April 19, 1966 W. B. SORRELLS 3,246,356

WOVEN LOOP MOP

Filed July 8, 1963

2 Sheets-Sheet 1

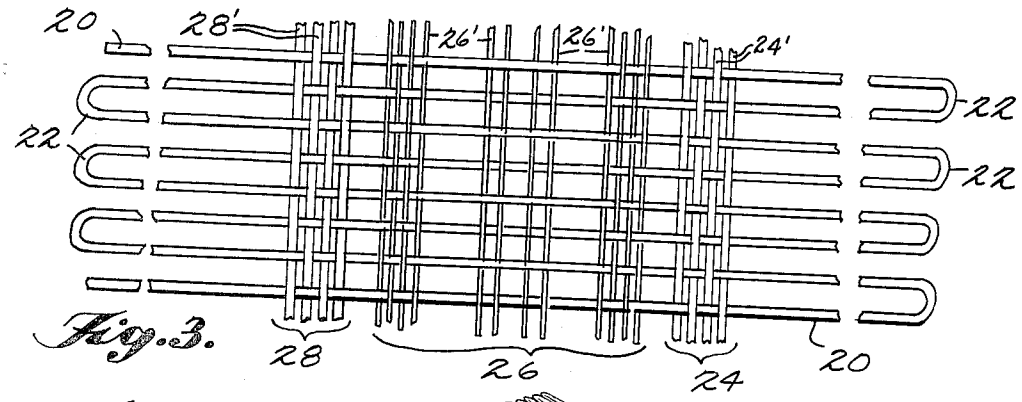


Fig. 3.

Fig. 2.

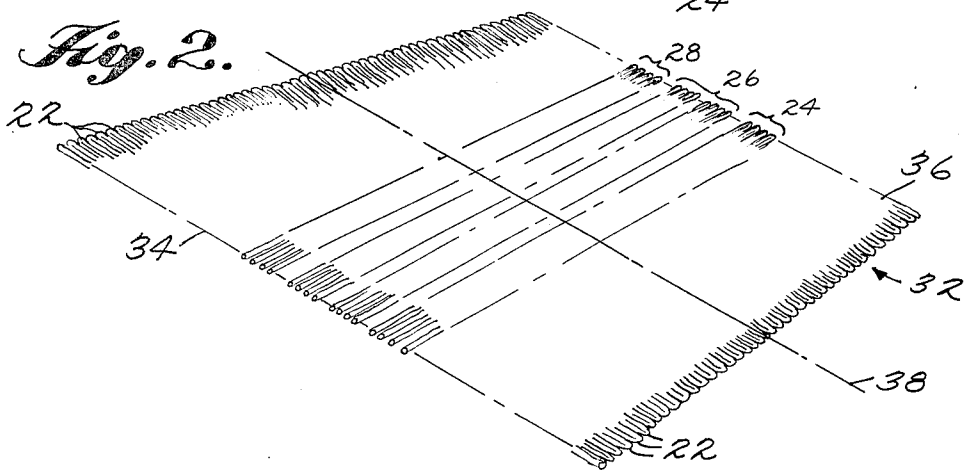
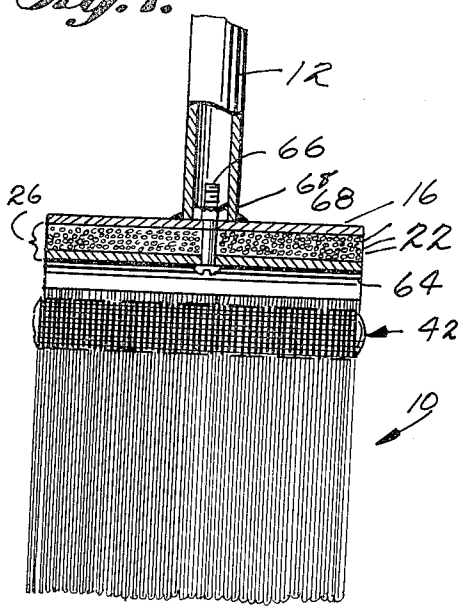


Fig. 7.



