

No. 626,352.

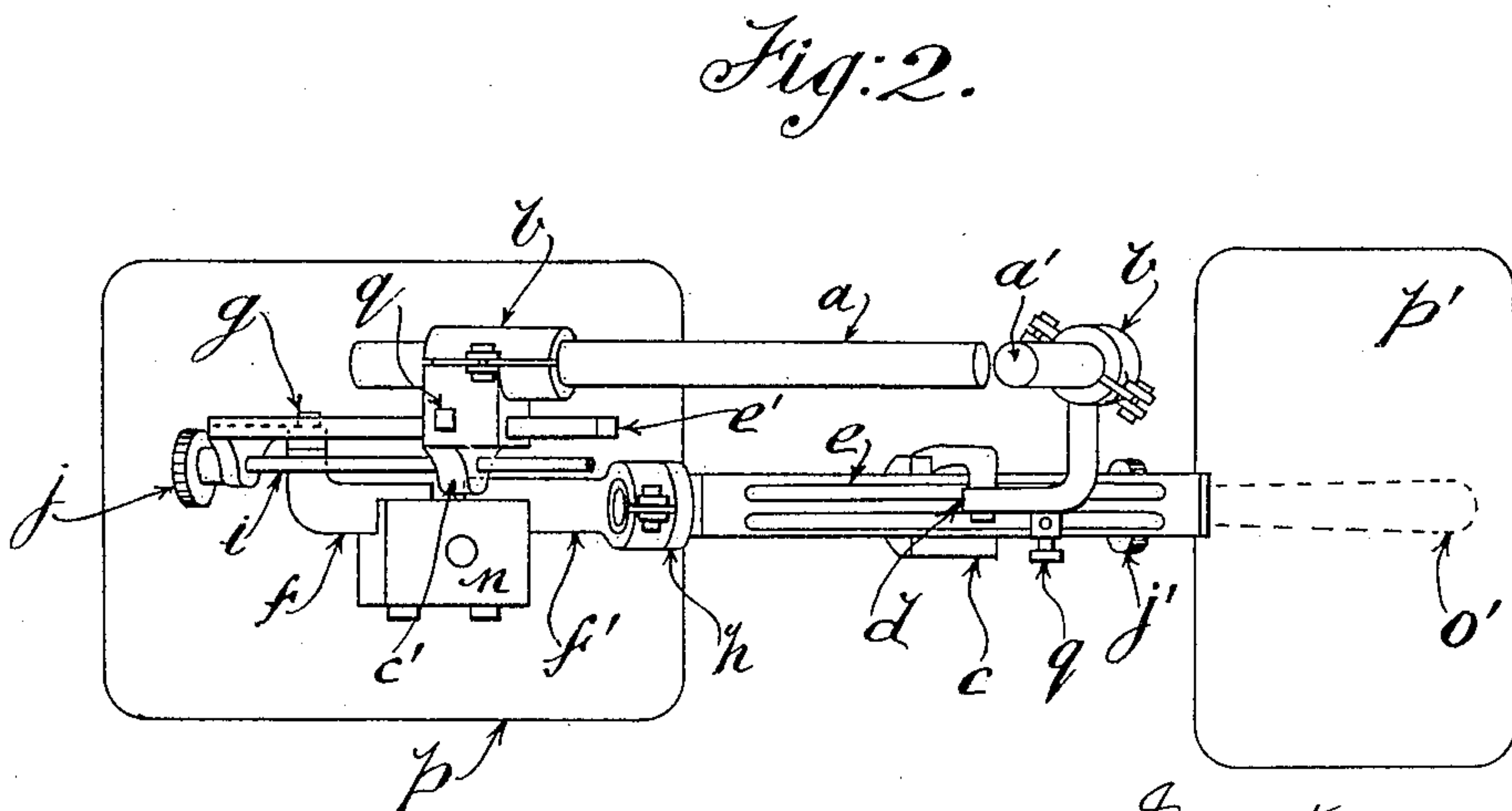
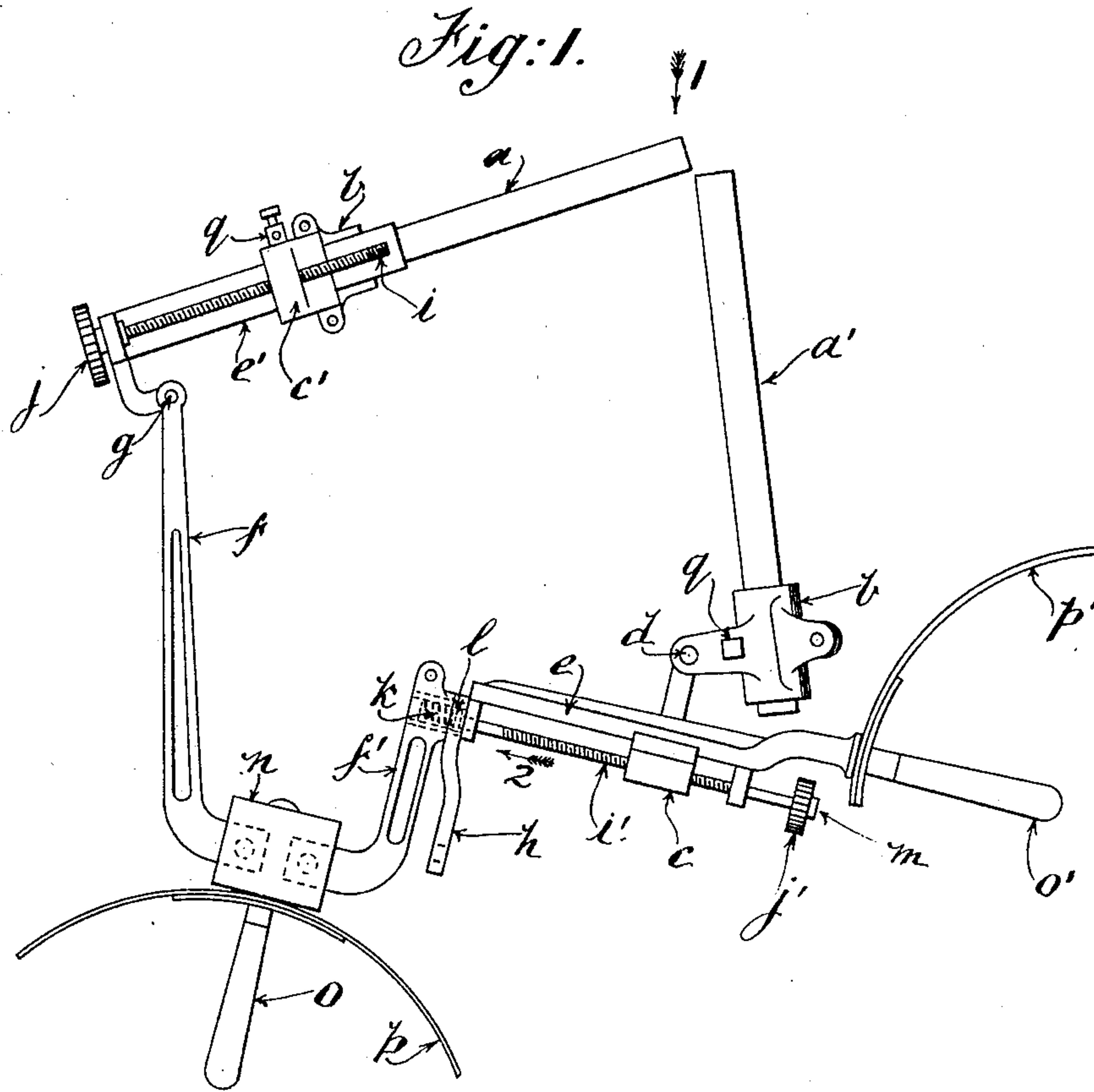
Patented June 6, 1899.

