Feb. 24, 1931. J. L. FUHREMANN 1,794,009

VEGETABLE SNIPPING MACHINE

Filed April 18, 1929 2 Sheets-Sheet 1

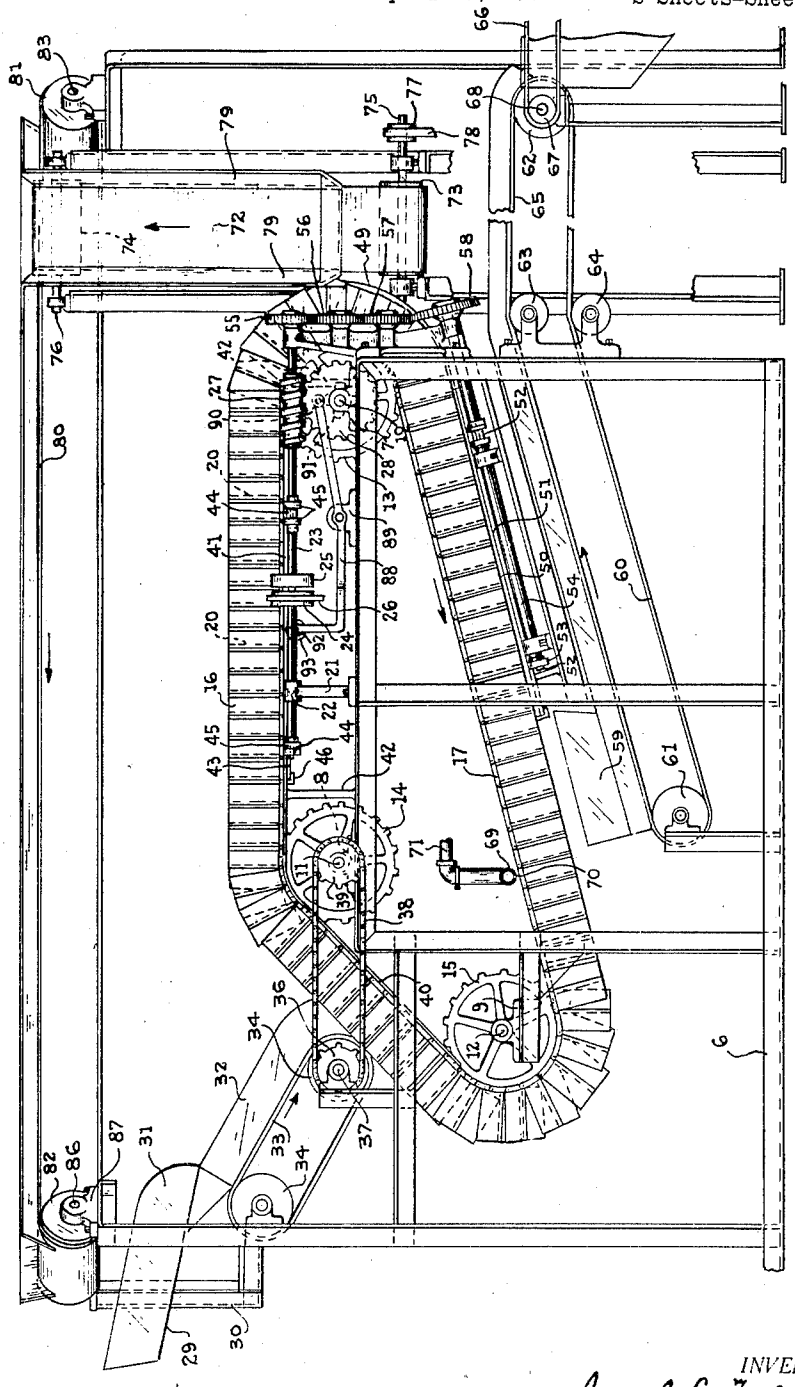


Fig. 1

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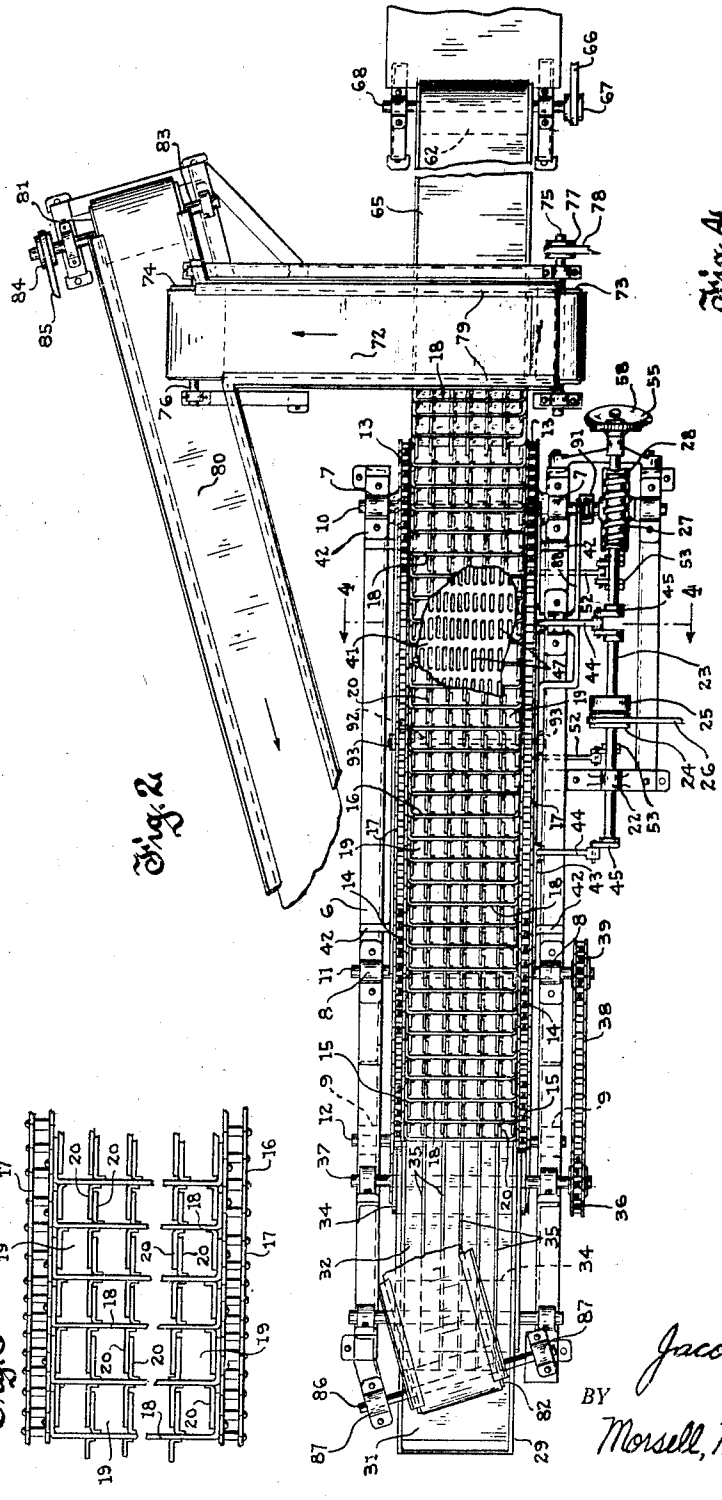


Fig. 2

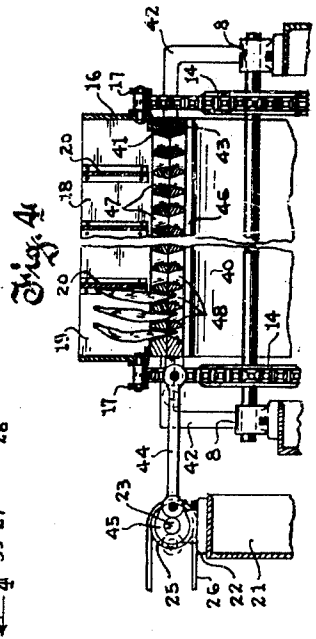


Fig. 4

Fig. 3

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UNITED STATES PATENT OFFICE

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VEGETABLE-SNIPPING MACHINE

Application filed April 18, 1929. Serial No. 356,006.

This invention relates to improvements in vegetable snipping machines, and more particularly to a machine for snipping the end portions of beans.

