(No Model.)

3 Sheets—Sheet 1.

T. E. CALVERT.

RAILROAD SWITCH STAND AND SWITCH CONNECTION.

No. 353,664. Patented Dec. 7, 1886.

Fig. 1.

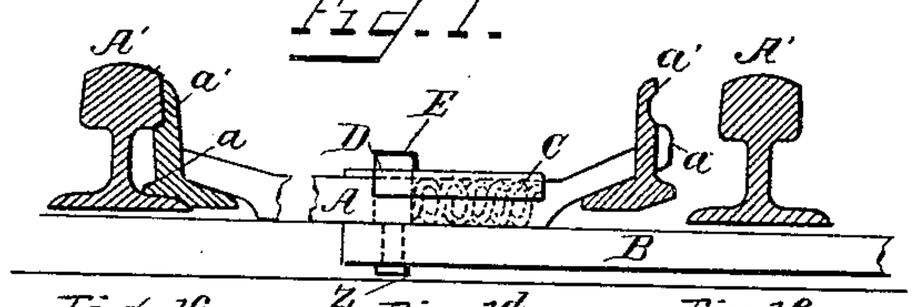


Fig. 1c

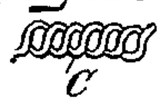


Fig. 1d

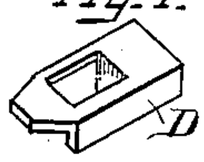


Fig. 1e

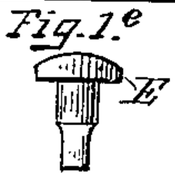


Fig. 2.

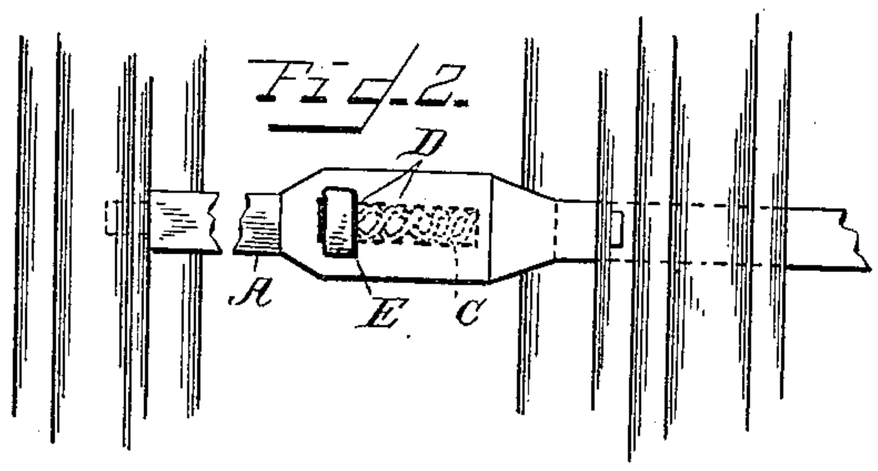


Fig. 3.

