

Feb. 6, 1968

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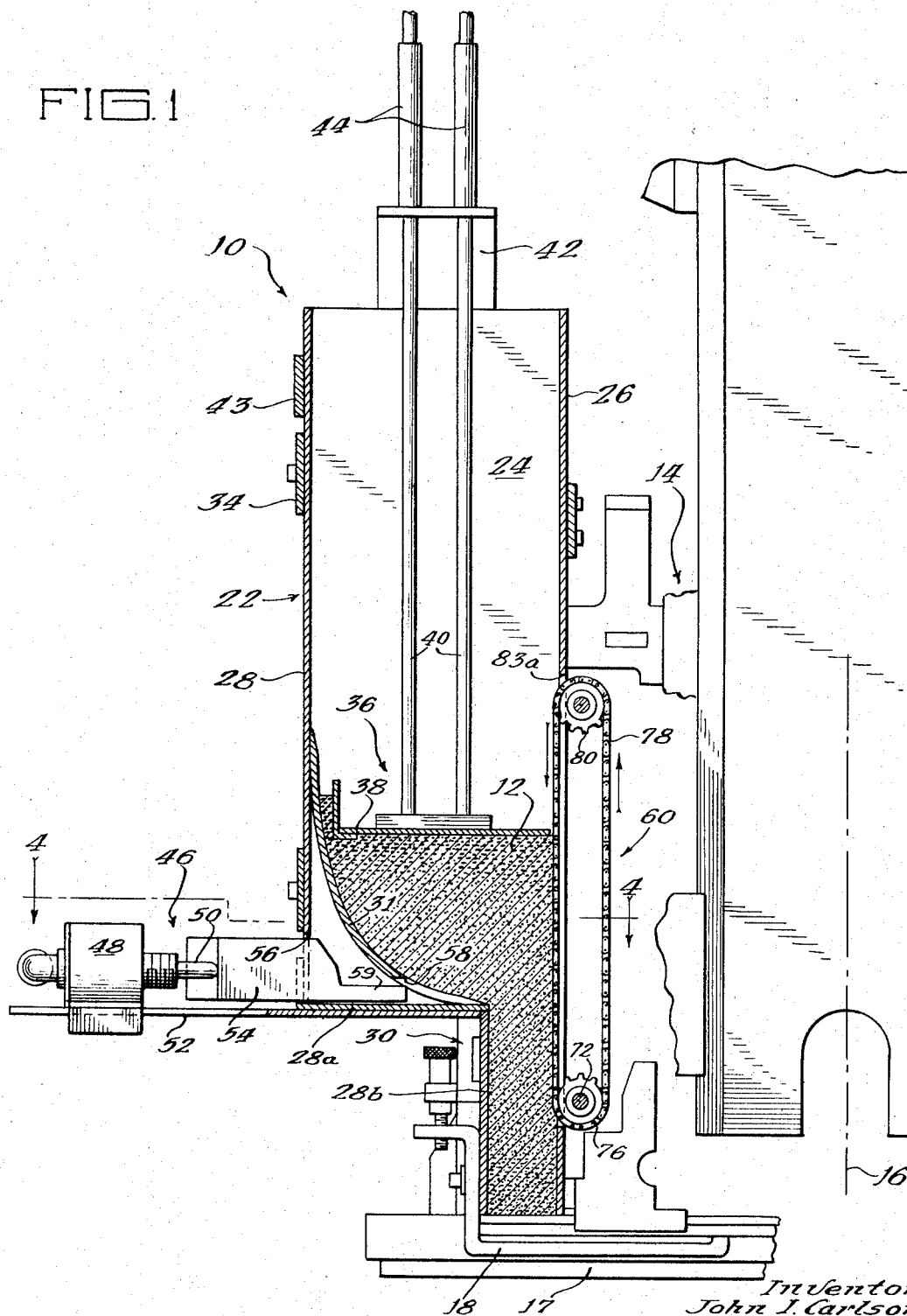
3,367,719

