Aug. 15, 1967 J. T. GELARDI 3,335,909

VARIABLE SLOT BRISTLE-FEEDING MECHANISM

Filed Nov. 4, 1965 2 Sheets-Sheet 1

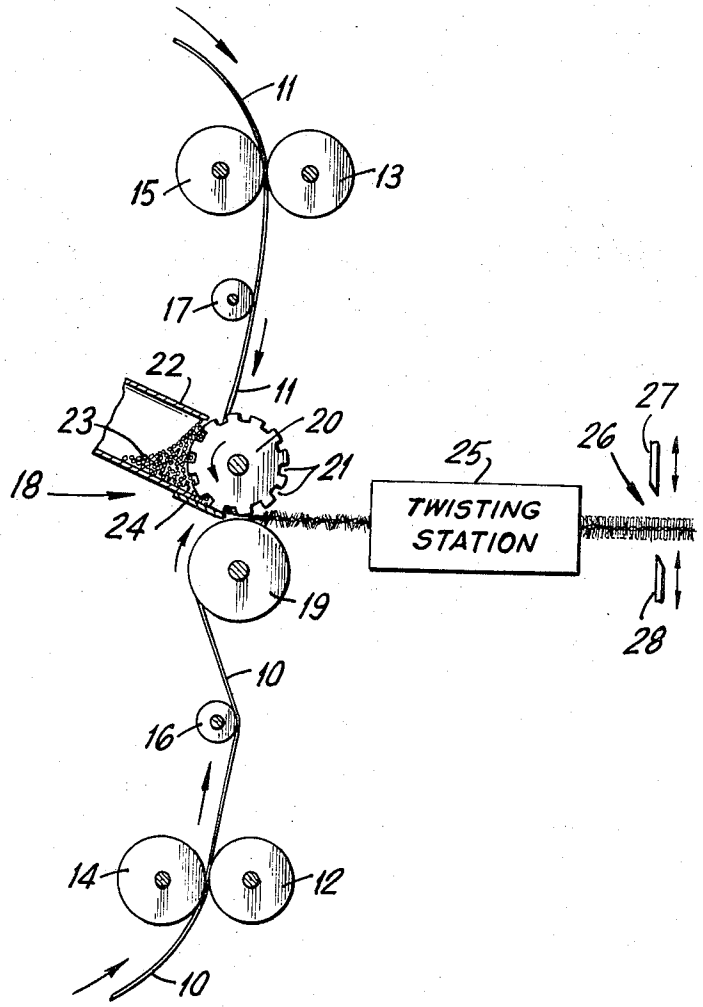



FIG. 1

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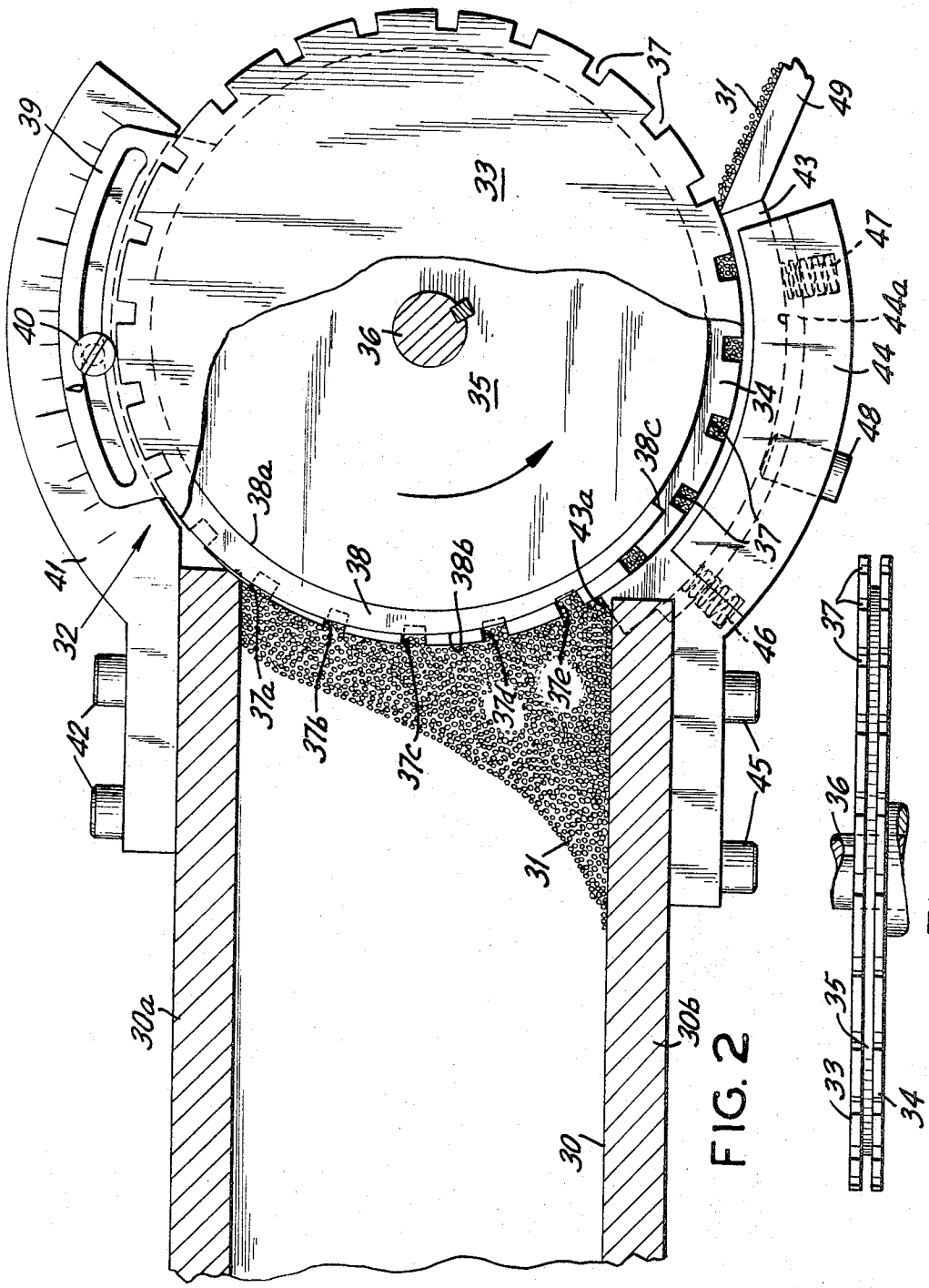



FIG. 2

FIG. 3

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3,335,909

# VARIABLE SLOT BRISTLE-FEEDING MECHANISM

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## ABSTRACT OF THE DISCLOSURE

A bristle-feeding mechanism is disclosed for a brush-making machine wherein the bristle feeding mechanism is adapted to remove measured amounts of bristles from a hopper for delivery to a receiving station. The combination which may be employed includes a hopper for containing bristles, the hopper having a discharge outlet. A rotatably mounted peripherally slotted picker plate is positioned relative to the hopper outlet, whereby the bristles are removed via the slots as the picker plate rotates across the hopper discharge outlet so as to expose a plurality of slots across the outlet. Each of the slots have a varying depth arising from the use of a circumferential arcuate wedge which is held against a peripheral face portion of the picker plate across the hopper outlet, the outer peripheral edge of the arcuate wedge defining a bottom for each of the plurality of slots so that the depth of each moving slot gradually increases across the outlet as the rotatable plate traverses the arcuate length of the stationary wedge.

This invention relates generally to brush-making machines and, in particular, to a feeding mechanism for removing measured amounts of particulate material, such as bristles, from a hopper and delivering the material to a receiving station.

