March 22, 1949. F. E. HOLLIS 2,465,231

ROTARY BRUSH HOLDER

Filed Oct. 26, 1945

Fig. 1

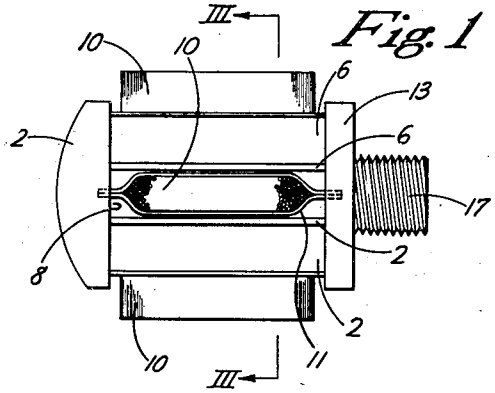


Fig. 2

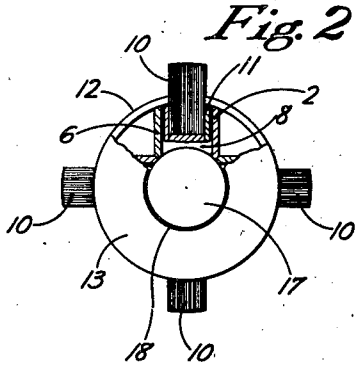


Fig. 3

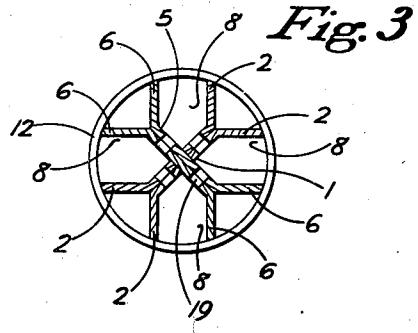


Fig. 4

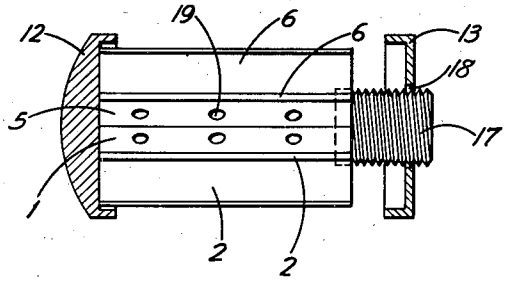
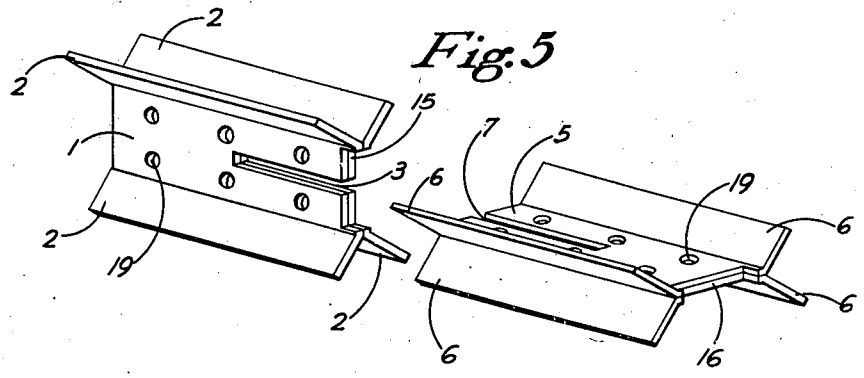


Fig. 5



WITNESSES:
V. A. Peckham
E. O. Johns

INVENTOR
Frank E. Hollis

BY
Brown, Critchlow & Flick
his ATTORNEYS.

Patented Mar. 22, 1949

2,465,231

UNITED STATES PATENT OFFICE

2,465,231

ROTARY BRUSH HOLDER

Frank E. Hollis, Irwin, Pa., assignor to Elliott Company, Jeannette, Pa., a corporation of Pennsylvania

Application October 26, 1945, Serial No. 624,696

6 Claims. (Cl. 15—179)

1

This invention relates to brush holders, and more particularly to cylindrical holders in which radially disposed brushes are removably mounted for cleaning the inside of tubes when the holders are rotated.

