(No Model.)

F. C. WEIR & N. O. GOLDSMITH.

AUTOMATIC SWITCH STAND.

No. 428,029. Patented May 13, 1890.

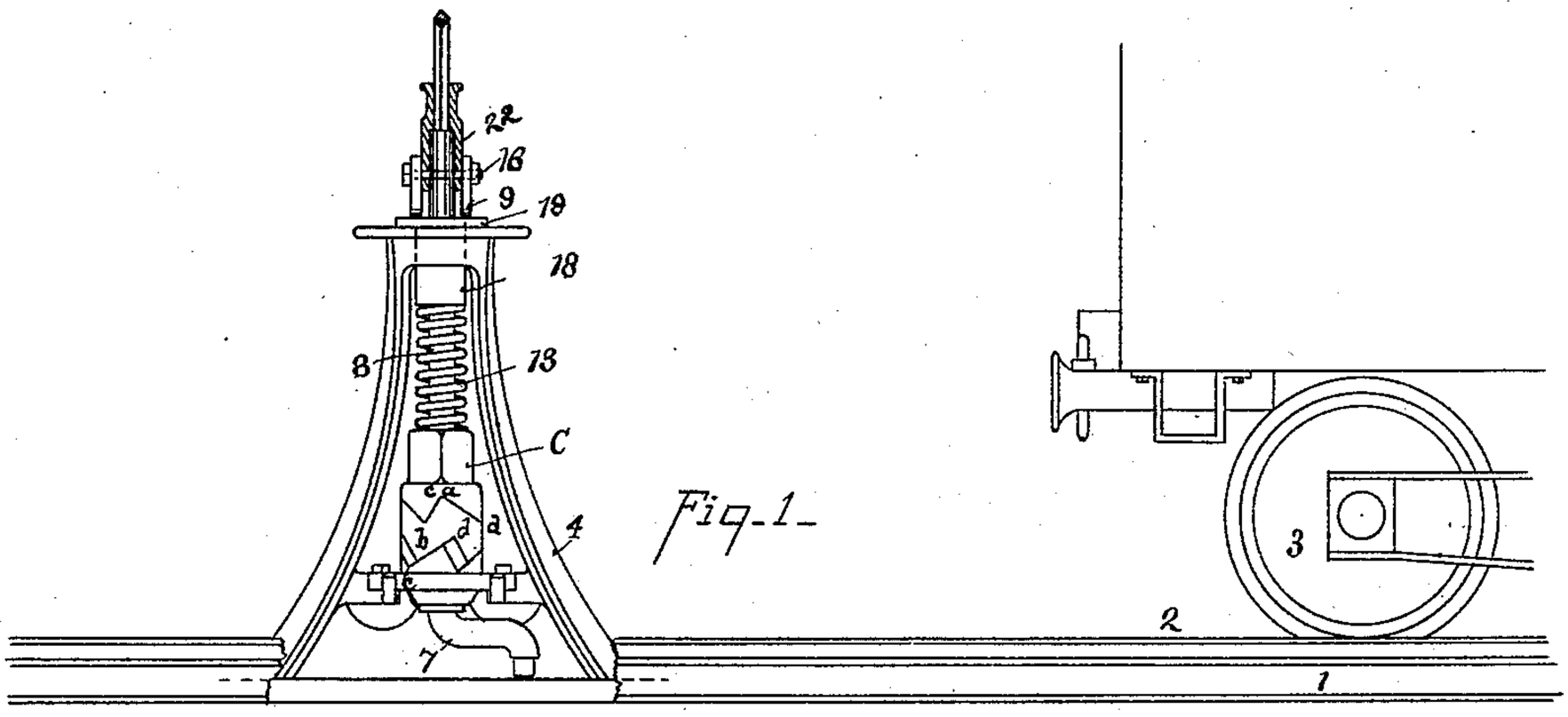

Fig. 1.

