Jan. 21, 1930. W. E. URSCHEL 1,744,251

ONION TOPPER

Filed Nov. 17, 1926 3 Sheets-Sheet 1

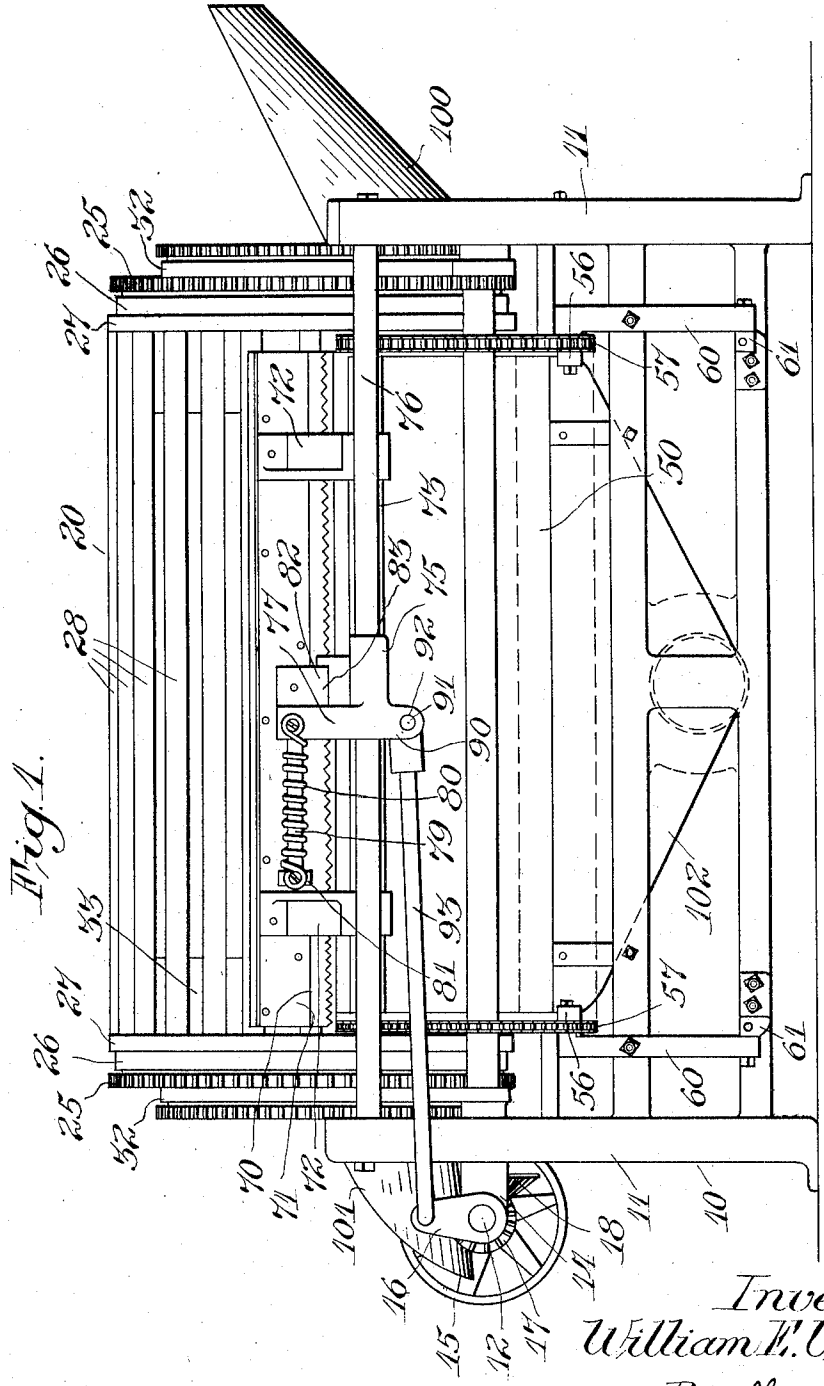


Fig. 1.

