(No Model.)

2 Sheets—Sheet 1.

E. W. VANDUZEN.

RUMBLE FOR SCOURING CASTINGS, WASHING ORES, &c.

No. 292,075. Patented Jan. 15, 1884.

Fig. 1.

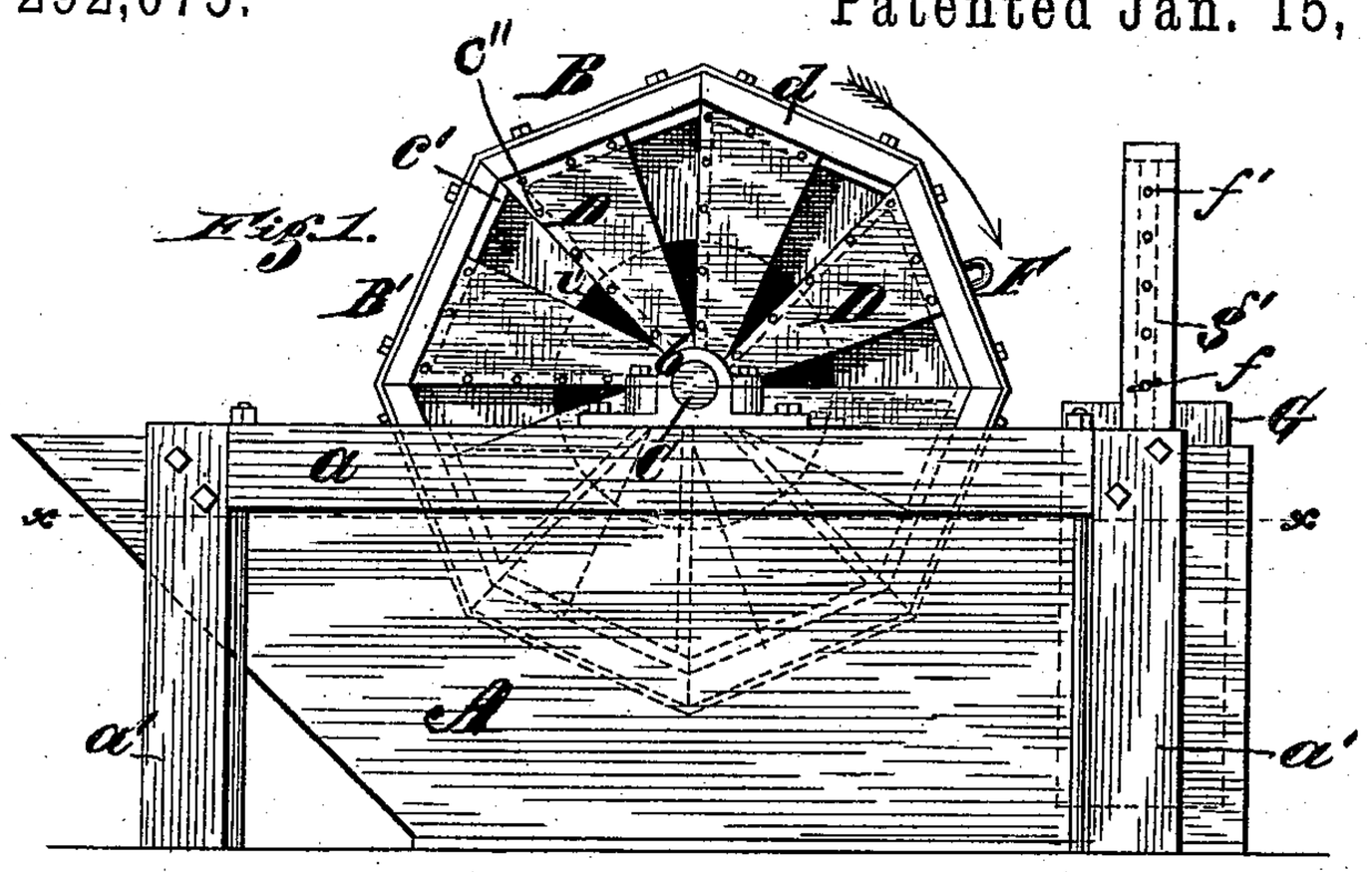


Fig. 2.

