

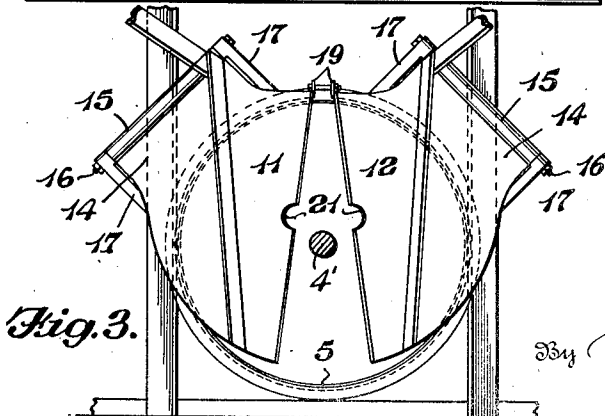
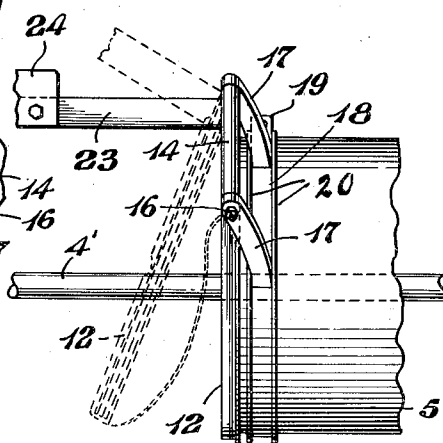
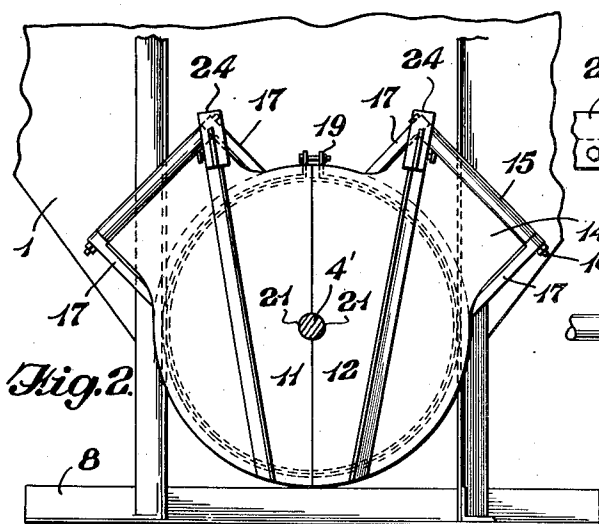
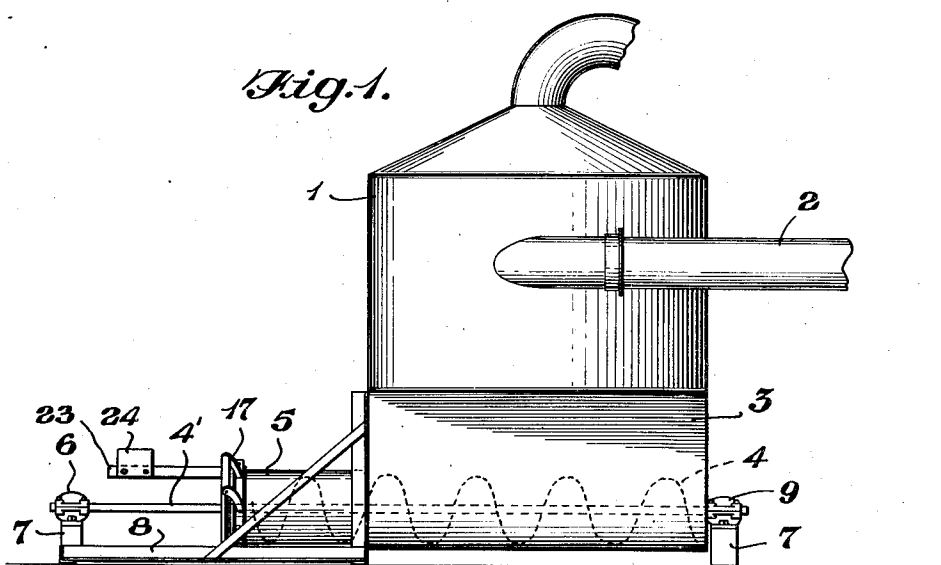
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2,199,894

