May 9, 1950 H. WRIGHT ET AL 2,507,290

GRAIN TREATING MECHANISM

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Fig. 1

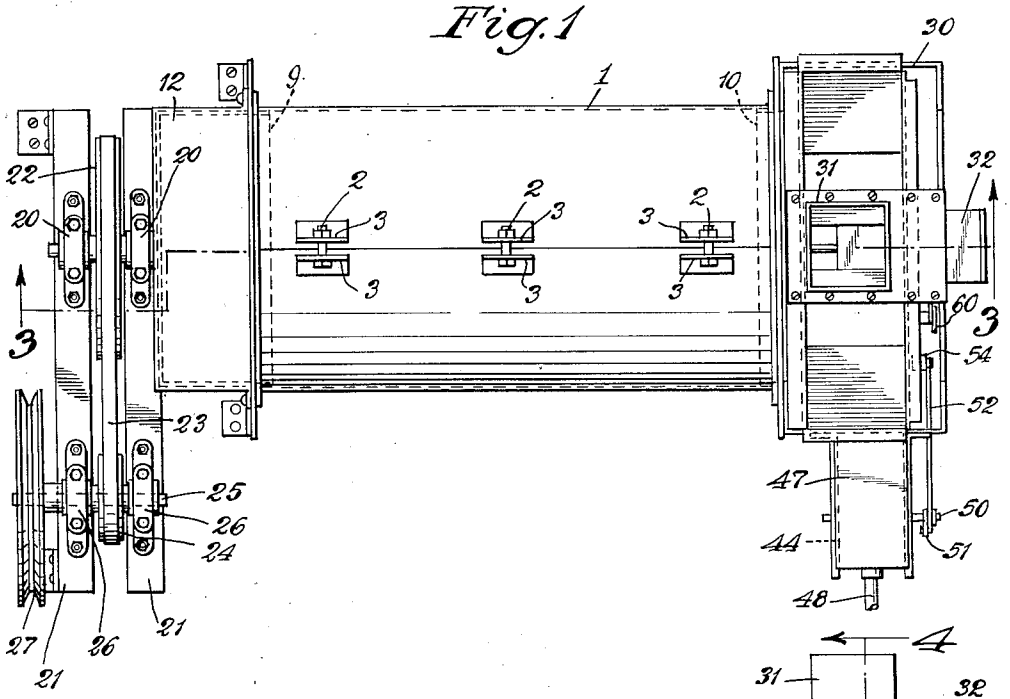
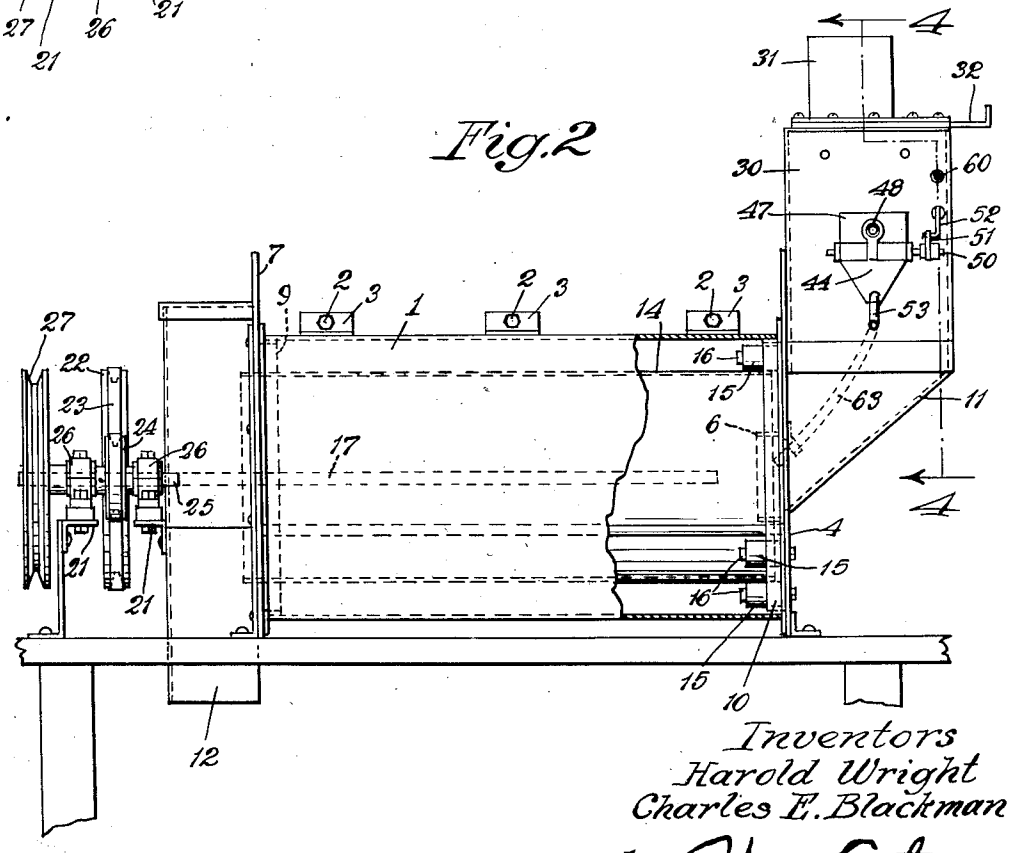


