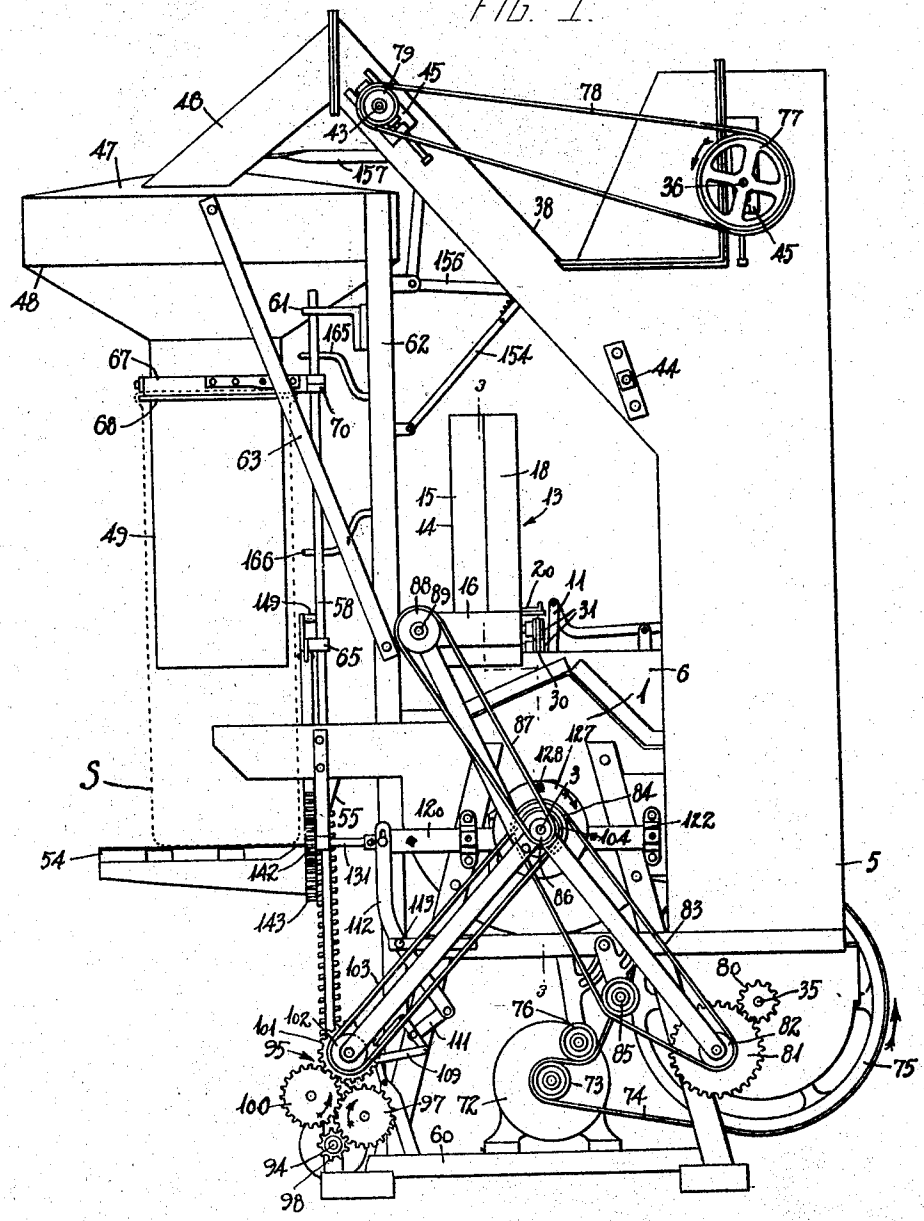
July 20, 1926. 1,593,189

W. MAUCH

SACK FILLING MACHINE

Filed Sept. 28, 1925 8 Sheets-Sheet 1

FIG. 1.



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July 20, 1926. 1,593,189

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SACK FILLING MACHINE

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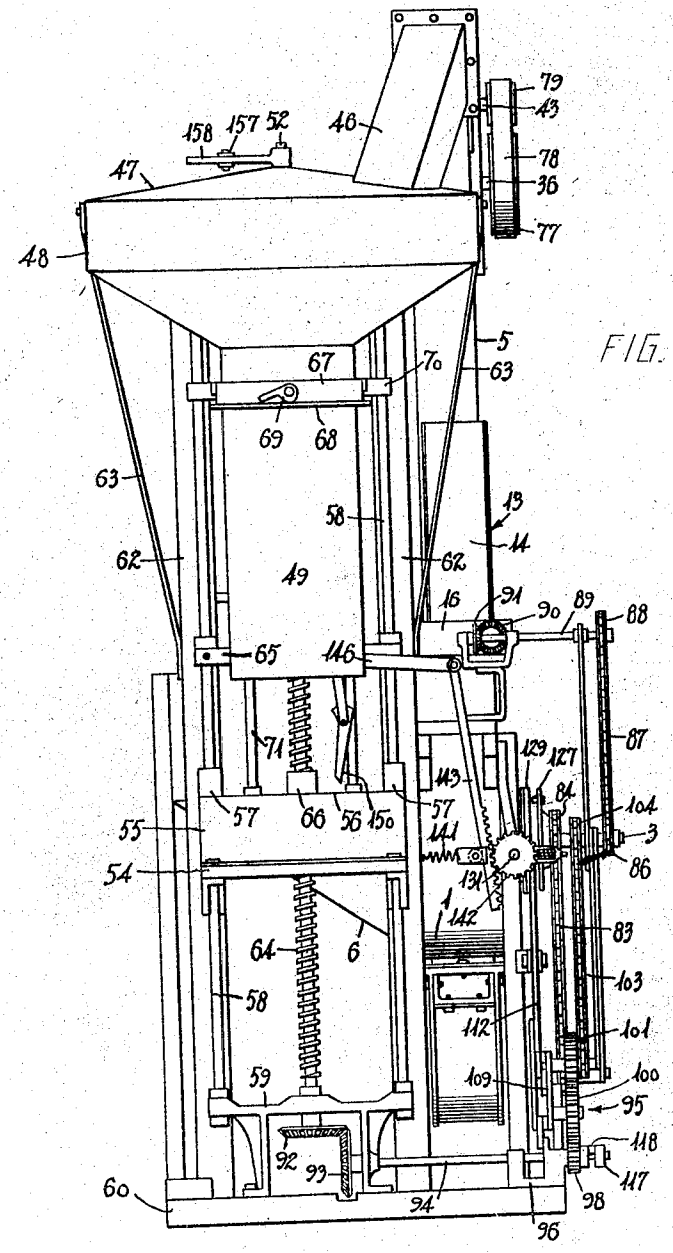


FIG. 2.

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SACK FILLING MACHINE

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FIG. 4.

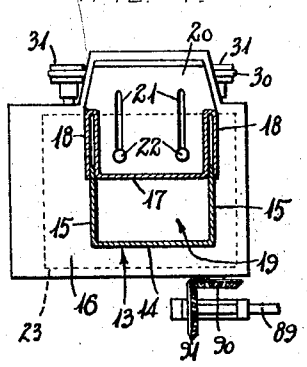


FIG. 3.

