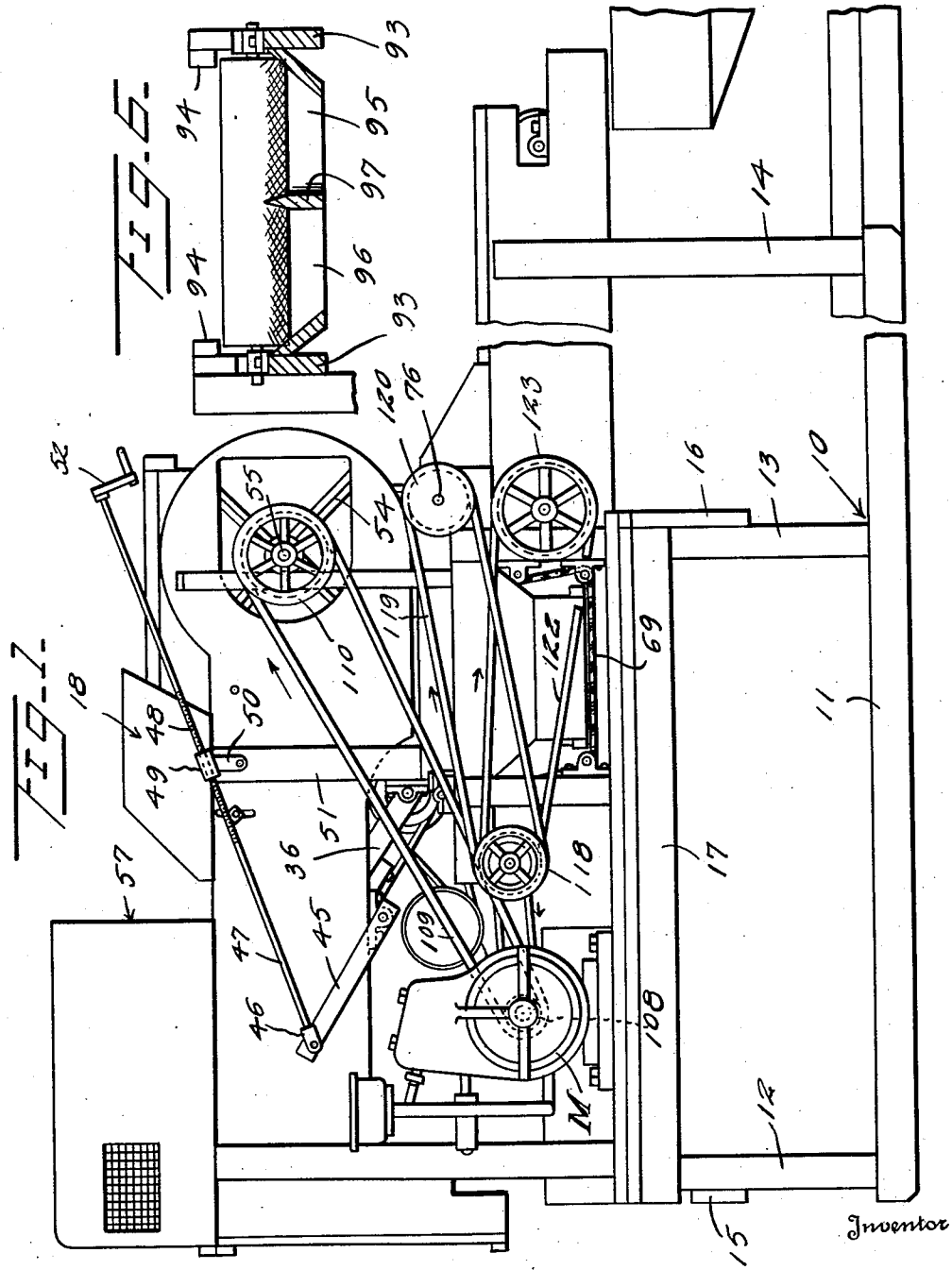
March 6, 1945. E. RIVERS 2,371,067

BERRY CLEANING AND SIZING MACHINE

Filed June 25, 1942 4 Sheets-Sheet 1



Inventor

