

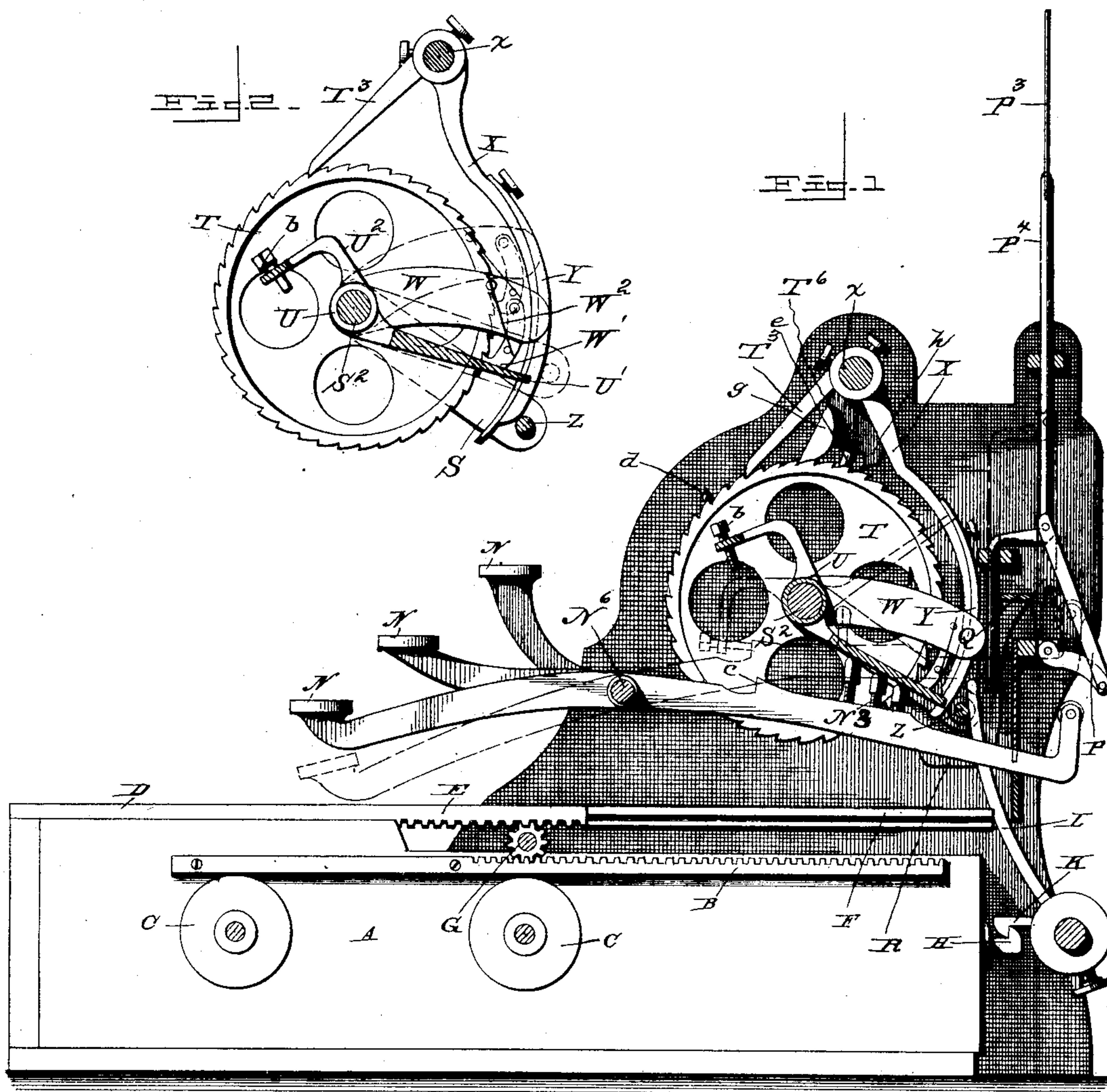
(No Model.)

5 Sheets—Sheet 1.

E. F. ROBERTS.
CASH REGISTER.

No. 484,376.

Patented Oct. 11, 1892.



