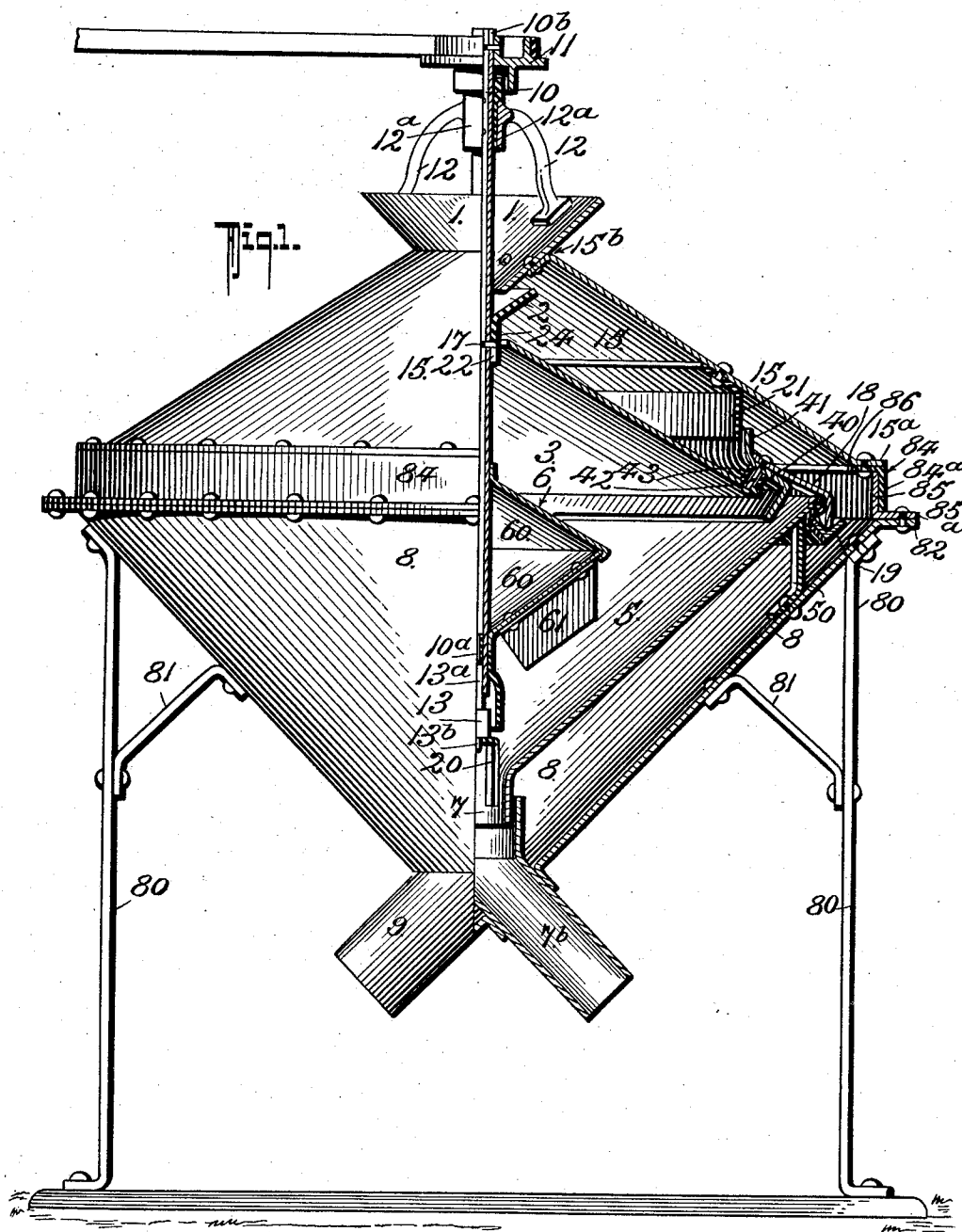


H. C. GROVES.
CENTRIFUGAL SEPARATOR.
APPLICATION FILED SEPT. 26, 1911.

1,057,237.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.



