

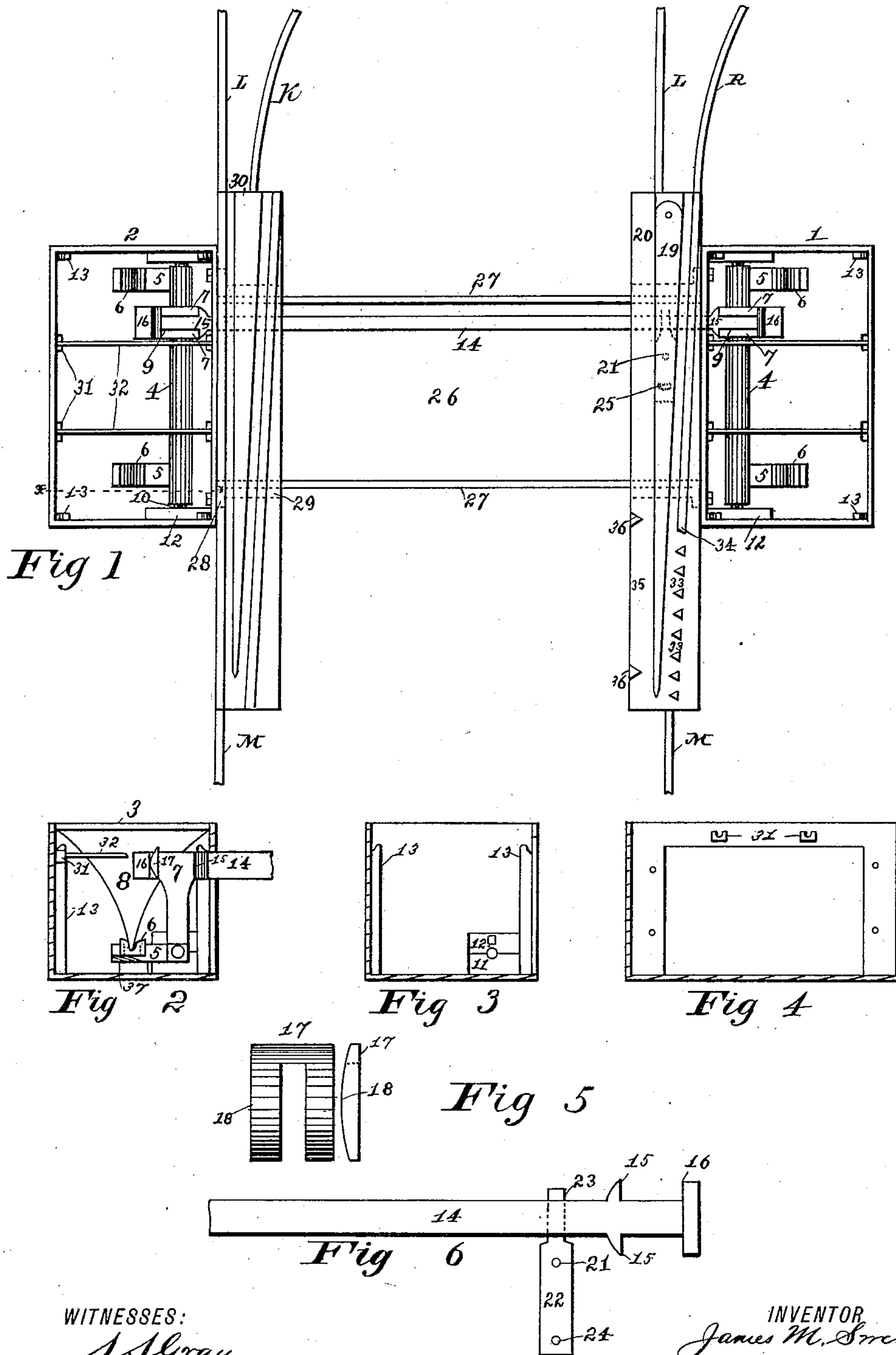
(No Model.)

J. M. SWEM.

MECHANISM FOR OPERATING SWITCH POINTS.

No. 404,446.

Patented June 4, 1889.



WITNESSES:

*S. Gray*  
*Chas. Hall*

INVENTOR

*James M. Swem*

BY *R. M. M. Dermott*

*his*

ATTORNEY



# UNITED STATES PATENT OFFICE.

JAMES M. SWEM, OF DENVER, COLORADO.

## MECHANISM FOR OPERATING SWITCH-POINTS.

SPECIFICATION forming part of Letters Patent No. 404,446, dated June 4, 1889.

