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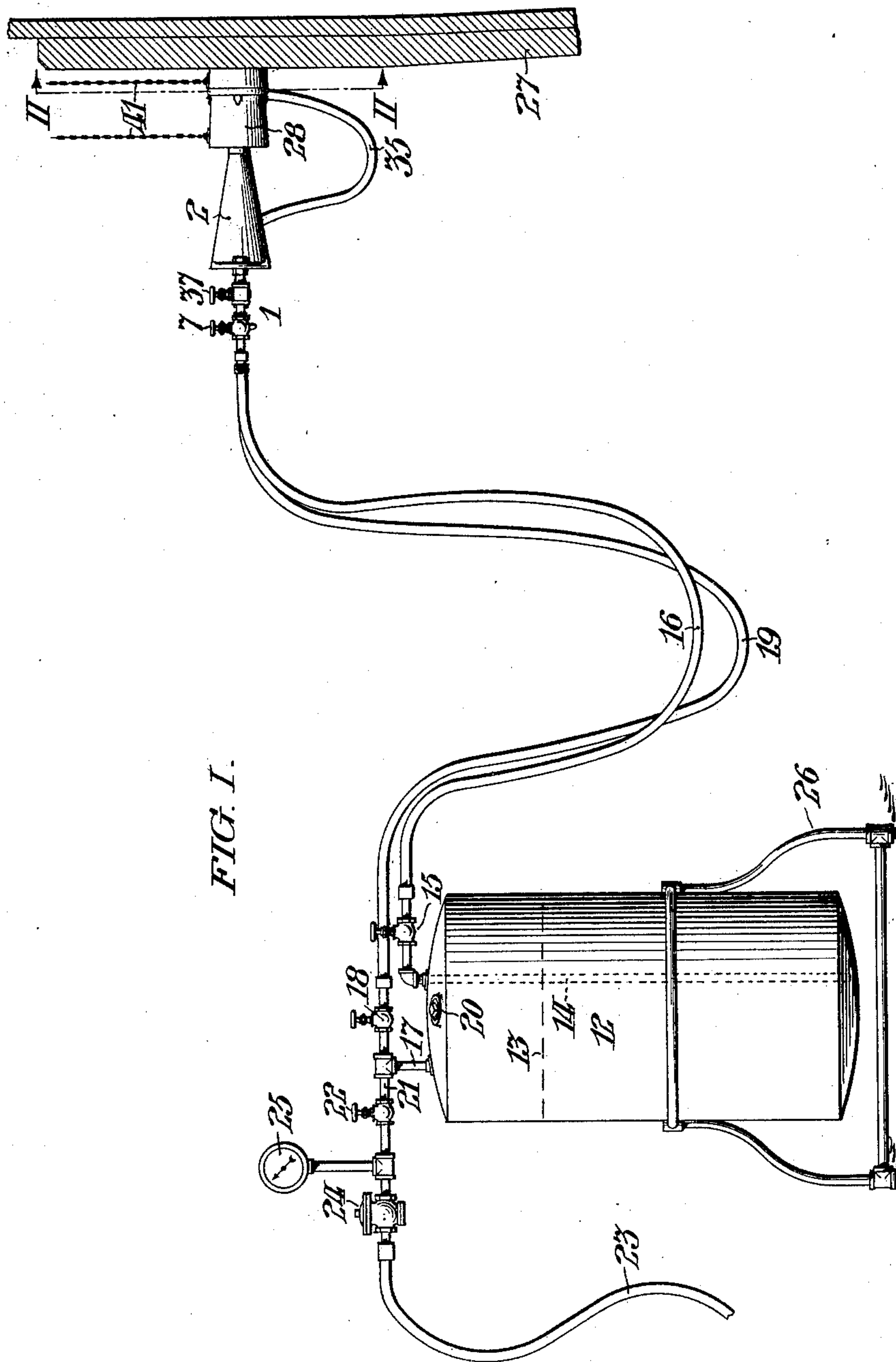
Patented Oct. 14, 1902.

