

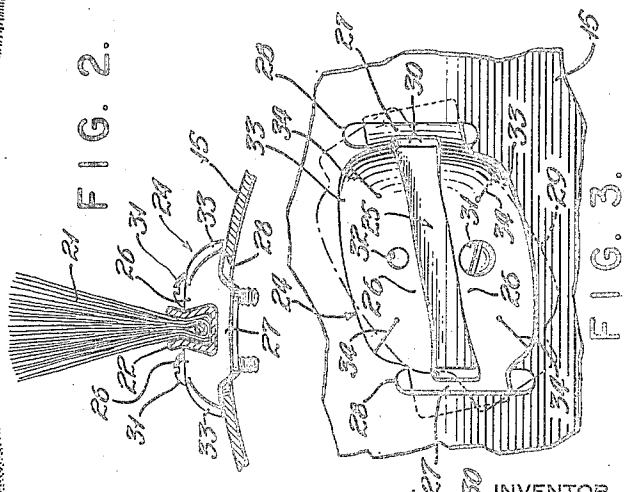
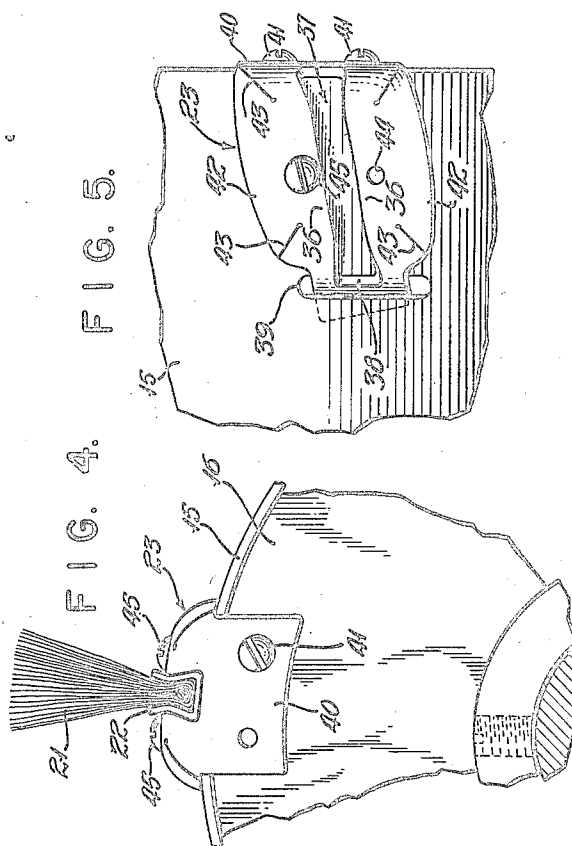
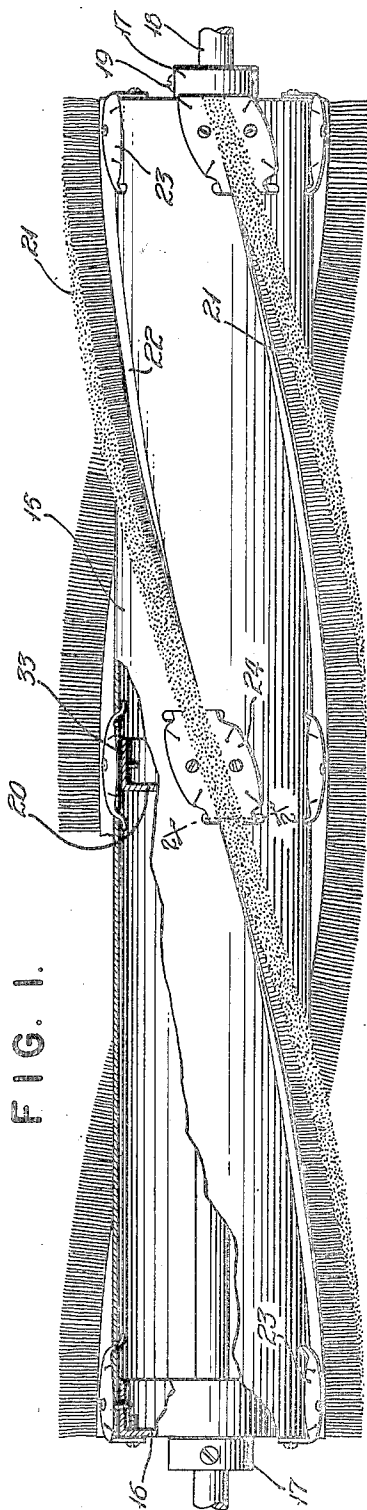
Sept. 15, 1953

