

No. 635,229.

Patented Oct. 17, 1899.

H. B. BURIN.

MEANS FOR HEATING APPLICABLE TO FORGES.

(Application filed Dec. 30, 1897.)

(No Model.)

3 Sheets—Sheet 1.

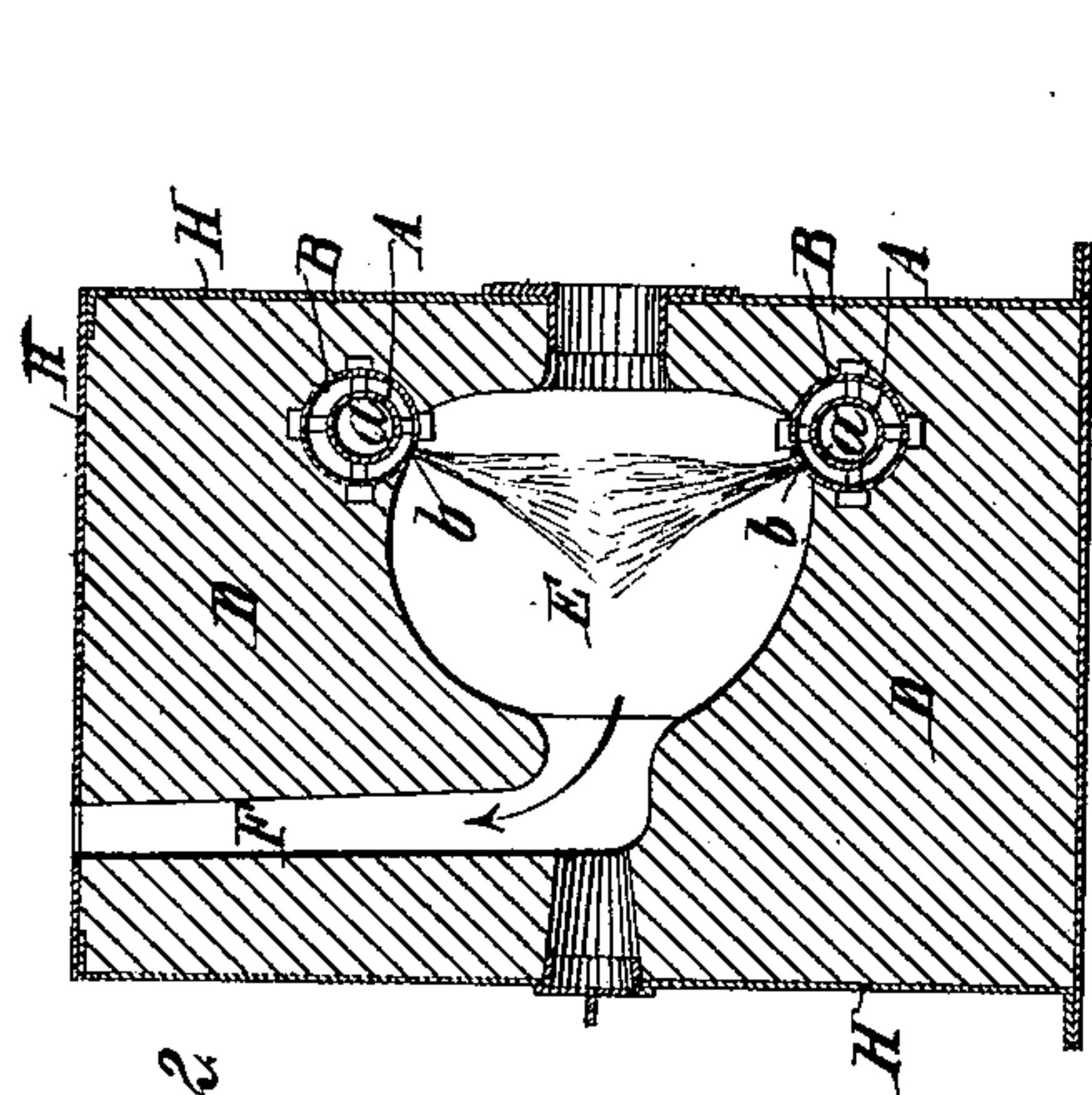


Fig. 2.