A primary object of the invention is to provide a machine of a relatively large capacity for expeditiously and efficiently, without undue waste, severing and removing the end portions of edible vegetables and particularly string beans, preparatory to the beans being cooked and canned, said severing operation generally being known as "snipping".

A further object of the invention is to provide a snipping machine in which the beans are carried in an upright position to the snipping knives by a pocketed endless conveyor.

A further object of the invention is to provide a snipping machine in which the beans are engaged by the snipping knives while in a vertical position with the conveying member being arranged to automatically reverse the beans as to ends after the first snipping operation to present to another set of snipping knives the other ends of the beans.

A further object of the invention is to provide a snipping machine of the class described so arranged that the bean ends will practically always be engaged by and operated on by the cutting knives.

A further object of the invention is to provide a bean snipping machine in which the beans are not unduly tumbled and bruised rendering them unfit for use.

A further object of the invention is to provide a bean snipping machine in which the beans, when in snipping position, are held vertically, with the provision of means, adjacent the knives, for jolting the conveyor, to aid gravity in causing the beans to sink within the conveyor pockets, so as to cause their lower end portions to engage the knives.

A further object of the invention is to provide a snipping machine having means for engaging and removing from the main conveyor, beans which were improperly positioned for snipping and reconveying the same to the hopper.

A further object of the invention is to provide in a snipping machine, means for automatically cleaning the conveyor pockets rearwardly of the discharge end of the conveyor.

A further object of the invention is to provide a snipping machine for beans and the like which is of very simple construction, is efficient, rapid and automatic in its operations, is strong and durable, and is well adapted for the purposes described.

With the above and other objects in view the invention consists of the improved snipping machine, and its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of the improved snipping machine;

Fig. 2 is a plan view thereof with parts broken away;

Fig. 3 is an enlarged fragmentary plan view of the pocketed conveyor; and

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 2 and on a larger scale.

Referring now more particularly to the drawings it will appear that the supporting frame for the improved snipping machine is indicated generally by the numeral 6 and journaled in bearing brackets 7, 8 and 9 carried by said frame are shafts 10, 11 and 12, on the opposite end portions of each of which are mounted fast pairs of sprockets 13, 14 and 15 respectively.

The pairs of sprockets 13, 14 and 15 are adapted to carry and to motivate the main endless conveyor of the machine which is indicated generally by the numeral 16. Said main conveyor consists of a pair of spaced chains 17 extended around said sprockets and between said chains are pivotally secured the flanged end portions of a plurality of spaced flights 18. To divide the spaces between adjacent flights into rows of cells or pockets 19, said flights carry at right angles thereto partitions 20 which are of less length than the distance between adjacent flights and the partitions of adjacent pairs of flights are overlapping, as shown in Fig. 3. The overlapping arrangement of said partitions permits a spreading of the same, without com-

plete separation, when said portions are carried by the conveyor chains around the sprockets.

Extending laterally from the machine frame 6 is a side frame 21 carrying a bearing bracket 22 in which is journaled a two-part shaft 23. Said shaft carries fast and loose pulleys 24 and 25 respectively engageable by a belt 26 extending to a source of power (not shown), by which means the shaft 23 is driven. One end portion of said shaft is formed with a worm 27 engaging a worm wheel 28 mounted fast on the end portion of the sprocket shaft 10, on which shaft the sprockets 13 are mounted fast. Hence, said sprockets 13 are turned with the shaft 10 to move the main conveyor.

An inclined hopper 29 is mounted on frame members 30 adjacent the upwardly directed portion of the main conveyor between the sprockets 14 and 15. Said hopper comprises an upper bucket portion 31 with a guide portion 32 connected to the lower front portion thereof over a short conveyor belt 33 which travels over rollers 34. Said guide portion is formed with side aprons which terminate over the pockets of the main conveyor and interiorly said guide portion is divided by longitudinal partitions 35 spaced apart the width of the conveyor pockets.

