

No. 706,334.

Patented Aug. 5, 1902.

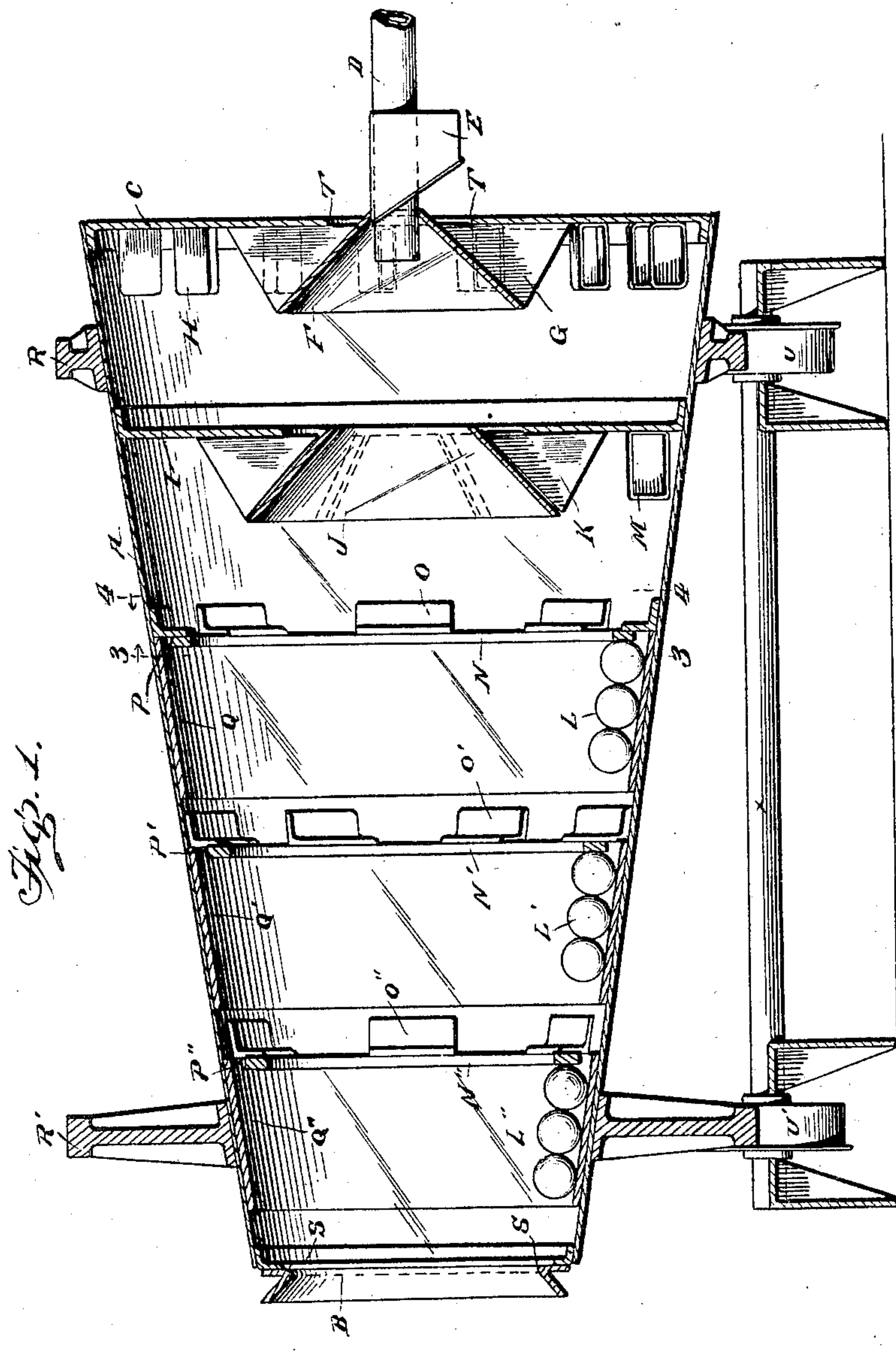
G. MOORE.

APPARATUS FOR LEACHING ORES, &c.

