

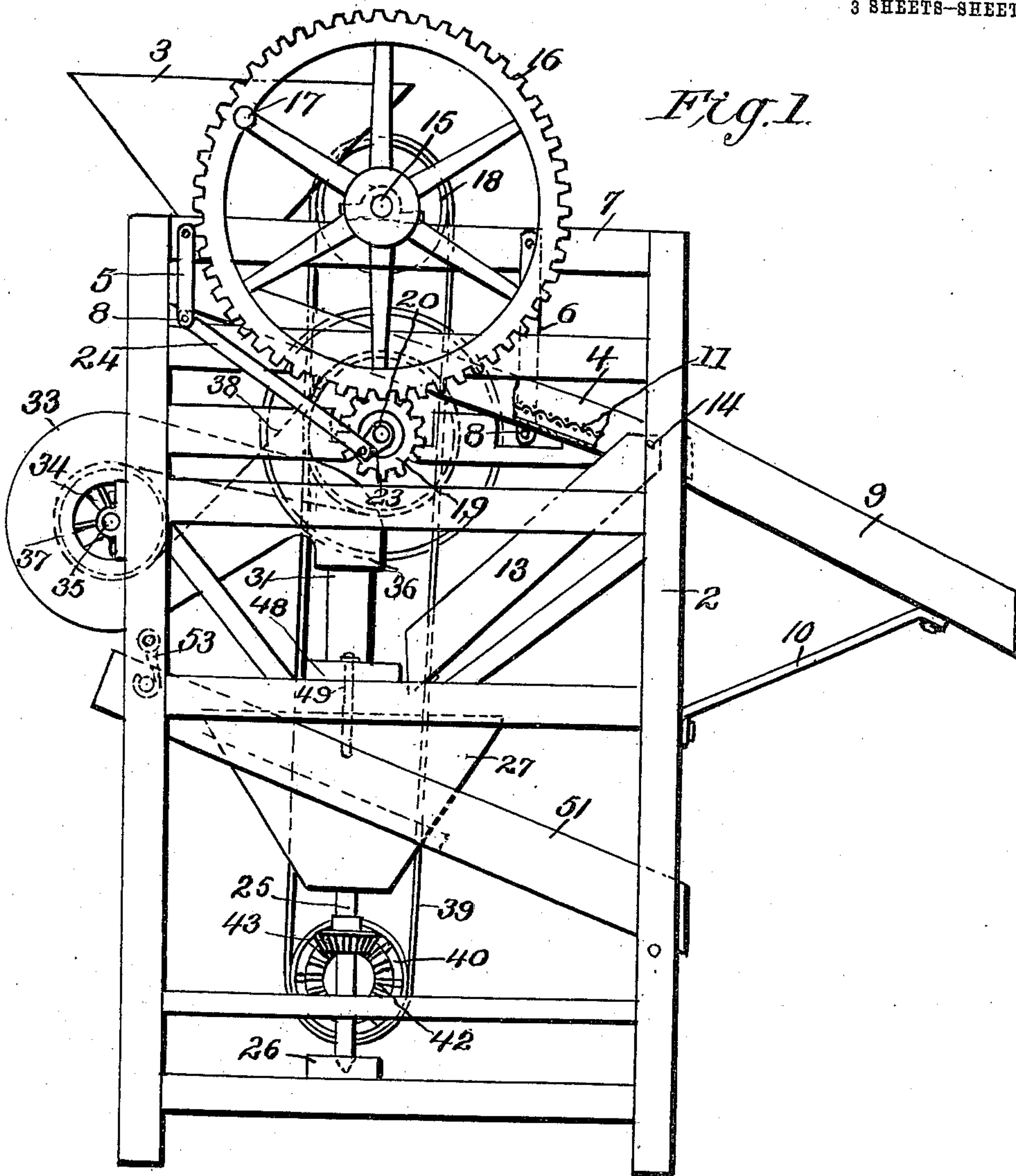
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ORE SEPARATOR.

APPLICATION FILED JUNE 14, 1910.

995,578.

Patented June 20, 1911.

