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M. M. CLAYTON

1,944,707

REMOVABLE KNOCK-OUT

Filed Dec. 14, 1929

FIG. 1.

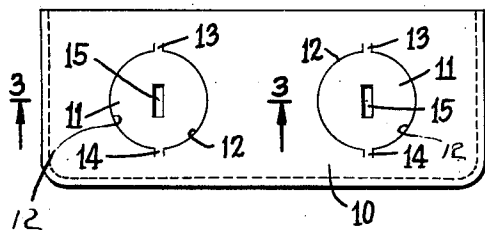


FIG. 2.

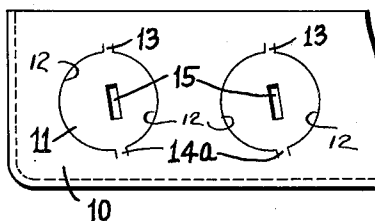


FIG. 3.

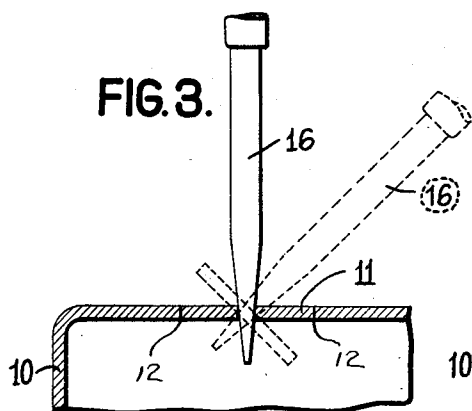


FIG. 4.

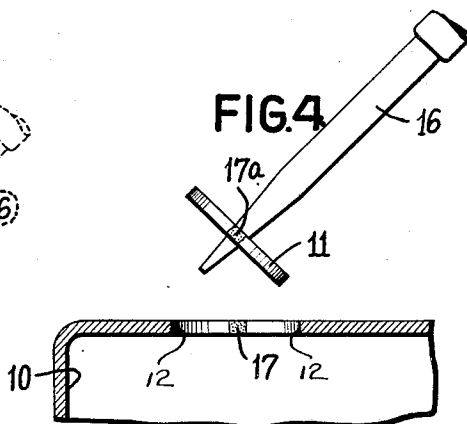


FIG. 5.

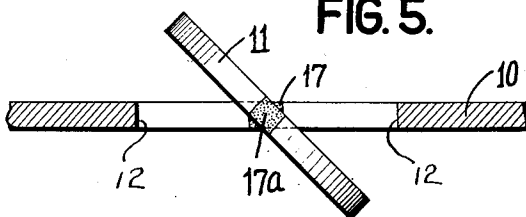
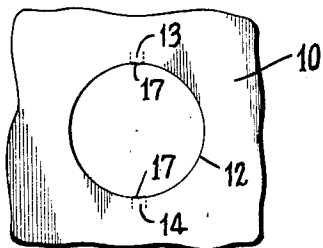


FIG. 6.



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UNITED STATES PATENT OFFICE

1,944,707

REMOVABLE KNOCK-OUT

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Application December 14, 1929
Serial No. 413,997

3 Claims. (Cl. 247—26)

This invention relates to knock-outs for boxes which are used for electrical purposes.

It has become the standard practice among manufacturers of such boxes to punch a portion of the metal in the walls of such boxes entirely through, with the exception of a small section which is left unpunched in order to retain the punched portion in the box. Such punched portions are known as knock-outs and are made in a variety of shapes and sizes to suit large varieties of wiring materials. These knock-outs when removed, provide an opening in the box wall by which wiring materials of various sorts may enter the box. Due to the disposition of the knock-outs in the box wall in the plane of the wall or parallel to it, difficulty has been experienced in removing such knock-outs. The usual procedure in removing knock-outs has been to drive them inwardly or outwardly, the retaining portion remaining intact, and then to bend the knock-out backward and forward until the knock-out is broken free of the retaining piece or else to grasp the knock-out after it has been sufficiently driven or forced out with a pair of pliers and then to twist it free from the retaining portion.

