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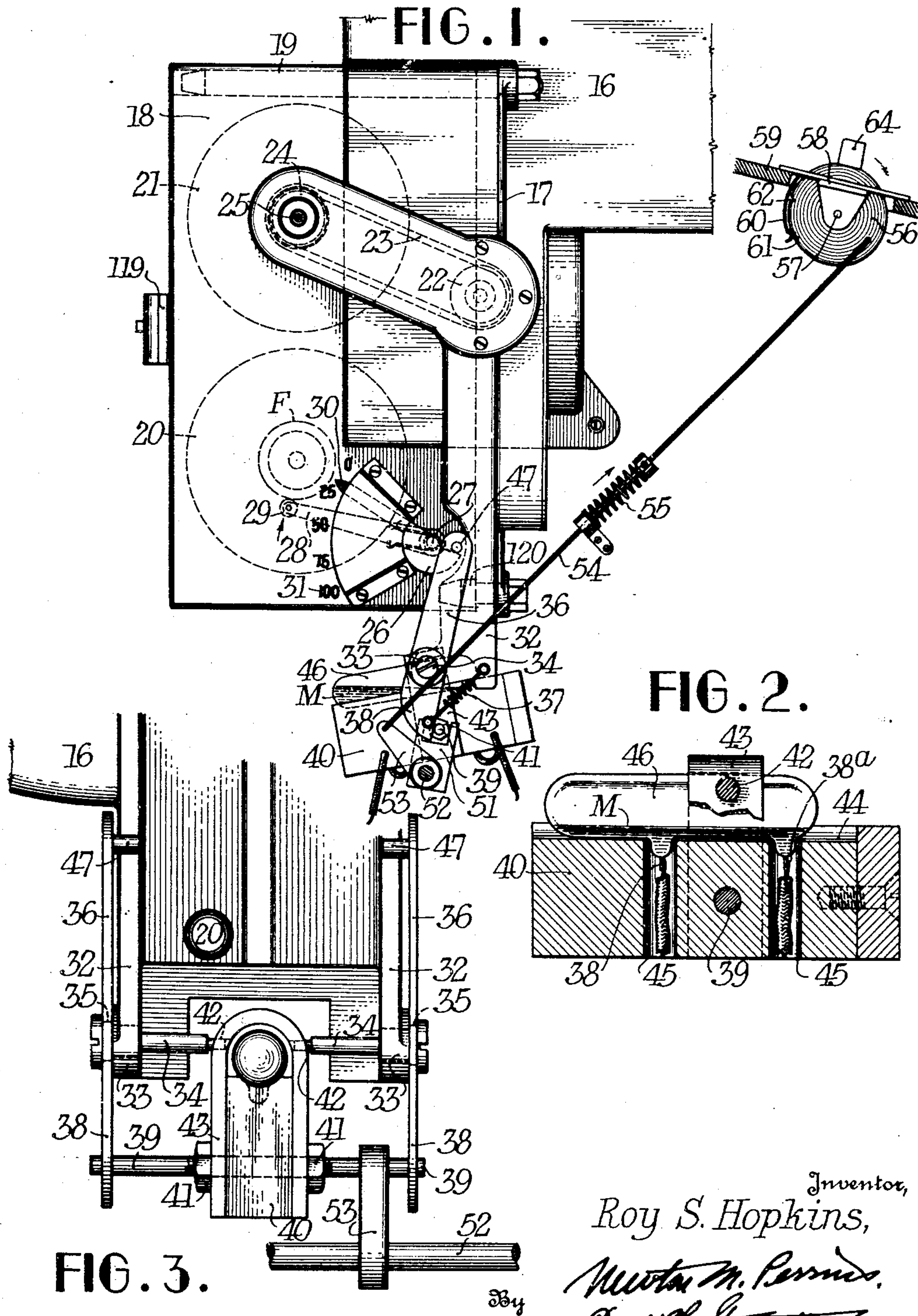
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1,897,903

