

C. H. REPATH.  
 RABBLE ARM.  
 APPLICATION FILED MAY 1, 1909.

932,496.

Patented Aug. 31, 1909.

FIG. 1.

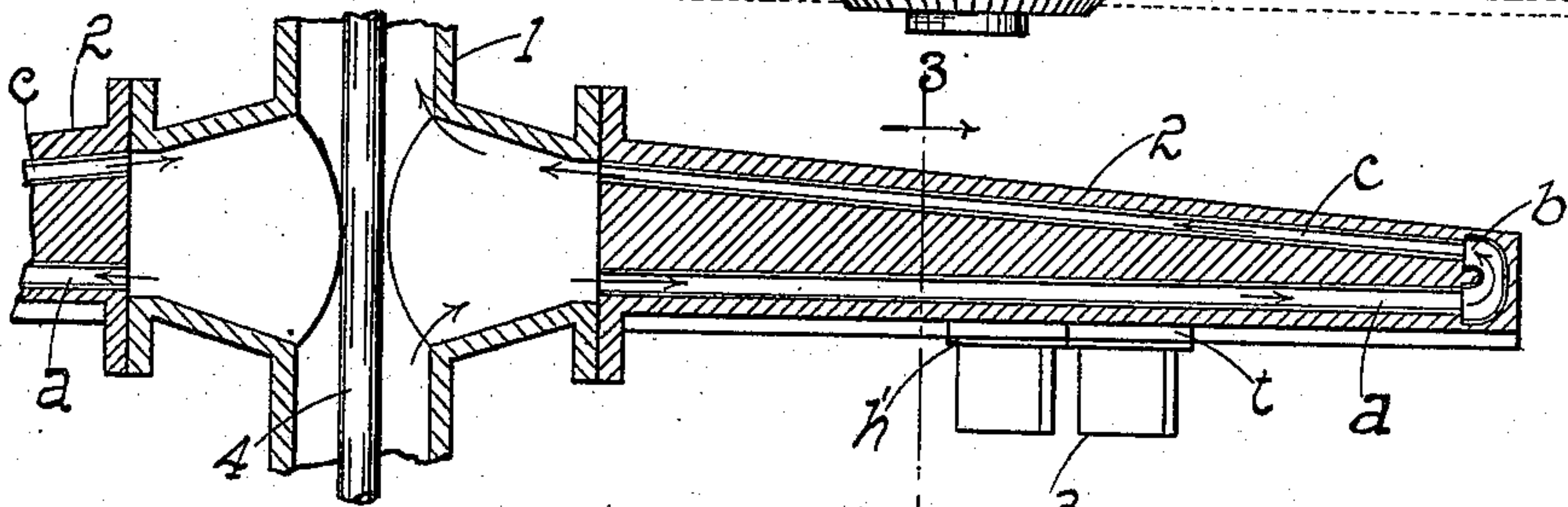
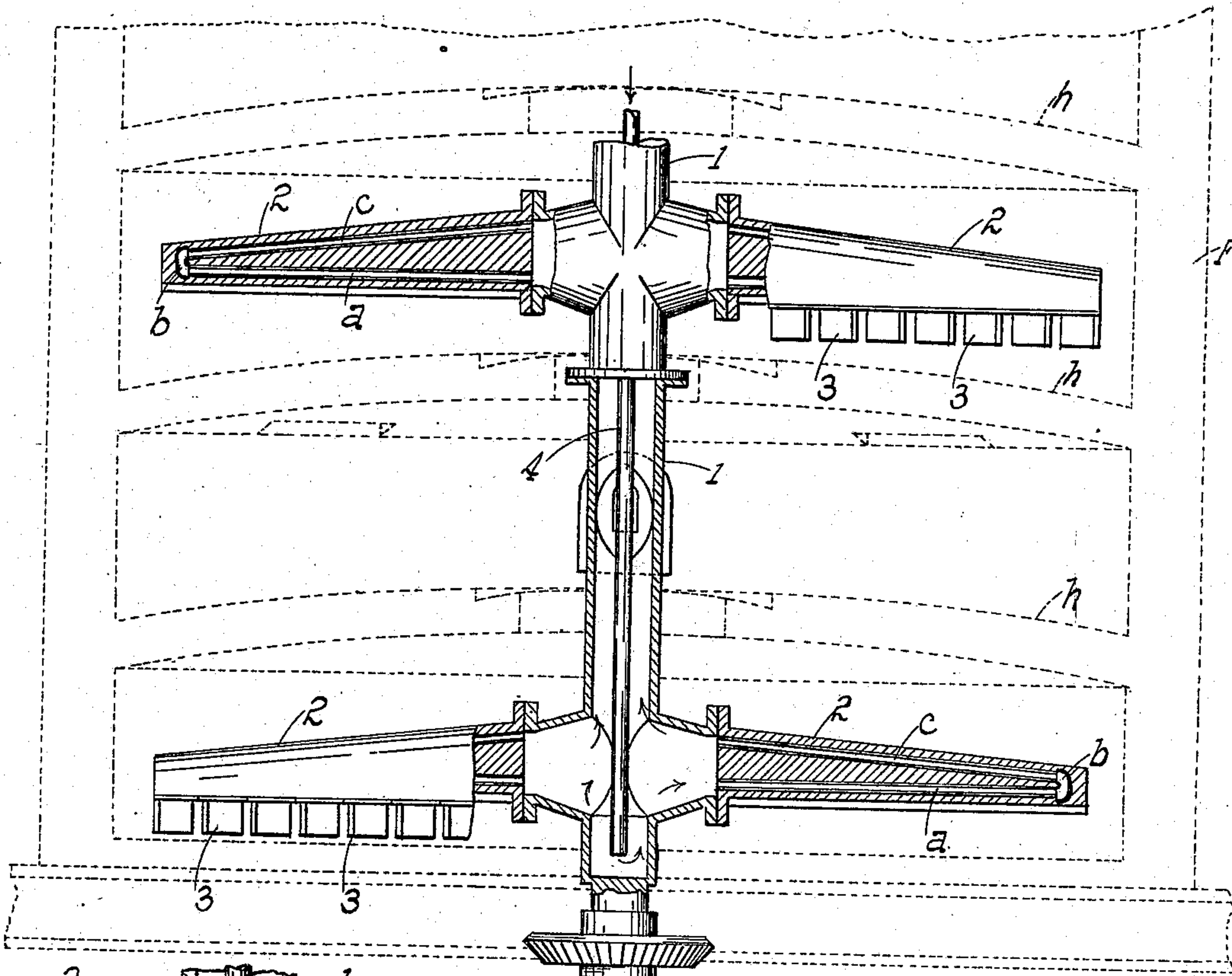
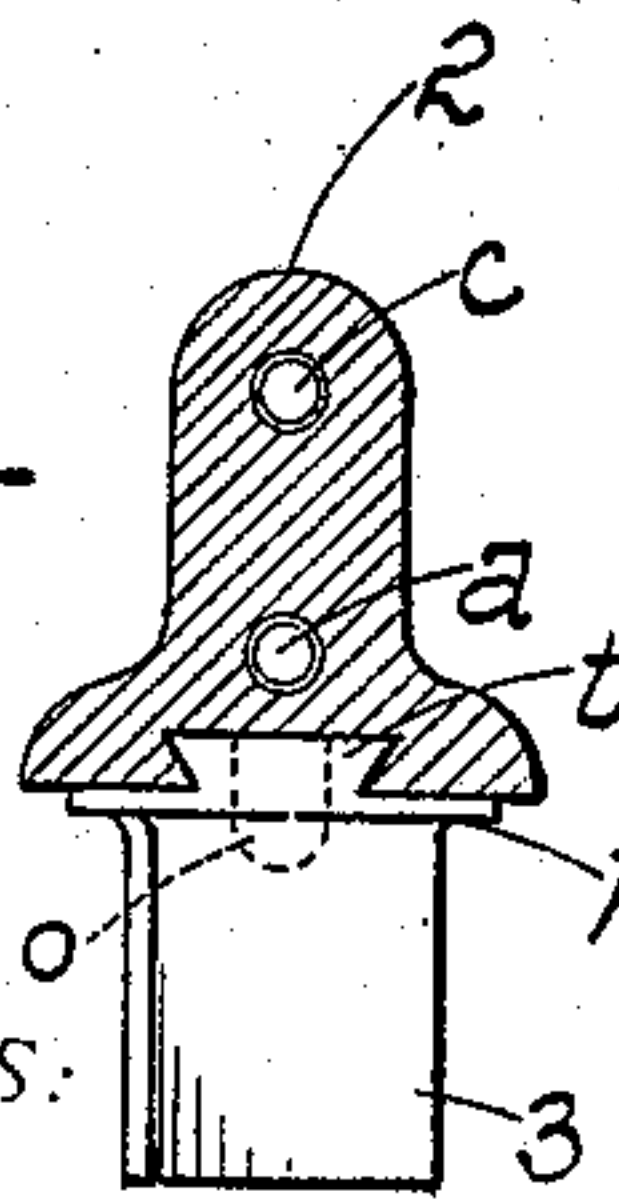


