No. 683,066. Patented Sept. 24, 1901.

O. PARPART.

ELECTRIC TUBE WELDING MACHINE.

(Application filed Sept. 1, 1900.)

(No Model.) 4 Sheets—Sheet 1.

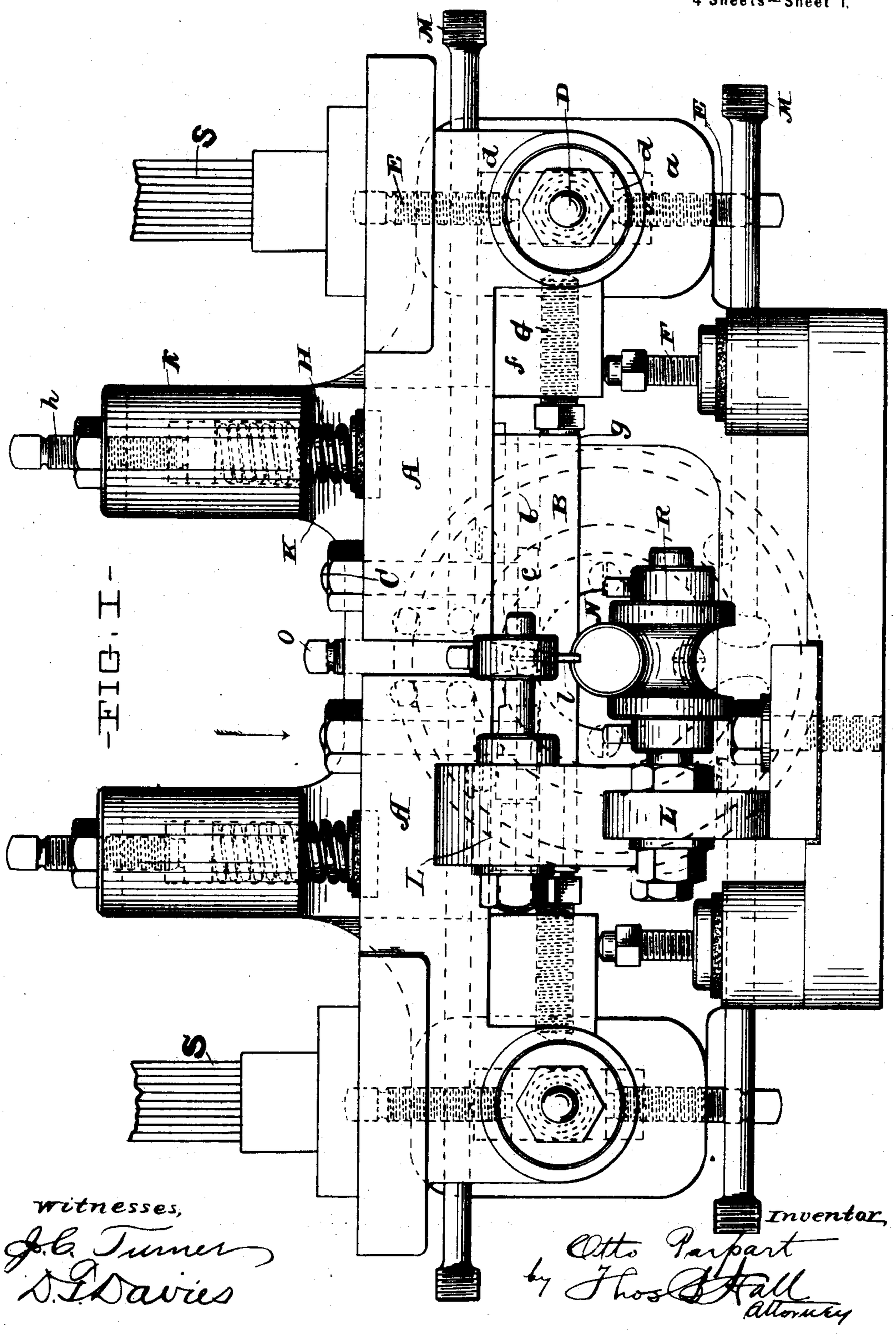

FIG. 1.