AUTOMATIC CONTROL FOR PHOTOGRAPHIC RECORDING MACHINES

Filed Dec. 29, 1928

2 Sheets-Sheet 1



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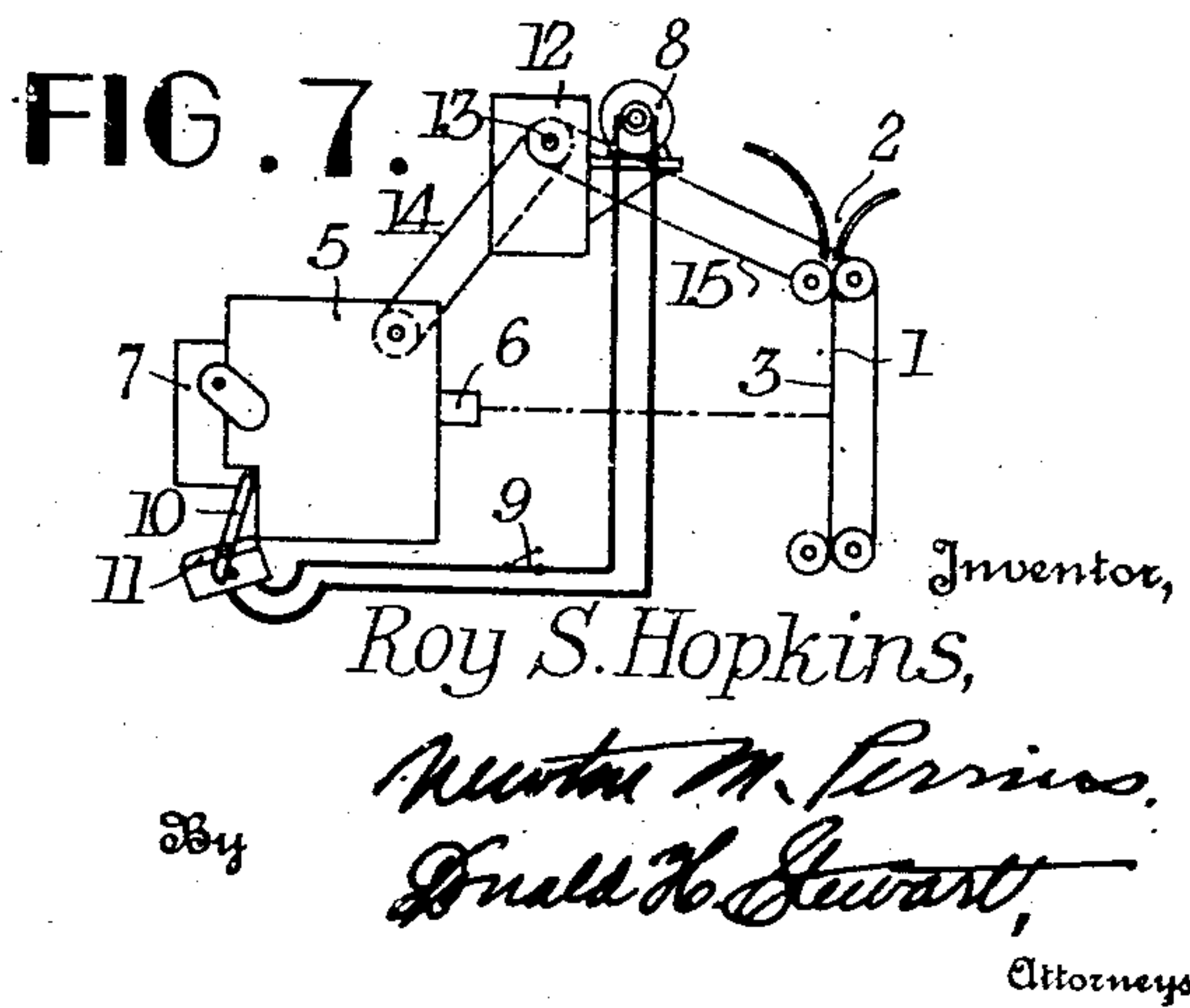
