

948,444.

A. T. CROCKER.
CONTROLLER.
APPLICATION FILED NOV. 2, 1908.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 1.

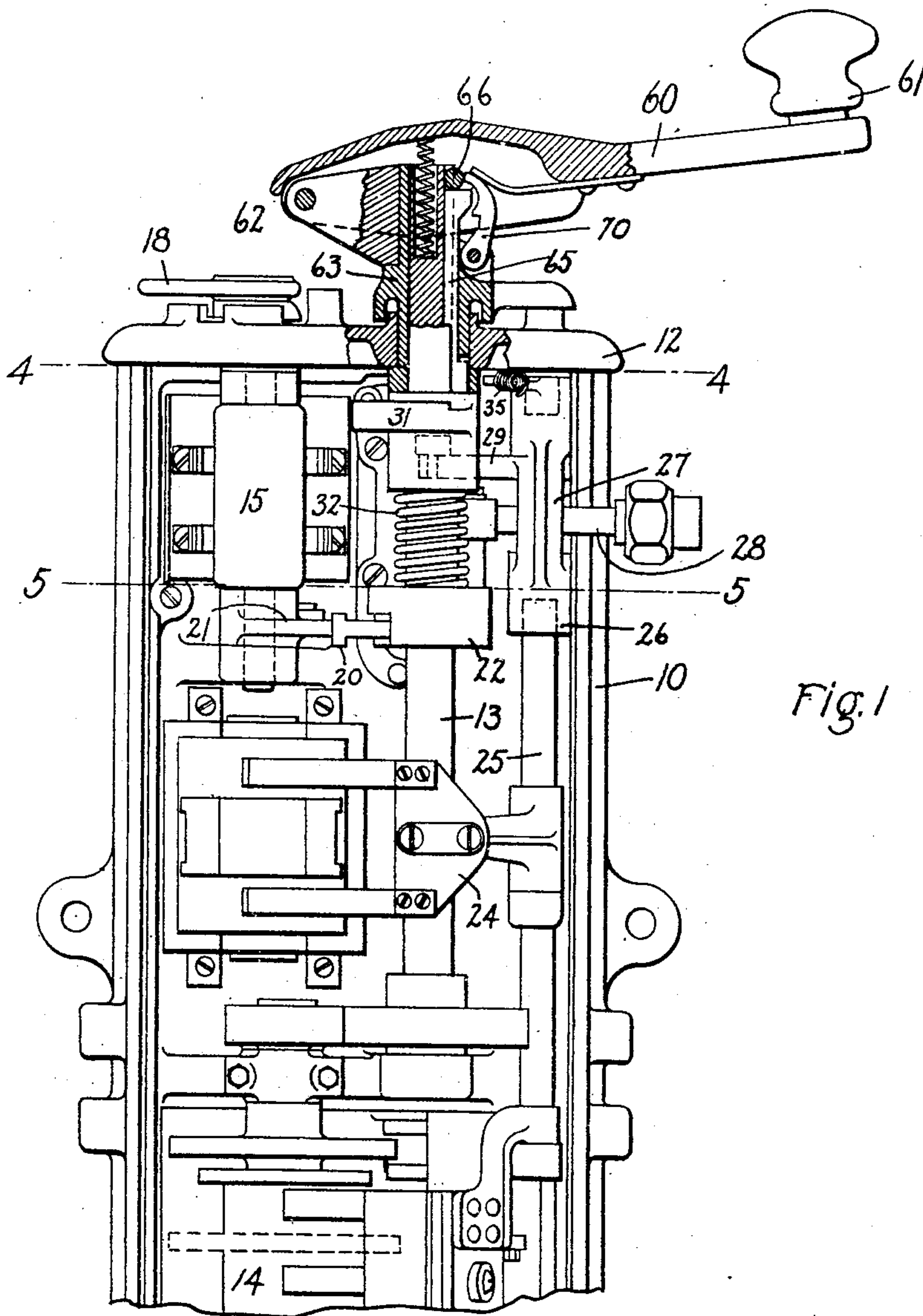


Fig. 1

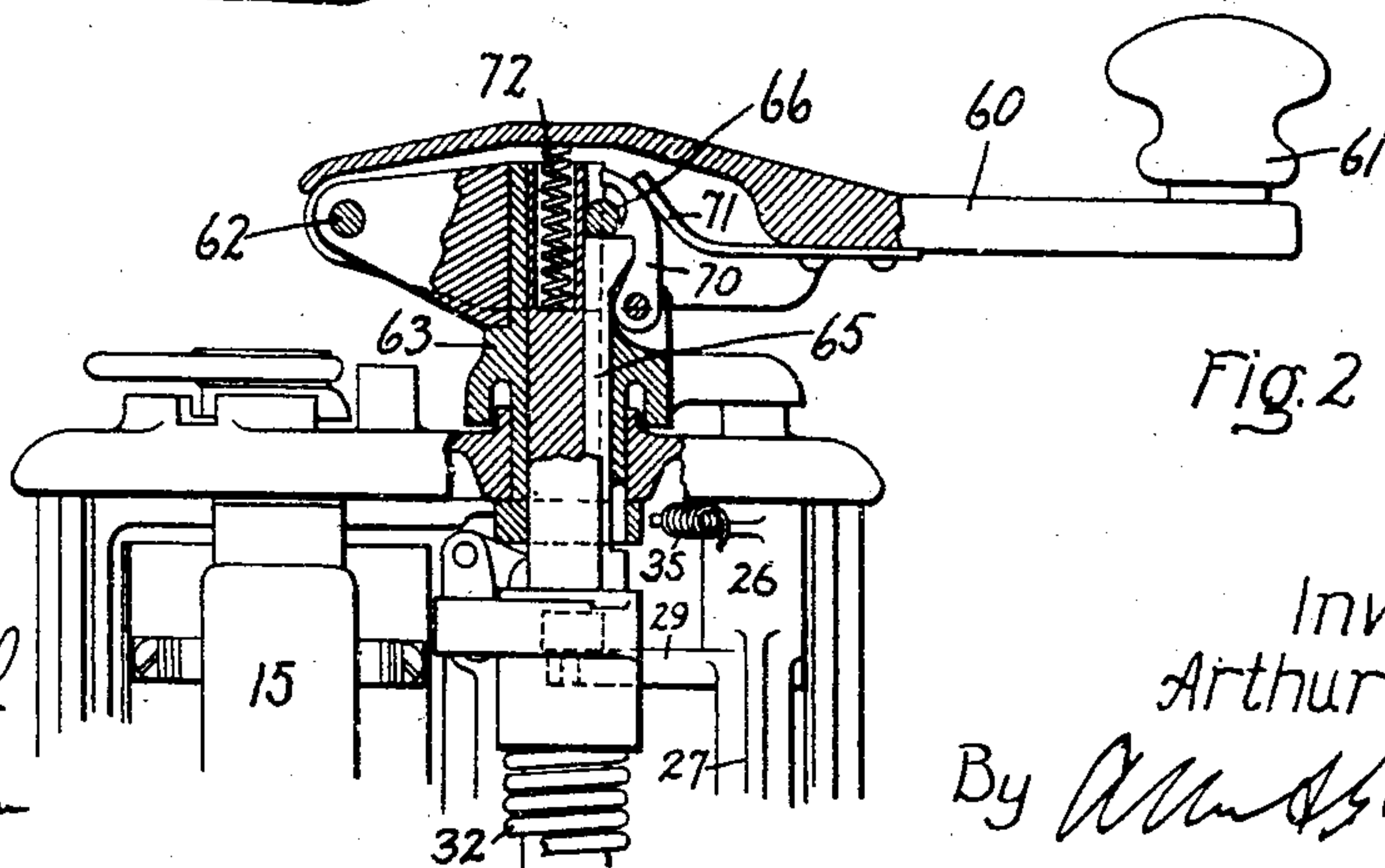


Fig. 2

Witnesses:
Lloyd C. Bush
J. Ellis Elen

Inventor:
Arthur T. Crocker,
By *Amos S. Davis*
Att'y.

948,444.

A. T. CROCKER.

CONTROLLER.

APPLICATION FILED NOV. 2, 1908.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 2.

