

(No Model.)

2 Sheets—Sheet 1.

C. L. ROWLAND.  
WELDING APPARATUS.

No. 561,614.

Patented June 9, 1896.

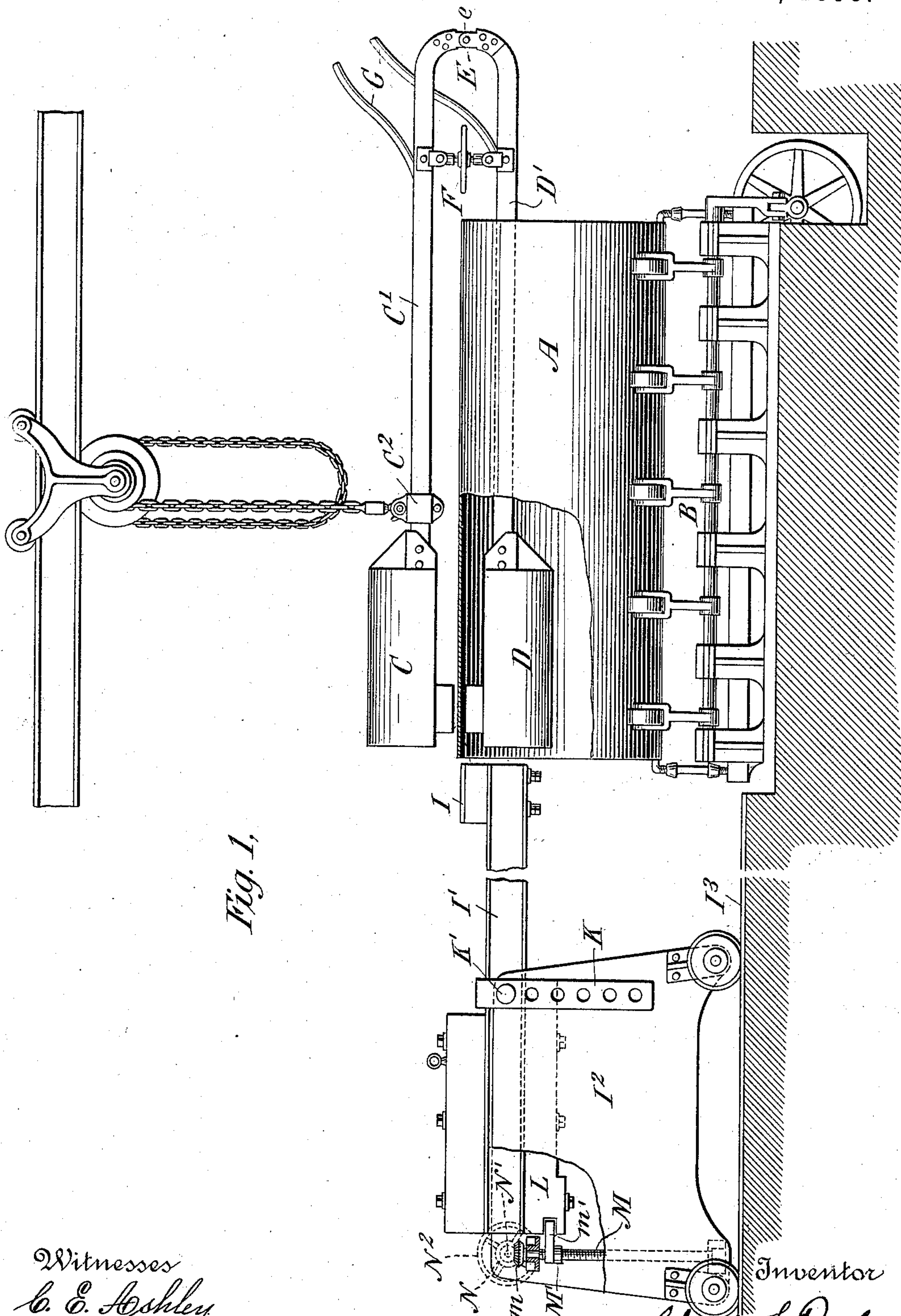


Fig. 1.