Fig. 2



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GRAIN TREATING MECHANISM

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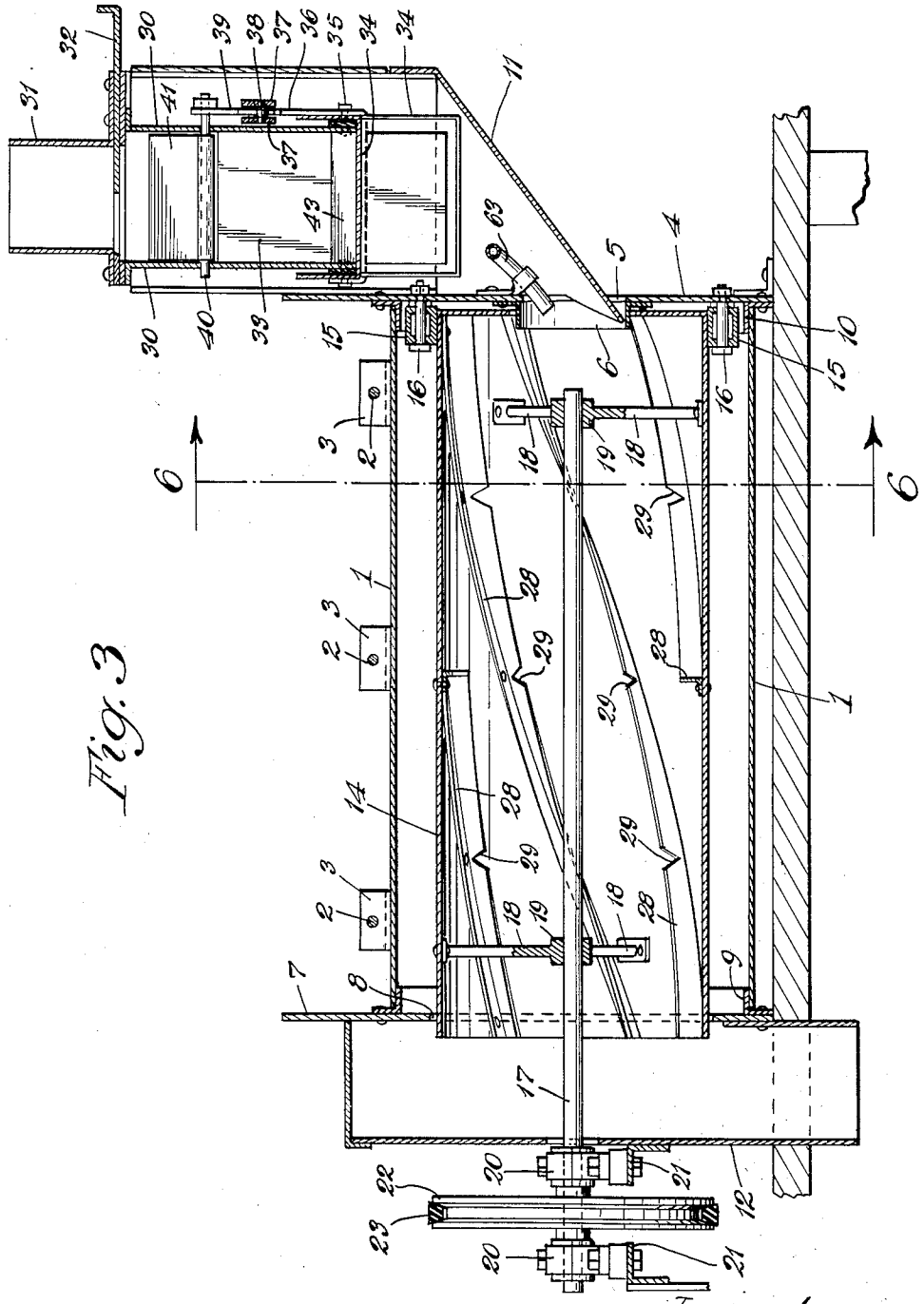


