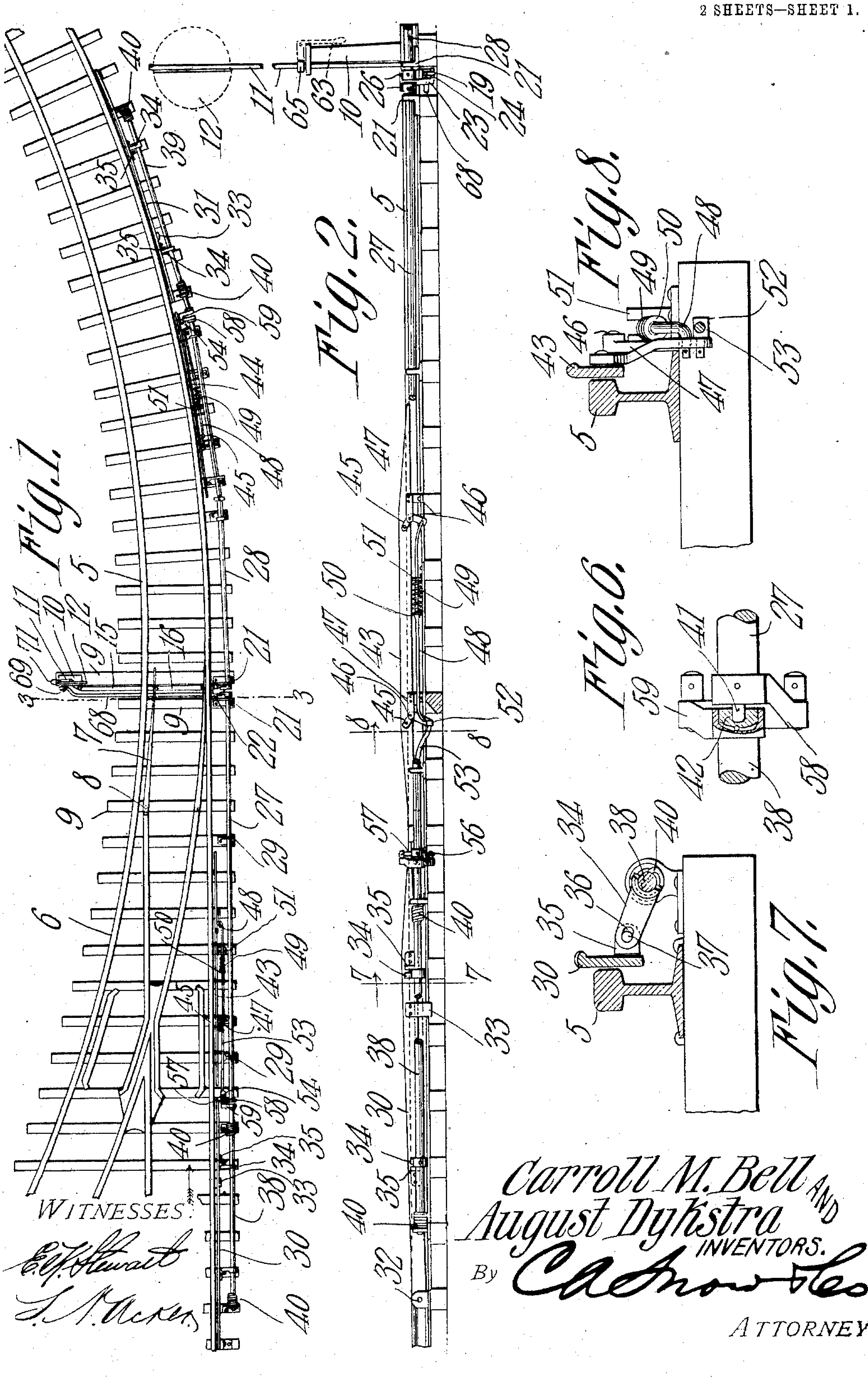
No. 864,879. PATENTED SEPT. 3, 1907.

C. M. BELL & A. DYKSTRA.

AUTOMATIC SWITCH MECHANISM.

APPLICATION FILED JUNE 26, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

E. F. Stewart

S. N. Acker

Carroll M. Bell AND August Dykstra INVENTORS.

By C. A. Snow & Co.

ATTORNEYS

No. 864,879. PATENTED SEPT. 3, 1907.

C. M. BELL & A. DYKSTRA.

AUTOMATIC SWITCH MECHANISM.

APPLICATION FILED JUNE 26, 1907.

