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ROTARY BRUSH

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Fig. 1.

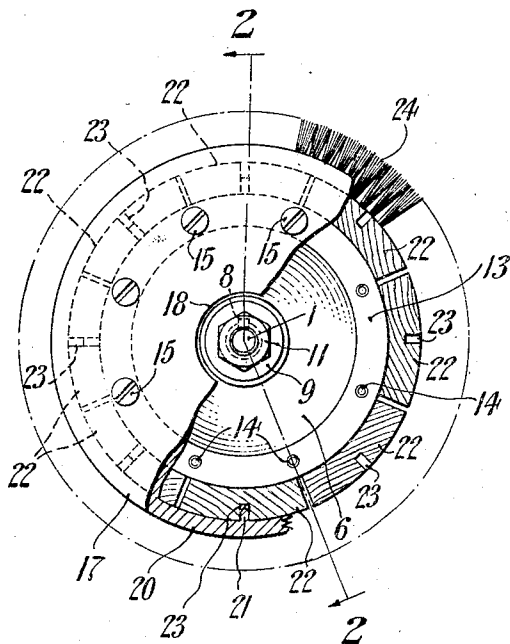
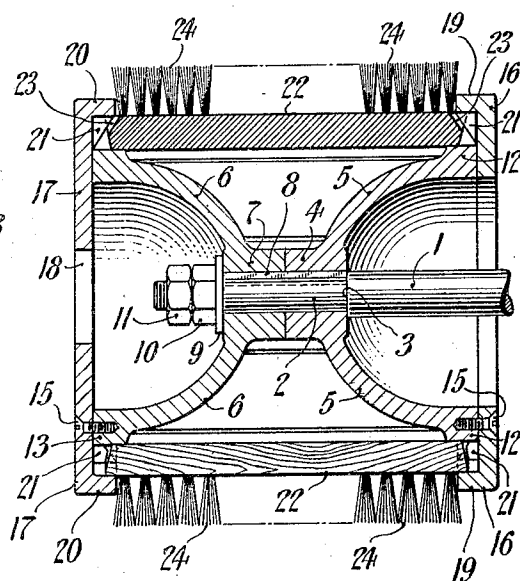


Fig. 2.



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ROTARY BRUSH

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The present invention relates to self-preserving cleaning brushes, and more particularly to rotary brushes of this class which are suitable for cleaning rotary sewer screens. Heretofore, rotary screen cleaning brushes have been used in substantially the same manner in which the brush embodying the present invention is to be used, but after a comparatively short period of service, have become unsatisfactory in operation and have given a great deal of trouble, have been inefficient for too large a portion of their natural life and have, as a result, been unduly expensive.

Inasmuch as rotary cleaning brushes used for cleaning rotary sewer screens are constantly subjected to watery conditions, the wooden backs for the bristles swell and warp, distorting the original formation of the brush, whereby the bristles are imperfectly applied to the screen they are attempting to clean. Consequently, some of the bristles become compressed too much and break down so that they do not attack the screen in a proper manner. A relatively small percentage of the bristles may perform as they are intended to, and still others of the bristles will not even touch the screen, due to the warping of the wooden backs in a direction to withdraw the bristles from positions in which they would brush the screen.

When brushes of the style heretofore used have become prematurely unsatisfactory to an extent that makes their repair desirable or necessary, it has been found that in seeking to remove the bristle carrying backs from the metallic spider holding them, the spider usually would become broken, because of the warped and swollen condition of the wooden backs and the unyielding grip of the old style of spider. Altogether the old type of brush was one that became misshapen, difficult, if not impossible, of separation into its constituent parts, and it is the purpose

of the present invention to eliminate these faults.

It is proposed to provide a brush-holding spider adapted to be secured on and to be driven by a suitable shaft, and to sectionally form the spider in such manner that the unavoidable wetness to which the brush will be subjected in service will not result in a warping of the wooden backs or staves of the brush segments. Means are provided for so retaining the staves of the brush segments that the latter are positively maintained in a spaced association, in which the opposing sides of adjacent staves may swell or expand toward each other without the staves mutually stressing themselves to become distorted in shape.

Brush retaining means are combined with the new form of spider, and the arrangement of the spider and such retaining means, while preventing improper endwise displacement of the wooden staves, allows for expansion longitudinally thereof for an amount sufficient to avoid concave or convex buckling of the staves. While allowing for such longitudinal expansion the plurality of brush staves or backs are tightly held against radial displacement.

Other features will become apparent hereinafter and are, of course, to be understood to be part of the present invention.

In the drawing,

Fig. 1 is an end view of a rotary brush embodying one form of the invention, there being a broken away portion; and

Fig. 2 is a section longitudinally of the brush, the section being taken on the line 2-2 of Fig. 1, looking in the direction of the arrows.

