

No. 711,352.

Patented Oct. 14, 1902.

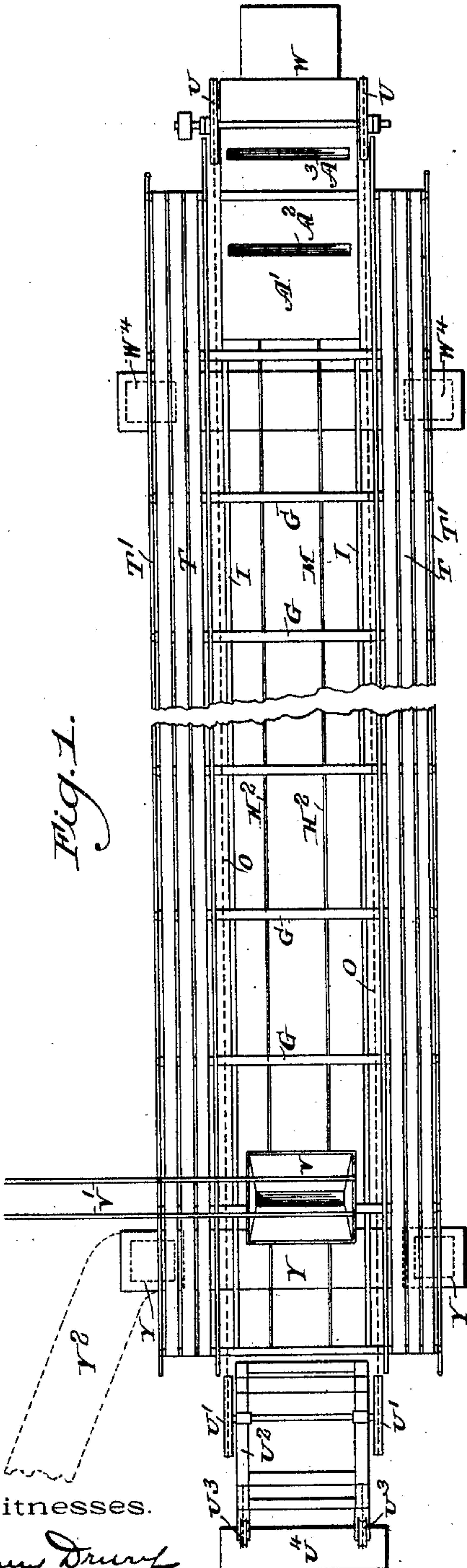
D. SHEEDY & M. W. ILES.

ROASTING FURNACE.

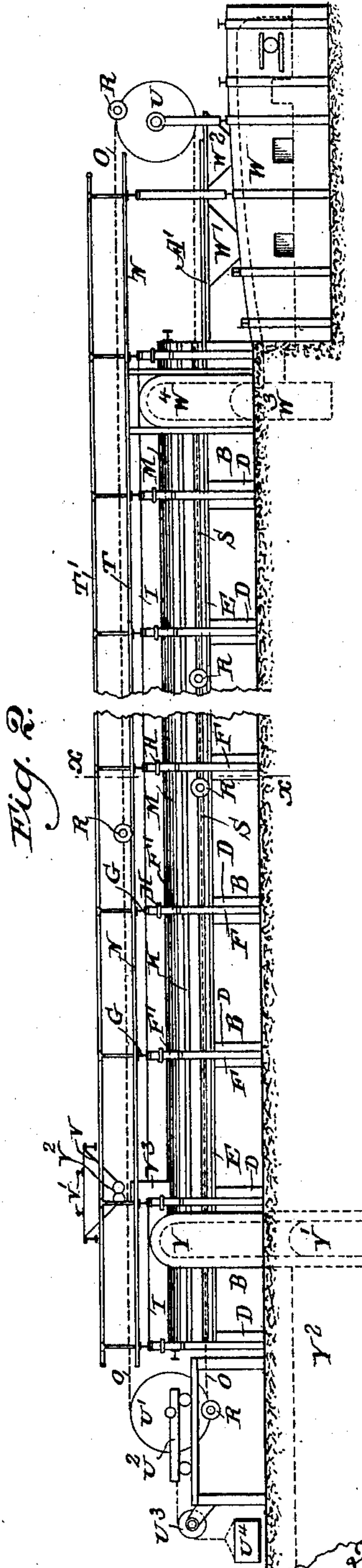
(Application filed Apr. 14, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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2 Sheets—Sheet 2.

