J. E. HEWES.

ELECTRIC FURNACE.

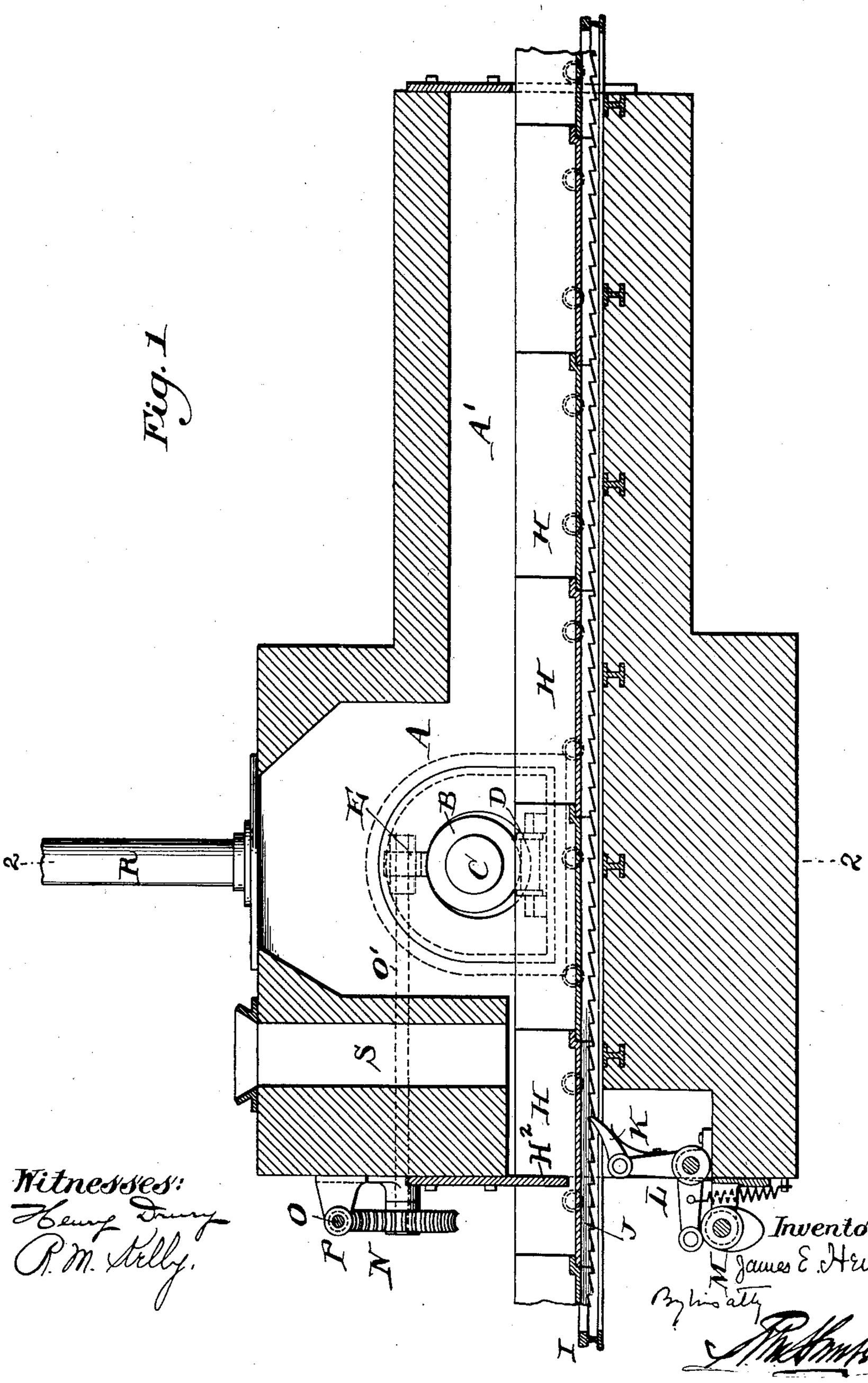
APPLICATION FILED SEPT. 7, 1905.