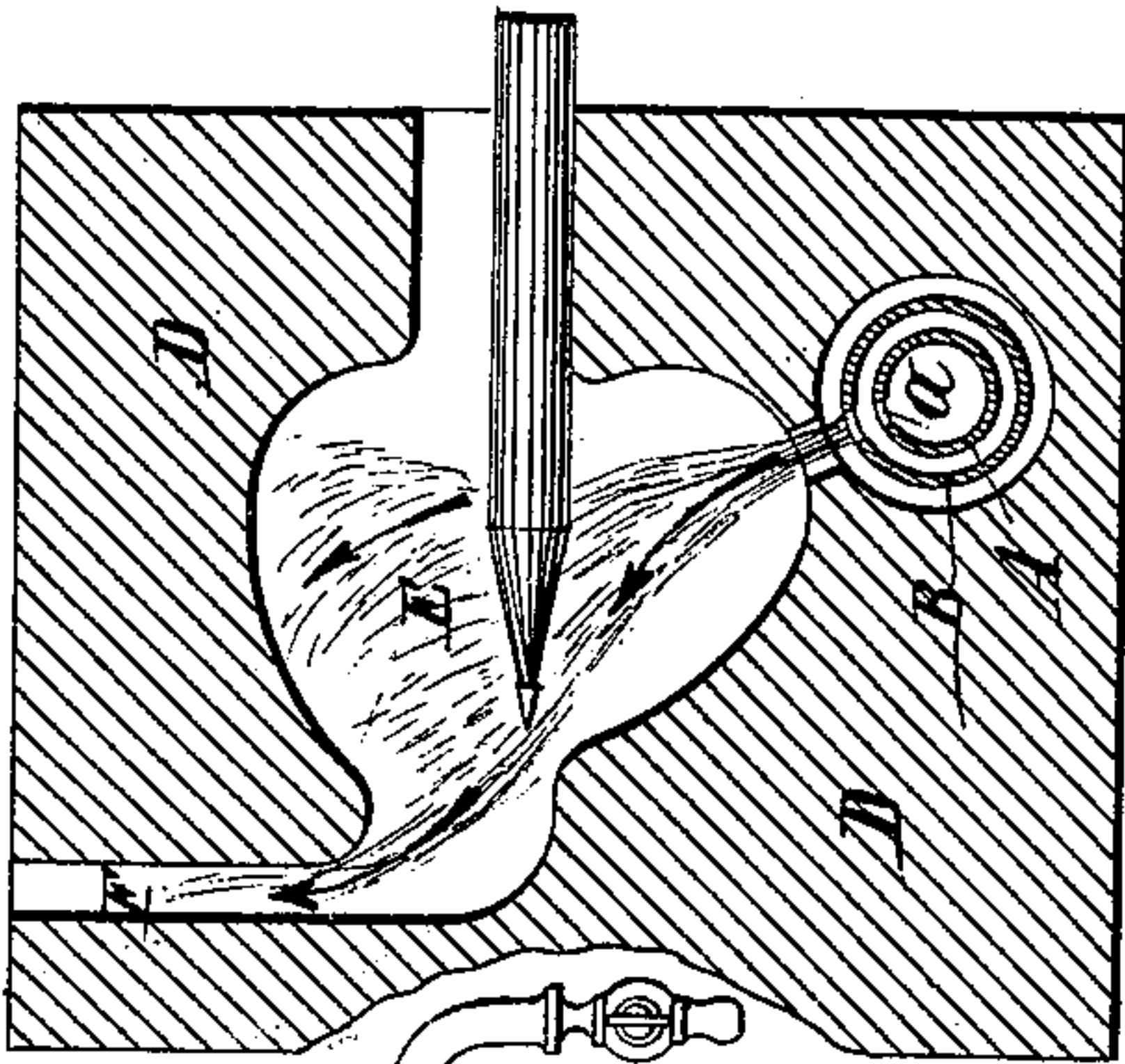


Fig. 3.

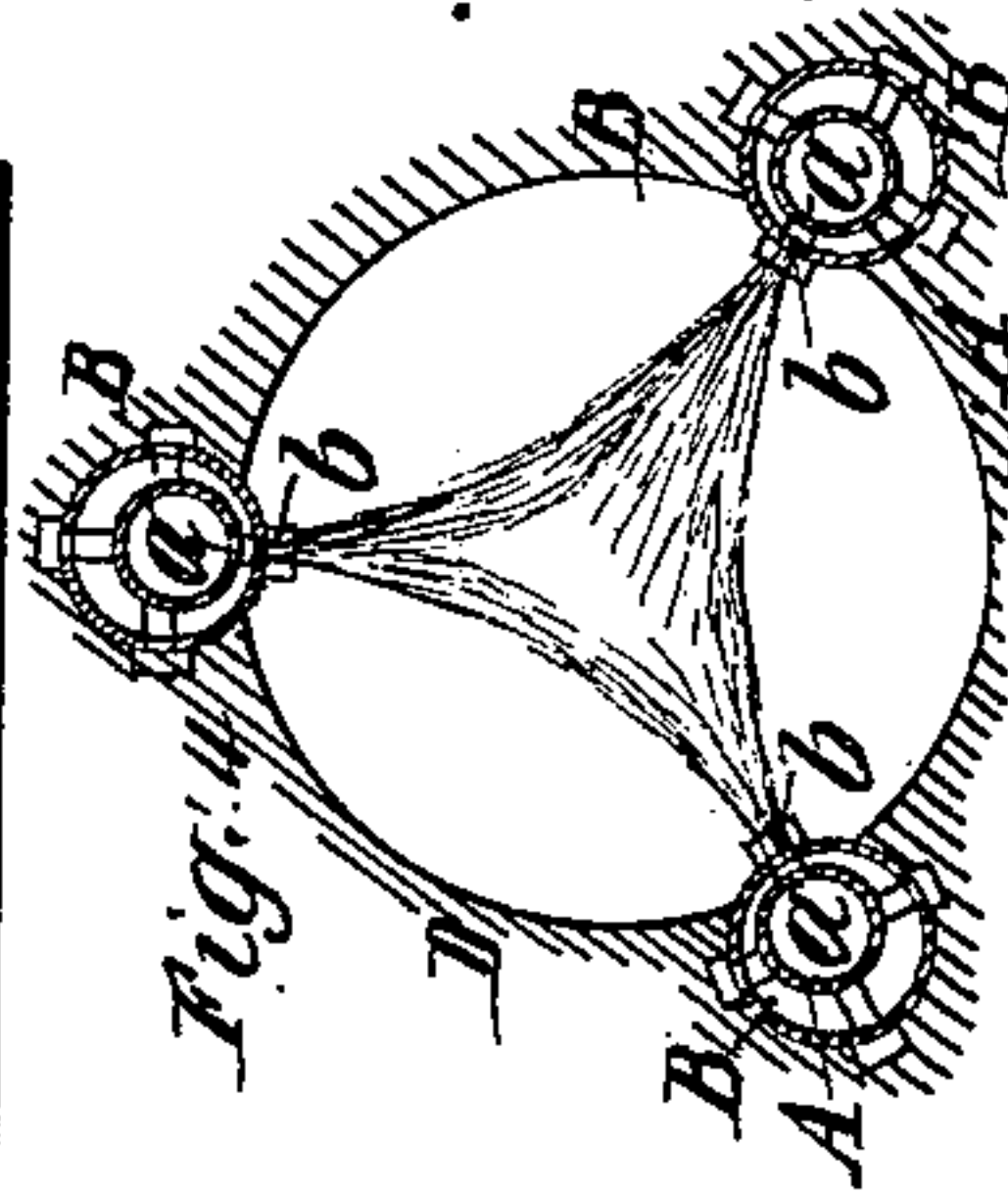


Fig. 4.

