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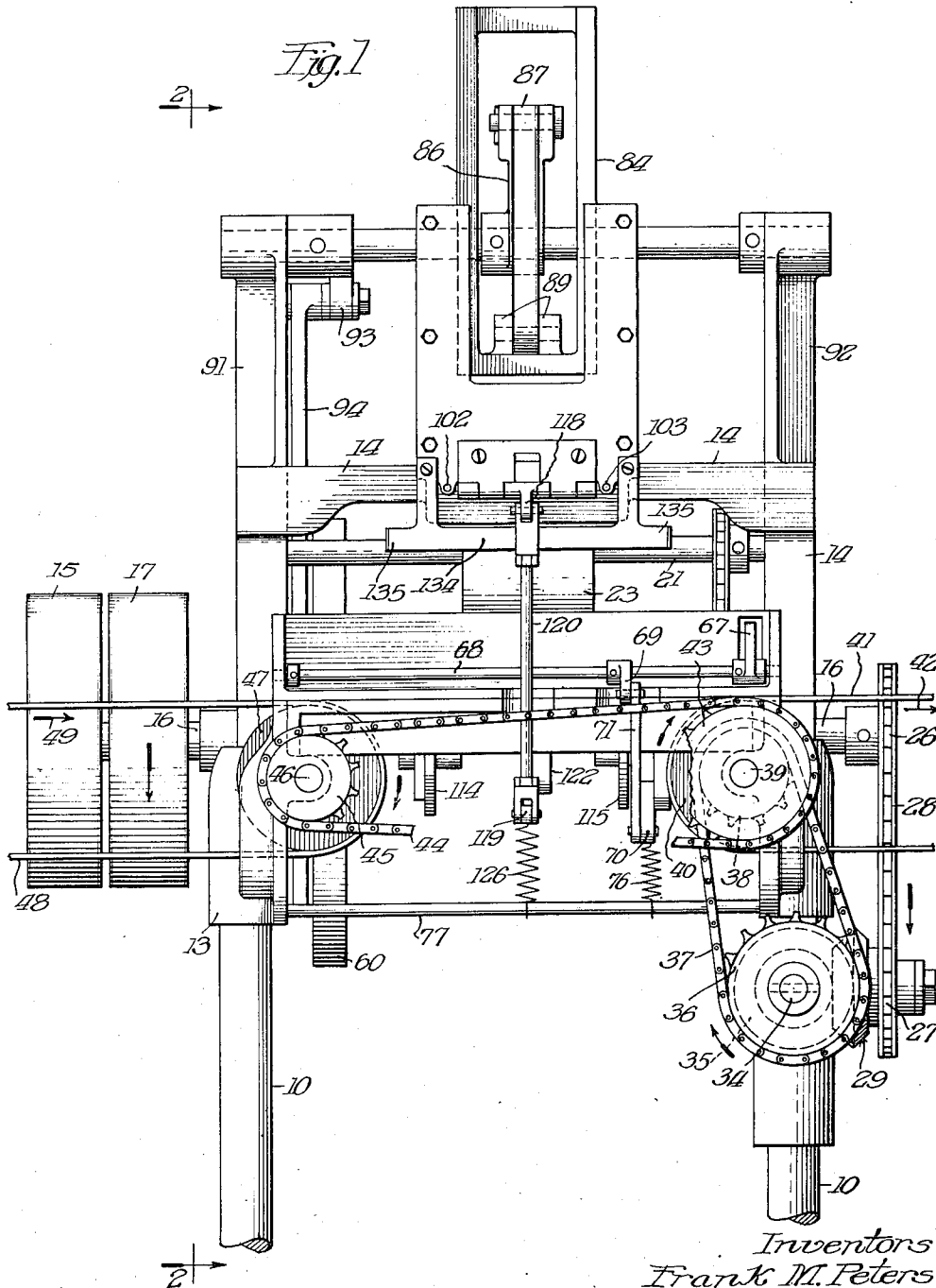
CARTON FILLING MACHINE.

APPLICATION FILED JAN. 5, 1918.

Patented Feb. 25, 1919.

6 SHEETS—SHEET 1.

1,295,197.



