Sept. 29, 1942. J. G. F. AUGUSTIN 2,297,382

BAG FILLING MACHINE

Filed Sept. 27, 1939

Fig. 1

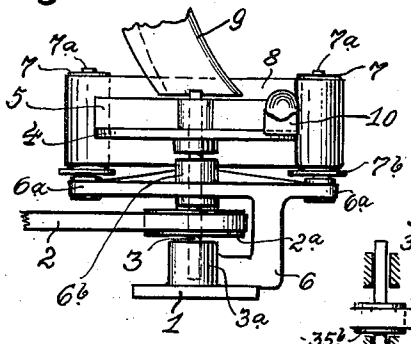


Fig. 4

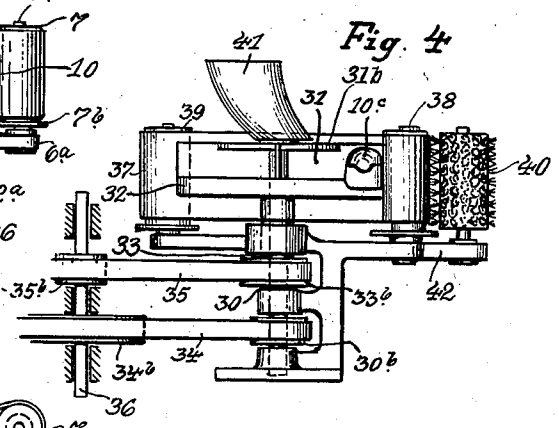


Fig. 2

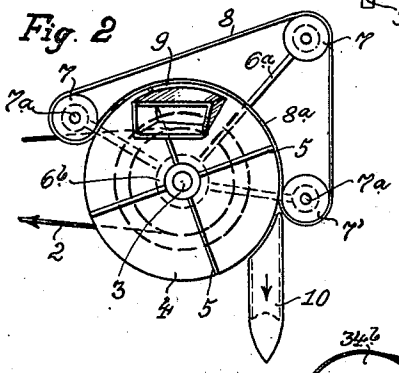


Fig. 5

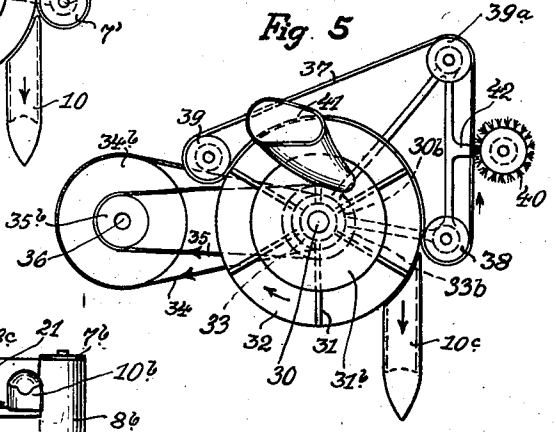
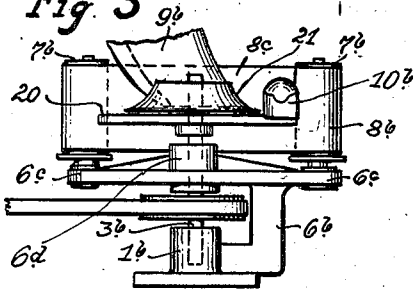


Fig. 3



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BAG FILLING MACHINE

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Application September 27, 1939, Serial No. 296,757
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5 Claims. (Cl. 226—48)

This invention relates to bag filling machines and more particularly to a machine for filling bags with material which is of a mealy or granular character.

An object of this invention is to provide a bag filling machine of this character which is so constructed that only a portion of the movable part of the machine need be enclosed, the machine contemplating a centrifugal device and a movable wall engaging about the centrifugal device so that the material thrown outward by the centrifugal device will not cling to the wall as is the case in devices at present available where a centrifugal plate is enclosed by a stationary circular wall.

Another object of this invention is to provide a rotatable centrifuge and a flexible, movable wall in the form of an endless belt which has a portion thereof contacting with the periphery of the centrifuge, so that a rotation of the centrifuge will simultaneously rotate the endless belt and thus carry along the material which is thrown outwardly by the centrifuge in the same direction as the rotation of the centrifuge.

A further object of this invention is to provide a structure of this kind which is capable of handling granular material in the form of superphosphate, which has a tendency to adhere to parts of the machine, and which in the case of a bag filling machine having a stationary wall has a tendency to pack or build up about the wall, the machine constructed according to this invention being so constructed that material of this and like character will be prevented from clinging or building up on the wall disposed at least partially about the centrifuge.

A still further object of this invention is to provide in a machine of this kind means to assist the material in its travel, the material assisting means being of such a character as to also assist in ejecting the material from the centrifuge into the bag holding device.

A further object of this invention is to provide a structure of this kind which is so constructed that only a portion of the periphery of the rotating plate or centrifuge need be enclosed by an arcuate wall.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawing, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a detail front elevation, partly broken away, of a bag filling machine constructed according to an embodiment of this invention.