WITNESSES

Walter H. Humphrey
J. Lawrence Berry

INVENTOR

Edward F. Roberts
By Arthurworth Hall & Brown
Attorneys

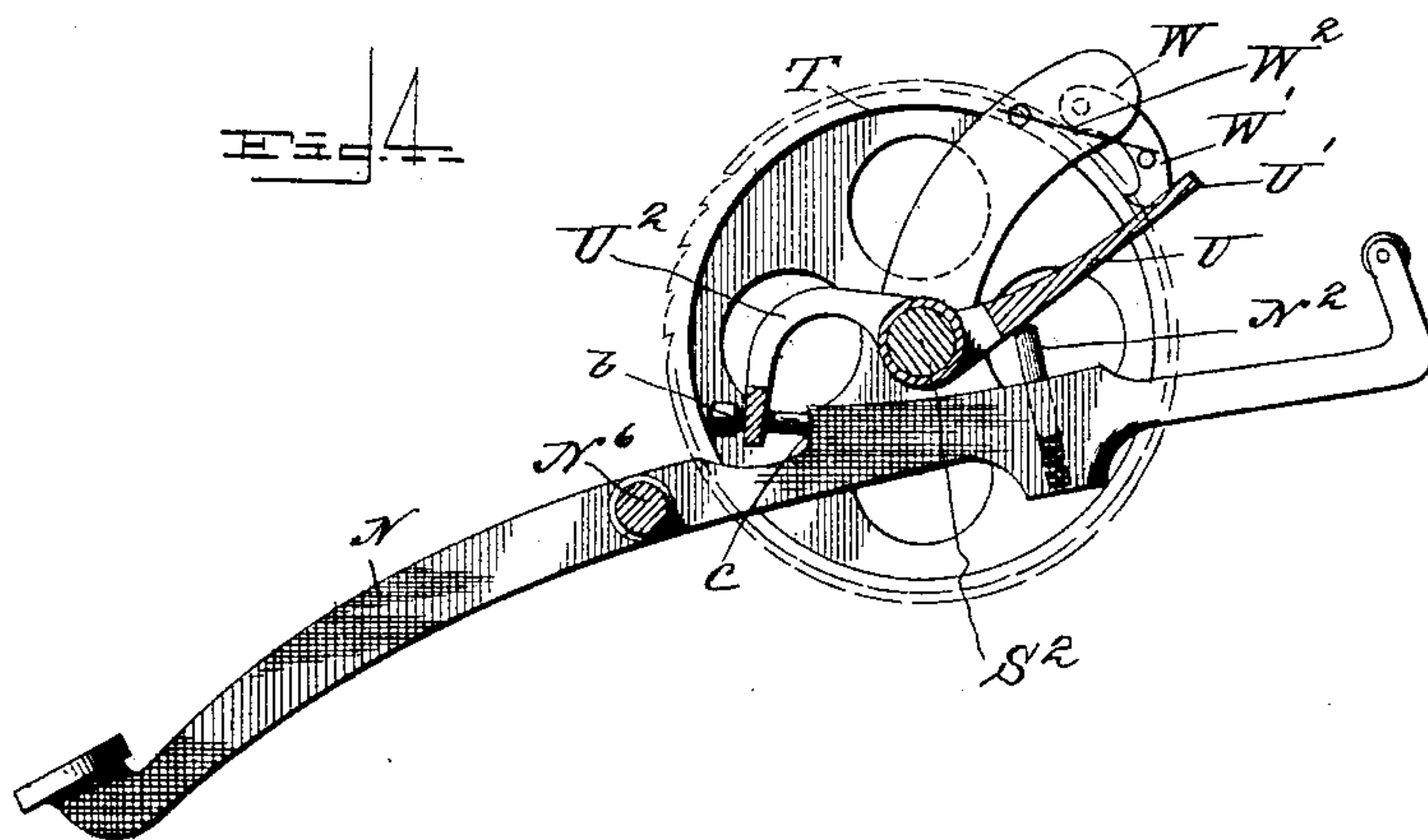
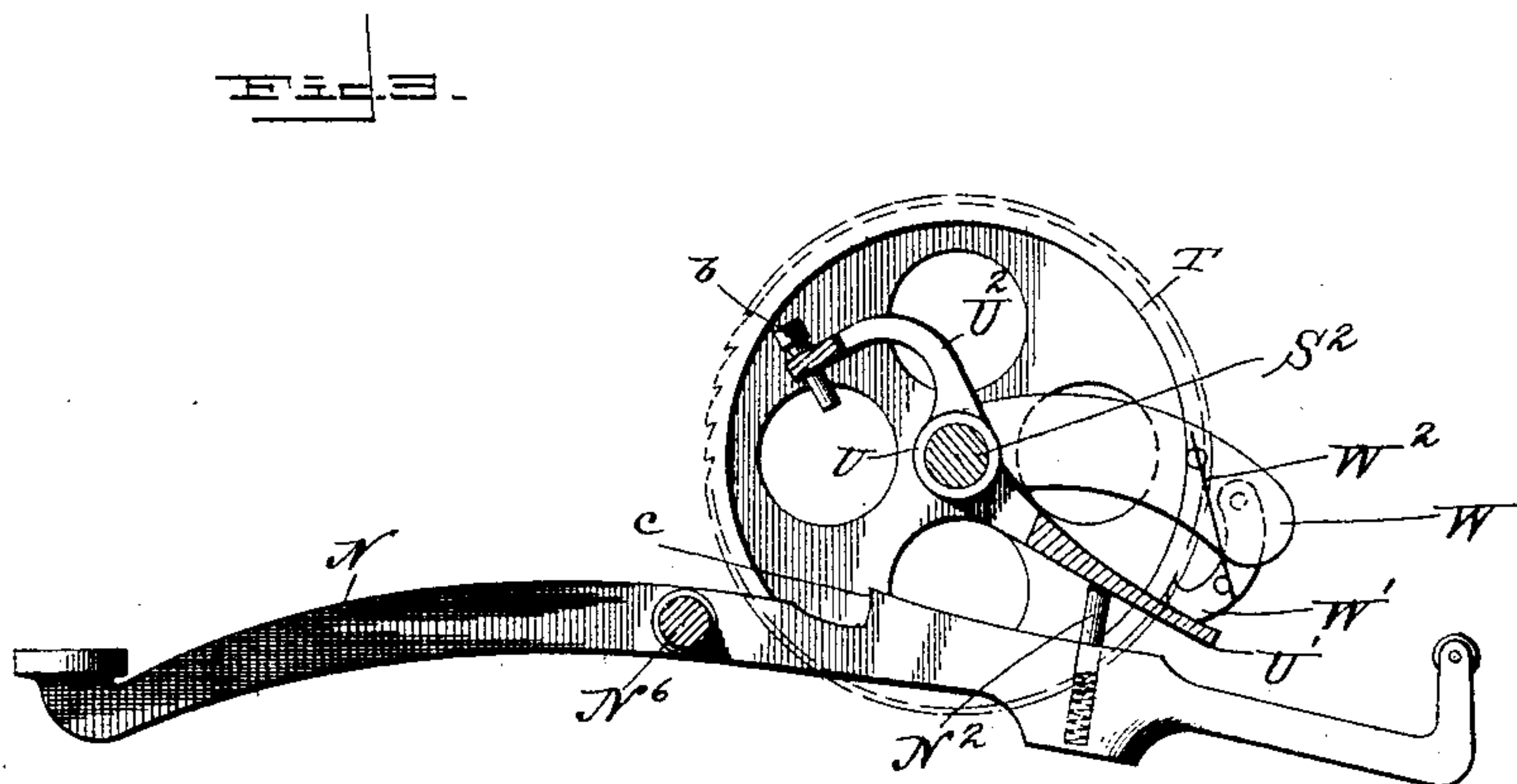
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