WITNESSES:
Hayward Woodard
Robert M. Greenwell

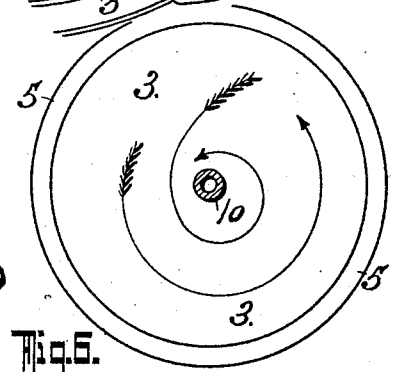
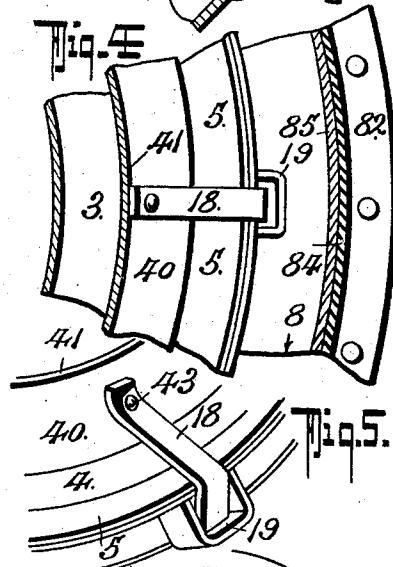
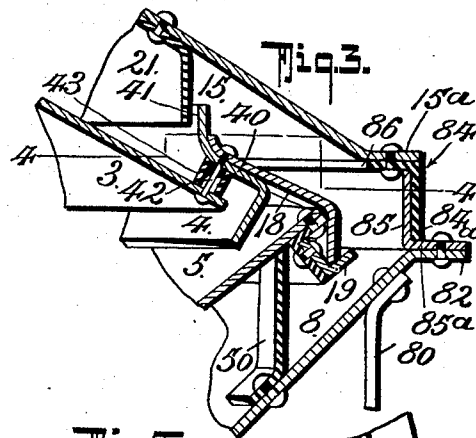
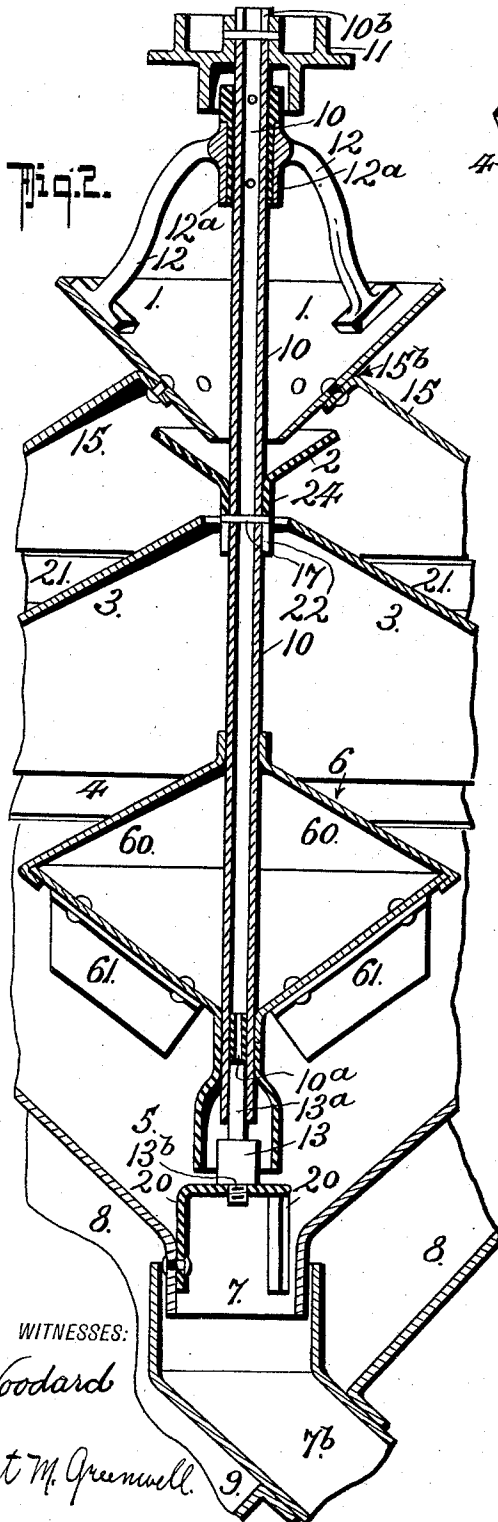
INVENTOR
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ATTORNEYS

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WITNESSES:
H. Woodard
Robert M. Greenwell

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UNITED STATES PATENT OFFICE.

HIRAM C. GROVES, OF WOODWARD, OKLAHOMA.

CENTRIFUGAL SEPARATOR.

1,057,237.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed September 26, 1911. Serial No. 651,326.

To all whom it may concern:

Be it known that I, HIRAM C. GROVES, residing at Woodward, in the county of Woodward and State of Oklahoma, have invented a new and Improved Centrifugal Separator, of which the following is a specification.