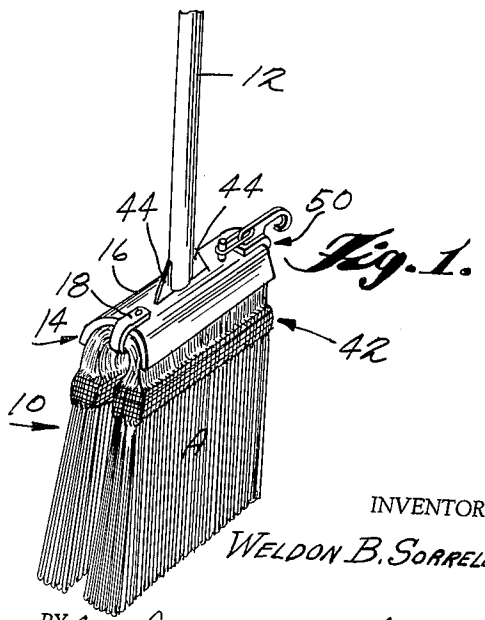


Fig. 1.

INVENTOR

WELDON B. SORRELLS

BY Cushman, Darby & Cushman

ATTORNEYS

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Fig. 4.

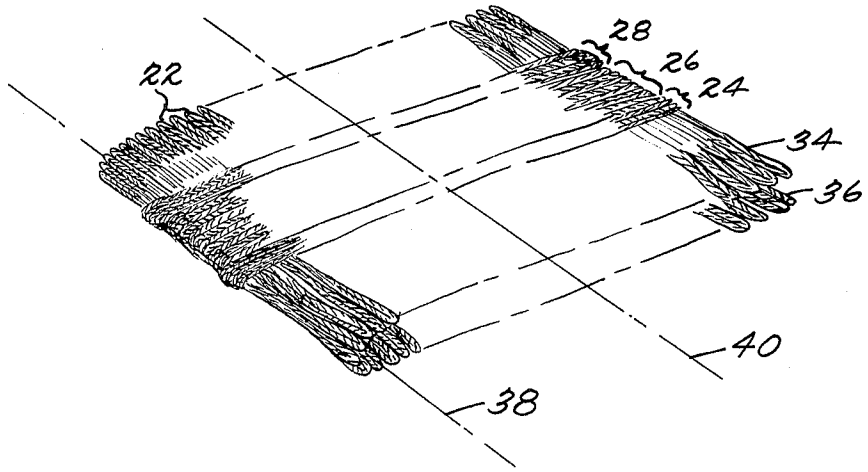


Fig. 5.

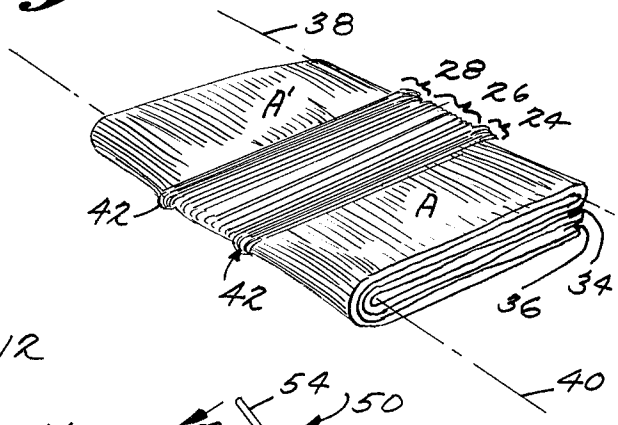
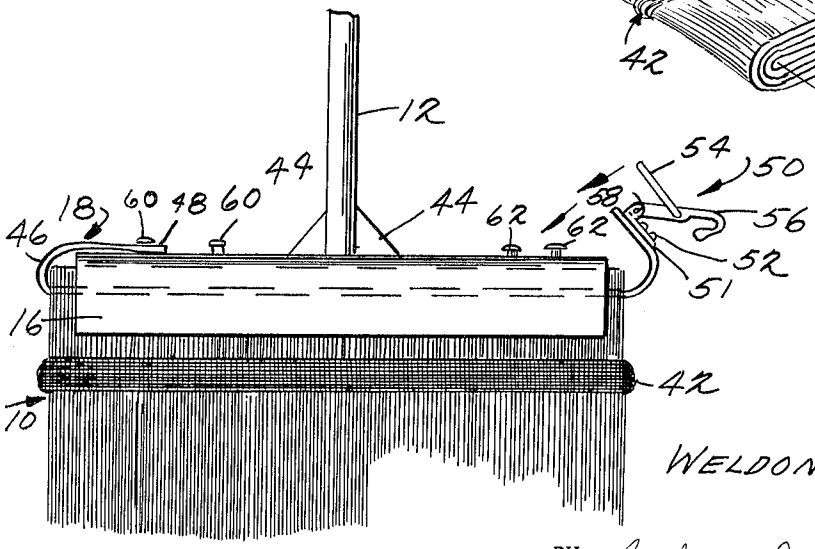


