

April 17, 1951

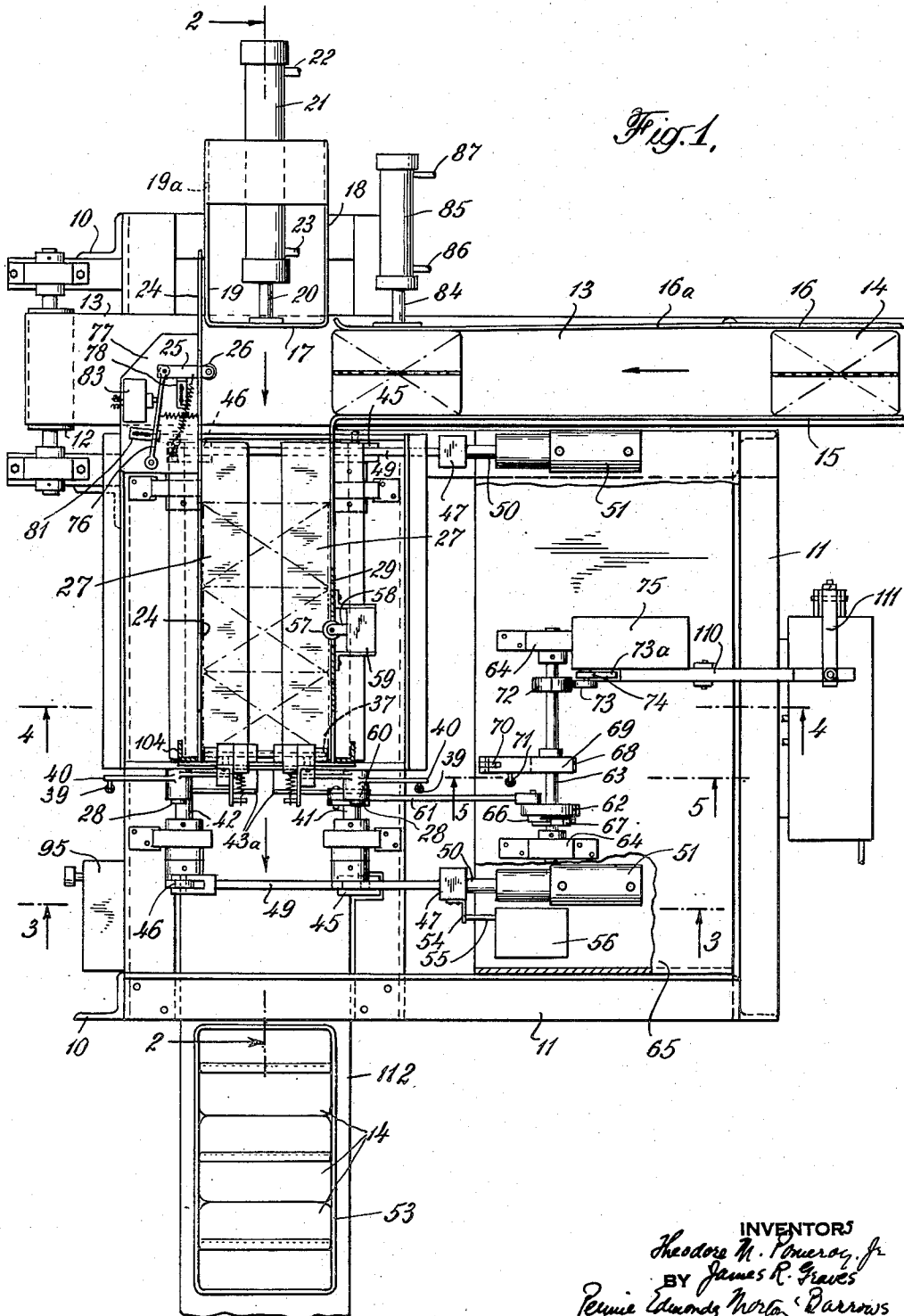
T. M. POMEROY, JR., ET AL

2,549,004

PACKING MACHINE

Filed Aug. 14, 1948

5 Sheets-Sheet 1



INVENTORS
Theodore M. Pomroy, Jr.
BY James R. Graves
Percie Edwards Norton & Darrows
ATTORNEYS