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SACK FILLING MACHINE

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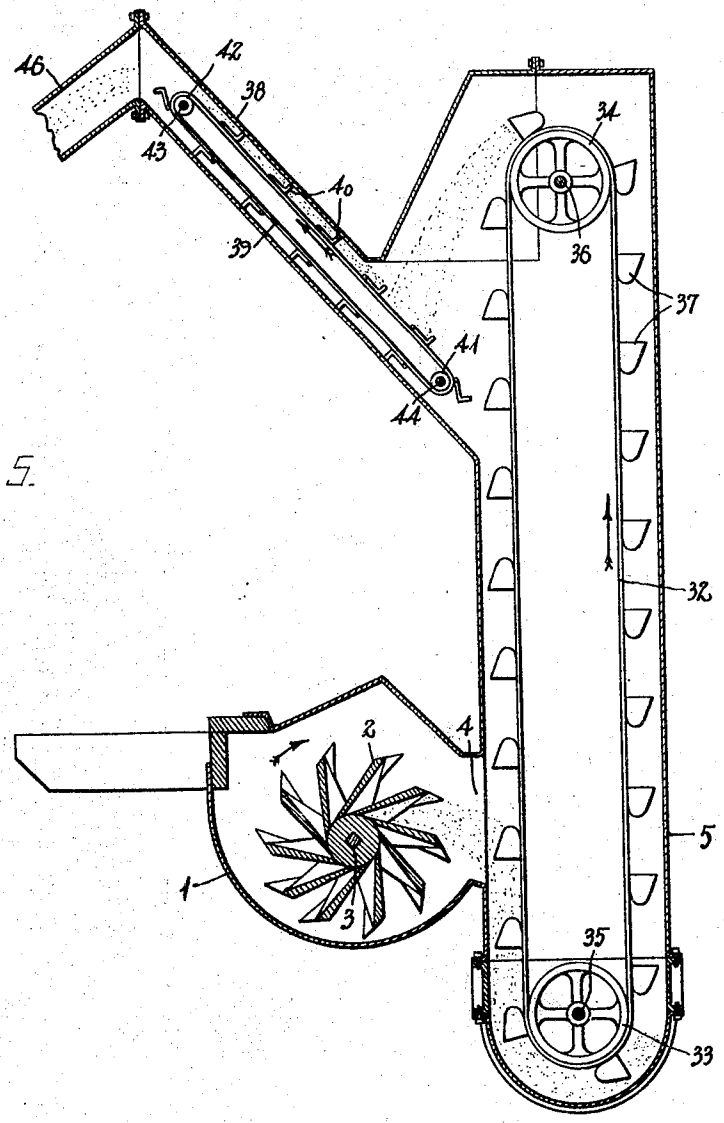


FIG. 5.

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SACK FILLING MACHINE

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FIG. 6.

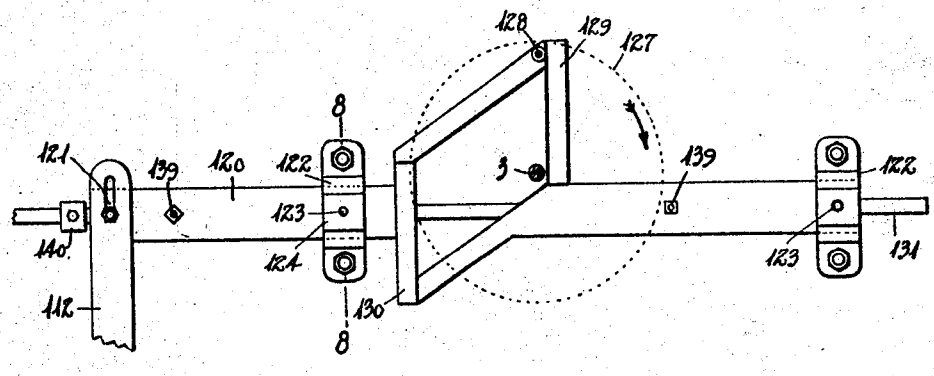


FIG. 7.

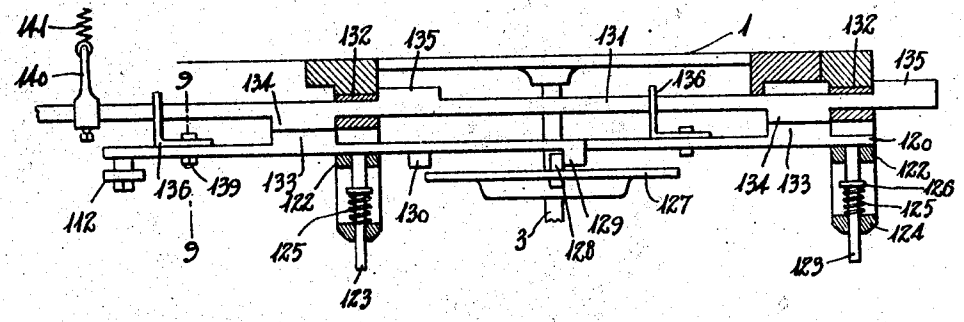


FIG. 8.

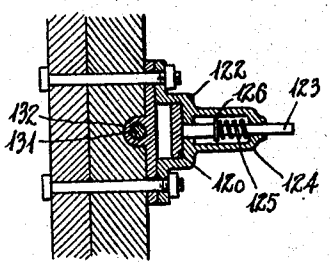
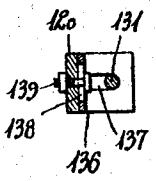


FIG. 9.



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SACK FILLING MACHINE

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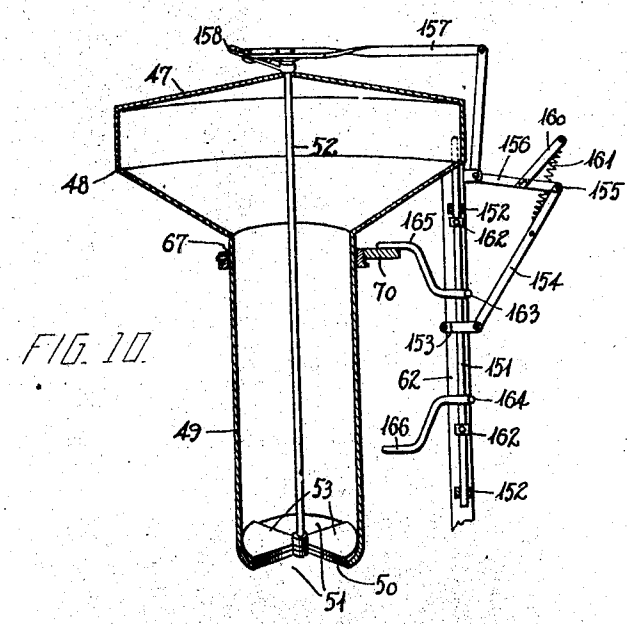


FIG. 10.