J. J. TYNAN.
ANNEALING APPARATUS.

(Application filed June 28, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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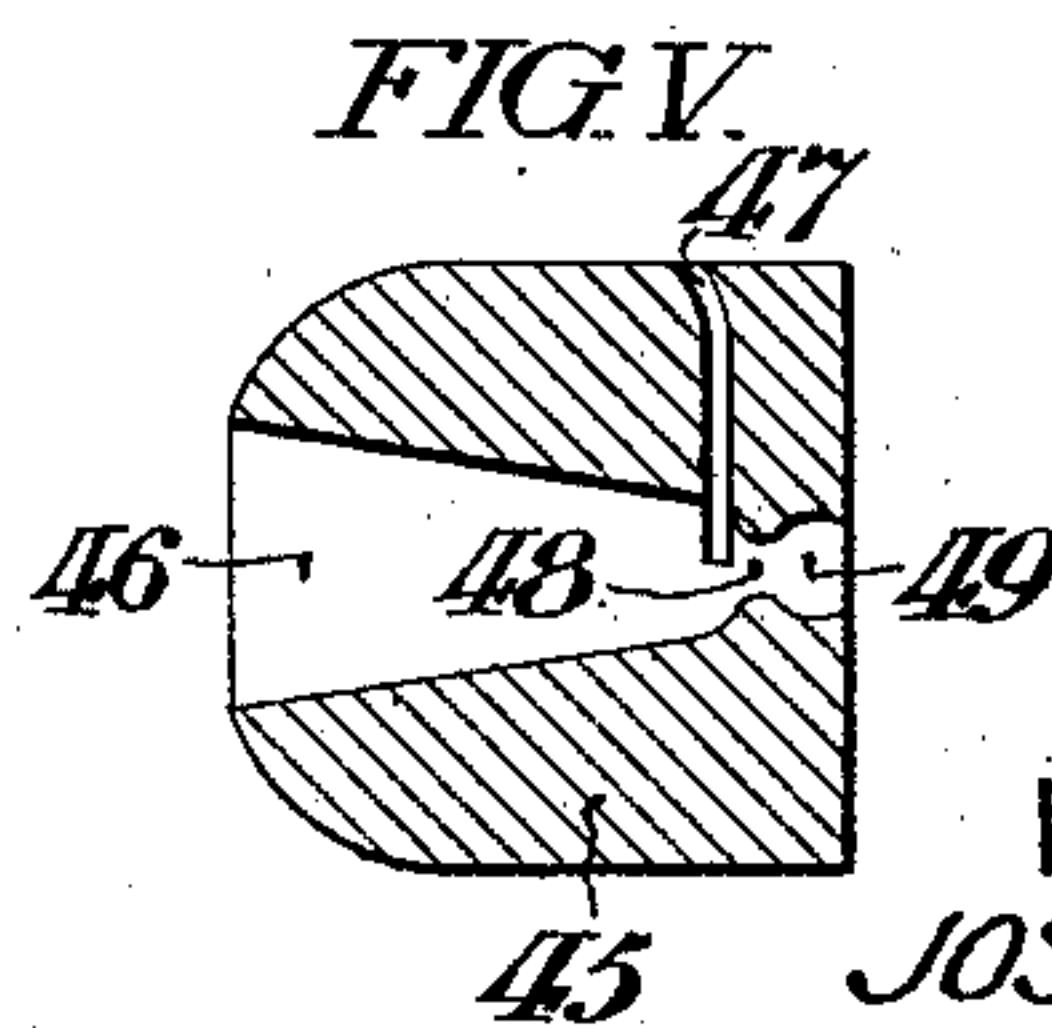
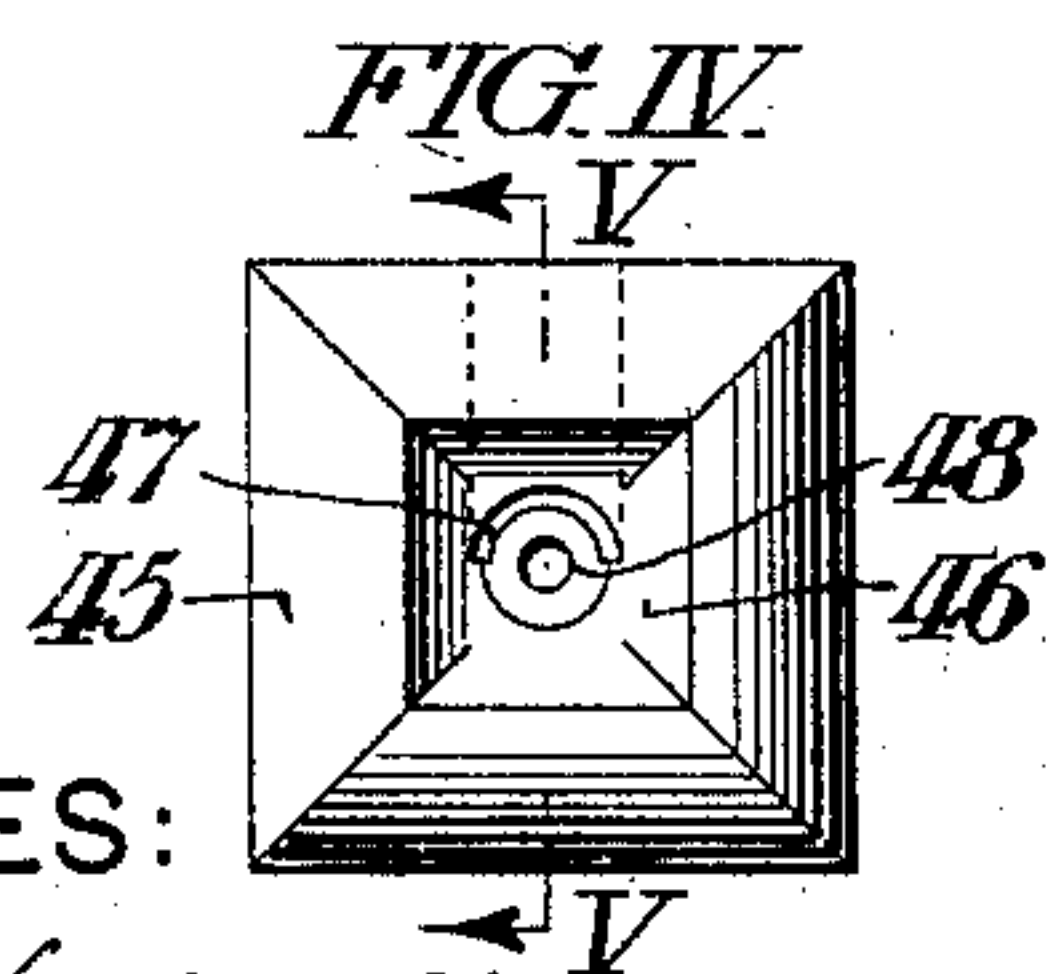
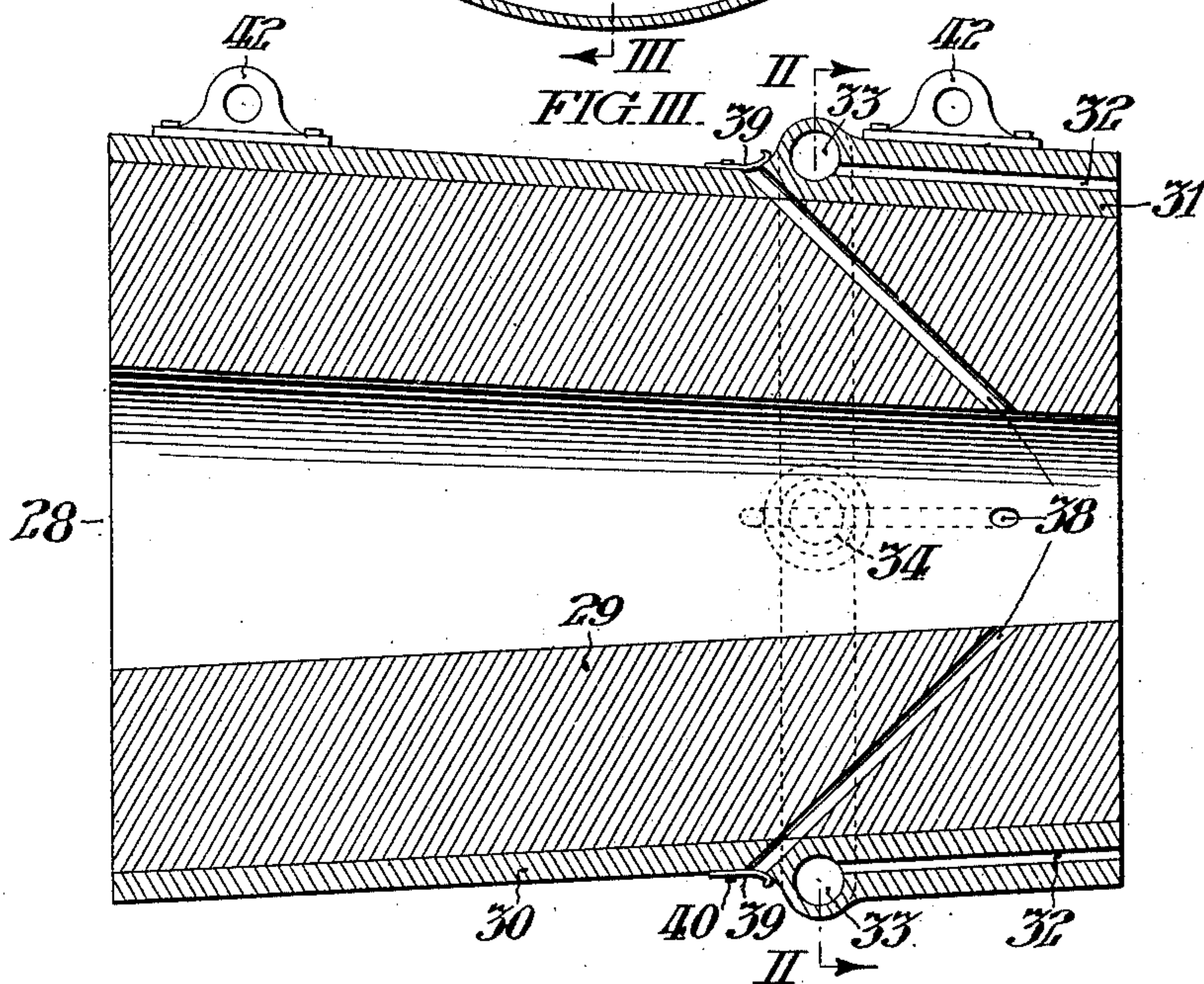