(Application filed Feb. 3, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Inventor

George Moore

By

Mason Fenwick Lawrence
his Attorneys

Witnesses

L. G. Hande

Ruth J. Mitchell

No. 706,334.

Patented Aug. 5, 1902.

G. MOORE.

APPARATUS FOR LEACHING ORES, &c.

(Application filed Feb. 3, 1902.)

(No Model.)

2 Sheets—Sheet 2.

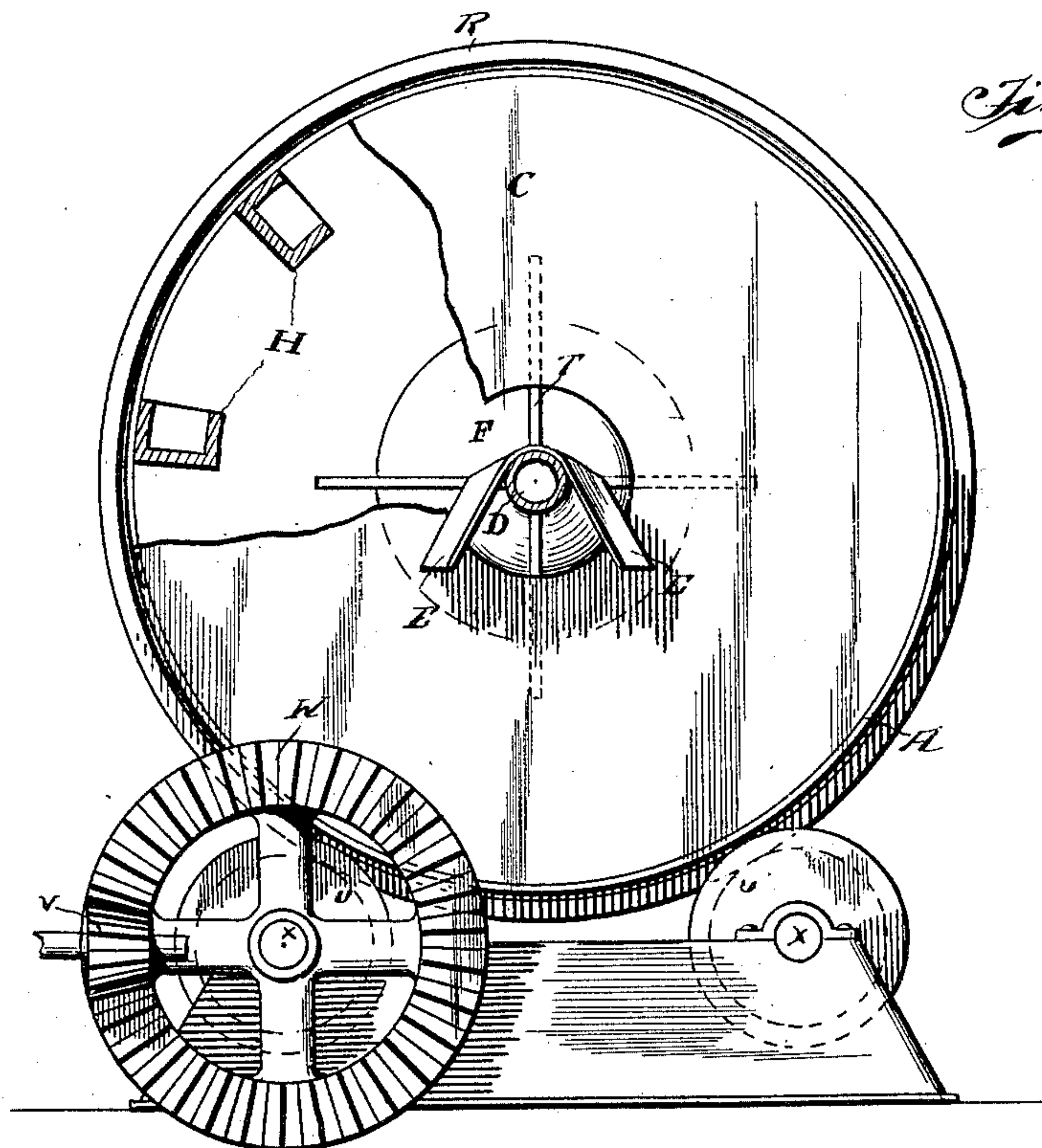


Fig. 2.