In the art of making brushes wherein bristles are deposited between a pair of wires and the bristles locked in place by applying a twist to the wires, the bristles are generally stored in a hopper and delivered via bristle-feeding means to a receiving station where the bristles are then deposited between the pair of wires. In continuous brush-making machines, for example, of the type illustrated and described in my U.S. Patent No. 3,160,440, granted Dec. 8, 1964, it is desirable that the bristles be sufficiently free flowing in the hopper so that they can be consistently and uniformly delivered to the receiving station. In retrieving the bristles from the hopper, a peripherally slotted, rotatably mounted picker plate may be used which is positioned relative to the outlet of the hopper so that as the slots of the plate pass by the outlet with the periphery of the picker plate in contact with the bristles in the hopper, bristles are deposited in the slots which are then carried away and delivered to a receiving station where they are then deposited between a pair of moving wires.

With this type of picker plate, the picker slots generally fill up immediately with bristles as they enter the outlet of the hopper, such that as the filled slots move into and across the outlet of the hopper, the bristles in contact with the periphery of the plate and with the bristles confined in the slots are shifted in the direction of the moving plate and tend to pack tightly together. This is particularly true of natural bristles, such as bristles obtained from pigs, horses, etc., and of certain synthetic bristles, which because of their surface characteristics tend to cling and pack together, although some synthetic bristles usually are free flowing. The movement of the bristles within the hopper as described hereinabove generally results in a dense packing in the hopper at the outlet portion such as



to inhibit and hinder the flow of bristles to the slots. As a result, the picker-plate slots may fail to pick up any bristles at all.

I have found that I can overcome the foregoing difficulty by modifying the picker plate assembly so that the flow of bristles to the periphery of the slotted picker plate is metered uniformly across the whole outlet such as to substantially inhibit compression and packing together of the bristles.

It is an object of my invention to provide a new and improved bristle-feeding mechanism for consistently and uniformly feeding bristles from a hopper to a receiving station.

As another object I provide a feeding mechanism for removing measured amounts of particulate material from a hopper and delivering said material to a receiving station.

These and other objects will more clearly appear when taken in conjunction with the following disclosure and the accompanying drawings, wherein:

FIG. 1 shows somewhat schematically a continuous brush-making machine with which one embodiment of my invention is employed;

FIG. 2 depicts in elevation partly broken away and partly in cross section a detailed version of one embodiment of the invention; while

FIG. 3 is an end view of FIG. 2 showing only the picker plates and the disc supported therebetween.

As will be appreciated, while the invention is described relative to the brush-making art, it may have other uses involving the transfer of particulate material from a hopper to a receiving station. However, I find my invention particularly advantageous in removing bristles having poor flow characteristics from a hopper and delivering them to a receiving station for deposit between a pair of moving wires. The invention may be used with an intermittently operable brush-making machine or with one that operates continuously.

Referring to FIG. 1, a schematic of a continuous brush-making machine is shown of the general type disclosed in my U. S. Patent No. 3,160,440. Continuous wires **10** and **11** are driven from reels not shown using friction drive rollers **12** and **13** which are rotated by means not shown in synchronism with each other to produce a desired feed rate. The friction drive rollers are pressed against their respective wires which are supported by idler rollers **14** and **15**. Guide idler rollers **16** and **17** are provided directing the wire in a path towards bristle-feeding station designated generally by the numeral **18**. There wire **10** is brought around part of the periphery of wire drum **19** and out towards the twisting station. Similarly wire **11** is brought partly around another wire drum similar to drum **19** but hidden from view by peripherally slotted picker plate **20**, said wire **11** being brought out adjacent wire **10** towards the twisting station.

The picker plate has a plurality of peripheral slots **21**, said picker plate moving into the outlet of hopper **22** containing bristles **23**. As the periphery of the slots move across the outlet of the hopper, bristles are deposited into the slots which are carried down incline **24** to a receiving station located between the drums where the bristles are deposited between the wires and the bristle-laden wires fed to twisting station **25** of the type disclosed in my U.S. Patent No. 3,160,440, the wires there being twisted together to lock the bristles therebetween and then delivered to cutting station **26** comprising reciprocating knives **27, 28** as shown.

In order to insure uniform metering of the bristles to the hopper outlet, the slots are adapted to increase in depth as they move across the hopper outlet so that each slot is continuously and uniformly filling with bristles as its depth increases. The details of the construction of the

picker plate assembly embodying the invention is shown more clearly in FIGS. 2 and 3.