969,622.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

Fig. 1



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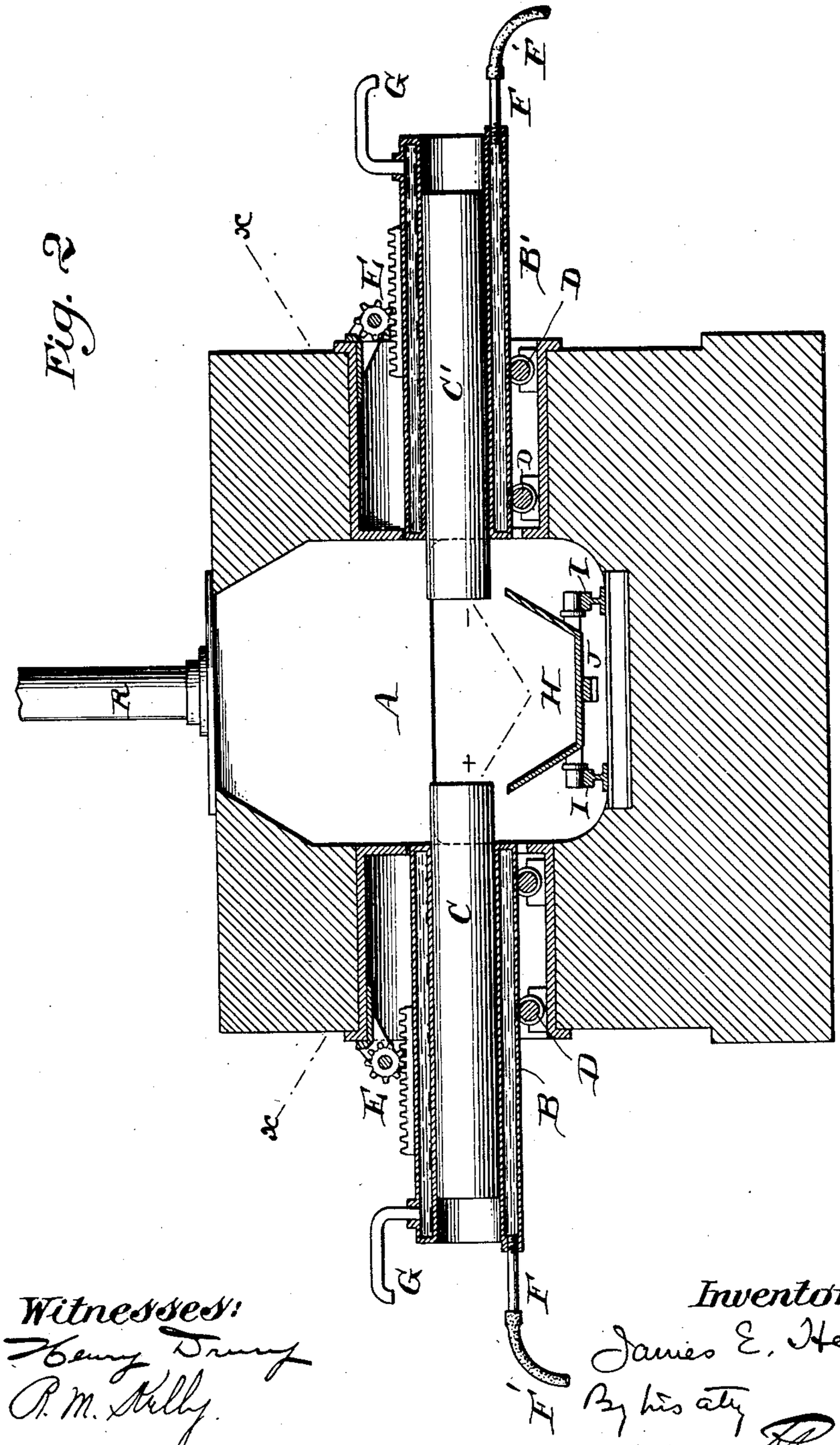
3 SHEETS—SHEET 2.

Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3

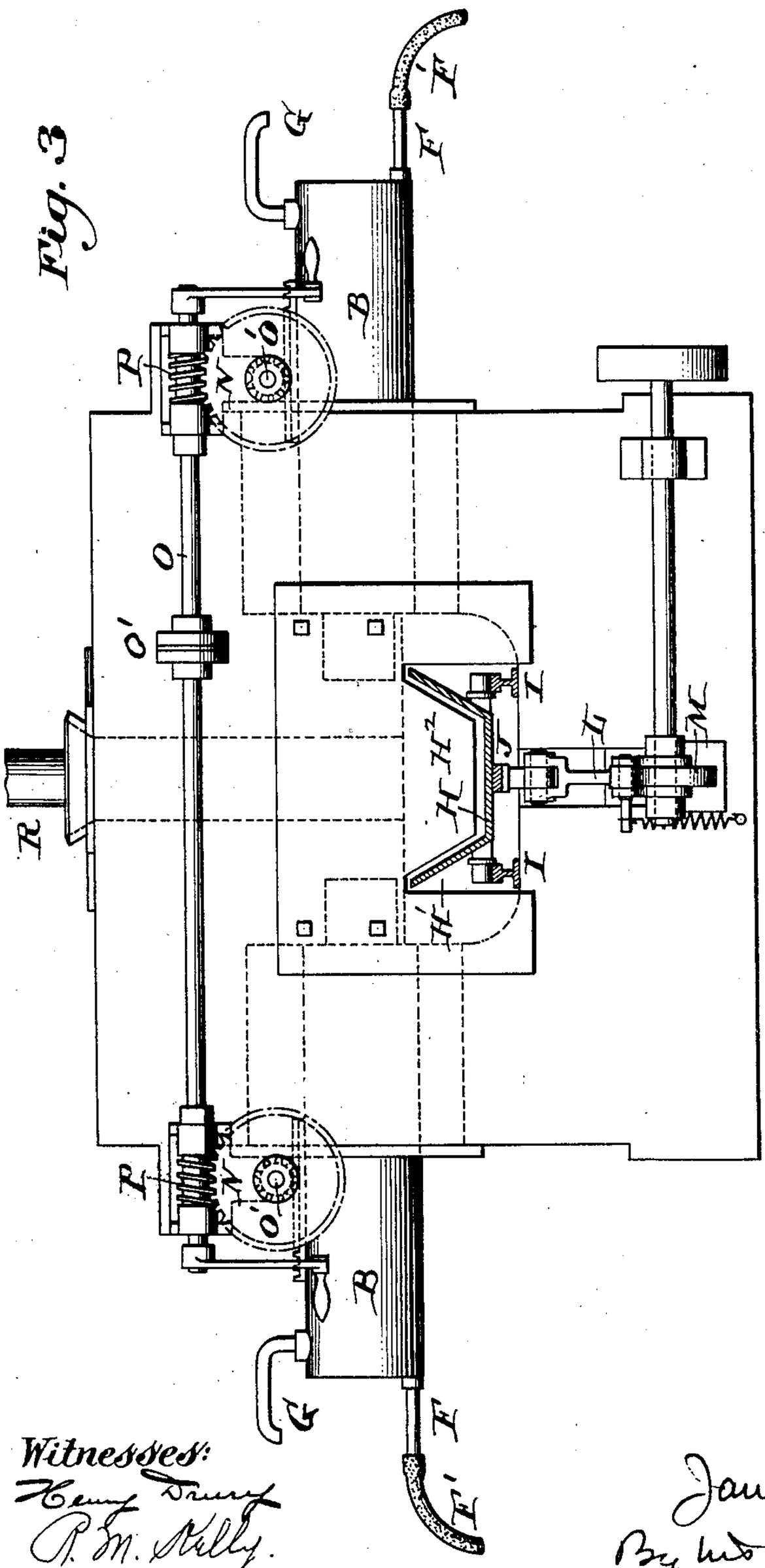
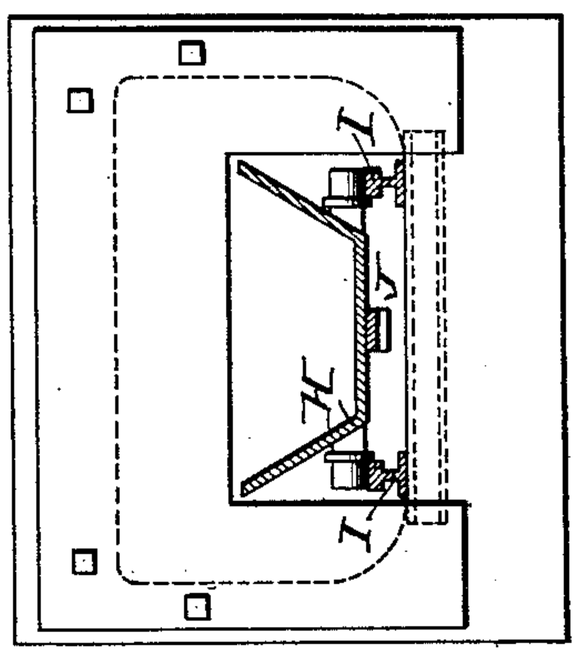


