

Nov. 16, 1971

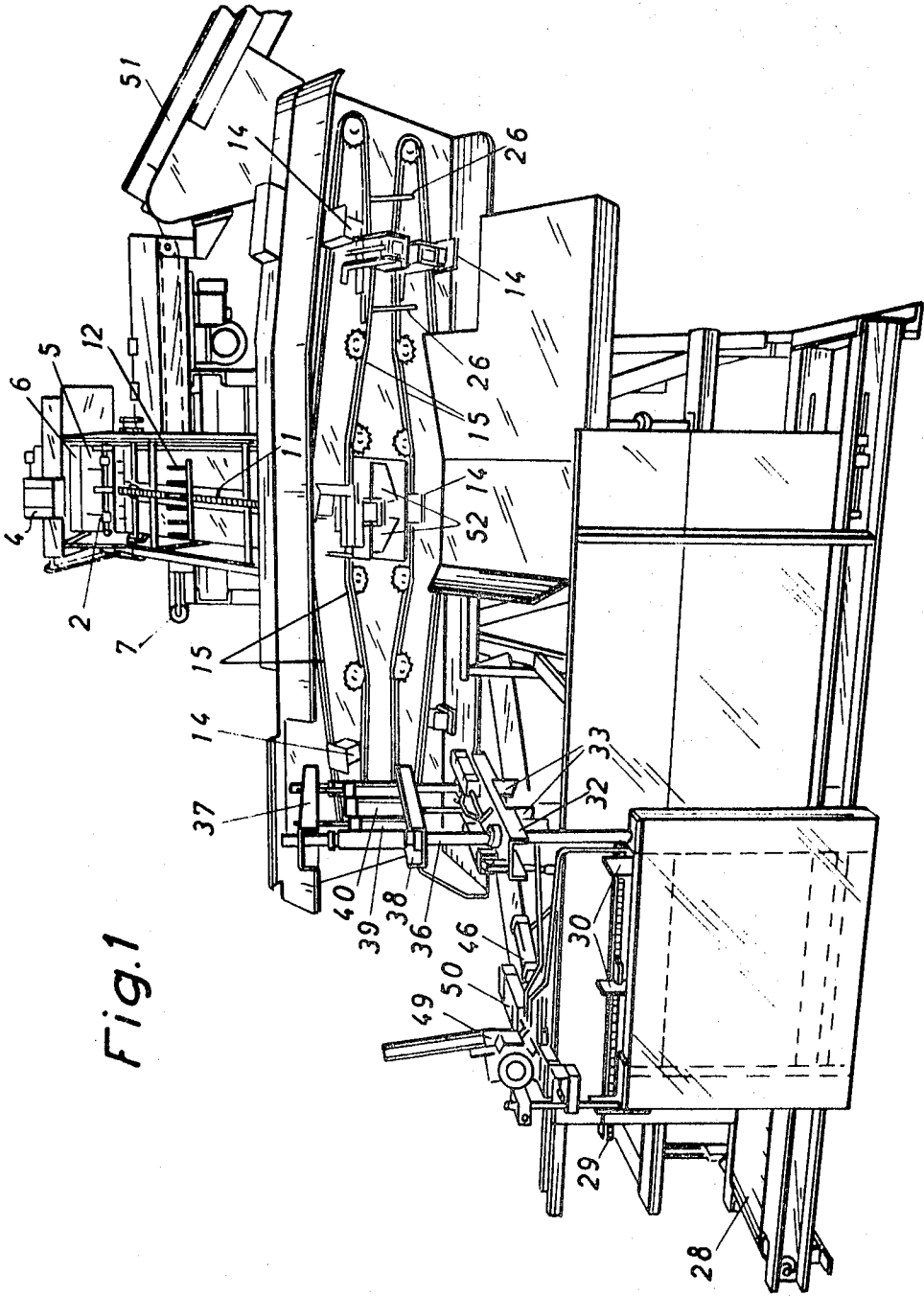
E. G. KAPARE

3,619,968

METHOD AND APPARATUS FOR PACKING SMALL PACKAGES HAVING  
VARYING CONFIGURATION AND CONTAINING ROOT-CROPS  
INTO LARGER RECEPTACLES

Filed Nov. 17, 1969

9 Sheets-Sheet 1



Nov. 16, 1971

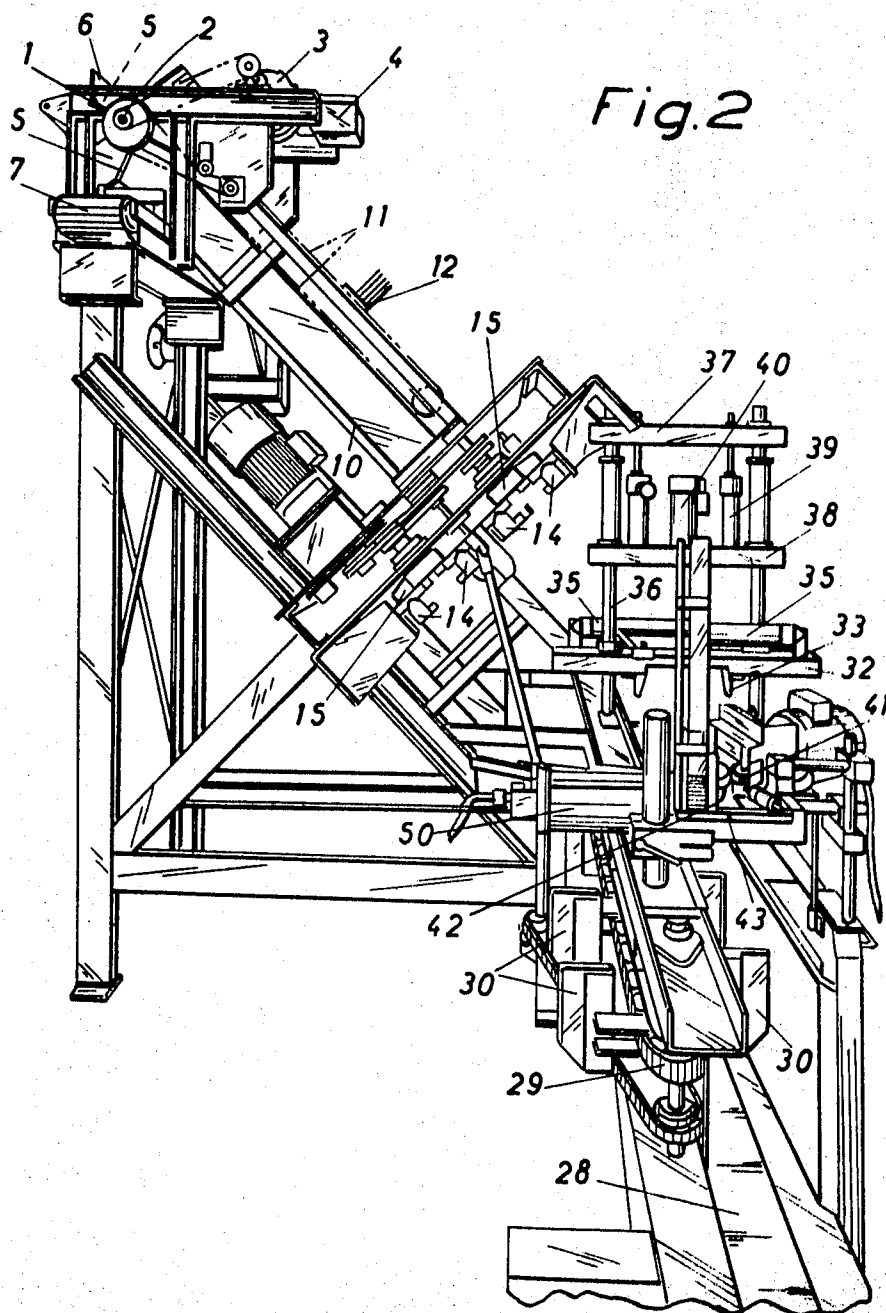
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9 Sheets-Sheet 2



