

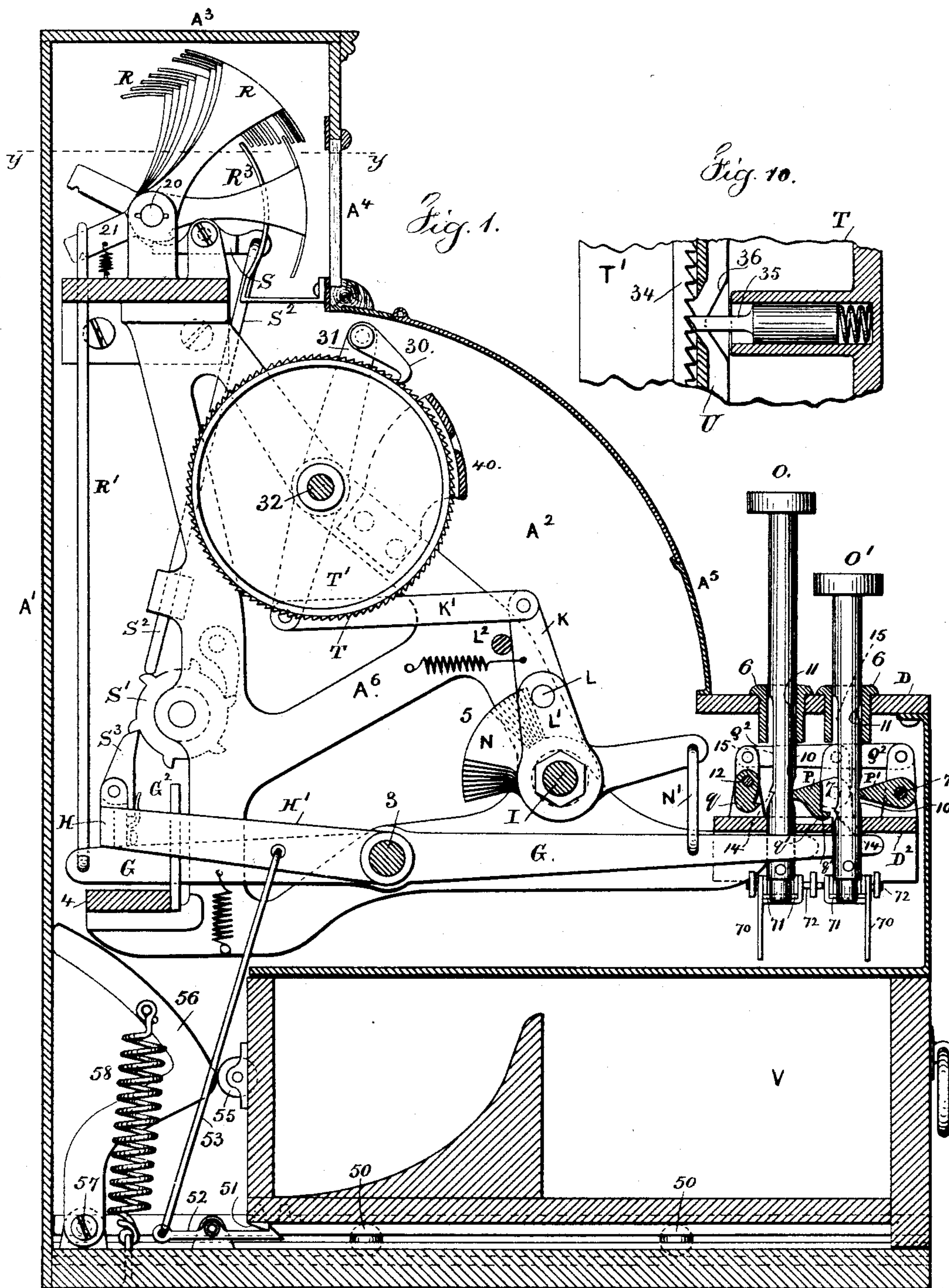
(No Model.)

3 Sheets—Sheet 1.

H. E. MARSHALL.
CASH INDICATOR AND REGISTER.

No. 437,441.

Patented Sept. 30, 1890.



