

No. 622,572.

Patented Apr. 4, 1899.

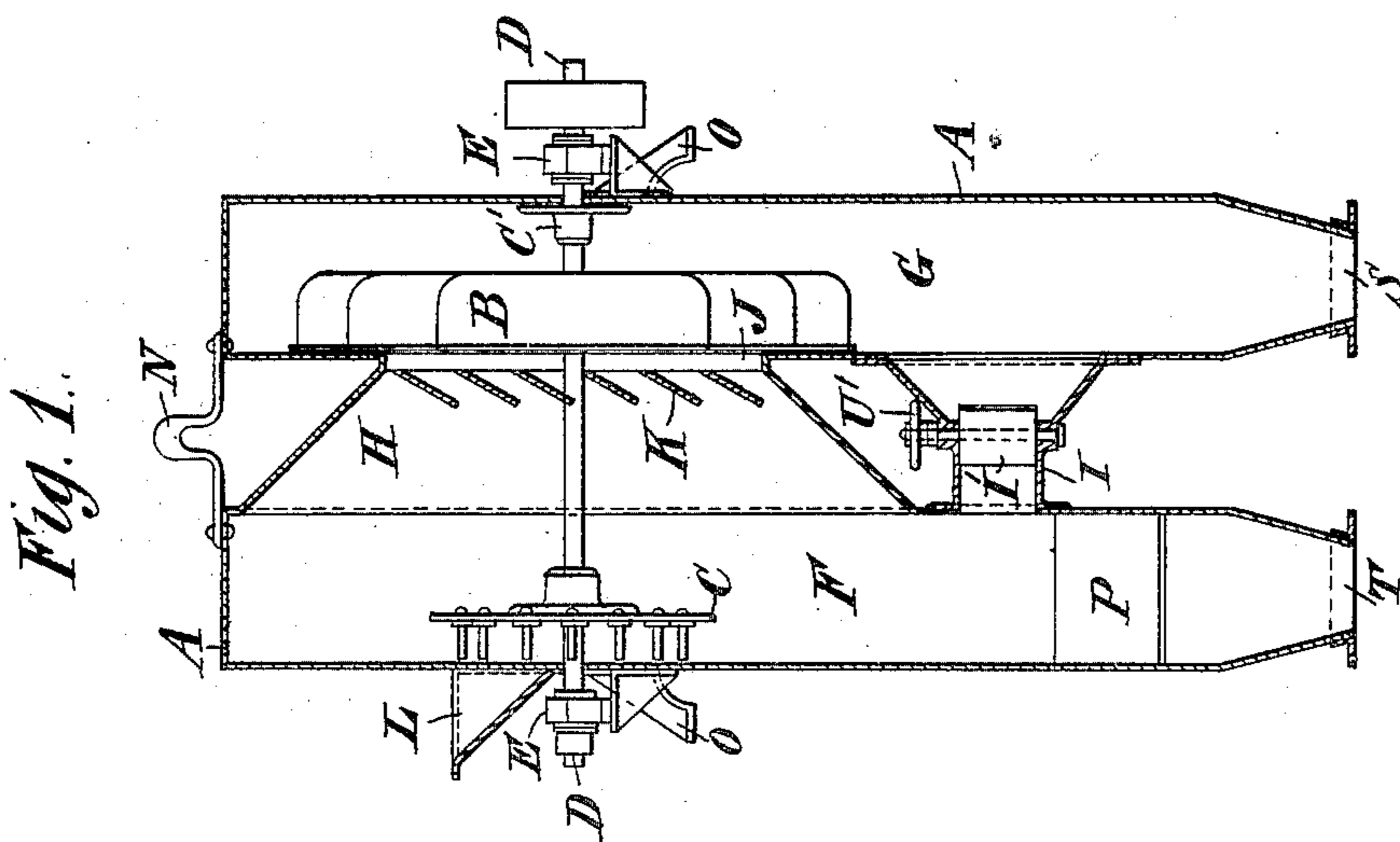
