March 31, 1942. R. BORZA 2,278,057

ELECTRIC SWITCH, CONNECTOR, AND THE LIKE

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Fig. 1

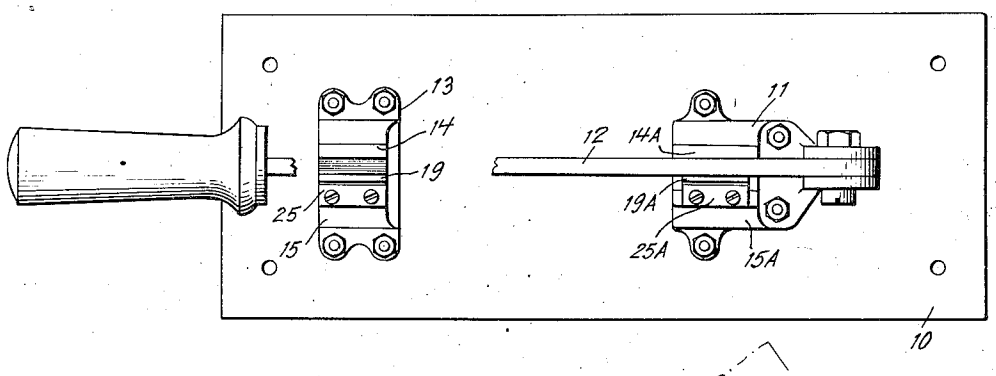


Fig. 2

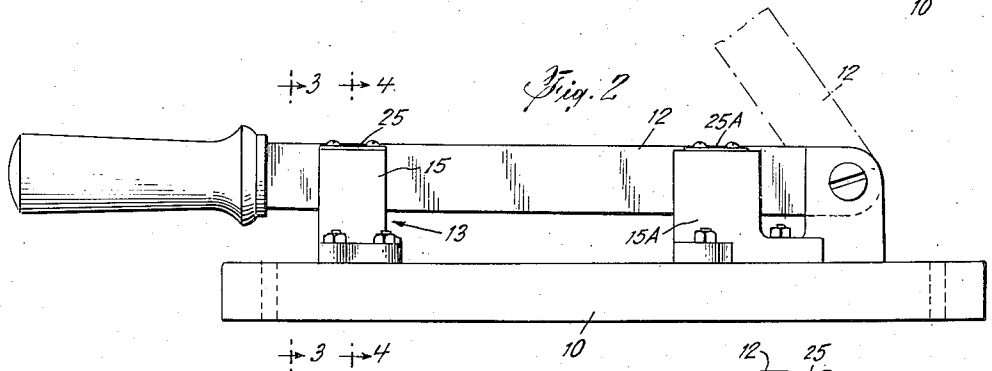


Fig. 3

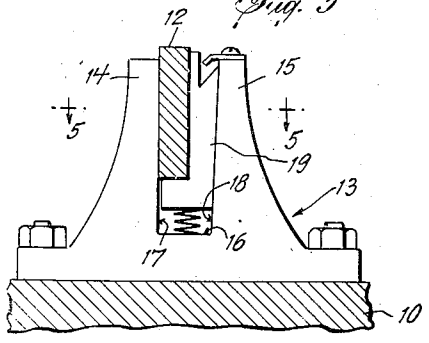


Fig. 4

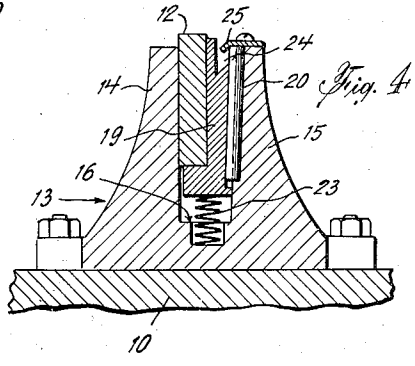
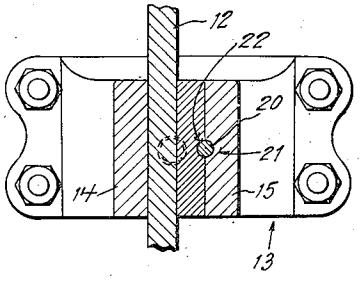


Fig. 5



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ELECTRIC SWITCH, CONNECTOR, AND THE LIKE

