

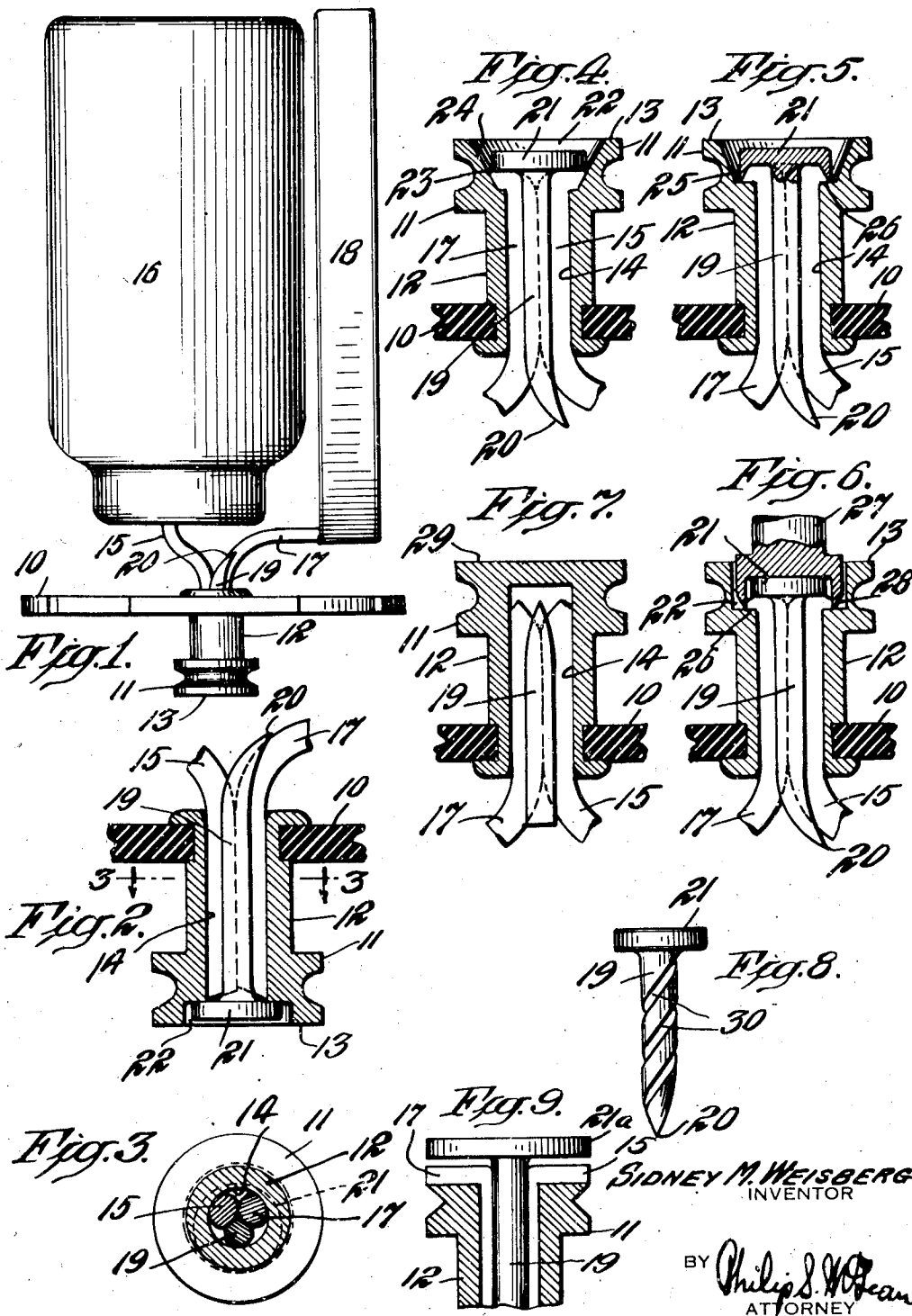
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S. M. WEISBERG

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SOLDERLESS CONTACT TERMINAL

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SIDNEY M. WEISBERG
INVENTOR

BY *Philip S. Weisberg*
ATTORNEY

UNITED STATES PATENT OFFICE

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SOLDERLESS CONTACT TERMINAL

Sidney M. Weisberg, Newark, N. J., assignor to
Allied Electric Products, Inc., Irvington, N. J.,
a corporation of New Jersey

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The invention here disclosed relates to contact terminals such as used on the starter switches for fluorescent lamps.

