

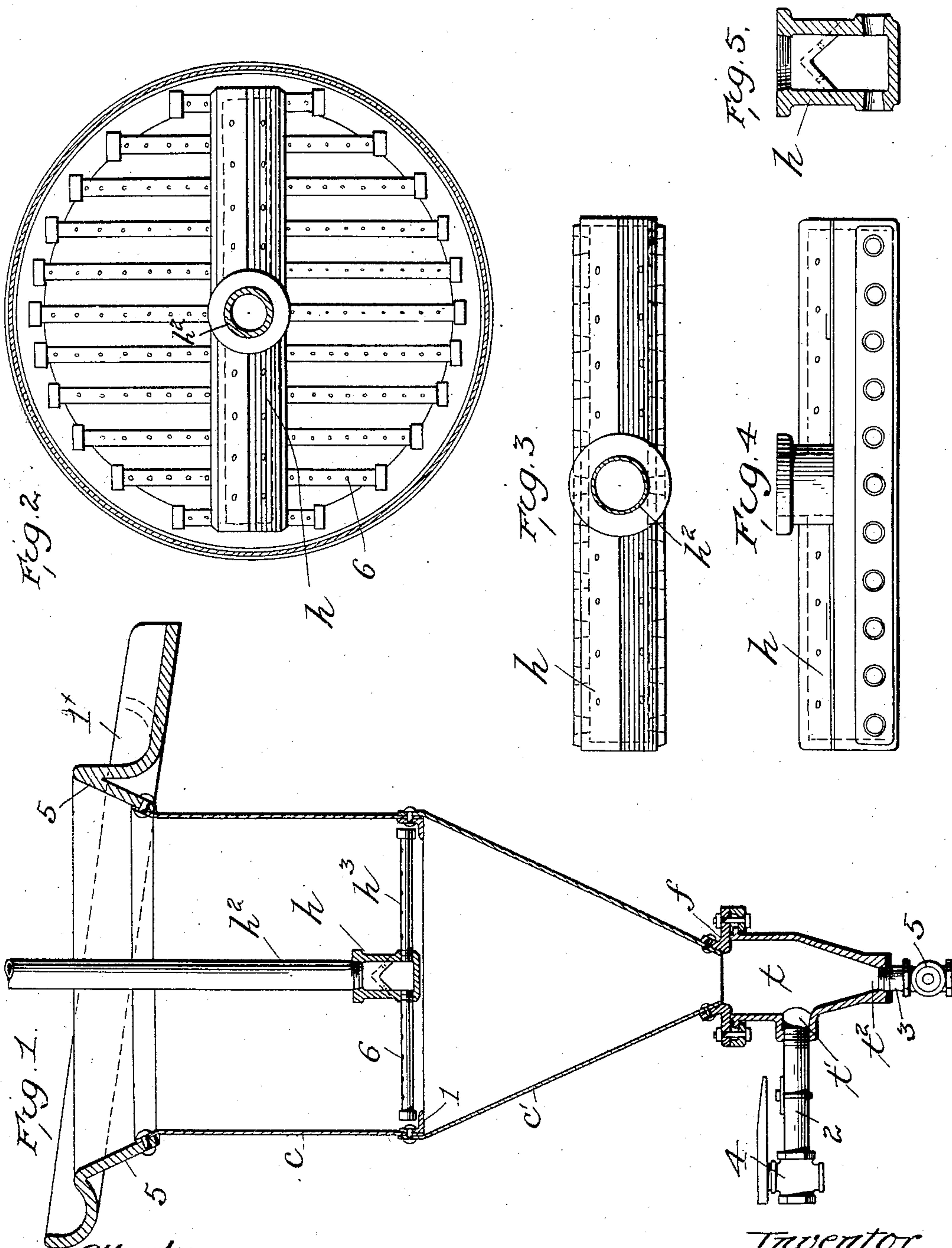
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W. R. GRANT.
PNEUMATIC HYDRAULIC SEPARATOR.

APPLICATION FILED MAR. 19, 1903.

NO MODEL.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC HYDRAULIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 771,874, dated October 11, 1904.

Application filed March 19, 1903. Serial No. 148,617. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROLLO GRANT, a citizen of the United States, residing at Denver, Colorado, have invented certain new and useful Improvements in Pneumatic Hydraulic Separators, of which the following is a specification.

The invention is designed for use more particularly with the cyanid process of the treatment of ore, though it is not limited in this respect. It is intended for the purpose of separating fine material and slimes from the coarser material in the said cyanid or other process by the use of air.

The features of the invention will be hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a central vertical section of the invention with parts in elevation. Fig. 2 is a plan view of the air-header in place within the apparatus, and Figs. 3, 4, and 5 are detail views of the air-header.

