Dec. 31, 1946. L. D. HANSEN ET AL 2,413,410

CONTACT FIXTURE

Filed Dec. 9, 1943 2 Sheets-Sheet 1

FIG. 1

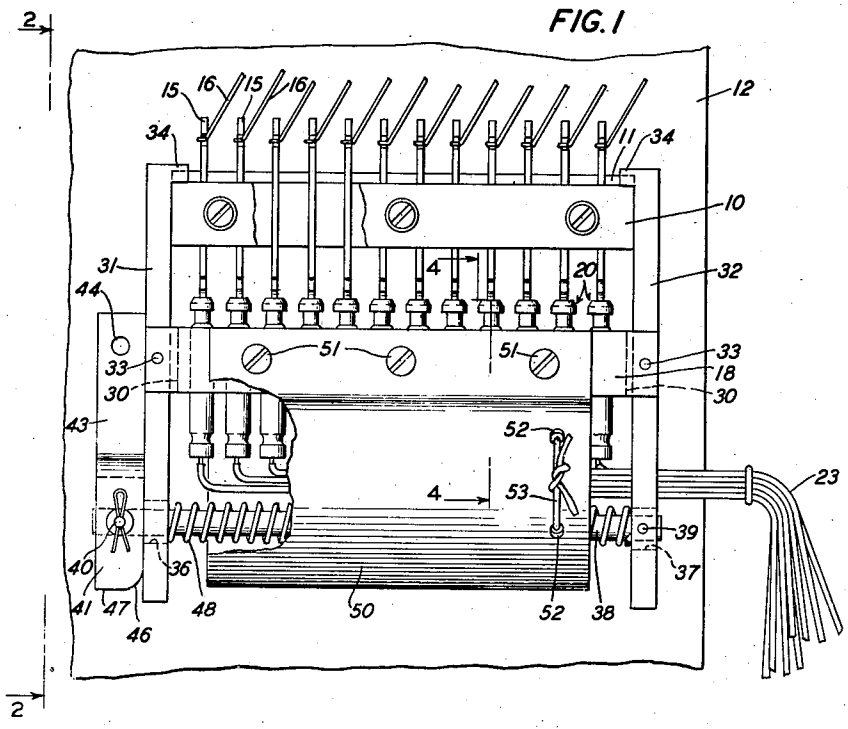
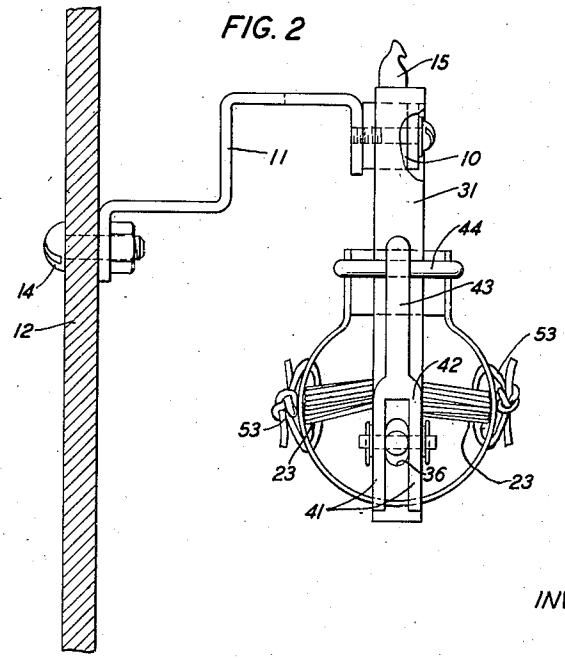


FIG. 2



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Filed Dec. 9, 1943 2 Sheets-Sheet 2

