F. H. NICKLE.

CAN FILLING MACHINE.

APPLICATION FILED FEB. 5, 1913.

1,266,706.

Patented May 21, 1918.

2 SHEETS—SHEET 1.

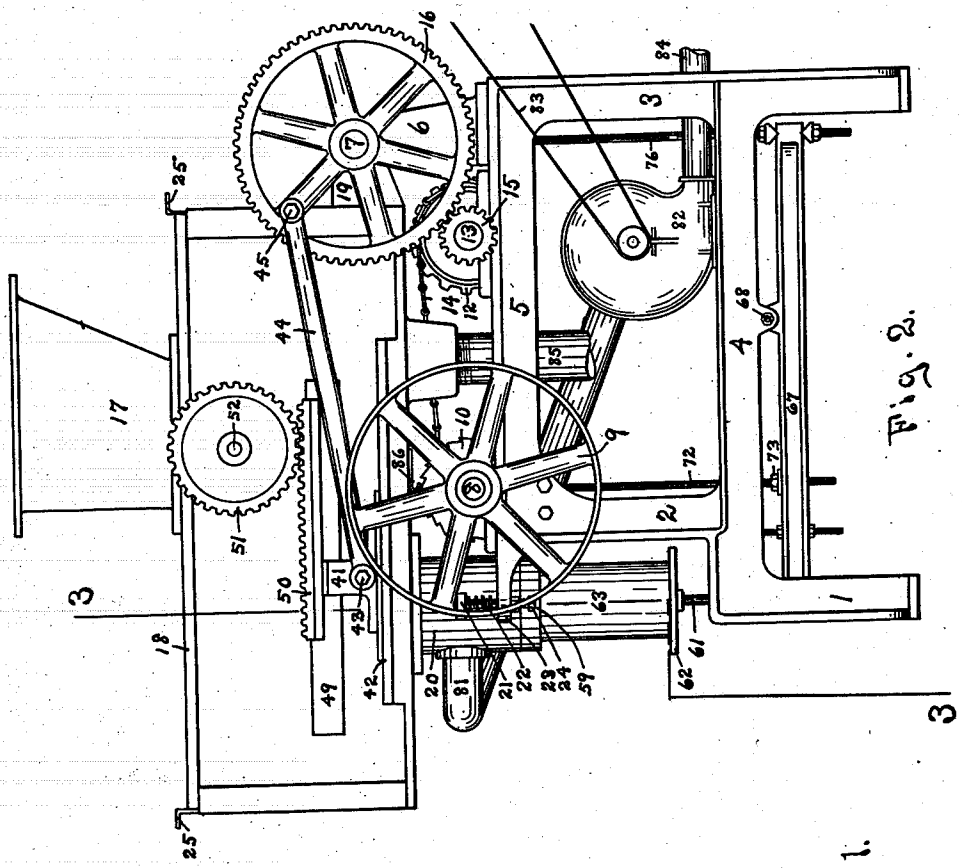


Fig. 2.

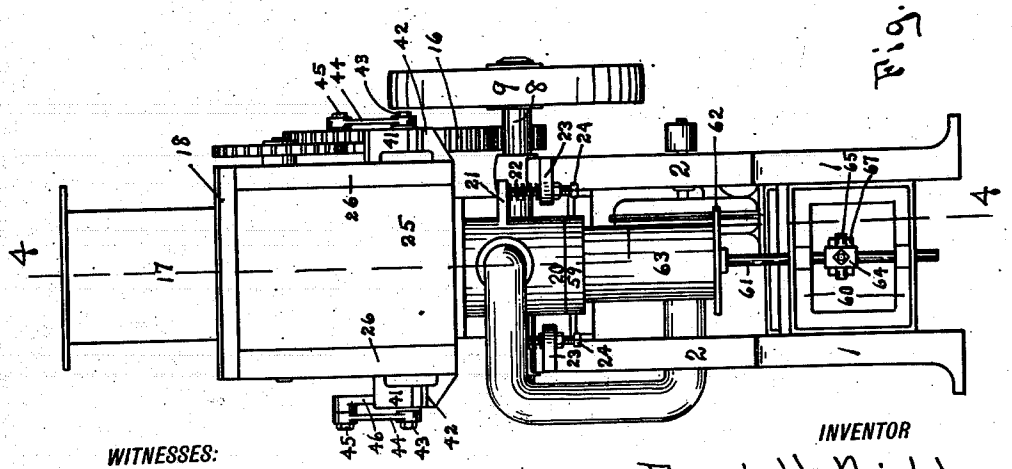


Fig. 1.

