

No. 612,185.

Patented Oct. 11, 1898.

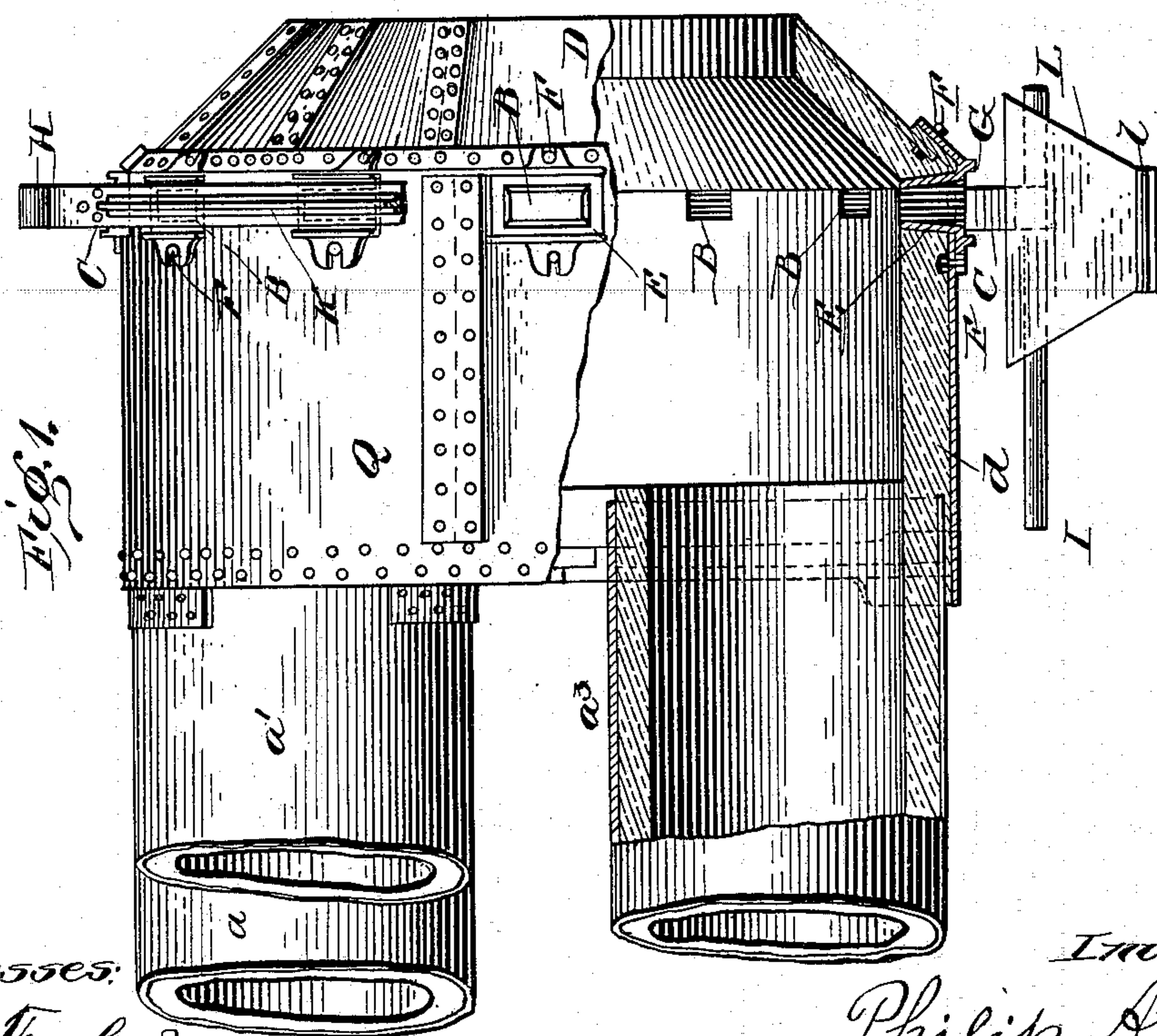
