May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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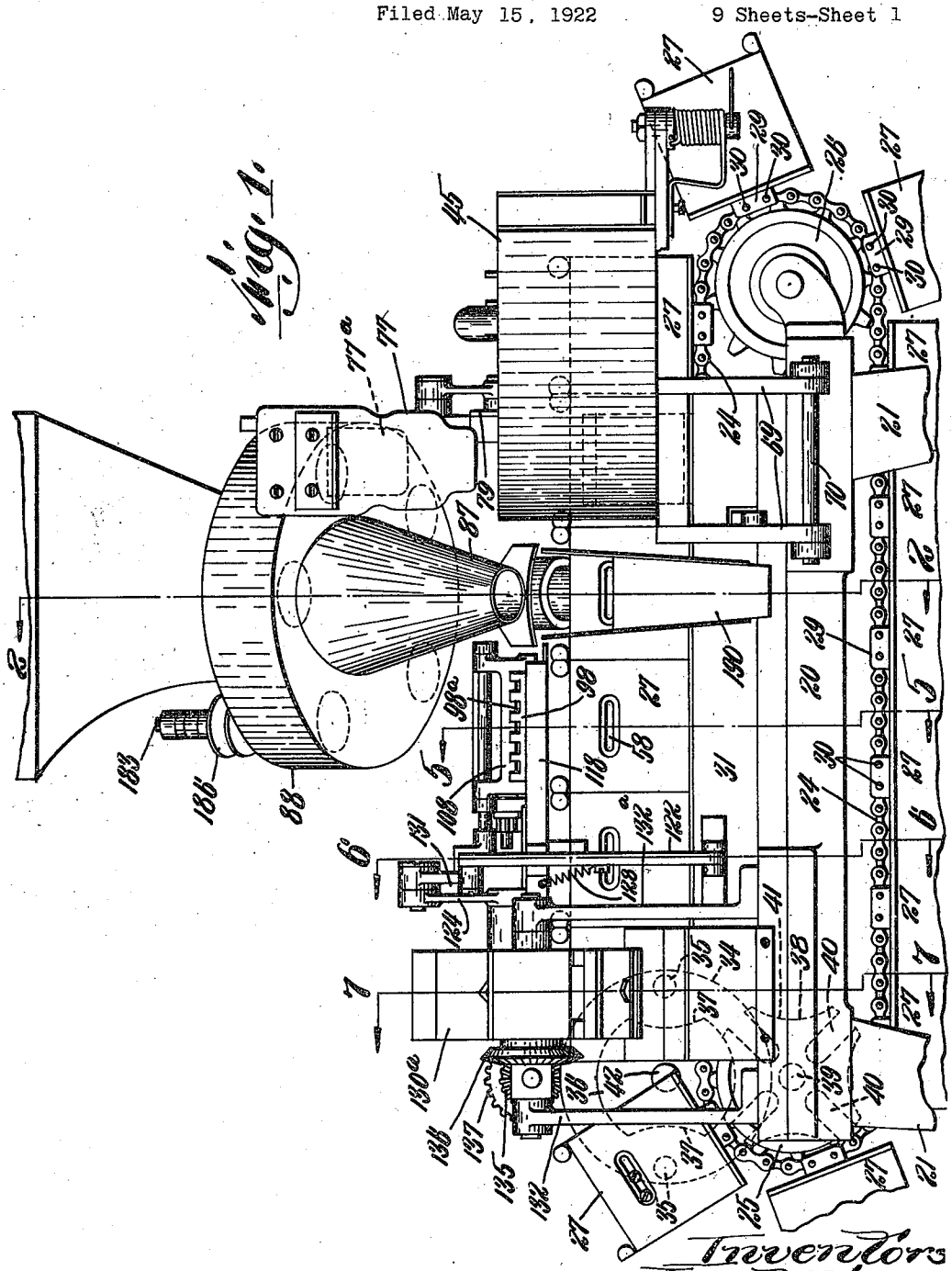


Fig. 1.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

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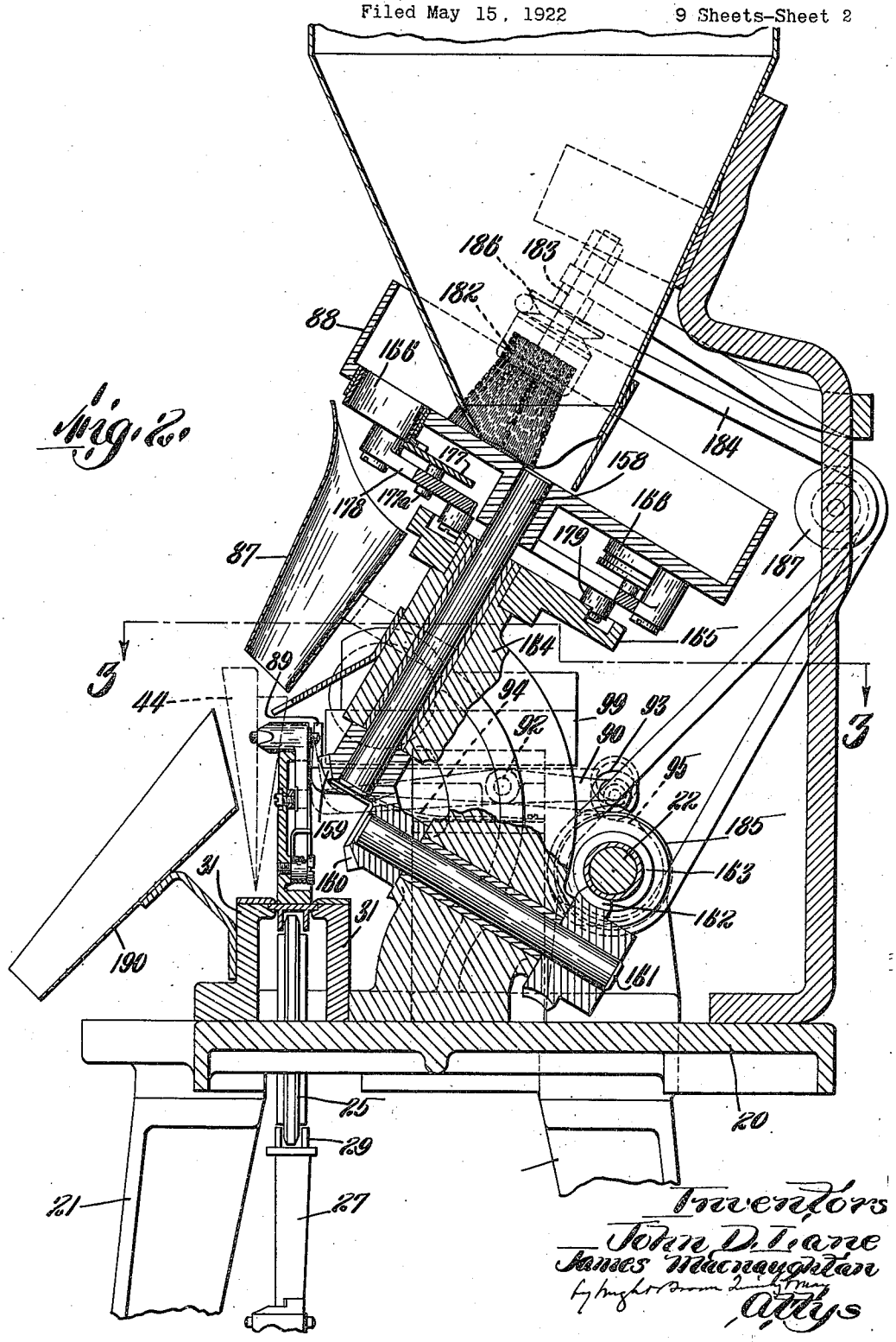


Fig. 2.