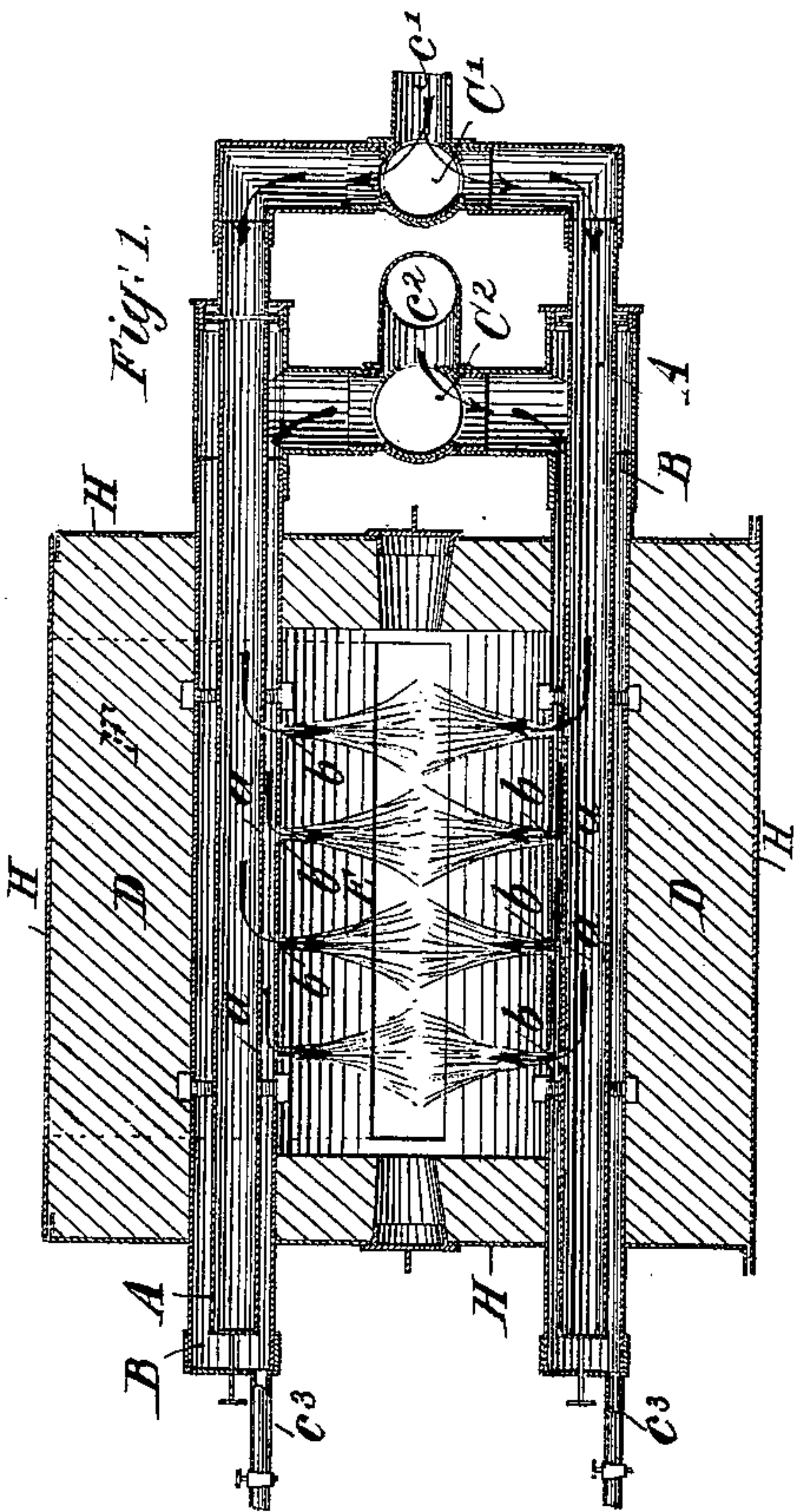


Fig. 1.

