ROBERT DIAMOND MAYO & ROBERT DAVID MAYO.

GRAIN CLEANING, DRYING, AND STORING APPARATUS.

APPLICATION FILED JUNE 27, 1913.

1,094,452.

Patented Apr. 28, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

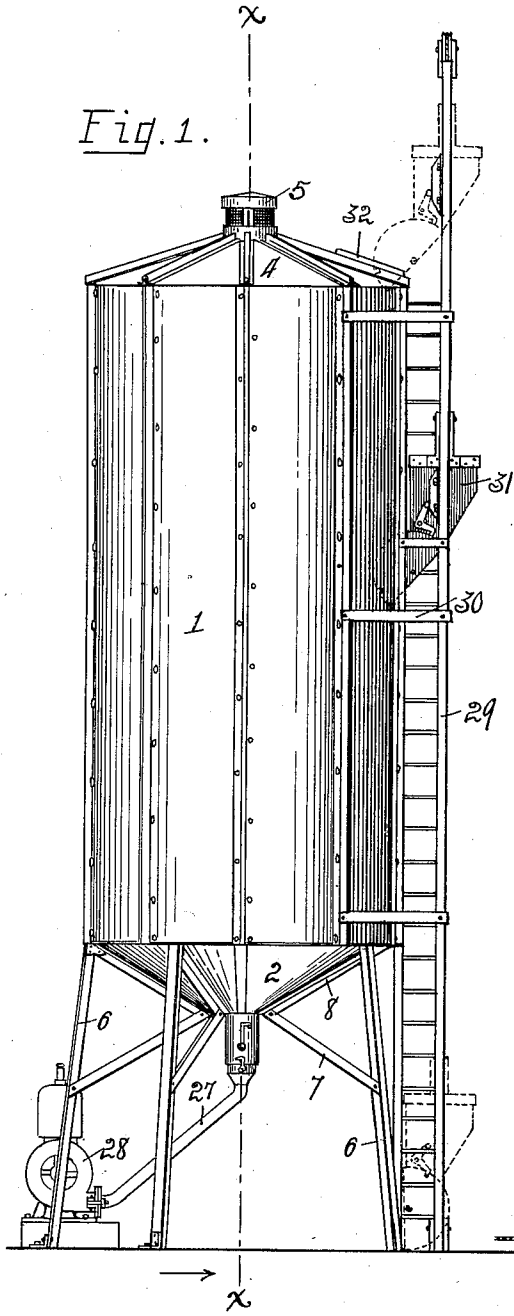
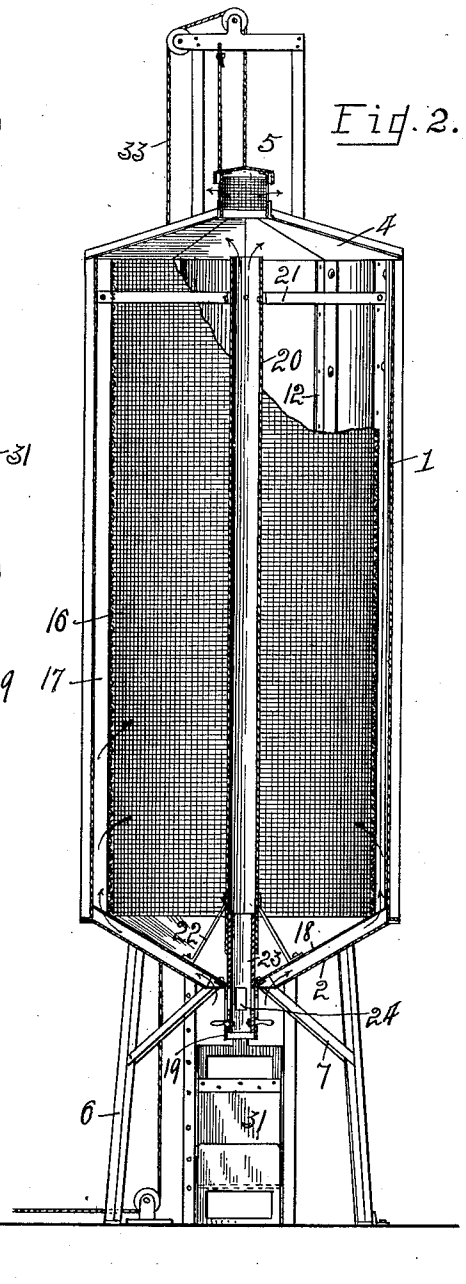


