UNITED STATES PATENT OFFICE.

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MACHINE FOR FILLING CANS.


To all whom it may concern:

Be it known that I, Dwight Washburn Rathbone, a citizen of the United States of America, and a resident of the city of Seattle, King and State of Washington, have invented certain new and useful Improvements in Machines for Filling Cans, of which the following is a specification.

My invention relates to improvements in machines for filling cans, and has special reference to an apparatus of this class which is especially adapted to fill cans with fish-meat.

Among numerous objects attained by this invention and readily understood from the following specification and accompanying drawings included as a part thereof is the production of a simplified and inexpensive can-filling machine embodying essential features of adaptability, utility, and general efficiency, which facilitates the operation of canning, avoids waste of the filling, and insures positive placement of a full weight of material in the can.

The above-mentioned and other desirable objects are attained by the constructions, combinations, and arrangements of parts as disclosed on the drawings, set forth in this specification, and succinctly pointed out in the appended claims.

With reference to the drawings filed herewith and bearing like reference characters for corresponding parts throughout, Figure 1 is a perspective view of my improved machine. Fig. 3 is a perspective view of the knife adapted to sever the core of filling and the valve for the core-box removed and shown on large scale. Fig. 3 is a view in diametrical section of the core-box and shows the knife closed and the valve open and in relative section and also shows by broken lines a portion of the throat of the box. Fig. 4 is a perspective view of the machine viewed from the opposite side relatively to Fig. 1. Fig. 5 is a vertical section of the machine, taken transversely of the main frame through the receptacle, core-box, and throat, and shows the machine with portions of the parts broken away at one side; and Fig. 6 is a view in perspective of one of the jaws of the can-grip removed from the machine.

With reference to the drawings, the numeral 10 indicates a main frame of any desired construction adaptable for the support of the several parts of the apparatus, and consisting, in the present instance, of a base 11, opposite side frames 12, and beams 14, connected with the side frames at suitable points to support the overhead parts of the machine.

This invention includes a receptacle 15 for the filling, which is open at the top and formed substantially U-shaped, viewed in vertical section taken transversely the edge walls, Fig. 3, and the upper portions of one edge wall and adjacent portions of the side walls of this receptacle are flared outwardly to provide a hopper, as 16, and at the base of the inner surface of this hopper a horizontally-disposed knife 17' is arranged along the wall with the blade projecting upwardly and conveniently formed by drawing a portion of the metal comprising the wall of the receptacle to a sharp edge along the base of the edge and side walls of the hopper. Immediately below the hopper a discharge-orifice is formed in the bottom portion of the wall of receptacle 15, and a downwardly-extending tubular throat 17 is connected with the receptacle at this orifice and formed with a circular bore, which is slightly restricted in diameter just below said orifice and is formed longitudinally of the throat on a compound curve.

At the outer end of throat 17 is placed a core-box 18, which is formed with a vertically-disposed circular bore substantially equal in diameter to the bore of said throat and registers therewith, Fig. 3, and at the upper or receiving end of the box is arranged a transversely-disposed knife 19, consisting of a single rectangular blade 20, and 20' a double rectangular blade, Fig. 2. These blades are slidably mounted in a suitable seat 18', consisting of a channel extending transversely through the core-box and of suitable size to receive the knife with the double blade slidable embracing the single blade, and these blades are formed with transverse openings 21 in their inner end portions of suitable size to clear the mouth of the bore of the box when the knife stands open with said openings in alignment with each other, Fig. 2.

The opening in the single blade 20 is formed with rear portion 22 of the wall extending diagonally across the blade relatively to the line of action of the knife, and the rear portions 22' of the openings in the double blade 20' are likewise diagonally disposed, so that when the knife is closing these diagonal edges of the openings in the blades will approach...
each other and act to shear the meat core or filling, and the blades are formed of suitable length rearwardly of the openings to seal the core-box at the receiving end when the knife is shut.