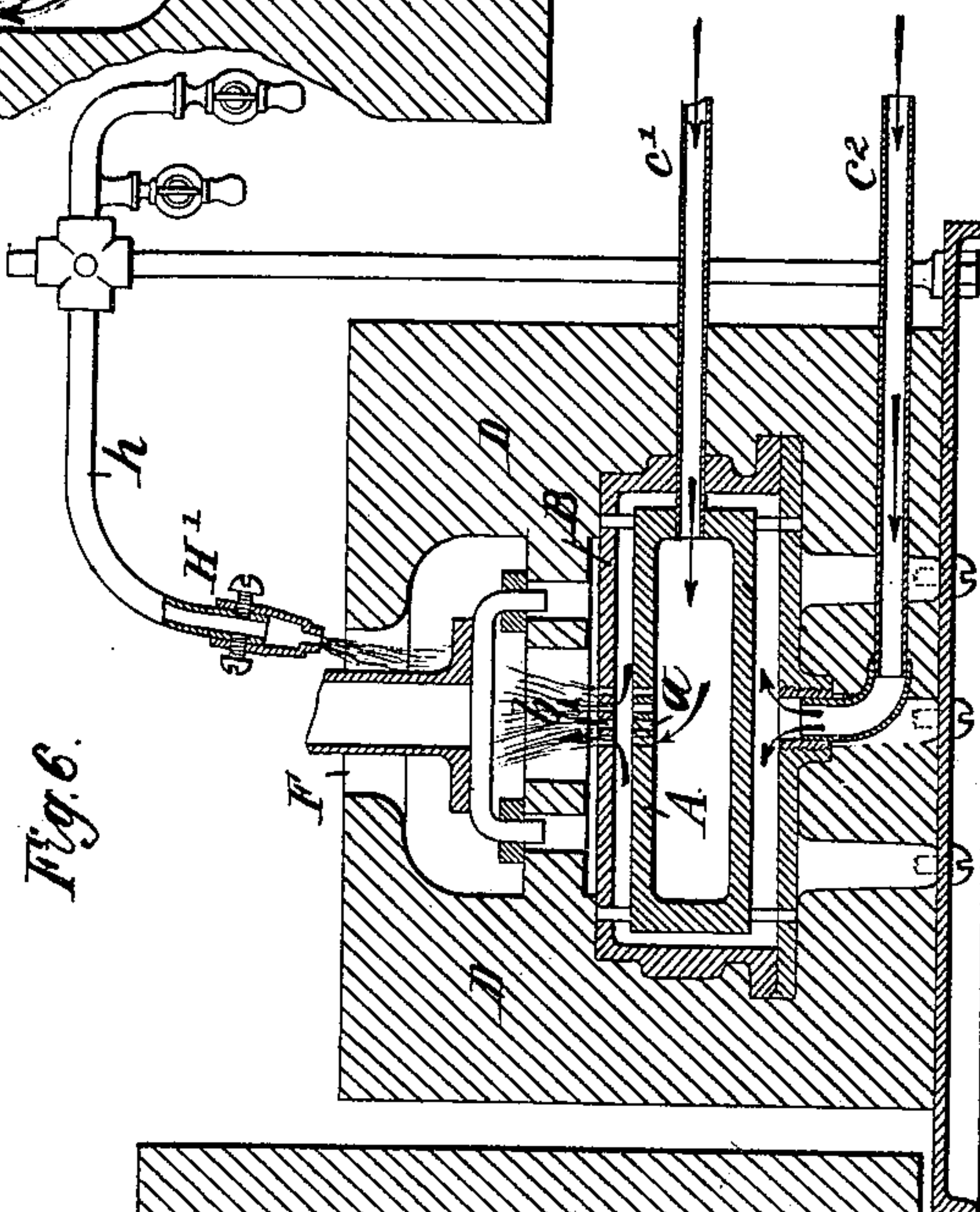


Fig. 6.