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Fig. 6

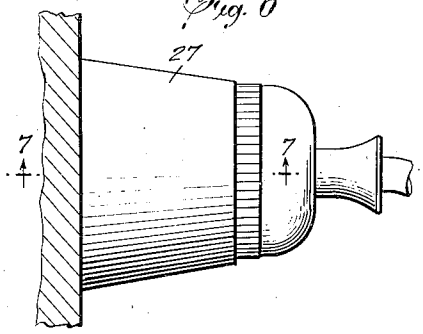


Fig. 7

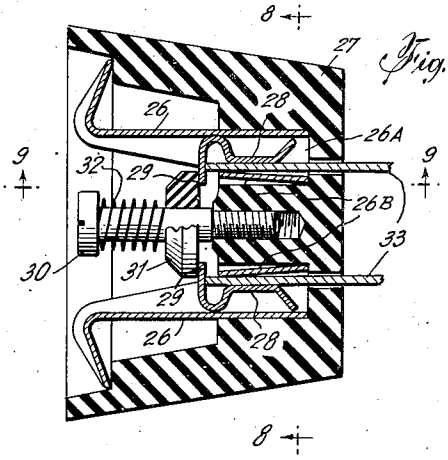


Fig. 8

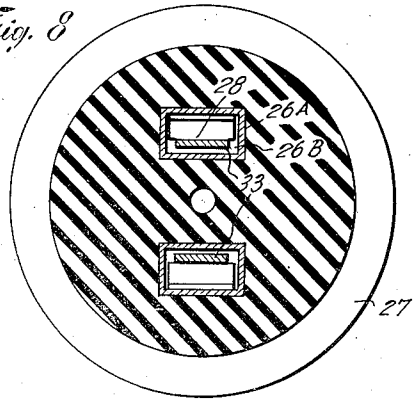


Fig. 9

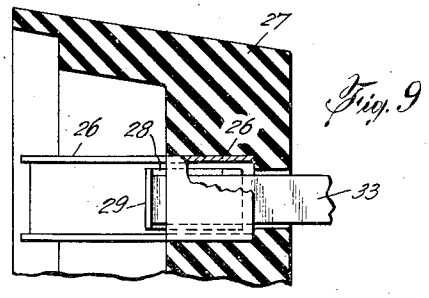


Fig. 10

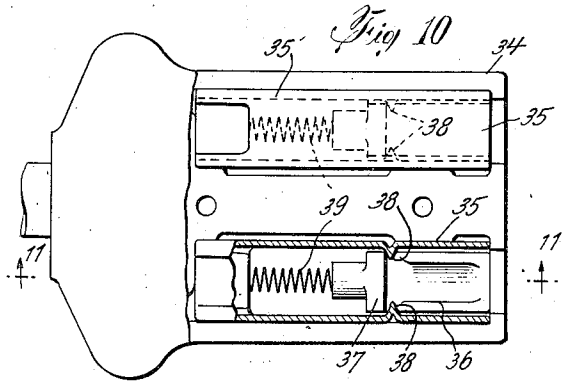
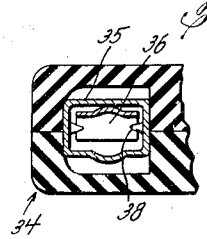


Fig. 12



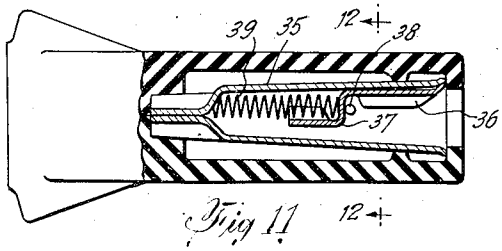


Fig. 11

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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH, CONNECTOR, AND THE LIKE

Raphael Borza, Yonkers, N. Y.

Application March 15, 1941, Serial No. 383,482

5 Claims. (Cl. 200—162)

This invention relates to electric switches, and aims to provide improvements whereby a practically perfect electric contact is had between the movable and the stationary contacts.

The above and other objects will become apparent in the description below, reference being had to the accompanying drawings wherein a number of different types of electric switches or contactors are illustrated. It is not intended to limit the invention to the specific details of construction shown, nor to the particular types of switches or contactors illustrated, as it may equally well be applied to other types or forms.

