No. 804,485. PATENTED NOV. 14, 1905.

R. H. LITTLE.

PERFORATING MACHINE.

APPLICATION FILED AUG. 29, 1904.

4 SHEETS—SHEET 1.

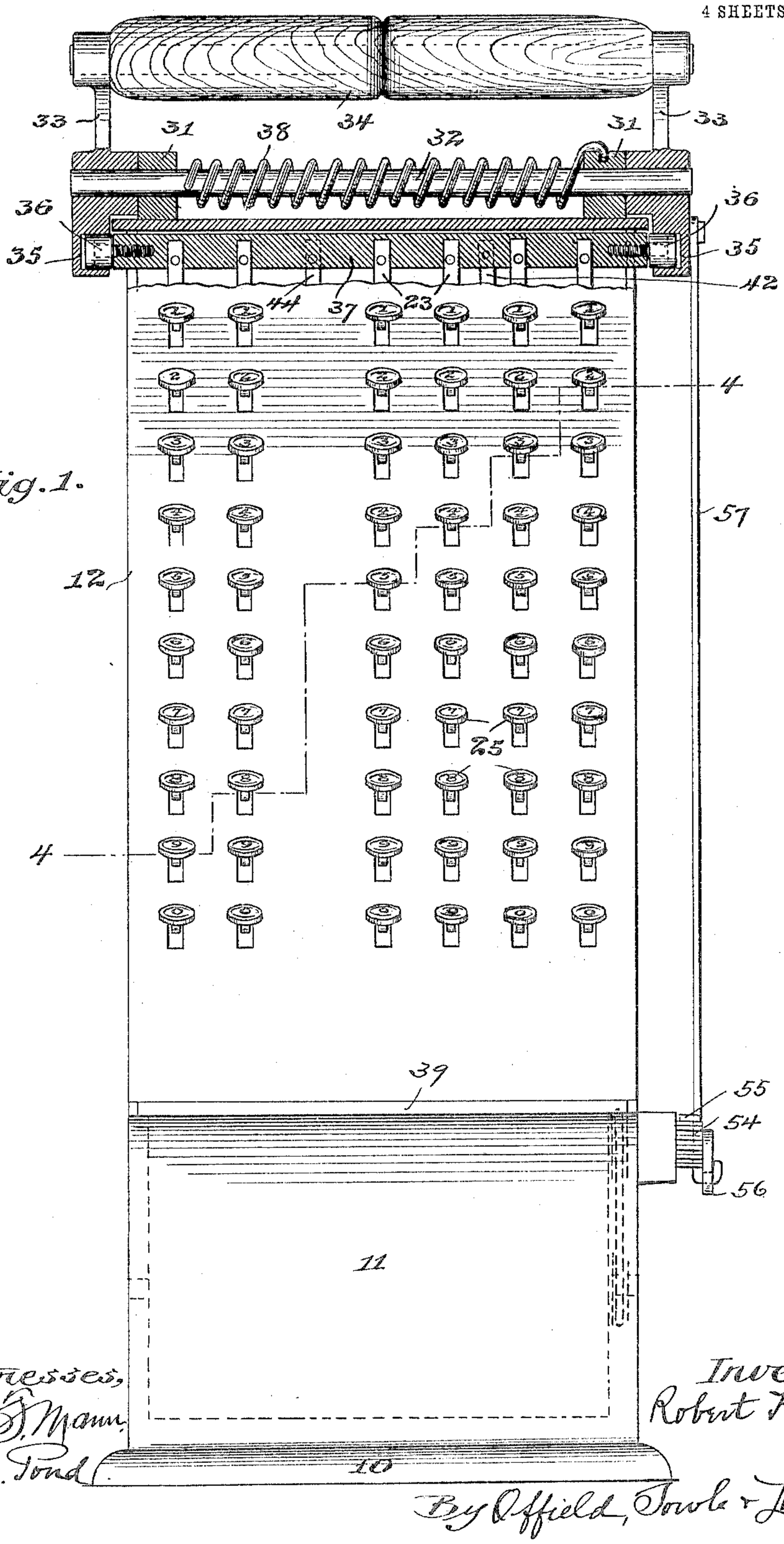

Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 2.

