

No. 777,233.

PATENTED DEC. 13, 1904.

E. P. WILKINS.
AMALGAMATOR.

APPLICATION FILED JAN. 9, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

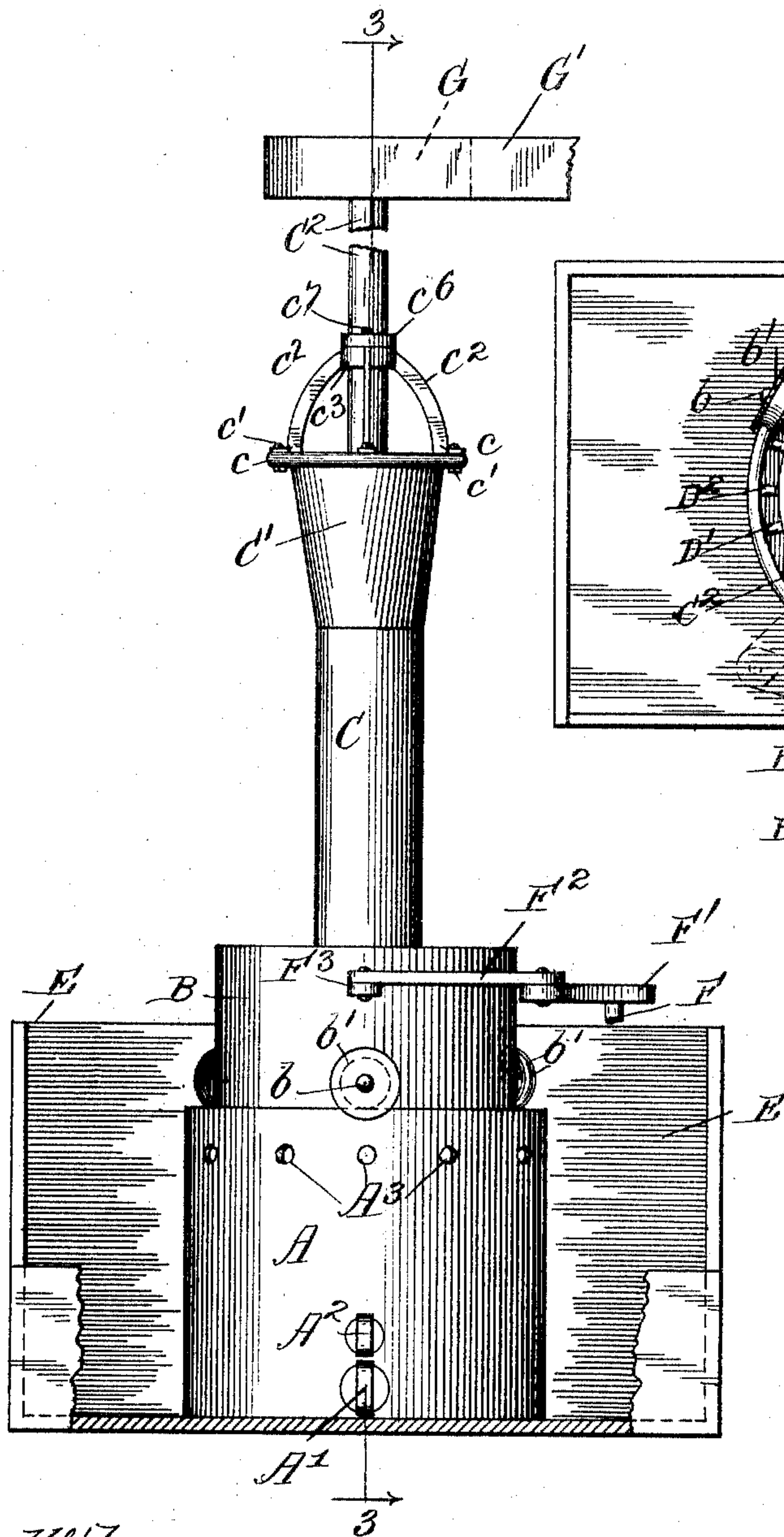
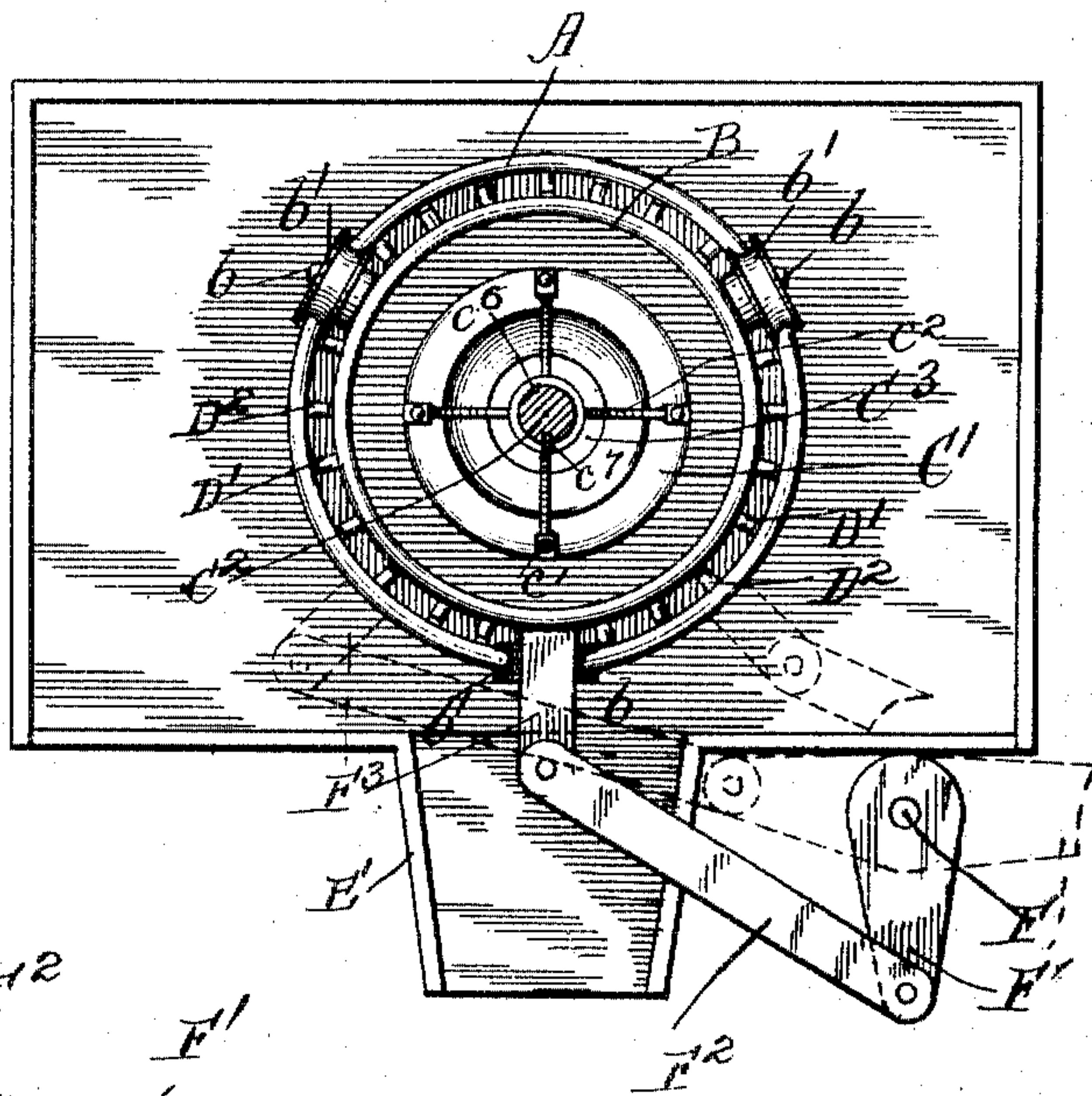