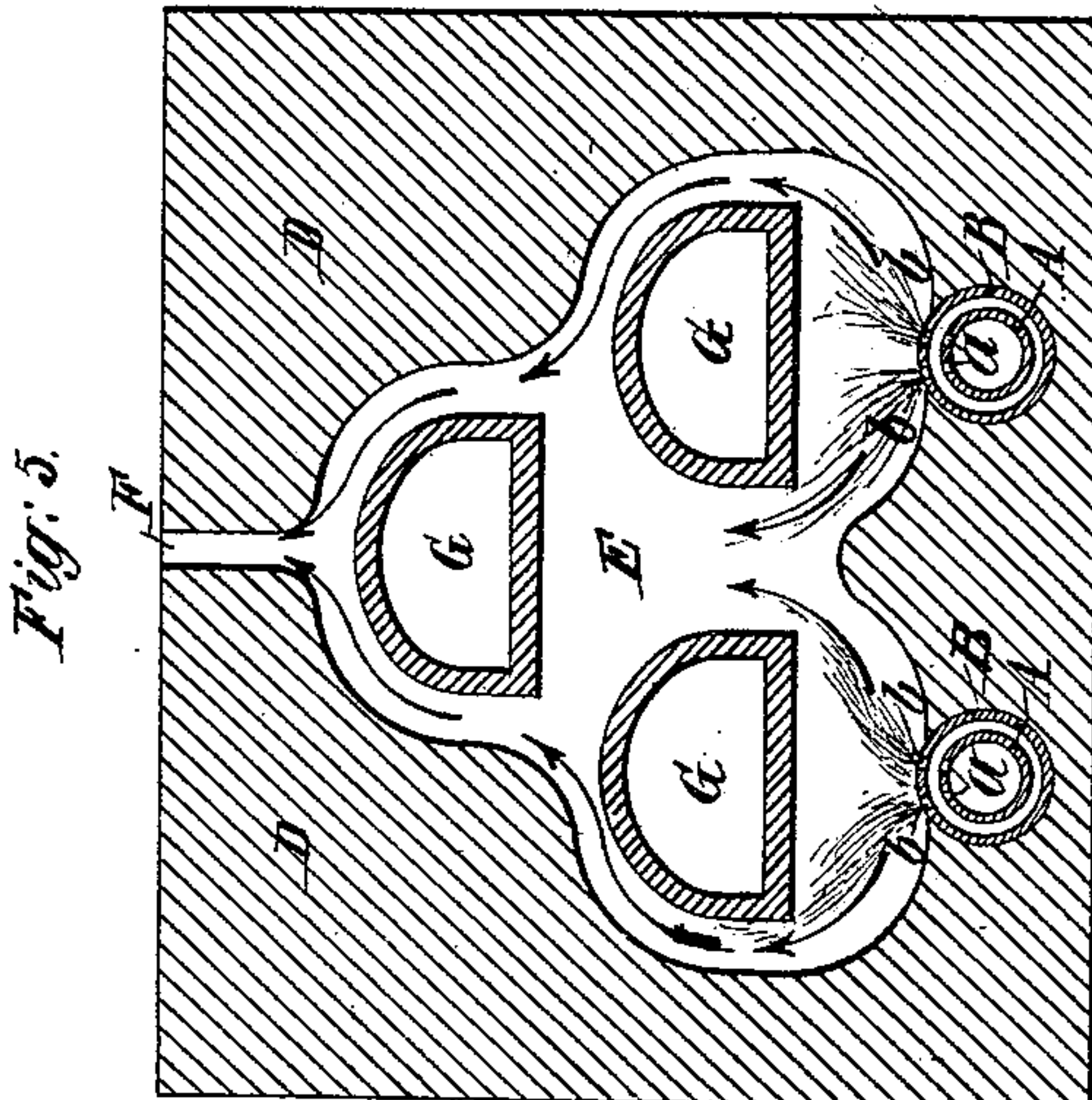


Fig. 5.

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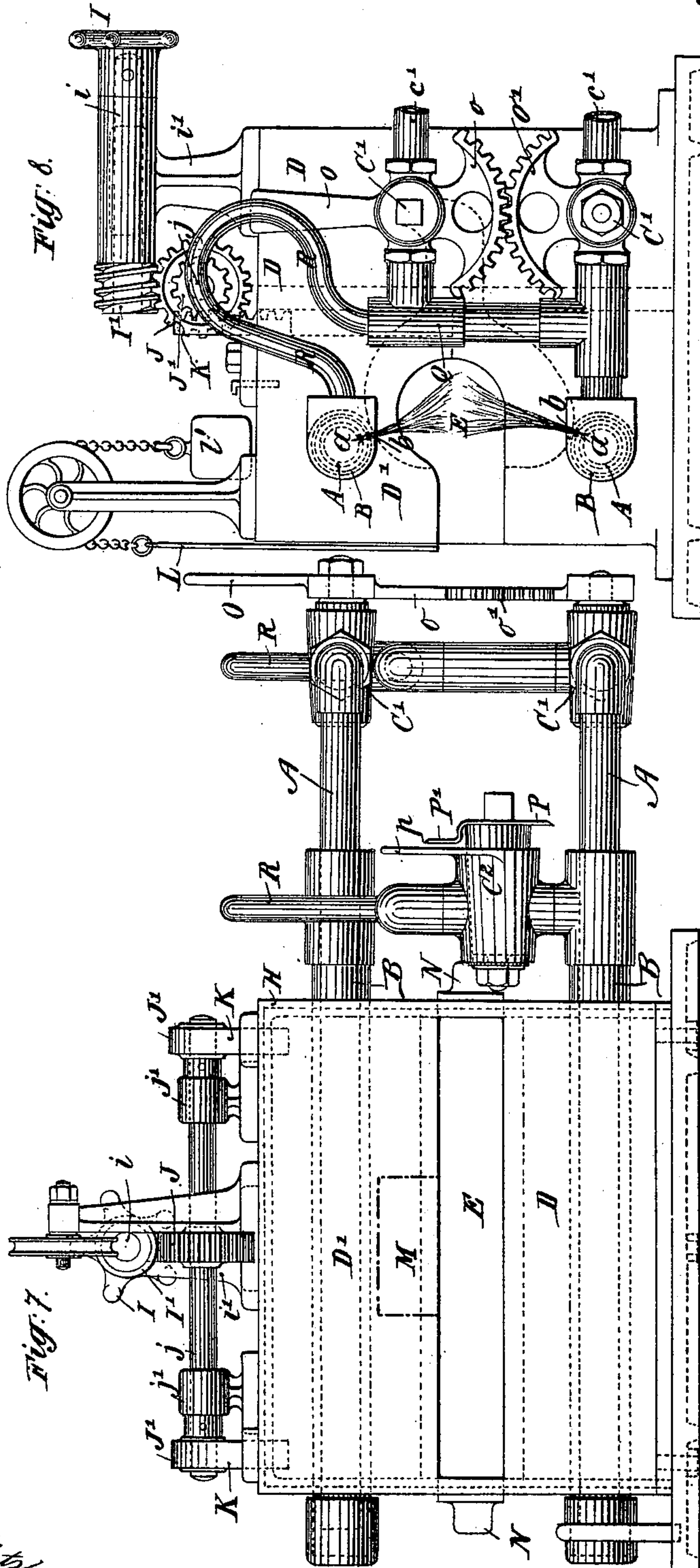
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3 Sheets—Sheet 2.