The blade 20 is formed with a duct or passage-way 23, Fig. 3, preferably formed in a longitudinally-disposed rib 24, arranged on the upper surface of the blade, and this duct opens through the bottom surface of the blade at a point closely adjacent the rearedge of the opening 21 and opens through the upper surface of said rib adjacent the rear edge of the blade and is incorporated as a convenient means by which compressed air is directed to the core-box to forcibly eject the severed portion of the core from the box in the can. In the top portion of the wall of the knife-seat 18 a port 25 is formed at a suitable point to register with the duct 23 when the knife stands closed, and a conduit 26 leads from this opening to a receiver 27, which is supplied with compressed air from a suitable air-pump 27, driven from the driving mechanism of the machine in any convenient manner.

At the discharging end of the core-box is slidably mounted a transversely-disposed gate-valve 28, which consists of a rectangular plat-metal body having an opening 28' of suitable size to clear the bore when the valve is open, and this valve is opened as the knife is closing and stands closed when the knife is open, so that the filling passed to the core-box when the knife is open will be retained by the valve until the knife is closed to sever the core, when the severed portion will be ejected through the opening in the valve by compressed air discharging beneath the knife into the core-box.

The blades 20 and 20' are connected at the outer ends with respective opposite slide-blocks 29, which are mounted in suitable guides 30, arranged at opposite sides of the core-box on base 11, and these blocks are operatively connected by means of a lever 31, connected at one end with the block of the single blade by a link 32, and a rod 33 pivotally connected with the opposite end of said lever and with the slide-block of the double blade, and the gate-valve 28 is secured at the outer end with the slide-block, so that it is conveniently opened and closed respectively to the knife, which is operated intermittently, to afford ample time for the replacement and filling of the cans through the medium of a telescoping rod 34, connected with one of the slide-blocks 29, preferably the one carrying the double blade and operated by a crank 35. This rod 34 includes a tubular section 34', which is pivotally connected at one end with a swinging hanger 39' and slidably engaged at the opposite end with a bar 36, pivotally connected with said slide-block and fitting within the tubular section at the outer end and formed with a longitudi-nally-disposed slot 36', Fig. 1, slidably engaging a suitable stop-pin disposed transversely the tubular section, and this slot is rendered of suitable length to give the desired intervals of rest to the knife by allowing said tubular section to travel independently of the bar 36 during a predetermined period at each end of the stroke of crank 35, which is operatively connected with said tubular section through the medium of a pitman 37 and is fixedly mounted on a transversely-disposed drive-shaft 37', supported in suitable journals arranged on the main frame.

Operating in filling-receptacle 15 is a conveyor 38, which is adapted to force the filling from the receptacle into the throat and includes an endless link belt 39, composed of pivotally-connected links of substantially the same width as the receptacle between its side walls. This belt is mounted on opposite 85 sprockets 40, one of which is rotatably supported substantially concentric with the bottom wall of the receptacle on an axle 40', seated in the side walls of said receptacle, and the other sprocket is secured to an overhead shaft 40'' rotatably supported in suitable journals arranged on the beams of the frame 10, with the shafts slightly rearwardly of the axle 40' relatively to hopper 16, so as to cause the active run of conveyor-belt 39 to rest against a vertical back-plate 41, which is secure in the receptacle back of the belt at the hopper, and thereby prevent the filling from getting behind the belt and said plate. Upon the outer side face of the links of belt 39 flights, as 42, are secured at equidistantly-spaced points, and these flights are formed of suitable size to fit snugly but freely between the side walls of the receptacle and between the belt and edge wall below the hopper, and are each preferably formed substantially V shape, with the outer side surface 43 of one stem convex, Fig. 5. The active run of this conveyor travels downwardly through the receptacle from the hopper and passes the discharge-orifice, and the flights are arranged to present their convex sides for pressure upon the filling and thereby better act as they approach the discharge-orifice to crowd the filling therethrough.