Thus, broadly stated, my invention comprises an improved feeding station for discharging particulate material to a receiving station. The combination I may employ comprises a hopper for containing particulate material and having an outlet to discharge the same, and a rotatably mounted peripherally slotted circular picker plate positioned relative to the hopper outlet to remove measured amounts of particulate material via said slots from the hopper as the plate rotates. Associated with the picker plate is a stationarily mounted circumferential arcuate wedge adjacent a peripheral face portion of the picker plate at the hopper outlet, the outer peripheral edge of the arcuate wedge defining a bottom for the slots which slots continually vary in depth as they move from one side of the hopper outlet to the other. Thus, the particulate material is removed substantially evenly from across the whole cross section of the hopper at the outlet portion so that the mass of the material in the hopper is enabled to move forward uniformly within the hopper to the outlet end without substantially hindering the removal of the particulate from the outlet portion of the hopper.

Referring to FIG. 2, a hopper **30** containing bristles **31** is shown disposed relative to picker plate assembly designated generally by numeral **32**. The embodiment there shown comprises a pair of peripherally slotted picker plates **33** and **34** separated by disc **35**, the two plates and the separator disc being mounted and keyed to a rotatable shaft **36**. As will be apparent, the disc in faying relationship with both picker plates, the diameter of the disc being less than that of the picker plates and below the maximum depth of the slots. The picker plates have slots **37** which are in register so that as the dual picker plates rotate across the outlet of the hopper, bristles are enabled to deposit within the slots defined by both picker plates. While I may prefer to use two picker plates, I do not intend to be limited to such use as one or several picker plates may be employed for the purpose.

Associated with the assembly is a stationarily mounted substantially circumferential arcuate wedge **38** having integral with it a slotted mounting handle **39** for mounting via locking screw **40** or suitable means to mounting bracket **41** which bracket is fixed to structural member **30***a* of hopper **30** via bolts **42**. As will be apparent, arcuate wedge **38** at its inner peripheral edge **38***a* rests against the periphery of disc **35** while its outer peripheral edge **38***b* lies adjacent and in faying relationship with the peripheral faces of both picker plates **33** and **34**, the peripheral edge **38***b* tapering gradually in width from its widest point at the mounting handle **39** corresponding to the diameter of the picker plates to its narrowest point at tip **38***c*. As will be noted, outer peripheral edge **38***b* defines slot bottoms of different depths starting with slot **37***a* and going successively through slots **37***b*, **37***c*, **37***d* and finally at **37***e* where the slot achieves its actual or full depth.

As the picker plates move into and across the hopper outlet, the slots will remove bristles somewhat evenly across the whole outlet as the depth of each slot gradually increases from slot **37***a* to **37***e*. Prior to this, the bristles tended to be pushed to the bottom of the outlet and compressed together until finally the bristles across the outlet were difficult to remove. By using the combination embodying the invention, the bristles may be gravity fed to the picker plate by disposing the hopper on an angle to the horizontal axis of the picker plate assembly, or if desired a pusher plate may be employed in back of the hopper to push the bristles towards the outlet.

In order to avoid loose bristles from being frictionally carried away by the periphery of the moving picker plates, a bristle wiper shoe in the form of an arcuate bar is disposed at the bottom of the picker plate assembly. Such a shoe **43** is shown supported in a grooved arcuate bracket **44** bolted to structural member **30***b* via bolts **45**. The arcuate shoe is shown resting in groove **44***a* and biased against the periphery of the picker plate by means of springs **46** and **47**, the arcuate shoe being held in place via pin **48** passing through bracket **44** as shown. As will be noted, arcuate shoe **43** provides a wiping edge **43***a* just within the bottom of the hopper to keep loose bristles from being frictionally dragged out by the moving periphery of the picker plates. As the bristle-laden slots move past the shoe, they are deposited at a receiving station **49** shown fragmentarily. With regard to FIG. 1, the bristles would be deposited immediately between the pair of moving wires **10** and **11**.



Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and the appended claims.