Fig. 3

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GRAIN TREATING MECHANISM

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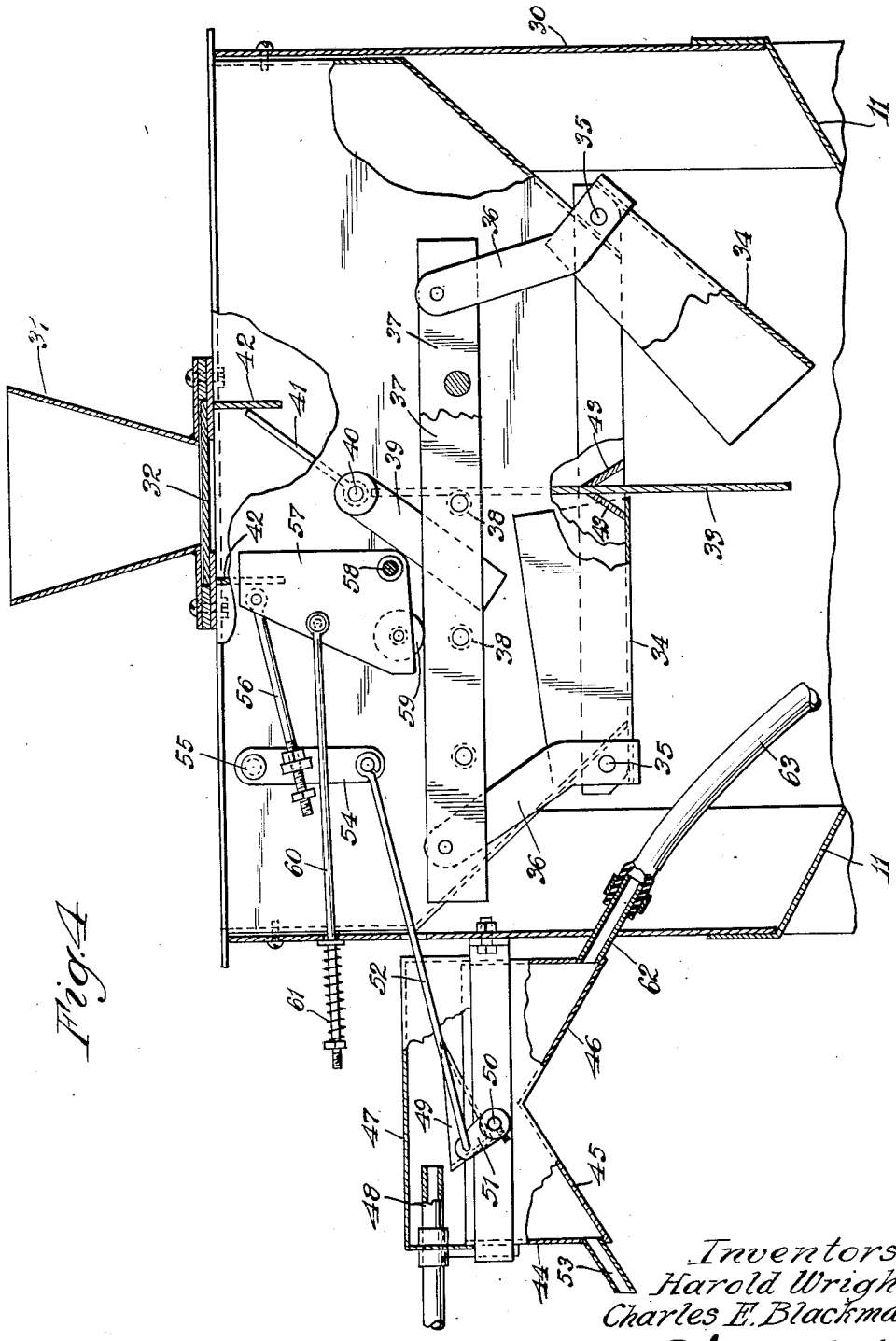