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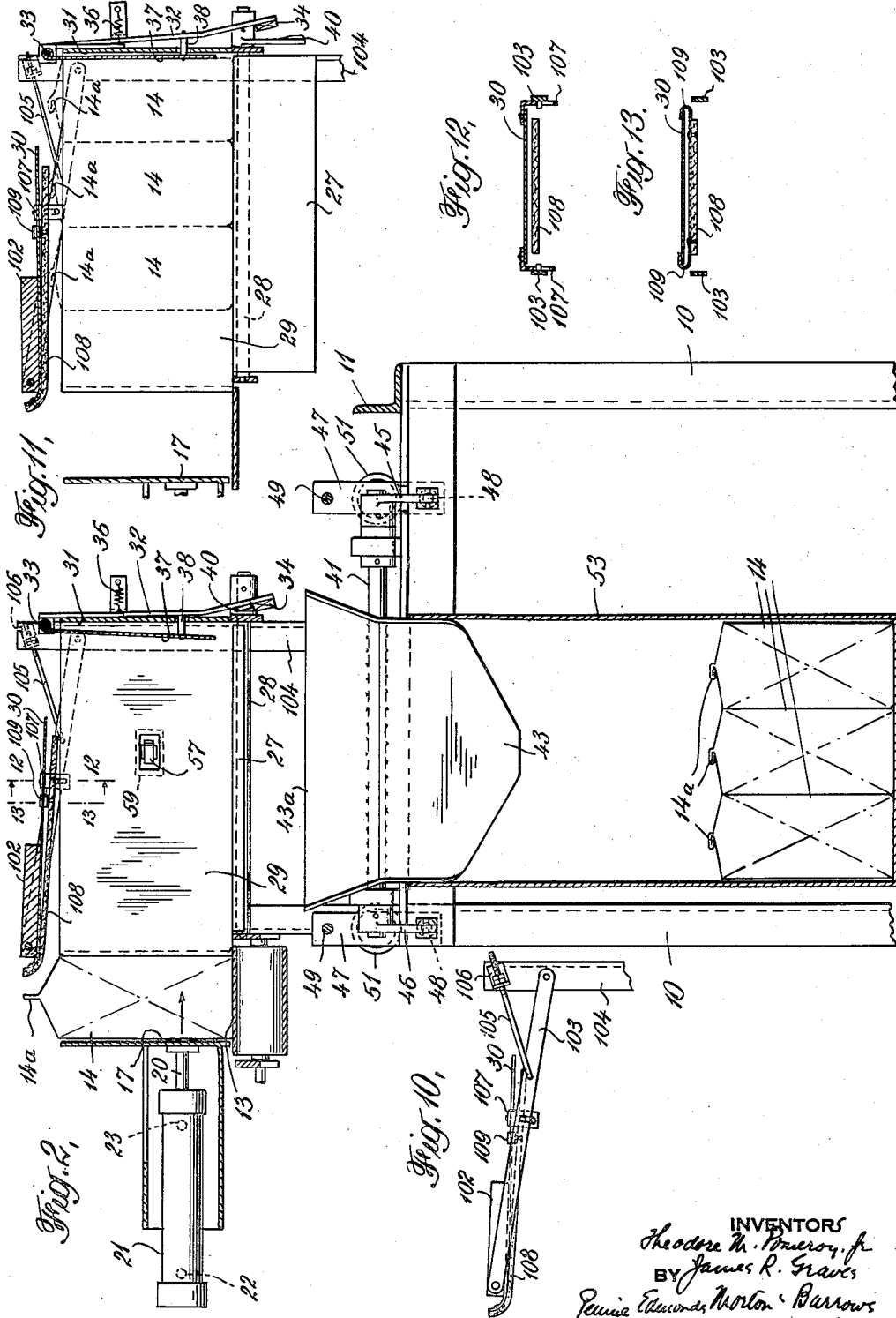
T. M. POMEROY, JR., ET AL

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PACKING MACHINE

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5 Sheets—Sheet 2



INVENTORS
Theodore M. Pomroy, Jr.
BY James R. Graves
Percie Edwards, Morton Barrows
ATTORNEYS

April 17, 1951

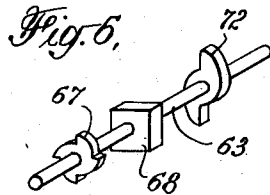
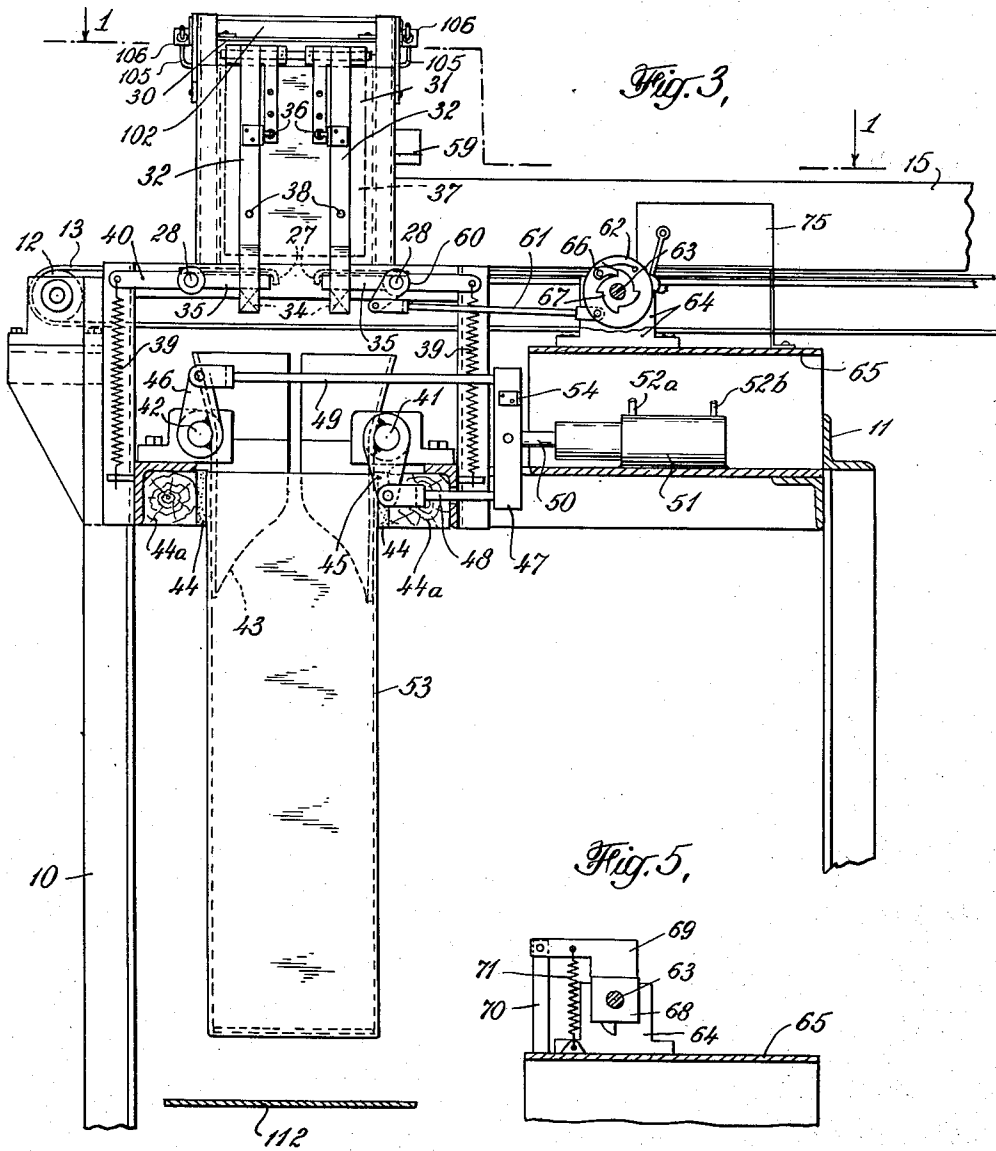
T. M. POMEROY, JR., ET AL