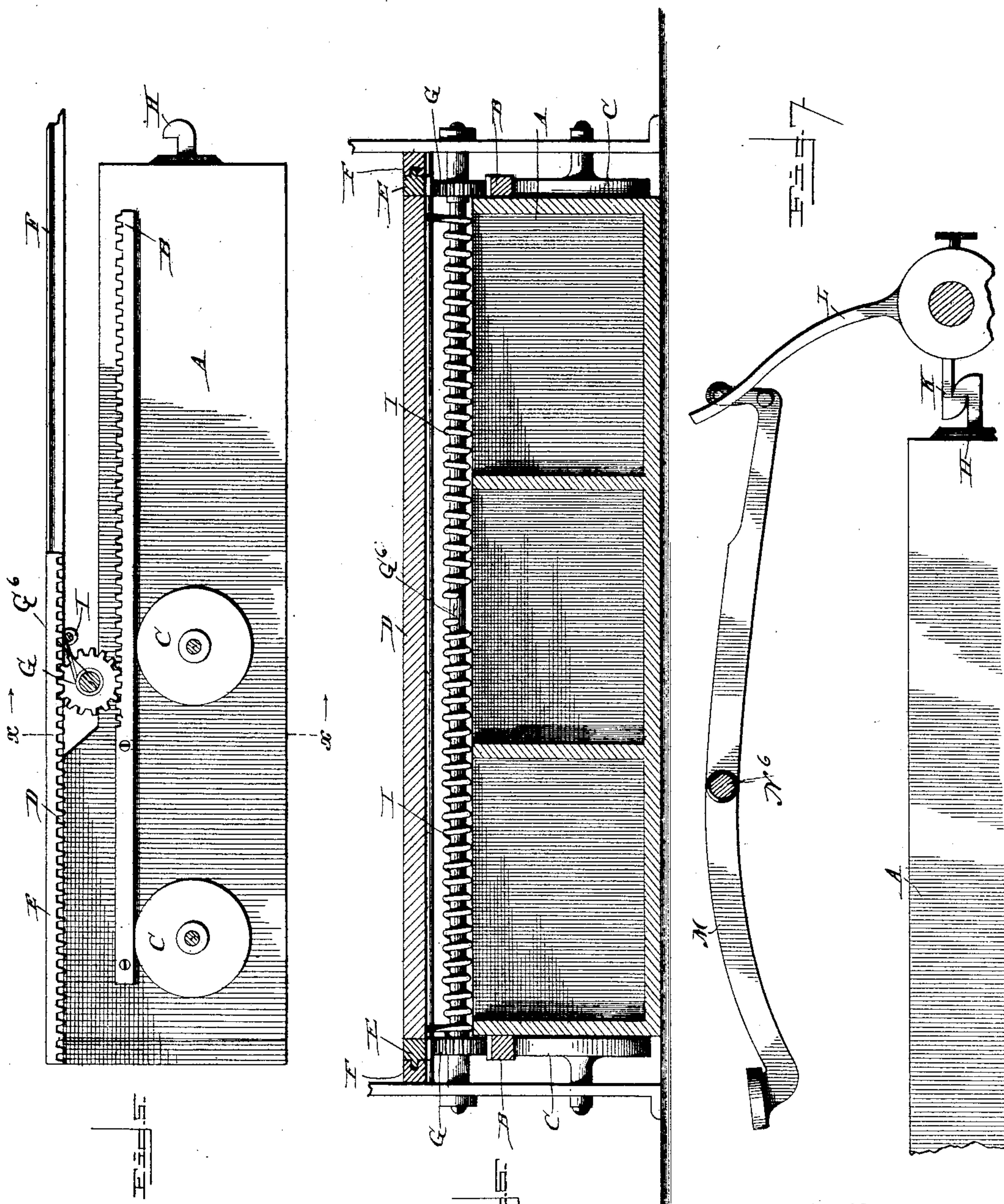
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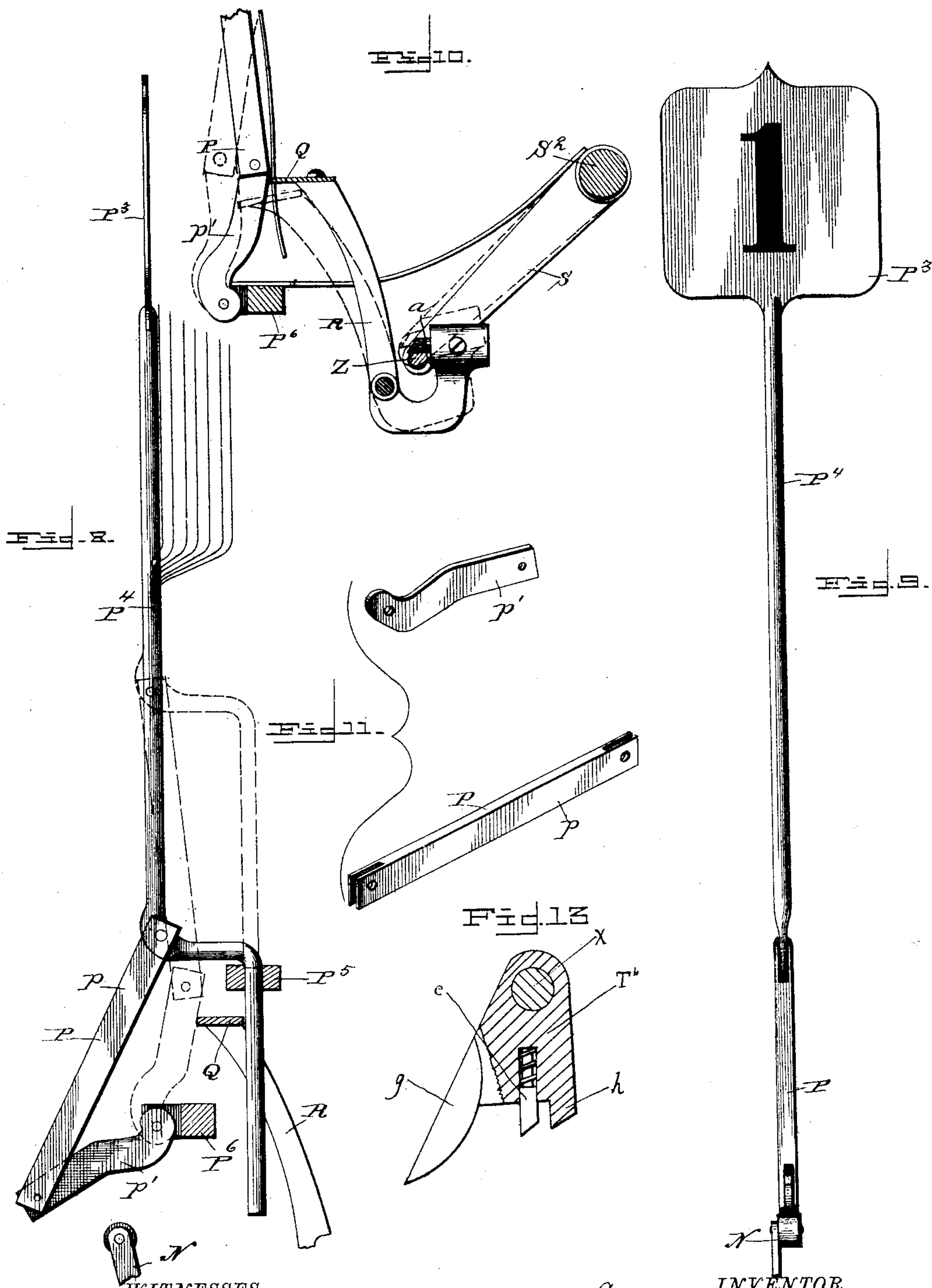
(No Model.)

