E. N. STROM AND M. L. ERIKSON.

SWITCH STAND.

APPLICATION FILED JAN. 28, 1921.

1,373,031.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 1.

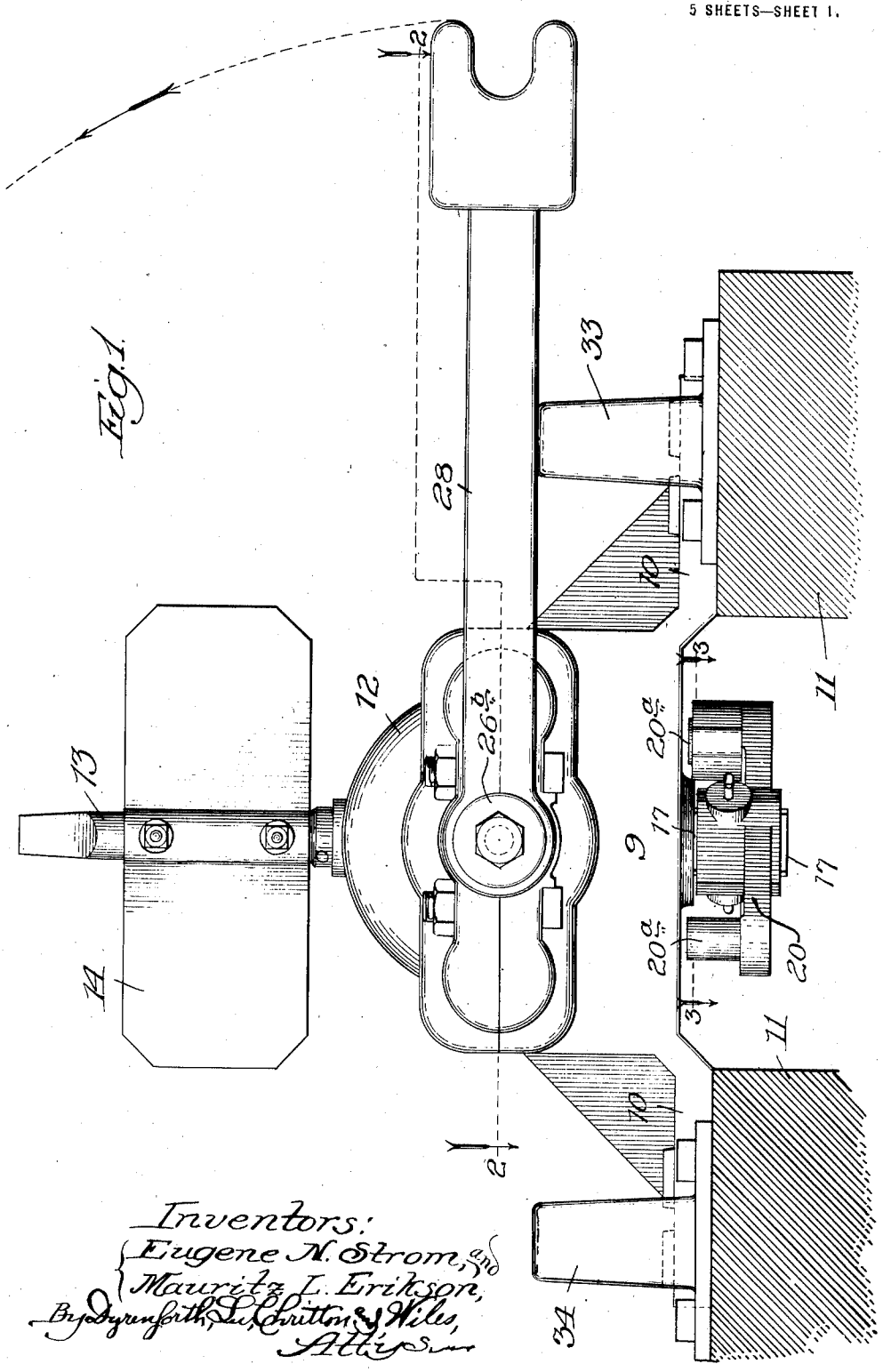


Fig. 1.