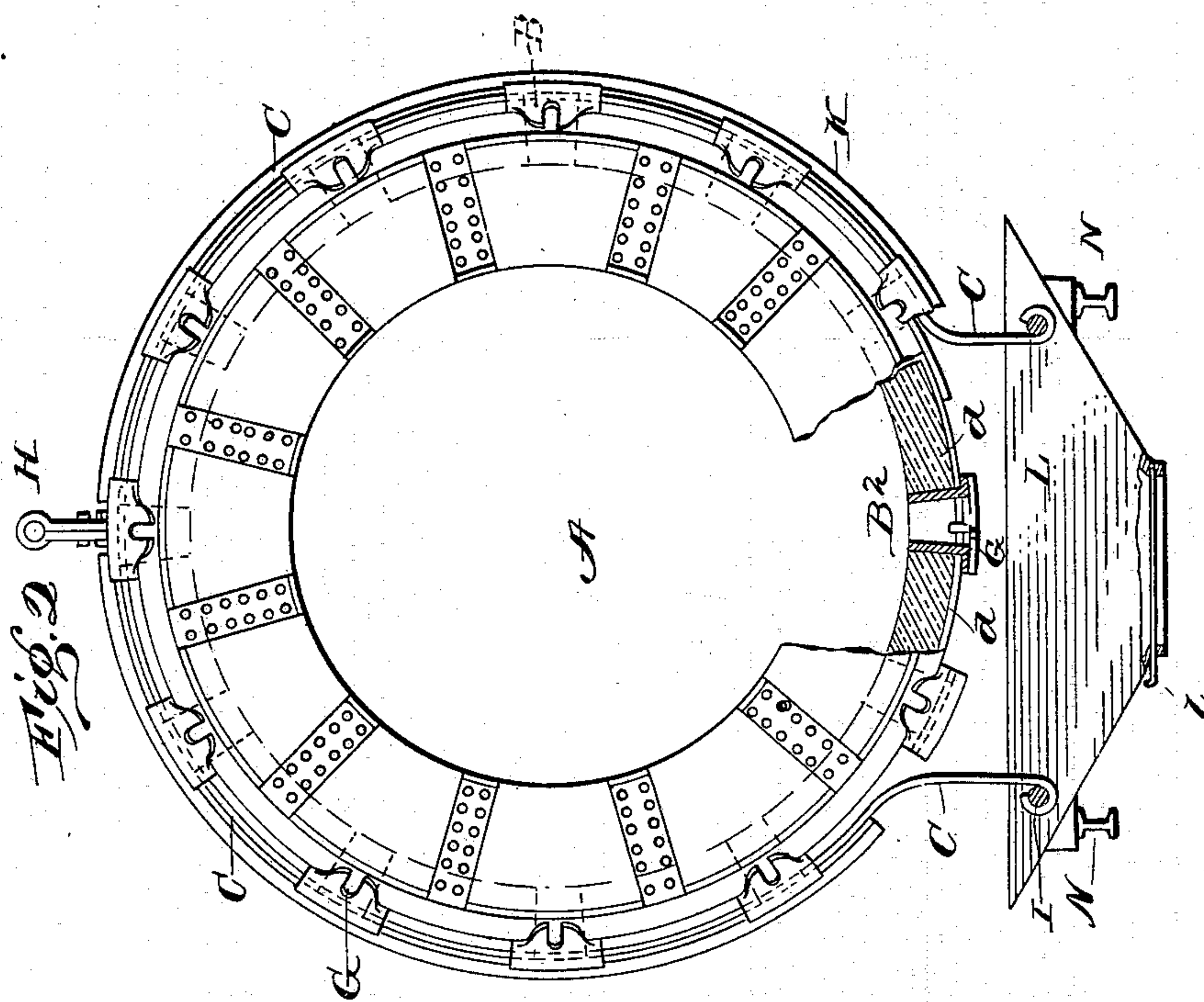
P. ARGALL.

