Sept. 4, 1934. W. ROSE 1,972,239

CONDUIT WRENCH

Filed June 22, 1931 3 Sheets-Sheet 1

Fig. 1.

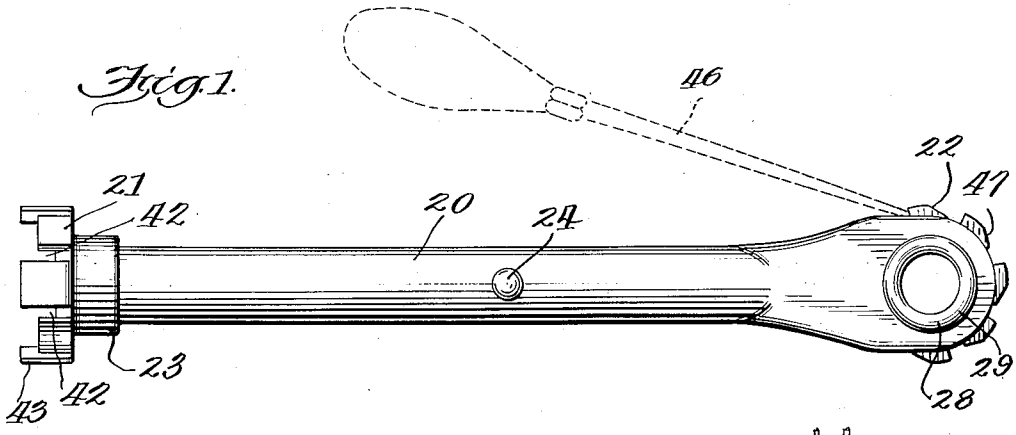


Fig. 2.

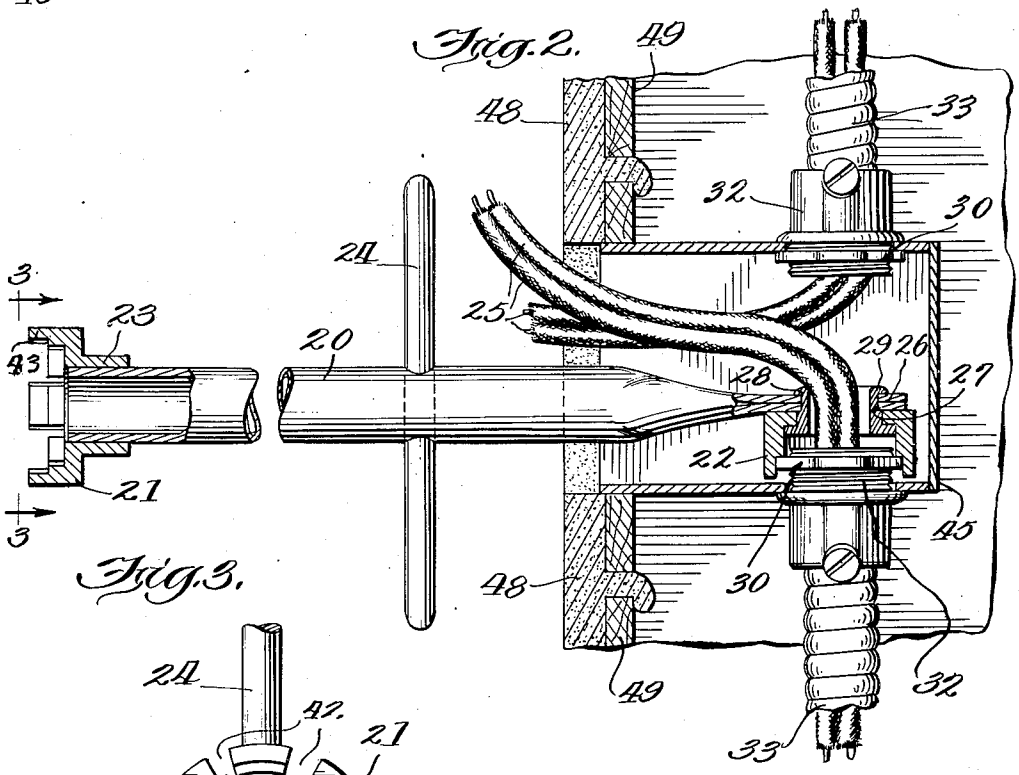
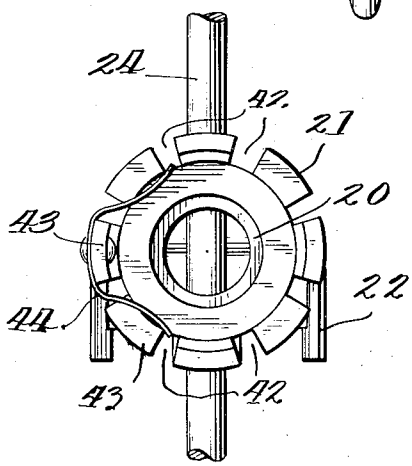


