

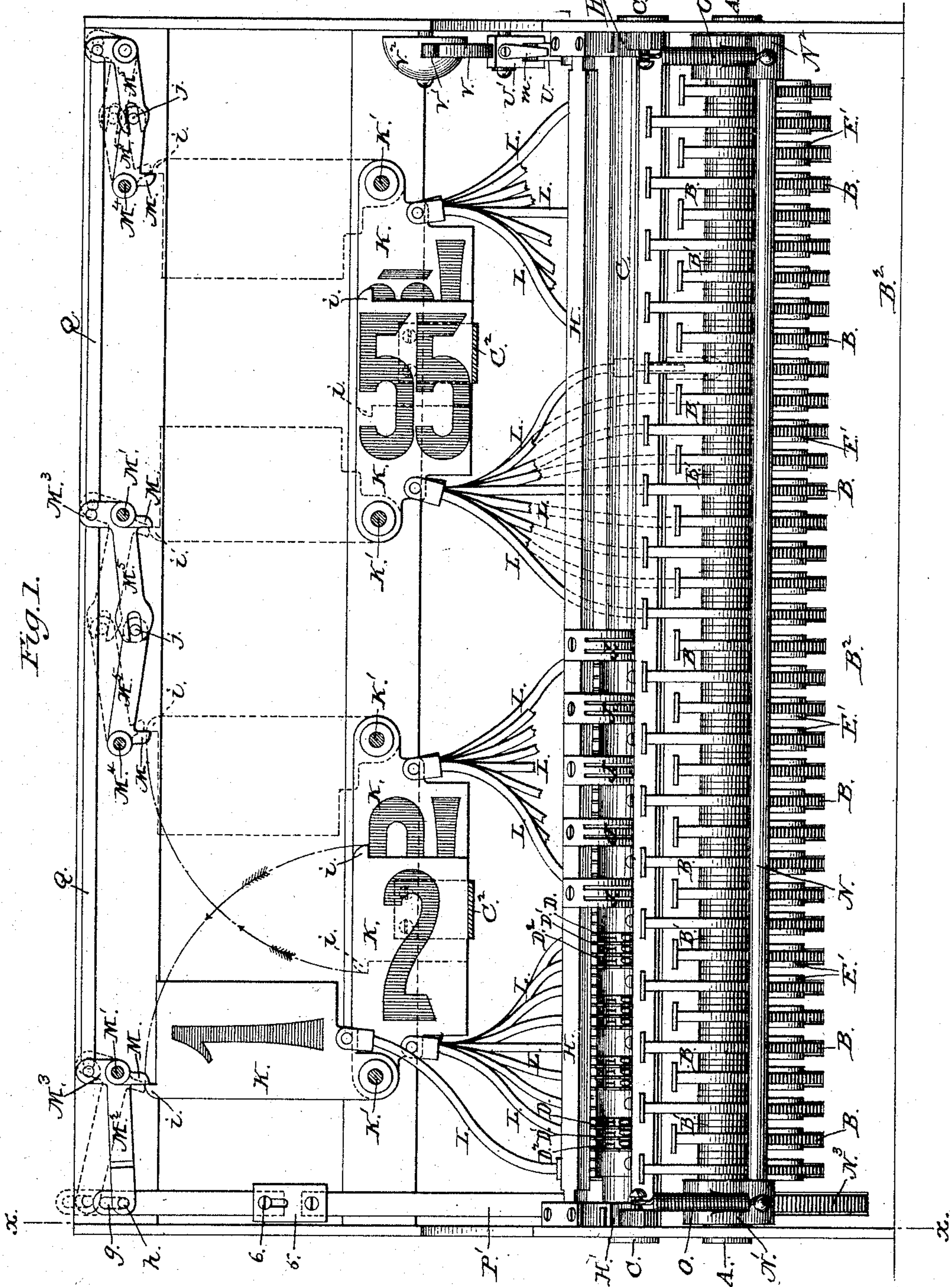
(No Model.)

3 Sheets—Sheet 1.

W. KOCH.
CASH REGISTER.

No. 354,867.

Patented Dec. 21, 1886.



Attest:
John A. Ellis.
Rena Dolson

Inventor:
William Koch
By David A. Burr
Atty.

