

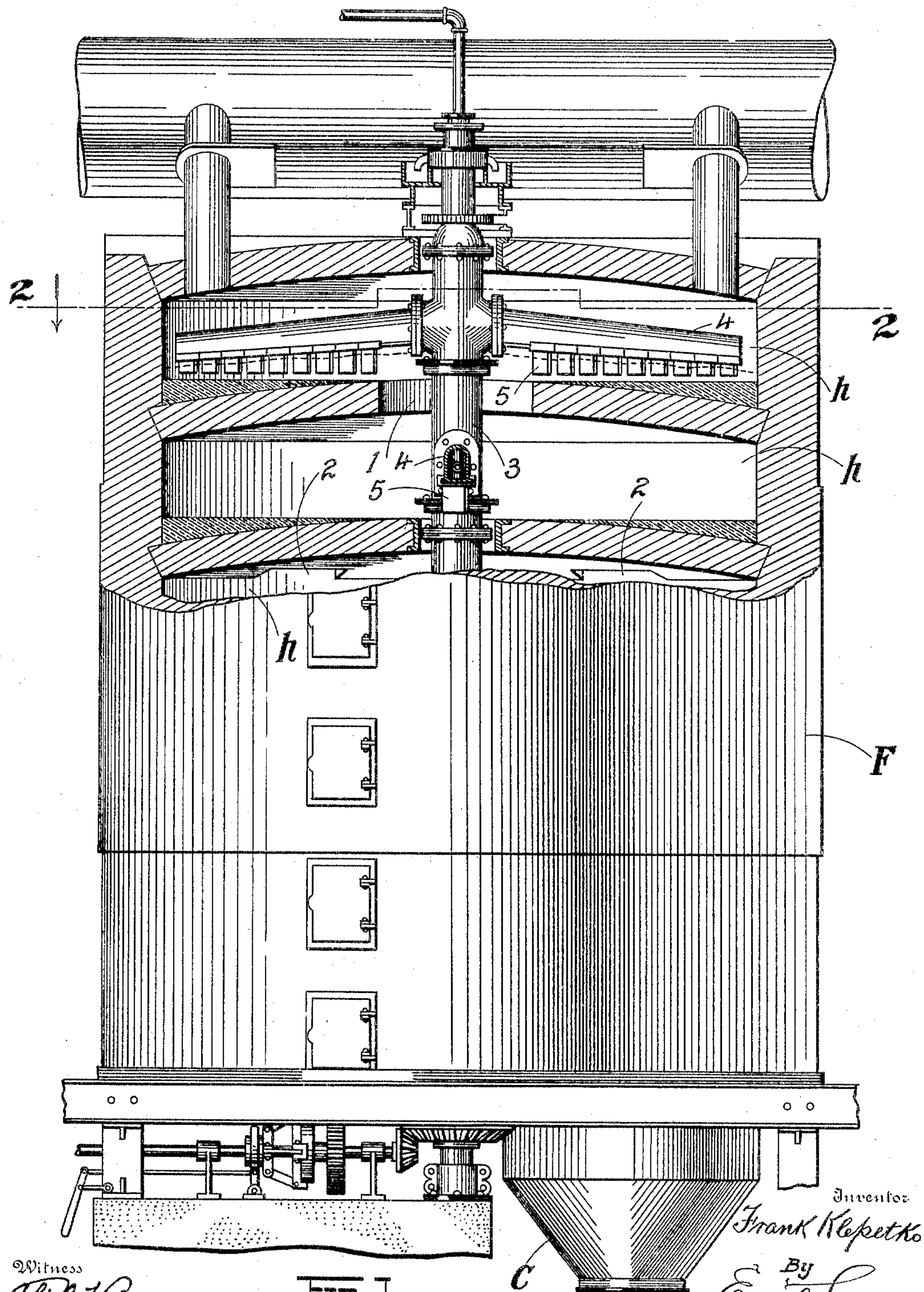
No. 793,939.

PATENTED JULY 4, 1905.