In the cleaning of deposits from the insides of tubes in boilers, stills, and the like, it is common practice to pass a rotating brush unit through the tube. The brush unit generally consists of a cylindrical holder from the periphery of which a plurality of circumferentially spaced brushes project radially. The holder is driven by a motor connected to one end of it. As the brushes have relatively short lives, the holder is made in such a way that worn brushes can be removed and new brushes substituted for them.

It is among the objects of this invention to provide a holder for tube-cleaning brushes and the like which is of simple and inexpensive construction, which is quickly and easily assembled, and which is strong and durable.

In accordance with this invention four plates have their flat central areas placed together face to face in pairs. The plates of each pair also have out-turned flat side portions, and their central areas are provided with an axial slot extending inwardly from one end. The two pairs of plates are joined together by first turning one pair at right angles to the other with their slots in alignment and with the open ends of the slots adjacent each other. The two sets of plates then are moved toward each to cause the slots to register and to interlock the two sets along their central axes. Each pair of adjacent out-turned plate portions diverge at approximately a 90° angle to provide between adjacent pairs of diverging portions brush-receiving slots having substantial parallel side walls. Brush-retaining means rigidly mounted on one end of the plates overlies the adjacent ends of the slots, while similar means is removably mounted on the opposite end of the plates where it normally overlies that end of the slots. Means is connected to one end of the plates for connecting them to a driving member. Preferably, this connecting means is a threaded stud secured to the end of the plates adjacent the removable brush-retaining means.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a side view of my holder with the brushes in place; Fig. 2 is an end view of the assembly partly broken away to show one of the brushes in section; Fig. 3 is a transverse section of the holder alone taken on the line III—III of Fig. 1; Fig. 4 is a side view of the holder with

2

the brush-retaining end members shown in section; and Fig. 5 is an isometric view of the two pairs of slot-forming plates about to be interlocked.

Referring to Fig. 5 of the drawings, a pair of rectangular metal plates are disposed face to face in engagement with each other throughout their flat central areas 1. At opposite sides of their central areas the plates are provided with out-turned flat side portions or wings 2. Each pair of adjacent out-turned wings diverge at approximately a 90° angle (Fig. 2). The engaging central areas of the plates are provided with an axial slot 3 extending inwardly from one end to the center of the plates. Another pair of plates substantially the same as those just described is also provided. This pair has central areas 5, wings 6 and axial slot 7. To connect the two pairs of plates together they are held in axial alignment with their slotted ends adjacent each other and with one pair of plates disposed at right angles to the other. The two pairs then are moved axially together to cause each slot to enter the slot in the other pair of plates and then to slip over the central areas of the latter plates. As the slots extend to the centers of the plates, the two pairs of plates can be moved toward each other until the length of the assembled group of plates is the same as the length of a single plate, as shown in Fig. 4.

When the four plates are assembled in this manner, slots 8 (Fig. 3) having substantially parallel side walls are formed between adjacent pairs of the diverging wings 2 and 6. These slots are provided for the purpose of receiving and retaining removable brushes that project therefrom. As shown in Figs. 1 and 2, each brush preferably consists of a compact bundle of metal bristles 10 the inner ends of which are welded in a surrounding clamp 11 that has projecting ends of reduced thickness at the opposite ends of the brush. The clamp is loosely mounted in one of the slots 8 in the brush holder.

To hold the brushes in the slots, retaining caps are mounted on the opposite ends of the plates. Thus, a cap 12 having a short annular flange is telescoped over one end of the plates so that the flange encircles the plates and overlies the adjacent ends of the radial slots and the projecting ends of the brush clamps therein. At the opposite end of the holder there is a similar cap which is removable so that worn brushes can be removed from the holder and new ones put in their place. This cap or cup 13 is provided with an annular flange that also encircles the plates and

overlies the ends of the radial slots and the ends of the brush clamps therein.