DOUBLE DOOR ON PNEUMATIC UNLOADERS

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## UNITED STATES PATENT OFFICE

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## DOUBLE DOOR ON PNEUMATIC UNLOADERS

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5 Claims. (Cl. 302-59)

This invention relates to improvements in double doors for pneumatic unloaders for use at the end of the discharge tube.

More specifically, the invention comprehends a double door structure for the discharge tube of pneumatic unloaders utilizing screw or other forms of conveyors, and comprehends a structure of sectional design which when in closed position will engage about the drive shaft of the screw conveyor and thus closely seal the tube.

In detail the invention includes a sectional door for the discharge end of a delivery device of pneumatic unloaders in which each of the door sections is separately hinged by mechanism so constructed and arranged that the door sections in their movement will swing clear of the drive shaft positioned centrally of the tube and which when in their closed position by virtue of automatic mechanism will closely engage about the drive shaft to properly seal the opening.

Other objects will more clearly hereinafter appear by reference to the accompanying drawing forming a part of the specification and wherein like characters of reference designate corresponding parts throughout the several views in which:

Fig. 1 is a side elevation of the assembly.

Fig. 2 is an end view with the doors in closed position.

Fig. 3 is a similar view with a door partly in open position, and

Fig. 4 is a side elevation showing the open position of the doors in dotted lines.

Referring to Figure 1, the conventional vacuum box is illustrated by reference character 1, this vacuum box being provided with the inlet connection 2 through which the seeds are drawn and deposited in the sloping bottom 3, which latter forms a trough at the center of which is positioned the screw conveyor 4 shown in dotted lines in Figure 1. The end of the conveyor extends into the discharge tube 5 and is mounted in front bearing 6 supported by standard 7 on the frame 8 a suitable distance from the outer extremity of the discharge spout 5. The opposite end of the conveyor is mounted in the rear bearing 9 supported by standard 7 at a point to the rear of the vacuum box 1 and essentially at a point diametrically opposite to the bearing 6 whereby a straight shaft may be properly positioned and supported for the screw conveyor 4 in the V-bottom 3 of the vacuum box 1. This conveyor extends into the discharge tube 5 as more clearly shown in Fig. 1. By this arrangement the bearings are positioned free of any dust, dirt, or like material which might tend to injure

or destroy the structure should they be positioned within or in close proximity to the vacuum box and discharge spout tube.

For the purpose of closing the discharge spout, as for instance when the machine is first started and at which time it is necessary to prevent the entrance of an excessive amount of air into the vacuum chamber 1, a pair of hinged closures or doors 11 and 12 are provided. Each of these doors includes a marginal extension 14 the outer edge of which is coiled to provide a transversely extending rolled portion 15 for receiving pintles 16. The pintles 16 are each supported between radiating pairs of projections 17 supported by the reinforcing band 18 clamped at 19 about the end portion of the discharge tube as shown. This clamped band 18 is illustrated with reinforcing flanges 20 which project outwardly from the circumferential edges of the band.

It will be noted that the hinges for the doors are arranged at points spaced from the outer wall of the discharge tube 5 and at an oblique angle to a line extending vertically through the shaft 4' of the screw 4. The doors 11 and 12 are formed with semi-circular notches 21 which are arranged to register when the doors are in closed position and to encircle the shaft 4' of the screw 4.

By this arrangement of hinges it will be observed that the opening movement of the door sections will be away from the shaft 4' and thus the door sections will be freed from locking arrangement therewith and their movement outwardly will be unhampered.

