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 [21] Appl. No **749,382**
 [22] Filed **Aug. 1, 1968**
 [45] Patented **July 6, 1971**
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Seattle, Wash.

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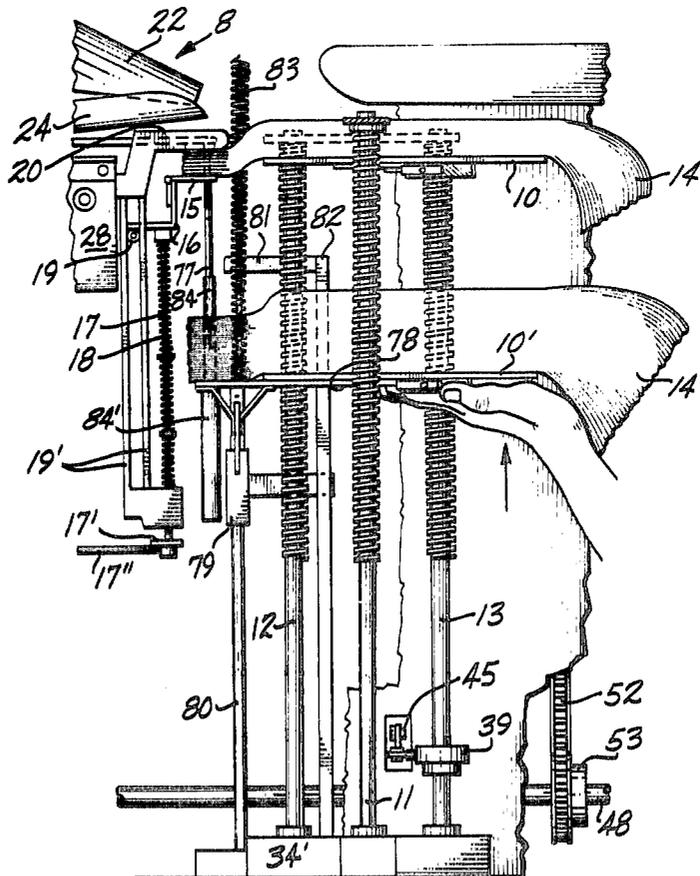
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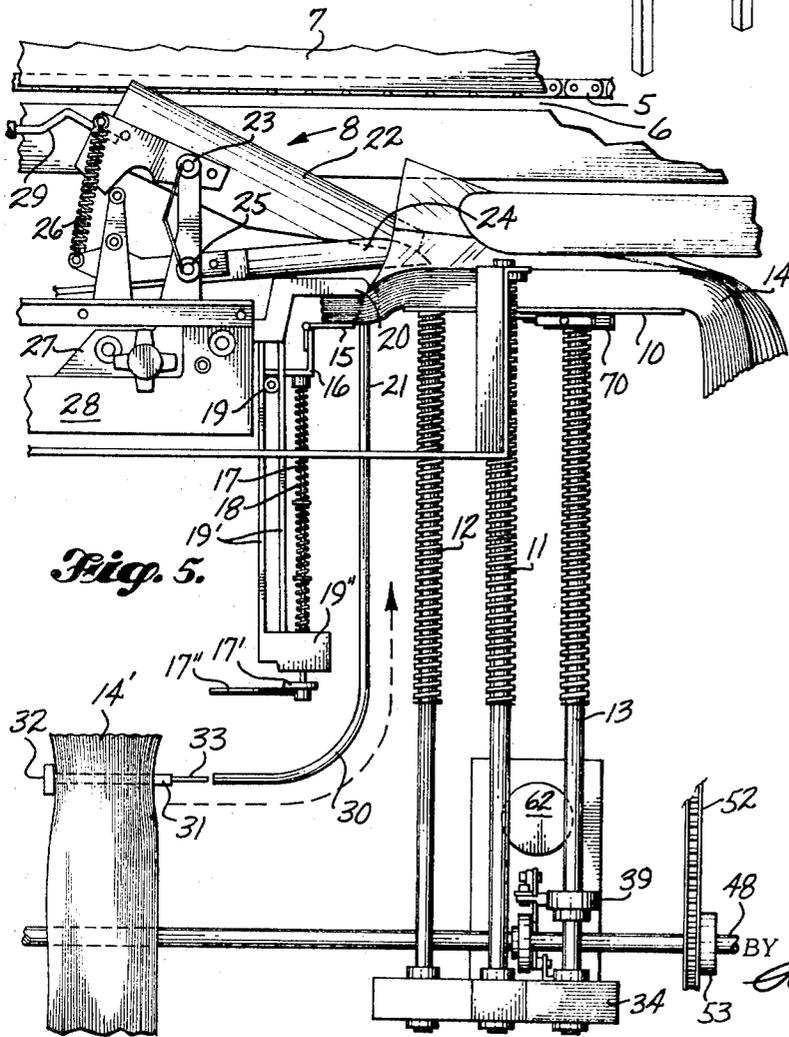
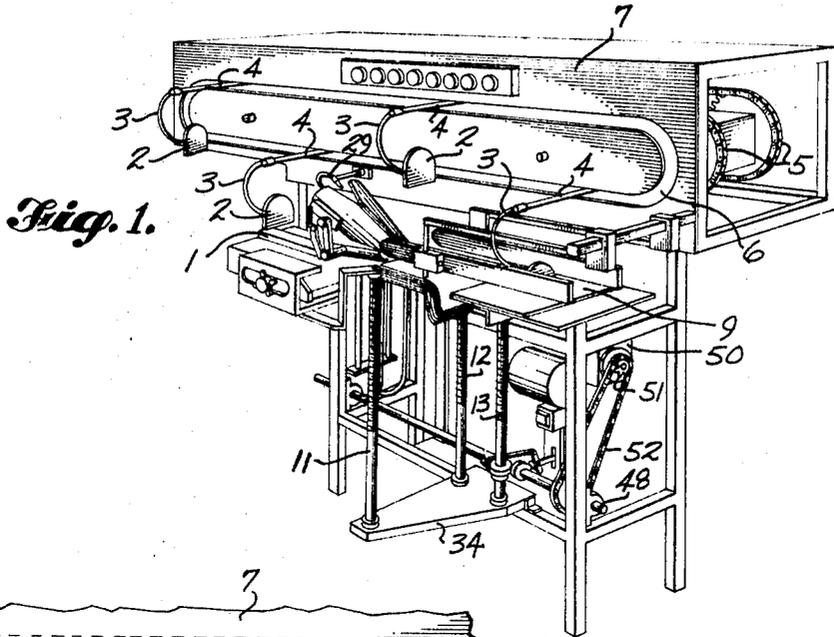
[54] **REFILL BAG PACK INSERTING MECHANISM FOR AUTOMATIC BAGGERS**
13 Claims, 20 Drawing Figs.

