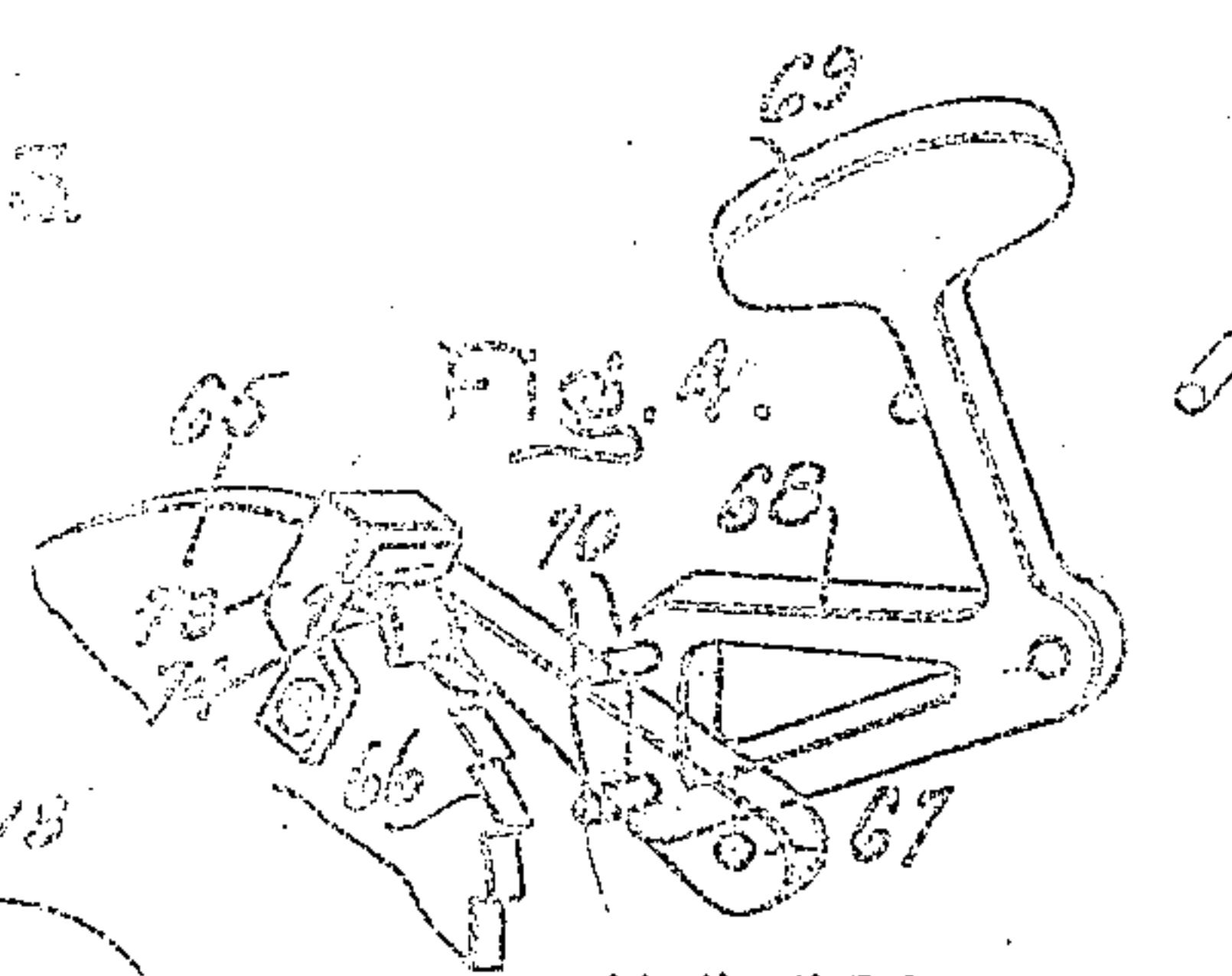
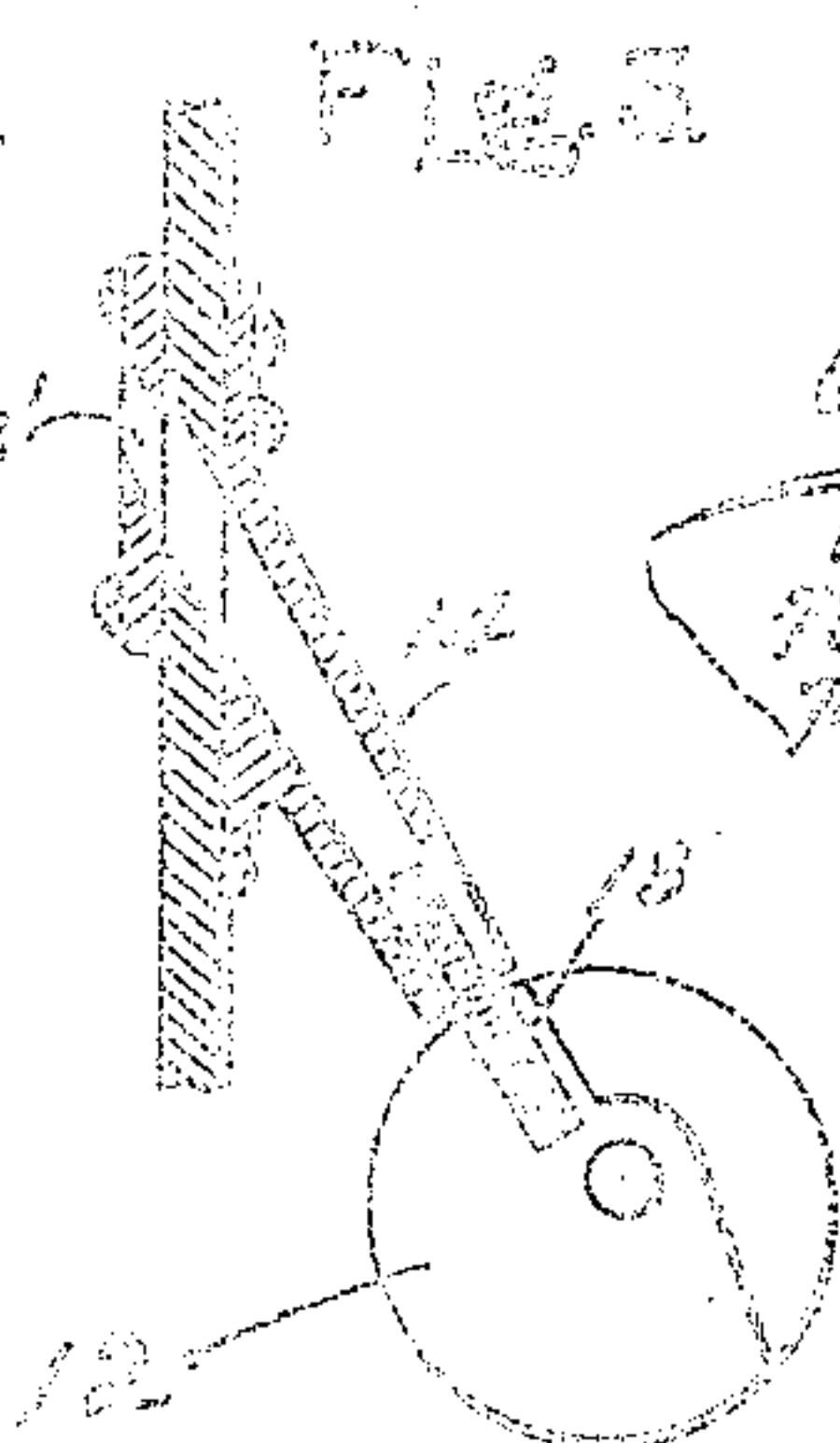