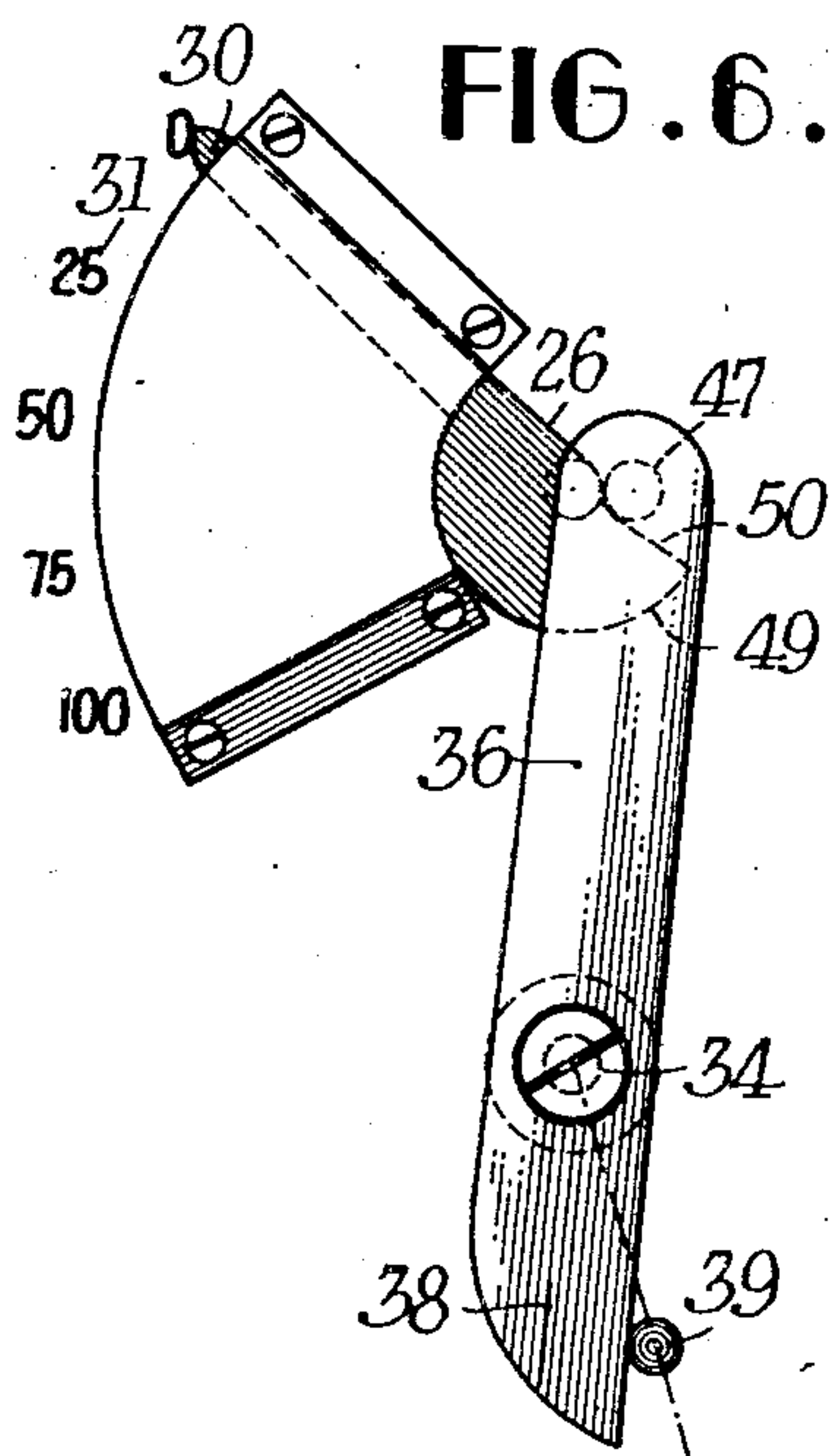
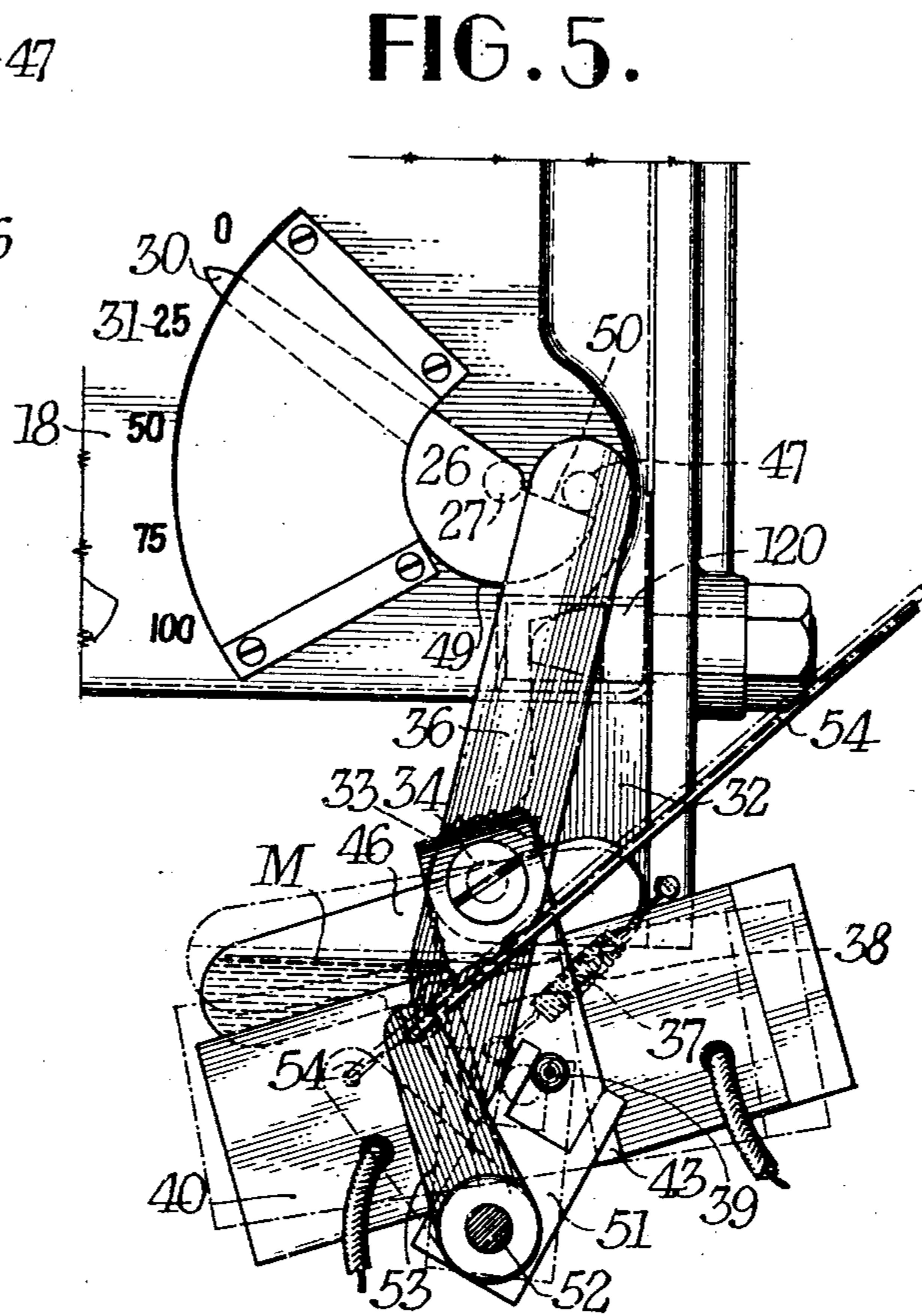