Fig. 3.

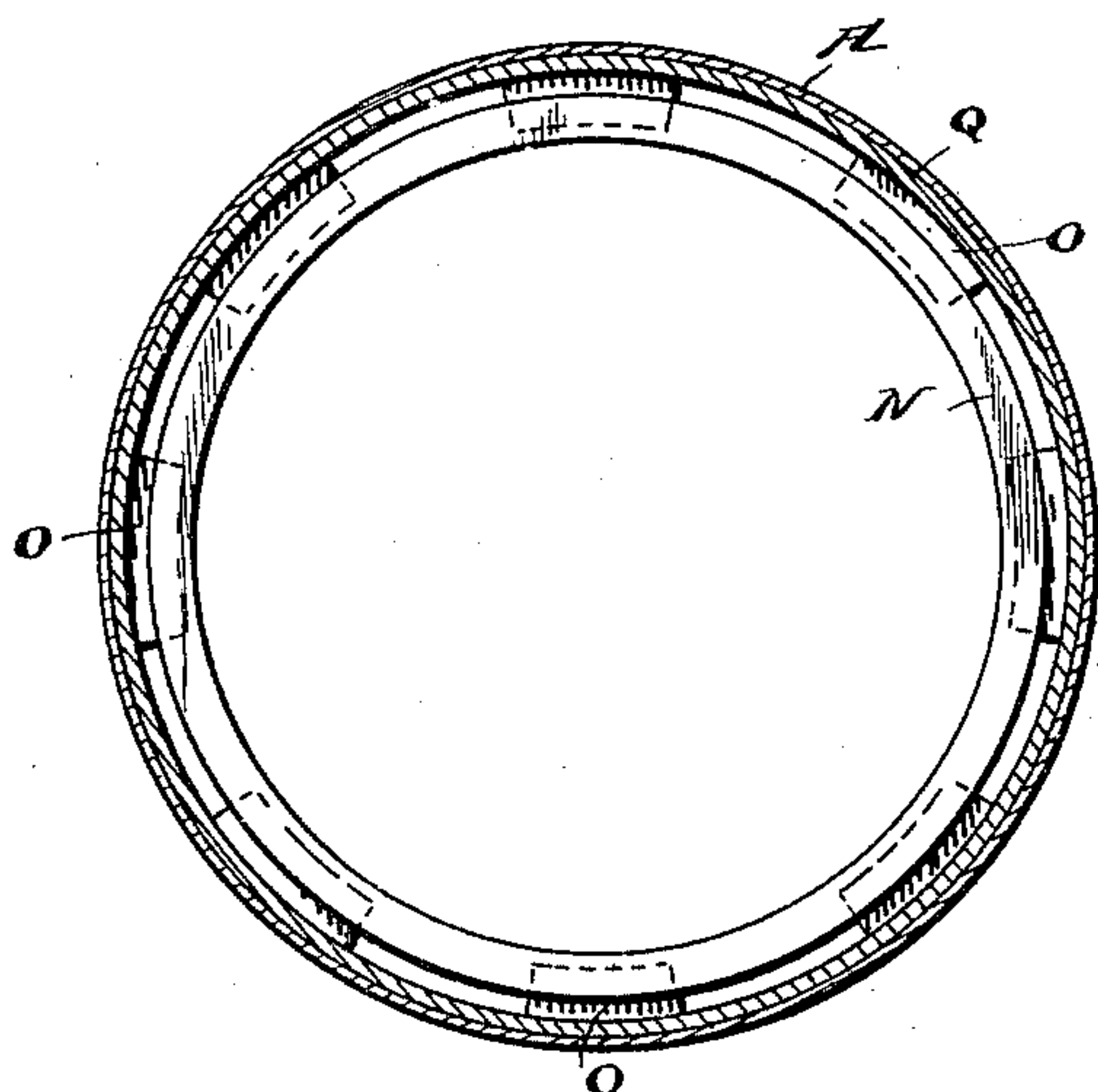