2 SHEETS—SHEET 2.

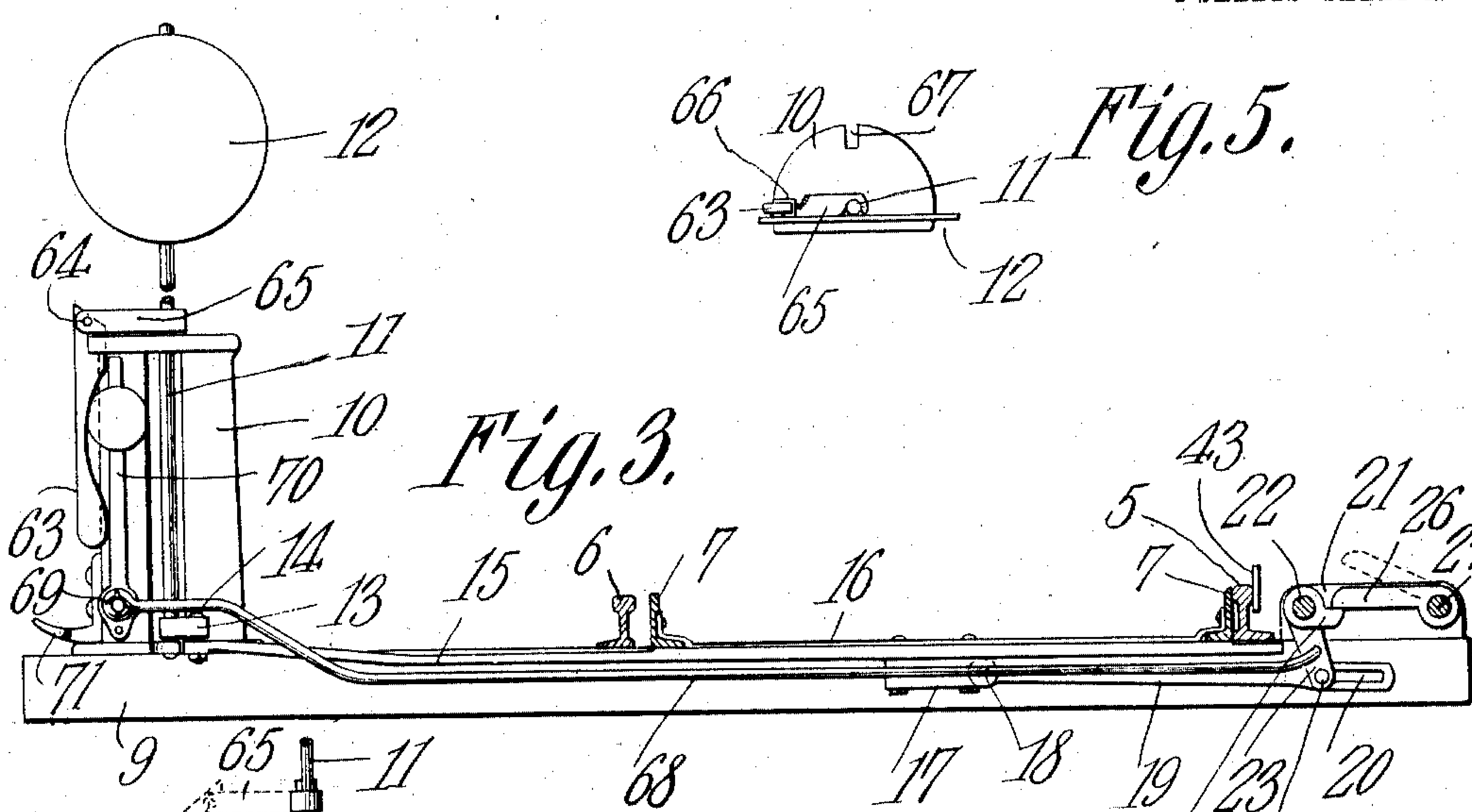


Fig. 5.

Fig. 3.