3 SHEETS-SHEET 1.



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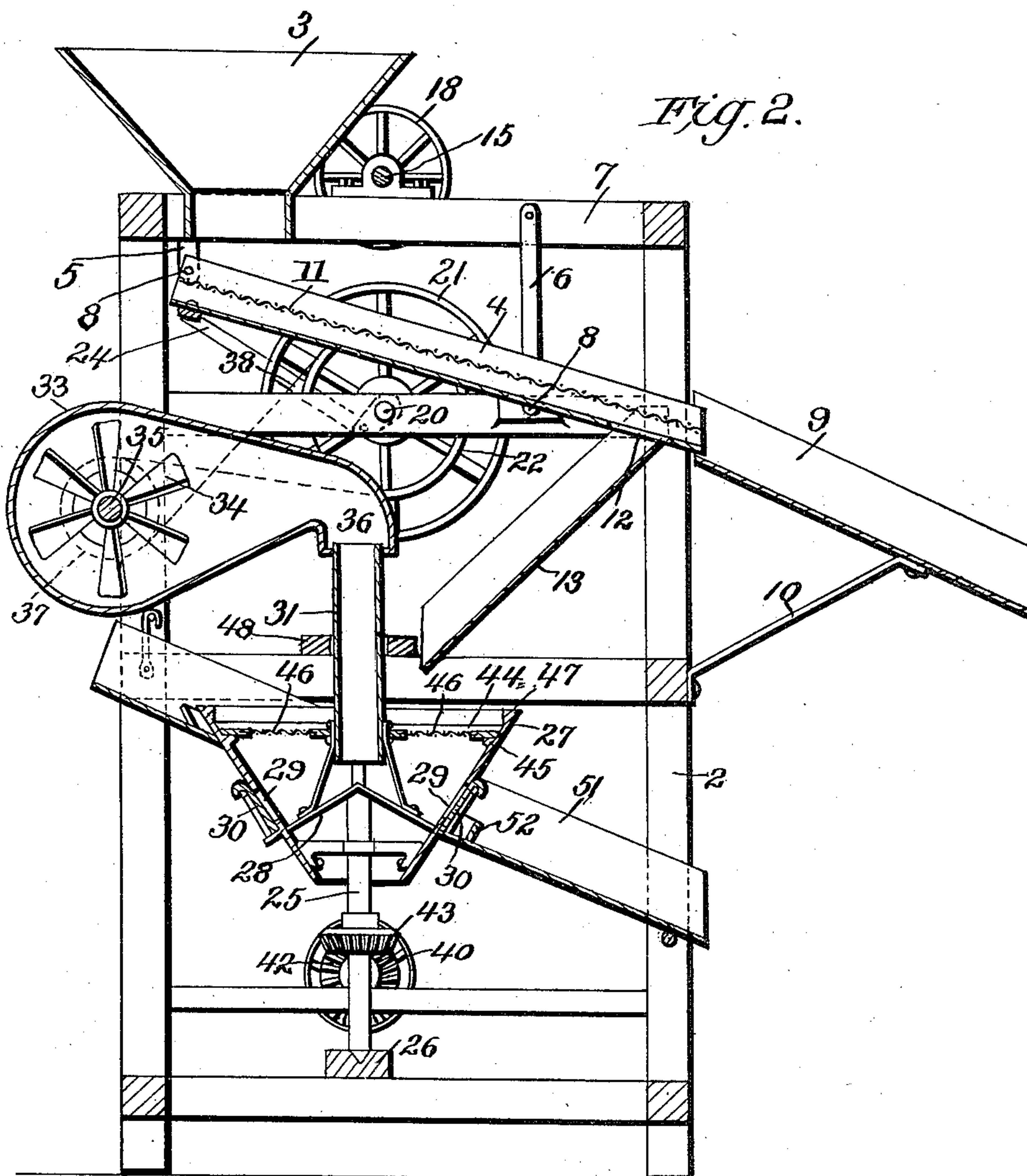


Fig. 2.

