April 14, 1931. J. PELLETIER 1,800,657

BAG FILLING MACHINE

Filed Aug. 8, 1929 3 Sheets-Sheet 1

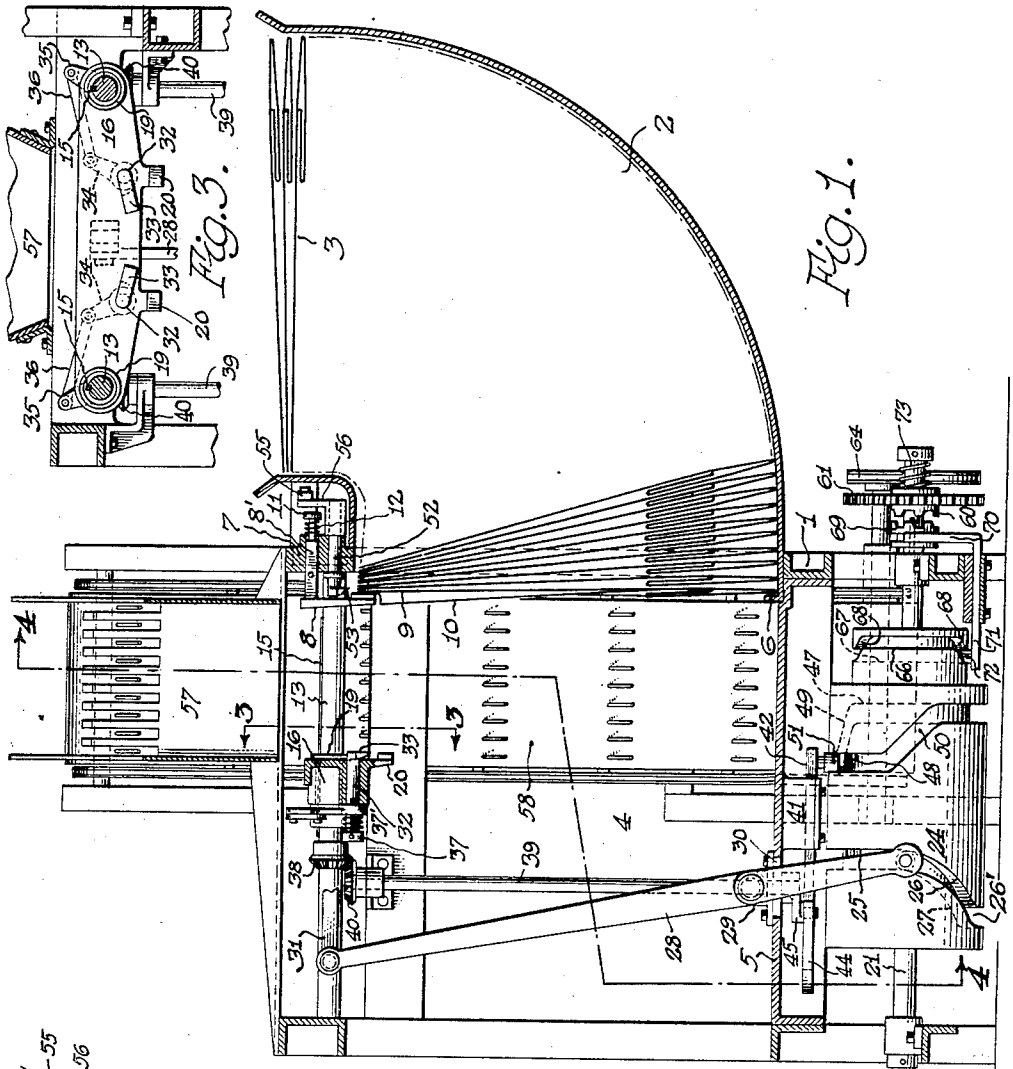


Fig. 1.

Fig. 3.

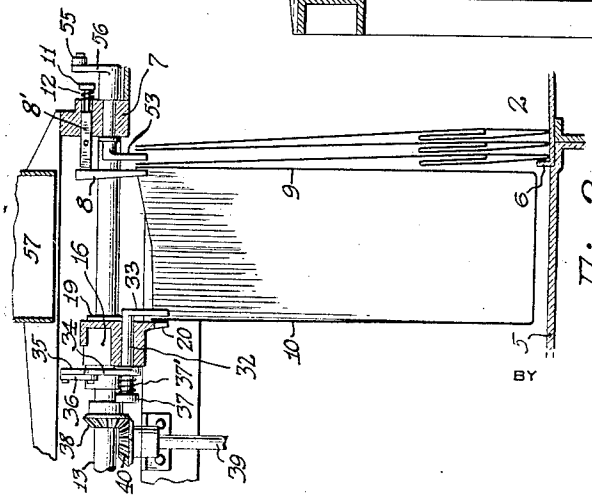


Fig. 2.

