

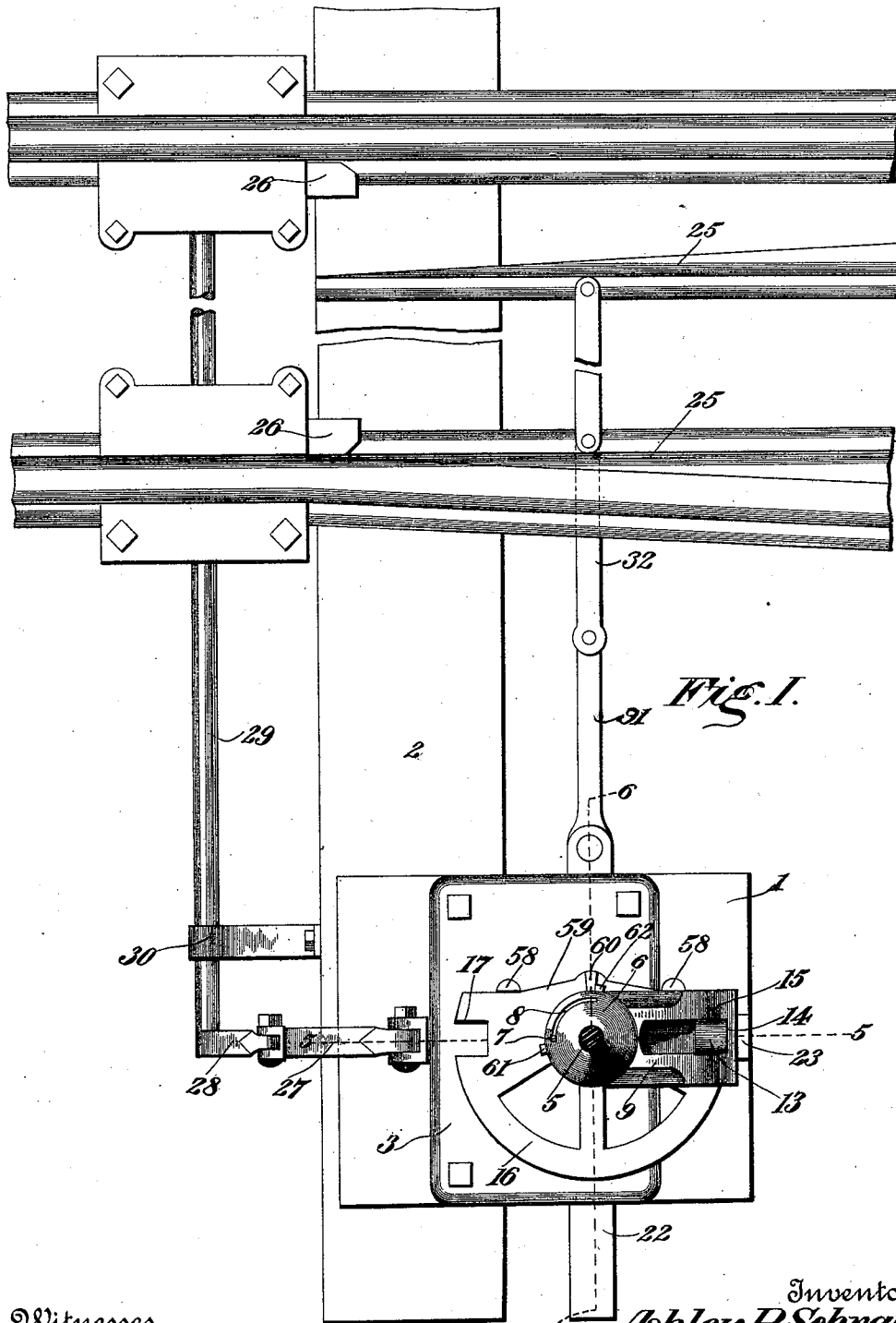
(No Model.)