What is claimed is:

**1.** The improved combination of a feeding station for discharging particulate material which comprises, a hopper for containing particulate material and having an outlet to discharge the same, a rotatably mounted peripherlly slotted picker plate positioned relative to said hopper outlet to remove measured amounts of particulate material via its slots from said hopper as the picker plate rotates across the hopper outlet, said picker plate being adapted to expose a plurality of slots across the outlet, and a stationarily mounted substantially circumferential arcuate wedge in faying relationship with a peripheral face portion of said picker plate across said hopper outlet, the outer peripheral edge of said arcuate wedge defining a bottom for each of said plurality of slots across said hopper outlet, such that the depth of each moving slot gradually increases across said hopper outlet as the rotatable plate traverses the arcuate length of the stationary wedge.

**2.** In a brush-making machine, the improved combination of a feeding station for discharging bristles to a receiving station which comprises a hopper for containing bristles and having an outlet to discharge the same, a rotatably mounted peripherally slotted picker plate positioned relative to said hopper outlet to remove measured amounts of bristles via its slots from said hopper as the picker plate rotates across the hopper outlet, said picker plate being adapted to expose a plurality of slots across the outlet and a stationarily mounted substantially circumferential arcuate wedge in faying relationship with a peripheral face portion of said picker plate across said hopper outlet, the outer peripheral edge of said arcuate wedge defining a bottom for each of said plurality of slots across the hopper outlet, such that the depth of each moving slot gradually increases across said hopper outlet as the rotatable picker plate traverses the arcuate length of the stationary wedge across the outlet of the hopper.

**3.** In a brush-making machine, the improved combination of a feeding station for discharging bristles to a receiving station which comprises, a hopper for containing bristles and having an outlet to discharge the same, a peripherally slotted picker plate fixed to a rotatable shaft and positioned relative to said hopper outlet to remove measured amounts of bristles via its slots from said hopper as the picker plate rotates across the hopper outlet, said picker plate being adjusted to expose a plurality of slots across the outlet each of said slots having the same maximum depth, a disc also fixed on said rotatable shaft in faying relationship with a face of said picker plate, the diameter of said disc being smaller than that of the picker plate and below the maximum depth of the slots, a stationarily mounted substantially circumferential arcuate wedge in faying relationship with a peripheral face portion of said picker plate across said hopper outlet, the inner peripheral edge of said arcuate wedge riding on the circumference of said disc, the outer periph-

eral edge of said arcuate wedge defining a bottom for the slots across the hopper outlet, such that the depth of each moving slot gradually increases to its actual depth across the hopper outlet as the rotatable picker plate traverses the arcuate length of the stationary wedge across the outlet of the hopper.

4. The feeding station as defined in claim 3 wherein an arcuate shoe is provided in wiping contact with a peripheral edge portion of the picker plate as it emerges from the hopper to prevent removal of loose bristles therefrom.

5. In a brush-making machine, the improved combination of a feeding station for discharging bristles to a receiving station which comprises, a hopper for containing bristles and having an outlet to discharge the same, a pair of peripherally slotted picker plates fixed to a rotatable shaft and positioned relative to said hopper outlet to remove measured amounts of particulate material via its slots from said hopper as the picker plate rotates, each of said slots of said plates being in registry and having the same depth, a disc also fixed on said rotatable shaft between said picker plates in faying relationship with a face of each of said picker plates, the diameter of said disc being smaller than that of the picker plate and below the maximum depth of the slots, a stationarily mounted



substantially circumferential arcuate wedge in faying relationship with both picker plates at said hopper outlet, the inner peripheral edge of said arcuate wedge riding on the circumference of the disc, the outer peripheral edge of said arcuate wedge defining a bottom for the slots as they move past the hopper outlet, such that the depth of each moving slot gradually increases to its actual depth as the rotatable picker plates traverse the arcuate length of the stationary wedge at the outlet of the hopper.

6. The feeding station as defined in claim 5 wherein an arcuate shoe is provided in wiping contact with a peripheral edge portion of the picker plates as they emerge from the hopper to prevent removal of loose bristles therefrom.

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