

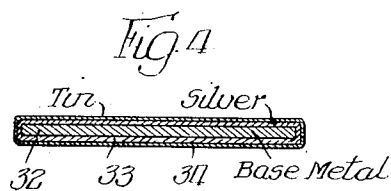
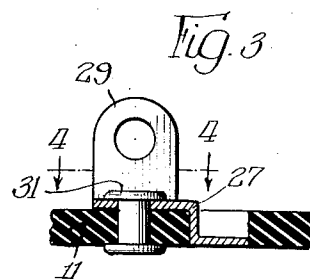
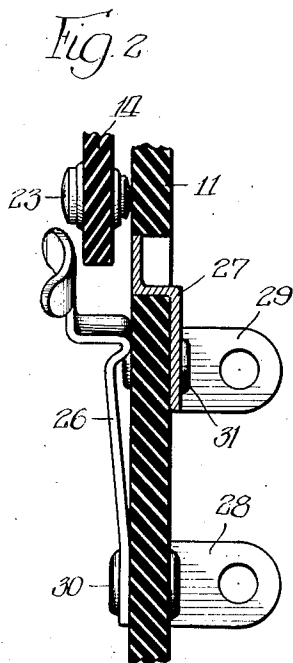
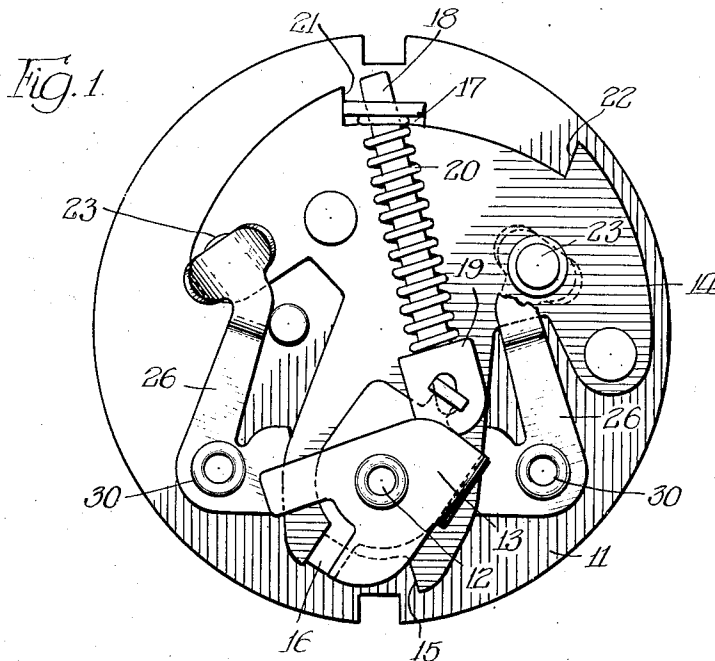
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2,177,288

SWITCH TERMINAL CONSTRUCTION

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SWITCH TERMINAL CONSTRUCTION

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6 Claims. (Cl. 200—166)

This invention relates to a new and improved switch terminal construction and more particularly to a construction which is adapted to permit a wire to be readily soldered thereto and to provide a low resistance switch contact.

In the manufacture of many types of switches for use in the radio and similar fields it has become customary to provide switch contacts which are silver plated to provide low contact resistance. In small switches of the snap type as well as in wave change or other multiple contact switches, in many cases the switch contact is formed integrally with a terminal or solder lug for connection to external wiring. This integral construction reduces the number of parts and facilitates manufacture and assembly. It also eliminates resistance due to surface contact between separate elements which may corrode or may not be uniformly and permanently secured together.

While silver when bright forms a surface which readily takes a soldered connection, the same silver when it becomes dull, tarnished or corroded presents a surface to which it is difficult to solder. A corroded or oxidized silver surface also does not form a good, low resistance contact surface on initial switch operation although repeated switch action may wear away the surface matter and restore the low resistance contact efficiency.

When switches are made in large quantities and shipped to radio set or test instrument factories or the like for assembly, a considerable period of time may intervene between the date of manufacture of the switch and the time when wires are soldered to the switch terminals. Humid atmospheric conditions or the presence of sulphur in the air may accelerate corrosion. It may be quite difficult therefore to obtain good, permanent, low resistance soldered connections to the switch at the time of assembly.

It is an object of the present invention to provide a new and improved switch contact construction.

It is a further object to provide a low resistance switch contact with an integral solder connection portion adapted for ready soldering to form a low resistance, permanent connection.

It is also an object to provide a low resistance silver contact having means for protection of the silver against corrosion.

It is an additional object to provide a switch contact of this character in which a silver protecting film also serves to facilitate soldering to an integral portion of the contact.

It is a further object to provide a switch con-

tact formed of a copper alloy or the like with a silver plate on the surface thereof and with a thin plating of tin superposed on the silver plate.

Other and further objects will appear as the description proceeds.

I have shown certain preferred embodiments of my invention in the accompanying drawing, in which—

Figure 1 is a plan view of a snap or toggle switch having contacts made according to the present invention;

Figure 2 is a fragmentary section on an enlarged scale showing the contact construction;

Figure 3 is another fragmentary section showing the fixed contact; and

Figure 4 is a section taken on line 4—4 of Figure 3 and shown on a much enlarged scale.

The switch construction shown is covered in my copending application Serial No. 24,752, filed June 3, 1935, and forms no part of the present invention. The switch has been shown in order to make clear the application of the present invention to such switches or the like.