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PACKING MACHINE

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5 Sheets-Sheet 3



INVENTORS
Rodore M. Pomeroy, Jr.
BY James R. Graves
Russell Edwards, Mortimer Barrows
ATTORNEYS

April 17, 1951

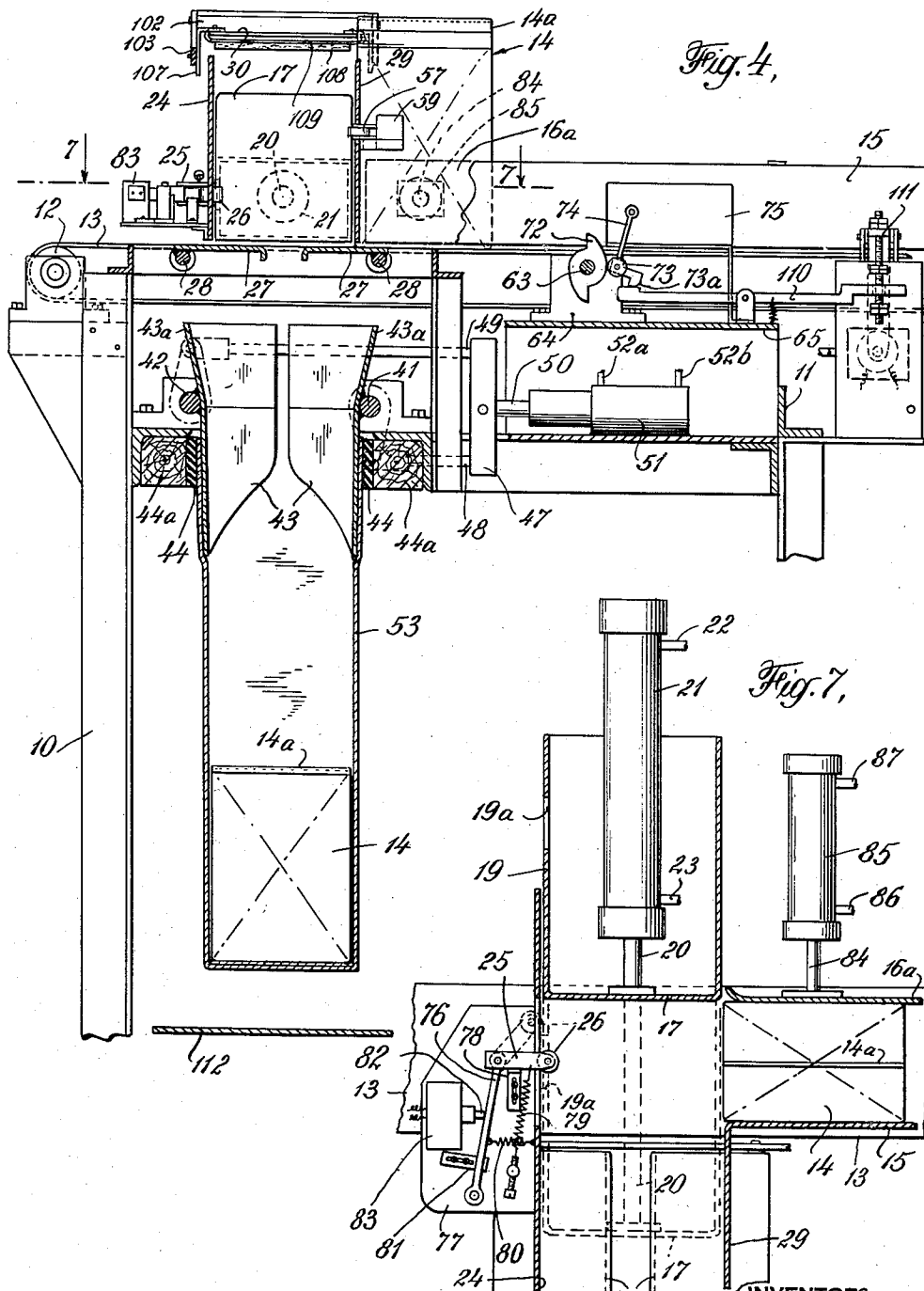
T. M. POMEROY, JR., ET AL

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PACKING MACHINE

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5 Sheets-Sheet 4



INVENTORS
Theodore M. Pomeroy Jr.
BY James R. Graves
Pennie Edmunds Morton Barrows
ATTORNEYS

