W. F. PROBST.

MACHINE FOR SNIPPING BEANS AND OTHER ARTICLES.

APPLICATION FILED JULY 15, 1920.

1,432,899.

Patented Oct. 24, 1922.

4 SHEETS—SHEET 1.

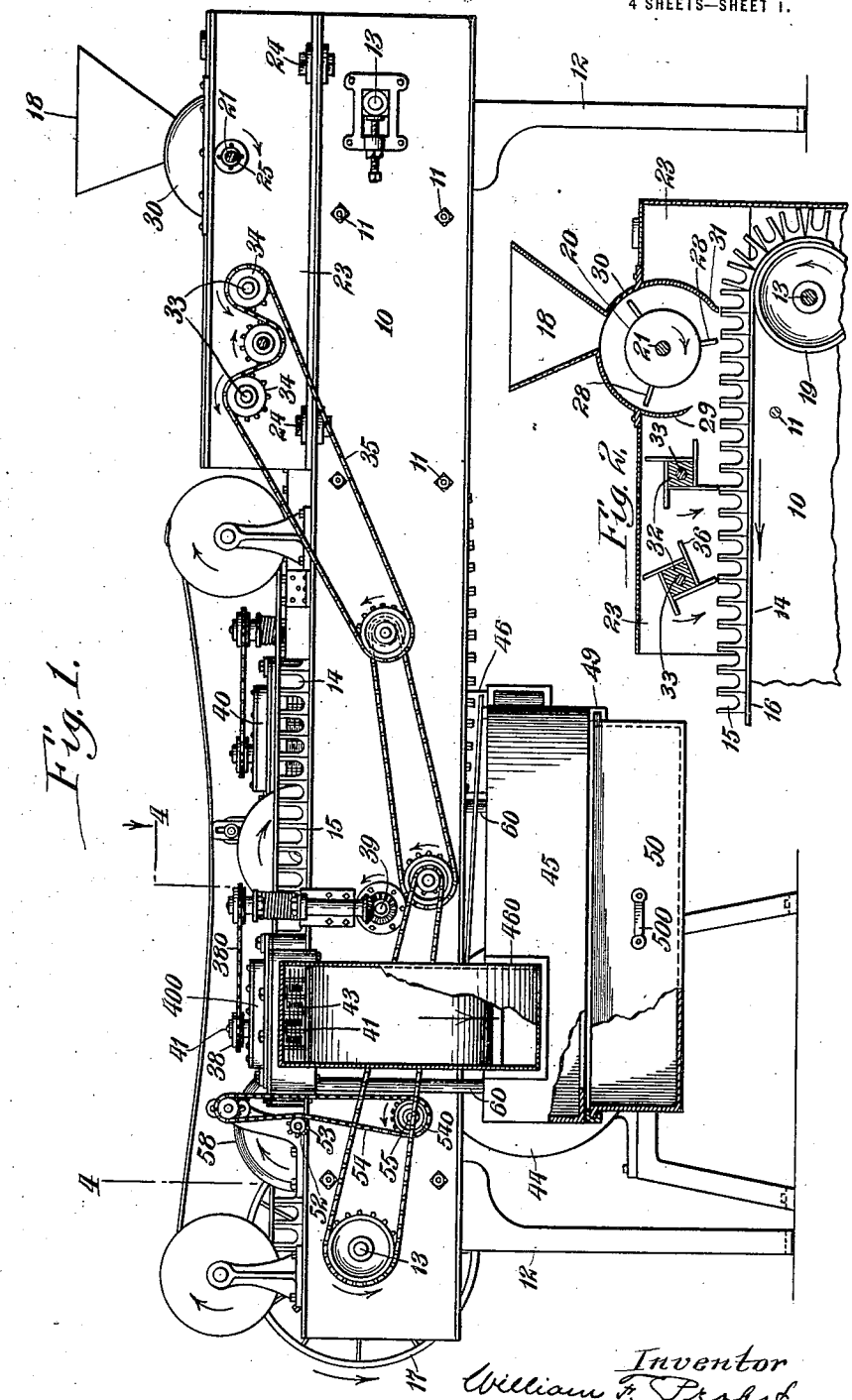


Fig. 1.

