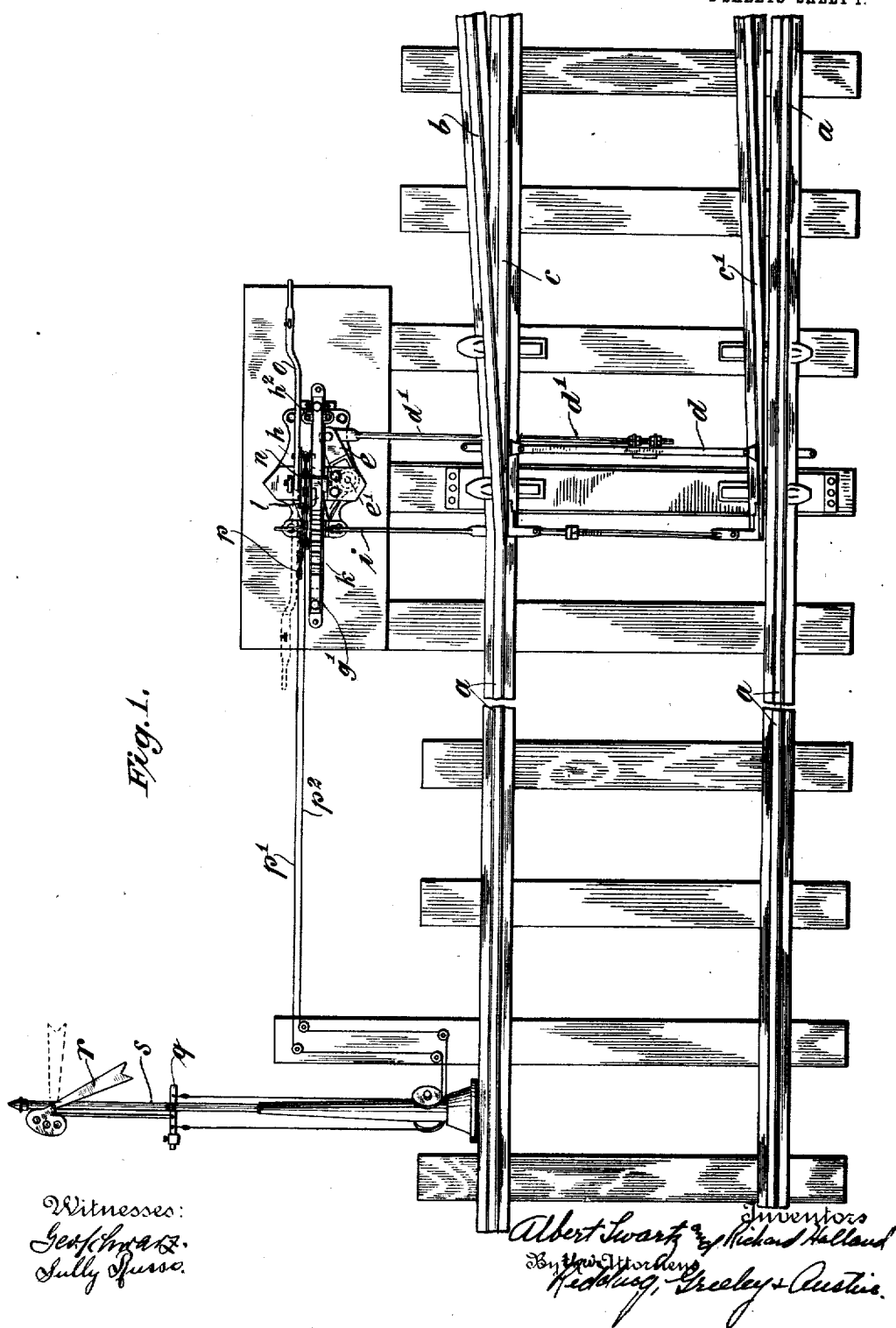


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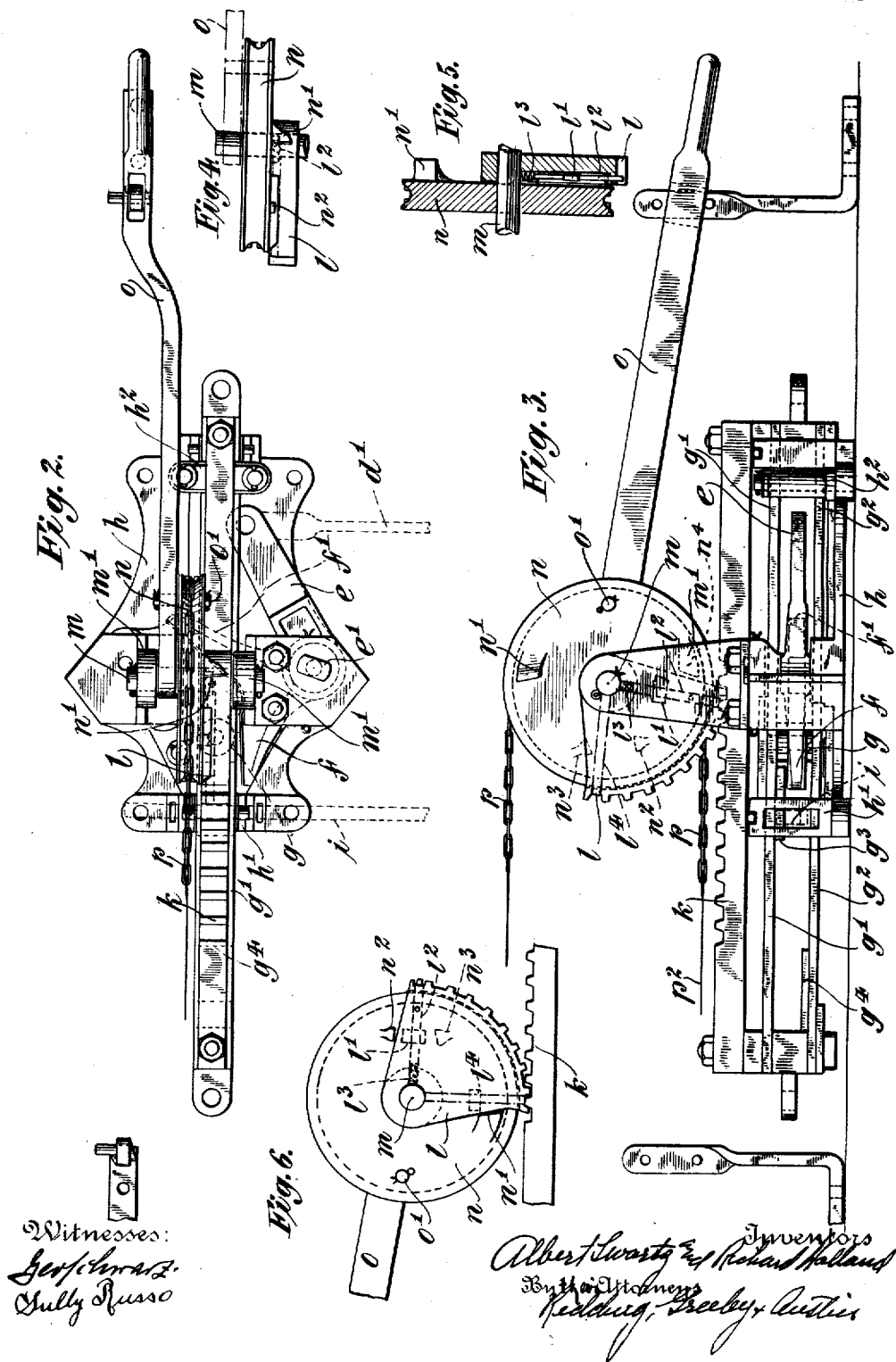
2 SHEETS—SHEET 1.



1,012,028.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

ALBERT SWARTZ AND RICHARD HOLLAND, OF HUNTINGTON, INDIANA.

SAFETY SWITCH AND SIGNAL DEVICE.

1,012,028.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed March 6, 1911. Serial No. 612,579.

To all whom it may concern:

Be it known that we, ALBERT SWARTZ and RICHARD HOLLAND, both citizens of the United States, and residing in Huntington, in the State of Indiana, have invented certain new and useful Improvements in Safety Switch and Signal Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object of this invention is to provide an improved mechanism for the operation of railway switches and distant signals, whereby, in the opening movement, the switch points shall remain locked in their closed position until the distant signal is set at "danger", and whereby, in the closing movement, the distant signal shall remain at "danger" until the switch points have been closed and locked.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a general top view of the rails, switch and operating mechanism, with the signal post in elevation. Figs. 2 and 3 are respectively a top view and a view in side elevation of the operating mechanism, on a larger scale than that of Fig. 1. Figs. 4, 5 and 6 are detail views illustrating the co-operation of the actuator and the gear segment hereinafter referred to.

