

No. 633,533.

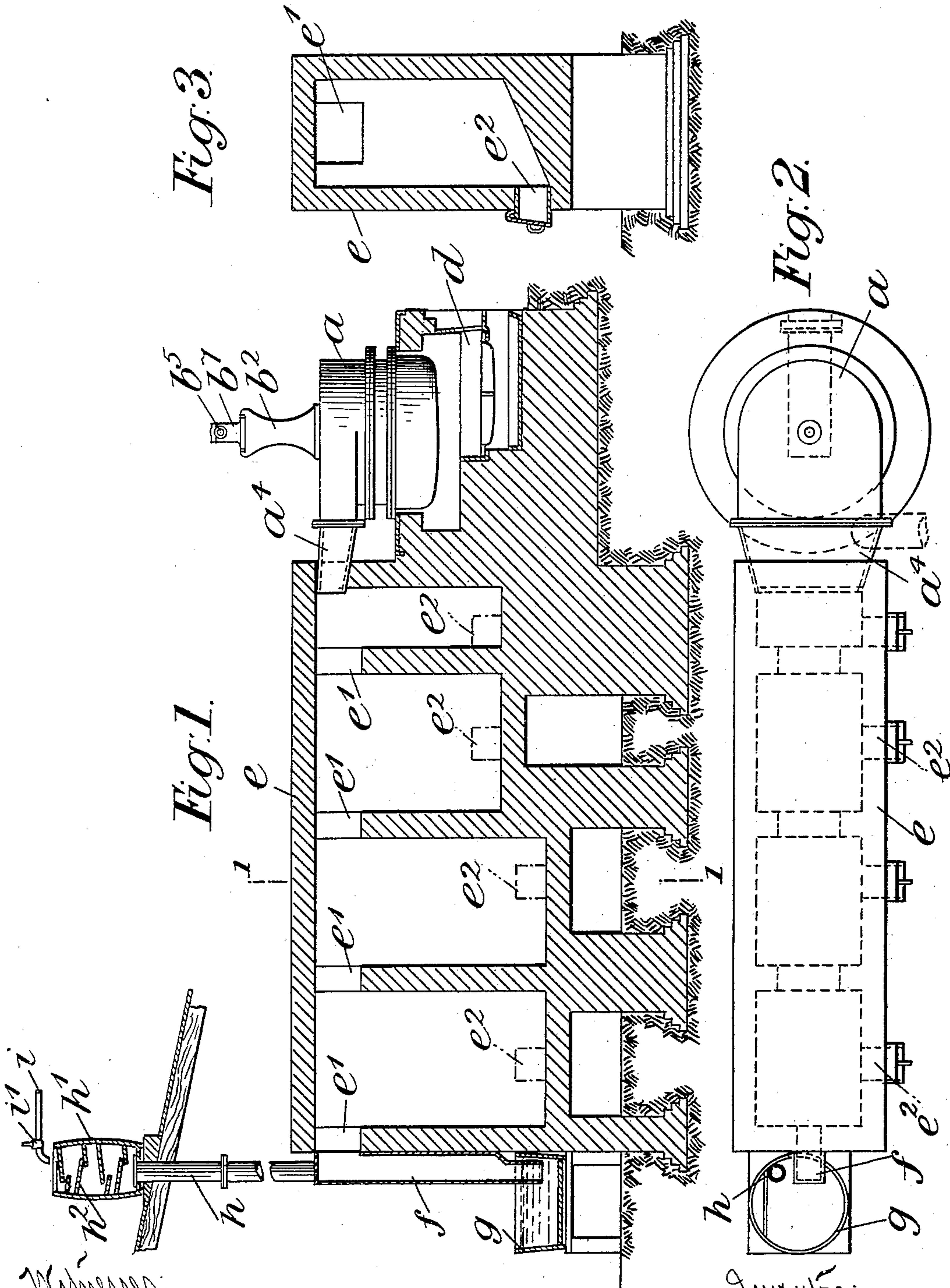
Patented Sept. 19, 1899.

S. POPE & G. V. BARTON.
APPARATUS FOR MAKING LEAD OXID.

(Application filed May 27, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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Fig. 4.

