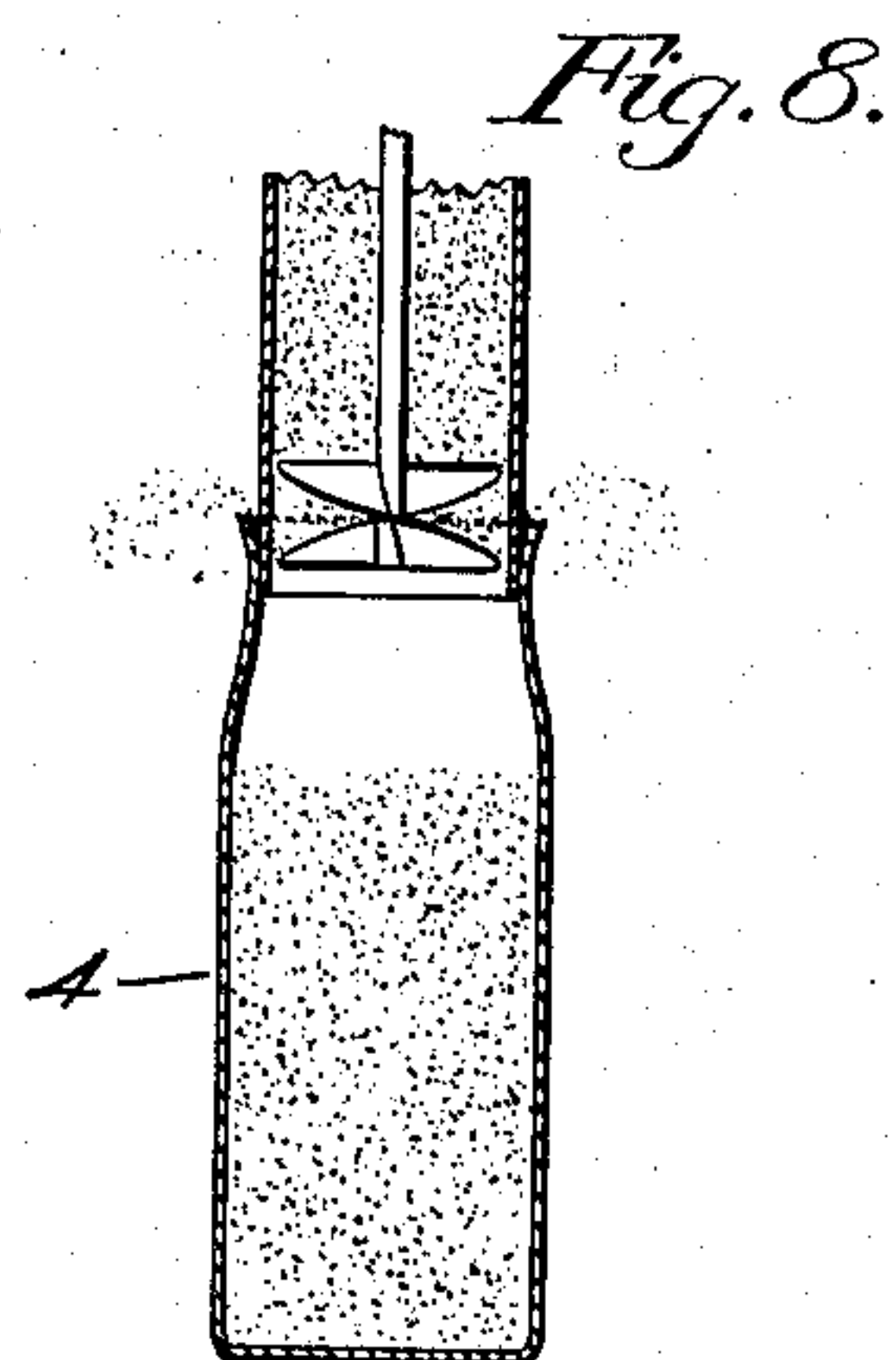
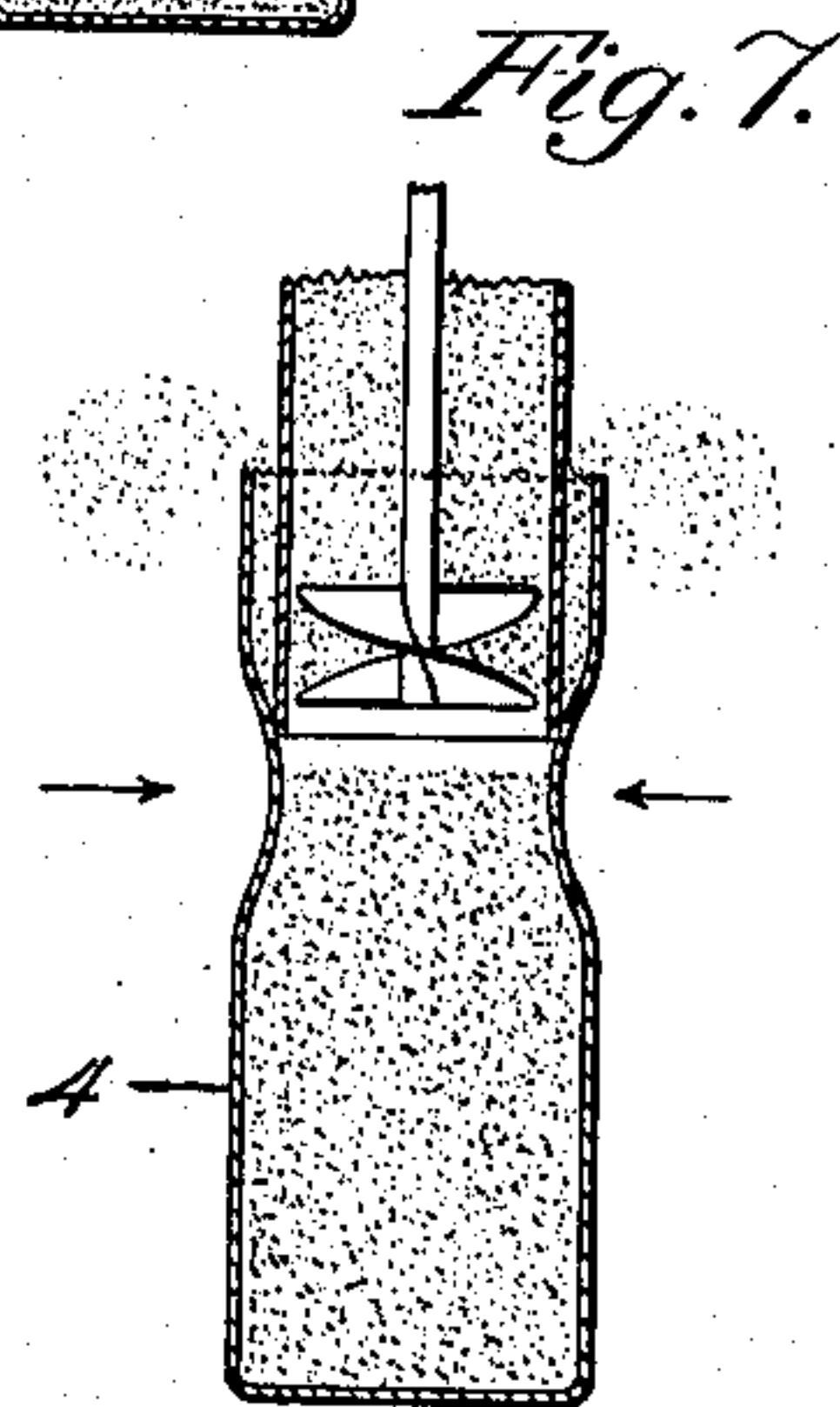