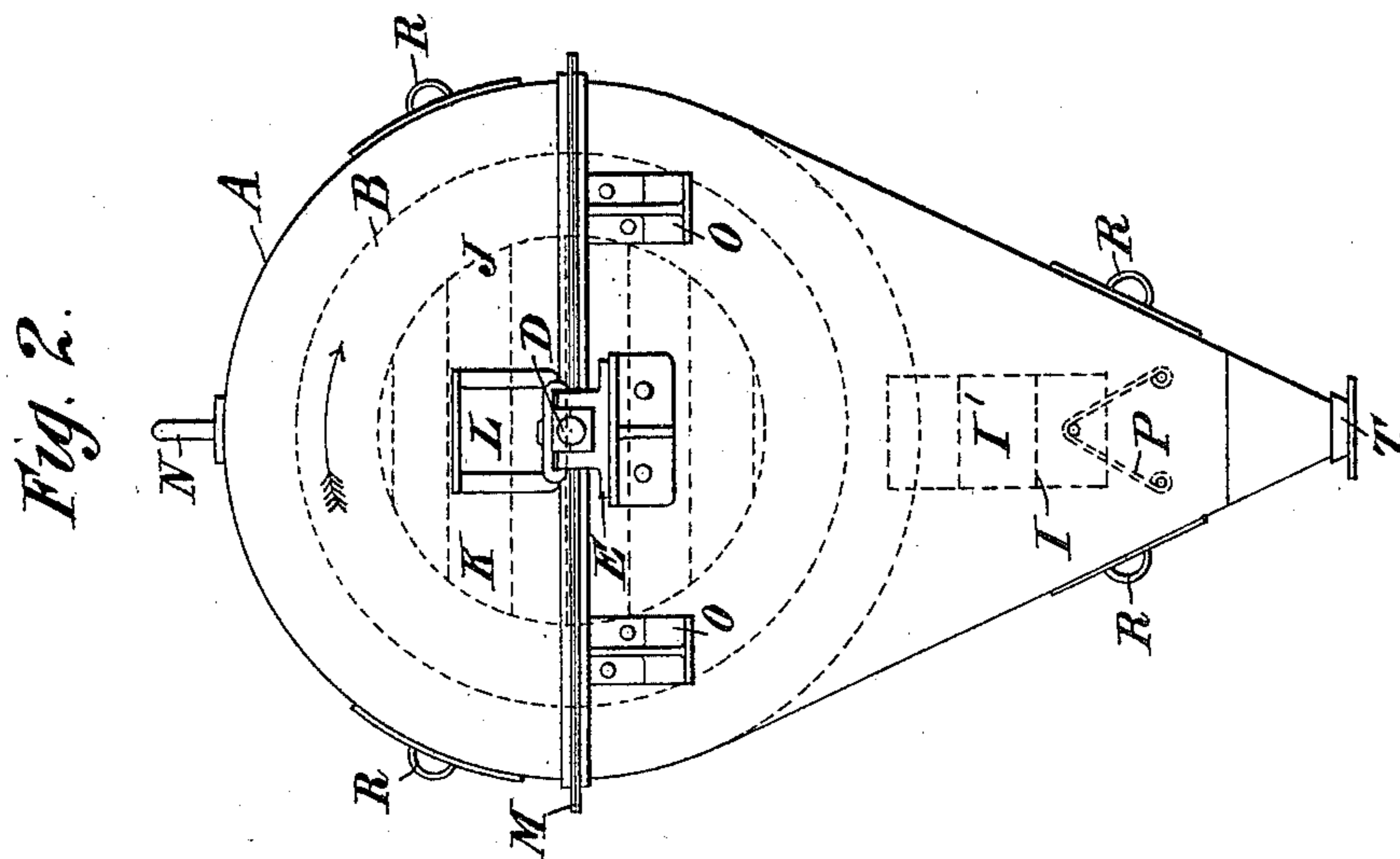
H. WALKER.