Fig. 4

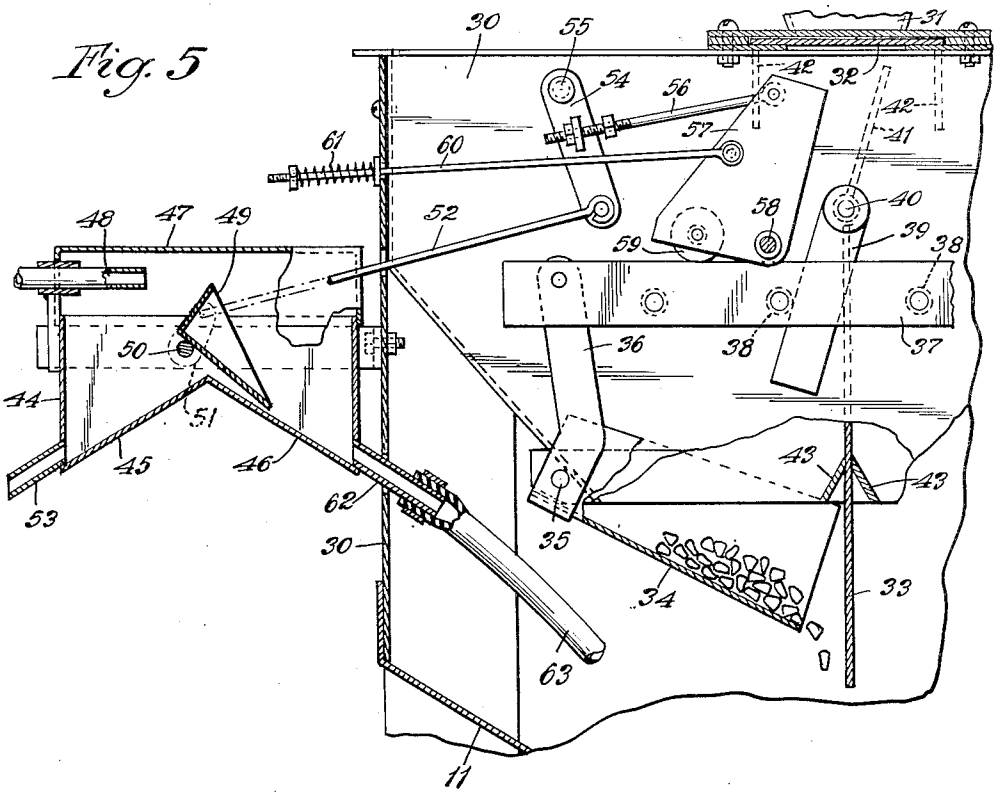
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GRAIN TREATING MECHANISM

