

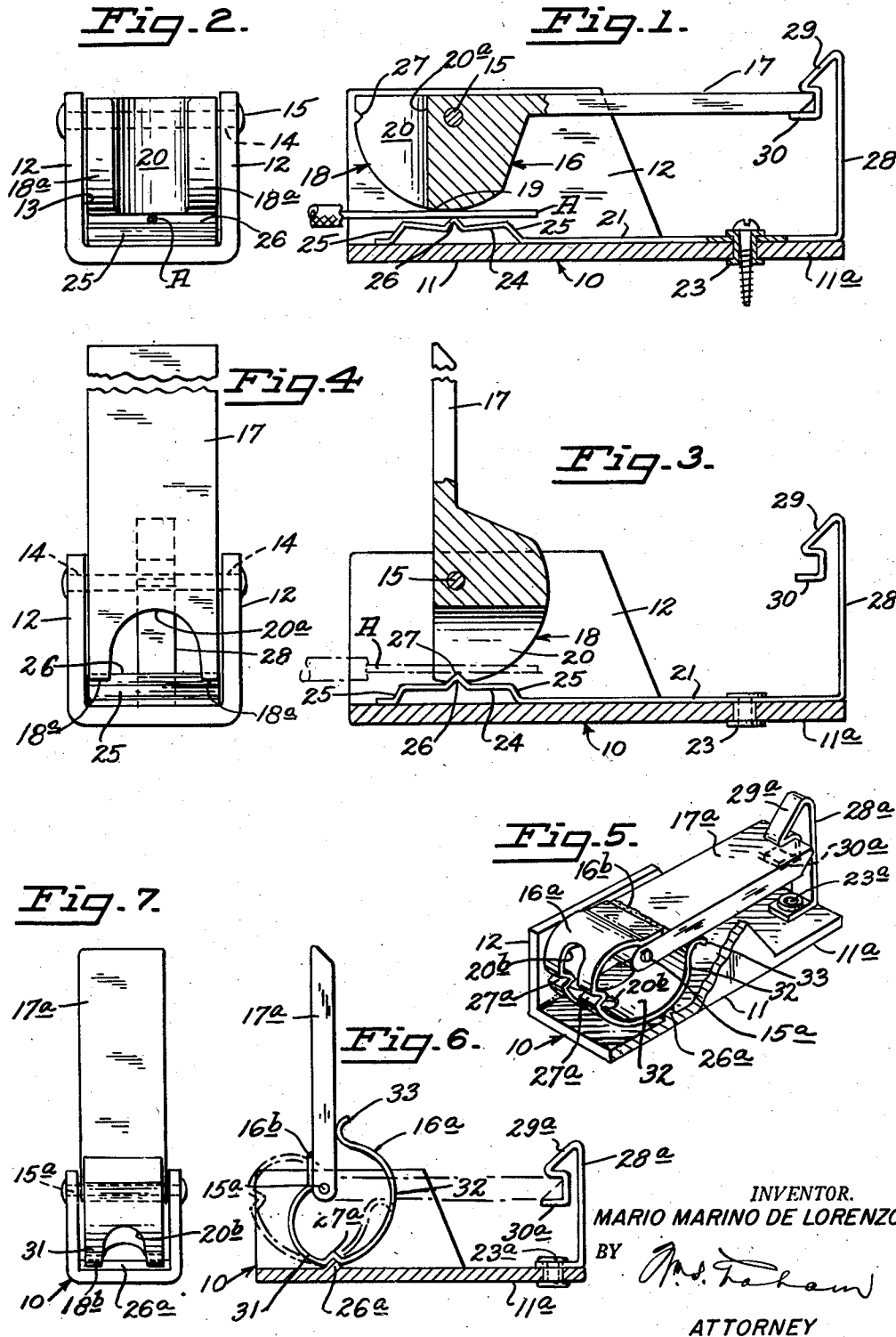
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CLAMPING CAM LUG FOR ELECTRICAL CONNECTIONS

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CLAMPING CAM LUG FOR ELECTRICAL CONNECTIONS

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This invention relates to improvement in electrical connection pressure lugs, and relates more particularly to such devices by which a wire conduit may be connected and disconnected at its terminal end without use of tools.

The lug device of the present invention is a cam clamp into which the terminal ends of a wire conduit may be inserted and securely held, or from which the wire may be released without the use of tools. In the electrical fittings trade such devices are generally referred to as lugs.