Inventors
John D. Lane
James Macnaughton
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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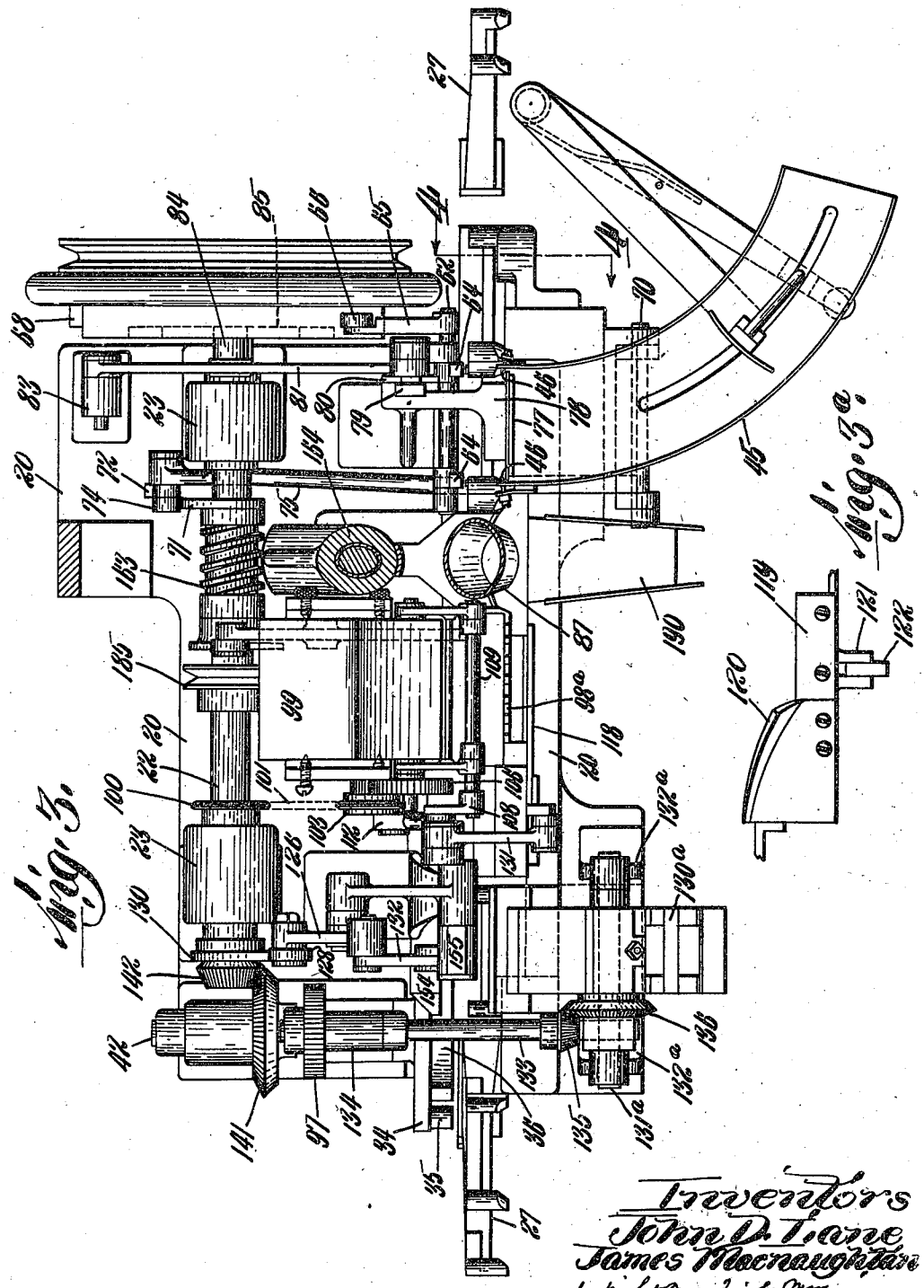


Fig. 5.

Fig. 5a.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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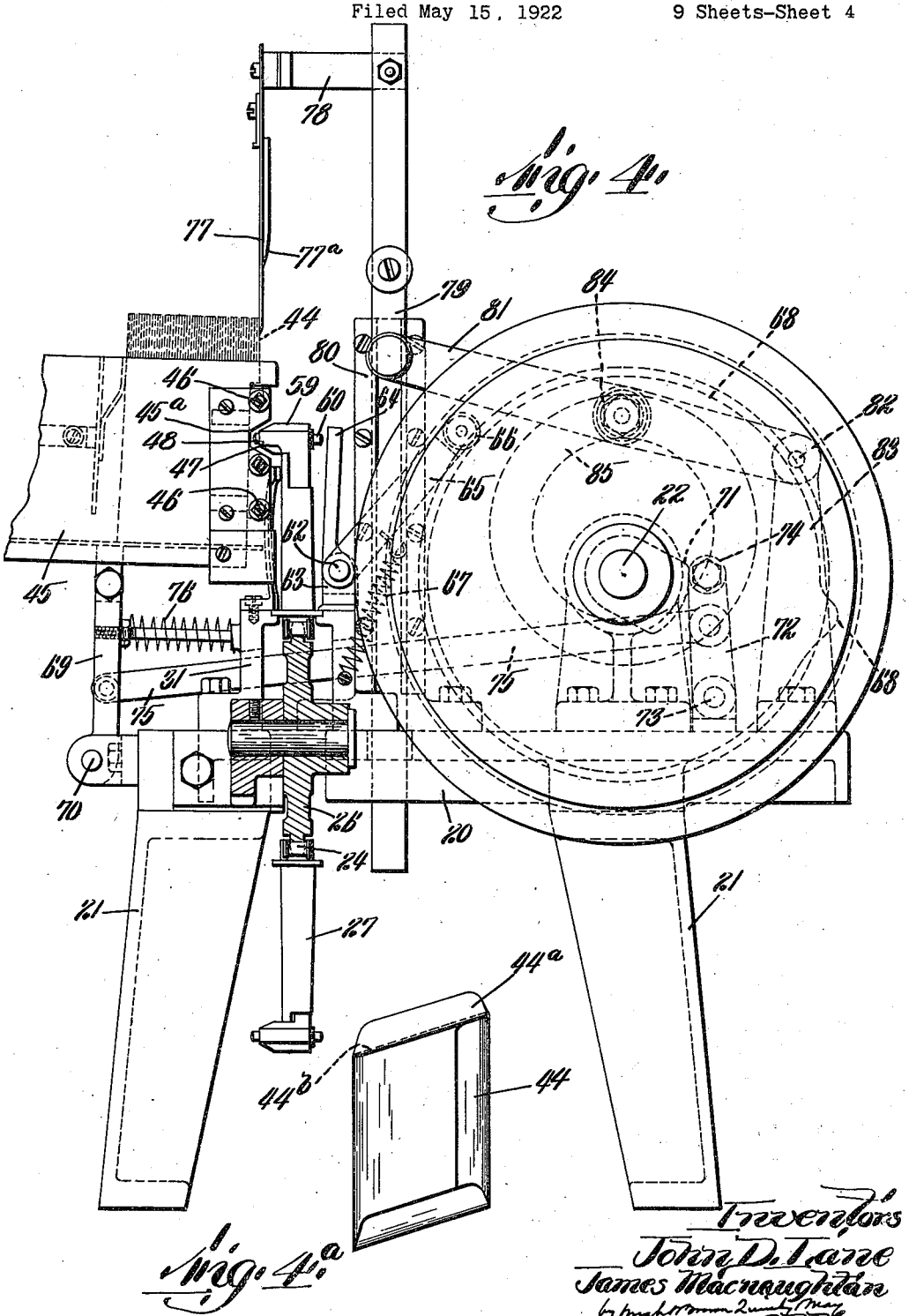


Fig. 4.