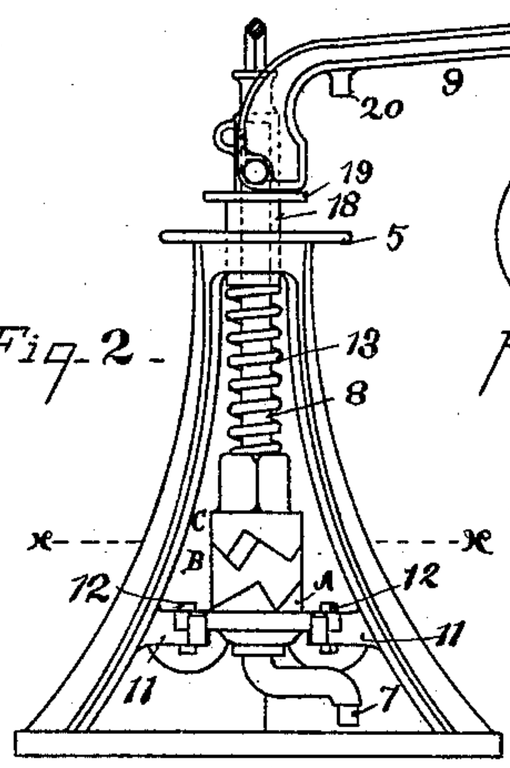

Fig. 2.

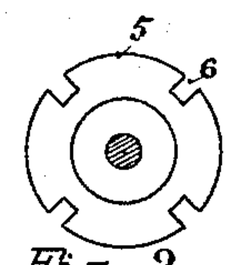

Fig. 3.

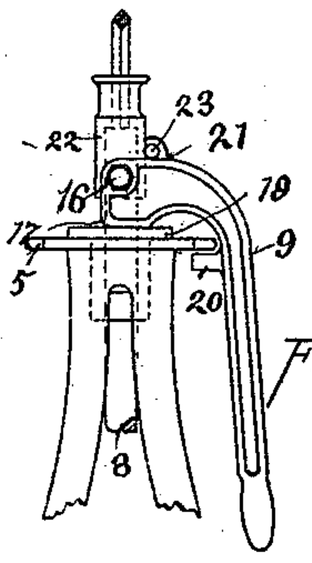

Fig. 4.

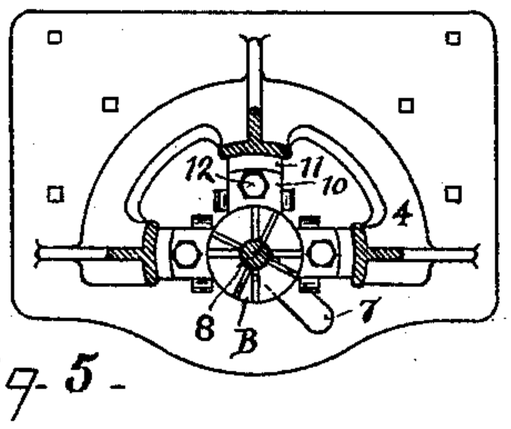

Fig. 5.

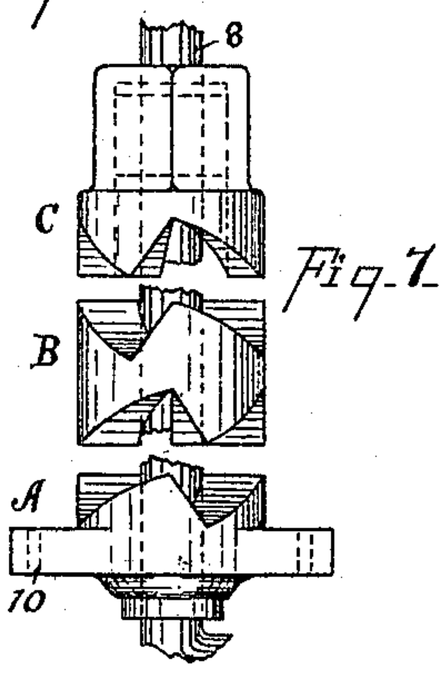

Fig. 7.