F. KLEPETKO.
ROASTING FURNACE.

APPLICATION FILED OCT. 22, 1904.

2 SHEETS—SHEET 1.



Witness
Chas. J. Gawn
G. L. Belfry

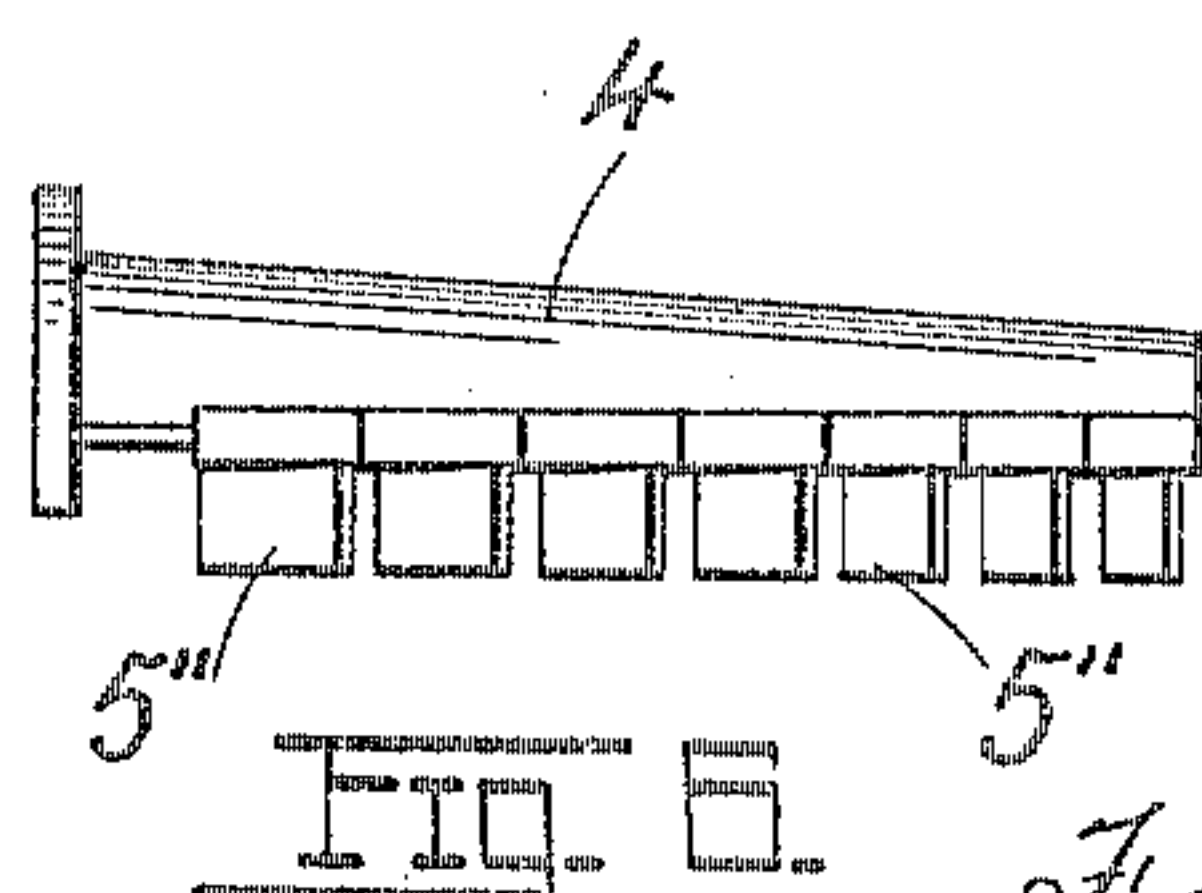
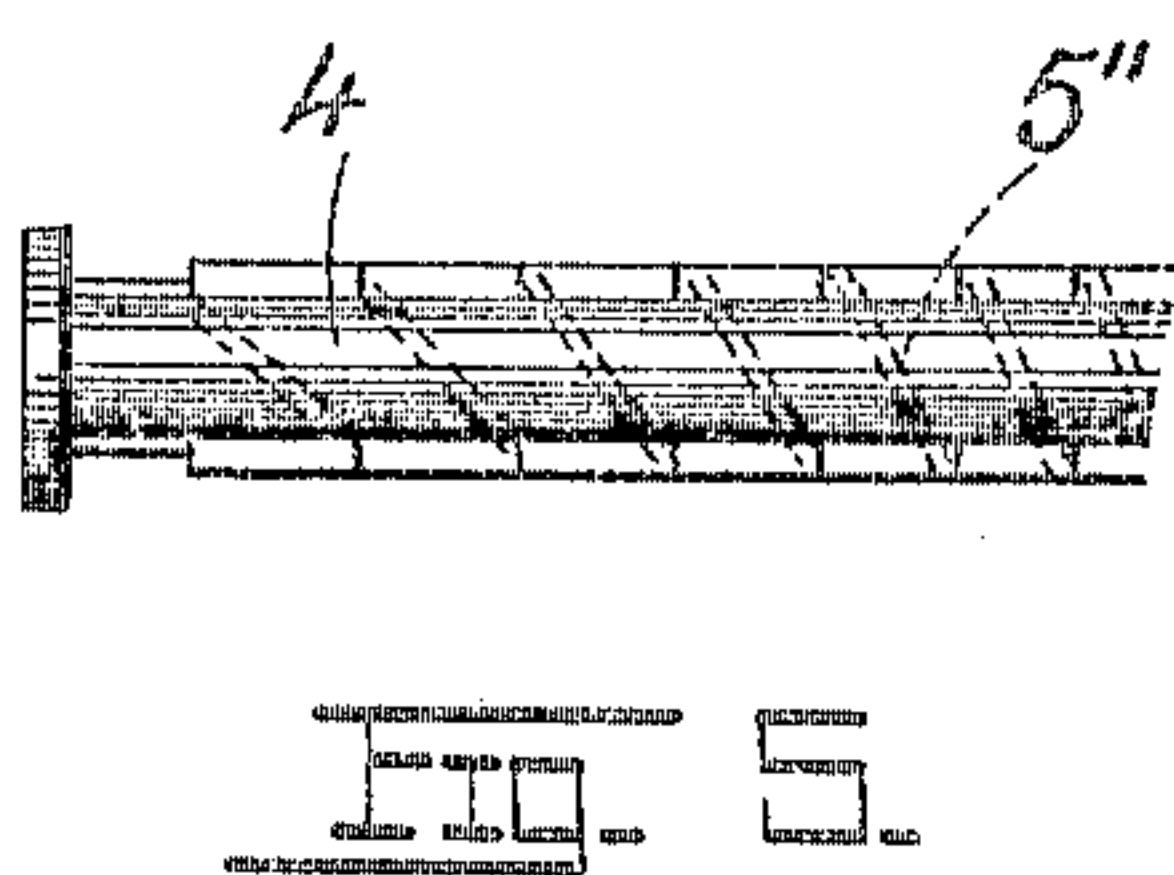