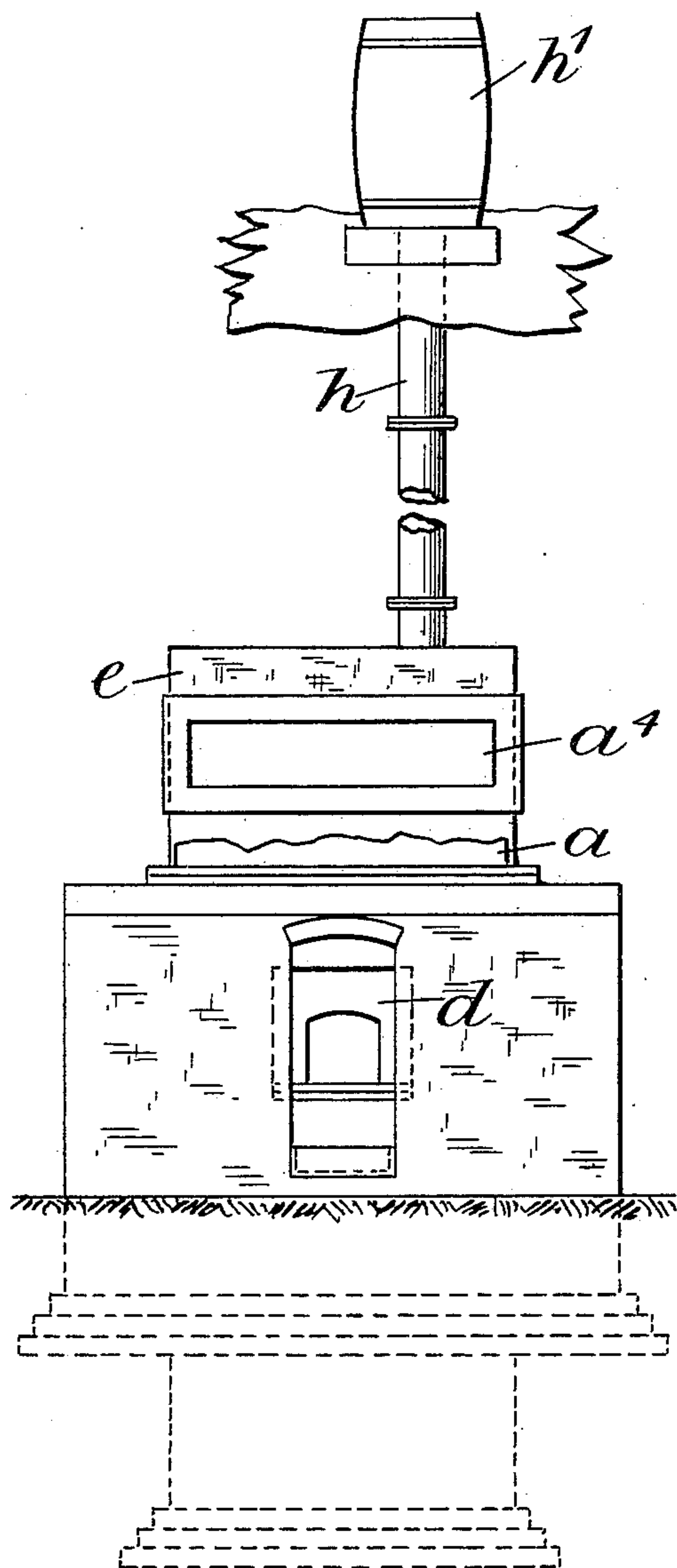
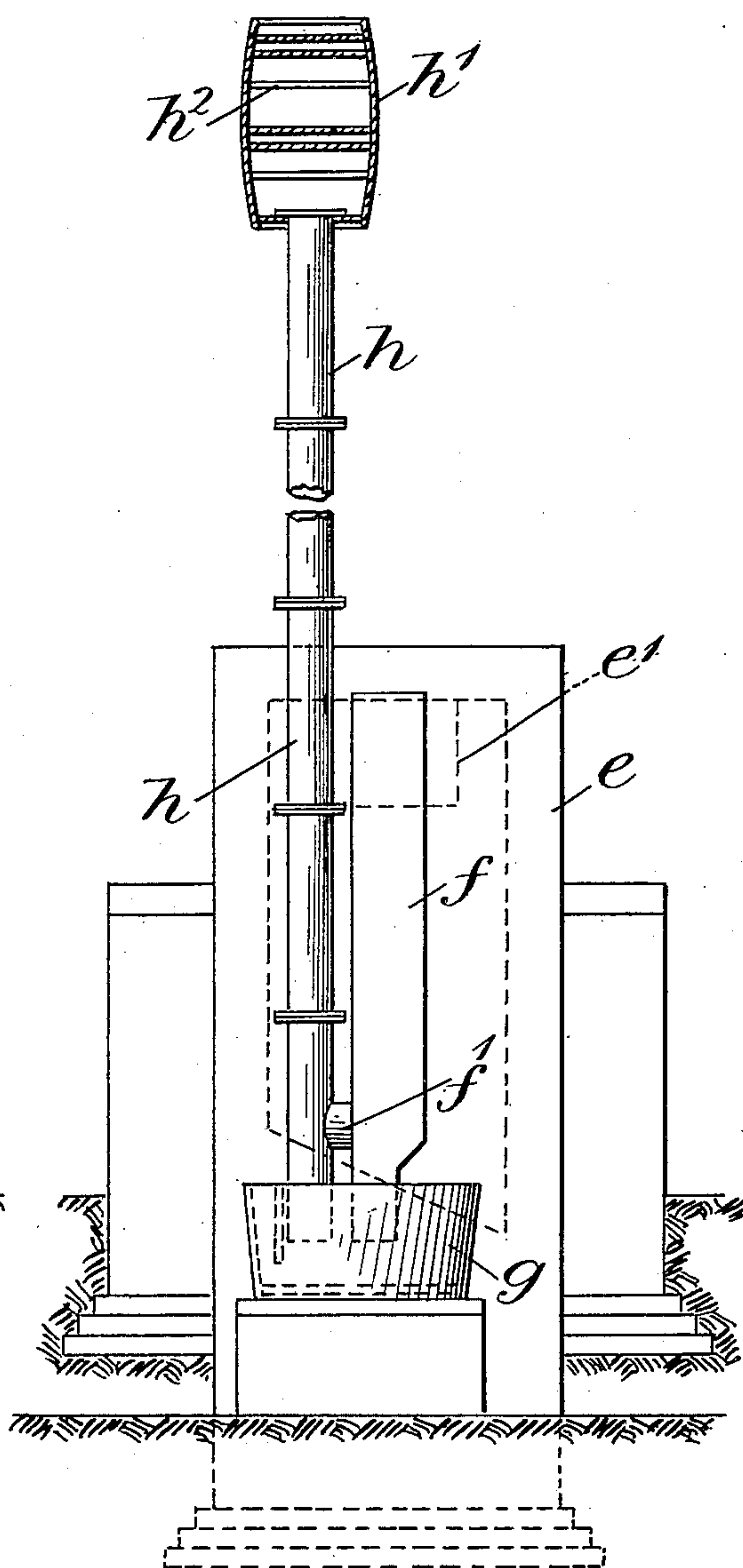


Fig. 5.



