United States Patent [19]

Popeil et al.

[11] **3,750,220**

[45] **Aug. 7, 1973**

[54] **MOP HEAD FOR A WRINGER TYPE MOP HOLDER**

[75] Inventors: **Samuel Joseph Popeil; James Harold Kupka,** both of Chicago, Ill.

[73] Assignee: **Popeil Brothers, Inc.,** Chicago, Ill.

[22] Filed: **Feb. 26, 1971**

[21] Appl. No.: **119,161**

[52] **U.S. Cl.** ..... **15/228,** 15/120 R, 15/244 A

[51] **Int. Cl.** **A47l 13/142**

[58] **Field of Search** ..... 15/98 R, 116 R, 116 A, 15/120 R, 120 A, 228, 230.11, 230.17, 230.19, 231, 232, 244 A; 29/119, 131; 401/197, 208, 218

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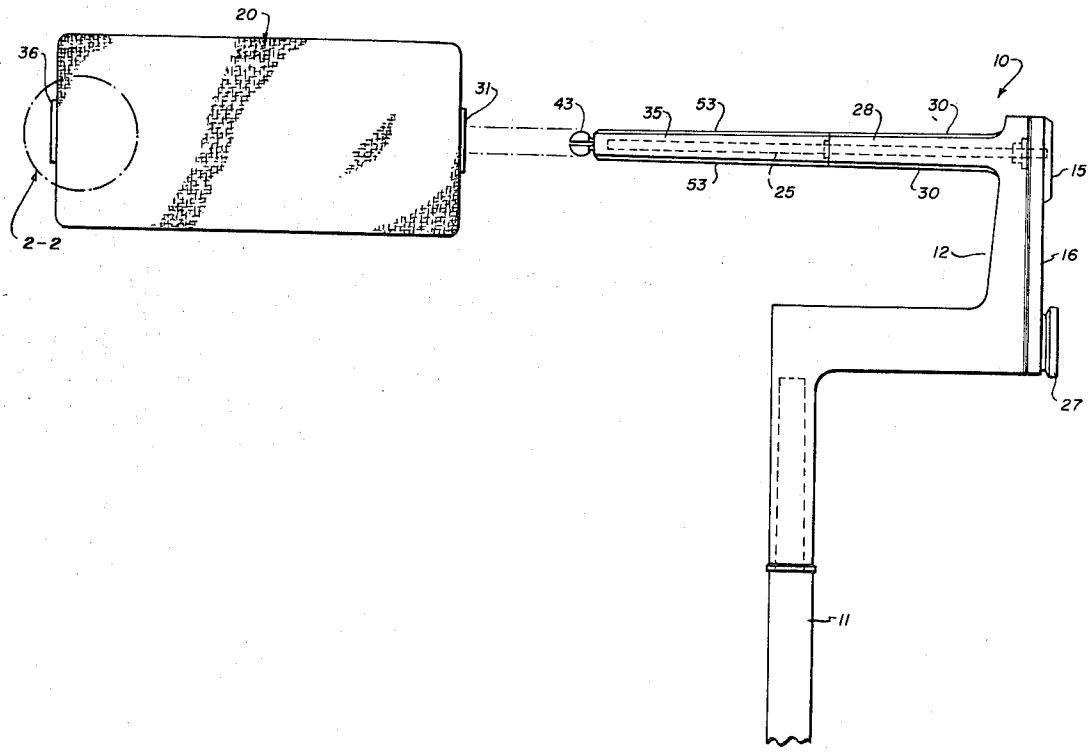
Primary Examiner—Daniel Blum
Attorney—Dominik, Knechtel & Godula

[57] **ABSTRACT**

A mop head which is adapted to be removably secured to a cantilever wringer mop in which a sponge block is encased in a cloth. The cloth is tucked in to co-acting spool and ring assemblies at both ends of the long axis of the block which secure the loose ends of the fabric interiorly of the block. Co-acting collars and teeth are placed respectively on the rings and spools to secure the cloth in place. In the method of manufacture the larger interior bored spool is first assembled with its co-acting ring. Thereafter the cloth sleeve is slipped over the sponge block, the sponge block having first been compressed across its weak axis, at least at the long corner edges, to provide room to loose-fittingly be received within the tubular fabric. Then a mandrel is passed through the already affixed spool and ring and extends upwardly to engage the lower portion of the ring at the opposite end. Thereafter the fabric is tucked within the ring thus engaged by the mandrel, and the last spool jam-fittingly pressed in place to thus securely lock the fabric interiorly of the ring and complete the construction of the mop head.