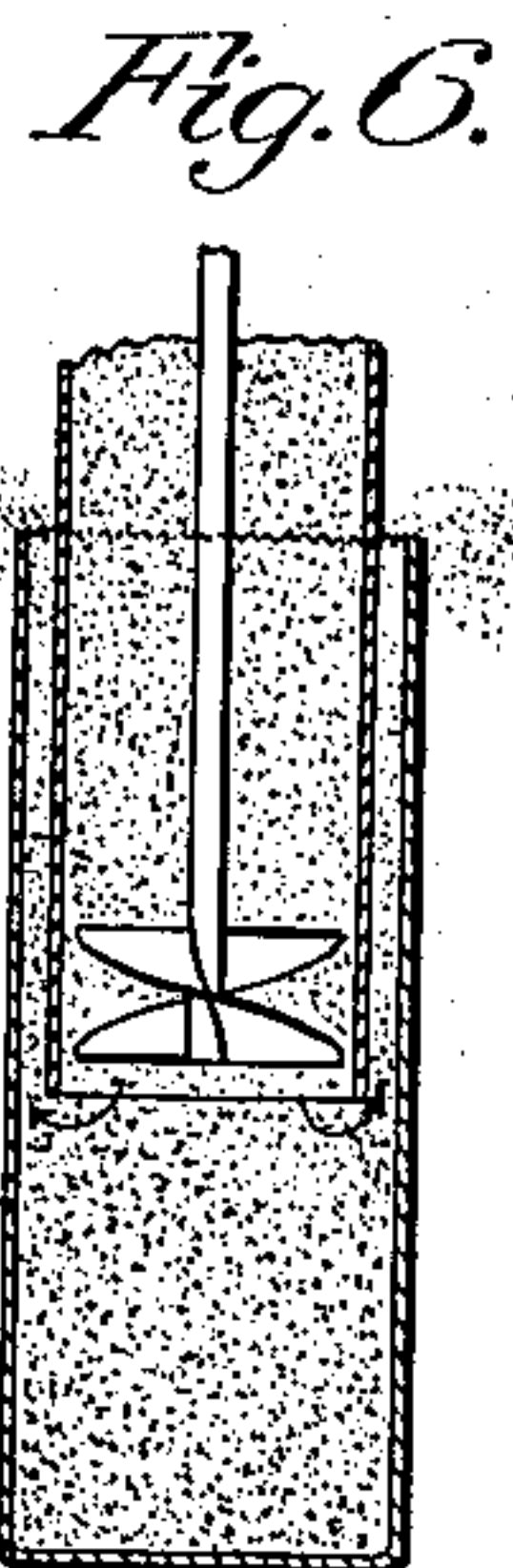
