

May 16, 1933.

W. H. NEESON

1,908,781

SWITCH STAND

Filed Feb. 28, 1931

2 Sheets-Sheet 1

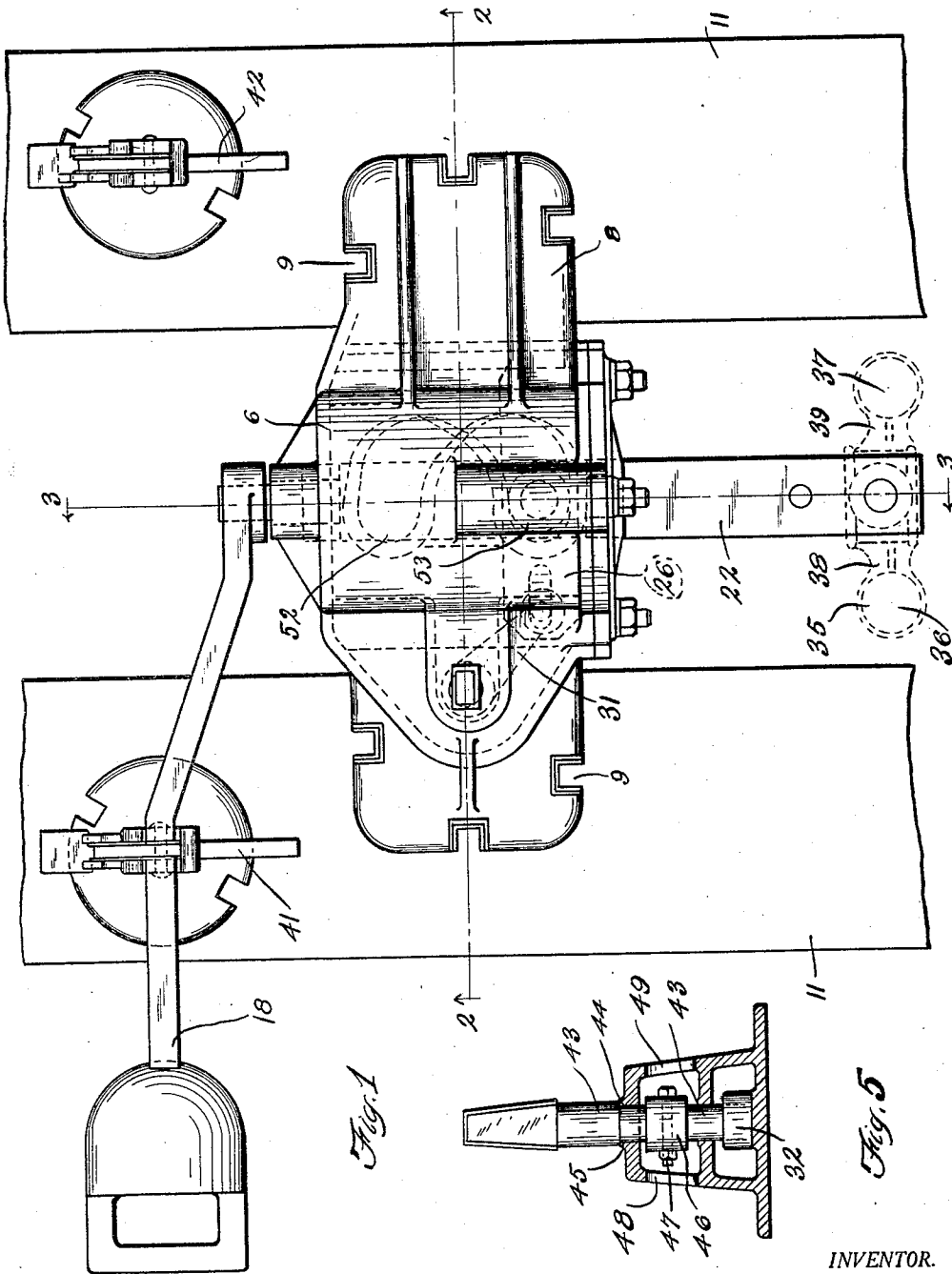


Fig. 1

Fig. 5

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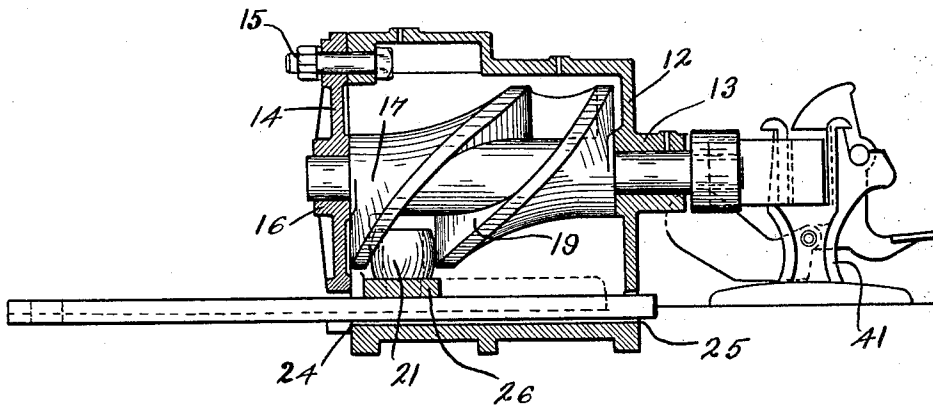
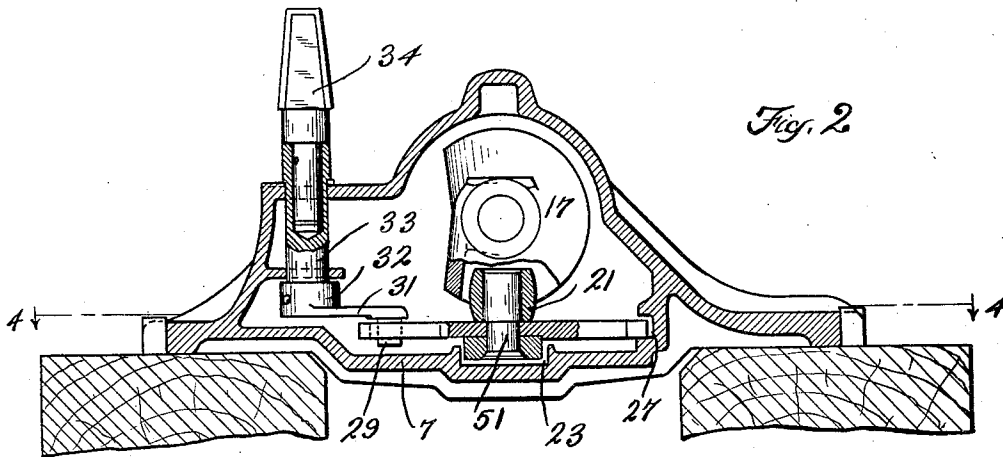


Fig. 3

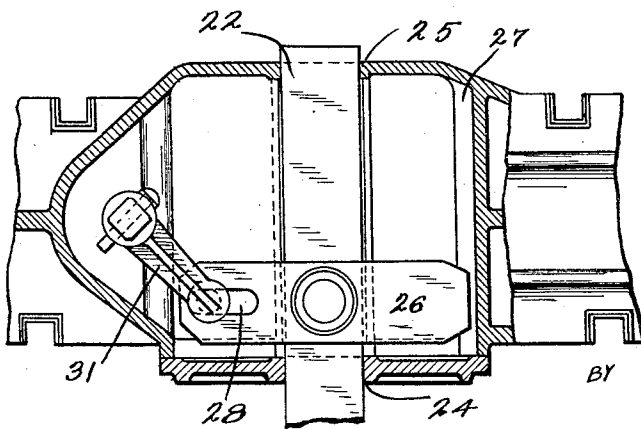


Fig. 4

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## SWITCH STAND

Application filed February 28, 1931. Serial No. 518,951.

The present invention relates to switch stands having improved operating characteristics and, more particularly, to a construction thereof which is certain and positive in its action.

