Sept. 29, 1931. H. R. BRAND 1,825,141

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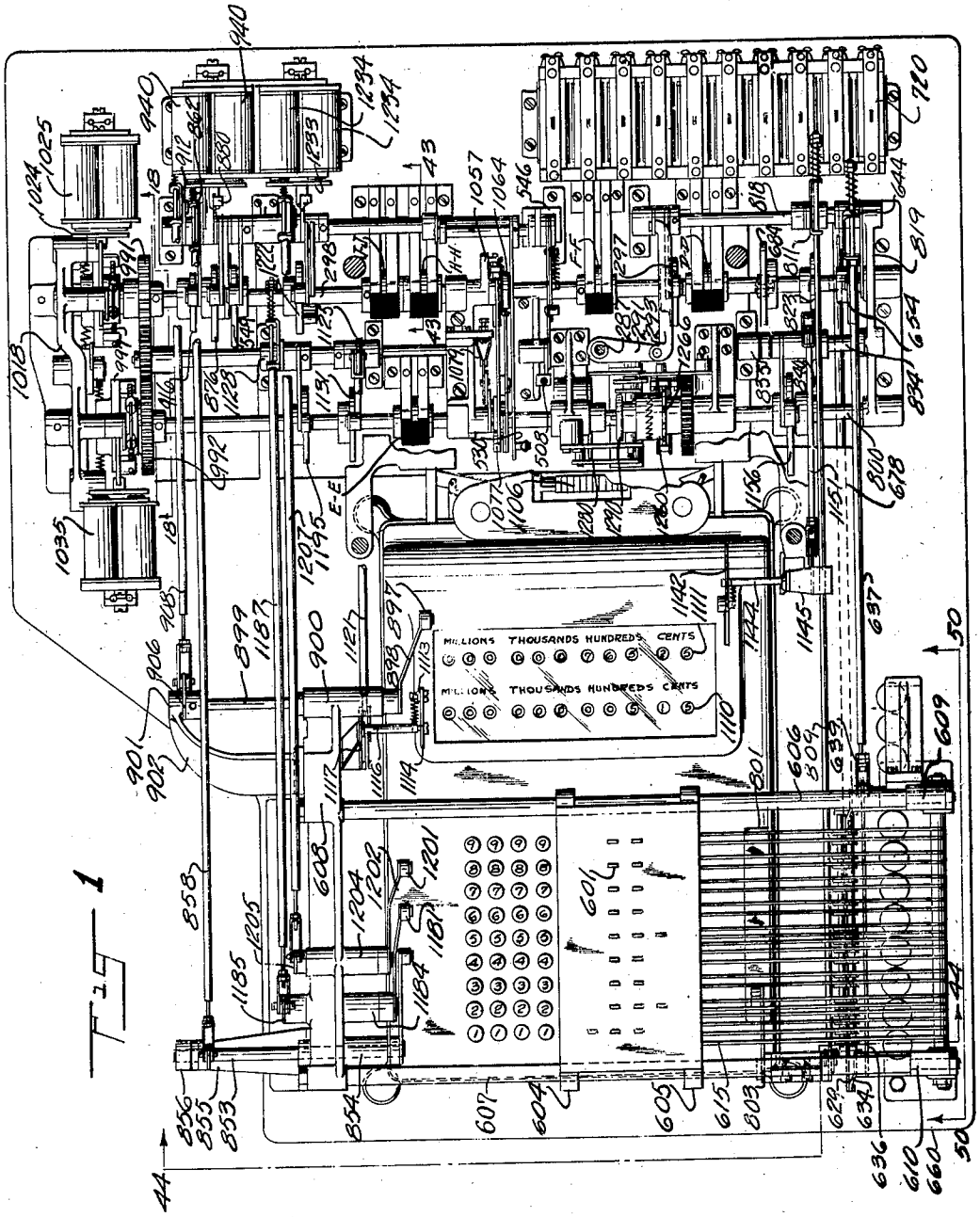


Fig. 1

INVENTOR
H. R. Brand
BY
John D Morgan
ATTORNEY

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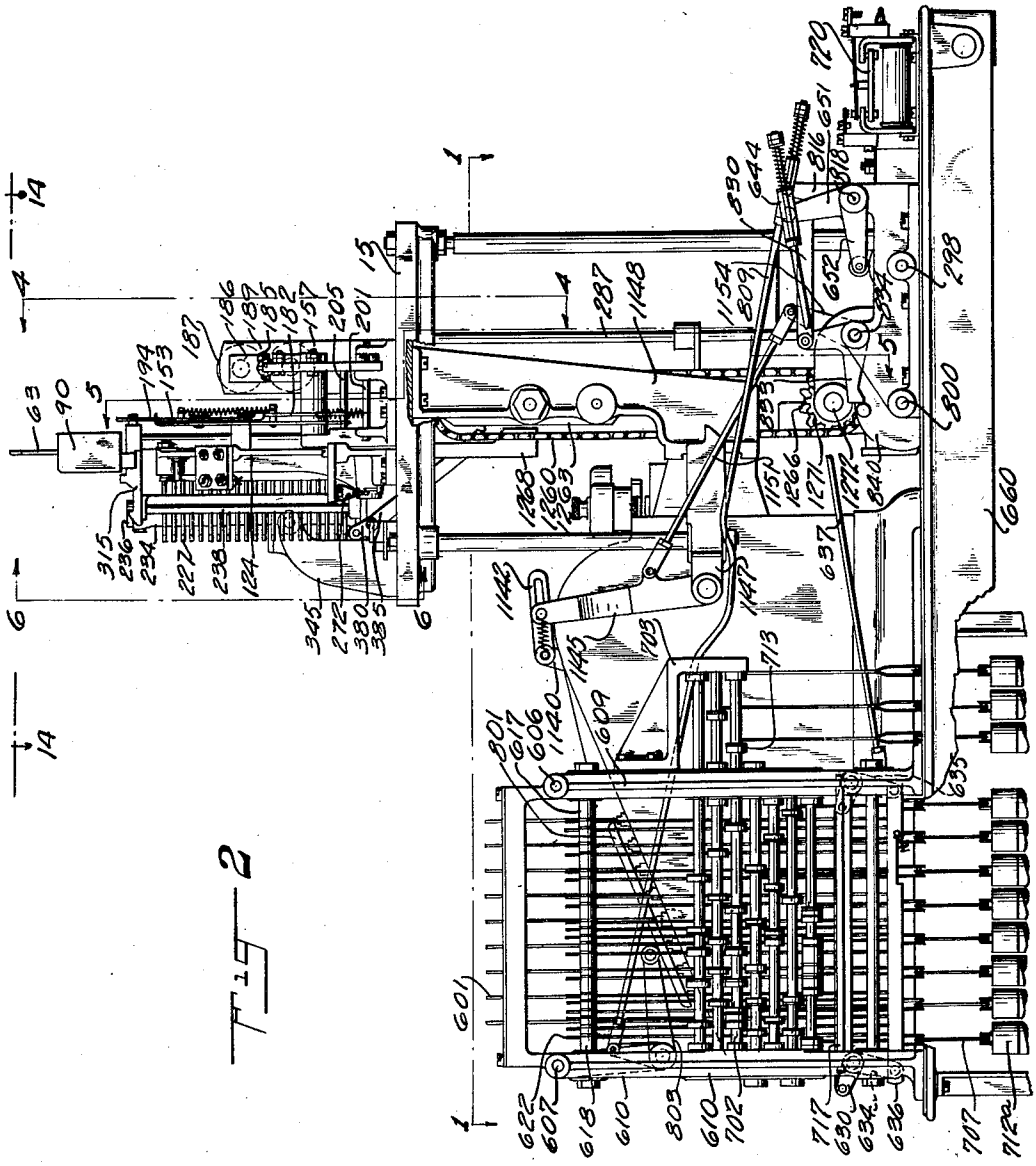


FIG. 2

INVENTOR
H. R. Brand
BY
John D. Morgan
ATTORNEY

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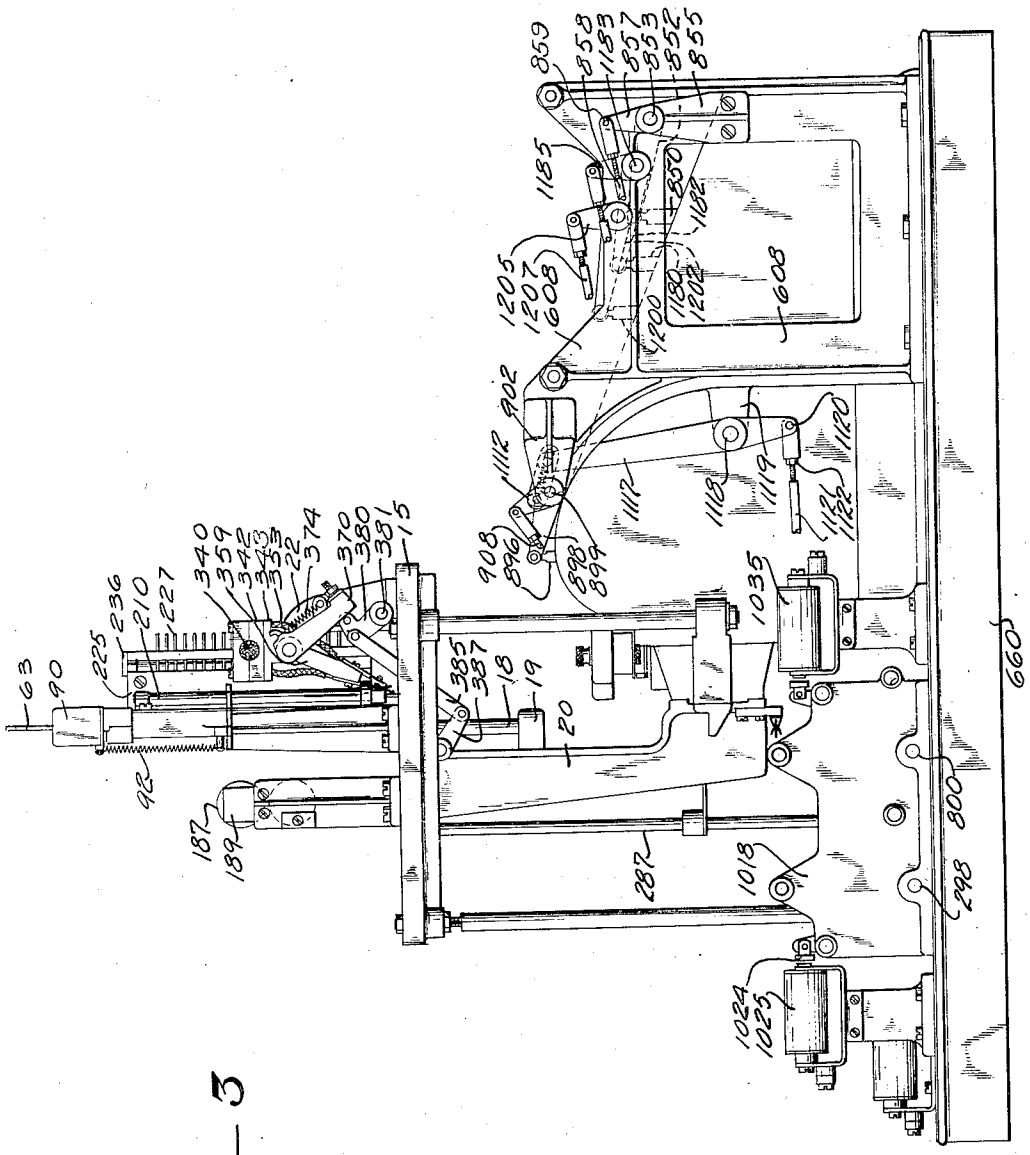


FIG. 3

INVENTOR
H. R. Brand
BY
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Fig 4

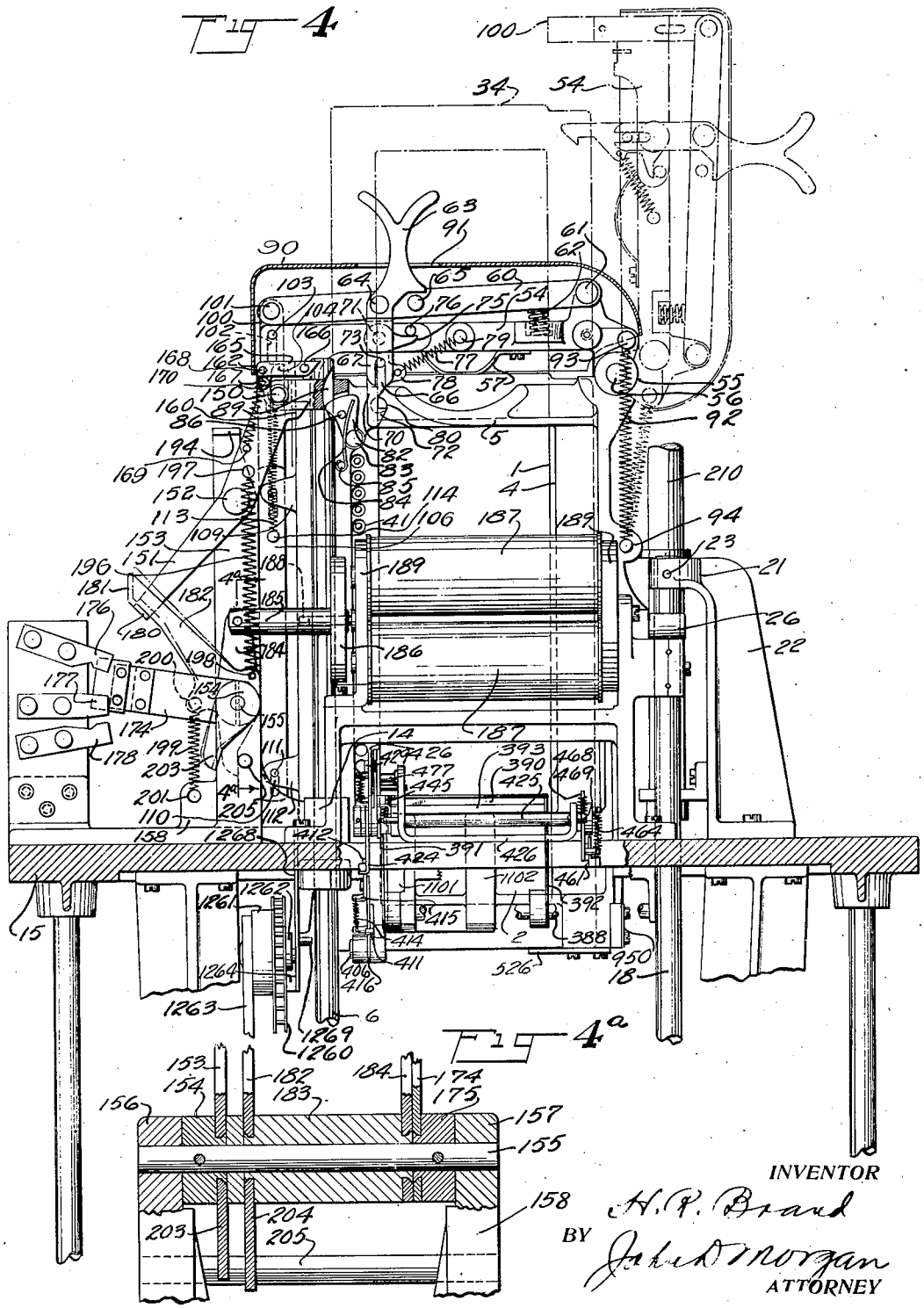


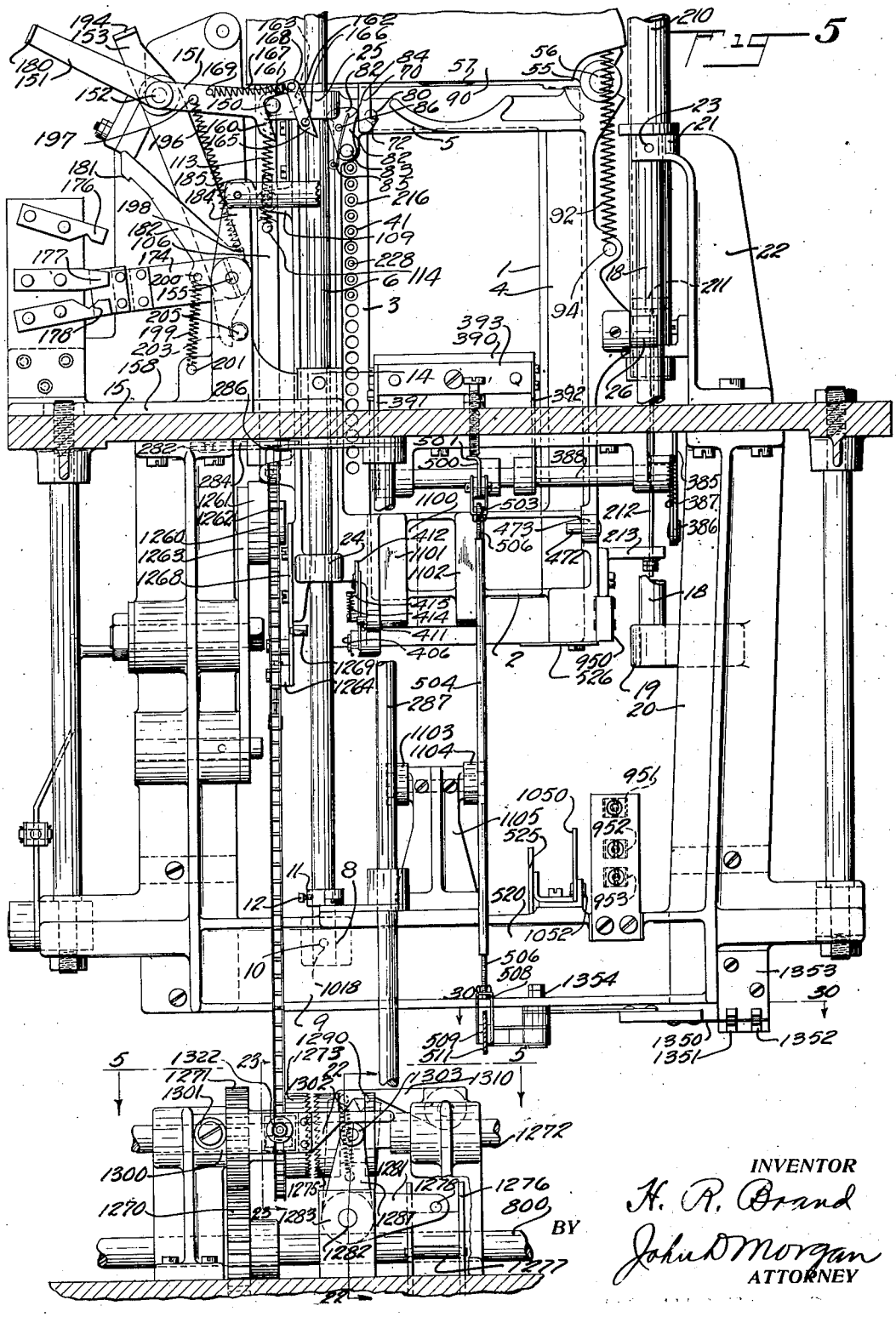
Fig 4a

INVENTOR
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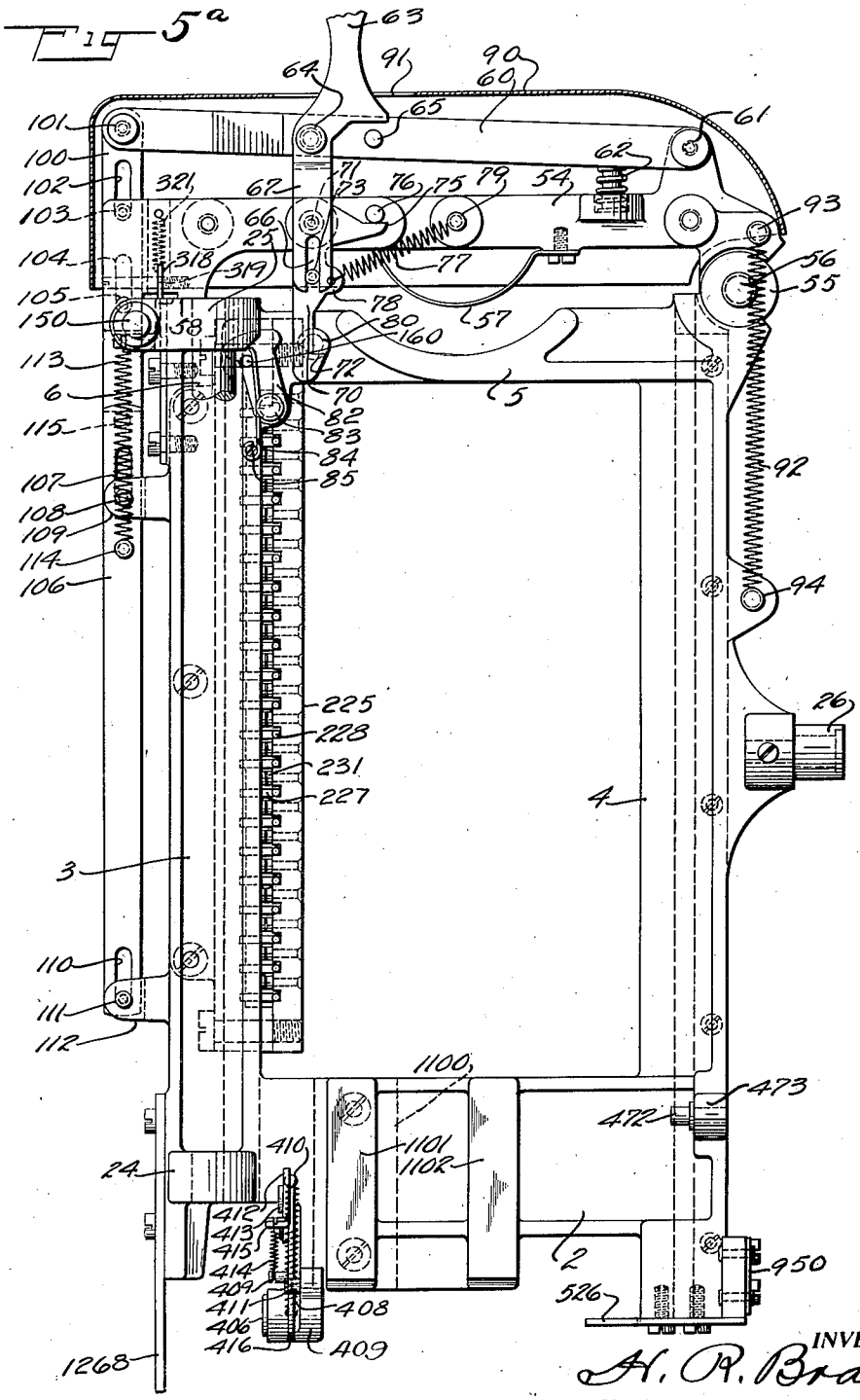
INVENTOR
H. R. Brand
BY
John D Morgan
ATTORNEY

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Fig 5a



INVENTOR
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Fig 5b

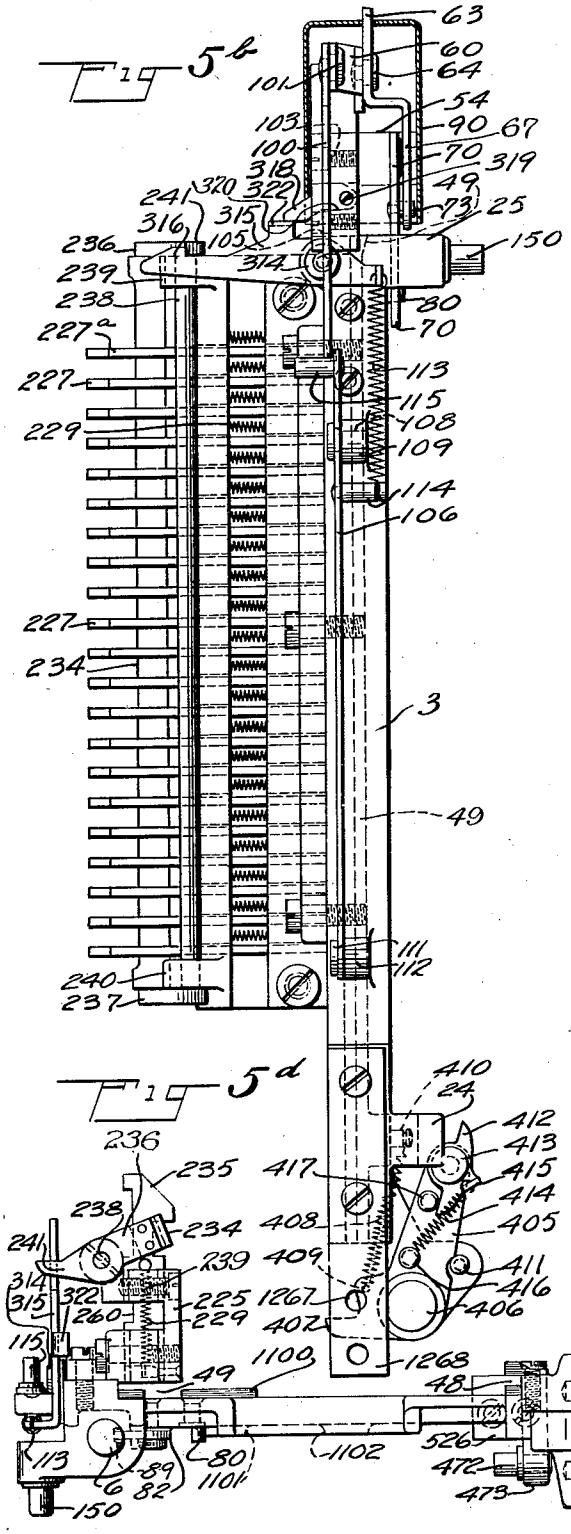


Fig 5c

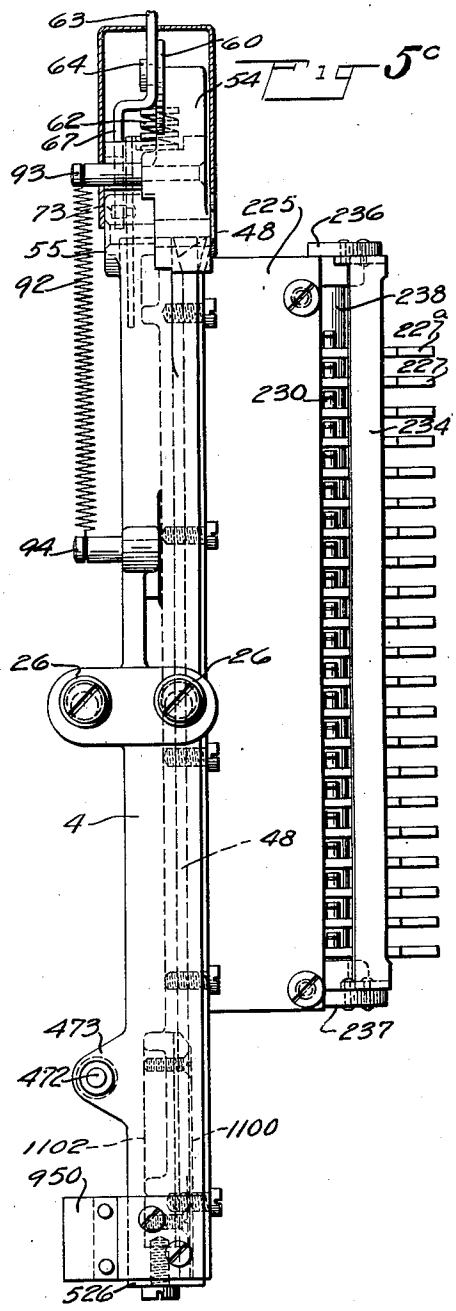


Fig 5d

INVENTOR
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Fig 6

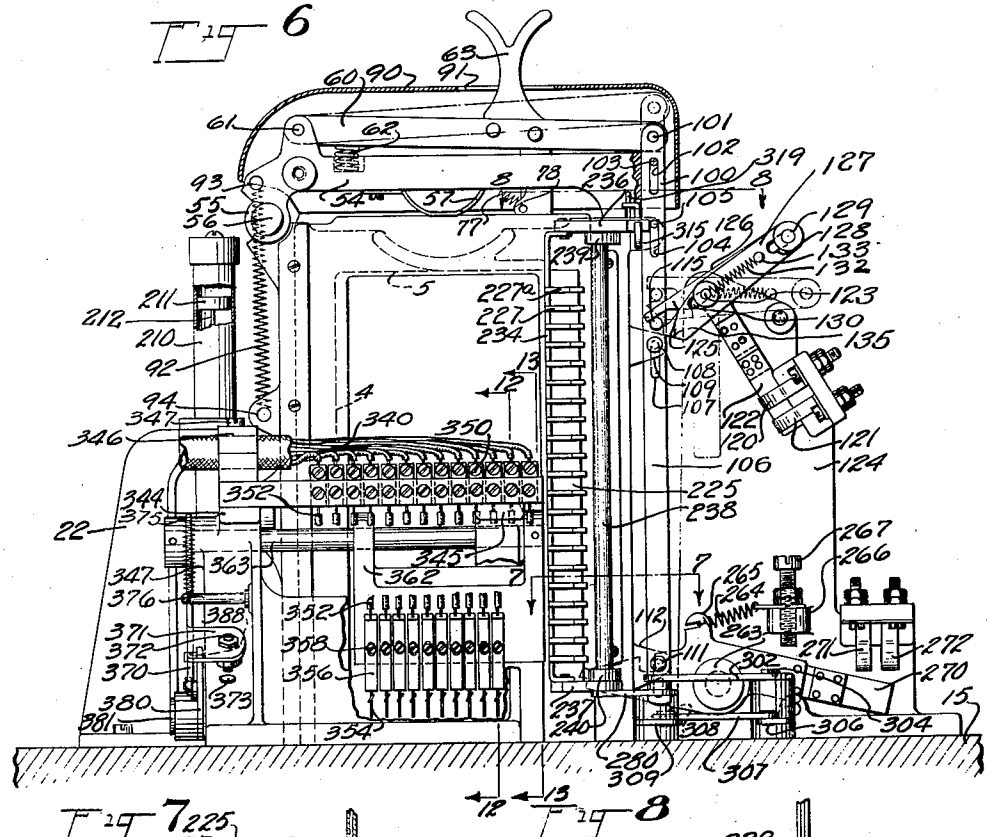


Fig 7

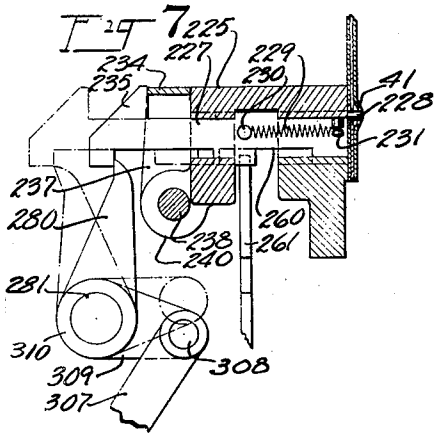
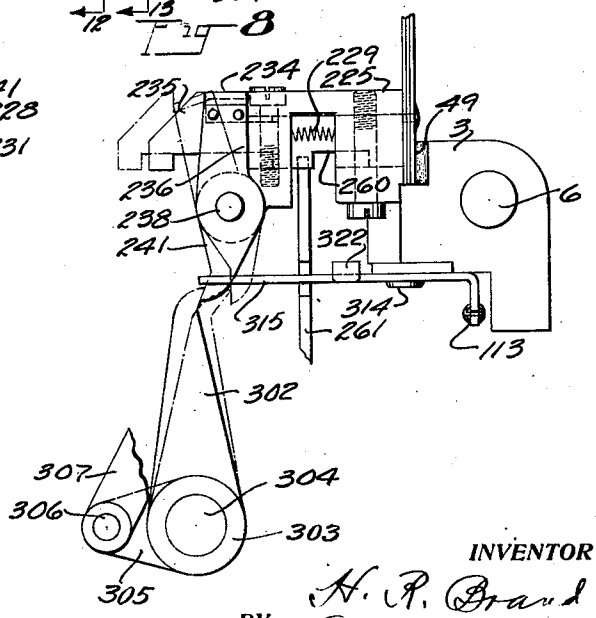


Fig 8



INVENTOR

H. R. Brand

BY

John D Morgan

ATTORNEY

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Fig 9

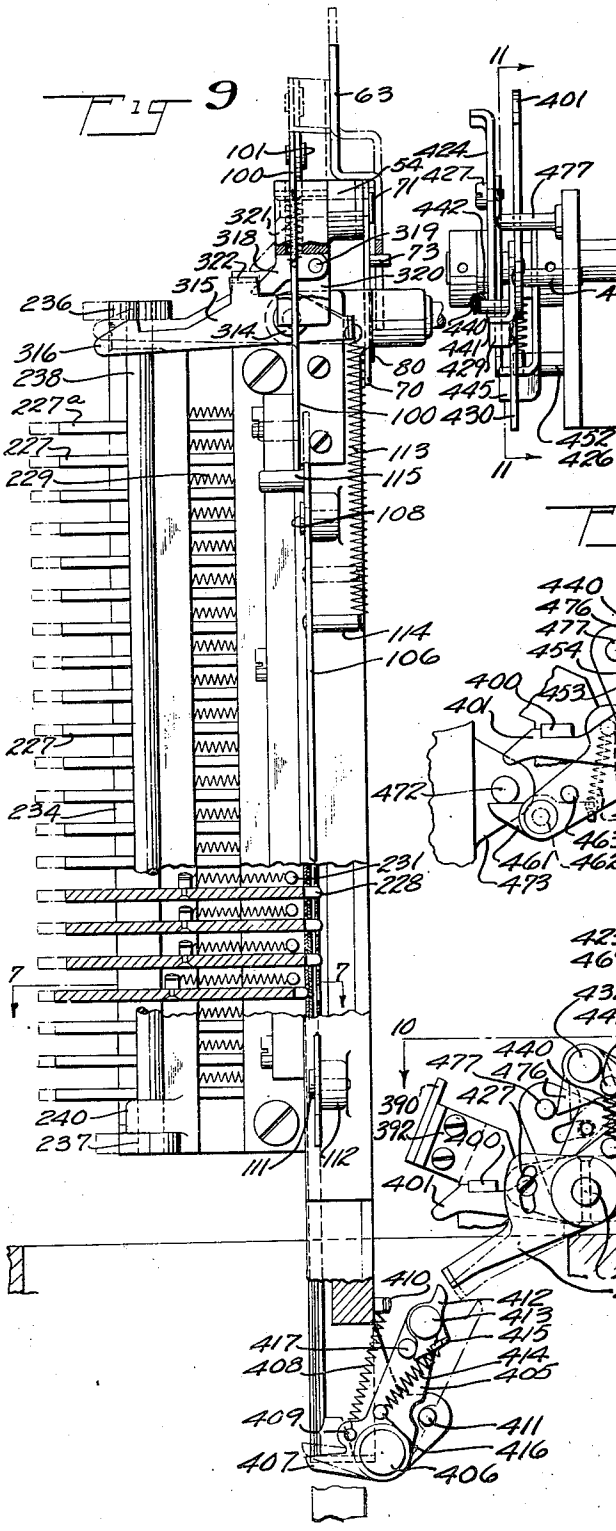


Fig 10

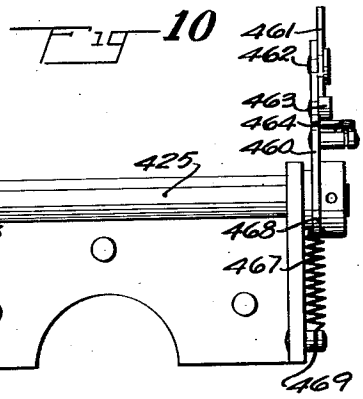


Fig 11

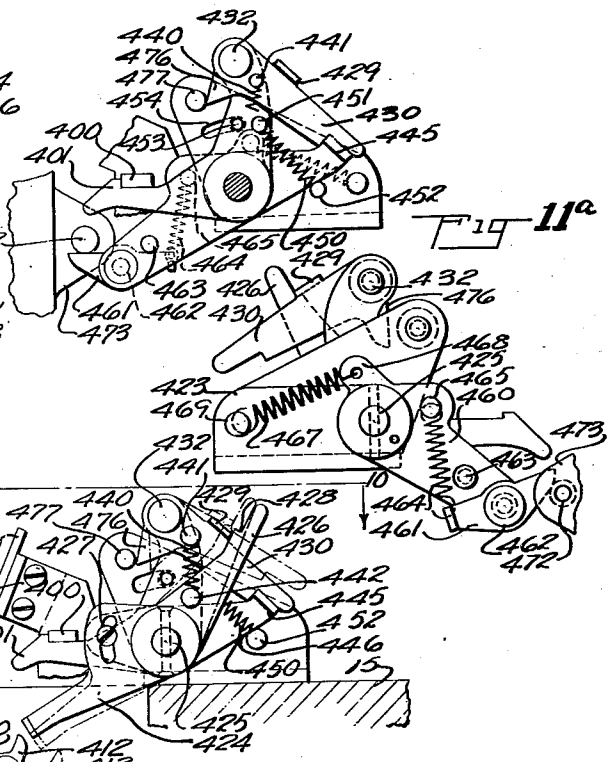


Fig 11a

INVENTOR

H. R. Brand

BY

John D. Morgan

ATTORNEY

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Fig 12

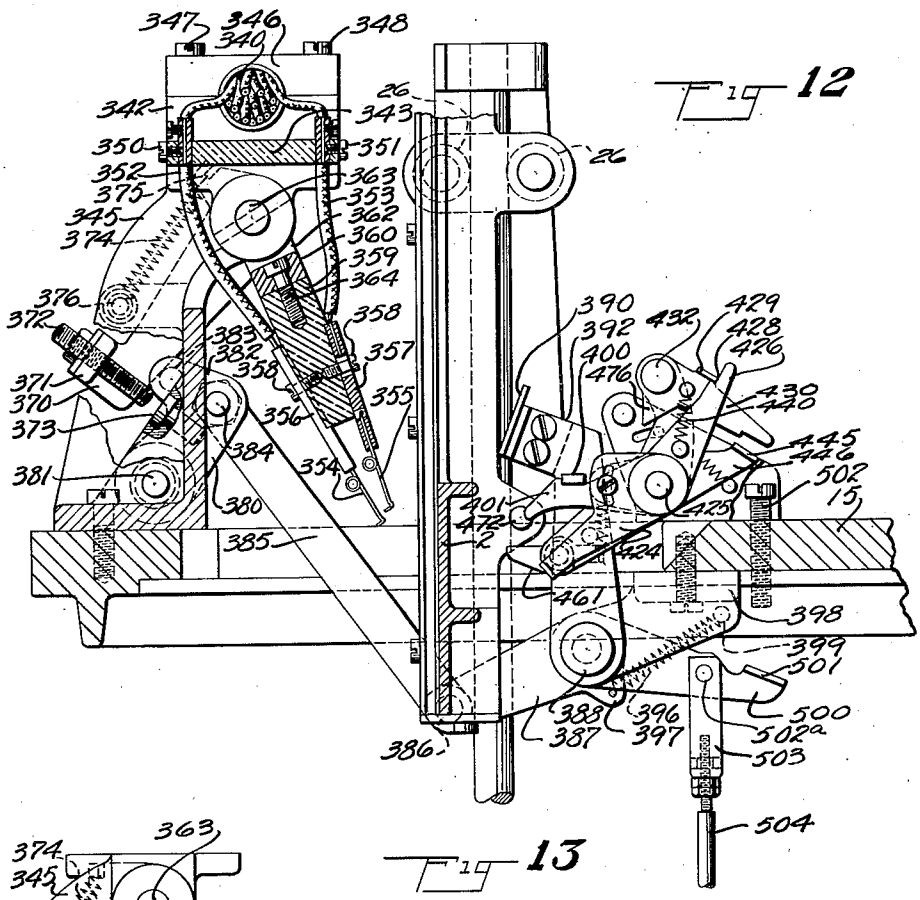
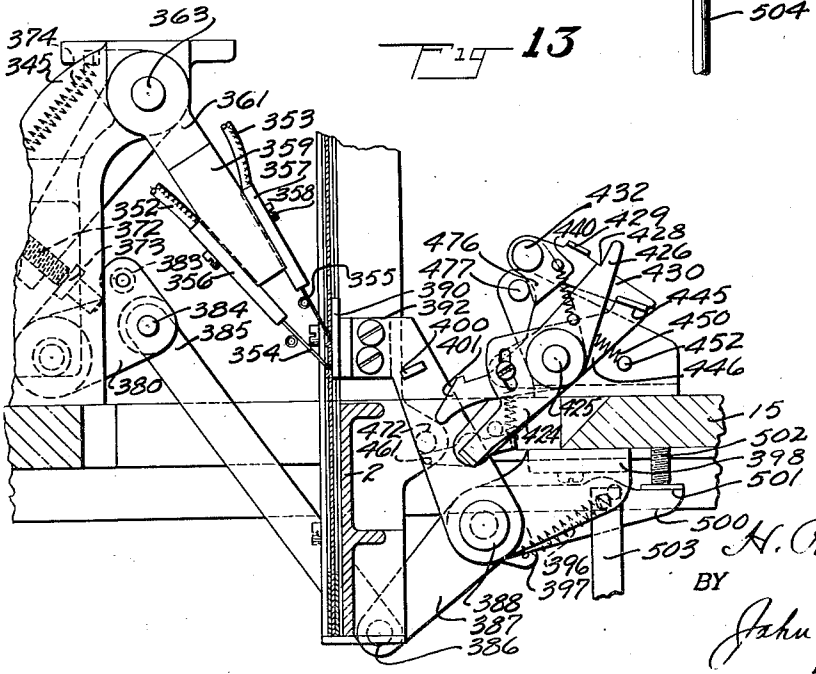


Fig 13



INVENTOR
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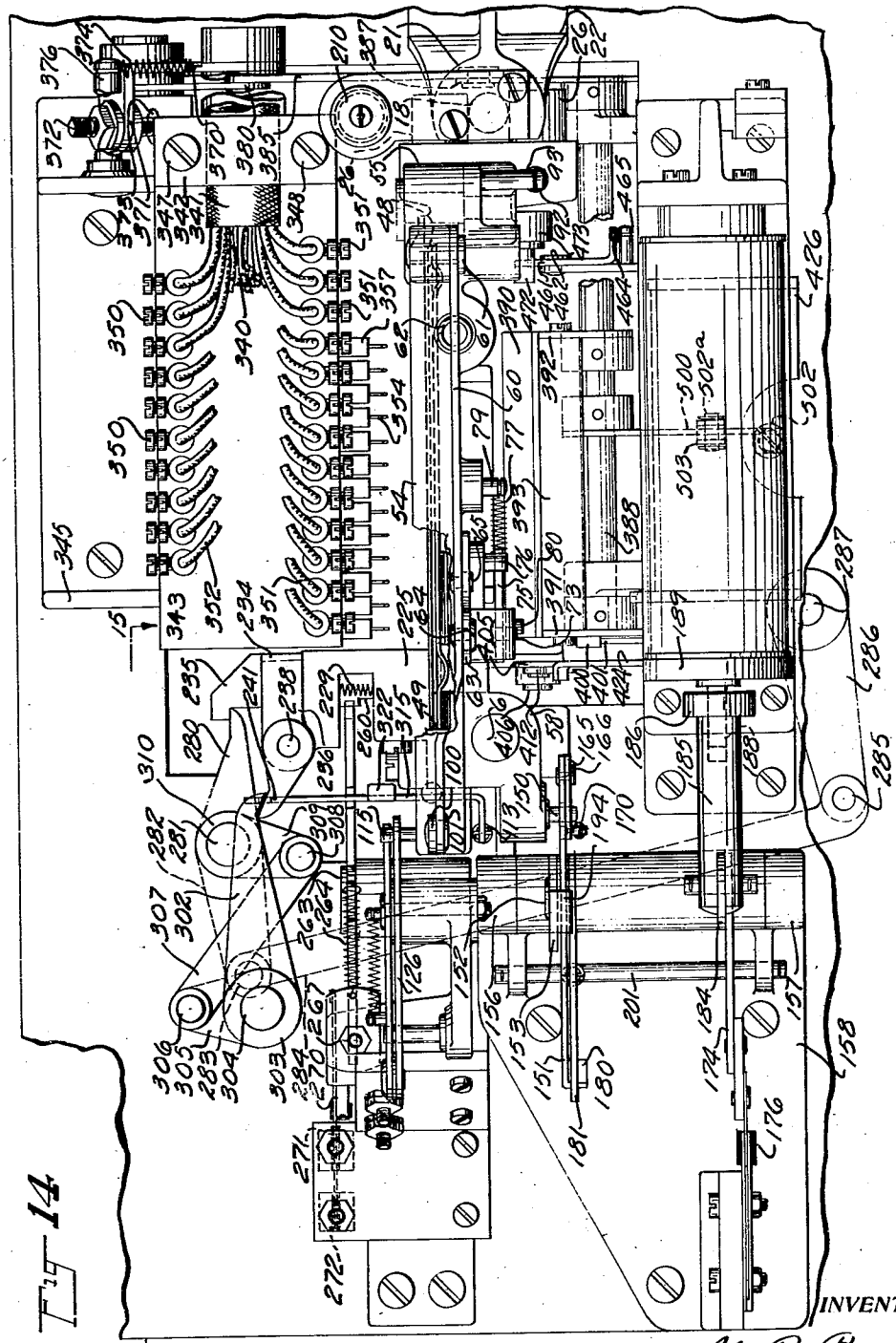


Fig. 14

INVENTOR
H. R. Brand
BY
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Fig 15

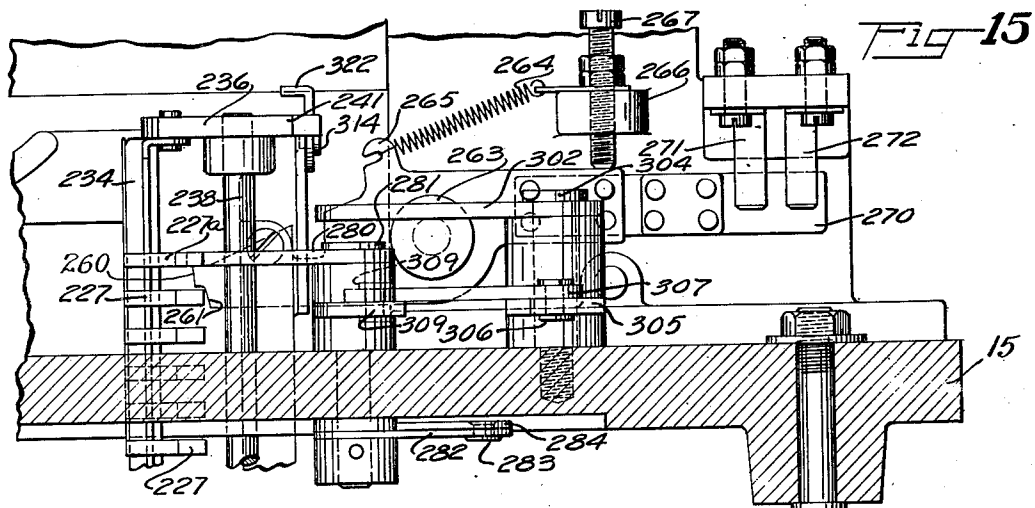
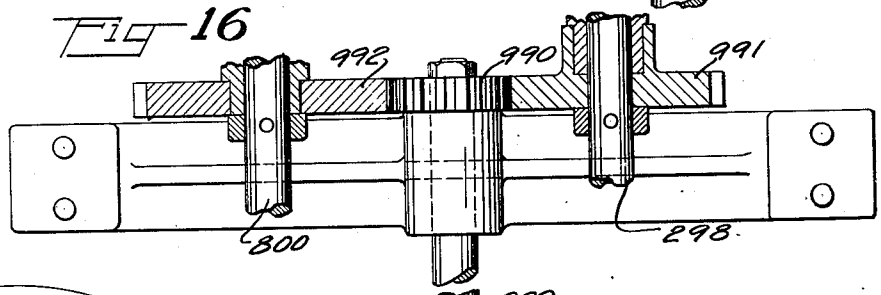
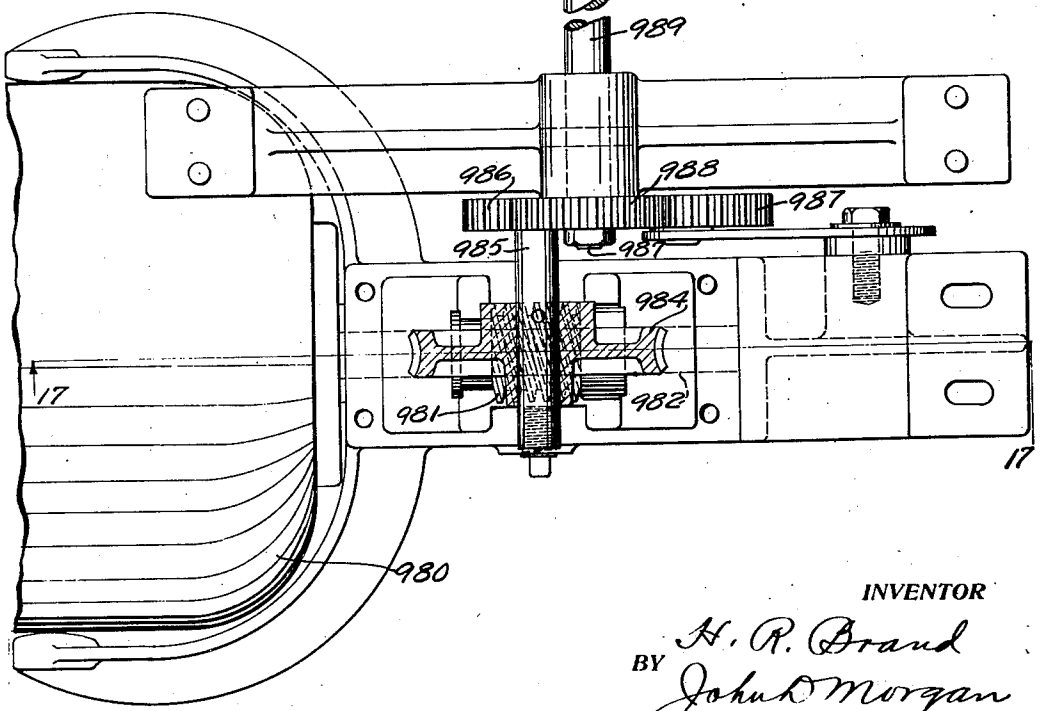


