June 28, 1960 W. I. SKINNER 2,942,607

MACHINES FOR CLEANING TOBACCO SCRAP

Filed July 8, 1957 2 Sheets-Sheet 1

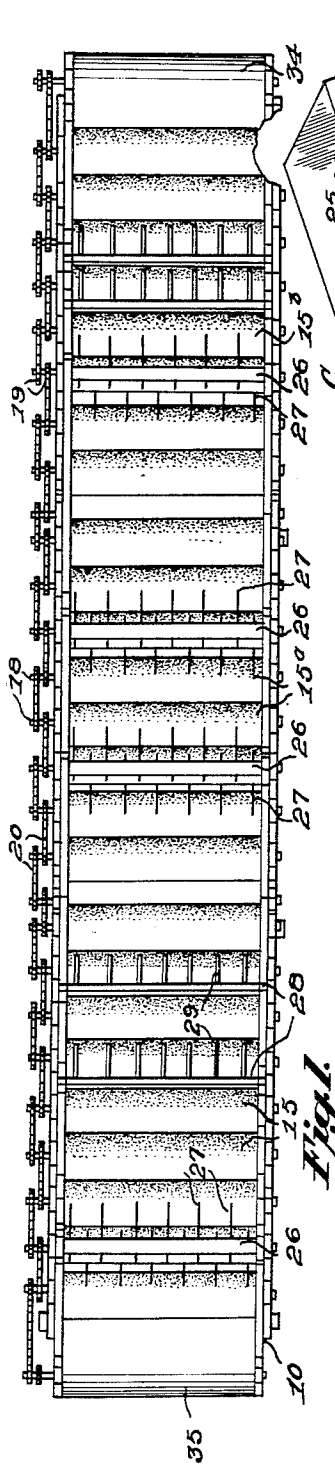


Fig. 1.

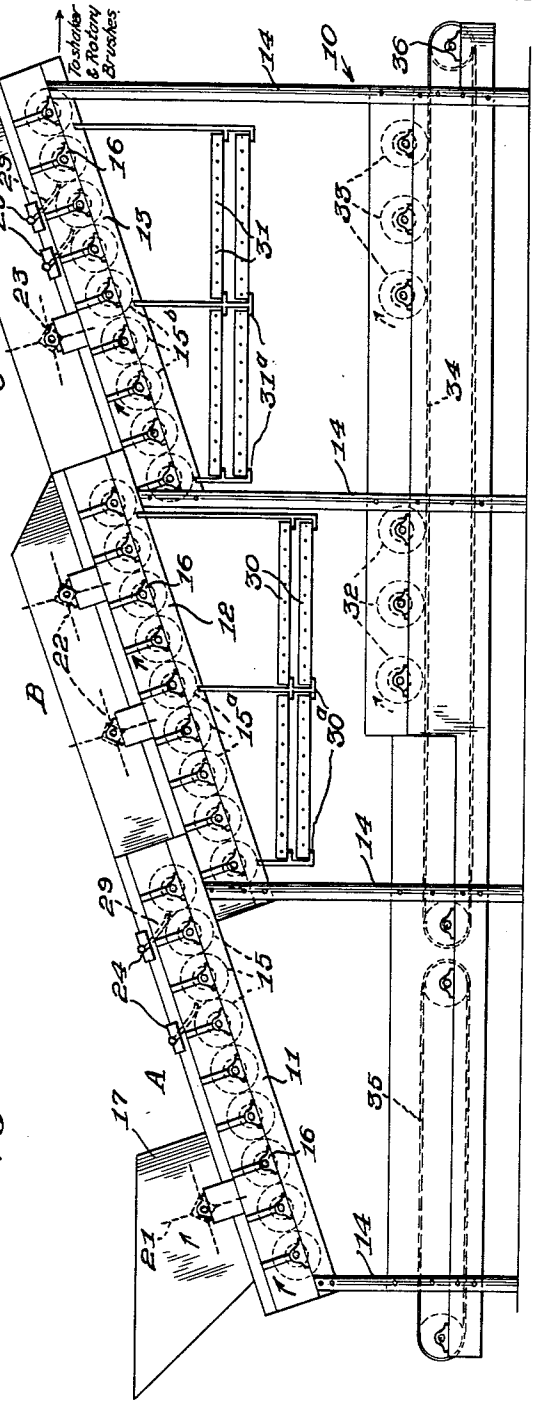


Fig. 2.

