Aug. 4, 1970 W. O. ARNOLD, JR 3,522,924

RECEPTACLE SUPPORT BRACKET

Filed May 31, 1968

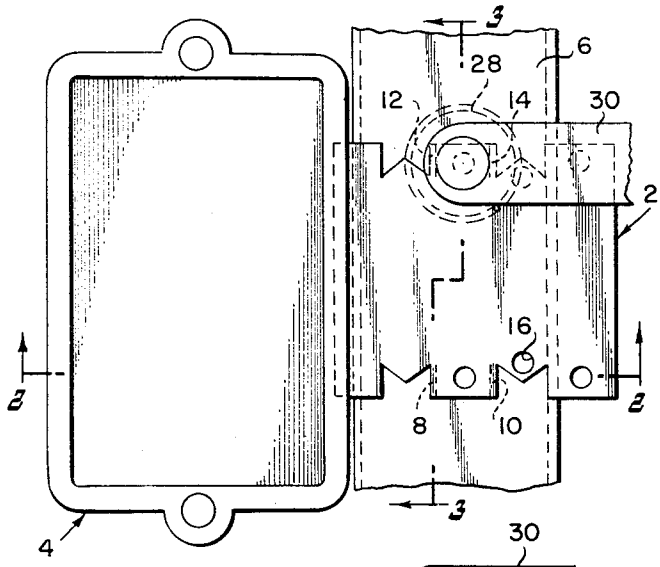


Fig. 1

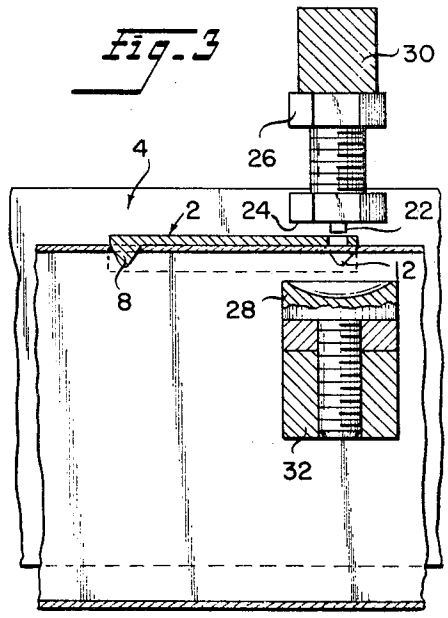


Fig. 3

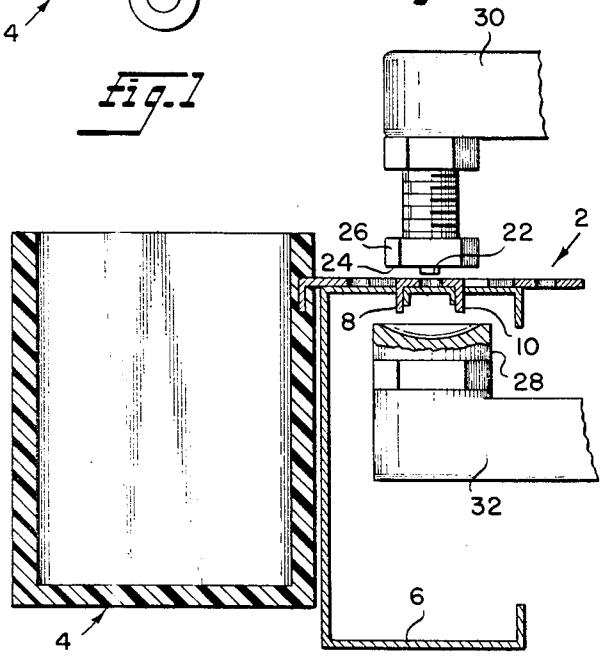


Fig. 2

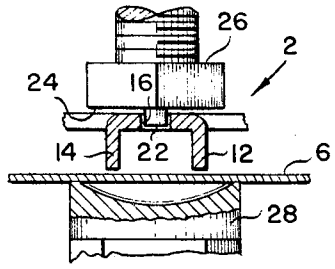


Fig. 5

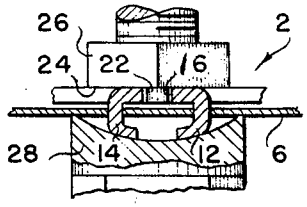


Fig. 6

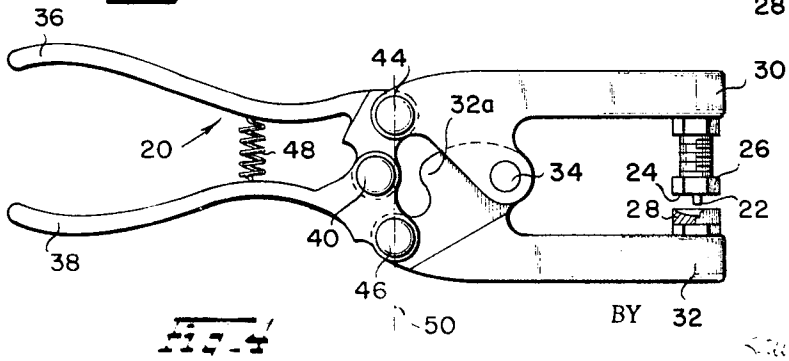


Fig. 4

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United States Patent Office 3,522,924
Patented Aug. 4, 1970

