Dec. 17, 1929. E. M. KUTZ, SR., ET AL 1,740,250

SILO ATTACHMENT

Filed Oct. 18, 1928 2 Sheets-Sheet 1

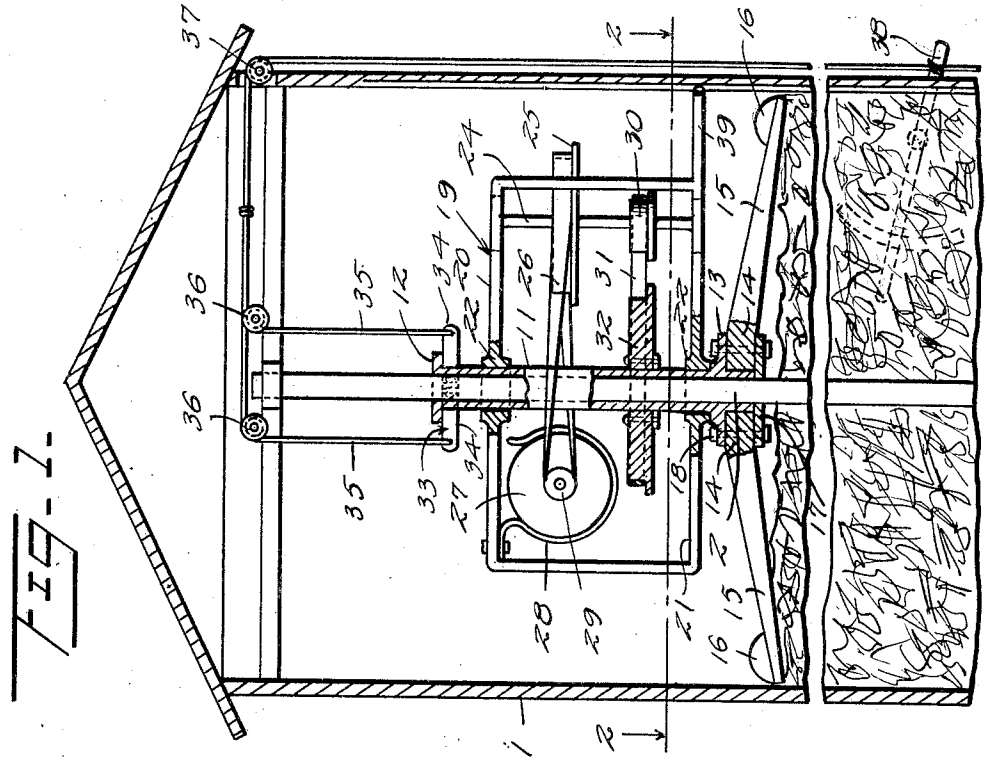


Fig. 1.

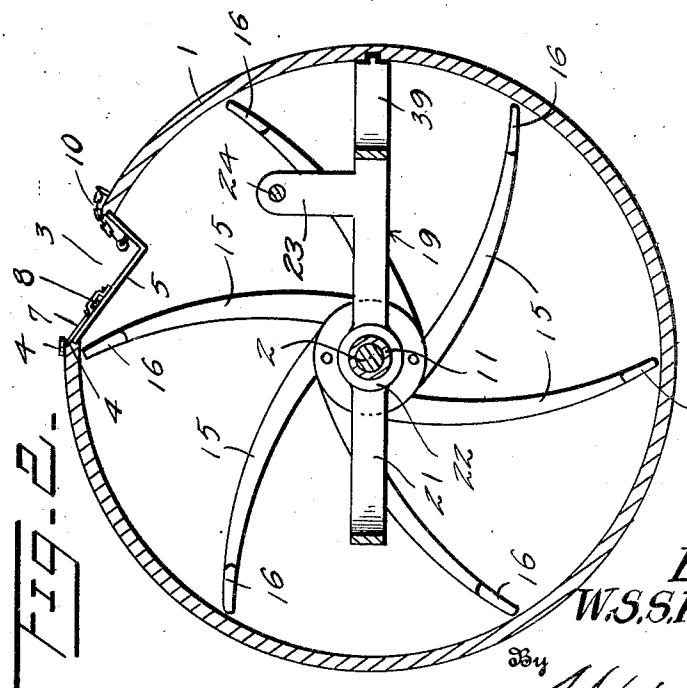


Fig. 2.

