W. S. OVERLIN.

MONEY PAYING, CHANGING, AND LISTING MACHINE.

APPLICATION FILED JULY 19, 1912.

1,256,363.

Patented Feb. 12, 1918.

13 SHEETS—SHEET 1.

Fig. 1.

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Witnesses

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MONEY PAYING, CHANGING, AND LISTING MACHINE.
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1,256,363.
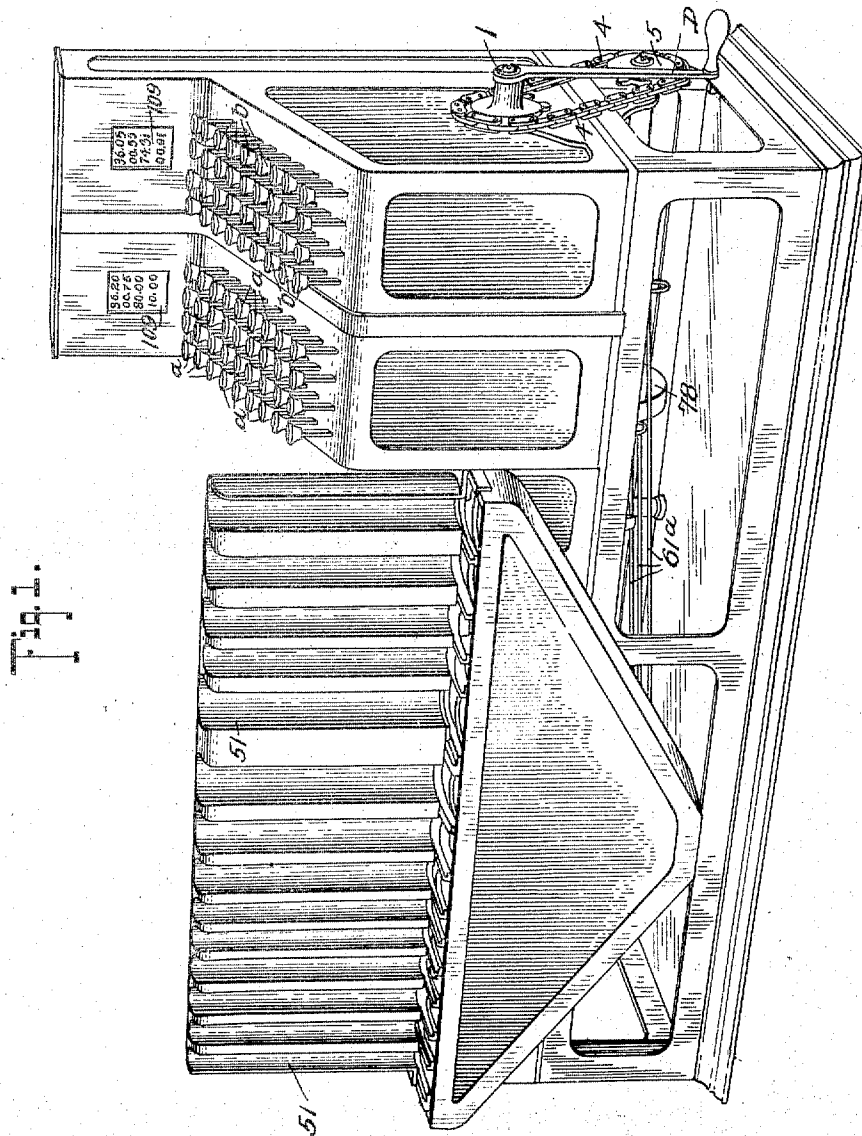
Patented Feb. 12, 1918.
13 SHEETS—SHEET 2.

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E. H. Wagner.
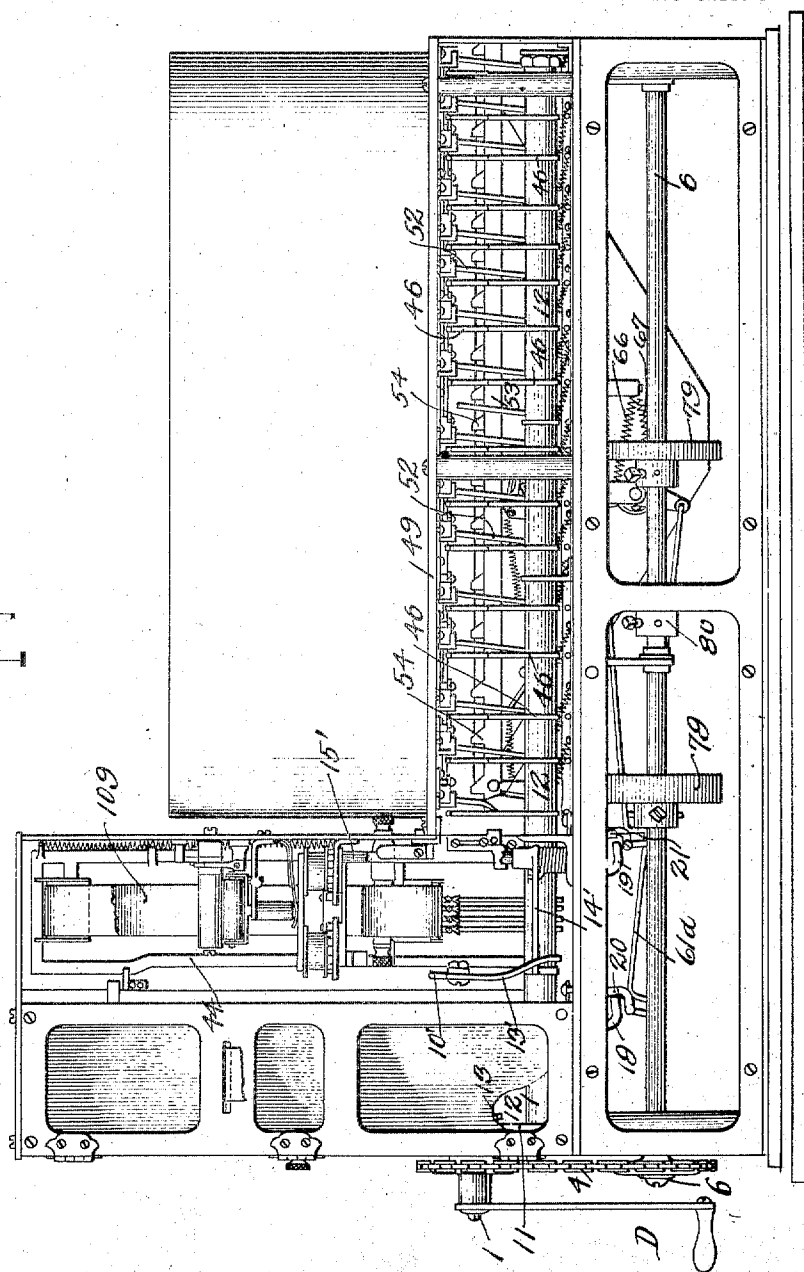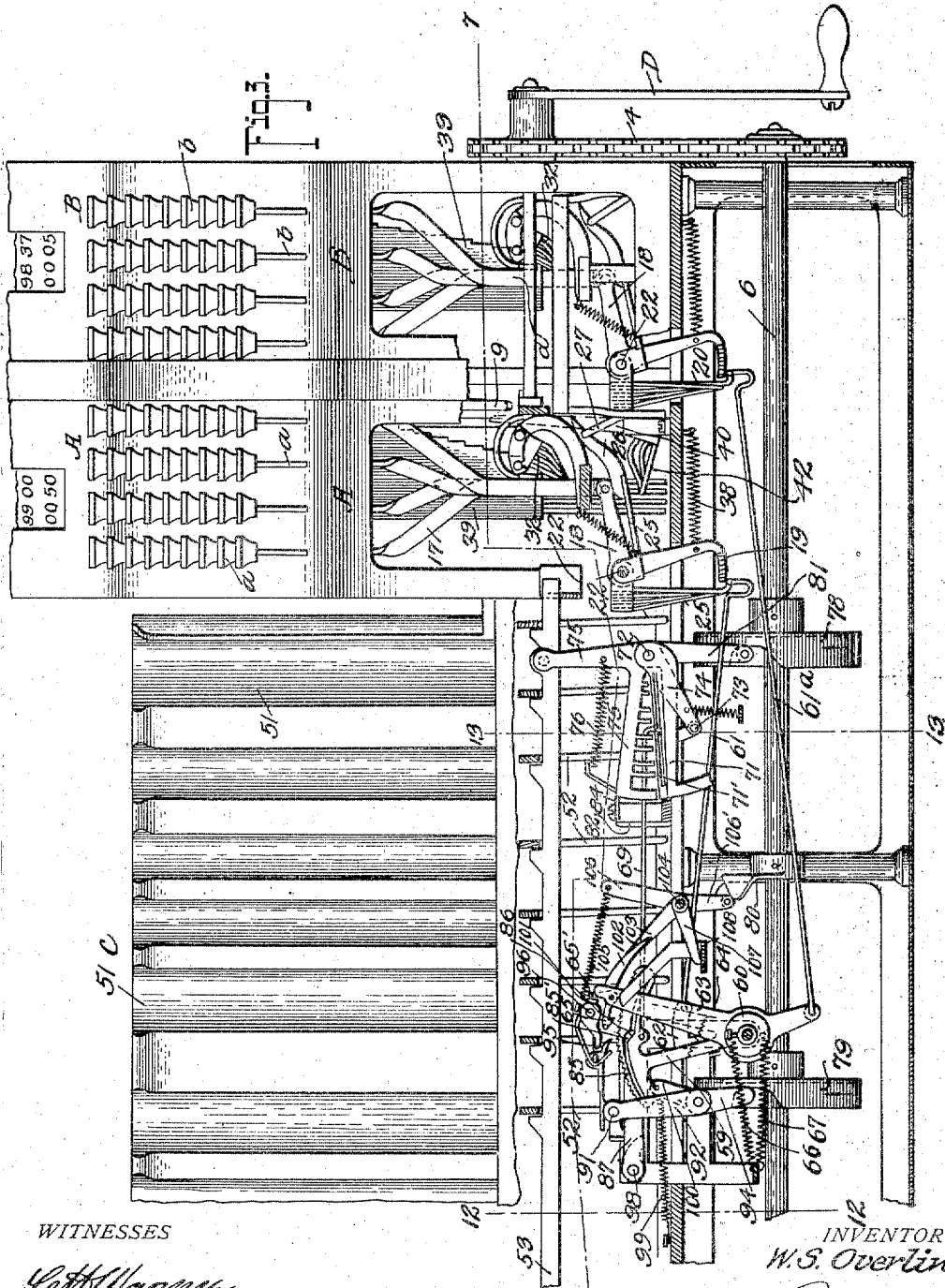G. W. Kirkley.

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13 SHEETS—SHEET 3.

Fig.3.

WITNESSES

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13 SHEETS—SHEET 4.

Fig. 4.

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C. H. Wagner,

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13 SHEETS—SHEET 5.

Fig 5.

1,256,363.

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Witnesses
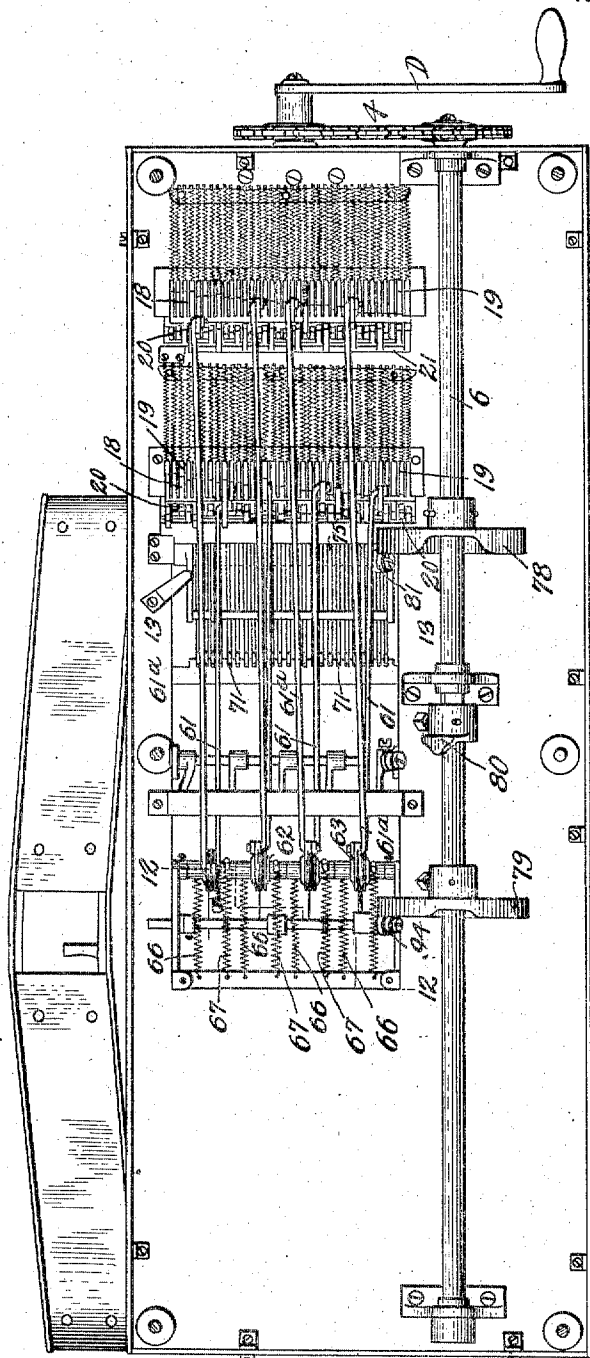
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13 SHEETS—SHEET 7.

Fig. 7.

WITNESSES

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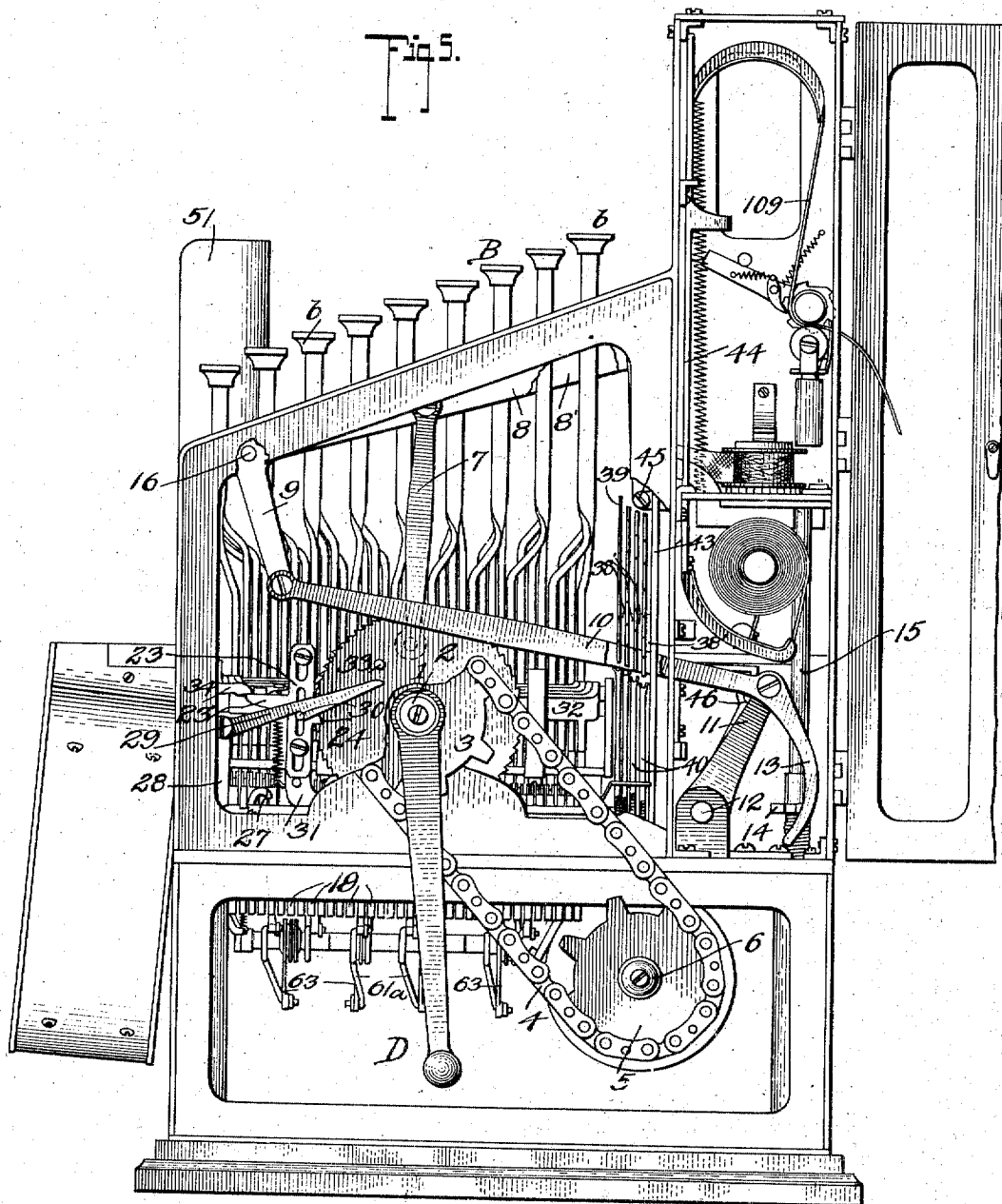Attorney

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Patented Feb. 12, 1918.
13 SHEETS—SHEET 8.

Fig.5.

Fig.6.

Witnesses
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13 SHEETS—SHEET 9.

Fig.10.

Fig. 21.