3,522,924

RECEPTACLE SUPPORT BRACKET

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Filed May 31, 1968, Ser. No. 733,642
Int. Cl. F16b 15/00
U.S. Cl. 248—216 2 Claims

ABSTRACT OF THE DISCLOSURE

Bracket means, method and apparatus for securing an article such as an electrical wiring box to a sheet metal support, characterized in that the bracket means includes at least one stamped point extending downwardly into engagement with the support, said bracket containing an orientation opening adjacent the point. To effect penetration of the support by the points and crimping of the points relative to the support, cooperating jaw means are provided on opposite sides of the bracket and the support, one jaw face member having a male projection extending into the orientation opening to properly align the jaws relative to the points.

In the patented prior art—as shown by the patents to Palmer Re. 25,593, Appleton No. 2,747,758, Clark No. 2,809,763 and Magee No. 3,011,747, various bracket means of the support penetrating type have been proposed for securing an electrical wiring box to a wooden stud or other support. In general, these brackets are hammered to effect penetration of pointed extensions into the support, which hammering generally imparts undesirable jolts and impact vibrations to the box that are especially detrimental in the case of a box formed by molding from a synthetic plastic insulating material, or a box in which the electrical components are already mounted.

Furthermore, as shown by the patents to Babyak No. 2,802,383, Bowman No. 1,433,775, Burrell No. 1,142,797 and Tuttle No. 1,176,793, various pliers-type tools have been proposed in the prior art including pivotally connected jaws having faces adapted to secure metal parts together by crimping, clenching or bending.

The present invention was developed to provide an improved method and apparatus for readily connecting electrical wiring boxes (preferably, but not exclusively of the molded insulation type) to a sheet metal support, use being made of an improved bracket containing a tool orientation opening adjacent one or more prestamped points. In accordance with a primary object of the present invention, the tool means includes a pair of pivotally connected jaws one of which has a jaw face including a male projection adapted for insertion within the orientation opening, thereby to align a companion female jaw member relative to the points on the opposite side of the support therefrom. Upon compression of the jaw members toward each other, the support is initially penetrated by the points, whereupon the points are bent inwardly toward each other to rigidly secure the bracket to the support.

In accordance with another object of the invention, the tool means for effecting penetration of the support by the points and subsequent crimping of the points includes a pair of pivotally connected jaws that are operable by a pair of pivotally connected levers, the adjacent free ends of corresponding ones of the levers and jaws also being pivotally connected. Stop means are provided for preventing operation of the jaws to a position in which the pivot shafts and the corresponding links are locked in an overcenter position.

Other objects and advantages of the invention will become apparent from a study of the following specification when viewed in the light of the accompanying drawings, in which:

FIG. 1 is a top plan view illustrating the manner in which the mounting bracket is fastened to a sheet metal channel-shaped stud;

FIGS. 2 and 3 are sectional views taken along lines 2—2 and 3—3, respectively, of FIG. 1;

FIG. 4 is a side elevational view, with certain parts broken away, of the fastening tool; and

FIGS. 5 and 6 are detailed sectional views illustrating the manner in which the stamped points are caused to penetrate and clinch the support.

Referring now to the drawing, the sheet metal bracket **2** is formed by stamping from a planar blank and is specifically designed to fasten a molded plastic electrical wiring box **4** to a sheet metal channel-shaped stud **6**. Thus, one side edge of the bracket is embedded (as shown in FIG. 2) or otherwise fastened to the box, whereby when the box is arranged adjacent the stud, the central portion of the bracket extends over the stud. The blank is pre-stamped to define two pairs of identical parallel downwardly extending points **8**, **10** and **12**, **14** respectively, adjacent the longitudinal central axis of the blank. Between each pair of points, the blank contains an orientation opening **16** which serves to properly orient a fastening or crimping tool **20** (FIG. 4) relative to the bracket. More particularly, the orientation opening **16** is adapted to receive a male orientation projection **22** that extends downwardly from the planar lower surface **24** of of a male jaw face member **26**. This male jaw face is adapted to cooperate with a concave female jaw face member **28** the diameter of which is at least as great as the spacing distance between the pair of stamped points.