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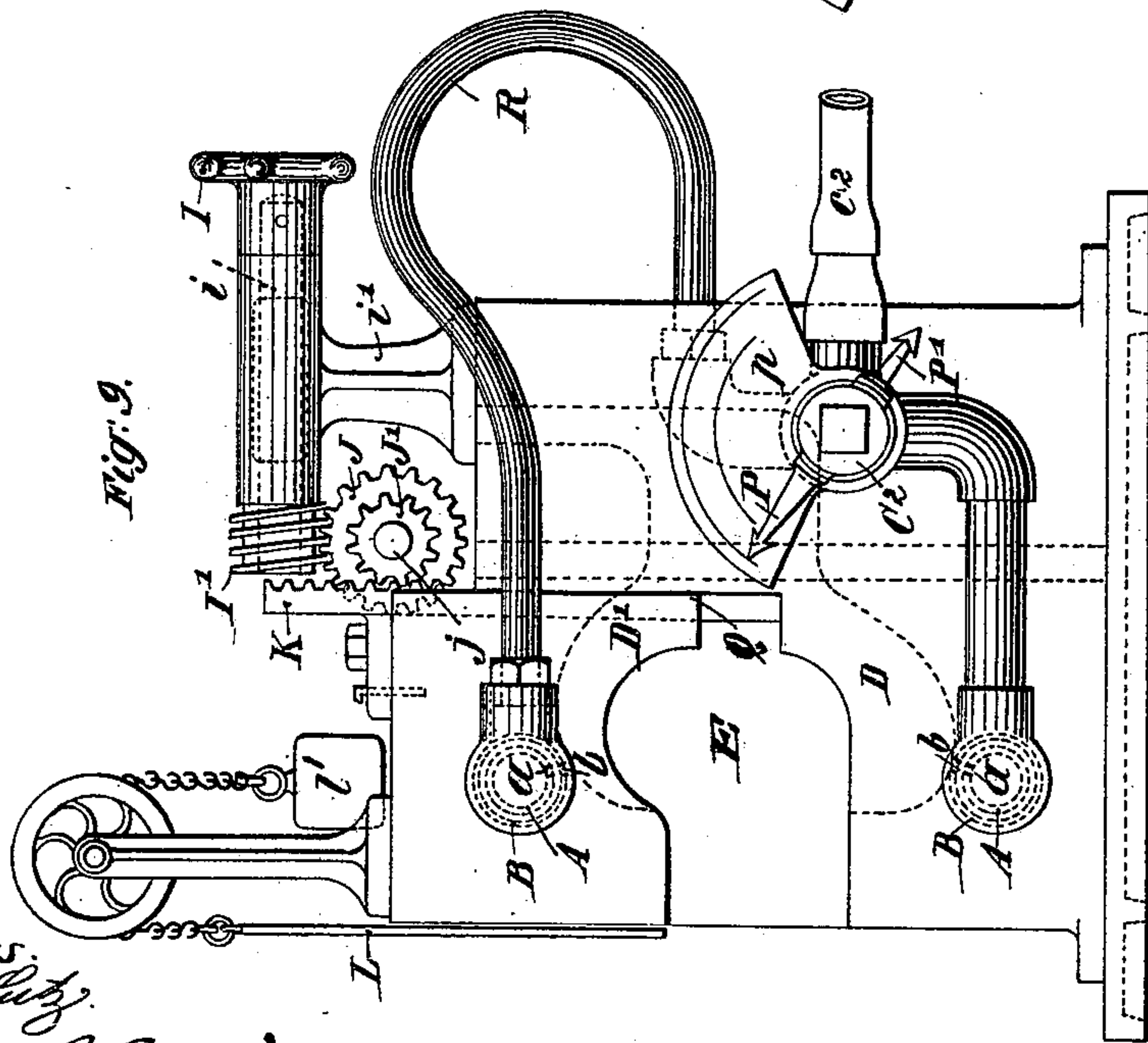
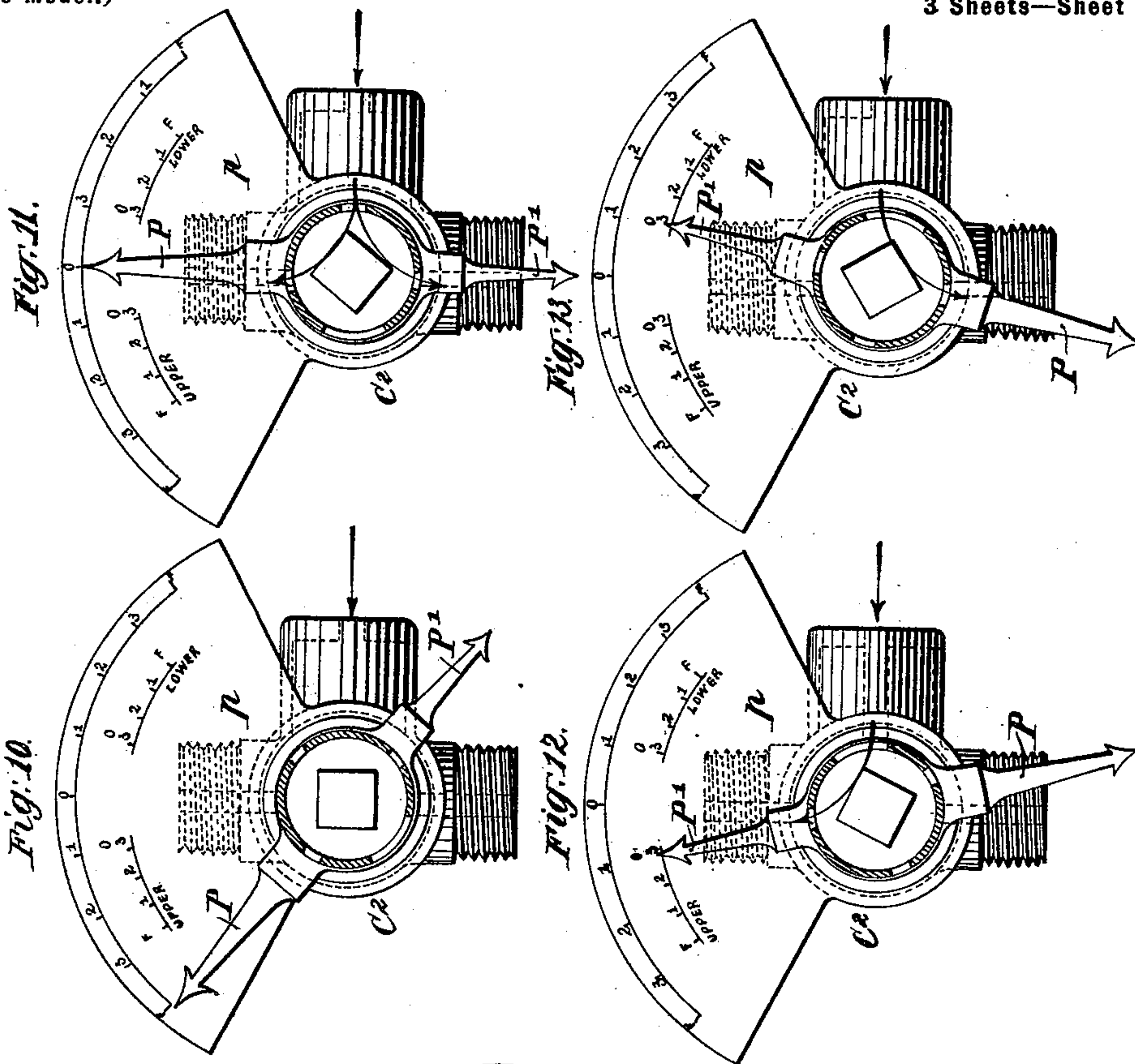
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(Application filed Dec. 30, 1897.)

