

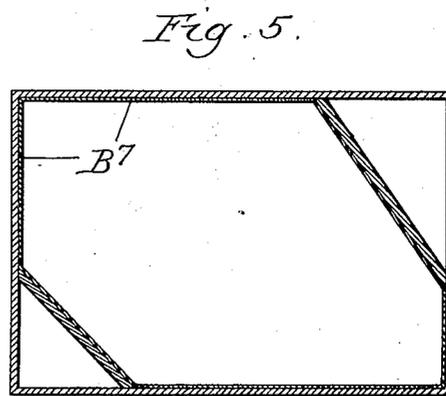
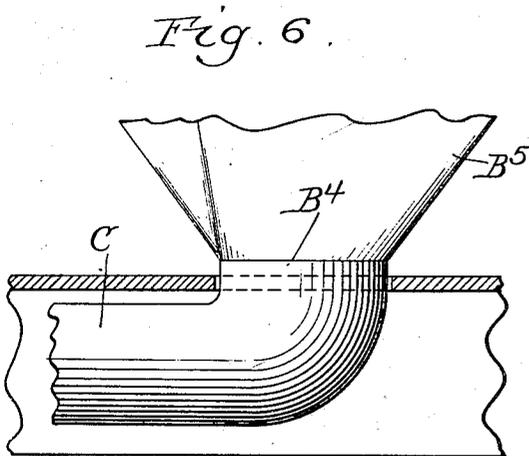
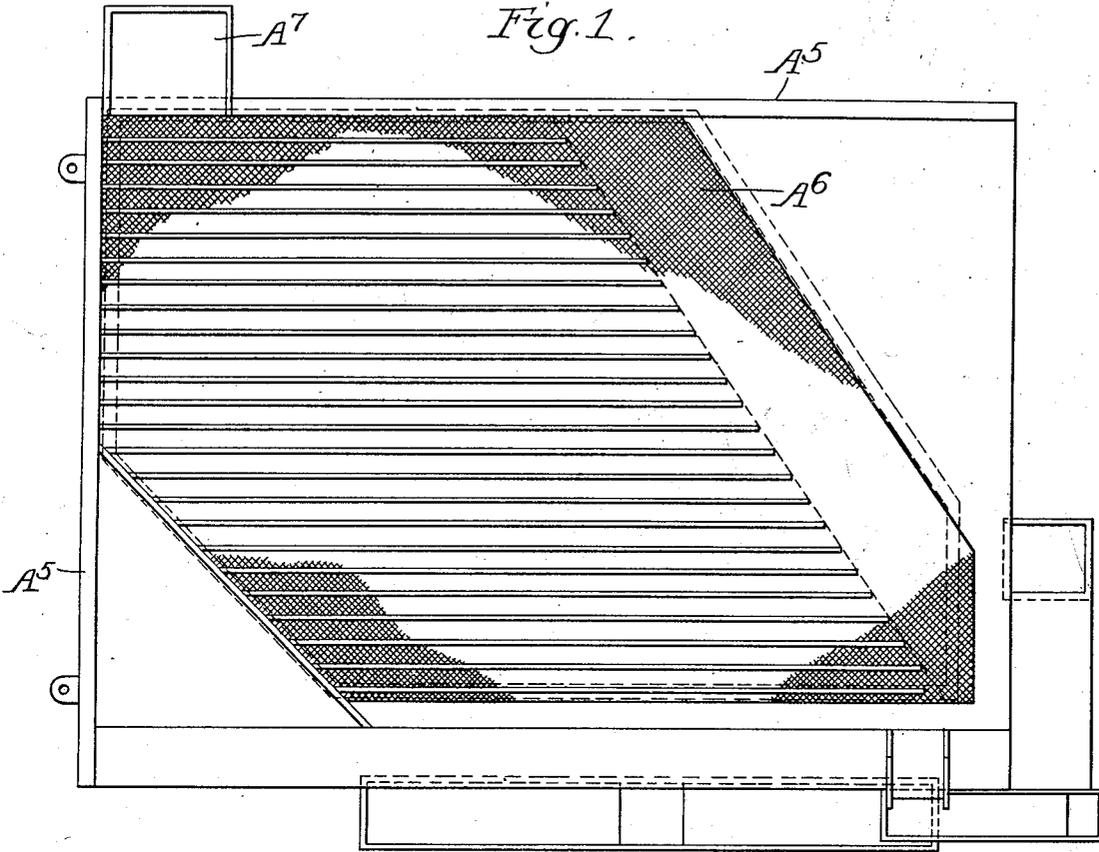
April 10, 1928.

