(No Model.) 2 Sheets—Sheet 1.

G. L. MERRELL.

CAN FILLING MACHINE.

No. 406,926. Patented July 16, 1889.

Fig. 1.

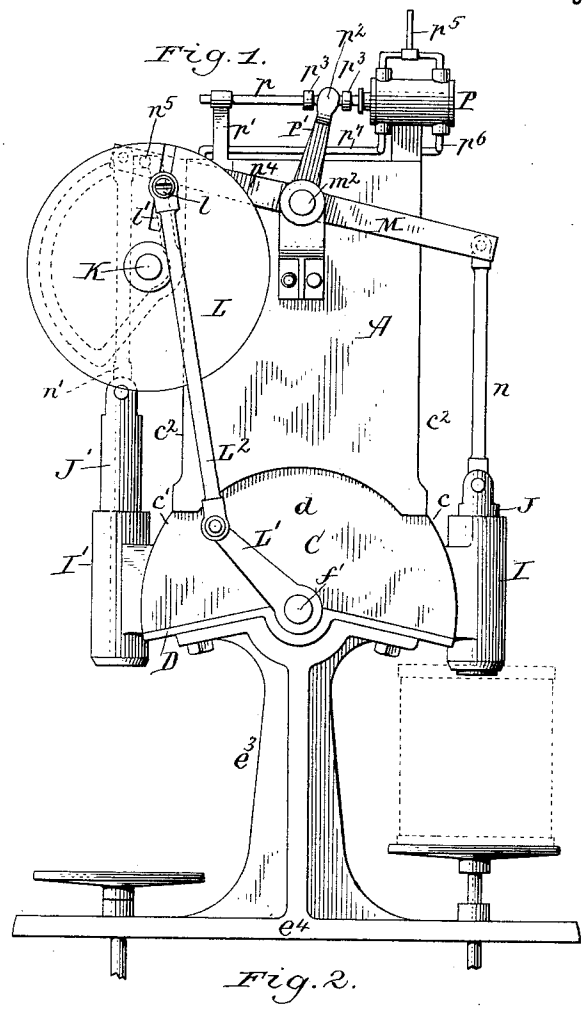
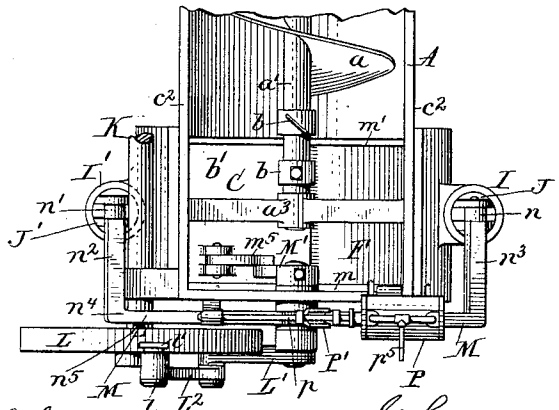


Fig. 2.



Witnesses.
Chas. J. Buchheit.
Geo. J. Buchheit Jr.

G. Lewis Merrell Inventor.
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Attorneys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