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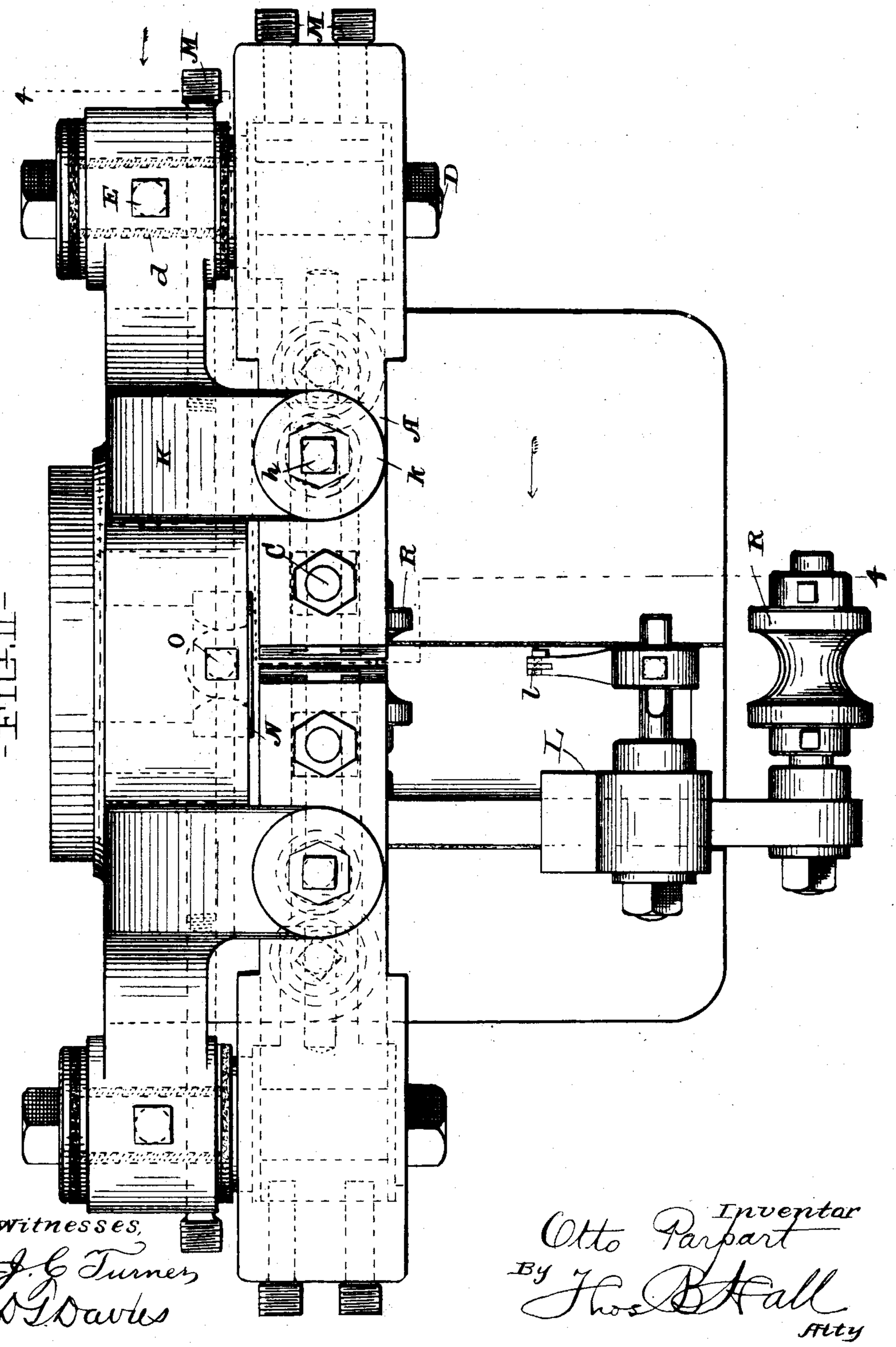
-FIG. II-



