

Feb. 5, 1935.

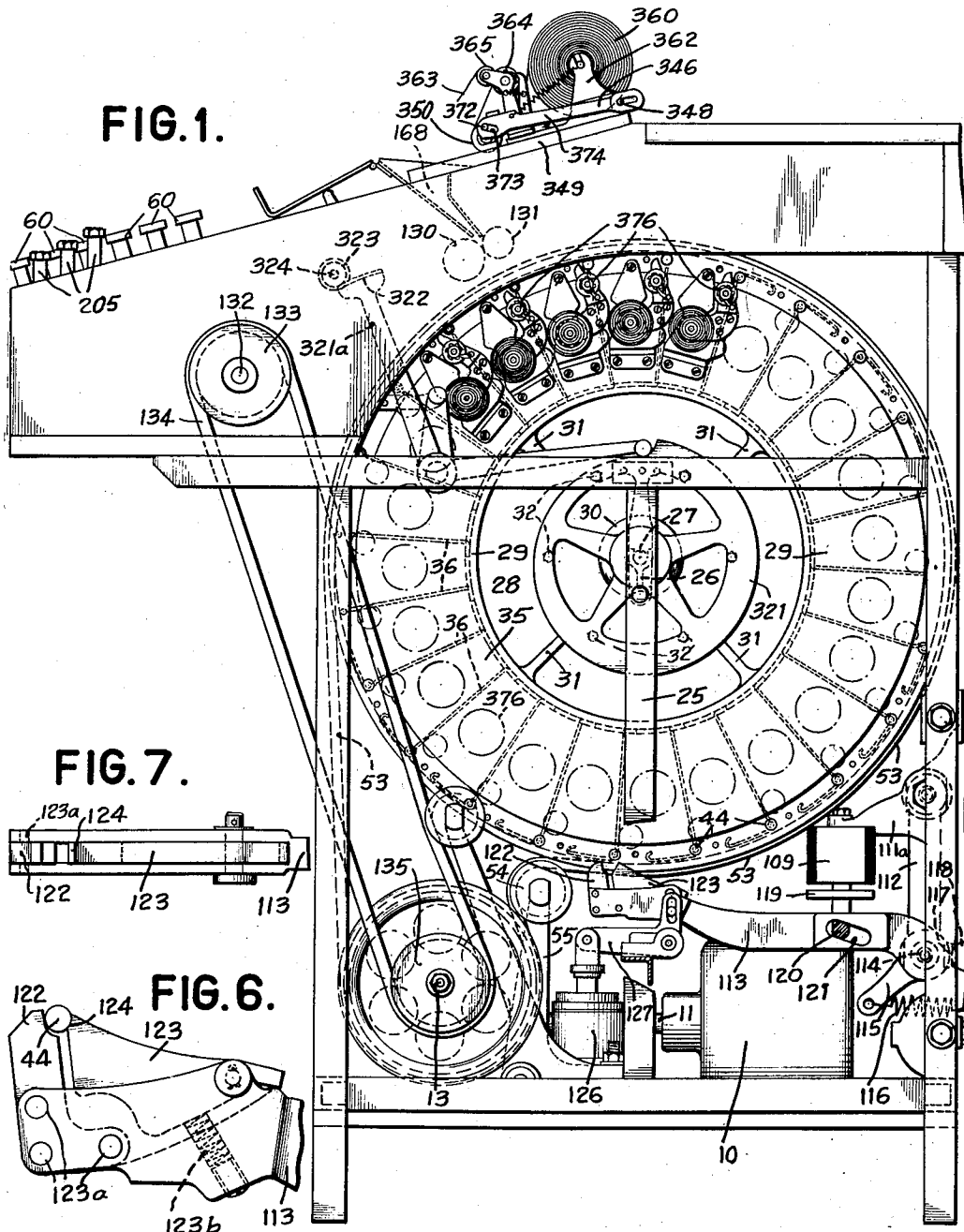
F. L. FULLER

1,989,976

SORTING AND PRINTING MACHINE

Original Filed Oct. 21, 1930 17 Sheets-Sheet 1

FIG. 1.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Feb. 5, 1935.

F. L. FULLER

1,989,976

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FIG. 2.

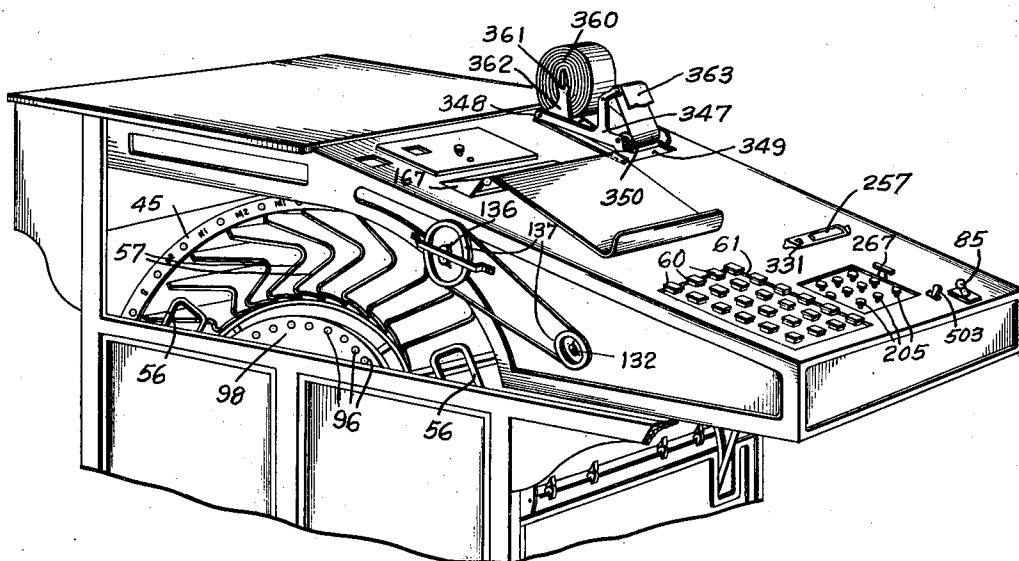
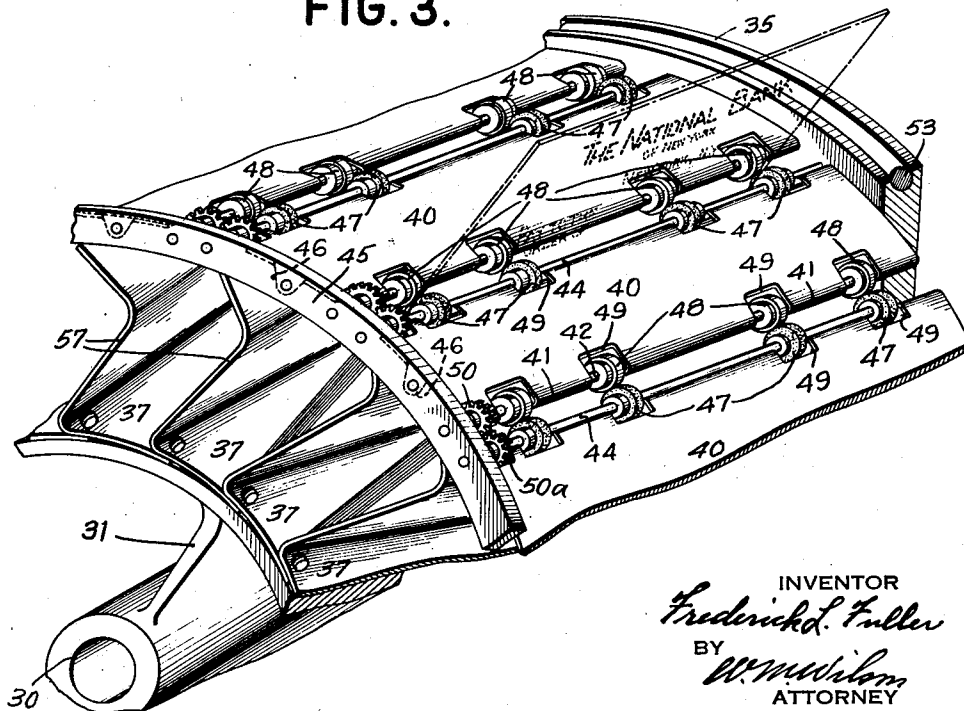


FIG. 3.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Feb. 5, 1935.

F. L. FULLER

1,989,976

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FIG. 8.

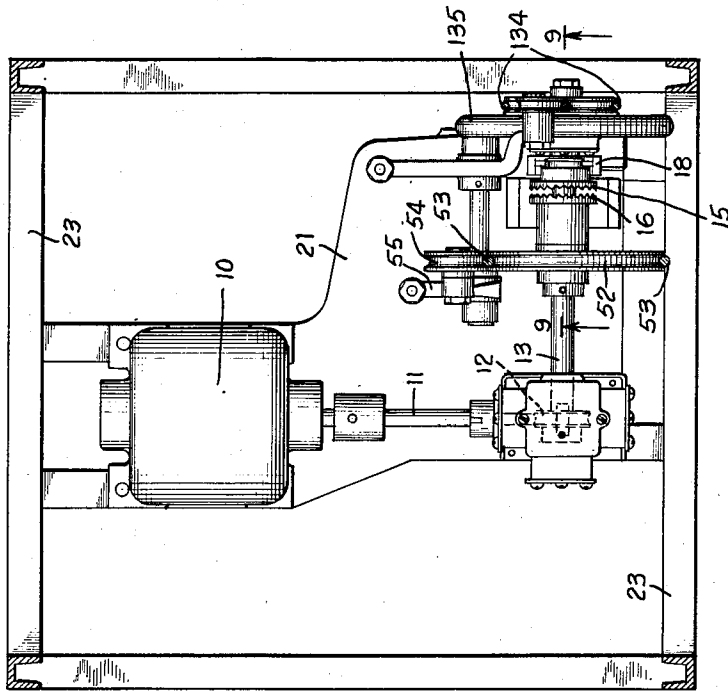
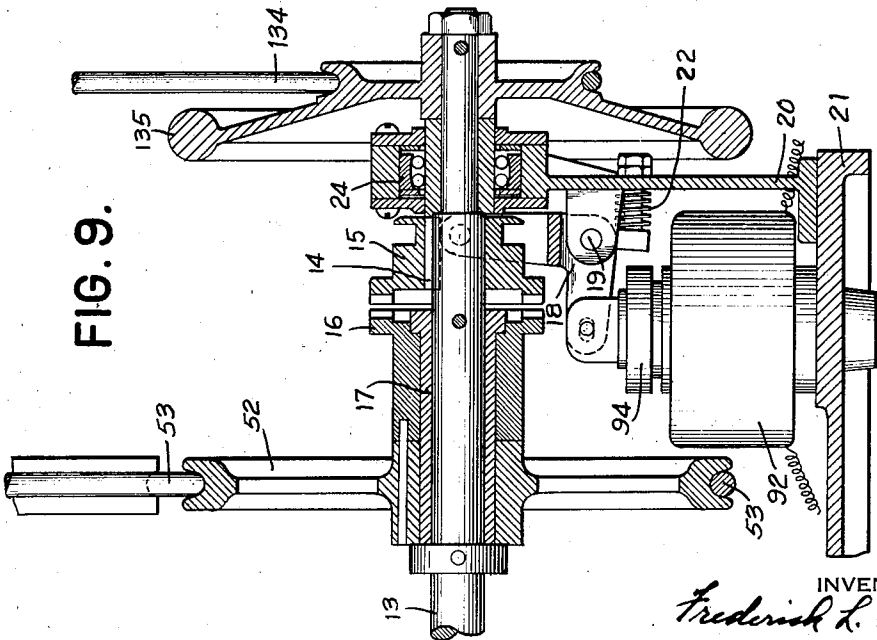


FIG. 9.



INVENTOR
Frederick L. Fuller
BY *W. M. Wilson*
ATTORNEY

Feb. 5, 1935.

F. L. FULLER

1,989,976

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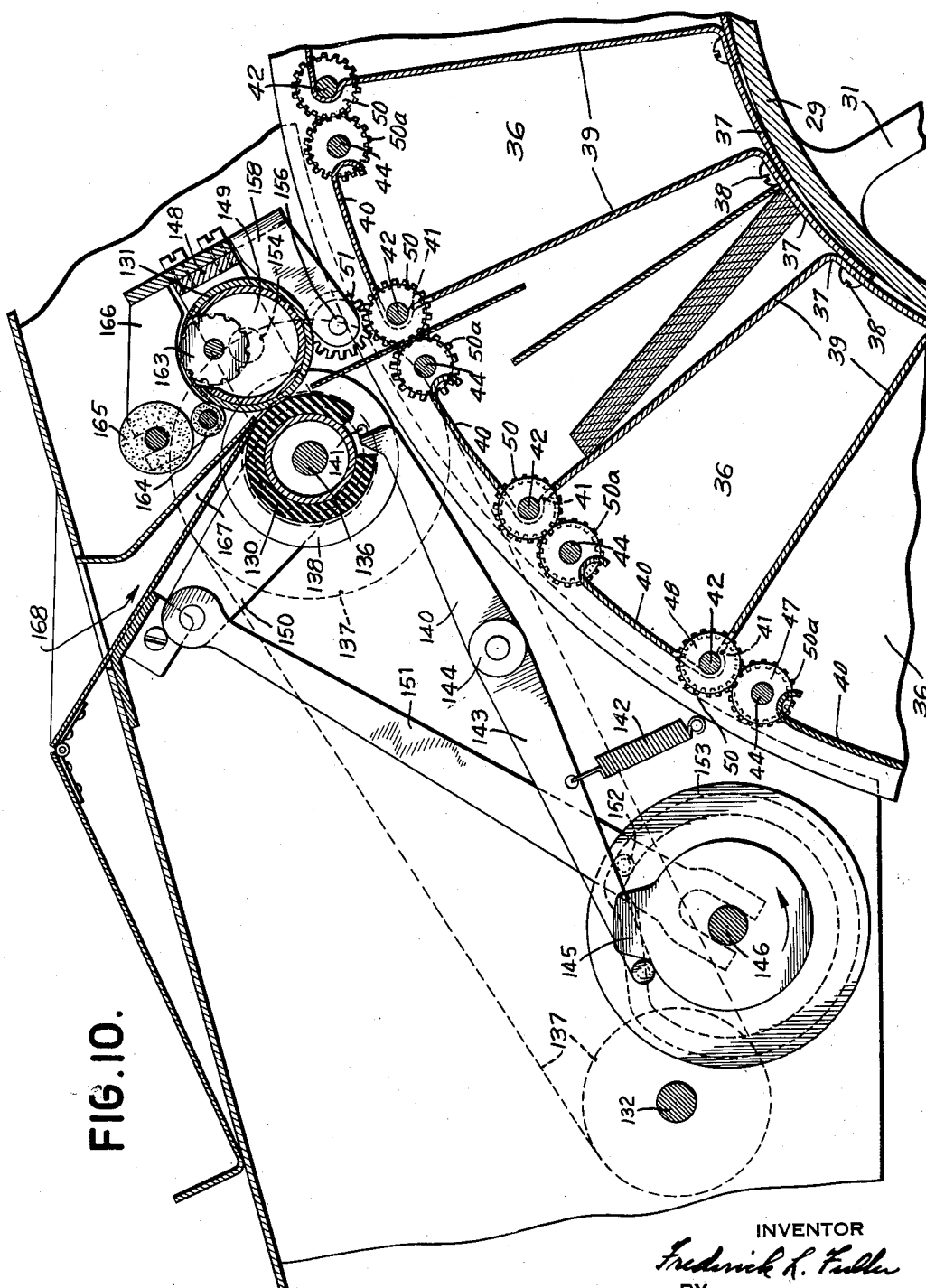


FIG. 10.

INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

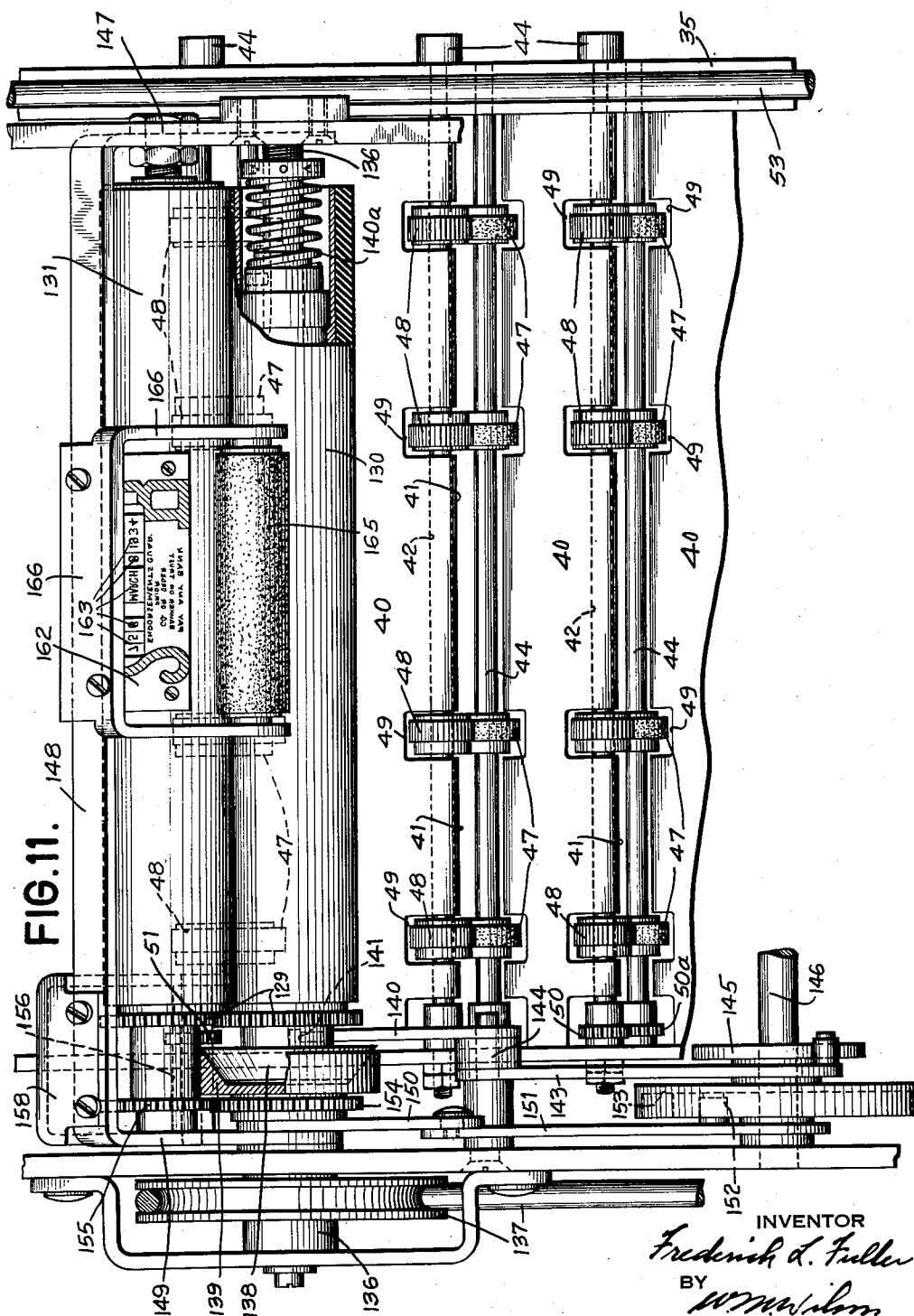
Feb. 5, 1935.

F. L. FULLER

1,989,976

SORTING AND PRINTING MACHINE

Original Filed Oct. 21, 1930 17 Sheets-Sheet 6



INVENTOR

INVENTOR
Frederick A. Fuller

BY

BY *W. W. Wilson*
ATTORNEY

ATTORNEY

Feb. 5, 1935.

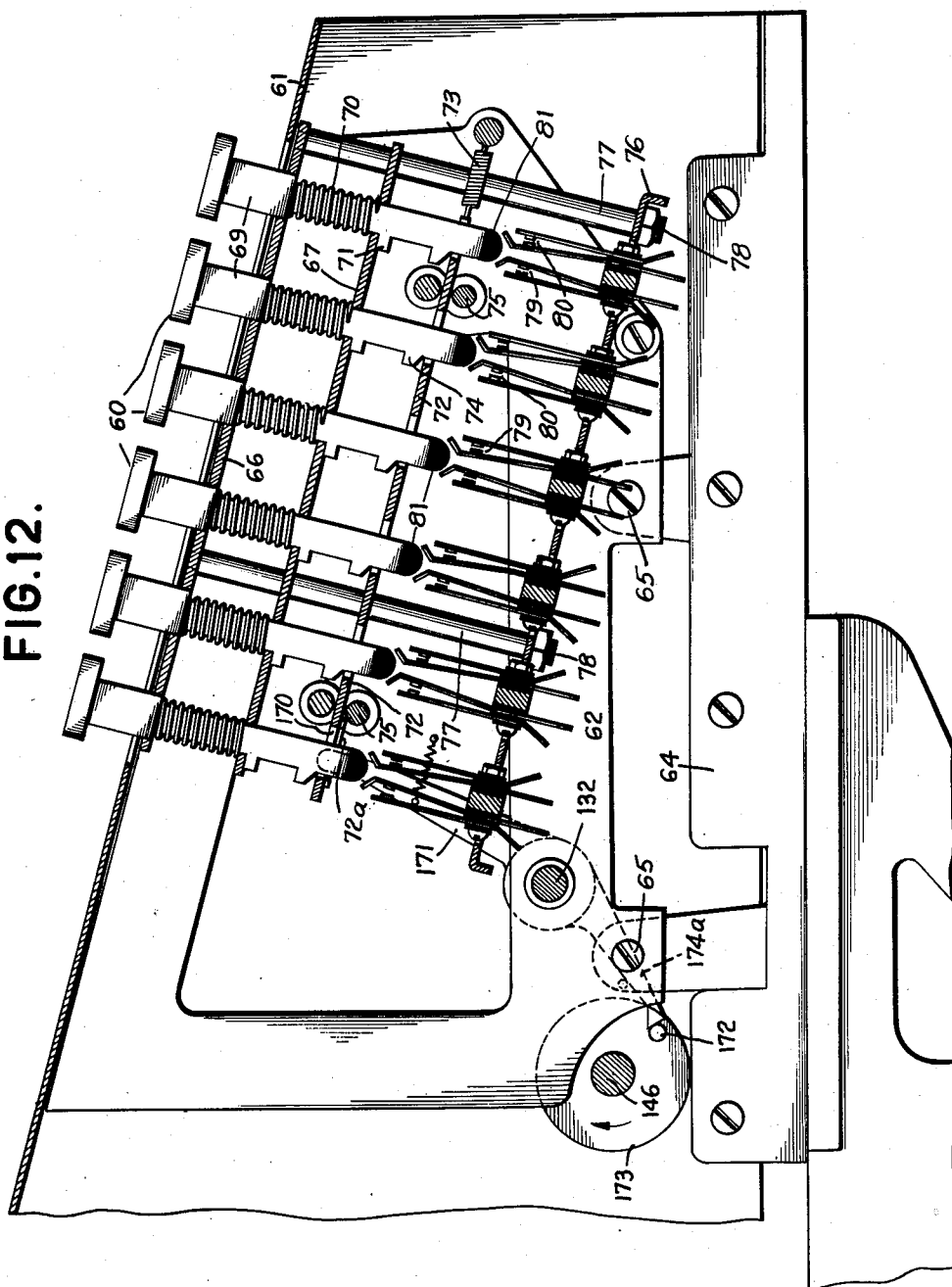
F. L. FULLER

1,989,976

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FIG. 12.



INVENTOR
Frederick L. Fuller
BY *W. M. Williams*
ATTORNEY

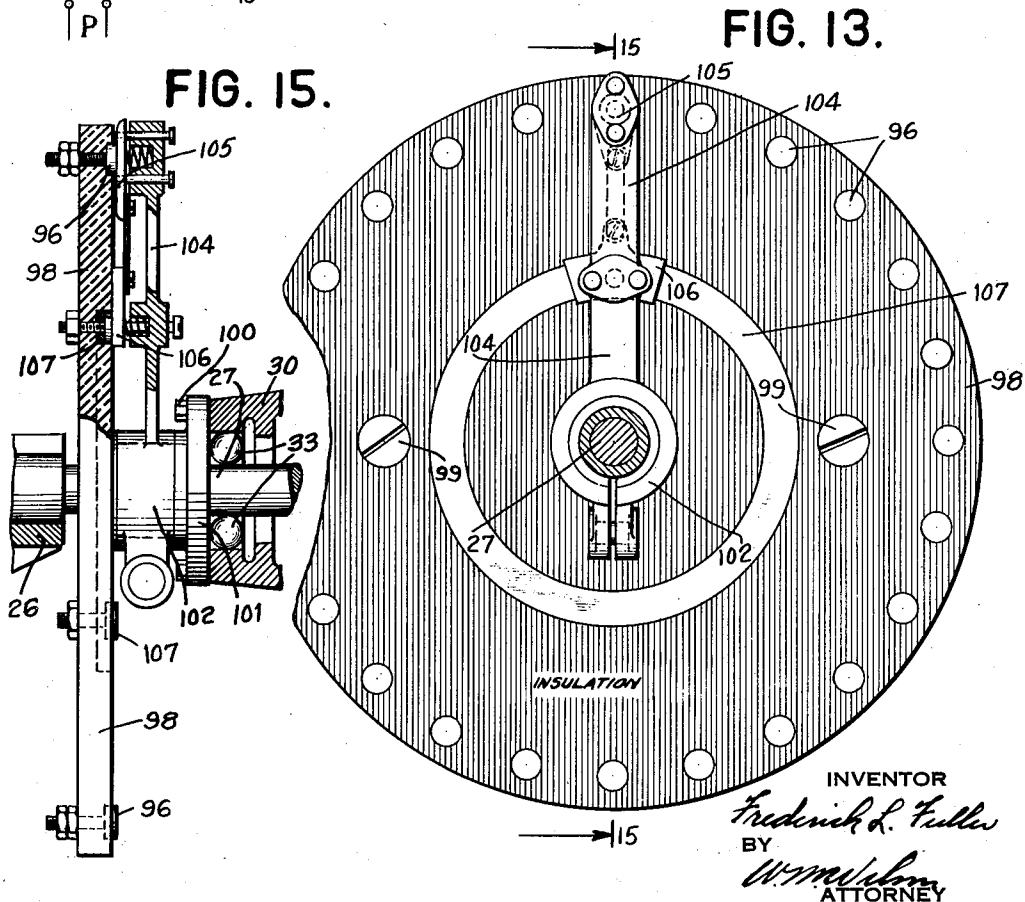
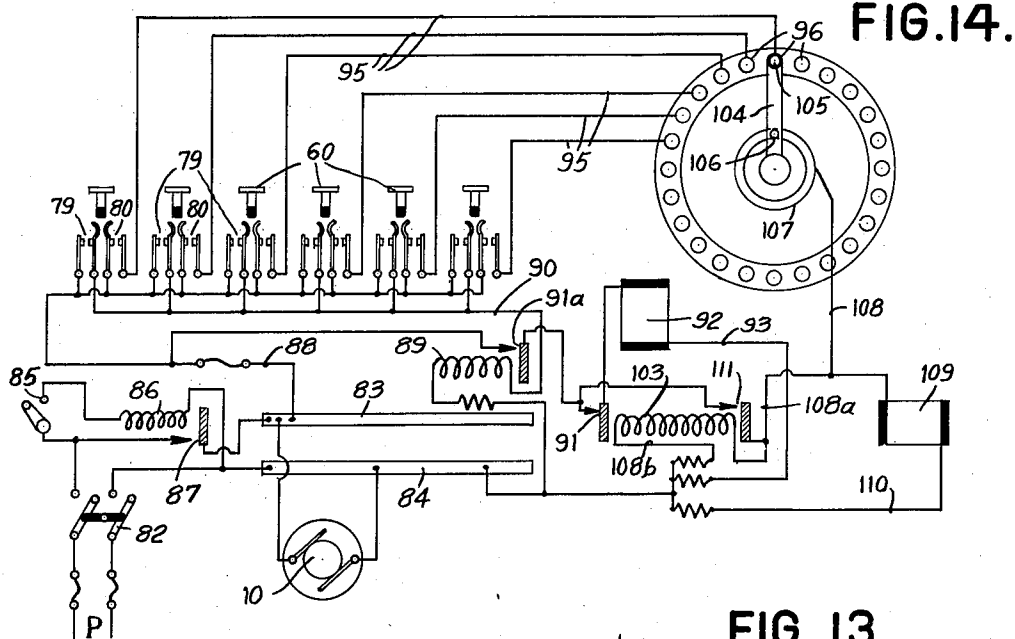
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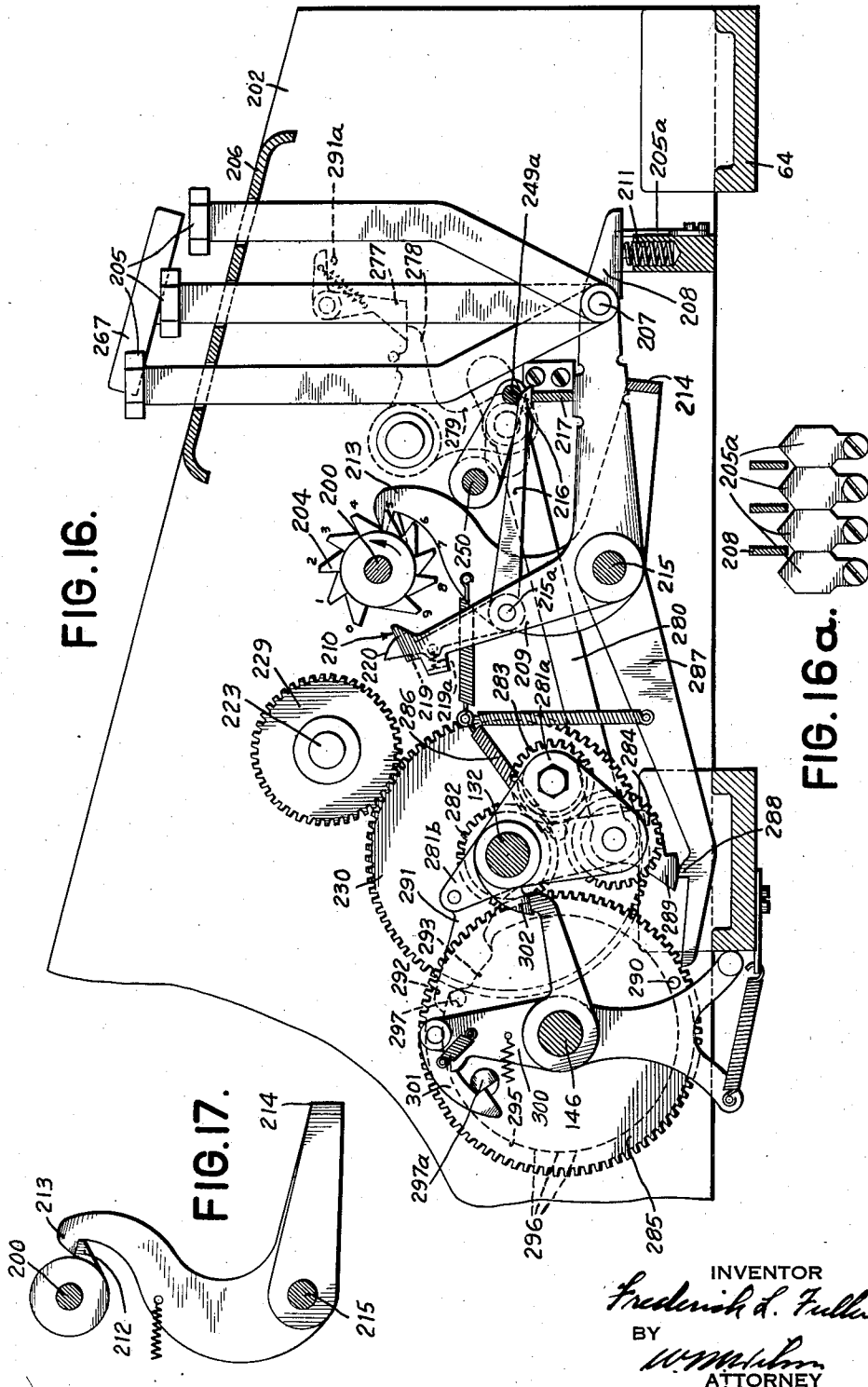
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F. L. FULLER

1,989,976

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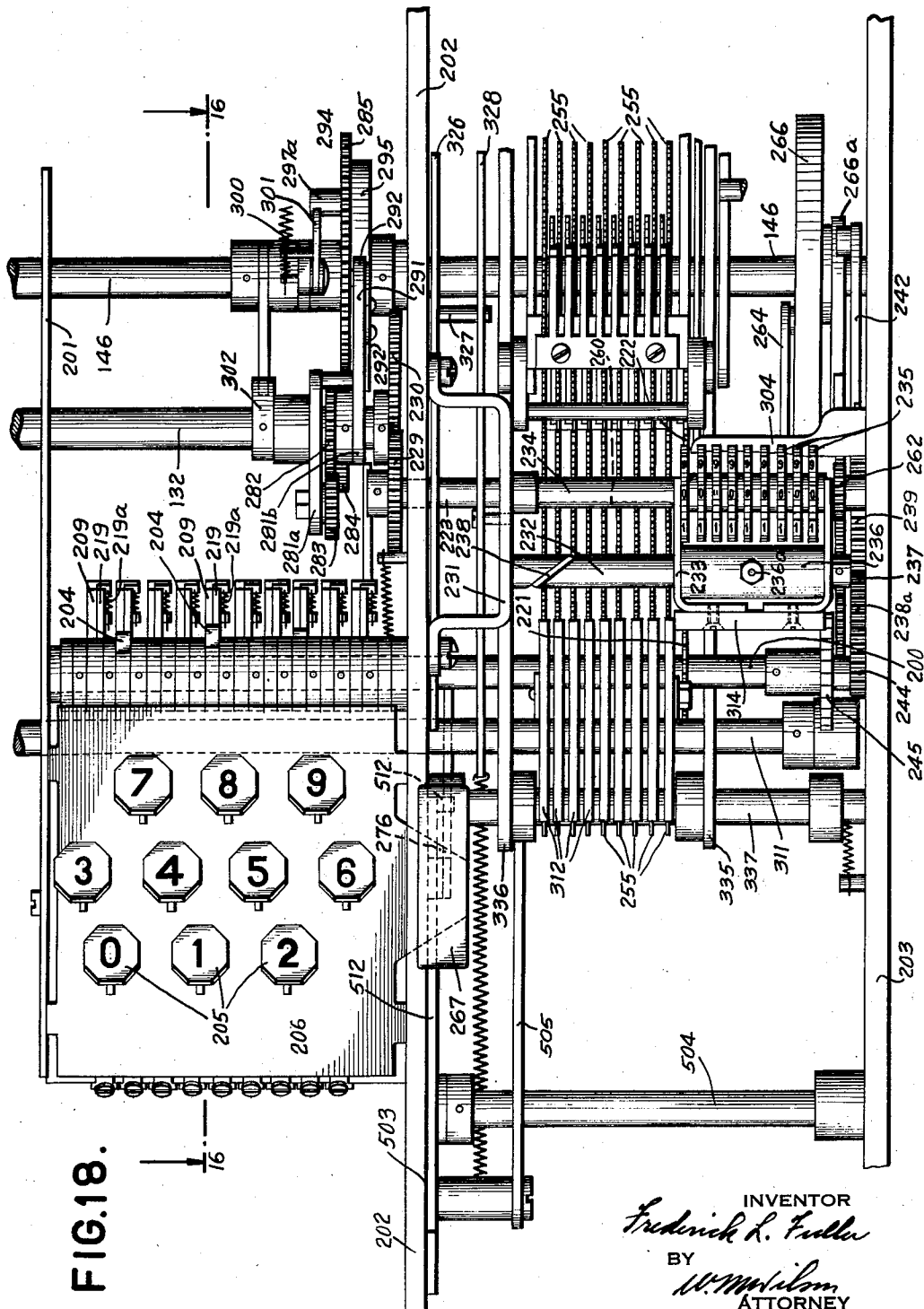


FIG. 18.