Fig. 3

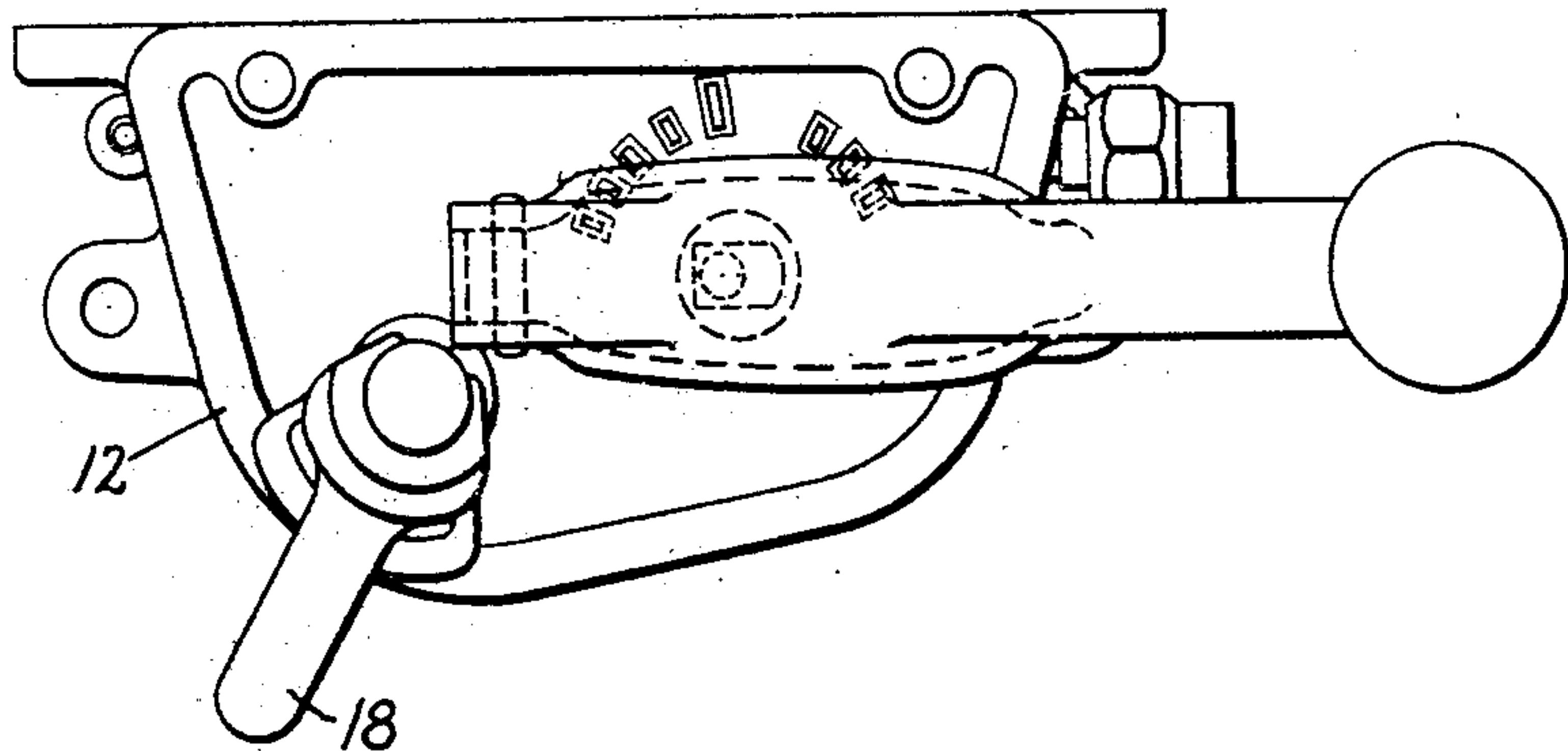


Fig. 4