3 Sheets—Sheet 1.

A. B. SCHRANTZ.
SWITCH STAND.

No. 581,519.

Patented Apr. 27, 1897.



Witnesses

M. E. Fowler
Mackay

Inventor:

Ashley B. Schrantz

By Joseph L. Atkins
Attorney

(No Model.)

3 Sheets—Sheet 2.

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Fig. II

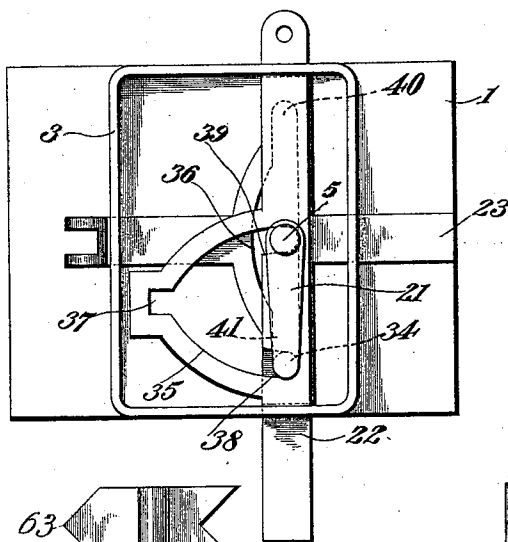


Fig. III.

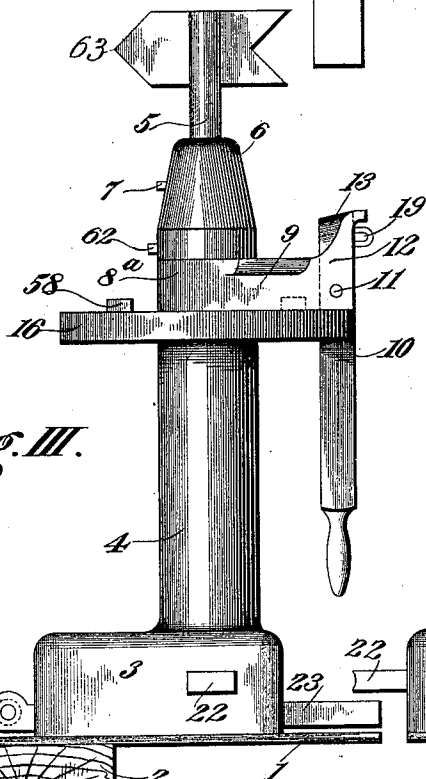
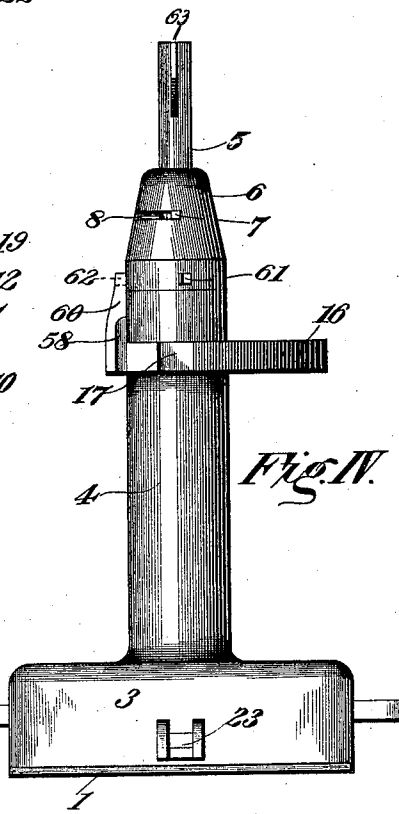


Fig. IV.



Witnesses

M. E. Fowler
S. M. Mcker

Inventor

Ashley B. Schrantz
By Joseph L. Hickman
Attorney

(No Model.)