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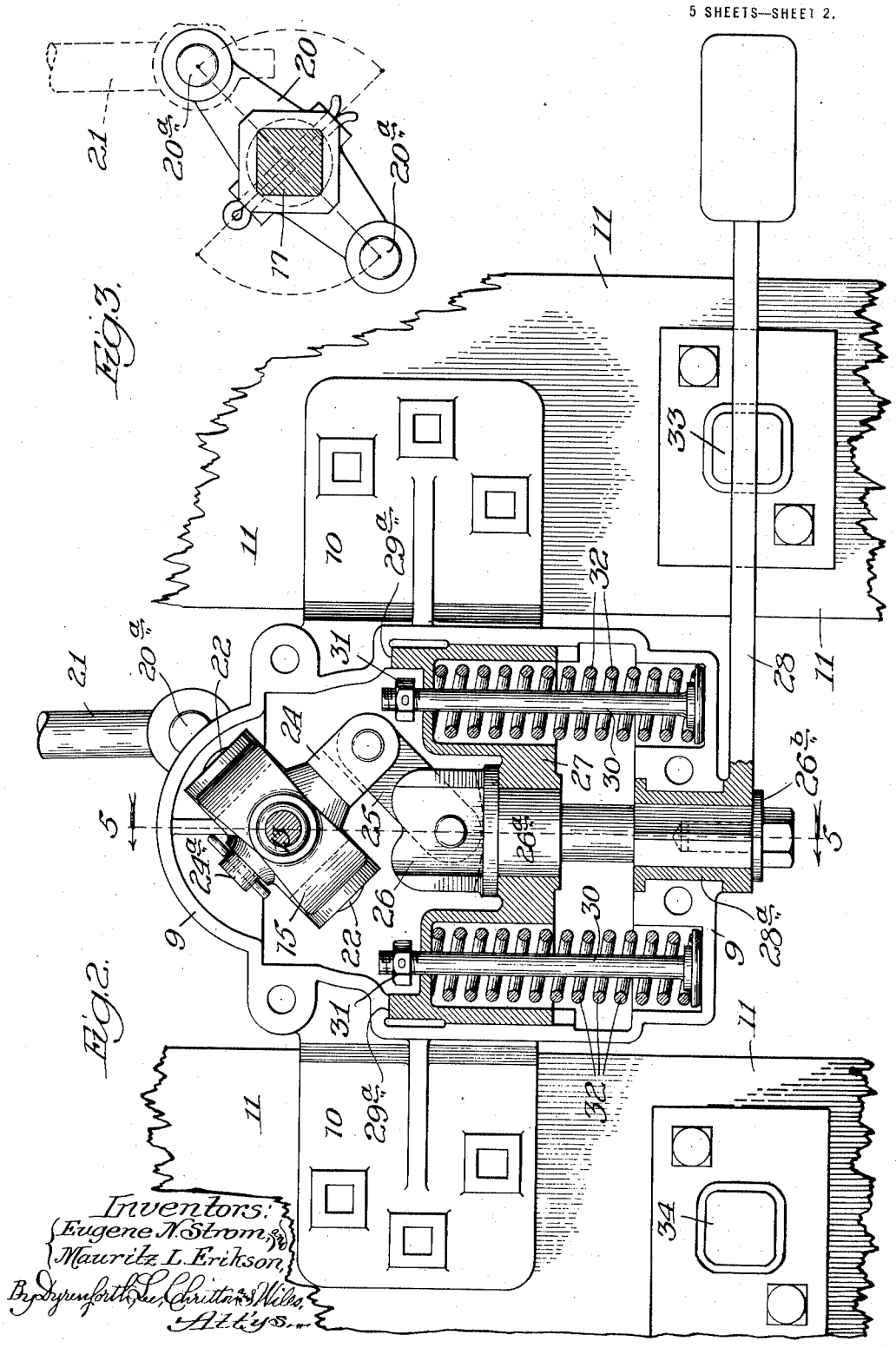
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