Feb. 26, 1929. 1,703,510

J. A. CHARETTE

BRUSH

Filed Jan. 20, 1928

Fig. 1.

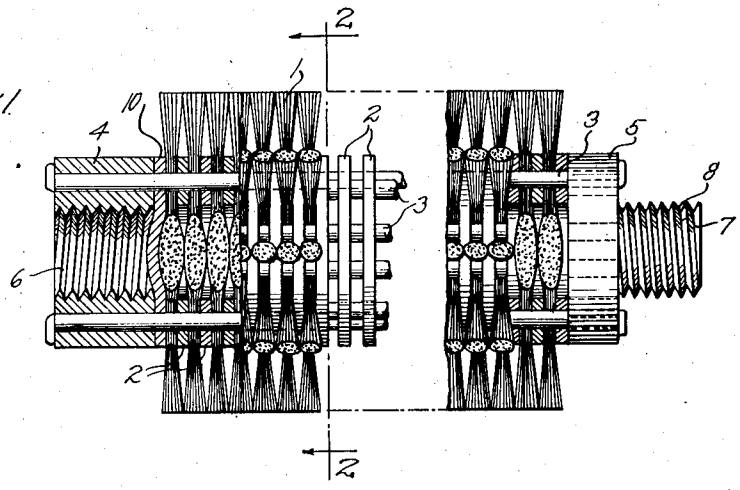


Fig. 2.

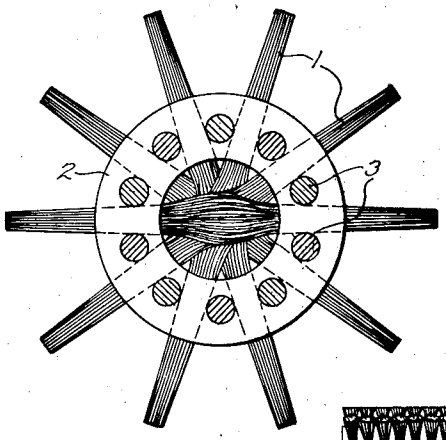


Fig. 3.

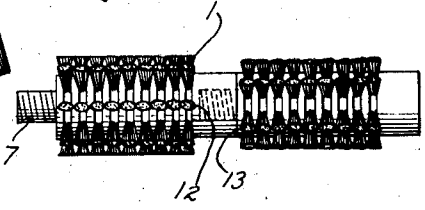
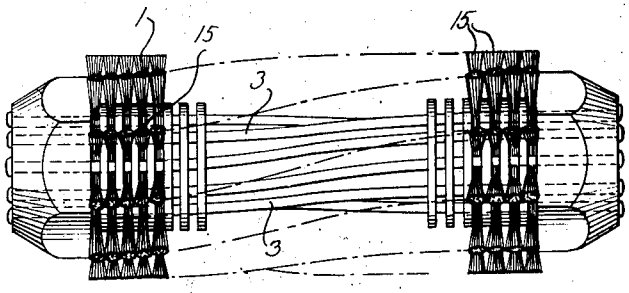


Fig. 4.



INVENTOR
JOSEPH A. CHARETTE
BY Newell & Spencer
ATTORNEY

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JOSEPH A. CHARETTE, OF SOUTH ORANGE, NEW JERSEY.

BRUSH.

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This invention relates to brush constructions and brush assemblies. Although the invention is herein shown in its application to the construction of brushes for cleaning boiler tubes to remove incrustations and other accumulations it will be understood that the invention is not restricted to the illustrated embodiment or uses but that it has wide utility in the brush art.

One of the objects of the invention is to provide a brush which may be cheaply produced and easily assembled.

Another object of the invention is to provide a brush in which the bristles are prevented from dislocation by being clamped against each other so as to be held in place frictionally.

A further object of the invention is to provide a brush in which the bristles extend transversely to the axis of the brush so that each end of every bristle forms a part of the brushing surface without the necessity for special shaping before assembling.

One feature of the invention resides in positioning the bristles which form the brushing surface so that they extend radially of the brush and overlap at their mid points so as frictionally to engage each other and prevent their dislocation with respect to each other.

Another feature of the invention resides in providing a plurality of sets of brushing elements positioned between retaining members and held in place by means of longitudinally extending securing members.

Other features and objects of the invention will be apparent from the following description and drawings which illustrate preferred embodiments of the invention.

Figure 1 is a side view, part in section and part in elevation showing the arrangement of the elements making up the brush;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view in elevation showing the manner in which several brushes may be used together; and

Figure 4 is a side view of a modified form of brush with a portion of the bristles making up the brush removed.