Referring to the drawing, 1 indicates a rotary shaft, which is driven by any suitable means at a speed at which it is desired to rotate the brush, the shaft having a portion 2 of reduced diameter whereby a shoulder 3 is formed between it and the main portion

of the shaft 1. Slipped over the reduced portion 2 of shaft 1 is the hub 4 of a bell-shaped casting 5 which constitutes one section of the brush spider, the hub 4 being brought into abutting contact with the shoulder 3 of the shaft 1. A similar casting 6 is also slipped over the reduced portion 2 of the shaft 1 but is reversed in direction and has a hub 7 that bears against the hub 4 of casting 5. Fitted into keyways in the reduced portion 2 of the shaft 1 and in the hubs 4 and 7 of the spider castings is a key 8, through means of which the spider castings 5 and 6 are rotated with the shaft 1. A washer 9 lies against the outside of spider hub 7, and a nut 10 is screwed on to a threaded end of the shaft 1, clamping the spider castings 5 and 6 together with the spider hub 4 forced against the shoulder 3 of the shaft 1. To securely maintain this relationship a check nut 11 is screwed onto the threaded end of shaft 1 to bear against the nut 10.

The bell-shaped castings 5 and 6 open outwardly and their mouths are outlined by annular rims 12 and 13 respectively. Drilled and tapped holes 14, best shown in Fig. 1, are annularly disposed around the outer faces of the rims 12 and 13 for the reception of screws 15 to hold a circular retaining ring 16 against the rim 12 of spider casting 5 and a cover plate 17 against the rim 13 of spider casting 6. At its center, the cover plate 17 has an opening 18 preferably just sufficiently large to admit a socket wrench for the nuts 10 and 11. Otherwise the interior of the bell of spider casting 6 is closed to exclude muck or sludge from entering and becoming lodged therein.

Circumferentially outlining the retaining ring 16 is an inwardly directed flange 19, while a similar flange 20 extends inwardly from the cover plate 17. Connecting the inner face of the retaining ring 16 with its annular flange 19 are triangularly shaped ribs 21, which are integrally formed therewith. The ribs 21 are annularly spaced at uniform intervals, and other ribs 21 are formed in similar manner on the cover plate 17.

As well shown in Fig. 1, a plurality of staves or brush backs 22 are annularly arranged around the spider. At the bottom of Fig. 2 it will be seen that the staves or brush backs 22 extend from the mouth rim 12 of spider casting 5 to the mouth rim 13 of spider casting 6, and also between the outer circumference of the spider rim 12 and the flange 19 of the retaining ring 16 at one end, as well as between the outer circumference of spider rim 13 and the flange 20 of cover plate 17. As the staves or brush backs 22 swell, because of being continually wet, the grip on their opposite sides at their end portions effected by the spider mouth rims 12 and 13 and the flanges 19 and 20 is strengthened,

and the staves 22 or brush backs are firmly held in place.

In its opposite ends, each stave or brush back 22 is provided with a triangular saw-cut or slot 23 midway the width of the stave, as shown in the uncovered ends of the staves or brush backs 22 in Fig. 1 and in section at the top of Fig. 2. The bristles 24 carried by the staves or brush backs 22 have been partly omitted, but their continuity has been indicated by dot and dash lines. The triangular ribs 21 which are integral with and annularly spaced around the inside circumferential margin of the retaining ring 16 and the cover plate 17, with measured regularity, project into the slots 23 in the ends of the staves or brush backs 22, and restrain the latter from sidewise displacement. Such spacing of the triangular ribs 21 is had as will also maintain space between adjacent staves or brush backs 22 to permit swelling of the latter without a resulting distortion thereof.

Furthermore, the saw-cuts or slots 23, while not made excessively deep, are still sufficiently deep to establish adequate clearance for longitudinal expansion of the staves or brush backs 22, whereby they will not press against the ribs 21 and will avoid convex or concave warping transversely of their length.

In using the brush, when shaft 1 is rotated, the key 8 in the portion 2 thereof of reduced diameter acts on the hubs 4 and 7, rotating the unified castings 5 and 6, which form the spider of the brush. The bristle bearing staves or brush backs 22, being clamped between the mouth rims 12 and 13 on their inner end surfaces, and the flanges 19 and 20 of the end members 16 and 17, on the outer end surfaces of the staves, the bristles 24 are revolved for brushing action. Displacement of the staves or brush backs 22 in an annular direction is positively prevented by the ribs 21 entered into the slots 23 in the ends of the staves or brush backs 22. The retaining ring 16 and the cover-plate 17 being screwed to the opposite ends of the brush spider, they rotate with and at the same speed as the spider, and through their ribs 21 exert the same velocity influence on the staves or brush backs 22 as is present in the other parts of the brush.