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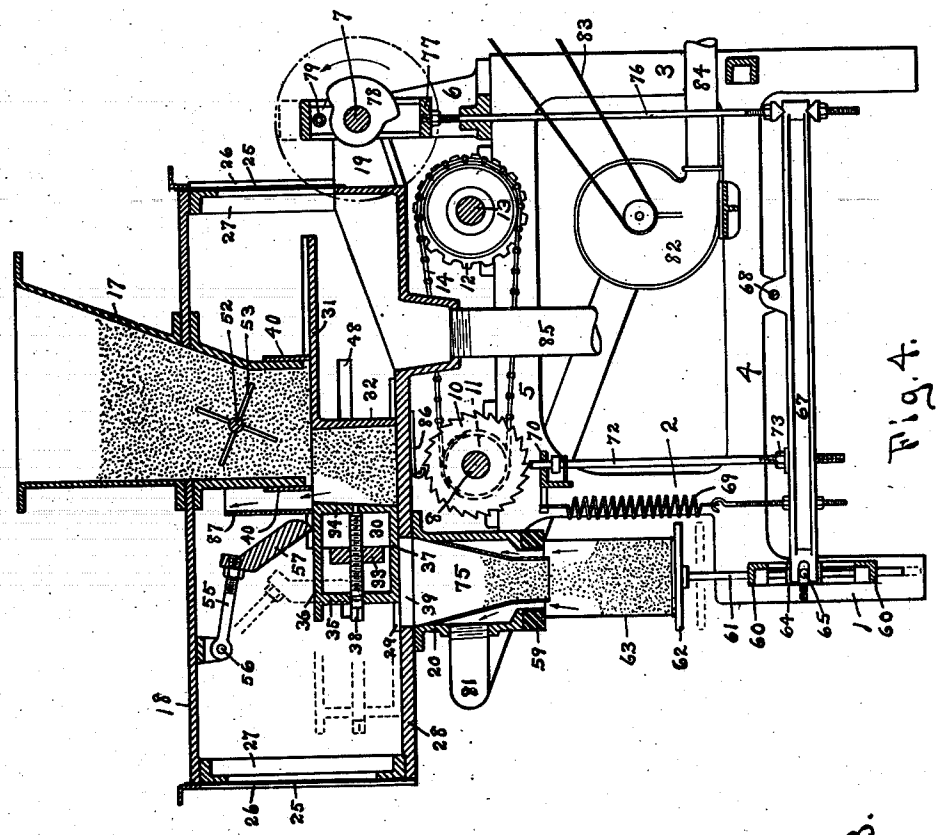


Fig. 4.

