

Sept. 14, 1948.

O. F. MAGNUS

2,449,239

SNUBBED TRAILING SETTING SWITCH STAND

Filed Nov. 25, 1944

2 Sheets-Sheet 1

Fig.1.

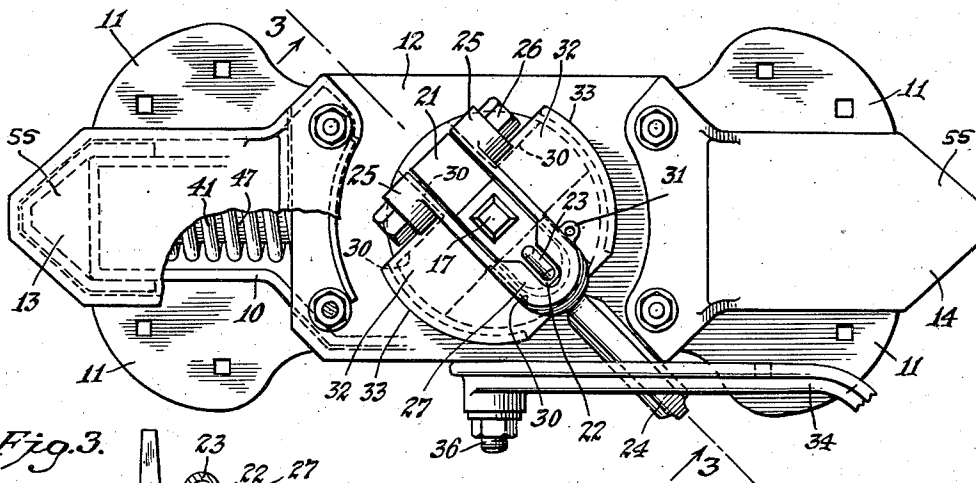


Fig. 3.

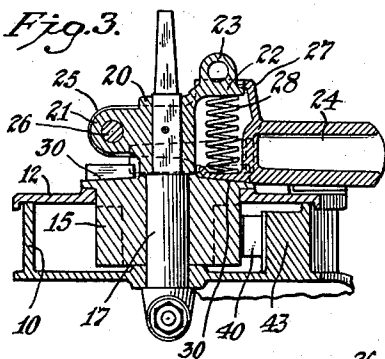
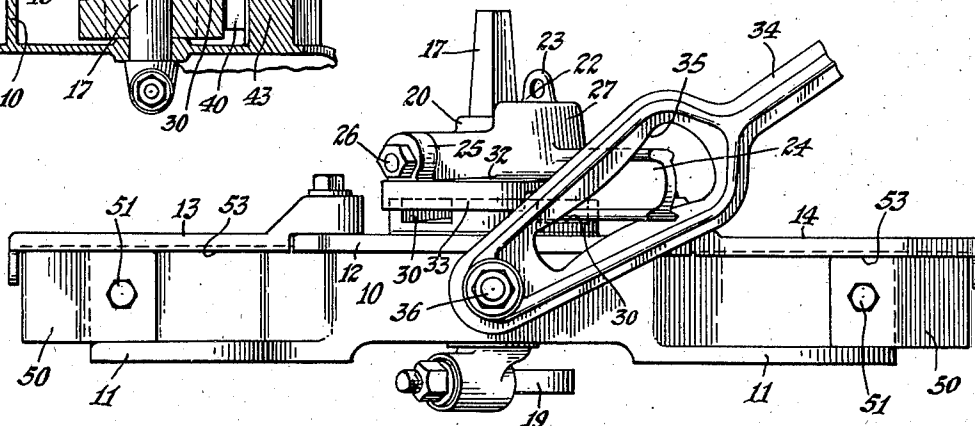


Fig. 2.



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Fig. 4.