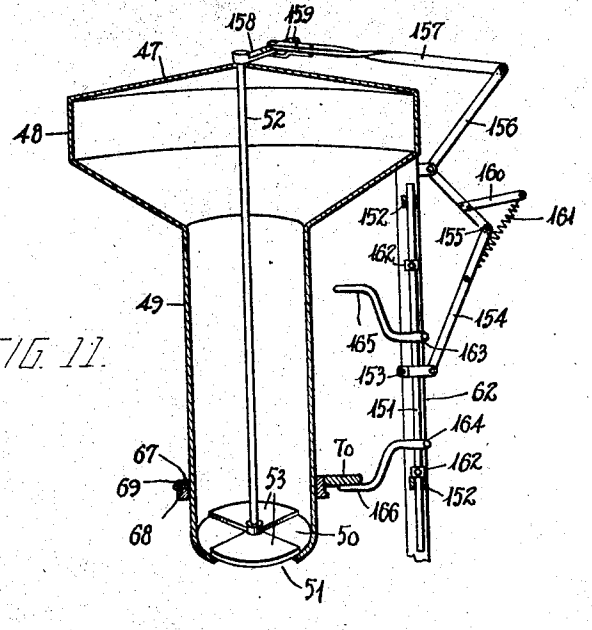


FIG. 11.

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July 20, 1926. 1,593,189

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SACK FILLING MACHINE

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FIG. 12.

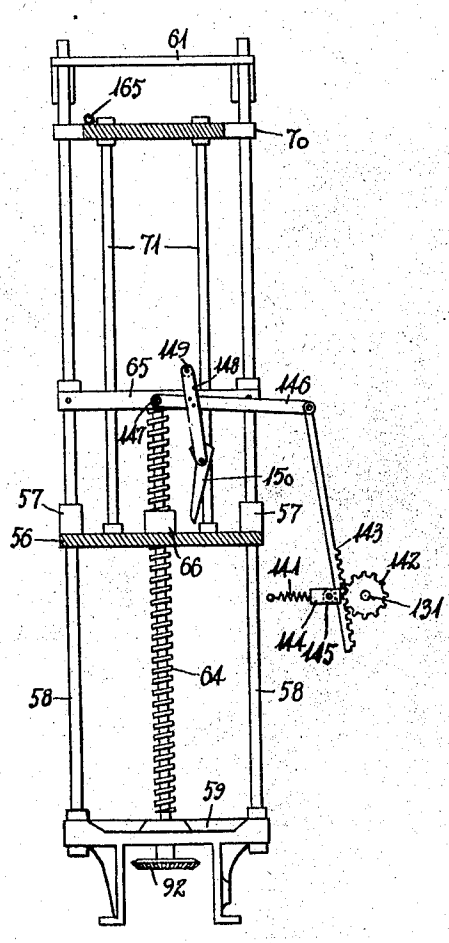


FIG. 13.

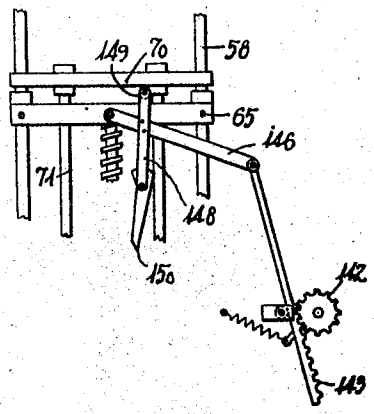
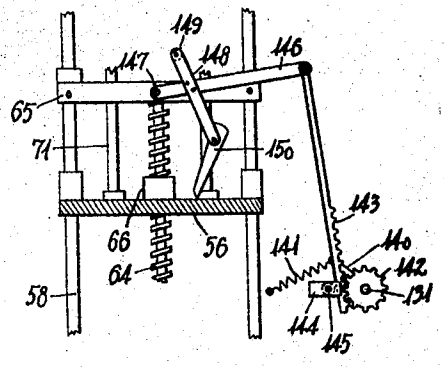


FIG. 14.



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SACK FILLING MACHINE

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FIG. 16.

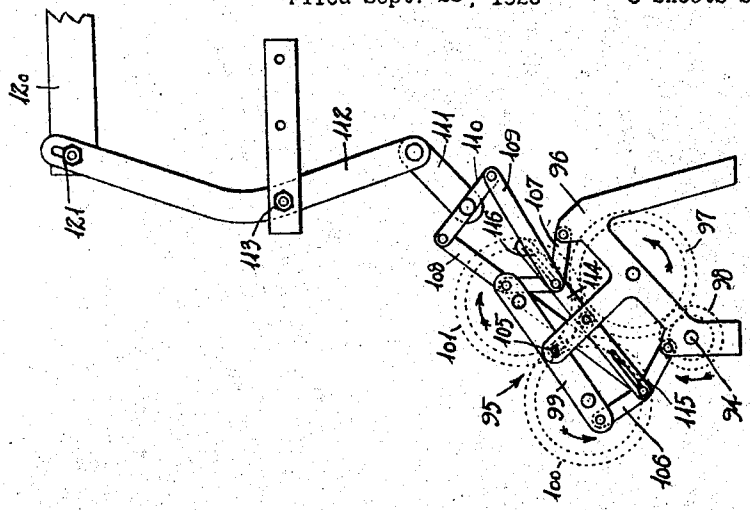


FIG. 15.

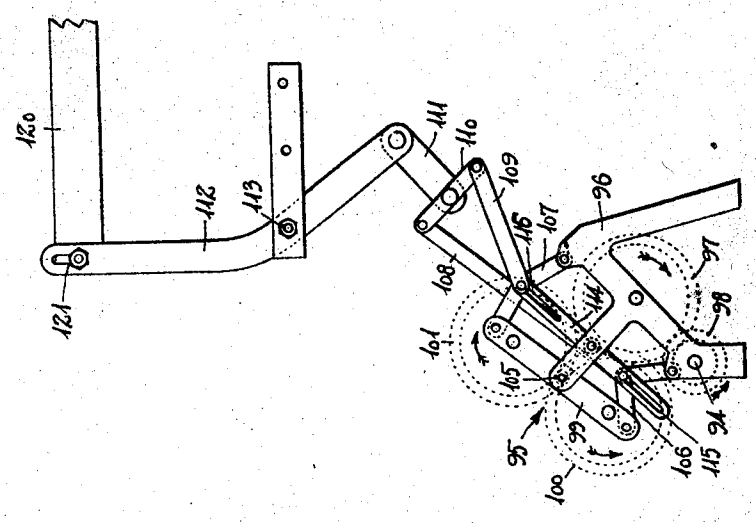
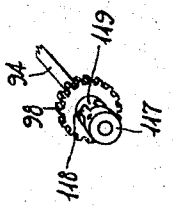


FIG. 17.



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Patented July 20, 1926. 1,593,189

UNITED STATES PATENT OFFICE.

WILHELM MAUCH, OF SPOKANE, WASHINGTON.

SACK-FILLING MACHINE.

Application filed September 28, 1925. Serial No. 59,173.

