

(No Model.)

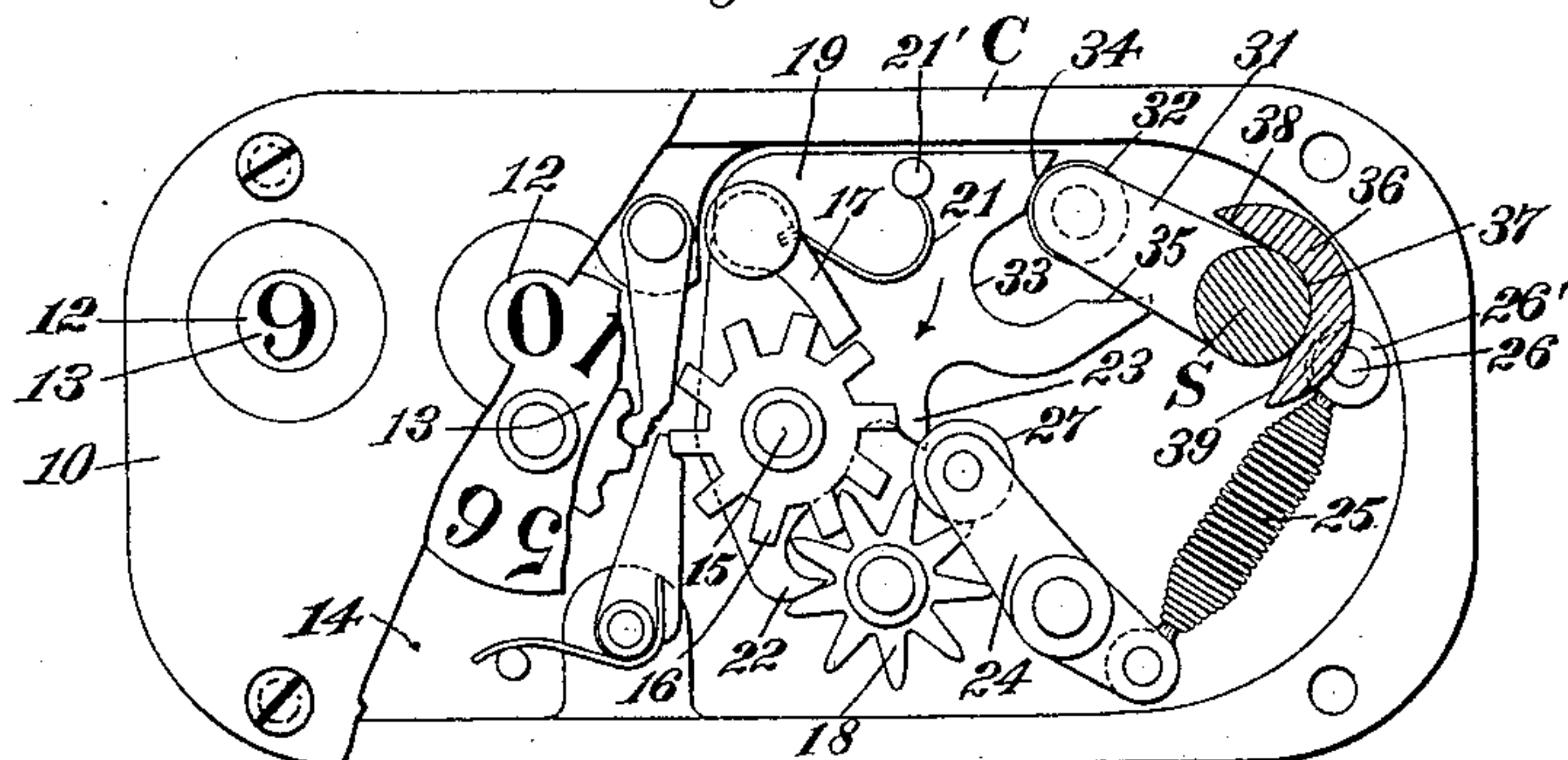
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F. H. RICHARDS.  
REGISTER.