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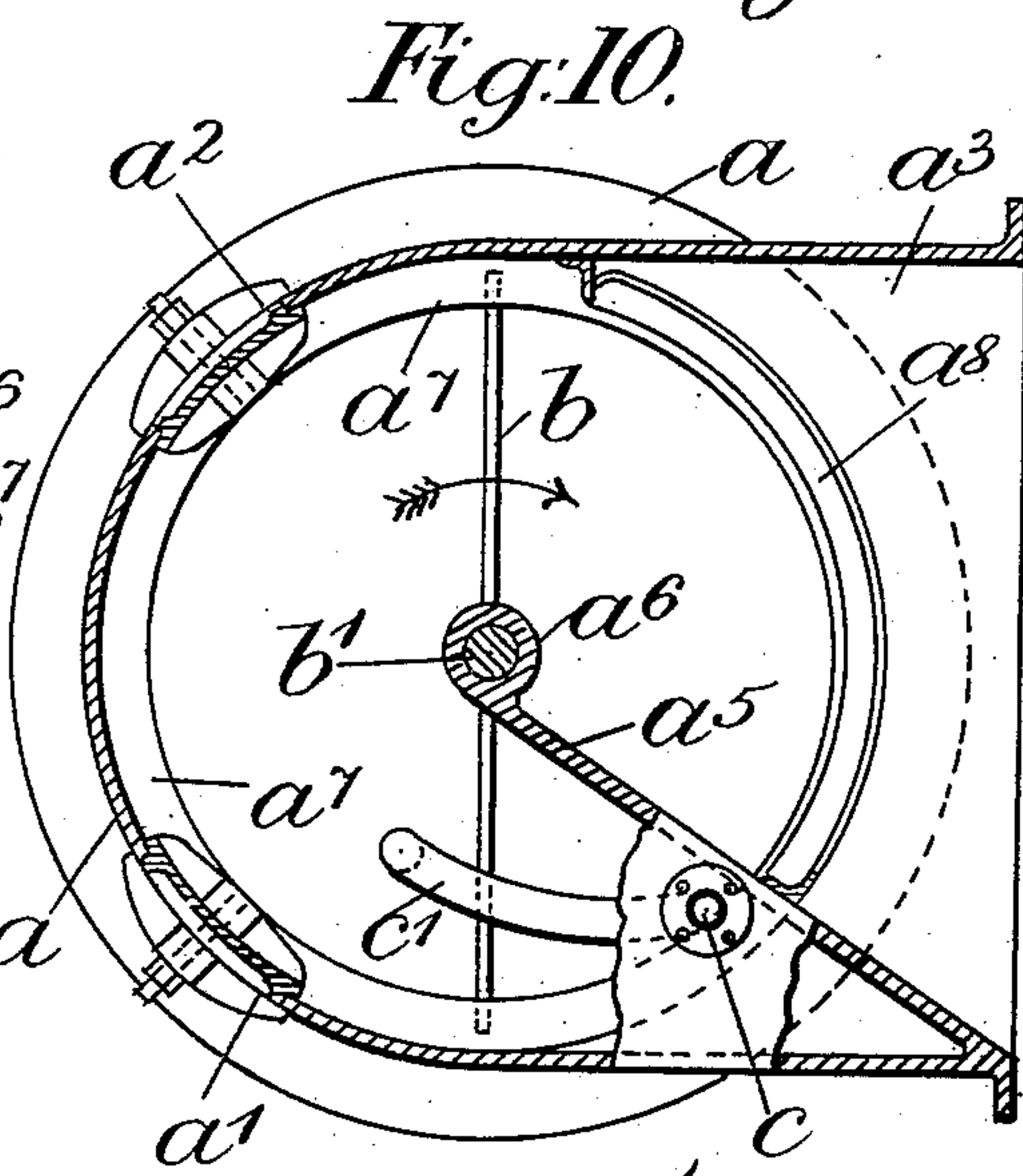
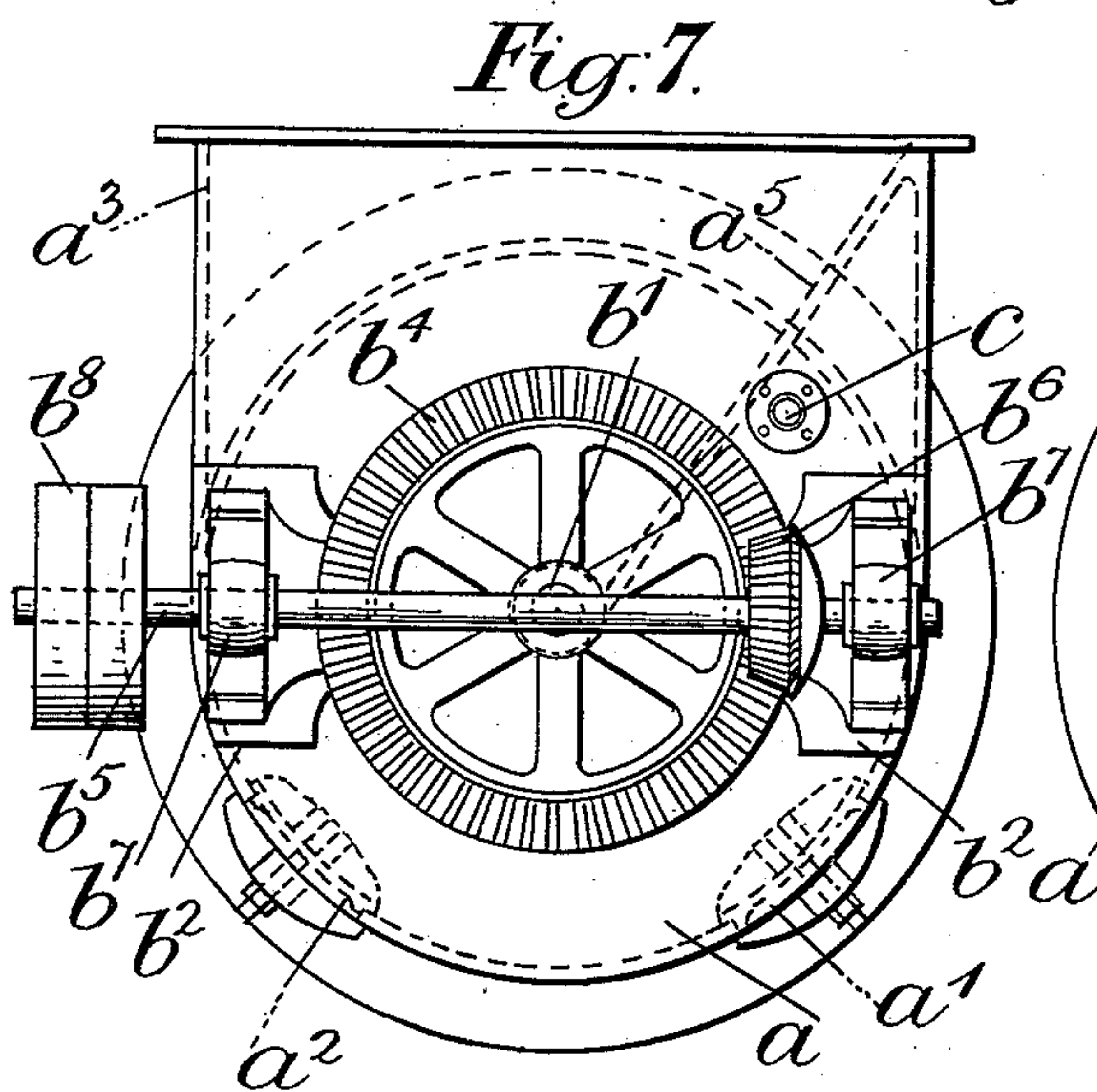