SEPARATING AND GRADING MACHINE.

(Application filed Oct. 2, 1897. Renewed Feb. 18, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

William Sadler

Alan Balch.

Inventor.

Harry Walker

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Fig. 4.

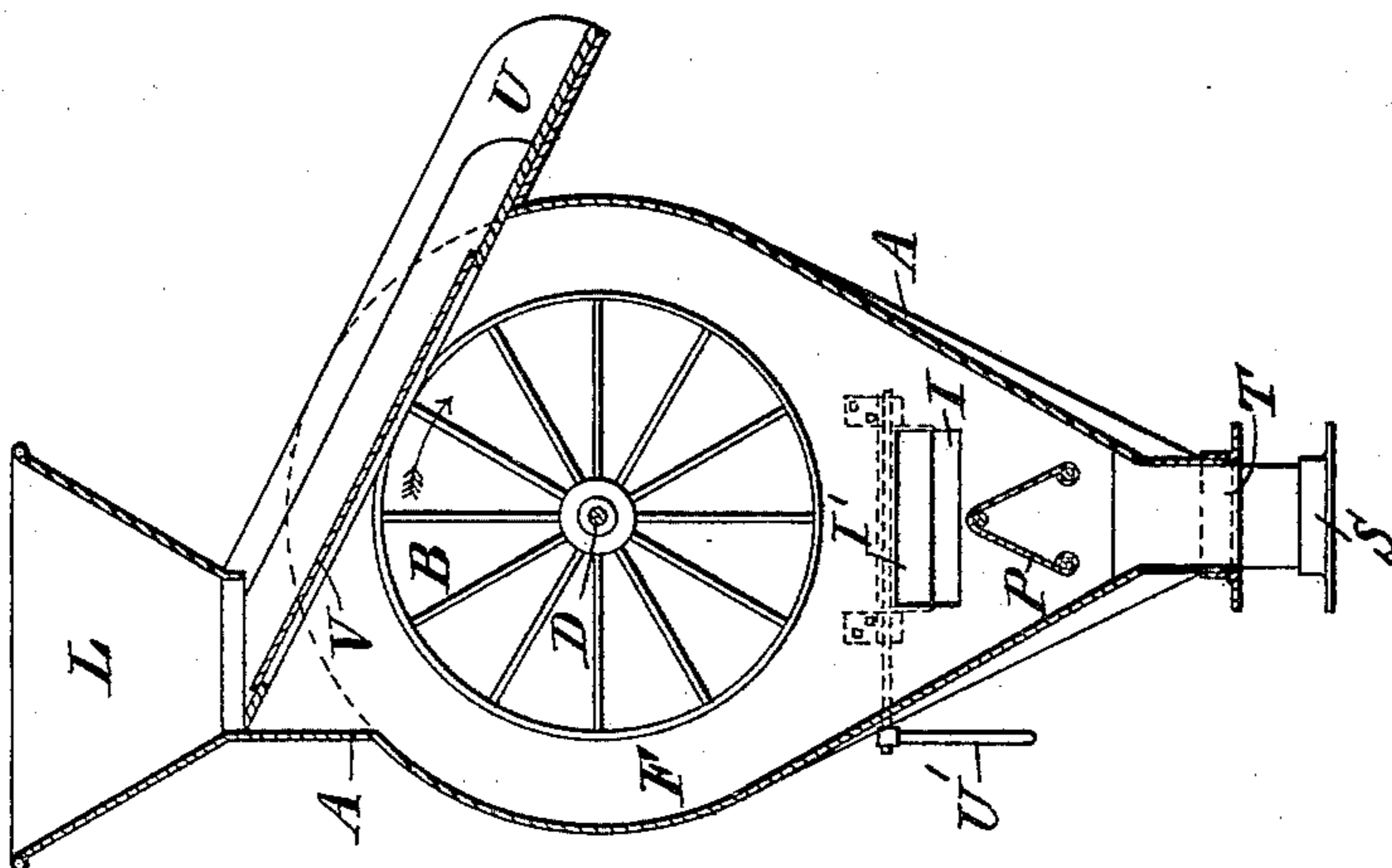
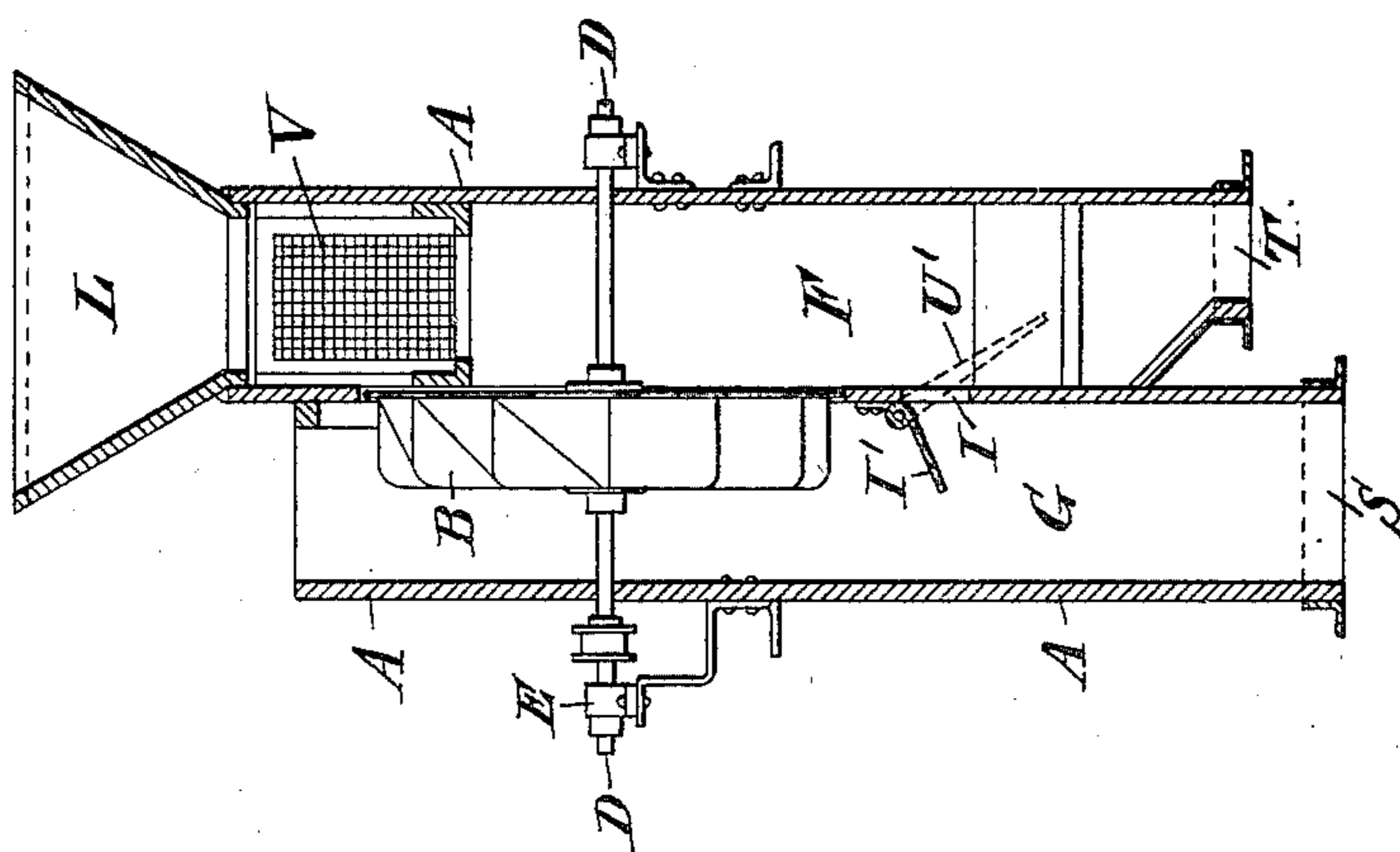