1,665,249

R. W. ARMS
DRY SEPARATING TABLE

Filed May 1, 1924

2 Sheets-Sheet 1



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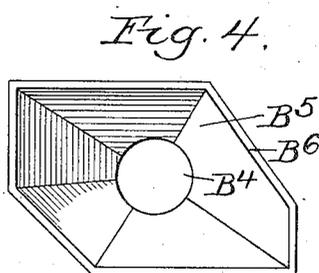
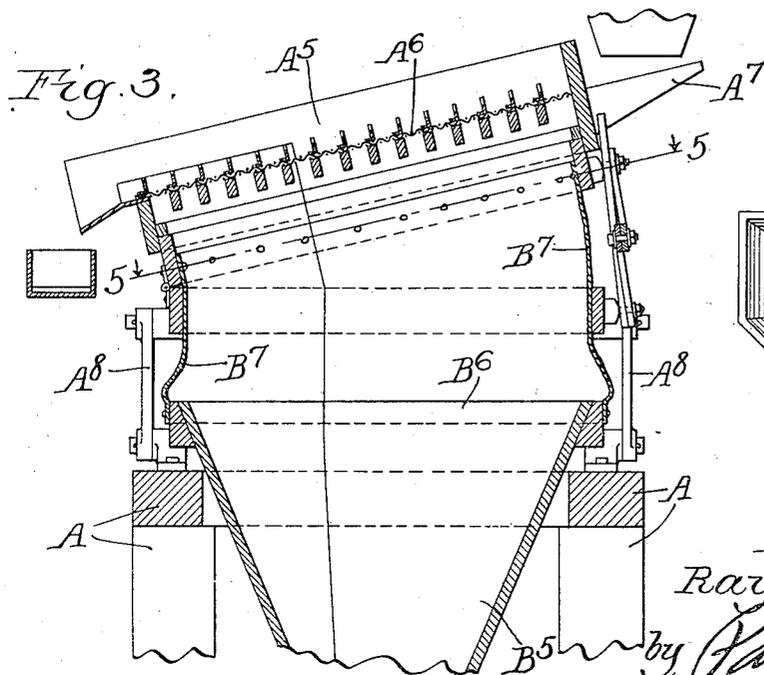
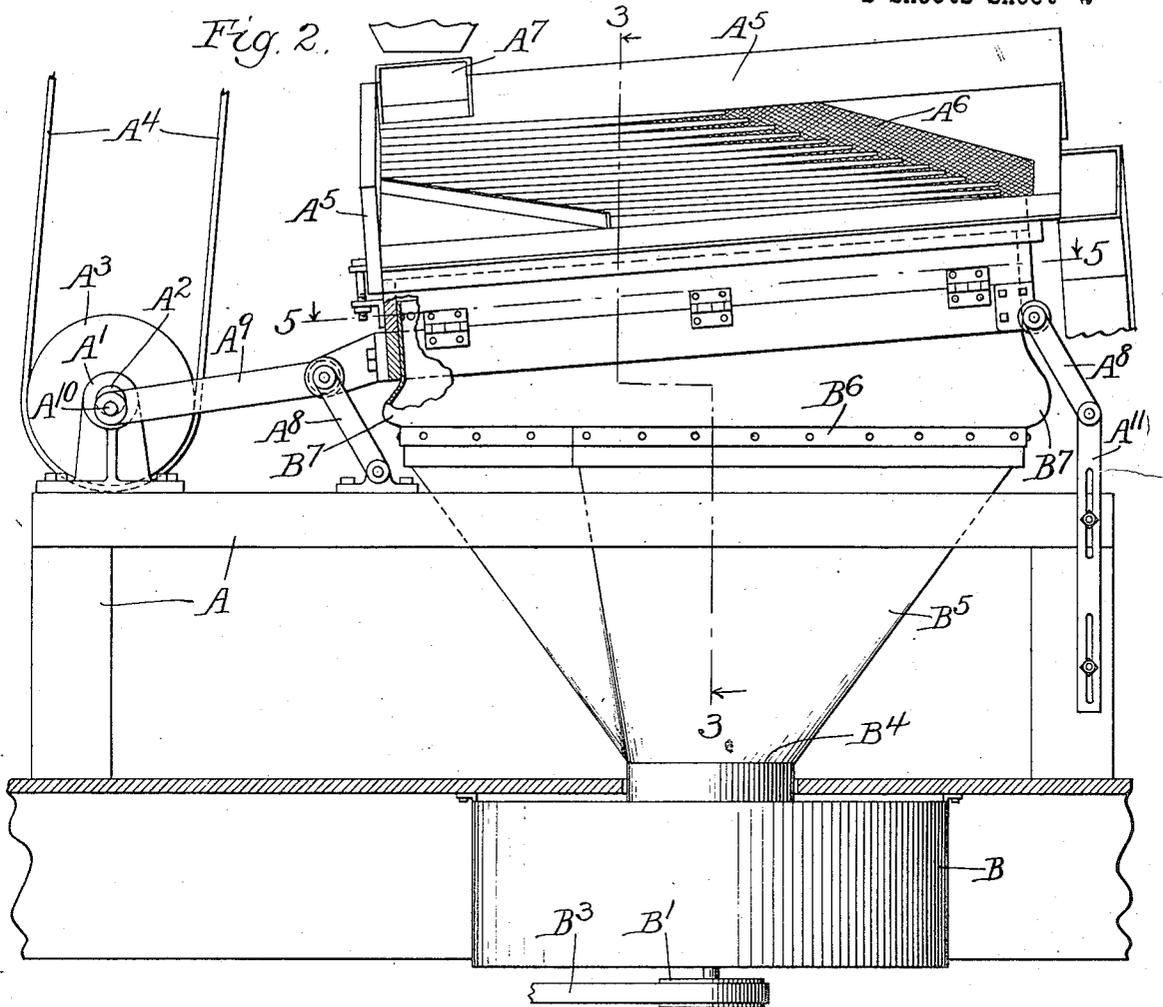
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R. W. ARMS