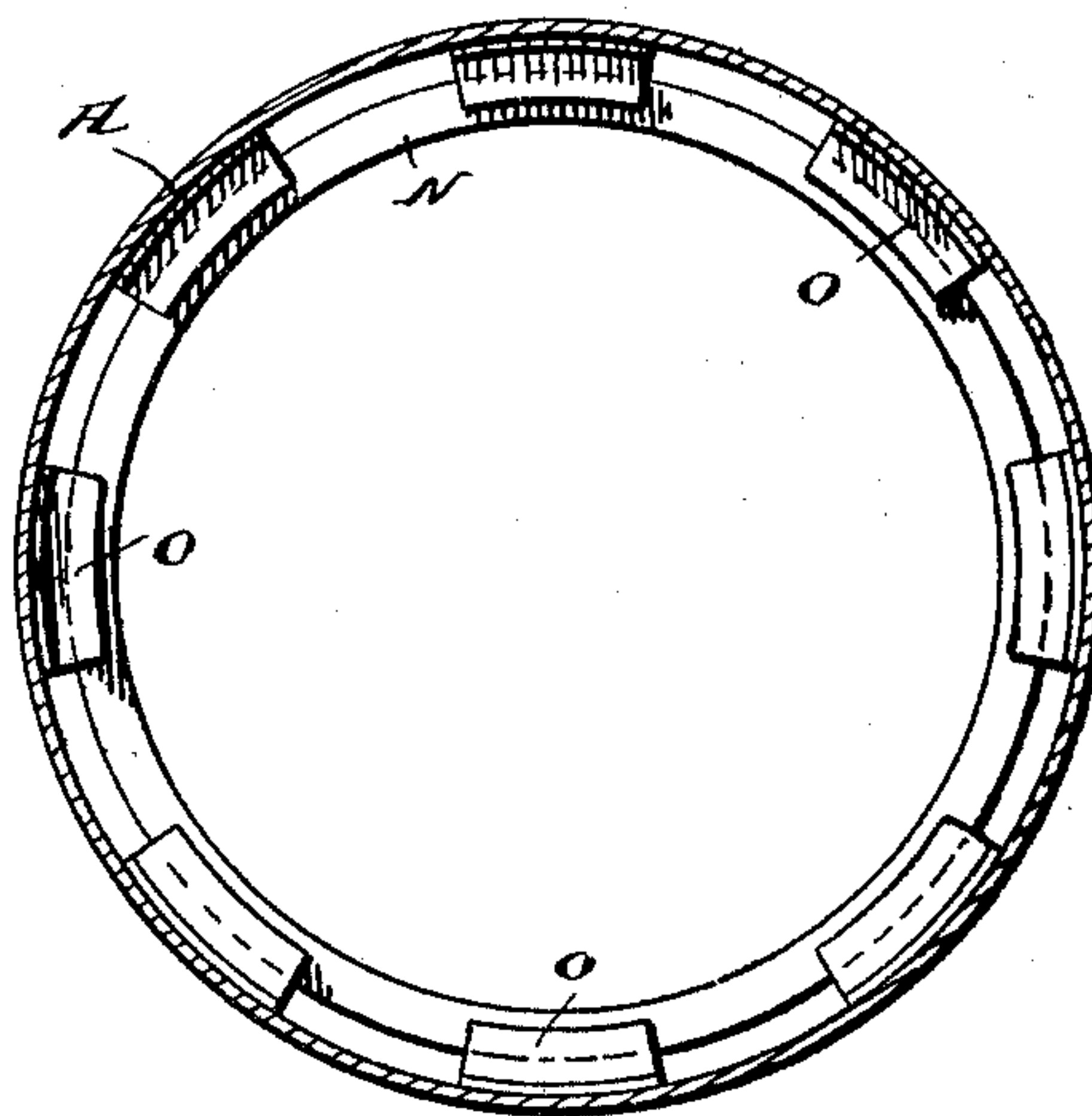


