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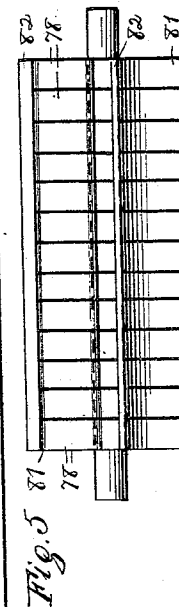
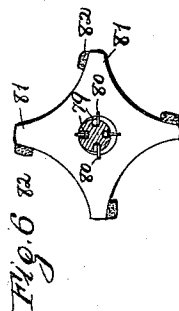
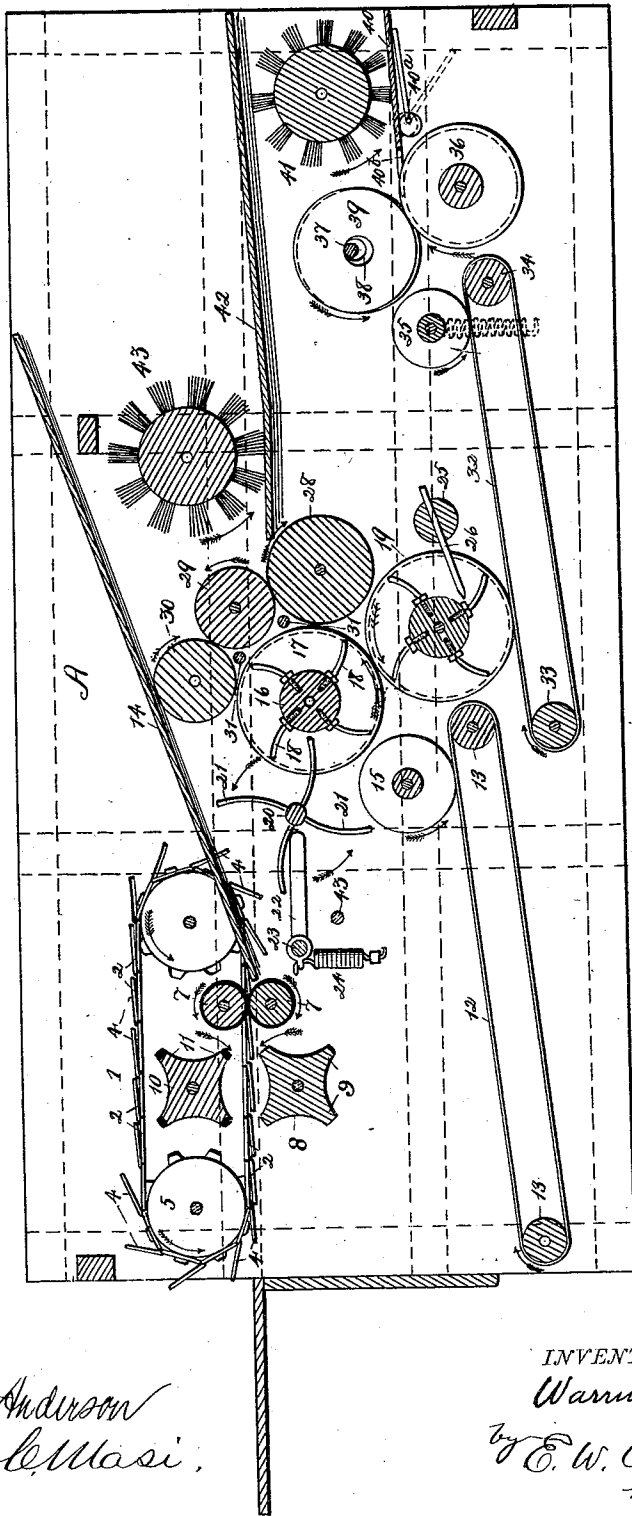
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W. H. CLARK.
HOP PICKER AND CLEANER.

No. 544,156.

Patented Aug. 6, 1895.

Fig. 1.



WITNESSES
Geo. M. Anderson
Philip L. Masi.