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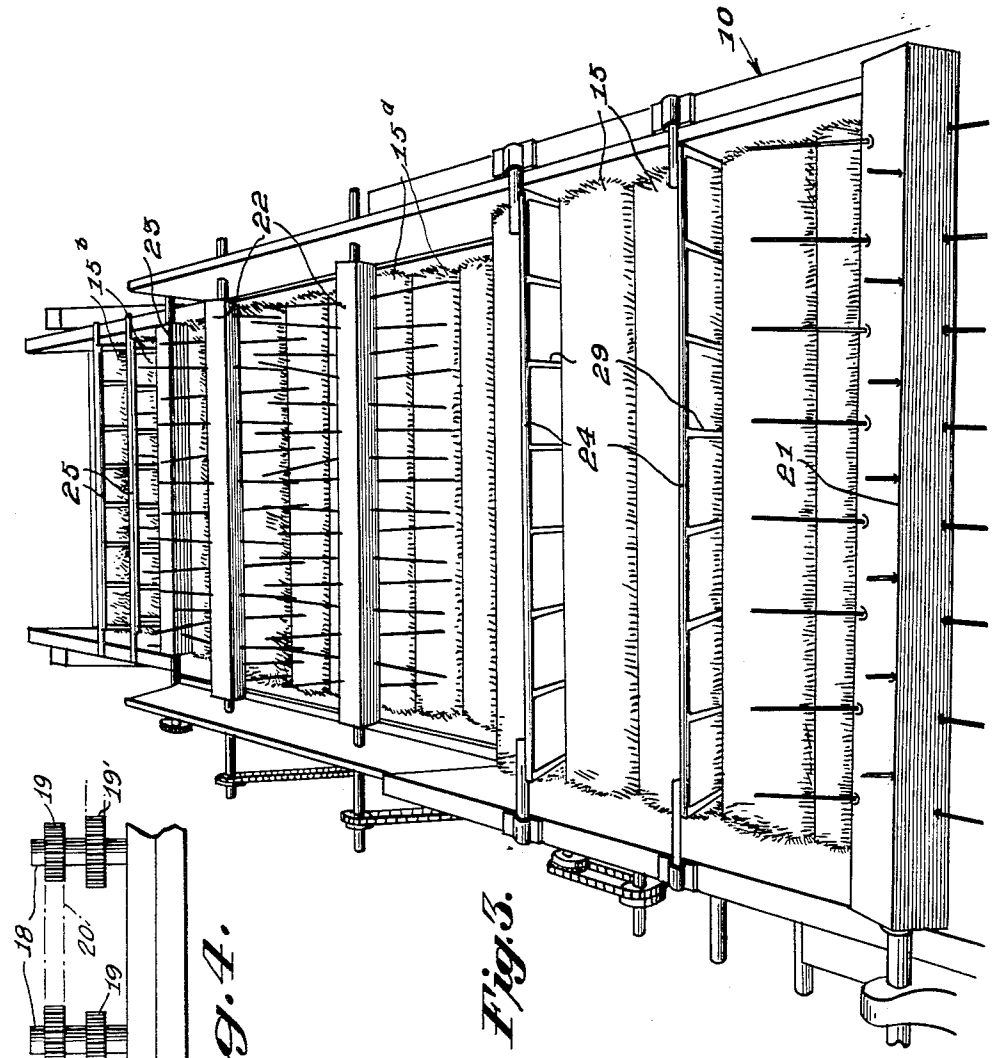


Fig. 3.

Fig. 4.

INVENTOR

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MACHINES FOR CLEANING TOBACCO SCRAP

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8 Claims. (Cl. 131—147)

The present invention has been prompted by a desire to revive a phase of the tobacco processing business, known as processing and dealing in tobacco farm scrap, which has become unprofitable because of constantly rising labor costs.