The main line rails *a*, turn-out rails, one of which is shown at *b*, and the movable switch points *c* and *c'*, are arranged in any usual or suitable manner, the two movable switch points *c* and *c'* being shown as being held in proper relation to each other by a bar *d* from which connection is made by a rod *d'* to the switch operating lever *e*. The latter is also mounted, as usual, upon a vertical shaft or axis, as at *e'*, and has rigidly secured thereto the rocker jaws *f* and *f'*, so that the switch points are shifted in the usual manner by the movement of a roller *g* mounted in a longitudinally movable slide bar which preferably comprises upper and lower members *g'* and *g''*, between which the roller *g* is supported. The slide bar *g'*, *g''* is mounted in suitable guides *h'*, *h''* on the bed plate *h* and its members *g'* and *g''* are provided respectively with locking lugs *g'*³ and *g''*³ which coöperate respectively with the

usual notched locking bar *i*, shown in full lines in Fig. 1 and in dotted lines in Figs. 2 and 3. When the switch is closed, and the switch points are in the position shown in Fig. 1, the locking lug *g'*³ engages a notch in the upper side of the locking bar *i* and holds the switch points in the closed position, and when the switch is open, the locking lug *g''*³ then engages a notch in the underside of the locking bar *i* and holds the switch points in the open position.

The invention is concerned particularly with the means for operating the slide bar *g'*, *g''* and for operating the distant signal, all in such manner that the signal must be thrown to "danger" before the switch can be opened and must remain at "danger" until the switch has been closed and locked. As shown in the drawings, there is secured to the slide bar *g'*, *g''* a rack bar *k* which is engaged by a gear segment *l*. The latter is mounted loosely on a shaft *m* which is supported by suitable pillars *m'*. Also mounted on the shaft *m* so as to be movable independently of the gear segment, is a grooved disk or other actuator *n*, to which the switch operating lever *e*, mounted on or secured to the shaft *m*, may be secured by any suitable means, as by a pin *o'*. In order that there may be lost motion between the disk or actuator and the slide bar, that is, between the signal operating devices and the switch operating devices, there are provided on the side of the disk *n* two lugs *n'*, *n''*, preferably about 140° apart, to coöperate with and effect the desired movement of the gear segment *l*. The lug *n'* may coöperate directly with the adjacent side of the gear segment, but the lug *n''* is arranged to coöperate with a lug *l'* which travels with the gear segment but is movable in a radial direction into and out of the path of movement of the lug *n''*. For this purpose the lug *l'* is formed on or secured to a rod *l''* which is movable radially in suitable guides provided therefor on the gear segment *l*. The rod and its lug *l'* are pressed normally outward, from the center of the gear segment by a suitable spring *l''* and the rod is positioned between two of the teeth of the gear segment *l*, so that when such teeth are in engagement with the rack bar *k* the rod will be pressed backward, toward the center of the gear segment, by the intermediate tooth of the rack

bar k , thereby carrying the lug l' out of the path of the lug n^2 on the actuator n .

About the grooved disk n is passed a chain p , the ends of which are connected in the usual manner by wires p' and p^2 , having more or less slack, with the operating lever q of the usual distant signal arm r on the pillar s .

In describing the operation of the improved mechanism it will be assumed that the switch is closed and all of the parts are in the proper corresponding positions. The lug n' on the disk n is then about 90° from the adjacent side of the gear segment l . If now the operating lever o is moved from the position shown in Fig. 3 through an arc of about 180° , to its left hand position, the movement of the parts will be as follows: The disk n will first be rotated through about 90° without affecting the gear segment l . Such movement of the disk, however, will permit the signal r to move to the danger position, in which it will remain during the continued movement of the switch operating lever, as is usual in devices of this character. When the switch operating lever and disk have been moved through an arc of about 90° , the lug n' will come in contact with the adjacent side of the gear segment l and during its continued movement will produce a corresponding movement of the gear segment. Through the engagement of the gear segment with the rack bar k , the slide bar g' , g^2 , will be moved from its extreme left hand position, shown in the several figures of the drawings to its extreme right hand position. In the first part of the movement of the slide bar, the locking lug g^3 will be withdrawn from the notch in the locking bar i , thereby unlocking the switch points so that they will be shifted during the continued movement by the coöperation of the roller g , on the slide bar, with the rocker jaw f' . The movement of the switch points from closed to open position will be completed before the movement of the slide bar is completed, so that the locking lug g^4 on the slide bar will enter the notch in the underside of the locking bar i , which notch is then in line with the lug, and will thereby lock the switch points in their open position. When the movement of the operating lever is reversed, to close the switch, the relative movements of the parts will be reversed, the signal wires having the proper relative slack so that the signal arm is set at "safety" after the switch is closed. In this reverse movement of the operating lever and disk, the lug n^2 on the disk coöperates, in the beginning of the movement, that is, during the first 60° of movement or thereabout, with the lug l' on the rod l^2 which is carried by the gear segment l , actuating the gear segment to throw the slide bar from its right