3 Sheets—Sheet 3.

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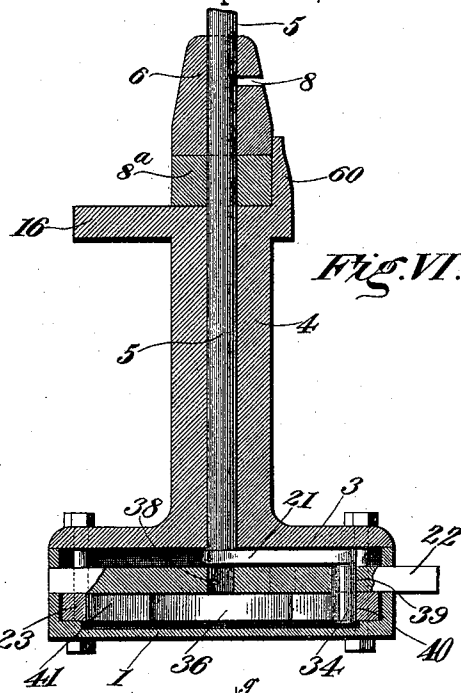
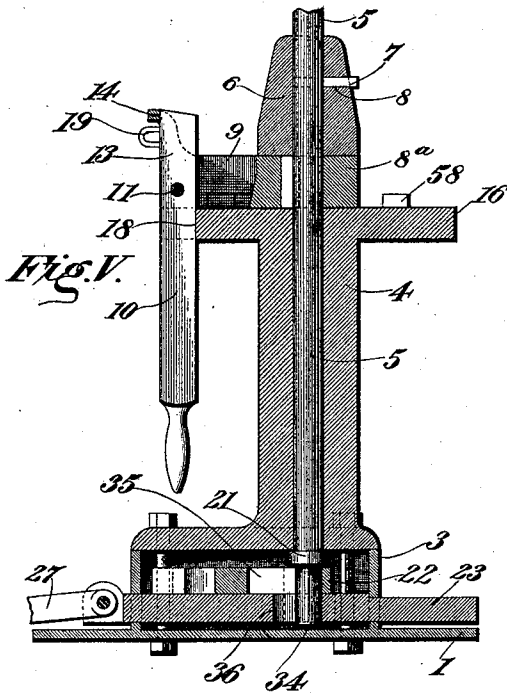
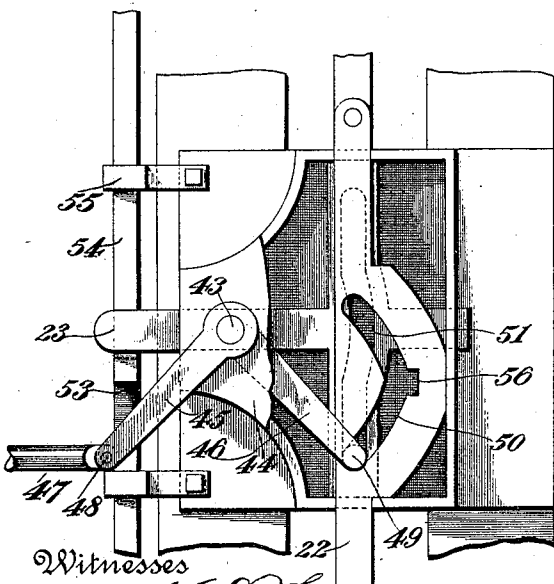


Fig. VII.



Witnesses

M. E. Fowler
Mackay

Fig. VIII.

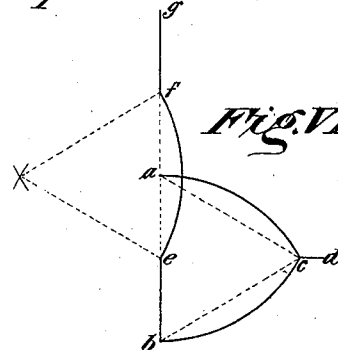
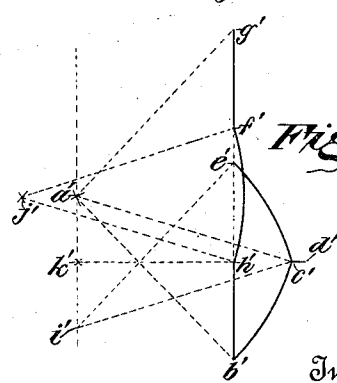


Fig. IX.