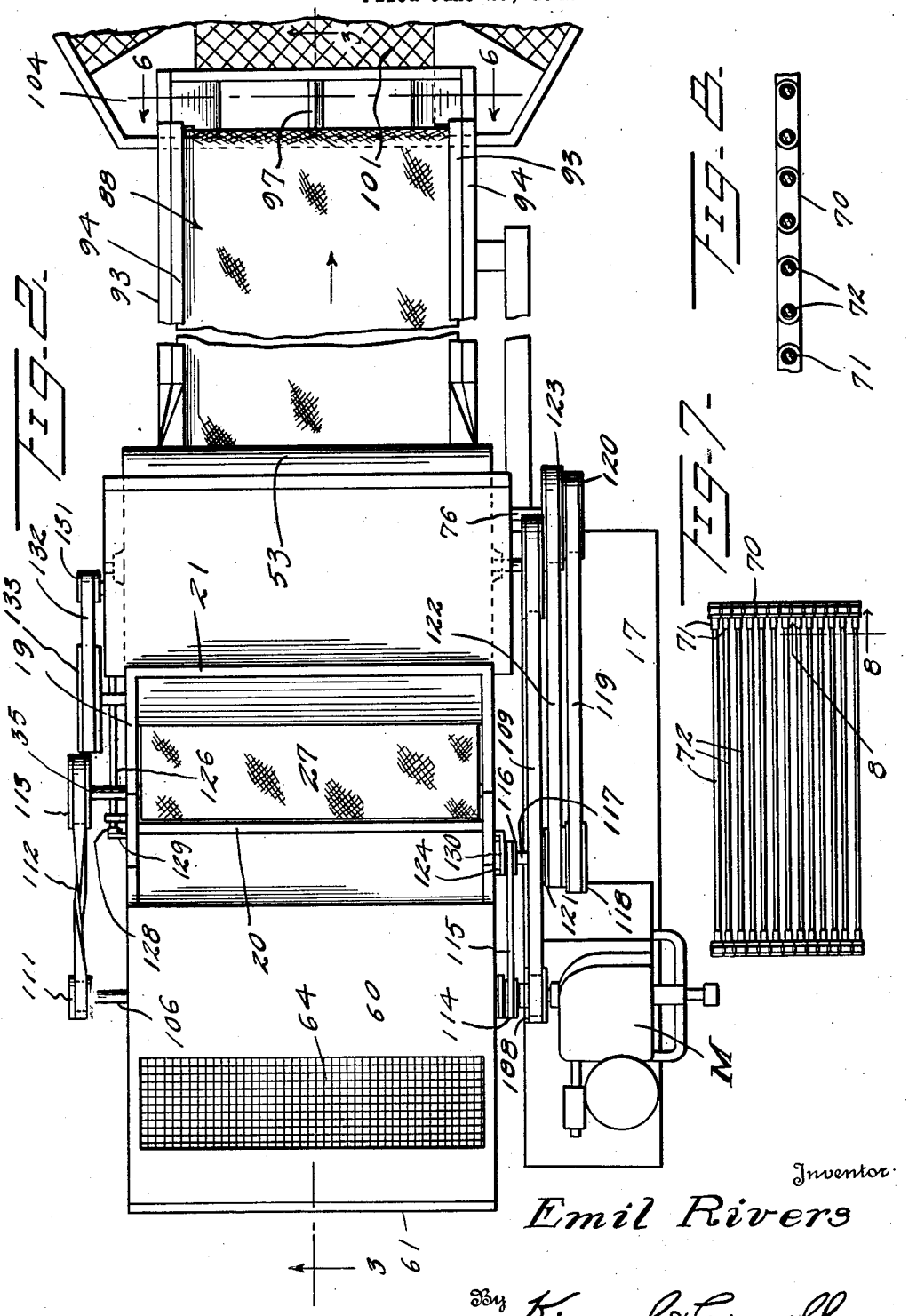
Emil Rivers

By Kimmel & Crowell Attorneys

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BERRY CLEANING AND SIZING MACHINE