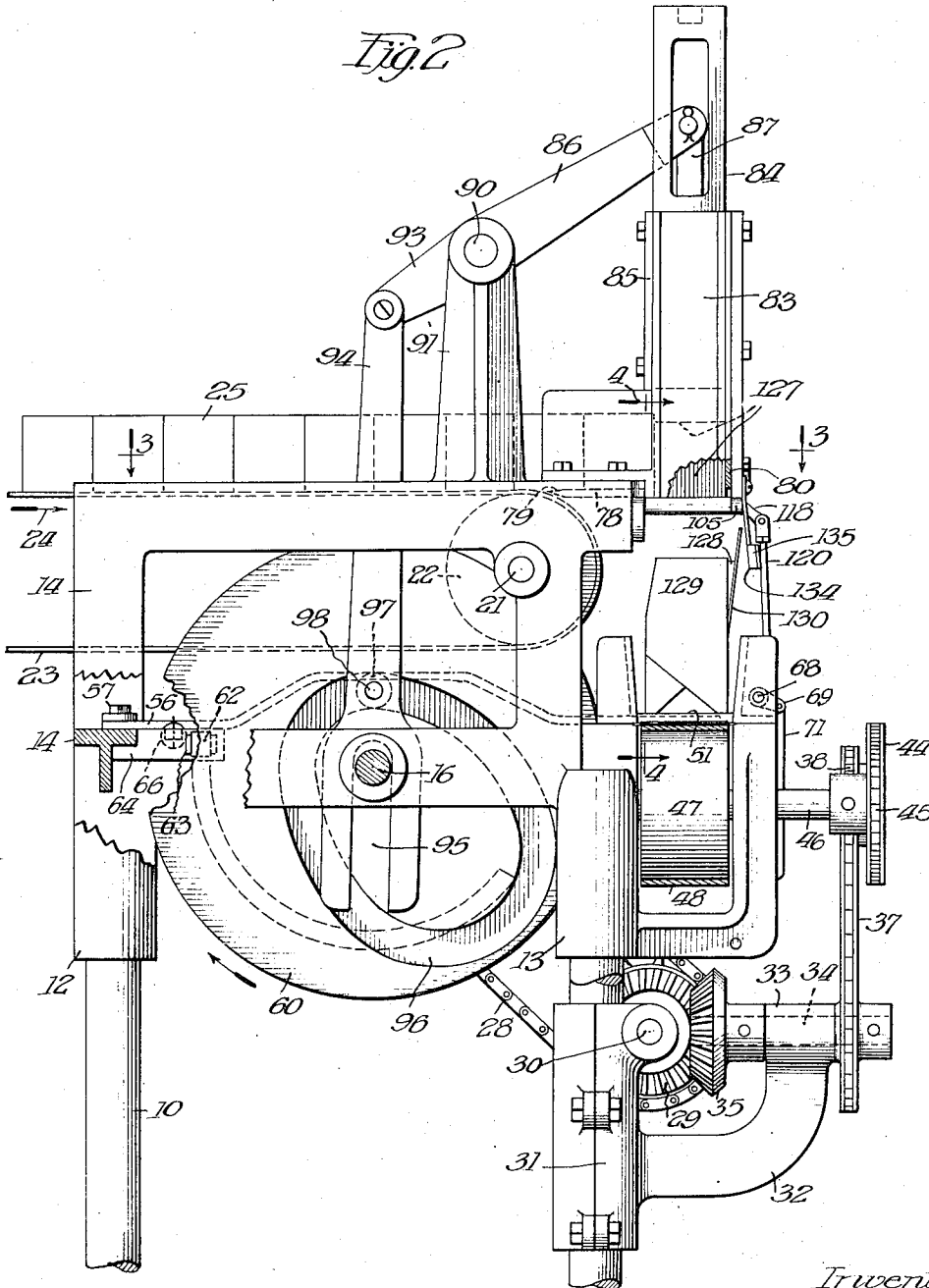
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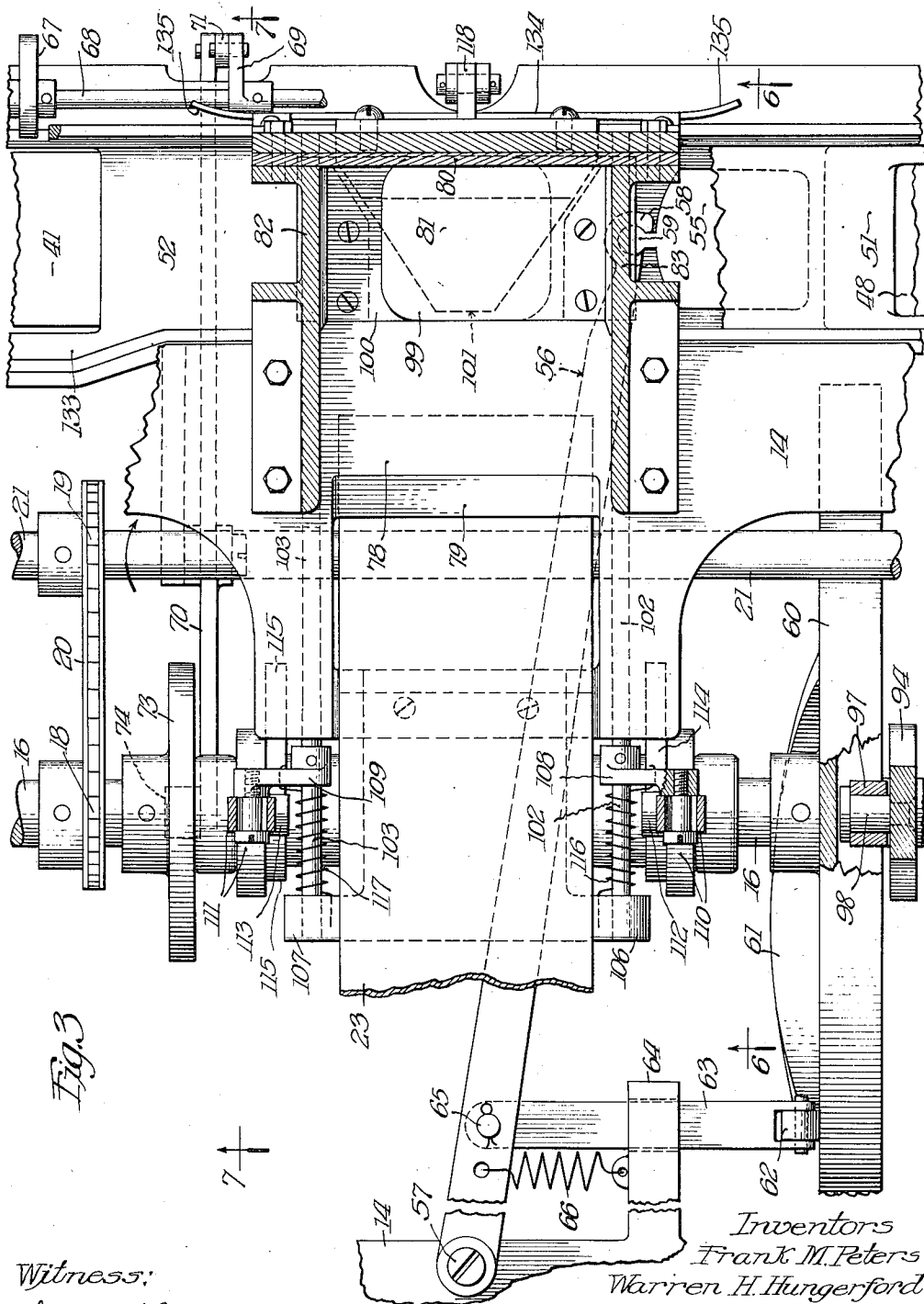


