July 6, 1965 P. H. CARTER ETAL 3,193,638

FLEXIBLE ELECTRICAL SWITCH POST

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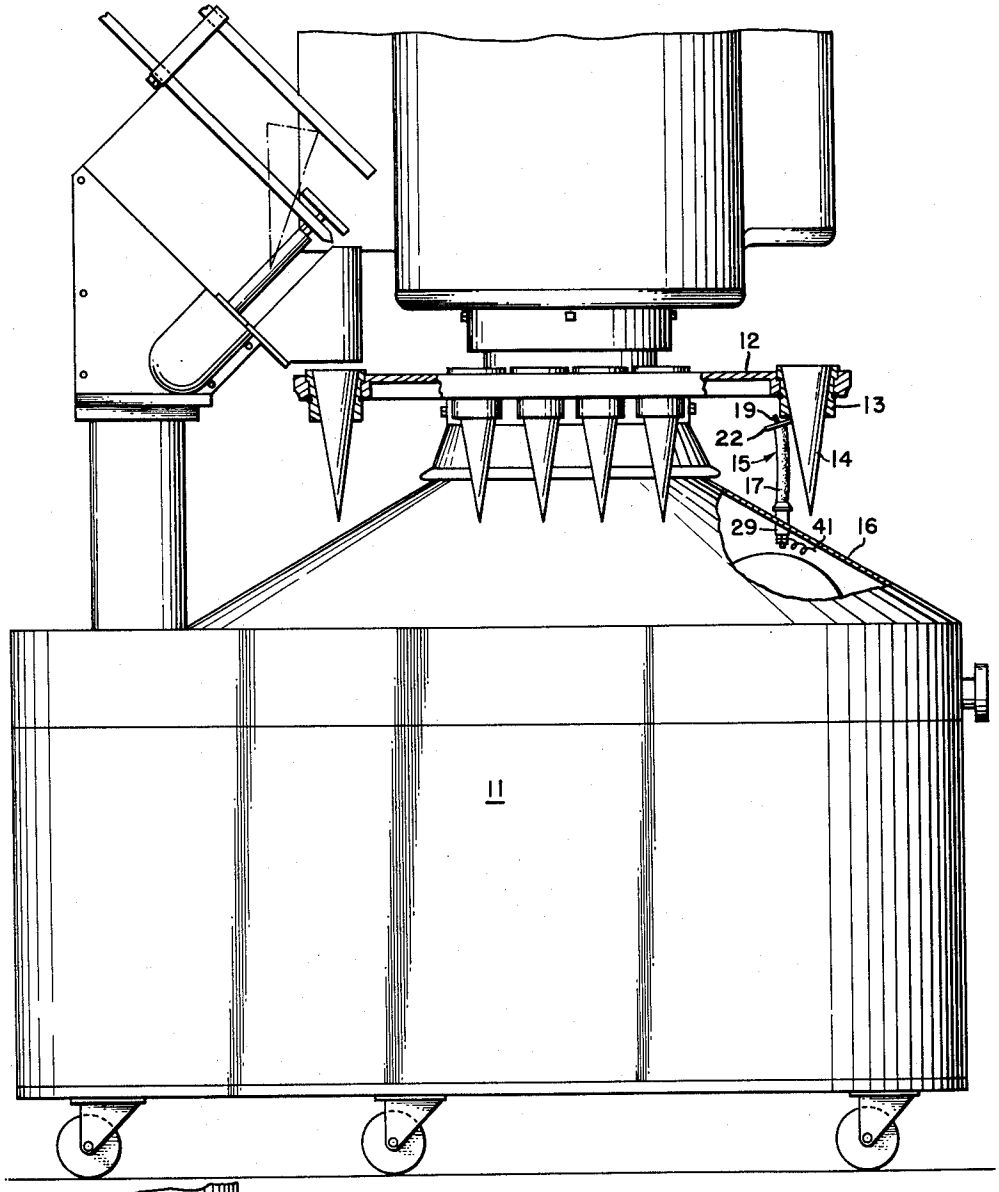


FIG. 1.