INVENTOR
Wm. H. Clark
by E. W. Anderson
his Attorney

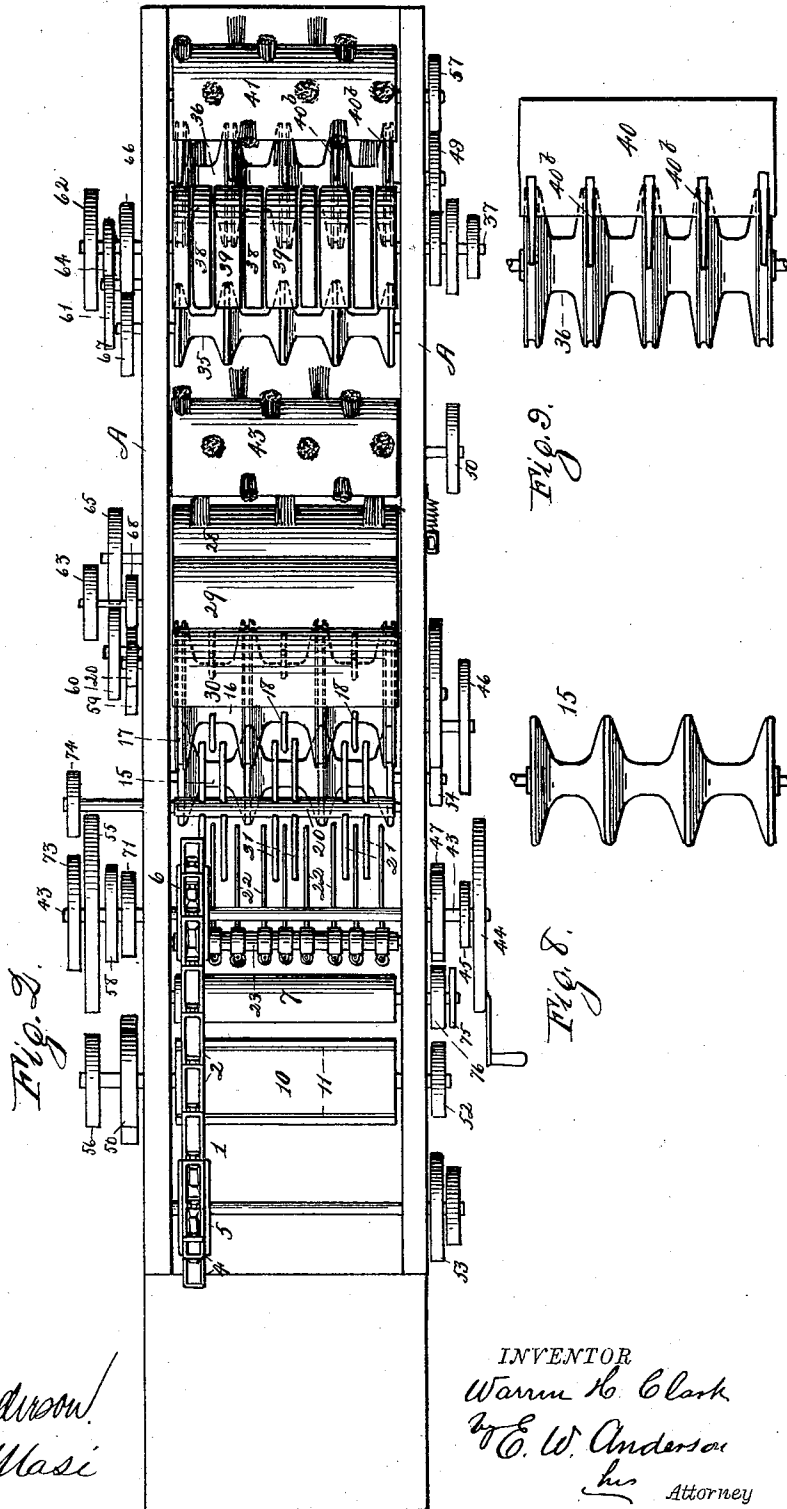
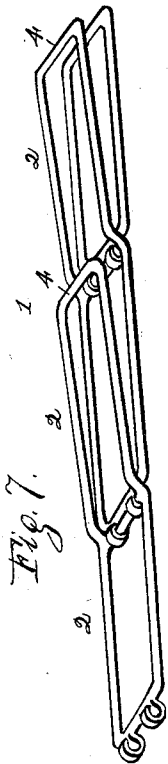
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Geo. M. Anderson
Philip C. Masi