The present invention relates to a machine for treating grain with copper carbonate or other preparation or compound, to prevent smut, and to preserve the grain, and it is an object of the invention to provide a novel and improved machine whereby the grain may be treated in an efficient and practical manner and collected within a bag or sack.

Copper carbonate has been recommended by the United States Department of Agriculture for the treating of seed grain in order to prevent smut in all sections of the country. Copper carbonate being a light and fluffy powder will, when agitated such as is necessary to mix the same with grain, float in the air in the form of dust. This makes the copper carbonate obnoxious inasmuch as the mixing thereof in the open with the grain will result in the surrounding air becoming laden with the copper carbonate dust, and same will be inhaled into the lungs of the person doing the mixing and others in the vicinity, and such dust becoming moistened in the lungs will become active, causing sickness.

It is an object of the invention to provide a machine for treating and sacking grain, especially seed grain, with copper carbonate or other powder, without the powder escaping.

A further object is the provision of novel sacking means in order that the treated grain may be sacked in a practical and efficient manner without creating dust, from the powder used, in the air surrounding the bag and machine.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the machine.

Fig. 2 is a front view thereof.

Fig. 3 is an enlarged vertical section on the line 3—3 of Fig. 1.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

Fig. 5 is a vertical section of the grain mixing and elevating means.

Fig. 6 is a fragmentary elevation of the tripping means, on an enlarged scale.

Fig. 7 is a plan view of the device shown in Fig. 6, portions being shown in section.

Fig. 8 is a cross section on the line 8—8 of Fig. 6.

Fig. 9 is a cross section on the line 9—9 of Fig. 7.

Fig. 10 is a sectional perspective view of the grain hopper and spout, showing the actuating means for the valve or closure of the spout, with said valve in open position.

Fig. 11 is a view similar to Fig. 10 showing the parts arranged with the valve closed.

Fig. 12 is a fragmentary elevation of the means for actuating the tripping device, with said device in neutral position.

Fig. 13 is a fragmentary elevation of the parts shown in Fig. 12 illustrating the position of the parts when the sack or bag has been filled with treated grain.

Fig. 14 is a fragmentary elevation of parts shown in Fig. 12 illustrating the position of the parts when the empty sack is in position to start the filling thereof with the treated grain.

Fig. 15 is an elevation of the reversing device of the sacking means in one position.

Fig. 16 is a view corresponding to Fig. 15 showing the parts in the opposite position.

Fig. 17 is a perspective view of a detail.

As shown, the machine is an elaboration of the grain treating machine disclosed in my Patent No. 1,274,180, granted July 30, 1918, said patented machine being used as a basis around and upon which the improvements are embodied. Thus, the present machine embodies a mixer of somewhat the same construction as disclosed in said patent, comprising a casing 1 in which is mounted a wheel or rotor 2 that has blades or scoops for picking up the grain delivered into said casing and discharging same through the outlet opening 4 of the casing. The rotor or wheel 2 serves to agitate the grain as well as delivering same through the opening 4 and said rotor is mounted on a horizontal shaft 3 journaled for rotation in the casing 1, as seen in Fig. 3. The grain that is discharged from the mixer is elevated within an elevator housing 5, as will hereinafter more fully appear, the grain passing from the opening 4 of the mixer into the lower portion of the housing 5.

A grain receiving hopper 6 is provided at one side of the mixer casing 1, and the casing 1 has a lower inlet opening 7 at said side for the flow of grain from the hopper into the lower portion of the casing 1, so that the grain is picked up by the rotor 2. A vertical partition 8 is provided in the hopper 6 adjacent to the casing 1 to provide a vertical passage 9 leading upwardly from the opening 7, and said partition 8 has an opening 12 at its lower end for the flow of grain from the hopper through the opening 12 to and through the opening 7, the grain flowing across the lower end of the passage 9 down which the powder or other treating material is dropped, as will presently appear. The flow of grain to the mixer from the hopper is controlled by a valve 10 slidable along the partition 8 to be projected downwardly below the upper edge of the opening 12, and the valve 10 has an upwardly extending stem 11 that may be controlled manually by any suitable means, in order that the feeding of the grain to the mixer may be controlled.

The powder feeder is located above the mixer for feeding powder down into the passage 9 to mix with the grain that enters the mixer. The powder is contained in a magazine or supply chamber 13 composed of two sections for purpose of adjustment to regulate the amount of powder that is fed to the grain. One section of the magazine 13 comprises the side walls 14 and 15, constituting three sides of the magazine, and having their lower ends secured to the top of a belt casing 16. The other section of the magazine comprises a side wall 17 between the walls 15, and constituting the fourth side of the magazine. Said wall 17 has the outstanding doubled portions 18 fitting astride the walls 15, to prevent leakage of the powder between the walls 15 and 17, and the wall 17 is adjustable between the walls 15 toward and away from the wall 14 to decrease and increase the cross-sectional area of the magazine. The top of the casing 16 has an opening 19 at the lower end of the magazine, and said opening is sufficiently large to correspond to the maximum separation of the walls 14 and 17. A base plate 20 is secured to the lower end of the wall 17 and portions 18 thereof, and is slidable on the top of the casing 16, said plate 20 having the slots 21 receiving clamping bolts 22 or other elements carried by the top of the casing 16 in order to hold the wall 17 in place in its different adjustments, and permit of the adjustment of said wall.

Within the casing 16 is mounted an endless belt 23, which passes around the rollers 24 and 25 that are mounted on the horizontal shafts 26 and 27 journaled for rotation in said casing 16. The upper run of the belt 23 is disposed close to the top of the casing 16 under the opening 19, so as to form a moving bottom for the magazine. Thus, the belt in moving will carry with it a thin layer of powder from the lower end of the magazine. The roller 25 is located above the passage 9, so that the powder will drop down into said passage, and a rotary brush 28 is located below the roller 25 for brushing the powder from the belt 23. Said brush 28 is mounted on a horizontal shaft 29 below the shaft 27. The brush and belt are made to move simultaneously by means of an endless belt 30 extending around pulley wheels 31 secured on projecting terminals of the shafts 26 and 29.

The band of powder taken by the belt or apron 23 from the powder magazine 13 will be of a width corresponding to the spacing of the wall 17 from the wall 14. Consequently, by moving the wall 17 closer to or farther away from the wall 14, it is possible to regulate the amount of powder delivered from the powder magazine to the passage 9. The thickness of the film or layer of powder on the belt or apron 22 will be substantially the same for different adjustments of the magazine 13, but the width of the band or layer of powder depends on the spacing of the walls 14 and 17 of the magazine. This band or layer of powder may be narrowed down when it is desired to decrease the supply of powder delivered to the mixer. The proportion of powder may also be varied by changing the gear ratio so as to operate the powder feeder either slower or faster with reference to the remainder of the machine.

It is also possible to feed various powders down through the passage 9 to mix with the grain, and provision may also be made for feeding formaldehyde, vitrol and other liquids to mix with the grain.