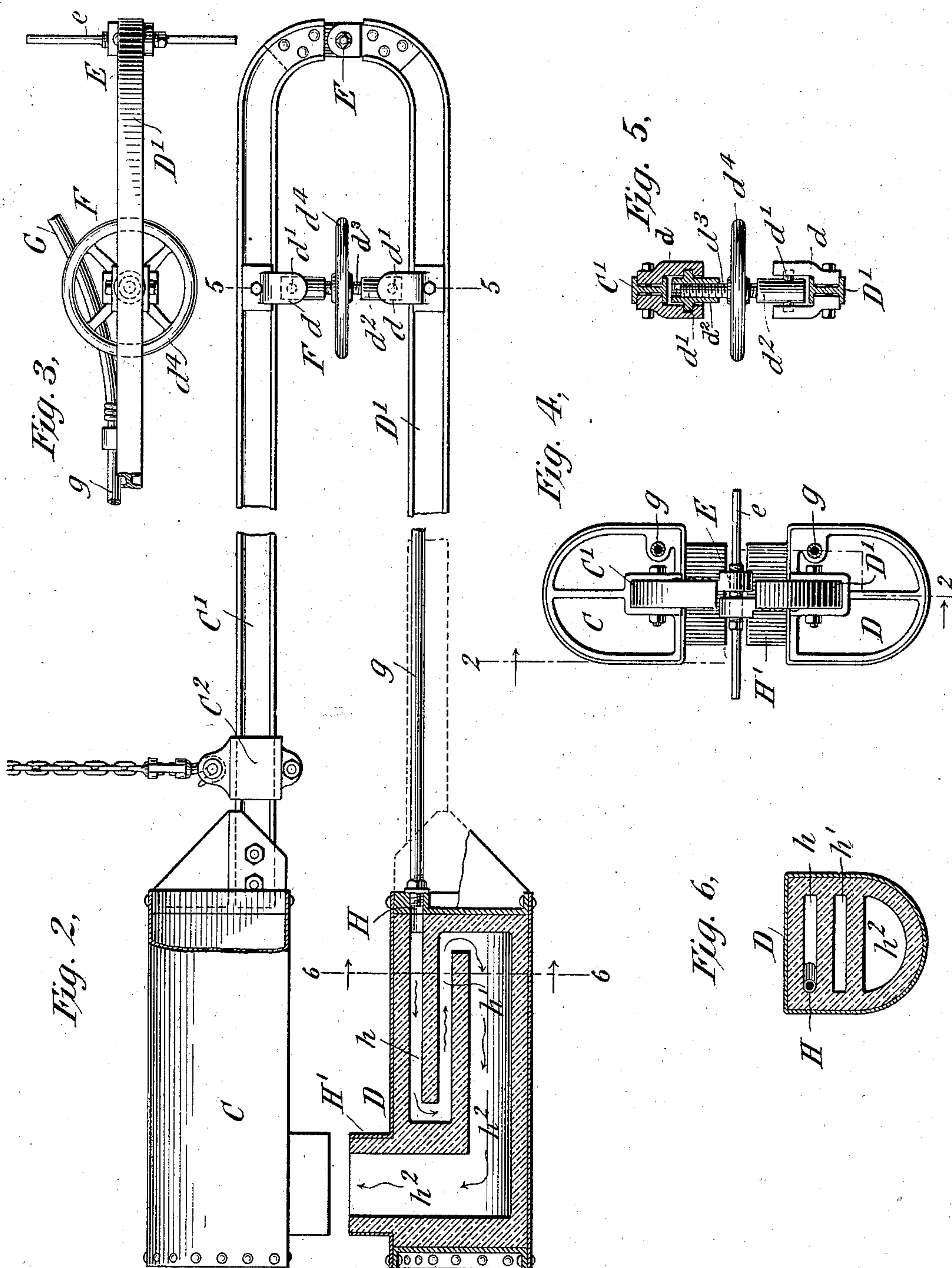
Witnesses  
C. E. Ashley  
H. W. Lloyd.