INVENTOR

Warren H. Clark.

by E. W. Anderson

Attorney

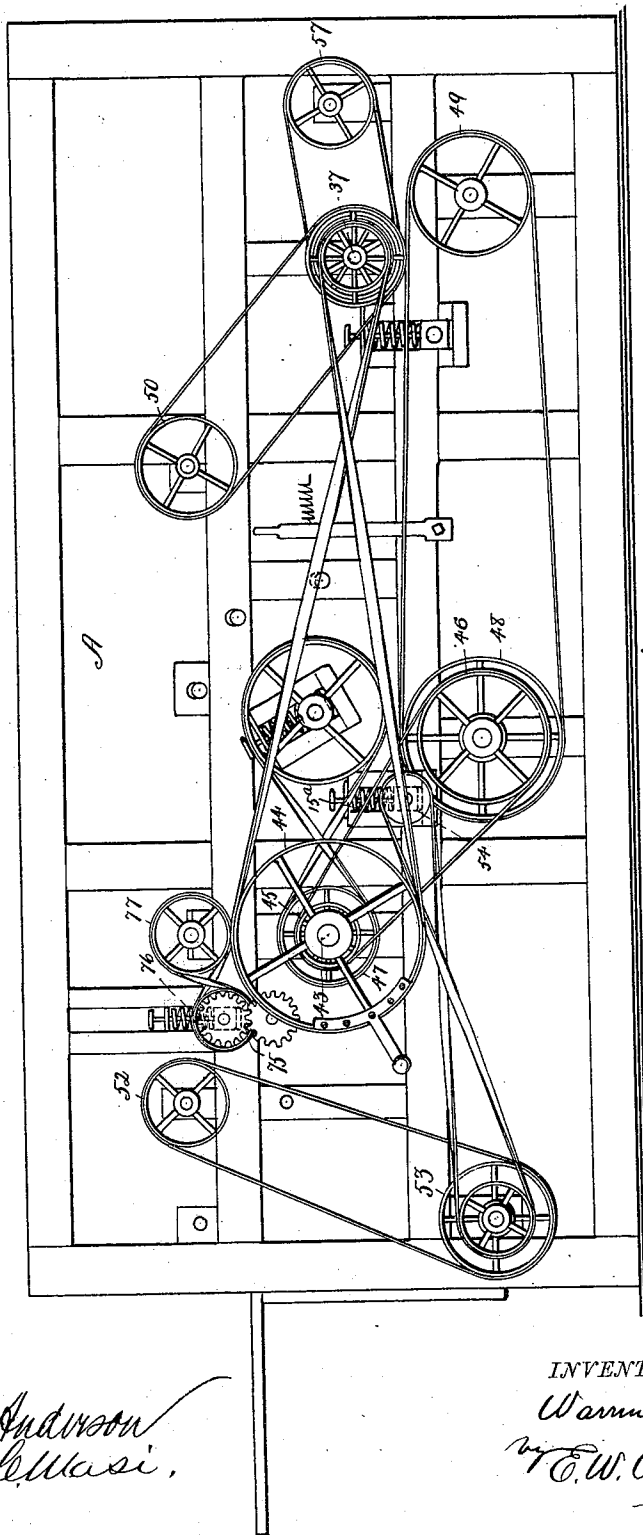
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Philip C. Masi.

INVENTOR

INVENTOR
Warren H. Clark
By E. W. Anderson
his Attorney

(No Model.)

