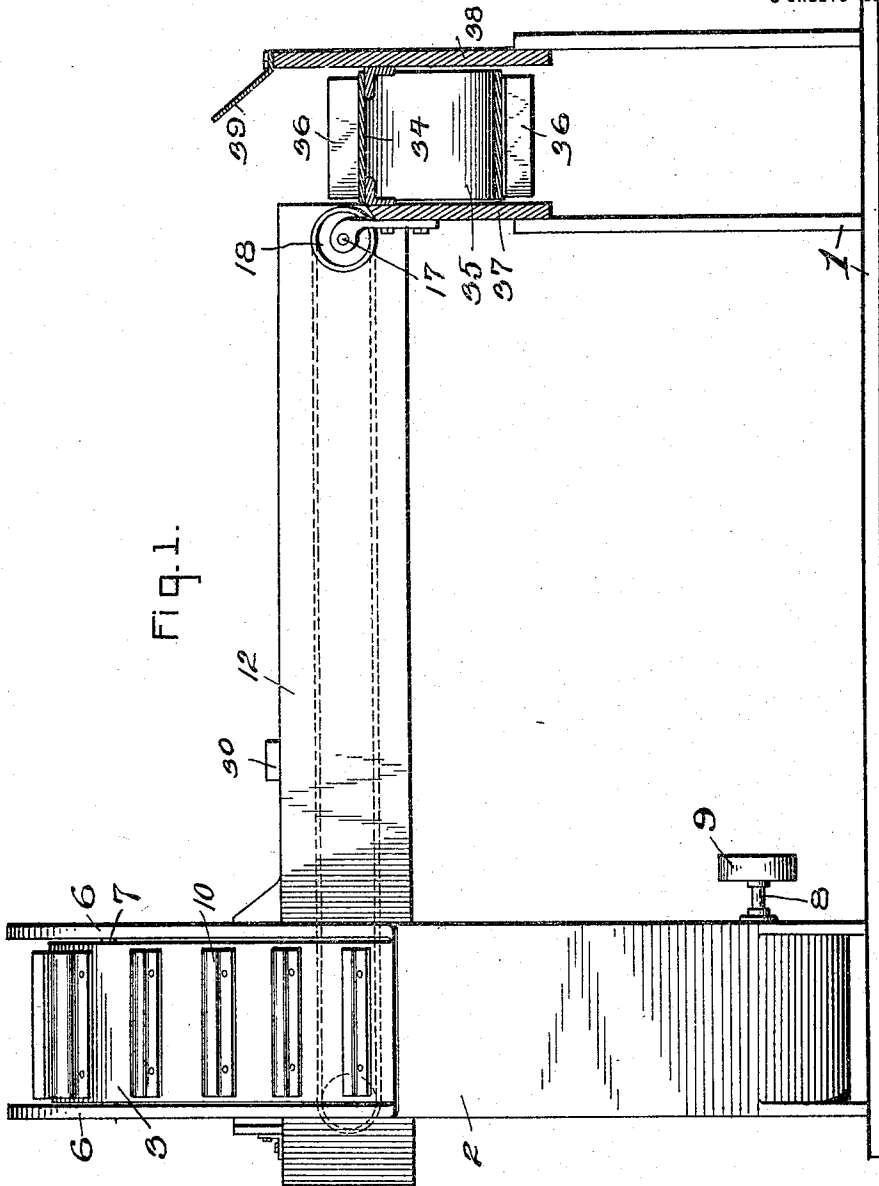


W. KILLINGSWORTH.
MECHANISM FOR FEEDING STRING BEANS, &c.
APPLICATION FILED AUG. 18, 1914.

1,276,375.

Patented Aug. 20, 1918.