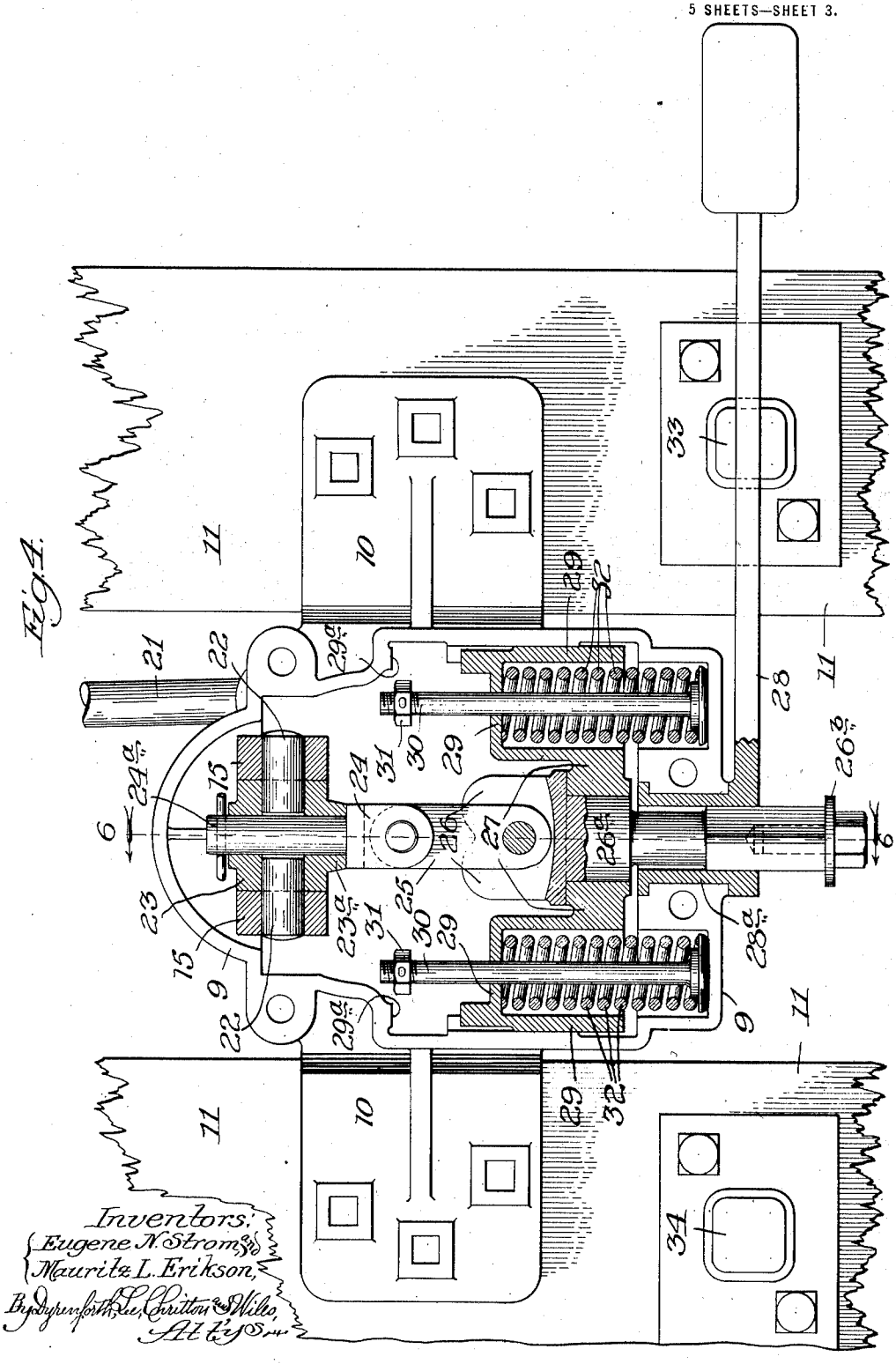
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