Fig. 4



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ELECTRIC FURNACE.

969,622. Specification of Letters Patent. Patented Sept. 6, 1910.

Application filed September 7, 1905. Serial No. 277,305.

To all whom it may concern:

Be it known that I, JAMES E. HEWES, of Plattsburg, in the county of Clinton and State of New York, have invented an Improvement in Electric Furnaces, of which the following is a specification.

My invention has reference to electric furnaces and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a simple construction of electric furnace especially adapted for smelting carbon and lime in the production of carbid of calcium, in which the support for the materials to be smelted shall be capable of traveling past two oppositely directed electrodes.

In carrying out the embodiment of my invention I provide two oppositely directed electrodes between which the electric arc passes and between which at a slightly lower elevation a traveling sectional hearth is employed for supporting the materials to be smelted, said hearth consisting of a series of carriages having bottoms and sides but no ends and abutted end to end to form a long trough-like structure. As this hearth travels, the carriages or sections are added at one end and removed with the smelted product at the other end. The electrodes are supported in water jackets combined with means for suitable adjustment.

My invention also comprehends details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which:

Figure 1 is a longitudinal sectional elevation of an electric furnace embodying my invention; Fig. 2 is a cross section of same on line 2—2 of Fig. 1; Fig. 3 is an end elevation of the same; and Fig. 4 is an elevation at the delivery end of the furnace adjacent to the carriages.

A is the furnace body and has the cooling chamber extension A′ leading to the rear. A chimney R may carry off the gases and products of combustion. Extending through the furnace body and extension are the rails I forming a track.

H are a series of carriages running upon the track and having bottoms and side walls but no end walls. These carriages abut so as to form a long trough-like hearth separable in sections and into which the materials to be smelted are deposited through the feeding chute S. The sides of these carriages slope outward at the top so as to easily remove the smelted product and unsmelted burden. The carriage sections are added to the hearth at one end and removed at the other end so that in effect there is a continuous traveling hearth within the furnace body. These carriages may be driven in any manner desired, but as shown the bottom of the carriages are provided with racks J and engaging therewith is a pawl K which is reciprocated by lever L and cam M.