The grain elevator comprises an endless belt or chain 32 within the housing 5 and passing around a lower pulley or sprocket wheel 33 and an upper pulley or sprocket wheel 34, which wheels are mounted on the respective shafts 35 and 36 journaled in the housing 5. The endless flexible member 32 carries buckets 37 which dip up the grain from the lower portion of the housing 5 and elevate the grain. The housing 5 has an inclined extension 38 near its upper end within which operates a secondary elevator comprising the endless belt or chain 39 passing around pulley or sprocket wheels 41 and 42 at the lower and upper ends of the extension 38, respectively. Buckets 40 are hingedly connected with the endless flexible member 39, and the wheels 41 and 42 are mounted on the shafts 44 and 43, respectively. The primary elevator including the buckets 37 discharges the grain from the buckets as they pass over the wheel 34, thereby delivering the grain to the lower portion of the secondary elevator, and the

grain is caught in the buckets 40 and carried upwardly in the extension 38. The secondary elevator operates at a higher speed than the primary elevator so that the grain is discharged violently through the upper end of the extension 38 as the buckets 40 pass around the wheel or roller 42 and swing away from said roller by centrifugal force. The buckets 40 rest on the upper run of the flexible element 39 as said buckets move upwardly, and the buckets are swung away from the flexible element 39 as the buckets pass around the wheel or roller 42, thereby throwing the grain through the upper end of the extension 38. The bearings 45 of the shafts 36 and 43 are preferably adjustable in order that the endless flexible elements 32 and 39 of the elevators may be tightened.

The elevated grain which is discharged from the extension 38 of the elevator housing 5 passes down an inclined chute 46, and the lower end of the chute 46 is connected to the top 47 of a funnel-shaped mixing and sacking member, comprising the hopper 48 and depending spout 49. The top 47 closes the hopper 48, and the chute 46, to prevent the escape of dust, and the chute 46 is located at one side of the center of the hopper so that the grain entering the hopper has a whirling motion therein before dropping down through the spout 49 into the sack or bag S. The spout 49 is of a size to receive the sack thereon.

The spout 49 is provided with a valve or closure to control the discharge of grain. Thus, the lower end 50 of the spout has openings 51, and a vertical shaft 52 disposed axially within the hopper 48 and spout 49 is journaled in the top 47 and bottom 50, and carries the wings 53 of the valve. The wings 53 may be turned over the openings 51, as seen in Fig. 11, to shut off the discharge of grain from the spout 49, with the valve in closed position, and the valve may be turned to remove the wings 53 from over the openings 51, as seen in Fig. 10, so that the grain may discharge down through said openings 51.

Below the spout 49 is mounted for vertical movement a bracket shelf 54 to support the sacks S. The shelf 54 has the back 55 provided with the rearwardly extending flange 56 having the bearings 57 slidable on parallel vertical guide rods 58. The lower ends of the rods 58 are secured to a frame member 59 secured on the base 60 of the machine and the upper terminals of the rods 58 are engaged within a bracket 61 secured to posts 62 that are secured on the base 60. The hopper 48 is secured to the posts 62, and braces 63 also connect the hopper 48 and posts 62, so as to support the hopper 48 and spout 49 in depending position from the frame.

In order to move the shelf 54 upwardly and downwardly, a vertical screw 64 has its lower terminal journaled in the frame member 59 and its upper terminal journaled in a yoke 65 that is secured to the rods 58, and the flange 56 of the bracket shelf 54 has a nut 66 engaging the screw 64, so that the rotation of the screw in opposite directions will raise and lower the shelf.

The mouth of the sack is also raised and lowered with the shelf, and for this purpose a ring 67 surrounds the spout 49 and has a lower out turned flange 68 over which the edge of the sack is placed, and the sack is secured to said ring 67 by any suitable means. For example, as shown, a cam 69 is pivoted to the ring 67 above the flange 68 for clamping the edge portion of the bag on said flange, the several of said cams or clamping elements may be used if desired. The ring 67 is carried by a slide 70 that moves up and down on the rods 58 above the yoke 65, and rods 71 connect the slide 70 with the flange 56 of the bracket shelf, whereby the ring 67 is raised and lowered with the shelf 54. The rods 71 slide through the yoke 65.

The machine is driven by an electric motor 72 mounted on the base 60, or other source of power may be used. A belt 74 passes around a pulley wheel 73 on the armature shaft of the motor 72 and around a pulley wheel 75 of larger diameter secured on the elevator shaft 35, thereby driving the elevator direct from the motor, and a belt tightener 76 is used for tightening the belt 74, reference being had to Fig. 1. A pulley wheel 77 on the shaft 36 is connected by a belt 78 with a pulley wheel 79 of smaller diameter on the shaft 43, whereby the secondary elevator is driven from the primary elevator. A gear wheel 80 on the shaft 35 meshes with a gear wheel 81 mounted in the frame, and a pulley wheel 82 is rotatable with the gear wheel 81 and is connected by an endless belt 83 with a pulley wheel 84 secured on the shaft 3, so that the rotor 2 of the mixer is operated simultaneously with the elevators. A belt tightener 85 is provided for the belt 83, or a sprocket chain can be used in lieu of the belt 83. A sprocket wheel 86 secured on the shaft 3 is connected by a sprocket chain 87 with a sprocket wheel 88 secured on a shaft 89, and the shaft 26 of the powder feeder is geared to the shaft 89 by means of meshing bevel gears 90 and 91 secured on the shafts 26 and 89. Thus, the powder feeder is operated simultaneously with the mixer and elevators.

The sack shelf 54 of the sacking means must be alternately raised and lowered, requiring the reverse rotation of the screw 64 which has a bevel gear 92 at its lower end meshing with a bevel gear 93 on the inner end of a horizontal shaft 94 journaled in

the frame member 59 and on the base 60. A reversing gear 95 is located betwen the shaft 94 and the shaft 3 from which the screw 64 is driven, in order to reverse the direction of rotation of the screw 64. The reversing gear, as shown in Figs. 1, 2, 15 and 16, includes a supporting bracket 96 in which the shaft 94 is journaled, and a gear wheel 97 carried by the bracket 96 and meshing with a pinion 98 on the shaft 94. A rocking bar 99 is fulcrumed between its ends, as at 105, on the bracket 96 and its opposite arms carry the gear wheels 100 and 101 adapted to alternately mesh with the gear wheel 97 when the bar 99 is oscillated to opposite positions. The gear wheels 100 and 101 mesh with one another, and a sprocket wheel 102 rotatable with the gear wheel 101 is connected by an endless sprocket chain 103 with a sprocket wheel 104 secured on the shaft 3 so that the wheel 101 is driven in one direction from the shaft 3, while the wheel 100 rotates in the opposite direction. Consequently, when the wheel 101 meshes with the wheel 97, as seen in Fig. 16, the shaft 94 and screw 64 are rotated in the corresponding direction, whereas when the wheel 100 meshes with the wheel 97, as seen in Figs. 1 and 15, the shaft 94 and screw 64 are rotated in the reverse direction.