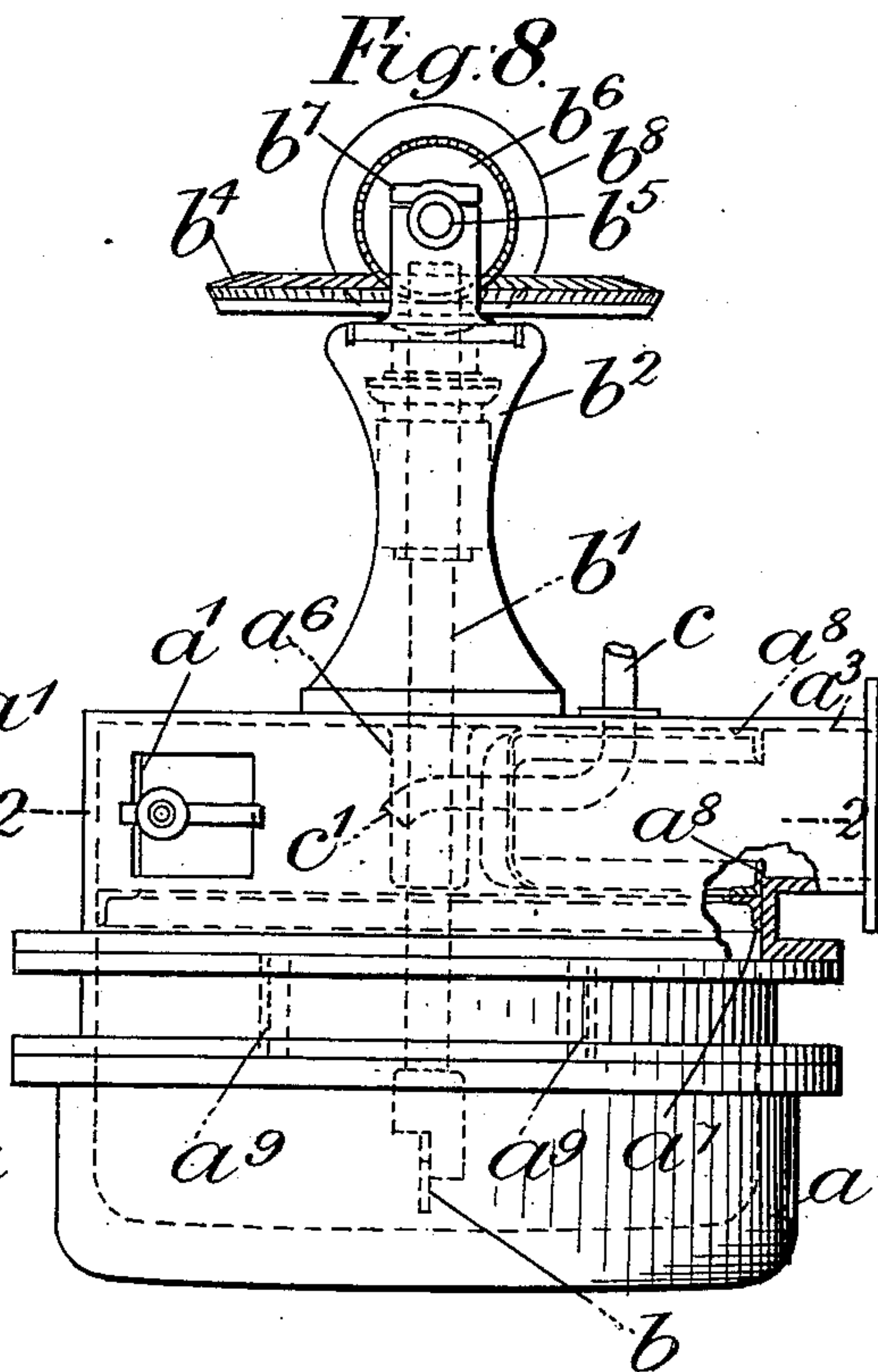
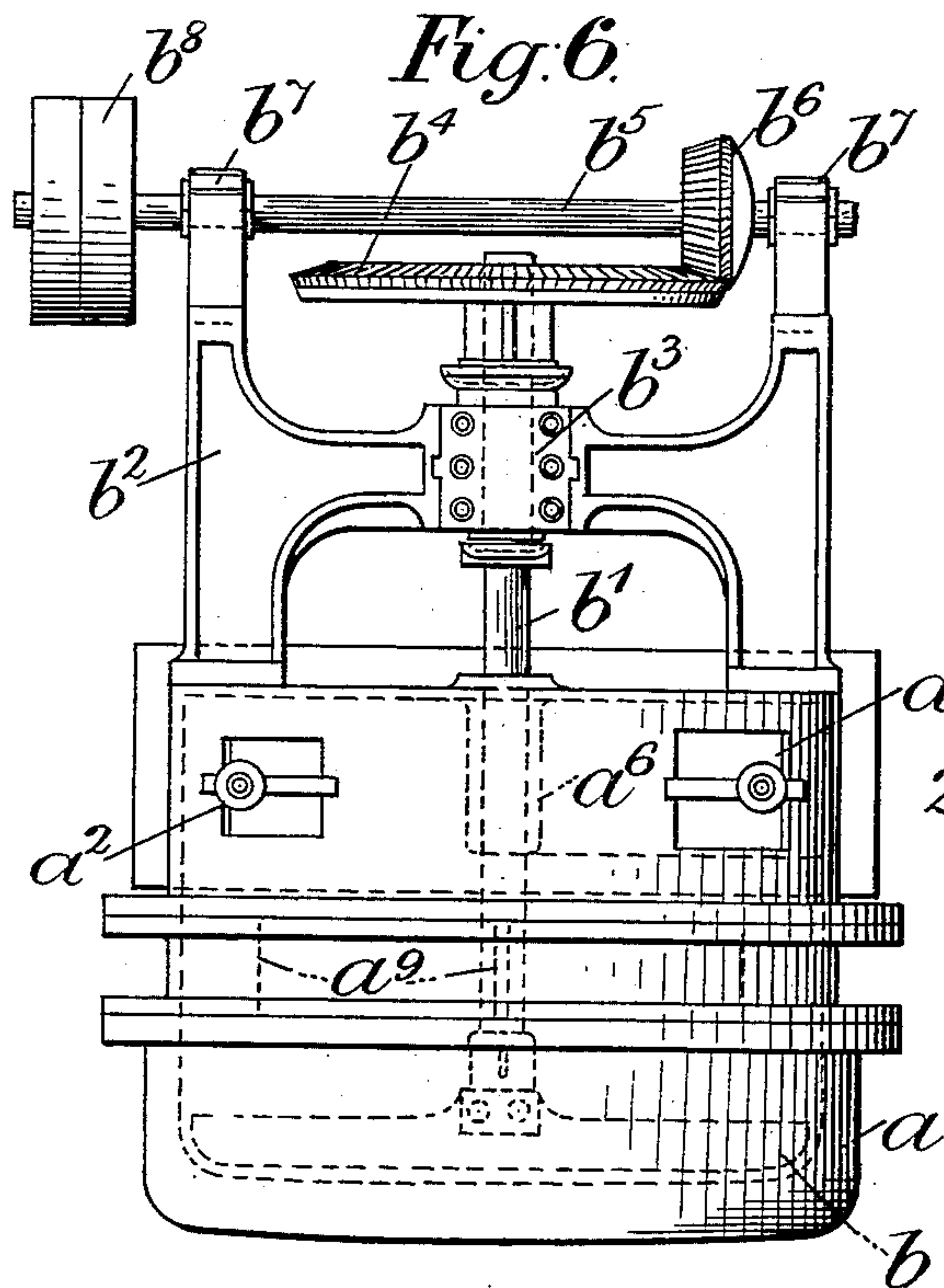
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(Application filed May 27, 1899.)