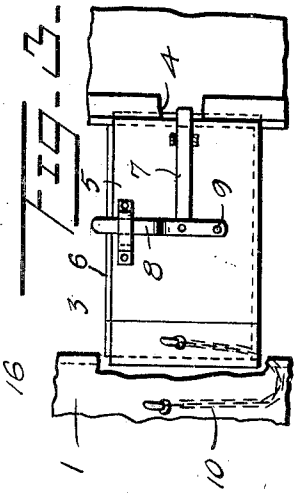


Fig. 3.

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Fig. 4.

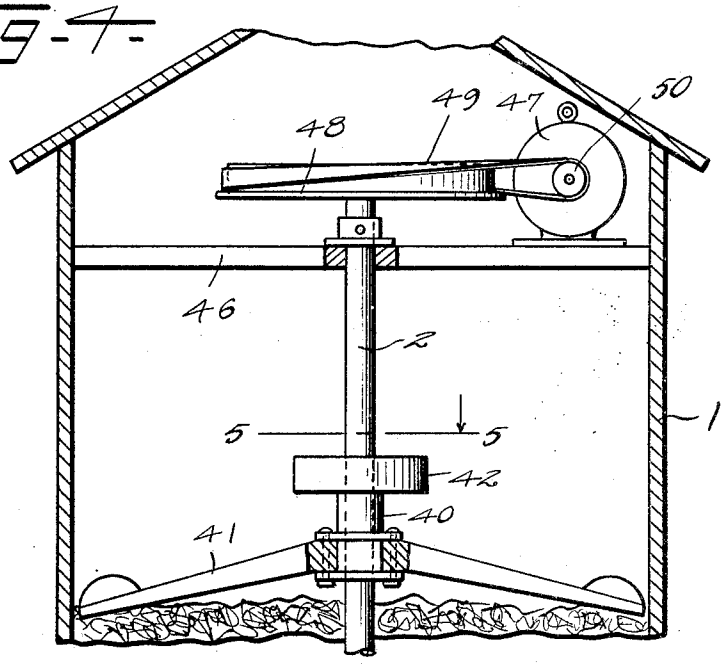


Fig. 6.

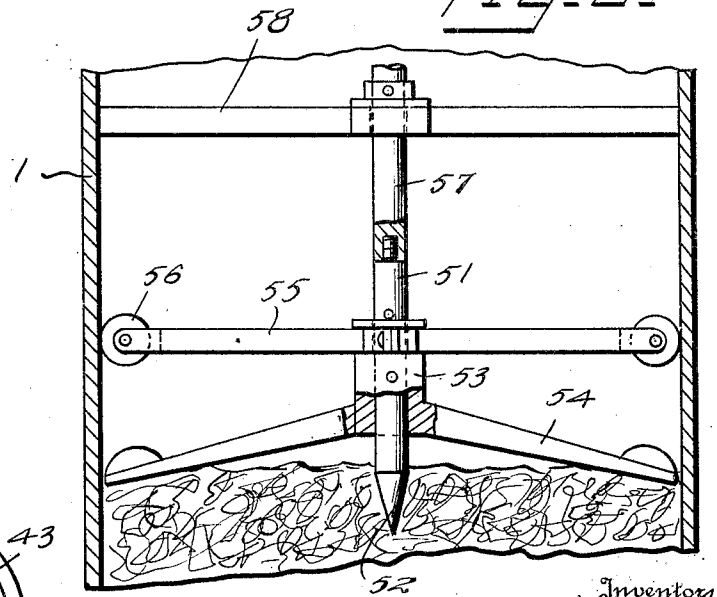
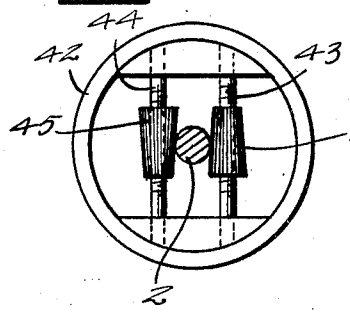


Fig. 5.