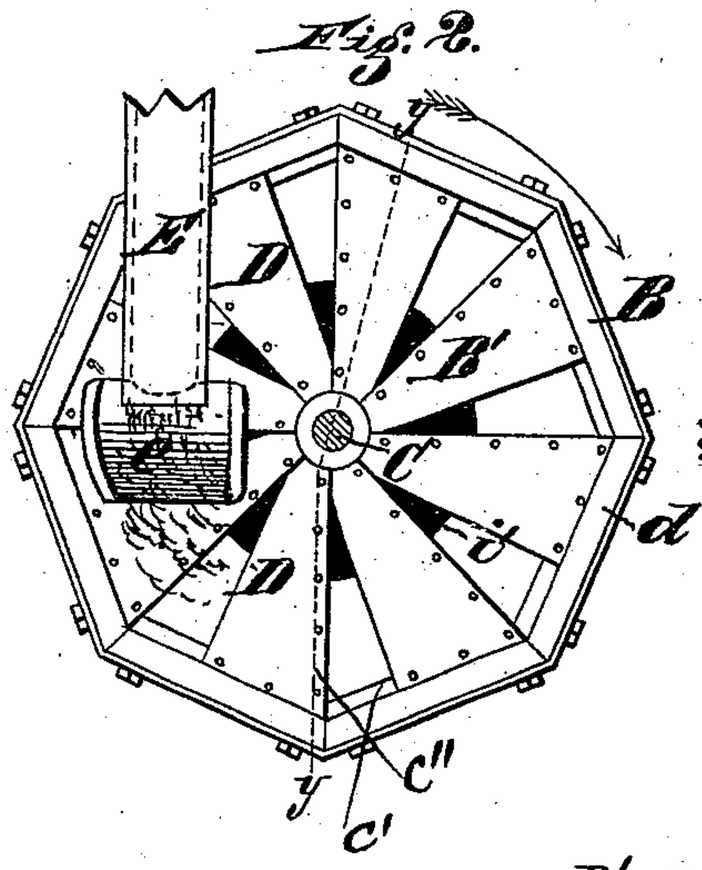


Fig. 3.

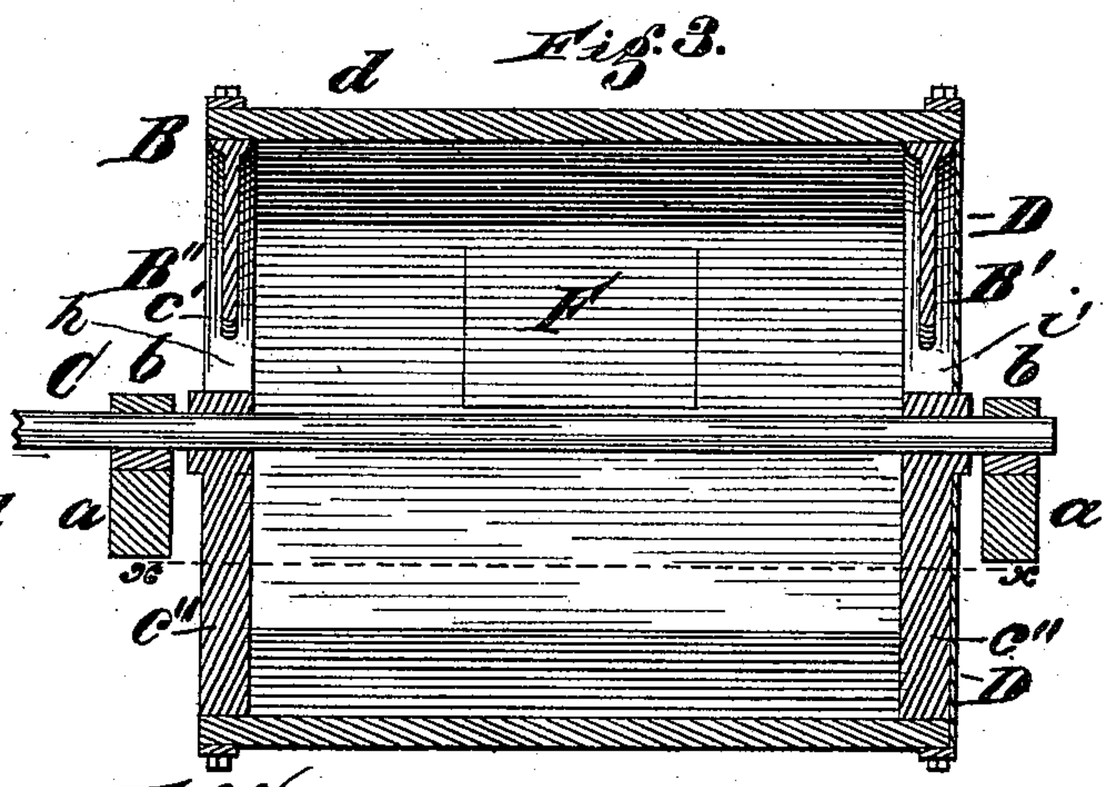


Fig. 4.