16 Claims, 29 Drawing Figures



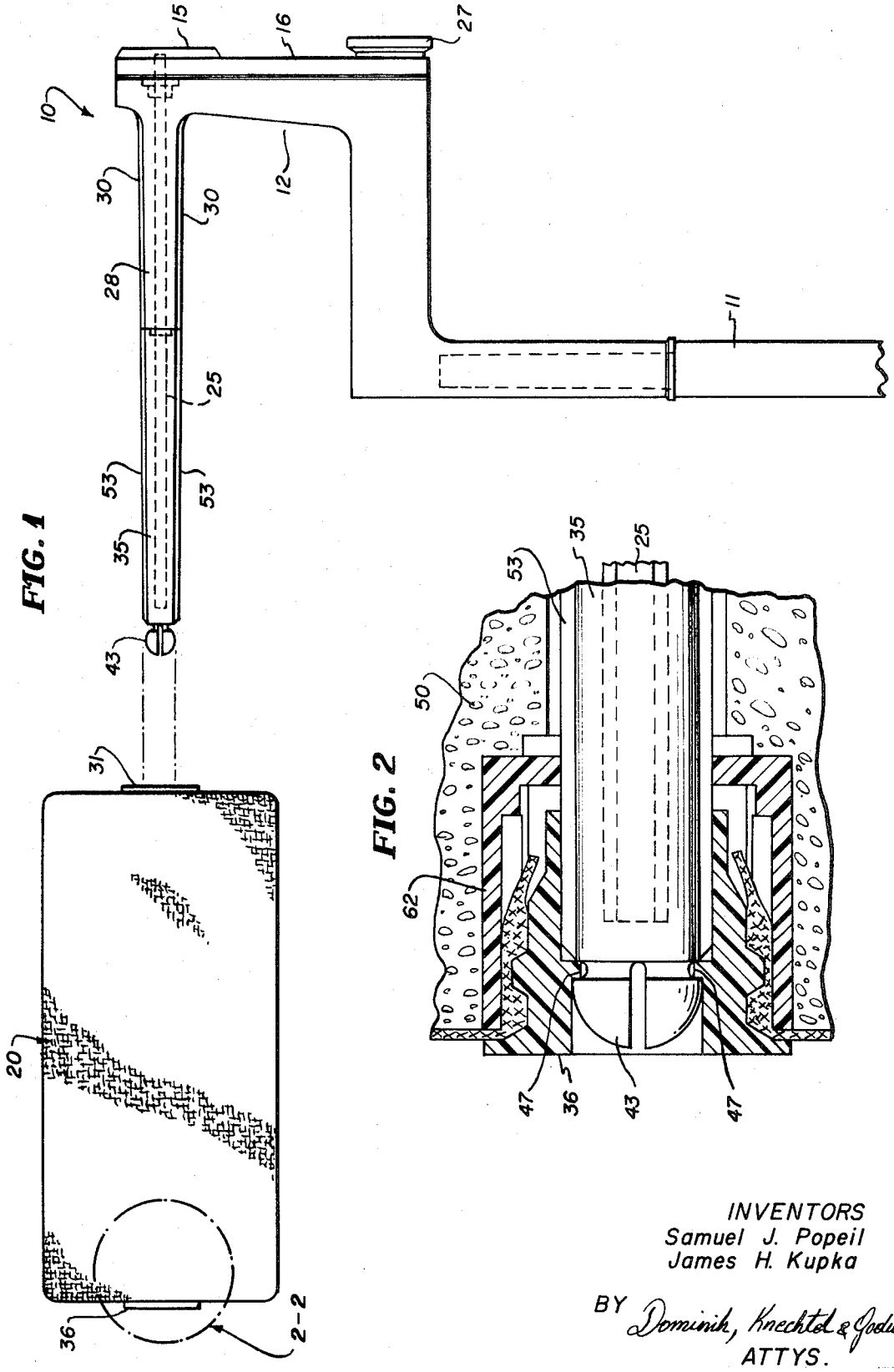


FIG. 1

FIG. 2

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FIG. 3

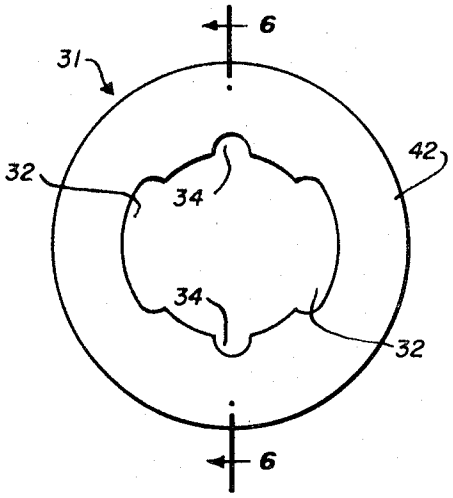


FIG. 4

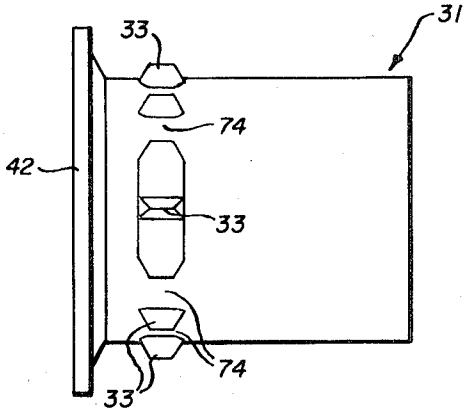


FIG. 5

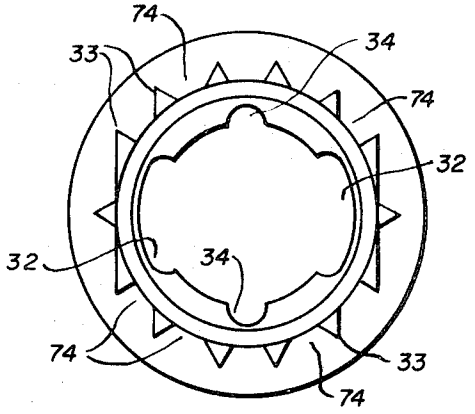


FIG. 6

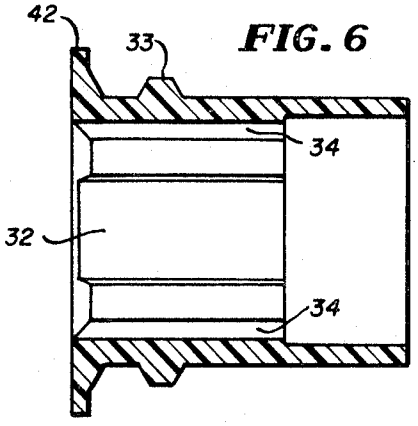


FIG. 7

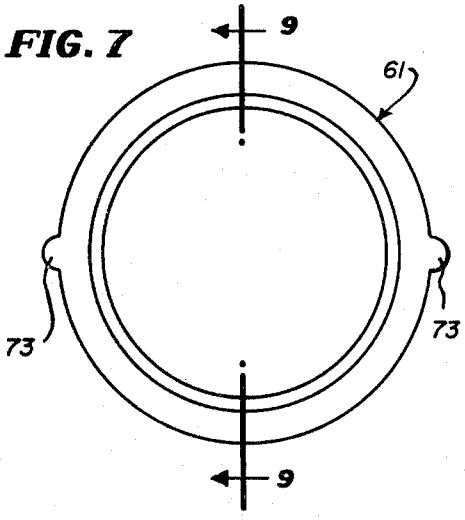
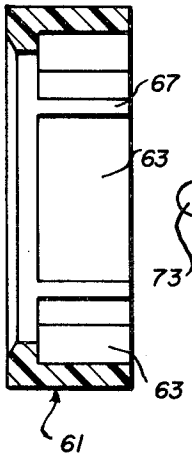


FIG. 9



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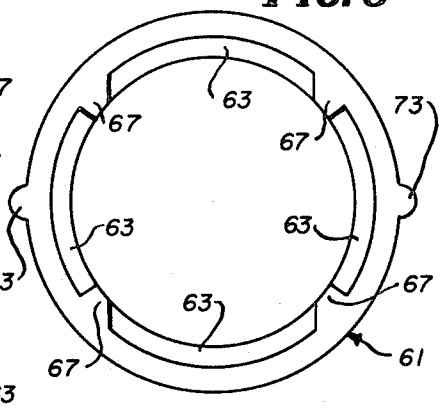

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FIG. 10

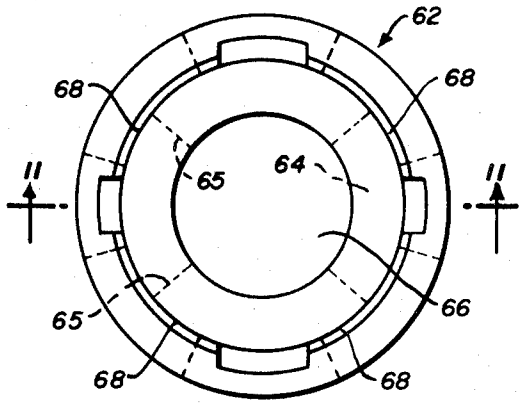


FIG. 13

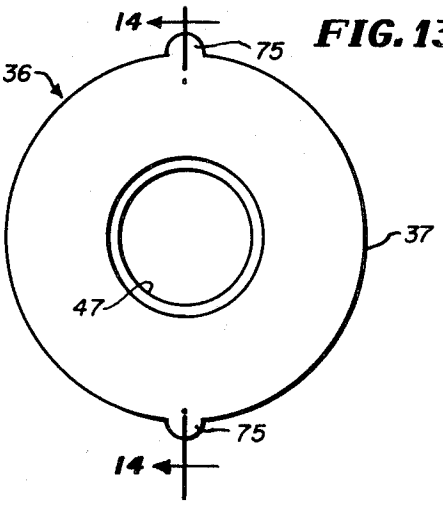


FIG. 11

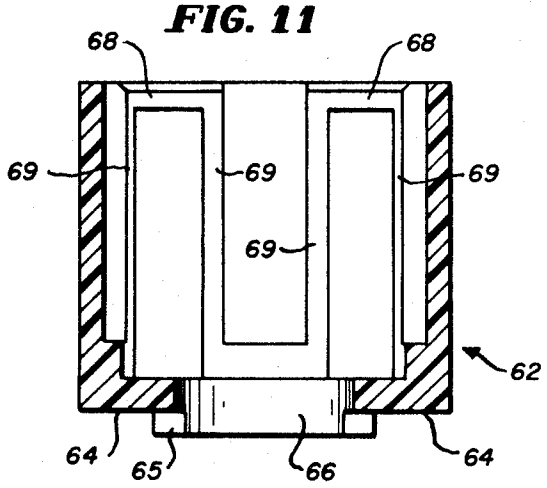
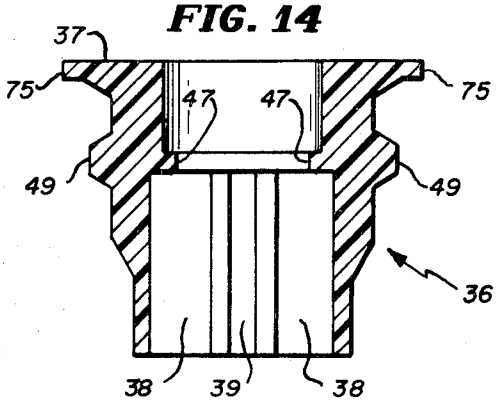