Fig. 4a.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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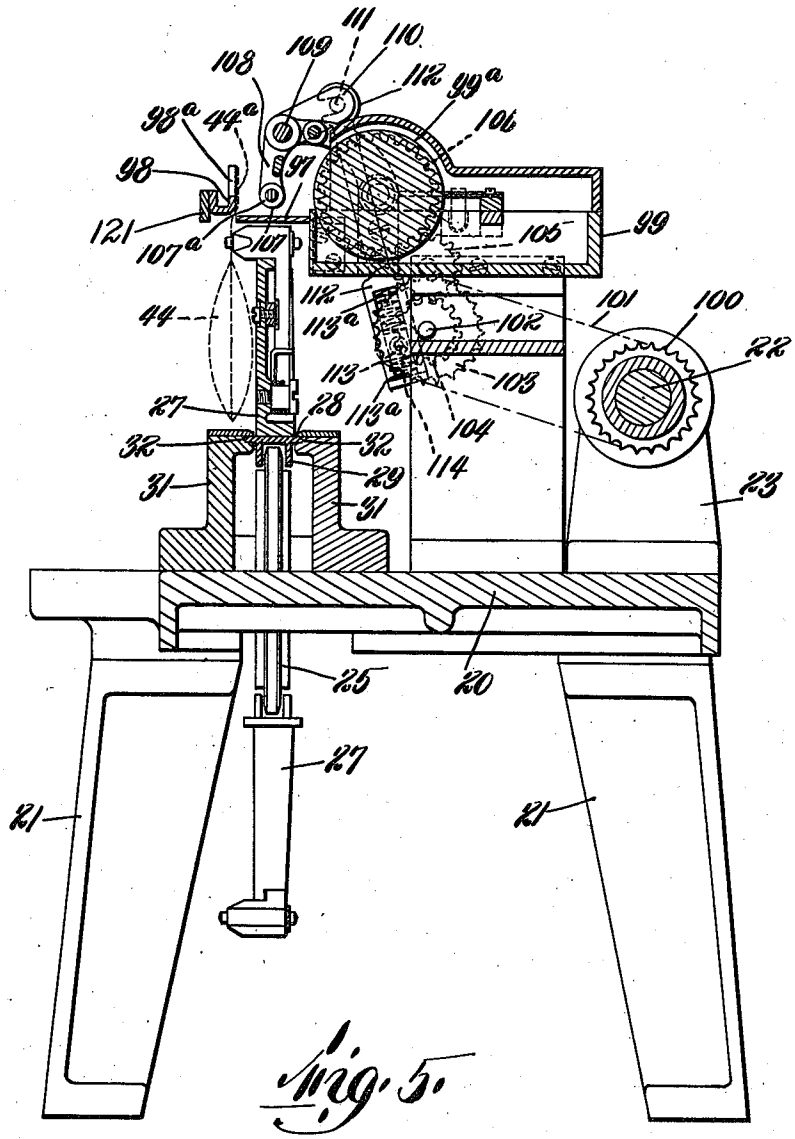


Fig. 5.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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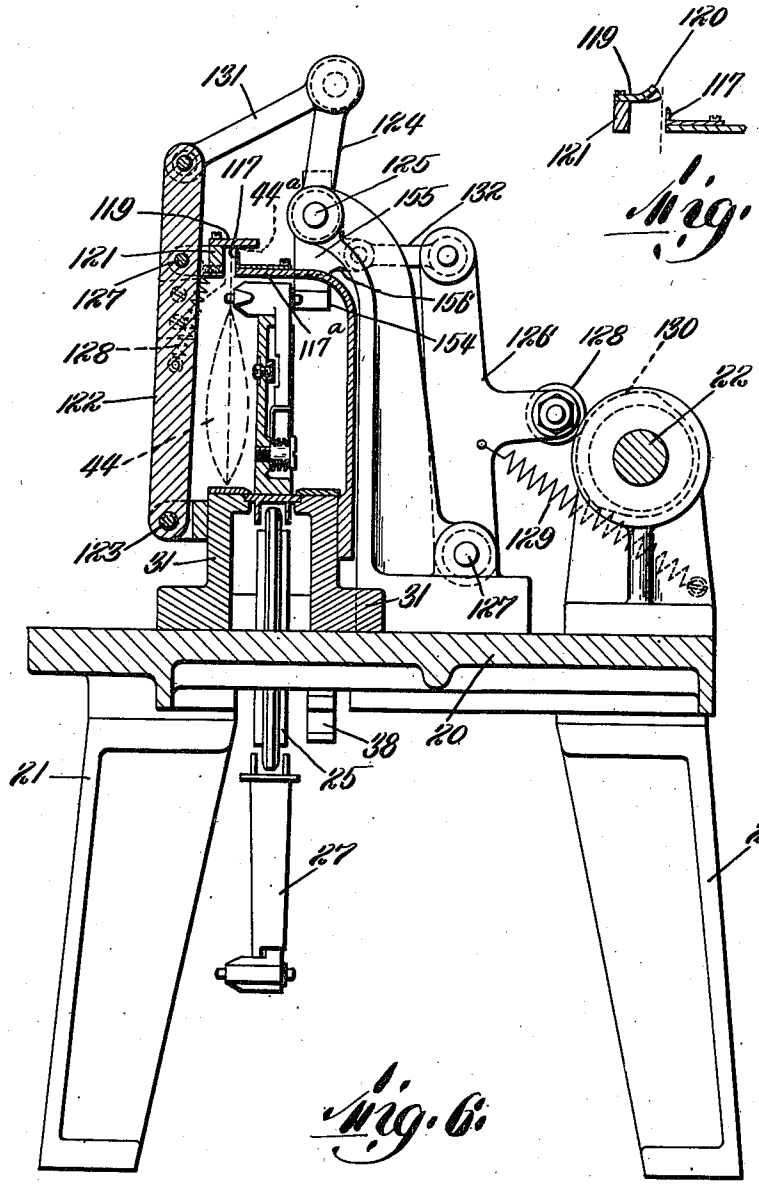


Fig. 6.