G. W. DE TUNZELMANN.

APPARATUS FOR HOLDING CARBONS FOR ELECTRIC WELDING.

(Application filed Jan. 6, 1899.)

(No Model.)



Witnesses.

*Benjamin Clark*

*Charles H. Briggs*

*George*

*Inventor.*  
*William, de Tunzelmann.*  
*per; E. Eaton.*  
*His Attorney*



# UNITED STATES PATENT OFFICE.

GEORGE W. DE TUNZELMANN, OF LONDON, ENGLAND.

## APPARATUS FOR HOLDING CARBONS FOR ELECTRIC WELDING.

SPECIFICATION forming part of Letters Patent No. 626,352, dated June 6, 1899.

Application filed January 6, 1899. Serial No. 701,375. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE WILLIAM DE TUNZELMANN, a subject of the Queen of Great Britain, and a resident of London, England, have invented certain new and useful Improvements in Apparatus for Holding Carbons for Electric Welding, (for which I have applied for a patent in Great Britain, No. 13,137, dated June 11, 1898,) of which the following is a full, clear, and exact specification.

In electric welding, brazing, or local heating, generally by means of an arc struck between a pair of electrodes in the form of rods, the effect of the current through the electrodes is to produce a magnetic field surrounding them, and unless the angle between the electrodes is exactly two right angles the effect of this magnetic field is to deflect the arc along the bisecting line of the angle between the electrodes. This effect increases as the angle between the electrodes is diminished from one hundred and eighty degrees to zero, when its effect is a maximum. Unless, however, the carbons are separated in part or entirely by an insulating substance I find it disadvantageous to make the angle between the electrodes less than about ninety degrees, as when the angle is made more acute the arc, instead of being formed entirely between the extremities of the electrodes, creeps up their sides, and the hottest part of the arc is formed between them instead of being thrown out, so that it can be directed upon the material to be welded, brazed, or locally heated for other purposes.

