(No Model.) 4 Sheets—Sheet 1.

# H. COOK.

## CASH REGISTER.

No. 450,365. Patented Apr. 14, 1891.

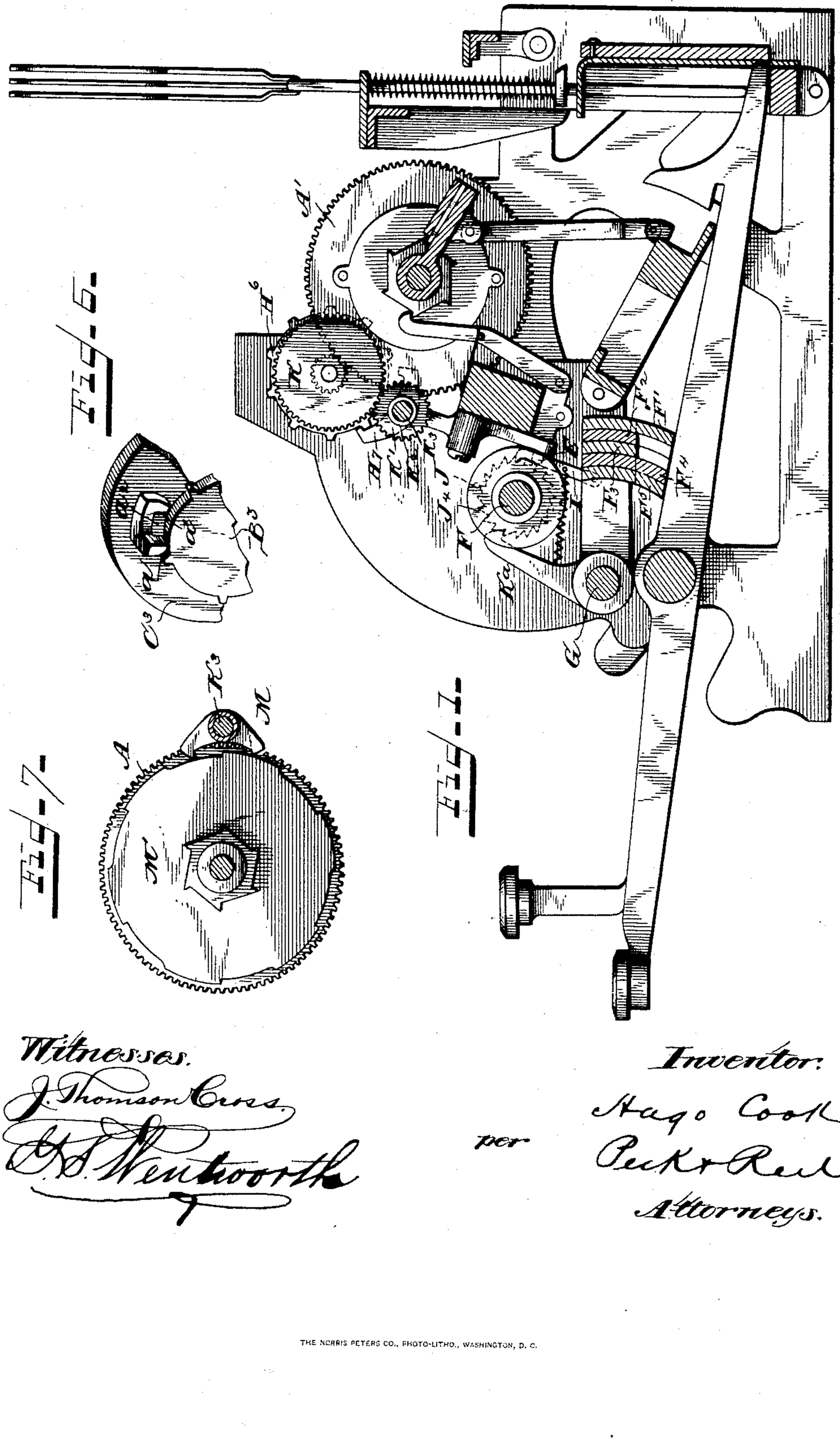


FIG. 5.

FIG. 6.

FIG. 7.

FIG. 7A.

Witnesses.
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# H. COOK.

## CASH REGISTER.

No. 450,365. Patented Apr. 14, 1891.