Fig. 2.

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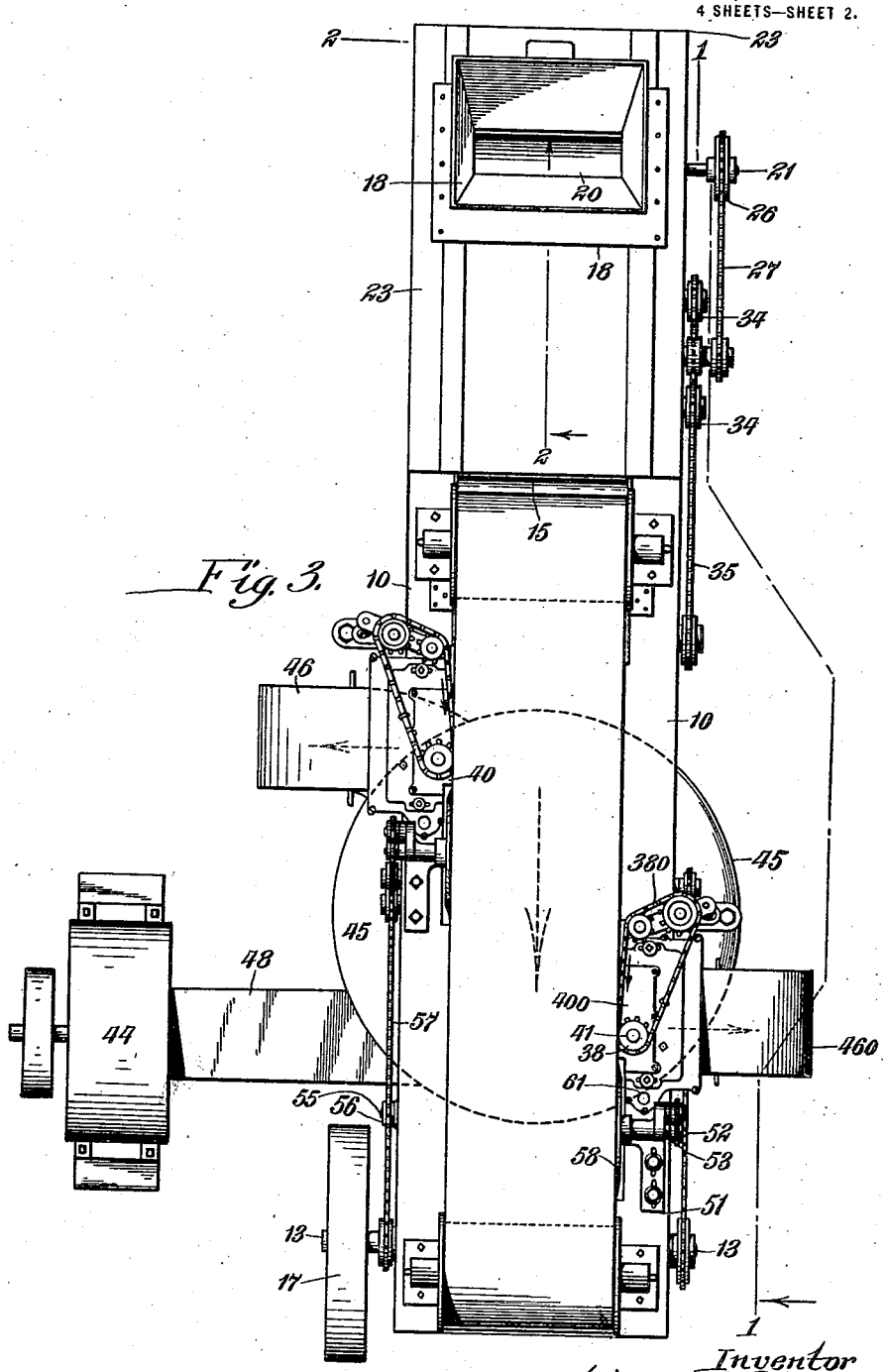
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4 SHEETS—SHEET 2.