Referring first to Figure 1, the switch is mounted on a disc 11 formed of sheet insulating material, such as Bakelite. The pivot 12, secured to base 11, carries the switch operating cam 13 and the switch arm 14. The switch arm 14 is made from sheet insulating material and is provided with a notch 15 to receive the downwardly extending lug 16 on the cam 13. The stop member 17 is secured to the base 11 and the free end 18 of the pitman 19 passes through the member 17. The other end of the pitman is secured to the operating cam 13, and the pitman carries the coil spring 20, the thrust from which maintains the cam and switch arm at either limit of movement. The movement of the parts is limited by the shoulders 21 and 22 on the switch arm 14, which shoulders alternately engage the fixed stop member 17.

The switch arm 14 carries the bridging contacts 23 which are in the form of rivets secured in the insulating switch arm. The switch as shown is of the double pole, single throw type adapted to open and close two independent circuits. The base 11 carries the fixed contacts 27 and the spring contacts 26 as best shown in Figure 2. Each contact 27 is located opposite a contact 26 so that in the closed position a contact 23 connects these two contacts. The contacts 26 each have a terminal portion or solder lug connecting portion 28 which extends through a slot in the base 11 to the outer face of the base. Each fixed contact 27 has also an integral ter-

minal portion 29 on the same face of the base 11. The contacts 26 and 27 are secured to the base 11 by the rivets 30 and 31 respectively.

As shown in the section of Figure 4, each contact member comprises a body 32 of base metal, a plating 33 of silver and a thin plating 34 of tin. The base metal used is normally copper or a copper alloy such as spring brass. A fixed contact such as the contacts 27 requires no resilience and may be made of copper or an alloy, while a spring contact such as contact 26 must be made of a resilient alloy which will maintain its resilience through a long life and a large number of switch operations.

The silver plating 33 should be heavy enough to last for the life of the switch, while the tin coating 34 may be very thin. A mere flash coating of tin is sufficient as it is not intended to stand up under any wear. It will be understood that the two coatings will normally be applied by successive electroplating operations.

Switches of this type are often made in very small sizes with the base an inch or less in diameter. Consequently all the parts are quite small in size and it is not commercially practical to silver plate any of them in part only. While it is not necessary to silver plate any part of the contact member other than the actual part which engages the movable contact in so far as use is concerned, due to the small size of the parts they are fully plated.

The solder terminal portion is therefore silver plated and a tarnished or corroded silver surface is difficult to solder to. The flash coating of tin is applied to the silver surface while it is still bright and the tin coating protects it from tarnishing. The tin itself forms an excellent soldering surface and insures a good soldered connection with the silver underneath it. The tin on the contact portion which engages the movable switch contact does not make as low resistance contact as the silver. The tin is thin, however, and quickly wears away from switch operation, exposing the bright silver underneath which is in condition to provide a low resistance contact surface which has been protected against corrosion.

While my invention has been shown as applied to one form of switch, it will be understood that it may be applied to other forms. It is especially adapted for use in cases where the switch contact is integrally formed with the associated solder lug. While tin is the preferred material for the protective coating or plating over the silver, other metals, such as lead, may be used. The metal must be non-corrosive and melt at a low temperature and should have an affinity for solder. It must be readily worn away on the switch contact points.

My invention is capable of modification to meet varying conditions and requirements and I contemplate such changes and variations as come within the spirit and scope of the appended claims.

I claim:

1. A switch contact comprising a body of conductive metal, a plating of silver on said body, and a protective plating of relatively soft non-corrosive metal on said silver plating, said protective plating being thin and adapted to be worn away quickly upon the engaging surface in the use of the contact.

2. A switch contact comprising a body of conductive metal, a plating of silver on said body, and a protective plating of tin on said silver plating, said protective plating of tin being thin and adapted to be worn away quickly upon the engaging surface in the use of the contact.

3. A metal switch contact comprising a contact portion and an integrally connected solder lug portion, said contact being formed of conductive metal, a plating of silver on said contact, and a protective plating of a relatively soft non-corrosive metal having an affinity for solder on said silver plating.

4. A metal switch contact comprising a contact portion and an integrally connected solder lug portion, said contact being formed of conductive metal, a plating of silver on said contact, and a protective plating of tin on said silver plating.

5. As an article of manufacture: a contact for use in an electrical instrumentality such as a switch; said contact comprising an attaching portion and a contact engaging portion; and the surfaces of the entire unit having a multiple thickness metallic plating; the outer layer of plating being of soft non-corrosive metal and the layer of plating directly thereunder being of metal having good electrical conducting characteristics and being well suited as a contacting surface, so that the entire contact unit is protected against corrosion before and after it is assembled in an electrical instrumentality, and whereby the outer non-corrosive plating over the contact portion is automatically rubbed off to expose the next adjacent plating during the initial operation of the instrumentality.

6. As an article of manufacture: a contact for use in an electrical instrumentality such as a switch, said contact comprising a contact engaging portion and an integral terminal portion adapted to have a conductor soldered thereto; and the surfaces of the entire unit having multiple thickness metallic plating, the outer layer of plating being of soft non-corrosive metal having an affinity for solder; and the layer of plating directly thereunder being of metal having good electrical conducting characteristics and being well suited as a contact surface, whereby the entire contact unit is protected against corrosion before and after its assembly in an electrical instrumentality, and whereby the outer non-corrosive plating is automatically rubbed off of the contact portion to expose the next adjacent plating during the initial operation of the instrumentality, while facilitating soldering at the terminal portion.

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