Inventor

Ashley B. Schrantz

By Joseph L. Peters
Attorney

UNITED STATES PATENT OFFICE.

ASHLEY B. SCHRANTZ, OF FAIRBURY, NEBRASKA.

SWITCH-STAND.

SPECIFICATION forming part of Letters Patent No. 581,519, dated April 27, 1897.

Application filed April 14, 1896. Serial No. 587,467. (No model.)

To all whom it may concern:

Be it known that I, ASHLEY B. SCHRANTZ, of Fairbury, county of Jefferson, State of Nebraska, have invented certain new and useful Improvements in Switch-Stands, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce mechanism for operating sliding bars to cause them to move at right angles to each other and at predetermined intervals of time and to lock the sliding bars, respectively, in fixed positions at certain stages of their movements.

My invention is especially designed to operate a switch and switch-lock clearly illustrated in my application for patent, Serial No. 573,745, but may be applicable to other uses.

In the accompanying drawings, Figure I is a top plan view of my switch-stand connected with a switch and switch-lock. Fig. II is a top plan view of the switch-stand proper disconnected and with the case removed. Fig. III is an end view of a switch-stand proper. Fig. IV is a view taken at right angles thereto. Fig. V is a central vertical section on the line 5 5 of Fig. I. Fig. VI is a similar section on the line 6 6. Fig. VII is a top plan view of a modified form of my device, showing the operating mechanism adapted to be actuated by a quarter-revolution of the main shaft. Fig. VIII is a diagram for constructing the form of operating mechanism clearly illustrated in Fig. II. Fig. IX is another diagram for constructing the operating mechanism shown in Fig. VII.

Referring to the figures on the drawings, 1 indicates the base of my switch-stand, which may be constructed in any suitable and ordinary manner and may be supported as upon cross-ties 2. Secured to the base by suitable means is a case consisting of a pedestal 3 and upright bearing-piece 4. Within the part 4 is revolubly carried a shaft 5, upon the upper end of which is loosely mounted an indicator-cap 6. The shaft 5 is provided with a pin 7, which projects through a horizontal slot 8 in the cap. The slot 8 is defined at its opposite ends by radial planes, and the length of the slot is equal to one-quarter the entire circumference of the cap 6.

8^a indicates a collar surrounding the shaft 5 and secured thereto. It is provided with a projection 9, which affords means for rotating it and which is provided at its outer extremity with a lever-handle 10, pivoted, as indicated at 11, in the bifurcated end 12 of the arm 9 between the two sides thereof. The lever-handle is provided with a locking end 13, that is adapted to enter a recess 14 in a bridge 15.

16 indicates a table over which the arm 9 turns and is provided upon its opposite sides with recesses 17 and 18, respectively, within which the lever 10, when the arm 9 is turned in the proper positions, may be set to secure the arm 9 in the fixed position. When the lever 10 is fixed in the locking position, as shown in Fig. III, its locking end 13 enters the recess 14 in the bridge 15, in which position it may be secured, as by a lock (not illustrated) inserted in a staple 19. When the lever 10 is brought into alinement with the arm 9, it constitutes a substantial continuation thereof and affords additional leverage for rotating the shaft 5. Upon its lower end, within the pedestal 13, the shaft 5 carries a crank-arm 21, that is designed to actuate sliding bars 22 and 23, respectively. The sliding bars move through bearing-apertures 24 and 25, respectively, in the sides of the pedestal 3 or any other suitable bearings provided for them upon the face 1. They move at right angles one to the other, and their movements are so timed as to perform the work required of them. As illustrated in the drawings, their office is to actuate the switch-rails 25 and the switch-rail locks 26. For this purpose the bar 23 is secured, as by a link 27, to the crank 28 of a rock-shaft 29, carried in bearings 30. The rocking of the shaft 29, by mechanism not necessary to describe in detail in this application, but which is fully explained in my previous application, imparts reciprocatory motion to the tongues 26. The bar 22 is secured, as by a link 31, to a spanner 32, that unites the two switch-rails 25.