(No Model.)

4 Sheets—Sheet 3.



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No. 633,533.

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(No Model.)

4 Sheets—Sheet 4.

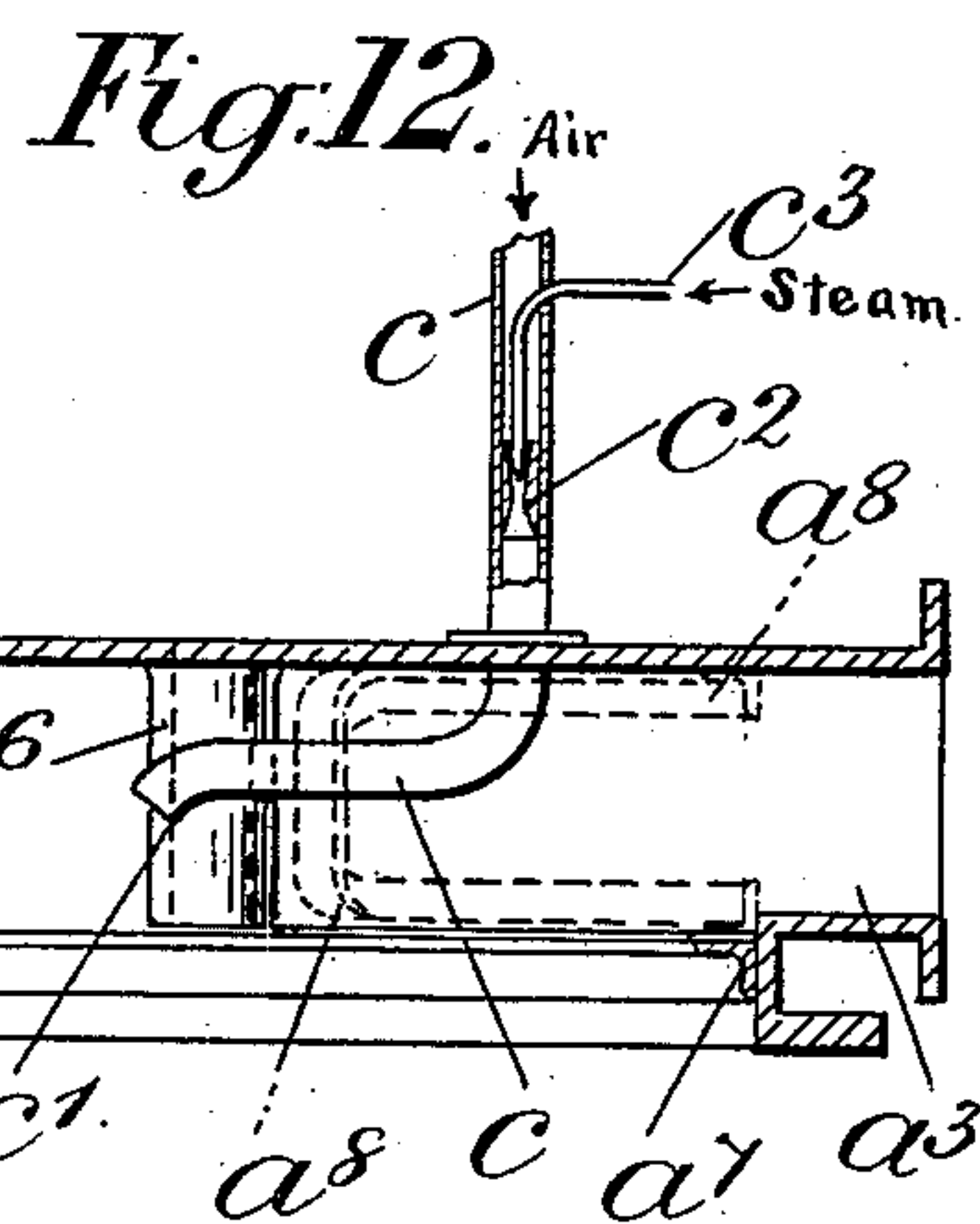
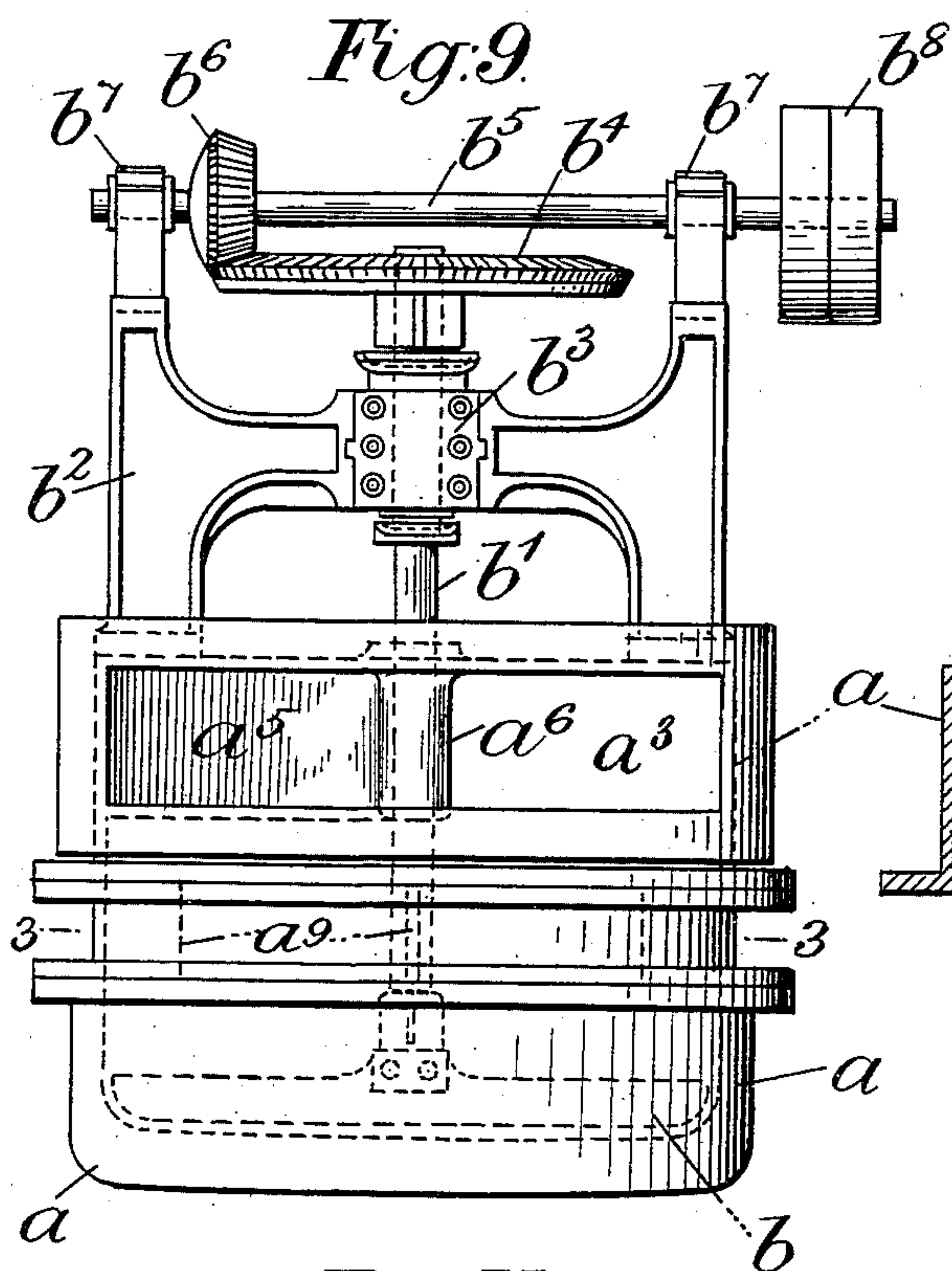
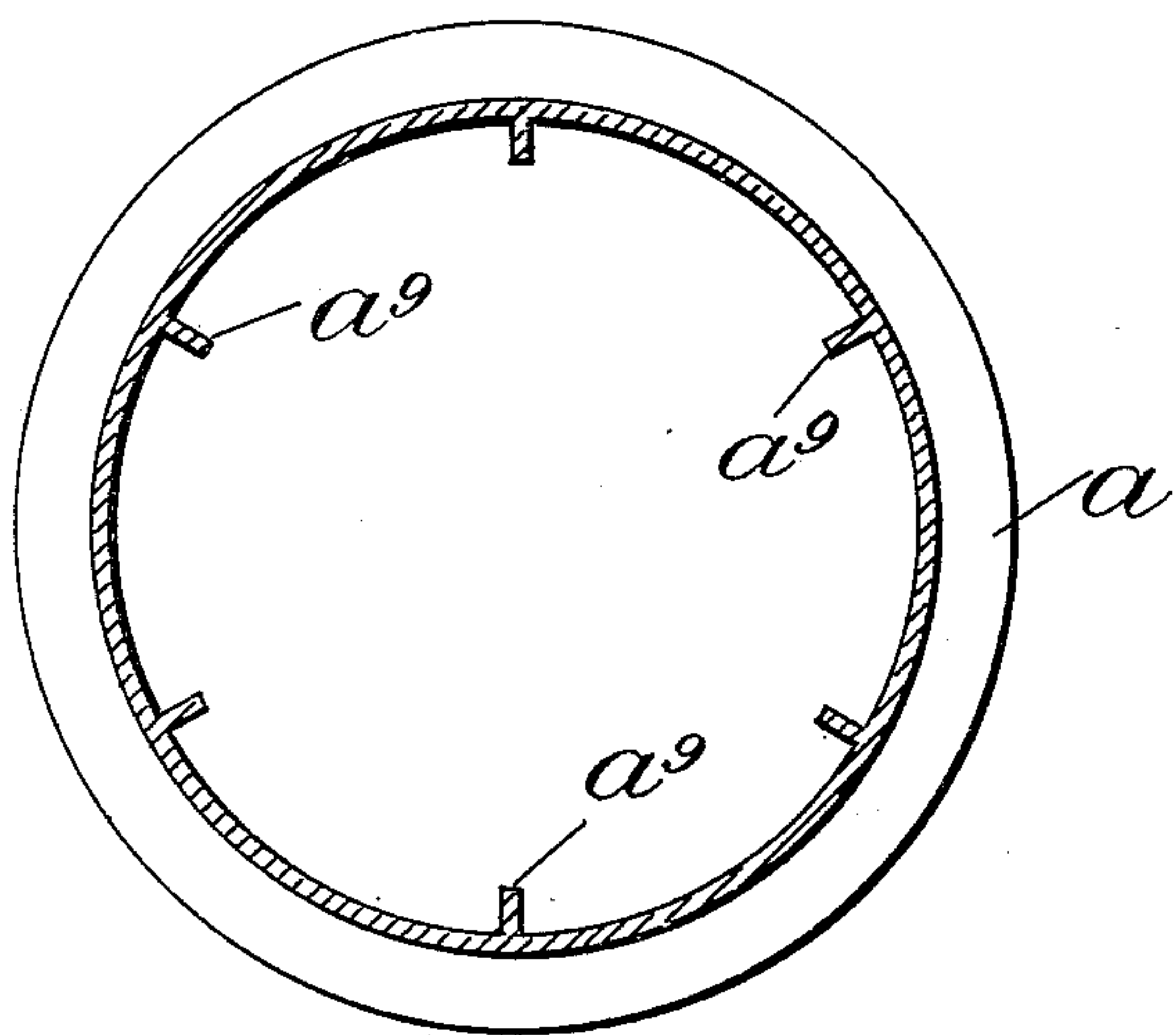


Fig. 11.