Fig. 6a.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

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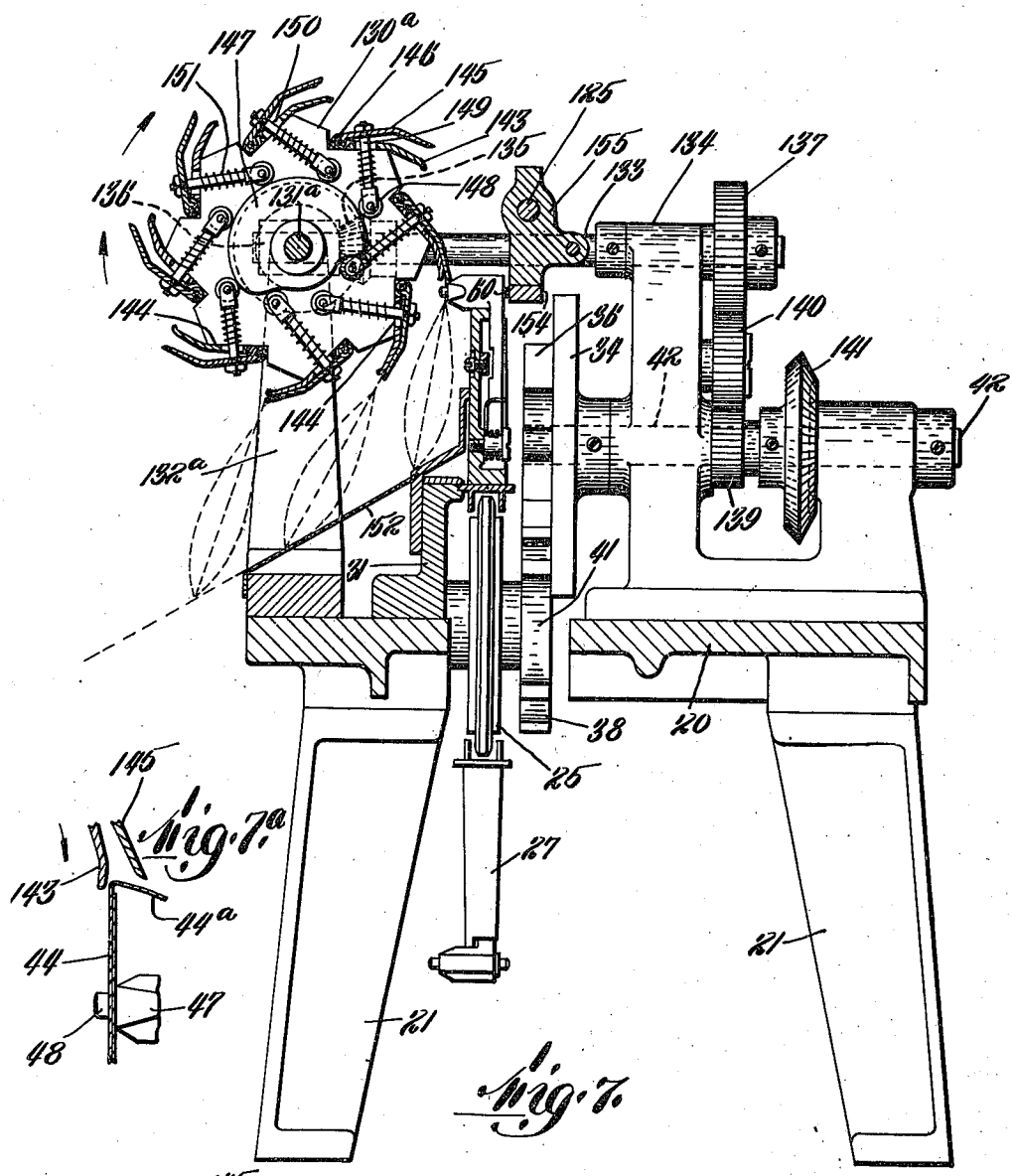


Fig. 7.

Fig. 7a.

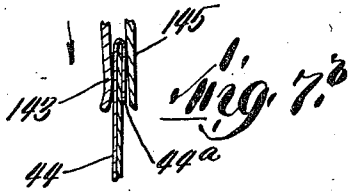


Fig. 7b.

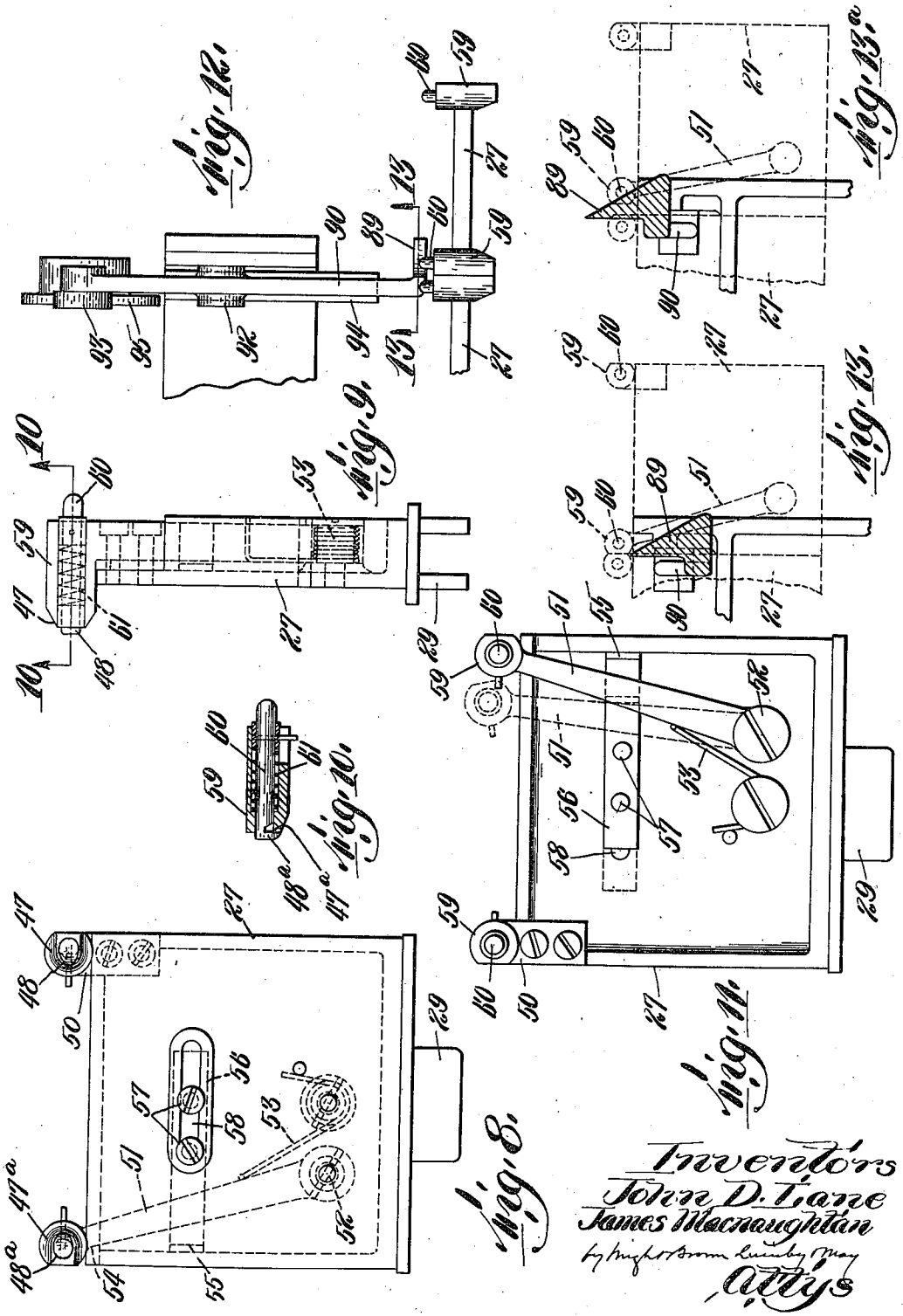
Inventors
John D. Lane
James Mannaughan
by Wright Brown Quinby & May
Attys

May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

Filed May 15, 1922 9 Sheets-Sheet 8



May 8, 1923. 1,454,060

J. D. LANE ET AL

BAG FILLING AND CLOSING MACHINE

Filed May 15, 1922 9 Sheets-Sheet 9

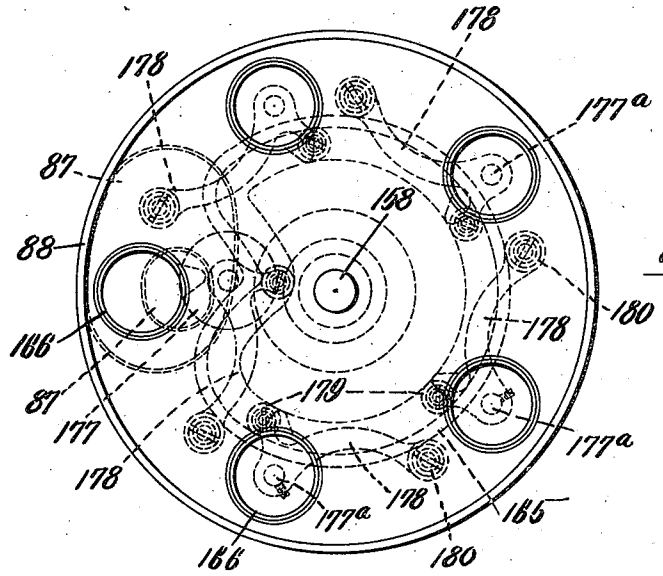


Fig. 14.