Nov. 16, 1971

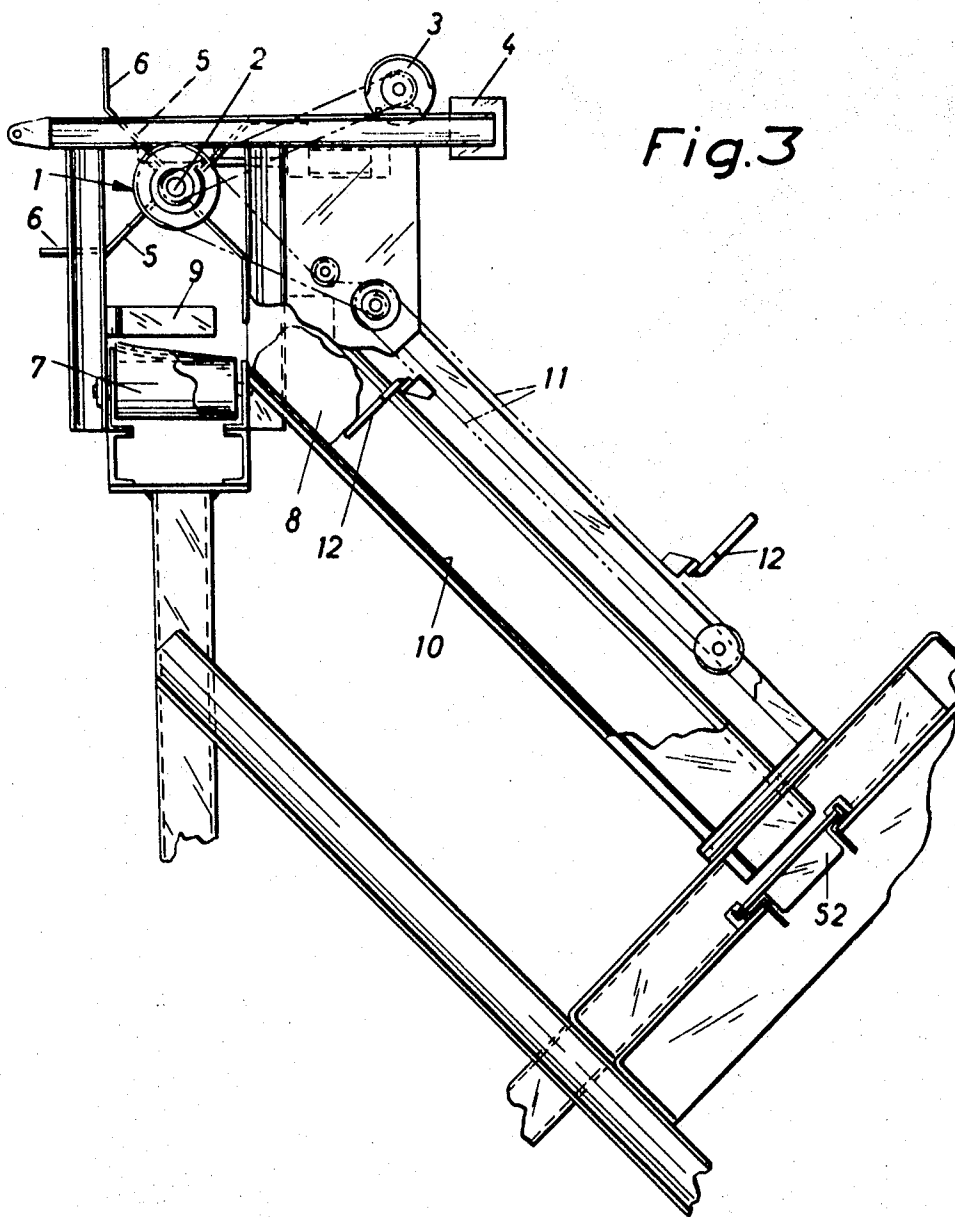
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9 Sheets-Sheet 5



Nov. 16, 1971

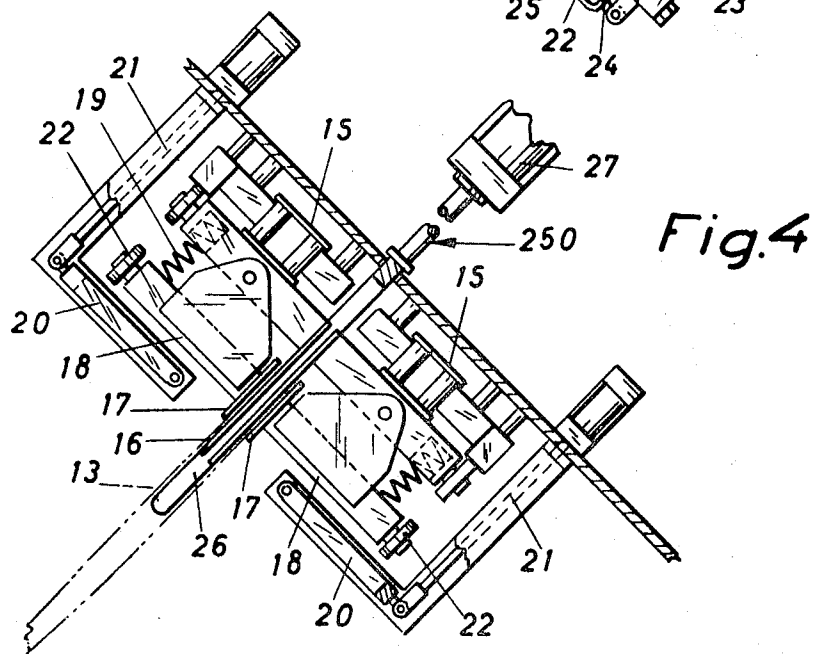
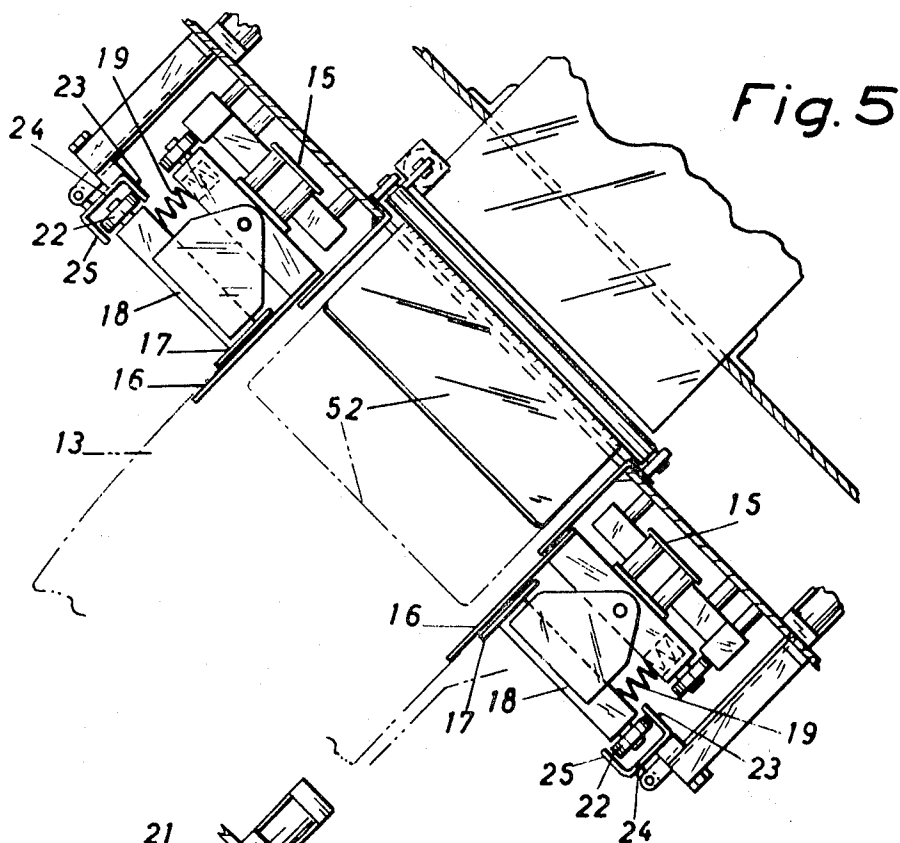
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Filed Nov. 17, 1969

