

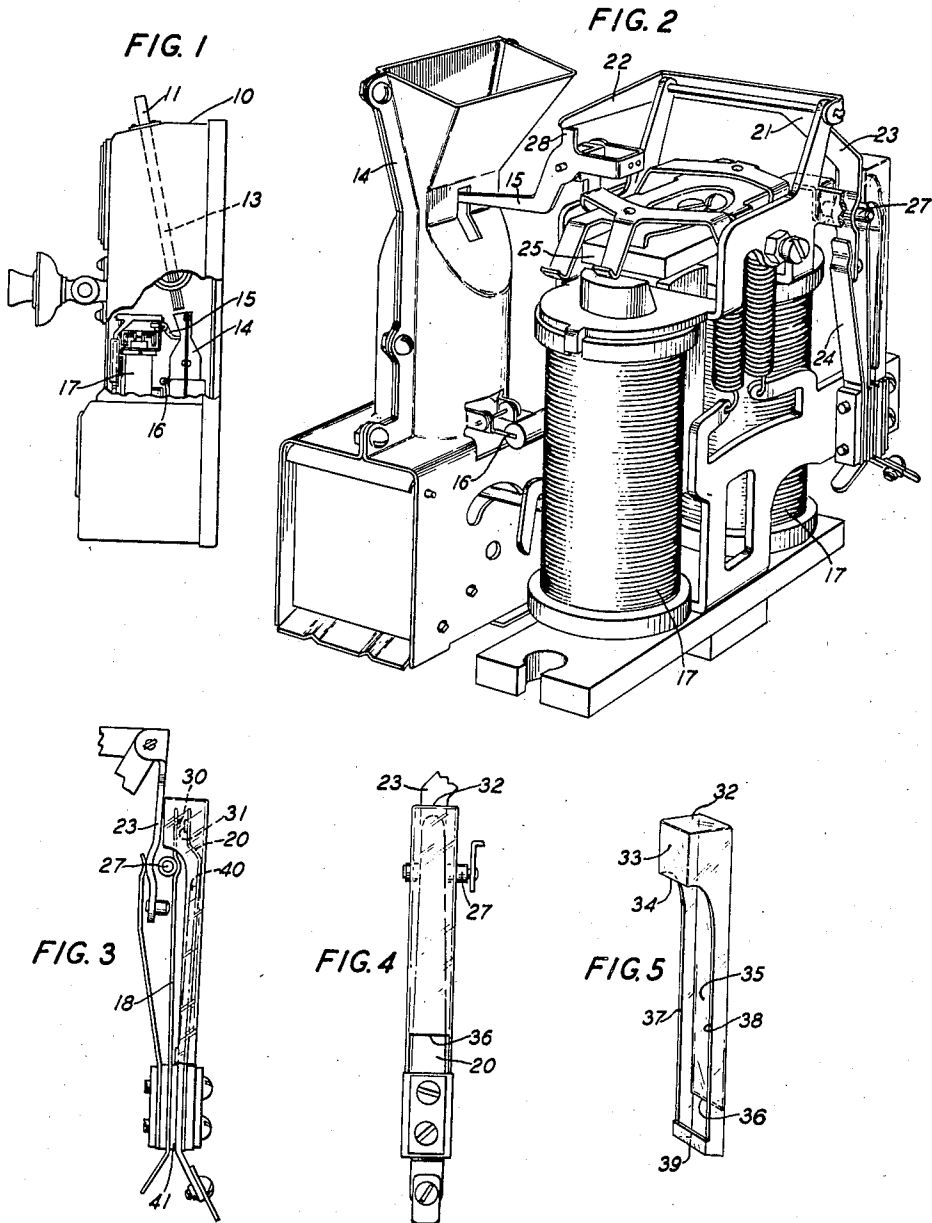
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SHIELD FOR ELECTRICAL SPRING CONTACTS

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SHIELD FOR ELECTRICAL SPRING CONTACTS

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This invention relates to a shield for electrical spring contacts and has for an object to prevent the accumulation of dust or other foreign material on the contacting surfaces of the spring contact members, which accumulation might tend to render ineffective the closure of the spring members by any suitable actuating means.

