

C. L. McKESSON & O. S. BLACK.

ORE CONCENTRATOR.

APPLICATION FILED DEC. 7, 1907.

941,333.

Patented Nov. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

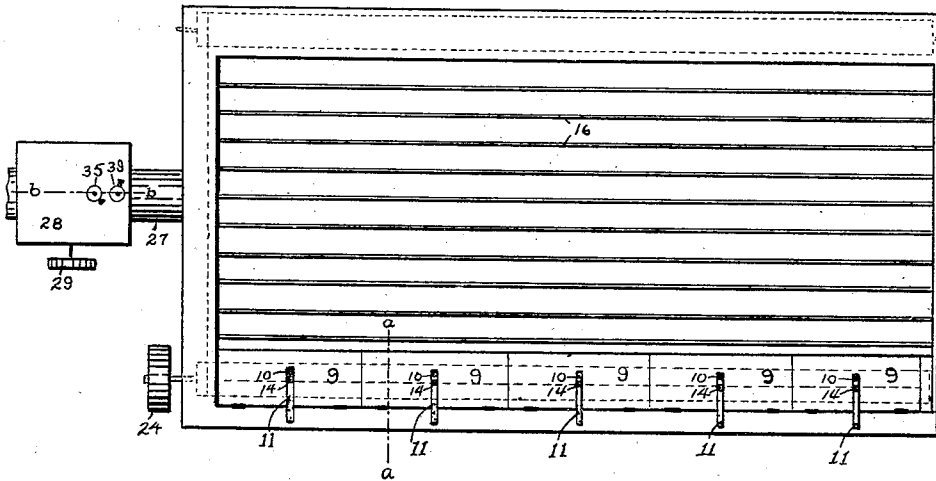


Fig. 2.

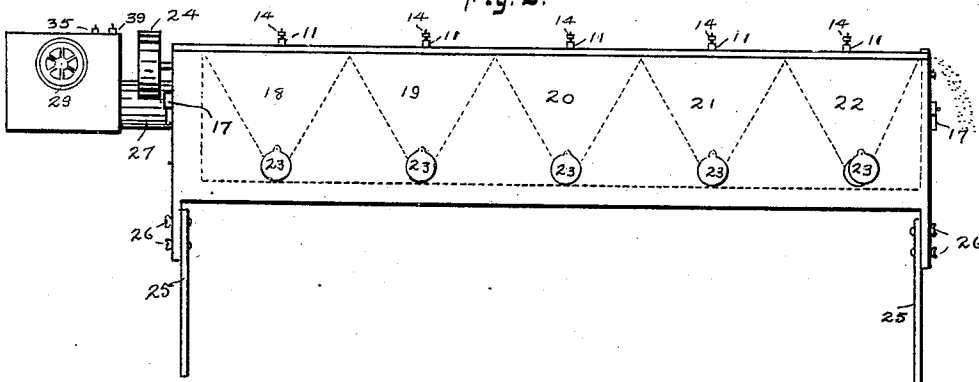
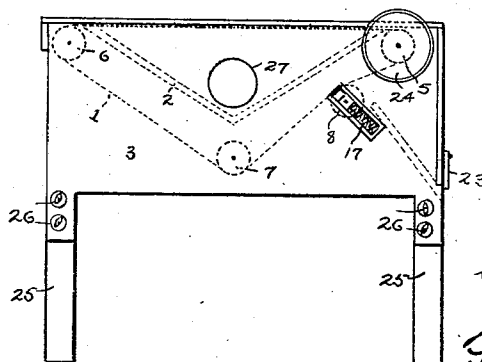


Fig. 3.



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2 SHEETS—SHEET 2.