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ONION TOPPER

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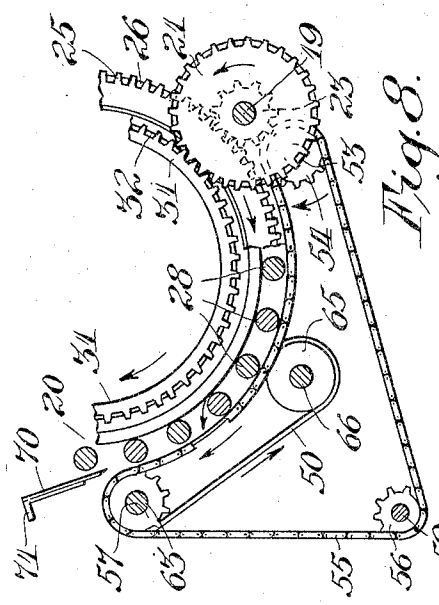


Fig. 8.

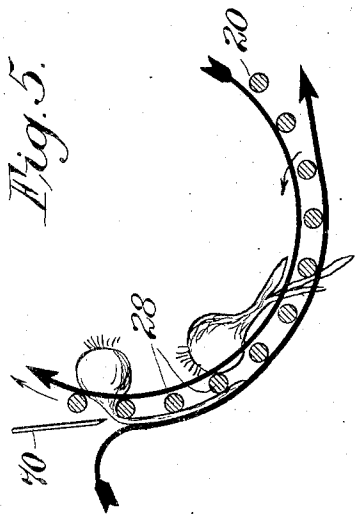


Fig. 5.

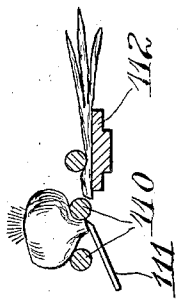


Fig. 7.

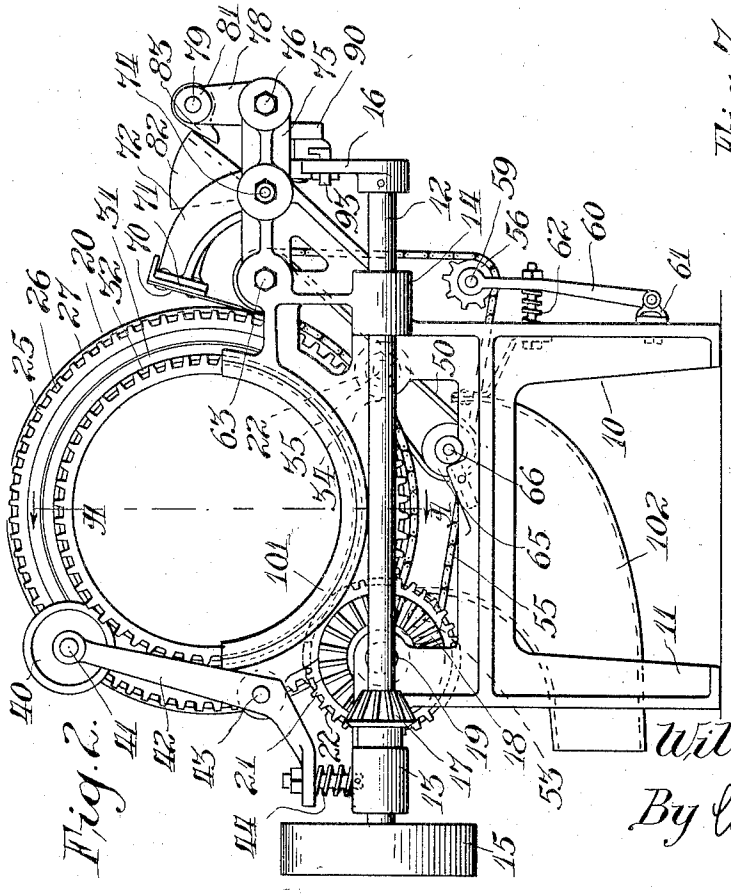


Fig. 2.

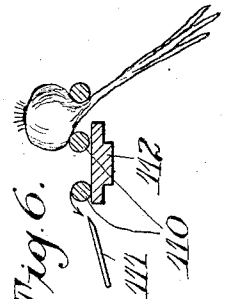


Fig. 6.