5 Sheets—Sheet 4.

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(No Model.)

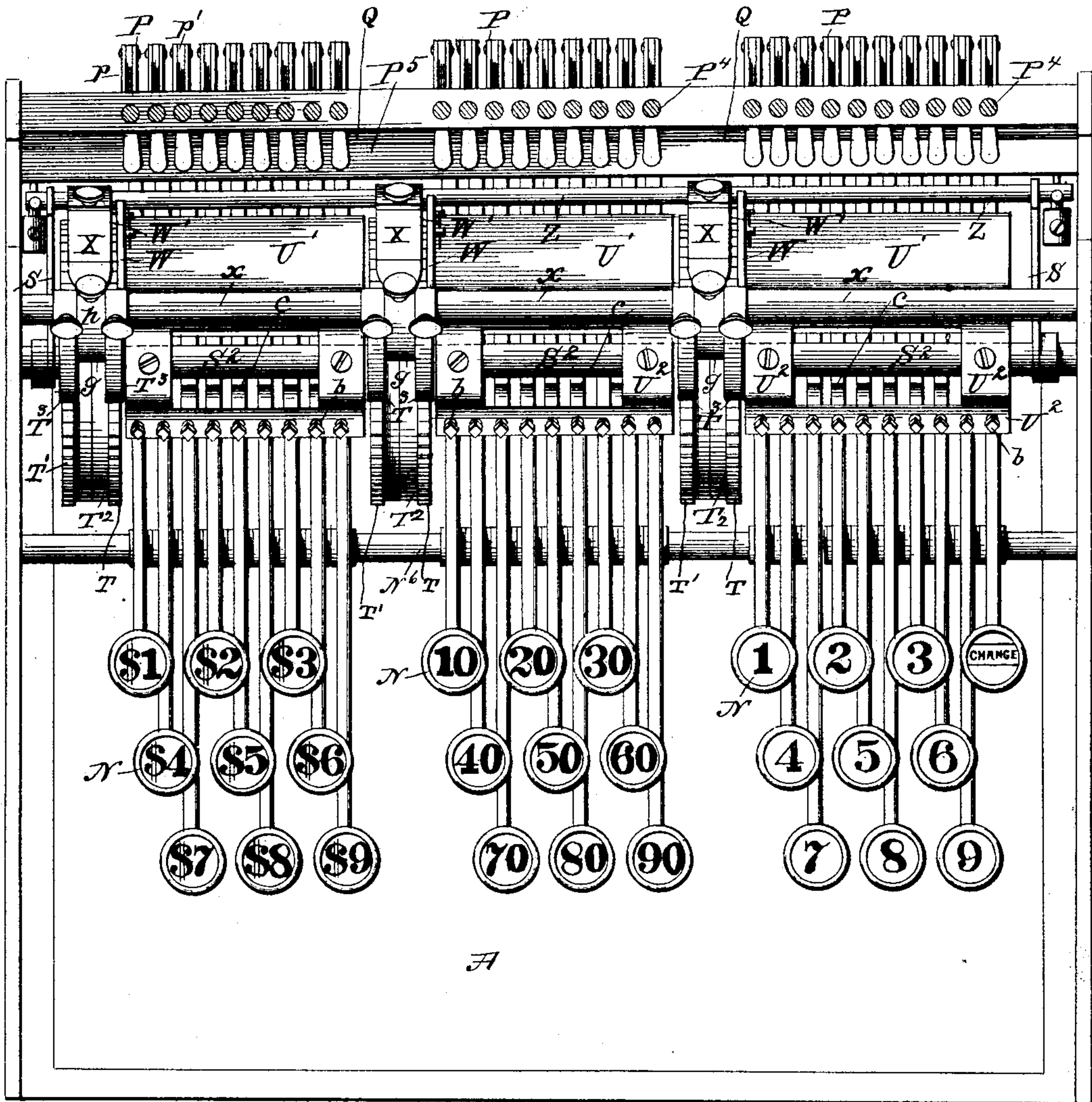
5 Sheets—Sheet 5.

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Fig. 12.



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UNITED STATES PATENT OFFICE.

EDWARD F. ROBERTS, OF COLUMBUS, OHIO, ASSIGNOR TO THE ROBERTS
MANUFACTURING COMPANY, OF SAME PLACE.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 484,376, dated October 11, 1892.

Application filed August 11, 1890. Serial No. 361,731. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. ROBERTS, a citizen of Great Britain, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Cash-Registers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to certain improvements in cash-registers; and it will be set forth in the succeeding specification and claims.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 is a longitudinal vertical section of the principal parts of my invention with the drawer and operating mechanism in side elevation. Fig. 2 is a detail view and side elevation of the mechanism for operating the units-wheel. Fig. 3 is a detail view and side elevation of the key-lever, the ratchet-wheel for operating the units-wheel, and mechanism for communicating motion from the lever to said ratchet-wheel. Fig. 4 is a view of the same mechanism in position after the key-lever has been depressed. Fig. 5 is an inside elevation of the drawer and the mechanism operating the same with the shafts of such mechanism in cross-section. Fig. 6 is a vertical cross-section on the line *xx* of Fig. 5. Fig. 7 is an outside elevation of a portion of the drawer, the locking mechanism, and the lever for operating such locking mechanism. Fig. 8 is a view in detail of the target-rod and the toggle-levers with a section of the key-lever or operating-lever. Fig. 9 is a front elevation of the same. Fig. 10 is a detail of the elbow-lever and throwing-bar for the target-operating mechanism. Fig. 11 is a detail view of the detached links of the toggle-levers; and Fig. 12 is a top plan view of the entire mechanism of the register, the casing and woodwork of drawer being removed and the target broken off. Fig. 13 is a detail sectional view of the dogging device.

One of the improvements coming within the scope of my present invention relates to the cash-drawer and the mechanism for manipulating the same, and this I will now describe.

The drawer A for containing cash is of ordinary shape and conformation. This drawer has affixed to each of its sides a longitudinal rack-bar B, the under side of which is smooth and rests on friction-rollers C C, attached to sides of main frame or casing, on which the drawer may travel. The frame is provided with grooved horizontal rails F, attached to its sides, forming ways for the tongued racks E, which are fastened to the side edges of the sliding cover D of the drawer. Mounted upon each end of a suitable shaft G⁶, journaled transversely in the main frame above the drawer and between it and cover, are two pinions G G, which are arranged so as to be between the rack-bars and the drawer and the cover and to mesh therewith. Upon the shaft G⁶ are two springs I I, having their inner ends secured rigidly to such shaft and their outer ends fastened to a projection from the main frame. These springs are so wound that their normal tendency is to turn the shaft and the pinions thereon, and thus cause the drawer to slide outwardly and the cover to slide inwardly. The pinions being placed between the rack-bars of the respective movable parts causes these parts to slide in opposite directions. To keep the drawer closed, I provide the latter with any suitable catch, such as is shown at H, which may interlock with a latch K, projecting from a rock-shaft journaled in the frame, which rock-shaft has an arm L projecting upwardly therefrom. This arm L may be manipulated from any convenient portion of the machine and by hand or by push-rod. As shown, it is operated from each key-lever by mechanism hereinafter described, and also by a special key-lever M, which may be arranged conveniently at one side of the machine and in a position to be manipulated for this purpose alone. By the use of the rack-bars B and E or similar mechanism and the intermediate mechanism for driving such rack-bars in reverse directions I am enabled to uncover the cash-drawer to the full extent by only one-half the movement of either the drawer or its cover which has ordinarily been necessary.