April 17, 1951

T. M. POMEROY, JR., ET AL

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PACKING MACHINE

Filed Aug. 14, 1948

5 Sheets-Sheet 5

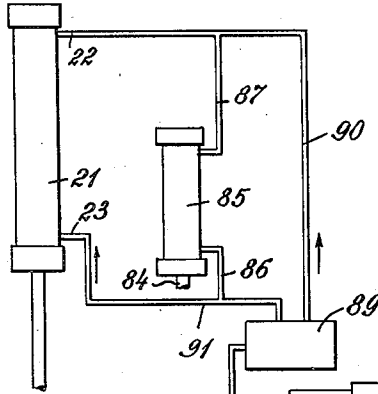


Fig. 8,

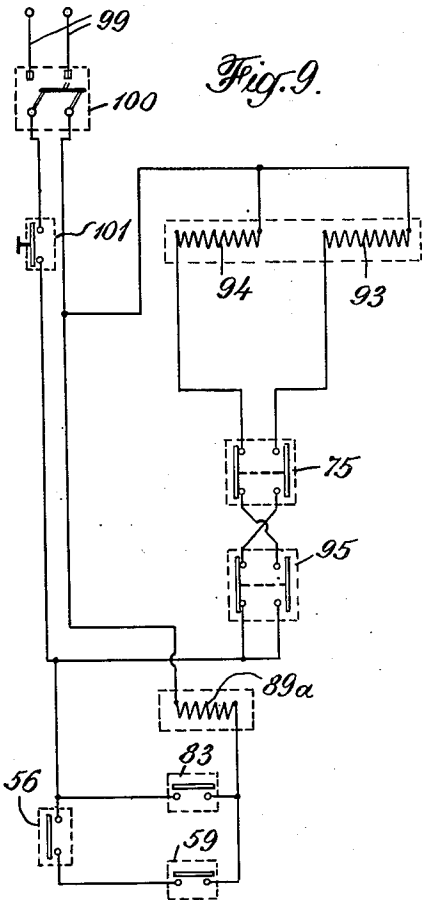
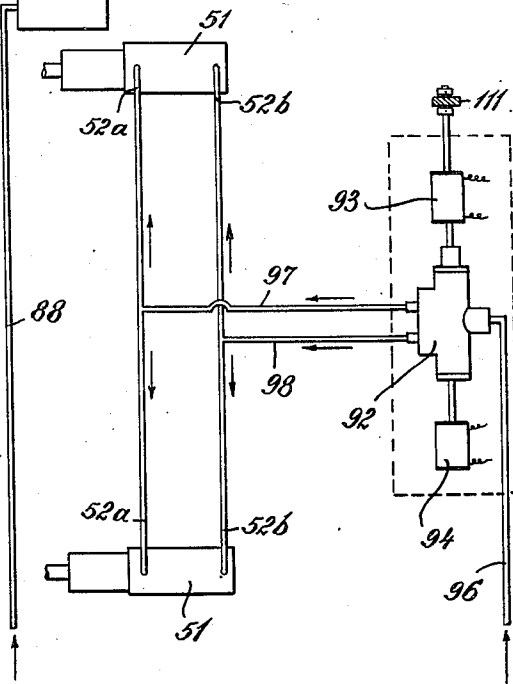


Fig. 9.



INVENTORS
Theodore M. Pomroy, Jr.
BY James R. Travis
Lucius Edmunds, Morton Barrons
ATTORNEYS

UNITED STATES PATENT OFFICE

2,549,004

PACKING MACHINE

Theodore M. Pomeroy, Jr., Pelham, N. Y., and
James R. Graves, Ellicott City, Md., assignors
to The American Sugar Refining Company,
New York, N. Y., a corporation of New Jersey

Application August 14, 1948, Serial No. 44,246

14 Claims. (Cl. 226—19)

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This invention relates to machines for packing articles into containers, such as bags, and is concerned more particularly with a novel machine, which assembles articles delivered thereto and packs groups of the assembled articles into close fitting containers. The new machine operates with a low power consumption, functions with little intervention by the operator, and packs readily deformable articles into containers without causing the articles to be distorted to an objectionable degree. The machine can be employed in the packing of articles of various kinds but, since it offers many advantages when used in the packing of bags of sugar into larger shipping bags, a form of the machine suitable for that application will be illustrated and described in detail for purposes of explanation.

At the present time, it is the common practice to package sugar for retail distribution in paper bags containing an amount of sugar, such as ten pounds, these bags being then packed for shipment in a larger bag called a "bundle cover." Such a bundle cover is ordinarily a multi-wall bag of strong paper, and a bundle cover holds different numbers of sugar bags depending on their size, as, for example, one bundle cover now in use holds six 10 lb. bags arranged in upper and lower rows of three. As it is desirable that the bundle cover fit tightly against the bags to protect them against too severe distortion during shipment, the packing of a charge of bags into a bundle cover presents numerous problems.

Machines for packing articles into bags or other containers have been made heretofore in many forms, but the prior available machines have not been wholly satisfactory for packing sugar bags into bundle covers. Such prior machines ordinarily operate to push a group of bags horizontally into a cover and, because of the weight of the material handled and the close fit of the cover, the machines consume much power and the bags are caused to bulge objectionably by the forces applied to them during packing.

The present invention is, accordingly directed to the provision of a novel bag packing machine, which overcomes the objections to prior bag packers and operates efficiently and with little distortion of the articles being packed. The machine, in a form suitable for packing sugar bags into bundle covers, receives the bags delivered thereto on a conveyor and pushes the bags successively from the conveyor along a movable floor extending laterally from the conveyor. The bags are pushed along the floor by a plunger, which

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advances each bag only part way along the floor, so that succeeding bags engage and push the bags lying ahead of them. The bags are thus assembled in a group on the floor with the bags in the group lying in contact in a row. The bundle cover to receive the bags is suspended beneath the floor and, when enough bags to form a row in the bundle cover have been placed upon the floor, the leading bag operates means releasing the floor, so that it swings aside and the group of bags descends by gravity past the floor and into the cover. The floor is then automatically restored to its initial position and another row of bags is advanced thereon. When the floor has been swung a selected number of times to discharge bags into the cover, the filled cover is automatically released from the suspending means and a new cover is then placed in position by the operator. During this operation, the machine continues to function but means are provided for preventing the discharge of bags from the floor, in the event that an empty cover is not mounted in place after a filled cover has been released.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which:

Fig. 1 is a sectional view of the new machine on the line 1—1 of Fig. 3;

Figs. 2, 3, 4, and 5 are sectional views on the lines 2—2, 3—3, 4—4, and 5—5, respectively, of Fig. 1;

Fig. 6 is a view in perspective of a shaft and the parts carried thereby, which are employed in the machine;

Fig. 7 is a sectional view on the line 7—7 of Fig. 4;

Fig. 8 is a diagrammatic plan view of the pneumatic operating mechanism of the machine;

Fig. 9 is a wiring diagram;

Fig. 10 is a view in side elevation of means for flattening the tops of bags on their way to the bundle cover;

Fig. 11 is a fragmentary sectional view on the line 2—2 of Fig. 1, showing the parts in different positions; and

Figs. 12 and 13 are sectional views on the lines 12—12 and 13—13, respectively, of Fig. 2.

The machine illustrated in the drawings includes a supporting framework including vertical and horizontal frame members 10, 11. A pulley 12 is mounted in bearings at the top of the framework at one side and a conveyor belt 13 is trained about the pulley. The belt advances the filled sugar bags 14 to the packing station

and the bags on the belt are guided between vertical walls 15, 16 lying at opposite sides of the belt. The wall 16 has an end section 16a, which is mounted to swing on a vertical axis and may be moved inwardly over the belt to hold back bags carried thereby.

