

Nov. 11, 1952

W. L. MCGEHEE

2,617,529

DEHYDRATOR

Filed March 5, 1946

2 SHEETS—SHEET 1

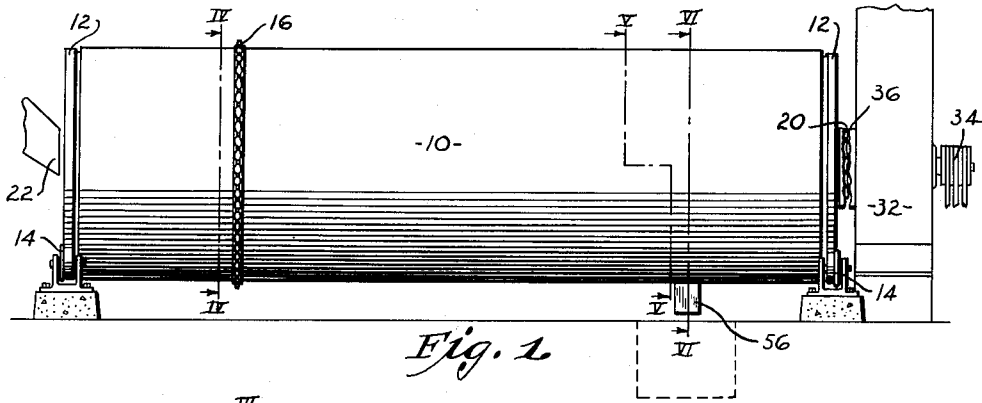


Fig. 1

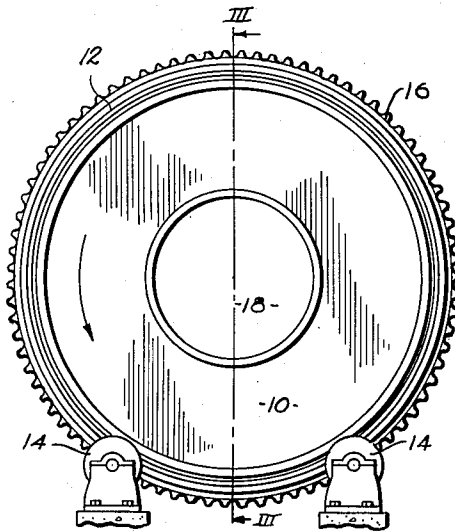


Fig. 2.

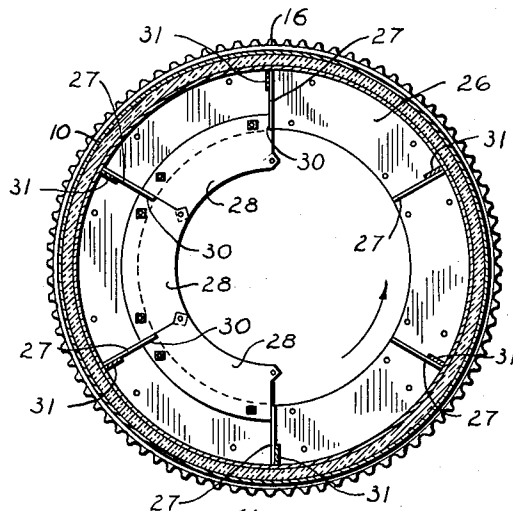


Fig. 4.

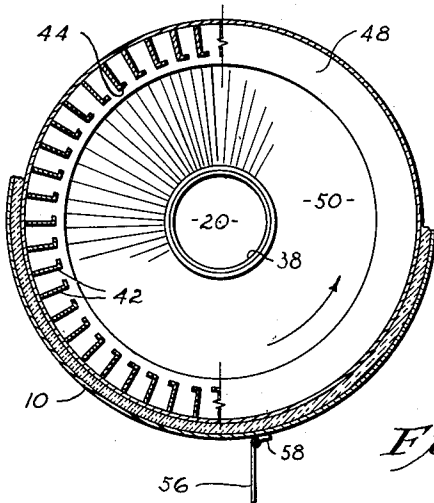


Fig. 5.

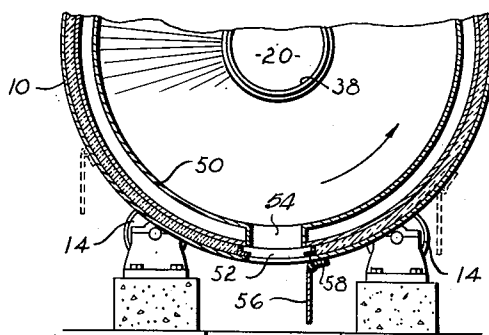


Fig. 6.

INVENTOR.