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ONION TOPPER

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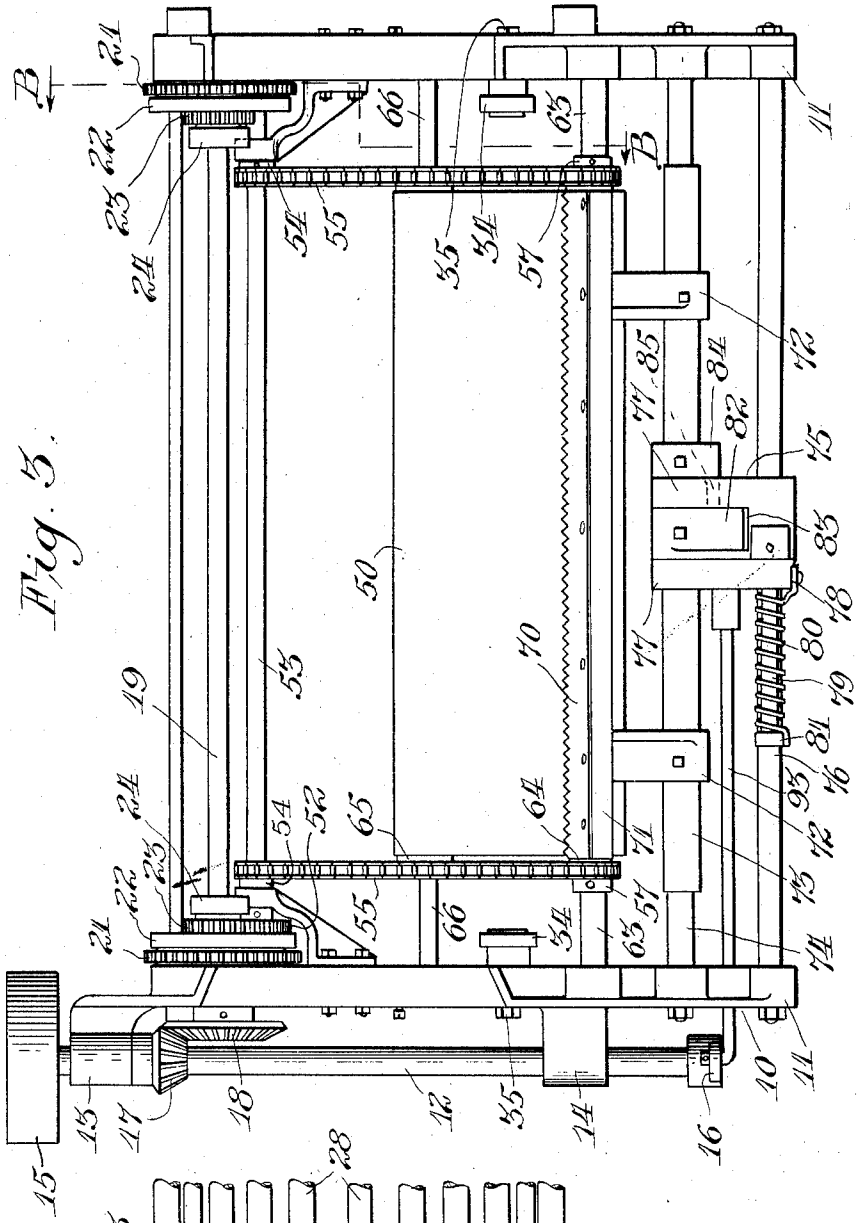


Fig. 5.

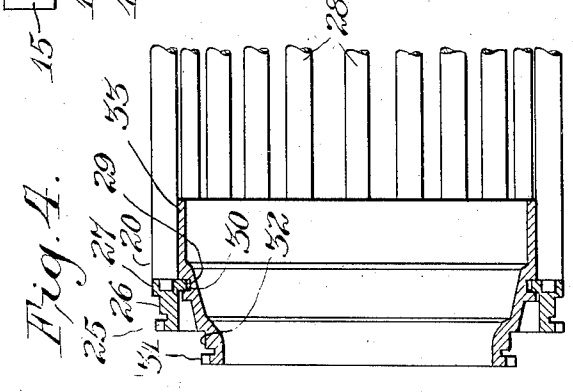


Fig. 4.