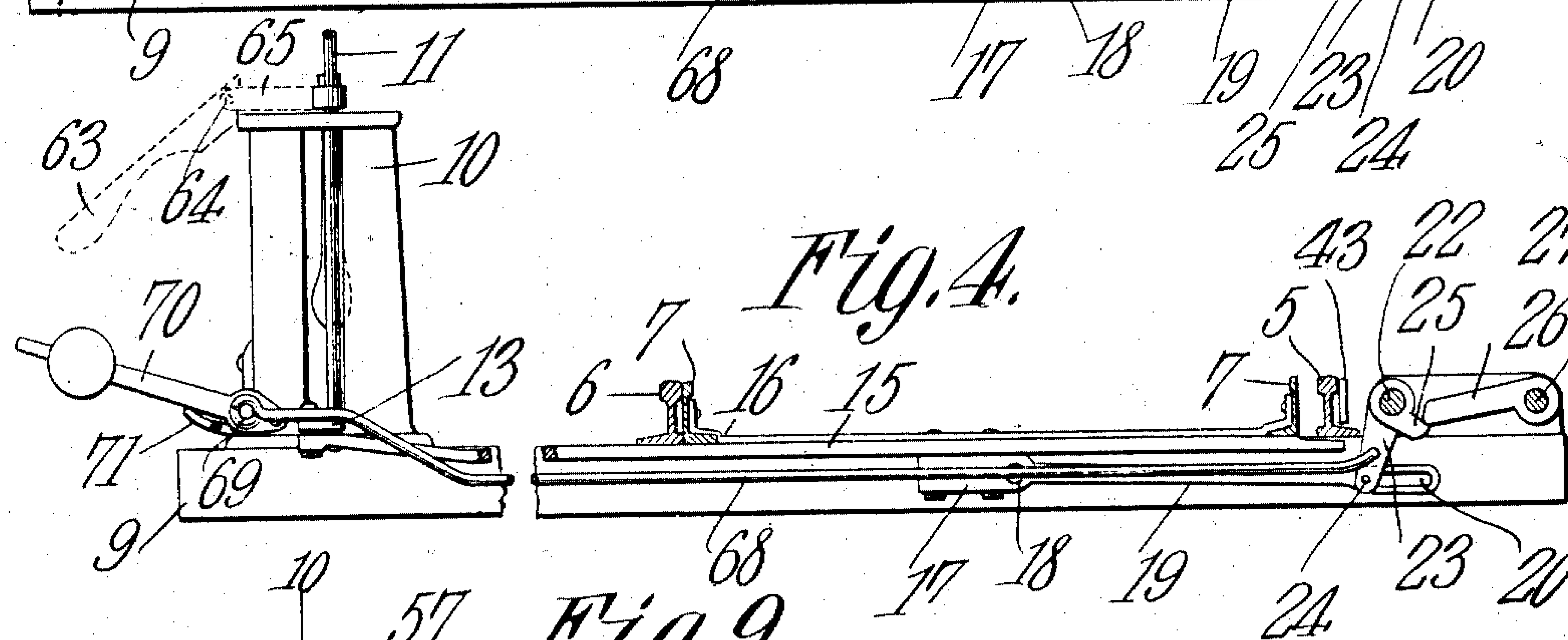


Fig. 4.