Forwardly extending from each of the marginal extensions 14 of the door sections are bars 23 which are provided with adjustable counterweights 24 of such construction and arrangement that they will tend normally to keep the door sections in closed position.

In operation the seed or like material particles are drawn into the vacuum box 1, through the inlet connection 2 where they are carried rapidly around several times and due to their weight are thrown to the outside, while the lighter material is carried off through the center and passes out of the pipe provided for that purpose to the usual dust collector not illustrated. The seed fall to the bottom of the vacuum box 1, which is sloped at its sides 3 to form a trough, at the center of which is arranged the conveyor 4. The conveyor may be driven by any suitable means but preferably a pulley or similar drive connection is provided at a point approximating the bearing 9. This arrangement being conventional and not

claimed as a part of this invention, the details are omitted. The end of the driven conveyor extends into the discharge tube 5 to within a short distance of the sectional doors 11 and 12 forming the substance of this invention. When the machine is first started the doors 11 and 12 are closed tightly against the end of the discharge tube 5 and, as shown, fit tightly around the shaft 4' to prevent an excess amount of air entering the vacuum box 1. As the conveyor 4 revolves it presses the seed into the discharge tube 5 forming a plug of seed sufficiently tight to keep the air from entering when the doors are pushed open by the seed, which fall out and are transported 10 by any suitable means to storage. The sectional nature of the door, its arrangement of hinges, and its self-closing means makes its operation entirely automatic and provides a sealing means rendering a decided improvement in the operation of pneumatic unloaders. 20

What I claim as new and desire to secure by Letters Patent is:

1. In a pneumatic unloader, a vacuum box, a discharge tube extending from said vacuum box, 25 a screw conveyor extending into the discharge tube, a shaft for the screw conveyor extending through the discharge tube, and a closure for the end of said tube comprising sectional door elements, a hinge for each door element, said hinges 30 being angularly arranged at opposite sides of said tube to cause said door sections during opening movement to separate and move away from said tube end, said door elements being formed with registering notches so arranged as to permit the 35 door sections to seat about said shaft.

2. A pneumatic unloader including a vacuum box, a discharge tube extending from said vacuum box, a conveyor shaft extending into said tube, a reinforcing band fixed to the outer end of said 40 tube, spaced pairs of arms radiating from said bands, pintles connecting the pairs of arms, each pintle being arranged oblique to and at one side of a vertical center line extending through the axis of said conveyor shaft, door sections for the 45 discharge end of said tube, each section being

provided with marginal extensions having hinged portions enclosing a pintle member, and means for normally closing said door sections.

3. A pneumatic unloader including a horizontally extending discharge tube, a conveyor extending into said tube, and a closure for the end of said tube comprising sectional door elements, a hinge for each door element, the longitudinal axis of the hinge of each door section being inclined with respect to the horizontal to cause 5 said door sections during opening movement to separate and move away from the end of said tube. 10

4. A pneumatic unloader including a vacuum box, a horizontally extending discharge tube for 15 said vacuum box, a conveyor in said vacuum box for feeding material through said tube, a sectional door for normally closing the discharge end of said tube, hinged connections mounting said door sections on said discharge tube, said 20 hinged connections being angularly arranged at opposite sides of said tube to cause said door sections during opening movement to separate and move away from said tube end and adjustable means for normally retaining said door sections 25 in closed position.

5. A pneumatic unloader including a vacuum box, a horizontally arranged discharge tube extending from the vacuum box, a screw conveyor arranged in the vacuum box and extending into 30 the discharge tube, said screw conveyor terminating within said tube, a shaft for the conveyor, said shaft projecting through said tube and through the wall of said vacuum box, bearings supporting said shaft spaced from said conveyor, pintles supported at the end of said discharge tube, each pintle being arranged oblique 35 to and at one side of a vertical center line extending through the axis of said conveyor shaft, door sections for the discharge end of said tube, each door section being provided with hinge elements for engagement with and movement about 40 said pintles, and means for normally closing said door sections.

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