APPARATUS FOR ROASTING AND DRYING ORES.

(Application filed Jan. 15, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

J. M. Fowler Jr.
Charles B. Payne!

Inventor:

Philip Argall,
by Henry H. Bates
his Attorney.

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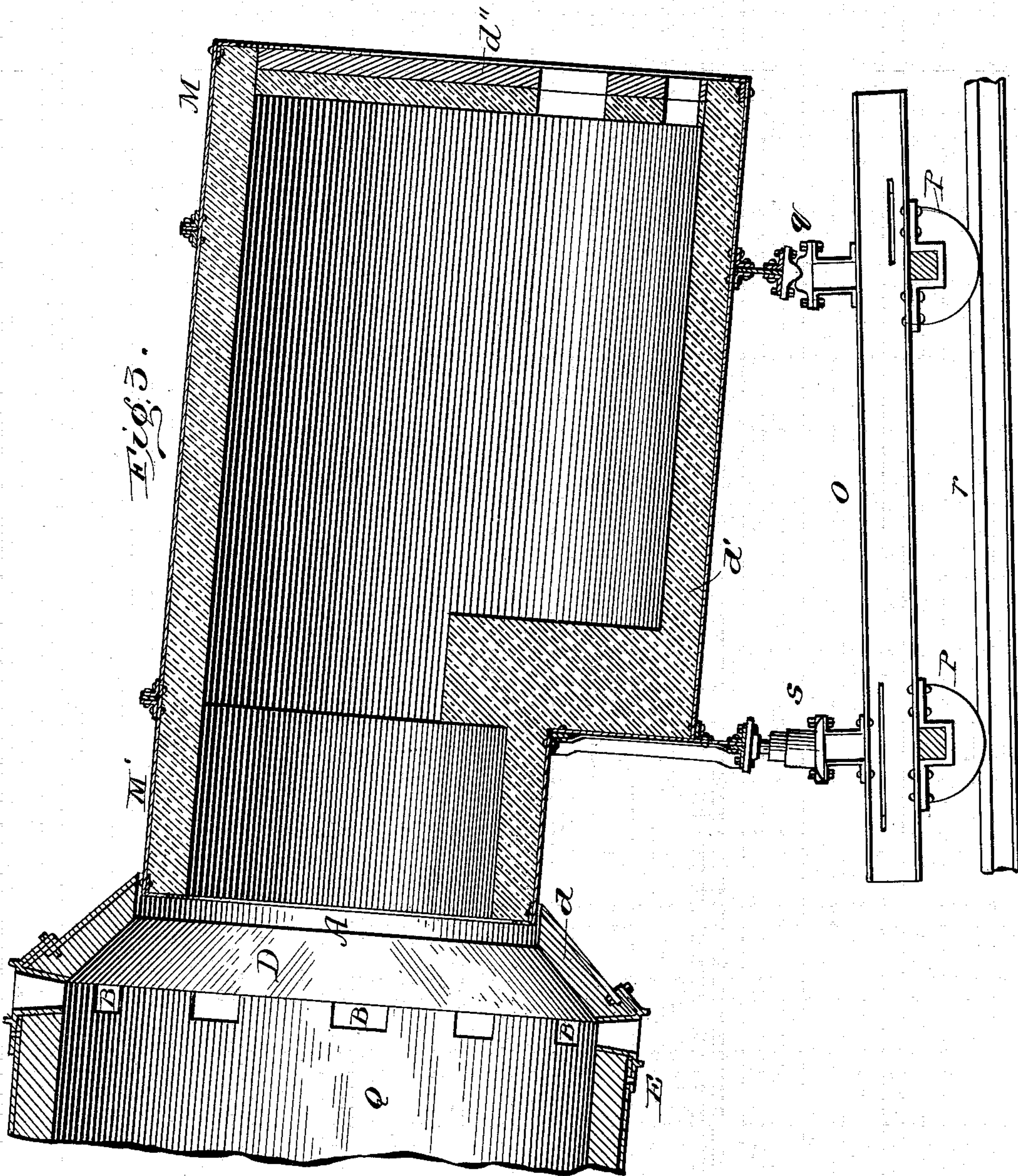
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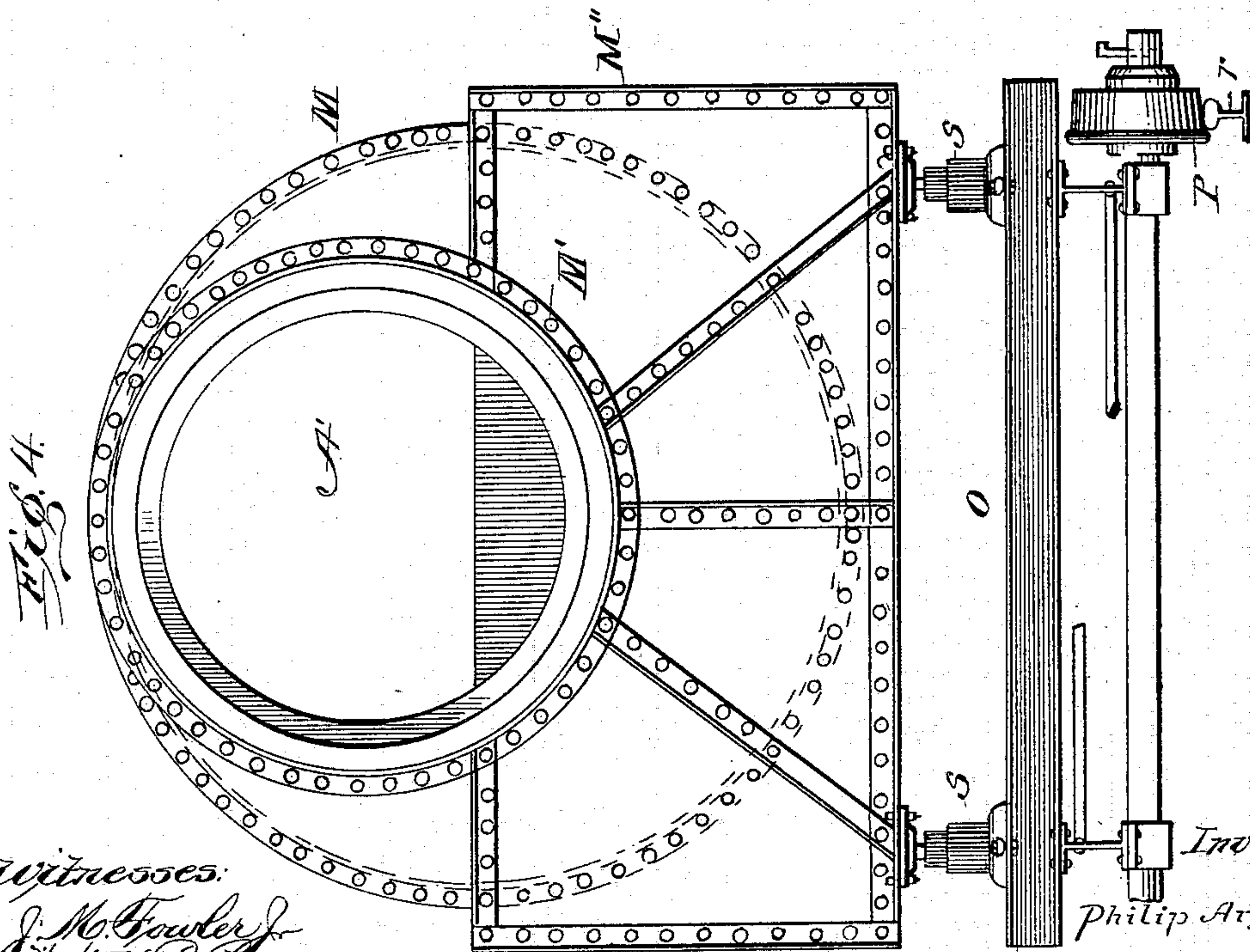
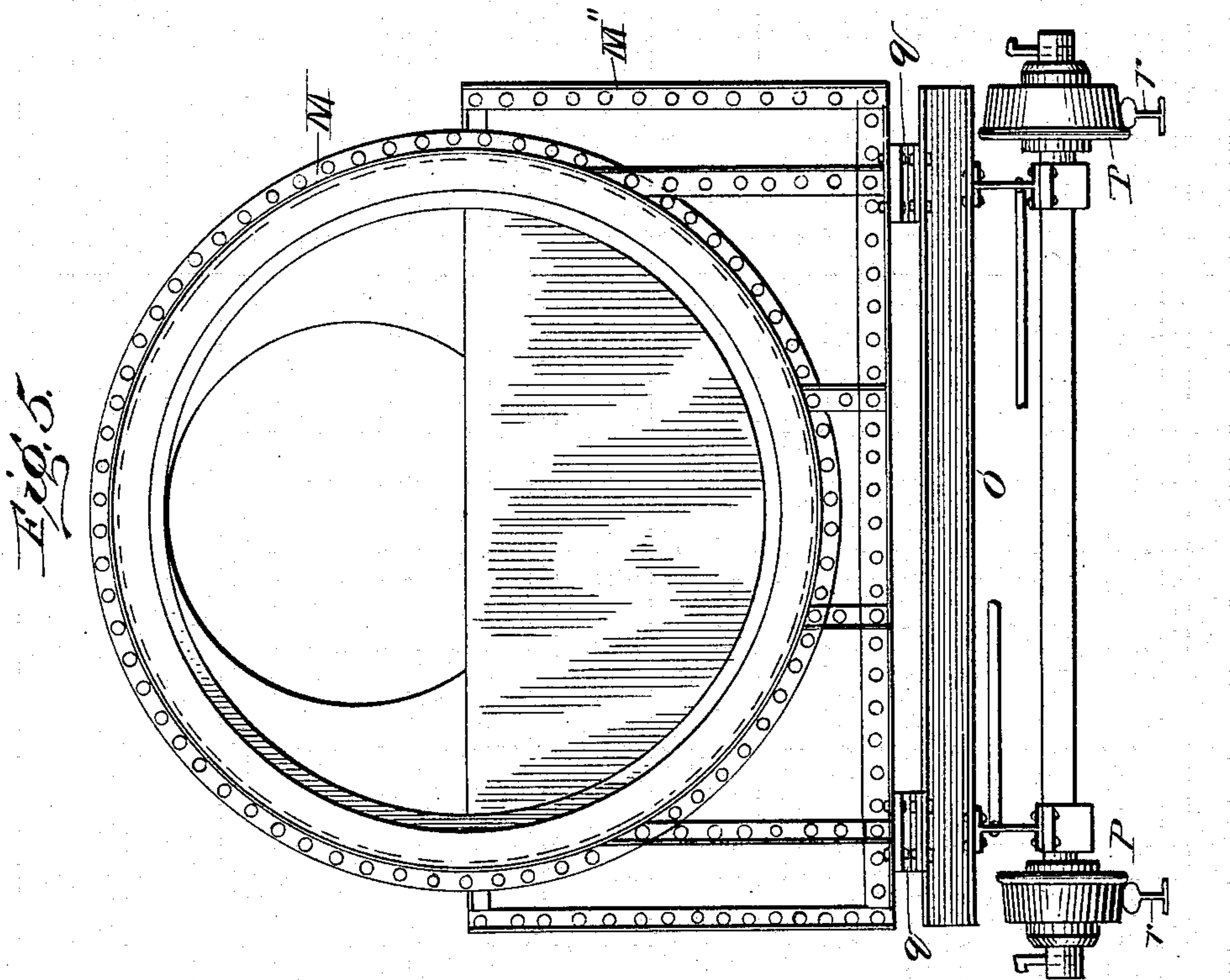
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