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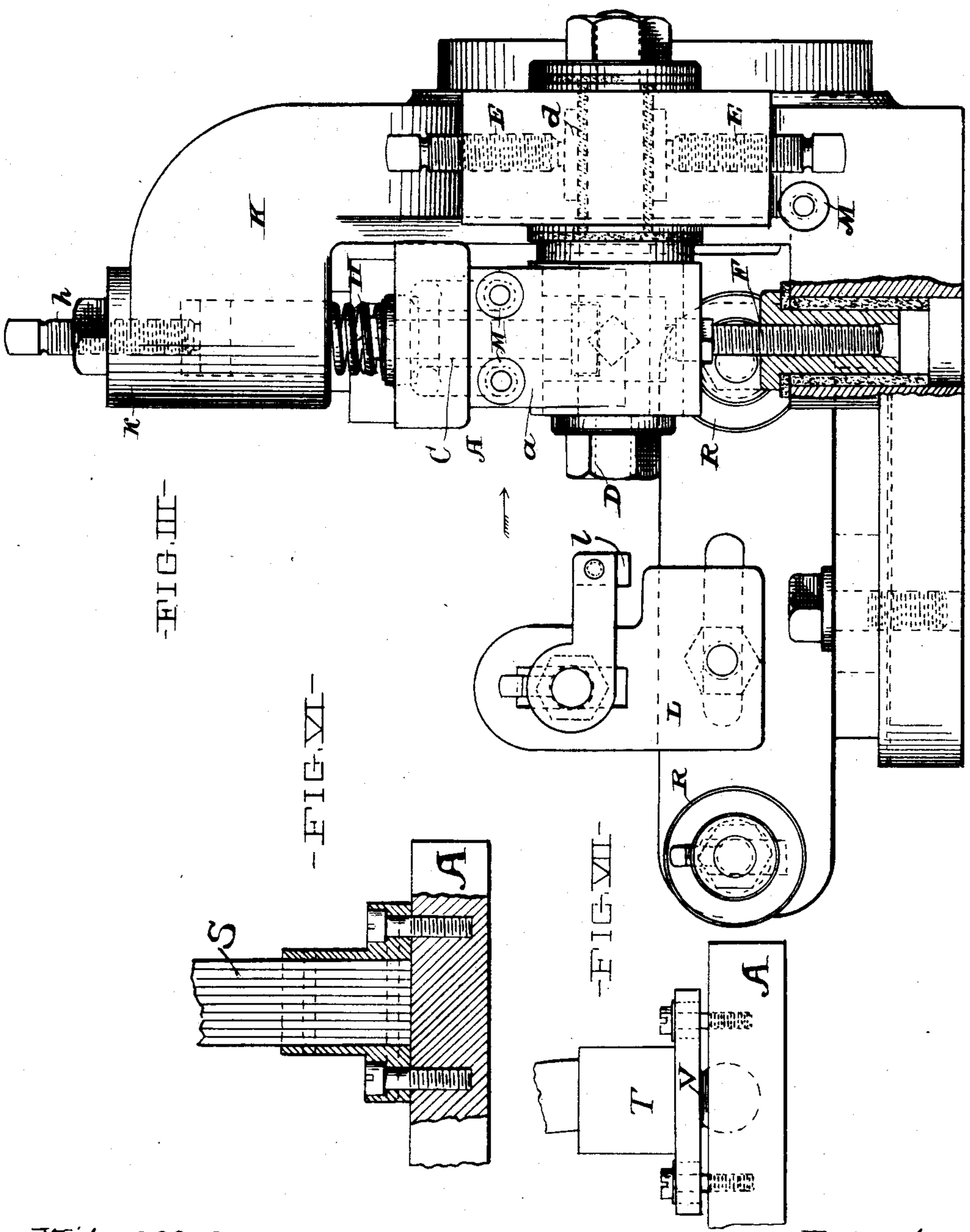

FIG. III.

FIG. V.

FIG. VI.

FIG. VII.