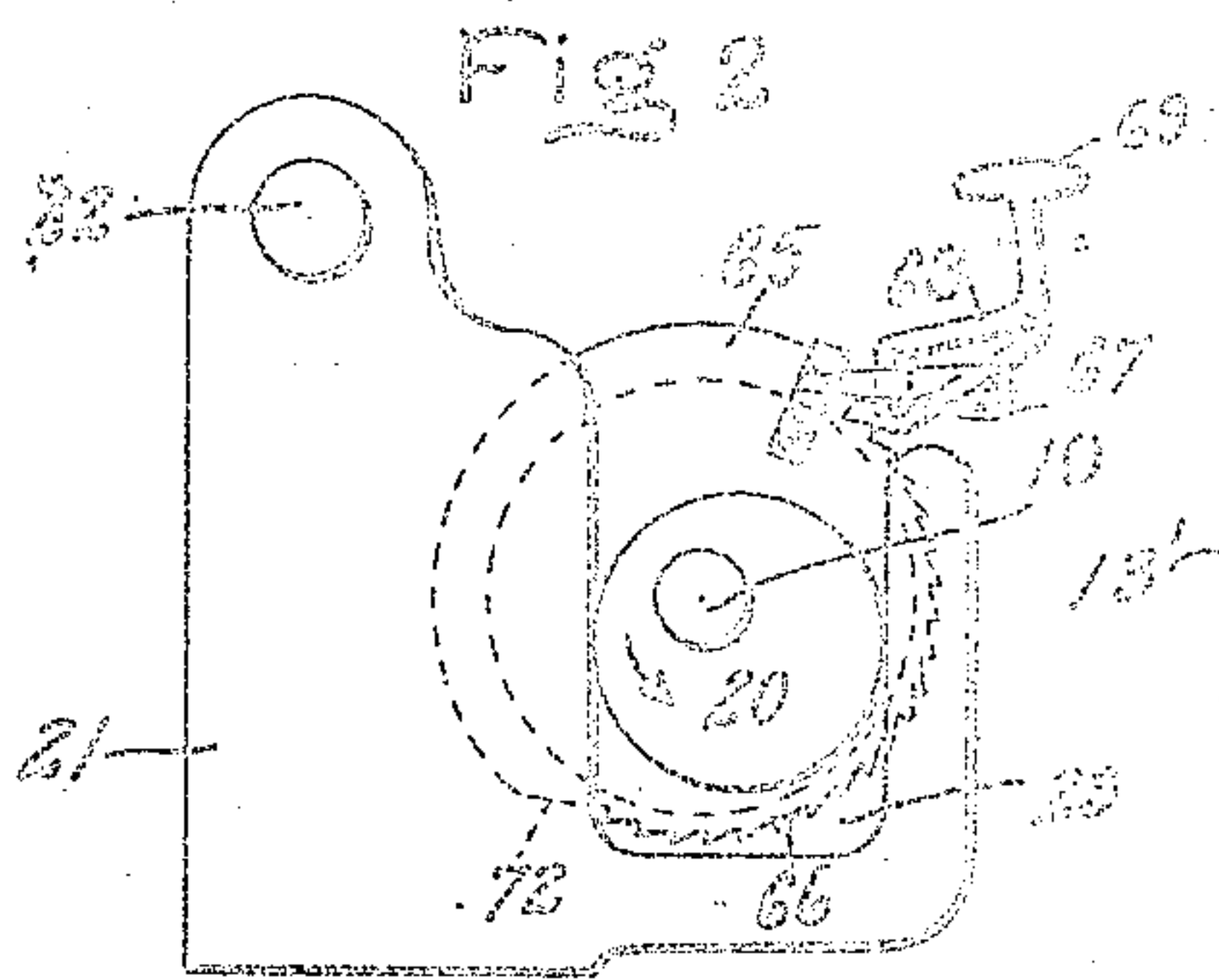
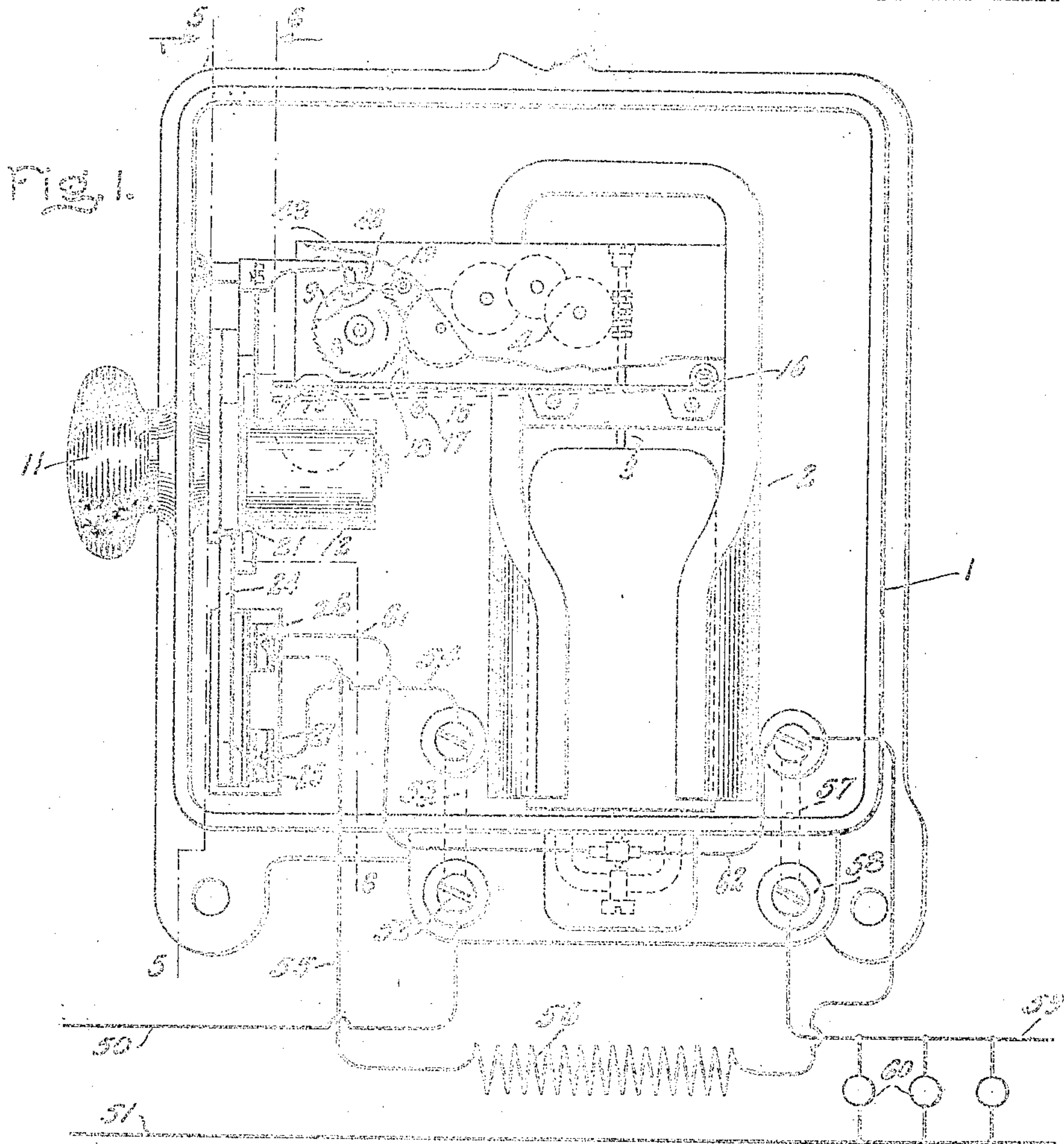