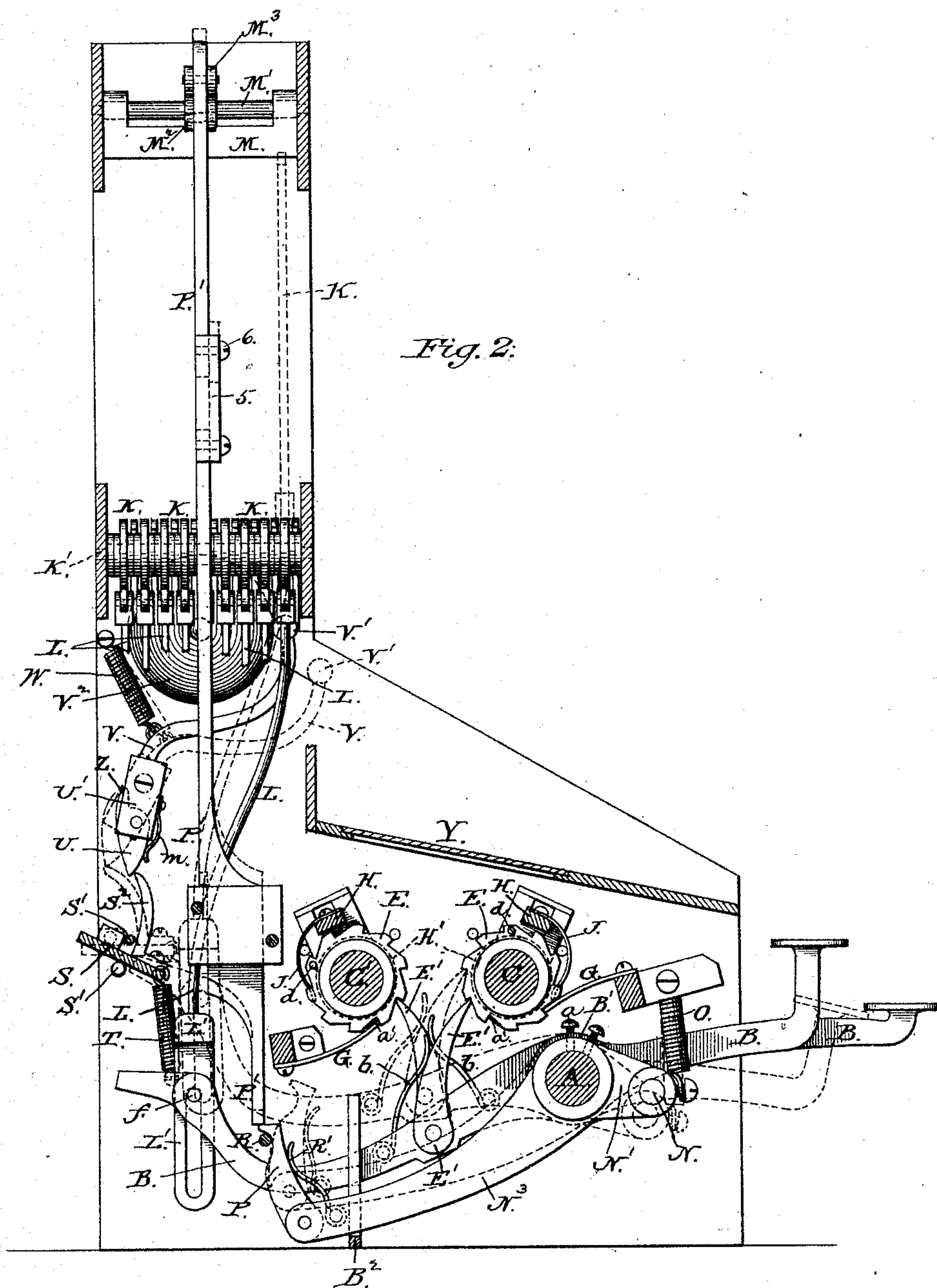
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3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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Fig. 3.

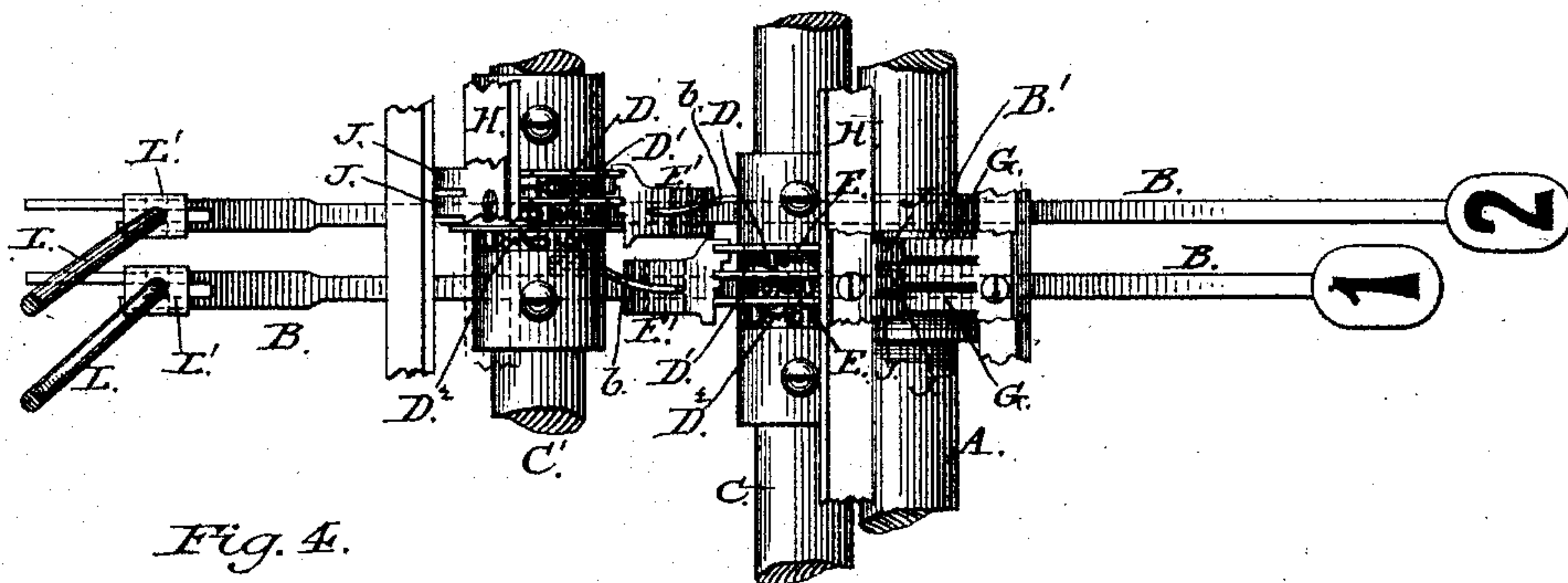


Fig. 4.