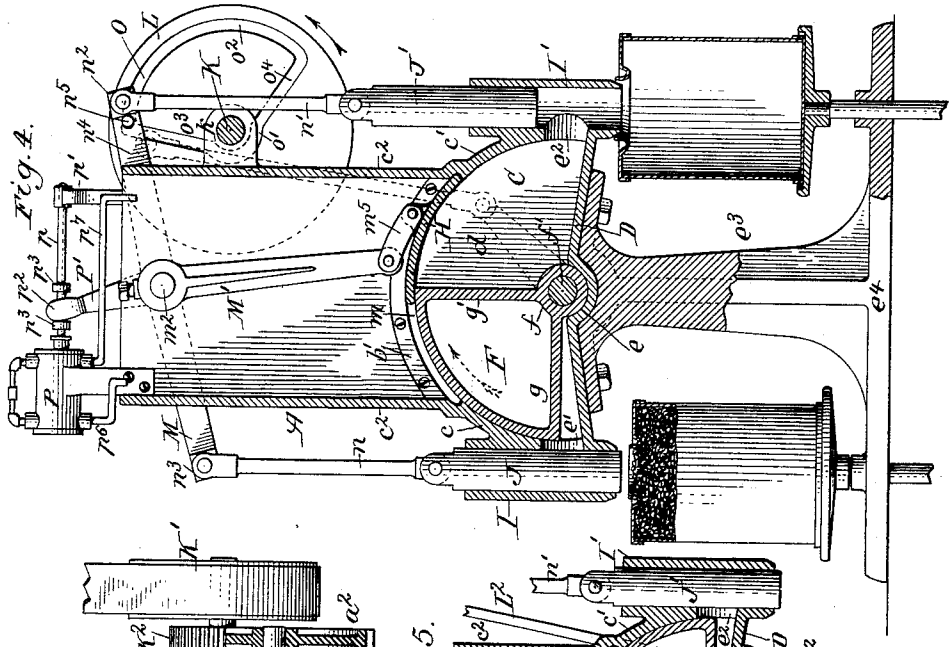

Fig. 5.

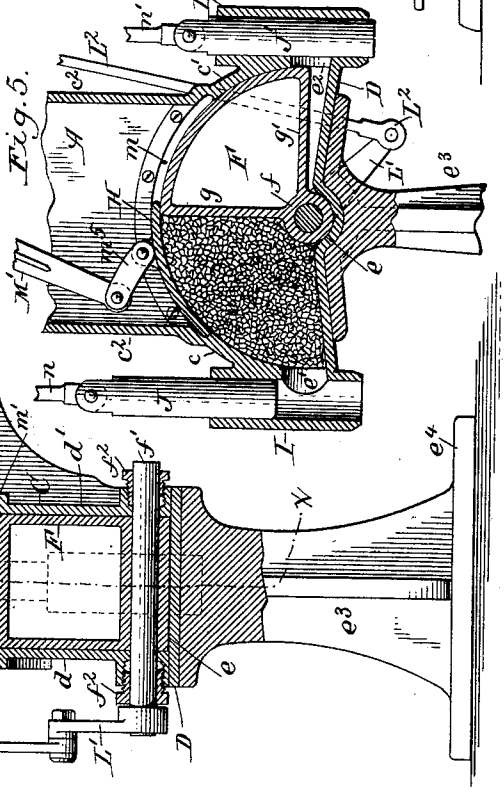

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

GAINS LEWIS MERRELL, OF SYRACUSE, NEW YORK.

CAN-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,926, dated July 16, 1889.

Application filed July 12, 1888. Serial No. 279,746. (No model.)

To all whom it may concern:

Be it known that I, GAINS LEWIS MERRELL, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Can-Filling Machines, of which the following is a specification.

This invention relates to that class of machines which are employed for filling cans with corn or other vegetable food for preservation; and which consists, essentially, of a receptacle in which the corn or other vegetable substance to be canned is placed, and a filling or measuring chamber into which the corn or other substance flows from the receptacle, and from which it is expelled by a moving piston and is driven into the cans.

The object of my invention is to produce a simple, compact, and inexpensive machine, which shall be practically continuous in its action, and whereby the operation of filling cans is greatly expedited.

My invention consists of the improvements, which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a front elevation of my improved can-filling machine. Fig. 2 is a fragmentary top plan view of the same. Fig. 3 is a longitudinal sectional elevation. Fig. 4 is a cross-section of the machine on line $x\,x$, Fig. 3. Fig. 5 is a fragmentary cross-section showing the piston and connecting parts in a reversed position.

Like letters of reference refer to like parts in the several figures.

A represents the trough-shaped receptacle into which the corn or other vegetable substance is delivered in any suitable manner, and from which it is removed for the purpose of filling the cans.

a represents a screw-conveyer arranged in the receptacle A, and having the rear end of its shaft a' extending through the rear wall of the receptacle in which it is journaled, and provided with a gear-wheel a^2, by which it is rotated. The opposite or front end of the conveyer-shaft a' is journaled in a cross-piece a^3, secured in the receptacle A.

$b\,b$ represent agitating arms or blades secured to the conveyer-shaft between the conveyer-screw and the journal at the front end of the shaft for the purpose of stirring up the material and mixing it with the sirup, which is injected at each stroke of the plunger.

C represents the measuring or filling chamber, which is arranged underneath the front portion of the receptacle A, and communicates at its top therewith through an opening b', so as to receive the material therefrom. This measuring-chamber is composed of curved side walls $c\,c'$, forming continuations of the upright walls c^2 of the front portion of the receptacle A, vertical front and rear walls $d\,d'$, and a bottom D. The latter is provided with a central depression e, and is inclined downwardly on both sides of said depression toward the discharge-openings e' e^2, which are formed in the curved side walls $c\,c'$, immediately above the bottom, as clearly represented in Fig. 4. The chamber C is secured to the upper end of a standard e^3, and the base e^4 of the latter is secured to a table or other suitable support.