Filed June 25, 1942 4 Sheets-Sheet 2



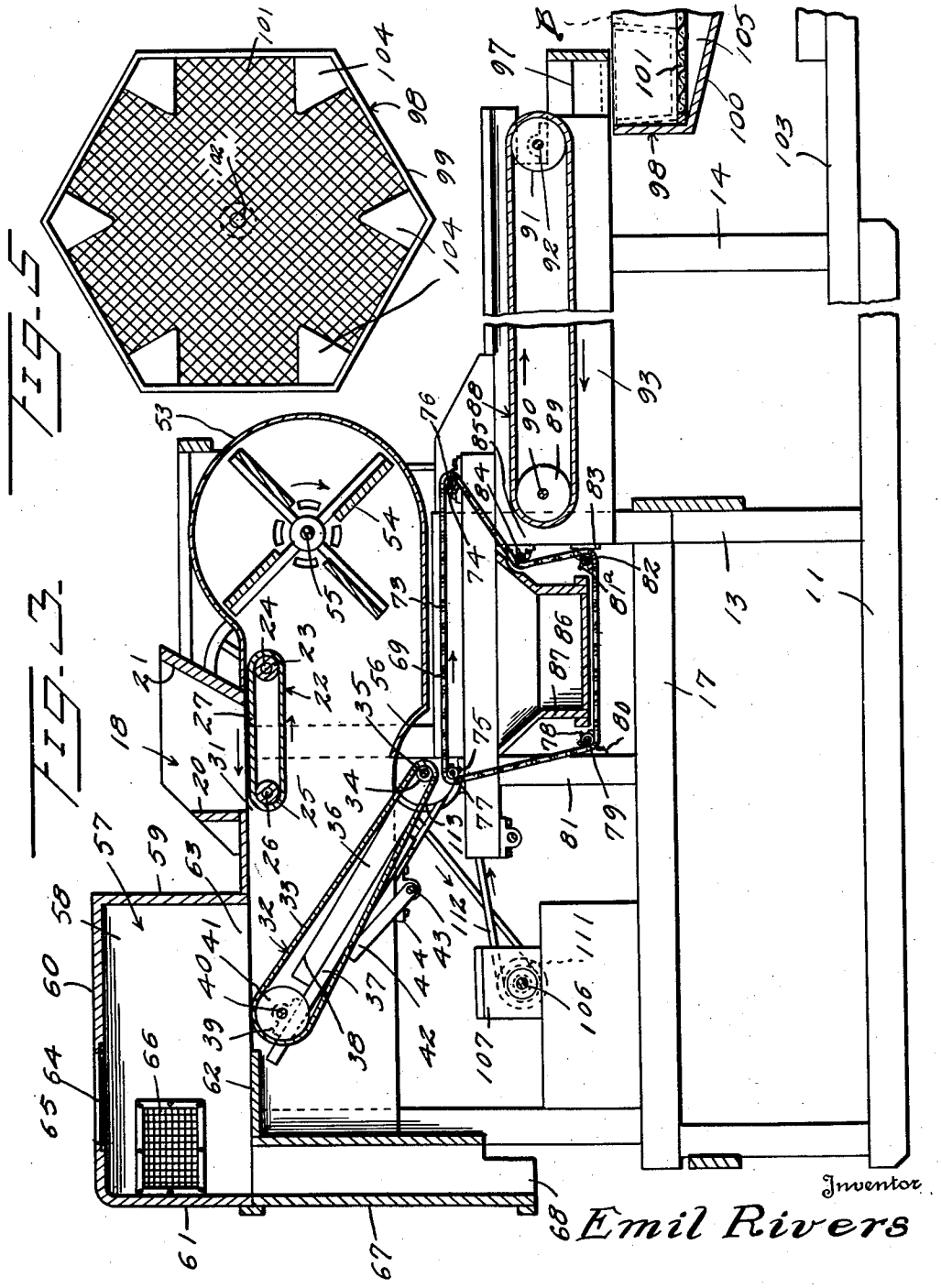
Inventor
Emil Rivers

By Kimmel & Crowell
Attorneys

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BERRY CLEANING AND SIZING MACHINE

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Inventor
Emil Rivers

By Kimmel & Crowell
Attorneys

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BERRY CLEANING AND SIZING MACHINE

