209 - 142

Search Room

T 209/142

X 209/237

May 28, 1935. C. A. BENNETT ET AL 2,002,974

FRACTIONATION DEVICE AND METHOD FOR EMPLOYING THE SAME

Filed Nov. 26, 1934

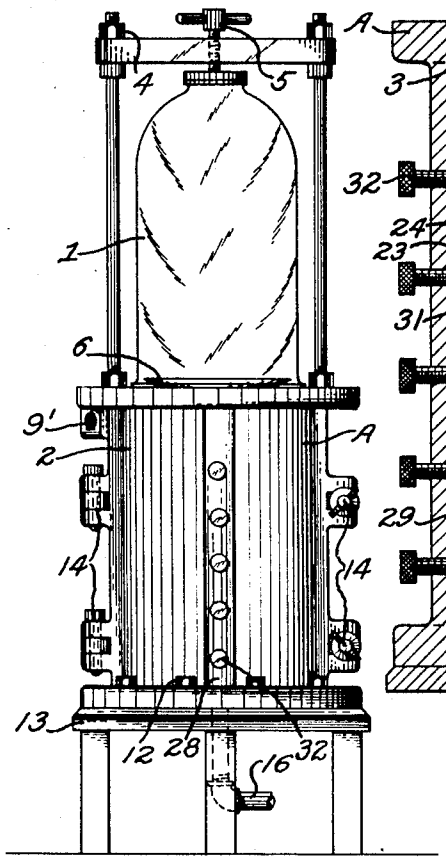


FIG. 1.

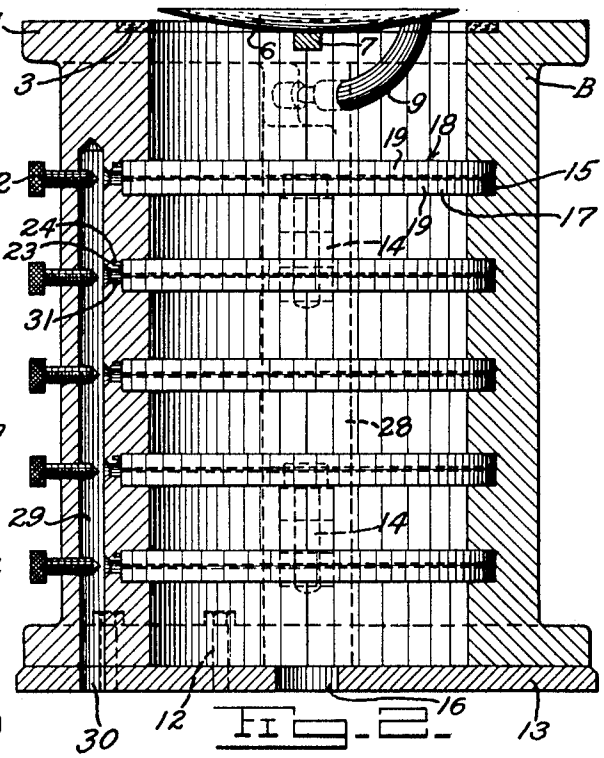


FIG. 2.

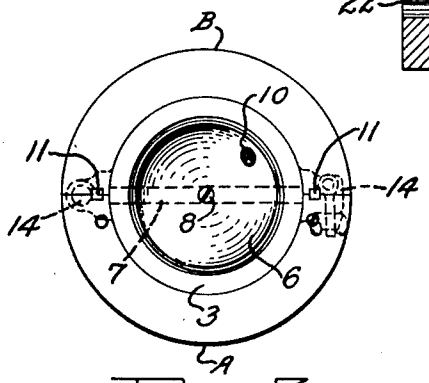


FIG. 3.

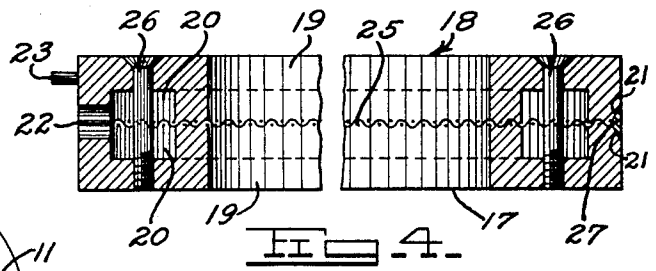


FIG. 4.