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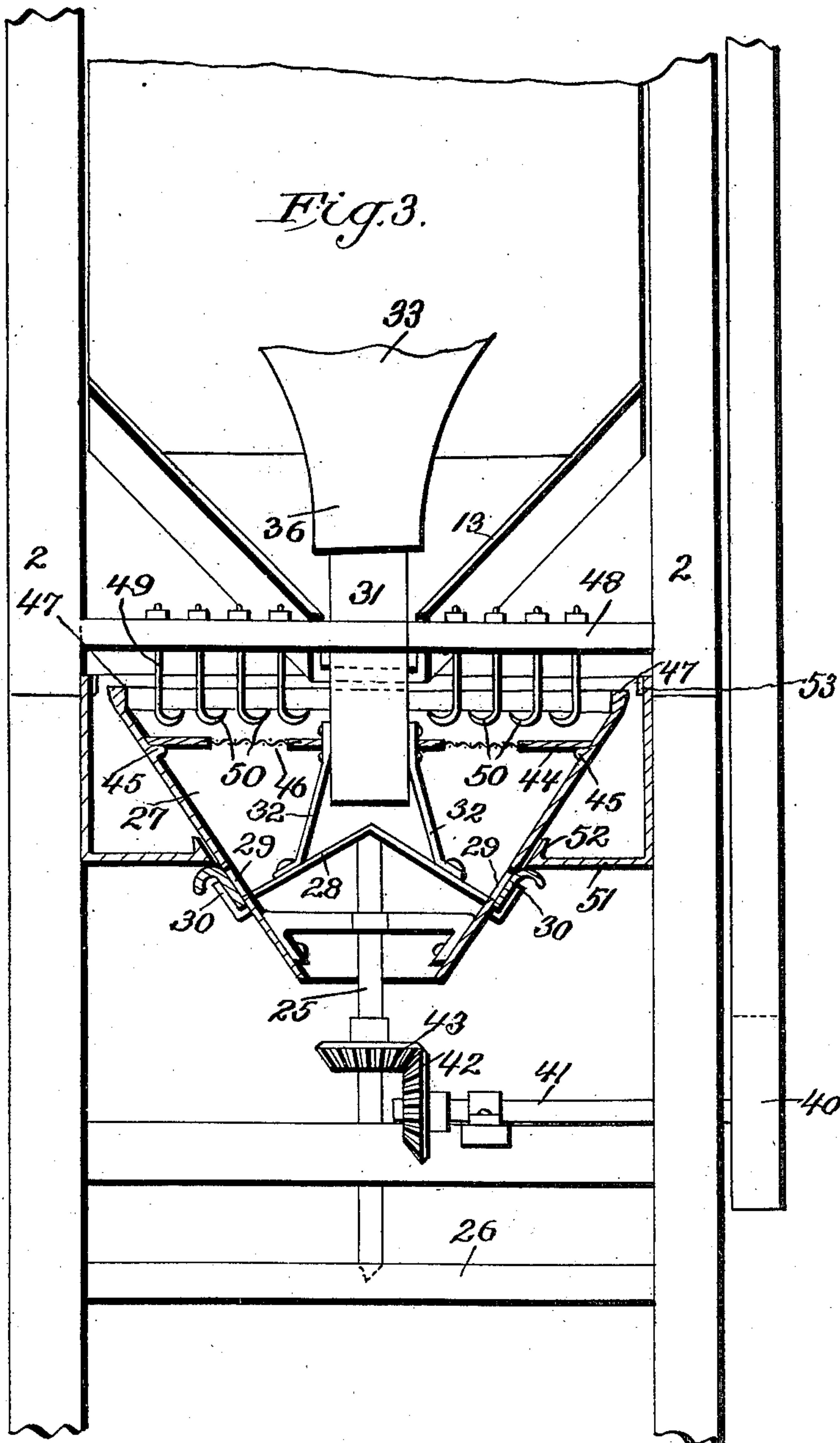
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOSEPH STANLEY, OF GEARY, OKLAHOMA, ASSIGNOR OF ONE-HALF TO BERTHA A. CARPENTER AND F. S. PRESTON, BOTH OF GEARY, OKLAHOMA.

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995,578.

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To all whom it may concern:

Be it known that I, JOSEPH STANLEY, a citizen of the United States, residing at Geary, in the county of Blaine and State of Oklahoma, have invented certain new and useful Improvements in Ore-Separators, of which the following is a specification.

My invention relates to dry ore separators of that type in which the ore after being crushed or in a finely divided state, passes over screens which separate the coarse material from the relatively fine material containing gold, the sifted material passing into a hopper or container wherein it is subjected to a blast of air so that the fine and light particles are driven out and ejected, leaving the relatively heavy particles of gold or other precious metal.

The invention comprises in its general features a supporting frame, a reciprocating chute provided with a sieve or partition of wire gauze extending along its whole length, and a centrifugal separator into which the sifted material from the chute is conducted, this separator being provided with a screen of wire gauze, and an air blast pipe extending down into the separator beneath the screen which acts to loosen the sand and prevent it from packing, and gives the precious metal a chance to settle, the object being to save or catch the flour gold or metal, which other separators have been unable to save, the air blast causing the sand to loosen and separate so that the heavier gold or metal will settle on to the screen and into the bottom of the separator.