FIG. 2.

FIG. 3.



WITNESSES:

Harry A. Beimes.  
 E. J. Clump

FIG. 4.

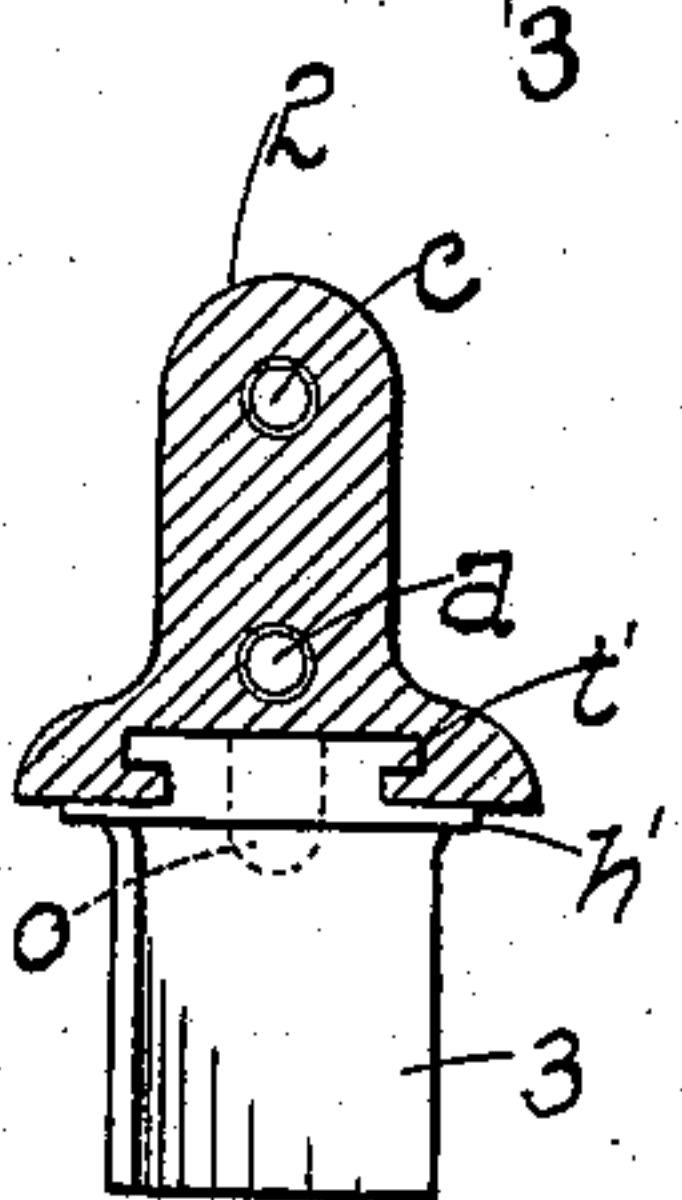


FIG. 5.

