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L. J. HANCOCK ET AL

3,434,103

ELECTRICAL TERMINAL WITH CAPTIVE SCREW

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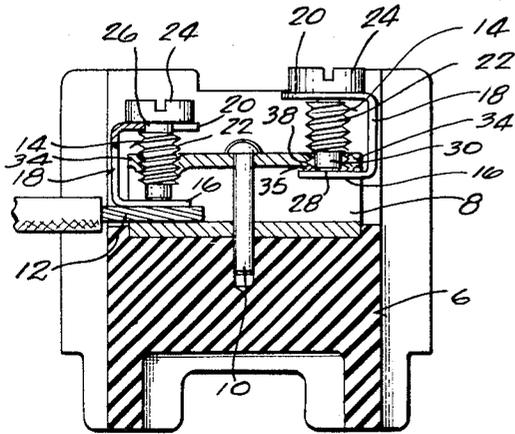


Fig. 2

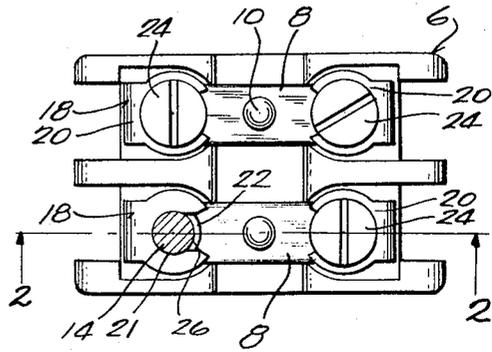


Fig. 1

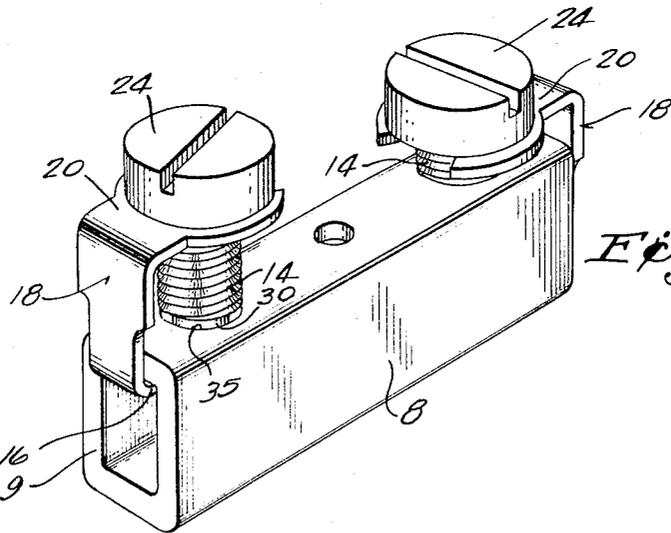


Fig. 4

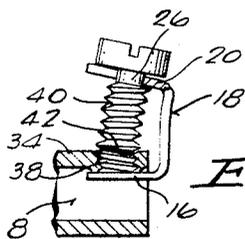


Fig. 3

PRIOR ART

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3,434,103

ELECTRICAL TERMINAL WITH CAPTIVE SCREW

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2 Claims

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ABSTRACT OF THE DISCLOSURE

A conductor to be anchored electrically is received into a tubular terminal and engaged within the tubular terminal by the end of a resilient U-shaped clip which passes about the end of the terminal and has externally of the terminal a leg with a bifurcated end embracing the neck of a captive screw threaded through the wall of the terminal tube.

Because the relative dimensions of the parts are such that the normally parallel upper and lower legs of the clip have to be sprung resiliently to enable the screw to enter the threaded opening of the terminal tube, the end of the captive screw cannot enter the threaded opening axially thereof. Accordingly, there has been a tendency of the screw to bind because its threads did not start properly in the threads of the tube. This has required time-consuming manipulation in assembly.

According to the present invention, the screw is so made that the end thereof which first enters the threaded opening in the terminal tube is reduced in radius sufficiently to eliminate, or substantially eliminate, threads therefrom. Thus, although the clip must be sprung open to permit the captive screw to enter the threaded opening in the tube, the clip can resiliently resume its normal form as soon as the reduced pilot extremity of the screw enters the opening. This is possible only because of the reduced cross section of this portion of the screw. Hence, with the upper leg of the clip firmly engaged with the top of the terminal tube, and the legs of the clip parallel, the screw will have the most advanced portion of its thread in proximity to and in alignment with the threads of the terminal tube.

Background of the invention

The closest prior art known to us is Curtis Patent 3,260,989 showing a terminal with captive screws with which difficulties were experienced over a period of years until the instant invention was made. The difficulties were those described above, the dimensions of parts inherently requiring the captive screw to enter the threaded opening of the terminal tube in a position of non-alignment. With the instant device, the threads are perfectly aligned, and such alignment is inherently assured at the time the threads are engaged.