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Fig. 4.

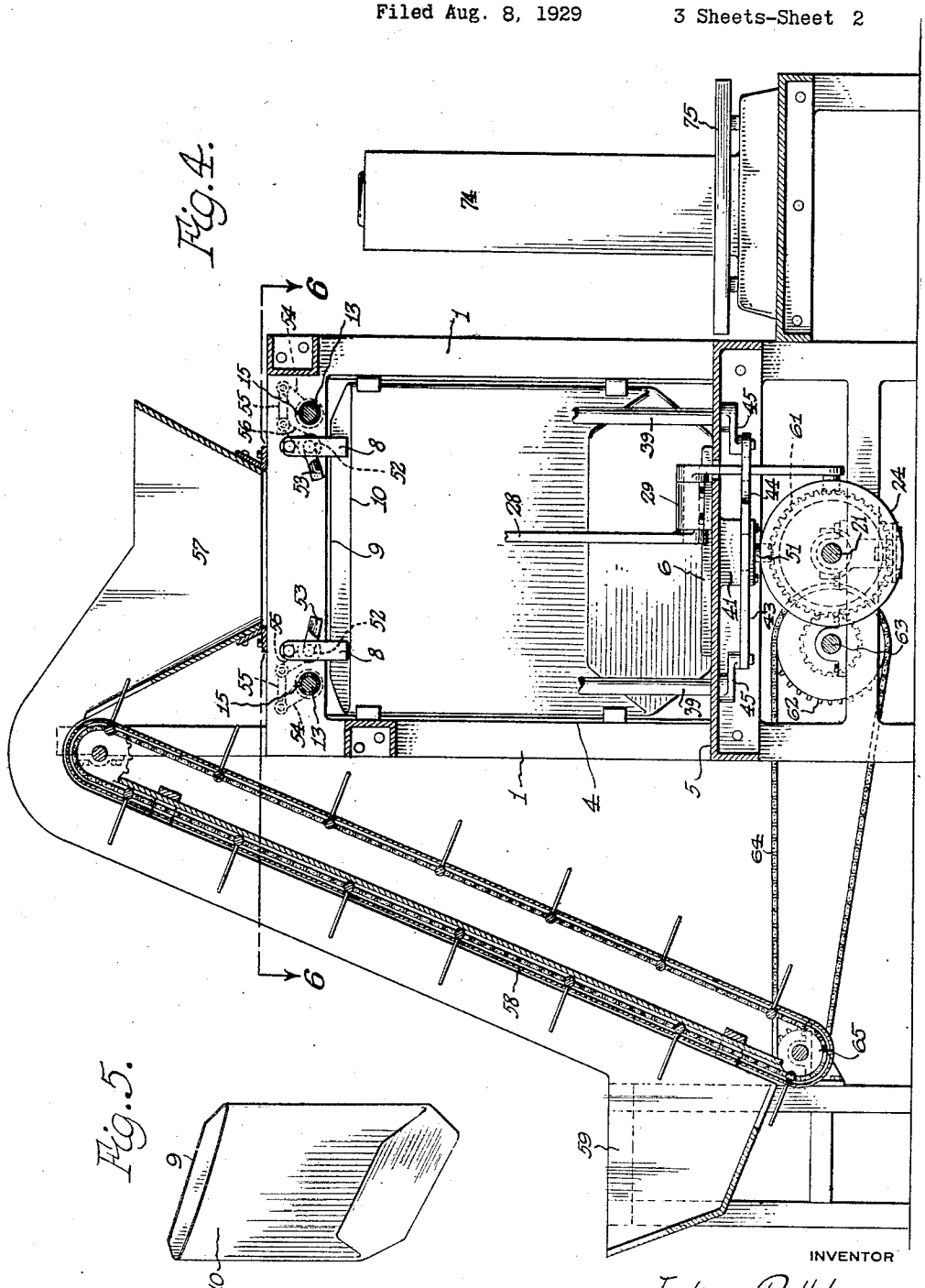


Fig. 5.