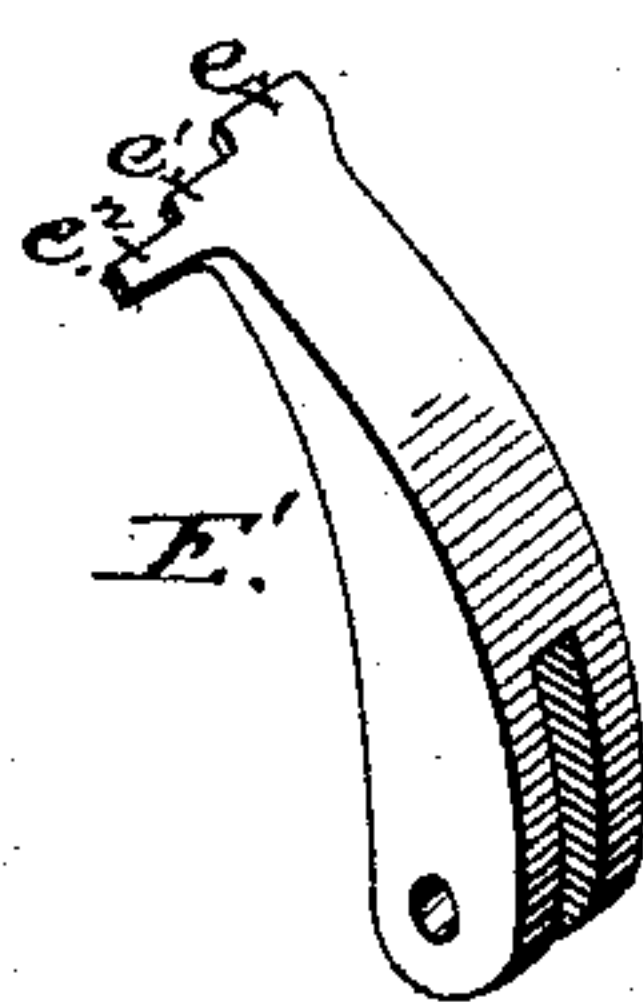


Fig. 5.

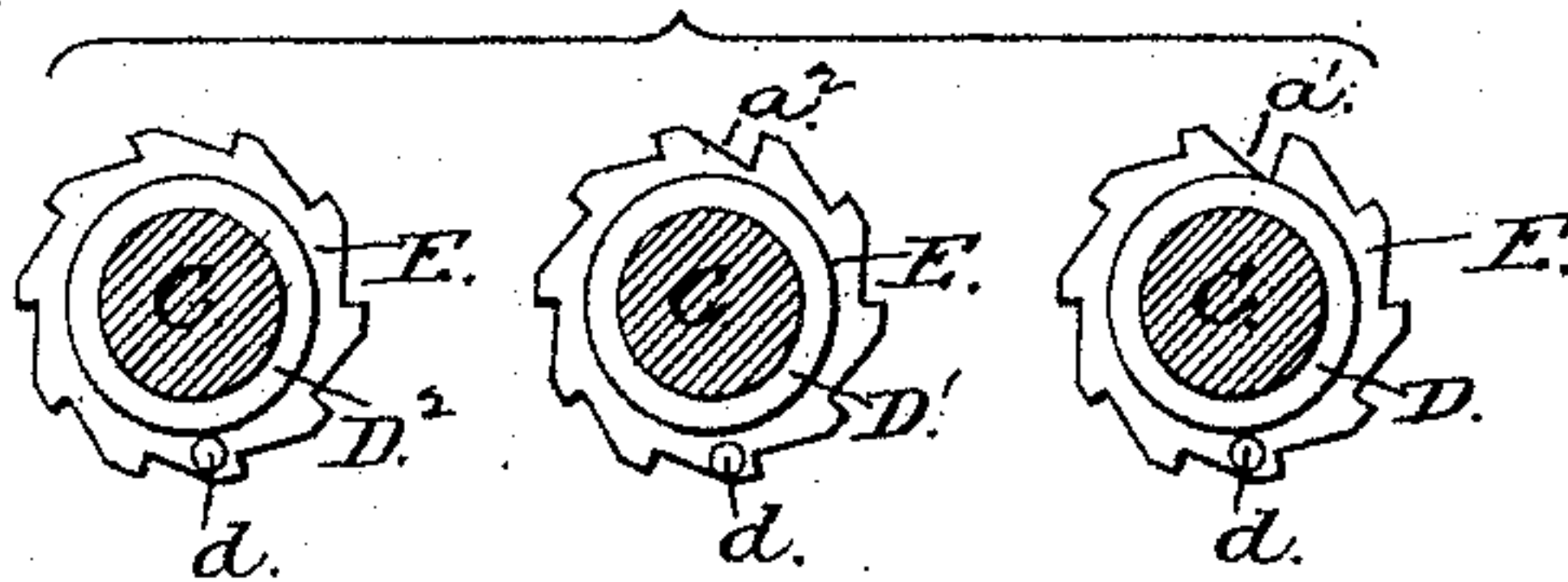


Fig. 6.

