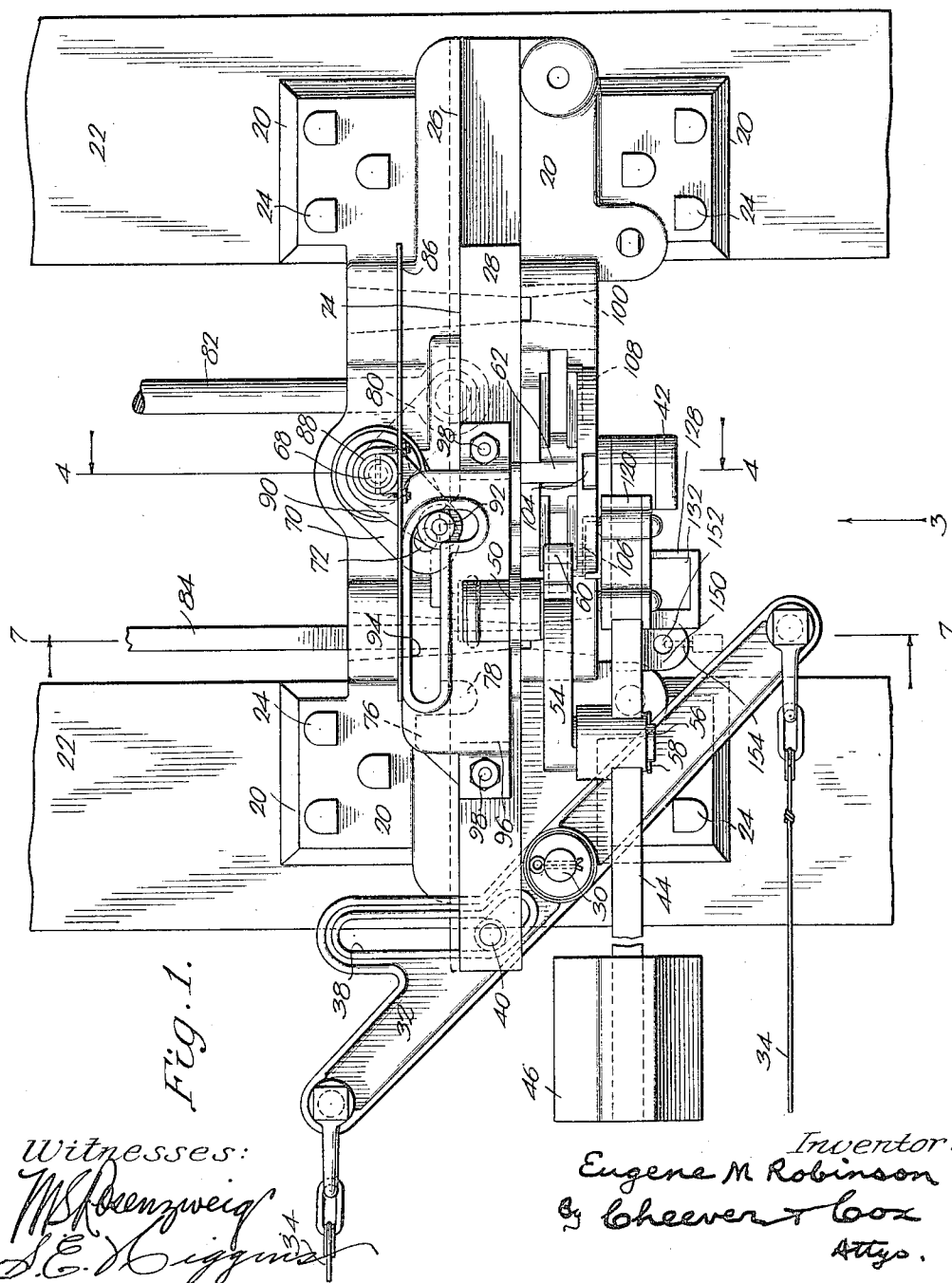


1,140,916.

E. M. ROBINSON.
SWITCH MECHANISM.
APPLICATION FILED NOV. 14, 1914.

Patented May 25, 1915.

7 SHEETS—SHEET 1.



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7 SHEETS—SHEET 2.

