May 26, 1942. S. J. IRWIN ET AL 2,283,996

ELECTRODE HOLDER

Filed May 25, 1940

Fig. 2.

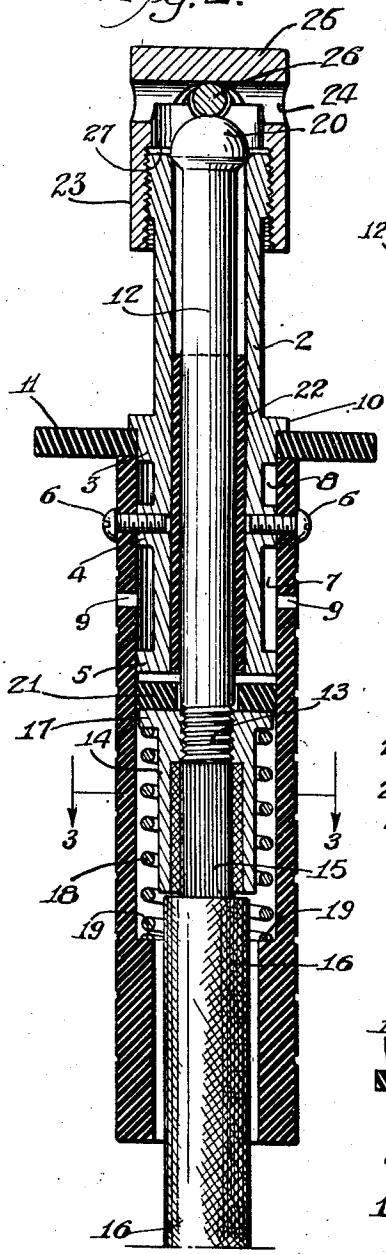


Fig. 4.

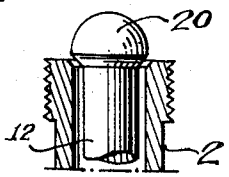


Fig. 3.

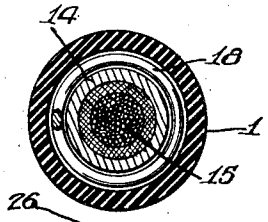


Fig. 5.

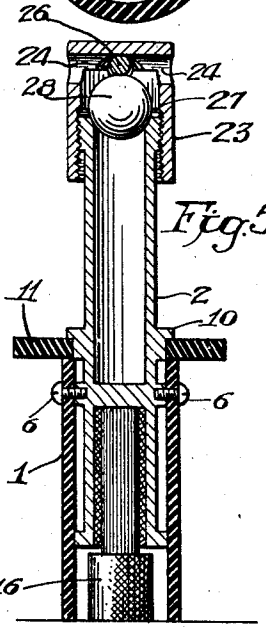
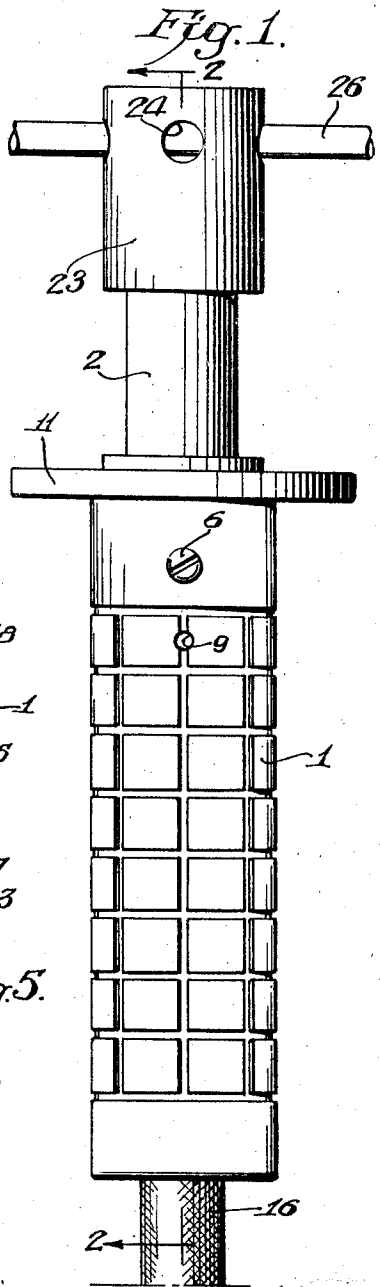


Fig. 1.