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UNITED STATES PATENT OFFICE.

SAMUEL POPE AND GEORGE VINCENT BARTON, OF RUNCORN, ENGLAND.

APPARATUS FOR MAKING LEAD OXID.

SPECIFICATION forming part of Letters Patent No. 633,533, dated September 19, 1899.

Application filed May 27, 1899. Serial No. 718,478. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL POPE and GEORGE VINCENT BARTON, residing at Old Quay, Runcorn, in the county of Cheshire, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Means or Apparatus for the Production of Lead Oxid, of which the following is a specification, reference being had to the drawings hereunto annexed and to the letters marked thereon.

The invention relates to improvements in means or apparatus for the production of lead oxid; and the primary object thereof is to obtain lead oxid in a more rapid and economical manner than heretofore.

In the accompanying drawings, Figure 1 is a vertical longitudinal section representing a plant for carrying the said invention into effect. Fig. 2 is a plan thereof with part removed. Fig. 3 is a vertical transverse section taken on the line 1 1 of Fig. 1. Fig. 4 is a front end elevation of the apparatus with the pot removed. Fig. 5 is a rear end elevation thereof, showing the barrel in section. Fig. 6 is a front elevation of the covered pot or vessel separately. Fig. 7 is a plan thereof. Fig. 8 is a side elevation thereof, partly in section. Fig. 9 is a rear elevation thereof. Fig. 10 is a horizontal section taken on the line 2 2 of Fig. 8. Fig. 11 is a horizontal section taken on the line 3 3 of Fig. 9 and with the paddle or stirrer removed, and Fig. 12 is a vertical transverse section showing the upper part of the pot separately.

In the several figures, in which like parts are indicated by similar letters of reference, Figs. 4 and 5 are drawn to an increased scale with respect to Figs. 1 to 3, while Figs. 6 to 12 are drawn to a still further increased scale.

Referring to the drawings, *a* represents a closed pot or vessel. *d* represents a furnace for heating the same. *e* represents several collecting or grading chambers for the oxid, and *f g h* represent an apparatus for trapping the lighter particles of oxid and preventing their escaping into the outer air.

The pot or vessel *a* is formed of iron or other suitable material capable of withstanding the heat to which it is subjected, and the

furnace *d*, which may be a coal, gas, or other suitable furnace, must be capable of efficiently heating the lead to be treated and which is contained in the pot *a*. The pot *a* is furnished at its front with two openings *a' a''*, closed by means of suitable covers, one of said openings—namely, that *a'*—serving as a manhole and the other, *a''*, serving as a feed-opening, through which a quantity of fused lead is from time to time introduced into the pot *a*, said lead being afterward maintained by the furnace in the required fluid state. At the rear side of the pot *a* and above the molten lead is provided an outlet *a'''*, to which is connected an upwardly-inclined chute *a''''*, which communicates with the collecting-chamber *e*, hereinafter more fully referred to.

Extending tangentially from the wall of the pot *a* at the rear side of the outlet *a'''* to the center of the pot *a*, or it might be beyond, is a suitably-shaped baffle-plate or curtain *a'''''*, which terminates in an apertured boss *a''''''*, formed on the upper part of the pot *a*, and this curtain or baffle-plate *a'''''* extends downward to a suitable position, as hereinafter described.

At or near the bottom of the pot *a* and beneath the baffle-plate or curtain *a'''''* is provided a horizontal paddle or stirrer *b*, which is fixed upon a vertical shaft *b'*, passing through the apertured boss *a''''''*, which forms a bearing to the shaft, and at its upper end said shaft is mounted in a bearing *b''*, supported by a frame *b'''*, carried by the upper part of the pot *a*. The vertical shaft *b'*, and consequently the paddle or stirrer *b*, receives rotary motion at a regulated speed through a beveled toothed wheel *b''''*, fixed upon the vertical shaft *b'*, which engages a beveled pinion *b'''''*, fixed upon a horizontal shaft *b''''''* at its ends, mounted in bearings *b'''''''*, carried by the frame *b''*, and furnished with fast and loose pulleys *b''''''''*, by means of which the shaft *b'* and paddle *b* may be driven from any suitable source of power. The paddle or stirrer *b*, which revolves in the direction of the arrow, Fig. 10, or there might be several stirrers, as will be readily understood, carries around with it the molten metallic lead, which forms a kind of wave, the crest of which dashes against the baffle-plate or curtain *a'''''*, said action taking place in front

of the outlet a^3 . The crest of this wave runs up the sides of the pot a , and portions of the metal are liable to become detached and by the blast hereinafter referred to carried up the walls of the pot a and through the outlet a^3 into the receiving or collecting chambers e . In order to obviate this difficulty, an annular horizontal flange or projection a^7 is provided, extending around the pot or vessel a on the interior thereof on a level with or slightly below the bottom of the outlet a^3 , by which means the wave will be kept properly under control. As a further precaution the outlet a^3 , leading from the pot to the receiving-chambers e , is surrounded by a flange or projection a^8 , which effectually prevents the metallic lead rising sufficiently at that point to be carried into the collecting-chamber e . At suitable intervals around the interior of the pot a are arranged vertical projections or baffle-plates a^9 , which serve to prevent the wave of lead unduly rising and at the same time assist to break up the same, as hereinafter described. By reason of the inclined position of the chute a^4 , leading from the outlet a^3 of the pot, any molten metallic lead which may be accidentally carried through the outlet a^3 will flow back by gravity into the pot a instead of being carried into the chambers e .

Above the surface of the molten lead is arranged a pipe c , which is formed with an open but downwardly-curved end c' , and this pipe extends horizontally from the rear side of the baffle-plate or curtain a^5 in a circular or curved form, so that its open end c' points in the direction in which the molten lead or the surface thereof is required to travel, and this pipe c is supplied with combined air and steam under pressure—for example, by the aid of a vena contracta c^2 , placed in the pipe c and into which enters a pipe c^3 , supplied with steam under pressure from any suitable source. The pipe c is open to the atmosphere or is similarly supplied with air, and the blast of combined air and steam issuing from the mouth c' of the pipe c is caused to impinge upon the surface of the molten lead and at the same time travel in the direction of the outlet a^3 from the pot a .

