

No. 611,615.

Patented Oct. 4, 1898.

D. EMBLETON.
STAMP FOR CRUSHING ORES, &c.

(Application filed Dec. 27, 1897.)

(No Model.)

3 Sheets—Sheet 1.

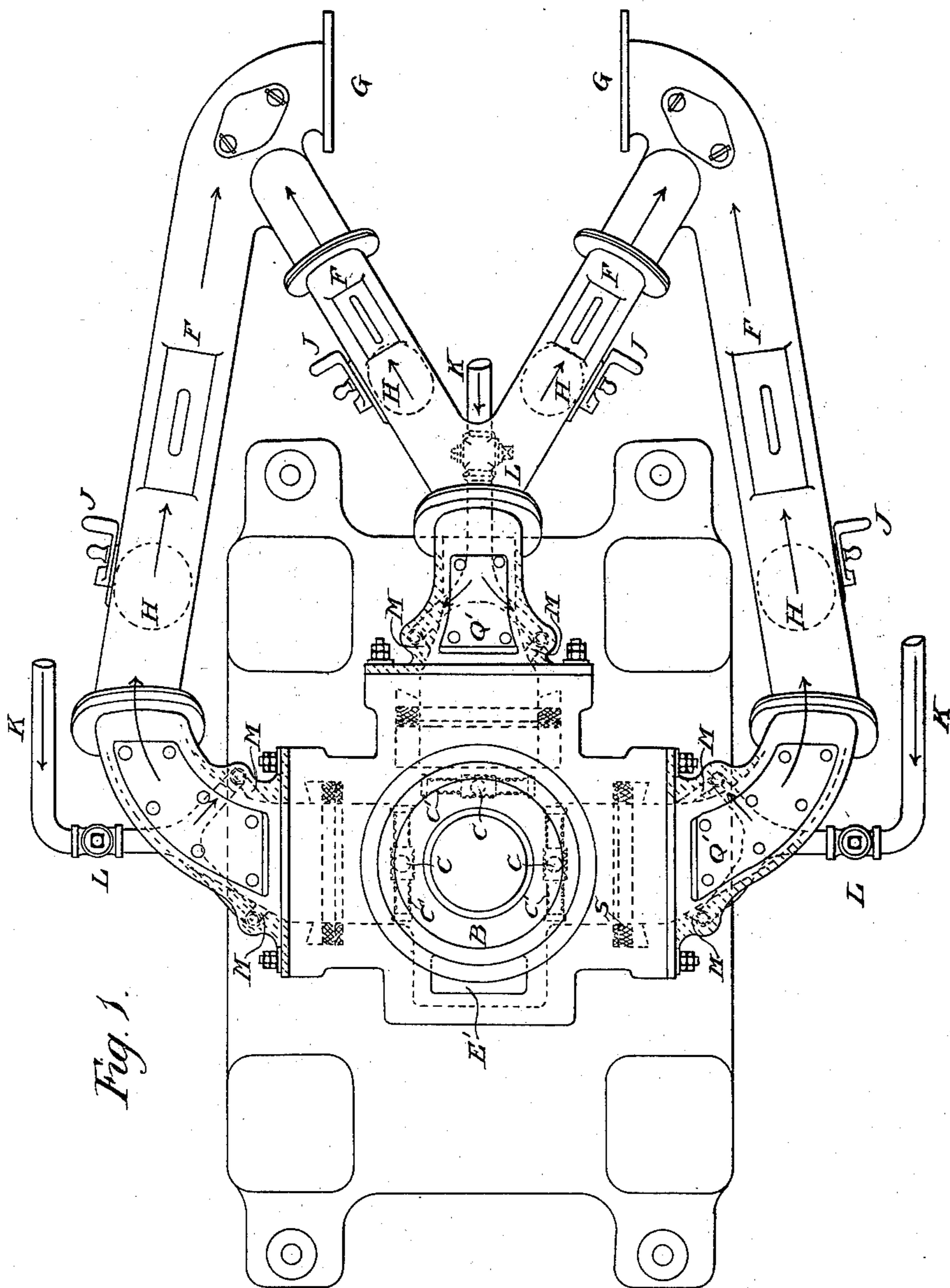


Fig. 1.