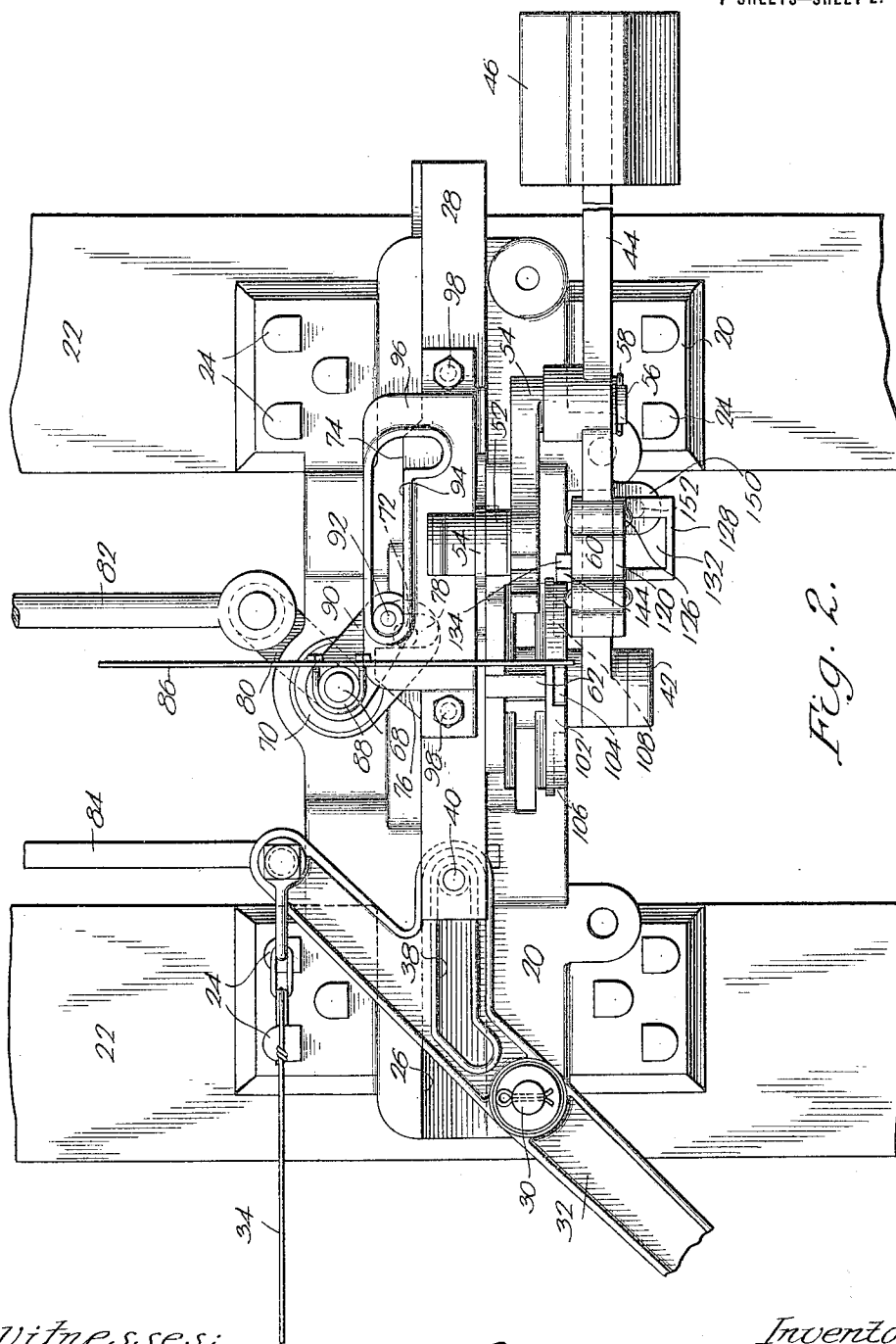


Fig. 2.

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7 SHEETS—SHEET 3.