Referring now to FIG. 4, the male and female jaw members **26**, **28** are adjustably connected in an opposed manner between the free ends of a pair of jaws **30**, **32**, respectively, that are pivotally connected intermediate their ends by a pivot shaft **34**. The jaws are operable by a pair of operating levers **36**, **38** that are connected intermediate their ends by another pivot shaft **40**. The free ends of levers **36** and **38** are pivotally connected with the free ends of jaws **30** and **32** by first and second pivot means **44** and **46**, respectively. The levers **36** and **38** and jaws **30** and **32** are biased apart to the open position by suitable spring means **48**. It is apparent that as levers **36** and **38** are compressed toward each other, jaws **30** and **32** are similarly compressed, the pivot shaft **40** being displaced to the right relative to the plane **50** containing pivot shafts **44** and **46**. In accordance with one feature of the invention, a stop abutment portion **32***a* is provided on jaw **32** to prevent the pivot shaft **40** from being displaced to an overcenter locked position relative to the plane **50**.

OPERATION

Assume that it is desired to secure to a sheet metal channel stud **6** a plastic or metal electrical wiring box **4** to which is attached a stamped bracket **2**. The box is positioned adjacent the stud with the stamp points **8**, **10**, **12**, and **14** extending downwardly into engagement with the upper surface of the stud as shown in FIG. 5. The tool is then arranged with the jaws straddling the side wall of the stud and with the male projection **22** extending into the orientation opening **16**. At this time, the lower concave jaw member **28** is automatically positioned coaxially beneath the pair of stamped points **12**, **14** whereupon the operating levers are compressed to cause points **12** and **14** to penetrate the stud wall portion interposed between the jaws. Upon further compression of the jaws, the points engage the concave surface of the female jaw face **28** and are crimped toward each other, as shown in FIG. 6, to rigidly

and permanently clench the bracket to the stud. Upon release of the operating lever, the jaws spring open, whereby the tool may be displaced laterally until the male projection is inserted into the opening **16** between the points **8** and **10**. The levers are again compressed as described above, whereupon the points are caused to penetrate the stud and to be clenched to the position shown in FIG. 6.

Of course, various modifications may be made in the apparatus described. For example, instead of crimping the points inwardly toward each other, it is conceivable that the female anvil could be so designed as to cause outward spreading of the points following penetration of the stud wall. It is apparent also that instead of forming the points at the edge of the stamped plate, they may be stamped from a central body portion of the plate, if desired. Furthermore, in certain cases, it may be desirable to provide three or more stamped points arranged around the orientation opening and extending normal to the plate. While generally these points are equally spaced from the opening, certain minor variations in spacing distance is permissible, as long as the maximum spacing distance between any two points to be simultaneously crimped is less than the diameter of the concave anvil.

According to another modification, adjustable cam means may be bolted on jaw **32** for contacting jaw **30** to limit the extent of opening of the jaws by the spring. The cam is approximately ⅝" in diameter and has a hole positioned off center to effect adjustment of the open space between the jaws. It is obvious that other changes and modifications may be made without deviating from the invention set forth in the following claims.

What is claimed is:

1. Sheet metal bracket means adapted for clinched permanent connection with a planar imperforate support sheet of finite thickness, comprising

a sheet metal blank having a planar body portion, and a plurality of spaced groups of spaced identical parallel points partially stamped from and extending on one side normal to said body portion, said points having a length greater than the thickness of said imperforate support sheet, the portion of said blank intermediate the points of each group being palnar and parallel with said imperforate support sheet when said points are positioned in contact with said support, said body portion intermediate said points containing an orientation opening for positioning the pivotally connected jaws of a crimping tool relative to said group of points, whereby when the jaws of the crimping tool are compressed on opposite sides of said blank and said support member, said points are caused initially to pierce the imperforate support member, and subsequently to be crimped together on the opposite side of the imperforate support member from said blank.

2. A sheet metal bracket assembly, comprising

an imperforate support sheet of finite thickness;

and a sheet metal blank including a planar body portion in parallel surface-to-surface contact with said support member, and a plurality of groups of spaced parallel identical points partially stamped from and extending on one side of said body portion, said points having a length greater than the thickness of said imperforate support sheet, the points of each group being forced through said support sheet and being crimped together on the opposite side of said support sheet from said blank to securely fasten said blank to said support sheet, the portion of said blank adjacent the point of each group being planar and in surface-to-surface contact with an imperforate portion of the support sheet, said planar blank portion adjacent each said point group containing an orientation opening for positioning the pivotally connected jaws of a crimping tool relative to said groups of points.

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U.S. Cl. X.R.

85—13; 220—3.9