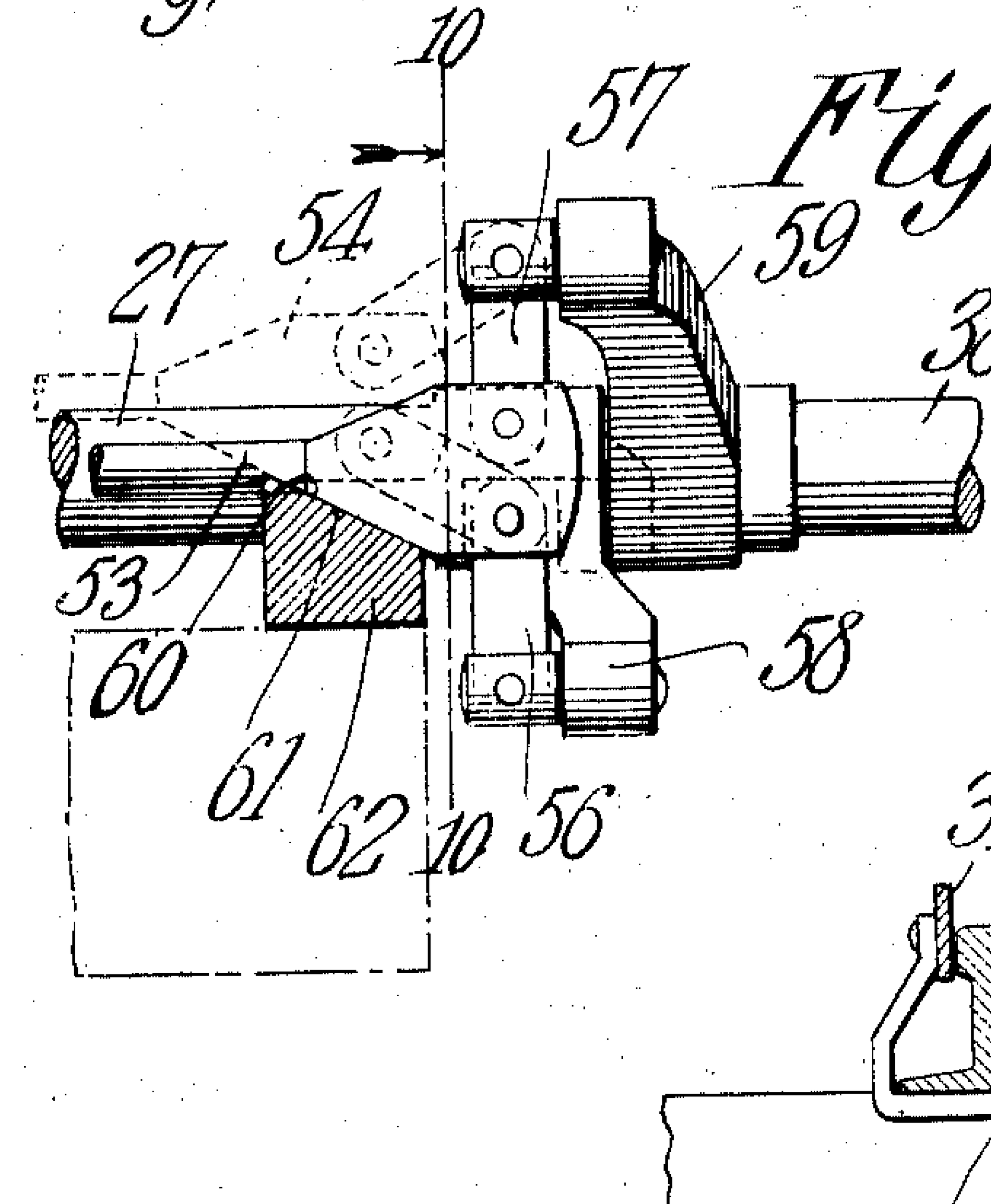


Fig. 9.

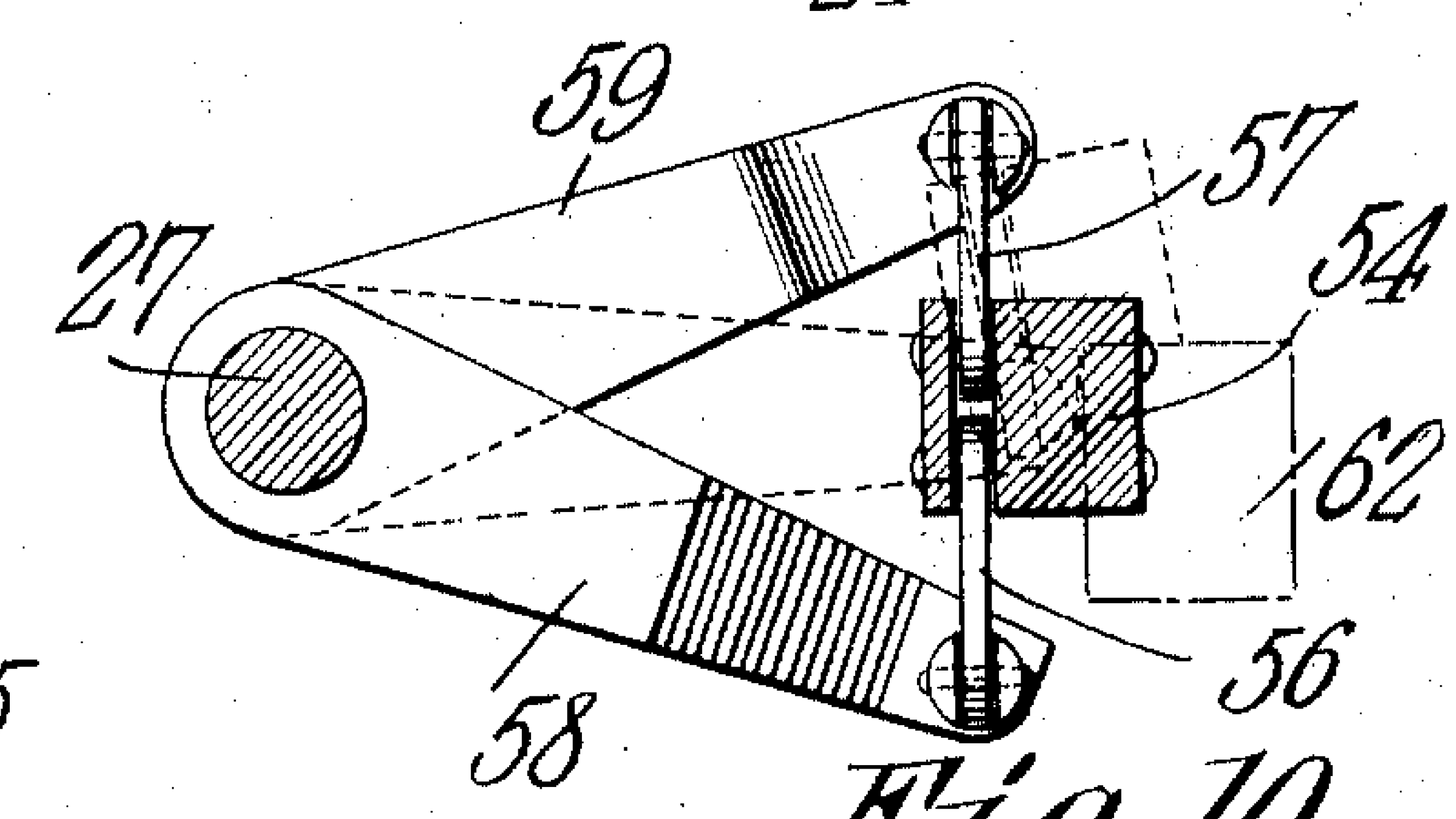


Fig. 10.