Fig. 6.



INVENTOR
WELDON B. SORRELLS

BY Cushman, Darby & Cushman
ATTORNEYS

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WOVEN LOOP MOP

Weldon B. Sorrells, 511 N. Monroe St., Arlington, Va.

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8 Claims. (Cl. 15—118)

This invention relates to mops of the kind used to wet-mop floors and in particular to improved mop heads having long life and to improved mop assemblies employing such mop heads detachably connected to a handle.

Conventionally detachable mop heads are constructed by disposing a large number of elongated filaments, strings or fibers in parallel, coextensive relationship and securing them together near their midpoints, the free end portions of the filaments forming the strands of the mop head. The usual method of securing the filaments together is to stitch across the filaments in a transverse direction near their midpoints or to stitch a separate layer of fabric, such as canvas, to the filaments in that area, in either case forming a saddle area by which the mop head may be secured to a handle in a variety of different ways. Alternatively, two bundles of filaments may be provided in spaced, end-to-end relationship and the opposed ends stitched or otherwise secured to a separate saddle piece.

It has been suggested at different times in the past that a mop head may be constructed by interweaving yarns with the filaments near their midpoints thereby forming a saddle portion which is integrally interwoven with the mop strands rather than stitched in place by a separate step. Such mops, however, have not been generally accepted or placed in wide use, probably as a result of their tendency to lose mop strings during prolonged use. As is known in the art, mops are subject to heaviest wear at, or just below the junction of the saddle portion with the strands with the result that the strands become worn at this point and become detached from the mop head when caught on furniture legs or the like during use.

The mop of the present invention embodies several advantageous constructions which avoid not only the lost strand problem but also several other disadvantages of conventional mops. In Patent No. 3,076,202 issued August 27, 1962, there is disclosed a compartmented mop sink in which mops, when not in use, are suspended so as to store the mop heads in a compartment of water or detergent solution. When conventional mops having cut strands are stored in this manner, the strands have a strong tendency to unravel. It is a further disadvantage of conventional mop heads that they cannot be spread apart for thorough cleaning, that is, conventional mop heads are usually secured together at their saddle portions in several layers so that even continuous rinsing and wringing does not remove dirt which has become lodged between the layers. Thus, the full advantage of mop cleanliness provided by the mop sink of the aforesaid patent cannot be realized with conventional mops. Accordingly, one of the features of the present invention is the provision of a mop which is not only an efficient cleaning instrument but which is also well adapted to be used with the mop sink of the aforesaid patent.

The mop head of the present invention has several constructional features, all of which contribute to prolonging the useful life of the head beyond that usually obtainable. In addition, the features provide additional advantages of simplicity, efficiency and ease of maintenance, the relative importance of which will depend on the use to which the mop is put.

Broadly, these advantages are obtained by forming the assembled mop head from a single layer of fibrous

materials embodying a particular configuration of different kinds of filamentary materials. The single layer is fabricated on a loom by weaving a long continuous bulky weft yarn with warp threads of lesser bulk to form a saddle portion, the weft yarn being doubled back on itself outwardly of each side of the warp threads after each pass through the warps so as to form two groups of elongated, parallel looped mop strands. These strands afford better water retention than cut mop strands and they cannot unravel even when the mop is stored in water for long periods of time.