Fig 16





INVENTOR

H. R. Brand

BY John D Morgan

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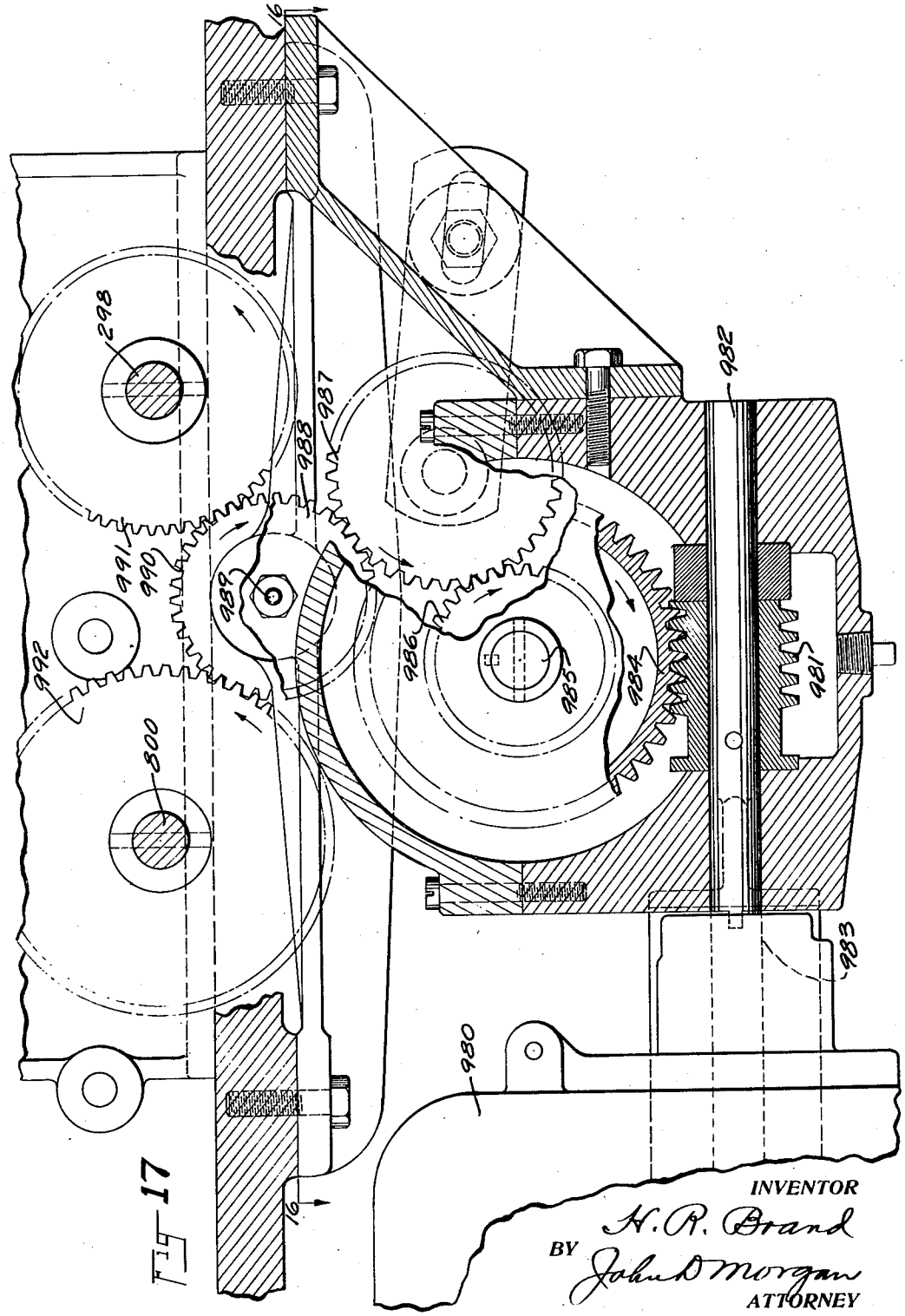


Fig. 17

INVENTOR
H. R. Brand
BY John D Morgan
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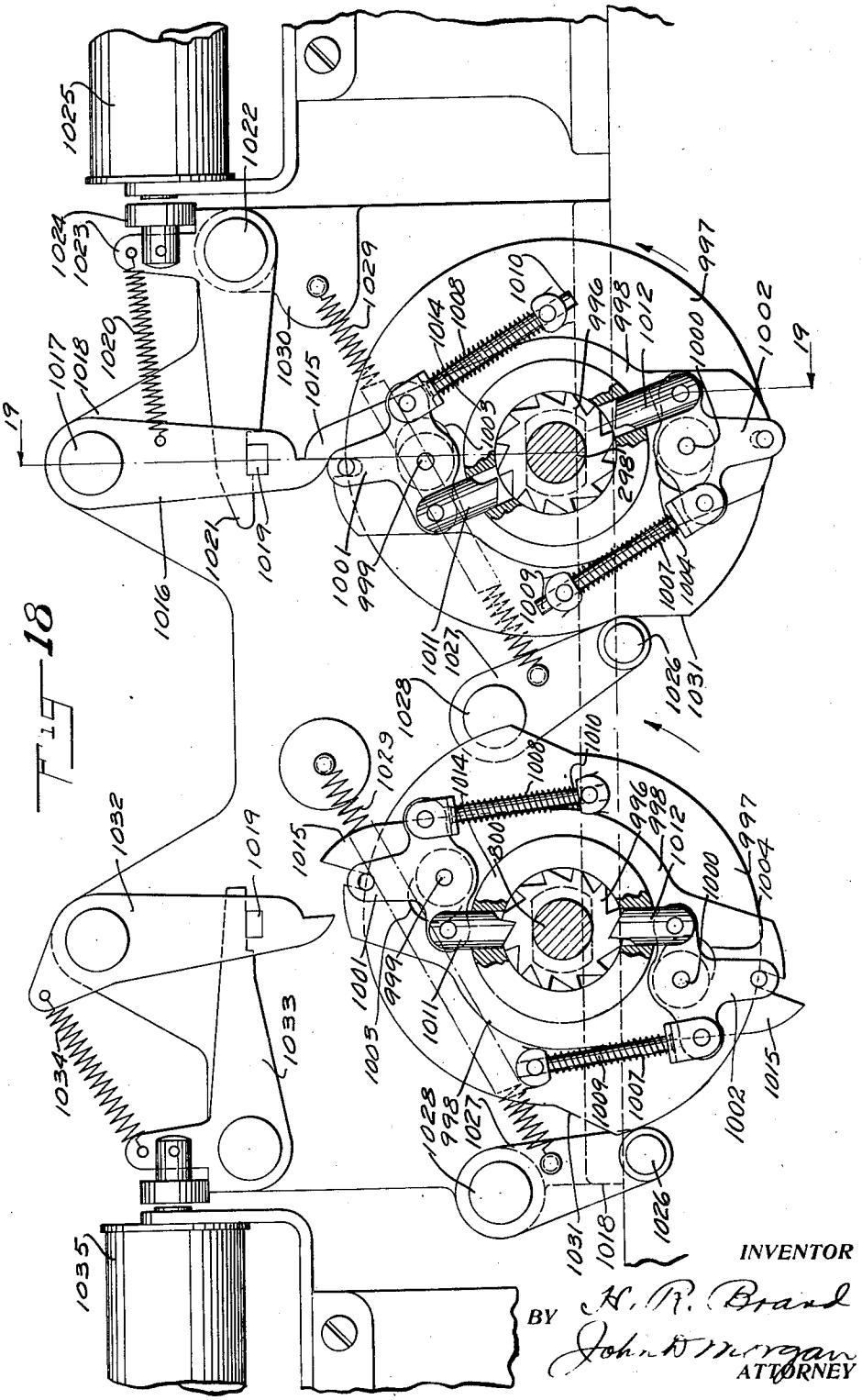


FIG. 18

INVENTOR

BY H. R. Brand

John W. Morgan

ATTORNEY

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Fig 19

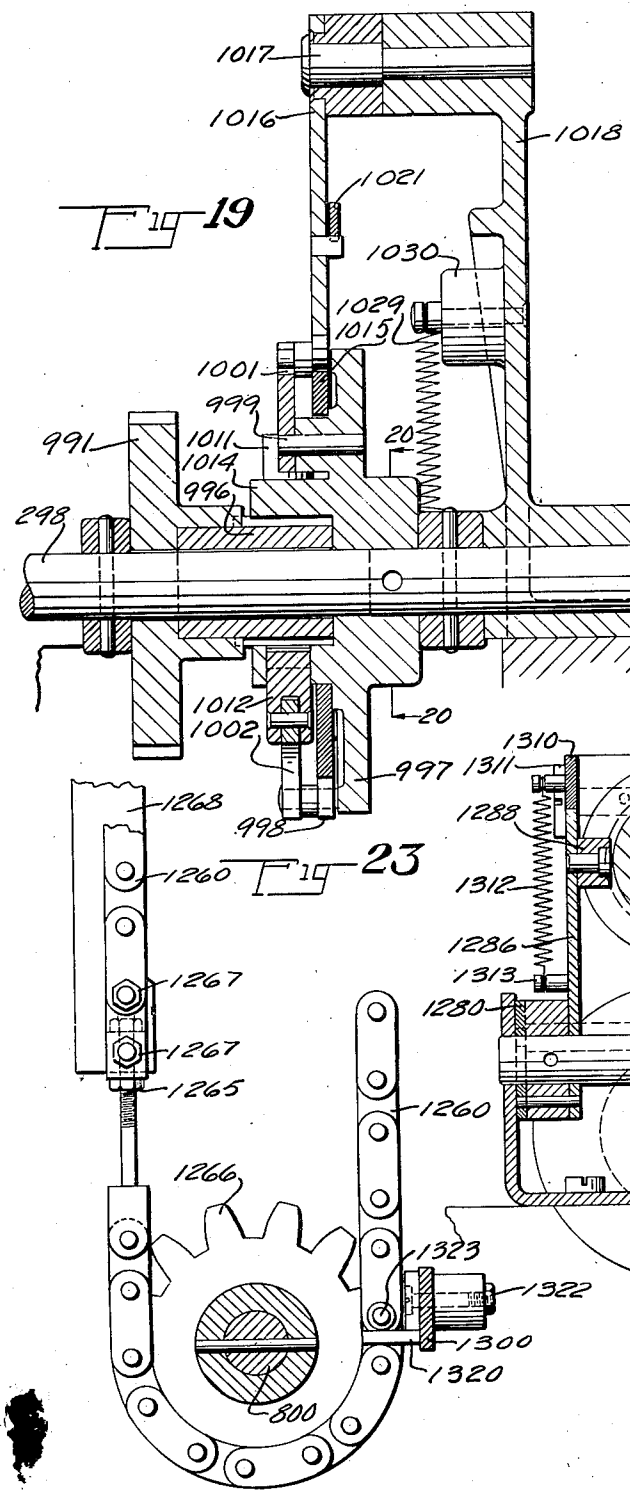


Fig 20

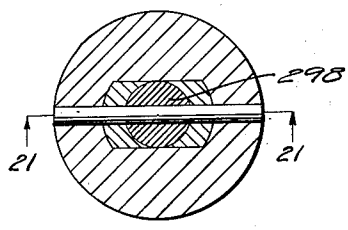


Fig 21

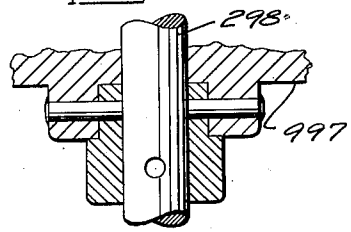


Fig 22

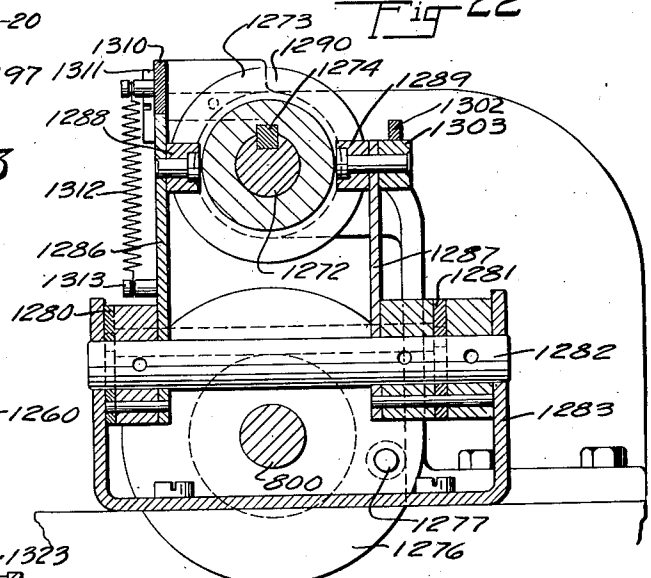


Fig 23

INVENTOR

H. R. Brand

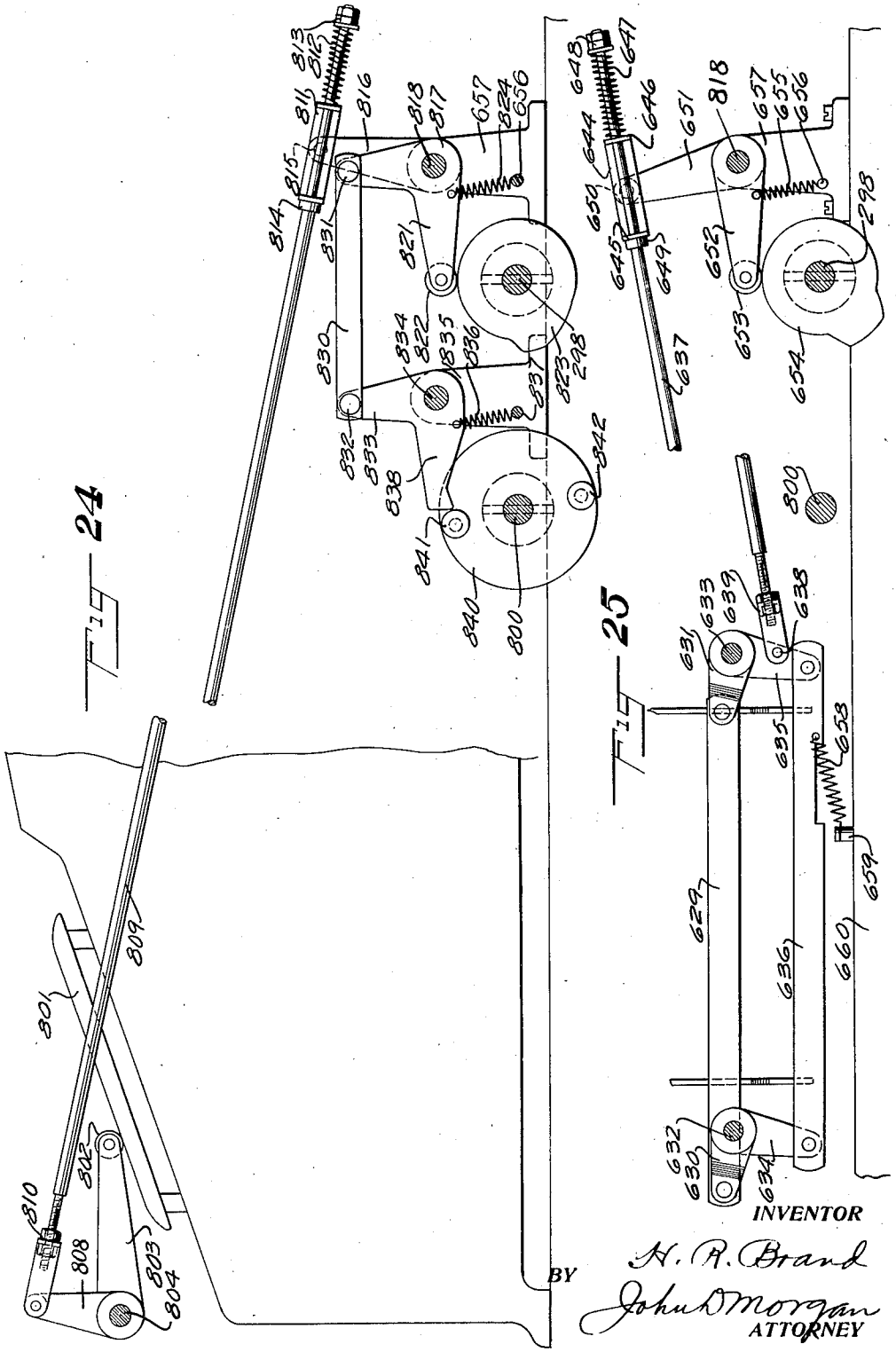
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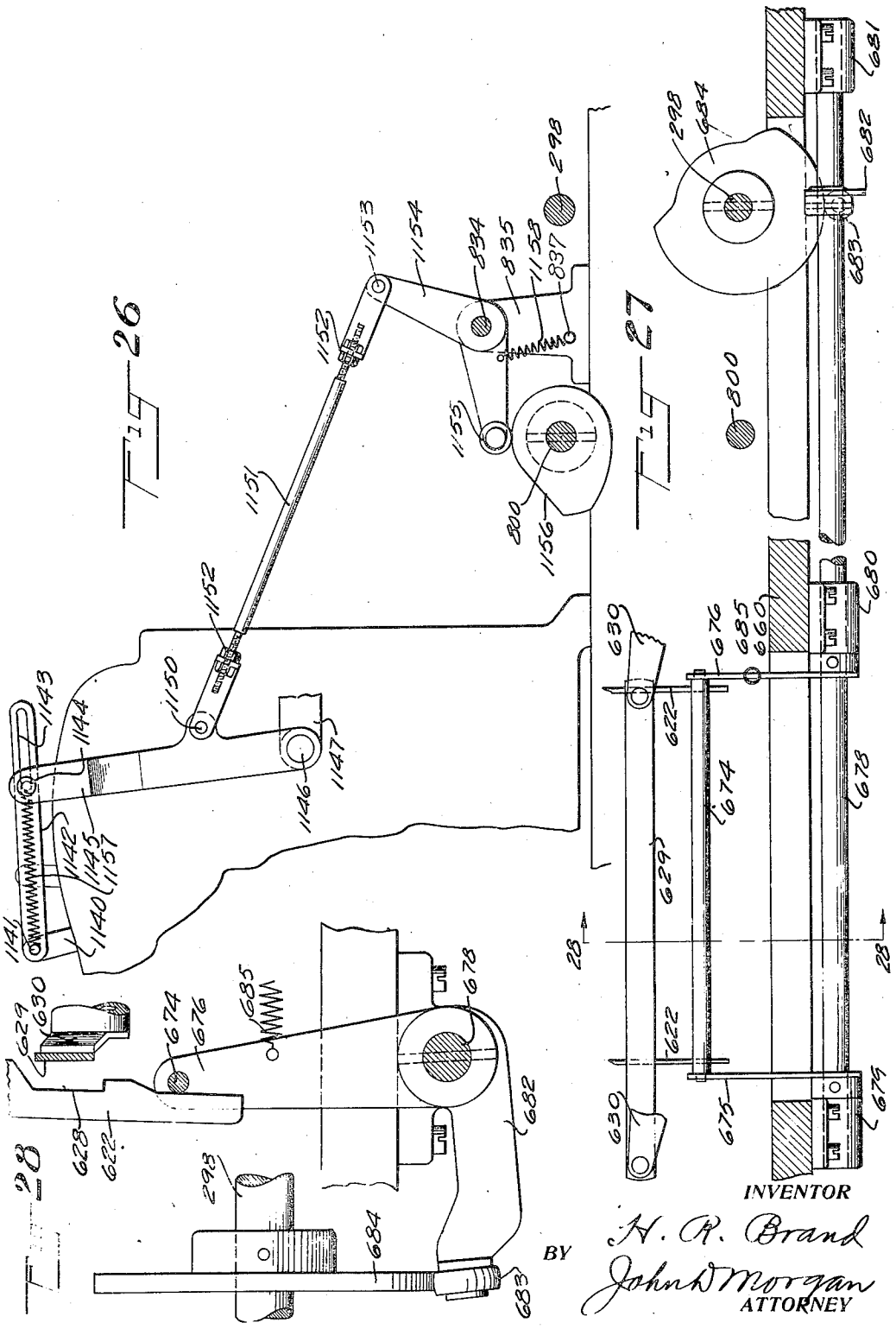


INVENTOR
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Fig. 29

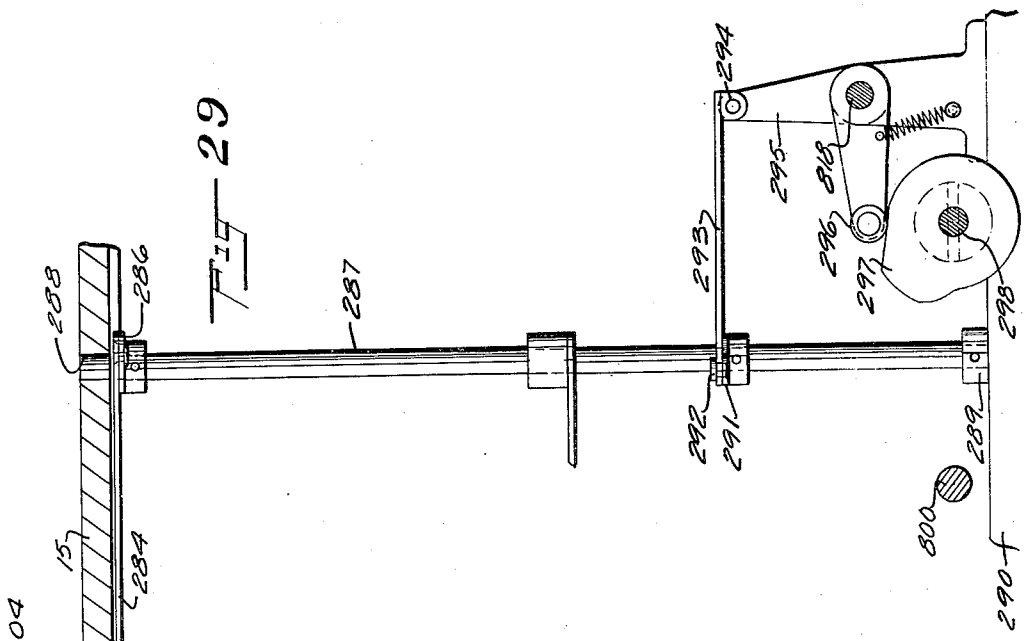


Fig. 30

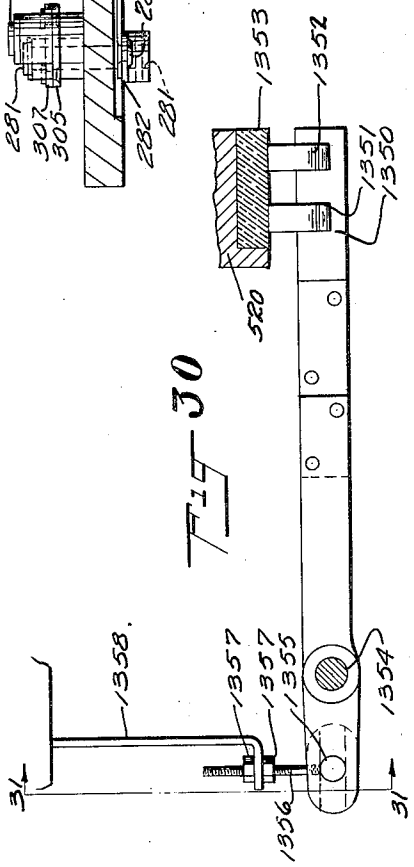
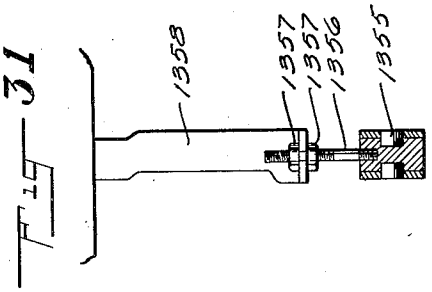


Fig. 31



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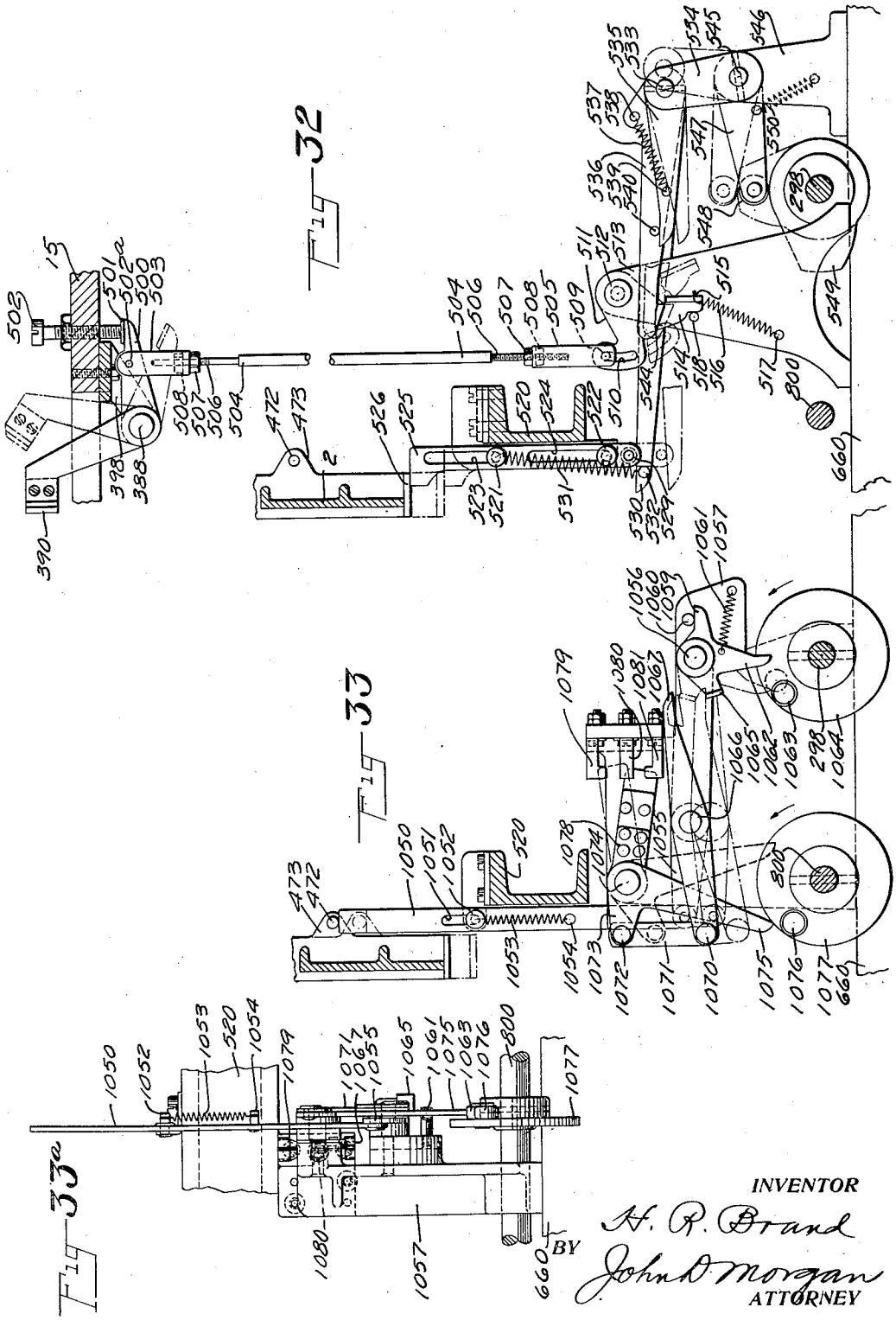


Fig 32

Fig 33

Fig 33a

INVENTOR
H. R. Brand
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John D Morgan
ATTORNEY

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COMPUTING AND RECORDING MECHANISM

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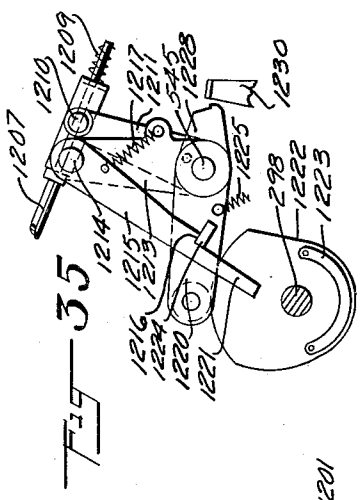


Fig. 35

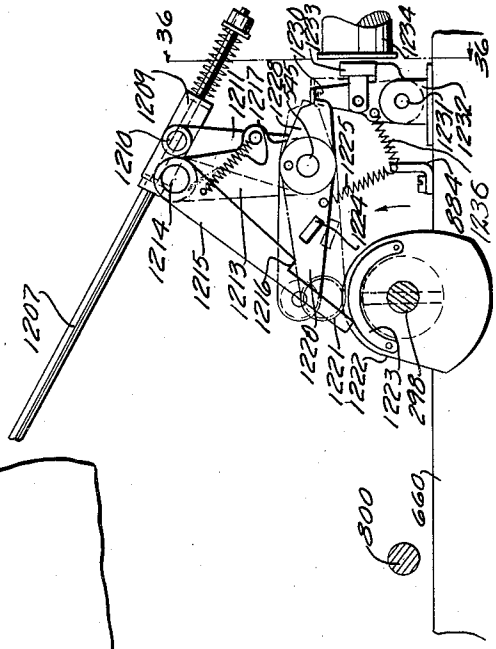
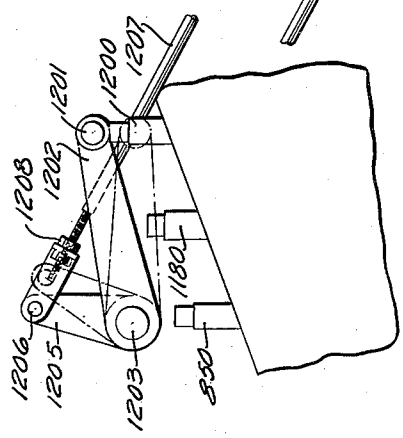


Fig. 34



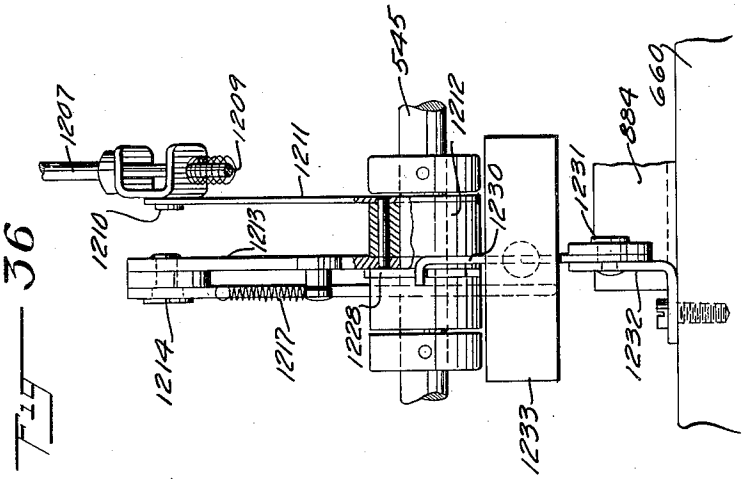


Fig. 36

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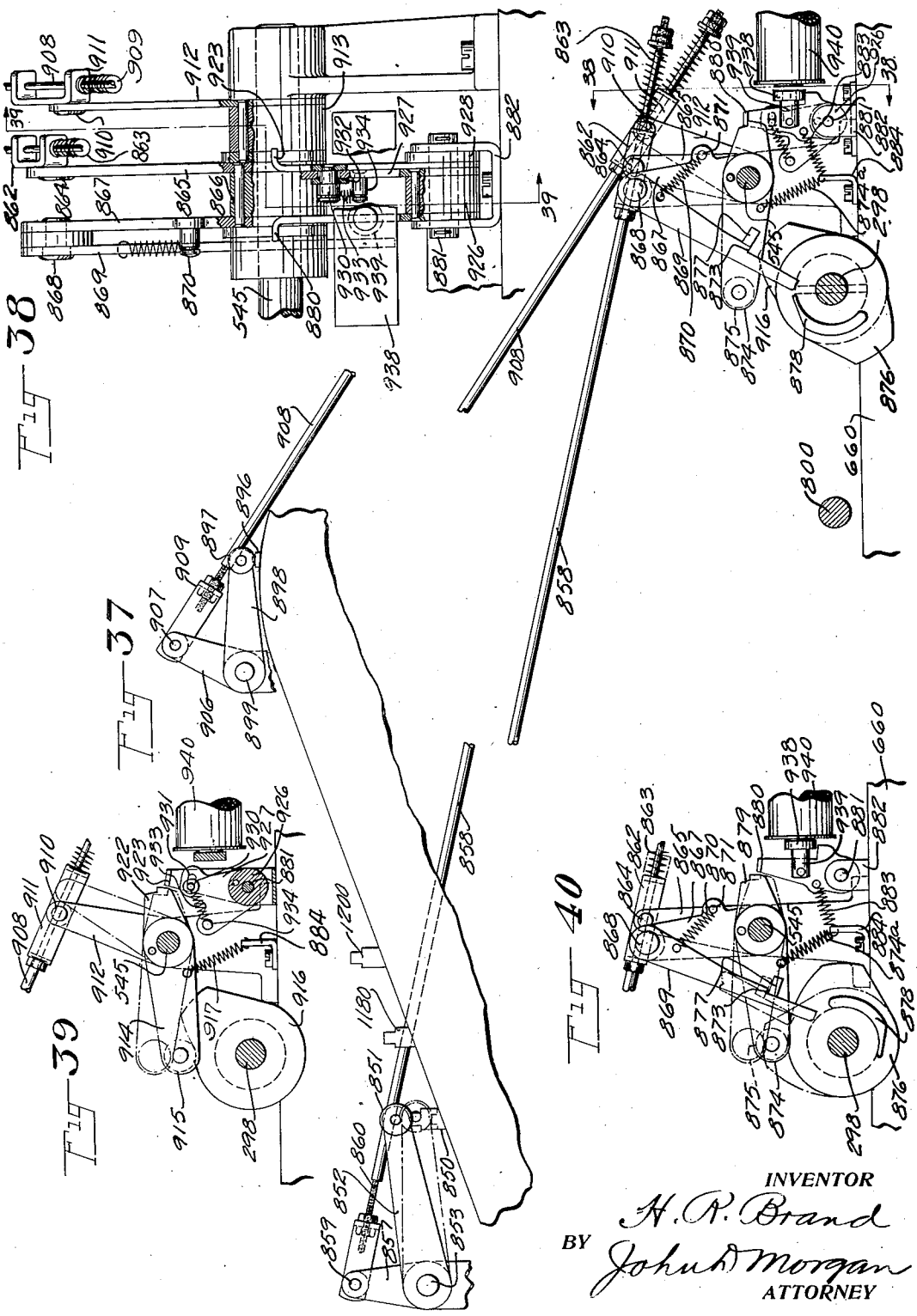


Fig. 38

Fig. 37

Fig. 39

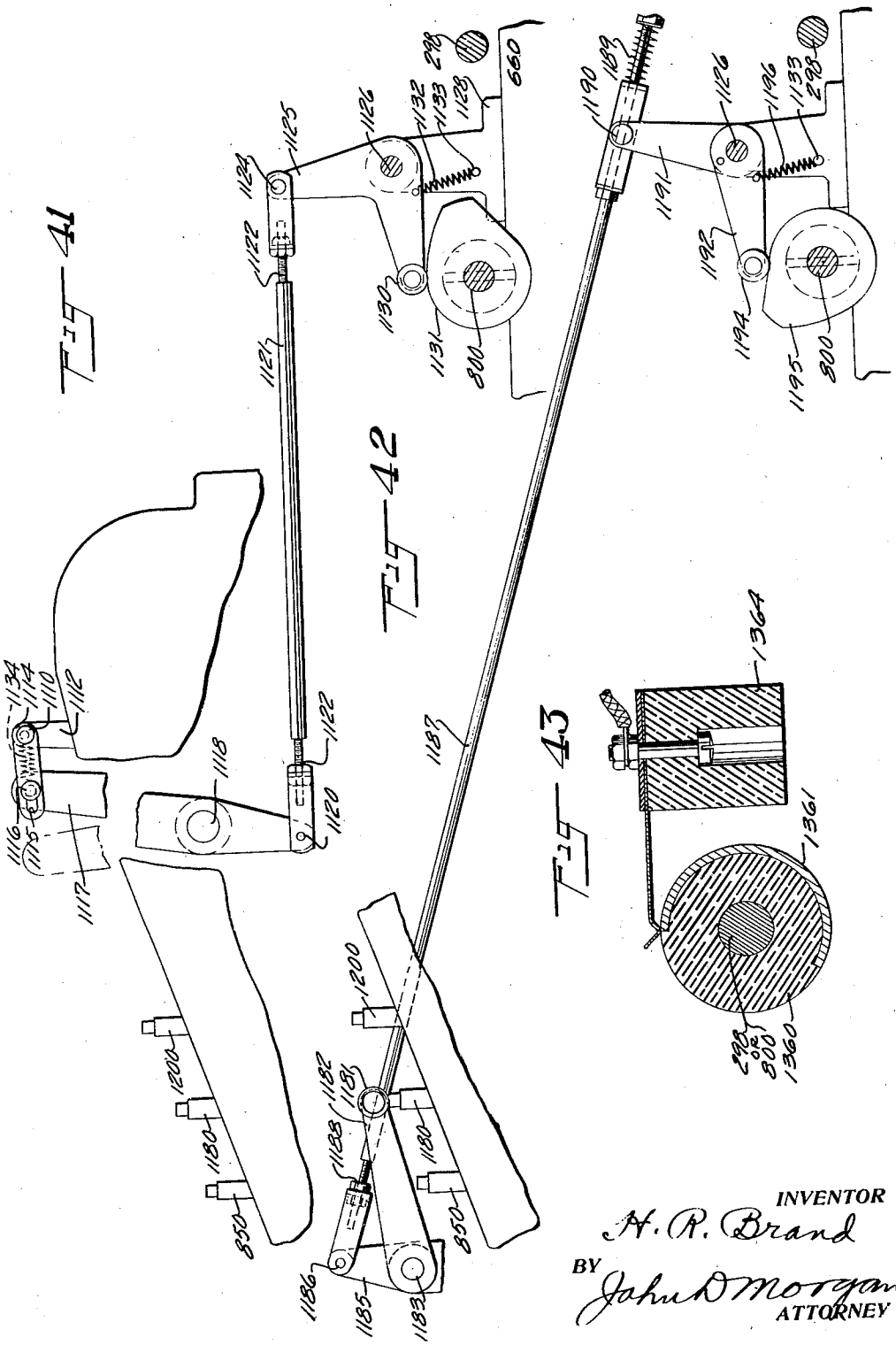
Fig. 40

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Fig 44

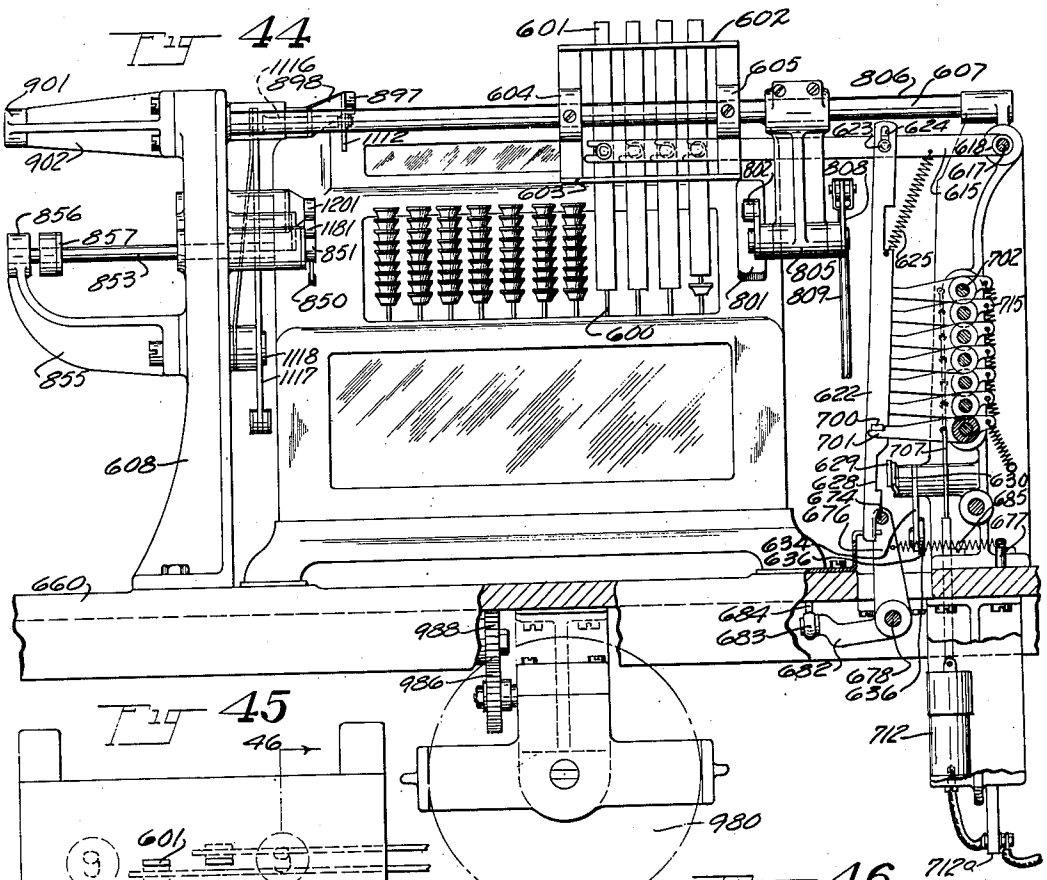


Fig 45

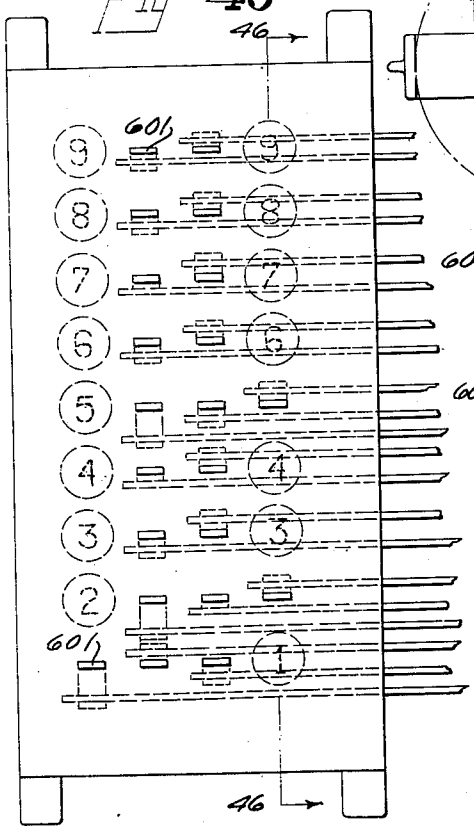
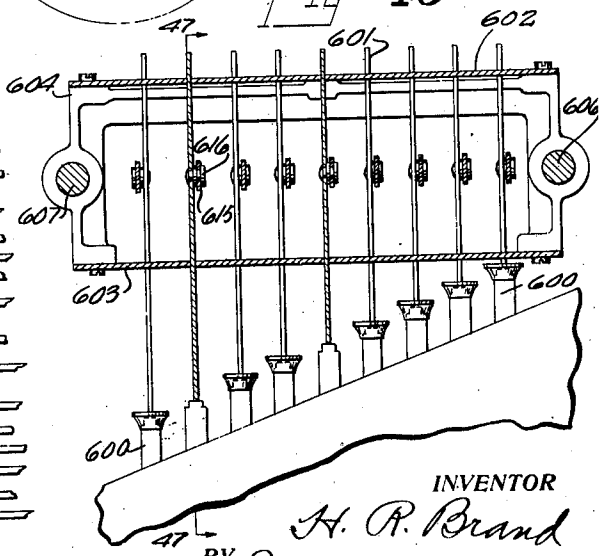


Fig 46



INVENTOR
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John D Morgan
ATTORNEY

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Fig 47

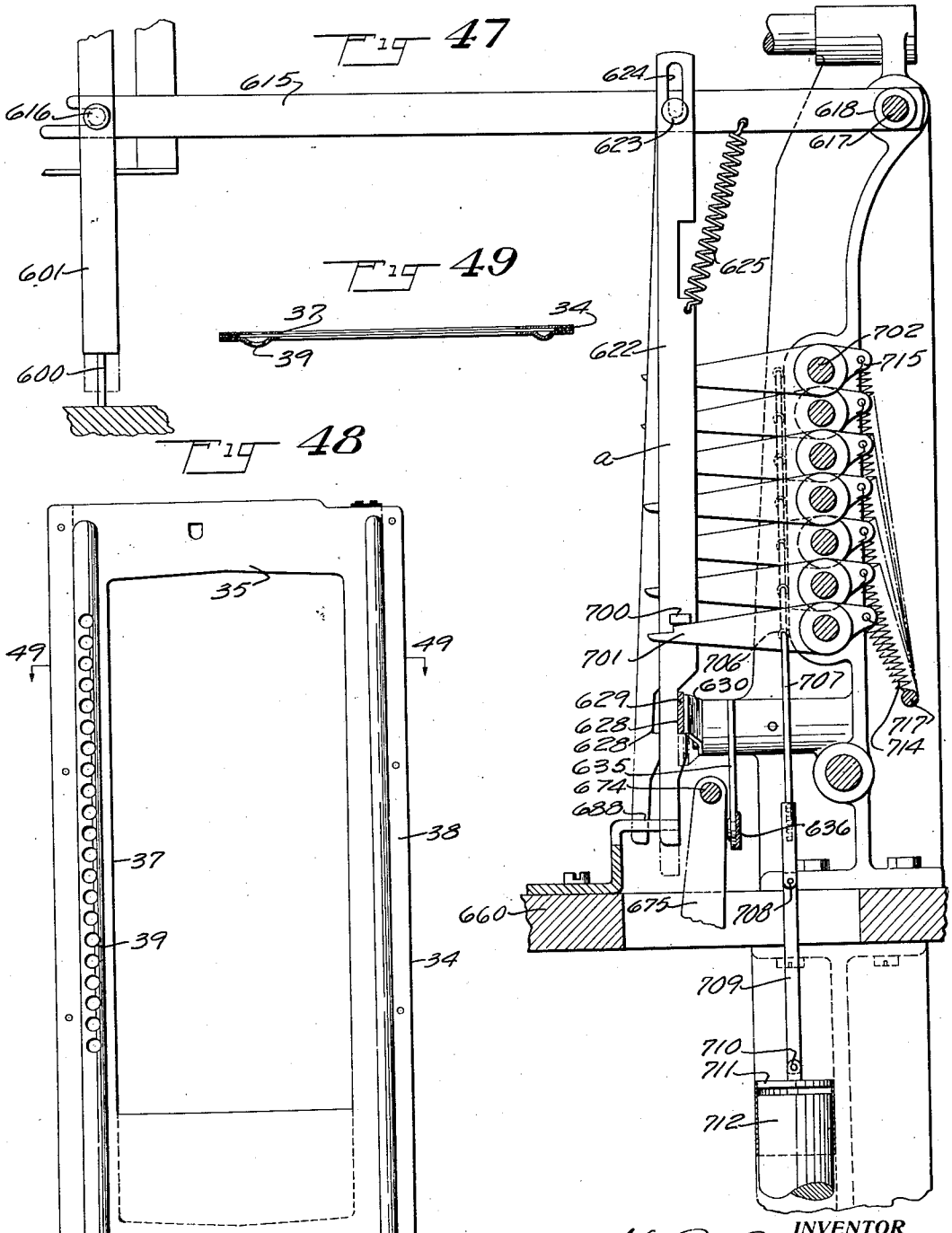


Fig 49

Fig 48

INVENTOR

H. R. Brand

BY

John D Morgan

ATTORNEY

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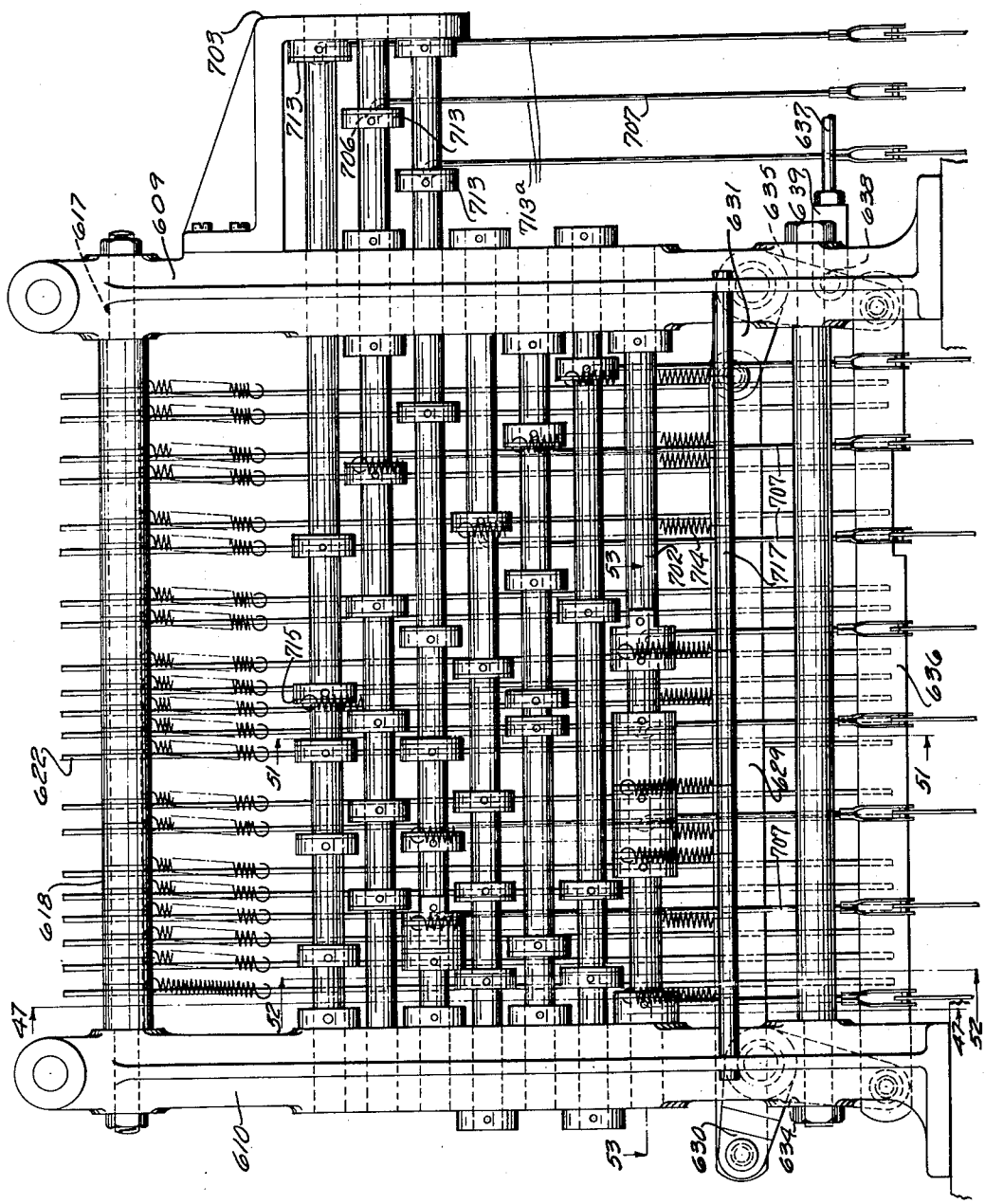


FIG. 50

INVENTOR

H. R. Brand

BY John D. Morgan

ATTORNEY

Sept. 29, 1931. H. R. BRAND 1,825,141

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Fig 52

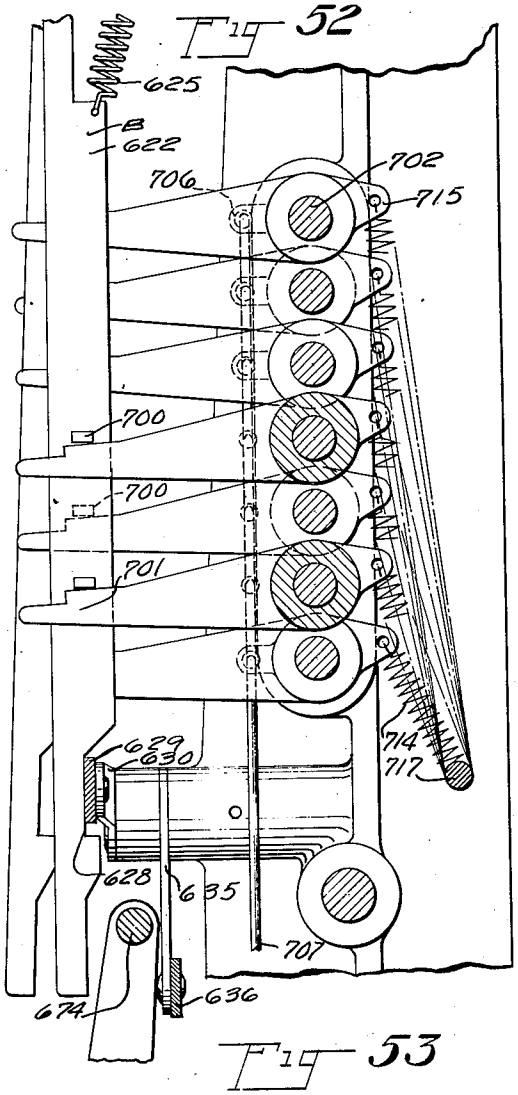


Fig 51

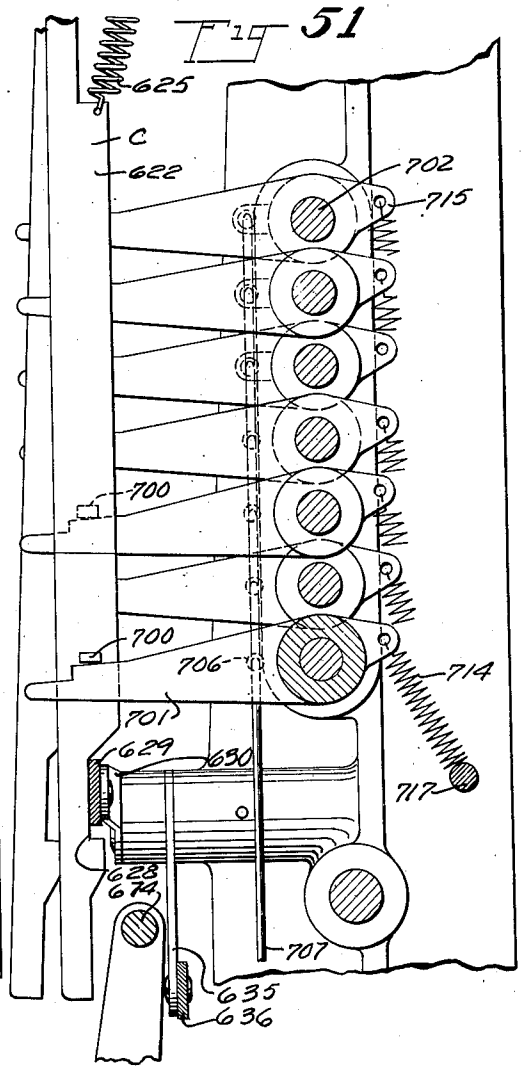
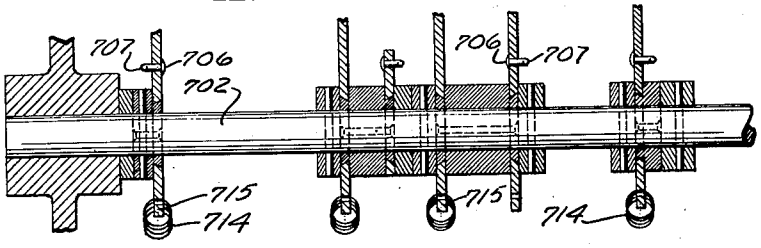