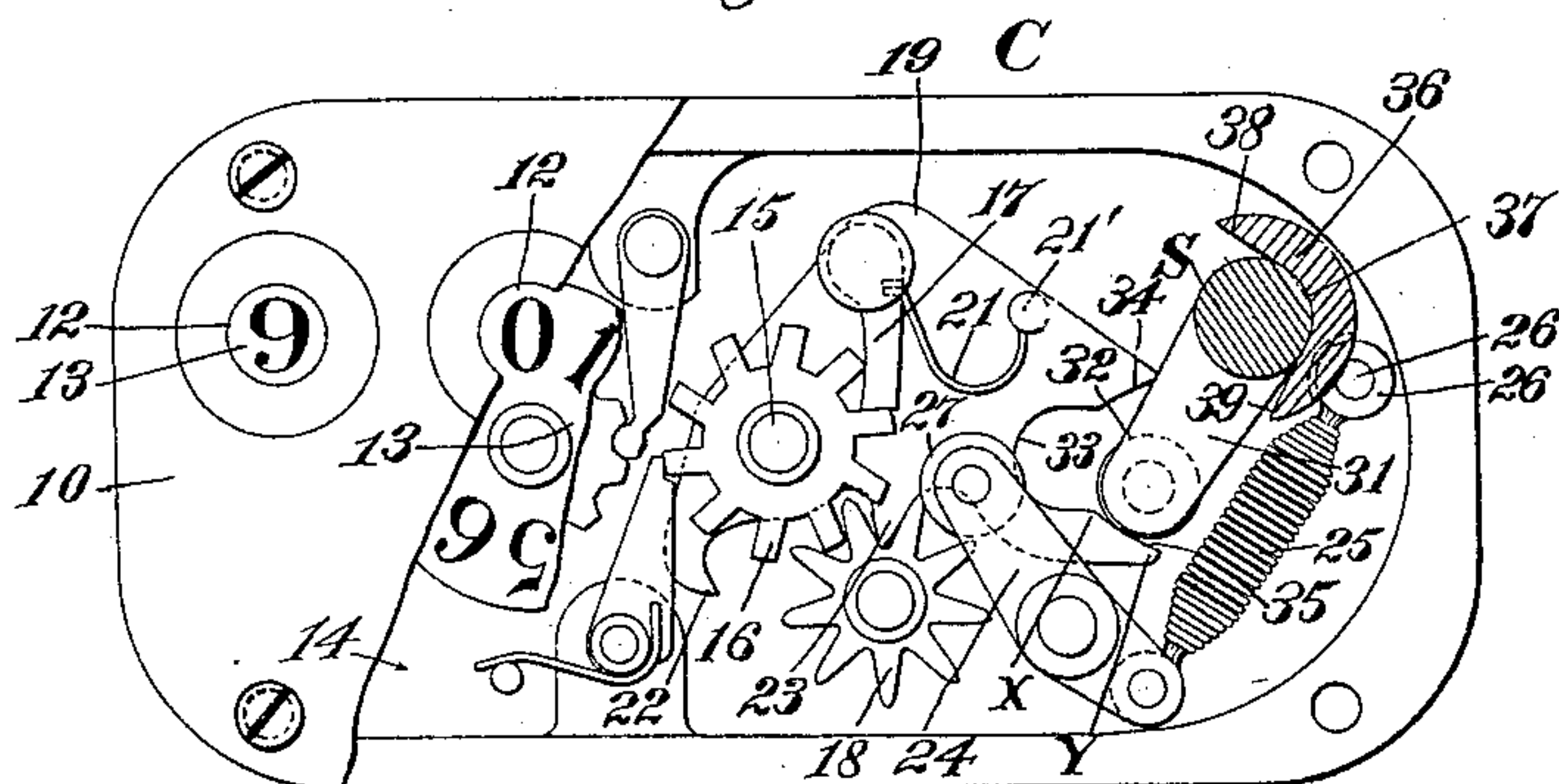
No. 563,884.

Patented July 14, 1896.