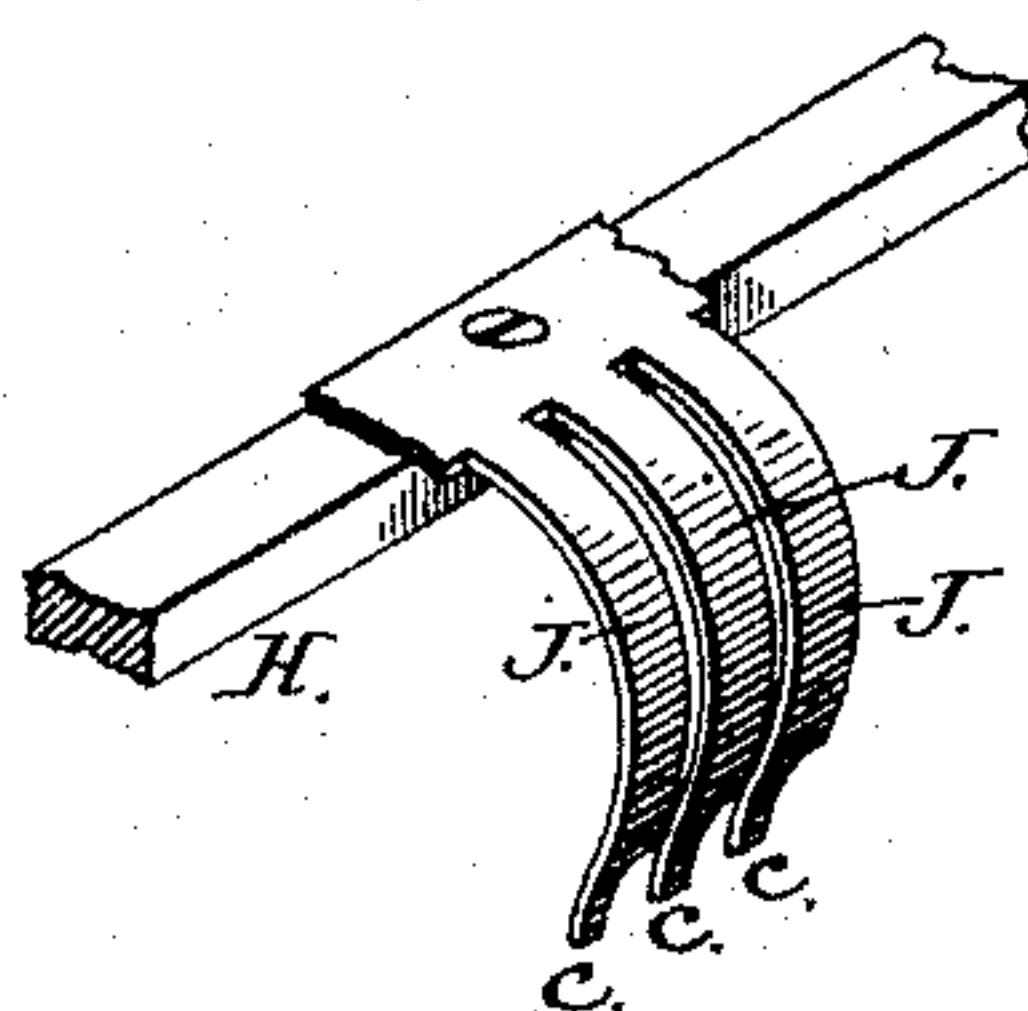


Fig. 7.

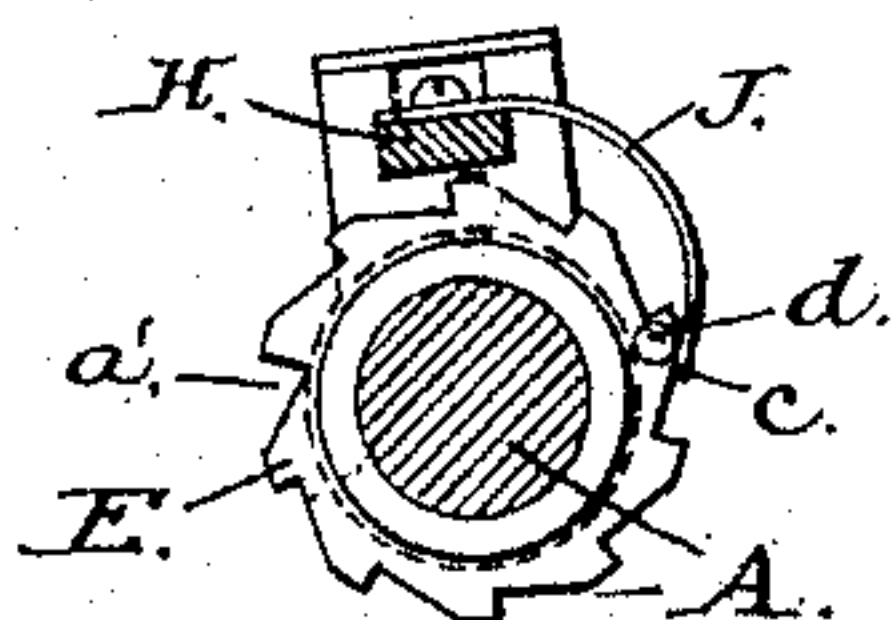
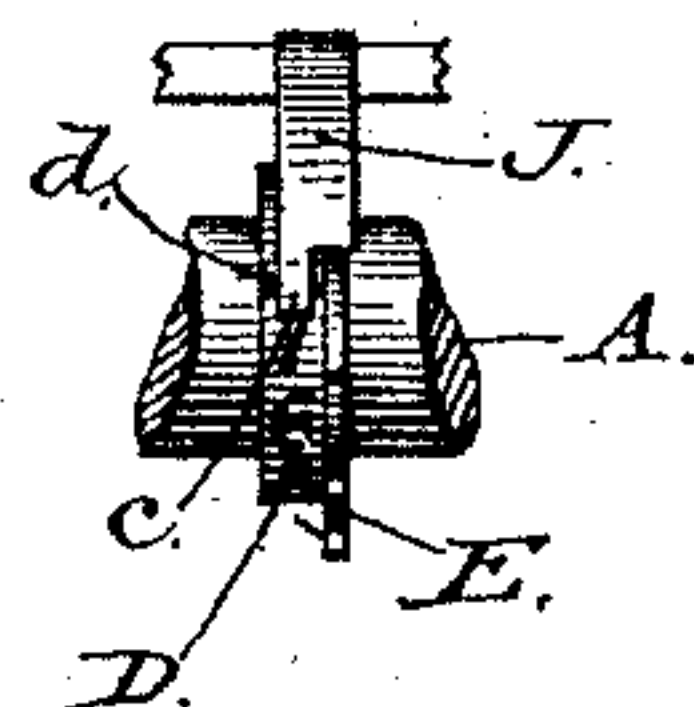


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 354,867, dated December 21, 1886.

Application filed February 5, 1886. Serial No. 190,900. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, a resident of the city, county, and State of New York, have invented certain new and useful
5 Improvements in Cash-Registers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a
10 part of this specification, in which—

Figure 1 is a front elevation of my improved machine with its casing removed, a portion only of the adding-wheels and resetting-pawls in position, and with a part of the
15 tablet-rods broken away. Fig. 2 is a vertical section in line *xx* of Fig. 1, affording a side elevation of the operative mechanism of the machine; Fig. 3, an enlarged detail plan of two of the keys and key-levers, and of a portion
20 of the axial shafts carrying the registering-wheels actuated by said keys, and of the shafts beneath upon which said keys are pivoted; Fig. 4, an enlarged detailed view of one of the pawls actuating a set of these registering-wheels, the ratchets pertaining to the set
25 being illustrated severally in detail in Fig. 5; Fig. 6, an enlarged detail in perspective of one set of the spring-pawls secured to the vibrating bar by whose movement the entire set
30 of registering-wheels on each shaft are all reset to their zero-point; Fig. 7, an enlarged side view of one of the said spring-pawls, with the shaft carrying the ratchet in section, illustrating the disengagement of the pawl by means
35 of the lateral pin on each ratchet; and Fig. 8 a front view of the same.