My invention is shown in the accompanying drawings wherein:

Figure 1 is a side elevation of my improved ore separator. Fig. 2 is a vertical section thereof through the hopper, the preliminary separating chute, the blower chest, and the centrifugal separator. Fig. 3 is a fragmentary section on an enlarged scale through the centrifugal separator, and a portion of the throat of the blower chest.

Referring to these drawings 2 designates the frame of the machine which may be constructed in any desired manner. Mounted upon the upper end of the frame of the machine is the receiving hopper 3 which opens at its lower end into a reciprocating chute 4. This chute is supported in hangers 5 and 6 which are pivoted to the uppermost cross bars 7 of the frame 2. The lower

ends of these hangers are provided with transverse cross bars 8 which are bolted to the bottom of the chute 4 or otherwise attached thereto. Means are provided for reciprocating the chute 4 which will later be described. The mouth of the chute opens into a fixed discharge chute 9 which is supported on a brace 10. The chute 4 is provided along its whole extent with the screen 11 of wire mesh or other suitable openwork material, and at its lower end the bottom of the chute is cut away as at 12 to provide a discharge opening located immediately above the upper end of a chute 13. This chute is pivoted at its upper end at 14 to the frame so that the chute may be lifted to provide for the removal of the centrifugal separator, as will be later described.

Mounted upon the cross bars 7 of the frame is the transversely extending shaft 15 which is provided on one end with the toothed gear wheel 16, this gear wheel being formed with the crank handle 17, whereby the gear wheel may be rotated. The other end of the shaft 15 is provided with the band pulley 18. The teeth of the gear wheel 16 mesh with a pinion 19 on a crank shaft 20, the other end of which crank shaft is provided with a balance wheel 21 and with the band pulley 22. The crank shaft 20 is provided with the cranks 23 which are connected by links 24 to the hangers 5. It will be obvious that upon a rotation of the shaft 20 the cranks 23 will cause a reciprocation of the links 24, which in turn will reciprocate the chute 4, thus jiggling the material carried in the chute 4, thus causing it to descend upon the screen 11 and to be discharged upon the permanent chute 9. The material which passes through the screen is discharged through the opening 12 upon the chute 13.

Mounted upon a vertical shaft 25 which extends upward from a bearing 26 carried upon the lower portion of the frame 2, is the rotatable separator 27. This separator has the form of an inverted frustrated cone, the walls of the separator being upwardly and outwardly flared as shown most clearly in Fig. 2. The lower end of the separator 27 is open and the shaft 25 extends up through this open lower end and is attached to a bottom 28. This bottom is conical in formation and the shaft is attached to the apex of the cone, the perimeter of the conical

cal bottom being of course attached to the wall of the separator 27, as shown most clearly in Fig. 3. Discharge openings 29 are formed in the wall of the separator co-incident with the perimeter of the false bot-
 5 tom 28, these discharge openings being closed by doors 30. Mounted upon the center of the false bottom and spaced from the apex thereof is the upwardly extending air-
 10 conducting pipe 31, the lower end of this pipe being mounted on legs 32 which extend downward and are riveted or otherwise attached to the bottom 28 of the separator. It will thus be seen that space is provided
 15 at the lower end of the pipe 31 through which air may be discharged into the contents of the separator, and that this air will be discharged against the conical bottom of the separator and deflected upward there-
 20 from through the separator and the material carried therein.

Suitably supported upon the frame 2 is a blower chest 33, within which is located the blower fan 34 mounted on a shaft 35. The
 25 blower chest at its inner end is contracted to form a throat 36 which is downwardly extended and open to surround the upper end of the pipe 31, as clearly shown in Fig. 2. While the upper end of the pipe 31
 30 is not connected to the open end of the blower chest, and while the blower chest has a movement relative to the upper end of the pipe 31, yet the engagement between the two is too snug to permit any large
 35 amount of air to escape between the upper end of the pipe 31 and the open end of the throat 36. It is to be understood, of course, that the pipe 31 revolves with the rotatable separator 27, while the blower chest 33 re-
 40 mains stationary. The blower chest is so mounted upon the shaft 35 that it may have a rotation upon said shaft as upon a center, thus permitting the mouth of the blower chest to be raised from its engagement with
 45 the pipe 31 to permit the removal of the rotary separator 27 and of the pipe 31 when it is desired to remove the separator from the frame. The blower fan 34 is driven by means of a pulley 37 on the shaft 35, a band
 50 38 passing over the band wheel 22 and over the pulley 37. The belt 39 passes over the pulley 18 and also passes over a pulley 40 mounted on a shaft 41 which is journaled in suitable bearings in the base of the frame
 55 2, which shaft carries upon its extremity the beveled gear wheel 42 which meshes with a beveled gear wheel 43 fast on the shaft 25.