FIG. 14



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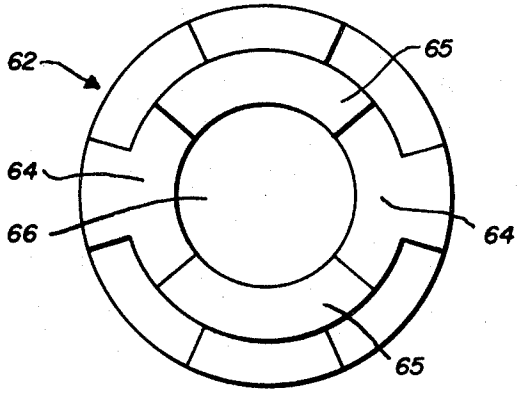

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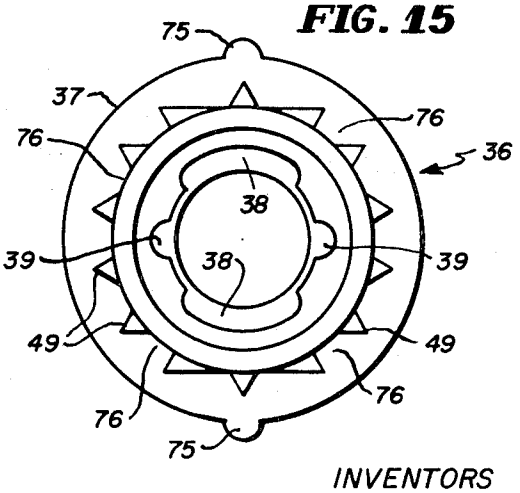

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FIG. 16

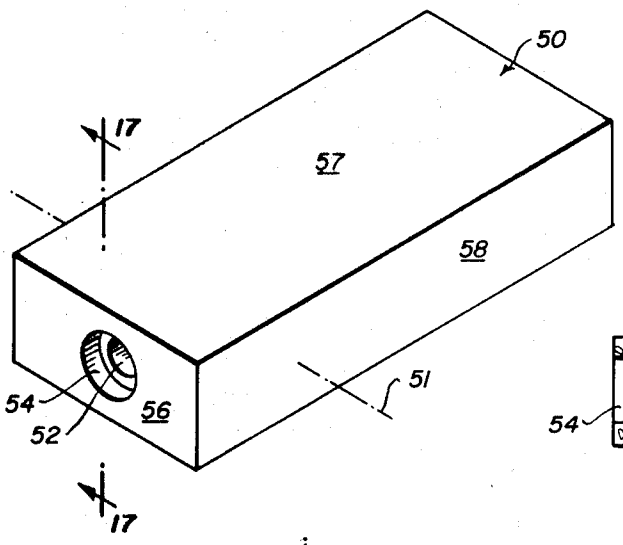


FIG. 17

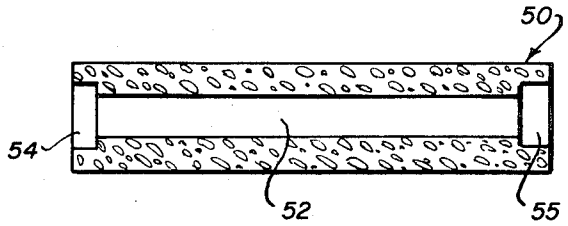
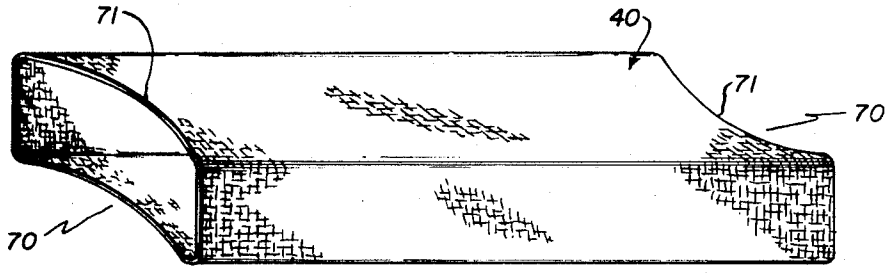


FIG. 18



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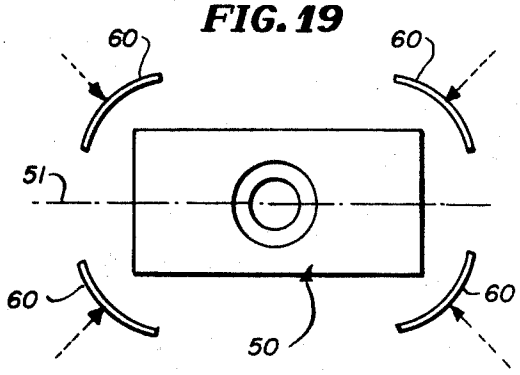