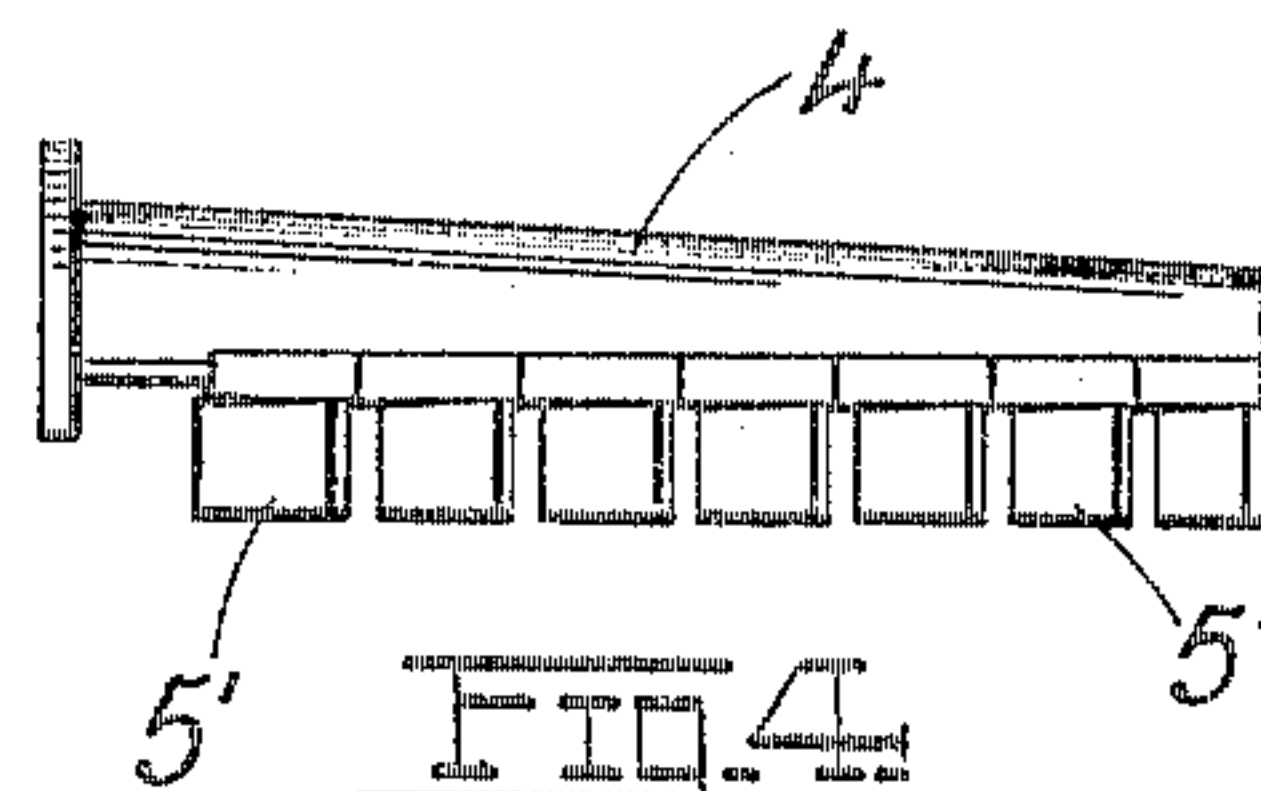
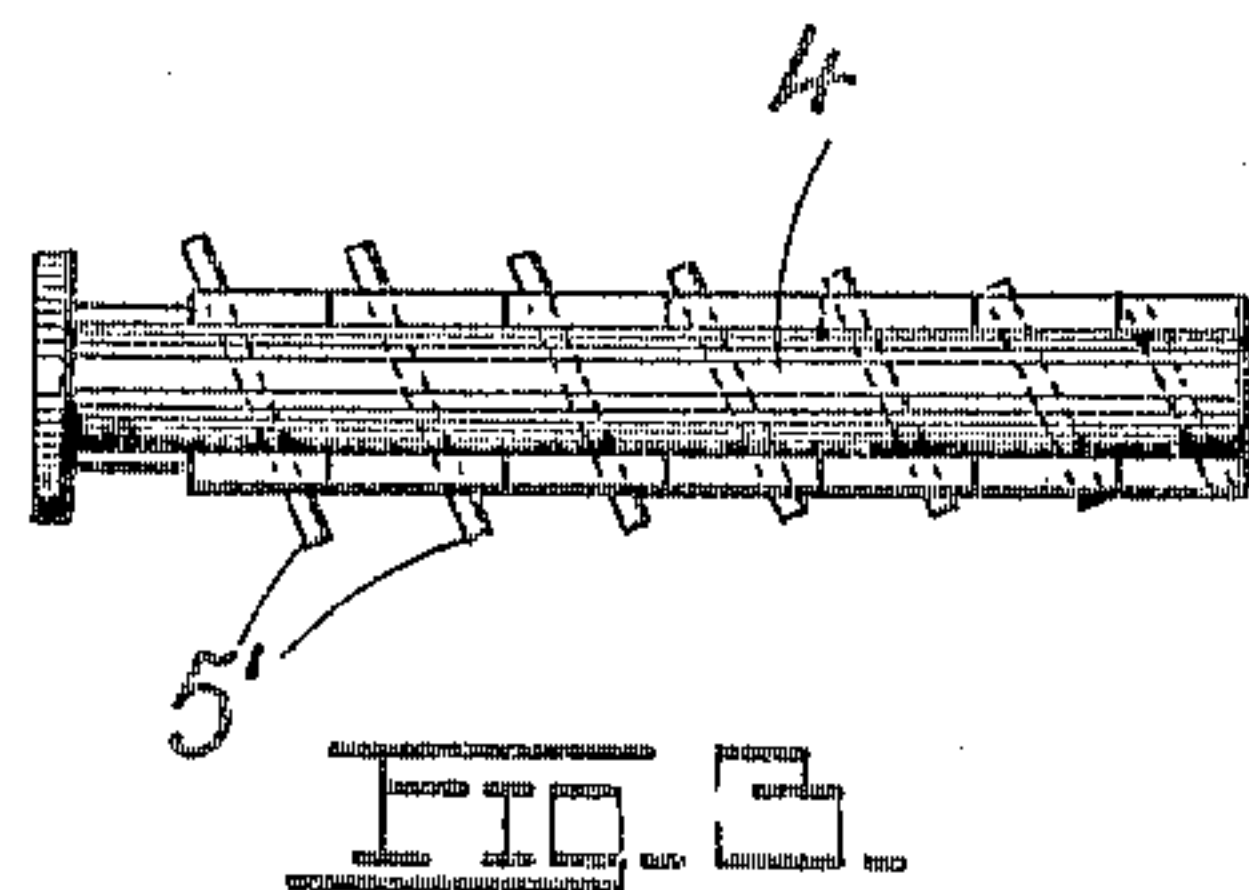