The rotary separator 27 is provided at a point somewhat above the lower end of the
 60 air pipe 31 with a screen section 44, this screen section resting upon shoulders 45, or being supported in any other suitable manner, and of course rotating with the separator 27. Preferably, the section 44 is
 65 provided at intervals with screens 46 of any

suitable character, through which screens the fine material such as flour gold or fine metal passes, the coarser metal or gold re-
 maining on top of the screen. The upper
 70 edge of the wall of the separator 27 is formed with a thickened portion or flange 47 to re-
 inforce the upper edge of the separator, and also act to prevent too easy ejection of the material from the separator over the
 75 edge of the wall. Mounted above the separator is the transverse brace 48 which is pro-
 vided with a plurality of downwardly de-
 pending stirrers 49 which extend down into the upper end of the rotary separator 27
 80 and which are formed at their lower ends with hooks or laterally bent portions 50. The lower ends of the stirrers are above the
 screen section 44 and act to agitate the mate-
 85 rial in the separator as the separator is ro-
 tated so as to prevent the particles of the ore from adhering to each other, and to per-
 mit the air blast to eject the finer and lighter particles of matter.

Extending across and mounted upon the
 90 frame 2 is the discharge chute 51, this chute being, of course, wider than the diameter of the separator 27 and being provided with an
 opening through which the conical separator passes, the opening being protected by
 95 means of upwardly extending inclined walls 52, thus preventing any material which is forced over the edge of the separator 27 and
 into the chute from getting into the space between the bottom of the trough or chute 51
 100 and the wall of the separator, and so pre-
 venting the easy rotation of the separator. The chute 51 is removably supported at one
 end as by means of the hooks 53, and at its
 105 other end is supported in any suitable man-
 ner and discharges upon the ground or into a suitable discharge chute not shown.

The operation of my invention will be obvious from what has gone before. The
 110 ore in a finely divided condition is placed in the hopper 3, and from thence passes down to the chute 4. The reciprocatory
 motion given to the chute 4 causes the ore to descend along the length of the screen
 115 11, and the finer particles of the ore con-
 taining the precious metal to be separated fall through the meshes of the screen and
 are eventually discharged through the open-
 120 ing 12 into the trough 13 by which they are carried to the separator 27. At the sepa-
 rator 27 the finer particles of material pass through the meshes of the screens 46, while
 the coarser material is triturated by the re-
 125 volving action of the separator and is even-
 tually thrown out by centrifugal action dis-
 charged upon the chute 51. While the sepa-
 rator is rotating a blast of air is being cre-
 130 ated by the fan 34 and conducted down through the tube 31 to a point immediately
 above the apex of the conical bottom 28. This blast is deflected by the conical bottom

28 and is forced upward through the mass of finely divided material which has passed the screens 46. The air passing through the screen sections 46 acts to loosen up the sand and prevent it from packing, thus giving the relatively heavy, metallic substances a chance to settle. The flour gold or fine metal passes through the gauze screen and is caught beneath the same, while the coarser metal remains on top of the gauze screen, the material forced out of the separator by reason of its centrifugal action falls upon the chute 51 and is finally discharged. When the separator 27 is filled the doors or discharge gates 30 are opened, permitting the precious metal contained within the lower portion of the separator to be taken out. The centrifugal action of the revolving separator 27 is assisted in its separating action by the depending rods or stirrers 50. These extend down into the separator within about a quarter of an inch of the screen section 44, and as the separator revolves these stirrers plow through the sand, thus keeping the sand loose so that the gold can settle down on to the section 44 and the fine gold dust passed through the screens 46.