INVENTOR
Frederick L. Fuller
 BY
W. M. Wilson
 ATTORNEY

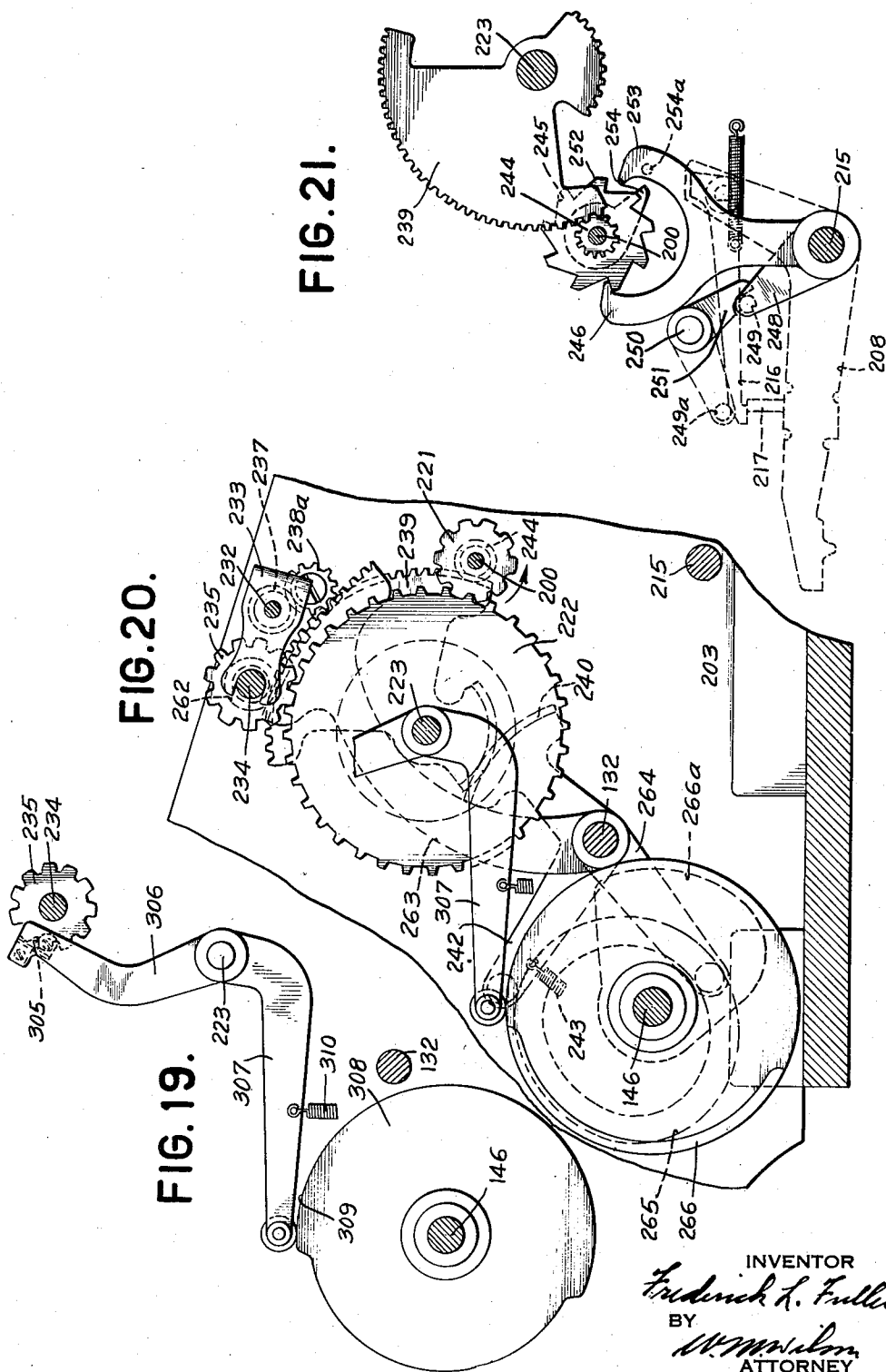
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F. L. FULLER

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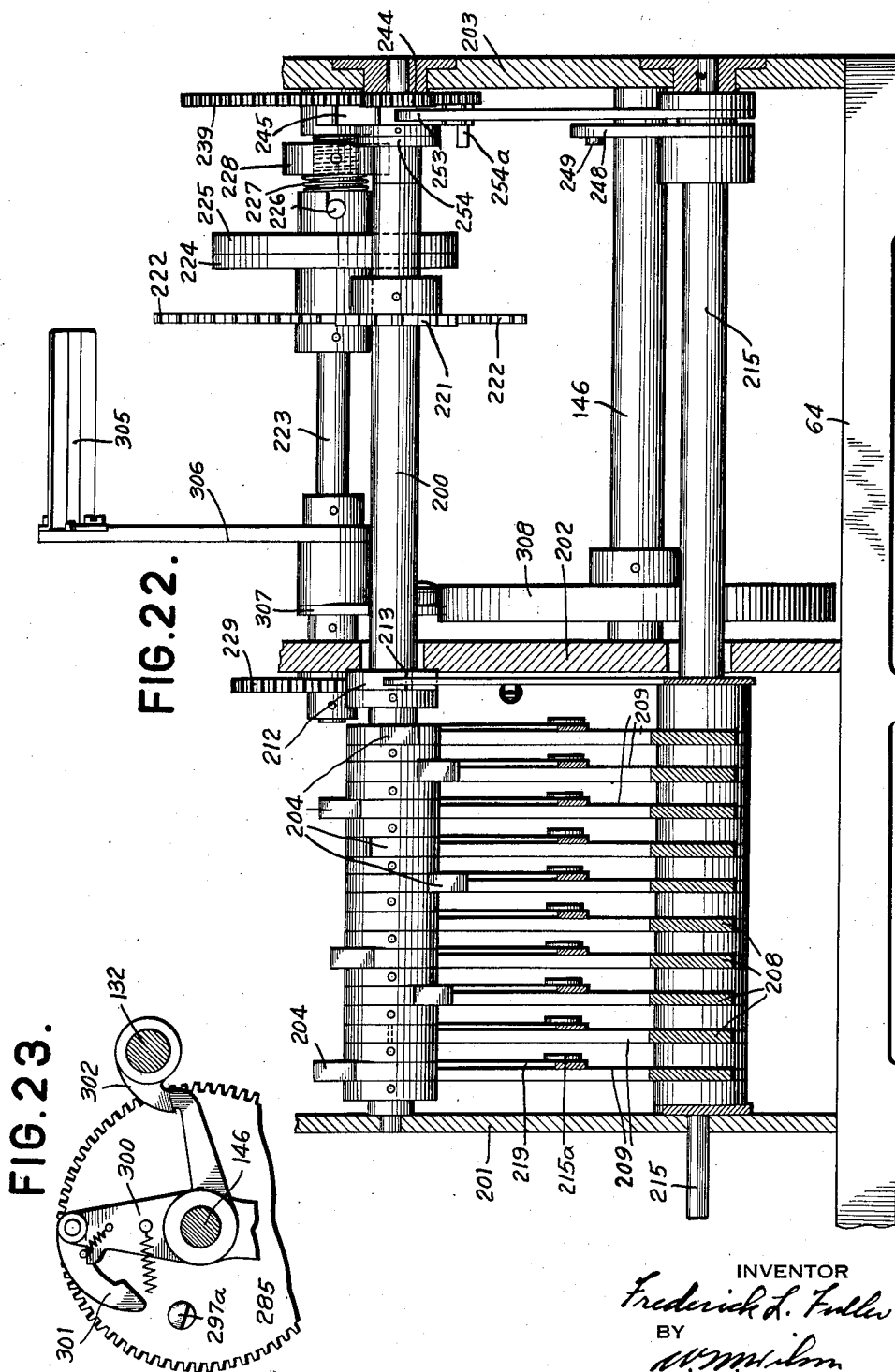
Feb. 5, 1935.

F. L. FULLER

1,989,976

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F. L. FULLER

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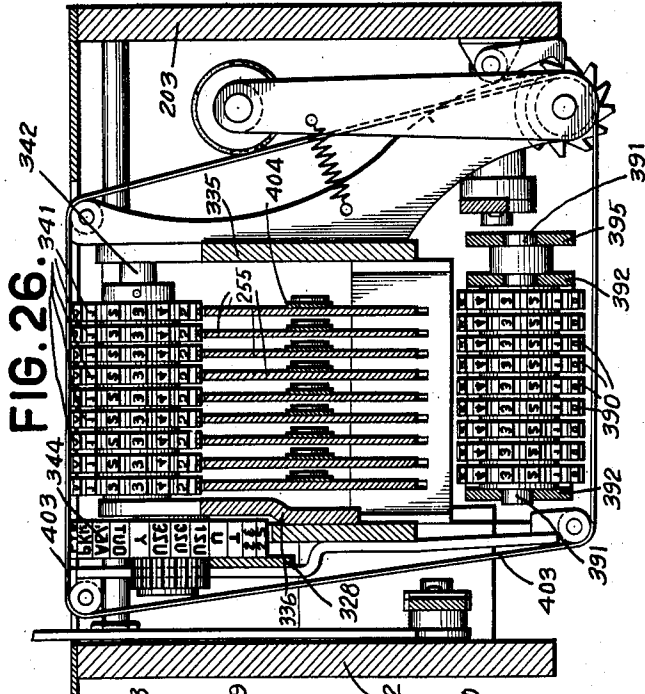


FIG. 25.

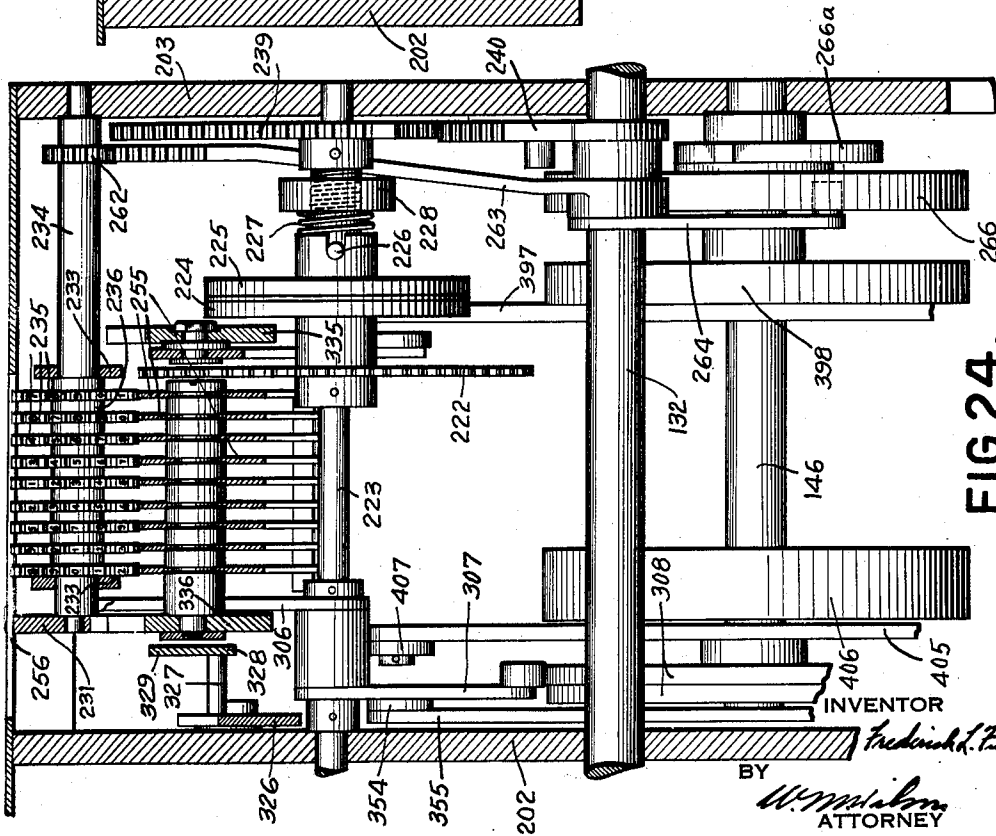
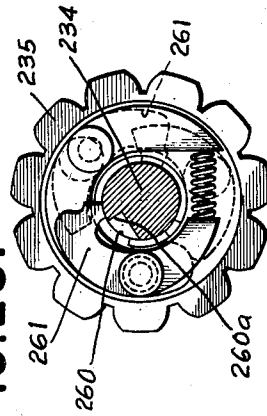


FIG. 24.

INVENTOR
Fredrich L. Fuller
BY
W. M. Williams
ATTORNEY

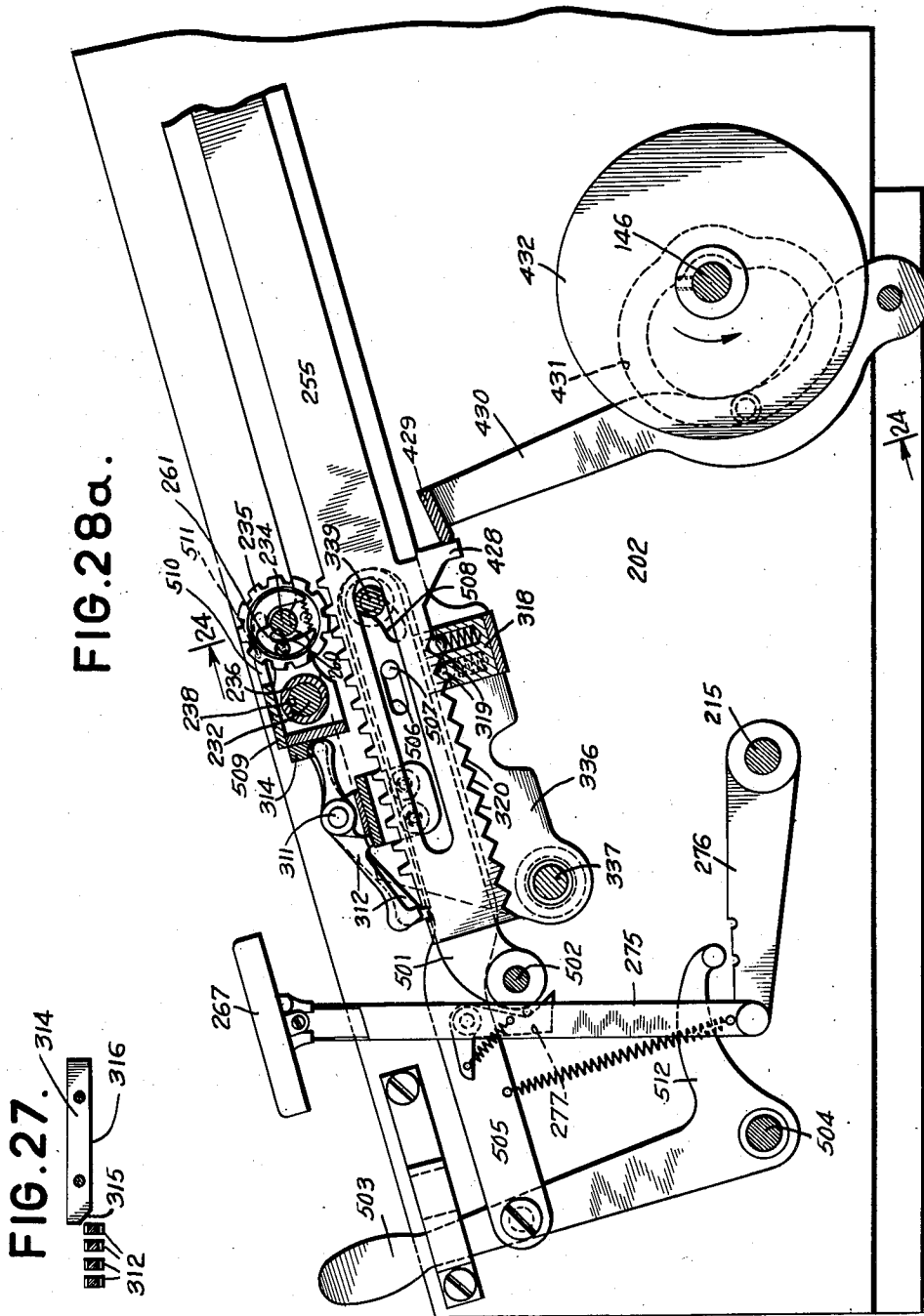
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F. L. FULLER