9 Sheets-Sheet 4



Nov. 16, 1971

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Filed Nov. 17, 1969

9 Sheets-Sheet 5

Fig. 6

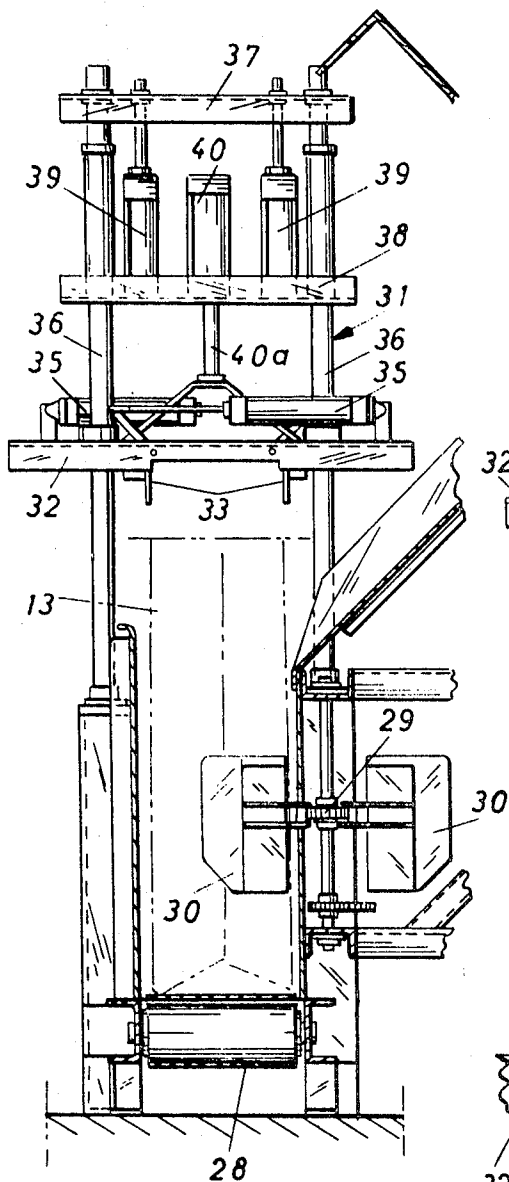


Fig. 7

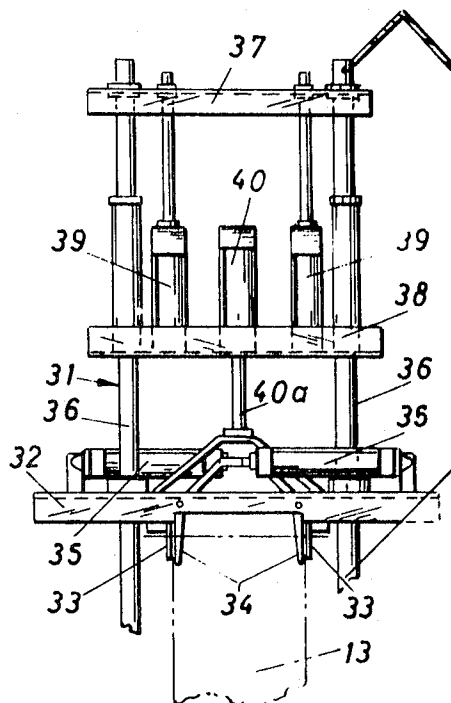
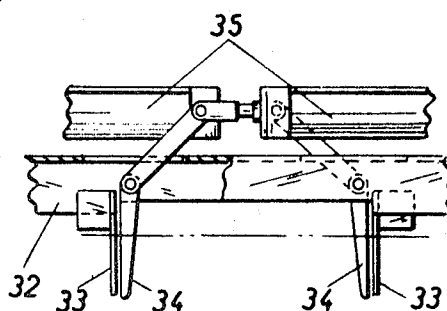


Fig. 8



Nov. 16, 1971

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INTO LARGER RECEPTACLES

3,619,968

Filed Nov. 17, 1969

9 Sheets-Sheet 6

Fig. 9

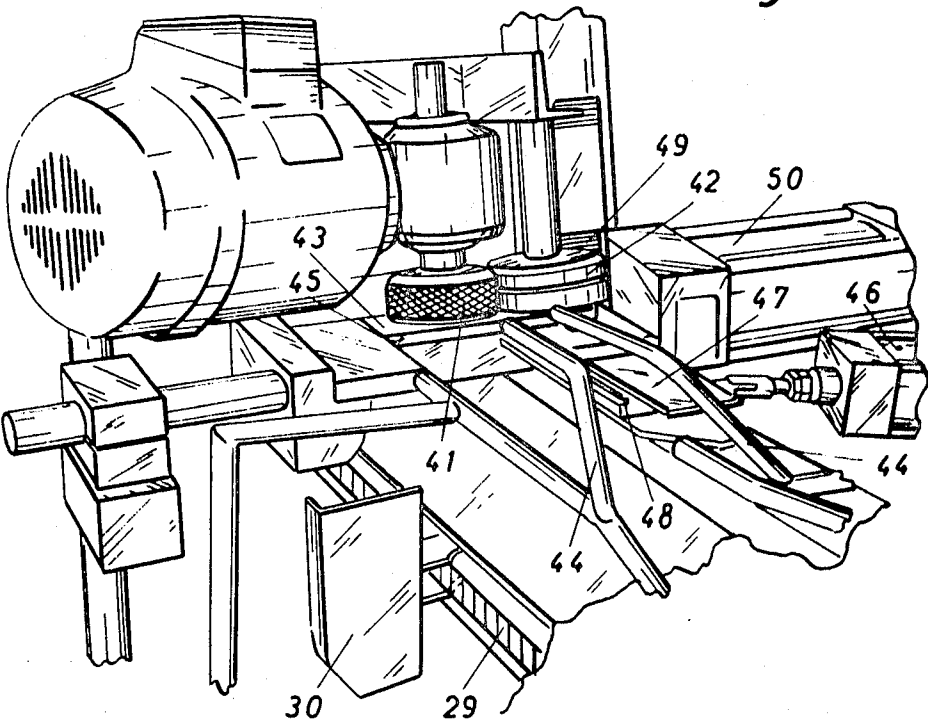
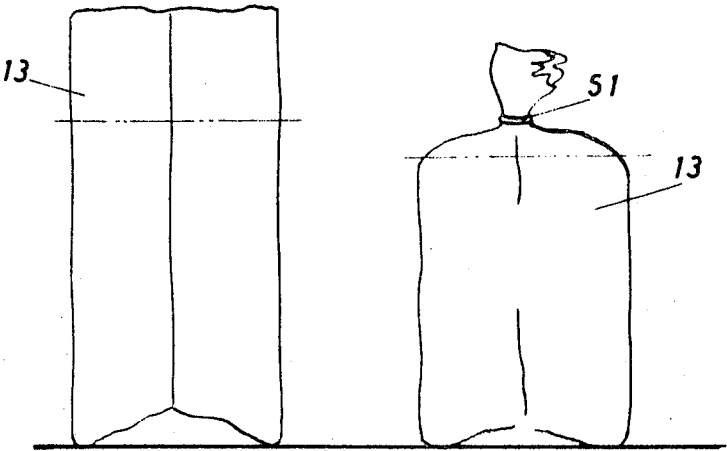