Fig. 3.



Inventor:
William Rose
By Williams, Bradbury,
McCaleb & Hinkle
Attys

Sept. 4, 1934. W. ROSE 1,972,239

CONDUIT WRENCH

Filed June 22, 1931 3 Sheets-Sheet 2

Fig. 4.

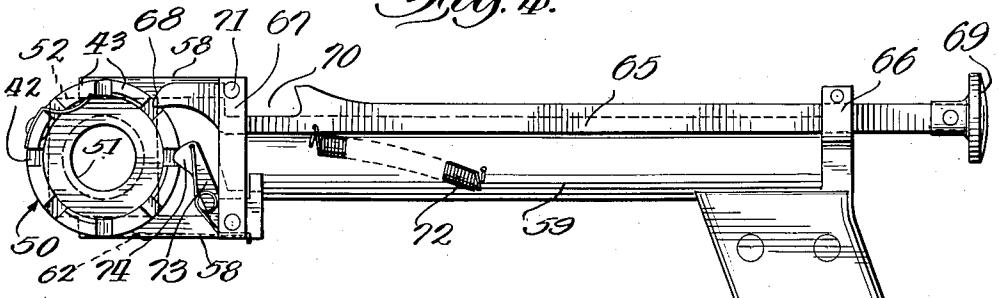


Fig. 6.

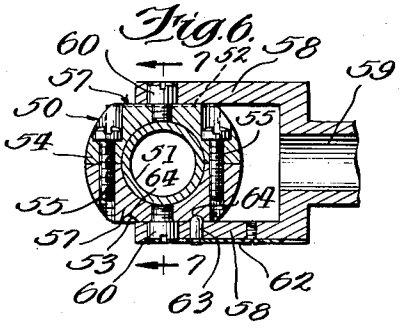


Fig. 7.

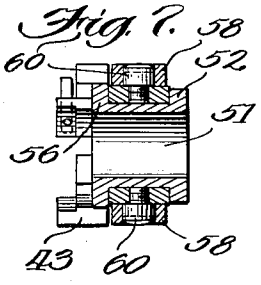


Fig. 5.

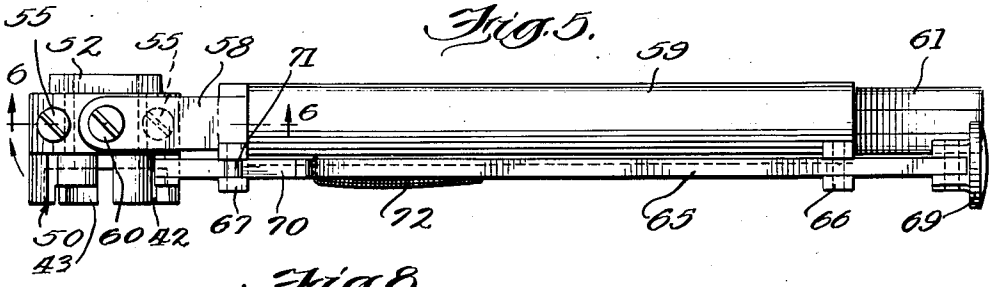


Fig. 8.