1,989,976

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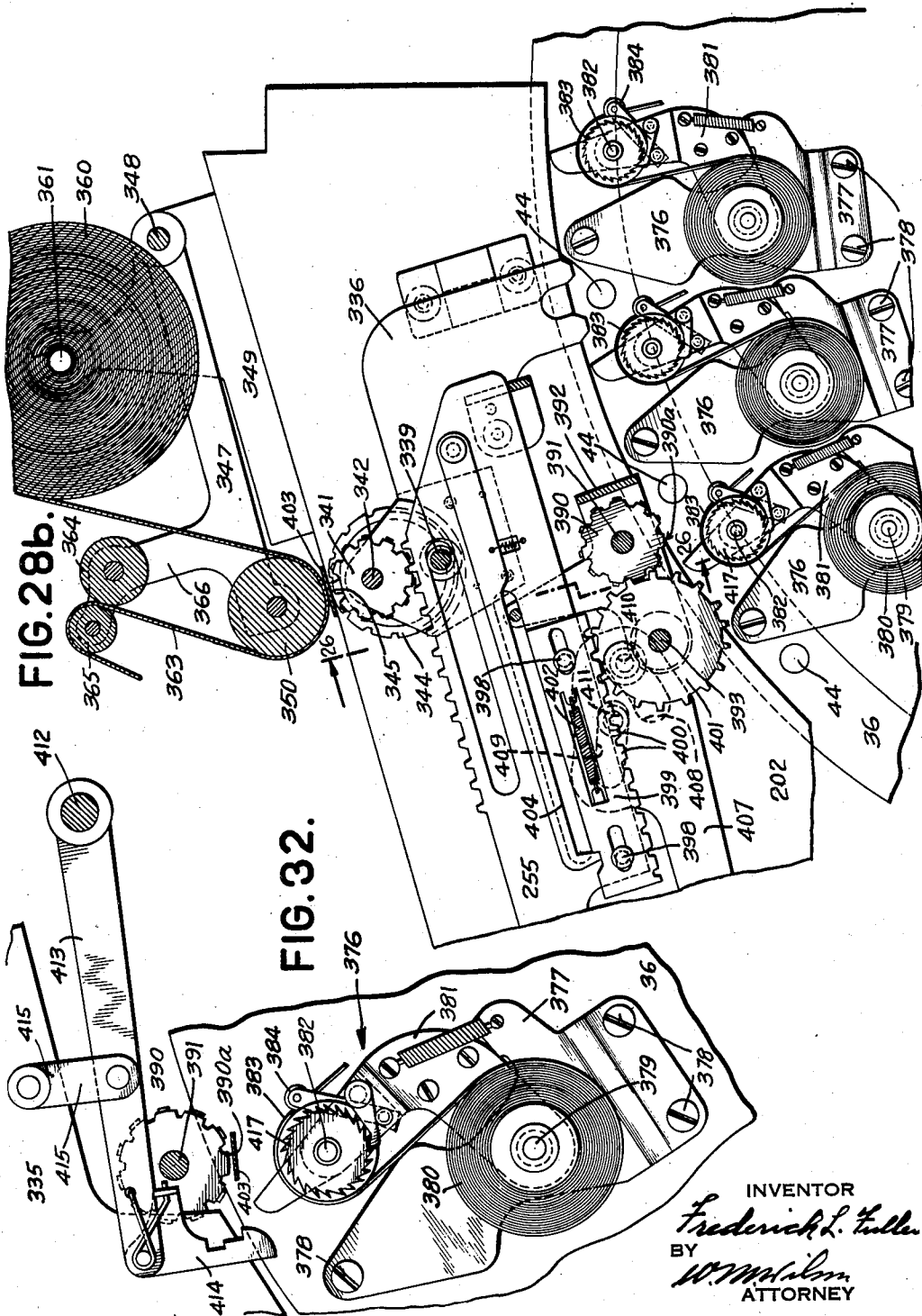
Feb. 5, 1935.

F. L. FULLER

1,989,976

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F. L. FULLER

1,989,976

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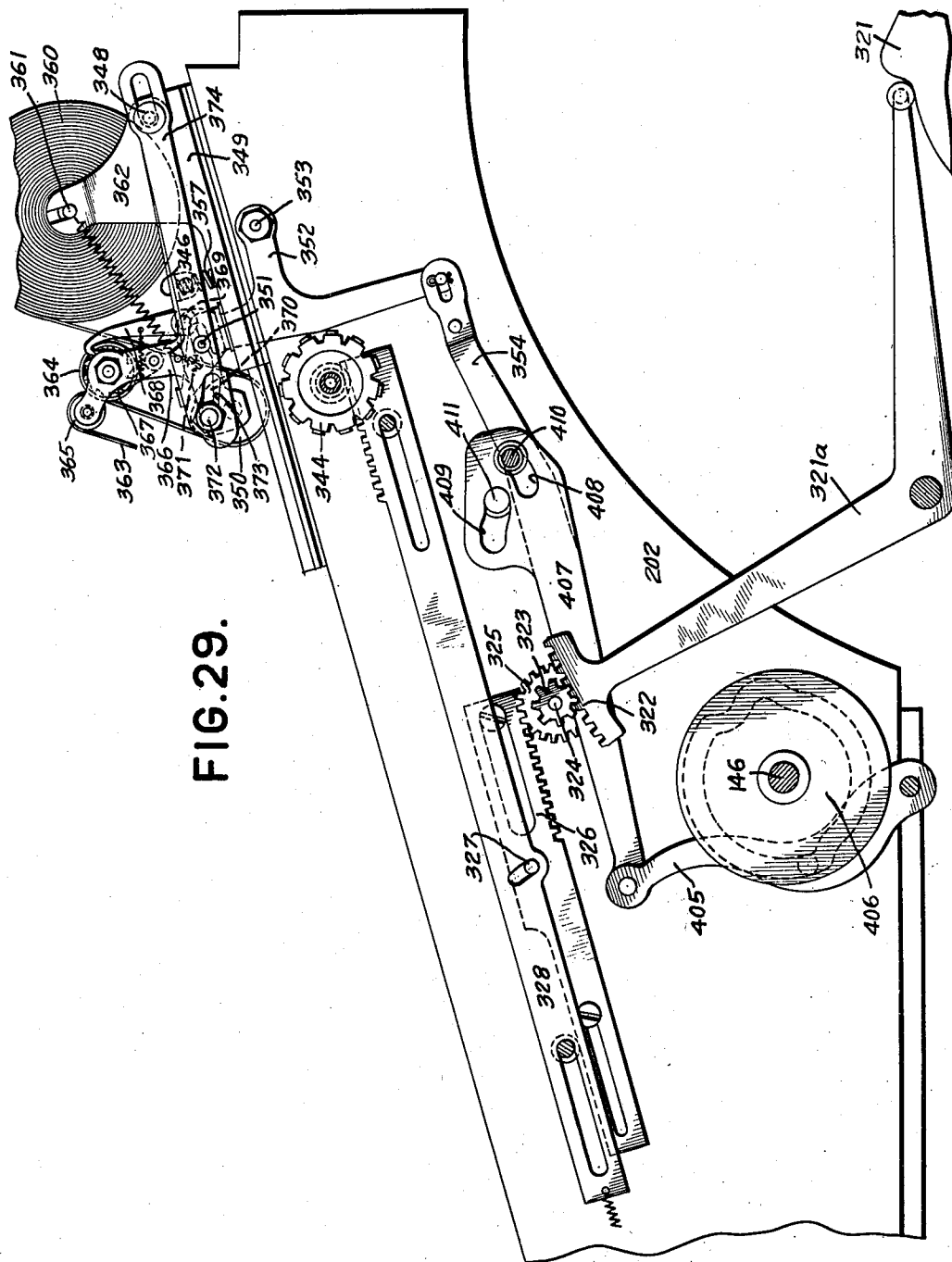


FIG. 29.

INVENTOR
Frederick L. Fuller
BY *W. M. Adams*
ATTORNEY

Feb. 5, 1935.

F. L. FULLER

1,989,976

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FIG. 30.

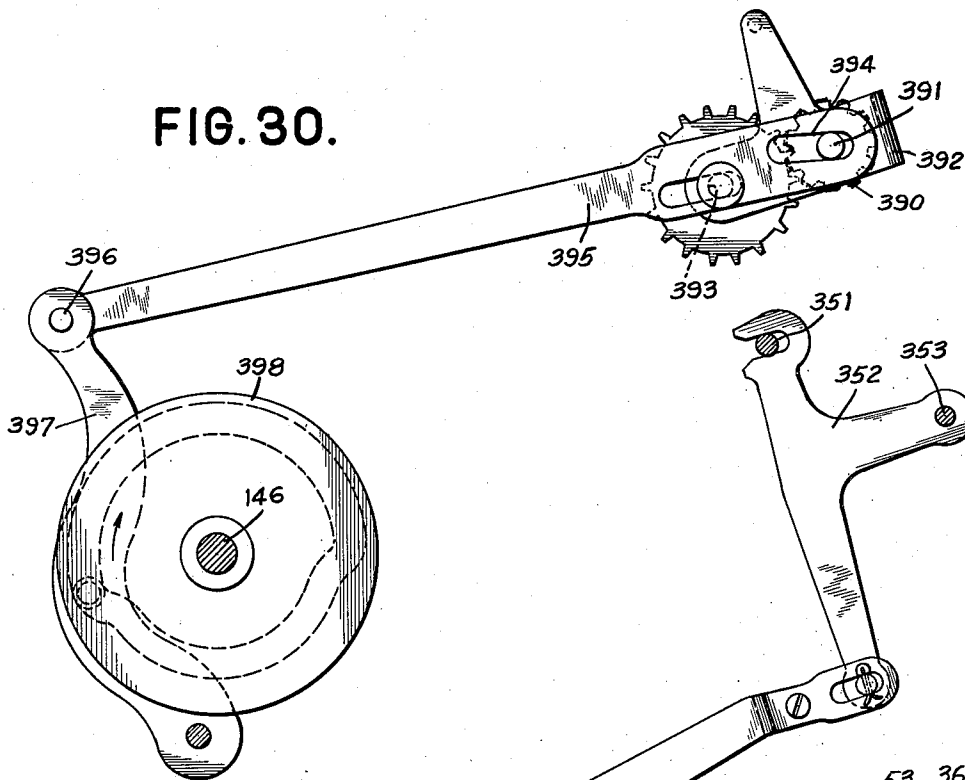


FIG. 31.

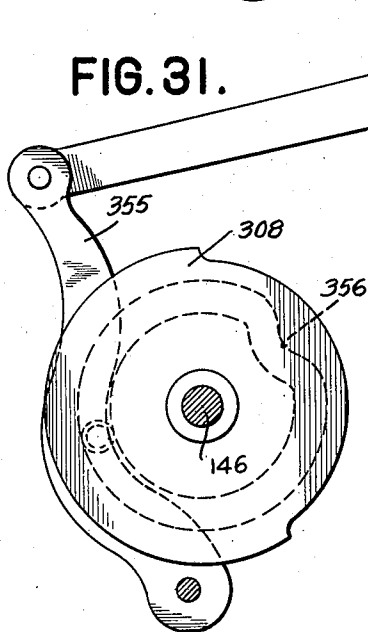
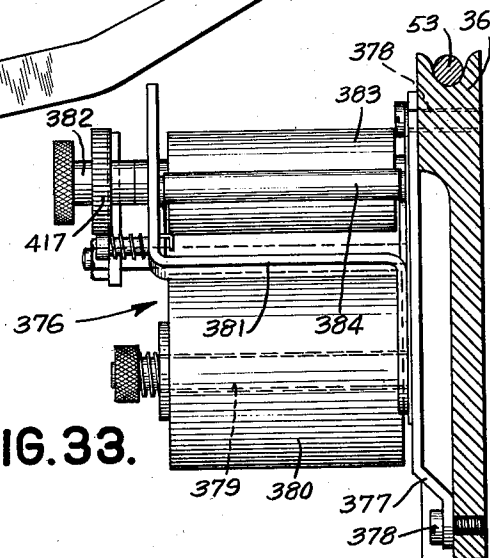


FIG. 33.



INVENTOR

INVENTOR
Frederick L. Fuller

BY

BY *W. M. Wilson*
ATTORNEY

ATTORNEY

UNITED STATES PATENT OFFICE

1,989,976

SORTING AND PRINTING MACHINE

Frederick L. Fuller, West Orange, N. J., assignor
to International Business Machines Corporation,
New York, N. Y., a corporation of New
York

Original application October 21, 1930, Serial No.
490,155. Divided and this application July 12,
1933, Serial No. 680,001

20 Claims. (Cl. 101-2)

This application is a division of the copending application of F. L. Fuller, Serial No. 490,155, filed October 21, 1930.

This invention relates to combined printing and sorting machines, particularly of the type in which provision is made for not only sorting records of different classifications such as checks, for example, but for printing the amounts, also known hereinafter as "items", represented by the checks or sorted papers. An extended feature of the machine provides not only for separately listing the items on the checks to give a list of items of all checks of same classification on a separate strip, but for listing on a supplemental strip the items of the checks arranged in exactly the same sequence the checks are sorted.

The present machine is so arranged that it may be utilized separately as an item printing, a sorting or a check endorsing machine and while in the preferred employment of the machine the combined functions are preferably utilized to gain all the benefits, the invention is not limited to the combination as many of the features are applicable singly to machines of the separate and distinct types.

The machine embodying the various features thus described has been designed particularly for use in banks and by the inclusion of the sorting and printing functions it is able to effect to a great extent a considerable saving in time and labor now required in the accounting and distribution systems of the check departments of banks and clearing houses.

To more clearly perceive one of the outstanding benefits that accrue from the present machine a brief description will be given of the "block" system now in vogue in a majority of banking institutions.

The receiving teller, in accepting deposits, receives a considerable number of checks as well as currency. The deposits received are listed separately by the customer upon a "deposit ticket" which is checked for accuracy. The teller makes out a slip for the currency received. The total of the amounts on such slips subtracted from the totals represented by the series of deposit tickets gives the sum represented by the checks received. A series of such checks constitute a "block".

The checks, in the sequence that they are listed on the series of deposit tickets, are then sorted into general classifications which operation brings the checks out of order with respect to their listings on the "deposit tickets". Each

group of checks of the same classification is then, by a separate operation, listed by an adding machine and a total obtained. A grand total of a series of such "group" totals must "prove" with the grand total of all deposit tickets and if they do not correspond the checks of the same classification are first compared with the listings on the related adding tape. If the entries on the tape are found correct and a discrepancy still obtains a detailed comparison between the amounts listed on the deposit tickets and the amounts listed on the adding machine tapes is required.

While the first comparison is tedious the last comparison is still more laborious and difficult since by the sorting operation the amounts of the checks represented on the adding machine tapes have been brought out of order with the listings on the deposit tickets.

By the employment of the present machine a "block" of checks may be sorted into twenty-four different classifications. As a check is sorted the item or amount represented on the check is also printed upon a record strip associated with the compartment selected. The total of such items or amounts may, in the machine herein illustrated be mentally added, to give a total of the items of checks of the same classification. When such listings are effected upon the individual record strips, there is also listed upon a main record strip the item or amount indicated on each check sorted and these listings are made in exactly the same sequence as the checks are sorted or in the same order that the checks are listed on the deposit tickets. A total of the item listings derived by mental addition, in the present machine must agree with the total of amounts of the checks derived from the deposit tickets and if a discrepancy is observed a comparison between the item listings on the deposit tickets and those on the main record strip is required. An error will readily be noted due to the preservation of the item listings in the original sequence.

The correction may be required on either the deposit ticket, designating an error by the customer and failure to observe by the teller, or on the main record strip which indicates an error made by the machine operator alone in entering the item or amount.

The required correction upon the individual classification strip is then made, and as all totals are now in agreement the checks may be forwarded for disposition according to the manner in which they are sorted.

With respect to the machine as to its combined

functions it is the main object of the present invention to devise a machine capable of sorting a promiscuous group of records or checks of different classifications and listing upon a main record strip in precisely the same sequence as the checks are sorted the items represented upon the checks.

It is a further object to include an individual record strip for listing thereon as the checks are sorted the items on the checks of the same classification, so that for every compartment receiving a series of checks of the same classification there will be provided a strip which separately lists the item represented by each check.

Considering the main record strip upon which the items are listed in the same sequence as the checks are sorted, it is a further object to enter and print such items as an incident to sorting.

Additional objects, with respect to the combined features, include an endorsing mechanism which effects endorsement in ink upon the rear face of each check as it is fed to the selected sorting compartment; a general arrangement of the machine to provide for sorting and printing operations in a manner which facilitates the operations required so as to effect a saving in both labor and time over the systems previously employed; and a general arrangement of the machine which facilitates the operations of the machine and which is carried out by placing the manually controlled devices within easy access of the operator.

A still further object of the invention, with respect to check feeding operations, is to provide a set of main feeding rollers which are adapted to feed a check inserted therebetween to the rollers which are related to the record receiving compartment.