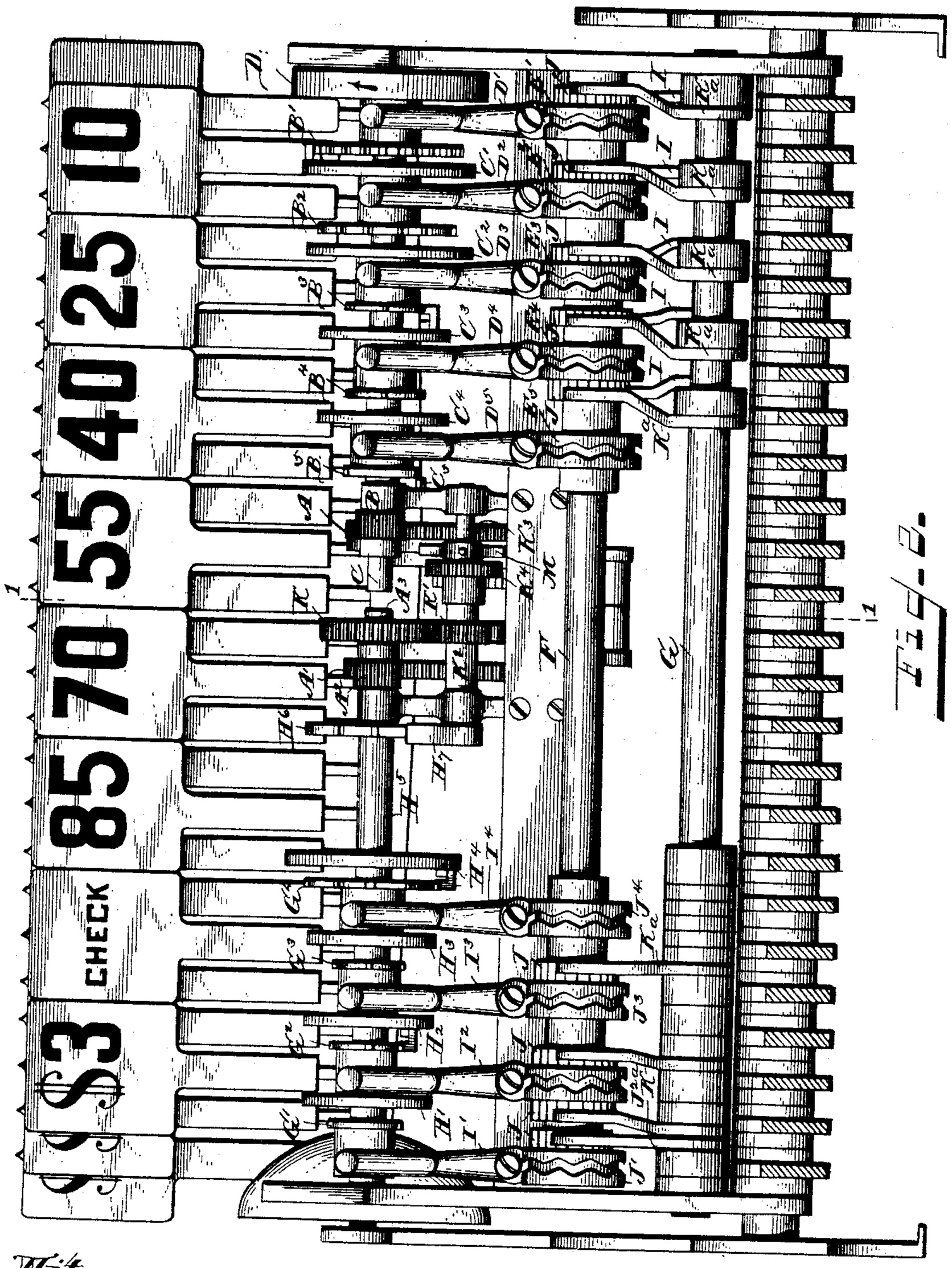


Fig. 2.

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# H. COOK.