[52] U.S. Cl..... 53/189
 [51] Int. Cl..... B65b 43/26
 [50] Field of Search..... 53/188,
 189, 190; 271/62 A

[56] **References Cited**
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ABSTRACT: A plate carrying a pack of bags adjacent to the loading station of an automatic bagger is engaged with and raised by rotation of upright screws as bags are used from the pack. A second plate underlying the first plate and also engaged with and raisable by the screws supports a refill bag pack closely underlying the first plate so that the first plate can be withdrawn enabling the first bag pack to be engaged and supported by the refill bag pack. Spindles extending through apertures in the upper bag pack maintain the bags in registry and transfer spindles enable apertures of a refill bag pack to be threaded on the same spindles as are engaged by the apertures of the upper bag pack. The screws are rotated intermittently to raise the bag packs by a cam-driven overrunning clutch.





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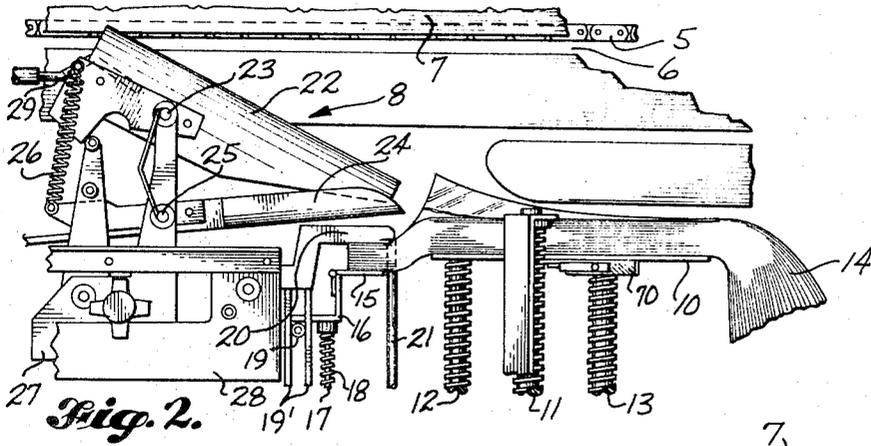


Fig. 3.

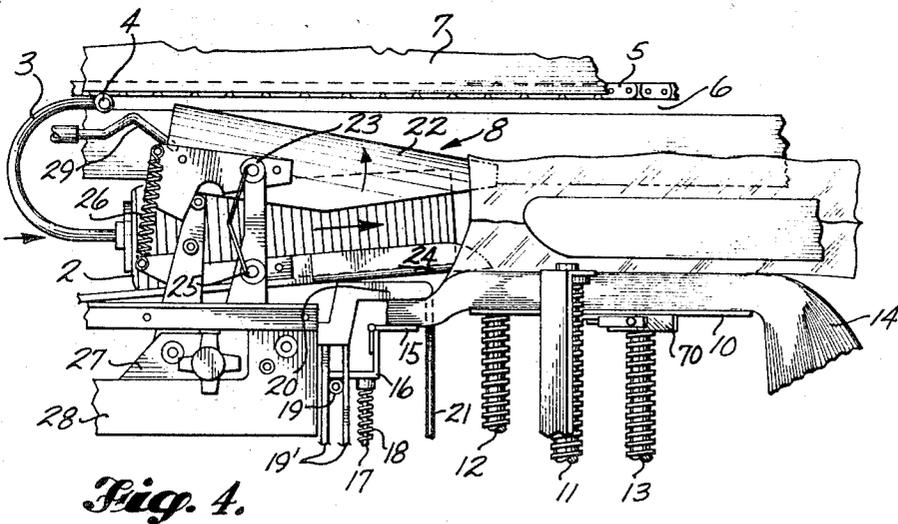
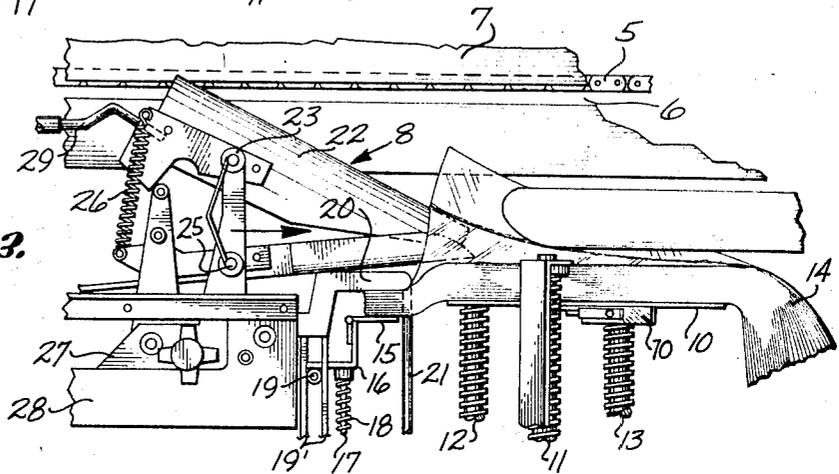


Fig. 4.

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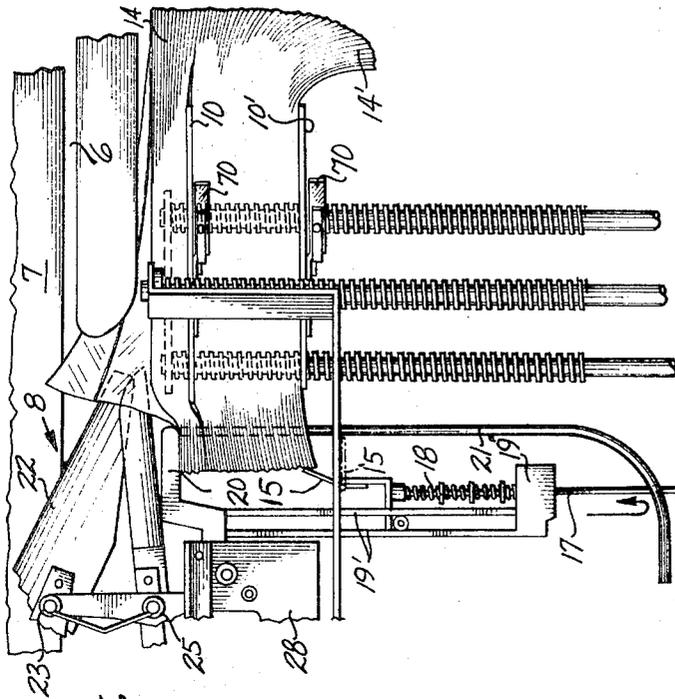


Fig. 7.