F represents an oscillating piston or plunger arranged in the measuring-chamber C, and secured with its hub f to a longitudinal rock-shaft f'. The hub of the piston is arranged in the longitudinal depression e of the bottom of the measuring-chamber. The longitudinal rock-shaft f' is journaled in the front and rear walls $d\,d'$ of the receptacle A, and is packed by means of stuffing-boxes f^2 to prevent leakage. The piston F has the form of a cylinder sector or quadrant, and sweeps with its peripheral face the inner side of the curved side walls $c\,c'$ of the measuring-chamber, while its radial end walls $g\,g'$ operate to press on the material in the chamber and expel the same therefrom.

H represents a cut-off valve or gate, whereby the material contained in the measuring-chamber in front of the piston is separated from the material in the receptacle A. This cut-off gate or plate is curved concentric with the peripheral face of the piston, so that the latter sweeps the lower surface of said gate.

I I′ represent vertical cylinders arranged at both sides of the measuring-chamber C, and communicating therewith by the openings e' e^2, so that the material which is expelled from the measuring-chamber by the

piston flows through these discharge-openings into the adjacent cylinder and out of the lower end of the latter.

J J′ represent vertically-reciprocating valve-plungers arranged in the cylinders I I′ in such manner that each plunger when raised uncovers the discharge-opening leading to its cylinder and closes such discharge-opening when lowered. The two plungers move in opposite directions, so that one discharge-opening is open while the other is closed.

K represents the driving-shaft arranged on one side of the receptacle A and journaled in bearings *k*, secured to the side of the receptacle.

K′ represents a driving-pulley, and K^2 represents a gear-pinion, which meshes with the gear a^2 of the conveyer-shaft *a*′, whereby the latter is rotated.

L represents a crank-disk secured to the front end of the driving-shaft K; and *l* represents a wrist-pin secured adjustably in a radial slot or groove *l*′, formed on the outer side of the crank-disk L.

L′ represents a rock-arm secured to the front end of the longitudinal rock-shaft *f*′, and L^2 represents a rod which connects the arm L′ with the wrist-pin *l*. The rock-arm L′ is of such length that the rotary motion of the wrist-pin *l* and crank-disk L will impart a rocking motion to the arm L′, and thereby move the piston F alternately from one side of the chamber C to the other.

The curved cut-off gate H moves in ways *m m*′, formed in the front and rear walls *d d*′ of the receptacle A, and is moved intermittently from one side of the receptacle A to the other, and thereby serves to confine the material which has been fed to the space on one side of the piston F, while it allows the opposite space to become filled as the piston expels the material from the filled space, and vice versa.

M represents a rock-lever arranged on the outer side of the receptacle A and secured midway of its length to a short horizontal rock-shaft m^2, journaled in suitable bearings m^3 m^4.

M′ represents a depending swinging arm arranged on the inner side of the front wall of the receptacle A and secured to the inner end of the rock-shaft m^2. The lower end of the swinging arm M′ is attached to the curved cut-off gate H by a link m^5.

n n′ represent rods which connect the upper ends of the plungers J J′ with rearwardly-curved arms n^2 n^3, formed on opposite ends of the rock-lever M. The arm n^4 of the latter is arranged immediately in rear of the crank-disk L, and is provided near its end with a forwardly-projecting stud or roller n^5, which engages in a cam-groove O, formed in the adjacent side of the crank-disk L, and whereby the rock-lever M, gate H, and the plungers J J′ are simultaneously actuated.

As clearly shown in Fig. 4, the cam-groove O consists of an inner concentric portion *o*′, an outer concentric portion o^2, and two inclined or tangential portions o^3 o^4. This construction of the cam-groove O imparts an intermittent movement to the rock-lever M, cut-off gate H, and the plungers J J′, and the movement of these parts is so timed with reference to the movement of the piston F that they will remain at rest while the piston F is moving in either direction, and will be quickly moved into a reversed position while the wrist-pin *l* is passing over the dead-center of the crank-disk L, ready to reverse the movement of the piston F.

P represents a transversely-reciprocating liquid-pump secured to one side of the upper end of the receptacle A; and *p* represents the piston-rod thereof, which is guided at its outer end in an arm *p*′, secured to the opposite side of the receptacle A.