W. A. LOMBARDI
BRUSH

2,651,799

Filed Aug. 1, 1947

2 Sheets-Sheet 1



BY

INVENTOR.
WILLIAM A. LOMBARDI
Mitchell Becht
ATTORNEYS.

Sept. 15, 1953

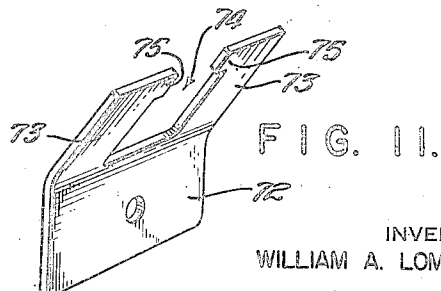
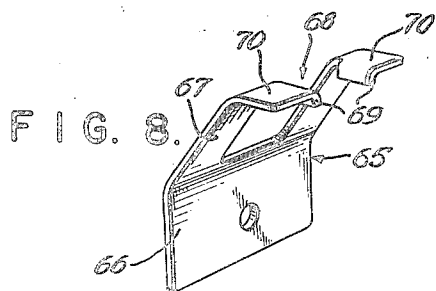
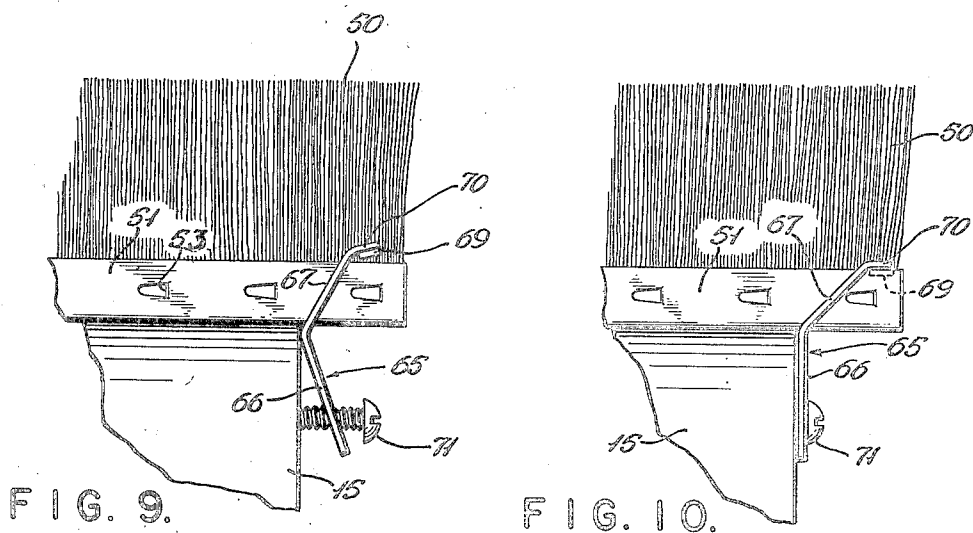
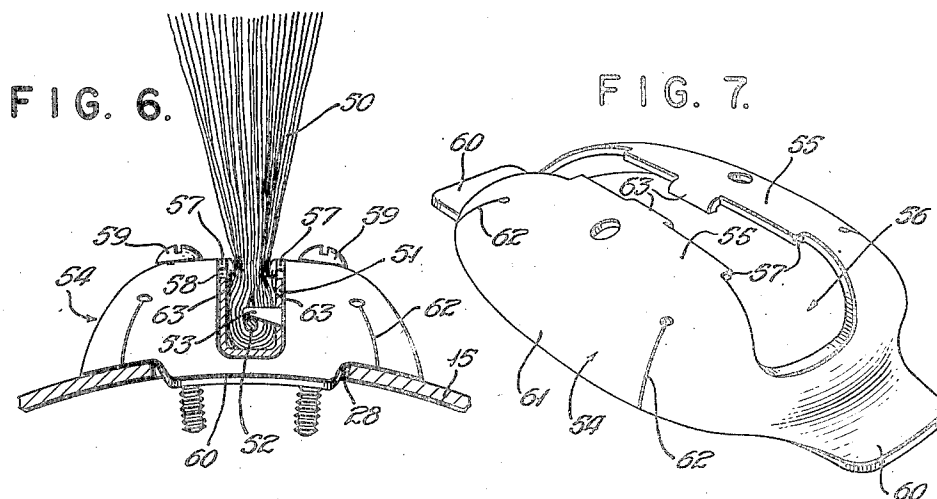
W. A. LOMBARDI