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UNITED STATES PATENT OFFICE

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SILO ATTACHMENT

Application filed October 18, 1928. Serial No. 313,353.

This invention relates to a silo attachment and has for its primary object to provide in a manner as hereinafter set forth a device for automatically throwing ensilage from the silo as the same is required.

Another object of the invention is to provide a device for discharging ensilage from a silo which can be readily shifted in the silo to follow the ensilage as the quantity thereof decreases so that the necessity of a person going into the silo is obviated.

A still further object of the invention is to provide a device of the above described character designed to form a compact unit which may be readily shifted in the silo as a whole.

Further objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of the present invention with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a view partly in elevation and partly in section of the structure embodying the present invention, the same being shown in operative position in the silo;

Figure 2 is a sectional view taken substantially upon the line 2—2 of Figure 1;

Figure 3 is a view in elevation of one of the door units used in connection with the present invention;

Figure 4 is a view partly in elevation and partly in section of a modified construction of the present invention;

Figure 5 is a sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a view partly in section and partly in elevation of a further modification of the present invention.

Referring to the drawings in detail wherein like numerals of reference indicate corresponding parts throughout the several views, a silo, which is indicated by the numeral 1, to be equipped with the present invention, is provided with a central vertical shaft 2 which extends throughout the length of the structure.

The usual door opening 3 of the silo is provided along each side with a longitudinally extending groove 4 and there is designed for closing the door opening a series of closure units 5 each of which is of substantially L-shaped design and is adapted to be placed in the opening with the angle thereof extending into the silo and with each end edge positioned in a groove 4. Each of the units is provided with a tongue 6 at its upper and lower side edges for engagement with the adjacent unit and each unit is in addition provided with a horizontal sliding latch 7 pivotally connected at its inner end with a vertical latch 8 the lower end of which is pivotally attached as at 9 to the door unit while the upper end extends a slight distance above the top edge of the unit. The other end of the sliding latch 7 projects beyond the adjacent end edge of the unit upon which it is carried for engagement in the adjacent door opening groove 4.

Each of the units is also permanently attached to the silo structure by a chain 10 so that when it is kicked from position in the manner hereinafter described it will be sustained outside of the silo and at one side of the door opening.

Within the silo the shaft 2 has slidably mounted thereon on a tubular casting 11 the upper end of which is formed to provide a lateral surrounding collar 12 while formed about and slightly inwardly of the lower end of this casting is a second collar 13, against the under face of which a hub 14, surrounding the lower end of the casting, bears.

This hub 14 carries a series of curved blades or arms 15 the outer end of each of which has an integral upstanding portion 16 which sweeps or scoops up the ensilage as the blades revolve.

The hub 14 may be held in position upon the lower end of the casing 11 by the plate 17

through which, and through the hub, bolts 18 are passed for engagement with the collar 13.

Mounted upon the hollow shaft or casting 11 is a frame, indicated as a whole by the numeral 19, this frame includes the upper and lower horizontal portions 20 and 21 respectively each of which has formed intermediate its ends the bearing 22 through which the casting 11 extends. The lower bearing 22 of the frame may rest directly upon the collar 13 and if desired have anti-friction elements interposed between it and the collar. The frame 19 at one side, has the upper and lower portions 20 and 21 provided with lateral extensions 23, between which extensions is pivotally mounted the shaft 24. Upon the upper portion of the shaft 24 is keyed or otherwise secured the pulley wheel 25 which pulley is connected by the belt 26 with a motor 27 suitably supported in or on the frame. In the present case a sling or cradle 28 is secured within the frame to the underside of the top member 20 thereof, in which cradle the motor 27 is mounted at the proper height to bring the driving pulley 29 thereof in the same horizontal plane as the pulley 25.