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BAG FILLING MACHINE

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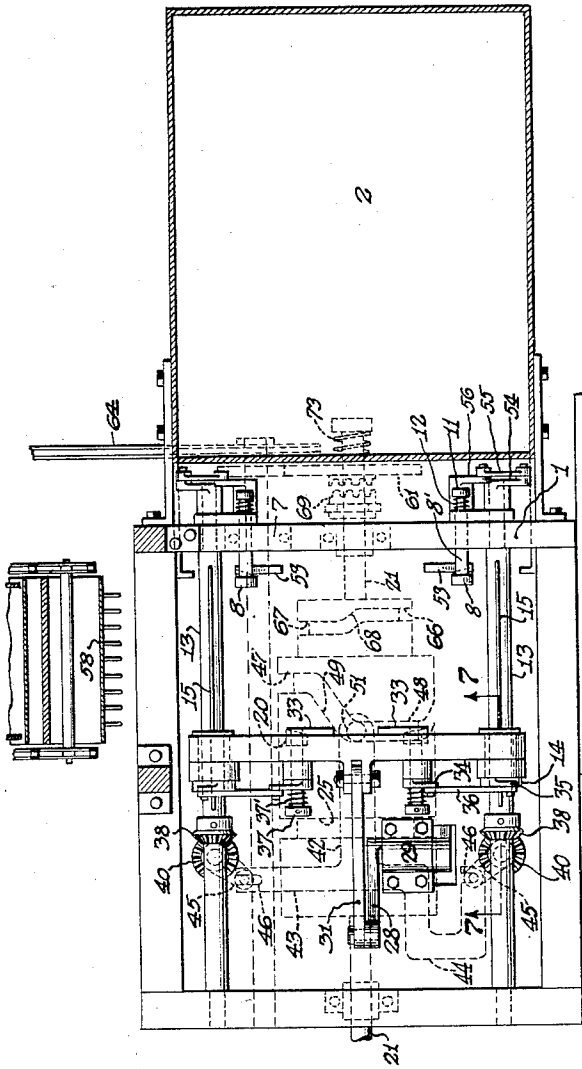


Fig. 6.

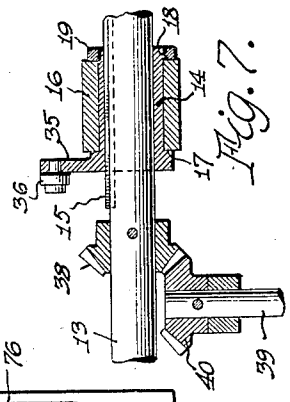


Fig. 7.

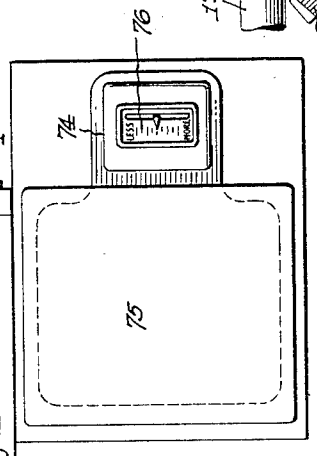


Fig. 8.

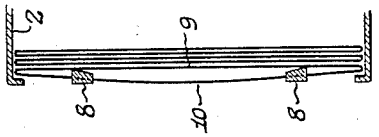


Fig. 9.

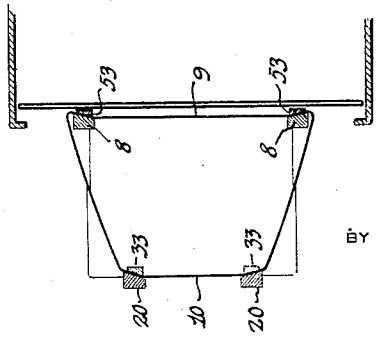


Fig. 10.

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Patented Apr. 14, 1931

1,800,657

UNITED STATES PATENT OFFICE

JULIAN PELLETIER, OF CALGARY, ALBERTA, CANADA, ASSIGNOR TO CHESTER E. WILLIAMS, OF WORCESTER, MASSACHUSETTS

BAG-FILLING MACHINE

Application filed August 8, 1929. Serial No. 384,237.

The present invention pertains to a novel bag filling machine, and the principal object is to provide a device of this character which automatically opens the foremost bag of a stack of folded bags and holds the same open while being filled.

Moreover, the invention includes a bag charging device such as an elevator which is timed in its operation to deliver material only while a bag is held open. The machine is of the repeating type, performing successively and repeatedly an operation consisting of certain definite movements.