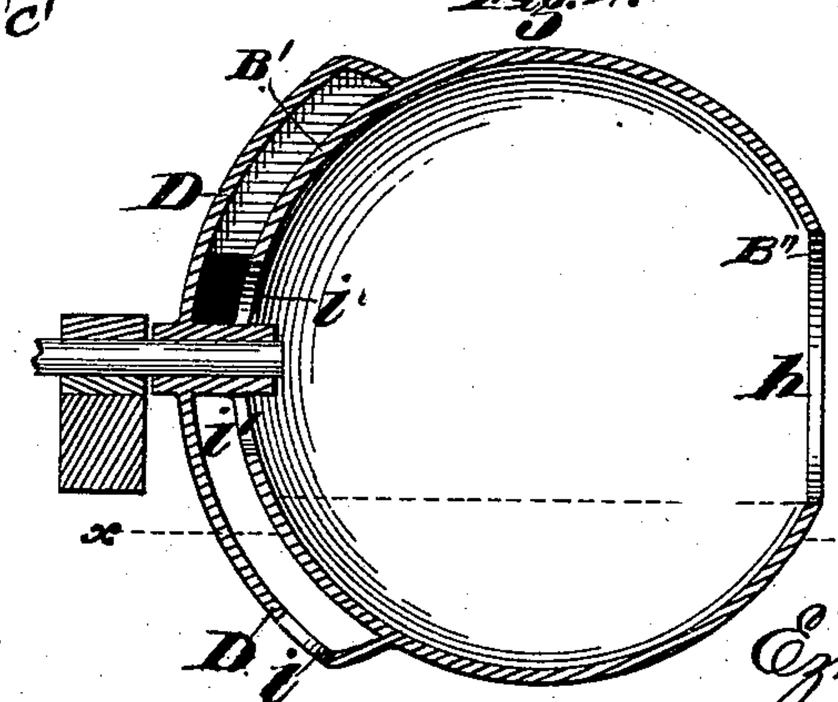
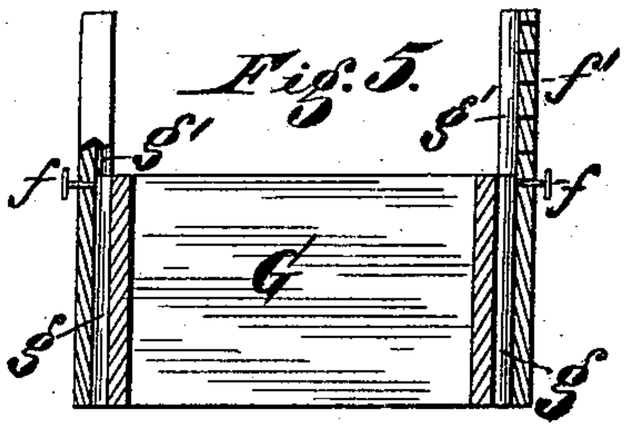


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

E. W. VANDUZEN.

RUMBLE FOR SCOURING CASTINGS, WASHING ORES, &c.

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Fig. 6.

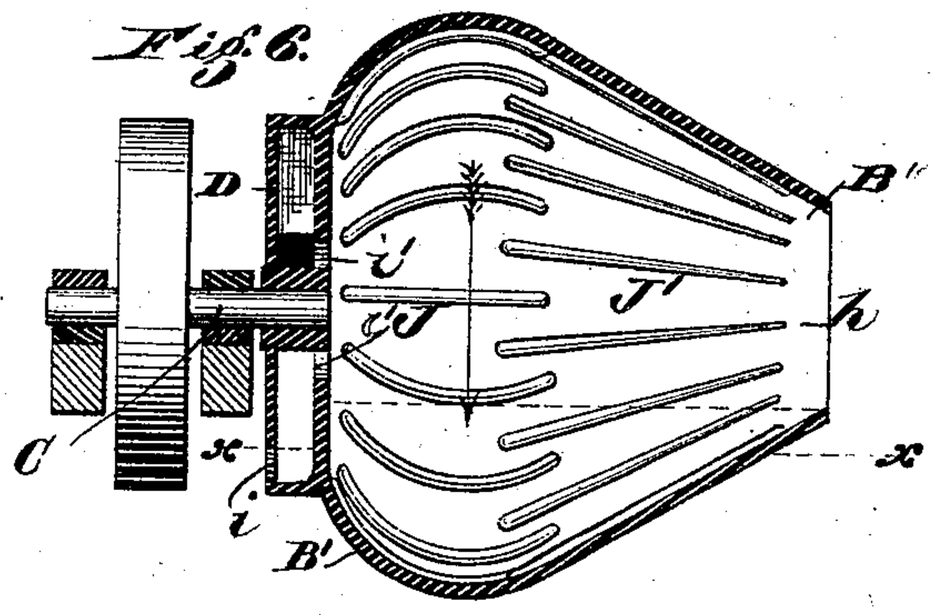


Fig. 7.