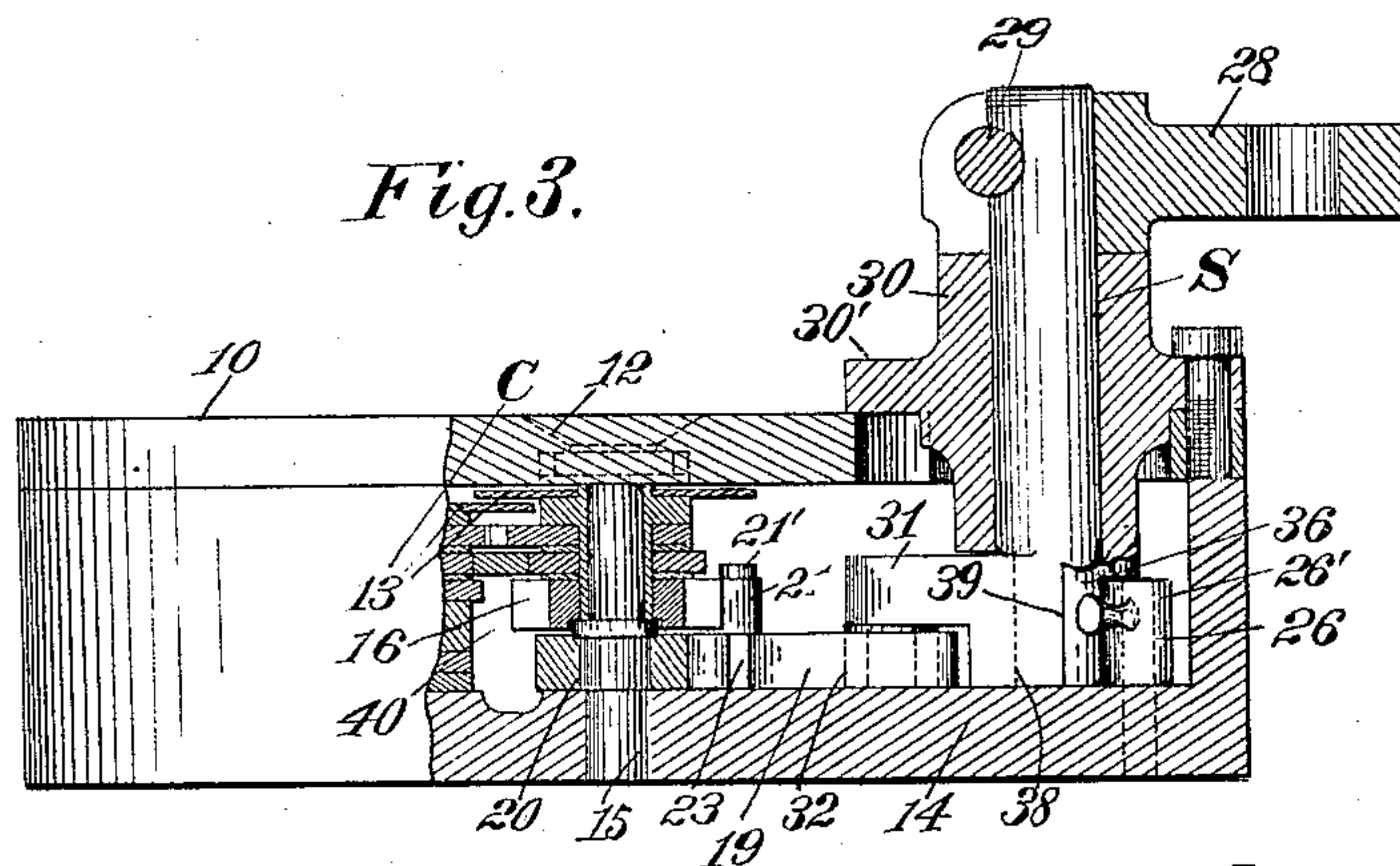
*Fig.1.*



*Fig.2.*



*Fig.3.*



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Chas. D. King.  
Fred. J. Dole.

Inventor:

F. H. Richards.

(No Model.)