FIG. 3

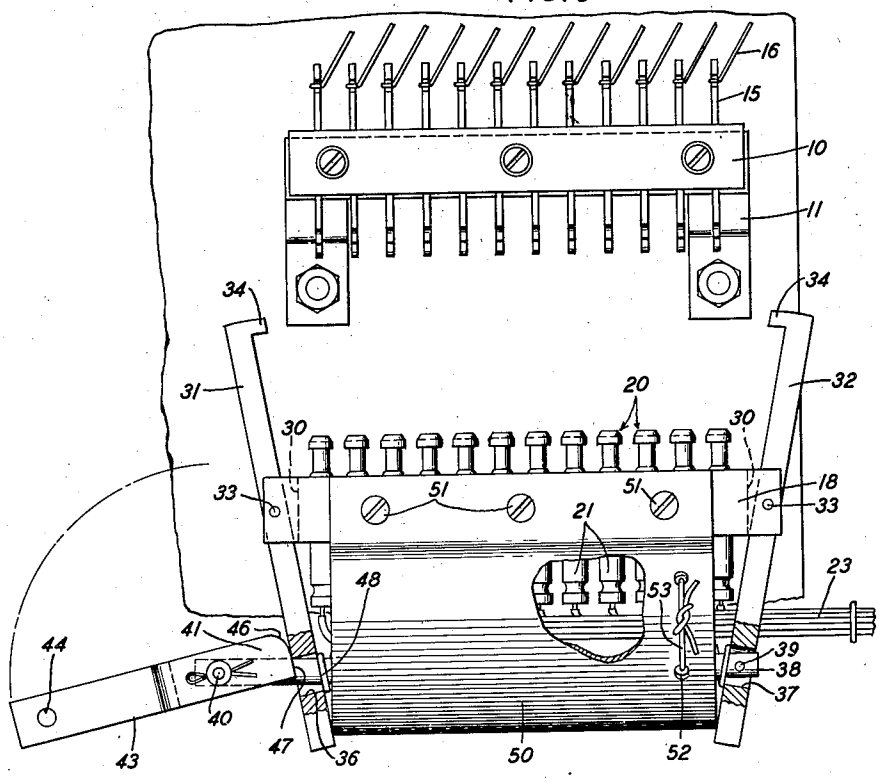
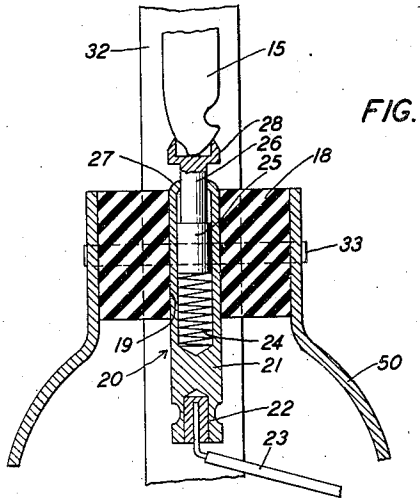


FIG. 4



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CONTACT FIXTURE

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Application December 9, 1943, Serial No. 513,620

3 Claims. (Cl. 173—328)

1

This invention relates to contact fixtures, and more particularly to fixtures adapted for temporary connection with electrical terminals.

In the manufacture of communications equipment it is desirable to test the electrical circuits thereof, and in so doing it is necessary to provide temporary electrical connections between portions of the circuit and the testing apparatus. In such instances the elements of time and accuracy are of great importance, that is, the time necessary to form such electrical connections and the efficiency of the means used in providing satisfactory electrical connections.

An object of the invention is to provide a contact fixture which is simple in structure, easily operable, and highly efficient in forming electrical connections with terminals.

With this and other objects in view, the invention comprises a contact fixture having a body supporting a plurality of spaced electrical elements for forming electrical connections with terminals of a terminal strip, gripping members for gripping the terminal strip, and means to cause actuation of the gripping members to move them into and out of engagement with the terminal strip.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a front elevational view of the contact fixture shown connected with the terminal strip;

Fig. 2 is an end elevational view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a front elevational view of the structure shown in Fig. 1, with the contact fixture in open position, and

Fig. 4 is an enlarged fragmentary sectional view taken substantially along the line 4—4 of Fig. 1.

