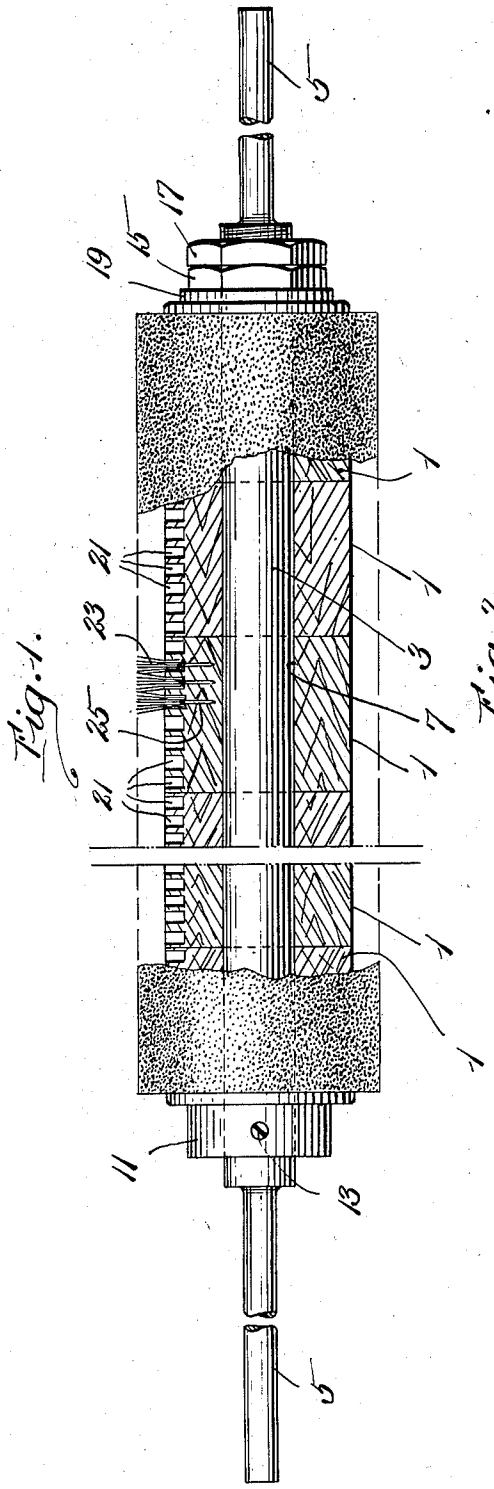
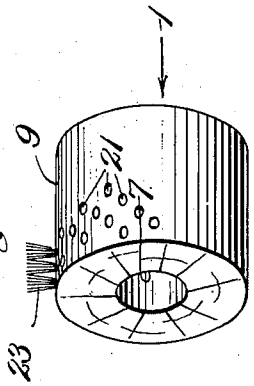
Nov. 2, 1937. F. H. HARDY 2,097,790

RAISING BRUSH FOR SHEARING MACHINES

Filed March 13, 1936





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Patented Nov. 2, 1937 2,097,790

UNITED STATES PATENT OFFICE

2,097,790

RAISING BRUSH FOR SHEARING MACHINES

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Application March 13, 1936, Serial No. 68,590

2 Claims. (Cl. 15—181)

This invention relates to the manufacture of cylindrical brushes in which the length substantially exceeds the diameter, such as are used as parts of machines in a number of different arts and in a variety of applications. In particular, and as illustrated herein, the invention relates to raising brushes for the shearing machines used to shear the nap of worsted and woolen suitings and other fabrics in the course of the finishing of these materials. It has as its object the production of an improved brush of this sort in simpler and cheaper manner than heretofore possible.

These brushes are cylindrical, usually of about six inches in diameter, clad with bristles having a free extent of about one inch, and act against one surface of the fabric while the latter is traveling and bent around the narrow ledger blade of the shearing machine. Since the brush has to extend across the entire width of fabrics customarily around fifty-six inches in width, with allowance of an ample margin for deviations and variations in the width of the latter, it has to be around sixty-six inches in length. Hence, for cheapness and lightness the brush is always made of wood, which in known forms is contiguous for the full length of the brush, with a heavy metal mandrel running through it to keep it from warping out of its straight relation, the reduced extremities of this metal core serving as journals and one thereof being supplied with a pulley through which the brush is rotated. Wood being thus used, the bristles have been cemented and pegged into holes formed therein to form tufts which give the best form of bristle surface for raising the nap.