In the form of the present invention illustrated, groups of fibers, wire or any other suitable bristles 1 are positioned so that they overlap at their mid point, as shown in Figure 2. Any desired number of sets of bristles arranged with the groups of each set positioned as shown may be provided. When the desired number of bristles have been placed in this position annular disk-like retaining members 2 are placed between the successive sets of bristles with the overlapping center portion of the bristles positioned in the center of the annular retaining member. A series of these sets of groups of bristles 1 and retaining members 2 is positioned as shown in Figure 1, having a common axis from which the bristles radiate, each bristle being positioned transversely to the axis of the brush and extending beyond the periphery of the retaining members.

In order to secure the retaining members and bristles in place longitudinally-extending securing members 3 are provided which pass through the retaining members at right angles to both the retaining members and the bristles. The ends of the securing members 3 are fastened to head members 4 and 5 by being bent over as shown or by any suitable means such as a nut threaded onto the end of the securing member. The annular retaining members are forced together and clamped upon the groups of bristles before the securing means are permanently secured in place and since the retaining members engage the bristles at points where they do not overlap they may be brought sufficiently close together so that the bristles of each group forming a set of bristles between the retaining members are flexed at their mid point where they overlap each other. If the retaining members are thin, as shown in Figure 1, the mid point of each set of bristles where they overlap each other will be in engagement with the bowed out overlapping portion of the succeeding set of bristles. On the other hand, if the retaining members are relatively thick, the sets of bristles may be spaced from each other, the arrangement in each case being dependent upon the use to which the brush is to be put. For example, if the brush is to have a limited number of spaced bristles the retaining members should be thick but if the bristles should be closely arranged on the brushing surface the retaining members should be thinner.

The head members 4 and 5 are preferably constructed with threaded portions, the head 4 having a female thread 6 and head 5 having a stud 7 provided with a male thread 8, so that a plurality of brushes may be secured to each other in axial alinement or a

handle or operating shaft may be secured to the brush.

In order that the stud 7 may not engage the overlapping portion of the end set of bristles when screwed into place in the head 4 it is preferable to provide a disk-like plate 10 which is similar to the retaining members 2 except that the center portion of the plate is not stamped out. This plate may be sufficiently thin to be flexed as shown in Figure 1, to allow for the overlapping portion of the groups of bristles or the member may be stamped with a depression in its center to permit the bowed out portion of the overlapping bristles to be positioned properly in contact with its face.

The form of invention shown and described in Figures 1 and 2 is particularly adapted for use as a rotary brush for removing incrustations and deposits of material which may have collected in pipes or boiler tubes; however, the brush construction is adapted for use in many other forms and types of brushes and is particularly well suited for the construction of brushes which are to be subjected to longitudinal or rotary motion or subjected to severe usage.

When the brush shown in Figures 1 and 2 is to be used for cleaning boiler tubes, it is ordinarily rotated about its axis by any suitable means secured to one of the threaded head members 4 or 5. If, however, it is desired to operate the brush merely by moving it axially and without rotation it may be desirable to employ a plurality of brushes as shown in Figure 3, in which case the male head member would be threaded into the female head member of a second brush and the longitudinal rows of bristles 12 of one brush displaced circumferentially from the longitudinal rows 13 of bristles of the next or another brush. Thus, any material in the tube which passed between the parallel rows of bristles 12 of the first of these brushes would be engaged by the offset rows of bristles 13 on another brush.

The form of brush shown in Figure 4 is similar in construction to that shown in Figures 1 and 2 with the exception that the groups of bristles in each succeeding set of bristles is displaced circumferentially from that of the preceding and succeeding groups of bristles. This is effected by positioning the longitudinally-extending securing members 3 at the desired angle to the retaining members 2 so that the groups of bristles are positioned in spirally arranged longitudinal rows 15. With this construction the longitudinal rows of bristles may be positioned so that when the brush is moved lengthwise without rotation succeeding portions of the longitudinal rows of bristles will engage material lodged between the first groups of bristles as the brush is moved lengthwise. In this way by means of a single brush it is possible to remove all incrustations or dirt from a boiler tube without requiring the rotation of the brush. The particular angle at which the longitudinally-extending securing members are positioned will detetrmine the location of the groups of bristles making up each set. This may be varied for different purposes but is preferably but little less than a right angle in order to maintain the necessary strength to the brush so that it may resist forces applied thereto.

If desired two or more brushes such as that shown in Figure 4 may be arranged as shown in Figure 3 with the spiral rows of bristles inclined in the same or opposite directions.

While various forms of brush construction embodying the present invention have been shown and described it is not intended to limit the invention to any particular construction or arrangement of parts except as defined in the claims.

What is claimed as new is:

1. A brush comprising retaining members, groups of bristles between said retaining members extending transversely to the axis of the brush and engaging with each other between their ends and projecting beyond the periphery of said retaining members, so that each end of each bristle will form a part of the brushing surface, and means for flexing said bristles for preventing displacement of said bristles with respect to each other.