Fig. 3.

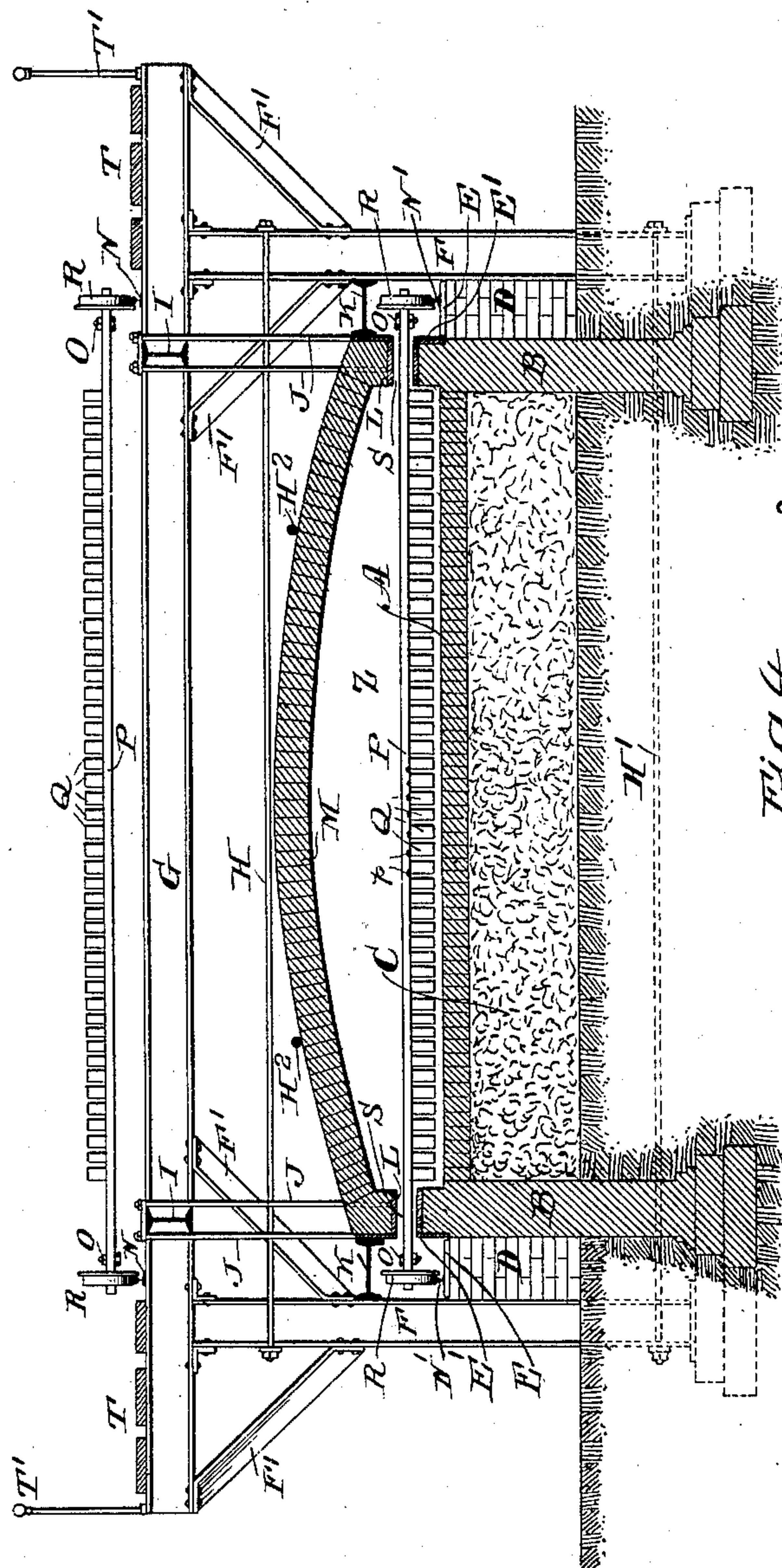
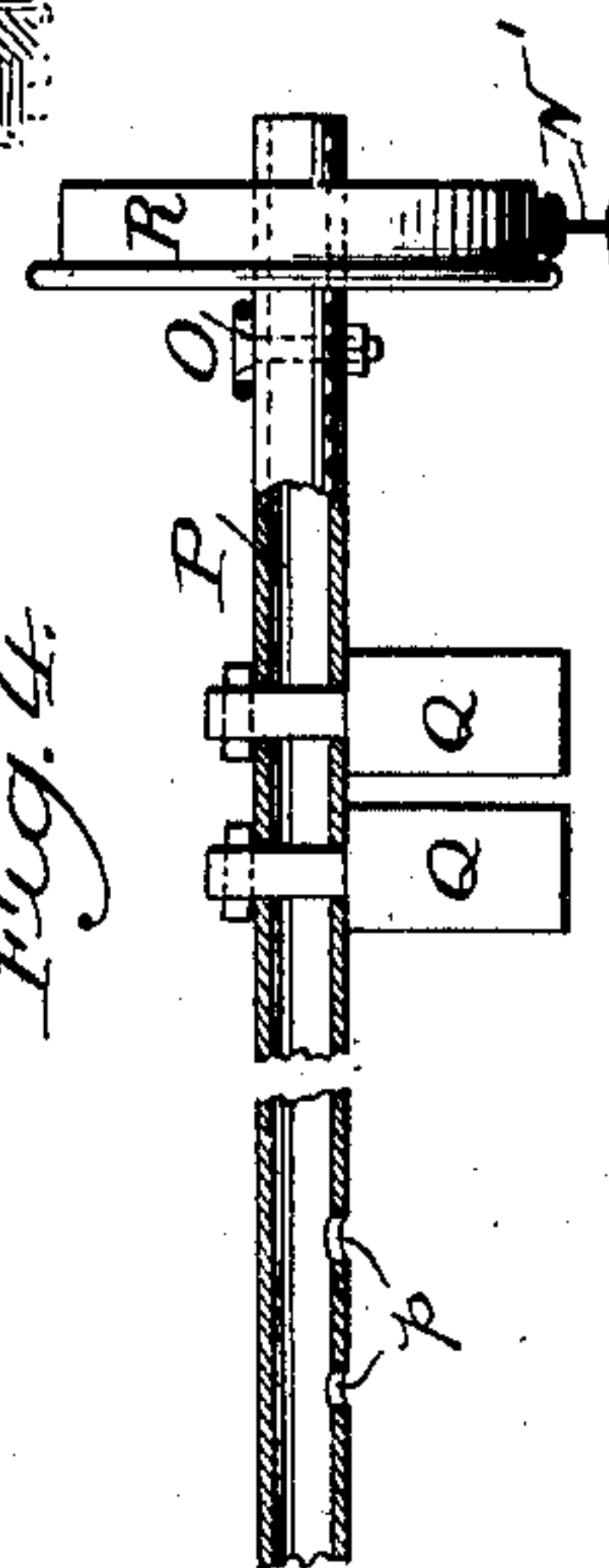


Fig. 4.



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UNITED STATES PATENT OFFICE.