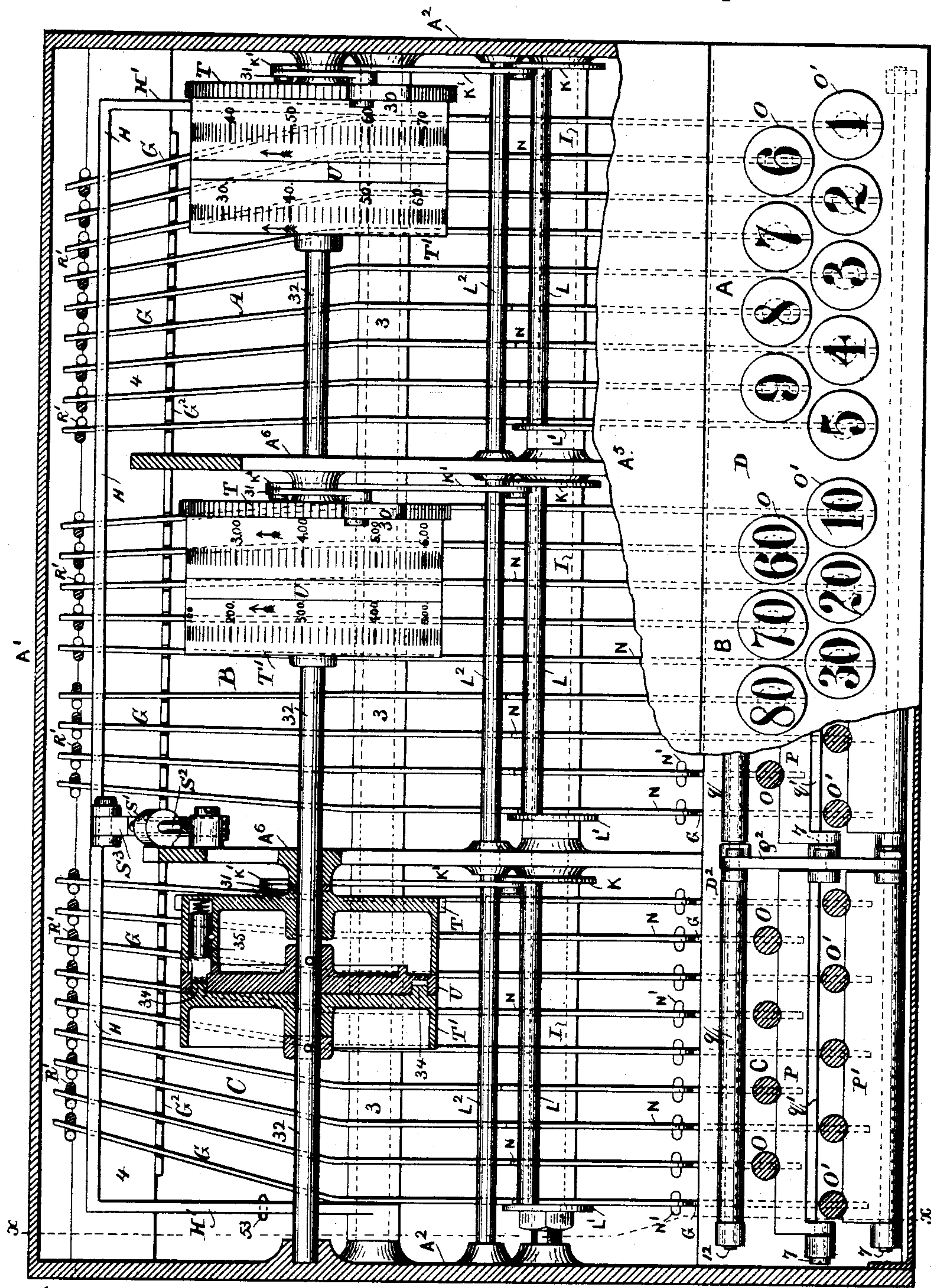
Witnesses
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J. Stail

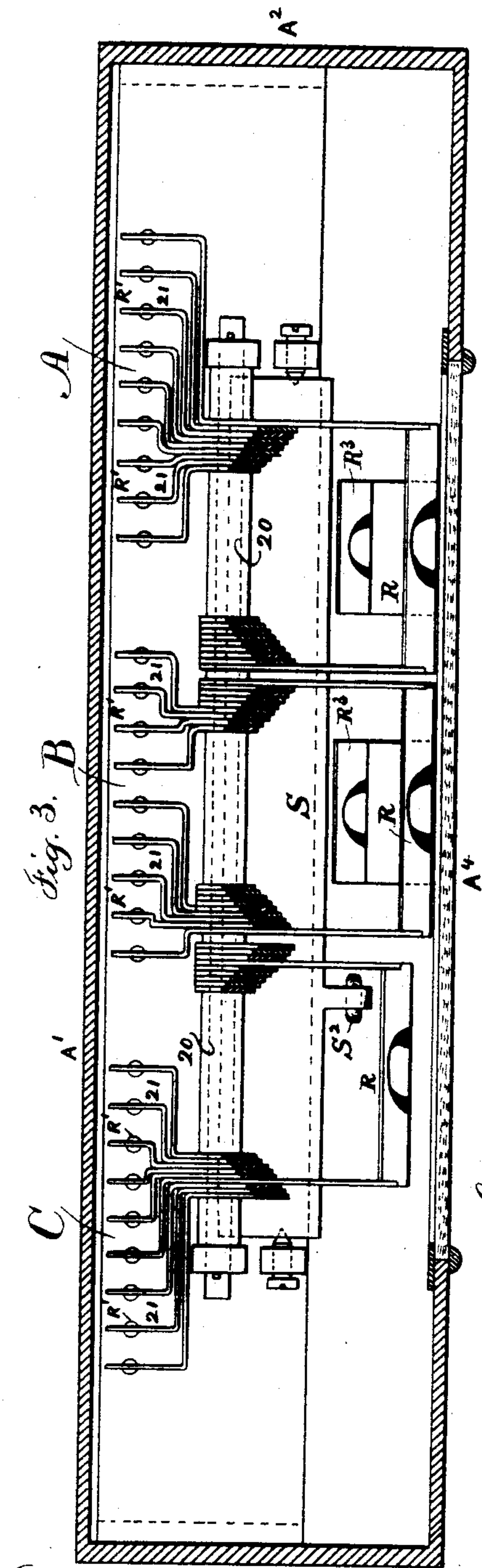
Fig. 2.

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Fig. 4.