Figure 2 is a top plan of the machine.

Figure 3 is a detail front elevation of a slightly modified form of this invention.

Figure 4 is a detail front elevation of a further modification of this invention, and

Figure 5 is a detail top plan of the structure shown in Figure 4.

Referring to the drawing, the numeral 1 designates generally a bearing forming part of a frame structure which includes a vertical arm 6 and radially arranged struts 6*a*, which radiate about a central hub or boss 6*b*.

A driven shaft 3 is disposed in a vertical position and is journaled at its lower end in the bearing 1, and extends through the boss 6*b*. A driven pulley 2*a* is secured to the shaft 3 between the bearing 1 and the boss 6*b*, anad a drive belt 2 is trained about the pulley 2*a* and is connected to a suitable source of power supply (not shown). A disc or plate 4 is fixed to the shaft 3 above the boss 6*b* and a plurality of radially arranged ribs or blades 5 are secured to and extend upwardly from the plate 4. A material discharging nozzle 9 shown in fragmentary form in Figure 1 is mounted in a position for discharging material onto the upper surface of the rotating plate 4, the lower or discharge end of the nozzle 9 terminating slightly above the upper edges of the ribs or blades 5, as shown in Figure 1.

The radial struts or supporting members 6*a* each have a rotatable roller 7 mounted on stationary shafts 7*a* carried by each strut or brace 6*a*. The lower ends of the rollers 7 may be provided with a flange 7*b* so as to prevent an endless belt 8 from moving downwardly and off the rollers 7. As shown in Figure 2, there are three of these rollers 7, two of the rollers 7 being positioned closely adjacent the peripheral edge of the plate 4 and the third roller 7 being positioned a substantial distance away from the periphery of the disc 4. In this manner, that portion of the endless belt 8 running over the two rollers 7, closely adjacent the disc 4, forms an arcuate and movable wall 8*a*, about a portion of the circumference of the disc 4 which is slightly less than one-half the circumference of the disc. The third roller 7 comprises an idler, and engages the outer run of the endless belt 8.

The belt 8, as shown in Figure 1, is so positioned relative to the disc 4 that the disc 4, together with the blades or ribs 5, will be disposed intermediate the upper and lower edges of the belt 8. In this manner, the edge of the belt 8

will not have a tendency to work inwardly of the upper surface of the disc 4, as would be the case if the belt 8 were positioned with the lower edge thereof substantially coplanar with the upper surface of the disc.

A discharge or bag filling member 10 is mounted in a position with the intake end thereof closely adjacent the roller 7', and a bag is adapted to be secured to or engaged with the filling member 10, so that the material moving outwardly through the tubular filling member 10 will enter a bag carried thereby.

In Figure 3, there is disclosed a slightly modified form of this invention wherein a driven shaft 3b is journaled in a lower bearing 1b and an upwardly extending frame member 6b is secured to the bearing 1b. A plurality of radially arranged struts 6c are secured to a central hub 6d through which the shaft 3b extends. A movable wall member 8b is mounted on rollers 7b, and the movable wall member 8b includes an arcuate wall 8c contacting with the periphery of a rotatable disc 20, which is fixed to the shaft 3b. A truncated, bell shaped spreader 21 is fixed to the shaft 3b, and the base or larger diameter of the spreader 21 is disposed closely adjacent to the upper surface of the disc 20. A material discharging nozzle 9b is supported in a position for discharging the material onto the spreader 21, and a filling tube 10b is mounted in a position whereby the material thrown about by the disc 20, and moved along by the movable wall 8c will freely enter the tube 10b.

In Figures 4 and 5, there is disclosed a further modification of this invention wherein a disc 32 is mounted on a tubular drive shaft 33 provided with a driving pulley 33b. A belt 35 is trained about the pulley 33b and also about a driving pulley 35b which is fixed to a drive shaft 36. A disc or plate 31b is fixed to the upper end of a shaft 30, which is driven by means of a drive belt 34, trained about a driven pulley 30b, and a drive pulley 34b. The drive pulley 34b is fixed to the shaft 36 and has a diameter substantially larger than the diameter of the drive pulley 35b so that the disc or plate 31b will rotate at a speed greater than the speed of the lower disc 32. The disc 31b is substantially smaller in diameter than the disc 32, and is provided with a plurality of radially arranged blades 31 which terminate at their outer edges substantially at the periphery of the lower plate 32. A material discharging nozzle 41 is supported in a position above the upper disc 31b so that the material to be placed in the bags will initially be discharged onto the upper disc 31b. An endless belt 37 is trained about triangularly arranged rollers 38, 39, and 39a, similar to the rollers 7, and a bag filling tube 10c is supported in a position closely adjacent the end of the travel of the belt 37 about the disc 32. A belt cleaning brush 40 is supported by a supporting means 42 from a part of the frame structure and contacts with the outer run of the belt 37 so as to remove any material which may cling to the surface of the belt 37 after it passes the pulley 38, which is positioned closely adjacent the intake end of the bag filling tube 10c.