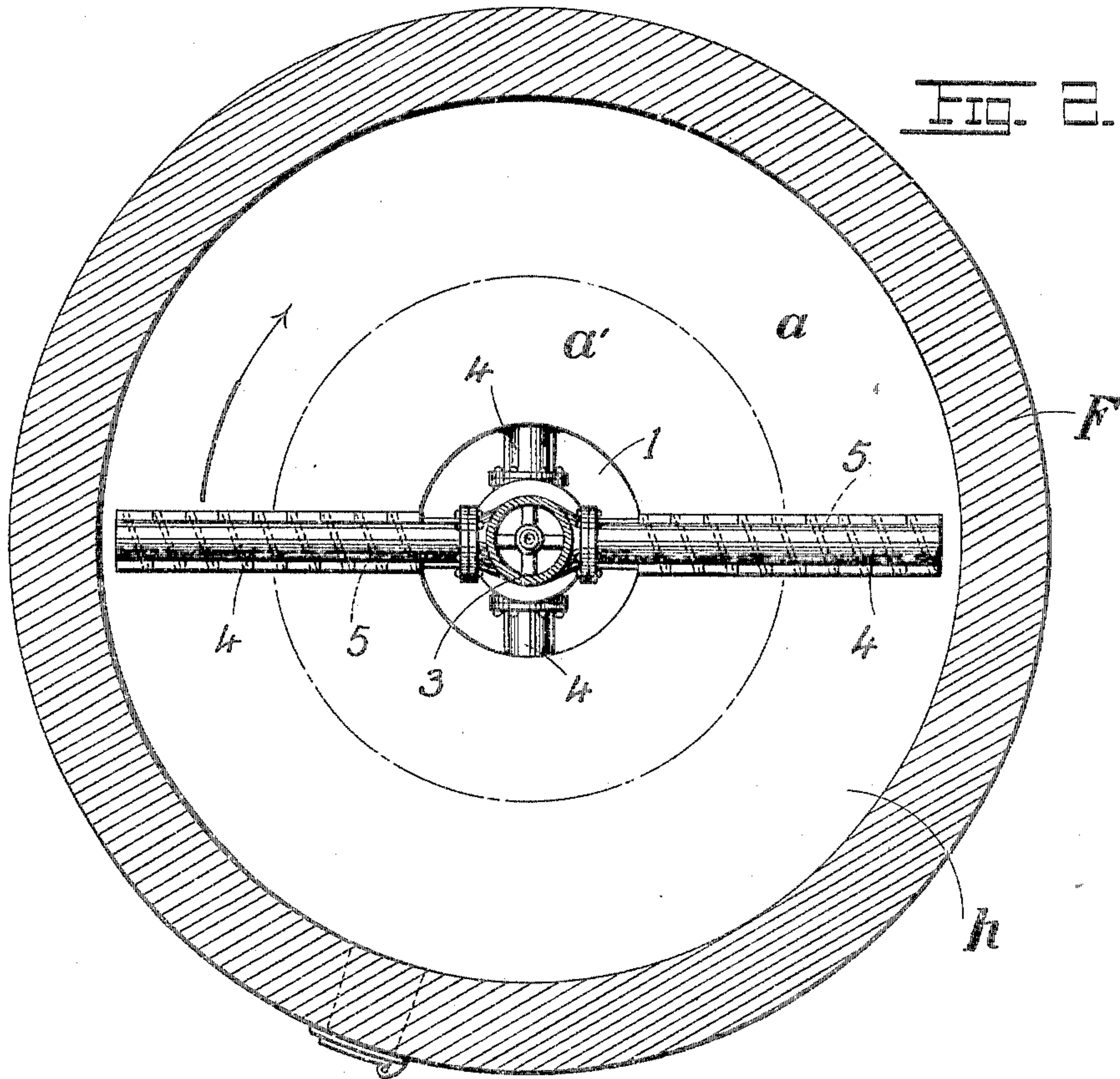
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2 SHEETS—SHEET 2



