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H. HUNTINGTON

TEST CLIP

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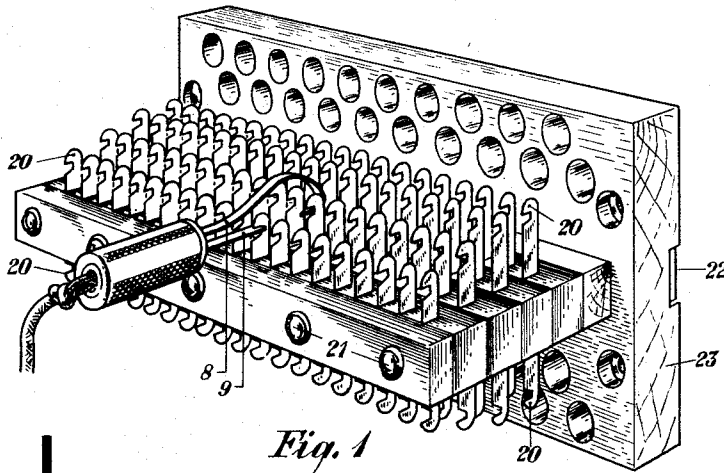


Fig. 1

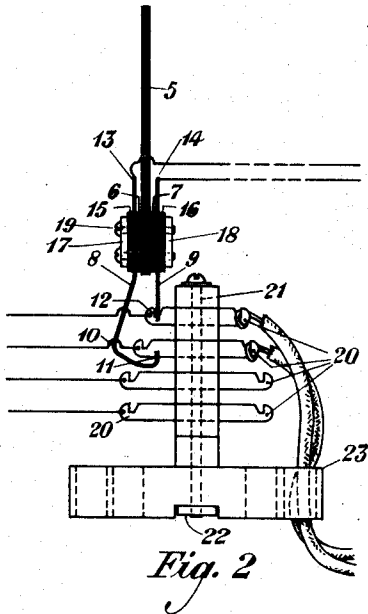


Fig. 2

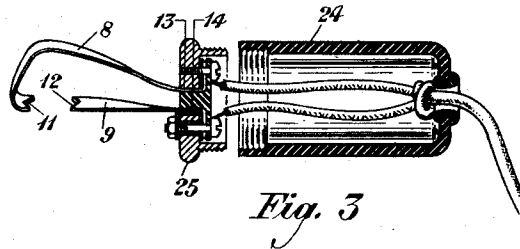


Fig. 3

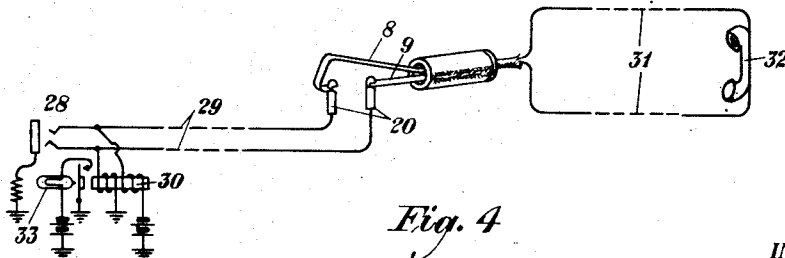


Fig. 4

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TEST CLIP.

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This invention relates to clips or connectors more particularly adapted for attachment to terminals of electrical circuits.

In telephone practice, it is customary to provide frames on which a plurality of terminal strips are mounted. These strips carry banks of metal punchings which are secured thereto in closely spaced relation. The punchings provide terminals to which the conductors of electrical circuits are connected, and by applying clips attached to testing apparatus to said punchings, the continuity and other tests of the conductors and associated apparatus may be determined in a well-understood manner. It is necessary that the clips be of small dimension and of suitable resilience so that they may be attached to the desired punchings without interfering with adjacent punchings and with sufficient tension to make a rigid connection therewith. The clips formerly employed for this purpose, such as the commonly known "suspender" clips, which were generally arranged in pairs, required considerable time and space in their application to the punchings and were undesirable in other respects. Accordingly, it is an object of this invention to provide a simple and inexpensive clip for making temporary connections with terminal punchings in an efficient and reliable manner.