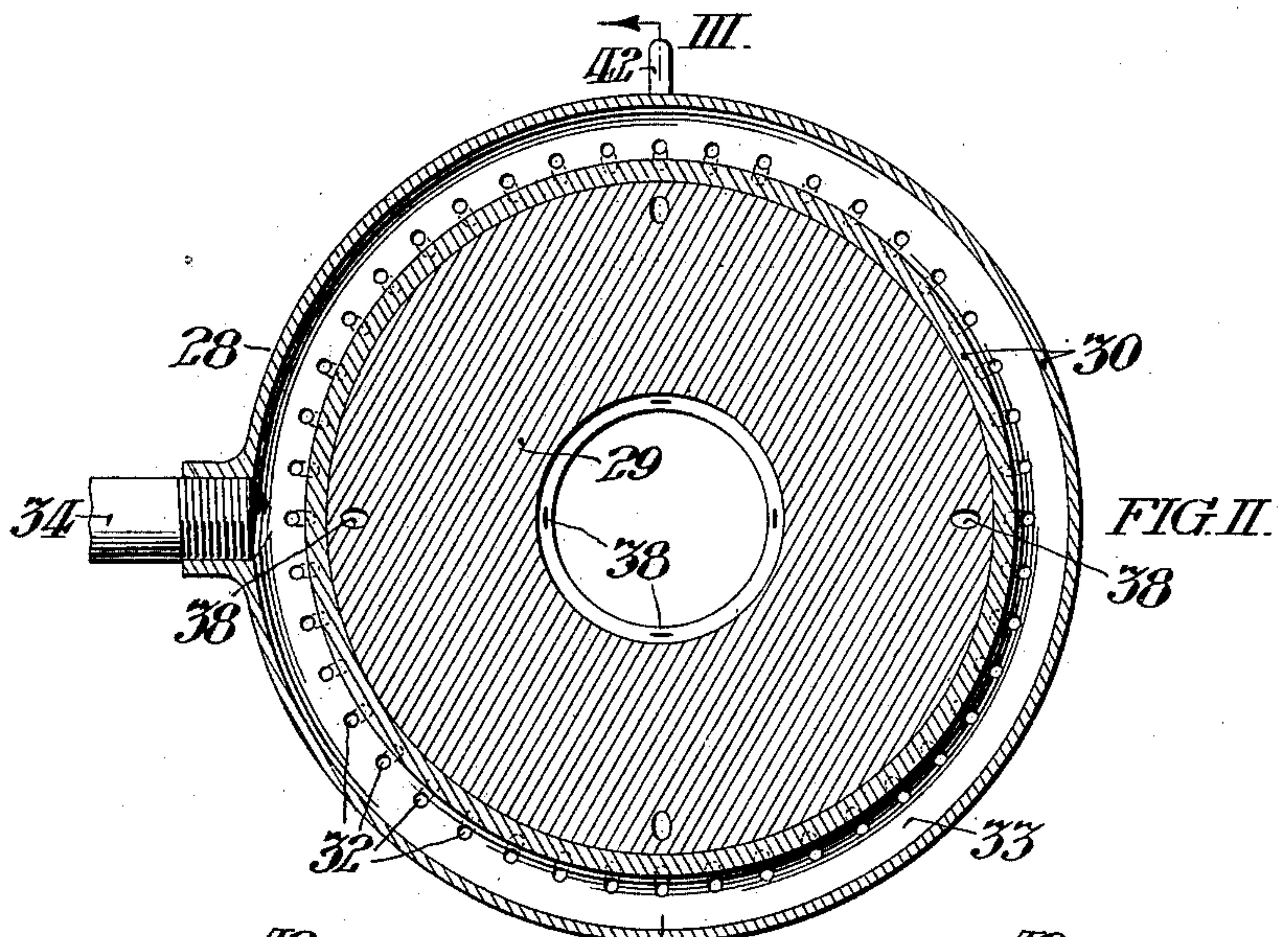
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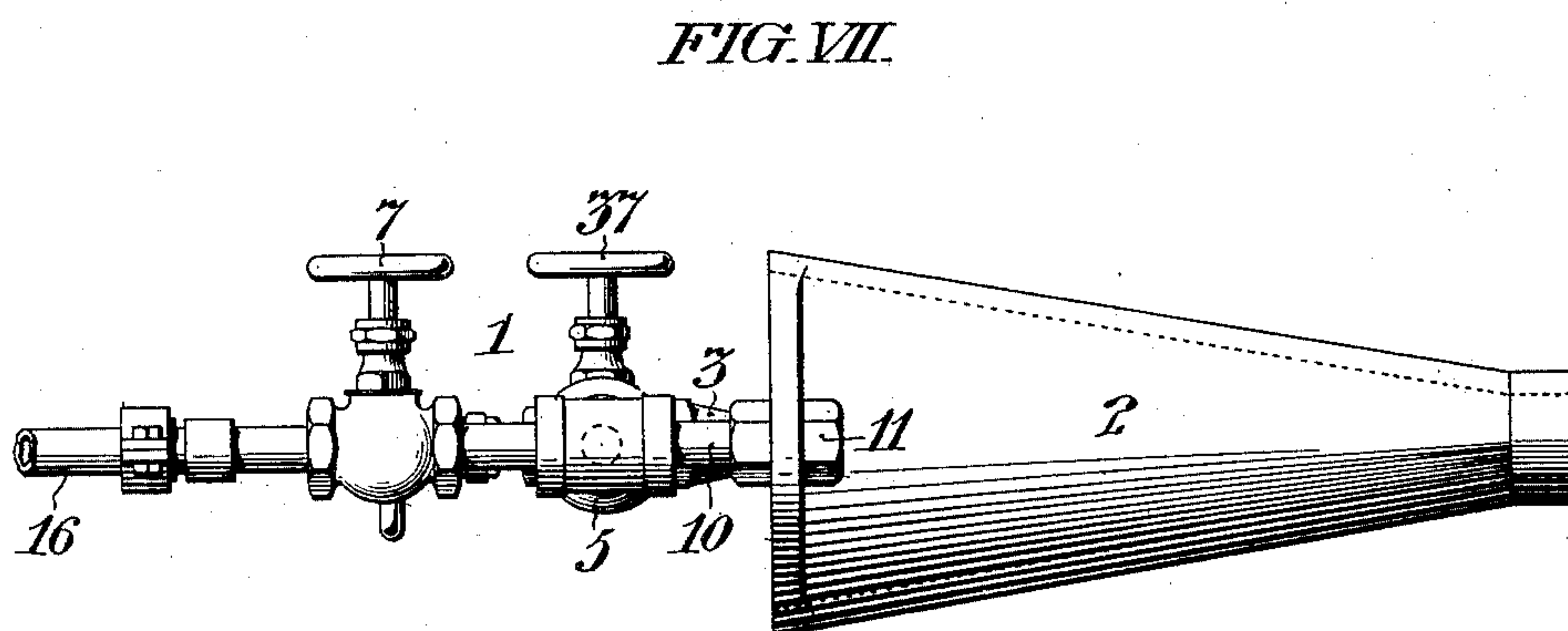