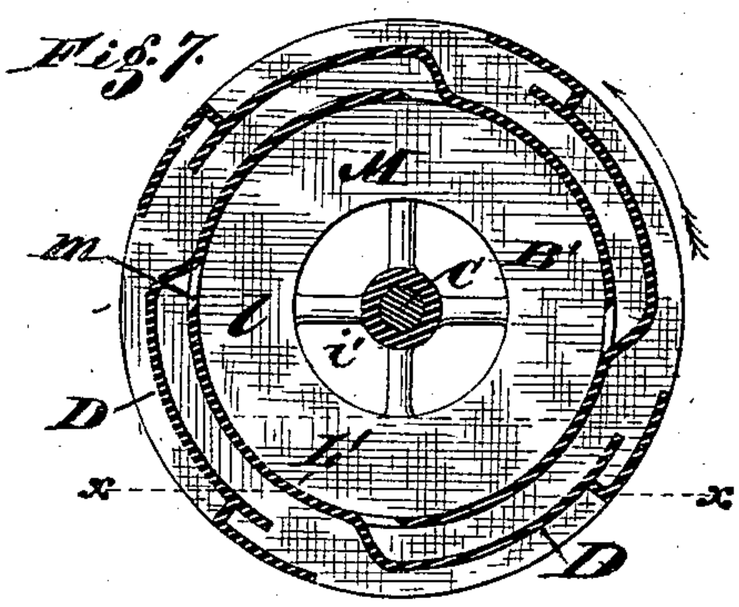


Fig. 8.

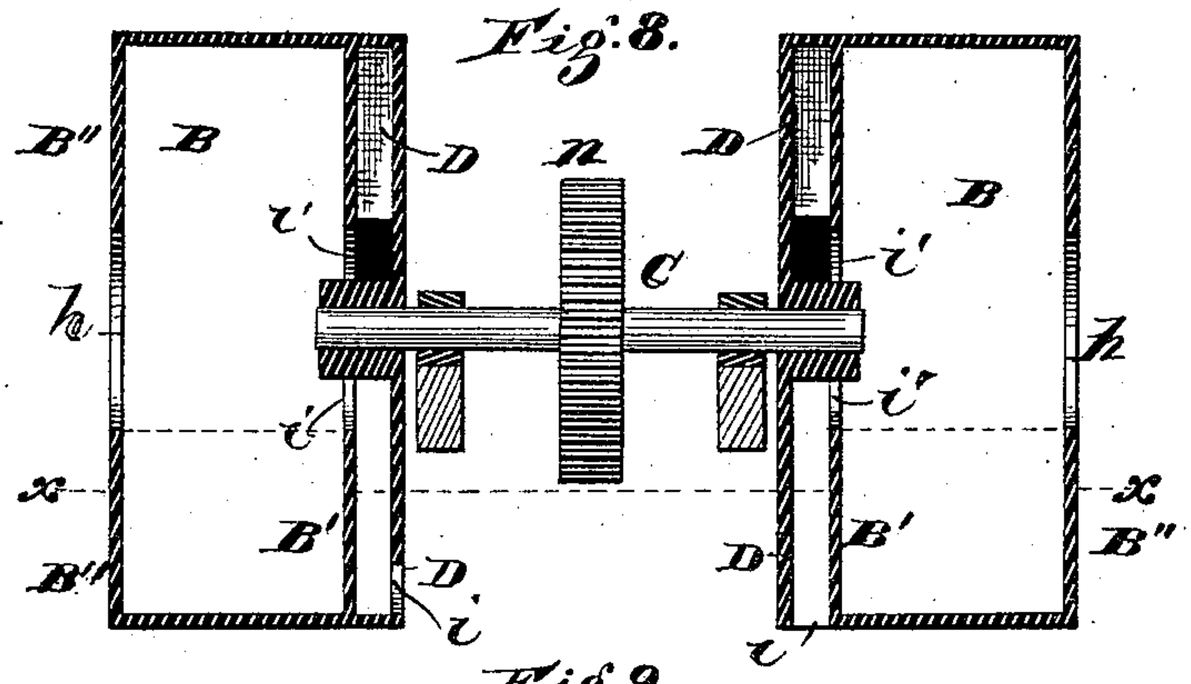


Fig. 9.