Inventor  
By his Attorneys Charles L. Rowland  
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# UNITED STATES PATENT OFFICE.

CHARLES L. ROWLAND, OF BROOKLYN, NEW YORK.

## WELDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 561,614, dated June 9, 1896.

Application filed April 23, 1895. Serial No. 546,824. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. ROWLAND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Welding Apparatus, of which the following is a specification.

My invention relates to the class of apparatus shown in my Patent No. 519,776, dated May 15, 1894—that is to say, apparatus in which facing furnaces are placed on opposite sides of the seam to be welded to raise the metal to the desired temperature, after which it is welded. Generally such facing furnaces for welding purposes are very old in the art, being shown, for instance, in the patents of Bertram, No. 15,159, dated June 17, 1856, and Cooke, No. 27,619, dated April 3, 1860. In the patents of Rowland, Hill, and McLachlan, Nos. 384,081 and 384,082, dated June 5, 1888, are shown adaptations of such facing furnaces in which the bars at the end of which the furnaces are carried are respectively connected with the same pivotal support. Thus in Patent No. 384,081 this support is a pendent rod X, to which each furnace bar or frame is connected and by which it is directly supported, the furnaces on the ends of the bars or frames being counterbalanced by weights on the opposite ends of the bars, and the bars of the frames being respectively directly supported near their center of gravity upon the vertical pivot X. The purpose of this construction is to allow a certain amount of horizontal adjustment of the furnaces, their proper position against the interposed object being operated upon being accomplished through the medium of the counterbalancing-weights. In Patent No. 384,082 the same arrangement of counterbalanced furnaces is shown, and the furnace bars or frames are respectively mounted upon a common pivot, upon which they may be adjusted with reference to each other in horizontal planes.

In my previous patent, No. 519,776, I show an organization distinctively different from the Patents Nos. 384,081 and 384,082. In my patent the furnace bars or frames are not counterbalanced. Each frame is supported by a pendent support, and at the ends oppo-

site the furnaces they are connected by an adjustable device, by which the furnaces may be locked when brought to the proper position. The furnaces are so arranged with reference to their respective points of support that the upper furnace has a tendency to descend and rest upon the cylinder or object being operated upon, while the lower furnace tends to fall away from the under face of such object and must be lifted by the manipulation of the outer frame or bar into proper position, where it is locked by the device mentioned.

In my present invention the two furnaces are respectively carried by bars constituting the sides of a frame united by rigid connecting devices having means for adjustment. This frame is preferably supported or suspended from a single point or is movable bodily to meet the requirements of the work. The frame thus normally rigid, but having the capacity for adjustment, may have two adjusting connections, one preferably at the end farthest from the furnaces and the other intermediate the furnaces and the first-named connection. The connection at the ends of the sides of the frame is one that permits movement of the sides, and consequently of the furnaces, at right angles to the axis of the frame—that is to say, at right angles to the plane of the seam to be welded—to bring the facing furnaces against or in proper juxtaposition to the opposite sides of the work lying between them and also the movement of the furnaces parallel to the plane of the seam to be welded lying between them but transverse to the line of the seam to bring the furnaces into proper opposition. The intermediate connection is such as to permit of the movement of the furnaces parallel with the plane of the seam and afford the adjustment to accomplish their movement at right angles to the plane of the seam. The furnaces are not therefore respectively counterbalanced or counterbalanced in any sense with reference to their adjustments, nor are they respectively connected with and independently supported by a common support, nor are they independently supported; but, on the contrary, they are mechanically rigidly tied together, with a capacity for the desired adjustments,



however, so that they constitute a rigid structure suspended or supported, preferably, at one point only.

In my organization the facing furnaces are normally held positively in fixed relation opposite each other, but may be adjusted toward or from each other to adapt them perfectly to the particular work or seam to be welded lying between them.