In order to produce the lead oxid by the means hereinbefore described, the furnace d is started and the pot a is charged through the feed-opening a^2 with a suitable quantity of fused metallic lead, which is maintained in a molten condition by the furnace d . The paddle or stirrer b is then set in motion at a suitable speed of rotation through the pulleys b^3 , hereinbefore referred to, and the supply of air and steam under pressure is admitted by the pipe c and impinges upon the surface of the molten lead, by which means said surface becomes coated with a film of oxid, which is carried around by the lead, which assumes a wave-like form, its crest coming against the baffle-plate or curtain a^5 , the film

of oxid near the periphery of the pot being at the same time broken up by the vertical baffle-plates a^9 . The wave of lead at the same time coming into contact with the vertical baffle-plates a^9 causes very violent turbulence and the pulverization of the lead striking said baffle-plates a^9 , thus shaking and loosening the oxid from the metallic lead and causing it to be more easily carried forward through the opening a^3 into the receiving or collecting chambers e , as hereinafter described. The lead and oxid are brought into contact with the baffle-plate or curtain a^5 with some degree of force, and their impact therewith causes the oxid to rise in a cloud, which is controlled or directed by the baffle-plate or curtain a^5 and deflected toward the outlet a^3 , through which and through the chute a^4 it is carried by the blast or current of air and steam into the receiving or collecting chambers or apparatus $e f g h$, hereinafter more fully referred to, where the oxid is finally deposited in the form of an impalpable powder of great purity. The cloud of oxid passing through the chute a^4 is carried by the blast into the first of a series of collecting-chambers e , which communicate with one another by openings e' at the upper part thereof, and these chambers are at their lowest point furnished with openings e^2 , closed by doors, by means of which the deposited oxid may be removed from time to time. The oxid entering the chambers e through the chute a^4 is deposited in the collecting-chambers according to its specific gravity, as is well understood, and the lighter particles are carried through the end opening e' into a trunk or chamber f , which at its lower end opens into a tub g , containing water, and near to its lower end, by means of a lateral connection f' , communicates with a vertical pipe h , the lower end of which is immersed in the water of the tub g and which at its upper end opens into the lower end of a barrel h' , furnished with a number of inclined and overhanging shelves or baffle-plates h^2 , onto which water is allowed to flow in regulated quantities from a cock i' , supplied by a pipe i , connected with any convenient reservoir of water. By means of this device the lighter particles of oxid which do not become deposited in the chambers e pass into the trunk f , and the heavier particles are carried by the blast into the water of the tub g , while the lighter particles pass by the connection f' into the pipe h , where on entering the barrel h' they encounter and are required to pass through the circuitous passage between the shelves h^2 , which are covered by a film of water which flows from shelf to shelf, and the escaping blast of steam and air to some extent atomizes the water, so that it is virtually impossible for any portion of the oxid to escape into the open air, and the process is thus rendered comparatively harmless. The oxid deposited in the tub g is removed and submit-

ted to the usual final processes to render it marketable or for the production of white lead.

In the same manner mixed rough litharge
5 may be converted into fine lead oxid, thus avoiding the operations of grinding and levigation to free the lead oxid from the metallic lead usually intermixed therewith when lead
10 oxid is produced by the old method of cupellation. For this purpose a charge of the rough litharge is introduced into the pot *a* and floats upon the surface of the molten lead, the apparatus is put into action, the oxid is caught by the curtain *a*⁵, and under
15 the combined influence of the stirrer *b* air and steam and baffle-plates *a*⁹ and curtain *a*⁵ is reduced to a fine state of division and carried into the collecting apparatus, where it is recovered in a state of fine powder ready for
20 use. Any metallic lead in the rough litharge is liquefied by the heat maintained in the pot or vessel *a* and becomes oxidized, and by these means the whole of the rough litharge is recovered as a fine powder of lead oxid.

25 Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is—

1. An apparatus for the production of lead
30 oxid comprising a closed pot or vessel adapted to contain a charge of lead, means for heating said pot, a collecting-chamber, an outlet from the pot, a connection between the outlet and the collecting-chamber, means for directing an oxidizing-blast onto the surface of
35 the fused lead, a paddle or stirrer within the pot, means for rotating the paddle, and a baffle-plate or curtain projecting laterally from the rear side of the outlet toward the center
40 of the pot and extending downwardly into a position to catch the film of oxid substantially as herein shown and described and for the purpose stated.

2. An apparatus for the production of lead
45 oxid comprising a closed pot or vessel adapted to contain a charge of lead, means for heating said pot, a collecting-chamber, an outlet from the pot, an inclined connection between the outlet and the collecting-chamber, a flange
50 surrounding said outlet, means for directing an oxidizing-blast onto the surface of the fused lead, a paddle or stirrer within the pot, means for rotating the paddle, a horizontal annular flange located above the surface of

the lead, vertical baffle-plates arranged at in- 55
tervals around the pot and a baffle-plate or curtain projecting laterally from the rear side of the outlet toward the center of the pot and extending downwardly into a position to catch the film of oxid substantially as herein 60
shown and described and for the purpose stated.

3. An apparatus for the production of lead oxid comprising a closed pot or vessel adapted to contain a charge of lead, means for heat- 65
ing said pot, a collecting-chamber, an outlet from the pot to the collecting-chamber, means for keeping the lead in motion, a baffle-plate or curtain projecting laterally from the rear side of the outlet toward the center of the pot 70
and extending downwardly into position to catch the film of oxid and means for oxidizing the surface of the lead and carrying the oxid through the outlet into the collecting-chamber substantially as herein shown and 75
described and for the purpose stated.

4. An apparatus for the production of lead oxid comprising a closed pot or vessel adapted to contain a charge of lead, means for heat-
ing said pot, a collecting-chamber of several 80
compartments, an outlet from the pot, a connection between the pot and the collecting-chamber, means for directing an oxidizing-blast onto the surface of the fused lead and carrying the oxid through the outlet into the col- 85
lecting-chamber, an opening at the end of the collecting-chamber for the passage of the lightest particles of oxid, a vertical trunk communicating with said opening, a water-tub in which the lower end of the trunk is immersed 90
in the water of the tub, a vertical pipe having its lower end extending into said tub and immersed in said water, a lateral connection between the trunk and the pipe, a barrel at the top of the pipe provided with overlapping 95
inclined shelves and a water-jet running onto said shelves substantially as herein shown and described and for the purpose stated.

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