By releasing the hooks 53 the chute 51 can be lowered to the bottom of the frame. The chute 13 may then be raised, the supporting beam 48 then raised, the blower chest lifted up, and the gold pan may be taken out, thus permitting the removal of the gold pan for cleaning purposes.

By means of my invention it is possible to work all day without a "cleanup," the separator or gold pan 27 will become filled to a level with the upper edge thereof, and then the separated material will pass off as fast as it runs in. A "cleanup" can be made at any time by taking out the separator 27.

What I claim is:

1. In mechanism of the character described, a rotary separator, a screen extending across the separator and rotatable therewith, an air blast pipe extending downward into the screen, and a deflector mounted below the mouth of the air blast pipe and deflecting the air discharged therefrom upward against the screen.

2. In mechanism of the character described, a rotary separator, a screen of wire gauze extending across the separator near the upper end thereof and rotatable therewith, a discharge chute arranged to discharge ore into said separator upon the upper face of the screen, an air blast pipe entering the separator below the screen, means for directing the air upward against the screen, and means mounted above the screen but non-rotatable therewith for agitating the material resting on the screen.

3. In a mechanism of the character described, a rotary separator having an outwardly and upwardly extending wall, a

screen mounted in the separator above the bottom thereof, a conical bottom having downwardly and outwardly extending walls, discharge openings formed in the outer wall of the separator, doors for closing said discharge openings, and an air pipe entering the separator through the screen thereof and discharging against the apex of the conical bottom.

4. In a mechanism of the character described, a rotary separator having the form of an inverted frustrated cone, a conical bottom to said separator, the apex of the bottom being upward, a screen mounted in the separator below the upper edge thereof, and an air pipe entering said separator through the screen and discharging against the apex of the conical bottom but spaced therefrom.

5. In a mechanism of the character described, a supporting frame, a reciprocating chute mounted on the supporting frame, a screen extending entirely along said chute on to which the matter to be separated is discharged, the lower end of the chute being provided with an opening in its bottom, a rotary separator having the form of an inverted frustrated cone, means for conducting the material from said first named chute to the separator, a conical bottom in the separator having its apex extending upward, an air pipe supported on the conical bottom, the discharge end of the air pipe being above the apex of the bottom, a screen mounted in the separator below the upper edge thereof but above the lower end of the air-conducting pipe, means for giving a rotary motion to the separator, and means for causing a blast of air in said air pipe.

6. In a mechanism of the character described, a supporting frame, a hopper mounted on the supporting frame, a reciprocating chute extending downward from the mouth of the hopper and provided with a screen supported above the bottom of the chute and extending the whole length thereof, the lower end of the bottom of the chute being formed with a discharge opening, a trough receiving material from the opening in the bottom of the chute, a rotatable vertical shaft, a rotatable separator mounted on the shaft to rotate therewith and having an upwardly and outwardly inclined circular wall, a conical bottom in the separator having its apex upward, a central air pipe discharging against the apex of the conical bottom but spaced therefrom, supports on the rotary separator engaging and supporting said air pipe, a screen section mounted in the rotary separator below the upper edge thereof but above the lower end of the air pipe, a blower chest having a mouth surrounding the upper end of the air pipe, a blower therein, a common means for reciprocating the reciprocating chute operat-

ing the blower and rotating the vertical shaft.

7. An ore separator including a pan having upwardly and outwardly inclined sides, the bottom of the pan being conical and having its apex upward, a shaft on which the pan is mounted and with which it rotates, a screen section extending across the pan below the upper edge thereof, an air delivery pipe mounted to rotate with the pan extending through the screen section and discharging air against the apex of the bottom, and stirrers supported above the screen section of the pan and acting to agitate the material in the upper part of the pan as the pan is revolved.

8. An ore separator including a rotatable separating pan having an outwardly and upwardly inclined wall, a conical bottom, the apex of the bottom being upward, a shaft with which the pan rotates, a removable

screen section supported in the pan below the upper edge thereof, an air blast pipe extending down through the screen section and opening above the apex of the bottom, stirring devices fixedly supported above the pan to agitate the contents thereof, and a chute within which the upper portion of the pan rotates and into which the contents of the pan are discharged, said chute being provided with an opening through which the pan extends, the margin of the opening being provided with an upwardly and outwardly extending wall parallel with the wall of the rotatable pan.

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

JOSEPH STANLEY. [L. s.]

Witnesses:

J. P. WISHARD,
J. W. DEAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