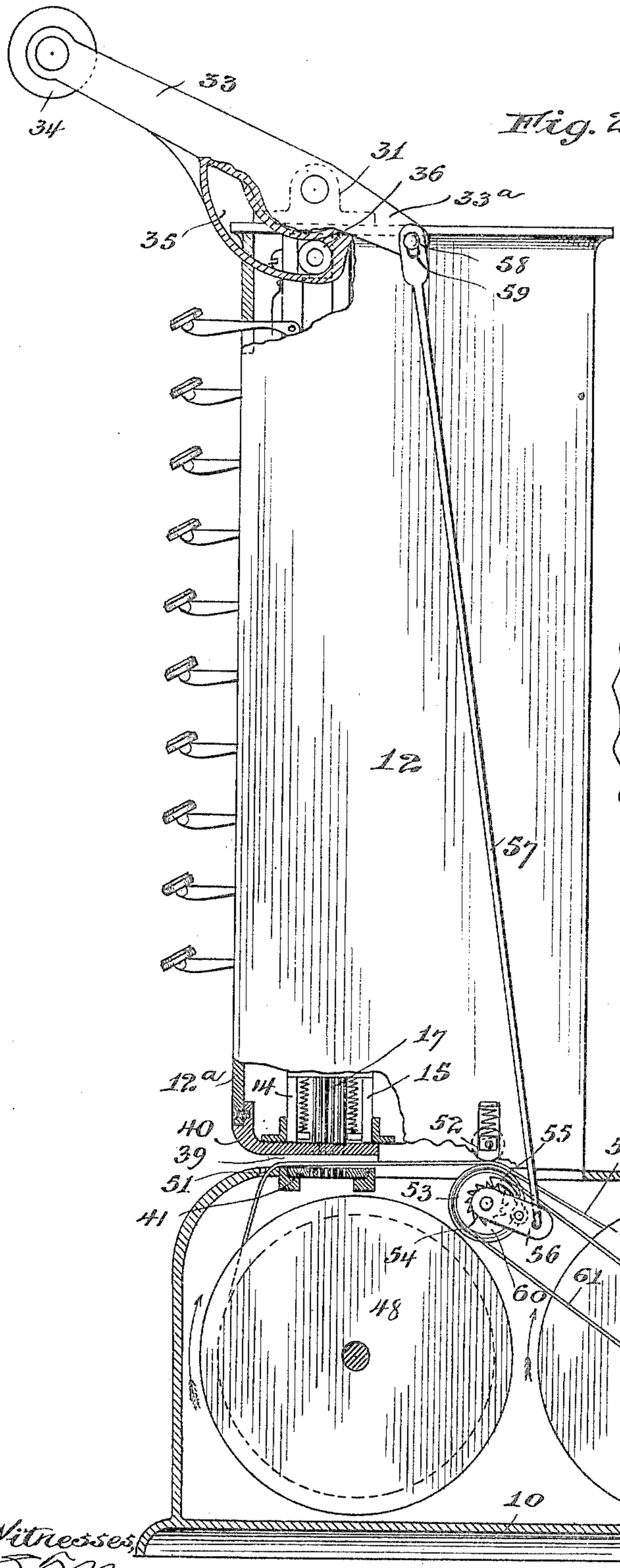
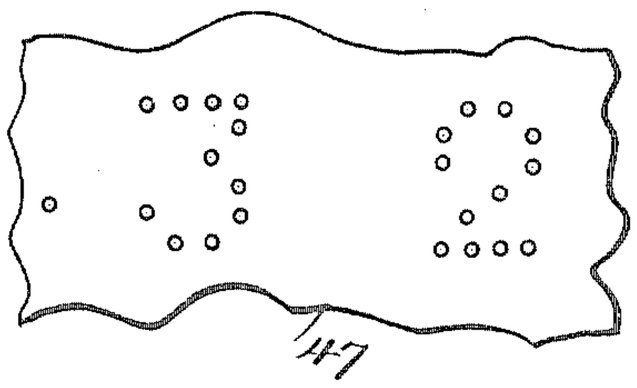


Fig. 6



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4 SHEETS—SHEET 3.

Fig. 3.