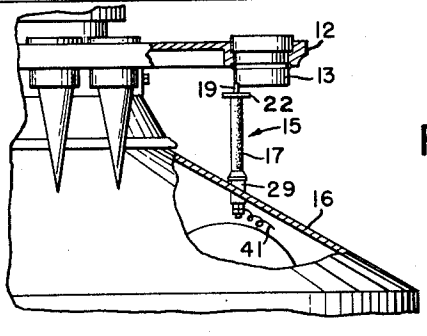


FIG. 2.

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FIG. 6.

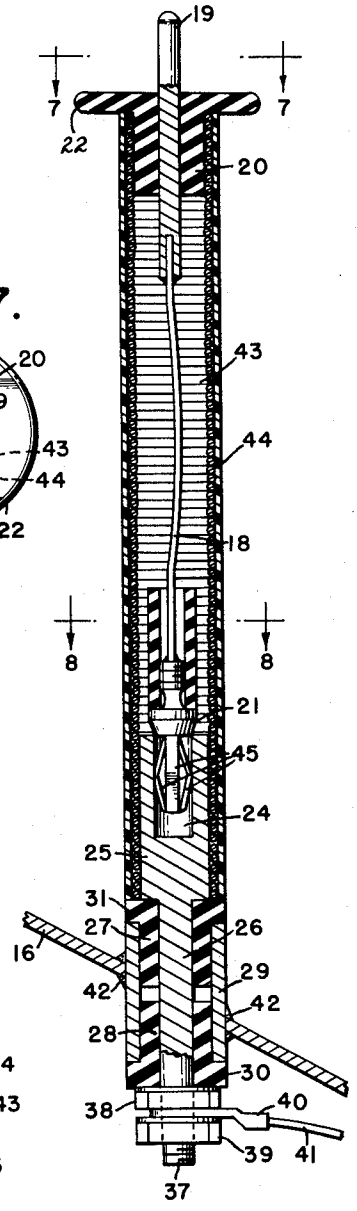


FIG. 4.

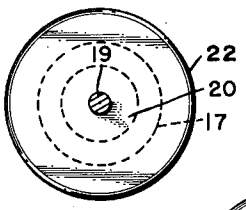
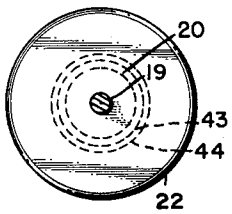


FIG. 7.



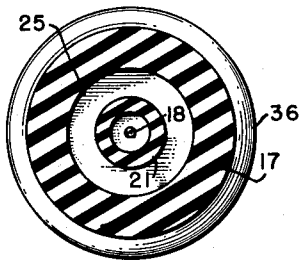


FIG. 5.

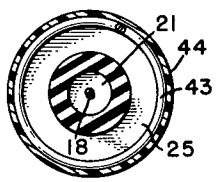


FIG. 8.

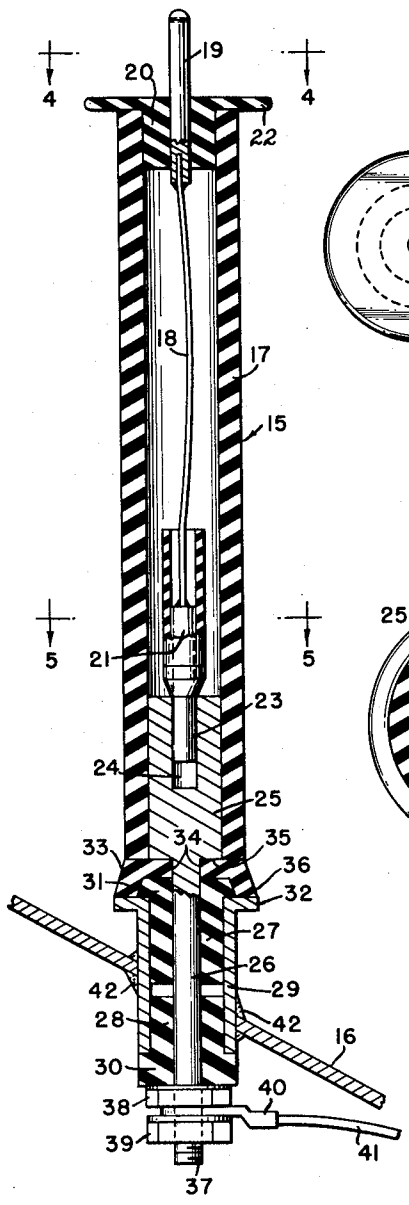


FIG. 3.