BRISTLE MAGAZINE FOR BRUSHMAKING MACHINE

Filed June 27, 1966

3 Sheets-Sheet 1

FIG. 1



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3 Sheets-Sheet 2

FIG. 2

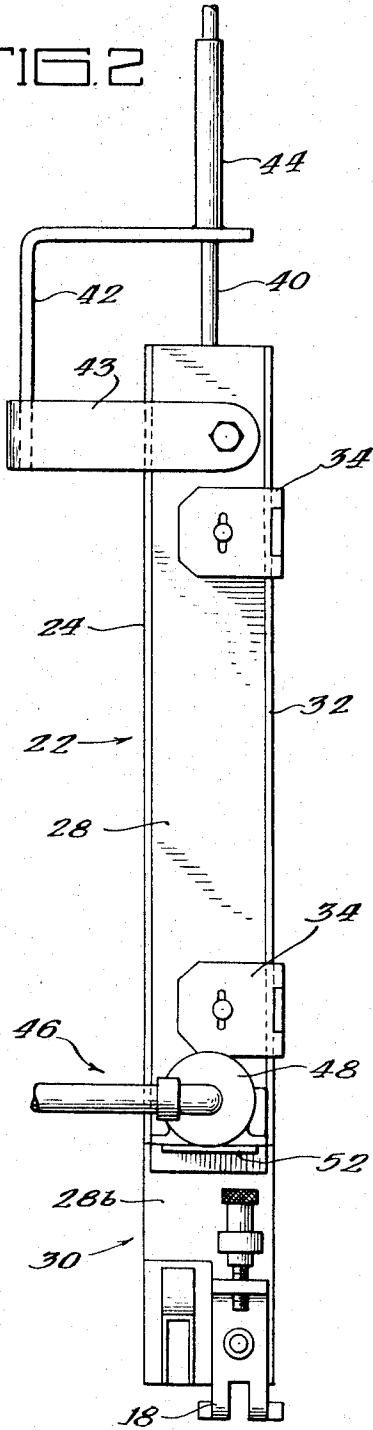
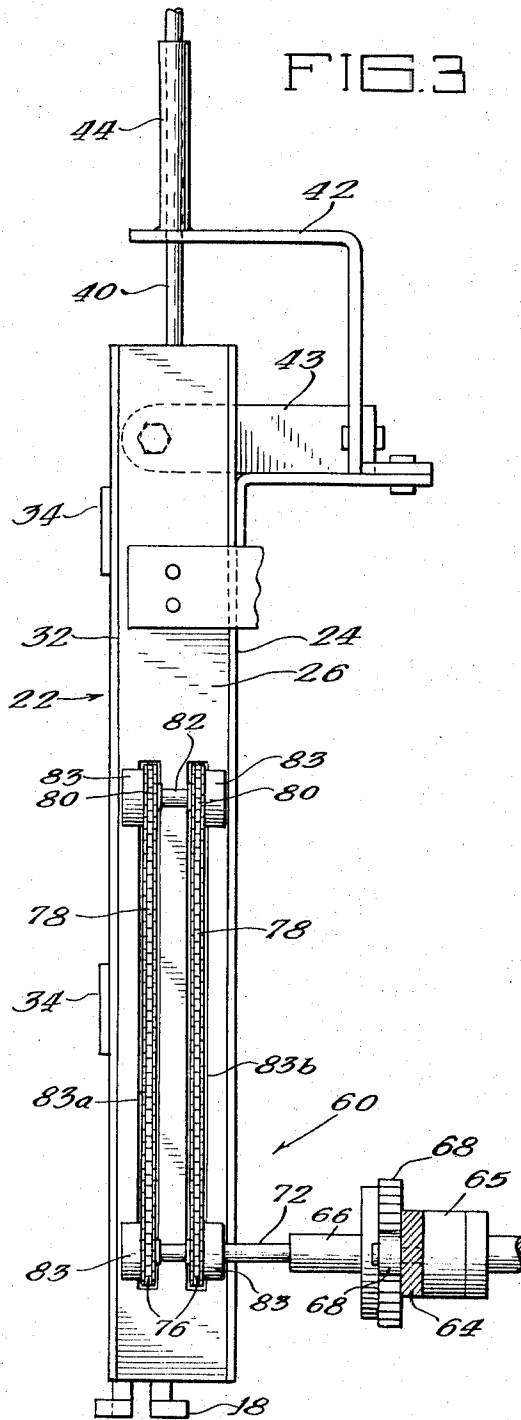


