United States Patent

[11] **3,574,880**

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[21] Appl. No. **781,355**
[22] Filed **Dec. 5, 1968**
[45] Patented **Apr. 13, 1971**
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[54] **ROTARY BRUSH**
5 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **15/179,** 15/195
[51] **Int. Cl.** **A46b 13/02,** A46b 3/16
[50] **Field of Search** ..... 15/179-—183, 197—200

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Primary Examiner—Peter Feldman
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ABSTRACT: A rotary brush for use in cleaning, drying and polishing produce comprising a core with filament extending therefrom and adapted to be arranged in a substantially horizontal plane laterally adjacent a plurality of similar brushes.

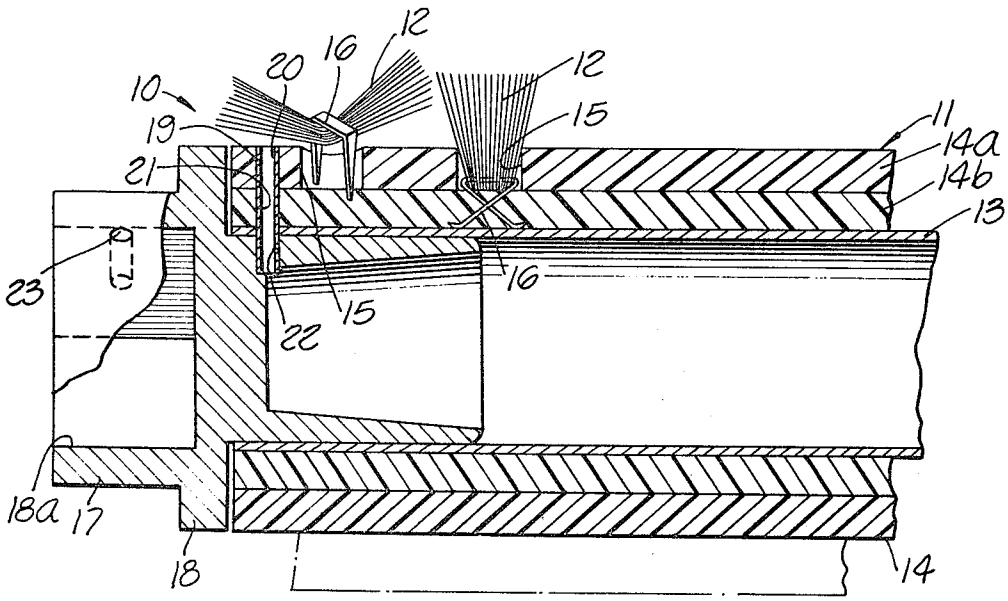
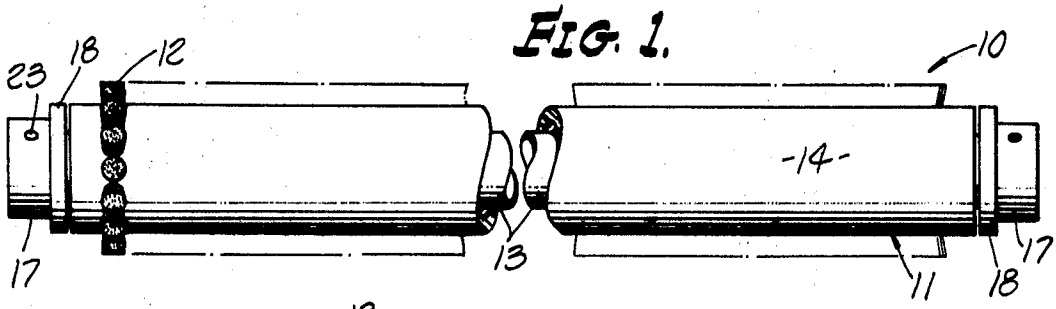


FIG. 1.