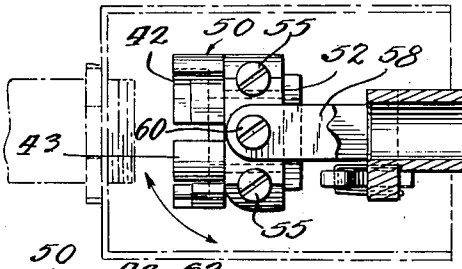


Fig. 9.

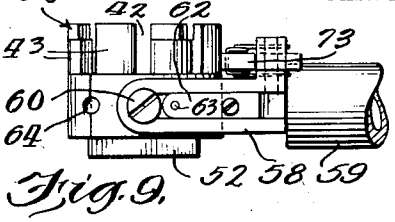


Fig. 13.

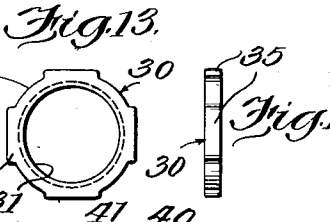


Fig. 14.

Fig. 15.

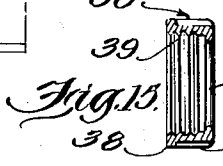


Fig. 16.



Inventor:
William Rose
By Williams, Bradbury,
McCaleb & Hinkle
Attys.

Sept. 4, 1934. W. ROSE 1,972,239

CONDUIT WRENCH

Filed June 22, 1931 3 Sheets-Sheet 3

Fig. 10.

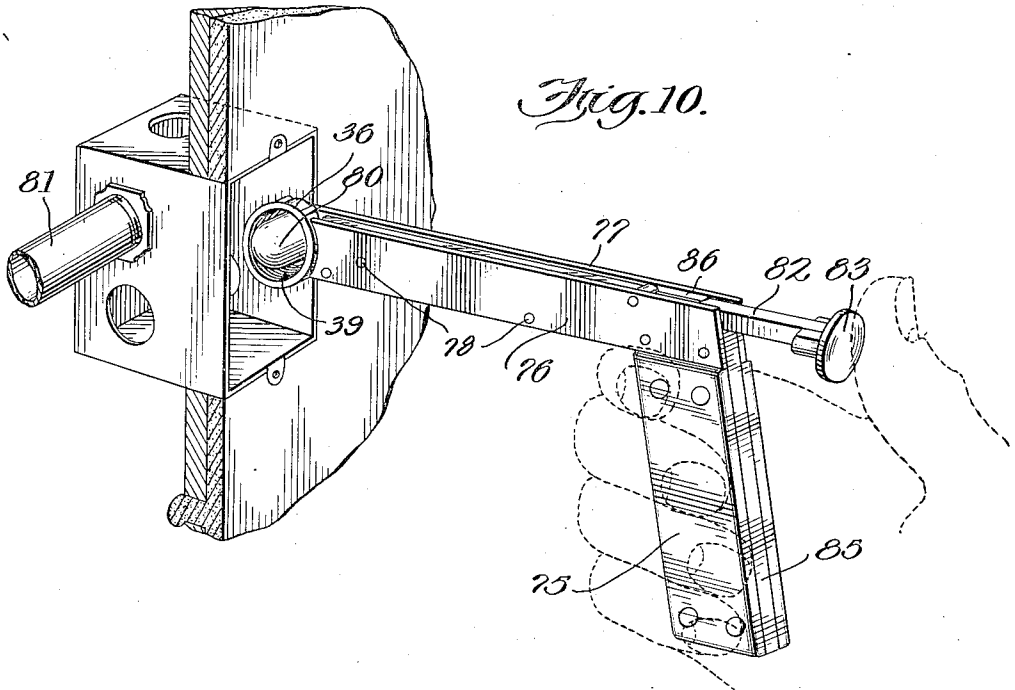


Fig. 11.