## CASH REGISTER.

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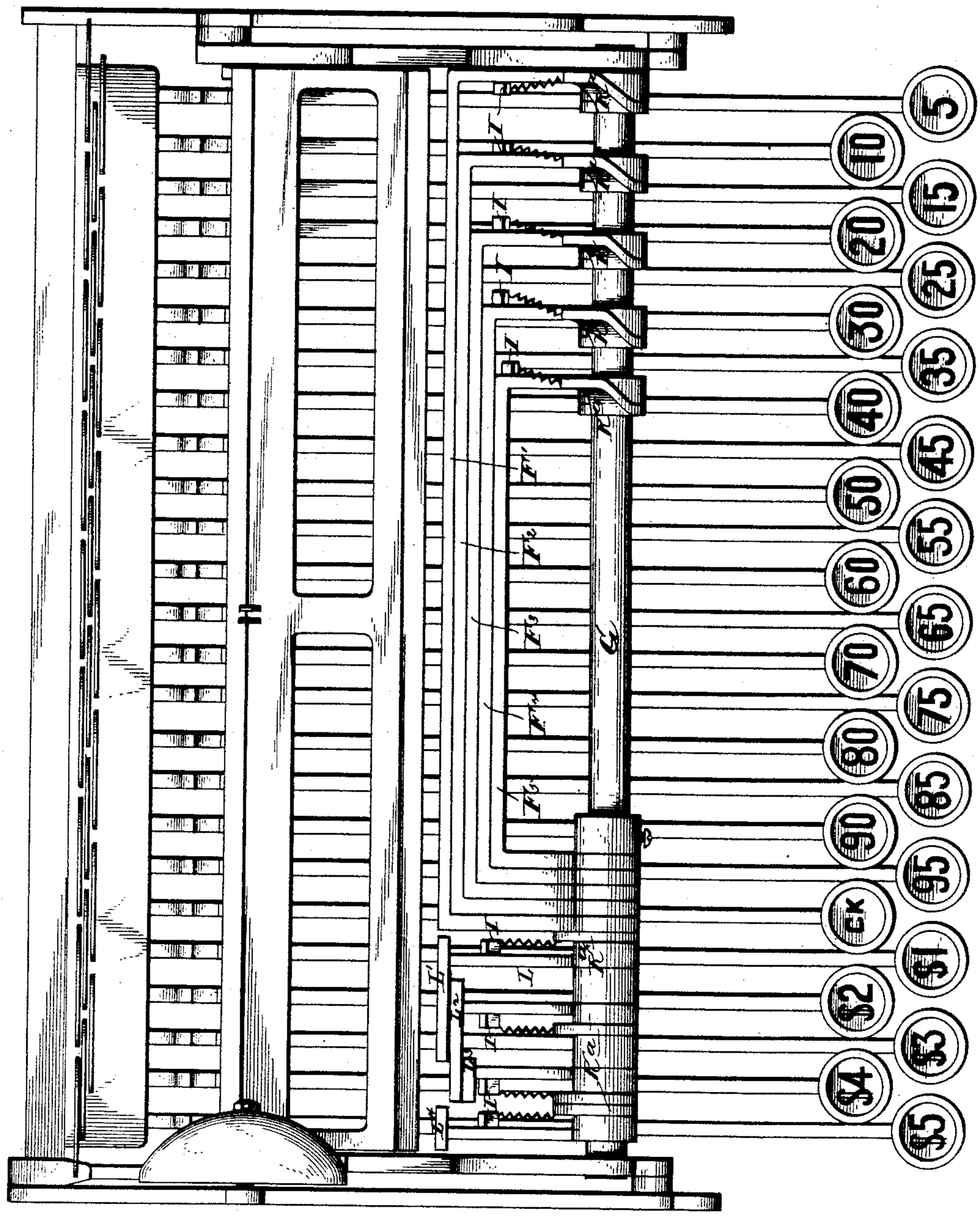


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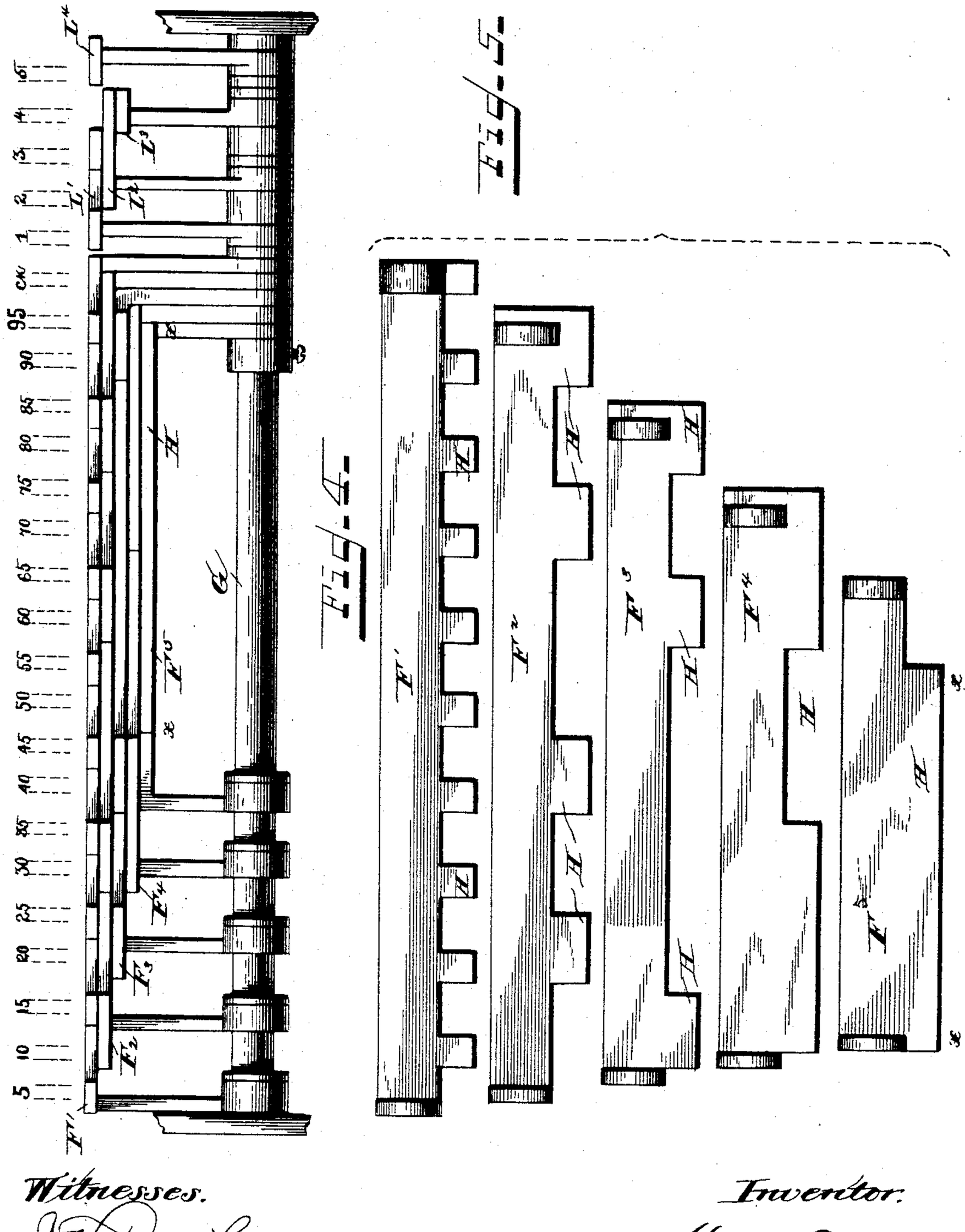
(No Model.) 4 Sheets—Sheet 4.