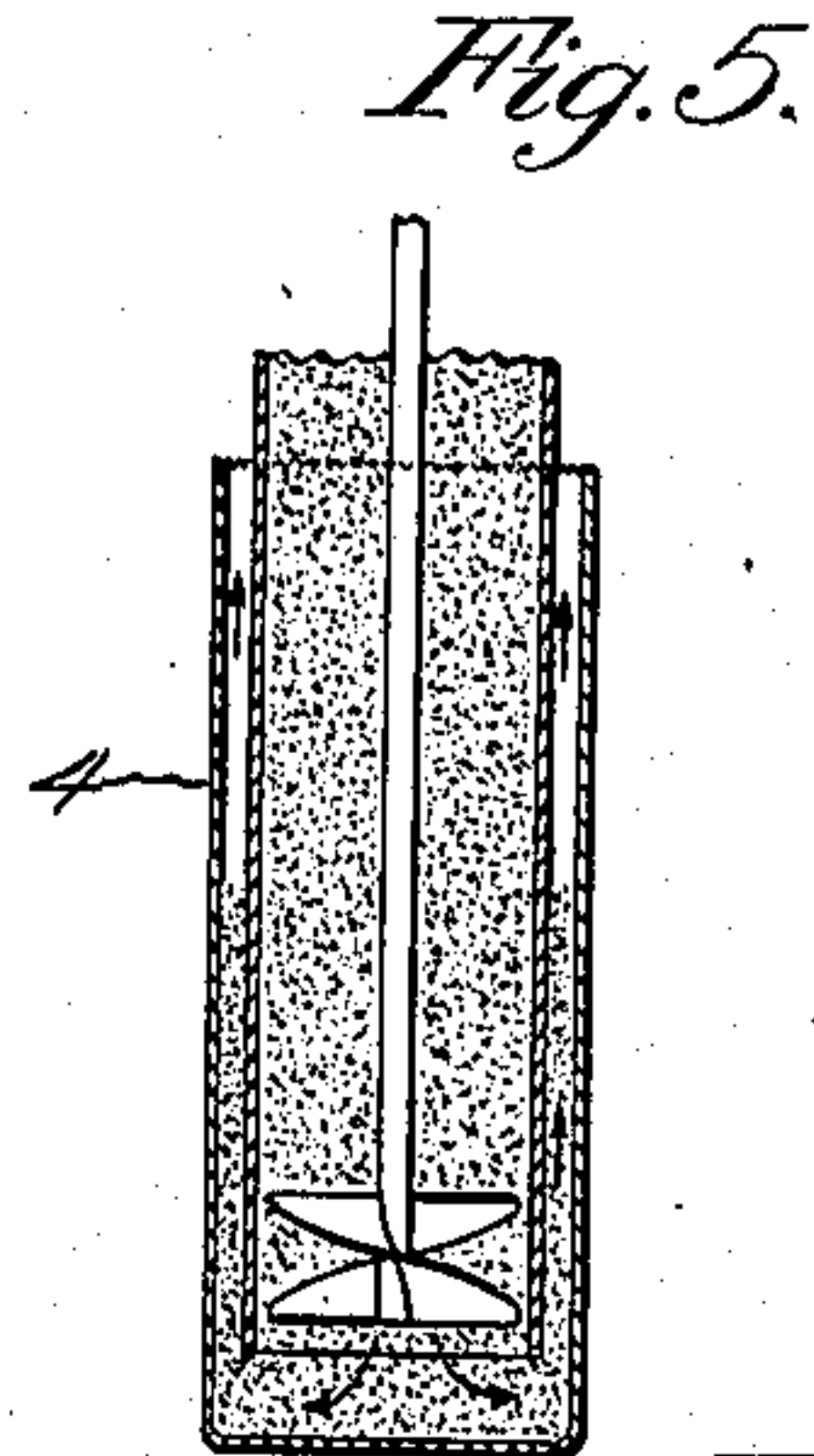
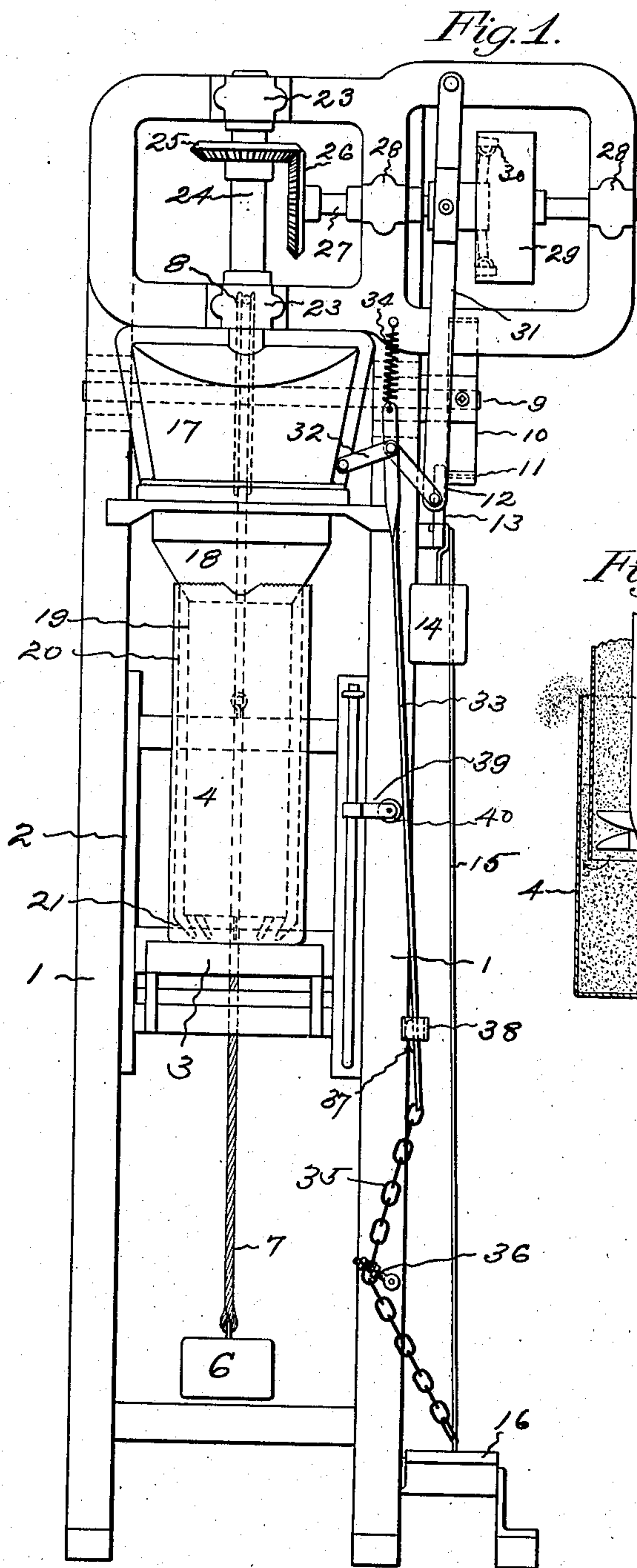