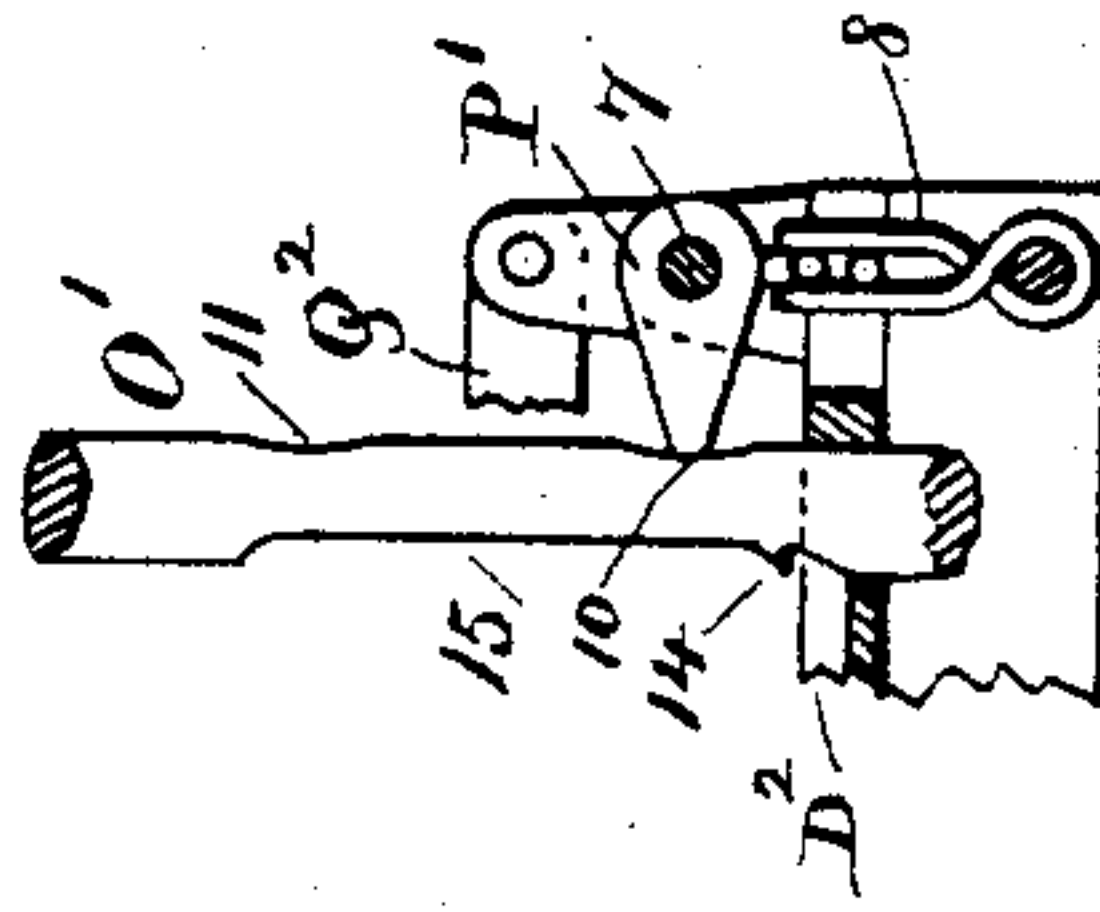


Fig. 5.

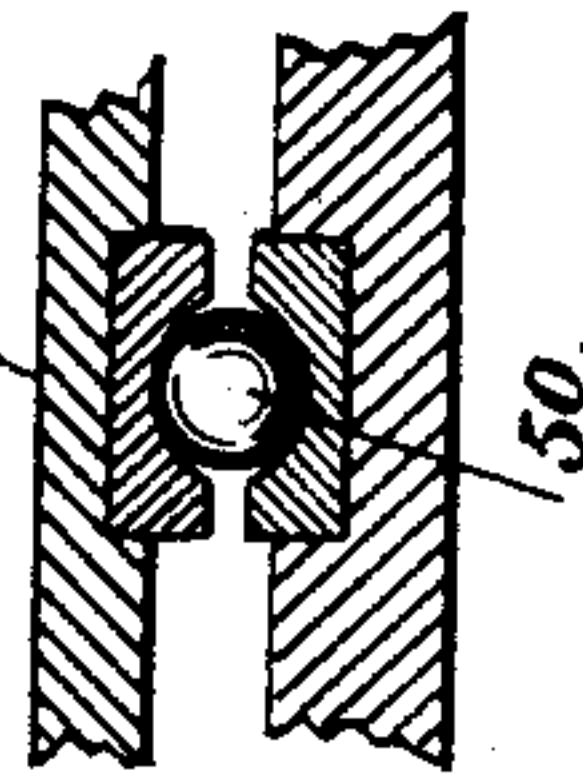


Fig. 6.

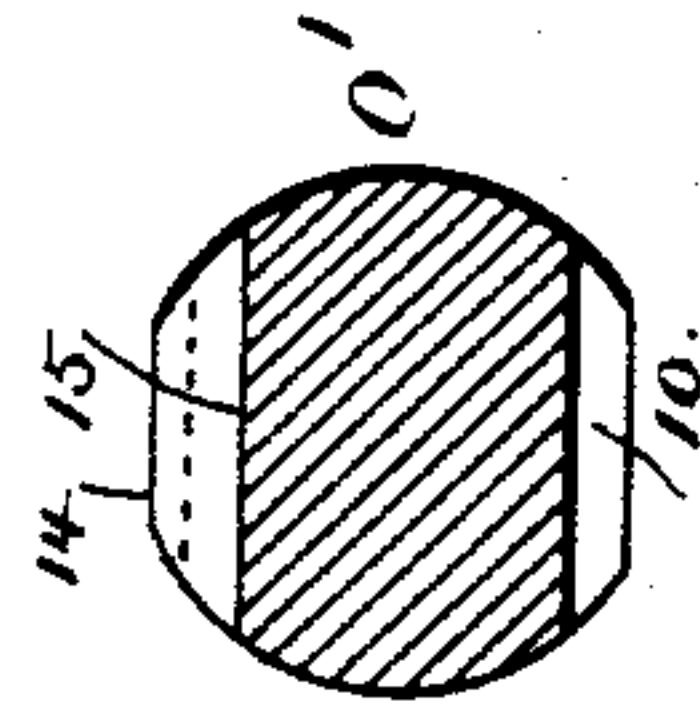


Fig. 7.