3 SHEETS—SHEET 1.



WITNESSES

M. Ray Taylor
Julius J. Rith

INVENTOR

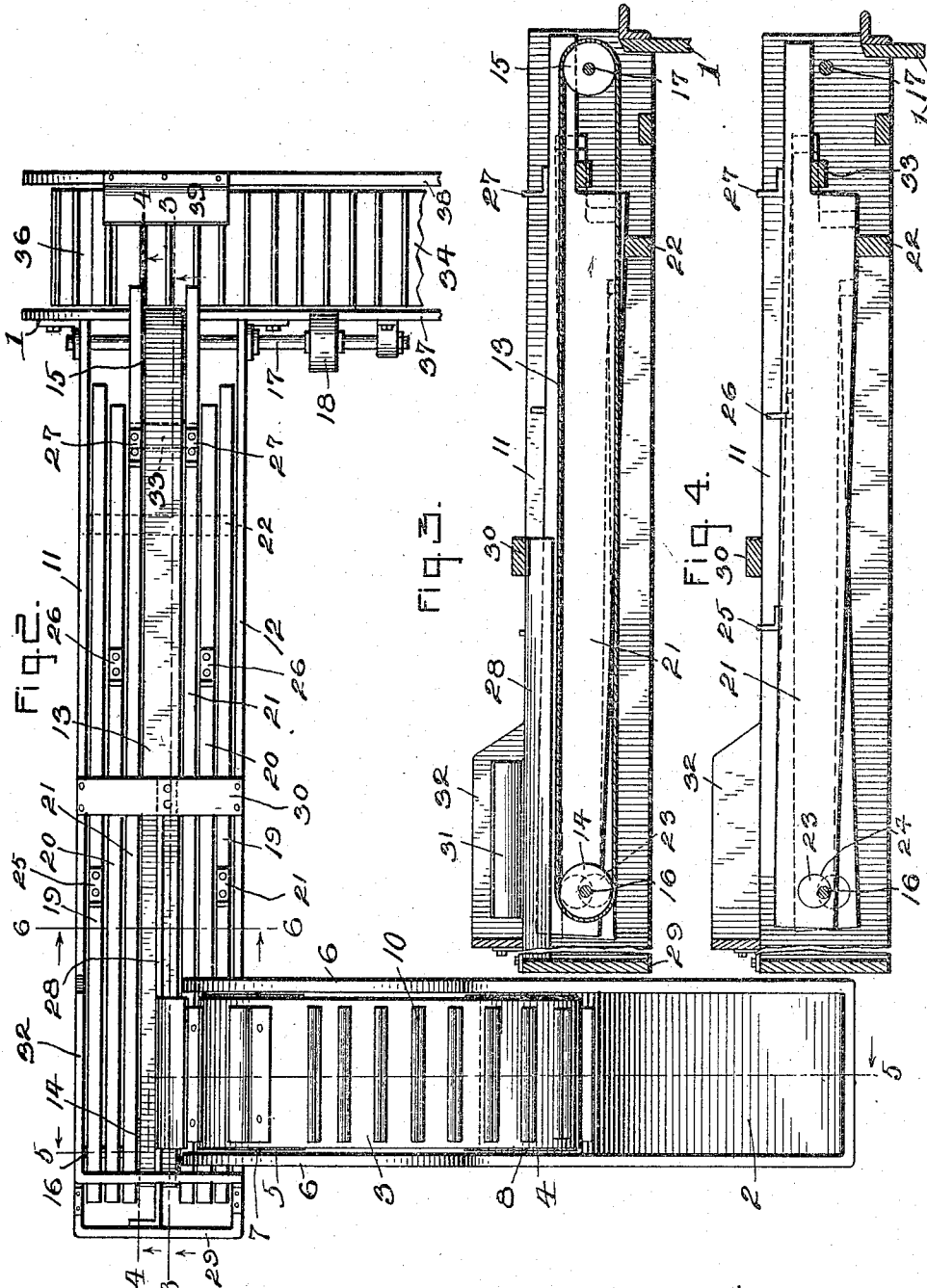
Wilber Killingsworth
by *Super & Poph*
ATTORNEYS

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WITNESSES
M. Ray Taylor
Julius J. Prible

INVENTOR
Wilber Killingsworth
BY *Edward P. Prible*
ATTORNEYS

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Fig. 6.

