

Nov. 21, 1939.

W. H. CHURCHILL

2,180,921

ELECTRICAL CONTACT MEMBER AND METHOD OF MAKING SAME

Filed Jan. 22, 1937

2 Sheets-Sheet 1

Fig. 1.

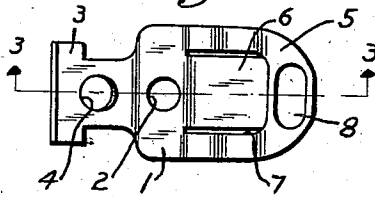


Fig. 2.

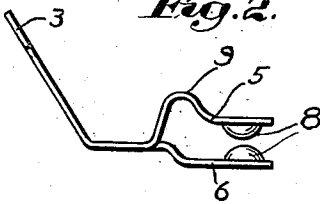


Fig. 3.

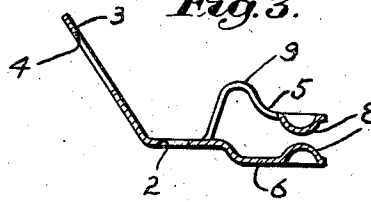


Fig. 4.

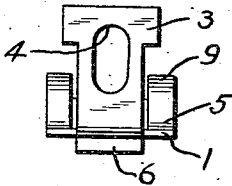


Fig. 5.

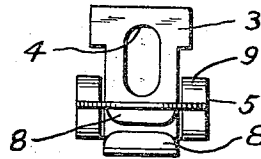
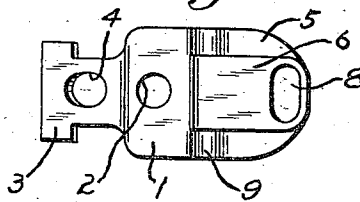


Fig. 6.



Inventor:

Wilmer H. Churchill.

by Walter S. Jones
Att'y.

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2 Sheets-Sheet 2

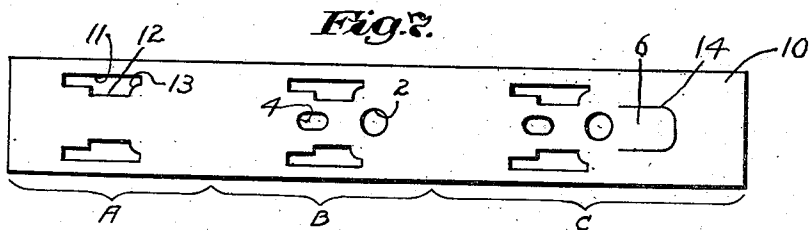


Fig. 8.

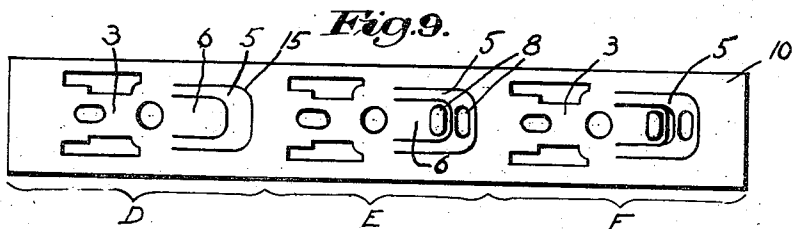
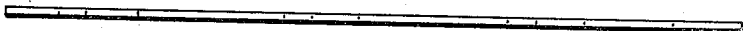
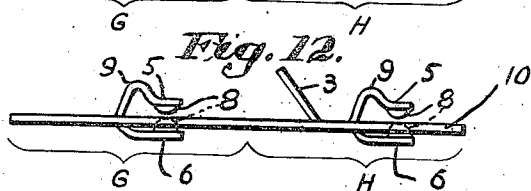
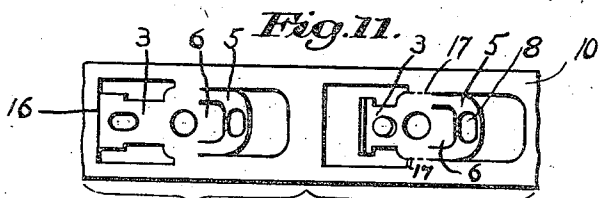
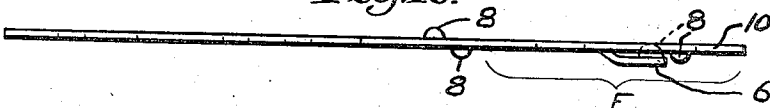


Fig. 10.



Inventor:

Wilmer H. Churchill.

by Walter S. Jones
Att'y.

UNITED STATES PATENT OFFICE

2,180,921

ELECTRICAL CONTACT MEMBER AND
METHOD OF MAKING SAME

Wilmer H. Churchill, Saugus, Mass., assignor to
United-Carr Fastener Corporation, Cambridge,
Mass., a corporation of Massachusetts

Application January 22, 1937, Serial No. 121,859

8 Claims. (Cl. 29—155.55)

My invention aims to provide improvements in contact terminals and in the method of making the terminals.