2,651,799

BRUSH

Filed Aug. 1, 1947

2 Sheets-Sheet 2



INVENTOR.
WILLIAM A. LOMBARDI

BY

Matthew Beecher
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,651,799

BRUSH

William A. Lombardi, Derby, Conn.

Application August 1, 1947, Serial No. 765,506

23 Claims. (Cl. 15—183)

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My invention relates to brushes, and in particular to supporting means for brushes composed of one or more strip-type brush elements.

It is an object of my invention to provide an improved device of the character indicated.

It is another object to provide an improved, adjustable, supporting and clamping means for more readily assembling a brush of the character indicated.

It is a further object to provide a supporting and clamping means for supporting a brush strip on a frame having a relatively smooth exposed surface, said brush being secured in substantially continuous supporting contact with said surface, in such a manner as to present substantially no sharp edges or pockets for the accumulation of foreign matter, such as lint or dust.

It is a general object to provide a simpler and less costly brush-supporting structure having features which inherently make for low-cost assembly in combination with brush elements, and for low-cost maintenance of assembled brushes.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings:

Fig. 1 is a partly sectionalized view in elevation, illustrating a brush assembly in accordance with the invention;

Fig. 2 is an enlarged fragmentary sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary plan view of cooperating elements in the middle of the assembly of Fig. 1;

Fig. 4 is an enlarged fragmentary side view of cooperating elements at an end of the assembly of Fig. 1;

Fig. 5 is a plan view of elements shown in Fig. 4;

Fig. 6 is a fragmentary end view of a modified structure serving the purpose of the arrangement of Fig. 2, but for a different type of brush;

Fig. 7 is a perspective view of an element of Fig. 6;

Fig. 8 is a perspective view of a further modification of the invention;

Fig. 9 is a fragmentary view of an assembly incorporating the device of Fig. 8, with parts shown in a first relationship;

Fig. 10 is a view similar to Fig. 9, but with parts shown in a second relationship; and

Fig. 11 is a perspective view, illustrating a modification of the parts shown in Fig. 8.

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Briefly stated, my invention contemplates novel means for assembling a strip-type brush element or a plurality thereof on a supporting structure. The supporting structure may be flat or, as in the forms to be described, a drum of wood, metal or other material. The brush strip may be secured to such drum by a clip having a longitudinally extending slot embraceably to receive the binding for the brush strip, with the bottoms of the slot preferably flush with the surface of the supporting frame. The securing means for securing the clip to the frame performs the additional function of clamping the walls of the slot against the brush binding so as rigidly to support the brush. Several forms of clips are described for supporting brush strips at their ends and at intermediate portions thereof. Modified clips are also described for supporting different types of brush strip.

Referring to Figs. 1 through 5 of the drawings, my invention is shown in application to a drum-type brush assembly of a type which may be particularly useful in brushing lint and other foreign matter from carding brushes or combs, as used in textile mills. The drum shown is formed with a sheet-metal tube 15 supported at the ends by cupped members 16 having central bosses 17 to be secured to a shaft 18, as by set screws 19. The cupped or flanged members 16 may be secured to the drum or shell 15 as described, but I prefer spot brazing or welding. As the brush assembly is relatively long, it may be desirable to employ a further centrally located flanged or cupped member 20, which may ride upon the shaft 18. A plurality of strip-type brush elements 21 may be spiraled as shown and spaced in equal angular increments about the surface of the drum 15.

