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SEPARATOR.

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Patented Sept. 12, 1916.

2 SHEETS—SHEET 1.

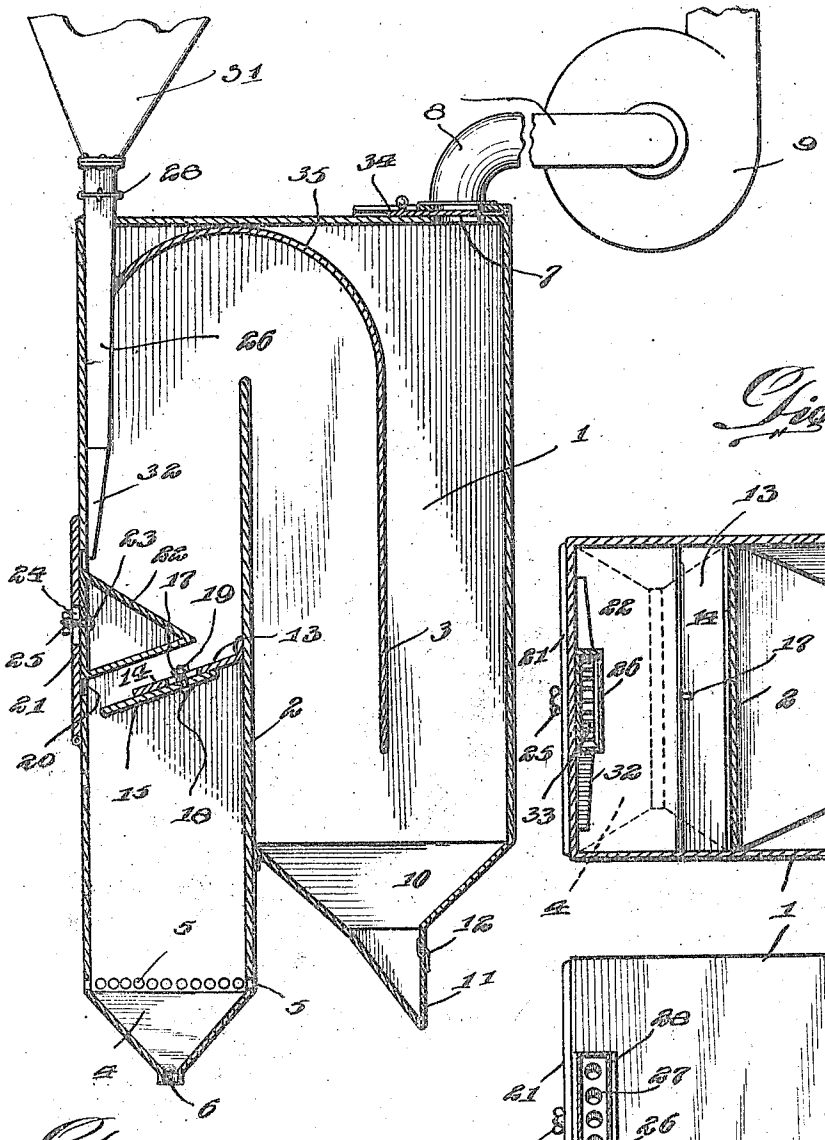


Fig. 1.

Fig. 2.