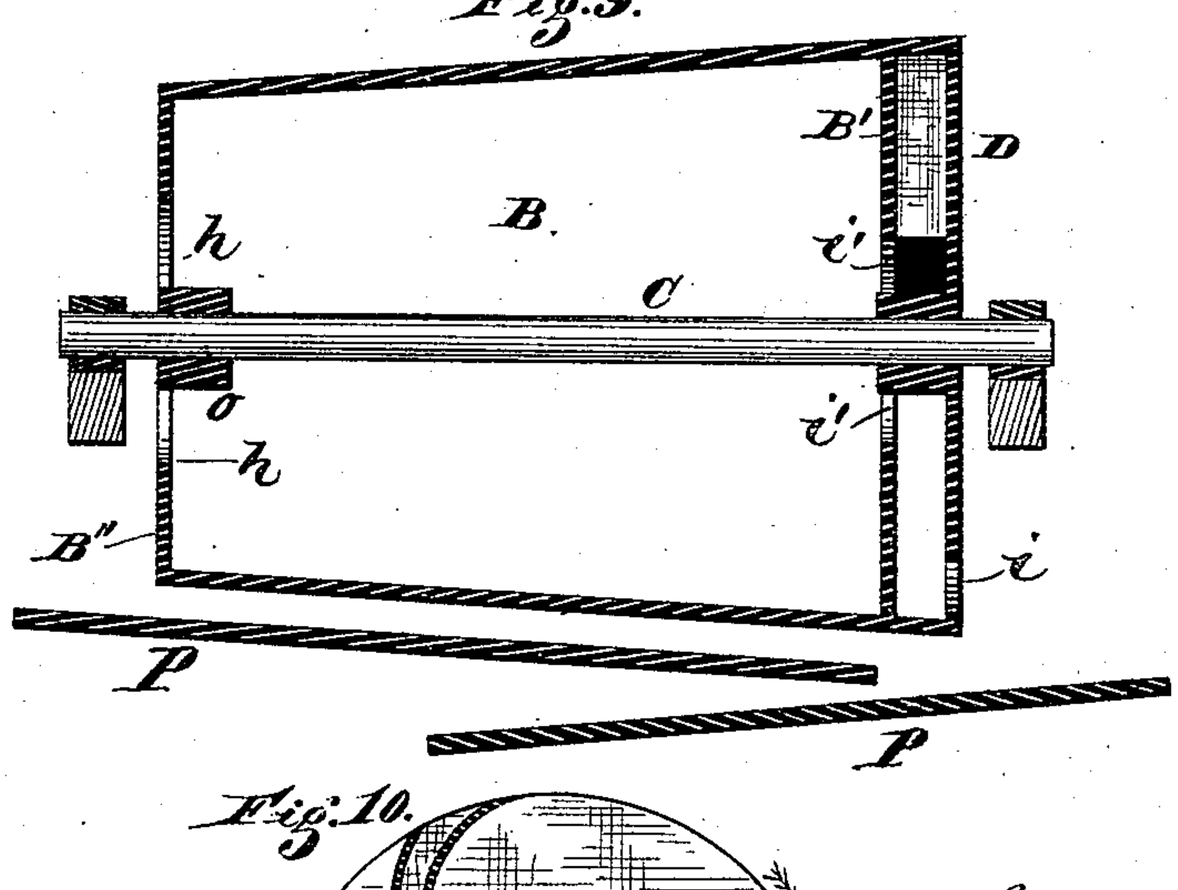
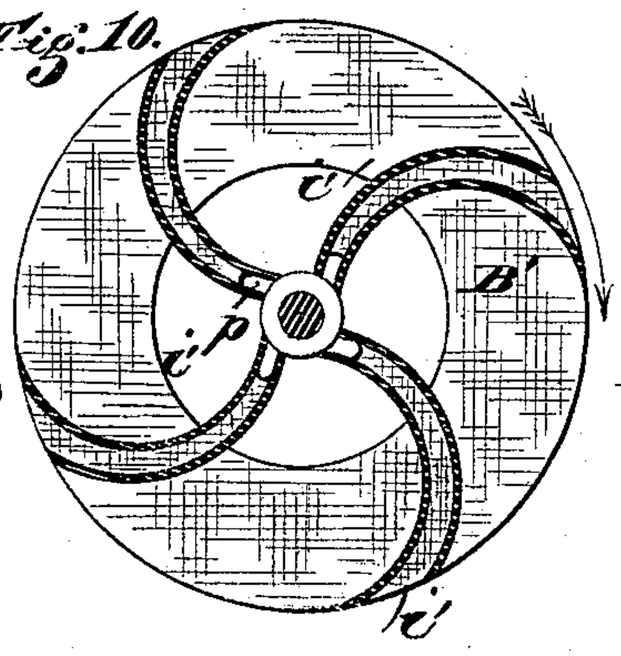


Fig. 10.



Attest,
Jno. E. Wiles.
Jno. L. Jones

Inventor.
Ezra W. Vanduzen,
by Wood & Boyle,
his Attorneys etc.