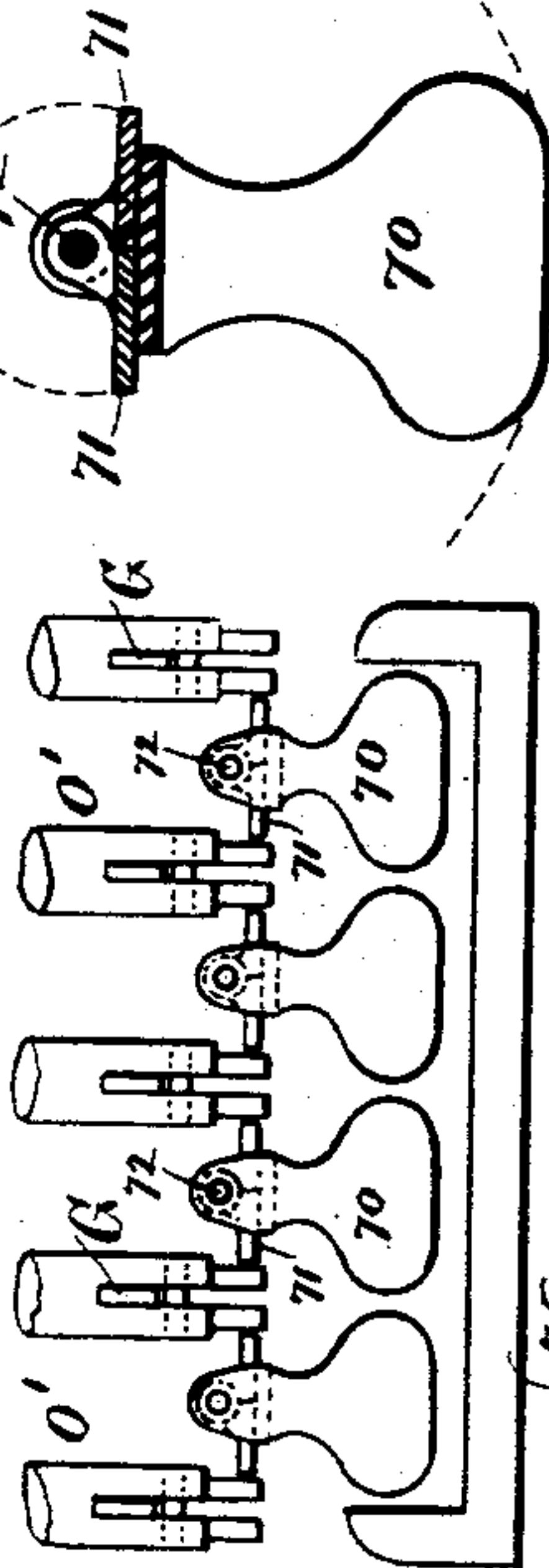
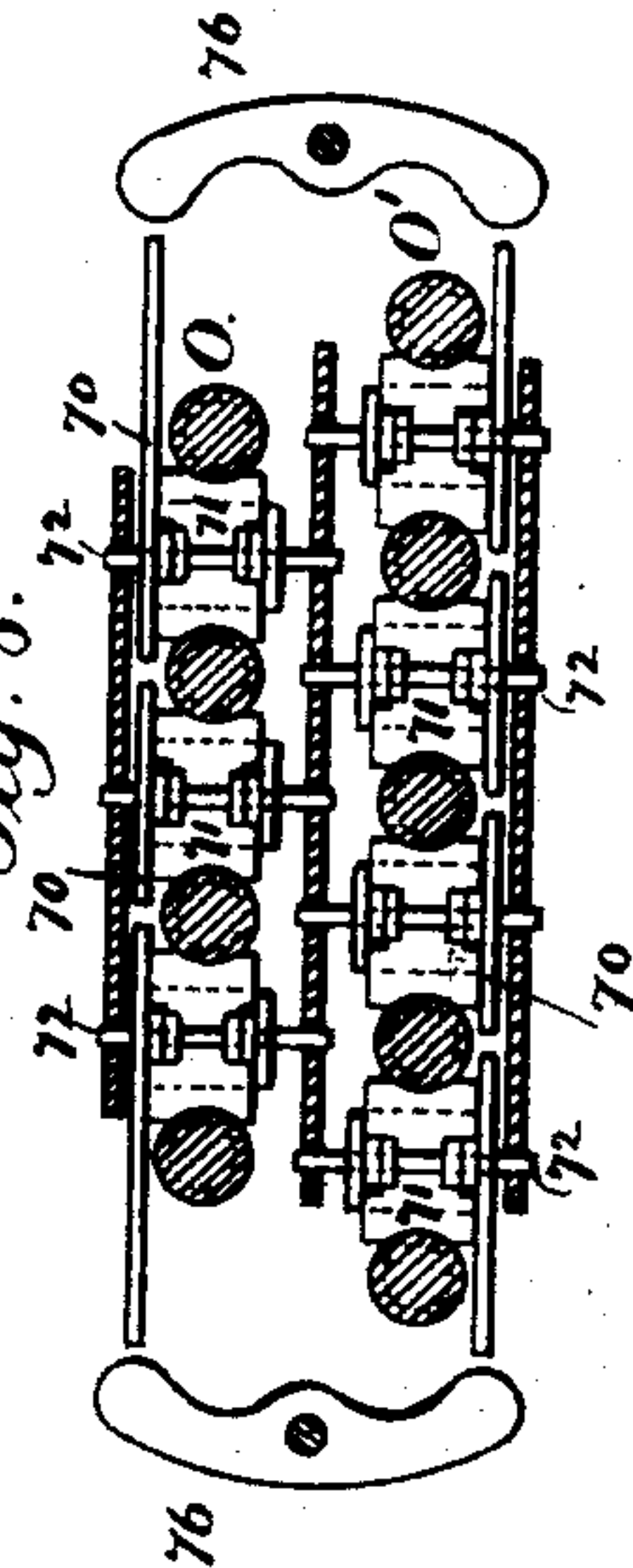


Fig. 8.