In accordance with the invention, novel securing means are provided for holding the brush elements 21 erect and in a desired spaced relationship. Such holding means preferably comprises clips having generally arched portions with a generally longitudinally extending slot in each said arched portion. The longitudinally extending slot is preferably so formed as to embrace the binder 22 of the brush strips 21. For the relatively long brush assembly shown in Fig. 1, I prefer to employ three brush-securing clips along the length of each brush strip 21. Thus, there may be two end clips 23 and one intermediate clip 24 for a particular brush strip.

Figs. 2 and 3 illustrate in some detail a preferred form of the central brush clip 24. The clip 24 will be seen to comprise a centrally arched portion having a longitudinally extending slot

25 therein. Slot 25 is thus defined by two opposed arched portions 26 of the clip. As indicated above, the cross-section or longitudinal projection of the slot 25 is preferably such as to conform with the cross-section of the brush binder 22, which in the form shown is widest at the base, i. e. generally triangular, and characterized by converging sides. The oppositely positioned arched members 26 thus project toward each other effectively to narrow the opening of the slot 25. Preferably, the cross-section of slot 25 is slightly larger than the cross-section of the brush binding 22, so that the binding 22 may be relatively easily inserted endwise into the slot 25. The longitudinal ends of the arched portions 26 are preferably both joined by anchoring portions 27 which may be set in recesses or openings 28 formed in the supporting drum 15. In the form shown, the openings 28 are slots to permit the slidable entry of the anchoring projections or lugs 27, as by twisting the clip 24 from the dot-dash outlined position 29 to the solid-line position shown in Fig. 3. Since the bottom edges 30 defining the slot 25 conform to the brush strip 22 and thus represent the bottom edge thereof, I prefer that when clip 24 is positioned in slots 28, the bottom edges 20 do not project above the surface of drum 15.

In order to secure the clip 24 to the drum 15, screw means may be employed effectively to compress the arched portions 26. In the form shown, a separate screw 31 is driven through each arched element 26, as through the hole 32, and the screws 31 are threaded to the shell or drum 15. In the assembly shown in Fig. 1, it will be appreciated that a proper positioning of the central supporting flanged member 20 may provide additional thickness of metal, as at the flange 33, for a very secure threading engagement of the screws 31. Upon tightening the screws 31 the projecting parts of the arched members 26 will be appreciated as tightly embracing the sides of the brush binder 22 and at the same time as clamping the bottom of the brush binder 22 securely against the surface of the drum 15.

In a preferred form, in order to prevent accumulation of lint, as in pockets under the arched portions 26, I prefer to provide integral with the arched portion 26 a skirt 33 flaring downwardly so as to hug the contour of the drum. If desired, in order to enhance the compressible resiliency of the clip 24, a number of relatively thin slits 34 may be cut into the skirt 33, and it will be understood that even when compressed in order to secure the brush 21, these slits 34 need not open so appreciably as to form pockets for the accumulation of lint or the like.

In Figs. 4 and 5, I illustrate an end clip 23 for securing an end of a brush strip 21. Again, the clip 23 may be said to comprise centrally arched portions 36 defining a longitudinally extending slot 37 embraceably to receive the brush binding 22. The anchoring means 38 at one end of the clip 23 is formed similar to the anchor lugs 27 of clip 24, that is, the lug 38 may be bent for insertion into the slot 39 in the shell or drum 15. At the other end, the clip 23 includes a downwardly depending wall or bracket 40 to be secured as by screws 41 threaded into the end cup or flange member 16. In other respects the clip 23 may resemble the clip 24, as by provision of a skirt 42 on each arched portion 36, of slits 43 in skirts 42, and of openings such as the opening 44 in the arched portions for accommoda-

tion of clamping screws 45. It will be appreciated that the clamping effected by a take-up of screws 45 may provide a secure mount for the end of brush strips 21, with the bottom of the brush binder 22 engaging the surface of the supporting drum or frame 15 for substantially the full length of brush 21.