Fig. 3.



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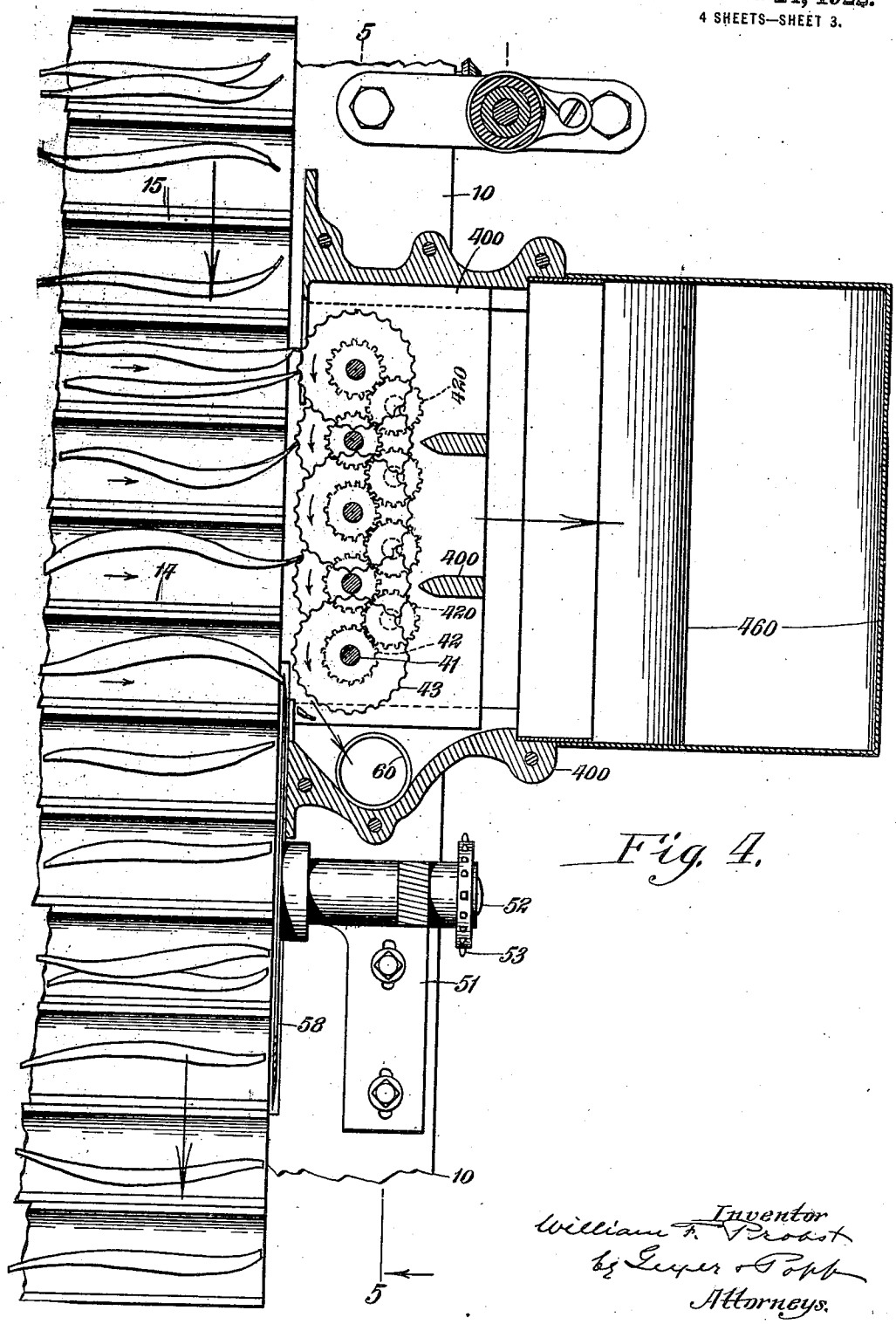


Fig. 4.