Other and further objects will be apparent from the following description, when considered in connection with the accompanying drawing, in which certain embodiments of the invention are illustrated.

Referring to the drawing, Figure 1 is a perspective view of mounted terminal punchings to which the improved device is adapted to be applied; Fig. 2 is an end elevation of the mounted terminal punchings showing the application of the clip thereto; Fig. 3 illustrates a side elevation of the clip and a form of handle which may be associated therewith; and Fig. 4 is a diagram of the improved clip and its associated circuit applied to the terminals of a telephone line circuit.

In the drawing, the numeral 5 indicates a mounting member which extends longitudinally of the clip and may be composed of suitable insulating material. Spacing members 6 and 7 are positioned at one end and on either side of the member 5, and have mounted thereon, respectively, a pair of resilient members 8 and 9. These resilient members may be composed of some such

rugged metal as German silver or clock spring steel, which is formed and tempered. The member 8 extends forwardly from its mounting and terminates in a hook-portion 10, the tip 11 of which is bent back in a direction substantially parallel with the main portion of the member. The resilient member 9 also projects forwardly from its mounting, so that its tip 12 is in alignment with the tip 11 of the resilient member 8 with a suitable intervening space between the two tips. A V-shaped slot is preferably provided in each of the tips 11 and 12, which are oppositely positioned with respect to each other, and serve to hold the punchings to which they are attached in secure gripping engagement, as will presently appear. The opposite ends 13 and 14, respectively, of the resilient members 8 and 9 are shown as extending rearwardly of their mountings and may be provided with perforations through which conductors can be introduced and soldered to said ends.

Additional spacing members 15 and 16 are indicated as positioned, respectively, on the resilient members 8 and 9, and these spacing members, as well as the spacing members 6 and 7, may be composed of any suitable insulating material, such as rubber, bakelite, or the like. A pair of plates 17 and 18 are positioned on the spacing members 15 and 16, respectively, and these are secured together by bolts 19 passing through aligned openings in the plates, spacing members and resilient members, and serve to hold these elements in clamped relation. A tubular sleeve may be provided for each of the bolts 19. These sleeves extend through the aligned openings of the previously mentioned elements and serve to insulate the bolts 19 therefrom.

A form of terminal, to which the improved clip is adapted to be attached, is shown in the present instance for the purpose of illustration as comprising punchings 20 which are mounted on terminal strips composed of hard rubber. These terminal strips and associated punchings are well known in the art and comprise a plurality of said strips mounted on a frame and secured to each other and to said frame by bolts 21 extending therethrough and registering with the threaded openings provided in the plate 22 lying in a slot in the base of the frame 23. The punchings are shown as having flat sides with a slot cut in one of the edges near the outer ends in the usual

manner. The punchings in the present case comprise a group of four to which the conductors of the tip, ring and sleeve, respectively, of a telephone line may be connected.

5 The fourth punching may be connected to a register or other circuit as the case may be. The punchings are affixed to the longitudinally extending terminal strips so that the individual groups with their flat sides lie at
10 right angles thereto.

In Fig. 3 the clip is shown as enclosed in a tubular casing comprising a main portion 24 having a cap 25 adapted to be screwed thereon. The resilient members 8 and 9 extend
15 through said cap, and conductors connected to the ends of contact springs 13 and 14 pass through a bushed opening in the member 24. The ends of the contact springs 23 and 24 may be attached to the cap 25 as indicated.