But wood is unavoidably of varying density, the heart wood being of different specific gravity from the sap wood, and since these brushes have to run rapidly, in the neighborhood of 500–600 R. P. M., they inevitably wabble to a greater or less degree, because the wood itself is out of balance, and in spite of any reasonably attainable stiffness of the mandrel, as the span between the bearings has to be of five feet or more, while the brush with its mandrel weighs ordinarily in excess of 75 pounds. If the brush does not run true, it bears harder against the cloth each time the high point in the circuit of the brush comes around and since the cloth is moving over the narrow edge of the supporting ledger blade a very slight lack of balance in the brush results in making a mark across the fabric which is clearly and permanently visible after the shearing operation.

In the effort to overcome this difficulty, it is common practice to check the balance of the assembled wooden portion with its mandrel in place, and remedy inequalities by drilling out or lead-weighting the metallic shaft; but even if this be done, and it must be done before the bristles are set, the finished brush will usually be unbalanced after the bristles have been inserted. No end of bother has been met with in the effort to produce true-running brushes, as a wabbling brush is worse than useless through the damage it occasions to the fabric.

I have found that by making the wooden part of the brush in short sections, with these sections clamped together on the mandrel so as to prevent relative rotation between the sections when in use, the brush can be made to run absolutely true, because the finished sections with bristles all inserted and trimmed down can be angularly adjusted about the mandrel with respect to each other before being clamped in fixed relation and thus the eccentric location of the center of gravity of each section can be compensated for and cancelled out by utilizing the unavoidable eccentric weighting of another section or sections to bring the brush into true dynamic balance.

As an additional feature of the invention, the making of the brush in sections makes it possible to produce a brush having a better brushing surface at a cheaper cost, because the short wooden sections being so much lighter and free of the weight of all metal parts can be held in position and manipulated manually for the semi-automatic action of the standard bristle-stapling machine, which cannot be done with the full-length brush, and therefore the tufts of bristles can be set much closer than they can be put in by hand, whether pegged or in pitch-set. For instance, where a six-section brush according to the invention is made, having the standard effective length of 66½ inches, each 11-inch section can have 4400 tufts of bristles, whereas the whole length of the equivalent one-piece hand-set brush can not economically have over 4500 tufts, the sectional brush thus being much fuller and presenting a far better working surface, while being much cheaper because made more completely by machine work. Also, a marked economy results from the fact that the bristle-stapling machine puts in stapled tufts, in which both ends of the bristles are exposed and put to work while the middle portion is held in the hole by the staple; whereas, in hand work, as compelled in making the former heavy full-length brushes, only pegging or pitch-setting can be

employed effectively, which means that 3¼ to 3½ inch length of bristles must be used in order to get the stiffness of bristle needed in the working surface, while bending and doubling of the bristles is not possible, and all of the bristles beyond the ⅝ inch sunk in the wood, plus the one-inch exposed length, must be trimmed off and thrown away.

Use of the invention principles obviates the mechanical difficulties met with in the attempt to form the axial bore accurately through the full-length wooden member of brushes of previous types. It is much easier to bore the necessary hole axially through a short 11-inch section of wood, and thereafter to ream it to a mechanically perfect fit on the mandrel, than to drill and ream accurately through a length of more than five feet of wood. In the latter case, it has seldom been possible to attain a bore which was straight and concentric with the outward surface, because the varying density of the wood on opposite sides of the bore deflected the boring and reaming tools out of their intended axial alignment, such deflection being impossible to prevent on account of the length of the shank of the tool compelled in the case of the former continuous wooden element used in the prior type of brushes.

In some classes of use of brushes of this type, the central parts of the bristle-surface of the brush become worn down faster than the parts at the ends. Heretofore this has meant returning the brush to the factory for retrimming if only slightly worn, and otherwise has meant a complete discarding and replacement of the entire brush. Through use of the invention principle, the user of the brush can keep a supply of new sections on hand, replacing the worn sections as needed, or all of them, himself without losing machine-time or having to send the brush back to the brush factory, or having to replace the entire brush including the expensive mandrel as is compelled if the latter has been "balanced" by boring or lead-plugging.

An illustrative embodiment of the invention is shown in the accompanying drawing in which,—

Fig. 1 shows in elevation the improved brush complete, partly broken away to show the structure.