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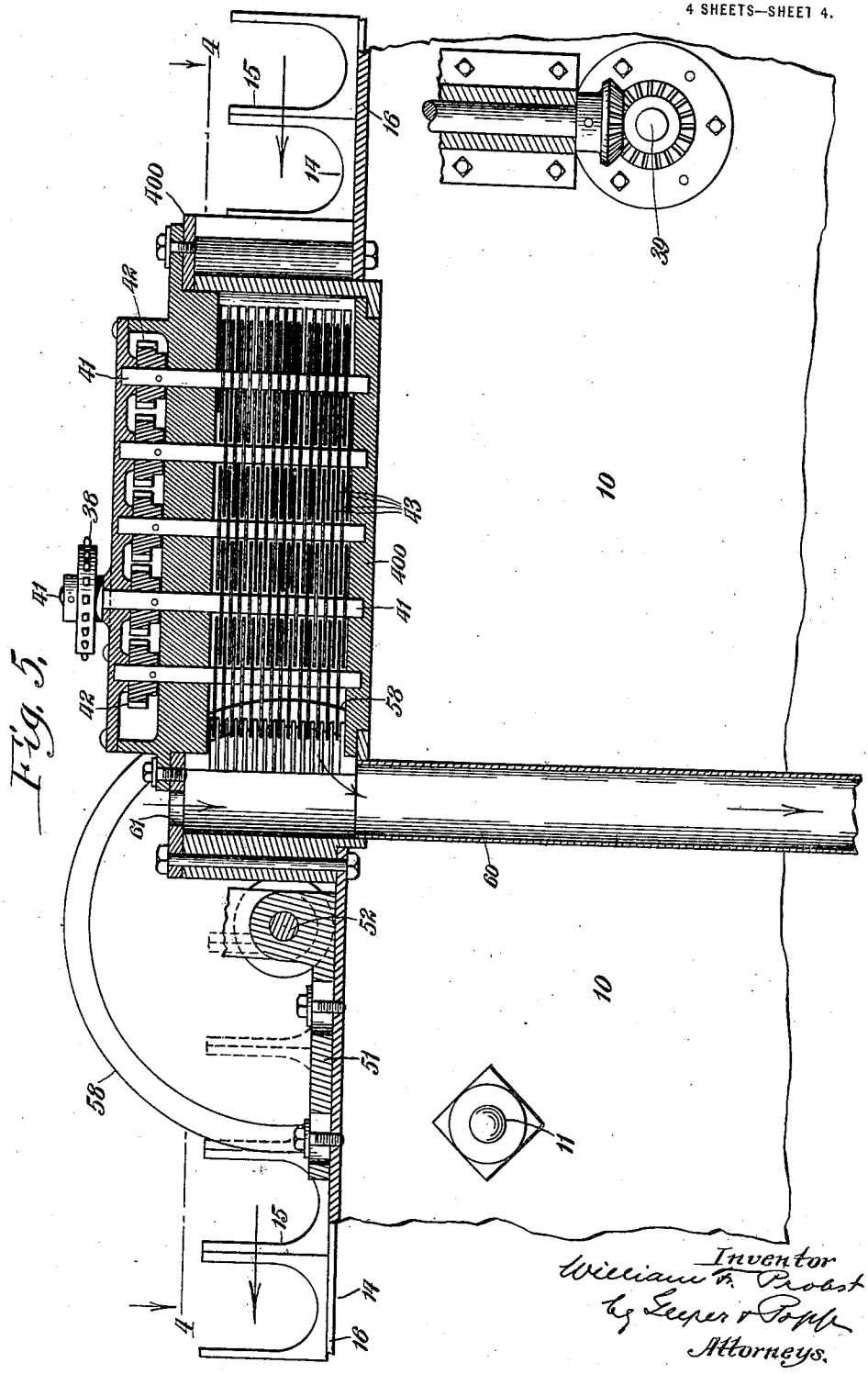


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR SNIPPING BEANS AND OTHER ARTICLES.

