June 10, 1941. R. R. ARMSTRONG 2,244,933

VEHICULAR TRAFFIC SWITCH

Filed April 11, 1938

FIG_1_

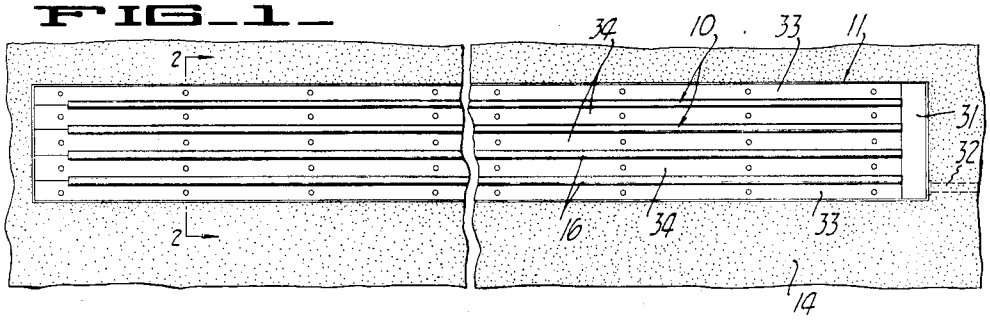


FIG_2_

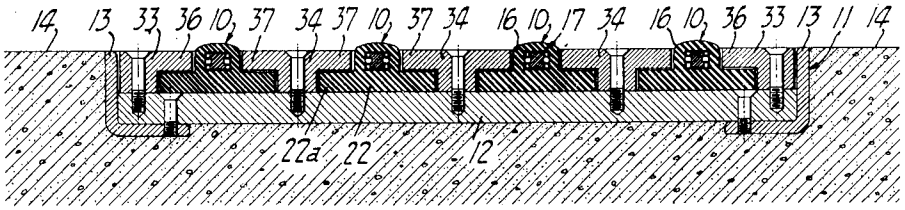
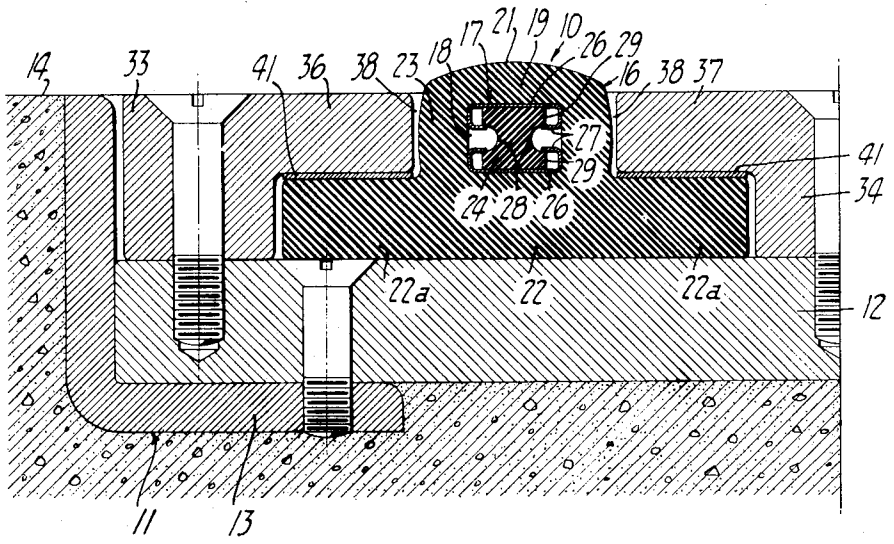


FIG_3_



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VEHICULAR TRAFFIC SWITCH

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Application April 11, 1938, Serial No. 201,319

4 Claims. (Cl. 200—86)

This invention relates generally to electrical switches of the type adapted to be installed in a roadway, for operation by the wheels of vehicular traffic. Such devices find useful application in various electrical systems, as for example systems for counting vehicular traffic, various electrical signalling systems, or other systems or arrangements where its is desired to control an electrical circuit responsive to the passing of a vehicle along a given path.

It is an object of the invention to provide a switch of the above character which will be simple in construction, and which will be sufficiently rugged to withstand the severe vehicular traffic of present-day highways.

A further object of the invention is to afford a switch structure having a novel form of contactor assembly, which can be readily removed as a unit for replacement or repair.

Another object of the invention is to provide an improved form of a vehicular switch which can be assembled in multiples for consecutive operation, with provision for removing or replacing separate switch structures or contactor units.