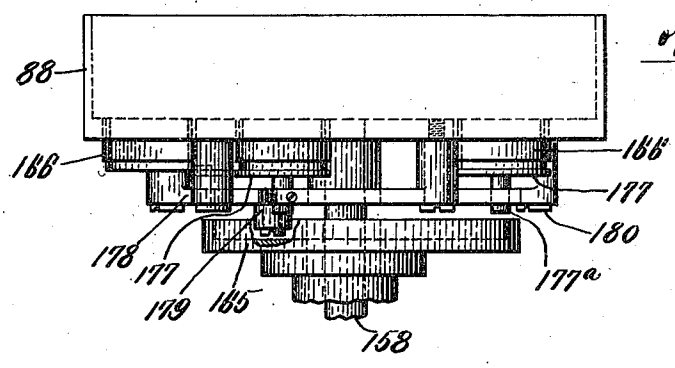


Fig. 15.

Inventors
John D. Lane
James Macnaughtan
by Wright Brown Quinby & May
Attys

Patented May 8, 1923. 1,454,060

UNITED STATES PATENT OFFICE.

JOHN D. LANE, OF BOSTON, AND JAMES MACNAUGHTAN, OF BROOKLINE, MASSACHUSETTS, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO GORDAN MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

BAG FILLING AND CLOSING MACHINE.

Application filed May 15, 1922. Serial No. 561,056.

To all whom it may concern:

Be it known that we, JOHN D. LANE and JAMES MACNAUGHTAN, citizens of the United States, residing at Boston and Brookline, in the counties of Suffolk and Norfolk, respectively, and State of Massachusetts, have invented new and useful Improvements in Bag Filling and Closing Machines, of which the following is a specification.

This invention relates to machines for packaging relatively small articles by inserting a predetermined number or quantity in a bag formed as an envelope, having a flap at one end, and closing and sealing the flap to confine the charge.

The object of the invention is to provide a simple, durable and efficient machine, including an endless carrier, adapted to hold a bag successively in a plurality of positions, and to perform a part of the operation while the bag is in each position, and also including means for simultaneously removing the bag from the carrier, completing the closing of the mouth of the envelope, and delivering the closed bag.

The invention is embodied in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is a front elevation of a machine embodying the invention, parts being broken away.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a top plan view, the hopper being removed, and the hopper-supporting bracket, hopper shaft, and the delivery chute shown in section.

Figure 3ª is a fragmentary plan view.

Figure 4 is an end elevation, parts being shown in section on line 4—4 of Figure 3.

Figure 4ª is a perspective view of a bag used with the machine.

Figure 5 is a section on line 5—5 of Figure 1.

Figure 6 is a section on line 6—6 of Figure 1.

Figure 6ª is a fragmentary view, similar to a portion of Figure 6, showing a different stage of the operation.

Figure 7 is a section on line 7—7 of Figure 1.

Figures 7ª and 7ᵇ are fragmentary views similar to portions of Figure 7, showing different stages of the operation.

Figure 8 is a front view; and

Figure 9 an end view of one of the bag carriers.

Figure 10 is a section on line 10—10 of Figure 9.

Figure 11 is a back view of the carrier shown by Figures 8 and 9.

Figure 12 is a fragmentary elevation, showing means for moving the adjustable carrier jaws.

Figure 13 is a section on line 13—13 of Figure 12.

Figure 13ª is a view similar to Figure 13, showing a different stage of the operation.

Figure 14 is a plan view; and

Figure 15 a side view of the hopper.

The supporting frame includes a bed plate 20, supported by legs 21. The mechanism includes a single driving-shaft 22, journaled in bearings 23, and an endless sprocket-chain 24, mounted on sprocket wheels 25 and 26, the wheel 25 being driven and the wheel 26 idle. The shafts of said wheels are journaled in fixed bearings on the frame, and the wheels support the chain with one stretch above, and the other below the bed plate, said stretches being substantially parallel with the driving-shaft.

Fixed to the chain are bag carriers 27, having guide-engaging flanges 28 at their bases, and chain-engaging ears 29, connected by rivets 30 with links of the chain. The carriers 27 on the upper and lower stretches of the chain, preferably abut against each other, as shown by Figure 1. The carriers on the upper stretch are guided between the sprocket wheels by a fixed horizontal guide, composed of spaced apart bars 31, on the bed plate, and provided with grooves 32, which receive carrier flanges 28, when the flanges after rounding the sprocket wheel 26, become horizontal and in line with the guide groove, the flanges moving endwise into the grooves.

The chain and carriers are moved step-by-step by mechanism which may include a Geneva movement, comprising a disk 34, having studs 35, shown by dotted lines in Figure 1, a cam 36, fixed to the disk and having reentrant curved faces 37, and a cam 38, fixed to a driven shaft 39, carrying the sprocket wheel 25, and having radial slots

40, cooperating with the studs 35, and reentrant curved faces 41, cooperating with the cam 36. The disk 34 is fixed to a shaft 42, continuously driven by connections hereinafter described, with the driving-shaft, the disk imparting in a well known manner a step-by-step movement to the sprocket chain, so that each carrier 27 on the upper stretch of the chain is held successively at five different stations. When at the first or bag-receiving station, the carrier cooperates with a bag raceway, a picker which partly opens the foremost bag in the raceway, and removes it from the raceway, and with mechanism for opening and closing the carrier jaws, so that a bag is transferred to, and grasped by the jaws. When at the second or bag-filling station, the carrier presents the bag to charge-delivering mechanism whereby it is filled. When at the third or bag-gumming station, the carrier presents the filled bag to gumming mechanism. When at the fourth or creasing station, the carrier presents the bag flap to creasing mechanism. When at the fifth station, the carrier presents the bag to closing mechanism, organized to also discharge the bag from the machine. The chain-driving sprocket wheel 25, and the mechanisms which cooperate with the carriers 27, at the several stations, are operated by the driving shaft 22, through suitable connections.

We will next describe in detail one of the carriers and the mechanism which cooperates therewith at the receiving station.

The carrier 27, shown by Figures 8 to 11, is a rectangular shallow box-shaped block, upstanding from the upper stretch of the chain, and is provided with two pairs of bag-gripping jaws projecting from its outer side, one pair being composed of jaws 47 and 48, and the other of jaws 47^a and 48^a, which are adjustable toward and from the jaws 47 and 48. Said jaws are arranged to project into the delivering end of a bag raceway or magazine 45, in which a detachment of bags 44 is yieldingly pressed toward the delivering end, this end being located at the bag-receiving station, and provided with pointed studs 46 (Figures 3 and 4), which arrest the foremost bag at the delivering end, and permit the removal of the bag by a lateral pull thereon, causing its vertical edges to yield and pass across the studs.

The jaws 47 and 48 are non-adjustable and are mounted on a fixed ear 50, at one edge of the carrier, and the jaws 47^a and 48^a are adjustable and are mounted on an oscillatory lever 51, pivoted at 52 to the carrier, and yieldingly pressed by a spring 53 away from the non-adjustable jaws 47 and 48, against a fixed stop 54, when the jaws are receiving a bag of maximum width. The adjustable jaws may be arrested by an adjustable stop 55, in position to receive a narrower bag, said stop being an ear on a plate 56, secured to the carrier by screws 57, passing through a slot 58 in the plate. The adjustable stop is shown in its inoperative position by Figure 8, and by full lines in Figure 11, and in an operative position by dotted lines in Figure 11.

