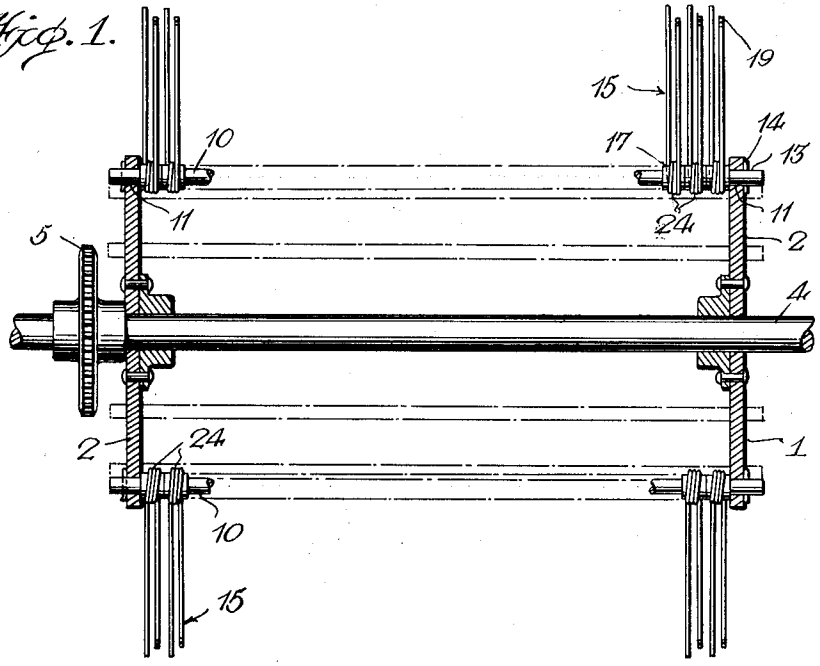
Dec. 4, 1928. 1,694,018

R. C. MUDGE ET AL

ROTATABLE BRUSH

Filed Feb. 19, 1927

Fig. 1.



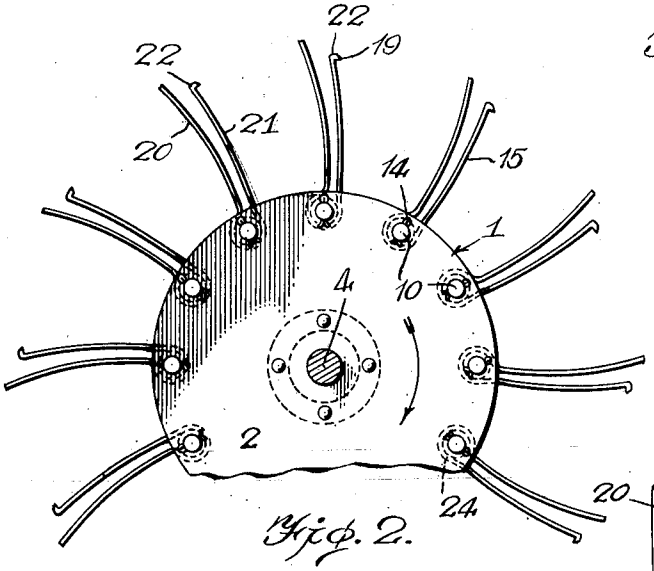
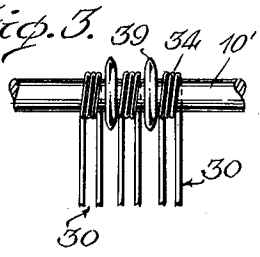




Fig. 2.

Fig. 3.



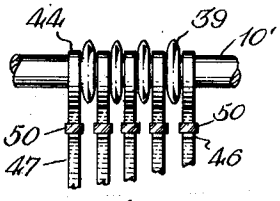




Fig. 4.

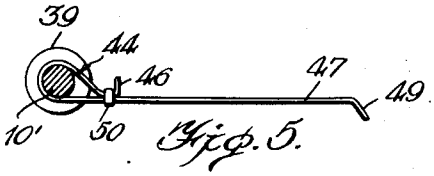



Fig. 5.

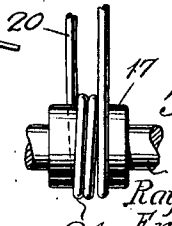



Fig. 6.

Inventors
Raymond C. Mudge
Ernest A. Gallison

By Pruto Cushman & Woodberry.
Attorneys

Patented Dec. 4, 1928. 1,694,018

# UNITED STATES PATENT OFFICE.

RAYMOND C. MUDGE, OF EAST BOSTON, AND ERNEST A. GALLISON, OF WATERTOWN, MASSACHUSETTS, ASSIGNORS TO BAY STATE FISHING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

## ROTATABLE BRUSH.

Application filed February 19, 1927. Serial No. 169,607.