Upon the shaft 24 at a suitable location there is also secured a smaller belt pulley 30 which is connected by a suitable belt 31 with a main driving pulley 32 carried upon the hollow shaft or casting 11. From the foregoing it will be readily seen that rotation of the casting 11 may be caused by the motor 27 through the transmission of power therefrom to the pulley 25, the shaft 24, and pulley 30 to the pulley 32 carried thereon. In this way the casing and blades carried thereby are caused to rotate in the bearings 22 of the frame.

In order to support the frame 19 and associate structure in proper position, the casting 11 has secured thereabout beneath the collar 12, a clamp 33 having lateral arms 34 to each of which a cable 35 is attached. Each of the cables 35 is passed upwardly over suitable pulleys 36 in the upper portion of the silo from which they are trained laterally to pass out through the side of the silo over a suitable pulley 37 mounted therein and downwardly along the outside thereof to a control lever 38 mounted upon the wall of the silo or at any other suitable point within easy reach of an operator.

In the operation of the present structure after manipulating the lever 38 to lower the blades 15 to position upon the ensilage within the silo, the motor 27 is started whereupon the blades 15 will be caused to rotate and will sweep the ensilage around in the silo to the door opening 3 from which it will be discharged to the outside. It will be seen that as the unit within the silo is lowered the rotating blades will eventually reach the point where one of them will strike the upstanding latch lever 8 of the door unit operating the same to release the door and at the same time kicking the door outside of the opening. Thus the device acts to automatically open the discharge door of the silo as the ensilage therein is used.

In order to prevent the frame 19 from rotating with the blades 15 and the castings 11, the arm 39 is made a part thereof which arm projects therefrom to engage the wall of the silo. The outer end of this arm may be positioned in a suitable recess in the silo wall or may be provided with a roller or otherwise suitably constructed to move longitudinally of the silo and to resist rotary movement therein.

In Figure 4 is shown a modification of the structure above described. In this modified structure a short hollow shaft or casting 40 is provided which is slidable upon the center shaft 2 of the wall structure, this casting supporting-blades 41 which are of the same construction and which are supported in the same manner as the blades 15 previously described. At its outer end this casting carries a box 42 through the center of which the shaft 2 passes and within this box is positioned a pair of spaced parallel shafts 43 arranged on opposite sides of the shaft 2. Each of these shafts 43 is threaded intermediate its ends as at 44 and has threadably mounted thereon a cone 45. The cone 45 on one shaft 43 has its tapered end directed oppositely to the cone upon the adjacent shaft 43 and a coupling is made between the shaft 2 and the casing 40 by threading the cones 45 in opposite directions until they wedge the shaft 2 between them.

In this modified form the shaft 2 is mounted at its lower end for rotation and has its upper end extended through a suitable floor or platform 46 in the upper part of the silo upon which an electric motor 47 or other suitable driving unit may be mounted. Upon the upper end of the shaft 2 there is mounted a driving pulley 48 which is connected by the belt 49 with the motor pulley 50.

While the operation of the modified form just described is the same as the form originally described it is apparent that adjustment of the blades cannot as easily be made to follow the ensilage down in the structure. In this form fixed settings of the blades must be made by loosening the clutch cones 45 and lowering the casting 40.

In Figure 6 a further modified form of the present invention is shown, this form being designed for use without erecting a shaft to extend through the silo structure. In this form a series of shaft units is provided, one of these units constituting a leading or penetrating unit 51, the lower end of which is pointed as indicated at 52 to enable it to work its way down through the body of ensilage within the

silo. To this leading shaft unit the hub 53 of the blades 54 is secured and directly above the hub 53 is mounted on this leading shaft unit, in a suitable manner as upon a collar or the like, a plurality, preferably 4, of radially extending guide arms 55 to the outer end of each of which is pivotally attached a guide roller 56 designed to pass longitudinally along the inner wall of the silo as the blades work downwardly therein, to keep the shaft unit 51 and blades centered.