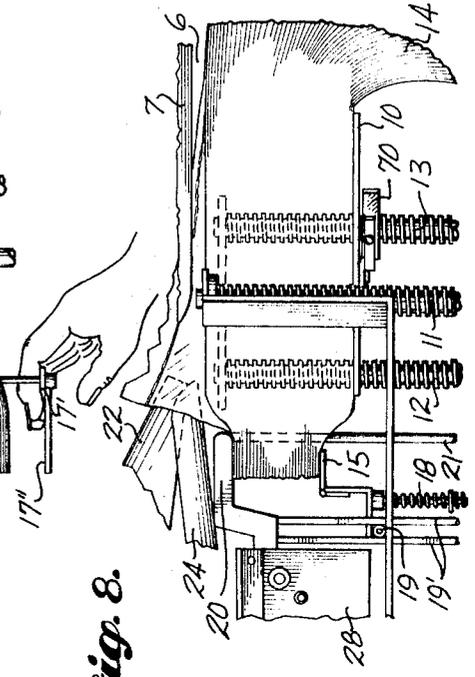


Fig. 8.

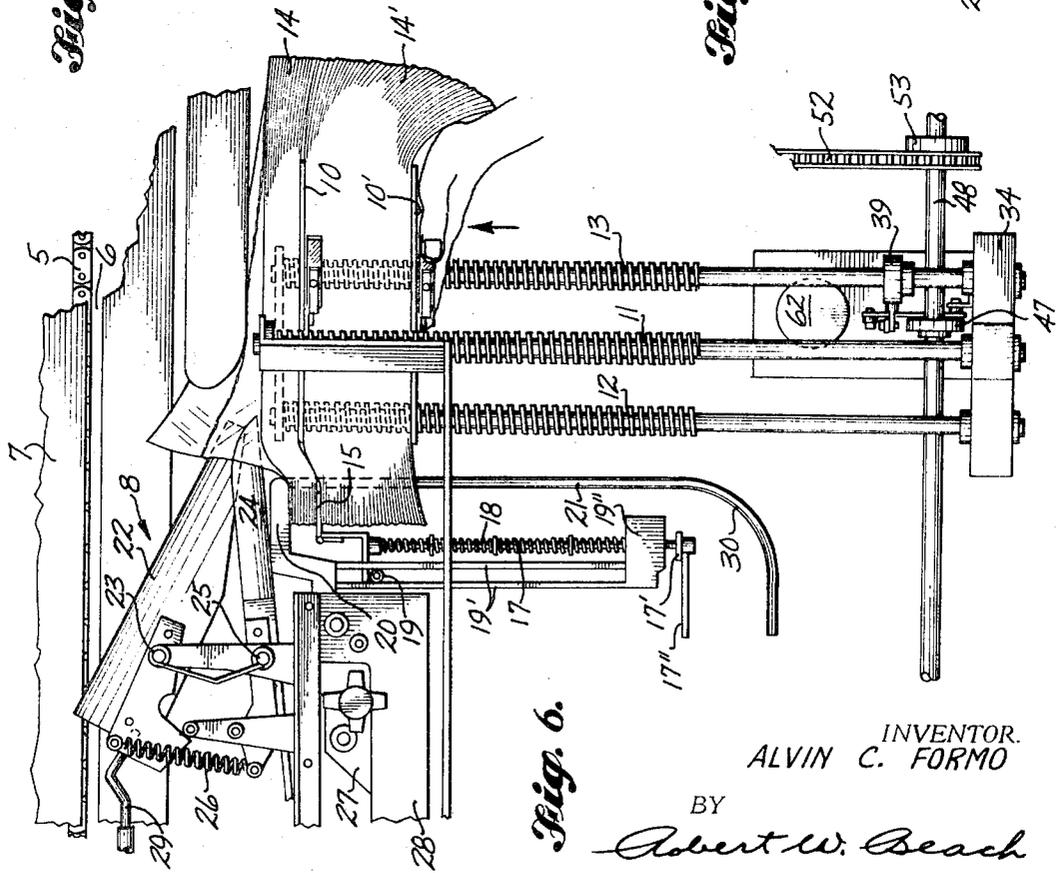
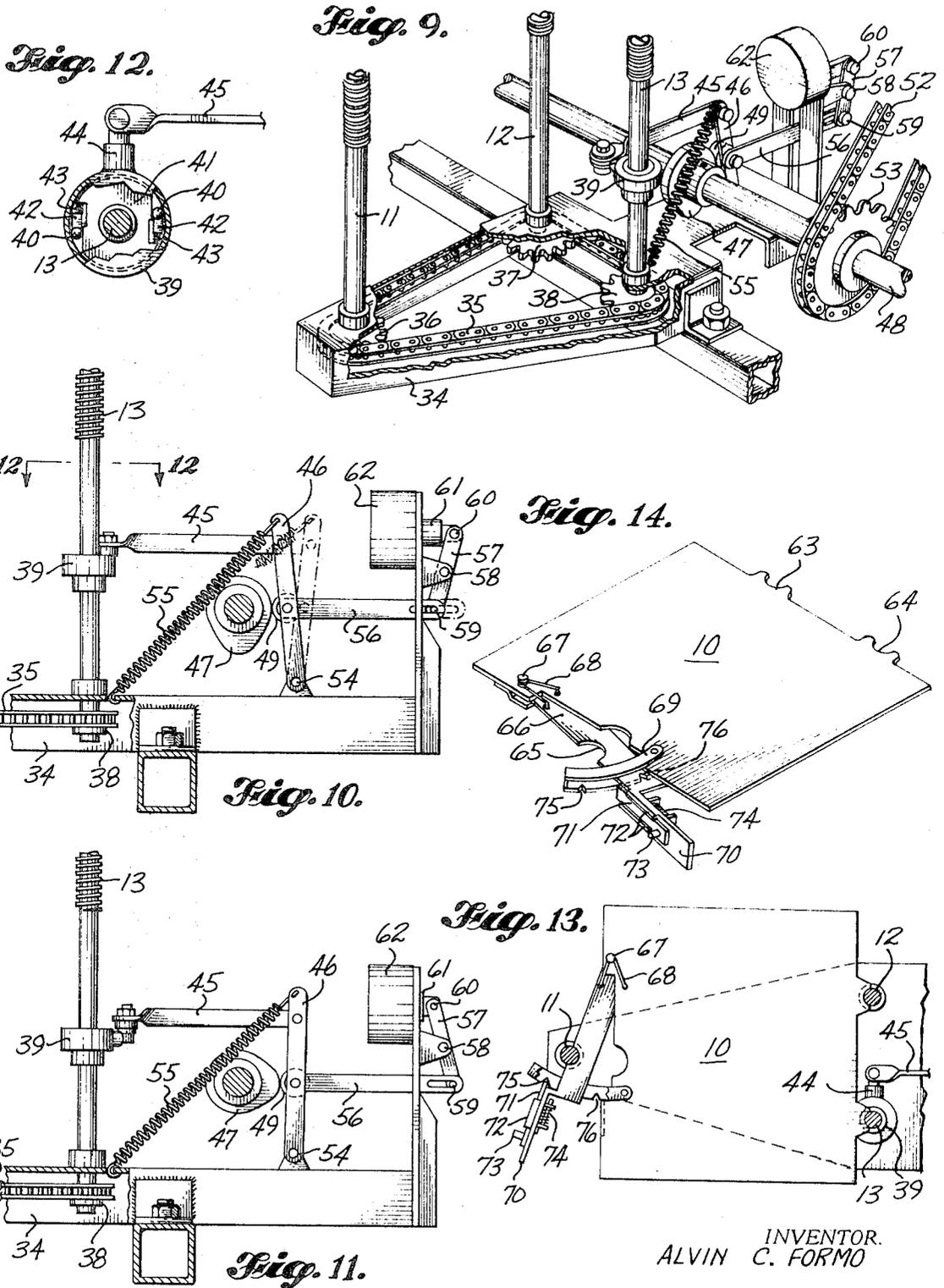