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Fig. 5



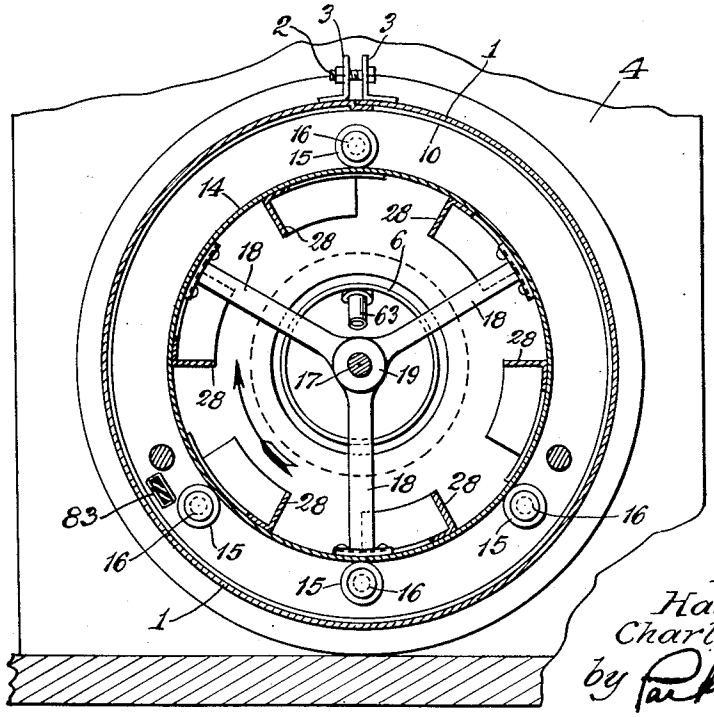


Fig. 6

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GRAIN TREATING MECHANISM

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Fig. 7

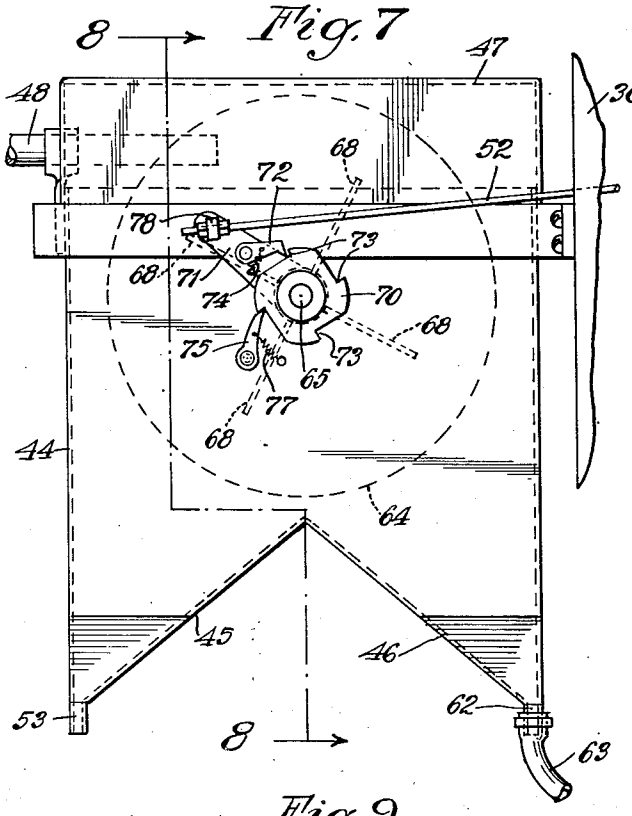


Fig. 8

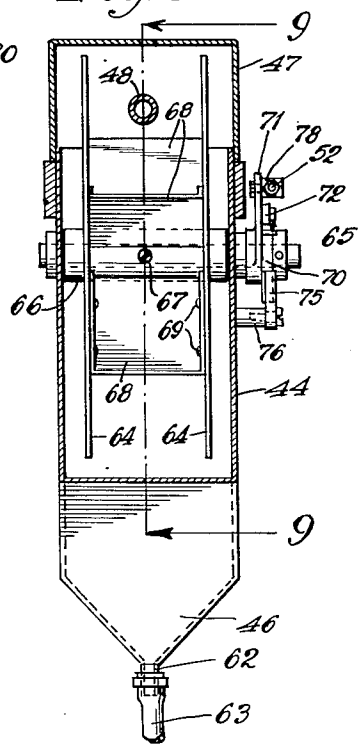


Fig. 9

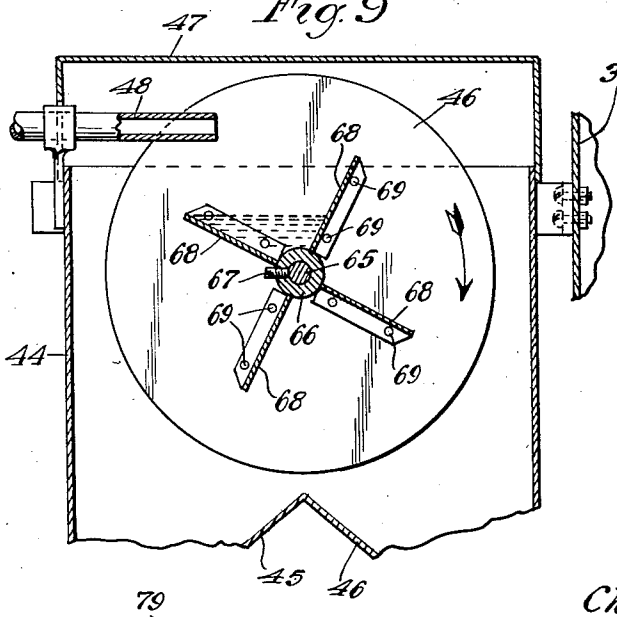
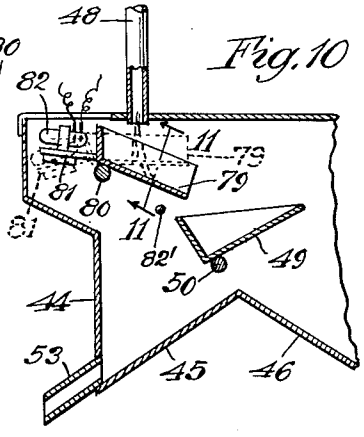


Fig. 10



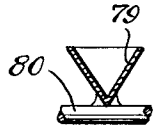


Fig. 11

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UNITED STATES PATENT OFFICE

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GRAIN TREATING MECHANISM

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Application February 19, 1947, Serial No. 729,484

3 Claims. (Cl. 259—14)

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This invention relates to an apparatus and to a method of applying material to grain. In the particular form here illustrated it has for one object to provide a method and an apparatus for applying fungicide to grain.

Another object is to provide an apparatus suitable for mixing fungicide or other material in controlled proportions with grain.

Another object is to provide a proportioning apparatus whereby materials are automatically mixed in predetermined proportions.

Other objects will appear from time to time throughout the specification and claims.

This invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a plan view of one form of the device;

Figure 2 is a side elevation with parts broken away and parts in section;

Figure 3 is a longitudinal vertical section taken on an enlarged scale at line 3—3 of Figure 1;

Figure 4 is a transverse vertical section taken on an enlarged scale at line 4—4 of Figure 2;

Figure 5 is a vertical transverse section showing some of the parts of Figure 4 in modified position;

Figure 6 is a transverse section taken on an enlarged scale at line 6—6 of Figure 3;

Figure 7 is a side elevation illustrating a modified form of proportioning mechanism;

Figure 8 is a vertical section taken at line 8—8 of Figure 7; and

Figure 9 is a vertical section taken at line 9—9 of Figure 8 on a plane generally at right angles to the plane of Figure 8;

Figure 10 is a vertical section illustrating a safety device; and

Figure 11 is a detail taken at line 11—11 of Figure 10.