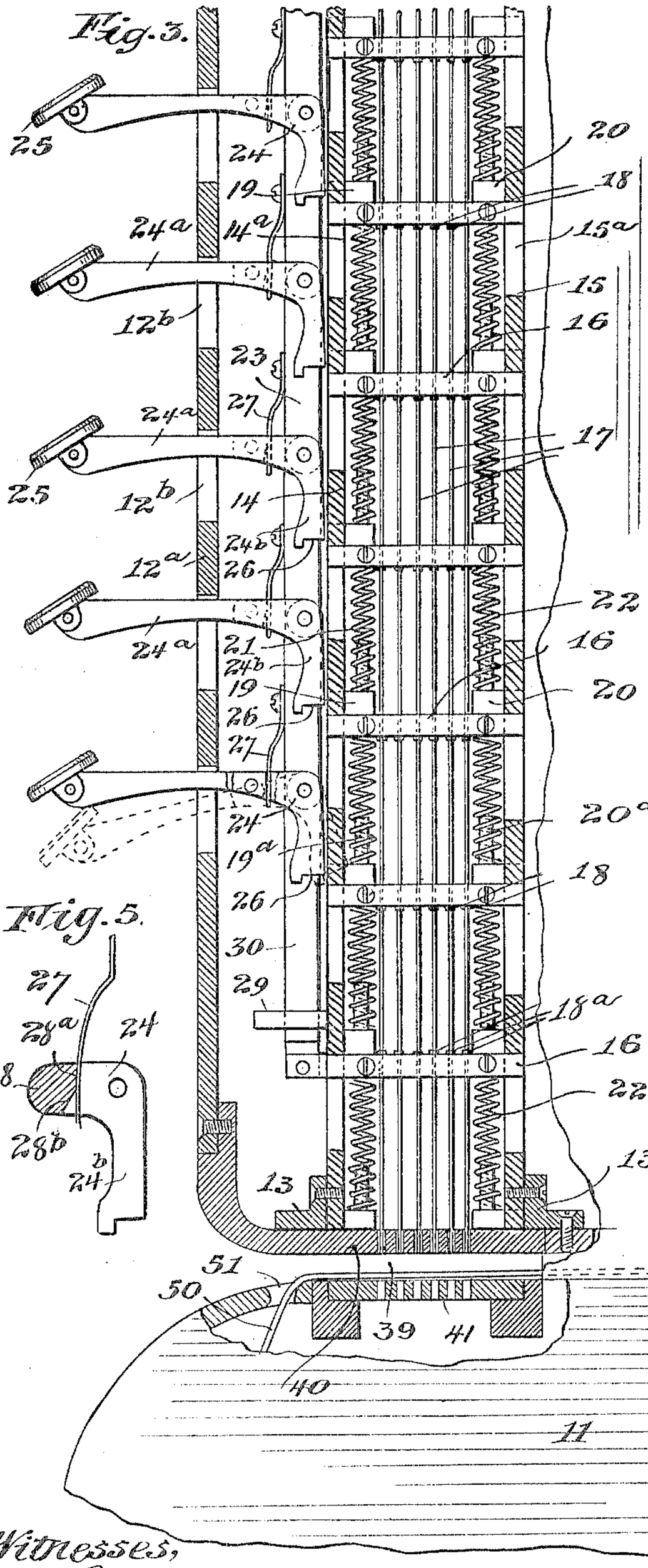

Fig. 5.

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4 SHEETS—SHEET 4.