The apparatus devised for holding the electrodes is made of suitable material and of a shape so as to remove the arc as far as possible from the insulation and also to bring the center of gravity as near as possible to a point from which the tool can be suspended for convenience of manipulation and is so arranged that the distance of the electrodes from each other may be regulated as required, while remaining at right angles to each other, by means of sliding holders actuated by screws or the like. In order to strike the arc, one of these screws is so arranged that it can be moved in the direction of its length through a required distance, being maintained in its normal position by the action of a spring or other convenient means. As an example I

find that the following is a convenient arrangement of my apparatus: The two carbons or electrodes are held in clips which are attached to the sliding pieces which slide upon supports, and their position may be adjusted thereon by means of screws. The two supports are insularly connected to the frame, and the relative angle of the electrodes or carbons may be varied by adjusting the position of the clips on the sliding pieces. One of the sliding pieces is operated by means of a screw-spindle, so arranged and controlled by a spring as to allow a certain amount of movement for the purpose of strengthening the arc as required. Suitable handles are provided, which are protected by means of shields, for operating the apparatus, and in the event of its being too large or weighty to be conveniently held in the hands a link is provided at or about its center of gravity, by which it may be suspended. The current is supplied through suitable terminals attached to the apparatus.

Where it is important to make the magnetic directing force as strong as possible, the electrodes must be inclined at a small angle or be parallel to one another, so as to be able to get the arc into narrow apertures which cannot be reached by electrodes at right angles to each other. I place the electrodes at a very acute angle or parallel to one another, fix them in a suitable apparatus similar in principle to that already described, allowing of contact being made for striking an arc, a wedge or plate of refractory material being inserted between the electrodes to prevent the arc from creeping up the sides. Another method of effecting this purpose is to coat the electrodes or their adjacent portions with a layer of material sufficiently refractory to melt only when the arc itself reaches it and to fix the electrodes in the apparatus at a small angle, which may be diminished, if desired, until they become parallel.

Referring to the annexed drawings for purposes of illustration, Figure 1 is a plan view of my apparatus. Fig. 2 is an elevation looking in the direction of the arrow 1 in Fig. 1.

$a$  and  $a'$  are the carbon electrodes, which are held in the clips  $b$ . The clips  $b$  are attached to the sliding pieces  $c$  and  $c'$  and in the case of the sliding piece  $c$  by means of



the pivot-bolt *d*, and by this means it will be seen that the angle at which the carbons meet may be adjusted. The sliding pieces *c* and *c'* slide upon the supports *e* and *e'*. The support *e'* is secured to the frame *f* by means of the pivot-bolt or the like, so that the relative angle of the electrodes or carbons may be varied. The frame *f'* carries the support *e*, a pivoted link *h* or the like being provided for suspending the apparatus and so facilitating its use. The sliding piece *c'* is operated by the screw-spindle *i*, to which the milled bead or thumb-screw *j*, formed of insulating material, is secured. The screw-spindle *i'* operates the sliding piece *c* and has a certain amount of movement in the direction of the arrow 2.

*k* is a spring which tends to bring the screw *i'* and sliding piece *c* back to their normal position, and the end of the screw-spindle *i'* is provided with a collar or the like *l* for controlling the amount of its play or movement, *j'* being a thumb-screw for rotating the spindle *i* when desired for purposes of adjustment. By this means it will be seen that by exerting pressure at *m* the electrode *a'* may be caused to approach the electrode *a* for the purpose of striking an arc, and by removing the pressure the electrode *a'* will then return to its normal position.

The frames *f* and *f'* are secured to a suitable block *n*, to which is attached the handle *o* of insulating material, and the shield *p*.

*o'* is an insulating-handle attached to the support *e* and which carries the shield *p*. These shields are for the purpose of protecting the hands from the action of the arc. By this arrangement it will be seen that the electrodes *a* and *a'* may be set at the desired angle to each other, and as they are consumed their ends may be caused to approach one another without altering their relative angles through

the medium of the screws *i* and *i'* being rotated.

*q* are the terminals to which the wires conveying the current are connected.

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

An apparatus or tool for carrying electrodes or carbons for electric welding consisting of two frames connected together through the medium of insulating material, one frame carrying a support adjustably secured thereto, upon which a sliding piece slides, said sliding piece being operated by means of a screw-spindle, and carrying a clip in which the carbon or electrode is held, the other frame carrying a support upon which a sliding piece slides, said sliding piece carrying an adjustable clip for holding the carbon or electrode, and being operated by a screw-spindle having a required amount of play for the purpose of striking the arc or bringing the electrodes into contact when required, said screw-spindle being maintained in its normal position by means of a spring or the like; handles provided at suitable parts of the apparatus for manipulating same in conjunction with shields for protecting the hands of the operator from the action of the electric arc, the whole being supported or suspended by means of a cord or the like attached to a pivoted link carried at a suitable part of the apparatus as near as possible to its center of gravity for the purpose of facilitating its manipulation.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of December, 1898.

G. W. DE TUNZELMANN.

Witnesses:

BENJAMIN CLARK,  
PERCY READ GOLDRING.