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F. S. CAMERON ET AL

1,890,213

OPEN ENDED REVERSIBLE RATCHET WRENCH

Filed March 9, 1931

Fig. 1.

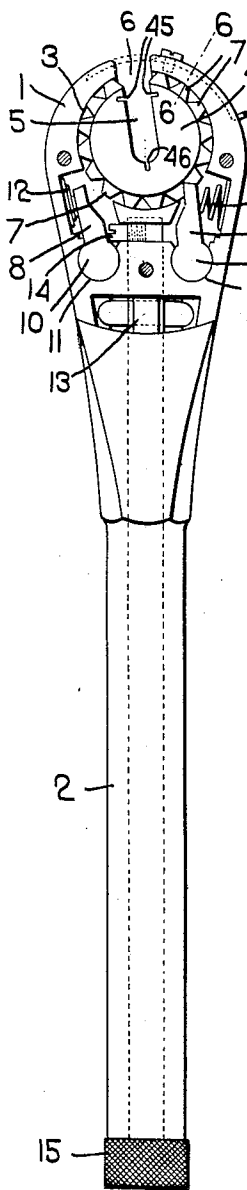


Fig. 2.

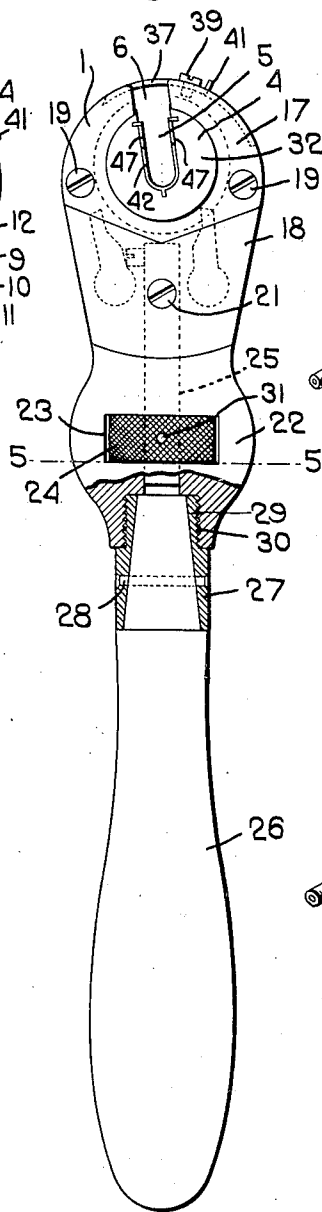


Fig. 3.

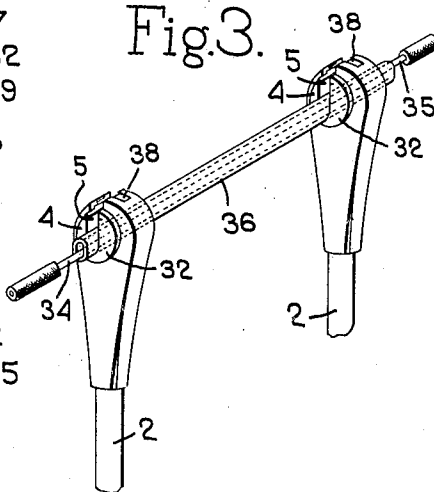


Fig. 4.

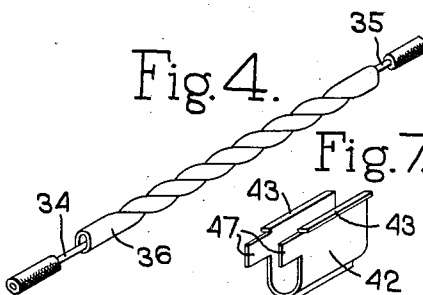


Fig. 7.

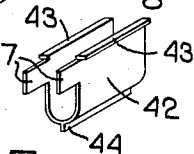


Fig. 5.

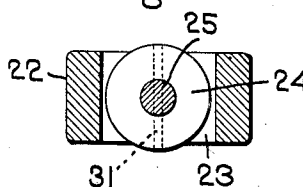
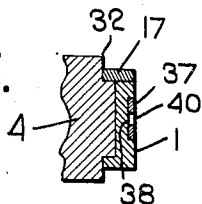


Fig. 6.