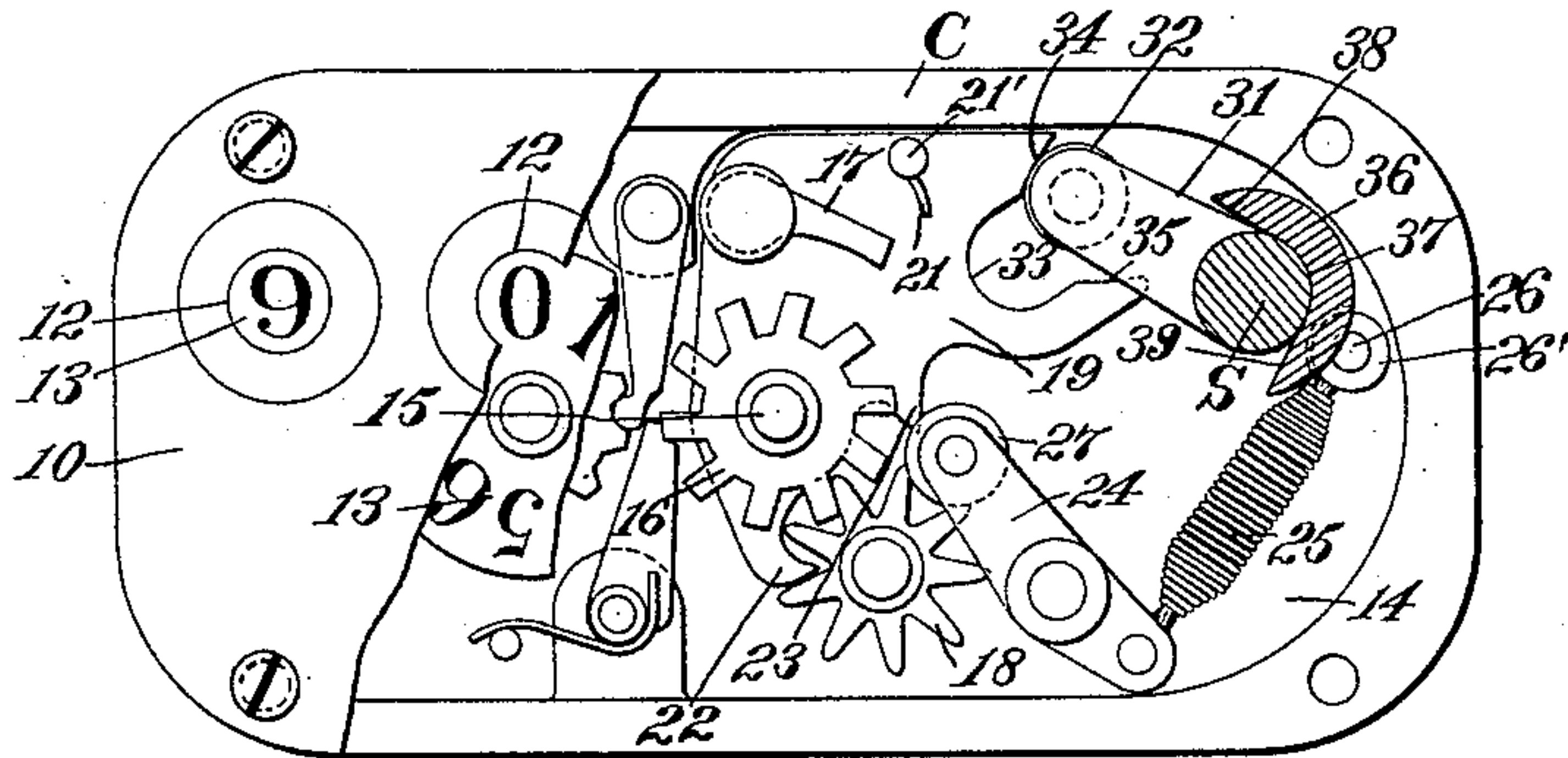
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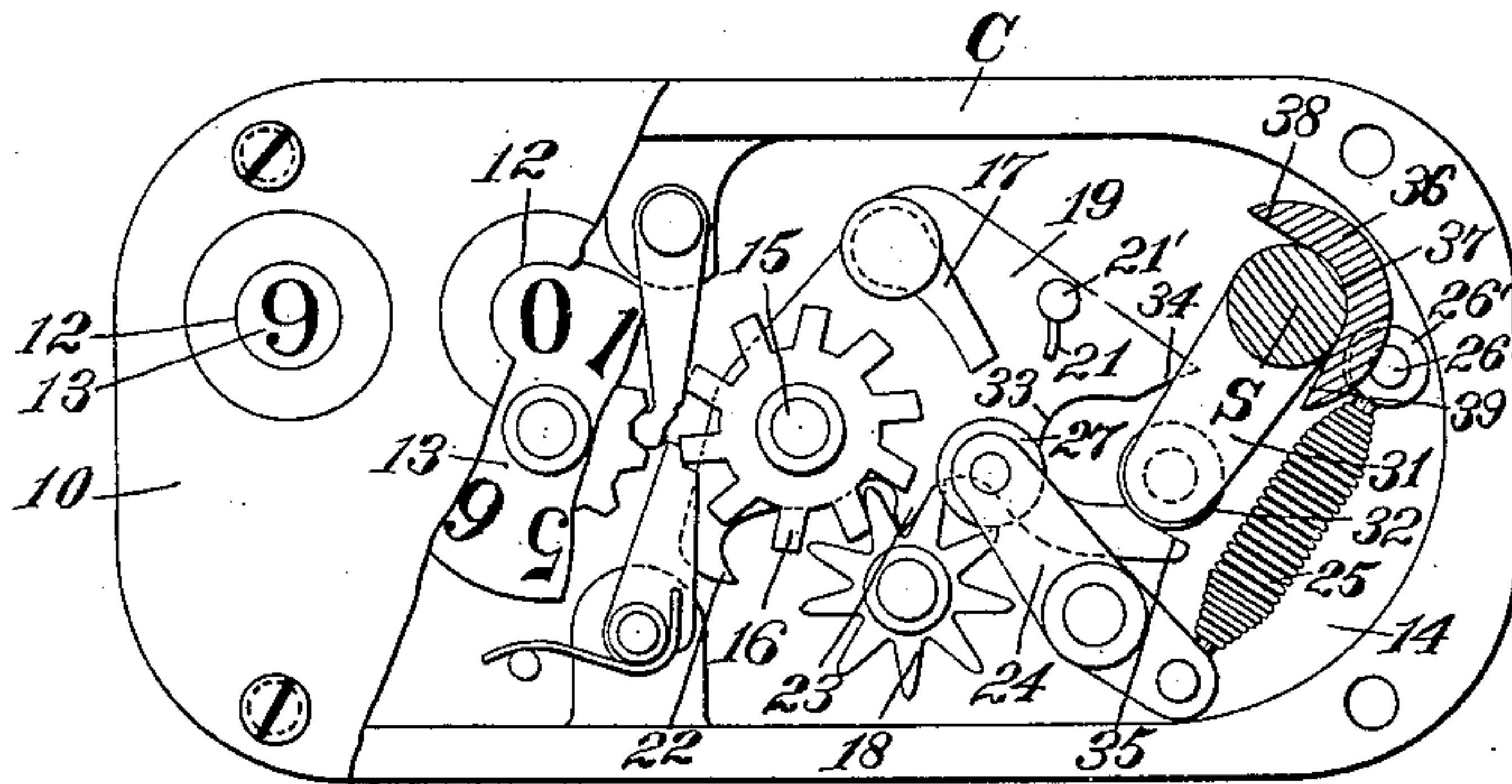
