

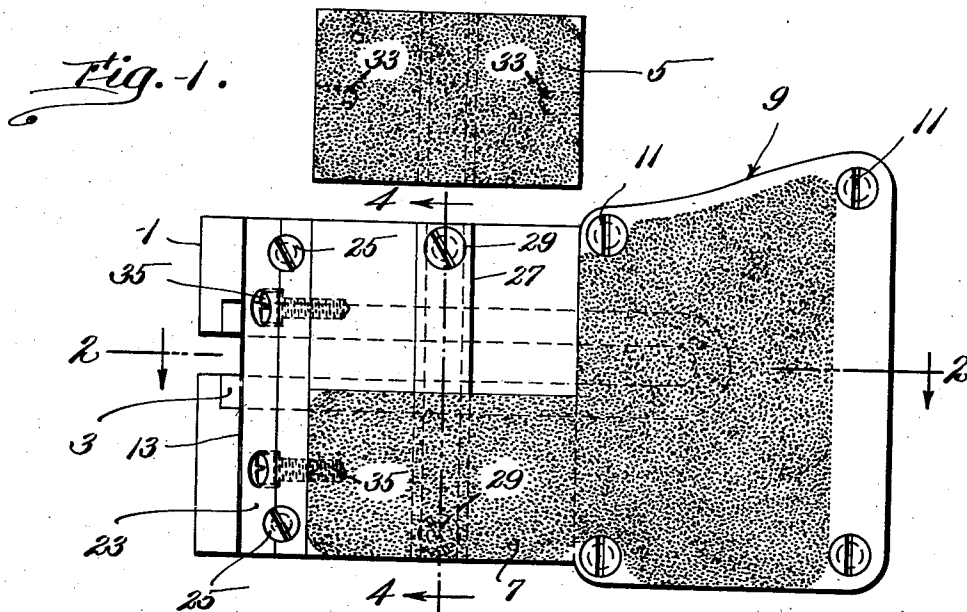
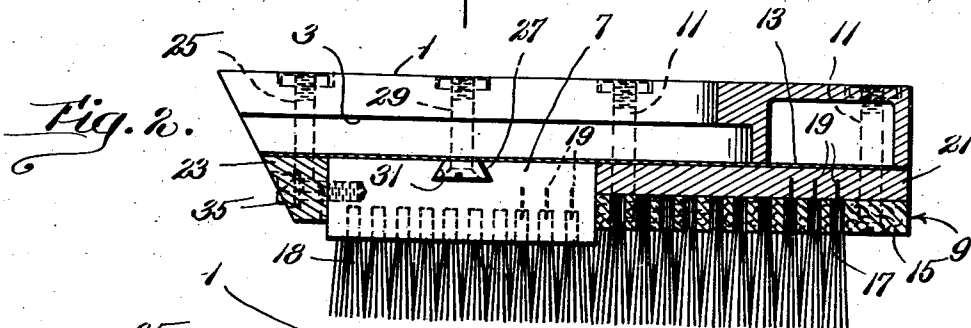
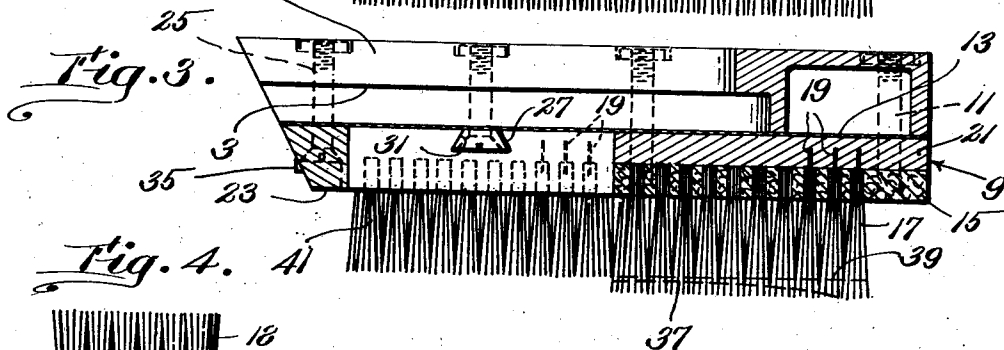
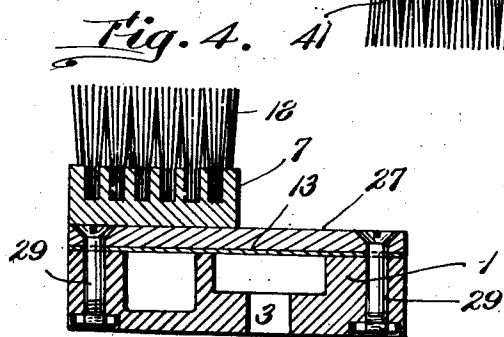
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DABBING BRUSH

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DABBING BRUSH

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5 Claims. (Cl. 19—124)

This invention relates to brushes in general, and more especially to dabbing brushes for use in wool combing machines such as the Noble comb, as well as to brushes used for analogous purposes.