20 In the diagram of Fig. 4, which shows the application of the clip to the terminals of one type of circuit to which it is adapted to be associated, a telephone line is indicated terminating at jack 28 at a telephone switchboard. Conductors 29 extend to the punchings 20
25 which are located, for instance, at a distributing frame and pass therefrom to other frames in a manner well-understood in the art. A line relay 30 is associated with said conductors which controls the operation of a line lamp 33. The application of the resilient members 8 and 9 of the clip to the punchings
30 20 closes a circuit from ground and battery through the windings of relay 30, conductors 29, punchings 20, springs 8 and 9, conductors 31 of the testing circuit and indicating device, in the present instance shown in the form of a hand set 32 comprising a telephone transmitter and receiver. If the conductors
35 29 and associated equipment are in proper condition, the relay 30 operates under this condition and causes the illumination of line lamp 33. The operator at the switchboard position where the lamp is located inserts the
40 plug of a cord circuit in jack 28, thereby establishing a talking connection thereover and over the circuit just traced to the hand set 32. This connection permits the operator and test man to converse with each other and check
45 up the number of the telephone line and make such other tests as may be necessary.

It will be obvious from the above description that the members 8 and 9 are formed so that they make a rigid connection with the punchings to which they may be attached and
50 only a single movement is necessary to apply them thereto. The secure manner in which they are attached permits the test man to attend to such adjustment and repair work as may be necessary in connection with the testing operations without attention to holding
55 the clip applied to the punchings. At the termination of the testing operation, the clip may be readily detached from the punchings.

60 While there is shown and described herein

one preferred form of the invention by way of illustration, it is understood that it is not limited or confined to the precise details of construction herein described and delineated, as modification and variation may be made
70 within the scope of the claims without departing from the spirit of the invention.

What is claimed is:

1. In a test clip adapted to be applied to individual groups of a bank of terminals, a pair of resilient members for the clip having
75 oppositely alined contact points for simultaneously engaging certain terminals of a group, one of said resilient members being of greater length than the other of said members
80 and being provided with a curved portion adapted to extend over the tips of an outer terminal and an inner terminal to grip the latter terminal, and the other resilient member being comparatively straight and adapted to
85 grip said outer terminal, a handle for said clip, insulating means positioned between said resilient members and said handle, and means to clamp said resilient members to said handle.

2. In a test clip adapted to be applied to
90 individual groups of a bank of terminals, said terminals having flat sides, a pair of resilient members for the test clip for simultaneously engaging the edges of the flat sides of two terminals of a group, one of said resilient mem-
95 bers being of greater length than the other of said members and being provided with a curved portion adapted to extend over the tips of an outer terminal and an inner terminal to grip the edge of the latter terminal and the
100 other resilient member being comparatively straight and adapted to grip the edge of said outer terminal, a handle for said clip, and means to clamp said resilient members and said handle together in insulated relation.
105

3. In a test clip adapted to be applied to individual groups of a bank of terminals, a pair of resilient members for the clip each having
110 a terminal notch to simultaneously engage the edges of certain terminals of a group, one of said resilient members being of greater length than the other of said members and being provided with a curved portion adapted to extend
115 over the tips of an outer terminal and an inner terminal to grip the edge of the latter terminal and the other resilient member being comparatively straight and adapted to grip the edge of said outer terminal, a handle for said clip, and means to clamp said resilient members in insulated relation on said
120 handle.

4. In a test clip adapted to be applied to individual groups of a bank of terminals, a pair of resilient members for the clips having
125 alined contact points oppositely positioned to each other for simultaneously and securely gripping opposite edges of two terminals of a group, one of said resilient members being of greater length than the other of said members and being provided with a curved portion
130

adapted to extend over the tips of an outer terminal and an inner terminal to grip the edge of the latter terminal and the other resilient member being comparatively straight and adapted to grip the edge of said outer terminal, a handle for said clip, means for insulating said resilient members from each other and from said handle, and means to affix said resilient members to said handle.

5 5. In a test clip adapted to be applied to individual groups of a bank of terminals, said terminals having flat sides, a pair of resilient members for simultaneously and securely gripping the edges of the flat sides of two terminals of a group, one of said resilient mem-

10 bers being of greater length than the other of said members and being provided with a curved portion adapted to extend over the tips of an outer terminal and an inner terminal to grip the edge of the latter terminal 20 and the other resilient member being comparatively straight and adapted to grip the edge of said outer terminal, a handle for said clip, and means to affix said resilient members and said handle together in insulated relation. 25

In testimony whereof, I have signed my name to this specification this 22 day of December, 1925.

HERBERT HUNTINGTON.