This invention relates to an improved form of brush and more particularly a brush designed to be used in removing the scales from fish, but also adaptable for other uses wherein it is desirable to have enduring spills which may be yieldably maintained in position in order readily to conform to the shape of the particular article being brushed.

In order to provide brushes of suitable sturdiness and reliability it is desirable to use material for the spills which will be tough and enduring; high grade metal stock, such as piano wire, being desirable for this purpose. However, the usual types of brushes, if provided with metal spills, would have a harsh brushing action which would be objectionable, if not absolutely unsatisfactory for many purposes. For example, in using a brush to remove scales from fish it is desirable to prevent tearing the flesh of the fish, and yet the spills have to endure considerable strain and must be made of tough and somewhat resilient material in order to provide a brush which will last for a reasonable length of time. The present invention therefore makes use of metal spills which are yieldably supported in order to conform readily to the shape of the fish, thus permitting removal of scales from all parts of the surface of the fish as it is being moved between brushes of this character.

In order to provide a brush which is comparatively simple and reliable it appears desirable to avoid use of springs or similar resilient elements for yieldably mounting the spills. The present invention, therefore, relates to the provision of a brush having spills which are loosely pivoted to a rotatable frame or cage, centrifugal force being depended upon to throw the working ends of the spills outward when the brush is run at a suitable working speed; the centrifugal force in conjunction with the pivotal mounting of the spills serving to provide a yieldable working surface for the brush itself.

Various advantageous detail improvements in a brush of this character are also objects of the present invention. For example, double ended spills are provided to afford the maximum brushing effect and yet to permit low cost of manufacture. The exact arrangement and formation of the spills is also a feature of the present invention while the preferred structure for mounting the spills permits effective spacing of the same to obviate tangling.

The above and further advantageous features of the invention will be apparent to those skilled in the art upon a reading of the subjoined description and claims in conjunction with the accompanying drawing in which

Fig. 1 is a central sectional view of a brush exemplifying this invention, the position of intermediate portions of the spills and supporting bars being indicated in dot and dash lines;

Fig. 2 is an end elevation of a portion of the brush shown in Fig. 1;

Fig. 3 is a detail view of a modified manner of supporting the spills;

Fig. 4 is an elevational detail of one spill mounting arrangement;

Fig. 5 is a view partly in section and partly in elevation of the spill mounting arrangement of Fig. 4; and

Fig. 6 is an elevational detail of the preferred spill mounting arrangement.

A brush of the type disclosed in the accompanying drawings preferably comprises a rotatable cage or frame 1 which, in the present embodiment of the invention, comprises annular end plates 2 connected by an axle 4.

Sprocket 5 is keyed or otherwise fastened to the axle and forms a convenient element for rotating the brush at a suitable speed. Portions of the plates 2 adjoining their peripheries are connected by a plurality of bars 10 which may conveniently be disposed parallel to the axis of rotation of the brush. Thus, in effect, the framework of the brush is a rotatable cage comprising annular end pieces and a series of circumferentially disposed connecting bars. These bars may conveniently be secured to the brush by passing through openings 11 in the plates 2 and by having diametric openings 13 to receive cotter pins 14 (Figs. 1 and 2). Such fastening means permit quick assembly of the bars in the rotatable cage or quick removal of the same, thus facilitating manufacture and repair of the completed brush.

Spills 15 are preferably provided with loops 24 which are threaded upon the bars so that the spills may be pivotally mounted upon the bars. In the form of the invention illustrated in Figs. 1 and 2 the loop portions 24 of the spills are preferably secured to small bushings 17 which themselves bear upon the

bars 10. Bushings 17 may preferably be of a suitable alloy which is adapted to cooperate with the material of the bars 10 to provide a suitable long-wearing bearing surface. Loops 24 may be secured to the bushings in any suitable manner, but preferably are soldered or brazed thereto. It is desirable somewhat to space the spills transversely of the brush in order to prevent tangling of spills which are located next to each other upon the same bar. For this purpose bushings 17 preferably provide outstanding shoulders beside loops 24. Each outstanding shoulder may conveniently bear against a similar shoulder upon an adjoining bushing in order to comprise spacer means to maintain the spills properly spaced transversely of the brush.