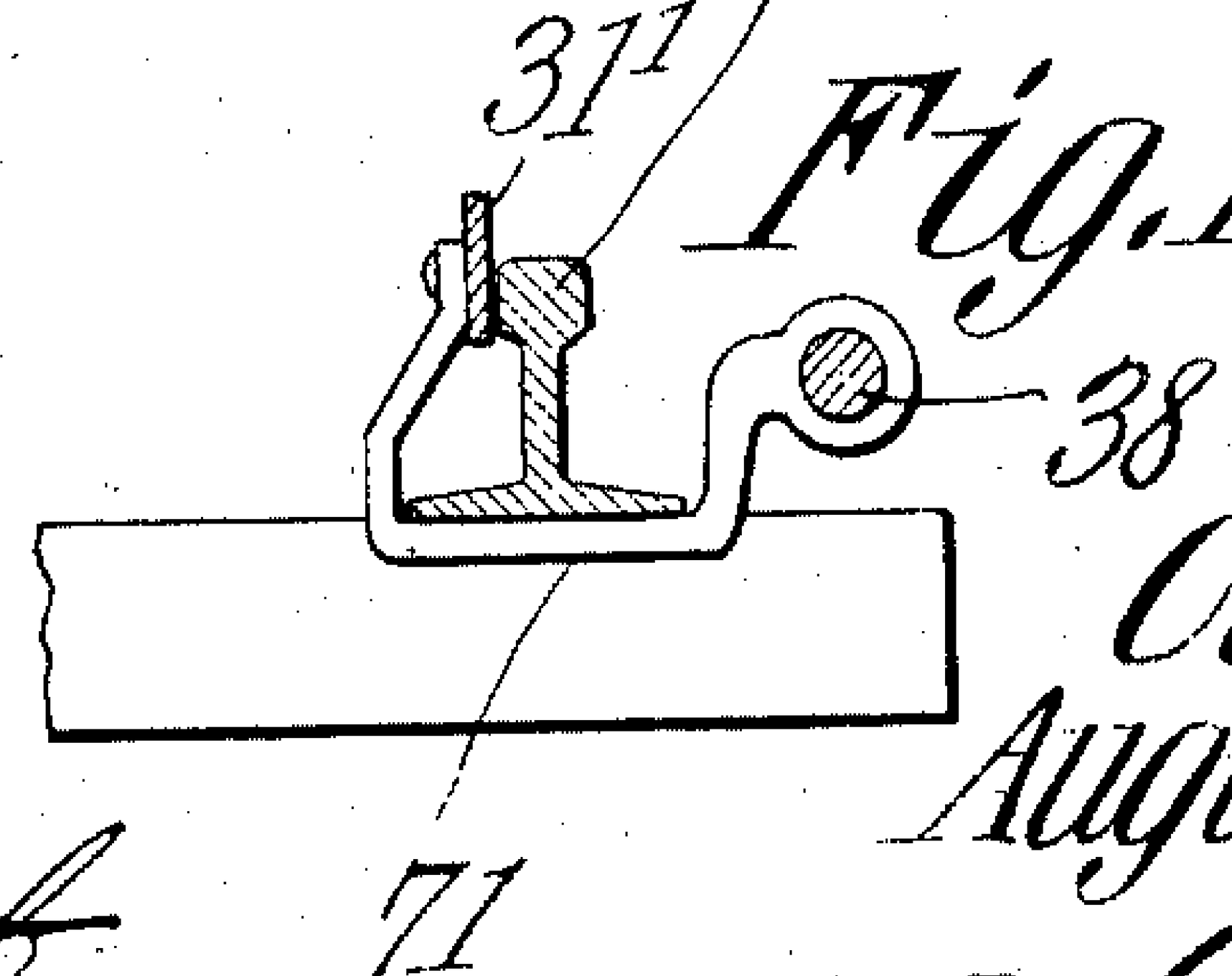


Fig. 11.

WITNESSES:

E. F. Stewart

L. N. Acker

Carroll M. Bell AND August Dykstra INVENTORS.

By C. A. Snow & Co

ATTORNEYS

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CARROLL M. BELL AND AUGUST DYKSTRA, OF GOODLAND, INDIANA.

AUTOMATIC SWITCH MECHANISM.

No. 864,879. Specification of Letters Patent. Patented Sept. 3, 1907.

Application filed June 26, 1907. Serial No. 380,928.

To all whom it may concern:

Be it known that we, CARROLL M. BELL and AUGUST DYKSTRA, citizens of the United States, residing at Goodland, in the county of Newton and State of Indiana, have invented a new and useful Automatic Switch Mechanism, of which the following is a specification.

This invention relates to automatic switches for railways and has for its object to provide improved mechanism for effecting the closing of a switch should the latter be accidentally or otherwise left open thereby to prevent derailment of the train with a consequent loss of life or injury to the passengers.

A further object of the invention is to provide a track device operable by the wheels of a passing train to effect the closing of the switch when the train is traveling in either direction.

A further object is to provide a sectional operating shaft having terminal crank arms for engagement with the crank arms of a counter shaft, said main shaft being operatively connected with the trip bars of the track device whereby when the trip bars on either side of the switch stand are depressed the crank arms of the counter shaft will move the switch to closed position.