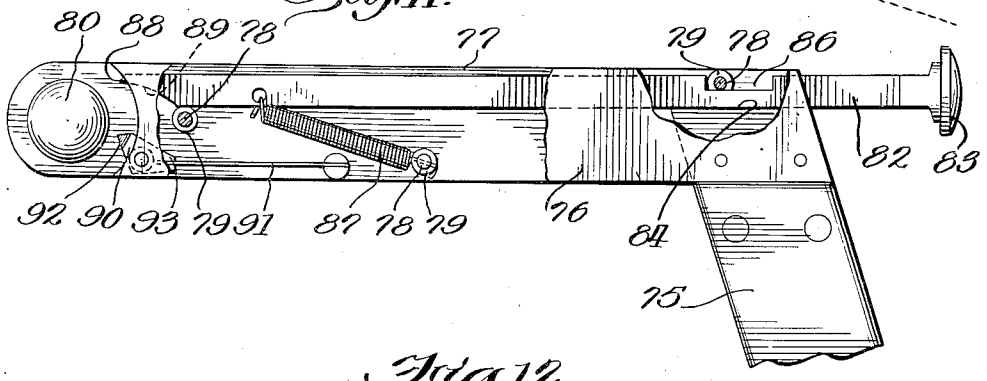
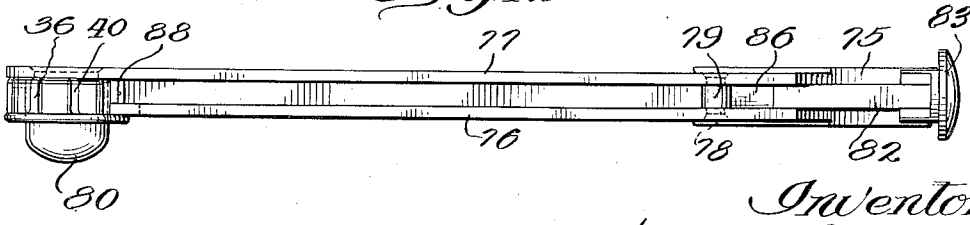


Fig. 12.



Inventor:
William Rose
By Williams, Bradbury
McCaleb & Hinkle
Attys.

Patented Sept. 4, 1934 1,972,239

UNITED STATES PATENT OFFICE

1,972,239

CONDUIT WRENCH

William Rose, Chicago, Ill., assignor to Mathias Klein & Sons, Chicago, Ill., a corporation of Illinois

Application June 22, 1931, Serial No. 545,980

8 Claims. (Cl. 81—121)

This invention relates to conduit wrenches for applying nuts or bushings to threaded members in inaccessible positions, and particularly for applying nut elements to conduits or conduit connectors in wall boxes.

The application of nuts on the ends of conduits or conduit connectors in the interior of wall boxes is frequently a matter of great difficulty. Wall boxes, particularly single-switch wall boxes, are relatively narrow and deep so that it is difficult or impossible to manipulate the nut by hand. This difficulty is frequently increased, particularly in old work, by the thickness of the plaster which is frequently of excessive thickness and adds to the effective depth of the box.

One of the objects of the invention is to provide a tool whereby such nuts may readily be applied.

A further object of the invention is to provide a tool which is adapted to engage nuts of the type normally employed with rigid conduits and of the type normally employed with connectors of flexible or BX conduits.

A further object of the invention is to provide a tool which is adapted to operate on both the sides and bottom of the wall box.

A further object of the invention is to provide a head for a tool of this type having means for holding the nut thereon until secured to the conduit or connector.

Another object of the invention is to provide a head for a tool of this type which is adapted to accommodate insulated conductors which project from the conduit.

Another object of the invention is to provide a tool of the type described including means for rotating the head.