In practice, it is convenient in assembling a brush construction of the kind shown in Fig. 1 if all clamps 23-24 are first merely lightly mounted upon the drum 15, that is, with the securing screws 31-41-45 only partially threaded into the supporting framework. It will then be found relatively simple to insert a brush strip 22 first through the slot 37 of an end clip 23, then through the slot 25 of an intermediate clip 24, and finally through the slot 37 of the end clip 23 at the opposite end. With the binder 22 lightly held in all slots, it is but a simple matter to tighten the end screws 41 and then to anchor the binding, as by take-up of screws 31-45. When screws 31-45 have been fully tightened, it will be understood not only that the brush strip is secured flush with the surface of drum 15 for substantially its entire length, but that there are no exposed pockets, sharp edges, or the like to serve for the accumulation of lint or other foreign matter.

In the remaining figures, I show how the principles of my invention may be applied for the equally effective securing and mounting of another type of strip brush 50. Brush 50 in the form shown is secured together by a binder 51 of generally U-shaped cross-section, and the core 52 is held in place by cam-like wedges or lugs 53 stamped out and bent in from the sides of the binder strip 51.

In Figs. 6 and 7, I show a clip 54 generally similar to the clip 24 of the first-described arrangement, but modified for appropriate support of the brush strip 50. The clip 54 may thus comprise two generally arched portions 55 defining a longitudinally extending slot 56 conforming generally, and preferably with slight clearance, with the cross-section of the brush-binder 51. In order to embrace the binder 51, the arched portions 55 preferably include projections 57 projecting toward each other at the mouth of slot 56, effectively to narrow the mouth of slot 56 and thus to overstand parts of the binder 51. In Fig. 6, the projections 57 are shown clearing the upper edges of binder 51, as at 58, prior to final take-up of the securing screws 59. It will be appreciated that upon take-up of the securing screws 59, the projections 57 may abut the upper edges of the strip 51 so as firmly to seat the brush strip 50 within the slot 56. As in the case of the clip 24, anchoring lugs 60 may be formed at opposite ends of the clip 54 to engage slots 28 in the drum 15. Dust-deflecting skirts 61 may also be slitted, as at 62, to provide a more resilient clip 54.

It will be noted that in the preferred form shown, the projections 57 which overstand edges of the brush binder 51 extend a substantial fraction of the total longitudinal length of slot 56, thus providing extended and substantial securing forces for holding the brush 50 in place. If desired, for a still better anchoring, further projections 63 may be formed on the projections 57, and the projections 63 preferably are directed downwardly, that is, toward the bottom of the slot 56. The projections 63 may clear the upper edges of the binder 51 when the binder 51 is inserted in slot 56, but when the screws 59 are

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taken up the projection 63 preferably overhangs parts of walls of the binder 51, as will be clear.

It will be understood that a brush strip having a binder such as the binder 51 may be secured at its end with an end clip generally similar to the end clip 23 but appropriately modified as exemplified in Figs. 6 and 7 to embrace the particular binder 51. In some cases, however, it may be desirable for the brush 50 to overhang some of the support drum 15 and for the end support to be effective as near to the end as possible. In Figs. 8, 9, 10, I show a clip 65 which may suitably provide such end support for the case of brush 50 projecting beyond the end of drum 15. In the form shown, the clip 65 is a simple bracket having a first face 66 to be secured to the flanged or other plate 16 at the end of drum 15, and a second side 67 having a slotted opening 68, conforming preferably with slight clearance to the cross-section of the binder 61. Side 67 may thus comprise a pair of projections, and the plane of these projections may be at an obtuse angle with the plane of the sides 66. The projections 67 may be formed with still further projections 69 serving, like the projections 62 of Figs. 6 and 7, effective to narrow the mouth of slot and to project generally downwardly in order firmly to lock the upper edges of the binder 51. In the form shown, the projections 69 are supported by lugs 70 formed with the projections 67 and substantially at right angles with the plane of the side 66.