PHILIP ARGALL, OF DENVER, COLORADO.

APPARATUS FOR ROASTING AND DRYING ORES.

SPECIFICATION forming part of Letters Patent No. 612,185, dated October 11, 1898.

Application filed January 15, 1898. Serial No. 666,798. (No model.)

To all whom it may concern:

Be it known that I, PHILIP ARGALL, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Apparatus for Roasting and Drying Ores; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for roasting and drying ores, for which Letters Patent of the United States were granted to me October 19, 1897, No. 591,909; also Canadian Letters Patent, dated November 2, 1897, No. 57,967; and it consists in a modification of the hood or discharge end of the apparatus, designed particularly for use when the apparatus is to be employed for roasting ores, which is one of its most important functions.

It further consists in an improved fire-box, which is used in conjunction with the said hood.

Reference is made to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of my improved hood at the discharge end of the apparatus, partly in section and partly broken away, showing also portions of the multitubular group of cylinders which terminate in the said hood, also partially in section. Said figure also shows the discharge-hopper in position for delivering the roasted or dried ore into a vehicle for conveying the same away. Fig. 2 is an end view of the said hood, also partially in section and partially broken away, showing also the discharge-hopper in place. Fig. 3 is a sectional view of my improved fire-box, shown in position at the entrance of the improved hood, the termination of the latter being partially shown, also in section. Fig. 4 is a front end view of the improved fire-box on a line of sight parallel with the axis thereof. Fig. 5 is a rear end view of said fire-box on a line of sight parallel with the axis thereof and before the rear brick wall is inserted. Said Figs. 3, 4, and 5 also show the movable wheeled truck on which the fire-box is mounted.

Like letters of reference refer to like parts.

The multitubular system of rotary apparatus for roasting and drying ores is an improvement on the well-known tubular system, and is fully described in my said patent, No. 591,909. The tubes, portions of which are shown in Fig. 1 at a a' a^3 , are lined throughout with fire-resisting material, such as fire-clay or fire-brick, (shown at d ,) and they terminate at the discharge end in a single enlarged tube or hood Q, the whole being suitably supported, so as to be rotated by the application of suitable power. Said hood is also lined with fire-resisting material and is made with a convergent or conical end D, as shown in the drawings, leaving a terminal opening A, through which hot gases enter from the fire-box. (Illustrated in Figs. 3, 4, and 5.) The hood is furnished with circumferential openings B, located at intervals, which are boxed with hollow flanged castings E, set into the fire-clay lining and secured to the metal of the hood by means of bolts F F or in any substantial and workmanlike manner. The object of these openings is to form an outlet for the roasted or dried ore as the several holes during the revolution of the cylinder or hood successively approach the bottom point of their travel, when the ore drops out through the same into the hopper L, suitably placed to receive the same. Said hopper is supplied with a sliding gate l , by means of which the ore can be periodically discharged into a car or other receptacle for conveying it away.