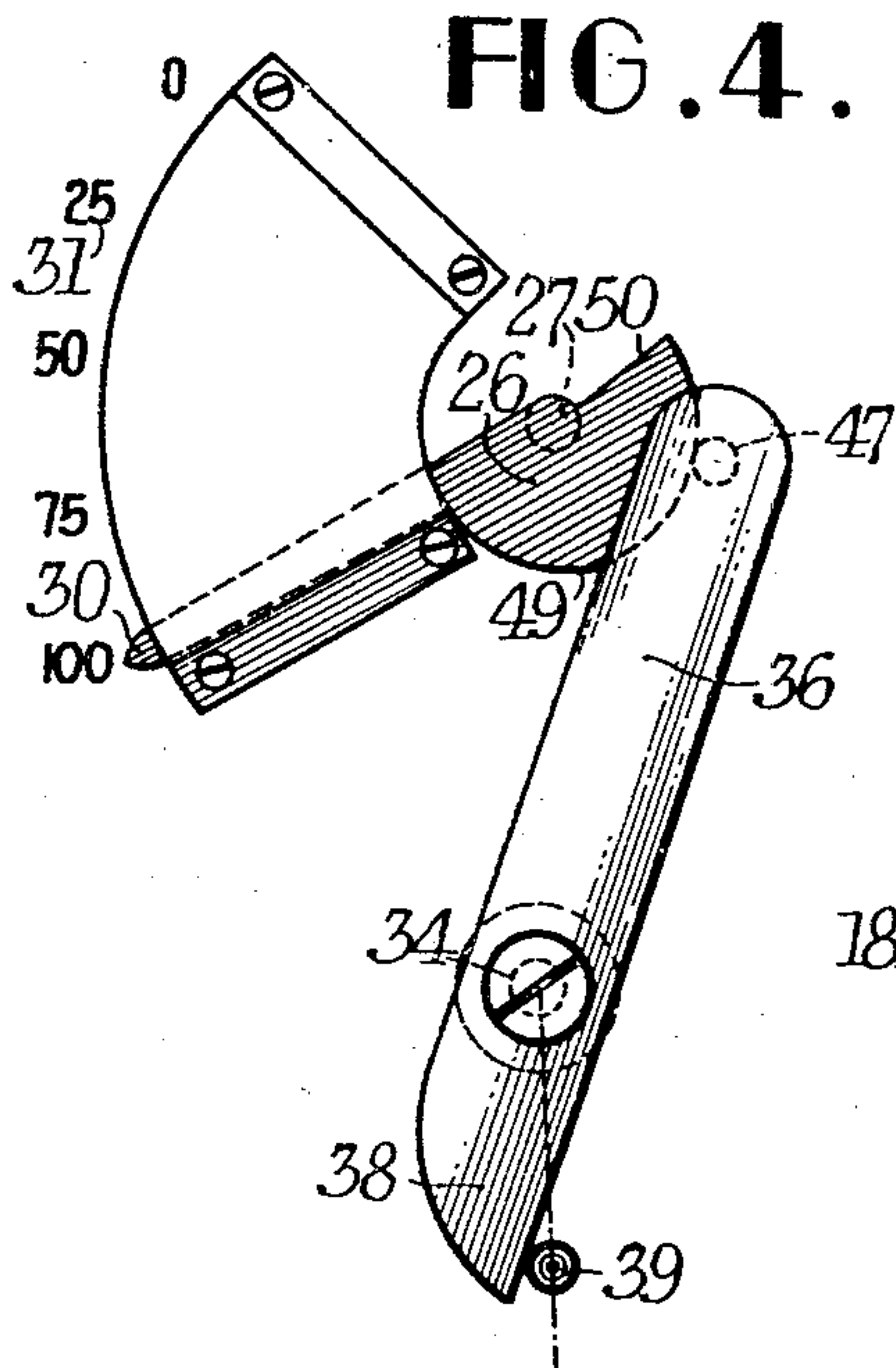
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2 Sheets-Sheet 2