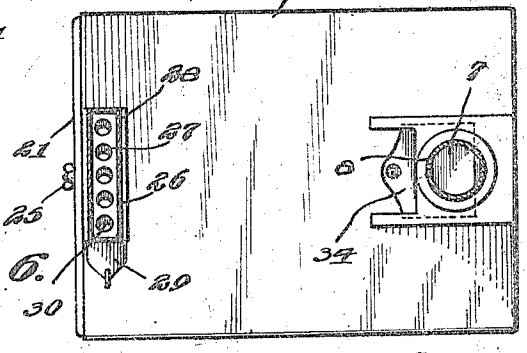


Fig. 6.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

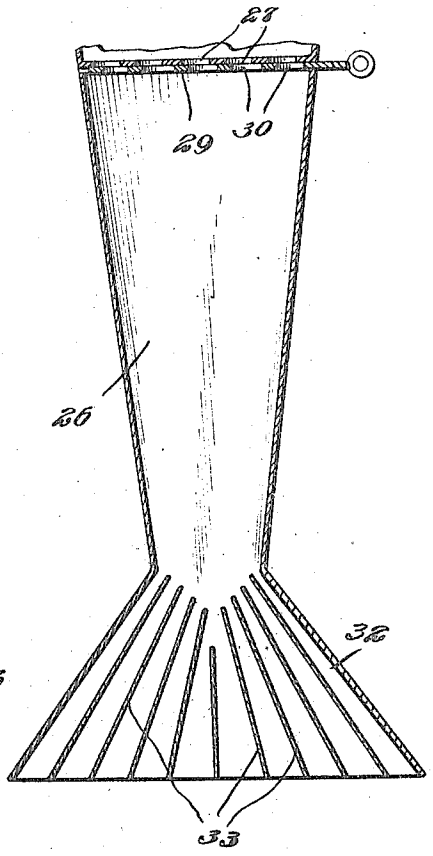


Fig. 3.

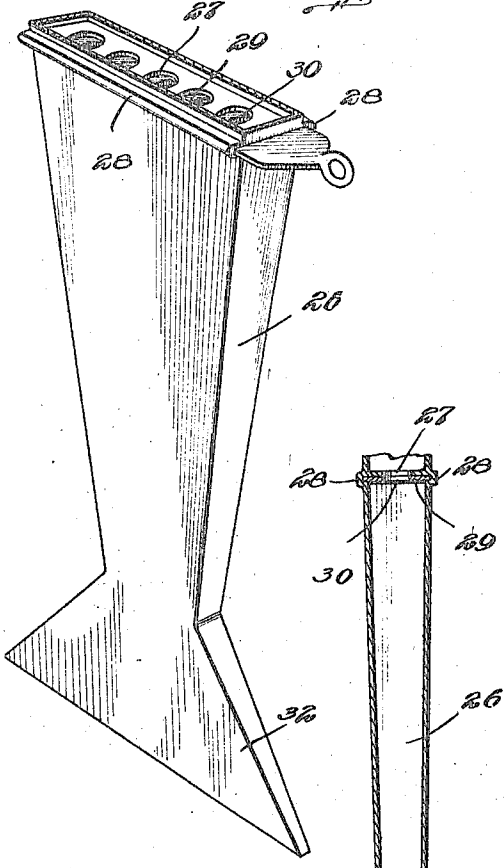


Fig. 5.

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UNITED STATES PATENT OFFICE.

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1,198,092. Specification of Letters Patent. Patented Sept. 12, 1916.

Application filed July 10, 1915. Serial No. 39,129.

To all whom it may concern:

Be it known that we, WILLIAM H. WILHELM, JOHN A. ARTLEY, and HARRY S. BRYAN, citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Separators, of which the following is a specification.

This invention relates to improvements in separators or concentrators and has particular application to a pneumatic separator.

In carrying out the present invention, it is our purpose to provide a pneumatic separator wherein by means of the air passing through the separator the heavy particles of the matter to be separated may be separated from the relatively light particles and the light particles carried away from the heavy particles.

It is also our purpose to provide a separator of the class described wherein the material will be delivered to the separating table in a number of separate streams and permitted to flow from one table onto another while the air is drawn through the separator, thereby enabling such air to remove the relatively light particles from the heavy particles so that the "tailings" may be separated from the concentrates, the dividing of the material into individual streams serving to augment the action of the air.