While the construction of the spills themselves may be varied in different ways, one desirable form of spill is illustrated in Figs. 1, 2, and 6 of the accompanying drawings. Such a spill may be manufactured out of any suitable tough and enduring material, such as steel, for example piano wire; this material not only having the desired degree of strength, toughness, and resiliency, but also being adapted to be readily bent or formed into the desired shape.

In manufacturing spills of the preferred form, we preferably take a piece of wire of suitable length and bend it to provide an intermediate loop portion 24 consisting of two or three convolutions of the wire (Fig. 6). End portions 20 and 21 of the wire curve outward slightly and are substantially parallel to each other. These outstanding wire portions are preferably spaced from each other in a direction perpendicular to the axis of the intermediate loop, as disclosed in Fig. 2, wherein it may be seen that wire portion 20 of the spill extends outward substantially in alignment with the diameter of the loop while the other portion 21 is substantially tangential to the loop. Preferably the first-named portion or end 20 of the wire extends outward slightly farther than the second-named portion thereof, while the latter portion has its extremity bent over substantially at right angles to the general direction of its exent. Preferably this bent-over or hooked portion 22 is cut off to provide a rather sharp beveled edge 19, the pointed portion of which is located upon the side of the out-turned extremity 22 which is nearer the loop 24.

Fig. 3 shows a slightly different way of mounting spills 30, on a bar 10′ of a brush which may correspond to the bars 10 of Figs. 1 and 2. In this embodiment of the invention the spills are provided with intermediate loop portions 34 which may conveniently be of a size to bear upon the bar 10′ without the interposition of a bushing. In this embodiment of the invention washers 39 or other suitable elements are threaded upon the bar 10′ between each of the spills in order to maintain spaces between the same.

Figs. 4 and 5 illustrate another form of the invention and more particularly a slightly different type of spill. Spills of the type illustrated in Figs. 4 and 5 may be manufactured of strips of metal of rectangular cross section, for example, wire or spring metal. As in the case of the previously described embodiments of the invention, the spill 47 is provided with a loop 44 which is adapted to engage supporting bar 10′ of a suitable rotatable cage. The loop 44 may, if desired, be soldered to a bushing after the manner disclosed in connection with the spills 15 of Figs. 1 and 2, or it may bear directly upon the rod 10′ with suitable spacers 39 located between each of the spills, as shown. Figs. 4 and 5 show a type of spill which is not double ended but the extremity 49 of which is bent at an obtuse angle to the main portion thereof in order to provide a comparatively stiff outer end combined with a somewhat more resilient intermediate portion. The other end of the wire is merely bent outward at right angles to the plane of the body portion thereof as designated by numeral 46, the portion of the wire between the loop and the end 46 being secured to the opposite extension thereof by any suitable clamping means or securing means, such, for example, as soldering or welding or the like. Preferably, however, we provide a securing wire or clip, as designated by numeral 50, which encircles the abutting wire portions and holds them together and the loop portion 44 in proper position, the outstanding wire extremity 46 and the loop 44 preventing longitudinal movement of the fastener 50. If desired the clip 50 may also be soldered or welded in place.

A brush of the general character disclosed in this invention is adapted to be rotated in the direction designated by the curved arrow of Fig. 2 so that the angularly exposed extremities of the spill wires will project in the direction of rotation of the brush and thus be adapted to catch under the scales of the fish. The peculiar shaping of the pointed extremities 19 and the slight backward curvature of the spills, shown in Fig. 2, permits their catching under the scales and yet tends to prevent the pointed portions thereof catching in and tearing the flesh of the fish. The longer wire portions 20 which follow the pointed portions 21 are adapted to reinforce and aid the action of the latter, especially when the scales have been caught and tipped up slightly from their normal position wherein they lie close to the surface of the fish.

It is to be understood that rotation of the brush at an appropriate speed tends to make the end portions of the spills stand outward substantially in a radial direction as shown in Fig. 2. It will be further understood that centrifugal force of this nature tends only

yieldably to hold the spills outward in this manner and that the spills may therefore be bent backward in relation to their normal position upon engaging the fish. Such a function permits the ends of the spills automatically to conform to the shape of the surface of the fish which is being moved past the brush and thus permits action of the brush upon various curved surfaces of the fish. Spacing of the bars 10 at a suitable distance and spacing of the individual end portions of each of the spills tends to prevent one wire portion catching or tangling with other wire portions to provide a rigid or more nearly rigid wire projection upon the brush which might tend to have too harsh an action upon the fish and to tear the same. Transverse spacing of the spills is also advantageous for this purpose, the provision of bushings 16 being particularly desirable since it provides bearing surfaces of a considerable width between the spills and supporting bars 10, thus tending to prevent any substantial tipping of the spills in a transverse direction and consequent interlocking of the wires of adjoining spills. Obviously the type of spill disclosed in Figs. 4 and 5 is adapted to be used in a manner similar to that described with reference to the preferred embodiments of the invention, the outstanding angular extremities 49 being adapted to catch under the scales of the fish.