The thus-formed single woven layer of material is then folded at least once and preferably more than once along a line, or lines, coextensive with one of the mop strands so as to form a plurality of layers which provide a suitable bulk of absorbent strands. The woven portions of the two exposed, opposite sides of the folded structure are then releasably clamped between the halves of a simple but effective connector assembly on the end of an elongated handle. When the assembled mop is held in an operative position the two groups of strands being downwardly in parallel relationship. Thus, the assembled mop head exposes two relatively small areas of the original woven sheet to maximum wear during use, but by refolding the sheet in different ways it is possible to spread the wear evenly. In addition, this construction permits the mop head to be washed in a completely unfolded state thereby assuring that it is completely clean.

Another of the important features of the invention is the provision of a tough, wear-resistant area between the mop strands and the portion of the saddle by which the mop head is secured to a handle. As pointed out above, it is this area which is scrubbed back and forth along the floor so that eventually the mop strands may be severed at this point. According to the present invention a tough, wear-resistant area is woven at this point so as to hold the mop strands in place and at the same time provide a scouring portion which strongly resists wear.

This construction is achieved by employing at least two different types of warp threads and/or types of weave in the saddle area. The center group of warps are of relatively light weight and/or are relatively widely spaced so as to form an area of relatively light construction which in the assembled mop will be engaged by the parts of a connector assembly. On each side of the center group of warps is a group of warps which are closely woven and/or woven of relatively heavy, tough fibers so as to form an area of relatively heavy construction. When the woven layer is folded along the line of one or more of the mop strands, the heavy area of each layer is superimposed on the others so as to form two spaced thickened portions in the folded structure. These two thickened portions are disposed just below the connector assembly in the assembled mop and will be pressed into contact with the floor when the mop is inclined from a vertical position.

Accordingly, it is a primary object of the present invention to provide a mop head having improved scouring action, longer life and freedom from inaccessible pockets which cannot be easily cleaned.

It is a further object to provide a mop head in which a saddle portion of high strength and good scouring action is formed by interweaving warp threads with a continuous strand-forming weft yarn, some of the warp threads being of strong tough material and/or closely spaced so as to form a relatively thick scouring portion in the assembled mop which tightly holds the strands in place and which receives maximum wear during use.

It is another object to provide a woven mop head in the form of a single layer of material which may be

folded in any of several different ways so as to provide a plurality of layers in the completed mop, each of the different ways exposing a different wearing surface on the completed mop.

It is still another object to provide a mop assembly having a simple and effective connector by which a woven, folded mop head may be detachably connected to a mop handle.

These and other objects and advantages will become apparent from the following detailed description taken with the drawings in which:

FIGURE 1 is a perspective view of a complete mop assembly;

FIGURE 2 is a perspective view of an unfolded woven sheet from which the mop head in FIGURE 1 may be formed;

FIGURE 3 is a fragmentary, schematic plan view, on an enlarged scale, of the sheet of FIGURE 2;

FIGURES 4 and 5 are perspective views illustrating the folding of the sheet of FIGURE 2 into a form which is usable as a mop head;

FIGURE 6 is a fragmentary view of the mop assembly of FIGURE 1; and

FIGURE 7 is a vertical sectional view of a modified mop assembly.

Referring to FIGURE 1 there is shown therein a strand mop assembly embodying the principles of the present invention which includes as major components a mop head **10**, an elongated handle **12** and a connector assembly **14** for detachably connecting the mop head **10** to the handle **12**. As already briefly described, the mop head **10** is formed of a single layer of fibrous material which, prior to assembly of the mop has been folded into a multi-layered structure. The midpoint of the folded structure is then clamped along opposite sides between the elements **16**, **18** of the connector assembly so that in the operative position of the mop the unclamped strand portions of the mop head **10** hang downwardly in parallel relationship.

As seen in FIGURES 2 and 3, the mop head **10** is constructed of a single bulky weft yarn **20** which is repeatedly doubled back on itself to form a plurality of elongated looped mop strands **22**. Intermediate the looped ends the weft yarn **20** is interwoven with three groups of warp threads to form three distinct areas **24**, **26**, **28** which together will constitute the saddle of the mop head. It will be understood without further explanation that this general construction may be readily produced in a continuous sheet on a conventional loom without employing any special techniques or auxiliary apparatus. The warps of the groups **24**, **26**, **28** will be controlled by a conventional harness arrangement to give any desired weave pattern, a **1—1** weave being illusrated for each group.