The jaws 47 and 47^a are the outer ends of tubes or guides 59, one fixed to the ear 50, and the other to the lever 51. The jaws, 48 and 48^a are shoulders or ears on the outer ends of studs or slides 60, which are movable endwise in the guides, and are yieldingly held by springs 61, to close one jaw on the other, or on a bag edge interposed between the jaws. The outer jaw of each pair is therefore spring-pressed toward the inner jaw. The slides 60 are automatically moved to open the jaws for the reception of a bag, by mechanism including a rock-shaft 62 (Figure 4), journaled in a fixed bearing 63, arms 64, 64 and 65 fixed to the rock shaft, the arm 65 having a trundle-roll 66, and being pressed in one direction by a spring 67 and a cam 68 on the driving-shaft, formed to cooperate with the spring in oscillating the arms and the rock-shaft. When the carrier is at rest at the receiving station, the jaw-carrying slides 60 are in the paths of the arms 64. Said arms are oscillated alternately to move the slides 60, to open the outer jaws 48 and 48^a, and permit the closing of said jaws by the springs 61.

The raceway 45 is fixed to an oscillatory lever 69, pivoted at 70, and oscillated by a cam 71 (Figure 4) on the driving shaft, a rocker-arm 72, pivoted at 73, and having a trundle-roll 74, a rod 75, connecting the lever 69 with the rocker-arm 72, and a spring 76 exerting pressure on the lever 69 to hold the trundle-roll 74 against the cam 71. The magazine is automatically projected toward and retracted from the carrier by this mechanism.

77 represents a vertically reciprocating picker blade, connected by an arm 78 to a slide 79, movable vertically in a fixed guide 80. The slide and picker blade are reciprocated by an arm 81, pivoted at 82 to a fixed support 83, and provided with a trundle-roll 84, and a cam groove 85, in a disk on the driving-shaft. The foremost bag in the raceway 45 is held in the path of the picker blade by the stops 46, when the raceway is projected. When the blade is raised, its lower end portion bears on the upwardly projecting flap 44^a (Figure 4^a) at the upper end of the bag. The descent of the blade causes it to enter the bag and separate the sides thereof, the blade having a protuberance 77^a on one side, formed to bulge the outer side of the bag outward, and thus draw the edges of the bag slightly

toward each other, so that when the raceway is retracted, the bag stops 46 on the raceway, slip easily across the edges of the bag, leaving the latter supported entirely by the blade.

The outer jaws 48, 48ª on the carrier are moved forward, after the blade descends, and brush across the edges of the bag, leaving said edges between the outer and inner jaws. The outer gripper jaws 48 and 48ª are then released and close on the edges of the bag, which is now firmly clamped against the jaws 47, 47ª, preparatory to being moved by the carrier to the filling station.

After the picker blade rises from the bag, the carrier is moved forward to the filling station, and comes to rest with the bag under a delivering chute 87 (Figure 2), to which a charge is delivered at a predetermined time, by a hopper 88, having automatic charge-segregating and releasing means, arranged to deliver charges to the chute at predetermined intervals. Before a charge is delivered to the bag now under consideration, the adjustable jaws 47ª, 48ª are moved toward the non-adjustable jaws 47, 48, sufficiently to bulge the sides of the bag outward, and thus ensure the entrance of the charge into the mouth of the bag, without spilling. This movement of the adjustable jaws is caused by a wedge 89, carried by one arm of a lever 90, which is fulcrumed at 92 (Figure 2), and has a trundle-roll 93 on the other arm, held by a spring 94 against a cam 95 on the driving-shaft. As shown by Figures 12 and 13, the inclined face of the wedge 89 is normally below the slide 60, carried by the lever 51. Before the charge is delivered, the wedge is raised, as shown by Figure 13ª, and its inclined face bears on the slide 60, on the lever 51, and swings said lever toward the non-adjustable jaws, as indicated by dotted lines in Figures 11 and 13ª, thereby adequately opening the mouth of the bag, as shown by Figure 2.

Before the carrier moves forward to the gumming station, the wedge drops and the adjustable jaws are moved by the spring 53 away from the non-adjustable jaws to exert tension on the mouth portion of the bag between the two pairs of jaws, and thus flatten the sides of the mouth portion preparatory to the closing operation.

The mouth of the bag having been drawn taut, and straightened as above described, at the filling station, the carrier moves forward to the gumming station, where, as shown by Figure 5, the flap 44ª is interposed between the outer edge of a fixed horizontal flange 97, and a movable ear or back stop 98. The flange 97 projects forward from a gum tank 99, containing a gum-raising roll 99ª, which is journaled in bearings on the tank and is driven by the driving-shaft through connections including a sprocket wheel 100, a chain 101, a shaft 102, having a sprocket wheel 103, and a gear 104, and an intermediate gear 105, connecting the gear 104 with a gear 106 on the gum roll. 107 represents an idle gum-transferring roll, which is oscillated laterally to contact alternately with the roll 99ª, and with the portion of the flap 44ª which is backed by the ear 98. The transferring-roll is journaled in arms 108, carried by a rock-shaft 109, journaled in fixed bearings, and provided with an arm 110, having a stud 111, engaging one end of a rod 112. The other end of said rod has a slot in which is a sliding block 113, engaged with a wrist-pin 114, on a rotating wheel, in this instance the sprocket wheel 103. The revolution of the wrist-pin reciprocates the rod 112, and the latter oscillates the rock-shaft 109, and imparts a lateral oscillating movement to the transferring-roll 107, which is thus caused to first contact with and be rotated by the gum roll 99ª, until its periphery is coated with gum, and then contact with the upstanding bag flap 44ª, and apply gum thereto. To enable the transferring-roll to contact yieldingly with the gum roll and the flap, springs 113ª are interposed between the block 113 and the ends of the slot in which it slides.

The transferring roll preferably has peripheral grooves 107ª, so that it has spaced apart peripheral portions, adapted to apply spots of gum to the flap. The back stop 98 is preferably provided with slots 98ª, coinciding with the peripheral portions of the transferring-roll, so that the back stop will not be gummed, if the roll moves forward when a flap is not present.

The carrier next moves to the creasing station, when the gummed flap is creased and partly bent over preparatory to being folded against one side of the bag, to complete the closing and sealing of the bag.

While the carrier is moving to the creasing station, the now upright flap 44ª is bent inward from the position shown by Figure 5, to that shown by Figure 6, by the conjoint action of a fixed creasing blade 117, on a fixed support 117ª, and a presser 119, having an inclined tapering lip 120. The presser is supported by a movable bar 121, which also supports and moves the back stop 98 (see Figure 1). The bar is moved to impart the above-described movements to the back stop, and to move the presser as presently described, by the mechanism shown by Figure 6, and including an oscillatory arm 122, pivoted at 123 to a fixed support, a bell-crank lever 124, mounted to oscillate on a fixed stud 125, an oscillatory arm 126, pivoted at 127, to a fixed support, and provided with a trundle-roll 128, pressed by a spring 129 against a cam 130, on the driving-shaft. The bell-crank lever 124 is

connected by a rod 131, with the free end of the lever 122, and by a rod 132 with the free end of the lever 126. The bar 121 is pivoted at 127 to the lever 122, and is pressed yieldingly against the blade 117 during the creasing operation by a spring 128. The described mechanism is organized to move the presser, both crosswise and toward and from the edge of the creasing blade, the presser being moved from the position shown by Figure 6[a], to that shown by Figure 6, to bend the flap 44[a] over the creasing blade, and press it against the creasing edge, thus forming the crease 44[b], indicated by the dotted line in Figure 4[a].