Application filed July 15, 1920. Serial No. 396,523.

To all whom it may concern:

Be it known that I, WILLIAM F. PROBST, a citizen of the United States, residing in Chillicothe, in the county of Ross and State of Ohio, have invented new and useful Improvements in Machines for Snipping Beans and Other Articles, of which the following is a specification.

This invention relates to a machine for snipping, trimming or cutting off the ends of string beans or similar articles preparatory to cooking the same and packing them for future use as is commonly done on a large scale in canning factories.

One of the objects of the invention is to feed the string beans or other articles in uniform quantities and in correct alignment to the article carrier and to automatically throw back into proper position such of the crooked beans or other articles as have not fallen into their proper positions. A further object of the invention is to prevent the waste ends of the beans from clogging the machine next to the cutters or shearing members. A still further object of the invention is to create a uniform air blast or suction pressure at each of the cutters or suction boxes. A still further object of the invention is to separate the waste ends of the beans from the current of air by which they are withdrawn from the suction heads. Further objects and advantages are more clearly disclosed in the following specification and appended drawings in which,

Figure 1 is a side elevation of the complete machine with certain parts in section taken on line 1—1, Fig. 3. Figure 2 is a fragmentary vertical longitudinal section through the machine taken on line 2—2, Fig. 3. Figure 3 is a top plan of the complete machine. Figure 4 is a fragmentary horizontal section through one of the cutter heads taken on line 4—4, Figs. 1 and 5. Figure 5 is a fragmentary vertical section through the same suction head taken on line 5—5, Fig. 4.

Similar characters of reference refer to like parts throughout the several views.

Although this invention may be applied to various kinds of machines for trimming off the ends of articles, the same is represented in the drawings as embodied in a machine for trimming or snipping beans.

Referring particularly to Figs. 1 and 2, 10, 10 represent a pair of parallel channel iron beams or frame walls which comprise the principal frame of the machine and which extend longitudinally the full length of the machine, their flat vertical faces facing inwardly toward each other. The said frame walls are suitably secured together and maintained in proper spaced relationship by means of a plurality of transversely disposed frame bolts 11 whose opposite ends are suitably secured to the vertical webs of said frame walls 10. The frame of the machine as thus constructed is suitably mounted on a number of supporting legs 12 at each lower side of each corner of said frame. Transversely journalled at opposite ends in said main frame of the machine are two article carrier shafts 13 around which passes an endless carrier 14 which is arranged between the inner flat faces of the frame walls 10 and which is provided on its outer flat sides with a plurality of pockets, buckets or troughs 15, which are open at the outer side and also at opposite ends thereof. In its preferred form, this carrier comprises an endless belt or apron 16, which passes with its opposite turns around suitable pulleys 19 mounted on the transverse shafts 13, said pulleys being arranged horizontally in line so as to form an operative horizontal upper stretch of this belt and an inoperative horizontal lower stretch of the same. The driving of the pulleys and the article carrier is effected by a driving pulley 17 which is mounted on one of the shafts 13 and may be belted to any suitable source of power. The pockets or buckets 15 of the endless carrier are preferably formed by means of a plurality of propelling members each of which is substantially U-shaped in cross section and is suitably secured to the endless belt 16 in such fashion that each of the flanges thereof projects laterally outwardly therefrom and extends crosswise of said belt from one edge thereof to the other edge in the form of a wing, flight or wall. These propelling members are arranged close together on the carrier belt and preferably so close that when the same are traveling on the horizontal stretch of the carrier belt, the adjacent flanges of the members closely abut against each other, and thereby form the said plurality of pockets, buckets or troughs 15 between the several laterally projecting flanges or wings of the propelling members.