As is well known, the bristles of dabbing brushes are subject to very severe wear, since in the nature of their work the close-set needles which perform the combing operation have to be moved at right angles to the bristles of the brush while the needles are deeply embedded in the tufts of bristles. In fact, in certain characters of work, dabbing brushes wear so rapidly as to impair the production of the comb and to require replacement of the brush in from ten to twenty hours of use. Not only do the removal and replacement and re-adjustment of dabbing brushes cause a loss of machine time and production of combed wool, but in the case of most prior types of dabbing brushes the wearing of the bristles entailed sending the entire brush back to the brush factory to have the worn bristles removed and replaced with new bristles, at a cost for work, materials, and transportation which represented a very material item of expense in view of its frequent occurrence. This procedure also required the mills to keep a relatively large stock of replacement brushes on hand involving also a substantial investment.

To meet this situation, the dabbing brush of my prior patent No. 1,919,736, issued on July 25, 1933, was devised, in which one feature of improvement consists in forming the bristle-clad or working face of the brush in two parts, of which one is L-shaped in area and comprises roughly $\frac{3}{4}$ of the area of the working face, this portion being semi-permanently affixed to the brush back whereby it is mounted on the dabbing foot of the comb, while the other $\frac{1}{4}$ of the area, including the portion of the brush subjected to the hardest wear and thus wearing out first, comprises a separate easily removable brush section composed of tufts of bristles set in a brush block of rectangular shape fitting into a corresponding rectangular reentrant angle formed in the block of the main brush body, and retained in place within such angle by a quickly-detachable thumb-operated detent. Thus, when the area subjected to the most rapid wear and lying within the removable brush section becomes worn out, the worn section is released, removed, and quickly replaced with a new one, without removing the dabbing brush from the comb.

In the present invention I have further in-

creased the economies attained in practice through the use of the structure of my prior patent named above, by making the portion of the brush receiving the hardest wear not only quickly replaceable but also reversible end for end, preferably at the same time locating the attaching slot in the brush back in proper position on the brush back so that the region of greatest wear though still falling on the removable section is localized along one side thereof, whereby through its reversal the removable section can be made to render double service, twice that of the removable section of my prior patent, through bringing the relatively unworn bristles at one side thereof into use after the bristles comprising the other side or half thereof have become no longer serviceable. In addition, instead of forming the heel or narrow portion of the brush with half its width quickly replaceable and the other half a part of the main brush body semi-permanently attached to the brush back, as in my prior patent, the entire heel portion of the new brush is composed of two of the new reversible brush sections, each comprising half the width of the heel and each arranged to be put successively in the position receiving the hardest wear. Thus, with a fresh brush of this improved construction installed in the comb, the brush is used until the bristles along one side or half of one of the two removable sections comprising the heel have become unserviceable, an amount of wear requiring replacement of the prior types of one-piece brush, and then the brush section on which this severest wear has fallen is removed, turned end for end, and replaced, whereupon the brush again delivers substantially the same period of wear as in its first run, but without need for replacing any bristles or other parts. When this doubly-worn brush section is no longer serviceable, it is removed and discarded, the adjacent section comprising the other half of the heel, which has been subjected only to moderate wear during the life of the first section, is slid over to replace the section worn out and removed, and a new section is inserted in the brush in the position of lesser wear. Thus, with the insertion of only one additional fresh brush section, the brush delivers service equivalent to the life of four standard one-piece brushes, each worn to the point compelling repair or replacement, or equivalent to the service rendered by a fresh brush of my prior patent referred to plus three fresh replacement sections therefor. Similarly, by discarding the second of the original removable brush sections, sliding over the fresh section, and

adding a second fresh brush section, the useful life of the brush is further extended for a period approximating twice the life of the standard one-piece brush, giving a total wear of about six times the life of the one-piece brush. This process is continued until the other parts of the brush have worn down to a point where their rebuilding or replacement is required.