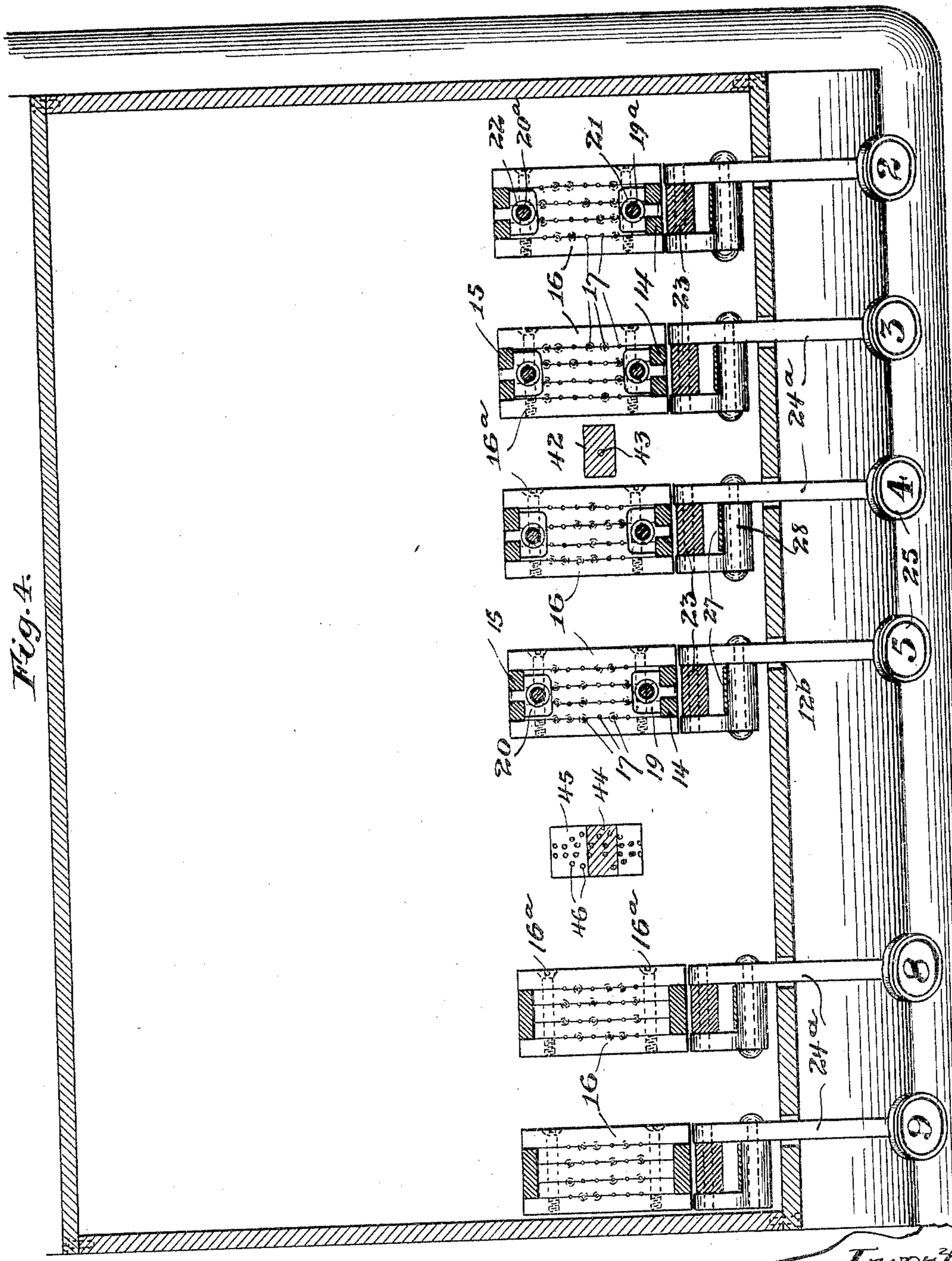

Fig. 4.

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UNITED STATES PATENT OFFICE.

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PERFORATING-MACHINE.

No. 804,485. Specification of Letters Patent. Patented Nov. 14, 1905.

Application filed August 29 1904. Serial No. 222,555.

To all whom it may concern:

Be it known that I, ROBERT H. LITTLE, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Perforating-Machines, of which the following is a specification.

My invention relates to that class of perforating-machines which are designed for use in stores and other commercial establishments and which serve to indicate the amount of sales or other financial transactions by means of numbers punched in cash checks or slips. Such a mode of registration is preferable to the ordinary mode consisting simply of written numbers or characters in that it makes a permanent and unalterable record.

The object of my invention is to provide a machine for the purpose specified which shall be simple and inexpensive in point of manufacture and certain and reliable in operation.

In its main features my invention is designed to record on cash-slips by means of perforations the amounts of sales, &c; but as important and valuable accessories the machine in its more perfect form, as herein shown, is designed to simultaneously record a number or symbol indicating the identity of the salesman or operator and also to make a permanent duplicate record on a continuous sheet of each transaction in a form to facilitate the ready computation of the total of the amounts recorded and their comparison with the separate slips or checks.

