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Patented Jan. 7, 1902.

W. JAMIESON & F. J. ODLING.
APPARATUS FOR SIFTING PULVERIZED ORES OR THE LIKE.

(Application filed June 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.

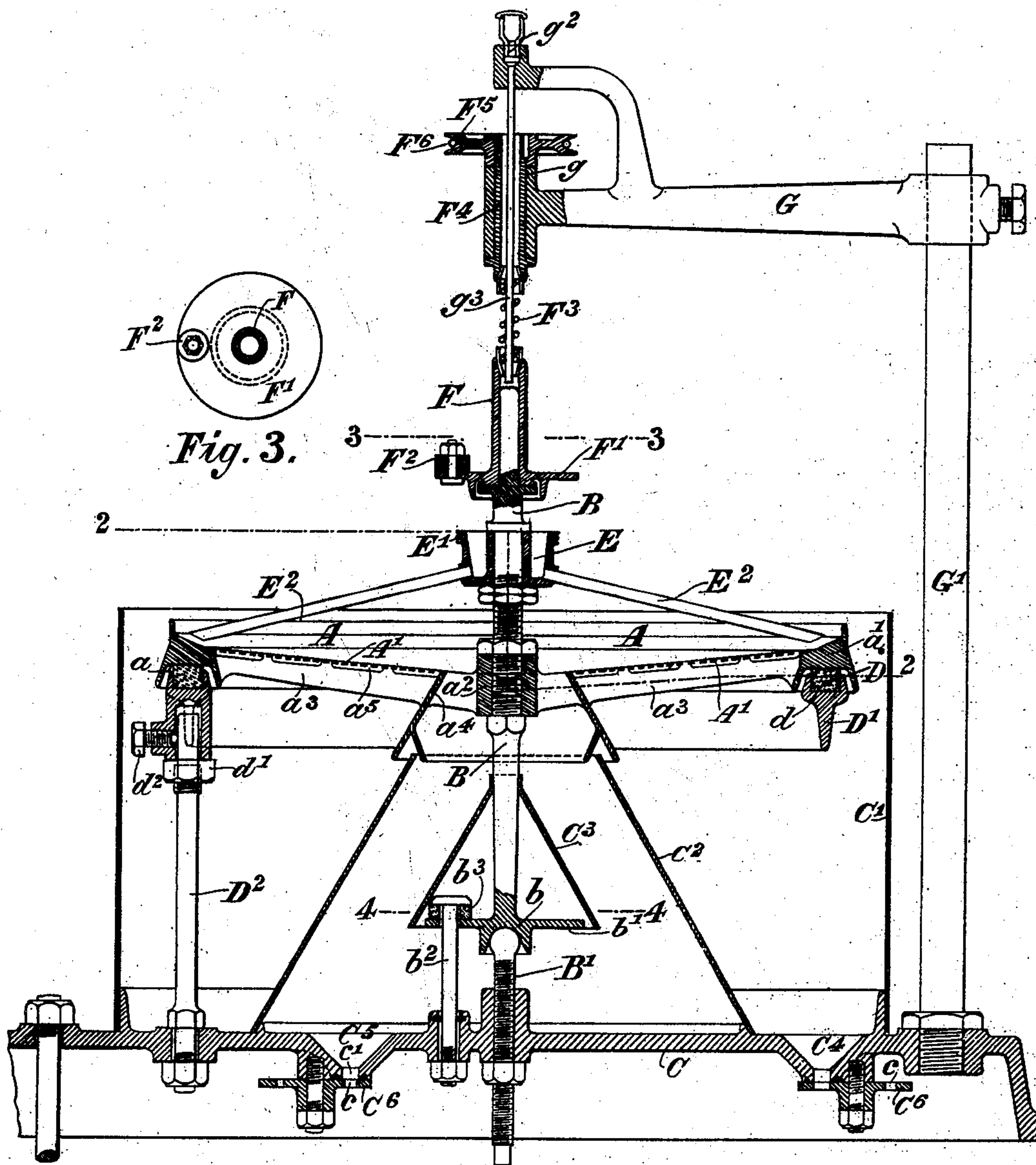


Fig. 1.

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2 Sheets—Sheet 2.