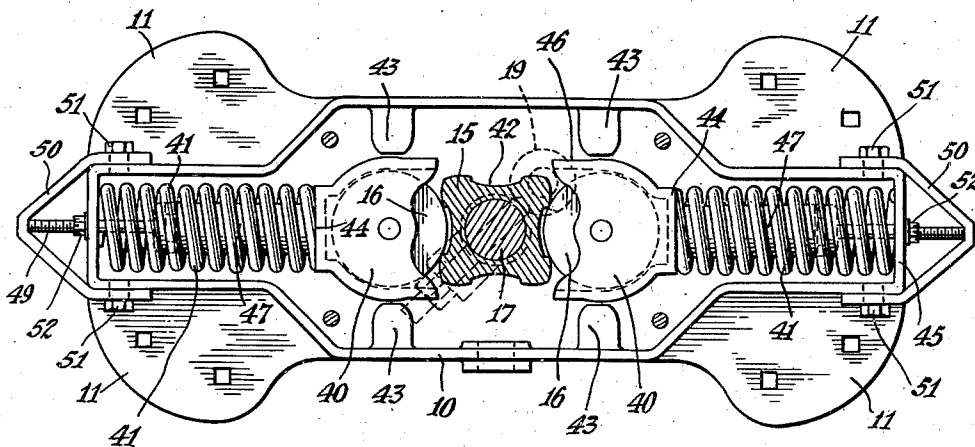


Fig. 5.

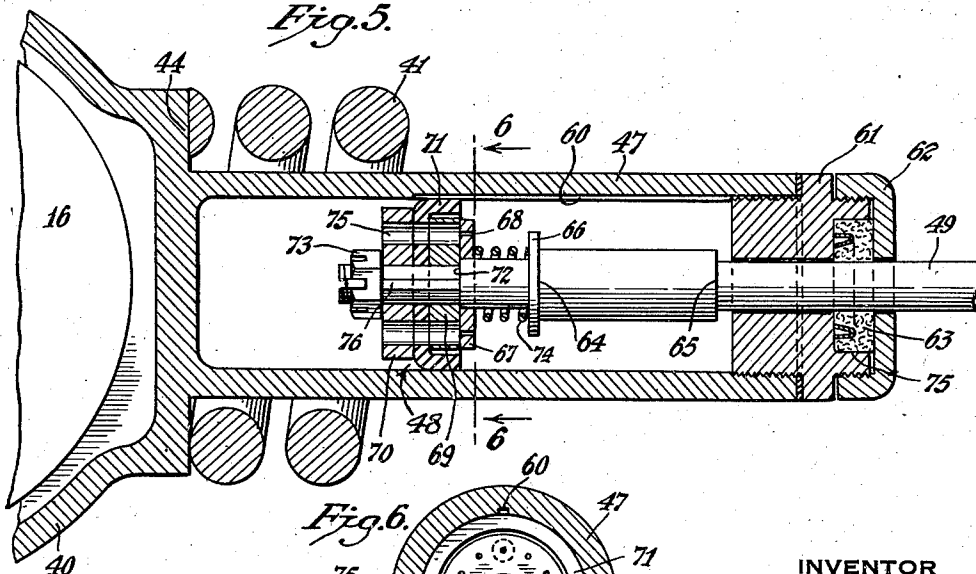
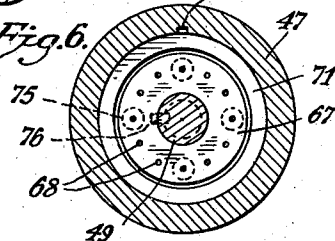


Fig. 6.



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SNUBBED TRAILING SETTING SWITCH
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Application November 25, 1944, Serial No. 565,072

5 Claims. (Cl. 246—284)

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The invention relates to snubbed trailing setting switchstands and more particularly to switchstands such as used for operating railway switches and the like.

An important feature of the invention is to provide retarding means for automatic switchstands or switch operating mechanisms which permit the switch, when opened by a train, to complete its throw to the opposite position and to stay there. Such switchstands are some times referred to as of the "setover" or "kickover" type in contrast to the "return" or "kick-back" type which causes the switch to return to its original position after the train has passed. Such a switchstand may be operated by hand to intentionally throw the switch from one position to the other. The automatic mechanism permits the switch to be thrown by a train trailing the switch when the switch is set against passage of the train. The retarding mechanism controls the automatic operation to reduce shock and wear on the parts of the switchstand, the switch and connecting parts.

The invention is illustrated as applied to a well known type of low switchstand disclosed in Eastburn Patent No. 2,124,190, dated July 19, 1938, but it will be understood that it may be applied to other types of switchstand including the high type switchstand disclosed in Cooper and Eastburn Patent No. 1,964,721, dated July 3, 1934.

