

Nov. 8, 1960

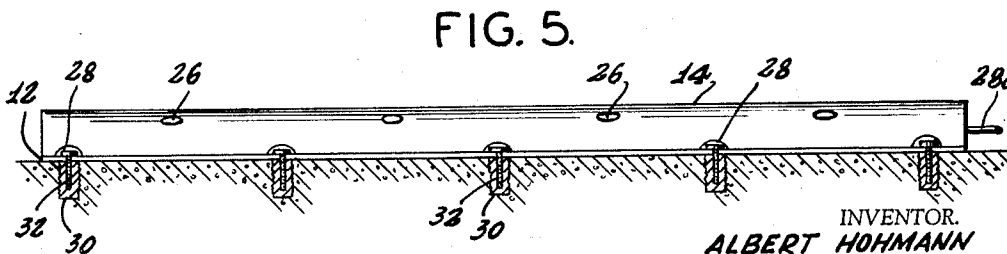
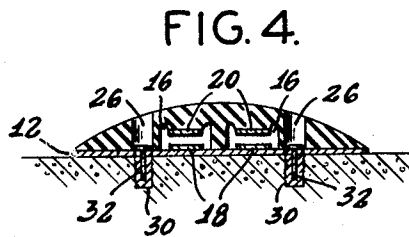
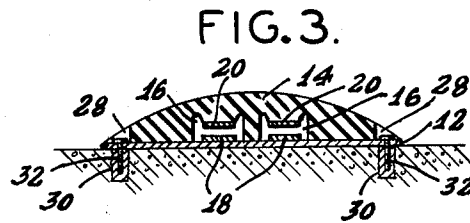
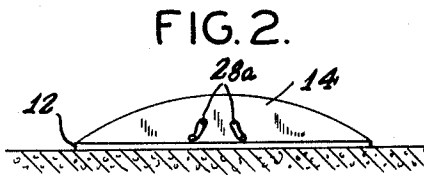
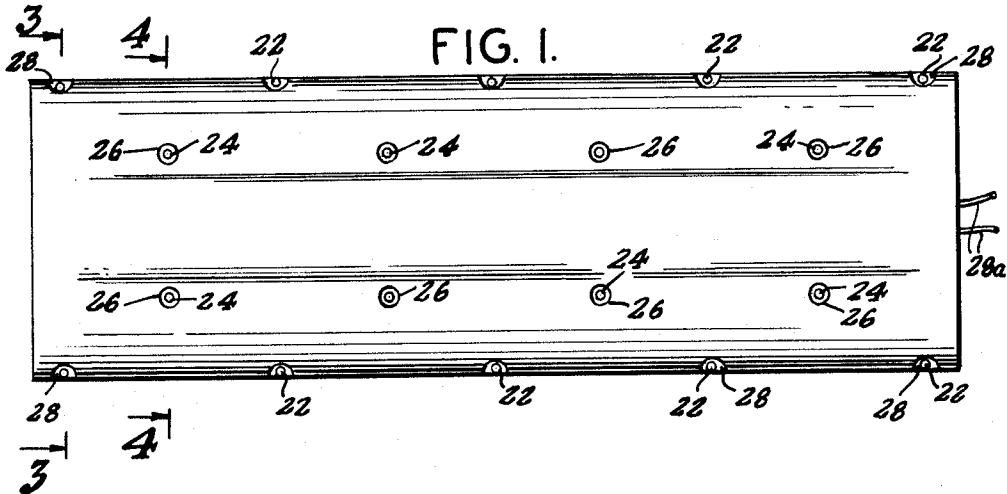
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2,959,647