Fig. 5.

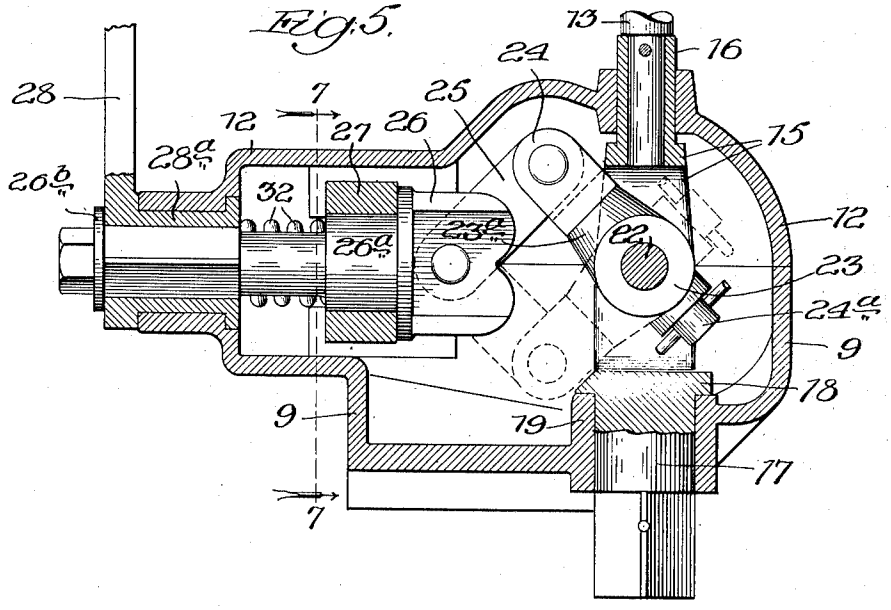
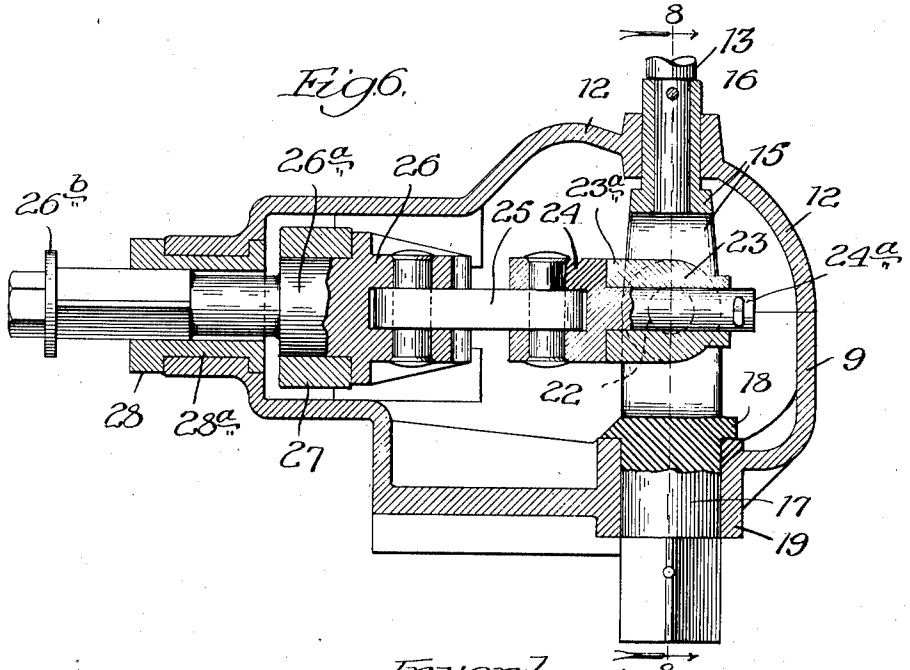


Fig. 6.



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SWITCH STAND.

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5 SHEETS—SHEET 5.

Fig. 7.