The bags carried by the belt are advanced into position in front of a plunger, which includes a front wall 17 and side walls 18, 19. The front wall is mounted on a rod 20 connected to a piston within a cylinder 21, which can be supplied with compressed air at its opposite ends through connections 22, 23. A vertical wall 24 is mounted on the framework to extend across the belt 13 at the far side of the plunger, and, as a bag 14 is advanced on the belt, it strikes the wall 24 and comes to rest in front of the plunger. The end of a switch arm 25 provided with a roller 26 extends through an opening in wall 24 and, as the bag approaches the wall, it engages the roller and pushes the switch arm ahead of it. The movement of the switch arm causes compressed air to be supplied to cylinder 21 through connections 22 and the piston moves to force the rod 20 and the plunger across the belt, the plunger pushing the bag ahead of it.

A pair of gates 27 (Fig. 4) are attached along their edges to parallel horizontal shafts 28 journaled on the framework and the gates extend toward one another to form a movable floor, along which the bag 14 is pushed by the plunger. In its movement along the gates, the bag is guided by wall 24 and wall 29 parallel thereto. The tops of the bags disclosed have been closed by stitching and the stitched ends 14a thereof extend upwardly. It is desirable that these ends of the bags be flattened, so that the bags will pack well in the bundle cover, and, for this purpose, a weighted plate 30 engages the tops of the bags as they are moved over the floor. The mounting of plate 30 will be later described.

At the ends of the gates 27 remote from the conveyor, the side walls 24, 29 are connected by an end wall 31 and a pair of latch members 32, one for each gate, are mounted to swing on a horizontal pivot 33 at the top of wall 31. At its lower end, each member 32 is formed with a block 34, which normally lies beneath an arm 35 fast on a shaft 28, and the respective latch members are acted on by springs 36, urging them to a position in which they engage and support their associated arms with gates 27 in horizontal position. A plate 37 mounted to swing on pivot 33 lies on the inner side of wall 31 and is engaged by pins 38 carried by the latch members 32 and extending through openings in wall 31. When plate 37 is moved toward the wall, the plate acts through the pins to swing the latch members to release arms 35 on shafts 28. Each gate 27 is then held in place only by a spring 39 attached at one end to a part of the frame structure and at the other end to an arm 40 fast on the shaft 28, on which the gate is mounted.

A pair of parallel horizontal shafts 41, 42 are mounted in bearings on horizontal frame members below the gates 27 and each shaft carries a movable gripping member 43, which is of trough shape and cooperates with a fixed gripping member taking the form of a resilient facing 44 on a horizontal beam 44a attached to the frame work. Above their shafts, the upper ends of the movable gripping members are flared out, as indicated at 43a, the two movable gripping members being placed with their concave faces opposed to one another, so that the flared upper ends form

a funnel. Shaft 41 carries downwardly extending arms 45 at opposite ends, and shaft 42 carries upwardly extending arms 46 at opposite ends. A cross-bar 47 is mounted at each end of the gripping members and each cross-bar is connected by a rod 48 to the arm 45 extending downwardly from shaft 41 and by a rod 49 to the arm 46 extending upwardly from shaft 42. Each cross-bar is connected to a rod 50 attached to a piston within a cylinder 51, which can be supplied with air at opposite sides of the piston through connections 52a, 52b. When the piston is moved to push on rods 48, 49, shafts 41, 42 are rocked in one direction and the lower ends of the movable gripping members 43 move away from the fixed gripping members 44. The upper end of a bundle cover 53 may then be telescoped over the lower ends of the movable gripping members to lie between them and their respective fixed gripping members 44. When air is then admitted into the cylinders 51 to pull on rods 48, 49, shafts 41, 42 are rocked in the opposite direction and the movable and fixed gripping members cooperate to grip the bundle cover and hold it suspended.

One of the cross-bars 47 is provided with an arm 54, which cooperates with the operating member 55 of a switch 56 mounted near one end of the path of the cross-bar. When the cross-bar is so moved that the gripping members assume their gripping relation, arm 47 engages member 55 and opens switch 56. When the cross-bar is moved in the opposite direction and the gripping members become inoperative, arm 54 moves away from member 55 and switch 56 automatically closes.

The wall 29 has an opening, through which projects a roller 57 on the end of an arm 58, which operates a switch 59. The opening is so placed that, when the plunger has operated twice to move bags 14 from the conveyor upon the gates 27, the first or leading bag engages the roller 57 and forces arm 58 outwardly to close switch 59. Under certain conditions, the closing of switch 59 stops the machine with the plunger in its advanced position.

One of the shafts 28 carries an arm 60 connected by a rod 61 to a disc 62 loosely mounted on a shaft 63 supported in bearings 64 on a plate 65 carried by the framework. The disc carries a spring-pressed pawl 66, which cooperates with a ratchet wheel 67 fast on the shaft. Each time the gates 27 swing downwardly, they rock their shafts 28 and arm 60 is swung to rock disc 62. This causes the pawl 66 to move back behind a tooth on the ratchet wheel 67 and, when the gates move back to their original horizontal positions, disc 62 is rocked in the opposite direction and its pawl advances the ratchet wheel 67 and shaft 63 a quarter turn. The shaft carries a square block 68, which is engaged by the square end of an arm 69 pivoted on a standard 70 rising from plate 65, the arm being acted on by a spring 71 attached at one end to a plate 65 and at the other end to the arm. The arm 69 and block 68 insure that the shaft 63 will be held in a fixed position at the end of each step in its movement. The shaft carries a cam 72 with two high points, and the cam cooperates with a roller 73 on an arm 74, which operates a switch 75.