A still further object of the invention consists in the provision of means whereby one of the main feeding rollers carries an electro-type for endorsing upon the rear face of the check as well as a series of printing wheels variably adjusted for printing dates and other variable data upon the check.

A still further object of the machine consists in the provision of a manual control over the driving of the check endorsing and compartment feeding rollers which permits the desired driving movement of such rollers to effect the endorsing and check feeding operations.

Considering the portion of the machine employed for the purpose of printing the items represented on the checks sorted and other functions, it is the main object of the invention to provide means to effect the listings of the items represented upon checks entered in a compartment upon a related record strip. To carry out this object the drum having the check receiving compartments is provided with a series of record strip printing mechanisms, there being a record strip for each compartment. When a compartment is brought to position for receiving a check by depression of the related key there will be brought to printing position a related record strip.

It is a still further object of the invention to provide in the machine item indicating wheels controlled by 10 keys which inform the operator the item to be later set up in the item printing devices. Since the items are set up on indicating wheels prior to the setting up of the item printing devices the operator is able to check for errors the items to be printed.

In connection with the item printing devices of the machine there has also been included two sets of item printing wheels, one set adapted to print upon the selected individual record strip and the other set upon the "main record strip".

In connection with the item printing devices of the machine previously mentioned, it is a further object of the invention to provide for printing of the items both upon the selected record strip and upon the main record strip. As to the latter, this function is obtained by rocking a platen to force the main record strip against one of the sets of differentially adjusted item printing wheels. For printing upon the selected record strip carried by the sorting drum the second set of item printing wheels is carried by a rockable frame which when depressed, forces the second set of item printing wheels against the selected record strip.

In order to inform the operator which compartment has received the record sorted this special character printing wheel is provided to print with the items upon the main record strip the classification of the check bearing that item.

It is a further object of the invention whereby if the item printing wheels are incorrectly set up due to the depression of one or more of the keys in error, the incorrectly represented item will not be printed upon either the main record strip or the selected individual record strip.

For the attainment of the object, one form of mechanism described permits the shifting of the item printing wheel setting racks as a group out of operative engagement with the item indicating wheels so that these wheels may be subsequently zeroized without affecting the movement of the racks and the position of the two sets of item printing wheels.

A still further object of the invention is the provision of means whereby operation of the error key directly sets the machine into operation, eliminating the necessity of the depression of the motor bar.

Other objects subordinate to those just enumerated will appear as the necessity of their accomplishment is developed during the course of the succeeding description of the preferred illustrative embodiment of the invention shown in the accompanying drawings.

In said drawings:

Fig. 1 is a view in side elevation of the right side of the assembled machine, portions of the casing having been removed to more clearly illustrate the individual printers, the rotatable drum and the associated stop devices;

Fig. 2 is a perspective view of the upper part of the assembled machine looking at the left side thereof. This view illustrates the keyboard arrangement comprising the sorting compartment selecting devices and the item entering controlling keys and also shows the arrangement of the sorting compartments for receiving the checks deposited therein;

Fig. 3 is a perspective view of a portion of the sorting drum showing how the periphery of the drum is closed at all times during the rotation of the drum and the manner in which checks may be inserted by the feeding rollers into the related and selected compartment;

Fig. 4 is a view in side elevation of the left side of the machine showing particularly the upper portion thereof;

Fig. 5 is a central sectional view of a part of the sorting drum showing the manner in which two like sections of the drum are assembled to

form a supporting means for the sorting compartments;

Fig. 6 (sheet 1) is an enlarged view of the end of the drum stopping arm;

Fig. 7 (sheet 1) is a plan view of the parts shown in Fig. 6;

Fig. 8 is a plan view of the base of the machine showing in detail the main driving motor, the speed reduction mechanism and the associated clutch and control devices for the sorting drum;

Fig. 9 is an enlarged sectional view taken on the line 9—9 of Fig. 8;

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 5;

Fig. 11 is a plan view of a part of the sorting drum showing particularly the main check feeding rollers and two sets of the individual compartment check feeding rollers;

Fig. 12 is a longitudinal sectional view of the keyboard section comprising the compartment selecting devices;

Fig. 13 is a front view in elevation of the commutator and associated brush contacting devices for electrically controlling the selection of the compartments of the sorting drum;

Fig. 14 is a diagram showing the wiring connections for the electrical instrumentalities of the machine;

Fig. 15 is a sectional view taken on the line 15—15 of Fig. 13;

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 18. This view illustrates in detail some of the ten keys controlling the setting of the printing mechanism with their related differential controlling devices. Also in this figure is shown the preferred form of motor clutch and control;

Fig. 16a is a detail view illustrating the single key locking mechanism for the item printing controlling keys;

Fig. 17 is a detail view in side elevation showing how the differentially positioned controlling shaft is normally locked against operation;

Fig. 18 is a plan view of the forward end of the mechanism for controlling the set up of the item printing devices showing particularly the arrangement of the ten item entering controlling keys, the item wheel carriage and item wheels controlled by the said keys and their relation with the racks which control the setting up of the item printing devices;

Fig. 19 is a detail view illustrating the locking bar for locking the item representing wheels and the means whereby the locking bar is shifted to unlocking position when said wheels are restored to control the subsequent positioning of the item printing devices;

Fig. 20 is a detail view showing the relation of the master wheel and the item representing wheels and the mechanism provided for causing the step by step shifting of the item wheel carriage;

Fig. 21 is a view in side elevation of the escapement devices provided for the item wheel carriage and the manner in which the item entering controlling keys control the operation of the escapement devices;

Fig. 22 is a longitudinal sectional view showing particularly the association of the shaft which controls the differential stop devices with the item entering controlling keys. At the right portion of this figure is shown the frictional devices for causing the operation of the master wheel;

Fig. 23 is a detail view showing the preferred construction whereby the main operating shaft is normalized at the termination of the machine cycle;

Fig. 24 is a cross sectional view taken on the line 24—24 of Fig. 28a;

Fig. 25 is a detail view illustrating one of the item representing wheels and its relation to its associated resetting devices;

Fig. 26 is a sectional view taken on the line 26—26 of Fig. 28b and shows particularly the two sets of item printing devices and the associated inking ribbon;

Fig. 27 is a detail of the locking devices for the racks which set up the item printing devices;

Figs. 28a and 28b taken together, with Fig. 28a on the left, show a longitudinal sectional view taken through the item wheel setting mechanism showing among other things one of the setting racks, its relation to the related item representing wheel and to two printing wheels of the two sets of item printing devices;

Fig. 29 is a longitudinal sectional view of the machine, the rack carrying frame having been removed to show more clearly the manner in which the special character printing wheel is differentially positioned under control of the sorting drum to designate the position of the latter. This view also shows the related printer and the manner in which the platen thereof is operated to effect the impression on the main record strip as well as the preferred construction for effecting paper spacing operations;

Figs. 30 and 31 are detail views in side elevation of two of the several operating cams and their connections for performing certain functions;

Fig. 32 is a view in side elevation illustrating one of the individual record strip printers upon which is printed the items related to the check which is forwarded to the associated compartment of the sorting drum;

Fig. 33 is a front view of the individual printer shown in Fig. 32.

Prime mover (Figs. 1, 8 and 9)

The power to drive the various mechanisms of the machine is derived from a motor 10 (Fig. 1) running constantly when the machine is in operation. From Fig. 8, it will be observed that the motor 10 drives a shaft 11, and through a reduction gear mechanism 12, a shaft 13 is also driven. By the provision of a spline 14 (Fig. 9) the shiftable clutch element 15 of a clutch mechanism has a constant driving engagement with the shaft 13. A companion clutch element 16 is loosely mounted on a sleeve 17 surrounding the shaft 13.

A driving engagement between clutch elements 15 and 16 is effected by the shifting of the vertical arm of a bell crank 18 pivoted at 19 to a bracket 20 secured to a base plate 21. The companion clutch elements 15—16 are normally separated by means of a spring 22 acting on bell crank 18.

Base plate 21 is secured to a pair of parallel cross members 23 (Fig. 8) which base provides the mounting at the lower part of the machine for the motor 10, reduction gear 12 mechanism, and by bracket 20 a support for one of the ends of the shaft 13, the shaft at this end being suitably mounted in a ball bearing assembly 24 (Fig. 9).

Sorting drum (Figs. 1, 2, 3, 4, 5, 10 and 11)

Referring particularly to Figs. 1 and 5, it will be observed that secured to vertical supporting or frame members 25 are bearing brackets 26 in which is journaled a rod 27. This rod is the sup-

port of horizontal axis about which the assembled sorting drum rotates. The particular manner in which the drum is constructed to form sorting compartments is preferably as follows:

5 The drum is composed of a pair of symmetrical castings (Fig. 5), preferably of aluminum or other material of a low specific gravity, and each casting comprises an annular plate 28, the outer concentric edge having an integral ring portion 29 substantially parallel to the rod 27 and extending completely around. The inner concentric edge of the plate 28 is provided with an integral conically shaped bearing portion 30. Radial ribs 31 (see also Fig. 1) extend between the portions 29 and 30 to give rigidity to the casting. Two such sections are joined together by fastening means such as bolts 32. The smaller end of each bearing portion 30 is supported by ball-bearing assemblies 33 surrounding rod 27 to lessen friction by the rotation of the drum.

As shown more clearly in Figs. 1 and 5 the right casting (Fig. 5) differs from the left only in the provision of an integral annular plate 35 providing at one end a closure for the series of sorting compartments 36 and to which plate is secured the plurality of record strips to be referred to and described in detail hereinafter. Upon the outer rings 29 are secured a plurality of adjacently mounted bent plates, preferably of aluminum to reduce the weight, each comprising (as shown in Fig. 10) a concentric base portion 37 and preferably each pair is in overlapping relationship so that each pair is fastened to the rings 29 by common screws 38. This overlapping arrangement makes the portions 37 the bottoms of the compartments and provides a smooth bottom as contrasted to one which would be afforded by the unfinished joined rings 29.

Portions 37 have integral plates 39 upwardly extending in a radial direction for forming the radial side walls of the compartments and they extend the width of the drum. Plates 39 are also formed over concentrically with respect to the center of the drum as indicated at 40 while the irregularly bent portion between 39 and 40 comprises a semi-circular portion 41 to receive a shaft 42. The end of each plate 40 is also curved in front of a related shaft 44. Pairs of such shafts 42-44 form the journalling means for the related set of feeding rollers and such shafts are journaled at one of their ends in the end wall plate 35 (Fig. 1) and at their opposite ends in an annular ring 45 (Figs. 3, 4 and 5). The plates 40, at their left ends, have tabs 46 (Fig. 3) which are secured to the ring 45 thus holding the latter in place.

As is best shown in Figs. 3 and 11 the shaft 42 has loosely mounted thereon a plurality of feeding rollers 48, preferably of brass and with smooth peripheries. The shaft 44 has secured thereto a plurality of feeding rollers 47, preferably of rubber, and in immediate frictional feeding engagement with associated rollers 48. The radial portions 39 (as well as portions 41) are suitably cut away at 49 (Fig. 11) to receive the plurality of sets of rollers. By the structural arrangement described the bottom (when the compartments are below) is suitably closed by the concentric plates 40 and the coating sets of rollers 47-48 to prevent dropping out of the checks while entrance of a check to the compartment (when it is above) may be effected by insertion of a check between the related pair of rollers 47-48 and then rotating them. To this end on shaft 42 there is loosely mounted a pinion 50 geared to a

pinion 50a secured to shaft 44, the pinion 50 having a driving engagement with a pinion 51 (Fig. 10) at the proper time so as to drive the feeding rollers of the compartment selected to receive and feed a check or paper thereto. The particular means whereby this is effected will be described more in detail hereinafter.

To prevent checks from falling out by shifting edgewise, guide rails 56 (Fig. 4) are secured to the framework while the diagonally shaped notches 57 (Fig. 3) in the plates 39 permit the checks to be easily withdrawn from the uppermost compartments not guarded by rails 56.

To rotate the drum through the clutch mechanism 15-16 (Fig. 9) there is rotatable with the clutch element 16 a grooved driving wheel 52 (Figs. 8 and 9) receiving an endless belt 53 passing around the edge of plate 35 (see Figs. 1 and 3) which is suitably grooved to receive the belt. The belt is kept tensioned by a pulley 54 carried by spring urged arm 55 (Fig. 1).

Compartment selection by keys (Figs. 2 and 12)

The drum, of course, is rotated differentially whenever a compartment not in a record receiving position is to be selected to receive a check and such rotation is under the control of a series of compartment selecting keys 60 (Fig. 2) there being one for each compartment and preferably grouped in banks. In the instant case 24 compartments are provided, and correspondingly, there are four banks of six keys each, which in aggregate, provide a keyboard of 24 keys projecting through an aperture of an inclined plate 61 (Fig. 12) for access by the operator of the machine. The key caps carry suitable indicia to designate the compartment that may be selected and are lettered according to the classification numbers, letters, etc. of the checks, records, vouchers, etc. to be sorted.

The keyboard comprises a separate unit detachable from the machine for assembly and inspection purposes and comprises a pair of side plates 62 (one of which is shown in Fig. 12) and each plate 62 is secured to a base plate 64 by screws 65 said screws passing into integral brackets extending upwardly from the base plate to thus hold the unit firmly in place.

Secured to and between the plates 62 is a pair of plates comprising an upper guide plate 66 and a lower guide plate 67. Both of these are provided with a series of guide slots in which the upper and intermediate portions of the keys are received, as shown in Fig. 12. The enlarged head 69 of each key 60 bears against a related compression spring 70 fitting around the reduced stem of the key, the lower portion of the spring bearing against the lowermost guide plate 67. In this manner each spring is capable of restoring its related key 60 to its normal position, the latter being maintained by virtue of a lug 71 engaging beneath the plate 67.

Each key is also received by a slot in a detent plate 72 the latter being urged to its normal position by means of a spring 73 and detent plate 72 may be shifted towards the left by means of an inclined cam lug 74 on the lower end of each key 60. When a key is depressed the coaction of the inclined cam lug 74 with the slot in the detent plate 72 will shift the detent plate against the action of the spring 73, said detent plate being shiftably guided by pairs of guiding rollers 75 provided for the purpose of reducing frictional resistance. When the cam lug 74 during the depression of the key 60 has passed beneath the

detent plate 72 the latter will be urged by the spring 73 to its normal position so that upon a restoration of the key the lug 74 will coact with the underside of the detent plate 72 to hold the key in depressed position. As will be described more in detail hereinafter means are also provided for operating the detent plate 72 to automatically release the depressed key at the end of the machine operation.

It is also pointed out that the detent plate 72 is common to the several banks of keys 60 so that depression of a key in one bank will shift the detent plate sufficiently to release a key depressed in either the same or another bank which feature is well known and is common in keyboard arrangements.

Located beneath the lower ends of the keys is a contact unit carried by a plate 76 spaced apart from the intermediate plate 67 by sleeves 77 in which passes the related fastening means 78. The plate 76 carries several banks of contact units each of which comprises two sets of contacts 79 and 80. The intermediate blades of the sets of contacts are adapted to be engaged by insulated portions 81 secured to the lowermost end of the keys so that, upon a full depression of a compartment selecting key, related contacts 79 and contacts 80 will be closed and remain closed by virtue of the previously mentioned locking of the key in depressed position.

Electrical controls (Figs. 2, 4, 5, 9, 13-14, 15)

The purpose of these contacts will be more apparent from the wiring diagram illustrated in Fig. 14. The diagram, incidentally, shows the electrical connections to motor 10 and the electrical connections to other electrical instrumentalities. In the wiring diagram reference character P indicates a power line adapted to be extended by means of a switch 82 to the bus bars 83 and 84. When said switch is shifted to the left, the lowermost bar 84 will be connected to the corresponding line side. When, however, a switch 85, positioned upon the keyboard for manipulation by the operator is shifted (see Fig. 2 also) the magnet 86 of a relay will be energized resulting in closing contacts 87 to thus connect the bus bar 83 to the corresponding side of the power line. This will set the motor 10 in operation as motor 10 is connected across bus bars 83 and 84 until either switch 82 or 85 is opened.

Contacts 79, when closed by depression of the related key 60 will result in the energization of a clutch control magnet 92 which controls the clutch mechanism 15-16 (Fig. 9) to effect a rotation of the drum. As will be observed in Fig. 14 one blade of contacts 79 is connected to the bus bar 83 by means of a wire 88. The other blade of the set in question is in series with the relay magnet 89 by means of a wire connection 90, the other side of relay magnet 89 being connected to the bus bar 84. From the above, it will be apparent that the depression of any one of the keys 60 in the several banks will cause energization of the relay magnet 89 to attract an armature thereby closing contacts 91a which extend a circuit from the wire 88 through the closed contacts 91a and then through the normally closed contacts 91 of a supplemental relay to one side of the clutch control magnet 92. The other side of the clutch control magnet 92 is connected by a wire 93 to the bus bar 84. Thus, depression of any key 60 causes clutch control magnet 92 to be energized.

Referring particularly to Fig. 9, it will be observed that when the magnet 92 is energized an armature 94 is attracted resulting by the connection illustrated in rocking the bell crank 18 in a counterclockwise direction thereby effecting a clutch connection between the companion clutch elements 15 and 16. This causes rotation of the drive wheel 52 and by the endless belt 53 previously described effects a rotation of the drum.