My invention relates to that class of cash registers and indicators in which a separate
40 key is employed to add the amount of each payment made of any one kind to the sum of the previous payments of similar amounts, the amount of the payment last made and registered being indicated upon an appropriate
45 tablet brought to view by the movement of the key, which causes said amount to be added and registered, and the fact of its registry indicated as soon as accomplished by the automatic ringing of a bell.

It has for its object to produce a simple apparatus to accomplish these results more efficiently than heretofore, and especially to provide for the exhibition of the amount paid and

registered at each movement of the several keys more conspicuously, and upon a larger tablet within the same space than in the machines now in use. 55

The machine is constructed with a suitable frame inclosed in an outer casing in the customary manner.

In the drawings, A represents the longitudinal shaft mounted in the frame, upon which the entire series of key-levers B B are loosely pivoted. These key-levers are placed side by side and separated by interposed collars B' B', secured to the shaft by set-screws *a a*.
60 For the sake of convenience in striking the keys, the outer arms of the key-levers are bent so that they shall be disposed in two banks, one slightly below and in front of the other, as shown in Fig. 2, every other key being thus brought into a different bank or row,
70 as shown in Fig. 1. The inner ends of the keys are brought to the same level and pass each through a vertical guide-slot cut in the upper edge of a transverse plate, B², as shown
75 in Fig. 2.

In order to obtain all possible compactness in the construction of the machine, the registering-wheels to be operated by the keys are fitted to rotate in sets on two parallel shafts, C C', which are mounted, in the customary manner, parallel with the axial shaft A, slightly above and in the rear thereof, as shown in Fig. 2, and the wheels for the upper row or bank of keys revolve on the one shaft, C, and those
80 for the lower row upon the other, C'. Three decimal-wheels, D D' D², indicating, respectively, the first, D, the number represented by the key which actuates it and nine multiples thereof; the second, D', the same figures, with
90 the decimal-point removed one place, and the third, D², also the same figures, with the decimal-point two places to the right, constitute a set, and each set is actuated by a single key. Each wheel is formed with a lateral ratchet,
95 E, concentric therewith, having ten teeth adapted to be engaged by a single pawl, E', pivoted to the inner arm of the key-lever. Each movement of the key will thus operate to turn the wheel engaged by the pawl one-
100 tenth of a revolution.

The pawl E' is made wide enough to overlap the ratchets of all three of the wheels in each set, and is provided at its end with three off-

sets or teeth, e e' e^2 , to engage separately the ratchet of each wheel, each tooth in order being longer than that preceding it. The longer tooth, e , engages the ratchet of the units-wheel D; but a single notch, a' , is cut in the periphery of said wheel to permit the tooth e and pawl to drop far enough to permit the second tooth, e' , of the pawl to engage the ratchet of the next or tens-wheel, D' . This also is provided with a single deep notch, a^2 , whereby when it is in line with the deep notch a' in the units-wheel the pawl is permitted to drop far enough to allow of its engagement with the third or hundreds-wheel, D^2 . Hence the tens-wheel D is carried forward one move at each revolution of the unit-wheel D' , and the hundreds-wheel D^2 one move at each revolution of the tens-wheel D' , all in manner as is well known to the art. The proper contact of each pawl E' with the ratchets engaged thereby is maintained in the usual manner by a spring, b . The reverse movement of the adding-wheels D D' D^2 in each set is prevented by a fixed spring-actuated pawl, G . (See Fig. 2.)

The sets of wheels on the two shafts C C' are fitted to rotate, respectively, in opposite directions, the actuating-pawls on the two banks of keys being made to engage them appropriately from opposite directions, as shown in Fig. 2.

For the purpose of bringing readily to the zero-point the entire series of registering-wheels on each of the shafts C C' , upon which they revolve, said shafts are left free to rock or rotate reciprocally each in its bearings, and a longitudinal bar, H , is supported above the shaft, parallel therewith, and secured at either end thereto by means of radial arms projecting from collars H' H' fixed thereon. If preferred, the shaft may be fixed and the collars H' H' left free to rotate thereon. In either case the bar H is left free to oscillate over the wheels upon their pivotal axis as a center. From this bar H a series of pawls, J , are made to project, to engage severally the ratchet-teeth E on the several wheels in the series, so that an oscillation of the bar H may operate to turn each and every one of said wheels. The end of each pawl J is made, however, wider than the periphery of the ratchet which it engages, and is formed with a projecting finger or offset, c , to overlap the side of the wheel, so as to strike upon a pin, d , projecting laterally from the wheel. (See Figs. 2, 5, and 7.) This pin is so placed with reference to the pawl as that when the wheel has been revolved by the intermittent movement of the pawl until the zero-point on its periphery is brought to view the pin passes under the finger c of the pawl, whereupon the finger will ride up upon the pin and thereby lift the pawl out of engagement with the ratchet, as shown in Fig. 7, and so prevent any further movement of the wheel by means thereof. The oscillation of the bar H will thus cause each and every wheel in the series to rotate until its zero-point is brought to view on a line common to all, a further movement of each wheel

being prevented at that moment by the position of its lateral pin d , operating as described to lift and disengage its actuating-pawl. By this means the entire series of wheels will be severally brought to zero before the bar H has been oscillated a sufficient number of times to effect a complete revolution of any one of them.