I will next describe the target-operating mechanism. Pivoted in the main frame by means of a transverse rod N⁶ or otherwise is

a series of key-levers N N, which are marked with predetermined symbols in the usual manner, or according to the best method elected by the constructor for the particular use to which the machine is to be put. In the machine shown in Fig. 12—the practical machine—I preferably have three groups of key-levers on shaft N⁶, nine levers in each group, and each group representing “units,” “tens,” and “hundreds,” or “cents,” “dimes,” and “dollars,” as indicated in Fig. 12. The change-key M is also mounted on shaft N⁶, beside the units group. The rear end of each one of these key-levers is preferably bent upward and provided with a small friction-roller. Arranged in the machine is a series of plates P³, bearing legends corresponding to the symbols upon the key-levers, one plate with its legend for each key-lever. These plates, with their legends, I denominate “targets.” I have found that it is convenient to mount the targets in the frame and operate the same in the following manner: To each target is affixed a depending stem or rod P⁴, which at a short distance from its lower end is bent at right angles and then again bent so as to project a small distance in a parallel plane to the main portion of the stem, but at right angles to the bent portion. Transversely of the frame I arrange two bars, one P⁵ at a point near the top of such frame and the other P⁶ at a point much lower down and in the path of the lower vertical ends of the stems or rods of the target. Each of these transverse bars is provided with vertical holes made to fit the portions of the stems or rods P⁴ which pass therethrough and are guided thereby. Connected to the target-stems, preferably at a point where the main portion of the stem is turned in the right-angle direction, is a link *p* of a toggle-lever P, the other link *p'* of which is pivoted at its outer end to the cross-bar P⁶. In their normal position with targets lowered all the toggle-levers are collapsed; but when a key-lever is operated its rear end strikes the lower link of the toggle-lever and carries the same upward until such lever is straightened, and, further, until its central pivot passes a vertical line between its end pivots and strikes a plate Q, which will hereinafter be described. In this manner the particular target actuated is lifted above its associates and caused to display its legend or symbol, and the position of the toggle-lever which supports it is such that the target will be held by gravity in this position exposed to view until the position of the toggle-lever is changed. Journaled in the main frame above the key-levers and intermediate shaft N⁶ and bar P⁵ is a shaft S², on which are arms S, the extremities of which are connected by a cross-rod Z, extending transversely from one side of the machine to the other. R R are opposite hook-shaped levers pivoted to the opposite sides of the main frame near the lower ends of their longer arms; their pivots being near the lower ends of arms S. The

upper ends of the longer arms of levers R are connected by a transverse plate O, which lies normally intermediate bars P⁵ P⁶. The shorter arms of levers R curve up in front of rod Z when the parts are in normal position and are provided with spring-pins *a*, which engage said rod and cause the latter to rock levers R when it is swung upward. The shaft S², upon which the arms S are mounted, is the main shaft of the machine, and when a key-lever is manipulated its first effect is to cause the arms S to swing in the arc of a circle, and thereby cause rod Z to come in contact with spring-pins *a* in the short arms of the bent levers R, which action causes said arms to turn upon their journals and cause the plate Q to strike the toggle-levers and force them toward the rear of the machine until their central pivots are beyond a straight line joining their extremities, and then they drop by their own weight with the targets.

The mechanism for operating the registering-wheels is next to be described. T T' designate pairs of ratchet-wheels mounted loosely on shaft S² beside each other, there being one pair of such wheels for each of the cents, dimes, and dollars groups of keys. Each wheel has a band or registering wheel T², attached to it, the perimeter of which is figured like an ordinary registering-wheel. Thus the wheel attached to the wheel T of the cents group is numbered “1” to “99,” and the wheel attached to wheel T' of the cents group is marked with another series of numbers indicating dollars, and is moved one notch for every complete revolution of wheel T, as hereinafter described, registering “\$1.” Mounted on shaft S² beside each wheel T is an “elbow-lever” or “key-lever stop and regulator” U. This has a rear depending “plate” portion U', which extends transversely over the rear ends of the series of key-levers in a “group” in rear of shaft S², and also has a front arm U², which is bent downwardly and then laterally and extends transversely over the series of key-levers in a group in front of shaft S² and is adapted to engage a shoulder *c* of either key-lever N. When a key-lever N is depressed, its rear end strikes plate U' and oscillates elbow-lever U, depressing arm U² thereof until it engages shoulder *c*, when the movement of the elbow-lever is arrested. In Figs. 3 and 4 I have shown the key-levers N provided with spring-pins N³ for striking the plates U', and in Fig. 1 I show the key-levers provided with screws N³, which can be adjusted to various heights, so as to impart varying movements to the plate from the several levers. The arm U² may be provided with a series of adjusting-screws *b*, by which the contact with shoulders *c* may be regulated. W is an arm attached to the hub of each elbow-lever U, and W' is a pawl pivoted to the outer end thereof and engaging teeth of the adjoining ratchet-wheel T in Figs. 1 and 2, being held in engagement therewith by a