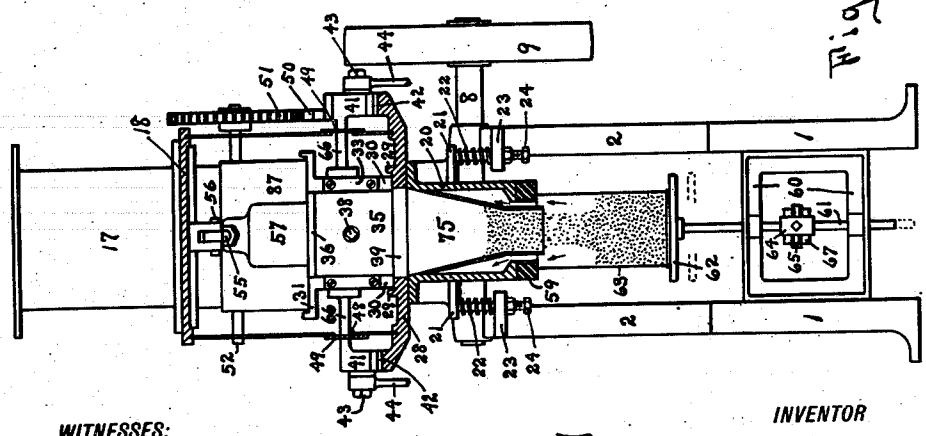


Fig. 3.

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CAN-FILLING MACHINE.

1,266,706. Specification of Letters Patent. Patented May 21, 1918.

Application filed February 5, 1913. Serial No. 746,263.

To all whom it may concern:

Be it known that I, FRANK H. NICKLE, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Can-Filling Machine, of which the following is a specification.

This invention relates to machines for filling cans, cartons and other containers with powdered or granulated materials, and its object is to provide a device which shall be simple in construction, rapid in operation, and which will prevent the dust of chemicals which are being placed in the containers from floating around and thus irritating the eyes, nose and lungs of the operator.

This machine consists in combination with a hopper and a longitudinally movable and adjustable measuring chamber beneath the hopper, of a chute adapted to receive the granular material conveyed from the hopper by the measuring chamber, of a container holder beneath the chute adapted to receive the cans, cartons or bags to be filled, together with actuating mechanism for reciprocating the measuring chamber and for shaking the container holder so as to cause the granular material to pack down quickly. This invention also consists in combination with the mechanism just enumerated, of a shell or housing extending around the chute and separated from the lower end of the same, of a ring of sponge-rubber or similar elastic material mounted on the lower edge of this housing against which the container may engage, and a pipe leading from said housing to convey away the dust rising from the container while being filled. It also consists in combination with the mechanism first described, of an arm pivotally mounted adjacent the hopper above the measuring device and so positioned, that when the measuring chamber is moved from the hopper to the position above the spout, this arm will descend into the measuring chamber and cause the material therein to drop out quickly. It also consists in a machine of the character described, of resilient means for supporting the containers being filled. It also consists in combination with a container, a measuring device and a spout as previously described, of a case surrounding the hopper and the measuring chamber, and means whereby the case may be pivoted for vertical movement and yieldably sustained in the desired position. It also consists of an agitator mounted within the hopper of a can filling device, and means for revolving said agitator back and forth. It further consists of the various details of construction shown in the accompanying drawings and especially pointed out in the annexed claims.

In the accompanying drawings, Figure 1 is a front elevation and Fig. 2 a side elevation of this improved machine. Fig. 3 is a vertical section on the line 3—3 of Fig. 2. Fig. 4 is a vertical section on the line 4—4 of Fig. 1.

Similar reference characters refer to like parts throughout the several views.

Many of the powdered and granular materials which are sold in sealed containers give off a large amount of dust while being packed, which dust is often very irritating if not poisonous to the operator. It is therefore desirable that these dust particles be collected and prevented from floating around in the atmosphere around the filling machines. It has also been found that the measuring chambers of can-filling machines become choked because of the arching of the material within them. It is therefore desirable that means be provided for breaking the arch and forcing the materials out of the measuring chamber. It has further been found desirable to shake or jar the containers in order to induce the powdered or granular materials to settle down hard within them, and it has been found that this is most easily accomplished when the containers being filled are supported by resilient means in such a manner that they and their supports can be quickly and suddenly shaken.

In the accompanying drawings, a frame is shown having uprights 1, 2 and 3, lower side bars 4 and upper side bars 5. These upper bars carry pedestals 6, in which is revolubly mounted a shaft 7. Near the front ends of these bars 5 are bearings for the shaft 8, on which may be secured a main driving pulley 9. On this shaft 8 is a ratchet wheel 10 and a chain wheel 11 which connects to a chain wheel 12 on the shaft 13 by means of a chain 14. This shaft 13 is mounted in bearings on the side bars 5 and carries a pinion 15 that meshes with a gear 16 on the shaft 7.