Like parts are indicated by like characters throughout the specification and the drawings.

In general the mechanism as shown includes an outer housing or shell 1. This may be formed of one or more parts. As shown it is formed of two parts which are joined together by bolts 2 which are engaged through ears 3. At one end the housing 1 is closed by a plate 4 which is perforated as at 5 for the introduction of material to be treated. A collar 6 may be positioned in communication with the perforation or opening 5. At its opposite end the housing 1 is closed by a plate 7 which is perforated as at 8. Ring-like members 9 and 10 serve to join the plates 7 and 4, respectively, to the housing 1 and to seal them hermetically.

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A hopper structure which will be described below is mounted over a chute 11 which directs material through the opening 5 to the interior of the device. A discharge housing 12 is positioned at the opposite end to receive material from the device after treatment.

Positioned with the housing 1 is a rotating drum 14. At one end the drum is carried upon rollers 15 which are mounted on trunnions 16 which are themselves fixed to the plate 4. The drum 14 is driven and partially supported by a shaft 17. Arms 18 secured to or integral with hubs 19 connect the drum 14 to the shaft 17. At its free end the shaft 17 is carried on bearings 20, 20 which are themselves mounted on suitable supports 21, 21. A pulley or sheave 22 is fixed on the shaft 17 and arranged to receive a belt 23. The belt may be connected directly to a source of power or may be engaged upon a pulley or sheave 24 on a jack shaft 25. This shaft is carried in bearings 26, 26 and carries a driving pulley 27 which may be driven from any suitable source of power.

Positioned within the drum 14 is a plurality of vanes 28. These may be arranged helically as shown and may be notched, as at 29, if desired. When the drum 14 is rotated by the shaft 17 the vanes 28 serve to convey material through it from right to left, as shown in Figure 3.

As shown in detail in Figures 4 and 5, a proportioning means for proportioning the fungicide or other material to the grain is illustrated. A housing 30 of any desired shape is preferably connected to and arranged to discharge into the chute 11. Material such as grain is discharged into the housing 30 through a member 31. A slide 32 may be provided for closure or adjustment.

Within the housing 30 a separator 33 is fixed. It is preferably arranged to lie along the middle line of the member 31 and to divide the housing into two compartments or subdivisions.

Movably positioned within the housing is a plurality of weighing pans 34, 34. These pans are pivotally mounted at 35 and each is provided

with an upwardly extending arm 36 fixed to it. The arms are pivoted or otherwise moveably connected to one or more bars 37, 37. If desired, there will be two members 36 on each pan 34 and two bars 37. Operating pins 38 extend transversely of the housing and are fixed in the member or members 37. A member 39 may engage either of the pins 38 and is fixed on a shaft 40 carried in any suitable bearing structure. Fixed also on the shaft 40 is a guide vane or blade 41.

Positioned on the housing about the opening defined by the member 31 is a pair of guiding members 42. These members, together with the vane 41, serve to guide material which enters the housing and to insure that it will fall to one side or the other of the member 33. Stops 43 may be positioned on the member 33 and they serve, as shown in Figures 4 and 5, to limit the upward movement of the pans 34.

Means for dispersing fungicide are enclosed in a housing 44 which is provided with a peaked bottom formed by the members 45, 46. A cover 47 may be provided to close the housing 44. A fungicide inlet conduit 48 is positioned to discharge fungicide from any suitable source into the measuring cup 49. As shown this cup is open topped and is adjustably mounted on a shaft 50. Fixed also on the shaft 50 is an operating arm 51 which is connected to a link 52. Fungicide is deposited through the conduti 48 into the cup 49 when the latter occupies the position shown in Figure 4. The cup 49 in the upright position of Figure 4 has its left-hand edge lower than its right-hand edge. Thus should it overflow, material will flow over the left-hand edge onto the member 45 and will flow out through a discharge conduit 53. This conduit may be conveniently connected with the source of fungicide so that overflowing fungicide is returned to the original container from which it came and is not lost.

The link 52 is connected to a lever 54 which is pivoted at 55 on the inside of the housing 30 or elsewhere. An adjustable link 56 is connected to the lever 54 and to a plate-like lever 57. This latter is pivoted at 58 and is provided with a roller or other anti-friction member 59 which rests on the top of the member 37. A return link 60 is connected also to the plate 57, extends outwardly through the wall of the housing 30 and has positioned about it a compression spring 61. The spring is biased to move the link 60 to the position shown in Figure 4.

