Nov. 24, 1942. H. A. MURRAY 2,303,222

ONION CLEANER AND GRADER MACHINE

Filed Jan. 6, 1941 4 Sheets-Sheet 1

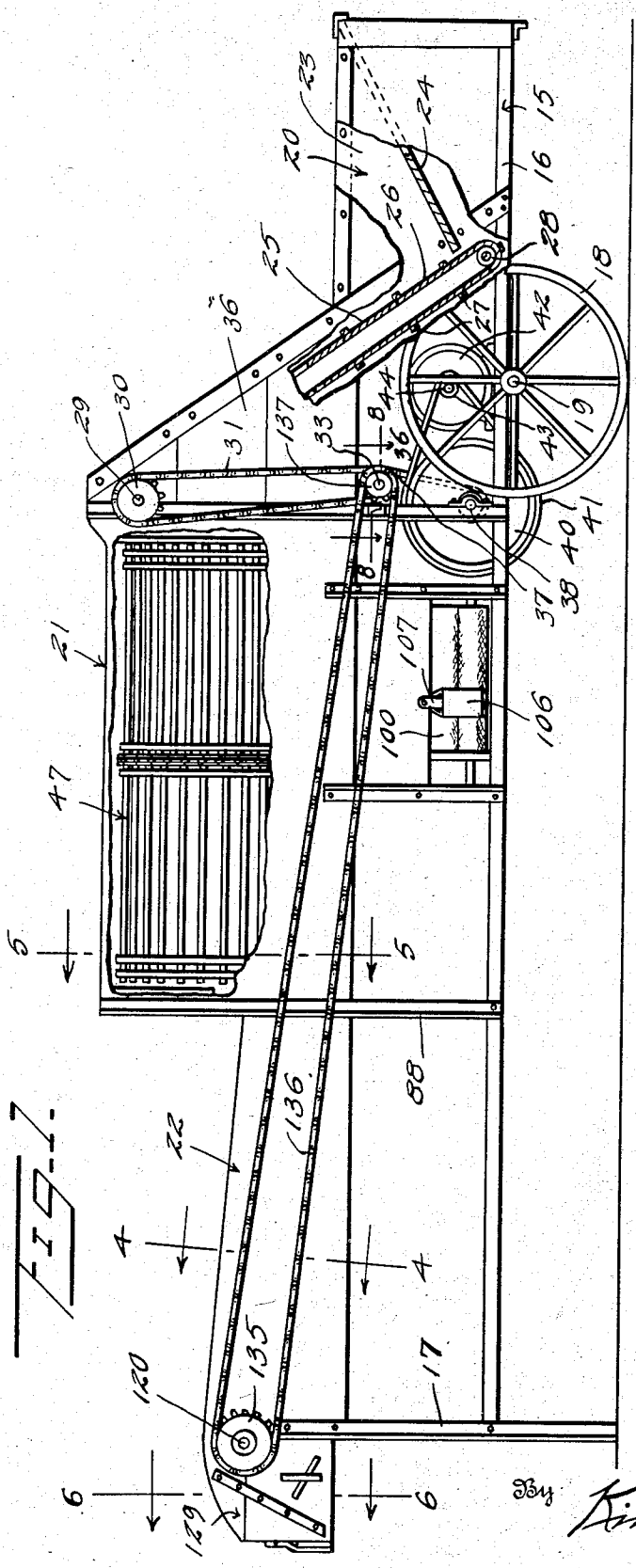


FIG. 7.

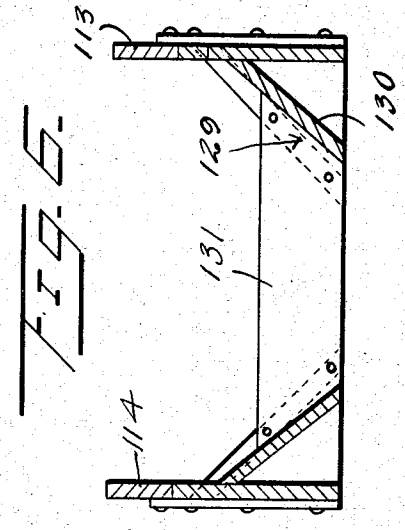


FIG. 5.

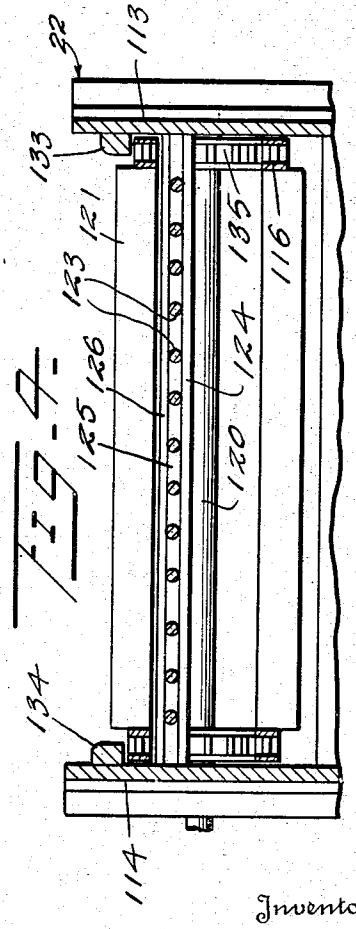


FIG. 4.