To these and other minor ends my invention consists in a perforating-machine for the uses and purposes stated and generally analogous purposes constructed and operating substantially as hereinafter described, and more particularly pointed out in the claims.

My invention in a preferred mechanical form thereof is illustrated in the accompanying drawings, wherein—

Figure 1 is a face elevational view of the machine with certain parts in vertical section. Fig. 2 is a side elevational view of same, partly broken out and in section, to show the interior construction. Fig. 3 is an enlarged detail side elevational view, partly broken out and in section, to more clearly illustrate the interior mechanism. Fig. 4 is a horizontal sectional view substantially on the offset line 4 4 of Fig. 1. Fig. 5 is a detail view illustrating the key-controlling mechanism, and Fig. 6 is a fragmentary plan view of a cash slip or check perforated by the machine.

Referring to the drawings, 10 designates a bed or base plate on which is mounted a box or casing 11, adapted to contain the mechanism for supporting and operating a duplicate record in the form of a continuous sheet or strip. Superposed on the casing 11 is an upright box or casing 12, herein shown as rectangular in form and adapted to house the principal mechanism of the machine. Within the casing 12 and just behind the removable front plate 12ª thereof are mounted and secured, as by means of angle-brackets 13, Fig. 3, a series of front and rear guide-bars 14 and 15, respectively. These guide-bars are provided at intervals with rectangular notches 14ª and 15ª, respectively, which receive and afford a limited vertical play to the projecting ends of a corresponding series of horizontally-disposed plates 16, these latter being provided with a series of vertical apertures adapted to accommodate a series of vertical perforating-rods 17. As shown in Fig. 4, the plates 16 are preferably formed by a series of edgewise contacting strips united by screws 16ª, and the perforations for the accommodation of the perforating-rods 17 are preferably formed in and through the joints between these strips, this construction facilitating the ready assembling and separation of the parts. Each plate 16 is, as herein shown, provided with a series of twenty-four apertures arranged in four longitudinal rows of six each and six transverse rows of four each. Each vertical stack of perforating-rods contains eleven superposed perforated plates, the first ten of which, counting from the upper plate downwardly, correspond with the numerals "1" to "9," inclusive, and "0," respectively—that is to say, the depression of these plates so actuates the perforating rods or needles as to cause the latter to perforate the numerals "1" to "9," inclusive, and "0" through the following mechanism: Beneath the uppermost plate certain of the perforating-rods which are so situated as to unitedly form the numeral "1" are provided with selective devices in the form of fixed collars 18, so that the depression of the plate carries with it these rods, the plate sliding idly over the other rods of the series not similarly provided with collars. Directly beneath the second plate from the top those rods whose rela-

tive disposition forms an outline of the numeral "2" are similarly provided with selective collars 18, and so on down through the series, including the next to the last plate, which causes the perforating-rods to register the numeral "0." The lowermost plate 16 has a different function, its office being to return or restore all of the rods to elevated positions after the perforating operation. For this purpose all of the rods passing therethrough are provided with collars 18[a], which collars are located above and in contact with the upper surface of the plate instead of below the latter.

Secured to and projecting inwardly from the inner faces of the guide-bars 14 and 15 are horizontally-extending lugs 19 and 20, respectively, which form supports on which are stepped the lower ends of front and rear coil-springs 21 and 22, respectively, the upper end of which springs bear against the under sides of the several superposed plates 16, thus serving as a means for normally maintaining said plates elevated and for returning them to elevated positions when depressed. The lugs 19 and 20 are preferably provided with posts 19[a] and 20[a], respectively, telescoping the lower ends of the springs and retaining the latter against possible displacement.