Switch stands as previously constructed have been subject to deterioration and interference with their operation due to the fact that the mechanism has been more or less exposed to the weather. In cold climates, ice may form in certain parts of the structure interfering with the proper action of the switch stand, while tilting of the mechanism often prevents smooth operation, due to the binding of the parts. Vibration from passing trains has also caused trouble and difficulty when transmitted to the operating mechanism. It has also been difficult with one piece mast and tip to readjust the signal indications in relation to the switch throwing means. Another difficulty met with is that of keeping switch stand lamps in focus due to the fact that the continual throwing of the switch stand has caused bolts in the mast to work loose with the result that the lamp tips wobble.

I have now invented an improved switch stand construction in which the difficulties above enumerated are largely overcome. It is, accordingly, an object of the invention to provide a switch stand in which the operating mechanism is housed against the weather. Another object of my invention is to provide an apparatus which will operate under icy conditions. Still another object of my invention is to provide a switch stand in which the signal parts may be quickly and readily adjusted in relation to the switch throwing parts, and wobbling of lamp tips eliminated. A further object of the invention is to provide a switch stand which shall operate smoothly without binding of the parts.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such dis-

closed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a top plan view of the switch stand; Fig. 2 is a section taken along the line 2—2 of Fig. 1; Fig. 3 is a section taken along the line 3—3 of Fig. 1; Fig. 4 is a section taken along the line 4—4 of Fig. 2; and Fig. 5 is a sectional elevation of a modified form of signal mast included in my invention.

Referring to Fig. 1 of the drawings, a main housing casting 6 has a base 7 and extending flanges 8 provided with spike notches 9 and adapted to rest on adjacent ties 11. The housing is constructed to contain most of the mechanism necessary to the operation of the switch stand and is closed at one end 12 where it is provided with a bearing boss 13 extending outwardly from the housing. The open end of the housing is closed by a bearing plate 14 secured to the housing by bolts and nuts 15, this plate also having a bearing boss 16. An operating cam member 17 is mounted in the bearings 13 and 16 and is formed with a squared end over which fits a weighted lever handle 18. The cam is of a type having a single spirally formed cam groove 19. The cam 17 is caused to revolve by the throw of the lever handle 18.

A roller 21 fits into the groove 19 in the cam and is moved longitudinally thereby. A slide bar 22 is mounted in a groove in the base of the housing and extends through closely fitting apertures 24 and 25 in the ends of the casing and bearing plates and carries the roller 21, as well as an operating arm 26 which is mounted at right angles to the slide bar. This operating arm and roller pin 51 may be formed integrally with the slide bar in a one-piece construction or they may be formed separately and attached or secured to the bar. At one end, the arm 26 fits slidably into a groove 27 in the housing and is thus prevented from tilting, which would cause binding and increased friction and wear. At its other end the operating arm has an elongated slot 28

in which fits a pin 29 or other suitable connecting means whereby a crank 31 is operably connected to the switch throwing means. Of course, it will be obvious that the slot may be in the crank and the pin on the operating arm to secure the same action. This crank bears a mast 33 into which fits the mast tip 34. Various signal devices may be fitted on this mast tip as desired and banners may be attached to the mast or to the mast and tip as occasion demands.

The slide bar 22 is connected to the switch through the breakable cross-arm 35, and a connecting rod, in the case of yard switches, or the bar may be connected directly to the connecting rod, which may be rigid or adjustable, for main lines. The breakable cross-arm has two apertures 36 and 37 and two breakable points 38 and 39, the function of which will appear hereinafter. The lever handle 18, by means of which the switch stand is operated, may be locked in position by means of the latches 41 and 42, with which a padlock may be used where it is desired to prevent unauthorized movement of the switch, or, for yard switches, due to the automatic locking nature of the stand, ordinary lever rests may be used.

The mast illustrated in Fig. 2 is known as a two-piece mast but, in a modified form of my invention, a one-piece mast is provided, as shown in Fig. 5. In this modification, the mast arm 32 connects with the one-piece mast 43 which extends above the housing and is supported by shoulders 44 resting on shoulders 45 formed on the housing, or the mast may rest in the arm 32 which may, in turn, rest on the floor of the housing, the shoulders 44 being omitted in such case. This type of mast would be readily withdrawable from the structure were it not for the provision of a ring or collar 46 which surrounds the mast within the housing and prevents upward movement of the mast. This ring or collar element is attached to the mast by means of a bolt and nut 47 passing through holes in the collar and mast. An aperture or apertures are provided such as those numbered 48 and 49, and oppositely disposed in the housing, which make it easy to remove the bolt, so that mast indications may be changed if desired.