Witnesses:

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His Attorneys

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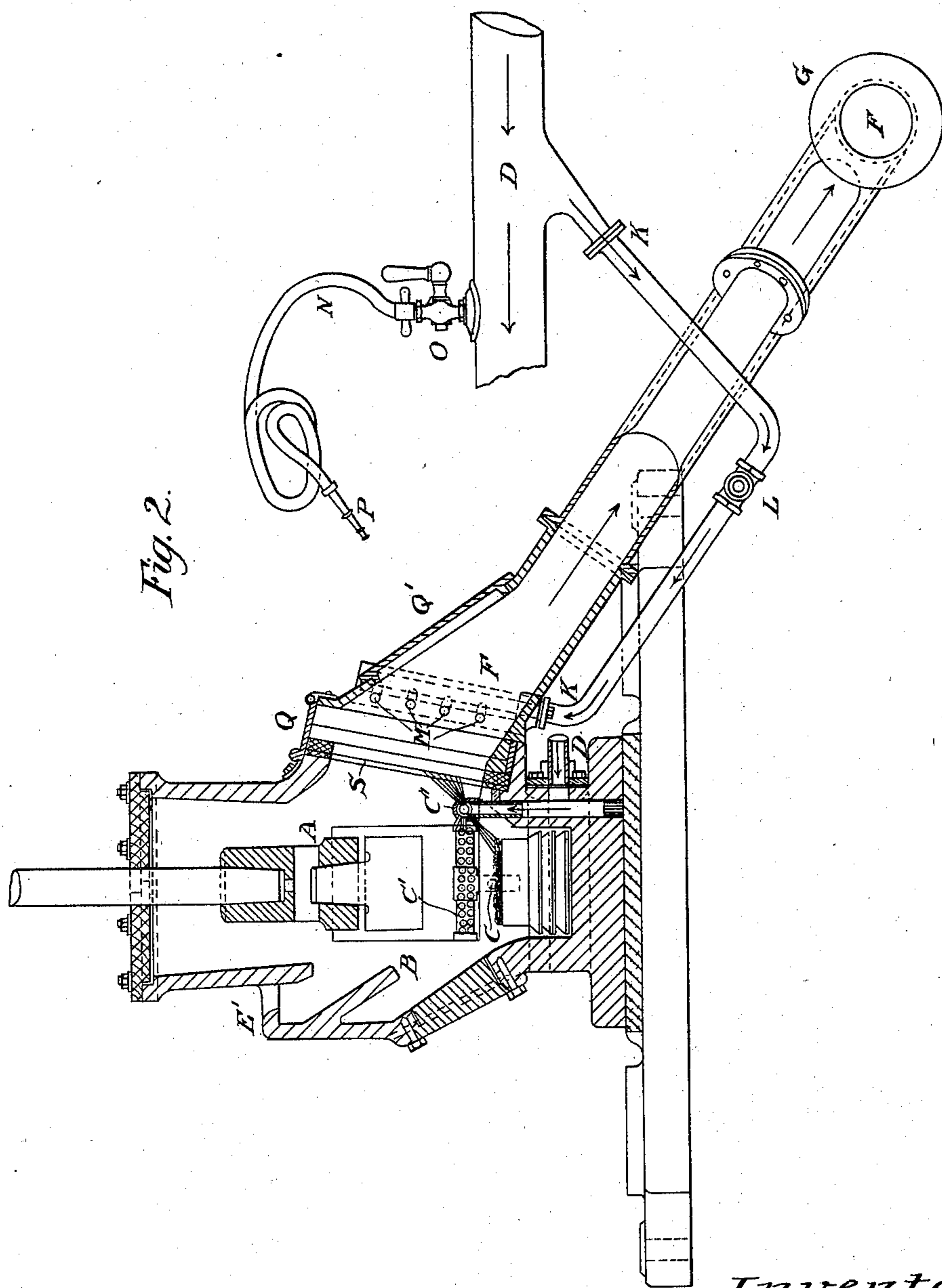
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3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