Additional objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a plan view, illustrating a switch structure in accordance with the present invention, disposed within a roadway.

Fig. 2 is a cross-sectional detail on an enlarged scale, taken along the line 2—2 of Fig. 1.

Fig. 3 is a cross-sectional detail showing one of the units incorporated in the installation of Figs 1 and 2, together with the parts serving to mount the same in a roadway.

The complete tread structure illustrated in Figs. 1 and 2, consists generally of a plurality of duplicate switches 10, carried by a common mounting means 11. The length of the tread structure may vary in different instances. For example in instances where it is desired to operate the switches by wheels on one side of a single line of motor traffic, the complete tread structure may be say two to five feet in length. Where the wheels on both sides of a single line of vehicular traffic are to pass over the tread structure, the length may be from seven to ten feet. Longer lengths can be used if desired, as for example a length sufficient to extend entirely across a multi-lane roadway.

The mounting means 11 may vary as to structural details, but as illustrated it consists of a bottom plate 12, together with the side and end angles 13. Thus a shallow pan or retainer is provided, which can be mounted within a roadway, with its upper edge substantially flush with the roadway surface 14.

The construction of the individual switches 10 can be best understood by reference to Fig. 3. Each switch consists of an elongated body 16, extending substantially the entire length of the mounting 11, together with an inner contactor assembly 17. Body 16 is preferably made entirely of resilient rubber, and is formed to afford a longitudinally extending passageway 18, to receive the contactor assembly 17. Extending over the passageway 18 there is a top wall 19, the upper surface 21 of which is convex to engage the wheels of vehicles. The lower or base portion 22 of the body 16 is preferably formed to afford laterally extending flanges 22a, which facilitate proper retention of the switch within the mounting means 11. Base portion 22 is integrally connected with the top wall 19, by the upright side walls 23.

Since the top and side walls 19 and 23 are formed of resilient material, the weight of a vehicle wheel upon the top wall 19 causes this wall to be depressed, and the vertical dimensioning of the passageway 18 to be decreased. It is such decrease in the vertical dimensioning of the passageway 18, which causes operation of the contacts of the contactor assembly 17.

The contactor assembly 17 in its preferred form, consists of a strip or core 24 of resilient material, like resilient vulcanized rubber, together with a pair of contactor strips 26. Strips 26 are formed of spring sheet metal, and preferably the sheet metal is bent to afford a substantially C-shaped cross-sectional contour. In other words these strips are generally channel-shaped, with the side flanges of the channels provided with inturned portions 27. It is portions 27 of the strips 26 which are normally in opposed spaced relationship, and which are brought into electrical contact by depressing the top wall 19. The resilient strip 24 is generally square or rectangular in cross-sectional contour, and in order to afford portions for detachable engagement with the strips 26, the sides of the strip 24 are provided with longitudinally extending grooves 28. Thus upper and lower portions 29 are provided, which are embraced by the strips 26, and which afford sufficient retention whereby the metal strips retain themselves in engagement with the rubber strip 24, as an assembly unit. Since por-

tions 23 are readily deformable it is apparent that one may readily detach one or both of the strips 26 from the rubber strip 24, or re-assemble these strips together, merely by applied manual force.

The metal strips 26 extend substantially the full width of the longitudinal passageway 18. The rubber strip 24 is of considerable less width than the width of passageway 18, but sufficient width is provided to avoid any buckling when it is compressed to bring portions 27 in direct contact. In general it may be said that the width of the rubber strip 24 should be greater than one-half its vertical dimensioning. Such proportioning of the strip 24 together with the provision of grooves 28, avoids possible pinching of rubber of the strip between the contacting portions 27, which if permitted would defeat the desired electrical engagement.

As previously pointed out in Fig. 1, the switch bodies 16 extend substantially the entire length of the mounting 11. The contactor assemblies 17 can be divided into a number of sections, it is simpler practice to afford a single assembly extending the entire length of the body 16. At one end of the mounting 11 a terminal box 31 can be provided, into which lead wires can extend from the metal strips of the several switches 10. A multiple conductor cable can lead from box 31, for connection with other parts of an electrical system.