Application filed October 5, 1888. Serial No. 287,301. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES M. SWEM, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Mechanism for Operating Switch-Points, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in switches for street rail or tramways of that class or type in which the switch point or tongue is caused to move automatically by the weight of the animal upon a platform adapted to reciprocate horizontally. Heretofore in such class of switches, so far as I am aware of, the switch-point has been moved by a direct push or thrust of the connecting-bar or bar connecting the systems of levers arranged beneath the platforms on opposite sides of the track, and such connecting-bar has been connected directly to the pivoted switch-tongue, each moving part acting on or being acted upon by its associated coacting parts by a pushing or thrusting movement. In such constructions the most of the elemental parts of the mechanism have had to be made, in effect, unnecessarily heavy and strong, that they might possess rigidity sufficient to withstand the bending or buckling effect of a pushing or thrusting force. In turn, then, this increased weight of the elemental parts has required an increased power to cause their movement and the operation of the switch tongue or point, the necessity of such increased power in many cases requiring a very large size of platform in order that the animal may place at least two of its feet thereon at once in order that such power or weight may be had. Then, in turn again, such large platforms require an extra amount of bearing or sustaining points and of increased size or an extra amount of strength therein that they may be properly and operatively sustained, all of these factors combining to cause the ordinary switch mechanisms of the type referred to to be unnecessarily cumbersome, heavy, and difficult of operation.

In view thereof the objects of my invention are to furnish a switch mechanism of the class noted in which each moving part acts on or is acted upon by its associated coacting

parts by a direct pulling movement, thereby insuring the lightest possible construction consistent with the tensile strength of the material and the most reliable transference of motion from one part to another—a switch mechanism of simple and very compact construction in which all the parts are readily assembled for operation and as readily dissociated when occasion requires, in which the parts subject to wear may be readily adjusted to compensate for any wear thereof or readily replaced by new parts when needed, in which all the parts are readily accessible for inspection when desired without disturbance of traffic or blockade of the part of the street or road where the mechanism may be situated, in which, with a comparatively small movement of a platform caused by a comparatively small force or weight, an ample and forcible movement of the switch-point may be had, in which provision is made for keeping the path of the moving switch-tongue upon its frog clear of mud or other obstructions liable to interfere with its proper operation—a switch mechanism withal economical in cost of construction and of maintenance, reliable and certain in operation with ordinary care, not liable to derangement or failure, and very durable; to which ends the invention consists in the features, arrangements, and combinations more particularly hereinafter described and claimed.

In the drawings is illustrated a switch mechanism embodying my invention, in which drawings Figure 1 is a plan view thereof, the covers of the containing-boxes being removed; Fig. 2, a section of a single box with the top in place on line *xx*, Fig. 1; Fig. 3, an interior view of an end of a box for containing part of the mechanism; Fig. 4, a plan view of the inner side of such a box; Fig. 5, a front and a side view of a detail of construction; Fig. 6, under side plan view of part of Fig. 1.

In the figures the reference-numerals 1 and 2 indicate the boxes located on opposite sides of and without the track for containing the reciprocating table or platform 3 and the mechanism for actuating the switch-point, such boxes 1 and 2 being connected by a transverse box 26, as hereinafter explained. Each box is provided with stops 13, limiting the downward movement of its top, and the platform 3,



and for convenience such stops may be located in the corners of the boxes and formed or cast therewith, as herein shown.

For convenience of description the side of a box nearest to or adjoining the track will be termed the "inner" side of the box, and the opposite side or side farthest away from the track the "outer" side, the tracks herein designated as M M for the main track approaching the switch, which main track leads to the frogs 20 30, whence a track branches to the right, (marked R R,) and another may either branch to the left or continue straight on, (marked L L.) Near the innerside of each box there is journaled a rock-shaft 4, having bearing ends 10, taking in boxes composed of the parts 11 12. Of these boxes one half—the lower portion 11—is cast or formed with and upon the end walls of the containing-case, while the other or upper half 12 is formed separately therefrom and secured in position, as shown, such construction enabling the shaft 4 to be readily placed in or removed from operative position. From near either end of this shaft project toward the center of the box the arms 5, upon each of which is seated a cup-bearing 6, in which take the extreme outer ends of the downwardly-projecting extensions 8 of the covers or platforms 3. While these bearings 6 may be formed integral with the arms 5, I prefer that they should be made separately for the object of easy detachment and replacement as worn. To such end the arms 5 are formed with recesses, in which the block containing such bearings 6 may be placed, the latter being provided with rims or flanges on their opposite sides taking over the body of the arms 5, and thereby preventing lateral disengagement of the two.