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## AUTOMATIC CONTROL FOR PHOTOGRAPHIC RECORDING MACHINES

Application filed December 29, 1928. Serial No. 329,145.

This invention relates to recording machines and particularly to automatically controlled photographic recording machines. One object of my invention is to provide a machine of the type in which separate documents are fed to a conveyor, moved into the focal plane of a photographing apparatus, and then moved from the focal plane of the apparatus, and to provide a control which will prevent the operation of this machine except at such times as when film is properly positioned in the camera for exposure. Another object of my invention is to provide a controlling device which will prevent the operation of the conveyor in moving documents into the focal plane of the recording apparatus when film is not properly positioned for exposure. Still another object of my invention is to provide a means for automatically preventing the operation of any part of the machine until film is properly positioned for exposure, and other objects will appear from the following specification, the novel features being particularly pointed out in the claims at the end thereof.

Coming now to the drawings wherein like reference characters denote like parts throughout:

Fig. 1 is a side elevation of a portion of a recording machine equipped with an automatic control constructed in accordance with a preferred embodiment of my invention.

Fig. 2 is an enlarged detail partly in section showing a preferred type of switch.

Fig. 3 is an end elevation of the switch mounting shown in Fig. 1 on a somewhat enlarged scale.

Fig. 4 is a diagrammatic showing of a switch-operating lever with the parts in position for operating the machine.

Fig. 5 is a side elevation on an enlarged scale of the switch and switch-operating members shown in Fig. 1.

Fig. 6 is a view similar to Fig. 4 with the parts in an inoperative position and,

Fig. 7 is a diagrammatic showing of a photographic recording machine which may be equipped with my invention.

In my copending application, Serial No. 237,467 for document photographing appa-

ratus, filed December 3, 1927, a complete lay-out of a machine of a type which may be used with the present invention as shown. In this application, however, a slightly different type of film carrier is used, although the mechanism in the gear box of the present invention is the same as that shown in the above mentioned application.

Other features of the photographic recording apparatus for which my automatic control was particularly designed are shown in two other applications filed herewith, Serial No. 329,143 for document conveying and photographing machine, filed Dec. 29, 1928, and Serial No. 329,144 for photographic camera and magazine construction, filed Dec. 29, 1928.

Since all of the details of a photographic recording machine are shown in the above identified patent application and in the two applications filed herewith, I have shown in the present drawings only such parts as are necessary for a complete understanding of the automatic control.

Referring to Fig. 7 where there is a diagrammatic showing of a machine of the type described in my other patent applications, a conveyor 1 is used to move documents from a document-directing means 2 into the focal plane 3 of a recording apparatus. This apparatus is shown broadly at 5 and is of a photographic type having an objective 6 and a film holder 7.

The motor 8 supplies power and is constantly rotated when a switch 9 is closed providing film is properly positioned for exposure. If, however, the film magazine 7 is not in place or if the film has become exhausted, a lever 10 may operate a switch 11 to break the circuit, causing the motor 8 to stop.

A gear box 12 is provided with gears for intermittently moving a shaft 13 which drives suitable sprockets and which, through chains 14 and 15 operate the conveyor and the recording machine.

In Fig. 1 a recording apparatus is provided with a support 16 having a seat 17 for a film magazine 18, the magazine being adapted to slide into position upon a guid-



ing post 19 and being located by a short post 120. This construction is fully described in my copending application, Serial No. 329,144 above referred to.

6 The magazine may be held in operative position by means of a clamp 119 and may be equipped with a film supply spool 20 and a take-up spool 21, the film passing through  
10 suitable driving mechanism from the lower roll to the top roll, this latter roll being preferably driven through a power drive consisting of a pulley 22, belt 23 and second pulley 24, which drives a shaft 25 meshing with a shaft in the film magazine. This  
15 structure is also fully described in my above referred to copending application.

In order to automatically control the motor 8, the following mechanism is employed. On one side of the magazine 18 there is provided a controlling segment 26, this member  
20 being mounted on a shaft 27 passing through the casing and having an arm 28 on the inside of the casing with a roller 29 on the end of the arm.

25 This arm is spring pressed in the direction shown by the arrow (Fig. 1) so that the roller will be kept lying against the outer convolution of film F on the supply reel. On the outside of the casing, shaft 27 carries  
30 a pointer arm 30. This arm may move past a scale 31 which indicates the film footage on reel 20. The position of segment 26 is regulated by the position of the arm 28.

As will appear obvious from Fig. 1, the  
35 magazine 18 may be slid to and from its support 16 without in any way altering the position of the indicating device and controlling segment 26 above described.

The support 16 has downwardly extending arms 32 in which there are bearings 33 as best shown in Fig. 3. In these bearings there are a pair of studs 34. These studs have shoulders 35 upon which levers 36 may  
40 freely turn, levers 36 being normally thrust in the direction shown by the arrow by means of springs 37 as shown in Figs. 1 and 5.

The lower ends 38 of levers 36 contact with a shaft 39 which is supported fixedly in a block 40 by means of the lock nuts 41.

50 The inner ends 42 of the studs 34 form bearings upon which a yoke 43 may turn. This yoke supports the block 40.

As best shown in Fig. 2 the block 40 is grooved at 44 and is provided with a pair of  
55 apertures 45. Lying in the groove 44 is a mercury switch 46 of a known type, this switch having a pair of terminals 38 and 38a.