A further object is to arrange the trip bars in such a manner that the train may enter or leave a siding without effecting the movement of the switch.

A still further object of the invention is to generally improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

In the accompanying drawings forming a part of this specification: Figure 1 is a top plan view of an automatic switch operating mechanism constructed in accordance with my invention. Fig. 2 is an enlarged side elevation of a portion of the track showing the construction of the actuating and cut out trips. Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1 showing the switch in open position. Fig. 4 is a similar view showing the sections in closed position. Fig. 5 is a top plan view of the switch stand. Fig. 6 is a detail side elevation partly in section showing the connection between the sections of the operating shaft. Fig. 7 is a transverse sectional view taken on the line 7—7 of Fig. 2. Fig. 8 is a sectional view taken on the line 8—8 of Fig. 2. Fig. 9 is a side elevation of the link or toggle connection. Fig. 10 is a transverse sectional view taken on the line 10—10 of Fig. 9. Fig. 11 is a transverse sectional view illustrating a modified form of the invention.

Similar numerals of reference indicate corresponding parts in all of the figures of the drawings.

The improved switch operating mechanism forming the subject matter of the present invention is principally designed for use in connection with steam railways and by way of illustration is shown applied to a rail-way of the ordinary construction in which 5 designates the main line, 6 the siding and 7 the switch points pivotally mounted at 8 on one of the cross ties, as shown. Secured to an extension 9 of one of the cross ties is a switch stand 10 having a vertically disposed rod or shaft 11 mounted for rotation therein and provided with a semaphore arm or signal 12 of any approved construction. Extending laterally from the lower end of the shaft 11 is a crank arm 13 to which is pivotally connected at 14 a bridge bar 15, the latter being disposed between the adjacent cross ties 9 and extended beneath the main rails 5 for connection with the switch points 7. The switch points 7 are connected by a tie bar 16, which latter is bolted or otherwise rigidly secured to the switch points and also to the intermediate portion of the bridge bar 15 so as to properly space the switch points and cause the same to move in unison when the bridge bar is actuated.

Bolted or otherwise rigidly secured to the lower face of the bridge bar 15 is a depending block 17 to which is pivotally connected at 18 one end of a relatively short rod section 19, the opposite end of which is provided with an elongated slot 20. Secured to the cross ties on the opposite side of the track from the switch stand 10 are spaced plates or brackets 21 in which is journaled a stub shaft 22 having a depending crank arm 23 the free end of which is provided with a laterally extending pin 24 which projects within the slot 20 for the purpose hereinafter referred to. Keyed or otherwise rigidly secured to the counter shaft 22 is a tappet 25 which is operated by the terminal actuating fingers 26 of a main operating shaft thereby to effect the closing of the switch. The main operating shaft is preferably formed in two sections 27 and 28 one end of each of which is journaled in the adjacent plate or bracket 21 while the opposite end thereof is journaled in suitable bearings 29 mounted on some of the cross ties, as shown.

Arranged on each side of the switch stand 10 and disposed parallel with the main rail 5 are actuating trips 30 and 31 adapted to be depressed by the wheels of a passing train for closing the switch. The actuating trips 30 and 31 are preferably in the form of longitudinal bars one end of each of which is pivotally mounted in a bracket 32, while the opposite end thereof projects slightly above the tread surface of the adjacent rail and in the path of movement of a passing train so that the weight of the cars will depress the trips and through the medium of the operating shaft and trip fingers 26 move the switch to closed position, in the manner hereinafter described. Depending from the

trips 30 and 31 are hangers 33 having laterally extending arms which project beneath the adjacent rail and which by engagement with said rail serve to limit the upward movement of the trip bars.

The trip bars 30 and 31 are operatively connected with the adjacent sections of the operating shaft by means of the crank arms 34 which are pivotally connected with lugs 35 extending laterally from one side of each trip bar, as shown, there being elongated slots 36 formed in the crank arms 34 for the reception of the pivot pins 37 whereby the trip bars may be elevated and depressed without danger of binding or buckling.

The sections 27 and 28 of the main operating shaft are provided with auxiliary sections 38 and 39 which carry the crank arms 34 and are each provided with one or more coiled springs 40 which serve to normally and yieldably support the actuating trips in elevated position above the tread surface of the adjacent rail. The inner ends of the auxiliary shaft sections 38 and 39 are formed with reduced extensions 41 which fit in correspondingly shaped sockets 42 formed in the adjacent shaft sections so as to permit the several shaft sections to rotate independently of each other.