There are many instances in electrical installations where it is desired to make a quick and effective releasably tight connection of a terminal end of an electrical circuit wire, without use of tools, such as in various types of telephone panel boards, on board ship where an emergency circuit supplements the regular service circuit, in any installation where it is desired to bring in a main line circuit on a buss bar and distribute the current to various facilities, quick repair of a broken current-carrying conduit by clamping both ends of the live wire in the lug, etc.

Known lugs present difficulties of operation, in that they require the use of tools to secure or release the circuit wire, and this operation is frequently difficult due to restricted space for operation of the tools, and also because screws, or nuts on binding posts become loose in environments where vibration is inherent, particularly in airplanes, aboard ships, or where heavy machinery is operated.

The present invention comprises in general a cam pressure clamping lug having a channeled frame for receiving a conduit terminal in the channel and providing side walls which pivotally mount a cam lever, the cam having a recessed cam face to provide space for receiving wires of varying sizes, and centering the wire in the clamp. A resilient means is interposed between the cam face of the lever and floor of the channel to provide a resilient relationship between the working face of the cam and the base, or resiliency may be inherent in the cam. Locking means are provided on the frame for securing the cam in clamping relation to an inserted wire.

An object of the invention is to provide a cam-operated clamping lug of simple and rugged construction, efficient in operation and economical in manufacture, which is operable without use of tools for selectively securing or releasing the terminal ends of an electric conduit, and maintaining a resilient grip by the cam upon a conduit in the lug.

One form in which the invention may be ex-

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emplified is described herein and illustrated in the accompanying drawing, it being understood that variations of detail may be resorted to without departing from the invention which is defined in the appended claims.

In the drawing:

Fig. 1 is a longitudinal vertical section of the lug of the invention with a lever member at locked position.

Fig. 2 is a front elevation of the device of Fig. 1.

Fig. 3 is a view similar to Fig. 1, with lever at unlocked position.

Fig. 4 is a front end elevation of Fig. 3.

Fig. 5 is a perspective, partly broken away, of a modified form of the invention.

Fig. 6 is a longitudinal vertical section of device of Fig. 5.

Fig. 7 is a front elevation of device of Fig. 5, with lever member at raised position.

Referring to the drawing in which like reference characters indicate similar parts in the several views of corresponding forms of the invention, and referring firstly to the form of invention illustrated in Figs. 1 to 4, 10 indicates generally a supporting frame providing an elongated planar base plate 11, having at one end relatively spaced opposed upstanding side walls 12, one at each longitudinal side of the base, providing therebetween a channel 13, the side walls preferably terminating centrally of the length of the base member 11, and the latter having an extension 11a rearwardly thereof. Adjacent the forward end and the upper edge of the side walls there is an opening 14 for a pivot pin 15.

A cam 16 having an elongated rearwardly extending lever handle portion 17 is pivotally mounted between the side walls 12 upon the pivot pin 15, the working face of the cam being elliptoidally eccentric to pin 15 with a slightly greater radius at the cam head 18 than at the nose 19.

The central portion of the head portion 18 of the cam has an arcuate recess or groove 20 substantially perpendicular to the length of the lever handle, providing on each side of the opposite sides of the recess elongated relatively narrow arcuate strips 18a which are a part of the cam working face.

Overlying the base plate 11 is a leaf spring member 21 mounted in the channel 13, the forward planar end portion underlying the cam, and the opposite end portion extending rearwardly to overlie the rear portion 11a of the base plate, to which it may be tightly secured by any suitable means such as a peened eyelet or grommet 23

mounted through a hole in the rear portion 11a of the base plate.

The forward end portion of the leaf spring 21 which underlies the cam is provided with an integral vertically offset planar portion 24 transversely of the channel, the offset planar portion being spaced from the opposing face of the base member by inclined walls 25, the foot of the walls being in contact with the base member within the channel and furnishing a resilience to the offset planar portion. Centrally of the planar portion 24 of the spring strip is an integral upset transverse tooth 26. The arcuate strips 18a of the cam face each has a groove or notch 27 therein, and the radius of the cam at the grooves 27 is sufficient for the tooth to engage in the groove when the cam lever is appropriately moved perpendicular to the base, as will be described. If desired, there may be a plurality of such teeth 26 or grooves 27. The lesser radius of the cam nose 19 is sufficient for the cam nose to superficially contact the tooth 26.

Means are provided at the rear end 11a of the base for releasably holding the lever 17 at a position whereby the cam nose 19 is in locked relation to the tooth 26 of the spring member. Such means may comprise a spring finger 28 which is a vertically turned extension of the rear end portion leaf spring 21, the spring finger having a snap-lock 29 to engage and releasably hold the end of the cam lever 17 at its free end, and having a stop member 30 to limit the downward movement of the lever at the locking position of the cam nose.