The machine includes a fixed holder which constantly engages the upper edge of the foremost bag of the stack. The bags are so folded that one ply of each bag is longer than the other ply. It is the longer ply which is engaged by the holder, while the shorter ply is free. Further, the machine includes a cross head movement towards and away from the holder. The cross head carries gripping means for engaging the shorter ply and thus opening the bag when the head is retracted. The movements of the cross head and gripping member are governed by a cam which also controls the actuation of an elevator discharging into the opened bags, in such a manner as to cause the elevator to operate only while a bag is held open.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the machine, partly in elevation;

Fig. 2 is a fragmentary section in the same plane, showing a bag held in open position;

Fig. 3 is a vertical section on the line 3—3 of Figure 1;

Fig. 4 is a vertical section on the line 4—4 of Figure 1;

Fig. 5 is a perspective view of one of the bags folded;

Fig. 6 is a plan section on the line 6—6 of Figure 4;

Fig. 7 is a detail vertical section on the line 7—7 of Figure 6; and

Figures 8, 9 and 10 are diagrammatic views showing the bag as affected by the bag opening mechanism in different positions or stages.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figures 1, 4 and 6 the machine is shown as built on an upright frame 1 at the rear side of which is a curved receptacle 2 which supports a stack of folded bags 3 lying substantially radial to the curvature of the outer wall of the receptacle. The receptacle engages the frame at a section 4 of the latter which may be designated as the bag filling compartment. The frame has a base 5 on which the forward edge of the receptacle rests, and the base wall of the receptacle is formed with a ledge 6 engaged by the lower edge of the foremost bag in the stack which is presented to the space 4.

At the top of the frame is a head 7 lying transversely of the frame as shown in Figures 4 and 6 and disposed substantially directly over the ledge 6. The head 7 slidably supports a pair of angular holders 8 which extend downwardly towards the upper edges of the bags. It will be seen by reference to Figures 1 and 5 that the bags are folded to form two plies 9 and 10, the former of which projects upwardly beyond the latter. The depending parts of the holders 8 engage only the projecting or exposed part of the longer ply 9 and leave the shorter ply 10 free to sag forwardly. The stems 8′ of the holders, which pass through the bar 7 have heads 11 on the rear side of the head 7 and are surrounded by springs 12 between the rear face of the head 7 and the heads 11, whereby the holders are spring drawn rearwardly against the stack of bags.

The top of the frame further supports a pair of rotatable shafts 13 parallel to each other and extending longitudinally of the machines and over the space 4 as shown more clearly in Figure 6. Sleeves 14 (Figure 7) are splined on the shafts by means of keys 15, and the sleeves are further surrounded by the ends of a cross head 16 bridged between the shafts. Each sleeve is formed at one end with a shoulder 17 engaged by one side of the cross head and is threaded as at 18 at the

other end to receive a nut 19 engaging the other side of the cross head, whereby the ends of the cross head are held against sliding relatively to the sleeves. A pair of holders or gripping members 20 depend from the cross head 16 to a farther extent than do the holders 8, so that the members 20 will engage the shorter lap 10 of the foremost bag when the cross head is moved towards this bag by the means presently to be described. In such position, the members 20 lie between the members 8 as shown in Figure 9.

Beneath the base or floor 5, the frame supports a shaft 21 lying parallel to the shafts 13. One end of the shaft is geared to a motor 22 as indicated by the numeral 23. The shaft carries a compound cam member 24 having a groove consisting of a constant portion 25 through an extent of substantially 180°, a slope 26 extending from one end of the part 25, and a return or opposite slope 27 connecting the part 26 to the other end of the part 25.

A rocker arm 28 is fulcrumed in a bearing 29 on the floor 5 and passes through a slot 30 in the floor. The lower end of this arm rides in the groove 25, 26, 27 of the cam 24, and the upper end is connected by a link 31 to the cross head 16 as shown in Figures 1 and 6. Thus, the slope 26 will move the cross head towards the foremost bag 3, and the device presently to be described grips the shorter lap 10 of the foremost bag. The return slope 27 promptly withdraws the cross head with the shorter lap attached thereto, thus opening the bag, and the constant part 25 of the cam groove holds the bag open for filling through approximately 180° cam rotation.