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ELECTRODE HOLDER

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3 Claims. (Cl. 219—8)

This invention relates to improvements in electrode holders of the type used in electric welding, and a principal object of the invention is to provide a holder of this type which shall be more adequately and effectively insulated than the holders of the prior art.

More particularly, an object of the invention is to provide a holder wherein the insulation is confined to the areas of the holder which are least subject to excessive overheating during the welding operations, and wherein at the same time the outer terminal or electrode-holding tip of the holder will be prevented from arcing if brought into contact with a metal object unless an electrode is secured in the holder.

Still more specifically, an object of the invention is to provide a holder of the type set forth wherein the outer terminal or electrode-holding tip of the holder is disconnected from the source of current except when a welding rod or electrode is secured in the holder.

Still another object of the invention is to provide a holder having generally improved structural and functional characteristics, including a more effective means for clamping the welding rod or electrode in place.

In the attached drawing:

Figure 1 is an elevational view of a holder made in accordance with our invention;

Fig. 2 is a longitudinal section on the line 2—2, Fig. 1;

Fig. 3 is a transverse section on the line 3—3, Fig. 2;

Fig. 4 is a fragmentary view of the outer terminal end or tip of the holder illustrating a functional detail of the device, and

Fig. 5 is a reduced longitudinal sectional view illustrating a modification within the scope of our invention.

With reference to the drawing, the holder therein illustrated comprises a tubular handle 1 of suitable insulating material, to one end of which is secured a metal sleeve 2. In the present instance, this sleeve is provided with spaced integral collars 3, 4 and 5 which engage the inner wall of the tubular handle 1, and the collar 4 is provided with tapped holes for reception of screws 6 by means of which the sleeve 2 is secured rigidly in the handle element. Between the collars air spaces 7 and 8 are formed in the interior of the handle 1 and between the handle and the sleeve 2, and these spaces may be vented to the atmosphere by means of holes 9 in the handle element. The collar 3 is flanged at its outer end as indicated at 10, and this flange forms a bearing for a disk 11 of insulating material which extends outwardly beyond the handle element 1, and is confined between the end of the said element and the flange 10 as illustrated.

Extending through the sleeve 2 is a metal rod 12, to the inner end of which is attached, by means of threads 13, a sleeve 14. The hollow end of the sleeve 14 forms a socket for reception of the exposed end 15 of an insulated electric cable 16 through which the electric energy is carried to the holder. The exposed end 15 of the cable is secured in the socket by soldering or by other suitable means. The sleeve 14 is flanged at 17, and this flange forms a seat for a spring 18, the other end of which is seated on a shoulder 19 in the handle element 1, and this spring exerts a pressure tending to force the rod 12 outwardly through the sleeve 2 so that the outer spherical end 20 of the rod is lifted away from the proximate end of the sleeve 2 upon which, under circumstances hereinafter described, the said tip is adapted to seat. An insulating washer 21 is interposed between the sleeve 14 and the proximate end of the sleeve 2, and this washer is dimensioned so as to afford clearance between the sleeve 14 and the inner end of the sleeve 2 to permit the aforedescribed movement of the rod 12 under action of the spring 18. It is apparent that the washer 21 constitutes a stop which limits the extent to which the rod 12 may be moved outwardly in the sleeve 2.

Interposed between the sleeve 2 and the rod 12 is a sleeve 22 of insulating material, this sleeve being suitably secured in the sleeve 2 and terminating well short of the outer end of the latter. It is apparent that by reason of this insulating sleeve 22 and the washer 21, the sleeve 14 and the rod 12 are prevented from contacting the sleeve 2 except when the spherical tip 20 of the said rod is seated against the outer end of the sleeve 2, as illustrated in Fig. 2.

Threaded on the outer terminal end of the sleeve 2 is a metallic cap 23, and this cap is provided towards its outer end with transverse openings 24, 24 for reception of the welding rod or electrode. The openings 24 intersect each other and pass in part through the solid end wall 25 of the cap 23, so that the electrode 26 when inserted in either of the openings 24 may have a solid seat or bearing against the said end wall 25 of the cap. If after insertion of the end of the electrode in one of the openings 24 the cap is screwed down upon the sleeve 2, the rod is brought first into engagement with the spherical

tip 20 of the rod 12, and thereafter, if the turning of the cap is continued, the rod 12 will be forced inwardly against the pressure of the spring 18 until the said spherical tip 20 is forced solidly against its seat on the outer end of the sleeve 2. The solid engagement of the spherical tip 20 with the rod produces a highly efficient clamping action which binds the rod solidly in position in the holder and precludes movement or accidental displacement of the rod in and from the holder.