A conduit 62 is connected to the member 46 and may also be connected to a hose or flexible conduti 63 by which fungicide is discharged into the incoming stream of material which is deposited upon and moves along the chute 11 and through the opening 5 and into the drum 14. The operation of the proportioning device will be described below.

A modified form of proportioning device is illustrated in Figures 7, 8 and 9. The housing is generally the same as that shown in Figures 4 and 5, except that it may be larger. It will not be redescribed and the same reference numerals apply to corresponding parts in Figures 4, 5 and 7.

Instead of the cup 49 which is moved back and forth to tip and to fill, a rotating series of cups is shown. This series is formed by discs or disc-like members 64, 64 supported on a shaft 65 by mean of a tubular member 66 which is held in adjusted position on the shaft 65 by a set screw 67. Blades 68 extend across between the discs 64 and are secured to them by rivets 69, or otherwise. Thus as shown particularly in Figure 9, the blades and discs form in effect four cups positioned at equal distances about the shaft 65.

At its outer end, preferably outside of the housing 44, the shaft 65 carries a sprocket 70. The sprocket is fixed to the shaft. A rocker arm 71 is mounted loosely on the shaft adjacent the sprocket and is provided with a dog 72 adapted to engage the teeth 73 of the sprocket. A spring 74 holds the dog in engagement with the sprocket. A positioning dog 75 is mounted on the wall of the housing 44 or upon an extension 76 which is itself mounted on the wall of the housing 44. A spring 77 is biased to hold the dog 75 in engagement with the sprocket. The link 52 shown in Figures 4 and 5 and described above in connection with those figures is connected to the rocker arm 71 by a pivotal connection 78.

If desired, the safety mechanism of Figure 10 may be used. This mechanism comprises automatic means for stopping the feeding of grain to the main mechanism when the fungicide or treating material is no longer supplied. The fungicide or treatment material structure shown in Figure 10 is the same as that shown in Figures 4 and 5 in detail, except that the member 48 through which the treatment material is supplied is positioned vertically.

The cup 49 and other associated parts are the same as those shown in Figures 4 and 5. The safety means includes a trough-like member 79 mounted on a pivoted shaft 80 and provided with a counterweight 81. A level responsive electric switch 82 is mounted to move with the trough 79. A stop 82' is positioned to limit downward movement of the trough.

For some purposes it is desirable or necessary to supply heating means to the assembly. This may take the form of a bar or other heating element 83 positioned between the outer shell or housing 1 and the movable cylinder 14. The cylinder 14 rotates in the direction of the arrow of Figure 6. The heat tends to dry the machine and its contents and to prevent the accumulation of moisture.

Although we have shown an operative form of our invention, it will be recognized that many changes in the form, shape and arrangement of parts can be made without departing from the spirit of the invention, and our showing is therefore to be taken as, in a sense, diagrammatic.

The use and operation of this invention are as follows:

When the device is to be operated, the drum 14 is driven and grain is deposited in the member 31 and falls through the opening, the size of which is determined by the position of the slide or valve 32. As the grain falls through it strikes the controlling member 41 and is guided to one side or the other of the guiding member 41 and thence it falls into one or another of the pans 34. With the parts in the position of Figure 4 it will be discharged into the pan 34 at the left.

When a sufficient quantity of grain has fallen into this pan to overbalance the weight of the other or right-hand pan 34, the left-hand pan will fall and the grain will be discharged from it onto the chute 11 and fall into the drum 14.

When the left-hand pan falls its lever 36 rises and moves to the right. At the same time, the right-hand pan 34 is raised against the stop 43. As the two pans move thus, one up and the other down, the members 37 which connect them are carried to the right. In doing so, they are also

raised because the upper ends of the members 36 move about arcuate paths. As this movement occurs the vane 41 is moved to the left through the contact of the member 39 with one of the pins 38. Since the member 39 in the position of Figure 4 is not in contact with either of the pins 38, some movement of the member 37 will occur before a pin 38 will contact the member 39 and initiate movement of the directing vane 41. These members are so spaced that the vane 41 will not be moved from one side to the other until the empty rising pan 34 has reached a level high enough to retain grain which will be directed to it as a result of the movement of the vane 41.

At the same time, since the member or members 37 rise, the lever 57 is tilted clockwise about its pivot 58. Its upper portion thus pulls upon the link 56, which swings the lever 54 to the right. This draws the link 52 to the right and tips the cup 49 to discharge the fungicide, which then flows through the conduit 62, 63 and is discharged into the entering grain.