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

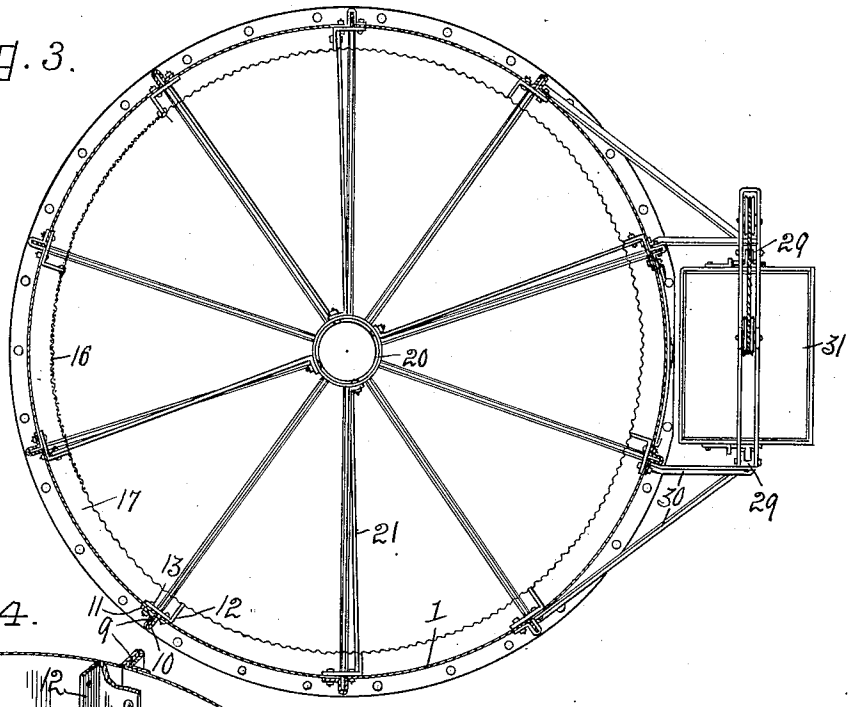


Fig. 4.

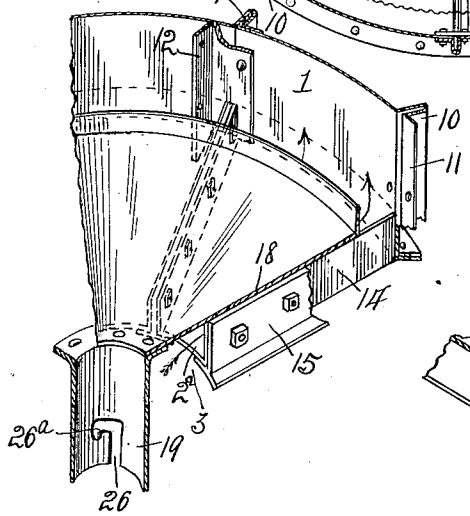
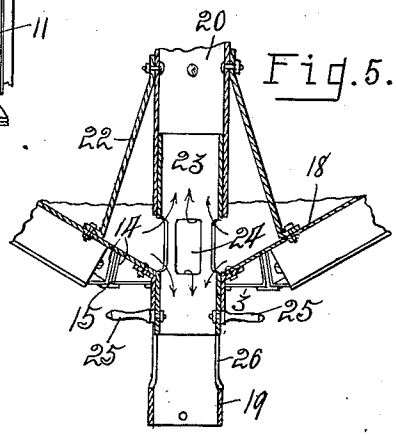


Fig. 5.



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ROBERT DIAMOND MAYO AND ROBERT DAVID MAYO, OF LAKEWOOD, OHIO.

GRAIN CLEANING, DRYING, AND STORING APPARATUS.

1,094,452. Specification of Letters Patent. **Patented Apr. 28, 1914.**

Application filed June 27, 1913. Serial No. 776,121.

