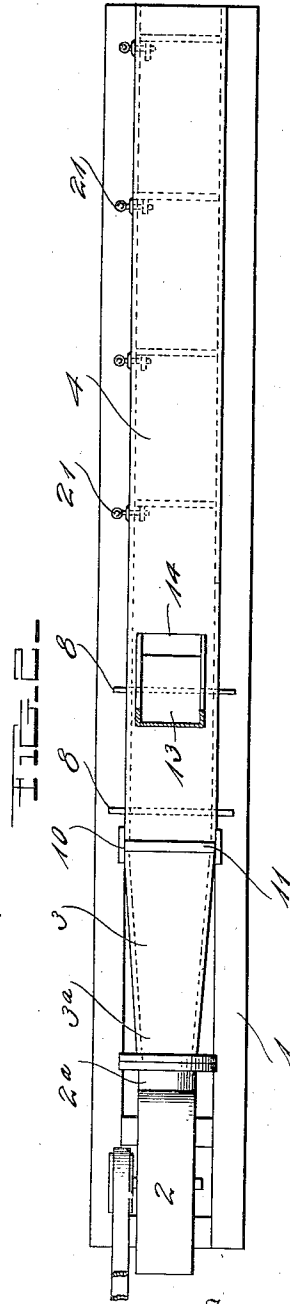
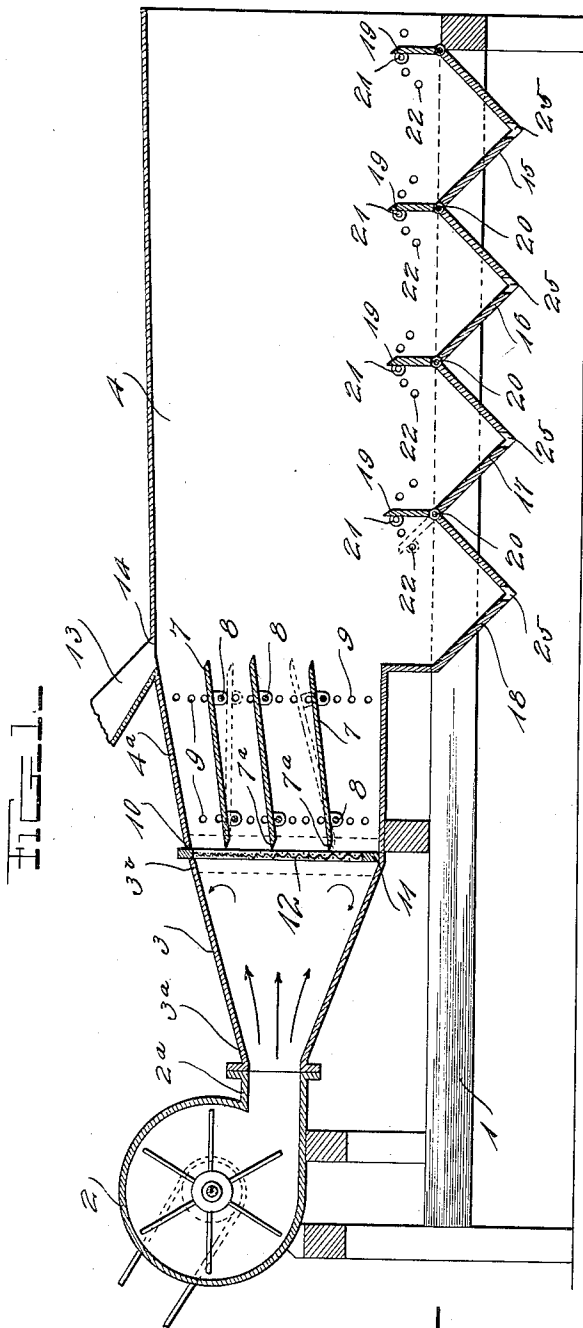


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SEPARATOR.
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1,042,836.

Patented Oct. 29, 1912.