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Patented Jan. 21, 1930 1,744,251

UNITED STATES PATENT OFFICE

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ONION TOPPER

Application filed November 17, 1926. Serial No. 148,800.

This invention relates to improvements in stem shearing or topping machines, and more particularly to the type adapted to be used for onion topping.

The objects of the invention are to provide a simple and efficient machine of the class described; to provide an onion topping machine capable of topping onions of all sizes and kinds; to provide a feeding table comprising a plurality of revolving rollers adapted to feed onions over a knife. Such rollers may be actuated in either horizontal or rotary directions as illustrated herein, but preferably embodying the rotary motion; to provide a reciprocally actuated knife, coacting with a plurality of revolvable feeding rollers for shearing the stems or onion tops; to afford a means whereby the onion tops will be drawn between a pair of rollers and snugly but firmly held until severed from the onion body; and to provide a machine of improved construction, affording débris removal and cleansing of the onion simultaneously with the topping operation.

Other and further objects and advantages of this invention will appear during the course of the following description, which will be best understood by reference to the accompanying drawings, in which

Figure 1 is a side elevation of the onion topping machine;

Figure 2 is an elevation of the onion topping machine, looking at the discharge end;

Figure 3 is a plan view of the machine with the revolving cylinder removed;

Figure 4 is a longitudinal cross-section through one end of the revolving cylinder, taken on the line A—A of Figure 2;

Figure 5 is a diagrammatic view illustrating the typical manner in which an onion may be fed to the knife for topping, and the direction of the movement of the members acting thereon;

Figures 6 and 7 are diagrammatic views showing the position of an onion relative to the revolving feeding rollers before and after severing the top thereof; and

Figure 8 is a partial transverse sectional view of the cylinder and endless belt drives, taken on the line B—B of Figure 3.

Referring now in detail to the drawings, the invention is illustrated in the preferred embodiment and comprises a rotary feeding cylinder having a plurality of revolving rollers. It will be seen that this machine affords numerous advantages over the laborious methods heretofore used in onion topping, especially those manual operations incident to large size onions. The machine proper is provided with a supporting frame 10, comprising a pair of longitudinally spaced end pedestals 11, 11, suitably cross braced together to form a rigid support for a rotary cylinder and driving mechanism therefor which will be hereafter fully described.

Reference should now be had in detail to the driving mechanism. Such mechanism comprises a transversely disposed drive shaft 12 mounted in suitable frame bearings 13 and 14 of the pedestal 11 at the discharge end of the machine. Said shaft 12 extends beyond the lateral boundaries of the supporting frame and is provided at the outer end thereof and outside of bearing 13 with a drive pulley 15, said pulley being adapted to be driven by a prime mover whereby the shaft 12 is rotated.

The opposite end of said shaft 12 is provided with a crank lever 16 which is keyed thereto and which is adapted to transmit reciprocal movement to a knife member, which will be hereinafter more fully described. A bevel pinion 17 is keyed on to the shaft 12 adjacent the inner end of bearing 13, and is operably meshed with a bevel gear 18 keyed on the forward end of a shaft 19. The hub of said bevel gear is backed against a boss portion of the forward pedestal 11.

Said shaft 19 extends longitudinally of the machine and is supported in bearings formed integral with the respective pedestals 11, 11. Adjacent the inside of said pedestals 11, 11 and mounted on the shaft 19 are suitable gearing trunnion rollers for driving and supporting a rotary cylinder 20. As the gearing and trunnion rollers and inner and outer gear rings and trunnion races are the same at both ends of the rotary cylinder, the descrip-

tion and numbering of said members for one end will suffice for and apply to both.

The driving gears and trunnion rollers may be separate members, but could satisfactorily be fabricated integral with each other as a complete unit and for the purpose of simplifying will be herein treated as such. Said units comprise a driving gear 21, a trunnion roller 22, a smaller driving pinion 23, and a small trunnion roller 24, all concentrically mounted and keyed to said shaft 19.

The rotating cylinder is guided and supported on trunnion rollers 22 and 24 and driven from the gears 21 and 23 respectively. As both ends of said cylinder are similar, description of one end will serve for both.