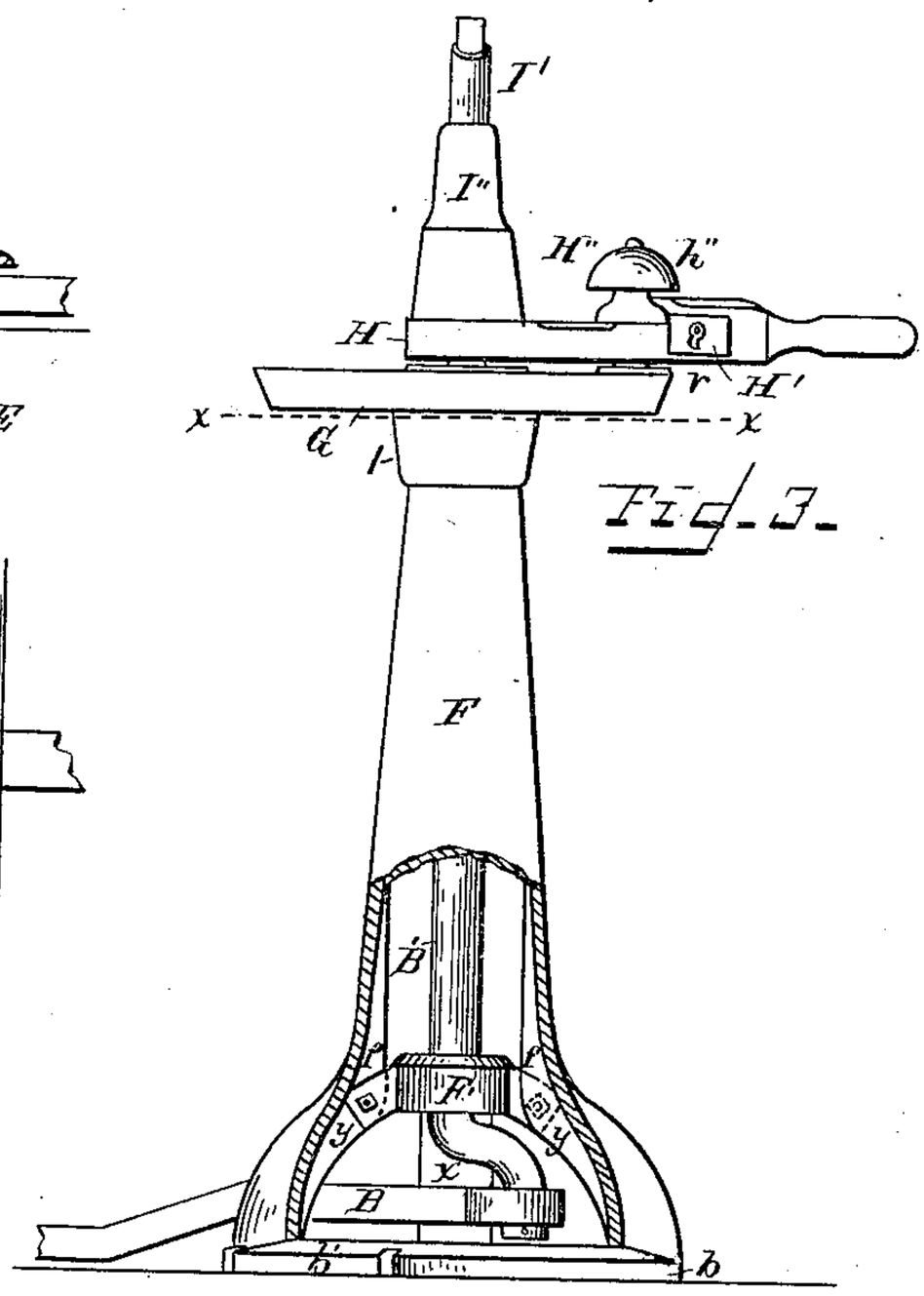


Fig. 4.

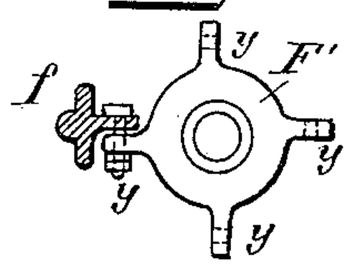


Fig. 5.

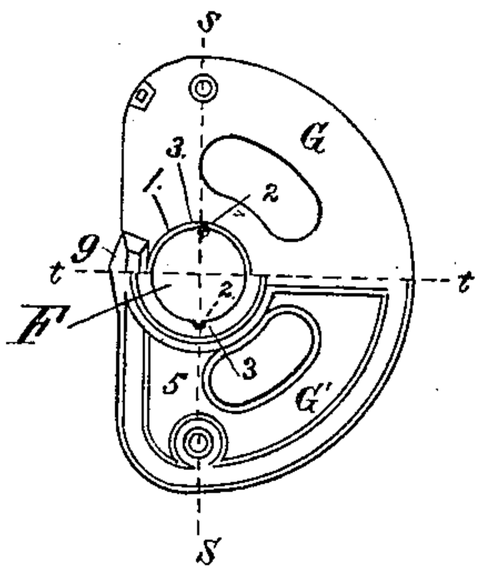


Fig. 6.

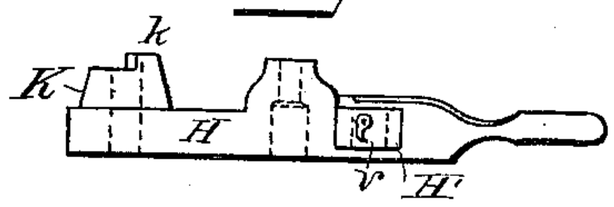


Fig. 7.

