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J. F. GORDON

2,921,286

BINDING POST

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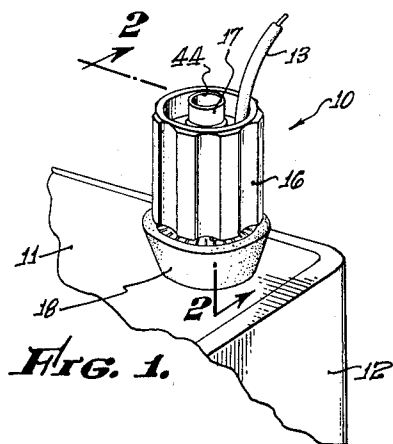


Fig. 1.

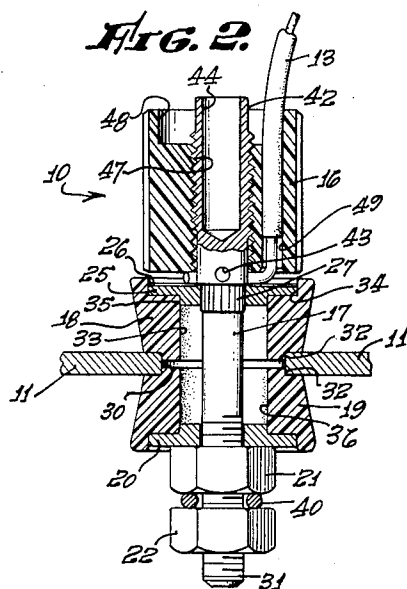


Fig. 2.

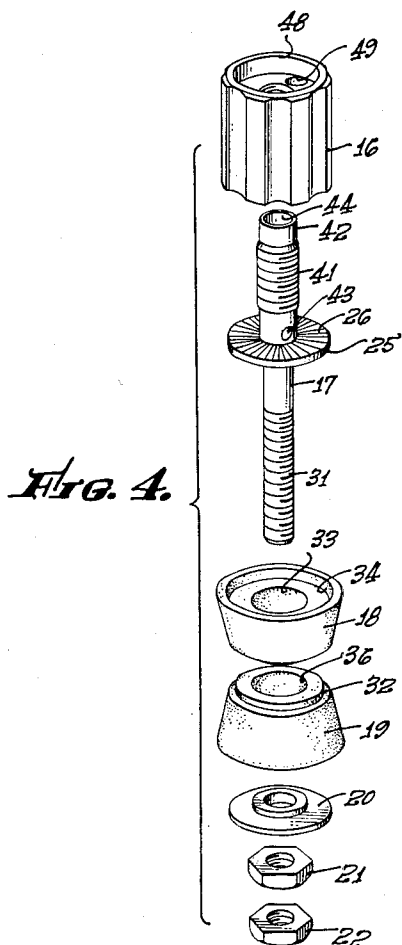


Fig. 4.

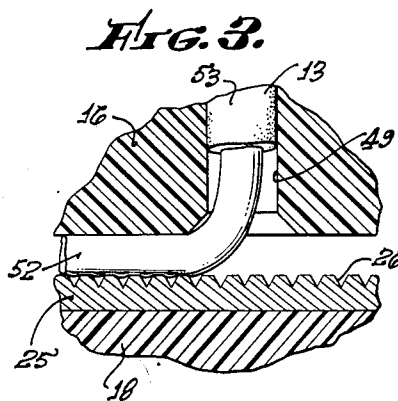


Fig. 3.

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BINDING POST

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4 Claims. (Cl. 339—202)

This invention relates to binding posts for use in connecting electrical circuits and in particular to a binding post which may be used with various types of conductor terminations.

In the electrical field, conductors are terminated in many ways, such as with banana plugs, battery clips, alligator clips, lugs, phone tips and bare wire, both tinned and untinned. Therefore, it is desirable in many pieces of electrical equipment, especially of the laboratory type, to be able to easily, securely and safely make connections with each of the various terminations. Accordingly, it is an object of the invention to provide a binding post for use with electrical equipment which can be easily and safely connected in circuit with a plurality of different types of electrical conductor terminations, such as lugs, phone tips, alligator clips, battery clips, banana plugs, bare wire and the like.

It is another object of the invention to provide a binding post for use with a bare wire conductor termination or the like in which the stress and strain on the conductor due to bending and pulling do not occur at the point where the electrical connection is made. Another object of the invention is to provide such a binding post having a knob which may be tightened down against a flange of a threaded shaft, the knob being provided with an opening passing through the knob substantially parallel to the axis of the threaded shaft so that an electrical conductor may be positioned in the opening with the end thereof clamped between the knob and the flange.

It is a further object of the invention to provide a binding post in which the hazard of an electrical shock to the user and the possibility of shorting circuits by stray wires or tools are reduced to a minimum. Another object of the invention is to provide such a binding post in which the flange extending from the threaded shaft is positioned within a recessed insulating bushing and in which the outer end of the knob is counter-bored to provide access to the threaded shaft while permitting very little of the shaft to project beyond the knob.