Fig 53



H. R. Brand INVENTOR

BY John D. Morgan ATTORNEY

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Fig 54

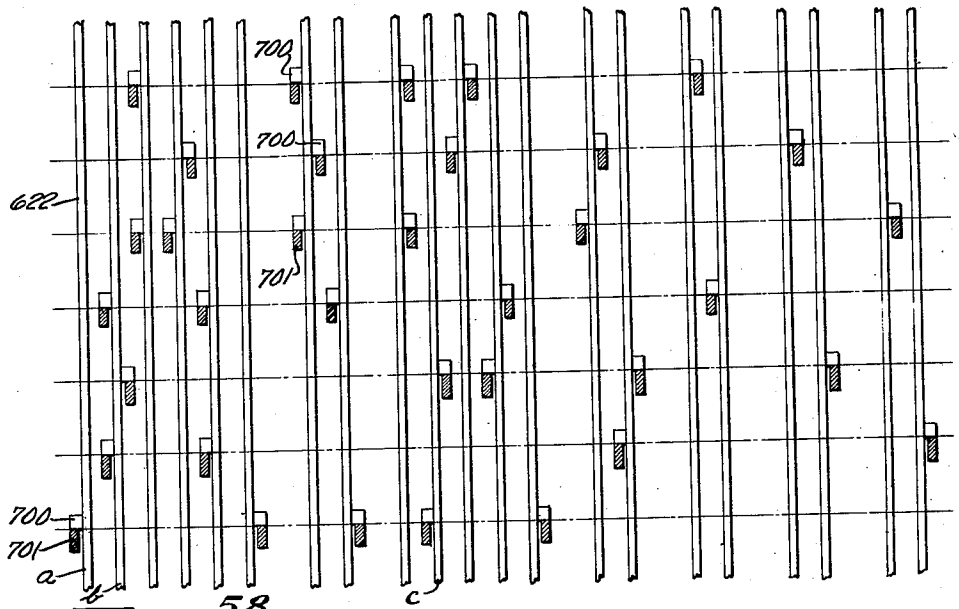
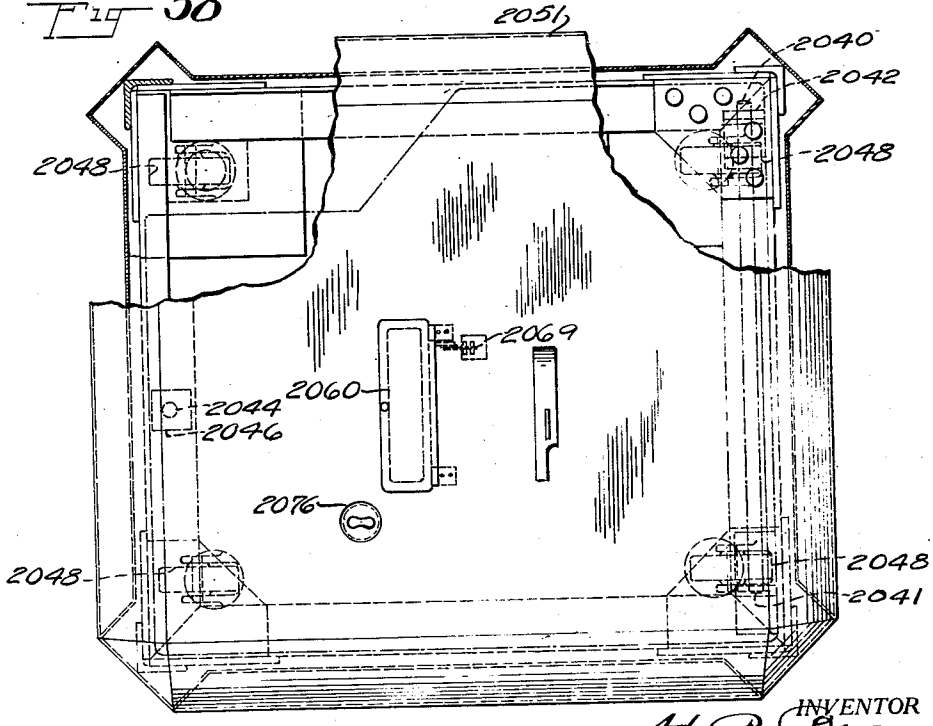


Fig 58



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Fig 55

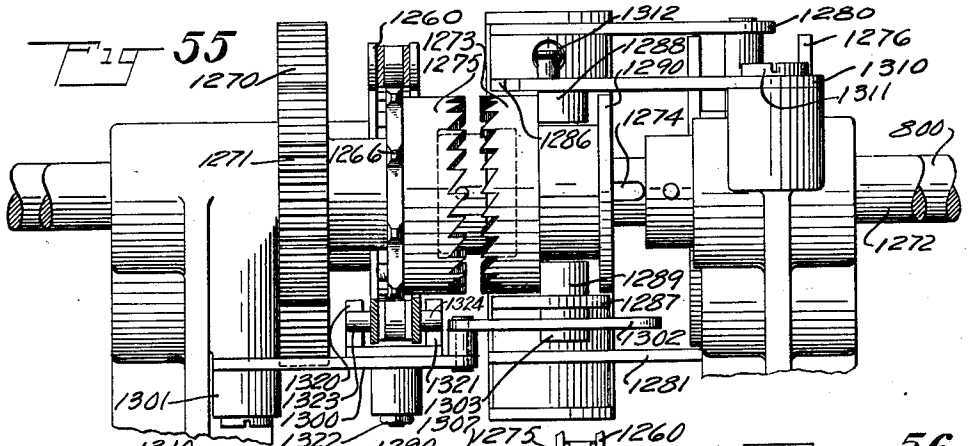


Fig 56

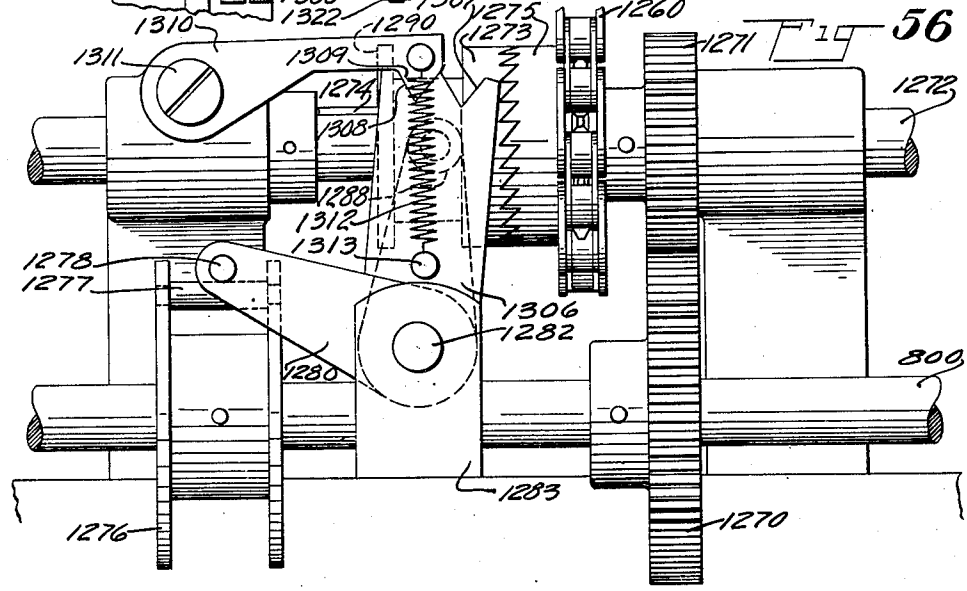
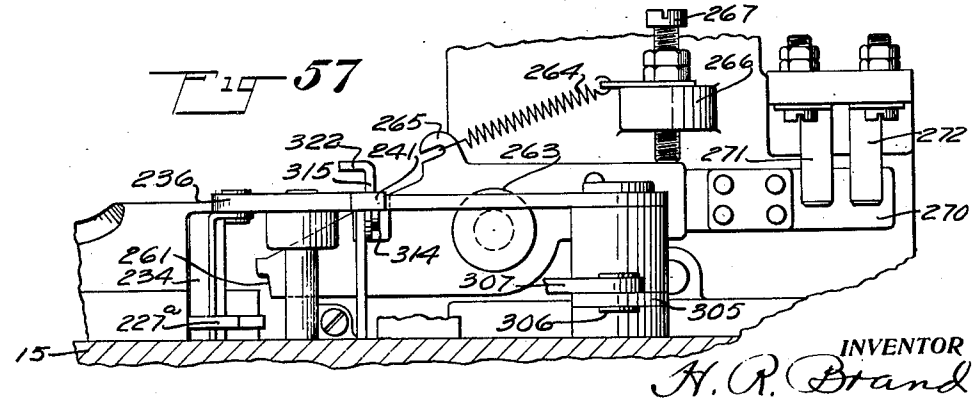


Fig 57



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Fig 59

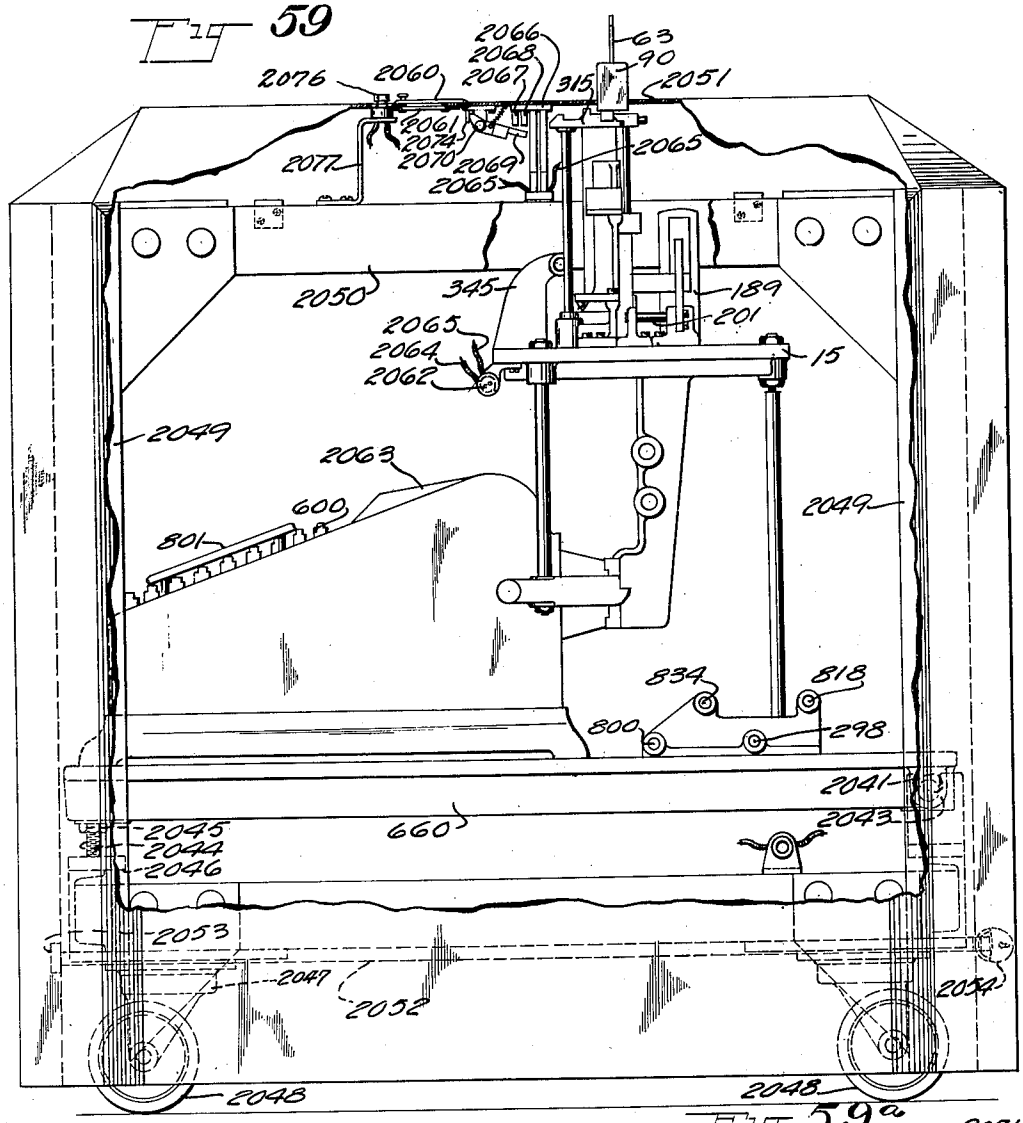


Fig 59a

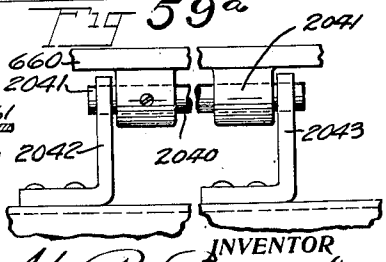


Fig 60

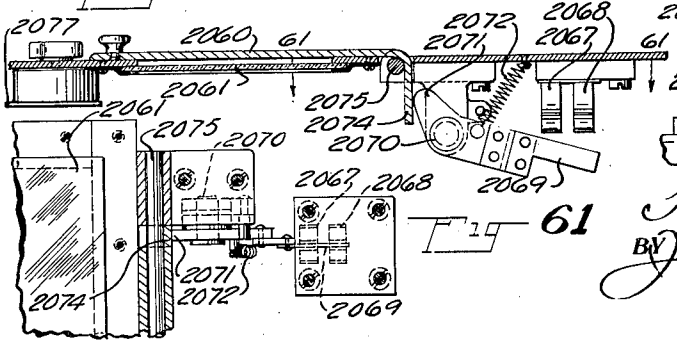


Fig 61

INVENTOR

H. R. Brand

BY John D. Morgan

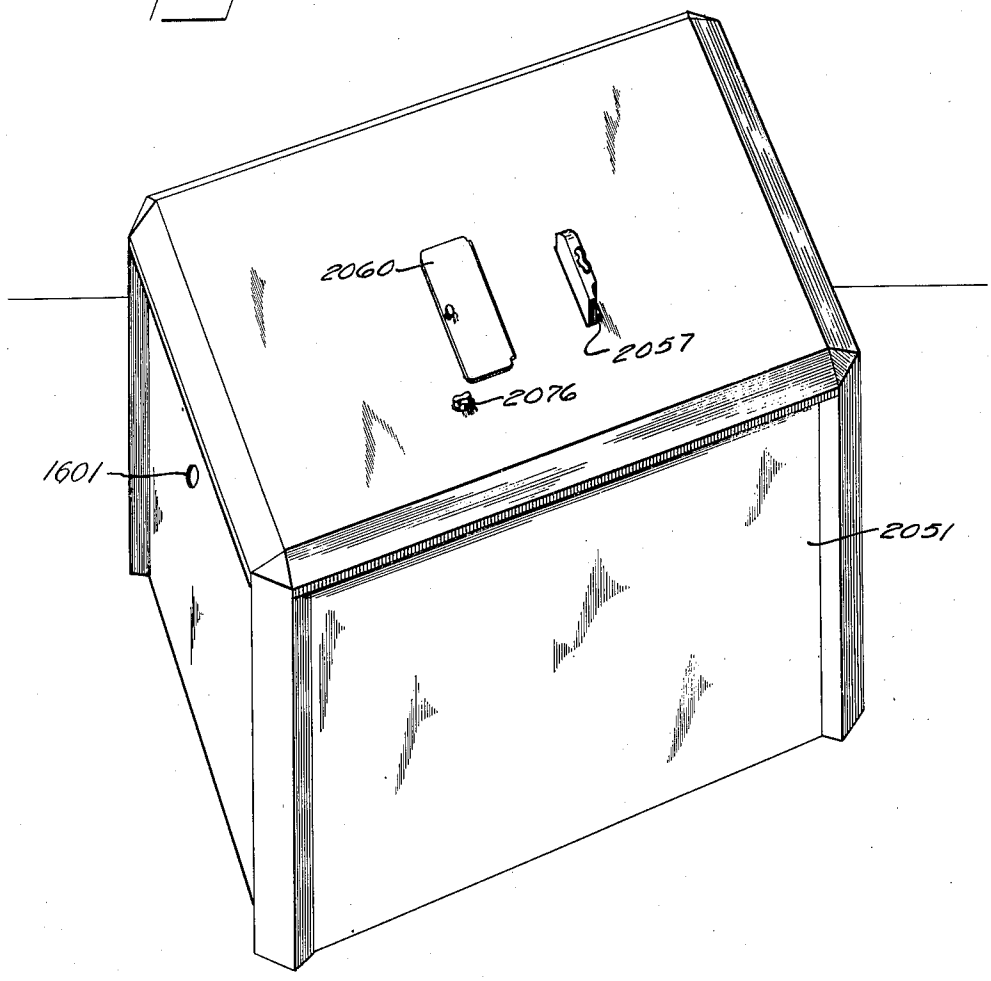
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Fig 62



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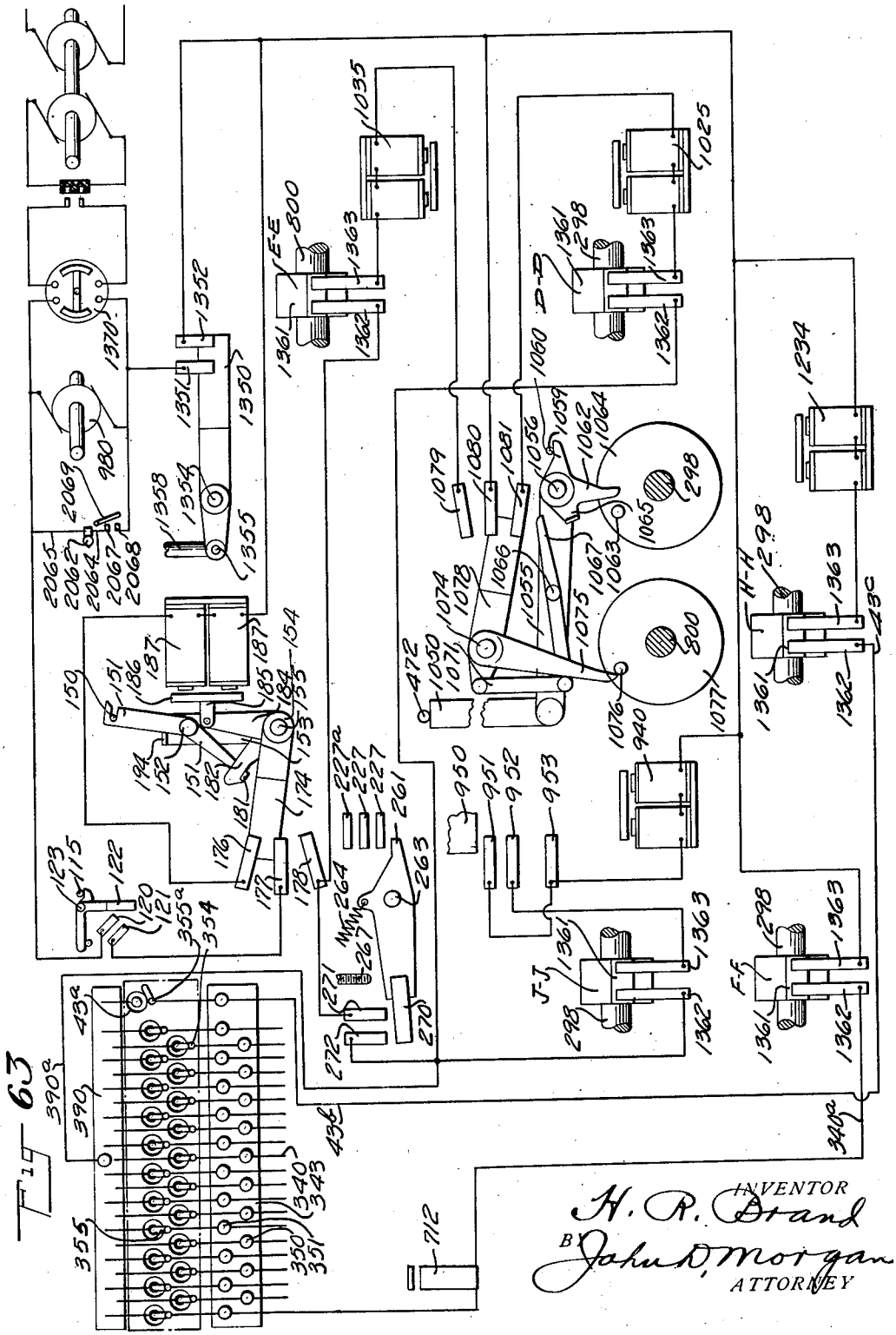


Fig. 63

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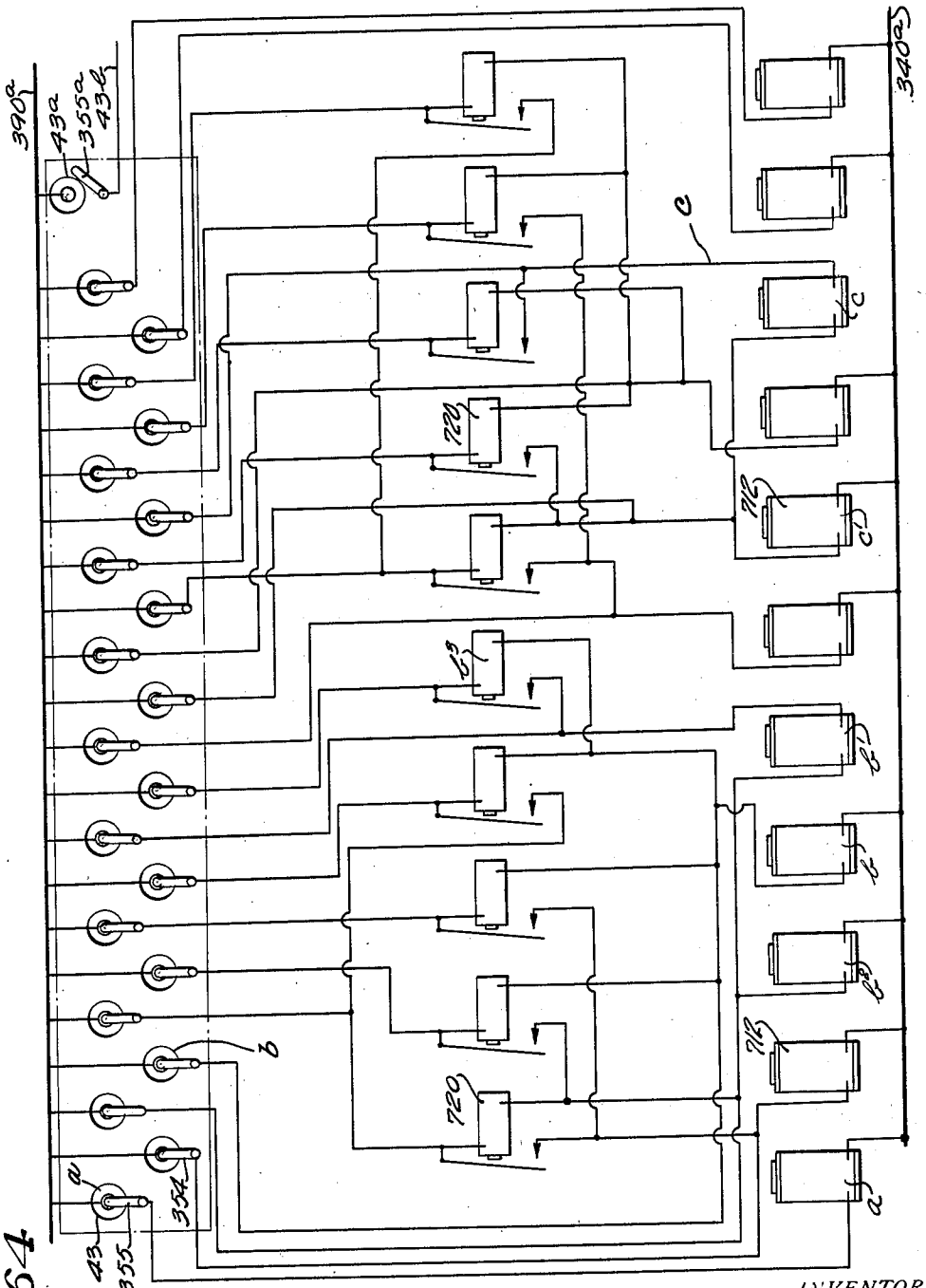


Fig-64

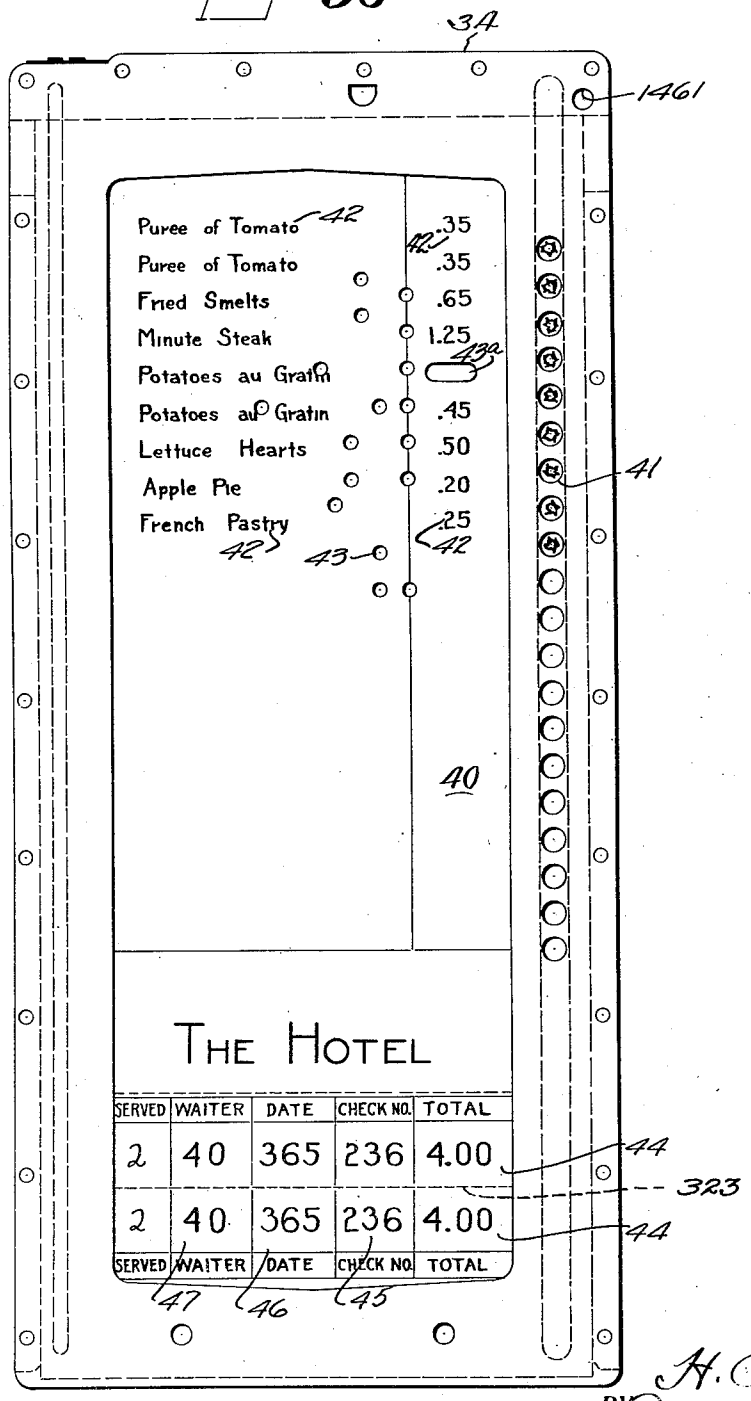
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Fig 65



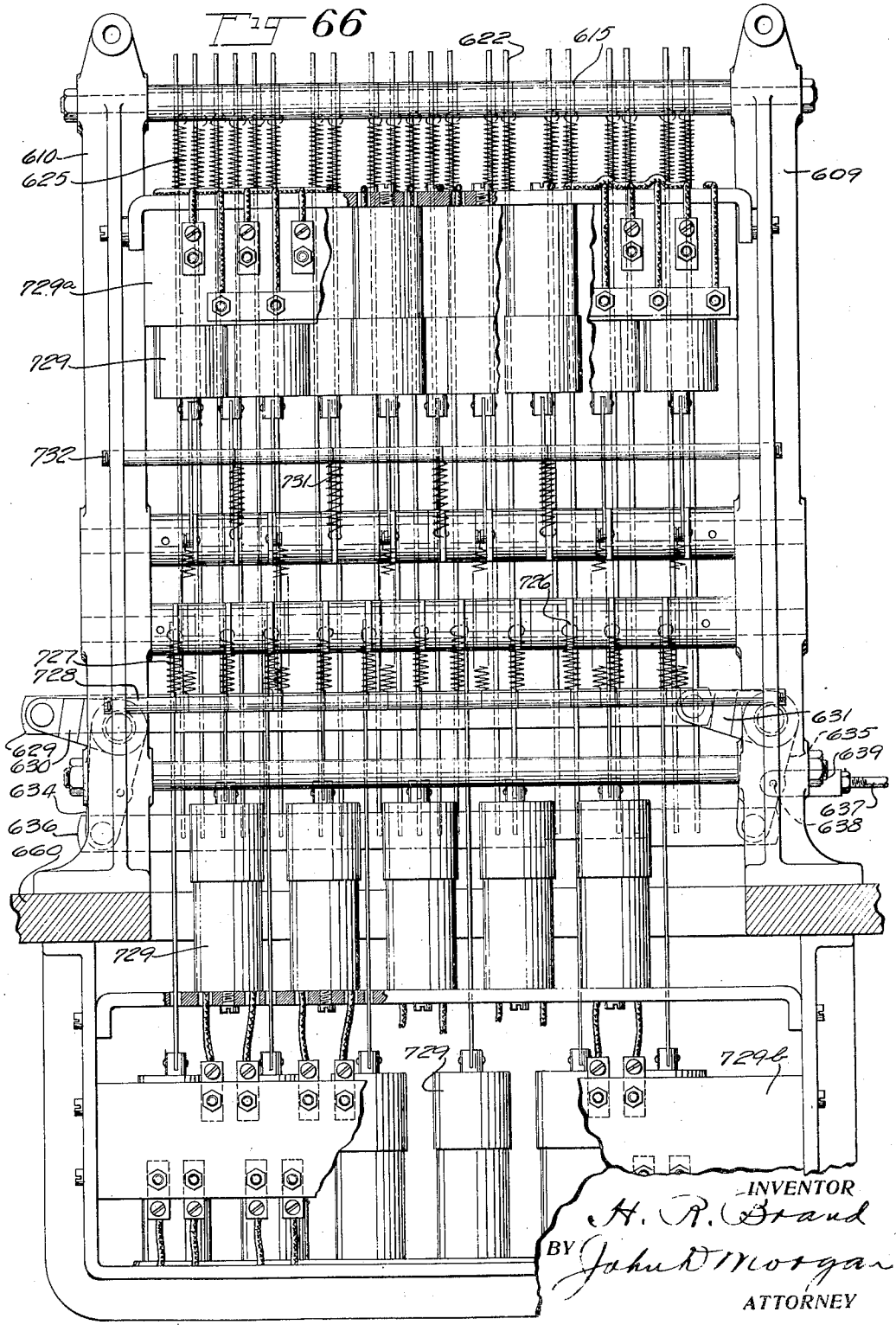
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Fig 66



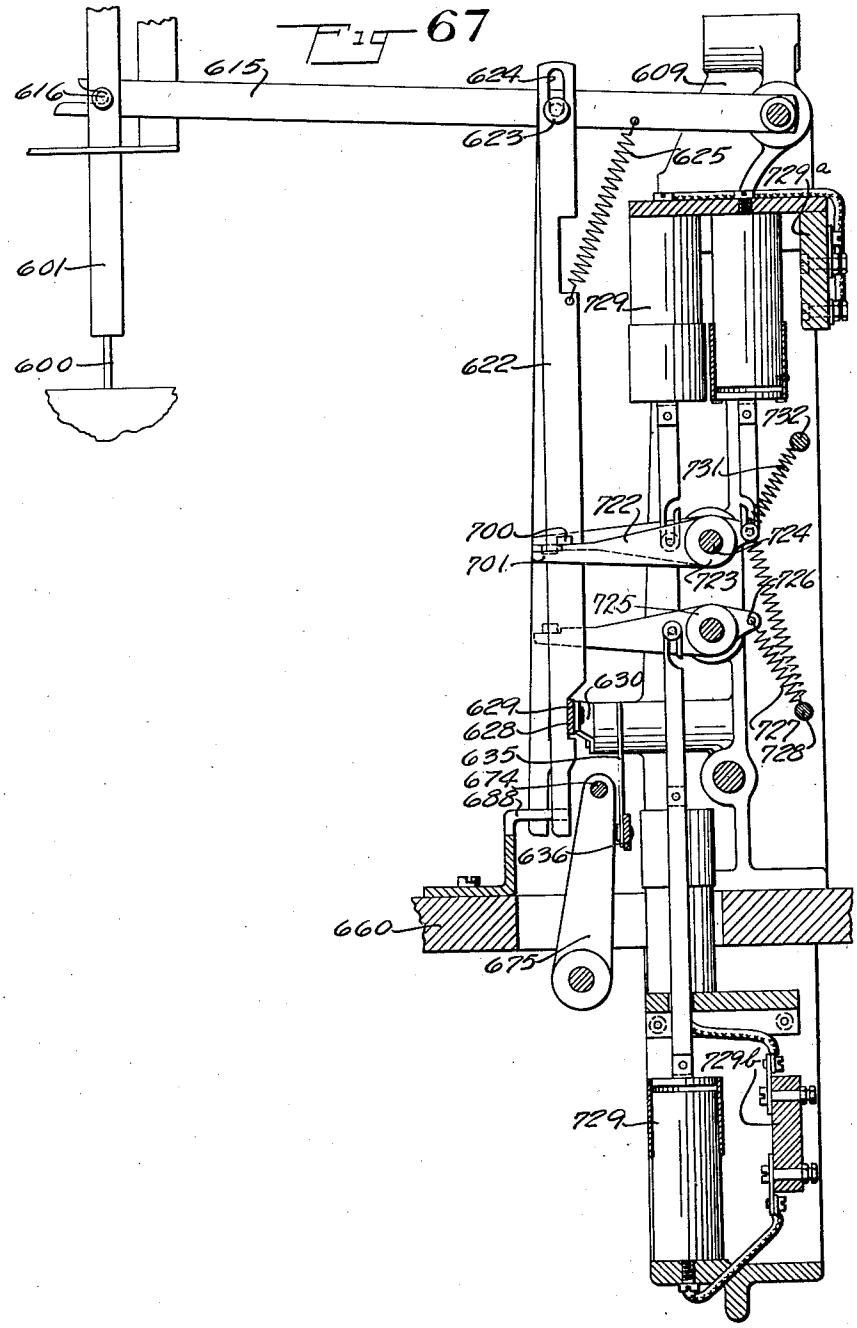
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Fig 67



INVENTOR

H. R. Brand

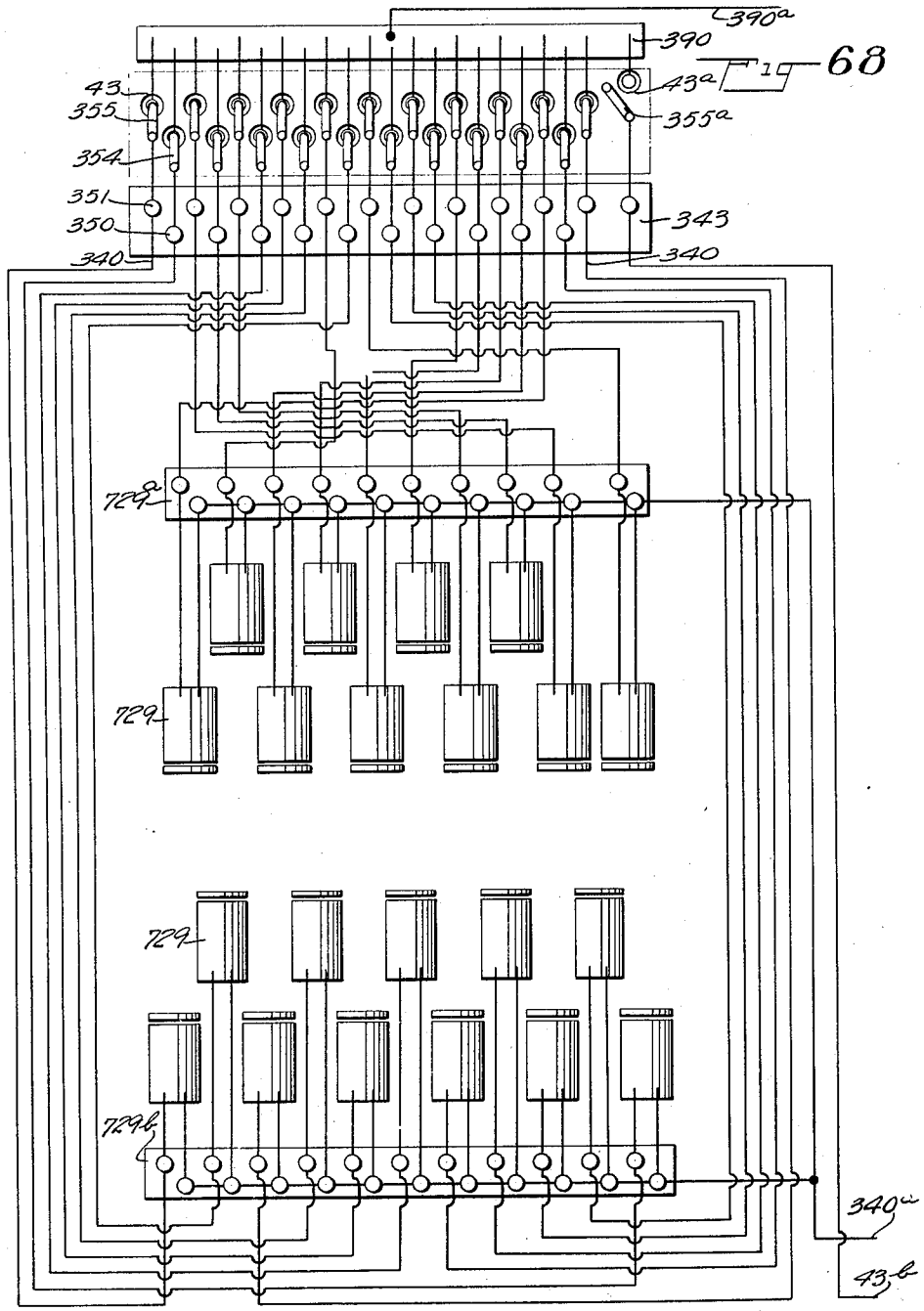
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Fig 69

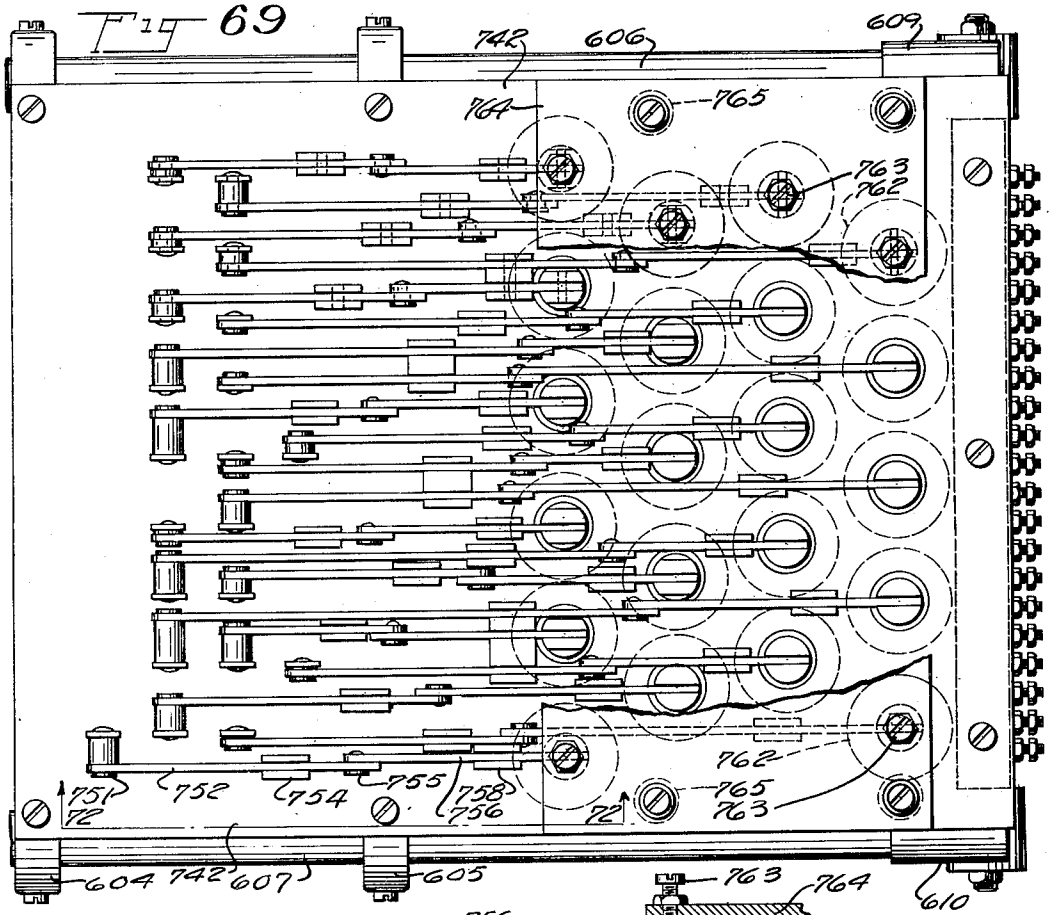
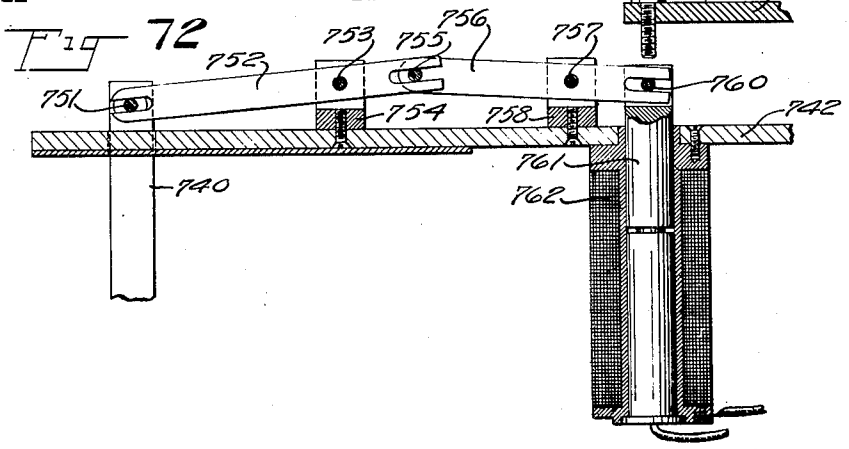


Fig 72



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Fig 70

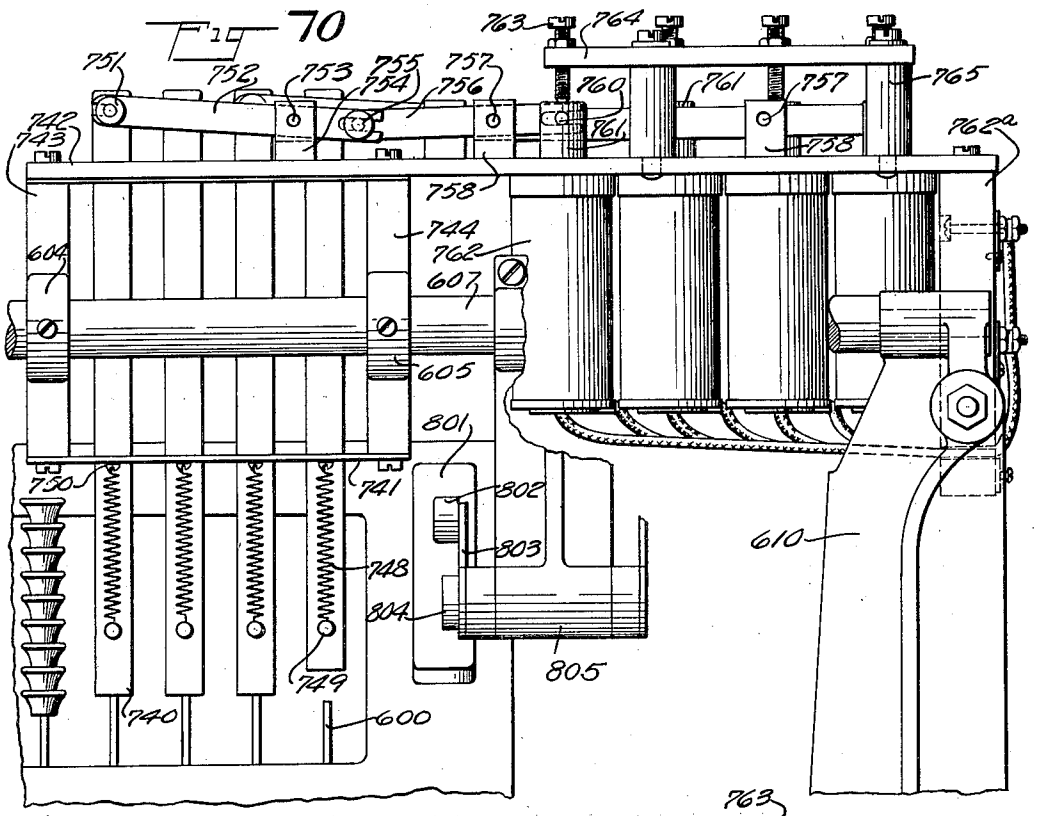
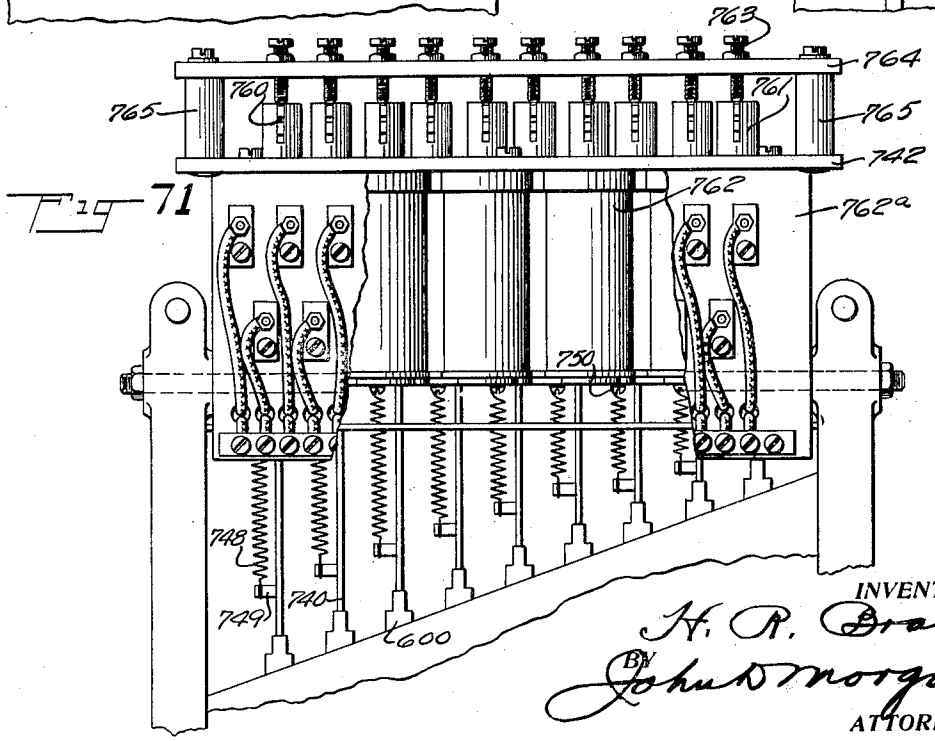


Fig 71



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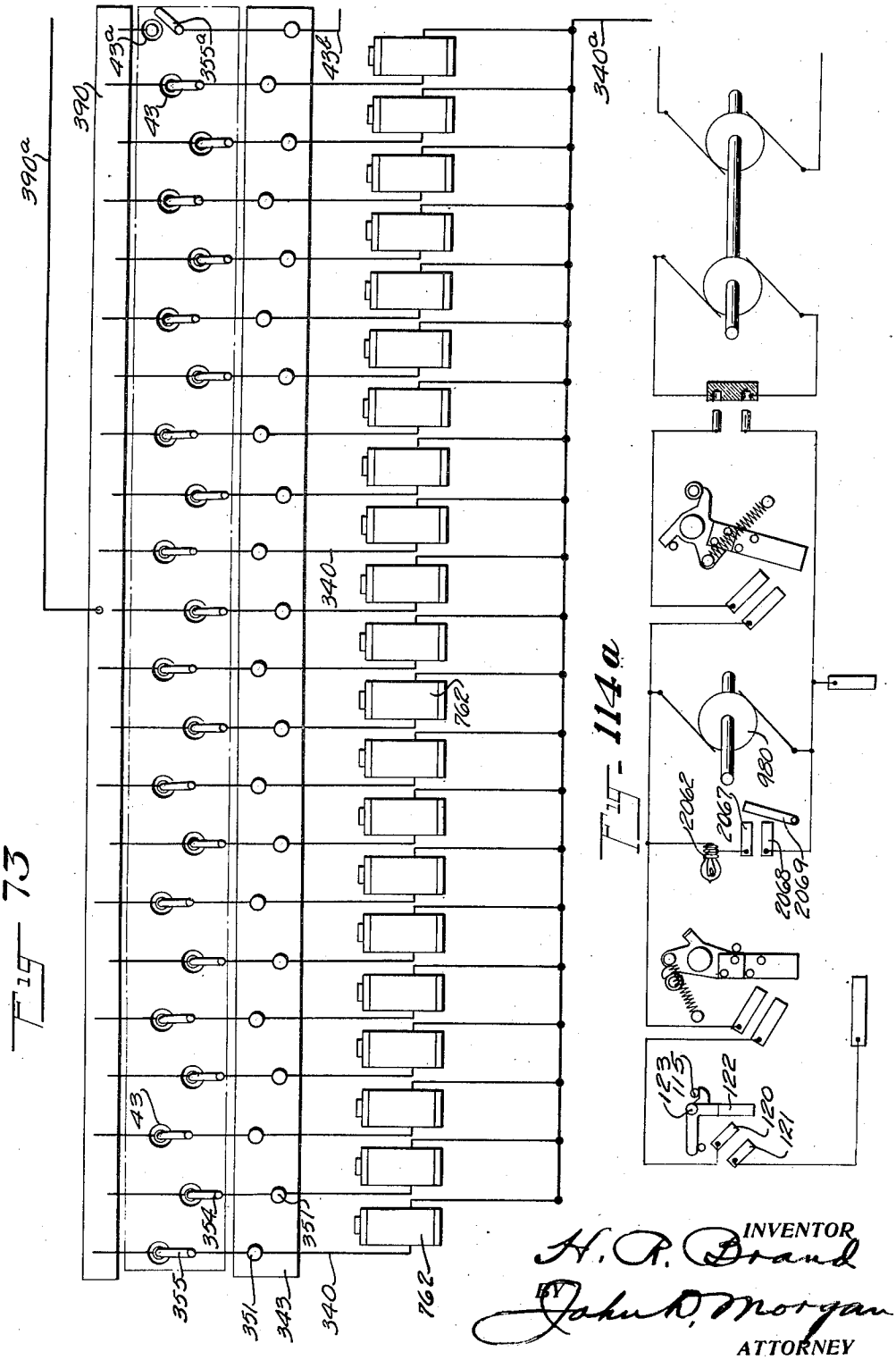