Terminals of this type usually have the wires of the switch or other device secured thereto by soldering. These soldered connections are objectionable as time-consuming and relatively expensive and they are not always satisfactory since the effectiveness of the joint depends entirely upon the care and skill of the operator making these soldered connections.

Objects of the present invention are to do away entirely with these soldered connections and to secure the wires to the terminals wholly by mechanical means and means of such a character as will insure both mechanically and electrically perfect connections.

Other related objects are to provide a solderless connection for terminal contacts which can be quickly and easily made up by unskilled labor at relatively low cost.

Other objects and the novel features by which the purposes of the invention are attained are set forth or will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates some of the present forms of the invention but it is to be understood that structure may be further modified and changed, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

In the drawing, Fig. 1 is a side elevation of a starter switch having the invention incorporated in the contact terminals of the same;

Fig. 2 is an enlarged broken sectional detail of the contact terminal shown in Fig. 1;

Fig. 3 is a cross sectional view of the terminal as on substantially the plane of line 3-3 of Fig. 2;

Figs. 4, 5, 6 and 7 are broken sectional views illustrating other, modified forms of the invention;

Fig. 8 is a detail view of a form of securing element which may be used in the terminal.

Fig. 9 is a broken sectional detail of another embodiment of the invention.

Fig. 1 illustrates a fluorescent lamp starter switch having a base portion 10 and contact terminals 11. These terminals, only one of which appears in Fig. 1, as to external appearance and operation may be the same as in general use, that is, with a projecting stem portion 12 and an enlarged contact head 13.

Also, as appears more fully in Fig. 2, the body of the terminal first shown is of typical design

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in that it is of tubular form having a passage 14 extending entirely therethrough. This passage is to receive the wire or wires extending from the switch parts, in this particular instance one wire 15 from the glow switch 16 and one wire 17 from the condenser 18.

These two wires are of considerably smaller diameter than the passage in the terminal post and so can be readily inserted in said passage.

The present invention involves the securing of these inserted wires, substantially for the full length of passage 14, instead of just at the outer end as by the usual soldered joint, by a driven fastening, in the nature of a tack 19.

This tack element may be of copper or other relatively soft, deformable, good conducting material. Preferably it may be pointed as indicated at 20, and it may have a head as at 21.

In this first form of the invention the parts are assembled by inserting the wires through the back end of the stud and then driving the elongated terminal tack 19 in through the front end of the stud to crush and squeeze the wires against the side wall of the bore 14, more or less after the manner indicated in the cross sectional view, Fig. 3. After being driven fully through the passage the pointed projecting end of the tack or pin 19 may be bent more or less to further lock the wedge pin in place. In this final position of the parts the head 21 or outer end of the pin will be received in a cavity 22 in the outer or contact end of the terminal stud so as not to interfere in any way with the full engagement of this end of the stud with the contact spring or other cooperating element of the socket or other device with which the starting switch is engaged.

The wedge pin 19 may be of circular, angular or other cross sectional shape best suited to effecting a crushing, squeezing engagement of the wire or wires in the passage.

This new form of connection is particularly suitable for a two-wire joint since, as indicated in Fig. 3, the wedge will then normally and naturally effect a more or less balanced three-point physical engagement of the members, that is, the two wires and the wedge pin, in the bore, assuring firm, positive engagement and securing of each and all these three elements.

If desired, the trimming of the wires may be effected as a part of the operation of driving the fastener.

Thus as shown in Fig. 4, the tack-like fastener may have a sharply cornered lower edge 23 which

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by cooperation with the inclined or conical side wall 24 of the end cavity 22 will effect a cutting and shearing off of any excess in the length of the wire or wires being fastened.

In the Fig. 5 construction, substantially the same results are accomplished by forming the head 22 of the drive pin with a chisel-like lower corner edge 25 to cooperate with the more or less flat floor 26 of the cavity 22.

Fig. 6 shows how the wire cut-off may be effected by using a punch 27 for driving the wire fastening and by providing the punch head with a sharp edged annular flange 28 which will enter the cavity and cooperate with the bottom wall of the same to sever any projecting wire ends.

If greater surface area is desired at the contact end of the terminal, such end of the terminal may be left closed, as indicated at 29, Fig. 7, and in such event the wedge pin 19 is inserted and driven in from the opposite, wire end of the terminal. In this view also the wedge pin is illustrated as of headless construction.