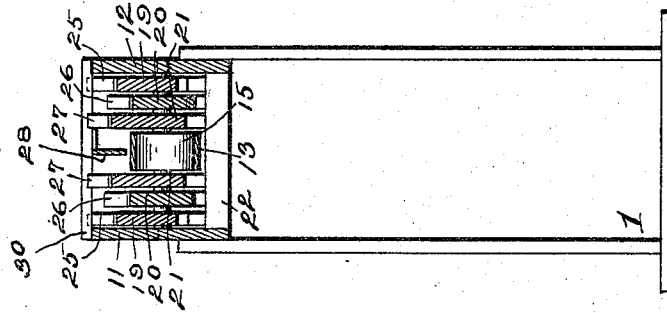
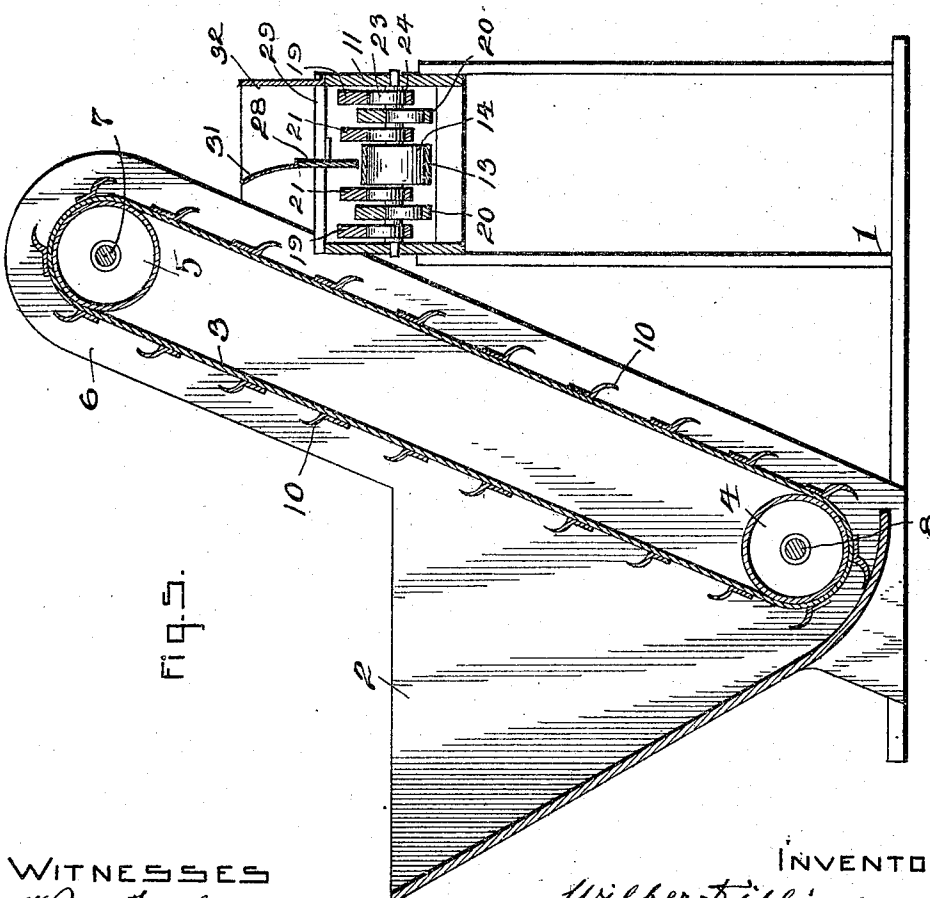


Fig. 5.