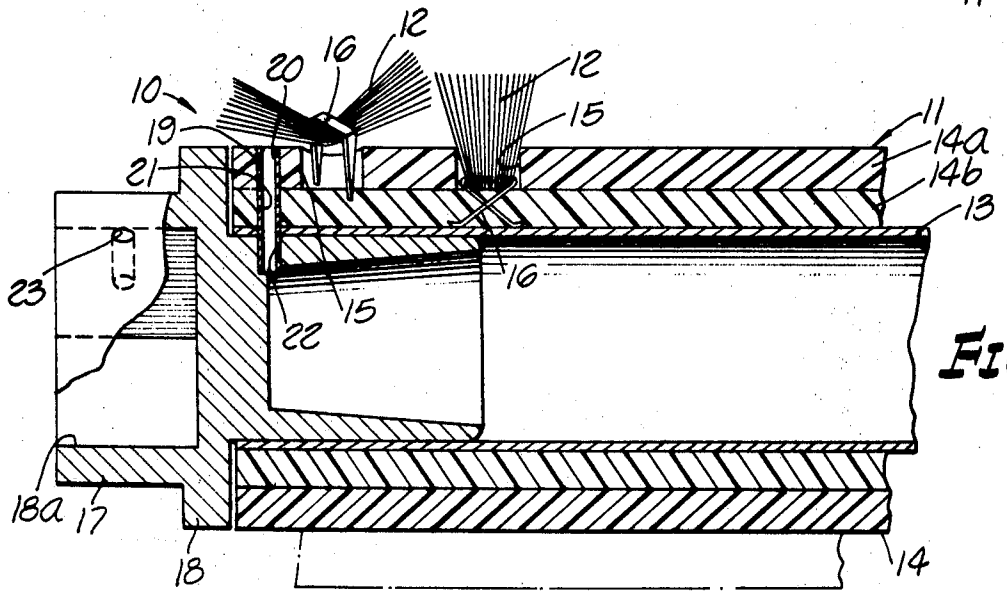


FIG. 2.

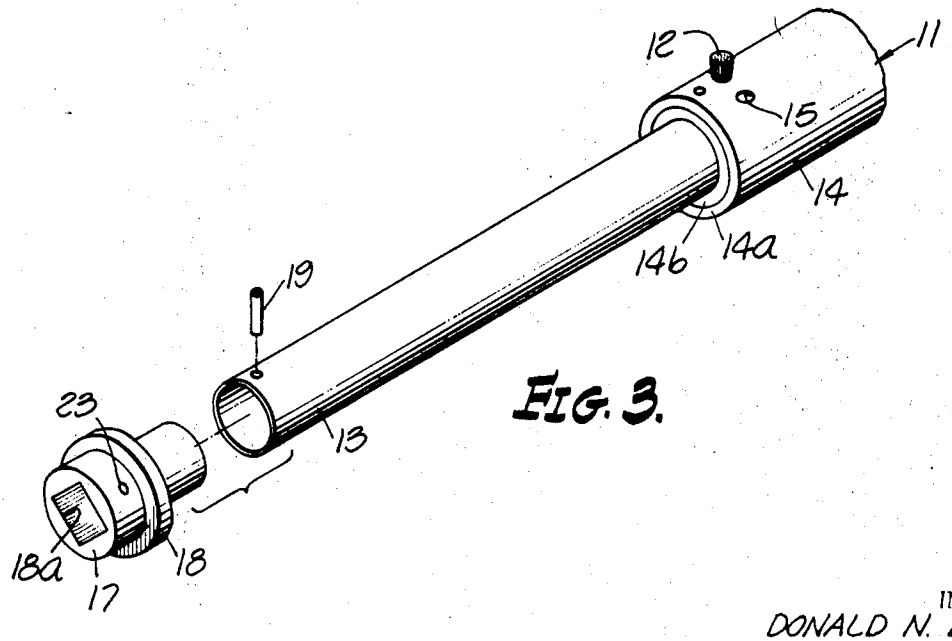


FIG. 3.

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ROTARY BRUSH

This invention relates to a brush and particularly to a rotary brush of the type used for cleaning, drying and polishing fruits and vegetables.

Rotary brushes have made a significant contribution to the fruit and vegetable processing industry. Fruit and vegetables are subject to the critical approval of the modern homemaker and today, more than ever, there is a desire for clean, better looking, and better lasting produce. The smart packer or processer is taking advantage of this desire through the use of a variety of rotary brushes now offered for cleaning, polishing and waxing purposes.

The present brushes generally include a wood core which consists of hard wood mandrels with fibers stapled to the wood core. It has been desirable to use wood because of its penetrable qualities which allow for easy and proper stapling of the filament. However, an ever present problem associated with wood core brushes is the checking, splitting and warping of the wood when it is subjected to moisture. To minimize this problem the brushes are seasoned at the beginning and end of a run. That is, when the brushes are idle they are removed from the machine and stored on end in a well-ventilated area and then before being put back into service the brushes are soaked with water daily for two or three days. Another partial solution has been to insert a steel pipe axially within the wooden mandrel. Neither of these solutions have been entirely satisfactory.

Therefore, it is a primary object of this invention to provide a brush which is suitable for stable setting of the filament and will not warp, chip or split when subjected to moisture. In accordance with this object, the brush should be easy to assemble and require a minimum of parts.

Other and further objects and advantages of this invention will be apparent from the following drawings and description.

IN THE DRAWINGS

FIG. 1 is a plan view of the brush.

FIG. 2 is a cross section of a portion of the brush.

FIG. 3 is a perspective view of one end of the brush disassembled.

Briefly, this invention is a rotary brush having a rigid inner member and a penetrable outer member concentric with the inner member to form a core. The fibers are attached to the outer member and the ends of the core are adapted to be releasably connected to a rotating body.

Referring to the drawings, the rotary brush generally designated **10**, includes a core **11** with filling material or filament **12** attached to the core **11**.