If additional mechanical interlock is desired, the wedge pin may be grooved, roughened or the like. In the case of grooving, such grooves may run longitudinally, be inclined or be more or less helical, after the manner indicated at 30 in Fig. 8.

The invention provides a quick, easy and secure way of making mechanical and electrical connections between wires and the contacts to which they are to carry or to receive current from. The wires are positively gripped substantially the full length of the passage in the terminal stud, with extensive metal-to-metal surface engagement between the wires, terminal stud and wedge, and similarly the wedge, which is of good contacting material, has substantially full length extensive surface engagement with the stud. Full electrical conductivity is therefore assured with no introduced resistance. Also the full length securing of the wires braces and reinforces these wires so that in the case of a starter switch such as illustrated, they can more firmly and reliably support and position necessary elements such as shown, such as the glow switch and condenser parts.

Actually in many cases the wedge or securing pin 19 need not be of conducting material. This is true where care is taken to effect full engagement of the wire with the wall of the passage in the contact or terminal member and the pin is employed only or primarily to fix the wire in engagement with the wall of the passage. Also, the connecting pin need not necessarily be of relatively soft, deformable material. It may in fact be hard enough to effect a deformation of the conducting wire against the wall of the passage.

An example of a case in which it is desirable to have the wire securing pin of metal and of good conducting metal is illustrated in Fig. 9 where the terminal 12 is shown as constructed with less than the full contact head 13 and the head 21a of the connecting pin 19 is widened to take the place of and constitute in fact the contact making end portion of the terminal.

While shown and described in conjunction with the terminal studs of starter switches, it will be appreciated that the invention is of much broader scope and may be used for effecting mechanical and electrical connection between electric wires and terminal members of any character.

In cases where the sole purpose is to mechanically and electrically connect the wires, the member 12 need not be of conducting material but in

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such constructions it is usually preferable to have the connecting pin 19 of good conducting material to serve as an electrical connection between the wires as well as the means for wedging and binding the wires in their mechanically connected engagement in the wire receiving passage. In carrying out the operations illustrated in Figs. 4, 5 and 6, the wires are pinched or sheared by the head of the fastener or the driving tool. This pinching or shearing action cuts or weakens the wires so that the projecting portions will either drop off or may be easily broken loose. Thus the wires are in effect automatically and uniformly terminated, where they should be, right at the end of the terminal and without leaving any projecting portions such as might interfere with the proper engagement of such terminal with the contacting contact in a receptacle or the like. The heads of the studs or tacks used for the fasteners vary to some extent in size due to inaccuracies in manufacture, and such variations may affect the extent to which the wires are actually cut, sheared or indented, but in all instances the shearing action is sufficient to weaken the wires to the extent that they will uniformly separate at this point.

Further details of method and mechanism for uniting the parts are disclosed and covered in copending application for patent, Serial No. 678,557, filed June 22, 1946.

What is claimed is:

1. A solderless wire connector comprising a terminal member having a wire receiving passage, two wires of less diameter than said passage disposed in said passage in engagement with the wall of the passage and a driven securing pin of less diameter than the passage in driven engagement with both said wires and with the wall of the passage at a point in substantially triangular relation to the points of engagement of the wires with the wall of the passage and thereby effecting substantially balanced, three-point securing engagement of said wires and a securing pin in said passage, said terminal member having a conical seat in the end of the same about said passage and said securing pin having a head at the outer end of the same of less than the maximum diameter of said conical seat to thereby enter said seat and cooperative with the conical wall of said seat for pinching and binding end portions of the wires projecting from the end of said passage beneath the head into said conical seat.

2. A solderless wire connector comprising a terminal member having a wire receiving passage and an annular seat in one end about the end of said wire receiving passage, a wire in engagement with the wall of said passage at one side and a headed pin driven into said passage longitudinally over that portion of the wire disposed therein and in binding engagement with the wall of the passage at the opposite side, the head of said pin being of less diameter than said annular seat to enter said seat when the pin is fully driven into the passage and substantially in engagement with the wall of said seat to pinch and bind any portion of the wire projecting from the end of the passage thereagainst and the engagement of the pin with the side wall of the passage enabling said pin to hold it in binding engagement with the wire as described.

SIDNEY M. WEISBERG

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