A series of large tablets, K K , are so pivoted at their inner or lower ends, each at one side of a median line, upon a series of fixed rods, K' K' , fixed at right angles to the shafts C C' , as that they will, when set free, drop automatically by their weight, each from an upright to a horizontal position, as shown in Fig. 1, being stopped in their horizontal position by a suitable cross-bar or plate, C^2 , fitted to support their top or outer ends. These tablets are preferably arranged in sets of nine, the tablets in each set being pivoted in common upon a separate axial rod, K' . Each tablet bears upon its face in large figures a number corresponding to the value of the key by which it is operated. The first set at the left comprises the tablets bearing the numbers from 1 to 9; the second those bearing numbers from 10 to 50, increasing by fives; the third in the same order of progression from 55 to 95; the fourth from 100 by hundreds to 900, and so on. The lower end of each tablet is coupled by a rod, L , pivoted thereto at one end and to the inner end of one of the key-levers at the other, the pivotal connection of the rod with the key-lever being preferably made by means of a slotted plate, L' , at the end of the rod (see Fig. 2) which is embraced edgewise by a fork at the end of the lever, the two arms of the fork being connected by a transverse pin, f , extending through the slot in the plate L' . This slot is so proportioned in length as that when the tablet to which the rod L is pivoted is swung down into its horizontal position and the outer end of the key-lever elevated in its normal position the upper end of the slot will rest upon the pin f , so that when by a depression of the key the inner end of the lever is swung up the rod L will be elevated, and its upward movement will operate to swing its connecting tablet into its vertical elevated position, bringing thereby the number thereon into full view through a suitable opening left for the purpose in the casing of the machine. Each tablet is formed with an offset or lug, i , projecting from its outer corner in line with the pivot at its inner corner, and when the tablet is thrown up by the depression of its key it is caught and held by the lower edge of a plate, M , depending from a transverse rock-shaft or rod, M' , mounted in position to rotate reciprocally upon its axis over each set of tablets, parallel and immediately over the fixed rod K' , upon which they are pivoted. As the offset i upon the tablet strikes the plate M the plate will swing and yield sufficiently to allow the offset to pass under it, but being prevented from swinging freely in the opposite direction beyond a vertical plane, the plate will serve to

prevent a return of the tablet and will thus uphold it and its rod L in their elevated position, the length of the slot in the rod-plate L' permitting, however, the key-lever and key which actuated it to return to its first or normal position independently thereof. Each key is elevated automatically when released and is upheld when at rest by the superior weight of the inner end of its key-lever B.

A bar, N, is mounted to extend under the entire series of keys in front of and parallel with the key-shaft A upon arms N' N², at either end thereof, pivoted to said shaft, the bar being upheld against the keys by a spring or springs, O, engaging one or both arms. One of said pivoted arms, N', is extended rearwardly beyond its pivotal bearing, and upon the end of this extension N³ a dog, P, is pivoted so as to project upward therefrom and engage the foot of a vertically-sliding bar, P', (see Fig. 2,) whose upper end is slotted at g to engage a pin, h, on the end of a horizontal arm, M², made fast to the one rock-shaft M', which carries the catch-plate M. (See Fig. 1.) By this means the upward movement of the extension-arm N³, produced by a depression of the bar N, will cause the shaft M' to vibrate far enough to carry the edge of the catch-plate M out free from the offset i of the tablet upheld thereby, and the released tablet, by reason of the eccentricity of its pivot, will thereupon swing over and drop automatically into its horizontal position. The slot g at the end of the bar P' permits the pin h to move freely and independently therein upward when said bar is at rest, so as to allow an independent oscillation of the rock-shaft M' and plate M sufficient to permit the offset i on the tablet K to slip forward under the plate and be caught thereby, as hereinbefore described.

The one transverse shaft M', which is actuated directly by the bar P', through the intervention of the arm M², as described, is coupled to all the other rock-shafts, M', carrying a catch-plate, whose movements are required to correspond therewith, by means of a radial arm, M³, projecting vertically from the corresponding shafts M', and a longitudinal coupling-rod, Q, pivoted to each, as shown in Fig. 1.

For the sake of greater compactness the indicating-tablets K K in every alternate set are made to drop toward the adjacent set, so that the tablets in the two sets shall interfold when dropped, as shown in Fig. 1; hence the two catch-plates which engage the tablets of each pair of interfolding sets must move freely in opposite directions, since the tablets which they are to engage swing upward in opposite directions. To provide for this opposite free movement of each pair of catch-plates the rock-shafts M¹ M¹, which carry the catch-plates for every other set of tablets, are provided with an arm, M⁵, projecting horizontally to intersect midway between the shafts a similar arm projecting toward it from the next rock-shaft M' beyond it, (see Fig. 1,) the two

arms being jointed together at their intersecting ends by means of a pin, j, projecting from the face of the one through a slot in the other, as illustrated in Fig. 1. By this form of connection the oscillation of the shafts M' M', produced by the movement of the coupling-rod Q, will operate to produce the oscillation of the shafts M¹ M¹ required to cause their catch-plates M M to release the tablet, which may at the moment be engaged thereby, without interfering with the free and independent oscillation of said plates required to permit the offset on either tablet to pass under the plate when the tablet is thrown up. (See dotted lines, Fig. 1.)

The outer edge of the swinging dog P, whose upper end engages the foot of the bar P', is made to rest and bear against a fixed pin, R, in the side of the frame by means of a suitable spring, R', fixed to the lever-arm N³, as shown in Fig. 2, and said outer edge is so curved as that in sliding over the pin R, as the dog is carried up by the movement of the lever N³, the upper end of the dog will, when the bar P' has been carried up far enough to cause the catch-plates M, operated thereby, to move and release the tablet engaged by either of them, be moved out from under the bar, (see dotted lines, Fig. 2,) and thereby permit the bar to fall back automatically by its weight into its normal position, the pressure of the spring R' serving to carry the end of the dog under the end of the bar again when the dog drops back with the lever N³. An adjustable joint is made in the length of the bar P' by dividing the bar and uniting the divided ends by means of a slotted plate, 5, secured to one end, which overlaps the opposite end and receives a set-screw, 6, which is passed through the slot into the bar beneath, as shown in Fig. 2. By this device the length of the bar may be adjusted to determine thereby the proper inclination of the catch-plates M M with reference to the offsets i i on the tablets K K, and consequently the moment of their release by a movement of the bar P', obtained as described.