The material to be packed is received in a hopper 17 mounted in a case or movable frame 18. The rear end of this case has a

pair of arms 19 which are pivotally mounted on the shaft 7. The front end of the case has a downwardly extending housing 20 having laterally extending lugs 21 which rest on the springs 22 carried by forward extensions 23 of the side bars 5. Bolts 24 extend up into the springs 22 and limit the downward movement of the lugs 23 and the front end of the case. The front and rear ends of the case are in the form of gates 25, vertically slidable between the guides 26 and 27, as shown in Figs. 1 and 4.

Referring to Figs. 3 and 4, it will be noticed that the bottom 28 of the case is provided with upwardly extending longitudinal ribs 29 between which a measuring chamber is slidable. This device consists of side plates 30, a top 31, a rear cross plate 32 and a front cross bar 33, the latter being removably secured to the side plates 30. A rectangular frame or box having a rear plate 34, a front plate 35, a top plate 36, and a bottom plate 37, is adjustably mounted between the front ends of the side plates 30 and positioned by a screw 38, as shown in Fig. 4. By means of this screw the distance between the plates 34 and 32, and therefore the size of the measuring chamber, can be accurately determined.

The measuring chamber is slidable below the bottom of the hopper 17 and above the discharge opening 39 in the bottom plate 28 of the case. In order to insure a tight joint between the bottom of the hopper and the plates 31 and 36, vertical plates such as the plates 40 may be secured to the lower edges of the sides of the hopper, as shown in Fig. 4. Extending outwardly from each side plate 30 of the measuring device is an arm 66 having a shoe 41 on its outer end slidable on the guide 42 projecting from the bottom plate 28 of the case. Each shoe carries a pin 43, between which and the pins 45 carried by the gear wheel 16 and by a crank 46 on the opposite end of the shaft 7, the connecting rods 44 extend. To prevent the escape of the dust of the material being filled into the containers, through the slots 48 through which the arms 66 extend, plates 49 may be mounted on the arms 66 over these slots.

On one side of the machine, a rack 50 is mounted on a shoe 41 and meshes with a gear 51 on a shaft 52 extending across through the hopper and sides of the case. On this shaft 52 is mounted the agitator 53, as shown in Fig. 4, so that at each reciprocation of the measuring chamber, this shaft will be turned back and forth. In order to cause the material within the measuring device to fall down through the discharge opening 39, an arm 55 may be pivoted at 56 within the case and have a weight 57 at its outer end of less width than the measuring chamber. When the chamber is in the position shown in Fig. 4, this weight 57 will rest on the top plate 36, but when the chamber has moved forward until it is over the opening 39, then this weight 57 will slide down into the chamber and press the material therein down through the opening 39.

The housing 20 has secured to its lower edge a ring 59 of sponge rubber or similar soft, resilient material. Between the front uprights 1 of the machine are a pair of guides 60 for the vertical rod 61, which carries a table 62 by which the can or other container 63 is supported, while being filled, with its upper edge in engagement with the soft packing ring 59. On this rod 61 is secured a collar 64 which carries a cross pin 65 that is engaged by the forked front end of a lever 67 mounted on the lower side bar 4 at 68. This lever is normally held up by means of the spring 69 supported by an interior cross bar 70, as shown in Fig. 4. Guided in this cross bar 70 is a rod 72 having an adjustable nut 73 near its lower end which engages the lever 67, and having its upper end in engagement with the ratchet wheel 10. It will be apparent, therefore, that as the ratchet wheel 10 revolves, the lever 67, the supporting plate 62 and the container 63 will be severely shaken. While the container moves up and down the packing ring yields and expands to keep the space between the housing and container filled. Extending downwardly from the opening 37 is the chute 75 whose lower end is spaced from the ring 59.