In this latter connection, a further feature of the present invention relates to the maintenance of the efficiency of the brush in the course of wear of the semi-permanent toe parts of its face. The wear of the bristles at these parts constituting the toe of the brush is much slower than at the heel. Since these bristles at the toe end do not have to perform the hard work performed by the heel bristles of forcing the wool down into the needles of the comb, but merely hold the wool down therein, it is economical and desirable common practice to make the bristles at the toe end of the brush at least $1\frac{1}{8}$ inches in length, because this length permits one or more retrimmings of the toe portion of the brush to level up its face after moderate wear, instead of removing and replacing these bristles at the toe with new ones to restore a level face. I have discovered, however, that when the bristles at the heel are made of this length, as usual hitherto, their length imparts a limberness which results in their bending somewhat in forcing the wool down into the needles, with the result that they are rapidly cut by the transverse movement of the needles relatively thereto because the intermediate portions of their length are not parallel with the needles so as to permit the latter to pass through them laterally without damage. The use of stiffer bristles at the heel would cure this, but would add to the cost of the brushes. But I have found that shortening the bristles at the heel end of the brush to approximately $\frac{7}{8}$ inch attains improved results, because average quality bristles of this length have an increased stiffness capable of forcing the wool to the desired depth in the needles without tending to bend or loop out of parallel with the needles, and hence the latter can move transversely through the bristles with less cutting of the bristles and hence with longer wear of the bristles involved. This favorable result makes possible the creation of a dabbing brush of satisfactory working characteristics out of Chinese hog bristle mixed with horse hair in the proportions presently compelled by existing Federal restrictions, which confine the use of the imported bristle to not over 55% of the contents of the entire brush, while attaining a life of the brush substantially equalling that of the all-bristle prior dabbing brushes. In fact, for many uses the entire half of the length of the brush at the toe end thereof has been made of horse hair of $1\frac{1}{8}$ inches in length, with the remainder composed wholly of Chinese bristles of $\frac{7}{8}$ inch length, without sacrifice of proper working or adequate life.

In accordance with the present invention, this optimum length of the bristles of the heel of the brush is attained without sacrificing the economy of the use of the longer bristles in the toe to provide for subsequent retrimming, by making the blocks forming the replaceable heel inserts of varying thickness, though always equipped with bristles of approximately $\frac{7}{8}$ inch, so that the face of the replaceable brush sections will match the face of the semi-permanent part and will create the necessary continuous level surface needed

throughout the length of the brush for proper operation, regardless of the length of the bristles forming the toe either as originally contrived or as shortened through subsequent retrimming. Thus, when the toe bristles are of $1\frac{1}{8}$ inch length, the blocks of the $\frac{7}{8}$ inch heel sections will be one-quarter inch thicker than the block in which the longer toe bristles are installed, and the heel blocks will project $\frac{1}{4}$ inch below such latter block. When the toe bristles have finally been retrimmed to $\frac{7}{8}$ inch, heel sections will be installed having blocks of the same thickness as that in which the toe bristles are set, so that the face of the brush is restored to the desired level relation without need to trim the entire surface.

A further feature of the invention is the provision of novel and improved means for securing the removable heel blocks in fixed and secure operating position on the brush back but with capacity for simple and rapid removal and replacement of the brush sections without need to take the dabbing brush out of the comb, together with shift of a given brush section from one side of the brush to the other without even the need of removing it from the brush.

Other features of the invention, and their purposes and manner of attainment, are as made plain hereinafter.

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

Fig. 1 is a bottom view of the improved brush, showing one of the replaceable brush sections in detached relation thereto.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2, showing the use of a replaceable brush section employing a thinner block, contrasted with the longer bristles of the toe section before retrimming to compensate for wear of the latter.

Fig. 4 is a view in section on line 4—4 of Fig. 1.

The brush back 1 is of light-weight construction, preferably being made as in my Patent No. 1,919,786 of aluminum or other light-weight metal having a chambered or cellular structure as shown herein, to reduce inertia. The general shape and dimensions are as usual, except that the slot 3 receiving the bolt whereby the brush is attached to the foot of the dabbing motion is located far enough off the longitudinal centerline of the heel or narrow portion of the brush to locate the longitudinally-extending zone of most rapid wear, i. e. the portion of the brush engaging the tangent point of the great and lesser circles of needles on the comb, substantially wholly within the width of one of the two quickly-detachable and renewable brush sections. Since this zone of most rapid wear is distinctly confined to a width of around $\frac{3}{4}$ inch, it takes but a slight shift of the location of slot 3 to cause it to fall within the inner half of the width of the removable brush section 5 located at the concave side of the brush, when such section occupies its working position on the brush. At the toe or wide end of the brush there is secured to the back 1 a brush section 9 covering the full width and substantially half the length of the brush, this section being attached firmly and semi-permanently by bolts 11 countersunk into the margins of the block of the brush section and engaging nuts let into the upper surface of the back 1. Since a supporting or reinforcing plate 13 of sheet metal of substantial thickness and stiffness is applied to the inner face of back 1 as in the aforesaid patent to cover the inter-rib