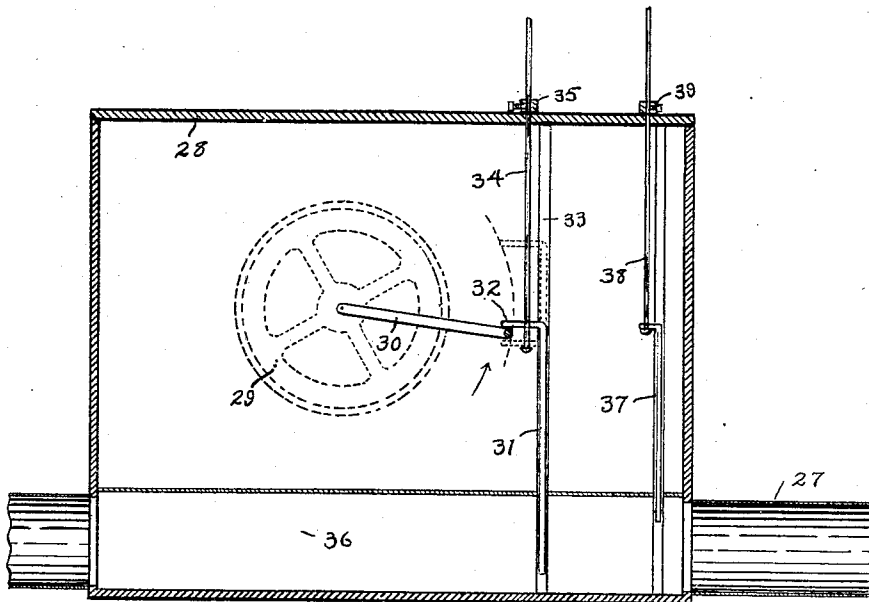
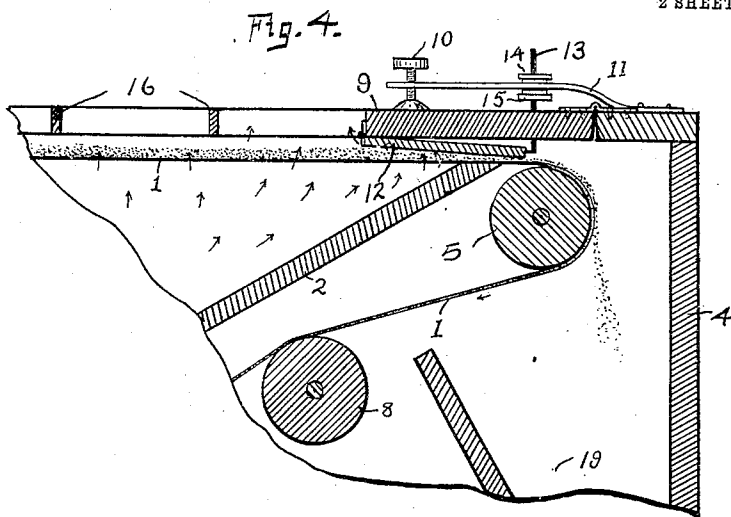


Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES L. McKESSON AND ORVILLE S. BLACK, OF COLORADO SPRINGS, COLORADO.

ORE-CONCENTRATOR.

941,333.

Specification of Letters Patent.

Patented Nov. 23, 1909.

Application filed December 7, 1907. Serial No. 405,596.

To all whom it may concern:

Be it known that we, CHARLES L. McKES-
SON and ORVILLE S. BLACK, citizens of the
United States, and residents of Colorado
Springs, in the county of El Paso and State
of Colorado, have jointly invented a new
and useful improvement in Ore-Concentra-
tors, of which the following is a specifi-
cation.

This invention relates to new and useful
improvements in ore separating machines
and has relation more particularly to that
class of separators known as pneumatic ma-
chines.

It is an object of the invention to provide
a device of this character wherein an inter-
rupted air current is employed to produce
the jiggling effect of the ore required for
the proper separation.

It is also an object of the invention to
provide a novel device of this character
wherein a movable medium is employed for
conveying the ore across an air current.

It is also an object of the invention to pro-
vide means acting in conjunction with the
movable means for regulating the depth of
the ore carried by the movable medium.

It is also an object of the invention to pro-
vide novel means acting in conjunction with
the movable medium for creating a draft
or air current traveling in a direction op-
posite to the movement of the movable me-
dium.

Furthermore, it is an object of the inven-
tion to produce a novel device of the char-
acter noted, which will possess advantages in
points of simplicity, efficiency, and durabil-
ity, proving at the same time comparatively
inexpensive to manufacture.

With the foregoing and other objects in
view, the invention consists in the details
of construction and in the arrangement and
combination of parts to be hereinafter more
fully set forth and claimed.

In describing the invention in detail, ref-
erence will be had to the accompanying
drawings forming part of this specification
wherein like characters denote correspond-
ing parts in the several views, in which—

Figure 1, is a view in top plan of the in-
vention; Fig. 2, is a view in side elevation of
the invention; Fig. 3, is an end view of the
device; Fig. 4, is a fragmentary sectional
view taken on the line *a—*a**, of Fig. 1; and
Fig. 5, is a sectional view taken on the line
*b—*b**, of Fig. 1.