# H. COOK.

## CASH REGISTER.

No. 450,365. Patented Apr. 14, 1891.



Witnesses.
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# UNITED STATES PATENT OFFICE.

HUGO COOK, OF DAYTON, OHIO.

## CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 450,365, dated April 14, 1891.

Application filed November 20, 1890. Serial No. 372,013. (No model.)

*To all whom it may concern:*

Be it known that I, HUGO COOK, a citizen of the United States, residing at Dayton, in the county of Montgomery, and the State of Ohio, have invented certain new and useful Improvements in Cash-Registers, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of machines shown in my prior patent, No. 430,001, of June 10, 1890, and in my several pending applications, in which the registering mechanism is driven by a spring-motor which constantly tends to turn the registering-wheels forward, but is held in check by an escapement mechanism under the control of the operating-keys of the machine, the construction and arrangement of the parts being such that upon operating any key the motor is released and permitted to turn the registering-wheel a distance proportionate to the value of the key, and is then arrested and again held in check until another key is operated.

As in my prior machines the escapement mechanism in my present machine consists of a train of detents and co-operating toothed escapement-wheels, the latter being movable toward and from their respective detents to free their teeth therefrom and release the motor, and being so moved to and from their detents by the operation of their respective keys. In my prior machines, owing to the character of the connection between the operating-keys and the laterally-movable escapement-wheels, the wheels were shifted toward their respective detents by one stroke of the keys and away from their detents by the reverse stroke of the keys. As a wheel was shifted in one direction by the stroke of an operating-key in one direction, the motor was released and permitted to turn the registering-wheel a portion of the distance between two of the teeth of the escapement-wheel, and as the wheel was shifted in the opposite direction by the reverse stroke of the key the motor was again released and permitted to turn the registering-wheel the remaining portion of the distance between two teeth of the escapement-wheel. It will thus be understood that in my prior machines a portion of the registry of the value of an operated key was effected upon the positive stroke of the key and the remaining portion upon its negative stroke. This was objectionable for several reasons, which need not be explained in detail, but all growing out of the fact that the complete registry of the value of a key was not effected by one stroke of the key.

It is the main object of my present invention to overcome this objection to my former machines by such a connection of the keys with the escapement-wheels, and such an arrangement and adjustment of the parts, that the full value of an operated key is registered upon one (preferably the positive) stroke of the key.

In the accompanying drawings, Figure 1 is a central vertical section of the machine on the line 1 1 of Fig. 2. Fig. 2 is a front elevation of the machine, with the ends of the operating-keys cut off. Fig. 3 is a top plan view of the machine, with the escapement and registering mechanisms removed. Fig. 4 is a bottom plan view of the vibrating bars, through which the movements of the various keys are transmitted to different groups or combinations of escapement-wheels. Fig. 5 is a front elevation of each of the shifter-bars. Fig. 6, Sheet 1, is a detail perspective view of one of the detents, its supporting-disk, and its co-operating escapement-wheel. Fig. 7, Sheet 1, is a side elevation of one of the motor-wheels, showing the cam-transfer disk and the rock-shaft and arm co-operating therewith.

The same letters of reference are used to indicate identical parts in all the figures.

A A′ are the main motor-wheels containing within the casings secured upon their sides coiled springs, which constantly tend to revolve them in the direction of the arrows, substantially as in my prior machines shown in my pending applications. The motor-wheel A on the cent side of the machine meshes with a pinion B, tight on a shaft C, suitably journaled in the frame-work of the machine. At its opposite end the shaft C has tight upon it the cent-registering wheel D. This wheel has on its left a laterally-extending hub, upon which is feathered the first escapement-wheel B′, co-operating with the detent on the adjacent disk C′. The disk C′ is loose upon the shaft C, and upon its laterally-extending hub is feathered the second es-

capement-wheel $B^2$, co-operating with the detent on the second detent support or disk $C^2$. Upon the hub of the latter is feathered the third escapement-wheel $B^3$, co-operating with the third detent on the disk $C^3$. The hub of the latter carries the fourth escapement-wheel $B^4$, co-operating with the fourth detent on the disk $C^4$, and the hub of the latter carries the fifth escapement-wheel $B^5$, co-operating with the stationary detent $C^5$, secured upon the frame-work, all as in my prior machines, and which therefore need not be more particularly described.