UNITED STATES PATENT OFFICE.

EZRA W. VANDUZEN, OF NEWPORT, KENTUCKY.

RUMBLE FOR SCOURING CASTINGS, WASHING ORES, &c.

SPECIFICATION forming part of Letters Patent No. 292,075, dated January 15, 1884.

Application filed March 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, EZRA W. VANDUZEN, a citizen of the United States, and a resident of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Rumbles for Scouring Castings and Washing Ores and other Materials, of which the following is a specification.

My invention relates to improvements in rumbles for scouring castings and pulverizing and washing ores or other materials.

The objects of my invention are, first, to provide a rotating cylinder or drum in which the castings or other articles are placed, having inlet-openings with elevating-buckets at one end and outlet-openings at its opposite end, through which water or other cleansing element passes, contained in a tub or tank, upon and within which tank the said cylinder is suspended and journaled; second, to provide, in connection with the said rotary cylinder, a displacer, adjustably mounted within said tub, to regulate the supply and depth of water in the cylinder.

The features of my invention will appear from the following description, and will be clearly defined by the claims.

Figure 1 is an end elevation of the machine embodying my invention, showing the revolving cylinder of the form especially adapted for cleaning castings, mounted upon and partially within a water tank or tub in connection with an adjustable water-displacing apparatus. Fig. 2 is an end view of the rotating cylinder, showing the water-raising buckets and inlet-openings in connection with a casting or ore-feeding device. Fig. 3 is a longitudinal sectional elevation on line *y y*, Fig. 2, of the cylinder and its journal-bearings. Fig. 4 is a central sectional elevation of a modified form of rotating drum, particularly adapted for pulverizing and washing ores—in this instance a spherical-shaped drum. Fig. 5 is a longitudinal sectional elevation of the preferred form of water regulating or displacing apparatus used in connection with the rotating cylinder. Fig. 6 is another modified form of rotating drum, also adapted for pulverizing and washing ores—in this instance a pear-shaped drum. Fig. 7 is a transverse end sectional elevation of another modified form of drum, showing the water-elevating buckets constructed on its periphery between two heads at the water-inlet end of the cylinder, adapted for pulverizing and washing ores and cleaning castings. Fig. 8 is a longitudinal sectional elevation of another modified form of drum, showing two of them, one mounted at each end of a revolving shaft, also adapted for pulverizing and cleaning ores. Fig. 9 is a longitudinal sectional elevation of another modified form of drum, shown in connection with inclined amalgam-coated plates or shelves, adapted for pulverizing, washing, and separating the more precious metal ores. Fig. 10 is a transverse section of another modified form of drum, showing curved water-elevating buckets, which are arranged between two disks at the inlet-head of the cylinder, similar to that shown in Fig. 7.

A represents a tank or tub, of any desirable form, for holding water or other cleansing element. Lines *x x* in the various figures of the drawings indicate the level at which the water is filled into the tub.

a a' represent a supporting and sustaining frame at both ends of tub A.

B is a cylinder or drum, suitably mounted upon a horizontal revolving shaft, C, which is journaled in bearings *b b* on the tub or the end frames, *a*, so that the drum shall be partially suspended within said tub.

B' B'' represent the end heads of drum B, both being provided with openings *i' h* for the feed and discharge or overflow of water.

c' c'' are ribs and arms formed upon the heads B' B''.

B' is the water feed or inlet head, each of the openings *i'* thereof being provided with buckets D. Buckets D are chambers formed by means of plates covering a portion of the space between the ribs *c'* and arms *c''*, as shown in Figs. 1 and 2, so as to leave the sides opposite the ribs open, and serve to scoop up the water, into which they dip, raising a portion of the same and conducting it toward the axis or shaft C, where it is discharged through the openings *c* into the cylinder. The raising of the water by the buckets into the cylinder at one end causes a circulation or current therein to preserve a slight overflow or discharge at the opposite end, and thereby draw off the lighter waste matter occasioned by the washing of the

castings or other material placed therein. The water-discharge is from the cylinder into the tank, so as to be used repeatedly, and thereby fully utilize it. In Figs. 1, 2, and 3 I have shown the cylinder of polygonal or angular form—in this instance an octagon. When used for cleaning small castings, I prefer to construct the faces *d* of wood, and heads B′ B″ of metal. The wood and water combined act as a sound-deadener, and only a very slight rattling of the castings can be heard when the drum is in motion.

In order to feed materials—such as ore—to the machine while the cylinder is either in motion or at rest, I provide a spout, E, having at its lower end an apron or guard, *e*, which approaches the face of the buckets D as near as possible and discharges the material into the buckets through their open sides, which in turn feed it to the cylinder. The spout E can be supported in any suitable manner that will hold it off from contact with the revolving cylinder and convey the material from any source of supply, as desired.