Fig. 2 is a perspective view showing one of the sections comprising the novel brush.

As indicated, the brush is made up of a plurality of sections 1 of right cylindrical form, of the requisite external diameter for the intended use, and of any convenient length. As an illustrative example only, in the case of a raising brush intended to have a working surface 66½ inches long, the sections 1 may be six in number, the terminal ones being 11½ inches long, each having one of its ends rounded and devoid of bristles for ¾ inch if desired, and four intermediate sections each 11¼ inches in length. This makes a convenient size and weight to be handled by the workman in presenting the section to the bristle-stapling machine, as in the operation of such machines each of the holes which have been formed in the section by a previous operation for the reception of the several tufts of bristles must be presented successively in correct alignment with the stapling plunger while the section is supported and guided by hand. The supporting shaft or mandrel 3 is ordinarily on the order of 1¾ inches in thickness, having its opposite extremities 5 turned down over a length of eight inches or so to a standard or desired size to fit into suitable journal boxes on the frame of the shearing machine and also to receive a suitable driving pulley. An axial bore 7 is made through each section and reamed into exact concentricity with the cylindrical exterior 9 of the section and to an accurate sliding fit upon the full-diameter portion of the mandrel 3.

The mandrel 3 is provided adjacent one end of its full-diameter portion with a shoulder constituted by a collar 11 fixed in place thereon by a set-screw 13 or otherwise as desired, against which one end of the series of sections 1 abuts. The opposite end of the full-diameter portion of mandrel 3 is threaded and provided with a nut 15 and lock-nut 17, serving through the interposed washer 19 to exert axial pressure on the series of sections 1 to force them endwise against each other and the remote end-section against the collar 11 to clamp the whole series together and to the mandrel so as to prevent all possibility of relative rotation in use.

When each of the component sections of a brush has been completely finished, with the bore of the wooden member accurately fitted to the mandrel, and with the bristles inserted and with their surface trued to exact concentricity with the bore, the sections are placed in their final order upon the mandrel 3 against the shoulder 11 thereon, the nuts 15 and 17 loosely applied, and the assembly is rolled upon horizontal straight-edges supporting the journals 5 to determine the balance of the brush. Thereafter it is a simple matter to rotate the several sections relatively to each other about the axis of the mandrel until a perfect balance of the whole is attained, whereupon the nut 15 and lock-nut 17 are tightened to clamp all the sections immovably together and thus retain the perfect balance secured by this easy adjustment.

If the brush loses its balance through uneven wear or other changes in use, it is but a moment's work to repeat the balancing process just described and thus restore this essential characteristic for proper operation. The removal of worn sections and their replacement with new ones, in simple and obvious manner, followed by the same balancing operation, will restore the brush to complete usefulness with slight expense and inconsiderable expenditure of time and effort.

Ordinarily the holes 21 to receive the bristles, and the corresponding tufts 23 fixed therein by staples 25 will be disposed in close order spirally about the surface of each section, being carried clear to the ends of the section (save the blank portions adjacent the rounded corners at the outward ends of the terminal sections) so that when put together end to end on the mandrel there will be no lack of uniformity in the texture of the bristle surface where the ends of the adjacent sections come together.

While I have illustrated and described a certain form in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular form shown, or to the details of construction thereof, but

What I do claim is:—

1. A raising brush for shearing machines comprising in combination a heavy metallic core, a plurality of bristle-clad cylindrical wooden sections of a length substantially approximating their outside diameter and sufficient to receive many

hundreds of tufts of bristles, such sections being coaxially mounted on such core end-to-end and rotated thereon relatively to each other to bring the brush into dynamic balance, and means for removably clamping the several sections in operatively immovable relation after the balancing has been accomplished.

2. A raising brush for shearing machines comprising in combination a metallic mandrel having a heavy intermediate portion and reduced extremities serving as journals, a plurality of bristle-clad cylindrical wooden sections of a length at least commensurate with their outside diameter and adequate to receive a multiplicity of tufts of bristles disposed lengthwise of the sections as well as around the circuit thereof, such sections being coaxially mounted on the intermediate portion of the mandrel end-to-end and rotated with respect to each other and to the mandrel to balance the eccentric center of gravity of one section by appropriate eccentric location of the center of gravity of another section, a shoulder fixed on the mandrel, and means engaging the mandrel and forcing the series of sections endwise to clamp them against each other and against the shoulder in operatively non-rotative relation to each other.

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