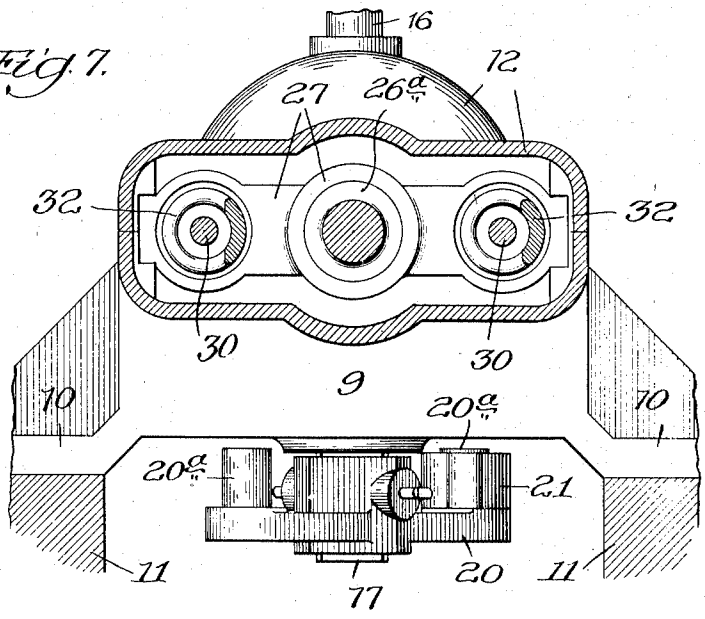
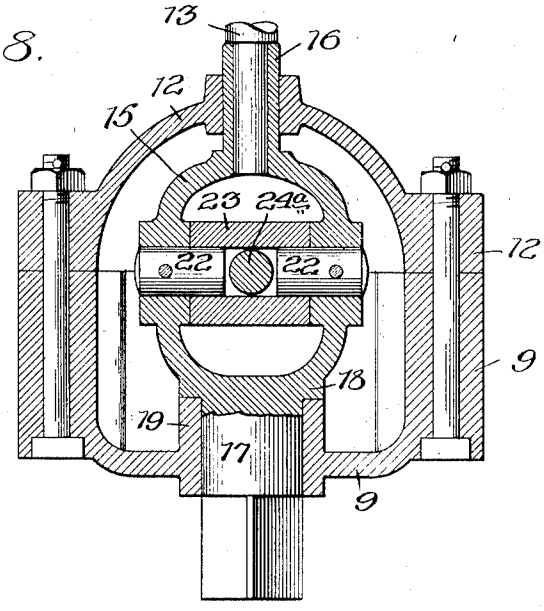


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SWITCH-STAND.

1,373,031. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed January 28, 1921. Serial No. 440,583.

To all whom it may concern:

Be it known that we, EUGENE N. STROM and MAURITZ L. ERIKSON, citizens of the United States, residing at 4710 West Division street, Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Switch-Stands, of which the following is a specification.

Our invention relates to an improvement in automatic switch-stands and is particularly designed for improving the type of switch-stand of U. S. Patent No. 718,348, dated January 13, 1903, to render the latter automatically operative to throw the switch by a locomotive or car running through it, but without turning or disturbing in its thrown position the lever employed for operating the stand by hand for the switch-throwing purpose.

In the accompanying drawings—

Figure 1 shows our improved switch-stand by a view in elevation; Figs. 2 and 3 are sections respectively on lines 2—2 and 3—3, Fig. 1; Fig. 4 is a view like that in Fig. 2, but with more parts in section and showing the mechanism undergoing automatic operation from a switch; Fig. 5 is a section on line 5—5, Fig. 2, but representing the parts in half-thrown position in operating the switch by the throw lever; Fig. 6 is a section on line 6—6, Fig. 4; Fig. 7 is a section on line 7—7, Fig. 5, and Fig. 8 is a section on line 8—8, Fig. 6.

The body of the switch-stand is a closed housing for the mechanism within it, and is preferably formed in two parts. The base 9, of the configuration illustrated in Figs. 2 and 4, has flanges 10 on its opposite sides, at which it seats and is securely fastened upon the head-blocks 11, 11. Upon the base fits and is removably fastened the top or cover 12, through which, near its end adjacent a switch (not shown) a target-shaft 13 is shown to project for carrying a semaphore-target 14. This shaft is carried and pinned in a socket-extension 16 (Fig. 8) of a yoke 15 terminating at its lower end in the spindle 17 having a shoulder 18 at which it seats rotatably on the upper end of a sleeve 19 formed as an integral part of the base 9. The spindle extends through this sleeve and its projecting end is of angular cross-section, as represented, and carries a crank-arm 20, to a crank-pin 20^a of which is fastened one end of the connecting rod 21.

The crank-arm is represented as a duplicated crank having two outer ends centrally between which it is removably fastened by a cotter to the spindle, each end carrying a frangible crank-pin or stud, so that in the event of one pin becoming fractured the arm may be readily re-set on the spindle for bringing the other pin into position for attachment to it of the connecting rod. However, a multiple frangible crank-pin provision is a common expedient for switch-stands; and in the present case the crank-arm may be single.

