

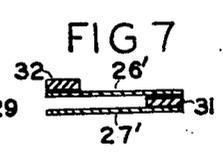
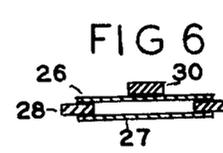
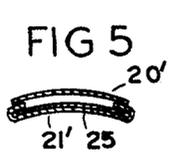
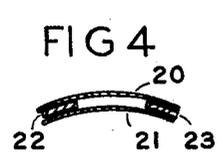
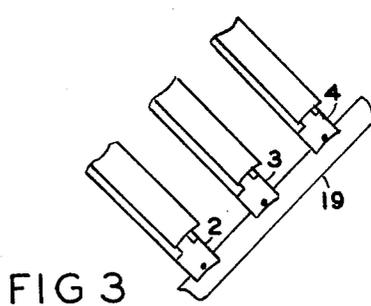
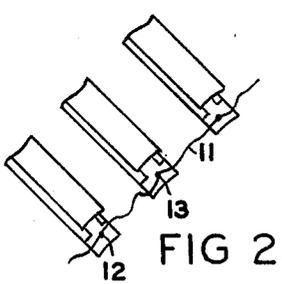
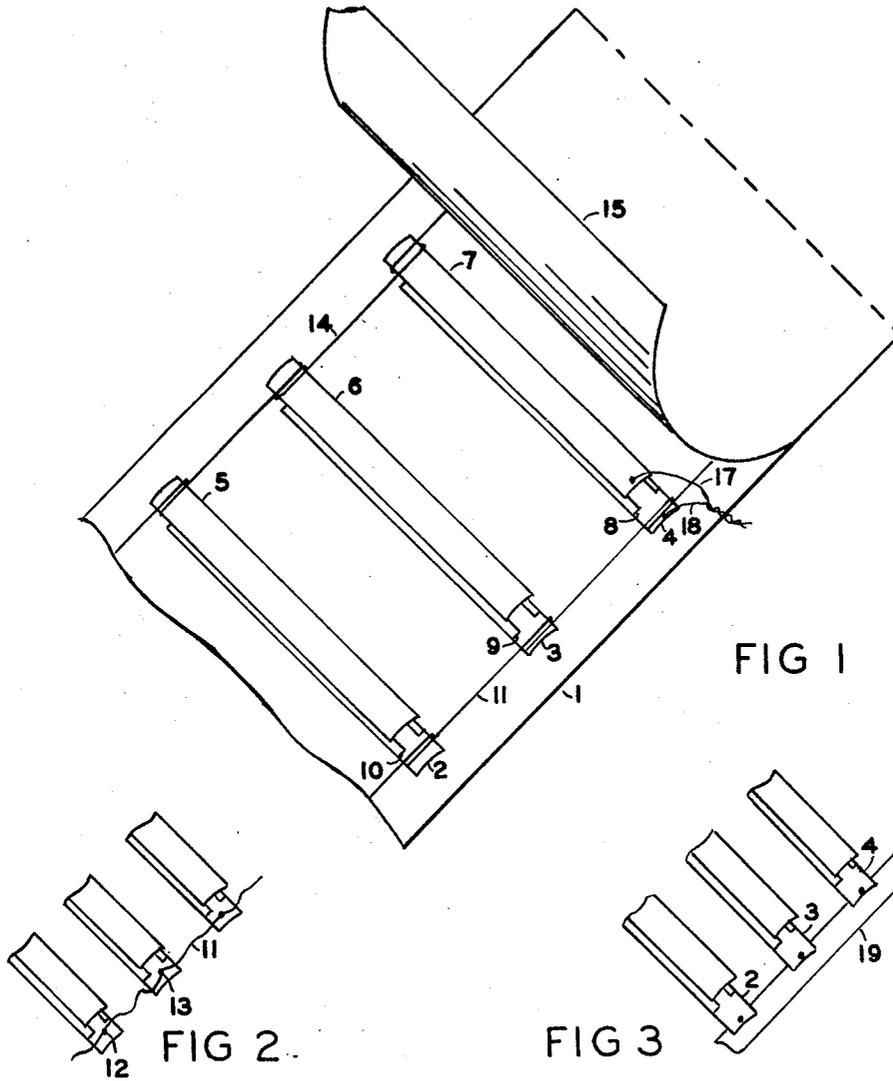
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ELECTRIC SWITCHING MAT

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1

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ELECTRIC SWITCHING MAT

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This invention relates to electric switching floor mats adapted to be operated by foot pressure.

