Dec. 8, 1953 A. O. SIREN 2,661,868

GERMICIDE SEED TREATING APPARATUS

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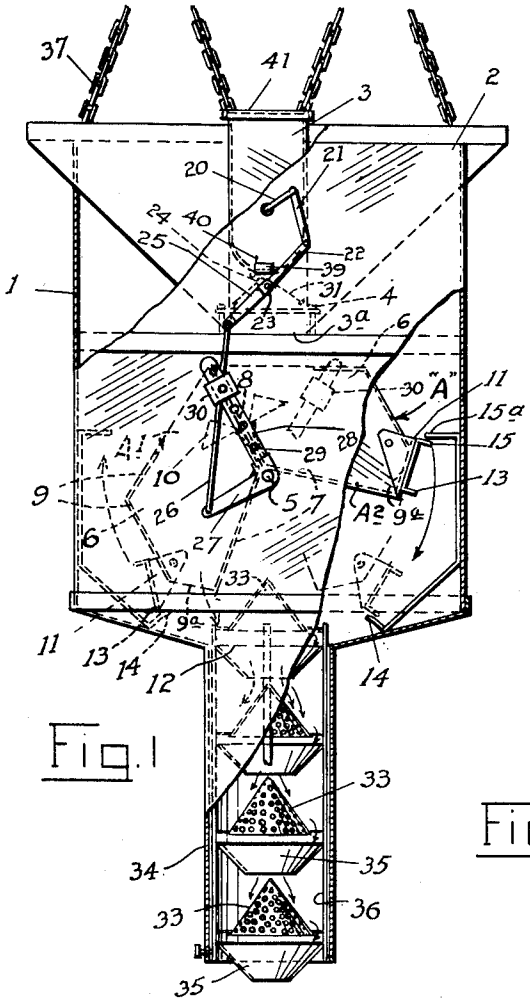


Fig. 1

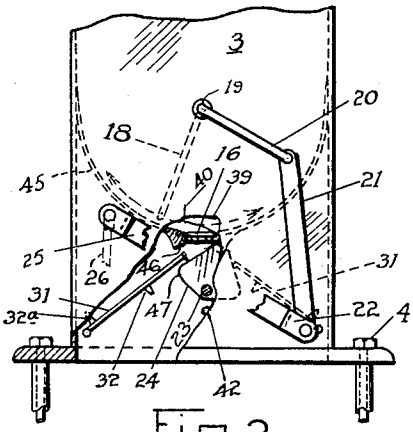


Fig. 2

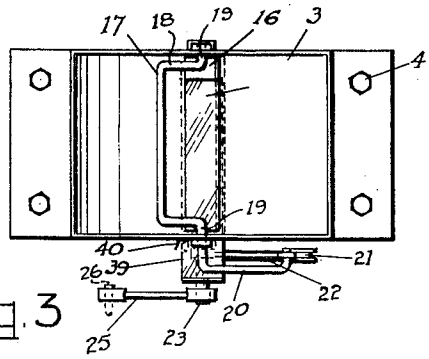


Fig. 3

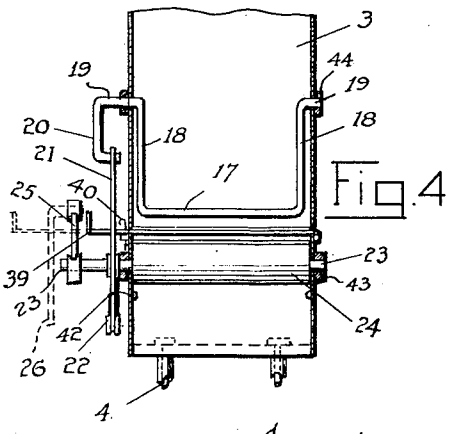


Fig. 4

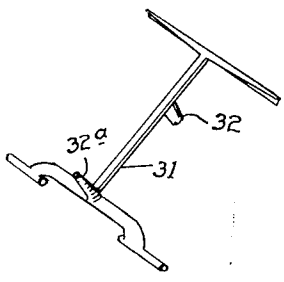


Fig. 5

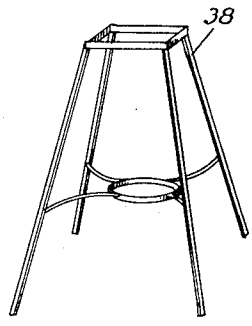


Fig. 6

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GERMICIDE SEED TREATING APPARATUS

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5 Claims. (Cl. 222—57)

1

This invention relates to seed grain dusting machines, the object of the invention being primarily to provide a combination of automatically coactivating parts gravitationally operated by the grain as it flows from an elevator spout into the receiving hopper of the device, and through my invented mixing devices, the dusting powder, or germicide, being automatically mixed with the falling grain in the process to be discharged together in a thoroughly commingled state.