It is another object of the invention to provide a binding post which is suitable for mounting on a panel which may be an electrical conductor, with the binding post providing an electrical circuit from one side of the panel to the other. Another object of the invention is to provide such a binding post which may be mounted on a panel having nonparallel surfaces, such as corrugated, tapered, irregular or the like.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. The drawing merely shows and the description merely describes a preferred embodiment of the invention, which is given by way of illustration or example.

In the drawing:

Fig. 1 is an isometric view of a preferred embodi-

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ment of the invention shown mounted on a portion of an instrument case;

Fig. 2 is an enlarged sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged view of a portion of Fig. 2; and
Fig. 4 is an exploded view showing the various components making up the embodiment of Fig. 1.

In Fig. 1, a binding post 10 is shown mounted on a panel 11 of an instrument case 12 with an insulated electrical conductor 13 connected to the binding post 10. The binding post 10 includes a knob 16, a shaft 17, bushings 18, 19, a plate 20 and nuts 21, 22.

A radially extending flange 25 is provided on the shaft 17 intermediate the ends thereof, the flange 25 preferably having a serrated upper surface 26. The shaft and flange may be made from a single piece of metal or the flange may be made separately and then fixed on the shaft by suitable methods such as by pressing over a knurled surface 27 on the shaft (Fig. 2).

A preferred method of mounting the binding post on the panel is shown in Fig. 2, wherein the bushings 18 and 19 are clamped to opposite sides of the panel 11 at an opening 30 therein by the shaft 17 which passes through the bushings and the opening, the flange 25 engaging the bushing 18 and the plate 20 being engaged with the bushing 19 by a nut 21 which is tightened on a threaded portion 31 of the shaft 17.

Each of the bushings 18, 19, is provided with a shoulder 32 corresponding to the opening 30 in the panel 11 to position the bushing relative to the opening. The bushing 18 has an opening 33 passing therethrough and a recessed portion 34 at the end opposite the shoulder 32, the shoulder, opening and recessed portion being concentric. The flange 25 of the shaft 17 and the recessed portion 34 of the bushing 18 are dimensioned so that the flange fits within the recessed portion with the shaft substantially centered within the opening and the upper surface of the flange below the upper edge of the bushing. If desired, the flange 25 may be provided with the annular shoulder 35 which fits within the opening 33 of the bushing. The bushing 19 and the plate 20 are formed similar to the bushing 18 and the flange 25 respectively. While the various openings, shoulders and flanges have been described as being circular in shape, the binding post of the invention will operate equally well when these elements have other cross-sectional shapes, such as square, hexagonal or the like.

The openings 33, 36 and the bushings 18, 19 are made considerably larger than the portion of the shaft 17 which passes therethrough. The binding post may be mounted on a panel with the axes of the two bushings out of alignment, i.e., with the two surfaces of the panel not parallel, without affecting the quality of the installation or the operating characteristics of the binding post. The binding post is preferably constructed with the diameters of the openings 33 and 36 at least twice the diameter of the portion of the shaft 17 which is positioned within the openings to provide clearance between the shaft and the panel when the bushing openings and the shaft are not concentric.

When the binding post of the invention is mounted on a panel, as shown in Fig. 2, an electrical conductor is fixed to the lower end of the binding post by suitable means, such as by wrapping a bare conductor 40 around the shaft 17 and clamping it in position with the nut 22.

A threaded portion 41 is provided on the shaft 17 between the flange 25 and an end 42 of the shaft, the threaded portion preferably not extending to the end of the shaft, thereby providing a smooth surface at the end 42. An opening 43 is provided in the shaft transverse to the axis thereof and adjacent the upper surface 26 of the flange 25. A cylindrical opening 44 is pro-

vided in the end 42 of the shaft, preferably being concentric with the shaft.

The knob 16 is preferably made of a single piece of electrical insulating material and is provided with an internally threaded opening 47 engageable with the threaded portion 41 of the shaft 17 so that the knob may be screwed down on the shaft to engage the flange 25. A recess or counterbore 48 is provided in the end of the knob opposite the end which engages the flange 25, the knob, shaft and recess being proportioned so that when the knob is engaging the flange, a substantial portion of the end 42 of the shaft is exposed while only a very small portion of the end extends beyond the rim of the knob.

An opening 49 extends through the knob 16, the axis of the opening being substantially parallel to the axis of the threaded opening 47 of the knob and displaced therefrom a distance less than the minimum extension of the flange 25. The upper end of the opening 49 preferably lies within the recess 48 of the knob 16 and the lower end of the opening 49 is preferably rounded or chamfered, as shown in Fig. 3. A bare conductor, either tinned or untinned may be clamped in the binding post by inserting the conductor through the opening 49 so that a portion of the conductor extends out of the opening to the space between the knob and the flange 25. When the knob is screwed down to clamp the conductor between the knob and the flange as seen in Figs. 2 and 3. The insulated conductor 13 consists of a copper wire 52 with a layer of insulating material 53 surrounding the copper wire, the insulating material having been removed from the end of the conductor so as to make an electrical contact with the flange.

The knob may be made of a slightly resilient material which will deform a small amount when a wire is clamped between the knob and the flange to provide a spring locking effect. Some materials suitable for this use are Teflon, polyethylene and nylon.