We claim:

1. A brush of the class described, comprising a rotatable cage, bars in said cage parallel to the axis thereof, and spills pivotally mounted on said bars.

2. A brush of the class described comprising a frame, pivot elements eccentrically mounted upon the frame, and spills pivotally mounted upon the pivot elements.

3. A brush of the class described comprising a central axle member, annular plates fixed to said member, detachably mounted bars substantially parallel to the axle, and spills pivotally mounted on said bars.

4. A brush of the class described comprising a frame rotatable about a central axis, eccentrically mounted bars substantially parallel to the axis of rotation of said frame, spills pivotally mounted on said bars, said spills including loop portions encircling said bars.

5. A brush of the class described comprising a rotatable frame, eccentrically mounted bars substantially parallel to the axis of rotation of said frame, spills pivotally mounted on said bars, and means for spacing the spills longitudinally of the bars.

6. A brush of the class described comprising a rotatable frame, removable bars substantially parallel to the axis of rotation of said frame, spills pivotally mounted on said bars, said spills including loop portions encircling said bars, and spacer elements to space the loop portions of the spills longitudinally of the bars.

7. A brush of the class described comprising a rotatable frame, eccentrically mounted bars substantially parallel to the axis of rotation of said frame, spills pivotally mounted on said bars, said spills comprising resilient metal elements and being secured to independent bearings which pivotally engage the bars.

8. A brush of the class described comprising a rotatable frame, eccentrically mounted bars substantially parallel to the axis of rotation of said frame, spills pivotally mounted on said bars, said spills comprising resilient metal elements, independent bushings pivotally mounted on the bars, the spills being secured to the bushings, said bushing being of a width to provide spacers for the spills.

9. A brush of the class described comprising end plates, a plurality of bars extending between said plates, bushings rotatably mounted on said bars and spills of resilient wire each having a looped portion secured about one of said bushings.

10. A brush of the class described, comprising end plates, a plurality of bars extending between said plates, bushings rotatably mounted on said bars, and spills of resilient wire secured to said bushings, said bushings having a width greater than the spills to maintain spaces between adjoining spills.

11. A brush of the class described comprising end plates, a plurality of bars extending between said plates, bushings rotatably mounted on said bars, and double-ended spills of resilient wire having an intermediate portion secured to said bushings.

12. A brush of the class described, comprising end plates, a plurality of bars extending between said plates, bushings rotatably mounted on said bars, and double-ended, metal spills having an intermediate portion secured to said bushings, said bushings having a width greater than the spills to maintain spaces between adjoining spills.

13. A brush of the class described comprising end plates, a plurality of bars extending between said plates, bushings rotatably mounted on said bars, and double-ended spills of resilient wire each having an intermediate portion looped about one of said bushings, one of the ends of each spill being substantially straight and the other having a hooked extremity.

14. A brush of the character designated, comprising end plates, bars connecting the plates, spills pivotally mounted on the bars, said spills being formed of wire bent to provide a substantially straight end portion, a hooked end portion, and an intermediate loop of wire encircling the bar upon which the spill is mounted.

15. A double-ended spill for a brush of the class described, comprising a piece of wire

bent to have one end form a substantially straight spill portion, an intermediate portion bent to form a substantially circular loop, and a second spill portion with an extremity bent at an angle to the remainder of the spill portion.

16. A double-ended spill for a brush of the class described, comprising a piece of wire bent to have one end form a substantially straight spill portion, an intermediate portion bent to form a substantially circular loop, and a second spill portion with an extremity bent angularly to the remainder of the spill portion, said extremity being bent away from the other spill portion.

17. A double-ended spill for a brush of the class described comprising a piece of wire bent to have one end form a substantially straight spill portion, an intermediate portion bent to form a substantially circular loop, and a second spill portion substantially parallel to the first portion but having an extremity bent in relation to the remainder thereof, the end of said extremity being inclined to provide a comparatively sharp point at the end of the second spill portion.

18. A double-ended spill for a brush of the class described, comprising a piece of wire bent to have its ends form outstanding spill portions, and an intermediate portion bent to provide a plurality of aligned convolutions to form a support for the spill.

Signed by us at Boston, Massachusetts, this 16th day of February, 1927.

RAYMOND C. MUDGE.
ERNEST A. GALLISON.