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ONION CLEANER AND GRADER MACHINE

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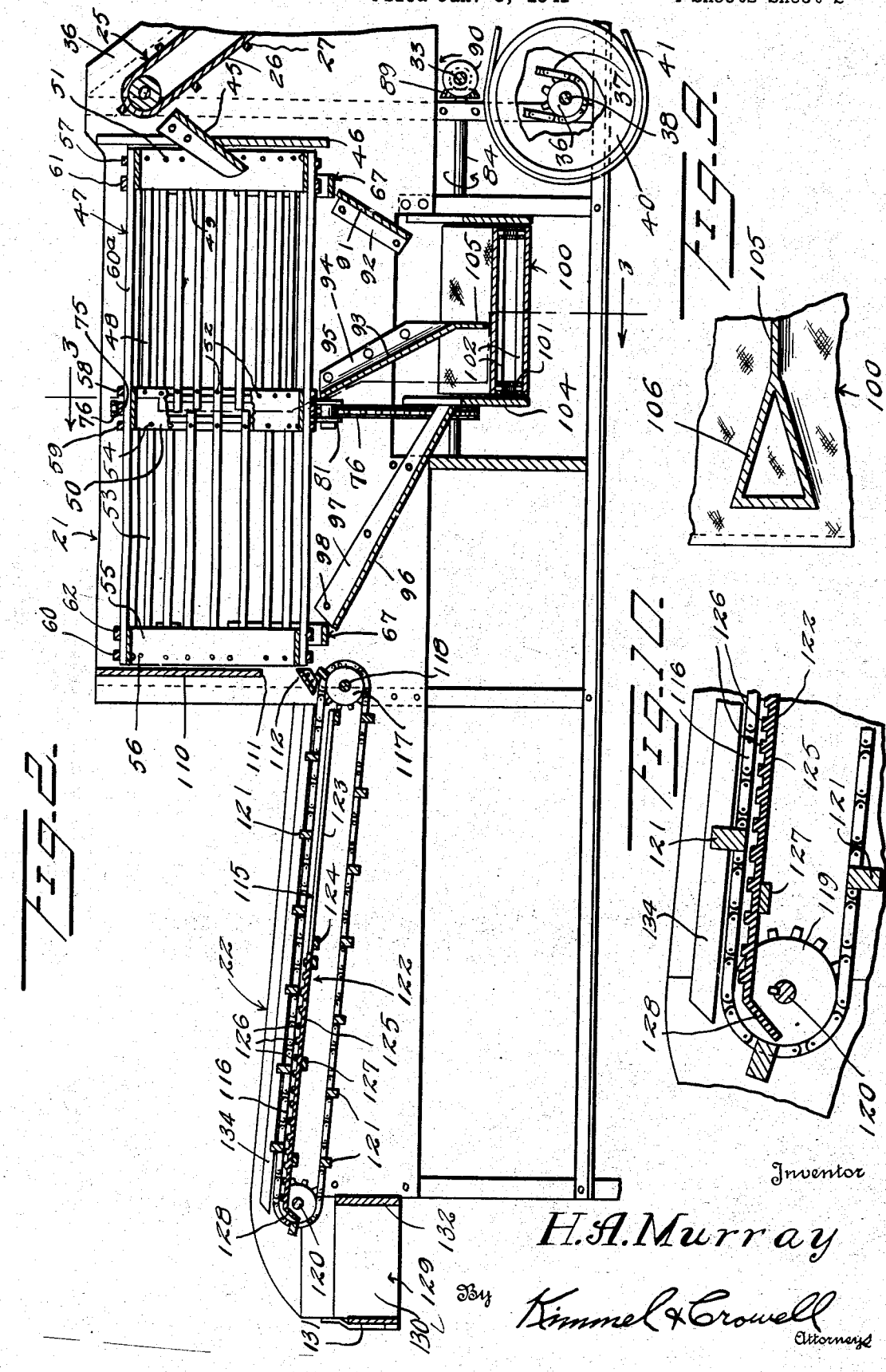


FIG. 2.

FIG. 3.

FIG. 4.