WITNESSES
M. Ray Taylor
Julius J. Prible

INVENTOR
Wilber Killingsworth
BY Geyer & Poppe
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILBER KILLINGSWORTH, OF COLUMBUS, OHIO, ASSIGNOR TO THE PHINNEY
ENGINEERING COMPANY, OF CHILLICOTHE, OHIO, A CORPORATION OF OHIO.

MECHANISM FOR FEEDING STRING-BEANS, &c.

1,276,375.

Specification of Letters Patent. Patented Aug. 20, 1918.

Application filed August 18, 1914. Serial No. 857,320.

To all whom it may concern:

Be it known that I, WILBER KILLINGSWORTH, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented new and useful Improvements in Mechanism for Feeding String-Beans, &c., of which the following is a specification.

This invention relates to a mechanism or machine for feeding string beans or the like to a machine which subsequently operates upon these articles, as for instance, to cut or snip off opposite ends thereof, preparatory to canning or putting the same up in packages for the trade.

Heretofore great difficulty has been experienced in properly feeding string beans to such snipping machines which resulted in limiting the output as well as the efficiency of the same.

The object of this invention is to provide a feeding mechanism for string bean snipping or trimming machines or the like which will take articles to be trimmed in a mixed and tangled mass and not only separate the same into small groups or units, but also feed them rapidly, regularly and evenly to the snipping or other machine in a manner which will enable the latter to trim said articles quickly and uniformly and without undue waste of material.

In the accompanying drawings:

Figure 1 is a side elevation of my improved feeding mechanism associated with a string bean snipper, a portion of the latter being shown in cross section. Fig. 2 is a top plan view thereof. Figs. 3 and 4 are vertical longitudinal sections taken on the correspondingly-numbered lines in Fig. 2. Figs. 5 and 6 are vertical cross sections taken on the correspondingly numbered lines in Fig. 2.

Similar characters of reference indicate corresponding parts throughout the several views.

The main frame 1 of the machine may be of any suitable construction to support the working parts.

2 represents an upwardly-opening feed hopper, bin or receptacle which receives the mass of mixed and tangled string beans which are to be cut off at their opposite ends. Within the rear part of this hopper is arranged an elevating device which picks up a few beans at a time and delivers the same

to the device which agitates and straightens out the beans and delivers the same in the proper position to the machine which effects the snipping of the ends thereof. This elevating device preferably comprises an endless belt 3 which passes with its lower turn around a lower supporting pulley 4 arranged in the lower part of the feed hopper while its upper turn passes around an upper supporting pulley 5 arranged between upward extensions 6 of the hopper side walls. The upper and lower pulleys 5, 4 are arranged vertically out of alignment, so that the two stretches of the belt are inclined forwardly from the hopper. The elevator-belt is operated so that its front stretch which is exposed on the inner side of the feed hopper moves upwardly while the rear or inner operative stretch thereof moves downwardly. The upper pulley 5 is mounted on a shaft 7 which is journaled in suitable bearings on the hopper extensions 6 while the lower supporting pulley 4 is mounted on a horizontal shaft 8 which is journaled on bearings on the lower part of the hopper and provided with a driving pulley 9 to which power may be transmitted from any suitable source through the medium of a belt passing around said driving pulley. On its outer side the elevating belt is provided with a plurality of elevating buckets, wings or flights 10 which are secured transversely thereto at suitable intervals. On the front or operative stretch of this belt each of its buckets picks up one or more of the beans which are loosely arranged in the feed hopper or receptacle and carries the same upwardly and over the upper supporting pulley 5 and then discharges the same downwardly during the first portion of the downward movement of the respective bucket with the inoperative stretch of the elevator belt.