It will be understood that the fibrous layer of FIGURE 3 is shown schematically in a loosely woven condition to illustrate the relative positions of the filaments and is not intended to show the actual number, spacing and size of the filaments.

The warp threads **24'** and **28'** of the outer groups **24** and **26** are strong, tough filaments having high abrasion resistance. They may be, for example, polyamide fibers such as nylon, polyester fibers such as Dacron, acrylic fibers such as Acrilan or Orlon. Nylon, having outstanding strength and abrasion resistance is preferred. Also suitable, preferably in combination with one or more of the above-named fibers, are abrasive filaments such as those often employed in dish mops or other similar scouring tools. One such type of filament consists of strands of steel, copper or other metal either alone or combined with textile filaments by twisting the two together. Another type of known abrasive filament consists of a porous textile filament which has been impregnated with an abrasive mixture of, for example, latex and Carborundum.

The threads **24'** and **28'** are preferably woven close together so as to hold the weft yarn **20** tightly and to expose their own surface rather than the surface of the weft yarn. The diameter and weave pattern of the warps is of no particular significance, it being desired only that overlying layers of the folded sheet present a somewhat thickened portion.

The width of the warp groups **24**, **28** may vary, depending on the type of service expected of the mop. For most applications a width of about one inch has been found to provide the necessary scouring action and holding of the mop strands **22** in place. Greater widths may be used but they do not have any greater advantages because only a relatively narrow width will engage the floor upon inclination of the mop.

The threads **26'** of the inner group **26** of warps will form the portion of the mop head **10** which is clamped between the clamping elements **16**, **18** of the connector **14** and need not include abrasive filaments or be closely woven. As shown, the threads **26'** are more closely spaced near the outer boundaries of the loosely woven portion **26** but their spacing is not critical. The threads **26'** may be nylon or other strong material and preferably they should be of lesser diameter than the threads **24'**, **28'** so that the overlying portions **26** in the folded structure will be less bulky than the overlying portions **24**, **28**. As before, any convenient weave pattern may be employed.

Since a loom will produce a woven sheet in a continuous strip, any length may be cut therefrom for making the mop head **10**, depending on the desired size of the assembled mop head. In the particular construction illustrated in FIGURES 2, 4 and 5, the cut length **32** is folded into a four-layered structure about 8 inches in width and would therefore be about 32 inches between its cut ends **34**, **36** in the unfolded condition, that is, the unfolded sheet would measure about 32 inches along the warps. Obviously, however, greater or lesser lengths and a greater or lesser number of folds may be employed. When nylon or other thermoplastic material is used for all the warp threads **24'**, **26'** and **28'** the cut edges of the lengths may be heat-sealed against raveling as is known in the textile art.

The mop head **10** illustrated in the drawing, is formed by first folding the length **32** about a midline **38** parallel to the mop strands **22** by folding the lower cut edge **34** upwardly as viewed in FIGURE 2, to engagement with the upper cut edge **36**. The resulting two-layer structure, shown in FIGURE 4, is then folded in a similar manner about a midline **40**. The resulting four-layered structure, shown in FIGURE 5, is then clamped between the members **16**, **18** along the warps **26'**, the upper surface of the four-layered structure forming two opposite exterior surfaces A, A' in the assembled mop. Due to the greater bulk of the woven material in the warp areas **24** and **28** the overlapping of these areas during the folding operations result in two thickened portions **42** in the final structure. As pointed out above, these thickened portions **42**, which are located just below the edges of the upper connector element **16** in the assembled mop, protect the mop strands **22** from scrubbing action at this point and in addition, serve as scouring pads to remove stubborn dirt spots.