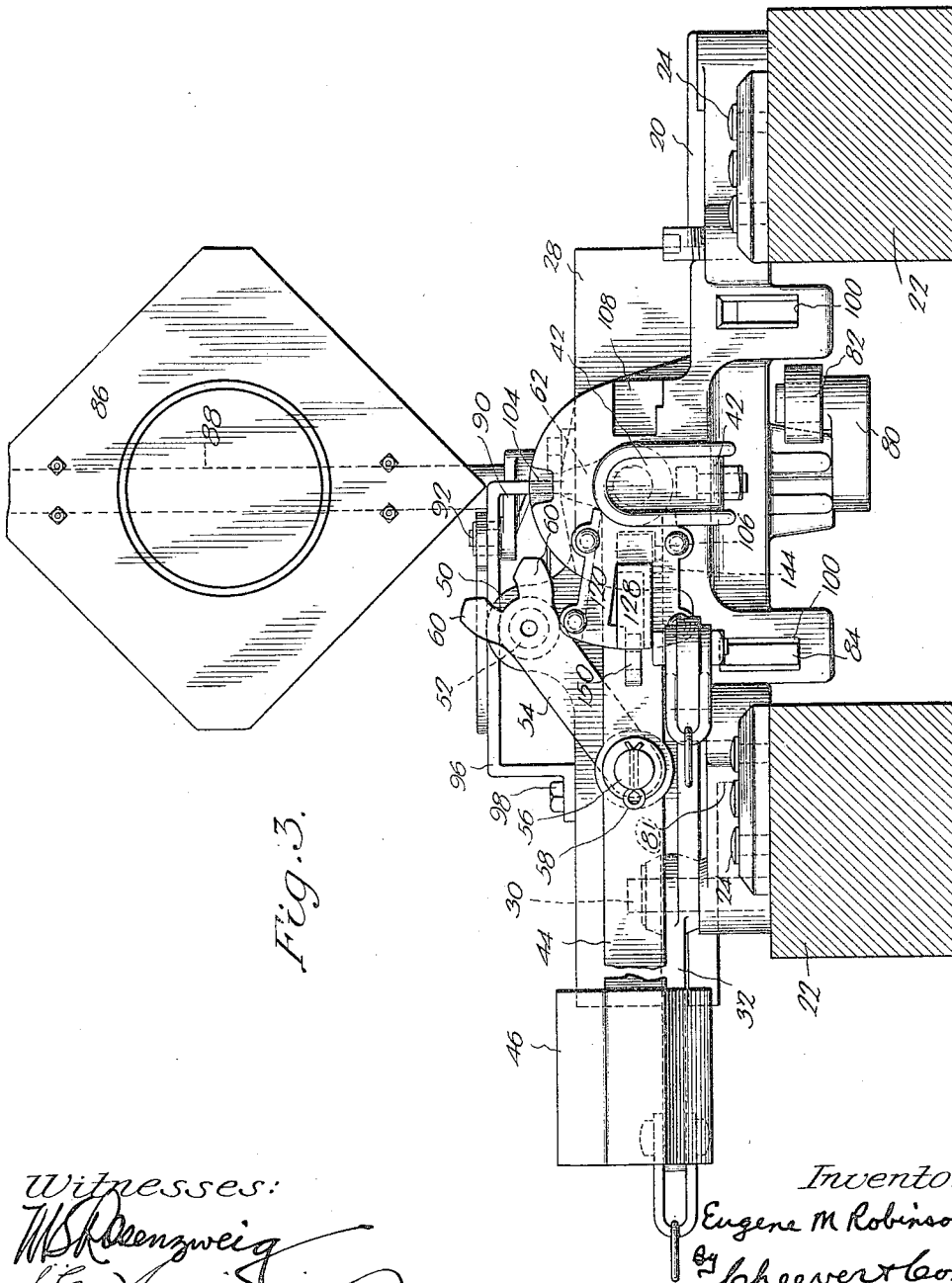


Fig. 3.

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 7 SHEETS—SHEET 4.

Fig. 5.

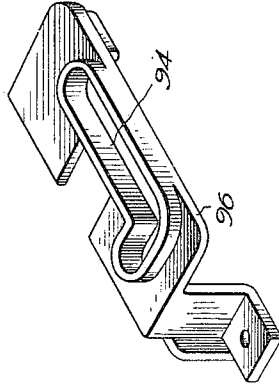


Fig. 6.

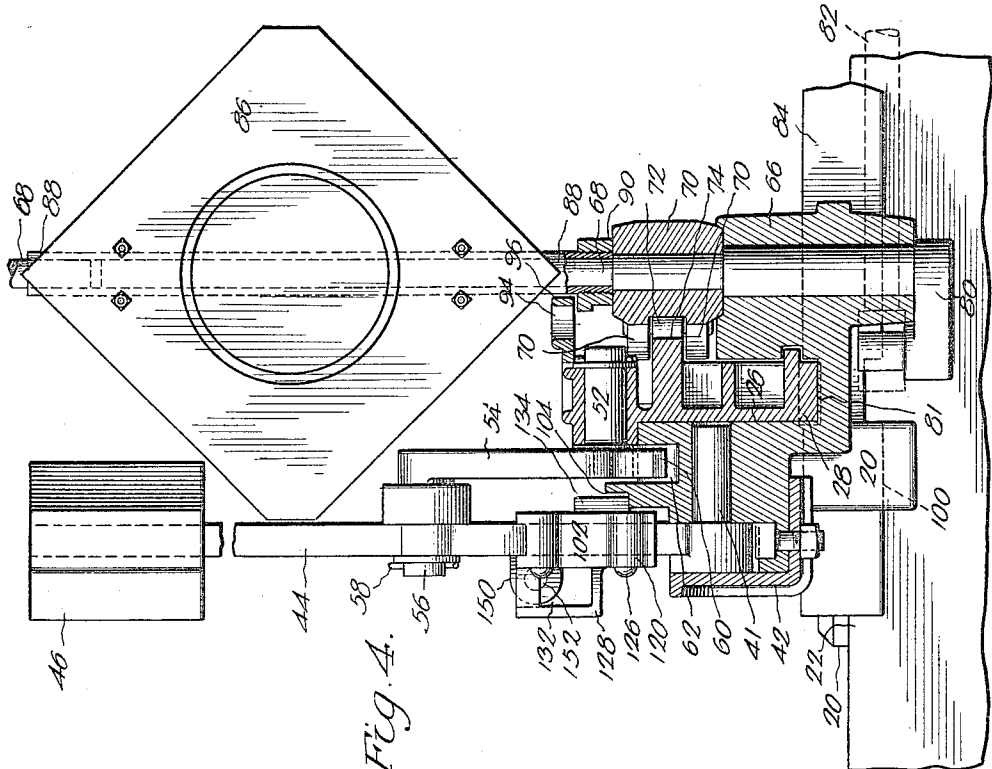
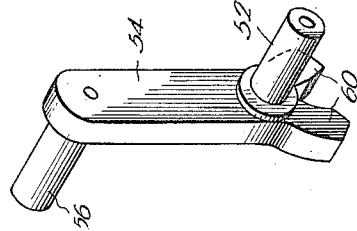


Fig. 4.