Other objects, advantages and capabilities of the invention will appear in the following description of preferred embodiments thereof taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side view of a tool embodying the invention;

Fig. 2 is an elevation thereof, partly in section showing the manner in which the tool is used when applying nuts to end connectors of flexible conduits;

Fig. 3 is an end view of the tool as viewed on the line 3—3 of Fig. 2;

Fig. 4 is an elevation of a further embodiment of the invention;

Fig. 5 is a plan view of same;

Fig. 6 is a sectional detail view taken on the line 6—6 of Fig. 5;

Fig. 7 is a sectional detail view taken on the line 7—7 of Fig. 6;

Fig. 8 is a plan detail view partly in section showing the tool adapted to cooperate with the bottom of the box, the box and conduit being indicated in dot-dash lines;

Fig. 9 is an inverted plan detail showing the underside of the tool head and associated parts;

Fig. 10 is a perspective view of a further embodiment of the invention adapted for use with rigid conduit nuts, showing the manner in which it is used;

Fig. 11 is an elevation of this embodiment partly broken away to show internal construction;

Fig. 12 is a plan view of this embodiment of the invention;

Fig. 13 is a plan view of a nut of the type employed with flexible conduit connectors;

Fig. 14 is a side view thereof;

Fig. 15 is a sectional view of a bushing or nut of the type normally employed with rigid conduit; and

Fig. 16 is a plan view of same.

Referring to the accompanying drawings and particularly to Figs. 1 to 3, the embodiment of the invention shown in these figures comprises a tubular shank 20 which carries at one end a tool head 21 adapted to cooperate with conduit entering the bottom of the box, and at the other end a head 22 adapted to cooperate with conduit entering the side of the box. The head 21 is rigidly secured to the shank 20 by means of a collar 23 and the shank 20 is preferably provided with a rod 24 at an intermediate point so that the shank may be rotated. The rod 24 is rigidly mounted on the shank 20 and projects on either side thereof as shown in Fig. 2. It is to be noted that the end of the shank 20 on which the collar 23 is mounted is left open so that conductors 25 projecting into the box may be passed into the tubular stem and located there while the nut is being threaded onto the connector or conduit carrying said conductors.

The head 22 is rotatably mounted on the shank 20, which is pressed flat at the end adjacent to the head 22 as shown at 26 in Fig. 2. The flattened portion 26 is provided with an opening 27 which receives a shouldered bushing 28. The outer shoulder of the bushing 28 engages the inner face of the base of the head 22. The inner shoulder of the bushing 28 rests upon one of the faces of the flattened portion 26, the distance between these shoulders being sufficient to insure the mounting of the head 22 in readily rotatable manner. The bushing 28 is secured to

the flat portion 26 of the shank 20 by swedging over the outer end of the bushing as indicated at 29. As will readily be seen in Fig. 2 the bushing 28 is provided with an opening sufficiently large to accommodate the conductors 25 while a nut of appropriate type is being applied to the conduit connector of the conduit carrying the conductors 25.

The nut engaging elements of the heads 21 and 22 are substantially the same with the exception of a modification of the latter which will hereinafter be referred to. These heads are adapted to cooperate with two types of nut which are ordinarily employed, one in connection with flexible conduit connectors and the other with rigid conduit. The nut employed with flexible conduit is shown in Figs. 13 and 14 being designated 30. This nut is formed from sheet metal and is relatively thin. It is provided with an internally threaded opening 31 whereby it is adapted to be screwed onto the end connector 32 which is mounted in the usual manner on the armor of the flexible conduit 33 at the end thereof. The periphery of the nut 30 comprises arcuate portions 34 which are spaced apart by peripheral lugs 35 which serve as means for rotating the nut during its application.

The form of nut normally employed with rigid conduit is shown in Figs. 15 and 16, the nut being designated 36. This nut is relatively deeper and is provided at its outer end with a flange 37 which provides a smooth surface and protects the insulated conductors from damage by the sharp edges of the conduit. At its inner end the nut 36 is provided with a flange 38 which projects outwardly from the threaded interior surface 39 so as to provide an abutment which bears against the face of the box around the opening therein. The nut 36 is provided with longitudinal ribs 40 which extend from the flange 38 to the outer face of the nut. In the usual construction eight ribs 40 are provided leaving peripheral spaces 41 between them. The nut 30 is provided with four lugs 35 so that the nut 36 is provided with twice as many ribs 40 as is the nut 30 with lugs 35.