Fig. 3

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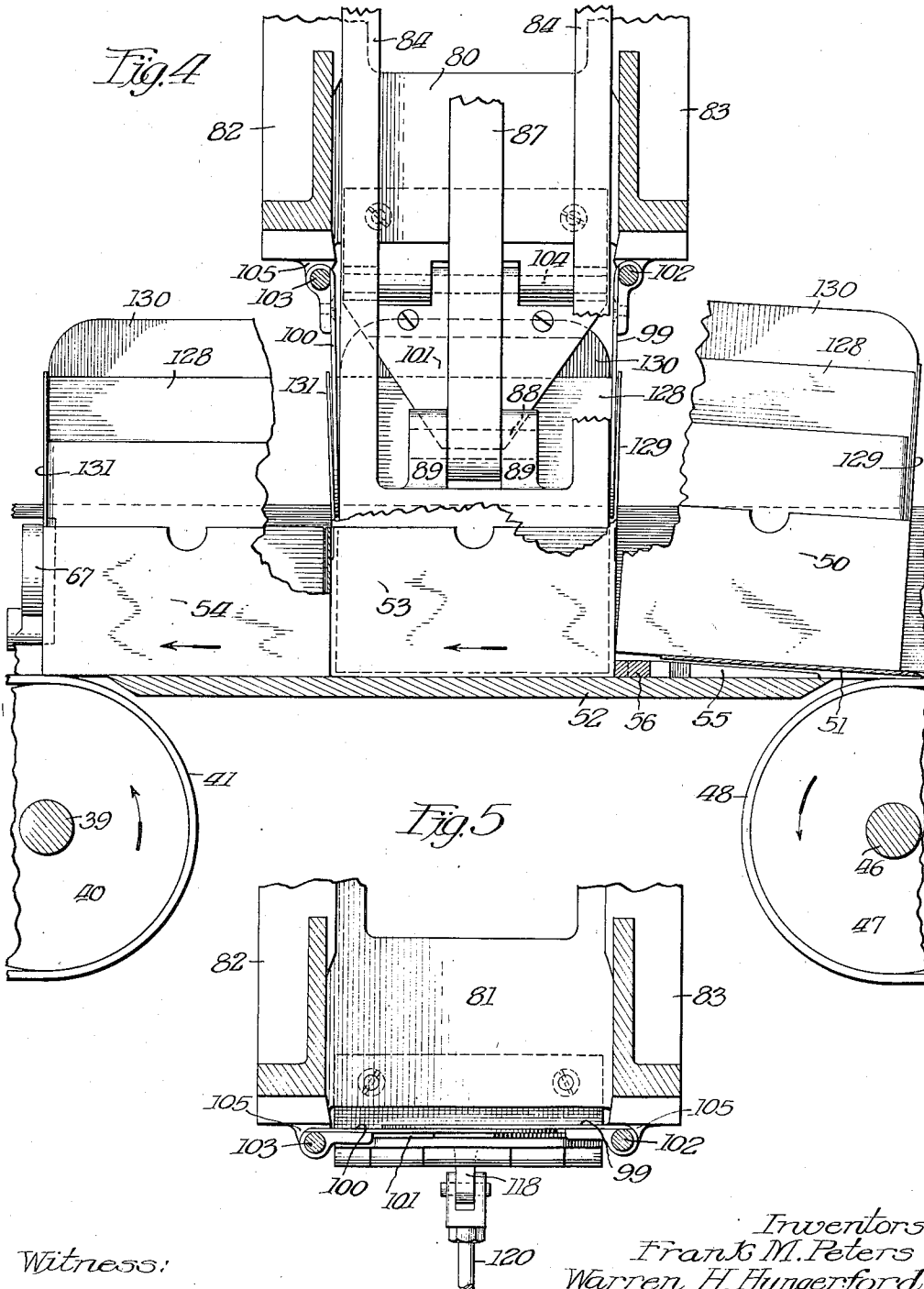
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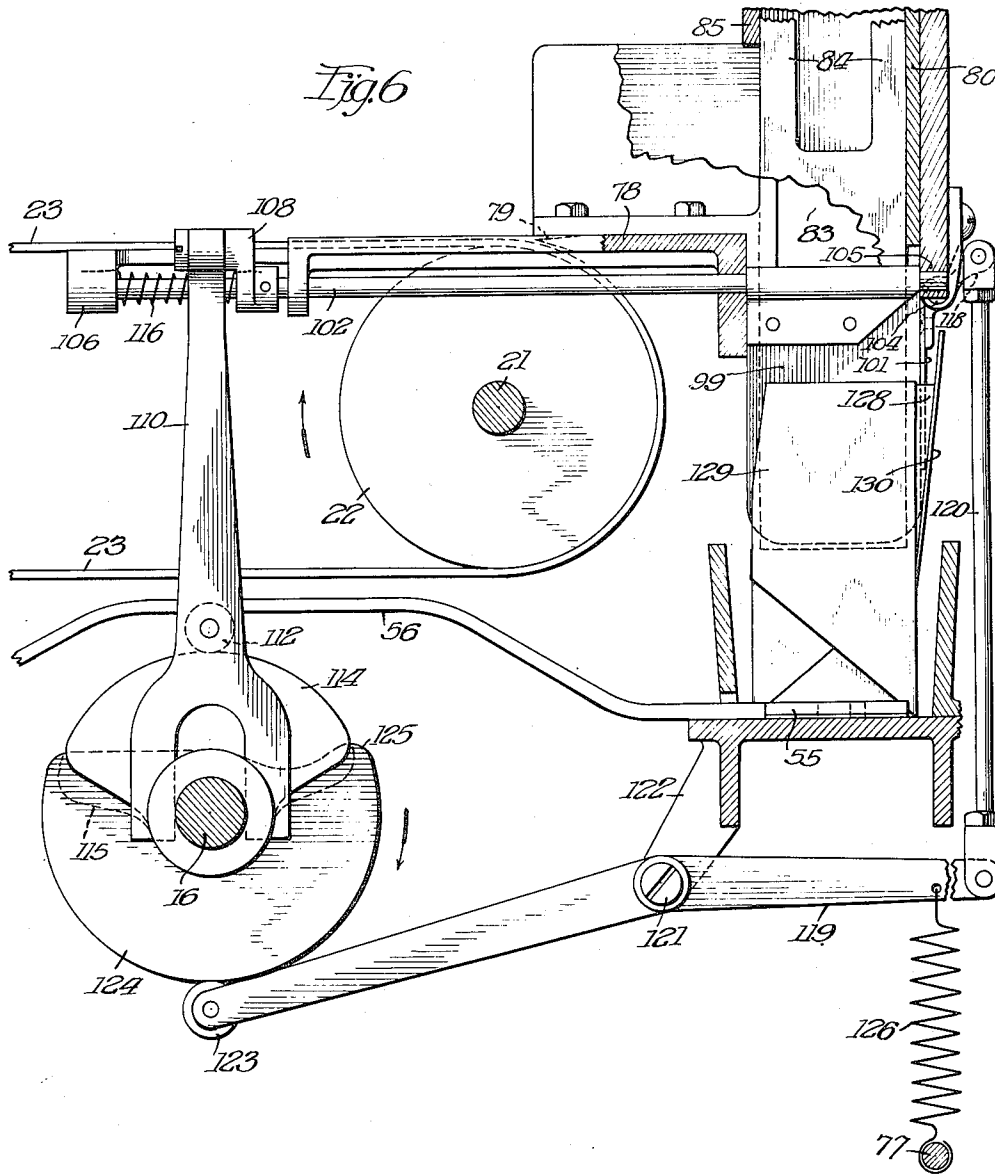