As the beans are discharged from the buckets of the elevator belt, they are received by a positioning device which causes the beans to be all arranged in a definite position and quickly fed to the devices which carry the beans to the snipping mechanism. This positioning device in its preferred form is constructed as follows:

11, 12 represent two longitudinal side walls which are arranged parallel with each other and at right angles to the plane in which the elevator belt moves. The front

ends of these side walls are arranged underneath the overhanging upper portion of the elevator belt so that the beans escaping downwardly from the buckets when passing around the upper turn of the belt drop into the space between the front ends of these side walls.

13 represents an endless delivery belt or apron arranged lengthwise and centrally between the longitudinal side walls and passing at its front and rear turns around a receiving pulley 14 and a delivery pulley 15 so as to provide an upper horizontal operative stretch which moves from the receiving pulley to the delivery pulley and a lower inoperative stretch which moves from the delivery pulley to the receiving pulley. That portion of the delivery belt passing around the receiving pulley is arranged underneath the upper end of the elevator belt and the receiving pulley 14 is mounted on a horizontal front shaft 16 which is journaled transversely in suitable bearings mounted on the front ends of the side walls 11, 12. The delivery pulley 15 is mounted on a horizontal shaft 17 which is journaled transversely in suitable bearings on the rear ends of the side walls and is preferably provided with a pulley 18 which is adapted to receive a driving belt for operating the delivery belt, although any other suitable means may be employed for this purpose.

On opposite sides of the delivery belt and between the latter and the side walls of the positioning device are arranged a plurality of agitating bars 19, 20, 21 which are adapted to agitate or shake the beans falling upon the same and cause any beans hanging together in bunches to be broken up and scattered, so that they fall upon the upper operative stretch of the delivery belt in a spread condition and in a position lengthwise of the movement of this belt, whereby the string beans when discharged from this belt at the discharge end thereof will be properly presented to the carrier which delivers them to the snipping mechanism or other machine. Although the number of agitating bars may be varied it has been found satisfactory in practice to employ three of such bars in each of the spaces on opposite sides of the delivery belt between the latter and the respective side wall. The agitating bars of each set or group are arranged lengthwise of the delivery belt and parallel with the same and with each other and a rising and falling as well as a longitudinally reciprocating movement is imparted to each of said bars, so that the same operate to gradually propel the beans falling on the same in the same direction in which the upper operative stretch of the delivery belt moves. For this purpose each of the agitator bars is so mounted that the upper side of the front part of the same when in

its lowest position is flush or substantially so with the top of the operative stretch of the delivery belt, while in its uppermost position the top of this bar is always below the upper edge of the adjacent side wall, thereby confining any beans which may be deposited upon this bar between the side walls and eventually causing the beans to slide from this bar upon an adjacent bar or upon the upper stretch of the delivery belt. This agitating movement of each bar may be effected in various ways, the means for this purpose shown in the drawings being suitable and comprising a transverse guide bar 22 secured to the lower rear parts of the side walls in position to slidably support the rear ends of the several agitator bars, and an eccentric or cam 23 mounted on the front shaft 16 and engaging with a bearing opening or socket 24 in the front end of the respective agitator bar. The eccentrics of each group of agitator bars may be variously arranged so that the several bars in each group operate irregularly, that is to say, while one agitator-bar is moving upwardly and forwardly, an adjacent bar will be moving downwardly and rearwardly. In the preferred arrangement of the eccentrics, as shown in Fig. 5, the adjacent eccentrics are not in axial alinement, the central eccentric of each group of bars having its high part on one side of the front shaft 16 while the eccentrics on opposite sides of the same have their high parts arranged on the diametrically opposite side of the front shaft. By this arrangement the outermost and innermost bars 19, 21 of each group or set are raised and moved forwardly while the central bar 20 of this group is moving downwardly and backwardly, and when the central bar of this group moves upwardly and forwardly, then the other two bars of this group move downwardly and backwardly. By this means a continuous tossing or agitation of the beans deposited upon the agitator bars is effected, which causes the beans to be separated and spread out and eventually worked transversely inward and in a lengthwise aligned position upon the upper operative stretch of the delivery belt. The latter travels rapidly, so that when the beans are delivered upon the same in a position lengthwise thereof, they are quickly discharged from the rear or delivery end of this belt to the devices which carry the beans without further liability of disarrangement to the devices which remove, snip or cut off opposite ends of the string beans or operate otherwise on the same.