Fig. 10

Fig. 11



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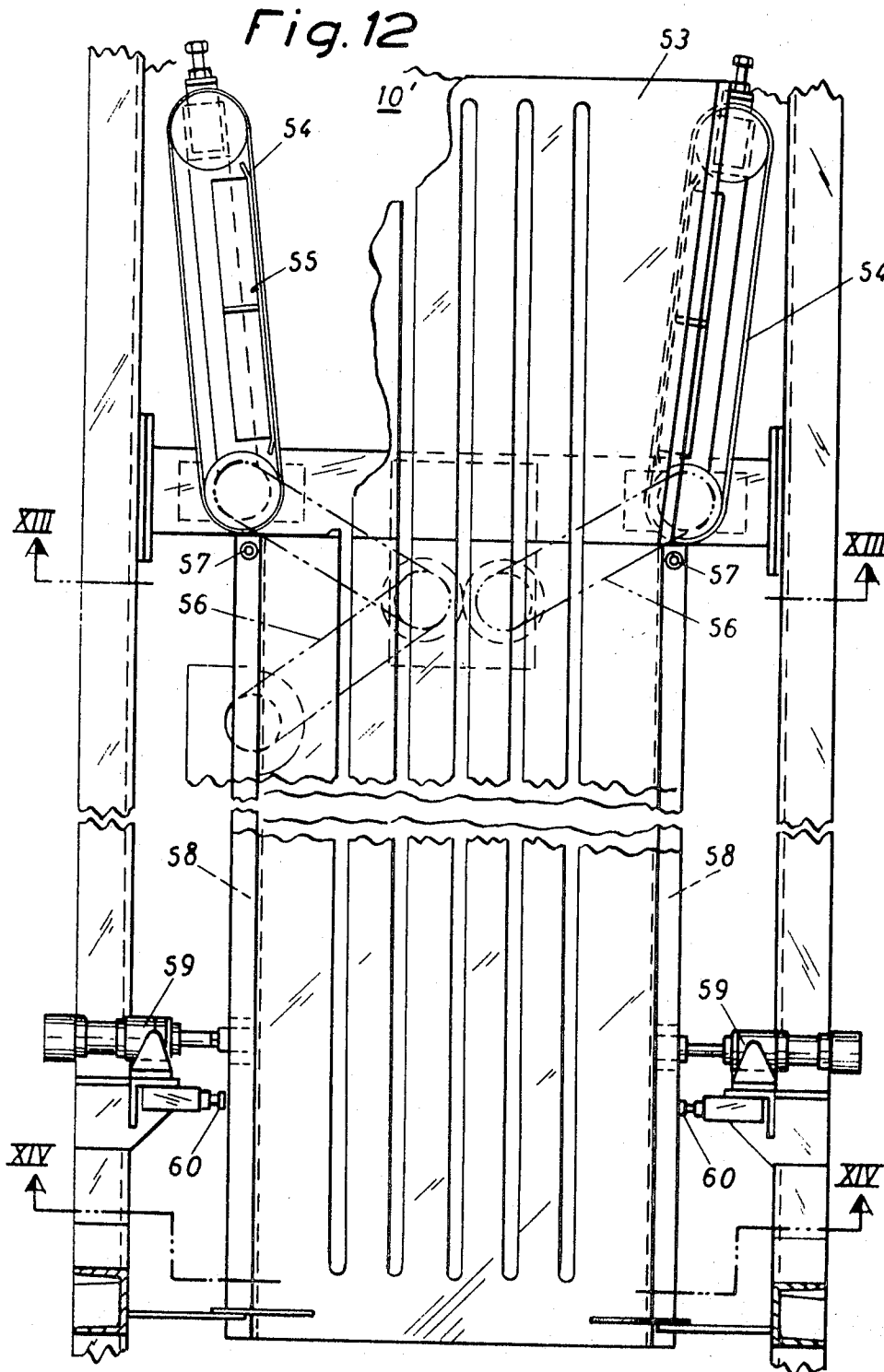
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Filed Nov. 17, 1969

9 Sheets-Sheet 7



Nov. 16, 1971

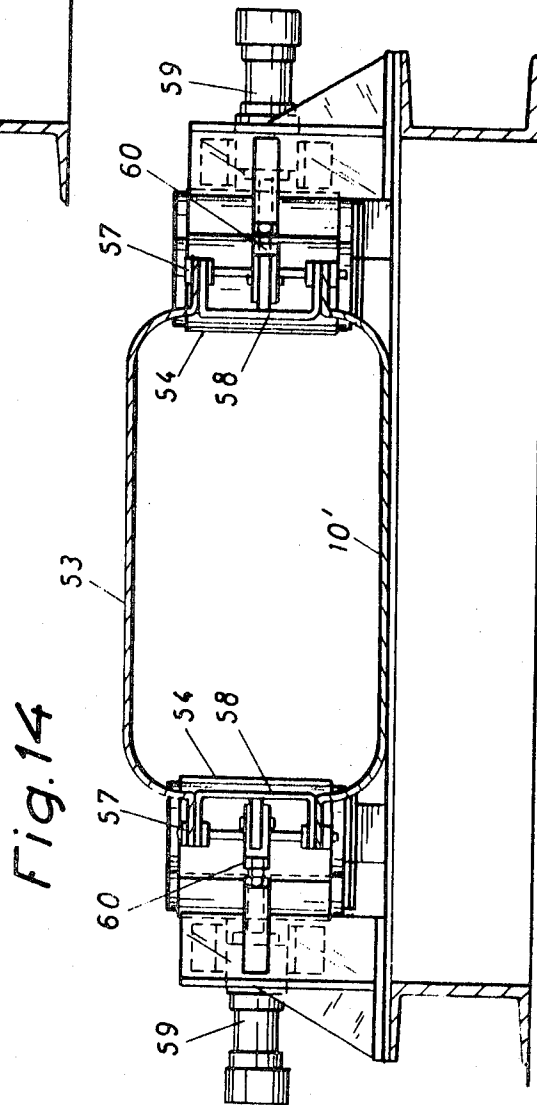
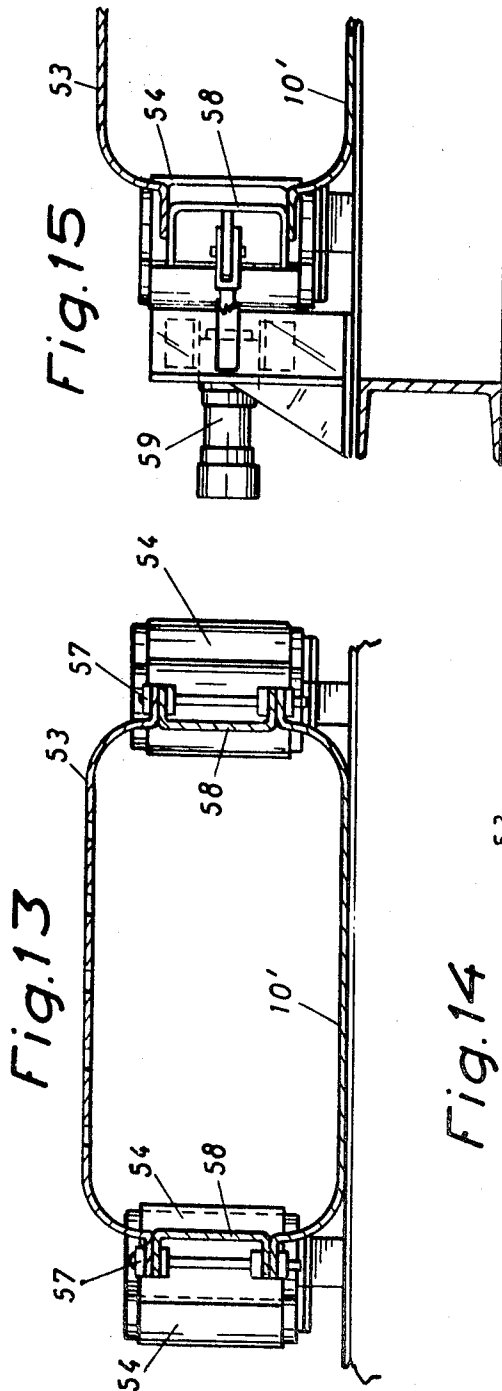
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Filed Nov. 17, 1969