In alining transverse bearings (Fig. 8) formed in opposite sides of the yoke 15 are pinned trunnions 22 spaced apart at their inner ends. These trunnions enter the opposite ends of a tubular cylindrical sleeve 23, which is thus supported to be rocked. A stem 24^a extends between the inner spaced ends of the trunnions and through a central transverse opening in the sleeve 23, being confined against withdrawal by a cotter (Fig. 6); and the stem terminates at its inner end in a jaw 24 fitting against a flange 23^a projecting about the adjacent end of the aforesaid transverse sleeve-opening. This jaw and its stem form one link of a toggle. The other link 25 is pivotally confined at one end in the jaw 24 and is similarly confined at its opposite end in a jaw 26 seating against a spring-pressed plunger 27, shown of general cross-head shape, about a central opening in which is rotatably confined, at its relatively large section, a stem 26^a extending from the jaw 26 and passing at its narrower section through the body of the stand (Figs. 2 and 4). The opening in which the stem passes through the stand-body (base and cover) is shouldered about its inner and outer ends for rotatably confining against longitudinal movement therein the hollow head 28^a of the switch-stand operating lever 28, shown to be weighted. The head 28^a is flanged about its ends to fit the aforesaid shouldered ends of the opening. The internal wall of the hollow lever-head is of angular cross-section, and the outer end of the stem 26, which extends through the head and is provided with a stop-flange 26^b, is similarly angular to fit and be engaged by the head, whereby turn-

ing of the lever 28 turns the stem 26 to effect throwing of the switch by hand, as hereinafter explained.

The plunger 27, which fits and is reciprocably confined in the housing, is provided at opposite sides of the center through which the stem 26 works, with similar projecting cap-like sockets 29. The extent of reciprocal movement in its guides of the plunger, is limited in one direction by shoulders 29ª formed in the walls of the stand-housing. Bolts 30 pass centrally through the ends of the plunger-sockets and have expanded inner ends bearing against the rear wall of the contracted end of the stand-housing; and the bolts carry nuts 31 shown to be pinned on their outer threaded ends. Helical springs 32 surround the bolts 30 and are endwise confined in the sockets 29 between the closed ends of the latter and the expanded ends of the bolts. The purpose of providing the nut-carrying bolts 30 is one of safety in removing the plunger from the housing, as for replacing a broken spring: For such removal, after taking off the cover-member 12 of the housing and unpinning the nuts 31, the latter are turned to compress the springs and lock them in tensioned condition between the expanded bases of the bolts and the ends of the plunger-sockets. Then the plunger-device may, upon disconnecting the toggle-link 25 from the jaw 26 of the other toggle-link, be lifted out (with the sleeve 28ª, jaw 26 and its stem), whereas unless the springs were thus locked they would, in lifting out the plunger, expand with such force as to drive the device out of the hands of the operator with resultant probable injury to him and itself and other objects which it might encounter. Upon replacing the plunger-device, the nuts are reset to restore the springs to the normal condition in which they are illustrated in Fig. 2.

The operation is as follows:

With the switch-stand in operative position and the rod 21 connecting the crank 20 with a switch, by turning the lever 28 from its illustrated position, wherein it is shown to bear on a stop 33 on one head-block, to that of bearing on a similar stop 34 on the other head-block, thus through an arc of 180°, the switch is thrown. This ensues from the resultant turning of the jaw 26 by the axial turning of the stem 26ª whereby the toggle is turned, without breaking it, upwardly (see Fig. 5) through a like arc, and in this turning, its forward link turns the yoke 15 to correspondingly turn the target-shaft 13 and the spindle 17 for actuating the crank 19 to throw the switch. In the operation thus described obviously no compression of the springs 32 ensues.

The parts of the switch-stand mechanism being as represented in Fig. 1, when a locomotive or car runs through the closed switch, it throws the latter, the wheel-flange first encountering the switch-point forcing it away from the adjacent rail. That throw of the switch moves the connecting-rod 21 longitudinally to turn the crank 20 through 90°, as indicated in Fig. 3, and turns the spindle 13 and shaft 17, thereby turning the yoke 15 with the result of straightening the toggle in the partial throw to the condition in which it is represented in Figs. 4 and 6, and forcing the jaw 26 and its stem lengthwise outwardly to cause the resultant movement of the plunger 27 to compress and tension the springs 32, as represented in Fig. 4. The recoil of the springs, when the toggle passes the dead-center, shifts the toggle straightway across the jaw 26 to the position opposite that shown in Fig. 2.