J. MERRITT.
PACKING MACHINE.
APPLICATION FILED AUG. 18, 1908.

936,792.

Patented Oct. 12, 1909.
3 SHEETS—SHEET 1.



Witnesses:
C. F. Storm
C. B. Cormier.

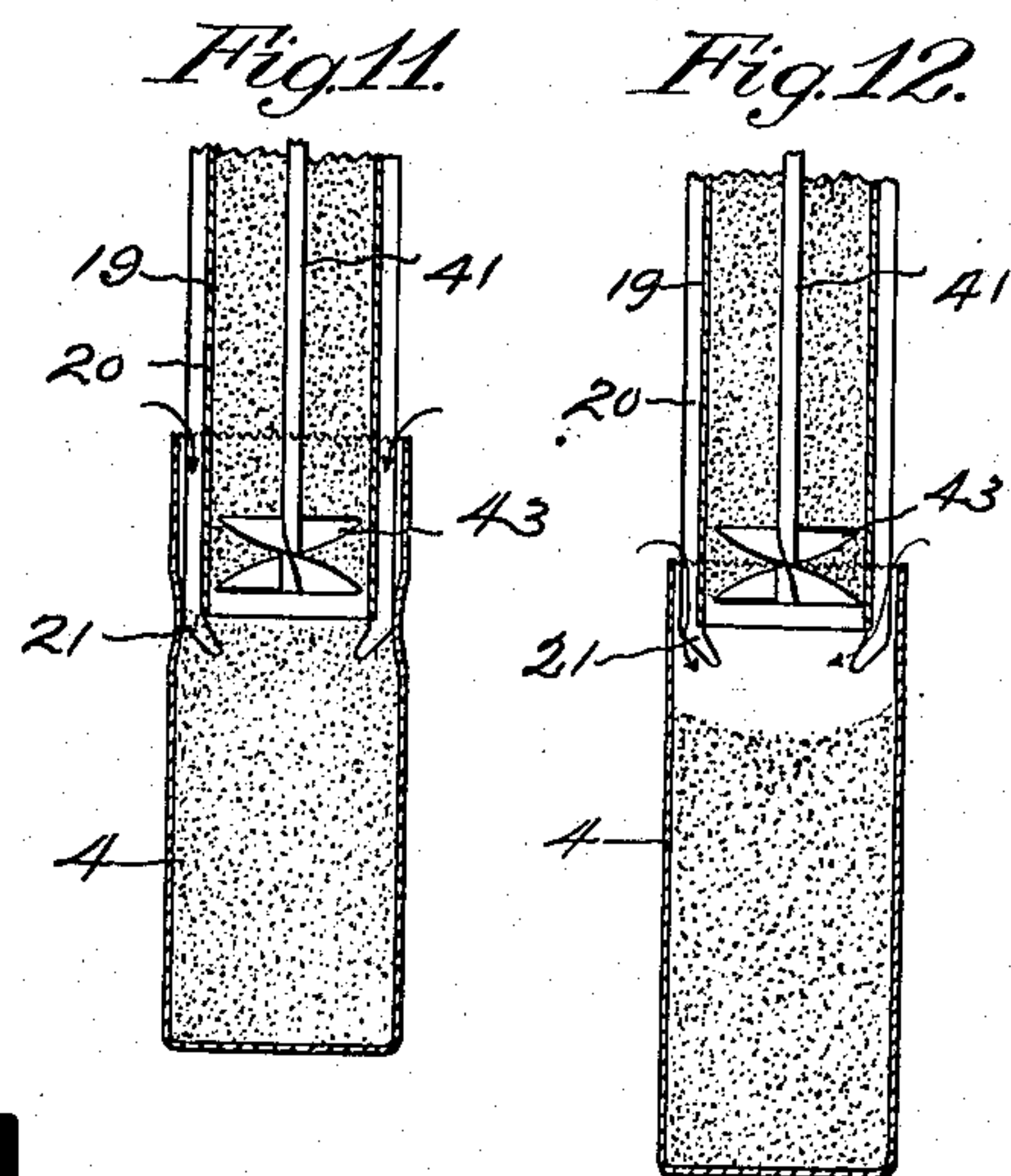
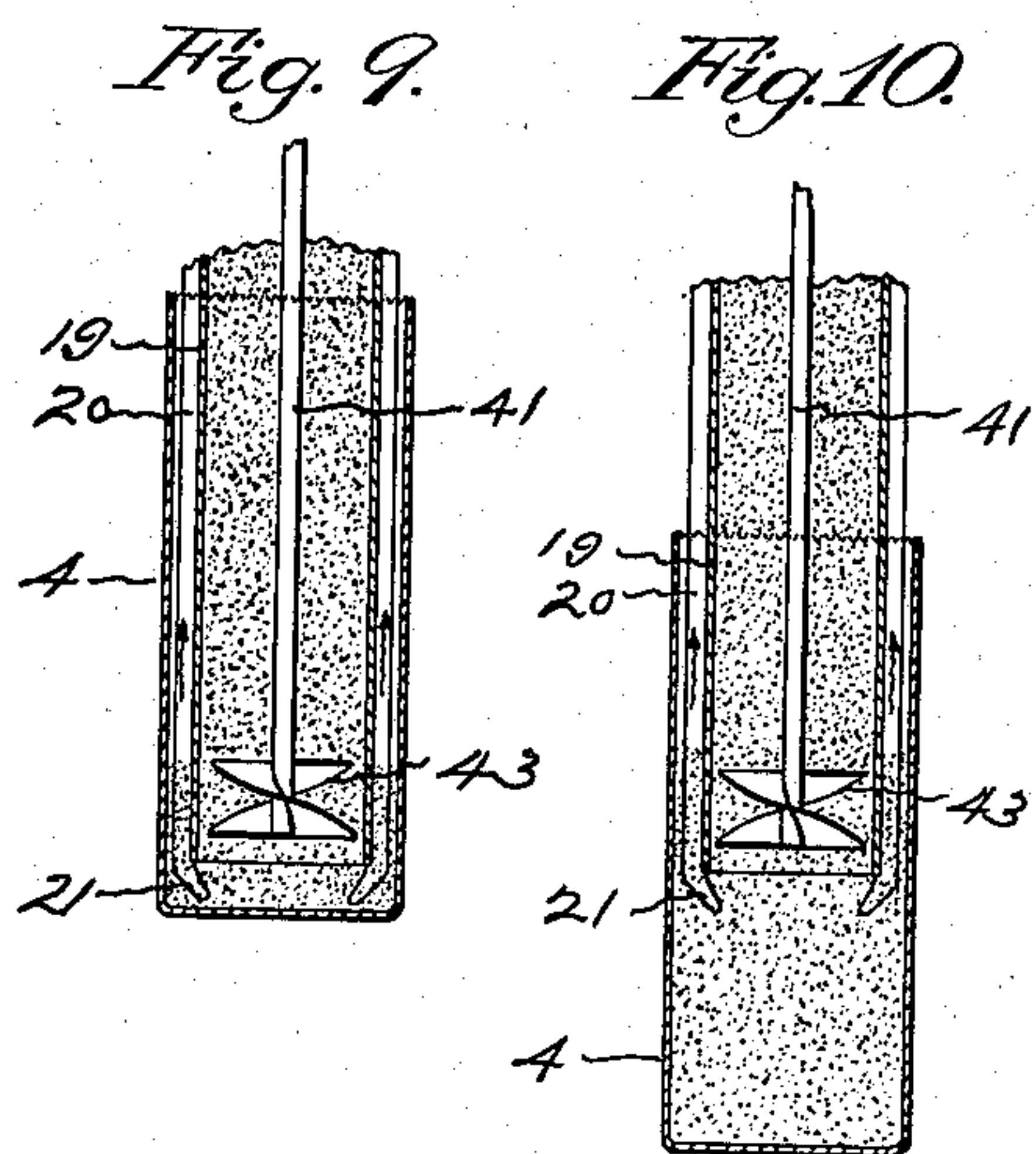