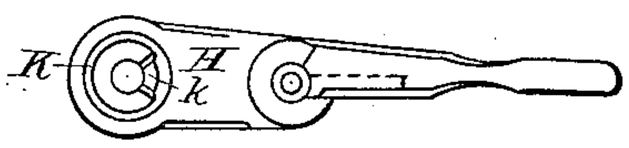
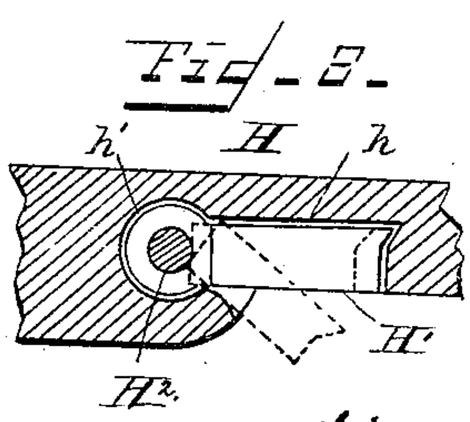


Fig. 8.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

T. E. CALVERT.

RAILROAD SWITCH STAND AND SWITCH CONNECTION.

No. 353,664. Patented Dec. 7, 1886.

Fig. 9.

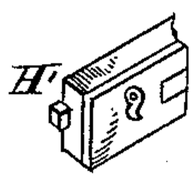


Fig. 10.

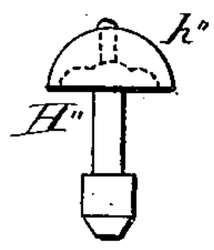


Fig. 11.

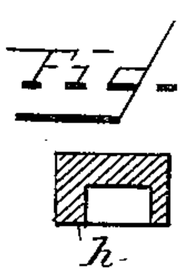


Fig. 12.

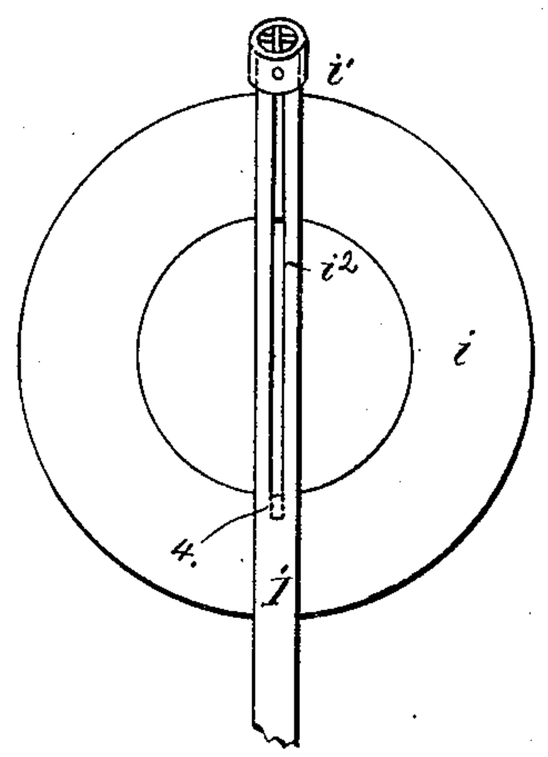


Fig. 16.

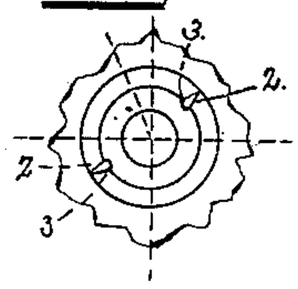


Fig. 17.

Fig. 18.

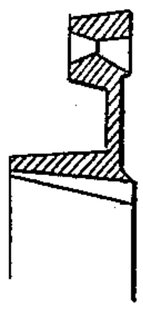
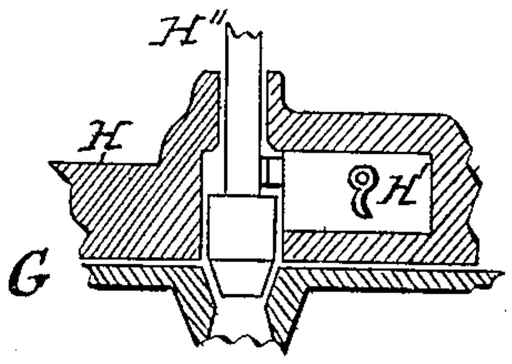


Fig. 19.

Fig. 20.



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(No Model.) 3 Sheets—Sheet 3

T. E. CALVERT.

RAILROAD SWITCH STAND AND SWITCH CONNECTION.

No. 353,664. Patented Dec. 7, 1886.

Fig. 15.