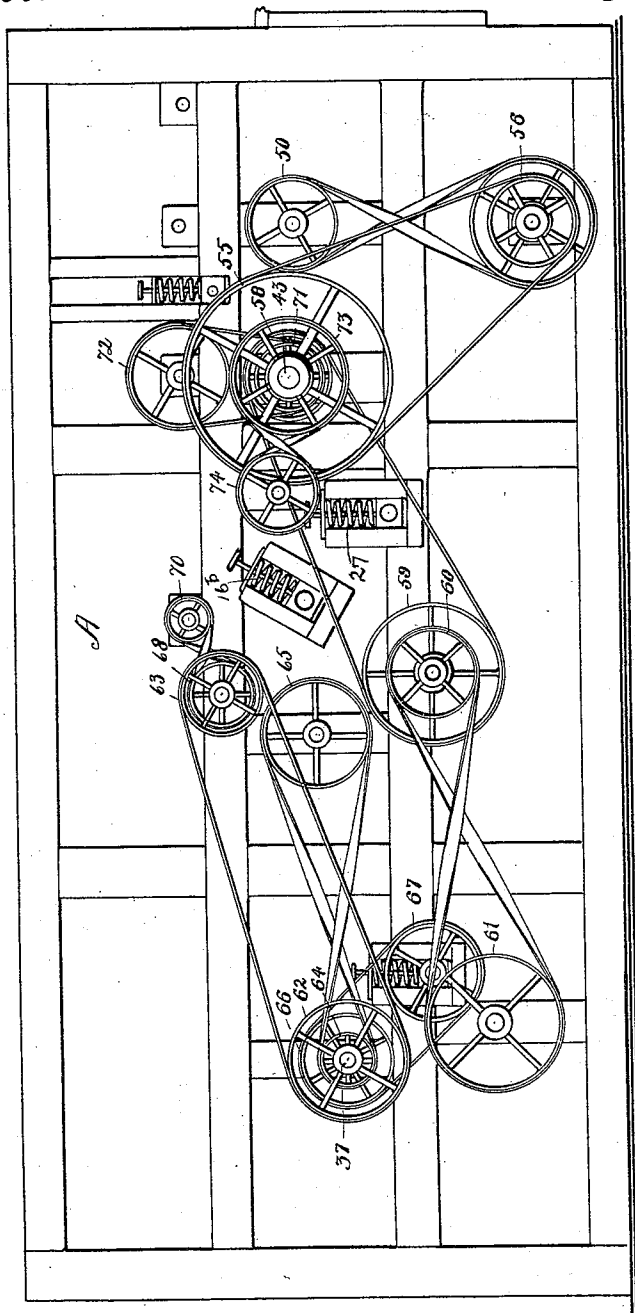
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Fig. 4



WITNESSES

Geo. M. Anderson
Philip C. Masi.

INVENTOR

Warren H. Clark
by C. W. Anderson
his Attorney

UNITED STATES PATENT OFFICE.

WARREN H. CLARK, OF WEST BURLINGTON, NEW YORK.

HOP PICKER AND CLEANER.

SPECIFICATION forming part of Letters Patent No. 544,156, dated August 6, 1895.

Application filed January 31, 1895. Serial No. 536,829. (No model.)

To all whom it may concern:

Be it known that I, WARREN H. CLARK, a citizen of the United States, and a resident of West Burlington, in the county of Otsego and State of New York, have invented certain new and useful Improvements in Hop-Pickers and Cleaners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a central longitudinal vertical section through the invention. Fig. 2 is a plan view of same with platforms 14 and 42 removed. Fig. 3 is a side elevation of machine, showing pulleys, &c. Fig. 4 is an elevation of the opposite side of same. Figs. 5 and 6 are detail views of modified form of stripper. Fig. 7 is a perspective view of a portion of the endless chain. Fig. 8 is a detail plan of hop guide and separator. Fig. 9 is a detail plan view of rotary picker and separator at the rear of machine.

This invention has relation to machines for picking and cleaning hops, the object being to provide a machine into which the hops and vines can be fed as they come from the field, and which will not only thoroughly pick the hops from the vines and stems, but will also effect the complete separation therefrom of the vines, leaves, and stems, the work being performed in a rapid and reliable manner.

With this object in view, the invention consists in the novel construction and combination of parts, all as hereinafter described and pointed out in the appended claims.

In order that the description of the machine may be better understood, I will first give a brief description of the general operation.