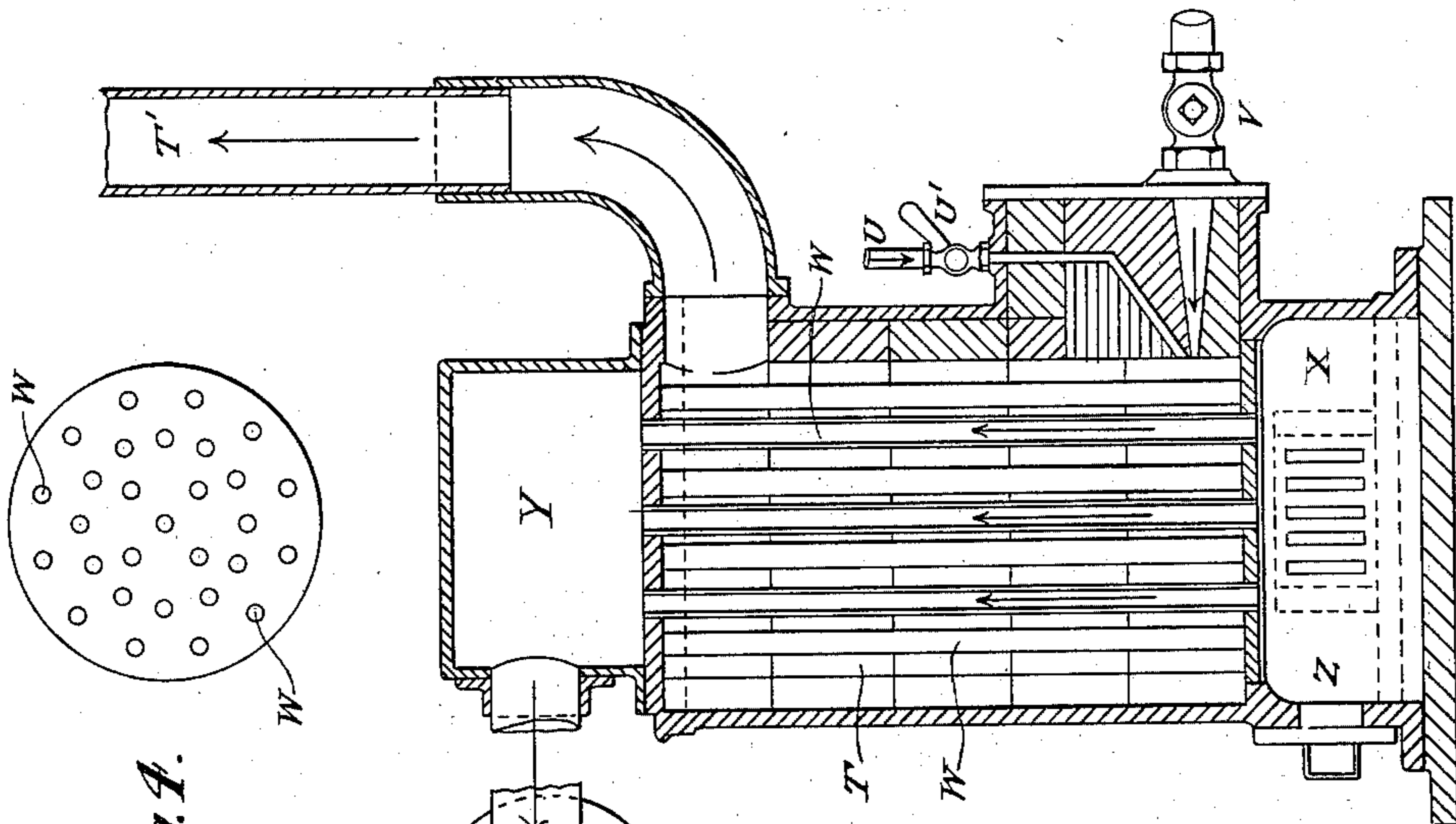


Fig. 4.