FIG. 20

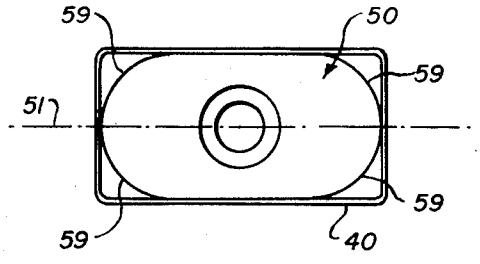

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FIG. 22

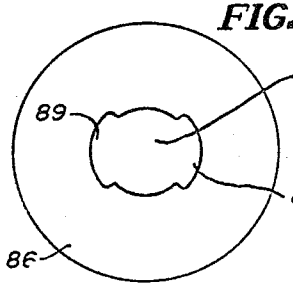

FIG. 23

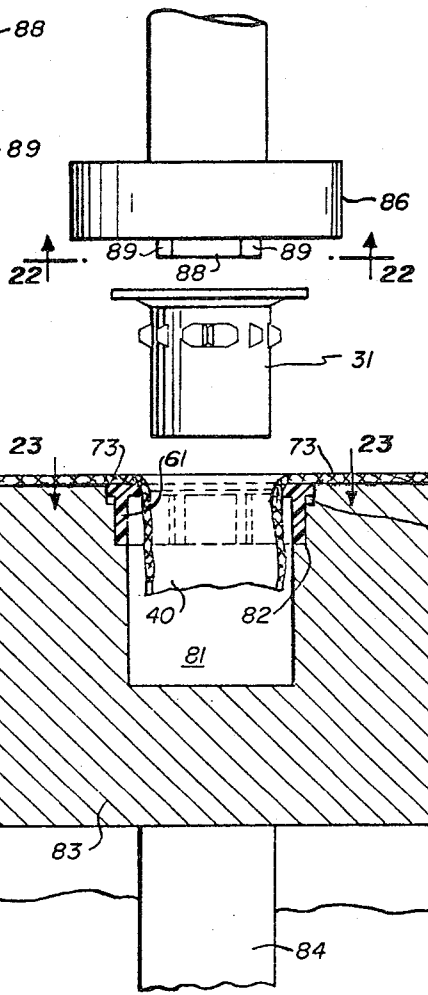

FIG. 21

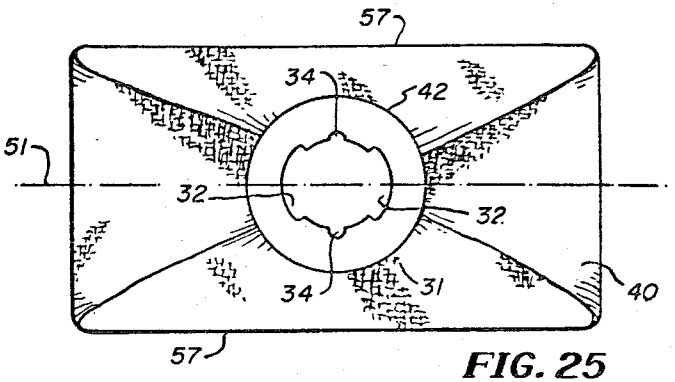

FIG. 25

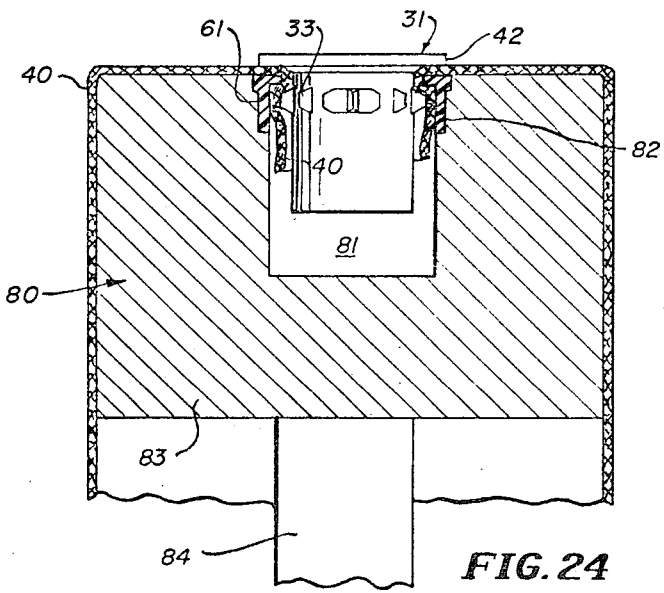

FIG. 24

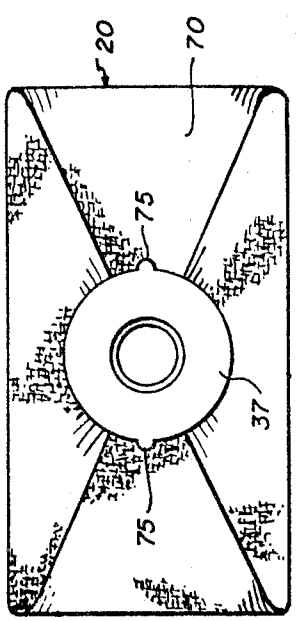

FIG. 29

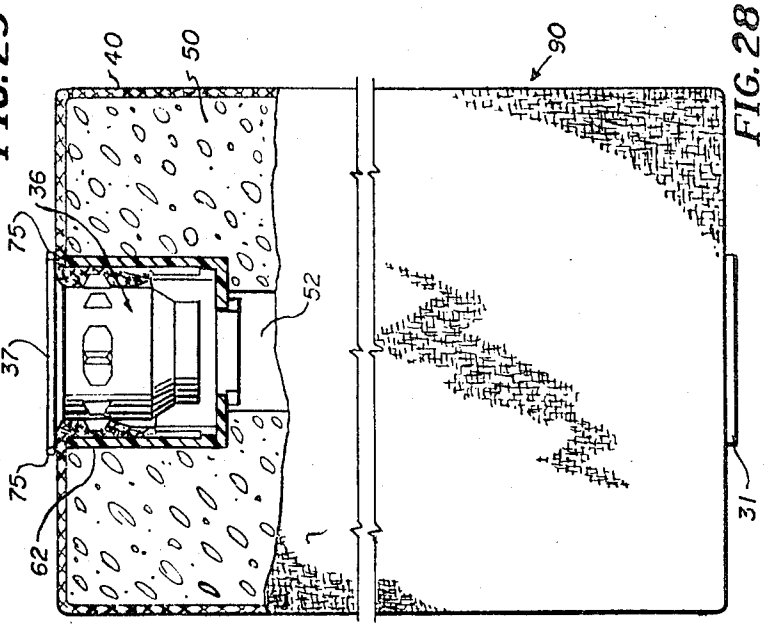

FIG. 28

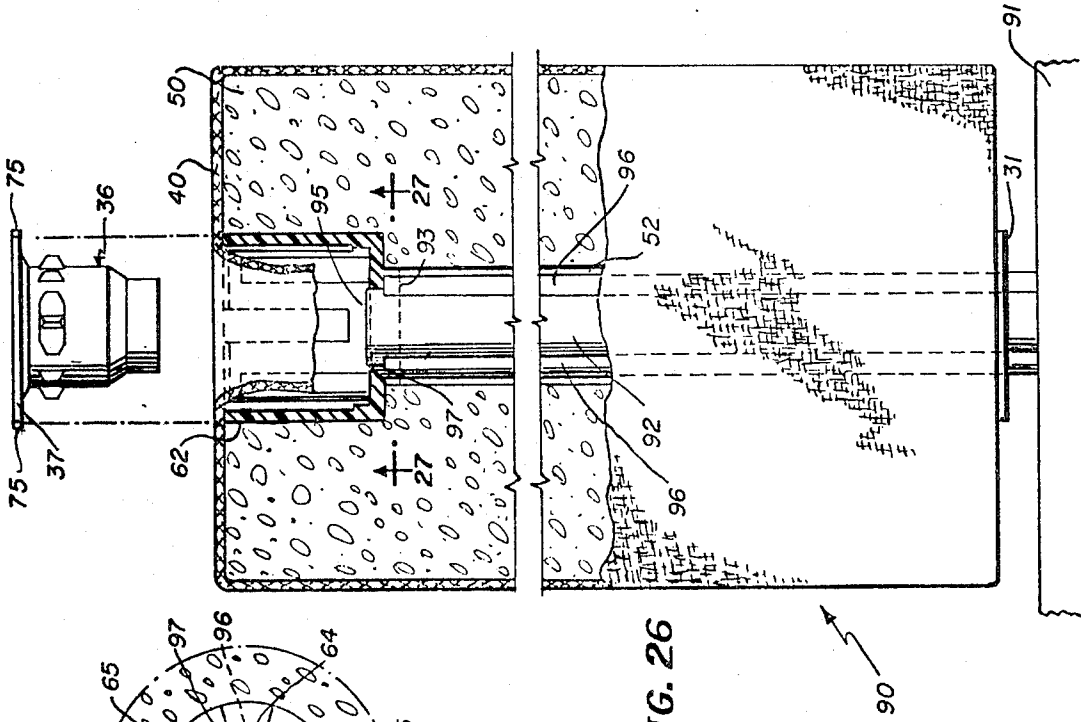

FIG. 26

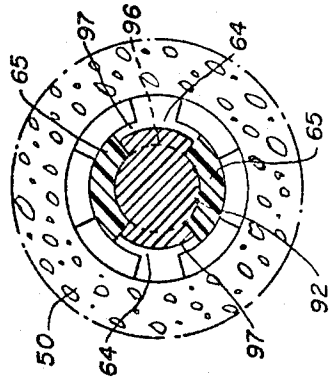

FIG. 27

MOP HEAD FOR A WRINGER TYPE MOP HOLDER

CROSS REFERENCE TO RELATED APPLICATIONS

The present invention relates to a mop head which is useful in connection with the Samuel J. Popeil U.S. Pat. application Ser. No. 119,160 entitled "WRINGER MOP" filed Feb. 26, 1971, now U.S. Patent No. 3,699,603, issued Oct. 24, 1972.