In addition to starting the rotation of the drum, the keys control the differential rotation of the drum in order that when the selected compartment is at the proper position in which the check can be fed the drum will be stopped in its rotation and locked in the adjusted position. The control means whereby this is effected comprises the supplementary set of contacts 80 and, considering an individual set, it will be noted that one side thereof is connected to the bus bar 83, and the other blade of the same set is connected by means of a wire 95 to a contact point 96. Considering a full complement of keys it will be observed that the one of the contact plates of each of the various sets of contacts 80 is connected to its related contact point 96 so that depression of a key 60 extends the circuit from the bus bar 83 to the corresponding contact point 96.

The series of contact points 96 with a related lever 104 comprise a commutator structure the mechanical details of which are shown in Figs. 13 and 15. The series of contact points 96 are carried by a disk 98 of insulating material fixed by screws 99 to the left bracket 26 (see Fig. 4). By means of screws 100 (Fig. 5) a flanged cylinder 101 is made an extension of the left hand bearing of the drum, and, by means of a split hub clamp 102, the commutator lever 104 (Fig. 13) is secured to the cylinder 101 and thus rotates with the drum.

A contact 105 carried by the upper end of lever 104 passes over contacts 96 to engage therewith electrically, while a spring urged contact 106 carried by the mid-portion of lever 104 is in constant engagement with a ring 107, connected by a wire 108 (Fig. 14) to one side of magnet 109 the other side being connected to the bus bar 84 by a wire 110.

The circuit from wire 108 or lever 104 divides so that also by a wire 108a the magnet 103 of a relay (which controls contacts 91 and 111) is extended to the bus bar 84.

It will be apparent that if a key is depressed the contact 96 operatively related thereto will extend the circuit from bus bar 83 to this point and since the drum is now placed in rotation lever 104 will move correspondingly until it engages the contact point 96 related to the depressed key. This, will, by the circuit connections just explained, cause magnet 109 to be energized. The latter has control, as will be explained, over the devices which effect stopping of the drum in its rotation. It will be noted that energization of magnet 103 will cause opening of contacts 91 to deenergize magnet 92. The deenergization of the latter will permit the clutch elements 15-16 to be separated thereby rendering ineffective the motor drive for the drum.

Drum stopping devices (Figs. 1, 6 and 7)

In general, this comprises an arm which is normally in ineffective position but is rendered effective whenever the magnet 109 is energized by being shifted to engage a portion of the drum to stop its rotation.

As best shown in Fig. 1 pivoted to the frame-

work structure 111a is a depending arm 112 to which is pivoted at 114 a lock arm 113, the arm 112 having an extension 115 to which is secured a spring 116. Contact between an extension 117 of lock arm 113 and a fixed projection 118 determines the normal position of arm 112 under control of spring 116.

Magnet 109 has a retractable core piece 119 the lower end carrying a pin 120 in engagement with an inclined slot 121 in arm 113.

The left end of arm 113 has secured thereto by rivets 123a (Fig. 6) an extension 122 (Figs. 6 and 7) so that when the extension 122 is projected upwardly it is placed in the path of one of a series of extensions, which in the present instance, comprise the extensions of the shafts 44.

It will be obvious that when magnet 109 is energized at the proper time the pin 120 engaging slot 121 will elevate arm 113 bringing the upward extension 122 in front of some particular shaft 44 thus acting as an obstruction to the drum in its rotation. The contact of shaft 44 with the extension 122 will tend by the momentum of the drum to shift arm 113 toward the left as viewed in Fig. 1 and, as it is now held in its upward position due to the elevation of pin 120 by continued energization of magnet 109, the incline of the slot 121 will cause arm 113 to be elevated still further, so that the extension 122 always retains its position in front of shaft 44 as the latter moves in a concentric path. The speed of rotation of the drum and the tension of spring 116 is so selected that arm 113 is never shifted to the left to its extreme position so that pin 120 never strikes the right end of slot 121. The drum having been thus stopped by the arm 113 and magnet 109 still energized the arm 113 with the drum are retracted by the spring 116 until a position defined by contacts of elements 117—118 is obtained. This position brings one of the record strips into position so as to be printed upon, as well as to bring the compartment in a proper position to receive a check, the drum being held locked in this position until the magnet 109 is later deenergized by the release of the depressed key and which, as will be later explained does not occur until the final operation of the machine prior to which time a check has been deposited in the selected compartment and a record strip has been printed.

To prevent retrograde movement of the drum when the arm 113 has been retracted there is pivoted in a slot in the arm 113 a spring urged check arm 123 (Figs. 6 and 7) having an extension 124 receiving the extension of the shaft 44. The free or left end of the arm 123 is depressed by a shaft 44 when the arm 113 is upward and extension 124 snaps upwardly under the action of a spring 123b when the shaft clears the arm. Since the shaft 44 is now firmly engaged between parts 122 and 124 it will be seen that a positive lock or retainer for the drum in both directions is provided as long as arm 113 is held upwardly.

To reduce the momentum of the drum when stopped in its rotation a compression device 126 of any suitable form may be provided. In the present machine when a shaft 44 engages the extension 122 the arm 113 will be shifted to the left but this is effected against the action of the compression device 126, through an interconnecting bell crank 127. This causes a gradual stopping of the drum in its rotation and eliminates the possibility of injury to the parts by shock if a very sudden stop was effected.

Check feeding devices (Figs. 1, 2, 9, 10 and 11)

In the preferred construction when a compartment has been selected to receive a check the latter is fed to the compartment feeding rollers 47—48 by suitable feeding means which, in the instant case, comprise a pair of feeding rollers 130, 131 (Figs. 10 and 11) between which the check or paper has been previously inserted.

The driving devices for driving the feeding rollers 130—131 receive their power from a shaft 132 (Fig. 1) which extends completely through the upper controlling section of the machine, the right end of the shaft carrying a pulley 133 having a belt connection 134 to a pulley 135 (Fig. 9) secured to the constantly rotating shaft 13.

As shown in Fig. 2 the shaft 132 drives a shaft 136 through a belt and pulley arrangement 137. Loosely mounted upon shaft 136 is the lower feeding roller 130 (Figs. 10 and 11) operatively engaged by intermeshing gears 129 with the upper roller 131 that is, the rollers have a positive driving engagement to feed a check inserted therein when the rollers are oppositely rotated. For driving the feeding roller 130 by the shaft 136 a friction drive comprising a bevelled disk 138 (Fig. 11) secured to the roller 130 and an internally recessed flange member 139 secured to shaft 136 is provided. A coil spring 140a is provided to give the required amount of friction between the elements 138 and 139 to drive the roller 130. While shaft 136 and, therefore, element 139 are constantly rotating, the lower roller is locked against movement by a lock arm 140 (Fig. 10) normally engaging a pin 141 secured to disk 138, this action being maintained by a spring 142. When a check is between rollers 130—131 the arm 140 is as will be explained rocked to bring its upper extremity away from the path of the pin 141 to permit the frictional drive of the pair of feeding rollers 130—131, this being preferably effected by rocking an arm 143 secured to the arm 140 by a sleeve 144 (Fig. 11), the arm 143 having a roller in engagement with the periphery of a profile cam 145 secured to shaft 146. When certain operations particularly in connection with the item printing mechanism have been effected, this shaft is operated so that the initial rotation of the cam 145 in the arrow direction (Fig. 10) will unlock the feeding roller 130 to cause an opposite rotation of rollers 130—131. At the final operation of the machine the arm 140 is restored by spring 142 to again contact with the pin 141 to stop the feeding operation. The above mechanism provides for an invariable operation of the feeding rollers.

The upper feeding roller 131 is journaled by a shaft 154 in a yoke shaped frame comprising a side plate 147 (Fig. 11), an integral cross member 148 and a side plate 149 (Fig. 10) both of said plates being loosely mounted upon the shaft 136. Pinned to the plate 149 is an upwardly extending arm 150 (Figs. 10 and 11) to which is articulated a link 151 bifurcated to receive the shaft 146 but having a roller 152 engaging the race of a box cam 153 secured to shaft 146.

Secured to the clutch element 139 is a gear 154 (Fig. 11) in continuous engagement with a gear 155 secured to a stub shaft 156. This shaft is carried by a ball shaped frame 158 (Fig. 10) secured to the cross member 148 to receive like movements of the latter. Pinned to the shaft 156 which, it will be observed, constantly rotates, is the roller driving pinion 51.

Under the action of cam 153 the frame members 147, 148, 149 and 158 are initially rocked

about shaft 136, roller 131 rolling slightly over roller 130. Movement of frame 158 downwardly causes the pinion 51 to engage one of the pinions 50 to thereby rotate the selected sets of feeding rollers 47 and 48 to receive the check or paper issuing from the rollers 130, 131 which are simultaneously driven thereby transferring the check to the selected compartment. At the termination of such feeding movement the frames are restored and pinion 51 is elevated to give the necessary clearance and permit a subsequent rotation of the drum to select another compartment.

When the drum is suddenly stopped, the checks already in the compartment have a tendency to lie in an inclined manner or are shifted to lie against the left wall (as shown in Fig. 10) and thus the checks already within the compartment permit an unobstructed entrance of a new check to the compartment. This provides for stacking the checks in the sequence they are sorted.

Certain adjuncts may be provided to print upon the back of the check sorted any desired matter, such as an endorsement indicating that the check has been cashed. Such devices, in the present instance, comprise an electrotpe plate 162 secured to the periphery of the roller 131. The electroplate is preferably apertured to receive a series of adjustable printing wheels 163 suitably pivoted in a recess in the roller 131. The latter feature is carried out in essentially the same manner as indicated in the patent to H. Cook, No. 483,511 and provides for printing of dates, etc.

Inking of the printing members may be effected by an inking roller 164 of felt, in constant engagement with the printing members and an inking supply roller 165, also of felt, these inking devices being suitably carried by a yoke frame 166 secured by screws to the cross member 148.

For facilitating the entry of checks for reception by rollers an inclined chute 167 is provided and in which a check is manually inserted. The weight of the checks is usually sufficient to insure that they pass in the "bite" of rollers 130 or 131 but in case they are crumpled, forcible entry may be required and to this end the upper portion of chute 167 is flared at 168 (Fig. 10) to permit entry of the fingers of the operator's hand when depositing a check in said chute.

Key release mechanism (Fig. 12)

At this point there will be described the means for releasing the keys although such occurs after item printing operations to be described have taken place. Detent plate 72 (Fig. 12) and a plate 72a secured beneath have a slot 170 which is received by the upper end of one arm of a bell crank 171. This slot in the normal position of bell crank 171 permits free movement of detent plate 72 by depression of the keys.

The bell crank 171 is rocked by means of a pin 172 on a disk 173 secured to the operating shaft 146 driven during item printing operations. Coaction of pin 172 with the arm 174a to rock bell crank 171 shifts the detent plate 72 to the left. This movement releases the detent plate from the depressed key which is restored to its normal position by its spring 70.

In connection with the release of the keys it was previously pointed out that the circuit through magnet 109 (Fig. 14) is closed by the contact of brush 105 with a point 96. Now, when the depressed key 60 is released opening of contacts 79 will cause magnet 89 to be deenergized, so that contacts 91a will open. As the contacts 111 also open, since relay magnet 103 is de-

energized by opening of contacts 80, the circuit to magnet 109 from bus bar 84 to bus bar 83 is open at two contact points (91a and 111) resulting in its deenergization. Such an arrangement provides for a minimum of sparking at the key controlled contacts 79 and 80 and permits a greater part of the sparking to take place at the relay contacts.

Item wheel set-up devices (Figs. 16, 17, 18, 21, 22, 24)

For the present, the manner in which the preferred structure sets up the item representing wheels to control the setting of two sets of item printing wheels will now be considered.

Secured to a shaft 200 (Figs. 16, 18 and 22) journaled in the adding machine frames 201, 202 and 203, which are secured to the base 64, are ten spirally arranged stop fingers 204 one for each of ten item entering keys 205. The keys 205 (Fig. 16) are slidably mounted in a guide plate 206 and each at its lower end has a pivot connection 207 to one arm 208 of a bell crank loosely mounted on a shaft 215, the other inclined arm 209 of the bell crank extending upwardly so that when shifted towards shaft 200 by the depression of a key 205 a stop shoulder 210 will be placed in the path of the related stop finger 204.

The keys 205 and related bell cranks 208—209 are suitably spaced apart as shown in Fig. 22 so that each key is cooperatively related with its associated stop finger 204. The keys are held upward to normal positions by springs 211 (Fig. 16) located beneath extensions of the arms 208.

For the purpose of preventing operation of more than one key at a time pivoted pendants 205a (Fig. 16a) of the usual form are provided. When the pendants are crowded by depression of a key the rocked pendants lock the remaining keys.

The shaft 200, in its normal positions, has its stop fingers 204 spirally located about shaft 200 so that the extent of movement of the shaft in a counterclockwise direction (Fig. 16) is dependent upon which arm 209 is shifted, and in the case of the "0" key the arm 209 will be thrust in the path of the related "0" finger 204 which will, when the shaft 200 is released for rotation, permit a units movement of the shaft as determined by coaction of the "0" finger 204 with a stop shoulder 210 of the arm 209 shifted by the "0" key. In the case of the "1" key the related stop finger will permit a rotation of two units of shaft 200 in a counterclockwise direction, and similarly the remaining keys control the differential rotation of the shaft 200 which, in the present instance, is always a unit more than the value of the key depressed.

As will be described hereinafter shaft 200 is normally urged for rotation but is normally locked by the provision of a stop finger 212 secured to said shaft (Fig. 17). A hooked part of a member 213 normally engages the stop finger 212 but is drawn out of such engagement by the operation of an integral spring urged bail 214 underlying all of the arms 208 of the ten item keys 205 and operated by the downward movement of any key. Bail 214 is loosely mounted on the shaft 215 and the hooked member 213 is integral with one of the side plates of the bail.

Pivoted at 215a (Fig. 16) to each arm 209 is a bell crank comprising a detent arm 216 having a hooked extension adapted to engage a stationary bar 217 when the related key is initially depressed to thereby hold the key depressed but such action

occurs before shaft 200 is released by disengaging the hook of member 213 from finger 212. Inserted between the upper arm 219 of the bell crank and a lug of the related arm 209 is a compression spring 219a. The upper extension of arm 219 has a cam edge 220 and since each finger 204 is of sufficient width (see Fig. 18) to engage both cam edge 220 and the stop shoulder 210 integral with arm 209 it will be observed that when the key is locked in depressed position and shaft 200 rotated the effective finger 204 will contact the part of the cam edge 220 near the stop shoulder 210 to shift the hook of arm 216 out of engagement with the bar 217 to release the key. This disengagement occurs just shortly before the time the stop finger 204 coacts with the stop shoulder 210. The cam edge 220 is so proportioned that when engaged by a finger 204 the arm 216 will be freed from bar 217 but, however, spring 211 does not act quickly enough to restore the arm 209 so that as found in practice the finger 204 actually coacts with the stop shoulder 210 determining the stopped position of shaft 200. The key is now free to be released either by relieving pressure on the key cap by the removal of operator's finger or subsequently by spring 211 alone, if the operator has previously removed his finger before the shaft 200 is stopped.

The prime purpose of the latch mechanism and associated devices is to insure that the particular arm 209 shifted will be held shifted until engaged by the related stop finger 204 and then automatically released. When the key is released the shaft 200 will again be free to rotate since the related arm 209 has been shifted away from the associated stop finger 204. When the restoration of bail 214 has been effected by elevation of the depressed key and the hooked arm 213 is again in the path of the finger 212, shaft 200 will be stopped when the finger 212 again contacts with the arm 213. The series of stop fingers 204 is now in normal position (Fig. 16) ready to determine the subsequent differential rotation of shaft 200.

Shaft 200, as will be seen in Fig. 22, extends through frame member 202 and has secured thereto a pinion 221 in mesh with a gear of a master wheel 222 (Figs. 20 and 22) loose on a constantly rotating shaft 223 and rotatable with one element 224 of a friction drive, the companion element 225 having a pin connection 226 (Fig. 24) to the constantly rotating shaft 223. The desired amount of friction between elements 224-225 is provided by a spring 227 (Fig. 24) which is regulated by a collar 228, adjustable on shaft 223 by any suitable means such as a screw thread. To the shaft 223 there is secured a pinion 229 (Fig. 16) in mesh with a gear 230 secured to the constantly running shaft 132.

It will be observed that the master wheel 222 and the shaft 200 geared thereto are urged to rotate by power but are released for such rotation by depression of any key. The shaft 200 is then stopped in its differential position by the stop devices described and then rotated as will be described supplementally to its normal position.

The above described differential rotation of the master wheel 222 under control of the keys is utilized to set up numeral wheels indicating the keys depressed so that upon completion of a series of key operations the numeral wheels will, by their characters, represent the keys previously depressed.

Journalled between side plate 203 and a bracket 231 secured to side plate 202 (Fig. 18) is a shaft

232 carrying a yoke or item wheel carriage 233, the side arms being forked to receive a shaft 234 (see Fig. 20). Between the side arms of the carriage and assembled on the shaft 234 is a series of item wheels 235, each being toothed to mesh with the master wheel 222 and carrying characters at the extremities of the teeth (see Fig. 24) to indicate the value of the key depressed. A units movement of an item wheel 235 by a depression of the "0" key brings the "0" character into view, and correspondingly, other characters are brought into view by depression of the other keys.

Between the side arms of the item wheel carriage is a sleeve 236 (Fig. 18) mounted on shaft 232 and in which sleeve there is inserted a screw stud 236a having its lower end in engagement with a spiral groove 238 formed in the periphery of shaft 232. By reason of the above arrangement steps of rotation of shaft 232 will cause the item wheel carriage and item wheels to be shifted in increments.