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FLEXIBLE ELECTRICAL SWITCH POST

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9 Claims. (Cl. 200—61.41)

This is a continuation-in-part of our copending application for patent Serial No. 815,883, filed May 26, 1959, now Patent No. 3,070,833.

This invention relates to electrical switches and it is more particularly concerned with an electrical device that can be inserted in an electrical circuit to sense the presence or absence of an object.

A specific application of the invention is in connection with the operation of a machine for manufacturing novelty ice cream products of the type disclosed in said copending application and the invention will be herein described in reference to such a machine although it is to be understood that such reference is to be regarded as illustrative only and not by way of limitation.

An object of the invention is the provision of an electrical device of the type mentioned which is rugged, safe, long wearing and reliable for prolonged periods of use.

Another object of the invention is the provision of an electrical device of the type mentioned which is adaptable to machines of different designs, but is especially useful in a machine of the type described in the application for patent referred to above.

Other objects and advantages of the invention will appear more fully from the following description considered together with the accompanying drawing.

In the drawing:

FIG. 1 is a side elevational view of a machine of the type mentioned above partly broken away which includes an embodiment of the invention in the position it assumes when a receptacle is disposed on the loading wheel in an adjacent receptacle holder.

FIG. 2 is a fragmentary portion of FIG. 1 showing the position of the embodiment when a receptacle is not present in the adjacent receptacle holder of the loading wheel.

FIG. 3 is a longitudinal cross-sectional view of the embodiment.

FIG. 4 is a section along the line 4—4 of FIG. 3.

FIG. 5 is a section along the line 5—5 of FIG. 3.

FIG. 6 is a view similar to FIG. 3 of a modified embodiment of the invention.

FIG. 7 is a section along the line 7—7 of FIG. 6.

FIG. 8 is a section along the line 8—8 of FIG. 6.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment is illustrated in conjunction with a machine for manufacturing novelty ice cream products, the construction and operation of which is fully described in said copending application and, for the purpose of explaining the present invention, comprises essentially a base structure 11, a horizontal loading wheel 12 having adapter members 13 for receiving receptacles, such as the conical receptacle 14, confectionary dispensing units (not shown) for dispensing various items such as ice cream, crushed nuts, chocolate, etc., into the receptacles, means for actuating the dispensers (not shown) and means (not shown) for intermittently rotating the wheel 12.

The performance of the machine requires the use of sensing devices in the form of an electrical conductor post 15 attached to a stationary hood 16 below the loading wheel 12 for detecting the presence or absence of a receptacle 14 to be filled with confectionary material. Each of these posts is so provided and arranged that when the receptacle is absent, as shown in FIG. 2, the post establishes electrical contact through the loading wheel 12 and completes a circuit (not shown) which holds the corresponding dispenser out of action. When the receptacle is in place, as shown in FIG. 1, electrical contact is broken and the corresponding dispenser is in operative condition.

This form of switch may be made to control various functions. For example, it may be employed in a circuit to condition a dispensing unit for actuation when a receptacle is present and to prevent such actuation of the dispensing unit when a receptacle is not present.

The embodiment of FIGS. 3 to 5 comprises a resiliently flexible tube 17 of an electrical insulating material, such as of rubber or a rubber-like material, containing on its interior an electrical wire 18. One end of this wire is connected to a metal pin 19 of a cap 20 and the other end to a metal plug 21. The cap 20 has a flange 22 extending outwardly beyond the periphery of tube 17. The plug 21 has a lower end shank 23 adapted to frictionally engage an axial socket 24 in a metal base block 25. The lower end 26 of the base block is of reduced diameter and projects downwardly through a pair of upper and lower bushings 27, 28, respectively, of an insulating material on the interior of a cylindrical metal shell 29 such as of steel or other suitable metal. The outer ends of the bushings 27, 28 are flanged at 30 and 31, respectively, over the respective ends of the shell 29. The upper end of the shell 29 has a flange 32 which supports an annulus 33. The annulus has a central aperture 34 through which the lower end 26 of the base block 25 passes. The downwardly facing annular shoulder 35 of the block 25 formed by the reduction in diameter of the lower end 26 abuts the annulus 33 which acts as a bearing support therefor. The annulus 33 has a peripheral flange 36 which rests on the flange 32 of the shell 29. The lowermost exposed portion 37 of the reduced part 26 is threaded to receive jam nuts 38 and 39 to form a terminal for attaching the clip 40 of an electrical wire or cable 41.