Farm scrap comprises broken tobacco leaves as well as smaller tobacco particles, which is known as fine scrap and which accumulates in the packing houses of tobacco growers while preparing their crops for marketing. This scrap product is not presently sold at auction but it is delivered to tobacco processing factories by growers, usually in burlap sacks, from which a worthwhile revenue was formerly obtained. Since the leaves of flue cured tobacco, after being pulled from the stalk in the fields, are tied or looped to tobacco sticks with cotton string before placing same in curing barns, farm scrap becomes badly entangled with cotton strings which have been dropped on the floors in pacing barns when the cured tobacco leaves are taken from tobacco sticks and prepared for marketing.

Farm scrap also contains a large percentage of sand and dirt, as well as much foreign matter such as chicken feathers, peanut hulls, straws, corn husks, cigarette butts, and even sometimes bottle caps, nails, small sticks and numerous other items, all of which must be removed from the farm scrap before the product is salable by the processor.

In times past when wages were at a substantially lower level than at present, it was possible to clean and pick foreign matter from tobacco scrap by hand labor and to render it to such a state that dirt and sand could be separated by mechanical means. However, when labor costs began to increase, as in the past fifteen years, farm scrap became more and more expensive until at the present time, the cost of processing this product is prohibitive. There was a domestic as well as a foreign demand for farm scrap, and because of the fact that present prices of flue cured leaf tobacco are steadily increasing thus causing the leaf tobacco exported to lose much of his foreign market, the inventor's interest was centered on means for cleaning farm scrap mechanically, as one possible source of supplying a limited quantity of flue cured tobacco to foreign customers at prices which could compete with foreign growths.

Accordingly a primary feature of the present invention is a means as above referred to in the form of a novel machine which is capable of removing foreign matter from and cleaning tobacco scrap at relatively low cost, whereby the mechandising of the scrap product is rendered profitable.

A further feature of the invention is the provision of a tobacco scrap cleaning machine which is relatively simple in construction, durable in use, efficient in operation, and which is capable of manufacture at relatively low cost.

Other features and advantages of the invention will become apparent in the course of the following detailed

description, taken in connection with the accompanying drawings, wherein:

Fig. 1 is a top plan view of the machine in accordance with a preferred structural embodiment thereof, and wherein the scrap receiving hopper is omitted.

Fig. 2 is a side elevational view of the machine.

Fig. 3 is a perspective view as observed from the front of the machine at a point above same.

Fig. 4 is a fragmental enlarged view of Fig. 3 and disclosing important structural features hereinafter referred to.

Referring in detail to the drawings, the improved machine will be seen to comprise a frame **10** which may be of any desired form for supporting the cooperating elements hereinafter referred to. The frame however, includes three bearing supports **11**, **12** and **13** which as indicated in Fig. 2 are supported by vertical members **14** in a position wherein same are in spaced parallel relation but at a uniform angle to the horizontal for a purpose as will later appear.

As is indicated, the bearing supports **11**, **12** and **13** provide the bases of three successive sections A, B, and C and which bases are provided with suitable side plates as indicated in the formation of a vertically stepped open bottom trough for flow of tobacco scrap to be cleaned.

Each of the sections A, B, and C is provided with nine roller brushes and which are designated **15**, **15^a**, **15^b** in the successive sections A, B and C. The roller brushes are rotatably supported by bearing brackets **16** and the brushes in each section are substantially in contact as illustrated. By reason of being in contact, the brushes provide a closure for the trough and prevent material from falling through the open bottom of the trough except when the brushes revolve.

As is clearly indicated in Fig. 2 the axes of brushes **15** are in a plane inclined to the horizontal and extending upwardly from the front of the machine. The axes of brushes **15^a** are in a plane in spaced parallel relation to said first plane and beneath same, while the axes of brushes **15^b** are in a plane in spaced parallel relation to said second plane and beneath same and said planes are equally spaced.

At the forward end of the machine is a hopper **17** into which tobacco scrap is admitted for passage through the machine and the scrap in section A is carried forward and upward by brushes **15** from the last of which it falls onto the first brush **15^a** in section B. The scrap is carried forward by brushes **15^a** from the last of which it falls onto the first brush **15^b** in section C and from which the scrap passes to a shaker and rotary brushes, forming no part of the present invention.