As will be seen from Figure 4, the cylinder comprises an outer gear ring 25 integrally formed with a trunnion race 26 and a ring portion 27. Said ring portion is provided with sockets or apertures adapted to support and afford rotation therein, the necked end portions of a plurality of longitudinally extending, rotating members 28.

Said rotating members form the body portion of the rotating cylinder 20 and are so spaced radially as to permit the stem or top portions of the onions to project therethrough and yet afford sufficient support for preventing the onion body from being pulled therebetween.

The gearing 25 is operably meshed with and driven from the driving pinion 23 disposed on the shaft 19 whereby the cylinder proper is afforded rotary motion. The trunnion race 26 of said outer ring coacts with trunnion roller 24 for supporting said cylinder, and is guided thereon by a shoulder of the ring portion 27. An inner ring projection 29 is formed integral with the outer gear ring and is adapted to coact with a corresponding groove 30, formed in the outer surface of the inner gear ring 31, for guiding and keeping the respective rings in alignment.

The inner gear ring 31 is of smaller diameter than the outer gear ring 25, and is disposed slightly forward thereof. A trunnion race 32 is integrally formed with the gear ring 31. The opposite end of said gear ring is provided with a wide bearing or trunnion face 33, upon which the rotary members 28 rotate.

The gear ring 31 is meshed with and driven from the driving gear 21, disposed on the shaft 19, adjacent pedestal 11. The inner gear ring is partially supported on the one side by the trunnion race 32, coacting with and guided by the trunnion roller 22, disposed adjacent the drive gear 21 on shaft 19.

A trunnion idler 34 is provided on the side of the cylinder opposite to the trunnion roller 22. Said idler is mounted on a stud 35 extending through a boss formed integral with the inner web of the pedestal 11. Said trunnion idler is in alignment with the respective trunnion roller 22, and is adapted to assist in supporting and guiding the cylinder 20 by coacting with the trunnion race 32.

It will thus be seen from the foregoing description that the cylinder 20, including the rotating members 28 mounted in outer gear ring 25, is rotated at a lower rate of speed than the inner gear ring 31, due to the difference in the gearing ratios of the drive pinions 23 and 21 to the gear rings 25 and 31 respectively. The greater speed of the inner gear ring having the trunnion face 33 affords the necessary rotational effect to revolve the rotatable members 28.

When looking at the machine from the discharge end, the trunnion drive shaft 19 must be driven in a clockwise direction so as to impart a counter clockwise direction of rotation to the cylinder. This rotation is essential only in the fact that the feeding and stem severing mechanisms are for convenience disposed on the side opposite to the gearing.

Tension means for keeping the cylinder in engagement with the trunnion rollers is provided on the same side of machine as the drive and comprises a trunnion idler 40, mounted on a stud 41 on the forward end of a lever 42. Said idler is pivotally mounted on a pin 43 disposed through an upright member projecting from the top of the pedestal 11.

The smaller arm of lever 42 is forged to form a tension abutment by means of a spring 44 disposed intermediate the under side thereof and a boss projection on the bearing 13. Said spring is held in place by a bolt extending upward therethrough from said boss and having its head in engagement with the upper surface of the smaller arm of lever 42.

This tension means affords sufficient force to be applied on the inner gear ring 31 and to cause the trunnion face 33 to bear more firmly against the inside of the rotating members 28 whereby to effect rotation of each individual member. Such rotative effect is enforced from a point somewhat below the severing knife which will be hereafter more fully explained.

An endless apron 50 is provided to co-operate with the rotating members 28 for properly feeding onions to the knife. Positive drives disposed transversely of the machine are provided at each end of the longitudinally extending apron 50. Said drives consist of a gear 51 keyed to the shaft 19, meshing and driving the pinion 52 affixed to the counter shaft 53.

Said shaft 53 extends parallel to the trunnion shaft 19 and is supported at each end in suitable bearings formed in pedestals 11, 11. Sprockets 54, 54 are keyed to said shaft 53 slightly inward of the respective trunnion races. Said sprockets 54, 54 co-operatively drive flexible chains 55, 55 which form triangular drives over idler sprockets 56, 56

and the endless apron drive sprockets 57, 57.