INVENTORS
C. A. BENNETT
G. E. GAUS

BY ATTORNEY

PREPARATION.
72

Patented May 28, 1935

2,002,974

UNITED STATES PATENT OFFICE

2,002,974

FRACTIONATION DEVICE AND METHOD FOR EMPLOYING THE SAME

Charles A. Bennett, Stoneville, Miss., and George E. Gaus, Washington, D. C.; dedicated to the free use of the Public

Application November 26, 1934, Serial No. 754,830

1 Claim. (Cl. 19—72)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This application is made under the act of March 3, 1883, as amended by the act of April 30, 1928, and the invention herein described and claimed may be manufactured and used by or for the Government for governmental purposes without the payment to us of any royalty thereon.

We hereby dedicate the invention herein described to the free use of the Public, to take effect upon the granting of a patent to us.

Our invention consists of an improved fractionation device to be used for fibrous material such as seed cotton and lint, whereby waste material and other foreign substances may be separated from the said fibrous material by introduction, within its mass, of a directed stream of air or vapor under pressure. The foreign and waste substances separated from the fibrous material are directed toward a series of screens of various mesh, for fractionation and collection, according to the size of their individual particles.

The object of our invention is to provide a device, not actuated by mechanical means, for rapid separation of a sample of fibrous material, of substances heavier and/or greater in bulk than its individual fibers, and also fly or dust-like waste substances contained therein; and segregation and collection of these waste substances according to their relative bulk. A further object of our invention is to provide automatic and continuous means for prevention of clogging the separator screens by the felting action of the fly. This felting action causes erroneous deposition and collection of waste particles on the various screen surfaces not in accordance with their respective bulk and the relative size of screen mesh.

In order to carry out the purposes of our invention, reference is to be had to the peculiar combination and arrangement of parts as shown in the accompanying drawing, being a preferred embodiment of our invention, forming a part of this specification, in which similar numerals refer to similar parts throughout the several views.

Figure I is a rear elevation of our device.

Figure II is a vertical section through the fractionation cylinder.

Figure III is a top view of the fractionation cylinder.

Figure IV is a partial section of a screen ring.

A wide mouthed preferably transparent vessel 1, having its upper end sealed, is mounted on cylinder 2 by means of gasket 3 and yoke clamp assembly 4—5. Recessed cross-bar 7 spans the interior of cylinder 2 beneath gasket 3. Concave circular baffle plate 6 is attached to cross-bar 7 by means of screw 8. The diameter of baffle plate 6 is slightly less than the internal diameter of vessel 1, and the bore of cylinder 2.

Air injector tube 9, with its inlet 9', in section A of cylinder 2, passes through cylinder 2 beneath baffle plate 6, and has its orifice 10 located eccentrically in baffle plate 6.

Cylinder 2 is divided vertically into two sections A and B, respectively, with its vertical edges lined with gaskets 11. Section A of cylinder 2 is fastened at its lower end by means of bolts 12 to the base plate 13. Sections A and B of cylinder 2 are held together by hinge and locking means 14. Recesses 15 encircle the interior walls of cylinder 2.

Base plate 13 has a central air outlet 16. Screen trays 17, of varying size mesh, are removably mounted in recesses 15, and are arranged therein according to fineness of their mesh. Screen tray 17 having the coarsest mesh is placed in the uppermost recess 15.

Screen trays 17 have a supporting ring 18 which comprises two ring segments 19.

Ring segments 19 have a groove 20 and chamfer 21 formed thereon.

The periphery of screen ring 18 has a duct 22 formed therein, which connects with groove 20 at the juncture of ring segments 19. Screen ring 18 carries a pin 23 which is adapted to seat in pilot hole 24 in recesses 15.

Screen cloth 25 is clamped between ring segments by means of screws 26, with grooves 20 and chamfers 21 adjacent.

Chamfers 21 are hermetically sealed by means of solder 27, or other suitable material, at the periphery of screen ring 18.

Boss 28 is disposed vertically on the exterior wall of section A of cylinder 2, with an air duct 29 formed therein. Duct 29 has an intake 30 located in base 13.

Air duct 29 is connected to ducts 22 by means of cross-air ducts 31.

Pins 23 in combination with pilot holes 24, located in recess 15 of section A of cylinder 2, permit alinement of air ducts 22 with cross-air ducts 31.

Pin screw valves 32 control the flow of air from air duct 29 to grooves 20 in screen rings 18.

Our invention may be practiced by first placing screen trays 17, in the order above described, in recesses 15 within cylinder 2 of section A, and alining ducts 22 with cross-air ducts 31.