The presser lip 120 acts to bend the flap inward over the creasing blade, while the carrier is moving to the creasing station, and before the flap is creased. The flap now stands at an angle to the plane of the bag, as indicated by Figure 6. The carrier finally moves forward to the closing and delivering station, where the flap is additionally folded, and its gummed surface is pressed against one side of the bag to seal the bag mouth.

When the carrier reaches the closing and delivering station, the creased flap occupying the position shown by dotted lines in Figure 6, is in the path of a series of pairs of flap-closing jaws, mounted on a wheel 130[a], which is fixed to a shaft 131[a], journaled in bearings in a fixed standard 132[a], at one end portion of the frame. Said wheel is rotated in the direction of the arrow Figure 7, by mechanism including a counter-shaft 133, journaled in a fixed bearing 134, and provided at one end with a bevel gear 135, meshing with a like gear 136, on the wheel shaft, and at the other end with a spur gear 137, a shaft 138 parallel with the shaft 133, and provided with a gear 139, and an intermediate gear 140, connecting the gears 137 and 139. The shaft 138 has a bevel gear 141, meshing with a like gear 142 (Figure 3), on the driving-shaft. Each pair of flap-closing jaws includes a tangentially arranged inner jaw 143, seated on a face 144 on the perimeter of the wheel, and an outer jaw 145, connected by a hinge 146, with the inner jaw. The wheel is hollow, and is formed internally to enclose a stationary cam 147 on the perimeter of which run trundle-rolls 148, journaled in arms 149, which are fixed to the outer jaws, and pass through slots 150 in the inner jaws. Springs 151 interposed between the inner jaws, and shoulders on the arms 149, serve to press the rolls 148 against the cam and close the outer jaws on the inner jaws when the rolls reach the recessed portion of the cam.

When the carrier is at rest, at the closing station, its jaws support the bag in the path of a pair of flap-closing jaws, which are opened, the jaws being opened when approaching the bag, as shown by Figure 7[a], then closing and pressing the flap against the side of the bag, as shown by Figure 7[b], and remaining closed until the bag is removed from the carrier jaws, and carried by the revolution of the flap-closing jaws into an inclined chute or guide 152. The flap-closing jaws, therefore perform two functions, one being the closing of the flap, and the other the ejection of the bag from the machine. The cam 147 is formed to force the outer jaws 145 outward and release the bag when the latter has been moved sufficiently outward from the carrier to slide down the chute.

The carrier jaws are opened to release the bag, just as the flap-closing jaws take control of the bag, so that there is no resistance to the removal of the bag from the carrier. To this end there is provided a bar 154 (Figure 7), arranged to bear simultaneously on the slides 60 of the carrier jaws, when the latter is at the closing station. Said bar is moved edgewise toward and from the carrier by a rocker-arm 155, to which the bar is attached, said arm being pivoted to swing on the fixed stud 125, and provided with an ear 156, which is pivoted to the rod 132, forming a part of the presser-operating mechanism. When the bar 154 is moved against the slides 60, the outer carrier jaws 48, 48[a] are forced outward, and release the bag. When the bar is moved in the opposite direction, the said jaws close upon the jaws 47, 47[a], and remain closed until the carrier is returned by the chain to the receiving station.

Returning to the filling station, it may be said that any suitable mechanism may be provided for delivering measured charges to the chute 87, when a carrier is in position to hold an opened bag under the chute. The mechanism here shown for this purpose includes the hopper 88, and is organized as next described. The hopper is fixed to an inclined shaft 158, which is connected by bevel gears 159 and 160 with a shaft 161, having a worm gear 162 meshing with a worm 163, on the driving-shaft. The said shafts are journaled in bearings in a fixed bracket 164. A non-rotating cam 165 is fixed to said bracket, the contour of the groove of said cam being shown by dotted lines in Figure 14. The hopper 88 is provided in its inclined bottom with short tubes 166, open at both ends, their upper ends being flush with the upper surface of the hopper bottom. Said tubes constitute the walls of charge-measuring cups, the bottoms of which are formed by valves 177, adapted to slide across the lower ends of the tubes and open and close the same. The valves are operated by the fixed cam 165, and by levers 178, having trundle-rolls 179, running in the groove of said cam. The valves are pro-

vided with stems 177ª, fixed to offset portions of the levers, as shown by Figure 14.

The levers are connected by pivot screws 180, with the bottom of the hopper 88. The arrangement is such that each tube is closed by its valve, until it is in delivering position over the chute 87, the valve, and the lever which supports it, being then swung inward by the cam 165, as shown at the left in Figure 14. When a tube has delivered a charge and is moved away from the chute, the cam closes the valve, which remains closed until the tube returns to its position over the chute.

The valves have a wiping contact with the lower ends of the tubes, preventing adhesion of the charge material to said lower ends and to the valves. 182 (Figure 2), represents a brush mounted on a shaft on spindle 183, and adapted to level off the charges of material taken in by each cup from the hopper, before the cup reaches its delivering position. The brush spindle is driven by a belt 184, running on a pulley 185, on the driving-shaft, and a pulley 186 on the brush spindle, said belt running also on an idle guiding pulley 187.

It will now be seen that the course of a bag through the machine, and the operation of the series of mechanisms thereon is as follows:

The picker blade being raised, the raceway is projected to press the flap of the foremost bag against the blade. The blade descends with the bag, separating its sides and reducing the distance between its vertical edges, so that when the raceway is retracted, its bag stops slip easily across the edges of the bag, leaving the latter on the blade. A carrier is held by the chain at the receiving station while the picker blade is descending, and its grippers engage the vertical edges of the bag near their upper ends, while the bag is on the depressed blade. After the bag is thus secured to the carrier, the blade rises and the carrier is moved forward to the filling station. The adjustable carrier jaws are moved toward the non-adjustable jaws, when the carrier reaches the filling station, and thus bulge the sides of the mouth portion of the bag outward. The bag is filled while at rest at the filling station, and before the carrier is again moved forward, the adjustable carrier jaws are moved away from the non-adjustable jaws to straighten the sides of the mouth portion of the bag, and prepare the flap for gumming.

The carrier is next moved forward to the gumming station, and when it is at rest thereat, the back stop is moved inward against the flap and spots of gum are applied to the flap by the gum-transferring roll while the flap is supported by the back stop. The transferring-roll and the back stop now move in opposite directions from the flap, and the carrier is moved forward to the creasing station, where the gummed flap is creased and partly folded, by the conjoint action of the creasing blade and the presser, the latter moving upon the bag flap, and pressing it against the creasing blade, after the carrier comes to rest at the creasing station. The presser is then moved away from the creased flap, and the carrier is moved forward to the closing and delivering station, where it holds the flap in the path of the revolving flap-closing jaws. The carrier jaws, which up to this point, have gripped the bag, are opened to release the bag, when control is taken of the bag by said revolving jaws.

We have heretofore referred to the chain 24 as a belt, and although this member is preferably composed of links adapted to engage sprocket wheels, it is obvious that it may be otherwise constructed to be positively driven step-by-step. To enable the carrier jaws to enter the delivering end of the raceway, when the latter is projected, we provide the sides of the raceway with recesses 45ª, formed to receive the jaws, as shown by Figure 4.

The carrier jaws are located at the outer portions of the carriers, so that a bag is grasped by the jaws at points above the center of gravity of the bag and its charge, the body of the bag and the charge being suspended from the jaws, and free from liability to be accidentally displaced sidewise. In case a bag is not present at the filling station when the charge is liberated thereat, the charge is conducted forward and downward by a fixed spillway 190, arranged as shown by Figures 1 and 2.

The horizontally guided belt, the series of operating mechanisms arranged in tandem order at the several stations, the driving-shaft, arranged substantially parallel with the upper stretch of the belt, and the operating connections extending transversely between the driving-shaft and the series of mechanisms constitute a simple and compact machine, adapted to operate accurately, and with reasonable rapidity.