In operation of the device illustrated in Figs. 1 to 4, the channeled frame 10 may be secured to an appropriate terminal base by screw 31 passing through eyelet 23, by first releasing the snap catch 29 and lifting the lever 17 perpendicular to the base plate, at which position the lever may be releasably held by engagement of the tooth 26 in the notch 27, since at such position of the lever it is desirable to maintain the lever and the cam against falling either forwardly or rearwardly when inserting a wire A or when inserting and cinching screw 31. This, likewise, is the position of the lever at the time of inserting the terminal end of a wire as shown in Fig. 3. At the perpendicular position of the lever, the bottom wall recess 20 is parallel to the planar portion 24 and the cam faces of the side strips 18a at the head of the cam are closely adjacent the face of said planar portion, thus providing at the forward end of the lug an arcuate passageway 20a of large cross sectional area for insertion of wires of varying gauges, and thus centering the wire in the channel. After the wire is inserted the lever is pressed rearward and downward to the position shown in Fig. 1, whereupon the nose 19 of the working face of the cam engages the wire and firmly presses it into holding engagement with the tooth 26. The working face of the cam at the nose 19 is of sufficiently lesser diameter than the radius at the cam head 13 so that the nose of the cam, when in locked position, is in substantial superficial contact with the tooth whereby even a small gauge wire may be held therebetween, yet due to the resilience of the offset planar portion 24 of the spring leaf member, upon which the tooth 26 is mounted, a substantial range of gauges of wire may be secured within a single clamping lug.

When the wire is properly locked by the nose of the cam the free end of the handle lever 17 is pressed under the spring snap-lock 29 and since

its further downward movement might have a tendency to push the engaged wire forward, or to release the wire-engaging of the cam, the stop member 30 will limit the further downward movement of the lever.

The invention is not limited, however, to a cam having a solid rigid body nor the specific type of vertically offset resilient planar spring portion, as shown at 24 in Figs. 1 to 4. As a modified form of the invention there is shown in Figs. 5 to 7, a cam device of arcuately bent spring strip metal in which the frame 10, sidewalls 12, base member 11, 11a and snap-lock 28a, 29a, 30a may be substantially similar as previously described. The cam member 16a is a loop of spring steel strip having one end welded or soldered as at 16b to a handle lever 17a which has an opening therethrough to receive the pivot pin 15a. The working face of the cam 16a may be eccentric as previously described, the radius at the head 31 of the cam being greater than at the cam nose 32.

The free terminal end of the spring strip cam 16a of this modification is preferably provided with a lip 33 which has sliding contact with the underface of the cam lever 17a, and a slot 20b in the arc of the cam head may provide the equivalent of a recess. An indent 27a may be provided in the arcuate side strips 18b of the working face of the head portion of the cam. The slot 20b and indents 27a in this modification are for purposes and functions similar to indent 27 and recess 20 in the device of Figs. 1 to 4.

In this modification since the cam member 16a is of spring strip metal, it is not essential that a spring strip be employed within the channel overlying the base 11, and the tooth 26a may be integral with the base wall 11. The spring snap-lock 29a and stop member 30a may be retroverted upon an upstanding spring finger 28a the base of which is secured to the rearward portion 11a of the base member by the open eyelet 23a, which also provides an opening for a screw by which the device may be suitably affixed to a terminal.

The manipulation and operation of the modification to engage and release a wire in the clamp lug is similar to that previously described except that the resilient relationship between the cam face and the tooth is inherent in the cam face rather than in the tooth.

Having described the invention, what is claimed as new and patentable is:

1. A pressure clamping lug including an elongated channeled frame having relatively spaced opposed side walls and a base, an integral cam and lever pivotally mounted between the side walls for pivotal movement in the channel for locking a wire therein, the cam being provided with a working face having a head portion recessed centrally substantially perpendicular to the lever and providing a side strip on each side of the recess, and said cam having a nose portion operable for engaging a wire between the cam and base plate, the side strips of the head portion having a greater pivotal radius than the nose portion of the cam, said base member having an upstanding tooth underlying the cam transversely of the channel, and said head portion of the cam having a transverse indented groove for engagement of said tooth when the cam lever is at a position substantially perpendicular to the base.

2. A clamping lug having the elements of claim 1, and in which the nose of the cam and the

base member have a resilient pressure relationship when a wire member is engaged therebetween.

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