BACKGROUND OF THE INVENTION

The field of invention is implied by the title of the application, namely a mop which is useful on a wringer mop of the type in which one end of the mop head is anchored, and the other end is twisted for wringing water from the mop.

A related mop is exemplified in U.S. Pat. No. 2,955,309 in which a diametrical compression action takes place. Also in U.S. Pat. No. 2,873,462 it will be observed that mop heads which are compressed axially are also known. In addition, a product made by the Mouli Company of Paris, France known as the Moulinex Mop as shown in U.S. Pat. 3,616,483, is known in which a mop head of a sponge-like material is encased in cloth for anchoring at one end and wringing at the other end.

In the various devices of the prior art, including that of U.S. Pat. No. 2,913,772, it has been recognized that encasing a sponge mop in a sleeve of porous material will improve the life of the sponge through repeated wringings and other wear inducive usage. The attempt to solve the problem by encasing the sponge block in a sleeve of porous material such as a cloth have invariably resulted in the effect of a bag tied at each end such as shown in U.S. Pat. No. 3,616,483 producing a frayed end of material which will also bump into mop boards and the like when, for example, mopping a floor and attempting to mop as closely as possible to the quarter round or the edge of the floor. Additionally, the tied ends, when the mop head is placed in a conventional washing machine for cleaning, will invariably fray and shorten the life of the mop head. Furthermore, where the end of the cloth is not very securely anchored to the members which secure the mop head to the wringer mop, the wringing action is inhibited partially and thus full and effective wringing or expressing of water is not as easily achieved.

In view of the foregoing, it is one of the principal objects of the present invention to provide a mop head construction which is durable and will withstand repeated washings in a conventional washing machine thereby effecting the economy of long life and repeated usage for the owner.

Still another object of the present invention is to provide a mop head of the character in which a sponge block is encased in a sleeve of porous material in which the sleeve is positively and very effectively secured to the elements which, in turn, secure the mop head to the wringer to thereby reduce the tendency of the sleeve to slip when wringing.

Another object of the present invention is to provide a mop head in which the effective length of the mopping or active surface is approximately the same length of the mop head thereby permitting the unit to gain access into rectangular spacial areas such as the joint between the mop board and the floor.

Finally, but not least of the important objects of the present invention, is to provide a mop head in which the cellular block is encased in a sleeve of porous fabric in which both ends of the sleeve are tucked interiorly of an anchor spool and wringer spool assembly at the respective ends of the mop head thereby enhancing the appearance of the mop head by eliminating the possiblity of a frayed or tied end.

The method of the present invention which finds little precedent in the prior art has as a principal objective the utilization of a minimum amount of simple tooling for high speed production which, of course, reduces the capital investment required to produce the mop head. A further and related object of the present invention is to provide a method for manufacturing the mop head which is susceptible of high speed manufacture and facilitating manual operation to thereby further contribute in reducing the cost of the mop head.

Still another object of the present invention is to provide a method for reliably, rapidly, and economically assembling the mop head which will result in a minimum of salvage and a high yield of a high quality product.

SUMMARY OF INVENTION

The mop head of the present invention is intended for usage on a cantilever wringer shaft mop with an anchor support at one end and a mop head engaging member at its other end. The body portion of the mop head is a sponge-like or cellular material, usually of a rectangular configuration. A through bore is provided in the body of the sponge block, and an anchor spool assembly is positioned at one end of the block and a wringer spool assembly at the other end which assemblies engage in locked and reversely folded hidden fashion both ends of a porous sleeve of material. The wringer spool assembly and anchor spool assembly comprise an interior ring member provided with means for lockingly engaging the reversely folded sleeve ends when secured in place by the spools which lockingly engage the rings and hold the cloth in place. In a preferred embodiment both ends of the sleeve are reversely folded and hidden in the wringer and anchor spool assemblies.

The method of manufacture contemplates first cutting the sponge block in such a manner that its weak axis is across the narrow two faces and perpendicular to the wringer shaft bore interior of the mop head. A porous sleeve is then formed to receive the sponge block. The ends of the sleeve are shortened between the portions intended to cover the narrow faces of the sponge block. Then one end of the porous sleeve is positioned interiorly of the anchor spool ring and the anchor spool press fitted into place. The sleeve is then placed over the sponge block after the corners are compressed to insure a close fit. Thereafter the thus partially encased sponge block is positioned over a mandrel upon which the wringer spool ring is positioned and oriented in place with its base atop the mandrel, the remaining free end of the cloth sleeve tucked within the wringer spool ring, and then the wringer spool forced in place interiorly of the wringer spool ring to completely enclose both ends of the tubular sleeve within the wringer spool assembly and anchor spool assembly in axial alingment. The axial alignment of the spools and rings is effected by a pair of lateral projections on the upstanding mandrel which will ac-

cept the spools only in properly aligned orientation, and also by orientation shapes on the spools and rings.

DESCRIPTION OF DRAWINGS

Further objects and advantages as well as a fuller understanding of the present invention will become apparent as the following description of an illustrative embodiment proceeds taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of a wringer mop showing diagrammatically and in exploded fashion the relationship between the mop head illustrative of the present invention and the wringer mop to which the mop head is removably secured.

FIG. 2 is an enlarged broken section of the free end of the wringer mop and its removably secured engagement with one end of the mop head.

FIG. 3 is an end view of the anchor spool which is secured in one end of the mop head.

FIG. 4 is a front elevation of the anchor spool shown in FIG. 3.

FIG. 5 is a view of the anchor spool end opposite that shown in FIG. 3.

FIG. 6 is a longitudinal sectional view of the wringer spool taken along section line 6—6 of FIG. 3.

FIG. 7 is a top view of the anchor spool ring intended for cooperative engagement with the anchor spool illustrated in FIGS. 3 through 6.

FIG. 8 is a bottom view of the anchor spool ring shown in FIG. 7.

FIG. 9 is a transverse sectional view of the anchor spool ring taken along section line 9—9 of FIG. 7.

FIG. 10 is a top view of the wringer spool ring.

FIG. 11 is a longitudinal sectional view of the wringer spool ring taken along section line 11—11 of FIG. 10.

FIG. 12 is a bottom view of the wringer spool ring.

FIG. 13 is a top view of the wringer spool.

FIG. 14 is a longitudinal sectional view of the wringer spool taken along section line 14—14 of FIG. 13.

FIG. 15 is a bottom view of the wringer spool.

FIG. 16 is a perspective view of the sponge block interior of the mop head.

FIG. 17 is a longitudinal sectional view of the sponge block shown in FIG. 16 taken along section line 17—17 of FIG. 16.

FIG. 18 is a perspective view of the porous cloth sleeve used to encase the sponge block illustrated in FIGS. 16 and 17.

FIG. 19 is a partially diagrammatic end view of the sponge block shown in FIGS. 16 and 17 illustrating how the same is, by suitable tooling, compressed along its weak axis prior to assembly.

FIG. 20 is an end view showing the relationship between the porous fabric sleeve and the compressed sponge block when the same is compressed in accordance with the showing in FIG. 20.