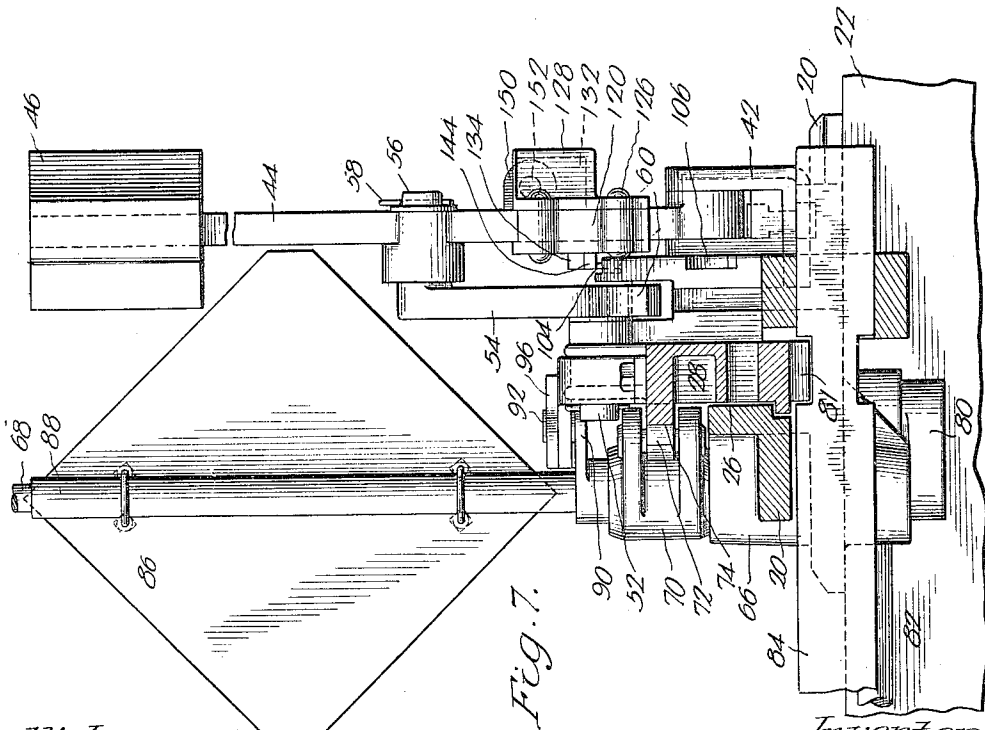
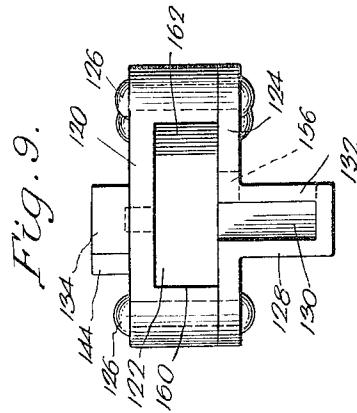
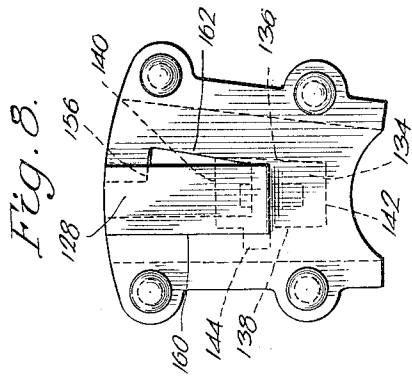
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1,140,916.

E. M. ROBINSON.
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Patented May 25, 1915.
7 SHEETS—SHEET 5.



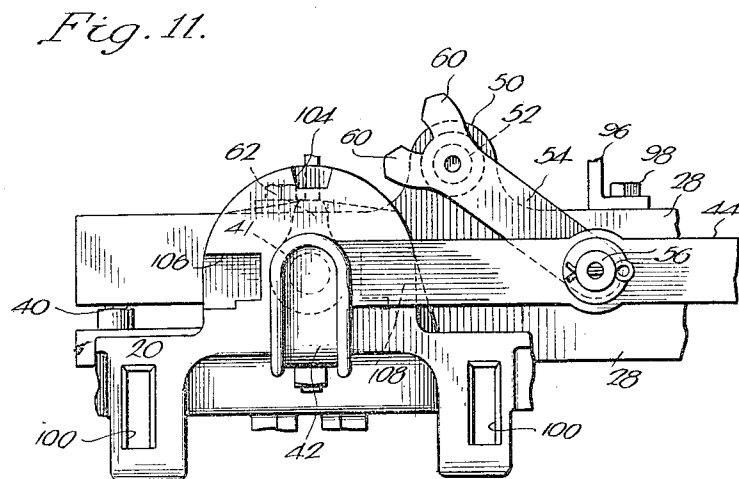
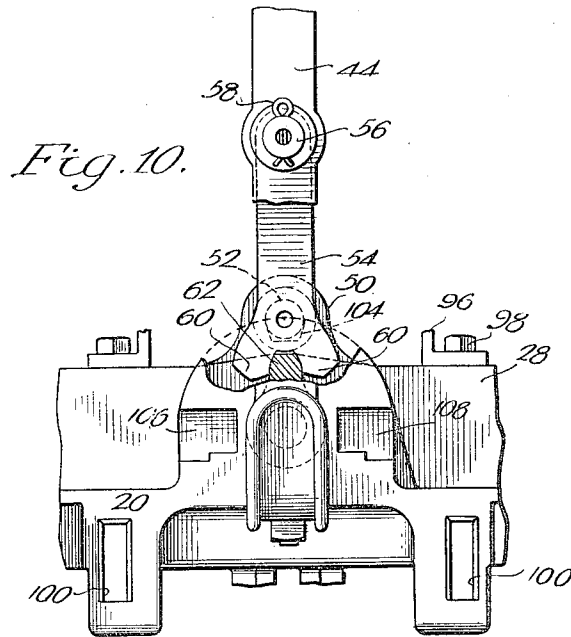
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APPLICATION FILED NOV. 14, 1914.

Patented May 25, 1915.
7 SHEETS—SHEET 6.