DRY SEPARATING TABLE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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DRY SEPARATING TABLE.

Application filed May 1, 1924. Serial No. 710,219.

My invention relates to improvements in dry separating tables and has for one object to provide a new and improved means for conveying and guiding the air column across which the material is to be fed to the separating table so as to provide throughout the area of the table a regular and controlled flow of air without eddying cross currents and the like which might otherwise interfere with the air cleaning or separation operation.

Another object is to provide an air chimney which transforms the pressure of the air from velocity pressure to static head at the point at which the air does its work on the flowing sheet or stream of granular material which is being classified.

Another object is to provide a chimney which distributes air uniformly to all parts of the deck surface without recourse to interior baffles, thus making it possible to keep the path of the air current free from obstruction thereby saving power, the chimney being gradually flared upwardly from the point at which the air enters the table assembly to the point at which the air is fed to the underside of the table or deck. The change in cross sectional area being gradual so as to conform to the shape of the deck at the top and the shape of the air duct or fan discharge port at the bottom.

Another object is to provide a connection between the chimney and the deck or table at the upper end of the chimney so as to reduce the weight of the reciprocating parts.

Another object is to provide a compact assembly of fan, air blower and table. Other objects will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a plan view;

Figure 2 is a side elevation with parts in section showing the table, chimney, bellows connection and fan;

Figure 3 is a section along the line 3—3 of Figure 1, taken through the chimney;

Figure 4 is a top plan view of the chimney;

Figure 5 is a section along the lines 5—5 of Figs. 2 and 3;

Figure 6 is a side elevation showing an air duct substituted for the fan.

Like parts are indicated by like characters throughout the specification and drawings.

A is a supporting frame-work or bed. A¹ A¹ are bearings mounted thereon carrying an eccentric shaft A² driven by a pulley A³ and belt A⁴ from any suitable source of power not here shown. A⁵ is a dry cleaning screen or table deck frame. It has on its upper surface a screen A⁶ to which material to be cleaned or treated may be fed through any suitable supply source A⁷. This table is supported on the bed by links A⁸. A⁹ is an eccentric rod extending from the eccentric A¹⁰ on the eccentric shaft to the table to oscillate or reciprocate it on the links. A¹¹ is an adjustable support for the links on one end of the table whereby the angle of inclination of the table may be changed or adjusted.

B is a fan mounted on the underside of the main support adapted to be driven by any suitable power through a pulley B¹ and belt B². B³ is a discharge port of the fan. B⁴ is a gradually expanding chimney extending upwardly from the discharge port of the fan and of the same cross sectional area and shape there as at its lower extremity. This chimney extends upwardly and outwardly terminating just above the top of the frame-work and is rigidly mounted on the frame-work. This chimney at its upper mouth B⁵ conforms in cross sectional area and shape to the screen surface of the deck. B⁶ is a bellows of cloth, rubber or other suitable flexible material interposed between the upper mouth of the chimney and the bottom of the deck, the bellows being attached to the deck around and conforming closely to the shape and cross sectional area of the open screen deck surface.