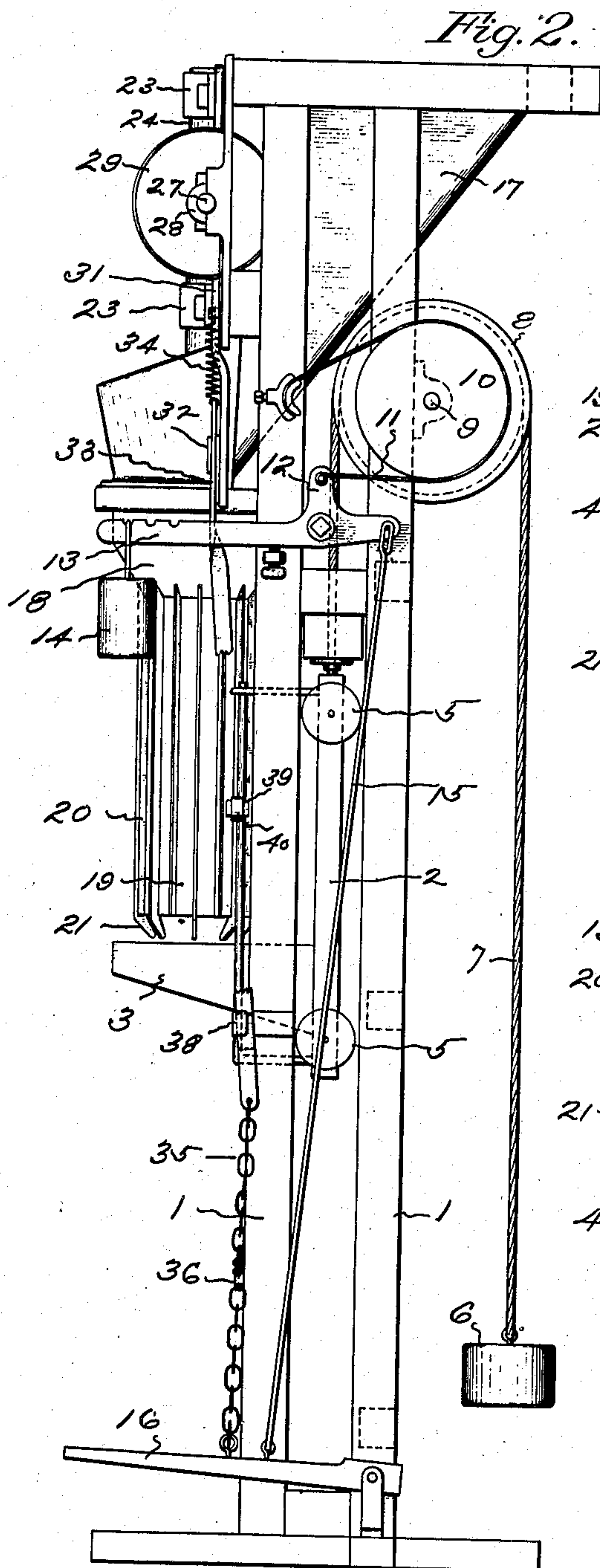
Inventor:
per Joseph Merritt
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3 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOSEPH MERRITT, OF HARTFORD, CONNECTICUT.