Assuming that it is string beans that are to be trimmed, snipped or cut off at their opposite ends in this machine, such beans are dropped into a supply hopper 18 which is arranged somewhat above the main frame of the machine and at the rear end thereof. The beans drop down from this supply hopper on top of a rotating cylindrical feeding drum 20 which is mounted on a transverse drum shaft 21. This feeding drum is arranged between a pair of longitudinally disposed channel iron plates 23 which are similar to the main frame walls 10 and rest on top of and in alignment with the same, being secured thereto by suitable bolts 24. The feeding drum shaft 21 is journaled in suitable bearings 25 which are secured to the vertical webs of said plates 23 and said shaft carries a feeding drum sprocket wheel 26 on one of its outer ends, the same being driven by a feeding-drum chain 27. Secured to the feeding drum 20 and projecting outwardly and longitudinally therefrom are a number of flanges or feeding fins 28, the number of fins and the rotation of the drum being preferably such that each fin discharges its load of beans into two of the buckets 15 which are moving longitudinally and immediately below said feeding drum. One of the features of this feeding drum is that the beans may be dropped into the hopper 18 in a disarranged or helter skelter mass and the feeding drum, by reason of its longitudinal fins, will arrange all of said beans parallel. To prevent the beans from sliding off of the drum too soon, and landing on their ends instead of on their sides, a semi-cylindrical drum casing 30 is arranged around said drum with its rear wall 31 extending down almost to the upper edges of the pockets 15, so that said fins control the position of said beans right up to the time they are deposited in said pockets 15. The front wall 32 of the casing also extends down somewhat below the top of the plates 23 and acts to shear off from the feeding drum fins 28 any beans which may have become adhered thereto.

The beans which slide out or drop from the casing 30 fall into the said pockets 15 and travel forwardly with the same, and pass under a pair of rotatable scrapers 32. These scrapers are secured to a pair of transverse scraper shafts 33 whose ends are suitably journaled in the webs of the plates 23, the outer end of said shafts being provided with suitable scraper sprocket wheels 34 which are driven by a belt chain 35. Each of the scrapers is provided with a number of flexible scraper strips 36 which extend tangentially outwardly from the scraper shaft and are adapted to bear with their lower ends against the upper edges of the pockets 15, the direction of rotation of the scrapers being such that the lower ends of the strips 36 brush rearwardly against the advancing edges of the pockets 15 thereby scraping off any beans or other articles which may have become lodged on the upper edges of said pockets.

The beans in the pockets of the endless carrier thereafter continue their forward motion, and move first past a primary suction or gage box 40 and then continue past a secondary suction or gage box 400, the beans being drawn transversely by an air blast or suction pressure first toward the primary and then later toward the secondary suction box. Both of said suction or gaging boxes are substantially alike in construction so that the following description of the secondary suction box 400 answers as well for the primary suction box 40. Rotatably mounted in said suction box is a longitudinal row of vertically disposed shafts 41 which are suitably journaled at their opposite ends in the upper and lower horizontal walls of the suction box. The upper ends of the shafts 41 are provided with spur pinion gears 42 and between the pairs of said gears 42 are arranged intermediate spur gears 420 which are mounted on vertical shafts which are suitably journaled in the suction box. One of the upright shafts 41 carries a sprocket gear 38 which is suitably driven by a belt or sprocket chain 380 which in turn receives its power from a transverse shaft 39 journaled in the main frame of the machine. Secured to each vertical shaft 41 are a plurality of horizontally disposed serrated gage disks 43, the disks of any one shaft 41 extending in between the disks of the shafts which are next adjacent, thereby effecting an overlapping arrangement which is self cleaning and which permits of a very close arrangement of said disks 43. The inner faces or serrated edges of these disks all turn in the same direction, i. e. forwardly, the peripheral speed being substantially the same as the speed of the endless carrier 14 with its pockets 15. As the beans (which are lying in the bottom of said pockets) are moved along with the endless carrier, they are caused to move lengthwise of said pockets and bear with their ends against the contiguous edges of the disks 43. This movement of the beans is caused by an air suction pump 44 which is belted to a suitable source of power and which is suitably connected to an equalizing vacuum or suction chamber 45, the latter communicating with the suction boxes through primary suction pipes 46 and 460. Both suction pipes, as best illustrated in Fig. 1, in the case of the one primary suction pipe 460, are very much reduced in cross sectional area at the point where they enter the suction box 400, the rest of said suction pipes being of greater cross sectional area, as shown clearly at the point where the pipe 460 enters the aforementioned equalizing chamber 45. This re-