Owing to the fact that the rear ends of the agitator bars slide upon the horizontal guide bar 22 no perceptible up and down or vertical movement occurs in the agitator bars in those portions thereof which are adjacent to this guide bar, but the front ends

of the agitator bars which are mounted upon the eccentrics of the front shaft 16 receive the maximum vertical movement which is imparted to these bars by the eccentrics.

5 It follows from this that the beans which are deposited by the elevator belt and buckets upon the front ends of the bars receive the greatest vertical agitation and as the beans are gradually shifted forwardly on
10 the agitating bars by the longitudinal reciprocating movement thereof, the vertical agitation of the beans gradually becomes less pronounced and practically ceases altogether by the time the beans reach the rear
15 ends of the agitator bars, thereby gradually bringing the beans to a state of rest so far as vertical motion is concerned as they pass from the front ends to the rear ends of the agitator bars, so that they are not liable to
20 be shifted upon the delivery belt in a cross-wise position, but instead are delivered to this belt in a position lengthwise thereof.

In order to facilitate this gradual reduction in the vertical agitation of the beans as they move from the front ends to the rear ends of the agitator bars, the outermost agitator bar of each group is provided with an upright stop, shoulder or deflector 25 on its upper side at a point adjacent to the elevator belt and preferably about one-third of the length of this bar from the front end thereof. The central bar of each group is provided with a similar stop, shoulder or deflector 26 on its upper side which is arranged about one third of its length from the front end thereof, while the innermost bar of each set or group is provided on its upper side at a point about three quarters of its length from the front end thereof
40 with an upwardly projecting stop, shoulder or deflector 27. The several stops or deflectors of each group of agitator bars are arranged in an oblique row relatively to the direction of movement of the delivery belt
45 and the two rows of deflectors of both sets of agitator bars converge forwardly relatively to the upper stretch of the delivery belt from the receiving toward the delivery end thereof. It follows from this construction that any beans which are deposited by
50 the elevator upon the outermost members 19 of the two groups of agitator bars are permitted to pass forwardly with the same until they engage the stops or deflectors 25 of these bars at which point the further forward movement on these bars is arrested and the beans during the continued agitation with these bars are discharged upon the intermediate bars 20 of both groups. The beans
60 then continue their forward movement on these intermediate bars due to the longitudinal reciprocation thereof until the beans engage the deflectors or stops 26 on these bars, when the beans are prevented from
65 continuing their forward movement on the

same and are eventually discharged inwardly upon the innermost bars 21 of both groups. The beans then in like manner continue their forward movement on the innermost bars of both groups by reason of the
70 longitudinal reciprocation of the same until the beans fall off these innermost bars onto the operative stretch of the delivery belt in a lengthwise alined position and are swiftly carried by the latter to the devices
75 which carry the same to the cutting mechanism or other devices adapted to operate on the beans.