Inventor

Herbert E. Marshall
per Lemuel W. Ferrell
att

UNITED STATES PATENT OFFICE.

HERBERT E. MARSHALL, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO WILLIAM BURTIS, OF NEW EGYPT, NEW JERSEY.

CASH INDICATOR AND REGISTER.

SPECIFICATION forming part of Letters Patent No. 437,441, dated September 30, 1890.

Application filed January 31, 1890. Serial No. 338,806. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. MARSHALL, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Registering Apparatus, of which the following is a specification.

Mechanism has heretofore been made in which the amount of money paid to the cashier or at a receiving-stand has been denoted by figures that are displayed to the customer at the time the money is received; but these indicating devices are liable to get out of order, and in some instances the cashier or attendant can make a false motion or displace the proper number without effecting a registration of the sum upon the registration mechanism, thus allowing for fraud and deception.

My present invention is designed to prevent the possibility of a false motion by compelling a complete movement of the key before any other part can be moved and before even the key that is operated upon can be returned to a normal position, and in effecting this operation figures are swung into view to denote the amount of money paid, and these remain visible until the instrument is operated upon for indicating another sum, and in connection with this indicating apparatus I make use of a registering device which adds up continuously the various sums, so as to denote at the end of the day the total amount of cash received, and the cash-drawer or receptacle is so connected with the registering apparatus that it cannot be opened until one of the keys has been depressed, thus furnishing an additional safeguard against the abstraction of money after the drawer has been closed. I prefer to make use of a registering apparatus of three principal sections. The first or right-hand section is adapted to payments varying from one cent to a dollar, and the registering mechanism connected with this records the summary of payments from one cent up to a hundred dollars. The middle section is adapted to indicate dimes and to register from one dime up to one thousand dollars, and the left-hand section is adapted to indicate dollars and to register the payments from one dollar up to ten thousand dollars.

In the drawings, Figure 1 is a vertical sec-

tion of my apparatus near the line $x x$, Fig. 2. Fig. 2 is a plan view with parts of the machine broken open and in section. Fig. 3 is a sectional plan view below the line $y y$ of the indicating devices. Figs. 4 to 10 are detached views of separate parts.

In this instrument a suitable case is made use of with a back A' , ends A^2 , top A^3 , transparent inclosure A^4 , and curved front A^5 , that extends down to the key-board D , and the instrument is composed of three sections, the section A being adapted to indicating and registering cents, the section B for indicating and registering dimes, and the section C for indicating and registering dollars, and there are nine keys to each group of keys.

In the section A the keys are numbered from 1 to 9. In the section B the keys are numbered from 10 to 90, indicating from one to nine dimes, and in the section C the keys are numbered from 1 to 9, indicating dollars, and I find it convenient to arrange these keys and their numbers in the manner indicated but do not limit myself in this particular, and I prefer to make use of the keys in two rows; but they might be arranged in only one row, or three rows might be used; and I remark that the keys are similarly constructed, so that a description of the keys in one bank or section will apply to all the keys, so far as such keys and their modes of operation are concerned.

The levers G of the range of levers are pivoted at 3, which is a shaft extending across the machine and preferably supported between one section and the next, and the levers G rest in their normal position upon a support 4 or stop near their back ends, and these levers G are between vertical pins or comb-guides G^2 , and there is a bar H , which acts to return the levers to their normal position, and this bar H extends across above the levers G near their back ends, and such bar H has end pieces or links H' , connecting the same to the shaft 3, and these parts are all free to swing upon such shaft 3.

The shaft I may extend from end to end of the machine, being supported in the end frames A^3 and by intermediate frames A^6 ; but it is preferable to have a separate shaft for each section, and upon this shaft I in each sec-

tion of the machine, and preferably near the right-hand portion of each section, is an arm K with a link K' to the registering apparatus hereinafter described, and upon such shaft I, near the other side of each section, is a second arm L', and with a separate shaft I for each section the arms K and L' will be permanently keyed to the shaft, and between these arms K and L' is a rod L, firmly fastened into the respective arms, so that when this rod L is acted upon it swings the arms K and L' and moves the link K' more or less, and in the normal position the arm K rests against the stationary cross-bar L², which forms a stop, and such arm K is pressed toward this stop L² by a suitable spring to return it to its normal position.

Upon the shaft I, between the arms K and L', there are in each section nine rockers N, each having an arm projecting forward, with a link N' or similar connection from the forward arm of the rocker to its corresponding key-lever G, and the rear projection or portion 5 of each rocker is of a length adapted to come into contact with the rod L, and it is now to be understood that a certain positive motion is given to each key-lever G and to each rocker N; but the edges of the respective rockers that come into contact with the rod L are in their normal position at different distances from such rod L, the back part 5 of the rocker for the No. 9 key being closely in contact with such rod L, so that this rod L will receive a full movement by the depression of the No. 9 key, and upon the registering apparatus nine teeth will be taken up; but the part 5 of the rocker connected with the No. 1 key is so far from the rod L that it will move said rod L only a distance sufficient to take up one tooth on the registering apparatus, and the edges of the intermediate rockers between the No. 1 and No. 9 are at proportionate distances from such rod L, so that by a given complete and positive movement to any one key the corresponding record will be made in the registering apparatus from 1 to 9.