F represents a door closing an opening made in the cylinder B for the charge and discharge of the materials therein. The door-opening F may be used in lieu of the spout E *e* as a means for feeding material to the cylinder when at rest; but its principal object is to discharge the material from the cylinder.

In treating ores in my machine, it is especially desirable to have an apparatus for regulating the depth of water in the cylinder. In Figs. 1 and 5 I have shown one of the preferred forms used in connection with my machine. It is composed of a long box, block, or vessel, G, having vertical strips or slides *g* at its opposite ends, which move in ways *g′*, constructed on the inner faces of the tub A, and projecting upward therefrom, to admit of an extended upward movement of box G, so that it may be held and suspended at any point within the water or above it, as desired.

f represents pins passing through holes *f′* in the guides and extensions *g′*, and into holes in the slides *g* on the ends of the displacer, to sustain the box in any desirable position. The displacement of the water caused by the lowering or immersing of the box G therein raises it to the desired level in the cylinder, which can be maintained at all times during the operation of the machine at the will of the operator.

The operation of my machine is as follows: The castings, sweepings, or ashes containing metal dust and scraps, or other material to be cleaned or otherwise treated, are placed in the cylinder through the door-opening F, or the feed-spout E. The tub is filled with water up to line *x x*. Motion being imparted to the cylinder, it revolves with its lower portion containing the castings or other articles immersed in water. In the rotation of the cylinder, sand, scale, and other dirt are readily removed from the castings by mutual attrition and the water, which, being agitated, carries off the sand and other light material in the overflow thereof through the ports or outlet-openings *h*. The castings, when sufficiently scoured, can then be removed from the cylinder through the door-opening F.

In Figs. 4, 6, 7, 8, 9, and 10, I show modified forms of tumbling-cylinders and different ways in which they are mounted, but all possess the same broad feature as described in connection with the form shown in Figs. 1, 2, and 3.

The form shown in Fig. 4 consists in a spherical shell with an orifice or opening, *h*, in its face end, through which the material is inserted and extracted. The shell is mounted on the end of a revolving shaft, which is suitably supported in bearings on the tub and suspended so as to be partially immersed in the water contained in said tub. D represents the water-raising buckets on that face of the shell connected with its driving-shaft. *i* are the dip-openings of the buckets, and *i′* the discharge-openings into the shell. This form of shell (shown in Fig. 4) is especially adapted for pulverizing and washing ores. In the operation of this device for treating ores, water is placed in the tub up to the line or level *x x*. When the ore is charged into the shell, it will to a greater or less extent absorb the water so that it will fall below the said level; and in order to maintain the proper level at all times for the successful operation of the machine, I have provided in connection with the shell or cylinder the displacer G, which, as hereinbefore described, can be adjusted vertically, so as to raise or lower the water, as described. While the ore is absorbing the water, the displacer G may be lowered, when the water will rise and fill the shell to the desired level. The action of the buckets on the water to raise it and discharge it into the shell and the passage or circulation of the water through and out of the shell are identical with that described in connection with the device shown in Figs. 1, 2, and 3. When the washed ores are to be removed from the cylinder or shell, the water can be lowered by raising the displacer, and a scoop, shovel, or other instrument inserted through the opening *h*.

The modified form shown in Fig. 6 is similar to that shown in Fig. 4, excepting that the shell is pear-shaped instead of spherical, and its interior face is provided with radial ribs J J′, the ribs J being curved and terminating about midway between the ends of the shell, and the ribs J′, arranged alternately between the ribs J, projecting therefrom up to the mouth or opening, where they taper to a point. Ribs J J′ cause resistance on the inside face of the shell, against which the ore comes in contact during the revolution of said shell. Thus the ore is carried around with the shell a portion of its revolution and thoroughly agitated and pulverized by being thrown against the ribs, and also materially advanced in its washing and separation. The overflow and radial ribs carry off the lighter materials into the body

of water in the tub, as in the other devices hereinbefore described. The ribs are made in divisions and alternating, as shown, in order that the material will not be carried off bodily or too rapidly toward the opening *h*. The elevating-buckets are similar to those shown in Fig. 4, excepting that the head is flat instead of curved. The entrance and exit of the water are identical; also the manner in which the shell is mounted on the end of the driving-shaft.

In Fig. 7 I have shown a modified form of water-elevating buckets, which may be used in either of the shells described and shown herein. The view shows a transverse sectional elevation of the water-inlet head of the cylinder with the end plate or disk removed. D represents the buckets, which, instead of being arranged so that they dip the water from the end face of the cylinder, are so arranged that they dip the water from the periphery of said cylinder. L′ represents an annular partition or ring arranged between two disks, *l l*, one of which is not shown, and forming a water-chamber, M, and part of the buckets D. *m* are the outlet-openings of the buckets into the chamber M. *i′* is a central orifice in the inner head *l*, for the passage of the water from chamber M into the cylinder.