In assembling a brush 50 and clip 65, the clip 65 may be loosely held on drum 15, as by only partly threading the securing screw 71 in the manner shown in Fig. 9. The clip 65 then rests at an elevated angle with the projections 69 out of engagement with the upper edges of binder 51. Alternatively, the binder may first be supported on the drum 15 and the clips 65 placed over the projecting ends of brush 50 so to assure the relative positioning shown in Fig. 9. A take-up of securing screw 71 will be understood to drive the lower side 66 flush against the end plate 16 and at the same time to force the projection 69 into locking engagement with the upper edges of binder 51, as will be clear from Fig. 10. I prefer that the angle between sides 66—67 of clip 65 be less when the clip is formed, than is its intended angle when tightly secured in place in the manner shown in Fig. 10. It will be appreciated that with such angularity a secure clip 65 may be resiliently stressed in a direction to compress the binder 51 firmly on the outer surface of the drum 15.

In Fig. 11, I show a simplified version of the clip of Fig. 8. The clip of Fig. 11 may comprise essentially two sides 72—73 with a slotted opening 74 on one of the sides. The sides 72—73 are again preferably at an obtuse angle, but the upper edges of the side 73 are formed with projections 75 converging toward each other at the mouth of slot 74 in order effectively to narrow the mouth of slot 74 and thus to provide a ledge for engagement with the binder 51. It will be appreciated with a suitable selection of angles, a brush 50 may be held with substantially equal effectiveness by either of the clips in Figs. 8 and 11.

It will be seen that I have provided a relatively simple brush assembly relying upon sturdy and very easily fabricated securing elements. In all forms, a simple relaxing of a few screws will relax all clips to permit slidable removal of a brush strip, as for replacement. All structures

may be very readily fabricated and yet provide protected and aligning support for holding a brush strip fully erect and, if desired, flush with a drum support for substantially the entire length of the brush strip.

While I have described my invention in detail for the preferred forms shown, it will be seen that modifications may be made within the scope of the invention as defined in the appended claims.

I claim:

1. In a device of the character indicated, a frame having a relatively continuous smooth outer surface, a brush strip having a binding to be secured on said surface, clip means including a unitary structure with jaws embracing opposite sides of said binding, and securing means for securing said clip means to said frame, said securing means being oriented to permit effectively drawing one of said jaws toward said surface so that said jaws may effectively squeeze said binding against said surface.

2. A device according to claim 1, in which said securing means includes a screw engaging a part of said clip means to urge one of said jaws toward said frame, whereby upon take-up of said screw said one jaw may be urged into tight securing abutment with said binding.

3. In a device of the character indicated, a frame having a part defining a brush-strip base, a brush strip having a binding to be secured to said frame and against said base, and a clip secured to said frame and having an opening embraceably to receive and engage opposite sides of said binding, the effective span of said opening in relation to its spacing from said base being less than the corresponding portion of the cross-section of said binder, whereby said clip will be in stressed engagement with said binder in holding the same against said base.

4. In a device of the character indicated, a drum, a brush including a binding to be secured to said drum, and a clip extending longitudinally of said binding and having a longitudinally extending slotted opening longitudinally and embraceably to receive said binding, said clip including means for securing the same to said drum.

5. As an article of manufacture, a clip for securing a brush binding of the character indicated, said clip including anchoring members at opposite ends, and an arched portion between said ends, said arched portion having a longitudinally extending slot embraceably to receive said binding.

6. A device according to claim 5, in which the bottom of said slot is wider than the top thereof.

7. A device according to claim 5, in which there is an opening in said arched portion and adjacent said slot, whereby a securing screw passing through said opening and entering a frame member may compress said arched portion and secure a brush element in said slot.

8. As an article of manufacture, a clip for a brush binding of the character indicated, said clip including at one end a portion to be anchored to a frame, and an arched portion extending longitudinally away from said anchoring portion, said arched portion having a longitudinally extending slot embraceably to receive a brush binding, said arched portion also including a downwardly extending skirt on said arched portion, said skirt defining with the bottoms of said slot a substantially continuous surface to fit the outer surface of the drum or other frame

member on which said clip is to be mounted.