A long flat plate, S, is pivoted by means of suitable journal-pins at each end thereof to the frame of the machine in the rear of the shafts C C' of the registering-wheels, and about in the same horizontal plane. This plate S is maintained in a transversely-inclined position, so as to be normally, when at rest, tipped toward the shafts, as shown in Fig. 2, by means of a spiral spring, T, confined at one end to the frame, and attached at the other to the inner edge of said plate S at one end thereof. Its movement, and its inclination when at rest, are controlled by suitable stops, S' S', its free edge being automatically drawn toward the lower stop by the tension of the springs. The lower or free edge of this inclined longitudinally-pivoted plate S is within range of the extreme inner end of each key-lever B in the machine, and the plate is so mounted with reference to the inner ends of the key-levers as that when a key is depressed nearly to its full

extent and has by its depression thrown up the tablet K, connected thereto in manner as described, the inner end of its lever will strike the edge of the plate S, and as it approaches the end of its stroke will turn the plate upon its pivot from an inclined to a horizontal position, as indicated by dotted lines in Fig. 2.

An arm, S², is fitted to the plate S at one end thereof to project upward therefrom and engage the end of a tripping-dog, U, pivoted in the end of a block, U', which is in turn pivoted to the side of the casing or frame of the machine so as to swing freely thereon. The dog U is formed with an offset, Z, at its inner end to engage the block U' and prevent the dog from moving outward beyond its face, leaving it free, however, to swing inward.

The block U is fitted with an arm, V, carrying a hammer, V', arranged to strike a bell, V², suitably secured to the frame of the machine. The hammer is made to strike the bell by means of a spring, W. (See Fig. 2.) When the plate S is swung up into a horizontal position by the pressure thereon of one of the key-levers, its arm S², bearing against the end of the tripping-dog U, will cause the block U' to turn upon its pivot, and thereby draw the hammer back from the bell. The arm S² and dog U are so proportioned in length as that after the arm has moved the block far enough to retract the hammer it will slip out of engagement with the end of the dog, thereby freeing the spring W, so that its recoil will cause the hammer to strike the bell. Upon the return of the arm S², as the plate S returns to its normal position, the dog U will yield to allow the arm to pass it, a too loose play of the dog being prevented by a light spring, m, which will also cause it to spring back into its normal position so soon as the arm has passed it. The numbering-wheels are covered by a suitable glass plate, Y, Fig. 2, through which to read the numbers brought into line and view by the working of the machine.

In the operation of the machine, the first movement on the depression of any one key will operate as it bears down the transverse bar N, resting against its under side, to throw up the arm N², and thereby lift the vertical bar P' far enough to cause an oscillation of all the catch-plates M M, so that any tablet previously thrown up into view will at once be released to drop automatically out of sight. As the arm N² moves up, however, its dog P will become disengaged from the bar P' so soon as the latter has moved far enough to produce, in manner as described, a release of the indicating-tablet K and the bar P' will drop back to its first position. When the bar P' is depressed in its normal position, the catch-plates M are, by reason of the slot in the joint of the upper end of the bar with the arm M² of the shaft M', left free to vibrate, so as to yield to the pressure of either tablet thrown up against it. The continued depression of the key after the tablets are released will operate further to throw up the rod L, coupled to the outer end

of the key-lever, and thereby cause the particular tablet K, bearing a number corresponding to that on the key, to swing up upon its eccentric pivot into sight in a vertical position, as shown at Fig. 1, and as the key finally completes its movement the offset i on the upper edge of the tablet will strike the edge of the catch-plate M depending over it, and swinging the catch-plate before it (see dotted lines, Fig. 1) will slip under its edge, leaving the plate free to drop back into a vertical position in the rear thereof (see positive lines, Fig. 1) to prevent a return of the tablet until the catch-plate is swung in the opposite direction by a movement of the bar P', produced by the next depression of a key. When the depression of the key is nearly completed, and just before the indicating-tablet K displayed thereby has become engaged by its catch-plate M, the inner end of the key-lever will strike the lower edge of the inclined pivoted plate S, extending across the rear of the machine, and by tipping the plate upward will cause the tripping-arm S² at one end thereof to actuate the bell-hammer and ring the bell in manner as described. After the movement of the key is fully completed and the key is released, the inner end of the key-lever will drop, by reason of its weight enforced by the upward pressure of the spring-actuated bar N against its outer end, and the key will be thereby elevated to its normal position. This return of the key-lever to its first position is effected independently of the tablet-rod L, by reason of the slotted connection of the lever and rod, the rod remaining in its elevated position until released by the next movement of a key. During the movement of a key-lever, produced by the depression of the key, as described, the pawl E', pivoted thereto and engaging the ratchet-teeth E of the units-wheel D in the set of registering-wheels D D' D² appropriate to that key, will push the wheel forward one-tenth of a revolution, and thereby bring the next higher number thereon to view. Thus, whenever a key is depressed to indicate the payment of an amount, the tablet previously exposed to view is made to drop. The registering-wheel is then actuated to effect the registry, and when this is accomplished and the key has been depressed to its fullest extent a bell is sounded to attract the attention of the customer to the indication given of the amount registered as paid, while at the last moment the tablet appropriate to the key is engaged by the catch-plate so as to remain in view. Before a second registration can be effected the tablet thus exposed to view is released, whether the same or any other key be struck, so that no tablet can remain in sight after a key is struck other than that appropriate to said key.