The electrodes C C′ extend into the body of the furnace at right angles or transversely to the trough-like hearth and so as to be slightly above the top of the sides of the said carriages. These electrodes are supported in water jackets B, B, which are movable upon guide grooved rollers D. The water jackets receive the water by pipes F communicating with a source of supply by insulated tubes F′, and the heated water runs off by pipes G so that its flow may be observed. The electrodes and their jackets may, if desired, incline slightly (see dotted lines *x*—*x*) or be horizontal as desired, the essential feature being that they shall be arranged for adjustment transversely to the travel of the hearth. It is important that the overflow of the water from the water jackets B B′ shall be seen because if from any cause the water be stopped and then started again there would be an explosion and damage as the jackets would become very hot.

The jackets B B′ are adjusted with their electrodes by rack and pinion gears E. These pinions are rotated by shafts O′ O′ which are in turn rotated by worm wheels N N and worms P P, the latter being secured upon a shaft O which may be rotated by hand or power. This shaft O is made in two parts connected by an insulating coupling O′ so as to keep the two electrodes C C′ insulated from each other. By rotating the shaft O both electrodes C C′ are adjusted to or from each other.

At the front end of the furnace where the carriages H enter, there is a V shaped aperture H′ through which the carriages pass, the apron H² fitting down between the sides

of the carriages as shown in Fig. 3. In this way the materials and gases cannot find easy escape.

A mixture of the proportion of 60 pounds of lime and 40 pounds of carbon is fed through chute S into the hearth H and the electrodes C C′ are brought together and then gradually separated to form an arc which plays across the material to be smelted. When the material is fused, the current passes through it as it advances in a progressive manner. When the furnace is in normal operation the ends of the electrodes are preferably about four inches apart. The carriages forming the hearth are fed along at approximately twelve inches per minute. It will be seen that the calcium carbid which is made will be moved away from the arc at right angles to the electrodes as fast as it is made, but enough of the mixture of lime and carbon is allowed to remain in the carriages unfused to act as an insulator of heat and electricity.

I may use either constant current or alternating current, or a current of constant quantity or variable quantity as preferred. The speed of the hearth may be constant or variable as desired. If the speed of the hearth is uniform, the current employed may be kept constant by regulating the distance between the electrodes. The electrodes C C′ receive current of opposite polarity in any suitable manner and should be well insulated from each other.

While I prefer the construction shown, I do not limit myself to the details thereof, as they may be modified without departing from the spirit of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an electric furnace, the body of the furnace combined with two electrodes directed toward each other from opposite sides of the furnace body, a traveling trough-shaped hearth made in separable sections having bottom and sides only, means for moving the sections of the hearth through the furnace in a rectilinear line, carriers or supports for the electrodes having means for being kept cool, and means for adjusting the carriers or supports.

2. In an electric furnace, the body of the furnace combined with two electrodes directed toward each other from opposite sides of the furnace body, a traveling trough-shaped hearth made in separable sections having bottom and sides only, means for moving the sections of the hearth through the furnace in a rectilinear line, water jackets for supporting the electrodes, and means for adjusting the water jackets to or from each other.

3. In an electric furnace, the combination of a trough shaped traveling hearth, means to feed the hearth in the direction of its length, electrodes adapted to strike an arc and maintain a fusing zone in the hearth extending toward the hearth from opposite sides thereof, water jackets for supporting the electrodes, means consisting of gearing and shafts for adjusting the water jackets to or from each other extending across the hearth so as to adjust both jackets simultaneously in opposite directions and provided with means for operating it from each side of the hearth, and means to maintain a supply of water through the water jackets during their adjustment.

4. In an electric furnace, a sectional trough shaped hearth, means to feed the hearth in the direction of its length, two electrodes directed toward each other over the hearth, hollow water jackets supporting the electrodes and arranged upon opposite sides of the furnace, and means for simultaneously moving the water jackets to or from each other consisting of two sets of gearing, a common power shaft for driving both sets of gearing adapted to be operated from either side of the furnace, and means for insulating the two sets of gearing from each other.

In testimony of which invention, I hereunto set my hand.

JAMES E. HEWES.

Witnesses:
VICTOR F. BOISE,
P. J. TWINING.