9. An article according to claim 8, in which said arched portion has openings on opposite sides of said slot to receive securing screws.

10. An article according to claim 8, in which relieving slits are provided in said skirt to enhance the resiliency of said arched portion without impairing the effectiveness of said skirt to prevent the collection of foreign matter under said skirt.

11. As an article of manufacture, a brush clip including an arched central portion having a longitudinally extending slot, the longitudinal projection of said slot conforming more or less to the cross-section of a brush binding to be embraced therein, the mouth of said slot in said projection being more narrow than the width of said slot at a location inwardly of the mouth, and securing means near said arched central portion.

12. An article according to claim 11, in which said projection of said slot is characterized by opposite walls converging toward the opening of said slot.

13. An article according to claim 11, in which in said projection the upper part of said arched portion includes a projecting element projecting in a direction effectively to narrow the opening of said slot.

14. An article according to claim 11, in which opposite edges of said slots at the upper portion thereof include elements projecting toward each other effectively to narrow the opening of said slot, and in which said projecting elements include further depending members projecting toward the bottom of said slot for interlocking engagement with a brush binder of the character indicated.

15. As an article of manufacture, a clip for a brush binder, said clip comprising a bracket having a first side and a second side at an obtuse angle with respect to each other, one of said sides having a slot with substantially parallel opposed walls to receive a brush binder, said one side including portions at the mouth of said slot projecting toward each other effectively to narrow said slot at the mouth.

16. As an article of manufacture, a brush clip comprising a bracket having two sides at an obtuse angle with respect to each other, one of said sides having a slotted opening to receive a brush binder, extensions on said one side from the walls of said slot and more or less at a right angle with the plane of the other of said sides, said extensions including portions extending toward each other effectively to narrow the mouth of said slot, said portions including a downwardly depending locking projection.

17. In an assembly of the character indicated, a frame on which a bound brush strip is to be mounted, a clip including an arched portion with a longitudinally extending slot embraceably to receive the binder of said brush strip, and an anchoring portion at an end of said clip and joining the sides of said slot.

18. An assembly according to claim 17, in which said frame includes a sheet metal outer member

upon which said brush strip is to be mounted, said sheet metal member having a slot to receive the anchoring portion of said strip.

19. As an article of manufacture, a clip for securing the binder of a brush strip, said clip including an arched portion having a longitudinally extending slot embraceably to receive a brush binder, and an anchoring portion at one end of said clip, said anchoring portion being defined by a downwardly depending wall more or less at a right angle with the longitudinal axis of the brush to be secured in said slot, and means for securing said wall to a frame.

20. In an assembly of the character indicated, a frame having a relatively smooth outer surface, a brush strip having a binder, and clip means for securing said brush strip to said frame, said clip means including an arched portion having a longitudinally extending slot embraceably to receive said binder, said clip means including portions spanning the ends of said slot, said frame having recesses to receive said end portions, whereby the bottom of said slot may be substantially flush with said relatively smooth surface, and securing means for securing said clip means to said frame, whereby the binder of said brush strip may be secured to said frame in substantially continuous supporting abutment with the relatively smooth surface thereof.

21. In a generally cylindrical brush assembly of the character indicated, a plurality of generally circular discs in spaced-apart relation, brush-strip receiving means supported by said discs and having angularly spaced generally outwardly opening slots therein, brush strips having elongated binders for bristles, each said brush strip extending through a plurality of said slots, retaining means including portions engaging the radially outer limits of said binders and radially inwardly stressed so as to hold said binders radially inwardly and located in said slot openings.

22. A brush assembly according to claim 21, in which said means embracing the outer limits of said binders comprises clips with means for driving the same radially inwardly toward said discs.

23. In a brush assembly of the character indicated, an elongated relatively continuous generally cylindrical supporting structure, longitudinally spaced brush-receiving means on said structure and having angularly spaced generally outwardly opening slots, corresponding slots being in general alignment with each other, brush strips having elongated binders for bristles and extending through said aligned slots, and retaining means including portions engaging the radially outer limits of said binders and radially inwardly stressed so as to hold said binders radially inwardly and located in said slot openings.

WILLIAM A. LOMBARDI.

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