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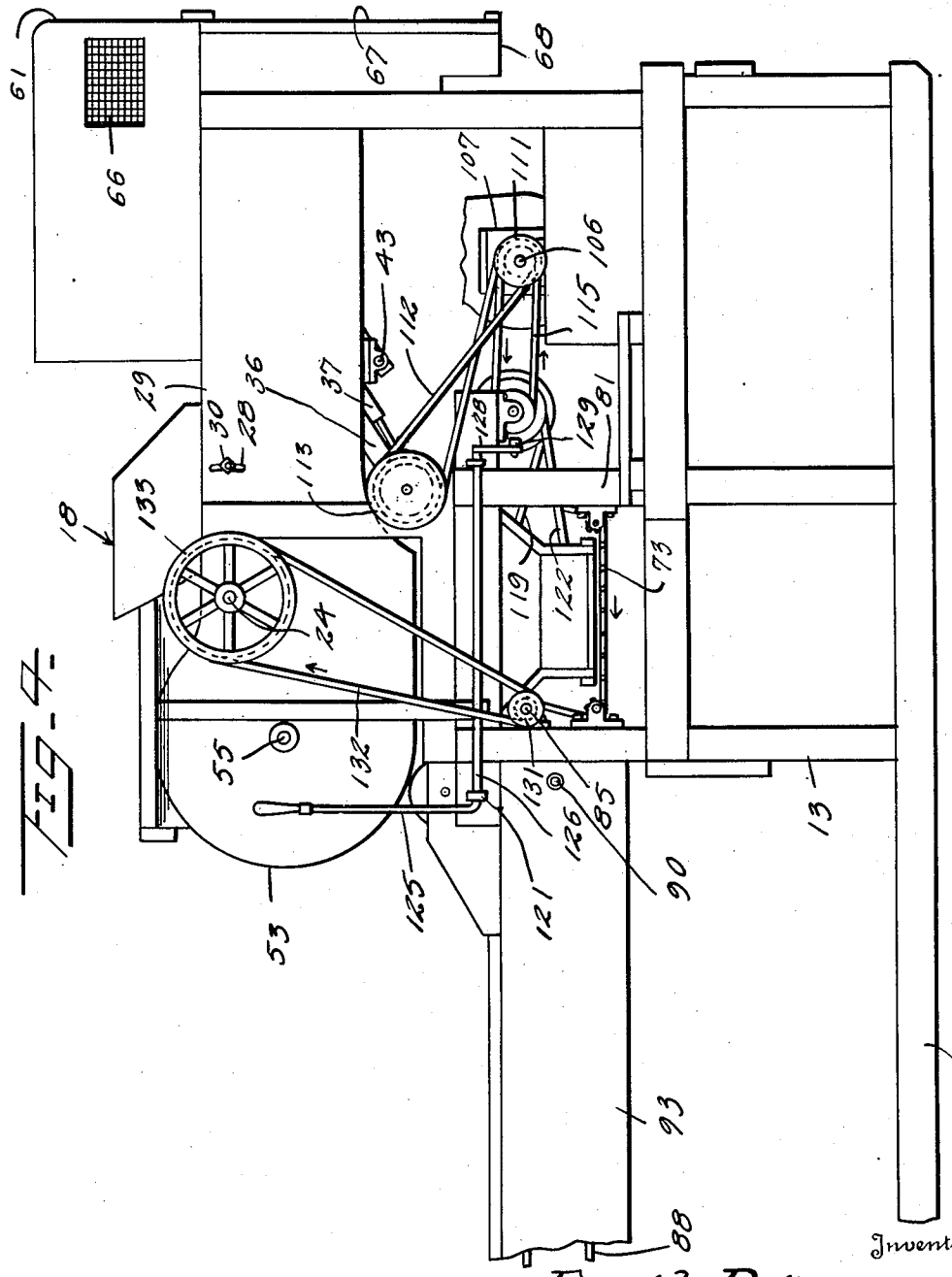


FIG. 4.

Inventor

Emil Rivers

By Kimmel & Crowell

Attorneys

Patented Mar. 6, 1945

2,371,067

UNITED STATES PATENT OFFICE

2,371,067

BERRY CLEANING AND SIZING MACHINE

Emil Rivers, Rockland, Maine

Application June 25, 1942, Serial No. 448,469

1 Claim. (Cl. 209—12)

This invention relates to berry cleaning and sizing machines.

An object of this invention is to provide a machine of this kind which is particularly adapted to cleaning blueberries without injury thereto.

Another object of this invention is to provide a machine of this kind which will not only clean the berries, but will also size them.

A further object of this invention is to provide a machine of this kind which may be operated by a small power member.

A further object of this invention is to provide a machine of this kind which includes a feeding conveyor which is adjustable to permit regulation of the quantity of berries discharged onto an endless debris carrier, and which also includes a fan for removing the light loose material as the berries drop down from the feeder to the debris carrier, the latter being inclined to the vertical, and the berries rolling down the carrier opposed to the movement of the carrier and then dropping onto an endless sizing member from which the berries are discharged onto an endless picking table and finally discharged into baskets mounted on a rotatable receiver.