spring W^2 . Consequently when the elbow-lever is shifted by a key-lever, as described, pawl W' is raised more or less and turns the ratchet-wheel T forward accordingly. $T^3 T^3$ are dogs pivoted on a transverse shaft x above and somewhat in rear of shaft S^2 , engaging ratchets $T T'$ to prevent backward movement thereof. T^6 is a dogging device suspended loosely on shaft x above each pair of wheels $T T'$ and having a depending lug g , which overlies the perimeter of wheel T^2 , attached to ratchet T , and is adapted to be engaged by a pin d on said wheel once during each revolution of wheel T . T^6 also has a spring-tooth e and a tooth h behind tooth e , both of which are adapted to engage the teeth of ratchet T' . When the pin d shifts lug g , the latter swings teeth $e h$ forward also, thereby moving wheel T' forward one notch. Tooth e is the driving-pawl, and tooth h is a locking-pawl, being shorter than tooth e , so that when the latter has caused wheel T' to move one notch tooth h comes into engagement with a tooth of the wheel T' and locks it upon the same principle as the "escapement" of a clock, so that wheel T' cannot be worked forward by momentum past the proper point. X designates a curved bar suspended from shaft x beside each wheel T and depending below and beside dog W' and in front of rod Z . Y is an additional wedge-shaped strip secured to the rear edge and lower portion of bar X . When moved inward, the bar X binds the dog W' against its ratchet, so that the dog serves as a brake and stop by binding or biting the wheel T' , and when the dog stops moving the wheel T' stops instantly with it. Normally the bars X swing rearwardly out of contact with the dogs W' . When a key-lever is depressed, thereby lifting the rod Z and dog W' , as hereinbefore described, the rod Z in using contacts with the cam-surface Y of the bar and swings the latter forward, thereby binding the dog W' against the ratchet so closely that the ratchet and dog are interlocked and the movement and stoppage of both are simultaneous. Upon the release of the key-lever the rod Z drops and bar X swings rearwardly, permitting the dog W' to drop with arm W to normal position without binding on the ratchet-wheel.

The feature of locking the ratchet so that the pawl becomes the stop for the ratchet is one of the main features of my invention, and as it might be accomplished by various means I desire to protect it broadly.

By the arrangement above described when a key-lever has caused the registering mechanism to do the desired work all further movement are prevented, inasmuch as the ratchets are locked by the pawls h and the pawl upon the arm W , and the bent lever U is locked by the shoulder upon the key-lever, and consequently steadiness and certainty of movement are secured which have heretofore been unattainable. The same movement of the key-lever also causes the release of the

drawer, as hereinbefore described. These locking devices also prevent dishonest or careless persons tampering with the registering mechanism, or, as it is styled, from "beating the machine." The spring-pins upon the key-levers—such as I have shown in Figs. 3 and 4—add to the efficiency of the machine in this respect, for it is impossible to ascertain to what extent this spring will compress, and the elbow-lever U , which actuates the registering mechanism, may be given its full throw (allowed by shoulder c) before the rear end of the key-lever has completed its upward movement and thrown up the target.

I am aware that it has heretofore been proposed to operate a ratchet-wheel of a register by means of a reciprocating rack-bar pivoted to an arm projecting from a rock-shaft and adapted when raised to be thrown into engagement with the teeth of the ratchet, so as to give the latter a partial rotation. My invention differs from such construction both in function and mode of operation, it being the sole object of the device referred to to insure an engagement of the rack-bar with the ratchet for the purpose of effecting a partial rotation of the latter, while the function of my device is to positively lock the pawl or dog to the ratchet-wheel on the initial movement of a key-lever, so that it not only effects a partial rotation of the wheel, but serves, also, as a stop therefor for the purpose of preventing forward motion of the wheel by reason of its acquired momentum when the motion of the pawl is arrested. I disclaim any such construction as that heretofore proposed and for the purpose stated.

What I claim as new, and desire to protect by Letters Patent, is—

1. The combination of a casing, a drawer therein, racks attached to the sides of the drawer, a horizontal shaft journaled in the sides of the casing above the drawer, and the coiled springs on said shaft for revolving the same with the sliding cover above the drawer and shaft, the tongue-and-groove guide-supports for the cover, the racks attached to the cover vertically over the racks on the drawer sides, and a single pinion on and near each end of said shaft, directly meshing with a rack on the drawer and on the cover, all substantially as described.

2. In a cash-register, the combination of the rod carrying a target, a toggle-lever for elevating said rod, and a key-lever adapted to open said toggle with the oscillating bent levers $R R$, the connecting-plate Q , swinging links S , and connecting-rod Z for knocking down the toggle, all substantially as described.

3. In a cash-register, one or more key-levers provided with shoulders, an oscillating bent or elbow-lever secured to a cross-shaft of the frame above the inner or longer end of the key-lever, one side of the bent lever being arranged in the path of the longer end of the key-lever, so as to be oscillated thereby upon the depression thereof, and the other side of

the bent lever making contact with the shoulder of the key-lever when the elbow-lever is oscillated, whereby the throw of the bent lever is limited, substantially as shown and described.

4. In a cash-register, one or more key-levers, each provided with a shoulder, the bent lever secured so as to turn upon the shaft in the frame, one end of the bent lever arranged in the path of the longer arm of the key-lever, the other end of the bent lever having an adjustable stop for coaction with the shoulder on a key-lever, whereby the throw of the bent lever may be adjusted to a predetermined degree, substantially as shown and described.

5. In a cash-register, one or more key-levers, each having a spring-pressed projection, a bent lever journaled on a cross-shaft, one side of said bent lever being provided with a stop to limit its throw and its outer side adapted to be struck by the spring-pressed projection, a registering-wheel mounted on the shaft beside the bent lever, and a bar connected with the bent lever for carrying a pawl for operating the ratchet of the registering-wheel, substantially as and for the purpose set forth.