FIG. 21 is a partially exploded diagrammatic partially sectioned view illustrating the anchor spool assembly fixture after the cloth sleeve has been positioned in place interiorly of the anchor spool ring awaiting the insertion of the anchor spool.

FIG. 22 is a broken end view of the assembly press for the anchor spool taken from the position shown by arrows 22—22 in FIG. 21.

FIG. 23 is a broken end view of the anchor spool fixture showing that portion which receives and orients the anchor spool ring.

FIG. 24 is a view of the anchor spool fixture showing the anchor spool in its assembled relationship with the porous fabric after the step illustratively shown in FIG. 21 has been completed.

FIG. 25 is an end view of the mop head showing the anchor spool and ring as assembled.

FIG. 26 is a transverse partially sectioned, partially exploded, partially diagrammatic view illustrating the assembly relationship between the wringer spool and the wringer ring.

FIG. 27 is a transverse sectional view of the upper portion of the assembly mandrel taken along section line 27—27 of FIG. 26.

FIG. 28 is a view subsequently showing the assembled relationship of the wringer spool and ring within the fixture after the step indicated in FIG. 26 has been completed.

FIG. 29 is an end view of the mop head showing the wringer spool and ring as assembled.

PREFERRED EMBODIMENT — MOP HEAD

The mop head 20 illustrative of the present invention is best understood in its environment as removably secured to a wringer mop 10 of the character shown in FIG. 1 of the accompanying drawings. There it will be seen that the wringer mop 10 is secured at the end of a handle 11 and includes as its principal body portion a U-shaped head mount 12. A wringer 15 having a wringer crank 16 which is actuated by turning the same with the operator grasping the handle 27 is secured at its rotating end to the base of the wringer shaft 25. The wringer shaft 25 is mounted in a wringer shaft support 28 having a pair of diametrically opposed anchor spool engaging fins 30. At the far end or free end of the wringer shaft 25 provision is made for a wringer snap assembly 35 which has at the end of its body portion a snap head 43 and extending diametrically from the body portion in axially aligned orientation with the anchor spool fins 30 are a pair of wringer snap assembly fins 53. The anchor spool engaging fins 30 and the wringer spool engaging fins 53 are positioned in axial alignment for engagement with their corresponding anchor spool 31 and wringer spool 36 of the mop head 20.

The mop head 20 has an interior body formed from a sponge block 50. As illustrated in FIG. 16, the sponge block 50 is rectangular and cut in a manner so that its weak axis 51 is perpendicular to the two narrow side faces 58 of the sponge block 50. The particular type of sponge material conveniently employed in the making of the subject mop head is described in column 1, lines 4-45 in U.S. Pat. No. 2,280,022. There it will be seen that a cellulosic pasty mass may be formed into sponges by continuous molding, extruding, or even molded in a single chamber. The extruded mass is progressively coagulated within a heated mold tube. In the process, the constituents of the pasty mass do not remain well fixed but the fibers and crystals (pore formers) lie at random in all directions. There is an orientation or stratification of the fibers and the salt crystals, along well-defined lines or planes. This results in planes of weakness or a graining effect comparable to the grain of wood. This orientation is particularly noticeable in the case of continuous molding by means of extrusion. The strength in the direction of the grain, where the fibers are intermatted, may be up to three times that across the grain where there is relatively little interlocking of the fibers. In the context of such cellular sponge, it will be appre-

ciated that the orientation of the weak planes becomes an asset in connection with the method of making the mop head of the present invention and in no way detracts from the ability of the mop head to perform in operation. The axis of the weak planes is shown herein by reference numeral **51** in FIG. **16.**

In FIG. **2** in greater detail there is shown the wringer snap assembly **35** in its co-acting engaged relationship with the wringer spool **36.** There it will be seen that the snap head **43** of the wringer snap assembly **35** snap-fittingly engages the wringer spool **36** and is held in place by means of the snap head collar **47.** The snap head collar **47** engages the snap head **43** at the narrow necked portion thereof and can be snapped in and out of position attributable to the yielding action of the slotted head of the snap head **43.** Suitable longitudinal slots are provided in the wringer spool **36** to longitudinally slidingly engage the fins **53** of the wringer snap assembly **35,** fixedly engaging the spool **36** for rotation with the wringer shaft **25,** the snap head collar **47** serving to engage the wringer spool and wringer snap assembly **35** against axial dislocation. To be noted in particular is the solid wedging support provided between the snap head collar **47** and the wringer snap assembly **35** so that the same is positively secured against further axial displacement of the wringer spool **36** in the direction of the crank end of the wringer shaft **25.** This construction is required to prevent any disengagement of the wringer spool **36** when the wringing action takes place and the free end of the mop head **20** which is secured by means of the anchor spool **31** which moves longitudinally along the wringer shaft support **28** secured by means of the anchor spool fins **30** as the mop head **20** is shortened by the wringing action which takes place when moisture is being expressed from the mop head **20.**

The specific details of the anchor spool **31** are shown in FIGS. **3** through **6** inclusive where it will be seen that the spool has a cylindrical body portion terminating in its upper end at an anchor spool collar **42.** The run of teeth **33** are provided immediately adjacent the anchor spool collar **42.** The interior body portion is provided with diametrically opposed flip-flop slots **32** which are opposed arcuate segments of approximately 90°. Diametrically and perpendicularly opposed fixed head slots **34** are provided on the interior portion of the anchor spool **31** for the different positional mounting of the mop head **20.** As will be noted particularly in FIG. **6,** the interior body portion of the anchor spool **31** is hollow and the spaces between the flip-flop slots **32** and the fixed head slots **34** are reinforced areas.

The purpose of the run of anchor spool locking teeth **33** becomes apparent when the relationship between the anchor spool **31** and its anchor spool ring **61** are considered. The purpose of the anchor spool ring **61** is to lockingly engage a reversely folded portion of the cloth or sleeve **40** in which the mop head sponge block **50** is encased to thereby hide the ends of the porous fabric sleeve **40.** The anchor spool ring **61** is further provided with a centrally projecting locking ring **63** which is proportioned to snap-fittingly ride over the run of teeth **33** on the anchor spool **31** to secure between the body of the anchor spool ring **61** and the collar **42** and body portion of the anchor spool **31** the end of the porous sleeve **40** which has been tucked interiorly of the anchor spool **61** in a manner which will be set forth in greater detail hereinafter. Longitudinal ribs **67** are formed interiorly of the anchor spool ring **61** and slide between rows of teeth **33** on the spool thereby further securing the sleeve **40** against rotation.

The wringer spool end portion of the mop head **20** in more specific detail than that shown regarding FIG. **2** is illustrated in FIGS. **10** through **15** where both the wringer spool ring **62** (FIGS. **10** through **12**) and the wringer spool **36** (FIGS. **13** through **15**) are shown in detail. It will be seen that the wringer spool ring **62** is a cup-shaped cylindrical type member having an assembly collar **64** at its base with a pair of orienting segments **65** extending from the assembly collar **64.** The center bore **66** of the wringer spool ring **62** is sufficiently large to accommodate insertion of the wringer snap assembly **35** as illustrated in FIG. **2.** There it will be seen specifically that the center bore **66** of the wringer spool ring **62** is slightly larger than the diametrical distance across the outer portions of the wringer fins **53.** Locking segments **68** are provided at the end of the wringer spool ring **62** opposite the assembly collar **64** and proportioned to snap-actingly engage with the wringer spool teeth **49** in the same fashion as provided with the anchor spool locking teeth **33** and the anchor spool locking segments **63** as set forth above. Longitudinal ribs **69** are also provided interiorly of the wringer spool ring **62** to co-act with the wringer spool teeth **49** as do the longitudinal ribs **67** of the anchor spool ring **61.**

Turning now to FIGS. **13** through **15,** it will be seen that the wringer spool **36** has a peripheral collar **37** at one end, and immediately adjacent thereto a run of wringer spool teeth **49.** Interiorly of the wringer spool **36,** provision is made for diametrically opposed fixed head slots **39,** and a pair of diametrically opposed wringer spool flip-flop slots **38.** The flip-flop slots are on an axis perpendicular with the axis of the fixed head slots **39** in exactly the same fashion as the corresponding slots in the anchor spool **31.** Additionally as observed in FIG. **14,** a snap head collar **47** is provided for snap-acting engagement with the snap head **43** of the wringer snap assembly **35** as described in connection with FIG. **2** above.