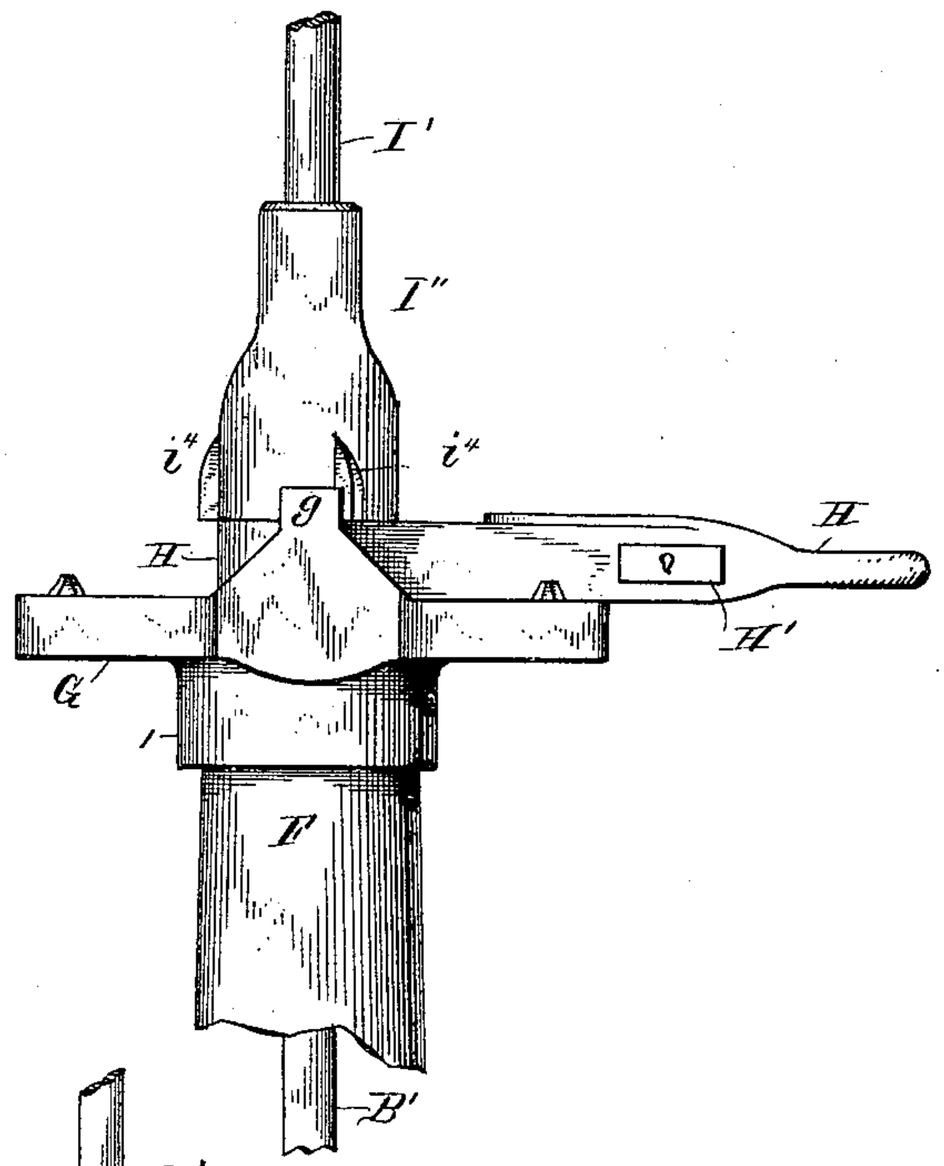


Fig. 13.