When the mercury M covers both terminals as shown in Fig. 2, the circuit is made and  
60 when, as shown in Fig. 5, the mercury covers one terminal only, the circuit is broken.

As will be seen from Fig. 3, the switch may be swung upon its pivots 42 by means of the lever 36, it may contact with the shaft  
65 39. Levers 36 may be moved by studs 47

which lie in the path of the segments 26 and the position of these segments controls the position of the mercury switch.

With this machine, as described in my copending applications above referred to, a single or double magazine may be employed. If  
70 the single magazine is employed, there will only be one segment 26 contact with one stud 47 on one side of the support 16. If two  
75 magazines are used, or if one double magazine is used, a segment 26 is provided on one side so that both arms 36 may be used to control the mercury switch.

Referring to Fig. 4, if the full magazine is slid into position on the support 16, the  
80 segment 26 will present a rounded periphery 49 to the stud 47 of arm 36 and this lever will be swung against the force of spring 37 into position shown in Fig. 4. This  
85 will hold the mercury switch substantially in the position shown in Fig. 2 wherein the contact is made.

To operate the machine it is then only necessary to close switch 9. This will cause  
90 the motor 8 to run and will cause the conveyor 1 and the photographing machine 5 to be intermittently operated.

As the film is gradually used up, the film will permit the controlling disc 49 to turn until the stud 47 rides up the inclined surface 50 until the position shown in Fig. 6  
95 is reached at which position the shaft 39 is thrust so far to the right of the supporting stud 34 that the mercury switch 46 will be moved to the full line position of Fig. 5 in  
100 which the circuit is broken. Surfaces 49 and 50 form a cam with which stud 47 contacts.

As will be indicated in Fig. 5, two separate means are provided for operating the  
105 switch 46. In this figure it should be noticed that the lower end 38 of lever 36 does not contact with the shaft 39, since this shaft has been moved from member 38 by means of the yoke 51 which is fixedly mounted on  
110 a shaft 52, this shaft also carrying a lever 53.

Lever 53 may be moved by a rod 54 which, as indicated in Fig. 1, is normally thrust in the direction shown by the arrow by spring  
115 55. The upper end of rod 54 is attached to a disc 56 pivoted at 57 to a bracket 58 supported by the top 59 of the recording machine.

Disc 56 may be moved into three positions. The position shown in Fig. 1 is the normal  
120 operating position. In this position the spring latch 60 engages a notch 61 in the periphery of the disc. When, however, the disc is turned to an off position, notch 62 is engaged by the spring latch 60.  
125

The third position is for causing the machine to be operated continuously and this is accomplished through holding the handle  
130 64 as far to the right (Fig. 1) as is possible. This merely holds the switch 46 in a position



to make the circuit and, in addition, holds certain parts of the machine, not herein described, in position for continuous operation.

5 In Fig. 5 switch 46 is shown in full lines in position to break the circuit, this being the position that is obtained by thrusting the handle 64 as far to the left (Fig. 1) as is possible, so that the spring latch 60 will en-  
10 gage notch 62. When the switch member 64 is moved to the position shown in Fig. 1 in full lines, the switch block 40 is permitted to swing back to the position shown in a dash and dot line (Fig. 5) in which position  
15 the movement is stopped by means of pin 35 coming into contact with arm 38 of lever 36.

With the mechanism above described, it will be evident that placing the film magazine 18 in the recording mechanism and seat-  
20 ing the magazine in its seat 17 causes the controlling disc 26 to contact with the stud 47 of arm 36 and thus position the switch 46 for operation.

If there is sufficient film in the magazine, the switch 46 will be held in an operative po-  
25 sition to make the circuit providing the magazine is properly seated. If it is not properly seated, the switch cannot be moved to an operative position.

30 So long as film remains on the supply roll, switch 46 will continue to make the circuit but when the film becomes exhausted, the parts assume the position shown in Fig. 6 and the switch 46 is locked upon its pivotal  
35 support 42 breaking the circuit. This, by stopping the motor, not only stops the operation of the recording camera, but also stops the movement of the conveyor so that the documents can no longer be fed into the  
40 chute 2 and this will immediately call the attention of an operator to the fact that a fresh supply of film is required. It is, therefore, impossible to continue to feed docu-  
45 ments into the machine for recording under the impression that they are being photographed.