Fig. 6.

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Fig. 15.

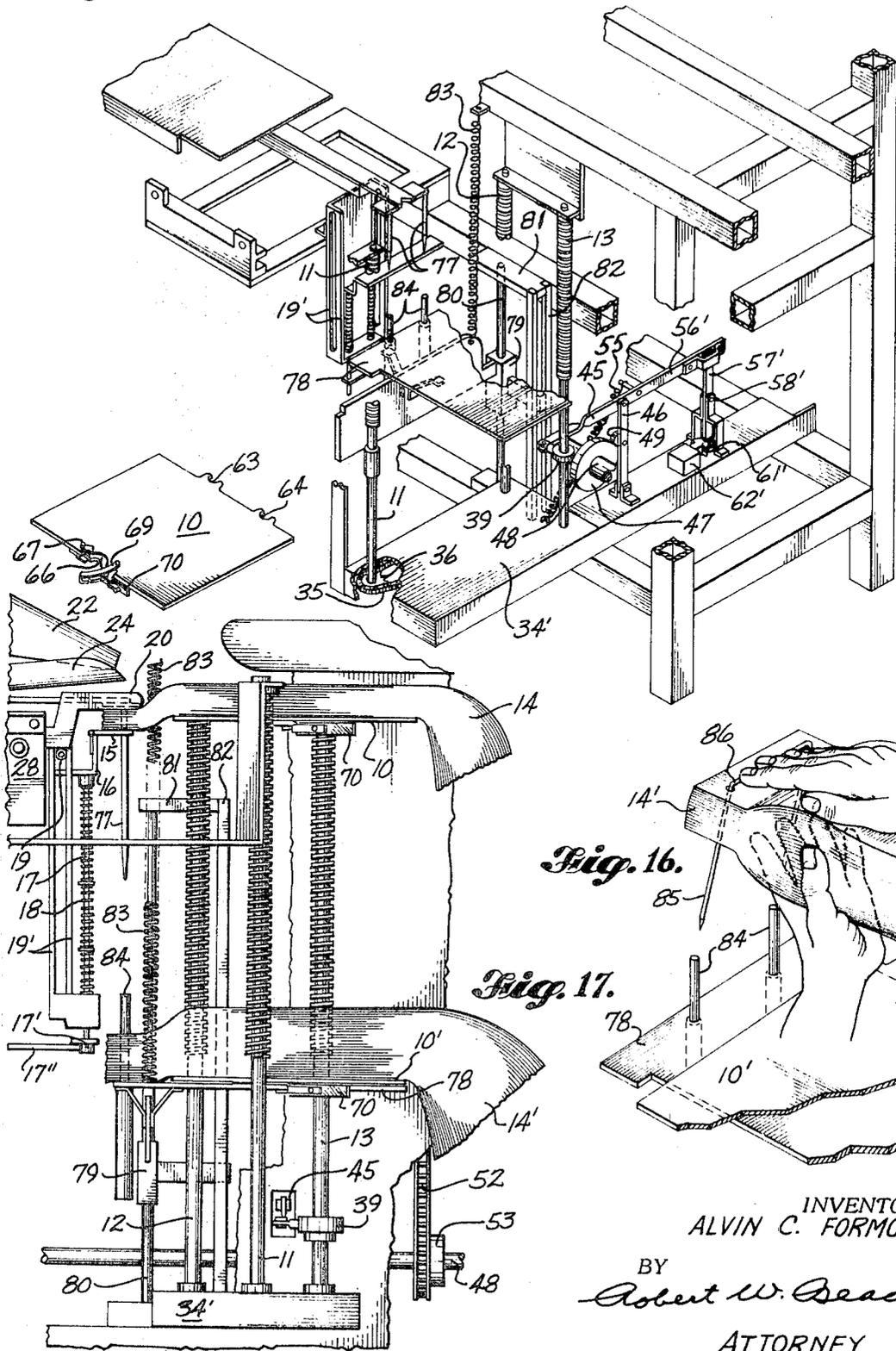
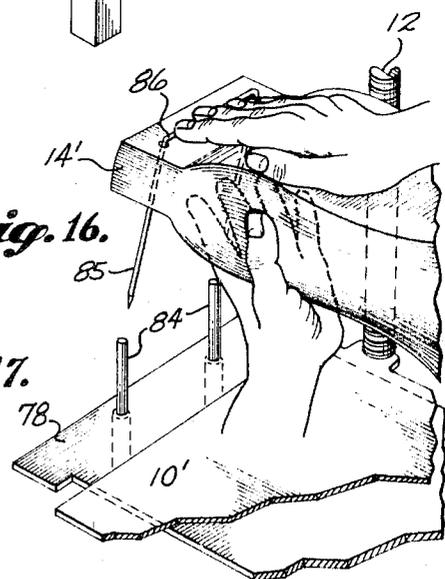


Fig. 16.

Fig. 17.