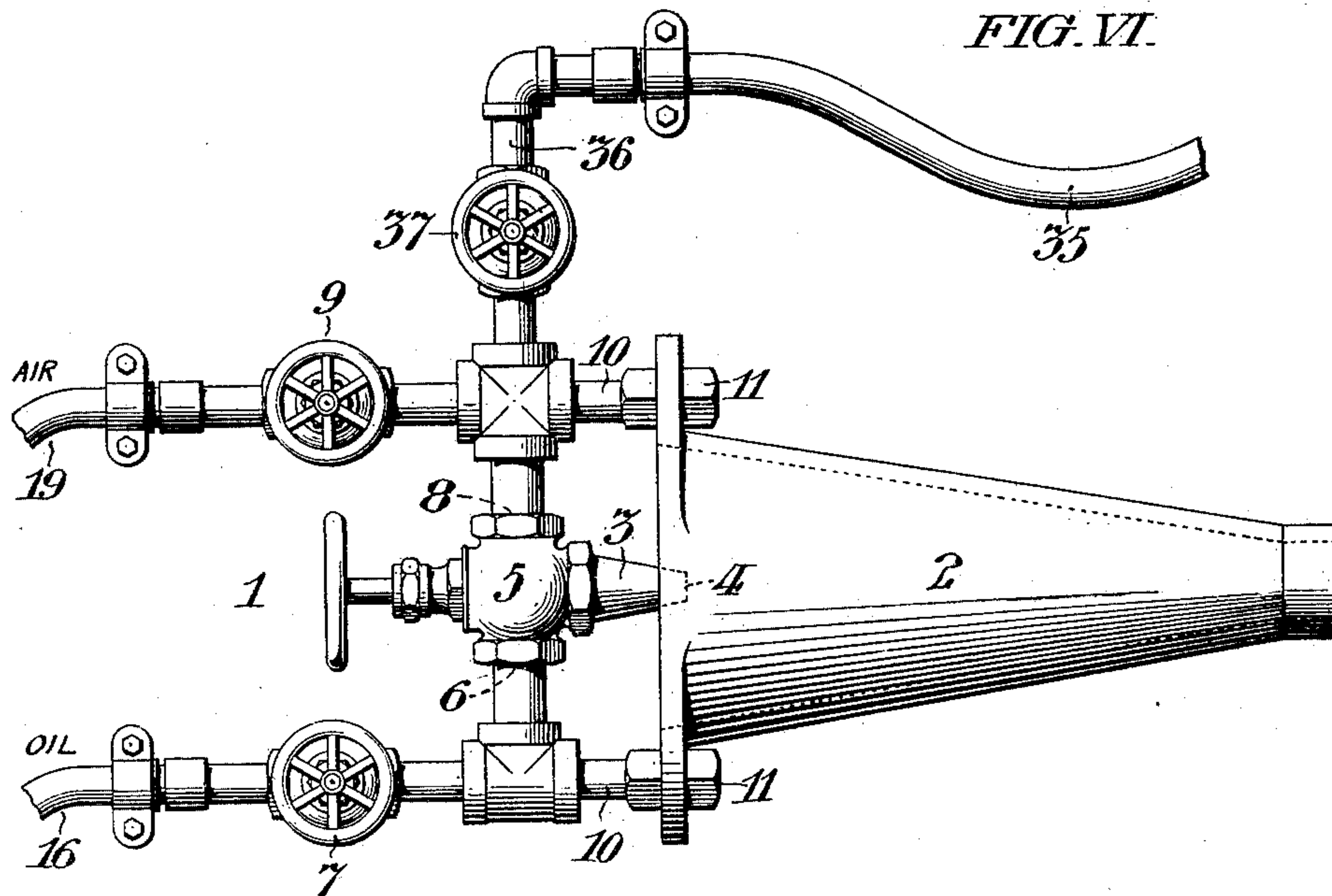
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JOSEPH J. TYNAN, OF PHILADELPHIA, PENNSYLVANIA.

ANNEALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 711,138, dated October 14, 1902.

Application filed June 28, 1901. Serial No. 66,415. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. TYNAN, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Annealing Apparatus, whereof the following is a specification, reference being had to the accompanying drawings.

My invention is particularly designed for use in connection with metal work comprising rolled or forged members bent and fitted to each other to form structural frames, such as ship-hulls, bridges, and the like. Although the shapes of the majority of the elements of such structures may be predetermined in the shop prior to the erection of the work, in every such structure there are elements whose precise shape can only be determined when the parts are assembled and which thereafter must be reheated and bent so as to fit properly before being bolted or riveted in position. Likewise certain armor-plates used in the construction of metallic ship-hulls must be annealed in spots after being placed in position in order to drill and tap holes for the attachment of angle-irons or other accessories which can only be located after the armor-plates are in position. Hitherto the aforesaid reheating of plates and girders has necessitated the repeated removal of the same from the ship-hull or other structure to a stationary furnace, and the aforesaid local annealing of armor-plates has only been effected by the employment of electrical apparatus of costly construction and difficult to manipulate.

It is the object of my invention to provide a furnace which is not only readily portable, but so arranged as to enable the operator to concentrate and apply an intense heat locally upon any portion of a structure of the class described during the process of assembling the members thereof, so that the operator may reheat at will a definitely-limited region of a plate or girder which requires to be bent without removing said member from the structure in which it is being fitted and so that the operator may anneal the particular spots in an armor-plate required to be drilled without disturbing the hardened condition of the remainder thereof and without the employment of the electrical apparatus aforesaid.

My invention comprises the combination, with a portable hydrocarbon-burner, of means to regulate the flame of said burner and means to concentrate and localize the heating action of said flame at the will of the operator.