9 Sheets-Sheet 8





**Nov. 16, 1971**

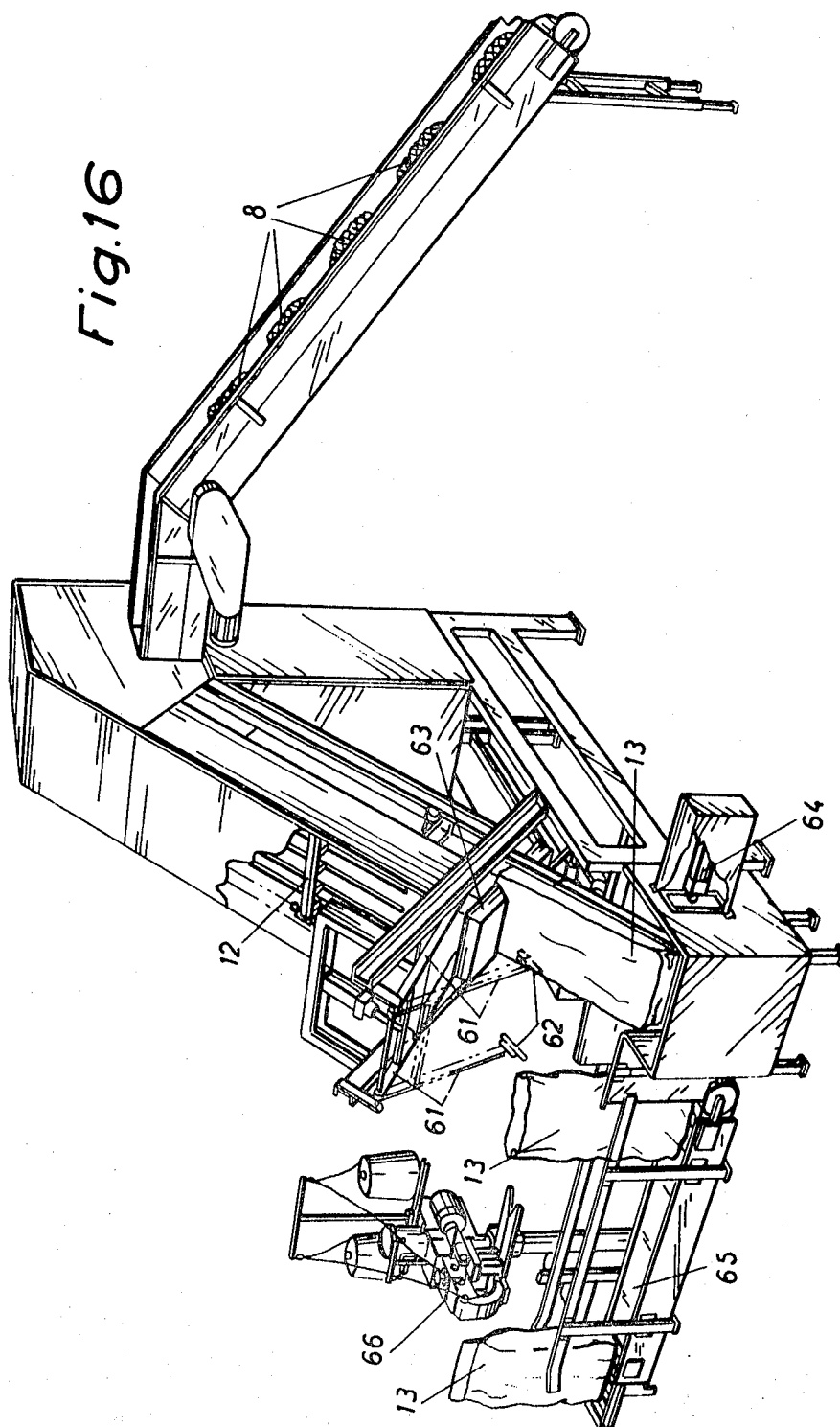
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## METHOD AND APPARATUS FOR PACKING SMALL PACKAGES HAVING VARYING CONFIGURATION AND CONTAINING ROOT-CROPS INTO LARGER RECEPTACLES

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Filed Nov. 17, 1969, Ser. No. 877,234

Claims priority, application Sweden, Nov. 25, 1968,

16,001/68; Nov. 11, 1969, 15,426/69

Int. Cl. B65b 35/50, 5/06

U.S. Cl. 53—26

17 Claims

### ABSTRACT OF THE DISCLOSURE

A method and a machine for packing small packages having varying configuration and containing root-crops, particularly potatoes into larger units. The smaller packages are fed into a step-by-step operating feeder mechanism which dispenses the packages stepwise onto a chute, one package at a time. The chute is provided with a stopper means which extends in the transverse direction of the chute so as to catch each package as it slides down the chute. The stopper means is adapted to move stepwise at the speed of dispensing of the feeder mechanism downwards along the chute and when a predetermined number of packages have aggregated the stopper means releases the unit of packages thus aggregated whereby they will fall into a sack beneath the chute as a close unit. In addition, retaining means are arranged to hold the sack in open position at the lower end of the chute and closing means for closing the sack.

### BACKGROUND OF THE INVENTION

To facilitate handling and distribution of roots such as for instance potatoes and the like the packing thereof takes place in centers. The packaging operation is carried out in the following manner. A certain quantity, such as 10 pounds, of potatoes is filled in a net bag or the like and a number of net bags thus filled, having a total weight of approximately 50 pounds, are then packed in paper sacks or the like.

The packing of the smaller packages into sacks has hitherto been done almost exclusively manually. When the net bags, the shape of which is very indefinite, are packed into the sacks it is necessary that they are placed one on top of the other in a flattened condition in order that the sack is filled uniformly and in addition the sack is lifted and shaken to further compact the potatoes. This work is heavy and for this reason cannot be done at the same speed as the filling of the net bags, unless carried out by a larger number of persons than those handling the filling of the net bags.

It should also be mentioned that the work becomes additionally heavy because the sacks, when shaken, must not touch the ground. If this happens the potatoes particularly those at the bottom of the sack will be damaged either directly or gradually as they will be subject to a quicker deterioration and decay than the rest.

Various automatic devices have been designed to facilitate this packaging work. However, none of them has produced satisfactory results, primarily on account of the difficulties arising from the indefinite shape of the root packages.