With the foregoing objects and 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 illustrated an embodiment of the invention as claimed, 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 of a berry cleaning and sizing machine constructed according to an embodiment of this invention,

Figure 2 is a detail top plan partly broken away of the machine,

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a fragmentary side elevation of the machine on the side opposite from that shown in Figure 1,

Figure 5 is a detail top plan of the rotatable box support at the delivery end of the machine,

Figure 6 is a sectional view taken on the line 6—6 of Figure 2,

Figure 7 is a fragmentary top plan of the sizing member, and

Figure 8 is a fragmentary sectional view taken on the line 8—8 of Figure 7.

Referring to the drawings, the numeral 10 designates generally a frame structure including base members or beams 11 which have extending upwardly therefrom upright frame members 12, 13 and 14. The uprights 12 are connected together by a horizontally disposed connecting member 15 and the uprights 13 are connected together by a horizontally disposed connecting member 16. The uprights 12 and 13 are connected together by a horizontally disposed connecting member 17.

A berry receiving hopper 18 is carried by the frame 10 and includes side walls 19, a forward wall 20 and a rear downwardly and forwardly inclined wall 21. The bottom of the receiving hopper 18 is open and has movably disposed therebelow an endless feeding conveyor 22. The conveyor 22 engages about a driving roller 23 which is secured to a driving shaft 24, and an idler roller 25 carried by an idler shaft 26 engages the opposite end of the conveyor 22. The upper run 27 of the conveyor 22 constitutes a movable bottom for the hopper 18 and the forward end of the upper run 27 is adapted to be adjusted with respect to the forward wall 20 of the hopper 18 by vertical adjustment of the idler shaft 26. This adjustment is accomplished by providing a pair of arcuate slots 28 in opposite side frame members 29 and a shaft 26 is fixed in its adjusted position by means of adjusting nuts 30. The adjustment of the space 31 at the forward end of the upper run 27 of the conveyor 22 will provide for the variation in the quantity of berries which are fed from the hopper 18.

The berries which are delivered or fed from the hopper 18 by means of the conveyor 22 are gravitatingly dropped onto an endless debris carrier 32. The carrier 32 has the upper run 33 thereof moving upwardly and forwardly so as to carry the dirt and other debris upwardly, whereas the berries dropping onto the run 33 are adapted to gravitatingly roll downwardly along the run 33. The carrier 32 at its lower portion is trained about a driving drum 34 mounted on a driving shaft 35. A pair of forwardly and upwardly extending supporting arms 36 are pivotally mounted on the shaft 35 and extend along the opposite edges of the carrier 32. A second pair of elongated members 37 are adjusted lengthwise of the elongated members 36 by means of adjusting bolts 38. Each of the extensible members 37 has secured thereto a bearing 39 through which an idler shaft 40 is journaled. An upper drum 41 is mounted on the shaft 40 and as shown in

Figure 3 is substantially larger in size than the drum 34.

The inclination of the carrier 32 may be varied by means of a pair of carrier supporting levers 42 which are mounted on a transversely disposed shaft 43. The shaft 43 is journaled through bearings 44 and the shaft 43 at one end has an outer adjusting lever 45 fixed thereto. The lever 45 at its upper or free end has pivotally secured thereto a coupling 46 within which one end of an adjusting shaft 47 is swivelly mounted. The shaft 47 is provided with threads 48 which threadably engage through a stationary nut 49 which is mounted on a supporting arm 50 carried by an upright 51. The shaft 47 is provided at its rear end with a crank or handle 52 so that the carrier 32 may be readily adjusted by rotation of the shaft 47.

A fan or blower housing 53 is disposed rearwardly of and below the hopper 18. The fan housing 53 has rotatably mounted therein a fan member 54 which is secured to a shaft 55. The fan housing 53 communicates at its delivery end with an air duct 56 which extends below the feeding conveyor 22 and between the delivery end of the conveyor 22 and the upper run of the carrier 32. The air forced forwardly by the fan blades 54 is adapted to pass through the dropping berries which drop from the delivery end of the conveyor 22 and any loose or free debris is forced forwardly and upwardly into a receiving housing 57. The housing 57 is disposed forwardly of the hopper 18 and includes upright side walls 58, a rear wall 59, a top wall 60, a forward wall 61 and a bottom wall 62. The bottom wall 62 is substantially shorter in length than the top wall 60 so as to provide a passage 63 through which the air and debris is adapted to pass in order to enter the housing 57. The top wall 60 has secured thereto an elongated screen 64 which covers an air outlet opening 65 and the opposite side walls 58 also have screens 66 covering side openings in the walls 58 so that the air entering the housing 57 may readily pass into the atmosphere. The housing 57 at its forward end has secured thereto a depending duct or chute 67 which is open as at 68 at its lower end so that the dirt or debris collected in the housing 57 will be discharged at one end of the frame structure 10.