PACKING-MACHINE.

936,792.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed August 18, 1908. Serial No. 449,008.

To all whom it may concern:

Be it known that I, JOSEPH MERRITT, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Packing-Machine, of which the following is a specification.

This invention relates to a machine which is particularly adapted for packing flour into paper sacks, but which also is serviceable for packing ground, crushed or whole seeds, cereals, grain, sugar, cement, lamp-black, graphite, and other powdered, pulverized, flocculent and granular substances into flexible or rigid sacks, bags, kegs, barrels, boxes and packages of various forms and sizes made of paper, woven fabric, wood, metal and other materials.

The object of the invention is to provide a comparatively simple, inexpensive and rapidly operating machine which will pack into a sack or other receptacle of paper or other material powdered or finely divided substances without causing "boiling", that is the blowing of some of the substance being packed out of the top of the receptacle, and without causing "collapse" and "fluffing", that is, without causing the receptacle to contract so that it clings to the packing spout and spills the substance when removed therefrom.

The present invention resides in a machine having means for packing a powdered, pulverized, flocculent or granular substance into a paper sack or other receptacle, and a packing spout containing such means which is so constructed that air ducts are provided around the packing means which allow the ready outflow of air expelled from the substance as it is packed in the receptacle so as to eliminate "boiling" and also allow the free inflow of air when the receptacle and packing apparatus are separated so as to prevent "collapse" and eliminate "fluffing", the means which provide the air ducts being utilized, in some forms of the invention, to prevent the substance from whirling around in the sack under the influence of the currents produced by the rotation of the packing means, and being utilized, in other forms, to prevent the substance from packing solidly and turning around in the spout with the conveyer instead of being advanced thereby.

Figure 1 of the accompanying drawings shows a front elevation of the machine which

embodies this invention with a sack in filling position. Fig. 2 shows a side elevation of the same machine without a sack. Fig. 3 shows a central vertical section on somewhat larger scale of a sack and packing means which embodies this invention. Fig. 4 shows a similar section of the sack and packing means provided with a modified form of packing spout. Fig. 5 is a sectional view illustrating the flow of flour at the beginning of packing into a sack by the packing machines of this type in common use. Fig. 6 is a sectional view illustrating the boiling action of flour being packed by the common prior machines. Fig. 7 is a section illustrating the action caused by the prior machines known as "collapse" of the sack and "fluffing" of the flour when the sack is withdrawn from the packing spout. Fig. 8 is a section illustrating the same action when the sack is practically withdrawn from the packing spout. Fig. 9 is a sectional view illustrating the flow when a sack is beginning to be packed by a machine which embodies this invention. Fig. 10 is a similar view showing the action when the sack is partly filled. Fig. 11 is a similar view illustrating the action when the sack is substantially filled and is being withdrawn from the packing spout. Fig. 12 is a similar view showing the action when the sack is filled and is almost separated from the packing spout. Fig. 13 shows a horizontal section taken on the plane indicated by the line 13-13 on Fig. 3. Fig. 14 is a horizontal section of the modified form shown in Fig. 4 taken on the plane indicated by the line 14-14 on that figure. Fig. 15 is a plan of a thimble that is thrust into the lower end of the form of packing spout shown in Fig. 4. Fig. 16 is a side view of the thimble. Fig. 17 is a view, with a part in side elevation and a part in central section, of the upper end of the packing spout and its head.