duction of the upper end of said suction pipe causes the effect of the air blast through said pipe to be concentrated in the suction box 400 so that the most effective work of said air blast or suction pressure acts at the point where it is most useful. Each suction pipe enters the equalizing chamber 45 in a tangential direction and the exhaust pipe 48, which leads to the suction pump 44, leads off from said equalizing chamber in a tangential direction, so that a swirling air current is caused in said equalizing chamber whereby the equalizing of pressure is rendered more rapid, said chamber being preferably cylindrical, as shown, to aid in this action. The bottom of said equalizing chamber is open, and arranged below said opening is a slide drawer or bean snip receptacle 50 which is slidably hung from a pair of transverse channel iron slides or guide ways 49 riveted or otherwise secured to the lower face of said equalizing chamber 45. The bean snips, being heavier than the air blast which withdraws them from the suction boxes, settle by gravity to the lower part of the equalizing chamber and drop into the slide drawer 50 below, where they may be periodically removed by grasping the drawer handle 500 and sliding out the drawer.

Forwardly of each of the suction boxes is arranged a longitudinally adjustable bearing block 51 and journaled in said block is a transverse cutter shaft 52. The outer end of said shaft 52 carries a small sprocket wheel 53 which receives its power from a chain belt 54 that passes with its lower turn around a sprocket wheel 540 on a driving shaft 55, whose opposite end carries a sprocket wheel 56 meshing with a belt chain 57. The inner end of the transverse cutter shaft 52 carries a rotary cutter or disk knife 58 which is adapted to cut off the ends of the beans after they have been drawn and still held by air pressure against the serrated gage disks 43, as best shown in Fig. 4. In previous bean snipping machines there has been a tendency for the bean ends to pack in a pile in the suction box just outside of the cutting portion of the said disk cutter 58. In the present machine this objection is eliminated, by providing a vertically disposed secondary suction pipe 60, whose upper end opens into the floor of the suction box adjacent to the cutter where the bean snips would otherwise pile up. The lower end of said secondary suction pipe opens into the upper horizontal roof of the equalizing chamber 45. To ensure a forceful blast of air passing into the upper end of said pipe 60, the roof of each suction box is provided with an inlet air opening 61 which is positioned vertically above said secondary pipe and permits an external air current to be drawn directly into said secondary pipe 60, so that any packing up of bean snips is absolutely eliminated and the rotary cutter 58 kept free and clear in condition to cut rapidly and sharply.

On the whole it will be evident that the machine may be used continuously without necessitating any shutting down for cleaning or disentangling accumulated masses of beans or bean snips. The beans are fed in uniform quantities and in correct alignment to the endless carrier and the beans are forced to lie properly in the bottom of the pockets 15. Wet piles of bean snips can not accumulate in the suction boxes 40 and 400 near the rotary cutters 58 by reason of the secondary suction pipes 60. And furthermore the reduction in area at the upper ends of the primary suction pipes causes the greatest suction pressures to be available at the point where they are most needed. The machine is simple in construction considering the nature of the work it performs and it may be constructed at low cost.