FIG. 3



Feb. 6, 1968

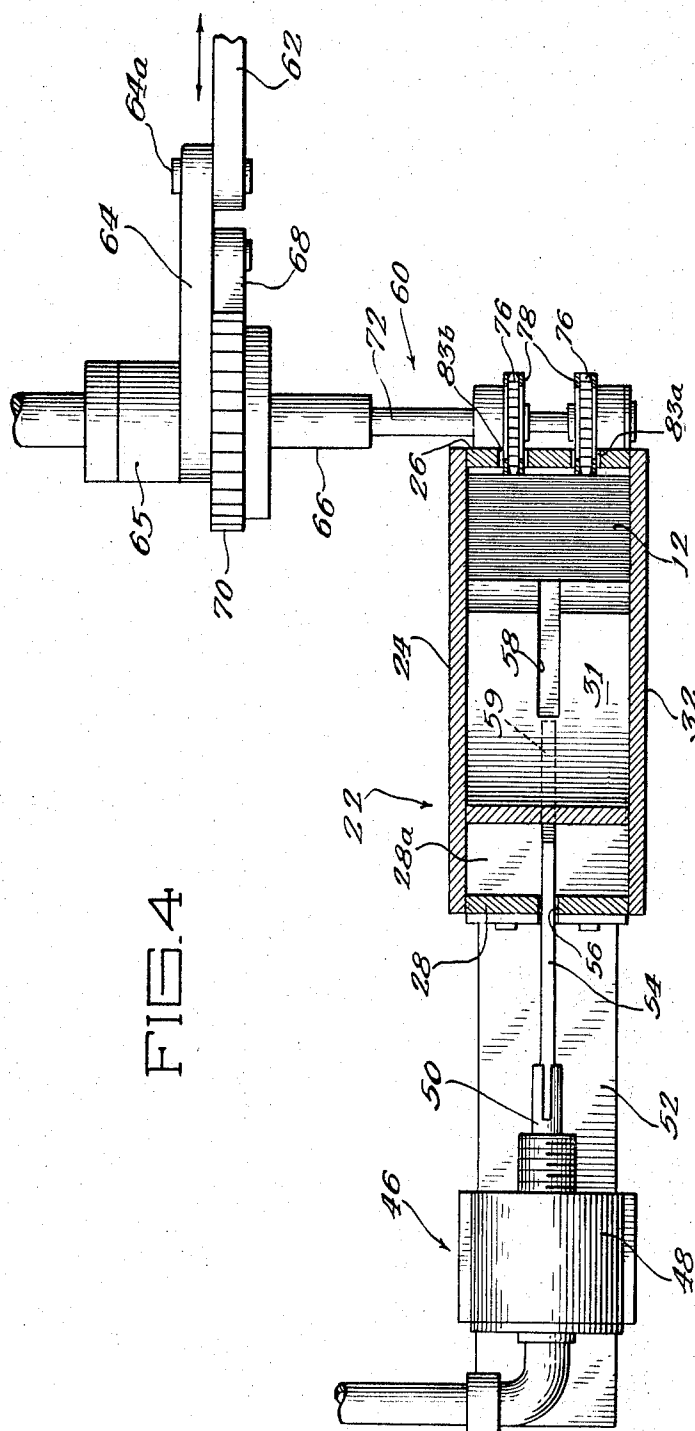
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3 Sheets-Sheet 3



1

3,367,719

BRISTLE MAGAZINE FOR BRUSHMAKING MACHINE

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8 Claims. (Cl. 300-7)

This invention relates to brushmaking machines and more particularly to an improvement in the bristle magazine wherein bristles are stored and from which bristles are taken to be inserted into the brushes fabricated in the machine.

Commonly, in a brushmaking machine a brush blank is first drilled at a drilling station so as to be provided with a plurality of holes into which tufts of bristles may be inserted. From the drilling station, the drilled brush blank is then fed to a tufting station wherein tufts of bristles are inserted in the previously drilled holes to substantially complete the fabrication of the brush. Most brushmaking machines are provided with a supply of brush bristles adjacent the tufting station. Suitable mechanism is provided for withdrawing a predetermined amount of bristles from the bristle supply and delivering the bristles to the tufting station where they are driven into and fastened in the drilled holes in the brush blank.

Recent improvements in brushmaking machines have made the operation of these machines more automated and have increased the possibility of assigning the control of a greater number of machines to an individual operator. One limitation has been that the reservoir of brush bristles has generally required relatively frequent attention and refilling as opposed to other functions of the machine. This is especially true in the case of brushmaking machines which make such small brushes as toothbrushes or the like. Also, brush bristles are being packed in increasingly larger bundles, and it is desirable to provide a reservoir which can easily receive such bundles. Present attempts to insert such bundles or larger quantities of bristles into present bristle magazines causes the bristles to rather tightly pack together making subsequent feeding difficult.

Furthermore, the increased use of nylon bristles has brought about problems in feeding the bristles since nylon bristles tend to bunch and cling together due to such factors as static electricity, minute dirt particles, and the natural affinity of the bristles for each other as well as moisture. Natural fibers are affected to a lesser degree by the same elements as well as the rather fibrous nature of the natural fiber bristles.