My invention also contemplates certain improvements in the adjustment of the anvil-beam and in the construction of the furnaces, which will be hereinafter described in detail.

In the accompanying drawings, Figure 1 is a side elevation illustrating my invention, partly broken away in two places. Fig. 2 is a side elevation of the furnaces, their frame and support, with one of the furnaces shown in longitudinal section on the line 2 2 of Fig. 4. Fig. 3 is a detail plan view of the end of the furnace-frame; Fig. 4, an end view of the same; Fig. 5, a section on the line 5 5 of Fig. 2, and Fig. 6 a section on the line 6 6 of Fig. 2.

I have illustrated in the drawings the welding of the seam of a cylinder A, that is supported horizontally upon a cradle B of the same construction as that shown in my patent before mentioned, and specific description thereof is therefore unnecessary.

Furnaces C D are respectively carried upon the ends of the horizontal sides C' D' of the frame. The upper side of the frame is supported at a single point C<sup>2</sup> by a chain from a pulley mounted in a carriage traveling on an overhead track, thus permitting of the horizontal travel of the furnaces. At the end of the frame opposite the furnaces the sides of the frame are connected by a hinge E, the pivot of which is horizontal, and between such connections and the furnaces by a connection F, which may be constructed substantially as follows and as shown in detail in Fig. 5: The respective sides C' D' of the frame have bolted to them brackets d, in which horizontal lugs d' are pivoted. These lugs are formed on hubs d<sup>2</sup>, screw-threaded internally reversely with reference to each other, and in which correspondingly-threaded ends of a rod d<sup>3</sup> work. The hand-wheel d<sup>4</sup> is secured centrally to this rod between the two hubs. By the manipulation of the hand-wheel the sides of the frame may be forced apart or drawn together to separate the furnaces or bring them closer together, the sides then turning upon the horizontal pivot of the hinged connection E. At the same time the sides of the furnace-frame are capable of turning horizontally to bring the furnaces into proper opposition, such adjustment being effected by the connection E.

The connection E may be constructed as follows: The ends of the frame sides are curved toward each other and overlap, and each is bored horizontally and reversely screw-threaded. A correspondingly-screw-threaded

rod e works in such bores, and by turning it the furnaces may be made to swing horizontally to bring them into proper position on opposite sides of the work, the two side parts of the frame then turning on the screw-rod d<sup>3</sup>. Thus it will be seen that the furnaces are rigidly locked together and are supported at a single point on the upper part of the furnace-frame, and that they are capable of two adjustments at right angles to each other to adapt them to the work. The ends of the rod e are somewhat extended to enable the operator to readily control the furnaces and their adjustment.

Air and gas mixed at any suitable point and under pressure, as indicated in my patent referred to, are conveyed by flexible tubes G to pipes g, placed on the sides of the furnace-frame and opening into the furnaces C D, which are constructed as follows: The mingled air and gas enter at H and pass forward through a passage h, thence backward through a passage h' to the combustion-chamber h<sup>2</sup> that extends forward to the burner H'. The passages h and h' are preferably flat and wide in cross-section and afford a sinuous or to-and-fro flue for the mixed air and gas discharged into the combustion-chamber, which is thus highly heated before combustion takes place. The arrows indicate the direction of the travel of the air and gas and the products of combustion. Combustion will take place when the air and gas leave h', and consequently the body of the furnace above the chamber h<sup>2</sup>, in which the flue is formed, is highly heated. The furnace may be made of fire-brick or other suitable material and incased in sheet-iron, substantially as shown.