The gripping means referred to includes a pair of stems 32 rotatably mounted in the cross head and carrying gripping fingers 33 angular thereto and adapted to be swung down directly in front of the members 20 as shown in Figure 2. The means for swinging the fingers includes arms 34 carried by the stems 32, arms 35 carried by the sleeves 14 and links 36 connecting the arms 34 to the corresponding or adjacent arms 35. The stems 32 are headed at 37 at the ends opposite the fingers 33 and are surrounded by springs 37′ beneath the heads, whereby the fingers are placed under tension in the direction towards the cross head 16.

The shafts 13 carry bevel gears 38, and adjacent these gears are journaled two upright shafts 39 carrying bevel gears 40 meshing with the gears 38. In a guide 41 attached beneath the floor 5 is mounted a slide member 42 having a pair of arms 43 and 44 extending towards the upright shafts. The latter carry cranks 45 as shown more clearly in Figure 4, which extend into slots 46 in the ends of the arms 43 and 44.

In the cam member 24 is another cam groove having a constant portion 47 of the same angular extent as the constant part 25 plus the slope 27, although displaced therefrom. Adjacent the part 47 is another constant part 48 having the angular extent of the slope 26. The ends of the part 47 are connected to the ends of the part 48 by slopes 49 and 50, the former being rather abrupt and the latter having substantially the same angular extent as the short constant piece 26′ between the slopes 26 and 27. The slide 42 has a roller 51 riding in the cam groove 47—50 and displaced approximately 90° from the lower end of the rocker arm 28, which is substantially the angular displacement between the corresponding or angularly equal parts of the cam grooves 25—27 and 47—50.

As the cross head 16 is advanced towards the head 7 by the slope 26, the stems 32 are held against turning by the constant part 48. Prior to the retraction of the cross head by the slope 27, the part 26′ permits a stationary interval of the cross head during which the slope 50 pulls the slide 42 and actuates the shafts 13 to swing the fingers 33 behind the shorter lap 10 of the foremost bag 3 as illustrated in Figure 9. The slope 27 then withdraws the cross head while the constant part 47 maintains the fingers 33 in gripping position. This position is also maintained while the bag is held open during the operation of the constant part 25 on the rocker arm 28. Prior to the next advance of the cross heads towards the head 7, the roller 51 travels in the slope 49, whereby the fingers 33 are released from the bag which has been opened.

The head 7 carries a pair of rotary stems 52 behind the holders 8 and equipped with jaws 53 adapted to be pitched into the stack of bags behind the holder. These jaws are actuated from the shafts 13 by means of arms 54 carried by the shafts and joined by links 55 to arms 56 carried by the stems 52. The jaws are operated simultaneously with the fingers 33 and bind one or more bags against the holders 8 while the foremost bag is being distended.

On the top of the frame 1, above the filling compartment 4, is a hopper 57 communicating with a conventional elevator 58 which is fed at a lower hopper or bin 59. The elevator therefore is positioned to discharge into the filling space and into the bags while held open. In order to operate the elevator only while the bags are held open, the elevator is geared to another cam slot on the cam member 24.

This gearing comprises a clutch element 60 loose on the shaft 21 and carrying a gear 61. The speed is stepped up by means of a compound gear 62 journalled on a stub shaft 63 supported by the frame. The larger element of the compound gear is connected by a chain 64 to one of the sprockets 65 which drive the elevator. The cam slot for actuating the clutch consists of two constant sec-

tions 66 and 67 (Figure 6) spaced apart and each extending through nearly 180°. The ends of one section are joined to those of the other by short slopes 68. A cooperating clutch member 69 is splined on the shaft 21 and is adapted to cooperate with the first named clutch member 60. A yoke 70 engaging the element 69 has an arm 71 extending towards the cam slot 66—68 and provided with a finger 72 which rides in the slot.

It has already been explained that the bag is held open during approximately 180° of cam rotation, while the lower end of the rocker arm 28 rides in the constant cam slot section 25. During the remainder of the revolution the cross head 15 travels back and forth on the shafts 13. It is evident by an examination of Figure 1 that while the rocker arm 28 is acted upon by the slot portions 26, 26′, 27 between the ends of the constant portion 25, the pin 72 travels in the section 66 which is more remote from the clutch, whereby the clutch is held open and the elevator is maintained in idle condition. When the constant portion 25 comes into operation on the rocker arm 28, the pin 72 travels in the section 67 near the clutch, at which time the element 69 is brought into engagement with the element 60 and the elevator is operated. The element 60 is backed by a spring 73 in order to enable a yieldable sliding movement thereof on the shaft 21, so that in case the clutch elements do not register properly on first contact, the element 60 will be repelled temporarily but permitted to return to its normal position when the element 69 has been turned by the shaft 21 into the proper position for registration with the element 60.