Fig.11.

Witnesses
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13 SHEETS—SHEET 10.

Fig.15.

Fig.12.

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Witnesses
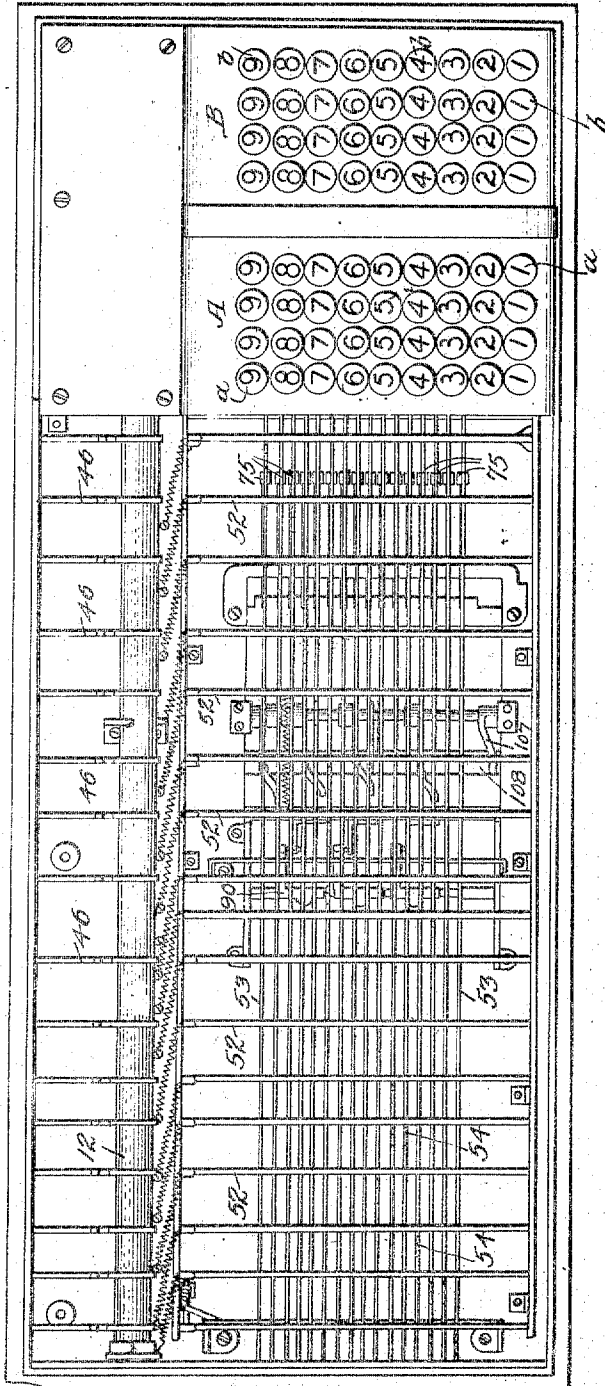C.H. Wagner.
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MONEY PAYING, CHANGING, AND LISTING MACHINE.

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Patented Feb. 12, 1918.

13 SHEETS—SHEET 11.

Fig.18.

Fig.16.

Fig.17.

Fig. 15.

Fig.14.

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1,256,363.

Fig.19.

Fig.19.ᵃ

Fig.19.ᶜ

Fig.19b

Fig.19d

Fig.19.ᵉ

Fig.19.f

Fig.19.ᵍ

Fig.19.h

Fig.19.i

Fig.19.k

Fig.19.l

Fig.19.m

Fig.19.n

Fig.19.o

Fig.19.p

Fig.20.
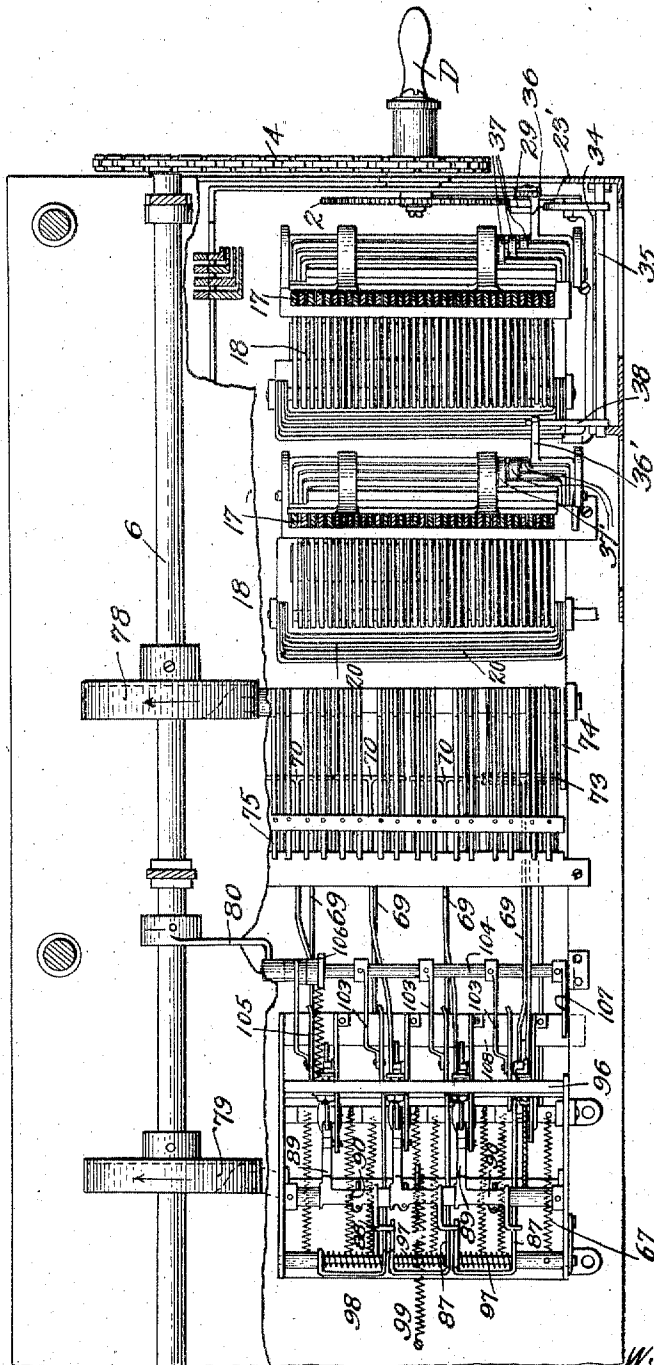
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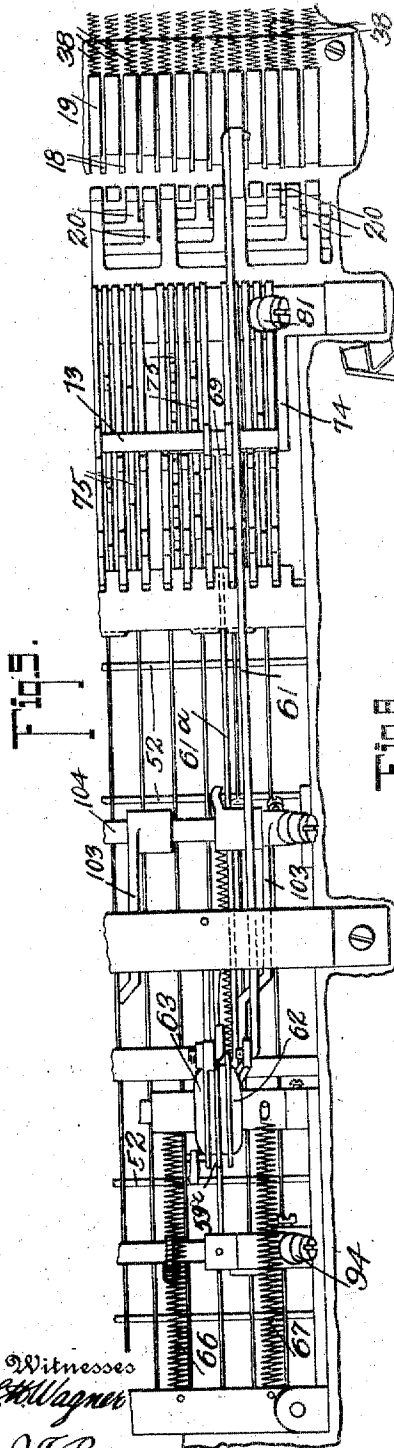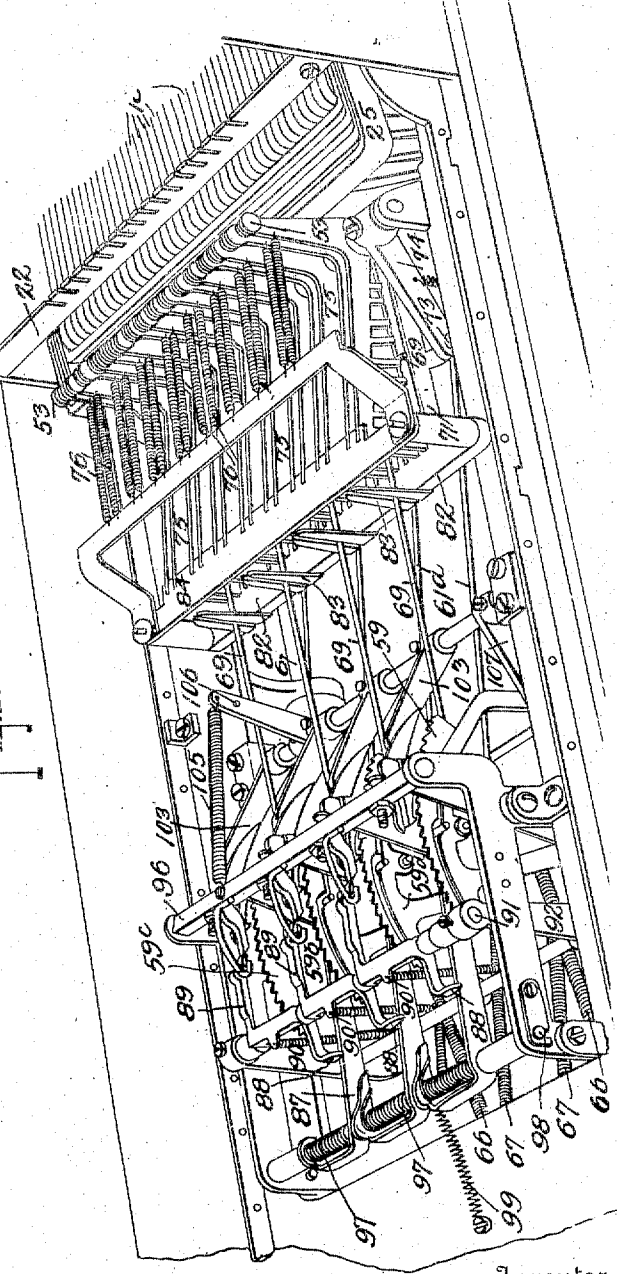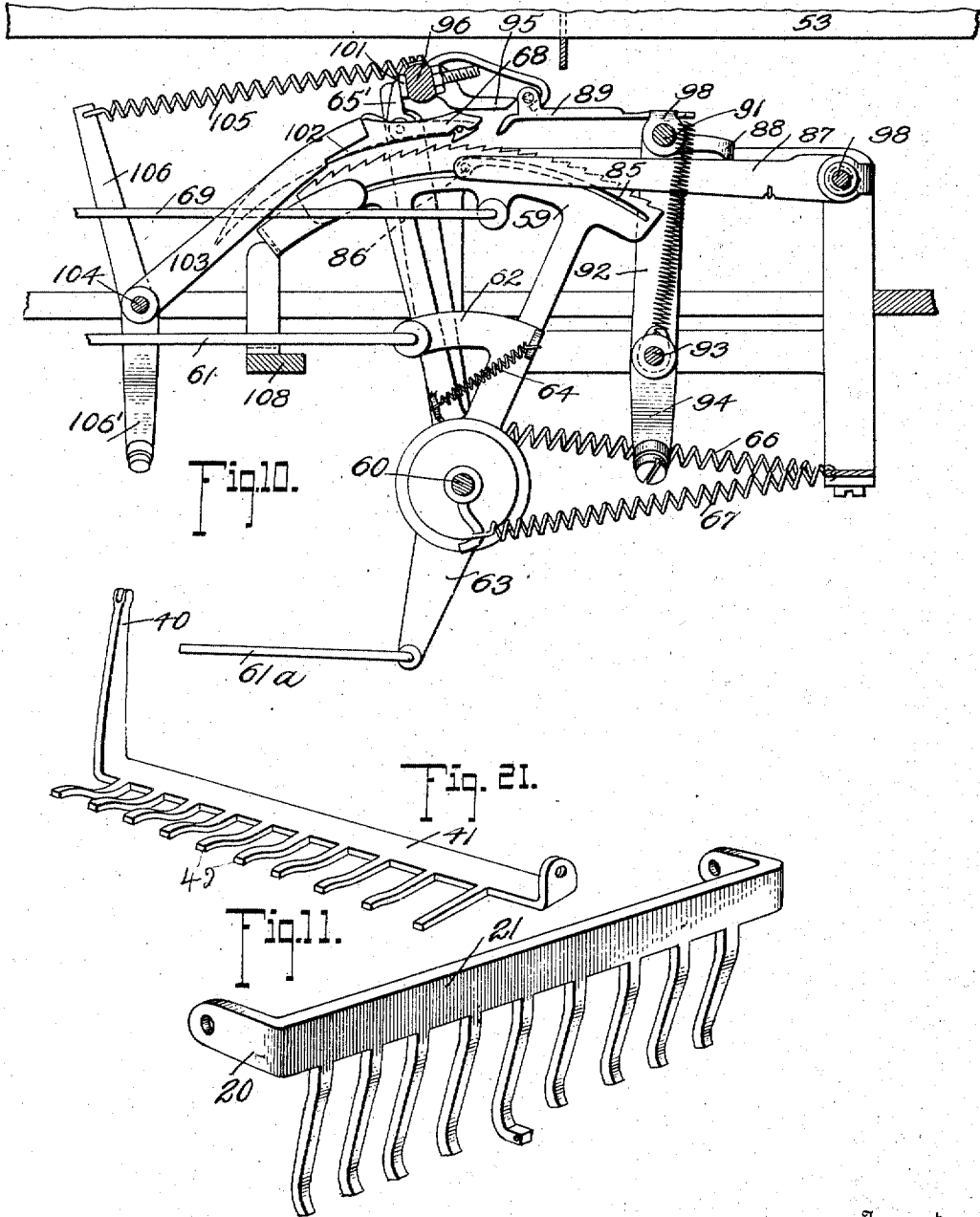
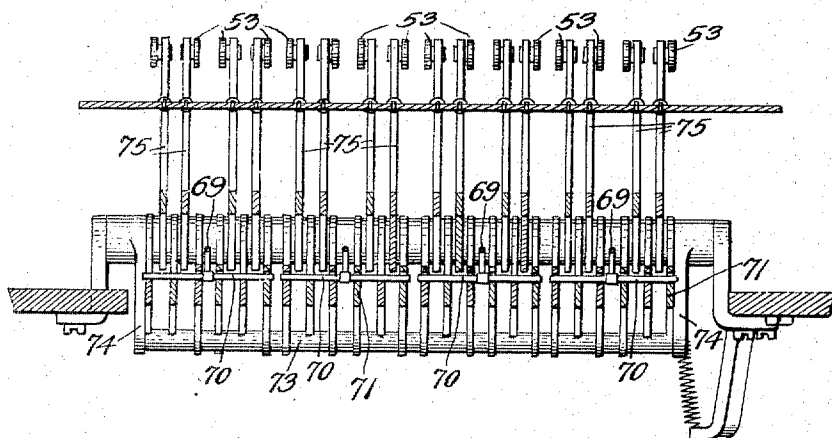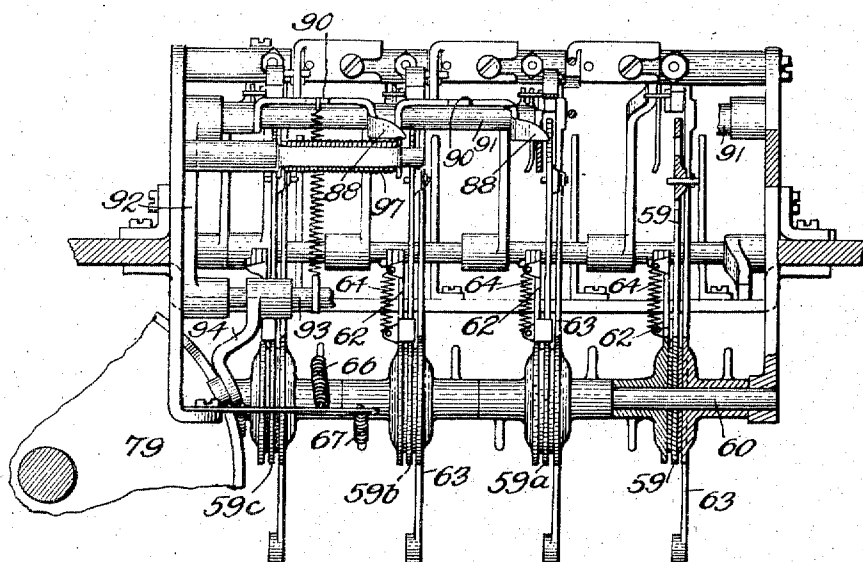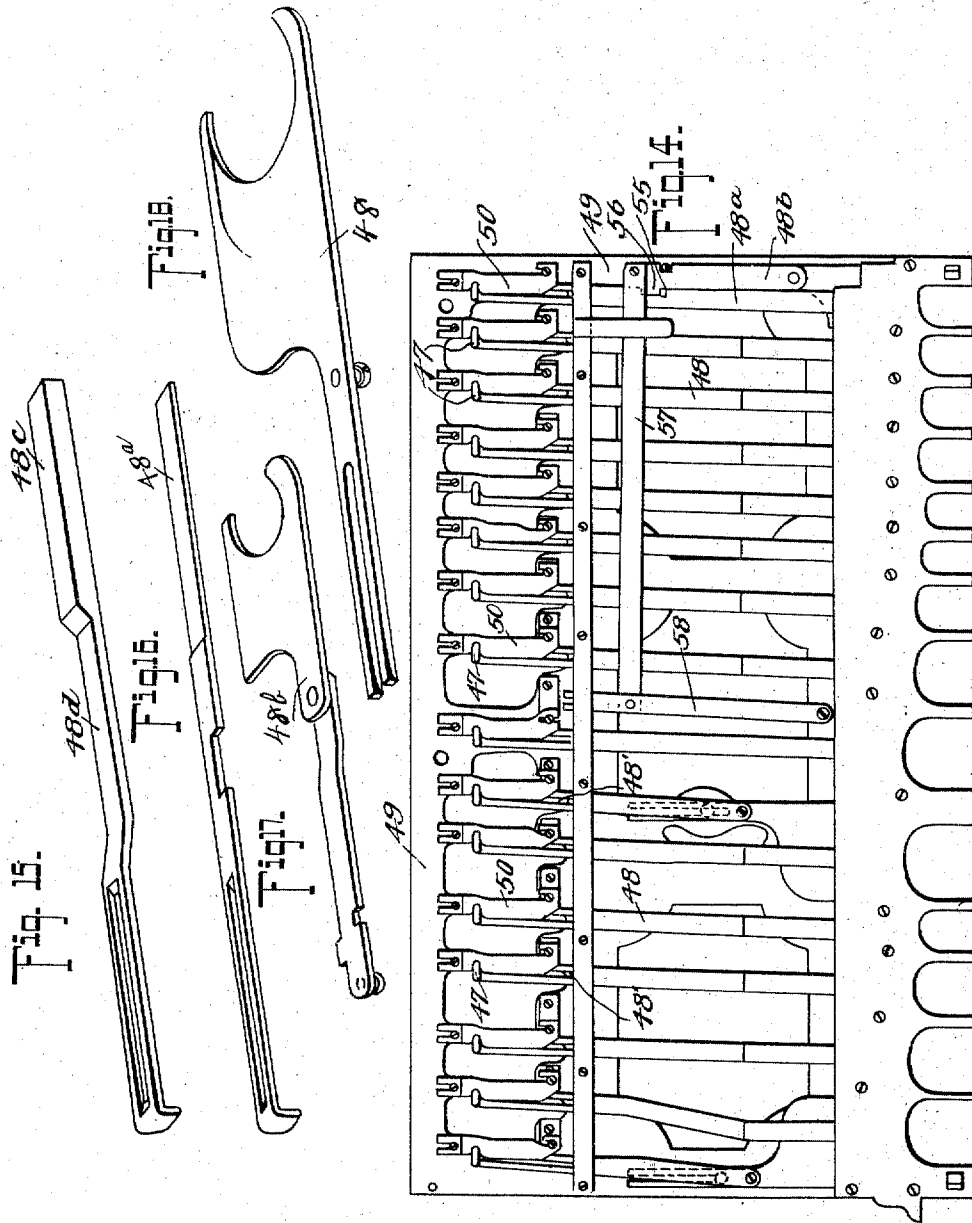1,256,363.
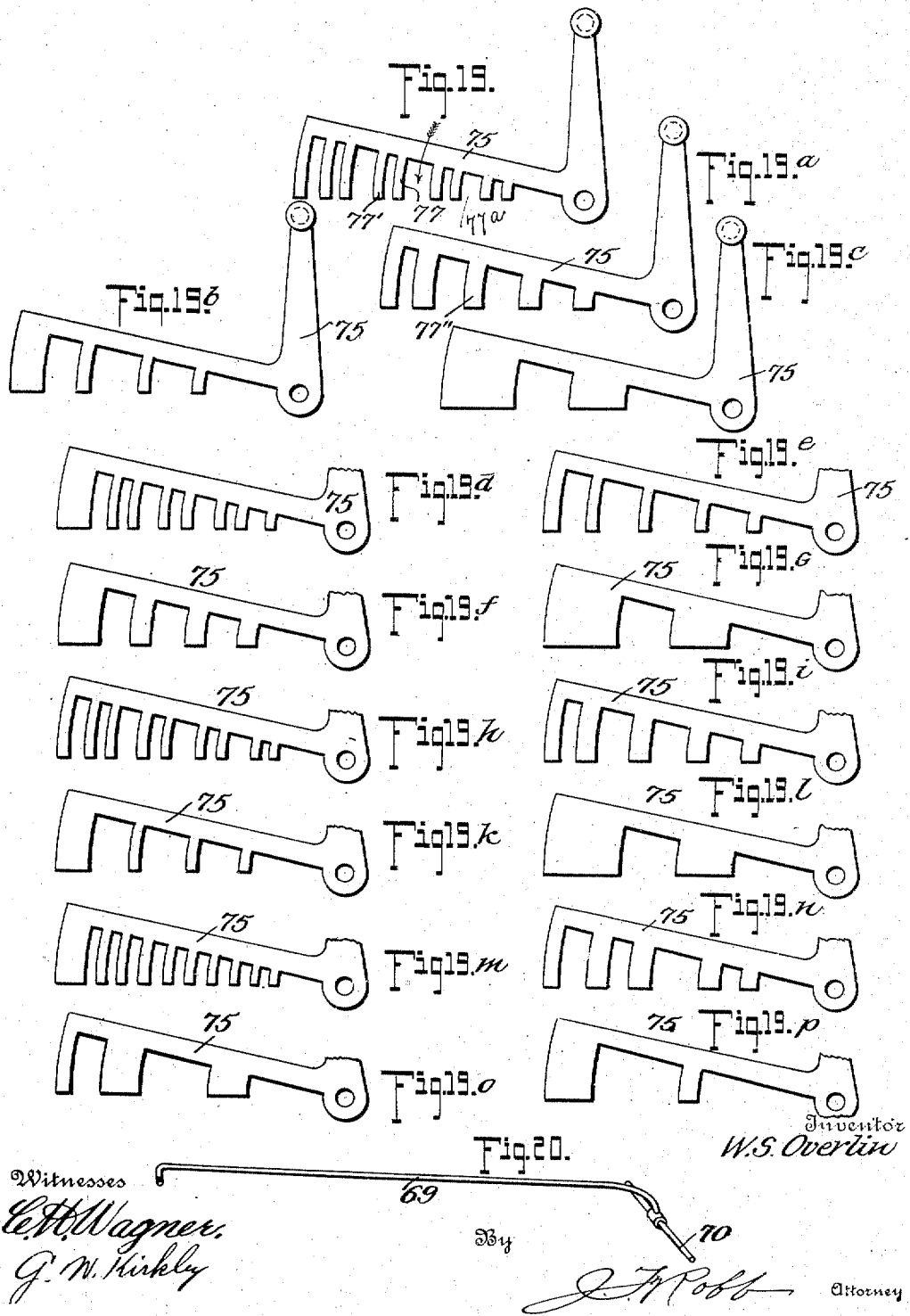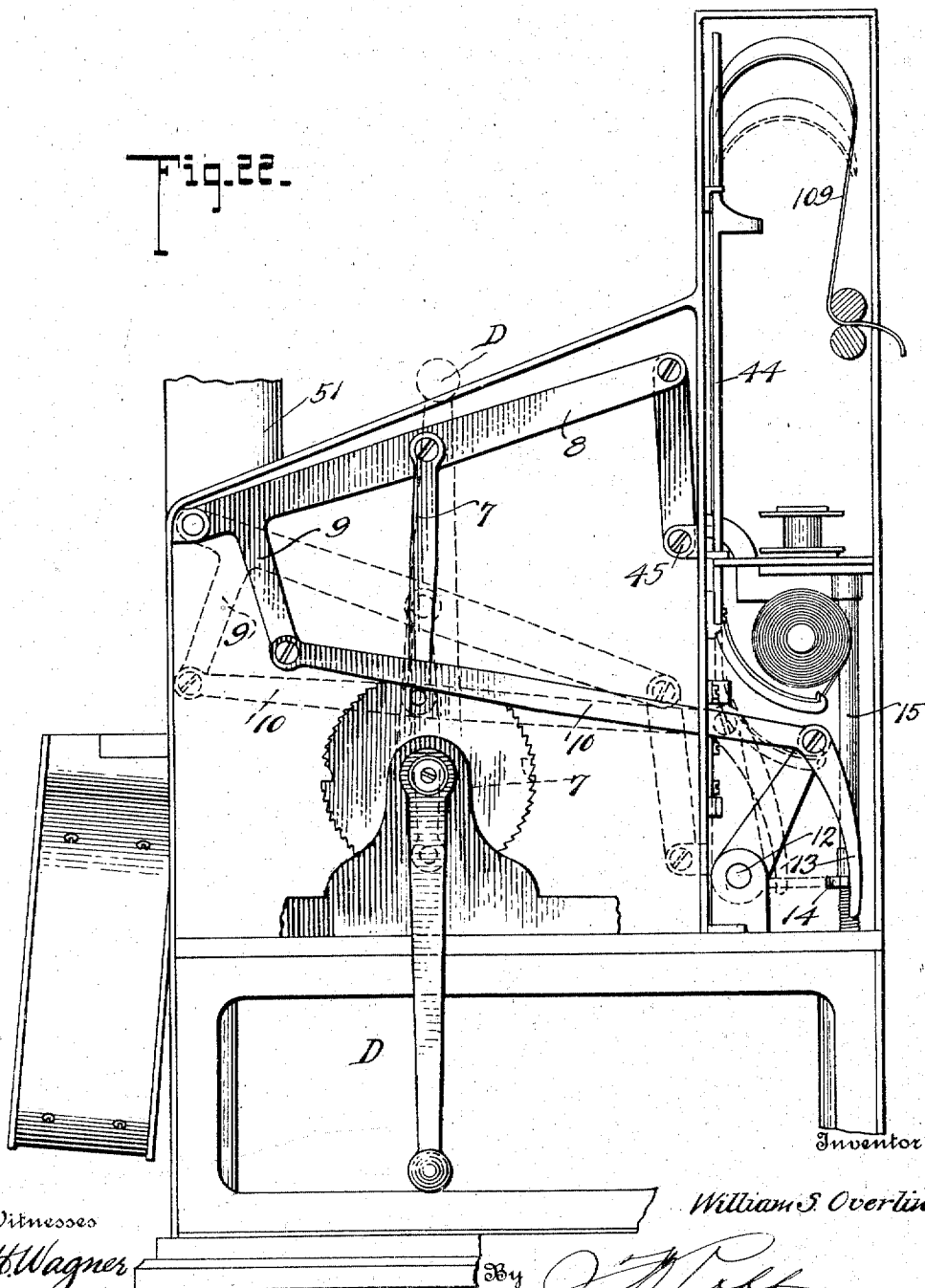
Patented Feb. 12, 1918.