The chain is allowed sufficient slack on the upper side thereof so as to permit of its conformation with the rotating members 28. In Figures 3 and 8 the chain drive is clearly illustrated. The idler sprockets 56, 56 are parts of a takeup for chain slack. Said sprockets are rotatively mounted on pins 59, 59 extending through bosses in brackets 60, 60, which brackets are also pivotally mounted in straps 61, 61 rigidly affixed to the longitudinal cross braces of the supporting frame.

As may be seen from Figure 2, a spring member 62 is interposed between the brackets 60, 60 and the cross brace member of the frame on a bolt extending therethrough and engaging said braces. The desired tension may thus be applied to the idler sprocket 56 for removing the slack in the chains 55, 55.

The sprockets 57, 57 are keyed on the stub projections 63, 63 of the longitudinally extending roller 64. Said roller is supported by the stubs 63, 63, mounted in suitable bearings of the end pedestals. The endless apron is trained over roller 64 and depends downwardly over and around a second roller 65 which is also provided with stub projections 66, 66 for supporting itself in frame bearings of the pedestals.

Said apron is flexible and will readily adapt itself to the shape of the cylinder with which it must co-operate. The apron is preferably of rubber or impregnated fabric and should fit against the rotating members with proper clearance so as to permit the onion tops to project outwardly between said rotating members and be drawn downwardly therealong as said apron rotates in a direction opposite to that of said cylinder.

The apron serves as a holding or positioning means for the onion stems or tops so that severing thereof by the knife will be at the desired point, as clearly illustrated in Figure 5. Thus it will be seen that the rotation of the rotating members just prior to and during the time that the stem passes over said apron, is particularly helpful in causing the onion tops or stems to pass through the openings between said rotating members and to be held in position by said apron so that said tops may be severed from the onion body.

A knife 70 extends longitudinally of said machine slightly above the endless apron 50. Said knife is preferably of the saw tooth type and reciprocably moves in a direction longitudinally of the machine. The saw tooth type of knife is especially desirable as it affords immediate cutting or severing of the tops as soon as they come in contact therewith.

The knife blade is secured to an angle frame 71 which in turn is supported and held in position by a pair of longitudinally spaced arms 72, 72 affixed to a sliding sleeve member 73 which is mounted on rod 74. Said sleeve with the arms 72, 72 are reciprocally moved back and forth with said knife.

The rod 74 is rigidly secured at each end thereof in bracket extensions of the end pedestals. A U shaped bracket 75 is loosely mounted on the rod 76 which is supported by the bracket extension of the pedestals slightly outward of the rod 74. The arms of the U shaped bracket are provided with hub portions 77, 77 through which the sliding sleeve 73 extends and in which said sleeve may be turned.

An upright projection 78 is formed integral with the top of said U shaped bracket, and has a spring rod 79 extending therethrough. Said spring rod is disposed parallel to and directly above the rod 76. Said spring rod is provided with a torsion spring 80, the outer end of which is fixed to a head 81 of said spring rod, the other end being secured to the outside of projection 78.

Torsional or rotative tension is afforded in this manner to the spring rod 79. The end of said rod, which extends through the projection 78, is provided with a pawl 82 firmly secured thereon by a set screw. Said pawl is accorded the torsional force set up by the spring 80 and thereby impinges the catch member 83, which is disposed intermediate the arms of the U shaped bracket 75 and fixedly attached to the sleeve member 73.

This spring arrangement will permit the knife and supports to be moved away from the rotating member in the event foreign matter finds its way into the rotary cylinder. The knife 70 is prevented from riding too close to the rotating members 28 by the stop 84 disposed on and rigidly secured to the sleeve 73 adjacent the arm of the U shaped bracket 75.

Said stop is provided with a finger 85 extending to one side thereof and adapted to engage the under portion of the forward end of the U bracket arm.

The finger is always impinging the underside of the U bracket arm and thereby keeps the knife 70 in the desired relation to the rotating members 28. The knife may be turned upward for inspection or cleaning and may be held in that position by the pawl 82 sliding over and engaging the opposite side of the catch 83.