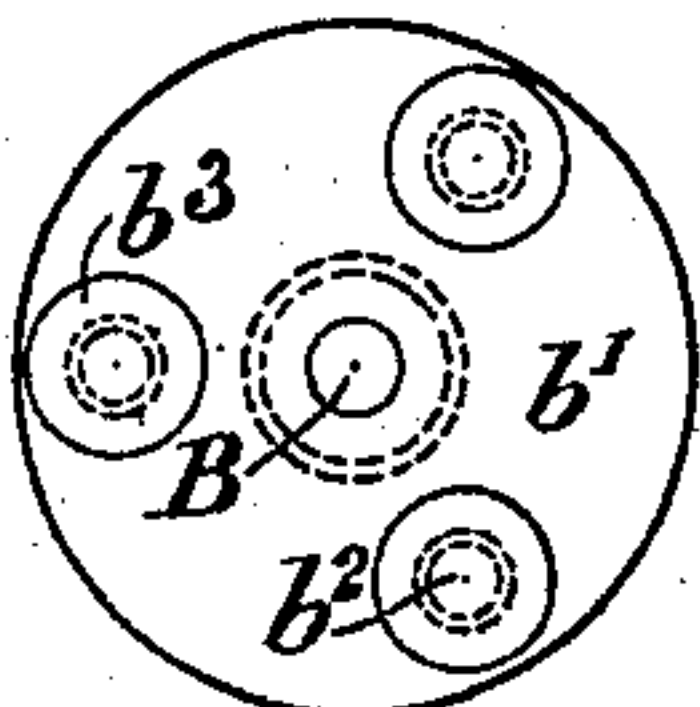
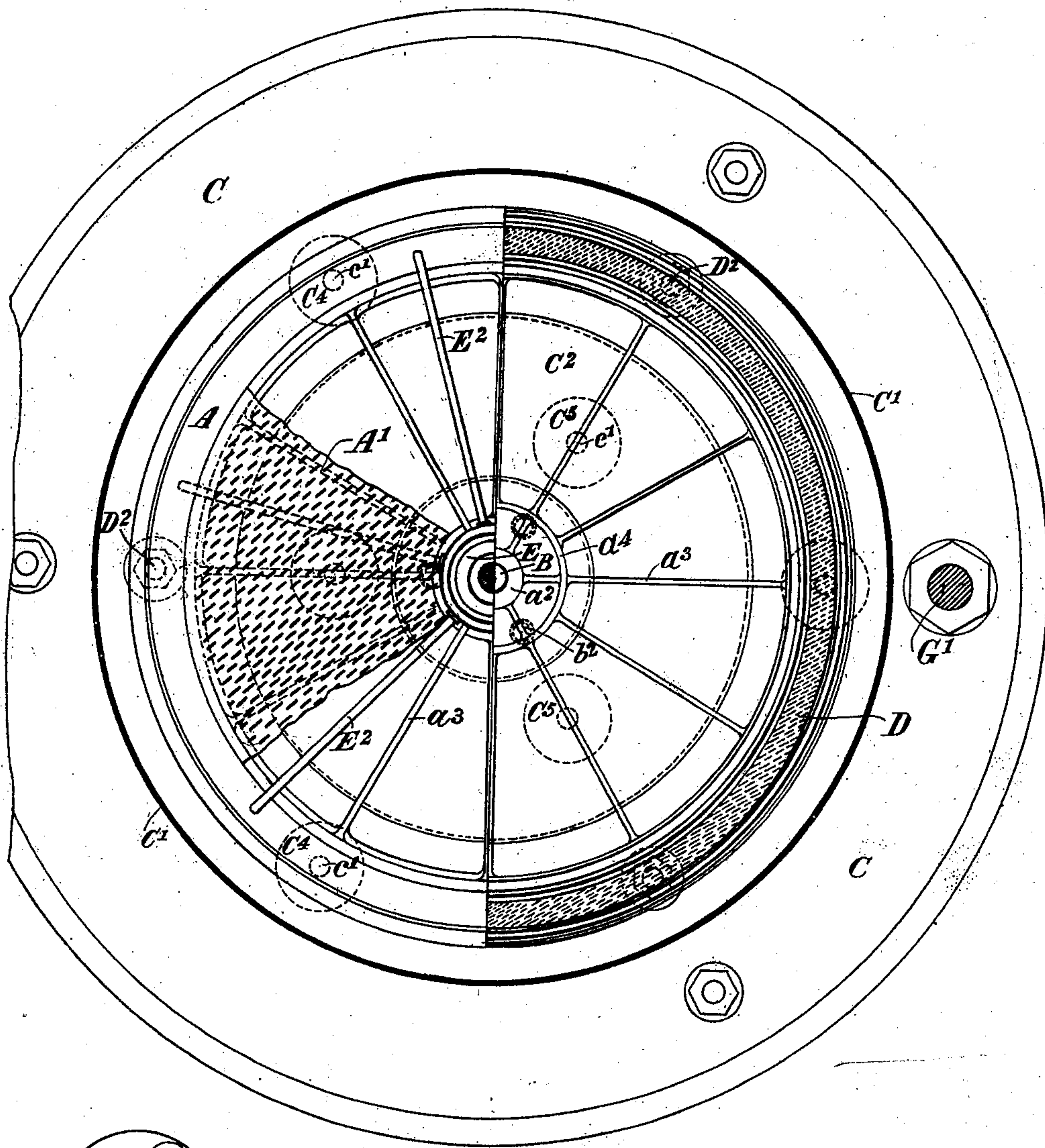