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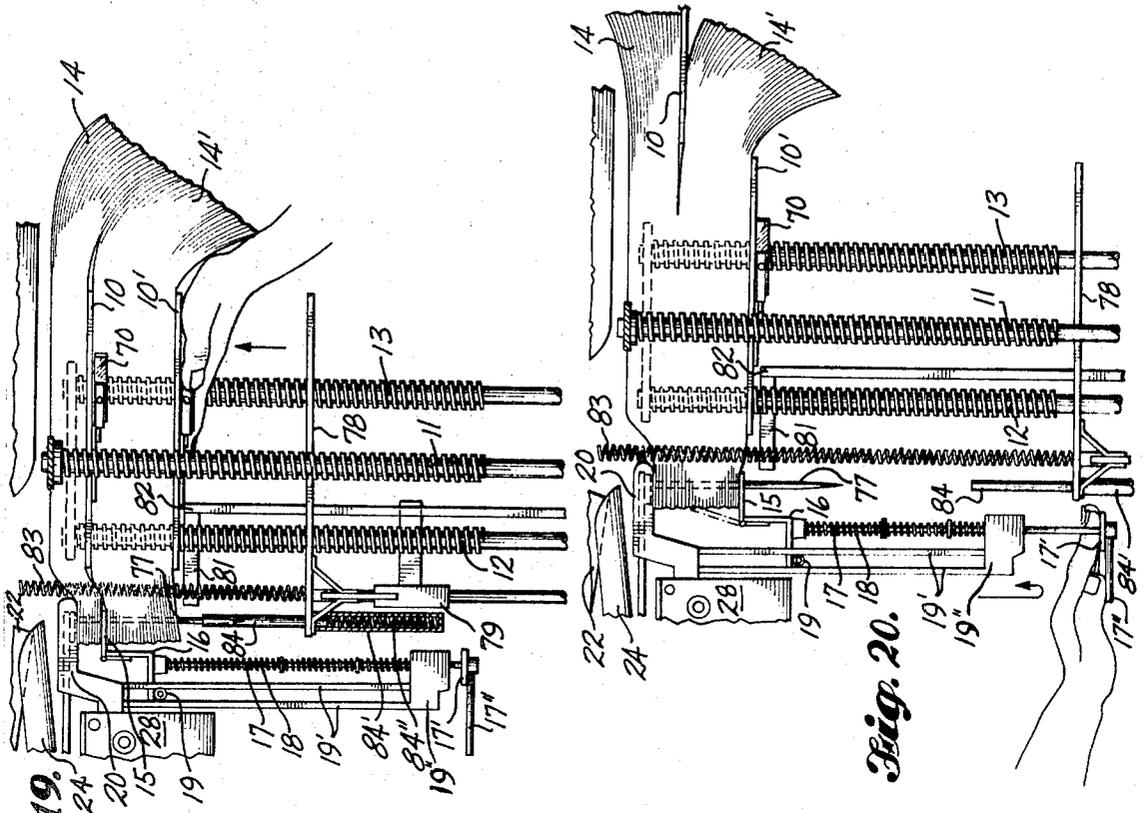


Fig. 19.

Fig. 20.

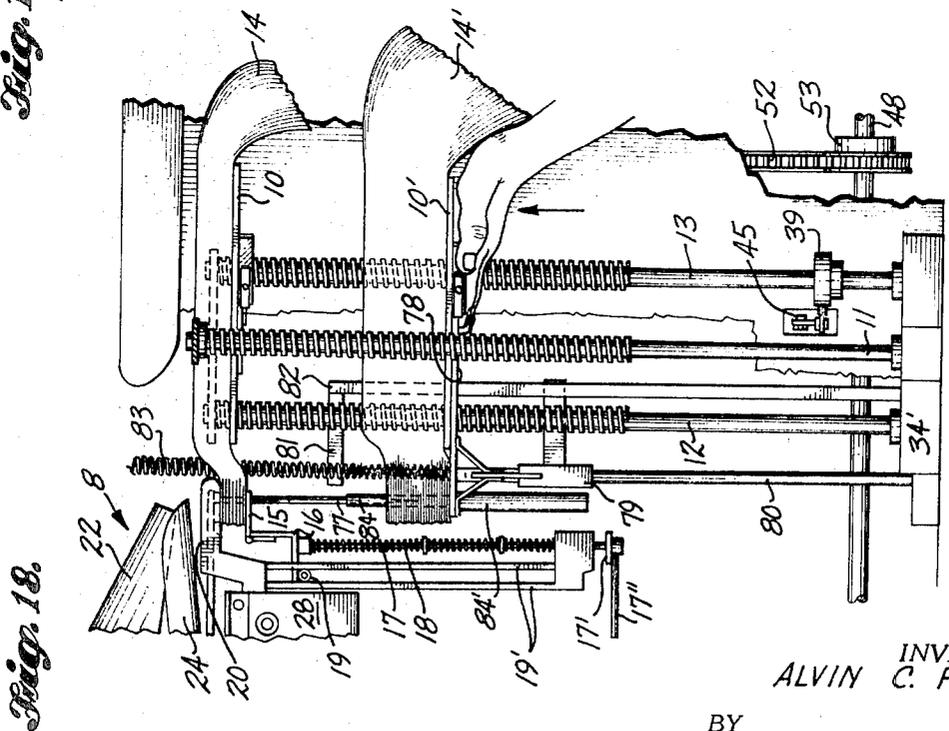


Fig. 18.

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REFILL BAG PACK INSERTING MECHANISM FOR AUTOMATIC BAGGERS

The principal purpose of the present invention is to be able to replenish the supply of bags used by an automatically operating bagger without interrupting the operation of the bagger.

Another object is to enable the supply of bags to be used by an automatic bagger to be replenished quickly and easily and without requiring the replenishing operation to be done at any particular time, but considerable latitude in the time selected for such operation is available so that an operator can service several of such baggers.

Another object is to provide such bag-replenishing mechanism which is adapted for bags of different size.

A further object is to avoid the risk either of bags in a bagger or of bags to be inserted into a bagger in the form of a pack getting out of registry during a bag-replenishing operation.

FIG. 1 is a top perspective of a bagger to which the present invention is applied, shown somewhat diagrammatically.

FIGS. 2, 3 and 4 are fragmentary side elevations of the loading station of a bagger of the type shown in FIG. 1, with parts in different positions, respectively

FIGS. 5, 6 and 7 are fragmentary side elevations of bag-supplying mechanism for a bagger of the type shown in FIG. 1 with parts in different positions and FIG. 8 is a similar view of a portion of such mechanism with parts in still a different relationship.

FIG. 9 is a fragmentary top perspective of drive mechanism for bag-supporting mechanism parts being broken away, and FIGS. 10 and 11 are side elevations of such mechanism showing parts in different positions. FIG. 12 is a detail section taken on line 12-12 of FIG. 10 and having parts broken away.

FIG. 13 is a plan of bag pack supporting means and FIG. 14 is a top perspective of the bag-supporting plate of such means.

FIG. 15 is a top perspective of part of the under portion of the bagger having sections broken away and showing a bag-supporting plate in exploded relationship.