Fig. 73

Fig. 114a

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Fig 74

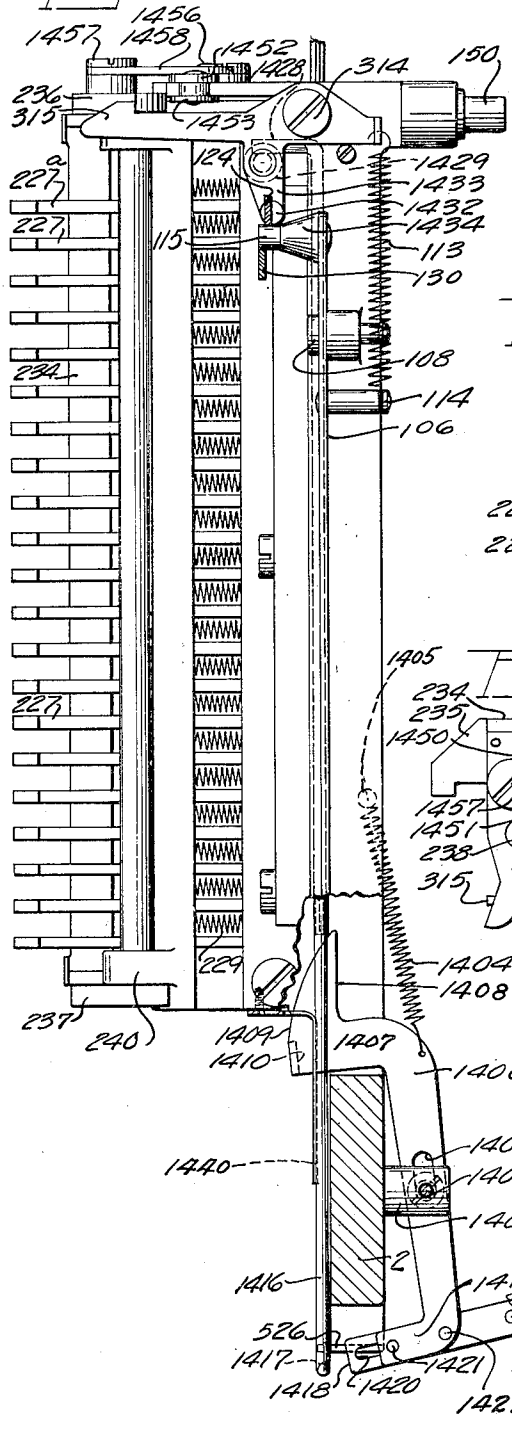


Fig 75

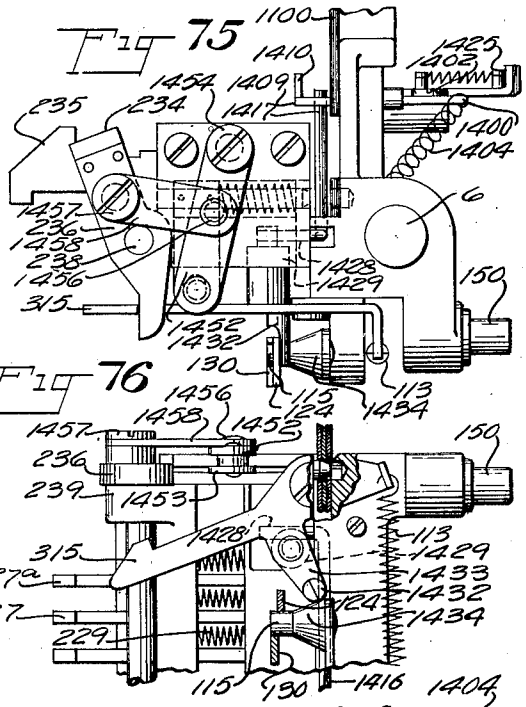
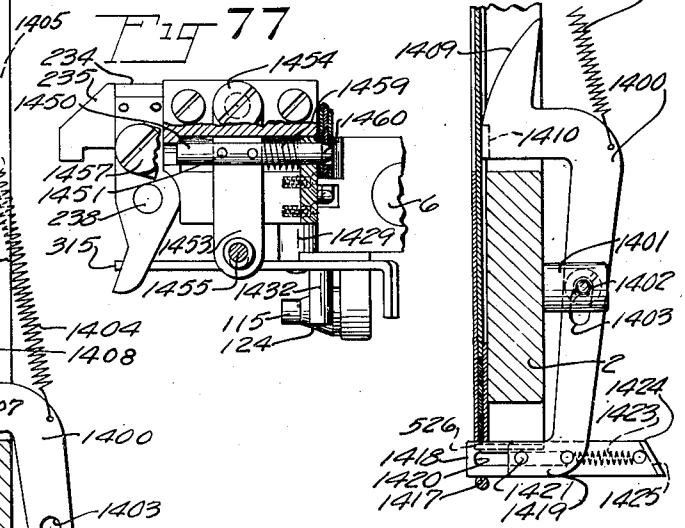


Fig 76

Fig 77



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Fig 78

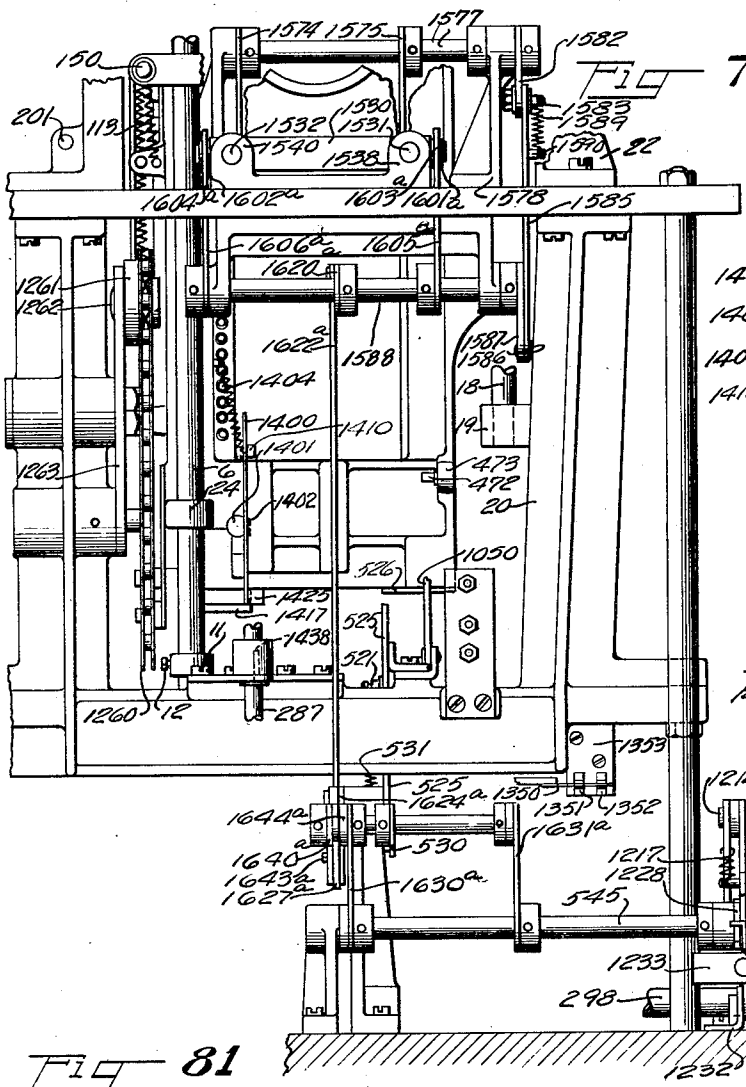


Fig 79

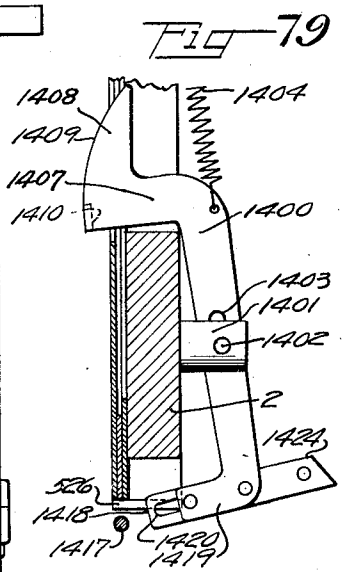


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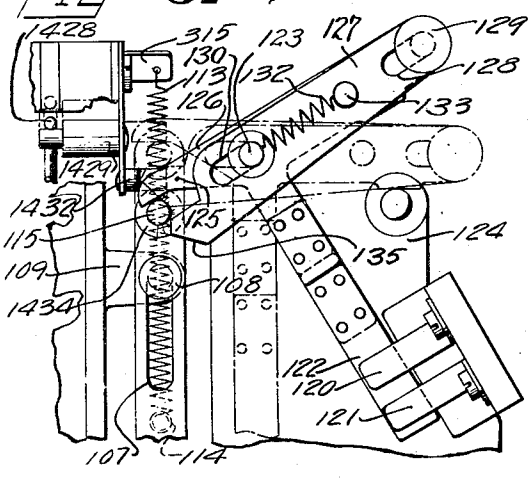
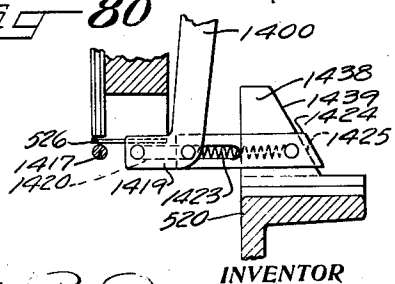


Fig 80



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Fig 82

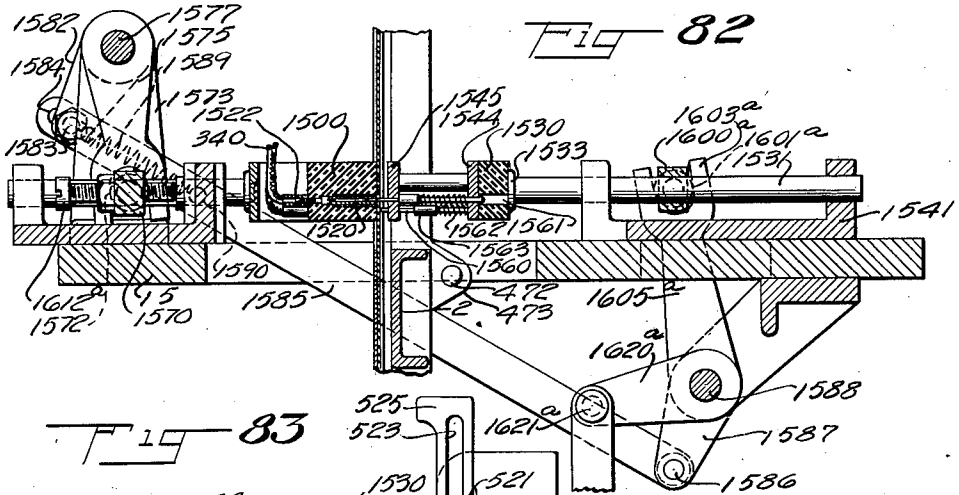


Fig 83

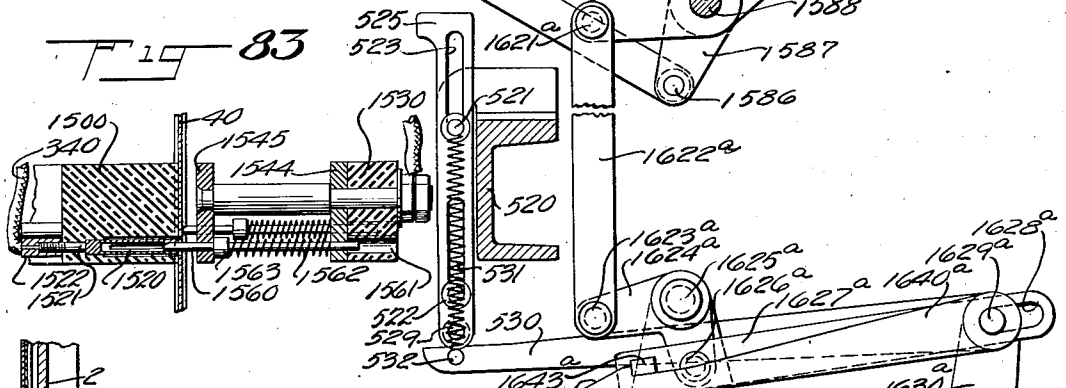
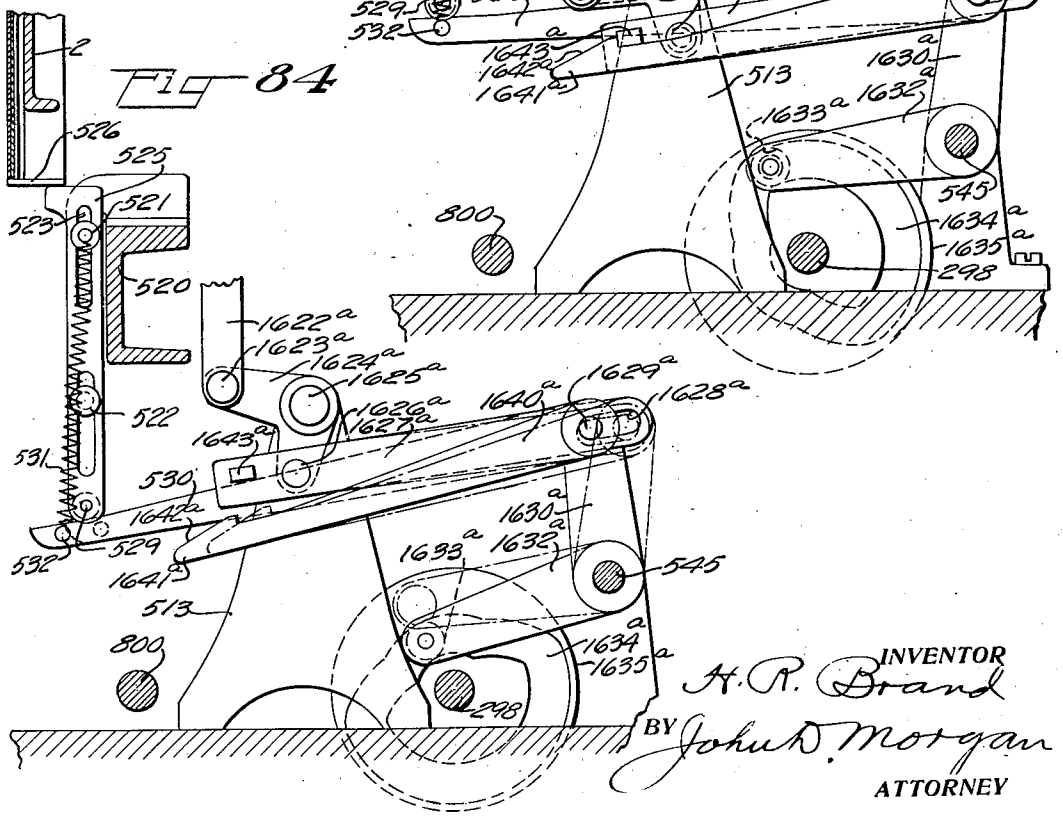


Fig 84

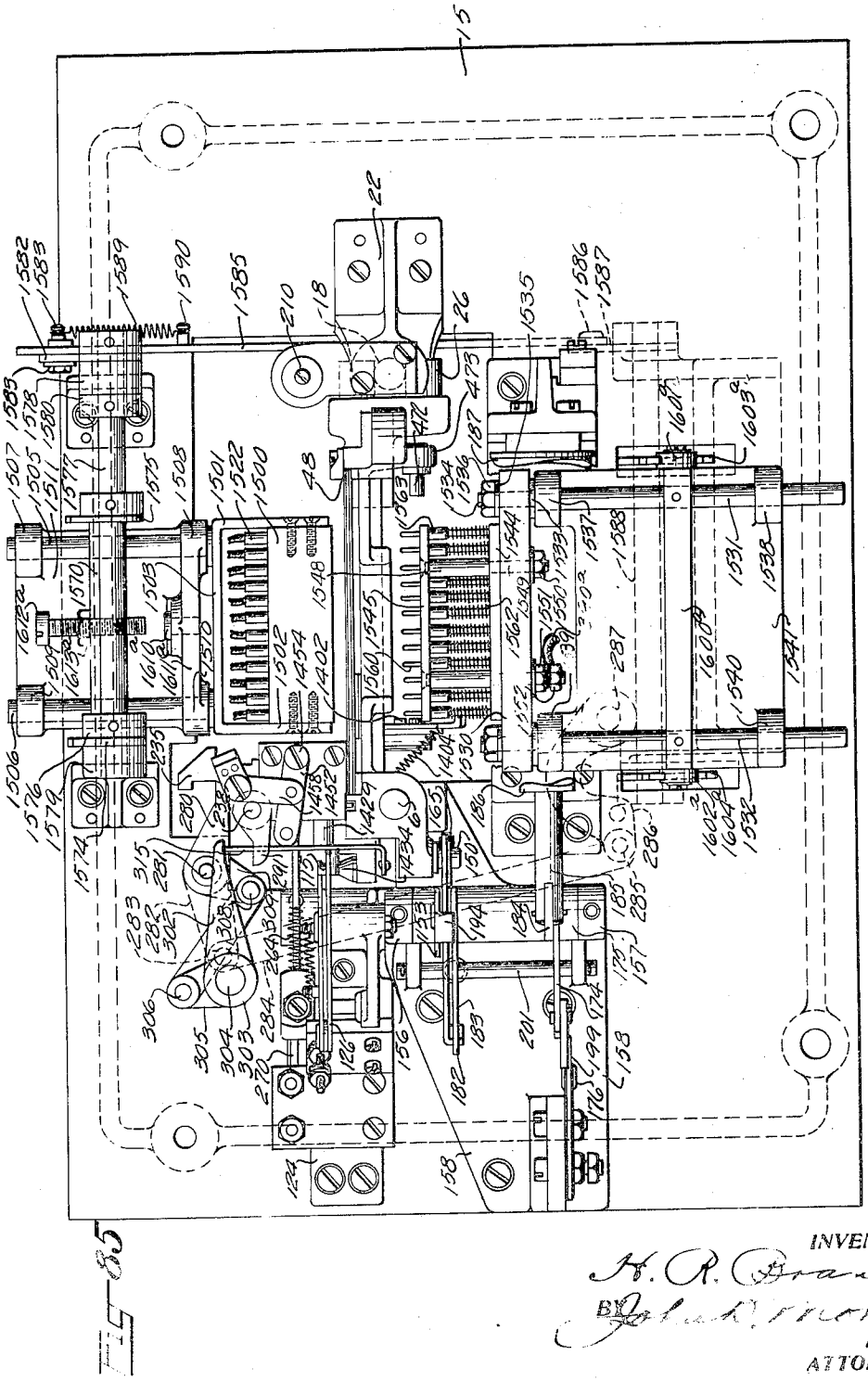


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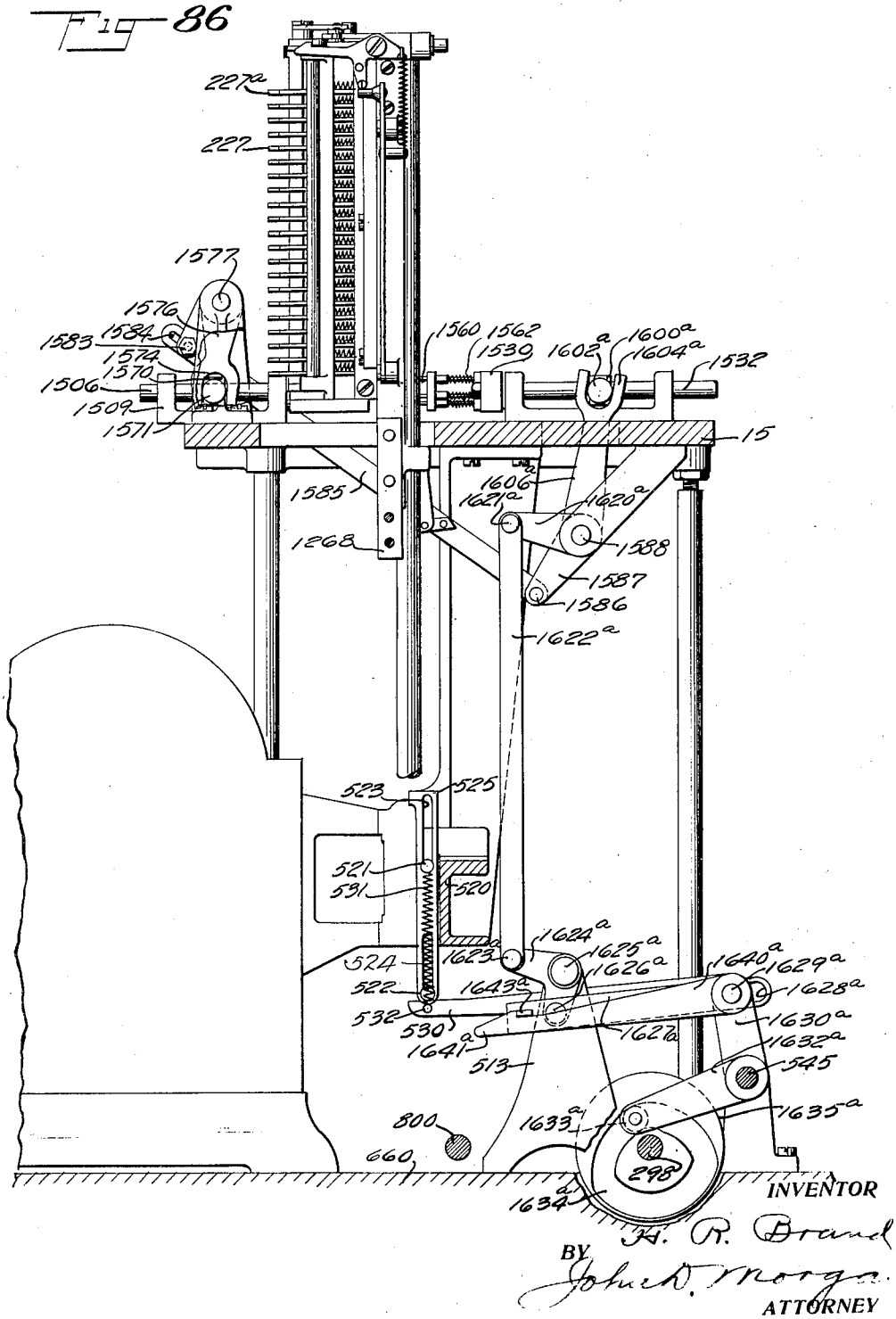
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Fig 86



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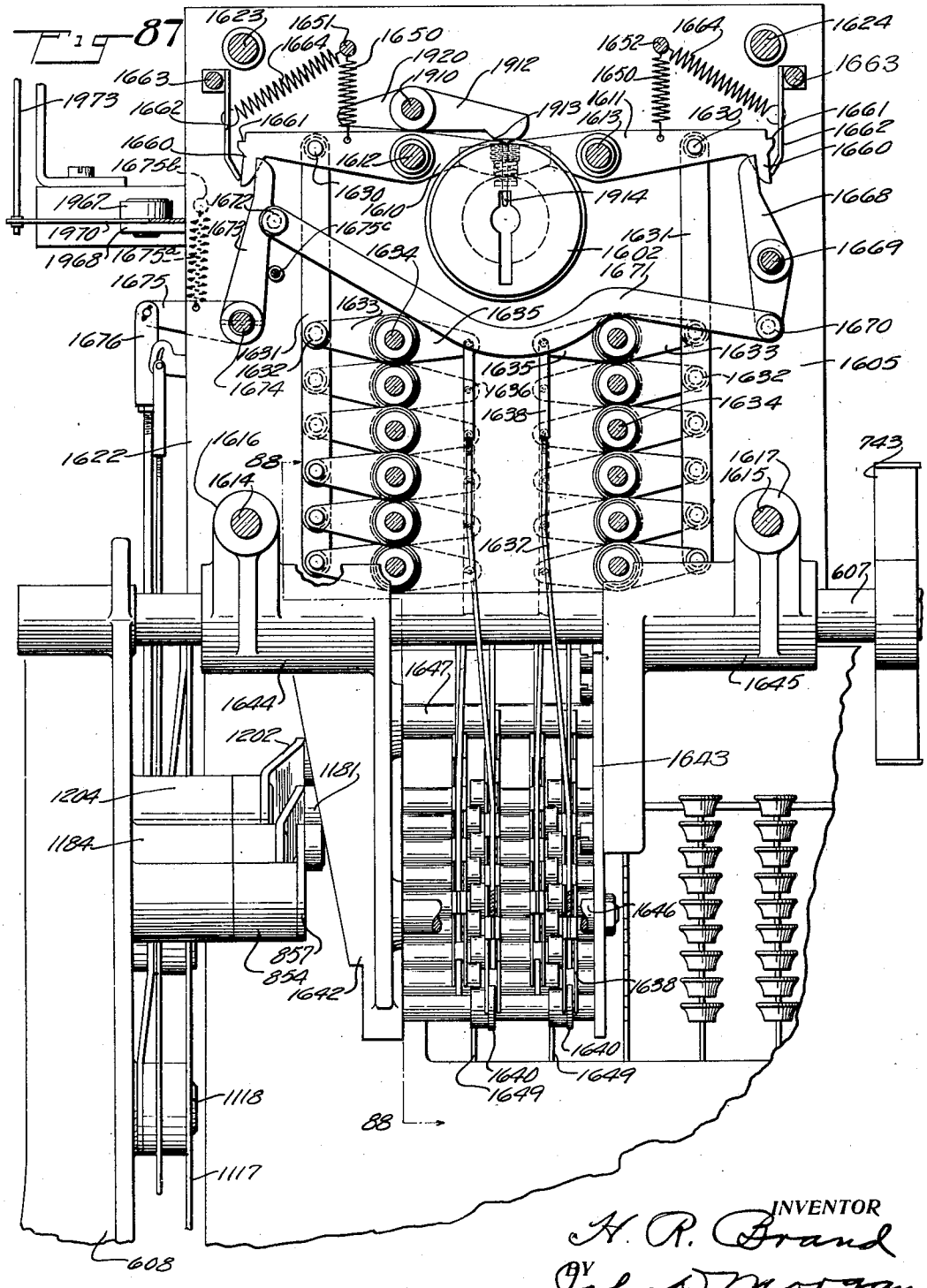
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Fig 87



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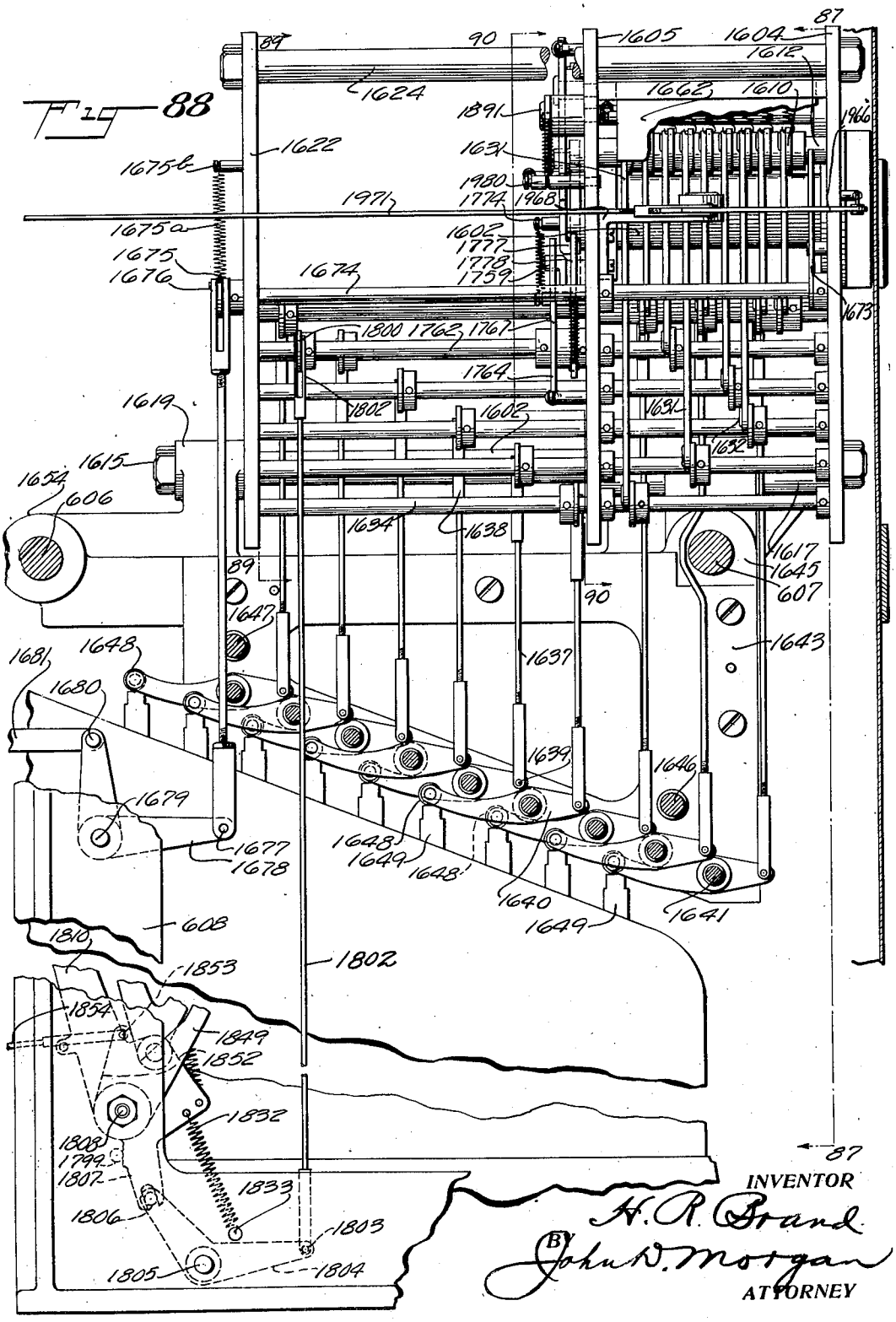
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Fig 88



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Fig 89

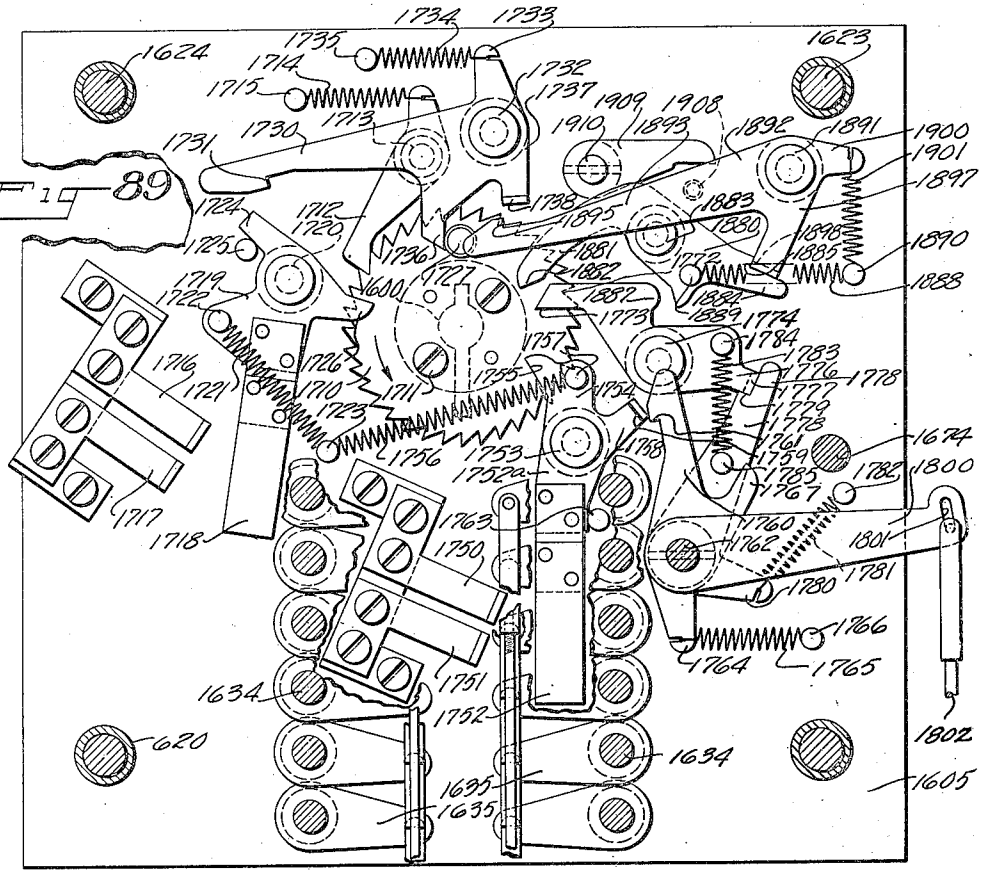
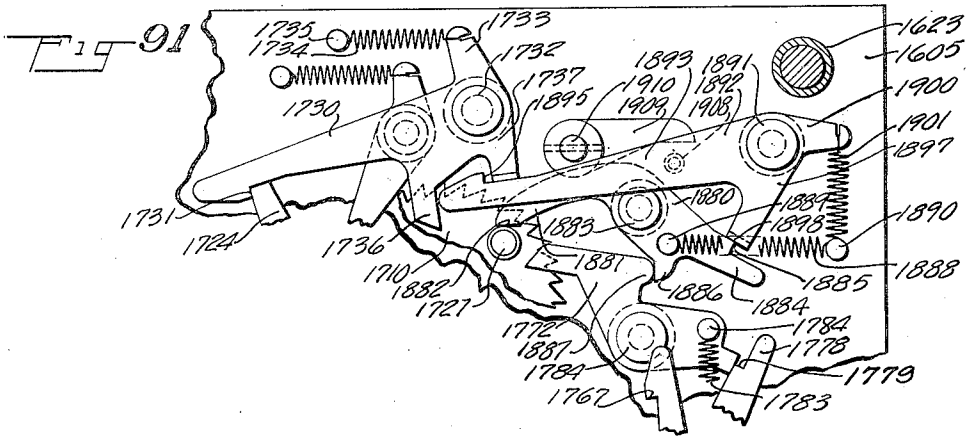


Fig 91



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Fig 90

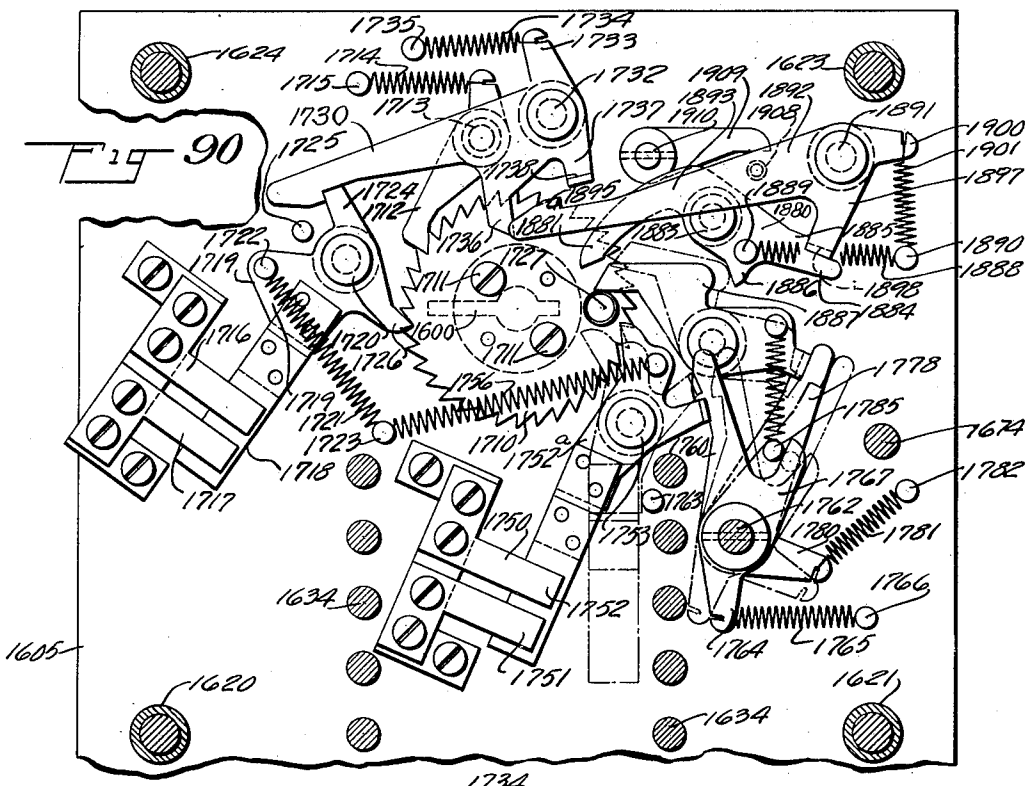
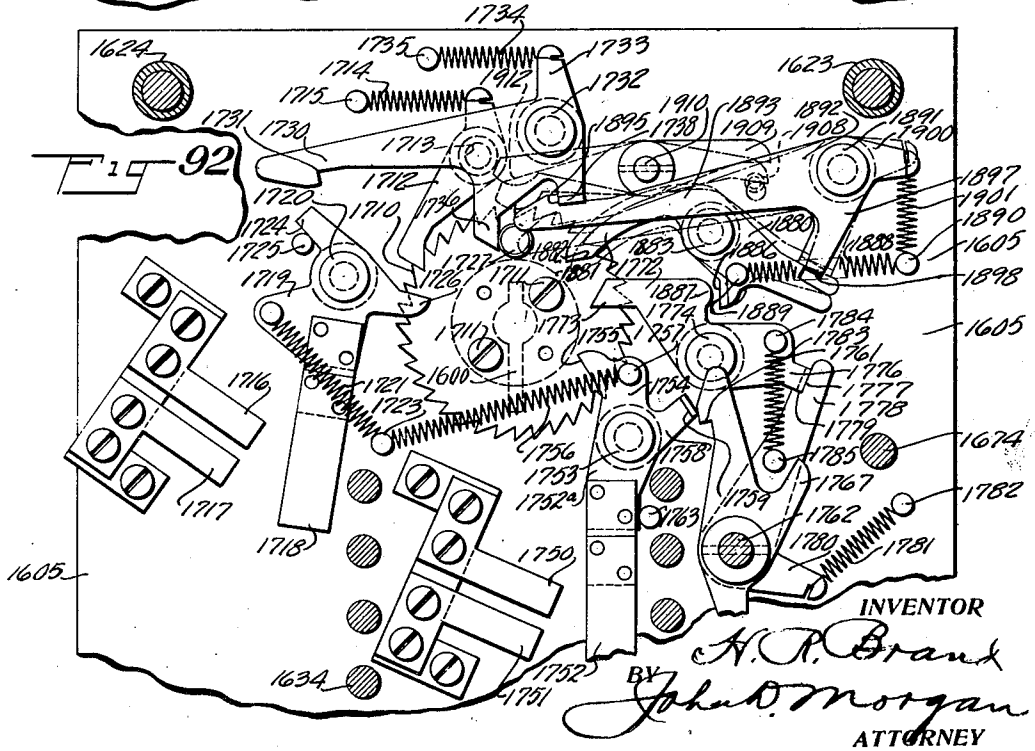


Fig 92



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Fig 93

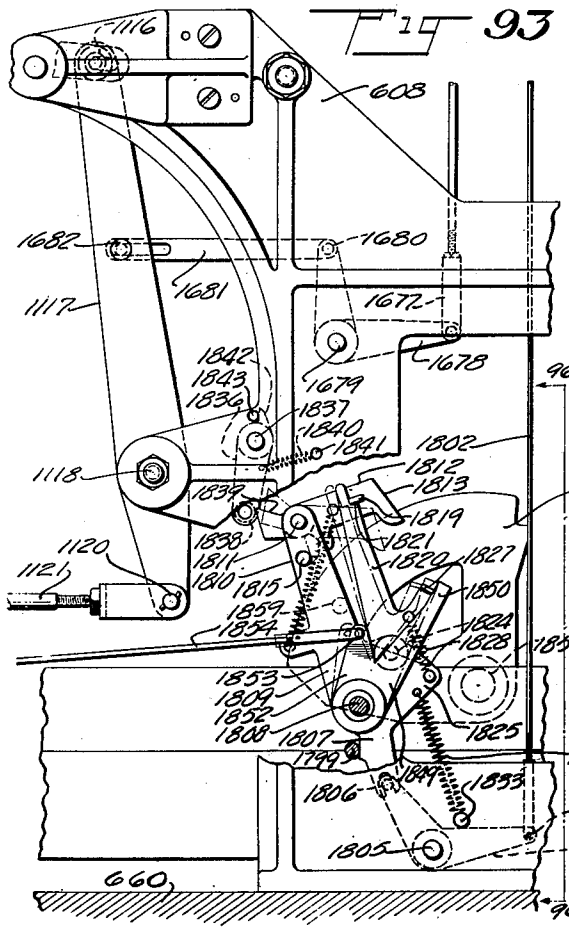


Fig 107

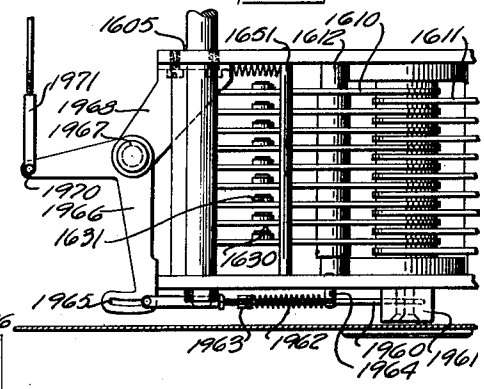


Fig 108

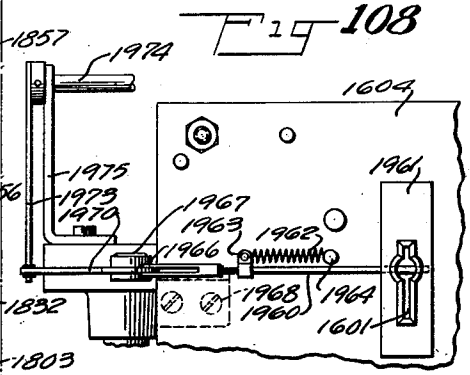


Fig 98

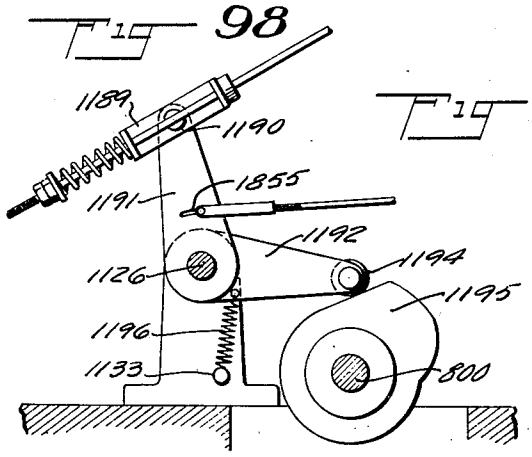
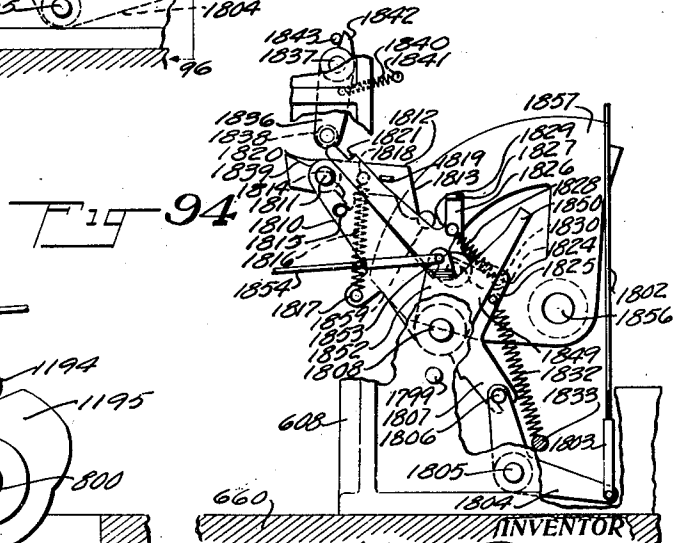


Fig 94

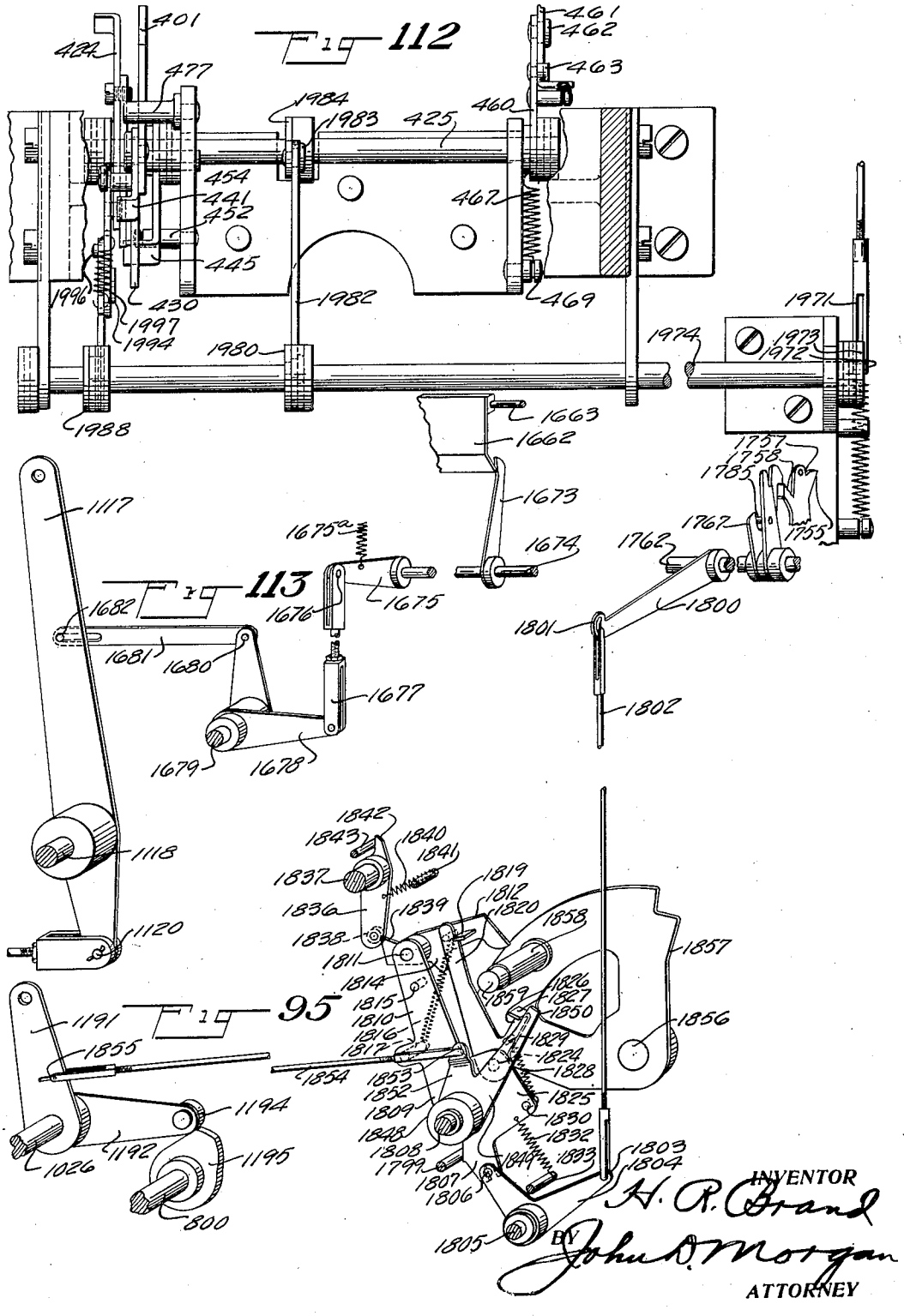


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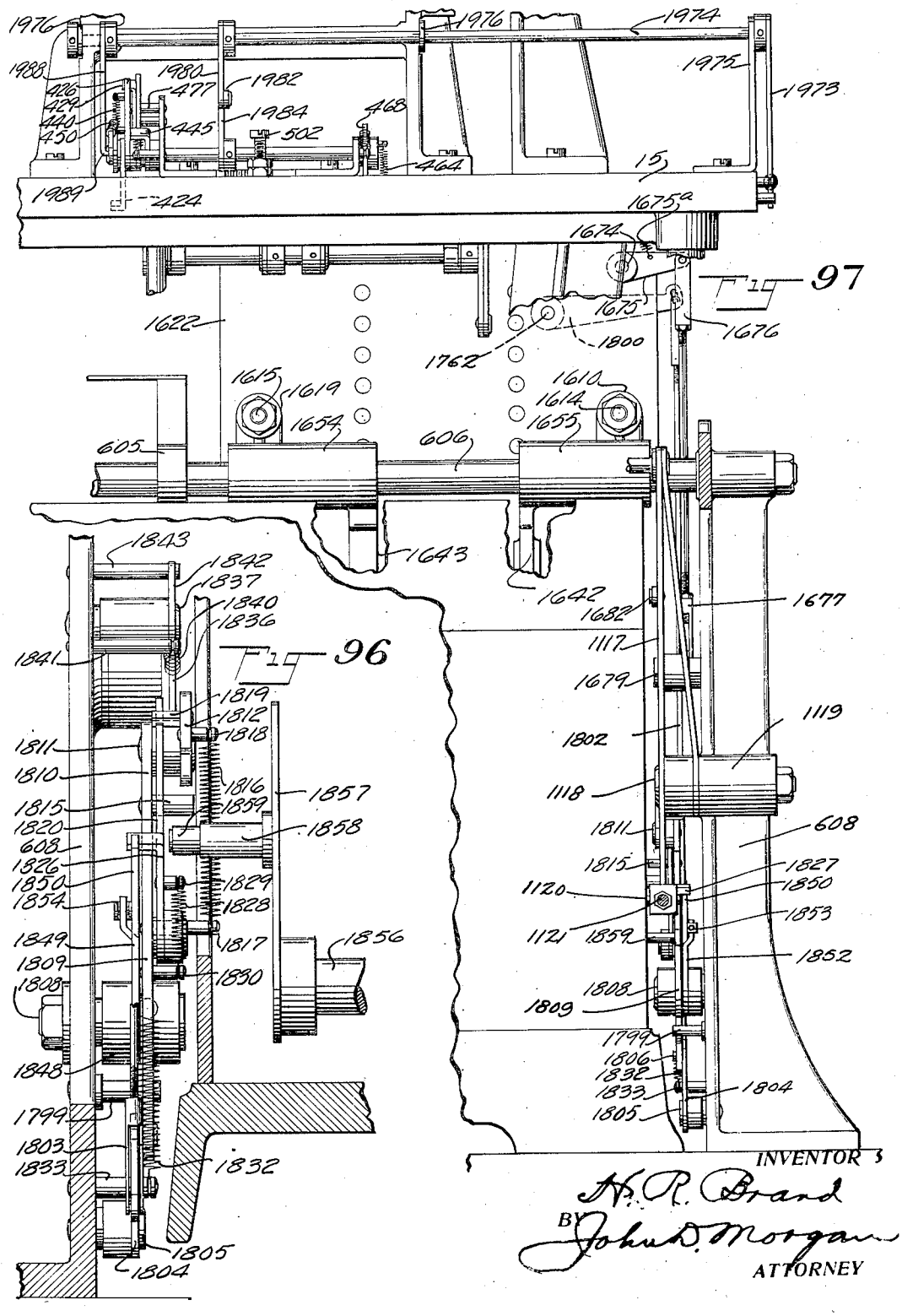