The hop-vines as they come from the field are fed into the machine by means of an endless feed-chain from which they are seized by a pair of rotating feed-rollers and drawn through between a pair of pickers or strippers of peculiar construction which are rotated against the vines and strip the hops, stems, and leaves from the vines, which pass onto a platform out of the machine. The hops, stems, and leaves fall onto an endless

traveling apron which carries them to a set of mechanism which breaks up the stems and hop-clusters. Acting in connection with this mechanism are a series of leaf-separators which seize the leaves from among the hops and pass them out to a suitable discharge. After passing this mechanism the hops are again carried along by an endless apron to other leaf-separators which take out any remaining leaves and discharge the hops in clean condition.

I will now proceed to describe the parts in detail.

Referring to the accompanying drawings, the letter A designates the frame of the machine, which may be of any suitable construction, capable of providing support and bearing for the various parts.

1 designates the endless chain which feeds the vines into the machine and which consists of a series of links 2, one end of each of which is pivotally secured to the central portion of the preceding link, whereby each link has a free overlapping portion or fork 4, as best seen in Fig. 1. These free portions or forks normally lie down upon the chain, but in passing around the toothed carrying-wheels 5 and 6 the impingement of the chain against the wheels throws the forks out or opens them to permit the insertion between them and the chain of the root portion of the vine. As the chain passes on, the forks close down upon the vines and carry them into the machine.

The wheel 5 is journaled in the upper forward portion of the machine at one side, while the wheel 6 is journaled just behind the feed-rollers 7 7, presently to be described. The chain works, therefore, at one side of the machine, at the ends of the pickers or strippers and of the feed-rolls, the lateral portion of the frame being cut away to permit its operation.

8 designates the lower picker or stripper, which consists of a drum journaled transversely at the upper forward portion of the machine and having at each of its angles or corners a longitudinal rib 9, as best shown in Fig. 1.

10 designates the upper picker or stripper, which is journaled over the lower one and which also consists of a drum formed with a series of longitudinal ribs or flanges 11, whose peripheral faces are shod with comparatively

thick strips 11, of rubber or other material which will yield to the vines. The ribs of the lower picker may be shod in the same manner, if desired.

5 Both pickers are positively rotated, but in opposite directions, as indicated by the arrows, so that as the vines pass between them they exert a stripping action in a direction reverse to the movement of the vine.

10 The feed-rollers 7 7 are journaled a short distance behind the pickers or strippers and are positively rotated to draw the vines between said pickers or strippers. These rollers are preferably covered with rubber, and the upper one has vertically-movable bearings acted upon by spring, which permit it to readily yield to the vines.

12 designates the endless apron onto which the hops, stems, and leaves fall from the strippers, and 13 13 designate the carrying-rolls therefor, one of which is journaled at the lower forward portion of the machine and the other at about the central portion thereof and at a somewhat higher elevation.

25 14 is a platform onto which the vines pass from the feed-rollers, and from which they may be delivered to one side of the machine, or they may be carried over and discharged at the rear. The root end of a vine is fed in by 30 the chain 1 and is caught by the feed-rollers, the bush or branch part of the vine being drawn between the pickers and stripped bare.

15 designates a hop guide and separator, which consists of a transverse shaft having 35 thereon a series of disks or flanges of considerable diameter, which rotate upon and with the apron 12. Said shaft is capable of a vertical movement in its bearings and is acted upon by springs 15^a.

40 16 designates a rotary picker and separator, which consists of a transverse shaft having thereon a series of broad disks or flanges 17, somewhat similar to those of the device 15, but of broader peripheries and greater 45 diameters. The peripheries of these flanges are also circumferentially grooved, as indicated. This device is journaled above and forward of the part 15, and its flanges, while turning in line with those of 15, do not make 50 contact therewith. Between the flanges the shaft carries a series of curved fingers 18, whose ends are about flush with the edges of the flanges. The shaft of this device is journaled in elongated oblique slots, which permit the device to yield vertically without getting too far away from the guide and separator 15.

16^b are springs which give the device the proper tension.

60 19 designates a second picker and separator, which is similar to the one described, and which is journaled below and slightly behind the first one, the flanges of the two rotating in contact with each other, but in opposite 65 directions, while the curved fingers of the two are arranged to just pass each other.