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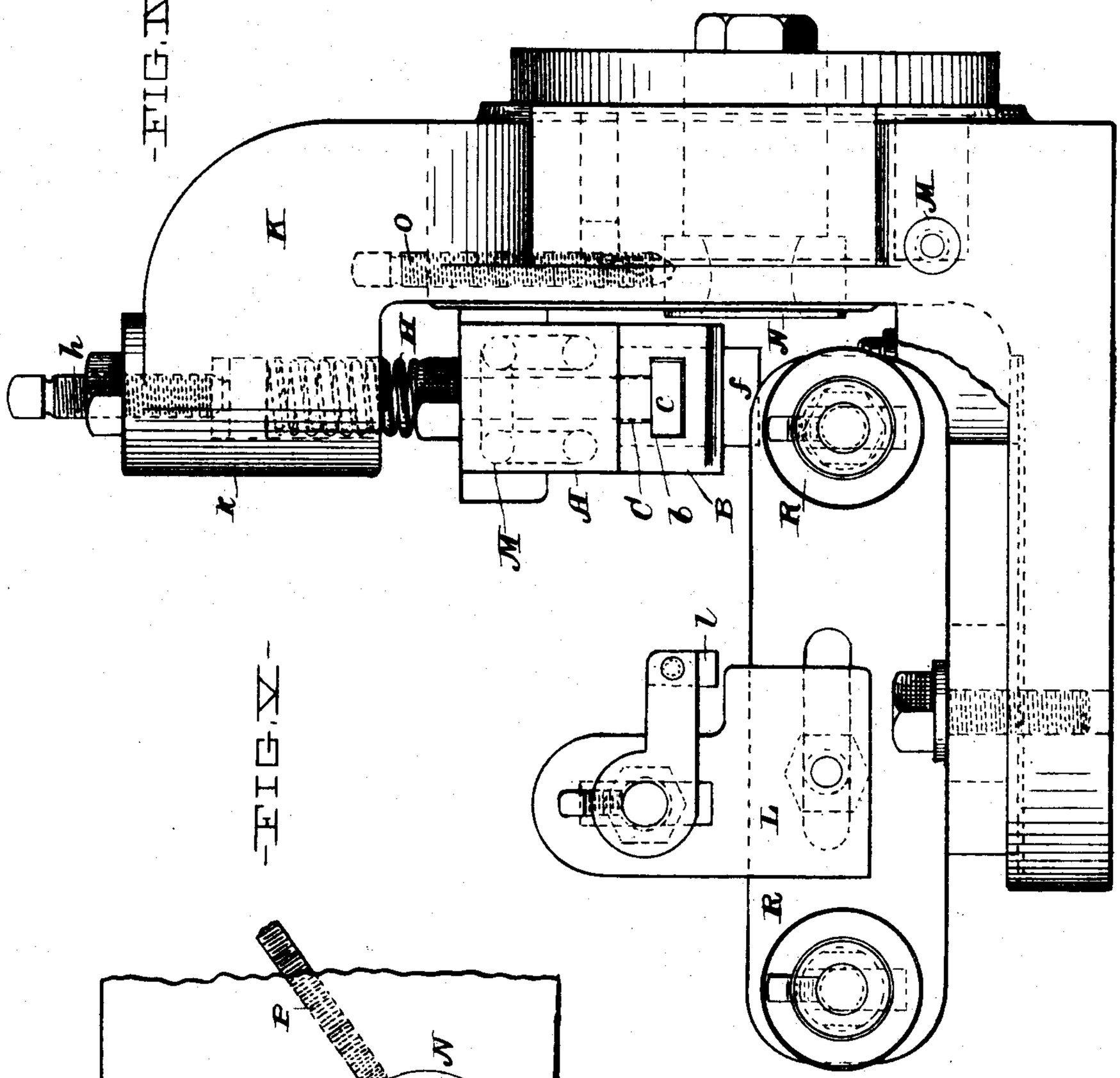
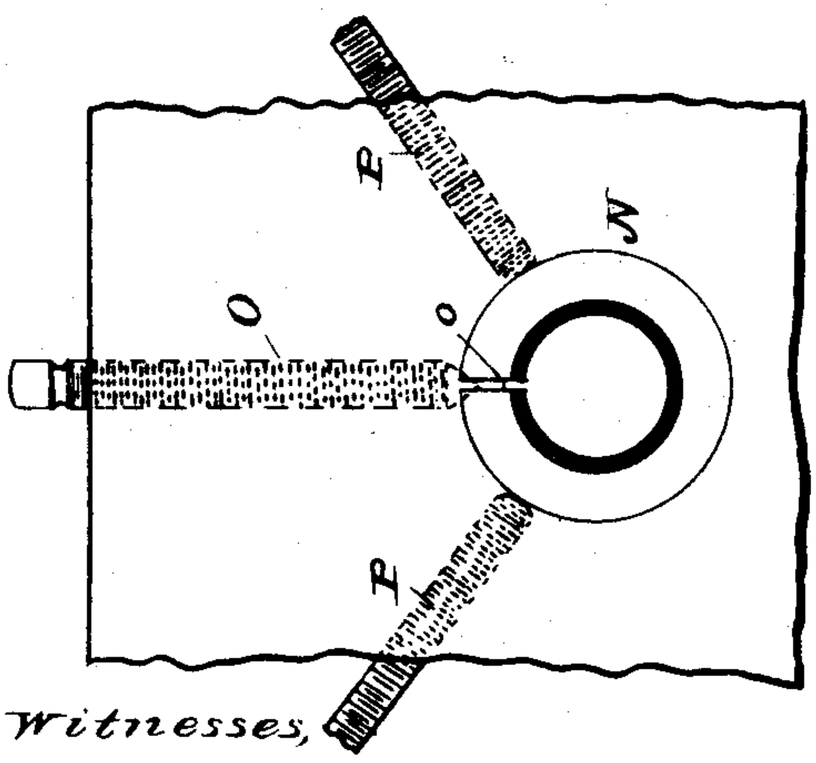
(No Model.) 4 Sheets—Sheet 4.