The switch arm 25, which extends through an opening in wall 24 with its roller 26 in position to be engaged by a bag advancing along the belt 13, is pivotally mounted on an arm 76 pivoted on a bracket 77. Arm 25 is normally held

against an adjustable stop 78 on bracket 77 by a spring 79 and arm 76 is held by a spring 80 against another adjustable stop 81 on bracket 77. Arm 76 also lies in contact with the operating member 82 of a switch 83. When arms 25 and 76 lie against stops 78 and 81, respectively, the roller 26 on arm 25 lies in the path of a bag advancing along the conveyor belt and the switch 83 is open. When a bag being carried along on the belt strikes roller 26, arm 25 moves endwise to the rear and arm 76 is swung to close switch 83. The closing of switch 83 results in movement of the plunger to push the bag laterally off the conveyor belt and upon the gates 27. The wall 19 of the plunger has an opening 19a and, when the plunger reaches the end of its movement, the opening 19a comes into registry with the opening in wall 24, through which arm 25 projects. Spring 80 then causes arm 76 to swing away from the switch member 82 and the switch, which is of the spring return type, opens. Under certain conditions, the opening of the switch causes the plunger to move back. As the trailing edge of the opening 19a in the plunger engages the roller 26 on arm 25, arm 25 is swung relatively to arm 76 but, since spring 79 is weaker than spring 80, the swinging of arm 25 does not cause arm 76 to swing and switch 83 is unaffected.

When the plunger is pushing a bag from the conveyor belt 13 upon gates 27, it is desirable to hold back any bags advancing along the belt, until the plunger has returned to its initial position. For this purpose, the swinging end section 16a of wall 16 is connected by a rod 84 to a piston within a cylinder 85 supplied with compressed air through connections 86, 87. The supply of air to cylinder 85 is controlled by the same means as the supply of air to cylinder 21, so that, when the plunger advances to push a bag from the belt upon the gates, the wall section 16a is moved across the belt to hold back any bag that may be advancing on the belt. As the plunger moves back to its initial position, wall section 16a is likewise swung back to release the bag that has been held back and the bag is then carried along on the conveyor belt into position in front of the plunger.

Compressed air is supplied to cylinders 21 and 85 from a supply line 88 controlled by an air valve 89, which is operated in one direction by a solenoid controlled by switch 83 and is operated in the reverse direction by a spring. When switch 83 is closed by the arm 76, which is in turn swung by arm 25 engaged and moved by a bag on the conveyor belt, the solenoid is energized and air is supplied through the valve to line 90, which is connected to the cylinder connections 22, 87. The pistons in cylinders 21 and 85 then move forwardly to advance the plunger and the end section 16a of wall 16. When switch 83 is opened, valve 89 is returned to its initial position by its spring and air is supplied through line 91 to the cylinder connections 23, 86. As a result, the plunger is retracted and wall section 16a swung outwardly from above the top of the conveyor belt.

The cylinders 51, which operate the bundle cover gripping members, are supplied with air through a valve 92, which is moved in one direction by a solenoid 93 controlled by switch 75 and, in the other direction, by a solenoid 94 controlled by a switch 95 mounted on the framework of the machine. Air is supplied to valve 92 through a line 96 and from the valve through

line 97 leading to cylinder connections 52a and line 98 leading to cylinder connections 52b.

Power is supplied to the packer from power lines 99 through a cut-out switch 100 and a manually operable power control switch 101. The solenoid 89a of valve 89 is in a branch circuit across the power lines and the circuit includes switches 56 and 59 in parallel with switch 83. As previously explained, switch 56 is closed, whenever the movable gripping members 43 are out of gripping relation to the stationary gripping members 44, switch 59 is closed by the leading bag, when the plunger has advanced twice to move two bags upon the gates 27, and switch 83 is closed, when a bag on the conveyor strikes roller 26 on arm 25 and moves that arm. Thus, when a bag on the conveyor closes switch 83, solenoid 89a is energized and air is supplied to cylinders 21 and 85 to move the plunger to push the bag off the conveyor and upon the gates and to move wall section 16a inwardly over the belt to hold back succeeding bags being advanced on the belt. When the plunger reaches the end of its forward movement and arm 25a passes through opening 19a on the plunger, switch 83 opens, the solenoid 89a is de-energized, and valve 89 is operated by its spring to cause air to be admitted to the cylinders 21 and 85 to cause the plunger and wall section 16a to be retracted. If, while these operations are going on, no bundle cover has been mounted in the gripping members, switch 56 remains closed and, when the plunger has functioned twice to push bags upon the gates and the leading bag engages and closes switch 59 at the end of the outward stroke of the plunger, a shunt circuit is set up through switches 56 and 59 to solenoid 89a, so that the solenoid continues to be energized, even though switch 83 is open. Accordingly, air continues to be supplied to cylinders 21, 85 through connections 22, 87 and the plunger remains at the outward end of its stroke. As the gates are not released until three bags have been advanced upon them by the plunger, the stopping of the plunger in its outward position, after it has pushed two bags along the gates, prevents bags from being discharged between the gates, when there is no bundle cover in position to receive them.

One of the power lines 99 leads to the switch 95, which is of the double pole type and the output terminals of the switch are reversely connected to the input terminals of switch 75, which is also of the double pole type. The output terminals of switch 75 are connected through the solenoids 93, 94 to the other power line 99.

The plate 30, used for flattening the tops of the bags, is secured to the under surface of a block 102. A pair of arms 103 are pivoted on uprights 104 at the ends of walls 24 and 29 and are held in proper angular position by threaded hooks 105, which engage the respective arms and extend through brackets 106 on the uprights. The block 102 is pivoted in the outer ends of the arms 103 and the plate 30 has slotted clips 107 at opposite sides, which receive pins on the arms. The plate has a leather facing 108 secured to its undersurface at its forward upturned end by rivets and held in clips 109, which overhang the edges of the plate toward its rear end. Normally, the rear end of the plate rests on top of the pins on arms 103 and, as the bags are advanced along the floor, their stitched upper ends engage the facing 108 and swing the rear end of the plate upwardly, the ends of the bags being flattened in this operation.