FIG. 16 is a top perspective of bag pack transfer structure having parts broken away.

FIGS. 17, 18, 19 and 20 are side elevations of the bag-supplying portion of the bagger shown in FIG. 1 illustrating a construction somewhat different than that of FIGS. 5 to 8 inclusive and having parts in different operative positions.

A typical bagger of the type in which the present invention can be used is illustrated in FIG. 1 as a machine for bagging loaves of bread or similar articles. Such articles are conveyed by suitable mechanism to a feed platform 1 along which a pusher plate 2 is moved. Such pusher plate is mounted on the lower end of an arm 3 curved downward from the end of a cantilever rod 4 extending between and driven by two parallel endless chains 5. Such chains drive the rods 4 around an orbit defined by the slot 6 in casing 7 having parallel, horizontal upper and lower stretches connected by arcuate end stretches. Such pushers push articles to be bagged through the bag-loading station 8 and out of the machine along the discharge platform 9.

At the loading station a bag pack supporting plate 10 constituting shelf means is engaged with upright screw shafts 11, 12 and 13, conjoint rotation of which will raise plate 10 and a pack 14 of bags on it into a position such that the upper bag of the pack will be in the path of an article moved through the loading station by a pusher 2.

The plate 10 is not long enough to support the bags of the pack 14 over their entire length. The lip ends of the bags are supported by a leaf 15 hingedly mounted on the upper end of a slide 16 mounted on the upper ends of rods 17. The lower ends of such rods are connected by a crossbar 17' on which a horizontal handle 17'' is mounted. Compression springs 18 encircling the rods 17 support the slide 16 and press the supporting leaf 15 against the underside of the lip of the lowest bag in the pack. The slide is guided for elevational movement

by rollers 19 movable in guideways 19'. The lower end of such guideways carries the block 19'' through which rods 17 slide and against which the lower ends of compression springs 18 bear.

The upper side of the lip of the top bag in the pack is held down by hold-down bars 20 which can be raised periodically to release the lip of a filled bag. The bag lips have two spaced holes through them through which spindles 21 extend to maintain the bags in registry prior to and during the bagging operation. Such operation includes distending the mouth of the bag between a pair of upper jaws 22 mounted on a pivot 23 to swing up and down and a pair of lower jaws 24 mounted on a pivot 25 also to swing up and down. The bag-engaging ends of the jaws 22 and 24 are normally urged apart into the position shown in FIG. 4 for spreading open the mouth of the bag by tension springs 26 connected between portions of jaws 22 and 24 at the side of pivots 23 and 25 remote from the bag-engaging ends of the jaws.

The pivots 23 and 25 mount the jaws 22 and 24 on a carriage 27 guided for horizontal reciprocation toward and away from the bag pack 14 by guides 28 between the position shown in FIG. 2 and that shown in FIGS. 3 and 4. An air jet projected from a nozzle 29 can effect initial opening of the upper lip of a bag from its lower lip as shown in FIG. 2 so that, when the carriage 27 is reciprocated toward the bag from the position of FIG. 2 to that of FIG. 3, the bag-engaging ends of the jaws 22 and 24 will be inserted into the bag. The bag mouth can then be distended by swinging the jaws apart about horizontal axes from the position of FIG. 3 to that of FIG. 4. As shown in this figure, the pusher 2 then moves the article to be bagged between the jaws 22 and 24 into the opened bag and then the pusher moves the bagged product onto the discharge platform 9 shown in FIG. 1.

By such successive bagging operations, bags are stripped one by one from the pack 14 supported by the plate 10 as shown in FIG. 5. Consequently, it is necessary to replenish the supply of bags from time to time. This can be accomplished by the mechanism shown in FIGS. 5 to 8, for example. In this instance, the bag registry spindle 21 extending through spaced apertures in the bag lip are tubes, the lower portions 30 of which are curved so that their lower ends are disposed horizontally. To insert a refill bag pack 14 into the machine, spindles 31 having heads 32 are inserted through the bag-registering apertures in the lips of the bags in pack 14'. The ends of the spindles 31 opposite the heads 32 are reduced to form pins 33 which can be inserted into the lower horizontal ends of the tube spindles 21 as indicated in FIG. 5.

From the depending position of FIG. 5, the bags of bag pack 14' can be slid to the right and upward in the direction indicated by the broken arrow so that the bag apertures are transferred from the spindles 31 to the spindles 21. When the bags have been raised to a horizontal position, another supporting plate 10' is inserted beneath the refill bag pack and between the screws 11, 12 and 13. This plate is then raised until the upper side of the refill pack contacts the lower side of plate 10. Plate 10' can then be engaged with the threads of the screws 11, 12 and 13 so that this plate will be elevated in synchronism with plate 10 by rotation of such screws.

When the second plate 10' is thus supported by screws 11, 12 and 13, the auxiliary bag lip supporting leaf 15 can be withdrawn from the position shown in FIG. 6 beneath the lips of the bags in the upper pack and moved downward past the lower pack in the manner indicated in FIG. 7 by drawing down on handle 17'' or bar 17' until the leaf has passed below the lower bag pack as indicated in broken lines in FIG. 7. If the handle 17'' is then released, the compression spring 18 will raise the slide 16 to urge the leaf 15 tightly up against the bottom of the refill pack lip end as shown in FIG. 8. The upper plate 10 can then be released from the screws 11, 12 and 13 and withdrawn so that the refill pack, in effect, forms a part of the previous bag pack as shown in FIG. 8.

The bag pack or packs are elevated by conjoint, though intermittent, rotation of screw shafts 11, 12 and 13 supported by

and extending upward from casing 34 as shown in FIG. 9. An endless chain 35 encircles and engages sprockets 36, 37 and 38 mounted on the lower ends of screw shafts 11, 12 and 13, respectively. Rotation of any of these shafts will therefore turn correspondingly the other two shafts. In FIGS. 9, 10 and 11 intermittent drive mechanism for screw shaft 13 is shown as an overrunning clutch within a casing 39 which is shown in detail in FIG. 12. Balls 40 are engaged in angles between the interior of casing 39 and the straight sides of a block 41 secured to screw shaft 13. Followers 42 are pressed against the respective balls 40 by compression springs 43 to urge them toward their angles.

A force can be exerted on casing 39 to turn it relative to block 41 by exerting a force on arm 44 projecting radially from the casing 39, such as by a link 45 connecting such arm to a lever 46. Such lever can be swung by a rotary cam 47 mounted on shaft 48 and having a lobe engageable with cam follower roller 49, rotatively mounted on such lever. Shaft 48 is rotated by a motor 50 shown in FIG. 1 which turns a sprocket 51 to drive chain 52 engaged with such sprocket and with sprocket 53 secured on shaft 48.