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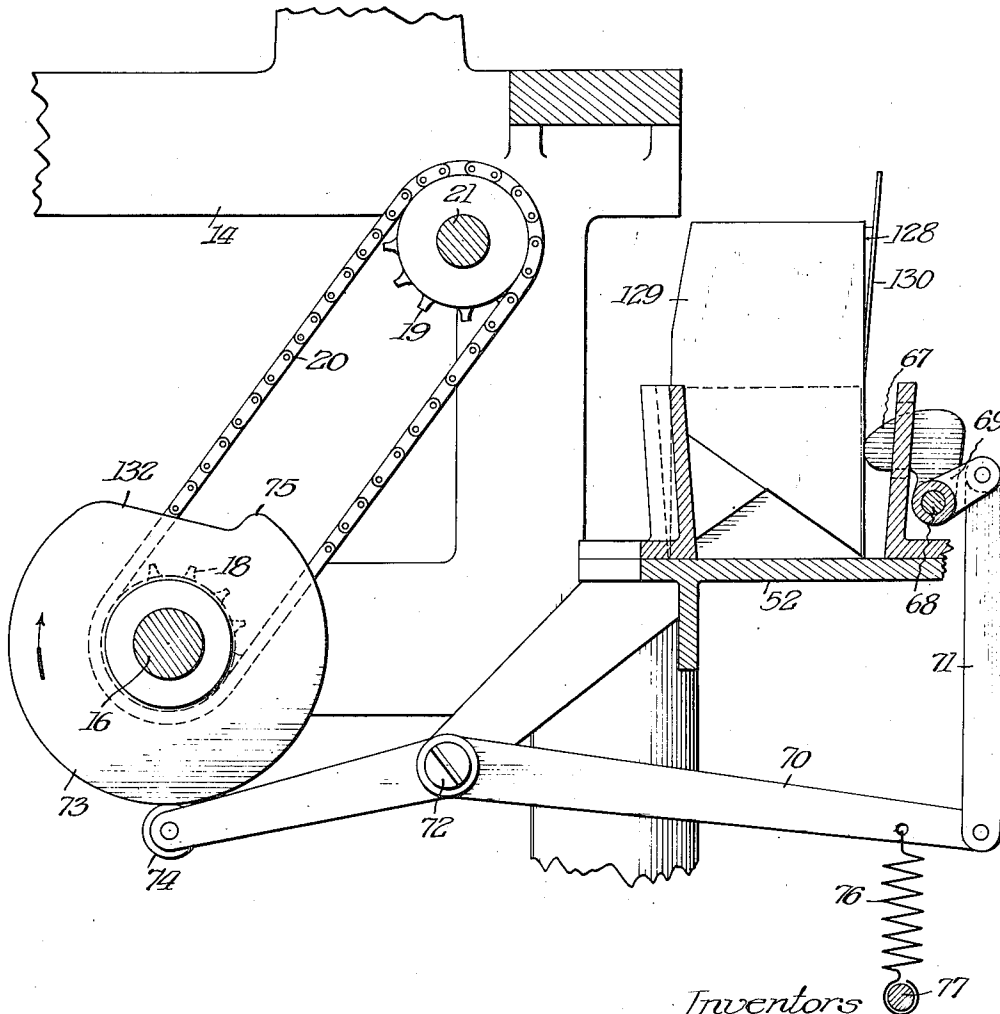
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6 SHEETS—SHEET 6.