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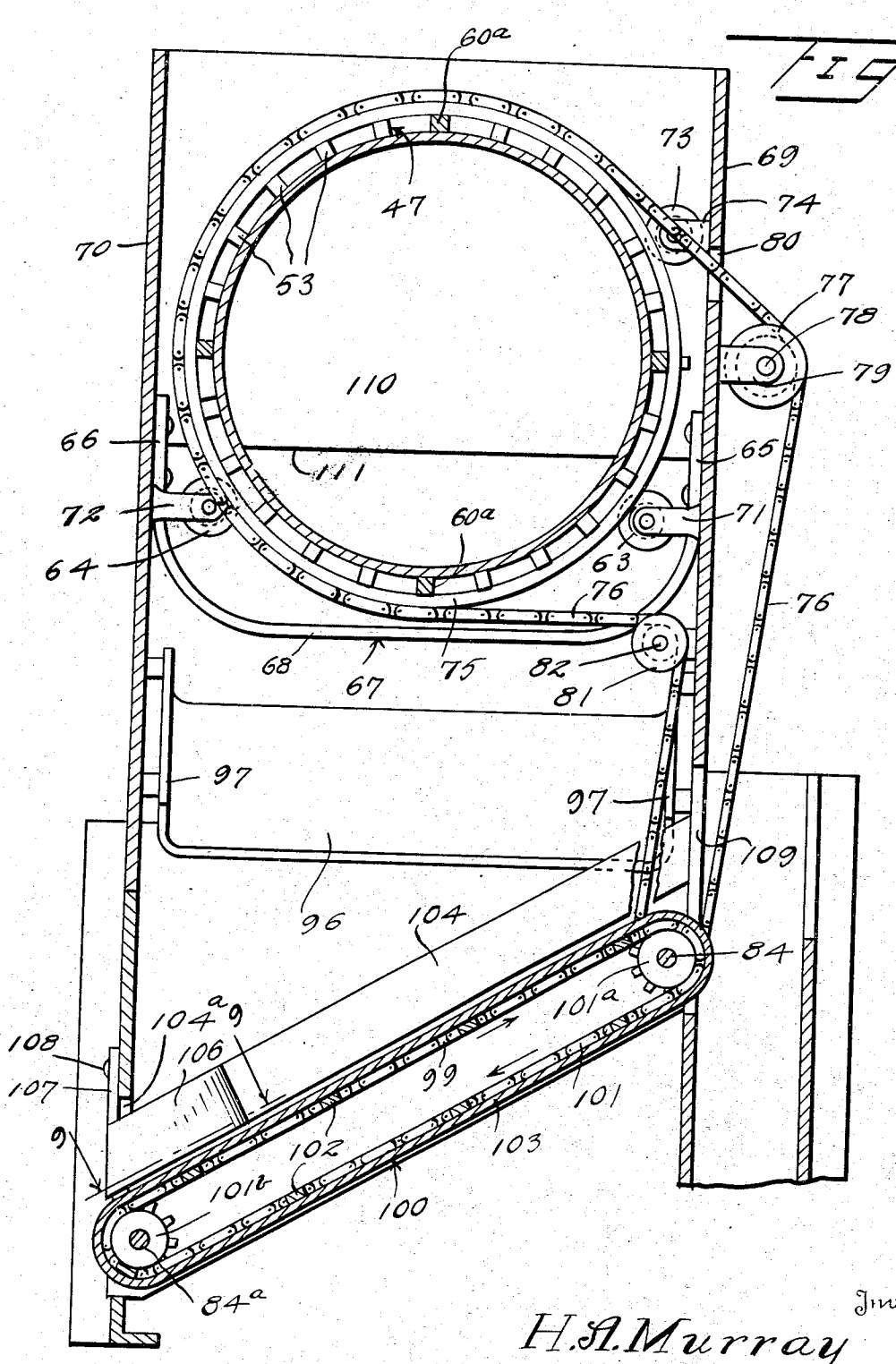
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Fig. 3.



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Fig. 7.