13 SHEETS—SHEET 13.

Fig.22.

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM S. OVERLIN, OF PORTLAND, OREGON, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INTERNATIONAL MONEY MACHINE COMPANY, OF TERRE HAUTE, INDIANA, A CORPORATION OF INDIANA.

MONEY PAYING, CHANGING, AND LISTING MACHINE.

To all whom it may concern:

Be it known that I, WILLIAM S. OVERLIN, a citizen of the United States, residing at Portland, in the county of Multnomah and
5 State of Oregon, have invented certain new and useful Improvements in Money Paying, Changing, and Listing Machines, of which the following is a specification.

The present invention appertains to the
10 art of money handling, and comprises a machine for mechanically delivering money in predetermined amounts, for automatically computing the difference between two amounts so as to deliver money equivalent to
15 such difference, and for listing certain transactions of the machine, as for instance, amounts of money tendered and amounts of sale or purchase, or one of said amounts, all commonly occurring in the operation of
20 many businesses.

From the foregoing it will be apparent that this machine is of wide adaptability, an especial object in view having been to design a construction wherein the advantageous op-
25 eration of what is ordinarily known as a change maker, may be obtained, while on the other hand, to accommodate for certain frequent business usage, the same machine can be employed for the mere delivery of money
30 in selected amounts entirely irrespective of the change making action above referred to.

The computing mechanism constitutes one of the most important features of the machine, its action being unique and novel in
35 many phases thereof, as may now be instanced. In money transactions where the machine is employed as a change maker, manipulative devices are operated in accordance with the amount paid or tendered, and
40 the various denominations of money which represent such amount are determined or selected without any transfer or carry-over action of the computing means being necessary, no matter how large the amount in
45 question may be, so long as it is within the capacity of the machine. There are also, of course, manipulative devices for operation according to an amount of sale or purchase, the operation of the machine involving the
50 mechanical subtraction of the latter amount from the former, so to speak, and the delivery of change equal to the amount of the difference.

Where an amount of sale or purchase in-
55 volves one or more denominations of money and the value of each denomination is equal to or less than the value of the corresponding denominations of those representing the amount tendered, no carry-over or transfer
60 action of the computing devices is required in this machine. An example of such a transaction is the determination and selection of the change where the amount tendered is $77.64 and the amount of sale is
$66.53, or $67.43, or $77.64. Most money
65 transactions, however, necessitate the subtraction of an amount such as $66.58 from larger tendered amount, as $74.83, the amount of sale including one or several denominations of coins or currency of greater
70 individual value than the corresponding denominations of the purchase amount. In the last cited example the units denomination (cents) and hundreds denomination (dollars), of the purchase amount are
75 greater than the corresponding denominations of the tendered amount while the ten-hundreds (ten dollars) and tens denomination (dimes) are less. A condition of this sort requires an interdenominational action
80 of the computing instrumentalities so that when 8 cts. is subtracted from 83 cts., for instance, the tens denomination mechanism will be controlled to deliver 70 cts. where it would previously have delivered 80 cts., an
85 action which is really a reverse transfer as contra-distinguished from what is commonly known as a transfer from a lower to higher denomination, such as utilized in the art of cash registers, adding machines, etc.
90
The instrumentalities employed for accomplishing this necessary mechanical computation incidental to subtraction, or an equivalent arithmetical operation, are simplified to a large extent and do not involve
95 the necessity of permutation of the selecting devices, are capable of ready actuation in the performance of their functions, and insure absolute accuracy and reliability of action, results attained in a manner entirely
100 new in the arts.

The listing means mentioned before herein comprises printing mechanisms to coact with the respective amount tendered and purchase amount manipulative devices. Said print-
105 ing mechanisms are capable of synchronous,

or separate operation, a necessary feature of the machine in order that the tendered and purchase amounts may be listed in one operation of the machine used as a change 5 maker, or only one of said amounts listed as when the machine is operative for money delivery purposes.

For a full understanding of the present invention, reference is to be had to the fol- 10 lowing description and the accompanying drawings, in which:

Figure 1 is a general perspective view of a machine embodying the essential features of the present invention.

15   Fig. 2 is a rear elevation of the machine, one of the doors offering access to the printing mechanisms being open and the other door closed, the rear casing plate being detached to show more clearly the selector 20 bails or yokes and associated selecting and ejecting devices.

Fig. 3 is a front elevation of a machine showing the coin section partly broken away and certain front plates of the casing re- 25 moved to bring out clearly the key locking mechanism, the selector devices, and the operative connections between the keys, computing mechanism and selector devices.

Fig. 4 is a bottom plan view of the ma- 30 chine, the selector levers and some other detail parts being omitted for the sake of clearness.

Fig. 5 is an end elevation looking toward the key section of the machine, casing parts 35 being broken away or adjusted to bring out clearly the key release mechanism, ejector shaft operating means, and the printing or listing instrumentalities.

Fig. 6 is a plan view of the machine with 40 the coin chute detached and with the upper section carrying the ejectors removed in order to present clearly other parts of the selector and computing mechanisms.

Fig. 7 is a horizontal sectional view, 45 partly broken away, taken about on the line 7—7 of Fig. 3.

Fig. 8 is a perspective view bringing out more clearly the parts of the selector and computing mechanisms with operative con- 50 nections therebetween.

Fig. 9 is an enlarged bottom plan view showing particularly the operative connections between the differential levers which coöperate directly with a computing sector, 55 together with the arrangement of the selector levers and the actuating arms for the latter.

Fig. 10 is an enlarged elevation of one of the computing sectors together with adja- 60 cent members controlling the operation of the same, the view being reverse to that of the same parts as shown in Fig. 3.

Fig. 11 is a detail perspective view of one of the differential levers.

65   Fig. 12 is a sectional view taken about on the line 12—12 of Fig. 3, certain parts being shown in section or broken away.

Fig. 13 is a vertical sectional view taken about on the line 13—13 of Fig. 3, and bringing out most clearly the relation of the 70 selector levers, actuating arms therefor, and connections between the levers and selector bars.

Fig. 14 is a bottom plan view of the ejector devices which are carried by the top 75 plate of the coin section of the machine.

Fig. 15 is a perspective view of an ejector of double thickness for discharging two coins from a coin holder.

Fig. 16 is a similar view of a special 80 ejector.

Figs. 17 and 18 are detail perspective views of special ejectors.

Figs. 19, 19^a, 19^b and 19^c show the selector levers of the unit or cents denomination. 85

Figs. 19^d, 19^e, 19^f and 19^g show the selector levers of the tens or dimes denomination.

Figs. 19^h, 19^i, 19^k, and 19^l show the selector levers of the hundreds or dollars denomina- 90 tion.