Wallace L. McGehee

BY

Robert Young
ATTORNEY

Nov. 11, 1952

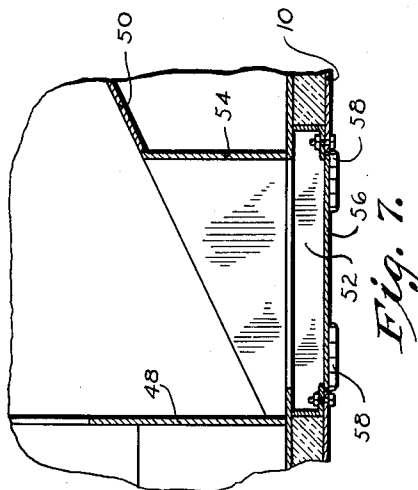
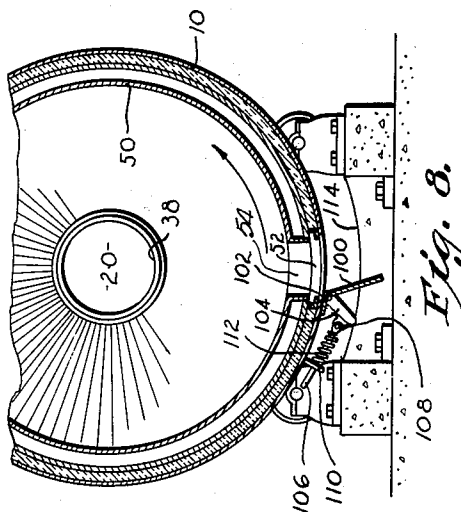
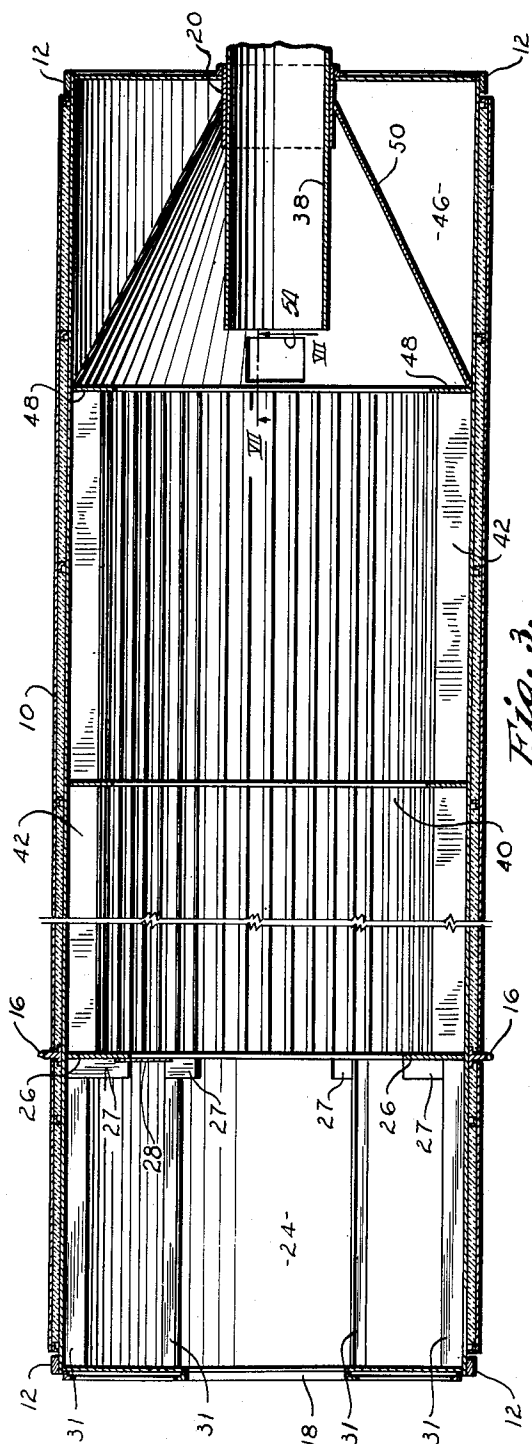
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2 SHEETS--SHEET 2



INVENTOR.
Wallace L. McGehee
BY 
ATTORNEY

UNITED STATES PATENT OFFICE

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DEHYDRATOR

Wallace L. McGehee, Kansas City, Mo.

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2. Claims. (Cl. 209—135)

1

This invention relates to apparatus for dehydrating crops or other materials from which it is desired to withdraw substantially all the moisture and simultaneously separate the relatively heavy particles from those capable of being entrained in a stream of air passing through the machine.

One of the primary objects of this invention is the provision of a dehydrator having as a part thereof novel and unique means for automatically separating particles of comparatively heavy character from flocculent or lighter portions of the mass without interrupting the continuous operation of the dehydrator.