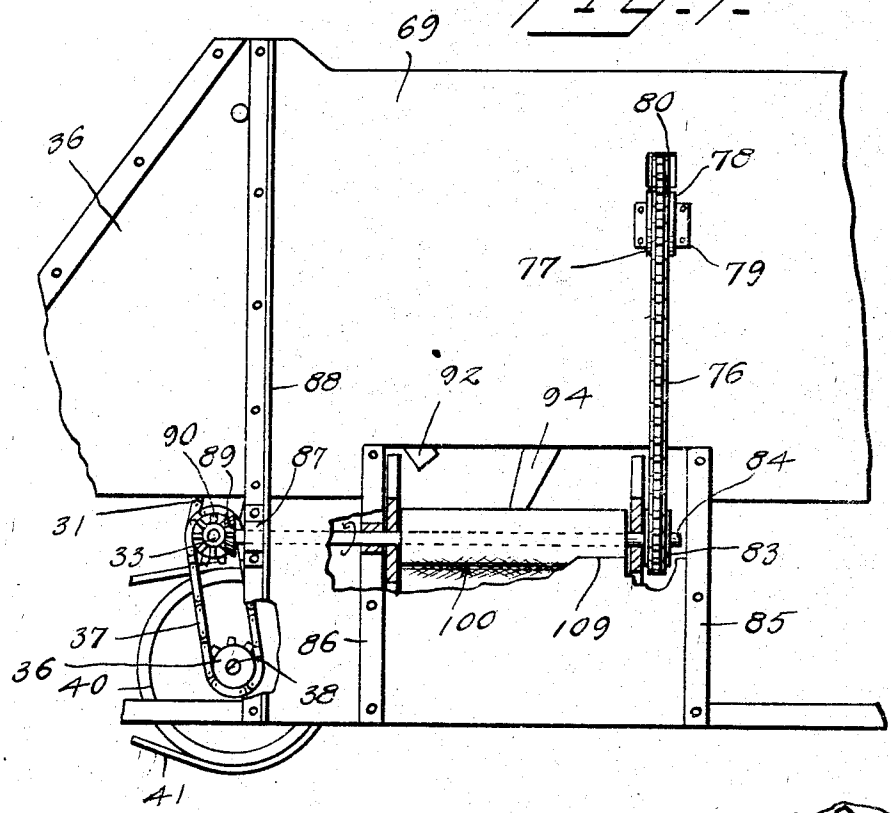


Fig. 5.

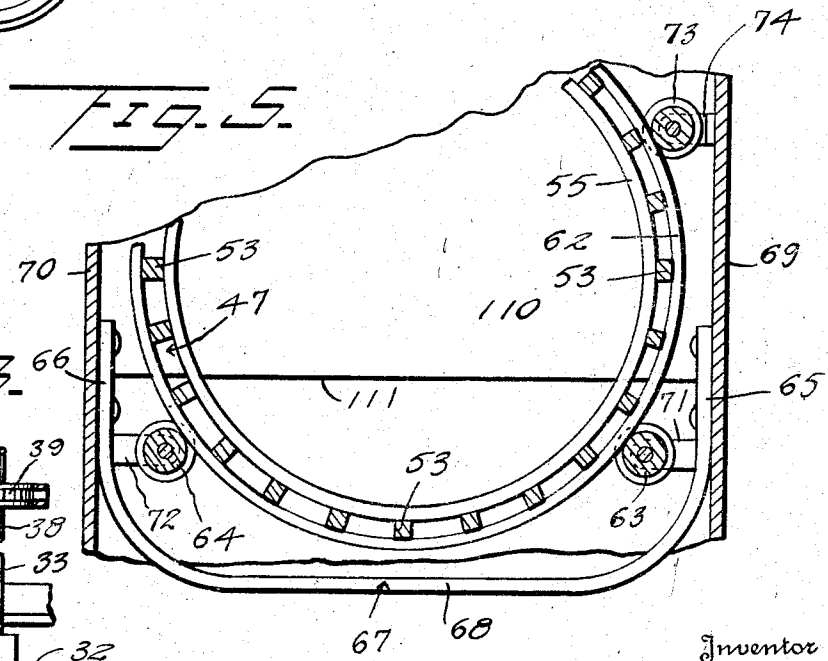
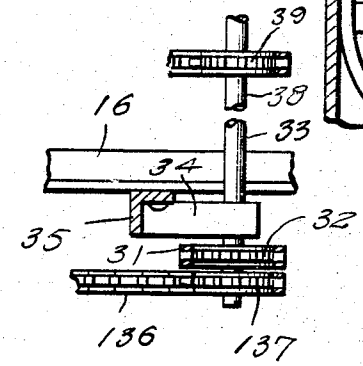


Fig. 8.



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UNITED STATES PATENT OFFICE

2,303,222

ONION CLEANER AND GRADER MACHINE

Henry A. Murray, Garrett, Ind.

Application January 6, 1941, Serial No. 373,347

5 Claims. (Cl. 209—71)

This invention relates to vegetable cleaning and sizing devices and more particularly to a machine for cleaning onions, potatoes or the like.

An object of this invention is to provide a machine of this type which is adapted to sort or size the onions or other globular vegetables and at the same time to remove the dirt adhering thereto.

Another object of this invention is to provide a machine of this type wherein at least one conveyor forming a part of the machine is so constructed and arranged as to convey or guide two sizes of the articles in one direction and to convey the dirt and waste material in the opposite direction.

A further object of this invention is to provide in a machine of this type, an improved sorting or sizing drum which will also loosen and remove the dirt from the articles for discharge onto a transverse duplex conveyor.

A still further object of this invention is to provide an improved sorting table and conveyor which is adapted to not only convey the articles from the sizing drum, but also to rotate or tumble the articles as they are being moved in order that the undesired articles may be observed and manually removed from the table.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation partly broken away and in section of a vegetable cleaning and sizing device constructed according to an embodiment of this invention.