Figs. 19^m, 19^n, 19^o, and 19^p show the selector levers of the ten-dollar or ten-hundreds denomination.

Fig. 20 is a detail perspective view of one 95 of the selector rods.

Fig. 21 is a detail perspective view of one of the index stop plates.

Fig. 22 is an end view of the machine, the end plate of the casing removed and show- 100 ing more particularly the operative connections between the actuator and the printing mechanism.

Throughout the following detail description and on the several figures of the draw- 105 ings, similar parts are referred to by like reference characters.

In its general organization, a money delivering, money changing and listing machine embodying the present invention com- 110 prises a keyboard having keys adapted for manual operation, to select predetermined amounts of money to be discharged from the machine upon the operation of a main actuator, such as a handle. For use as a money 115 changer there are two independently operable keyboards, practically speaking, one of said keyboards including the keys first mentioned above, which are adapted to be actuated in accordance with the amount of 120 money tendered, the other keyboard including keys adapted to be independently operated according to an amount of sale or purchase. Suitable selector mechanism is provided for direct actuation of the ejector 125 means to set the latter in an operative position, and intermediate said selector means and the keys is located a computing mechanism adapted to be not only adjusted by the operation of the money tendered keys, but 130

to be subsequently acted upon by the purchase or sale keys. The final adjustment of the computing mechanism correspondingly adjusts certain parts of the selector mechanism, whereby the latter assume positions that represent the difference between the amounts of the operated money tender and purchase keys, so that when the ejectors controlled by said selector devices are moved in the final operation of the main actuator, an amount of money is discharged from the machine corresponding exactly to the difference between the amounts represented by the keys above referred to. Simultaneously with the operation of the selecting and ejecting means, printing mechanisms controlled by the amount of money tendered and purchase keys, are operated to list the amount of money paid in or tendered, and the amount of the sale or purchase.

I shall now proceed to describe in detail the various mechanisms generally referred to hereinbefore.

The keyboard and key-locking and releasing mechanisms.

Referring particularly to Figs. 2 and 3, 5, 6 and 15, and 14 to 18, inclusive, it will be observed that the keyboards A and B are located on a key section or casing of the machine to the right of the coin or money paying section, C. A main actuator consisting of the handle D is carried by a stub shaft 1 at the right extremity of the machine, said shaft having rigidly affixed thereto a full stroke compelling disk 2. A sprocket 3 on the shaft 1 is operatively connected by a chain 4 with a similar sprocket 5 mounted upon a drive shaft 6 which is journaled in suitable bearings in the opposite ends of the machine and extends the entire length of the latter for a purpose to be presented more fully hereinafter. The disk 2 is connected by a link 7 with a lever 8 pivotally mounted in the upper portion of the key section of the machine, said lever 8 having an arm 9 pivotally connected with a bar 10, the latter being pivotally secured at its rear end portion to the actuating arm 11 of the ejector shaft 12. The bar 10 has a downwardly projecting arm 13 which is adapted to engage a corresponding arm 14 carried by a vertical shaft 15 forming a part of the printing mechanisms by which the amounts represented by operated purchase keys will be listed. There is a second lever similar to the lever 8, designated 8', the same being mounted upon the shaft 16 that forms the pivotal axis of the lever 8, whereby the two levers 8 and 8' will be simultaneously operated through the medium of the link 7. A second bar 10' having an arm 13' is provided, and coöperates with the arm 14' of the vertical shaft 15' which forms a part of a second printing

mechanism for listing the amounts of money tendered or paid in, in a money changing transaction. In other words, the printing mechanisms just referred to, and which will be more fully described later coöperate with the keys, *a* and *b* of the keyboards A and B, respectively.

In certain general features, the key-locking and releasing mechanism now to be described is practically the same as the equivalent mechanism set forth in the previous application for patent of Thomas Bilyeu, Fay A. Gridley, and myself, Serial No. 555,554, filed April 14, 1910.

The arrangement of the keys and associated parts directly coöperating therewith, of each keyboard A and B, is practically the same, and one only will therefore be described in detail. The keys *a* of keyboard A are arranged in several series of nine each, the operation of said keys in controlling the selection and discharge of coins being in general accordance with the decimal system. The keys *a* of each row from front to rear of the machine, are numbered from "1" to "9", respectively, and the stems 17 of said keys are bent at their lower ends into aline-ment. The lower terminals of the keys aforesaid are secured to the upper arms of bell crank levers 18. A bell crank lever 18 is provided for each key and the lower arm of said bell crank lever has an extension 19 projecting laterally therefrom. As there are nine keys *a* in each row of the keyboard A, there will be provided nine of the levers 18 for each row of keys. Each set of nine levers 18 aforesaid coöperates with a single differential lever 20 in the form of a plate 21 having nine lever arms, as shown in Fig. 11. The extensions 19 of each set of nine levers 18 are of different lengths, in order to engage with and impart differential movement to the coöperating lever 20. In other words, the lever 18 connected with the key *a* numbered "1", has a very short extension 19, so that when said key "1" is depressed, a single increment of movement will be imparted to the coöperating differential lever 20. On the other hand, since the lever 18 connected with a key *a* numbered "8", has an extension 19 which is eight times the length of the extension of the corresponding lever 18 operable by the key numbered "1", it will be apparent that upon the depression of the key numbered "8", a movement will be imparted to said differential lever 20 and which subsequent movement will represent eight increments of movement as compared to that which may be caused by the depression of key numbered "1".

While it is to be understood that any suitable number of rows of keys may be provided for each keyboard, this depending upon the desired capacity of the machine for the performance of transactions thereby,

four rows of keys are illustrated as employed for each keyboard. A differential lever 20 is therefore utilized for each row of the keys *a*, and the several levers 20 swing upon the
5 shaft 22, the latter also constituting the axis for the levers 18. A computing mechanism is provided and controlled by the peculiar differential movements which may be imparted to the levers 20, which computing
10 mechanism, however, will be set forth in detail hereinafter. As in the previous application referred to, the disk 2 is normally locked to prevent operation of the machine by the actuating handle D, for which purpose is provided the locking plate 23 having
15 a catch 24 engaging with a notch in the peripheral portion of the disk, the latter being also toothed. It is hardly deemed necessary to describe in exact detail the operation of
20 releasing the depressed keys, other than to set forth that whenever a key of any row is depressed, the lower terminal of the stem of said key engages with a pivoted release plate 25, shown in Fig. 3, thereby causing an arm
25 26 of said plate to engage with a cam 27 on a tilting lever 28 which lever 28 carries at its upper end a pivoted catch 29. The catch 29 engages with a pin 30 on a lever 31 which carries the locking plate 23. The depres-
30 sion of a key *a* through the parts 25 to 31, inclusive, tilts the lever 31 to the left, as shown in Fig. 5, withdrawing the catch 24 from engagement with the disk 2, permitting free rotation of said disk to operate the
35 machine. Meanwhile, the depression of said key has caused a projection *a'* near the lower end of the key to be engaged by one of the teeth or arms of a locking comb 32, one of which is provided for each row of a key-
40 board. The depressed key is thus held locked in its depressed position and will then be released after a complete rotation of the disk 2, the final movement of the handle B causing a pin 33 on said disk to
45 trip the pivoted catch 29 upwardly, thus returning the lock plate 24 to its normal position co-acting with the disk 2. Said final movement of the disk 2 also slides the lock plate 23 upwardly on the lever 31, and an
50 arm 23' of said plate 23 engages with a cooperating arm 34 on a shaft 35, see Fig. 7. Said arm 23' also engages an arm 36 of the outermost locking comb 32 of the keyboard B. The engagement of the arm 23' with the
55 arm 36 tilts the outermost locking comb 32 aforesaid upwardly, and simultaneously operates the coaxial locking combs 32, by reason of the fact that the latter have lugs 37 overlapping the locking comb provided with
60 the arm 36.

Since the lock plate 23 and its arm 23' are remote from the locking combs of the keyboard A, the interposition of the shaft 35 is required in order to transmit movement
65 from the arm 23' to the arm 36' on the outer-

most locking comb of those coöperating with the keys *a* of the keyboard A. Said shaft 35 has the secondary arm 38 which directly engages the arm 36', and by this means simultaneous release of depressed keys of both 70 of the keyboards A and B will be effected. The inner locking combs have the keys *a*, the lugs 37' performing the function of the lugs 37' above described.

Listing mechanism. 75

The listing mechanism used on my machine comprises duplicate printing mechanisms of the general type fully described in the previous application of Thomas Bil- 80 yeu, Fay A. Gridley and myself, Serial No. 617,201, filed March 27, 1911. Since any printing mechanism could be utilized for the purposes of the present machine, I do not deem it necessary to describe the print- 85 ing means illustrated in detail, although it may be observed that each of the printing mechanisms employed, one for the money tendered keyboard A, and the other for the purchase keyboard B, is controlled from the 90 keys of said keyboards in exactly the same manner as presented in the application just mentioned. There are provided as a part of each printing or listing means, a suitable number of type bars 38 which carry an in- 95 dex plate 39 for coöperation with an index stop 40. Each stop 40 is adapted for differential movement since it constitutes an arm of a tilting bar 41, one of which is provided for each row of keys and has the indexing 100 fingers 42 arranged at graduated elevations in the path of movement of the lower ends of the keys.

The depression of a predetermined key of any row of a keyboard will cause said key 105 to engage with its corresponding finger 42 of the index bar 41, thereby tilting the stop 40 of the latter into an operative position to engage with a certain one of the notches or steps of the coöperating index plate 39. 110 The coöperation of the parts 39 and 40 to properly position a type bar, takes place during the operation of the handle D and other parts of the machine. The type bars 38 are formed with extensions 38', seen best 115 in Fig. 5, which extensions project rearwardly through a guide plate 43 at the rear of the key section of the machine. The extensions 38' carry the index plates 39 which are secured thereto in any substantial man- 120 ner. It may be noted, also, that the levers 8 and 8' are connected with the carriage 44 of the printing mechanism, as shown at 45, in the manner set forth in the last-mentioned application. 125

Money paying or ejecting mechanism.

This mechanism as disclosed in my present invention is quite analogous to the ejecting mechanism shown in United States Let- 130

ters Patent No. 985,136, issued February 28, 1911. The ejector shaft 12 has been previously described as being operated from the main actuator D through the medium of the parts 7, 8, 10 and 11. On this shaft 12 are carried the ejector arms 46, said arms being notched at their upper ends so as to interlock with downwardly extending projections 47 on the rear extremities of the ejectors 48. The ejectors 48 are mounted upon a supporting plate 49, shown in Fig. 14, which is an underside plan view of the ejector mechanism proper, as removed from the machine. On the supporting plate 49 are carried the combined stop and locking plates 50, which plates have lateral notches or recesses in which the projections 47 of the ejectors 48 are normally seated.

The ejectors 48 are designed for longitudinal sliding movement beneath the plate 49 (note Fig. 2), in order that the free ends of said ejectors may move in a path intersecting the bases of the coin or money receptacles, the latter receptacles being arranged in groups and containing preferably coinage of standard United States currency, said coins ranging from a penny to twenty dollar gold pieces, in denominational value. It is not deemed necessary to detail the special arrangement of the receptacles 51, because this arrangement has been presented clearly in previous applications in which I am an applicant for patent, as well as in the Letters Patent referred to. It is obvious that since the ejectors 48 are normally interlocked with the plates 50, it is necessary, in the operation of the machine, to shift said ejectors laterally in the same plane as their ejecting movement to disengage the ejectors from the plates 50 initially, whereupon, ejecting movement may then be imparted to said ejectors. For this purpose, a suitable selecting mechanism is availed of, the same having certain features in common to the equivalent mechanism shown in the Letters Patent before identified. I refer now particularly to the employment of pivoted selector bails 52 having at their upper ends projections interlocking in slots 48' of the ejectors, there being provided selector bars 53 movable longitudinally of the machine beneath the upper bars of the lugs or bails 52. The selector bars 53 have the projections 54 to engage with the bails 52, in order to tilt said bails and correspondingly move the ejectors interlocked with the bails to set the former in operative positions or subsequent inoperative positions. The movement of the ejectors 48 into an operative position results in the disengagement of the projections 47 from the plates 50 and the engagement of said plates in the notches in the upper ends of the ejector arms 46. When such an adjustment of any one or more of the ejectors 48 has been effected, it will be

apparent that when rocking movement is imparted to the shaft 12 those ejectors that have now been connected with the arms 46 will have a sliding movement imparted thereto to engage and eject coins from predetermined coöperating receptacles 51. This is in brief the operation used in the previous Patent No. 985,136, although some modification has been made in the exact form of the ejectors, as will now be set forth, reference being had particularly to Figs. 14 to 18, inclusive.

A special penny ejector 48^a is formed with a notch 55 in one edge thereof with which a lug 56 of an auxiliary ejector 48^b is adapted to engage. The ejector 48^b is composed of pivotally connected parts, and the inner end of said ejector is connected by a plate 57 with a lever 58 pivoted to the under side of the ejector supporting plate 49. The ejector 48^a may be actuated by a selector bar 53 independently of the ejector 48^b, whereby a single coin will be ejected from the penny receptacle on the ejecting movement of the member 48^a. Under certain conditions it may be desirable to eject two coins from the penny receptacle 51, whereupon a predetermined ejector bar 53 will coöperate with the lever 58, under the control of a proper key of the keyboard. Shifting of the lever 58 is adapted to cause simultaneous movement of the two ejectors 48^a and 48^b to bring the ejector 48^a into connection with its ejector arm 46. As the parts 48^a and 48^b are interlocked, when the ejector 48^a has ejecting movement imparted thereto, similar movement will be imparted to the ejector 48^b, and two coins will be ejected from the penny receptacle, since the members 48^a and 48^b are superposed with respect to one another. The ejectors 48^a and 48^b are shown clearly in Figs. 16 and 17 of the drawings, and Fig. 18 illustrates another form of ejector used in connection with receptacles from which more than a single coin is to be discharged under certain conditions. Two coins can be ejected from a single receptacle by the employment of an ejector as shown in Fig. 15, where the ejecting end of the ejector is of double thickness, as shown at 48^c, the ejector itself being designated 48^d. One or more of the ejectors 48^d may be employed, according to the requirements in actual usage of the machine.

While in the previous Patent No. 985,136, the keys of the controlling keyboard are shown as directly connected with the selector bars, as before premised herein, such direct connection is not utilized in the present machine, because of the provision of a special computing mechanism for obtaining the desired money changing action. With the above in view, therefore, the connections between the keys of the present machine and the ejectors, involve the employment of cer-

tain additional selector parts and computing devices which will now be described.

Computing mechanism.

5   I have already set forth hereinbefore that for each row of keys in each of the keyboards A and B, there is provided a type bar adapted to print numbers corresponding with that on any operated key. For each 10 row of keys there is also provided a differential lever 20 which is adapted to have nine different increments of movement imparted thereto by the separate actuation of the nine keys which coöperate with said lever 15 through the bell cranks 18. The computing mechanism is directly controlled from the set of differential levers 20 operated from the money tendered keys *a*, and the set of corresponding differential levers 20 operated 20 from the purchase or sales keys *b*. The principle upon which the computing means operates is to set the computing devices in a predetermined or positive position initially by the operation of the money ten- 25 dered keys. In this manner, the computing members in coöperation with certain selector parts are so adjusted as to set up for selection ejectors that will discharge from the machine an amount represented by the posi- 30 tions of the computing members and the operated money tendered keys. The next step involved is the operation of the sales keys, whereby the computing members previously operated in a positive manner are now oper- 35 ated in a negative sense, whereby to position the same at an adjustment which to all intents and purposes arranges the parts of the invention for the selection of ejectors which will eject from the machine money equiva- 40 lent in value to the amount of the difference between the amounts set up on the money tendered and purchase or sales keys. In other words, the operation of the purchase or sales keys destroys, if necessary, the 45 adjustment of the computing devices as effected under the control of the money tendered keys. The respective operations of the computing devices in a positive and negative manner are entirely separate and 50 independent, and furthermore an important result is achieved by this particular action of the parts in that by the mere elimination of a negative operation, a controlling selection of ejectors may be obtained for the sin- 55 gle purpose of a money delivery action instead of a money changing action.

The computing means is best shown in Figs. 3, 9, 10, 12, 13 and 19 to 20, inclusive, wherein it will be observed that a plurality 60 of computing sectors 59 are provided. The sectors 59 are mounted upon a shaft 60 supported in suitable bearings transversely of the machine. The number of computing sectors 59 will always correspond with the 65 number of denominational rows of keys of

the keyboards, there being four sectors in the present machine which will be hereinafter referred to as the units sector 59, the tens sector 59ª, the hundreds sector 59ᵇ, and ten hundreds sector 59ᶜ. The units sector 70 59 is controllable positively and negatively by the operation of the units rows of keys *a* and *b*, respectively; the tens sector by the tens rows of keys *a* and *b*; the hundreds sector by the hundreds, or third, rows of 75 keys *a* and *b*; the ten hundreds sector by the ten hundreds, or fourth, rows of keys *a* and *b*, and so on where a larger number of rows of keys and corresponding sectors are employed. To provide for this particular con- 80 trol I will now describe the controlling connections between the units sector and the units rows of keys *a* and *b*, said connections being for the most part duplicated in reference to the operating means for the tens, 85 hundreds and ten hundreds sectors and their corresponding rows of keys. The differential lever 20 operated by the units rows of keys, is connected by a rod 61 to a small lever 62 mounted on the shaft 60 at one side 90 of the sector 59. On the opposite side of said sector 59 is mounted intermediate its ends, a second lever 63, the lowermost arm of which is connected by a rod 61ª with the differential lever 20 controlled by the 95 units row of keys *b*. In other words, the lever 62 is connected with a positively operating differential lever 20, while the lever 63 is connected with the negatively operating differential lever 20, and the sector 59 100 is adapted to be operated accordingly by the parts 62 and 63 and other detail parts. It will be noted that the lever 62 is connected with the sector 59 by a spring 64, and the lever 63, which like the lever 62 is loose on 105 the shaft 60, carries a pawl 65 at its upper end adapted to engage with the teeth provided on the sector 59, but normally out of engagement with said teeth. Springs 66 and 67 are attached to the hubs of the levers 110 63 and 62, respectively, and normally hold these levers in a predetermined position such as shown in Fig. 3 of the drawings. While in this normal position, the tooth of the pawl 65 occupies a neutral position in rela- 115 tion to the teeth of the sector 59, or in other words, a position central of the entire series of said teeth. The teeth of said sector 59 are arranged in graduated positions corresponding with the number of a certain key 120 of the keyboard. Each sector therefore will be provided with sufficient teeth to correspond with the number of keys in the units rows *a* and *b*, in order that positive and negative movement may be imparted to the 125 sector, as will now be described.