Witness

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UNITED STATES PATENT OFFICE.

FRANK KLEPETKO, OF NEW YORK, N. Y.

ROASTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 793,939, dated July 4, 1905.

Application filed October 22, 1904. Serial No. 229,638.

To all whom it may concern:

Be it known that I, FRANK KLEPETKO, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in roasting-furnaces; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claim.

In the drawings, Figure 1 is a combined elevation and section of a conventional McDougall ore-roasting furnace, showing one form of my invention applied thereto. Fig. 2 is a horizontal section on line 2-2 of Fig. 1, taken through the upper hearth. Fig. 3 is a top plan of a rabble-arm, showing a modified form of rake covered by the present invention. Fig. 4 is a side elevation thereof. Fig. 5 is a top plan of a rabble-arm, showing the rakes disposed at different angles to effect the results contemplated by my invention; and Fig. 6 is a side elevation of the same.

The present invention is directed to the raking mechanism of ore-roasting (or other) furnaces wherein the material is raked toward the center of one hearth, where it is discharged onto the hearth beneath, where in turn it is raked radially outward to be discharged through marginal openings onto the next or third hearth, and so on till it reaches the bottom hearth. A conventional type of such a furnace is the McDougall. (Illustrated in the drawings.) For the treatment of ores which require a comparatively long exposure to the heat and where it is desirable to allow the ore to remain a correspondingly longer time on the hearth it is economical to materially increase the diameter of the furnace to secure an increased area for the hearth.

Owing to this increase in area and the increased capacity of any hearth, the ore accumulating at the center under the action of the rakes must be disposed of as fast as it accumulates. If the rakes carried by the rabble-arms were all of one size or were so dis-

posed angularly as to have the same area of radially-effective feed, the ore would pile up at the center and the hearth become choked up. To avoid this consequence, I provide each rabble-arm with a series of rakes whose radially-effective sweeping-surface increases toward the center of the hearth, all as will more fully appear from a detailed description of the invention, which is as follows.