Figure 2 is a fragmentary longitudinal section taken through the device.

Figure 3 is an enlarged vertical section taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a fragmentary side elevation partly broken away and in section of the machine on the side thereof opposite from that shown in Figure 1.

Figure 8 is a sectional view taken on the line 8—8 of Figure 1.

Figure 9 is a sectional view taken on the line 9—9 of Figure 3.

Figure 10 is a fragmentary longitudinal section at the delivery end of the device.

Referring to the drawings, the numeral 15 designates generally a frame structure which is formed of horizontally disposed elongated side angle members 16, which have secured to one end thereof vertical angle members 17. The angle members 17 extend below the horizontal frame members 16 and constitute legs or supporting means for one end of the frame structure 15. The frame structure 15 adjacent the end thereof opposite from the angle members or legs 17 has mounted thereon, a pair of wheels 18 which are carried by an axle 19 extending transversely below the frame member 15.

The frame structure has mounted therein a combined hopper and elevating unit 20, which is disposed at the receiving end of the frame and also has mounted therein a combined sorting and cleaning unit generally designated as 21, which is adapted to receive the articles from the receiving and elevating unit 20. The frame structure 15 also includes a combined sorting table structure and delivery unit generally designated as 22 which extends from the delivery end of the sorting and cleaning unit 21.

The receiving and elevating unit 20 includes a receiving hopper formed of vertical side walls 23 and a downwardly and forwardly inclined bottom wall 24. The hopper wall 24 is inclined in the direction of an upwardly and forwardly inclined elevator or conveyor 25, which is constructed in the form of a flexible web 26 having cleats 27 extending transversely thereacross. The conveyor 25 is trained at its lower end about a lower idling drum 28 and is trained at its upper end about an upper drum secured to a driving shaft 29. A sprocket 30 is fixed to the shaft 29 and a chain or flexible driving member 31 is trained about the sprocket 30. The chain 31 as shown in Figure 8, is trained about a lower sprocket 32, which is fixed to a shaft 33.

The shaft 33 extends horizontally between the sides of the frame 15, being journalled in bearings 34, which are secured to vertically disposed angle members 35. The angle members 35 are secured at their lower ends to the lower frame members 16 and also have secured thereto side

wall boards 36 which constitute side walls for the conveyor 25. The shaft 33 is connected by means of a chain 37 to a countershaft 38 journalled in the frame structure 15, below the shaft 33. The shaft 38 has a sprocket 39 fixed thereto about which the chain 37 engages.

A relatively large pulley or driven member 40 is fixed to the countershaft 38 and a flexible driving member 41 engages about the pulley 40. A motor or power member 42 is carried by the frame structure 15 and the driving belt 41 engages about a driving pulley 43 secured to the drive shaft 44 of the motor 42. The motor 42 is adapted to be connected to a suitable source of electric current supply. It will be understood, however, that if desired any other suitable type of power member, such as an internal combustion engine or the like may be substituted for the power member 42.

The conveyor 25 at the upper end thereof is adapted to discharge the articles onto a guiding chute 45 which extends downwardly and forwardly from the upper portion of the conveyor 25. The chute 45 is mounted between the side walls 36 forming part of the conveyor structure 25 and engages a vertically disposed transverse wall or partition 46. The chute or guide member 45 is adapted to discharge the articles such as onions or potatoes into the receiving end of a combined cleaning and sizing drum structure generally designated as 47. The drum structure 47 is formed of two aligned front and rear sections, the rear section being formed of a plurality of parallel spaced slats 48 which are mounted on the outer periphery of spaced edgewise alined rear and intermediate a pair of cylindrical members 49 and 50 respectively. The slats 48 are secured to the cylindrical member 49 by means of fastening devices 51 and are also secured to the intermediate cylindrical member 50 by fastening devices 52.

The second section forming the drum 47 comprises a plurality of parallel spaced slats or bars 53, which at their inner ends are secured as by fastening devices 54 to the intermediate cylindrical member 50. A forward cylindrical member 55 engages interiorly of the circle formed by the slats 53 and the slats 53 may be secured to the forward cylindrical member 55 by fastening devices 56. Preferably a ring-shaped holding member 57 engages about the rear ends of the slats 48 and a second ring-shaped holding member 58 engages about the forward ends of the slats 48. A ring-shaped member 59 engages about the rear ends of the slats 53 and a second ring-shaped holding or clamping member 60 engages about the forward ends of the slats 53. The drum 47 is preferably stiffened or reinforced by providing at least four circumferentially spaced apart elongated bars 60*a* which extend from the rear cylindrical member 49 to the forward cylindrical member 55. These reinforcing or stiffening bars 60*a* engage over the periphery of the intermediate cylindrical member 50 and engage interiorly of the ring-shaped clamping or holding members 57, 58, 59 and 60.