Supposing that the units key *a*, numbered "7", is depressed. The units differential lever 20 will be given seven increments of movement by a predetermined bell crank 18, 130

said differential lever 20 acting through the rod 61, the lever 62, and the spring 64 will impart to the sector 59 seven increments of movement in one direction, which may be styled positive movement. Now, upon depression of the units key b, numbered "4", it will be apparent that four increments of movement will be imparted to the lever 63 through the negatively operating units differential lever 20, its connecting rod 61ª and the pawl 65. The pawl 65 has a lateral pin engaging beneath a cam 68 whereby the pawl is engaged with the tooth portion of the sector immediately the lever 63 is actuated. The coöperation of the pawl 65 with the sector 59 moves the sector in a negative manner, or in a direction reverse to its operation by the lever 62, so that the sector finally assumes a position, as a result of its seven increments of positive movement and four increments of negative movement, equivalent to three increments of positive movement. This particular computing action of the sector 59 and the corresponding sectors controlling higher denominational computation, is utilized to select the proper ejectors for the delivery of an amount of money corresponding in value with the final number of increments of movement, whether negative or positive, represented by the ultimate adjustment of a predetermined sector or sectors.

With the above in view, the selector mechanism used in my machine is merely modified as necessary to attain the result just mentioned, which is accomplished by providing a selector rod 69 attached at one end to the sector 59 and provided at its other end with a head 70 shown clearly in Fig. 20. The head 70 of the selector rod 69 is movable in longitudinal slots formed in actuating arms 71 which are pivotally mounted upon a shaft 72 also supported transversely of the machine in suitable bearing brackets. A number of actuating arms 71 may be mounted in spaced relation upon said shaft 72 and are connected together by a rod 73, the latter being secured at its ends to lifter arms 74 rigidly attached to the shaft 72 for operation by the latter. Between the various spaced actuating arms 71 are mounted loosely on the shaft 72 a plurality of series of selector levers 75 with which are connected springs 76 which normally hold the levers in predetermined positions. The levers 75 are of bell crank form and their upper arms are connected in a pivotal manner with the selector bars 53, there being one lever 75 for each bar 53. Four selector bars 53 are utilized for the selection of the desired coins of any one denomination, such number being sufficient for general usage to cover the range of selection, although any suitable number of said bars might be employed within the purview of the invention. For direct coöperation with

each of the sectors, there will therefore be four of the selector levers 75, or one series. The series of levers 75 co-acting with the sector 59 is shown each in its detail formation, in Figs. 19, 19ª, 19ᵇ and 19ᶜ. The said formation involves the provision of projections 77 extending downwardly from each lever 75 and located in graduated positions with respect to an intermediate or neutral point designated by the arrow in Fig. 19. That is to say, referring especially to Figs. 3 and 19, if the arms 71 are raised while the head 70 of the selector rod 69 occupies the neutral position shown in Fig. 3, there will be no movement imparted to any of the levers 75 of the series coöperating with the sector 59. The levers 75 coöperating with the sector 59 may be termed the units selector levers and the head 70 of the selector rod 69 is capable of assuming nine positions to the left of the neutral point shown in Fig. 19 and to the right of said neutral point, all under direct control of the sector, the various positions of which, to obtain said adjustments of the head 70, are determined by the actuation of the money tendered and purchase keys. The arrangement of the teeth 77 and spaces at opposite sides of the neutral point of each lever 75 have been determined with a view particularly to the value of the various selector bars 53. The first selector bar 53 of the penny group or units denomination will be operated to pay or deliver one cent from the machine; the second selector bar to deliver two cents; the third bar to deliver four cents, and the fourth bar to deliver five cents. If, therefore, the selector lever 75 shown in Fig. 19 is provided with a tooth 77 which will be opposite the head 70 of the selector rod 69, when said selector rod has one increment of movement imparted thereto in a positive direction for cents (which would be to the left in Fig. 19,) such head 70 will constitute an obstruction between the lever 75 and certain arms 71 beneath said lever. Then, when the arms 71 are lifted the movement of the arms must necessarily be transmitted to the one-cent selector 75, its connected selector bar 53 thereby setting in operative position the one-cent ejector controlled by the bar 53. This describes the action of a single one of the levers 75 in a positive manner. Supposing, now, that the sector 59 is adjusted in a final position representing three increments of positive movement: under these conditions an equivalent movement will have been imparted to the head 70 of the selector rod 69, and said head will now be interposed between a tooth, designated 77', of the lever shown in Fig. 19, and a tooth, designated 77'', of the lever shown in Fig. 19ª, the latter selector lever controlling the selector bar 53 of the two cent ejector. Therefore, when the arms 71 are lifted with the foregoing adjustment

complete, the head 70 constitutes an obstruction between the selector levers shown in Figs. 19 and 19ª, thereby raising the toothed arms of said levers, imparting longitudinal movement to the selector bars 53 of said levers and setting in operative position the one-cent ejector and two-cent ejector so that in the final operation of the main actuator and the ejectors, three cents will be discharged from the machine. I believe the foregoing presents quite clearly the operation of the sectors in controlling the selection of a predetermined amount of money for subsequent discharge by the machine. It suffices to state that the arrangement of the teeth 77 of the selector levers is empirically determined and the arrangement of said teeth is merely designed to afford a proper selection by the sector 59 of any one of the units selector bars for different combinations of said bars which will be moved to render the ejectors operative by the coaction of the head 70 of the selector rod with the actuating arm 71 and the graduated teeth of one or more of the levers 75. As shown clearly in Fig. 13, the head 70 of the selector rod 69 is considerably elongated so that it is capable of operatively engaging the teeth 77 of one or more of the four units selector levers 75. The several actuating arms 71 with which the units selector levers 75 and the head 70 coöperate, are provided with slots 71′ in which the heads are adapted to slide in a manner readily evident upon reference to Fig. 13.

Figs. 19ᵈ, 19ᵉ, 19ᶠ and 19ᵍ show the selector levers coöperating with the selector bars of the tens group and which are controlled from the sector 59ª. The last-mentioned selector levers control the delivery of ten cents, twenty cents, thirty cents and fifty cents, respectively. The hundreds group of selector levers shown in Figs. 19ʰ, 19ⁱ, 19ᵏ and 19ˡ, control the action of ejectors to deliver one dollar, two dollars, three dollars and five dollars, respectively. In like manner, the selectors shown in Figs. 19ᵐ, 19ⁿ, 19° and 19ᵖ, control, respectively, the delivery from the machine of ten dollars, twenty dollars, forty dollars and eighty dollars. It is only necessary to raise the toothed arms of the proper levers 75 of one or more of the several groups of said levers in order to obtain a discharge from the machine of money corresponding in amount to the aggregate of the amounts controlled by the respective levers which are operated.

I have described that the normal position of the head 70 of each selector rod is neutral or practically inoperative in so far as it may act upon predetermined selector levers 75 until properly adjusted by its sector 59. I have also given a brief example of the action of the selector rod when adjusted in a positive direction in order to deliver

three cents from the machine. To show the possibilities of the computing mechanism, it is apparent that upon depressing the key 5 of the units money tendered keys a and the key 7 of the tens or second row of keys a, the sector 59 will be adjusted positively to a position represented by five increments of movement, and the tens sector 59ª will be correspondingly adjusted to a position representing seven increments of movement, the adjustment of both sectors being effected by the rods 61, the levers 62 and spring connections 64 previously described. The keys depressed as above described represent an amount of money tendered the operator of the machine. Supposing that the amount of the purchase is fifty-four cents; the operator will then operate the key b, numbered "4" in the units row, and the key b, numbered "5" in the tens row, of the purchase keys. Such keys through their differential levers 20 will impart four increments of movement in a negative sense to the sector 59 and five increments of movement in a negative sense to the sector 59ª, so that the final position of the sector 59 is that afforded by one increment of positive movement of the same, and the final adjustment of the sector 59ª is that afforded by two increments of positive movement of the same. The two sectors operated in the above transaction have therefore been adjusted for the payment of twenty-one cents, since the heads 70 of their corresponding selector rods are adjusted to coöperate with the proper selector levers 75 to effectuate the discharge of the last-mentioned amount from the machine. The initial movement of the handle D not only operates promptly the printing instrumentalities in the manner presented in the previous application, Serial No. 617,201 but causes the shaft 6 to rotate. On the shaft 6 are cam wheels 78 and 79 and a cam arm 80. The cam of the wheel 78 engages the downwardly extending arm 81 rigid on the shaft 72, when the handle D is initially moved, thereby rocking the shaft 72, raising the actuating arm 71 and causing the selector levers 75 with which the heads 70 are adjusted for coöperation, to be tilted upward. Such movement of the lever 75 imparts a selecting movement to the selector bars 53, setting in operation those ejectors 48 controlled by the moving selector bars. Just as soon as the ejectors are in their operative positions, which means that they are now connected or interlocked with their ejector arms 46, the latter will begin to move by reason of rocking of the shaft 12, and the selected amount of money will be discharged from the receptacles 51.

A cross bar 82 arranged transversely of the machine intermediate the sectors and the selector levers 75 carries pairs of spaced guide members 83, between which the selec-

tor rods 69 are guided in their movement. The free extremities of the selector levers 75 are guided in their vertical movement by operating in notches or slots in a guide plate 84 secured in superposed relation to the cross bar 82.

As the computing mechanism has thus far been described, its action has been confined to movement of the sectors in a positive sense, or in one direction or sense moving the heads 70 of the selector rods 69 in a corresponding manner, according to an amount of money tendered, then adjusting said sectors in a negative manner, by opposite movement, according to an amount of purchase, the final position of the sectors in the illustration offered having resulted in a positive adjustment of the heads 70 of the selector rods, or an adjustment in a positive direction with respect to the neutral point shown in Fig. 19. The operation described will always take place, in so far as the principles of action of the parts is concerned, where the amount of money tendered is greater than the amount of purchase, and the value of each denomination of money representing the amount of purchase is less than the corresponding denominations of the money tendered. To render my machine practicable for commercial usage, it is necessary that the computing mechanism be capable of interdenominational operation such as incidental to a computation involving the subtraction of an amount, such as $44.53 from an amount of money tendered, say $63.42. The former amount makes necessary the subtraction of amounts in the units and tens denominations which are greater than the corresponding denominations of money included in that represented by the amount tendered. A computation of this sort requires the provision of means whereby the operation of the computing instrumentalities representing lower denominational amounts may influence the operation of those instrumentalities representing higher denominational amounts. An example or actual transaction will best indicate what is meant by the foregoing and illustrate the interdenominational action of the computing instrumentalities. It may be timely observed, in reference to Fig. 19 and the corresponding figures of the drawings, that while those teeth and spaces of those selector levers arranged in a positive direction from the neutral point are graduated so as to represent increasing denominational values, as, for instance, 1 to 9, in relation to the lever illustrated in Fig. 19, the teeth and spaces 77ª on the opposite side of the neutral point are graduated in their positions to represent decreasing denominational values beginning with 9 and terminating with 1. The purpose of this will be appreciated more fully hereinafter, and a

simple transaction involving the last-mentioned feature and the employment of a reverse transfer mechanism will now be described.

In each of the sectors 59, 59ª and 59ᵇ, is provided a guide or slot 85 offset at its central portion so that the slot throughout about half its length is nearer to the axis of the sector than the other half. The offset portion is shown at 85' and will be termed a neutral point also. Adapted to operate in the slot 85 of the sector 59 and the corresponding slotted sectors, is a pin 86 of a transfer lever 87, said transfer lever having its upper edge in engagement with a tail 88 of a transfer pawl 89 which is pivoted intermediate its ends by a central yokelike portion 90, to an oscillating shaft 91 carried by the upper ends of oscillating arms 92. The arms 92 are rigid on a rock shaft 93 from which downwardly projects a rocker arm 94 adapted to be engaged by the cam of the cam wheel 79. The transfer pawl 89 is capable of engaging with an adjacent sector, one of these pawls being provided for each of the sectors 59ª, 59ᵇ and 59ᶜ. There being no transfer involving a higher denominational sector than the sector 59ᶜ, the latter sector is not provided with a slot 85 or coöperating transfer lever 87.

Supposing the operator of the machine desires to obtain change equivalent to the difference between a tendered amount of twenty-five cents and a purchase amount of seven cents; the keys a numbered "2" and "5" of the tens and units rows will be depressed, setting the corresponding sectors 59ª and 59 in the second and fifth positive positions, respectively. Were the handle D now operated, the machine would pay out twenty-five cents, and the sectors 59 and 59ª have been moved to the left, to the extent indicated, the pins 86 of their transfer levers 87 operating in the right hand ends of the slots 85 of said sectors. As the transaction in question necessitates the subtraction of seven cents from twenty-five cents, before turning the handle D the operator will set up seven cents on the purchase keyboard, and this will cause a movement of the units sector 59 in a negative sense for seven increments of movement to the right. Two peculiar adjustments are caused by the operation of the seven cents key just mentioned. First selector rod 69 of the units selector 59 is actuated to cause its head 70 to move from the fifth positive position in relation to the selector levers 75, to the second negative position between the levers 75 and actuating arms 71 of the units series. In other words, said head 70 is moved from a position where it would actuate selector bars to pay five cents to a position where it will actuate selector bars to pay eight cents,

it being recalled that the second negative position of the head 70 with respect to the neutral point, designated in Fig. 19, on the lever 75, will pay eight cents, the values represented by the graduated arrangement of the teeth and spaces of the lever 75, on the negative side of the neutral point running reversely to the values on the opposite side in a manner before presented. The machine is now adjusted for the payment of twenty-eight cents, but during the initial movement of the handle D the shaft 6 with its cam wheel 79 is rotated, and the cam of the wheel 79 causes the shaft 91 to be oscillated in the direction of the keyboard, carrying the several transfer pawls 89 therewith. It should be noted that when the sector 59 was adjusted to its second negative position for the payment of eight cents, an action performed by the lever 63 and its pawl 65, the pin 86 of the tens transfer lever 87 was caused to move into the portion of the slot 85 more remote from the axis of the sector, said pin passing up the offset neutral point of said slot in said movement. The coöperation of the pin 86 and transfer lever 87 on the negative movement of the sector beyond its neutral position, caused the transfer lever to be raised slightly, lifting the tail 88 of the tens transfer pawl and depressing the latter preliminary to operative engagement with the sector 59ᵃ. This adjustment of the tens pawl 89 having been completed before the movement of the handle D, it will be obvious that as said handle is turned and before the cam wheel 78 coöperates with the arm 81, the cam wheel 79 will oscillate the shaft 91 carrying the transfer pawls 89 toward the keyboard. The tens transfer pawl 89 has been lowered sufficiently to engage beneath guide member 95 supported on a cross rod 96 spanning the computing mechanism and secured to the frame of the machine. The other, or hundreds and ten hundreds transfer pawls, have not been depressed and will therefore be oscillated toward the keyboard, but moving above their guide members 95. The action of the guide member 95 on the tens transfer pawl 89 is to cause the latter pawl to engage with the tens sector 59ᵃ and move the same a distance equal to the length of one tooth so that it assumes a positive position equivalent to one increment of movement thereof. Said tens sector with its selector rod is now positioned to pay ten cents, a dime actually speaking, instead of twenty cents as before, and thus during the further rotation of the handle D, the now completely adjusted selector mechanism will control the ejectors to finally discharge eighteen cents, the proper amount representing the difference between 25 cents, the amount tendered, and seven cents, the amount of purchase.

A transaction of a somewhat different character is as follows: $91.43 represents the amount tendered, and $89.54 the amount of purchase. In setting up the tendered amount on the machine, the third positive position is given to the sector 59, the fourth positive position to the sector 59ᵃ, the first positive position to the sector 59ᵇ, and the ninth positive position to the sector 59ᶜ. In setting up the purchase or sale amount, the four-cent units key eliminates the third positive position of the sector 59 and sets said sector in the first negative position to pay nine cents. The fifty-cent purchase key eliminates the fourth positive position of the sector 59ᵃ and converts it into first negative position, which pays ninety cents. The operation of the nine dollar purchase key eliminates the first positive position of the sector 59ᵇ and converts it into the eighth negative position, which pays two dollars. The eighty dollar purchase key eliminates the ninth positive position of the sector 59ᶜ, moving said sector into first positive position, which will pay ten dollars. The machine is now set with the parts adjusted for the payment of twelve dollars and ninety-nine cents. In the operation described, the sector 59 passed the neutral point 86 rendering the tens transfer pawl 89 operative in relation to the sector 59ᵃ. Also, the movement of the sector 59ᵃ to a negative position rendered the hundreds transfer pawl 89 operative in relation to the sector 59ᵇ, and the movement of the sector 59ᵇ negatively beyond its neutral position rendered the ten hundreds transfer pawl operative in relation to the sector 59ᶜ. The sectors 59ᵃ, 59ᵇ and 59ᶜ will therefore be transferred the space of one tooth each on the initial movement of the handle D and before the heads 70 of the selector rods are raised. The sector 59 not being subject to the action of any transfer, maintains its adjustment in its first negative position to pay nine cents. The ninth position of the sector 59ᵃ will be changed to the eighth, the second position of the sector 59ᵇ will be changed to the first position, and the first position of the sector 59ᶜ will be changed to neutral or zero, thereby causing one dollar and eighty-nine cents to be discharged when the selectors and ejectors are operated in regular order, which amount is that required.