No. 850,755.

PATENTED APR. 16, 1907.

J. E. HUBBELL.  
PREPAYMENT MECHANISM.  
APPLICATION FILED JULY 20, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

George H. Thornton  
Helen A. Ford

INVENTOR:

John E. Hubbell,  
By *Wm. H. [Signature]*

No. 850,755.

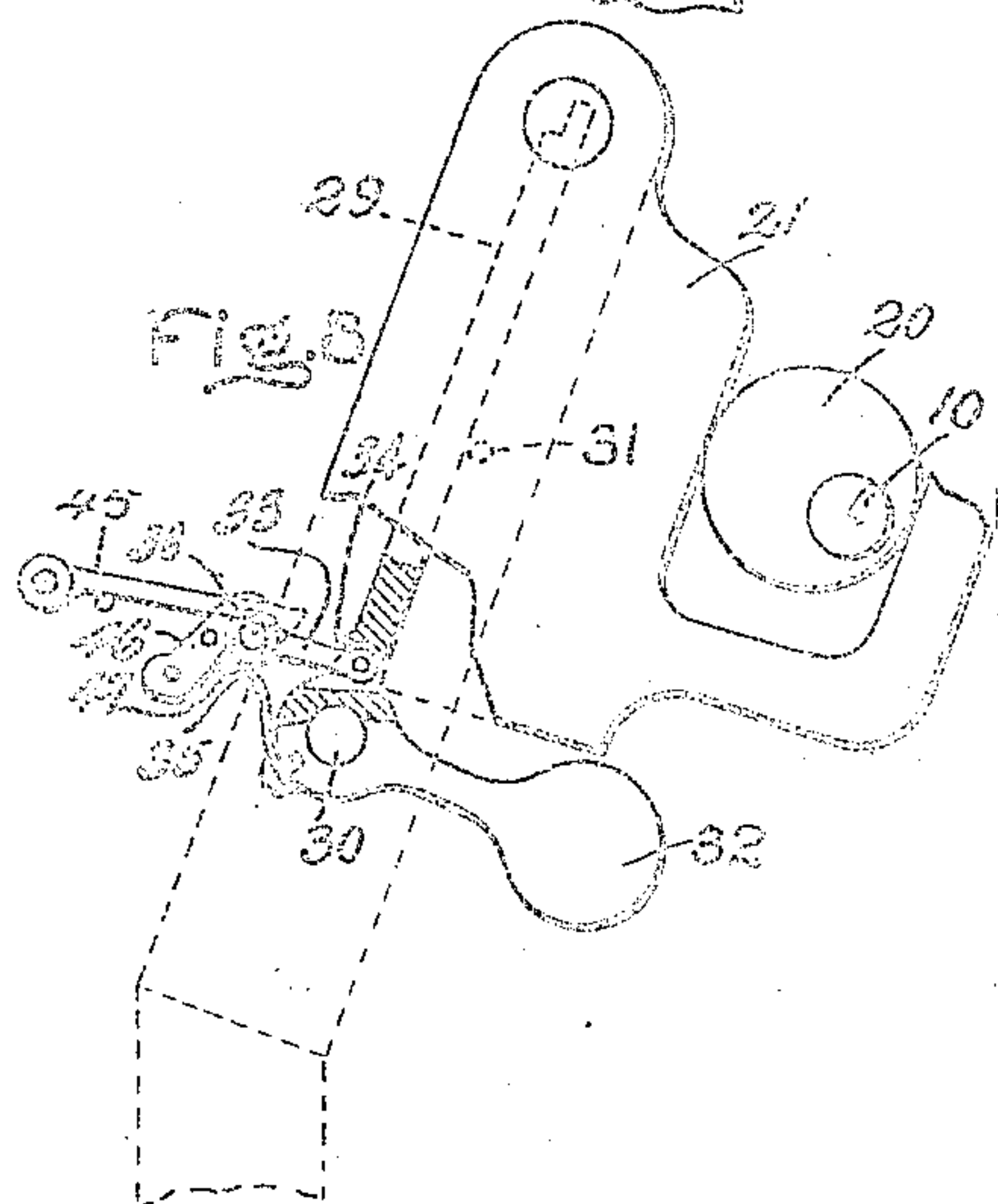