When the machine is at normal, one of the item wheels 235 (see Fig. 18) is in mesh with the master wheel 222 so that this item wheel may be the first to be set up to represent the value of the first key depressed. When this operation has been completed the carriage will then be shifted a step to bring the rotated item wheel out of position of engagement with the master wheel to permit the shaft 200 to then be given its subsequent rotation which occurs during the release of the depressed key.

The worm screw threaded shaft 232 is urged to rotate by suitable spring means now to be described. In mesh with a pinion 237 (Fig. 20) secured to one end of shaft 232 is an idler pinion 238a pivoted to side frame 203 and in mesh with the upper teeth of a double rack segment 239 loose on shaft 223. The lower teeth of said segment are in mesh with a segment 240 loose on the shaft 132 and having an arm 242 normally urged downwardly by a spring 243 to turn worm screw shaft 232 in a clockwise direction (Fig. 20) to shift the item wheel carriage to the left (Fig. 20), as the numerals of the keys are read. In mesh with the upper teeth of segment 239 is a pinion 244 (Fig. 21) secured to which is a toothed escapement wheel 245, both being loosely mounted on a reduced portion of shaft 200.

One tooth 246 (Fig. 21) of a double pallet escapement lever normally engages a tooth of the escapement wheel 245 to prevent rotation of shaft 232 as urged by spring 243. The escapement lever is loosely mounted on the shaft 215 but to said escapement lever there is fixed an arm 248 having a pin 249. Mounted over the series of arms 216 is a rod 249a of a yoke secured to a rock shaft 250 to which is pinned an arm 251 overlying the pin 249. The action of the parts is such that after the shaft 200, and, therefore, the first item wheel 235 through the master wheel 222 is differentially rotated, elevation of one of the arms 216 will elevate rod 249a to depress arm 251. This results in rocking the hooked end 246 of the escapement lever out of engagement with one of the teeth of escapement wheel 245. The latter then rotates clockwise slightly until one of the teeth designated by 252 engages the top of hooked portion 253 of the escapement lever. This permits a step of rotation of shaft 232 sufficient to step the carriage to bring the item wheel just differentially rotated out of engagement with the master wheel 222.

The shaft 200 now being free subsequently rotates supplementally to its normal position and which rotation is effected during the elevation of the key depressed. During this operation an arm 254 (Fig. 21) secured to shaft 200 whips around in a counterclockwise direction and strikes a pin 254a attached to the escapement lever so that the cam end of arm 254 cams the escapement lever to the right. The escapement wheel will now turn clockwise and a second half step of movement of the item wheel carriage is thereby effected since the hooked end 246 has now been shifted to the right (Fig. 21) bringing it in the path of the tooth of the escapement wheel 245 just below the one previously engaged.

This second shift of the item wheel carriage shifts the wheel 235 just set differentially to mesh with the first of a series of racks 255 (Fig. 24).

In this manner a depression of a key sets up an item wheel, the first one being shifted to mesh with the first rack, the depression of the second key resulting in differentially setting the second item wheel and shifting the first wheel (previously set) into mesh with the second rack, and the wheel just set differentially in mesh with the first rack.

At the end of a setting up operation the item wheels 235 set will represent a number to be printed corresponding to the keys depressed, and verification of this amount is ascertained by reading the figures on the series of wheels 235 which have been shifted so as to be visible through a window or slot 256 (Fig. 24). The figures are preferably magnified by a magnifying glass 257 (Fig. 2) so as to be easily readable by the operator.

Differential adjustment of racks (Figs. 18, 20, 21, 24, 25)

The wheels 235 besides indicating to the operator of the machine the values of the keys previously depressed also control the differential positioning of the series of the racks 255. Referring to Figs. 18 and 25, it will be observed that the shaft 234 has a cut in its periphery preferably in the form of a long groove 260 adapted to coact with a series of resetting pawls 261 one of which is secured to the side of each item representing wheel 235 and pivotally mounted within an annular recess of the related wheel. When a wheel 235 is rotated about shaft 234 and then shifted it is operatively engaged with the groove. The normal relation of an item wheel at home position with the groove 260 is shown in Fig. 25, wherein it will be observed that the end of one of the series of pawls 261 rests upon the circular part of the periphery of the shaft 234. When an item wheel has been rotated by the differential mechanism it will be rotated about shaft 234 in a clockwise direction, the pawl assuming the dotted line position shown in Fig. 25. When the shaft 234 is then rotated in a counterclockwise direction, it will be apparent that the radial wall 260a of the groove 260 coacting with the end of pawl 261 will pick up the related wheel 235 to restore it to its normal position and for each wheel such restoration will require as many units of movement as a wheel has been previously rotated.

An item wheel restoring operation by shaft 234 is effected by mechanism now to be described. Secured to the end of shaft 234 is a pinion 262 (Figs. 20 and 24) in continuous driving engagement with teeth formed at the upper end of a

segment arm 263 loosely mounted upon the shaft 132. Attached to the segment 263 and depending below shaft 132 is an arm 264 provided with a roller engaging the race 265 of a box cam 266 secured to the shaft 146.

It will be remembered that this shaft is given a single revolution when the item printing and check feeding operations are to be performed during which operation it will be observed that segment 263 will rock drive shaft 234 first in a counterclockwise direction so that the groove 260 therein will return the item wheels 235 to their normal positions. As stated each item wheel 235 is in the form of a pinion, the teeth of which are also in mesh with the teeth of a related rack 255. As an item wheel is returned to normal, the rack 255 with which it is in mesh will be shifted an amount dependent upon the value indicated on that particular wheel. After the item wheels are at zero and the racks 255 differentially adjusted the zeroized item wheels are then shifted to the right (Fig. 24) by a movement of the item wheel carriage in the same direction.

During the item wheel setting operations, it will be observed that the spring 243 (Fig. 20) will cause the arm 242 to approach the shaft 146 more or less and to an extent dependent upon the number of item wheels adjusted, or in other words, proportional to the highest denomination of the amount to be entered. A restoration of arm 242 will cause the restoration of the item wheel carriage by a reverse operation of the same mechanism employed to shift the carriage when the item wheels are successively adjusted. When the shaft 146 is rotated as an incident to check feeding and item printing operations a profile cam 266a will coact with the roller secured to arm 242 and elevate the same, this operation being effected after the shaft 234 has been turned to zeroize the adjusted item wheels. The elevation of arm 242 causes the spirally grooved shaft 232 (Fig. 18) to be turned to shift the item wheel carriage to the right. During this operation it will be observed that escapement wheel 245 (Fig. 21) will be turned counterclockwise, the tooth 246 of the escapement lever functioning as a retrograde preventing pawl for the escapement wheel. When the item wheel carriage is at its normal position (see Fig. 18) the shaft 234 is then rotated in a clockwise direction (Fig. 25) by the box cam 266 so as to be brought to the normal starting position shown in Fig. 25.

Motor bar control (Figs. 2, 16, 18, 28a)

The performance of the restoring operations just described and to others are under control of a motor bar 267 depressible by the operator to effect the clutching of the constantly running shaft 132 (Fig. 16) with the shaft 146 which performs the functions incidental to the printing and check feeding operations. The preferred form of clutch mechanisms will now be described in detail.

The motor bar 267 is operable exteriorly of the machine (see Figs. 2 and 28a) and is carried by a stem 275 slidably mounted at its upper end and pivoted at its lower end by an arm 276. The stem carries a pawl 277 (Fig. 16) the lower end of which is adapted to engage one arm 278 of a bell crank, the vertical arm 279 being pivoted to a link 280 which is secured to the lower end of a pinion carrying frame comprising parallel plates 281a and 281b both loosely mounted on shaft 132 (see Figs. 16 and 18). Secured to the constantly running shaft 132 is a pinion 282 in

mesh with an idler pinion 283 pivotally mounted on the frame plate 281a. Pinion 283 is in constant mesh with a broader pinion 284 also pivotally mounted on plate 281a. The pinion 284 when

5 rocked into mesh is sufficiently broad to mesh with and drive a pinion 285 secured to the cam carrying shaft 146.

A spring 286 (Fig. 16) connected to the frame 281a—281b retracts the latter so a normal disengagement is effected between pinions 284 and 285. When the motor bar is depressed pawl 277 rocks bell crank 278—279 to shift the link 280 so that when the pinion carrying frame is rocked sufficiently to effect a driving engagement between pinions 284—285 a lug 288 of a spring urged latch arm 287 will spring behind a projection 289 of frame plate 281b. Shaft 146 will now be driven to effect the various functions described. Towards the end of a complete revolution a pin 290 (Fig. 16) secured to gear 285 will coact with a tail of the latch arm 287 to rock the latter permitting spring 286 to restore the frame 281a—281b to effect a disengagement between pinion 284 and gear 285.

25 When stem 275 is depressed pawl 277 will rock the bell crank and by the coaction of a tail of the pawl with a fixed stud 291a the pawl will be rocked in its downward movement and will pass by the arm 278 after the pinion carrying frame is rocked to be latched by pawl 287. The engaging end of pawl 277 now being below the arm 278 it will be observed that repeated operations of the drive shaft 146 cannot be effected by holding the motor bar depressed. The provision of

35 the above "non-repeat" device requires restoration of the motor bar and a subsequent depression for each operation of the drive shaft 146. Secured to an extension 291 of plate 281b is a plate 292 the lower concentric edge 293 being adapted to be engaged by a pin 297 secured to the gear 285 rotatable with shaft 146. The passage of the pin 297 beneath the concentric edge also retains initially the desired clutching engagement of the drive and driven pinions and

45 this is maintained after the pin has cleared the edge 293 by the concentric edge 296 of disk 295 coacting with the lower edge 293.

When the shaft 146 returns to its home position restoration of the frame 281a, 281b by the unlatching of lever 287 will cause the lower projecting portion of plate 291 to fit in and engage a cut out portion of the disk 295, the parts now being at normal.

55 *Device for normalizing cam shaft 146 (Fig. 23)*

It is desirable that the shaft 146 be brought to its normal starting position if not done by the drive mechanism and to this end there is loosely mounted on shaft 146 a spring urged bell crank 60 300 (Fig. 23) carrying a pawl 301 having an end adapted to hook over a pin 297a carried by gear 285. On shaft 132 there is secured a wiper cam 302 which wipes past one arm of the bell crank, and as the shaft 132 is constantly revolving pawl 301 will be constantly reciprocated. Towards the end of the driving movement of shaft 146 pawl 301 will hook over the pin 297a and give shaft 146 an extra movement if necessary bringing it to its home position at which time pin 297 (Fig. 16) will abut the end of plate 292.

70 *Aligning devices for item wheels (Figs. 19, 22, and 24)*

It is desirable that the item wheels be aligned 75 or locked against movement while the carriage is

in its normal position. To carry out the above object there is secured to the side plate 203 a transversely extending bar 304 (Fig. 18) fitting within the interdental spaces of the series of item wheels. Such engagement is effected when the wheels 235 are shifted to the right as an incident to the restoration of the item wheel carriage when printing and check feeding operations are completed.

As the item wheels are successively shifted 10 they leave the bar 304 so that the teeth thereof pass into engagement with a movable locking bar 305 (Figs. 19 and 22) and such locking relationship is maintained until the item wheels differentially set are restored to zero to positive- 15 ly shift the racks 255. Bar 305 is carried by the upper end of an arm 306 loosely pivoted on shaft 223. Secured to the arm is another arm 307 having a roller in engagement with the periphery of a profile cam 308. The high portion 309 20 of the cam maintains the locking bar 305 in its locking position but when the item wheels 235 are zeroized to control the movement of racks 255 the roller drops to a lower portion under the action of a spring 310 to shift the bar 305 out 25 of engagement with the item wheels. Such relationship is maintained during the time the item wheels are zeroized but immediately thereafter the high part 309 of the cam is effective to rock the bar 305 into engagement with the item 30 wheels, keeping them locked during the lateral shifting of the item wheel carriage and until the item wheels pass under control of the fixed locking bar 304.

35 *Device for unlocking operating racks (Figs. 27 and 28a)*

Referring to Figs. 27 and 28a loosely mounted on a rod 311 is a series of locking pawls 312 urged by gravity so that their lower engaging ends 313 40 normally fit in recesses formed in the upper edges of the left ends of the series of racks 255. The pawls 312 prevent accidental movement of the racks but when the item wheel carriage is shifted the pawls are successively operated to un- 45 lock the various racks. For this reason a bar 314 secured to the cross plate of the item wheel carriage has a bevel cam portion 315 (Fig. 27) which passes over the rearward ends of the pawls 312 to shift them so as to unlock the racks 255. 50 As a pawl 312 is shifted it is held in such position by a straight edge 316 forming a continuation of the bevel cam edge.

In this manner if four item wheels 235, for example, are set to represent a number the corresponding number of racks 255 are unlocked for operation.

Aligning devices for slides (Fig. 28a)

For the purpose of aligning the racks 255 in the different positions of adjustment there is inserted in holes in a bar 318 (Fig. 28a) a series of resiliently urged balls 319 one for each slide and each coacting with the related series of wedge-shaped notches 320 formed at the lower 65 edge of the related rack 255.

Item printing wheels for main record strip (Figs. 28a, 28b together and 26)

It is desirable that a printed list of items be 70 provided by the machine to list the items represented upon the records in the same sequence that they are sorted by the operator.

The nine racks 255 are slidably mounted in a frame comprising a side plate 335 and a side 75

plate 336 (Figs. 18 and 28a) both pivoted upon a fixed rod 337. The two plates are spaced apart to form a frame by a plurality of cross members such as the bar 318; a pair of guide rods 339 (see also Fig. 28b) on which the series of racks are slidably mounted at their forward and rearward ends, respectively, and other members which act as supporting devices for various elements carried by the rack carrying frame.

The main record strip item printing wheels 341 (Fig. 28b) of which there are nine, one for each rack it is in mesh therewith, are carried by a rod 342 (see also Fig. 26) fixedly held in upward extensions of the side plates 335 and 336, and, of course, the printing wheels being at the right end of the adding frame move up and down as the frame is rocked about the pivot point 337.

Attention is directed to the fact that in the normal position of the item printing wheels 341 (when the racks 255 are home) a blank space 345 of each printing wheel 341 is at the printing line. Upon the resetting of an item wheel 235 from a "0" position to its blank position the corresponding rack 255 will rotate the related printing wheel 341 a units movement from its normal position to bring a "0" character to the printing line. If a "6" stands upon the item wheel 235, the seven steps of movement necessary to zeroize that wheel (from 6 to normal position) will adjust the related rack 255 the same number of steps and correspondingly the related printing wheel 341 will be moved seven steps from a normal position to present a "6" numeral to the printing line.

For the higher denominational orders in which no item wheels 235 are utilized, for example, in representing 20.04 the remaining five higher order racks 255 will not be adjusted and the related printing wheels, being retained normally in such position that no printing characters are at the printing line, will not be rotated to cause a character to be printed to the left of "2". The above arrangement provides a simple means for the proper elimination of zeros in denominational orders not utilized but their insertion to the right of any significant figure as is required.

Means for identifying items printed on main record strip (Figs. 1, 18 and 29)

It is desirable that each item printed upon the main record strip be identified by printing a character or characters representing the classification of the check or record designating such item. Therefore by classifying the items printed, the operator can tell in which compartment the related check is deposited. To this end secured to the sorting drum is a cam disk 321 (Figs. 1 and 29) and in contact with the periphery of the cam disk is one end of one arm of a bell crank 321a, the other arm thereof having teeth 322 in mesh with a pinion 323.

Cam disk 321 is graduated so that different positions of the bell crank are provided for the various positions of the sorting drum. A shaft 324 carrying the pinion 323 is also provided with a second pinion 325 in mesh with a rack 326 slidably mounted on the side plate 202. Extending from the rack 326 is a pin 327 (Figs. 18 and 29) engaging an arcuate slot in a rack slide 328 slidably mounted on the side plate 336. The teeth at the rear end of the rack slide 328 mesh with a pinion attached to a special character printing wheel 344 carrying characters corre-

sponding to the compartment selecting keys 60 and the printing wheel 344 has the same printing line as the set of item printing wheels 341. This wheel 344 sets up a character representing the compartment in which the check is sorted and is printed in conjunction with the related item on the main record strip.

Main record strip printing means (Figs. 1, 2, 4, 28b, 29 and 31)

For the purpose of effecting printing from the item type wheels 341 differentially adjusted by the racks 255 and the differentially adjusted special character printing wheel 344 there is provided a frame comprising a pair of arms 346 and 347 (Figs. 1, 2, 4 and 29) each pivoted at 348 to a base plate 349. Between the forward extremities of the arms is journaled a roller platen 350. Rocking of the platen at the proper time effects printing from the adjusted item printing wheels 341 and the special character printing wheel 344.

For the present, considering that a stud 351 (Fig. 29) is movable with the arm 346, it will be observed from Fig. 31 that the stud is received by a bifurcation of an arm 352 pivoted at 353 by an extension at its mid-extremity. The lower end of the arm has a pin and slot connection to a link 354 articulated to the upper end of an arm 355 carrying a roller engaging a cam race 356 of the cam disk 308 secured to shaft 146.

The cam race 356 is effective to rock the platen 350 downwardly through the connections just described at the proper time and by its contact with the printing wheels effect the print, restoration of the platen and frame being provided by the cam race 356 and assisted by the action of a compression spring 357 (Fig. 29). While the rear end of the frame 335, 336 is rocked downwardly after this time (for reasons to be explained hereinafter) the platen roller 350 contacts with the printing wheels 341, 344 before this operation and sufficiently to effect the desired print on a record strip 363.