### SUMMARY OF THE INVENTION

The present invention which more specifically relates to a method of packaging such small packages which have varying configuration and contain roots, particularly potatoes, such that these smaller packages form larger units, has been conceived with a view to obtain

2

a method making possible for one person alone to handle the whole process of packaging the net bags in sacks and simultaneously shake and close these sacks. The characteristic features of the invention are that the smaller packages, when fed to a feeder mechanism which operates by step-by-step movements, are fed one at a time by said mechanism onto a chute at the upper part of which they are caught by a stopper means positioned transversely of the chute and deposited by said means, one on top of the other in a flattened condition, so as to abut against said stopper means which is adapted to progress step by step downwards along the chute at the rate of dispensing of the packages onto the chute, and that the packages, when a predetermined number thereof have assembled and formed a unit, are released from the stopper means and allowed to slide freely along the lower part of the chute down into a sack or the like which is attached to this chute end and kept by means of retaining means in open position, whereupon the sack is conveyed to a closing device to close the sack mouth.

The invention also relates to a machine for performing the method. It is characterised by at least one conveyor means for feeding packages into a step-by-step operating feeder mechanism which is adapted to dispense the packages stepwise one by one onto a chute across which chute is arranged at least one stopper means catching the packages sliding down said chute, the stopper means being adapted to progress step by step, at the same speed as the step feeder dispenses packages onto the chute, from the upper end of the chute towards the lower end of the chute and to release a unit formed of a predetermined number of packages, as soon as such a predetermined number has assembled, by retaining means for holding a sack or the like in an open position at the lower end of the chute, and by a closing means for closing said sack.

### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described more in detail in the following with reference to the accompanying drawings, in which:

FIG. 1 is a front view of the machine in accordance with the invention,

FIG. 2 is a side view thereof,

FIG. 3 illustrates, on an enlarged scale, the upper part of the machine as seen from the side,

FIGS. 4 and 5 illustrate on an even larger scale and in various positions, the sack holding means incorporated in the machine,

FIGS. 6-8 illustrate a shaker mechanism included in the machine, in various positions of the mechanism,

FIG. 9 is a perspective view of the closing device of the machine,

FIGS. 10 and 11 illustrate a sack in various stages of packing,

FIG. 12 is a broken plan view of the upper part of the machine in accordance with a modified embodiment wherein the chute forms the bottom of a drum having hinged side walls,

FIG. 13 illustrates a section along line XIII—XIII in FIG. 12,

FIG. 14 illustrates a section along line XIV—XIV in FIG. 12, the side walls being swung inward;

FIG. 15 illustrates one drum half along the same section line but the side wall being swung open, and

FIG. 16 is a perspective view of the machine in accordance with a further developed embodiment.

### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

In the upper part of the machine is disposed a feeder mechanism 1 operating by step-by-step movements the

horizontal rotatable shaft 2 of the mechanism being drivingly connected with the shaft of the programming disks 3 of a programming work 4 controlling most of the operating functions of the machine. The step feeder mechanism 1 comprises vanes 5 projecting radially from the shaft 2. The outer portion 6 of said vanes is bent backwards in relation to the direction of rotation of the step feeder mechanism. Beneath the step feeder mechanism 1 is disposed a belt conveyor 7 for feeding the smaller packages 8 of potatoes or the like below the same. Between the step feeder mechanism 1 and the belt conveyor 7 is arranged a vertical plate 9 which, when contacted by a package 8, gives an impulse both to the conveyor 7 to stop and also to the step feeder 1 to advance one step.

A sloping chute 10 extends from one longitudinal side of the belt conveyor 7, the inclination of said chute relative to the ground plane preferably being approximately 45°. A chain conveyor 11 or the like having a circular path is arranged above the chute 10 such that it extends parallel thereto, perpendicularly projecting forks 12—two such forks are provided in the shown embodiment (FIG. 3)—being attached to said chain conveyor to serve as stopper means for the packages 8 delivered to the chute 10. When at the beginning of a working sequence a first package 8 is fed onto the chute 10, one fork 12 is positioned, as is shown in FIG. 3, at the upper end of the chute and thereafter progresses downwards step by step, one step for each new package fed onto the chute at the pace of dispensing of the step feeder mechanism 1.

To hold and advance the sacks 13 in which the smaller packages are to be packed, retaining means 14 are arranged, said retaining means being attached to chain conveyors 15 or the like, spaced apart by mutually equal distances. The conveyors 15 are arranged in closed loops, one at each side of the lower end of the chute 10.

The retaining means 14 consist of two plates 16 and 17 that can be pressed together one plate 16 being fixed and the other one 17 mounted on one end of an arm 18 which is adapted to swing towards and away from the fixed plate. A spring 19 arranged at the opposite end of the arm 18 is adapted to hold the plates 16 and 17 pressed together.

A link arm 20 which is parallel to the arm 18 is arranged laterally of said swingable arm 18 at the side opposite the spring 19 and said link arm 20 is pivotally mounted at its inner end and at its outer end is pivotally connected to a piston cylinder 21, disposed at right angles to the link arm. When urging the link arm 20 towards the outer end of the swingable arm 18 by means of the piston cylinder 21 the plate 17 will open up a clearance between the two plates 16 and 17.

The retaining means 14 operate in pairs, one in each conveyor loop 15, and one sack 13 consequently is held simultaneously by two retaining means which each follows its own, separate path. When one pair of retaining means advances towards the chute 10 with a sack being clamped between the plate 16 and the plate 17 of the retaining means, as appears from FIG. 1, the retaining means will move apart, causing the sack to open.

At the outer end of the swingable arm 18 of the retaining means 14 is arranged a runner wheel 22 which when the retaining means advances towards the mouth of the chute 10, abuts against the inner surface of the upper flange 23 of a U-shaped rail 24 extending in the direction of feeding with its flanges facing inwards. The plate 17 will hereby be pressed against the plate 16 with a pressure that exceeds the one exerted by the spring 19. The purpose of this arrangement is to prevent the sack 13 which at this moment extends in open position over the mouth of the chute 10 from being pulled away from the retaining means 14 by the sliding packages 8.

The rail 24 is displaceable perpendicularly to its own longitudinal direction. When displaced upwards, the inner surface of the lower rail flange 25 will press against the runner wheel 22 at the outer end of the swingable arm 18,

whereby the plate 16 is released from the plate 17 and the sack 13 allowed to fall down.

Empty sacks are clamped in the retaining means 14 disposed at the right as seen in FIG. 1. To facilitate clamping of the sacks a preferably U-shaped fork element 250 is here disposed between the two conveyor loops 15 of the retaining means 14, one limb 26 of the fork being disposed at each side of a pair of retaining means. The fork element 250 is displaceable in its longitudinal direction, or rather vertically with respect to the retaining means 14, by means of a piston cylinder 27. When an empty sack has been threaded on the limbs 26 of the fork element the edge portions at the mouth of the sack will, through displacement inwards of the fork element 250 by said piston cylinder, be inserted between the plates 16 and 17 of the respective plate pair, the plates being at this moment kept apart by the link arm 20 actuated, as previously explained, by piston cylinder mechanism 21. Thereafter the link arm 20 is returned to the position out of contact with the arm 18 and the plates 17 under the influence of springs 19 will be returned to clamping position as shown in FIG. 4.

When the sack 13 has been filled with a definite, predetermined number of smaller packages at the mouth of the chute 10 the sack is released from the retaining means 14 and slides down onto a belt conveyor 28 between follower means 30 which are attached to a chain conveyor 29 and situated above the belt conveyor, the purposes of said follower means 30 being to prevent the sack from falling over.

It is often suitable to further compact the smaller packages in the sack. For this purpose the machine may include a shaker device 31 up to which the sack is thereafter advanced. The shaker device comprises clamping means for the sack, said clamping means consisting of fixed plates 33 directed vertically downwards from a horizontal frame 32. The lower angular portion of angle bars 34 which are pivotally mounted on the frame 32, is adapted to be pressed against said fixed plates 33 and the upper angular portions of the angle bars 34 are connected to one piston cylinder 35 each mounted on the frame.