The brushes **15**, **15^a** and **15^b** all rotate clockwise as indicated by arrows in Fig. 2 and each succeeding brush rotates faster than the preceding brush for a purpose later to appear. The r.p.m.'s preferably vary from 36 to 60 and in order to provide for such variation in speed a sprocket drive is provided as is indicated in Fig. 1 and wherein the axle **18** of each rotary brush is provided with a pair of axially spaced sprocket wheels **19** and **19'** and sprocket chains **20** are engaged with the sprocket wheels, which vary slightly in diameter to effect the above noted variation of the speed of the rotation of the brushes as is more clearly shown in Fig. 4.

While not clearly shown in Fig. 1, a sprocket chain drive will of course be in cooperation with the vertically spaced brushes at adjacent ends of the sections. A doffer **21** is supported adjacent the advance end of section A and above the brushes therein. A pair of similar doffers **22** are provided in section B and supported above the brushes therein and a further doffer **23** is provided in section C and supported above the brushes

therein. The doffers may be driven by sprocket chains having drive connections with certain of the brush axles as indicated in Fig. 3.

A pair of brush engaging idlers **24** are supported in section A adjacent the rear end thereof and a pair of like idlers **25** are supported in section C.

The doffers **21**, **22** and **23** each comprise an elongated hub **26** from which radiate a plurality of light gauge tines **27** and the idlers **24** and **25** each comprise a rotatable supporting rod **28** from which project a series of laterally spaced prongs **29** whose inner free ends are slightly curved with the convex sides thereof engaging the corresponding brushes as shown in Fig. 2. Disposed beneath the brushes **15ª** in section B are a pair of superposed wire racks or trays **30** and a similar pair of wire racks or trays **31** are disposed beneath the brushes **15ᵇ** in section C. The trays **30** and **31** are slidably supported in members **30ª** and **31ª**, respectively. Three fine scrap brushes **32** are rotatably supported beneath the wire racks **30** and three similar fine scrap brushes **33** are rotatably supported beneath the wire racks **31**.

The brushes **32** rotate in a clockwise direction and contact a conveyor **34** and a conveyor **35** is disposed beneath the brushes **15** in section A. The motive power is preferably applied to shaft **36** from which a sprocket chain drive is disposed between same and the sprocket chain drive shown in Fig. 1, and a sprocket chain drive is provided between the drive of Fig. 1 and the conveyor **35**.

Having set forth the detail construction of the improved tobacco scrap cleaning machine, the operation thereof is as follows.

Farm scrap is first dumped on a table where the most noticeable extraneous matter, such as sticks, rags, etc., can easily be separated manually and the scrap is then fed into a hopper built with an inclined conveyor that passes under an adjustable doffer thus regulating the feed of the scrap, and onto a shaker which removes some of the loose dirt and sand from the scrap. The scrap is then dropped down a chute into the hopper **17** to the first revolving brush **15** in section A.

As the scrap passes over the driven roller brushes **15**, **15ª** and **15ᵇ**, the different speeds of rotation of the successive brushes create a turbulence within the scrap, thereby causing more surface of the scrap to come into contact with each brush. This brushing action and friction removes dirt and sand from the tobacco and also picks strings from the leaves thereof, by winding thereof onto the rotating brushes.

Prior to the tobacco scrap being fed onto the brushes **15** of section A, only a small amount of loose dirt and sand has been removed; therefore the greatest percentage of sand, dirt, lint, straws and other small particles of foreign matter is brushed from the scrap in section A and falls vertically onto the conveyor **35** for disposal thereof.

The small amount of fine scrap falling onto the conveyor **35** with foreign matter is impractical to reclaim.

The doffers **21**, **22** and **23** rotate in a clockwise direction and regulate the flow of scrap, and at the same time function to draw out long strings which are wound around the cores of the doffers.

The idlers **24** and **25** have the prongs **29** thereof normally resting upon the adjacent brushes, thereby causing more brushing friction on the scrap as it passes under the idlers and onto the following brushes.

The brushes **15ª** and **15ᵇ** in sections B and C have the same action and function as those in section A, but the scrap upon reaching section B has been untangled and is approximately 90 percent free of dirt and sand and is in better condition for effective removing of strings. The brushes in sections B and C therefore are more effective in removing long and short strings from the scrap. Many of the shorter strings are too short to wind onto the brushes but are separated from the scrap and fall between the brushes onto the wire racks or trays **30** and **31**.