Fig. 2.



Witnesses:
Ray White
Harry R. White

Inventor:
Elizabeth P. Wilkins
By Charles M. Nier
Atty.

No. 777,233.

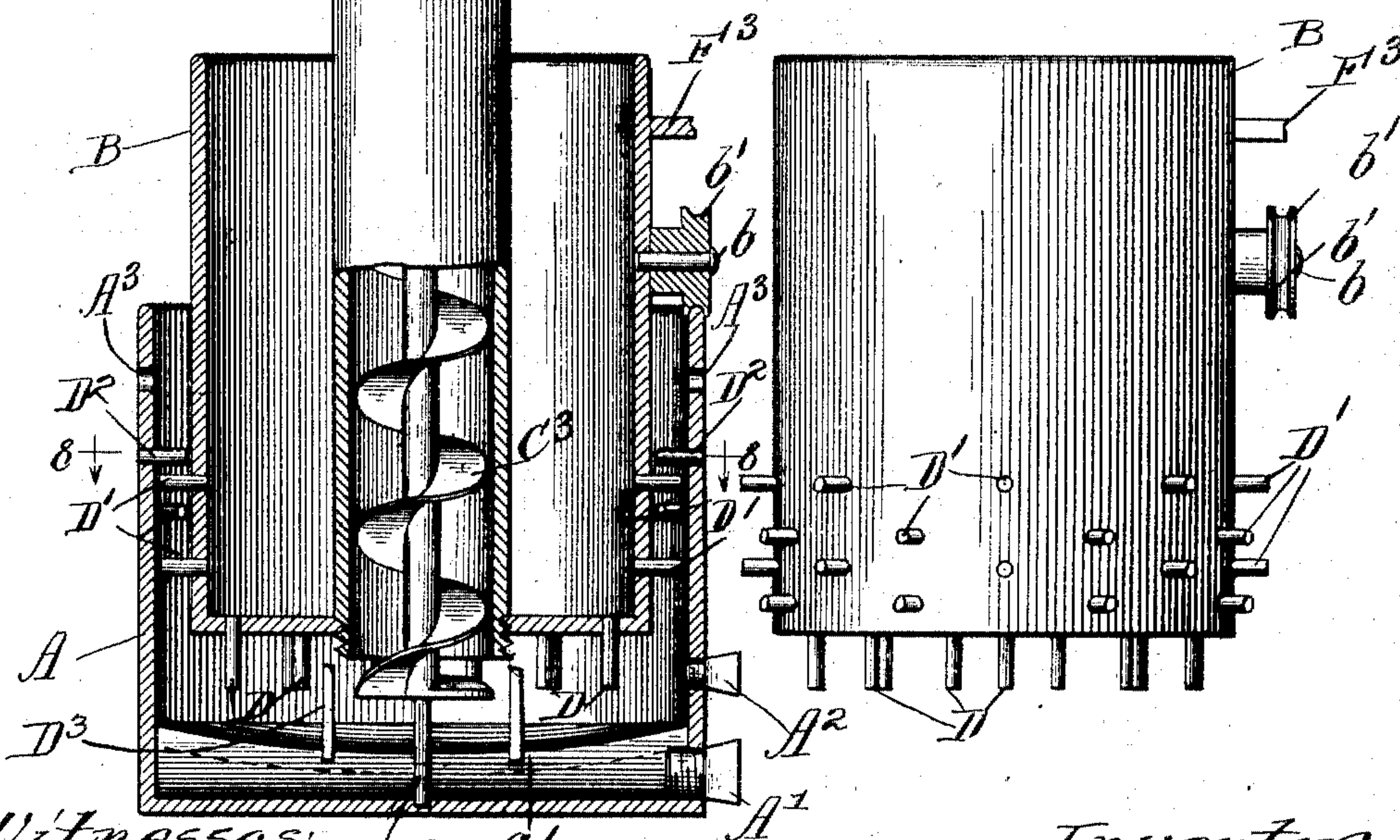
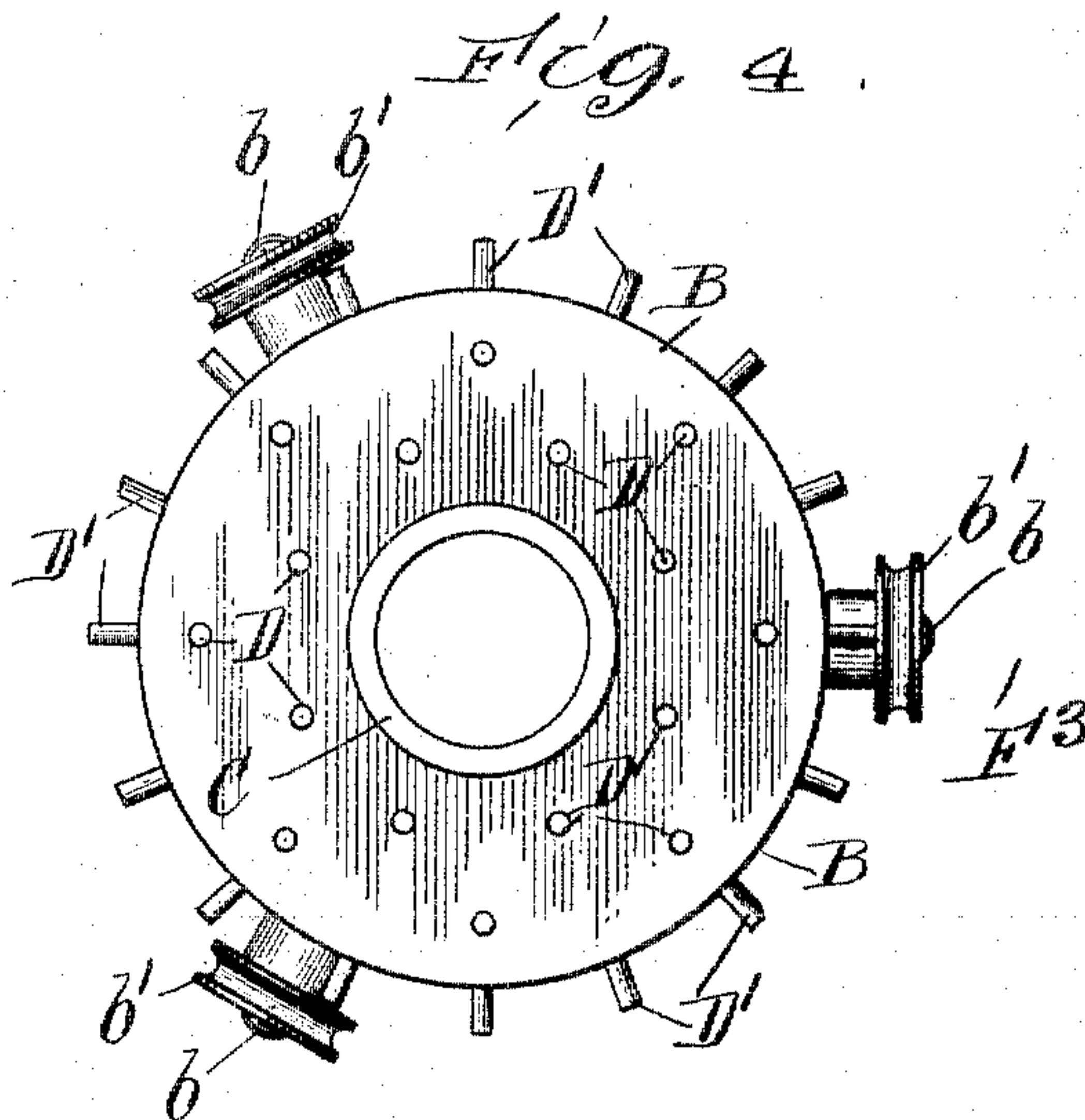
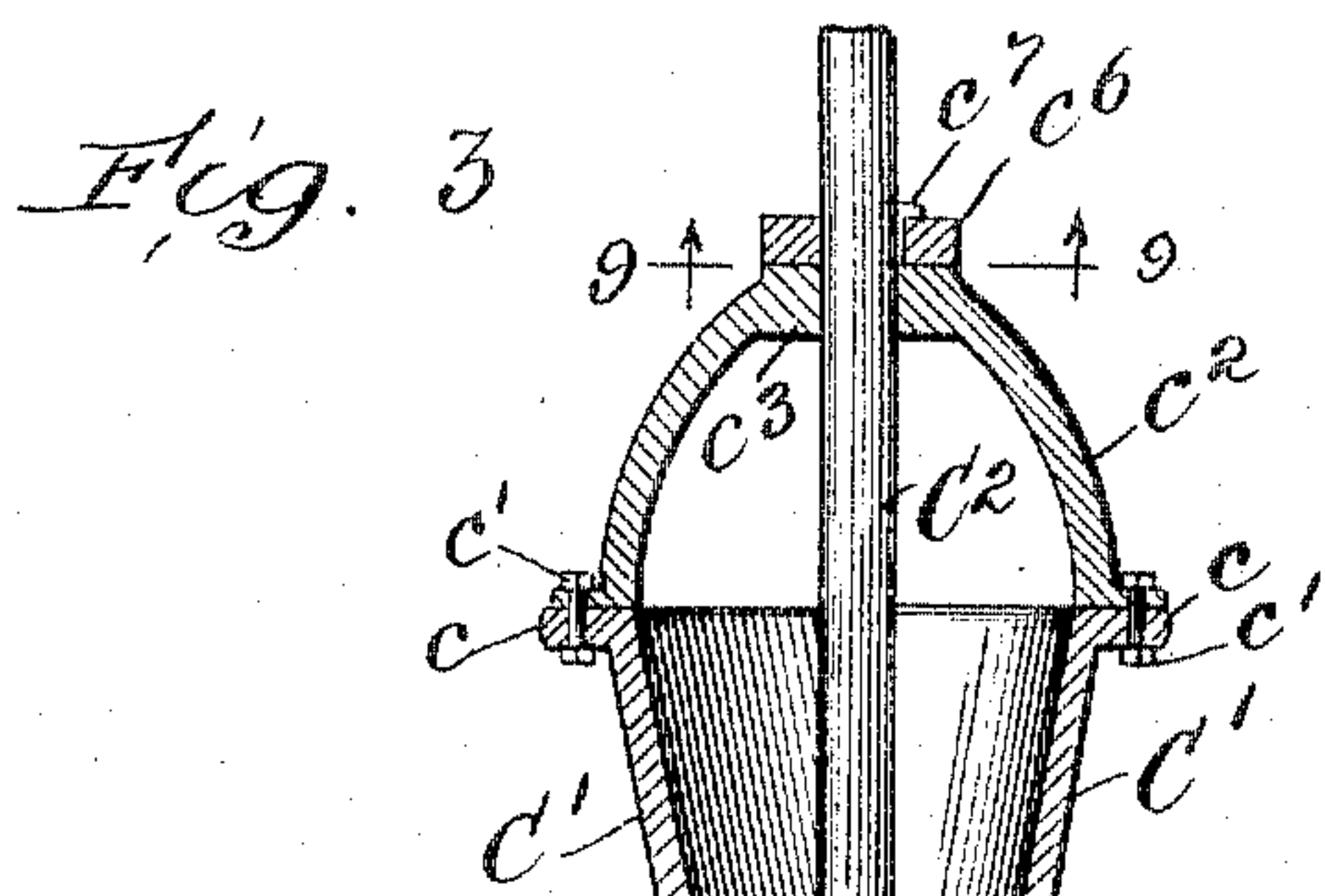
PATENTED DEC. 13, 1904.