Fig. 4.



Inventor

George Moore

Witnesses

L. G. Handy

Ruth J. Mitchell

By

Mason Fenwick Lawrence

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE MOORE, OF SALT LAKE CITY, UTAH.

APPARATUS FOR LEACHING ORES, &c.

SPECIFICATION forming part of Letters Patent No. 706,334, dated August 5, 1902.

Application filed February 3, 1902. Serial No. 92,392. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MOORE, a 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 apparatus for separating solutions and slimes from ores and other materials and for utilizing completely the dissolving power of such solutions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for dissolving metals and metallic compounds contained in ores or furnace products and for separating slimes from the sands of ores.

In dissolving the soluble portions of ores, furnace products, and other like materials it has always been difficult in one operation to dissolve the final traces of the soluble portions and at the same time completely utilize the dissolving power of the acid or alkali. The weakening of the acid or alkali by its dissolving action makes its action less energetic toward the finish of the operation at the very time when the more difficultly soluble particles, needing the most energetic dissolving action, are acted upon. This not only causes loss of reagent, but also further loss on account of the poor extraction of the soluble elements desired. Also in the case of ores of a talcose or slimy nature the talcose portions in the form of slimes prevent percolation of the solutions in tanks by clogging. These slimes should be separated and filtered separately by known methods. Then the remaining portion will easily allow percolation.

The object of this invention is to provide an improved apparatus for the purpose of overcoming these difficulties; and with this object in view the invention consists, primarily, in a hollow truncated cone mounted to rotate about a central horizontal axial line, provided with an opening at one end to receive the material to be acted upon, an opening at the opposite end to receive the fluid solvent, means for actuating the material through the cone in one direction, and means for actuating the fluid solvent through the cone in the opposite direction simultaneously with the passage of said material.

The invention further consists in the improved construction, arrangement, and combination of such an apparatus, as hereinafter fully described and afterward specifically claimed.

In the accompanying drawings, which illustrate, by way of example, one embodiment of my invention, Figure 1 represents an apparatus embodying my invention in central longitudinal vertical section. Fig. 2 represents in elevation the larger end of the apparatus, parts being broken away. Fig. 3 represents a sectional view on the transverse vertical plane indicated by the broken line 3 3 of Fig. 1. Fig. 4 represents a similar sectional view on the plane indicated by the broken line 4 4 of Fig. 1.

Like letters of reference mark the same parts wherever they occur in the several figures.

Referring to the drawings by letters, A indicates the shell or body of the apparatus in the form of a truncated cone, the smaller end or head B of which is provided with a large central opening S and the larger end or head C of which is provided with a smaller central opening T, whereby when the shell is mounted, as hereinafter described, to rotate about a central horizontal axial line the relative position of the two openings S and T is such that fluid entered at the smaller opening T through a pipe D will be discharged from the larger opening S.

E indicates a shield for the pipe D to prevent injury to the pipe from the material discharged through opening T, as hereinafter explained.

O O' O'' indicate angular brackets secured at intervals upon the interior of the shell, to which are secured transverse rings N N' N'', whose peripheries are slightly distant from the shell, leaving spaces P P' P'' to permit of the passage of material from one end to the other of the shell, the compartments formed by this construction being lined with short metallic conic frustums Q Q' Q'' to prevent injury to the interior of the shell by balls L L' L'', contained in the respective compartments, by the rings N N' N'', before referred to, while rolling around the shell to disintegrate and crush the material passing through.

J indicates a conical apron secured by ra-

dial wings K and a partition I, interposed between the head C and the nearest series of balls L, and M indicates one of a series of buckets secured to the partition I outside of said conical apron J, the smaller end of the apron entering a central opening in the partition. A similar conical apron F is secured by means of radial wings G upon the head or end C of the shell, and a series of similar buckets H are secured upon the head outside of the cone, the smaller end of the conical apron F entering the opening T in the head.

R R' indicate tires secured upon the shell, which tires rest upon wheels U U', mounted upon shafts X X', the shafts being rotated in any suitable manner to cause the rotation of the shell, the means here shown being a large gear-wheel W on the shaft X, rotated by a pinion D on a shaft at right angles to shaft X, although any other suitable gearing may be used.