Fig. 4

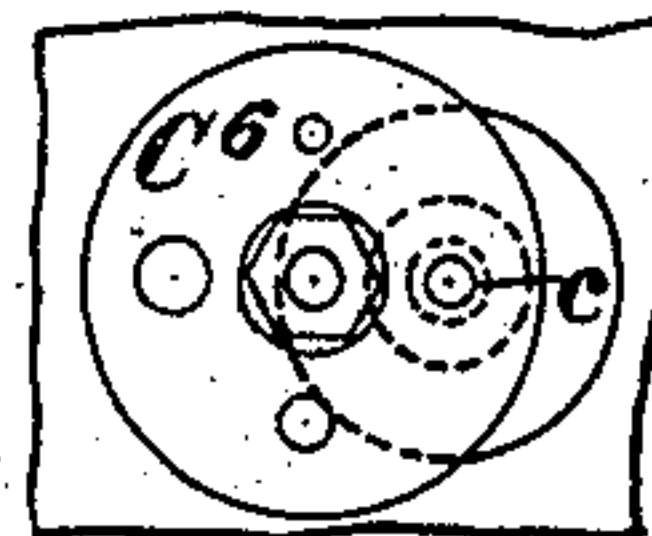


Fig. 5.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SIFTING PULVERIZED ORES OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 690,731, dated January 7, 1902.

Application filed June 10, 1901. Serial No. 84,135. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM JAMIESON, gentleman, residing at Broken Hill Chambers, No. 31 Queen street, Melbourne, and FRANCIS JAMES ODLING, mining engineer, residing at No. 2 Prince's Walk, Prince's Bridge, Melbourne, in the State of Victoria, subjects of the King of Great Britain and Ireland, have invented a new and useful Improved Apparatus for Sifting Pulverized Ores or the Like, of which the following is a specification.

This invention relates to an improved apparatus for sifting pulverized ores and the like, although it has been designed mainly to size or sift pulverized ore preparatory to its being subjected to concentration or to magnetic separation, the said pulverized ore or like material being treated in the apparatus either in a wet or dry state.

The main feature of the invention consists of a suitably-supported sifting or sizing appliance composed, preferably, of a conically-dished, perforated, or meshed surface or screen which has a peculiar tilting motion or tremor imparted to it by suitable appliances in order to agitate and distribute the pulverized or finely-divided ore upon and over the perforated conically-dished surface while it is being treated and also to cause the coarse particles which will not pass through the meshes to traverse from the periphery to a central discharge, all as will hereinafter be fully described.

In order that our invention may be well understood, we will now describe it, aided by a reference to the accompanying drawings, in which—

Figure 1 is a vertical central sectional elevation of an apparatus constructed in accordance with our invention; and Fig. 2, a sectional plan of the apparatus looking down from line 2 2, Fig. 1. Fig. 3 is a detail plan taken from line 3 3, and Fig. 4 a detail plan taken from line 4 4, both in Fig. 1, while Fig. 5 is a plan of the underside of the delivery-funnel and its cover.