As the beans drop from the elevator-buckets while the latter pass over the upper
80 supporting pulley 5 the same are divided so that some of them fall on the front parts of one set of agitator bars and one half of the front part of the delivery belt while others fall on the front parts of the other set
85 of bars and the other half of the front part of the delivery belt, this being accomplished by mean of an upright dividing wall 28 arranged lengthwise over the front or receiving part of the operative stretch of the de-
90 livery belt in line with the longitudinal center thereof and supported at its front end on the adjacent cross piece 29 of the side walls while its rear end is supported by means of a cross piece 30 extending over the delivery
95 belt and agitator bars and secured to the adjacent parts of the side walls. Inasmuch as the size or weight of the beans, the speed of delivery from the elevator to the agitator, or other conditions, may influence the equal
100 or substantially equal division of the beans discharged from the elevator to the delivery belt and agitator bars on opposite sides of the dividing wall, means are provided whereby this division may be adjusted with ap-
105 proximate accuracy. For this purpose an adjustable dividing wing or plate 31, preferably constructed of sheet metal, is secured in an upright position to the upper edge of the dividing wall immediately below the
110 place where the beans are dropped from the elevator buckets. By bending this dividing plate laterally in one direction or the other its upper edge may be so located relatively to the falling stream of string beans
115 that this stream is divided into two substantially equal parts and thereby causes both sides of the positioning device to perform an equal amount of work and increase the output of the machine accordingly. In
120 order to guard against any string beans being thrown over the longitudinal wall 11 which is farthest from the elevator, the upper edge of this wall is provided at a point opposite the falling stream of beans with an
125 upright guard 32 which intercepts any beans which tend to fly over this wall and directs the same upon the adjacent parts of the agitator bars and delivery belt.

The spaces between opposite edges of the 130

upper stretch of the delivery belt and the innermost agitator bars as well as the spaces between the several agitator bars and also between the outermost agitator bars and the side walls is so small that no beans can get into these spaces. As a matter of fact in actual practice these various members practically touch each other and form a substantially unbroken surface for the mass of beans to rest upon.

The innermost agitator bars of both groups are preferably connected with each other by means of a cross bar 33 at the delivery end thereof, which cross bar is secured to these agitator bars on the undersides of the reduced rear portions thereof and extends crosswise between the upper and lower stretches of the delivery belt, as shown in Figs. 2, 3 and 4, thereby causing the respective agitator bars to be held in proper relation to the opposite edges of the upper stretch of the delivery belt. These innermost agitator bars are preferably of such length that their rear ends extend a short distance rearwardly beyond the rear turn of this belt so as to positively confine the beans on the delivery portion of the delivery belt. In this region the upper edges of the innermost agitator bars are constantly arranged a short distance above the upper surface of the operative stretch of the delivery belt so as to form a channel through which the beans after being separated and straightened, are positively controlled up to the time the beans are delivered by this belt to the devices which carry the same to the snipping or cutting mechanism. The intermediate members and the outermost members of both groups of agitator bars need however only be carried a short distance rearwardly beyond the guide bar 22 inasmuch as the beans at no time reach the rear ends of these bars by reason of the operation of the deflectors 25, 26 on the same operating to successively direct the same from the outermost to the intermediate bars and then to the innermost agitator bars from which latter the beans finally work over upon the delivery belt. The innermost agitator bars and the outermost members of both groups of these bars are not connected in pairs in the manner in which this is done with reference to the innermost agitator bars, inasmuch as the outermost and intermediate bars are incapable of any lateral displacement which would permit the passage of any beans in the spaces between the same and adjacent parts.

As the beans are discharged from the delivery belt at the rear turn of the same, the beans are received by a carrier which is so constructed that the beans delivered upon the same in a separated and straightened position are presented without possibility of disarrangement to a cutting or snipping mechanism or other device. As shown in the

drawings, this carrier preferably comprises an endless belt 34 which passes with its front turn around a pulley 35 and is provided on its outer side with a plurality of transverse buckets or pockets 36 each of which is arranged lengthwise in line with the delivery belt while passing transversely below the place where the beans are discharged by the rear turn of the delivery belt. The operative stretch of the carrying belt 34 is uppermost and moves between two longitudinal side walls 37, 38 so that each of its pockets is successively moved into alinement with the rear turn of the delivery belt and receives one or more of the string beans which are deposited in a crosswise position in the respective pocket, so that these beans are under positive control and opposite ends of the same may be reliably presented to appropriate cutting mechanism for trimming off these ends the required extent and without undue waste of material preparatory to cooking or packing these beans for the trade.