(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

HENRY BARTHELEMY BURIN, OF MONS-EN-BAROEUL, FRANCE.

MEANS FOR HEATING APPLICABLE TO FORGES.

SPECIFICATION forming part of Letters Patent No. 635,229, dated October 17, 1899.

Application filed December 30, 1897. Serial No. 664,614. (No model.)

To all whom it may concern:

Be it known that I, HENRY BARTHELEMY BURIN, a citizen of the United States, residing in Mons-en-Baroeul, Nord, France, have invented a Means for Heating Applicable to Forges, Smithies' Furnaces, or other Similar Apparatus, (for which I have obtained a patent in France, dated July 27, 1897, No. 249,084; in Belgium, dated July 31, 1897, No. 116,877, and in Great Britain, dated August 6, 1897, No. 14,838,) of which the following is a specification.

This invention relates to a means for heating, having for its principal object to facilitate the working of the steel or iron for tools in general, the suppressing of inconveniences inherent to present methods of forging—that is to say, the deterioration of the material treated by reason of the heating, facilitating the work of the smith or workman by the absence of smoke, dross, &c.—and a system favorable to rapid work or manipulation.

So as to leave no doubt as to the nature of my invention, I refer in the following description to the annexed drawings, in which—

Figure 1 is a longitudinal vertical section of an apparatus constructed according to my invention. Fig. 2 is a corresponding transverse vertical section. Figs. 3, 4, 5, and 6 are sectional views showing various applications of my system. Fig. 7 is an outer view of a forge, showing the practical application of my system of heating. Fig. 8 is an outer side view. Fig. 9 is another elevation thereof. Figs. 10, 11, 12, and 13 are detail views showing the working of a distributing-cock.

My heating apparatus is characterized, essentially, as one can see from Figs. 1 and 2 of the annexed drawings, by the use of cylinders A and B, arranged concentrically and pierced with a suitable number of holes *a* and *b*, exactly situated opposite one another. In the central tube A is admitted the air under pressure from a suitable apparatus, and in B, which serves as an envelop or casing for the previous one, the gas is delivered. Cocks *C'* and *C''* serve to put in communication, the former, *C'*, the receptacles A with the air-inlet pipe *c'* and the latter, *C''*, the receptacles B with gas-inlet pipe *c''*. The outer receptacles B can, besides, be fed with gas by small tubes *c''* for the lighting or starting of the apparatus.

The part of the cylinders A and B furnished with holes *a* and *b* is inclosed in a refractory envelop or casing D, in the center of which is the combustion-chamber E. In the envelop D are arranged openings allowing the entrance of the articles to be heated. This envelop is itself surrounded with metallic parts or strengthening-pieces H, which prevent distortion or deformation thereof.

The working of this heating system is very easily understood. Gas is first admitted by pipes *c''* into the receptacles B, and this gas is lighted at its exit from the holes *b* in the combustion-chamber E. Afterward gas and air are admitted into the cylinders A and B by tubes or pipes *c'* *c''*. The air escaping from the holes *a* of the cylinder A violently forces and draws the gas of the receptacles B into the combustion-chamber E, and the mixture of gas and air so formed burns in a continuous manner and with an intensely-hot flame. The products of combustion are conducted or led out by a pipe F, forming a chimney.

In the example shown on Figs. 1 and 2 of the drawings there are two sets of cylinders A and B, the flames of which meet in the middle of the combustion-chamber E, in which latter the article to be heated is introduced. It will be understood that this method of heating is capable of numerous applications, and that according to the particular application made thereof I may employ a single set of cylinders A B or several sets similarly arranged in the most suitable manner with a view to obtaining the greatest possible heating effect. For the same purpose these sets of cylinders A and B may be mounted or erected in a movable manner, which will allow of their being brought together or being separated one from the other, according to the dimensions of the article to be heated. The walls of the combustion-chamber E have a special form or shape, as shown on the drawings, in view of the complete utilization of the flames produced by each of the sets of cylinders A B.