Preferably, the connector elements **16**, **18** and the handle **12** are fabricated as shown in FIGURES 1 and 6 in the interest of simplicity of initial construction and operation and freedom from damage and maintenance. As illustrated, the upper element **16** is a rigid metal strip of generally U-shaped transverse cross section. The convex surface of the U is fixedly secured to the lower end of the tubular, metal handle **12** at a right angle thereto as by welding. A pair of triangular reinforcing plates **44** are also welded to the convex surface of the U and to the handle **12**. Preferably, the length of the element **16** is somewhat less than the width of the mop head **10** so that the material of the mop head **10** prevents the ends of the element **16** from contacting furniture and the like during use.

In the embodiment illustrated in FIGURES 1 and 6 the lower connector member **18** consists of a heavy web strap **46** having a metal rimmed eye **48** or similar structure at one end and a conventional tension-producing latch **50** at the other end. The latch **50** has a base **51** which is secured to the strap **48** by rivets **52** and includes a stiff wire loop **54** pivoted at one end to a lever element **56** which in turn is pivoted to the base **51** at **48**.

In use, the strap **46** is first attached to the connector member **16** by slipping the eye **48** over one of several spaced hooks **60** which are fixed to the upper surface of the member **16** and then looping the strap downwardly and to the right as seen in FIGURE 6. The four-layer, folded sheet **32** is then draped over the strap **46** along the warp group **26** so that the loops **22** hang downwardly to form the completed mop head **10**. Next the free end of the strap **46** is attached to the right hand end of the member **16** by slipping the stiff wire loop **54** over one of several spaced hooks **62** fixed to the top of member **16**. Upon pushing the lever **56** downwardly, the strap **46** is tightened, and the mop head **10** becomes tightly clamped between the strap **46** and the lower surface of the member **16**.

While the lower clamping member **18** had been described as a web strap **46**, it will be understood that a flexible metal strip or a metal chain, preferably of stainless steel, could be employed.

FIGURE 7 illustrates another manner of detachably connecting the mop head **10** to the handle **12**. In this embodiment a second U-shaped rigid metal strip **64** is nested within the upper U-shaped member **16** and held in place by means of a bolt **66** which passes upwardly into threaded engagement with a nut **68** which has been welded inside the lower end of the handle **12**. As before, the mop head is clamped between the upper and lower elements along the warp group **26**.

The mop, assembled as described above, is used in a conventional manner. After a long period of use, however, it is desirable to remove the mop head **10**, clean it thoroughly in an unfolded condition and refold it so that different surfaces are exposed to maximum wear. So long as the fold lines are along the mop strands **22**, the folded structure will take the shape illustrated in the drawing and will be capable of being clamped between the upper and lower elements **16, 18**. Folds should not be made in the direction of the warps **24', 26', 28'** because the resulting structure will have more than one upper and lower surface and therefore cannot be clamped between the members **16, 18**. It is possible, of course, to fold along the warps if a different type of connector is employed, for example one of the jaw type, which engages only the outside surface of the saddle portion.

It will be apparent from the above description of the folding operation, that the illustrated mop head **10** is capable of exposing eight different areas, depending on the manner of folding. That is, when the cut length **32** of woven material is contemplated as being folded into four layers, each surface of each layer may be brought to the outside to receive maximum wear. If it is desired to provide a mop head having a greater or lesser number of layers, the length **32** may be folded to give the desired number. In any case, the number of exposable surfaces is always twice the number of layers when the length is folded only along the mop strands.

Thus, it will be appreciated that the present invention provides a mop head which is simple in construction, long-lived under conditions of hard use, easy to assemble and easy to disassemble for thorough cleaning of the strands. The above-described features of woven foldable construction, tough warp areas, looped strands and simple clamping arrangement all contribute and cooperate to the long life of the mop. The foldable construction permits different areas of the mop head to be subjected to maximum wear and thereby helps avoid lost mop strands, a condition which reduces the effectiveness of the mop as a cleaning tool. In addition, the foldable construction permits the mop head to be thoroughly and easily cleaned. The heavy warp areas **24, 26** by themselves and particularly in combination with the foldable construction, provide a tight anchor for the mop strands, protect them from being cut by scrubbing action on the floor and provide an excellent scouring portion of the mop. The simple clamping arrangement in combination with the foldable construction, not only provides for easy disassembly, but it also serves as a back-up for the heavy warp areas when the mop is used on stubborn dirt spots.