The apparatus consists of a cylindrical shell *c*, having a conical extension *c'* riveted to its lower end, an angle-iron 1 being held by the said rivets and strengthening the joint. At the apex or lower end of the conical portion a cast-iron tip *t* is arranged, the said tip being bolted to a cast-iron ring *f*, secured to the lower open end of the conical portion. This tip *t* is provided with a plurality of outlets *t'* and *t''*, and these outlets are furnished with pipe connections 2 and 3, each of which is provided with a suitable valve 4 and 5, the said pipe connections being screwed into suitable nipples on the tip. The cylindrical part *c* is surmounted by a flaring rim 5, which at its upper edge ends in a launder 1^x, which is inclined, as shown in Fig. 1, for the discharge of the material passing over the flared rim 5. At the point near the junction of the cylindrical portion with the depending cone an air-header *h* is provided extending transversely across the cylindrical portion and having connected therewith a number of pipes *h'*, each closed at its outer end and having a series of upwardly-directed air-openings 6. To this header an air-pipe *h''* is

connected, said air-pipe being preferably located centrally of the cylindrical portion and extending vertically thereof.

In the operation of the apparatus the cyanid solution or water containing the pulp and ore is fed into the open upper end of the tank. The material as it descends encounters the fine ascending stream of air furnished by the header, and this causes the fine particles of ore and slimes to rise with the air and overflow the flaring rim 5 into the surrounding launder 1^x. The coarser material will settle through the ascending air-currents and slimes and will pass down between the air-pipes of the header into the cone *c'*, where they will be collected and whence they may be delivered through one of the outlets *t'* or *t''*. Either one of these ports may be used for the introduction of air or solution, or both, in the event of the material packing or banking in the conical section or cone-tip.

It will be seen from the above that by this apparatus it is possible to make any desired separation or grading between the coarse and fine materials, for by varying the volume and pressure of the air the size and quantity of material which is caused to ascend and separate from the coarser material may be gaged to satisfy different conditions and any requirements desired.

I do not wish to limit myself to the air-currents directed upwardly, as said currents may be directed otherwise. The air, however, in any event will rise and act upon the material introduced into the top of the casing or tank.

As my invention relates to the apparatus, it will be understood that I do not limit its use to the precise fluids mentioned in connection therewith, and where I have used the word "air" in the accompanying claims I mean the same to apply to any fluid which will answer the purpose.

I claim as my invention—

1. An apparatus for separating and classifying material comprising a casing for holding a liquid and having an outlet at its top for fine material and a lower outlet for the

coarser material and means for introducing air to rise upwardly in the said casing, said air-introducing means being interposed axially between the upper and lower outlets and at an intermediate height in said casing and diffusing air throughout the entire cross-sectional area of the said casing and leaving passages throughout the cross-sectional area for the free fall therethrough of the coarser material, substantially as described.

2. An apparatus for separating and classifying material comprising a casing for holding a liquid and having an outlet at its top for fine material and a lower outlet for the coarser material, means for introducing a fluid-supply at or near the lower outlet, and means for introducing air to rise upwardly in the said casing, said air-introducing means being interposed axially between the upper and lower outlets and diffusing air throughout the entire cross-sectional area of the said casing and leaving passages throughout the cross-sectional area for the free fall therethrough of the coarser material, substantially as described.

3. In combination in a separator a casing, means for introducing air into the same to rise upwardly, means of discharge below the air-introducing means, said casing having an upper discharge and being unobstructed for the free downward passage of material from the air-introducing means to the lower discharge, said air-introducing means extending across the entire cross-sectional area of the casing to diffuse the air gently throughout

the entire mass of material, substantially as described.

4. In combination a casing, means for introducing air at an intermediate height in said casing and throughout the entire cross-sectional area of the said casing, said casing having a lower discharge and means for supplying fluid-pressure thereto, substantially as described.)

5. In combination a casing made up of a cylindrical portion and a depending conical extension having a lower outlet and means for introducing air for the separation of the material and having spaces for the fall of the heavy material throughout the cross-sectional area of the casing, said means being located adjacent to the junction between the cylindrical and conical portions, said means extending across the entire cross-sectional space of the cylindrical portion, substantially as described.

6. In combination a casing having an upper and a lower outlet and an air-header therein composed of a series of pipes extending across the entire space within the casing to diffuse the air into all parts of the material, said pipes having spaces between them for the fall therethrough of the coarser material, substantially as described.

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

WM. ROLLO GRANT.

Witnesses:

J. H. BROKAW,
A. H. SIMPSON.