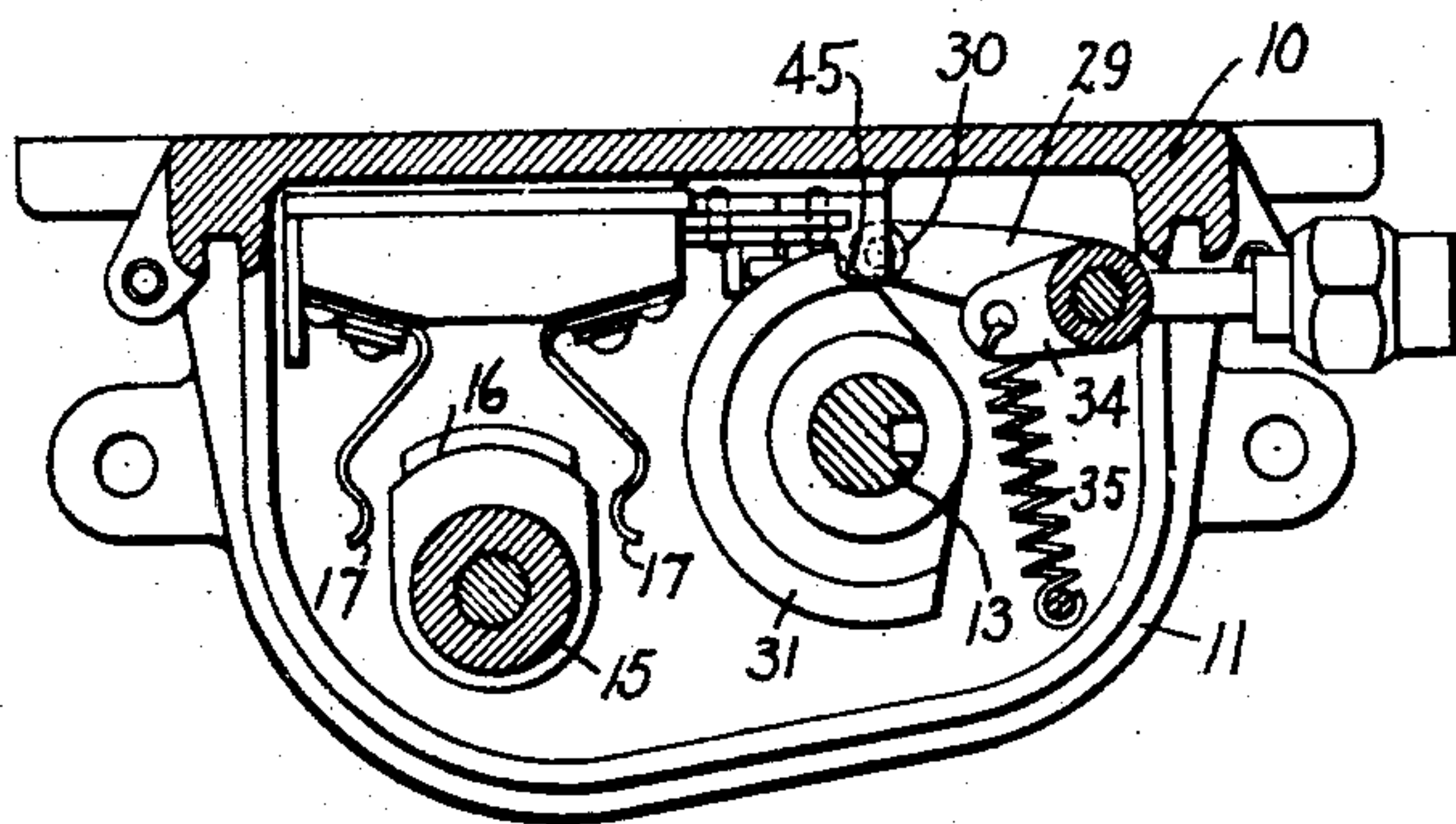


Fig. 5