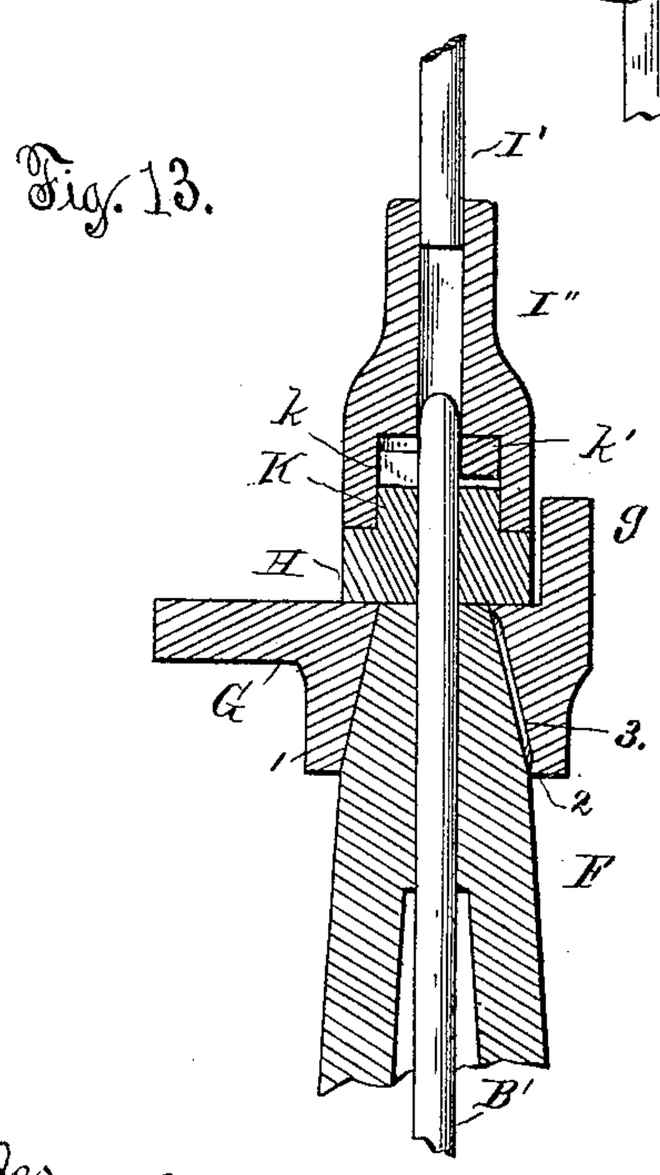
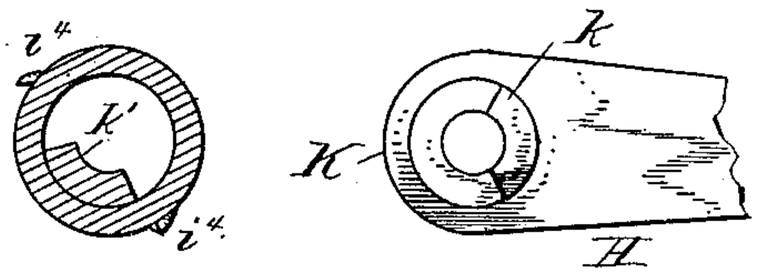


Fig. 14.



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Inventor
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By his Attorneys,
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UNITED STATES PATENT OFFICE.

THOMAS E. CALVERT, OF LINCOLN, NEBRASKA.

RAILROAD SWITCH-STAND AND SWITCH-CONNECTION.

SPECIFICATION forming part of Letters Patent No. 353,664, dated December 7, 1886.

Application filed October 3, 1885. Serial No. 178,950. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. CALVERT, of the city of Lincoln, in the county of Lancaster and State of Nebraska, have invented certain new and useful Improvements in Railroad Switch-Stands and Switch-Connections; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention has for its object to furnish a switch-stand and switch-stand connections which shall be simple in construction, effective in operation, and more suitable for use than others heretofore known.

My invention consists, first, in an improved tie-rod, a switch-rod supported in connection therewith, and an elastic element interposed between the bearing of the switch-rod and a seat in the tie-rod, as hereinafter stated and claimed; second, the improved means of holding the crank or main vertical shaft; third, the improved switch-table and means of connecting the switch table and stand; fourth, the switch-lever, constructed to receive and retain the lock; fifth, the locking mechanism, whereby the key cannot be withdrawn until the switch is locked in the position desired; sixth, the construction and arrangement of the mechanism whereby the semaphore is moved one-quarter of a revolution while the switch-lever is drawn around one-half of a revolution and the lost motion thoroughly compensated therefor.