When a conductor is clamped in the binding post, as shown in Fig. 2, the stress and strain on the conductor due to bending and pulling on the conductor will not be transmitted to that portion of the conductor being clamped against the flange and therefore the serviceability of the connection will be materially lengthened. Furthermore, that portion of the conductor from which the insulating layer has been removed is totally enclosed within the insulating material portions of the binding post so that the chances of electrical shock or electrical short-circuiting are substantially reduced. The flange 25 of the shaft 17 is concealed within the recessed portion 34 of the bushing 18, thereby further reducing the chances of shock and short-circuiting.

Other types of conductor terminations may also be accommodated by the binding post of the invention. For example, the opening 44 is dimensioned to receive a banana plug. A battery clip may be clamped on the smooth end 42 of the shaft 17. An alligator clip may be clamped about the shaft adjacent the flange 25 or may be clamped on the end 42 with one jaw of the clip extending into the opening 44. The conventional U-shaped lug termination may be clamped against the flange 25 by the knob 16 with the shaft positioned within the U. The transverse opening 43 is designed to receive a phone tip or similar termination, the phone tip being clamped in place by the knob 16.

Although an exemplary embodiment of the invention has been disclosed and discussed, it will be understood that other applications of the invention are possible and that the embodiment disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

I claim as my invention:

1. In a binding post for use in an electrical circuit, the combination of: a shaft having a radially extending flange intermediate the ends thereof and an external

threaded surface adjacent one end thereof; means for mounting said shaft on a panel; means for coupling an electrical circuit to said shaft adjacent the other end thereof; and a knob having an internal threaded opening mating with said threaded surface, said knob being positionable on said shaft in cooperative relationship with said flange, said knob having an enclosed passageway extending therethrough parallel to and displaced radially from said threaded opening for receiving a conductor with the end of said conductor projecting through said passageway and contacting said flange whereby said conductor end is bent at a right angle to said passageway and wrapped around said shaft by rotation of said knob to advance said knob along said shaft towards said flange, said radial displacement being less than the minimum extension of said flange so that said passageway is covered when said knob and flange are cooperatively engaged with said conductor end.

2. In a binding post for use in an electrical circuit, the combination of: a shaft having a radially extending flange intermediate the ends thereof and an external threaded surface adjacent one end thereof; means for mounting said shaft on a panel; means for coupling an electrical circuit to said shaft adjacent the other end thereof; and a knob having an internal threaded opening mating with said threaded surface, said knob being positionable on said shaft in cooperative relationship with said flange, said knob having an enclosed passageway extending therethrough parallel to and displaced radially from said threaded opening for receiving a conductor with the end of said conductor projecting through said passageway and contacting said flange whereby said conductor end is bent at a right angle to said passageway and wrapped around said shaft by rotation of said knob to advance said knob along said shaft towards said flange, said radial displacement being less than the minimum extension of said flange so that said passageway is covered when said knob and flange are engaged, the outer end of said knob having a coaxially extending recess therein, said opening and said passageway being positioned in said recess.

3. In a binding post for use in an electrical circuit, the combination of: a shaft having a radially extending flange intermediate the ends thereof and an external threaded surface adjacent one end thereof and a coaxial opening in said one end; means for mounting said shaft on a panel; means for coupling an electrical circuit to said shaft adjacent the other end thereof; and a knob having an internal threaded opening mating with said threaded surface, said knob being positionable on said shaft in cooperative relationship with said flange, said knob having an enclosed passageway extending therethrough parallel to and displaced radially from said threaded opening for receiving a conductor with the end of said conductor projecting through said passageway and contacting said flange whereby said conductor end is bent at a right angle to said passageway and wrapped around said shaft by rotation of said knob to advance said knob along said shaft towards said flange, said radial displacement being less than the minimum extension of said flange so that said passageway is covered when said knob and flange are cooperatively engaged with said conductor end.

4. In a binding post for use in an electrical circuit, the combination of: a shaft having a radially extending flange intermediate the ends thereof, one of said ends being cylindrical and having a coaxial opening therein, the surface of said flange facing said one end being serrated, said shaft having an external threaded surface intermediate said cylindrical end and said flange; means for mounting said shaft on a panel; means for coupling an electrical circuit to said shaft adjacent the other end thereof; and a knob having an internal threaded opening mating with said threaded surface, said knob being positionable on said shaft in cooperative relationship with

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said flange, said knob having an enclosed passageway extending therethrough parallel to and displaced radially from said threaded opening for receiving a conductor with the end of said conductor projecting through said passageway and contacting said flange whereby said conductor end is bent at a right angle to said passageway and wrapped around said shaft by rotation of said knob to advance said knob along said shaft towards said flange, said radial displacement being less than the minimum extension of said flange so that said passageway is covered when said knob and flange are engaged, said cylindrical end of said shaft extending through said knob when said knob and flange are engaged.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,921,286

January 12, 1960

James F. Gordon

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 58, for "wihin" read -- within --; column 3, line 27, for "When" read -- Then --.

Signed and sealed this 7th day of June 1960.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents

UNITED STATES PATENT OFFICE
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