The keys O O' pass vertically through the key-board D and are guided at their lower ends by the base portion D² of the key-board, and it is preferable to have the keys O longer than the keys O', so that they project in a higher range or bank, and upon the top end of each key is a suitable button or holder for numbers or figures representing cents, dimes, and dollars, and this button is preferably of glass in a metal frame, with the number beneath, as usual in type-writers and similar instruments, and there may be any desired guides for the keys O O'—such as brass or hard-rubber ferrules 6—in the key-board, and the lower end of each key is connected to its key-lever G in any suitable manner, preferably by the key being slotted for the reception of the lever G, and a pin introduced across the key below the lever, as represented, and when the key for a given number of

cents, dimes, or dollars is depressed its lever G is moved a uniform distance, and its connected rocker N is also moved a uniform distance; but the rod L and the registering mechanism are only moved a proportionate distance, according to the space between the back part of the rocker N and the rod L, as before mentioned.

One of the important features of the present invention is to effectually prevent either key being only partially depressed, and with this object in view I make use of an automatic clamp to each key that will prevent the key rising until after it has been entirely depressed. The automatic clamp-bars P P' are pivoted at 7, and in a normal position these clamp-bars are horizontal, and the springs 8 (see Fig. 4) hold such clamp-bars in this horizontal position; but they can swing up or down, as necessary, and the edge of each clamp-bar is contiguous to its range of keys in each section, and each key is made with two segmental notches 10 and 11. The curvature of these notches corresponds to an arc described by the movement of the edge of the clamping-bar, and one notch 10 is adjacent to the clamping-bar when the key is completely elevated and the other notch 11 is adjacent to the clamping-bar when the key is entirely depressed, and it is now to be understood that when the one key is depressed its clamping-bar is swung upon its pivot 7 by the contact of the front edge of the key O or O' as it passes vertically down and presses upon such clamping-bar, and the clamping-bar swinging in the segmental notches of the other keys is not obstructed in its movement, but the clamp-bar acts with that key that has been partially depressed as a friction-pawl, standing at a slight inclination to the surface of the key, and being held thereto by its spring 8. Hence it is impossible for the key to rise or be pulled up until such key has been fully depressed to bring the segmental notch 11 opposite the inclined clamping-bar, at which moment the spring returns the clamping-bar to its normal and horizontal position within the notch 11, and as the key O or O' rises the clamping-bar P or P' is swung upwardly and occupies an upward inclination, so that the key cannot again be depressed until such key has reached its full elevation and the notch 10 comes opposite to such clamp-bar and allows it to swing down into its normal position.

It is preferable to make use of keys O O' that are round rods flattened or filed away on the surface adjacent to the clamping-bars P P', as illustrated in the magnified section, Fig. 6, so as to present the required extent of bearing-surface for such clamping-bars, and the notches 10 and 11 are made in the flattened portions of the surfaces of the keys, and it will be seen that the clamp P passes in between the key O of one range and the keys O' of the other range, and under some circumstances these clamping-bars alone may be

made use of; but I find it is preferable to make use of latches $q q'$ in addition, the latch q' being formed by a lip upon the lower back edge of the clamping-bar P and the latch q being separately pivoted at 12, and upon each clamp-bar P P' is an upward projection or crank-arm pivoted to the link Q^2 , which link Q^2 connects all these crank-arms, so that the clamp-bars P P' and the latch-bar q all swing together, and in the back edges of the keys O O' are catches 14, and immediately above the catches are vertical slots or recesses 15. Hence it will be understood that when one key O' is depressed the catch 14 passes below the latch q' before the movement of that key O' swings the clamp-bar P', and with it the clamp-bar P, latch q' , and the latch-bar q . Hence the key that is depressed is not caught by the latch q' ; but all the other keys are caught by the latches $q q'$, entering the catches 14, and the slot 15 above the catch in the key that is depressed allows for the movement of the latch without the key becoming an obstruction against the end of the same. Hence all the other keys are held by the latches and catches in the section by the depression of one key, so that no two keys can be operated one after the other, and this holding operation continues until the key that has been depressed reaches the extreme downward movement, by which the clamping-bar is liberated as the segmental slot 11 comes opposite to such clamping-bar, and immediately all the parts return to their normal positions, and it will be noticed that the clamping-bar is moved upwardly by the upward movement of the key, and in so doing the latches $q q'$ are moved still farther back from the respective keys; but no other key can be depressed during the upward movement of the key that has been depressed, because the clamping-bars are swung upwardly and would act as clamps to prevent the downward movement.

Having thus described the operation of a key and the parts connected therewith in one section of the apparatus, it is only necessary to remark that each section of the apparatus is independent of the other, and that the devices are duplicated for the respective sections, and that in indicating the cents, dimes, and dollars it is immaterial whether the cents are denoted first or the dollars, according to the habit or convenience of the cashier or operator.

I will next describe the indicating mechanism. Within the upper part of the case and behind the glass A^4 is a shaft 20, upon which are pivoted indicators R, which may be of any suitable character. I prefer that these should be of metal and segments of cylinders of gradually smaller radius, so that one indicator swings behind the other, as shown in Fig. 1, and upon the faces of the indicators numbers are placed, and it is preferable that the figure 9 should be on the indicator that comes the closest to the glass A^4 , and the figure 1 upon the indicator that is of the smallest radius and is the far-