A rod 76 extends upwardly from the rear end of the lever 67 and carries a yoke 77 at its upper end which surrounds a cam 78 on the shaft 7. This yoke carries a roller 79 which rests on this cam so that when the high portion of the cam engages this roller, the rear end of the lever 67 will be lifted and the front end depressed sufficiently to disengage the container 63 from the ring 69, so that it may be removed and another put in its place.

A pipe 81 connects to the housing 20, and if desired, a suction fan 82, driven by a belt 83 from any proper countershaft, may be connected to this pipe 81 and convey away the powdered substances which pass through this pipe 81 by means of the second pipe 84. Another pipe 85 may connect into the bottom of the case for the purpose of carrying off such substances as leak through between the hopper, the measuring device and the bottom of the case, and are scraped back by the rear plate 32 of the measuring device. If it is desired to shake or jar the case 18 so as to pack down the materials passing through the hopper, an engaging member 86 may be secured to the bottom 28 of the case, as shown in Figs. 2 and 4, in such a manner that the case and its contents virtually rest on the ratchet wheel 10. The result is that the case trembles violently and

that the loose powders therein settle down in a very compact manner. The operation of this machine is as follows:

The material in the hopper is kept from caking or arching by means of the agitator 53 which is turned by means of the gear wheel 51 and the rack 50 which is reciprocated by means of the gear 16 and crank 46. Whenever the measuring chamber is at the rear end of its stroke, that is, after it has passed somewhat beyond the position shown in Fig. 4, the material in the hopper will fill it so that at the movement of this measuring device to the left, (Fig. 4), a quantity of powdered or granular material will be carried forward over the opening 39 in the bottom of the case. At this instant the weight 57, pivoted at 56, will descend as shown in dotted lines in Fig. 4, preventing any caking or arching of the material in the measuring chamber while it is over the opening 39. This causes the material to pass down through the chute or spout 75 with a rush and assists in packing the material in the container 63. If a fan 82 is employed, the air within the container and the housing 20 will be of less pressure than the surrounding air, which will also insure the contents of the measuring chamber passing down at increased speed into the container 63. This also prevents the air in the container from passing up through the descending powder. Under normal conditions, when a charge of this kind falls into a container, a puff of dust rises therefrom, which is sometimes lost and often is very irritating to the eyes and lungs of the operator. By using a fan 82, a pipe 81 and a housing 20, this puff of dust, and any that may float from the container as it is being released, is prevented from escaping into the workroom but passes through the pipe 81 to a proper bin, where it can be recovered. During all of this time, the revolution of the wheel 10 and the action of its teeth on the upper end of the rod 72, causes the plate 62 and the container 63 to shake, insuring tight packing of the material.

In case paper bags or cartons are the containers being filled, the dust cannot pass through openings between the upper edges thereof and the ring 59, because the inrushing air through these openings will prevent such dust escaping.

When an opening is left between the bottom of the spout 75 and the top of the container 63, dust from the powdered material being filled into the containers will collect around the outside of the upper part of the containers and be lost, often also acting as irritants to the mucous membranes of the operators.

It is often desirable to secure a bent plate 87 (Figs. 3 and 4) to the front of the hopper to form an air pipe through which air may pass from the measuring chamber while being filled, which air will often carry up particles of the materials in the measuring chamber, which particles afterward fall back into the measuring chamber.

Many changes in the details of construction can be made by those skilled in the art without departing from the spirit of my invention as expressed in the following claims.

I claim—

1. A filling machine comprising a movable container holder, resilient means tending to force the container holder to the limit of its movement in one direction, means for moving said holder against the action of the resilient means to cause said holder to tremble, and other means for moving the holder to the limit of its movement in another direction.

2. In a filling machine, a container holder, resilient means for raising and supporting the holder, means for moving said holder against the action of said resilient means to cause the holder to tremble, other means for lowering the holder.

3. In a filling machine, the combination of a case having a discharge opening, a hopper supported thereon, a measuring chamber movable within the case below the hopper, a spout connected to the case at the discharge opening, an arm pivotally mounted within the case, and a weight on said arm adapted to ride on the measuring chamber while it is being filled from the hopper and to descend into said chamber when over the discharge opening.