E. P. WILKINS.
AMALGAMATOR.

APPLICATION FILED JAN. 9, 1904.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:
Ray White.
Harry R. Lewhite

Inventor
Elizabeth P. Wilkins
By Charles M. Rice
Atty.

No. 777,233.

PATENTED DEC. 13, 1904.

E. P. WILKINS.
AMALGAMATOR.

APPLICATION FILED JAN. 9, 1904.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 6

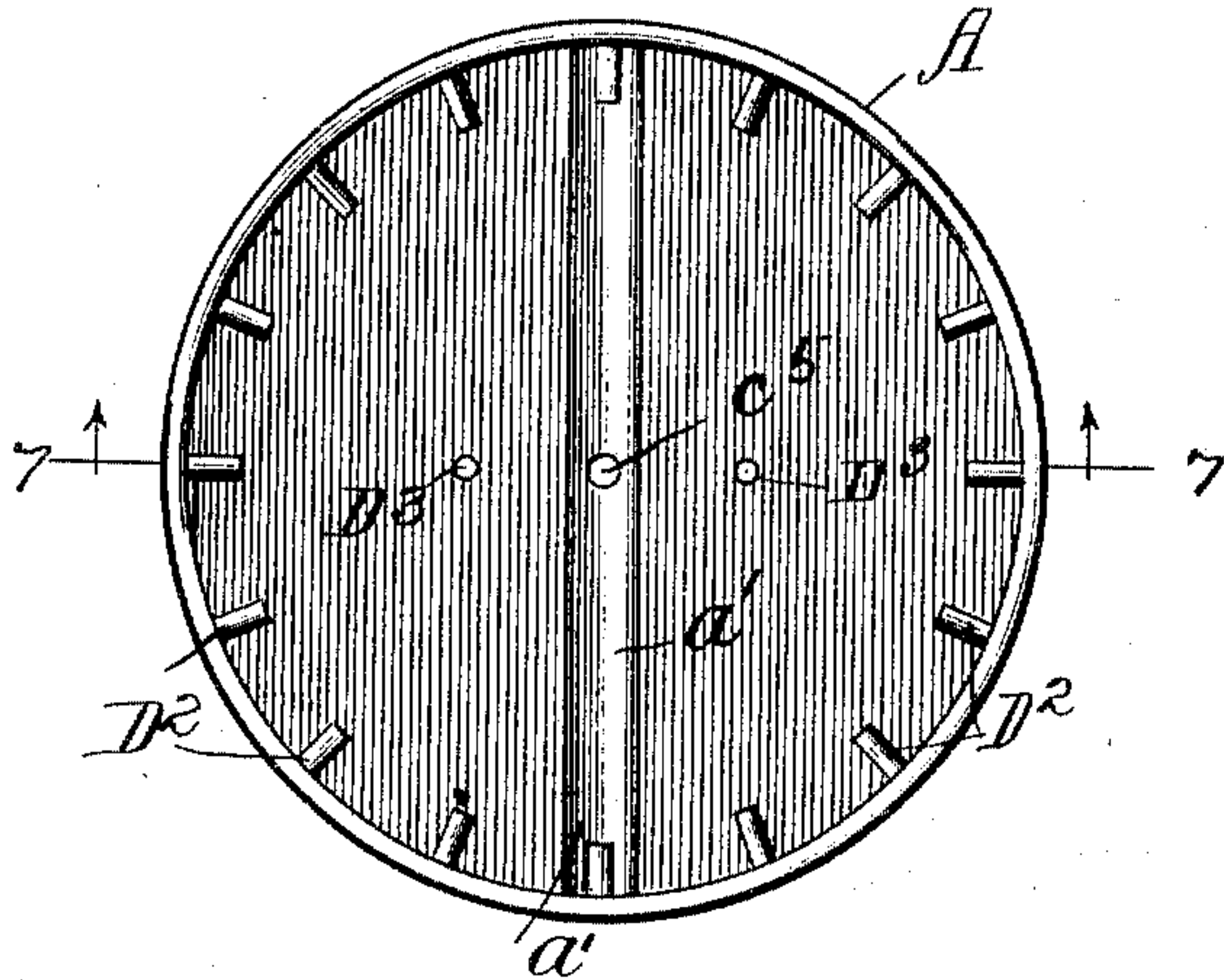


Fig. 9.

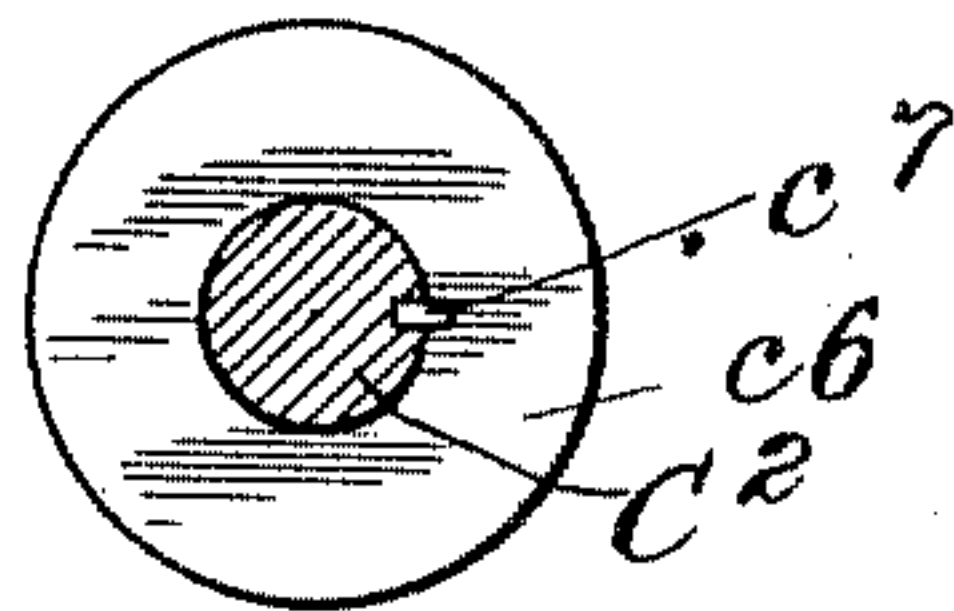


Fig. 7.