N N denote I-beams, which sustain the hopper L.

C denotes a fixed metallic band, usually of wrought-iron, covering all the holes B except those at or near the bottom point of travel, (B^2 ,) the object of said band being to keep the flame and hot gases from escaping through the said discharge holes or openings in the periphery of the hood. This band resembles a brake-strap on a wheel and is kept in its proper position by means of flanges G G on the outer portion of the castings E E and a suitable support H at the top and rods I I at the bottom. The said rods are preferably sustained upon the hopper L. The band C is strengthened and stiffened by a T-shaped iron reinforce K.

In drying ores the ore to be operated upon is usually of a much coarser grade than that for roasting, and the temperature is much lower. The general operation is, however, the same as when the apparatus is used for roasting.

The fire-box which I prefer to use with this improved hood is a metallic shell or vessel, preferably of steel, circular in cross-section, lined throughout with fire-resisting material, such as fire-brick *d'*, and preferably adapted for oil or gas fuel. In the accompanying drawings, M is the fire-box, having an extension M', also of circular contour, adapted to enter and fit the entrance A of the hood Q, as shown in Fig. 3. The fire-box is set in a box-like structure or carriage M'', mounted on a wheeled truck O, moving, preferably, on rails *r r*, so as to be readily and quickly drawn back from the opening of the hood for purposes of repairs, and is made readily adjustable as to height at the front end by means of hinged or rocking bearings *q q* at the rear and jack-screws *s s* at the front end of the carriage, whereby it is made to accurately aline with the opening A in the hood and is kept in alinement through all the unavoidable changes due to temperature, use, and wear. The rear end of the box is built up with fire-brick, leaving such openings as are necessary to admit oil or gas fuel and air for purposes of combustion. As the rotary furnace is usually set at an inclination of one inch to the foot, a similar inclination is given to the fire-box by the difference in the height of the front and back supports, as shown, the carriage and the track being level. The advantages of this fire-box in connection with the improved hood are that the flame is thus conducted directly into the furnace. The outer steelwork of the furnace and hood does not become overheated and burned, as was the case when the latter was inclosed by the brickwork, as in my Patent No. 591,909, above referred to, due partly to the radiation of heat from the red-hot brickwork upon the steel plates of the furnace and in part to the direct action of flame escaping outward from the fire-box between the brickwork and the furnace when using forced draft. The steel tubular fire-box is also less expensive to construct than a stationary brick one, while being much more convenient to operate and especially useful where quick and rapid adjustments are

necessary when occasion arises for sudden repairs.

I claim and desire to secure by Letters Patent—

1. In an ore roasting or drying furnace, a multiple revoluble group of independent cylinders merged in a single large tube or hood Q at the discharge end of the apparatus, said hood having a convergent end D terminating in a circular opening, and overlapping the outside of the lined terminal flue of a portable fire-box, substantially as specified.

2. In an ore roasting or drying furnace, a multiple revoluble group of independent cylinders merged in a single large tube or hood Q at the discharge end of the apparatus, said hood having a convergent end D terminating in a circular opening, adapted for the admission of the terminal flue of a portable fire-box, discharge-openings located at intervals around the periphery of said hood near the angle of convergence, and a stationary flat metallic band C covering the series of peripheral discharge-openings except at or near the point of discharge, substantially as specified.

3. In an ore roasting or drying furnace, a multiple revoluble group of independent cylinders merged in a single large tube or hood Q at the discharge end of the apparatus, said hood having a convergent end D terminating in a circular opening, in combination with a portable metallic fire-box M lined with refractory material, said fire-box having a tubular projecting flue M' adapted to enter and fit the convergent end D of the rotary hood Q, substantially as specified.

4. In combination with the hood or terminal portion of a revolving furnace, a fire-box M having a tubular projection M', lined throughout with fire-resisting material, mounted on a wheeled truck by means of rocking bearings at or near the rear portion and elevating-screws at the front portion, whereby the said fire-box can be accurately alined with the opening in the said hood, and readily drawn back for repairs, substantially as specified.

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

PHILIP ARGALL.

Witnesses:

HENRY A. VEZIN,
HARRY E. NELSON.