hand position to its left hand position, in which movement the slide bar first releases the locking bar i , then shifts the switch points, and then again engages the locking bar to lock the switch points in their closed position. As the closing and locking of the switch points are completed and the rack bar reaches its final position, a tooth of the rack bar coöperates with the end of the rod l^2 and moves the same against the pressure of the spring l^3 , thereby moving the lug l' out of the path of the lug n^2 of the actuator, so that the actuator is permitted to continue its movement to set the signal from "danger" to "safety", this being effected during the movement of the lever from about 60° to about 90° . During the remaining 90° of movement of the lever the slack of the signal wires is taken up. If it is desired to adapt the devices to the operation of a signal with the stand on the opposite side of the switch from that shown, all that is necessary is to shift the rod l^2 to the guides indicated by dotted lines at l^4 on the gear segment and to make use of the lugs on the actuator indicated by dotted lines at n^3 and n^4 in place of the lugs in n^2 and n' .

It will be understood that the details of construction will be varied to suit different conditions of use and that the invention, therefore, is not limited to the precise construction and arrangement shown.

We claim as our invention:

1. The combination with movable switch points and a distant signal, of an operating lever, an actuator operated by the lever, connections whereby the distant signal is operated by movement of the actuator during the first part of the movement of the lever, a slide bar and switch shifting devices operated thereby, a rack secured to the slide bar, a gear segment engaging the rack and means whereby the gear segment is moved by the actuator during the latter part of such movement, whereby the distant signal is thrown to "danger" before the switch is moved.

2. The combination with movable switch points and a distant signal, of an operating lever, a signal operating device carried by the operating lever, connections from the signal operating device to the distant signal, a gear segment mounted on the same axis with the signal operating device, lugs on the signal operating device to coöperate with the gear segment, a rack bar engaged by the gear segment, and switch shifting devices operated by the movement of the rack bar.

3. The combination with movable switch points and a distant signal, of an operating lever, an actuator carried thereby and provided with segment operating lugs, connections whereby the distant signal is operated by movement of the actuator, a gear segment mounted co-axially with the actuator, a rack bar engaged by the segment, switch

shifting devices actuated by movement of the rack bar, and switch locking devices controlled by movement of the rack bar.

4. The combination with movable switch points and a distant signal, of an operating lever, an actuator carried thereby and provided with segment operating lugs, connections whereby the distant signal is operated by movement of the actuator, a gear segment mounted co-axially with the actuator, a rack bar engaged by the segment, switch shifting devices actuated by movement of the rack bar, a notched locking bar connected to the switch points, and locking lugs carried by the rack bar and adapted to engage the locking bar in different positions at the ends of the movement of the rack bar.

5. The combination with movable switch points and a distant signal, of an operating lever, a signal operating device carried by the operating lever, connection from the signal operating device to the distant signal, a gear segment mounted on the same axis with the signal operating device, a lug mounted movably on the gear segment, means to move the lug, lugs on the signal operating device to cooperate with the gear segment and with the movable lug thereon, a rack

bar engaged by the gear segment and switch operating devices operated by movement of the rack bar.

6. The combination with movable switch points and a distant signal, of an operating lever, a signal operating device carried by the operating lever, connection from the signal operating device to the distant signal, a gear segment mounted on the same axis with the signal operating device, a lug carrying, spring-pressed rod mounted for radial movement on the gear segment and projecting between teeth of the gear segment, lugs on the signal operating device to cooperate with the gear segment and with the lug on the movable rod respectively, a rack bar engaged by the gear segment and having one of its teeth adapted to move the said rod against the pressure of the spring and switch shifting devices operated by movement of the rack bar.

This specification signed and witnessed this 28th day of February A. D., 1911.

ALBERT SWARTZ.

RICHARD HOLLAND.

Signed in the presence of—

E. E. YAHNE,

E. E. HILDEBRAND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."