The lower end of lever 46 is mounted on base 34 by pivot 54 and the upper end of such lever is normally swung toward screw shaft 13 by a tension spring 55 connected between the upper end of such lever and the base 34. Every time shaft 48 makes one revolution, therefore, its lobe will engage the cam follower roller 49 and swing the lever 46 from the solid-line position to the broken-line position of FIG. 10. When the cam lobe moves out of engagement with the follower roller, the spring 55 will swing the lever from the broken-line position of FIG. 10 into the solid-line position of that figure and in doing so will swing arm 44 of the overrunning clutch shown in FIG. 12 in the counterclockwise direction. Such movement of the arm will cause the casing to force the balls 40 into the angle between the casing and the block 41 to turn such block and, consequently, screw shaft 13, through a predetermined small increment of rotation.

It is desired to turn screw shafts 11, 12 and 13 only at times and to the extent necessary to raise the bag-supporting plate 10, or plates 10 and 10', sufficiently to keep the upper bag of the upper pack in the path of movement of an article to be bagged pushed by a pusher 2. Consequently, it is desirable to time the indexing swinging of arm 44. This could be done by starting and stopping motor 50 intermittently but, alternatively, can be accomplished by controlling the effect of cam 47 on cam follower roller 49. In such case, cam 47 can be turned continuously but lever 46 can be swung by mechanism independent of cam 47 and cam follower 49 when desired so that the cam and cam follower will not engage to cooperate with spring 55 in oscillating lever 46 in synchronism with the cam rotation.

For the purpose of controlling the swinging of lever 46 independently of cam 47 and cam follower 49, a link 56 can connect such lever to one end of a lever 57 mounted on a central pivot 58. The pivot 59 connecting lever 57 to link 56 is engaged in a slot in lever 56 so that, when the lever 57 is in the position of FIG. 10, the link 56 may be reciprocated unrestrictedly by engagement of cam 47 with cam follower 49. The upper end of lever 57 is connected by pivot 60 with a plunger 61 of a fluid-pressure cylinder or diaphragm actuator 62. When such plunger and cylinder or actuator moves lever pivot 60 to the left from the position shown in FIG. 10 to that of FIG. 11, pivot 59 will draw link 56 to the right from the position of FIG. 10 to that of FIG. 11 in opposition to the force of spring 55 so that continued rotation of cam 47 will not effect oscillation of lever 46 and reciprocation of link 45. Consequently, block 41 will remain quiescent until the cylinder of actuator 62 is deactivated.

As has been mentioned above, conjoint rotation of screw shafts 11, 12 and 13 effects elevation of the plate 10 or plates 10 and 10'. Such elevating movement is accomplished by engagement of arcuate notches of the plates with the threads of the respective screw shafts. FIGS. 13 and 14 show the struc-

ture of such a plate as including fixed arcuate notches 63 and 64 on one edge of the plate constituting nut means for engagement simultaneously with the threads of the screw shafts 12 and 13 respectively. A third notch 65 of the plate structure is engageable with the threads of screw shaft 11 but such notch is formed in a plate-supporting latch arm 66 mounted swingably on the shelf means plate by a pivot 67. A torsion spring 68 encircling such pin and engaging the plate and arm 66 urges such arm outwardly toward the position in which its notch 65 would engage the thread of screw shaft 11.

The swinging end of arm 66 is guided for swinging movement by being received between arcuate guides 69. A handle 70 projects from the swinging end of such lever, and such swinging end also carries a latch finger 71 guided for sliding lengthwise of handle 70 by a guide 72. Such latch finger can be drawn outward by engagement with a handle 73 projecting laterally from it in opposition to the force of compression spring 74 which urges the latch member inward. Such latch finger can retain the latch arm 66 in position with its notch 65 in engagement with the thread of screw shaft 11 by the latch fingertip engaging a notch 75 in the outer portion of a guide 69. Alternatively, the latch arm 66 can be secured in an inwardly swung position by engaging the inner end of the latch finger 71 in a notch 76 in a guide member 69 adjacent to the edge of plate 10.

In the construction shown in FIGS. 15 to 20, a somewhat different arrangement is shown for inserting a refill bag pack and for controlling elevating movement of the bag packs. In FIG. 15 the indexing of screws 11, 12 and 13 is similar to that described in connection with FIGS. 9, 10 and 11, being controlled by connecting the lever 46 by a link 56' to a lever 57' which is pivoted at 58'. The upper end of lever 57' is engaged in a slot formed by a strap on the side of link 56' so as to provide a lost-motion connection between such lever and link. Spring 55 normally holds link 56' to the left in FIG. 15 to enable the lobe of cam 48 to engage cam follower 49 as the cam rotates for indexing screw shaft 11. The end of lever 57' remote from link 56' can be swung by movement of plunger 61' to the left, actuated by solenoid 62', to move the upper end of such lever to the right. The lever then holds link 56' to the right for tilting lever 46 so that cam follower roller 49 will be held out of the path of the rotating lobe of cam 48 to prevent raising of the bag pack supporting plates when not necessary.

Also in the construction shown in these figures, the long tubular spindles 21 of the apparatus shown in FIGS. 5 to 8, inclusive, for maintaining the bags in registry are replaced by short solid spindles 77 having tapered lower ends. A refill bag pack 14' can be raised into position beneath a bag pack 14 by being supported on a rest 78 guided for elevational movement by a slide block 79 slidable along a guide rod 80. Such guide is held in upright position by an anchor plate 81 supported by the anchor plate supporting bars 82. Such rest is counterbalanced by a supporting tension spring 83 connecting such rest to the machine frame.

In one end of rest plate 78 are mounted tubular bag registry spindles 84 located to slide over the downwardly tapered tips of spindles 77 when the rest is raised from a lower position such as shown in FIG. 17 to a raised position such as shown in FIG. 18. When the rest is in such lower position, the legs 85 of a wicket extending through the apertures of a refill bag pack 14' can be inserted into the upper ends of the tubes 84 as shown in FIG. 16. Such wicket legs are connected by the bale 86 to prevent the bags from getting out of registry. The refill bag pack is thus transferred onto a pack-supporting plate 10' lying on the rest. When this transfer of the refill bag pack has been made to the position shown in FIG. 17, the wicket 85, 86 is withdrawn.