In Fig. 8 I have shown another modified form of cylinder. Two of them are shown, one on each end of a driving-shaft, mounted on bearings between the cylinders and having intermediate driving pulley or gear, *n*. These cylinders are plain round drums, each being provided with flat heads B′ B″, the head B′ being the one having the water-elevating buckets, and the head B″ being the one for the charge and discharge of the material placed in the cylinder through the orifice *h*, which orifice coincides with those described and shown in Figs. 4 and 6. The buckets shown in both cylinders are the same as those shown in Fig. 6, excepting that those in the right-hand cylinder dip from the periphery instead of from the end face. The operation of these cylinders is identical with those above described, and it will not be necessary for me to again describe it.

In Fig. 9 I have shown another modified form of cylinder. It is mounted in the same manner as the cylinder shown in Fig. 1, on a through-shaft suitably journaled in bearings on the tub. This cylinder is of frustum shape, the incline thereof causing the heavier material to be drawn toward and settle in the larger or water-inlet end, the lighter particles being carried off by the current occasioned by the elevation of the water by the buckets and its discharge or overflow through the exit-orifice. Spider-arms connect the hub *o* with the exit-orifice head B″ of this cylinder, which arms are not shown. The water-elevating buckets are the same as those above described in connection with Figs. 6 and 8. P are inclined ordinary amalgam-coated plates arranged beneath the cylinder to catch the overflow, and are particularly designed to separate and collect ores containing precious metals that escape from the cylinder in said overflow.

In Fig. 10 I have shown another form of water-elevating buckets. These buckets are arranged between two disks or heads in a similar manner to those described, and partly shown in Fig. 7; but they are curved from the axis radially, the water-chamber in this device being absent. The inlet opening or orifice *i′* to the cylinder is like that shown in Fig. 7, and formed in connection with the inner disk or cylinder head proper as in that figure. *p* are the discharge-openings of these buckets, emptying the water at the axis of the cylinder, as in all the views shown in the drawings, excepting Fig. 7.

I am aware that it has been proposed to supply water to a revolving cylinder by means of buckets communicating with the interior of the cylinder near one end, the said buckets lifting water from a tank beneath the cylinder; and therefore I lay no broad claim to such feature. My invention differs from such constructions in having contracted open ends to the cylinder, and in introducing the water into the cylinder through such contracted ends by means of the buckets communicating therewith, instead of directly with the cylinder through its periphery.

Having shown herein various modified forms of cylinders and numerous ways in which the water-elevating buckets may be constructed and arranged, it is obvious still further modifications in construction could be shown and still be within the scope of my invention.

In order to pulverize ore or other articles, bowlders or heavy balls of iron or other suitable material may be inserted in the cylinder or shell, together with the material to be acted upon. In the revolution of said cylinder or shell, the balls will roll over and upon one another, and thereby crush or pulverize the ore that comes between them.

I claim—

1. The combination of the tank having a single water-compartment, the shaft journaled on the tank, and the rotating cylinder constructed with an imperforate periphery and contracted open ends, and provided at one end with water-supply buckets for lifting the water from the tank into the cylinder through one end thereof, and discharging such water at the opposite end of the cylinder directly into the tank, substantially as described.

2. In a machine for cleaning and treating castings, ores, and other articles, the combination of a tank, a rotating cylinder journaled above the tank and extending down into the same, and a water-displacer or level-regulator moving in ways within the tank, and means for sustaining the regulator at any desired point, substantially as described.

3. In an ore washer or pulverizer, the combination of a water-tank, A, a cylinder, B, mounted above the tank and extending down

into the same, and having an imperforate periphery and contracted open ends, the water-supply buckets at one end of the cylinder, and inclined amalgam-plates P beneath the cylinder, and extending beyond the end thereof, to gather such particles of metal as may escape in the overflow of water from the end of the cylinder, substantially as described.

4. In an ore washer and pulverizer, the combination of the tank A, the rotating cylinder journaled above the same and extending down into it, the water-supply buckets communicating with the interior of the cylinder through one end, and a feed-spout, E, and apron *e* for feeding the cylinder while in motion, substantially as described.

5. The combination of the tank, the revolving cylinder supported on a shaft above the tank and provided with bucket-supply openings at one end and a discharge-opening at the other end, and a water-displacer or level-regulator within the tank, substantially as described.

In testimony whereof I have hereunto set my hand.

EZRA W. VANDUZEN.

Witnesses:
JNO. E. JONES,
A. GLUCHOWSKY.