In order to provide the heads 21 and 22 with means for cooperating with both these nuts I provide the head with an outwardly projecting cylindrical wall which is slotted longitudinally to provide eight slots 42. The inner diameter of the cylindrical wall is such that it readily receives the nut 36, the ribs being located in the slots 42 and the cylindrical elements 43 extending into the spaces 41 between the ribs 40. The engagement between the cylindrical elements 43 and the ribs 40 is such that when the head is rotated the nut 36 is positively turned.

Each alternate cylindrical element 43 is cut away as shown in Fig. 1 so as to permit the nut 30 to be inserted in the head in the position shown in Fig. 2, the lugs 35 resting upon the outer ends of the short cylindrical elements 43 and the intermediate peripheral surfaces 34 lying in juxtaposition with the inner sides of the elongated cylindrical elements 43. In order to hold the nuts in position upon the tool during the initial operations of applying them to the conduit, I may provide a spring 44 on the head, as shown in Fig. 3. This spring may be secured to one of the longer cylindrical elements 43 on the outer side thereof, and may pass over the ends of the adjacent short cylindrical elements 43 into the position normally occupied by the nuts. It will readily be understood that when the nuts are inserted in the head the spring 44 is displaced in such a manner that the nut is resiliently held in position until it is located upon the conduit and the tool is withdrawn.

The operation of the tool will readily be understood from the foregoing description. When operating upon the bottom of the box the head 21 is used, the nut being inserted thereinto in the manner described above. The head 21 is then inserted into the box so as to bring the nut into cooperative relation with the conduit or conduit connector on which it is to be threaded. This mounting is effected by rotating the shank 20, the rod 24 being employed to tighten the nut. The method of applying the nut to the side of the box is shown in Fig. 2, which also shows the normal manner of mounting the box 45 in old work. In this case the rotatable head 22 is employed and this head is rotated by means of a screwdriver 46, or other suitable tool which may be inserted into the box. In order to provide more effective space for the engagement of the tool 46 in the slots 42, I prefer to chamfer the cylindrical elements 43 on the head 22 as shown at 47. It will be noted from Fig. 2 that the effective depth of the box is increased by the plaster 48, the box being normally mounted upon the latch 49 on the inner side of the plaster, thus making the mounting of the nuts a difficult operation. The improved tool constructed according to the invention obviates this difficulty in a simple, effective, and expeditious manner.

In Figs. 4 to 9 inclusive I have illustrated a further embodiment of my invention employing a head 50 of the type described above. The nut engaging elements of the head 50 are similar to those of the heads 21 and 22 and similar reference numerals have been applied thereto. The head 50 comprises a hollow sleeve 51 which carries a block 52 at the end remote from the nut engaging elements. The head 50 is rotatably mounted in an opening 53 in a two-part block 54 which is assembled around the sleeve 51 and is held together by screws 55. The block 54 is of a width which enables it to enter snugly between the block 52 and the base 56 which connects the cylindrical elements 43 to the sleeve 51. The block 54 is cut away to provide opposite flat faces 57 which are adapted to engage arms 58 which extend outwardly from the hollow stem 59. The block 54 is pivotally mounted between the arms 58 by means of screws 60 so that it may be rotated relatively to the stem 59 so as to adapt the head for use with conduits entering the sides and the bottom of the box. These positions of adjustment are shown in Figs. 5 and 8. The block 52 is preferably square so that when the head is located as shown in Fig. 8 rotation of the head with respect to the stem 59 is prevented. It will readily be seen from Fig. 8 that when the head is in this position the sleeve 51 and the hollow stem 59 are in alignment so that they may receive the conductors 25 which may extend from the conduit being secured. The stem 59 carries at its outer end a pistol grip 61 whereby the tool may be rotated on the axis of the stem.