In Fig. I of the drawings the switch-rail is shown as locked by one of the tongues 26. If from that position the operator desires to shift the switch, he raises the lever 10 into line with the arm 9 and turns the arm 9 from the position over the recess 17 through one hun-

dred and eighty degrees, until it comes over the recess 18. The movement of the shaft 5, through aid of the arm 9, first imparts motion to the bar 23 to cast it toward the rock-shaft 29, whereby it operates the latter shaft and causes it to retract the locks 26. This action is entirely accomplished, completely releasing the rails 25, before, through continuous rotation of the shaft 5, the bar begins to be actuated. As soon, however, as the rails are released the bar 23 comes to a full stop and the transverse movement of the bar 22 is performed. This is timed to immediately follow the movement of the tongues 26, so as to shift the positions of the switch-rails. As soon as the switch-rails are shifted and before the movement of the arm 9 and its shaft 5 is completed the bar 22 is again actuated, this time in a direction away from the rock-shaft 29, which, reversing the operation previously described, throws the tongues 26 again in the locking position and secures the rails 25 to the position to which they have been shifted.

To accomplish the movements above described, I prefer to employ a downwardly-projecting pin 34 on the extremity of the crank-arm 21 and upon the sliding bars 22 and 23, respectively, interior cam-surfaces 35 and 36, of peculiar shape, so designed as to accomplish the movements above described through the operation of the pin against their respective cam-faces.

A method of constructing the cams will hereinafter be described for the better explanation of my invention. At present it should be observed that the cam 35 has three pockets 37, 38, and 39, into which in the operation of the shaft 5 the pin 34 successively falls, thereby locking the bar 22 in a fixed position whenever it is so engaged with any of the pockets. The cam 36 is provided with pockets 40 and 41, designed in like manner to lock the bar 23 in fixed position whenever the pin 34 is engaged therein.

In Fig. II of the drawings the bars 22 and 23 are shown as locked in the position illustrated in Fig. I. Consequently the pin 34 is shown as engaged in the pocket 38 of the cam 35 and in the pocket 41 of the cam 36. If from the position shown in Fig. II the shaft 5 were rotated in the manner previously described, the bar 22 would become locked by engagement of the pin 34 with the pocket 37 when the tongues 26 had become completely retracted, so that they might not be accidentally made to interfere with the subsequent movement of the rails 25. When the half-revolution of the shaft has been completed, both bars 22 and 23 will again become locked, but the crank-arm 21 will be in position diametrically opposite to that shown in Fig. II, and the relative positions of the bars 22 and 23 will be changed accordingly.

It may be noted that the shaft 5 in the figures of the drawings I to VI, inclusive, is shown as passing it through the cams 35 and 36.

In Fig. VII, I show a pin 43 located to one side of the cams and carrying on one side of a supporting-partition 44 a crank-arm 45 and on the other side thereof a crank-arm 46, the two arms 45 and 46, with their connecting-pin 43, constituting a bell-crank lever, which may be operated by suitable means, the same being indicated by a rod 47, pivoted, as indicated at 48, to the arm 45. The arm 46 is provided with a pin 49, which moves within a cam 50 of the lever 22 and within a cam 51 of the lever 23. The operation of the levers is substantially the same as previously described, except that it is accomplished through a quarter-revolution of the pin 43 instead of by a half-revolution of the corresponding part—the shaft 5—previously described. The bar 23 in Fig. VII is shown as adapted by its movement to engage with the notch 53 in a sliding lock-bar 54, moving in bearings 55, but the bar 23 is equally adapted to operate a rock-shaft 29, and the lock-bar 54 is shown merely by way of variation, since it forms no part of my present invention.