The drum 47 adjacent each end thereof and preferably inwardly from the bands or holding members 57 and 60 is provided with a pair of circular tracks 61 and 62 respectively. The drum 47 is rotatably supported by means of pairs of flanged wheels or rollers 63 and 64, there being one pair of these rollers 63 and 64 disposed in a position for engagement with the circular tracks 61 and 62. The rollers 63 and 64 are secured to the vertical legs 65 and 66 respectively of a U-shaped supporting member generally designated as 67. The bight 68 of the U-shaped member 67 extends between the side walls 69 and 70 of the frame structure 15. Preferably the rollers 62 and 63 are supported in a position for engagement with the tracks 61 and 62 by supporting members 71 and 72 carried by the legs or extensions 65 and 66, respectively.

An upper roller 73 is rotatably supported from a bracket 74 secured to the side wall 69 above the axial center of the drum 47 and in the present instance above the lower roller 63. An intermediate toothed band 75 is fixed to the drum 47 between the intermediate bands 58 and 59 and a flexible drum operating member 76 in the form of a chain or the like is trained about the band 75. The chain or driving member 76 is trained about an idler-pulley 77 which is rotatable on a shaft 78. The shaft 78 is carried by supporting members 79 fixed to the side wall 69 and the side wall 69 is provided with an opening 80 through which one run of the chain 76 loosely engages. A second idler pulley 81 is carried by a shaft 82 which is supported by brackets 82*a* fixed to the inner side of the wall 69 below the pulley 77.

The chain 76 at its lower portion is trained about a sprocket 83 which is fixed to a rotatable shaft 84. The shaft 84 extends horizontally beneath the drum structure 47 and is rotatably carried by a pair of vertically disposed frame members 85 and 86. The shaft 84 also engages through a bearing 87 carried by an upright angle member 88 which is fixed to the side wall 69 adjacent the forward end thereof and the forward end of the shaft 84 has fixed thereto a bevel gear 89. The bevel gear 89 meshes with a right angularly disposed bevel gear 90, which is mounted on the countershaft 33 at the end thereof opposite from the sprocket 32.

The articles which are sorted or sized by the sizing bars 48 and 53 are adapted to drop downwardly below the drum 47. A depending forwardly inclined rear hopper or guide wall 91 having flanged opposite ends 92 is secured between the side walls 69 and 70, respectively, and a depending rearwardly inclined forward hopper wall 93 having end flanges 94 is secured by fastening devices 95 between the side walls 69 and 70 forwardly from the rear hopper or guide member 91. The walls 91, 92 are arranged below the bars 48. A forward downwardly and rearwardly inclined hopper member comprising a plate 96 having end flanges 97, is secured by fastening devices 98 to the side walls 69 and 70 below the forward sizing bars 53.

The articles which are guided by the hopper walls 92 and 93 and the hopper wall 96 are discharged onto the upper run 99 of a transversely disposed conveyor 100. The conveyor 100 is inclined to the vertical and comprises a pair of chains 101, transverse bars 102 and a flexible sheet 103 fixed to the bars 102. The chains 101 are trained about sprockets 101*a* fixed to the shaft 84 and also about sprockets 101*b* carried by a shaft 84*a*. The shaft 84*a* extends between side members 104, which engage on the opposite edges of the flexible conveyor 100. The conveyor 100 is preferably inclined to the vertical so that when the articles drop downwardly from the drum 47, these articles will roll downwardly over the upper run 99 of the conveyor 100 and will be discharged through the lower portion of the wall 70, which is formed with a delivery opening 104*a*.

A partition or dividing wall 105 is formed integral with the lower end of the hopper member or plate 93 and loosely engages over the upper run 99 of the conveyor 100 so that the two sizes of articles which drop onto the upper run 99 will not mix as these articles roll downwardly on the run 99. The partition 105 at its lower or delivery end is provided with a flared delivery member 106, which is secured by means of an extension 107 and a fastening device 108 to the side wall 70. A pair of suitable receivers such as a pair of bags or the like may be positioned below the delivery opening 104a and below the divider 106 to receive the articles as they roll downwardly over the conveyor 100.

The conveyor 100 is adapted to convey the loose dirt upwardly for discharge through an opening 109, which is formed in the wall 69. In this manner the loose dirt or undesired material is discharged on one side of the frame structure 15 and the vegetables or other articles are discharged into suitable receivers on the opposite side of the frame 15 as the conveyor 100 travels in the direction of the arrows, Figure 3, and the dirt will cling to the upper face of the run 99 which travels rearwardly and upwardly from the opening 104a.