Other aims of the invention are the provision of novel, unique, durable and effective parts for embodying the broad concepts of the invention; to provide means for positively directing heavy portions of the mass of material being dehydrated toward a discharge opening where the same will pass completely from the shell of the dehydrator periodically and positively as the said shell is rotated about its longitudinal axis; the provision of structure cooperating with the discharge opening formed in the shell as aforesaid to insure that the particles of heavy character will escape from the shell through said discharge opening and the fine or less heavy particles of the mass being dried will be entrained in a stream of air under pressure passing to an outlet port; and to provide means within the revolvable shell in the dehydrator for controlling the amount of material carried in one of the compartments of the shell, which said last mentioned means is especially disposed with respect to the aforesaid discharge opening and a number of lifts mounted within the shell to act upon the material being treated.

Other aims of the invention will appear during the course of the following specification referring to the accompanying drawings, wherein:

Figure 1 is a side elevational view of a dehydrator made pursuant to the present invention.

Fig. 2 is an elevational view of the intake end thereof.

Fig. 3 is a condensed longitudinal vertical sectional view taken on line III—III of Fig. 2.

Fig. 4 is a transverse cross-sectional view taken on line IV—IV of Fig. 1 looking in the direction of the arrows.

Fig. 5 is a similar cross-sectional view taken on line V—V of Fig. 1.

Fig. 6 is a fragmentary cross-sectional view taken on line VI—VI of Fig. 1.

2

Fig. 7 is an enlarged fragmentary sectional view taken on line VII—VII of Fig. 3; and

Fig. 8 is a fragmentary cross sectional view through a dehydrator made to embody a modified form of the invention.

The material handling apparatus chosen for illustration comprises a substantially cylindrical double wall shell mounted for rotation with its longitudinal axis disposed horizontally and broadly designated by the reference numeral 10. The wall is insulated as illustrated in Figs. 3 to 6 inclusive and has at least two external annular bands 12 designed to engage supporting rollers 14, thereupon the entire weight of shell 10 is impressed during the operation of the equipment. An annular sprocket 16 on shell 10 is engaged by any suitable form of drive chain or the like, as is conventionally known but not here illustrated.

Shell 10 has an intake opening 18 at one end thereof and an outlet port 20 at the opposite end; the former being associated with a material chute 22, as shown in Fig. 1, and through the medium whereof the substance to be dehydrated is introduced. The interior of shell 10 is divided into a number of sections for lifting and shifting the material, as will be more fully hereinafter set down when describing the precise operation of the dehydrator.

The first section within shell 10 is designated by the numeral 24 and is divided from the remaining part of shell 10 by a radial, inwardly directed flange 26 connected by welding or other suitable means, to shell 10 and to member 27, fixed within shell 10, as clearly shown in Figs. 3 and 4. A flange having a number of segmental sections 28 are bolted or otherwise removably secured to flange 26 and have notches 30 adjacent to members 27 when said sections are in position as shown in Fig. 4. These sections 28 are replaceable and shiftable to the end that the opening described by the inner arcuate edges thereof, may be varied in diameter to control the velocity of air passing longitudinally there-through. A plurality of longitudinal radial inwardly directed agitators or lifts 31 are fixed within section 24 and extend from flange 26 to the end of shell 10 having intake opening 18. Incidentally, the conventional blower fan 32 is in communication with the outlet port 20 of shell 10, as shown in Fig. 1, and the fan is driven by suitable means 34. The fan 32 is joined to shell 10 by a conduit 36 of desired length and fan 32 communicates with an ordinary cyclone separator, or other analogous ap-

paratus, as the material being dehydrated requires.

An adjustable longitudinally shiftable tube 38 fitted into outlet port 20 has its inner end intermediate the zone of juncture between the conical section of shell 10 and the section next adjacent thereto and the end of shell 10 having the outlet port therein, all as will be more fully hereinafter set forth. The distance of projection into shell 10 by tube 38 may be varied because of the sliding interengagement of the parts shown in Fig. 3. The major portion of the length of shell 10 is occupied by a central section 40 wherein a number of radial lifts 42 are mounted in a manner shown in Fig. 5. These lifts are in spaced relation, have laterally extending lips 44 at the free edges thereof and are so arranged that the lips are at the leading sides of all of lifts 42 for the purpose of gathering small quantities of the material that might drop by gravity to the lower portion of shell 10. After this material is elevated to a point above the horizontal plane passing through the longitudinal axis of shell 10 by rotation thereof, the same begins to fall and thereby traverse by way of intersecting the path of travel of air moving through the shell from intake opening 18 to outlet port 20.

The end section 46 next adjacent to outlet port 20 preferably has structure therein for moving particles resting on the inner surface of the shell inwardly from said end toward section 40 and against the radial inwardly directed flange 48.