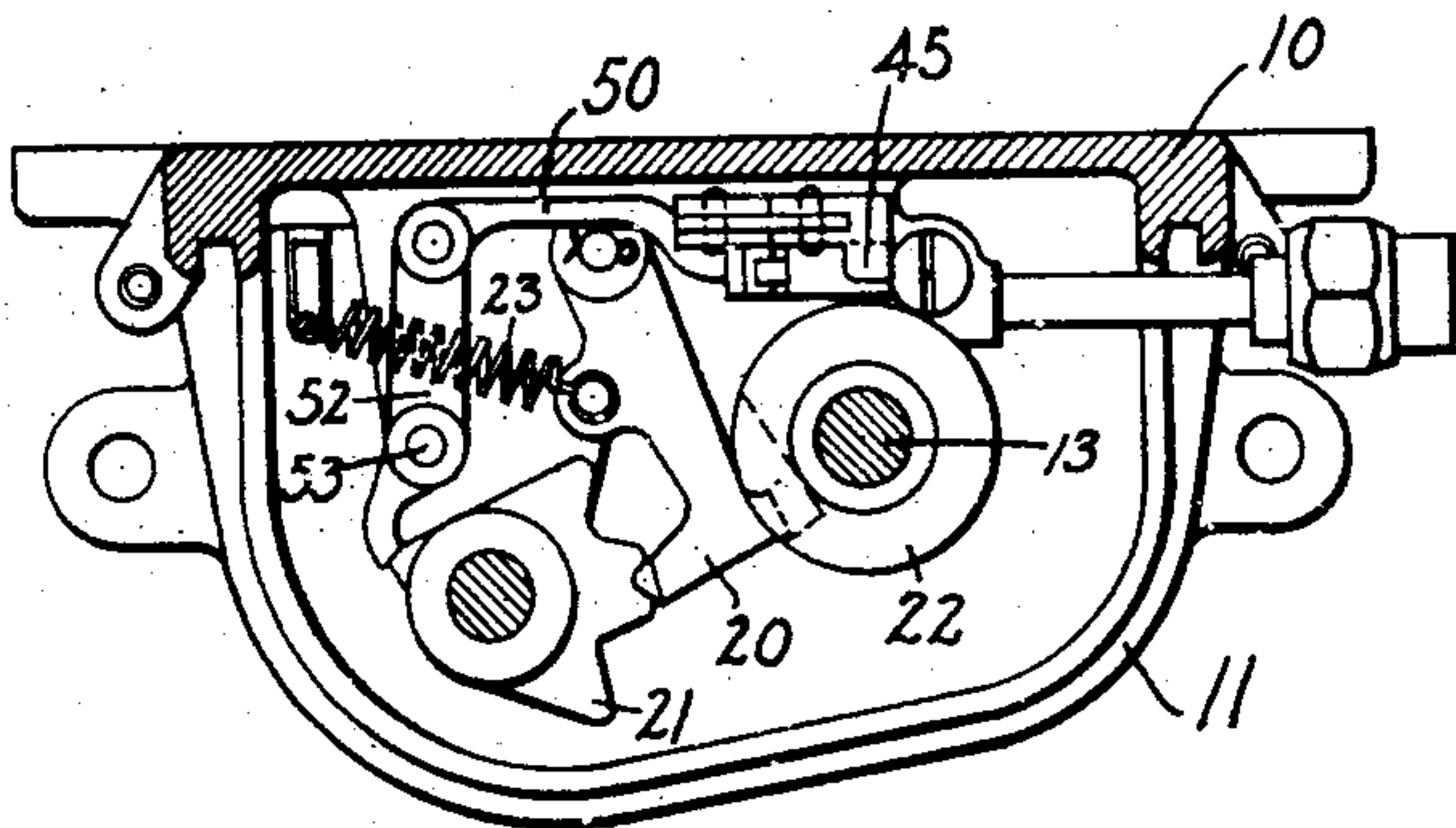
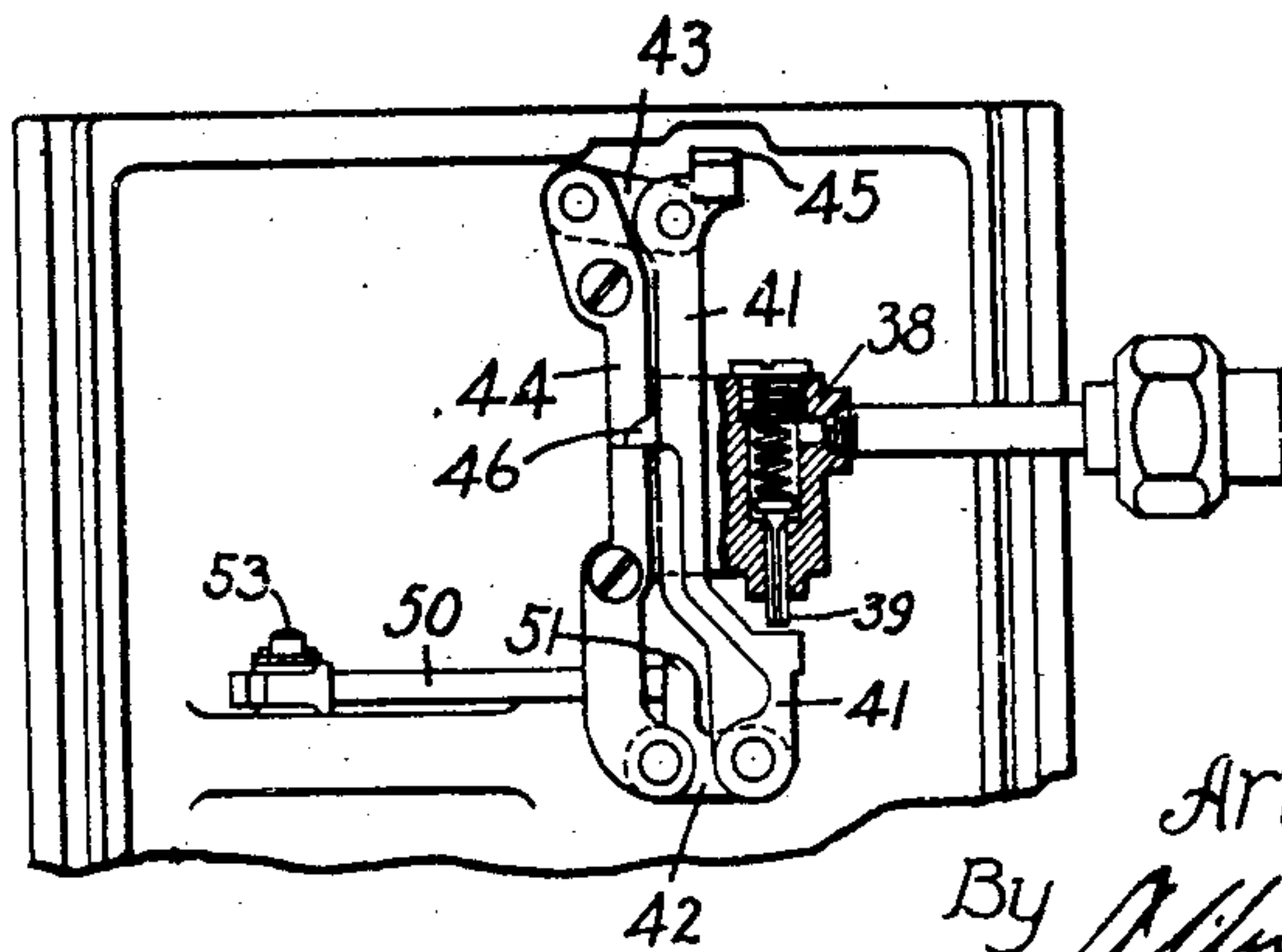