A further object in my invention is the provision of the mixing apparatus in the form of a complete unit for suspension directly below the elevator spout in a convenient manner, as well as having the device provided with a stand for manipulation by hand feeding in place of such suspension means.

A still further object is the provision of a device of the character here described for finely adjusting the quantities of seed grain passing, and also the properly proportioned amount of germicidal dust for mixing therewith as the grain flows regularly into and gravitates from an oscillating twin-chambered weigher, the oscillations of which provide the motive power when overbalanced by the inflowing grain to operate the dust feeding apparatus, all in synchronous unison. In this device a predetermined amount of the dusting germicide is fed alternately into each chamber of the weigher, falling from an overhead powder hopper in proper proportions per bushel of grain as synchronously regulated by a feed shutter within the powder distributing piece of apparatus.

Another object in my invention is the provision of opposedly positioned conical baffle plates removably housed in vertical disposition within a cylinder directly under the said weigher to further mix powder and grain, the upper cones only being perforated for the powder. The purpose of these sets of cones within a dustproof enclosing cylinder is to thoroughly commingle the dusting germicide with the grain and over each seed, and at the same time is a means of generating rising air currents within the cylinder to assist in the blending. The upper cones are perforated and the lower ones are inverted and truncated to act as hoppers arranged respectively in pairs.

Another object is the provision of a graduated vertically disposed swingable arm in combination with the swingable weigher with an adjustable counterweight for the synchronization of bushel metering apparatus with the chambered mixing unit to tally the seed treated, the position of this

2

weight on its arm being fixed for different kinds of grain.

An advantage in this seed dusting device is that it is possible to operate it either automatically or by hand feed as previously mentioned, and that in either case the germicide flow is positively controllable and adjustable, and that the device is in a dustproof housing, avoiding danger from spraying powder into the atmosphere.

A further advantage in my invention is that the agitation caused by the machine's movements assists in depositing the germicide dust evenly on every kernel of the seed being treated, also the machine is of simple construction, and may be very economically fabricated, there being only five main assembly parts.

With the above mentioned objects and advantages I have devised the novel seed dusting apparatus which I will now describe and claim in the accompanying specification, referring to the drawings appended herewith, in which reference characters are used to indicate the several parts, such characters referring to similar parts throughout the different views.

Fig. 1 is a partly sectionalized elevational view of the device.

Fig. 2 is an enlarged fragmented view of the germicide powder metering device, and the operating transmission mechanism.

Fig. 3 is a plan view of the operating mechanism as seen in Fig. 2, of the complete unit, with the lid removed.

Fig. 4 is a sectional side view of Fig. 2 of the complete unit, showing lower portion only of the container.

Fig. 5 is a perspective view of the scraper device.

Figure 6 is a perspective view of the stand.

In the drawings the numeral 1 refers to a hopper bottomed housing enclosing the weighing apparatus of this machine, with the exception of some movement-transmitting parts described later Within the top open end of this housing is a grain receiving hopper 2, in the center of which is a germicide container 3 fitted to the hopper 2 at its bottom delivery and 3a by bolts 4 within suitable distance pieces. This contained part is the germicide metering unit for the delivery of germicide dusting powder in regulated proportional quantities for mixture with the proportioned amount of grain flowing into and passing out of the grain hopper 2. It is important to note that this germicide commences to mingle the seeds of grain at the uppermost portion of the apparatus.

A weigher A is disposed spacedly below the outlet aperture of the hopper 2, and is mounted on a spindle 5 transversely therewithin, and is axially centered with regard to the said aperture. This weigher comprises two chambers left and right as viewed in Fig. 1, A1 and A2 respectively, which chambers are symmetrically related to exactly balance one another on the spindle 5. Each chamber is formed with vertical side walls 6, bottom plates 7, and there is a dividing wall plate 8 between them. These side walls are braced over with plates 9 with the exception of a grain receiving space at the top and a grain delivery outlet 9a at the bottom of the sloping bottom plate. A transverse perforated powder receiving hollowed cone 10 is attached to each face of this middle wall 8 for use as the initial means of spreading the germicide powder evenly over the sliding grain.