The wire racks **30** and **31** are slidably supported on members **30ª** and **31ª** and are disposed immediately under the brushes **15ª** and **15ᵇ** of sections B and C. The wires in these racks catch the strings as they fall from the brushes.

During the brushing action in sections B and C some fine scrap is forced between the brushes and falls through the wire racks onto the conveyor **34**.

The fine scrap brushes **32** rotate in a clockwise direction and are tangent to the upper run of the conveyor **34**. Fine scrap falling onto the conveyor is conveyed into contact with the first brush **32**, where the brushing action removes lint and remaining strings before rolling scrap over the top of such brush for similar treatment against the second and third brushes **32**.

The same action follows with brushes **33** under the section C. Fine scrap is thus reclaimed in a merchantable condition.

During the brushing action in sections A, B and C, the farm scrap leaves have been freed of fine particles of tobacco and approximately 98 percent of strings, feathers and foreign matter, but in order to remove larger pieces of foreign matter such as soft drink bottle caps, whole peanut shells, and odd items of approximately that size, which are too large to be brushed between the contacting brushes of sections A, B and C, the scrap is passed onto a shaker, which separates all remaining particles of tobacco leaves up to ¾ inch as well as the few remaining straws, thus leaving only the larger pieces of foreign matter and tobacco leaves.

From the shaker, the scrap passes through another section similar to section A but wherein the brushes are separated approximately one quarter of an inch, the separation of the brushes permits foreign matter to be brushed between them but at the same time not permitting the larger leaves of farm scrap to pass between the brushes.

The final step in the processing of the scrap is to pass the cleaned scrap varying in size from approximately one inch to whole leaves across a moving conveyor belt where the different grades of tobacco are picked and assorted before the tobacco is redried and packed in hogsheads.

I claim:

1. A machine for removing foreign matter from tobacco scrap, comprising a frame, an elongated open bottom scrap confining trough supported by said frame and including a plurality of sections which are disposed at equal angles to the horizontal and which are vertically offset at equal distances from each other, a plurality of roller brushes completely covered with bristles and disposed in each section transversely thereof and extending substantially from end to end thereof, each brush being in contact with adjacent brushes and preventing material from falling therebetween except when said brushes revolve, means supported by said frame for imparting clockwise rotation to all of said brushes simultaneously and thereby setting up a turbulence in tobacco scrap being treated thereon, said rotation imparting means comprising sprocket wheels and cooperating sprocket chains, and said sprocket wheels being of uniformly varying diameter for slightly higher speed of rotation of each succeeding brush than the immediately preceding one.

2. A machine according to claim 1, together with at least one doffer rotatably supported in each of said sections, each doffer comprising a hub and a plurality of tines radiating therefrom, said tines cooperating with adjacent brushes for regulating the flow of scrap thereon and for drawing out strings which may have become wrapped about the rotary brushes.

3. The structure according to claim 2, wherein said sections comprise a first section, a second section, and a third section, and said first section having its doffer ad-

jacent the front end thereof, said second section being provided with a pair of said doffers intermediate the ends thereof, and said third section having its doffer intermediate the ends thereof.

4. A machine according to claim 1, wherein the first section and the last section are each provided with a pair of idlers, each of which comprises a free swinging supporting rod, and a plurality of brush engageable prongs projecting laterally from said rod.

5. A machine for cleaning tobacco scrap, comprising a frame, a first, second, and third series of roller brushes rotatably supported by said frame, each brush being completely covered with bristles and being in contact with adjacent brushes and preventing tobacco thereon from falling therebetween except when said brushes revolve with each series of brushes having their axes in a plane inclined to the horizontal and the planes of the axes of all three series of brushes being in uniformly spaced relation, means for imparting simultaneous rotation to the brushes of all three series thereof and causing turbulence in the tobacco scrap being treated, and string catching wire racks removably supported beneath each of the second and third series of brushes.

6. The structure according to claim 5, together with

a series of fine scrap rotary brushes disposed beneath said wire racks.

7. The structure according to claim 6 together with a conveyor disposed beneath said series of fine scrap rotary brushes having the upper run thereof tangent to the fine scrap rotary brushes.

8. The structure according to claim 7 together with a second conveyor disposed beneath said first section.

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