Projecting upwardly from the rock-shafts 4 and at or about at right angles to the arms 5 is on each shaft an arm 7, to which is connected the connecting-bar 14. The preferable form of such connection is as shown—that is, the arms 7 are slotted at their tops, as shown at 9, in which slots rests the bar 14, the latter being provided with shoulders 15 and shouldered heads 16, so that the bar and the arms 7 are so attached that each must move as the other is moved. The space between the shoulders 15 and the shoulders of the head 16 at either end is left somewhat greater than the length of the slot 9, and to take in and to fill up such space and also give a uniform bearing-surface between the arms 7 and the shoulders of the connecting-bar a washer 17, having a curved or oval face 18, is slipped upon the bar. Such washer is practically of a staple shape, as shown in Fig. 5, so as to pass over and yet be retained by the bar. It is of course evident that such convex or rocking surface 18 could be formed either upon the end of an arm 5 or upon the shoulders of the head 16; but it is easier to form the same upon a separate washer 17. As the impinging surfaces wear, additional and plain-faced washers of similar shape may be used to keep

the impinging surfaces of arm 7 and bar 14 in proper relation to each other. As stated, this connecting-bar 14 extends between and is connected to the arms 7 in the two boxes 1 and 2, each box being provided with a cover or platform 3, from which depend the arms 8, taking in the cup-bearings 6; hence as a platform or cover is depressed by sufficient weight or force coming thereupon, the arms 5 are forced downward, the arm 7 at such box is turned toward the longitudinal center of the box, and the connecting-bar 14 pulled toward the box when the depression has taken place, and this pull is utilized to move the switch-tongue, as will now be explained.

Pivoted at 21 to the under side of the frog 20, as shown in dotted lines in Fig. 1 and full lines in Fig. 6, is a lever 22, from which projects upwardly through a slot 25 in the frog a pin 24, pivoted or attached to the under side of the switch-point. At the rear of the lever 22 is an extension or tenon 23, taking in a recess, slot, or mortise in the connecting-bar 14, so that as the bar is moved the lever and the switch-point are moved. As shown in Fig. 1, the switch-point 19 is in a median position, neither fully closing nor opening the path to either the L or R track. Supposing now it is desired to send a car moving in the direction of the arrow to the right, the driver guides the animal upon the cover of box 1, the weight of the animal depressing it, forcing through arms 8 the arms 5 downward, rocking shaft 4 and swinging arm 7 toward the longitudinal center of the box, pulling the bar 14 in the direction from box 2 to 1, instead of pushing the same, as is usual, the bar 14, through the intervention of the lever 22, swinging the point of the switch-tongue 19 over against the stop or stops 36, opening the right-hand track R. If the animal be directed upon the top of the box 2, the bar 14 is pulled to the left, swinging the tongue against the rail 33 of the frog 20 and opening the track L. This arrangement, it will be noticed, causes the arms 7 and bar 14 to operate on the switch-point and on each other from box to box with a direct pull instead of a thrust; hence the size of the parts need be no greater than is sufficient for the tensile strength of the material used to overcome or be slightly greater than the strength or force of the pull, danger of bending or buckling due to thrusting strain being avoided. At the same time, as the bar 14 is connected to the tongue indirectly through the medium of the lever 22, the parts can be so proportioned that a very small movement of the top 3 shall be needed to give sufficient and a quick movement of the point. Switches have been arranged and are in daily use involving these principles, wherein the tables or tops are but sixteen by thirty inches and reciprocate but three-fourths of an inch to move the point, and that with a weight of less than fifty pounds applied thereon.

To protect the bar 14 and the lever, the



boxes 1 2 are connected by a transverse box 26, composed of sides 27, upon which is laid a cover, (not herein shown,) the bottom thereof being the soil or a stratum of lumber or of bricks or masonry, as the nature of the ground may indicate. The inner side of each box is formed with an aperture 35, (see Fig. 4,) corresponding in size and contour to the size and contour in cross-section of the box 26. Each side 27 of the box is formed or cast with end flanges 28, by which they may be bolted or otherwise secured to the boxes 1 2, and with flanges 29 at the ends of their upper edges, by which they are similarly secured to the frog-plates 20 30, the sides 27 of the box thus acting also as ties or supports for the frog-plates, the latter, the boxes 1 2, the box 26, and the inclosed switch mechanism being firmly united together, so that there is no danger of accidental displacement of the parts nor disturbance of their positions relatively to each other.

As the pressure of the soil upon the exterior of the boxes 1 2 is liable sometimes to force the wall in sufficiently to prevent the free movement of the lids or tops 3 within the area of the walls at points upon the interior of the boxes, lugs 31 are formed or cast, in which are dropped so as to rest therein cross-brace rods 32, the number of lugs and cross-braces depending on the length of the box. The use of these cross-braces not only obviates the danger noted, but also enables the boxes to be made lighter than heretofore without the incurrance of such danger.