The sifting or sizing appliance is formed of a conical-shaped skeleton dish A, having an annular channel a on the under surface of its peripheral ring a' and provided with a central boss a^2 , said boss and outer ring being connected together by radial ribs or arms a^3 ,

which also carry a central delivery-funnel a^4 , the whole conical surface between the ring a' and central funnel a^4 above the radial ribs being covered with perforated plate, wire gauze, or other suitable sifting or sizing material A' . The ribs a^3 are cut away at regular intervals, as at a^5 , under the sifting-plate to allow freedom for screening.

The conical-shaped skeleton dish A is supported at its center on a vertical spindle B, which is shown screwed into boss a^2 . The bottom end b of said spindle is cup-shaped and rests on a spherical-headed rod B', screwed into a bed-plate C, in order that the spindle may be capable of vertical adjustment. Also on lower part of spindle B is a flange or disk b' , provided with three holes, each to take a bolt b^2 , which is secured to the bed-plate C, while between the head of each bolt and the upper surface of the disk is a rubber ring or buffer b^3 . The annular flat surface of the peripheral ring bears upon a flat circular ring of rubber or other suitable material D, which is capable of constituting a buffer, the latter being supported in an annular groove d , provided in a circular piece D', which is capable of vertical adjustment by its being supported at the upper end of three pillars D², each of which is furnished with an adjusting-nut d' and a lock-stud d^2 . Said pillars D² are also secured to the bed-plate C.

E is a central hopper supported loosely on the upper length of the central vertical spindle B, which is also shown screwed into boss a^2 . The said hopper is capable of being rotated by a belt E', and it is provided with radial and downwardly-inclined distributing-pipes E², which feed the material under treatment uniformly to near the periphery of the conical-shaped dish A.

On the upper part of the central vertical spindle B, above the feed hopper or cup, is a loose gun-metal sleeve F, provided with a disk flange F', carrying a weight F² at one side, and which weight may be increased or diminished, as required. Said sleeve is connected by a coiled spring or flexible driving medium F³ to a tubular spindle F⁴, upon which is a driving-pulley F⁵, to which motion is imparted by belt F⁶. The tubular spindle F⁴ is supported in a bearing g at end of an

arm or bracket G, carried on a pillar G', screwed into the bed-plate C.

g^2 is an oil-well feeding the pipe g^3 , which leads to the bearing of sleeve F.

5 The top of bed-plate C is made solid in order to be water-tight, and secured to a rim on it is a cylindrical casing C', which passes to a height above the top of the conically-shaped dish A in order that said dish may be
10 fully immersed in water when so desired while the materials are being treated.

C² is a division-cone forming a free continuation from the central funnel a^4 , cone C² being secured to a rim or narrow flange on
15 the said bed-plate.

C³ is a conical shield carried by the central spindle B and designed to protect the buffers b^3 .

C⁴ and C⁵ are discharge funnels or channels formed in bed-plate C, the former for
20 the materials which have passed through the perforations of screen A' and the latter for the material which has been delivered over the screen to the central discharge-funnel a^4 .

25 The opening c' in each of said discharge-channels is provided with a circular cover-plate C⁶, centered on a stud, as shown, and furnished with several holes c of varying diameters in order that the rate of discharge
30 may be regulated.

Although on the drawings the whole of the materials passing through the meshes of the sifting or sizing plate A' are designed to be delivered to the chamber leading to funnel
35 C⁴, the surface of plate A' may have meshes or perforations of different sizes formed in it. For instance, the finest perforations being nearest the periphery would allow the finer or smaller-sized materials to pass through, while
40 the larger and coarse materials would pass through the larger perforations nearer the discharge, and in such a case the space under the sifting or sizing surface would be divided off into separate chambers to catch the
45 several sizes of sifted material.