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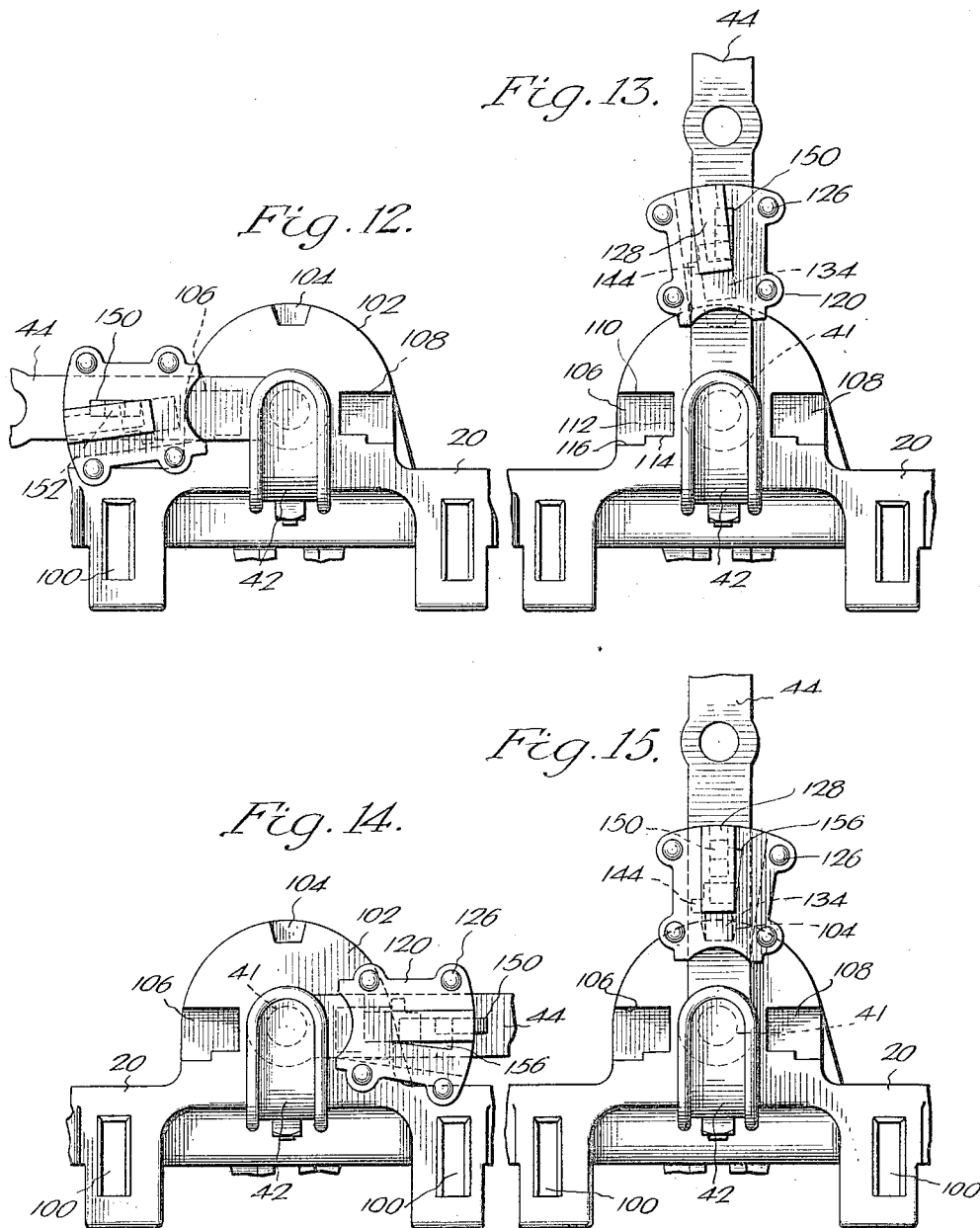
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 APPLICATION FILED NOV. 14, 1914.

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Patented May 25, 1915.

7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

EUGENE M. ROBINSON, OF CHICAGO, ILLINOIS.

SWITCH MECHANISM.

1,140,916.

Specification of Letters Patent.

Patented May 25, 1915.

Original application filed February 21, 1910, Serial No. 545,059. Divided and this application filed November 14, 1914. Serial No. 872,112.

To all whom it may concern:

Be it known that I, EUGENE M. ROBINSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Switch Mechanism, of which the following is a specification.

This invention relates to switch stand devices used upon railways to move, control and lock an adjacent switch, the same being a division made by requirement of the examiner from application 545,059, filed February 21, 1910.

The object of this invention is to provide a simple device of this class which can be easily and cheaply made and installed, is satisfactory in operation and is not readily liable to get out of order and also to make one which shall have the other advantages hereinafter pointed out.

The invention consists in the mechanism for carrying out the foregoing objects hereafter described and claimed.

Referring to the drawings:—Figure 1 is a plan view of the device showing the preferred form of the invention, in which the parts are in the position which they assume when the main track is clear and the distant signal is set at safety. Fig. 2 is a similar plan view of the same parts as in Fig. 1, showing the position which said parts assume when they are all at their extreme opposite positions in which the distant signal has been set at "safety" and the switch point has been completely thrown from main track position to side track or switching position. Fig. 3 is a front view of the device taken in the direction of the arrow 3, Fig. 1. Fig. 4 is a vertical sectional detail view on approximately the line 4—4 of Fig. 1, but with the switch lever proper in mid throw position. Fig. 5 is a perspective detail view of a cam device for controlling the movement of the target. Fig. 6 is a perspective detail view of an intermediate link of the lever operating mechanism. Fig. 7 is a detail view on the line 7—7, Fig. 1, but with the lever in mid throw position. Fig. 8 is a side detail view of the latch member. Fig. 9 is a plan view of the same part shown in Fig. 8. Fig. 10 is a detail view of the operating lever mechanism, the lever being in the mid throw position, the latch member being removed to facilitate clearness of description. Fig. 11 is a view similar to Fig.

10, showing the lever mechanism in its extreme position opposite to the position of Fig. 3. Figs. 12, 13, 14 and 15 illustrate different positions assumed by the latch member as the operating lever moves to different positions.