The operation of my improved switch stand is as follows: To open or close a switch and simultaneously to set a signal corresponding to the position of the switch, the lever handle 18 is swung through an angle of 180° until it rests on the other of the two latches shown. This movement of the lever handle causes the cam 17 to revolve and the cam groove 19 moves the roller 21 forward or backward as the case may be and this roller in turn moves the slide bar 22, to which it is attached, longitudinally, thus

opening or closing the switch. In yards where switches are often run through, it is advisable to connect the slide bar to the switch through the breakable cross-arm 35 which has breaking points 38 and 39. A train passing through the switch will not injure the switch stand but will merely break off one of the legs at the breaking point and the switch stand can be reconnected through the unbroken leg. When the second leg is broken, a new breakable cross-arm may be easily attached. In the present improved construction, the cross arm is placed out in front of the switch stand housing where it is easily accessible for inspection and replacement.

In order to indicate whether a switch is open or closed, signal means are always mounted on the switch stand and these are connected, in my construction, in a new and improved manner. As the slide bar 22 moves longitudinally, it carries with it the cross-arm 26 which is prevented from tilting at its free end by the sides of a groove 27 and this arm, in turn, moves the crank 31 which is connected to the mast 34. It will be noted that, while the lever handle 18 swings through an arc of 180° to operate the switch, the crank 31 moves through an angle of only 90° in the same time, thus changing the signal from red to green or vice versa, since the signals are mounted on the mast at right angles to each other. As the slide bar cross-arm 26 moves with the slide bar, it swings the crank by the bearing of the elongated slot 28 on the pin 29, the elongation of the slot allowing play for the pin as the distance between the mast and the cross-arm changes.

As stated above, the slide bar 22 lies in the groove 23 in the bottom of the housing. The roller 21 which operates the slide bar is connected thereto by means of a pin 51 and the hole in the slide bar into which this pin fits is shown as being countersunk. The pin may also be flush with the bottom of the slide bar but, in no case, should it project beyond. It has been the practice in previous constructions to hold the roller to the slide bar by means of a nut lying below the lower surface of the slide bar, but this has often resulted in preventing the operation of the switch in icy weather due to the fact that the underlying projection contacts with the ice in the groove 23 and prevents the slide bar from moving back and forth. In such instances it is necessary to thaw out the switch stand. In the present construction, ice in the groove 23 will not interfere with the operation since there is no nut or other projection below the slide bar to contact with any ice which may be present. It is also possible to make the slide bar, cross arm, and roller in a one-piece forging, as mentioned above, provided the same provisions

are made to avoid under-hanging projections.

The groove 19 in the operating cam 17 is of peculiar construction, terminating at each end in pockets 52 and 53 which have no angular advance so that the roller fitting therein does not move during the first part of the lever throw, say for 20° of throw. When the roller is in these pockets, the switch stand is locked against vibrations set up by passing trains and possibility of a gap developing between switch points and stock rail is eliminated.

The two-piece mast 34 shown in Fig. 2 gives satisfactory operation. It may be equipped with either the plug type tip as shown or the basket type if desired. However, the one-piece mast is subject to the objection that it is not easily adjusted when it is desired to change the signal in relation to the position of the switch. In such case, it is somewhat difficult to make the desired readjustment. To overcome this difficulty, I have provided a one-piece mast as shown in Fig. 5, in which the mast arm 32 operates the mast directly. The mast 43 extends down through a hole in the casing into a preferably, square socket in the mast arm, thus eliminating the need of a pin or bolt to secure the mast to the arm. Shoulders 44 on the mast bear against shoulders 45 on the casing and thus support the mast, or the mast may be supported from the bottom by the crank arm which may rest on the housing. It is necessary, however, to provide means whereby the mast cannot be withdrawn and I have, accordingly, devised the tube or collar 46 which fits around the mast and is held in engagement therewith by means of a bolt and nut 47 passing through holes in the collar and mast. With the collar in position the mast cannot be withdrawn since the collar then comes in contact with the casing. When it is desired to change the signal indications by turning the mast 90° the bolt is accessible through apertures 48 and 49 in the housing and may be readily withdrawn. Of course other retaining means may be used to prevent withdrawal of the mast, said means being located wherever desired on the mast, below or above the casing as well as inside thereof.