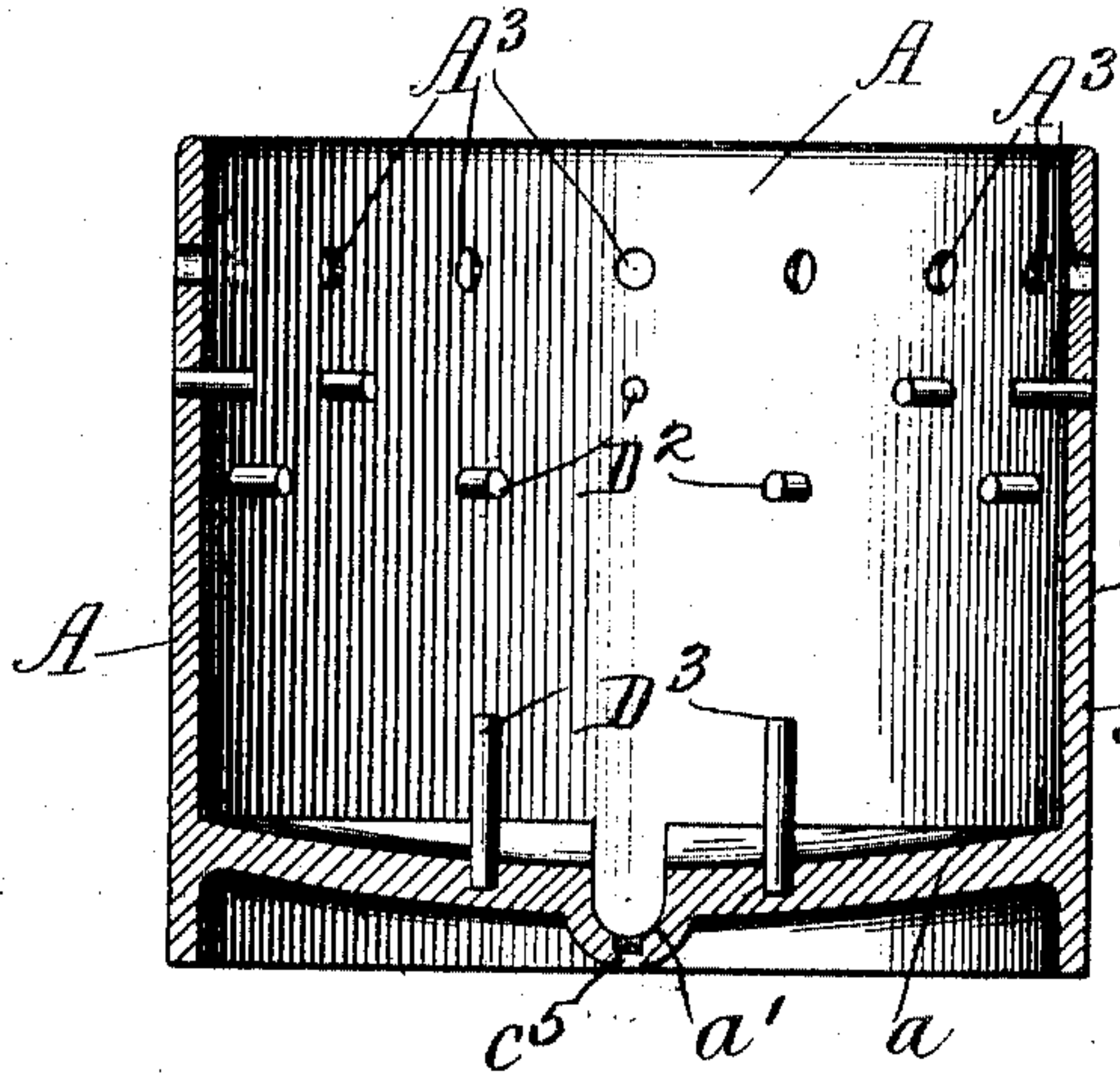
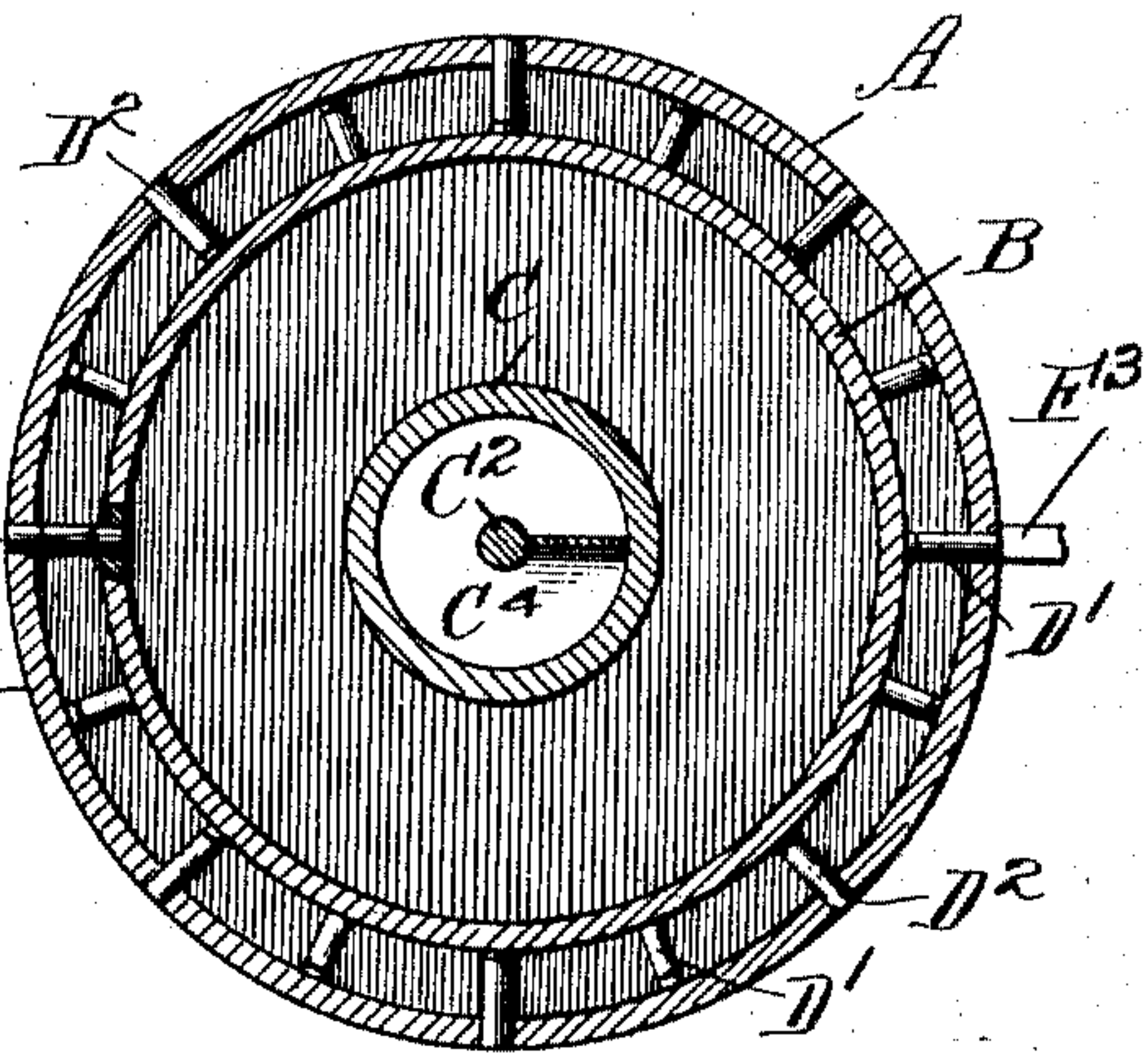


Fig. 8.