The position of the parts illustrated in Figure 5 is that in which one pan 34 has been partly dumped, the other pan 34 has been partly raised and the member or members 37 have moved to their uppermost position to tilt the lever 57 and to tip the cup 49.

Since the empty pan 34 has been raised to the full upper position against the stop 43, the lever 57 falls again to the position of Figure 4, partly under the influence of gravity and partly under the effect of the compression spring 61. The spring 61, since it tends to move the plate lever 57 counterclockwise, also exerts a pressure through the lever upon the members 37 and resists the upward movement of these members which occurs when a pan 34 is dumped. Consequently adjustment of the compression of the spring 61 can be used to determine the amount of grain which can be carried by the pans 34 before they move to tilt or dump.

This movement restores the position of the cup 49 to the upright or receiving position. Ordinarily fungicide is discharged constantly through the conduit 48 and overflows constantly.

The modified form of fungicide distributing device of Figures 7, 8 and 9 is association with the same main mechanism as that shown above and described, the only difference being in the fungicide distributing device. As there shown, when the grain receiving pans are in the position of Figure 4, the parts will be as shown in Figures 7 and 9 and a quantity of fungicide collects in the uppermost cup. When the grain pans and associated parts move from the position of Figure 4 to that of Figure 5, the link 52 is drawn to the right in the manner above described and thus the lever arm 71 is rotated and through the dog 72 rotates the shaft 65 and the cup a quarter turn and thus discharges the material from the cup which was uppermost. When the grain pans and associated parts move again from the position of Figure 5 to the position of Figure 4, the link 52 is carried to the left and the dog 72 moves over one of the teeth 73 of the sprocket 70 and is again in position to rotate the wheel and the cups when another grain pan has been filled with a weight sufficient to tip it.

The safety device of Figure 10 is arranged to stop feed of the grain to the main treating cylinder when the feed of fungicide or other treating or adding material is interrupted.

The device includes the trough 79 and counterweight 81. When no material is discharged into the trough through the member 48, the counterweight carries the trough to the raised or dotted line position of Figure 10. When that occurs the switch 82 is actuated to break the current. The switch may be connected to the elevator and conveyor drive by means of which grain is conveyed to the cylinder. Thus when the switch circuit is broken the grain conveyor is stopped and no further grain is discharged to the treating cylinder. So long as liquid or other material flows through the conduit 48 onto the trough 79 the weight of the material as it moves along the trough is sufficient to carry the trough and associated parts to the full line position of Figure 10. In this position the switch is moved so as to close the circuit and therefore the drive of the conveyor which carries grain to the treating cylinder is not interrupted and the feeding continues. The safety device thus provides an automatic means for stopping the feed of the grain to the cylinder whenever the feed of the auxiliary or treating material is interrupted for any reason.

We claim:

1. In combination in a grain treating mechanism, a pair of separate grain receiving parts, means for directing grain to one or another of said parts at a time, means for supporting said parts for tipping, said means comprising arms fixed one to each of said receiving parts and a connecting member joined to the free ends of said arms, fixed pivots for said receiving parts, said connecting member being moved back and forth by the movement of said arms and rising and falling as a result of said movement, a movable receptacle adapted to contain material to be added to said grain, means for conveying material to said receptacle, and means for discharging said receptacle in response to the up and down movement of said connecting member.

2. In combination in a grain treating mechanism, a pair of separate grain receiving parts, means for directing grain to one or another of said parts at a time, means for supporting said parts for tipping, said means comprising arms fixed one to each of said receiving parts and a connecting member joined to the free ends of said arms, fixed pivots for said receiving parts, said connecting member being moved back and forth by the movement of said arms and rising and falling as a result of said movement, a movable receptacle adapted to contain material to be added to said grain, means for conveying material to said receptacle, and means for discharging said receptacle in response to the up and down movement of said connecting member, said connecting member being rigid, said arms being bent, and said discharging means including a tilting member positioned to contact said connecting member and to rise and fall with said connecting member.

3. In combination in a grain treating mechanism, a pair of separate grain receiving parts, means for directing grain to one or another of said parts at a time, means for supporting said parts for tipping, said means comprising arms fixed one to each of said receiving parts and a connecting member joined to the free ends of said arms, fixed pivots for said receiving parts, said connecting member being moved back and forth by the movement of said arms and rising and falling as a result of said movement, a movable receptacle adapted to contain material to be added to said grain, means for conveying material to said receptacle, means for discharging said receptacle in response to the up and down

movement of said connecting member, said connecting member being rigid, said arms being bent, said discharging means including a tilting member positioned to contact said connecting member and to rise and fall with said connecting member, and means joining said tilting member with said receptacle and adapted upon the occurrence of a tilt of said tilting member to tilt said receptacle.

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