In its assembled configuration both the anchor spool **31** and the wringer spool **36** (as shown in broad outline in FIG. **1** and as illustrated in specific detail in FIG. **2**) co-act with their respective rings **61, 62** to tuck the free ends **41** of the porous cloth sleeve **40** interiorly and in nesting engagement with the co-acting spools and their respective rings. The cloth (again as illustrated in FIG. **2**) is wedgingly engaged between the run of teeth of the spool and the interior of the spool body, and further locked by its 90° bend at the intersection between the spool outer collar **37, 42** and the outer edge of the ring **61, 62.** As a further securing measure, both rings **61, 62** are provided with longitudinal inner ribs **67, 69** to fit between the spool teeth **33, 49** to fix the cloth sleeve **40** against rotation in the spool-ring attachment. Thus in the assembled configuration, by employing the rings and spools illustrative of the present invention, the free ends **41** of the cloth sleeve **40** completely encase the sponge block **50,** and are hidden from view as well as wear and tear as shown in FIG. **1,** and as will be described in considerably greater detail in FIGS. **24** and **28** in connection with the method illustrative of the present invention. Furthermore, the respective fixed head slots **34, 39** and flip-flop slots **32, 38** are axially aligned for the proper engagement with the wringer

spool fins 30 and the wringer spool fins 53 of the wringer mop 10.

Prior to describing the method of manufacture, certain elements of construction which assist in the method of manufacture will be identified. For example, the anchor spool ring 61 (see FIGS. 7–9) is provided with orienting studs 73 located at a midposition and diametrically opposed adjacent the locking segment 63 and between the longitudinal ribs 67. On the other hand, referring now to FIG. 3, it will be seen that the anchor spool 31 omits orienting studs on the periphery of the anchor spool collar 42 since alignment is a function of the flip-flop slots 32.

Further to be observed, are the rib gaps 74 between the runs of teeth 33 on the anchor spool 31 which, of course, nestingly receive the ribs 67. The cross-sectional configuration of the ribs 67, particularly as noted in FIG. 8, is proportioned to nestingly engage within the rib gaps 74, as will be observed in FIG. 5. A corresponding relationship between the longitudinal ribs 69 of the wringer spool rings 62 is indicated in FIGS. 10 through 15. There it will be seen that a rib gap 76 is provided on the wringer spool 36 between the run of teeth 49 of the wringer spool 36. The orienting segment 65 of the wringer spool ring 62 makes unnecessary on the wringer spool any orienting studs such as orienting studs 72 provided on the anchor spool 31. On the other hand, the wringer spool 36 is provided with orienting studs 75 at a diametrically opposed position on the wringer spool collar 37. The operation and function in connection with the method of assembly of the orienting studs, the orienting segments, and rib gaps of the respective spools and rings will become apparent as the preferred method of manufacture is described hereinafter.

PREFERRED EMBODIMENT - METHOD OF MANUFACTURE

In the method of making the mop head, the sponge block 50 is first cut in accordance with the configuration illustrated in FIG. 16. There it will be seen that the block is generally rectangular having large block faces 57 parallel with the plane of the weak axis 51, and the block sides 58 in planes perpendicular with the weak axis 51. The block ends 56 are in planes parallel with the weak axis 51 and necessarily perpendicular with the planes of the block faces 57 and the block sides 58.

At each end of the block a wringer spool cutout 54 and an anchor spool cutout 55 is provided at the terminal ends of the wringer shaft bore 52 (see FIG. 17). The cutouts 54, 55 are proportioned to nestingly receive the respective spools and rings and in addition to accommodate those portions of the tubular sleeve ends 70 which must be secured to the respective spools 31, 36.

In preparation of the porous cloth sleeve 40 for encasing the sponge block 50, it will be noted particularly in FIG. 18 the sleeve ends 70 are provided with a cutout portion 71 of a generally circular segmented configuration. The purpose of the cutout 71 is to provide, as will become apparent hereinafter, a generally equal amount of sleeve end 70 material to be engaged by the respective spools and rings.

Prior to positioning the sponge block 50 within the tubular sleeve 40, the corners of the sponge block 50 are compressed by compressor 60 as illustrated in FIG. 19. This provides the sponge block 50 with compressed corners 59 of the general configuration shown in FIG. 20. It will be appreciated that varying degrees of compression may be dictated by the type of material employed in the sponge block 50. Depending upon the amount of stretch anticipated with the porous sleeve 40 (or shrinkage upon use), the amount of compression of the corners 59 will be determined in accordance with good manufacturing techniques.

The anchor spool 31 and the anchor spool ring 61 are assembled in the sequence illustrated in FIGS. 21 and 24. The purpose is to tuck the sleeve end 70 of the tubular sleeve 40 in between the anchor spool 31 and the anchor spool ring 61 leaving a neatly folded end 71 of the tubular sleeve 40 as shown in FIG. 25, with the flip-flop slots 32 oriented in a centrally disposed position with regard to the weak axis 51 of the sponge block 50. Similarly, the fixed head slots 34 of the anchor spool 31 are oriented in an axis perpendicular to the weak axis 51 of the sponge block 50 and perpendicular to the faces 57 of the sponge block 50.

The tubular sleeve 40 is placed over the anchor spool fixture 80 which comprises a block 83 having a spool assembly recess 81 topped by an anchor ring shoulder 82. The entire assembly is supported by a support shaft 84, and diametrically opposed in the anchor ring shoulder 83 provision is made for an orienting stud slots 85 (see FIG. 23) to receive the orienting studs 73 of the anchor spool ring 61. The first step in assembly is to position the anchor spool ring 61 within the shoulder 82 so that the orienting studs 73 of the anchor ring 61 fit in the orienting stud slots 85.

Then the sleeve 40 is placed over the anchor spool fixture block 83 and the sleeve ends 70 are tucked into the anchor spool ring 61 which has already been positioned within the spool assembly recess 81 securely atop the anchor ring shoulder 82. For best results, the portions of the sleeve 40 which are adjacent the intended block sides 58 are tucked in first, and thereafter the cutout portion 71 of the sleeve end 70 placed within the anchor spool ring 61 to achieve the neatly folded end configuration as seen in FIG. 25.

Thereafter the anchor spool 31 (see FIGS. 21,22) is positioned for jam-fittingly engaging the anchor spool ring 61 by first positioning flip-flop slots 32 within the press head orientor 88 of press head 86 with the flip-flop slots 32 engaged by the keys 89. After the anchor spool 31 is pressed in place, the teeth 33 co-act with the locking segments 63 of the anchor spool ring 61 and the longitudinal ribs 67 to secure the same against axial dislodgment as well as torsional disengagement while the longitudinal ribs 67 align themselves between ones of the teeth 33.