My invention also comprehends the novel construction and arrangement of parts hereinafter specified and claimed.

In the accompanying drawings, Figure I is a general view of a furnace conveniently embodying my improvements. Fig. II is a sectional view of the localizer taken on the line II II in Figs. I and III. Fig. III is a sectional view of said localizer taken on the line III III in Fig. II. Fig. IV is a front elevation of a modified form of localizer. Fig. V is a sectional view of the localizer taken on the line V V in Fig. IV. Fig. VI is a plan view of the hydrocarbon-burner shown in Fig. I. Fig. VII is a side elevation of the hydrocarbon-burner shown in Fig. VI.

In said figures, 1 is a hydrocarbon-burner comprising the exterior concentrating-nozzle 2, which is open at both ends to the atmosphere. Within said concentrating-nozzle 2 is the mixing-nozzle 3, whose outlet 4 is controlled by the valve 5. Said nozzle 3 is provided with the oil-port 6, controlled by the valve 7, and with the air-port 8, controlled by the valve 9. As best shown in Fig. VI, the mixing-nozzle 3 is fixed in axial alignment with the concentrating-nozzle 2 conveniently by the screw-studs 10 and nuts 11.

The receptacle 12 is adapted to contain oil 13, together with compressed air in the space above said oil. Said receptacle is provided with an oil-outlet pipe 14, which is controlled by the valve 15 and connected with the burner 1 by the flexible conduit 16, arranged to convey oil between said receptacle and the oil-port 6 of said burner. Said receptacle 12 is also provided with the air-pipe 17, controlled by the valve 18 and connected with the burner 1 by the flexible conduit 19, arranged to convey compressed air between said receptacle and the air-port 8 of said burner. Said receptacle 12 may be charged with oil through the inlet 20, and in order that it may be conveniently charged with compressed air I provide the pipe 17 with the branch 21, controlled by the valve 22. Said pipe 21 is in communication

with any suitable source of compressed air through the flexible conduit 23, and in order that the pressure of air supplied to the burner 1 may be precisely determined irrespective of the pressure of the air-supply I prefer to provide said pipe 21 with the pressure-regulator 24. As a matter of convenience said pipe 21 is also provided with the pressure-gage 25 between said regulator and the receptacle 12. Said receptacle 12 is conveniently mounted in the portable stand 26, and it is to be noted that the conduits 16 and 19, connecting said receptacle with the burner 1, are flexible, so that said burner is movable with respect to the receptacle at the will of the operator.

It is to be understood that the arrangement of the parts above described is such as to deliver oil from the receptacle 12 to the burner 1 under pressure from the air contained in said receptacle and that the compressed air is also delivered from said receptacle to said burner, so that the oil and air which are mixed in the nozzle 3 may be ignited in a flame which is concentrated within the nozzle 2 and delivered from the apex of the latter. However, if said flame is delivered directly against the structural members which are to be reheated—for instance, the plate 27, (shown in Fig. I)—the flame is diffused upon the surface thereof instead of being localized, and in order to insure that the flame from the burner 1 shall be concentrated and localized upon a definite region of the plate 27 predetermined by the operator I provide what I shall term a "localizer" 28, which is movable independently of the burner 1 at the will of the operator, but which in operation is opposed to said burner, substantially as indicated in Fig. I. As shown in Figs. II and III, the localizer 28 comprises the tubular body 29, which is preferably formed of refractory material, such as fire-brick, and inclosed in the jacket 30, which latter may be formed of cast-iron. The front end 31 of the jacket 30 is provided with the circular series of blast-orifices 32, all of which communicate with the annular blast-chamber 33, extending circumferentially around the localizer 28. Said blast-chamber 33 is provided with an inlet 34 and a flexible conduit 35, through which said chamber 33 is supplied with compressed air. Although said conduit 35 may be connected with a source of compressed air independently of the burner 1, I find it convenient to provide a branch 36 in the conduit leading to the air-port 8 and to connect said conduit 35 therewith, the flow of compressed air through said conduit being independently controlled by the valve 37.

It is to be understood that the construction of the localizer 28 above described is such that an intense heat may be concentrated upon the plate 27, for instance, and the heating action be definitely limited and localized to a particular region by the effect of a cold-air blast delivered through the orifices 32, the

extent of the cold blast being determined at the will of the operator by manipulation of the valve 37. In order to further regulate and control the action of the localizer 28, I find it convenient to provide the same with diagonal passage-ways 38, which extend through the lining 29 and jacket 30 and are provided upon the exterior of the latter with valves 39, which are hingedly connected with the jacket 30 by the studs 40 and may be opened or closed at the will of the operator.