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRY WALKER, OF LEEDS, ENGLAND, ASSIGNOR TO WILLIAM JOHNSON,
OF SAME PLACE.

SEPARATING AND GRADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 622,572, dated April 4, 1899.

Application filed October 2, 1897. Renewed February 18, 1899. Serial No. 706,063. (No model.)

To all whom it may concern:

Be it known that I, HARRY WALKER, a subject of the Queen of Great Britain, residing at Leeds, in the county of York, England, have invented new and useful Improvements in Separating and Grading Machines, (for which Letters Patent have been granted in England, No. 8,274, dated April 20, 1896, and No. 16,616, dated July 27, 1896,) of which the following is a specification.

This invention has reference to improvements in machinery employed in separating and grading various kinds of materials, such as mineral ores, of different sizes or specific gravities, but particularly to that class composed of two or more grades, whereby the finer particles are drawn away or separated from the heavier or coarser particles prior to the latter falling by gravity. Its object is to accomplish this by submitting the material operated upon to a plurality of distinct separating actions, namely: First, on the material entering the feed-chamber after it has been acted upon by a disintegrator or sieve the fine particles are drawn by the suction of a fan either directly or through a cone in a chamber which will hereinafter be termed the "dust-chamber;" second, while the heavier material or tailing is falling by its gravity into the feed-chamber it is submitted to the action of a column of air entering the said chamber through, say, a suitable pipe, and this causes the finer particles to be carried upward and drawn by the fan into the dust-chamber; third, when the heavier material falls upon or strikes against, say, a fixed beater-plate the finer particles (if any) will by the concussion be separated from the heavier material and conveyed by the suction of the air entering the feed-chamber through the before-mentioned pipe into the cone, from which it is drawn by the fan into the fine chamber, or it may be drawn by the fan into the dust-chamber without the use of a cone. These objects are attained by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation; Fig. 2, a front elevation; Fig. 3, a sectional elevation of separating apparatus in which the cones

are dispensed with; Fig. 4, a sectional elevation drawn at a right angle to Fig. 3.

Like parts in all the views are marked with similar letters of reference.

The casing A is arranged to form two distinct chambers or compartments F and G and which are hereinafter termed, respectively, the "feed-chamber" F and the "dust-chamber" G. The casing may be made of any suitable material—such as, for example, wood or sheet-iron or a skeleton framework of wood covered with sheet-iron. In the dust-chamber G is mounted vertically and fixed on a horizontal shaft D a fan B of any ordinary construction, or an air-propeller of, say, any suitable type, and a dust-disk C', which is designed to prevent the dust from passing into and clogging the bearing of the shaft D. At the opposite end of the horizontal shaft D and within the feeding-chamber F is mounted vertically and fixed a disintegrating-spreader C. The disintegrating-spreader, which is somewhat similar in construction to a clay-breaker, consists of a hub or disk having a number of rods or arms fixed at intervals to its face and projecting toward the casing at or about a right angle to the face of the hub and in a line with the axis of the horizontal shaft. The fan B, disintegrating-spreader C, and dust-disk C' may rotate in a vertical or substantially vertical plane. The ends of shaft D of the fan and spreader are carried in bearings E E, mounted on brackets attached to the casing A.

The two chambers F and G may be arranged side by side, as at Figs. 3 and 4, or connected together by a suction-cone H and a damper box or pipe I, provided, if required, with a coned end, as shown at Figs. 1 and 2. A circular opening or inlet J is provided at the end of suction-cone H nearest to the dust-chamber G. Over or across this opening J may be provided and fixed, if so desired, a number of baffle-plates or boards K. These baffle-plates K may either be stationary or made to move in any desired direction by any suitable means, and they may also be of any desired shape. The fan B is made to rotate against the inlet J and baffle-plates K in chamber G. The

spreader C rotates in chamber F close to casing A and in close proximity to feed-inlet L. The pressure of air from the dust-chamber G to the feeding-chamber F may be regulated
5 by damper I'.

The chambers F and G are arranged to terminate at their lower ends, as in Figs. 1 and 2, in contracted outlets (respectively marked T and S) for the separated material, or only
10 one chamber may be contracted, as in Figs. 3 and 4.

The top portion of casing A can be made, if so desired, so that it can be removed at pleasure. When so desired, an angle-iron
15 joint M is provided for this purpose, and a lifting-iron N is attached to casing A, as shown, for the purpose of lifting the top half or the whole of the casing. On each side of casing A are provided carrying-brackets O O
20 for securing the separator in any desired position.

The chamber F is further provided with a fixed baffle-plate P, which is fixed below the damper-opening I'.

25 A number of doors R (see Fig. 2) are provided for cleaning out the interior of the apparatus.

Over the cone connecting the two chambers may be fixed a coarse screen for the purpose
30 of preventing any large or lumpy material, rags, or the like entering the fine chamber.

At Figs. 3 and 4 the material to be operated upon is shown as being fed into a large hopper L, arranged over the feed-chamber F,
35 from which it passes to the inclined chute U, armed with a fixed or movable grating V to form a sieve or riddle, through which the graded material passes to be acted upon by the fan B. This enables the disintegrating-
40 spreader, cones, and baffle-plates above described to be dispensed with should it be so desired.