The shell 29 is disposed in an aperture of the hood 16 and is secured thereto by suitable means such as the welds 42.

An electrical circuit (not shown) which includes the cable 40 and the wheel 12 as a ground will be open when a receptacle such as the receptacle 14 is disposed in the wheel to contact the flange 21 of the cap 20 to hold the pin 19 out of contact with the wheel as seen in FIG. 1. The circuit will be closed, however, if the receptacle is absent and thereby permit the pin 19 to contact the wheel as illustrated in FIG. 2.

The embodiment of FIGS. 6 to 8 is similar to that of FIGS. 3 to 5 except that the rubber tube 17 is replaced by a resilient steel coil 43. The use of a rubber tube has the disadvantage in that it is relatively inelastic in the technical sense and, after prolonged use, takes a flexural set which affects its efficiency and effectiveness. By substituting a highly resilient steel spring in relation to which the flexural stresses to be encountered are well within its elastic limit, this problem is obviated and the device remains useful, efficient and effective indefinitely.

A protective sleeve 44 of a thin plastic sheet material, such as polystyrene, is disposed on the outer surface of the coil 43. This sleeve not only provides electrical insulation but excludes dust, dirt and other foreign particles from the interior of the coil.

This second embodiment includes other parts similar to those of the first embodiment and which are designated by the same numerals to facilitate the description, except that the shank 23 is substituted by a group of resilient fingers 45 to increase frictional contact with the socket 24; a feature which may also be employed in the first embodiment.

Having thus described our invention, we claim:

1. An electrical sensing device comprising a flexible resilient tube, a head member secured to and carried by one end of the tube, said head member comprising a flange extending laterally beyond the periphery of the tube, a pin of an electrical conducting material secured to and carried by the head member, said pin extending outwardly and axially of the tube, a base block of an electrical conducting material secured to the other end of the tube, said block having a portion extending outwardly from the tube and adapted as an electrical terminal, and disengageable means electrically connecting said pin with said block.

2. An electrical device as defined by claim 1 in which the tube is of a rubber-like material.

3. An electrical device as defined by claim 1 in which the tube is in the form of a coil spring of a highly elastic metal.

4. An electrical device as defined by claim 3 and a plastic sleeve covering the outer lateral surface of the spring.

5. An electrical device as defined by claim 1 in which the pin is connected to the block by a flexible electrical wire, one end of the wire being fixed to the pin and an electrical plug secured to the other end of the wire, said block having a socket therein for frictionally engaging the plug.

6. In combination with a machine having a fixed member and a member spaced from and movable relative to the fixed member, said movable member having an aperture therein adapted to receive and carry an article to be operated upon by the machine, a device for sensing the presence or absence of the article in said aperture at a given station on the fixed member, said sensing device comprising a flexible resilient tube, a head member comprising a flange extending laterally beyond the periphery of the tube out of the path of movement of the movable member and in the path of movement of a portion of an article disposed in said aperture and supported by the movable member, said portion extending beyond the aperture into an open area adjacent the movable member, a pin of electrical conducting material secured to and carried by the head member and extending into the path of movement of the movable member, a base block of an electrical conducting material secured to the other end of the tube and to the fixed member, said flange being of a size to offset the pin from the movable member and prevent contact therewith when the flange is in contact with the article.

7. The subject matter of claim 6 in which the tube is of a rubber-like material.

8. The subject matter of claim 6 in which the tube is in the form of a coil spring of a highly elastic metal.

9. The subject matter as defined by claim 8 and a plastic sleeve covering the outer lateral surface of the spring.

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