SURFACE MOUNTED TREADLE

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2 Sheets-Sheet 1



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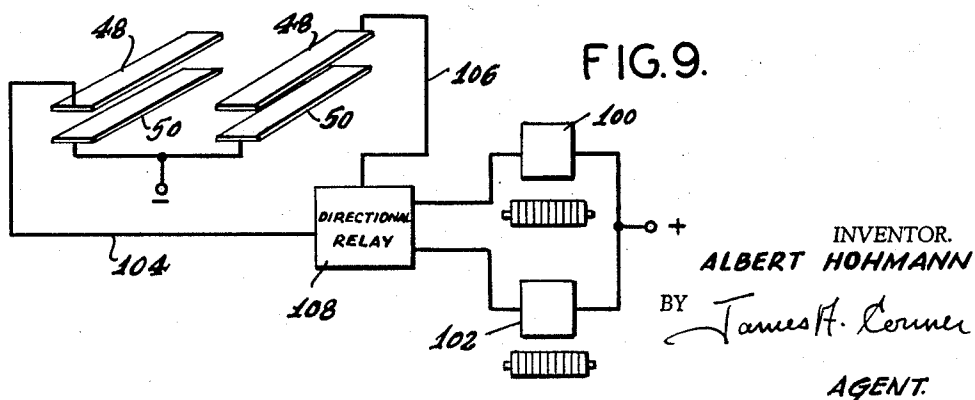
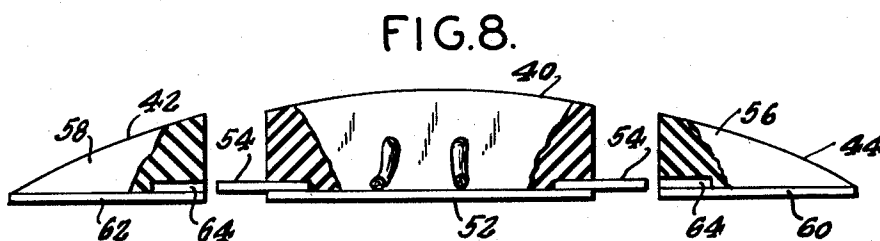
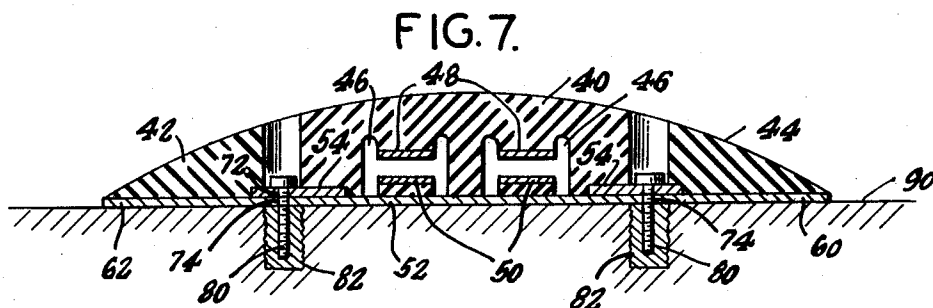
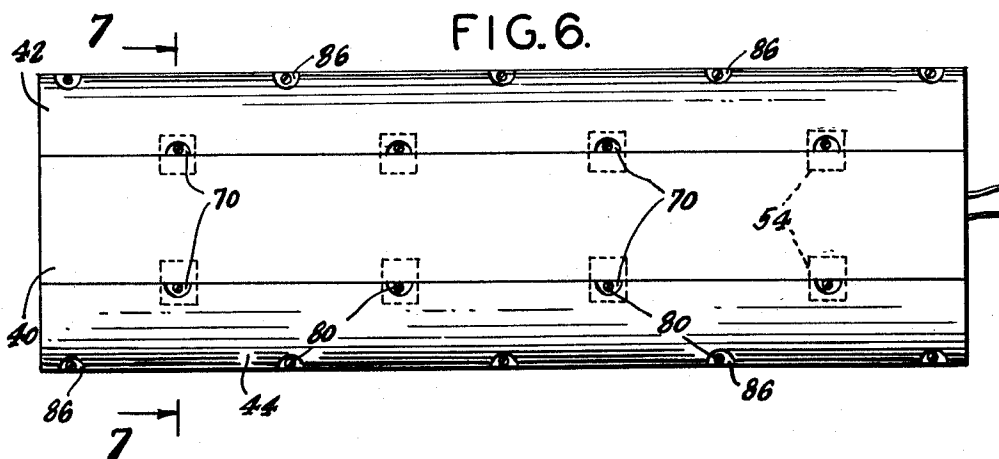
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SURFACE MOUNTED TREADLE

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2 Claims. (Cl. 200—86)

This invention relates generally to treadle switches and in particular to a novel surface mounting treadle switch.

Treadle switches are devices that are disposed transversely across a lane of vehicular traffic and respond to wheels of a vehicle passing thereover. Generally, the switch or switches are of the normally-open type that close upon the weight and pressure of a vehicle wheel. The switches, when closed, complete circuit means that actuates a counter. In the multi-switch type treadle, the direction of sequential closing of the switches controls relay means that actuates directional counters. Heretofore, treadles of this type generally comprises a rectangular shaped rubber envelope that was set in a metal frame embedded in the lane or roadway wherein the upper surface of the treadle was co-planar with the roadway surface. This type of treadle installation is expensive and time consuming and often required closure of the roadway to traffic while the frame was initially set in concrete and the concrete cured. The use of treadle switches is extremely desirable where an accurate vehicle count is desired, such as toll collection facilities where the vehicle count is the sole check on the toll revenue collected. The problem of installing the treadle frame has discouraged and even prevented many small enterprises from using the desirable and accurate vehicle counting treadle. The present invention overcomes these disadvantages and permits a fast, simple, and relatively inexpensive installation.