To obtain with the machine an exact registry of the cash receipts during a day or other given time, all the wheels are first set with their zeros exposed to view in line. This is readily accomplished by a reciprocation of the pawl-bar H, mounted to swing over the

wheels and operating in manner as described. The number of movements thereafter made of each key will then be separately registered upon the set of registering-wheels actuated thereby, and at the end of the given time the reading of each set of wheels multiplied by the value of the key appropriate thereto will give the sum of the amounts paid in of that value, and by adding together the sums thus derived from the figures in view on each set of wheels the sum total of the receipts of the day is obtained.

I am aware that machines of various constructions have been made in which a series of keys, each representing a given value, and a registering mechanism to indicate the number of movements of each key, are combined with a signal mechanism and an alarm, so that the operation of each key will produce a registry of its movement, and visibly, as well as audibly, indicate the fact, the mechanism being so arranged as that no signal can be exhibited until the movement of its appropriate key has been registered, while the movement of any one key will release any signal previously exhibited; also that devices have been employed in connection with such machines to reset simultaneously all the registering-wheels and bring all the zero-marks into line of sight.

My invention differs from all others in the special and novel construction and combination of its various parts as described; and

I claim as my invention—

1. The combination, in a registering and indicating machine, of a series of pivoted keys, two parallel axial rods, one above the other, a series of tablets pivoted upon the lower rod to drop automatically into a horizontal position, a swinging catch-plate mounted to vibrate upon the upper rod to engage each tablet when thrown up, and connecting mechanism, substantially as described, whereby upon depressing any one key to its farthest limit a tablet bearing a number corresponding in value to that of said key is swung upward into a vertical position and caught by the catch-plate, and there held while the key returns to its normal position, and upon thereafter depressing the same or any other key in the series its first movement will operate to release the tablet, substantially in the manner and for the purpose herein set forth.

2. The combination, with a series of pivoted key-levers in a registering and indicating machine, of a series of tablets pivoted to swing at a right angle to the said key-levers, and coupling devices, substantially as described, whereby the inner end of each key-lever is connected to a tablet bearing a number corresponding in value to that of the key, and a depression of the key shall cause the tablet to swing up from a horizontal to a vertical position, substantially in the manner and for the purpose set forth.

3. The combination, with a series of key-levers and keys, and registering mechanism actuated thereby, of a series of tablets piv-

oted eccentrically upon a common axial shaft at a right angle to the axis of the keys, an offset or lug upon the upper end of each tablet, a slotted rod coupling each key-lever with a tablet in manner so that the movement of the key to operate the registering mechanism shall swing up the tablet into a vertical position and leave it there, when the key-lever returns to its first position, and a pivoted catch-plate pivoted above the tablets, and governed, substantially in manner as described, to swing freely in one direction, and thereby permit the catch lug or offset upon each tablet to pass freely under its lower edge, but prevent its automatic return, substantially in the manner and for the purpose herein set forth.

4. The combination, in a registering and indicating machine, with a series of key-levers or keys, a series of tablets pivoted to swing in a plane at right angles to the length of the key-levers, devices, substantially as described, for coupling each key to a tablet bearing a number corresponding to the value of the key, whereby the depression of the key operates to swing up the tablet from a horizontal to a vertical position and leave it there, and a catch-plate pivoted above the tablets in position to yield automatically and allow an offset upon the upper end of each tablet to pass under it when the tablet is carried forward, but prevent its automatic return, of a vertically-moving rod, a slotted arm projecting radially from the swinging catch-plate at a right angle thereto, a pin in the end of said arm engaging a slot in the upper end of the vertical rod, a bar upheld transversely under and against the outer ends of the entire series of key-levers, upon arms pivoted upon the axial shaft of said lever, one or more springs upholding the bar, an extension of one of said arms projecting under the end of the vertical rod, a tripping-dog pivoted to the end of said extended arm to engage the lower end of the vertical bar, and a pin fixed in position to trip the dog and disengage it from the bar when the latter has been lifted, and thereby permit a further independent movement thereof, whereby the first movement of any one key when depressed will lift the vertical rod sufficiently to swing the catch-plate clear of the offset on the up-lifted tablet, and allow the tablet to drop and the catch-plate to return to its normal position before the movement of the key is completed, substantially in the manner and for the purpose herein set forth.

5. In a registering and indicating machine, the combination, with the key-levers and registering mechanism actuated thereby, and with a series of tablets severally coupled to the key-levers and arranged in sets, each set embracing two or more tablets pivoted to swing and drop automatically toward each other at a right angle to the axis of the key-levers, and into a horizontal interfolding position, a catch-plate pivoted over each set to automatically engage and detain each tablet therein when swung up, and mechanism, substantially as

described, whereby the first movement in the depression of any one key-lever is made to move the first catch-plate, so as to produce a release of the tablet upheld thereby, of a coupling-bar connecting a radial arm upon the axial shaft of said first catch-plate with a similar arm upon the pivotal axis of each catch-plate, whose movement in the same direction will release the tablets upheld thereby, and radial arms projecting from the pivotal axis of these connected plates to interlock with similar arms projecting from the pivotal axes of the remaining catch-plates, whereby all the catch-plates are swung simultaneously by the depression of any one key each in the proper direction to release a tablet upheld by either of them, all substantially in the manner and for the purpose herein set forth.

6. The combination, in a registering and indicating machine, of a series of keys, an oscillating plate pivoted to turn upon a longitudinal axis proximate to the edge thereof and parallel with the inner ends of the key-levers, a stop or stops limiting the movement of the

plate, but permitting it to drop automatically into a position inclined toward the keys, with its free edge in range to be struck and uplifted by each key-lever as it is about to finish its complete movement, a gong, a spring-actuated hammer for striking the same, a dog pivoted to an extension of the hammer-arm below its pivot, and a tripping-arm fixed to the oscillating plate and adapted to bear against the dog, so as to carry back the hammer as the free edge of the plate is lifted by a key, slip off the end of the dog and release the hammer as the plate completes its movement, and trip the dog to pass back under it as the plate drops back to its first position, all substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM KOCH.

Witnesses:

J. F. ACKER, Jr.,
JOHN A. ELLIS.