Fig. 7



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UNITED STATES PATENT OFFICE.

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CARTON-FILLING MACHINE.

1,295,197.

Specification of Letters Patent.

Patented Feb. 25, 1919.

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To all whom it may concern:

Be it known that we, FRANK M. PETERS and WARREN H. HUNGERFORD, both citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carton-Filling Machines, of which the following is a specification.

Our invention relates to improvements in carton-filling machines, and is of particular service when used for packaging butter and other products.

The principal objects of the invention are to provide in apparatus of the class described improved means for feeding successive charges of the material and introducing said charges, one by one, into containers successively brought into a filling zone; to provide improved means for facilitating the introduction of the material charge into a container having a flexible filling aperture; to provide improved means for successively moving the containers into and out of the filling zone; to provide improved means by which the above described objects are effected in properly coordinated relation; to provide a machine of the class described which shall be simple and economical to design and manufacture, and inexpensive and convenient to operate and maintain; and, in general, to provide an improved machine of the character referred to.

In the drawings, which illustrate our invention in one of its applications, viz., a machine for automatically inserting previously wrapped "prints" of butter into suitable cartons—

Figure 1 is a front elevation of the machine;

Fig. 2 is an end elevation or section taken on the line 2—2 of Fig. 1;

Fig. 3 is a view in plan representing a section taken on the line 3—3 of Fig. 2;

Fig. 4 is a section taken on the line 4—4 of Fig. 2, but showing the plunger after it has descended;

Fig. 5 is a view similar to Fig. 4, but showing certain parts in the positions they occupy when the plunger is elevated;

Fig. 6 is a section taken on the line 6—6 of Fig. 3; and

Fig. 7 is a section taken on the line 7—7 of Fig. 3.

Referring to the drawings, it will be observed that the machine as a whole is carried

by a set of four suitable rods or columns 10, the lower ends of which are equipped with feet (not shown) resting upon the floor of the room in which the machine is installed. The upper ends of these columns 10 are inserted in a set of four bosses, for instance 12 and 13, forming integral parts of a main skeleton cast iron frame member designated as a whole 14, upon which the operative parts of the machine are mounted. Power to actuate the various parts is supplied by a constantly running belt (not shown) passing around a pulley 15 keyed to a main operating shaft 16, a loose pulley 17 receiving said belt when it is desired to stop the operation of the machine.

The main shaft 16, from a pair of sprocket wheels 18, 19, and a chain 20 (see Fig. 7), drives a shaft 21 carrying a wide-faced pulley 22 around which is trained a conveyer belt 23 (see Figs. 2 and 6). The upper stretch of said belt, which moves in the direction of the arrow 24, carries the individually wrapped prints 25 of butter into the filling zone and moves continuously, the movement of the prints 25 being, however, intermittent. Through sprocket wheels 26, 27, and chain 28 the shaft 16 also drives a bevel gear 29 mounted to rotate upon a pin 30 which is supported in the upper end of a cast iron bracket 31 (see Fig. 2). The said bracket 31 is formed with an integral outwardly and upwardly extending arm 32 having a boss 33 in which is journaled a shaft 34, the said shaft being actuated by a bevel gear 35 meshing with the bevel gear 29 previously referred to. To the outer end of the shaft 34 there is keyed a sprocket 36 which, through a chain 37, drives a complementary sprocket 38 keyed to a shaft 39 suitably journaled in the frame of the machine. To the rear end of said shaft 39 there is keyed a wide-faced belt pulley 40 around which is trained a conveyer belt 41 which moves continuously in the direction of the arrow 42 and serves to convey the filled cartons away from the machine.