In the accompanying drawings, Figure 1 represents a side view of my improved flexible joint switch-connection. Fig. 2 represents a top view of the flexible joint-connection. Fig. 3 represents a front view in elevation of a switch-stand, switch-lever, switch-table, and semaphore embracing my improvements. Fig. 4 is a detail view of the eccentric box holding the crank-shaft. Fig. 5 represents a top and bottom view of my improved switch-table, the top being shown in that part above the line *t t* and the bottom construction as below that line. Fig. 6 is a side view of my improved switch-lever. Fig. 7 is a top view of my improved switch-lever. Fig. 8 is a detail sectional view of the switch-lever, showing lock-space and pin-hole space, and the lock in its seat and its position when being removed, shown in dotted lines. Fig. 9 is a detail view in perspective of lock used in connection with switch-lever. Fig. 10 is a detail view of lock-pin. Fig. 11 is a transverse sectional view of the lock-space of switch-lever. Fig. 12 is a side view of the upper portion of my improved semaphore. Fig. 13 is a vertical central view of the semaphore-base, the axial end of the switch-lever, the switch-table, and the upper part of the switch-stand, showing the semaphore-base resting on the axial end of the switch-lever and the socket of the table on the end of the stand. Fig. 14 is a detail view of the base of the semaphore and the axial end of the switch-lever, arranged to show the several lugs and projections in relative position when in the position seen in Fig. 15. Fig. 15 is a detail view of the base, switch-table, the switch-lever, the base of the semaphore, and the upper part of the stand. Fig. 16 represents a sectional view of base of switch-table and top of switch-stand. Fig. 17 is a detail view of switch-lever stop on switch-table G. Fig. 18 is a section of switch-table on line *s s* of Fig. 5. Fig. 19 is a detail view of switch-table projection *g*. Fig. 1^e is a detail view of switch-pin used in connection with my flexible joint-connection. Fig. 1^d is a detail view of the cap used in the flexible joint-connection. Fig. 1^c is a detail view of the spring used in the flexible joint-connection. Fig. 20 is a sectional view of the lever, showing the lock and pin as they stand when the switch is locked.

Similar letters and figures represent similar parts throughout the several views.

My first improvement is a flexible joint-connection of the switch-rod and tie-rod, and is a device which consists, as seen in Fig. 1, of tie-rod A, switch-rod B, spring C, cap D, and pin E.

The tie-rod A, as seen in Fig. 1, is formed with end hooks, *a a*, which are passed through holes in the switch-points *a′ a′*, the shoulders of the tie-rod setting against the inner faces of the switch-points and holding them firmly in their positions. By this construction I dis-

pense with bolt-fastenings, which are liable to work loose and eventually drop off, thereby disconnecting the parts. As seen in Figs. 1 and 2, the tie-rod A is further provided with spring C, which serves to take up all the lost motion in all the joints. Spring C is also shown in detail, Fig. 1ᵉ. Above the tie-rod A, Figs. 1 and 2, is placed cap D, (shown in detail, Fig. 1ᵈ,) which is designed to serve as a covering for spring C and to prevent the same from becoming clogged with snow, ice, and other obstructions. The switch-pin E, Figs. 1 and 2, passes through slots in cap D, tie-rod A, and fits snugly in a slot in end of switch-rod B, as seen at *z*, Fig. 1. This switch-pin E, Fig. 1, is riveted at its lower end, to prevent the switch connection from being tampered with.

The switch-pin E is made the weakest element in the construction of the switch, in order that it will give way when any strain is exerted which would otherwise break any of the other parts.

It will be perceived from the foregoing description that the interposition of the spring C gives the parts a yielding or elastic connection, so that while the switch-points are held securely in position the elasticity imparted by the spring serves to protect the parts from being broken during the operation of turning the switch.

The crank-shaft B′, Fig. 3, of the switch-stand F is designed to throw a larger distance than the switch-points *a′ a′* actually move, the difference or intervening space thereby occasioned being taken up by spring C, Fig. 1.

The base *b* of the switch-stand F, Fig. 3, is constructed with a rim or flange, *b′*, upon which the rear end of switch-rod B, Fig. 3, rests and travels, and is designed to prevent the switch-rod B from becoming disconnected from the crank-shaft B′, even if the pin or bolt connecting the switch-rod B and crank-shaft B′ does come out. In Fig. 3 the switch-rod B is shown in its designated and operative position somewhat above the flange *b′*.

My second improvement is a device for holding the foot of the crank-shaft. In Fig. 3, and detail, Fig. 4, is shown the box F′, used for this purpose. This box F′ (see Figs. 3 and 4) consists of a hub cored out to form a bearing for the lower part of the crank-shaft B′, and is formed with radially-projecting fingers or lugs *y*, perforated to receive fastening-bolts, which are passed through the interior flanges or ribs, *f*, in the case of the switch-stand F, substantially as shown in the drawings. When the box F′ is in its fixed position, the ends of the radial lugs do not quite reach the inner face of the switch-stand, in order that when the bolts which hold the lugs to the flanges are removed the shaft B′ may be raised vertically, carrying the box F′ upward, thus giving sufficient play to lift the end of the crank from the switch-rod B, and also permitting the switch-lever to be raised enough to remove the lock, if desired.