In the use and operation of this bag filling machine, the granular or comminuted material is discharged from the discharge nozzle 9 onto the centrifugal disc 4, between the radial blades 5. The speed of rotation of the disc 4 is such that the material discharged thereonto will be thrown gradually beyond the marginal edge thereof into contact with the movable wall 8. At this time the movable wall 8 will carry such material as contacts therewith about the outer edge of the disc 4, and when the wall 8 reaches the roller 7' any material clinging thereto will be loosened by reason of the sharp bend in the wall. The rotation of the disc 4 and the upstanding blades 5 will throw the loose material forwardly to the point where the intake end of the filling tube 10 confronts the disc 4. The material will then pass through the tube or filling member 10 with a sufficient force and speed so as to be thrown out of the tube 10 into a bag which may be secured thereto in any convenient manner.

With a construction of this kind, it is not necessary to provide a circular wall entirely about the centrifugal disc 4, neither is it necessary to provide a top wall for the centrifugal filling means due to the heavy character of the material being discharged into the bags. This heavy material is of such a character that it will not fly in the air in the form of dust at the speed of rotation of the centrifugal plate 4 and the blades 5.

With a structure such as is shown in Figures 4 and 5 the loose material is initially discharged onto a relatively high speed plate 31b and is then thrown outwardly beyond the marginal edge thereof and falls onto the slower speed disc 32. At this point the material is swept about the disc 32 by the blades 31. The operation of the structure shown in Figures 4 and 5 is otherwise similar to that shown in Figures 1 and 2.

It will, of course, be understood that various changes and modifications may be made in the details of construction of this invention, such changes and modifications being restricted only by the scope of the appended claims.

What is claimed is:

1. A centrifugal bag filling machine comprising a rotatable plate, means for rotating said plate, a second plate above said first plate and having a diameter less than said first plate, means for rotating said second plate independent of said first plate, radial ribs carried by said second plate and overlying said first plate, means discharging material onto said second plate, a pair of rollers disposed closely adjacent the periphery of said first plate, supporting means for said rollers, an endless flexible wall trained about said rollers and contacting with a portion of the periphery of said first plate, and a tubular bag filling nozzle disposed adjacent one of said rollers.

2. A centrifugal bag filling machine comprising a rotatable plate, means for rotating said plate, a second plate above said first named plate and having a diameter less than that of said first named plate, means for rotating said second plate at a greater speed than that of said first named plate, radial ribs carried by said second plate extending outwardly to the periphery of said first named plate and extending downwardly from the second plate to overlie said first plate, an endless belt extending partly above the periphery of said first named plate and rotatable with the latter, means for discharging material on to said second plate within the run of said belt, and a bag filling nozzle disposed to receive material from the end run of said belt.

3. A centrifugal bag filling machine comprising a vertically spaced pair of co-axial plates, the lower plate being of greater diameter than the upper plate, radial blade members projecting outwardly from said upper plate to substantially

the periphery of said lower plate, said blade members extending downwardly from said upper plate to overlie said lower plate, means for rotating said lower plate at a predetermined speed, means for rotating said upper plate at a speed greater than said lower plate, an endless belt extending partly above the periphery of said lower plate and rotatable with the latter to form a movable wall which extends vertically to a predetermined point above the upper plate, means for discharging material on to said upper plate within the run of said movable wall, and a bag filling nozzle adjacent the periphery of said lower plate disposed to receive material from the end run of said movable wall.

4. In a centrifugal bag filling machine, a plate member rotatable about a vertical axis, an endless belt extending partly above the periphery of said plate member and rotatable therewith to form a vertical movable wall, means for introducing material on to said plate member within the run of said movable wall, vertical blade means rotatably supported above said plate member and extending radially outwardly to said movable wall, said blade means overlying said plate member and being rotatable at a greater speed than said plate member, whereby the material on said plate member is swept therefrom and hurled outwardly towards said movable wall by said blade means, and a bag filling nozzle adjacent the periphery of said plate member disposed to receive material from the end run of said movable wall.

5. In a centrifugal bag filling machine, the combination of a horizontal plate disc member rotatable about a vertical axis, an endless belt vertically disposed and extending less than about half around the perimeter of said member in contact therewith and movable with said member and having a discharge end forming with the periphery of said member a bight, said belt having more than about half its width extending above and less than about half of its width extending below its contact portion with said member, the upper part of the belt being adapted to receive and hold upon it the material projected by centrifugal force from the said member, means for holding said belt at its inner run only by said member, means supplying material to said member about a quadrant distant from said discharge end of the belt, a bag filling nozzle at said discharge end having its receiving end beyond the periphery of the member, with a part of said end extending into the said bight of the member and discharge end of the belt and having said end extending along the upper width of the belt and adjacent to the periphery of said member, and means for rotating said member for moving the material supplied to the member centrifugally against the belt, and also from said member into said opening of said nozzle, the moving belt being moved by said member and said belt also discharging the material on the belt into the opening of said nozzle by centrifugal force from the belt.

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