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Fig 99

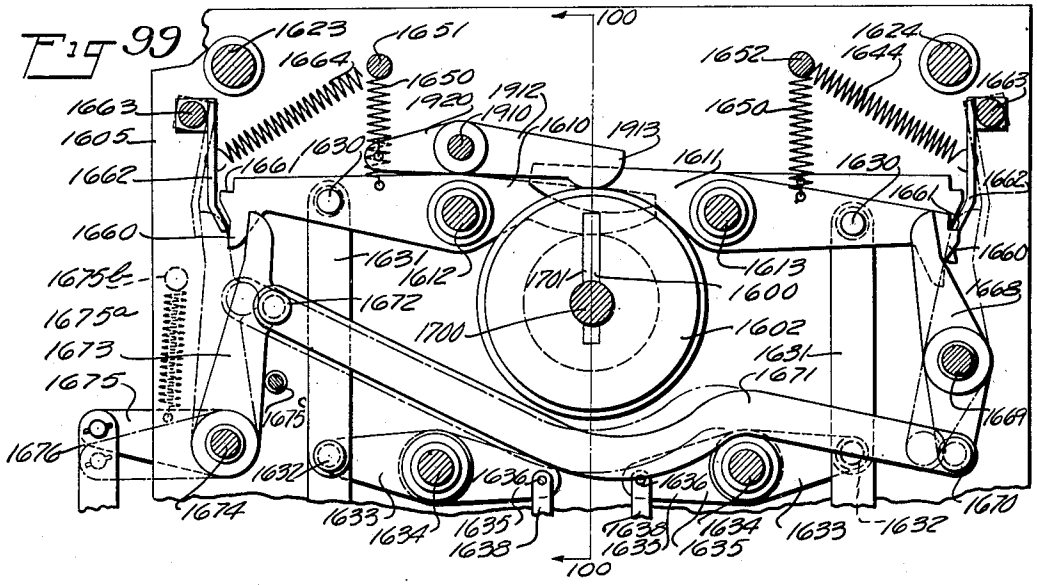


Fig 101

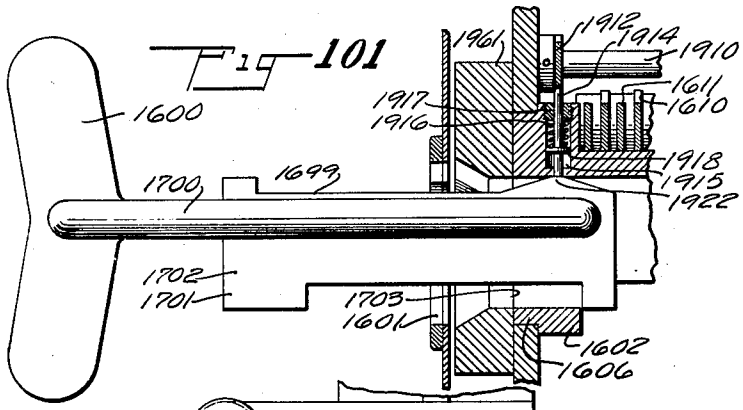
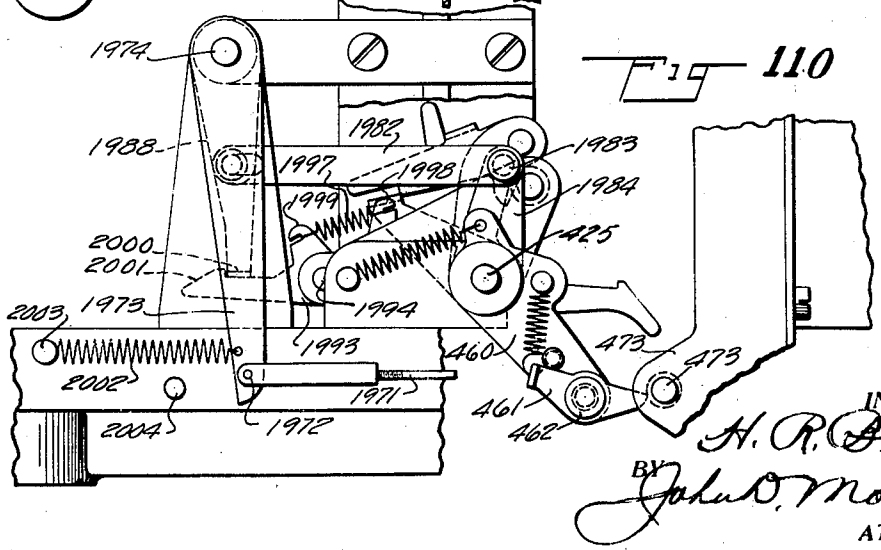


Fig 110



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Fig 111

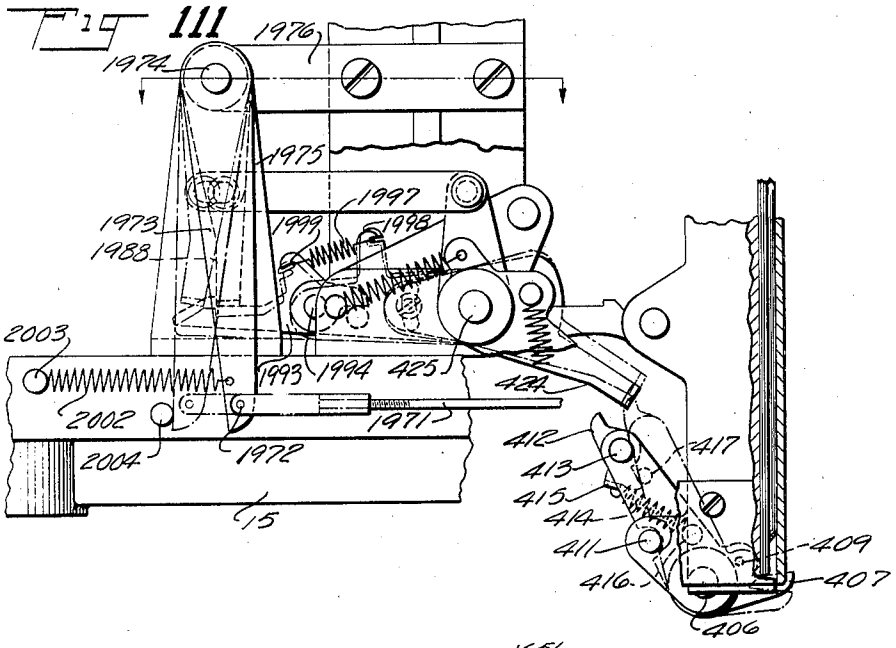


Fig 100

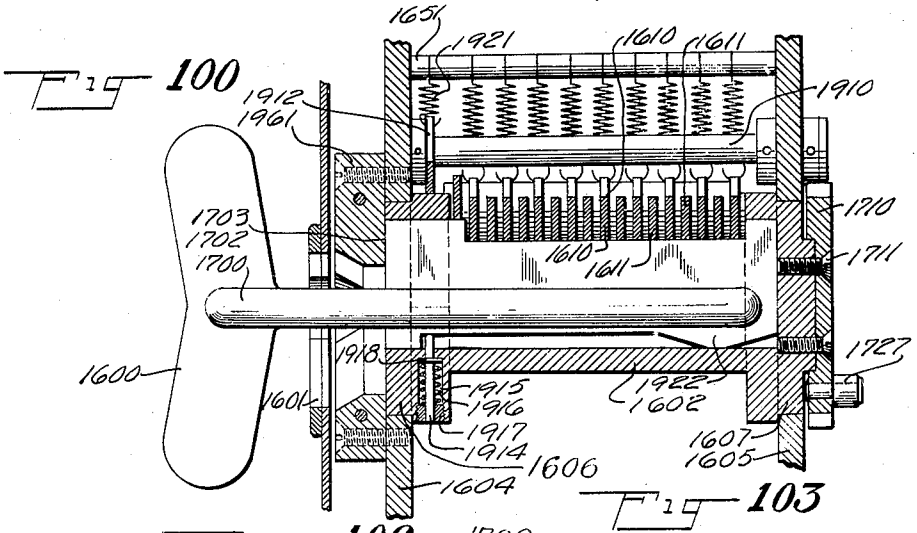


Fig 103

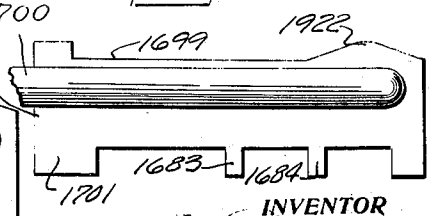
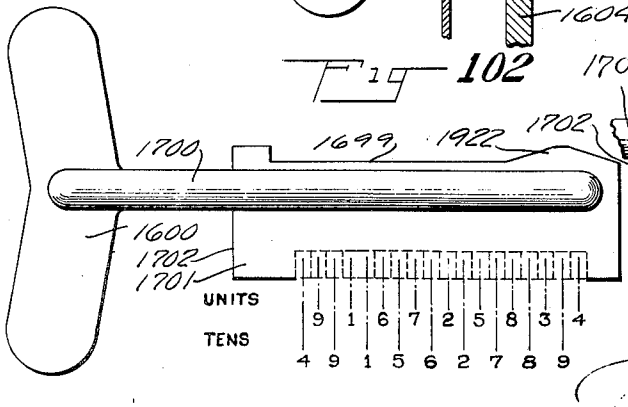


Fig 102



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Fig 109

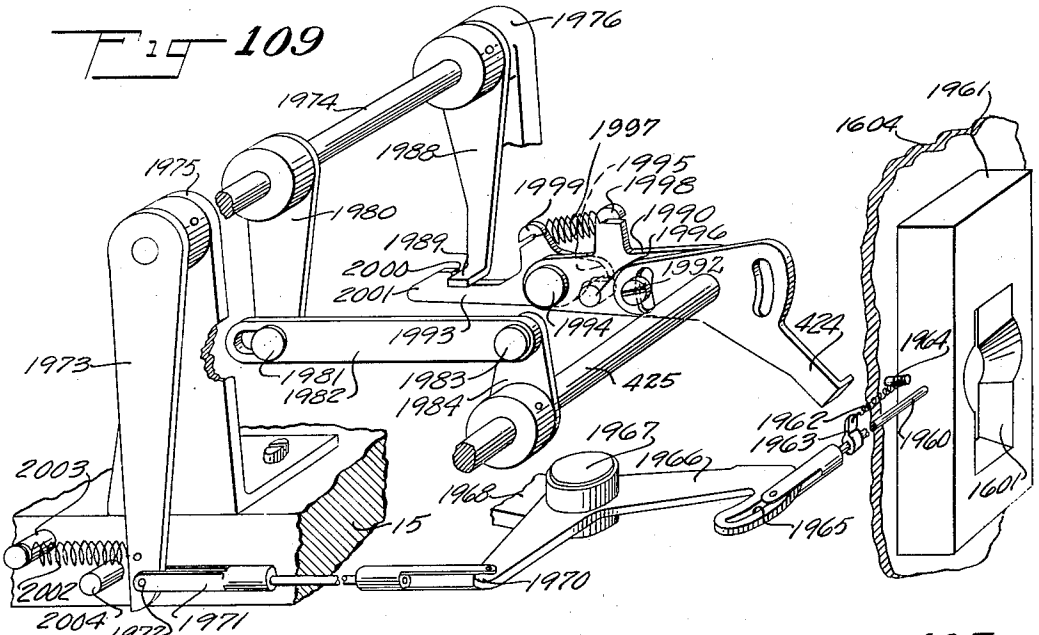


Fig 104

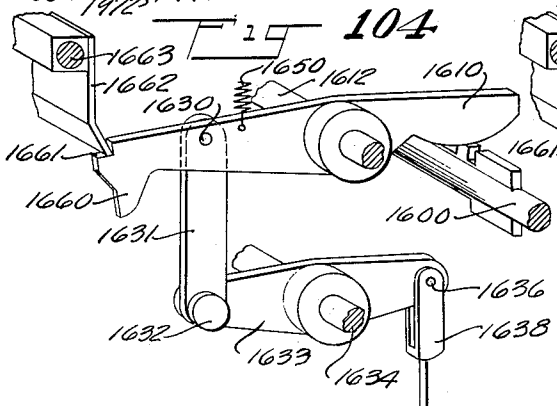


Fig 105

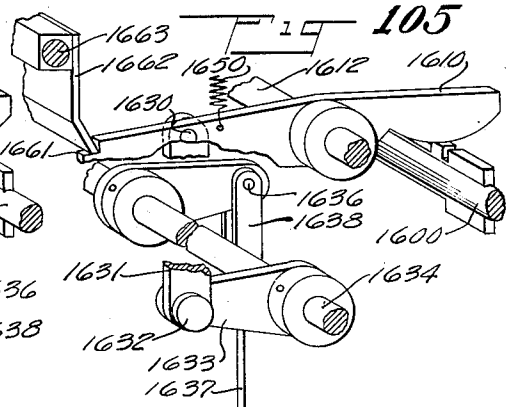
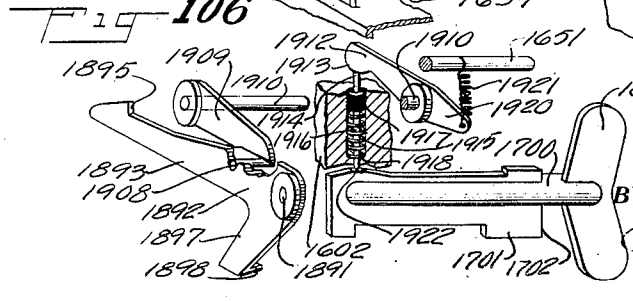


Fig 106



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COMPUTING AND RECORDING MECHANISM

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Fig 114

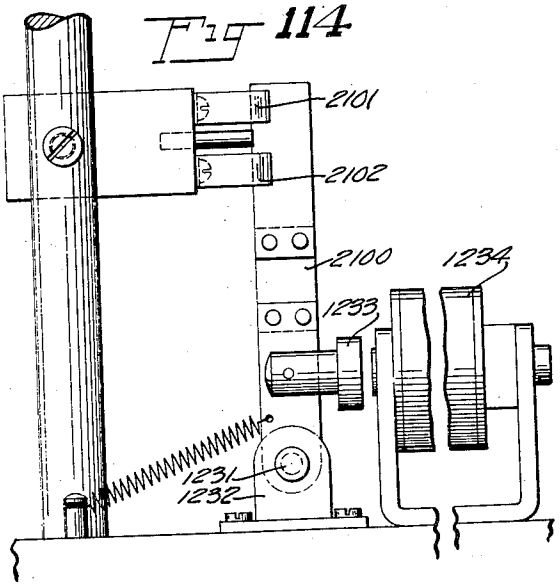


Fig 115

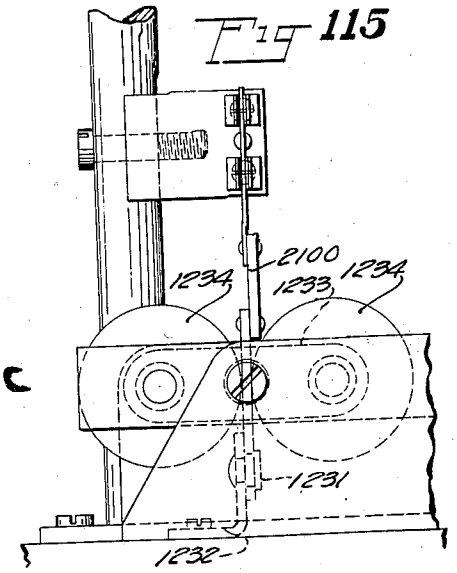
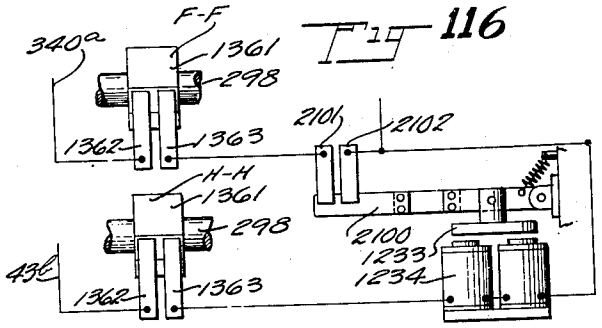


Fig 116



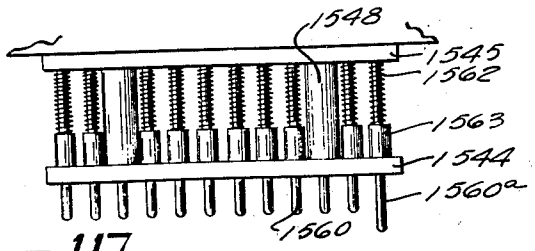
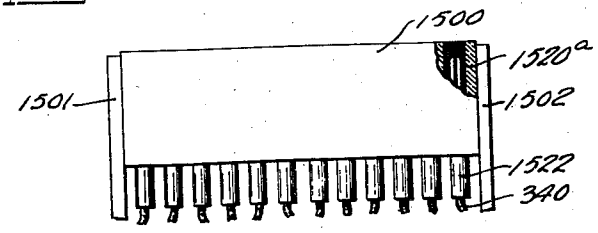


Fig 117



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Patented Sept. 29, 1931 1,825,141

UNITED STATES PATENT OFFICE

HARRY RUSSELL BRAND, OF NEW YORK, N. Y.

COMPUTING AND RECORDING MECHANISM

Application filed May 19, 1922. Serial No. 562,229.

The invention relates to a system and to automatic mechanism for use in the involuntary recordation of the exact status of a business, such as charging, crediting, pricing, totaling, tabulating, checking, and other control and recordation of the sales, inventorying, or other dispensing or handling of commodities; and in certain of its aspects, as here exemplarily embodied, it relates more particularly to such a system and mechanism adapted for restaurants or other food purveying or serving establishments.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a top plan of a machine, embodying the invention, except that the upper right-hand part shown in Fig. 2 is cut off on the line 1—1;

Fig. 2 is a side elevation of the right-hand side of the machine considered from the front, which would be looking at Fig. 1 from the right-hand side of the sheet;

Fig. 3 is an elevation of the left-hand side of the machine;

Fig. 4 is an enlarged fragmentary elevation and part-section, taken substantially on the line 4—4 of Fig. 2;

Fig. 4^a is a vertical section, on an enlarged scale, on line 4^a—4^a of Fig. 4;

Fig. 5 is a further enlarged framentary elevation, with parts in section, taken substantially on the line 5—5 of Fig. 2;

Fig. 5^a is a detached elevation of the carriage the same as in Fig. 5, that is, from the right in Fig. 2;

Fig. 5^b is a detached side elevation looking at Fig. 5^a from the left;

Fig. 5^c is a detached side elevation looking at Fig. 5^a from the right;

Fig. 5^d is a top plan of Figs. 5^a, 5^b and 5^c, with the gate removed;

Fig. 6 is a fragmentary, enlarged elevation, with parts in section, taken substantially on the line 6—6 of Figs. 2 and 3;

Fig. 7 is a detached, enlarged detail, partly in horizontal section, taken on the line 7—7 of Fig. 6;

Fig. 8 is a detached, enlarged, detail plan, taken substantially on the line 8—8 of Fig. 6;

Fig. 9 is an enlarged fragmentary elevation, with parts in section and parts broken away, taken substantially on the line 9—9 of Fig. 6, but shows in addition the bottom part of the carriage for the check-holder, in operative position with the bus-bar actuating mechanism;

Fig. 10 is a detached top plan of the bus-bar actuating mechanism, taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a section, with parts in elevation, taken on the line 11—11 of Fig. 10;

Fig. 11^a is an end elevation looking at Fig. 10 from the right;

Fig. 12 is an enlarged fragmentary vertical section, taken substantially on the line 12—12 of Fig. 6, but showing the bus-bar actuating mechanism in elevation (which is at the rear of Fig. 6);

Fig. 13 is a fragmentary enlarged detail elevation, with parts in section, taken substantially on the line 13—13 of Fig. 6, and showing the same mechanism as Fig. 12, but showing the parts in position to cooperate with the guest check to operate the computing machine;

Fig. 14 is an enlarged top plan, with parts including the casing 90 broken away, of the upper right-hand part of Fig. 2, substantially on line 14—14 of Fig. 2;

Fig. 15 is a fragmentary elevation, with parts in section, taken substantially on line 15—15 of Fig. 14, and showing on an enlarged scale, parts in the lower right hand corner of Fig. 6, some of which parts are in an operated position;

Fig. 16 is a fragmentary detached detail, partly in plan and partly in section, of the driving connection from the computing machine motor to the cam shafts of the controlling mechanism, and is located just beneath the bottom of Figs. 2 and 3, but is not shown therein, and is shown in Fig. 44, and is taken substantially on the line 16—16 of Fig. 17;

Fig. 17 is a vertical section, on an enlarged scale, with parts in section and with parts broken away, taken on the line 17—17 of Fig. 16;

Fig. 18 is a fragmentary detail elevation, greatly enlarged, and with parts in section and parts broken away, taken on line 18—18 of Fig. 1, and showing the escapements and controls for the two cam shafts;

Fig. 19 is a transverse vertical section, taken on the line 19—19 of Fig. 18;

Fig. 20 is a section taken on the line 20—20, in Fig. 19;

Fig. 21 is a fragmentary horizontal section taken on the line 21—21 of Fig. 20;

Fig. 22 is a vertical transverse section, on an enlarged scale, taken on the line 22—22, of Fig. 5, showing a part of the carriage returning or elevating mechanism;

Fig. 23 is a vertical transverse section, taken on the line 23—23 of Fig. 5;

Fig. 24 is a fragmentary, enlarged detail, in elevation, of the actuating mechanism for the computing machine operating bar, which is also shown in Fig. 2;

Fig. 25 is a fragmentary detail, in elevation, of the actuating means for one form of the mechanism for selecting the keys of the computing machine;

Fig. 26 is a fragmentary detail, in elevation, of one form of actuating or controlling means for the key in the computing machine for effecting either subtractions or additions;

Fig. 27 is a fragmentary detached detail, with parts in section, of the restoring mechanism for one form of the computing machine key actuating mechanism;

Fig. 28 is a fragmentary detached detail, on an enlarged scale, taken substantially on line 28—28 of Fig. 27;

Fig. 29 is a detached detail of the actuating mechanism for the stop pin restoring mechanism on the carriage and of the escaping mechanism for the carriage, and is shown in part in Figs. 1, 5 and 14;

Fig. 30 is a fragmentary detached plan, with parts in section, of the governor switch for timing the operation of the cam shafts from the operation of the computing machine, and it is shown also at the right-hand bottom part of Fig. 5;

Fig. 31 is a horizontal section, taken substantially on the line 31—31 of Fig. 30;

Fig. 32 is a detail, partly in elevation, and partly in vertical section, of the controlling mechanism for re-latching the bus-bar, part of this mechanism being shown on Figs. 1, 4, 9, 12, 13 and 14;

Fig. 33 is a detached detail, partly in elevation and partly in section, showing the mechanism for actuating and controlling the operating mechanism for the two cam shafts;

Fig. 33a is a view looking at Fig. 33 from the left;

Fig. 34 is a fragmentary detached detail of the operating mechanism for the correction or cancellation key of the computing machine;

Fig. 35 is a detail of part of the mechanism shown in the lower right-hand side of Fig. 34, showing the parts in a different position;

Fig. 36 is a part section and a part elevation, taken on the line 36—36 of Fig. 34, on an enlarged scale;

Fig. 37 is a detached fragmentary detail of the actuating and controlling mechanism for the total key and the non-print key of the computing machine;

Fig. 38 is a part section and part elevation, taken on line 38—38 of Fig. 37, on an enlarged scale;

Fig. 39 is a fragmentary detail of a part of a mechanism shown at the bottom of Fig. 37, and in Fig. 38, and shows the release for the non-print key actuating mechanism;

Fig. 40 is a detached detail, also showing part of a mechanism in the lower right-hand part of Fig. 37, and substantially looks at Fig. 38 from the left, showing the unlatching mechanism for the actuating mechanism for the total key in a different position;

Fig. 41 is a fragmentary detached detail of the actuating mechanism for transferring the temporary totals into the permanent totals;

Fig. 42 is a detached detail of the actuating mechanism for the clearance key of the computing machine;

Fig. 43 is an enlarged detached detail in vertical section of one of the commutators and of the cooperating circuit terminals;

Fig. 44 is a fragmentary front elevation, with parts in section, taken substantially on the lines 44—44 of Fig. 1;

Fig. 45 is an enlarged fragmentary top plan, corresponding to the central left hand part of Fig. 1, and is a complete plan of Fig. 46;

Fig. 46 is a transverse vertical section on the line 46—46 of Fig. 45;

Fig. 47 is an enlarged view of the right-hand side and the upper right-hand central portion of Fig. 44, showing the mechanism in a different position; and substantially on line 47—47 of Fig. 50;

Fig. 48 is a detail of the check holder, looking at it from the rear when it is in position in the machine;

Fig. 49 is a section taken on the line 49—49 of Fig. 48;

Fig. 50 is a detail vertical elevation, look-

ing at Fig. 47 from the right, and substantially on the line 50—50 of Fig. 1;

Fig. 51 is a detail, on an enlarged scale, of the central right-hand part of Fig. 47, employing a combination of two latches for a pull-bar for actuating a key of the computing machine;

Fig. 52 is a similar view showing a combination of three latches for actuating a key of the computing machine;

Fig. 53 is a section taken on line 53—53 of Fig. 50;

Fig. 54 is a diagrammatic view of one set of combinations for the selecting and actuating mechanism for the computing machine;

Fig. 55 is a detached detail, greatly enlarged, substantially on the line 55—55 of Fig. 5, showing the carriage restoring or elevating mechanism in inoperative position;

Fig. 56 is a view of the same mechanism, looking thereat from the back of Fig. 5, and from the top of Fig. 55, showing it in the operative position;

Fig. 57 is a fragmentary, enlarged detail in elevation of the master switch for controlling the magnet circuits, and is shown in the open circuit position at the lower right-hand part of Fig. 6;

Fig. 58 is a top plan with parts broken away, showing the casing for inaccessibly enclosing the machine;

Fig. 59 is a side elevation, with the casing largely broken away, showing the machine within the casing;

Fig. 59[a] is an enlarged detail of the hinge support shown in the lower right hand portion of Fig. 59;

Fig. 60 is an enlarged detail of the upper central part of Fig. 59;

Fig. 61 is a horizontal section on the line 61—61 of Fig. 60;

Fig. 62 is an isometric perspective of the enclosing casing;

Fig. 63 is a diagrammatic representation of the switches with their controlling magnets and circuits for the cam shafts and other mechanisms;

Fig. 64 is a similar view relating to the selecting mechanism for the computing machine;

Fig. 65 represents the guest-check holder with the guest-check therein ready to be inserted into and to operate the machine;

Fig. 66 is a fragmentary elevation of a different form of selecting and actuating mechanism for the computing machine;

Fig. 67 is a vertical section on the line 67—67 of Fig. 66;

Fig. 68 is a diagram on the circuits and controlling mechanism for Figs. 66 and 67, and cooperates with the mechanism of Fig. 63;

Fig. 69 is a top plan of another form of selecting and actuating mechanism for the computing machine;

Fig. 70 is an elevation looking at Fig. 69 from the bottom;

Fig. 71 is an elevation looking at Figs. 69 and 70 from the right;

Fig. 72 is a vertical section taken substantially on the line 72—72 of Figs. 69 and 71;

Fig. 73 is a circuit diagram for the mechanism of the preceding Figures (69, 70, 71 and 72) and cooperates with the mechanism of Fig. 63;

Fig. 74 is a fragmentary elevation generally similar to Fig. 9, but showing another form of the mechanism for controlling the carriage from the check holder;

Fig. 75 is a fragmentary top plan, looking at Fig. 74 from the top, and corresponding generally to Fig. 8, but showing the same mechanism as in Fig. 74;

Fig. 76 is a fragmentary elevation, corresponding to the top part of Fig. 74, with parts in section and with parts broken away, showing the mechanism in another position;

Fig. 77 is a view similar to Fig. 75, with parts in section and with parts broken away, showing the mechanism in the same position as Fig. 76;

Fig. 78 is a fragmentary rear elevation of the machine, with parts omitted and parts broken away, and showing the relation of the mechanism in the preceding figures to the general structure of the machine;

Fig. 79 is a fragmentary detail in vertical section, corresponding to the lower part of Fig. 76, and showing the operation of the machine and the position of the mechanism when there is no guest-check or equivalent device in the machine;

Fig. 80 is a fragmentary detail, partly in vertical section and partly in elevation, corresponding to the lower part of Figs. 74 and 76, but showing the mechanism in a different position;

Fig. 81 is a fragmentary detail elevation, corresponding to the upper right hand part of Fig. 6, and showing the relation of the master switch to the mechanism of the preceding figures;

Fig. 82 is a fragmentary detail, in vertical section, of a modified form of the contact finger and the bus bar mechanism;

Fig. 83 is a fragmentary view, on an enlarged scale, of the mechanism in the central part of Fig. 82;

Fig. 84 is a vertical section, corresponding to the lower and right-hand part of Fig. 82, showing the mechanism in a different position;

Fig. 85 is a top plan, with parts omitted and parts broken away, and showing the forms of mechanism which are also shown in Figs. 74 to 84;

Fig. 86 is a fragmentary side elevation with parts in section and parts broken away, and showing the mechanism of Figs. 74 to 85

in connection with other parts of the machine;

Fig. 87 is a fragmentary elevation, with some few parts in section, taken substantially on the line 87—87 of Fig. 88, and showing the key control and the identifying means for the waiter or other operator;

Fig. 88 is a fragmentary elevation, looking at Fig. 87 from the left, the upper part being in full and the lower part in section, taken substantially on the line 88—88 of Fig. 87;

Fig. 89 is a vertical section taken on the line 89—89 of Fig. 88;

Fig. 90 is a fragmentary detail section, taken substantially on the line 90—90 of Fig. 88, and showing the mechanism in a different position from Fig. 89;

Fig. 91 is a fragmentary detail, corresponding to the upper right hand part of Figs. 89 and 90, but showing the mechanism in a different position;

Fig. 92 is a view corresponding to Figs. 89, 90 and 91, showing the mechanism in a different position from the preceding figures;

Fig. 93 is a fragmentary detail, with parts broken away, of the actuating mechanism for the key controlling mechanism;

Fig. 94 is a fragmentary detail, corresponding to the lower part of Fig. 93, but showing the mechanism in a different position;

Fig. 95 is a perspective detached detail of the mechanism shown in Figs. 93 and 94 with certain cooperating parts;

Fig. 96 is a fragmentary detail, with parts in section, looking at Fig. 93 from the right;

Fig. 97 is a fragmentary detail, with parts broken away, the lower part thereof looking at Fig. 93 from the left, and the upper part thereof showing the guarding device for the key mechanism;

Fig. 98 is a fragmentary detail showing the relation and connection of the mechanism of Fig. 95 to the control for the clearance key mechanism (shown also in Fig. 42);

Fig. 99 is a fragmentary detail, corresponding to the upper part of Fig. 87, but showing the mechanism in a different position;

Fig. 100 is a vertical longitudinal section, taken substantially on the line 100—100 of Fig. 99, and showing the key after a half rotation;

Fig. 101 is a fragmentary view, corresponding to the left-hand end of Fig. 100, and showing the key nearly withdrawn and operating a part of the controlling mechanism;

Figs. 102 and 103 are details explaining the embodied form of key;

Fig. 104 is a perspective view of the mechanism for setting a numeral key of the computing machine from the operator's key;

Fig. 105 shows a somewhat different form of the same mechanism;

Fig. 106 is a perspective view, showing the mechanism of Fig. 101 with cooperating parts;

Fig. 107 is a fragmentary top plan of the key guard and its controlling mechanism;

Fig. 108 is a fragmentary elevation looking at Fig. 107 from the direction of the bottom of the sheet, with the external casing removed;

Fig. 109 is a perspective view, showing portions of the mechanism shown in Figs. 107 and 108 and certain cooperating controlling mechanism;

Fig. 110 is a fragmentary detail in elevation of the actuating and controlling mechanism for the key guard;

Fig. 111 is a similar view looking at the same mechanism, showing manner of resetting same;

Fig. 112 is a fragmentary top plan, with parts broken away and parts in horizontal section, showing the mechanism of Figs. 110 and 111 with certain cooperating parts;

Fig. 113 is a perspective view of part of the mechanism shown in Figs. 87, 88, 93, 97, and 99;

Fig. 114 is a fragmentary detail of a part of a modified form of the cancellation mechanism;

Fig. 114[a] is a diagrammatic view showing electrical circuits in connection with the key-operated mechanism;

Fig. 115 is a view of the same mechanism, looking at Fig. 114 from the right;

Fig. 116 is a partly diagrammatic view, showing the mechanism of the two preceding figures in relation to the commutator switch for the electro-magnet, and the relation of the operative switch to its circuit; and

Fig. 117 is a detailed fragmentary plan of the circuit controlling mechanism cooperating with the guest-check and the like, and showing partly the correction contact finger in relation with the other fingers.

The present invention is capable of independent use and utilization in a business, but in many of its features it is especially adapted for use and employment in the system and in the series of automatic mechanisms referred to later herein. The present invention finds one of its widest fields of usefulness and application in connection and cooperation with such machines as the "controllers" of my copending applications Ser. No. 283,817, filed March 20, 1919, and Ser. No. 527,516 filed January 6, 1922; and in a somewhat different relationship, but also in close mutual cooperation with the machines and systems of my other copending applications for what I conveniently term the "token depositor", Serial No. 548,250, filed March 30, 1922, and the mechanisms conveniently called "annunciators" Ser. No. 449,560, filed March 3, 1921, and also disclosed in application Ser. No. 548,250 just mentioned.

One of the main objects of my system and

series of cooperating mechanisms, and of the present particular invention in itself and as cooperating with the other inventions, is to provide intrinsic or involuntary automatically computed data and information for the control of the business, which data and information is computed, produced, and expressed by the conduct of business itself, that is, the human agents involved necessarily and involuntarily perform their parts in the controlling and recording operations (without the need of volition or recollection on their part) through the mere and necessary acts involved in performing the business. Thereby the complete and immediate information requisite and helpful for the correct, efficient and profitable management of the business is immediately made, and conveyed or rendered available to the managing authority essentially during and by reason of the transaction of the business.

By my general invention the transaction of the business in itself, without impeding such transaction, is conducted so that the business of each day produces, immediately available for the controlling person or authority, the information necessary or pertinent to the immediate management of the business. In other words, at the close of business each day, the managing authority has all essential facts, such as volume and value of sales of each commodity, prices of units, identity of salesmen and supply men or other dispensers or agents involved, together with inventory decreases or changes and so on.

That is, immediately at the close of each day, or other predetermined business period, there is infallibly furnished involuntarily (as do in their spheres the compass, the steam gage, the speedometer and the like), without the assistance or employment of any kind of mathematical or accounting labor, all requisite managerial data, much of which data in the present usual and ordinary transaction of business is not obtainable at all, and that data which is obtainable in the present and ordinary transaction of business can be deduced and gotten together only by much extra labor and expense, and only after such a long lapse of time that its chief utility and efficiency as information to aid in controlling the business is practically lost or nullified. Again, usually the present requisites or data are the results of computations and statistical entries effected by clerical work, and as such are not infallible.

The invention provides means and instrumentalities which involuntarily compute and indicate in a complete and fully safe-guarded manner all essential data of all the business transactions, necessarily and automatically, from the mere transaction of the business. In addition, the invention immediately, at the end of each day or other selected period, detects losses, that is, discrepancies between sales or dispensings and inventory or supplies. As set forth in my copending applications, already referred to, and referring for the sake of clearness to the exemplary application of the invention to a restaurant or a dining-room business, it will be recalled that the waiter or other sales agent, is able to execute an order for food, or other commodity sale, only by inserting the guest-check, or other equivalent instrumentality, into the "controller". This acts records on the guest-check or the like, in words and letters the name and quantity and price of the commodity, and also makes perforations in the guest-check or the like, which are recognizable for certain purposes by the machine of the present invention, as will be later described. At the same time, certain records are made within the "controller" involuntarily by, and inaccessible to, the waiter, or other sales agent, and a commodity-demanding token, or like medium, which is essential to securing from the source of supply the commodity sold, dispensed or otherwise handled, is issued from an inaccessible supply within the controller.

It will be further recalled that records are made in the kitchen, or other supply station, of the sale of food, or other commodity transaction, one such record being voluntarily deletable by the supplying agent in connection with the preparation of the sold, dispensed or handled commodity, and other record being deletable involuntarily and inaccessibly by the deposit of the commodity-representing token, or other medium, the token then becoming an inaccessible record both against the sales agent and the supply agent, and is accessible only to the supervisory authority.

The present invention, in certain of its aspects, is especially designed to cooperate with the foregoing system and mechanisms, and may be exemplarily broadly described, without being limited, in this relation. The guest-check, as imprinted, perforated or equivalently automatically, inaccessibly and involuntarily marked by the controller mechanism, is merely and preferably necessarily, inserted by the waiter or other operator in the "totalizer" of the present invention, and in like automatic involuntary and inaccessible manner the totals of the imprinted commodities and their prices are printed on the guest check and on the stub. That is, more broadly stated, an automatic and necessarily accurate recording is made, of necessity and safe-guarded from tampering or accidental errors, of the total of such transactions, both for the customer upon his bill or equivalent record, and for the house or supervisory authority, thereby guarding against peculations, omissions, mistakes or other accidental or intentional irregularities and errors.

In connection therewith, the total of the transactions represented by any bill, guest-

check, or the like is automatically transferred into the inaccessible totals of the computing mechanism, thereby making a continuing record, both for the day or other predetermined business period, and for more protracted periods as desired, of total transactions in a particular department, or from a particular class of commodities, or in or from some other source or classification.

In connection therewith, are provided means for safe-guarding the mechanism against interference, tampering or fraudulent operation, together with means for compelling the making of a record of the identity of each authorized person each time the mechanism is operated by him.

Broadly defined, as embodied, a computing mechanism equipped with permanent recording or storing means, and adding or other computing mechanism for making totals for each bill or guest-check, together with mechanism for recording the identity of the sales agent, or other authorized operator, is inaccessibly enclosed within a casing, together with an automatic controlling mechanism therefor. This latter mechanism has instrumentalities, likewise in accessibly inclosed within the casing, and cooperating with the record made on the bill, guest-check or the like, to properly operate and control the computing and recording mechanism in the manner already generally described.

More in detail, and referring to the particular and exemplary application to the restaurant or dining-room business, the guest-check in the holder which was employed to insert the guest-check into the "controller" is inserted into the "totalizer" of the present invention. The insertion of the guest-check and holder starts the totalizer into operation. The controlling mechanism in the totalizer cooperates successively with the successive sets of perforations made in the guest-check by the controller, and operates upon the computing mechanism of the totalizer to add these items together, and when they are all added together the computing mechanism will print the total thereof both upon the guest-check and upon the guest-check stub, and will transfer the value thereof into the total dials of the computing mechanism.

If desired the guest's check stub may be returned to the waiter as his receipt for the amount indicated as a total thereon and given to him when the guest's payment has been turned into the cashier; the latter retaining the itemized part of the check.

Each waiter is supplied with an individual identifying key, and this enables him to start the totalizer into operation, but only after the guest-check and holder have been properly positioned in the mechanism, and at the same time the key records his identity both upon the check and upon the stub. In connection with this optional mechanism, means are provided for preventing partial operation, premature withdrawal, or other tampering or improper operation of the mechanism by means of the key.

There are other features, functions, and means which will be set forth for the first time in connection with the following detailed description of the invention; and it will be understood that the foregoing general description and the following detailed description are exemplary and explanatory, but are not restrictive of the invention.

Referring now to the embodied form of the carriage for holding the frame for the guest-check or other record receiving medium (Figs. 2, 3, 4, 5, 5ª, 5ᵇ, 5ᶜ, 5ᵈ, 6, 9, 12, 13 and 14), the carriage (see especially Figs. 5 and 5ª) comprises a bottom cross-reach 2 and two upwardly extending side reaches 3 and 4, and a top cross-reach 5. As embodied, the carriage travels to and fro in a vertical path, and for this purpose suitable guides are provided (Figs. 4, 5 and 14), one guide comprising a rod 6 mounted at its bottom end in a bracket 8 (see Fig. 5) carried upon the frame piece 9, and secured by a pin 10. Mounted on the bottom end of the rod 6 is a longitudinally adjustable or movable collar 11, having a clamping screw 12, and acting as a stop for variably limiting the downward travel of the carriage at its lowest position. The rod 6, is also supported by a bracket 14 (Fig. 4), fixed thereto upon the outer side thereof and also mounted upon the horizontally-disposed plate 15.

On the opposite side, (Figs. 4 and 5) the carriage is guided on a rod 18, supported at its lower end in a bracket 19, fixed to or mounted upon the part 20 of the machine frame. The rod 18 at its upper end is carried in an apertured support 21, formed in the upper part of the bracket 22, carried upon and fixed to the plate 15. A pin 23 passes through the bearing 21 and through the shaft to hold it in position. The carriage is provided with suitable guiding means for running upon the guiding rods 6 and 18, and as embodied, fixed to the carriage and running on the rod 6 (see also Fig 5ª) are two recessed lugs 24 and 25, located respectively near the top and bottom ends of the carriage, and shaped to fit and run along the rod. On the opposite side, cooperating with the rod 18, are a pair of rollers 26 (see particularly Figs. 5, 5ª and 12) running on either side of the rod 18.

In the embodied form, the guest-check, or other record receiving medium, is carried within a holder which is insertible into and withdrawable from the carriage (Figs. 4, 5, 5ª, 5ᵇ, 5ᶜ, 5ᵈ, 6, 14, 48, 49 and 65). Referring first to the embodied form of check holder (see especially Figs. 4, 48, 49 and 65) it comprises a frame 34, having end reaches 35 and 36 and side reaches 37 and 38. The frame 34 is double, the guest-check is slipped there-

within so that the frame holds it and protects it on both sides. The principal details of the guest-check (or equivalent record receiving medium) holder are shown in a copending application for patent, Ser. No. 444,502, of A. L. Saltzman, filed Feb. 12, 1921, and need not be described herein except insofar as they relate to the cooperation of the guest-check and guest-check holder with the present machine.

As embodied, there are a series of holes 39 in the reach 37 of the guest-check holder, through which the guest-check 40 is perforated in the controller, (shown and described in my copending application Ser. No. 527,516, filed January 6, 1922) with perforations 41, which correspond to the various items 42, respectively, printed with their prices upon the guest-check, by the controller. In the guest-check there are also made perforations 43, by the controller, which correspond to the prices printed against the various items 42, the perforations 43 and the mechanism and manner of making them being likewise fully described in my said copending application Ser. No. 527,516. These perforations 43 are recognized by and serve to control the present machine in the manner hereinafter described.

On the guest-check (Fig. 65) is shown printed twice a total 44 being the sum or total of the different prices 42 and corresponding to the accompanying and corresponding perforations 43, which total is printed in duplicate by the present machine, as shown at 44, under the control of the perforations 43, once on the check and once on the stub, as shown. Additional data, such as a serial check number 45, the date 46, and the waiter's identifying number 47, may be printed upon the check by mechanism later described herein.

In the present machine, the guest-check 40 in its frame 34 is inserted into the carrier already described, the carrier being provided with internal guideways (Figs. 5^b, 5^c, 5^d, 6, 8 and 14), one vertical guideway being indicated by reference numeral 48 and the other by reference numeral 49.

Means are provided for enclosing and locking the guest-check holder in the carrier, and as embodied (Figs. 4, 5, 5^a, 5^b, 5^c, 6 and 9), a bar 54 has a hub 55 pivoted on a pin 56, mounted at one of the upper corners of the carriage. On the under side of the bar 54 (see Figs. 4 and 5^a) is fixed a bow string 57, which in the closed position presses against the upper end of the guest-check frame and holds it firmly in position within the carriage. The bottom face 58 of the bar 54 rests upon the upper surface of the lug 25.

Means are provided for firmly latching and locking the carriage closure in closed position, and cooperating therewith are devices for automatically starting the machine upon the closing and locking of the closure of the carriage. As embodied (clearly shown in Fig. 5^a), a bar 60 is pivotally mounted on a pin 61 carried upon the bar 54, and a coiled spring 62 is under tension between the bar 60 and the bar 54, being nested in the latter. A handle 63 is pivoted at 64 upon the bar 60, and a stop pin 65 limits its movement in one direction. The handle 63 is formed on a lever, which has a slot 66 formed in the end of its other arm 67.

A latching lever 70 is pivoted at 71 on the bar 54, and has a detent notch 72 formed in the lower end thereof. A pin 73 is fixed to the latch lever 70 and projects through the slot 66 in the arm 67 of handle-lever 63. A tail 75 on latch lever 70 cooperates with a stop pin 76, fixed to the bar 54, and a spring 77 is in tension between the lug 78 on the latch lever, and a pin 79 on the bar 54, yieldingly holding the latch lever in locking position, with its tail 75 against the pin 76. A squared pin 80 is fixed in the carriage and forms the locking stop for the latch lever.

Means are provided also for locking the latch lever so that the carriage closure may not be opened or otherwise disturbed during the operation of the machine. As embodied (clearly shown in Fig. 5^a), a locking lever 82 is pivoted at 83 upon the carriage, and a spring 84 is carried at 85 on the carriage and acts against a pin 86 upon lever 82 to impel it into the unlocking position, as shown in Fig. 4. Formed in the upper part of the guide-rod 6 is a recess 89, into which the locking lever is moved by the spring 84, as shown in Fig. 4, when the carriage is in its uppermost position. The recess 89 is positioned and shaped so that when the carriage starts on its downward travel, the locking lever 82 in passing out of the recess 89 is moved to the locking position shown in Fig. 5, bearing against the guide rod 6, and during the entire travel of the carriage forwardly and back the lever 82 is held in the locking position of Fig. 5. When the carriage at the completion of the return movement is again in the position of Fig. 4, locking lever 82 is moved by spring 84 into the recess 89 and thereby automatically unlocks and permits the unlatching and the opening of the carriage closure, as when it is in this position handle lever 63 may be rocked about its pivot 64 to move the latching lever 70 clear of the stop 80 on the carriage.

A closure or casing 90 (Figs. 4, 5^a, 6, 59 and 62) is provided about the carriage closure which cooperates with a general closure for the machines which will be later described, the operating handle-lever 63 projecting through a slot 91 in the casing 90. A spring 92 is in tension between a pin 93 on bar 54, and a pin 94 on a lug formed on the side of the carriage, to hold the carriage closure in open or elevated position.

Referring now to the embodied form of means for automatically starting the machine upon the closing of the carriage closure (Figs. 4, 5, 5ª, 5ᵇ, 5ᶜ and 6), pivotally connected at 101, to the end of the bar 60 is a bar 100 working in a vertical guideway in the end of the bar 54 (Figs. 4, 5ª, 5ᵇ, 6, 9 and 14), provided with a slot 102, through which projects a guiding and retaining pin 103 mounted in the bar 54 and also with a slot 104, through which projects a guiding and retaining pin 105, likewise fixed in the bar 54.

In operative relation with the longitudinally sliding bar 100 is a longitudinally sliding bar 106 (Figs. 4, 5, 5ª, 5ᵇ, 6 and 9), mounted upon the carriage and adapted to be moved longitudinally by the bar 100. The bar 106 has a slot 107 formed therein through which projects a pin 108, mounted on a lug 109, formed on the side of the carriage. Likewise there is a slot 110 in the lower part of the bar 106, through which projects a guiding and retaining pin 111, mounted on a lug 112, fixed to the carriage. A spring 113 acts to maintain the bar 106 resiliently in the upper or open switch position, the spring being in tension between a pin 114 on the bar 106 and a latch member 315 (Fig. 5ᵇ) later to be described. The sliding bar 100 moves the bar 106 downwardly against its spring 113 by means of a pin 115, fixed in the upper end of the bar 106 and against which the bottom of the bar 100 abuts.

In the embodied form, the automatic means for starting the machine operated by the closure of the carriage, is electrical, and as so embodied comprises a switch mechanism (Figs. 6, 14 and 63) which operates to release the carriage. As so embodied, a pair of circuit terminals 120 and 121 suitably mounted on a bracket 124 are in operative position with an insulated switch lever 122, which is pivotally mounted at 123 upon the bracket 124, fixed and supported on the frame plate 15. The switch lever on its pivotal support 123 has an angled arm 125, which extends across the path of, and is located above, the pin 115 already described. Lever 122 has also an arm 126 projecting oppositely to the arm 125.

Mounted on the switch lever 122 (see also Fig. 81) is a spring-pressed, longitudinally reciprocable plate 127, having a slot 128 therein through which passes a guiding rivet 129, fixed in the arm 126. Plate 127 has also a slot 130 therein, through which the pivot bearing 123 for the switch lever passes. A spring 132, in tension between a pin 133 in the plate 127 and the pivot pin 123 resiliently holds the plate 127 to the left in Fig. 6. The inner end of plate 127 is located beneath the pin 115 on the bar 106, already described, and plate 127 is provided on the under side thereof with a cam surface 135. Thus when the carriage closure is closed bar 100 is moved downwardly and thereby moves bar 106 downwardly to the position shown in Fig. 6.

During this movement, pin 115, in engagement with the upper surface of plate 127, rocks the switch blade 122 from the broken line to the solid line position of Fig. 6, thereby closing the circuit at the terminals 120, 121, the pin 115 passing downwardly out of engagement with the plate 127. When the carriage has completed its travel and returns again to the upper end of its path, the pin 115 engages with the under side of the arm 125, and throws switch lever 122 from the solid line to the broken line position of Fig. 6, thereby breaking the circuit at the terminals 120, 121. The beveled end 135, the spring 132, and the pin and slot mounting for the plate 127 permits the plate to yield endwise, if necessary, to insure the pin 115 passing by and engaging the arm 125 as just described. This also insures the pin 115 being on the upper side of the plate 127 in position to again close the switch when the carriage closure is again closed.

Referring now to the embodied form of the cooperating carriage releasing mechanism (Figs. 2, 4, 4ª, 5 14 and 63), electrically controlled and actuated means are shown for holding the carriage in its topmost position and for releasing it therefrom, operating automatically when the carriage is closed. In said embodied form, a pin 150 is fixed on lug 25 on the carriage. Cooperating therewith is a lever 151, pivoted at 152 upon a lever arm 153. Lever arm 153 is fixed to a hub 154 fixed on a shaft 155, journaled in bearings 156 and 157 in a bracket 158, fixed on the supporting plate 15 of the frame.

Means are provided in connection therewith for accurately positioning the carriage at its top or initial position, said means permitting a slight overthrow of the carriage in connection with the throw-out of the clutch in the carriage returning or elevating mechanism (to be later described), and also to permit the resetting of other mechanism through the machine. As embodied, the upper end of lever 151 is provided with a jaw 160, extending laterally therefrom, the lever being recessed or narrowed at the part 161 beyond the jaw 160, adapted to coact with pin 150 on the upward movement of the carriage, and then having a jaw 162 spaced away from and extending in the same direction as the jaw 160. Jaw 162 is provided with a recess 163, adapted to receive the pin 150 on the upward movement of the carriage. Pivoted on the jaw 162 is a spring-pressed damping arm 165, pivoted at 166. At its opposite end arm 165 is acted on by a tension spring 167, connected between a pin 168 on the arm 165 and a pin 169 on the lever 151.