My third improvement has reference to switch-tables, of which Fig. 5 presents a detail view.

The switch-table G is formed with a depending tubular flange, 1, forming a socket to set over the upper end of the switch-stand F, and is there held without bolts or rivets, gains 2 being formed in the socket, to take spines or ridges 3 on the end of the switch-stand and hold the switch-table G from sliding or turning. The switch-table G, Fig. 5, is hemispheroidal. Fig. 16 represents a sectional view of base of switch-table on switch-stand, taken on line *x x* of Fig. 3, and Fig. 18 a sectional view on line *s s* of Fig. 5. On the rear side of switch-table G, Fig 5, is projection *g*, the purpose of which will be hereinafter explained.

My fourth and fifth improvements are in reference to the switch-lever of a switch-stand and the locking mechanism used in connection therewith.

The switch-lever H, Fig. 3, is provided with lock-space *h* and pin-hole space *h′*, as seen in section view, Fig. 8. Fig. 9 is a detail perspective view of spring-lock H′, which is seated in a mortise in switch-lever H, as seen at *v*, Figs. 3 and 6. The switch-lever H and mortise-lock H′, Fig. 3, are used in combination with lock-pin H″. This lock-pin H″ is a circular and taper-pointed pin. (Shown in detail, Fig. 10.)

The lock-pin H″, Fig. 3, is practically a part of switch-lever H, Fig. 3, as it is originally inserted in the pin-hole of the switch-lever H, from the bottom side of the switch-lever H, and is then permanently capped with hemispherical handle *h″*, Fig. 3. In the switch-table G, Fig. 5, may be seen pin-holes for the reception of the lower extremity of the lock-pin H″ when the switch is locked. When the lock H′, Fig. 3, is unlocked, the lock-pin H″ can be raised only far enough to allow the switch-lever H, Fig. 3, to be drawn around the switch-table G. In this position the bolt of the mortise-lock H′ presses against the lower and larger portion of the lock-pin H″, and prevents the key of the mortise-lock H′ from being withdrawn. The advantage of having the lock inserted in connection with a lock-pin which cannot be entirely removed from the stand is this: The lock-pin cannot be lost, the lock itself is not so apt to get out of order when fixed as in this switch-lever, and by this arrangement the fastening can be fixed so that the switch must be locked for either side or main track before the key can be taken out of the lock. The lock is held in its seat by the extension or flange on its rear, and by having its bolt end set in the mortise opening into the lock-pin hole, as shown in Fig. 8 of the drawings. The lock is removed by drawing back the bolt, then disconnecting the bearing-box F′, then lifting the crank-shaft, which raises the lever from the table and permits the lock-pin to remain down in its seat or drop, so that the shoulder of the enlarged lower end of the lock-pin comes below the lower face of the

lock, when the lock can be slid inward until the bolt end comes against the smaller upper part or stem of the lock-pin and admits the rear end to be swung out and the lock removed, as shown in Fig. 8 in dotted lines.

The switch-lever H, Fig. 3, communicates motion to the crank-shaft B′, to which it is secured by pin or other ordinary device. The switch-lever H, Fig. 3, when drawn around the hemispherical switch-table G, causes the crank-shaft B′ to accomplish a half-revolution.

My sixth improvement has reference to the construction of a semaphore appurtenant to a switch-stand.

My improved semaphore I, Figs. 3 and 12, consists of targets i i^2, target-shaft I′, and semaphore-base I″. The target-shaft I′, Fig. 12, is hollow, and the upper end is split or slotted at right angles to receive the targets i i^2, which are fastened by being run at right angles to each other through the slots in the target-shaft I′. The targets i i^2 are fastened simply by screw i' on the end of target-shaft I′, and when they get loose can be tightened by simply turning screw i'. The smaller or inner vane, i^2, of the semaphore is notched or slotted in its lower edge, as at 4, Fig. 12, which notch sets over the plate of the larger vane, and then when the nut i' is tightened the sections of the slotted portions of the staff are drawn in and against the vanes and hold them both in place. The upper extremity of crank-shaft B′, Fig. 3, passes into the bore of target-shaft I′. The target-shaft I′, Fig. 12, receives its motion by being connected with semaphore-base I″ by pin or other ordinary fastening. The semaphore-base I^2 is chambered out to set over a projecting lug or flange, K, formed on the axial end of the switch-lever, as shown in the drawings in Fig. 13. On the face of the semaphore-base I^2, (see Figs. 14 and 15,) are formed stops or spines i^4 i^4, which when the base is turned stop against the projection g on the switch-table, and thus prevent the semaphore shaft and base from turning any farther in that direction. The movement of the semaphore-base with the semaphore is ninety degrees, and is externally assured, because the distance between either face of the lug g and the adjacent stop i^4 covers that distance. In the chamber of the base of the semaphore is formed a stop, k', the base of which slides over the upper face of the step in the projection K, and the edges of which engage the lug k on the projection K on the switch-lever. The relative arrangement or position of the lugs k and k', as they stand when the mechanism is in position seen in Fig. 15, is shown in detail in Fig. 14. It will be seen by reference to this Fig. 14 of the drawings that the internal lugs, k k', occupy a space of three-fourths of a circle, so that when they are set in a common plane, with two edges contacting and turned therein, the one may be moved ninety degrees before the non-contacting faces will meet. This construction, in connection with lugs on the table, limits the swing of the lever to one hundred and eighty degrees, and the lug g on the table, in connection with the flanges or spines i^4 on the semaphore-base, limits the movement of the semaphore-staff to ninety degrees without interfering with movement of the lever to the limit stated.