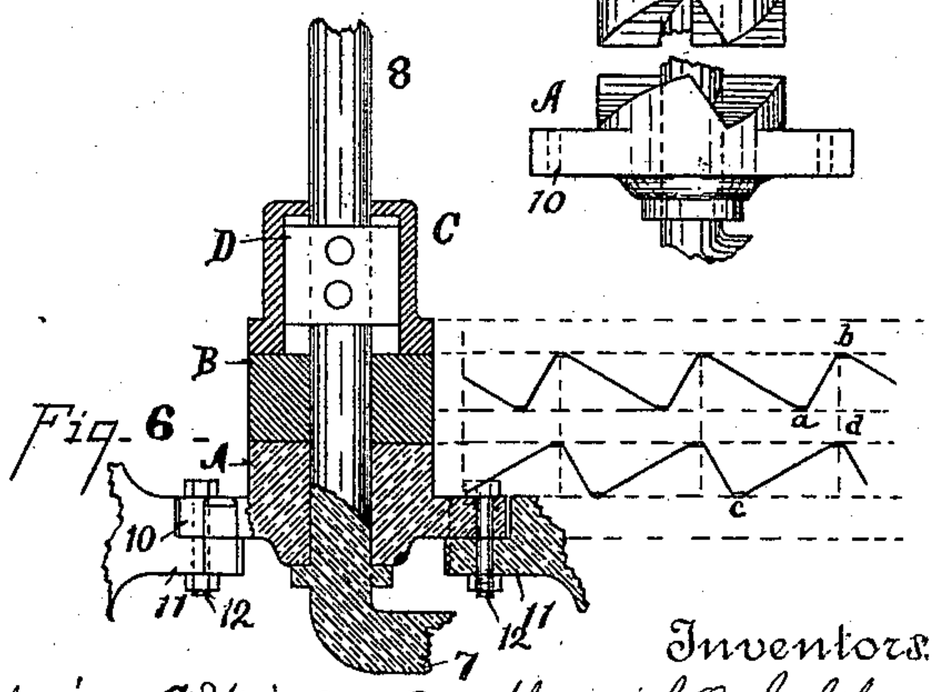

Fig. 6.

Witnesses
C. W. Miles.
T. Simmons

Inventors.
Fredrie C. Weir and Nathaniel O. Goldsmith
By their Attorneys Wood & Boyd

UNITED STATES PATENT OFFICE.

FREDRIC C. WEIR AND NATHANIEL O. GOLDSMITH, OF CINCINNATI, OHIO,
ASSIGNORS TO THE WEIR FROG COMPANY, OF SAME PLACE.

AUTOMATIC SWITCH-STAND.

SPECIFICATION forming part of Letters Patent No. 428,029, dated May 13, 1890.

Application filed December 21, 1889. Serial No. 334,549. (No model.)

To all whom it may concern:

Be it known that we, FREDRIC C. WEIR and NATHANIEL O. GOLDSMITH, citizens of the United States, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Switch-Stands, of which the following is a specification.

Our invention relates to that class of switch-stands called "automatic," or, more properly, "safety" switch-stands, inasmuch as a point-switch provided with a stand of this description allows a train to pass from track No. 1 onto track No. 2 without danger of being derailed, although the switch may be set for the use of trains on track No. 2, or vice versa.

The objects of our invention are, first, to provide an upright automatic stand which can be locked by a padlock, so that it cannot be thrown by hand, but can be thrown by a train in case the switch is set for the wrong track; second, to provide an improved arrangement of connections such that the resistance offered by the spring to the opening of the switch-rails when thrown by the train is comparatively slight; but the finishing movement of the switch-rails is accomplished by means of the spring without the aid of the train; third, to reduce the lost motion between stand and switch-rails due to clearance in parts of stand to a minimum; fourth, to insure the switch-rails being in a safe and secure position before the hand-lever of the switch-stand can be brought in a position to be locked, and, fifth, to increase the wearing of the clutches by dividing the work between two sets of clutch-teeth.

The various features of our invention will be fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of our improvement, partly in section, with the lower clutches partly open. Fig. 2 is a transverse side elevation showing the handle raised and partly turned, as thrown by hand. Fig. 3 is a plan view of the notched top plate. Fig. 4 is a sectional elevation of the top portion of the stand, showing the lever down in position to compress the spring. Fig. 5 is a section on line *x x*, Fig. 2. Fig. 6 is a sectional elevation of the clutches, which clutches are also shown in diagram. Fig. 7 is a detailed view of the three members of the clutch.