Both of these methods are awkward and generally required the use of more than one tool. In any event a succession of operations are required to remove a knock-out, viz., first there is a displacement of the knock-out to a graspable position, and second there is a bending back or forth or a tearing off of the retaining portion before severance could be effected.

Previous efforts have been made towards facilitating the removal of such knock-outs, but all such efforts have been directed to facilitating the lifting up of the knock-out to a graspable position and when the knock-out was in such graspable position the second removal operation step had to be performed as before, either by hand or by a different implement.

To provide increased facility for the preliminary lifting up of the knock-out disks which was the previous preliminary operation prior to the severance and removal of the knock-outs, such disks were shaped at their perimeter in such a manner that a prying implement could be placed up under the knock-out and manipulated to pry up the knock-out out of the plane of the box wall to a graspable position. Certain constructions provided the usual single intact portion which acted as a hinge during the preliminary prying up operation and which had to be subsequently broken off by the second removal

step and in other constructions a thin fin was left substantially entirely around the knock-out disks to connect it somewhat weakly with the box wall, which fin during the preliminary prying up step was torn until a hinge portion remained which then had to be broken off as before by a separate operation.

All of such previous constructions contemplated and required an initial prying up step by one implement and a second breaking off step either by hand or usually by a pair of pliers.

The present invention is directed to an improved removable knock-out construction in which by a new construction and new mode of operation the necessity for the initial prying up step is obviated, and in which there is no necessity for performing double steps in removing a knock-out, viz. first prying it up and thereafter bending it back and forth and in some manner tearing it to effect its disconnection from the box.

The present invention has also for its object the provision of a knock-out construction in which complete removal of a knock-out from its associated wall may be effected by a single implement and by a simple manipulation of the single implement so that the knock-out may be removed in a more rapid manner than heretofore.

A further object of the present invention resides in the provision of a knock-out construction which provides for the complete removal of a knock-out without having to perform two steps in the operation, viz., without having to first pry out the knock-out up to a graspable position and thereafter pry up the knock-out and bend it back and forth to break off the retaining tongue or hinge.

A further object of the present invention resides in the provision of a knock-out provided with a slot or other opening within the area of the knock-out disk itself which slot or opening is adapted to receive the removing implement and to permit the removing implement to be itself utilized to lift out the knock-out out from the box wall after it has been broken off and severed by the action of the implement.

A further object of the present invention resides in the provision of a knock-out construction in which retaining uncut portions act as shearable pivots when the removing implement is applied and manipulated. Accordingly, by a simple manipulation of a single removing implement, such shearable pivots may be broken off cleanly and thereafter the removing implement itself may

be utilized to lift the broken off knock-out away from the box wall.

A further object of the present invention is to provide a construction which eliminates the necessity of either driving or prying the knock-out away from the wall in order that it may be broken off free from the retaining neck.

A further object of the present invention resides in the provision of a knock-out construction in which removal of the knock-out may be effected by one tool which is regularly carried by a wireman.

Further and other objects of the present invention will be hereinafter set forth in the appending specification and claims and shown in the drawing, which by way of illustration shows what I now consider to be preferred embodiments of the invention.

In the drawing:

Figure 1 shows an elevational view of a knock-out box embodying my invention;

Fig. 2 is a similar view but with a slight modification of the location of the uncut portions of the knock-outs;

Fig. 3 is a large cross-sectional view taken on line 3—3 of Fig. 1 but showing a removing implement inserted and also showing the removing implement and a knock-out in rocked position;

Fig. 4 is a view showing the manner in which the implement can remove a knock-out after it is severed;

Fig. 5 is an enlarged diagrammatic view showing the pivotal shearing action which takes place upon the uncut portions upon manipulation of the removing implement; and

Fig. 6 is a fragmentary view similar to Fig. 1 but with a knock-out severed and removed from the box.