It will be noted that practically all of the mechanism necessary for the action of my switch stand is enclosed in the housing 6, thus protecting important operating parts from the action of the weather. Another feature of my improved switch stand is that no attaching means such as bolts or cotter pins are required inside the housing, only bolts 15 being used to attach the bearing plate 14 to the housing where a two-piece mast is used, and these bolts together with bolt 47 being necessary where a one-piece mast is used. This type of construction per-

mits ready assembly and disassembly of the stand and also makes for safer and smoother operation.

So far as I am aware, no switch stand now in use incorporates the above set forth features including a slide bar with no underlying projection, a cam with a groove adapted to lock the switch stand in position and a cross-arm, whether formed integrally with the slide bar or separately therefrom, said cross-arm transmitting the motion of the slide bar directly to the mast crank and also means for preventing tilting of the cross-arm during operation of the device. A one-piece mast with the adjustment features disclosed is also believed to be new whether used with or without the other features characterizing the improved switch stand.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A switch stand comprising a housing, an operating cam, and a mast mounted in said housing, a slide bar and slotted operating arm enclosed in said housing, a roller on said slide bar engaging said cam, a crank secured to said mast and having a pin extending into said slot in one end of said operating arm, a guide-way in said housing engaging the other end of said operating arm, and lever means adapted to rotate said cam.

2. A switch stand comprising a housing, an operating cam mounted in said housing, a crank mounted in said housing, a one-piece mast inserted in one end of said crank, a slide bar mounted in said housing, said bar having a roller adapted to engage said cam, a slotted operating arm secured at right angles to said slide bar, a pin in the free end of said crank extending into said slot in said operating arm, and lever means for rotating said cam.

3. In a switch stand having a housing, an operating cam mounted in said housing, and a crank mounted in said housing, the combination which comprises a one-piece mast inserted in one end of said crank, retaining means within said housing adapted to prevent the withdrawal of said mast, and apertures in said housing giving access to said retaining means.

4. In a switch stand having a housing, an operating cam mounted in said housing, and a crank mounted in said housing, the combination which comprises a one-piece mast inserted in one end of said crank, a hollow tube within said housing surrounding said

mast, a bolt passing through said mast and said tube, and apertures in said housing giving access to said bolt.

5 In a switch stand having a housing, an operating cam mounted in said housing, and a crank in said housing, the combination which comprises a one-piece mast having a square end inserted in one end of said crank, a hollow tube within said housing surrounding  
10 said mast, a removable bolt passing through said mast and said tube, and apertures in said housing giving access to said bolt.

6. A switch stand comprising a housing,  
15 an operating cam and a mast mounted in said housing, a slide bar mounted in said housing, said bar having a roller adapted to engage said cam, a slotted operating arm secured at right angles to said slide bar, a crank secured  
20 to said mast and having a pin at its free end extending into said slot in one end of said operating arm, a guide-way in said housing engaging the other end of said operating arm to prevent tilting, and lever  
25 means for rotating said cam to operate said slide bar and mast.

7. A switch stand comprising a housing, an operating cam and a mast mounted in said housing, a slide bar and connected operating arm in said housing, means slidably  
30 connecting said slide bar and said cam, revoluble means connecting said mast with one end of said operating arm, a guide-way in said housing engaging an end of said operating arm, and means adapted to rotate  
35 said cam.

8. A switch stand comprising a housing, an operating cam and a mast mounted in said housing, a slide bar and associated operating arm in said housing, means slidably  
40 connecting said slide bar and said cam, a crank engaging said mast and connected by slot and pin means with said operating arm, a guide-way in said housing engaging an end of said operating arm, and means adapted to  
45 rotate said cam.

Signed by me, this 25th day of February, 1931.

WILLIAM H. NEESON.

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