In a modified form, the pipe C may be substituted for the fan and air may be fed through that pipe through any suitable source not necessarily intimately connected with the assembly. Under some conditions the cross sectional area of the upper end of the Evasee chimney might be of different cross sectional area from the screen though its shape would always be substantially the same. In such case the bellows would bridge the gap between the screen and the chimney and take care of any expansion or contraction of the air current.

It will be evident that while I have shown

an operative device, still many changes might be made in the size, shape and disposition of parts without departing materially from the spirit of my invention. I wish, therefore that my showing be taken as in a sense, diagrammatic.

Experience has shown that if the Evasee chimney which I propose to use to lead the air from the intake or supply point to the deck is made with a very gradual taper, eddying and turbulence will be minimized and baffles to distribute the air over the entire area of the deck in the chimney may be dispensed with but when the angle of inclination of the walls of the chimney with respect to the central axis becomes greater than forty degrees, this effect is negative and the use of baffles becomes imperative. I propose, therefore, that in my chimney the wall shall be inclined to the axis less than forty degrees.

The use and operation of my invention are as follows:

In starting up the table, the eccentric shaft and the fan will be started to cause the table to reciprocate on its link support and to cause the fan to rotate driving a column of air upwardly through the chimney, through the bellows and through the screen surface or the table or deck. Material is fed to the table through the chute and since the table is inclined as indicated, this material tends to move downwardly and laterally across the table. The riffles as shown or any other suitable means which may be desired, tend to resist the downward and encourage the lateral movement of material across the table. The reciprocating action of the screen tends to feed material in the general direction of the riffles. The vibratory action tends to vibrate the material, lift both the riffles and permit travel downwardly across them. The air current exerts a greater lifting effect on the lighter particles than it does on the heavier ones. The tendency is for the lighter particles to ride over the riffles and the heavier ones to stay behind them and to move across the deck while the lighter particles move diagonally across the riffles. This action will not take place without the cooperation of the reciprocating movement and the air current or column tending to support or raise the material. The result of this is a classification of the material with the lighter particles tending to flow at a more or less sharp angle to the riffles, and the heavier particles tending to flow longitudinally along the riffles. The riffles decrease in height toward the discharge end of the table, as indicated, so that as the material moves downwardly toward it, there is a tendency for more and more heavier particles to move across the riffles. The result of this is that the material is first stratified on the face of the table and

then fed across it. The lighter particles come off the table on the left hand side and the heavier particles come off the table on the right hand side as shown in Figure 1, even clear around the upper side thereof.

This results in a classification of material because the material running off the table can be classified as desired, the lighter particles or coal falling into one bin, the middlings or particles partly coal or refuse, falling into another bin and the heavier refuse particles which are stone and the like falling into a third bin.

While air is the gas normally propelled by the fan and driven through the screen and deck, other gases might be used and where I have used the term air, I have used it as a generic term and I do not wish to be bound directly to the use of air alone as the only gas.

While my device is in present practice primarily adapted to the separation and cleaning of coal and while I have spoken of coal middlings, refuse and the like, it will be understood that this language is general and that other materials might be and have been separated or treated by my apparatus.

I have shown a fan discharging directly into the chimney. Obviously a pipe might be substituted for this fan and air be fed to the chimney from any suitable source adapted to supply air under pressure. Under some conditions also the cross sectional area of the upper end of the Evasee chimney might be different from the screen, it might be smaller though it would preferably always be of substantially the same shape, in which case, the bellows would be tapered and would bridge the gap between the chimney, and it is even possible that under some conditions, it might be desirable to have the upper extremity of the bellows larger than the screen in which case the bellows would be tapered in the opposite direction.

I claim:

1. In an air cleaning table, a material supporting deck, having an irregularly shaped air pervious surface, means for feeding a continuous supply of fragmentary material thereto, and means for vibrating the deck to feed such material thereacross in a continuous flowing sheet, means for feeding a blast of air upwardly through the deck and the bed of material thereon, comprising an air supply pipe located and terminating below the deck, a fixed, rigid funnel leading from the discharge end of the pipe upwardly toward the under side of the deck and expanding gradually from general conformity with the supply pipe to accurate conformity with the size and shape of the pervious surface of the deck in a plane immediately below the deck, a bellows joining the extreme upper end of the funnel and the pervious portion of the deck, the body of the bellows being

substantially parallel at all points with the path of air flow from the funnel end to the deck. central point of the polygon defining the pervious deck are all located on the same 10 vertical line.

2. The device of claim 1, characterized by the fact that the central points of the polygons formed by the intersection of the upper and lower extremities of the funnel respectively with horizontal planes, and the

Signed at Chicago, county of Cook and State of Illinois, this 12th day of April, 1924.

RAY W. ARMS.