Referring briefly to the drawings,

Figure 1 is a plan view of a knife switch embodying the invention.

Figure 2 is a side elevational view of the same.

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a side elevational view of a contact plug socket embodying the same invention.

Figure 7 is a cross-sectional view taken on the line 7—7 of Figure 6.

Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 7.

Figure 9 is a cross-sectional view taken on the line 9—9 of Figure 7.

Figure 10 is a plan view, partly in section and with part of the cover removed, of a so-called electric iron plug socket, embodying the same invention.

Figure 11 is a cross-sectional view taken on the line 11—11 of Figure 10.

Figure 12 is a cross-sectional view taken on the line 12—12 of Figure 11.

Referring in detail to the drawings, the numeral 10 indicates the base of a knife switch, the pedestal 11, secured thereon, having the throw arm or blade 12 pivoted thereto. The contact or pole 13 is similarly secured to the base. For the sake of simplicity, the wire terminals are not shown.

The pole 13 comprises a unitary member having a pair of opposed rigid upright arms 14 and 15 extending therefrom, the space between these arms having a floor 16. The mutually opposed or inner walls 17 and 18 of these arms are very slightly inclined in a downward direction with respect to each other, so that the said space between the arms is slightly wedge-shaped. In the illustration, the wall 17 is shown perpendicular to the base 10 and the wall 18 at a slight angle to the perpendicular.

An L-shaped block 19 is slidably mounted against the wall 18, and is keyed against lateral movement by a pin 20 registering loosely in opposed cylindrical grooves 21 and 22, the former in the wall 18 of the arm 15, and the latter in the wall of the block 19. The opposed walls of the block 19 are also very slightly tapered with respect to each other, but in the opposite direction to that of the arm walls 17 and 18. A coiled spring 23, registering in a recess in the floor 16, normally urges the block 19 upward. An angular slot 24 is cut across the top of the block 19 and a tongue 25, screwed to the top of the arm 15, is adapted to register in the slot to serve as an upper limit stop, to prevent the block from leaving the space between the arms.

It is apparent that, as the blade 12 is forced into the pole 13, it engages the block 19 and carries the same with it. In so doing, the adjacent surface of the block is forced into closer and tighter contact with the blade, owing to the wedge-shape of the block and the inclination of the arm wall 18. Upon extraction of the blade, the spring 23 restores the block to an upper position, as is obvious.

The pedestal 11 is provided with similar parts and is in generally similarly constructed, the externally visible parts thereof being indicated, in Figures 1 and 2, with identical numbers followed by the letter *a*. Of course, any other suitable guide means, to prevent lateral movement of the block 19, may be provided instead of the loose key and slot arrangement shown.

It is apparent from the above that a switch has been provided whereby, when in closed position, practically no loss of power is entailed, owing to the snugness of the contacts. As a result, heavily loaded switches may be built substantially smaller in size than is at present necessary.

In the application of the principle of the invention to a simple plug socket of the common two-prong type shown, the members 26 are rigid within the housing 27 and are provided with suitable contact terminals, not shown, for the leads. That portion of each member 26, shown at 26*a*, which registers in the recesses in the housing, is tubular and rectangular in cross-section, with the wall 26*b* tapering toward the opposite wall as shown. Slidably mounted within the tube 26*a*, between opposed walls thereof, is a deformed resilient wedge-like finger 28 having a tongue 29 extending inward toward the axis of the housing. A screw 30 is insertable into the housing in the

axis thereof, and carries a loose insulated washer 31 urged outward by a spring 32. The tongues 29 of the wedges 28 are both in touch with the washer 31, and are urged by the spring 32 acting against the washer, into their tubular homes within the sections 26a. When the prongs 33 of a plug, not shown, are inserted into the socket 27, and their tips reach the tongues 29, further forcing home of the plug moves the tongues 29 against the washer 31 and spring 32 and carries the fingers 28 further toward the narrower end of the tube sections 26a. Thus, the further the plug is inserted, the more secure and tighter becomes the electrical contact between the prongs 33 and the members 26 through the medium of the fingers 28. When the plug is removed, the washer 31 restores, by virtue of the spring 32, the fingers 28 toward the entrances to the tube sections 26a.