In order to drive the brush holder, the plate ends adjoining cup 13 have their central areas 1 and 5 cut back to form notches 15 and 16 (Fig. 5) for snugly receiving the inner end of a threaded stud 17 that projects axially away from the plates. The cup is provided with a large central opening 18 so that it can slip over the stud and can be held in place by the flexible drive shaft (not shown) to which the stud is connected in use. When the cup is backed away from the brushes or removed from the stud, as shown in Fig. 4, the brushes can be pulled out of the holder slots.

In making this brush holder its various components, with the exception of the removable cup 13, are assembled into a self-supporting unit by means of the tight or press fits that they have with one another. The crossed plates serve as a support for cap 12 and the threaded stud. At the time of assembly copper brazing material is applied to some of the elements. The holder, minus the removable cup, then is placed in a furnace where its temperature is raised to the point where the copper brazing material melts and diffuses throughout the holder to permanently unite all of those parts. This brazing takes place even though the parts of the holder are press fitted together. The unit then is removed from the furnace and quenched to heat treat it. By initially assembling the elements of the holder by press fits, there is no necessity for providing additional clamping means to hold them together until they are brazed. Combining the heat treating and brazing operations reduces the cost of making this holder still further.

The central areas of the plates preferably are provided with a plurality of holes 19 through which dirt can pass from one slot to another to help keep it from being packed in the inner ends of the slots. Also, dirt can shake around inside the holder and escape therefrom through the spaces beside the reduced ends of the brush clamps, as shown in Fig. 1.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having flat central areas disposed face to face and also having out-turned flat side portions, each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side walls, and means for retaining brushes in said slots.

2. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having flat central areas disposed face to face and also having out-turned flat side portions,

each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side walls, brush-retaining means mounted on and secured to one end of said plates and overlying the adjacent ends of said slots, brush-retaining means removably mounted on the opposite end of the plates and normally overlying the adjacent ends of said slots, and means connected to one end of the plates for connecting them to a driving member.

3. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having flat central areas disposed face to face and also having out-turned flat side portions, each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side walls, an end member secured to one end of the plates and having a flange encircling the adjacent ends of said slots, a coupling member secured to the opposite end of the plates for connecting them to a driving member, and a cup loosely mounted on said coupling member and normally overlying the adjacent ends of said slots.

4. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having flat central areas disposed face to face and also having out-turned flat side portions, each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side walls, brush-retaining means mounted on one end of said plates and overlying the adjacent ends of said slots, brush-retaining means removably mounted on the opposite end of the plates and normally overlying the adjacent ends of said slots, said plates being provided at one end with notches, and a threaded drive stud inserted in said notches and secured to the adjoining plates, said stud projecting axially from the plates.

5. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having perforated flat central areas disposed face to face and also having out-turned flat side portions, each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side

walls, and means for retaining brushes in said slots.

6. A rotary brush holder comprising two pairs of plates intersecting each other at right angles along their central axes, the plates of each pair having flat central areas disposed face to face and also having out-turned flat side portions, each pair of said central areas being provided with an axial slot extending inwardly from a different end with the central areas of the other pair of plates extending through the slot to interlock the two pairs of plates, and each pair of adjacent out-turned portions diverging at approximately a 90° angle to provide between adjacent pairs of said diverging portions brush-receiving slots having substantially parallel side walls, an end member secured to one end of the plates and having a flange encircling the adjacent ends of said slots, the opposite end of said plates being provided with notches, a threaded drive stud mounted in said notches and projecting axially from the plates, and a cup loosely mounted on the stud and normally overlying the adjacent ends of said slots.

FRANK E. HOLLIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
280,008	Bioren	June 26, 1883
282,782	Sahlstrom	Aug. 7, 1883
1,849,083	Grimes	Mar. 15, 1932
2,324,461	Anderson et al.	July 13, 1943