Another object of our invention is to provide a separator of the class described wherein the tables may be adjusted relatively to one another so that the air space between the same may be varied and wherein the component parts will be so arranged and correlated that access may be readily had to the interior of the separator to facilitate the adjusting of the tables and to enable the parts to be cleaned or replaced whenever necessary.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter set forth in and falling within the scope of the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view through a separator constructed in accordance with the present invention. Fig. 2 is a horizontal sectional view through the same. Fig. 3 is a perspective view of the inlet spout removed from the separator. Fig. 4 is a vertical sectional view through such spout. Fig. 5 is a cross sectional view therethrough. Fig. 6 is a fragmentary top plan view of the separator.

Referring now to the drawings in detail, 1 designates a vertical casing substantially rectangular in cross section. Uprising from the bottom wall of the casing 1 adjacent to one end wall thereof and parallel with such end wall is a partition 2 of a width equal to the similar dimension of the casing and having the upper end thereof terminating below the top wall of the casing, while depending from the top wall of the casing is a vertical partition 3 disposed behind the partition 2 at a point approximately centrally of the distance between the partition 2 and the remaining end wall of the casing and the lower end of the partition 3 terminates above the bottom of the casing. The end walls of the casing 1 and the partitions 2 and 3 coöperate to form a sinuous air passage and the bottom wall of the casing 1 at the lower end of the front leg of the air passage is formed to provide a depending hopper-shaped trough 4 having the side walls thereof formed with air inlet openings 5 and the lower wall formed with a discharge opening 6, while formed in the top wall of the casing at the upper end of the rear leg of the sinuous air passage is an opening 7 and connected with the opening 7 is one end of a conduit 8 having the remaining end thereof leading into the casing of a suction fan 9 whereby air may be drawn through the sinuous passage in the casing. The bottom wall of the casing 1 at the juncture of the central leg of the sinuous air passage with the rear leg is formed to provide a depending V-shaped trough 10 and one wall of the V-shaped trough 10 is equipped with a hinged valve plate 11 normally held in closed position by means of a spring 12 and capable of movement to open position under the weight of the contents of the trough 10 to release the contents from the trough.

Secured to the partition 2 at a point approximately centrally thereof and projecting across the front leg of the sinuous air passage is a downwardly inclined table 13 comprising a stationary section 14 and an adjustable section 15 secured to the under surface of the stationary section and capable of movement toward and away from the front end wall of the casing to vary the distance between the lower edge of the table

and the front end wall of the casing. In the present instance, the stationary and movable sections 14 and 15 of the table 13 are formed with coöperating slot 17 and opening respectively through which is passed a securing bolt 18 having one end equipped with a thumb nut 19, the bolt 18 and nut 19 coacting to hold the sections of the table in the desired adjusted position. This table 13, of course, extends across the entire width of the front leg of the sinuous air passage. Formed in the front end wall of the casing adjacent to the table 13 is an opening 20 extending across the front wall and detachably secured within the opening 20 and normally closing the latter is a plate 21. Mounted upon the inner surface of the plate 21 is a table 22 comprising, in the present instance, a hollow section triangular in cross section and having the bottom wall thereof lying parallel with the table 13 and the top wall inclined downwardly from the plate 21 toward the rear end of the table 13 so that any material discharged upon the upper surface of the table 22 will gravitate onto the table 13. In the present instance, the front wall of the hollow section forming the table 22 is fastened to the plate 21 by means of headed bolts 23 passed through vertical slots 24 respectively formed in the plate 21 and equipped with thumb nuts 25. By means of the bolts 23 and the slots 24, the table 22 may be adjusted vertically within the casing so that the space between the discharge end of the table 22 and the receiving end of the table 13 may be varied. The table 22 is of a length equal to the table 13. Disposed within the casing 1 above the table 22 and secured to the front end wall of the casing is a vertical inlet spout 26 having the side walls thereof converging downwardly toward each other so that the lower end of the spout will be restricted. The upper end of the spout 26 projects through the top wall of the casing and is closed and formed in the end wall of the spout are openings 27 spaced apart longitudinally of the end wall, while formed on the side edges of the upper end wall of the spout are guides 28 and slidably mounted within the guides 28 is a valve plate 29 having openings 30 formed therein corresponding to the openings 27 and adapted to be moved into and out of registration with the openings 27, respectively. Secured to the upper end of the spout 26 is a hopper 31 and communication between the hopper 31 and the spout is controlled by the valve plate 29. The lower end of the spout 26 terminates above the upper surface of the table 22 and connected with the lower end of the spout is a discharge nozzle 32 having the front and back walls thereof converging downwardly toward each other and the side walls diverging outwardly from each other from the upper end toward the lower end of the spout. Secured to the confronting faces of the front and back walls of the spout 32 are division plates 33 corresponding in position to the positions of the end walls of the nozzle 32 and spaced apart and adapted to divide the material passing through the nozzle into individual streams so that such material will be distributed over the table 22 evenly and uniformly. In the present instance, the opening 7 in the top wall of the casing 1 is controlled by means of a sliding plate 34 operable to establish and cut off communication between the conduit 8 and the casing 1 and to vary the size of the opening 7.