To the front end of the same shaft 39 there is also keyed a large sprocket wheel 43 which, by means of a chain 44, drives a smaller sprocket 45 keyed to another shaft 46 also suitably journaled in the main frame 14. On the rear end of the said shaft 46 there is also keyed a wide-faced belt pulley 47 around which is trained a conveyer belt

48 which moves continuously in the direction of the arrow 49 (see Fig. 1) and serves to deliver empty cartons to the filling mechanism. It will be noted that the upper or operative stretches of the conveyer belts 41 and 48 move in the same direction and are substantially in the same horizontal plane, but are separated by a space equal to the horizontal spacing of the two shafts 39 and 46.

Describing the mechanism for successively advancing the cartons in properly timed relation into and out of the filling zone, it will be observed, by reference to Fig. 4, that each empty carton 50, as it is moved forward by the conveyer belt 48, slides over the facing edge of a small inclined plate or table 51 elevated slightly above the upper face of a slideway 52 extending substantially the entire distance between the belts 48 and 41. The forward push, due to the empty following cartons carried by the belt 48, is sufficient to move the first empty carton 50 onto the inclined plate 51 and push the same forwardly from the plate 51 onto the slideway 52. The amount of such forward push of the empty cartons is, however, usually insufficient to overcome the friction of the filled cartons 53 and 54 resting upon the slideway 52, and we therefore prefer to use a separate mechanism for such purpose.

The said carton-moving mechanism comprises a wedge-shaped slipper 55 arranged to slide upon the upper face of the runway 52, and thin enough to pass under the inclined plate 51, as shown best in Fig. 4. The said pusher 55 is reciprocated in properly timed relation along the runway 52 by means of a long arm 56 pivoted on a vertical pin 57 secured in the rear part of the frame 14. The outer or front end 58 constitutes a surrounding socket for a circular head 59 on the end of the member 55. The side edge of the socket 58 is the part which directly engages and pushes the filled cartons along the runway.

The means for actuating the oscillatory lever 56 comprises a disk 60 keyed to the shaft 16, said disk 60 having formed integrally and concentrically therewith a raised cam track 61 located at the proper distance from the center of the shaft 16 to engage a roller 62 pivotally mounted in the end of a short rod 63 parallel to the axis of the shaft 16. Said rod 63 is slidably mounted in a small bracket 64 forming an integral part of the main frame 14, the rear end of said rod 63 being pivotally secured to an intermediate point on the lever 56 by means of a pin 65. After executing a feed stroke, the lever 56 is retracted by a coil tension spring 66, the ends of which are respectively secured to the lever and to the stationary arm 64.

In order properly to position the cartons

in register with the filling mechanism, we prefer to employ a movable stop 67 (shown best in Figs. 4 and 7), said stop 67 taking the form of a short sector-shaped arm which is keyed to an oscillatory shaft 68. To said shaft 68 is also keyed a short arm 69, the outer end of which is connected to a cam lever 70 by means of a pivoted link 71. Said cam lever 70 is, intermediate its ends, pivoted upon a fixed pin 72 secured in the frame of the machine. The cam lever 70 is actuated by a radial cam 73 keyed to the main operating shaft 16, the surface of said cam 73 engaging a cam roll 74 carried by the rear end of the cam lever 70. When the cam roll 74 drops off the heel 75 of the cam, the lever 70 is pulled down by a coil tension spring 76, the ends of which are respectively secured to the outer end of the cam lever 70 and a stationary rod 77 extending across the front of the machine and secured in parts of the main frame 14.

Referring to Figs. 2 and 3, it will be observed that at the upper stretch of the belt 23 there is a small horizontal plate or table 78, the upper surface of which is substantially at the same level as the top of the said conveyer belt 23. In order to permit the wrapped prints of butter to move forward onto the surface of the said table 78 without obstruction, the facing edge of the latter is beveled, as shown at 79. In front of the front edge of the said plate 78 there is positioned a vertically extending abutment 80 spaced apart from the plate 78 a sufficient distance to permit the passage of a charge of material, and on either side of the aperture 81, behind said abutment 80, are a pair of side guides 82 and 83. The parts 80, 82, and 83 extend upwardly to form the three sides of a vertical guideway in which slides a plunger or cross-head 84, the rear side of said guideway being formed by a plate 85 bolted across the rear edges of the parts 82 and 83 at a sufficient distance above the platform 78 to allow the material charge to enter the chute.

The plunger 84, the cross-section of which is a rectangle substantially equal in area to the horizontal cross-section of the material charge, is reciprocated up and down in the vertical guide chute just described, and serves the purpose of forcing the material into the container located vertically beneath the guide chute. Such reciprocatory movement is effected by means of an oscillatory arm 86 which is pivotally connected to the cross head 84 by means of a link 87, the lower end of said link being articulated upon a fixed pin 88 mounted in a pair of integral lugs 89 in the lower end of the said plunger 84. The rear end of the oscillatory arm 86 is keyed to a horizontal shaft 90 extending across the top of the machine and journaled in a pair of brackets 91 and 92 ex-

tending upwardly from opposite sides of the frame 14. The shaft 90 is preferably oscillated in properly timed relation by means of an arm 93 keyed to said shaft and actuated
 5 by a vertically extending cam rod 94, the upper end of which is pivotally connected to the short arm 93. The lower end of the said cam rod 94 is vertically slotted, as shown at 95, in order to straddle and to be guided by
 10 the main shaft 16. Vertical movement of said cam rod 94 is effected by means of a closed cam groove 96 formed in the outer face of the cam disk 60, previously referred to, with which coöperates a cam roll 97
 15 mounted to rotate upon a pin 98 carried by the said cam rod 94.