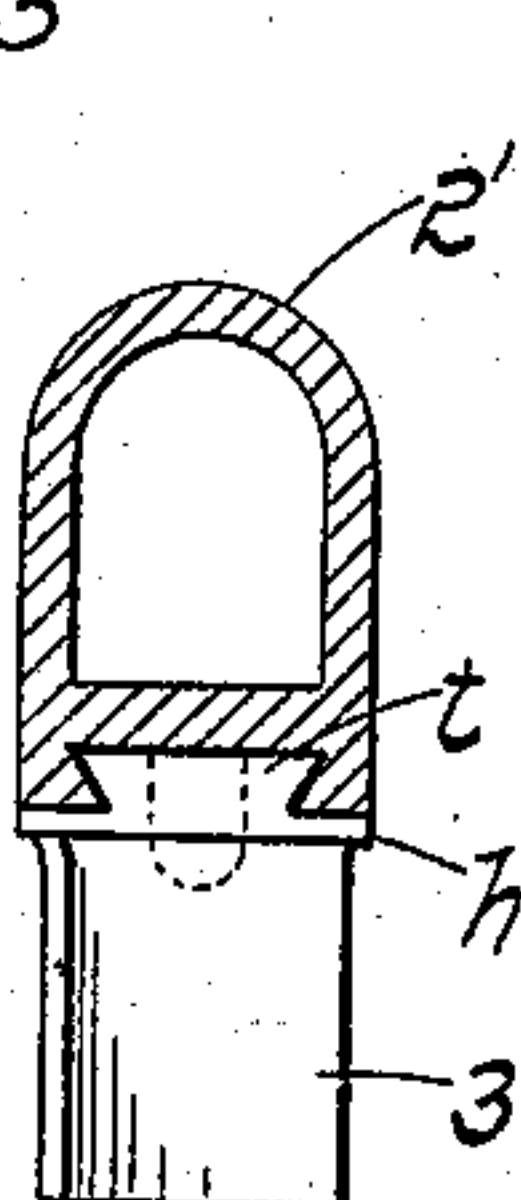
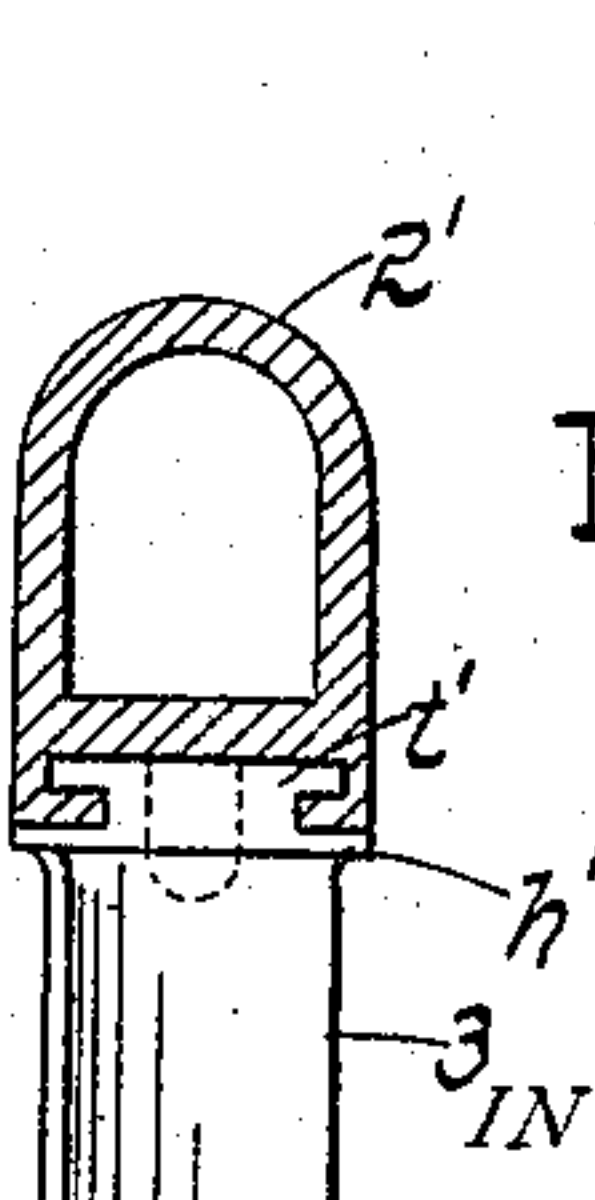