Electric switching floor mats are useful for a number of purposes: to operate door openers, burglar alarms, annunciators to control other apparatus, or for counting.

It is desirable that the mat be thin for use under rugs or doors and that it be flexible, durable and inexpensive. It is also desirable that the mat be capable of being rolled up or twisted without short circuiting.

It is preferable that the mat be adapted for manufacture in continuous form and that it may be easily custom cut for different size installations. It is also preferable that the mat be useable partly rolled up and partly flat where the installations are not permanent.

Accordingly, a principal object of the invention is to provide a new and improved floor switching mat adapted to be operated by foot pressure.

Another object of the invention is to provide a new and improved flexible floor switching mat.

Another object of the invention is to provide a new and improved floor switching mat that may be rolled up without short circuiting.

Another object of the invention is to provide a floor switching mat that is very thin for use under rugs or doors yet which is durable.

Another object of the invention is to provide a floor switching mat which will not be damaged by metal chips, nails, or moisture.

Another object of the invention is to provide a floor switching mat which does not require a perfectly flat surface for operation.

Another object of the invention is to provide a floor switching mat which is adapted for continuous manufacturing methods but which may be easily cut to any desired length.

These and other objects of the invention will be apparent from the following specification and drawings, of which:

Figure 1 is a perspective view of an embodiment of the invention with the upper covering layer partly removed to show the interior construction.

Figures 2 and 3 are detail views illustrating different methods of interconnection.

Figures 4, 5, 6, and 7 are detail sectional views illustrating different configurations of the contact strips.

Referring to the figures, the mat comprises a bottom sheet 1 of material which may be of rubber, plastic or other insulating material. A plurality of lower contact strips 2, 3, and 4 are placed transversely across on top of the bottom covering sheet 1. A plurality of upper contact strips 5, 6, and 7 are placed above the lower contact strips and separated therefrom by insulating strips 8, 9, and 10. The contact strips are preferably placed parallel to each other to provide a uniform construction suitable for easy manufacture and which permits the mat to be rolled up without short circuiting.

The lower contact strips extend beyond the upper contact strips on one side and are connected together by

2

means of a connecting wire 11 which is preferably permanently fastened to the end of each connecting strip, for instance, by soldering as shown by the soldered joints 12 and 13 in Figure 2.

The upper contact strips extend beyond the lower contact strips on the other side and are connected together by means of a similar connecting wire 14. It is not essential that the contact strips extend beyond each other at the different ends. However, it provides a simple method of connecting them together without undue difficulty.

The strips are mechanically held in place primarily by means of the pressure of the upper sheet 15 of insulating material which is placed over the strips sandwiching them in between the upper sheet 15 and the lower sheet 1. The upper and lower strips are sealed along the edges and to each other in areas between the contact strips by vulcanizing, heat sealing, or other equivalent bonding means. Therefore, the contact strips are held in place by the positioning action of the upper and lower sheets.

The interconnected upper and lower strips are connected to an external source by means of the wires 17 and 18 which are soldered or otherwise connected to the upper and lower strips respectively. In continuous manufacturing an external connection would preferably be placed every 3 or 4 feet so that the continuous strip could be cut to any desired length. The spacing of the contact strips is suggested as 2 or 3 inches for ordinary foot contact actuation, but it may be greater where economy is desired and specific applications permit. The configuration of the contact strip need not be parallel as illustrated, but should be uniform for easy manufacture and installation.

Figure 3 is a variation wherein the connecting member is another flexible strip 19 which is soldered or otherwise connected to the contact strips 2, 3, and 4.