Having thus described my invention, what I claim as new and desire to secure by Let-  
ters Patent is:

50 1. In a camera including operative mechanism, a power drive for the operative mechanism, a removably mounted magazine adapted to carry film on supply and take-up  
55 spindles, connections between the power driven camera mechanism and the take-up spindle and means carried by the magazine and automatically cooperating with the camera through movement of the magazine into the  
60 camera for controlling the power drive.

2. In a camera including operative mechanism, a power drive for the operative mechanism, a removably mounted magazine adapt-  
65 ed to contain film on supply and take-up spindles, connections between the power driven camera mechanism and the take-up spin-

dle, a movably mounted controller carried by the magazine and adapted to move in ac-  
cordance with the amount of film in the mag-  
azine, and means on the camera adapted to be  
automatically engaged by said controller 70  
through movement of the magazine into the camera and adapted to be regulated through the controller for controlling the power drive.

3. In a camera including operative mechanism, a power drive for the operative mechanism, a removably mounted magazine adapt-  
75 ed to carry film on supply and take-up spindles, connections between the take-up spindle and the power driven camera mechanism, a cam mounted on the magazine, a shaft sup-  
80 porting the cam passing through the magazine, connections between the shaft and the coil of film carried by the magazine for moving the cam, and means lying in the path of  
85 the cam adapted to be automatically engaged by moving the magazine into the camera and adapted to be operated by said cam for controlling the power drive.

4. In a camera including an operative mechanism, a power drive for the operative  
90 mechanism of the camera, a removably mounted magazine adapted to carry film on supply and take-up spindles, connections between the take-up spindle and the power op-  
95 erated camera mechanism, a cam mounted on a shaft passing through the magazine, an arm carried by the shaft and means on the end of the shaft adapted to contact with the film  
100 carried by the magazine, a swinging switch arm mounted on the camera and adapted to contact with the cam carried by the magazine whereby the power drive may be con-  
trolled through the film in the magazine.

5. In a camera including operative mechanism, a magazine adapted to be seated there-  
105 on and to contain a take-up and supply spindle and film attached thereto, a power drive for the camera mechanism, connections between the power driven camera mechanism and the take-up spool, a film contacting mem-  
110 ber adapted to move as film is moved relative to a spool, a controller operable through the film contacting member, a pivoted mercury switch included in a circuit controlling  
115 the power drive and means for moving the switch through the controller.

6. In a camera including operative mechanism, a power drive for the camera operat-  
ing mechanism, a magazine adapted to be  
120 seated on the camera and to contain film, a pair of film supports, means for moving one film support, connections between said movable film support and said power driven  
camera mechanism, a film contacting mem-  
125 ber adapted to be moved as the film is moved relative to the film supports, a controller operable through the film contacting member, a pivoted mercury switch included in a circuit controlling the power drive, and means  
130 for moving the switch through the controller,



a second means for moving the switch including a handle adapted to be manually actuated.

7. In a camera including operative mechanism, a power drive for the operative mechanism, a magazine adapted to be seated on the camera and to contain film, film supports carried by the magazine, connections between one film support and the camera mechanism adapted to be driven by power, a film contacting member adapted to be moved as film is moved from one support to the other, a controller operable through the film contacting member, a pivoted mercury switch included in a circuit controlling the power drive, means for moving the switch through the controller, a second means for moving the switch including a handle adapted to be manually actuated, the connections between the two means for moving the switch and the pivoted mercury switch being such that the second mentioned means is operable only when the controller is in position to be operated.

8. In a camera including operative mechanism, a power drive for the operative mechanism, a magazine adapted to be seated on the camera and to contain a coil of film, a pair of supports adapted to support the film, one support being adapted to be rotated by power, connections between the rotatable support and the power driven camera mechanism, a film contacting member adapted to be moved as film is moved from one support to the other, a controller operable through the film contacting member, a pivoted mercury switch included in a circuit controlling the power driving means for moving the switch through the controller, a second means for moving the switch including a handle adapted to be manually actuated at a lost motion connection between the second means for moving the switch and whereby the first switch operating means may move independently of the second switch operating means.

Signed at Rochester, New York this 21st. day of December, 1928.

ROY S. HOPKINS.

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