In the present embodiment the contact fixture is designed for use in combination with a terminal strip 10 mounted through the aid of a bracket 11 to a panel 12, as shown at 14. The terminal strip 10 supports a plurality of terminals 15 of the contours shown, and in this illustration electrical conductors 16, which are parts of the electrical circuits to be tested through the aid of the contact fixture, are electrically connected to their respective terminals. These connections of the conductors 16 with their terminals 15 are shown at the upper ends of the terminals. In the present illustration the lower ends of the terminals are free of conductors, but it should be understood that if

2

desired the contact fixture could function with or without conductors secured to the lower ends of the terminals.

Referring now to the contact fixture, a body 18 of a suitable insulating material has a plurality of spaced apertures 19 therein (Fig. 4) for receiving contacts indicated generally at 20. For the specific structure of the contacts, attention is directed to Fig. 4 and a description of the contact shown therein will apply to the other contacts. In this figure the contact includes a hollow member 21 of a suitable conductive material apertured at its lower end to receive a quantity of solder 22, in which the bare end of an insulated conductor 23 is embedded, to form electrical connection between the conductor and the member 21. In the hollow portion of the member 21, a spring 24 is disposed for normally urging a plunger portion 25 of a terminal engaging member 26 upwardly. The outer end of the member 21 is turned inwardly, as at 27, to limit the upward movement of the member 26. A cup-shaped portion 28 is formed integral with the member 26 to receive the end of its respective terminal 15. The contacts 20 are disposed in the body 18 at positions for registration with their respective terminals 15.

The ends of the body 18 are notched, as at 30, to receive clamping elements 31 and 32. These elements are pivotally connected, as at 33, to the body 18 and have inwardly projecting hook portions 34 at their upper ends. Near the lower ends of the clamping elements 31 and 32, apertures 36 and 37 are formed therein to receive an actuating rod 38. The adjacent end of the actuating rod 38 is pivotally connected to the clamping element 32 in its aperture 37 by a pin 39. The opposite end of the actuating rod projects through the aperture 36 of the clamping element 31 and is pivotally connected, at 40, to legs 41 of a yoke portion 42 of a cam lever 43. The cam lever is provided with a handle 44 by the aid of which it may be actuated, that is, moved about its pivot 40. The lower ends of the legs 41 have like rounded end portions 46 curving into diagonal portions 47, which have their particular purpose hereinafter described.

A compression spring 48 is disposed concentric with the actuating rod 38 and has its ends abutting the inner surfaces of the clamping elements 31 and 32, to apply sufficient force to the elements to urge them into clamping engagement with the terminal strip.

A housing 50, formed of sheet metal or other suitable material and of the cross-sectional contour shown in Fig. 2, surrounds and encloses the

major portion of the structure previously described, as illustrated in Figs. 1 and 3, and has its upper edges fixed, as at 51, to the body 18. Pairs of apertures 52 are provided in the housing 50 adjacent one end thereof, to receive ties 53 for holding groups of the conductors 23 away from the actuating rod and spring as well as the clamping elements, as illustrated in Fig. 2.

Considering now the function of the contact fixture, let it be assumed that the fixture is in the position shown in Fig. 1. In this position the lever 43 lies in close engagement with its adjacent clamping element 31 and the force present in the spring 48 is divided between the clamping elements 31 and 32 to cause their upper ends, including the hook portions 34, to firmly grip the contact strip 10 and hold the remaining structure of the fixture in place. When in this position the movable portions of the contacts 20 are depressed, causing the force created in their springs 24 to form positive electrical connections between the cup-shaped portions of the contacts and their respective terminals 15. At this time circuits including the conductors 16, their terminals 15, the contacts 20, and their conductors 23 are completed between the apparatus including the terminal strip and the testing unit (not shown) connected electrically to the contact fixture.