Referring to the drawing, 10 represents a box wall having one or more knock-outs 11 provided therein by punching out the greater part of the periphery as indicated by reference characters 12. To integrally connect the knock-outs with the wall portion of the box, preferably but not essentially, two uncut portions 13 and 14 are provided, which preferably are disposed opposite to one another or substantially so. In Fig. 1 these uncut portions 13 and 14 are disposed on a diameter of the knock-out and in Fig. 2 one of these uncut portions 14a is shown disposed somewhat and slightly off the diameter line. In order to provide for the reception of a combined severing and removing implement, each knock-out 11 is provided with an implement receiving opening 15. Preferably such opening is in the form of an extended slot because usually a screw driver 16 is used as the severing and removing implement. However, such slot-like configuration is not essential, although it is preferable. Preferably also to best retain the severed knock-out upon the implement while the knock-out is being removed, the opening is located entirely within the area of knock-out and is bounded by the material of the knock-out. While such location is not essential it is preferable and if a different location is selected the configuration of the opening preferably should be such that the knock-out will be retained and impaled upon the shank of the inserted implement after its severance (see Fig. 4).

To provide for the best severing action it is desirable that the implement receiving opening be located substantially in line with the uncut portions and preferably upon the diameter line which extends between the uncut portions.

The manner of severing and removing a knock-

out will be clear from the drawing. When it is desired to sever and remove a knock-out, the severing implement such as a screw driver 16, is inserted in the slot 15 and rocked. The rocking action causes the uncut portions to become pivots which are sheared off during and by the rocking action. The shearing point is localized in the uncut portions at points which are substantially in alignment with the perimeter of the initially cut portions with the result that the knock-out is cleanly severed from the wall without any ragged edges remaining as was the case heretofore when hinge-like removal was effected. As shown, preferably the rocking action is about a diameter line which passes through the axis of the uncut portions and also through the implement receiving opening. Removal may still, however, be effected if one of the uncut portions is disposed slightly off the diameter line, in which case the slot is somewhat aligned with the uncut portions as shown in Fig. 2.

In Fig. 5 of the drawing the knock-out is shown as tipped and the initially uncut portion is shown as having been sheared off as conventionally indicated by the stippling 17. In this figure, 17 designates the sheared off material which remains on the box wall and 17a indicates the sheared off material upon the knock-out. Similar reference characters 17 and 17a are used on Fig. 6 and upon Fig. 4. In Fig. 6, 17 shows the comparatively clean sheared edge which forms a continuation of the initially cut portion 12. It is to be noted that a shearing action takes place about an axial line which passes through the axis of the uncut portion and which line passes also substantially centrally through the knock-out and through the wall portion.

Usually complete severance of a knock-out may be effected by a simple single rocking action, but in the event that severance is not effected immediately, a multiplicity of back and forth rocking movements may be necessary. The action necessary will, of course, depend upon the strength of the metal of the uncut portions, the size of the uncut portions and other design factors which can be widely varied.

After the knock-out has been severed from the wall by the action of the implement it will remain impaled upon the shank of the screw driver or removing implement (see Fig. 4) and it can then be lifted clear of the hole and away from the box wall by the implement itself. Accordingly a single implement serves to both sever the knock-out from the wall and this implement can be utilized to remove it after severance.

What I claim is:

1. In a device having a wall with knock-out portions therein intended for removal when desired, said knock-out having integral uncut portions securing the same to the wall, and an implement receiving opening within the area of the knock-out, extending through the knock-out and disposed between and substantially in alignment with the uncut portions so that upon inserting an implement and rocking it said uncut portions act as shearable pivots which are completely twisted and sheared off so that the knock-out may be removed by manipulation of a single implement.

2. In an outlet box having a knock-out, said knock-out being defined by a perforation interrupted by a plurality of circumferentially spaced fins or intact portions, said knock-out also being provided with an opening therethrough through which a tool may be inserted for removing the

knock-out, the said opening being entirely bounded, in the plane of the knock-out, by the material of the knock-out per se.

5 3. In an outlet box having a knock-out, said knock-out being defined by a perforation interrupted by a plurality of circumferentially spaced fins or intact portions, said knock-out also being provided with a slot-like opening therethrough

through which the flat bit of a tool such as a screw driver may be inserted to move the knock-out about an axis in the plane of the knock-out and thereby remove the knock-out, the said opening being entirely bounded, in the plane of the knock-out, by the material of the knock-out per se. 80

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10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150