For temporarily supporting the material charge, the machine is equipped with a trap-door arrangement located slightly below the
 20 top of the transverse table 78. Said trap-door arrangement in the present instance comprises a set of three horizontally pivoted sheet metal wings 99, 100, and 101, said wings being pivoted respectively on oscillatory shafts 102, 103, and 104, said shafts being
 25 suitably supported in small brackets or hinge parts, for instance as shown at 105 in Fig. 4, depending from the lower ends of the chute parts 80, 82, and 83. The said
 30 wings, in addition to forming constituent parts of the trap-door arrangement, also serve the purpose, when swung down, of establishing an entrance chute for the container into which the material charge is to
 35 be introduced.

The parallel shafts 102 and 103 which carry the wing members 99 and 100, extend rearwardly a considerable distance, their rear ends being journaled in parts 106 and
 40 107 of the main frame, and are actuated by means of a pair of small crank arms 108 and 109 keyed to the said shafts. The outer ends of the said crank members 108 and 109 are pivotally connected to the upper ends of a
 45 pair of vertically extending cam rods 110 and 111 similar to the cam rod 94 and carrying cam rolls 112 and 113 riding on radial cams 114 and 115, keyed to the shaft 16. The said shafts 102 and 103 are retracted by a pair of
 50 tension springs 116 and 117.

The front horizontal shaft or pin 104, which carries the front V-shaped wing 101, is actuated by means of a crank arm 118 keyed to said shaft 104 and having its front
 55 end connected to the front end of a rearwardly extending cam lever 119 by means of a link 120. The said cam lever 119 is pivoted upon a fixed pin 121 secured in a depending arm 122 of the main frame 14, and at its
 60 rear end carries a pivoted cam roll 123 riding on a radial cam 124 keyed to the shaft 16. When the cam roll 123 drops off the heel 125 of the cam 124, a coil tension spring 126 depresses the front end of the said lever
 65 119 and causes the V-shaped wing 101 to

swing back up into horizontal or closed position. The respective ends of the tension spring 126 are respectively secured to the outer end of the cam lever 119 and the horizontal rod 77 previously referred to.

The operation of the machine will now be described. The material charges, in this instance rectangular prints of butter previously wrapped in waxed paper, are fed onto the constantly traveling conveyer belt 23,
 70 the front prints moving up into engagement with each other, as shown at 25, by reason of the normal excess of material supplied. The movement of the traveling belt tends to push the front prints off the delivery end of the
 75 belt and across the transverse table 78. Such tendency, however, except as to the first two or three prints, is resisted by reason of the front face of the front print 127 engaging the front abutment 80, the said print 127
 80 being meanwhile temporarily supported by the trap-door. During the time that the front print 127 is being advanced into the position just described, the plunger 84 is maintained in elevated position, as shown in
 85 Fig. 2. By this time, an empty carton 53 has been allowed to move forward over and off the end of the inclined plate 51, by reason of the fact that the pusher 56 has forced the filled carton 54 from beneath the plunger
 90 and into engagement with the stop 67, previously moved into operative position. The carton 53 does not drop off the end of the plate 51 until the wedge member 55 has been pulled back beneath the plate 51 by the
 95 spring 66.

The empty carton 53, having assumed the position shown in Fig. 4, and the print 127 having assumed the position shown in Fig. 2, the plunger 84 commences to descend and
 100 at the same time the bottom V-shaped wing 101 drops down into vertical position, which is followed by similar movements of the wings 100 and 99, in the said order. The said three wings 99, 100, and 101 in their
 105 downward swinging movements, enter the open end of the empty carton and spread apart its waxed paper lining 128 and outer flaps 129, 130, and 131 so as to provide a free and unobstructed entrance chute for the material charge. In the present instance, we have found it unnecessary to provide a
 110 fourth wing for the remaining side of the carton, although in certain cases such fourth wing might be conveniently employed.

The opening up of the trap-door composed of the three wing members has now removed the temporary support for the print 127, which descends by gravity into the carton through the entrance chute formed by the
 115 three wing members, the downward movement of the print being rendered positive and complete by the downward falling movement of the plunger 84. Upon the completion of the falling movement of the plunger,
 120 125

it ascends into the elevated position shown in Fig. 2, and the trap-door wings 99, 100, and 101 follow up into horizontal position in proper sequence. During the time that the plunger 84 is in depressed relation, the material charges are prevented from moving into the filling zone, by reason of the front charge engaging the rear face of the said plunger 84, but as soon as the bottom edge of the plunger rises above the top of the material charges 25, the continued movement of the conveyer belt 23 forces another charge onto the trap-door and against the abutment 80.

As soon as the wings 99, 100, and 101 have been folded up out of the way, the stop member 67 snaps back out of the way of the previously filled carton 54, and the arm 56, being simultaneously actuated, engages the rear end of the now filled carton 53 and pushes the filled carton 54 past the stop, soon after which the stop is again moved into operative relation by reason of the cam roll 74 riding up the inclined surface 132 (see Fig. 7) of the cam 73. In order to permit the filled carton 54 to get out of the way of the stop 67 when the latter is so moved into operative relation, the distance between the said guides of the carton runway in front of the stop is increased, as shown at 133 in Fig. 3. The movement of the free arm 56 is just sufficient to move the filled carton 63 into engagement with the stop 67, and before the next succeeding empty carton 50 has dropped off the inclined plate 51, the lever 56 is snapped back into its normal inoperative position (shown in Fig. 3) by the spring 66 previously described.