While a specific embodiment of the invention has been described and illustrated, modifications thereof are contemplated and it is not intended that the described details be limiting except as they appear in the appended claims

What is claimed is:

1. A mop head comprising: a single layer of fibrous material having a saddle portion and two groups of elongated parallel looped mop strands extending therefrom in opposite directions, the looped strands being formed by at least one long weft yarn doubled back on itself and interwoven in the saddle portion with at least three parallel groups of warp threads, the outer two groups of warps threads being of tough strong material and closely interwoven with the weft yarn to tightly hold the same and to form a thickened scouring portion and the inner group being relatively loosely woven to form a relatively thin portion.

2. A mop head as in claim **1** wherein said single layer of fibrous material is folded along at least two straight lines to form a generally U-shaped, multi-layered structure in which all said looped strands are parallel and in which said outer groups of warp threads are folded upon themselves and thereby for a thickened scouring area of said mop head, the first of said fold lines being along one of said mop strands and the second of said fold lines being along one of the threads of said inner group of warp threads whereby the resultant structure may be unfolded when it is desired to clean the same and refolded to leave a different position thereof exposed to wearing action during use.

3. A mop comprising: a single layer of woven fibrous material folded into a plurality of overlying layers and clamped between clamping members carried at the end of a handle, said single layer including a saddle portion and two groups of elongated parallel mop strands extending therefrom in opposite directions, the strands being interwoven with a plurality of warp threads to form said saddle portion, said single layer being folded along at least one line extending along a mop strand so as to form a multi-layered structure, said clamping members engaging part of the overlying saddle portions and leaving exposed a strip of saddle portion between the mop strands and the clamping members, the warp threads in the area of the strips being of coarse, tough material whereby said strips serve as scouring surfaces when said mop is inclined from a vertical position.

4. A mop comprising: a single layer of fibrous material having a saddle portion and two groups of elongated parallel looped mop strands extending therefrom in opposite directions, the looped strands being formed by at least one long weft yarn doubled back on itself and interwoven in the saddle portion with at least three parallel groups of warp threads, the outer two groups of warp threads being of tough strong material and closely interwoven with the weft yarn to tightly hold the same and to form a thickened scouring portion and the inner group being relatively loosely woven to form a relatively thin portion; said single layer being folded along at least one straight line along a mop strand to form a multi-layered structure having two exposed surfaces and in which the saddle portions of the layers overlie each other; a rigid generally channel-shaped clamping member engaging a substantial portion of one of the exposed loosely woven areas; a second clamping member engaging a sub-

stantial portion of the other exposed loosely woven area and releasably secured to said channel-shaped member, said scouring portions being exposed between each group of strands and the clamping members.

5. A mop as in claim 4 wherein said channel-shaped clamping member is rigid and wherein said clamping second member is flexible and is attached at each end to the upper surface of said channel-shaped member.

6. A mop head comprising: a single layer of fibrous material having a woven saddle portion of uniform width extending from one edge of the layer to the opposite edge and two groups of elongated parallel mop strands disposed transversely of said saddle portion and extending a substantial distance from said saddle portion in opposite directions, said strands being formed of at least one long weft yarn doubled back on itself at the outer ends of said strands, said saddle portion being formed by a plurality of warp threads interwoven with said mop strands and defining a center strip and two outer strips extending from said one edge to said opposite edge, the two outer strips being of tougher, more wear resistant construction than the center strip and the strands, said single layer being folded at least once along a straight line into a multilayered structure in which all said looped strands are parallel and in which said wear resistant outer strips are folded upon themselves form a reinforced scouring portion on each exterior side of the folded structure;

and a handle and connector assembly releasably attached to the center strip of said saddle portion, said scouring portions thereby being exposed between each group of mop strands and said assembly.

7. A mop head as in claim 6 wherein the threads in said two outer strips are made of stronger, tougher material than the threads in said center strip.

8. A mop head as in claim 6 wherein the threads in said two outer strips have abrasive material associated therewith to provide said high wear resistance.

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DANIEL BLUM, *Primary Examiner.*

CHARLES A. WILLMUTH, *Examiner.*