-FIG. IV-



-FIG. V-



Witnesses,

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UNITED STATES PATENT OFFICE.

OTTO PARPART, OF CLEVELAND, OHIO, ASSIGNOR TO THE STANDARD WELDING COMPANY, OF SAME PLACE.

ELECTRIC TUBE-WELDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 683,066, dated September 24, 1901.

Application filed September 1, 1900. Serial No. 28,750. (No model.)

To all whom it may concern:

Be it known that I, OTTO PARPART, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Electric-Welding Tube-Drawing Machines, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The object of the invention is to provide an improved machine for welding tubes by electricity.

The invention consists of the means hereinafter described, and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

Figure I is a front elevation of the machine with copper electrode semicircle broken away. Fig. II is a plan of the machine with omission of said semicircle. Fig. III is a side elevation of the machine with like omission of semicircle. Fig. IV is an elevation taken on line 4 4 of Fig. II with like omission of semicircle. Fig. V is a detail of the die and die-adjusting means. Fig. VI is a sectional detail of the terminal semicircle. Fig. VII is a detail view of a modification of adjustable electrode.

A considerable portion of the machine consists of two duplicate transverse halves, so that a description of one such half will be understood as applying to the companion half. A carrier-bar A is located transversely of the machine, so as to be at right angles to the plane determined by the axis and the joint of the tube when the latter is being welded. The inner end portion of such carrier-bar is provided with a contact device B, located below the same and attached thereto by a bolt C, such bolt having its lower end provided with a head *c*, adapted to have free sliding movement within guideway *b*, formed longitudinally within said contact device B. The outer end portion of the carrier-bar A is provided with a depending extension *a*, through the central portion of which passes a bolt D, parallel with said plane determined by the tube joint and axis. Said bolt extends rearwardly and is supported in two bearing-boxes *d*, located, respectively, above and below the bolt, each such box being maintained in position by a set-screw E, threaded through the main framework of the machine. A set-screw F is threaded in the lower portion of the main framework of the machine and its head has bearing in vertical adjustment against the under side of an extension *f*, depending from and rigid with the lower central portion of carrier-bar A. A set-screw G is threaded horizontally through said extension *f*, so as to be at right angles to the plane determined by the tube axis and joint, the head of said set-screw having engagement in horizontal adjustment against the outer end *g* of the contact device B. A spring H is seated upon the upper side of carrier-bar A and is adapted to have varying degrees of pressure upon said carrier-bar by vertical adjustment of set-screw *h*, threaded within a thimble *k*, rigid with a forwardly-projecting arm K of the main framework of the machine. The vertical set-screw F is located in a line passing vertically through a portion of the horizontal set-screw G and between the vertical planes within which bolt D and spring H are respectively located. The planes within which said bolt D, and set-screws E, and set-screw F, and spring H, respectively, are located are all parallel with the plane determined by the tube axis and joint. The lines of force resulting from such relative location of said members are such that set-screw F may operate as a vertically-adjustable fulcrum relatively to carrier-bar A, and hence to its contact device B, while the set-screws E may operate to raise or lower the outer end of said carrier-bar, and hence the inner end portion of its contact device B, and spring H may operate to exert a yielding pressure of greater or less degree down upon the forward end portion of said carrier-bar, and hence down upon the corresponding front end portion of its