or cellular spaces of the base, or to prevent splitting when the back is made of wood, the restapling or bristle-replacing operation on this brush section 9 is usually performed while this brush section and the back remain bolted together, and section 9 is only removed when it is worn out beyond repair. As in the prior patent, this section 9 comprises a plate 15 of fiber or other tough material or metal having holes in which the tufts 17 of bristles are inserted, the tufts being secured by staples 19 driven into a second plate 21 of wood held to plate 15 by such staples or by other means.

At the heel end of back 1 is located a fixed abutment 23 of quadrangular section, preferably made of metal, extending clear across the width of the brush, having one of its faces oblique to conform to the undercut slope of the heel end of back 1, and its face which is toward brush section 9 disposed perpendicularly to plate 13. It is secured to the under face of plate 13 by bolts 25 passing through the abutment, the plate 13, and the back 1 into nuts sunk in the upper surface of the back.

Between the abutment 23 and the brush section 9, preferably midway of such interval, there is located a spline 27 of dove-tail or trapeziform section, having the narrower one of its two parallel faces secured against the under side of plate 13 by bolts 29 passing through such plate and through the back 1 into nuts recessed in the top of the back 1. This spline preferably though not necessarily extends entirely across the width of the brush.

A pair of quickly-removable brush sections 5, 7, comprising tufts of bristles set in holes in inexpensive one-piece wooden blocks, fit accurately but easily between the perpendicular face of abutment 23 and the proximate end of the composite block of brush section 9, each of such sections being of half the width of back 1 at this point, and each having a dove-tail rabbet or recess 31 fitting closely over spline 27, whereby each section is held in place between the abutment 23 and brush section 9 and against the under surface of plate 13, with capacity for movement only lengthwise of spline 27, i. e. transversely of the brush.

To retain the two brush sections 5, 7, in fixed operating position and prevent them from sliding laterally along spline 27 when the brush is in use, each brush section 5, 7, is provided with a hole 33 in each of its ends, into one of which enters a cap-screw 35 put through the oblique outward face of abutment 23 and in screw-threaded engagement with such abutment, the screws 35 also respectively pressing each brush section 5, 7, endwise into tightly fixed engagement with one side of spline 27 or the opposing vertical end of semi-permanent brush section 9. The two removable sections 5, 7, are thus held in operatively fixed relation as shown in Fig. 2 during use of the brush, and until the bristles comprising the inward half of the face of removable section 5 become worn down to an extent requiring change, whereupon without removing the dabbing brush from the dabbing motion the screw 35 holding brush section 5 in place is backed out sufficiently to clear the hole 33 in section 5. This section is slid along spline 27 and off from the brush, turned end for end, replaced on spline 27, and slid inward to bear against its companion section 7, whereupon screw 35 is again tightened and the operation of the brush resumed. When the other half of section 5 has been worn down

until the bristles no longer work properly, both screws 35 are backed out, and section 7 is shifted along spline 27 to occupy the position of section 5, expelling the latter from the brush; a fresh replacement section identical with sections 5 and 7 is then inserted along spline 27 from the opposite side of the brush, taking the place previously occupied by section 7, screws 35 are tightened into holes 33 in their respective brush blocks, and the brush is again ready for continued use.