In order to prevent the delivery belt from throwing the beans over the wall 38 of the carrying belt which is farthest from the delivery belt, a guard plate 39 is provided which projects upwardly from the wall 38 opposite to the discharge of the delivery belt and operates to direct the beans discharged by the same downwardly into the adjacent pockets or buckets of the carrier.

This string bean feeding mechanism may be used in connection with a cutter mechanism of any suitable character, but preferably of the type shown in an application for patent filed by myself on the 3rd day of September, 1914, and serially numbered 860,008.

By means of my improved feeding mechanism it is possible to take the mass of beans which vary as to length, thickness and shape and not only separate them but also feed them uniformly and a few at a time in the proper position comparatively fast to a machine which is intended to snip the ends or otherwise operate upon the beans.

In its construction this machine has no complicated or delicate parts which are liable to be easily broken or get out of order; the same is not liable to become clogged by beans of abnormal shape and but very little power is required for its operation, thereby effecting a considerable saving in the cost of feeding and snipping beans by machinery as compared with the cost when these operations are performed by hand. Furthermore, by separating, positioning and feeding the beans in this manner, the resulting product is more cleanly and sanitary inasmuch as no handling of the same is necessary.

I claim as my invention:

1. A mechanism for feeding string beans and the like comprising a horizontal delivery belt, an agitator bar arranged lengthwise

adjacent to said belt, and means for reciprocating said bar horizontally and vertically.

2. A mechanism for feeding string beans and the like comprising a horizontal delivery belt, an agitator bar arranged lengthwise adjacent to said belt, and means for reciprocating said bar horizontally and vertically comprising a support on which the rear part of said bar slides and a rotatable eccentric operatively engaging the front end of said bar.

3. A mechanism for feeding string beans and the like comprising a horizontal delivery belt, an agitator bar arranged lengthwise adjacent to said belt, a deflector arranged on the upper side of said bar, and means for reciprocating said bar horizontally and vertically.

4. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged respectively, between said belt and said walls, and means for reciprocating the bars of each set lengthwise and vertically at different times.

5. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged respectively, between said belt and said walls, and means for reciprocating the bars of each set lengthwise and vertically at different times, comprising a shaft having a plurality of eccentrics each of which engages operatively with one of said bars and each eccentric being arranged out of line with an adjacent eccentric.

6. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged, respectively, between said belt and said walls, and means for reciprocating the bars of each set lengthwise and vertically at different times comprising a shaft having a plurality of eccentrics each of which engages operatively with one end of one of said bars and each eccentric being arranged out of line with an adjacent eccentric and a fixed support on which the opposite end of each of said bars slides.

7. A mechanism for feeding string beans

and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged, respectively, between said belt and said walls, means for reciprocating the bars of each set lengthwise and vertically at different times, and deflectors arranged on the uppersides of said bars, the deflectors of one set of bars being arranged at different points lengthwise of the several bars of one set and together forming an oblique row and the rows of deflectors of both sets of bars converging forwardly.

8. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged, respectively, between said belt and said walls, means for reciprocating the bars of each set lengthwise and vertically at different times, and a connection between the bars next to said belt at the rear ends thereof.

9. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged, respectively, between said belt and said walls, the bars next to said belt projecting with their rear ends beyond the discharge turn of said belt, and means for reciprocating the bars of each set lengthwise and vertically at different times.

10. A mechanism for feeding string beans and the like comprising a delivery belt, walls arranged on opposite sides of said belt, two sets of agitator bars arranged, respectively, between said belt and said walls, the bars next to said belt projecting with their rear ends beyond the discharge turn of said belt, while the other bars terminate at their rear ends short of the discharge turn of said belt, and means for reciprocating the bars of each set lengthwise and vertically at different times.

Witness my hand this 14th day of August, 1914.

WILBER KILLINGSWORTH.

Witnesses:

A. FULZBACHER,
MARTIN F. CUDDEN.