Disposed parallel with the main rails and interposed between the actuating trips and the switch stand are depressible cut-out trips 43 and 44. The cut-out trips or bars 43 and 44 are provided with bell crank levers 45 which are pivotally mounted at 46 on suitable brackets 47 secured to the adjacent cross ties, the long arms of the bell crank levers being connected by a longitudinally disposed rod 48 provided with a coiled spring 49 for yieldably supporting the adjacent cut-out bar or trip in elevated position above the tread surface of the adjacent rail. The spring 49 is interposed between an annular shoulder 50 on the rod 48 and a stationary bracket 51 carried by one of the cross ties so that when the cut-out bar or trip is depressed by a passing train the spring will automatically return said cut-out bar or trip to elevated or operative position. The long arm of one of the bell crank levers 45 is provided with a laterally extending lug 52 in which is journaled the adjacent end of a rod 53 the opposite end of which is provided with an enlarged head 54 having links or toggles 56 and 57 pivotally connected therewith. The link or toggle 56 is pivotally connected with the adjacent crank arm 58 of one of the sections of the operating shaft while the link or toggle 57 is pivotally connected with a similar crank arm 59 of the adjacent section. By having the rod 53 connected with the main operating shaft by the link or toggle connection the actuating trip may be depressed without effecting the movement of the cut-out trip.

The head of the rod 53 is provided with a cam face 60 which bears against a correspondingly inclined or cam face 61 of a supporting block 62, the latter being secured to one of the cross ties of the track, so as to prevent the cut-out springs 49 from throwing the switch when the actuating trip is depressed and the cut-out bar released.

It will thus be seen that when the train passes over the trip 30 or 31 the several sections of the operating shaft will be rotated so as to depress the actuating fingers 26 and cause the same to engage the tappet 25 and through the medium of the crank arm 23 and bar 15 effect the closing of the switch.

It will also be seen that when the train passes over the cut-out trip the latter will be depressed against the tension of the springs 49 and through the medium of the rear toggle connection rotate the adjacent section of the operating shaft in the opposite direction so that the actuating fingers 26 will be moved to elevated position and prevent further movement of the switch.

As a means for manually operating the switch there is provided a hand operated lever 63 which is pivotally connected at 64 to an arm 65 carried by the rod or shaft 11, said operating lever 63 being adapted to engage spaced locking recesses 66 and 67 formed in the head of the switch for locking the switch in open or closed position independent of the automatic actuating mechanism.

When the operating handle 63 is in engagement with the recess 66 the switch is in open position but when the lever 63 is rotated on the switch head into engagement with the notch 67 the rod 11 will be correspondingly rotated and through the medium of the arm 13 and bridge bar 16 move said switch to closed position.

In order to insure the throwing of the switch when the actuating trips 30 and 31 are depressed, there is provided an actuating rod 68 one end of which is pivotally connected with the crank arm 23 while the opposite end thereof is pivotally connected at 69 to a weighted lever 70 carried by the switch stand. When the switch is in open position the weighted lever 70 is in vertical position and bears against the hand operated lever 63, as best shown in Fig. 3 of the drawings. As soon as the actuating trip is depressed, however the crank arm 23 will impart a longitudinal movement to the actuating rod 68 and thus throw the weighted lever 70 outwardly to the position shown in Fig. 4 of the drawings. The weighted lever in its outward movement will throw the hand lever 63 out of engagement with the adjacent locking notch 66 and cause the same to enter the locking recess 67 when the shaft or rod 11 is rotated.

The object of the weight on the lever 70 is to assist in holding the switch in closed position should for any reason the hand-operating lever 63 fail to engage the locking recess 67 in the switch stand.

The outward movement of the weighted lever 70 is limited by engagement with a bracket or arm 71 secured to one side of the switch stand and arranged in the path of movement of the weighted lever, as shown.

The operation of the device is as follows: Should the train be traveling in the direction indicated by the arrow in Fig. 1 of the drawing and the switch be accidentally or otherwise left open the wheels of the cars will depress the adjacent actuating trip 30 and through the medium of the operating shaft partly rotate one of the actuating fingers 26 so as to cause the same to depress the tappet 25 and actuate the bridge bar 15 to move the switch to closed position. When the train passes over the adjacent cut-out trip 43 the latter will be depressed against the tension of the spring 49 and by means of the toggle connection elevate the adjacent actuating finger 26 so as to prevent a further movement of the crank arm 23. When it is desired to enter the siding, the train will first depress the actuating trip bar 31 and then engage and depress the adjacent cut-out trip 44, the cut-out trip 44 preferably being of sufficient length to accommodate both trucks of the cars. When the cut-out bar 44 is depressed it elevates the adjacent trip finger 26

so that the brake-man is free to operate the lever 63 to effect the opening of the switch and permit the train to enter the siding. When it is desired to leave the siding the wheels of the car will engage the cut-out trip 44 and depress the same so that when the train passes over the adjacent actuating trip 31 the movement of the switch will not be effected and thus permit the train to pass onto the main track. As soon as the train clears the actuating trip 31 the coiled springs 40 will elevate the trip 31 and thus automatically effect the closing of the trip.