contact device B. A guide *l* is provided and adapted to depend between the two edges of the tube-joint that is to be welded, such guide being carried on a bracket L, provided with slots and devices adapted to permit the guide to be adjusted to different positions horizontally and vertically. Waterways M are provided throughout the framework of the machine and of such location surrounding the die N as to maintain the latter sufficiently cool to be in good working condition during operation. This die is located in the main framework of the machine in rear of the vertical plane, within which the carrier-bars and their contact devices are located. It is formed with an open cross-slit *o* at its top, the conical lower end of a vertical set-screw O engaging with the upper wall portions of such slit and expanding such walls in desired relative adjustment as may be permissible in connection with the set-screws P, having end bearing against the die, respectively, to opposite sides of said slit.

In operation the tube whose joint is to be welded is passed over rollers R with the guide *l* fitting between the edges of such joint, so as to maintain the tube in proper position relatively to the contact devices. The two contact devices, respectively, have contact with opposite edge portions of the tube-joint, thereby heating such edge portions to a degree such as to cause them to firmly unite in welding action as they are forced together by the tube passing through the die. Each of the two contact devices B may be independently adjusted lengthwise, so as to cause same to have desired contact with the appropriate edge portion of the tube-joint. Independent adjustment of each contact device is also permissible in planes respectively parallel with and at right angles to the plane determined by the tube axis and joint. Each contact device is also adapted to bear with a yielding pressure upon its appropriate edge portion of the tube-joint in a plane substantially parallel with the plane determined by the tube axis and joint. Furthermore, each contact device is adapted to have an independent tilting movement, so as to cause any desired longitudinal section of the tube edge portion to receive greater or less degree of contact-pressure, the contact device being adjustable to and maintainable in different angles of inclination to the plane determined by the tube axis and joint, the two set-screws F respectively serving each as a fulcrum for its respective contact device, as the latter may be changed and maintained in position by reason of appropriate adjustment of set-screws E. As either contact device B may wear away in operation it may be redressed and then adjusted by the described means, so as to cause it to again be in condition to properly perform its desired function.

The electrode semicircle S of the transformer is preferably formed of copper bands, the terminals thereof respectively secured to the two carrier-bars A at their outer end portions. The flexibility of said copper bands causes the electrodes to be adjustable, and thus adapt themselves to the pivotal movements of said carrier-bars and the corresponding movements of the contact devices. Another form of adjustable electrodes is shown in Fig. VII, wherein a non-flexible electrode T is connected by a ball-and-socket-joint mechanism V with a carrier-bar A.

By reason of the carrier-bars A having the contact devices connected to their lower surfaces the electric transformer is caused to have most convenient form and to possess advantage of construction and operation as compared with a transformer in which the contact devices are located in its upper portion.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means covered by any one of the following claims be employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a tube-welding machine, the combination of two electric-current-conducting devices respectively connected with opposite electric poles and adapted to have contact respectively with the opposite edge portions of the joint of a tube, and a die located in a different plane from said conducting devices transverse to the line of movement of the tube, substantially as set forth.

2. In a tube-welding machine, the combination of two electric-current-conducting devices respectively connected with opposite electric poles and adapted to have contact respectively with the opposite edge portions of the joint of a tube, and a die located in a plane transverse to the line of movement of the tube in rear of all planes transverse to the line of movement of the tube in which said conducting devices are located, substantially as set forth.

3. In a tube-welding machine, the combination of a carrier-bar, a bolt transverse thereto and having one portion supporting such carrier-bar while the other portion is supported in bearing-boxes adjustable to and from the axis of the bolt, a contact device connected to such carrier-bar by a bolt whose head is movable in a guideway longitudinal of such contact device, a screw engaging against the outer end of said contact device, a screw engaging said carrier-bar in a line parallel with the plane determined by the tube axis and joint and passing between such plane and the parallel plane in which said adjustable bearing-boxes are located, substantially as set forth.

4. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a

tube-joint, and means adapted to adjust said conducting device so that its said contact-surface may at different times be at different angles to the plane determined by the tube axis and joint, substantially as set forth.

5. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a tube-joint, and means adapted to adjust said conducting device so as to cause different parts of its contact-surface to bear with different pressures against said edge portion, substantially as set forth.

6. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a tube-joint, and means adapted to adjust said conducting device so as to cause its part nearer to the tube-joint to bear upon said edge portion with a greater or less degree of pressure than its part farther from said joint, substantially as set forth.

7. In a tube-welding machine, the combination of two electric-current-conducting devices respectively connected with opposite electric poles and adapted to have contact respectively with the opposite edge portions of the joint of a tube, and adjusting means adapted to independently adjust each of said conducting devices to different angles relatively to their respective contact-surfaces of said opposite edge portions, substantially as set forth.

8. In a tube-welding machine, the combination of a carrier-bar, a contact device attached to one end portion of said bar, means engaging with the opposite end portion of said bar and adjustable in a plane substantially parallel with the plane determined by the tube axis and joint, a fulcrum for said bar in a line parallel with said two planes, substantially as set forth.

9. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a tube-joint, means adapted to adjust said conducting device so that its said contact-surface may at different times be at different angles to the plane determined by the tube axis and joint, elastic means adapted to exert pressure against said contact device in a line substantially parallel with said plane and passing between the latter and said conducting-device-adjusting means, substantially as set forth.

10. In a tube-welding machine, the combination of a carrier-bar, a contact device attached to one end portion of said bar, means engaging with the opposite end portion of said bar, and adjustable in a plane substantially parallel with the plane determined by the tube axis and joint, a fulcrum for said bar in a line parallel with said two planes and passing between them, elastic means bearing against said carrier-bar in a line substantially parallel with the plane determined by the tube axis and joint and passing between the latter and said fulcrum, substantially as set forth.

11. In a tube-welding machine, the combination of a carrier-bar, a contact device attached to the inner end portion of said bar, a bolt transverse to said bar and having one portion of its length supporting the outer end portion of said bar, boxes adjustable in a plane substantially parallel with the plane determined by the tube axis and joint and supporting the remaining length portion of said bolt, a pivot for said bar parallel with said two planes and passing between them, substantially as set forth.

12. In a tube-welding machine, the combination of a horizontal carrier-bar, a contact device attached to the lower side of the inner end portion of said bar, a bolt transverse to said bar and having one portion of its length supporting the outer end portion of said bar, vertically-adjustable boxes in which the remaining length portion of said bolt has bearing, a vertically-adjustable pivot which provides bearing for said bar located in a line parallel with the plane determined by the tube axis and joint and passing between such plane and the parallel plane in which said adjustable boxes are located, a vertically-adjustable elastic-pressure device bearing upon said bar substantially parallel with said pivot, substantially as set forth.

13. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a tube-joint, means adapted to adjust said conducting device so that its said contact-surface may at different times be at different angles to the plane determined by the tube axis and joint, and an electrode adjustable in itself or in its mechanical connection with said conducting-device-adjusting means, substantially as set forth.

14. In a tube-welding machine, the combination of a current-conducting device adapted to have contact with the edge portion of a tube-joint, means adapted to adjust said conducting device so that its said contact-surface may at different times be at different angles to the plane determined by the tube axis and joint, an electrode formed of flexible bands secured to said conducting-device-adjusting means, substantially as set forth.

15. In a tube-welding machine, the combination of two electric-current-conducting devices respectively connected with opposite electric poles, and adapted to have contact respectively with the opposite edge portions of the joint of a tube, each such conducting device being adjustable from a point eccentric to the tube, substantially as set forth.

16. In a tube-welding machine, the combination of two electric-current-conducting devices adapted to have contact respectively with the opposite edge portions of the joint of a tube, means adapted to adjust said conducting devices at different angles to the plane determined by the tube axis and joint,

electrodes connected to said conducting devices and adapted to adjust themselves in conformity with the adjustment of said conducting devices, substantially as set forth.

17. In a tube-welding machine, the combination of two electric-current-conducting devices adapted to have contact respectively with the opposite edge portions of the joint of the tube, and an electric transformer from which said conducting devices depend, substantially as set forth.

18. In a tube-welding machine, the combination of two electric-current-conducting devices adapted to have contact respectively with the opposite edge portions of the joint of a tube, and an electric transformer having horizontal carrier-bars to whose lower surfaces said conducting devices are connected, substantially as set forth.

Signed by me this 30th day of August, 1900.

OTTO PARPART.

Attest:

THOS. B. HALL,

D. T. DAVIES.