The seed grain enters the hopper 2 at the top thereof and flows continuously through its bottom outlet aperture 3a and into one of the weigher chambers A1 or A2, whichever one happens to be in the receiving position, during the overbalancing process. Each of these chambers acts as a bin for the reception of the grain, and a bottom closure gate 11 is pivotally attached to the side walls of each chamber, which gate swings open as soon as the weigher tips down on that particular side for delivery of the grain down and through an aperture 12 in the bottom of the housing 1. The gates 11 in their down positions are maintained open by fingers 13 contacting stops 14 projecting from the floor of the housing 1. The gates are also kept shut in their upward positions by fingers 15 on the gates contacting stops 15a projecting inwardly from the walls of the housing 1.

In this manner of weigher operation an equal proportional amount of grain is alternately diverted first to one half of the housing 1 and then to the other half to continuously, in intermittent rocking movements of the weigher, deliver the grain below.

The container 3 holds the germicide powder as stated, and a fine predetermined amount leaves it through a transversely slotted aperture 16 in the bottom thereof by means here set forth. A powder stirring bar 17 is transversely mounted to swing by means of an attached crank arm 18 on a spindle 19, both of which bar and spindle are axially parallel with the slotted aperture 16, and are within the container 3. The rocking movement of this bar 17 is communicated thereto from the rocking weigher A by a crank arm 20 on the outboard end of the spindle 19, which arm connects by means of a link 21 with a crank 22 rigidly attached to a transverse spindle 23 bearably mounted in the walls of the housing 1. This spindle 23 carries a powder distribution shutter member 24 which is rocked by means of a crank 25 mounted on spindle 23 on the opposite side to the crank 22. This crank 25 is radially operated about the axis of the spindle 23 by means of a pitman rod 26 pivotally attached to a crank 27 affixed to the weigher spindle 5 projecting outwardly from the housing 1. This crank 27 has a lever 28 disposed upwardly perpendicular thereto extending from the axis of the spindle 5. This lever is holed as at 29 along its length, and has a slidable weight 30 thereon for adjustment as a counterbalance for the movable parts of the device. The weight 30 is held in position by means of a screw bolt.

The powder is distributed from the container 3 intermittently through the aperture 16 from side

to side as the controlling shutter 24 rocks synchronously with the rocking motion of the weigher A, so that, as one chamber of the weigher is being filled the powder is falling over the cone 10 in that particular chamber for distribution throughout the grain seeds therein.

Scraper mechanism is introduced to keep the shutter faces free from possibly adhering powder, in the form of a lightly balanced scraper rod 31 mounted transversely within the container body 3, said rod parallelling and contacting the shutter face on each side. A small weight 32 is added to each scraper to increase the effectiveness thereof, and a stop 32a on the opposite side limits the backward movement of each scraper.

The powder is further associated with the seed grain after it leaves the weigher by being sifted over and through a series of hollowed perforated cones with their apices on top. These cones 33 are removably housed within a vertical cylinder 34 registering axially with the circular aperture 12 in the bottom of the housing 1. The top cone is actually within the said housing, and the lower series of the cones are spaced axially coincident with this top one. An inverted truncated hollowed cone 35 is affixed immediately below each said upper perforated cone, and is of larger diameter to receive the falling grain and also the falling powder from the upper cone, in their commingled state.

The series of these coupled cones are so mounted as to be slidably insertable and removable into and from the cylinder 34 for cleaning and repair purposes, by means of vertical bars 36.

This device may either be suspended by means of chains 37 from the top of an elevator, or may be placed on a framed stand 38 as suggested in Fig. 6.

A transverse sliding gate 39 is provided between the slotted aperture 16 and the shutter 24, which gate is adjustably manipulated outside the container 3 by hand, and is graduated and held in position by a spring 40, the graduations defining the exact proportional amounts of powder needed for a particular proportional amount for a particular type of grain.

The baffle plate cones are very important elements in my invention, being so arranged to completely intermingle the dusting powder with the grain. This type of baffling encourages small masses of the seeds in the flow of grain to separate and regroup at varying relative speeds during their downward travel gravitationally. All this arrangement of baffling the mixing components is so provided in order to produce the maximum of agitation with a minimum of parts.

A lid 41 is removably fitted to the top of the container 3. Stops 42 are disposed inside the housing walls to prevent the overswing of the shutter member 24. Bosses 43 project from the outsides of the container walls to journal the spindle 23, also bosses 44 for the spindle 19.

The bottom of the container 3 is curved as shown at 45, and is enlarged in thickness along each side of the longitudinal slot 16, the face 46 of each said enlarged portion being curved for the slidable engagement of the rounded edge 47 of the shutter 24.

It should be noted that the purpose of the radially reciprocal shutter member 24, as indirectly activated by the rocking weigher A, is to open and close the aperture 16 synchronously with the tilting movements of the weigher.