To all whom it may concern:

Be it known that we, ROBERT DIAMOND MAYO and ROBERT DAVID MAYO, citizens of the United States, and residents of Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Grain Cleaning, Drying, and Storing Apparatus; and we do hereby 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates particularly to grain cleaning, drying and storing apparatus, but it is not restricted to such use, as it can be used in any connection for which it may be adapted or appropriate.

The object of our invention is the provision of an improved apparatus of this class, which is capable of use as a storage chamber for grain, and is operable to effect a drying, cleaning and agitation of the grain within the chamber.

A further object of the invention is the provision, in an apparatus of this character, of an interior chamber having a perforated incasing wall within which the grain is confined, and an encompassing wall of imperforate material in spaced relation to the perforated wall to provide a passage therebetween for the circulation of air and for the drainage of moisture gathering on the inner surface of the outer wall by reason of the sweating of the grain.

Further objects and advantages will be apparent from the following detailed description.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of an apparatus embodying the invention. Fig. 2 is a central vertical section on the line *x*—*x* in Fig. 1, with parts broken away. Fig. 3 is an enlarged cross-section of the apparatus. Fig. 4 is an enlarged sectional detail in perspective of a bottom portion of the apparatus, and Fig. 5 is an enlarged section of the central base portion of the apparatus.

Referring to the drawings, 1 designates the outer shell of the apparatus, which is preferably, but not necessarily of cylindrical form in cross-section and intended to stand upright in use. This shell is preferably made of sheet metal of imperforate form, and has an outwardly protuberant conical bottom 2 provided with an opening 3 in its center. The upper end of the shell is closed by a top 4, in the present instance, of outwardly protuberant conical form, and such top is provided in its center with a turret or cupola 5 having screened ventilating opening or openings for the outward passage of air and dust from the interior of the shell and being vertically adjustable relative to the top to change the size of the ventilated opening as desired. The shell is preferably supported a distance above the ground or floor over which it is positioned by legs 6, which are connected by braces 7 to the inner edge portion of the bottom 2. A brace strip 8 also extends from the upper inner end of each strip 7 to the upper end of the respective leg, and tends to brace and reinforce the bottom 2.

It is preferable to make the body of the shell of a plurality of upright sections, which lap each other at their adjoining edges, with each section provided at one side or vertical edge with an outwardly turned flange 9, and adjacent to its other edge with an outwardly projecting vertically-disposed looped portion 10, into the recess of which the flange 9 of the adjoining lapped edge is intended to project. The loop 10 is provided in slightly spaced relation to the edge of the section in which it is formed to provide a bolt-receiving footstrip 11 at the outer side thereof for bearing against the adjoining section at the inside of the flange 9 thereof, as shown in the drawings. Each seam is covered at its inner side by one flange of an angle-bar 12, with such flange rigidly secured to the adjoining sections at opposite sides of the seam by bolts or rivets 13, or in any other suitable manner. The securing means 13 at one side of the seam pass through the angle-bar, the edge 11 of a section and the adjacent or lapped portion of the adjoining section, as indicated. It is evident with this manner of connecting the section edges that such edges are not only securely united in a removable manner, but that the uniting means forms external and internal vertical

reinforcing ribs on the body to strengthen the same against buckling or collapsing stresses. The top 4 is also of sectional construction with the adjoining edges of the sections thereof radiating from the turret 5 and secured together in a manner similar to that above described. The bottom 2 has the side edges of its sections provided with up-turned flanges 14 with the flanges of adjoining edges bolted, riveted or otherwise suitably secured to opposite sides of the interposed flange of a reinforcing T-bar 15, the head or cross-section of which is disposed at the under side of the bottom and underlies the adjacent edges of the respective sections.

Provided within the shell 1 is a lining 16 of perforate material of any suitable form, which lining extends substantially the entire depth of the shell and is spaced from the shell by the inturned flanges of the angle-bars 12 to provide a space 17 between the lining and shell entirely around the same, as shown. The lining 16 is provided with a preferably imperforate bottom 18 of outwardly protuberant conical form, which rests upon the up-turned flanges of the bottom 2 of the shell to provide a space 2^a between such bottoms. The bottom 18 is provided at its center with an opening, which is smaller than the opening in the center of the bottom 2 and secured to and depending from the marginal edge of such smaller opening is a pipe or tubular extension 19. The pipe 19 is spaced from the edge of the opening in the bottom 2 to permit air to freely enter the space between the two bottoms, as shown in Figs. 2, 4 and 5.