Referring to the drawings, and particularly Figs. 1 and 2, F represents the furnace, and H the hearths in which the material is treated, the latter dropping from the upper hearth successively through the several hearths until it is received by the delivery-hopper C, the hearths being provided, respectively, with the central and marginal openings 1, 2 for the passage of the material. Passing through the hearths is the rotatable rabble-shaft 3, from which radiate the series of rabble-arms 4, extending into the several hearths and carrying rakes or rabbles 5, by which the material is successively fed from one hearth to the hearth immediately beneath, all as fully understood in the art. Taking the upper hearth as an example, we can for convenience divide the same into two areas, an outer annular area a and an inner annular area a' , Fig. 2. With the rabble arms and shaft rotating in the direction indicated by the arrow, the rakes will feed the ore radially toward the central opening 1; but owing to the quantity of ore treated on a hearth of increased capacity the ore thus raked toward the center will pile up as it approaches the opening 1, the material distributed over the area a being obliged to occupy the diminished area a' . The ore thus piled up (see dotted wave line in Fig. 1, which represents the character of pile formed) unless taken care of and raked into the discharge-opening 1 would accumulate and choke up the hearth, so that to avoid such consequence I increase the superficial area of the rakes as they approach the center of the furnace, the increase in the area of the rakes thereby offering a larger raking-surface to the ore thus accumulated. I may (for blades whose angle of deflection is uniform for the full length of the rabble-arm) increase this raking-surface by either increasing the depths of the blades

approaching the center, as shown in Fig. 1, or I may increase the width of the blades, as shown by blades 5' in Figs. 3 and 4, or I may increase both the depth and width. By "raking-surface" is herein meant that component of the entire area of the blade which is available for driving the ore radially, (inward or outward,) for it must be remembered that at the same time the ore is raked toward or from the center of the hearth it is constantly being raked circularly. The circular travel of the ore, however, is in no wise instrumental in producing the piling up thereof, as described, but it is only the radial advance of the ore inwardly to which the piling up is directly due. It must be remembered that the blades are deflected to the proper angle to effect a radial advance in either direction and that by varying the angle of deflection as to some of the blades we can increase that component of the blades' area which is available to direct the ore radially, so that, as shown in Figs. 5 and 6, the outer blades 5'', which are set at a less acute angle of deflection (relatively to the axis of the rabble-arm) than the inner blades, will have a less tendency to rake the ore radially than the inner blades, which are set at a greater inclination to the axis of the rabble-arm. The results accomplished, therefore, by the disposition of the blades as shown in the modification in Figs. 5 and 6 are the same as those shown in Figs. 1 to 4, inclusive. I may even qualify the arrangement shown in Figs. 5 and 6 by increasing the areas of the inner blades by the methods proposed in connection with Figs. 1 to 4, inclusive. Of course what is true for the top hearth is true for the second hearth. In the latter the ore accumulated at the center must be raked radially outward; but as it approaches the area a the necessity for its rapid radial advance becomes less pressing, and the available radially-outward-raking

surfaces of the respective blades decreases as they approach the outer ends of the rabble-arms. We may consider that the ore travels along each hearth in two directions—a circular direction and a radial direction. Of course it is only the radial direction with which the present invention is concerned, since the circular component is a dead element so far as its tendency to pile up the ore at the center is concerned. Generically expressed, therefore, my invention contemplates providing a rabble-arm with rakes whose available radially-feeding surface increases toward the inner end of the arm or toward the end at which accumulation of the ore tends. This surface is that component of the entire surface which drives the ore radially, the other component driving it circularly. This component (the radial one) may be varied or increased by either of the methods above outlined or by any combination of them. Were it not for the arrangement here disclosed the ore in furnaces of large hearth capacity would simply pile up over the rabble-arm and choke the hearth.

The generic idea here set forth may of course be used in other connections or arts and need not be limited in its application to roasting-furnaces.

Having described my invention, what I claim is—

A rabble-arm adapted to rotate about a fixed axis, having a series of rakes whose depth increase as they approach said axis, substantially as set forth.

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

FRANK KLEPETKO.

Witnesses:

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M. A. PESTANA.