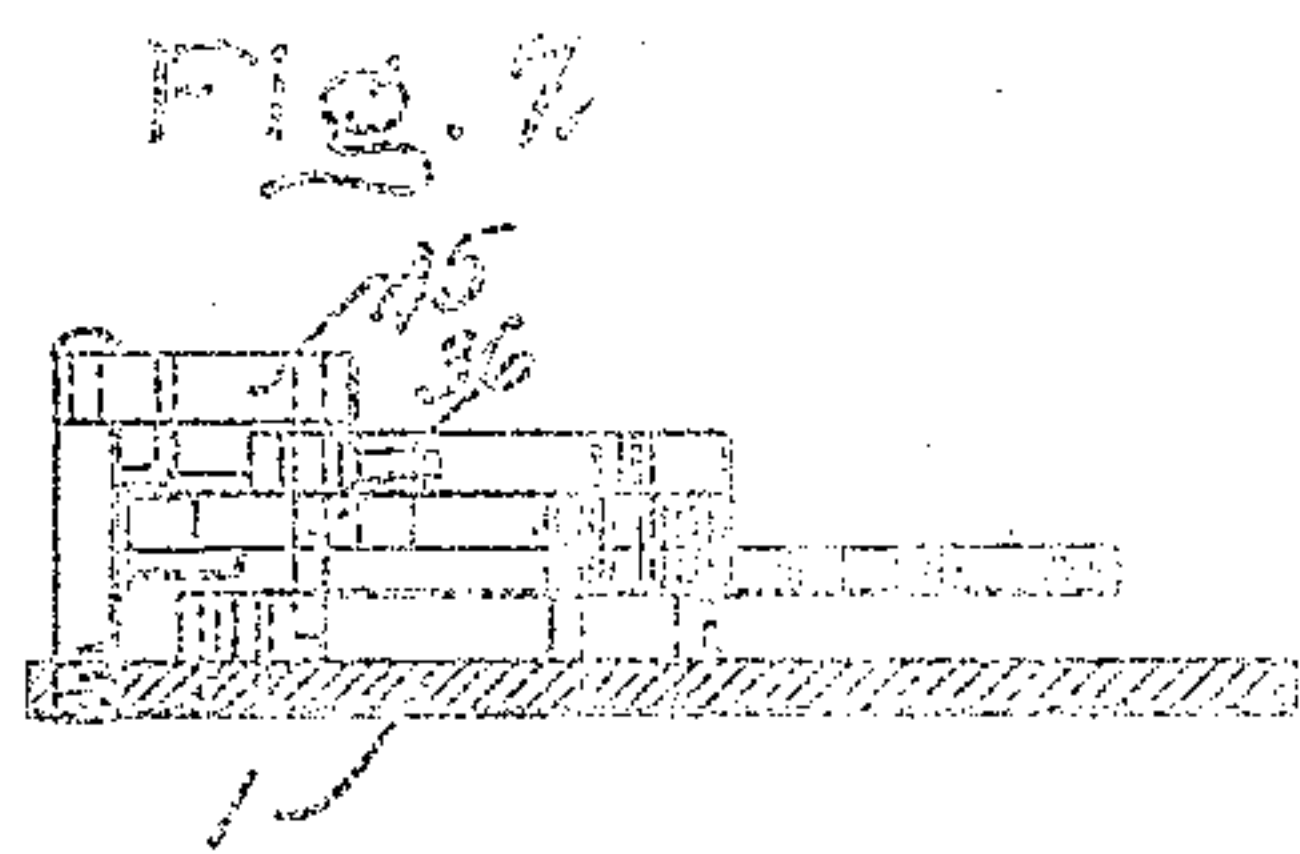
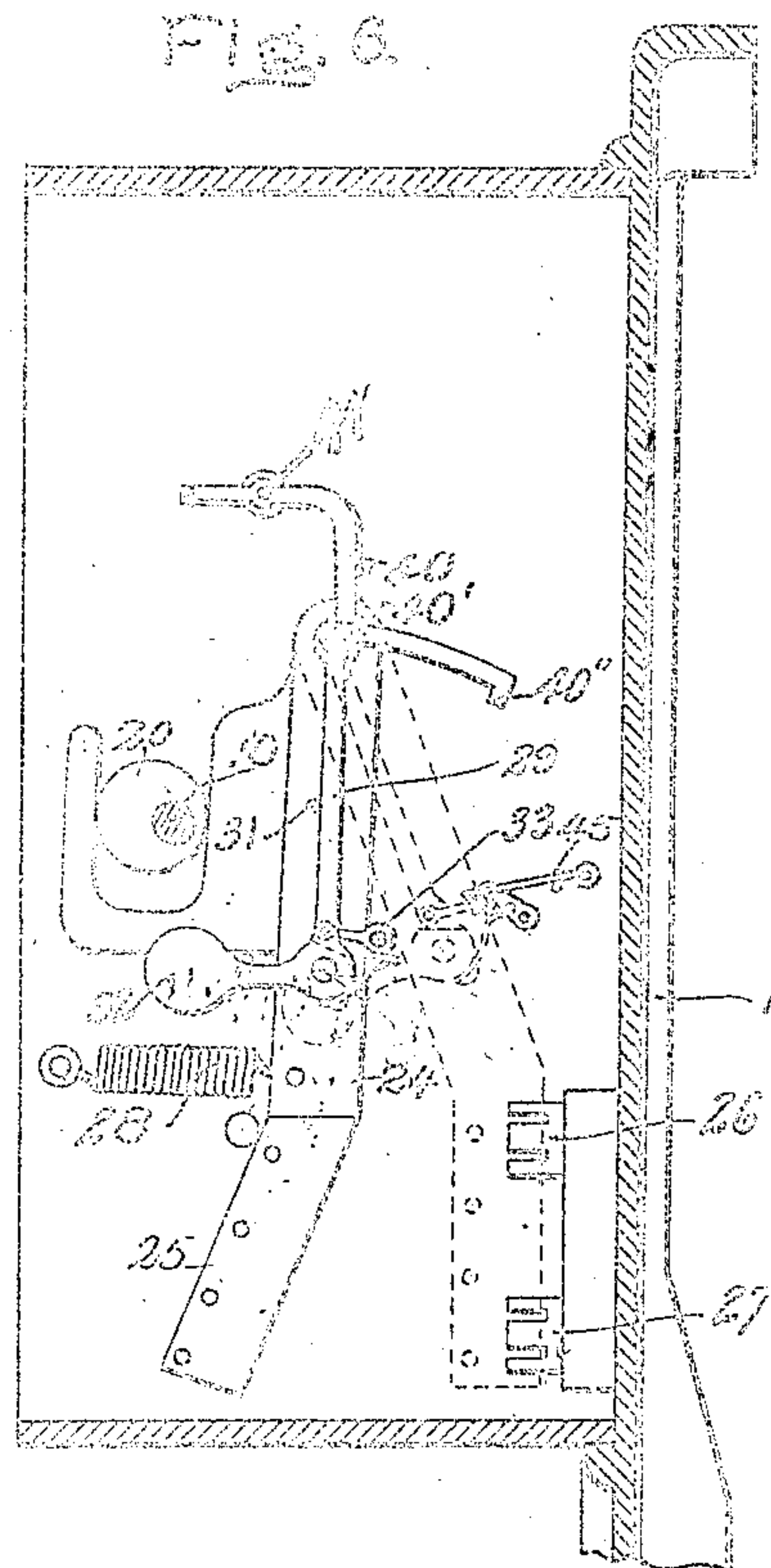
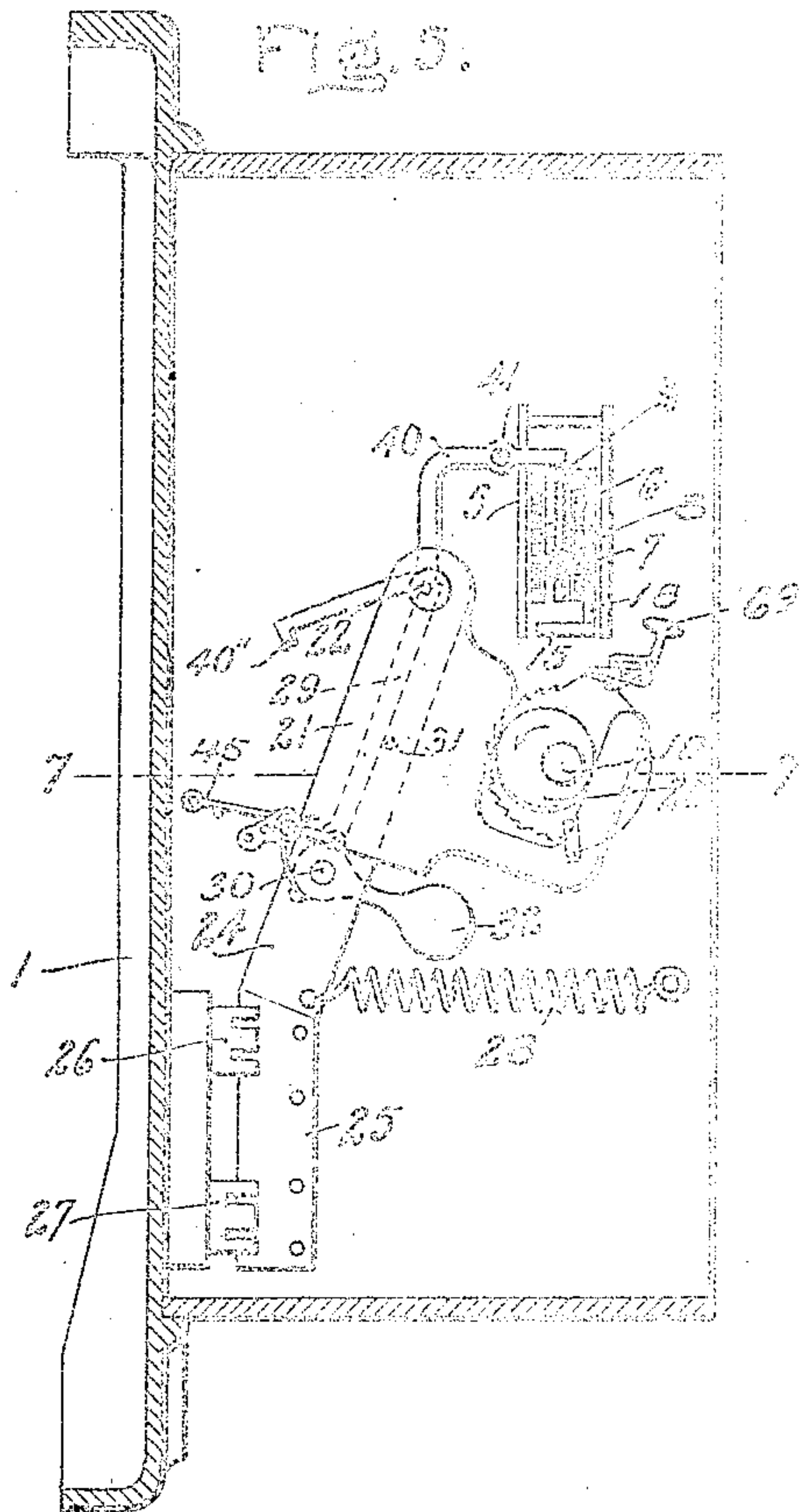
PATENTED APR. 16, 1907.