Referring now to the means for effecting the depression of the plates and rods to register the desired or predetermined numbers or values, 23 designates each of a series of key-bars depressed parallel with and directly in front of the front guide-bar 14 of each stack. These key-bars are so mounted in the frame or housing as to be capable of a limited vertical sliding movement therein, and each pair has pivotally mounted edgewise thereof a series of keys 24, said keys having the general form of a rectangular bell-crank lever and being pivoted to the key-bars at their elbows, thus providing a horizontally and forwardly extending arm 24[a] and a vertically-depending shorter arm 24[b]. The horizontal arms 24[a] play in and through slots 12[b] in the removable front wall of the casing 12 and are provided on their ends with tips or buttons 25, bearing the numerals "1" to "9," inclusive, and "0," counting from top to bottom. The lower ends of the depending arms 24[b] are provided with rectangular notches 26, which when the keys are depressed are adapted to engage and overlie the several plates 16, thereby rendering the arms 24[b] operative connections to depress the plates upon the depression of the key-bars. As a convenient means for retaining the key-lever in both operative and inoperative relation to the plates 16 I provide a series of leaf-springs 27, which are secured at their upper ends to the front face of the key-bar and engage at their free ends flat angularly-disposed surfaces 28[a] and 28[b], formed on the inner side of lateral projections 28 of the several key-levers slightly in advance of their pivots. The lower end of each key-bar 23 is rigidly connected to the forwardly-projecting end of the lowermost of the series of plates 16, so that the depression of the bar depresses said lowermost plate in all cases. Any suitable means may be provided to guide the key-bar in its vertically-reciprocating movements, the device herein shown for that purpose consisting of a forwardly-projecting pin or lug 29, secured to the face of the front guide-bar 14 and extending through a vertical slot 30 in the key-bar. (See Fig. 3.)

The means which I have herein shown for effecting the vertical reciprocations of the several key-bars consists of the following: Rotatably mounted in a pair of bearing-blocks 31, mounted on top of the casing 12 and extending transversely across said casing, is a shaft 32, on the projecting ends of which are keyed a pair of forwardly-extending arms 33, in and between the forward ends of which is secured a handle 34. Each of the arms 33 has a depending edgewise extension located beneath its pivotal point, in the inner face of which extension is formed a cam-shaped slot 35, these slots engaging the rollers 36, mounted in the ends of a transversely-extending bar 37, to which the upper ends of the several vertical key-bars are attached, as best shown in Fig. 1. A coil-spring 38, secured at one end in the shaft 32 and at the other end in one of the bearing-blocks 31, normally tends to turn the shaft in a direction to maintain the arms and handle in the elevated positions shown in Figs. 1 and 2, in which position the rollers 36 engage the inner or rear ends of the slots 35, as shown in Fig. 2, which corresponds to the elevated position of the cross-bar 37 and the several key-bars.

Between the lower end of the forward portion of the casing 12 and the top of the forward portion of the casing 11 is a horizontal slot 39, Fig. 3, formed between the upper and lower plates 40 and 41, respectively, which plates are perforated in vertical alinement with the perforations of the several punching-rod-actuating plates 16, so that said punching or perforating rods when depressed travel across and through the horizontal slot 39.

The machine as thus far described is complete for the purpose of recording memoranda of cash and other items on cash or memoranda slips.

The machine may be provided with any desired number of vertical series of keys, which latter may represent denominations of units, tens, hundreds, and upward, respectively, as well as other indicia indicating the identity of the salesman or operator. In the machine herein illustrated I have shown, at the right of Fig. 1, two columns, representing the units and tens, respectively, of the cents series, and inwardly of the same two other columns, representing, respectively, units and tens of the

dollars series. In order to properly divide the two series, I interpose between the units-column of the dollars series and the tens-column of the cents series a single depending bar 42, attached at its upper end to the cross-bar 37 and carrying at its lower end a single punch 43, designed to make a decimal-point. On the left-hand side of the machine as shown in Fig. 1 I have shown two vertical columns of keys, which in respect to mechanical construction are or may be identical with the columns at the right-hand side of the machine and which are designed to register any number from "0" to "99," serving as an identifying-number for the salesman or operator. Between the latter group of keys and the cash-indicating group is inserted a vertical bar 44, attached at its upper end to the cross-bar 37 and at its lower end carrying a head 45, Fig. 4, from which depend a series of punch-rods 46, arranged to form the dollar symbol, ($.)