The action of the apparatus is as follows: The material to be separated is fed into the
45 feed inlet or hopper L, which delivers the material directly to chamber F, as at Figs. 3 and 4, or into the disintegrating-spreader C, fixed, as before described, as at Figs. 1 and 2, on shaft D in chamber F. At this point by the
50 action of the disintegrating-spreader the material is thrown or formed into a shower or spray, thereby disintegrating each particle or disengaging or separating the particles one from each other. The fan or air-propeller B,
55 rotating in the dust-chamber G at the desired speed, produces a certain amount of suction which is capable of attracting or drawing the particles of a certain specific weight from the shower or spray (caused by the revolving of
60 the spreader C) through the cone H, baffle-plates K, and opening J into the fine chamber G. The contents of chamber G fall by their gravity and pass out of it by way of outlet S. The heavier particles contained in the
65 shower in chamber F and which resist the suction from fan B descend down the conical portion of chamber F and out by way of out-

let T. The coarser portion of the material, however, before reaching the outlet T comes into contact with the fixed baffle-plate P, which is the means of checking the velocity
70 of the descending material and also causing any fine particles passing out with the coarse material to be further disengaged, whereby they are drawn up and carried through open-
75 ing J, as before described, by means of fan B.

Between the chambers F and G may be fixed, as described, the damper-box I, consisting of, say, a pipe containing the clack or damper I', which is opened or closed by means
80 of a handle U', arranged on the outside of the casing A. When this damper or clack is open, communication is made through openings in the damper-box I, so that any of the lighter particles which may have been missed
85 by the first action of the fan and have passed partly down chamber F may now be drawn through opening J into chamber G by means of the surplus air from fan B, which is allowed to return back again into chamber F
90 by way of damper-opening I'.

Having now particularly described my invention and the method of carrying it into practice, what I claim is—

1. An apparatus for the purpose herein
95 specified, comprising a casing made in parts and provided with an inlet-hopper and divided into two compartments, said compartments being connected at the upper portion thereof by a suction-cone provided with baffle-plates, and at a lower point by a damper-pipe provided with a conical end and having a valve,
100 a horizontal shaft arranged to pass through and revolve within the said chambers and through the center of the suction-cone, and a disintegrating-spreader mounted upon said shaft within one compartment, and a fan mounted on said shaft within the other compartment, substantially as shown and described.

2. An apparatus for the purpose herein
specified, comprising a casing made in parts and provided with an inlet-hopper and divided into two compartments, said compartments being connected at the upper portion thereof
105 by a suction-cone provided with baffle-plates, and at a lower point by a damper-pipe provided with a conical end and having a valve, a horizontal shaft arranged to pass through and revolve within the said chambers and through the center of the suction-cone, and a disintegrating-spreader mounted upon said shaft within one compartment, and a fan mounted on said shaft within the other compartment, and a fixed baffle-plate arranged in
110 one compartment by which the material under treatment is subjected to a final separation of the finer particles from the coarser, substantially as shown and described.

3. In apparatus for separating substances
115 of different sizes or specific gravities, the combination of a casing made in parts and armed with an inlet-hopper and divided into two compartments, said compartments being con-

5 nected together at the upper portion by a
suction-cone armed with baffle-plates, and at
a lower point by damper-pipe provided with
a coned end and armed with a valve, a hori-
zontal shaft arranged to pass through and re-
volving within the said chambers and through
the center of the suction-cone, a disintegrat-
ing-spreader mounted upon said shaft within
one compartment, and a fan and dust-disk
10 mounted on said shaft within the other com-
partment, and a fixed baffle-plate arranged
in one compartment by which the material
under treatment is submitted to a final sepa-
ration of the finer particles from the coarser,
15 all arranged substantially as set forth.

4. An apparatus for the purpose herein
specified, consisting of two upright casings
which are open at their lower ends, said cas-
ings being provided with a conical connection
20 the apex of which is cut away and opens into
one of said casings, baffle-plates arranged at

one side of said opening, a shaft passing
transversely through said casings, and cen-
trally through said openings, a fan mounted
on said shaft in one of said casings, a disin- 25
tegrating-spreader mounted on said shaft in
the other casing, an inlet-hopper connected
with the outer wall of said last-named casing
adjacent to said spreader, and a damper-box
forming a connection between the lower por- 30
tions of said casings, the casing in which the
spreader is mounted being also provided near
its lower end with a baffle-plate, substantially
as shown and described.

In testimony whereof I have hereunto 35
signed my name to this specification in pres-
ence of two subscribing witnesses.

HARRY WALKER.

Witnesses:

WILLIAM SADLER,
ALAN BALCH.