4. In a filling machine, the combination of a movable case having a discharge opening, a hopper supported on the case, a measuring chamber movable within the case below the hopper, an arm mounted on the frame and a weight thereon, said arm being actuated by the movement of the chamber to discharge material therefrom.

5. In a filling machine, the combination of a casing having a discharge opening, a hopper supported on the casing, a measuring chamber movable within the casing below the hopper, an arm pivotally mounted on the casing and a weight thereon, said arm being actuated by the movement of the chamber to discharge material therefrom.

6. In a filling machine, the combination of a case having a discharge opening, a hopper mounted on said case, a measuring chamber movable within the case, means to vibrate the case including a shaft and a ratchet wheel on said shaft, an engaging member on the bottom of said case resting on said ratchet wheel, a second shaft and supporting means for one end of said case pivoted on the said second shaft.

7. In a filling machine, the combination of a case having a discharge opening in its

bottom and slots in its sides, a shaft at one end of said case, a hopper mounted on said case, a measuring device slidably mounted in said case and having arms extending through the slots in the sides of the case, cranks on said shaft and connecting rods between the cranks and said arms by means of which the measuring chamber may be moved between the hopper and the discharge opening, a rack on one of said arms, a shaft extending into said hopper, an agitator on said shaft, and a gear on the shaft in mesh with said rack whereby the agitator will be turned back and forth as the measuring chamber reciprocates.

8. In a filling machine, the combination of a frame, a container holder, resilient means for supporting said holder, means for moving said holder against the action of said resilient means to cause the container to tremble, a case having a discharge opening, a measuring chamber within the case, a hopper, and means for causing the case to vibrate vertically.

9. In a filling machine, the combination of a frame, a container holder, resilient means for supporting said holder, means for moving said holder against the action of said resilient means to cause the holder to tremble, a case having a discharge opening, a measuring chamber within the case, a hopper, and means for causing the case to vibrate.

10. In a filling machine, the combination of a container support, a case, a spout leading from the case, a housing surrounding the spout and spaced therefrom, means to vibrate the support up and down, and means to cause the case to vibrate vertically.

11. In a filling machine, the combination of a movable case, a hopper supported thereon and having a discharge opening, a measuring chamber movable beneath the discharge opening, means to reciprocate the measuring chamber, means to vibrate the case while the measuring chamber is being reciprocated, said means comprising a shaft, a ratchet wheel on the shaft, an engaging member on the movable case resting on said ratchet wheel, and a shaft for supporting the end of the case opposite to the ratchet wheel.

12. In a filling machine, the combination of a movable case, a hopper supported thereon and having a discharge opening, a measuring chamber reciprocable beneath the discharge opening, means to reciprocate the measuring chamber, means to vibrate the case while the measuring chamber is being reciprocated, said means comprising a shaft mounted on a fixed support, a ratchet wheel on the shaft, an engaging member on the case resting on the ratchet wheel, a shaft for supporting the end of the movable case opposite to the ratchet wheel, and means arranged between the movable case and shaft support for varying the length of movement given to the movable case by the ratchet wheel.

13. In a filling machine, the combination of a support, a casing pivoted thereto at one end, a hopper supported on the casing, a measuring chamber reciprocable beneath the hopper, means to reciprocate the measuring chamber, means to vibrate the casing about its pivot, and means for varying the amount of such vibration.

14. In a filling machine, the combination of a support, a casing pivoted thereto at one end, a hopper supported on the casing, a measuring chamber reciprocable beneath the hopper, means to reciprocate the measuring chamber, a shaft mounted on the support, a ratchet wheel thereon, an engaging member on the casing resting on the ratchet wheel, a screw adjustable in respect to the support, a bearing member on the casing and a spring surrounding the screw and upon which, together with the screw, the casing is adapted to rest.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK H. NICKLE.

Witnesses:
EDWARD N. PAGELSEN,
HUGO W. KREINBRING.