Description of the invention

In the drawings:

FIG. 1 is a plan view of a terminal block embodying the invention.

FIG. 2 is an enlarged detail view taken in section on the line 2-2 of FIG. 1, the head of one of the screws being broken away.

FIG. 3 is a fragmentary detail view comparable to a portion of FIG. 2 and showing for comparison the position of the parts of the patented device of Curtis 3,260,989.

FIG. 4 is an enlarged detail view in perspective showing a single terminal tube and a pair of captive screws

and associated clips made in accordance with the present invention.

The terminal block 6 is generally conventional, being molded of synthetic resin with channels to receive terminal tubes 8. The tubes may be held in the channel in any manner, as by pins 10 passing through the tubes into the block. The present invention is not concerned with the block but only with the tubes and the means for anchoring therein conductors such as the wires shown at 12.

The clamping screw 14 does not act directly upon the conductor but acts through the lower leg 16 of a clip 18 with which it is in unitary assembly and which holds the screw captive in the tube. It will be noted that the clip 18 passes about the end 9. The clip is provided above the level of the tube with a bifurcated upper leg 20. As shown in detail in FIG. 1, there is a neck portion 26 between the screw threads 22 and the head 24 of each screw 14. The bifurcated leg 20 has recesses 21 in which said neck portion 26 is resiliently engaged so that the screw is captive and cannot be lost. The screw cannot even be disengaged except by springing the bifurcated upper leg 20 open to clear the neck 26.

The threads 22 of each screw 14 terminate above the end 28 of the screw. This is done by so reducing the radius of the pilot portion 30 of the screw as preferably to eliminate threads therefrom for a distance which is nearly identical with the thickness of the threaded wall 34 of the terminal tube 8. As shown, the tube wall 34 has an opening 35 having threads 38 to receive the threads 22 of the captive screw 14 so that as the screw is turned downwardly in the wall 34 of the terminal, it forces the lower leg 16 of the clip against the conductor 12 and keeps the latter within the terminal as shown at the left in FIG. 2.

The screw illustrated at the right in FIG. 2 is shown in an uppermost position in which the lower leg 16 of the clip is in engagement with the threaded upper wall 34 of the terminal tube 8. The screw is in a position such that the first fractional turn thereof will engage its threads 22 with the threads 38 of the terminal wall 34 to move the clip downwardly against the work. Meantime the reduced pilot portion 30 of the screw passes freely through the threads 38 of the terminal block to allow the clip to resume normal form and to hold the screw perfectly upright with its threads in proper alignment with the threads 38 for aligned engagement.

FIG. 3 is a view showing a prior art screw which lacks the reduced radius pilot portion 30. This prior art screw, identified by reference character 40, has its threads extending into close proximity to its blunt pressure end 42. As a result, when the clip 18 is sprung open to separate its legs 16 and 20 sufficiently to permit the screw to enter the threads 38 of the wall 34 of terminal 8, the screw will be misaligned as shown. Since the distortion of the clip cannot be corrected until the screw has entered the tapped opening in the terminal block, and since the entry of the screw into the tapped opening cannot be achieved except by engaging the threads of the screw with those of the terminal block, it will be evident that improper engagement of the threads is inherently probable. The instant invention eliminates much time and care previously required in making such an assembly because the stress occasioned by the distortion of the clip is immediately relieved by the entry of the unthreaded pilot portion 30 into the terminal block.

We claim:

1. The combination of a tubular terminal having an internal work supporting surface and an opposing wall provided with a threaded opening, and a unitary assembly of a U-shaped clip and a captive screw, said clip passing about the end of the terminal tube and having

a lower clamping leg portion extending into the tube and an upper bifurcated leg portion normally parallel to its said clamping portion and disposed externally of the tube, said captive screw having a head and a neck portion engaged by the bifurcated upper leg of the clip, said screw further having threads engageable with the threads of the terminal tube and being provided beyond said threads with a terminal pilot portion adapted to pass freely through the threads of the terminal tube and substantially corresponding in length to the thickness of the said wall of the terminal tube, the spacing between the legs of the clip in relation to the dimensions of the terminal tube and screw being such that with the clip engaged with the neck of the screw, the pilot portion of the screw cannot be received into the threaded opening of the tube except by distorting the clip, the entry of the pilot portion of the screw into the threaded opening relieving clip distortion

and leaving the end of the screw in substantial engagement with the lower leg of the clip and the threads of the screw proximate to and aligned with the threads of the tube.

2. A combination according to claim 1 in which the reduced pilot portion of the captive screw is unthreaded.

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U.S. Cl. X.R.

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