With the refill bag pack thus lying on the plate 10', the rest 78 can be raised by an operator's hand engaged beneath it as shown in FIG. 18 until the upper side of the refill bag pack 14' has been engaged with the lower side of the upper plate 10 as shown in FIG. 19. The latch 71 of the lower plate can then be

retracted and the arm 66 swung outward by manipulation of handle 70 until the notches of the plate assembly are engaged with the threads of screw shafts 11, 12 and 13. Such raising of the rest has also caused the tubular spindles 84 of the rest to slide over the downwardly projecting solid spindles 77' so that the registering apertures of the refill bag pack are penetrated by such solid spindles. During such operation the spindles 84 can telescope into tubes 84', shown in FIG. 19, to whatever extent may be necessary, in opposition to the tube-projecting force exerted by springs 84''. The rest 78 can then be allowed to drop to the position to which it is suspended by its spring 83 as shown in FIG. 19, by which movement the tubular spindles 84 will have been withdrawn from the apertures of the refill bag pack and will have been projected again by springs 84''.

With the two plates 10 and 10' thus engaged with the screw shafts 11, 12 and 13, the two bag packs are moved upward in synchronism as the screws are turned intermittently. At any selected elevation of the shelf means plate 10 along the screw 11 the latch finger 71 of the upper plate 10 can be released by manipulation of handle 73 and latch arm 66 swung inward by manipulation of handle 70 to disengage its notch 65 from screw 11 so as to release the upper plate from the screw for removal in the manner indicated by FIG. 20. The handle 17'' can also be pulled downward to lower the bag lip support leaf from the position of FIG. 19 through the broken-line position of FIG. 20 to the solid-line position where such leaf again will support the lip end of the bag pack. Upon release of the handle, the compression spring 18 will press the leaf 15 upward to clamp the lip end of the bag pack between such leaf and the holddown 20.

I claim:

1. In a bagger, first bag pack supporting means supporting a first bag pack adjacent to a loading station, second bag pack supporting means underlying said first bag pack supporting means and supporting a refill bag pack beneath said first bag pack supporting means, raising means for raising said second bag pack supporting means, rest means for supporting said second bag pack supporting means beneath said raising means and guided for movement relative to said raising means to facilitate orientation of said second bag pack supporting means relative to said raising means for engagement therewith, first spindle means carried by the bagger adjacent to the loading station and engaged in apertures in the bags of the first bag pack for effecting registration of the bags thereof, and transfer spindle means carried by said rest means and engageable with apertures in the refill bag pack on said second bag pack supporting means and alignable with said first spindle means for transfer of the registering apertures of the refill bag pack from said transfer spindle means to said first spindle means.

2. In the bagger defined in claim 1, the transfer spindle means including spindles, spindle-receiving tubes into which said spindles can be retracted lengthwise, and spring means in said tubes urging said spindles into positions extended lengthwise from said tubes.

3. In a bagger, a bag pack supporting means supporting a first bag pack adjacent to a loading station, first spindle means mounted on the bagger adjacent to said loading station and engaged with registering apertures of a first bag pack supported by said bag pack supporting means, and transfer spindle means engaged with registering apertures of a refill bag pack and engageable with said first spindle means for guiding movement of the apertures in the refill bag pack from said transfer spindle means to said first spindle means.

4. In the bagger defined in claim 1, one of the spindle means having tubular spindle ends and the other spindle means hav-

ing spindle ends engageable in said tubular spindle ends for arranging spindles of the two spindle means in alignment.

5. In the bagger defined in claim 1, the first spindle means including upright spindle portions, generally horizontal spindle portions and curved spindle portions connecting said upright spindle portions and said generally horizontal spindle portions.

6. In a bagger, bag pack supporting means for supporting a first bag pack adjacent to a loading station and a refill bag pack beneath the first bag pack, and bag pack lip engaging means engageable beneath at least part of the first bag pack lip portion and movable into a corresponding position engaged beneath at least part of the refill bag pack lip portion.

7. In the bagger defined in claim 6, the bag pack lip engaging means including a hinged leaf and spring-pressed supporting means for said hinged leaf elevationally movable for transfer of said leaf from a position engaged beneath the lip portion of the first bag pack to the position engaged beneath the lip portion of the refill bag pack.

8. In a bagger, first bag pack supporting means supporting a first bag pack adjacent to a loading station, second bag pack supporting means underlying the first bag pack and supporting a refill bag pack in position for supporting the first bag pack in substitution for said first bag pack supporting means supporting the first bag pack, common raising means engageable simultaneously by both of said bag pack supporting means and always moving both of said bag pack supporting means simultaneously when engaged with said common raising means, and latch means carried by said first bag pack supporting means and retractable from said common raising means in any selected raised position of said first bag pack supporting means to release said first bag pack supporting means from said common raising means in such a selected raised position for removal of said first bag pack supporting means from between the first bag pack and the refill bag pack to enable the first bag pack to be supported by the refill bag pack.

9. In the bagger defined in claim 8, the raising means including a plurality of screw shafts and the first bag pack supporting means including a plate disengageably engageable with at least one of said screw shafts for elevation by conjoint rotation thereof.

10. In a bagger, bag pack supporting means supporting a bag pack, raising means engageable by said bag pack supporting means for raising the same, and rest means beneath said raising means for supporting said bag pack supporting means and guided for movement relative to said raising means to facilitate orientation of said bag pack supporting means relative to said raising means for raising engagement therewith.

11. In a bagger, raising means including a plurality of upright screw shafts, and bag pack supporting means including shelf means supporting a bag pack and latch means movable relative to said shelf means and engageable with the threads of at least one of said screw shafts for raising said shelf means by rotation of said screw shafts and movable relative to said shelf means and to the threads of said screw shafts at various locations of said shelf means along the lengths of said screw shafts into thread-disengaged position for separation of said bag pack supporting means from said screw shafts.

12. In the bagger defined in claim 11, the latch means of the bag pack supporting means including nut means engageable with the thread of a screw shaft and retractable therefrom by movement relative to the shelf means.

13. In the bagger defined in claim 11, the latch means being disengageable from the thread of a screw shaft at various locations along the length of such screw shaft between the ends of its screw thread.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,590,553 Dated July 6, 1971

Inventor(s) Alvin C. Formo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 40, cancel "spindle" and insert --spindles--;
line 43, cancel "14" and insert --14'--.

Column 3, line 26, cancel "its" and insert --the--; same
line, after "lobe" insert --of its cam 47--.

Column 4, line 13, cancel "lever" and insert --arm--;
line 18, cancel "member" and insert --finger--; line 37,
cancel "48" and insert --47--; line 38, cancel "11"
and insert --13--; line 43, cancel "48" and insert
--47--.

Column 5, line 5, cancel "77'" and insert --77--.

Column 5, line 57, cancel "a", second occurrence, line 66,
cancel "1" and insert --3--.

Column 6, line 3, cancel "1" and insert --3--; lines 57
and 58, cancel "bag pack supporting" and insert --shelf--.
line 62, after "means" insert a period.

Signed and sealed this 8th day of February 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents