

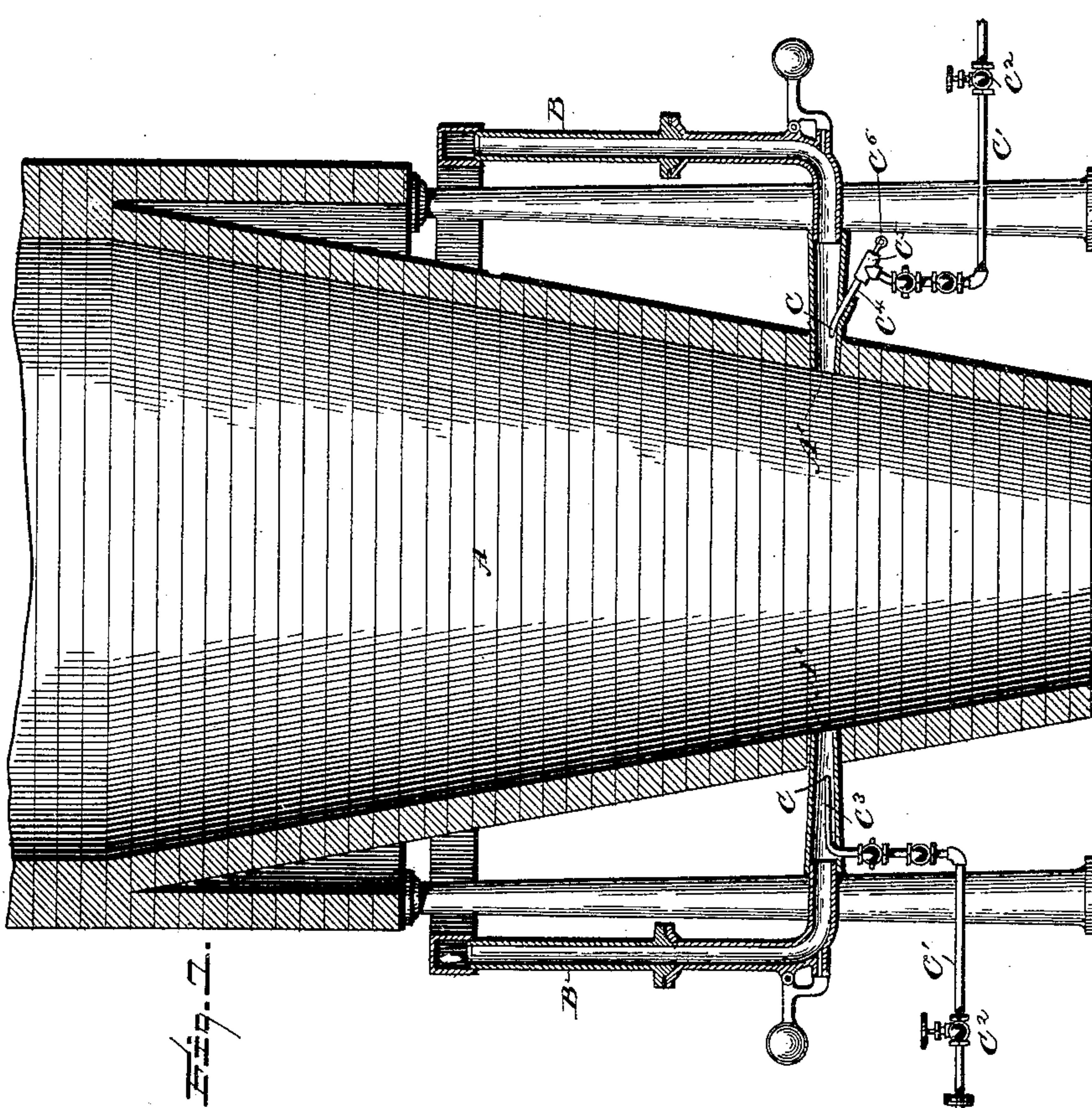
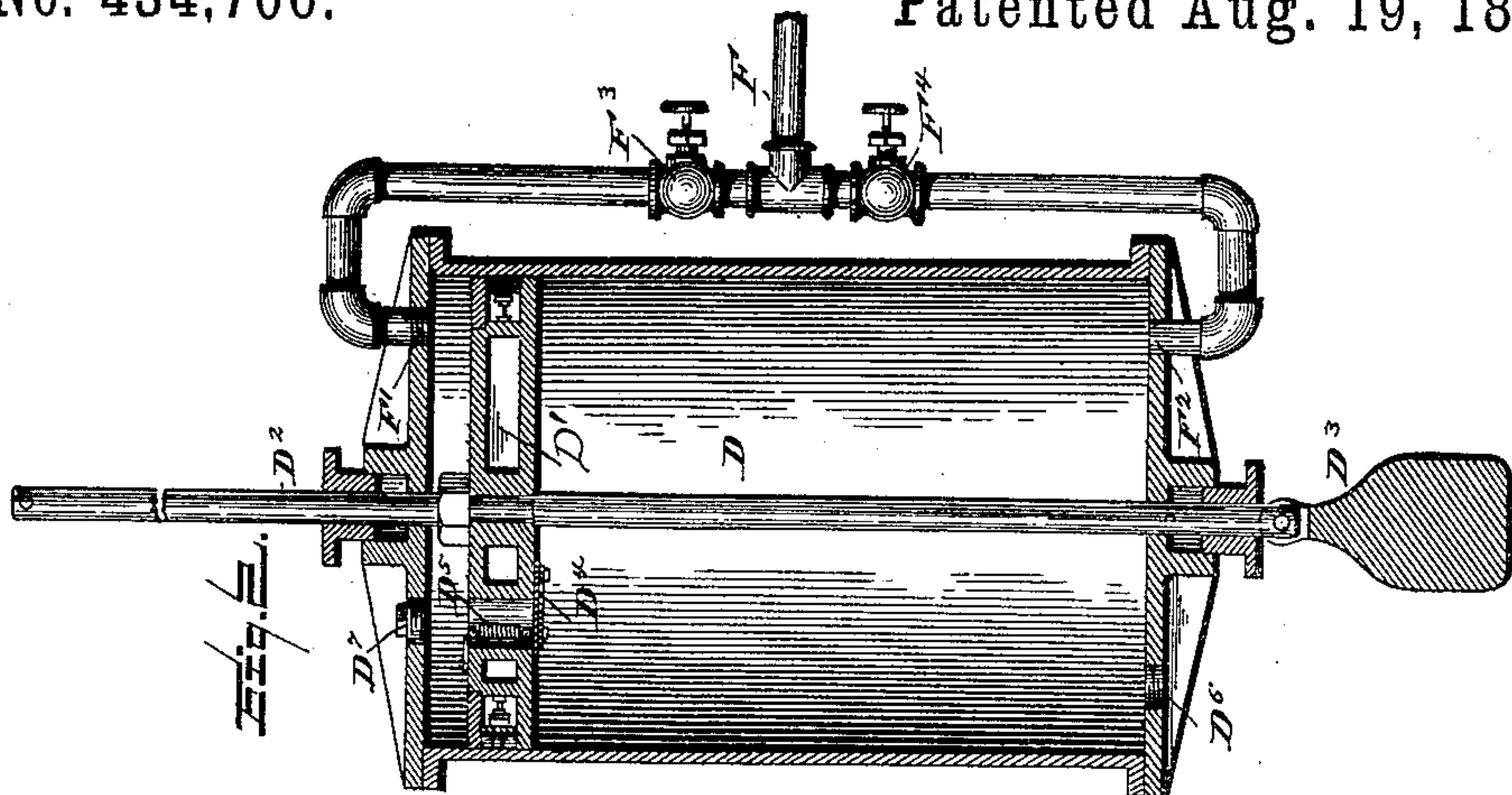
(No Model.)