The motion of cam 72 acting on the operating arm 74 of switch 75 is so rapid that it is desirable to insure that the arm will be held in operating position for the time required to operate the switch. For this purpose, the arm 74 is provided with a hook 73a at its free end, which engages behind a shoulder on one end of a lever 110 mounted on plate 65, when the arm is swung by cam 72. The other end of the lever is connected to a bell crank lever 111 operated by solenoid 93, and, as soon as the solenoid is energized, it acts through the bell crank to swing lever 110, so that hook 73a is freed from the shoulder on the lever and the lever may then return to its initial position.

In the operation of the apparatus, bags are placed upon the conveyor belt in random order and brought successively in position in front of the plunger. At the start of operations, the attendant telescopes the end of a bundle cover over the lower ends of the gripping members 43 and then closes switch 95, so that the movable gripping members 43 are swung to grip the bundle cover and switch 56 is opened. When the first bag arrives in front of the plunger, it closes switch 83, and the plunger is thereby advanced to move the bag from the conveyor belt upon gates 27 and wall section 16a is swung to hold back the succeeding bags on the belt. At the end of the forward stroke of the plunger, roller 26 on arm 25 enters the opening 19a in the side wall 19 of the plunger, so that switch 83 is opened and the plunger and the wall section 16a are retracted. When the next bag comes in front of the plunger and is moved upon the gates 27, it pushes the first bag ahead of it. During this movement of the plunger, the leading bag engages roller 57 on arm 56 to close switch 59. If, at this time, a bundle cover has not been mounted in the gripping members and switch 56 is closed, the closing of switch 59 will cause the plunger to remain at the extreme end of its forward travel, until the condition is corrected by the mounting of a bundle cover in the gripping members.

When three bags have been moved upon the gates 27 by the plunger, the leading bag will release the latches 32 and the gates will be swung downwardly by the weight of the bags thereon, so that the bags will drop between the gripping members and into the suspended bundle cover. The upward return movement of the gates causes shaft 63 to be advanced a quarter turn and, when a second row of three bags has been discharged between the gates and into the bundle cover, cam 72 on shaft 63 will operate switch 75 and this will cause the movable gripping members 43 to be swung to release the suspended bundle cover. The filled cover drops upon a conveyor belt 112 and is carried away, the operator mounts an empty cover in the gripping members, and the operation of the machine continues as described.

We claim:

1. A machine for packing articles into bags, which comprises means for holding a bag in upright position with its mouth open, a movable floor above the bag mouth, a reciprocating plunger for advancing articles successively along the floor to positions above the bag mouth, the plunger advancing each article partway along the floor with succeeding articles pushing those ahead, means for delivering articles in front of the plunger to be advanced thereby, means for reciprocating the plunger, means operable by an article delivered for causing the reciprocating

means to advance the plunger and operable by the plunger near the end of its advancing movement to cause the reciprocating means to retract the plunger, and means actuated by the leading article at a predetermined position on the floor for causing the floor to move from beneath the article thereon, the articles then descending into the bag.

2. A machine for packing articles into bags, which comprises means for holding a bag in upright position with its mouth open, a movable floor above the bag mouth, a reciprocating plunger for advancing articles successively along the floor to positions above the bag mouth, the plunger advancing each article partway along the floor with succeeding articles pushing those ahead, means for delivering articles in front of the plunger to be advanced thereby, means for reciprocating the plunger, means operable by an article delivered for causing the reciprocating means to advance the plunger and operable by the plunger near the end of its advancing movement to cause the reciprocating means to retract the plunger, means for holding the floor in position to support articles thereon, and means actuated by the leading article at a predetermined position on the floor for rendering the holding means ineffective, the floor being then moved aside by the weight of the articles, which descend into the bag by gravity.

3. A machine for packing articles into bags, which comprises means for holding a bag in upright position with its mouth open, a movable floor above the bag mouth, a reciprocating plunger for advancing articles successively along the floor to positions above the bag mouth, the plunger advancing each article partway along the floor with succeeding articles pushing those ahead, a conveyor for delivering articles in front of the plunger to be advanced thereby, means operable with the plunger for preventing articles on the conveyor from being delivered in front of the plunger, means for operating the plunger and preventing means, means operable by an article delivered for causing the operating means to advance the plunger and to render the preventing means effective and operable by the plunger near the end of its advancing movement to cause the operating means to retract the plunger and render the preventing means ineffective, and means actuated by the leading article at a predetermined position on the floor for causing the floor to move from beneath the articles thereon, the articles then descending into the bag.

4. A machine for packing articles into bags, which comprises means for holding a bag in upright position with its mouth open, a movable floor above the bag mouth, a reciprocating plunger for advancing articles successively along the floor to positions above the bag mouth, the plunger advancing each article partway along the floor with succeeding articles pushing those ahead, a conveyor for delivering articles in front of the plunger to be advanced thereby, a barrier member movable with the plunger relative to the conveyor to hold back articles being conveyed thereby, means for reciprocating the plunger and barrier member, means operable by an article delivered for causing the reciprocating means to advance the plunger and barrier member and operable by the plunger near the end of its advancing movement to cause the reciprocating means to retract the plunger and barrier member, and means actuated by the leading article at a predetermined position on the floor for

causing the floor to move from beneath the articles thereon, the articles then descending into the bag.

5. A machine for packing articles into bags, which comprises means for holding a bag in upright position with its mouth open, a pair of gates mounted above the bag for swinging movement on parallel horizontal axes, means for urging the gates toward horizontal position, latch means for holding the gates in position to support articles thereon, a reciprocating plunger for advancing articles successively along the tops of the gates to positions above the bag mouth, the plunger advancing each article partway along the gates with succeeding articles pushing those ahead, means for delivering articles in front of the plunger to be advanced thereby, a member movable to restrain articles on their way to a position in front of the plunger, means for operating the plunger and restraining member, means operable by an article delivered in front of the plunger to cause the operating means to advance the plunger and move the restraining member to operative position and operable by the plunger near the end of its advancing movement to cause the operating means to retract the plunger and move the restraining member to inoperative position, and means actuated by the leading article at a predetermined position on the gates to release the latch means, the articles on the gates then swinging the gates and descending between them into the bag.