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UNITED STATES PATENT OFFICE

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OPEN-ENDED REVERSIBLE RATCHET WRENCH

Application filed March 9, 1931. Serial No. 521,162.

This invention relates to an open-ended reversible ratchet wrench and has for its general object to provide a tool of this type which is specially designed for use in splicing electric conductors by twisting the connector sleeve which is used in making such splice.

Other objects of the invention are to provide a tool of this type in which the ratchet-reversing means is in the form of a rod which extends lengthwise of the handle thereof; to provide a tool of this type which is equipped with a gate by which the open end of the wrench may be closed if desired; to provide a novel means for varying the size of the open-ended socket opening in the socket member, and to otherwise improve tools of this type in the particulars more fully hereinafter set forth.

In the drawing wherein we have illustrated some selected embodiments of our invention, Fig. 1 is a view of an open-ended reversible ratchet wrench embodying our invention, said view illustrating the wrench with the cover plate removed;

Fig. 2 is a view of a different form of wrench embodying our invention;

Fig. 3 shows how the open-ended wrench may be used for twisting the connector sleeve used in splicing wire conductors;

Fig. 4 is a view showing the splice after it has been made with our improved tool;

Fig. 5 is a section on the line 5—5, Fig. 2;

Fig. 6 is a section on the line 6—6, Fig. 1;

Fig. 7 is a perspective view of a liner member adapted to be inserted in the socket opening for varying the size thereof.

The tool shown in Fig. 1, which represents one embodiment of our invention, comprises a head member 1 which is provided with a handle 2 by which the wrench is manipulated and which is also provided with a socket-receiving chamber 3 in which is rotatably mounted the socket member 4. The socket member 4 has the socket opening 5 to receive the article to be turned. This socket opening 5 extends from the periphery of the socket member 4 inwardly in a radial direction to a point slightly beyond the center of the socket. In other words, the socket opening

5 is open at the periphery of the socket member 4.

The head member 1 is provided with an opening 6 extending radially through the wall thereof and adapted to be aligned with the socket opening 5 when the socket is in the correct angular position as shown in Figs. 1 and 2. With the openings 5 and 6 thus in alignment the article to be turned with the wrench can be entered into the socket opening 5 through the entering slot 6 in the head.

A suitable ratchet mechanism is provided for rotating the socket member 4 and in the illustrated embodiment of the invention the ratchet mechanism is a reversible ratchet mechanism similar to that employed in some reversible ratchet wrenches so that the socket member 4 can be turned in the head 1 in either direction.

The socket member 4 is provided on its periphery with a plurality of teeth 7 and the head member is provided with two spring-pressed pawls 8 or 9, either one of which may be moved into operative engagement with the teeth 7. Each pawl has a rounded end 10 which is received in a corresponding recess 11 formed in the head member. This rounded end 10 and recess 11 provide a pivotal connection which allows the pawl to swing into and out of operative position. Each pawl is acted upon by a spring 12 which tends to throw it into operative position.

A shipper member which extends in the direction of the length of the handle is provided for throwing either pawl out of operative position depending upon which direction it is desired to turn the socket member.

This shipper member is in the form of a rod 13 which extends in the direction of the length of the handle and is provided at its inner end with a lateral projection or pin 14 adapted to engage the inner face of one or the other of the pawls as the shipper rod is turned thereby to throw said pawl backwardly and into inoperative position. The pawl which is not acted on by the shipper pin 14 will be automatically thrown into operative position by its spring 12. With this construction a half rotation of the rod 13 will serve to reverse the pawls.

In Fig. 1 the shipper rod extends the full length of the handle 2 and is provided at the end of the handle with a knurled head 15 by which the rod may be turned. In the construction shown in Fig. 2 the handle portion of the wrench is made somewhat differently than in Fig. 1. In Fig. 2 the body of the wrench is enlarged somewhat at 22 and this enlargement is provided with an opening 23 in which is received a knurled collar 24 through which the shipper rod 25 extends and which is fastened to said shipper rod by means of a pin 31. In this embodiment of the invention the handle 26 of the wrench may be of wood or some other suitable insulating material and as herein shown said handle is formed at its inner end with a ferrule 27 which is secured thereto in some suitable way as by the rivet 28 and this ferrule has an exteriorly screw-threaded end 29 which screws into a screw-threaded socket 30 formed in the end of the enlarged portion 22 of the wrench.