Section B of cylinder 2 is then closed and sealed with section A by means of gaskets 11 and hinge and locking means 14. A desired quantity of fibrous material is then placed on

baffle plate 6. Vessel 1 is then placed open end downward on gasket 3 and held in place on cylinder 2 by means of yoke clamp assembly 4—5. Air under pressure is admitted through tube 9 and directed into vessel 1 by means of orifice 10. The current of air on leaving orifice 10 contacts the fibrous material on baffle plate 6, causing it to rotate in a curvilinear and/or swirling motion and to be violently propelled against the inner walls of vessel 1 and baffle plate 6. The resultant permutations and combinations of action of centrifugal force, air propulsion, and beating against the edge of baffle plate 6, causes the particles of fly and waste, or foreign matter, contained in the fibrous material to be dislodged from the enmeshing fibers of the sample. The particles of matter thus liberated are carried in suspension by the moving air current.

The current of air escaping from vessel 1 passes downward, around, past and beneath the periphery of baffle plate 6, enters the interior of cylinder 2 and thence passes through the series of screen trays 17, fitted in recesses 15, to emerge at air outlet 16.

The particles of fly, waste, or foreign matter, held in suspension by the downward moving air current, become deposited on the successive screen cloths 25 of screen trays 17 in accordance with their respective size.

Ordinarily the finer particles of fly or lint, carried by the downward moving air current, adhere to the surfaces of the screen cloths forming a felt thereon. This felting action interferes with the passage through the upper and coarser mesh screen trays, of subsequent fine particles of fly, foreign and waste substances carried by the downward moving air current, preventing proper segregation and collection of the particles on the lower and finer mesh screen trays.

The formation of an undesirable felt on the screen trays 17 during operation of our device, is overcome by passing air under pressure through duct 29, thence through pin screw valves 32 to cross-air ducts 31, thence through ducts 22 and into grooves 20 of screen trays 17. At the points of intersection of the warp and woof strands of screen cloth 25, clamped between ring segments 19, the thickness of the screen cloth is greater than the diameter of the warp or woof wires, respectively. The distance between ring segments 19 is greater than the thickness of the individual strands of wire forming the screen cloth, thereby permitting the passage of air, under pressure, from annular chamber 20 into the interstices between the intersections of the strands of screen cloth 25 and thence across the upper and lower surfaces of screen cloth 25. Since the chamfers 21 formed in the periphery of screen ring 18, with the exception of the induction port 22, are hermetically sealed with solder 27, or other suitable material, the air admitted to annular chamber 20 can emerge only into the interstices between the strands of screen cloth 25. The current of air escapes from grooves 20 into the interstices between the strands of screen cloths 25, then sweeps across the upper and lower surfaces of screen cloths 25, and passes downward through the interior of cylinder 2 emerging at air outlet 16.

It is obvious the cross currents of air sweeping the surfaces of the individual screen trays agitate the substances deposited thereon, prevent clogging and formation of a felt on the screen surfaces, and permit passage through upper and coarser mesh screen trays of fine particles of matter for segregation and collection by the lower and fine mesh screen trays.

It is also obvious each or any number of the screen trays may have the substances deposited therein agitated at will by manipulation of pin screw valves 32, controlling the volume of air admitted to grooves 20.

It should be understood that reasonable modifications may be made in the construction and positioning of the baffle plate 6, tube 9 and screen tray assemblies 17, 18, 19, without departing from the spirit of our invention.

Having thus described our invention, what we claim for Letters Patent is:

In a device of the character described, comprising a base having an exhaust port formed therein; a vertical sectional cylindrical chamber hingedly connected and provided with locking means with one of its sections affixed to said base; a boss having a duct formed therein and integral with the outer wall of said affixed section; said duct having its induction port in said base, and a plurality of valve controlled eduction ports formed in the interior walls of said affixed section; said chamber having horizontally encircling recesses formed on its inner wall and abutting said eduction ports; a plurality of circular bi-sectioned trays, comprising screen cloth, and an induction port formed on the periphery thereof and communicating with a channel having eduction ports formed in the interstices of said screen cloth; means on the periphery of said trays for preventing leakage of air; means for alining, and means for slidably mounting said trays within said chamber; a circular concave baffle plate, of lesser diameter than the bore of said chamber, detachably mounted on the upper end thereof; an inductor tube having its eduction port terminating at an opening provided off center in said baffle plate and having its induction port formed in the wall of the affixed section of said chamber; a dome-like substantially transparent receptacle with a diameter substantially equal the bore of said chamber and adapted to surmount said baffle plate, and means for detachably mounting said receptacle on said chamber.

CHARLES A. BENNETT.
GEORGE E. GAUS.