DENNIS SHEEDY AND MALVERN W. ILES, OF DENVER, COLORADO.

ROASTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 711,352, dated October 14, 1902.

Application filed April 14, 1897. Serial No. 632,079. (No model.)

To all whom it may concern:

Be it known that we, DENNIS SHEEDY and MALVERN W. ILES, citizens of the United States of America, residing in Denver, in the county of Arapahoe, in the State of Colorado, have invented a certain new and useful Improvement in Furnaces, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to the construction of furnaces, and particularly to what may be called "mechanical" furnaces, such as are used for calcining and roasting all classes of ores, including the so-called "chloridizing" roasting and the roasting to sulfates and drying of materials.

The objects of our invention are to provide an improved method of construction whereby the arch or top of the furnace is entirely suspended from above and whereby the stirring and conveying devices can be extended laterally outside the walls of the furnace and supported upon tracks or other mechanical construction situated outside of the furnace.

A further object of our invention is to provide means for keeping the stirring and conveying devices cooled, so as to prevent their destruction by the action of the furnace-heat and corrosive gases upon them.

Reference being now had to the drawings which illustrate our improvements in what we consider to be their best form, Figure 1 is a plan view of the furnace constructed in accordance with our invention; Fig. 2, a side elevation thereof; Fig. 3, a cross-section taken on the line *xx* of Fig. 2 and shown on an enlarged scale; Fig. 4, a view of a portion of one of the stirring and conveying devices shown on a still more enlarged scale.

A indicates the bottom or floor of the furnace, which, as shown, is inclosed on each side by brick walls B B, C being a filling beneath the floor A.

D D indicate brick buttresses built up between the walls B and the columns F F, which last-mentioned columns extend, as shown, above the top of the furnace, E E being cast-iron plates situated at intervals on top of the buttresses D, and E' a continuous iron angle situated on top of wall B. Upon the top of the columns F F are cross-beams G G, &c.,

connecting the columns in pairs and extending across the furnace.

F' F', &c., indicate angular braces secured to the columns F and to the beams G.

H and H' are heavy tie-rods situated near the top and near the bottom of the columns F F and serving to tie or anchor the columns together, so as to overcome the tendency to spread or push them apart.

J J indicate a series of suspension-rods which are supported by the beams I, extending continuously between adjacent beams G and supported by them. The suspension-rods support at their lower ends angles L, which angles are braced to prevent outward thrust by continuous beams or braces K K, situated between the angles L and the columns F. As shown, M is the top arch of the furnace, which is supported at each side upon the angles L L and suspended by rods J upon the cross-beams G, as shown, being attached directly to the beams I.

H² H² indicate longitudinal tie-rods for holding the furnace together longitudinally.

N indicates a track supported above the cross-beams G; N', a corresponding track supported on the plates E outside of the furnace.

O is a conveyer chain or rope, which may be of any convenient construction and to which are attached the stirring and conveying devices. We prefer to make the axle of hollow pipe, having downwardly-extending rabbles Q attached to the pipe P. The outer ends of the pipes pass through the continuous slot S S, situated on each side of the furnace between the base and the suspended top or arch of the furnace, and these slots, as well as the openings under the arch at each end of the furnace, are closed by any suitable automatic closing-doors.

R R indicate wheels journaled upon the outer ends of the hollow pipes P and adapted to run upon the track N' and N, as shown. Both the outer ends of the pipes P are open to the air, and we form small openings at or near the center of the pipe, as indicated at *p*, as a result of which a current of air is always passing into the outer ends of the hollow pipes and issuing into the furnace through the openings *p*, with, of course, the result of keeping the pipes relatively cool and prolonging their life.

The cooling device is considered to be an improvement upon similarly - constructed cooling devices in so far as the air may enter freely both ends of the pipe irrespective of the direction of the wind and likewise performs a useful function in admitting oxygen at that portion of the furnace where it is most needed and which supply of air is wholly within control of the operator. In case oxygen is not needed at the central portion of the furnaces (as is the case in certain processes) then the holes *p* may be closed and we would still retain the desired cooling effect by a current of air passing freely through the pipe without entering the furnace.