With switch-points difficulty is constantly experienced from mud and street-refuse lodging upon the plate and between the tongue and guard-rail on one side and the tongue and rail upon the other, impeding the operation of the tongue. In some instances the plate has been perforated—in others griddled—to permit such obstructing matter to fall through the plate into a receptacle or catch-basin below it, such arrangement necessitating attention to and frequent cleaning of the catch-basin. Again, it has been proposed to form the bodies of both the exterior and interior guard-rails into what may be termed a "rack," whose teeth extend upwardly, the spaces between the teeth being intended for the passage of the dirt; but in such case there remained surfaces on either side of the tongue for the latter to impinge against, which would prevent the free escape of the dirt. In my invention, however, to give certainty that the tongue shall sweep the dirt, mud, &c., beyond its path, the interior guard-rail is entirely dispensed with, the frog-plate being a simple plain surface on such interior edge. From it project one or more stop pins or lugs, 36, limiting the inward movement of the tongue, one near the tip of the tongue being sufficient under ordinary circumstances, while the two shown are ample. The retained outer guard-rail 34 is formed with a series of cuts or notches 33, extending down to the base or

web of the frog-plate. These cuts or openings are wider on the interior than on the exterior of the rail, so as to leave between them triangular or saw-toothed projections or teeth, each coming to or about to a point upon the interior of the rail, so giving little, if any, obstruction to the free passage of dirt through the cuts or interstices 33 as it is forced thereinto by the tongue or point, while their upper surfaces are sufficient for the tread of the wheel to run upon. Then, as the point is moved to the right, dirt, &c., upon the plate is swept by the tongue out through the openings 33 without material obstruction of the point, while on movement in the other direction the tongue sweeps such dirt, &c., beyond the line of the stops 36.

In all boxes for switch mechanisms of this type some dirt is liable to sometimes work into a box beneath or around its lid, wherefore it is preferable to bevel the under side of the arms 5, as shown at 37, such bevel being somewhat acute and coming to a point at the free ends of the arms. Then, if any dirt has gotten beneath the arms, their moving ends force themselves thereinto, and are not blocked thereby.

While herein both boxes 1 and 2 are shown as located upon the outside of the main track and its frog-plates, it is evident that either or both could be placed within the track; but it is preferable that the box upon the side of the switch-point (herein box 1) be upon the outside of the track, as the draft of the animal is in that direction.

As the box 26 comes apart and is readily detachable from the boxes 1 2, the whole mechanism may be put into exceedingly compact form for shipment and the parts then readily assembled and put in operative position and relation.

Having thus described my invention, what I claim is—

1. The combination of a pivoted switch-tongue, a connecting-bar, a lever connecting such bar with the switch-tongue, and two sets of mechanisms, one at either end of the connecting-bar and each consisting of a rocking lever having an upwardly-projecting arm connected to the connecting-bar, arms projecting outwardly at an angle to such upward arm and each carrying a cup-bearing, and a platform having legs taking in such cup-bearings, substantially as set forth.

2. The combination of the boxes 1 2, each provided with a top 3, having inwardly-projecting arms 8, shaft 4, with arms 7 and 5, the bar 14, connected to the arm 7 of each box, the convex-faced washers 17, the lever 22, and switch-point 19, substantially as set forth.

3. The combination, with the pivoted switch-point, the lever 22, and the bar 14, of the following instrumentalities located at either end of the bar and in suitable boxes thereat, to wit: the rock-shaft 4, with arms 7 and 5, the cup-bearings 6, detachably secured upon the arms 5, and the table or platform 3, having



arms 8 taking at their ends in the cup-bearings, substantially as set forth.

4. The combination of a box having lugs 31 secured or formed upon its interior, cross-brace rods 32, seated therein, a vertically-moving platform-top seated in the upper part of the box, and a switch mechanism actuated thereby and located within the box, substantially as set forth.

5. The combination of the boxes 1 2, each provided with a top having inwardly-projecting arms 8, shaft 4, with arms 5 and 7, the bar 14, connected to the arm 7 of each box, the lever 22, switch-point 19, pivoted on the frog-plate, having stops or lugs 36 on its inner edge, and the single rail on its outer edge formed with openings or apertures 33 through its body, substantially as set forth.

6. The combination, with the boxes 1 2, of the transverse box 26, having sides 27, formed with the flanges 28 29, substantially as set forth.

7. The combination of the shaft 4, having arms 5 and 7, the bearings 6 on the arms 5, the top 3, having arms 8 taking in such bearings, and the bearing-boxes for the shaft 4, each bearing-box having one half 11 formed with the inclosing-box and one half 12 secured thereto, and the inclosing-box, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES M. SWEM.

Witnesses:

Z. F. WILBER,

B. L. POLLOCK.