J. E. HUBBELL.

PREPAYMENT MECHANISM.

APPLICATION FILED JULY 30, 1904.

2 SHEETS—SHEET 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN E. HUBBELL, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## PREPAYMENT MECHANISM.

No. 850,755.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed July 30, 1904. Serial No. 213,906.

*To all whom it may concern:*

Be it known that I, JOHN E. HUBBELL, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Prepayment Mechanisms, of which the following is a specification.

My present invention relates to prepayment mechanisms, and more particularly to prepayment-electric-meter mechanism, and comprises means whereby the meter-switch may be opened or closed at will by the consumer as long as the electric current, energy, or the like paid for by the coins or tokens deposited remains unconsumed. Suitable automatic means are provided for opening the switch when the energy or the like paid for has been consumed and for preventing its subsequent closure until the deposit in the device of another coin, token, or the like.

With mechanical switches of the type ordinarily used for the purpose in hand there is a liability of the parts sticking if the switch is allowed to remain in the closed position for long intervals, as may be the case with prepayment mechanisms in which a subsequent coin or token may be inserted before the energy or the like purchased by the previous coin has been consumed. With a prepayment mechanism equipped with my invention the switch can be used as a main switch by the consumer and can be operated at frequent intervals by an inspector of the company furnishing current or by the collector who removes the coins deposited, even though the consumer does not operate it himself. This insures operation of the switch frequently enough to prevent sticking.

In order that my invention may be better understood, I have hereinafter illustrated and described in detail one form in which it may be embodied. It will be obvious, however, to all skilled in the art that my invention is capable of use in many different embodiments and for other purposes than are shown in the present case.

Of the drawings, Figure 1 is an elevation and diagram of a prepayment electric meter equipped with my invention, with a cover-plate of the casing and certain elements removed. Fig. 2 is a view showing details of the means for preventing retrograde movement of the operating element. Fig. 3 is a

sectional elevation showing a portion of the coin-carrier. Fig. 4 is a perspective view of the details shown in Fig. 2. Fig. 5 is a section on the line 5 5 of Fig. 1 looking in the direction of the arrows directed to said line. Fig. 6 is a section on the line 6 6 of Fig. 1 viewed from the direction indicated by the arrows applied to the line 6 6. Fig. 7 is a partial sectional plan on the line 7 7 of Fig. 5; and Fig. 8 is an elevation with parts broken away and in section, showing the operation of the means which permits the opening of the switch.

The construction shown on the drawings is substantially the same as that disclosed in the patent to Holden, No. 782,028, dated February 7, 1905, for improvements in coin-freed electric meters, except as the same is modified by the addition of my present invention.

Referring to the drawings, 1 represents a casing inclosing the prepayment mechanism and an electric meter 2. In the construction shown the meter 2 is an ampere-hour motor-meter. The shaft 3 of the meter through a suitable train of gearing 4 drives a gear-wheel 5. The gear-wheel 5 and a concentrically-mounted gear-wheel 6 are coupled together to form an epicycloidal train by a gear-wheel 7, which is mounted on a radial stud or post 8, carried by a disk 9, concentrically mounted with respect to the gear-wheels 5 and 6.

A shaft 10, journaled in the wall of the casing 1 and provided exteriorly of the casing with an operating-handle 11, carries inside the casing a coin carrier or holder 12. A suitable coin or check 13 inserted in the casing through a suitable slot 13' is transmitted by a chute 14 to a recess formed for the purpose in the carrier 12. Upon the proper rotation of the handle 11 the coin 13 will engage the free end of the lever 15, pivoted to a suitable support at 16, and move it from the position shown in dotted lines in Fig. 1, where it is normally held by a stop 17, to the position shown in full lines in Fig. 1.

The lever 15 carries a spring-pawl 18, which engages the gear-wheel 6 and rotates the wheel upon the elevation of the lever. A pawl 19 prevents backward rotation of the gear-wheel 6. The rotation of the gear-wheel 6 produced by the lever 15 is in the direction indicated by the arrows in Fig. 1.

The rotation of the gear-wheel 5 produced by the meter-shaft is in the opposite direction. It will thus be seen that the rotation of the gear-wheel 6 will, through the gear-wheel 7, move the disk 9 in the direction indicated by the arrows, while the rotation of the gear-wheel 5 by the meter will move the disk 9 in the opposite direction.

The shaft 10 has secured to it inside the meter-casing an eccentrically-mounted cam-disk 20. A plate 21, pivoted to a shaft 22, carried by the meter-casing, is formed with a slot 23, with the walls of which the cam-disk 21 engages, so that the rotation of the shaft 10 will, through the cam-disk 20, oscillate the plate 21 about the shaft 22. An arm 24, also pivoted to the shaft 22, carries a circuit-controlling device in the form of a switch-blade 25. When the switch-blade 25 is in the position shown in full lines in Fig. 5 and dotted lines in Fig. 6, it electrically connects contacts 26 and 27. A helical spring 28 tends to hold the arm 24 and switch-blade 25 in the position shown in full lines in Fig. 6.

An arm 29, pivoted to the arm 24 at the point 30, is normally held in the position shown in Figs. 5 and 6 against a stop 31 by a weight 32, carried by an extension from the arm 29. An arm 33, pivoted to the arm 29 and supporting a pin 36, is normally held in the position relative to the arm 29 (shown best in Fig. 8) by a stop 34 and spring 35. In this position of the arm 33 the pin 36 is in position to be engaged by the lower end of the plate 21.

A bent lever 40, pivoted at 41, is provided with a projection 42. The lever 40 is so proportioned that gravity holds the projection 42 in a notch or recess 43 in the periphery of the disk 9 when the latter is in the position assumed when the consumer has no credit in the device. When the disk 9 is rotated away from the no-credit position, the projection 42 slides up on the periphery of the disk 9 and the lever 40 is turned on its axis. A portion 40' of the lever 40 engages the upper end of the arm 29 and locks it in the position relative to the switch-blade arm 24, (shown in Figs. 5, 6, and 8,) when the projection 42 is out of the notch 43. When the projection 42 drops into the recess or notch 43, however, the portion 40' moves out of the position in which it locks to the switch-arm 24. A hook 40'', carried by an extension of the lever 40, limits the tilting movement of the arm 29.