The invention is of particular importance as applied to the coin controlled mechanism of a telephone coin collector of the type disclosed, for example, in the O. F. Forsberg, U. S. Patent 1,043,219, issued November 5, 1912, where the deposit of a coin is adapted to close a pair of spring contacts for closing the energizing circuit for the line relay at the central office, the contact closure also placing the coin relay under the control of the remote operator to secure the subsequent collection or refund of the deposited coin. Although the coin relay and associated mechanism are usually surrounded by a metal housing there is a tendency for dust to accumulate within the housing and in particular on the contacting surfaces of the spring contacts to such an extent as to produce a high contact resistance, thereby rendering uncertain the operation at the central office of the line relay to notify the operator of the incoming call. While some of this difficulty might be overcome by increasing the pressure of the biasing spring for the spring contacts, other operating considerations limit this pressure to a fairly low value.

The present invention reduces the danger of poor contact closure by providing a hood substantially enclosing the upper ends of the spring members adjacent the contact points, the hood being so constructed and supported as to enable the spring members to be freely operated either by the coin controlled lever or by the relay armature without imposing any additional requirements on any of the controlling mechanism. To this end the hood is made of a lightweight material covering only the upper ends of the spring members and is freely supported for a small amount of transverse movement by an extension which preferably rests on the clamping means for the spring pile-up.

Referring to the drawing,

Fig. 1 is a general side view of a telephone coin collector in which this invention is adapted to be used;

Fig. 2 is an enlarged view of the coin relay of a telephone coin collector showing the shield of this invention protecting the spring contacts associated with the relay;

Fig. 3 is an enlarged view of the spring contacts and the protecting shield;

Fig. 4 shows the spring contacts and the shield viewed from another angle; and

Fig. 5 is a view in perspective of the shield of this invention.

The shield of this invention is of particular value as applied to the type of telephone coin collector illustrated in Fig. 1 where the upper housing 10 of the collector supports a coin gauge 11 in which coins may be deposited to traverse a coin chute 13, drop into a coin hopper 14 to actuate a coin trigger 15, and temporarily come to rest upon a coin trap 16 for subsequent collection or refund under the control of coin magnet 17. A collector of the above type is disclosed in greater detail in the above-mentioned Forsberg patent.

As explained in the Forsberg patent the deposit of a coin and the actuation of coin trigger 15 causes the energization of the line relay at the central office and places the windings of coin magnet 17 under the control of the remote central office operator due to the closure of spring contacts 18, 20. The pivoted frame 21 has an arm 22 resting on shoulder 28 of coin trigger 15 and has another arm 23 which normally prevents biasing spring 24 from closing contacts 18, 20. However, the actuation of coin trigger 15 removes the shoulder 28 supporting arm 22 and hence allows the biasing spring 24 to move arm 23 to close spring contacts 18 and 20, and thereby establish a circuit leading from the central office through the windings of the coin magnet 17. The pivoted armature 25 of the magnet may be moved clockwise or counterclockwise depending upon the polarity of the source of voltage applied to the line. The armature 25 has an extension 26 which, as explained in the Forsberg patent, serves to collect or refund the coins depending upon the direction the armature is moved. A plate fastened to armature 25 carries a roller 27 which normally rides in a depression in spring 18 and an opposed depression in arm 23 of frame 21. When the armature is actuated in either direction from its normal position the roller 27 rides out of these depressions and moves arm 23 clockwise as viewed in Fig. 3 to enable the coin trigger 15 to be restored to its normal position of Fig. 2, and at the same time maintaining contacts 18, 20 closed. When the energizing source for the coin magnet 17 is removed, the restoration of armature 25 again places roller 27 within the depression in spring 18 allowing the spring contacts 18, 20 to open, the biasing spring 24 now being in-

effective since shoulder 28 of coin trigger 15 is again supporting lever arm 22.

It will be noted that the amount of pressure exerted by biasing spring 24 is limited by the fact that this biasing spring normally presses arm 22 against shoulder 28 and the friction between shoulder 28 and arm 22 must be small enough to permit trigger 15 to be actuated by a small coin such as a dime. This necessity of having the coin trigger positively actuated by a deposited coin against the pressure produced by biasing spring 24, therefore, limits the maximum pressure which may be applied to close spring contacts 18, 20. Hence, the accumulation of dust or other foreign material on the contact points 30, 31 may prevent the proper closure of the contacts or make a contact of such high resistance that the line relay at the central office is not energized to notify the operator of the incoming call.