At the rear edge of the discharge-orifice relatively to the direction of travel of the conveyor a movable deflector 44 is arranged to normally lie across the path of the flight and act to direct the filling to the discharge-orifice. This deflector consists of a plate-metal body slidably fitting between the side walls of the receptacle and seated in a suitable slot formed in the bottom wall and yieldingly held in closed position by suitable springs, as 45, which consist of opposite spring-locars seated at one end on the throat and engaged at the free ends with suitable ears secured to the deflector at the outer corners. The convex surfaces of the flights 42...
Each of these jaws consists of a section of plate metal concaved at one end to afford a gripping surface and yieldingly held in advanced position by a bowed leaf-spring 56, Fig. 6, which is secured at one end to the lower end of a downwardly-projecting stem 57, attached to said plate at one side edge, and the spring bears at the other end against the forward end of a respective guide 56 and bows outwardly, so as to yieldingly hold the jaw in advanced position against a suitable stop 58 and lie in the path of movement of the lower end of the cans as placed for filling, so that the carriers will act to open the jaws as they advance by forcing said springs outwardly, and a laterally-projecting arm 57 is secured to each stem 57 at the lower end and extends inwardly relatively to the path of movement of cans as removed at suitable inclination to contact with the can gripped by the jaws, so that when the placed can is moved for replacement it will force these arms apart against action of spring 56, and thereby open the jaws to clear them of the can.

The can-conveying belt 51 is conveniently operated intermittently and correlatively to the action of knife 19 by means of pawl-and-ratchet mechanism, which includes a ratchet-wheel 59, secured to shaft 53 of one of the sprockets 52, Fig. 5, and a pawl 60, pivotally mounted on a carrier-head 61, journaled on said shaft and pivotally connected with one end of a connecting-rod 62, which is engaged at the opposite end with a crank 63, secured to a shaft 63, which is rotatably supported in suitable journals and operatively connected with shaft 40 by a suitably-supported vertically-disposed cross-shaft 64 and suitable differential gearing 64 of requisite pitch diameters to revolve shaft 63 twice during each complete action of knife 19, so that pawl 60 will be thereby reciprocated once and move belt 51 one step to replace the can at the core-box correlatively to severing actions of knife 19.

The shaft 40 is conveniently driven from drive-shaft 37 by means of a suitably-supported vertical cross-shaft 65 and differential gearing 65 of requisite pitch diameters to reduce the speed of shaft 40" to the desired speed, and shaft 37 is conveniently driven through the medium of a belt leading from a suitable driving-pulley (not shown) to a pulley 66, Fig. 1, secured on said shaft.

At the end of the can-conveyor where the cans are received thereby is a salting device 67, which is suitably supported above the conveyor and includes a box 68, having a discharge-opening in the bottom wall normally closed by a slide-valve 69, which is slidably seated on the bottom of the box and formed with a transverse opening 70, suitably arranged to register intermittently with said discharge-opening. In this box are opposite salt-breakers consisting of disks 71, secured to a spindle 74 and having teeth 72 on their
oposing side faces, and this spindle is supported in suitable apertures in the side walls of the box and is driven by a belt passing from a pulley 73 on shaft 37 and about a pulley 73 on said spindle. The valve 69 is opened to allow salt to discharge through opening 70 and the discharge-aperture in the box by means of a lever 75, which is pivotally engaged at one end with the valve and pivotally connected at the opposite end with one end of a connecting-rod 76, which is pivotally engaged with the connecting-rod 62, which drives the pawl-carrier and is thereby made to open and close the valve correspondingly to the steps of the can-conveyor.

This can-filling machine is especially adapted to handle fish-bodies after they are dressed without requiring their previous severance into small sections and avoids mutilating or breaking the fiber of the flesh as the dressed fish-bodies are received between the flights on the conveyor-belt 39 and forced tail foremost into throat 17, and the knife 19 acts to sever the bodies transversely into sections of the required length to fill the cans.

By arranging the trimming-knife 17 at the base of the hopper bones or the like which may project from the filling when placed piecemeal into the hopper will be trimmed thereby as the filling is carried forward by the flights 42, and by restricting the diameter of the passage-way in throat 17 slightly at the receiving end and curving same the filling is more uniformly compressed and kept from becoming congested in the throat, while the compressed fluid ejects the severed portions of the core from the core-box in a most rapid and satisfactory manner.