The general frame casting 20 is secured to railroad ties 22 by spikes 24, and is, for convenience, made of quite an irregular shape comprising various specific parts, some of which will hereafter be given different numerals. Slidably mounted in a suitable recess 26 in this case casting is a locking bar 28. This locking bar has between its ends an enlarged central portion comprising the lug 50 and the detachably secured member 96, hereafter referred to, from which the ends proper, of the bar 28, extend horizontally and are guided by the sides of the slot 26 in the rigid base. Pivoted near one end of the frame casting 20 and adjacent to this recess 26 upon a pin 30 is a lever 32 having its opposite ends connected by wires 34, or the like, to any suitable distant signal, adapted, when operated, to indicate to a train approaching at a distance the condition of the switch controlled by this mechanism. In one arm of this lever 32 is an escapement or L shaped slot 38 of ordinary construction in which a pin 40 upon the adjacent locking bar 28 is adapted to travel. As shown in Figs. 1 and 2, the short arm of this L slot runs along the axis of the lever 32, while the longer arm of the slot lies in substantially the central plane of the locking bar 28 when the lever 32 is in the position of Fig. 2. The lever 32, the locking bar 28 and the slot 38 are so arranged with reference to each other and with reference to the distant signal that, when the parts are in the position of Fig. 1, the distant signal is in a position to indicate "safety" at the point controlled by the device here in question. When the locking bar 28 has been moved sufficiently so that the lever 32 assumes the position of Fig. 2 with the long arm of L slot 38 in line with locking bar 28 the distant signal indicates "danger" at the point controlled by this mechanism irrespective of the position of pin 40 in the longer arm of L slot 38. In other words, when the lever 32 has been moved to the position of Fig. 2, the locking bar 28 may be moved backward or forward a distance equal to the length of the longer arm of slot 38 without in any way affecting

the distant signal and it will also be seen that when the pin 40 is in any portion of the long arm of slot 38 this lever 32 is locked by pin 40 so that it cannot possibly be rotated about its axis 30 from which it follows that the distant signal is thus effectually locked at "danger."

Pivottally mounted in the base or frame casting 20 by the aid of pin 41 and a suitable extending bracket, bearing support or pillow-block 42 is a switch lever 44 of ordinary size and any convenient shape carrying at its outer end the usual weight 46. Rising from the locking bar 28 is a lug 50 in which is journaled a pin 52 on an intermediate link 54, best seen in Fig. 6, whose opposite end carries another pin 56 which is inserted in and journaled in switch lever 44, being secured in position by the cotter 58. Upon the end of intermediate link 54 nearest to pivot 52 are two ratchet teeth 60 adapted to mesh and engage with a stationary tooth 62 directly behind member 102. The parts are so shaped that when the lever 44 is at one extreme limit of its throw they assume the position shown in Fig. 3 and that when the lever is moved to the opposite extreme limit of its throw they assume the position shown in Fig. 11, the intermediate position through which the parts pass, in being moved from the position of Fig. 3 to that of Fig. 11 or vice versa, being shown in Fig. 10. The advantage of this construction of switch lever, intermediate link and gear teeth lies in the fact that there is no dead center existing in any position which these parts just described assume so that the lever 44 can be thrown over by a movement of locking bar 28. This situation saves breakage of the parts described in the event of the switch controlled by this stand being "run through" as will more fully appear hereafter.

In another part of the frame casting 20 is a vertical hub 66 in which is journaled a vertical shaft 68 to which an ordinary target, not the same one here shown, may be attached in the ordinary manner. Rigidly secured upon this vertical shaft 68 is a crank arm 70 carrying a crank pin 72 adapted to lie adjacent to the vertical face 74 of locking bar 28 and be engaged by lug 76 upon one end thereof, as shown in Fig. 2, and be driven into notch 78 in the face of said bar. The notch 78 and the lug 76 are so shaped and located with reference to this lever arm 70 and this pin 72 that during the time the switch lever 44 is operating the distant signal in the manner heretofore described the locking bar will exert no influence upon this pin and crank, but as soon as the longer arm of the L slot 38 is brought into line with the locking bar 28 the lug 76 will engage the pin 72 and gradually rotate the crank 70 to the position of Fig. 2. Also rigidly mounted

upon the shaft 68, preferably so as to form a bell crank arm rigid with crank arm 70, heretofore described, is another lever arm 80 to which is attached switch rod 82 or switch actuator leading to the adjacent switch point, not shown, which is to be operated by this mechanism. The parts heretofore described are so shaped and arranged that as locking bar 28 moves the length of the longer arm of escapement L slot 28 this switch rod 82 is moved a sufficient distance to throw said adjacent switch point from "closed" position to "opened" position or from main track to switch track position. Rigidly attached to the switch point which is controlled by the switch rod 82 is a locking rod 84 which interfits with locking bar 28, as shown at 81, Fig. 4; the same in the particular case here illustrated being notched engagement, fully shown, described and claimed in my two prior Patents, No. 759,634, issued May 10, 1904, and No. 778,336, issued December 27, 1904; to prevent the switch point from being moved except when the distant signal is at a position to indicate "danger" and conversely to prevent the distant signal from being set to safety except when the switch point is locked. In other words, the initial movement of the switch lever 44 in moving locking bar 28, sets the distant signal to indicate "danger" and unlocks locking rod 84 and consequently the switch point, while the reverse movement of the lever 44 securely locks said locking rod 84, this latter reverse movement being prevented if the switch is not in fact closed or at safety so that notches 81 are fully in register as more fully appears in said prior patents. Target 86 is mounted on a hollow sleeve 88, on the shaft 68, and is operated by crank arm 90 having crank pin 92 traveling in an escapement slot 94 in member 96 attached to locking bar 28 by bolts 98 as more fully appears in said original application.