The reversing of the screw 64 is obtained by the oscillation of the bar 99 to alternately engage the wheels 100 and 101 with the wheel 97. For this purpose, toggle links 106 and 107 connect the opposite arms of the bar 99 with the bracket 96. A link 108 is connected to the joint of the links 106, and a link 109 is connected to the joint of the links 107. Said links 108 and 109 are connected to an evener bar 110 which is pivoted between its ends to a link 111 that is in turn pivoted to the lower arm of a lever 112 fulcrumed, as at 113, to the frame. The evener bar 110 distributes the strains between the links 108 and 109 when the lever 112 is swung to move said links 108 and 109 in either direction. A bar 114 pivoted between its ends to the bracket 96 has slots 115 and 116 in which the joints of the toggle links 106 and 107 are movable, in order to limit the movement of the parts. When the lever 112 is swung to the position shown in Figs. 1 and 15, the links 108 and 109 are pulled upwardly, thereby moving the joints of the toggle links 106 and 107 in the corresponding direction. The toggle links 106 are therefore "broken", while the links 107 are moved slightly beyond a straight line position. This will swing the bar 99 to remove the wheel 101 from the wheel 97 and bring the wheel 100 in mesh with the wheel 97. The links 107 moving slightly beyond a straight line or "dead center" position will lock the parts in this position, the joints of the toggle links being limited in their movement in the slots 115 and 116 of the bar 114. When the lever 112 is moved to its opposite position, as seen in Fig. 16, the links 108 and 109 are moved downwardly to the position shown in Fig. 16. The toggle links 107 are "broken", while the links 106 are moved slightly beyond a straight line position, thereby swinging the bar 99 to remove the wheel 100 from the wheel 97 and engage the wheel 101 with said wheel 97. The links 106 moving slightly beyond straight line or "dead center" position will lock the parts with the wheel 101 in mesh with the wheel 97.

Loose play or lost motion is provided for between the pinion 98 and shaft 94 to permit either of the wheels 100—101 to come into mesh with the wheel 97 before the power is applied to the shaft 94. Thus, a collar 117 is secured on the shaft 94 and said collar has a lug 118 cooperable with a lug 119 on the hub of the pinion 98. When the pinion 98 is rotated in one direction the lug 119 bears against one side of the lug 118 to drive the shaft 94 in the corresponding direction. When the rotation of the pinion 98 is reversed the lug 19 will move through more than one-half of a circle before contacting with the opposite side of the lug 118 to drive the shaft 94 in the corresponding direction. In this way, whenever the rotation of the pinion 98 is reversed, the pinion will turn almost a complete revolution before turning the shaft 94 with it, and this gives the gear wheel 100 or 101 an opportunity to mesh with the gear wheel 97 before the power is applied to the shaft 94 to rotate the screw 64 and move the shelf 54.

A tripping device is used for operating the control lever 112 of the reversing gear, and is in turn controlled by the movement of the shelf 54 to its extreme upper and lower positions. The tripping device includes a horizontal reciprocating bar 120 having a pin and slot connection 121 with the upper arm of the lever 112, so that said lever is swung by the reciprocatory motion of the bar 120. Said bar 120 is slidable in guides 122 that are secured to the legs of the casing 1 or frame of the machine, and said bar 120 also has a lateral shifting movement in the guides. The bar 120 is pressed inwardly by means of rods 123 slidable in the guides 122 and outstanding loops 124, and coiled springs 125 surround the rods 123 and are confined between the loops 124 and shoulders or washers 126 on the rods 123 in order to yieldingly move said rods and bar 120 inwardly. The bar 120 is slidable across the inner ends of the rods 123, and said rods constantly urge the bar 120 inwardly.

A disk 127 is secured on the shaft 3 at the outer side of the bar 120 and carries a crank pin 128 arranged to alternately wipe along the vertical portions 129 and 130 carried by the bar 120. Thus, reference being had to

Fig. 6, when the bar 120 is moved outwardly to bring the portions 129 and 130 into the path of movement of the wiper pin 128, the pin 128 contacting with the portion 129 (the shaft 3 and disk 127 rotating clockwise) will move the bar 120 toward the right, and the pin 128 engaging and wiping along the portion 130 will move the bar 120 toward the left or forwardly. When the bar 120 is moved inwardly by the spring-pressed rods 123, the portions 129 and 130 are retracted from the path of movement of the pin 128 so that the bar 120 will remain in the position to which it has been slid longitudinally thereof.

The tripping action is obtained by a rock shaft 131 located behind the bar 120 and journaled in bearings 132 with which the guides 122 are provided. The bar 120 has lugs or portions 133 at its inner side adapted to engage opposite sides of the guides 122 for holding the bar 120 in either of its opposite positions. Thus, when the bar 120 is moved forwardly and shifted inwardly the lugs 133 engage in front of the guides 122, whereas when the bar is slid rearwardly and shifted inwardly the lugs 133 engage in rear of the guides 122. The rock shaft 131 has the cams 134 and 135 in front and in rear of the corresponding guides 122 and extending in opposite directions. In the intermediate or neutral position of the shaft 131 the cams 134 extend downwardly, as seen in Fig. 3, while the cams 135 project upwardly. Thus, if the lugs 133 engage in front of the guides 122 and the shaft 131 is swung in the proper direction, the cams 134 will force the lugs 133 outwardly, as seen in Fig. 7, thereby enabling the bar 120 to be slid rearwardly. Similarly, if the lugs 133 are engaged in rear of the guides 122, and the shaft 131 is turned in the opposite direction, the cams 135 move the lugs 133 outwardly so that the bar 120 may be slid forwardly.

To assist in supporting and guiding the bar 120, angle pieces 136 are secured by means of bolts 139 or other clamping elements to the inner side of the bar 120. The pieces 136 have horizontal slots 137 receiving the shaft 131 and assisting in guiding the bar longitudinally and laterally. The pieces 136 also have vertical slots 138 receiving the bolts 139 to permit of the bar 120 being adjusted vertically with reference to the shaft 131.

An arm 140 is secured to the shaft 131 and is connected by a spring 141 with the adjacent post 62 or other part of the frame, in order to yieldingly hold the shaft 131 in intermediate position.

The shaft 131 is turned in opposite directions when the shelf 54 reaches its uppermost and lowermost positions, to obtain the tripping action for reversing the operative connection between the screw 64 and driving means. A pinion 142 is secured on the shaft 131 and meshes with a rack 143 that is slidable in a guide 144 having a roller 145 which keeps the rack 143 in mesh with the pinion 142. The upper end of the rack 143 is pivotally connected with a lever 146 that is fulcrumed, as at 147, to the yoke 65. A bar 148 is secured to the lever 146 and carries a roller or member 149 at its upper end with which the slide 70 contacts when the shelf 54 and ring 67 reach their lowermost position, thereby depressing the lever 146 and turning the pinion 142 and shaft 131 counter clock-wise as seen in Figs. 2, 12, 13 and 14. This particular position of the parts is shown in Fig. 13. A depending arm 150 is pivoted to the lower terminal of the bar 148 and is raised by the flange 56 of the shelf 54 when said shelf reaches its uppermost position, as seen in Fig. 14, thereby swinging the lever 146 upwardly so that the rack 143 rotates the shaft 131 clockwise. When the shaft 131 is turned in either direction from intermediate or neutral position, the arm 140 being swung will stretch the spring 141, so that the shaft is returned to intermediate position as soon as the lever 146 is released.