The shaft unit 51 has detachably connected to its upper end one or more following units 57 depending upon the position of the blades 54 within the silo and the uppermost one of the following units extends upwardly through a suitable bearing in the partition or floor 58 covering the upper portion of the silo structure. That portion of the upper shaft unit projecting through the partition 58 may be equipped with a detachable pulley, (not shown), to which any desired power unit may be connected to cause rotation of the shaft and the blades carried at the lower end thereof.

It is of course understood that the arms 55 are so mounted upon their supporting shaft unit as to permit the unit to freely rotate without turning the arms.

From the foregoing description it will be readily seen that ensilage may be readily and easily removed from a silo equipped with the structure embodying the present invention. It will also be apparent that the removal of the ensilage will be effected positively and that the mechanism may be readily shifted either to remove the blades from the ensilage material to prevent them from becoming frozen thereto in winter weather or to permit the introduction of fresh material into the silo.

Having thus described our invention, what we claim is:—

1. In combination with a silo having a longitudinal opening formed through the wall thereof, an ensilage discharging device comprising a rotary unit designed to rotate horizontally of the base thereof, a door closing said opening, and latching means for said door, said latching means being engageable with said rotary unit whereby to open the door.

2. In combination with a silo having a longitudinal opening formed through the wall thereof, an ensilage discharging device adapted to rotate horizontally within the silo, a plurality of doors mounted in said opening and latching means for each door, said latching means being engageable with said rotary unit, said doors being successively opened by rotation of the rotary unit.

3. In combination with a silo having a longitudinal opening formed through the wall thereof, ensilage discharging means adapted to sweep the ensilage toward the said opening, an axial member mounted within the silo and about which the discharging means is adapted to rotate, closures for said wall opening and latching means for said closures, said closures being adapted to be opened upon engagement of said latching means with said discharging means.

4. In combination with a silo having a longitudinal opening formed through the wall thereof, ensilage discharging means adapted to sweep the ensilage toward the opening, said discharging means comprising a hub member and a plurality of outwardly extending blades, a shaft mounted in the silo and about which the hub member is adapted to rotate, closure means for said opening and latching means for said closures, said latching means extending inwardly of the silo and engageable with said blades whereby to release the closure means for discharge of the ensilage through the opening.

5. In combination with a silo having a longitudinal opening formed through the wall thereof, ensilage discharging means rotatably mounted within the silo, rotating means for said discharging means, a plurality of closures for said wall opening, latch means for said closures, said discharging means being adapted to engage the said latch means whereby to open said closures, and stop means for holding said rotating means against rotary movement within the silo.

6. In combination with a silo having a longitudinal opening formed through the wall thereof, ensilage discharging means adapted to sweep the ensilage toward said opening, a plurality of closures for said opening, latching means mounted on said closures for holding the closures in said opening, said latching means being adapted to engage said discharging means whereby to release the closure upon engagement with said discharge means, rotating means for said discharge means, and means for raising and lowering the discharge means within the silo.

7. In combination with a silo having a longitudinal opening formed through the wall thereof, an axial member mounted within the silo, discharge means rotatable about said axial means and adapted to sweep the ensilage toward said opening, a plurality of closures for said opening, latch means for said closures, said closures being adapted to be successively released upon rotation of the discharge means, rotating means for said discharging means, slidable stop means mounted in the silo for holding the rotating means against rotary movement within the silo, and elevating and lowering means operable exteriorly of the silo for elevating and lowering the discharge means.

8. In combination with a silo having a longitudinal opening formed through the wall thereof, ensilage discharging means adapted to sweep the ensilage toward said

opening, a shaft mounted centrally of said silo, said discharge means being slidably mounted on said shaft for rotation thereabout, a plurality of closures for said opening, release means mounted on said closures, said release means being engageable with said discharge means whereby to release the closure, and operating means mounted exteriorly of said silo for raising and lowering the discharge means within the silo.

In testimony whereof we hereunto affix our signatures.

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