Figs. 3 to 13 show some of the various applications of my system of heating. Fig. 3 shows a small fixed forge, which is employed for forging and annealing small fragile tools. As will be seen later, the heating of the forge is derived from a single set of cylinders A

and B. Fig. 4 illustrates another forge in which three sets of cylinders A and B are employed. Fig. 5 shows a muffle-furnace or annealing-furnace G, which is used in forging, tempering, and annealing articles of cutlery, surgical instruments, &c. As shown, two sets of tubes A B are used to heat this furnace, and in each of these sets the cylinders A B are provided with two series of holes *a* and *b*, always arranged opposite to one another. This arrangement is used whenever it is necessary to obtain a considerable calorific power. The heated furnace may of course comprise any desired number of vessels or chambers G. Fig. 6 shows a hearth or forge for brazing tubes into position. Here A and B are the boxes producing exactly similar effects to the tubes A and B in the previously-described apparatus. To complete the working of this forge or hearth, a blowpipe H' is fixed to the end of a flexible or jointed pipe *h*, as shown on the drawings, so that it may be moved about as required and produce the running or flux of the solder or other compound used.

In order that the practical working of my invention may be fully understood, Figs. 7 to 13 of the annexed drawings are full and detail views of a forge furnished with my heating system and working in such a manner as to derive all possible advantages from the system. This forge consists of a mass of refractory earth formed of two parts D D' independent one of the other. This mass or block is molded or shaped in such a manner as to form the combustion-chamber E. Metallic stays or braces H, arranged on the outside, are intended to secure it and consequently prevent its deformation. In each of the parts or halves D D' of the mass of refractory earth is arranged a set of tubes, cylinders, or boxes A and B in every way identical with those to which I have previously referred. As may be seen from Figs. 8 and 9, the part D' of the mass of earth independent of that D is capable of being displaced with regard to this latter by means of a slide Q for this purpose, which allows the dimensions of the combustion-chamber E to be varied according to the size of the articles to be heated and to produce in the flames issuing from the holes *b* of outer cylinders B the greatest possible calorific effect. To obtain this displacement or motion of the half D', it is sufficient to act on a sort of fly-wheel or hand-wheel I, keyed to a shaft *i*, supported or journaled in a framework *i'*, solid with the fixed part D, and to the other end of which shaft *i* is secured a worm I', engaging a worm-wheel J, fixed or keyed to a shaft *j*, mounted in supports *j'*, also fixed to the half D and having at its ends toothed wheels J', acting in combination with racks K, suitably attached to the movable part D'. It will easily be understood that by means of this arrangement the flames of the upper set A B can be used without any loss or waste, which is a very desir-

able result, since with an apparatus of this kind a tube of a large diameter may be heated in as reasonable a way as a tube of small diameter either to bend it or preparatory to its being treated in any other fashion. The apparatus can also be employed in the heating of a tool or article of small diameter and thickness.

A vertical door L, having a counterweight *l'*, is arranged to be able to close the principal entrance to the forge. It could, if needed, be furnished with an opening or slot M, so as to allow the entrance of small or narrow tools or articles. The side openings of the forge may themselves be closed by means of plugs or plates N, as shown on Fig. 7.

The compressed air is led into the apparatus by tubes *c'*, on each of which is situated a regulating-cock C'. The simultaneous opening of these two cocks is obtained by acting in the desired direction on a hand-lever O, governing and actuating two toothed sectors *o o'*, engaging one with the other and which are mounted each on the stem or plug of one of the cocks C'. If for any reason whatever it is desired to supply air to only one set of cylinders A and B, one of the sectors is disengaged—for example, the one *o*—from its axis, and the operator then works solely on the valve-plug or the stem of the cock C', which it is wished to alone put in action. To exactly replace the sectors *o o'* in their proper and relative positions, they may be suitably marked or furnished with other indications.

The gas is conducted into the apparatus by a single tube *c*², and a cock C² regulates the passage of the gas. This cock C², which has numerous bores or passages, distributes the gas as desired either into the tubes B or only into the one or the other of these tubes. To facilitate the manipulation of this cock, its stem or plug is furnished with two indicating hands or needles P P' of different lengths intended to act in connection with a graduated and fixed segment or scale *p*. Figs. 10, 11, 12, and 13 of the drawings show in a very clear fashion the working of this cock C². When the larger needle P is led opposite one of the extremities of the graduated and corresponding scale of the sector *p*, (see Fig. 10,) no communication exists between cylinders B and the pipe *c*²; but if the needle be rotated so as to lead it across the center of the graduated scale, Fig. 11, the two cylinders B are supplied with gas. If it be desired to supply with gas only one of the cylinders B, the small needle P' is led opposite the special and graduated scales carried by the sector *p*. (See Figs. 12 and 13.) In moving this needle opposite the right scale the lower cylinder B is or is not fed, and if in the contrary direction it is placed opposite or over the left the upper cylinder B is or is not supplied.

It will be remarked that the gas or air intended to supply the upper set of cylinders A B is admitted by means of flexible or telescopic tubes R, metallic or otherwise, so as

to allow this set to follow the movement or rotations of the movable part D' of the mass of refractory earth.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a furnace, the combination of two sections forming a combustion-chamber, one of the sections being mounted to move on the other, a rack in connection with said section, 10 a gear meshing with the rack, a worm-gear in connection with the first-named gear, and a worm meshing with the worm-gear.

2. A furnace comprising a stationary section provided with a recess or cavity, a movable section facing said cavity and slidable 15

toward and from the same in a straight line, said movable section having on its inner face a cavity forming a heating-chamber in conjunction with the cavity of the stationary section the side edges of the sections being 20 spaced to form a longitudinal slot or opening leading into the heating-chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY BARTHELEMY BURIN.

Witnesses:

ALBERT PANKELOR,
JULIEN DESQUIERS.