In the chosen form of this structure the same comprises a frusto-conical wall 50 extending inwardly and diverging from the outlet port 20 to the annular inner wall of shell 10 and to flange 48, all as clearly shown in Fig. 3.

A radially disposed discharge opening 52 is formed through the shell at the zone of juncture between the frusto-conical section and flange 48 at the end of section 40 and to insure that the discharge opening 52 communicates with the interior of wall 50, a throat 54 is provided, as clearly shown in Fig. 7. A door 56 hinged as at 58 to shell 10 is movable to and from a position closing opening 52 and as shell 10 rotates, this door will swing in the manner illustrated in Fig. 6. As opening 52 approaches its lowermost position during rotation of shell 10, the door will swing open through the action of gravity and an unrestricted passage for the discharge of heavy materials resting upon wall 50 will be presented. These heavy materials migrate from adjacent to outlet port 20 toward section 40 or the outermost zone on wall 50 as the dehydrator is in operation while the lighter flocculent portions of the mass of material being treated are entrained in the stream of air passing out through tube 38, outlet port 20 and thence to fan 32. Such material, the heavier portions of the material being dried, and foreign matter as may enter intake opening 18 will therefore, be automatically dumped through discharge opening 52 as soon as door 56 is opened to the position shown in Fig. 6.

If it is desirable to provide positive structure for moving the door to the open position, such may be done through the employment of means such as illustrated in Fig. 8 showing a modified form of the invention. In this type of dehydrator with positively operating dumping means for the heavier materials, door 100 is hingedly mounted as at 102 adjacent to discharge opening 52 through shell 10. Arm 104 rigid to one edge of door 100 has a rod 106 pivotally joined thereto at 108 and this rod slides through an ear 110

on shell 10. A compression spring 112 coiled about that portion of rod 106 between arm 104 and ear 110 yieldably maintains door 100 in the closed position until such time as arm 104 strikes cam face 114 extending a distance to each side of a vertical line projected upwardly through the longitudinal axis of shell 10. Thus—interengagement between arm 104 and cam face 114 occurs while discharge opening 52 is moving through the lowermost portion of its path of travel. Door 100 will be positively opened and held in such condition until arm 104 leaves cam face 114 whereupon spring 112 will close the door where it remains in such condition until a substantially complete revolution has again occurred on the part of shell 10.

Thus—it will be manifest that either form of the discharge means including opening 52 and doors 56 or 100, as the case may be, will efficiently dump relatively heavy materials from within shell 10, if said materials are riding upon the inner surface of shell 10 adjacent to opening 52 or 54. The flange 48 will serve to cooperate with wall 50 or wall of shell 10 if wall 50 is eliminated in collecting the heavier particles that should be evacuated, for they seek the lowermost portion of shell 10 where the periodic presence of opening 52 will allow the heavier material to fall through the opening when the door swings open.

The usual means for directing flame into the dehydrator or otherwise heating the interior of shell 10 may be employed, but since these features do not constitute a fulfillment of the objects of the invention, and further since they are of well known character, a discussion thereof is unnecessary to those skilled in the art.

In the operation of the equipment, material to be dehydrated enters the shell 10 and is retained in compartment 24 until it becomes light enough to be drawn through the opening formed by sections 28 on flange 26.

When the material reaches section 46, it will separate into light and heavy groups. The heavy material will drop out of the stream of air drawn through tube 38, its specific gravity depending upon the position of the inner end of the tube with respect to outlet port 30.

It is realized that other means may be provided in a dehydrator for automatically eliminating the heavier particles and therefore, it is desired to be limited only by the spirit of the invention and scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a dehydrator, an elongated, cylindrical drum mounted for rotation on a horizontal axis and having a pair of end walls, one end wall having an inlet port and the other end wall having an outlet port; a hollow frusto-conical member in the drum having a vertical base and an apex disposed adjacent to said other end wall, said base having an opening therethrough coaxial with the drum; and a radially disposed outlet spout extending through the drum and disposed to place said member into communication with the exterior of said drum, said spout being disposed between said other end wall and said base of the member and next adjacent the latter.

2. In a dehydrator, an elongated, cylindrical drum mounted for rotation on a horizontal axis and having a pair of end walls, one end wall having an inlet port and the other end wall having an outlet port; a hollow frusto-conical mem-

ber in the drum having a vertical base and an apex disposed adjacent to said other end wall, said base having an opening therethrough coaxial with the drum; a radially disposed outlet spout extending through the drum and disposed to place said member into communication with the exterior of said drum, said spout being disposed between said other end wall and said base of the member and next adjacent the latter; and an elongated tube extending into said member through said outlet port, said tube being reciprocable in the outlet port for movement of the innermost end thereof to and from a position adjacent a vertical plane through the outlet spout.

WALLACE L. McGEHEE.

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