The valve of the spout 49 is also automatically opened and closed when the shelf 54 and ring 67 reach their uppermost and lowermost positions. The operating means includes a vertical rod 151 slidable in guides 152 carried by the corresponding post 62, and a link 154 connects a clamp 153 on the rod 151 with one arm of a bell crank lever 156 which has its elbow fulcrumed to the corresponding post 62. The other arm of the lever 156 is connected by a link 157 with an arm 158 secured on the upper end of the valve shaft 52, said arm 158 having a series of apertures 159 to receive the pivot and provide for adjustment of the valve 53. A piece 160 is secured to the lower arm of the lever 156 and is connected by a coiled tension spring 161 with the link 154, and said spring is movable past the pivot 155 between the link 154 and lever 156 in the opposite positions of the parts, as seen in Figs. 10 and 11. The spring 161 will therefore hold the parts in either position when moved past the pivot 155. Adjustable stop collars 162 are secured on the rod 151 to contact with the guides 152 and limit the upward and downward movements of the rod 151. Adjustable collars 153 and 164 secured on the rod 151 have upwardly and downwardly offset arms 165 and 166, respectively, located above and below the slide 70. The collars 162, 163 and 164 may be adjusted to suitable positions on the rod 151, and the collar 153 may also be adjusted on said rod, which, together with the adjustment of the link 157 on the arm 158, enables the valve 53 to be properly operated by the upward and downward movement of the

slide 70 and ring 67. When the slide 70 reaches its uppermost position, it contacts with and raises the arm 165, so as to raise the rod 151. The link 154 will swing the lever 156 so that the link 157 swings the arm 158, thereby turning the valve 53 to open position, as seen in Fig. 10. When the slide 70 reaches its lowermost position, as seen in Fig. 11, it contacts with and depresses the arm 166, thereby sliding the rod 151 downwardly. The link 154 will pull down on the lever 156 so that the link 157 swings the arm 158 to close the valve 53.

The operation of the machine is as follows: Assuming that the sack S has been applied to the ring 67 around the spout 49 with the bottom of the sack resting on the shelf 54, with the shelf 54 and ring 67 moving upwardly, then the valve 53 will be closed by the previous depression of the arm 166 and rod 151 by the slide 70, as seen in Fig. 11. Also, under these circumstances the trip bar 120 is in its rearmost position, as seen in Fig. 16, with the gear wheel 101 meshing with the gear wheel 97, so that the screw 64 is rotated in the direction to raise the shelf 54 and bag holding ring 67. The lugs 133 of the bar 120 engage in rear of the guides 122, and the bar 120 is in the position opposite to that shown in Figs. 6 and 7, with the bar moved rearwardly to bring the portion 130 adjacent to the shaft 3 and the portion 129 spaced rearwardly from said shaft.

The grain dumped into the hopper 6 from a sack will flow through the openings 12 and 7 into the casing 1 of the mixer, and, at the same time, the powder feeder is operated so as to deliver powder down through the passage 9 to mix with the grain which enters the casing 1. The grain is picked up in the casing 1 by the rotor or wheel 2 to mix the grain and powder and discharge them through the opening 4 into the lower portion of the elevator housing 5. The grain is elevated in said housing by the primary elevator and delivered from the buckets 37 onto the lower portion of the secondary elevator whose buckets 40 carry the grain and powder upwardly and discharge same through the housing extension 38 into the chute 46. From the chute 46 the grain is delivered into the hopper 48 and has a whirling motion therein, and the grain drops down into the spout 49, being prevented from discharging from said spout by the valve 53 which is closed. When the sack is raised to its uppermost position, the slide 70 contacts with the arm 165 (which occurs as the slide 70 arrives at its uppermost position) thereby raising the rod 151 and swinging the lever 156 so as to turn the arm 158 and shaft 52, thereby opening the valve 53, as seen in Fig. 10. The grain in the spout 49 will therefore drop into the sack, the bottom of which rests on the shelf 54. At the same time, the shelf 54 being raised will result in the flange 56 thereof contacting with the arm 150 and swinging the lever 146 upwardly, as seen in Fig. 14, so that the rack 143 rotates the pinion 142 and shaft 131 clock-wise, as seen in Fig. 14. The shaft 131 is therefore turned to move the cams 135 outwardly, and said cams will move the lugs 133 outwardly from in rear of the guides 122. At the same time, the bar 120 is moved outwardly to bring the portions 129 and 130 thereof into the path of movement of the wiper pin 128. Said bar 120 being in its rearmost position will result in the pin 128 contacting with the portion 130 and thereby sliding the bar 120 forwardly, and when said bar reaches its foremost position the lugs 133 engage in front of the guides 122, under the pressure of the rods 123, thereby locking the trip bar 120 in its foremost position, and, at the same time, the bar 120 is moved inwardly to remove the portions 129 and 130 from the path of the pin 128, the bar 120 being now in the position shown in Fig. 6. The forward movement of the bar 120 swings the lever 112 so as to reverse the connection between the screw 64 and shaft 3, the gear wheel 100 now meshing with the gear wheel 97, as seen in Figs. 1 and 15. As a result, the screw 64 is now rotated in a direction to move the shelf 54 and bag holding ring 67 downwardly, and the sack is filled by grain dropping down the spout 49 as the sack is lowered. In this way, the grain is delivered into the sack after the sack has been raised, and during the lowering the sack, to prevent the powder passing through the sack as dust.

When the sack reaches the lowermost position, the slide 70 contacts with and depresses the arm 166, thereby moving the slide rod 151 downwardly and closing the valve 53, as seen in Fig. 11. This stops the delivery of grain from the spout into the bag, the bag having been filled. Furthermore, the slide 70 contacting with the roller 149 will depress the lever 146, as seen in Fig. 13, thereby turning the pinion 142 and shaft 131 so that the cams 134 are moved outwardly, as seen in Fig. 7, to disengage the lugs 133 from in front of the guides 122 and also move the bar 120 outwardly to bring the portion 129 into the path of the pin 128. The pin 128 wiping along the portion 129 will slide the bar 120 rearwardly, and the lugs 133 are moved behind the guides 122 by the spring rods 120. The rearward movement of the bar 120 will reverse the connection between the screw 64 and shaft 3, as hereinbefore described, so that the gear wheel 101 now meshes with the gear wheel 97 to rotate the screw 64 so as to raise the shelf 54. At this point, the filled sack is removed from the shelf 54, and

the machine may be stopped for a slight interval while removing the filled sack. An empty sack is then slipped up on the spout 49 and fastened to the ring 67, and the operation is repeated.