The circuit connections of the meter shown are as follows: 50 and 51 represent the main current-carrying leads of the supply system. The conductor 50 is connected to a binding-post 52. Conductors 53 and 54, of which the former may be a fuse, connect the binding-post 52 to the switch-contact 27. A conductor 55, which may include a resistance 53 and a fuse 57, connects the switch-

contact member 26 to a binding post or terminal 58. A conductor 59, leading from the terminal 58, cooperates with the conductor 51 to supply current to the consuming devices, which may consist of lamps 60. A conductor 61 connects one brush of the meter to the switch-contact 26. The other brush of the meter is connected to the fuse 57 by a conductor 62. It will be observed that in the meter shown the armature of the meter is in shunt to the resistance 56, which carries the current passing through the consumption-circuit.

Assuming the initial position of the apparatus to be that in which the projection 42 rests in the notch 43 and the consumer has no credit in the device, upon the insertion of the coin and the rotation of the shaft 10 in the direction indicated by the arrows in Fig. 5 the oscillation of the lever 15 will move the disk 9 in the direction of the arrow shown in Fig. 1 in the manner hereinbefore described. This will immediately move the projection 42 out of the notch 43, and thereby lock the arm 29 to the switch-blade arm 24. The rotation of the shaft 10 through the cam-disk 20 will cause the plate 21 to engage the pin 36. This engagement of the plate 21 and pin 36 when the arm 29 is locked to the switch-blade arm 24 will move the switch-blade 25 from the open position into the closed position. A hook 45, pivoted to the casing, thereupon engages the pin 36 to hold the switch-blade in its closed position against the action of the spring 28.

The parts are so proportioned that the switch-blade is moved into its closed position before the cam-disk 20 has given the maximum forward movement to the plate 21. A member 46, secured to the casing and provided with an undersloping cam-surface 47, is so placed that when the plate 21 is given its maximum forward movement by the disk 20 the surface 47 will engage the pin 36, forcing the latter below the lower edge of the plate 21 and out of engagement with the hook 45, thus releasing the switch-arm 24 both from the hook 45 and the plate 21. When this occurs, the switch will be opened by the spring 28.

Unless the switch-blade is opened by the engagement of the pin 36 and the member 46 the switch-blade will remain in the closed position until the movement of the meter returns the disk 9 to its initial position, thus canceling the credit purchased by the coin or coins previously inserted, whereupon the projection 42 will drop into the notch 43 and the lever 40 will move out of the position in which it locks the arm 29 to the arm 24. When this occurs, the spring 28 will cause the pin 36, which is above the pivotal point 30 of the arm 29, to be turned about the point 30 until it is moved below the position in which it engages the hook 45 and the plate

21, whereupon the switch-blade 25 will be moved to its open position by the spring.

The shaft 10 carries a disk 65, provided with ratchet-teeth 66 on a portion of its periphery. A pawl 67 coöperates with these teeth. A pivoted member 68 is provided with pins or projections 70, which are adapted to engage opposite sides of the pawl 67. The member 68, which carries a weight 69, can be moved from the position shown in Fig. 5, in which the weight 69 is to the right of the vertical line passing through its point of pivotal support to the position shown in Figs. 2 and 4, where the weight 69 is to the left of this line. When the member 68 is in the position shown in Fig. 2, the pawl 67 is in position to engage the ratchet-teeth 66 and prevent rotation of the shaft 10 in a direction opposite to that shown by the arrow in Fig. 2; but when the member 68 is moved into the position shown in Fig. 5 the pawl 67 is held out of engagement with the teeth 66 by the lower pin 70.

The parts shown in Fig. 2 are in the initial position in which the slot in the coin-carrier is in line with the coin-chute. The pawl 67 is then in position to coöperate with the teeth 66 and prevent any backward rotation of the shaft 10 until the coin-carrier has moved into the position in which the coin is discharged and the switch-blade has been locked in the closed position by the engagement of the hook 45 and pin 36. At this period a shoulder 72 formed on the periphery of the disk 65 engages the pawl 67 and forces it against the upper pin or projection 70 to move the member 68 from the position shown in Fig. 4 to the position shown in Fig. 5. The shaft 10 may thereafter be turned in the forward direction to release the switch-blade or may be returned to its initial position.

A member 73, carried by the disk 65, is so located as to engage a projection 74 on the pawl 67 and force it into engagement with the teeth 66 whenever the shaft 10 is turned in either direction into the position in which the member 73 and the projection 74 engage.

The downward movement of the pawl 67, produced by the engagement of the member 73 with the projection 74, moves the member 68 into the position shown in Fig. 2. It will thus be seen that upon the insertion of the coin in the apparatus the coin-carrier must be moved from the coin-receiving position into the coin-discharging position without any retrograde movement, but that after the coin is discharged and the switch is closed the handle may be drawn forward to open the switch or may be returned to its initial position. After its return to its initial position the operation may be repeated as often as it is desired to purchase credit by the insertion of coins. The amount of credit which can be purchased at any one

time depends, of course, upon the number of actuations of the lever 15, which are necessary to give a complete or substantially complete turn to the disk 9.

It will be obvious to all those skilled in the art that many changes may be made in the form of my invention without departing from its spirit, and I do not wish the claims hereinafter made to be limited to the particular embodiment of my invention disclosed more than is made necessary by the state of the art.

What I claim as new, and desire to secure by Letters Patent of the United States, is---

1. In a prepayment mechanism, a movable member, a switch, a credit-purchasing mechanism, connections between said mechanism, switch and member whereby an initial movement of the member after the insertion of a coin will cause said mechanism to be operated, and subsequent movements of the member without the insertion of other coins will cause the switch to be opened and closed without operating said mechanism.

2. In combination, a switch, a credit-purchasing mechanism, and a movable member arranged to close said switch and operate said credit mechanism on its initial movement and to open and close said switch on its further movement as long as the original credit remains unexhausted.