Accordingly, one of the principal objects of the invention resides in the provision of a treadle switch having means for the mounting thereof on the surface of a roadway.

Another object of the invention is to provide a treadle switch that is readily removable after installation without marring or defacing the roadway.

Other ancillary objects will be, in part, hereinafter pointed out and will be, in part, hereinafter apparent.

In the drawings:

Figure 1 is a plan elevation of the surface-mounting treadle.

Figure 2 is an end elevation of the treadle.

Figure 3 is a transverse cross-section taken along line 3—3 of Figure 2.

Figure 4 is a transverse cross-section taken along line 4—4 of Figure 1.

Figure 5 is side elevation with the roadway cross-sectioned to illustrate the treadle anchoring means.

Figure 6 is a plan elevation of a further embodiment of the invention.

Figure 7 is an enlarged cross-section taken along line 7—7 of Figure 6.

Figure 8 is an end elevation of the embodiment shown in Figures 6 and 7 prior to the installation thereof on the surface of a roadway.

Figure 9 is a simple schematic diagram of a treadle switch circuit.

Referring to the drawings in detail 10 generally dis-

notes a treadle switch embodying the present invention wherein there is provided a metal base plate 12 having a rubber envelope 14 bonded thereto. Envelope 14 is formed by a conventional molding process wherein a pair of longitudinal cavities 16 are provided. Affixed to the base plate and running longitudinally with each cavity 16 is a contact strip 18. It will be noted that the contact strip 18 may be electrically connected to the base plate or may be insulated therefrom. Disposed in a spaced parallel relation to the contact strips 18 are a pair of contact strips 20 which are bonded to the envelope 14 by conventional means.

The metal base plate 12 is provided with a plurality of mounting holes 22 that are disposed along the marginal edges thereof. Further, there is provided a plurality of mounting holes 24 in aligned relation in the interior portions of the base plate 12. Analogously, the rubber envelope 14 is formed with a plurality of apertures 26 which co-align with the mounting holes 24. Further, the terminal edge portions of the rubber strip 14 are provided with cut-away sections 28 which co-align with the mounting holes 22.

It will be noted from the drawings that the recesses 16 having the contacts therein are disposed longitudinally in spaced parallel relation between the aligned rows of apertures 26 and mounting holes 24. It will be apparent that the edge portions of the rubber envelope 14 having the cut-outs 22 therein have a minimum thickness of rubber thereon. The rubber envelope 14 extends from a minimum thickness at the edge portions to a maximum thickness that is central of the pair of contact strip recesses 16.

Extending through one end of the rubber envelope 14 are a pair of conductors 28 which are connected respectively to the contacts 20. Conductors 28 are provided for a purpose hereinafter apparent.

The treadle 10 is designed specifically for use on the surface of a roadway wherein expansion type anchors 30 are pre-embedded. The anchors 30 are set in the roadway surface in a pattern corresponding to the mounting holes 22 and 24. Thus the treadle 10 may be disposed transversely on a roadway and secured thereto by means of a plurality of bolts 32 passing through the mounting holes 22, 24 and into the pre-embedded anchors 30. Thus vehicle wheels rolling transversely over the tapered treadle 10 will directionally and sequentially cross the contacts 18 and 20 accordingly. The tapered structure affords a minimum of resistance to the vehicle wheel and permits an accurate closing of the contacts therein. The accuracy of any vehicle counting system that utilizes a treadle is predicated upon the avoidance of vertical jumping motion of the actuating vehicle wheel. The elimination of vertical motion or jumping assures closing of the contacts in the treadle by the vehicle wheel. Since vehicles traversing the instant invention will be decelerating or accelerating, transverse strains are generally impressed on the treadle per se. The securing of the present treadle and its base to the roadway by means of the precisely disposed mounting holes and related bolts and anchors prevents accidental loosening of the treadle and thereby assures a long life thereof in addition to the required counting accuracy.