2. A brush comprising a plurality of radially-extending groups of bristles positioned with the middle portions of the bristles overlapping and in contact with each other, and retaining means flexing said bristles for causing them to frictionally engage each other to prevent their displacement.

3. A brush comprising a plurality of radially-extending bristles overlapping between their ends, each end of said bristles forming a part of the brushing surface, and means engaging said bristles at points where they do not overlap for holding said bristles in position in said brush.

4. A brush comprising a plurality of sets of bristles forming a brushing surface, said bristles extending through said brush transversely to the axis thereof and in contact with each other, retaining members between the successive sets of bristles, and means for forcing said retaining members into contact with said bristles to prevent relative movement thereof.

5. A brush comprising head members, a plurality of sets of brush-forming bristles, bristles of each set being in contact with each other and extending transversely of the axis

of said head members and projecting beyond the periphery of said members, longitudinally-extending securing members located eccentrically with reference to said head members and between the bristles forming each set, and means between said sets of bristles to prevent radial displacement thereof.

6. A brush comprising spaced head members, concentrically-arranged retaining members between said head members, longitudinally-arranged secured members extending between said head members and engaging said retaining members and bristles extending through said brush transversely to said securing members in contact with each other and between said retaining members.

7. A brush comprising a plurality of overlapping radially-extending bristles in contact with each other, circular retaining members of less diameter than the length of said bristles, a head member at each end of said brush and rivets extending between said head members and at an angle less than a right angle to said bristles, said rivets being secured to said head members and said retaining members.

8. A brush comprising a plurality of groups of bristles overlapping at their mid points, retaining members engaging said bristles at points where they do not overlap, said retaining members being spaced apart a distance less than the thickness of the overlapped bristles whereby said bristles are flexed and frictionally held against displacement.

9. A brush comprising a plurality of annular retaining members, a plurality of sets of bristles consisting of bristle groups extending transversely to said brush and said groups overlapping at the axis thereof, said retaining members being sufficiently thin to permit the overlapping portions of the groups of successive sets of bristles to engage with each other and means for securing said bristles and retaining members in place.

10. A brush comprising retaining members, a set of bristles consisting of bristle groups extending through the brush transversely to the axis thereof and beyond the periphery of said retaining members, another set of bristles similar thereto having groups displaced circumferentially from said first set of bristles, and means for securing said bristles against relative axial or circumferential movement.

11. A brush comprising retaining members, a group of bristles extending through the brush transversely to the axis thereof and beyond the periphery of said retaining members, another group of bristles similar thereto displaced circumferentially from said first group of bristles, and securing members engaging said retaining members and extending at an angle less than a right angle thereto to hold said bristles and retaining members in place.

12. A brush comprising a plurality of sets of bristles positioned between retaining members and extending radially of said brush, the retaining member at one end of said brush being in the form of a disk which closes the end of said brush and others of said retaining members being of annular form and means for securing said retaining members and bristles against relative movement.

13. A brush comprising a plurality of sets of bristles, retaining members positioned between the successive sets of bristles and spirally arranged and longitudinally-extending securing members engaging said retaining members to secure said bristles in position in said brush.

14. A brush comprising a plurality of bristles extending through said brush transversely to the axis thereof and in contact with each other, retaining members engaging and flexing said bristles to frictionally retain them in position, and longitudinally-extending securing members engaging said retaining members.

15. A brush comprising a plurality of groups of bristles extending through and overlapping to form the body of the brush, annular retaining members concentric with the body of the brush, said members being positioned on opposite sides of said groups of bristles and engaging said bristles outside the points of overlap, and means for holding retaining members on opposite sides of said overlapping groups of bristles, said means engaging the retaining members and clamping the same against the bristles so that the brushing ends of the different groups are flexed substantially into a common plane.

16. A brush comprising a plurality of bristles overlapping mid-way between their ends to form a group of radially-extending bristles having a central body portion, annular retaining members concentric with the body portion of said group of bristles and engaging opposite faces thereof outside the points of overlap, the body of said group being received in the recesses of said members and the free ends of said bristles being brought substantially into one plane by the pressure of said members upon opposite faces of the group.

17. A brush comprising a plurality of sets of radially-arranged bristles overlapping at their middle portions to form the brush body, annular retaining members concentric with the body of the brush and located between adjacent sets of bristles and means pressing said members toward each other to flex the portions of the bristles in each set, outside the overlap, substantially into a common plane.

18. A brush formed of a series of sections each comprising a plurality of groups of bristles overlapping at their mid points, centrally recessed retaining members engaging said bristles at points where they do not overlap, said retaining members being spaced apart a distance less than the thickness of the overlapped bristles whereby said bristles are flexed substantially into a common plane and frictionally held against displacement, and means extending through said retaining members and between said groups of bristles, said members clamping said series of sections together to form a unitary structure having a common axis.

Signed at New York, N. Y., this 19th day of January, 1928.

JOSEPH A. CHARETTE.