P′ represents an upwardly-projecting arm formed centrally on the rock-lever M. The upper bifurcated end p^2 of the arm P′ straddles the piston-rod *p* between two adjustable collars p^3 p^3, secured to the piston-rod *p*, by means of which the latter is actuated.

p^5 represents a liquid-supply pipe, which is connected at one end with a tank containing a sirup, preserving, or other suitable liquid, and at its opposite end with the opposite upper ends of the cylinder of the pump P.

p^6 p^7 represent liquid-discharge pipes connected with the opposite lower ends of the cylinder of the pump P, and which deliver a suitable quantity of liquid with each stroke of the plunger into the receptacle A, where it is mixed with the material by the revolving arms *b b*.

The operation of machine is as follows: When the piston F has arrived in the position shown in Fig. 4 and has expelled the material from the left-hand side of the measuring-chamber C through the opening *e*′ and lower open portion of the adjacent cylinder I into the can below the latter, the wrist-pin *l* of the crank-disk L has passed the dead-center in the direction of the arrow in Fig. 4, the arm n^4 of the rock-lever M has been moved upwardly by the inclined groove o^3 of the cam-groove O, the cut-off gate H has been shifted by the arm M′, the plunger J has been moved downwardly so as to close the opening *e*′ and force the material contained in the lower end of the cylinder I into the can, the plunger J′ has been moved upwardly so as to open a communication between the cylinder I′ and the discharge-opening e^2, and the piston of the liquid-pump P has been moved outwardly, so as to deliver a quantity of liquid through the pipe p^6 into the receptacle A. The cut-off gate H, the plungers J J′, and the piston of the liquid-pump P will now be held at rest in this position by the engagement of the stud n^5 of the rock-lever M with the concentric portion o^2 of the cam-groove O. The movement of the piston F toward the right in the direction of the dotted arrow in Fig. 4 will now force the material

confined by the slide H in the right-hand side of the chamber C through the opening e^2, cylinder I′, and through the open lower end of the latter into the can below the same. This forward movement of the piston F allows the space in the chamber C in rear of the same to become filled through that portion of the opening b' which is uncovered by the gate H. This movement of the piston continues until the wrist-pin l reaches the limit of its downward stroke, and at that moment the lower portion o^4 of the cam-groove O engages the stud n^5 of the arm n^4, and moves the same quickly downward until the stud n^5 is in engagement with the inner concentric portion o' of the cam-groove O. This downward movement of the arm n^4 of the rock-lever causes the plunger J′ to descend and close the discharge-opening e^2, and forces the material contained in the lower portion of the cylinder I′ into the can below the same, moves the plunger J upwardly, so as to open the discharge-opening e', moves the piston of the liquid-pump P inward, so as to cause the same to inject a stream of liquid through the pipe p^7 into the receptacle A, and shifts the cut-off gate H to the left-hand side of the receptacle A, so as to confine the material in the left-hand side of the chamber C in front of the piston F, ready for a reverse stroke of the piston. It will thus be seen that the material flows from the receptacle A into the measuring-chamber C, in which it completely fills the space between the piston and the plunger, which closes the respective discharge-opening, and after the measuring-chamber has been so filled its contents are separated from the material in the receptacle A by the cut-off gate H. This measured quantity of material is then forced out of the measuring-chamber C by the oscillating piston into the can, which is held with its top opening against the lower end of the discharge-cylinder by any suitable vertically-movable can-support. The downward stroke of the plunger in the discharge-cylinder forces into the can all the material which may adhere to the interior of the discharge-cylinder, and finally compresses or compacts the material in the can, leaving the top of the latter unobstructed by material and ready for the subsequent operations of wiping, capping, and soldering. The operation of filling the cans is in this manner performed by my improved machine automatically and uniformly, insuring a full and uniform charge of the material for each can and rapid and uniform working.

The sirup or other liquid is delivered by the pump into the receiving-chamber in predetermined quantities, and is mixed in this chamber by the agitating devices with the corn, so that the material which passes into the measuring-chamber is a homogeneous mass in which the sirup or other liquid is diffused through the entire mass and which contains a uniform percentage of sirup in each charge. This produces a much better article of canned goods than heretofore, and avoids the liability of forcing the sirup out of the can by the stiff starchy mass of corn which exists when the sirup is introduced first into the can, and the corn subsequently.