One sack of grain is delivered into the hopper 6 for each sack that is filled, and the sack which is emptied into the hopper 6 may be immediately applied to the sack holding ring 67. The mixer and elevator may operate continually during the operation of the machine, so that grain is delivered continually into the hopper 48 and spout 49, it being noted that the valve 53 closes the spout after a sack has been filled and until the empty bag is brought to its uppermost position. It is also possible to remove a filled sack of grain and replace same by an empty sack without stopping the machine. The dust resulting from the mixing of the powder with the grain is confined within the casing 1, housing 5 and hopper 48, and will not escape, thereby protecting the attendant. Should the spout 49 become filled with grain during the time that the valve 53 is closed, the grain overflowing from the spout will be held in the hopper 48, and when the valve 53 is opened the grain will drop from the spout 49 into the sack with minimum agitation, the grain moving downwardly as a column from the spout into the sack.

Having thus described the invention, what is claimed as new is:—

1. In a machine of the character described, a spout, a valve for closing the spout, sack holding means movable upwardly and downwardly to raise and lower a sack on the spout, and means operated by said sack holding means when it reaches its uppermost and lowermost positions for opening and closing said valve, respectively.

2. In a machine of the character described, a spout, a valve at the lower end of the spout for closing the spout, sack holding means movable upwardly and downwardly for moving a sack upwardly and downwardly on said spout, and automatic means operated by said sack holding means when it reaches its upper and lower limits of movement and controlling said valve to open and close the valve when said sack holding means reaches its uppermost and lowermost positions, respectively.

3. In a machine of the character described, a spout, a vertical shaft mounted within the spout and projecting from the upper end thereof, a valve carried by said shaft within the spout for closing the spout, sack holding means movable upwardly and downwardly for moving a sack up and down on the spout, and means actuated by said sack holding means when it reaches its uppermost and lowermost positions and operably connected with said shaft for opening and closing said valve when the sack holding means reaches its uppermost and lowermost positions, respectively.

4. A machine of the character described comprising a hopper having a top and a spout, means for delivering material into the hopper, a vertical shaft in said spout and extending through said top, a valve carried by said shaft within the spout for closing the spout, sack holding means movable upwardly and downwardly and adapted to hold a sack for up and down movement on said spout, and automatic means operated by said sack holding means when it reaches its uppermost and lowermost positions for automatically closing and opening the valve when said sack holding means reaches its uppermost and lowermost positions, respectively.

5. A machine of the character described comprising a spout, a valve in the spout for closing same, vertically movable sack holding means adapted for moving a sack up and down on the spout, a vertically movable rod operably connected with said valve, arms carried by said rod, said sack holding means having a member movable between said arms for raising and lowering said rod when the sack holding means reaches its uppermost and lowermost positions, so as to open and close the valve, respectively.

6. In a machine of the character described, a spout, sack holding means movable vertically on said spout and adapted for holding the edge portion of a sack for up and down movement on said spout, a driving shaft, an operative connection between said shaft and means including a reversing gear for moving said means upwardly and downwardly, and means controlling said reversing gear and controlled by said means for reversing said gear when said means reaches its uppermost and lowermost positions.

7. In a machine of the character described, a spout, vertically movable sack holding means adapted for holding a sack for up and down movement on the spout, a driving shaft, an operative connection between said shaft and means including a reversing gear for moving said means upwardly and downwardly, and means driven from said shaft for controlling said reversing gear and controlled by said sack holding means when said sack holding means reaches its uppermost and lowermost positions to reverse said gear by power from said shaft.

8. In a machine of the character described, a spout, sack holding means adapted for holding a sack for up and down movement on the spout, a driving shaft, an operative connection between said shaft and means including a reversing gear for moving said means upwardly and downwardly, means controlling said reversing gear and arranged to be operated from said shaft, and means controlling the last named means

from the sack holding means when same reaches its uppermost and lowermost positions so as to reverse said gear by power from said shaft.

9. In a machine of the character described, a spout, sack holding means movable upwardly and downwardly and adapted to hold a sack for up and down movement on the spout, a drive shaft, an operative connection between said shaft and sack holding means including reversing gear for raising and lowering said means, a longitudinally and laterally movable bar operably connected with said gear for reversing the gear when said bar is slid longitudinally to different positions, said shaft and bar having cooperable portions for reciprocating said bar to opposite positions by the rotation of the shaft, and means controlled by said sack holding means when it reaches its uppermost and lowermost positions to shift said bar laterally to bring said portions into cooperation for sliding said bar to reverse said gear, and means for shifting said bar when slid longitudinally in either direction to separate said portions.

10. In a machine of the character described, a spout, sack holding means movable vertically and adapted to hold a sack for up and down movement on the spout, a drive shaft, an operative connection between said shaft and said sack holding means including a reversing gear for moving said means upwardly and downwardly, a longitudinally and laterally movable bar operably connected with said gear for reversing it when said bar is slid to different positions, portions carried by the shaft and said bar cooperable when the bar is moved laterally in one direction for moving the bar longitudinally from either position to the other position, spring means for moving said bar laterally in the opposite direction, means for locking said bar against longitudinal movement when moved laterally in the last named direction, and means controlling the lateral movement of said bar and controlled by said sack holding means and operable to shift said bar laterally in the first named direction when the sack holding means reaches its uppermost and lowermost positions, so as to unlock said bar and bring said portions into cooperation.

11. In a machine of the character described, a spout, sack holding means movable vertically and adapted to hold a sack for up and down movement on the spout, a drive shaft, an operative connection between said shaft and sack holding means including a reversing gear for moving said means upwardly and downwardly, a longitudinally and laterally movable bar operably connected with said reversing gear for reversing said gear when said bar is moved longitudinally to different positions, members across which said bar is movable longitudinally, said bar having lugs to engage on opposite sides of said members when the bar is slid to its opposite positions, spring means for shifting said bar laterally to engage said lugs with said members, a rock shaft having opposite cams at opposite sides of said members cooperable with said lugs and so arranged that when the shaft is turned in opposite directions the opposite cams are moved to disengage said lugs from said members and shift the bar laterally in the corresponding direction, cooperable portions operated by said shaft and carried by said bar, respectively, adapted to cooperate when the bar is shifted laterally in the last-named direction for sliding the bar longitudinally from either position to the other, and means for turning said shaft in opposite directions when said sack holding means reaches its limits of upward and downward movement.

12. In a machine of the character described, a spout, a valve in the spout for closing same, sack holding means movable vertically and adapted to hold a sack for up and down movement on the spout, a drive shaft, an operative connection between said shaft and sack holding means including a reversing gear for raising and lowering said means, means controlling said reversing gear and controlled by said sack holding means for reversing said gear when said means reaches its upper and lower limits of movement, and means also controlled by said sack holding means for automatically opening and closing said valve when said sack holding means reaches its upper and lower limits of movement.

13. In a machine of the character described, a spout, a vertically movable sack shelf below the spout, a sack holding member movable on the spout and connected with said shelf for movement therewith, and means for moving said shelf and member upwardly and downwardly.

14. In a machine of the character described, a spout, a vertically movable sack shelf below the spout, a ring surrounding the spout and adapted to hold the edge portion of a sack, a connection between said ring and shelf for the simultaneous upward and downward movement thereof, and means for moving said shelf and ring upwardly and downwardly.

In testimony whereof I hereunto affix my signature.

WILHELM MAUCH.