Adjacent the frame 1 and in proximity to the filling space 4 is mounted a scale 74 having a weighing platform 75 and an indicator 76. The bags, after having been filled from the elevator and released by the gripping device may be moved manually to the platform 75 and checked as to the weight of their contents.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claims.

What I claim is:—

1. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping finger carried by said head, means for actuating said cross head, and means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder.

2. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping finger carried by said head, means for actuating said cross head, means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, and means for retracting said head from said holder after said finger has been turned.

3. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping finger carried by said head, means for actuating said cross head, means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, a jaw rotatably mounted behind said holder, and means for intermittently turning said jaw to a position directly behind the bag-engaging part of said holder.

4. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping finger carried by said head, means for actuating said cross head, means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, means for retracting said head from said holder after said finger has been turned, a jaw rotatably mounted behind said holder, and means for intermittently turning said jaw to a position directly behind the bag-engaging part of said holder.

5. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a spring drawn holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping spring drawn finger carried by said head, means for actuating said cross head, and means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder.

6. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a rotatable gripping finger carried by said head, means for actuating said cross head, means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, and a hopper adapted to discharge into the space between said holder and said cross head in retracted position.

7. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable to-

wards and away from said holder, a stop carried by said cross head and adapted to engage the foremost bag, a rotatable gripping finger carried by said head, means for actuating said cross head, and means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder.

8. In a bag filling machine, a receptacle adapted to contain a stack of folded bags, a holder adapted to engage the upper edge of the foremost bag, a cross head movable towards and away from said holder, a stop carried by said cross head and adapted to engage the foremost bag, a rotatable gripping finger carried by said head, means for actuating said cross head, means for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, and means for retracting said head from said holder after said finger has been turned.

9. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head slidable thereon towards and away from said holder, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the latter, linkage from said cam to said finger for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder.

10. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head slidable thereon towards and away from said holder, a rotatable gripping finger carried by said head, a stop carried by said cross head and adapted to engage the foremost bag, an operating cam, linkage from said cam to said head for sliding the latter, linkage from said cam to said finger for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder.

11. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head slidable thereon towards and away from said holder, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the latter, linkage from said cam to said finger for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, a jaw rotatably mounted behind said holder, and means for intermittently turning said jaw to a position directly behind the bag-engaging part of said holder.

12. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head splined on said shaft and slidable thereon towards and away from said holder, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the same, linkage between said shaft and finger for turning the latter towards the bottom of said filling compartment, drive means for said shaft, and a linkage from said cam to said driving means for actuating the latter when the head is in close proximity to said holder.

13. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head splined on said shaft and slidable thereon towards and away from said holder, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the same, linkage between said shaft and finger for turning the latter towards the bottom of said filling compartment, drive means for said shaft, a linkage from said cam to said driving means for actuating the latter when the head is in close proximity to said holder, and a jaw member rotatably mounted behind said holder and linked to said shaft.

14. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head splined on said shaft and slidable thereon towards and away from said holder, a stop carried by said

cross head and adapted to engage the foremost bag, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the same, linkage between said shaft and finger for turning the latter towards the bottom of said filling compartment, drive means for said shaft, and a linkage from said cam to said driving means for actuating the latter when the head is in close proximity to said holder.

15. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head splined on said shaft and slidable thereon towards and away from said holder, a stop carried by said cross head and adapted to engage the foremost bag, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the same, linkage between said shaft and finger for turning the latter towards the bottom of said filling compartment, drive means for said shaft, a linkage from said cam to said driving means for actuating the latter when the head is in close proximity to said holder, and a jaw member rotatably mounted behind said holder and linked to said shaft.

16. In a bag filling machine, a receptacle affording a filling compartment and a bag compartment adjacent thereto for containing a stack of folded bags, a holder supported in said receptacle for engaging the upper edge of the foremost bag in a plane substantially separating said compartments, a shaft supported in the upper part of said filling compartment, a cross head slidably thereon towards and away from said holder, a rotatable gripping finger carried by said head, an operating cam, linkage from said cam to said head for sliding the latter, linkage from said cam to said finger for turning said finger towards the bottom of said receptacle when said head is in close proximity to said holder, a loading device adapted to discharge into said filling space, and drive mechanism for said loading device geared to said cam for intermittent operation thereby.

In testimony whereof I affix my signature.

JULIAN PELLETIER.