thest away from the glass, and each indicator is made with an arm 21 extending outwardly and backwardly, so as to connect with the rod R' passing to the key-lever G, that is moved by the corresponding key to the number on the indicator. Hence it will be understood that when one of the keys O or O' is depressed and its lever G moved the rod or link R' is raised and the indicator R is lowered, exposing behind the glass A^4 the corresponding number. Upon each of the indicators is a tooth, (shown by dotted lines in Fig. 1,) and adjacent to the hubs of the indicators is a pawl-bar S, so that when the indicator R is swung down the tooth thereof passes behind the pawl-bar and the indicator is held in position by such pawl-bar, and I provide a cam-wheel S' upon the frame A^6 , and there is a rod S^2 pivoted at its upper end to an arm extending out from the pawl-bar S, and the lower end of this rod S^2 is adjacent to one of the teeth upon the cam-wheel S', and there is a pawl S^3 pivoted upon the returning-bar H. Hence as either lever G is acted upon by the key O O' and the returning-bar H raised the pawl S^3 moves the cam-wheel S', turning one tooth beneath the rod S^2 . Hence the pawl-bar S is moved back and immediately returns to position to catch the tooth on the indicator R that is lowered by the key acting on the link R', and the indicator R is caught by the pawl-bar and remains in place, because as the returning-bar H assumes its normal position when the key O or O' has risen the pawl S^3 only drops into its normal position, and the indicator remains visible until another key is depressed, and in so doing the cam-wheel S' is turned one tooth, which raises the pawl-bar S and liberates the indicator that had been turned down, and the pawl-bar assumes the normal position ready to catch the tooth upon the indicator that is turned down in giving the apparatus the next movement.

From the foregoing description it will be apparent that when a payment is made and the instrument operated, the indicators that had been placed in position when the former payment was made are first released and rise, and the indicators that are brought down into the position to denote the fresh payment remain in position, so that they can be observed by the cashier, by the customer, and other parties until another payment is made and the indicators are changed, and the indicator upon the section allotted to cents will denote from 1 to 9, and the indicator in the section for dimes will denote from 1 to 9, and the indicator in the section for dollars will denote from 1 to 9; and in order to avoid confusion I place a stationary indicator R^3 , with a cipher (0) upon it, behind the indicator R having the smallest radius, so that when all such indicators are raised two ciphers will be apparent in the section A and B of the apparatus, and the cipher (0) in the section for cents will remain visible when the indicator for one or more dimes is brought into position to the

left of such cipher, (0,) and the same in respect to the indication of dollars. It is preferable to use one pawl-bar S for all of the sections of the indicator, so that the indicators R that may be depressed will be allowed to rise out of the way when any other payment is made, whether it be in dollars, dimes, or cents.

A registering apparatus is provided for each section, and each registering apparatus is the same, with the exception of the marks and numbers applied thereto to denote dollars, dimes, or cents. The wheel T has one hundred teeth around its periphery, and it is acted upon by a pawl 30 upon the lever 31, which lever has the shaft 32 of the wheel T for its fulcrum, and the lower end of this lever 31 is connected with the link K', and there is sufficient friction of the wheel T upon its shaft 32 to prevent the wheel being carried too far by its inertia, or any suitable blocking apparatus may be made use of—such as well known in fare-registers—and it will be apparent from the foregoing description that the pawl 30 will take up as many teeth upon the periphery of the wheel T as there are numbers designated upon the key O or O' that is depressed, because the arms K L' and rod L, together with the link K', are moved by the back portions 5 of the rockers the proper proportionate distance by the full depression of either key, as before described, and between the wheel T and the wheel T' is a disk U, that is fastened permanently upon the shaft 32, and neither the shaft nor the disk revolves, but the wheels T and T' are turned progressively upon such shaft 32; and upon the wheel T' is an annular flange 34, with one hundred teeth in the face thereof, and in the wheel T there is a spring-pawl 35, and there is a mortise through the disk U, having inclined faces, as seen in Fig. 10, so that at every revolution of the wheel T the spring-pawl 35 is projected through the mortise in the disk U and engages one tooth on the flange 34 and moves the same one space, and the incline 36 at the base of the mortise in the disk U draws out the pawl 35, disengaging it from the teeth of the flange 34 until the wheel T makes another revolution, and so on; and upon the cylindrical surfaces of the wheels T and T' there are to be stamped or engraved the proper characters to indicate the summary of the receipts, and there is a stationary bar 40 or similar device along in front of these registering-wheels T T', (see Fig. 1,) and the curved front A⁵ of the case is hinged and provided with a suitable lock, so that it can be swung up and opened when unlocked, so that these respective wheels T T' can be inspected and the record obtained of the total amount of cash indicated by the respective sections, and these wheels can then be turned around by hand to the cipher or zero point each time the apparatus is examined or periodically, as desired, and in this registration the section A of the instrument which is intended for cents will keep a correct account from one

cent up to one hundred dollars—that is to say, the wheel T of this section is moved one notch for each cent and makes one revolution for each registration of a dollar, and the wheel T' makes one complete revolution for every one hundred revolutions of the wheel T. Hence this wheel T will be properly marked upon its surface to denote cents up to one hundred and the wheel T' will be marked to denote dollars up to one hundred dollars.

In the central section B of the apparatus the wheel T will be marked upon its surface to denote dimes from one to one hundred, or, if more convenient, the divisions will be made to denote ten cents for each tooth and dollars from one dollar up to ten dollars, and the wheel T' will be marked to denote dollars from ten dollars up to one thousand dollars, each tooth of this wheel T' in the central section being equal to ten dollars, and in the section C of the apparatus the wheel T will be marked to denote from one dollar to one hundred dollars, and the wheel T' will be marked to denote one hundred dollars for each tooth from one hundred dollars up to ten thousand dollars. Hence by opening the case and examining the wheels in the respective sections a faithful and accurate registering will be apparent of the total amount received and denoted by the registering devices of the respective sections.

As an additional convenience in this apparatus the money-drawer V is provided in the base portion thereof, and the same is fitted, preferably, upon balls or rollers 50 and slideways to lessen friction and wear, and there is a catch 51 on the under side of the drawer and a spring-latch 52, with a link 53, to the returning-bar H, so that this latch is disconnected every time the returning-bar is lifted by the depression of any one key, and the latch holds the drawer shut effectually between one payment and the next; but in order to prevent the latch 52 returning to position and holding the drawer before the drawer can be moved by hand I place upon the back of the drawer a roller 55 and a cam 56, pivoted at 57, with a spring 58, to bear against this roller 55 and give to the drawer a slight forward movement the moment the latch 52 is disconnected, so that the drawer is in a position to be moved by hand for the reception of the money, and as it is pushed back into place the roller acting against the cam restores the same to its normal position, and the spring-latch 52 again holds the drawer so that it cannot be moved until one of the keys O or O' is depressed.