Theoretically the switch-lever H is designed, when in operation, to move ninety degrees before the semaphore I would begin to move and before the superior lug, k, of switch-lever H would engage the internal lug, k', of semaphore-base I″, and then while the switch-lever H traverses the remaining ninety degrees of its half-revolution, owing to the engagement of said lugs k k', it would move the semaphore I ninety degrees. Practically, however, owing to the weight of the semaphore I, resting upon the switch-lever H, Fig. 3, and the friction consequent therefrom, the semaphore I commences to revolve as soon as the switch-lever H, Fig. 3, begins its half-revolution, and when the semaphore I has performed a quarter-revolution the external lug, i^4, of semaphore-base I″ engages the projection g of switch-table G, and prevents the further revolution of the semaphore I, while the switch-lever H accomplishes the remainder of its half-revolution, carrying lug k of switch-lever H into close contact with internal lug, k', of semaphore-base I″.

I am aware that there are other designs for turning the semaphore ninety degrees while the switch-lever turns through one hundred and eighty degrees; but they are intricate in construction, unsightly in appearance, and exposed, while the mechanism of my device is simple in construction and thoroughly protected.

In my improved switch-stand and connections, as above described, a minimum amount of metal is used, and the whole contrivance makes a neat stand that takes up but little room.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The tie-rod A, formed with shouldered end hooks, as a a, adapted to pass through apertures in the switch-points from the inner sides, substantially as described.

2. The combination of the tie-rod A, formed with a central slot, a switch-rod having its end supported by a bearing in the slot, and a spring interposed in the said slot between the bearing and the end of the slot, substantially as described.

3. The combination, in a switch-connection, of tie-rod A, switch-rod B, spring C, cap D, and pin E, for the purpose of forming an elastic and flexible joint, substantially as described.

4. The combination, with the switch-stand formed with interior flanges, f, and the spindle, as B′, of the bearing-box F′, formed with projecting flanges adapted to be secured to the flanges of the switch-stand, substantially as described.

5. The combination of switch-stand F, eccentric box F′, and crank-shaft B′, substantially as described.

6. The combination, with a switch-stand formed with spines on its upper end, of the hemispheroidal switch-table formed with depending annular chamber or socket having gains to take the spines of the switch-stand, substantially as described.

7. The combination, with the spindle and the switch-stand and the lever formed with a lock-seat and lock-pin hole, of a lock seated in the seat of the lever and a lock-pin, substantially as described, and for the purpose stated.

8. The switch-lever H, in combination with mortise lock H′ and pin H″, substantially as described.

9. The switch-table G, in combination with a switch-lever, H, provided with mortise-lock H′ and pin H″, as herein specified.

10. The improved semaphore I, consisting of semaphore-base I″, target shaft I′, targets i i^2, and screw i', substantially as described.

11. The combination, with the switch-table formed with a locking-pin seat and the turning lever, of a vertically-arranged locking-pin in the turning lever, and a lock seated in the turning lever with its bolt arranged to pass over a shoulder on the locking-pin, whereby the pin is held in the seat in the table of the switch locked, substantially as described.

12. The combination of switch-stand F, switch-table G, switch-lever H, mortise-lock H′, lock-pin H″, and semaphore I, substantially as described.

In testimony that I claim the foregoing as my own invention I affix my signature in the presence of two witnesses.

THOMAS E. CALVERT.

Witnesses:
A. B. SMITH,
W. B. LEATHER.