String beans are deposited in the upper bucket portion 31 and slide and are pushed therefrom into the guide portion 32 wherein the partitions separate the beans so that only suitable quantities will be delivered into the various pockets of the main conveyor. The roller 34 and the belt 33 are driven by a sprocket 36 mounted fast on the roller shaft 37 and said sprocket is connected through a chain 38 with a sprocket 39 fast on the shaft 11, which is driven as previously described. Therefore, by the moving belt 33 the beans are carried in the channels between said partitions and are deposited lengthwise in the registering pockets of the main conveyor. It will be noted that an elongated pan 40 forms a bottom portion for said conveyor and pockets for a considerable length thereof and prevents the beans for dropping through.

Adjacent the upper termination of the pan 40, immediately below the upper horizontal portion of the conveyor is an elongated stationary knife member 41 supported by arms 42 from the main frame 6. A laterally movable knife plate 43 underlies the stationary knife plate and said movable knife plate is adapted to be reciprocated against the undersurface of the stationary knife plate by a pair of pivotally connected arms 44 having wrist pin connections with cranks 45 mounted on the driven shaft 23. The stationary knife plate is somewhat longer than the movable knife plate and is formed with depending inwardly extending flanges 46 to guidingly support the end portions of the movable knife plate.

As shown clearly in Figs. 2 and 4 both knife plates are formed throughout their lengths with spaced transverse rows of elongated openings, the openings of the stationary plate being designated by the numerals 47 and the openings of the movable plate being designated by the numerals 48. The walls of the openings 47 are inwardly tapered, while the walls of the openings 48 are oppositely tapered, as in Fig. 4, and normally the rows of openings 47 and 48 register with the result that the lower end portions of beans within the pockets of the main conveyor are disposed with respect to the sets of openings as shown and the reciprocating action of the movable knife plate will cause the bean ends engaged to be sheared.

The shearing or cutting of one set of ends of the beans takes place along the upper length of the main conveyor and when the ends of the knives 41 and 43 are reached the conveyor portion curves around the sprockets 13 and in so moving the upper portion of the conveyor becomes the bottom portion and the beans in the pockets thereof are end-wise reversed and the lower uncut ends (originally the upper ends) rest against a pan 49.

Adjacent the termination of said pan 49, below the lower length of the main conveyor, a stationary knife member 50 and a movable knife member 51 are mounted, said knives being similar to the upper knives 41 and 43 described in detail, and the uncut ends of the beans are snipped or sheared thereby. The movable knife member 51 is reciprocated by arms 52 operated by cranks 53 fast on a lower shaft 54 which is driven through gears 55, 56, 57 and 58 from the upper shaft 23.

After the ends of the beans last mentioned are snipped said beans are carried by the pocketed main conveyor past the lower ends of the knives 50 and 51 and drop into a receiving member 59 mounted on an endless conveyor belt 60 which extends over and around drums 61, 62, 63 and 64. Said conveyor belt carries the snipped beans to an elongated inspection table portion 65 where they may be sorted and removed for packing. The conveyor belt 60 is driven by a belt 66 extending to a source of power (not shown) and said belt 66 drives a pulley 67 fast on an end portion of the shaft 68 of the drum or roller 62.

Disposed over the lower length of the main conveyor beyond the receiving member 59 is a transverse pipe 69 formed with orifices 70. Said transverse pipe 69 is connected by a pipe 71 with a source of fluid supply (not shown) and fluid under pressure is discharged through the orifices 70 into the conveyor pockets and cleans the same prior to their coming into juxtaposition with the member 32 for re-loading.

It may happen that some of the beans delivered to the main conveyor will not lodge in the pockets thereof, but will lie across the flights 18 and partitions 20 forming the pockets. When this is the case the beans so disposed will not be snipped by the knives 41 and 43. However, at the end of the main conveyor beyond said knives, an upwardly directed endless conveyor 72, at right angles to the main conveyor, is mounted. Said conveyor 72 extends around separated rollers 73 and 74 mounted on journaled shafts 75 and 76 respectively and the shaft 75 carries fast thereon a pulley 77 connected by a belt 78 with a source of power (not shown). The conveyor 72 is provided with fixed inclined side portions 79 and one of the same engages the curved end portion of the main conveyor and scrapes therefrom improperly disposed unsnipped beans which beans are carried upwardly by the conveyor 72 and drop from the upper end portion thereof to an endless conveyor 80. The conveyor 80 is carried by spaced rollers 81 and 82 and on the shaft 83 of the roller 81 is a fixed pulley 84 engaged by a belt 85 extending to a source of power (not shown) for driving the conveyor 80. The other roller 82 is carried by a shaft 86 journaled in bearings 87 mounted immediately above the hopper 29. Hence, by this arrangement the improperly disposed unsnipped beans will be scraped from the main conveyor and carried by the conveyor 72 to the conveyor 80 and permitted to drop from the end portion of the latter into the hopper 29 to be again fed to the pocketed conveyor for snipping.