An object of my invention is to provide a one-piece contact terminal of simple and inexpensive construction capable of satisfactory use with selector switches or other electrical devices.

Another object is the provision of a succession of steps upon a strip of metal comprising a method for making the terminal.

Other objects will be apparent from inspection of the drawings and the specification hereinbelow set forth.

Referring to the drawings, in which I have illustrated a preferred embodiment of my invention and a preferred method for making the same:

Figure 1 is a top plan view of one of my improved contact terminals;

Fig. 2 is a side elevation of the terminal shown in Fig. 1;

Fig. 3 is a section taken along the line 3—3 of Fig. 1;

Fig. 4 is a rear view of the contact terminal;

Fig. 5 is a front view of the contact terminal;

Fig. 6 is a bottom plan view of the contact terminal;

Figs. 7, 9 and 11 are plan views of a strip showing successive operations in forming the contact terminal shown in Figs. 1—6; and

Figs. 8, 10 and 12 are edge views of the respective strips shown in Figs. 7, 9 and 11.

Referring first to the contact terminal selected for illustration of my invention, I have shown in Figs. 1—6 a one-piece terminal adapted for use with selector switches or similar electrical devices. The particular terminal illustrated has a substantially flat attaching portion 1 and an aperture 2 in the attaching portion for receiving an attaching member (not shown) by which the terminal may be secured to a support (not shown). Integral with one edge of the attaching portion 1 I have provided a tail portion 3 extending, in my preferred form, in angular relation to the plane of the attaching portion 1. The tail portion 3 has means such as an aperture 4 for receiving a wire (not shown) whereby the wire may be soldered to the terminal. At the other end of the attaching portion 1 I have provided spring arms 5 and 6 for receiving a cooperating member (not shown) of another part between them. The arm 6 is struck from material within the edges of the arm 5 whereby an aperture 7 (Fig. 1), from which material was taken to form the arm 6, is disposed in the arm

5. Bumps 8, pressed from the material near the free ends of the arms 5 and 6, extend toward each other for engagement with opposite sides of a cooperating contact member. It will be noticed from an inspection of Figs. 1—6 of the drawings that the arm 5, from which material was taken for the arm 6, is foreshortened by means of a fold 9 extending transversely of the direction in which said arms extend. As a result of this construction the bump 8 of the arm 5 is disposed in substantially superposed close relation to the bump 8 of the arm 6. The arm 6, in my preferred form, is bent slightly out of the plane of the attaching portion 1 with material near the free end in substantially parallel relation to the plane of the attaching portion, as most clearly shown in Fig. 2 of the drawings. When a cooperating member (not shown) is introduced into the opening defined by the free ends of the arms 5 and 6, the bumps 8—8 engage opposed sides of the cooperating member through reason of the natural spring action in the arms 5 and 6 thereby providing good electrical connection between the terminal and the cooperating member.

In Figs. 7—12 I have shown a preferred succession of operations on a strip of sheet metal 10 for forming the terminal illustrated in Figs. 1—6. At step A of Fig. 7 apertures 11 are formed in the strip delineating opposed sides 12 of the tail 3 and an edge 13 of the attaching portion 1 of the completed terminal. At step B the wire-receiving aperture 4 is formed in the tail 3. At the same time the aperture 2, for receiving an attaching member by which the completed terminal is secured to a support, is formed in the strip at a predetermined point relative to that portion of the strip which is the attaching portion 1 of the completed terminal. At step C the strip is cut along the line 14 thereby defining the arm 6, which, relative to the completed terminal, is integral with an opposite edge of the attaching portion 1, from the tail 3. At step D of Fig. 9 the strip 10 is cut along the line 15 disposed outside the line 14 and defining the arm 5. The arm 5 is also integral with the same edge of the attaching portion 1 as the arm 6. At step E an upwardly-extending bump 8 is formed near the free end of the arm 6 and a downwardly-extending bump 8 is formed near the free end of the arm 5. At step F the arm 6 is bent downwardly out of the plane of the strip 10 with material near the end of the arm extending in substantially parallel relation with the plane of the strip. During this step the arm

6 is foreshortened slightly in the direction of the tail 3. At step G of Figs. 11 and 12 a fold 9 is provided in the arm 5 so as to bend the arm upwardly out of the plane of the strip 10 and foreshorten it in the direction of the arm 6 so that the bump 8 of the arm 5 is disposed in substantially superposed close relation to the bump 8 of the arm 6, as most clearly shown in step G of Fig. 12. As a result of this construction the bumps 8 of the arms 5 and 6 provide an opening for receiving a cooperating member (not shown) whereby the bumps engage opposed sides of the cooperating member under spring tension provided through the natural resiliency of the arms. Also, at the time of the last-mentioned step the strip 10 is cut along the line 16 (Fig. 11) thereby freeing the tail 3 from the strip and at step H the tail is bent upwardly out of the plane of the strip, as most clearly shown at H of Fig. 12. In the final step (not shown) the terminal is blanked from the strip by cutting along the dotted lines 17 shown at H of Fig. 11 delineating opposed lateral edges of the attaching portion 1.