If a cashier or receiver desires to be dishonest and presses simultaneously on two keys in one section, the highest indicator may be brought into view and the registration thereof would be made; but there would be no registration of the smaller amount. I have provided devices to prevent this being done. Below and between the keys O O' are the pend-

ulous checks 70, each of which is provided with two latches 71 at the upper ends, which latches swing on the same pivot 72 as the pendulous check 70, as seen in larger size in Fig. 9, and these latches lie horizontally and upon the upper ends of the pendulous checks when in their normal position, and there are shoulders or teeth upon the keys, as seen in Figs. 1 and 7, and the latches 71 lie horizontally and nearly against the lower ends of the shoulders, so that when one key is depressed the two pendulous checks are swung apart by the key acting upon their latches, and in so doing the other latches of the pendulous checks are swung slightly upward, and the lower ends of all the pendulous checks will be moved progressively less and less from the ones that are separated by the depression of the key, because these lower ends almost touch each other, and the sum of the openings is equal to the distance that two of these checks have to be separated by the depression of one key. Hence when one key is depressed all the lower ends of these checks touch each other, and no other key can be depressed, because no other two of the pendulous checks can be moved; but as soon as the depressed key rises the checks resume their normal vertical pendulous condition. Where these checks are in one line the two end checks are connected by a limiting bar or link 75, (see Fig. 7;) but where there are two banks of keys, as illustrated in Fig. 8, the end checks of one bank are connected by horizontal levers 76 with the end checks of the other bank of keys, so that they work together, and the checks in the two banks can only swing apart sufficient to allow one key to be depressed, and when that is depressed all the checks are locked by contact with each other, and no other key can be depressed until the depressed key rises and liberates the checks, as aforesaid.

I claim as my invention—

1. The combination, with the range of keys, each having two segmental recesses and a plain intervening surface, of a swinging clamping-bar adjacent to one range of the segmental recesses and acted upon by either key in the range that is depressed and serving to prevent it being raised at any point until a complete downward movement has been imparted to the same, substantially as set forth.

2. The combination, with the range of keys, each key having two segmental recesses, of a swinging clamping-bar adjacent to one range of the segmental recess when the keys are in their normal position and a swinging latch-bar connected with the clamping-bar, there being catches in the keys by which the latch-bar will hold all of the keys except the one that has been moved and is being depressed, substantially as set forth.

3. The ranges of keys O and O', each key having segmental notches 10 and 11, catches 14, and slots 15, in combination with the clamp-bars P P' adjacent to the lower ranges

of segmental notches in the respective ranges of keys, the latches q q', and connections between the latches and the clamp-bars, substantially as specified, whereby all of the keys are locked except the one that is being depressed and the complete downward movement of that key is insured, substantially as set forth.

4. The combination, with the keys, of levers moved by the keys, a registering-wheel, pawl and lever for actuating the same, the shaft I, the arms thereon, the rod L, supported by such arms, the rockers pivoted on the shaft I, and the connections to the respective keys, the operative faces of the rockers being at progressively-increasing distances from the rod L, and a connection to the pawl-lever, whereby the movement given to the registering apparatus by a uniform downward movement of the keys is regulated by the rockers to cause the registration to correspond to the number upon the key, substantially as set forth.

5. The combination, with the indicators and the shaft upon which they are supported, of a latch or pawl bar to hold the indicator that is swung into sight, a key-lever and connection for moving the indicator, a returning-bar acted upon by the key-levers, a cam-wheel receiving its motion from the returning-bar, and a rod connected with the latch and receiving its motion from the cam-wheel for liberating the indicator, substantially as set forth.

6. The combination, in a registering apparatus, of three sections—one for cents, the second for dimes, and the third for dollars—a separate pivoted indicator for each key, adapted to denote the respective numbers in the different sections, banks of keys and key-levers for each section, and a separate registering apparatus for each section, receiving its movement from the respective keys of the section, and a case for inclosing the apparatus, a portion of the case being movable to give access to the respective registering devices, and a returning bar extending over the keys in all the sections, and a connection therefrom to the indicators to cause them to return to their normal positions, substantially as set forth.

7. The registering-wheel T, having one hundred teeth, in combination with the pawl, levers, rockers, and keys for actuating the same, and the wheel T', having teeth and a pawl intervening between the respective wheels for moving the wheel T' one tooth at each revolution of the wheel T, and a stationary incline acting to draw back the pawl, substantially as set forth.

8. The combination, with a registering instrument, of a money-drawer, a latch for holding the drawer when closed, a connection between the latch and the return-bar of the registering instrument for moving the latch directly when either key of the registering instrument is depressed, and a pivoted cam and

spring acting on the same for giving a partial movement to the drawer automatically after it is unlatched, substantially as set forth.

9. The combination, with a range of keys, 5 of pendulous checks and latches at opposite sides of the pivots of the checks and acting to give motion to such checks to bring them into contact with each other, except the two that are separated by the depression of a key, 10 so as to block all the other keys, substantially as set forth.

10. The combination, with the range of keys and the levers and devices actuated by the

same, of a swinging clamping-bar adjacent to and acting upon the plain portion of either 15 key in the range to insure the complete downward movement of a key before it can be raised and checks to prevent two keys being depressed at the same time, substantially as set forth. 20

Signed by me this 28th day of January, 1890.

HERBERT E. MARSHALL.

Witnesses:

GEO. T. PINCKNEY,
HAROLD SERRELL.