Witnesses:

Ray White.

Harry R. White

Inventor:

Elizabeth P. Wilkins

By Charles M. Viles
Atty.

UNITED STATES PATENT OFFICE.

ELIZABETH P. WILKINS, OF BALTIMORE, MARYLAND.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 777,233, dated December 13, 1904.

Application filed January 9, 1904. Serial No. 188,381. (No model.)

To all whom it may concern:

Be it known that I, ELIZABETH P. WILKINS, a citizen of the United States, and a resident of Baltimore, Maryland, have invented certain
5 new and useful Improvements in Amalgamators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference
10 marked thereon, which form a part of this specification.

This invention relates to amalgamators for treating ore, and more particularly to improvements in the invention set forth in United
15 States Patent No. 378,348, issued to Joseph Wilkins February 1, 1888, for amalgamators.

In all amalgamators it is very essential that every particle of the ore in a finely-divided state be brought into physical contact with
20 the mercury in order that the metal may amalgamate therewith instead of being carried away with the tailings. To accomplish this, it has usually been customary to add to the finely-divided ore a sufficient quantity of water to reduce it to a pasty consistency. The
25 pulp thus formed is then delivered to and thoroughly mixed with and passed through the mercury, great care being taken to prevent the pulp from caking, thus preventing its complete amalgamation, and, furthermore, as the
30 ore is of less specific gravity than the mercury there is a constant tendency for it to rise to the surface of the mercury before complete amalgamation, and to insure its complete immersion in and mixing with said mercury I
35 have provided novel feed and agitating mechanisms.

The object of this invention is to provide a device in which the ore is delivered to and
40 beneath the mercury by a forced feed, thus insuring its complete immersion therein.

It is also an object of this invention to so construct the feed and the mixing mechanisms that the pulp is prevented from caking and is
45 retained in the mercury until the metal is all amalgamated.

A further object of my invention is to provide means whereby the contents of the amalgamator are thoroughly mixed and the tail-
50 ings thoroughly beaten and stirred before leav-

ing the amalgamator to cause any globules of mercury retained therein to be separated therefrom before the tailings are discharged.

The invention consists in the matters hereinafter described, and more fully pointed out
55 and defined in the appended claims.

In the drawings, Figure 1 is a side elevation, partly broken, of a device embodying my invention. Fig. 2 is a top plan view of the same with the conveyer-shaft in section. Fig. 3 is
60 a section on line 3 3 of Fig. 1, showing parts in elevation. Fig. 4 is a bottom view of the inner receptacle. Fig. 5 is a side elevation of the same. Fig. 6 is a top plan view of the outer receptacle. Fig. 7 is a section on line
65 7 7 of Fig. 6. Fig. 8 is a section on line 8 8 of Fig. 3. Fig. 9 is a section on line 9 9 of Fig. 3.

As shown in said drawings, A represents an outer mercury-holding receptacle, and B is an
70 inner receptacle or cylinder closed at its bottom and provided on its sides with outwardly-extending stud-shafts *b*, on which are journaled the rollers *b'*, which track upon the upper edge of the receptacle A and on which the
75 inner receptacle or cylinder B is supported with its bottom elevated above the bottom of the receptacle and is partly rotated in the receptacle A. Said cylinder B is of considerably less external diameter than the internal
80 diameter of the receptacle A, thereby providing an annular passage between the cylinder and the receptacle. Said space between the bottoms of the cylinder and receptacle and a
85 part of said annular passage between the same are adapted to be filled with mercury and such other materials as facilitate amalgamation.

Secured in and protruding a slight distance through and below the bottom of the cylinder B by means of screw-threads or by any other
90 desired means affording a tight joint and extending upward through said cylinder axially thereof is a stand-pipe C, provided on its upper end with an upwardly-opening hopper C', adapted to receive the ore or pulp from any
95 convenient source and deliver the same to the amalgamator. Said stand-pipe at its upper end is provided with a peripheral flange *c*, on which are rigidly bolted the upwardly and inwardly directed bracket-arms *c'*, integrally
100

connected at the top and provided with a bearing c^3 , concentric with the stand-pipe C. Extending upwardly through and fitting in said stand-pipe is the shaft C^2 , having its lower end c^4 reduced and journaled in suitable bearings c^5 in the bottom of the receptacle A and its upper end journaled through the bearing c^3 in the top of the brackets c^2 . Said shaft extends above the said bearing sufficiently to receive a driving-pulley G, (shown in dotted lines in Fig. 1,) on which is engaged the driving-belt G' . Above said bearing C^3 and in close contact therewith is a bearing-collar c^6 , rigidly secured upon the shaft C^2 by means of a key c^7 or in any other desired manner to prevent said collar from slipping longitudinally of the shaft. Said bearing-collar c^6 acts to carry the weight of said shaft, thereby preventing excessive wear in the bearing in the bottom of the receptacle A. The shaft C^2 is provided with a screw conveyer or worm C^3 , which fits closely in and extends downwardly through the stand-pipe C and below the end thereof into close proximity to the bottom of the receptacle A.