In operation the material to be operated upon is fed by any suitable means into the smaller end of the shell through opening S, and by the rotation of the shell such material is fed along toward the larger end, being crushed and disintegrated on its passage by the balls. The material is caught up by buckets M and dropped upon apron J, which deflects through the opening in partition I into the last compartment, wherein it is caught up by buckets H, dropped on apron F, and deflected through discharge-opening T in head C upon cover E and thence into suitable receptacles. The fluid solvent is entered from pipe D through opening T in head C and flows toward the smaller end of the shell, overflowing through opening S in head B when a sufficient quantity has been entered. The result of this operation is that the more easily soluble portions of the material are acted upon by the fluid solvent nearest to the smaller end of the shell, and as the material passes along toward the larger end and the fluid toward the smaller end of the shell the gradually-weakening solvent encounters the material in a more and more difficultly soluble condition until the material at the discharge end, with the greatest amount of soluble matter dissolved and the most difficultly soluble portions remaining, encounters the freshly-entered and strongest fluid solvent.

The advantages attending the use of this invention will be readily seen by those skilled in the art, and while I have specifically described the construction of the apparatus it will be obvious that slight changes and variations might be made without departing from the spirit and scope of the invention.

Having thus fully described my invention, what is claimed as new, and desired to be secured by Letters Patent of the United States, is—

1. An apparatus for leaching comprising a shell or body in the form of a truncated cone, a head at each end of said body having a central opening, one of said openings to receive

material to be operated upon and the other to receive a fluid solvent, means for rotating the body about its central horizontal axial line, and means for causing the material and fluid solvent to pass through the body simultaneously in opposite directions, substantially as described.

2. An apparatus for leaching comprising a shell or body in the form of a truncated cone, a head at each end of said body having a central opening, one of said openings to receive material to be operated upon, and the other to receive a fluid solvent, means for rotating the body about its central horizontal axial line, and combined means for actuating the material through the body in one direction, and disintegrating it during its passage, and means for simultaneously causing the fluid solvent to flow through the body in the opposite direction to the movement of the material, substantially as described.

3. An apparatus for leaching, comprising a shell or body in the form of a truncated cone mounted to rotate about its central horizontal axial line, a head at each end having a central opening, the opening in the larger head being arranged to receive a fluid solvent, and that in the smaller head to receive material to be operated upon, means for actuating the material to be operated upon through the body from the smaller to the larger end, and means for causing the fluid solvent to flow through the body from the larger to the smaller end, substantially as described.

4. An apparatus for leaching, comprising a shell or body in the form of a truncated cone, a head at each end having a central opening, the opening of the small head being larger than that of the large head, and adapted to receive material to be operated upon, means for admitting a fluid solvent through the opening in the large head, and discharging it through the opening in the small head, and means for actuating the material through the body, and discharging through the opening of the large head, substantially as described.

5. An apparatus for leaching, comprising a hollow truncated conical body or shell arranged to rotate about its central horizontal axial line, brackets secured in the shell at intervals of its length, transverse rings secured upon said brackets, out of contact with the shell, and forming partitions to divide the shell into compartments, and a series of balls in each compartment, substantially as described.

6. An apparatus for leaching, comprising a hollow truncated, conical body, a head at the smaller end, having a central opening to receive the material to be operated upon, a head at the larger end having a central opening, a pipe for discharging fluid solvent into the latter opening, a guard or cover over said pipe, and means for discharging the material admitted at the small end through the large end around said guard, substantially as described.

7. An apparatus for leaching comprising a suitable shell, a head at each end of said shell, having a central opening, one of said openings being adapted to receive material to be
5 operated upon and the other to receive a solvent, means for rotating said shell, and means for causing the material and solvent to pass through the body simultaneously in opposite directions, substantially as described.

10 8. An apparatus for leaching, comprising a rotatably-mounted hollow, truncated, conical body, rings of less diameter than the inner surface of said body arranged therein

and spaced apart for forming compartments, brackets supporting said rings in position, 15 whereby spaces are produced between the outer periphery of the rings and the inner surface of said body, and balls in said compartments, substantially as described.

In testimony whereof I hereunto affix my 20 signature in presence of two witnesses.

GEORGE MOORE.

Witnesses:

ANDREW L. HOPPAUGH,
FRANK EVANS.