A forward end wall 110 is secured between the side wall members 69 and 70 and has the lower end 111 thereof disposed in upwardly spaced relation to an article guiding plate or member 112 which is inclined to the vertical and is secured between the side wall members 69 and 70. The guiding member 112 is disposed in alignment with the forward cylindrical member 55 so that the larger size articles will roll forwardly from the forward cylindrical member 55 and downwardly over the guide member 112. The movable sorting table and conveyor 22 comprises stationary side wall members 113 and 114 which extend forwardly from the side wall members 69 and 70 and which are secured between the upright angle members 17 and 88.

An endless conveyor member generally designated as 115 engages between the side wall members 113 and 114 and comprises a pair of endless chains 116 which are trained about sprockets 117 carried by a rear shaft 118. The chains 116 at their forward ends are trained about a pair of forward driving sprockets 119 secured to a forward rotatable shaft 120 which is journalled between the side wall members 113 and 114. The pair of chains 116 have secured therebetween a plurality of spaced apart slats or cleats 121, which are adapted on the upper runs of the chains 116 to move the articles forwardly over a stationary table 122.

The table 122 comprises a rear perforate section formed of parallel longitudinal bars 123 supported between the side members 113 and 114 by transverse supporting bars 124. The table 122 is also formed with a forward imperforate section in the form of a flexible sheet 125 having transverse ribs 126 on the upper surface thereof. The bars 123 are spaced apart so as to form guideways to keep the material thereon in substantially parallel alignment. The sheet 125 is supported below the upper run of the conveyor 115 by means of transverse supporting bars 127 fixed to the sides 113 and 114. The forward end of the sheet 125 has a downwardly inclined delivery member 128 extending therefrom. The articles rolling over the plate 128 are adapted to be discharged into a delivery hopper generally designated as 129. The delivery hopper 129 comprises a pair of downwardly converging hopper walls 130 which are secured between the side wall members 113 and 114 adjacent the forward ends thereof.

A forward hopper wall 131 is secured to the downwardly converging hopper walls 128. A rear hopper wall 132 is secured to the rear ends of the inclined walls 130 and the side walls 113 and 114. A suitable receiver such as a bag or the like is adapted to be disposed below the hopper 129 so that the articles dropping through the hopper 129 will be received in a collector or receiver. In order to provide a means whereby the articles moving forwardly over the upper runs of the chains 116 will not contact with the chains 116, I have provided a pair of longitudinally extending guard members 133 and 134 which are secured to the inner sides of the side walls 113 and 114 as shown in Figure 4. The shaft 120 has secured thereto a driving sprocket 135 about which a chain 136 engages. The chain 136 also engages about a sprocket 137 fixed to the shaft 33.

In the use and operation of this combined sizing and cleaning device, the articles which are removed from the ground are placed in the hopper unit 20. These articles will move downwardly over the inclined hopper wall 24 and will be picked up and carried upwardly by the elevator 25 for discharge into the rear end of the sizing drum 47. The rear section of the sizing drum 47 has the slats 48 thereof spaced apart a distance less than the spacing between the forward slats 53 so that the smaller articles will drop downwardly between the slats 48 and will be guided by the hopper members 91 and 93 onto the conveyor 100. The second size of articles which are fixed by the sizing slats 53 will drop downwardly into the hopper 96 and move from the hopper 96 onto the conveyor 100.

These two sizes of articles on the conveyor 100 will be kept separate by the partition 105 and will roll downwardly over the upper run 99 of the conveyor 100 into suitable receivers positioned at the delivery or lower end of the conveyor 100. The dirt, dust and other loose and undesired material which is removed from the articles by the action of the rotating drum 47 will be carried upwardly and will be discharged by the upper run 99 of the conveyor 100 through the discharge opening 109 in the side wall 69.

The articles remaining in the drum 47 which are too large to pass through the second series of slats 53 will be discharged onto the guide member 112 and onto the spaced bars 123 forming the rear section of the combined sorting and conveying table structure 22. The conveyor means 115 will move the larger articles forwardly and as these articles are moved forwardly by means of the slats or cleats 121, they will be partially rotated or tumbled by engagement with the ribs 126 of the flexible sheet 125. The turning over or tumbling of the articles at the delivery end of the machine will permit the undesired or damaged articles to be readily picked off of the moving table so that the articles which are finally discharged into the hopper 129 will be undamaged articles ready for the market.

The space between the lower end of the wall 110 and guiding plate 112 provides a front outlet for the unit 21. The lower ones of the slats 53 form the forward part of the lower portion of the unit 21 with a forward outlet. The lower ones of the slats 48 form the rear part of the lower portion of the unit 21 with a rear outlet. By this

arrangement the unit 21 is formed with three outlets for the cleaned and sized articles.