We claim:

1. A bag-filling machine comprising, in combination, an endless belt, means maintaining an upper stretch of the belt in a substantially horizontal position, said means including spaced apart wheels engaging the belt, and a fixed guide between said wheels supporting the upper stretch, jaw-carriers fixed to the belt, bag-engaging jaws supported by said carriers and arranged in groups, each group arranged to engage a bag, the carriers and jaws on the upper stretch of the belt being maintained in a predetermined path by said guide, a driving-shaft substantially parallel with the guide,

operating mechanism connecting the driving-shaft with one of said wheels, and organized to impart a step-by-step movement to the belt, the arrangement being such that each jaw-carrier on the upper stretch is held successively at a series of stations, the first of which is a bag-receiving station, a bag-supplying mechanism organized to engage a bag with the jaws at the receiving station, operating connections between said supplying mechanism and the driving-shaft, a series of following mechanisms organized to cooperate successively with a bag held by the jaws at the other stations, to fill, gum, crease and close, the engaged bag, and operating connections between said mechanisms and the driving shaft.

2. A bag-filling machine substantially as specified by claim 1, the said carriers projecting upward from the upper stretch of the belt, and their jaws being located at the upper portions of the carriers, so that the center of gravity of a filled bag is below the jaws.

3. A bag-filling machine substantially as specified by claim 1, the said supplying mechanism including means for opening the jaws to cause them to grasp a bag between them, and the said closing mechanism including means for opening the jaws to release a bag.

4. A bag filling machine substantially as specified by claim 1, the said bag-supplying mechanism comprising a vertically reciprocating picker blade, a longitudinally reciprocating bag raceway, having bag stops at its delivering end, and held alternately with its delivering end in the path of the picker blade, and retracted from said path, and means for opening the jaws to permit their engagement with a bag detached from the raceway by the picker blade.

5. A bag-filling machine substantially as specified by claim 1, the said bag-supplying mechanism comprising a vertically reciprocating picker blade, a longitudinally reciprocating bag raceway, having bag stops at its delivering end, and held alternately with its delivering end in the path of the picker blade, and retracted from said path, and means for opening the jaws to permit their engagement with a bag detached from the raceway by the picker blade, the delivering end of the raceway being recessed to receive the carrier jaws when the raceway is projected.

6. A bag-filling machine substantially as specified by claim 1, each of said carriers comprising a rigid block fixed at one edge to the said belt, and provided at its outer portion with two pairs of jaws, each including an inner jaw, which is immovable crosswise of the carrier, and a spring-pressed outer jaw, which is movable crosswise of the carrier, and is provided with a slide whereby it may be opened, the said operating mechanism at the receiving station including means for moving the slides simultaneously to open the jaws preparatory to the engagement of a bag therewith.

7. A bag-filling machine substantially as specified by claim 1, each of said carriers comprising a rigid block fixed at one edge to the said belt, and provided at its outer portion with two pairs of jaws, each including an inner jaw, which is immovable crosswise of the carrier, and a spring-pressed outer jaw, which is movable crosswise of the carrier, and is provided with a slide whereby it may be opened, the said operating mechanism at the receiving station including means for moving the slides simultaneously to open the jaws preparatory to the engagement of a bag therewith, one pair of jaws being non-adjustable, and the other pair adjustable toward and from the non-adjustable jaws, the carrier being provided with means for movably supporting the adjustable jaws, and the said operating mechanism including means for moving the adjustable jaws to alternately bulge and straighten the sides of the engaged bag.

8. A bag-filling machine substantially as specified by claim 1, each of said carriers comprising a rigid block fixed at one edge to the said belt, and provided at its outer portion with two pairs of jaws, each including an inner jaw, which is immovable crosswise of the carrier, and a spring-pressed outer jaw, which is movable crosswise of the carrier, and is provided with a slide whereby it may be opened, the said operating mechanism at the receiving station including means for moving the slides simultaneously to open the jaws preparatory to the engagement of a bag therewith, one pair of jaws being non-adjustable, and the other pair adjustable toward and from the non-adjustable jaws, the carrier being provided with means for movably supporting the adjustable jaws, and the said operating mechanism including means for moving the adjustable jaws to alternately bulge and straighten the sides of the engaged bag, the carrier being provided with an adjustable stop for limiting the separation of the adjustable from the non-adjustable jaws, in accordance with the width of the bag.

9. A bag-filling machine substantially as specified by claim 1, the said filling mechanism including a rotary hopper, located at the filling station, and provided with a series of cups, each formed by an open tube and by a valve in sliding contact with one end of the tube, the arrangement being such that the cups are brought successively to a delivering position over a bag held at the filling station, the hopper being rotated by the driving-shaft through the operating connections at the filling station, and mecha-

nism actuated by the rotation of the hopper for opening and closing said valves, each valve being opened when the cup, of which it forms a part, is in delivering position.

10. A bag-filling machine substantially as specified by claim 1, the mechanism at the gumming station including a gum tank, having a partially exposed gum-raising roll, located at the inner side of the bag flap held at the gumming station, a laterally movable back stop, located at the opposite side of said flap, and a laterally movable gum-transferring roll adapted to contact alternately with the gum-raising roll and with a flap backed by said stop, the operating connections with the driving-shaft, at the gumming station, being organized to reciprocate the transferring roll and the back stop laterally.

11. A bag-filling machine substantially as specified by claim 1, the mechanism at the gumming station including a gum tank, having a partially exposed gum-raising roll, located at the inner side of a bag flap held at the gumming station, a laterally movable back stop, located at the opposite side of said flap, and a laterally movable gum-transferring roll adapted to contact alternately with the gum-raising roll, and a flap backed by said stop, the operating connections with the driving-shaft, at the gumming station being organized to reciprocate the transferring roll and the back stop laterally, and including means for pressing the transferring roll yieldingly against the gum-raising roll and against the flap.

12. A bag-filling machine substantially as specified by claim 1, the mechanism at the gumming station including a gum tank, having a partially exposed gum-raising roll, located at the inner side of a bag flap held at the gumming station, a laterally movable back stop, located at the opposite side of said flap, and a laterally movable gum-transferring roll adapted to contact alternately with the gum-raising roll, and a flap backed by said stop, the operating connections with the driving-shaft at the gumming station being organized to reciprocate the transferring roll and the back stop laterally, the transferring roll being peripherally grooved to apply gum in spots, and the back stop being slotted to prevent contact with the transferring roll, in the absence of a bag flap.

13. A bag-filling machine substantially as specified by claim 1, having a creasing station, the mechanism thereat including a fixed creasing blade, located at the inner side of a bag flap held at the creasing station, a presser located above the creasing blade and at the outer side of said flap, the operating connections with the driving-shaft at the creasing station being organized to move the presser laterally crosswise of the creasing blade, and downward toward the edge of said blade to partially bend the flap and then crease the same.

14. A bag-filling machine substantially as specified by claim 1, having a bag-closing and delivering station, the mechanism thereat including a wheel rotated by operating connections with the driving-shaft, in a plane substantially at right angles to the plane in which a bag is held at said station, and provided with a series of tangentially arranged inner jaws, a series of swinging outer jaws hinged to the inner jaws, and means operated by the rotation of the wheel to alternately open and close the jaws, a creased and partly bent flap being supported in the path of said jaws, and the arrangement being such that the jaws are open when approaching the flap, and encounter and close upon the flap to press the latter against the side of the bag, and thus complete the closing operation, the operating mechanism including means for opening the carrier jaws at the closing and delivering station, so that the movement of the jaws closed on the flap, removes the bag from the carrier.

In testimony whereof we have affixed our signatures.

JOHN D. LANE.
JAMES MACNAUGHTAN