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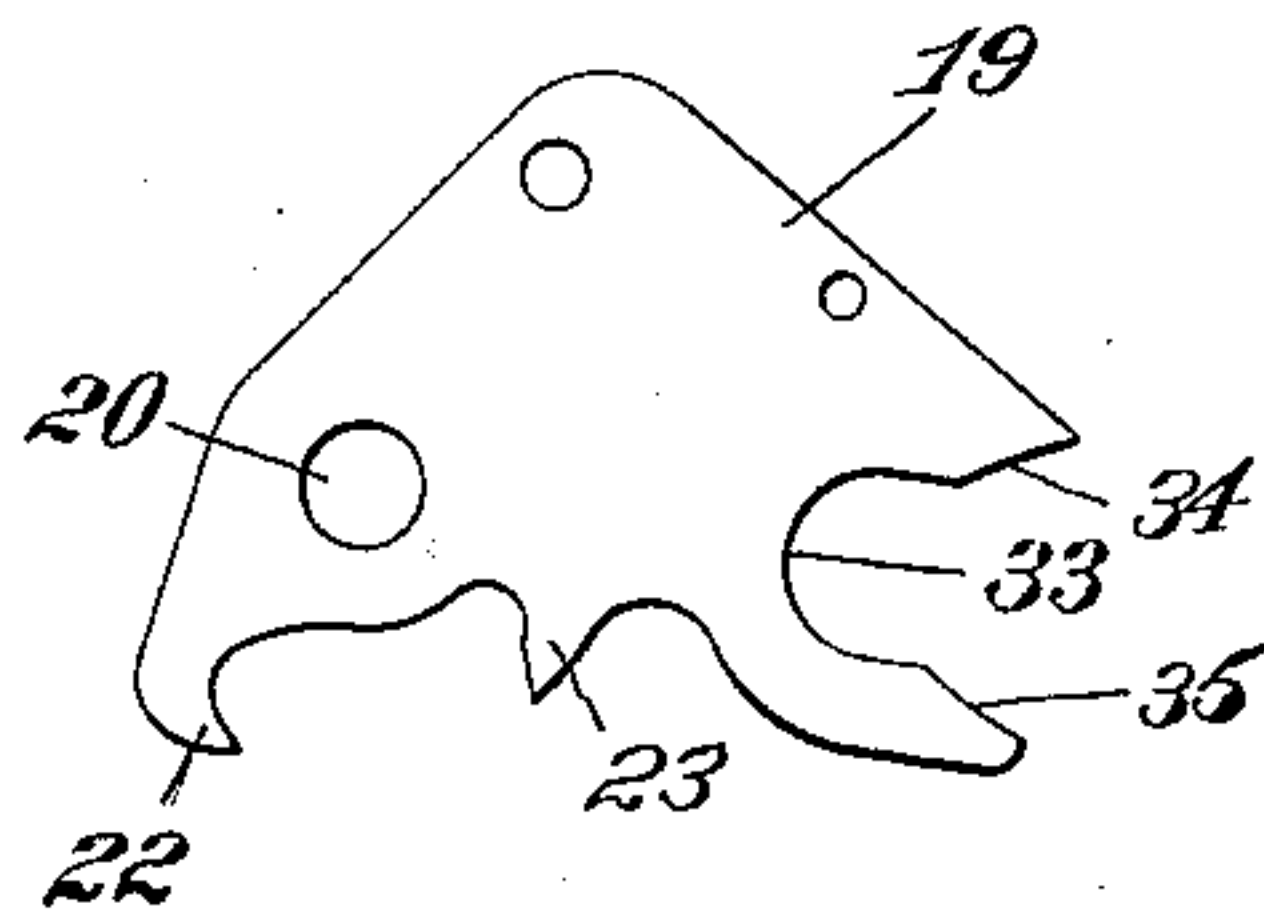
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