In order to retain the head in postion for operation on the sides of the box, that is in the position of adjustment shown in Figs. 4, 5 and 9, I mount a leaf spring 62 on the outer side of the lower arm 58. This spring presses upon a plunger 63 which extends through said arm and is provided with an inner rounded end which is adapted to enter a recess 64 provided in the lower face 57.

A pusher rod 65 is adapted to effect the rotation of the head 50 when in this position of adjustment. This rod is slidably mounted in guide elements 66 and 67 mounted on opposite ends of the stem 59 and is provided at its inner end with a point 68 which is adapted to enter the slots 42 in the head and effect the rotation of the head when the pusher rod is pressed inwardly by means of the button 69 carried on the outer end of the rod. Adjacent the guide members 67 the rod 65 is provided with a recess 70 and a pin 71 extending between the guide members 67 is located within this recess so that it engages the end walls thereof so as to limit the longitudinal movement of the rod 65 in both directions. The rod 65 is normally maintained in the retracted position shown in Fig. 4 by means of coil spring 72 which is connected to the rod 65 and to the stem 59 at a position rearwardly and below its point of connection to the rod 65. It will readily be understood that as the rod 65 is pushed inwardly, its inner end rises somewhat due to the point 68 being carried around with the head 50. This manner of mounting the spring 72 results not only in its retraction rearwardly but also results in the point 68 being drawn downwardly so as to enter the next slot 42. It is preferred to provide a spring-pressed pawl 73 which is adapted to cooperate with the slots 42 and prevent return movement of the head 50. The nose 74 of the pawl 73 is of substantially V-shape and is adapted to position the head 50 accurately so as to insure entry of the point 68 of the bar 65 in the appropriate slot 42. It will readily be understood that in this position of adjustment the head 50 can readily be rotated in the desired direction by appropriate reciprocation of the bar 65.

In Figs. 10 to 12 I have illustrated an embodiment of the invention which is adapted for use with nuts of the type shown in Figs. 15 and 16. This embodiment comprises a pistol-grip handle 75 which carries forwardly extending spaced side plates 76 and 77, which are held together in spaced relationship by means of rivets 78 provided with spacer washers 79. At its forward end the plate 77 carries an inwardly directed mandrel 80 upon which the nut 36 is adapted to be placed in the manner shown in Fig. 10. The plate 76 is cut away at its forward end to permit the nut to be applied in this manner. The mandrel 80 is of a diameter slightly less than that of the flange 37 so that the nut may be freely rotated thereon. The projecting end of the mandrel 80 is preferably curved so as to enable it to enter readily into the open end of the conduit 81.

The nut 36 is rotated by a pusher-bar 82 which is located between the side plates 76 and 77 which form side guides therefor. The rear end of the bar 82 projects beyond the handle 75 and is provided with a button 83 whereby it may be pressed inwardly by the thumb as shown in Fig. 10. Adjacent its rear end the bar 82 is guided between the upper surface 84 of the central element 85 of the handle 75 and by one of the rivets 78 and its washer 79, which extend through a slot 86 on the upper side of the bar so as to limit its movement in both directions. Adjacent its forward end the bar 82 is supported on its under side by one of the rivets 78, when the bar is in its retracted position. A spring 87 located between the side plates 76 and 77 and secured to the bar 82 and one of the washers 78 tends to cause the bar 82 to be held in its retracted position with its forward end resting on one of the washers 79. The forward end of the bar 82 is pointed as shown at 88 and is cut away on its under side adjacent said point as shown at 89. When the bar 82 is pressed inwardly the point 88 is brought into engagement with the ribs 40 on the nut 36 and this nut is thereby rotated in the appropriate direction for engagement with the threaded end of the conduit 81. The forward end of the bar 82 is free to elevate to enable the point 88 to follow the periphery of the nut during its rotation. When the bar 82 is released the spring 87 causes its retraction and return to its lowest position so that the next forward movement of the bar causes it to engage the next rib 40 and so forth until the nut is screwed up.