The operation of this device is substantially as follows: In the position of the weighing device

reverse to that shown in Fig. 1, shutter **24** is in the position shown in Fig. 2, at which time germicide from the container **3** is continually dusted over the grain being received in chamber A, the amount of germicide dispensed being regulated by the position of slide 39. The shutter **24** acts to divert the germicide to either chamber A1, as appreciated from Fig. 2, or to chamber A2, depending on the position of the shutter 24. Upon counterbalancing of chamber A1 to the position shown in Fig. 1, the shutter **24** is actuated in a counter-clockwise direction from that shown in Fig. 2. In its travel from the position shown in Fig. 2 to a position displaced approximately 75° in a counter-clockwise direction from that seen in Fig. 2, the shutter **24** acts first to stop the flow of germicide from the chamber **3** and then to divert the flow to the chamber A2, at which time the germicide is continually dusted over the grain being received in the chamber A2. Also when the position of the shutter **24** is operatively reversed to that shown in Fig. 2, the germicide is continually dusted over the grain being received in the chamber A1.

In between the powder deliveries through the action of the shutter **24** there is a shut-off period for the flow of powder, due to the specific shape of the shutter at its upper contour as illustrated. The travel of the stirring bar **17** assures a movement of powder across this particular portion of the shutter to prevent clogging of the powder.

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

1. In a grain dusting apparatus comprising a hopper, an enclosed twin-chamber grain receiving weigher balanced on a spindle below said hopper to be automatically overbalanced by the accumulation of grain in one of said chambers at one time in an alternatively oscillating manner, a pivoted outlet gate for each of said chambers for grain discharge therefrom, means to automatically retain the opened and closed positions of each said gate at each oscillation of said weigher, a germicide dust container situated in said hopper having a dust discharge slotted aperture with slidable means to regulate the size of the aperture, means to stir the dust in said container, an oscillatory spindle-mounted shutter below said container aperture to direct and dispense the correct discharge therefrom alternately into one of said grain filled weigher chambers, and mechanism outside said container to oscillate said dust stirring means and said shutter synchronously with said weigher movements.

2. Oscillatory apparatus for grain dusting or mixing other materials, comprising a bottom-apertured dustproof housing, a hopper discharging gravitationally into said housing, a twin-chambered material receiving weigher, a transverse spindle within said housing on which said housed weigher is centrally and fixedly balanced, the weigher being automatically overbalanced as one chamber thereof is filled at a time and the other chamber thereof is emptied alternatively, a pivotally balanced discharge control gate for each said chamber, a finger on each gate and a stop on the housing to maintain the closure of each gate before the overbalance of the weigher, a finger on each gate and a stop on the housing to maintain each gate in an open position when discharging grain through the bottom aperture

of said housing, means to stir the dust in said container, and mechanism outside said container to oscillate said dust stirring means coactively and synchronously with said weigher spindle oscillations.

3. Germicide powder dusting apparatus comprising a bottom-apertured outer housing, a hopper with a gravity discharge aperture for delivery of grain into the top of said housing, a curved bottom germicide powder container within said hopper, a removable lid for said container, a dust discharge slotted aperture in the bottom of said curved portion of said container, a spring held slide to adjust the quantity of powder passing through said aperture, an oscillatory powder-stirring bar swingably mounted within said container, an outside crank to oscillate said bar, a spindle below said aperture and slide and bearing in the sides of said container and mounting a shutter to measure and direct the desired quantity of the powder first to one side and then to the other side alternately into the chambers of an oscillatory weigher below, a crank arm on said spindle link-connected with the said outside crank, a second crank on said spindle opposedly aligned with said crank arm, a spindle to carry the weigher and journaled in the said housing, a crank on said weigher spindle, and a pitman rod connecting said weigher spindle crank with said second crank for the transmission of the oscillatory movements of the weigher to said shutter and said powder-stirring bar.

4. Germicide powder dusting apparatus for dusting grain and the like, comprising in combination a bottom-apertured housing, a hopper with a gravity discharge aperture delivering into the top of said housing, a closed germicide powder container within said hopper with mechanical means automatically dispensing the germicide powder on to the grain in one side chamber at a time of an oscillating type grain weigher within said housing, a spring held slide to adjust the quantity of discharge from said container, a spindle to carry the weigher and oscillating therewith and bearing in the walls of said housing, a crank on said spindle, and linkage and crank members actuated by said oscillating crank to operate germicide powder delivery means from said container and the stirring of the powder within same.

5. The device according to claim 4 including a counterbalance lever for said linkage and crank members, and with a weight to adjustably counterbalance for varying types of grains.

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