## REGISTER.

SPECIFICATION forming part of Letters Patent No. 563,884, dated July 14, 1896.

Application filed March 10, 1896. Serial No. 582,550. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Registers, of which the following is a specification.

This invention relates to devices for registering the strokes or movements of operative or moving members, and is adapted for connection with various classes of machinery, the object being to provide simple and efficient operating means for the actuating devices of the register mechanism, which shall be so organized that the register-operating device or analogous member of the register may have a surplus or overthrow movement beyond its normal stroke without interfering with the operation of said actuating devices or injuring any of the working parts of the register.

The present invention is in the nature of an improvement upon the register or registering mechanism shown and described in Letters Patent No. 546,748, granted to me September 24, 1895, to which reference may be had, and in connection with which the said invention is herein illustrated.

In the drawings accompanying and forming part of this specification, Figure 1 is a face or front view of a register embodying my invention, the face plate and certain parts adjacent thereto being broken away to better illustrate said invention. Fig. 2 is a similar view illustrating a second position of the register mechanism. Fig. 3 is a side view with parts in section and in elevation. Figs. 4 and 5 are views similar to Figs. 1 and 2 and illustrate one of the register-operating devices as out of action, and Fig. 6 is a detail view of one of the operative parts of the register mechanism.

Similar characters designate like parts in all the figures of the drawings.

The casing or box for containing the operative mechanisms and parts of the register may be of any suitable form and is herein shown as being approximately of rectangular shape, and is designated in a general way by C, and is also shown as having a removable front or face plate 10, which may be secured in place by screws or other suitable fastening

means. The face plate 10 is also provided with a series of sight-openings 12, through which the register dials or indexes 13 are visible.

The back plate 14 of the register-casing is provided with a series of spindles or shafts, one of which is shown at 15, and as journaled for rotative movement in a suitable bearing formed in said back plate. The spindle 15 is illustrated as provided with a ratchet 16, which is suitably secured to said shaft for rotation therewith, and which is also provided with the usual teeth (shown as ten in number) and is rotated by connections with the member the movements of which are to be registered, said ratchet being rotated one division or tooth on each of such movements, and being also operative for rotating a succeeding ratchet one division or tooth on each complete rotation of the first-mentioned or primary ratchet of the series in a well-known manner.

As a means for actuating the primary ratchet 16, and hence through the latter the register-train, a compound or duplex mechanism is illustrated, comprising two devices—a primary device which is normally operative for operating the primary ratchet of the series, and a secondary or auxiliary device, which is normally ineffective as such, or which runs idly, except that should the primary device through any unforeseen contingency become inoperative the strokes or movements of a member to which the register is operatively connected may still be registered or counted through the agency of said auxiliary device.

With the ordinary types of registers great care and precision have to be observed in locating the registers—due to the differences in strokes of the various operative members with which they are connected. With my improved register, however, such precautions are entirely unnecessary, said register comprising two coöperative movably-supported members, one of which embodies means for permitting a movement of the other beyond its normal range or limit of action, so that the register-operating shaft, which is designated in a general way by S, and which is herein illustrated as constituting one of said coöperative members, may have a surplus or



overthrow movement, without thereby interfering with or injuring any of the working parts of the register, as will be hereinafter more particularly described.

5 It will be remembered that the register has been described as embodying two actuating devices, and the spring-pressed pawl 17 is herein illustrated as constituting the primary device, the escapement-wheel 18 constituting the auxiliary or secondary device and running idly during the effective operation of the pawl 17.

As a means for supporting the spring-pressed pawl 17 a rocking plate 19 is illustrated, (see Fig. 6,) in which an opening 20 is shown as formed, through which the spindle or shaft 15 may be passed, said spindle serving as a means for supporting the rocking member or plate 19. The normal position of the rocking plate is illustrated in Fig. 1, and its direction of movement is indicated by the arrow. The pawl 17 is herein illustrated as a spring-actuated pawl, a spring 21 connected, respectively, with the pawl and 25 with a stud 21', formed on or carried by the plate 19, being illustrated as a means for maintaining the pawl in its operative or working position.