Slots 100 are provided on opposite sides of the center of the switch stand for the guidance and support of the rod 84 but only one set of these slots is used at a time, they being provided so that the base casting may be used in assembling either a right hand or left hand stand.

Rising from the base or frame casting proper and immediately beyond the switch lever 44 is a semi circular block 102 having in its top a V shaped notch 104 and in its opposite sides, as best seen in Figs. 13 and 15, two relatively large notches 106 and 108 formed in the lines 110, 112, 114 and 116, as shown. In order that the stand may be put together as a right or left handed stand, as desired, these last two notches are made of the same size and shape. Inclosing the switch lever 44 and slidable thereon is a latch block or dog 120 shown

in particular detail in Figs. 8 and 9, the block proper having within it a wedge shaped recess 122 closed by a face plate 124 secured in position by rivets 126. On this face plate 124 is a U shaped lug 128 designed to act as a guard for the padlock and as a handle, the same having within it a recess 130 opening into a recess 122, as shown. Thus lug 128 is also opened up by having a notch 132 visible in Figs. 1 and 2 formed therein so as to permit movements hereafter described.

On the rear of this latch member 120 is a lug 134 of rectangular form following the dotted lines 136, 138, 140 and 142 of Fig. 8. Projecting from one side and mid way of this lug 134 is a side lug 144. The main lug 134 is of such a size that, as shown in Fig. 13, it may enter notch 104, that as shown in Fig. 3, it may enter notch 106, and that, as shown in Fig. 2, it may partially enter notch 108, complete entrance in the latter notch being prevented purposely by the engagement of said side lug 144 with the upper corner of notch 108.

Rigidly mounted upon the front of switch lever 44 is a padlock lug 150 having through it a hole 152 through which padlock 154 may be inserted when all of the parts of the device are in the position shown in Fig. 1. This padlock lug 150 is of such a thickness and of such a size that, owing to the presence of recess 130 heretofore described, the latch dog may pass partially over this padlock lug from the position shown in Fig. 1 to that shown in Fig. 12, in which latter position the latch dog is hooked upon this padlock lug by means of the notched faces 156 formed, as best seen in Fig. 8, upon the interior of the latch dog, this situation being provided for by making the two interior faces 160 and 162 of the latch dog 120 tapering with reference to each other, as shown.

The operation of this locking dog device is as follows:—When all of the parts of the switch stand device are in the position shown in Fig. 1 the lug 134 is substantially wholly within notch 106 in semi circular member 102 so that padlock 154 can be inserted in hole 152, as shown, thereby locking the entire device in the position of Fig. 1, in which position, as heretofore described the distant signal is at safety. The operator now removes padlock 154 from padlock lug 150, takes hold of handle 128 and moves the entire latch member to the left in Fig. 1 to the position shown in Fig. 12, and in which position the latch dog entirely incloses or guards the padlock lug and the lug 134 is entirely clear of semi-circular member 102, the latch member being hooked upon and supported by the padlock lug, as shown. The operator now takes hold of switch lever 44 and moves it first to the position shown in Fig. 13, in

which the latch dog is directly over notch 104 but owing to the fact that the latch dog is hooked and supported upon the padlock lug it does not drop down into engagement with notch 104. During this motion just described the distant signal has been moved from safety to danger but the switch point has not been affected and the switch point lock device at 81 is opened. The operator then continues the movement of lever 44 from the position of Fig. 13 to that of Fig. 14, in reaching which the latch dog drops off from the padlock lug, and as the latch approaches the upper edge of notch 108 it can be moved into said notch to the position of Fig. 14 but it cannot, because of the engagement of side lug 144 with the upper corner of notch 108, enter said notch a sufficient distance to uncover padlock lug 150 and permit padlocking of the switch stand. In other words, during the last mentioned half movement of the switch lever 44 the device has set the switch point from main track or "safety" position to side track or "danger" position, and the object of this construction is to prevent the operator's inadvertently padlocking the entire switch stand while the distant signal is set at "danger" and the switch point is in fact at "danger" or side track position, the inability to so padlock the stand warning the operator that he must not leave it in this condition. When now the operator starts to move the switch lever from the position of Fig. 14 back toward the starting point, the latch dog is no longer hooked upon the padlock lug, and in passing notch 104 the dog drops therein, as shown in Fig. 15, thereby warning the operator that if he continues said motion of the switch lever 44 he will begin to set the distant signal to "safety". The advantage of this construction is that the operator may oscillate the switch lever 44 between the positions of Figs. 14 and 15, thereby repeatedly setting the switch point controlled by the device from main track to side track position or vice versa as switching operations may require under the protection of the distant signal set at "danger", and that as soon as he reaches the position of Fig. 15 he is warned by the automatic latching of the latch dog 104 not to swing the lever 44 past the position of Fig. 15, thereby affecting the distant signal, until such time as he is ready to permanently return the lever to the position of Fig. 1 and padlock it, thus setting the distant signal to "safety". This latching at the position of Fig. 15 is also of use in rendering the switch point safe for passage of wheels of cars being switched.