An additional peculiar action of the transfer levers and pawls will now be described. Upon reference to Fig. 7, it will be noted that transfer lever 87 coöperating with the sector 59 is operatively connected by a spring 97 with the transfer lever 87 which coöperates with the sector 59ᵃ. In like manner, a spring 97 connects the transfer levers 87 of the sectors 59ᵃ and 59ᵇ. The said springs 87 are coiled about a shaft 98 which forms the pivotal axis of the levers 87, the opposite ends of the springs being opera-

tively connected in any suitable manner with the transfer levers as above set forth. A spring 99 is secured at one end to the frame of the machine and at the other end to an arm 100 rigidly attached to the rock shaft 93. The purpose of the spring 99 is to hold the parts 91, 92, and transfer pawls 89 supported by the latter, in a predetermined position, and maintain the arm 94 in operative relation also with respect to cam wheel 79. When the computing sectors are in their neutral or zero position, the pawls 65 of the levers 63 are held out of operative engagement with the sectors by the vertical arms 65' of said pawls. These vertical arms 65' engage with adjustable stops 101, in the form of screws carried by cross rod 96. In the operation of the computing sectors in a negative sense, by means of movements of the levers 63 and their pawls 65, the moment the arms 65' of the pawls 65 leave the stops 101, the teeth of the pawls are permitted to drop into engagement with the sectors and said pawls are maintained in such engagement by curved abutments 102, the latter being carried by lever arms 103 mounted upon a rock shaft 104. The lever arms 103 with their abutments 102 are maintained normally in the position shown in Figs. 3 and 10 by means of a spring 105 which is attached at one end to the rod 96 and at its other end to the lever 106 which projects upwardly from the shaft 104. The downward movement of the lever arms 103 is limited by a stop 107 rigid on and projecting from the shaft 104 into engagement with the stop plate 108. The lever 106 is secured intermediate the ends of the shaft 104, and the arm 106' near the lower end of the lever carries a roller adapted to be engaged by the cam arm 80 in order to cause a partial rotation of the shaft 104 to raise the lever arms and their abutments 102 from engagement with the pawls 65.

Reverting to the special action of the transfer levers last referred to, exemplifying the same by a transaction of the machine, if a tendered amount is ninety dollars, for instance, and the purchase amount is one cent, the ninety dollar key a will be depressed and the one-cent key b similarly depressed. This operation initially sets the sector 59ᶜ in its ninth positive position, while the sector 59 is set in its first negative position, the former to pay ninety dollars and the latter to pay nine cents. When the sector 59 assumed its first negative position, its transfer lever 87 was raised by the pin 86 moving into the uppermost portion of the slot 85 of said sector 59. The raising of the transfer lever 87 of the sector 59, through the springs 97, causes the transfer levers of the sectors 59ᵃ and 59ᵇ to be raised simultaneously. The movement of the last-mentioned transfer levers 87 is admitted of because the sectors 59ᵃ and 59ᵇ

are in their neutral or zero positions, allowing a certain amount of vertical play of their pins 86 in the offset portions of the slots 85 of said sectors. During the initial movement of the handle D, therefore, the sector 59 will remain in its said position to pay nine cents, while the sectors 59ᵃ and 59ᵇ will be moved from their zero positions to the first negative positions, so that these sectors will be adjusted to pay ninety cents and nine dollars, respectively. Furthermore, during the initial movement of the handle D, the sector 59ᶜ will be moved by its transfer pawl 89 from the ninth positive position to the eighth positive position, to pay eighty dollars. The amount delivered upon completing the operation of the machine will be eighty-nine dollars and ninety-nine cents. The springs 97 constitute operative connections between the transfer levers 87 to cause the simultaneous movement of said levers when such action is required and permitted by reason of the positions of the sectors. Said springs, however, afford yieldable connections necessary because in money transactions an absolutely independent operation of the transfer pawls and levers is required.

General complete operation of the machine.

When money of a predetermined amount is tendered to the operator of the machine, to cover a sale or purchase, or any transaction of an equivalent nature, the money tendered keys a are operated in exact accordance with the amount proffered. Said keys through the connections specifically described, directly operate a computing sector or sectors, of those orders or denominations corresponding with the denominations, or orders of the keys, operated. The movement or adjustment of the sectors by the money tendered keys is in a positive direction, and as soon as the operator depresses those purchase keys b which represent the amount of the sale or purchase, the last-mentioned keys readjust the positions of the sectors acting thereon in a negative sense. Of course, during the movement of the sectors as above described, their selector rods 69 are correspondingly operated, and if the transaction referred to does not involve any interdenomination action or reverse transfer, the heads 70 of the selector rods 69 are positioned between the actuating arms 71 and those teeth of the selector levers 75, so that later on, when the arms 71 are lifted the proper selector bars 53 will actuate corresponding ejectors. The handle D or main actuator is now grasped and turned. At the outstart of the movement of the handle, the cam wheel 79 by engagement with the required arm 94 oscillates the transfer shaft 91 and its pawls. If there is no transfer operation involved in the transaction set up on the keys of the machine, all of the transfer pawls 89 will ride

upon the upper sides of the guide members
95, and there will be no further adjustment
of the sectors. If, however, the transaction
aforesaid does involve transfer, certain of
5 the transfer levers 87 will then be raised, cor-
respondingly lowering the pawls 89, so that
on oscillation of the shaft 91 those lowered
pawls will engage their sectors and accomplish
a final adjustment of the sectors other than
10 the adjustment obtained by operation of the
keys *a* and *b*, just before the cam of the wheel
78 actuates the arm of the shaft 72. As the
shaft 72 is operated on the further move-
ment of the handle D, the selector levers 75
15 are rocked, shifting their selector bars 53
longitudinally, and thus operatively con-
necting the corresponding ejectors with the
ejector arms 46 of the ejector shaft 12. The
movement of the parts is so timed by the ar-
20 rangement of the connections between the
disk 2 and the ejector shaft 12, that said
shaft 12 does not begin to rock with its arms
46 until selected ejectors 48 are interlocked
with the arms 47. The connection between
25 the parts 46—48 being effected, the ejectors
slide forwardly beneath the coin receptacles
51 to discharge from said receptacles the
proper coins representing the difference be-
tween the amount tendered and amount of
30 purchase. When the keys *a* and *b* are op-
erated, the index stops 41 controlled by said
keys, are set in proper position to coöperate
with the index plates 39. The initial move-
ment of the handle D caused downward
35 movement of the paper carriage 44, and at
the same time released type bars 38 to per-
mit the index plates 39 to engage with the
stops 40 and thus index the type bars in
their proper printing positions. A subse-
40 quent movement of the handle causes the
shaft 15 of each printing mechanism to ro-
tate partially by the coöperation of the arms
13 and 14, whereby the printing of the tape
or strip of paper 109, passing by the type
45 bars of each printing mechanism, is ef-
fected, the amounts represented by the de-
pressed keys of each of the keyboards A and
B being listed on the tapes 109. It will be
apparent that the arrangement of the key-
50 boards A and B in relation to the comput-
ing mechanism is such that the computing
sectors 59, 59ª, 59ᵇ and 59ᶜ may be operated
by the keys *a* of the keyboard A to assume
positions representing any amount within
55 the capacity of said keyboard, and if the
main actuator D is operated, for setting up
a transaction upon the keyboard A only, an
amount will be delivered or paid from the
machine equivalent to that determined by
60 the operated keys *a*, and furthermore, said
amount will be listed on the printing tape
109 on the printing mechanism which is
controlled by keyboard A. Under these
conditions, it is apparent that the machine
65 is adapted to be utilized for the discharge

of coins of predetermined amounts, irre-
spective of any actual money changing op-
eration such as would result if the keys of
both keyboards are actuated. To all in-
tents and purposes, therefore, the keyboard 70
B may remain inoperative according to the
desire of the operator, and the money dis-
charged from the ejecting mechanism may
be controlled by the operation of the key-
board A entirely independent of, or to- 75
gether with, the keyboard B, depending
upon whether the operator desires to use
the machine for money delivery purposes
only, or as a money changer.

While the money delivery, changing and 80
listing machine as herein set forth has been
adapted for the accommodation of United
States currency, it will, of course, be under-
stood that by slight modification the general
principles of operation of this machine may 85
be employed in connection with the currency
systems of other countries, especially those
utilizing a decimal system of coin or cur-
rency valuation. The keyboards of the ma-
chine are flexible, each key of a row being 90
adapted to be released when depressed, by
the operation of any other key in said row,
and in the manner set forth in one of the
previous applications herein identified.

Having thus described the invention, what 95
is claimed as new is:

1. In a money changing and listing ma-
chine, the combination of change delivery
mechanism, different denomination comput-
ing members, a series of different denomina- 100
tion manipulative members corresponding
with said computing members and control-
ling an initial adjustment of the latter, a
printing mechanism controlled by said se-
ries of manipulative devices, a second series 105
of manipulative devices of different de-
nominations corresponding with the com-
puting members and controlling a subse-
quent adjustment of the latter, a printing
mechanism controlled by the last-mentioned 110
manipulative devices, means whereby the
change delivery mechanism is controlled
from the computing members, and means
for effecting a further adjustment of certain
computing members and also operating the 115
change delivery mechanism.

2. In a money changing and listing ma-
chine, the combination of change delivery
mechanism, different denomination comput-
ing members, a series of different denomi- 120
nation manipulative members correspond-
ing with said computing members and oper-
able to cause an initial movement of the lat-
ter, a printing mechanism controlled by said
series of manipulative devices, a second se- 125
ries of manipulative devices of different de-
nominations corresponding with the com-
puting members and adapted to move the
latter, a printing mechanism controlled by
the last-mentioned manipulative devices, 130

means whereby the change delivery mechanism is controlled from the computing members, and means for effecting a further adjustment of certain computing members and for operating the change delivery and printing mechanisms simultaneously.

3. In a money changing and listing machine, the combination of change delivery mechanism, different denomination computing members, a series of different denomination manipulative members corresponding with said computing members and controlling an initial adjustment of the latter, an accounting mechanism controlled by said series of manipulative devices, a second series of manipulative devices of different denominations corresponding with the computing members and controlling a subsequent adjustment of the latter, an accounting mechanism controlled by the last-mentioned manipulative devices, means whereby the change delivery mechanism is controlled from the computing members, means for simultaneously operating the change delivery mechanism and accounting mechanisms, and means for effecting further adjustment of certain computing members independently of the manipulative devices aforesaid and affecting the operation of the change mechanism.

4. In a machine for the purpose described, means operable in accordance with an amount tendered and with an amount of purchase, computing mechanism comprising denominational devices controlled by said means to predetermine an amount of money representing the difference between any amount tendered and any amount of purchase within the limits of the machine, operating mechanism controlled by said computing mechanism, a single transfer mechanism intermediate said denominational devices, and means to render the transfer mechanism active only as incident to the operation of the means operating in accordance with an amount of purchase.

5. In a money changing machine, the combination of money delivery mechanism, means controlling the operation of said mechanism, including computing members, manipulative devices for controlling a preliminary adjustment of the computing members in accordance with a predetermined amount, other manipulative devices for controlling an adjustment of the computing members in accordance with a second amount, and an actuator for operating the change delivery mechanism, means to connect the actuator with the computing members to effect a final adjustment of the same and controlled by one set of the said manipulative devices, and means operated by the actuator to also cause the operation of the change delivery mechanism.

6. In a money changing machine, the com-

bination of money delivery mechanism, means controlling the operation of said mechanism, including computing members, manipulative devices for controlling a preliminary adjustment of the computing members in accordance with a predetermined amount, other manipulative devices for controlling an adjustment of the computing members in accordance with a second amount, other means for effecting a final adjustment of the computing members previous to operation of the change delivery mechanism as controlled thereby, and printing means operated by the last-mentioned means for listing amounts set up by said groups of manipulative devices.

7. In a money changing machine, the combination of money delivery mechanism, means controlling the operation of said mechanism, including computing members, manipulative devices for controlling a preliminary adjustment of the computing members in accordance with a predetermined amount, other manipulative devices for controlling an adjustment of the computing members in accordance with a second amount other means for effecting a final adjustment of the computing members previous to operation of the money delivery mechanism as controlled thereby, and separate printing mechanisms controlled by the sets of manipulative devices hereinbefore mentioned and operable by the means for effecting a final adjustment of the computing members.

8. In a money changing machine, the combination of money delivery mechanism, means controlling the operation of said mechanism, including computing members, manipulative devices for controlling a preliminary adjustment of the computing members in accordance with a predetermined amount, other manipulative devices for controlling an adjustment of the computing members in accordance with a second amount, other means for effecting a final adjustment of the computing members previous to operation of the change delivery mechanism as controlled thereby, printing mechanisms including indexing means operable one by the manipulative devices controlling the preliminary adjustment of the computing members, the other by the manipulative devices controlling the further adjustment of the computing members, and an actuator common to the means for effecting adjustment of the computing members and to the printing mechanisms.

9. In a money changing machine, the combination of change delivery mechanism, different denomination computing members controlling said delivery mechanism, a series of different denomination manipulative devices corresponding with said computing members for effecting movement of

the latter to a preliminary adjustment, a second series of different denomination manipulative devices corresponding with the computing members for effecting movement of the latter to a secondary adjustment, and a main actuator for effecting a final adjustment of certain computing members and for operating the change delivery mechanism.

10. In a money changing machine, the combination of change delivery mechanism, different denomination computing members controlling said delivery mechanism, a series of different denomination manipulative devices corresponding with said computing members for effecting movement of the latter to a preliminary adjustment, a second series of different denomination manipulative devices corresponding with the computing members for effecting movement of the latter to a secondary adjustment, a main actuator for effecting a final adjustment of certain computing members and for operating the change delivery mechanism, and separate printing mechanisms each controlled from one of the series of manipulative devices and by the main actuator.

11. In a money changing machine, the combination of change delivery mechanism, different denomination computing members, controlling said delivery mechanism, a series of different denomination manipulative devices corresponding with said computing members for effecting movement of the latter to a preliminary adjustment, a second series of different denomination manipulative devices corresponding with the computing members for effecting movement of the latter to a secondary adjustment, a main actuator for effecting a final adjustment of certain computing members and for operating the change delivery mechanism, and separate printing mechanisms each involving indexing devices controlled from a predetermined one of the series of manipulative devices, each printing mechanism being operable by said main actuator.

12. In a change making machine, the combination of change delivery mechanism and means for controlling the operation of said mechanism, comprising different denomination computing members, a series of manipulative devices for setting said computing members in a predetermined position according to an amount paid in, a second series of manipulative devices for setting the computing members for accomplishing a further adjustment of the computing members according to an amount of purchase, selector mechanism connected with the computing members and having its selective action controlled by the latter, and means common to the computing members, the selector mechanism and the change delivery mechanism, for operating the same in the order named.

13. In a change making machine, the combination of change delivery mechanism and means for controlling the operation of said mechanism, comprising different denomination computing members, a series of manipulative devices for setting said computing members in a predetermined position according to an amount paid in, a second series of manipulative devices for setting the computing members for accomplishing a further adjustment of the computing members according to an amount of purchase, selector mechanism connected with the computing members and having its selective action controlled by the latter, means common to the computing members, the selector mechanism and the change delivery mechanism, for operating the same in the order named, and simultaneously operable printing mechanisms, one controlled by the manipulative devices actuated according to the amount paid in, and the other controlled by the manipulative devices actuated according to an amount of purchase.

14. In a change making machine, the combination of change delivery mechanism and means for controlling the operation of said mechanism, comprising different denomination computing members, a series of manipulative devices for setting said computing members in a predetermined position according to an amount paid in, a second series of manipulative devices for setting the computing members for accomplishing a further adjustment of the computing members according to an amount of purchase, selector mechanism connected with the computing members and having its selective action controlled by the latter, means common to the computing members, the selector mechanism and the change delivery mechanism, for operating the latter in the order named, and printing mechanisms, one controlled by the manipulative devices actuated according to the amount paid in, and the other controlled by the manipulative devices actuated according to an amount of purchase, the operation of the printing mechanisms being controlled by the common operating means hereinbefore mentioned.

15. In a money handling machine, the combination of money ejecting mechanism, different denomination computing members controlling the action of said ejecting mechanism, different denomination manipulative devices corresponding with and controlling the adjustments of the computing members, selector mechanism including different denomination devices corresponding with the computing members, connections between the computing members and said selector devices, connections between the selector devices and the ejector mechanism, a printing mechanism involving indexing means controlled by said manipulative devices, and an

actuator for initially operating the different denomination selector devices as adjusted by the computing members, for subsequently operating the ejecting mechanism, and for also operating said printing mechanism.

16. In a money handling machine, the combination of money ejecting mechanism, different denomination computing members controlling the action of said ejecting mechanism, different denomination manipulative devices corresponding with and controlling the adjustments of the computing members, selector mechanism including different denomination devices corresponding with the computing members, connections between the computing members and said selector devices, connections between the selector devices and the ejector mechanism, a printing mechanism involving indexing means controlled by said manipulative devices, locking and releasing means for the manipulative devices aforesaid, and an actuator common to the different denomination selector devices, the ejecting mechanism, printing mechanisms, and the said key locking and releasing mechanism.