1 represents one of the main-track rails.

2 represents one of the side-track rails.

3 is a car-wheel upon the side track.

4 represents switch-stand, which is preferably made of skeleton form.

5 represents the top plate of the stand, provided with two or more notches 6.

7 represents the crank.

8 represents the crank-shaft suitably journaled within the stand, passing up through the same.

9 represents the handle or lever attached to the crank-shaft at the top, so that the crank may move back and forth by hand to throw the switch in either direction.

The following is the mechanism for allowing the switch to be turned in either direction automatically by trains.

A, B, and C represent a three-part clutch. Clutch A is provided with flanges 10, which fit the lugs 11 of the switch-stand frame, to which the clutch is rigidly secured by means of bolts 12. This clutch member forms one of the journal-supports for the crank-shaft 8. The clutch-teeth of each of the members A B C are formed with two different angles upon either side.

a b represent the greater angles, and *c d* represent the lesser angles. The lesser angles of the member A are set opposite the greater angles of the member C, and the clutch-teeth from either side of the member B are made the counterpart of the members A and C, respectively.

The upper clutch C must move freely on the shaft in vertical directions, and the middle clutch member B must turn as well as rise freely on the shaft, as shown in Fig. 1. Both clutches C and B may rise simultaneously, as shown in Fig. 1; but in one of the movements the member B is stationary, and the upper member C alone rises. This upper member C is made hollow, as shown in Fig. 6.

D represents a square collar pinned to the crank-shaft 8. It is enlarged so as to be of greater diameter than the shaft. The clutch

C rises freely on said square collar D sufficiently to allow the clutch-teeth to pass over each other. Said square collar is also made with sufficient space between it and the upper part of the member B to allow the member B to rise freely, as shown in Fig. 1, without coming in contact with said collar.

To understand more fully the object of making the clutches in this form it is essential that the conditions under which the stand must operate be known. This stand is useful in connection with point-rail switches only. If a switch of this character is connected to a rigid stand and a train running from the heel of the switch toward the point attempts to pass through it when it is set for the wrong track, either the switch-rail or the stand must break, and possibly the train be derailed. If, on the contrary, the switch is connected to this stand, the train passes through safely, as will be explained.

In practice the gages of car-wheels are found from one-half to one and one-fourth inch less than the gage of the track-rails, and for this reason if the car passes through the switch it may leave the point of the switch-rail from one-fourth to one inch away from the main-track rail. The train which runs through the switch may not be derailed; but if the points are left in this position a train coming in the opposite direction will strike against the point of the switch-rail which stands ajar, and either derail the train or break or bend the end of the switch-rail. Now to overcome this danger the stand should close the point up tight. This can only be done by the force of the spring on the clutches. If the faces of the clutches are made of an angle sufficiently great to do this, and the inclination of each clutch-face made the same, then the strain on the switch-rails necessary to allow the train to pass through the switch by forcing the clutches open and compressing the spring becomes so great that the switch-rail is liable to be either broken or bent in doing this. To avoid this liability the angle of the clutch-face must be made less steep, so that the stand may work easier; but when this is done the pressure of the spring is not sufficient to close the point of the switch-rail tight against the main-track rail, the danger of which was spoken of before. By making the clutch in three parts and the faces of different inclinations we overcome these difficulties. Thus suppose a switch is so connected that a train on the side track runs through the switch which is set for the main track. It forces the crank of the stand to move. This, by means of square collar D, moves the clutch member C, which becomes locked to the clutch member B by reason of the great inclination of the clutch-faces *a b*, (see Figs. 1 and 6;) but the members C and B so locked will move together as one clutch on the less inclination of the clutch-faces *c d* of the lower clutch-face of member B and the rigid member A. This allows the crank to move and compress the spring 13, which is seated between bosses on 18 and C. As the crank turns, the clutches B and C locked together move up the crank-shaft 8, sliding on the clutch-faces of the members A and B until after the points of the clutch-teeth have passed each other. Up to this period of the operation the train has been doing the work; but after the points of the clutch-teeth have passed each other then the spring has sufficient power to close the clutch members A and B, because they move on faces *a b* of a greater inclination or more nearly vertical. This closing completes the movement of the crank 7 and the switch-rail is pulled up tight against the main-track rail. Now the switch is set for the side track, and if a train on the main track runs through it the crank 7 must move back to its first position, turning the movable clutch member C, as before, by means of square collar D; but during this movement the clutch member B becomes locked to the rigid clutch member A by means of their steep clutch-faces, as had occurred in the previous movement with members B and C. This makes members A and B practically one rigid clutch, and the clutch-faces of less inclination of member C and upper half of member B slide over each other, opening the clutches and compressing spring 13. (See Fig. 2.) The same operation takes place as described before. When the clutch-teeth pass each other, the clutch members close, sliding on faces of great inclination, and the switch-rail is forced up tight against the other main-track rail.