T T indicate platforms supported upon the cross-beams G upon each side of the tracks N. T' T' are hand-rails.

U indicates a device for imparting motion to the conveyer ropes or chains O, which may conveniently consist of sprocket - wheels driven in any convenient way, U' indicating chain or rope wheels situated at the other end of the furnace and preferably supported upon a compensating device which will keep the conveyer chains or ropes O under constant tension. Thus, as shown, the chain-wheels U' are supported on a longitudinally-inovable frame U², from which extends a cable, passing over pulleys U³ and having attached to its end a compensating weight U⁴.

V is a hopper into which the ore or other material to be treated in the furnace is fed. As shown, a track V' leads above this hopper, so that ore-cars may be dumped directly into it, and at the bottom of the hopper we have indicated pipe-rolls V², which are sometimes desirable where the lumpy ore needs to be broken before entering the furnace. Below the rails V² a chute V³ is shown leading through the arch of the furnace.

Our furnace may be heated in any usual way. As shown, we place at its end a cinder-furnace W. The floor or hearth of the furnace proper is continued beyond its end onto cast-iron plates A', through which are formed slots A² and A³, leading into hoppers W' and W², which in turn lead into the cinder-furnace W, which may or may not be attached thereto. The gases from the cinder-furnace W pass into a flue W³, thence into side flues W⁴, which curve inward and enter through the crown or arch of the furnace. The gases then sweep through the furnace in the opposite direction to that in which the ore is moved and finally pass out through the arch at Y, passing through side flues into a flue Y', from which a flue Y² leads to any suitable exit, the draft being induced by a stack or fan.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A furnace adapted for roasting, drying, calcining and chloridizing of ores and other materials having in combination, a base or

hearth, a frame extending over the sides and top of said base, angles L L supported by depending rods J J the upper ends of which are secured to the parts of the frame extending over the top of the base, and laterally braced by the vertical parts of said frame, a fixed top supported on said angles and entirely suspended from said frame, an endless carrier and conveying device extending longitudinally beneath and above the fixed top and means for moving said carrier.

2. A furnace adapted for roasting, drying, calcining and chloridizing of ores and other materials having in combination, a base or hearth, a frame extending over the sides and top of said base, angles L L supported by depending rods J J the upper ends of which are secured to the parts of the frame extending over the top of the base, and laterally braced by the vertical parts of said frame, a fixed top supported on said angles and entirely suspended from said frame and disconnected from the base and at such a distance above the same as to afford continuous openings on both sides for the passage of stirring and conveying devices, endless carriers connected with the ends of the stirring and conveying devices outside the furnace and extending over the fixed top and means for actuating said carriers.

3. A furnace adapted for roasting, drying, calcining and chloridizing of ores and other materials having in combination, a base or hearth, a frame extending over the sides and top of said base, angles L L supported by depending rods J J the upper ends of which are secured to the parts of the frame extending over the top of the base, and laterally braced by the vertical parts of said frame, a fixed top supported on said angles and entirely suspended from said frame and disconnected from the base and at such a distance above the same as to afford continuous openings on both sides for the passage of stirring and conveying devices, transverse scrapers and stirrers passing through the lateral openings on each side of the furnace, endless carriers O, one on each side of the furnace, connected with the scrapers and extending back over the fixed top, tracks or continuous supports also situated on each side of the furnace, and bearings for the outer ends of the scrapers supported and moving on said tracks.

4. In combination with a furnace Z having its top M entirely suspended from above and continuous lateral openings S S between the top and base of the furnace; a conveyer having the hollow pipes P extending through the openings S and having both their outer ends open, and openings, as *p*, at or near the center of the furnace.

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