A stop pin 170 (Figs. 2, 4 and 14) positioned in the narrow part 161 of the lever 151 contacts with the underside of the arm 165 to limit or control the operation of the arm 165

about its pivot 166 when the pin 150 is in the position as shown in Figs. 4 and 5.

Thus when the carriage returns upwardly, pin 150 will enter between the jaws 160 and 162 and swing the lever 151 upwardly, Fig. 5 showing the parts intermediately in this movement. As the carriage ascends and as lever 151 rocks, pin 150 will move upwardly into the recess 163, the arm 165 yielding against spring 167 and damping or checking the carriage movement. At the same time, by reason of the pin 150 being in the recess 163, the lever 151 is held in proper position in engagement with the pin 150. After the clutch disengages, on the carriage return mechanism, later described, the carriage will drop backwardly slightly to its proper top position and will rest on jaw 160, but at this time lever 151 is locked in the position of Fig. 4, as will later be described.

Referring again to the automatic carriage releasing mechanism, a switch lever 174 is fixed also to shaft 155 by means of a hub 175 pinned to the shaft 155. Switch lever 174 cooperates with circuit terminals 176, 177 and 178, in the upper position (shown in Fig. 4), closing one circuit and in the lower position (shown in Fig. 5) closing another circuit.

A latching lever for holding the carriage in the initial position, and electro-magnetic means for releasing said holding means are provided in connection with the mechanism now being described. As embodied (Figs. 4 and 4a), the bottom end of lever 151 is provided with an angled end 180, which operates as a detent and cooperates with a latch 181, formed in the end of a lever 182, which lever is fixed to a sleeve 183 loose on shaft 155. Fixed also on sleeve 183 is a lever arm 184, to which is pivotally connected a rod 185, an armature 186 for a pair of magnets 187 being fixed to the other end of said rod. For the purpose of supporting and guiding the rod 185, a brass pin 188 projects into a central aperture in the rod, said pin being supported on the frame 189, which supports the magnets.

The lever arm 153 is provided at its top end with an angled portion 194, which acts as a stop for the angular travel of the lever 151 in both directions, its stopping action at the upper end of the lever 151 being shown in Fig. 4, and its stopping action at the other end of the lever occurs at a fixed position somewhat beyond that shown in Fig. 5. A tension spring 196 is fixed to a pin 197 in lever arm 151 and to a pin 198 on lever arm 182, which holds the lever 151 and latch lever 182 in an unlatched or broken position, slightly beyond the position shown in Fig. 5, holding the lever 182 in readiness to relatch at the points 180 and 181, when the carriage is raised to the initial or upward position, as shown in Fig. 4. In this position spring 196 is in tension between the lever 151 and the latch 182, to facilitate the operation of unlatching points 180 and 181, which is effected (see Fig. 63), when the magnets 187 are energized, through the armature 186, the rod 185, the lever 184, and the bushing 183 on the shaft 155. A spring 199 is in tension between a lug 200 on lever 182 and a rod 201 supported on the frame member 158, which is carried on frame plate 15. By referring to Fig. 63 it will be obvious that the closing of circuit at 120, 121, 122 the magnet 187 will be energized. On the hub of lever 153 is a tail 203, and fixed to lever 182 is a tail 204, with both of which cooperates a stop rod 205 carried in the bracket 158.

The manner of operation of the mechanism just described is substantially as follows:

When the guest check and its frame have been inserted in the carriage, and the carriage closure latched thereover, switch blade 122 is deflected into circuit terminals 120 and 121, and the switch is thereby closed, as already described.

The closing of switch 122 energizes magnet 187, which disengages the detent lever 182 from lever 151 at points 180 and 181, which is then unlatched to rotate about its pivot 152, being impelled by the spring 196. The carriage consequently begins to drop downwardly, and in doing so, pin 150 will allow lever 151 to swing downwardly and will also impel it toward the left in Fig. 4, thereby rocking lever 153 to the left very quickly and suddenly. Switch blade 174 will thereby be moved quickly from the position of Fig. 4 to that of Fig. 5, which cuts out the magnet 187 from its circuit until the return of the carriage and until the mechanism is brought back into the position of Fig. 4. The circuit, however, at the position of the carriage as shown in Fig. 4 is opened by the withdrawal of the switch blade 122 from the circuit terminals 120 and 121, and held open by the pin 115 (Fig. 6) until operated again by the next successive release of the carriage in the manner already described.

In the embodied form, the carriage after being so released, is free to move downwardly by gravity to the first stop pin which is set, as will be later described, and means are provided for permitting a free downward movement of the carriage but at the same time preventing any slamming or violent action. For this purpose an air cylinder or dash-pot cylinder 210 is provided, having a piston 211 and a piston rod 212, which is connected to a lug 213, fixed to and extending outwardly from the side of the carriage (Figs. 5 and 6). This mechanism is provided with air valves in a well-known manner to permit the carriage to descend quickly but gently to the first set stop pin.

Means are provided by the invention for feeding the carriage forward, step by step, which would be downwardly in the present embodiment, to bring the successive items or

entries on the guest check or other controlling medium into cooperative relation with the setting and controlling means for the calculating machine.

As embodied (Figs. 2, 3, 5^a, 5^b, 5^c, 5^d, 6, 7, 8, 9 and 15), said means comprises a series of stop pins which cooperate with, that is, are set by, the perforations 41 in the guest check (shown in Fig. 65 and already described) and with the cooperating mechanism cause successive intermittent feeds of the carriage to bring the successive lines of perforations 43 into position to operate and control the computing mechanism.

Referring now to the embodied form of stop pin mechanism on the carriage, which cooperate with perforations 41 to stop and to feed the carriage (Figs. 5^a, 5^b, 5^c, 5^d, 6, 7, 8, 9 and 14), a stop pin frame or carrier block 225 is mounted in fixed position on the side reach 3 of the carriage, the block or piece 225 constituting one part of the guide for the guest check holder, as shown in Figs. 8 and 14. The block 225 is provided with a series of apertures in which are slidably mounted a series of horizontally-disposed, longitudinally-slidable, equally spaced apart stop plates or members 227, these members being spaced apart equidistantly with the perforations 41 and 43 in the guest check, which latter operate the actuating and controlling mechanism for the computing machine. The stop plates 227 (with one exception as will be later described) are provided at their inner ends with pins 228 adapted to find and to pass through the perforations 41 in the guest check already described.

The stop plates are yieldingly impelled inwardly, that is, toward the guest check, by tension springs 229, fastened to pins 230 in the respective stop plates and to a corresponding pin 231 fixed in the block 225 (Figs. 7 and 9). It will be seen that thereby the stop plates are yieldingly impelled against the guest-check and the pins 228 will find and enter the corresponding perforations 41, when they exist.

Means are provided for retracting and holding in retracted or inoperative position all the stop plates except when it is desired to have them cooperate with an inserted guest check or like controlling member. This mechanism, as embodied (Figs. 5^a, 7 and 8), comprises a bail or universal bar 234, vertically disposed, and positioned on the inside of heads or projections 235 formed on the outer ends of each of the stop plates 227. The bail 234 is carried at its top and bottom ends on arms 236 and 237, fixed on a vertically disposed shaft 238, which is journaled in lugs 239 and 240 fixed on the block 225. It will be seen from Figs. 7 and 8 that when the bail is in the position of Fig. 7 the stop plates may slide inwardly, that is to the right in Fig. 7, so as to pass through the perforations 41. When the bail is moved from the full line position of Fig. 8 to the broken line position of that figure, all the stop plates are thereby retracted from the full line position to the broken line position, shown in Figs. 7 and 8.

Referring now to the embodied form of means for operating the bail 234 to so retract the stop plates after they have been in operation and later to permit them to come into cooperative relation with the next succeeding guest check or equivalent device, the arm 236 is provided with a tail 241, which is operated in connection with the escapement or feeding mechanism for the carriage which will next be described.

Referring now to the successive step by step feed of the carriage, just referred to, each stop bar 227 is provided in its side with a recess 260 (see Figs. 5^d, 7 and 8), with which recess an escapement lever 261 (see especially Figs. 6, 15 and 57) cooperates, which also serves in the present embodiment as a circuit controlling mechanism for the setting and actuating mechanism for the computing machine, and may be conveniently termed a master switch. That is, when any of the stop pins 228 are in corresponding perforations 41, their stop plates 227 are set, that is, are in the position of Figs. 7 and 8, and lever 261 will cooperate with the lowermost set stop plate, and will correspondingly stop and position the carriage with the corresponding perforations 43 in position to actuate and control the computing machine. When the stop plates are in retracted position, their respective recesses 260 are in line or register with the escapement lever 261, and the carriage can therefore pass downwardly, and the escapement lever will cooperate with the next set stop plate to again position the carriage.

As embodied, the escapement lever 261 is pivoted at 263 upon the machine frame, and is resiliently impelled into its upward position by a tension spring 264, fast to a lug 265 on the lever and to a lug 266 on the bracket 124. An adjustable stop 267, screw-threaded into lug 266, provides an accurate and nice adjustment for the feeding movement of lever 261. At its other end lever 261 is provided with an insulated switch blade 270, which cooperates with circuit terminals 271 and 272 in a manner and for a purpose hereinafter to be described.

Means are provided for successively retracting the set stop plates to permit the step by step feed of the carriage at the completion of each successive setting and actuation of the computing machine. As embodied (see especially Figs. 7, 14, 15 and 29), an arm 280 is fixed to a shaft 281, which shaft extends downwardly through the frame plate 15, and has fixed to the bottom end thereof an arm 282. Pivoted to the end of arm 282

at 283 is a link 284, which link at its opposite end 285 is pivoted to an arm 286, which arm is fixed on a shaft 287 (Figs. 1, 2, 3, 5, 6, 14, 15, 29 and 85). Shaft 287 is journaled at 288 on the plate 15 and at 289 on the bottom plate 290 of the frame.

Fixed on shaft 287 (Fig. 29) is an arm 291, and pivoted thereto at 292 is a link 293, which link at its other end 294 is pivoted to a bell-crank lever 295. The other end of lever 295 has a cam roller 296, cooperating with a cam 297, which cam is fixed on cam shaft 298 (which will be conveniently styled the first cam shaft). It will be understood that the cam 297 will actuate the mechanism after each successive operation of the computing machine to retract the particular stop plate 227, which permits the carriage to advance the distance to the next set stop plate 227, which will then be stopped and positioned by the escapement lever 261 in the manner already described.

Referring now to the cooperating mechanism for actuating the bail 234, which retracts, and later permits the advance of all the stop plates 227, it may be stated that after the arm 280 has retracted a particular stop plate, and the carriage has consequently fed forward or downward, and thereby the stop plate moves away from the arm 280, the stop plate will again advance by the pin 228 entering the corresponding perforation 41, but as it is passed the escapement mechanism this is an idle movement.

When the carriage has reached the bottom end of its travel, and the various functions are completed, the bail 234 restores or retracts all the stop plates and holds them retracted until the next operation of the carriage with the next succeeding guest-check or equivalent controlling and actuating device. It is obvious that the carriage is thus free to be returned to the starting position when desired. In the embodied form of the bail actuating mechanism (Figs. 8 and 14), an arm 302 is fixed to a sleeve 303, which is loose on a stub shaft 304. Fixed to sleeve 303 is an arm 305. To arm 305 there is pivoted at 306 a link 307, which link at its other end 308 is pivoted to an arm 309, fixed by a hub 310 to shaft 281. At the bottom limit of the travel of the carriage, arm 241 comes into alinement or operative relation with arm 302, and thereby bail 234 is rocked from the full line position of Fig. 8 to the broken line position of that figure, thereby retracting all of the stop plates.

Referring now to the embodied form of means for retaining the bail and the stop plates in retracted position until the starting of the carriage on its next trip (Figs. 5b, 5d, 6, 8, 9, 14 and 15), there is pivoted on the side of the carriage at 314 a latching lever 315, provided with a hook 316, which snaps behind the arm 241 on the bail arm 236 when the latter is in the broken line position of Fig. 8. This action of the lever is effected through the tension spring 113, already described.

Means are provided which will permit the locking action of the lever 315 already described, and which will also actuate the lever to release the bail 234 and the stop plates 227 when the carriage closure is next closed. For this purpose (Figs. 5b and 9) a dog 318 is pivoted at 319 in a recess 320 in the bar 54, and is resiliently held in the position of Fig. 9 by a tension spring 321, located in a recess in the bar 54.

When the carriage closure is opened the spring 321 will permit the dog 318 to rock downwardly in Fig. 9 and snap by the lug 322 on latch lever 315 so that the levers are not disturbed from locking position when the bar 54 of the carriage closure swings upwardly. When the carriage closure is closed, dog 318 will be in the broken line position of Fig. 9 and full line position of Fig. 5b, as will also the lever 315, and the dog will then depress lever 315 against spring 113, and will release arm 241 and therewith the bail mechanism. By the release of the bail, stop plates 227 will move to the position of Figs. 7 and 8, permitting such of the pins 228 as are in register with perforations 41 in the guest-check to find and enter these perforations, and will then be in proper relation to the corresponding perforations 43 to make the successive setting of the computing mechanism.

Assuming that the guest check 40 in its holder 34 is inserted in the guideways 48 and 49 of the carriage, the carriage closure is latched thereover as above described. When the carriage closure is closed, dog 318, pivoted on bar 54, depresses lever 315 against its spring 113, thereby releasing arm 241 and the bail 234, allowing the stop plates and pins 227, 228 carried in block 225 on the carriage to move forwardly under the action of their several springs 229 to find and enter the perforations 41 in the guest check.

Also, bar 100, pivoted to bar 60, moves downwardly and moves bar 106 downwardly carrying the pin 115 which engages with the longitudinally reciprocable plate 127 of lever 122, and by moving downwardly with bar 106, moves the switch lever 122 to closed circuit position, and passes downwardly out of engagement with the plate 127.

The magnet 187 is thereby energized, and disengages detent 182 from lever 151, which is rotated about its pivot by spring 196. The carriage being thus released begins to drop downwardly, carrying pin 150, which rocks lever 153 to the left, as viewed in Fig. 4, causing switch blade 174 to move quickly to the position of Fig. 5. This cuts out magnet 187 from its circuit.

The carriage moves downwardly, too sudden movement of the carriage being prevented by the air cylinder 210, until the lowermost stop plate 227 contacts with escapement lever

261, which stops the downward movement of the carriage with the guest check and its perforations 43 in position to cooperate with the detector fingers 354 and 355 and the bus bar 390. At this time the circuit for the setting and actuating mechanism for the computing machine is closed by switch blade 270 carried by the lever 261, which is moved into circuit closing position as the stop plate 227 bears downwardy on the escapement lever 261, (see Fig. 15).

After actuation of the computing machine, governed by the perforations 43 as positioned by the stop plate, the set stop plate is withdrawn by arm 280 (Fig. 7) actuated from the first cam shaft 298 by the lever mechanism of Fig. 29, and the carriage, being thus released, again moves downwardly as before until the next plate 227 brings the carriage to its next stopped position by contacting with the escapement lever 261, which, when released by the withdrawal of the first stop plate, acted on by spring 264, has opened the switch 272. At the next stopping position of the carriage, the foregoing operations are repeated.

At the end of the downward movement of the carriage, determined by the position of the adjustable stop collar 11, arm 241 of the bail 234 comes into operative relation with arm 302, which is actuated by the first cam shaft 298 through shaft 281 to move the bail 234 to retract all the stop plates to inoperative position, the bail being held in this position by latching lever 315, which is released, as above described, when the next guest check is inserted.

After reaching the limit of its downward movement, the carriage is returned to its initial position for the withdrawal of the guest check or equivalent device and the insertion of a new one by the roller chain mechanism of Fig. 23, hereinafter referred to.

The machine as embodied is designed to print upon the guest check the total of the various items represented by the various groups of perforations 43, and to print these totals upon both the stub and the check, as shown at 44 in Fig. 65. There is, therefore, on each cycle of the machine a stop of the carriage to print each of these totals, and for this purpose, as embodied (Fig. 9), the upper stop plate 227ª, corresponding to the stub total (the separating line between the stub and check being represented by line 323 in Fig. 65) is not provided with a pin 228, and is therefore set in stopping relation with respect to the escapement lever 261 for each trip of the carriage. The check total 44, that is the one above line 323 in Fig. 65, is printed at the last position of the carriage.

Referring now to the embodied form of the selective mechanism whereby the guest check or equivalent controlling device controls the setting and operation of the computing machine (Figs. 3, 6, 12, 13 and 14), said means is electro-magnetically operated and controlled.

Referring to the details of said embodiment, a series of insulated electric wires 340 lead from the respective selective devices (later to be described) through an insulated cable casing 341, which is mounted in a block 342, carried upon one end of an insulated plate 343. Plate 343 is mounted on bracket 345 fixed to and supported on the plate 15. The block 342 is shown with a detachable part 346, held in place by screws 347 and 348, whereby the cables may be removed when desired. The various wires lead, respectively, to two series of terminals 350 and 351 carried upon the edges of the insulating supporting plate 343.

From the terminals 350 and 351 (see especially Figs. 12 and 13) short cables 352 and 353 lead, respectively, to resilient contact fingers 354 and 355, detachably carried, respectively, in mountings 356 and 357, detachably and adjustably mounted by suitable means, such as screws 358, upon an insulating block 359. The block 359 is detachably fastened by suitable means, such as screws 364, to a bar 360, carried on arm 361 and 362, fixed on a shaft 363, which shaft is journaled in the bracket 345.

In the embodied form of actuating means therefor, the contact fingers are impelled into the contacting or operative position (that is, they are pressed against the guest check) by resilient means and are moved back against the action of said means and held out of operative relation except when required. As embodied (Figs. 3, 6, 12 and 14) an arm 370 is fixed on shaft 363, and is provided with an offset part 371 into which is screw-threaded an adjusting screw 372, the point of said screw cooperating with a hardened true surface 373 set into the bracket 345. This provides a nice adjustment for regulating the pressure of the fingers 354 and 355 against the guest check or equivalent device or against means hereinafter described, as shown in Fig. 13. A helical spring 374 is in tension between a hook 375 on arm 370 and a pin 376 on bracket 345, resiliently impelling the fingers 354 and 355 into contacting position.

Further, in the embodied form (see particularly Figs. 12 and 13), an arm 380 is pivotally mounted at 381 on bracket 345, and is provided with a part 382, in which is set a pin 383, against which the arm 370 is resiliently pressed by the spring 374. Pivotally connected to arm 380 at 384 is a link 385, which link is pivotally connected at 386 to an arm 387, fixed on a shaft 388. Shaft 388 rotatably carried on the bracket 398 fixed to the underside of the plate 15 operates not only the mechanism just described, but operates also a universal contact bar or bus bar 390,

which makes circuit with all of the contact fingers 354 and 355 which find perforations 43 in the guest-check.

In the embodied form of said means (Figs. 4, 5, 9, 12, 13 and 14), the bus bar 390 is mounted on two arms 391 and 392 by means of an insulated block 393. The two arms 391 and 392 are fixed on the shaft 388 journalled in two sides of the bracket 398. The bus bar 390 with its arms 391 and 392 is rotatably spring impelled about the axis of its shaft 388 to operative position, that is, to contact position with respect to the guest check similarly to the contact fingers already described, and for this purpose a tension spring 396 is connected between a lug 397 on arm 387 and a pin 399 fixed on the bracket 398.

Means are provided for latching back the bus bar out of circuit closing position, and as embodied (see especially Figs. 12 and 13), a detent piece 400 is set in arm 391, and a latch lever 401 engages and disengages therewith. In the embodied form of means controlling the latch 401, a device is provided on the carriage, controlled by the insertion of the guest check frame, for setting the latch controlling mechanism, thereby requiring the insertion of a guest check in the carriage before the selecting mechanism can be rendered operative.

For this purpose (Figs. 5[a] and 9), a trigger lever 405 is pivoted at 406 upon the bottom of the carriage frame, and is provided with a tail 407 which is positioned in the path of the bottom end of the guest-check holder. A helical spring 408 is in tension between a hole 409 on the trigger lever and a pin 410 on the carriage frame. A stop pin 411, fixed on the bottom part of the carriage, limits the movement of the trigger lever under the action of spring 408. At its outer point, the trigger lever is provided with a spring-acting latch 412, pivoted at 413, and having a tail at its lower end to limit its rotation by contacting with a stop pin 417 on the trigger lever 405. A spring 414 in tension between a lug 415 on the latch 412 and a pin 416 on trigger lever 405 rotates latch 412 about its pivot in one direction to a stop against pin 417.

Cooperating with the trigger lever just described (see also Figs. 10, 12 and 13), is a lever arm 424, mounted loosely on shaft 425, which shaft is journaled in the two sides of a bracket 423, mounted on the plate 15. A cooperating arm 426 is adjustably connected to arm 424 by a screw and slot adjustment 427. Arm 426 is provided at its upper end with a latching notch 428. Cooperating therewith is a detent lug 429, formed on a lever 430, which lever is pivoted at 432 on the end of the bent latch lever 401, already described. A tension spring 440, fast to pins 441 and 442, impels lever 430 into engagement with a lug 445 on lever arm 446. Lever arm 446 is fast on shaft 425. A tension spring 450 is in tension between a pin 451 on the tail of latch lever 401 and a pin 452, fixed on bracket 423.

To limit the movement of the latch lever 401 when not in engagement with the bus bar (see particularly Figs. 11 and 11[a]), a pin 453 fixed on the tail of the latch lever 401 works in a slot 454 formed in the bracket 423. Fixed to the other end of the shaft 425 is an arm 460, on the outer end of which a latch lever 461 is pivoted at 462. The latch lever is impelled against a stop pin 463 by a tension spring 464, fastened to the latch lever and to a pin 465 on the lever arm 460. A tension spring 467 connected at 468 to the lever arm 460, and at 469 to the bracket 423, resiliently presses arm 446 against the stop pin 452, already referred to. A pin 472 (see also Figs. 5 and 5[a]), carried on a lug 473, formed on the carriage, cooperates with latch lever 461.

The manner of operation of the machanism just described is substantially as follows:

When the guest check holder reaches its position within the carriage, trigger lever 405 is thereby moved from the broken line to the full line position in Fig. 9, at the top position of the carriage. This moves lever 424 from the broken line to the full line position in Fig. 9, and latch 428 moves out from beneath lug 429 and permits lever 430 to drop from the broken line to the full line position, whereby it latches with lug 445 on lever 446.

The mechanism is now in position so that the latch lever may be tripped by the pin 472 on the carriage. When the carriage is released and during its movement to its first stop pin position, as has been described, pin 472 engages with spring latch 461, as shown in Fig. 11, rocks arm 460 about its shaft 425 and, through it, arm 446 and latch lever 430 (which is pivoted at 432 on the tail of latch lever 401) and thereby rocks the latch lever 401 free from the lug 400. Thereupon, under the impulsion of spring 396, the bus bar contacts with one side of the guest-check or equivalent device, and such of the contact fingers 354 and 355 as find perforations 43 in the guest-check under impulse of spring 374, establish electrical connections, through these perforations, with the bus bar 390.

A still further throw of lever 460 by pin 472 will lift latch lever 430 so that lever 426 will be rocked to the left under the impulsion of spring 440, and detent piece 429 will seat in the latch 428, as shown in broken lines in Fig. 9 and in full lines in Fig. 12, by the engagement of the cam face 476 on lever 430 with pin 477, fixed in bracket 423. The idle return movement of the pin 472 past spring latch 461 is shown in Fig. 11[a]. The position of the mechanism in Fig. 9 shows the carriage at the upper end of its travel, and when the guest check holder is removed from the

carriage, spring latch 412 will snap idly past the end of lever 424, and come to the broken line position of Fig. 9 ready for again operating as already described.

Referring now to the embodied form of the mechanism for moving the bus bar and the contact fingers back again to the retracted or inoperative position (Figs. 1, 5, 12, 13, 14 and 32), an arm 500 is fixed to shaft 388, and is provided with a lug 501, which cooperates with an adjusting screw 502, screw-threaded into the frame plate 15, to nicely and accurately regulate the operative position of the bus bar 390. Pivoted to arm 500 at 502[a] is a fork 503, to which is attached a rod 504. At its bottom end, rod 504 is attached to a fork 505, which, by means of the screw-threaded ends 506 of rod 504 and nuts 507 and 508, constitute an adjustment for the length of the rod 504. A pin 509 is carried by the fork 505, the pin working in a slot 510 in a lever arm 511.

Arm 511 is pivotally mounted on a short shaft 512, journaled in a bracket 513, mounted on the base plate of the machine. Arm 511 has extending from its bottom side an arm 514, provided at its end with an angularly disposed lug 515. A tension spring 516 fixed to lug 515 on arm 514 and to a pin 517 on the supporting bracket 513 resiliently holds arms 511 and 514 to a stop pin 518, that is, in the full line position of Fig. 32. Mounted on a cross frame piece (see Fig. 32) 520 are guiding pins 521 and 522, such as shoulder rivets, which work in slots 523 and 524 in a vertically and longitudinally reciprocable bar 525.

The upper end of the bar 525 is in the path of a plate 526 (see Fig. 5[a]), carried on the bottom cross frame 2 of the carriage, as it approaches the bottom end of its travel. Near its bottom end the bar 525 carries a flanged roller 529, with which contacts the end of a lever 530. A tension spring 531, fast to the guide pin 521 (fast on the frame) and to a pin 532 fixed on lever 530, impels the bar 525 and the lever 530 upwardly to a stopped position as governed by the travel of guide pins 521 and 522 in their respective slots 523 and 524.—

Lever 530 is fixed to a shaft 533, journaled in a pair of reciprocable arms 534 (see Fig. 12). Fixed also on shaft 533 is an arm 535. Loose on shaft 533 is an arm 536, and a spring 537 is in tension between a pin 538 on an arm 536 and a pin 539 on arm 535, and thus resiliently holds a stop pin 540 in arm 536 against the upper side of the arm 535. At its free end arm 536 is provided with a hook 544 adapted to engage lug 515 of the arm 514 when in the full line position of Fig. 32, and to effect the retraction of the bus bar as later described by rocking the lever arms 514 and 511 to the position shown in the broken line position of Fig. 32.

The arms 534 are fixed on a shaft 545, which shaft is journaled in a pair of supporting brackets 546 carried upon the machine base plate. Fixed to shaft 545 is an arm 547 having a cam roller 548 cooperating with a cam 549 fixed on the first cam shaft 298, and held thereto by a spring 550.

The manner of operation of the mechanism just described is substantially as follows:

During the step by step downward travel of the carriage, and the successive rotations of the cam shaft 298, the arms 535 and 530 will reciprocate to and fro, but owing to the plate 525 being in the elevated or full line position of Fig. 32, and arm 530 and therewith arms 535 being held upwardly in the full line position, hook 544 will reciprocate idly above the lug 515 without engaging therewith. At the last selecting position of the carriage with respect to the computing machine, plate 526 engages the upper end of bar 525 and depresses it against spring 531 to the broken line position of Fig. 32.

In the next reciprocation to the right of arms 534 by cam 549, the hook 544 will engage the lug 515, and will swing arms 514 and 511 to the broken line position of Fig. 32, and thus bar 390 will be swung back to the broken line position, and latch 401 (see Fig. 12) will engage with lug 392 in the manner already described, and the bus bar will be held back in inoperative position until again released in the manner already described.

The carriage has two more downward feeds, for the printing of the totals on the guest-check stub and on the guest-check (to be later described), during which operations there is obviously no selecting action, and the bus bar 390 and the contact fingers 354 and 355 are continued in the inoperative position. During these two reciprocations of the arms 530 and 536, spring 516 will draw arms 514 and 511 backwardly to contact against stop pin 518, but owing to the pin 509 having moved to a position at the bottom of slot 510, the rod 504 does not move and the bus bar and contact fingers operating mechanisms will remain latched and inoperative.

In accordance with certain features of the invention, if desired, the computing mechanism may be a separate and self-inclusive mechanism, which is set and operated by the selecting, actuating, and controlling mechanisms. As exemplarily embodied herewith, a computing machine unit is shown incorporated in the present machine of the kind which is commercially known as the "Wales" machine, and as a specific example of a particular form of adding machine suitable for use in the present invention, the drawings illustrate the Wales machine known as Model 30, electrically operated, though it is to be understood that the invention is not limited to this particular make or model.

As further exemplarily embodied the select-

ing, actuating and controlling mechanisms cooperate with the usual keys and other controls and parts of the "Wales" machine.

In the accompanying exemplary drawings, three forms of mechanism controlled by the circuits through the contact fingers and bus bar for effecting the selection of the keys of the computing machine corresponding to the indications of the guest-check or equivalent device are shown and will be described in succession.

Referring now to one form thereof (Figs. 1, 2, 25, 27, 28, 44, 45, 46, 47, 50, 51, 52, 53, 54 and 64), the desired or proper keys of the computing machine are selected or depressed by mechanism operated by electro-magnets, operating in certain cases singly and in certain cases in combinations of two, three or possibly four magnets, the energizing of the combinations of magnets being effected through a group of relays, which likewise are energized by the circuits through the contact fingers and the bus bar, as controlled by the perforations in the guest-check.

In this form of mechanism, the energized magnets selectively release movable pull bars, which bars are then moved into the path of a universal actuating bar to effect the desired selection or key setting in the computing machine or mechanism. Suitable automatic restoring means for bringing the pull bars back to original or inactive position are also provided. By the employment of the combination system. eleven magnets suffice to selectively operate twenty-one selecting keys on the computing mechanism; ten relays being employed with the eleven magnets for the purposes and in the manner generally described above.

In describing in detail the above-outlined mechanism, it will be simpler and clearer to begin with the selecting keys of the computing machine (Figs. 1, 44, 45, 46, 47). These keys 600 may be utilized with or without the ordinary buttons or caps, and are operated in the usual manner so far as the computing machine is concerned. Arranged above, in alinement and in contact with the respective keys to be selected and then actuated are a corresponding series of longitudinally reciprocable key-setting bars 601, which are mounted for longitudinal reciprocation in slots formed in two spaced-apart, horizontally-disposed guiding and supporting plates 602, 603, which plates are carried upon two frame pieces 604 and 605. These frame pieces are mounted on supporting rods 606 and 607, the rod 606 being carried at one end on a frame piece 608 and at the other end on a standard 609; and rod 607 being carried at one end by the frame piece 608 and at the other end on a standard 610.

Referring now to the embodied form of actuating means for the bars 601 (see especially Fig. 47), there is provided a corresponding set of levers 615 having, respectively, forked ends which straddle pins 616 fixed in the corresponding bars 601. The levers 615 are pivotally supported on a rod 617, which rod is carried in the upper end of the standards 609 and 610, spacing collars 618 being mounted on the rod between the levers.

The embodied actuating means for the various lever arms 615 comprises a corresponding set of resiliently-swingable and longitudinally-movable pull bars 622, which are pivotally mounted on pins 623 fixed in the respective lever arms. This mounting is preferably slotted at 624 and springs 625 are in tension between lever arms 615 and pull bars 622, so that the depression of the keys is effected by a resilient pressure through the springs 625. This guards against any breakage or disarrangement of the mechanism in case any of the keys 600 should stick or otherwise fail to operate. The springs 625 also operate to swing any released pull rod into the path of the universal bar or actuating bail.

In this embodiment, as already indicated, the electro-magnetic mechanism is utilized to control the selection or release of the proper or desired pull bars to be operated by a universal actuating bar, which causes them to set the keys of the computing machine, and for convenience the universal actuating bar mechanism and the cooperating parts will be first described. As embodied, the pull bars 622 have formed therein near their lower ends recesses 628, adapted to engage with the universal actuating bar 629 (Figs. 2, 25, 27, 28, 44, 47 and 50). The universal bar 629 (see Fig. 25) is pivotally mounted at its ends upon bell-crank levers 630 and 631, which levers are mounted, respectively, on studs 632 and 633 carried by the standards 609 and 610, respectively.

The other arms 634 and 635 of the bell-crank levers are pivotally connected together by link 636. The universal actuating bar is operated from the first cam shaft 298 by a rod 637, pivotally connected at 638 to the bell-crank arm 635, and preferably having a screw-threaded adjustment 639. At its opposite end, there is mounted upon rod 637 a mechanism whereby a resilient actuating pull is exerted to operate the universal bar 629, and as embodied, an angled bearing piece 644 has its two ends 645 and 646 bent and apertured to be longitudinally slidable upon the rod 637. A spring 647 is coiled in compression between the end 646 of the bearing piece 644 and a nut 648, which is screw-threaded on the end of rod 637. A collar 649 limits the movement of the bearing piece 644 in the opposite direction.

Pivoted at 650 to the bearing piece is one arm 651 of a bell-crank lever, the other arm 652 thereof having a cam roll 653, running on a cam 654, which cam is fixed on the first cam shaft 298. A spring 655 is in tension

between the lever arm 652 and a rod 656, fixed on the bracket 657. The lever arm 652 is loosely mounted on the shaft 818, hereinafter described, one end of which is carried in the bracket 657. A spring 658 is also in tension between the link 636 and a pin 659 fixed on the base-plate 660 of the machine. It will thus be seen that the pull on the universal actuating bar 629 is resilient to provide for overthrow and, so as to insure against breakage or damage in the actuation of the mechanism.

Means are provided for restoring the selected pull bars 622 to initial or inactive position after the selection of the desired keys has been effected. As embodied (Figs. 1, 27, 28, 44, 47, 51 and 52), a restoring rod or bail 674 (see especially Figs. 27 and 28) extends longitudinally past the bottom parts of the pull bars, this bail being mounted at its ends on arms 675 and 676. These arms are fixed on a shaft 678, which shaft is journaled in bearings 679, 680, 681 on the underside of the base plate 660 of the machine. Fixed to shaft 678 is an arm 682 on the end of which is mounted a cam roller 683, cooperating with a cam 684, fixed on the first cam shaft 298. A spring 685 is in tension between arm 676 and a pin 677 (see Fig. 44) mounted on the base plate of the machine, to hold the lever 682 and its roller 683 to the cam and to hold the restoring bail 674 in a forward or operative position, that is, in a position away from the pull bars in their inactive or latched position (as shown in Figs. 28 and 44).

In the actual construction it is preferred to have the parts so proportioned and arranged that when the pull bars are all in the latched or unselected positions, the lugs on the pull bars are just clear of their latches (as shown in Fig. 44), which insures an easy and certain operation of the latches by the electro-magnets during the selecting action.

For the purpose of retaining the pull bars in alinement and guiding them in their paths (see Fig. 47), a slotted guide plate or comb 688 is mounted on the base plate of the machine, the lower ends of the respective pull bars 622 traveling in the corresponding slots.

In the embodied form now being described, some of the pull bars are controlled by one releasing latch, and some of the pull bars are controlled by a plurality of latches, the latches being operated by the electro-magnets, in correspondence with the arrangement of the magnets already generally described. This will best be seen from Figs. 47, 51, 52 and 54. That is, as embodied, the pull bars 622 are provided with either one or a plurality of lugs 700. The respective pull bars have either one, two, three or four such lugs cooperating with a corresponding number of latches.

Describing now the mechanism generally, each of the lugs 700 has cooperating therewith a latch-lever 701, mounted on a corresponding shaft 702, the respective shafts 702 being journaled in the standards 609 and 610, or in an extension bracket 703 carried thereby. In the illustrated embodiment, there are seven of the shafts 702 employed, and four of the magnets are connected to latches which are sleeved on some of the seven shafts as a matter of structural convenience.

Pivotally connected to one of the latches 701 on each of the shafts and sleeves at 706 (or in some case to an arm on the shaft or sleeve) is a pull rod 707 (see especially Fig. 47), which rod is pivotally connected at 708 to a link 709, which latter is pivotally connected at 710 to the armature 711 of a magnet 712. As a matter of structural convenience (see Fig. 50), the three longer shafts which have bearings also in the bracket 703, are provided with actuating arms 713, to which their magnets are pivotally connected by pull rods 713a, instead of to the latch-levers, as this construction allows more room for the mechanism.

Each of the shafts and sleeves is resiliently acted on by corresponding tension springs 714 connected to lugs 715, fixed on the shafts or sleeves and to a rod 717, which is carried in the standards 609 and 610. These springs resiliently impel the latches into the arresting position for the pull bars 622, having been restored or moved backwardly by action of the bail 674 and the cam 684, that is, to hold them in the inactive or unselected position, out of the path of the universal actuating bar.

Referring further to the present selective system or construction as exemplarily embodied, the arrangement will be readily seen by reference to Fig. 54, a corresponding circuit diagram being shown in Figs. 63 and 64. In said embodied arrangement, it will be noted that no pull-bar 622 will be drawn into operative relation to be actuated by the universal actuating bar 629 unless every one of the latches holding that particular pull-bar are simultaneously released.

It will be understood, that where more than one latch holds back a pull-bar that these various latches are operated, respectively, by different magnets. For instance, if a particular pull bar is held back by three latches, it will be released only on the simultaneous energizing of the corresponding three magnets. Two of those magnets could be and are utilized in the combinations for releasing other pull bars. Thus two of these magnets could be energized and their latches retracted, but owing to the third magnet of this particular combination not being energized, and its corresponding latch not being retracted, this pull-bar is held back in the inactive or unselected position.

Referring now by way of further example, the first pull-bar 622 in Fig. 47 is the pull

bar shown at the left in Fig. 54, and marked for identification *a*. The actuating magnet therefor is indicated with a corresponding *a* in Fig. 64, there being but a single latch-lever 701 controlling this bar. The first bar 622 shown in Fig. 52 is marked for identification *b* and is the second bar from the left in Fig. 54 where it is likewise marked *b*, and the corresponding magnets therefore in Fig. 64 are marked *b*, *b'* b^2. It will be noted that this lever is held by three latches 701, and to release it there is correspondingly three magnets *b* energized, the magnets *b'* and b^2 being energized through the relay b^3.

In Fig. 51 the first pull-bar 622 is marked for identification *c*, and is similarly marked in Fig. 54, where it is positioned the tenth bar from the left. This bar is held by two latches, and its circuit, likewise marked *c* in Fig. 64 energizes the two magnets marked *c* and *c'*.

The making of the circuits through the perforations 43 in the guest-check 40 whereby the magnets are thus energized are shown at the top of Fig. 64 and the corresponding perforations are likewise identified by the letters *a*, *b* and *c*. To insure the cooperation of the various leads or wires forming the electrical path or circuit for the operation of the various magnets as described, an insulated connection block or terminal block 712^a is mounted on the underside of the machine base plate, and is shown in Fig. 44.

It will be understood that if two or more keys are depressed in a particular column of the adding machine used or if such a condition exists in any adding machine with a keyboard of a similar design, only the key depression representing the lowest numerical value in that particular column will be recorded by the adding machine. For example, if the numbers 1, 5 and 9 are depressed, only the value of the number 1 key will be recorded, and likewise if the numbers 6, 7 and 8 are depressed only the value of the number 6 key will be recorded. With this fact in view, and further recalling that only one contact in a particular group of contacts will be used at any particular time, the operation of the various combinations of relays and magnets will be understood and it will not be necessary to follow all the circuits through, as the principle upon which they operate will be clear from the foregoing description. The bank of relays which is shown in diagram in Fig. 64 is shown on the machine at 720 in Fig. 1.

In Figs. 66, 67 and 68 is shown a different arrangement wherein the circuits operate separately and directly from the corresponding contact fingers and the bus bar to electromagnets, heretofore described, which operate directly upon the latches for the pull bars 622, there being in this arrangement but one magnet and one latch for each pull bar. The mechanism in its other features may be the same as, or substantially similar to, that already described, and the parts are identified by the same reference numerals and need not be again described.

In this case, the latches 722, corresponding to the latches 701 so far as mechanical structure and their action upon the pull bars 622 are concerned, are fixed to or are integral with sleeves 723, mounted loosely on rods 724, which rods are supported in the standards 609 and 610. Between the sleeves 723 for the respective latch arms 722 are spacing collars 725. Some of these latches in being operated by their respective magnets are moved downwardly away from their respective latching points and some are moved upwardly away from their respective latching points as shown in Fig. 67. Each of the latch arms 722 is provided with a lug 726, and for those latches operating in a downward path a spring 727 is in tension between a lug 726 and a rod 728 carried in the standards 609 and 610, while for those latches operating in an upward path, a spring 731 is in tension between a lug 726 and a rod 732, likewise carried by standards 609 and 610.

Some of the actuating magnets 729, corresponding to the magnets 712, are arranged above and others below the latch arms, and the general arrangement will be clear from Figs. 66 and 67. Fastened to a plate supporting the magnets on the standards 609 and 610 is an insulated terminal or connection block 729^a, to which is fastened, by convenient means, leads or wires forming the electrical circuit to and from the magnets as shown in Figs. 66 and 67. A similar insulated block 729^b is shown mounted on the under side of the machine base (Figs. 66 and 67). The wiring diagram corresponding to Figs. 66 and 67 is shown in Fig. 68, and will be clear in connection therewith, the circles 43 representing the perforations in the guest-check, and there being a corresponding circuit and magnet for each of the circuits.

In Figs. 69, 70, 71 and 72, another form of controlling and key-selecting means for the computing machine is shown. In this form, which is the present preferred form, longitudinally-reciprocable actuating bars 740 correspond to the bars 601 already described. The bars 740 are mounted for longitudinal sliding movement in slots in guiding plates 741 and 742, carried upon supports 743 and 744 mounted on the rods 606 and 607, already described, and plate 742 is supported at one side by the standards 609 and 610 as shown in Fig. 69. The actuating rods 740 are resiliently held in retracted position, respectively, by springs 748 in tension between pins 749 on the bars 740, and screws 750 fastened in the plate 741.

At the top ends of the bars 740, they have a pivoted connection, by means of pins 751,

with the slotted end of corresponding levers 752. The levers 752 are pivoted at 753 upon supports 754, mounted on the top plate 742. At their opposite ends, levers 752 are slotted to straddle pins 755, fixed in the ends of levers 756. Levers 756 are pivoted at 757 upon supports 758, fixed upon the top plate 742. At their opposite ends, levers 756 are slotted to straddle corresponding pins 760, which are mounted in slots in the armatures 761 of magnets 762.

The throw or travel of the mechanism is regulated by means of a series of set screws 763, screw-threaded into a plate 764, carried on supports 765 from the plates 742. The adjusting screws 763 cooperate with the armatures 761 of the magnets. In Fig. 70 the right-hand bar 740 is shown retracted by its spring 748 after its key 600 has been set and its magnet has been deenergized. An insulated connection or terminal block 762ª is shown in Figs. 70 and 71 and is used for the same purposes as already set forth in the previous description.

In this construction and arrangement just described, there is a direct circuit from the selected contact fingers 354 or 355, diagrammatically representing the closing of the electrical circuit by the contacting of the fingers 354 and 355 through the perforations 43 of the guest-check with the bus bar 390 to each of the magnets 762, as will be clear without detailed description from the diagram of Fig. 73.

The manner of operation of the mechanism just described will be clear from the foregoing, and it may be stated by way of résumé:

In its downward travel, the carriage is positioned or stopped by a stop plate 227, which has been allowed to move in the path of a lever 261 already described, by having its pin 228 extend through a perforation 41 in the guest check, so that the corresponding group of perforations 43 are brought in line with the contact fingers 354 and 355, and the bus bar 390, and thereby close the corresponding circuits at 43. This closure of the circuits energizes the electro-magnets corresponding to these perforations 43 for the particular item selected on the guest check, thereby releasing the corresponding latches 701, thereby allowing the corresponding pull-bars 622 to move forward into an operative position with respect to the universal actuating bar 629, the bail rod 674 moving away to permit this action.

The universal bar 629, upon its downward travel, then actuates these bars 622 to set or depress the corresponding keys 600 of the computing machine, and thereafter the bail rod 674 restores these pull-rods 622 preparatory to the next selective setting of the machine. In cooperation or circuit with the mechanism just described is a circuit controlling commutator switch on the first cam-shaft 298, and there is also in this circuit a time switch which synchronizes the operations of the selecting and controlling mechanism and of the computing machine so they occur in the proper order. These will be later described.

Means are provided by the invention for automatically actuating the operating key for the computing machine after a selective setting of the numeral keys, such as has been described, has been made. As embodied (Figs. 1, 2, 24 and 44), this mechanism is operated from the first cam shaft 298 and from the second cam shaft 800, which will be later described. As so embodied, the operating key 801 of the computing machine has cooperating therewith a roller 802, carried on an arm 803, which is fixed on a shaft 804, which shaft is journaled in a bracket 805, fixed to and hung from the rod 607.

Fixed also to shaft 804 is an arm 808, and pivotally connected to arm 808 is a rod 809, having a screw-threaded adjustment 810. At its opposite end, rod 809 has a resiliently acting actuating device, generally similar to that already described in connection with the universal actuating bar 629. In this device, the bearing piece 811 is acted on by a compression spring 812, coiled about rod 809 between the bearing piece and nuts 813. A collar 814 limits the movement of the bearing piece in the opposite direction.

Pivoted to the bearing piece 811 at 815 is an arm 816, fixed on a sleeve 817, which is loose on a shaft 818, which shaft is journaled in a bearing bracket 819 and in a bearing bracket 657. Fixed also to sleeve 817 is a bell-crank lever 821, on one end of which is a cam roller 822 cooperating with a cam 823, which is fixed on the cam shaft 298. A spring 824 is in tension between arm 821 and a rod 656, mounted on the bearing brackets 819 and 657.

For the purpose of operating this mechanism from the second cam shaft 800, a link 830 is pivotally connected at 831 to bell-crank 821, and at 832 to a bell-crank lever 833, loosely mounted on shaft 834, which shaft is journaled in brackets 819 and 835. A spring 836 is in tension between bell-crank lever 833 and a rod 837, mounted on the bearing brackets 819 and 835. This mechanism is actuated twice for each revolution of the second cam shaft 800, and a disc 840 is fixed on the cam shaft and has two cam rollers 841 and 842, rotatably mounted at the edge of the flat side of the cam disc 840 and in the path of the suitably shaped arm 838 of the bell crank 833, as shown in Fig. 24, thus serving to actuate the mechanism once for each half revolution of the second cam shaft 800.

Referring now to the mechanism for operating the total key of the computing machine (Figs. 1, 3, 37, 38, 39 and 40), and cooperatively therewith the non-print key, whereby

for the purpose of the present invention, there is no printing by the computing machine except of the totals from each guest-check upon the guest-check. In said embodied form, the total key 850 (see especially Figs. 1, 3 and 37) has in operative relation therewith a roller 851, rotatably mounted on an arm 852, which is fixed on a shaft 853, which shaft is journaled on a hub 854, formed on a bracket or frame piece 608.

Fixed to bracket 608 is a bracket 855, shaft 853 being also journaled therein at 856. Fixed to the outer end of shaft 853 is an arm 857, to which is pivotally connected at 859 a rod 858, having a screw adjustment 860 therewith.

The actuating means from the cam shaft is of the kind already described, whereby a resilient pull is exerted on the mechanism to set the key, and comprises (see especially Figs. 37, 38 and 40) a longitudinally slidable bearing piece 862, a spring 863 and other parts as already described. Pivotally connected at 864 to the bearing 862 is an arm 865 which is pinned to a sleeve 866, which is loose on a shaft 545.

Pinned also to sleeve 866 is an arm 867, and pivotally connected to the outer end of this arm at 868 is a latch lever 869. A spring 870 is in tension between latch lever 869 and a pin 871 on arm 867. Lever 869 is provided with a latching notch 873 near the outer end thereof. Loose on shaft 545 (see also Fig. 1) is a cam-actuated arm 874, provided with a cam roller 875, which cooperates with a cam 876 on cam shaft 298. A spring 874a is in tension between lever 874 and a bracket 884 on the machine base plate. On lever arm 874 is a lug 877 cooperating with the latch 873.

On the side of cam 876 is a cam-piece 878, which operates to hold latch lever 869 out of latching position with respect to lug 877 at a particular time in its operation. Arm 874 has a backwardly extending tail 879, provided with a detent notch. In operative relation therewith is a latching lever 880, pivotally mounted at 881 upon a bracket 882, which is carried on the base plate of the machine, and is resiliently impelled into latching position by a spring 883, in tension between the latch lever 880 and the bracket 884 on the base plate.

Referring now (Figs. 1 and 37) to the embodied form of mechanism for controlling the non-print key 896, a roller 897 is in operative relation therewith. This roller is mounted on an arm 898, fixed on a shaft 899, which shaft is journaled in a hub 900 on bracket 608, and is journaled also at 901 in a bracket 902, supported from the bracket 608. Fixed to shaft 899, near the outer end thereof, is an arm 906 and pivotally connected thereto at 907 is a rod 908, having a screw adjustment 909.

At its opposite end said rod has a sliding resilient connection 910 of the kind already described, and pivotally connected thereto at 911 is an arm 912 (see also Fig. 38), pinned to a sleeve 913, which sleeve is loose on shaft 545. Pinned also to sleeve 913 is an arm 914 (Fig. 14a), having a cam roller 915, cooperating with a cam 916 on the first cam shaft 298. A spring 917 is in tension between the arm 914 and the bracket 884, mounted on the machine base. Extending rearwardly from and integral with an arm 914 (Fig. 39) is a latching arm 922, with which cooperates a latch 923.

As here embodied, the latch 880 for the total key and the latch 923 for the non-print key disengage together, but the latch 880 reengages prior to the latch 923. For this purpose, latch 880 is pinned to a sleeve 926, loose on rod 881, and pinned also to this sleeve is an arm 927. The latch lever 923 has its hub 928 loosely mounted on rod 881.

Fixed to latch lever 923 (see also Fig. 39) is a pin 930, which projects through a slot 931, formed in the plate-like arm 927, and a washer 932 (Fig. 38) under the head of the pin, and forming an integral part thereof, maintains the parts together. A spring 933 is in tension between pin 930 and a pin 934, fixed in the arm 927, thus providing a spring tension between the total mechanism latch 880 and the non-print mechanism latch 923. Thus it will be seen, from Figs. 37 and 39, that if the total latch 880 is drawn backward to unlatching position (to the right in said figures), it will draw the latch 923 into unlatching position with it, but that the latch 880 may return independently to latching position, and the latch 923 will be later returned by the action of the spring 933.

In the embodied form of actuating means for the latch mechanism, just described (see also Fig. 1), an armature 938 is fixed to a short rod 939, (see also Fig. 38) which is pivoted to the latch-lever 880. A pair of electro-magnets 940 operate this mechanism at the proper time, and will be later described in connection with the general circuit diagram.

The manner of operation of the mechanism just described is substantially as follows:

A switch blade 950 (see Figs. 5a, 5c and 63) is mounted on the bottom part of the carriage, and as the carriage descends to the total position, this switch makes the circuit through circuit terminals 951 and 952 at the first total position. This energizes magnets 940, through a commutator and a governor or timing switch (to be later described) and thereby unlatches the levers 880 and 923.

It will be seen from Fig. 37 that this movement releases the non-print key 896, which has heretofore been held depressed, so that the amounts or items represented by the successive sets of perforations 43 in the guest check 40 have been accumulated in the computing

machine but have not been printed. The release of the latch 923 and therewith of the non-print key 896, upon the operation of the computing machine, will allow the accumulation or the totals of these several amounts or items, to be printed upon the guest-check stub and upon the guest-check, as has heretofore been described. It will be understood that the contact fingers 354 and 355 and bus-bar 390 have been withdrawn and the electric circuits for the selection of the desired keys of the computing machine have been thereby opened, just preceding the first or stub total operation.

The release of the latch 880 and of the detent notch on the tail 879 of the lever 874 thereof, allows the rotation of the cam lever 874 in a counter-clockwise direction about its shaft 545, under the tension of its spring 874ª and this rotation as described, is checked or retarded by the contact of the cam roller 875 with the face of the cam 876 as shown in full lines in Fig. 40. Lever 869 under the tension of its spring 870 is brought into a latched position, whereby the notch 873 at its outer end is brought into conjunction with the lug 877 of the arm 874, and thus, levers 865 and 867, which are fixed to their hub 866, are impelled in a clock-wise direction, actuated and controlled by the rotation of the cam 876, and through the cam roller 875, its lever 874 and the latch levers 869.