What I claim is:

1. In a cleaning and sizing machine for vegetable articles, a horizontally disposed revoluble combined cleaning and sizing unit for the articles having an intake at its rear for the articles to be cleaned and sized, an outlet at its front for cleaned articles of the largest size, a forward outlet formed by the forward part of its lower portion for cleaned articles smaller in size than the articles discharged by said front outlet and a rear outlet formed by the rear part of its lower portion for cleaned articles of a size smaller than the articles discharged by said forward outlet, said unit comprising a front, an intermediate and a rear vertically disposed annular member arranged in parallel spaced relation, a set of spaced parallel forward sizing slats disposed circumferentially of and secured upon portions of the outer periphery of said front member and to spaced parts of the forward side of the outer periphery of said intermediate member, a set of spaced parallel rear sizing slats disposed circumferentially of and secured upon spaced parts of the rear side of the outer periphery of said intermediate member and disposed circumferentially of and secured upon spaced portions of the outer periphery of said rear member, the spaces between the forward slats being greater than the spaces between the rear slats, a set of spaced parallel reinforcing slats extending from said front to said rear member and being secured upon other parts of the outer peripheries of the said several members, a pair of spaced parallel clamping bands, one encompassing the said forward sizing slats and the said reinforcing slats and the other encompassing said rear sizing slats and said reinforcing slats and both being secured to said intermediate member, a second pair of spaced parallel clamping bands, one encompassing the reinforcing slats and forward sizing slats and being secured to said front member and the other encompassing said rear sizing slats and the said reinforcing slats and being secured to said rear member.

2. In a cleaning and sizing machine for vegetable articles, a horizontally disposed revoluble combined cleaning and sizing unit for the articles having an intake at its rear for the articles to be cleaned and sized, an outlet at its front for cleaned articles of the largest size, a forward outlet formed by the forward part of its lower portion for cleaned articles smaller in size than the articles discharged by said front outlet and a rear outlet formed by the rear part of its lower portion for cleaned articles of a size smaller than the articles discharged by said forward outlet, said unit comprising a front, an intermediate and a rear vertically disposed annular member arranged in parallel spaced relation, a set of spaced parallel forward sizing slats disposed circumferentially of and secured upon portions of the outer periphery of said front member and to spaced parts of the forward side of the outer periphery of said intermediate member, a set of spaced parallel rear sizing slats disposed circumferentially of and secured upon spaced parts of the rear side of the outer periphery of said intermediate member and disposed circumferentially of and secured upon spaced portions of the outer periphery of said rear member, the spaces between the forward slats being greater than the spaces between the rear slats, a set of spaced parallel reinforcing slats extending from said front to said rear member and being secured upon other parts of the outer peripheries of the said several members, a pair of spaced parallel clamping bands, one encompassing the said forward sizing slats and the said reinforcing slats and both being secured to said intermediate member, a second pair of spaced parallel clamping bands, one encompassing the reinforcing slats and forward sizing slats and being secured to said front member and the other encompasisng said rear sizing slats and the said reinforcing slats and being secured to said rear member, a fixed peripherally toothed-like driving means for said unit encompassing said reinforcing slats and the inner ends of said sizing slats between said first mentioned pair of clamping bands, and a pair of fixed circular tracks encompassing said slats, one located inwardly of and in proximity to one of the second mentioned pairs of clamping bands and the other located inwardly of and in proximity to the other band of such pair.

3. In a cleaning and sizing machine for vegetable articles and of that type including a rotatable cylindrical combined cleaning and sizing unit having an outlet at its front; a conveyor unit inclining upwardly from its rear to its front, leading forwardly from said outlet and including a pair of spaced opposed driven endless chains, spaced supporting slats for the articles connecting said chains together, a stationary table arranged below the upper runs of said chains and including an imperforate flexible forward section provided on its upper face with spaced transverse ribs and a rear section formed of longitudinal bar-like parts disposed in parallel relation, and a depending hopper at the forward ends of said chains.

4. In a cleaning and sizing machine for vegetable articles and of that type including a rotatable cylindrical combined cleaning and sizing unit having an outlet at its front; a conveyor unit inclining upwardly from its rear to its front, leading forwardly from said outlet and including a pair of spaced opposed driven endless chains, spaced supporting slats for the articles connecting said chains together, a stationary table arranged below the upper runs of said chains and including an imperforate flexible forward section provided on its upper face with spaced transverse ribs and a rear section formed of longitudinal bar-like parts disposed in parallel relation, a depending hopper at the forward ends of said chains, and an inclined delivery member at the forward end of said table.

5. In a cleaning and sizing machine for vegetable articles and of that type including a rotatable cylindrical combined cleaning and sizing unit having an outlet at its front; a conveyor unit inclining upwardly from its rear to its front, leading forwardly from said outlet and including a pair of spaced opposed driven endless chains, spaced supporting slats for the articles connecting said chains together, a stationary table arranged below the upper runs of said chains and including an imperforate flexible forward section provided on its upper face with spaced transverse ribs and a rear section formed of longitudinal bar-like parts disposed in parallel relation, a depending hopper at the forward ends of said chains, and spaced means to prevent the articles contacting with the chains.

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