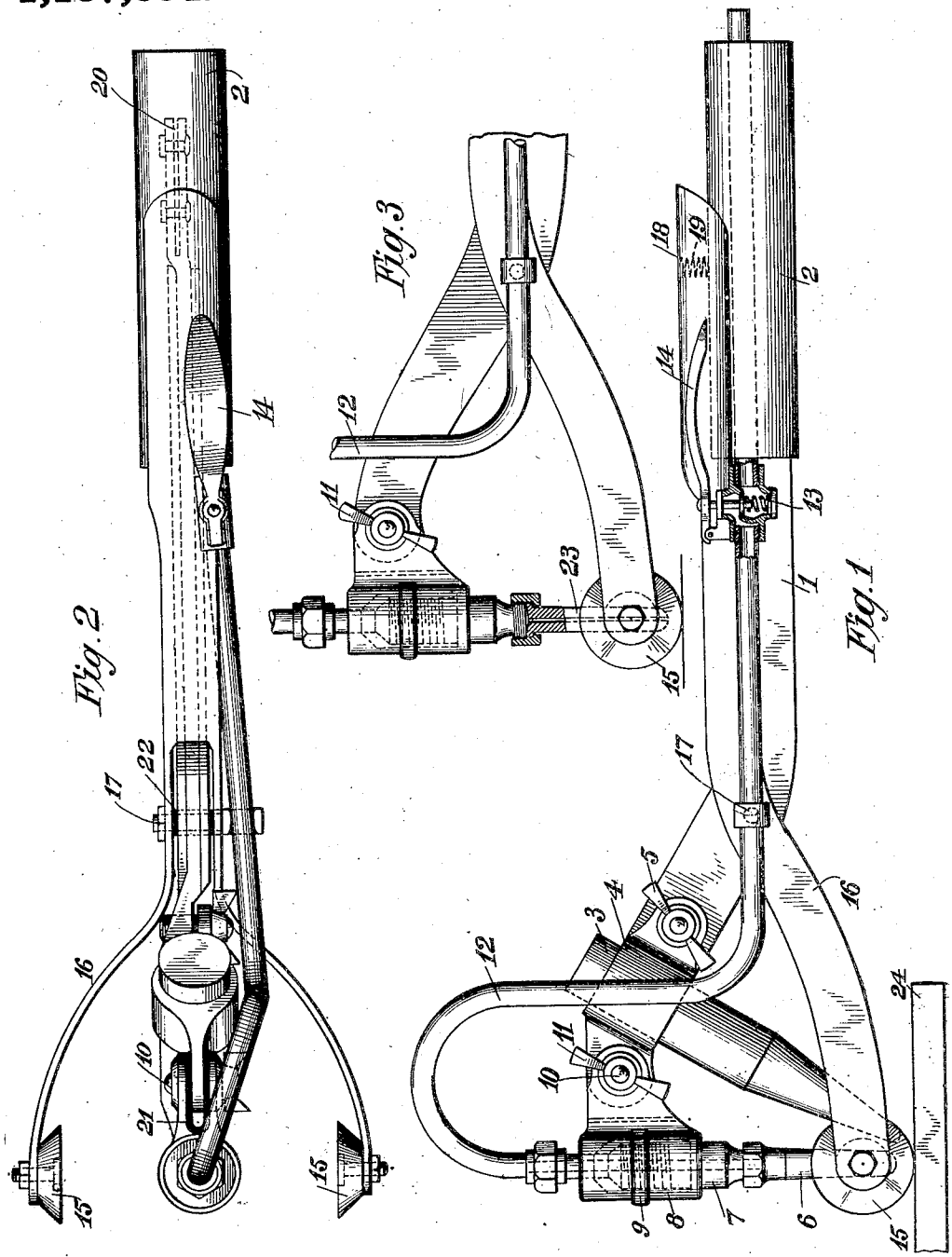
F. M. BOWERS.

APPARATUS FOR CUTTING, WELDING, AND BRAZING METALS.

APPLICATION FILED AUG. 26, 1914.

1,137,834.

Patented May 4, 1915.



Witnesses:
Merrell E. Clark
M. L. MacIntyre

Inventor
Frederick M. Bowers
By his Attorneys
Sheffield, Bentley & Betts

UNITED STATES PATENT OFFICE.

FREDERICK M. BOWERS, OF CHESTER, PENNSYLVANIA.

APPARATUS FOR CUTTING, WELDING, AND BRAZING METALS.

1,137,834. Specification of Letters Patent. Patented May 4, 1915.

Application filed August 26, 1914. Serial No. 858,659.

To all whom it may concern:

Be it known that I, FREDERICK M. BOWERS, a citizen of the United States, residing in the city of Chester, county of Delaware, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Cutting, Welding, and Brazing Metals, of which the following is a specification.

My invention relates to improvements in apparatus for welding, brazing or severing metal, and particularly to apparatus of this type which is adapted to subject the metal to be welded, brazed or severed to the combined action of an electric arc and a blast of oxygen.

The objects of my improvement are: 1. To provide an apparatus whereby a large quantity of heat may be obtained at very high temperature and at a minimum cost. 2. To provide an apparatus whereby a sufficiently large quantity of heat of high temperature can be obtained to readily cut, weld or braze silicious surfaces or other material not readily oxidizable except at a blast of very high temperature. 3. To provide an apparatus whereby a large quantity of heat of high temperature can be readily increased or decreased at the will of the operator, thus permitting larger cross sections of metal to be cut, welded or brazed.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a side elevation of the preferred arrangement of my apparatus, Fig. 2 is a top view of the arrangement shown in Fig. 1 and Fig. 3 is a detailed view of a modification of Fig. 1.