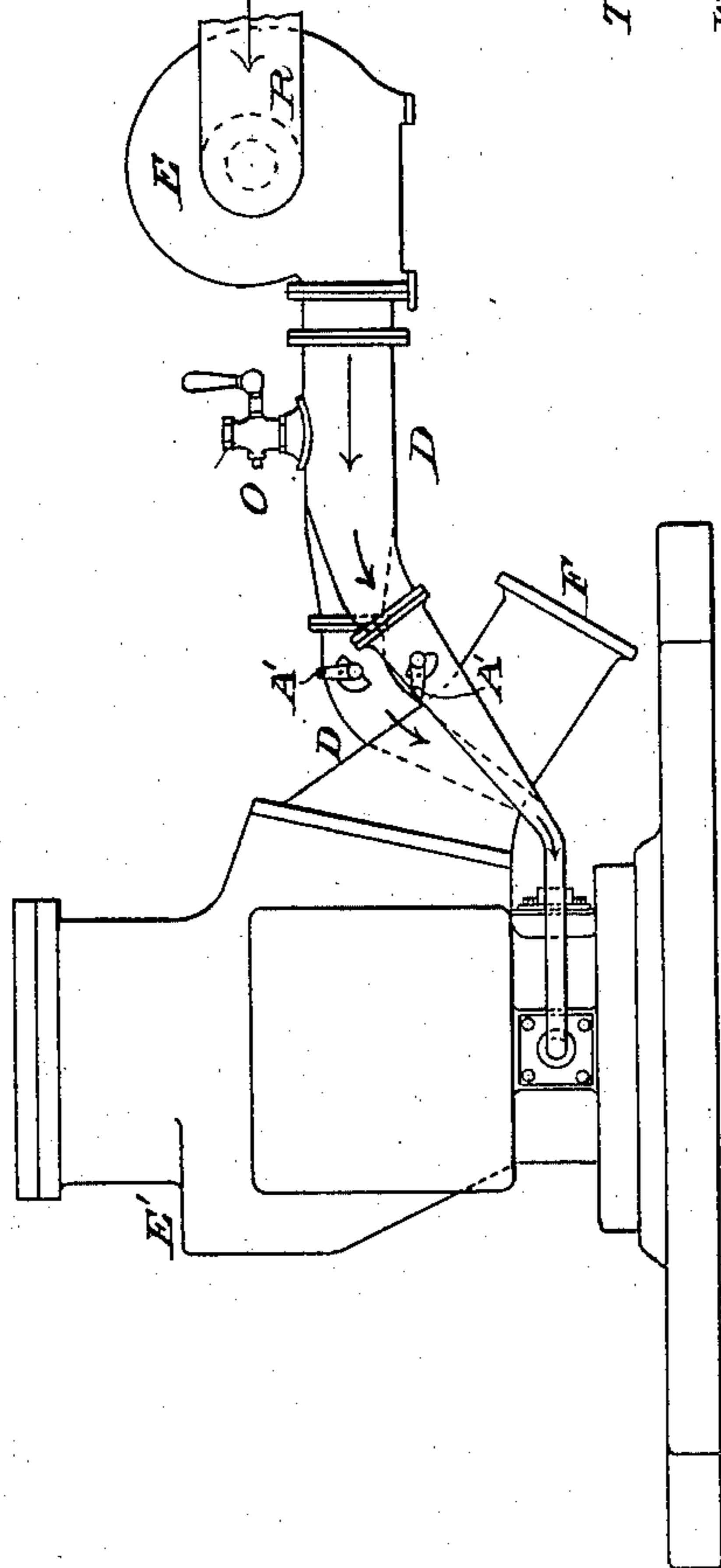


Fig. 3.

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UNITED STATES PATENT OFFICE.