By means of the additional mechanism heretofore described, a key known as the total key on the computing machine will be depressed by the action just described and upon the further operation of the computing machine, the non-print key 896 having been released, and being now elevated, a total, known as the first or stub total 44 will be printed on the stub of the guest-check as shown in Fig. 65. The cam piece 878, at a desired time in the rotation of the cam 876 on shaft 298, strikes the tip of arm 869, unlatches arm 874 from the lug 877, and thereby allows the total key 850, upon the operation of the computing machine, to be restored or returned to its initial or inoperative position in readiness to be operated again in the manner described.

The carriage then moves downwardly to the last or guest-check total position in which it prints the total upon the bottom of the check, being the upper total 44, amounting to $4.00 in Fig. 65. As the carriage moves to this position, the electrical circuit is closed at the terminals 952 and 953 (Figs. 5 and 63), energizing again the magnets 940, and the operation just described is repeated to print this second or check total in the same way as for the first or stub total.

It will be understood that with the form of computing machine herein shown the operating bar or key 801 is actuated or depressed for each operation or function of the computing machine, and this is taken care of from the cam shafts by the mechanism already described.

The functions and operations of the embodied form of the machine so far described are effected from the first cam shaft 298, and the remaining functions to complete the cycle of the machine are performed from the second cam shaft 800. This is largely a matter of convenience in construction and design, and as embodied, the computing functions and the printing of the totals by the computing machine are effected from the first cam shaft, and the restoring functions completing the cycle of the computing machine are effected from the second cam shaft.

Referring first to the embodied form of drive and therewith to the releases for the cam shafts (Figs. 16 and 17), the automatic selecting and controlling mechanisms for the computing machine, which has been described, are conveniently driven from the computing machine motor 980. The motor 980 has a worm 981 fixed on a shaft 982, connected by a flexible joint to the motor shaft 983. A worm wheel 984 is fixed on a shaft 985, on which is fixed also a pinion 986, which meshes with an idler gear 987, which is in mesh with a gear 988 fixed on a shaft 989. Fixed also on shaft 989 is a pinion 990, which is in mesh with a gear 991, loose on cam shaft 298, and also with a gear 992, loose on the second cam shaft 800.

The clutch mechanism may be of any standard or known form, so far as concerns the invention, and as embodied (see especially Figs. 18 and 19), the pawl disc or ratchet 996 in each case is fixed with the corresponding gear 991 and 992 and the description may be applied to either mechanism throughout. A disc 997 is fast on the corresponding cam shaft 298 or 800. A plate 998 is mounted for angular movement on disc 997 by pin and slot connections 999 and 1000. Pivoted on the pins 999 and 1000 are three-armed levers 1001 and 1002, respectively, having a pin and slot connection 1003 and 1004, respectively with plate 998.

Acting on each of the three armed levers 1001 and 1002 is a compression spring 1007 and 1008, coiled, respectively, about guide rods 1009 and 1010. Pawls 1011 and 1012, respectively, are pivotally mounted upon one arm of each of the levers 1001 and 1002, the springs 1007 and 1008 impelling the pawls 1011 and 1012 into engagement with the teeth of the ratchet 996. The bearings for the pawls 1011 and 1012 are in the hub 1014 formed on the disc 997, upon which hub the plate 998 is journaled. Plate 998 is provided with a detent tooth 1015. In operative relation with the detent tooth 1015 of the clutch mounted on shaft 298 is a stop arm 1016 pivoted at 1017 upon a bracket 1018, mounted on the base of the machine.

The arm 1016 is provided with a stop lug 1019. Cooperating with the lug 1019 is a stop lever 1021, pivoted at 1022, and having an arm 1023 carrying a pivotally-mounted armature 1024 cooperating with a pair of magnets 1025. A spring 1020 is in tension between the arm 1023 and the arm 1016 to restore them to a latched or operative position. A roller 1026 is mounted on an arm 1027, pivoted at 1028 on the frame 1018. A relatively powerful spring 1029 is in tension between arm 1027 and a lug 1030 on the frame 1018. Roller 1026 bears on the periphery of disc 997, which is provided with a cam rise 1031.

The manner of operation of the mechanism is substantially as follows:

Considering the right-hand mechanism in Fig. 18, the disc 997 is at rest and therewith the cam shaft 298, while the ratchet wheel 996 is rotating therewithin in a counter-clockwise direction. When magnets 1025 are energized, stop lever 1021 releases lug 1019, and stop arm 1016 yields against spring 1020, releasing the detent tooth 1015. This permits plate 998 to rotate under the impulsion of springs 1007 and 1008, about the bearing or hub 1014 formed on the disc 997 and controlled by a pin and slot connection 999, 1000, 1003 and 1004 thereby throwing the pawls 1011 and 1012 into engagement with ratchet 996 and thereby causing the cam shaft 298 to rotate in synchronism.

At the end of the rotation just described, the stop arm 1016 being again held latched by the detent arm 1021, and in the path of the detent tooth 1015, the three armed levers 1001 and 1002 are thereby rocked against their springs 1007 and 1008 thereby retracting the pawls 1011 and 1012 out of engagement with the teeth of the ratchet 996. At this time, that is, when the pawls 1011 and 1012 are disengaging with the teeth of the ratchet 996, the cam roller 1026, through its lever 1027 and under the impulse of its spring 1029, is brought into engagement with the cam rise 1031 of the disc 997, thus completing the disengagement of pawls 1011 and 1012 and the teeth of the ratchet 996, and bringing the disc 997 and therewith the shaft 298 into a position of rest, with the three armed levers 1001 and 1002, in the proper position under the compression of their springs 1007 and 1008, to be released at a subsequent operation as has been described.

Considering the left hand mechanism shown in Fig. 18, actuating the second cam shaft 800:

This is substantially the same as has been already described with these exceptions, whereas, for certain conveniences of construction and design, the first cam shaft 298 is brought to a stop at the completion of each rotation already described, the second cam shaft 800 is brought to a stop or at rest, twice to one complete rotation, 180° or a semicircumference apart, and for this purpose the disc 997 is provided with two cam rises 1031 spaced 180° apart, and the plate 998 is also provided with two detent teeth 1015, also spaced 180° apart. The further escapement of the cam shaft is accomplished similar to shaft 298, that is, through the levers 1032 and 1033 and their spring 1034 and the pair of electro-magnets 1035.

Means are provided for alternatively closing the circuit for the magnets 1025 for the first cam shaft or for the magnets 1035 for the second cam shaft, subject to the control of the circuits by a timing switch to be later described. These operations are likewise determined and controlled by the position of the check holder carriage. As embodied, a pin 472 in lug 473 of the check holder carriage (see especially Figs. 33 and 33[a]) cooperates with a longitudinally-slidable bar 1050, having a slot 1051 through which projects a head or pin 1052 mounted on the frame piece 520. This bar is resiliently held in its upper position by a spring 1053, in tension between a pin 1054 in the bar and the pin 1052. Pivotally connected to the lower end of bar 1050 is an arm 1055, which is pivoted at its other end 1056 to a bracket 1057, carried on the machine frame.

Pivotally supported at 1056 is a three armed lever 1059, one arm of which is impelled against the stop pin 1060 by a tension spring 1061. Another arm 1062 of this lever projects into the path of a roller 1063, mounted on a cam disc 1064, fixed on the first cam shaft 298. The other arm of the lever has an angled end 1065. Pivotally mounted on the arm 1055 at 1066 is a lever 1067, one end of which is in the path of the angled end 1065 of the lever arm already described.

Lever 1067 at its opposite end 1070 is pivotally connected to a link 1071, which at its other end 1072 is pivoted to a three armed lever 1073, which lever is pivotally mounted at 1074 upon bracket 1057. One arm 1075 of lever 1073 is movable into the path of a cam roller 1076, mounted on the side of a cam disc 1077, fixed on the second cam shaft 800. The third arm of the lever forms an insulated switch blade 1078 which cooperates with circuit terminals 1079, 1080 and 1081.

During the functions of the machine to include the printing upon the guest check of the first or stub total, the mechanism, just described, is in the full line position of Fig. 33, which is the closed-circuit position for electromagnets 1025, subject to the further control of a commutator and its brushes and a timing switch to be described later. As the carriage drops to the second or check total printing position, bar 1050 is depressed to the broken line position of Fig. 33 by the contact of pin 472 with the bar 1050. This movement, by lowering the pivot point 1066,

brings the right-hand end of lever 1067 into engagement with the angled lever arm 1065.

Thereupon cam roller 1063, upon the completion of its rotation with the shaft 298, engages arm 1062 of the lever 1059, and angled arm 1065 rocks lever 1067 about its pivot 1066, thereby pulling down link 1072 and thus throwing switch blade 1078 from the full line to the dotted line position of Fig. 33. This action opens the circuit (see also Fig. 63), controlling the release of the first cam shaft 298 by means of the electro-magnets 1025, as heretofore described, at the circuit terminals 1081 and 1080, and closes the circuit, controlling the release of the second cam shaft 800 by means of the electro-magnets 1035, as has also been described, at the circuit terminals 1080 and 1079. These circuits are subject to the control of the commutators and the timing switch heretofore mentioned.

The second cam shaft 800 is released and stopped, twice successively, subject to the timing switch for its two successive half revolutions. In the position of the mechanism just described, lever arm 1075 is in the broken line position of Fig. 33. As cam shaft 800 approaches the end of its second half revolution, cam roller 1076 engages arm 1075 and, upon the completion of its rotation, moves the mechanism back to the full line position of Fig. 33, thereby opening the circuit of magnets 1035 and re-closing the circuits of magnets 1025, subject again to the circuit control by the commutator and timing switch, heretofore mentioned.

In printing the total 44 upon the guest check 40, it is preferred to have a plate or platen in position behind and supporting the guest-check, and opposed to the printing type of the computing machine. For this purpose (see especially Figs. 5, 5^a and 5^b), the guest-check holder carriage on its bottom cross reach 2 is provided with a plate or platen 1100, extending across the face of the desired types thereof, and behind the guest-check when in its operative position with its holder in the carriage, and the carriage lowered to the position for the computing machine to print the stub and check total.

Back of the platen 1100 on the bottom cross reach 2 of the check holder carriage frame are two contact surfaces 1101 and 1102, which when the guest-check carriage is in the position for the type of the computing machine to print the totals, pass into contact respectively with two rollers 1103 and 1104, journaled on a bracket 1105 mounted on the frame piece 520. This furnishes a solid backing or support behind the guest check, while the types of the computing machine are printing the desired totals.

In Fig. 1 of the drawings the total printing type mechanism 1106 is shown, this being a part of the computing machine and therefore not necessary to describe in detail.

Referring now to the embodied form of mechanism for operating the computing machine to transfer the successive totals, after they have been printed on the successive guest-checks, into the total storage mechanism, which is part of the computing machine, so that a cumulative and complete record of the successive totals from the guest checks is preserved in the computing machine. For this purpose, mechanism is provided for automatically operating the mechanism of the computing machine to effect this result.

After the total key 850 is depressed (Fig. 3) and thereafter the operating key or releasing key 801 (see especially Fig. 1), the total from that particular setting of the computing machine (which will be the total of the particular guest check) will be accumulated into a series of dials 1110, which are usually known in the "Wales" machine as the "addition dials".

As the "Wales" machine is constructed, means are provided which will allow for the making of a permanent record of this total, that is, of the successive totals in a series of dials 1111, which are usually known in the "Wales" machine as the "subtraction dials". In the usual operation of the "Wales" machine, the number appearing here is the complementary number to the number appearing in the addition dials, but this serves by the total decretals indicated by the dials 1111 to indicate the total or gross additions successively accumulated or shown in the dials 1110.

In the embodied form of means for effecting this, the transfer lever 1112 of the computing machine (Figs. 1, 3 and 41) has pivoted thereto at 1113 a flat link 1114, in the other end of which is a slot 1115. Through this slot projects a head or pin 1116, which is mounted in the upper end of a lever 1117, the lever being pivoted at 1118 on a bracket 1119, carried on the frame piece 608. Pivotally connected at 1120 to the other end of the lever is a rod 1121, having a screw adjustment 1122 at each end thereof.

This rod at its opposite end is pivoted at 1124 to one arm of a bell-crank lever 1125, which is loosely mounted on a shaft 1126, supported in brackets 1127 and 1128 mounted on the bed plate 660 of the machine. In the other arm of the bell-crank lever is a cam roller 1130, which cooperates with a cam 1131, fixed on the second cam shaft 800. A spring 1132, in tension between the lever 1125 and a rod 1133, fixed in the brackets 1127 and 1128, holds the cam roll to the cam. A spring 1134, in tension between the levers 1112 and 1117, provides for an easy and yielding slow start of the lever 1112.

Upon the opposite side of the computing

machine as shown (Figs. 1, 2 and 26) is provided a key 1140. For the purposes of the present machine, this key serves alternatively to throw the addition accumulator or the subtraction accumulator into operation in connection with the series of dials 1110 and the series of dials 1111. For present purposes, the operation is a subtraction operation. As embodied, a lever 1140 has pivoted thereto at 1141 a flat link 1142, provided at its other end with a slot 1143.

In the slot 1143 is a headed pin 1144, fixed in the end of a lever 1145, which lever is pivoted at 1146 upon a bracket 1147. This bracket is supported on the frame piece 1148, which is integral or fixed to the frame piece 9. Pivoted at 1150 to lever 1145 is a rod 1151, having screw adjustments 1152. This rod is pivoted at its end 1153 to a bell-crank lever 1154, loosely mounted on shaft 834, previously described. The other arm of this lever is provided with a cam roller 1155, cooperating with a cam 1156, fixed on the second cam shaft 800. A tension spring 1157 is connected between the lever 1140 and the lever 1145. A tension spring 1158 is connected between the bell-crank lever 1154 and a rod 837 mounted on the brackets 819 and 835.

The lever 1140 is normally in the broken line position of Fig. 26, and when lever 1117 is rocked from the full line to the broken line position of Fig. 41, lever 1140, through the mechanism and operation of the computing machine, is moved from the broken line to the full line position of Fig. 26, at which time the roller 1155 is on the low part of the cam 1156. However the lever 1140 does not restore with the transfer lever 1112, but is later restored by the high part of the cam 1156, which is actuated through a second release for semi-circumferential rotation, as heretofore described, and is timed to closely follow this particular release of the cam shaft 800, and preceding the release or operation of the computing machine.

Through the pull of lever 1145 on spring 1157, the lever 1140 is moved to the broken line position of Fig. 26. The mechanism remains in this position, with the cam roller 1155 away from the low part of cam 1156, which gives clearance for the next movement of lever 1140 to the full line position with the movement of lever 1112 to the left in Fig. 41, as already described. Thus the lever 1140 is in a position to operate the addition dials, that is, the broken line position of Fig. 26 until after the totals are printed, and the first release of the second cam shaft 800 has occurred, and it is in the subtraction position, that is, the full line position of Fig. 26 until the transfer has been made, and the second cam shaft 800 has been released for its second half rotation.

Referring now to the operation of a key on the computing machine, known as the "clearance" key (Figs. 1, 3 and 42), this key 1180 has a roller 1181 in contact therewith, the roller being mounted on a lever arm 1182, fixed on a shaft 1183. Shaft 1183 is mounted in a hub 1184, formed on the bracket 608. At its opposite end, there is fixed to shaft 1183 an arm 1185, which arm is pivoted at 1186 to a rod 1187, having a screw adjustment 1188. At its opposite end this rod is provided with a sliding, resilient actuating mechanism 1189 of the kind previously described. Pivoted thereto at 1190 is one arm 1191 of a bell-crank lever, mounted loosely on shaft 1126, the other arm 1192 of the bell-crank lever being provided with a cam roller 1194, which cooperates with a cam 1195 on the second cam shaft 800. A tension spring 1196 is connected to the lever arm 1192 and to rod 1133, already described.

Closely following the restoration of the lever 1140, which follows the transfer of the totals from the guest-check as accumulated on the addition dials 1110 to the permanent record or accumulation of the several totals as recorded on the subtraction dials 1111 already described, and during the second release or half rotation of the second cam shaft 800, and preceding the release and operation of the computing machine, it will be understood that for a subsequent operation of the machine as described, the necessity arises whereby the addition dials 1110 must be cleared or brought to a zero position in readiness to receive the accumulation or total of items as accumulated from a subsequent guest-check 40. This is accomplished through the clearance key 1180 and its mechanism integral with the computing machine and the additional mechanism as controlled by the cam shaft 800, as has just been described.

Means are provided by the invention to eliminate or cancel any item or price 42 of Fig. 65 that has been ordered by a guest, and therefore appears printed and perforated on the guest-check 40, and then for some reason rejected by him. In connection therewith, means are provided by my system of control of commodity dispensing, for making a cancelation indication, such as a perforation 43ª in the guest-check 40, which indication is made and recorded under proper control and authority. A mechanism for effecting this is shown in my copending application Ser. No. 628,028, filed March 27, 1923.

In this present embodied machine, means are provided for carrying this cancelation into effect in connection with the computing machine and the printing of the total upon the stub and upon the guest check. One contact finger 355ª (Figs. 68 and 73) corresponds to the cancelation perforation 43ª, and its circuit controls a key known as the "correction" key of the computing machine. In the embodied form of said mechanism (Figs. 1, 3, 34, 35 and 36) the correction

key 1200 has in engagement therewith a roller 1201, carried on an arm 1202, which is fixed on a shaft 1203, which shaft is journaled in a hub 1204 on the frame member 608.

Fixed to the other end of shaft 1203 is an arm 1205, and pivoted thereto at 1206 is a rod 1207, having a screw adjustment 1208. At its other end, rod 1207 is provided with a resilient sliding actuating connection 1209, such as has already been described. Pivoted at 1210 to the sliding connection 1209 is an arm 1211, pinned to a hub 1212, which is loose on shaft 545. Pinned also to sleeve 1212 is an arm 1213. Pivoted at 1214 to arm 1213 is a latch arm 1215, having a latching notch 1216 near its free end. A tension spring 1217 is in tension between the latch arm 1215 and arm 1213.

A lever 1220 is loosely mounted on shaft 545, and at its outer end is provided with a cam roller 1221, cooperating with a cam 1222, which is fixed on the first cam shaft 298. Carried on cam 1222 is a cam piece 1223 which controls in part the operation of the latch arm 1215. A lug 1224 is fixed on arm 1220, and is adapted to engage with the notch 1216. A spring 1225 is in tension between arm 1220 and the bracket 884, already described.

Lever 1220 is provided with a rearwardly extending tail 1228, provided with a latching notch. A latch 1230 is pivoted at 1231 upon a bracket 1232 fixed to the bed plate of the machine. A spring 1236 is in tension between the latch 1230 and the bracket 884 mounted upon the base of the machine. Pivoted to the latch 1230 is the armature 1233 of a pair of magnets 1234. It will be noted that the structure of this mechanism is substantially the same as that used for the operation of the total key.

This mechanism is held normally inactive, with the latch 1230 holding the roller 1221 away from cam 1222. When a cancelation perforation 43[a] (Fig. 65) closes the corresponding circuit, through the contact fingers 355[a] and the bus bar 390, and under the control of a commutator on shaft 298, and the timing switch already described in conjunction with the total key actuation, magnets 1234 are energized and latch 1230 is released, lever 1220 rocks into operative relation, bringing its roller 1221 in contact with its cam 1223, and latch 1216 makes the connection with the rod 1207 (shown especially in Fig. 35) and the correction key 1200 is depressed, as has already been described in conjunction with the actuation of the total key 850 (Figs. 37, 38 and 40). The perforations 43 corresponding to the canceled item also close their circuits, and through the mechanism already described select corresponding numeral keys of the computing machine.

Means are provided, through a mechanism integral with the computing machine, as described, whereby upon the depression of the correction key 1200 the entire keyboard consisting of all the numeral keys will be unlocked and thereby restored or returned to their initial position. This action, however, could not occur if the correction key 1200 was depressed after the release or operation of the computing machine through its key 801 and therefore, the depressing of the correction key as described, is synchronous with the action of the selecting of the numeral keys and precedes the operation of the computing machine.

Therefore, cam 1222 keeps the correction key 1200 depressed, and thus the numeral keys selected from the perforations 43 do not record, due to the key-board being held unlocked, as previously described, by the key 1200, and the selected numeral keys are allowed to immediately return as soon as their magnets are deenergized. Cam-piece 1223 then lifts latch arm 1215 away from lug 1224, and latch 1230 again latches lever 1220 at 1228, in the upward position until another cancelation perforation is encountered. It will be understood that magnet 1234 is suitably deenergized by one of the circuit-controlling commutators (Fig. 63) hereinafter described, to permit the latching of lever 1220.

Referring now to the mechanism for returning the carriage to its initial position for the withdrawal of the guest check or equivalent device and the insertion of a new one (Figs. 1, 2, 4, 5, 22 and 23, 55 and 56), a roller chain 1260 (see especially Fig. 5) runs over an idler sprocket wheel 1261, journaled on a stud 1262, fixed on a plate 1263, which is carried on the machine frame 9. The chain 1260 is fixed to the carriage by a block 1264 (Figs. 5 and 23) carried by studs 1267, fixed on a plate 1268, fastened to the carriage frame (Figs. 5[a] and 5[b]) and a screw adjustment 1265 is provided for the chain. At its bottom end, the chain runs over a sprocket wheel 1266, this sprocket wheel being connectible to and detachable from a drive for elevating the carriage, but is free during the downward travel of the carriage, which is fed and controlled in such downward movement in the manner already described. A pin or stud 1269 (Figs. 5 and 5[a]) on the opposite side of plate 1268, serves to limit the travel of the carriage in a downward direction by contacting with the collar 11, adjustably mounted on rod 6.

In the embodied form of means for driving the sprocket wheel 1266 to elevate the carriage on its idle return movement, on the cam shaft 800 (see especially Figs. 5 and 55) is a gear wheel 1270, with which meshes a gear wheel 1271, which is fixed on a shaft 1272. Mounted on the shaft 1272, to rotate therewith, but longitudinally slidable thereon, is a clutch member 1273, slidable on a spline 1274. The cooperating clutch jaw 1275 is formed on the hub of the sprocket wheel 1266, and is loose on the shaft 1272. Fixed on shaft

800, is a two-flanged cam 1276 having a cam roller 1277, with which cooperates a cam roller 1278, which roller is carried on arms 1280 and 1281, which arms are fixed on a shaft 1282, journaled in a bracket 1283 on the machine base. Fixed on shaft 1282 are a pair of arms 1286 and 1287, carrying respectively a pair of rollers 1288 and 1289, working in an annular groove 1290 in the clutch jaw 1273. This constitutes the throw-in mechanism for the clutch.

Referring now to the throw-out mechanism, a lever 1300 is pivoted at 1301 on the frame, and is provided with a cam surface 1302, with which cooperates a cam roller 1303, which roller is mounted on an arm 1287. The arm 1286 at its upper end is provided with cam faces or notches 1307 and 1308, with which cooperate the angled end 1309 of a lever 1310, pivoted at 1311 upon the frame. A tension spring 1312 impels the lever into the notches 1307 and 1308, the spring being connected to the lever 1310 and to a pin 1313 on the arm 1286. On the inner face of the cam lever 1300 (see also Fig. 23) is a yoke having projections 1320 and 1321, the yoke being pivoted at 1322. Cooperating therewith (see Fig. 23) are a pair of pins or rollers 1323 and 1324, fixed on the chain 1260.

The manner of operation of the mechanism is substantially as follows:

Considering the carriage as at the bottom end of its travel, and the necessary functions as described having been accomplished, upon the actuation or rotation of cam shaft 800, the cam 1276, through its cam roller 1277, engages cam roller 1278, and throws the clutch into engagement as shown in Fig. 56. The carriage is then elevated, through the subsequent rotation of shaft 800, to the upper end of its travel, any possible overthrow of the carriage at that point and its locking in position there having been already taken care of. As the carriage comes to the top of its travel, the pins 1323 and 1324 engage the projections 1320 and 1321 on the yoke, and lever 1300 is depressed, throwing the arms 1286 and 1287 to the left in Fig. 56 and to the position shown in Figs. 5 and 55, and thereby disconnecting the clutch. The lever 1310 and the cam notches 1307 and 1308 insure the positive throw of the sliding clutch member in and out. The drive of the clutch teeth as they are forced outwardly will function until the part 1309 of arm 1306 is over the apex into the notch 1307, whereupon spring 1312 snaps arm 1310 down giving an instantaneous release to the teeth of the clutch and thereby releasing the carriage and allowing it to settle back into the initial position in readiness for a subsequent operation upon the insertion of another guest-check.

Means have been provided by the invention for coordinating and insuring proper sequence between the oeprations of the various mechanisms. Thereby the operation of the computing machine is controlled or governed from the cam shafts 298 and 800 of the controlling mechanism, and likewise the controlling mechanism is governed or controlled from the computing machine, so that their operations will occur alternately and at the proper time and will not interfere one with the other.

Likewise means have been provided whereby the several groups of mechanisms in the controlling mechanism itself will operate in their proper sequence, and will not interfere with the operations of each other.

For the purpose of timing the computing machine to the controlling mechanism, an insulated switch arm 1350 is provided (Figs. 5–30 and 31), which arm serves to open and close the electric circuit (Fig. 63) at the circuit terminals 1351 and 1352, which are mounted on an insulating block 1353 on the frame 520. The switch arm 1350 is also pivoted at 1354 to the frame piece 520, and at its other end is pivotally mounted at 1355, to a screw adjustment 1356, fastened by means of lock nuts 1357 to an arm 1358, projecting from the back of the computing machine.

The arm 1358 forms one of the normal parts of the type of computing machine hereinbefore referred to, and is ordinarily used in such machines to actuate and control the spacing of the consecutive printings of the items to be added by the machine, and their totals which are ordinarily imprinted upon a paper roll or other suitable means for retaining this record. In the ordinary operation of the computing machine, for the purpose of accomplishing the foregoing functions, the arm 1358, which projects from the back of the machine, is caused by the machine to travel in a path both in and out each time the machine prints an item or a total.

For the purposes of the present invention, however, the printing of each separate item by the computing machine is omitted, and is replaced by other record retaining mechanism, and as a matter of convenience in design and construction, the arm 1358 has in the present invention been conveniently used as a governor between the computing machine and the controlling mechanism.

For the purpose of holding or controlling the several mechanisms of the controlling mechanism to operate at their proper time or sequence, one with the other, the cam shafts 800 and 298 have been provided with several rotating switches or commutators (Fig. 63) thus opening or closing the electric circuits at the proper time to perform their several operations. As the construction and design of all of these commutators are similar, varying only in the interval of time and angular position of opening or closing their circuits, the description of any one of them will cover all.

As embodied (Fig. 43) a circular insulating block 1360 is fixed to the cam shaft 298 or 800, and flush with the surface thereof and extending part way around in an angular direction, is a sector 1361 of electrically conducting material. Bearing upon the surface thereof (see also Fig. 63) are two circuit terminals or brushes 1362 and 1363, mounted on an insulated block 1364 on the machine base.

It may thus be readily understood that this method of electrical switch control will enable the operation of the various mechanisms at their proper time or sequence without interference one with the other.

Referring now to the diagrammatic arrangement of the several mechanisms with their switches and circuits, as shown in Fig. 63, a switch 1370, which for convenience may be a snap switch, is so located in the circuit as to be readily accessible to the operator, and serves to control all the intermediate circuits, and to allow for the start and operation of the mechanisms described.

The closure of the switch 1370 both starts the motor 980, which as hereinbefore described, provides the power in readiness for the cam shafts 800 and 298 to be rotated as desired, and also furnishes the necessary electrical energy for the various functions so performed, as hereinbefore and hereinafter described.

Upon the insertion in the carriage of a guest-check 40 with its holder 34, the switch arm 122 is rocked into contact with the circuit terminals 120 and 121, as has been described in detail. This closure completes the circuit through the circuit terminals 176 and 177 (see especially Fig. 63), thereby energizing the electro-magnets 187. The computing machine at this time is at rest, by reason of the position and operation of the timing or governing switch arm 1350 and its circuit terminals 1351 and 1352.

Upon the energizing of the electro-magnets 187, the corresponding mechanism is unlatched or actuated, as has been described, and the check holder carriage is allowed to move to its first selecting position or stop bar 227, under control of its escapement lever 261. As has heretofore been described, through the actuation of the mechanism as controlled by the magnets 187, the switch arm 174 is rocked from its closed position at circuit terminals 176 and 177, again opening the circuit just described, and closing other circuits thereby at the terminals 177 and 178.

As the check holder carriage is now under control of the escapement lever 261, through its stop bars 227 contacting with the lever 261, it will be seen from the diagram (Fig. 63) that the switch arm 270 will be rocked and the circuit closed at the terminals 271 and 272. The closure just described controls the closure of several different circuits and they will be described consecutively.

The several key selecting circuits for the actuation of the keys of the computing machine are closed by the contacting of the contact fingers 354 or 355 with the bus bar 390, through the perforated holes 43 in the guest-check 40 for the corresponding items, thence through the corresponding circuit terminals 350 or 351, supported on the insulated block 343, thence through the electro-magnets 712, singly or in series, or multiple, or series and multiple, connection with the electro-magnets 712 and the relays 720 (see Fig. 64), thence through the terminals or brushes 1362 and 1363 of a cooperating commutator 1361, fixed on the cam shaft 298, and operated by the release of this cam shaft through a circuit, later to be described, and thence through the closure of a governor switch arm 1350, and its terminals 1351 and 1352, as has been described.

The key-selecting circuit as shown on Fig. 63, through the energizing of its electro-magnet 712, serves to control or actuate a corresponding key of the computing machine, and is shown diagrammatically, and represents all the circuits as shown in Figs. 64; 68 and 73.

As has been described as an exemplary instance, means are provided for the cancelation of an item or order appearing on and perforated in the guest-check, which item has been ordered by a guest and then declined by him.

The circuit controlling the operations of the mechanisms as described, is closed at the circuit terminals 177 and 178, and the switch blade 174, through the circuit terminals 271 and 272 and the switch blade 270, to the bus bar 390, by the contact of the contact finger 355^a, contacting through the perforated hole 43^a of the guest check 40, with the bus bar 390, through a terminal 351 on the insulated block 343, through a cooperating commutator 1361, on the cam shaft 298, and its circuit terminals 1362 and 1363, as has been described, thence through a pair of electro-magnets 1234, cooperating with the mechanism for actuating the computing machine correction key, and thence completing the circuit closure at the governor switch blade 1350, and its circuit terminals 1351 and 1352, as has heretofore been described.

The release of the cam shaft 298 has already been described in connection with its mechanism, and is actuated by the closure of the switch arm 270 and its terminals 271 and 272, just described, through a corresponding commutator 1361, fixed on the cam shaft 298, and its terminals or brushes 1362 and 1363, through a pair of electro-magnets 1025, the energizing of which actuate a corresponding releasing mechanism, through circuit terminals 1080 and 1081 and their

switch arm 1078; and thence through the governor switch arm 1350 and its circuit terminals 1351 and 1352, heretofore described.

As has heretofore been described in connection with the step by step feed of the check holder carriage at its last two positions (or stub and check total positions) mechanisms have been provided whereby the accumulated total of the various items as perforated in the guest-check will be printed on the stub and check, and for the first or stub total the carriage moves into a corresponding position and the stop bar 227ª rocks the switch arm 270 again into a closure with its terminals 271 and 272, as has already been described.

The switch blade 950 carried on the lower right hand side of the carriage frame contacts with a pair of terminals 951 and 952, and the circuit is thereby closed from the terminals 271 and 272, through a cooperating commutator 1361, carried by the cam shaft 298, and its terminals or brushes 1362 and 1363, through the terminals 951 and 952 and the switch blade 950, through the electro-magnets 940, and thence through the governor switch blade 1350 and its terminals 1351 and 1352.

The energizing of the electro-magnets 940, as just described, cooperates with the mechanism which in turn actuates or depresses the total key of the computing machine and has already been described in detail.

As described in the step by step feed of the check-holder carriage, and for its last or check total position, the carriage moves downwardly into a corresponding position, and a latch arm 315, as shown in Fig. 9, contacts with the escapement lever 261 and again rocks the switch arm blade 270 into closure with its circuit terminals 271 and 272, and the circuit as described for the first or stub total is again closed through the circuit terminals 952 and 953, and the switch blade 950, which is mounted on the bottom of the carriage frame.

A mechanism has already been described whereby, after the cam shaft 298 has been allowed to release for the printing of the check total and at the completion of the rotation of the cam shaft 298, the switch closures or connections for the further operation, or the restoring, of the various mechanisms will be operated from the release or rotation of the second cam shaft 800. For this purpose, the mechanism, of which the switch blade 1078 is a part, at the completion of the rotation of the cam shaft 298 for the printing of the last or check total, is actuated by the contact of the pin 1063 and the arm 1062, heretofore described, and the switch blade is rocked from the circuit closing position as shown in Fig. 63 to a closure through the circuit terminals 1079 and 1080.

The rotation of the cam shaft 800 occurs but once to a cycle of the machine, and this rotation has two releases, spaced a half circumference apart, and the carriage is partly restored after the first release, and completely restored after the second release, and the stop bars 227 and 227ª of the check holder carriage have been retracted and are inoperative at the first release, and both releases of the second cam shaft 800, the circuit would be opened at the blade 270 and its terminals 271 and 272 for the second release. The circuit controlling these releases of the cam shaft 800 is closed through the circuit terminals 177 and 178 and the switch blade 174, through a commutator 1361 on the cam shaft 800 and its circuit terminals 1362 and 1363 through a pair of electro-magnets 1035, which control the actuation of the mechanism for the release of the cam shaft 800, as has already been described, through the circuit terminals 1079 and 1080 and the switch blade 1078, and thence through the governor switch blade 1350 and the terminals 1351 and 1352, as has been described for other circuits.

After the second release of the second cam shaft 800, and during the completion of the restoration of the check holder carriage to its original or initial position, the switch blade 174 is again rocked from the closure with the circuit terminals 177 and 178 to a closure with the terminals 176 and 177, and the switch arm 122 is thrown out of engagement with the circuit terminals 120 and 121.

After the second release of the cam shaft 800, and towards the completion of its rotation, the pin 1076 carried on the cam disc 1077 contacts with a tail formed on the end of the lever 1075, and upon the further rotation of the cam shaft 800, the lever arm 1075 and therewith the switch arm 1078 is rocked from its circuit closure with the terminals 1079 and 1080 to its circuit closure with the circuit terminals 1080 and 1081, and the cycle of operations of the several mechanisms, upon the termination of the computing machine operation, have been completed and the machine is in readiness for the insertion of another guest-check and to repeat the operations as described.

Referring now more particularly, and in detail, to Figs. 74 to 81, a different form of mechanism is shown for the release and return of the carriage and for positioning and holding the guest check in the carriage. In this mechanism, the mere insertion of the guest check in the carriage effects the release of the carriage, as soon as the guest check holder is in position and means are provided for holding it in position. The top closure for the carriage shown and described in preceding figures, is dispensed with in this form of mechanism.

In connection with the foregoing, and in accordance with one feature of the invention, means are also provided for preventing

operation of the machine by the insertion of a guest-check holder without the guest-check therein.

Referring now in detail to said embodied form and referring more particularly to Figs. 74 to 81, the parts of the mechanism which are of the same form as in the preceding figures of the drawing are indicated by the reference numerals previously used, and will not be described again.

In this form, a lever 1400 is pivotally mounted, by means of a pin 1402, in a slotted stud 1401, projecting from the frame piece 2 of the check holder carriage, pin 1402 passing through a slot 1403 in the lever 1400. A tension spring 1404, attached to the lever 1400 and to a pin 1405 on the frame piece 3 of the check holder carriage, resiliently holds the lever 1400 in the upper position, as shown in Fig. 74.

The upper portion 1407 of the lever is bent inwardly, that is, to the left in Fig. 74, and thereby projects over the carriage frame piece 2 into the path of the guest-check holder 34, as it is nearing its proper position in the carriage. From the part 1407 of the lever, an end portion 1408 is formed at an angle, extending upwardly in Fig. 74, and is provided with a curved cam face 1409, with which face the bottom or forward end of the guest-check holder engages to rock the lever, as hereinafter described. A contact face 1410 is formed on and projects laterally from the part 1408 of the lever so as to form a broader contact surface upon the guest check, after the frame has passed the lever, as the guest check is usually of heavy paper.

In connection with the foregoing mechanism, the embodied form of release for the latching lever 315 (see also Figs. 5[b], 5[a] and 9), comprises a rod 1416, extending longitudinally of the carriage, and at its bottom end bent into a transverse, horizontally extending part 1417, with which certain mechanism mounted on the lever 1400 is adapted to engage to operate latch lever 315. This mechanism comprises a slide 1418 connected to a transversely disposed part 1419 at the bottom end of the lever 1400. This slide is mounted on the lever 1400 by means of a slot 1420 in the slide 1418 through which project headed pins 1421 and 1422 mounted on the lever 1400. The slide is resiliently held to the left-hand position, as shown in Figs. 74 and 76, by a spring 1423 in tension between the pin 1422 and a pin 1424 on the slide. At its right-hand end in these figures the slide is provided with an angularly disposed laterally projecting cam face 1425, which operates as hereinafter described.

The rod 1416 extends upwardly along the check holder carriage (the carriage having been already described), and is provided at its upper end with a horizontally bent portion 1428, which is positioned just above the reduced end of a stud 1429 fixed to an arm on the latch lever 315.

It will be recalled that the switch blade 122 (Fig. 6) of the "master switch" is moved into circuit closing position with respect to the terminals 120 and 121 by the longitudinal movement of the bar 106. As here embodied, the switch blade 122 has positively imparted thereto a final movement into the terminals 120 and 121 by means which, as embodied, comprise a pin 1432, fixed in an arm 1433 on latch lever 315 and extending downwardly therefrom, and which cooperates with a cam surface or member 1434, formed on the pin 115.

The mechanism just described operates as follows:

In Fig. 74 the guest-check frame 34 is shown engaging with the cam face 1409, and the lever 1400 is thereby rocked from the position of Fig. 74 to that of Fig. 76, as the guest-check frame is moved to its proper operating position within the carriage. During the latter part of the movement of the guest-check frame 34, the slide 1418, by the movement of the lever 1400, has been moved in above the bent portion 1417 of rod 1416, and during the final and further movement of the guest-check frame (as shown in Fig. 76) the slide 1418, lever 1400 and the rod 1416 are thereby moved downwardly. This causes the upper part 1428 of the rod, acting on the stud 1429 to draw the latch lever 315 to the disengaging position of Fig. 76, thus releasing arm 236, and therewith bail 234, permitting the stop bars 227 and 227[a] to move inwardly under the impulsion of their springs 229, and allowing their pins 228 to find any corresponding perforations 41 in the guest check 40.

During the final portion of this movement, the pin 1432 rides on the conical cam 1434 on pin 115, and thus positively moves the bar 106 downwardly, thereby positively forcing switch blade 122 into its terminals 120 and 121. The pin 1432 is cut away on one side (as shown in Figs. 75 and 76) so that it may rest on the pin 115 just behind the lever arm 124 of the "master" switch mechanism. In Fig. 76, the face 1410 of lever 1400 is shown resting against the back of the guest-check 40. This relation is utilized as later described for preventing the operation of the machine by a holder without the guest-check therein.

Means are provided for permitting the latch lever 315 to return to engaging position so as to automatically latch the arm 236 when the stop bars have been restored, to hold them in retracted position ready for the next operation of the machine. As embodied (Fig. 80), a lug 1438 is mounted on the machine frame 520 and has a cam face 1439 cooperating with the laterally projecting cam face 1425 on the slide 1418, Figs. 74 and 76. In the final position in the downward travel of

the carriage, the cam face 1425, moving along the cam face 1439, retracts slide 1418, to the right in Figs. 76 and 80, and this releases rod 1416, and latch lever 315 returns to latching position under the impulsion of the spring 115, carrying the rod 1416 with it. As a matter of convenience, a flat spring 1440 (Fig. 74) may be provided, to press the guest-check holder 34 closely to position in its guideway.

Means are provided for accurately registering the guest-check frame or holder 34 in position in the guest-check carriage and for holding it firmly and accurately in that position during the travel of the carriage and for releasing it after all the computing operations have been completed. A pin 1450 suitably guided is fastened to an arm 1453 by pin 1451, which is pivoted at 1455 on an arm 1452 pivoted on the stud 1454, mounted upon the mounting 225 for the stop bars 227, 227a. The arms are connected and spaced apart at their outer end by the shouldered rivet 1455, by which said arms are pivotally connected.

Pivotally connected at 1456 to arm 1452 is a link 1458, which is also pivotally connected at 1457 to the arm 236. A spring 1459 is coiled about the pin 1450, in compression between the arms 1452 and 1453 and a part of the stop pin mounting. The pin 1450 is provided with a beveled point 1460. A registering and holding aperture 1461 (Figs. 65 and 77) is provided in proper position in the guest-check frame into which the pin 1450 enters to register the guest-check holder in the carriage and to maintain the guest check in desired position against the action of the spring 1404.

In the operation of the mechanism as described, when the latch lever 315 releases the arm 236, the stop pins resiliently press the pin 1450 against the guest-check frame, and when the beveled point of the pin finds the registering and holding opening 1461, it is pressed thereinto. This registers and holds the guest-check frame 34, and permits the stop pins 228 which are in register with perforations 41 in the guest-check 40 to enter the respective perforations, to successively position the carriage as already described. On the retraction of the stop bars by the bail 234, the spring 1459 acts to prevent any retarding of the restoring movement due to friction on the pin 1450.

In Figs. 82 to 86 of the drawings, a modified form of the electric circuit making and breaking mechanism and the operating and controlling mechanism therefor is shown. As embodied, a bar 1500 of insulating material is mounted between the arms 1501 and 1502 of a yoke. From the backward cross reach 1503 of the yoke, two guiding and supporting rods 1505 and 1506 extend backwardly, and are longitudinally reciprocably mounted in bearings, respectively, in apertured lugs 1507 and 1508 and 1509 and 1510 mounted upon and extending upwardly from a plate 1511 fixed to the machine frame plate 15.

Mounted in the insulating block 1500 (Figs. 82 and 83), are a plurality of slotted spring socket terminals 1520, the terminals being mounted in cylindrical recesses in the block 1500 which are sufficiently larger than the terminals to permit the desired spring action. Each of the terminals 1520 has projecting rearwardly therefrom a screw rod 1521, upon which is screwed a cap 1522, making a detachable electrical connection with one of the cables 340.

Mounted on the opposite side of the guest check and holder, is a bus bar mechanism, which, as embodied, comprises a block 1530 of insulating material, at either end of which are mounted rearwardly-extending supporting and guiding rods 1531 and 1532 (see also Fig. 85). These rods are fastened to the insulating block 1530 in suitable manner, and as shown, the rods are provided, respectively, with a flange 1533, contacting with the back of the block 1530, a reduced screw-threaded portion 1534 of the rod passing through the block. On the opposite side of the block there is a washer 1535, and a nut 1536 is screw-threaded on the part 1534 of the rod. The supporting and guiding rods 1531 and 1532 are longitudinally reciprocably mounted, respectively, in upwardly-extending apertured lugs 1537 and 1538 and 1539 and 1540 fixed to a plate 1541 mounted on the frame plate 15.

On the forward face of the insulating bar 1530 is a plate 1544 of conducting material, and in front thereof and spaced away therefrom is another plate 1545, likewise preferably of conducting material, the plates being spaced apart and supported in alinement by suitable means. As shown, shouldered pins 1548 are provided, the forward ends thereof projecting through and being upset in the plate 1545, while the rear ends are shouldered against the plate 1544, the reduced portion 1549 of the pin 1548 passing through the plate 1544 and through the insulating block 1530, and being screw-threaded on the other side thereof to receive fastening devices on the back of the block. One of the pins is shown held in place by a nut 1550, while the other pin is utilized for a circuit terminal, corresponding to the circuit line 390a shown in Fig. 63, the wire 390a having a terminal between two nuts 1551 and 1552.

Longitudinally reciprocably mounted in the plates 1544 and 1545 are a series of spring-pressed pins 1560, corresponding in number to, and being in alinement with, the spring socket terminals 1520, each pin 1560 being adapted when finding a perforation 43 in the guest check 40 to pass therethrough and to enter the corresponding socket 1520 and thereby to make the circuit for the corresponding function of the mechanism.

The pins 1560 are mounted in apertures

in the plates 1544 and 1545, and their rear ends work in apertures 1561 in the insulating block 1530. Springs 1562 are coiled about the respective pins in tension between the plate 1544 and collars 1563 on the pins. The pins are thus resiliently pressed against the guest-check, the lowermost pin shown in Fig. 83 having found its perforation 43 and made the circuit through the guest check 40 with its socket 1520, and the uppermost pin has yielded backwardly against its spring 1562, there being no perforation for it in the guest-check.

Referring now to the embodied form of actuating means for the mechanism just described, and referring to the left-hand end of Fig. 82 and the top of Fig. 85, a cross bar 1570 is fixed to the supporting and guiding rods 1505 and 1506, and on the exterior sides of the rods there are mounted on the bar two rollers 1571 and 1572 (see also Fig. 86).

These rollers, respectively, are straddled by the forked ends 1573 and 1574 of arms 1575 and 1576, which arms are fixed to, and extend downwardly from a shaft 1577. Shaft 1577 is journaled in brackets 1578 and 1579, mounted upon and extending upwardly from the plate 15 of the machine frame. A collar 1580 is fixed upon the shaft 1577 to hold it in place with respect to the bearing 1578, while the hub of the arm 1576 effects the same purpose at the other bearing.

The shaft 1577 extends beyond the bearing 1578 and externally thereof it has fixed thereto an arm 1582. Arm 1582 extends downwardly from the shaft 1577 and has at its free end a pivot pin 1583, projecting through a slot 1584 in the end of a link 1585, which link is pivotally connected at 1586 to an arm 1587, fixed on a shaft 1588 (see also Fig. 86). A spring 1589 under tension, and fastened between the pivot pin 1583 and a pin 1590, fixed on the link 1585, resiliently presses the pivot pin to the right-hand end of the slot in Figs. 82 and 85.

On the other side of the mechanism, a bar 1600^a is fixed to the guiding and supporting rods 1531 and 1532, and externally to the rods there is mounted upon the ends of the bar two rollers 1601^a and 1602^a. Straddling these rollers, respectively, are the forked ends 1603^a and 1604^a of two lever arms 1605^a and 1606^a, which lever arms are fixed on the shaft 1588, to which, it will be recalled, the arm 1587 is also fixed.

Means are provided in connection with the foregoing for alining or positioning the insulating block 1500 and the circuit mechanism connected thereby with respect to the guest check, and as embodied (Figs. 82 and 85), a hardened bearing surface 1610^a is provided, which is forced into a cross-brace 1611^a, extending across between, and integral with, the bearing lugs 1508 and 1510. An adjusting screw 1612^a is screw-threaded into the bar 1570, and is preferably provided with a locking nut 1613^a, the squared end of the screw being adapted to engage with the hardened true face 1610^a. This together with the pin and slot connection 1583, 1584 and the spring 1589 provides a yielding and true adjustable positioning means for the mechanism.

In the common operating means for the mechanism just described (Fig. 82), an arm 1620^a is fixed to shaft 1588, and at its free end is pivotally connected at 1621^a to a link 1622^a which link (see also Figs. 78, 84 and 86) is pivotally connected at 1623^a to a bell crank lever 1624^a, which lever is pivoted at 1625^a upon the bracket 513. The other arm of lever 1624^a is pivoted at 1626^a to an arm 1627^a which arm is mounted by a slot 1628^a upon a rod 1629^a, which rod is journaled in a pair of arms 1630^a, 1631^a fixed on shaft 545. An arm 1632^a is fixed also on shaft 545, in the free end of which arm is mounted a cam roller 1633^a, running in a cam groove 1634^a in a cam 1635^a, fixed on cam shaft 298.

Means are provided for preventing the actuation of the circuit-controlling mechanism during the printing of the totals on the stub and on the guest-check, and as embodied, an arm 1640^a is fixed on rod 1629^a, and is provided near its free end with a latch 1641^a and a beveled face 1642^a. Fixed on the arm 1627^a is a lug 1643^a, which cooperates with the latch 1641^a, as hereinafter described.

A spacing collar 1644^a (see especially Fig. 78) between the arm 1627^a and the arm 1630^a, and conveniently fixed to the latter, serves to keep the arms 1627^a and 1640^a in alinement, and insures free and true movement and guards against sidewise displacement or distortion. The arm 530 is also fixed to shaft 1629^a and is given the same numeral as in a previous construction (see for example Fig. 32).

The operation of the mechanism will be clearly understood from Figs. 82 and 84. During the step by step downward travel of the carriage for the successive cooperation of the perforations in the guest-check with the cooperating circuit-controlling devices, the mechanism is in the position of Fig. 82. That is, on each revolution of cam 1635^a with its shaft 298, arms 1630^a and 1631^a are rocked, and by reason of the latch 1641^a engaging with the lug 1643^a, arm 1627^a travels with arm 1640^a, and the lever 1624^a is thereby rocked, about its pivot 1625^a, and the circuit controlling mechanism is thereby moved from the position of Fig. 85 to that of Figs. 82 and 83 and back again.

When the carriage comes to the first total printing position, that is, for printing the total on the stub, the carriage engages the top of the rod 525, as already described, and thereby depresses the lever 530, therewith rocking the lever 1640^a so that the latch 1641^a

is clear of the lug 1643ª. Upon the following actuation of the arms 1630ª and 1631ª from the cam 1635ª, the arm 1640ª will move backwardly with its latch 1641ª clear of the lug 1643ª on arm 1627ª and the circuit controlling mechanism will not be actuated, the slot 1628ª permitting the movement just described. The same is true for the second total printing position except that the arms 530 and 1640ª are rocked to a still lower position.

By the mechanism just described, a positive circuit controlling action is effected, that is, the circuits at the perforations are positively made, as the pins 1560 are driven or pressed with sufficient force through the perforations into the spring socket terminal, and will make a good contact despite irregularity in the perforations 43, the presence of fragments of paper, lint, or any other accidental obstacles. Also, there is a positive yet sufficiently yielding movement together of the circuit mechanism from each side, together with an accurate positioning thereof.

Means are provided by certain features of the invention for normally locking the entire machine against operation and providing therewith unlocking means, that is, means for calling the mechanism into operation and at the same time necessarily and inaccessibly recording the identity of the operator who so operates the mechanism. This mechanism may be used optionally with the remainder of the machine, but so far as concerns many features of the invention, the remainder of the machine will operate independently and completely apart from the present mechanism.

In the embodied form of this mechanism, a key for the waiter (still exemplarily considering the invention used in a dining room or restaurant business) or other operator is provided, and located inaccessibly within the machine and actuated by the key, is the controlling mechanism governing the operation of the entire machine, and also the mechanism for recording the identity of the operator. As embodied (Figs. 87, 88, 99 to 105) a key 1600 (see especially Fig. 102) is inserted from exteriorly to the general casing of the machine, whereby the machine is rendered safe against tampering, through an opening 1601 (see Fig. 100) into a key barrel or cylinder 1602, which is mounted to rotate in the frame plates 1604 and 1605, by means of cylindrical heads 1606 and 1607, the key cylinder turning with the key in a well-known manner. The cylinder is mounted eccentrically with respect to the heads 1606 and 1607 for a purpose hereinafter described.

During the rotation of the key, in the present embodiment, amongst its functions, it operates certain switches or switch controlling mechanisms which turn on and off the current for the motor 980, and also operates the various controlling switches for the controlling mechanism for the computing machine, all of which will be later described in detail.

Referring now to the embodied form of the means for recording the number, or other identifying mark, for the waiter or other operator of the machine, that is, the person responsible for the key, said means consist preferably of mechanism operated by the waiter's key, or the like, for selectively setting certain keys in the computing machine which set keys thereafter print upon the stub and guest-check, or equivalent record receiving means the number or characters so set at the same time with the printings of the total, both upon the stub and upon the guest-check.

Referring to said means in detail, as embodied (Figs. 87, 88, 99, 100, 101, 104, 105 and 107), two series of levers 1610 and 1611 are pivotally mounted, respectively, at either side of the key cylinder, on rods 1612 and 1613, respectively, which rods are mounted at their opposite ends in the frame plates 1604 and 1605. These plates are supported on rods 1614 and 1615, mounted in brackets 1616 and 1617, which brackets are mounted on the frame rod 607, and also in brackets 1618 and 1619, which brackets are mounted on the frame rod 606 (see also Fig. 97). Upon the rods 1614 and 1615 are mounted spacing collars 1620, and at the rear end of the mechanism, that is, the left-hand end in Fig. 88, is a corresponding frame plate 1622 which serves as a support for part of the mechanism. At the upper end of the plates 1604, 1605 and 1622 are spacing and tie rods 1623 and 1624, connecting the mechanism together and maintaining the parts in proper position.