It is to be noted that the localizer 28 may be conveniently supported by the chains 41 in any desired position with respect to the structure member operated upon, said chains being connected to the eye-plates 42, fixed upon the jacket 30.

In Figs. IV and V, I have shown a simplified form of localizer consisting of a body 45, of fire-brick or similar material, provided with the conical recess 46, arranged to receive the flame from the burner 1. Said recess is provided with the lateral vent 47, leading to the atmosphere, and the reduced neck 48 within said recess 46, which serves to return the flame to said vent 47 and to restrict the distribution of the flame through the aperture 49 at the apex of said recess 46 when the device is withdrawn from the plate 27.

I do not desire to limit myself to the precise construction and arrangement which I have herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a device supported independently of said burner, constructed and arranged to localize the heating action of the flame of said burner, substantially as set forth.

2. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, supported independently of said burner, and comprising a body of refractory material opposed to said burner, substantially as set forth.

3. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, supported independently of said burner, and comprising a body of refractory material, relatively movable with respect to said burner, substantially as set forth.

4. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, supported independently of said burner, and comprising a body of refractory material provided with a recess arranged to receive said flame, substantially as set forth.

5. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, supported independently of said

burner; a recess in said localizer; and a vent from said recess to the atmosphere, substantially as set forth.

6. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, supported independently of said burner; a recess in said localizer; and a vent extending laterally from said recess to the atmosphere, substantially as set forth.

7. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a receptacle for hydrocarbon provided with means to force the hydrocarbon to the burner; and a device supported independently of said burner, constructed and arranged to localize the heating action of the flame of said burner, substantially as set forth.

8. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a receptacle for hydrocarbon, provided with pneumatic pressure; means to force the hydrocarbon to the burner; and a device, supported independently of said burner, constructed and arranged to localize the heating action of the flame of said burner, substantially as set forth.

9. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a receptacle for hydrocarbon, provided with pneumatic pressure; means to force the hydrocarbon to the burner; means to control the pressure of delivery of the hydrocarbon; and a device supported independently of said burner, constructed and arranged to localize the heating action of the flame of said burner, substantially as set forth.

10. The combination with a hydrocarbon-burner; of a localizer for the flame of said burner, comprising a body of refractory material provided with a recess arranged to concentrate and deliver said flame; a jacket surrounding said body; an air-blast chamber in said jacket; and a plurality of cold-blast orifices opening from said chamber at the delivery end of said localizer, substantially as set forth.

11. The combination with a hydrocarbon-burner; of a localizer for the flame of said burner, comprising a body of refractory material provided with a recess arranged to concentrate said flame; a jacket surrounding said body; an air-blast chamber in said jacket; a plurality of blast-orifices opening from said chamber adjacent to said recess; and means to control a supply of cold air to said blast-chamber, substantially as set forth.

12. The combination with a hydrocarbon-

burner; of a localizer for the flame of said burner, comprising a body of refractory material provided with a recess arranged to concentrate said flame; a jacket surrounding said body; an air-blast chamber in said jacket; a plurality of blast-orifices opening from said chamber adjacent to said recess; a passage-way extending from said recess through the wall of said body and said jacket to the atmosphere; and a valve arranged to control said passage-way, substantially as set forth.

13. In annealing apparatus, the combination with a hydrocarbon-burner, comprising a mixing-nozzle; of an oil-port in said nozzle; an air-port in said nozzle; a receptacle arranged to contain oil and compressed air together; a flexible conduit connecting said receptacle and said nozzle, arranged to convey the oil between said receptacle and said oil-port; a second flexible conduit connecting said receptacle and said nozzle, arranged to convey compressed air between said receptacle and said air-port; a localizer; a flexible conduit connecting said localizer with the air-conduit; and means to coöperatively control said conduits, substantially as set forth.

14. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, comprising a body of refractory material open at both ends; a jacket incasing said body; and means upon said jacket arranged to support said localizer independently of said burner, substantially as set forth.

15. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, comprising a body of refractory material open at both ends; a jacket incasing said body; and an eye-plate upon said jacket arranged to support said localizer independently of said burner, substantially as set forth.

16. In a device for annealing armor-plates and the like, the combination with a hydrocarbon-burner; of a localizer for the flame of said burner, comprising a body of refractory material open at both ends; a jacket incasing said body; and chains connected with said jacket respectively at the front and rear thereof and arranged to support the localizer independently of said burner, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 27th day of June, 1901.

JOSEPH J. TYNAN.

Witnesses:

ARTHUR E. PAIGE,
E. L. FULLERTON.