Attempts to remedy the situation by devising a funnel-like or hopper-like bristle feeding magazine have proved futile since the bristles pack tightly together and do not feed evenly or continuously. For successful tufting operation, any feeding system incorporating a bristle magazine must be capable of feeding the bristles so that a predetermined number of bristles will be removed from the magazine through every cycle of operation and the feeding must be continuous so that there is an even flow of bristles throughout the feeding cycle.

This invention is directed to a brush bristle magazine which is provided with a partially enlarged configuration for receiving a larger supply of bristles and an auxiliary agitating means for encouraging the continuous even flow of the bristles in the form of a moving element along one side of the stack of bristles opposite the enlarged area of the bristle magazine.

It is therefore a primary object of this invention to provide a new and improved brush bristle storage magazine for a brushmaking machine.

It is a general object of this invention to provide an improved brush bristle feeding magazine for a brushmaking machine wherein the bristle magazine has a first en-

2

larged area to store larger quantities of brush bristles and a second reduced feeding area to permit controlled dispensation of the bristles.

Yet another object of this invention is to provide an improved brush bristle magazine for a brushmaking machine having an enlarged bristle storage area and a reduced feeding area and means spanning the storage and feeding area for encouraging continuous even feeding of the brush bristles.

A further object of this invention is to provide an improved brush bristle magazine having a moving element adjacent one side of the stack of bristles to assist in the continuous feeding of the bristles.

Other objects, features and advantages of the present invention will be apparent from the following description of the preferred embodiments illustrated in the accompanying drawings, in which:

FIGURE 1 is a fragmentary sectional view of a portion of a brushmaking machine illustrating the brush bristle magazine of this invention;

FIGURE 2 is a side elevational view of one side of the structure shown in FIGURE 1;

FIGURE 3 is a side elevational view of the other side of the structure shown in FIGURE 1, opposite from that side shown in FIGURE 2; and

FIGURE 4 is a horizontal section view taken generally along the line 4-4 of FIGURE 1.

Brush bristle magazine 10 of this invention is utilized for storing a supply of brush bristles 12 for use in tufting previously drilled brush blanks. Magazine 10 is secured to the frame 14 of a brushmaking machine generally adjacent the center line 16 of tufting mechanism (not shown). A picker bar 17 is mounted for horizontal reciprocation between forked member 18 which is secured closely adjacent the bottom of the bristle magazine 10. The function of the picker bar is to receive a predetermined number of brush bristles from the magazine and carry the bristles to the tufting mechanism generally in the area of center line 16. The structure and operation of the picker bar and fork member and other components are relatively old and will not be described in detail herein, reference being had to the state of the art and the disclosure of Carlson Patent 2,709,625, issued May 31, 1955 and assigned to the assignee of this invention.

The brush bristle magazine includes the generally box-like body 22 comprising a back 24, side wall 26 and opposite side wall 28. Side wall 28 terminates in an inwardly extending wall 28a which extends generally perpendicularly from wall 23 towards wall 26 in a plane spaced from the bottom of the magazine. Wall 28a, in turn, terminates at a generally perpendicularly extending wall 28b which is substantially parallel to wall 28 to form a reduced neck portion 30 at the lower end of the magazine. In the interior of body 22, a curved wall portion 31 extends between the juncture of walls 28a and 28b and a point on the interior of the side wall 28. Preferably the reduced neck portion is similar in size to the former bristle magazines so that the dispensation of bristles out the lower end of the magazine may be accommodated by present picker bar and related structure.

If desired, the body 22 may be provided with a cover 32 which is preferably transparent so that the quantity of bristles contained in the magazine can be readily visually determined. Furthermore, it is preferable that the cover 32 be secured to the body by means affording the ready access to the interior of the magazine, and in the preferred embodiment this is accomplished by hinge means 34.

Means 36 are provided for normally urging the bristles downwardly in the magazine. Included in this means 36 is a plate 38 which generally spans the width of the

magazine between walls 26 and 28. Plate 38 is secured to the lower end of rods 40 which pass through a guide 42 secured at the upper end of the magazine by bracket means 43. Guide 42 is provided with bushing means 44 in which the rods 40 are held for vertical slidable movement. Generally a weight means (not shown) is secured to the top of rods 40 for adding to the normal gravitational force pushing the rods 40 downwardly thereby causing plate 38 to urge the bristle supply 12 downwardly.

Means 46 is provided in the area of the reduced dimension of the body 22 for assisting the flow of bristles in the transitional area of wall 31 into the reduced neck 30. Included in means 46 is a means for providing a source of movement such as piston and cylinder device 48 having a linearly extensible piston rod 50. This device 48 is mounted on a plate 52 which is secured to the underside of wall 28a and is substantially an extension thereof.