The contact fixture may be readily removed from the terminal strip by the operator gripping the housing with one hand, and, with the other, moving the lever 43 from the closed position shown in Fig. 1 to the open position shown in Fig. 3. During this movement of the lever, force is applied inwardly to both clamping elements 31 and 32, the force applied to the clamping element 31 being through the lever 43, while that applied to the clamping element 32 is through the actuating rod 38. During this movement of the lever the rounded portions of the ends 46 of the legs 41 will ride upon the adjacent surface of the clamping element 31 until the diagonal or flat portions 47 are brought into engagement with this surface of the clamping element, as illustrated in Fig. 3. At this time the contact between the lever and the clamping element 31 is beyond dead center of the pivot point 40 and the center line of the actuating rod. The mechanism is thus locked in this position and the fixture may be removed from the contact strip as the upper ends of the clamping elements have been moved into spaced positions, as illustrated in Fig. 3. Furthermore, this locked position of the fixture permits movement thereof into engagement with another like contact strip, where a similar connection may be made, in movement of the contacts 20 into engaging position with the terminals 15 of the terminal strip through the aid of the housing 50, serving as a handle portion at the center of the fixture and at the position where pressure is needed to compress the movable portions of the contacts 20 as they are brought into engagement with their respective terminals so as to locate the upper portions of the clamping elements 31 and 32 above the contact strip 10. When in this position the lever 43 need only be moved out of its locked position and the force present in the spring 48 will complete the actuation of the clamping elements 31 and 32 to move them into the clamping positions shown in Fig. 1. Attention is directed to the relationship of the elements 31 and 32 with the housing 50. The latter serves to cause equal positioning of the elements, that is, movement of the elements like distances into open positions before their lower ends engage the housing (Fig. 3).

Through the aid of this fixture, electrical connections may be made simultaneously with a multiplicity of terminals through the aid of a like number of contacts 20 individually embodying therein sufficient force to assure the desired electrical connections, having their cup-shaped ends to maintain mechanical as well as electrical connections with the terminals. Furthermore, the structure of the lever 43 serves to quickly actuate the clamping elements either to force them into open positions, as illustrated in Fig. 3, or to release them for movement by the spring 48 into closed position.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. A contact fixture for use in combination with an elongate terminal strip having a plurality of spaced terminals between its ends, the contact fixture comprising a body, contacts carried thereby and spaced for engagement with the terminals, clamping elements pivotally connected intermediate their ends to the opposing ends of the body, an actuating rod extending between adjacent ends of the elements and connected to one of the elements, a spring adapted to force the elements in directions about their pivots to move the other ends thereof into engagement with the ends of the terminal strip to hold the contacts in engagement with the terminals thereof, and means connected to the other end of the rod to cooperate with the rod to actuate the elements.

2. A contact fixture for use in combination with an elongate terminal strip having a plurality of spaced terminals, the contact fixture comprising a body, spring pressed contacts disposed at spaced positions longitudinally of the body for engagement with the terminals, clamping elements, having hook-shaped ends and apertured ends, pivotally supported intermediate their ends at opposing ends of the body, an actuating rod disposed in the apertures of the elements and connected to one of the elements, means to force the hook-shaped ends of the elements into closed positions in engagement with the terminal strip, and means connected to the free end of the rod to move the elements into open positions.

3. A contact fixture for use in combination with an elongate terminal strip having a plurality of spaced terminals, the contact fixture comprising a body, spring pressed contacts disposed at spaced positions longitudinally of the body for engagement with the terminals, clamping elements, having hook-shaped ends and apertured ends, pivotally supported intermediate their ends at opposing ends of the body, an actuating rod disposed in the apertures of the elements and connected to one of the elements, means to force the hook-shaped ends of the elements into closed positions in engagement with the terminal strip, and a lever connected to the free end of the rod to move the elements into open positions and lock the elements in these positions.

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