I claim as my invention—

1. The combination, with the receptacle for the material to be canned, of a fixed measuring-chamber communicating with said receptacle, a movable gate whereby the communication between the receptacle and the measuring-chamber is controlled, a movable piston which is arranged in the measuring-chamber and expels the material therefrom, an open-mouthed discharge-cylinder communicating with the discharge-opening of the measuring-chamber, and a valve-piston which is arranged in said cylinder and closes the discharge-opening of the measuring-chamber while the movable gate is open and the chamber is being filled, and opens the discharge-opening while the gate is closed and the measured quantity of material is being expelled from the measuring-chamber, substantially as set forth.

2. The combination, with the receptacle for the material to be canned, of a segmental measuring-chamber communicating with said receptacle and provided with inlet and discharge openings in its periphery, an oscillating piston arranged in said chamber, a movable gate which opens and closes the inlet-opening of the measuring-chamber, a discharge-cylinder communicating with the discharge-opening of the measuring-chamber, and a valve-piston arranged in the discharge-cylinder, substantially as set forth.

3. The combination, with the measuring-chamber provided with discharge-openings at both sides, of an oscillating piston arranged in said chamber, a receptacle for the material to be canned communicating with the top of said chamber, and a movable gate whereby the opening between the measuring-chamber and the receptacle is closed in front of the piston when the measuring-chamber has been filled, substantially as set forth.

4. The combination, with the receptacle for the material to be canned, of a segmental measuring-chamber communicating at its top with said receptacle and provided with discharge-openings at its sides, discharge-cylinders communicating with said discharge-openings, plungers arranged in said cylinders, an oscillating piston having a curved peripheral face and arranged in the measuring-chamber, and a curved cut-off gate arranged between the measuring-chamber and the receptacle, substantially as set forth.

5. The combination, with the segmental measuring-chamber having discharge-openings at its sides and having its bottom provided with a central depression, of an oscillating piston arranged in said chamber and having its hub seated in said depression, substantially as set forth.

6. The combination, with the receptacle A, of the measuring-chamber C, provided with discharge-cylinders I I′ and plungers J J′, a piston F, arranged in the measuring-chamber, a movable cut-off gate H, a rock-lever M, connected with the plungers J J′, and an arm M′, connected with said cut-off gate, substantially as set forth.

7. The combination, with the receptacle A, of the measuring-chamber C, provided with discharge-cylinders I I′ and plungers J J′, a piston F, arranged in the measuring-chamber, a movable cut-off gate H, a rock-lever M, connected with the plungers J J′, an arm M′, connected with said cut-off gate, a crank-disk L, connected with the oscillating piston F, and a cam-groove O, engaging with the rock-lever M, substantially as set forth.

8. The combination, with the receptacle for the material to be canned, provided with an agitating device, and the measuring-chamber and piston, of a pump having its delivery-pipe opening into said receptacle, whereby the sirup or other liquid is delivered into said receptacle, substantially as set forth.

9. The combination, with the receptacle for the material to be canned, provided with an agitating device, and the measuring-chamber and piston, of a pump working in unison with said piston and having its delivery-pipe opening into said receptacle, whereby the sirup or other liquid is delivered in measured quantities into said receptacle and mixed therein with the material to be canned, substantially as set forth.

10. The combination, with the receptacle A, of the measuring-chamber C, having discharge-openings at its sides, cylinders I I′, plungers J J′, a rock-lever connected with the plungers, a liquid-pump, and an arm connected with the rock-lever, whereby said liquid-pump is actuated, substantially as set forth.

11. The combination, with the trough-shaped receptacle for the material to be canned, of a screw-conveyer arranged in said receptacle, a measuring-chamber arranged underneath the receptacle and communicating at its top therewith, a piston arranged in the measuring-chamber, a cut-off gate arranged between the measuring-chamber and the receptacle, and a discharge-cylinder and valve-plunger connected with the discharge-opening of the measuring-chamber, substantially as set forth.

Witness my hand this 3d day of July, 1888.

G. LEWIS MERRELL.

Witnesses:
W. B. GERE,
EDW. S. GAYLORD.

Correction in Letters Patent No. 406,926.

It is hereby certified that the name of the patentee in Letters Patent No. 406,926, granted July 16, 1889, for an improvement in "Can-Filling Machines," was erroneously written and printed "Gains Lewis Merrell," whereas said name should have been written and printed *Gaius Lewis Merrell;* and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 10th day of December, A. D. 1889.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.