FIG. 6.



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# UNITED STATES PATENT OFFICE.

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## RABBLE-ARM.

932,496.

Specification of Letters Patent.

Patented Aug. 31, 1909.

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*To all whom it may concern:*

Be it known that I, CHARLES H. REPATH, citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Rabble-Arms, 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 rabble arms for furnaces; and it consists in the novel construction of arm more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 shows the dotted outline of a conventional form of McDougall or roasting furnace, with a vertical sectional view of one form of my invention; Fig. 2 is an enlarged middle vertical section of one form of rabble arm and a portion of the hollow shaft to which it is coupled; Fig. 3 is a vertical transverse section on line 3—3 of Fig. 2; Fig. 4 is a section similar to Fig. 3 showing a modified form of groove and tongue connection between the rabble arm and rake; and Figs. 5 and 6 are cross sections of a modified form of rabble arm showing two different forms of tongue and groove connection with the rakes.

The present improvement while designed particularly in connection with roasting furnaces of the McDougall type, may of course be utilized as a feature in any stirring or rabble apparatus where necessity arises for keeping such apparatus cool, or at a temperature sufficiently reduced to escape the destructive effects of too great a heat.

The object of the invention is to provide an arm which, while it shall offer the best facilities for the circulation of the cooling medium, shall at the same time provide means for readily attaching or detaching the rakes or rabbles by which the stirring of the material or ore is accomplished.

A further object is to provide a construction which will effectively prevent access of the furnace dust to the joints between the arm and rakes, thereby avoiding the consequent cementing of the rakes to the arm. This leaves the rakes in condition for ready withdrawal or removal from the arm in the

event a rake becomes broken and its complete removal becomes necessary for the substitution of a new rake.

The advantages of the invention will be best apparent from a detailed description thereof, which is as follows:

Referring to the drawings, and for the present to Figs. 1 to 4 inclusive, in which is shown one application of my improvement, F represents a roasting furnace of the McDougall type, shown in dotted outline. The hearths of the furnace are represented by *h*, the material or charge dropping from one hearth to the next hearth below as well understood in the art. Passing through the several hearths is the rotatable hollow rabble-shaft 1, from which radiate the series of rabble arms 2, extending into the several hearths and carrying rakes 3, by which the material is successively fed from one hearth to the hearth immediately beneath it, all as fully understood in the art.

Into the hollow shaft is inserted a water-feed pipe 4, which discharges into the bottom of the shaft whence the water circulates through the series of arms and upward through the shaft as follows: Each arm is cast about an open ended circulating distributing pipe comprising an outflowing substantially horizontal branch *a*, a terminal elbow *b* and an inflowing or return branch *c* discharging into the shaft, the branch *a* taking the water from the shaft. The branch *c* is inclined inwardly and upwardly so as to facilitate the circulation of the water, the cooler water seeking the horizontal branch *a* and flowing outwardly, and the hotter particles flowing upwardly and inwardly toward the common rising current in the shaft and around the feed-pipe 4. The disposition of the branches *a*, *c*, dispenses with the necessity of leading a distributing pipe directly from the feed-pipe as is common in many systems of circulation in this class of furnaces, the inclined position of the branch *c* serving to induce proper circulation in the arm without resorting to the expediency of a special distributing pipe coupled to the feed-pipe. By thus casting the rabble arm 2 solid as shown (in lieu of a hollow arm as is frequently used) it may be made lighter and of comparatively reduced cross-section, the