Fitting in the circumferential grooves in the hubs of the wheels B′, $B^2$, $B^3$, $B^4$, and $B^5$, Fig. 2, are pins in the upper forked ends of the centrally-pivoted levers D′, $D^2$, $D^3$, $D^4$, and $D^5$. Pins E, Fig. 1, upon the lower forward sides of these levers, fit in circumferential zigzag cam-grooves in disks E′, $E^2$, $E^3$, $E^4$, and $E^5$, loosely mounted upon a shaft F. It results from this engagement of the upper ends of the levers with the hubs of the escapement-wheels and the engagement of their lower ends with the cam-grooves in the disks, that when any one of the latter is revolved its corresponding lever will be given a vibratory movement, thereby shifting its connected escapement-wheel toward and from the disk which carries its co-operating detent. Hung by their side arms, Figs. 1, 3, 4, and 5, upon a shaft G, are five vibrating bars F′, $F^2$, $F^3$, $F^4$, and $F^5$, one for each disk E′ $E^2$, &c., and its connected escapement-wheel. Portions of the under side of each bar are cut away to form pendent lugs H, Fig. 5, just as in my prior machines portions of the laterally-movable slides were cut away to form like pendent lugs. There is a lug H on the under side of each bar for and immediately above each key with which that particular bar is to co-operate, just as in my prior machine there was a pendent lug on the under side of each slide for each key with which that slide co-operated.

As seen in Figs. 4 and 5, the under side of the bar F′ has ten pendent lugs H, one of which lugs is in the path of each odd-numbered key, while the even-numbered keys are in line with the slots between the lugs. The bar $F^2$ has four pendent lugs H, the bar $F^3$ has three, the bar $F^4$ two, and the bar $F^5$ only one, but extending from $x$ to $x$ nearly the entire length of the bar. Thus it will be seen that although there is not a separate lug in each bar for each key with which the bar co-operates, yet each bar has a lug in the path of travel of each key with which it co-operates, the separate lugs being merged into one wide lug, where they are immediately adjacent to each other. The length of the lugs (and consequent depth of the slots between them) is such that the full stroke of a key will not move any of the bars but those whose lugs are in the path of the key, the key playing idly up and down in the slots in the others, just as in my prior machine an operated key moved only those slides whose lugs projected into the path of the key.

Carried by each bar near its right-hand end, Figs. 2 and 3, (left hand in Fig. 4,) is an upwardly-extending pawl I, one engaging a ratchet J on the hub of each of the disks E′ $E^2$, &c. In Fig. 1 one of these pawls I on the dollar side of the machine is shown engaging the ratchet of one of the disks on that side of the machine. The arrangement of the pawls and ratchets is the same on the cent side, so no further illustration is deemed necessary. It results from this ratchet-and-pawl connection of each bar F′ $F^2$, &c., with one of the disks E′ $E^2$, &c., that whenever any key is operated and lifts the bar or bars whose lugs project into its path said bar or bars, through the medium of the pawl and ratchet, turn the disk or disks corresponding to the lifted bars. The turning of the disks will vibrate their corresponding levers D′ $D^2$, &c., and shift the connected wheels B′ $B^2$, &c. The play of the bars F′ $F^2$, &c., and the shape of the cam-grooves in the disks E′ $E^2$, &c., are such that the full stroke of a key will turn the connected disk or disks just the distance between the two of the angles in the cam-grooves, so that a full positive stroke of a key will shift the lower end of the centrally-pivoted lever in only one direction, and the succeeding positive stroke upon another operation of the key will shift the lower end of the lever in the reverse direction. It will thus be seen that the escapement-wheels are shifted by the levers only on the positive strokes of the keys and remain stationary during the negative strokes of the keys, the pawls I slipping idly back over the wheels.

Suitable holding-pawls $K^a$, strung on the shaft F, are held in engagement with the ratchets J by coiled springs to prevent the ratchets and disks turning backward.