20 designates a reel which is journaled in

front of the picker and separator 16, and which has a series of fingers 21 similar to the fingers 18, the two series of fingers 18 and 21 70 rotating between each other in operation. In front of this reel is arranged a transverse series or gang of horizontal knife-fingers 22, placed with their cutting-edges uppermost and so disposed that the fingers of the reel in 75 rotation pass between them. These knives are preferably individually pivoted on a rod 23, and connected each in front of said rod with a stiff spiral spring 24. By this arrangement each knife is enabled to give or yield to 80 any hard or large substance which may come in contact therewith.

25 designates a rock-shaft which is journaled directly in rear of the part 19, and which is provided with a series of fingers 26, 85 which work between the fingers 18. Said shaft is acted upon by a spring 27 to allow it to yield downwardly when necessary.

28 designates a transverse smooth-surfaced roller which is journaled behind the part 16 90 and in rolling contact with the flanges thereof. 29 is a second and similar roller, whose axis is above and forward of the axis of the roller 28, the surfaces of the two rollers being in contact. 30 is a third and like roller 95 in contact with roller 29, and whose axis is above and forward of the axis of said roller. Said rollers are capable of a slight vertical movement in their bearings.

31 31 are two transverse bars or rods which 100 extend across the machine, one just in front of the contact portions of the rollers 28 and 29 and the other in similar relation to the rollers 29 and 30.

The arrows indicate the direction of rotation of the various parts. 105

32 is a second endless apron whose forward carrying-roll 33 is journaled below the rear carrying and driving roll of the apron 12, and whose rear carrying and driving roll 34 is 110 journaled near the rear end of the machine and somewhat higher than the roll 33. 35 designates a hop-guide and leaf-separator, which is journaled over this apron and which is similar to the part 15, before described. 115

36 and 39 is a device similar to the parts 16 and 19, with the exception that the curved fingers are omitted, it being journaled to the rear of the part 35.

Above 36 and forward of the center thereof 120 is a shaft 37, upon which are mounted a series of broad-faced disks 39, between each adjacent two of which is a narrow-faced disk 38. Both series of these disks have large central openings through which the shaft passes, the 125 openings being of sufficiently greater diameter than the shaft to give the disks considerable loose play, the narrow-faced disks having the greater play. The broad-faced disks are so disposed as to be in contact with the 130 flanges of the separator 36, while the narrow-faced disks drop between said flanges.

40 designates a table at the rear, onto which the leaves are discharged from the devices

just described, and along which they are swept by a rotary brush 41. Said table has an adjusting device 40^a, and at its forward edge a series of fingers 40^b, which rest upon or adjacent to the grooved flanges of 36.

42 is a table, onto which the leaves are discharged from the first set of separators, and 43 is a rotary brush journaled thereover.

As the hops, for the most part in clusters and on stems with the leaves, are carried along by the belt 12 they are brought to the guide and separator 15. The hops are unable to pass under the flanges of this device and are consequently divided and pass between the flanges. The leaves, however, are largely caught between the peripheral edges of the flanges and the apron, and as the separator is rotated considerably faster than the apron they are thrown by the rotation of 15 between the separators 16 and 19, and are caught by the meeting flanges of said rollers, being held more firmly thereby owing to the fact that such flanges are grooved. Some smaller leaves will be carried out between 16 and 19 onto the second traveling apron 32. Others will be carried up and rolled out between the rollers 28 and 29. The leaves carried out by the rollers 28, 29, and 30 fall upon the table 42, where the rapid rotation of the brush and the blast created thereby causes them to be moved along the platform and discharged at the rear. The stems and hop-clusters pass between the flanges of 15, and being caught by the rotating curved fingers of 16 and 19 are carried between these devices, many of the hops, being broken off the stems, falling upon the lower apron 32. The smaller clusters and stems are carried between 19 and the roller 28 and come under the action of the fingers of 19 and the fingers 26 of the rock-shaft 25, which strip the hops from the stems and clusters and they fall onto the apron 32. The larger clusters and stems, with the others that are not carried through as just described, are carried up by 16 and over to the reel 20, being prevented from catching between rollers 28, 29, and 30 by the transverse bars or rods 31. Passing to this reel they are carried down upon the series of knives 22, upon which they are forced by the fingers of the reel. These knives cut up the clusters and stems, and the hops again fall onto the apron 12 to be again submitted to the action described. The flanges or disks of the parts 15, 16, and 19 are usually separated from each other a distance of about an inch and one-half, more or less, and it will be understood that it will be almost impossible for any large stem or cluster to be carried through between these flanges onto the second apron, the action of the various fingers being also taken into account, but that such clusters or stems will be repeatedly acted upon until they are broken up and separated.