I. ECKERT.

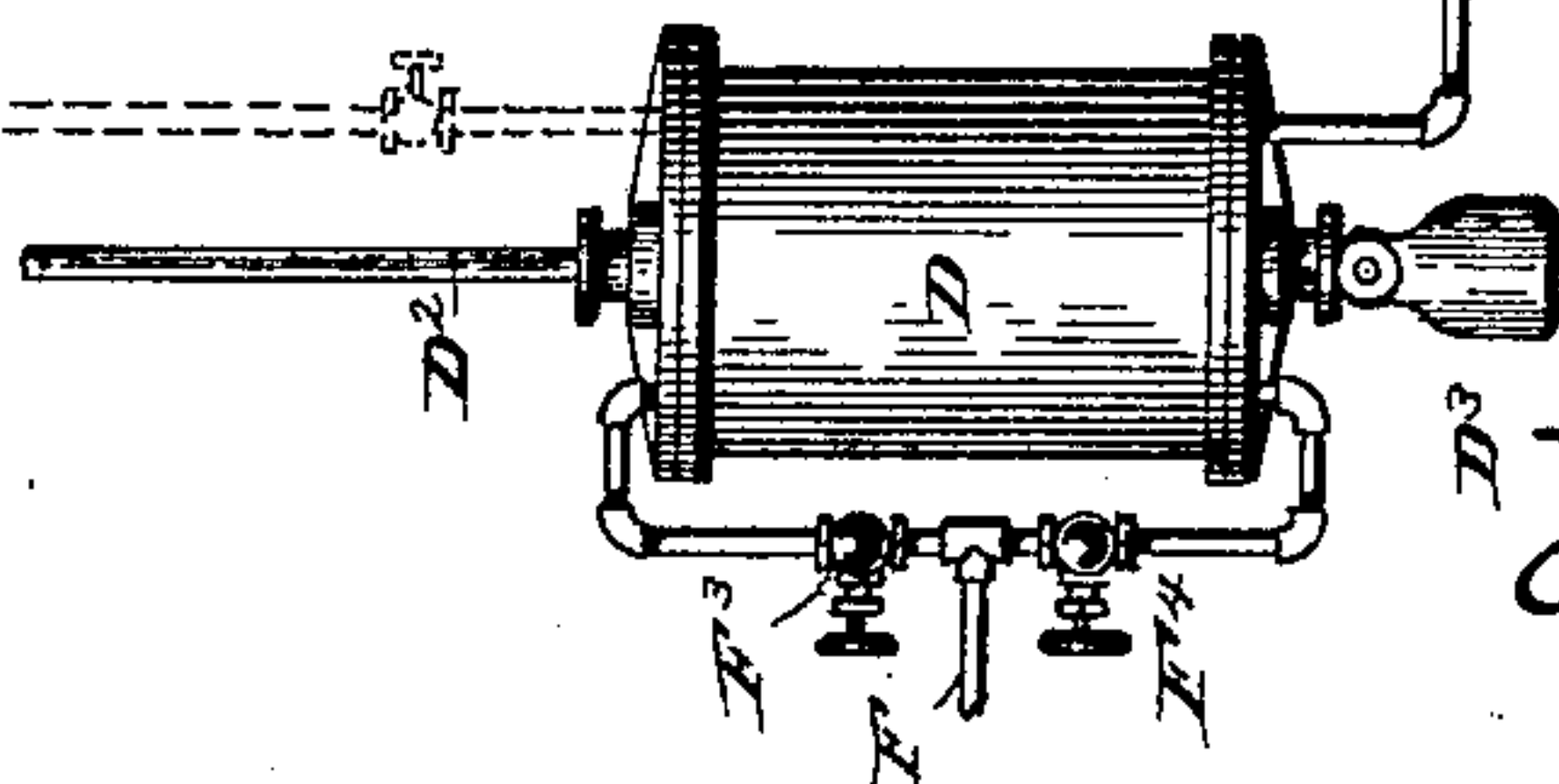
OIL FEEDING DEVICE FOR BLAST FURNACES.

No. 434,706.

Patented Aug. 19, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

ISAAC ECKERT, OF READING, PENNSYLVANIA.

OIL-FEEDING DEVICE FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 434,706, dated August 19, 1890.

Application filed March 16, 1889. Serial No. 303,514. (No model.)

To all whom it may concern:

Be it known that I, ISAAC ECKERT, a citizen of the United States, residing at Reading, in the county of Berks, State of Pennsylvania, have invented certain new and useful Improvements in Oil-Feeding Devices for Blast-Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is the provision of a convenient and thoroughly-successful machine for the supplying of oil through the tuyeres of a blast-furnace under pressure and control varying with the character of the slag, ore, and quality of pig to be produced.

To this end I have constructed my machine in the manner hereinafter described, and have invented in connection therewith such novel features as will be fully pointed out in the claims at the end of the specification.