As the furnaces are moved along the seam to be welded the anvil I is caused to follow them and the heated seam is welded by hammering or otherwise. The anvil is carried on a beam I', supported in a carriage or traveling support I<sup>2</sup>, that may be advanced in any way—for instance, by a hydraulic cylinder, as shown in my patent before mentioned. In the drawings I show merely a carriage mounted upon wheels traveling on a track I<sup>3</sup>. The frame of this carriage has on each side a bearing-plate K, having multiple apertures therein, in any one of which the pivot-pin K', passing through the beam I', may be placed. At the rear of such pivot a weight L is bolted to the beam and serves to slightly overbalance the anvil, so as to press it against the under side of the seam being welded. A vertical screw-threaded shaft M in rear of this weight carries a bevel-pinion m, driven by a corresponding bevel-wheel N on a horizontal shaft N', operated by a hand-wheel N<sup>2</sup>. A nut M' on the vertical shaft has an extension m', seated in a recess in the end of the weight. When, therefore, the shaft is rotated, the weight may be raised or lowered to bring the anvil into proper position. The nut M' serves to hold the anvil up to its work



and may also be run down on the shaft to such point as to permit the insertion of the pivot-rod K' in any one of the holes in the plate K to adapt the anvil to the welding of cylinders of various sizes. As described in my previous patent, the cradle A is of such construction as to receive cylinders of various sizes and support them in the plane of welding. With the adjustable anvil and adjustable furnaces such as shown the cradle need not be capable of supporting cylinders of various diameters in the same plane.

Of course the details of the connections E F may be varied. In any case, however, they serve to tie the sides of the frame rigidly together, so that the frame may be supported or suspended as a whole and yet afford the desired adjustment of the parts of the frame.

In my improved construction the rigid frame will hold the furnaces in the determined opposition, and were it not that it is desired sometimes to vary their relation the adjustment parallel with the plane of the seam to be welded, but transverse to the seam, accomplished at the connection E might be dispensed with. Such adjustment is, however, in some cases desirable because the ordinary fire-bricks used for the furnace mouth or burner vary in size, and it may be convenient to have the adjustment for other reasons.

I claim as my invention—

1. The combination, substantially as set forth, of the facing furnaces, their supporting-frame having two sides united by rigid connecting devices normally holding the sides of the frame and the furnaces in fixed relation opposite each other and having means for adjustment, whereby the sides of the frame and consequently the furnaces may be adjusted toward or from the seam to be welded, and means for supporting or suspending the frame.

2. The combination, substantially as set forth, of the facing furnaces, their supporting-frame, having two sides united by rigid connecting devices normally holding the sides of the frame and the furnaces in fixed relation opposite each other and having means for adjustment affording an adjustment of the furnaces toward and from the seam to be welded, and means for supporting the fur-

naces and frame from a single point of support.

3. The combination, substantially as set forth, of the facing furnaces, their frame having two sides united by rigid connecting devices, having means for adjustment affording two adjustments of the sides of the frame and consequently of the furnaces, one adjustment toward and from the seam to be welded, and the other parallel therewith but transverse thereto, the rigid frame carrying the furnaces and moving it to and fro along the seam to be welded.

4. The combination, substantially as set forth, of the facing furnaces, their frame having two adjustable connections between the sides thereof, one at the end of the sides of the frame, on which the sides have a horizontal adjustment and vertical movement and one intermediate such connection and the furnaces, on which the sides have a vertical adjustment and horizontal movement.

5. In a welding apparatus, the combination of two facing furnaces, their frame by which they are normally rigidly supported in fixed relation opposite each other, means for effecting their movement toward or from each other to bring them into proper proximity to the seam lying between them, and means for moving them, while so supported in fixed opposition to each other, back and forth along the seam, substantially as set forth.

6. In a welding apparatus, the combination, substantially as set forth, of the anvil, its beam, the weight, the carriage or support having a series of bearings arranged in a substantially vertical line in which the beam may be pivoted, and means for raising and lowering the weighted end of the beam.

7. In a cylinder-welding apparatus, the combination, substantially as set forth, of the anvil, its beam, its pivoted support, the vertical screw-shaft, means for rotating it, and a nut thereon having a projection that raises and lowers the end of the beam and holds the anvil up to its work.

In testimony whereof I have hereunto subscribed my name.

CHARLES L. ROWLAND.

Witnesses:

WM. C. LANE,  
FRANK A. DEMPSEY.