It will be evident that on the swinging 30 movement of the rocking plate 19 from the position indicated in Fig. 1 to that illustrated in Fig. 2 the pawl will be moved by and with the plate 19, and, engaging one of the teeth of the ratchet 16, will partially rotate said ratchet; that is to say, the length of rotary 35 movement will be equal to one tooth on each of said movements of the rocking member 19.

The teeth or arms of the escapement or escapement-wheel 18 are illustrated as being 40 in mesh with the ratchet-teeth, and as the ratchet is rotated in the manner previously described said escapement-wheel will be oppositely rotated through the medium of and by the power of said ratchet, it being understood, of course, that during this operation 45 the pawl 17 is effective for rotating its ratchet. If, however, the pawl-spring 21 should be broken, and said pawl, through any cause, be held away from or out of contact with the 50 teeth of the ratchet, as clearly indicated in Figs. 4 and 5, the auxiliary device or escapement-wheel becomes immediately effective for rotating the ratchet.

The rocking plate 19 is illustrated as having 55 formed thereon the two pallets or blades 22 and 23, located and operable for alternately engaging the teeth of the escapement-wheel on each of the working strokes of the rocking member 19, whereby said escapement-wheel 60 is intermittently rotated, and is also effective for rotating the meshing ratchet 16 one division or tooth on each of its said intermittent movements.

A detent for the escapement-wheel 18 is 65 herein illustrated, and is operable for preventing retractive or reverse movement of said escapement-wheel. In the form illustrated

this escapement-detent consists of the lever 24, which is pivotally supported by the back plate 14 of the register-casing, one of its ends 70 being connected by means of the retracting coil-spring 25 with a sleeved or headed stud or projection 26, removably seated in an opening formed in said back plate, the purpose of the spring being to maintain the working end 75 of said detent-lever 22 in operative engagement with the teeth or arms of the escapement-wheel 18, said working end of the detent-lever being shown as provided with an antifriction-roll 27, which serves its well-known function. When, however, the escapement-wheel is rotated either by the pallets 22 and 23 or by the rotating ratchet 16, it will be obvious that the detent-lever will be moved laterally sufficiently far to permit the 85 partial rotation of the escapement-wheel 18. When, however, said escapement has made such rotation, the roll will drop into position between two succeeding teeth of the escapement-wheel for the purpose of preventing reverse movement thereof. 90

It will be remembered that reference has hereinbefore been made to the rock-shaft S. In the form illustrated this rock-shaft S constitutes a means for operating the register 95 mechanism, and in practice will be connected by some suitable form of connection with the moving part of a machine or apparatus to which the register may be applied. The rock-shaft is shown as carrying at its outer end, 100 or that part thereof which projects beyond the register-casing, the crank-arm 28, secured in place to said shaft by a pin or key 29, and which constitutes a means for connecting the register to such moving part. The shaft S 105 is shown as journaled for rotative movement in the hub or collar 30, which projects into the register through an opening formed in the face plate thereof, and which is provided with a circumferential flange 30', which serves as 110 a means for excluding dust from the working parts of the register and for also securing said hub in place, a screw or screws being preferably employed for holding the hub in position. The rock-shaft S is illustrated as provided, 115 at a point near the inner end thereof, with a rock-arm 31, which is adapted for operating the plate 19, whereby the partial rotation of the ratchet 16 may be effected—either through the pawl carried thereby or, if said pawl be 120 inoperative from any cause, the escapement-wheel 18, which, it will be remembered, constitutes an auxiliary actuating device. The working end of the rock-arm 31 is shown provided with a projection, herein illustrated as 125 an antifriction-roll 32, the function of which will be now described.

The rocking member 19, to which reference has been made, is shown as having peripherally formed thereon the recess or partly-circular opening 33, and as also having the two 130 overrun faces 34 and 35, which are shown as curved and as concentric with the axis or center of movement of the shaft S when the



rock-arm 31 is in each of its terminal positions, so that the shaft may have an excess of movement beyond its normal stroke without injuring any of the operative mechanisms of the register. For example, and on reference to Fig. 2, let it be assumed that the point  $x$  marks the limit of rocking movement or stroke of the rock-arm 31, or that which is necessary to operate the register. It will be evident that the said rock-arm may have a further movement; that is to say, until that part of the perimeter of the roll 32 which is in contact with the overrun face 35 has reached the point marked  $y$ , the point  $x$ , it being understood, indicating the normal range of movement of the rock-arm 31. It will be apparent, therefore, that by this peculiar organization the rock-arm 31, and hence the rock-shaft S, may have a considerable movement beyond that which is required to effect a registration without interfering in the least with any of the internal mechanism of the register. The same peculiar result is attained on the return stroke of the rock-arm 31, so that the nicety and precision which ordinarily have to be observed in putting a register in position need not be followed with the present invention.