DENIS EMBLETON, OF LEEDS, ENGLAND.

STAMP FOR CRUSHING ORES, &c.

SPECIFICATION forming part of Letters Patent No. 611,615, dated October 4, 1898.

Application filed December 27, 1897. Serial No. 663,543. (No model.) Patented in England November 18, 1896, No. 25,968; in Germany November 26, 1896, No. 95,897; in New South Wales December 31, 1896, No. 7,166; in New Zealand December 31, 1896, No. 9,161; in Queensland December 31, 1896, No. 3,693; in Tasmania December 31, 1896, No. 1,790; in Victoria December 31, 1896, No. 13,830; in Cape Colony December 31, 1896, No. 1,269; in South Australia January 4, 1897, No. 3,512; in West Australia January 8, 1897, No. 1,459, and in South African Republic February 1, 1897, No. 1,316.

To all whom it may concern:

Be it known that I, DENIS EMBLETON, a subject of the Queen of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented certain new and useful Improvements in Connection with Stamps for Crushing Ores and other Material, (for which I have obtained patents in the following countries and colonies: Great Britain, No. 25,968, dated November 18, 1896; Germany, No. 95,897, dated November 26, 1896; Transvaal, No. 1,316, dated February 1, 1897; South Australia, No. 3,512, dated January 4, 1897; Western Australia, No. 1,459, dated January 8, 1897; New South Wales, No. 7,166, dated December 31, 1896; New Zealand, No. 9,161, dated December 31, 1896; Queensland, No. 3,693, dated December 31, 1896; Tasmania, No. 1,790, dated December 31, 1896; Victoria, No. 13,830, dated December 31, 1896, and Cape Colony, No. 1,269, dated December 31, 1896,) of which the following is a specification.

This invention relates to certain improvements in stamps suitable for dry crushing, and has for its object the agitation or constant movement of the material in the mortar-box undergoing crushing and the extracting of the material when crushed sufficiently fine through the sieves of the mortar-box in such a manner that the quantity of fine particles of crushed material floating about the stamps is reduced and the meshes of the sieves are not so readily stopped or choked by the particles of pulverized ore as is the case with machines as hitherto constructed.

In describing my invention in detail reference is made to the accompanying drawings, in which—

Figure 1 represents a plan of a base-plate and mortar-box of an apparatus for stamping or crushing ores, with blowing and exhausting pipes connected to the said box. The stamp-shaft, stamp-head, and box-cover are removed. Fig. 2 is a vertical sectional elevation through the mortar-box, with the stamp-head and shoe in section. Fig. 3 represents a side elevation of a mortar-box, blowing-fan, and a heating-chamber in section;

and Fig. 4, a plan showing how the heating-pipes may be arranged.

The stamp-shaft and stamp-head A are operated in the ordinary manner, and inside the mortar-box B, I mount one or more pipes C, (three are shown in the drawings,) which are connected to one of the main pipes D, coupled to the blower E, (shown by Fig. 3,) and to each pipe C within the mortar-box B is connected a cross-piece C', perforated, so that the air blowing through the perforations toward the center of the box and upon the material being crushed keeps the particles constantly moving within the box, wing-valves of the ordinary construction being placed in some convenient portion of the connecting-pipes D and operated by levers A' for controlling the admission of air through the perforations in cross-pieces C'.

The perforations in the cross-pieces C' are so placed that the currents of air flowing through same not only stir up or agitate the material in the mortar-box B, but the perforations at the back of each cross-piece C' direct currents of air somewhat tangentially to the inner inclined surface of the sieves S, by which means I prevent the meshes of the said sieves choking up so rapidly as they otherwise would, and thus add materially to the duty of a machine fitted with my improvements. The material as it is crushed fine enough is drawn along with the air flowing from the perforations through the sieves S in the manner as hereinafter described.