Witnesses
P. R. Pierce

N. L. Kocamer

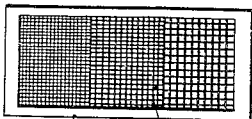


Fig. 1

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRITZ OSCAR STROMBORG, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Separators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to dry separators, more especially of that type adapted for the separation of ores although it is not necessarily confined thereto; and the object of the same is to make use of a split or divided blast of air operating transversely to the falling material being separated, to blow the larger particles or those of a greater specific gravity a lesser distance and deliver them into a different hopper from that receiving the finer particles or those of lighter specific gravity. This object is accomplished by the construction hereinafter more fully described and claimed, and as shown in the drawings wherein—

Figure 1 is a central longitudinal section of this separator complete; Fig. 2 is a plan view thereof; Fig. 3 is a detail of one of the screen panels.

In the drawings the numeral 1 designates a bed or framework upon which the superstructure is erected, and at one end thereof is a device for creating a blast of air, herein shown as a fan 2, the outlet end 2^a of whose casing is connected with the inlet end 3^a of a trunk 3 whose walls diverge from its inlet to its outlet 3^b.

The numeral 4 designates the separator box or casing proper, whose inlet 4^a is contracted slightly so that it is of about the same size as the outlet 3^b of the trunk 3, and these ends are spaced slightly so as to leave an opening or slot 10 at either side and across the top. Into this opening may be placed a screen panel 11 best seen in Fig. 3, consisting of a frame containing a wire netting or screen 12 which is, as shown, of fine mesh at one end, of coarse mesh at the other, and of medium mesh between the two ends. The means for holding this panel removably in place are not illustrated and need not be described, but it is obvious that the panel can be inserted either end up and also that panels whose screen is of one size

mesh throughout may be employed without departing from the spirit of my invention.

Within the inlet end or portion 4^a of the box 4 are disposed a series of partitions 7, preferably about three in number as shown, and having sharp front edges 7^a so that they cut the blast of air delivered through the trunk 3. These partitions are adjustable and removable, the means for adjustment herein shown consisting of two series of upright holes 9 in the sides of the inlet end 4^a of the box, and two sets of rods 8 passing through aligned holes in opposite sides thereof, so that both the front and rear edges of each partition may be vertically and independently adjusted as the dotted lines in Fig. 1 will show. The arrows in this view show that the wind delivered from the fan 2 passes into the inlet 3^a of the trunk 3 and then expands slightly into strata or currents, the central one of which will of course pass along into and through the inlet 4^a without obstruction. But those currents which flow along the top and bottom of the trunk 3 will set up eddies as indicated by the fine arrows, and it is the purpose of these partitions 7 to check the tendency to the formation of eddies and to deliver the split or divided blast of air into the box 4 in several strata moving horizontally one above the other throughout the length of said box and at equal speed. If, however, one or more of the panels illustrated in Fig. 3 are employed, the size of the mesh therein will have its bearing upon the amount of air admitted through the slot or opening 10 opposite said mesh and will therefore effect the volume of air—and necessarily the speed thereof—in each stratum passing through the box 4. That is to say, if the screen shown in Fig. 3 be inserted in the opening 10, the fine mesh at the top of the same will retard the admission of air above the uppermost partition 7, the medium mesh at the center of the same will have less retarding effect and therefore will admit yet more air between the uppermost and lowermost partitions, and the coarse mesh at the bottom of the panel will admit more air below the lowermost partition, with the result that the uppermost strata within the box 4 will be moving at a slower speed than those below. Assuming that the air passes out the outlet 2^a from the fan at a given velocity, within the diverging walls of the trunk 3

such velocity decreases, and throughout the length of the flaring inlet 4^a of the box 4 the velocity further decreases, so that by the time the air passes into and moves through the body of the box 4 its velocity will be considerably less than at the time it issued from the fan 2. If, however, a panel having variable sizes of mesh at its upper and lower ends be employed, the strata of air passing through the trunk 3 are differently retarded at different parts thereof, and the strata moving through the box 4 will have different velocities. They may commingle toward the outlet end of said box, but at its inlet end and just beyond the inner end of the partitions 7, the strata will be entirely distinct and the movement of one in no way affected by the movement of another.

Through the top of the box 4 is formed an inlet opening 14, and 13 designates a spout delivering from any suitable source the material to be separated. The bottom of the box is formed into a series of hoppers 18, 17, 16 and 15, respectively nearer to and more and more remote from the outlet ends of the partitions 7, and between these hoppers are wings 19 hinged at 20 and rendered adjustable in any suitable manner, as, for instance, by means of pins 21 inserted in holes 22 in the sides of the box 4. From the outlets 25 at the lower ends of said hoppers the separated material is taken in any suitable manner not necessary to describe in this connection.