The core consists of a rigid inner member **13** and a penetrable outer member **14**. The inner member **13** is a hollow steel cylinder. The outer member or sleeve **14** includes a pair of concentric tubular members **14***a* and **14***b*, each a plastic material, preferably polyethylene. The rigid inner member **13** is press fitted into the outer member **14** and is concentric with the outer member **14**. The wall thickness of each of the tubular members **14***a* and **14***b* is such that each member can be produced by the process of extruding, but together they are thick enough for staple setting or attaching of the filament of fill material **12**. The outer surface of the sleeve **14** is provided with a plurality of circumferential tuft holes **15** extending radially inwardly and spaced axially at regular intervals. Each tuft hole **15** receives a plurality of fibers or fill material **12**. A staple **16** secures the fibers within the tuft hole to the outer member **14**. The ends of each staple **16** are wedged against the outer surface of the inner member **13** to maintain each staple in a tight-fitting position. This type of staple fastening of the fibers within circumferential tuft holes allows for easy clean out of small debris that stick to the core and also prevents larger particles from collecting on the core.

Mounted axially within each end of the inner member **13** is a cap **17** which allows the brush to be releasably attached to a rotating member within the produce-cleaning or polishing machine. The cap **17** is preferably heat treated steel or grey cast iron. An annular flange **18** on the cap **17** abuts the ends of the inner and outer members **13** and **14**. The end of the cap which extends beyond the flange **18** includes a square bore **18***a* which receives a square shaft (not shown) which rotates the brush. Cap **17** may also be designed to accommodate a round shaft and square key to support and drive the brush.

A roll pin **19** near each end of the core passes through aligned openings **20**, **21** and **22** in the outer member **14**, inner member **13** and cap **17**, respectively, for securing the three members. A similar opening **23** in the cap **17** extends into the square bore and receives a roll pin (not shown) after the shaft (also not shown) is received.

The size of each member may be varied to suit may particular instance. An example of the size of a typical brush is as follows: The inner steel member **13** has a wall thickness of approximately 0.049 inches thick and the polyethylene tubular members each have a wall thickness of 9/32 inches. The overall length of the inner and outer member is 48 inches. The cap is approximately 3 inches long and extends 1¼ inches beyond the ends of the inner and outer members **13** and **14**. The diameter of the core is 2⅝ inches. The fiber attached to the outer member extends with ¼ inch of the ends of the inner and outer members **13** and **14**. The distance that the fibers project radially from the core may vary according to the particular use of the brush. The density of the filling material or fiber and the type of fibers are also varied according to the particular use.

In operation these brushes are arranged in a horizontal plane adjacent to each other and each brush is rotated in the same direction. The fruit or vegetable passes over the brush and as it is passed over the brush the fibers clean, dry or polish the produce.

The present rotary brush is warp free and not susceptible to splitting or chipping when subjected to moisture. The plastic sleeve holds the stapled filament securely and allows for easy cleanout of small debris and prevents collection of larger debris. The brushes include reversible end castings with square bores for a proper fit on the shaft ends.

Having fully described my invention, it is to be understood that I am not to be limited to the details herein set forth, but that my invention is of the full scope of the appended claims.

I claim:

1. A rotary brush particularly adaptable for use in moist conditions, comprising:

a rigid metal mandrel;

a penetrable plastic sleeve mounted concentrically on and in engagement with the outer surface of said mandrel, said sleeve having a plurality of circumferentially spaced and inwardly extending tuft bores terminating at a particular distance from said mandrel;

tufts of filament extending radially outward from said sleeve, each said tuft of filament received by one of said tuft bores;

staple members, each said staple member penetrating said sleeve and securing a tuft of filament against said sleeve at the termination of said tuft bore;

said distance between the termination of each said tuft bore and said mandrel being such that each said staple member is substantially deformed by said mandrel and clinched between said mandrel and said sleeve whereby said tufts of filament are securely anchored to said sleeve.

2. The brush of claim **1**, wherein each end of said mandrel is provided with a releasably secured end cap, each said end cap fitting axially within the end of said mandrel and adapted to be connected to means for rotating the brush.

3. The brush of claim **1**, wherein said sleeve comprises a pair of concentric extruded plastic members with said tuft bores in said outer concentric plastic member and said staple members penetrating said inner concentric plastic member.

4. The brush of claim **1**, wherein said plastic sleeve is polyethylene.

5. An apparatus having a plurality of laterally adjacent rotatable brushes arranged in a substantially horizontal plane, each said brush comprising:

a metal core;

a penetrable plastic sleeve concentrically mounted on and in engagement with the outer surface of said core, said sleeve having a plurality of circumferentially spaced and inwardly extending tuft bores terminating at a particular distance from said core;

tufts of filament extending radially outward from said sleeve, each said tuft of filament received by one of said tuft bores;

staple members securing said tufts of filament within said tuft bores and penetrating the portion of said sleeve between the termination of each said tuft bore and said core;

said distance between the termination of each said tuft bore and said core being such that each said staple member is substantially deformed by said core and clinched between said core and said sleeve whereby said tufts of filament are securely anchored to said sleeve;

means releasably attached to each end of said core and adapted to be connected to power driven means for rotating the brush.