As in my prior machines each of the detents co-operating with the escapement-wheels has two contact-faces $a$ $a'$, located in different planes, with a passage $a^2$ between them. (See Fig. 6.) Supposing a tooth of an escapement-wheel to be engaged with the outer face $a$ of a detent, as in Fig. 6, upon shifting the escapement-wheel toward the detent-support its engaged tooth will be moved out of the plane of the face $a$ of the detent and into the plane of the face $a'$, whereupon the motor, being released, will turn forward until the tooth of the escapement-wheel engages the face $a'$ of the detent. The distance between the faces of the detent is such relatively to the distance between the centers of two of the teeth of escapement-wheel that upon the disengagement of the teeth from the face $a$ and re-engagement of it with the face $a'$ the wheel will be moved just one-half the distance between two of its teeth. Upon shifting the wheel away from the detent-support its tooth which was in engagement with the face $a'$ of the detent will be moved out of the plane of such face, and that tooth be thereby entirely freed

from the detent, whereupon the wheel will turn on (the motor turning the registering-wheel at the same time it turns the escapement-wheel) until its next succeeding tooth engages the face *a* of the detent. This last movement of the escapement wheel is also just one-half of the distance between two of its teeth. It will thus be seen that upon each operation of a key the escapement wheel or wheels with which it is connected are shifted laterally in one direction only and are permitted to turn just one-half the distance between two of their teeth. The five-cent wheel B′ has twenty teeth, so that upon each shifting of said wheel it, and consequently the shaft C and registering-wheel D, turn one-fortieth of a revolution. The wheel D is therefore provided with two series of numbers, each containing all the multiples of five from 0 to 95, and five cents is added to the registry at each fortieth of a revolution. The wheel $B^2$ has ten teeth, and at each operation permits the motor to turn the shaft C and wheel D one-twentieth of a revolution and add ten cents to the registry on the wheel D. The wheels $B^3$ and $B^4$ each have five teeth, and at each operation each permits the motor to turn the wheel D one-tenth of a revolution and register twenty cents, while the wheel $B^5$ has only two teeth and at each operation permits the motor to turn the wheel D one-fourth of a revolution to register fifty cents. The pawl I, carried by the bar F′, engages the ratchet secured to the hub of the disk E′, whose lever D′ shifts the five-cent escapement-wheel B′. In the same manner the bar $F^2$ actuates the disk $E^2$ and shifts the ten-cent escapement-wheel $B^2$, while the bars $F^3$, $F^4$, and $F^5$ in like manner act upon the wheels $B^3$, $B^4$, and $B^5$, respectively.

The various combinations of different escapement-wheels with different keys through the medium of the bars F′ $F^2$, &c., will be understood from Fig. 4, where the positions of the keys are shown by the dotted lines. There it will be seen that the five-cent key will move only the bar F′, the ten-cent key the bar $F^2$, the fifteen-cent key both of the bars F′ and $F^2$, the twenty-cent key the bar $F^3$, the twenty-five cent key the bars F′ and $F^3$, the thirty-cent key the bars $F^2$ and $F^4$, the fifty-cent key only the bar $F^5$, the seventy-five-cent key the bars F′, $F^4$, and $F^5$, and so on to the ninety-five cent key, which will move the bars F′, $F^3$, $F^4$, and $F^5$, each key of the series moving just such bar or bars as will shift the proper escapement wheel or wheels to permit the motor to turn the registering-wheel the proper distance to register the value of the key, as was the case in my prior machines and as will be readily understood.

On the dollar side of the machine the motor-wheel A′ meshes with a pinion $A^2$ tight on a shaft $A^3$ in line with the shaft C.

Feathered upon the opposite end of the shaft $A^3$ is the first escapement-wheel G′ of the dollar series, having two teeth and co-operating with a detent on the adjacent disk or support H′. The latter is loose on the shaft and has feathered upon its hub the second escapement-wheel $G^2$, having five teeth and co-operating with the detent on the disk $H^2$. The hub of the latter in like manner carries the third escapement-wheel $G^3$, also having five teeth, while the third detent-support $H^3$ carries the fourth escapement-wheel $G^4$. The latter has ten teeth and co-operates with the detent on a disk $H^4$, rigid with a sleeve $H^5$, loose on the shaft $A^3$ and having tight on its opposite end a toothed escapement-wheel $H^6$. This latter wheel has ten teeth, and is engaged by detents upon the opposite ends of a rocking arm $H^7$, Figs. 1 and 7. The wheel $H^6$ and rocking arm $H^7$ form part of the transfer mechanism hereinafter described, and are not affected by the movements of the detents and wheels on the shaft $A^3$ under the operations of the dollar-keys. The wheel $H^6$ is always held stationary by one of the detents on the arm $H^7$, except at such time as a transfer is being effected, and the disk $H^4$ tight on the sleeve $H^5$ being of course also held stationary. The detent on the disk $H^4$ is really the end of the dollar train of wheels on the shaft $A^3$, and holds said train in check just as the detent $C^5$ holds the cent train of wheels in check.

Upon the end of the shaft $A^3$ to the right of the pinion $A^2$ is secured a gear K, meshing with a pinion K′ tight on a sleeve $K^2$, loose upon a rock-shaft $K^3$, suitably supported in the frame-work and carrying the rocking arm $H^7$ at its left-hand end; also, tight upon the sleeve $K^2$ is a gear $K^4$, which meshes with the primary wheel of the total-register. (Not shown, but the same as in my prior machines.) The gear K on the shaft $A^3$ has twice as many teeth as there are in the pinion K′ on the sleeve $K^2$ with which it meshes, so that each complete revolution of the shaft $A^3$ will turn the sleeve $K^2$ and gear $K^4$ two revolutions. The registering-wheel driven by the gear $K^4$ therefore makes a complete revolution at each revolution of said gear and consequently at each half-revolution of the shaft $A^3$. It registers ten dollars at each revolution and transfers onto a second wheel of the total-register, so that a complete revolution of the shaft $A^3$ will add twenty dollars to the total registry.