The frame 32 is moveable over two vertical uprights 36 and can be raised or lowered over the belt conveyor 28 by means of a lifting element included in the shaker device 31. The lifting element consists of a pair of piston cylinders 39 which are interposed between a fixed transverse arm 37 located at the upper end of the uprights 36 and an arm 38 positioned between the arm 37 and the frame 32, the said arm 38 being displaceable over the uprights.

The shaker device proper is arranged on the arm 38. Shaker device consists of a piston cylinder 40 the piston 40a of which is rigidly connected to the frame 32.

The packaging machine in accordance with the invention further includes a closing device of partly known construction. It embraces in accordance with the invention a means intended to deform or crumple the mouth portion of the sack 13. This closing means consists of two substantially horizontal, abutting rotary wheels 41 and 42. They are adapted to constrict the mouth opening of the sack 13 when the latter passes between said wheels whereby the mouth portion is pressed against a wall 43 positioned behind said wheels. A pair of bars 44 or the like are provided to guide the mouth portion of the sack 13 towards the wheels 41, 42, the said bars being arranged in front of said wheels and extending in the direction of transport while converging inwards towards the wheels.

The wall 43 is provided with a horizontal slit 45. This detail is incorporated in a known closing device marketed under the registered trademark Tipper Clip® and further comprising a horizontal arm 47 which is pivotable around its inner end and at its outer end is connected to a piston cylinder 46, the said arm 47 being provided with a longitudinal slit 48 which, upon swinging-in of the arm towards the wall 43, forms a channel together with the slit 45. At the end of said channel there is provided a clip storage 49

5

from which a clip 51 by means of a clip feeder device 50 can be inserted into the channel to enclose and seal the sack mouth.

The packaging process will be described in detail in the following. From the centre where the potatoes are weighed and packed in small net bags or the like these smaller packages are deposited on a conveyor 51, care being thereby taken that the packages which are usually of elongate shape, are deposited on the conveyor in their longitudinal direction. The packages are fed onto the belt 7 which stops as soon as a package 8 abuts against the plate 9. The package 8 is at this stage positioned opposite the chute 10 and is pushed onto said chute by one of the vanes 5 of the step feeder mechanism 1. On the chute 10 the package 8 is immediately caught by one of the forks 12. When the immediately following package 8 is deposited on the chute, the fork 12 progresses one step downwards and leaves space on the chute for the second package. This stepwise process is continued until the fork 12 has reached its lower turning point. Because they are caught immediately when fed onto the chute 10 the packages aggregate one on top of the other in a flattened condition, which would not have been the case, had they been allowed to slide freely down along the full length of the chute. Owing to the step by step feeding they are further compacted.

While the packages 8 are aggregating in a definite number on the chute 10 the only person operating the packaging machine threads an empty sack 13 over the limbs 26 of the fork element 250 which by means of the piston cylinder 27 is displaced inwards, whereby the mouth portions at the edge of the sack are inserted between the plates 16 and 17 of the retaining means 14, the said plates being spaced apart at this moment.

The sack 13 is fed to the mouth of the chute 10 by the retaining means 14 working in pairs, the said retaining means following as described above diverging paths and in doing so, opening up the sack on its way to the chute mouth. When the sack reaches said mouth, a pair of mouth-opening flaps 52 swing down into the sack to open it up further.

In this position the fork 12, carrying the packages 8, has reached its lower turning point, turns and thereby allows the packages, now assembled as a unit, to slide freely along the lower portion of the chute 10 down into the sack 13, the flaps 52 serving as guide plates. Because the packages 8 are allowed to slide into the sack as close unit compact filling of the sack is ensured.

The sack is thereafter lowered onto the conveyor 28 and advanced to the shaker device 31. By means of the piston cylinders 35 the mouth edge portions of the sack are clamped between the fixed plates 33 and the lower angular portion of the angle bars 34, whereupon the piston cylinders 39 lift the entire frame 32 a certain distance such that the sack will be suspended above the conveyor 28. The shaker means 40 starts at this moment and through rapid and short movements upwards and downwards for a few seconds it causes the potatoes to be more closely packed in the sack 13. In FIGS. 10 and 11 which illustrate the appearance of the sack 13 before the shaker process and after the finished packaging, respectively, is indicated the approximate degree of further compacting to be obtained through the shaker process.

After completion of the shaker process the sack is again lowered down onto the conveyor 28 and released. It is thereafter forwarded to the closing device, the mouth portion of the sack being guided by means of the rods 44 in towards the wheels 41, 42 through which said mouth portion is pulled so as to be constricted and thereupon pressed against the wall 43. The arm 47 is thereupon swung forwards, a clip 51 is inserted in the channel formed by the slots 45 and 48 and the sack is closed by being deformed and pressed against the wall opposite the clip storage 49. Finally, the sack is pulled by the conveyor 28 and one of the follower means 30 out of the closing device.

6

FIGS. 12-15 illustrate a modified version of the machine shown in FIG. 3. According to this embodiment the chute is formed from the bottom 10' of a drum 53 having an essentially rectangular cross-sectional shape.

When the packages 8 are fed transversely along the chute they tend to extend unnecessarily much lengthwise if the width of the drum 53 exceeds the length of the packages by a broad margin. If, on the other hand, the drum 53 is very narrow one runs the risk that the packages 8, on account of an excess of friction against the side walls, will not be given sufficient time to be packed tightly one on top of the other during the step-by-step displacement downwards of the stopper means arranged across the chute 10', and not fall as a close unit down into the sack.

The problem of making the packages 8 move downwards along the chute 10' in a somewhat compressed condition and still avoid the above-mentioned disadvantages has been solved in accordance with the invention in that the drum is formed at its upper portion with said walls which converge in the direction towards the outlet opening and with side walls at its remaining portion which can be swung outwards at their lower ends from a position in which said walls are substantially parallel relatively each other. At the upper portion of the drum 53 the side walls are preferably in the form of continuous belts 54 rotating in a direction such that the inner half of each belt moves towards the outlet opening of the drum. During such movement the belt 54 slides over a guide rail 55.

Reference numeral 56 designates the driving mechanism of the belts 54.

This arrangement ensures that the walls can converge relatively sharply without risk that the packages 8, when delivered onto the chute 10', will be blocked. At the same time they are forced into a compact shape.

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The remaining portions of the drum 53 consist of side walls which are pivotally mounted at 57 at their upper ends to form laterally swingable rails 58. Displacement in the lateral direction is effected by means of piston cylinders 59 from an inner position in which the rails 58 are essentially parallel or preferably diverge somewhat in the feeding direction, to an outer position in which the rails diverge to a larger extent. The degree of swingability can be adjusted by means of stops 60.

During the successive packing of the packages 8, one on top of the other on the stopper means 12 in the drum, they become somewhat flattened and in doing so abut against the side walls. However, there is no risk that the packages 8 will get stuck anywhere along this portion of the drum 53, particularly as the rails 58 diverge slightly already in their inner position. The friction between the packages and the side walls is, however, so strong that, had the walls been rigid, the packages would have been unable to slide down into the sack as a close unit when the stopper means 12 is swung away. Particularly the last package of each unit would have been delayed as compared with the rest.

In accordance with the invention the side walls, formed by the rails 58, will instead, when the stopper means 12 is swung upwards, be simultaneously swung out from the position shown in FIG. 14 to the position shown in FIG. 15, whereby the packages will slide down into the sack without difficulty as a close unit.

As appears from FIGS. 13-15 the drum 53 has rounded corners and consequently a shape that is well adjusted to that of the packages 8 and the sack mouth.