In order to prevent interference between the flaps of the carton and the actuating link 120, we prefer to equip the machine with a guide 134 having its facing end 135 suitably flared, as shown in Fig. 3.

When the filled cartons in their forward movement are pushed off the end of the slide-way 52 and onto the receiving end of the constantly running conveyer belt 41, they are moved thereby and delivered to a machine suitable for the folding of the carton flaps, etc.

The scope of the invention should be determined by reference to the appended claims, the described details of construction and operation being merely illustrative of a single application of our invention.

We claim—

1. In apparatus of the class described, the combination of conveyer mechanism for advancing a series of containers, a stop for arresting the movement of a leading container, and a reciprocatory member for moving a filled container into engagement with said stop whereby a following empty container is located in filling position.

2. In apparatus of the class described, the

combination of filling mechanism, a continuously traveling conveyer for moving a series of empty containers toward the field of the filling mechanism, a movable stop member for arresting the travel of the series of containers, and subsidiary means for moving the filled cartons out of the filling zone.

3. In apparatus of the class described, the combination of a belt conveyer for delivering a series of empty containers, a runway for receiving containers delivered by said conveyer, a movable stop for arresting the movement of the said containers whereby a container may be located in filling position, and means for withdrawing said stop subsequent to a filling operation whereby the movement of the said containers may be resumed.

4. In apparatus of the class described, the combination of filling mechanism, a continuously moving belt conveyer for delivering a succession of empty containers, secondary conveying mechanism for carrying away filled cartons, a runway connecting the delivery end of the first conveyer with the receiving end of the second conveyer and arranged to conduct the containers through the filling zone, and a stop movable transversely into the path of movement of said containers on said runway and synchronized with the filling mechanism.

5. In apparatus of the class described, the combination of filling mechanism, a continuously moving belt conveyer for delivering a succession of empty containers, secondary conveying mechanism for carrying away filled containers, a runway connecting the delivery end of the first conveyer with the receiving end of the second conveyer and arranged to conduct the containers through the filling zone, a stop movable transversely into the path of movement of said containers on said runway and synchronized with the filling mechanism, and subsidiary means for moving the filled containers into the receiving field of the second conveyer.

6. In apparatus of the class described, the combination of filling mechanism, a traveling conveyer for advancing a series of containers toward the field of the filling mechanism, means for supporting the containers in the filling zone when received from the said conveyer, a pusher arranged to reciprocate beneath the containers as delivered by said conveyer, and means for supporting the containers above said reciprocatory member prior to their entrance into the filling zone.

7. In apparatus of the class described, the combination of filling mechanism, a conveyer for advancing a series of containers toward the field of said filling mechanism, a delivery conveyer for the filled cartons, a runway for supporting the cartons while

in the filling zone, a support interposed between said runway and the first mentioned conveyer and elevated above said runway, and a pusher reciprocable along said runway and beneath the containers delivered by said first conveyer for moving the filled cartons into the field of the delivery conveyer.

8. In a machine of the class described, the combination of means for delivering successive charges of material into a filling zone, a reciprocatory member for forcing the said charges successively into a container, and means movable into one position to support a charge temporarily and into another position to constitute means for guiding the charge into a container, said reciprocatory member constituting a stop for succeeding material charges during its operative movement.

9. In a carton-filling machine, the combination of means for advancing successive charges of material into a filling zone, a pair of opposed wing members pivoted on opposite sides of said filling zone and movable into substantially horizontal position to support a charge temporarily and into substantially vertical position to constitute spaced apart means for spreading the filling aperture of said carton, and a plunger adapted to reciprocate between said last named members for forcing the charge into said carton, said plunger during such forcing movement constituting a temporary stop for a succeeding material charge.

10. Means for inserting a body of material into a carton having a non-rigid inner lining, comprising a pair of oppositely disposed pivoted plates arranged to overlap each other when folded, and means for rotating said plates in opposite directions to cause said overlapping ends to enter the

lining of the carton, thereby extending the mouth thereof and preventing movement of said lining by a body of material moved into the carton between said plates, said plates serving as guides for said material during its movement into the carton.

11. In a machine for filling lined cartons of the class described, the combination of a pair of oppositely disposed trap members normally adapted to be held in substantially horizontal position with their ends overlapping, for supporting temporarily a body of material deposited thereon and rotatably downwardly into substantially vertical position to enter the mouth of said carton lining and spread and hold the same, thereby constituting oppositely disposed guides for conducting the said body of material into said carton and preventing the said material from disarranging said lining while entering the carton, and means for engaging said trap members in suitably timed relation.

12. Means for inserting a body of material into a carton having a non-rigid flexible inner lining, comprising a pair of oppositely disposed pivoted plates arranged to overlap each other when folded, and means for rotating said plates in opposite directions to cause said overlapping ends to enter the lining of the carton, thereby extending the mouth thereof and preventing movement of said lining by a body of material moved into the carton between said plates, said plates serving as guides for said material during its movement into the carton, said plate-operating means being suitably synchronized to effect movement of the plates in perfectly timed relation without interference with each other.

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