bulk of the metal being placed along the bottom where it serves to support the rakes or rabbles 3. This distribution of the metal gives to the arm an enlarged laterally extended base, along the central portion of which is preferably formed a dove-tail groove, running the full length of the arm and open at the outer end. Into this groove are inserted the correspondingly shaped tongues *t* projecting from the flat upper heads *h'* of the rakes, the heads *h'* bearing against the under surface or flat bottom of the rabble arm. The dove-tail cross-section of tongue and groove connection is shown in Figs. 1, 2, 3. The groove and tongue may however, be T-shaped as shown in the modification in Fig. 4, the tongue *t'* representing the modified form.

The rakes 3, may with equal propriety be secured in the manner already described, to conventional types of hollow rabble arms such as 2' shown in the modification in Figs. 5 and 6, wherein both forms to tongue *t* and *t'* for the rake are illustrated.

The construction of arm and its rake as here described brings the securing tongue *t* (*t'*) of the rake close to the cooling circulating medium whether confined in the pipes *a c b*, or in the hollow arm 2', the tongue being thus interposed between the means for circulating the cooling medium and the rake proper. This not only cools but protects the tongue; and in that protected position the tongue is practically incased within the body of the rabble arm so that no dust or fine ore particles can accumulate in the joints between the tongue and the groove which receives it, and thus the danger of the dust cementing the rake to the arm is eliminated. The rake is thus ever free to be shifted along the groove, and should a rake break at any point along the length of the arm, those in front of it may be withdrawn from the outer end of the arm, then the broken rake may be removed in the same way, and a new rake inserted. The rake could originally be cast with an opening of a size indicated by the dotted line *o*, and should a rake "stick" it could be pried off by inserting a lever or bar through the opening thus formed, when the prying off of the rake could be accomplished without noticeable injury to the ribs constituting the sides of the groove formed in the rabble arm. To prevent the outer rake of the series from working out of the groove, it may be locked or secured to the arm by any means well known in the art, such detail being of no consequence in the present connection.

It will be seen from the foregoing that the

groove for receiving the tongues of the rakes is formed in the center of the main body of the arm and above the bottom thereof, the enlarged bearing head *h'* of the rake resting against the flat bottom of the arm, the heads extending on either side of the blade of the rake so as to properly space the series of rakes strung along the arm. No dust can accumulate in the joints between the tongues and the walls of the grooves in which they are inserted, and the danger of a rake becoming cemented to the arm is reduced to a minimum. Of course, the heads *h'* overlapping as they do, the joints formed between the bottoms of the tongues and grooves and bearing against the bottoms of the arms prevent any dust reaching such joints.

Having described my invention what I claim is:

1. A rabble arm having an expanded base and a reduced upper portion, an outward circulating passage-way disposed along the bottom, and a return passage way leading therefrom and inclined upwardly and inwardly toward the inner end of the arm, the arm being provided with a groove between the bottom face of the arm and the outward circulating passage-way, and rakes having tongues inserted in said groove, and heads overlapping the sides of the groove and bearing against the bottom of the arm.

2. A rabble arm having an expanded base provided with a flat bottom, and having a reduced upper portion, an outward circulating pipe incased within the arm and disposed adjacent to the bottom, an inwardly and upwardly inclined return circulating branch incased within the arm, the arm being provided with a groove between the bottom face of the arm and the outward circulating pipe, and rakes having tongues inserted into said groove from the outer end of each arm, and heads overlapping the sides of the groove and bearing against the bottom of the arm.

3. A rabble arm provided with means for circulating a cooling medium therethrough, and having a longitudinal groove disposed along the bottom and between the sides of the arm, and rakes having tongues inserted in said groove and formations adjacent to the tongues overlapping the joints between the tongues and groove and bearing against the bottom of the arm.

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

CHARLES H. REPATH.

Witnesses:

FRED RITTER,  
A. G. MCGREGOR.