I claim as my invention:

1. A machine for cutting the ends of articles comprising a cutter, a carrier for moving the articles to be cut past said cutter, a primary suction pipe for moving said articles crosswise of said carrier, and a secondary suction pipe opening adjacent to the operative portion of said cutter.

2. A machine for cutting the ends of articles comprising a cutter, a gage device arranged adjacent the forward end of said cutter, a carrier for moving the articles to be cut past said cutter, a lateral primary suction pipe tubularly connected with said gage, and a lateral secondary suction pipe opening adjacent to the operative portion of said cutter.

3. A machine for cutting the ends of articles comprising a cutter, an article carrier, a suction box provided with a gage device and with an air opening adjacent to said cutter, a transverse primary suction pipe tubularly connected with said suction box, and a secondary suction pipe opening into said suction box adjacent to the operative portion of said cutter.

4. A machine for cutting the ends of articles comprising a cutter, an article carrier, a suction box adjacent to the forward edge of said cutter and provided with an inlet opening adjacent said forward edge, a horizontal lateral primary suction pipe tubularly connected to said suction box, and a secondary vertical suction pipe opening into the lower part of said suction box adjacent to the operative portion of said cutter.

5. A machine for cutting the ends of articles comprising a cutter, an article carrier, a suction box arranged adjacent said cutter and abutting said carrier, an equalizing suction chamber, a primary suction pipe tubularly connecting said suction box to said equalizing chamber and reduced in size at the point where it enters said suction box,

and a suction pump connected to said equalizing chamber.

6. A machine for cutting the ends of articles comprising an article carrier, a cutter, a suction box, an equalizing suction chamber, a primary suction pipe connecting said suction chamber to said suction box, a secondary suction pipe opening into said suction box closely adjacent to said cutter and connected with said equalizing chamber, and a suction pump connected to said equalizing chamber.

7. A machine for cutting ends of articles comprising an article carrier, a pair of cutters, a pair of suction boxes enclosing the operative portion of said cutters, a suction equalizing chamber, a pair of primary suction pipes tubularly connected at their upper ends to said suction boxes and tangentially entering said equalizing chamber at their lower ends, and a suction pump connected to said equalizing chamber.

8. A machine for cutting the ends of articles comprising an article carrier, a pair of cutters, a pair of suction boxes enclosing the operative portion of said cutters, a suction equalizing chamber, a pair of primary suction pipes tubularly connected at their upper ends to said suction boxes and tangentially entering said equalizing chamber at their lower ends, a suction pump, and a pump tube tangentially opening into said equalizing chamber, and connecting with the inlet of said pump.

9. A machine for cutting the ends of articles comprising an article carrier, a cutter, a suction box adjacent to the operative portion of said cutter, an equalizing chamber, a primary suction pipe tubularly connecting said suction box with said equalizing chamber, a suction pump connected to said equalizing chamber, and an article receptacle opening into the lower side of said equalizing chamber.

10. A machine for cutting the ends of articles comprising an article carrier, a cutter, a suction box adjacent to the operative portion of said cutter, an equalizing chamber, a primary suction pipe tubularly connecting said suction box with said equalizing chamber, a suction pump connected to said equalizing chamber, and a drawer receptacle slidably arranged on the lower face of said equalizing chamber and opening into the lower side thereof.

11. A machine for cutting the ends of articles comprising an article carrier having a plurality of transverse carrier pockets, a rotatable scraper provided with a flexible scraping strip extending substantially the width of said pockets and adapted to longitudinally scrape the upper edges of said carrier pockets, and means for engaging and cutting the articles in said carrier pockets.

12. A machine for cutting the ends of articles comprising an article carrier consisting of an endless belt having a plurality of transverse pockets secured thereto, a rotatable scraper provided with a comparatively small number of radial flexible strips, each of which extends substantially the width of said pockets, and means for gaging and cutting the articles in said pockets.

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