As shown in Fig. 2, the bristles comprising the tufts 17 of the toe portion 9 of the brush are materially longer than the bristles in the tufts 18 of the quickly-detachable removable and replaceable sections 5, 7, the block in which the bristles 18 are set being of sufficiently greater thickness than the composite block of toe section 9 to make up for the difference in length of the respective tufts and to bring the ends of both sets of tufts to the same level so that the face of the brush will have the necessary flat surface throughout its length. When, however, the brush has been in use long enough to have caused wear of the bristles in the tufts 17 of the toe section 9, which occurs at intermediate portions of the width of section 9 along a line similar to that indicated at 37 in Fig. 3, the brush is removed from the dabbing motion and these tufts 17 are trimmed level along a line similar to that indicated at 39 in Fig. 3, the trimming being done so as to leave a definitely known length of bristle in the tufts 17, and being done after the removable sections 5, 7, or their replacements, are out of the brush. Thereafter, replacement sections are installed in the heel portion which have blocks of the proper thickness to bring the ends of the tufts composing the face thereof exactly flush with the new surface which has been put onto section 9 by the retrimming operation, thus attaining the desired flat face of the brush without the necessity for retrimming its entire area. Preferably, the wearing-down and subsequent retrimming of the longer bristles initially installed in the toe section of the brush are so managed that a definite fraction such as $\frac{1}{8}$ inch is removed, so that a stock of replacement sections 5, 7, having blocks varying in thickness by the same $\frac{1}{8}$ inch increments may be kept on hand for insertion in the brushes after retrimming of the toe portions, and thus attain a flat-surfaced brush without need to retrim its entire area. Also, by this method, the hard-worked bristles of the heel portion of the brush may be maintained of optimum length in proportion to their stiffness and quality to do their best work and render their longest possible wear, while utilizing bristles in the toe which are long enough at the start to permit the economy of repeated retrimming to level up the face. Thus, referring to Fig. 3: Assuming that the bristles in the tufts 17 of the toe section are 1 inch in length and are then worked until the worn area in the face of the toe section approaches the depth indicated by dotted line 37, these tufts will be trimmed to the line 39 to restore a flat face to this section, thus making the bristles $\frac{7}{8}$ inch in length; assuming also that such length of $\frac{7}{8}$ inch gives optimum results with the quality of bristles used in tufts 41 of the replaceable heel sections, fresh replacement sections having blocks of the same thickness as the block of toe section 9 will be taken from stock and used to replace the previous heel sections which had blocks $\frac{1}{8}$ inch thicker. Thus, the face of the brush will be restored to new condition with its face in flat and level relation after retrimming only the toe section.

Because of the simplicity and cheapness of construction of the replaceable sections, and the ease and quickness with which replacement can be made, the quantity and quality of the output of the comb has been found to be substantially increased, through eliminating the tendency to try to extend the use of worn dabbing brushes beyond the point where they can perform their work effectively.

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 forms shown, or to the details of construction thereof, but what I do claim is:

1. A method of providing for the repair of dabbing brushes which includes forming the toe portions of the brush of longer bristles fixed in a block secured to the brush back and the heel portions of shorter bristles flush with the first bristles and fixed in a block of greater thickness secured to the brush back in removable relation, whereby the face of the brush is kept level after trimming the longer toe bristles, following wear thereof, by replacement of the heel portions with blocks lesser in thickness than their predecessors by the amount of the length thus trimmed from the toe bristles but having bristles of the same length as before.

2. A method of providing for the repair of dabbing brushes which includes initially forming the toe portions of long bristles and the heel portions of shorter bristles set flush with the toe bristles at the face of the brush, trimming the toe bristles down as wear occurs, and replacing the heel bristles with new bristles of the same length as these portions had before but set in a thinner block than before so as to have the same free extent while terminating flush with the bristle surface

of the toe portions after the latter have been trimmed.

3. The method of repairing dabbing brushes which includes replacing the heel portions with new bristles of the same length set in successively thinner blocks, and progressively trimming the bristles of the toe portions flush with the surface of these successive replacement heel portions.

4. A dabbing brush for wool combs having a wide end and a narrow end and having in combination a brush back, a bristle-clad brush block fixed on the wide end thereof having a level face composed of bristles longer than the minimum useful length for the nature of the work being performed, a second bristle-clad brush block having bristles of optimum length for the work and with its block thicker than that of the first block bringing the ends of its bristles flush with the ends of the bristles forming the face of the first block, and quickly-detachable means fixing the bare surface of the second block against the surface of the back at the narrow end of the back with capacity for removal and replacement by a brush block having the same optimum length of bristles but with a thinner block, whereby the face of the entire brush is kept level, after trimming down the face of the first block following wear thereof, with retention of the same optimum length of bristles in the narrow portion of the brush.

5. The method of repairing a dabbing brush having a back and long toe bristles and a removable section having shorter heel bristles with their free ends terminating in substantially the same plane as the toe bristles, which includes the step of replacing the heel section, after wear, with a new section having the same length bristles as before but terminating in a plane closer to the brush back, and trimming the toe bristles flush with the ends of the bristles of the new heel section.

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