The parts of the device being thus constructed, the operation of the whole is as follows: Power applied to the fan 2 sets up a blast of air throughout the trunk 3, and between the various partitions 7 and throughout the length of the box 4 and out its outlet end in a manner which will be clear. Meanwhile material fed down the spout 13 falls through the inlet opening 14 and across the inner ends of the partitions 7 where it encounters the various strata of air which move at different velocities according as the partitions have been set and the panel has been used, and according to the mesh of the screen at the various parts of said panel. If the material being separated is fed into this machine promiscuously as to the relative sizes of the lumps, it will be found that the large pieces offer more resistance to the blasts of air than the smaller ones, and therefore the very large pieces will fall into the hopper 18, those of next smaller size into the hopper 17, and so on, and the extremely fine pieces or what might be called dust or powder will be blown out the outlet end of the box 4. If, on the other hand, the material has been sized or graded before it is fed into this machine, it will be found that those lumps or pieces having the greatest specific gravity will afford the strongest resistance to the wind currents and

will drop into the hoppers 18 and 17 nearest to the inlet, while those having the lesser specific gravity will be acted upon more forcibly by the blasts or currents of wind and will drop into hoppers more remote, and the extremely light pieces will be blown out the outlet end of the box 4. Ordinarily dry separators are employed to size or grade the lumps or pieces of ore or material of a mass which is substantially all the same ore; and, if so, this machine affords possibilities for separating the pieces according to their size or their specific gravity as above set forth. But it might occur that the machine would be employed on occasions to separate particles of different kinds of ores which had become mixed or which were mined in mixed condition. Even in this contingency it will be observed that the angle of inclination of each partition may be adjusted independently of that of all others so that the several strata of air may be more or less inclined to a horizontal and the lumps or pieces blown thereby delivered farther and farther to the rear; also the use of panels 11 of different mesh or with portions of the frame containing screens of different mesh, admits more or less air to the various strata; also the size of the mouth or inlet portion of the various hoppers may be adjusted by setting the wings as the dotted lines will show, and finally the speed of the fan can be increased or decreased to vary the strength of the blast of air admitted.

It will not be necessary for the purposes of a patent specification to enter into the effect produced by feeding the material through the spout 13 in a more or less damp or wet condition or by supplying the fan with other fluid than air at its normal temperature, because the mechanical construction of the device has been set forth with sufficient clearness to show that conditions vary by reason of the feeding of different materials into the machine and can be overcome or met by the various adjustments. If the conditions also vary by reason of the moisture in the material to be treated or the nature of the fluid passed through the fan, they also can be met by some of the adjustments set forth above.

What is claimed as new is:

1. In a dry separator, the combination with means for producing a blast of air; of a trunk whose walls diverge in the direction of the blast of air, the side walls having two upright series of holes and the top wall having a feed opening, a series of partitions disposed one above the other within the trunk, and rods removably mounted in certain pairs of said openings for adjustably supporting the front and rear ends of each partition independently of each other and of the other partitions.

2. In a separator, the combination with

means for producing a blast of air, and a separator box having a series of chambers across its bottom; of a trunk connecting said means with the inlet end of said box and its side walls having upright openings between the two and its top wall an opening adjacent said box, means for feeding through the last-named opening the material to be separated, a series of transverse partitions adjustably mounted at their front and rear ends within the trunk between its side openings and its feed opening, and screen panels of variable mesh adapted to be removably inserted in said side openings.

3. In a separator, the combination with means for producing a blast of air, and a horizontal separator box; of a trunk connecting said means with the inlet end of

said box and its walls having openings between the two, means for feeding through the top of the trunk the material to be separated, a series of transverse partitions adjustably mounted within the trunk, and a panel adapted to be removably inserted in said openings and comprising a frame and a screen therein which is of fine mesh at one end, of coarse mesh at the other end, and of medium mesh between said ends.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRITZ OSCAR STROMBORG.

Witnesses:

A. J. MARTIN,
TOM CRANNAGE.