The berries which roll downwardly over the upwardly moving carrier 32 are adapted to drop on the horizontal upper run of a sizing member 69. The sizing member 69 which is shown in greater detail in Figures 7 and 8 comprises a pair of spaced apart chains 70 which have secured to the inner sides thereof sockets 71 and sizing bars 72 engage at their opposite ends in the sockets 71. The chains 70 on the upper run 73 of the sizing member 69 are trained over sprockets 74 and 75 which are fixed to shafts 76 and 77 respectively. The chains 70 at their rear portions are then extended downwardly and forwardly and are trained over sprockets 78 carried by a shaft 79 journaled in bearings 80. The bearings 80 are secured to uprights 81 which are fixed at their lower ends to the horizontal frame members 17. The chains 70 are then extended forwardly and horizontally and are trained about a second pair of lower sprockets 81 which are secured to a shaft 82 journaled in bearings 83. The bearings 83 are carried by the uprights 13. The chains 70 are then extended upwardly about sprockets 84 which are secured to a shaft 85. The shaft 85 is journaled in bearings 86 also secured to the uprights 13 and the chains are then extended forwardly and upwardly to the forward end of the upper run 73. A collecting hopper 87 is disposed below the upper run 73 of the sizing member 69 and is interposed between the upper and lower runs of the sizing member 69 as shown in Figure 3.

The larger berries which do not drop through the sizing member 69 are carried forwardly and are then delivered to a forwardly moving and horizontally disposed picking table 88. The picking table 88 is constructed in the form of an endless conveyor which has one end portion thereof trained about a drum 89 mounted on a driving shaft 90. The other end of the conveyor or table 88 is trained about an idler drum 91 mounted on an idler shaft 92. The table or conveyor 88 has disposed on the opposite longitudinal edges thereof elongated side boards or members 93 which extend above the upper run of the table or conveyor 89, and preferably, the side members 93 have secured to the upper inner faces thereof inwardly projecting flanges 94 which overlie the upper run of the conveyor 88. The flanges 94 are disposed close enough to the upper surface of the conveyor or table 88 so as to prevent any berries from rolling over the opposite longitudinal edges of the table 88.

A pair of receiving hoppers 95 and 96 are disposed at the delivery end of the conveyor or table 88 and are separated from each other by a center divider 97. The hoppers 95 and 96 are open at their upper and lower ends and the berries received in the hoppers 95 and 96 are adapted to be delivered into baskets B which are mounted in a rotatable basket carrier or support, generally designated as 98. The basket carrier 98 is as shown in Figure 5 of hexagonal configuration and includes vertical side walls 99, a downwardly inclined bottom wall 100 and an inner perforate bottom or screen 101. The carrier 100 is mounted on a vertically disposed shaft 102 which is carried by forwardly extending supporting beams 103 secured to the lower frame members 11. The carrier 98 is provided at the junction between the respective side members 99 thereof with a plurality of inwardly projecting dividers 104 so that at least two berry baskets may be disposed between the pairs of the dividers 104 and such baskets may be positioned directly beneath the hoppers 95 and 96.

In the event the baskets B become overfilled with berries, the excess berries will drop onto the screen or inner bottom 101 and pass through this screen and will be collected in the space 105 between the inner bottom 101 and the lower bottom 100. The screen 101 may be of a readily removable construction so that any berries collecting in the space or chamber 105 may be periodically removed.