Fig. 6



Witnesses:
Lloyd C. Bush
J. K. Allen

Inventor:
Arthur T. Crocker,
By *Allen S. Davis*
Atty.

UNITED STATES PATENT OFFICE.

ARTHUR T. CROCKER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CONTROLLER.

948,444.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed November 2, 1908. Serial No. 460,614.

To all whom it may concern:

Be it known that I, ARTHUR T. CROCKER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Controllers, of which the following is a specification.

My invention relates to controllers for electric motors, and is particularly applicable to controllers now extensively used in the operation of electrically driven cars. In this service the controllers are often provided with so-called "dead man's handles," the function of which is to cause the interruption of the motor circuit and some times, also, the application of the air brakes if the motorman, for any reason, takes his hand from the operating handle during operation. A well known form of such apparatus is set forth in my Patent #872,990, dated December 3, 1907, in which a button on the controller handle, normally depressed by the hand of the operator during operation, when released allows the automatic operation of suitable mechanism in the controller to cause interruption of the motor circuits and application of the air brakes.

My invention relates particularly to controllers provided with one or both of the emergency devices above mentioned, and has for its object to provide a new and improved form and arrangement of controller handle and operating mechanism for the emergency devices.

To the above end, my invention, briefly stated, comprises a handle mounted on the controller shaft and arranged to rotate therewith and pivotally mounted for limited movement in a vertical plane, means being provided for operatively connecting said handle and the emergency devices, whereby rotary movement of said handle under the downward pressure of the operator's hand operates the emergency devices, a latch mechanism being also provided for relieving the operator, during normal operation, from a large part of the upward thrust which biases the mechanism to the emergency position.

For the purpose of illustration I have shown my invention as applied to a controller having emergency devices constructed and arranged substantially as set forth

in my Patent No. 872,990, above referred to, and as shown in an application filed concurrently herewith in the name of Frank E. Case, Serial No. 460,612, but it is obvious that it might equally well be used in connection with many other forms of controller.

Referring to the drawings, Figure 1 is an elevation, partly in section, of the upper portion of a controller provided with my invention, the casing being removed and the mechanism being in the position which it assumes when the handle is released by the operator; Fig. 2 is an elevation, similar to Fig. 1, showing the handle in its depressed position; Fig. 3 is a plan view of the top of the controller; Fig. 4 is a horizontal section approximately on the line 4—4 of Fig. 1; Fig. 5 is a horizontal section, approximately on the line 5—5 of Fig. 1, certain parts being omitted for the sake of clearness; and Fig. 6 is an elevation, partly in section, showing a portion of the operating mechanism for the emergency brake controlling valve.

Referring to the drawings, the backboard of the controller is indicated at 10, the base at 11 and the top at 12, these parts being of a well-known design.

At 13 is shown the main shaft of the controller from which the main drum 14 may be driven through gearing or operated in any other suitable manner. A reversing switch is shown as comprising a drum 15 carrying contact segments 16 which cooperate with fingers 17 in a well-known manner. The shaft of the drum 15 extends upward through the top plate 12 and is adapted to receive a removable reversing handle 18.

In order to lock the main drum of the controller when the reversing switch is in its "off" position, and to prevent the reversing switch from being moved when the main controller drum is in an "on" position, a mechanical interlock between the reverser shaft and the main shaft is generally used and, in the present construction, is shown as comprising a pivoted dog 20, the toe of which engages with a toothed segment 21 on the shaft of the reverser, while the heel engages with a notched collar 22 fixed on the main shaft 13, a spring 23 serving to hold the dog yieldingly in engagement with the segment. The construc-

tion and arrangement of this interlocking mechanism will be clear from Fig. 5 and need not be further described since it forms no part of my invention.