In accordance with this invention it is proposed to provide a hood or shield for the upper ends of the spring contacts 18 and 20 to substantially prevent the accumulation of dust or other foreign material between the contact points 30 and 31, the hood being light in weight and supported in such a manner that it does not interfere with the operation of the spring contacts by lever arm 23 or armature extension 27 while still being readily installed or removed without requiring any modification or adjustment of the spring pile-up as found in standard telephone coin collectors.

The shield of this invention as shown more particularly in Fig. 5 comprises a top wall 32, a front wall 33 extending downwardly from the top wall to an edge 34, a rear wall 35 extending downwardly to a lower edge 36 and two side walls which after reaching a point opposite edge 34 are cut away to form two ribs 37, 38 for the rear wall 35, these ribs extending beyond the lower edge 36 of the rear wall for a short distance and being joined by a cross-arm 39 on the side opposite rear wall 35.

In putting this shield in position the top of spring contact 20 is inserted between cross-arm 39 and rear wall 35 and the space between this cross-arm and the lower edge 36 of the rear wall enables the cross-arm to be moved past the crook in spring 20 and then to the left of stop spring 40 as viewed in Fig. 3 so that the cross-arm comes to rest on the top edge of the insulating spacer 41 between stop spring 40 and spring contact 18 with the front wall 33 of the hood between the upper end of spring contact 18 and lever 23. The distance between top wall 32 and the bottom edge of cross-arm 39 is such that when cross-arm 39 rests on the top edge of insulator 41 the top wall 32 does not contact with the upper ends of springs 18, 20. The side walls of the shield are cut away to enable roller 27 to be moved upwardly or downwardly without coming into contact with the shield. It is also obvious from Fig. 3 that lever 23 in operating may actuate the spring contacts without any interference from the shield.

It thus will be seen that the spring contacts 18, 20 may be freely actuated for closure or opening of contact points 30, 31 without any interference from the shield and at the same time the hood at the upper end of the shield forms a substantial enclosure for the contact points to protect them from dirt or other foreign material.

The above-described shield may be made from any suitable material such as thin fibre or cellulose acetate and may be strengthened if necessary in any suitable manner. It is also contemplated that the shield may be made of lightweight metal provided with an insulating finish. A shield of cellulose acetate is of particular advantage in that it is not only light in weight but it is substantially transparent so that the contact points may be examined without removing the shield.

What is claimed is:

1. In a coin collector, a vertical spring pile-up comprising a plurality of spring members, fastening means for the lower ends of said members including an insulating spacer between the lower ends of two of said members, the upper free ends of said members having adjacent electrical contacts and a hood surrounding the upper ends of said members, said hood having an extension arm contacting with said spacer and loosely supported thereby to freely permit lateral movement of said hood when the upper free ends of said springs are moved laterally.

2. In a coin collector, a spring pile-up comprising a plurality of spring members, fastening means for said members at one end of the pile-up, the opposite ends of said members being free for transverse movement, a pair of said members having adjacent electrical contacts near their free ends, another of said members acting as a biasing spring for said pair tending to close said contacts, and means for protecting said contacts from dust comprising a hood of lightweight material surrounding the upper ends of said pair, said biasing spring being external to said hood, said hood having an extension loosely resting on said fastening means at points immediately adjacent the lower ends of said members.

3. In a coin collector, a vertical spring pile-up comprising a plurality of spring members, fastening means for the lower ends of said members, the upper free ends of said members having adjacent electrical contacts, a biasing spring for said members supported at one end by said fastening means and adapted to move said free ends laterally in closing said contacts, a hood substantially enclosing only the upper ends of said members, and means connected to said hood and supported by said fastening means to freely permit lateral movement of said hood when said members are actuated by said biasing spring, the free end of said biasing spring being external to said hood.

4. In a coin collector, a vertical spring pile-up comprising a plurality of spring members, fastening means for the lower ends of said members, the upper free ends of said members having adjacent electrical contacts, means tending to move said free ends laterally in closing said contacts, a hood substantially enclosing only the upper ends of said members, said hood having a downwardly extending arm, said arm and said fastening means having abutting surfaces maintained in contact solely by gravity to support said hood in a vertical plane while permitting said hood to move laterally with said spring members.

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