When the ores being treated either wet or dry are fed to the central hopper E, which is rotated by the belt E', the radial pipes E² distribute the pulverized or finely-divided materials uniformly at the periphery of the dish
50 A, and the materials immediately become subjected to the peculiar tilting motion given to the dish, and so to the sifting and sizing surface A', which causes the ore to travel from
55 the outer edge of the sifting-surface over the perforations to the central discharge a^4 , the smaller grains or material falling through the openings in the sifting-surface A', and the larger grains or particles continue their
60 course and discharge to the central opening a^4 , each falling into separate compartments, as before explained. The peculiar tilting motion is imparted to the screening or sizing appliance by aid of the rotary weighted sleeve-disk F F' F², which has motion communicated
65 to it through the medium of flexible shaft F³, sleeve F⁴, and sheave F⁵, driven by belt F⁶.

Then as the dish A is seated on a rubber cushion or buffer D and the lower end of dish-spindle B seated on a spherical-headed bolt
70 B' and secured down by the rubber-cushioned bolts b^2 the rotary vibration of the dish can be adjusted by the weights F² and by pressure exerted on the rubber cushion D under the rim of the dish and by that exerted on the
75 rubber cushions b^3 of bolts b^2 . It will now be understood that the dish A does not rotate, but has the peculiar tilting motion or shake given it while seated on the rubber cushion D. By making the weight F² heavier its
80 tendency to make the drivingsleeve and spindle B deflect from the vertical will be increased, and the flexible shafting will yield to a greater extent for this purpose. The power-belts F⁶ and E' may be driven by any
85 suitable means.

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

90 1. In combination, a conically-dished sifter having a central discharge, a spindle carrying the same, and supported to tilt in different directions, a weighted disk above the sifter for acting upon the spindle, and means
95 for driving the weighted disk to allow the same to have a lateral deflection under the action of the weight to thus tilt the spindle and sifter in different directions.

2. In combination, the dish-shaped sifter
100 having an annular rim a' formed with a flat seating-surface on its under side, a rubber cushion upon which said flat surface rests, said sifter having the central discharge, a spindle carrying the said dished sifter, and
105 means for causing said spindle and sifter to tilt in different directions, substantially as described.

3. In an apparatus for the purpose specified a conically-dished sifting or sizing dish A
110 formed of an annular rim or ring a' having an annular rim a formed with a flat seating-surface on its under side, yielding means upon which said surface a rests, radial ribs or arms
115 a^3 , central boss a^2 , central discharge-opening a^4 , the perforated or meshed material A' covering open surface between the outer ring and central discharge above the said ribs or arms and means for giving the sifting-dish a tilting movement substantially as described and
120 illustrated.

4. In an apparatus for the purpose specified, the conically-dished sifting or sizing appliance A having its surface A' perforated or meshed and provided with a central discharge a^4 , and
125 a central pivotal spindle B, combined with the hopper E rotatable on spindle B and provided with radial feed-pipes E², the sleeve-disk F, F' having a weight F² at one side and designed to rotate on upper part of spindle B,
130 and the rubber or other cushion D upon which dish A is seated, substantially as described and illustrated.

5. In an apparatus for the purpose specified

the combination of the conically-dished sifting or sizing appliance A A' provided with a central discharge a^4 and with a peripheral feed appliance, the central spindle B provided
5 with pivotal cup b and flange b' at its lower end, weighted rotating disk F' F², flexible shaft F³, disk-driving spindle F⁴, dish-seating cushion D supported in an adjustable ring D', the spherical-headed adjustable bolt B',
10 the holding-bolts b^2 , the rubber washers b^3 between bolt-heads and disk, and the bed-plate C substantially as described and illustrated.
6. In combination, the conically-dished sifting appliance A A', a cushion D upon
15 which said appliance rests, a ring D' supporting the cushion, adjustable pillars D² supporting the ring, a spherically-headed adjustable pivot-bolt B', the dish-spindle B having a cup and a flange b' connected to its lower
20 end, said cup resting on the head of the pivot-

bolt, a bed-plate C, the bolts b^2 extending therefrom having heads, rubber washers on the flange b' upon which said heads rest, a casing, and means for giving the spindle a tilting movement in a direction circumferen- 25
tially of the sifter, substantially as described.

7. In combination, a dish-shaped sifter, a spindle supporting the same, means for tilting said spindle in a direction circumferen- 30
tially of the sifter while said spindle and sifter are held against actual rotation, and means for so holding the spindle and sifter, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

WILLIAM JAMIESON.

FRANCIS JAMES ODLING.

Witnesses:

BEDLINGTON NORDYCOMB,

W. J. S. THOMPSON.