The rock-arm 31, in addition to operating the rocking plate 19, also limits or prevents the premature movement of said plate in each direction, whereby the ratchet 16 might be accidentally rotated, or other equally disastrous results follow. It will be observed that when the rocking plate 19 and the rock-arm 31 are in their terminal positions, as indicated in Figs. 1 and 2, the overrun faces 34 and 35 will, respectively, contact with the roll 32, the rock-arm, while this relation continues, serving practically as a fixed abutment and positively resists any tendency of the plate 19 to rock or oscillate. As soon, however, as the projecting roll 32 has passed out of contact with one or the other of said overrun faces it will seat itself in the recess 33, which constitutes a socket therefor, and will move the rocking plate 19 in either one or the other direction—for effecting a registration or for returning said rocking plate to its normal position.

The hub or collar 30 of the shaft S is shown as having the thrust-receiving portion 36, herein illustrated as segmental or crescent shape in cross-section, and which is preferably formed integral therewith, the shaft S bearing against the face 37 thereof. This segmental portion 36 constitutes a stop or stop abutment for receiving the shocks from or impact of the rock-arm 31, and hence of the shaft S, as the latter is intermittently rocked, said stop abutment 36 being shown as provided with the two approximately straight stop-faces 38 and 39, extending from the bearing-face 37, and against which the rock-arm 31 impinges as it moves between its two terminal positions.

The segmental portion of the hub 36 is

also shown as provided with a recess or opening which takes over or embraces the sleeve or head 26' of the removable stud 26, and firmly maintains said stud in place in its opening without the employment of separate retaining devices or means for this purpose.

At 40 is shown the usual train of mechanism for operating the indicating-dials of the register, it not being deemed necessary to describe said mechanism in detail, as the same constitutes no part of the present invention.

By the term "overrun face," as herein used, is meant such a face as will permit the movement of an actuating member beyond its normal range of action, or that required to actuate the register. A specific form of overrun face is herein illustrated, the rocking plate 19 having two such faces, which are designated by 34 and 35, respectively, and which are also curved and depart from the recess 33 in said plate, so that the roll 32 may run over each of said faces when its supporting rock-arm 31 has reached the end of either of its normal strokes; and said curved faces will be preferably concentric with the axis of movement of said rock-arm when it is in either of such positions.

Having thus described my invention, I claim—

1. An element for a register, consisting of a plate provided with a recess, said plate also having an overrun face departing from said recess.
2. The combination with a register member or ratchet, of a movably-supported device operable for effecting a movement thereof; and a member for actuating said device, the construction being such that said actuating member has an ineffective stroke beyond its normal range of action and is during such stroke in contact with said device, thereby holding the said device against movement.
3. The combination with a register and actuating mechanism therefor, of two coöperative rocking members, one of which is provided with an overrun face.
4. The combination with a shaft, and with a ratchet supported by said shaft; of a rocking plate supported for movement about said shaft and having a recess, and having also means for rotating said ratchet; and a rock-shaft provided with a projection for engaging in said recess, to thereby operate said plate.
5. The combination with a register-operating device provided with a projection; of a rocking plate having a recess for the reception of said projection, said plate also having an overrun face over which said projection may travel.
6. The combination with a rock-shaft provided with an arm having a projection; of a rocking plate having a recess for the reception of said projection, and having also a curved overrun face departing from said recess.
7. The combination with a rock-shaft having an arm provided with a projection; of



a shaft; a ratchet carried by said shaft; an escapement-wheel meshing with said ratchet; a rocking plate carrying a pawl, and provided also with pallets for said escapement-wheel, 5 said rocking plate being also provided with a recess for the reception of said projection and with a curved overrun face departing from said recess.

8. A register, comprising a rock-shaft, hav- 10 ing a rock-arm for actuating the register mechanism; a hub for said rock-shaft, said hub provided with a segmental thrust-receiv- ing member for said rock-arm.

9. The combination with a shaft, and with 15 a ratchet supported thereby; of an escape-

ment-wheel meshing with said ratchet; a shaft having a projection; a plate provided with pallets for said escapement-wheel, and having also a recess for the reception of said projection; and a pawl carried by said plate. 20

10. The combination in a register, of a plate; a headed stud removably seated in place in an opening formed in said plate; a register-operating member; and a collar for the latter provided with a recess for embrac- 25 ing the head of said stud.

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