July 20, 1948. C. O. BRUESTLE 2,445,660

ELECTRIC TREADLE

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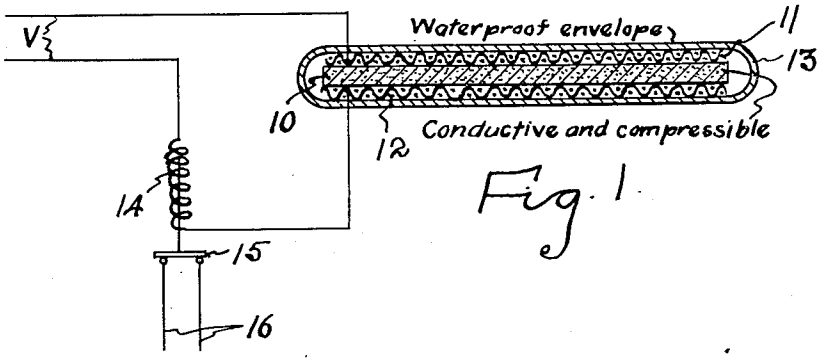


Fig. 1.

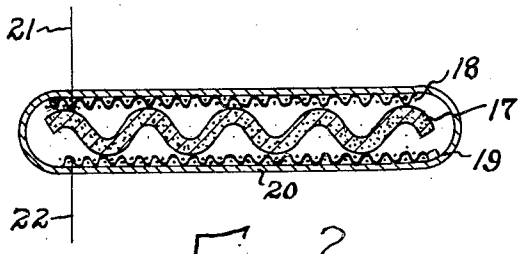


Fig. 2.

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ELECTRIC TREADLE

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1 Claim. (Cl. 201—50)

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This invention relates to improvements in electric treadles of the type commonly used, for example, in controlling the operation of vehicle doors.

A broad object of this invention is to provide an improved and simplified form of electric treadle involving constructional features whereby the vertical height or thickness thereof is kept small.

Another object of this invention is to provide an electric treadle construction in the form of a fluid-tight or fully sealed portable mat thin enough so that it can be placed on the floor in front of a door to be controlled by it.

Another object of this invention is to provide an electric treadle characterized in that it normally forms a conductive path of high resistance in the control circuit in which it is connected—the resistance of which falls to a low value under pressure.

Other and more detailed objects of the invention will be apparent from the following description of the several embodiments thereof illustrated in the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative location of parts as will be described in detail below.

In the accompanying drawings—

Figure 1 is a vertical, transverse, cross-sectional view through the treadle construction of this invention diagrammatically showing a portion of the circuit controlled thereby; and

Figure 2 is a similar view of a modified construction.

As illustrated, the treadle comprises a flexible deformable envelope 13 of any suitable material forming a water-tight housing. The envelope 13 can be constructed in many ways, the details of which are no concern of this invention. By way of example, however, it may be stated that the envelope may consist of a pair of similarly shaped rubberized fabrics hermetically sealed at the joints to make it fluid-tight. Within the envelope 13 is a body preferably in the form of a sheet 10 of a conductive and compressible material. For example, there is now known a material suitable for this purpose consisting of a conductive rubber compound moldable into the desired shape and having sufficient elasticity so as to return to normal shape after deformation. It is understood that one form of such material consists of a mixture of rubber and conductive particles such as graphite or the like present in sufficient quantity so as to form a conductive

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path therethrough. By controlling the amount of conductive material in the mixture its specific resistivity can readily be controlled, for example, to a high value. Arranged in juxtaposed relation are a pair of conductive sheets 11 and 12 which, in the form illustrated, comprise a woven wire screen or wire mesh of suitable material preferably of a hard springy nature such as spring brass, bronze and the like.

It will be seen from Figure 1 that the screens 11 and 12 are normally held in contact substantially throughout their areas with the member 10 and are closely enveloped by the capsule 13. A suitable source of current having the output voltage V is connected to the two screens 11 and 12, respectively, by wires which include in series circuit relation therewith the operating magnet 14 of a relay including the movable contact 15. This relay has a pair of fixed contacts to which the control circuit wires 16 are connected. The wires 16 will be included in a circuit in the case of the use of this treadle for door operation with the control devices for the door operating motor. It will be seen that the high resistance element 10 is included in this circuit and, therefore, the relay is constructed and proportioned so as to be of the sensitive type operable upon a change of current but not operable while the normally low current is flowing through the resultant high resistance path.

It will be seen, however, that when the treadle is subjected to pressure such as results when a person steps on it, the compressible conductive sheet 10 will be compressed at the points of pressure bringing the two mats 11 and 12 closer together thereby reducing the resistance in the circuit of the winding 14. To look at it another way, when the sheet 10 is under pressure, the material thereof at the pressure points will be compressed bringing the conductive particles in closer relationship and thereby reducing the resistance of current flow at this point. Thus when the treadle is stepped upon sufficient current will flow through the winding 14 to the sensitive relay to cause movable contact 15 to disengage the fixed contacts in the case of the mechanism illustrated. Of course, as those skilled in the electrical arts will immediately appreciate the relay can operate in a reverse sense in that it will be closed when the treadle is stepped upon completing the control circuit 16 rather than interrupting it.

The modification shown in Figure 2 is substantially similar to that of Figure 1 in most respects. In this case an envelope 20 like 13 encloses the conductive screens 18 and 19 and there

is imposed therebetween a conductive, deformable and compressible sheet 17. In this case, however, the sheet 17 is given a corrugated form as illustrated so that, as will readily be apparent, the paths of current flow through the sheet 17 are much longer in relaxed condition of the treadle than when the treadle is stepped upon. When the treadle is stepped upon the corrugated treadle tends to flap down and at the same time is pinched as before to reduce the resistance to current flow in the circuit including the wires 21 and 22 connected to the conductive elements 18 and 19. This construction normally provides a much higher resistance effect for relaxed treadle condition. The high resistance sheets 10 and 17 are not necessarily made of rubber since there are other materials available for the purpose such as some of the natural and synthetic resins which are normally elastic.

From the above description, it will be apparent to those skilled in the art that the subject matter of this invention is capable of considerable variation and I do not therefore, desire to be limited to the illustrative embodiments herein but rather by the appended claim.

What is claimed is:

In an electric treadle the combination comprising a housing, a sheet of conductive and compressible material in said housing formed of a mixture of a conductor and a non-conductor and having a normally high resistance to the passage of electric current, said sheet being of sepentine cross-section, and a pair of conductor sheets disposed on opposite sides of said first sheet and in contact therewith, the resistance to current flow of said first sheet being reduced under pressure.

CARL O. BRUESTLE.

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