Standing upright centrally within the lining 16 is a pipe 20, which is braced by upper and lower sets of brace members 21 and 22, respectively, and has its upper end terminating short of the top 4 and its lower end terminating short of the portion of the bottom 18 from which the tubular part 19 extends and in axial register with such part. A tubular valve member 23 connects the adjacent end portions of the pipes 19 and 20 and is mounted for reciprocatory movements therein, as best shown in Fig. 5. This valve member is provided with a series of openings 24 disposed to register with the space between the lower end of the pipe 20 and the bottom 18 when the valve member is raised within the pipes 19 and 20, whereby to open communication between the interior of the tank or storage chamber and the pipe 20, and the upper portion of the valve member is of imperforate form and of sufficient length to close the space between the bottom 18 and lower end of the pipe 20 when the valve member is lowered, the openings 24 then being disposed within the pipe 19. The movements of the valve member are controlled from below the apparatus by handles 25, which project radially from the lower end of the valve member through registering vertical slots 26 in the pipe 19, the upper ends of such slots being angled, as shown at 26^a in Figs. 1 and 4, to enable the handles to rest in such angled portions to support the valve member in raised or open position. The lower end of the lower pipe or extension 19 has communication through a pipe 27 with a blower 28 or other suitable means for creating a forced draft upward through the extension 19, valve member 23 and pipe 20.

A pair of vertical guide-bars 29, 29 are disposed in parallel spaced relation at one side of the apparatus, being spaced therefrom by bars 30, and guided for vertical movements between the guide-bars 29 is a bucket 31 for hoisting grain or other material to the hatchway 32 in the roof or top floor of the apparatus or to other openings in the apparatus, as best shown in Fig. 1. A cable 33 is operable in a well known or any suitable manner to hoist and lower the bucket 31 and may be actuated by a horse or other suitable draft means. The bucket 31 is preferably adapted to automatically dump its load into the storage chamber of the apparatus when it moves into register with a predetermined one of the dumping openings in the apparatus. As the construction and operation of this conveyer means forms no part of the present invention the same will not be specifically described.

The operation of our apparatus is as follows: Grain or other suitable matter having been deposited within the lining 16 of the apparatus, a forced draft is created through the pipe 20 and the valve 23 then opened to a greater or less extent, as desired, to permit the grain or other matter within the apparatus to flow into the lower portion of the pipe 20. As the matter flows into the pipe in this manner the air draft forces it upward through the pipe and discharges it upon the top of the matter within the apparatus while the dust and exhaust air which has become moist by contact with the grain or other matter, should the latter be of a moist nature, has its exit from the top of the apparatus through the screened openings of the turret 5, which may also be adjusted to permit a greater or less amount of the air to pass therethrough. If the turret 5 is open a sufficient extent to permit all of the air of the forced draft to pass therethrough from the apparatus, an upward draft will be created through the passage 2^a between the bottoms 2 and 18 and the passage 17 between the casing 1 and lining 16, a portion of which air passes through the lining 16 and into the grain or other matter contained therein. If the turret 5 is not open a sufficient extent to permit the passage therethrough of all of the air which is forced into the apparatus through the pipe 20 a

portion of such air will create a back draft down through the grain or other matter and out from the bottom of the apparatus through the passages 17 and 2a. When the air draft creating means is not in operation the pipe 27 leading from the blower 28 can be disconnected from the extension pipe 19 to permit air to enter the apparatus through the pipes 19 and 20 and also through the passages 2a—17, whereby to have a drying effect on the grain or other matter within the apparatus. It is evident that the slowly feeding of the grain from the bottom of the apparatus into the pipe 20 and thence passing it upward through such pipe and into the upper portion of the apparatus creates an agitation and more effective drying action on the grain and other matter than would otherwise be the case, and also that the grain is thereby more effectually cleaned of dust and dirt than would be possible if air were forced through a dead or stationary body of grain.