The frame of the machine shown has upright supports 1 which may be made of wood or metal as desired, and movable vertically between these supports is a gate 2 which is provided with a platform 3, upon which the sack 4 or other receptacle to be filled is placed. The gate which carries this platform is guided in its movements up and down by wheels 5 that travel between the upright supports on each side. This gate is connected with a counter-balancing weight 6 by a rope 7 which is wound around a pulley 8

that is fastened on a horizontal shaft 9 mounted in bearings secured to the rear of the frame uprights. The weight of this counter-balance is sufficient to cause the gate and platform with an empty sack, when not otherwise held, to be lifted so the packing spout will project into the sack.

Fastened on the shaft bearing the counter-balance pulley is a drum 10 about which passes a friction band 11 that is connected with the arm 12 of a lever 13 movable along which is a friction weight 14. Under normal conditions the friction band is drawn by its lever and weight sufficiently tight to bind the drum with the shaft and counter-balance pulley so that the counter-balance weight will not lift the gate and platform, in fact, the friction and counter-balance weight are sufficient to support the gate, platform and a filled sack on the platform. A rod 15 connects an end of the friction lever with a treadle 16 that is mounted near the floor convenient to the foot of the operative. This connection is so made that when the treadle is depressed the friction band is loosened and the drum released, then the counter-balance weight will lift the gate and platform with an empty sack.

Mounted at the top of the frame is a hopper 17 into which the flour or other substance to be packed into the sack or other package is allowed to flow. This hopper may be formed of galvanized iron or any other suitable material, and attached to its lower end is an outlet which has a tapering head 18 and a cylindrical spout 19 that is somewhat smaller in diameter than the sack to be filled. In the form of the invention first illustrated by the accompanying drawings the spout is provided on its exterior with outwardly projecting ribs 20. These ribs preferably extend longitudinally of the spout although not necessarily continuous from head to mouth, and some are made to project below the mouth so as to provide downwardly projecting fingers 21 which readily enter the mouth of a sack and assist in opening it when the sack is being placed upon the spout. These ribs and fingers prevent the flour or other substance being packed into the sack by the rotary packer from whirling around in the sack, which whirling in the old machines causes the substance to fill up the space between the outside of the spout and the walls of the sack or receptacle faster than the main body and thus produce "boiling." When the platform is raised by the counter-balance, the mouth of the sack is opened by the fingers and ribs and the sack is held expanded by the latter which project from the exterior of the spout in such manner that ducts 22 (Fig. 13) are formed between the spout and the sack which permit the outflow of air when flour or other substance is being packed into the sack and

the inflow of air when the sack is being removed from the spout after having been filled.

Supported vertically by bearings 23 at the top of the frame is a shaft 24 which is provided with a bevel gear 25 in mesh with which is a bevel gear 26 on a shaft 27 that is supported horizontally by bearings 28 secured to the top of the frame. Loosely mounted on the horizontal shaft is a driving pulley 29 which is adapted to be connected with the shaft by means of a clutch 30. This clutch is designed to be actuated for connecting and disconnecting the driving pulley and the horizontal shaft by a lever 31 that is pivoted to the top of the frame and that is swung back and forth by a toggle 32 which is opened and closed by a rod 33. This rod is raised by a spring 34 and is drawn down by the foot treadle with which the rod is connected by a chain 35. When the treadle is depressed, the rod is drawn down, the toggle straightened and the clutch lever moved sidewise so as to cause the clutch to connect the horizontal shaft and the driving pulley, then of course by this mechanism the vertical shaft is rotated. The chain which connects the clutch rod with the treadle is so connected with a rocker arm 36 that it tends to pull the lower end of the rod sidewise when drawn downward. Near the lower end the rod is provided with a shoulder 37 which when engaged with a lug 38 on the frame holds the rod in its lowest position. Adjustably attached to the platform gate is an arm 39 provided with a roll 40, which roll when the gate reaches the lowest desired position, engages the shoulder and pushes the lower end of the rod so as to disengage the shoulder from the catch lug and allow the spring to draw the rod up and bend the toggle and so swing the clutch lever that the clutch disconnects the horizontal shaft and the driving pulley.

Attached to the lower end of the vertical shaft is a shaft 41 provided with a spiral or worm conveyer 42 and a feed or packing screw 43. When the clutch is thrown in and the vertical shaft is rotated, the worm conveys the flour or other substance down through the spout and the screw ejects it therefrom and packs it solidly into the sack or other receptacle on the platform beneath. As the flour is packed in the sack by this means the platform is forced downwardly until the sack is filled to the desired level, the counter-balance weight and friction being adjusted to permit this. As the sack becomes full the roll on the arm attached to the gate engages the shoulder on the clutch rod and causes the clutch to release the driving mechanism and stop the rotation of the conveyer and packing screw. Then the friction band is released from the friction pulley by lifting the fric-

tion lever and the weight of the platform and the flour in the sack being sufficient, the platform and the sack descend from the packing apparatus so that the packed sack can be removed. If desired, the platform could be stationary and the packing spout be made movable for the purpose of permitting the removal of a packed sack.