After the anchor spool 31 and ribs 61 are securely locked the sleeve 40 is taken off of the anchor spool fixture 80 and the sponge block 50 is inserted so that the anchor spool 31 and anchor spool ring 61 nest within the anchor spool cutout 55 of the sponge block 50 as shown generally in the bottom portion of FIG. 26. The wringer spool fixture 90 has a base 91 and an upstanding mandrel 92. The mandrel 92 is provided with flip-flop locks 96 and orienting segment recesses 97. As will be seen, the mandrel 92 and locks 96 readily pass through the anchor spool 31. At the upper or free end portion of the mandrel 92 is a wringer spool ring engaging shoulder 93. Extending thereatop is the wringer spool guide 95 with wringer spool flip-flop slot locks 96. It will be seen that the flip-flop slots as well as their respective guides are smaller at the wringer spool end

of the mop head **20** than at the anchor spool end of the mop head **20.** This configuration not only facilitates the method of manufacture, but insures that the user positions the mop head properly on the wringer mop **10** so that the wringer spool **36** is always at the free end and engages the wringer spool snap assembly **35.** Positive orientation is insured when the orienting segments **65** are positioned within the mating mandrel segment pockets **97.**

After positioning as shown in FIG. **26,** the wringer spool **36** is positioned in alignment with the thus oriented wringer spool ring **62** as the orienting studs **75** are fitted within a press head (not shown) comparable to the anchor spool press head **86.** Thereafter the sleeve ends **70** are tucked into position into the central portion of the wringer spool ring **62** which, because its assembly collar **64** rides atop the wringer spool ring engaging shoulder **93,** can receive the free ends **70** of the sleeve **40.** Here again, the ends of the sleeve **40** are first tucked into place and the side portions which are cut out **71** secondarily positioned within the interior portion of the wringer spool ring **62** as shown diagrammatically in FIG. **26** awaiting the press fitting of the wringer spool **36.** Such sequence permits a neatly tucked in end configuration where only the wringer spool outer collar **37** appears to be holding the end **70** of the sleeve **40** in tucked relationship with the end of the sponge block **50.** As the wringer spool **36** is pressed into position, or hit with a rubber mallet, it takes the configuration as shown in FIG. **28** wherein the sleeve end **70** is secured against torsional displacement by the longitudinal ribs **69** of the wringer spool ring **62,** and further by the cooperation of the locking segment **68** and the wringer spool teeth **49** within the rib gaps **76.** Thereafter the completed mophead **20** is removed from the wringer spool fixture **90** and is ready for use with the wringer mop **10** illustrated in FIG. **1.**

In review it will be seen that a unique mop head **20** is provided in which the sponge block **50** may be encased in a porous sleeve **40** with the sleeve ends **70** both hidden and tucked interiorly of the anchor spool **31** and the wringer spool **36.** According to the preferred method of manufacture, simple and inexpensive fixturing may be employed which positively assures alignment of the flip-flop slots and the fixed head slots of the respective spools. The construction of the wringer spool ring **62** particularly with its assembly collar **64** not only assures ease of assembly, but also positively insures that the wringer spool and anchor spool will be properly aligned when assembled to the wringer mop **10.**

Although particular embodiments of the invention have been shown and described in full here, there is no intention to thereby limit the invention to the details of such embodiments. On the contrary, the intention is to cover all modifications, alternatives, embodiments, usages and equivalents of a mop head and method as fall within the spirit and scope of the invention, specification and the appended claims.

We claim:

1. For use with a wringer mop having a cantilever wringer shaft with an anchor support at one end and a mop head wringing member at its other end, a mop head comprising:

a rectangular sponge body portion

means defining a wringer shaft bore extending through the body,

a wringer spool for removable engagement with the free end of the wringer shaft,

an anchor spool for removable engagement with the anchor support,

a porous cloth sleeve having two ends closely encasing said rectangular sponge body and defining opposed pairs of overlying and underlying folds at opposed ends of said rectangular sponge body, the inner ends of said folds being positionally disposed within said wringer shaft bore,

a ring means securing said sleeve ends respectively to the wringer spool and anchor spool,

said spools being at opposed ends of the shaft bore of the sponge body,

opposed interlocking and radially interrupted offset rib means and teeth combination on at least one of said ring means and spool combinations, said offset rib means and teeth being interrupted radially to permit space for accommodating said porous cloth sleeve ends therebetween and for locking said sleeve ends permanently in position,

at least one of said sleeve ends being reversely folded interiorly and against one of said spools with the ring means disposed within said sponge body and in nesting engagement with said spool and reversely folded sleeve end, thereby securing and hiding said one free end of the sleeve within the sponge body.

2. In the mop head of claim **1,**

each of said ends of said sleeve being reversely folded on its respective spool, and,

each of said ring means securing the free ends of said sleeve between said respective ring means and said spools,

thereby securing and hiding both ends of the sleeve within the sleeve encased body.

3. In the mop head of claim **1,**

a run of locking teeth means clampingly engaging said sleeve ends at the connection between each ring means and spool.

4. In the mop head of claim **2,**

a run of locking teeth means clampingly engaging said sleeve ends at the connection between each ring means and spool.

5. In the mop head of claim **1,**

each spool having diametrically opposed rigid mounting slots,

each spool having diametrically opposed flip flop slots,

said rigid and flip flop slots being axially aligned from spool to spool,

said rigid and flip flop slot axes being substantially perpendicular to each other.

6. In the mop head of claim **2,**

each spool having diametrically opposed rigid mounting slots,

each spool having diametrically opposed flip flop slots,

said rigid and flip flop slots being axially aligned from spool to spool,

said rigid and flip flop slot axes being substantially perpendicular to each other.

7. In the mop head of claim **1,**

one of said ring means being a cup shaped member with an annular base, the annulus of which has a diameter less than the center bore of the opposed spool.

8. In the mop head of claim 2,
one of said ring means being a cup shaped member with an annular base, the annulus of which has a diameter less than the center bore of the opposed spool.

9. In the mop head of claim 3,
said run of teeth being formed on each spool,
each ring means having a cylindrical body portion, and
one end of each ring body portion having teeth row inwardly projecting segments for snap fittingly passing over the row of teeth and engaged portion of the encased sleeve end, thereby lockingly engaging the sleeve ends tucked interiorly of the sleeve engaged block.

10. In the mop head of claim 4,
said run of teeth being formed on each spool,
each ring means having a cylindrical body portion, and
one end of each ring body portion having teeth row inwardly projecting segments for snap fittingly passing over the row of teeth and engaged portion of the encased sleeve end, thereby lockingly engaging the sleeve ends tucked interiorly of the sleeve engaged block.

11. In the mop head of claim 10,
a longitudinal rib in each ring means for engagement between ones of said teeth to resist torsional disengagement of the sleeve ends.

12. In the mop head of claim 11,
a longitudinal rib in each ring means for engagement between ones of said teeth to resist torsional disengagement of the sleeve ends.

13. In the mop head of claim 3,
each said spool having an annular rim approximating the outer diameter of its corresponding ring means, whereby the sleeve ends are clamped between the rim and ring means in addition to the engagement by the row of teeth.

14. In the mop head of claim 4,
each said spool having an annular rim approximating the outer diameter of its corresponding ring means, whereby the sleeve ends are clamped between the rim and ring means in addition to the engagement by the row of teeth.

15. In the mop head of claim 10,
said spool having an annular rim approximating the outer diameter of its corresponding ring means, whereby the sleeve ends are clamped between the rim and ring means in addition to the engagement by the row of teeth.

16. In the mop head of claim 11,
said spool having an annular rim approximating the outer diameter of its corresponding ring means, whereby the sleeve ends are clamped between the rim and ring means in addition to the engagement by the row of teeth.

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