In the drawings 3, denotes the end of the
frame having secured thereto the sides 4.
The ends 3 and sides 4, form a frame. With-
in the frame formed by the sides and ends 60
and extending longitudinally thereof is an air
chamber having its top open and its bottom
2, formed of converging sections. Mounted
in the ends 3, and adjacent the top of the
air chamber 2, exterior thereof, are the 65
rollers 5 and 6, and mounted in the ends ap-
proximately centrally thereof, and beneath
the bottom 2, is a third roller 7, around
which passes an endless belt 1. This belt is
intended to travel around the rollers 5, 6, 70
and 7, and move transversely across the air
chamber hereinbefore referred to. The belt
may be moved in any desired manner, but
it has been found best to extend the shaft
of the roller 5, to the exterior of the frame 75
and mount on this exterior portion a belt
pulley 24, which will be suitably engaged
with any desired source of power. The belt
1 may be of any desired material, it only
being essential that it be sufficiently porous 80
to permit air to pass therethrough. It may
be further stated that belts of different ma-
terial are required for different ores, but as
this forms no essential feature of the inven-
tion, further detail thereof is believed un- 85
necessary. The belt has its upper surface
undisturbed or uninterrupted, that is to say
that the upper surface of the belt is even,
free of ripples, attachments or raised edges
which would have a tendency to interfere 90
with the free passage of the material across
the surface of the belt. It is necessary that
that portion of the belt passing over the
open face of the air chamber should be taut.
To maintain this condition, a tension roller 95
8, is mounted in the slotted bearings in the
ends 3, and is under the control of the
springs 17, as is more particularly shown in
Fig. 3. Along the side of the air chamber
toward which the belt moves, is arranged a 100
series of cleaners, all of like construction
and designated as 9. Each of these cleaners
9, is hinged to the frame of the machine and
may be raised or lowered and held in posi-
tion by means of the screw 10, threaded 105
through the support 11. Hinged to the edge
of the cleaner and depending therefrom is
an adjustable plate 12. One edge of this
plate may be dropped as closely as desired
to the belt 1, and is held in position by 110
means of the rod 13, and the nuts 14 and 15,
thereon, arranged on opposite sides of the

plate 11. Under the edge of the machine provided with the cleaners are placed suitable launders 18, 19, 20, 21 and 22, to receive the concentrates when separated from the tailings. These launders are made with walls sloping in such a manner as to cause the concentrates to gather in front of the gates 23, for removal.

The ore to be separated is fed to the belt 1, in any desired manner and in order that said ore will not attain too great a depth or thickness on the belt, the longitudinal strips 16, are placed at intervals across the open face of the air chamber.

The frame or concentrator may be supported in any manner desired, but it has been found best to provide the legs 25, which are made adjustable so that the surface of the frame may be set at any desired angle. To afford this adjustment, the legs are shown jointed with thumb screws 26, for the purpose of obtaining any desired length of the legs.

Air is supplied to the chamber hereinbefore referred to through the pipe 27, connecting said air chamber with an air regulating chamber 28. Passing through the air chamber 28, is a spindle 30, bent to an approximate U-shape. A portion of this spindle extends to the exterior of the chamber 28, and has secured thereto a pulley 29, which is to be rotated by any ordinary or preferred means. Operating within the chamber 28, and in the guide grooves 33, is a jig gate 31, having its upper edge formed with a lip or flange 32. This flange 32 is engaged by the U-shaped portion of the spindle 30. The lip 32, is also engaged by a rod 34, which extends through the top of the casing. The exterior portion of this rod is provided with an adjustable collar 35, which provides a means for limiting the distance which the gate may fall, this distance being changed at will by the operator. The lower portion of the chamber 28, is suitably divided to form an air channel 36, which is intersected by the gate 31, hereinbefore referred to. In addition to this gate, there is a blast gate 37, for regulating the maximum flow of air through the air channel. This gate is provided with an adjusting rod 38, and collar 39, constructed similar to the parts referred to with reference to the jig gate.