The guide and separator 15 is rotated at a speed considerably greater than that of the apron 12, as before stated, and also than that

of the parts 16 and 19. Rollers 28, 29, and 30 will also be rotated at a comparatively-high speed.

The apron 32 carries the hops to the guide and separator 35, which acts in the same manner as the similar device 15, dividing the hops and catching largely such leaves as remain therein and throwing them between the flanges of 36 and the broad-faced disks 38, whereby they are rolled out onto the table 40 and swept out by the brush 41. The smaller hops are discharged from the rear end of the apron 32, while the larger hops are pressed through between the flanges of 36 by the narrow-faced disks, where a further leaf separation is made and are discharged at the rear.

When a too-clean separation of leaves and stems is not desired, the parts 35 36 and brush 41 may be thrown out of gear and the apron 32 removed.

The various rotary parts may be geared in any suitable manner. In the drawings I have shown the machine as having a main driving-shaft 43, having a large pulley 44, cross-belted to a small pulley on the shaft 37, a small pulley 45, straight-belted to a larger pulley 46 on the driving-shaft of the apron 12, and a third pulley 47, cross-belted to a larger pulley on the shaft of 16.

A large pulley 48 on the driving-shaft of the apron 12 is straight-belted to a pulley 49 on the driving-shaft of 36. Shaft 37 is also belted to pulleys 50 and 51 on the respective brush-shafts.

The upper picker 10 has a pulley 52, which is belted to an idle-pulley 53, driven by a belt from a small pulley 54 on the shaft of 15.

Upon the opposite side of the machine the driving-shaft 43 has a large pulley 55, which is belted to a double pulley 56, cross-belted to a pulley 57 on the shaft of the lower picker 8. A second pulley 58 on the driving-shaft is belted to a pulley 59 on the shaft of 19, which also carries a pulley 60, belted to a pulley 61 on the driving-shaft of the apron 32. Shaft 37 has a pulley 62, belted to a pulley 63 on the shaft of roller 29, and a second pulley 64, cross-belted to a pulley 65 on the shaft of roller 28, and a third pulley 66, belted to a pulley 67 on the shaft of 35. A pulley 68 on the shaft of roller 29 is cross-belted to a pulley 70 on the shaft of roller 30. A third pulley 71 on the driving-shaft is belted to a pulley 72 on the driving-shaft of the feed-chain 1. A pulley 73 on the shaft of the wheel 6 is belted to a pulley 74 on the shaft of reel 20. The two feed-rollers 7 7 are geared together by gear 75 and are driven by a pulley 76, belted to a pulley 77 on the driving-shaft. I do not, however, consider the above mode of gearing essential, as various ways will be open to the mechanic.

In Figs. 5 and 6 I have shown a modified form of the upper picker 10, wherein it is built up of a series of sections 78, through which the shaft passes centrally, said shaft having therein a series of longitudinal grooves

79, designed to receive interval wings or flanges 80 of the sections in such a manner as to permit the sections to play on the shaft. These sections are provided with the peripheral ribs 81, which may or may not have supplementary rubber strip 82.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hop picking and cleaning machine, the combination with the pair of rotating pickers or strippers and the pair of feed rollers journaled behind said pickers, of the endless feed chain having the forks arranged to hold the vines and carry them to the feed rollers, said chain extending through between the pickers or strippers and between the feed rollers at one end thereof, substantially as specified.

2. In a hop picking and cleaning machine, the combination with a pair of longitudinally ribbed, rotary pickers or strippers, the pair of feed rollers journaled behind said pickers, and means for rotating the pickers reversely to the feed rollers, of the endless feed chain having the pivoted forks arranged to hold the vines and carry them to the feed rollers, said chain extending through between the pickers or strippers and between the feed rollers at one end thereof, substantially as specified.