As will be seen from the foregoing explanation, when the switch is thrown to operate it automatically in the manner described, the operating lever stays in the horizontal position to which it was last turned in operating the switch-stand by hand. This presents the advantage, which is a primary object of our invention, of avoiding, as a result of the automatic operation, swinging the lever from one to the other of its normal positions with the more or less likely result of its striking and seriously injuring or even killing a by-stander in its path.

As will also be apparent, when the switch, after being thus automatically thrown, is next operated by hand, this is effected by turning the lever 28 from its illustrated position, in which it was left by the automatic operation, whereby the toggle-device is turned downwardly, instead of upwardly as hereinbefore explained.

It is realized that considerable variation is possible in the details hereinafter described, and we do not intend by illustrating a single, specific or preferred embodiment of our invention to be limited thereto, it being the intention in the following claims to claim protection for all the novelty there may be in our invention as fully as the state of the art will permit.

We claim:

1. In a switch-stand, the combination with a housing, of a crank-carrying spindle for connection with a switch, a rotatable stem in the housing, a switch-throwing lever connected with the stem, a toggle connecting said stem and spindle, and spring-pressed mechanism with which said stem is connected, automatically operating, independently of said lever, to throw the switch by running therethrough.

2. In a switch-stand, the combination with a housing, of a crank-carrying yoke-containing spindle for connection with a switch, a sleeve journaled in the spindle-yoke, a rotatable stem in the housing, a switch-throwing lever connected with the

stem, a toggle connecting said stem and sleeve and a spring-pressed plunger with which said stem reciprocates longitudinally.

3. In a switch-stand, the combination with a housing, of a crank-carrying yoke-containing spindle for connection with a switch, a sleeve journaled in the spindle-yoke, a rotatable stem in the housing, a switch-throwing lever connected with the stem, a toggle connecting said stem and sleeve, a plunger with which said stem reciprocates longitudinally and provided with sockets, and springs confined in the plunger-sockets.

4. In a switch-stand, the combination with a housing, of a crank-carrying yoke-containing spindle for connection with a switch, a sleeve journaled in the spindle-yoke, a rotatable stem in the housing, a switch-throwing lever connected with the stem, a toggle connecting said stem and sleeve, a plunger with which said stem reciprocates longitudinally and provided with sockets, bolts passing lengthwise through the sockets and having expanded inner ends at which they bear against the housing-wall, and springs confined about the bolts between their expanded ends and the ends of the sockets.

5. In a switch-stand, the combination with a housing, of a crank-carrying yoke-containing spindle for connection with a switch, a sleeve journaled in the spindle-yoke, a jaw having a stem passing transversely through the sleeve, said jaw and stem forming one link of a toggle, a rotatable stem in the housing, having a switch-throwing lever connected with its outer end, and a toggle-link connecting said first-named link with the inner end of said lever-equipped stem.

6. In a switch-stand, the combination with a housing, of a crank-carrying yoke-containing spindle for connection with a switch, a sleeve journaled in the spindle-yoke, a jaw having a stem passing transversely through the sleeve, said jaw and stem forming one link of a toggle, a rotatable stem in the housing, having a switch-throwing lever connected with its outer end and a jaw on its inner end, a toggle-link connecting said two jaws, and a spring-pressed plunger with which said lever-equipped stem reciprocates longitudinally.

7. A switch-stand comprising a housing, a crank-carrying yoke-containing spindle journaled in the housing for connection with a switch, a sleeve journaled in the spindle-yoke, a jaw having a stem passing transversely through the sleeve, said jaw and stem forming one link of a toggle, a spring-pressed plunger reciprocably confined in the housing, a stem journaled in and longitudinally reciprocable with the plunger and extending at one end through an opening in the housing, said stem terminating at its opposite end in a jaw, a toggle-link connecting said two jaws and an operating lever having a hollow head rotatably confined in said housing-opening and engaging the stem passing therethrough.

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