17. In a machine for the purpose described, means operable in accordance with an amount tendered and with an amount of purchase, computing mechanism comprising denominational devices controlled by said means to predetermine an amount of money representing the difference between any amount tendered and any amount of purchase within the limits of the machine, money delivery mechanism controlled by said computing mechanism, a single transfer mechanism intermediate said denominational devices, means to maintain the transfer mechanism inactive when the computing devices are acted upon by means operable in accordance with the amount tendered, and means to render the transfer means active only as incident to the operation of the means operating in accordance with an amount of purchase.

18. In a machine for the purpose described, means operable in accordance with an amount tendered and with an amount of purchase, computing mechanism comprising denominational devices controlled by said means to predetermine an amount of money representing the difference between any amount tendered and any amount of purchase within the limits of the machine, operating mechanism controlled by said computing mechanism and capable of actuating the latter after predetermining adjustment of the same, a single transfer mechanism intermediate said denominational devices maintained inactive when the amount tendered means is actuated, and means to render the transfer means active only as inci-

dent to the operation of the means operating in accordance with an amount of purchase.

19. A computing mechanism comprising a computing member, means connected with said member for moving the same in one direction representative of one sense, means for moving said computing member in another direction representative of a different sense, a connection between the last mentioned means and the computing member including a flexible element permitting movement of the computing member while the last moving means is stationary, and mechanism controlled by the final adjustment of the computing members resulting from the operation of the foregoing instrumentalities.

20. In a computing mechanism, the combination of two different denomination computing members, means for moving one of said members in one direction, other means for imparting a separate additional movement to said member, and means rendered operative to control the operation of the other computing member when the first-mentioned computing member has imparted thereto one of the movements aforesaid, and means to actuate the last named means.

21. Computing mechanism comprising two different denomination computing members, manipulative means for imparting initial movement to one of said members, manipulative means for imparting an additional separate movement to said member, and a single one way acting transfer means intermediate the members rendered operative to cause a transfer movement of the other member only when a certain one of its separate movements is imparted to the first-mentioned member.

22. Computing mechanism comprising a units computing member and a tens computing member normally occupying neutral or zero position, means for imparting to the units computing member a positive movement in one direction from its neutral position, separate means for imparting to the units computing member a negative movement in an opposite direction to that above mentioned so that it may assume a negative position in respect to the neutral position, a single carrying means intermediate the units and the tens computing members adapted to be rendered operative to cause a transfer movement of the tens member when the units member occupies a negative position only, and means to actuate said carrying means.

23. Computing mechanism comprising a units computing member, a tens computing member, both members normally occupying a neutral or zero position and being capable of movement in opposite directions from

said neutral position to occupy positive and negative positions, and means intermediate said computing members to cause a transfer movement of the tens member when the units member occupies a negative position, the last-mentioned means including a transfer lever normally inoperative, while the units member occupies a neutral or positive position, said units member having means to render said transfer lever operative when the units member occupies a negative position.

24. Computing mechanism comprising a units computing member, a tens computing member, both members normally occupying a neutral or zero position and being capable of movement in opposite directions from said neutral position to occupy positive and negative positions, means intermediate said computing members to cause a transfer movement of the tens member when the units member occupies a negative position, the last-mentioned means including a transfer lever normally inoperative, while the units member occupies a neutral or positive position, said units member having means to render said transfer lever operative when the units member occupies a negative position, and a transfer pawl controlled by the transfer lever to assume a position for cooperation with the tens computing member only when the units computing member assumes a negative position.

25. Computing mechanism comprising a units computing member, a tens computing member, both members normally occupying a neutral or zero position and being capable of movement in opposite directions from said neutral position to occupy positive and negative positions, means intermediate said computing members to cause a transfer movement of the tens member when the units member occupies a negative position, the last-mentioned means including a transfer lever normally inoperative, while the units member occupies a neutral or positive position, said units member having means to render said transfer lever operative when the units member occupies a negative position, a transfer pawl controlled by the transfer lever to assume a position for cooperation with the tens computing member when the units computing member assumes a negative position, and selector mechanism including a units selector device and a tens selector device, each selector device comprising a selector rod operable by the computing member which corresponds with such selector device.

26. Computing mechanism comprising a units computing member, a tens computing member, both members normally occupying a neutral or zero position and being capable of movement in opposite directions from said neutral position to occupy positive and

negative positions, means intermediate said computing members to cause a transfer movement of the tens member when the units member occupies a negative position, the last-mentioned means including a transfer lever normally inoperative, while the units member occupies a neutral or positive position, said units member having means to render said transfer lever operative when the units member occupies a negative position, a transfer pawl controlled by the transfer lever to assume a position for cooperation with the tens computing member when the units computing member assumes a negative position, and selector mechanism including a units selector device and a tens selector device, each selector device comprising a selector rod operable by the computing member that corresponds with such selector device, each selector device also comprising selector bars and ejectors for discharging money controlled by said selector bars.

27. Computing mechanism comprising a sector having elements graduated according to increments of value, means operable according to an amount paid in and an amount of purchase to impart movement to the sector, separately operable means to cause it to assume a position representing the difference between the amount paid in and the amount of purchase, and mechanism controlled by the final position of the sector.

28. Computing mechanism comprising a sector having elements graduated according to increments of value, means operable according to an amount paid in and an amount of purchase to impart movement to the sector, separately operable means to cause it to assume a position representing the difference between the amount paid in and the amount of purchase, and money ejecting mechanism controlled by the final position of the sector.

29. Computing mechanism comprising a sector having elements graduated according to increments of value, means operable according to an amount paid in and an amount of purchase to impart movement to the sector, independent means to cause it to assume a position representing the difference between the amount paid in and the amount of purchase, money ejecting mechanism controlled by the final position of the sector, a printing mechanism controlled by the paid in manipulative devices, a printing mechanism controlled by the purchase manipulative devices, and an actuator common to the independent means aforesaid, and to ejecting mechanism and printing mechanisms.

30. In a machine of the class-described, the combination of a computing member, means for imparting differential movement to said computing member, selector mechanism including a plurality of selector mem-

bers having elements graduated according to increments of value, a second selector member movable according to the differential movement of the computing member to 5 assume a predetermined position with relation to the graduated elements of the first selector members, and means for operating the second selector member to thereby cause it to operate one or more of the first selec- 10 tor members, and mechanism the operation of which is controlled by said selector mechanism.

31. In a machine of the class described, the combination of a computing member, selec- 15 tor mechanism comprising a selector rod connected with the computing member, a selector lever having elements graduated according to increments of value, manipulative means for differentially operating the 20 computing member and correspondingly actuating the selector rod to cause the latter to assume a predetermined position in relation to the graduated elements of the selector lever, and means controlled in operation by 25 the selector mechanism.

32. In a machine of the class described, the combination of a computing member, selector mechanism comprising a selector rod connected with the computing member, a se- 30 lector lever having elements graduated according to increments of value, manipulative means for differentially operating the computing member and correspondingly actuating the selector rod to cause the latter to 35 assume a predetermined position in relation to the graduated elements of the selector lever, means for operating the selector mechanism to cause coöperation of the selector rod and selector lever, and money discharg- 40 ing mechanism controlled by said selector mechanism.

33. In a machine of the class described, the combination of computing mechanism comprising a plurality of different denomina- 45 tion computing sectors, manipulative devices for operating said sectors in one sense, other manipulative devices for operating said sectors in another sense, money discharging mechanism controlled by the positions of 50 the sectors after the operation of said manipulative devices, transfer mechanism between said sectors, and an actuator operable to cause transfer action of the transfer mechanism and to also operate the money dis- 55 charging mechanism.

34. In a machine of the class described, the combination of a plurality of toothed sectors, predetermining means for operating said sectors in one sense, other predetermin- 60 ing means for operating said sectors in an opposite sense, transfer mechanism between the sectors to act on the teeth thereof, mechanism controlled by the said sectors, and other means for operating the last-men- 65 tioned mechanism and for effecting transfer

action of the sectors in the opposite sense above referred to.

35. In a machine of the class described, the combination of a plurality of computing members of different denominational orders, 70 transfer mechanism intermediate said members, predetermining means controlling said members in a positive sense, other predetermining means controlling said members in a negative sense, mechanism the operation of 75 which is controlled by the computing members, and means other than the means above set forth for causing the transfer mechanism to act upon the computing members in a negative sense. 80

36. In a machine of the class described, the combination of units and tens computing members, selector mechanism comprising a group of units selector devices which coöperate with the units computing member and a 85 group of tens selector devices which coöperate with the tens computing member, means for adjusting the computing members, a selector member intermediate each computing member and its corresponding group of selector 90 devices and co-acting with the latter to select a predetermined one or more of the same for operation, means for operating the selector mechanism after the operation of the computing members is completed, and ac- 95 counting mechanism controlled by the means operating the computing members and adapted to be actuated by the means for operating the selector mechanism.

37. In a machine of the class described, the 100 combination of a units computing member, a tens computing member, a group of units selector devices, a group of tens selector devices, a selector member intermediate each computing member and its corresponding group of 105 selector devices and common to the latter to control the action of the corresponding selector devices, manipulative devices operable according to an amount tendered to set the computing members in a predetermined posi- 110 tion, and correspondingly adjust said intermediate selector members, money ejecting mechanism controlled by the selector devices, and means for operating the selector devices and said ejecting mechanism. 115

38. In a machine of the class described, the combination of a units computing member, a tens computing member, a group of units selector devices, a group of tens selector devices, a selector member intermediate each 120 computing member and its corresponding group of selector devices and common to the latter to control the action of the corresponding selector devices, manipulative devices operable according to an amount ten- 125 dered to set the computing members in a predetermined position, and correspondingly adjust said intermediate selector members, manipulative devices operable according to an amount of purchase for readjusting the 130

positions of the computing members and their corresponding selector members, and means for operating the selector devices after the final adjustment of the computing 5 members.

39. In a machine of the class described, the combination of a units computing member, a tens computing member, a group of units selector devices, a group of tens selec-
10 tor devices, a single selector member intermediate each computing member and its corresponding group of selector devices and operable to control the action of the corresponding selector devices, manipulative de-
15 vices operable according to an amount tendered to set the computing members in a predetermined position and correspondingly adjust said intermediate selector members, manipulative devices operable according to
20 an amount of purchase for readjusting the positions of the computing members, and their corresponding selector members, and means for effecting a further adjustment of the computing members and for operating
25 the selector devices after the final adjustment of the computing members is completed.

40. In a machine of the class described, the combination of a computing sector, a
30 group of selector devices coöperating therewith and including a plurality of selector levers, actuating arms for said levers, a selector rod connected with the computing member and having a head operating be-
35 tween the selector levers and their actuating arms to select one or more of said levers for operation, means for operating the sector, means for operating the selector levers by operating the actuating arms.

40 41. In a machine of the class described, the combination of a computing sector, a group of selector devices coöperating therewith and including a plurality of selector levers, actuating arms for said levers, a selector rod con-
45 nected with the computing member and having a head operating between the selector levers and their actuating arms to select one or more of said levers for operation, differential levers connected with the sector, manip-
50 ulative devices for differentially operating said levers in order to impart corresponding movement to the sector and selector rod, and means for operating the actuating arms to impart movement to selected selector levers.

55 42. In a machine of the class described, the combination of a computing sector adapted to control the delivery of money of a certain denomination, a group of selector devices to control the selection of money of
60 different amounts of the denomination controlled by said sector, each selector device consisting of a selector lever having elements graduated according to increments of value, an actuating arm co-acting with said
65 lever, a selector member operable by the

computing sector to assume a predetermined position in relation to the graduated elements of said selector lever and the actuating arm thereof, means for differentially operating the computing sector, and means for 70 operating the selector devices when adjusted by the computing sector.

43. In a machine of the class described, the combination of a computing sector adapted to control the delivery of money of 75 a certain denomination, a group of selector devices to control the selection of money of different amounts of the denomination controlled by said sector, each selector device consisting of a selector lever having ele- 80 ments graduated according to increments of value, an actuating arm co-acting with said lever, a selector member operable by the computing sector to assume a predetermined position in relation to the graduated ele- 85 ments of said selector lever and the actuating arm thereof, manipulative keys to control the differential movement of said sector and the corresponding selector member, and other means for operating the selector 90 devices after adjustment of the selector member aforesaid.

44. In a machine of the class described, the combination of a computing sector adapted to control the delivery of money of a certain 95 denomination, a group of selector devices to control the selection of money of different amounts of the denomination controlled by said sector, each selector device consisting of a selector lever having elements graduated 100 according to increments of value, an actuating arm co-acting with said lever, a selector member operable by the computing sector to assume a predetermined position in relation to the graduated elements of said selec- 105 tor lever and the actuating arm thereof, manipulative keys to control the differential movement of said sector and the corresponding selector member, other means for operating the selector devices after adjustment of 110 the selector member aforesaid, and money ejecting mechanism controlled by the selector devices and operable by the means for actuating said selector devices.

45. In a machine of the class described, 115 the combination of a computing sector adapted to control the delivery of money of a certain denomination, a group of selector devices to control the selection of money of different amounts of the denomination 120 controlled by said sector, each selector device consisting of a selector lever having elements graduated according to increments of value, an actuating arm co-acting with said lever, a selector member operable by the comput- 125 ing sector to assume a predetermined position in relation to the graduated elements of said selector lever and the actuating arm thereof, manipulative devices for operating the sector in a positive sense, other manipu- 130

lative devices for operating the sector in a negative sense, whereby the selector member is correspondingly operated in relation to the graduated elements of the selector levers, money ejecting mechanism controlled by the selector levers, and an actuator common to the actuating arm aforesaid and to the ejecting mechanism.

46. In a change making machine, in combination, money ejecting mechanism and means for controlling the same including a pivoted sector having a ratchet portion, and means for differentially actuating said sector including a pawl adapted to engage said ratchet portion.

47. In a money handling machine, the combination of money ejecting mechanism, different denomination computing members controlling said ejecting mechanism, keys in units and tens groups for differentially operating each computing member in a positive manner, and other keys in units and tens groups, each group corresponding with one of those first mentioned for negatively and differentially operating each computing member.

48. In a money handling machine, the combination of money ejecting mechanism, different denomination computing members controlling said ejecting mechanism, keys in groups of nine for differentially operating each computing member in a positive manner, other keys in groups of nine for negatively and differentially operating each computing member, and separate accounting mechanisms controlled by the respective keys aforesaid, and means to operate the accounting mechanisms as controlled by their sets of keys.

49. In a money handling machine, the combination of money ejecting mechanism, different denomination computing members controlling said ejecting mechanism, keys in groups of nine for differentially operating each computing member in a positive manner, other keys in groups of nine for negatively and differentially operating each computing member, and separate printing mechanisms independently controlled by the first and second-mentioned keys, whereby one printing mechanism may list independent of the other, and means to operate the printing mechanisms and the ejecting mechanism simultaneously.

50. In a machine of the class described, the combination of computing members, keys in groups of nine each, and the keys of each group operable for actuating one of said computing members differentially in accordance with a predetermined amount, other keys in groups of nine each and the keys of each of which latter groups are operable for actuating one of said computing members differentially in accordance with another amount for finally positioning said comput-

ing member, separate printing mechanisms controlled by the first and second named groups of keys, and operating means common to said printing mechanisms and the computing members.

51. In a money changing and listing machine, the combination of change delivery mechanism including ejectors, different denomination computing members each controlling a certain group of ejectors, a series of different denomination manipulative members corresponding with said computing members and controlling an initial adjustment of the latter, a printing mechanism controlled by said series of manipulative devices, a second series of manipulative devices of different denominations corresponding with the computing members and controlling a subsequent adjustment of the latter, a printing mechanism controlled by the last-mentioned manipulative devices, means whereby the change delivery mechanism is controlled from both series of manipulative devices through the computing members, and means for simultaneously operating the change delivery mechanism and printing mechanisms and for normalizing the same.

52. In a money changing and listing machine, the combination of change delivery mechanism, different denomination computing members, a series of different denomination manipulative members corresponding with said computing members and controlling an initial adjustment of the latter, a printing mechanism controlled by said series of manipulative devices, a second series of manipulative devices of different denominations corresponding with the computing members and controlling a subsequent adjustment of the latter, a printing mechanism controlled by the last-mentioned manipulative devices, means whereby the change delivery mechanism is controlled from both series of manipulative devices through the computing members, and means for effecting a further adjustment of certain computing members, and for normalizing all operated parts.

53. In a money changing machine, the combination of money delivery mechanism, means controlling the operation of said mechanism, including computing members, manipulative devices for controlling a preliminary adjustment of the computing members in accordance with a predetermined amount, means operable by said manipulative devices normally connected with the computing members to actuate the same, other manipulative devices for controlling an adjustment of the computing members in accordance with a second amount, instrumentalities operable by the last mentioned manipulative devices and normally out of engagement with respect to the computing members, means to cause the last named in-

strumentalities to engage the computing members, and other means for effecting a final adjustment of the computing members previous to operation of the money delivery mechanism as controlled thereby and for normalizing all operated parts.

54. In a money changing machine, the combination of change delivery mechanism, different denomination computing members, a series of different denomination manipulative devices corresponding with said computing members for effecting movement of the latter to a preliminary adjustment, a second series of different denomination manipulative devices corresponding with the computing members for effecting movement of the latter to a secondary adjustment, instrumentalities operable by the last mentioned manipulative devices and normally out of engagement with respect to the computing members, means to cause the last named instrumentalities to engage the computing members, and a main actuator for operating the means last mentioned, for effecting a final adjustment of certain computing members and for operating the change delivery mechanism, and also adapted to normalize the operated parts.