When the rod 26 first engages the tip 20 of the rod 12, the only access which the electrical current has to the sleeve 2 is through the walls of the cap 23; but when the cap 23 has been screwed down on the sleeve to an extent forcing the tip 20 into seating engagement with the sleeve 2, there is a direct path for electrical current to the said sleeve. In other words, when the parts are in the relative positions shown in Fig. 2, the path for the electrical current to the electrode or rod 26 is not only directly through the rod 12 but also through the upper end of the sleeve 2 and the cap 23, so that the resistance to the passage of current to the electrode is materially reduced and the heating of the entire terminal end of the holder correspondingly reduced. It will be noted further that the threads of the cap 23 terminate in a shoulder 27, which by engagement with the outer end of the sleeve 2 limits the extent to which the cap may be turned inwardly on the sleeve. This shoulder stop is positioned so as to preclude direct contact between the rod 12 and the cap 23. At the times therefore when no electrode is inserted in the holder, the entire outer terminal end or tip of the latter, including the sleeve 2 and the cap 23, is disconnected from the source of current, and if under these circumstances the cap 23 or the sleeve 2 should come into proximity to or in contact with a grounded metallic body, there will be no arcing or burning, so that damage both to the metal body and to the holder is prevented under these circumstances.

It will be apparent that a holder made as described above is effectively insulated both as to the operator using the holder, and also against damage to the holder due to accidental arcing. It will be noted further that these objects are attained without extending the insulation elements to the area of the holder which is subjected to major heating in use, but are kept remote to this area so that the insulation is not subject to rapid deterioration from that cause. Still further, it is to be noted that the means for clamping the electrode in the holder while extremely simple in form is highly efficient and is capable of maintaining the electrode solidly in place under the most adverse conditions of use.

In this latter connection, we have illustrated in Fig. 5 a device utilizing this form of clamp in a holder which lacks the high degree of insulation described above. Such holders are relatively inexpensive and may be used under circumstances where a holder of the fully insulated type is not essential. In this case, the tubular insulated handle 1, the metallic sleeve 2, and the cap 23 are essentially the same as described above. The cable 16, however, in this case is connected directly to the sleeve 2 as illustrated. The rod 12 and the associated parts are eliminated and are replaced by a spherical element 28 which seats in the outer end of the sleeve 2. When a rod 26 is inserted in the cap 23 and the latter is threaded down on the sleeve 2, the rod is engaged by the spherical element 28, and is thereby clamped solidly in the holder in the manner previously set forth.

There may be other modifications without departure from the invention.

We claim:

1. In an electrode holder, an insulated handle, a metallic tip comprising a sleeve secured in said handle, a terminal element slidably mounted in the handle and extending through said sleeve, insulating material interposed between the sleeve and said element, a spring operatively connected with said element and operative to urge said element to an advanced position in which the outer extremity thereof extends beyond the end of the sleeve, and a cap on the outer end of said sleeve embracing the projecting extremity of the terminal element, said cap having an aperture for reception of an electrode and being adjustable longitudinally of the sleeve so as to bring said electrode into forcible engagement with the spring-pressed terminal element.

2. In an electrode holder, an insulated handle, a metallic tip comprising a sleeve secured in said handle, a terminal element slidably mounted in the handle and extending through said sleeve, said element being normally electrically disconnected from the sleeve, a spring operatively connected with said element and urging said element longitudinally of the sleeve into an advanced position in which the extremity of said element extends beyond the end of the sleeve, said extremity being enlarged and adapted in a retracted position of said element to seat upon the end of the sleeve, and a cap on the outer end of said sleeve embracing said enlarged extremity of the terminal element, said cap having an aperture for reception of an electrode and being adjustable longitudinally of the sleeve so as to bring said electrode into forcible engagement with the spring-pressed terminal element to thereby move said element to the said retracted position wherein the said enlarged extremity is seated upon the end of the sleeve.

3. In an electrode holder, an insulated handle, a metallic tip comprising a sleeve secured to said handle, a terminal element mounted in the handle and extending through said sleeve, said element being normally electrically disconnected from the sleeve, an apertured cap threaded on the outer end of said sleeve and embracing the extremity of said element, said cap constituting a means for clamping an electrode against the said extremity of the terminal element, and means for preventing direct contact of said cap with the terminal element.

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