Figures 4, 5, 6, and 7 show various methods of construction for the contact strips. Figure 4 shows one method having upper and lower strips 20 and 21 which have a transverse curvature and which are separated along their edges by means of the insulating strips 22 and 23. When foot pressure is applied, contact will be made between the center portions of the strips. The contact strips may be made of spring-tempered, copper-clad steel or spring-tempered, beryllium copper. Of course, other equivalent materials may be used.

Figure 5 shows another variation wherein the contact strips 20' and 21' are the same or similar as in Figure 4, but the insulating strip 25 is in one piece extending under the lower strip and around the lower strip on each side.

Figure 6 shows another embodiment wherein the contact strips 26 and 27 are flat and separated along their side edges by means of the insulating strips 28 and 29. Due to the flat construction, it is necessary or desirable to add a protrusion 30 on top of the upper strip to cause sufficient deflection in the upper strip to make good contact with the lower strip. The protrusion 30 may be of any material, either an insulating strip such as rubber or plastic or it may be an integral part of the upper contact strip.

Figure 7 is similar to Figure 6 in that the contact strips 26' and 27' are flat and separated by an insulating strip 31 along one edge only. A protrusion 32 is mounted on the upper strip over the free edge thereof. This variation might be useful in certain applications such as on stairways where the foot pressure is likely to be on one side.

Therefore, the present invention provides a foot switching mat which may be made extremely thin for concealed use under rugs yet which is durable and inexpensive. The covers are preferably made of a rugged type material such as plastic or rubber so that long wear may

3

be obtained. The mat is adapted to be rolled up or twisted without short circuiting and may be manufactured in a continuous strip form and easily cut for particular installations. The mat may be made of particular sizes for particular uses. The present invention is not limited to foot pressure but may be used in any case where it is desired to detect a mechanical pressure to control an external apparatus or indicator.

I claim:

1. A foot switching mat adapted to be rolled up without making contact comprising a bottom length of flat insulating material, a plurality of lower contact strips spaced along said length, said strips being shorter than the width of said bottom length, a pair of continuous insulating strips placed along the entire length of the top edges of said contact strips, a plurality of upper contact strips placed on said insulating strips but displaced axially from said lower contact strips, whereby when pressure is applied contact of said upper and lower contact strips will be made between said insulating strips, the ends of said lower contact strips extending past said upper contact strips at one end and the ends of said upper contact strips extending past said lower contact strips at the other end, means connecting said extending upper ends, means connecting said extending lower ends, and an upper length of insulating material laid over said strips and bonded to said bottom length of insulating material.

2. Apparatus as in claim 1 wherein said contact strips have a transverse curvature.

3. A switching mat comprising a bottom length of insulating material, a plurality of flexibly connected lower contact strips spaced along said length, a plurality of flexibly connected upper contact strips placed above said lower contact strips, continuous insulating means between said upper and lower strips along the entire length thereof, said insulating strips being substantially narrower than said contact strips and spaced thereon so that contact may be made without substantially deforming said insulating strips, and an upper length of insulating material connected to said lower length of insulating material at all points between said contact strips to hold them in

4

place, whereby said mat may be rolled up without short circuiting said contact strips.

4. A modular switching mat comprising a bottom insulating covering, a plurality of lower contact strips connected in substantially parallel relationship to said covering, continuous insulating strips placed along at least one of the top edges of said contact strips along the entire length thereof, a plurality of upper contact strips placed on said insulating strips, flexible conductor means electrically connecting said lower strips, flexible conductor means electrically connecting said upper strips, and a top insulating cover bonded to said lower insulating cover at all points not occupied by said contact strip, said means connecting said strips being arranged for external connection at any point where said mat is custom cut to fit a particular application.

5. A modular switching mat comprising a bottom insulating cover means, a plurality of flexibly connected lower contact strips spaced along said length, a plurality of flexibly connected upper contact strips placed above said lower strips, insulating strips between said lower and upper contact strips said insulating strips being substantially narrower than said contact strips and spaced thereon so that contact may be made without substantially deforming said insulating strips, and an upper insulating cover means connected to said lower insulating cover means a first wire connecting said upper strips at one side of said mat, a second wire connecting said lower strips at the other side of said mat, whereby said mat may be cut to any size on the job.

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