The cylinder B is provided on its bottom with a plurality of downwardly-projecting pins or beaters D and on its sides near the bottom with a plurality of laterally-projecting pins or beaters D' , arranged staggering with each other, of which those on the sides extend into close proximity with the side of the receptacle A. The receptacle A is provided on its sides adjacent to the beaters D' with a plurality of inwardly-directed pins or beaters D^2 , arranged staggering with the pins D' and which also extend nearly across said annular passage. Said receptacle A is provided on its bottom with upwardly-projecting pins D^3 , as shown two in number, though obviously a greater number may be used, if preferred. Said pins or beaters are of a length to overlap each other and are so arranged that when the cylinder B is rotated or partly rotated the beaters D and D' do not contact with the beaters D^2 and D^3 , while they are close enough together to keep the pulp in constant motion and prevent caking.

The receptacle A is provided with a concave bottom a , and extending diametrically thereof is a recess or trough a' , which leads to an outlet-aperture provided with a gate or plug A' , and above said aperture is another and smaller aperture provided with a similar gate or plug A^2 . Near the top of the receptacle A are a plurality of apertures A^3 , through which the tailings pass after the separation of the metal. Said receptacle for the purpose of catching said tailing as they issue from the receptacle is supported in a trough E, provided with a spout E' , adapted to carrying said tailings to any desired place of deposit.

The rotary motion or a partly rotary motion of the cylinder before mentioned may be imparted by any preferred or suitable mech-

anism, as shown. However, an upright shaft F is provided, which may be driven from any source of power and is provided at a point near the top of the receptacle B with a laterally-extending crank-arm F' , rigidly secured thereon, at the outer end of which is pivoted the connecting-rod F^2 , which in turn is pivoted at its opposite end on an arm F^3 , rigidly secured upon and projecting radially of the cylinder B. The rotation of the shaft F acts to partly rotate the cylinder in said receptacle, constantly stirring the material to be treated and of course thoroughly mixing the same, rendering caking impossible.

The operation is as follows: The receptacle A being filled with mercury and such other chemical agents as may be desirable to a point somewhat above the bottom of the receptacle B, finely-pulverized ore to which has been added a sufficient amount of water to wash the same and form a paste or pulp is delivered to the hopper C' , and the rotation of the worm C^3 acts to force said pulp downwardly through the stand-pipe C to the bottom of the receptacle A and completely immersing it in the mercury. Since the conveyer C^3 extends below the bottom of the stand-pipe C, its point of discharge is near the bottom of the mercury, and the pulp being lighter than the mercury immediately begins to move upwardly and laterally and is retarded in its movement by the beaters D and D' , which also prevent its caking and thoroughly mix it with the mercury. All the pulp is thus brought into chemical relation with the mercury, and the amalgam formed by the separated metal settles to the bottom of the receptacle A, while the tailings pass upwardly through the annular passage between the walls of said receptacle and cylinder, and any particles of mercury which they may have carried upward therewith are separated by the beaters D^2 and D^3 and allowed to fall back into the bottom of the receptacle A. Said beaters D^2 and D^3 also retard the upward passage of the tailings sufficiently to prevent the pulp from rising too rapidly in the mercury; but the pressure exerted thereby is less than the downward pressure exerted by the conveyer and the weight of the pulp, so that the tailings are forced upward. As material is constantly added to the hopper it forces the tailings upwardly in the receptacle A after the metal has been extracted therefrom and out of the apertures in the top of said receptacle, where they fall into the trough E and are carried away. By opening the gate A^2 a sufficient quantity of mercury may be drawn from the receptacle to be tested. When the mercury has become saturated with the metal or thoroughly amalgamated, the plug A' may be removed and the amalgam withdrawn and subjected to the proper treatment to separate the metals.

Obviously any desired amalgamating mix-

ture may be used and many details of construction may be varied without departing from the principles of my invention.

I claim as my invention—

5 1. In a device of the class described the combination with a receptacle of a cylinder adapted to rotate therein, a stand-pipe rigidly engaged in and projecting below the bottom of said cylinder, a worm conveyer in said stand-
10 pipe projecting below the bottom thereof, inwardly-directed beaters on the bottom and sides of said receptacle and outwardly-directed beaters on the bottom and sides of the cylinder arranged staggering therewith.

15 2. In a device of the class described, the combination with a mercury-holding receptacle having peripherally-arranged apertures at the top thereof, a cylinder adapted to rotate therein, grooved wheels journaled thereon adapted
20 to track on the top of said receptacle, a stand-pipe rigidly engaged in said cylinder and projecting below the same, a screw conveyer therein extending near the bottom of the receptacle, a plurality of pins projecting out-
25 wardly from the bottom and sides of said cylinder and a plurality of pins projecting inwardly from the bottom and sides of the re-

ceptacle and arranged staggering with the pins on the cylinder.

3. In an amalgamator a receptacle having 30 apertures in the top thereof, a rotative cylinder therein having a closed bottom and providing an annular passage between the walls of the cylinder and the receptacle, a stand-pipe extending axially of said cylinder above 35 and below the same, a hopper on the upper end of said stand-pipe, a bearing on the top of the said hopper, a rotative worm conveyer in said stand-pipe and journaled in said bearing and in the bottom of the receptacle, means 40 for rotating said conveyer, a plurality of overlapping beaters on the receptacle and cylinder, a trough beneath said receptacle, an arm on said cylinder, a rotative shaft, an arm thereon, and a connecting-rod pivotally engaged 45 on said arms.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

ELIZABETH P. WILKINS.

Witnesses:

BERT A. VAN WINKLE,
EUGENE T. COOKE.