The material to be crushed is fed through the opening E', and to three sides of the mortar-box B is connected an exhaust-pipe F, coupled by flanges G to an exhaustor of the ordinary construction, each pipe F being fitted with a wing-valve H, each adjustable as to amount of opening by a lever J for regulation of strength of draft or amount of exhaust-current, or in place of wing-valves I may employ rising and falling plates somewhat the same as are used in sluice-valves and operated in the same manner by a screw. In all cases the flow of the current is indicated by the respective flying arrows.

The amount of air drawn out of the mortar-box B along with the crushed material by the before-mentioned exhaustor through the pipe F is equal to, but preferably greater than, the amount of air blown in through the perforations in cross-pieces C'. By this means I am enabled to leave the hopper or feed-inlet E' into the box B open, with free access of air while the machine is at work. By this arrangement all the fine particles of crushed material floating about the stamps as hitherto often constructed, necessitating the attendants wearing respirators, is passed out by the before-mentioned exhaustor, as the pressure in the mortar-box B has a tendency to be somewhat less than that of the external atmosphere, thereby preventing what is known as "back draft."

I accomplish my object as to the prevention of any stoppage, making up, or choking of the meshes of the sieves S by means of branch pipes K, connected to one of the main pipes D of the blower E. The currents of air when passing through the pipes K are regulated by the respective taps L, which when open allow the air to flow through the nozzles M, the jets impinging on the outside of each sieve S from time to time as the taps are opened, thereby blowing back into the said box any particles of crushed material that may clog the meshes of the sieve.

For further facilitating the removal of the particles of crushed material adhering to the inner surface of the sieves S, I employ a flexible pipe N, provided with a tap or valve O and terminating with a nozzle P, by which on opening a lid Q, placed over each sieve-space, or removing a cover-plate Q', I am enabled, when required, to direct the force of air against the outside of the respective sieves to clear the particles away from the inner surface of the sieve without having occasion to stop the stamp.

Machines as hitherto constructed have frequently to be stopped for the cleaning of the sieves, thus detracting from the duty the machine is capable of performing.

By these several improvements I am enabled to considerably increase the capabilities of the machine when dry crushing by keeping the meshes of the sieves S clearer by directing currents of air at intervals and thus forcing any particles of material away from the face of the sieves.

In order that pneumatic and like stamps

may operate upon and crush material that is not thoroughly dry and obviate the necessity of having to dry the ore previous to crushing, I connect the fan or blower E by pipe R to an air-heating chamber or furnace T.

The drawings show a furnace suitable for burning oil; but it will be obvious that furnaces constructed for burning other kinds of fuel may be utilized. In the furnace shown by Fig. 3 the oil fuel is admitted through the pipe U, the supply being regulated by the tap or valve U'. A current of air is injected through the pipe and nozzle V for effecting combustion and distributing or spraying the oil fuel within the furnace or heating-chamber T, through which pass vertically a series of pipes W. A plan of the pipes is shown by Fig. 4.

The vertical pipes W connect the space X at the bottom of the furnace, and which is open to the atmosphere, to the chamber Y, which is coupled by pipe R to the fan or blower E, connected to the mortar-box B in the manner as hereinbefore described.

By regulating the sliding valves Z air is admitted into the space X as required for heating by pipes W and drying the ore being crushed, the pipe or funnel T' conveying the products of combustion away from the furnace-chamber T.

What I claim as my invention is—

1. An ore-crusher comprising the mortar-box and mortar, the feed-opening to the said box, the sieves in the walls of the mortar-box, the perforated pipes connected with the air-supply arranged to direct jets upon the mortar and sieves, the pipes and nozzles for directing currents of air upon the outer surfaces of the sieves and the exhaust-pipes connected to the said sieves substantially as described.

2. In combination, the mortar-box, the mortar therein, the sieves, the air-pipes delivering air-currents to said mortar and to the inner surface of sieves, pipes and nozzles for directing currents of air to the outer surface of the sieves, air-suction pipes and a heater for drying said air delivered to the mortar all substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

DENIS EMBLETON.

Witnesses:

JOHN GILL,
WILLIAM BENTLEY.