A pair of ears 90, 90 are integrally formed with the U bracket 75 and on the underside thereof, and these engage the pivot nut 91 which is loosely mounted on pin 92 extending through said ears. A connecting rod 93 is disposed in a longitudinal plane below the rods 74 and 76, having one end engaged by the pivot nut 91 and the other end pivotally connected to the arm of the crank lever 16. The connecting rod, being actuated by the crank lever on the main drive shaft 12, affords reciprocating movement to the knife

70 through the U bracket engaging the catch disposed on the sliding sleeve 73, which sleeve is rigidly attached to and moved with the said knife.

A charging chute 100 is provided at the feeding end of the rotary cylinder and may be either supported from the end pedestal 11 or by outside supporting members. A chute 101 is disposed at the discharge end of the cylinder and is adapted to properly guide the discharge therefrom. The discharge chute is preferably supported from the end pedestal.

A hopper 102 is provided in the lower portion of the supporting frame beneath the rotary cylinder. This hopper is formed with a neck for connection to a suction tube. Air draft or suction removing the toppings, outer onion skins and débris from the onions that fall into said hopper, affords a higher speed of operation and consequently greater production.

As may be seen from Figures 6 and 7, the principle herein involved may be utilized in a slightly modified manner.

In the modified form a feeding table comprising a plurality of rotating members 110 may be provided and be reciprocated transversely to a knife member 111. A stationary table 112 is disposed below said rotating members and serves to force the top or stem of the onion that depends through the spaces of the rotating members in a backward direction, so that the top or stem may be properly severed from the onion bulb when the feeding table moves over the knife 110, as is well illustrated in Figures 6 and 7.

The machine should be mounted at a slight incline so that the onions or other vegetables of like nature, by gravity, will gradually work through the cylinder from the charging to the discharging end and be topped during passage therethrough. Simultaneously with the topping operation and during the time which the objects pass through the cylinder, all débris and outer skins are removed and thereby provide a cleansed and more merchantable product with a greatly increased production.

Although I have shown and described my invention in one embodiment and in a modified form, it will be understood that the construction and arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the specific construction illustrated herein, excepting as may be specifically limited in the appended claims.

The utility of the suction apparatus is very pronounced for the purpose of drawing the onion stems through the longitudinal spaced apart members so that the traveling apron may thereby engage the stems to draw them outwardly for the purpose of their removal when coming in contact with the reciprocating knife. Of course, there is an additional utility for the suction device in that it assists in withdrawing the severed tops or stems from the machine.

I claim:

1. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed members in spaced relation adapted to permit the tops or stems of onions or the like to protrude therethrough, means coacting with said longitudinally disposed members for engaging said tops or stems when protruding therethrough, and a knife co-operating with said feeding table for severing the protruding tops or stems of said onions or the like.

2. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed members in spaced relation adapted to permit the tops or stems of onions or the like to protrude therethrough, means coacting with said feeding table for forcing the protruding tops or stems in a direction opposite to the travel of said table, a knife co-operating with said feeding table for severing the tops or stems of said onions or the like, and means for moving said feeding table transversely of said severing means.

3. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed rotating members in spaced relation and adapted to permit the top or stem portions of onions or the like to protrude therethrough, means for rotating said members, a knife forming a severing mechanism, means coacting with said rotating members for forcing said tops or stems in a direction opposite to the travel of said table, when said protruding tops or stems approach the severing mechanism adapted to shear the top or stem portions of said onions or the like, and driving means for actuating said feeding table transversely to said severing mechanism.

4. In an apparatus of the character described, the combination of a supporting frame, a rotary cylindrical feeding table disposed in said frame, said table comprising a plurality of longitudinally extending rotating members in spaced relation and adapted to permit the tops or stems of onions or the like to protrude therethrough, means for rotating said cylinder and for simultaneously actuating said rotating members, means co-operating with said rotating members and adapted to hold the protruding top or stem portions against the adjacent and following rotating members, and a reciprocating knife disposed in advance of the co-operating means and parallel with and adjacent to said rotating members, said knife being adapted to shear said tops or stems of onions or the

like as said protruding portions pass said knife.

5. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed members spaced apart to permit the tops or stems of onions or the like to protrude therethrough, said members being adapted to be rotated to facilitate the projection of said tops or stems therethrough, means coacting with said longitudinally disposed members for engaging said tops or stems when protruding therethrough and for rotating said longitudinally disposed members, and a knife for severing the protruding tops or stems of said onions or the like.

6. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed rotatable members spaced apart to permit the tops or stems of onions or the like to protrude therethrough, an apron coacting with said longitudinally disposed members for engaging said tops or stems when protruding therethrough and for rotating said rotatable members to draw the stems or tops outwardly, and means co-operating with said feeding table for severing the outwardly protruding tops or stems of said onions or the like.

7. In an apparatus of the character described, the combination of a feeding table comprising a plurality of ring members adapted to be rotated in one direction, a plurality of longitudinally disposed rotatable members spaced apart to permit the tops or stems of onions or the like to protrude therethrough and mounted in said ring members, an endless apron coacting with said longitudinal members for drawing the protruding tops or stems in a direction opposite to the travel of said table and for actuating said longitudinal members in a direction opposite to the rotation of said ring members, and means co-operating with said feeding table for severing the tops or stems of said onions or the like.

8. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed members spaced apart to permit the tops or stems of onions or the like to protrude therethrough, means coacting with said feeding table for drawing the protruding tops or stems in a direction opposite to the travel of said table, and a knife adapted to be reciprocated longitudinally of said feeding table for severing the tops or stems of said onions or the like.

9. In an apparatus of the character described, the combination of a feeding table comprising a plurality of longitudinally disposed rotating members spaced apart to permit the top or stem portions of onions or the like to protrude therethrough, an endless apron for roating said members and to force said tops or stems in a direction opposite to the travel of said table when said protruding tops approach a severing mechanism, and a severing mechanism adapted to shear the protruding tops or stems of said onions or the like, said apron being adapted to provide a carrier for discharging the severed tops or stems from said apparatus.

10. An onion topper comprising a body having rotating ring members and longitudinally disposed rotatable members mounted in said ring members and spaced apart to permit the top or stem portions of onions to protrude, means for rotating said ring members in one direction, an endless apron adapted to coact with said rotatable members whereby to rotate said members in a direction opposite to the rotation of said ring members and to draw the onion tops or stems in a direction opposite to the travel of said ring members, and a severing member adapted to reciprocate longitudinally of said longitudinal members whereby to sever said tops or stems.

11. The device described in claim 10 and in which said endless belt provides a carrier for removing the severed tops or stems from the device.

12. The device as described in claim 10, having in combination therewith suction means and in which said endless apron is adapted to convey the severed tops or stems to a position whereby said suction means may remove said parts from the device.

13. An onion topper comprising means for imparting movement between a series of rollers, a member cooperating with said rollers for drawing onion tops between adjacent rollers, and means for severing the tops held between said rollers and said cooperating member.

14. In an onion topper, a series of separated supports, means for supporting onions on one side of said supports to permit of the tops protruding therebetween, cooperating engaging means on the other side of said supports for drawing said stems or tops beween said supports, means for producing movement in said supports and said cooperating means in opposite directions, and a knife for severing the tops or stems from the onions when drawn intermediate adjacent supports.

15. In an onion topper, the combination of a feeding table comprising a plurality of longitudinally disposed members spaced apart to permit the tops of onions to protrude therethrough, a flexible and elastic belt-like member in juxtaposition to said longitudinal member and cooperating therewith to draw the tops of onions through said longitudinally disposed members, and a knife attached to be reciprocated longitudinally of said feeding table for severing onion tops held intermediate said belt-like member and said longitudinally disposed members.

16. In an onion topper or the like, spaced apart members through which the tops or stems of the onions may protrude, a member for engaging the protruding tops or stems, means for removing the protruding tops or stems, and suction means adapted to draw such tops or stems outwardly through the spaced apart members before said tops and stems come into contact with said engaging member.

17. In an onion topper, spaced apart members through which the tops or stems of the onions may protrude, means for causing said tops or stems to protrude, a knife for removing the protruding tops and stems, and means for rendering said knife inoperable upon contact with a foreign object.

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