In order to prevent return movement of the nut 36 I prefer to mount a pawl 90 between the side plates 76 and 77, this pawl being pressed by a leaf spring 91 so as to cause the nose 92 of the pawl to engage the ribs 40 as the nut is rotated. The pawl 92 is of such shape that it permits rotation of the nut in clockwise direction and prevents rotation in the opposite direction. If desired the pawl may be located so that it normally engages the wall of the nut between the ribs 40 so that it serves to hold the nut upon the tool against accidental removal. The outer edge of the pawl 90 may be chamfered slightly adjacent its operating point 92 as shown at 93 to permit easy application of the nut to the tool.

The operation of this embodiment will readily be understood since it is closely analogous to that of the embodiment last described, in the position of adjustment shown in Fig. 4, the present embodiment however acting directly upon the nut 36.

Although the invention has been disclosed in connection with the specific details of preferred embodiments thereof, it must be understood that such details are not intended to be limitative of the invention except insofar as set forth in the accompanying claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In a wrench, a nut engaging head comprising cylindrical members separated by slots adapted to accommodate the ribs of a rigid conduit type nut, said cylindrical members being alternately long and short to accommodate a flexible conduit type nut.

2. In a wrench, a nut engaging head comprising cylindrical members separated by slots adapted to acommodate the ribs of a rigid conduit type nut, said cylindrical members being alternately long and short to accommodate a flexible conduit type nut, said head being provided with an axial opening to receive the conduit conductors.

3. In a wrench, a nut engaging head comprising cylindrical members separated by slots adapted to accommodate the ribs of a rigid conduit type nut said cylindrical members being alternately long and short to accommodate a flexible conduit type nut, and resilient means adapted to bear against said nuts in alignment with the projecting portions of the longer members and hold same to the head.

4. In a wrench, in combination, a head adapted to engage a conduit nut, a bearing for the head, a shank pivotally supporting said bearing whereby the head may be operably located in alignment with the shank and at right angles thereto, and means carried by the shank having an off-center engagement with the exterior of the head adapted to be reciprocated manually to

rotate the head relative to the shank when the head is located at right angles to the shank.

5. In a wrench, in combination, a head adapted to engage a conduit nut, a bearing for the head, a shank pivotally supporting said bearing whereby the head may be operably located in alignment with the shank and at right angles thereto, a reciprocating rod having an off-center exterior engagement with the head when said head is at right angles to the shank, said rod being carried by the shank and being adapted to rotate the head by manual reciprocation, and a pawl adapted to cooperate with the head.

6. In a wrench, in combination, a body member adapted to be projected into a wall box, a nut engaging head comprising cylindrical members separated by slots adapted to accommodate the ribs of a rigid conduit type nut, said cylindrical members being alternately long and short to accommodate a flexible conduit type nut, and a reciprocable push rod mounted on the body member adapted to effect rotation of the nut engaging head.

7. In a wrench, in combination, a body member adapted to be projected into a wall box, a nut engaging head comprising cylindrical members separated by slots adapted to accommodate the ribs of a rigid conduit type nut, said cylindrical members being alternately long and short to accommodate a flexible conduit type nut, a reciprocable push rod mounted on the body member adapted to effect rotation of the nut engaging head, and a pawl adapted to prevent reverse movement of the head.

8. In a wrench, in combination, a head adapted to engage a nut, a bearing for the head, a shank pivotally supporting said bearing whereby the head may be operably located in alignment with the shank and at right angles thereto, means preventing relative rotation between the shank and head when same are located in alignment, and a reciprocable push rod carried by said shank, said rod having an off-center engagement with said head when the head is at right angles to the shank, and being adapted to be actuated manually on the shank to cause rotation of the head relative to the shank.

WILLIAM ROSE.