The record strip 363 upon which printing is effected is drawn from a supply roll 360 (Figs. 29 and 28b) pivoted upon a stud 361 supported by upward extensions 362 of the base plate 349. The record strip 363 as it comes from the supply roll passes around the platen roller 350 and thence upwardly between a pair of feeding rollers 364 and 365 both of which are carried by upper extensions 366 of the pivoted frame 346, 347. The rollers 364 and 365 being resilient seize the record strip frictionally.

Secured to roller 364 is a ratchet wheel 367 (Fig. 29) the teeth of which are in cooperation with a resiliently urged pawl 368 pivoted by a stud 369 to one end of a lever arm 370 pivoted by a stud 371 carried by a bracket secured to the base plate 349. The forward end of the lever arm 370 has a stud 372 passing through the side plate 346 and received by an inclined slot 373 of a plate 374 slidably mounted at its rearward end by the pivot stud 348.

When the printer frame is rocked downwardly to effect an imprint the arm 352 will draw the stud 351 down, which as will be noted is secured to the plate 374, so as to rock the plate 374 and through stud 372 will rock arm 346 about its pivot 348 to effect the print and the lever arm 370 about the fixed pivot 371. This rocking of lever arm 370 will elevate pawl 368 so that it will engage the next higher tooth of ratchet wheel 367 and said pawl, when the frame is elevated

after the printing operation, will be depressed so as to turn the roller 364 and thus space the paper strip 363.

When the items have all been listed the printed record strip 363 is simply detached from the rest of the roll.

Individual record strip printing devices (Figs. 1, 26, 28b, 29, 30, 32, 33)

10 Secured to the side plate 36 of the sorting drum is a series of plates each of which carries an individual record strip printing device 376 (Fig. 1). In the same machine cycle that check sorting is performed the item represented on the check is
15 also printed upon the individual record strip associated with the compartment receiving the check sorted.

Each individual record strip printing device is mounted upon its own plate 377 (Fig. 32) which
20 is secured by screws 378 to the side plate 36.

Pivotaly mounted on a stud 379 which pivotaly supports a paper strip supply roll 380 is a platen supporting plate 381 suitably bent laterally and
25 upwardly as shown in Fig. 33 so as to support by a rod 382 a platen roller 383. Urged into contact with the platen roller 383 by a spring is a roller 384. The record strip passes from the supply roller 380 and between the roller 383 and the roller 384.

30 The item printing type elements that are adapted to print upon the individual record strip selected for operation comprise a series of item type wheels 390 (Fig. 28b) identical in character arrangement as the other item type wheels 341,
35 that is each has its blank space 390a (Fig. 32) normally at the printing line of the record strip at printing position.

The series of item printing type wheels 390 are rotatable on a rod 391 carried by a yoke shaped
40 frame 392 pivoted on a rod 393 which at its ends is journaled in the side plates 335 and 336. By this arrangement the item type wheels 390 are bodily shifted to print upon the selected individual record strip (which is now in position) when the
45 frame 335, 336 and frame 392 are first moved downwardly together but at the termination of such printing operation the yoke shaped frame 392 is elevated independently of the frame 335, 336 at the time the latter frame is also moved
50 upwardly in order to effect a certain operation preparatory to carrying out item accumulating operations not involved in this divisional application, and therefore, forming no part of the present invention.

55 To differentially adjust the type carriers 390 the right end of each rack 255 (Fig. 28b) has slidably mounted thereon by studs 398 a short rack 399 having rack teeth 400 in engagement with pinions 401 which are loosely mounted on
60 shaft 393 and constantly in mesh with a related type wheel 390. Extending between and secured to lugs integral with one of the racks 399 and the related rack 255 is a normally tensioned spring 402 the tendency of which is to shift the rack 399
65 to the left independent of the rack 255 but in the position of the rack 399 shown in Fig. 28b such movement is prevented by the engagement of a hooked extension of a spring urged latch lever 404 pivotaly mounted on rack 255 and
70 normally engaging a notch in the rack 399. By this connection the rack 399 and related rack 255 move to the right as a unit under control of the resetting of the related item wheel 235 imparting a like amount of movement to the type carrier 390 through the intermediate pinion 401.
75

When the type elements 390 are differentially adjusted by resetting of the item wheels 235 the frame 335, 336 is shifted downwardly to effect the printing on the selected individual record strip but prior to such movement, as previously stated, the platen roller 350 is shifted downwardly to effect printing from the upper series of item printing wheels 341 and special character printing wheel 344 upon the main record strip 363.

To depress the frame 335, 336 the following
10 devices are preferably employed. Pivoted to an arm 405 (Fig. 29) carrying a roller in engagement with a race of a box cam 406 secured to shaft 146 is a plate 407 having a cam slot 408 in engagement with a stud 410 secured to the frame
15 plate 336 and a cam slot 409 in engagement with a stud 411 secured to the stationary frame plate 202.

When the cam plate 407 is shifted to the right (Fig. 29) under action of the cam 406 the frame
20 335, 336 will be depressed to effect printing upon the selected record strip. By a reverse action the frame is immediately restored to its uppermost position.

The means by which the type carriers 390 are shifted upwardly independent of the frame 335—
25 336 will now be described. The shaft 391 supporting the item type wheels 390 (Fig. 30) engages a cam slot 394 of a cam plate 395 slidably mounted at one end by a pin 393 carried by the frame 335—336 and which plate is pivoted at 396 to
30 the upper end of an arm 397 carrying a roller engaging the race of a box cam 398 secured to shaft 146.

The cam plate 395 is not shifted until after the frame 335—336 is depressed so it will be
35 observed that the type wheels 390 partake of the same movement as the frame 335, 336 during the initial downward movement of the latter.

When the frame 335—336 is elevated after its first depression cam 398 acting upon link 395
40 will cause cam slot 394 to shift the type wheel carrying frame 392 upwardly and a sufficient distance so that when frame 335—336 is subsequently depressed by means of the cam 406 (Fig. 29) item
45 printing wheels 390 will not again engage the selected record strip and accomplish a second imprint. The second depression of the frame is necessary to accomplish item accumulating operations involved in the machine shown in the parent application and not forming part of the
50 present invention. After item printing operations on the main and individual record strips are completed the series of differentially adjusted racks 255 are restored or shifted to the left to their home positions.
55

In the preferred construction of the machine each of the racks 255 is provided with a downwardly extending projection 428 (Fig. 28a) normally in contact with a bail 429 common to a series of projections 428. One arm 430 of the
60 bail is provided with a roller engaging the race 431 of a cam disk 432 secured to shaft 146. The cam race is so proportioned that when the racks 255 are moved rearwardly to differential positions the bail will be shifted rearwardly the maximum
65 extent of movement that can be imparted to any of the racks 255. When the differential positions of the racks have been determined by the item representing elements and after item printing operations the cam race 431 is effective to reverse the movement of the bail 429 so that by its
70 coaction with the depending projections 428 of the series of racks 255 the latter will be positively shifted to the left or restored to their normal positions.
75

During the final operation of the machine the cam 406 (Fig. 29) is effective to restore the frame 335—336 to its normal position, during which time the cam 398 (Fig. 30) is effective to shift the cam plate 395 to the left and through the shaft 391 shift the type carrier supporting frame 392 downwardly to the normal position shown in Fig. 28b.

Paper feeding devices for individual record strips (Fig. 32)

For the purpose of feeding the particular individual record strip printed upon to space the printed items there is pivoted at 412 to the stationary frame 203 (Fig. 32) an arm 413 to which is pivoted a spring urged pawl 414. The mid-point of the arm 413 has a link connection 415 with the side plate 335 of the frame 335—336 so that when the frame is depressed the pawl 414 engages a tooth of a ratchet wheel 417 secured to the platen roller 383 and turns the platen roller 383 of the individual printer in position a single step of rotation. As was just stated the frame 335—336 is given a following movement of depression and elevation and when again elevated the pawl 414 causes a second step of rotation of the platen roller 383. These two steps of rotation feeds the individual record strip sufficiently to space the printed items.

Inking devices for item type carriers (Fig. 26)

The imprint taken from the type carriers 341, 344 is effected by an endless inking ribbon 403 (Fig. 26) which it will be observed also passes beneath the item type wheels 390. No further details of the inking ribbon devices will be given as they are well known in the art.

Error key mechanism (Figs. 2, 18, 28a)

In the event that any of the keys 205 are depressed in error it is desirable that the item representing elements 235 be restored to normal without transmitting the value represented on them to the two sets of item printing wheels.

It will be remembered that it was previously stated that the rod 339 was the supporting means for the racks 255 at their forward ends, as will be best seen in Fig. 28a. This rod is carried by a pair of arms 501 fixed to a cross rod 502 supported in the side frames 203 and 202. The error key lever 503 is pivoted upon a rod 504 and the handle portion thereof projects through a slot in the cover plate of the machine so as to be externally operable by the operator of the machine (see Fig. 2).

Articulated to the mid-portion of the error key lever is a plate 505 (Fig. 28a) having an elongated slot 506 receiving a pin 507 secured to the side frame 336 of the adding frame. The plate 505 is also provided with a cam slot 508 receiving a reduced end of the rack supporting rod 339. When the parts are as shown in Fig. 28a, it will be observed that the teeth formed at the upper forward ends of the racks 255 are in mesh with the pinion teeth of the item representing elements 235 when the latter have been shifted laterally. If at the termination of such operations the operator observes that the amount represented is incorrect, for rectification, it is only necessary to shift the lever 503 rearwardly. During such operation, it will be seen that the action of the cam slot 508 upon the supporting rod 339 is such that the rod 339 will be lowered thereby effecting a disengagement between the teeth of the racks 255 and the teeth

of the laterally shifted item representing wheels 235.

During the subsequent machine operation, it will be observed that the restoring shaft 234 will be rocked to pick up and restore the previously set elements 235 but during such operation, it will be noted that no movement will be transmitted to the racks 255 and that they will merely remain in their normal position of adjustment. By the provision of such means, it will be observed that the machine goes through an idle cycle of operation and the only effective work that is accomplished is the feeding of the record strip of the individual record strip printing device 376 selected for operation and the feeding of the main record strip.

Since the two groups of item printing wheels are in such position that their blank portions are presented to the printing line no imprint upon either strip will be effected with the exception, of course, printing upon the main record strip from the special printing wheel 344 representing the compartment previously selected. This printing together with the record strip spacing gives an indication to the operator of the machine that not only were the item keys 205 operated but also that the error key device was employed.

For the purpose of defining the normal or zero position of the item representing wheels when they are restored during the resetting operations there is secured to the item wheel carriage 233 a plate 509 (Fig. 28a) having a plurality of stop fingers 510 against which pins 511 secured to the side faces of the elements 235 abut at their zero positions.

For the purpose of automatically setting the machine into operation by shifting of the error key when employed, the error key lever 503 has a curved extension 512 (Figs. 18 and 28a) in the plane of the arm 276 and adapted to depress this arm and therefore, motor bar 267 when the lever 503 is shifted rearwardly.

While the lever may be held in shifted position at the end of the machine cycle no second operation thereof will ensue for reasons explained in connection with the operation of the motor bar described in the section designated—"Motor bar control".

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is as follows:

1. In a machine of the class described, in combination, means for providing the listing of items represented by records in groups of the same classification, each group on one of a plurality of record strips, a plurality of sorting compartments for sorting the records into groups according to their classifications, means for selecting a record strip and a related compartment according to the classification of the item represented by the record to be sorted, and means for printing the items in the sequence the records are sorted.

2. In a machine of the class described, in combination, means for printing items represented

by records into groups according to their classifications, a plurality of sorting compartments for sorting the records according to their classifications, and a plurality of keys representing different classifications of the records each for selecting a sorting compartment and causing the printing of the item in the related group.

3. In a machine of the class described, in combination, means for securing the printing of items represented by records into groups on individual record strips according to their classifications, a plurality of compartments for sorting the records according to the classification of the items, a plurality of keys, a main operating mechanism, and means whereby the main operating mechanism under control of the keys selects a record strip and a related sorting compartment.

4. In a machine of the class described, the combination with a carriage carrying paper rolls for securing the printing of items into classified groups according to the classifications of the items represented by records, of a plurality of sorting compartments for sorting the records into groups according to their classifications, and key controlled means for causing the shifting of the carriage to cause printing to take place on a paper roll related to the classification of the record and to select a related sorting compartment for receiving the same record.

5. In a machine of the class described, the combination with a carriage carrying paper for securing the printing of items into groups according to the classifications of the items, of sorting compartments carried by said carriage for segregating the item representing records into groups according to their classifications, and means for differentially positioning said carriage to select a particular sorting compartment and cause printing of the item in the group corresponding to the sorting compartment selected.

6. In an accounting machine, the combination with means for securing the printing of items represented by records in classified groups, of a plurality of sorting compartments for sorting the classified records, and means operable at the will of the operator and after the selection of a sorting compartment for feeding the record into a selected sorting compartment concomitantly with the printing of the item represented by the same record in the related group.

7. In an accounting machine, the combination with printing means for listing items on a plurality of record strips, each record strip receiving items represented by records of the same classification, of a plurality of sorting compartments for sorting the records according to their classifications, a plurality of keys each for selecting a sorting compartment and a related record strip, and means for causing the operation of said printing means to list an item upon the selected record strip as the record representing the item is deposited in the related sorting compartment.

8. In a machine of the class described, the combination with a plurality of sorting compartments for sorting records into groups of the same classification, of means for listing upon separate record strips, one for each classification, the items represented by the records as they are deposited into the sorting compartments, and means including a main record strip common to the sorting compartments and record strips for listing the items represented by the records in the sequence the latter are deposited into the sorting compartments.

9. In a machine of the class described, the combination with a plurality of movable sorting compartments for segregating records into groups of the same classification, of printing devices for printing on a plurality of record strips, means for securing the printing on said record strips of items represented by the records into groups of the same classification, and means effective when a sorting compartment has been moved to a record receiving position for printing by said printing devices an item upon a record strip as the record representing the same item is fed to the related sorting compartment.

10. In a machine of the class described, the combination with a plurality of sorting compartments for segregating records into groups of the same classification, means for listing items represented by the records upon a record sheet in the sequence that the records are deposited into the compartments, and means for listing upon a plurality of record strips in groups of the same classification the items represented by the records as the latter are deposited into the selected compartments.

11. In a machine of the class described, in combination, a plurality of compartments for sorting records representing items into groups of records of the same classification, a plurality of platens carrying individual record strips each strip for providing a list of the items of all the records deposited in the related compartment, a main record strip for providing a list of the items in the sequence that the records are sorted to the different compartments, and printing devices for printing upon the selected individual and main record strips the item on the record which is deposited in the selected sorting compartment.

12. In a machine of the class described, in combination, a carrier having a plurality of sorting compartments for segregating records into groups of the same classification, means for securing the printing of items represented by the records into groups of the same classification, means including a main record strip for listing the items in the sequence that the records are fed into the selected compartments, and means controlled by the carrier for printing adjacent each item printed upon the main record strip the classification of the item for designating the compartment receiving the related record.

13. In a printing and sorting machine, in combination, a rotatable drum having a plurality of sorting compartments, a plurality of keys for selecting the compartments, a feeding device having provisions for marking or endorsing the material to be sorted as it is fed to the selected compartment, and means under control of said keys for bringing a selected compartment into association with the feeding device.

14. In a machine of the class described, in combination, a plurality of sets of type carriers, common manipulative devices for controlling the differential adjustment of both sets of type carriers, means whereby one of said sets of type carriers effects the listing of data upon a selected one of a plurality of record strips, and means whereby the remaining set of type carriers effects listing of the same data upon a main record strip in the sequence the data is listed upon the plurality of record strips.

15. In a combined printing and sorting machine, the combination with a plurality of record sorting compartments, of common manually con-

5 trolled means for causing the selection of a sorting compartment concomitantly with the selection of one of a plurality of record strips for receiving the listing of data represented by the record deposited in the related sorting compartment, and means for feeding the record strip upon which the data are listed.

10 16. In a combined printing and record sorting machine, printing means set under control of keys and operable for printing on a single record sheet the data represented by records in the same sequence as the sorting of said records, and record sorting means operable as an incident to the operation of said printing means.

15 17. In a combined printing and record sorting machine, printing means operable for printing the data represented by records in a segregated manner in accordance with the sorting of said records, record sorting means operable as an incident to the operation of said printing means, and printing means for printing the data represented by the records in the sequence the latter are sorted by said sorting means.

20 18. In a combined printing and sorting machine, a carriage carrying a plurality of record sorting compartments and a corresponding number of paper rolls, common means for causing the shifting of said carriage to bring a paper roll into printing position and a related compartment into

record receiving position, and means for printing upon a paper roll the data represented by a record as said record is automatically deposited in the related sorting compartment.

5 19. In a combined printing and sorting machine, a plurality of sorting compartments, means for marking a record as the latter is fed to a selected compartment, means for printing in groups according to the classification of the records data represented by said records as the latter are sorted, means for printing the same data of the records in the sequence the latter are sorted, and manipulative devices for causing the selection of a compartment for receiving a record and the printing in the related group of the data represented by the same record.

10 20. In a combined printing and record sorting machine, record sorting means, and printing means operable as an incident to the operation of said record sorting means for printing on a medium other than said records data represented by the records sorted in a segregated manner in accordance with the sorting of the records, and also including means for printing the same data on a medium other than said records in the sequence the records are sorted by said sorting means.

FREDERICK L. FULLER.