Referring in detail to the structure shown in Figs. 1 and 2, the numeral 1 designates a supporting frame provided with a handle 2. 3 designates a carbon electrode which may be adjusted with relation to the supporting frame 1, and which is held in the socket 4 by the clamp screw 5. The nozzle 6 for delivering oxygen is preferably but not necessarily made of insulating material and is detachably mounted on the head 7 which may be adjusted vertically in the guide member 8 by means of the thumb nut 9. The guide member 8 is angularly adjustable about the point 10, and can be secured in adjusted position by the thumb screw 11. The pipe 12 extends from the head 7 of the nozzle through the handle 2 and communicates with a suitable source of oxygen. In this pipe, just in front of the handle 2 is a valve 13 provided with a controlling lever 14 which the operator can conveniently manipulate with the thumb of the hand with which he holds the handle 2, to control the flow of oxygen through the pipe.

In order to maintain the nozzle and electrode at the proper distance above the material operated on, I provide the wheels 15 mounted on the bifurcated lever 16. This lever is pivoted to the supporting frame at 17 and is provided at the rear end with a handle 18 overlying the handle 2, and normally held away therefrom by a spring 19. In this position, the wheels 15 support the electrode and nozzle above the work, as shown in Fig. 1. To depress the electrode and nozzle toward the work the operator needs merely to press the handle 18 toward the handle 2 against the action of the spring 19. Electric current is supplied to the electrode 3 through the frame 1 to which a suitable conductor is connected at 20. The guide member 8 which supports the nozzle is insulated from the frame 1 at 21, and the lever 16 is insulated therefrom at 22. The work itself constitutes the other electrode. It is obvious that adjustments have been provided for accurately positioning the electrode and nozzle with relation to the work, and with relation to each other. It is possible to adjust the electrode 3 toward and from the work and the nozzle by sliding it in the socket 4, and to secure it in adjusted position by manipulating the clamp screw 5. The nozzle may be adjusted vertically by means of the nut 9, or it may be swung about the point 10 and clamped by the screw 11. By means of these last mentioned adjustments the nozzle may be removed as far as necessary from the arc if the heat becomes too intense for the nozzle to resist. Also the electrode and nozzle may be adjusted bodily with the frame 1, toward and from the work by moving the handle 18 toward or from the handle 2.

In using the apparatus above described for severing a body of metal, for instance that shown at 24, the operator establishes the arc by momentarily bringing the electrode 3 into contact with the metal. This is done by pressing the handle 18 against the handle 2. As soon as the surface of the metal has been suitably cleaned and raised to the desired temperature by the arc, the

oxygen is turned on and the apparatus as a whole is gradually moved rearwardly toward the operator so that the surface will be progressively heated and cleaned by the electric arc and simultaneously subjected to the blast of oxygen for the purpose of fusing the body of metal.

The arrangement shown in Fig. 3 is in general the same as that shown in Figs. 1 and 2, except that the nozzle 23 is made of conducting material and serves as an electrode as well as a nozzle to deliver the supply of oxygen. The modified arrangement is used in the same general way as the one previously described, except that it has the added advantage of being capable of being moved in either direction for the purposes of severing the body of metal.

From the foregoing description it will be seen that the essential feature of my invention is the application of the electric arc whereby I obtain a large quantity of heat at a high temperature which is readily controlled and which destroys the surface incrustations and impurities and maintains the temperature of the metal at the desired temperature; and the simultaneous application of an oxygen blast so that it will combine with the metal which has been brought to a high temperature by the arc.

Having now described my invention, what I claim is:

1. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, a nozzle also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, means for adjusting the nozzle vertically with respect to the electrode and other means for adjusting the nozzle angularly with respect to the electrode.

2. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, a nozzle also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, means for adjusting the electrode with respect to the nozzle, means for adjusting the nozzle vertically with respect to the electrode and other means for adjusting the nozzle angularly with respect to the electrode.

3. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, a handle on said frame adapted to be grasped by the hand of the operator, and means operable by the hand of the operator when grasping said handle for regulating said oxygen blast.

4. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, a lever pivoted to the frame and rollers mounted on the lever for supporting the electrode above the material being operated upon.

5. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode and an adjustable support adapted to contact with the material being operated upon and under the control of the operator, for regulating the elevation of the frame above said material.

6. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, a lever pivoted to the frame, and means adapted normally to position said lever to cause it to co-act with the material to be operated upon, to support the frame above said material, but permitting the lever to be moved about its pivot relatively to the frame, to depress the frame.

7. In an apparatus of the kind described, the combination of a supporting frame, an electrode mounted thereon, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, a lever pivoted to the frame, rollers mounted on the lever and means normally positioning the lever, to cause the rollers to contact with the material to be operated upon, to support the frame above said material, but permitting the lever to be moved about its pivot relatively to the frame, to depress the frame.

8. In an apparatus of the kind described, the combination of a supporting frame provided with a handle, an electrode mounted on the frame, means also mounted thereon for supplying an oxygen blast adjacent the point of said electrode, a lever pivoted to the frame, supporting rollers mounted on one end of the lever, a handle secured to the other end thereof and overlying the first mentioned handle, and means normally separating the handles to cause the rollers to support the electrode above the material being operated upon but permitting one handle to be pressed toward the other to depress the electrode.

In witness whereof I have hereunto signed my name in the presence of two witnesses this 20th day of August, 1914.

FREDERICK M. BOWERS.

Witnesses:

J. Ed. Miller,

John D. Buskey.