The two series of levers 1610 and 1611, as a matter of structural convenience, are connected, respectively, with two corresponding rows of keys in the computing machine mechanism, as best appears from Figs. 87, 104 and 105. The connections from these levers 1610 and 1611 to the keys of the computing machine are the same on both sides, and one description will suffice for both. The respective levers 1610 and 1611 have pivotally connected thereto at 1630, downwardly depending links 1631, which links are pivoted at 1632 to the respective arms of a corresponding series of arms 1633. Some of these arms are sleeved, or mounted loosely, upon shafts 1634, and other of these arms are fixed to the shafts 1634 as a matter of structural convenience in arranging the mechanism.

Fixed to move with the various arms 1633 are a set of corresponding arms 1635, some being fixed to the same hub with their arms 1633 and others being fixed to the same shaft therewith, as the case may be. Pivotally connected at 1636 to the various arms 1635 are corresponding downwardly extending links 1637, the arms 1636 and their links being

positioned at convenient points longitudinally on the various shafts 1634 to correspond with the position of the keys of the computing machine. The various links 1637 are provided with screw adjustments 1638 for adjusting their length.

At their lower ends, respectively, the links 1638 are pivotally connected at 1639 to the respective arms of a corresponding series of levers 1640. The levers 1640 are double-arm levers, and are rotatably sleeved upon a corresponding series of shafts 1641, mounted at their ends in a pair of depending frame plates 1642 and 1643, these frame plates extending downwardly from the hubs 1644 and 1645 of the brackets 1616 and 1617, and from the hubs 1654 and 1655 of the brackets 1618 and 1619, as appears best in Figs. 87, 88 and 97. The frame plates 1642 and 1643 are spaced and held in position by a pair of shouldered or sleeved tie rods 1646 and 1647.

The levers 1640 at their free ends are provided with rollers 1648, which are in operative relation, respectively, with corresponding keys 1649 of the computing machine. The links 1637 and the levers 1640 are staggered or laterally positioned as shown in Fig. 87, as a matter of structural convenience. Springs 1650, in tension between the respective levers 1610 and 1611 and corresponding rods 1651 and 1652, tend to keep the levers in the top position of Fig. 87 that is, with the keys of the computing machine unset, that is, not depressed.

Means are provided for maintaining any set or selected keys of the computing machine in the set or depressed position for a desired period after they have been set by the operation of the waiter's key and the mechanism just described, and until numbers or characters set thereby in the computing machine have been printed or otherwise recorded upon the guest-check or other record-receiving device. As embodied, (Figs. 87, 88, 99, 104 and 105), the various levers 1610 are provided with a series of downwardly extending tails 1660, and formed upon the tail of each of these levers is a detent notch 1661, the levers 1611 being similarly constructed.

Cooperating with the mechanism just described at either side, respectively, is a detent plate or universal detent 1662, swingably supported on a rod 1663, these rods both being mounted in the frame plates 1604 and 1605. These plates, respectively, are impelled into detenting position for the levers 1610 and 1611 by springs 1664, in tension between the respective detent plates and the rods 1651 and 1652 already referred to.

Means are provided for releasing the set levers 1610 and 1611 from the detent plates 1662 after the numbers, or other identifying marks, set by the set keys 1649 of the computing machine have been imprinted or otherwise recorded on the guest-check or other record-receiving medium. As embodied (Figs. 87, 88, 93, 99 and 113) cooperating with the universal detent 1662 at the right-hand side of Fig. 87, is a restoring arm 1668, which arm is pivotally supported on a stud 1669, mounted on the frame plate 1604. At its opposite end 1670, the lever is pivoted to a link 1671, which link at its opposite end 1672 is pivoted to an arm 1673 (see especially Fig. 88). Arm 1673 is fixed on a shaft 1674, which is journaled in the frame plates 1604, 1605 and 1622.

Fixed to the shaft 1674 is an arm 1675, to which arm is pivoted a link 1676, which link at its other end 1677 is pivoted to an arm of a bell crank lever 1678. A spring 1675^a is in tension between the arm 1675 and a pin 1675^b, which is fixed on the frame plate 1604, and tends to keep the levers in the position shown in Fig. 87 against a stop pin 1675^c fixed to the frame plate 1622. The bell crank lever 1678 is pivoted at 1679 upon the frame member 608. At its opposite end 1680 (see especially Fig. 113), the bell crank lever is pivoted to a link 1681, which link has a pin and slot connection 1682 with the actuating lever 1117 for the transfer lever 1112, already described and which is shown in Figs. 3 and 41.

The various keys 1600 (Figs. 100, 101, 102, 103 and 106), are so formed that when rotated in the key cylinder, the various keys will set different combinations of the levers 1610 and 1611, and thereby different combinations of computing machine keys to constitute numerical identifications for the different waiters or other operators. As already stated, the two rows of keys in the computing machine represent tens and units, and in Fig. 102 the key 1600 is shown divided theoretically into certain parts or areas, properly marked in the figure, representing teeth or projections corresponding to the levers 1610 and 1611 and also to the corresponding computing machine keys for the tens and units. The key is formed as shown in Fig. 103 with two of these projections located to select the identifying number "68", as the projections 1683 and 1684 are positioned, as will be seen by comparison with Fig. 102, to set the two corresponding levers 1610 and 1611, and through them two corresponding keys of the computing machine.

The manner of operation of the mechanism so far described is substantially as follows:—

The key 1600 is inserted in the barrel, and is turned to set the corresponding levers 1610 and 1611 as described. Various other functions are also effected previous and during this time, which together with the mechanism for effecting the same will be later described. The corresponding levers 1610 and 1611 are set as the key 1600 passes the half

rotation. The ends of these levers project across in alternate relation above the key 1600 (Figs. 87, 88, 99, 100 and 101), the central part of the key cylinder being open, cut away (as appears from Figs. 100 and 101) so that the projections 1683 and 1684, or other projections, as the case may be, on the key may engage with the levers. The engagement of one of the levers 1611 with the projection representing number 40 on the key is shown in Fig. 100. It can be seen also that the levers not in engagement with a projection on the key remain in an inoperative position, resting on the periphery of the shouldered portion of the key cylinder which is central with the heads 1606 and 1607.

When any of the levers 1610 and 1611 are set, that is, lifted upwardly, by the rotation of the key 1600, the corresponding keys 1649 in the computing machine are set through the system of levers already described. During this key-setting movement of the selected levers 1610 and 1611, their tails are rocked downwardly, as shown in Figs. 99, 104 and 105, and the universal detent plates 1662 spring in above the notches or teeth 1661 and hold the levers and the set keys of the computing machine in this position.

In the releasing or restoring operation, when the actuating lever 1117 for the transfer lever (Figs. 3 and 113) is operated, the arms 1668 and 1673 will be rocked to swing the detent plates 1662, against their respective springs 1664, away from the teeth 1661 on the set levers 1610 and 1611. This permits the levers to drop down, under the action of their springs 1650 to the unset position, and leaves the keys 1649 of the computing machine free to be restored by the proper operation of the computing machine.

Means are provided by the invention for preventing either withdrawal or backward movement of the actuating key 1600 once the controlling and actuating movement thereof has been begun. As embodied, the mechanism is constructed and designed to complete its cycle upon one complete rotation of the key 1600, and the safety device just described comes into operation previous to any of the controlling or actuating functions of the mechanism. As embodied (as seen especially in Fig. 103), the key comprises the central rod-like portion 1700, this portion fitting a like recess in the key cylinder and serving as a guide for the key when inserted into the cylinder. The blade-like portion 1701, upon which is carried the lever and key setting lugs 1683 and 1684, is eccentrically mounted with respect to the central rod-like portion 1700. This may best be seen from Figs. 99 and 100. The blade portion 1701 is also formed to have certain functions as is later described.

The key is inserted in the position shown in full lines in Fig. 87 and in dotted lines in Fig. 89 the key-way being shown in the corresponding position in Fig. 101. From a comparison of these with Fig. 100, it will be obvious that the least angular change in the position of the key from that of Figs. 87, 89 and 101, will cause the portion 1701 to lock the key behind the face 1703 of the escutcheon 1961, fixed to frame plate 1604. This will prevent the withdrawal of the key from the cylinder until the key is brought back to the position of Fig. 89. In Fig. 100, in which figure the key is shown after a half revolution, similarly to Fig. 99, the face 1702 of the body or blade of the key is shown locked against the face 1703 of the escutcheon or frame member 1961, hereinafter referred to, in the manner just described.

In cooperation with the mechanism just described, means are provided for preventing backward rotation of the key, so that once its angular motion has been started a complete rotation must be imparted thereto before the key can be withdrawn. In the embodied form thereof (Figs. 89, 90, 92 and 100), fixed to the rear end of the cylinder 1602, to rotate therewith, is a ratchet wheel 1710, which is fixed to the cylinder by suitable means, such as screws 1711.

Cooperating with the teeth of the ratchet wheel 1710 is a pawl lever 1712, pivoted at 1713 on the frame plate 1605. A spring 1714, in tension between the tail of the pawl lever 1712 and a pin 1715 on the frame plate 1605 resiliently impels the pawl lever into the teeth of the ratchet wheel. Thus backward rotation of the key 1600 is prevented.

In accordance with certain features of the invention, means are provided, (see Figs. 89 and 90) operated by the actuation of the key 1600, for turning on the electric current for the entire machine. In the embodied form thereof, two terminals 1716 and 1717 are provided, suitably mounted on the plate 1605, with which cooperates a switch blade 1718, which is insulated on the lever 1719, which lever is pivoted at 1720 upon the frame plate 1605.

The switch blade 1718 is normally maintained in the open circuit position by a spring 1721, in tension between a pin 1722 fixed upon the lever, and a pin 1723 fixed on the frame plate 1605. An arm 1724 forming part of the lever, cooperates with a stop pin 1725, fixed on the plate 1605, to limit the movement of the switch blade 1718. An actuating arm 1726 is also a part of the switch lever structure, and is in the path of the roller 1727, which roller is mounted on the external face of the ratchet wheel 1710.

Means are provided by the invention (Figs. 89, 90, and 92) for holding the switch blade 1718 in the closed circuit position for the required period of time, that is, during the remainder of rotation of the key 1600. In the embodied form thereof, a lever 1730 is pro-

vided with a detent hook 1731, which hook is adapted to engage the arm 1724 of the switch lever and to hold it in the circuit closing position against the spring 1721 as shown in Fig. 90. The lever 1730 is pivoted at 1732 upon the frame plate 1605, the lever having an arm 1733. A spring 1734 is in tension between this arm and a pin 1735, mounted upon the frame plate 1605.

Lever 1730 has an arm 1736, which projects downwardly in the path of the roller 1727, which roller is mounted upon the ratchet wheel 1710 as already described. Lever 1730 is also provided with an arm 1737, the end of which is formed into a laterally-extending portion 1738, the function of which parts will be later described.

The manner of operation of the mechanism just described is substantially as follows:

As the rotation of the key 1600 is begun, it locks against retraction from the mechanism as already described. The rotation of the key causes corresponding rotation of the teeth of the ratchet wheel 1710 beneath the spring pawl 1712, thereby preventing reverse rotation of the key. The roller 1727 through the rotation of the ratchet wheel engages the arm 1726 of the switch lever 1719 and the switch blade is thereby moved from the open-circuit position of Fig. 89 to the closed circuit position of Fig. 90.

Previous to this the roller 1727, at the beginning of the rotation of the key, moved past the arm 1736 of the lever 1730, imparting an idle motion to the lever, the roller snapping quickly by the beveled end of the arm. As soon as the arm 1736 was clear of the roller 1727, the locking lever 1730 swung to the operative position of Fig. 90, under the action of its spring 1734.

When the roller 1727 struck the arm 1726, as already described, and the switch was moved to the closed-circuit position as indicated by broken lines in Fig. 89, arm 1724 engaged the beveled end of lever 1730 and by the lever yielding against its spring 1734, the arm 1724 snapped into the detent 1731. This action closed the switch at the terminals 1716 and 1717 (as seen in Fig. 90), which will remain closed until the roller 1727 again engages with the arm 1736 of the detent lever 1730 at the completion of the rotation of the key (this position being shown in Fig. 89). The switch 1716, 1717 is in the power line for the entire machine, and closes the power circuit for the motor 930 and for the various electro-magnets of the controlling mechanism.

There is preferably provided by the invention a governing switch for the entire controlling mechanism of the computing machine (Figs. 89, 90 and 92), this switch being preferably in series in the circuit between the switch 1716, 1717 just described, and the carriage release switch 121, 122. As embodied, switch terminals 1750 and 1751 suitably mounted on the plate 1605 have cooperating therewith a switch blade 1752, mounted upon and insulated from a supporting lever arm 1752ª, which is pivoted at 1753 upon the frame plate 1605.

An arm 1754 of this switch blade lever 1752ª has a face 1755 adapted to engage with the roller 1727 already described. A spring 1756 in tension between a pin 1757 fixed on the arm 1754 and the pin 1723, already described, resiliently holds the switch blade in the open-circuit position, shown in full lines in Figs. 89 and 92 and in broken lines in Fig. 90.

An arm 1758 is provided with a latch projection 1759. Cooperating therewith is a latch lever 1760, having a detent notch 1761, the lever being pivoted, free to rotate, on a shaft 1762 rotatably mounted in the plates 1605 and 1622 (see Fig. 88). A stop pin 1763, mounted on frame plate 1605, limits the open position of the switch blade lever 1752ª.

Lever 1760 has an arm 1764, and a spring 1765 is in tension between this arm and a pin 1766, fixed to the frame plate 1605. Lever 1760 is also provided with an arm 1767, which will be later described.

In the present embodied structure, and in view of the present preferred sequence and manner of operation, means are provided for preventing the complete rotation of the key until the completion, or nearly the completion, of the cycle of operation of the computing machine and its controlling mechanism. Accordingly, a stop lever 1772 has a face 1773, projecting into the path of the roller 1727 on the ratchet wheel 1710.

Lever 1772 is pivoted at 1774 on the frame plate 1605, the lever at its other end 1776 having a laterally projecting lug 1777, which cooperates with a detent lever 1778, having a detent notch 1779. The lever 1778 is fixed on shaft 1762, the lever having a tail 1780, and a spring 1781 is in tension between it and a pin 1782 fixed on the frame plate 1605. A spring 1783 is in tension between a pin 1784 on lever 1772 and a pin 1785 on lever 1778.

Means are provided by the invention for withdrawing or releasing the key stop lever 1773 at the close of the cycle of the machine, permitting the completion of the rotation of the key 1600 so that it may be withdrawn, and also for moving both of the switches 1718 and 1752 to open-circuit position. As embodied (Figs. 88, 89, 93, 94, and 95), there is fixed to shaft 1762 an arm 1800, having a pin and slot connection 1801 with a link 1802, the link being provided with screw adjustments. At its opposite end 1803, the link 1802 is connected to one arm of a bell crank lever 1804, which lever is pivoted on a stud 1805 (see also Fig. 97), carried on the bottom part of the frame 608.

The other arm of bell crank lever 1804 (Figs. 88, 93, 94, 95 and 96) has at its free

end a pin 1806, which works in the forked end of an arm 1807 of the lever 1809, which is pivoted on a stud 1808, mounted in the frame piece 608. This lever 1809 has an arm 1810, and pivotally mounted at 1811 on the upper end of this arm in an interponent 1812. This interponent 1812 has an operating face 1813, and has also a stop surface 1814, which cooperates with a pin 1815, fixed on the lever 1810. A spring 1816 is in tension between a pin 1817 on the lever 1810 and a pin 1818 on the interponent 1812.

Extending laterally from the face of the interponent 1812 is a lug 1819, with which cooperates a latch lever 1820, having a detent notch 1821, adapted to engage with the lug 1819 and thereby hold the interponent 1812 against its spring 1816, out of operative or actuating position. Latch lever 1820 is pivotally mounted at 1824 on an enlarged part 1825 of the lever 1810.

The latch lever has an arm 1826, projecting outwardly therefrom, the end 1827 thereof being bent at an angle to engage with a release mechanism, to be later described. A spring 1828 is in tension between a pin 1829 on the arm 1826 of the latch lever 1820 and a pin 1830 fixed in the part 1825 of the lever 1809. A spring 1832 for restoring lever 1809 is in tension between the part 1825 of lever 1811 and a pin 1833 fixed on the frame piece 608.

Cooperating with the interponent 1812 is a restoring arm 1836, pivotally mounted on a stud 1837, fixed on the frame piece 608, the arm 1836 having a roller 1838, adapted to cooperate with a tail 1839 of the interponent 1812. A spring 1840 is in tension between the arm 1836 and a pin 1841, fixed in the frame piece 608. A tail 1842 of the arm 1836 rests against a stop-pin 1843 on the frame 608, to hold the arm in position against the action of the spring.

A lever 1849 has its hub 1848 loosely pivoted on the stud 1808 which lever operates the latching lever 1820. This lever has an arm 1850 in engagement or operative relation with the end 1827 of the latch lever 1820. The lever 1849 has another arm 1852, to which is pivotally connected at 1853 a link 1854, having preferably screw adjustments, this link having a pin and slot connection 1855 with the clearing lever 1191, previously described (see especially Figs. 42, 95 and 98).

Mounted in the computing machine, as embodied, is a shaft 1856 a part of the computing machine mechanism (Figs. 93, 94, 95 and 96) on which is fixed a sector 1857, this sector having an arcuate reciprocation about its shaft 1856 for each operation of the operating key 801 previously described. Fixed in and extending outwardly from the sector 1857 is a pin 1858 having a roller 1859 adapted to cooperate with the face 1813 of the interponent 1812.

The operation of the mechanism just described is substantially as follows:

The mechanism may be considered in the position of Figs. 93 and 95, wherein it is in the inactive position, that is, the switches 1752 and 1718 are in the closed-circuit position while the various operations of the controlling and computing mechanisms follow in sequence when the operating key 801 is successively actuated. The shaft 1856 and the sector 1857 reciprocate in an arc for each operation of the operating key 801.

Upon the operation of the clearing key 1180 (Figs. 42 and 98) the arm 1191 is rocked as previously described. Through the connections shown in Figs. 95 and 98, this rocks lever arm 1850, thereby rocking the latch lever 1820 to the left against the spring 1828. This permits the interponent 1812 to move from the position of Figs. 93 and 95 to the broken line position of Fig. 93, so that the interponent will be in the path of travel of the roller 1859, the interponent at this time being drawn downwardly under the action of the spring 1816 until the face 1814 is against the pin 1815.

As the roller 1859 moves to the right from the position shown in Fig. 93, it will snap past the interponent 1812, but will not lift it sufficiently to cause the lever 1820 to reengage the lug 1819. As the sector 1857 moves backwardly again to the left, the roller 1859 will engage the face 1813 of the interponent, and will rock lever 1809 against its spring 1832, thereby rocking bell-crank lever 1804 and therefrom arm 1800 and shaft 1762.

This action (Figs. 89, 90, 91, 92 and 95) rocks arm 1778 to the right in Figs. 89, 90 and 92, thereby disengaging the detent notch 1779 from the lug 1777, and allowing the stop arm 1772 to be drawn out of the path of the roller 1727 by the spring 1785, as shown in the broken line position of Fig. 90. The key 1600 may now be turned by the operator for the last quarter of its revolution, which brings it to the position where it may be withdrawn.

When the arm 1778 is rocked to the right from the position of Fig. 92, that is, from the full line to the broken line position of Fig. 90, the pin 1785 engages the arm 1767, thereby rocking lever 1760 to the right from the solid line position of Fig. 90 to the broken line position of Fig. 90. This rocks the detent hook 1761 free from the lug 1759, and switch blade 1752 is moved from the full-line, circuit-closing position to the broken-line, open-circuit position of Fig. 90 by the spring 1756. This cuts off the current from the controlling mechanism for the computing machine as will be understood from the previous description.

When the key is turned from the position of Fig. 90 to that of Fig. 89, approximately a quarter turn, the roller 1727 will engage

with the arm 1736, to release the arm 1724 from the detent 1731, whereby switch blade 1718 is moved to the open-circuit position, that is, from the position of Fig. 90 to that of Fig. 92 by spring 1721. Certain of the mechanism participating in this operation has not yet been described, but will be described later herein.

The restoration of the interponent 1812 to the inactive position, preparatory to the next cycle of operation in the entire machine, is effected by the roller 1838 on the arm 1836 snapping by the tail 1839 of the interponent as the latter moves back to the left, at the completion of which move the roller 1838 is above the surface 1839. When the roller 1859 arcs or snaps by the nose of the end 1813 of the interponent, as shown in Fig. 94, lever 1809 is moved to the right under the impulsion of the spring 1832, until it is brought to rest against the stop pin 1799.

During this movement the roller 1838, riding on the inclined surface 1839, lifts the interponent, and latch lever 1820 snaps again beneath lug 1819. This holds the interponent in inactive position until the clearance key is again operated, when the sequence of operations just described is again begun.

Means are provided, in cooperation with the foregoing mechanism, for permitting the moving of the switch blade 1718 from the circuit-closing to the open-circuit position, and for positively preventing more than a complete rotation of the key, and thereby compelling the withdrawal of the key after its complete rotation. In the embodied form thereof (Figs. 89 to 92), a bent lever 1880 has an arm 1881, having a face 1882 in the path of the roller 1727, the lever being pivoted at 1883 upon the frame plate 1605.

The other arm 1884 of lever 1880 is provided with a detent notch 1885, and there is on this arm also a projection 1886, adapted to cooperate with the projection 1887 on the stop lever 1772, already described. A spring 1888 is in tension between a pin 1889 on the lever arm 1884 and a pin 1890, fixed in the frame plate 1605.

Pivoted at 1891 on the frame 1605, is a lever 1892, having an arm 1893 provided with a detent notch 1895, adapted to engage with lug 1738 on lever 1730, previously described. Lever 1892 has an arm 1897, provided with an angled lug 1898, which cooperates with detent notch 1885 of the lever 1880. Lever 1892 is also provided with an arm 1900, a spring 1901 being in tension between this arm and the pin 1890.

Mounted on arm 1893 of lever 1892 is a pin 1908, and cooperating therewith is an arm 1909, fixed on a shaft 1910 (Figs. 89 to 92, 100, 101 and 106). Shaft 1910 is journaled in the frame plates 1604 and 1605, and near the opposite end it has fixed thereto an arm 1912, having a contact face 1913, with which cooperates a spring-actuated pin 1914 (Figs. 87, 100, 101 and 106). Pin 1914 is resiliently longitudinally reciprocable in a cylindrical recess 1915 in the cylinder 1602 of the key. A spring 1916 is coiled about the pin and is in tension between a screw lug or bushing 1917, screwed into the cylinder 1602, and a collar 1918 fixed on the pin, the spring impelling the pin to the position of Fig. 100.

The tail 1920 of the arm 1912 has a tension spring 1921 connected thereto, which is also connected to the rod 1651, impelling the contact face 1913 into the path of the pin 1914. Formed on the blade or flat part of the key is a cam shape 1922 (Figs. 100 to 103 and 106), and as the key is inserted and again as it is retracted the cam shape 1922 reciprocates the pin 1914 as best shown in Figs. 101 and 106. As the key is inserted, this is an idle movement, due to the position of the lever 1892, but on the retraction of the key this mechanism operates as hereinafter described.

The mechanism just described operates substantially as follows:—

The stop lever 1772 having been swung back to the broken line position of Fig. 90, as already described, the operator may complete the rotation of the key from the position of Fig. 90 to that of Fig. 92. During this movement, roller 1727 engages with face 1882 of lever 1880, thereby rocking notch 1885 clear from lug 1898.

This permits spring 1901 to swing lever arm 1893 upwardly into the path of lug 1738 on lever arm 1737 of detent lever 1730 for switch member 1718. At this time, as shown in Fig. 91, there is a certain amount of space between lug 1738 and notch 1895 for a purpose about to be described.

When roller 1727 engages face 1882 of arm 1881, and thereby rocks lever 1880, as already described, projection 1886 on the lever engages part 1887 of lever 1772, and rocks it back to the full-line position of Figs. 90 and 92.

When lever 1772 is thus rocked back, latch lever 1778 snaps under lug 1777. Stop arm 1772 is now in position for the next operation of the machine. This movement of lever 1778 is permitted through the pin and slot connection 1801. Detent lever 1760 is not affected by this movement, as it is mounted loosely on shaft 1762.

It will be recalled that in the foregoing description, while detent hook 1895 is in the path of lug 1738, that the lug is not against the hook. As roller 1727 comes to the position shown in Fig. 92, at the end of the rotation of the key, the roller engages the arm 1736, and swings detent lever 1730 against its spring 1734. This releases arm 1724, and switch blade 1718 is snapped open by its spring 1721, cutting off the electric current from the machine until a key 1600 is again inserted in the lock and actuated.

During this movement of roller 1727 against arm 1736, lug 1738 is moved against notch 1895, and the mechanism is locked against further rotation of the key, and it is thus made necessary to withdraw the key before the mechanism can be again actuated.

As the key is withdrawn (Figs. 101 and 106) the cam shape 1922 engages pin 1914, which is moved outwardly against its spring 1916, and thereby rocks arm 1912 and therewith the shaft 1910. This rocks arm 1909 downwardly, as shown in Fig. 92, and the arm engages with pin 1908 in arm 1893, thereby rocking detent hook 1895 free from lug 1738, and leaving the mechanism free so that upon the insertion of the key 1600 the operations just described may be repeated.

Means are provided by the invention for preventing the insertion of an actuating key without first inserting the holder for the guest-check, or equivalent agency, in proper position in the controlling mechanism. (It will be recalled that means have already been described for preventing the controlling mechanism from operating unless there is a guest-check in the holder.)

In the embodied form of the mechanism for guarding against the insertion of a key without the prior positioning of a guest-check holder (Figs. 87, 88, 97, 107, 108, 109, 110, 111 and 112), a longitudinally slidable rod 1960 is mounted in the block or escutcheon 1961. The rod is resiliently held across the passageway for the key by a spring 1962, in tension between a lug 1963 fixed on the rod and a pin 1964 fixed on plate 1604, thus keeping the rod resiliently seated across the passageway for the key. Rod 1960 (Figs. 107, 108 and 109) has a pin and slot connection 1965 with one arm of a bell crank lever 1966, pivotally mounted at 1967 upon a bracket 1968, which bracket is mounted on the frame plate 1605.

The frame plate 1604 acts as a stop for bell crank lever 1966 against the pull of spring 1962. The other arm of the bell crank lever is pivoted at 1970 to a link 1971, preferably provided with screw adjustments. The other end of the link 1971 is pivoted at 1972 to an arm 1973, which is fixed on shaft 1974. Shaft 1974 is journaled in brackets 1975 and 1976 mounted upon the general machine frame plate 15.

Fixed on shaft 1974 (Figs. 97 and 109 to 112) is an arm 1980, which at its free end is connected by a pin and slot connection 1981 with a link 1982. At its opposite end 1983, link 1982 is pivoted to an arm 1984, fixed on the shaft 425 of the controlling mechanism for the selective means which cooperate with the perforations in the guest-check to control the computing machine, this mechanism having already been described.

Fixed also on the shaft 1974 is an arm 1988, having its free end 1989 bent laterally to constitute a detent lug. A lever 1990 is pivoted on the shaft 425, alongside the lever 424, and is connected thereto by a screw and slot adjustment 1992, to permit angular adjustment of the lever 1990 relatively to lever 424. Mounted on the lever 1990 is a latch-lever 1993, pivoted thereto at 1994, and having a tail 1995, resiliently pressed against a stop-pin 1996 on the body of the lever 1990.

A spring 1997 is in tension between a lug 1998 on the lever 1990 and a lug 1999 on the latch lever 1993. The latch lever is provided with a detent hook 2000, which engages with lug 1989 on the lever 1988. The latch lever is provided with a beveled nose 2001. A spring 2002 is in tension between lever 1973 and a pin 2003, fixed in the base plate 15 of the machine. A stop-pin 2004 also fixed in base plate 15 limits the backward movement of the arm 1973.

The operation of the mechanism just described is substantially as follows:

When the guest-check frame 34 (Fig. 111) reaches its proper final position in the guest-check holder, it actuates lever 407 in the manner already described, rocking it from the full line to the broken line position in that figure. This causes the spring-acting latch 412 to describe the movement from the full line to the broken line position in Fig. 111, thereby rocking the lever 424 from the full to the broken line position of said figure.

This releases arm 1988 from detent lever 1993, and arm 1973 is moved backwardly by spring 2002, until the arm strikes its stop-pin 2004. This retracts rod 1960 from the passageway for the key 1600, and permits the insertion of the key as already described. The motion of all the parts will be clear from a comparison of the full line and dotted line positions in Fig. 111. The preceding motion has been permited by reason of the pin and slot connection 1981 already described.

The means for restoring the key-guarding mechanism, that is, the means for releasing this mechanism so that the bar will re-enter the key passage upon the withdrawal of the key, has already been described, and operates substantially as follows:—

The arm 460 of the release mechanism for the bus bar, it will be recalled, is fixed on shaft 425, the spring-acting latch lever 461 being carried on the lever 460. As the guest-check carriage comes (Fig. 110) down to the first stop-pin 227 and the first item on the guest-check, the pin 472 engages the spring-acting latch 461, and rocks arm 460. By reason of lug 1989 having been free from detent lever 1993, the mechanism is in the broken line position of Fig. 111, and the pin is in the left-hand end of the slot at 1981 in Fig. 109.

When arm 460 and therewith shaft 425 are rocked, as already described, arm 1984 is rocked to the right from the broken line

position of Fig. 111 to the full line position of that figure and Fig. 110. At the completion of this movement detent lever 1993 snaps over lug 1989 and holds the mechanism in this position against the action of the spring 202.

Bell-crank lever 1966 has rocked to the right in Figs. 107 and 109, by reason of the movement just described, this movement being rendered possible by the pin and slot connection 1965. This leaves the pin in the rod 1960 at the back end of the slot, but impelled forwardly by the spring 1962, but by reason of the key 1600 being in the lock at this time, the rod merely presses resiliently against the key. When the key is withdrawn, rod 1960 under the impulsion of the spring 1962, snaps across the key passageway and prevents the reinsertion of a key 1600 until a guest-check holder has been reinserted in the carriage.

Referring now to the embodied forms of mounting and general protective casing, whereby the machine is safeguarded against tampering or unauthorized use thereof, as embodied, the machine as so far described is mounted on its general or external frame (Figs. 58, 59 and 59ª) by means of a rod 2040 extending through and fastened to lugs 2041 formed on the underside of the bed plate 660 of the machine, and journaled, respectively, in bearings 2042 and 2043 mounted on the general frame of the machine casing. At the opposite end of the bed-plate it is provided with a bearing consisting preferably of a pin or post 2044 screw-threaded into the bed-plate 660 and provided with a lock nut 2045, the pin resting upon a cross reach 2046 of the general frame. This provides an adjusting and leveling device for positioning the machine in its frame. The general frame comprises four rectangularly-disposed, horizontal reaches 2047, supported upon four wheels 2048, preferably swiveled to the underside of the frame. The frame is provided also with upwardly extending reaches 2049 and top horizontal cross reaches 2050 at the upper end.

A general or external casing 2051 is adapted to fit over the general frame work of the machine, and suitable locking means are provided, said means being shown as a rod 2052, passing through openings in the general casing and through or beneath one of the bottom horizontal reaches of the general frame. The rod is provided with a head 2053 on the outside of the casing at one end and with a lock 2054 at the outside of the casing on the opposite end, thus rendering the machine inaccessible except as to the operative parts, such as the opening 1601 (see Figs. 62 and 101), for the key and the opening 2057 through which the entrance to the guest-check carriage is provided, or from which the carriage projects.

Means are provided by the invention permitting inspection of the total registers or dials, without removing the casing, as for instance where any supervising authority, or the agents thereof, desire to make a record of the total of the transactions during a day, or other given period, without opening the casing.

As embodied (see especially Figs. 59 and 60), a door 2060 is provided in the casing 2051, and within this there is a closure 2061 of glass or other transparent material. In connection therewith means are provided for illuminating the total dials, and as embodied, a lamp 2062 is mounted upon the frame of the machine in position to illuminate the total dials at 2063.

In connection with this, means are provided for turning on and off the light 2062 automatically with the opening and closing of the lid 2060. As embodied, the lamp 2062 is provided with circuit wires 2064 and 2065, and in circuit therewith is a plunger switch 2066, mounted partly on the machine frame and partly on the general casing, and making a detachable connection therebetween. In circuit therewith (see also Fig. 61) are a pair of circuit terminals 2067 and 2068, with which cooperates a switch blade 2069, properly insulated, and pivotally mounted at 2070 on a bracket 2070ª fast on the casing 2051 and having a tail 2071. A spring 2072 in tension between the switch lever and the general casing, resiliently impels the lever 2069 into the circuit-closing position.

The door 2060 is provided with an angled plate or finger 2074, extending downwardly into the casing 2051 in operative relation with the tail 2071 of the switch lever 2069. The door 2060 pivots about a hinge-rod 2075. Thus when the door 2060 is opened, the finger 2074 moves away from tail 2071 of the switch blade 2069, and it is snapped by its spring 2072 into contact with terminals 2067 and 2068. A circuit is thereby closed at the terminals 2067 and 2068 and the lamp 2062 is lighted. When the door 2060 is again closed, the finger 2074 again forces the switch open.

A general hand-operated switch 2076 may be provided, if desired, for the entire machine, and is shown (see Figs. 59, 60, 61, 62), mounted on a bracket 2077, fixed on the cross reach 2050 of the general frame and extending out through the machine casing. This renders the switch accessible from the exterior of the general frame, but the wiring is undisturbed by the removal of the casing. If desired, the general power circuit for the machine may be controlled entirely by the key 1600, as already described, and the switch 2076 in that case could be dispensed with.

In Figs. 114, 115, 116 and 117 is shown a modified form of the cancellation or correction mechanism. That is, when an order has

been given and has later been canceled, as for example, when a guest orders a dish and then declines to receive it. In accordance with one feature of the invention, a cancelation perforation is made in the guest-check, or like record-receiving device, and this perforation, cooperating with the machine, prevents such actuations, for the cancelled order, as are usually made by the perforation in the guest's check. This perforation is made in the guest-check, or the like, in definite relation to the perforations for the canceled order.

As embodied, the correction perforation energizes an automatic circuit-breaking device, which is in the general circuit for the operating magnets for the computing keys, that is, those keys of the computing machine which are selectively operated to record the total of the guest-check thereon and to add it to the totals in the computing machine, as already described. As embodied, the electro-magnets 1234 heretofore described are utilized for this purpose. In this form, the armature 1233 is connected to a switch blade 2100, mounted on the pivot pin 1231, previously described. This switch blade 2100 cooperates with terminals 2101 and 2102, which are in the circuit 340ª, which circuit is part of the general circuit for the electro-magnets, which selectively operate the computing keys.

In the embodied form of operating means for energizing the electro-magnets 1234, a spring-pressed contact pin 1560ª, similar in general construction to the others (Fig. 115) is provided, this pin, however, being longer than the others and passing into circuit-closing relation with its slotted, spring-socket terminal 1520ª in advance of the other pins 1560.

Thus, if there is a cancelation or correction perforation at a given position on the guest-check, the pin 1560ª will find this perforation, and will close the circuit with its socket 1520ª before any of the pins 1560, which have found the perforations corresponding to the canceled item can close the circuits through their corresponding sockets 1520. Thus, the electro-magnets 1234 will be energized before any of the electro-magnets which actuate the computing keys. The energizing of magnets 1234 will open the operating circuit at 2101 and 2102, and, therefore, there will be no operation of the computing keys nor any of the accompanying or consequent functions due to any of the contact fingers 1560 finding the perforation of the canceled item, as these circuits are not closed until the magnets 1234 have opened the circuit at 2101 and 2102.

From all the foregoing it will be understood that mechanism has been provided realizing the advantages and objects of invention hereinbefore set forth, together with other objects and advantages; and that changes may be made from the structures and arrangements herein shown and described, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. A computing and recording machine including in combination a computing mechanism and operating means therefor, and controlling means for initiating and controlling the operation of said operating means to cause the computing mechanism to perform a computation upon insertion of said controlling means in said machine and to record the result on said controlling means.

2. A computing and recording machine including in combination a computing mechanism and controlling means therefor including a card, and means cooperating with said computing mechanism and started and controlled by said controlling means for causing the computing mechanism to perform a computation upon insertion of said card in said machine and to record the result on said card.

3. A computing and recording machine including in combination a computing mechanism and controlling means therefor including a card bearing numbers involved in a computation to be performed by said machine, and means cooperating with said computing mechanism and started and controlled by said controlling means for causing the computing mechanism to perform a computation upon insertion of said card in said machine and to record the result of the computation on the card and in a desired relation to the numbers thereon.

4. A computing and recording machine including in combination a computing mechanism and controlling means therefor including number indicating perforations, and means cooperating with said computing mechanism and started and controlled by said controlling means for causing the computing mechanism to perform a computation upon insertion of said controlling means in said machine and to record the result on said controlling means.

5. A computing and recording machine including in combination a computing mechanism and controlling means therefor including a card carrying number indicating perforations, and means cooperating with said computing mechanism and started and controlled by said controlling means for causing the computing mechanism to perform a computation upon insertion of said card in said machine and to record the result on said card.

6. A computing and recording machine including in combination a computing mechanism and controlling means therefor including a card bearing numbers involved in a computation to be performed and carrying number indicating perforations, and means cooperating with said computing mechanism and started and controlled by said controlling

means for causing the computing mechanism to perform a computation upon insertion of said card in said machine and to record the result of the computation from the perforations on the card and in a desired relation to the numbers thereon.

7. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a plurality of number indications and item indications arranged thereon and devices cooperating successively with said item indications for controlling said computing mechanism actuating means for causing said computing mechanism to compute a result from said number indications and to record the result therefrom on said member.

8. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said computing mechanism including a member having a plurality of item indications and number indications and a plurality of numbers corresponding to said number indications of the same numbers arranged thereon and devices cooperating successively with said item indications for controlling said computing mechanism actuating means for causing said computing mechanism to compute a result from said number indications and to record the result therefrom on said member.

9. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said computing mechanism including a member having a plurality of item indications and number indications and a plurality of imprinted numbers corresponding to said number indications of the same numbers arranged thereon and devices cooperating successively with said item indications for controlling said computing mechanism actuating means for causing said computing mechanism to compute a result from said number indications and to record the result therefrom on said member in a desired position with respect to the imprinted numbers.

10. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said computing mechanism including a member having a plurality of item indications and number indications arranged thereon and devices cooperating successively with said item indications for controlling said computing mechanism actuating means for causing said computing mechanism to compute a result from said number indications and to record the result therefrom on said member in a desired position with respect to the number indications.

11. A computing and recording machine including in combination a computing mechanism, actuating means cooperating therewith, and controlling means including a member having a plurality of number indications and a plurality of item indications corresponding thereto for setting in motion said actuating means and causing the computing mechanism to perform a computation and to record the result on said controlling means and also to register the result in the computing mechanism.

12. A computing and recording machine including in combination a computing mechanism, actuating means cooperating therewith, and controlling means for said actuating means and including a card including a member having a plurality of number indications and a plurality of item indications corresponding thereto for causing the computing mechanism to perform a computation and to record the result on said card and also to register the result in the computing mechanism.

13. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a card bearing numbers involved in a computation and having a plurality of number indications and a plurality of item indications corresponding thereto and cooperating with said computing mechanism actuating means for causing the computing mechanism to perform a computation and to record the result of the computation on the card and in a desired relation to the numbers thereon and also to register the result in the computing mechanism.

14. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a plurality of number indications and a plurality of item indications corresponding thereto arranged thereon and devices cooperating successively with said number indications for controlling said computing mechanism actuating means to cause said computing mechanism to compute a result therefrom and to record the result therefrom on said member and also to register the result in the computing mechanism.

15. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a member having a plurality of number indications and a plurality of item indications corresponding thereto cooperating therewith and setting in motion said computing mechanism actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means and to add said result to a general total in the computing mechanism.

16. A computing and recording machine including in combination a computing mech-

anism, actuating means therefor, and controlling means including a card including a member having a plurality of number indications and a plurality of item indications corresponding thereto and cooperating with and setting in motion said computing mechanism actuating means for causing the computing mechanism to perform a computation and to record the result on said card and to add said result to a general total in the computing mechanism.

17. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a card bearing numbers involved in a computation to be performed, said card having a plurality of number indications representing a plurality of items, and cooperating with and setting in motion said computing mechanism actuating means for causing the computing mechanism to perform a computation and to record the result of the computation on the card and in a desired relation to the numbers thereon and to add said result to a general total in the computing mechanism.

18. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a plurality of number indications arranged thereon and a plurality of item indications corresponding thereto and devices cooperating successively with said number indications for controlling said computing mechanism actuating means and causing said computing mechanism to compute a result therefrom and to record the result therefrom on said member and to add said result to a general total in the computing mechanism.

19. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting devices, and controlling means cooperating with and setting in motion said actuating means and correction effecting devices for causing the computing machine to perform a computation including corrections and to record the result on said controlling means.

20. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting devices, and controlling means including a card adapted to cooperate with and set in motion said computing mechanism actuating means and said correction effecting devices for causing the computing mechanism to perform a computation and to record the result on said card.

21. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting devices, and controlling means including a card adapted to cooperate with and set in motion said computing mechanism actuating means including said correction effecting devices for causing the computing mechanism to perform a computation and to record the result of the computation on the card and in a desired relation to the numbers thereon.

22. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means including a card having number indicating perforations and correction indicating perforations cooperating with said actuating means and correction effecting mechanism for causing the computing mechanism to perform a computation and to record the result on said controlling means.

23. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means cooperating therewith and including a card carrying correction indicating perforations adapted to cooperate with and set in motion said correction effecting mechanism and actuating mechanism for causing the computing mechanism to perform a computation and to record the result on said controlling means.

24. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means including a card bearing numbers involved in a computation to be performed and carrying number indicating perforations and correction indicating perforations and adapted to cooperate with and set in motion said actuating means and said correction effecting mechanism for causing the computing mechanism to perform a computation and to record the result of the computation from the perforations on the card and in a desired relation to the numbers thereon.

25. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means adapted to cooperate with and set in motion said actuating means and said correction effecting mechanism for causing the computing mechanism to perform a computation and to record the result on said controlling means and also to register the result in the computing mechanism.

26. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means including a card having means thereon cooperating with and setting in motion said actuating means and said correction effecting mechanism for causing the computing mechanism to perform a correct

computation and to record the correct result on said card and also to register the result in the computing mechanism.

27. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means including a card bearing numbers involved in a computation to be performed and provided with means cooperating with and setting in motion said actuating means and said correction effecting mechanism for causing the computing mechanism to perform a correct computation and to record the correct result of the computation on the card and in a desired relation to the numbers thereon and also to register the result in the computing mechanism.

28. A computing and recording machine including in combination a computing mechanism, actuating means therefor including correction effecting mechanism, and controlling means including a card having number and correction indicating perforations adapted to cooperate with and control said actuating means and said correction effecting mechanism for causing the computing mechanism to perform a correct computation and to record the correct result on said controlling means and also to register the result in the computing mechanism.

29. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, and timing means for controlling said actuating means and said controlling means for relatively timing the operation of the computing mechanism and of the controlling means.

30. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a card bearing numbers involved in a computation to be performed for cooperating with and controlling said actuating means for causing the computing mechanism to perform a computation and to record the result of the computation on the card and in a desired relation to the numbers thereon, and timing means for controlling said actuating means and said controlling means for relatively timing the operation of the computing mechanism and of the controlling means.

31. A computing and recording machine including in combination a computing mechanism actuating means therefor, and controlling means therefor including a member having a plurality of number indications arranged thereon and devices cooperating successively with said number indications to control said actuating means and cause said computing mechanism to compute a result therefrom and to record the result therefrom on said member, and timing means for controlling said actuating means and said controlling means for relatively timing the operation of the computing mechanism and of the controlling means.

32. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means cooperating with and setting in motion said actuating means for causing the computing mechanism to perform a computation, correction effecting devices associated with said actuating means and controlled by said controlling means, and to record the result on said controlling means, and timing means for controlling said actuating means and said controlling means for relatively timing the operation of the computing mechanism and of the controlling means.

33. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a card having number indicating perforations for controlling said actuating means and causing the computing mechanism to perform a computation and to record the result on said controlling means and correction effecting mechanism adapted to cooperate with correction indicating perforations in the card, and timing means for controlling said actuating means for relatively timing the operation thereof and of the computing mechanism and of the controlling means.

34. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means for said actuating means including a card insertable in said mechanism, closure means for preventing withdrawal of said card from said mechanism, and electrical devices cooperating with said actuating means and operating automatically when said closure means is closed to set in motion said actuating means to cause the computing mechanism to perform a computation and to record the result on said card.

35. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means provided with item indications and number indications corresponding thereto, electrically operated devices associated with said controlling means and with said actuating means and controlled by said controlling means for setting in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means and also to register the result in the computing mechanism.

36. A computing and recording machine

including in combination a computing mechanism, actuating means therefor, and controlling means therefor provided with item indications and number indications corresponding thereto, electrically operated devices cooperating with and controlled by said controlling means and cooperating with and setting in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means and to add said result to a general total in the computing mechanism.

37. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a card bearing numbers involved in a computation and having corresponding number indications and item indications, electrically operated devices cooperating with and controlled by said card and cooperating with and setting in motion said actuating means for causing the computing mechanism to perform a computation and record the result on the card in a desired relation to the numbers thereon and also to register the result in the computing mechanism.

38. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a plurality of number indications arranged thereon and having a plurality of item indications corresponding thereto, electrically operated devices cooperating successively with and controlled by said number indications and cooperating with and setting in motion said actuating means for causing the computing mechanism to compute a result from said number indications and to record said result on said member and also to register the result in the computing mechanism.

39. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a card bearing numbers involved in a computation to be performed and bearing a plurality of number indications and item indications corresponding thereto, and electrically operated devices cooperating with and controlled by said card and cooperating with and setting in motion said actuating means for causing the computing mechanism to perform a computation and to record the result thereof on the card and in a desired relation to the numbers thereon and to add said result to a general total in the computing mechanism.

40. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a member having a plurality of number indications arranged thereon and having a plurality of item indications corresponding thereto, and electrically operated devices cooperating successively with and controlled by said number indications and cooperating with and controlling said actuating means for causing said computing mechanism to compute a result from said number indications and to record the result on said member and to add said result to a general total in the computing mechanism.

41. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means and adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means a plurality of times.

42. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a card and adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said card a plurality of times.

43. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a card bearing numbers involved in a computation to be performed and adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on the card in a desired relation to the numbers thereon a plurality of times.

44. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including number indicating perforations adapted to cooperate with and control said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means a plurality of times.

45. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means including a card carrying number indicating perforations adapted to cooperate with and control said actuating means for causing the computing mechanism to perform a computation and to record the result on said card a plurality of times.

46. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a plurality of number indications arranged thereon and devices cooperating successively with said number indications and also cooperating with and controlling said actuating means for causing said computing

mechanism to compute a result from said number indications and to record the result on said member a plurality of times.

47. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a member having a plurality of number indications and imprints of the same numbers arranged thereon, and devices cooperating successively with said number indications and cooperating with and controlling said actuating means for causing said computing mechanism to compute a result therefrom and to record the result on said member in a desired position with respect to the imprinted numbers a plurality of times.

48. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means and adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means a plurality of times and also to register the result in the computing mechanism.

49. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a card adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said card a plurality of times and also to register the result in the computing mechanism.

50. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a card bearing numbers involved in a computation to be performed and adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result thereof on the card in a desired relation to the numbers thereon a plurality of times and also to register the result in the computing mechanism.

51. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a member having a plurality of number indications arranged thereon, and devices cooperating successively with and controlled by said number indications and cooperating with and controlling said actuating means for causing said computing mechanism to compute a result from said number indications and to record the result on said member a plurality of times and also to register the result in the computing mechanism.

52. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, and identifying means for starting said controlling means into operation.

53. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, identifying means for starting said controlling means into operation, and timing means associated with said controlling means and with said actuating means for relatively timing the operations of the controlling means and the actuating means.

54. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a card bearing numbers in a computation to be performed and cooperating with and setting in motion said actuating means for causing the computing mechanism to perform a computation and record the result thereof on said card in a desired relation to the numbers thereon, and locking means cooperating with said controlling means for starting said controlling means into operation.

55. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a member having a plurality of number indications arranged thereon and devices cooperating successively with said number indications and associated with and controlling said actuating means for causing said computing mechanism to compute a result from said number indications and to record the result on said member, and locking means associated with said controlling means for starting said controlling means into operation.

56. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means for said actuating means including a card adapted to cooperate with and set in motion said actuating means for causing the computing mechanism to perform a computation and record the result on said card, a closure preventing removal of said card, and means associated with and automatically starting said controlling means as soon as said closure is closed.

57. A computing and recording machine

including in combination a computing mechanism, actuating means therefor, and controlling means cooperating with and adapted automatically to set in motion said actuating means for causing the computing mechanism to perform a computation and record the result on the controlling means, and means associated with said actuating means for causing the computing mechanism to record the identity of the operator on said controlling means.

58. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means associated with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, and means associated with said actuating means and set in motion therewith for causing the computing mechanism to record the identity of the operator on said controlling means.

59. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means associated with and setting in motion said actuating means for causing the computing mechanism to perform a computation and recording the result on said controlling means, and means for recording the identity of the operator, said last-named means being associated with and calling into action said controlling means.

60. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, and means including a key for starting said controlling means into operation.

61. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means including a detachable card and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said card, means including a key for starting said controlling means into operation, and means for preventing operation of said key if there is no card in said controlling means.

62. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means including a detachable card and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said card, means including a key insertable in said mechanism for starting said controlling means into operation, and means for preventing insertion of said key when there is no card in said controlling means.

63. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, means including a key insertable in said mechanism for starting said controlling means into operation, and means for preventing withdrawal of said key until said computation has been recorded.

64. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, means including a key insertable in said mechanism for starting said controlling means into operation, and means for preventing withdrawal of said key until said controlling means has completed a cycle of operations.

65. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, means including a key insertable in said mechanism for starting said controlling means into operation, means for preventing withdrawal of said key until said computation has been recorded, and means preventing a subsequent operation of said key to restart said controlling means until said key has been withdrawn from and reinserted in said mechanism.

66. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, means including a key insertable in said mechanism for starting said controlling means into operation, means operated by the actuating means for locking the key in said mechanism, and means operating automatically to release the key when said computation has been completed.

67. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said con-

trolling means, key actuating means for starting said controlling means into operation, said key actuating means being operable by any one of a number of keys, and means automatically recording the identity of the particular key used in said key actuating means.

68. A computing and recording machine including in combination a computing mechanism, actuating means therefor, controlling means cooperating with and adapted to set in motion said actuating means for causing the computing mechanism to perform a computation and to record the result on said controlling means, key actuating means for starting said controlling means into operation, said key actuating means being operable by any one of a number of keys, and means automatically recording on the controlling means the identity of the particular key used in said actuating means.

69. A computing and recording machine including in combination a computing mechanism, actuating means therefor, and controlling means therefor including a member having a series of number indications thereon and devices cooperating with said number indications to control said actuating means for causing said computing mechanism to compute a result from said number indications and to record the result on said member, said actuating means including means for advancing the member to bring said number indications successively into cooperative relation with said devices, and said actuating means also including means for retracting said member after said result has been recorded.

70. A computing and recording machine including in combination, a computing mechanism, actuating means therefor, and controlling means therefor, said actuating means including electrically actuated devices and a switch controlling the circuits of said devices, said controlling means including a card provided with number indicating perforations arranged in a series of items and provided further with a correction perforation in one of said items, said controlling means also including contact fingers cooperating with said number indicating perforations item by item to selectively control said devices and cause said mechanism to compute a result from said items, said controlling means also including a contact finger cooperating with the correction perforation in advance of the operation of the other fingers to open said switch and eliminate from the computation of the machine the item having the correction perforation.

In testimony whereof, I have signed my name to this specification.

HARRY RUSSELL BRAND.