55. Computing mechanism comprising a units computing member, a tens computing member, both members normally occupying a neutral or zero position and being capable of movement in opposite directions from said neutral position to occupy positive and negative positions, means intermediate said computing members to cause a transfer movement of ⌐ae tens member when the units member occupies a negative position, and means capable of normalizing the operated parts, and adapted to operate the means last mentioned.

56. In a machine of the class described, the combination of keys depressible in accordance with an amount received and other keys depressible in accordance with an amount of purchase, a differential lever associated with each class of keys above mentioned, levers operable by the received-keys to impart differential movement to the associated differential lever, levers operable by the purchase keys to impart differential movement to their associated differential lever, a connection between the received-keys differential lever and said computing member, a connection between the purchase-keys differential lever and said computing member, by which connections the computing member is adapted to be set in a position representing the resultant of the relation of the amounts set up on the keys above mentioned, and means for locking and releasing said keys.

57. In a machine of the class described, the combination of keys depressible in ac-

cordance with an amount received and other keys depressible in accordance with an amount of purchase. a differential lever associated with each class of keys above mentioned, levers operable by the received keys to impart differential movement to the associated differential lever, levers operable by the purchase keys to impart differential movement to their associated differential lever, a computing member, the connection between the received-keys differential lever and the computing member including a yielding means to permit operation of the computing member by the purchase-keys differential lever while the received-keys differential lever is locked from movement.

58. In a machine of the class described, the combination of keys depressible in accordance with an amount received and other keys depressible in accordance with an amount of purchase, a differential lever associated with each class of keys above mentioned, levers operable by the received keys to impart differential movement to the associated differential lever, levers operable by the purchase keys to impart differential movement to their associated differential lever, a computing member, a connection between the received-keys differential lever and said computing member, a connection between the purchase-keys differential lever and said computing member, by which connections the computing member is adapted to be set in a position representing the resultant of the relation of the amounts set up on the keys above mentioned, and means for locking and releasing said keys, the connections between the differential levers aforesaid and the computing member comprising levers at opposite sides of the computing member, one of said levers being normally connected with the computing member and the other of said levers being normally disconnected therewith.

59. In a machine of the class described, the combination of keys depressible in accordance with an amount received and other keys depressible in accordance with an amount of purchase, a differential lever associated with each class of keys above-mentioned, levers operable by the received keys to impart differential movement to the associated differential lever, levers operable by the purchase keys to impart differential movement to their associated differential lever, a computing member, means intermediate one of said differential levers and the computing member, normally connected with the latter, to transmit movement of said differential lever to the computing member, and means intermediate the other differential lever and said computing member, but normally disconnected from the latter, to transmit movement of the last

mentioned differential lever to said computing member.

60. In a machine of the class described, the combination of computing member, manipulative means to control the operation of the computing members in accordance with a predetermined amount, lock means to lock said manipulative means after operation thereof, other manipulative means to additionally control the operation of the computing members according to a second predetermined amount so that said computing members may assume a position representing a resultant of a certain relation between the amounts set up by the respective manipulative means, yielding means controlling the movement of the computing members as influenced by the first mentioned manipulative means and permitting of movement of the computing members under the influence of the second mentioned manipulative means, while the first manipulative means remains locked, and means for normalizing the parts after a transaction is performed on the machine.

61. In a machine of the class described, the combination of a computing member, means to operate the computing member initially and subsequently in accordance with two different amounts, and yielding means to hold the computing member in the position of its initial operation, and permitting subsequent operation of said computing member irrespective of the means controlling its initial operation.

62. In a machine of the class described, the combination of a computing member, actuating means to operate the computing member initially in accordance with a predetermined amount, means to lock said actuating means after operation thereof, other actuating means to subsequently operate the computing member according to a second predetermined amount so it will assume a position representing a resultant of a certain relation between the amounts set up, yielding means to hold the computing member in the position of its operation by the first mentioned actuating means, and permitting movement of said member while the first mentioned actuating means remains locked, and means to normalize the parts after a transaction is performed on the machine.

63. In a machine of the class described, the combination of an oscillatory computing member, levers coaxially mounted with the computing member, a yielding connection between one of said levers and the computing member, a detachable connection intermediate the other lever and the computing member, and manipulative means operable in accordance with predetermined amounts and controlling the actuation of the said

levers to set the computing member in a position representing the resultant of a certain relation between the amounts.

64. A computing device consisting of a shaft, a toothed sector mounted on said shaft, a lever adjacent to the sector, means intermediate said lever and sector normally spaced from the sector to engage the teeth of the latter for imparting movement thereto, means to engage the last mentioned means with the sector, a second lever adjacent to the sector and connected therewith for moving the same, manipulative devices controlling the independent operation of the levers aforesaid to cause them to set the computing member in a predetermined position, and mechanism operably variable according to different positions of adjustment of the sector.

65. A computing device comprising a sector, levers mounted at opposite sides of the sector, a spring connecting one lever with the sector, a pawl adapted to connect the other lever with the sector, and manipulative devices controlling the differential action of the levers to thereby set the sector in a predetermined position.

66. A computing device comprising units and tens computing members, means for effecting a positive adjustment of said computing members to assume positions representing any amount between a predetermined minimum and maximum and for negatively operating said computing members, and a single transfer mechanism between the computing members, means to maintain said transfer mechanism inactive on said positive adjustment and to render said mechanism operable incidental to negative movement of the same only.

67. A computing device comprising units and tens computing members, manipulative means controlling the operation of said computing members in positive and negative senses, a transfer mechanism intermediate the computing members, means for controlling the operation of the transfer mechanism in a negative sense only on the tens computing member and rendered operable only when the units computing member assumes a negative position, and means to cause transfer action of said transfer mechanism.

68. A computing device comprising units and tens computing members operable to assume negative and positive positions at opposite sides of the neutral point, transfer means to impart negative movement to the tens computing member, and a guide on the units computing member coöperating with said transfer means to render the latter operative when the units computing member occupies a negative position in respect to said neutral point.

69. A computing device comprising units

and tens computing members movable to assume negative and positive positions at opposite sides of a neutral point, a transfer pawl associated with the tens computing member for effecting negative movement thereof and normally inoperative in relation thereto, a member connected with said transfer pawl to set the same in operative position, the units computing member being provided with a guide to operate said transfer member when the units computing member assumes a negative position, and means for operating the transfer pawl and normalizing the parts.

70. A computing device comprising units and tens oscillatory sectors having toothed portions, manipulative devices engageable with said toothed portions for controlling the adjustment of said sectors to a position representing a predetermined amount, and transfer mechanism between the sectors comprising a member engageable with the said toothed portion of one of the sectors.

71. In a machine of the class described, the combination of units and tens sectors, manipulative means controlling the adjustment of said sectors to a position representing a predetermined amount, transfer mechanism comprising a transfer pawl, the sectors having toothed portions for coöperation with the manipulative devices, and the toothed portion of one of the sectors being common to its manipulative devices and to the transfer pawl, and means for operating the transfer pawl to effect a transfer movement of its associated sector under the control of the other sector, and means for normalizing the parts.

72. A computing device comprising units and tens sectors, manipulative devices controlling adjustment of the sectors in accordance with a predetermined amount, an oscillatory shaft, a transfer pawl on said shaft capable of engaging an adjacent sector, a transfer lever connected with said transfer pawl, means on the other sector for setting the transfer lever and pawl when the latter sector assumes a predetermined position, whereby the transfer pawl is rendered operative in relation to its sector, means for oscillating said shaft to operate the pawl, and mechanism controlled by the sectors.

73. A computing device comprising coaxially mounted spaced toothed sectors, manipulative means for controlling the adjustment of said sectors in accordance with a predetermined amount, an oscillating shaft, a transfer pawl mounted on said shaft to engage one of the sectors and normally inoperative in relation thereto, a transfer lever pivotally supported to engage and operate the transfer pawl to render the latter operative in relation to its sector, a guide on the other sector engaging the transfer lever and adapted to move the same when the latter

sector assumes a predetermined position, and mechanism controlled by the positions of the sectors.

74. A computing device comprising coaxially mounted spaced toothed sectors, manipulative means for controlling the adjustment of said sectors in accordance with a predetermined amount, an oscillating shaft, a transfer pawl mounted on said shaft to engage one of the sectors and normally inoperative in relation thereto, a transfer lever pivotally supported to engage and operate the transfer pawl to render the latter operative in relation to its sector, a guide on the other sector engaging the transfer lever and adapted to move the same when the latter sector assumes a predetermined position, mechanism controlled by the positions of the sectors, the transfer pawl being provided with a tail which is directly in contact with the transfer lever, and a guide coöperating with said transfer pawl to maintain the same in an inoperative position under certain conditions and to maintain it in engagement with its sector when the pawl is rendered operative relative to the latter.

75. In a machine of the class described, the combination of a computing member having elements graduated from a neutral point in accordance with increments of value, money delivering mechanism, selector mechanism coöperating with the money delivering mechanism and comprising a selector member having elements graduated from a neutral point in accordance with increments of value to correspond with the similar elements of the computing member, manipulative means controlling the operation of the computing member and bearing a predetermined relation to the elements of the latter, and means for operating the selector member aforesaid including a selecting part controlled by the computing member for adjustment in relation to the elements of the selector member according to the adjustment of the corresponding elements of said computing member.

76. In a machine of the class described, the combination of a computing member having elements graduated from a neutral point in opposite directions in accordance with increasing and decreasing increments of value, money delivering mechanism, selector mechanism coöperating with the money delivering mechanism and comprising a selector member having elements graduated from a neutral point in opposite directions in accordance with increments of value to correspond with the similar elements of the computing member, manipulative means controlling the operation of the computing member and bearing a predetermined relation to the elements of the latter, and means for operating the selector member aforesaid including a selecting part controlled by

the computing member for adjustment in opposite directions from the neutral point of the selector member to assume a predetermined position relative to the elements of the latter.

77. In a machine of the class described, the combination of a computing member, means for differentially adjusting said computing member in accordance with a predetermined amount, a series of selector levers having elements graduated thereon in accordance with increments of value, money delivering mechanism controlled by said selector levers, a selecting part adjustable by the computing member to assume a predetermined position in relation to the graduated elements of the series of selector levers, and means to impart movement to the selecting part after adjustment thereof by the computing member to engage said selecting part with a certain element or elements of the selector lever, by which engagement the latter have movement imparted thereto to influence the action of the money delivering mechanism.

78. In a machine of the class described, the combination of a computing member having teeth graduated from opposite sides of a neutral point in accordance with increments of value, manipulative devices operable in accordance with received and purchase amounts to control the movement of the computing member in opposite directions and coöperating with the toothed portion of the latter, a selecting rod connected with the computing member, a series of selector levers having teeth graduated in opposite directions from the neutral point in accordance with increments of value, means to move said selecting rod into engagement with one or more of the teeth of the selector levers after said rod is adjusted and to thereby cause movement of one or more selector levers, and money delivering mechanism controlled by said selector levers.

79. In a machine of the class described, the combination of money delivering mechanism, rows of keys of different denominations, manipulative according to an amount received, and according to an amount of purchase, different denomination computing members associated with the rows of keys of corresponding denominations, connections intermediate the keys and their corresponding computing members whereby adjustment of the latter in two senses is controlled by the corresponding keys, a group of selector levers associated with each computing member for coöperation with the money delivering mechanism, a selecting part connected to each computing member and adapted to coöperate with one or more of the associated group of selector levers, according to adjustment of the computing member, and means to effect relative movement of said

selecting part and its group of selector levers.

80. In a machine of the class described, the combination of money delivering mechanism, rows of keys of different denominations, manipulative according to an amount received, and according to an amount of purchase, different denomination computing members associated with the rows of keys of corresponding denominations, connections intermediate the keys and their corresponding computing members whereby adjustment of the latter in two senses is controlled by the corresponding keys, a group of selector levers associated with each computing member for coöperation with the money delivering mechanism, the selector levers having teeth thereon graduated in two senses according to increments of value, a selecting rod intermediate each computing member and its coöperating group of selector levers and having a head capable of adjustment to engage a tooth of one or more of said levers, and means for moving said head to simultaneously engage the same with the teeth of levers selected thereby to cause operation of the money delivering mechanism from said selector mechanism.

81. In a machine of the class described, the combination of money delivering mechanism, rows of keys of different denominations manipulative according to an amount received, and according to an amount of purchase, different denomination computing members associated with the rows of keys of corresponding denominations, connections intermediate the keys and their corresponding computing members whereby adjustment of the latter in two senses is controlled by the corresponding keys, a group of selector levers associated with each computing member for coöperation with the money delivering mechanism, the selector levers having teeth thereon graduated in two senses according to increments of value, a selecting rod intermediate each computing member and its coöperating group of selector levers and having a head capable of adjustment to engage a tooth of one or more of said levers, and means for simultaneously actuating the heads of the selecting rods of all the computing members to cause coöperation of said heads with the various groups of selector levers as controlled by the adjustment of the computing members, whereby the money delivering mechanism is affected.

82. In a machine of the class described, the combination of money delivering mechanism, rows of keys of different denominations manipulative according to an amount received, and according to an amount of purchase, different denomination computing members associated with the rows of keys

of corresponding denominations, connections intermediate the keys and their corresponding computing members whereby adjustment of the latter in two senses is controlled by the corresponding keys, a group of selector levers associated with each computing member for coöperation with the money delivering mechanism, the selector levers having teeth thereon graduated in two senses according to increments of value, a selecting rod intermediate each computing member and its coöperating group of selector levers and having a head capable of adjustment to engage a tooth of one or more of the said levers, and an actuator common to the money delivering mechanism, the computing members and selecting rods whereby the latter are caused to engage and operate one or more of the selector levers of the various groups independent of the adjustment of the computing members.

83. In a machine of the class described, the combination of a computing member, a differential lever connected with said member, a plurality of keys manipulative according to predetermined amounts, and a series of levers operable by and corresponding with the keys, said levers having members of different lengths to engage and thereby impart differential movement to the differential lever and its associated computing member.

84. In a machine of the class described, the combination of a computing member, actuating levers associated therewith, means intermediate said levers and the computing member whereby on operation of the levers the computing member will be moved, a series of keys, a differential lever connected with one of the actuating levers, a series of levers intermediate said keys and said differential lever and having extensions of different lengths to engage the differential lever to impart differential movement thereto and corresponding movement in one direction to its actuating lever, a second series of keys, and means intermediate said keys and their actuating lever equivalent to the means between the first series of keys and the first mentioned actuating lever, whereby the last mentioned actuating lever may be operated in an opposite direction to that in which the first mentioned lever is actuated, and money delivering mechanism controlled by said computing member.

85. In a computing machine, in combination, a plurality of denominational sectors, operating levers for imparting differential movement to said sectors, pawls carried by the levers and normally uncoupled in relation to the sectors and adapted to engage and cause movement of the latter, means for effecting engagement of the pawls with the sectors, a transfer mechanism adapted to act upon the sectors independently of said levers and pawls, key controlling means for said levers, and mechanism controlled by the aforesaid parts.

86. In a computing machine, the combination of a plurality of coaxially mounted sectors, key controlled operating levers associated with the sectors, pawls carried by said levers to engage and move the sectors but normally inoperative in relation thereto, transfer mechanism coöperating with the sectors, means for operating said transfer mechanism to effect movement of the sectors independently of movement caused by the operating levers, and mechanism controlled by the positioning of the sectors.

87. In a computing machine, in combination, computing devices including a plurality of oscillatory sectors, operating levers associated with the sectors and normally inoperative in relation thereto, means intermediate said levers and the sectors for connecting said parts together, transfer mechanism coöperating with the sectors, and a series of manipulative devices for differentially determining the position of each operating lever.

88. In a money changing machine, the combination of a plurality of money receptacles, a keyboard arranged at one side of said receptacles and comprising a series of keys operable in one sense and another series of keys operable in a different sense, a computing member, means intermediate each series of keys and the computing member whereby on operation of a key of both series, said computing member will be actuated in two different senses, selector mechanism controlled by the computing member, a main actuator comprising a shaft and arms thereon, money delivering devices for the receptacles, means intermediate said money delivering devices and the selector mechanism whereby the connection of the former with the arms of said shaft may be controlled, and an operating handle carried by said shaft on the side of the keyboard remote from the money receptacles.

89. In a money changing machine, the combination of a plurality of money receptacles, a keyboard arranged at one side of said receptacles and comprising a series of keys operable in one sense and another series of keys operable in a different sense, a computing member, means intermediate each series of keys and the computing member whereby on operation of a key of both series, said computing member will be actuated in two different senses, selector mechanism controlled by the computing member, a main actuator comprising a shaft and arms thereon, money delivering devices for the receptacles, means intermediate said money delivering devices and the selector mechanism whereby the connection of the former with the arms of said shaft may be controlled, an

operating handle carried by said shaft on the side of the keyboard remote from the money receptacles, a chute at the front portion of the machine common to the said
5 receptacles to conduct money discharged therefrom to a single point of delievery, and mechanism for normalizing the computing member, selector, money delivering, and key devices and controlled by said main actuator.
10 90. A change making machine embodying delivering mechanism divided into denominational groups, a plurality of selectors, one for each group, separate groups of keys divided into sets indicating the value of a pur-

chase and the sum deposited, one group for 15 each selector, and mechanism controlled by one selector for advancing the selector of next higher order, one step independently of its controlling keys, whenever a purchase key of higher value than a deposit key is 20 operated in the group controlling the selector of next lower order.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. OVERLIN.

Witnesses:
    FRANK MENEFEE,
    HAZEL A. GIESY.