The apparatus is shown as being of the sectional knockdown type to facilitate a shipping of the same in compact sectional form and to enable the apparatus to be easily and quickly set up, without necessitating the employment of skilled labor for such purpose, thus admirably adapting it for use in rural districts.

We wish it understood that our invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is,—

1. In an apparatus of the class described, a shell of imperforate material forming a tank-like chamber, a perforate lining disposed within said chamber in spaced relation to its wall and having a bottom portion for directing matter to its center, a pipe having one end in valve controlled communication with the lower interior portion of the chamber formed by the lining and having its other end in communication with the upper portion of such chamber to permit matter to flow into the pipe from the lower portion of said chamber, and means for creating a draft upward through said pipe.

2. In an apparatus of the class described, a tank, a pipe extending upward through said tank and opening into the upper and lower end portions of the tank, a valve controlling the lower opening, and means for creating a forced draft upward through said pipe from below the valve whereby matter flowing into the lower portion of the pipe from the tank is blown upward through the pipe and into the upper portion of the tank.

3. In an apparatus of the class described, a tank having an opening in its top portion, means forming a conduit extending from the lower to the upper portions of the tank and opening thereinto, valve means controlling the lower opening into the tank, and means for creating a forced draft upward through said passage whereby the material flowing into the passage from the lower portion of the tank is pneumatically conveyed to the upper portion of the tank and the dust contained therein is expelled from the tank through the top opening therein.

4. In an apparatus of the class described, a tank having imperforate walls and having an opening in its bottom, a perforate lining disposed within the tank in spaced relation to its side wall and having a bottom portion coöperating with the tank bottom to form a passage leading from said bottom opening to the space between the side walls of the lining and tank, and means for introducing air upward through the interior of said lining to the upper portion of the tank.

5. In an apparatus of the class described, a tank of imperforate material, a lining therefor of perforate material and forming a space therebetween, said space having an opening to the atmosphere at the lower portion of the tank, and a pipe extending upward through the interior of the lining and opening with the upper and lower portions thereof, and means for creating a forced draft upward through said pipe.

6. In an apparatus of the class described, a tank having an opening to the atmosphere in its top portion and having a double bottom forming a passage therebetween which opens to the atmosphere below the tank, a perforate lining rising from the inner bottom and spaced from the tank wall to provide a passage therebetween in communication with said bottom passage.

7. In an apparatus of the class described, a tank having an adjustable opening in its top portion, a perforate lining spaced from the tank wall to form a passage therebetween which is open to the atmosphere at the bottom portion of the tank, and means for introducing air under pressure upward through the interior of said lining and into the upper portion of the tank.

8. In an apparatus of the class described, a tank built up of sections the edges of which overlap with one lapping edge provided with an outward loop forming an internal recess and with the other lapping edge formed with a flange for fitting into said recess, means securing said lapped edges in interengaging position, a perforate lining disposed within the tank in spaced relation to its wall to form a passage therebetween, said passage being open to the atmosphere at the lower portion of the tank, and means for introducing air under pressure upward through the interior of said lining and into the upper portion of the tank.

9. In an apparatus of the class described,

a sectional sheet-metal tank having its sections united at the edges thereof to form vertical internal ribs, a perforate lining for the tank spaced from the wall thereof by said ribs, and means for introducing air through the interior of the lining and into the upper portion of the tank.

10. In an apparatus of the class described, a sectional sheet-metal tank having its sections united at the edges thereof to form internal and external vertical reinforcing ribs, a perforate lining spaced from the side walls of the tank by the internal ribs and having a bottom portion in spaced relation to the tank bottom to form a passage therebetween which passage is open to the atmosphere at the lower central portion of the bottom and has communication with the space between the tank wall and lining, and means extending up through said bottoms to adjacent the upper portion of the tank to permit air under pressure to be introduced up through the interior of the tank into the upper portion thereof, said means having its lower end portion in valve-controlled connection with the lower interior portion of the lining to permit matter to blow therein from the interior of the lining.

In testimony whereof, we have hereunto signed our names to this specification in the presence of two subscribing witnesses.

ROBERT DIAMOND MAYO.
ROBERT DAVID MAYO.

Witnesses:
F. E. AUL,
E. E. THOMAS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."