In operating the machine as thus far described the memorandum-slip, which may consist of a strip of thick paper or cardboard, a fragment of which is indicated at 47 in Fig. 6, is inserted within the slot 39. Assuming for the sake of illustration that the operator's number is "98" and the amount of the sale to be recorded is fifty-four dollars and thirty-two cents the operator first depresses the "9" and "8" keys of the left-hand columns and the appropriate keys of the dollars and cents columns, which depressed keys will assume positions corresponding to that indicated by dotted lines in Fig. 3, whereby the depending arms of the several keys are carried inwardly into engagement with the several reciprocatory punch-operating plates with which they respectively coöperate. This done, a single downward swing of the handle 34 through the cam-slots 35 and rollers 36 carries downwardly the cross-bar 37 and all of the several key-bars and dollar ($) and decimal-point indicating-bars connected thereto. By this operation the punch-rods forming the dollar and decimal symbols are carried through the inserted slip, perforating the latter, and at the same time those of the punch-rods in each stack, which unite to form an outline of the numeral indicated by the depressed key cooperating therewith, are simultaneously depressed and the numerals formed by perforations in the slip, the latter when removed showing at the left the operator's number "98," and at the right the cash item assumed for the illustration, the right-hand portion of the slip showing the cents-mark being illustrated in Fig. 6. The depression of each key causes the spring 27 to engage the lower flat surface 28^b of the key-lever, thus holding the key in depressed position. When the key-bar has been fully depressed, the lower edge of the key strikes the bottom of the slot 12^b, thus automatically restoring the key to horizontal position and releasing its engagement with the punch-rod-operating plate 16. Upon the release of the handle 34 the coil-spring 38 acts to restore the handle to an elevated position, this motion automatically lifting the series of key-bars, which latter operation is assisted by the lowermost series of spring-coils 21 and 22, thrusting upwardly against the lower plate 16, which is connected to the lower end of each key-bar. It will be observed that the lowermost plate 16 in each vertical series coöperating with the collars 18^a serves the important function of lifting all the punch-rods of each series after each perforating operation, and thus clearing the slot 39 for the insertion of the next slip. At the same time this lowermost plate by reason of its connection to the key-bars is carried downwardly with each depression of the bars, and thus does not interfere with the downward thrust of such punching-rods as are called into operation by the manipulation of any of the keys.

For the purpose of effecting a connected duplicate record of successive registrations on a single sheet I preferably equip the machine with mechanism such as the following: In the box or casing 11 are horizontally mounted a pair of drums 48 and 49, Fig. 2, the former of which carries a roll of paper adapted to be delivered to the latter, the strip constituting this roll being designated by 50. This strip is carried from the roll 48 upwardly through a slot 51 in the top of the casing 11 over the lower stationary perforated plate 41, thence between a pair of guide and tension rolls 52 and 53 to the axis of the drum 49. As a means for actuating the latter drum in a direction suitable to wind the strip thereupon I provide on one face of the roll 53 a ratchet-disk 54, with which coöperates a hooked pawl 55, carried by an arm 56, loosely mounted on the shaft of the roll 53, said arm having a connecting rod or link 57 extending upwardly to and connected with a rearward extension 33^a of one of the arms 33. This latter connection is a lost-motion connection, conveniently formed by a pin 58 in the arm engaging the longitudinal slot 59 in the end of the connecting-link. (See Fig. 2.) On one end of the roll 53 is a pulley 60, which through a belt 61 drives a corresponding pulley 62 on the shaft of the drum 49, thus actuating the latter. From the foregoing it will be seen that by inserting the memorandum-slip 47 in the slot 39 a single downward movement of the handle 34 will effect the simultaneous and duplicate perforation of both the slip and the strip. As the handle returns to its elevated position under the action of its return-spring the lost motion between the arm 33^a and the link 57 permits the retraction of the punching-rods from the strip 50 before the link 57 is actuated, after which on a continued upward movement of the handle 34 the link 57

is depressed and through the pawl-and-ratchet mechanism described effects a partial rotation of the roll 53 and through the belt-and-pulley connections to the drum 49 turns the latter through a partial rotation to bring a fresh unperforated portion of the strip beneath the punch-rods.

From the foregoing it will be seen that the machine of my invention provides a simple and easily-manipulated means for recording in an indelible and unalterable manner memoranda connected with the sale of merchandise or other matters, at the same time in its most complete form creating a duplicate record of the same character in a form convenient for subsequent totalizing.

It is evident that the machine as described and shown may be varied and modified in respect to unessential details without departing from the principle of the invention or sacrificing any of the advantages thereof. Hence I do not limit the invention to the particular form, construction, and arrangement of parts herein shown and described except to the extent indicated in specific claims.