The shipper rod 25 terminates just beyond the knurled collar 24 and the latter is of sufficient size to project through the opening 23 on opposite sides of the wrench so that it can be readily manipulated to turn the shipper rod and thereby actuate the pawls.

The wrench head is made with a removable cover plate which retains the socket member and pawls in place and which when removed provides access to the socket member, pawls, springs and shipper mechanism as seen in Fig. 1. In the illustrated embodiment of the invention this cover plate is made in two sections 17 and 18. The cover section 17 has an opening through which the hub portion 32 of the socket member 4 extends, said section overlying the toothed portion of the socket member and thus retaining the latter in position. This cover section 17 is shown as retained in place by suitable screws 19.

The other cover section 18 covers the pawls and springs and retains them in place. The cover section 16 is retained in position by a suitable screw 21. By removing the cover section 17 the socket member 4 is exposed so that it can be readily removed and replaced by another socket section having a different size socket opening and this operation can be accomplished without uncovering the pawls and springs. If it is desired to obtain access to the pawls and springs or to the shipper mechanism then the cover section 18 may be also removed without disturbing the cover section 17 which retains the socket member in place.

By thus making the cover plate in two sections it is possible to effect a change of the socket member without danger of having the springs or pawls becoming displaced or lost.

The herein-described wrench has been specially designed for use in twisting the con-

ductor sleeve which is commonly used in splicing wire conductors used for communication or power transmission. One common way of splicing two conductors, as for instance the two conductors 34 and 35, is to remove the insulation from the ends of the conductors which are to be spliced, then to insert the bared ends of the conductor wires into opposite ends of a connector sleeve 36 as shown in Fig. 3. The sleeve 36 is then twisted as shown in Fig. 4, this twisting serving not only to lock the two overlapping ends of the wires firmly into the sleeve but also to make a satisfactory electrical connection. In thus splicing two conductors one end of the sleeve may be held by means of a clamp or any other appropriate device and a tool embodying our invention may be applied to the other end of the sleeve by entering the sleeve into the aligned slots 6 and 5 and said tool can then be operated to ratchet the socket member 4 around in the socket-receiving chamber 3, this operation involving a back and forth pumping movement of the handle 2 or 26 and resulting in twisting the connector sleeve 36 as shown in Fig. 4. Or, if desired, two tools may be employed, one to be applied to each end of the sleeve 36 as shown in Fig. 3. In the latter case if two tools are employed, one tool will be set to ratchet in one direction and the other will be set to ratchet in the opposite direction and by grasping the handles of the two tools and pumping said handles back and forth in opposite directions the sleeve will be twisted as shown in Fig. 4 thereby making the desired splice. This operation of twisting the sleeve is very quickly and easily done by means of the tool herein described.

This splicing of the wires is frequently done after the wires are strung on the pole and the wires to be spliced may be in proximity to other wires which are carrying current. Under these conditions the use of a tool with a woden handle 26 or with a handle which is insulated, has advantages because it obviates the danger of the operator short circuiting any circuit by accidentally hitting the handle against a live wire.

Our improved wrench is also provided with a gate by which the slot 6 may be closed thereby to prevent the wrench from dropping off from the connector sleeve while in use. This gate is shown at 37 and it is illustrated as being mounted in a groove 38 formed in the periphery of the head 1. This gate may be curved to correspond to the curvature of the periphery and is adapted for sliding movement back and forth in the groove 38 from the open position shown in Fig. 1 to the closed position shown in Fig. 2.

The gate is retained in position by means of a screw 39 which screws into the head and operates through a slot 40 with which the gate is provided. The gate is shown as

provided with a finger piece or projection 41 by which it may be manipulated.

The connector sleeves 36 which are used for splicing wires vary in size somewhat and in order to provide a device which may be used for connector sleeves of different sizes without the necessity of replacing the socket member 4 we have provided a construction wherein the socket opening 5 may be provided with liner elements of different thicknesses. Such a liner element is shown at 42 in Fig. 7. This has a U-shaped construction which is adapted to be set into the socket opening 5 and in order to hold it in position the liner element is formed with a flange 43 at each top edge and with a flange 44 at the bend which are adapted to be received in notches or grooves 45 and 46 with which the socket member 4 is provided.

These liner elements may be made of metal of different thicknesses so that as the different liner elements are placed in the opening 5 the transverse dimension of said opening will be correspondingly varied.