As before stated, the escapement-wheel $G^4$ has ten teeth. When it is slid toward the disk $H^4$, its engaged teeth are disengaged from one face of the detent, and the wheel can turn forward until said tooth strikes the other face of the detent, thus permitting the motor to turn the wheel one-half the distance between two of its ten teeth, or one-twentieth of a revolution. This turning of the wheel $G^4$ and consequently of the shaft $A^3$ and gear K one-twentieth of a revolution causes the gear $K^4$ to turn the primary wheel of the total-register one-tenth of a revolution to register one dollar, as will be readily understood. In like manner when either of the wheels $G^2$ or

$G^3$ is disengaged from its co-operating detent, the motor turns said wheel one-half the distance between two of its five teeth, or one-tenth of a revolution, causing the gear K to turn the gears K′ and $K^4$ and consequently the registering-wheel two-tenths of a revolution to register two dollars. The wheel G′ has only two teeth and at each operation of it it permits the motor to turn the shaft $A^3$ and gear K one-fourth of a revolution, and consequently to turn the primary registering-wheel one-half of a revolution to register five dollars. The escapement-wheels G′, $G^2$, $G^3$, and $G^4$ are connected by centrally pivoted levers I′, $I^2$, $I^3$, and $I^4$ with circumferential cam-grooves in disks J′, $J^2$, $J^3$, and $J^4$ loose on the shaft F, just as on the cent side of the machine. Upon the hub of each of the disks J′ $J^2$, &c., is a ratchet J, engaged on their rear sides by pawls I, Fig. 3, carried by the supporting arms of bars L′, $L^2$, $L^3$, and $L^4$ corresponding to the bars F′ $F^2$, &c., on the cent side of the machine. These bars, as shown in Figs. 3 and 4, are hung by their arms upon the shaft G. There are five dollar-keys, from 1 to 5, inclusive, with a blank or check key L interposed between the dollar and cent series. The bar L′ has two lugs on its under side, one above the one-dollar key and one above the three-dollar key. The two-dollar key plays up and down between these lugs and does not move the bar L′. The bar $L^2$ has no separate lugs. It extends above the two, three, and four dollar keys and is moved by each of them. The bar $L^3$ is moved only by the four-dollar key and the bar $L^4$ by the five-dollar key. The pawl carried by the bar L′ engages the ratchet on the hub of the disk J′, connected with the one-dollar escapement-wheel $G^4$. The pawl carried by the bar $L^2$ engages the ratchet of the disk $J^2$, connected with the escapement-wheel $G^3$, while the pawls of the bars $L^3$ and $L^4$ engage, respectively, the ratchets of the disks $J^3$ and $J^4$, connected with the escapement-wheels $G^2$ and G′. It will thus be seen that the operation of the one-dollar key will shift the escapement-wheel $G^4$, the two-dollar key will shift the wheel $G^3$, the three-dollar key will shift the wheels $G^3$ and $G^4$, the four-dollar key the wheels $G^2$ and $G^3$, and the five-dollar key the wheel G′.

The transfer of the dollars registered by the half-revolutions of the cent-registering wheel D is effected by the following means and in the following manner: Tight upon the rock-shaft $K^3$, just to the right of the gear $K^4$ on the sleeve $K^2$, Figs. 1 and 7, is a curved arm M, whose ends bear against the periphery of a cam-disk M′, secured upon the side of the motor-wheel A, Fig. 6. This cam-disk has twelve alternately raised and depressed spaces upon its periphery, and the spaces and the arm M are of such relative lengths that one end of the arm is always engaged with a depressed space and its opposite end with a raised space. As the motor-wheel revolves forward, the cam-disk rocks the arm M as one of its ends strikes and rides upon a raised space, and its opposite end enters a depressed space. The motor-wheel A has ninety teeth, and the pinion B on the shaft C, with which it meshes, has fifteen teeth, so that a complete revolution of the motor will cause six revolutions of the shaft B and cent-registering wheel D. As there are twelve of the spaces on the cam-disk M′ the arm will be rocked twelve times during a complete revolution of the motor-wheel, or once at each half-revolution of the registering-wheel D. The adjustment of the parts is such that it is rocked just as the wheel D completes a half-revolution and brings its 0 to the reading-point. The rocking of the arm M and shaft $K^3$ rocks the arm $H^7$ tight on the left-hand end of the shaft, and at each rocking disengages one of the detents on said arm from the escapement-wheel $H^6$, thereby permitting the motor to turn forward until another tooth of said wheel engages the opposite detent on the arm $H^7$. At each of such operations the wheel $H^6$ turns one-half the distance between two of its ten teeth, or one-twentieth of a revolution. The motor-wheel consequently turns the shaft $A^3$ one-twentieth of a revolution and causes the pinion K to turn the pinion $K^4$ and primary registering-wheel one-tenth of a revolution to register one dollar, as will be readily understood.