In practice, the material to be treated is deposited in the hopper 31, the valve plate 29 actuated to open position so that such material may pass through the spout 26, and the fan 9 set in operation. The material passing through the spout 26 enters the nozzle 32 and is divided into streams by the division plates 33 and distributed over the entire surface of the table 22 and passes down the table 22 and onto the table 13. The air being drawn through the casing under the action of the fan 9 passes through the material dropping from the table 22 onto the table 13 and separates the light particles from the relatively heavy particles and permits the heavy particles to slide down the table 13 and into the hopper 4. Owing to the shape of the air passage, the light particles are carried downwardly through the central leg of such passage and as they reach the lower end of such leg, drop into the V-shaped trough 10. Should any of the light particles gravitate down the table 13 with the heavier particles, such light particles will be separated from the heavy particles when the material falls from the table 13. When a certain quantity of the light particles accumulate in the trough 10, such quantity or volume being determined by the strength of the spring 12, the valve 11 opens under the weight of the material and permits the latter to gravitate from the trough, thereby automatically releasing the material from the trough so that choking of the separator will be eliminated. The corners of the sinuous air passage at the upper ends of the front and central legs are preferably rounded as at 35 so as to facilitate the drawing of the air through the sinuous passage.

While we have herein shown and described one preferred form of our invention by way of illustration, we wish it to be understood that we do not limit or confine ourselves to the precise details of construction herein described and delineated, as modification and variation may be made within the scope of the claims without departing from the spirit of the invention.

We claim:

1. A separator of the class described com-

prising a casing having a vertical air passage therethrough and formed with an air inlet at the lower end of said passage and an air outlet at the upper end of said passage, a table connected to one wall of said passage in the path of the air and comprising two sections, one of which is adjustable relatively to the other to vary the length of the table, and means for securing said sections in adjusted position, a second table secured to another wall of said passage and disposed above said first table and spaced apart therefrom and inclined downwardly toward the first table, an adjustable connection between the second-mentioned table and the wall of the casing whereby the distance between the tables may be varied, means for delivering the material to be acted upon to said second-mentioned table whereby said material will gravitate down the second-mentioned table onto the first table, and means for drawing air through said passage to separate the light particles from the heavy particles when the material is passing from one table onto the other.

2. A separator of the class described comprising a casing having a vertical air passage therethrough and formed with an air inlet at the lower end of said passage and an air outlet at the upper end of said passage, tables within said passage spaced apart vertically, a vertical spout secured within said casing and having the upper end thereof projecting through the top wall of said casing, a hopper connected to the upper end of said spout, a valve controlling communication between said hopper and spout, a discharge nozzle connected to the lower end of said spout to distribute the material over said tables evenly and uniformly, and division plates within said nozzle acting to divide the material passing through the nozzle into streams.

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

WILLIAM H. WILHELM.
JOHN A. ARTLEY.
HARRY S. BRYAN.

Witnesses:
W. J. EDERER,
C. O. CONN.