The maintained clearance between the staves or brush backs 22 and between them and the ribs 21 allows the staves to expand under aqueous conditions without warping, and the flanged end members may be removed without difficulty when it is desired to repair the brush. The construction is simple and rugged, as well as contributory to satisfactory service and self-preserved condition. Decreasing the already low initial cost of the brush is the further saving due to its long life, which is occasioned by its scientific construction.

It is obvious that it may be desirable to construct the brush in different forms for different purposes, and it will, of course, be understood that alterations and variations from the illustrated embodiment of the invention may be indulged in, without departing from the spirit of the invention, as defined by the appended claims.

What I claim is:

1. A brush comprising successively arranged brush sections provided with brush backs having opposite ends, and sides opposed to similar sides of the backs of adjacent sections, a holder for said brush sections having portions extending opposite to the end faces of said brush back ends, and positioning means including projections narrow relatively to the ends of the brush backs interposed between said brush back ends and said portions of said holder that are opposite said end faces, said projections being rigid with one and received by the other with clearance less than the distance between said ends and said opposite portions to preserve space therebetween, said projections also being fixed with respect to said opposite portions of said holder and successively spaced by sufficient amounts to maintain continuous space between the sides of adjacent brush backs.

2. In a sectional brush, a shaft, central members having juxtaposed hubs mounted on said shaft, keying means entering said shaft and hubs, a plurality of brush sections arranged about said central members said sections being provided with brush backs having ends, and sides opposed to similar sides of adjacent brush backs, annular end members rigid with the outer ends of said central members and extending into spaced opposition to the ends of said brush backs, and positioning elements correlating said end members and brush back ends for endwise movement of the latter by amounts insufficient for said brush back ends to engage said end members, said positioning elements being annularly spaced apart by amounts greater than the widths of said brush backs to maintain space between said backs.

3. In a rotary sectional brush, central members having juxtaposed hubs and portions extending away therefrom in opposite directions, a shaft passing through and beyond said hubs, means keying said hubs to said shaft, clamping means combining said members in fixed position on said shaft, removable end members attached to the outer ends of said central members and having portions extending transversely thereof and projecting radially therebeyond, a plurality of brush sections arranged annularly about the combined central members and provided with brush backs opposed to the transverse radially projecting portions of said end members, and sets of positioning elements spaced annu-

larly about the respective end members by amounts greater than the widths of said brush backs and located inwardly of said transverse radially projecting end member portions, the sets of positioning elements being spaced apart by distances greater than the lengths of said brush backs, whereby said brush backs are maintained spaced from said projecting end member portions and from each other.

4. In a sectional brush, a frame, a plurality of brush sections having brush backs retentively and successively arranged on said frame, said frame having transverse end walls at its opposite ends extending into spaced opposition to the ends of said brush backs, and positioning devices in fixed relation to and located inwardly of said end walls, said devices being spaced in the direction of the succession of said brush backs by amounts greater than the widths of said backs, said brush backs and said positioning devices being entered one into the other with clearance therebetween sufficient to prevent the opposite ends of said brush backs from engaging the portions of said transverse end walls from which said positioning devices are inwardly located.

5. In a rotary sectional brush, a shaft, a rotatable central frame mounted thereon to be driven thereby and comprising separable parts, means clamping said parts together, said parts having seat-forming peripheral portions spaced from each other, a plurality of separated brush sections having brush backs annularly disposed on said portions, and end members provided with elements entering the ends of said brush backs with clearance less than will permit said ends to contact with opposing portions of said end members, said elements retaining said brush backs in place with space extending around each section.

6. In a rotary sectional brush, a shaft, a central frame mounted thereon to be driven thereby, said frame having annular formations at its opposite ends, end members secured to said annular formations and provided with inwardly directed flanges, a plurality of separated brush sections having brush backs extending between said flanges and said annular formations, said brush backs being provided with recesses, positioning devices on said end members entering and partially filling the recesses in said brush backs and holding them separated from each other and away from opposing portions of said end members.

7. In a rotary sectional brush, a shaft, a central frame mounted thereon to be driven thereby and having annular formations at its opposite ends, end members removably secured to said annular formations and comprising end walls, inwardly directed flanges and ribs connecting said walls and flanges, a plurality of brush sections annularly disposed

around said frame and having recessed ends
into which said ribs project, the recesses being
sufficiently deep to prevent opposite ends of
said brush sections from touching ribs at op-
posite ends of said frame at the same time,
said ribs maintaining said brush sections an-
nularly spaced from each other, and said
brush sections being held at their opposite
ends between said annular formations of the
frame and the flanges of said end members.

In testimony whereof I affix my signature.

WILLIAM RAISCH.

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