An extension of rod 50 in the form of a blade-like member 54 is secured to the rod 50 for reciprocation inwardly and outwardly relative to the body 22 of the bristle magazine through upright slot 56 in the lower end of wall 28 and slot 58 in curved wall portion 31. Preferably member 54 has a reduced end 59 so that the dimension of slot 58 may be relatively small to minimize the possibility of bristles falling through the slot or becoming caught therein. Responsive to an appropriate signal, reciprocation of rod 50 causes reciprocation of member 54 so that the end 59 moves inwardly and outwardly from the bristle supply 12 in the area just above the reduced neck 30 to prevent the bristles from becoming packed together in that area.

Means 60 is provided for agitating and encouraging the feeding of the bristles downwardly with respect to the body 22. Included in this means is a reciprocating arm 62 which is driven by suitable means (not shown). Arm 62 is pivoted to arm 64 at 64a. Arm 64, in turn, is secured to a hub 65 for rotation relative to shaft 66 and also bears a pawl member 68. Pawl member 68 is positioned for engagement with a ratchet 70 which is fixed on shaft 66.

Hub 65 houses slip clutch structure for transmitting driving force imparted to shaft 66 by ratchet 70 to shaft 72 which is coaxially positioned within shaft 66. A pair of chain sprockets 76 are journaled near the end of shaft 72 opposite from ratchet 70. Moving elements or chains 78 are wrapped around sprockets 76 at the lower end of side wall 26 and also around sprockets 80 at a point intermediate the end of side wall 26. Sprockets 80, in turn, are rotatably secured on shafts 82 mounted on bushing means 83 on the outside of side wall 26.

Upright slots 83a and 83b are formed in side wall 26 to permit the chains 78 to slightly protrude to the interior of the body 22. In the preferred embodiment, the chains protrude about $\frac{1}{16}$ of an inch to the interior of the body. The chains extend above and below the reduced neck portion 30 and are generally driven downwardly through the aforescribed ratchet, pawl and slip clutch structure to gently urge and agitate the bristles downwardly into the neck portion to prevent jamming and bunching thereof and to permit the continuous even feeding of the bristles to the picker mechanism.

When the lower narrow channel of the magazine is filled with bristles, a substantial resistance is imposed upon the chains 78. In such a condition, the clutch slips and no driving force is transmitted to the chains. As the bristles are extracted from the bottom of the magazine, there is less resistance imposed on the chains and the

clutch permits driving forces to be transmitted to the chains which, in turn, will assist in insuring that bristles fill the narrow neck portion of the magazine.

The bristle magazine of this invention provides a means for holding a larger quantity of brush bristles and feeding the brush bristles in a continuous even flow. The particular configuration of the magazine, including the one straight side wall and the other partially offset side wall, in combination with the moving element in the one straight side wall extending above and below the enlarged area of the magazine, provides a novel means for storing and dispensing brush bristles. In addition, the magazine is such that it may be readily incorporated in present brushmaking machine structure without any significant alteration thereof.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

I claim:

1. A bristle feeding magazine for use in a brush-making machine, comprising: a body having an open lower end and including spaced generally upright side walls forming part of an enclosure for receiving and feeding brush bristles, said side walls spaced apart a first enlarged distance at the upper end of said body and a second reduced distance at the lower feeding end of said body, the upper and lower end portions of the body being joined by an intermediate wall portion to provide continuous even feeding of bristles out the reduced lower end.

2. The bristle magazine of claim 1 wherein one of said side walls is substantially straight and the other side wall has a curved portion intermediate its ends terminating in a straight portion defining the reduced end of the bristle magazine.

3. The bristle magazine of claim 1 wherein one of the walls of the magazine is provided with a moving element which extends into the interior of the magazine.

4. The bristle magazine of claim 3 wherein one of said side walls is substantially straight and the other side wall has a curved portion intermediate its ends terminating in a straight portion defining the reduced end of the bristle magazine.

5. The bristle magazine of claim 4 wherein part of said moving element is positioned in the interior of the straight side wall and extends above and below the curved portion of the opposite wall in a generally upright plane.

6. The bristle magazine of claim 5 wherein the direction of movement of the moving element is toward the reduced end of the magazine.

7. The bristle magazine of claim 6 wherein the moving element is driven by means responsive to the load conditions in the bristle magazine to move the moving element when the bristles in the magazine are tightly bunched together.

8. The bristle magazine of claim 7 wherein the side wall having the intermediate curved portion is provided with a reciprocating agitator element which is positioned to protrude into the interior of the magazine in the area of the curved wall portion.

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GRANVILLE Y. CUSTER, JR., *Primary Examiner*.