The intermediate portion of an elongated angular lever 88 is pivotally mounted on a bracket 89 carried by an upper horizontal portion of the main frame below the knives 41 and 43. One end portion of said lever carries a small roller 90 engaged by the surface of a cam member 91 mounted fast on the shaft 10. The other end portion of said lever is upwardly off-set and carries at its upper end portion a rod 92 transversely to the knives 41 and 43 and immediately therebelow. Said rod also carries rollers 93 adjacent the side edge portions of the knives and main conveyor. Due to the engagement of the lever roller 90 with the cam 91 said lever will be rocked causing the rollers 93 on the rod 92 to gently jolt or shake the main conveyor so as to cause the beans in the pockets thereof to settle correctly in the pockets with their lower end portions in position to be snipped by the knives.

It will thus be seen that in the improved snipping machine beans or the like are deposited in upright positions into a pocketed conveyor which carries the beans over a pair of complementary knife members which snip the lower ends of the beans. Then, by the movement of the main conveyor the beans are end-wise reversed and the other ends are snipped by another set of knife members. After this action the snipped beans are deposited onto a conveyor for carriage to an inspection table and other operations. Also means are provided for removing beans improperly positioned on the main conveyor and for returning the same to the entrance end of the main conveyor for redisposition.

From the foregoing description it will be seen that the improved vegetable snipper is simple and efficient, and is well adapted for the purposes described.

What is claimed as the invention is:

1. A snipping machine, comprising a moving endless pocketed conveyor having upper and lower lengths, means for feeding beans into the pockets of said conveyor so that the beans are carried substantially upright, an upper cutting mechanism forming the bottom of a portion of the upper length of the conveyor for snipping the lower ends of the beans, means for removing from the conveyor beyond the upper cutting mechanism beans improperly positioned on said conveyor, and a lower cutting mechanism forming the bottom of a portion of the lower inverted length of the conveyor for snipping the other ends of the beans.

2. A snipping machine, comprising a moving endless pocketed conveyor having upper and lower lengths, means for feeding beans into the pockets of said conveyor so that the beans are carried substantially upright, an upper cutting mechanism forming the bottom of a portion of the upper length of the conveyor for snipping the lower ends of the beans, means for removing from the conveyor beyond the upper cutting mechanism beans improperly positioned on said conveyor, means for carrying removed beans and redelivering the same to the forward end portion of the conveyor, and a lower cutting mechanism forming the bottom of a portion of the lower inverted length of the conveyor for snipping the other ends of the beans.

3. A snipping machine, comprising a moving, endless conveyor having upper and lower lengths and carrying outwardly projecting partitions defining rows of pockets, means for feeding suitable quantities of beans into the various pockets of the conveyor, the conveyor carrying the beans substantially upright, an upper cutting mechanism forming the bottom of a portion of the upper length of the conveyor for snipping the lower ends of the beans, means for removing from the conveyor beyond the upper cutting mechanism beans improperly positioned on said conveyor, and a lower cutting mechanism forming a bottom of a portion of the lower inverted length of said conveyor for snipping the other ends of the beans.

4. A snipping machine, comprising a pair of separated cutting mechanisms, a conveyor

moving adjacent both pairs of cutting mechanisms and presenting one set of the ends of vegetables carried thereby to one cutting mechanism for snipping, means for removing from the conveyor beyond said first-mentioned cutting mechanism beans improperly positioned on said conveyor, and means for directing the conveyor after the first snipping operation to cause an endwise reversal of the vegetables to present the other set of vegetable ends to the other cutting mechanism for snipping.

In testimony whereof, I affix my signature.

JACOB L. FUHREMANN.