6. In a cash-register, one or more key-levers, an oscillating bent or elbow lever arranged in the path of the longer arm of the key-lever and connected to mechanism for operating the register, said bent lever being pivoted above the key-lever, so that it will be both oscillated and stopped by the key-lever when the latter is depressed, substantially as and for the purpose set forth.

7. In a cash-register, a registering-wheel, one or more key-levers, an oscillating bent lever beside the registering-wheel, having one end arranged in the path of the longer arm of the key-lever and the other end provided with stops to limit its movement, and mechanism carried by said lever for operating said registering-wheel, substantially as described.

8. In a cash-register, the combination of a ratchet-wheel operating the register, one or more key-levers, an arm journaled on a cross-shaft and carrying a dog for operating the ratchet-wheel and arranged in the path of the key-lever, in combination with mechanism for moving and simultaneously locking the dog to the ratchet-wheel on the initial movement of a key-lever, substantially as and for the purpose set forth.

9. In a cash-register, a register-wheel, one or more key-levers, an arm journaled on a cross-shaft, carrying the pawl, and arranged in the path of movement of the key-levers, a ratchet-wheel connected with the register-wheel, and a pivoted and curved bar, and mechanism for automatically carrying the free end of this bar inwardly, so as to lock the pawl to the ratchet-wheel, substantially as and for the purpose set forth.

10. In a cash-register, one or more key-le-

vers, a projection journaled upon the main shaft, having an arm arranged in the path of the key-levers, and an arm carrying a pawl, in combination with a ratchet connected to the register, a bar pivoted at one end having an outer cam-face at its free end, and mechanism for automatically forcing such free end inwardly, so as to cause the pawl to lock the ratchet, substantially as and for the purpose set forth.

11. In a cash-register, one or more key-levers provided each with a shoulder, a bent or elbow lever journaled upon a shaft in the frame, having one arm arranged in the path of the key-lever, a bent arm having its end arranged for contact with the shoulder, a pawl suitably connected with the elbow-lever, a pivoted curved bar having an outer cam-face, and mechanism for automatically actuating the free end of the curved bar, causing the same to lock the pawl in a notch of a ratchet-wheel, which latter is connected to the register, substantially as and for the purpose set forth.

12. In a cash-register, one or more key-levers, a units-register, mechanism connecting the key-lever with the units-register, a pin on the face of the units-register, a dogging device T^6 , pivoted to a shaft in the frame and consisting of a single casting having a laterally-extending lug for engagement with the pin, and a spring-tooth e and tooth h for engagement with the registering device for tens and hundreds, substantially as and for the purpose set forth.

13. The combination, with the ratchet-wheel for operating the registering devices and its actuating pawl or dog, of a key-lever and connections for shifting said dog and mechanism whereby the dog is locked in engagement with the wheel on the initial movement of the key-lever and the dog and wheel caused to move together about a common center, so that the arrest of the motion of the dog shall stop the further movement of the wheel, substantially as described.

14. The combination of the ratchet-wheel for operating the registering mechanism, its actuating pawl or dog, and key-levers and connections for raising said dog to revolve said ratchet-wheel forwardly with the swinging cam-bar and connections for shifting the same, whereby upon the depression of a key-lever the dog is moved to revolve the ratchet-wheel and simultaneously positively interlocked therewith, so as to prevent forward motion of the wheel by momentum when the motion of the dog is arrested, substantially as described.

15. The combination of the pair of registering-wheels and ratchets, the dogging device suspended above the same, formed of a single casting having fixed teeth g h and provided with a spring-tooth e , substantially as described.

16. The combination of the ratchet-wheel for actuating the registering devices, the actu-

ating-dog therefor, the cam-bar Y, rod Z, and key-levers, all substantially as described.

17. In a register, a ratchet-wheel and its operating mechanism, including a pawl or dog adapted to normally engage said wheel and move therewith, and means for actuating the dog and simultaneously locking the same in engagement with the wheel on the initial movement of said operating mechanism, so as to cause both dog and wheel to move and stop together, substantially as described.

18. In a register, the combination, with a ratchet-wheel and its operating mechanism, including a pawl or dog adapted to engage a tooth of said wheel, a swinging cam-bar, and connections for shifting said bar, so as to cause the latter to lock said pawl or dog in a tooth of said ratchet, substantially as described.

19. In a register, the combination, with a ratchet-wheel and its operating mechanism, of a movable cam-bar and a rod extending across the key-levers, whereby upon the operation of a key said bar is caused to lock a dog in a tooth of said ratchet-wheel, substantially as described.

20. In a register, the combination, with a

ratchet-wheel and its operating mechanism, of a cam-bar and a rod secured to arms projecting from a shaft journaled in the main frame, said rod extending across the key-levers, whereby upon the initial movement of the key the said bar is caused to lock a pawl or dog in a tooth of said ratchet-wheel, substantially as described.

21. In a register, the combination, with a ratchet-wheel and its operating mechanism, of a cam-bar, a series of key-levers, and a rod secured to arms projecting from a shaft journaled in the main frame, said rod extending across and above the rear ends of said key-levers, whereby upon the initial movement of a key the cam-bar is caused to lock a pawl or dog in a tooth of said ratchet-wheel and to retain the dog or pawl so locked during the stroke of said key, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD F. ROBERTS.

Witnesses:

O. M. BALL,

GEO. W. STICKNEY.