In the drawings, Figure 1 shows a full side elevation of my device as attached to a blast-furnace, the latter being shown in section, and two modifications of the oil-supplying device being shown, one on either side of the furnace. Fig. 2 is a detail of my supply-cylinder in central vertical section.

In Fig. 1 the blast-furnace is shown at A, and the entrance of the tuyeres therein is shown at A'. These tuyeres, as shown at B, are of the ordinary construction, and are supplied, as usual, from some form of blast apparatus. Underneath these tuyeres there communicates with the same the outlet of my device, and it is here, as at C, that the oil is supplied to the furnace. The blast in entering the furnace has to pass the mouth of the supply-pipe and create a suction, which results in the atomizing of the oil and its thorough distribution through the mass of the solid fuel or slag, or both, which may be used with the ore in the process of reduction.

The oil which is distributed at the point C comes, primarily, through the pipe C', which descends, preferably, beneath the pillars which ordinarily support the vertical sides of the furnace and proceed to the supply-cylinder, which is hereinafter described. About midway preferably is placed a globe or other valve for the control of the flow of the oil through the pipe C'. This valve is shown at C². The outlet end of this pipe may lie along the

bottom of the tuyere or go through the middle thereof, and may be horizontal, as shown at C³, or inclined, as shown in Fig. 1 at C⁴. In the latter case the end of the pipe is turned slightly, so as to approximate to the horizontal and give the oil the proper direction at the last moment. In this case also the end of the pipe is supported in a bearing C⁵, while through the back of the pipe there extends a snuffer or a thick wire C⁶, adapted to be thrust at will into the tip of the pipe for the purpose of clearing the same of any accumulations of soot or thick oil which might tend to obstruct the action of the supply.

The oil is supplied by means of the action of the devices connected with the supply-cylinder D. This cylinder is provided internally with a plunger D', fastened to a piston-rod D², the two ends of which extend through the top and bottom of the cylinder through the proper stuffing-boxes, as shown. This plunger is provided with a valve D⁴, which opens in the direction of its effective stroke and is kept closed by the action of the spring D⁵. At one end of the piston-rod there is a weight D³, which tends to depress the plunger and thus express the oil contained in the cylinder through the opening D⁶. The oil is supplied to the supply-cylinder through the opening D⁷ from a tank E, which is placed above the level of the top of said cylinder. The raising of the plunger is accomplished either by raising the piston-rod by means of a chain or other attachment at the top of the same or by means of compressed air or steam admitted to the top and bottom of the cylinder, as shown in Fig. 2. This pipe is shown at F, and has two openings F¹ and F² into the top and at the bottom of the cylinder, respectively. The branches leading to these two openings are governed by the valves F³ and F⁴, as shown, and by the same the steam may be admitted to or shut off from the two ends of the cylinder.

The operation of my device is as follows: Suppose the plunger to be depressed and the oil to be admitted to the top of the cylinder through the opening D⁷, and the cylinder thus filled. This being accomplished, the plunger may be raised either, as described above, by the action of the chain at the upper end of the piston-rod or by the action of the steam

or compressed air being allowed to come into operation underneath the plunger by opening the valve F¹. When the plunger has reached its highest position, the steam or compressed air is shut off by the above valve and the action of the weight brought into play. Now this weight may act either by itself or in connection with the pressure of steam upon the upper surface of the plunger by opening the valve F³ and allowing it to come in action upon the upper surface. By the opening of this valve more or less the amount of pressure of the oil sent through the pipe C' may be varied according to the rate of blast and the quality of the pig to be produced. For a quicker regulation of the flow the valve C² may be employed between the supply-cylinder and the furnace.

What I claim is—

1. The combination, with the tuyere and a blast-furnace, of an oil-supply cylinder, the

supply-pipe from said cylinder extending into the tuyere outside its entrance to the furnace, and a snuffer on the discharge end of said pipe within the tuyere between the entrance 25 of the tuyere to the furnace and the end of the supply-pipe leading to said tuyere, substantially as shown and described.

2. The combination, with the furnace and the tuyere having an inclined nipple, of the 30 supply-pipe from an oil-supply chamber, and a snuffer on the end of said supply-pipe passing through said nipple in an inclined direction and having its end within the tuyere substantially in line with said tuyere, as set 35 forth.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC ECKERT.

Witnesses:

S. H. FISHER,

A. M. BURKHOLDER.