Such substances as flour carry a rather large quantity of air as they flow down through a packer, and as the substances are packed into the sack solidly, this air is expelled. In the prior machines of this type now in use, as the substance is packed in the sack the air that is expelled escapes around the outside of the packing spout and in thus escaping carries light particles of the substance up around the outside of the spout, as indicated in Fig. 5. This space around the spout is thus filled faster than the main body of the sack, and when it becomes full the substance overflows or as it is termed "boils out", as illustrated in Fig. 6, and becomes wasted, unless it is gathered from the floor, which is an uncleanly act and which takes time and labor. Furthermore, when the sack is dropped from the packing spout of the prior machine, the substance in the space about the spout forms a packing and suction results which causes the sides of the sack to collapse so that it closes against and clings to the spout with the result that the sack drops slowly and the substance in the space above collapsed portion is drawn up as the sack descends and overflows its mouth as indicated in Figs. 7 and 8. Under these conditions the descent of the filled sack is slow and quite a little of the substance overflows or as it is termed "fluffs out" and is wasted, as all of the substance between the outside of the spout and the walls of the sack above the collapsed or contracted portion is drawn out as the sack and packing spout are separated. In a packing machine provided with the form of my improvement already described, the air which is expelled from the inflowing substance as it is packed, from the beginning, as is indicated in Fig. 9, can flow upwardly through the air ducts between the ribs on the outside of the packing spout, which ribs, as has been stated, provide ample space for the free escape of the air and prevent the substance which is carried up between them from turning around in the sack and being blown out. In this form of the invention the space between the ribs on the outside of the packing spout never becomes filled so much higher than the main body of the sack, as indicated in Fig. 10, that the substance will "boil" over the top before the sack is filled. When a sack provided with the improvement described is lowered from the packing spout, air flows inwardly through the ducts between the ribs on the outside of the packing spout, as indicated in Figs. 11 and 12, and relieves

the suction. In no case can the walls of a sack with this form of packing spout collapse more than to come in contact with the outer edges of the ribs and this holds the walls of the sack so that the air spaces for the inflow of air do not become closed. This eliminates all "fluffing", "drawing" or "blowing" of the substance out of the mouth of the sack as the sack is removed from the spout.

In the form shown in Figs. 4 and 14 the ducts 44 for the outflow of expelled air when the sack is packed are produced by corrugating the packing spout 45. It is preferred to corrugate the spout from head to mouth as illustrated, and insert a thimble 46 in the lower end to provide a cylindrical mouth of substantially the diameter of the packing screw. In this form of apparatus air ducts are provided on the exterior of the packing spout which permit the outflow and inflow of air and prevent the collapse of the sack closely against the walls of the filling spout, and the shape of the spout prevents the turning of the flour on the outside, and also tends to hold it from turning on the inside and thereby becoming caked and turning around with the feed worm without advancing.

The invention claimed is:

1. A packing machine having a packing spout with a non-perforated wall and open only at top and bottom, means for forcing substance from the spout, and air ducts formed on the exterior of the spout from top to bottom, substantially as specified.

2. A packing machine having a packing spout with a non-perforated wall and open only at top and bottom, a worm for advancing substance in the spout, a screw for forcing substance from the spout, and air ducts formed on the exterior of the spout from top to bottom, substantially as specified.

3. A packing machine having a packing spout, ribs extending longitudinally on the exterior of the spout, and means for forcing substance from the spout, substantially as specified.

4. A packing machine having a packing spout, fingers projecting downwardly from the mouth of the spout, and means for forcing substance from the spout and between the fingers, substantially as specified.

5. A packing machine having a packing spout, ribs extending longitudinally on the exterior of the spout, fingers projecting downwardly below the mouth of the spout and means for forcing substance from the spout between the fingers, substantially as specified.

6. A packing machine having a packing spout, ribs extending longitudinally on the exterior of the spout, some of said ribs projecting beyond the end of the spout and forming fingers below the mouth thereof,

and means for forcing substance from the spout and between said fingers, substantially as specified.

7. A packing machine having a packing spout with a single solid wall shaped to provide longitudinally extending air ducts on its exterior, and means for forcing substance from the spout, substantially as specified.

8. A packing machine having a packing spout provided with longitudinally extending projections arranged to prevent the substance being packed from moving rotarily in the receptacle, and rotatory means for forcing the substance from the spout into the receptacle, substantially as specified.

9. A packing machine having a packing spout with a corrugated wall to provide ducts for the passage of air in and out of a receptacle on the outside of the spout, and

means for forcing substance from the spout into the receptacle, substantially as specified.

10. A packing machine having a packing spout with a corrugated wall and a tubular mouth and rotatory means located in said spout for forcing substance through the spout and out the mouth, substantially as specified.

11. A packing machine having a packing spout provided on its exterior with ribs adapted, during the packing operation, to support a receptacle from collapse and provide air passages from the bottom of the spout to the mouth of the receptacle, substantially as specified.

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