A similar movement of the clutch members takes place when the crank-shaft 8 is turned by the hand-lever 9; but the parts are so constructed that the spring is not compressed, the work being done by the hand-lever 9, which is explained as follows: The handle 9 is of bell-crank shape, and is hinged to the crank-shaft by the pin 16, provided with an eccentric boss 17. 18 represents a sleeve journaled on the crank-shaft, the lower end of which forms a seat for the spring 13. Compression of the spring tends to raise the same up when the lever is in position shown in Fig. 2, there being no resistance to the movement of sleeve 18 up the shaft, the spring is not compressed, and the crank 8 may be turned readily by the hand-lever 9 to throw the switch in either direction, the clutch members moving and operating the same as when said movements are made by the force of the train.

When the hand-lever 9 is turned down into the position shown in Fig. 4, the boss 17 strikes against the flange 19 of the spring-seat and forces it down, and compresses the spring, so that when lever 9 is down the switch is in position to be turned by the train, and yet the switch cannot be thrown by hand against the strain of the spring. In order to insure a complete throw of the switch-rail by the movement of the hand-lever 9 and prevent it being only partially thrown, we provide the follow-

ing instrumentalities: The top plate 5 is provided with two or more notches 6. The hand-lever is provided with a lug 20. The hand-lever cannot be depressed in position shown in Fig. 4, except when the lug 20 is opposite one of the notches 6, which is the limit of the movement of the switch. The said lug 20 will then pass through one of the notches 6 and allow the lever to be brought into position shown in Fig. 4. The lug 20 being below the plate 5 will allow the crank-handle 9 to move around when turned by the train. The said handle can then be raised to move the switch back into position, if desired.

21 represents an ear on the top of the lever, which is brought into position against the square collar 22 and pierced with the holes 23, through which the hasp of a padlock may be inserted to lock the lever in position.

It is obvious that where it is desired to make the switch automatic from one track only the member B may be dispensed with and the differential clutch A C alone used; but it is generally desired to have the switch constructed so as to be worked automatically by a train running either on the side or main track.

Having described our invention, what we claim is—

1. In an automatic switch-stand, the combination, with the crank-shaft, of the spring and clutch members having differential angles on opposite side of the clutch-teeth, whereby the crank-shaft may be moved easily in one direction against the strain of the spring and readily closed by the force of said spring, substantially as specified.

2. In combination with an automatic switch-stand, the three-part clutch having a fixed member and movable member, and an intermediate alternately fixed and movable member, substantially as specified.

3. In combination with a crank-shaft, an automatic switch-stand, the three-part clutch A B C having differential angles on opposite faces of the clutch-teeth, substantially as specified.

4. In an automatic switch-stand, the combination of the clutches A B C, the clutch member C being made hollow and guided upon the polygonal collar D, secured to the crank-shaft, whereby the clutch C may be raised separately or the clutches B and C may be raised jointly as the switch-rails are alternately thrown, substantially as herein specified.

5. In combination with the crank-shaft 8 of an automatic switch-stand, the hand-lever 9, provided with the lug 20, and the notched plate 5, for controlling the closing of said lever, substantially as herein specified.

In testimony whereof we have hereunto set our hands.

FREDRIC C. WEIR.
NATHANIEL O. GOLDSMITH.

Witnesses:
C. W. MILES,
T. SIMMONS.