FIG. 16 shows a further developed and in several respects simplified embodiment of the machine in accordance with the invention. The entire system comprising the chain conveyor 15 and the retaining means 14, shown for instance in FIG. 1, has been eliminated in this embodi-

ment. The fork element 25 is replaced by a pair of arms 61 which are positioned obliquely over the outlet opening of the drum and swingable in vertical direction. These arms are adapted, when a sack 13 has been threaded onto the cross limbs 62 at the lower free ends of the arms, to be swung inwards towards the outlet opening where the retaining means 63 having the same function as the retaining means 14, clamp the sack walls at the mouth portion thereof and open up the sack.

When the sack 13 has been filled and released it is brought by means of a piston cylinder 64, a so-called pusher, out onto a conveyor 65 of conventional kind which carries the sack straight to a closing device which in accordance with this embodiment is constituted by a sewing machine 66 of known construction.

Owing to the well organized method and design of the machine having a high degree of automation one has succeeded in obtaining high capacity and good filling of the sacks while at the same time providing a careful handling of the roots. The nominal capacity of the machine attains one 10-pound package per second, and consequently the maximum capacity to be reckoned with is fifty packages per minute. The packaging is thereby naturally carried out consecutively, one sack being present at each position simultaneously.

The invention is not limited to the embodiment shown and described but can be varied in various ways within the scope of the appended claims. The step feeder mechanism may, instead of the circularly running vanes shown in FIG. 3, be provided with a pusher positioned at the side of the conveyor 7 opposite the entry end of the chute 10, the said pusher being directed towards the entry end and consisting, like the piston cylinder 64, of a piston cylinder operated by the programming works 4.

All functions in accordance with the invention, i.e. the stepwise feeding, the application and clamping of the sacks, the combined clamping, lifting and shaking and finally closing of said sack, are effected by pressure means, but hydraulic or electrical means are likewise possible.

What I claim is:

1. A method for packing small packages of varying configuration and containing root-crops, such as potatoes and the like, into larger units, comprising the steps of feeding the small packages by a conveyor to a step-by-step operating feeder mechanism, passing said small packages into said feeder mechanism and operating said mechanism to feed said packages individually onto a downwardly inclined chute, catching and holding said small packages on said chute by means of a stopper means positioned transversely of said chute, actuating said stopper means progressively step-by-step downwardly along said chute at a rate of movement comparable to the dispensing of said packages onto said chute by said step-by-step feeder mechanism, accumulating on said chute a plurality of said small packages one against another in a flattened condition with the lowermost package abutting said stopper means until a predetermined number of small packages have been assembled and formed into a unit, then releasing said assembled unit of small packages from said stopper means and allowing said packages to slide freely as a unit down the lower end of said chute, positioning a sack at the lower end of said chute for receiving the released unit of small packages and holding said positioned sack in open position during the discharge of said unit into said sack, conveying the thus filled sacks to a closing mechanism and closing the sack openings.

2. In an improved machine for packing small packages of varying configuration and containing root-crops, such as potatoes and the like, into larger units, the combination comprising a step-by-step operating feeder mechanism, at least one conveyor means for conveying the small packages into said step-by-step operating feeder mechanism, a downwardly inclined chute associated therewith into which the feeder mechanism is adapted to feed stepwise said packages one by one, at least one stopper means

associated with said chute and arranged transversely thereof and adapted to catch and hold said packages delivered to said chute, means for moving said stopper means progressively downwardly of said chute step-by-step at the same speed as the step-by-step movement of said feeder mechanism, means for releasing as a unit a predetermined number of said packages on accumulation thereof from said chute, retaining means for holding a sack in open position at the lower end of said chute for reception of said predetermined number of packages as a unit and closing means for closing said sack.

3. The machine according to claim 2, wherein the step feeder mechanism consists of vanes extending radially from a horizontal rotatable shaft.

4. The machine according to claim 3, wherein the outer portion of the vanes is bent at an angle away from the direction of rotation.

5. The machine according to claim 2, wherein the stopper means is a fork and wherein a chain conveyor having a circular path is provided in a position above said chute and extending parallel thereto, the fork being attached to said chain conveyor so as to project essentially perpendicularly from said conveyor.

6. The machine according to claim 2, wherein chain conveyor means are provided, the said chain conveyor means being arranged in closed loops, one at each side of the lower end of the chute, the said sack retaining means being spaced equidistantly apart along said chain conveyor means.

7. The machine according to claim 6, wherein the retaining means comprise two plates which are arranged to be pressed together, one of said plates being fixed and the other one mounted on one end of an arm, the said arm being adapted to swing towards and away from the fixed plates, a spring being mounted on the opposite end of said swingable arm, the said two plates being adapted to clamp between them a mouth portion at the edge of the sack through the action of said spring.

8. The machine according to claim 7, wherein a link arm is provided, the link arm being disposed at that side of the swingable arm which is opposite the spring and adapted, when urged against the free end of the swingable arm, to space the said two plates apart.

9. The machine according to claim 6, wherein two retaining means are provided, the said means operating in pairs and one such means being disposed in each loop for clamping the sack at the mouth edge portions thereof, the said retaining means being adapted, when advanced towards the mouth of the chute, to move apart to opposite sides of the chute, thereby to cause the sack to open up.

10. The machine according to claim 7, wherein a runner wheel is attached at the free end of the swingable arm of the retaining means, a U-shaped rail being positioned at the mouth of the chute and extending in the direction of feeding, the said runner wheel being adapted, upon advancement of the retaining means towards the chute, to abut against the inner surface of the upper flange of said U-shaped rail, thereby causing the plates to be clamped together with a pressure that exceeds the one exerted by the said spring.

11. The machine according to claim 10, wherein the plates are adapted to be separated at the mouth of the chute through displacement of the rail in the transverse direction to press the lower rail flange against said runner wheel.

12. The machine according to claim 9, wherein a fork element is provided, positioned in the area in which empty sacks are inserted between the two conveyor loops of the said retaining means, one fork limb being disposed at each side of one pair of the retaining means, the said fork element being arranged for displacement in its longitudinal direction substantially perpendicularly to the plane of the path of the retaining means, and adapted, when an empty sack has been manually threaded on its limbs,

9

through it said displacement inwards towards the path plane to force the mouth edge portions of the sack in between the said plates of the retaining means.

13. The machine according to claim 2, wherein a shaker mechanism is provided for compacting the packages in the sack, the said shaker mechanism comprising clamping means adapted to hold the sack at the mouth edge portions thereof during the shaking operation, lifting means in the form of preferably vertical piston cylinders to bring the sack to a suspended position prior to the beginning of the shaking process, and a shaker means, likewise in the form of a piston cylinder and rigidly connected to the clamping means, the said shaker means being adapted to compact the packages in the sack.

14. The machine according to claim 2, wherein the closing means comprise an element for constrictingly deforming mouth portion of the sack, the said element consisting of two substantially horizontal, rotary wheels abutting against each other and adapted, upon the passage of the sack between said wheels, to constrict the mouth portion of said sack while pressing it against a wall positioned therebehind.

15. The machine according to claim 14, wherein bars are provided being positioned in front of the wheels and extending in the direction of feeding so as to converge towards the wheels and adapted to guide the mouth portion of the sack towards said wheels when the sack is being feed towards the said closing devise.

10

16. The machine according to claim 2, wherein the chute consists of the bottom of a drum having a substantially rectangular cross-sectional shape, the upper portion of said drum having its side walls converging in the direction of feeding-out while the side walls at the remaining portions are adapted to be swung outwards at their lower ends from a position in which they are essentially parallel to each other.

17. The machine according to claim 16, wherein the converging walls at the upper portion of the drum consist of rotating endless belts and the walls at the remaining portions of the drum consist of rails, adapted to be swung out at the lower end thereof.

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U.S. Cl. X.R.

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