According to a preferred form of the invention, the casing of a low switchstand is provided with a vertical spindle having a conventional crank arm at its lower end for connection to the switch. The spindle, which is adapted to have the target or flag fixed to its upper end, has a horizontally pivoted operating lever by which the switch is manually thrown. Surrounding the spindle, and journaled in the casing, is a safety or star block having four recesses separated by star points in its side and also having locking recesses in its top which latter are engageable by the operating lever to lock the switchstand in thrown positions. To relatively fixedly hold the switchpoints in thrown position, a pair of oppositely disposed helical spring assemblies is provided in the base engaging opposite sides of the star block. Disposed within each helical spring of the two spring assemblies is a fluid buffer whose cylinder is connected to the movable part of the spring assembly and whose piston is fixedly connected to the casing wall. Suitable control passages are provided in the buffer to permit relatively free compression

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of the spring assemblies but to retard their expansion.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part hereof, in which

Fig. 1 represents a plan view of a low type switchstand to which the invention is applied;

Fig. 2 is a side elevation thereof;

Fig. 3 is a section on the line 3—3 of Fig. 1 illustrating the operating mechanism;

Fig. 4 is a plan view with covers removed and certain parts shown in section;

Fig. 5 is a detail section of a spring assembly and accompanying buffer mechanism; and

Fig. 6 is a detail taken on the line 6—6 of Fig. 5.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

In the drawings accompanying and forming part of this specification, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Referring now to the drawings, the switchstand comprises a casing indicated, in general, by 10 having base flanges 11 for spiking or otherwise securing to the railroad ties. The casing has upstanding sides and is covered by a three-part covering comprising a mid-section 12 and easily removable end sections 13 and 14. This type of cover is described in detail and claimed in Eastburn Patent No. 1,783,283, granted December 2, 1930.

Seated within the casing 10 and journaled in the mid-cover section 12 is a star block 15 having four recesses 42 engageable by the spring pressed rollers 16, as indicated in Fig. 4. The top of star block 15 is provided with four slots 30 opening upwardly. Journaled within the star block 15 is a vertical spindle 17 passing through

the bottom of the casing 10 and having an arm 19 for connection to a connecting rod (not shown) extending to the switch. The upper end of spindle 17 is shaped to support a target (not shown) for indicating the position of the switch.

Pinned to the spindle 17 is a sleeve 20 having an ear 21 to which the operating arm 24 is pivoted. The sleeve 20 also has a lug 22 supporting a lock eye 23 through which a padlock (not shown) may be passed for locking the switchstand.

The operating arm or drop lever 24 is forked to straddle the sleeve 20 and has ears 25 embracing ear 21 through all of which pivot bolt 26 passes. Part of the arm 24 is shaped to form a housing 27 seating a spiral spring 28 engaging between the bottom of the housing 27 and the lug 22 to urge the operating arm downwardly. The side of housing 27 is provided with a small eye 31 to which the chain of the padlock may be secured.

Formed preferably integral with the operating arm 24 are laterally extending plate members 32 having depending flanges 33. These plate members 32, depending flanges 33, together with the hinge ears 21 and 25 and housing 27 form a protecting housing or covering for the four slots 39 in the star block 15, thus protecting these slots from the introduction of foreign matter, no matter to what position the switchstand is thrown.

Pivoted by pivot bolt 36 to the side of casing 10 is hand lever 34. This hand lever is provided with a slot 35 in which the operating arm 24 engages. Movement of the hand lever from one position to the other lifts drop lever 24 out of a locking recess 30, swings the drop lever 24 ninety degrees and drops it into the next locking recess 30, all in one operation.

The star block 15 is always in engagement with oppositely disposed rollers 16. Said rollers 16 are journaled in yokes or frames 40 and yieldingly held in engagement with the star block recesses 42 by helical springs 41. The arrangement of these parts is such that any movement of the star block 15 will compress the springs 41 which will automatically tend to return the block to its original position, with one switchpoint against its stock rail, until the points of the star block 15 pass the center line of the rollers 16, whereupon the action of the springs 41 will tend to rotate the block further and in the same direction until the rollers 16 again come to rest in the star block recesses 42, thereby throwing and holding the other switchpoint against the stock rail.

The yokes 40 are guided in their movement by guides 43. The helical springs 41 operate between shoulders 44 on the yokes 40 and the end walls 45 of the casing 10. The yokes 40 are relieved at 46 to permit a certain lateral movement of the yokes to help prevent the star block sticking at dead center position.

For controlling the movement of the spring assemblies, each spring has disposed within it a dashpot or buffer mechanism. Since these buffers are identical, it is only necessary to describe one in detail.

Each buffer comprises a cylinder 47 which may be integral with its adjacent yoke 40. Disposed within the cylinder 47 is a piston 48 having a rod 49 which passes through an opening in the casing end wall 45. The rod 49 engages a bent strap or backer 50 suitably secured to the side walls of the casing 10 by bolts 51. A nut and washer 52 are mounted on the screw threaded end of rod 49 to engage the end wall 45 of casing 10 and to prevent inward movement of the rod 49. This ar-

angement also provides a simple means for compacting the spring when assembling the switchstand.

The lower edge of strap 50 may rest upon the bottom flange 11 of the casing and its upper edge may extend flush with the upper edge of casing 10. If desired, each end cover 13 and 14 may be provided with a triangular extension 55 to overlie the strap 50, as shown especially in Figure 1.

The cylinder 47 has a longitudinal groove 60 extending part way of the length and is closed by a cylinder head 61 threaded into the bore against a suitable washer. The piston rod 49 passes somewhat loosely through holes in the cylinder head 61 and in a cap 62. To seal these openings against the escape of oil, a conventional packing 63 is disposed in a recess 75 in cylinder head 61 and held in position by cylinder cap 62.

The piston rod 49 has an enlargement providing shoulders 64 and 65. It also has a reduced end forming a shoulder 72 against which seats a cup support 69. A leather cup 71 fits over cup support 69 and a cup backer 70 fits against the leather cup 71. A nut 73 threaded on rod 49 holds the leather washer 71 tightly compressed between discs 69 and 70 acting against shoulder 72. The edge walls of leather cup 71 tightly engage the cylinder walls as will be understood. Large alignment holes 75 pass through cup support 69, backer 70 and leather cup 71. These parts are prevented from rotation by a suitable key 76.

The piston 48 is provided with a check valve comprising a valve flap in the form of a metal disc 67. Disc 67 is slidable on the rod 49 and is yieldably held against cup support 69 by a helical spring 74 acting against a washer 66 resting on shoulder 64. The valve disc 67 has a plurality of pin holes 68 so spaced that at least one of these holes will always register with each of the large holes 75. The cylinder 47 may be completely filled, on both sides of piston 48, with suitable hydraulic fluid, such as light oil.

It will be understood that, when the switchstand is thrown automatically by action of a train trailing through the switch, the safety block is rotated more than forty-five degrees and the cylinders 47 are forced back, compressing the switchstand springs 41. As the cylinder 47 is forced back, the oil in the cylinder passes from the left of the piston, as illustrated in Figure 5, to the right through the aligned openings 75, raising the flap valve 67 off its seat. The return of the cylinder 47 to its original position by the pressure of the switchstand spring 41 is retarded by the slow flow of oil from the right of the piston to the left through the pin holes 68 in the flap valve 67 which is held on its seat both by valve spring 74 and by oil pressure. This condition occurs until the switchpoints are almost home when the piston 48 becomes bypassed by the cylinder wall groove 60. This causes the oil pressure on opposite sides of the piston to equalize more quickly, causing the switchpoints to move more quickly as they approach their home position with one against the stock rail.

In operation, with the parts in the position shown in Fig. 1, the switchpoints are in one set position, say for traffic on the siding or branch line. When it is desired manually to operate the switchpoints to the other set position, the padlock (not shown) is removed from hole 23 and hand lever 34 swung up and over to its other position. This raises drop lever 24 out of a notch 30 and moves the drop lever and spindle 17 ninety

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degrees in which new position the drop lever 24 seats in the next locking notch 30. The handle 34 may be locked in this new position by replacing the padlock in hole 23.

It will be noted that, when the switchpoints are operated as above described, the star block 15 remains stationary, the crank arm 19 and spindle 17 turning to operate the switchpoints.

If, however, the switchpoints are set against a train and the train trails the switchpoints with them set against it, the wheels will force the switchpoints from their set position, operating the crank arm 19 and turning the entire assembly including spindle 17, drop lever 24, together with the star block 15, as a unit. Hand lever 34 will also be operated. The rotation of the star block 15 causes the spring pressed rollers 40 to ride up on the points of the star block against the pressure of springs 41 until the star block has rotated forty-five degrees and is in dead center position after which the star block will continue to rotate under influence of the switch points, the expansion or return of the helical springs tending to assist this further rotation. The movement of the yokes 40 causes the buffer action described above, that is, the buffers offer little or no resistance to compression of the helical springs but impede or retard their expansion.

It will be understood that this action of the buffer and of the springs will take place regardless of the set position of the switchpoints when set against a train trailing the switch.

Thus a switchstand has been described which is compact, having all of the operating parts enclosed within a housing where they are protected from dirt and injury. The switchstand is rigid and permits free manual operation of the switchpoints from either position to the other. The points must be fully thrown before the switchstand can be latched, and the target or signal always indicates the position of the switchpoints. The spring mechanisms, for accomplishing the automatic operation, are located within the housing and are independently connected with the switchstand spindle through rollers and either of the spring assemblies will automatically complete the movement of the trailed switchpoints from original set position to opposite set position when set against train movement and thrown by a train. The buffers are also located within the housing and allow free opening of the points and completion of their movement to opposite position by the train but retard the follow-up of the automatic spring mechanisms, which insures the completion of switchpoint movement from set position to the opposite position.

Thus the retarders permit a train trailing the switch, not only to move the switchpoints from set position without breaking the stand or its connections, but to throw the switchpoints to their opposite position whence they remain until moved back either by hand or by another train trailing the switch from the other track. Thus the switchstand is automatically and completely operated by the first pair of wheels so that there is no further movement of the switchstand during passage of the train. Furthermore, the initial movement of the switchstand to dead center position occurs without substantial retardation by the buffer nor is there any retarding force applied by the switchstand to the switchpoints for the second half of their movement to the opposite set position.

All impacts of the switchstand parts, hand lever, switch and connections are minimized by

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the retardation of the expanding movement of the spring assemblies. Furthermore, the retarders being placed inside the helical springs, take up little or no additional space. They are protected from the weather by the switchstand casing. They exercise direct control on the springs and yet the connection between the buffers and the casing is flexible enough to permit the necessary lateral play of the spring assemblies to obviate any possibility of the switchstand getting stuck in a dead center position. The advantages of safety and balance in having two spring assemblies are retained.

While certain novel features of the invention have been disclosed herein, and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

20 What is claimed is:

1. In an automatic switchstand of the setover type, a switchstand casing, a spindle journaled in said casing having set positions corresponding to the opposite set positions of a switch, a movable holding member in said casing having set positions corresponding to the opposite set positions of a switch, over-centering mechanism yieldably retaining said holding member in its set positions to permit a train to set over the switchstand from one to its other set position, said over-centering mechanism comprising a movable cylinder member having operative connection with said holding member, said cylinder member having an abutment, a helical spring surrounding said cylinder member and exerting thrust between said abutment and said casing, a piston member within said cylinder member and connected to said casing, said cylinder member and piston member constituting a dashpot, said dashpot comprising means exerting comparatively little resistance to compression of said helical spring while exerting comparatively great resistance to expansion of said spring, means for manually moving said spindle between said set positions substantially independently of the action of said over-centering mechanism and of said dashpot, and for normally holding said spindle in fixed relation to said holding member.

2. The combination as set forth in claim 1, in which the movable holding member comprises a star block surrounding the spindle and the movable cylinder member has a yoke secured thereto and a roller is journaled in said yoke, said roller engaging the space between adjoining points of the star block.

3. The combination as set forth in claim 2, in which a second overcentering mechanism is provided having a second movable cylinder with yoke and roller, whose roller engages a space between adjoining points of the star block diametrically opposite the point of engagement of the roller of the first overcentering device.

4. The combination as set forth in claim 2, in which the piston member has a rod passing thru the head of the cylinder member and the casing has guides for the yoke, said piston rod being anchored to said casing so as to permit lateral play of said yoke between said guides when the star block is in dead center position.

5. The combination as set forth in claim 1, in which the piston member has a rod passing out thru the head of the cylinder member which rod also passes thru the casing wall, a nut on said rod outside said casing wall to limit inward move-

ment of the piston member, and means for preventing outward movement of the piston member.

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REFERENCES CITED

The following references are of record in the file of this patent:

Number	Name	Date
318,948	Brown	June 2, 1885
882,024	Snow et al.	Mar. 17, 1908
1,020,802	Corts	Mar. 19, 1912
1,710,335	Andersen	Apr. 23, 1929
1,964,721	Cooper et al.	July 3, 1934
2,385,891	Swanson	Oct. 2, 1945

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