Another embodiment of the invention is shown in Figures 6 through 8 wherein the treadle is formed in sections 40, 42, and 44. Section 40 is similarly provided with a pair of parallel recesses 46 in which contacts 48 and 50 are mounted. The center section 40 is bonded to a metallic base 52 which has welded thereon diametrically opposite extending side wing portions 54. Each wing portion 54 is welded to the base plate 52 and the portion of the envelope 40 abutting thereagainst is

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similarly bonded as is the remaining portions of the envelope to the base 52. Further, the wing portions 54 are disposed in a plane offset to the plane of the base 52. The envelope section 40 is tapered from a minimum thickness along the longitudinal edges thereof to a maximum thickness along the central axis thereof. The side portions 42, 44 each comprises an oppositely formed rubber pad 56, 58 that is bonded to a base 60 and 62 respectively. The pad 56 tapers from a maximum thickness along one side thereof to a minimum thickness along the parallel side thereof. Recessed within the pad 56, adjacent to the base plate, is a recess 64 that is adapted to receive therein a wing portion 54. The maximum thickness of the pad 56 is of substantially the same dimension as the minimum thickness of the pad 40. Thus when the wing portions 54 are inserted within the complementary recesses 64, the pad 56 matches the center of the treadle envelope section 40.

In a similar manner, side section 42 has a rubber pad 58 bonded to a base 62 and the rubber pad 58 extends from a minimum thickness along one longitudinal edge thereof to a maximum thickness along the parallel longitudinal edge thereof. Similarly, pad 58 is provided with a plurality of recesses 64 that are adapted to receive the wing portions 54 therein. It will be noted that the side portions 42, 44 are provided with a plurality of cut-away recesses 70 that co-align with apertures 72 in wing sections 54. Further, the base plates 60, 62 of the sections 44, 42 are analogously provided with co-aligning apertures 74 which permit mounting bolts 80 to pierce therethrough. Bolts 80 are adapted to be secured within anchors 82 that have been pre-embedded in the roadway surface 90. Bolts 80 may similarly be used to pass through mounting holes 86 in the base plates 60, 62 so that the leading edges of the sections 42, 44 may be effectively secured to the roadway 90. When assembled, the sections 40, 42, and 44 effectively produce a minimum of resistance to the wheels of a vehicle passing transversely thereover.

As shown in Figure 9, treadle switches of this type are generally used in circuits that actuate electromagnetic counters 100 or 102. As shown, a source of negative potential is supplied to the lower contacts 50 and when the upper contacts 48 engage the lower contacts 50 the negative potential will be conducted sequentially over conductors 104 and 106. The negative potential is fed to a directional relay panel 108 which controls the pulsing of the electromagnetic counters 100 or 102. The directional aspect of treadles of this type is determined by the relay system utilized in association with the contact strips. It will be noted that the vehicle wheel will close one pair of contacts prior to its closing of the second pair of contacts. Such a sequential closing controls relays accordingly and it is possible to determine the di-

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rection of movement of the vehicle wheel across the treadle. Such sequential circuitry is conventional and well known to those skilled in the art.

Thus, it is apparent that there has been provided a device in which the several objects of the invention are achieved and which is well adapted to meet the conditions of practical use.

While there have been shown and described plural embodiments of the invention, it is to be understood that modifications and changes might be made without departing from the scope of the present invention, except as limited by the claims.

The invention claimed is:

1. A treadle switch comprising at least one pair of normally open contact strips, a base plate, a rubber envelope bonded to said base plate and surrounding said contact strips, said strips being disposed centrally and longitudinally in sealed relation within said envelope, said envelope having a maximum thickness longitudinal mid-section that tapers transversely in both directions to a minimum thickness adjacent to the longitudinal margins of said base plate, and means for securing said base plate to the surface of a roadway, and said means comprising a plurality of equidistantly spaced recesses in said envelope that terminate adjacent to said base plate, a plurality of co-aligning apertures in the base plate disposed centrally within the recesses, and screw means adapted to be disposed within said apertures to secure said base plate to the surface of a roadway.
2. A treadle switch comprising plural pairs of normally open contact strips, a base plate, a rubber envelope bonded to said base plate and surrounding said contact strips, said strips being disposed centrally and longitudinally in spaced sealed relation within said envelope, said envelope having a maximum thickness longitudinal mid-section that tapers transversely in both directions to a minimum thickness adjacent to the longitudinal margins of said base plate, and means for securing said base plate to the surface of a roadway, and said means comprising a plurality of equidistantly spaced recesses in said envelope that terminate adjacent to said base plate, a plurality of co-aligning apertures in the base plate disposed centrally within the recesses, and means adapted to be disposed within said apertures to secure said base plate to the surface of a roadway.

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