To summarize the foregoing descriptions of operation, it will be seen that whenever the operator unlocks the device while in the position of Fig. 1 and gives the switch

lever 44 a half stroke movement he first sets the distant signal from "safety" to "danger"; that continuing said movement of the switch lever to full stroke, he sets the switch point controlled by the device from main track to side track or from "safety" to "danger" position, the lever being latched so as to afford safe movement of wheels over the switch point but it cannot be padlocked in that position; that the operator may then, by oscillating the switch lever through the second half of its stroke, repeatedly set the switch point from side track to main track and vice versa, being warned each time he sets the device to main track position not to affect the distant signal until he is through with the switching operation and that he may then return the switch lever to original position, thereby setting the distant signal from danger to safety and bolt locking the switch by engagement of the lock bar and lock rod and that he may then padlock the entire stand in that position, said padlocking being only possible in that one position.

If when the switch stand has been set to such a position that the switch point is set for the side track, a train on the main track runs through the switch stand, the force at the switch point is communicated through rod 82 to locking bar 28, and thus throws lever 44. In the particular construction, here illustrated, this running through of the switch can only take place when the switch point is in the position named; because in the particular case, here illustrated, when the switch point is set for main track, the form of the escapement slot is such that it prevents the crank pin from turning when the switch point is run through in main track position. The locking device also in this position prevents the running through of the device without breaking anything.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In mechanism of the class described, the combination of a pivoted lever, a reciprocable bar and an intermediate connecting mechanism comprising a connected link and guiding device therefor arranged to be operated either by moving the lever or bar as desired.

2. In mechanism of the class described, the combination of a fixed support, a pivoted lever, a reciprocable bar, an intermediate connecting link pivoted to the bar and to the lever, one end of the link engaging with the fixed support for the purposes set forth.

3. In mechanism of the class described, the combination of a fixed standard, a lever pivotally mounted on said standard, a bar to be reciprocated, mounted to slide transversely of said standard, an intermediate link pivoted upon said lever and pivoted upon

said bar, the pivot upon the bar being relatively nearer to the main pivot of the lever than the pivot of the intermediate link upon the lever, and gear teeth upon the end of the intermediate link which is adjacent to the pivot of the lever being adapted to engage a part of the fixed standard, to operate as described for the purposes set forth.

4. In a device of the class described, a switch lever, a fixed member adjacent thereto, a latch dog slidably mounted upon the switch lever adapted to selectively engage notches in said fixed member, and mechanism permitting locking of said latch dog in engagement with one of said notches while preventing said locking in all other positions of the lever.

5. In mechanism of the class described, the combination of a pivoted switch lever, a fixed member adjacent thereto, provided with notches therein, a latch dog carried by the switch lever adapted to enter said notches, a padlock lug carried by said switch lever and adapted to be covered by the latch dog in moving along the lever, the dog and padlock lug being so shaped and arranged that when the dog is in engagement with one of the notches upon the circular member the padlock may be inserted through the padlock lug to lock the lever, and that this action is prevented in all other positions of the device.

6. In a device of the class described, a switch lever, a latch dog having a wedge shaped opening through which the lever passes, the dog being slidable upon the lever, a lug upon the lever adapted to enter a recess within the lever, and be hooked therein for the purposes set forth.

7. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base, and connected with the switch actuator, a member reciprocally mounted on said base and having means for actuating and locking said pivoted member, a bracket supported by and secured to said base, and means retained by said bracket for actuating said reciprocatory member.

8. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base and connected with the switch actuator, a member reciprocally mounted on said base and having means for actuating and locking said pivoted member, a bracket, supported by and secured to said base, a crank revolvably retained by said bracket having means for actuating said reciprocatory member, and means for actuating said crank.

9. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base and connected with the switch actuator, a member reciprocally mounted on said base and hav-

ing means for actuating and locking said pivoted member, a bracket supported by and secured to said base, a crank revolubly retained by said bracket having means for
 5 actuating said reciprocatory member, and a lever connected with said crank for actuating same.

10. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base and connected with the switch actuator, a member reciprocatively mounted on said base and having means for actuating and locking said
 15 pivoted member, a bracket supported by and secured to said base, a crank revolubly retained by said bracket having means for actuating said reciprocatory member, a lever connected with said crank for actuating same, and means for locking said lever in
 20 its set positions.

11. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base and connected with the switch actuator, a member reciprocatively mounted on said base and having means for actuating and locking said
 25 pivoted member, a bracket supported by and secured to said base, a crank revolubly retained by said bracket having means for actuating said reciprocatory member, and a lever connected with said crank for actuating same and having its free end
 30 weighted.

12. In a switch-stand, the combination with an actuator for the switch, of a base, a member pivoted to said base and connected with the switch-actuator, a member reciprocatively mounted on said base and having means for actuating and locking said

pivoted member, a bracket supported by 40 and secured to said base, a crank revolubly retained by said bracket having means for actuating said reciprocatory member, a lever connected with said crank for actuating same and having its free end weighted, and 45 means for locking said lever in its set positions.

13. In a device of the class described, the combination of a switch stand, a lever movable with reference thereto through an arc of about 180 degrees substantially parallel to the track to which the stand is to be applied, means for latching and padlocking said lever in its main track position, a member reciprocatable in the switch stand movable between two positions by said lever, a switch point movable through the agency of a crank having escapement engagement with the reciprocatable member in such a manner that said reciprocatable member 60 may move under the action of said lever even after the switch has been closed; that is to say returned, from open to closed or main track position, a member attached to and moving with the switch point obstructing the path of the reciprocatable member 65 and preventing movement of the reciprocatable member and the lever to the position where the latter may be latched and padlocked unless the switch point is actually in proper safe relation with the main rail. 70

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

EUGENE M. ROBINSON.

Witnesses:

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SELINA E. HIGGINS.