3. In a hop picking and cleaning machine, the combination with the endless traveling apron, of the hop guide and separator 15 having the disks or flanges, the upper and lower pickers and separators 16 and 19 having the broad deep flanges or disks, and the curved fingers between said flanges or disks, the rock-shaft 25 having the fingers 26, the leaf rollers 28, 29 and 30, the reel 20, and the series of knives 22, substantially as specified.

4. In a hop picking and cleaning machine, the co-acting rotary picker and separator devices 16 and 19, one of which is journaled above and forward of the other, said devices consisting each of a shaft having thereon a series of broad faced disks or flanges and a series of fingers between said disks or flanges, substantially as specified.

5. In a hop picking and cleaning machine, a device comprising a shaft having thereon a series of flanges or disks having broad peripheral edges, and separated from each other, and a series of pins carried by the shaft between said flanges or disks, together with parts adjacent to the said peripheral edges whereby the hop leaves are caught thereby while the hops or hop clusters are carried between said flanges by said fingers, substantially as specified.

6. In a hop picking and cleaning machine, the combination with the co-acting rotary pickers and separators 16 and 19 of a number of smooth-surfaced rollers turning in close relation to the said pickers and separators for the purpose of taking the leaves therefrom, and guards for preventing said rollers

from catching the hops, substantially as specified.

7. In a hop picking and cleaning machine, the combination with the rotary pickers and separators 16 and 19, of a reel journaled in front of the picker and separator 19 and having a series of fingers arranged to pass those of said picker and separator and a series of knives in front of said reel, substantially as specified.

8. In a hop picking and cleaning machine, the combination of the rotary pickers and separators 16 and 19, having the flanges or disks and the fingers, the shaft journaled behind the picker and separator 19 and having a series of stationary, but yielding, fingers which co-operate with those of said picker and separator 19, and a rotary shaft 20 journaled in front of the picker and separator 16, and which carries a series of fingers which co-operate with those of said picker and separator 16, and rollers journaled with their peripheral surfaces adjacent to the flanges of said pickers and separators, substantially as specified.

9. In a hop picking and cleaning machine, the combination with the rear apron 32, of the hop guide and separator 35 the flanged roller 36, and the shaft 37 above said roller and having thereon a series of loose disks, substantially as specified.

10. In a hop picking and cleaning machine, the combination with the picker and separator 36, of the shaft 37 journaled above and somewhat forward of the shaft of 36, and a series of alternating broad and narrow-faced disks hung on said shaft 37 the broad-faced disks being arranged to contact with the flanges of the separator 36, and the narrow-faced disks to work between said flanges, substantially as specified.

11. The herein described hop picking and cleaning machine, consisting essentially of a pair of oppositely rotated picking or stripping drums, feed rollers journaled behind said drums, a feeding device to carry the vines to said feed rollers, an endless traveling apron below said feeding and stripping devices, a vine-discharging platform, a series of rotating pickers and separators which take the hops from the said apron, and separate them from the clusters and stems and take out the leaves, a leaf-discharging brush and driving gear, substantially as specified.

12. A hop picking machine, having at its upper forward portion mechanism for feeding the vines and stripping them, a traveling apron below such mechanism, a rotary guide and separator in contact with said apron, a flanged separator and picker forward of said guide and separator and having between its flanges a series of fingers, a second and similar separator and picker above and forward of the first, a series of knives in front of said second separator and picker, a reel between the knives and said separator and picker, a series of fingers operating in connection with those of the

first separator and picker, a second feed apron, a second set of leaf separators at the rear portion of the machine, and means for discharging the leaves and vines separately from the hops, substantially as specified.

13. In a hop cleaning machine, a separating device comprising a shaft having thereon a series of broad deep flanges, whose peripheral faces are circumferentially grooved, substantially as specified.

14. In a hop picking machine, a picking or stripping device, comprising a drum composed

of a series of sections placed side by side upon a common central shaft, and having each a central opening of larger diameter than the shaft, said openings having internal wings or flanges which engage longitudinal grooves in the said shaft, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WARREN H. CLARK.

Witnesses:

PHILIP C. MASI,
GEORGE H. PARMELEE.