As stated at the beginning of the specification, the principal object of my present invention is to cause the full values of the keys to be registered upon their positive strokes, and not part on their positive and part on their negative stroke, as heretofore. This I accomplish by connecting the keys with the laterally-movable escapement-wheels in such manner that said wheels are shifted upon the positive strokes of the keys, but remain stationary during the negative strokes thereof. I have illustrated and described in detail one form of connection suitable for this purpose; but my invention is not limited to the details of construction or arrangement of such connections, but contemplates, broadly, the combination of the laterally-movable escapement-wheels, the operating-keys, and connections interposed between the keys and escapement-wheels by which the latter are shifted laterally by the stroke of the keys in one direction and allowed to remain stationary during their strokes in the opposite direction.

It will also be understood that while in my present machine, as in my former ones, the escapement-wheels, and not the detents, are the laterally-movable elements of the escapement mechanism, yet this arrangement might be reversed and the detents be made the laterally-movable element, the connection between the detent-supports and operating-keys

being made substantially the same as the connections between the escapement-wheels and keys.

Having thus fully described my invention, I claim—

1. In a registering-machine, the combination of a series of detents, a series of laterally-movable co-operating escapement-wheels, a series of operating-keys, and connections interposed between the operating-keys and escapement-wheels by which the latter are shifted in one direction upon one stroke of the keys and allowed to remain stationary during the reverse stroke of the keys, substantially as and for the purpose described.

2. In a registering-machine, the combination of a revoluble shaft, a train of detents and co-operating laterally-movable escapement-wheels mounted thereon, a series of operating-keys, and connections between the keys and escapement-wheels by which the latter are shifted laterally in one direction upon the positive strokes of the keys and allowed to remain stationary during the negative strokes thereof, substantially as and for the purpose described.

3. In a registering-machine, the combination of a spring-impelled motor-wheel, a revoluble shaft and registering-wheel geared thereto, a train of detents and co-operating laterally-movable escapement-wheels mounted upon the revoluble shaft, a series of operating-keys, and connections between the keys and escapement-wheels by which the latter are shifted laterally in one direction upon the positive strokes of the keys and allowed to remain stationary during the negative strokes thereof, substantially as and for the purpose described.

4. In a registering-machine, the combination of a detent and a co-operating laterally-movable escapement-wheel, a shifter for the escapement-wheel, a revoluble cam actuating said shifter, and an operating-key actuating said cam, substantially as and for the purpose described.

5. In a registering-machine, the combination of a detent and a co-operating laterally-movable escapement-wheel, a shifter for the escapement-wheel, a revoluble cam actuating said shifter, and two or more operating-keys connected with said revoluble cam and actuating the same independently of each other, substantially as and for the purpose described.

6. In a registering-machine, the combination of a series of detents and a series of co-operating laterally-movable escapement-wheels, a shifting-lever for each escapement-wheel, a revoluble cam for each shifting-lever, and a series of operating-keys, some of which are each connected with two or more of the revoluble cams, substantially as and for the purpose described.

7. In a registering-machine, the combination of a series of detents and a series of co-operating laterally-movable escapement-wheels, a shifting-lever for each wheel, a revoluble cam for each shifting-lever, a series of movable bars each actuating one of the revoluble cams, and a series of operating-keys co-operating with the movable bars, in the manner and for the purpose specified.

8. In a registering-machine, the combination of a train of detents and co-operating laterally-movable escapement-wheels, a shifting-lever for each wheel, a revoluble cam for each shifting-lever, a ratchet for each cam, a series of movable bars each carrying a pawl engaging one of said ratchets to turn the cam upon the moving of the bar in one direction, and a series of operating-keys co-operating with said movable bars, in the manner and for the purpose specified.

9. In a registering-machine, the combination of the detents C′ C², &c., and co-operating laterally-movable escapement-wheels B′ B², &c., mounted upon the shaft C, the shifting-levers D′ D², &c., engaging the hubs of the escapement-wheels at their upper ends, the revoluble disks E′ E², &c., provided with the cam-grooves engaging the lower ends of said levers, the ratchets J, turning with the disks, the vibrating bars F′ F², &c., each carrying a pawl I, engaging one of the ratchets J, and the operating-keys co-operating with the bars F′ F², &c., in the manner and for the purpose specified.

10. In a registering-machine, the combination of the motor-wheel A, the cam-disk M′, secured to its side, the cent-registering wheel driven by the motor, the rock-shaft K³, provided at one end with the rocking arm M, bearing at both ends upon the periphery of the disk M′, and at its other with the rocking arm H⁷, provided with a detent at each end, the motor-wheel A′, the escapement-wheel H⁶, geared to the motor-wheel A′ and co-operating with the detents on the opposite ends of the arm H⁷, and a registering-wheel driven by the motor A′, substantially as and for the purpose described.

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