I claim—

1. In a perforating-machine of the character described, the combination with a group of punch-rods, of a movable key-supporting member, a plurality of keys mounted on the latter each bearing a symbol, means whereby each of said keys is, when actuated, operatively connected with a plurality of punch-rods of the group, which combine to form the symbol borne by the key, and means for actuating said key-supporting member, substantially as described.

2. In a perforating-machine of the character described, the combination with a group of punch-rods, of a reciprocable key-bar disposed alongside of said punch-rods, a plurality of keys mounted on said key-bar each bearing a symbol, means whereby each of said keys is, when actuated, operatively connected with a plurality of punch-rods of the group, which combine to form the symbol borne by the key, and means for actuating said key-bar, substantially as described.

3. In a perforating-machine of the character described, the combination with a group of punch-rods, of a plurality of independently-reciprocable apertured plates through which said punch-rods pass, a reciprocable key-bar disposed alongside of said punch-rods, a plurality of keys mounted on said key-bar each bearing a symbol and adapted, when actuated, to operatively engage said apertured plates, means for actuating said key-bar, and selective devices through which the operative movement of each plate is transmitted to those rods which combine to form the symbol borne by its coöperating key, substantially as described.

4. In a perforating-machine of the character described, the combination with a group of punch-rods, of a plurality of independently-reciprocable apertured plates through which said punch-rods pass, a reciprocable key-bar disposed alongside of said punch-rods, a plurality of keys mounted on said key-bar each bearing a symbol and adapted, when actuated, to operatively engage said apertured plates, means for actuating said key-bar, and selective contact devices carried by said rods and engaged by said plates in the operative movement of the latter, the contact devices coöperating with each plate being applied only to such rods as combine to form the symbol borne by the coöperating key of said plate, substantially as described.

5. In a perforating-machine of the character described, the combination with a group of punch-rods, of a plurality of independently-reciprocable apertured plates through which said punch-rods pass, a reciprocable key-bar disposed alongside of said punch-rods, a plurality of key-levers pivotally mounted on said key-bars and adapted, when depressed, to operatively engage said apertured plates, means for actuating said key-bar, selective contact devices carried by said rods and engaged by said plates in the operative movement of the latter, automatic means for returning said apertured plates to normal position, and automatic means for returning said punch-rods to normal position, substantially as described.

6. In a perforating-machine of the character described, the combination with a group of punch-rods, of a reciprocable key-bar disposed alongside of said punch-rods, a plurality of key-levers pivotally mounted on said key-bar each bearing a symbol, means whereby each of said key-levers is, when depressed, operatively connected with those punch-rods of the group which combine to form the symbol borne by said key-lever, means for actuating said key-bar, and means for retaining each key-lever in its assumed position both when elevated and when depressed, substantially as described.

7. In a perforating-machine of the character described, the combination with a plurality of groups of punch-rods, of a corresponding plurality of reciprocable key-bars operatively associated with said groups of punch-rods, respectively, a plurality of keys mounted on each of said key-bars, each bearing a symbol, punch-rod selecting and operating connections between each key and a plurality of punch-rods of the group associated therewith, which combine to form the symbol borne by said key, and means for simultaneously actuating all of said key-bars, substantially as described.

8. In a perforating-machine of the character described, the combination with a plurality of upright groups of punch-rods arranged side by side, of a corresponding plurality of upright reciprocable key-bars coöperatively associated with said groups of punch-rods, re-

spectively, an upright row of keys mounted on each of said key-bars, punch-rod selecting and operating connections between each key and its associated group of punch-rods, a transverse bar connecting all of said upright key-bars, means for depressing said transverse bar, and automatic means for restoring said transverse bar to normal position, substantially as described.

9. In a perforating-machine of the character described, the combination with a group of punch-rods, of a movable key-bar, a series of keys mounted on said key-bar, each bearing a symbol, selecting and operating connections between each key and those punch-rods of the group which combine to form the character borne by the key, a key-bar-actuating device, means for supporting and feeding a strip of paper or the like across the path of said punch-rods, and strip-feeding means connected with and actuated by said key-bar-actuating device on its return movement, substantially as described.

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