This invention relates to that class of pneumatic separating or concentrating machines in which the material treated is subjected to centrifugal action, and it primarily has for its object to materially reduce the cost of handling the material to be operated upon, and to simplify and increase the efficiency of the machine, as compared with other machines for the same purpose, and particularly to design a machine of the character stated, in which the use of bolts is avoided and the several parts so formed and adapted to so cooperate that they may be readily assembled for use.

With other objects in view that will hereinafter appear, my invention consists in the peculiar construction and novel arrangement of the parts hereinafter fully explained, specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:—

Figure 1, is an elevation of my improved separator or concentrating machine, one-half being shown in section. Fig. 2, is a vertical longitudinal section of the central shaft and its attached parts and portions of the main framing. Fig. 3, is an enlarged vertical section of the check ring, the distributing cone, and the casing or frame. Fig. 4, is a detail horizontal section thereof on the line 4—4 on Fig. 3. Fig. 5, is a detail perspective view of one of the check ring supports hereinafter referred to. Fig. 6, is a diagrammatic view that illustrates the paths of the concentrates and the tailings during the process of their separation.

In the practical application of my invention, the separating mechanism embodies a casing, the lower portion of which forms a receptacle 8 for the tailings, and which has a discharging spout 9 at the lower end, the said receptacle also being of an inverted cone shape, whereby to direct the said tailings to the said central discharge 9. The receptacle 8 is mounted on metal standards or legs 80 provided with inwardly projected brackets 81 that are riveted to the underside of the receptacle 8, as is clearly shown in Figs. 1 and 3, and by reference to which it

will be seen the upper edge of the receptacle 8 terminates in an outturned horizontal rim flange 82 that forms a support for an annular angle bar 85, the base 85^a of which is riveted on the flange 82, as shown. 84 designates a second annular and inverted angle bar whose vertical member 84^a fits over the vertical member of the bar 85, and whose upper or horizontal portion 86 is riveted to the lower or flanged end 15^a of a casing top 15, it being clear from the drawing, that by mounting the said casing top as described and shown, it is readily removable and when in position forms an overhanging support for the internal parts of the separating mechanism.

1 designates a hopper that is centrally supported in the opening 15^b of the top 15, and 12 designates a bracket mounted upon the hopper and provided with a long bearing 12^a for the upper end of a hollow fan carrying shaft 10, the lower end of which has a Babbitt metal plug 10^a that seats on a bridge bearing 20, that is provided with a trunnion 13, having a stub 13^a to fit into the extreme lower end of the hollow fan shaft and to be engaged by the Babbitt metal plug 10^a, and trunnion 13 has a threaded shank 13^b for adjustably connecting with the bridge bearing or tree 20.

11 denotes a drive pulley, having a hub provided with a cross pin or key, for interlocking with the slotted upper end 10^b of the hollow shaft 10.

2 designates a dished shaped feeder having a pendent apertured shank 24 for slipping onto the shaft 10, to which it is locked for turning therewith by a cross pin 17 on the shaft, the ends of which project and engage slots 22, in the lower end of the shank 24, as best shown in Fig. 2.

By reason of supporting the hopper and mounting the feeder 2 as shown and described, it follows that as the material leaves the hopper and engages the feeder 2, it is given a whirling action and thrown centrifugally outward against the casing top 15, from whence it drops onto a distributing cone 3, apertured at its apex for the shaft 10, and removably supported but stationarily held to its operative position, in the manner best shown in Fig. 3.

4 designates a check ring that extends around the lower or discharging end of the cone 3 and the said ring includes an upper portion 40 that extends over the cone 3 and

terminates in an upturned rim 41. Check ring 4 is fixedly connected to the cone 3 by the rivets 42 which pass through spacing sleeves 43, that hold the said ring away from the said cone.

18 designates legs fixedly attached to the ring 4 by the rivets 42, and the said legs extend over the upper edge of an inverted cone-shaped concentrate receiving pan 5, the lower end of which has a discharge 7, to which the outlet spout 7^b connects and which passes through the receptacle 8 to discharge the concentrates in a direction opposite to the discharge for the tailings.

19 designates a series of stirrups, usually four, that are riveted outside of the upper edge of the pan 5, and which form seat bearings for the legs 18, and 50—50 indicate brackets, secured on the inside of the receptacle 8 that project vertically and form supports for the pan 5.

21 is a shield consisting of an annular rim pendent from the casing top 15, to which it is riveted, and which extends down into the upwardly flared end of the check ring 4, as is clearly shown in Figs. 1 and 4.

The bridge bearing 20 before referred to, is mounted on the inside of and over the discharging end of the pan 5.

6 designates a fan consisting of a pair of sheet metal cones 60 seamed together and keyed on the shaft 10 to turn therewith.

61 designates the fan blades pendent from the lower cone 6 to which they are riveted.