Granted placement of filling in the filling-receptacle and cans on the can-placing and replacing conveyor, an operation of the machine would occur substantially as follows: As the conveyor 38 advances filling is forced from the receptacle into throat 17 against knife 19 when standing closed and into the core-box against gate-valve 28 when said knife stands open. As the core-severing knife closes the gate-valve opens and compressed air is admitted to the box on the line of cut of the knife and forces the severed portion of the core into the placed can, which moves away and is replaced as the valve is closing and the knife is again opening. As the flights 42 approach deflector 44 the convex surfaces thereon act to force same outwardly, or if the trip-rods are incorporated they act successively to move the deflector from the path of the flights, as heretofore set forth.

It will be understood that I do not confine myself to the mechanism shown for operating the several coacting parts of the machine, as they can be variously modified and altered without departing from the spirit of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a can-filling machine; the combination of a main frame, a filling-receptacle, a core-box, means to forcibly pass filling from said receptacle to the box, a core-severing knife operating in said box, and means to introduce compressed fluid intermittently to said box at the inner end of the severed portion of the core.

2. In a can-filling machine; the combination of a main frame, a filling-receptacle, a core-box in communication with said receptacle, means to forcibly pass filling from said receptacle to the box, a core-severing knife adjacent the receiving end of said box, and means to introduce compressed fluid intermittently to said box at the line of cut of said knife.

3. In a can-filling machine; the combination of a main frame, a filling-receptacle, a core-box in communication with said receptacle, means to forcibly pass filling from said receptacle to said box, a core-severing knife intermittently sealing the receiving end of said box, an intermittently-operating gate-valve at the discharge end of said box, and means to introduce compressed fluid intermittently to said box.

4. In a can-filling machine; the combination of a main frame, a substantially U-shaped filling-receptacle having a discharge-orifice in the bottom, an endless conveyor-belt operating in said receptacle and having flights thereon, an intermittently-operating deflector normally lying across the path of said flights, a throat extending from said orifice, a core-box at the outer end of said throat, and an intermittently-operating core-severing knife at the receiving end of said box.

5. In a can-filling machine; the combination of a main frame, a substantially U-shaped filling-receptacle having a discharge-orifice in the wall, an endless conveyor-belt operating in said receptacle, a core-severing knife at the receiving end of said box, a gate-valve at the discharge end of the box, means to introduce compressed fluid to said box intermittently at the line of cut of said knife, and intermittently-acting can placing and replacing mechanism.

6. In a can-filling machine; the combination of a main frame, a filling-receptacle, a core-box in communication with said receptacle, means to forcibly pass filling from said receptacle to the box, a core-severing knife at the receiving end of said box, a gate-valve at the discharge end of the box, means to introduce compressed fluid to said box intermittently at the line of cut of said knife, and intermittently-acting means to place and replace cans relatively to the discharge end of said box.

7. In a can-filling machine; the combination
of a main frame, a substantially U-shaped filling-receptacle having a discharge-orifice in the bottom, a pair of wheels, one of which is mounted in said receptacle substantially concentric with the bottom thereof, an endless conveyer-belt mounted on said wheels and having flights, and an intermittently-operating deflector adjacent the rear edge of said orifice normally lying across the path of said flights.

8. In a can-filling machine; the combination of a main frame, a substantially U-shaped filling-receptacle having a discharge-orifice in the bottom, a pair of sprocket-wheels, one of which is mounted in said receptacle substantially concentric with the bottom thereof, an endless conveyer-belt mounted on said sprockets and having flights formed convex on their active side surfaces, and an outwardly-movable deflector normally lying across the path of said flights and yieldingly held in said position.

9. In a can-filling machine; the combination of a main frame, a filling-receptacle having a discharge-orifice, a conveyer-belt operating in said receptacle and having flights formed convex on their active side surfaces, and an outwardly-movable deflector normally lying across the path of said flights, and yieldingly held in said position.