Upon comparison of the cams 35 and 36 with the cams 50 and 51 it will be observed that the construction of the respective cams is materially modified. The cam 50 is provided with only one locking-pocket 56, the position of the pin 43 serving to lock the bar 22 at the opposite limits of its travel without the aid of pockets.

In order to accomplish the proper relative movements of the bars 22 and 23, their cams must be of proper construction both independently and relatively. I shall therefore proceed to describe the manner of constructing both varieties of cams.

Referring, therefore, in the first place, to Fig. VIII for the construction of the cams 35 and 36, the operation is as follows: At the point *a*, within a radius *a b*, draw the arc *b c*, and at *b*, with radius *a b*, draw the arc *a c*. Then through *c* draw *c d* perpendicular to *a b*, making the distance *d e* equal to *a b*. This gives the center line of the cam 35. Now in the same figure make *a e* equal to one-half *a b* and *f e* equal to *a b* and draw the arc *f e* with radius *a b* and make *e b g f e* equal, respectively, to one-half *a b*. This gives center line of the cam 36. Let it be noted that all arcs *a c*, *c b*, and *f e* have equal radii.

To construct the cams 50 and 51 as shown in Fig. VII, refer to Fig. IX. At *a'* construct the right angle *g' a' b'* and make *g' a'* equal to *a' b'*. With radius *a' b'* draw arc *b' c'* through *a'*. Then draw *a' i'* parallel to *g' b'* and make *a' i'* the throw of the bar 22. Practically, as illustrated, this would be in this case four inches. From *i'* as a center, with a radius *a' b'*, draw arc *c' e'*. Then through *c'* draw *c' d'* perpendicular to *a' i'* and make distance *d' k'* equal to *a' b'*. This gives *e' c' d' e' b'*, the center line of cam 50. Now through *a'* draw *a' j'* perpendicular to *g' b'*, making distance *a' j'* equal to throw of the bar 23. In this instance the throw of the bar 22 being four inches that

of the bar 23 would be one and seven-eighths inches. From j' , with radius $a' b'$, draw arc $f' h'$. This gives $g' f' h' b'$, the center line of cam 51. The table 16 is provided with stop-lugs 58 on opposite sides of its face 59, which serve to limit the movements in the opposite direction of the arm 9.

60 indicates a vertical stop-piece which rises from the face 59 of the table to a point a little above the lower edge of the cap 6. The cap is provided with lugs 61 and 62, separated by a distance of ninety degrees upon the circumference of the cap. By this arrangement, conjointly with the pin 7 in the slot 8, the cap 6 may be made to turn through only a quarter of a revolution to each half-revolution of the shaft 5. By this means the switch-indicator 63 upon the top of the cap 6 may be employed in the ordinary manner to indicate whether the switch is open or closed, as the case may be.

What I claim is—

1. The combination in a switch-stand of a case, a pair of sliding bars working respectively in bearings in the case, a cam on the respective bars, a crank-arm movably secured

in the case, and a pin upon the crank working in the path of the cams, substantially as set forth.

2. The combination in a switch-stand, of a pair of sliding bars, an elongated cam upon one of the bars, pockets in the opposite ends of said cam, a three-cornered cam upon the other bar, a pocket at each of the three corners thereof, and cam-operating mechanism, substantially as set forth.

3. In mechanism for actuating a pair of switch-bars at right angles to each other, the combination with the bars, of a pair of cams located upon the bars, respectively, one of the cams being an elongated one, and the other a three-cornered one, and being constructed, with respect to each other, upon the lines specified, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

ASHLEY B. SCHRANTZ.

Witnesses:

W. E. BOGART,
F. KIRKPATRICK.