In Fig. 11 of the drawings there is illustrated a modified form of device in which the actuating and cut-out trips are arranged at the inner face of the rail instead of on the outer face thereof. In this form of the device the actuating trips 31′ are connected with the operating shaft through the medium of a yoke or bracket 71 which extends beneath the adjacent rail, as shown.

It will of course be understood that the track devices may be arranged on either side of the track and disposed at any desired distance from the switch stand.

From the foregoing description it is thought that the construction and operation of the device will be readily understood by those skilled in the art and further description thereof is deemed unnecessary.

Having thus described the invention what is claimed is:

1. The combination with the main rails and siding, of the switch rails, a stub shaft operatively connected with the switch rails and provided with a tappet, an operating shaft having terminal fingers for engagement with the tappet, and a track device for rotating the operating device to effect the closing of the switch.

2. The combination with the main rails and siding, of the switch rails, a main shaft operatively connected with the switch rails and formed of independent rotatable sections, actuating members operatively connected with some of the shaft sections for effecting the closing of the switch, and cut-out members connected with the adjacent shaft sections for holding the shaft in inoperative position when the actuating members are depressed.

3. The combination with the main rails and siding, of the switch rails, a main shaft provided with actuated fingers and formed of independent rotatable sections, a stub shaft operatively connected with the switch rails, depressible actuating members connected with some of the shaft sections for actuating the fingers to effect the closing of the switch, and depressible cut-out bars connecting the adjacent shaft sections for elevating the fingers when the actuating members are operated.

4. The combination with the main rails and siding, of a switch stand, a bridge bar connecting the switch rails and stand, a stub shaft provided with a tappet and having a depending crank arm, a weighted lever pivotally mounted on the switch stand, a rod forming a pivotal connection between the weighted lever and crank arm of the stub shaft, an operating shaft provided with actuating fingers for engagement with the tappet, and actuating trips operatively connected with the shaft for effecting the closing of the switch.

5. The combination with the main rails and siding, of the switch rails, a switch stand provided with a semaphore arm, a bridge bar forming a connection between the semaphore arm and switch rails, a stub shaft having a crank arm and provided with a tappet, a weighted lever pivotally mounted on the switch stand, a rod forming a connection between the crank arm and weighted lever, a hand operated lever connected with the semaphore arm and disposed in contact with the weighted lever when the switch is in open position, an operating shaft, and actuating trips operatively connected with the shaft for actuating the fingers thereby to close the switch.

6. The combination with the main rails and siding, of the switch rails, a switch stand having a rotatable semaphore arm, a bridge bar connecting the switch rails with one end of the semaphore arm, a rod section pivotally connected with the bridge bar and having a slot formed in one end thereof, a stub shaft provided with a depending crank arm operating within the slot of the rod section, a weighted lever, a rod forming a pivotal connection between the crank arm and the weighted lever, a tappet carried by the stub shaft, and track devices for actuating the tappet to effect the closing of the switch.

7. The combination with the main rails and siding, of the switch rails, a switch stand having a rotatable semaphore arm, a bridge bar forming a connection between the switch rails and one end of the semaphore arm, a rod section pivotally connected with the bridge bar and having one end thereof provided with an elongated slot, a stub shaft provided with a laterally extending pin working in the slot in the rod section, a weighted lever pivotally mounted on the stand, a rod forming a pivotal connection between the lever and stub shaft, a hand operating lever secured to the semaphore arm and normally resting against the weighted end of the lever, a tappet carried by the stub shaft, and a track device for depressing the tappet thereby to effect the closing of the switch.

8. The combination with the main rails and siding, of the switch rails, a stub shaft operatively connected with the switch rails and provided with a tappet, a sectional operating shaft provided with terminal actuating fingers adapted to engage the tappet, and spring actuated bars operatively connected with the operating shaft for effecting the closing of the switch.

9. The combination with the main rail and siding, of the switch rails, a sectional shaft operatively connected with the switch rails, a trip bar operatively connected with some of the sections of the shaft and actuated by a passing train to effect the closing of the switch, and a cut-out bar connected with the adjacent shaft sections.

10. The combination with the main rails and siding, of the switch rails, a sectional shaft operatively connected with the switch rails, a toggle connection between some of the sections of the shaft, a track device for rotating the shaft to effect the closing of the switch, and a cut-out device operatively connected with the toggle carrying sections.

11. The combination with the main rails and siding, of the switch rails, a stub shaft operatively connected with the switch rails and provided with a tappet, an operating shaft including main and auxiliary sections, an actuating finger carried by one end of each main section and adapted to engage the tappet for effecting the closing movement of the switch, auxiliary shaft sections pivotally connected with the main shaft sections, spring pressed actuating trips operatively connected with the auxiliary shaft sections for depressing the actuating fingers, cut-out trips operatively connected with the main shaft sections for elevating the fingers, and a toggle connection between the cut-out trips and auxiliary shaft sections.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

CARROLL M. BELL.
AUGUST DYKSTRA.

Witnesses:
Z. F. LITTLE,
H. C. CONSTABLE.