Each liner element is shown as having two extensions 47 which project beyond the end of the socket member and by means of which the liner may be manipulated. These liner elements can be inserted into place edgewise and they preferably will be of spring metal and so constructed that when in place the resiliency of the metal will force the sides of the liner against the side walls of the opening 5 thereby assisting to frictionally hold said liner in place.

For the larger sizes of sleeve the socket member 5 may be used without the liner as shown in Fig. 1. For an intermediate size of sleeve a liner with thin walls may be employed, for a smaller size of sleeve a liner with a still thinner wall may be employed. By this means it is possible to give the opening 5 of the socket member the correct dimension to fit any particular sleeve 36.

We claim.

1. An open-ended ratchet wrench comprising a head member having a socket-receiving chamber, a handle extending from the head member and having the portion which is grasped when the wrench is operated of insulating material, a socket member rotatably mounted in said chamber and provided with a socket opening which leads to and is open at the periphery of said socket member, said head member having a radial opening through the wall thereof with which the socket opening may be aligned to permit the article to be turned to be entered into the socket opening in a radial direction, pawl and ratchet connection between the socket member and the head member and a U-shaped liner element resilient in a transverse direction insertable edgewise into said socket opening and which by its presence in said

opening reduces the transverse dimension thereof.

2. An open-ended ratchet wrench comprising a head member having a socket-receiving chamber, a handle extending from the head member, a socket member rotatably mounted in said chamber and provided with a socket opening which leads to and is open at the periphery of said socket member, said head member having a radial opening through the wall thereof which has a width less than the diameter of the socket member and with which the socket opening may be aligned to permit the article to be turned to be entered into the socket opening in a radial direction, said socket member having peripheral teeth, pawls carried by the head member for engagement with said teeth, means for throwing either pawl into or out of operation, the portions of the head member on the opposite sides of the radial opening being rigid and fixed relative to each other and a gate movably carried by one of said portions and adapted in one position to close the slot in the head member.

3. An open-ended ratchet wrench comprising a head member having a socket-receiving chamber, a handle extending from the head member, a socket member rotatably mounted in said chamber and provided with a socket opening which leads to and is open at the periphery of said socket member, said head member having a radial opening through the wall thereof with which the socket opening may be aligned to permit the article to be entered into the socket opening in a radial direction, said socket member having peripheral teeth, pawls carried by the head member for engagement with said teeth, a pawl-reversing shipper rod extending in the direction of the length of the handle and adapted by its turning movement to render either pawl inoperative, a collar fast on said rod and operating in an opening formed in the wrench body, said collar being exposed on opposite sides of said body, whereby the shipper rod may be readily actuated.

4. An open-ended ratchet wrench comprising a head member having a socket-receiving chamber, a handle extending from the head member, a socket member rotatably mounted in said chamber and provided with a socket opening which leads to and is open at the periphery of said socket member, said head member having a radial opening through the wall thereof with which the socket opening may be aligned to permit the article to be turned to be entered into the socket opening in a radial direction, a pawl and ratchet connection between said socket member and said head, and a U-shaped liner element resilient in a transverse direction and insertable edgewise into said socket opening and which by its presence in said opening reduces the transverse dimension

thereof, the resiliency of said liner producing frictional engagement between the sides of the liner and the sides of the socket opening which resists edgewise movement of the liner in said opening.

5. In an open-ended ratchet wrench comprising a head member having a socket-receiving chamber and pawl-receiving recesses, a handle extending from said head member, a socket member rotatably mounted in said chamber and provided with a socket opening which leads to and is open at the periphery of said socket member, said head member having a radial opening through the wall thereof with which the socket opening may be aligned to permit the article to be turned to be entered into the socket opening in a radial direction, said socket-receiving chamber being open at one side of the head to permit the socket member to be inserted into or removed from the chamber, said socket member having peripheral teeth, pawls mounted in said pawl-receiving recesses for engagement with said teeth, and means to reverse the pawls, and a two-part removable cover plate for closing the pawl-receiving recesses and retaining the pawls therein and also for retaining the socket within the socket-receiving chamber, said plate being made in two independently-removable sections, one of which retains the pawls in position and the other of which retains the socket in place, whereby when one of said sections is removed the socket can be exchanged without releasing the pawls and when the other sections are removed the pawls are accessible without removing the socket member.

In testimony whereof, we have signed our names to this specification.

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ALLAN B. JONES.

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