In the socket shown in Figures 10–12, the housing 34 is of standard construction and contains the two hollow tubes or sleeves 35 which are adapted to receive the cylindrical prongs, not shown, of the plug. In each sleeve 35 a slidable contact member 36 is mounted, and its rear is deformed into a Z-shaped extension 37. As shown, the sleeves 35 taper inwards, and as the prong is inserted into the sleeve from the front, its tip carries the member 36 inward by engagement with extension 37, thus causing a wedging action which tightens the electrical contact. A coiled spring 39 is placed between the inner, reduced and closed end of the sleeve, and the free end thereof lies against the extension 37 of the member 36. Indents 38 in the opposed side walls of the sleeve, lying in the path of the extension 37, act as limit stops to prevent passage of the members 36 out through the mouth of the tube 35. The springs 39, obviously, urge the members 36 outward again, to the position shown, on extraction of the prongs of the plug.

It is apparent from the above that a practical means has been provided for greatly enhancing the efficiency of electrical contact in such devices as switches and contact plugs. Obviously, modifications in form and structure may be made without departing from the spirit and scope of the invention.

I claim:

1. In combination, a male contact member and a female contact member adapted to receive and make electrical contact with said member, said female member having a metallic lined recess therein and a metallic member slidable in said recess, said recess tapering inward, said slidable member having an extension thereon adapted to be engaged by said male member upon insertion of the latter into the recess and to be carried rearward thereby toward the tapering end of the recess, said movement of said male and slidable members causing said slidable member to wedge said male member tightly in said recess, said female member and said slidable member having opposed complementary longitudinal grooves therein, a pin mounted partly in each of said grooves, and resilient means for restoring said slidable member to its original forward position in said recess upon extraction of said male member from said recess.

2. In combination, a male contact member and a female contact member adapted to receive and make electrical contact with said member, said female member having a metallic lined recess therein and an L-shaped metallic block slidable in said recess, said recess tapering inward, said one arm of said block forming an extension thereon adapted to be engaged by said male member upon insertion of the latter into the recess and to be carried rearward thereby toward the tapering end of the recess, said movement of said male and slidable members causing said slidable member to wedge said male member tightly in said recess, said female member and said block having opposed complementary longitudinal grooves therein, a pin mounted partly in each of said grooves, and resilient means for restoring said slidable member to its original forward position in said recess upon extraction of said male member from said recess, and a limit stop to limit the forward movement of said slidable member.

3. In combination, a male contact member and a female contact member adapted to receive and make electrical contact with said member, said female member having a metallic lined recess therein and an L-shaped metallic member slidable in said recess, said recess tapering inward and thereby constituting a wedge-shaped recess, one arm of said slidable member forming an extension thereon adapted to be engaged by said male member upon insertion of the latter into the recess and to be carried rearward thereby toward the tapering end of the recess, said male and said slidable members thereby cooperatively constituting a wedge and said movement of said male and slidable members causing said slidable member to wedge said male member tightly in said recess, resilient means for restoring said slidable member to its original forward position in said recess upon extraction of said male member from said recess, and guide means limiting said slidable member to longitudinal movement and constraining the same against lateral movement.

4. An electrical socket comprising a hollow housing having spaced plug openings through one wall thereof, a pair of spaced contact members mounted in the housing, the opposed walls of said members tapering in a rearward direction from said openings, the forward ends of said members having rearwardly tapering tubes rectangular in cross-section formed thereon, said tubes being open at both ends and having their forward ends lying adjacent said plug openings, members slidably mounted in said tubes and having extensions on the rearward ends thereof, said extensions projecting toward each other out of the rear ends of said tubes, a stud secured in said housing between said extensions and having a washer-like member slidable thereon, and resilient means normally urging said last-named member in a forward direction against said extensions to normally urge said slidable members forward in their respective tubes.

5. An electrical socket comprising a housing having an opening in the forward end extending rearward thereof, a tube registering in said opening and tapering rearward, a contact member longitudinally slidable in said tube and having a substantially right-angled extension on the rearward end thereof, a coiled spring mounted between the rear end of said tube and said extension, said sleeve having intermediate its length projections on the opposed inner walls thereof positioned forward of said extension and serving as limit stops to the forward movement of said member, said spring urging said member forward and simultaneously urging the same against one wall of said sleeve.

RAPHAEL BORZA.