Irrespective of the precise type of mounting employed for the switch, and irrespective of the number of switches used in a group, it is desirable to employ strips or flanges which overlie the body flanges 22*a*, and which carry the main thrust of vehicles. Thus in Figs. 1 and 2 metal clamps 33 and 34 are provided, which have flanges 36 and 37 to overlie the flanges 22*a* of the switch bodies. Clamps 33 and 34 rest directly upon and are secured to the base plate 12, whereby the upper surfaces of these clamps form in effect a continuation of the roadway surface, and sustain the downward pressure and thrust of vehicle wheels. Sufficient clearance 38 is afforded between the outer surfaces of the switch body walls 23, and the adjacent flanges of the clamps, whereby the top wall 19 can be depressed until its upper surface is co-extensive with the upper surfaces of clamps 33 and 34. Also the switches are so dimensioned, and the spacing between the clamps such that the tires of motor vehicles will not depress the top wall 19 materially below the road surface. Some adjustment of the relationship between top wall 19, and the road surface, can be had by placing shims 41 beneath the flanges 36 and 37. Increasing the thickness of such shims will serve to effectively lower the upper switch surface 21, with respect to the road surface, and conversely decreasing the thickness of the shims will serve to compensate for wearing away of the upper surface 21.

Operation of the switch described above can be briefly outlined as follows: Depression of a portion of the top wall 19 of the switch causes the resilient core 24 of the contactor unit, below the depressed area, to be compressed to cause portions 27 of the contactor strips 26 to be brought into direct electrical engagement. A certain amount of bending of strips 26 is necessarily involved but such bending is well within the elastic limits of materials like hard bronze, copper, or monel metal. While the wheel of a motor vehicle is in engagement with the top surface 21 of the switch, the downward pressure from the wheel tire is carried mainly by the adjacent clamps, and that part of the downward thrust carried by the switch itself is accommodated by the compressed side walls 23, and by the base portion 22 underlying the longitudinal passage 18. Immediately after the wheel has passed over the switch, the switch body returns to its original form, and the parts of the switch unit spring back to their normal positions as shown in Fig. 3.

In the event the switch unit 17 should become disabled through long usage, before the body 16 has reached the end of its useful life, the contactor assembly or unit can be slid longitudinally from the body, and the injured parts repaired or replaced, or a new assembly inserted.

I claim:

1. In a traffic switch, an elongated casing formed to afford an inner longitudinally extending passageway, said casing being adapted to be installed in conjunction with a roadway whereby the top wall of the casing is adapted to be engaged and depressed by vehicular traffic, thereby decreasing the vertical dimensioning of said passageway, and contacting means disposed within said passageway and adapted to be operated by a decrease in the vertical dimensioning of said passageway, said contacting means comprising a strip of resilient material, and electrical contacting strips retained on the upper and lower portions of said strip of resilient material and adapted to be brought into electrical engagement by compressing said strip of resilient material in a vertical direction, the upper strip having depending side portions and the lower strip having upwardly extending side portions, said side portions loosely embracing the upper and lower portions of the resilient strip and forming electrical contact surfaces.

2. In a traffic switch, an elongated casing formed to afford an inner longitudinally extending passageway, said casing being adapted to be installed in conjunction with a roadway whereby the top wall of the casing is adapted to be engaged and depressed by vehicular traffic, thereby decreasing the vertical dimensioning of said passageway, and a contactor assembly removably disposed within said longitudinal passageway, said assembly comprising a strip of resilient material, said strip having a width substantially less than the width of said passageway, and a pair of oppositely faced channel-shaped strips of sheet spring metal embracing the upper and lower portions of said strip of resilient material, said metal strips having a width substantially equal to the width of said passageway and having opposed side portions adapted to be brought into direct physical engagement, upon compressing said strip of resilient material in a vertical direction responsive to downward movement of said top wall.

3. In a traffic switch, an elongated casing formed to afford an inner longitudinally extending passageway, said casing being adapted to be installed in conjunction with a roadway whereby the top wall of the casing is adapted to be engaged and depressed by vehicular traffic, thereby decreasing the vertical dimensioning of said passageway, and a contactor assembly adapted to be removably disposed within said longitudinal passageway, said assembly comprising a pair of conductor strips formed of sheet metal bent to have a cross-sectional contour substantially C-shaped, and a strip of resilient rubber having its upper and lower portions embraced by said conductors, whereby when said assembly is disposed within

said passageway, downward movement of said top wall serves to compress said strip of resilient material to effect direct physical engagement between said conductor strips.

4. In electrical contacting apparatus, a contactor assembly comprising a strip of resilient material, said strip having longitudinal grooves in the opposite side faces thereof, and a pair of oppositely faced C-shaped strips of sheet spring metal embracing the upper and lower portions of said strip of resilient material with the opposite inturned edge portions of the flanges thereof extending into said grooves in interlocking relation, the strip of resilient material being compressible to permit electrical contact between the inturned edge portions of said metal strips.

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