6. A machine for packing articles into bags, which comprises means for suspending a bag in upright position with its mouth open, a movable floor above the bag, means for holding the floor in position to support articles, means for advancing articles successively along the floor to positions above the bag mouth, the advancing means moving each article partway along the floor with succeeding articles pushing those ahead, means actuated by the leading article at a predetermined position on the floor for rendering the holding means inoperative, the articles on the floor then moving it aside and descending by gravity into the bag, and means operated by the movement of the floor for causing the suspending means to release the bag suspended thereby.

7. A machine for packing articles into bags, which comprises means for suspending a bag in upright position with its mouth open, a movable floor above the bag, means for holding the floor in position to support articles, means for advancing articles successively along the floor to positions above the bag mouth, the advancing means moving each article partway along the floor with succeeding articles pushing those ahead, means actuated by the leading article at a predetermined position on the floor for rendering the holding means inoperative, the articles on the floor then moving it aside and descending by gravity into the bag, and means operated by the leading article on the floor at a second predetermined position and effective, when the suspending means are in inoperative condition, to stop the advancing means.

8. A machine for packing articles into bags, which comprises means for gripping a bag at its mouth and holding it suspended in upright position with its mouth open, a pair of gates mounted above the bag for swinging movement on parallel horizontal axes, means for holding the gates in position to support articles, means for advancing articles successively along the tops of the gates to positions above the bag mouth,

the advancing means moving each article partway along the gates with succeeding articles pushing those ahead, means actuated by the leading article at a predetermined position on the gates for rendering the holding means inoperative, the articles then swinging the gates aside and descending between them by gravity into the bag, and means operated by the movement of the gates for causing the gripping means to release the bag suspended thereby.

9. A machine for packing articles into bags, which comprises means for gripping a bag at its mouth and holding it suspended in upright position with its mouth open, a pair of gates mounted above the bag for swinging movement on parallel horizontal axes, means for holding the gates in position to support articles, means for advancing articles successively along the tops of the gates to positions above the bag mouth, the advancing means moving each article partway along the gates with succeeding articles pushing those ahead, means actuated by the leading article at a predetermined position on the gates for rendering the holding means inoperative, the articles then swinging the gates aside and descending between them by gravity into the bag, and means operated by the leading article on the gates at a second predetermined position and effective, when the gripping means are in inoperative condition, to stop the advancing means.

10. A machine for packing articles into bags, which comprises fixed and movable gripping members for suspending a bag in upright position with its mouth open, a pair of gates mounted above the bag for swinging movement on parallel horizontal axes, means for holding the gates in position to support articles, a reciprocating plunger for advancing articles successively along the tops of the gates to positions above the bag mouth, the plunger in its advancing movement moving each article partway along the gates with succeeding articles pushing those ahead, a member engaged by the leading article at a predetermined position on the gates for releasing the holding means, the articles on the gates then moving the gates aside and descending by gravity into the bag, and means operated by the movement of the gates a selected number of times for causing the gripping members to release the suspended bag.

11. A machine for packing articles into bags, which comprises fixed and movable gripping members for suspending a bag in upright position with its mouth open, a pair of gates mounted above the bag for swinging movement on parallel horizontal axes, means for holding the gates in position to support articles, a reciprocating plunger for advancing articles successively along the tops of the gates to positions above the bag mouth, the plunger in its advancing movement moving each article partway along the gates with succeeding articles pushing those ahead, a member engaged by the leading article at a predetermined position on the gates for releasing the holding means, the articles on the gates then moving the gates aside and descending by gravity into the bag, and means operated by the leading article on the floor at a second predetermined position and effective, when the movable and fixed gripping means are out of gripping relation, to stop the plunger.

12. A machine for packing articles into bags, which comprises movable and fixed gripping members for suspending a bag in upright position

with its mouth open, a pair of gates mounted for swinging movement on parallel horizontal axes above the bag, means for holding the gates in position to support articles, a reciprocating plunger for pushing articles successively along the tops of the gates to positions above the bag mouth, the plunger in each forward movement moving an article partway along the gates with succeeding articles pushing those ahead, means for delivering articles in front of the plunger to be pushed thereby, means for reciprocating the plunger, means operable by an article placed in front of the plunger for causing the plunger operating means to advance the plunger and operable by the plunger near the end of its advancing movement to cause the operating means to retract the plunger, means actuated by the leading article at a predetermined position on the gates for rendering the holding means inoperative, the articles on the gates then moving them aside and descending between them by gravity into the bag, and means operated by the movement of the gates a selected number of times for causing the gripping members to release the suspended bag.

13. A machine for packing articles into bags, which comprises movable and fixed gripping members for suspending a bag in upright position with its mouth open, a pair of gates mounted for swinging movement on parallel horizontal axes above the bag, means for holding the gates in position to support articles, a reciprocating plunger for pushing articles successively along the tops of the gates to positions above the bag mouth, the plunger in each forward movement moving an article partway along the gates with succeeding articles pushing those ahead, means for delivering articles in front of the plunger to be pushed thereby, means for reciprocating the plunger, means operable by an article placed in front of the plunger for causing the plunger operating means to advance the plunger and op-

erable by the plunger near the end of its advancing movement to cause the operating means to retract the plunger, means actuated by the leading article at a predetermined position on the gates for rendering the holding means inoperative, the articles on the gates then moving them aside and descending between them by gravity into the bag, and means operated by the leading article on the gates at a second predetermined position and effective, when the gripping members are in inoperative relation, to stop the plunger at one end of its path of travel.

14. A machine for packing articles into bags, which comprises means for suspending a bag in upright position with its mouth open, a movable floor above the bag, means for holding the floor in position to support articles, means for advancing articles successively along the floor to positions above the bag mouth, the advancing means moving each article part way along the floor with succeeding articles pushing those ahead, means actuated by the leading article at a predetermined position on the floor for rendering the holding means inoperative, the articles on the floor then moving it aside and descending by gravity into the bag, and means actuated by the door upon a plurality of movements thereof to render the suspending means ineffective.

THEODORE M. POMEROY, JR.
JAMES R. GRAVES.

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