In operation the pulp or pulverized ore is fed from any suitable source upon the belt 1, at or near the upper end of the machine. By means of the drive pulley 5, the belt is being continuously revolved at a predetermined speed according to the nature of the ore being treated. Air from a suitable compressor or blower is applied through the air chamber 28, and pipe 27, to the air chamber under the belt. The belt being porous, the air passes readily therethrough and into

the pulp on the belt, thereby agitating the pulp. The constant air current is in quantity the amount passing through the air channel 36, when the jig gate is at the lowest point to which it is allowed to drop constantly agitates and holds the pulp over the belt. The additional air allowed to enter the air chamber when the jig gate 31, is raised gives the ore a puff which being rapidly repeated is in reality a jig motion. This agitation and jig motion causes all of the heavier particles in the ore to settle to the belt while the lighter waste passes down to and over the tail end of the machine. The heavier particles, known as concentrates, with some waste are carried by the belt to the cleaners at the side of the machine. The cleaners come in close proximity to the belt and the air which passes through the belt under the cleaners escapes to the upper edge of the cleaners and thereby produces a strong current which blows back the particles of waste material. By raising and lowering the cleaners, the strength of this current is accordingly diminished or increased. The cleaners are regulated until the air current is just strong enough to blow back all waste from the concentrates which are then carried out under the cleaners, over the roller 5, and deposited in the launders. As this ore passes down over the machine, different minerals of different specific gravity find their way to the different cleaners. The several cleaners being independent may be given different inclinations if necessary to clean the concentrates passing under them. The bottom plate of each cleaner being kept at its rear edge very close to the belt prevents air from escaping to the launders and carrying out waste in that direction. In the concentrating of ores on this machine, it is found that coarse heavy ores require a strong air current and a heavy blast, while very fine light ores require very little air. A perfect control of the air current both as to constant flow and as to blasts is essential owing to the many different grades and kinds of ores which are treated. This control is readily afforded through the medium of the gate 37.

The porous belt 1, may be made of any material not impervious to air and may be smooth, rough or corrugated on its upper surface. A heavy woolen material like beaver or broadcloth has been found to make an excellent belt for a majority of ores.

We claim—

1. An ore concentrator comprising an air chamber, a belt having its upper run arranged over the same, a gate member arranged in the path of the delivery of said air current, an actuated shaft for effecting the intermittent vertical movement of said gate, and means for limiting the drop of said gate.

2. An ore concentrator comprising an air

chamber, a belt having its upper run extending over the same, means for delivering an air current into said chamber, a gate member arranged in the path of the delivery of said air current, a pulley-actuated shaft having a lateral arm adapted to engage a corresponding upper end extension of said gate and means for limiting the drop of said gate.

3. An ore concentrator comprising an air chamber, a belt having its upper run passing over said chamber, a gate member arranged in the path of the delivery of said air current and having a collar for limiting its drop, and a pulley-actuated shaft having a lateral extension or arm adapted to engage a corresponding upper end extension of said gate.

4. An ore concentrator comprising an air chamber, a belt having its upper run passing over said chamber, means for delivering an air current into said chamber, a gate member arranged in the path of the delivery of said air current, said gate being equipped with an adjustable collar for limiting the drop of said gate and for varying such dropping action, a shaft having a lateral extension or arm adapted to engage a corresponding upper end extension of said gate, and means for actuating said shaft.

5. An ore concentrator comprising an air chamber, means for delivering an air current into the chamber, a belt having its upper run passing over said chamber, a hinged or pivoted member having a hinged supplemental member underlying the first noted

member and means for the adjustment of said supplemental member relatively to said belt near the delivery end of the latter.

6. An ore concentrator comprising an air chamber, means for delivering an air current into said chamber, a belt having its upper run passing over said chamber, a hinged or pivoted member, having an underlying supplemental hinged member, and a bracket or support overhanging the first mentioned hinged member and having an adjusting screw working or threaded into the latter, said supplemental member being arranged contiguous to the delivery end of said belt.

7. An ore concentrator comprising an air chamber, means for delivering an air current into said chamber, a belt having its upper run passing over said chamber, a hinged or pivoted member having an underlying supplemental hinged member, a bracket or support overhanging the first mentioned hinged member and equipped with an adjusting screw threaded into the latter, and a rod passing through said bracket or support and engaging said supplemental hinged member, said rod being equipped with nuts for engagement with said bracket, said underlying hinged member being arranged contiguous to the delivery end of said belt.

In testimony whereof, we affix our signatures in the presence of two witnesses.

CHARLES L. McKESSON.

ORVILLE S. BLACK.

Witnesses:

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C. LEON McKESSON.