The Babbitt metal bushing in the lower end of the shaft 10 is vertically apertured for the free passage of the lubricating oil to the trunnion 13, and the latter is guarded by a dust shield 13^a, secured on the lower end of the shaft 10.

From the foregoing taken in connection with the drawings, the complete construction, manner of the operation and the advantages of my invention will be readily apparent to those skilled in the art to which this invention relates.

The material, after it is fed to the hopper, passes into the rapidly revolving feeder 2, from whence it is whirled against the casing top 15 and deflected back onto the distributing cone 3, traveling over the cone 3 and down against the check ring 4 which directs the said materials into the pan 5, it being understood the shield or ring 21 prevents the said materials from jumping over the ring 4. Where the material is subjected to a strong blast created by the fan, the tailings pass out between the upper edge of the pan 5 and under the ring 4, and are thereby thrown or whirled outwardly into the receptacle 8, from whence they pass out of the discharge 9, while the concentrates pass into the pan 5 and down out through the spout 7^b. It is obvious that in acting on the material in the manner stated, the same is whirled and

caused to travel spirally, the heavier particles or concentrates turning inwardly to the discharge therefor, while the tailings, chaff or other light materials are caused to whirl outwardly over the pan and into the receptacle 8.

The several movable parts, and particularly the bearings for the shaft, are lubricated by filling the hollow shaft 10 with oil, said shaft being suitably perforated for feeding the oil to the bearings.

What I claim is:

1. In a separator of the class described; the combination of a casing, the lower portion of which forms a tailings receiver, a hopper opening into the top of the casing, a stationarily held distributing member, a revolving feeder between the said member and the hopper for imparting a whirling action to the material before it is deposited on the distributing member, and means for retarding the material during its whirling and descending action, and other means for separating the tailings from the concentrates where the said material is retarded.

2. In a centrifugal separator; an inner and an outer receptacle, said receptacles being stationary, a casing over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing cone having its peak directly beneath said hopper and adjacent thereto, said cone being located between the casing and the fan and supported over the inner receptacle, and a means for retarding the flow of the material to the said inner receptacle.

3. In a centrifugal separator; an inner and an outer receptacle, said receptacles being stationary, a casing over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing cone above the fan and the inner receptacle and having its peak directly beneath said hopper, said cone being removably supported and a means for retarding the flow of the material to the inner receptacle.

4. In a centrifugal separator; an inner and an outer receptacle, said receptacles being stationary, a casing over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing cone above the fan and the inner receptacle, said cone being removably supported, and a means mounted upon the discharging edge of the distributing cone for retarding the flow of the material to the inner receptacle.

5. In a centrifugal separator; an inner and an outer receptacle, the said receptacles being stationary, a casing removably supported over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing

cone between the hopper and the fan and held over the inner receptacle, and a check ring for retarding the flow to the inner receptacle, said ring being mounted upon the discharging edge of the distributing cone.

6. In a centrifugal separator; an inner and an outer receptacle, a casing supported over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing cone supported between the hopper and the fan to discharge into the inner receptacle, means for retarding the flow of the material from the distributing cone to the inner receptacle and a rotary feeder located between the discharge of the hopper and the distributing cone.

7. In a centrifugal separator; an inner and an outer receptacle, the said receptacles being stationary, a casing removably supported over both receptacles, a rotary fan within the inner receptacle, a hopper that opens through the casing, a distributing cone between the fan and the casing, said cone being removably supported over the inner receptacle to discharge therein and a check ring for retarding the flow of the material to the inner receptacle, said ring being carried by the distributing cone, and a rotary feeder located between the discharge of the hopper and the distributing cone.

8. The combination with an outer and an

inner fixedly held receptacle, each of which has a discharge at the lower end, a casing top having an inlet mounted on the outer one of the said receptacles, a bearing on the lower end of the inner receptacle, a hopper mounted on the inlet end of the casing top, a bearing supported by the hopper, a shaft rotatably mounted in the said bearing and the bearing on the inner receptacle, a fan carried by the shaft located within the inner receptacle, a distributing cone that receives the material from the hopper, and a retarding member for deflecting the material as it passes from the cone into the inner receptacle, as the lighter particles or tailings thereof are forced into the outer receptacle.

9. In a centrifugal separator, an inner and an outer receptacle, said receptacles being stationary, a removably held casing over both receptacles, a distributing member within the casing for leading the material into the inner receptacle, a hopper feeding onto the said distributor, a checking member at the entrance to the inner receptacle, a shield for preventing the material passing over the said checking member into the outer receptacle, and means within the inner receptacle for blowing the tailings out of the inner receptacle into the outer receptacle.

HIRAM C. GROVES.

Witnesses:

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HOWARD BEBOUT.