5 The emergency circuit breaker may be of exactly the same construction as that shown in my patent, above mentioned. The movable member 24 of the circuit breaker is mounted on a shaft 25, the upper end of
10 which is embedded in a casting 26 pivotally mounted on the bottom of the top plate 12. This casting 26 has an outwardly extending web portion 27 which extends around the pipe 28, hereinafter referred to, this
15 construction allowing the parts to be arranged in a compact form. Extending from the casting 26 is an arm 29, the end of which carries a roller 30 which engages with a cam 31 secured to rotate with but having
20 a limited sliding movement upon the shaft 13. The cam 31 is biased in an upward direction by the spring 32 and in its upper position is out of engagement with the roller 30. The casting 26 also has extend-
25 ing from it an arm 34 between which and a pin extending downwardly from the top plate 12 a spring 35 is located. This spring 35 serves to bias the circuit breaker to an open position and to hold the roller 30 in
30 engagement with the cam 31, the constructions and arrangement of these parts being similar to that of the corresponding parts in my patent above referred to. The pipe
35 of the air brake system, extends into the controller and at its end is provided with a valve 38 of well known form, shown in cross-section in Fig. 6, having a valve stem
40 39 which projects from the casing biased to a closed position by means of a spring and the pressure in the train pipe.

The mechanism by which the emergency air brake valve 38 is operated is best shown in Figs. 4 and 6. The lower end of the
45 valve stem 39 is engaged by a member 41 pivotally connected by links 42 and 43 with a bracket 44 secured to the back of the controller. The upper part of the member 41 is provided with an extension having
50 a lip 45 arranged to project horizontally out over the top of the cam 31 by which it is engaged in all angular positions of the cam. When the cam 31 is in its upper position the member 41 is forced upwardly against
55 the valve stem 39 and the valve is opened, but when the cam is depressed the member 41 is allowed to drop and the valve 38 to close. A lug 46 on the member 41 engages with a shoulder on the bracket 44 and pre-
60 vents the member 41 from dropping farther than is necessary.

In order to maintain the valve 38 closed, except when the controller is in use, means is provided, as in the case of the controller
65 in my patent above referred to, for releas-

ing the upward pressure on the valve stem when the reversing switch is in its mid-position. In the particular controller shown, this means comprises a rod 50, the
70 end of which engages with an extension 51 on the link 42, this rod being moved longitudinally from the reversing shaft through the medium of a lever 52 pivoted at 53, one
75 end of which is connected to the rod 50 while the other engages a cam surface formed on the segment 21, as is clear from Figs. 5 and 6. When the reverser is in its
80 mid-position the rod 50 is moved to the right and the member 41 is forced downwardly, thereby releasing the valve stem 39; in either "on" position of the reverser, however, the upward pressure of the spring
85 32 on the cam 31 forces the member 41 upward and tends to hold the valve 38 open and the brakes applied, this action being unimpeded by the rod 50. It will be observed that the construction and mode of
90 operation of the mechanism for the operation of the emergency devices as described up to this point are substantially the same as shown in my patent and in the Case ap-
plication above referred to.

I now come to the description of my new and improved form of controller handle which I have shown as adapted to coöperate
95 with the particular arrangement of emergency devices above described. It will be clear, however, that my handle and its co-operating parts are in no way limited to use in connection with the particular internal
100 construction of controller shown.

Referring now particularly to Figs. 1 and 2, my handle comprises a lever 60 provided with a grip 61, said lever being pivoted at
105 62 in a bracket 63 either permanently or removably mounted upon the shaft 13 so as to rotate therewith. In the present case the upper end of the shaft 13 is made substantially quadrilateral in cross-section for this
110 purpose. Arranged for sliding movement in a keyway in one side of the shaft 14 is a key 65, the lower end of which engages with the top of the cam 31. This key 65 serves
115 as a sliding connection between the handle 60 and the cam 31 and is engaged in its upper end by a pin 66 mounted in the handle as shown. With such an arrangement it is
120 clear that when the lever 60 is pressed downward by the hand of the operator from the position shown in Fig. 1 to that of Fig. 2, the key 65 will be forced down and the cam
125 31 moved to its lower position against the upward pressure exerted by the spring 32. With such an arrangement it is obvious that the emergency devices could be successfully controlled. Since, however, the upward
130 pressure exerted by the spring 32 must be considerable, it is desirable to provide means for relieving the operator from the necessity of resisting this upward pressure dur-