The contact terminal I have described is simple, strong and capable of efficient usage. The method I have invented for making the terminal is novel and easily and inexpensively performed.

With reference to my preferred form of invention illustrated and described, I am aware that changes and alterations may be made in the terminal per se and that the succession of steps for making the terminal may be changed or modified and steps added or omitted without departing from the spirit of my invention. For that reason I do not wish to be limited by the preferred form of my invention and method of making the same, as illustrated and described, since the scope of my invention is best set forth in the following claims.

I claim:

1. A contact terminal for an electric switch, said terminal having a tail at one end for receiving a wire, a pair of spring arms at the other end adapted to receive a contact member between them, said arms each having a projecting portion near their free ends for engaging opposite sides of said contact member, and an attaching portion intermediate said tail and said arms for securing said terminal to a support, one of said arms formed of material struck from within the free edges of the other of said arms, said last-mentioned arm having a fold extending transversely of the direction in which said arm extends for foreshortening said arm, and said projections being normally in substantially superposed close relation.

2. The method of making a contact terminal having a wire-receiving portion, a pair of arms for receiving a contact member between them, which comprises subjecting a strip of metal to a series of blanking operations to form the wire-receiving portion and the arms, one arm being disposed within the other arm, folding said outside arm to foreshorten said arm whereby material at the ends of said arms are in substantially superposed relation, and finally blanking said terminal from said strip.

3. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a series of blanking operations to form the tail and the arms, one arm being disposed within the other arm,

folding said outside arm to foreshorten said arm whereby material at the ends of said arms are in substantially superposed relation, and blanking said terminal from said strip.

4. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a series of blanking operations to form the tail and the arms, one of said arms being disposed within the other arm, folding said outside arm to foreshorten said outside arm so that material at the ends of said arms is in substantially superposed relation, bending said tail out of the plane of said strip and cutting along opposed lateral edges of said attaching portion to blank said terminal from said strip.

5. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a blanking operation to delineate opposed sides of said tail and one end of said attaching portion, blanking a pair of arms at the other end of said attaching portion, one of said arms being disposed within said other arm, said arms having one end integral with said attaching portion, folding said outside arm transversely of said arms to foreshorten said outside arm so that material at the ends of said arms is in substantially superposed relation and finally cutting the terminal blank from said strip.

6. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a blanking operation to delineate opposed sides of said tail and one edge of said attaching portion, blanking a pair of arms at the other edge of said attaching portion, one of said arms being disposed within said other arm and said arms having one end integral with said attaching portion, bending said inner arm out of the plane of said strip, folding said outside arm transversely of said arms to foreshorten said outside arm so that material at the ends of said arms is in substantially superposed relation, cutting said strip adjacent an end of said tail to free said tail from said strip, bending said tail out of the plane of said strip, and cutting along opposed lateral edges of said attaching portion to blank said terminal from said strip.

7. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a blanking operation to delineate opposed sides of said tail and one edge of said attaching portion, blanking a pair of arms at an opposite edge of said attaching portion, one of said arms being disposed within the other arm and said arms having one end integral with said attaching portion, forming an upwardly-extending bump near the free end of said inner arm and a downwardly-extending bump near the free end of said outer arm, bending said inner arm out of the plane of said strip, folding said outer arm transversely of said arms to foreshorten said outer arm so that the bumps of said arms are in substantially superposed close

relation, and finally cutting the terminal blank from said strip.

8. The method of making a contact terminal having a wire-receiving tail at one end, a pair of arms at the other end for receiving a contact member between them and an attaching portion intermediate said tail and said arms which comprises subjecting a strip of metal to a blanking operation to delineate opposed sides of said tail and one edge of said attaching portion, forming an aperture in said tail and said attaching portion, blanking an arm at an opposite edge of said attaching portion, blanking another arm outside said first arm, one of said arms being disposed within the periphery of the other of said arms

and said arms having one end integral with said attaching portion, forming an upwardly extending bump near the free end of said inner arm and a downwardly-extending bump near the free end of said outer arm, bending said inner arm downwardly out of the plane of said strip, folding said outer arm transversely of said arms to foreshorten said outer arm so that the bumps of said arms are in substantially superposed close relation, cutting said strip adjacent an end of said tail to free said tail from said strip, bending said tail out of the plane of said strip, and cutting along opposed lateral edges of said intermediate portion to blank said terminal from said strip.

WILMER H. CHURCHILL.