3. In combination, a switch, a credit-purchasing mechanism, a movable member arranged to close said switch and operate said credit mechanism on its initial movement and to open and close said switch on its further movement as long as the original credit remains unexhausted, and means for preventing a retrograde movement until the initial movement of the movable member is completed.

4. In combination, a movable member, a credit-purchasing mechanism operated by an initial movement of the member after the insertion of a coin, a switch opened by a further movement of the member, means for preventing a retrograde movement of the member prior to completion of said initial movement, and means for allowing a retrograde movement of the member after the completion of the initial movement of the member and before the switch has moved into the switch-opening position.

5. In combination, a consumption-circuit, a switch controlling said circuit, manually-actuated operating means for opening and closing the switch normally disconnected therefrom, and a prepayment mechanism which permits the switch to be opened and closed by the operating means as long as credit corresponding to the coin deposited remains in the device.

6. In an electric prepayment device, a movable switch member, a manually-actuated shaft, and coin-controlled means for

connecting the shaft and switch member, the connection between the shaft and switch member being such that a partial rotation of the shaft will move the switch into the closed position and a further movement of the shaft will move the switch member into an open position without canceling the credit purchased in the device by the previous insertion of coins.

7. In an electric prepayment device, a switch, credit-purchasing means, a manually-actuated means for moving the credit-purchasing means on the insertion of a coin, value-canceling means for returning the credit-purchasing means to its original position, and means controlled by the position of the credit-purchasing means for operatively connecting the manually-actuated means and the switch.

8. In combination, a consumption-circuit, a switch controlling said circuit, manually-actuated operating means for the switch, and coin-controlled means for connecting the switch and operating means upon the insertion of a coin so that the switch may be opened or closed at will.

9. In an electric prepayment mechanism, a switch, actuating means therefor, and coin-controlled means for rendering said actuating means operative to open or close the switch at will while credit purchased by the insertion of one or more coins remains unconsumed.

10. In an electric prepayment mechanism, a switch, actuating means therefor, coin-controlled means for rendering said actuating means operative to open or close the switch at will while credit purchased by the insertion of one or more coins remains unconsumed, and separate means also controlled by the coin-controlled means for opening said switch when the credit purchased by the coins inserted is entirely consumed.

11. In a prepayment mechanism, a switch, a credit-purchasing mechanism, a device for operating said mechanism on the insertion of each of a plurality of coins, and means controlled by the mechanism for rendering said device operative to open or close said switch so long as the credit purchased by the insertion of the coins is not consumed.

12. In a prepayment mechanism, a member moved away from an initial position upon the insertion of coins and toward said position by the delivery of the commodity for which the coins are inserted, a switch, and means controlled by the position of said member for opening and closing said switch at will while said member is out of said initial position.

13. In an electric prepayment mechanism, a member moved from an initial position upon the insertion of coins and returned to said position by the delivery of the commodity purchased by the coins, a switch, a mov-

able device for moving said member away from the initial position upon the insertion of each coin up to a maximum prior to the consumption of the commodity purchased by the inserted coins without opening said switch, and means connecting said device and said switch whereby the latter may be operated by said device at will while said member is out of said initial position without the insertion of additional coins.

14. In a prepayment mechanism, a member moved from an initial position upon the insertion of coins and returned to said initial position by the delivery of the commodity purchased by the coins, a movable device for moving said member away from the initial position upon the insertion of a second coin prior to the consumption of the commodity purchased by a previously-inserted coin or coins without opening said switch, and means connecting said device and said switch whereby the latter may be operated by said device at will while said member is out of its initial position without the insertion of additional coins.

15. In a prepayment mechanism, a switch, a credit-purchasing mechanism, means for operating the credit-purchase means upon the insertion of a coin prior to the delivery of the commodity purchased by a previously-inserted coin or coins without disturbing the switch, and a connection between said means and said switch whereby the means may be operated to open and close the switch at will without the insertion of additional coins prior to the delivery of the commodity purchased by the coins already inserted.

16. In a prepayment mechanism, a switch, a coin-carrier, a credit-purchasing mechanism operated by the movement of the coin-carrier after the insertion of a coin from a coin-receiving position to a coin-discharging position, and a connection between the switch and the coin-carrier whereby said movement after the insertion of the coin from the coin-receiving position will cause the switch if open to be closed and further movement of the coin-carrier will cause the switch to be opened.

17. In a prepayment mechanism, a switch, a coin-carrier, a credit-purchasing mechanism operated by the movement of the coin-carrier from a coin-receiving position to a coin-discharging position, a connection between the switch and the coin-carrier whereby said movement after the insertion of the coin from the coin-receiving position to the coin-discharging position will cause the switch if open to be closed and further movement of the coin-carrier will cause the switch to be opened, and means preventing retrogression of the coin-carrier prior to the completion of the movement from the coin-receiving position to the coin-discharging position.

18. In a prepayment mechanism, a switch, a coin-carrier for actuating said switch freely movable from a coin-discharging position either to a position in which it causes the switch to be opened or to a coin-receiving position, and means for preventing retrogression of the carrier during movement from the coin-receiving position to the coin-discharging position.

19. In a prepayment mechanism, a switch, a coin-carrier, and a connection between the coin-carrier and the switch whereby the movements of the former may operate the latter, said coin-carrier being freely movable from a coin-discharging position to a switch-opening position or to a coin-receiving position.

20. In a prepayment mechanism, a switch, a coin-carrier, a credit-purchasing mechanism operated by the movement of the coin-carrier after the insertion of a coin from a coin-receiving position to a coin-discharging position, and a connection between the switch and the carrier by means of which fur-

ther movement of the coin-carrier will cause the switch to be opened.

21. In a prepayment mechanism, a controlling device, a coin-carrier movable from an intermediate coin-discharge position either to a position in which it will actuate said controlling device in a predetermined manner, or to a coin-receiving position.

22. In a prepayment mechanism, a controlling device, a coin-carrier movable from an intermediate coin-discharge position either to a position in which it will actuate said controlling device in a predetermined manner; or to a coin-receiving position, and means for causing the coin-carrier to move without retrogression from the coin-receiving position to the coin-discharging position.

In witness whereof I have hereunto set my hand this 29th day of July, 1904.

JOHN E. HUBBELL.

Witnesses:

BENJAMIN B. HULL,  
JOHN W. TUCKER.