A power member M is carried by the frame 10 being mounted above the horizontal supporting members 11 and the power member M is adapted to rotate a drive shaft 106. Preferably, a speed reducing gear member 107 is interposed between the motor or power member M and the drive shaft 106. The shaft 106 has fixed thereto a pulley 108 about which a belt 109 is trained. The fan shaft 55 has fixed thereto a pulley 110 and the belt 109 is also trained about the pulley 110. The drive shaft 106 also has fixed thereto a second pulley 111 about which a twisted belt 112 engages. The belt 112 also engages about a pulley 113 which is mounted on the shaft 35. The belt 112 is adapted to drive the endless carrier 32. A second pulley 114 is mounted on the drive shaft 106 and has trained thereabout a belt

115. The belt 115 is also trained about a pulley 116 mounted on a shaft 117. The shaft 117 has fixed thereto a second pulley 118 about which an endless belt 119 is trained. The belt 119 is also trained about a pulley 120 which is fixed to the shaft 76 so that the sizing member 69 will be operated through the train comprising the driving belt 115 and the belt 119.

The shaft 117 also has secured thereto a third pulley 121 about which an endless belt 122 is trained. The belt 122 engages about a pulley 123 which is fixed to the shaft 90 so that the conveyor or moving table 88 will be operated with rotation of the shaft 117. Preferably, a clutch 124 of conventional construction is correlated with the pulley 116 and the shaft 117 and is released or engaged by means of a handle lever 125 which is fixed to a rock shaft 126. The rock shaft 126 is rockably mounted in bearings 127 and the shaft 126 has formed at the end thereof opposite from the handle or lever 125 a right angular lever 28. A transversely and horizontally disposed releasing link 129 is connected at one end to the lever 128 and at the other end is connected to a clutch shifting fork 130 of conventional construction. The movement of the clutch 124 to disengaged position will stop movement of the sizing member 69 and the picking table 88.

The shaft 85 which is rotated by movement of the sizing member 69 has fixed thereto a pulley 131 about which a belt 132 is trained. The drive shaft 24 of the feeding member 27 has fixed thereto a pulley 133 about which the belt 132 is also trained. In this manner, when the clutch 124 is disengaged and the sizing member 69 is stopped, the feeding member 27 will also be stopped but the fan member 54 and the debris carrier 32 will be operated when the power member M is operating.

In the use and operation of this machine, the berries as picked are placed in the hopper 18. The feeding conveyor 22 will feed the berries through the delivery opening 31 onto the debris carrier 32. The light debris which drops down with the berries will be blown forwardly by the draft of air created by the fan 54 and this debris will be collected in the housing 57 and then dropped downwardly onto the ground through the duct 67. Any heavier debris which engages the upper run 33 of the carrier 32 will be moved upwardly and discharged onto the bottom wall 62 of the housing 57. The berries which drop onto the carrier 32 will roll downwardly by gravity onto the upper run 73 of the sizing member 69. The smaller berries will drop between the sizing bars 72 and the larger berries will be carried forwardly and then dropped onto the upper surface of the picking table or conveyor 88. Any undesired berries or other material which may be discharged onto the picking table 88 may be removed as the upper run of the table 88 moves forwardly so that when the berries are discharged into the hoppers 95 and 96 the berries will be cleaned and the cleaned berries will be delivered to the baskets B which are supported on the basket support or carrier 98.

When a pair of baskets have become filled, the carrier or support 98 may be rotated to position another pair of baskets beneath the hoppers 95 and this operation may take place without stopping the picking table 88.

What I claim is:

A berry cleaning and sizing machine comprising a frame structure, a receiving hopper in said frame, a horizontal feeding conveyor below said hopper, an endless debris carrier inclined to the vertical and disposed forwardly of said feeding conveyor, a blower rearwardly of said feeding conveyor for creating an air draft between said feeding conveyor and said carrier in the same direction as the movement of the upper run of said carrier to thereby remove light debris from the berries and force such light debris forwardly and upwardly, a debris collector forwardly of said carrier, said collector having an intake opening underlying the upper run of said carrier, a movable endless perforate sizing member below said carrier for receiving the berries gravitating downwardly of the latter, and a collector between the upper and lower runs of said sizing member, an endless picking member disposed with an end thereof beneath the discharge end of said sizing member, said sizing member including horizontal upper and lower runs, a forward run having an upper portion extending downwardly and rearwardly at an acute angle to said upper run, and a lower portion extending downwardly and forwardly at an obtuse angle from said upper portion, and a rear run extending between the rear ends of said lower and upper runs, the angle between the upper and lower portions of said forward run providing a space whereby the rear end of a picking member may be extended rearwardly beneath said upper run.

EMIL RIVERS.