10. In a can-filling machine; the combination of a main frame, a filling-receptacle having a discharge-orifice in the bottom, a pair of sprockets, one of which is mounted in said receptacle adjacent the bottom thereof, a conveyer-belt mounted on said sprockets and having flights formed convex on their active side surfaces, an intermittently-operating deflector normally lying across the path of said flights, a throat extending outwardly from said orifice, a core-box at the outer end of said throat, a core-severing knife at the receiving end of said box and a gate-valve at the discharge end.

11. In a can-filling machine; the combination of a main frame, a substantially U-shaped filling-receptacle having a discharge-orifice in the bottom adjacent one edge wall, a pair of sprockets, one of which is mounted in said receptacle substantially concentric with the bottom thereof, a conveyer-belt mounted on said sprockets and having flights, an intermittently-operating deflector normally lying across the path of said flights, a throat at said orifice formed with a passage-way restricted in diameter adjacent the receiving end and extending outwardly at a compound curve, and a core-severing knife intermittently sealing the outer end of said throat.

12. In a can-filling machine; the combination of a main frame, a filling-receptacle having a discharge-orifice, a pair of sprockets, one of which is mounted in the receptacle adjacent said orifice, a conveyer-belt mounted on said sprockets and having flights, an intermittently-operating deflector normally lying across the path of said flights, a core-box in communication with said orifice, a core-severing knife adjacent the receiving end of said box, and means to place and replace cans relatively to the discharge end of said box.

13. In a can-filling machine; the combination of a main frame, a filling-receptacle having a discharge-orifice, a continuously-moving endless conveyer-belt operating in said receptacle and having flights, an intermittently-operating spring-retracted deflector normally lying across the path of said flights, a core-box in communication with said orifice, an intermittently-operating core-severing knife adjacent the receiving end of said box, an intermittently-operating gate-valve at the discharge end of said box, means to introduce compressed fluid into said box intermittently at the line of cut of said knife, intermittently-acting can placing and replacing mechanism and means to operate said knife, valve and can moving mechanism correlative.

14. In a can-filling machine; the combination of a core-box, a knife comprising oppositely-disposed overlapping blades composed of sections of plate metal having transverse openings adjacent their inner ends and slidably mounted transversely said box at its receiving end, a gate-valve at the discharge end of said box, means to intermittently reciprocate said blades, and valve simultaneously, and means to introduce compressed fluid intermittently to said box.

15. In a can-filling machine; the combination of a core-box, a core-severing knife adjacent the receiving end of said box and arranged to intermittently seal said end, a gate-valve at the discharge end of said box, means to introduce compressed fluid intermittently to said box, and intermittently-acting can placing and replacing mechanism arranged at the discharge end of said box.

16. In a can-filling machine; the combination of a core-box formed with a knife-seat having a port in the wall connected with a source of fluid-supply, and a core-severing knife operating in said seat and having a duct arranged to intermittently register with said port.

17. In a can-filling machine; the combination of a core-box formed with a transversely-arranged knife-seat having a port in the wall connected with a source of fluid-supply, and a core-severing knife operating in said seat and normally closing said port and having a duct opening to said box and arranged to intermittently register with said port.

18. In a can-filling machine; the combination with a filling-receptacle, a conveyer operating therein, and a trimming-knife in said receptacle embracing the conveyer.

19. In a can-filling machine; the combination of a filling-receptacle, a conveyer-belt op-
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In a can-filling machine; the combination of a filling-receptacle, a hopper, a conveyor operating in said hopper, and a trimming-knife in said receptacle at the base of said hopper and embracing the conveyor.

20. In a can-filling machine; the combination of a filling-receptacle, a hopper, a conveyor operating in said hopper, and a trimming-knife in said receptacle embracing the active run of the conveyor.

WITNESS:

ROBERT A. BROWN,

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Signed at Seattle, Washington, this 1st day of September, 1903.

DWIGHT WASHBURN RATHBONE.