ing normal operation of the controller. For this purpose I provide a latch device comprising a latch member 70 pivoted in the bracket 63, as shown, and arranged, under the pressure of a spring 71, to engage the top of the key 65, the upper end of this key being enlarged for this purpose. The upper end of the latch 70 may be formed as shown in order to allow its engagement by the pin 66 when the handle 60 is released by the operator and allowed to fly up a certain distance under pressure exerted by a spring 72 embedded in the top of the shaft 13. The pin 66 by engaging the top of the latch 70 moves the latter outwardly out of engagement with the key 65 and permits the latter to fly up under the pressure exerted on the cam 31 by the spring 32. With this arrangement it will be understood that when in the "off" position of the controller the operator depresses the handle from the position of Fig. 1 to that of Fig. 2, the cam 31 will be forced down and will be held in that position against the upward thrust of the spring 32 by the latch 70, as long as the handle is held in its lower position. If, however, the motorman removes his hand from the handle 61 the latter flies up under the pressure of the spring 72 and the latch device is at once released and the cam allowed to move to its emergency position, thereby causing the emergency operation of the circuit breaker and air brake valve.

While I have shown but one construction in which my invention may be embodied, I aim in the appended claims to cover all the constructions which come within the spirit and scope of my invention.

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

1. In a controller, an operating shaft, a handle mounted thereon arranged to rotate with said shaft and pivotally mounted for limited rotary movement in a vertical plane, an emergency device, means for operatively connecting said handle and said emergency device whereby rotary movement of said handle under the downward pressure of the operator's hand operates said emergency device, means for biasing said handle in an upward direction, and a latch operative when said handle is in its lower position for taking part of the upward thrust of said biasing means.

2. In a controller, an operating shaft, a handle mounted thereon arranged to rotate with said shaft and pivotally mounted for limited rotary movement in a vertical plane, an emergency device, means for operatively connecting said handle and said emergency device whereby rotary movement of said handle operates said emergency device, means for biasing said handle in an upward direction, and a latch released when said handle is in its upper position and operative

when said handle is in its lower position for taking part of the upward thrust of said biasing means.

3. In a controller, an operating shaft, a handle mounted thereon arranged to rotate with said shaft and pivotally mounted for limited rotary movement in a vertical plane, an emergency device, means for operatively connecting said handle and said emergency device whereby rotary movement of the handle under the downward pressure of the operator's hand operates said emergency device, means for biasing said connecting means in an upward direction, a latch device for holding said connecting means in its lower position against the upward force of said biasing means, a spring for biasing said handle in an upward direction, and means operated by said handle for releasing said latch device when the handle is allowed to move upward under the force of said spring.

4. In a controller, an operating shaft, a handle mounted thereon arranged to rotate with said shaft and pivotally mounted for limited rotary movement in a vertical plane, an emergency device coöperating with said controller, means for operatively connecting said handle and said emergency device, a spring for biasing said connecting means in an upward direction, a latch coöperating with said connecting means and arranged when the latter is in its lower position to hold the same there against the force of said spring, a spring arranged between said shaft and said handle and tending to rotate said handle in an upward direction, and means carried by said handle and arranged to release said latch when the handle is allowed to move upward under the influence of said last mentioned spring.

5. In a controller, an operating shaft, a handle pivotally mounted thereon and arranged to rotate with said shaft and pivotally mounted for limited rotary movement in a vertical plane, an emergency device coöperating with said controller, a connection between said handle and said emergency device including a key slidably mounted on said shaft and a pin carried by said handle and engaging said key, a spring arranged to exert an upward thrust on said key, a spring arranged between said shaft and said handle tending to rotate said handle about its pivot in an upward direction, and a latch mechanism arranged to engage said key and hold it in its lower position after it is moved thereto by movement of the handle in a downward direction, said pin being arranged to release said latch when said handle is allowed to move upward under the pressure of said last mentioned spring.

6. In a controller, an operating shaft, a bracket mounted on the end of said shaft, a handle pivoted therein and extending over

the end of said shaft and arranged to rotate
with said shaft and to have a limited move-
ment in a vertical plane, a grip on said
handle on the opposite side of said shaft
5 from the pivot for said handle, an emer-
gency device coöperating with said control-
ler, a sliding connection between said handle
and said emergency device whereby rotary
movement of said handle under the down-
10 ward pressure of the operator's hand oper-
ates said device, a spring for biasing said
sliding connection in an upward direction,
a latch mounted on said bracket arranged to
hold said sliding connection in its lower

position, a spring arranged to force said 15
handle in an upward direction, and means
carried by said handle arranged to move
said latch to its releasing position when the
handle moves upward under the influence
of said last mentioned spring upon being re- 20
leased by the operator.

In witness whereof, I have hereunto set
my hand this 30th day of October, 1908.

ARTHUR T. CROCKER.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.