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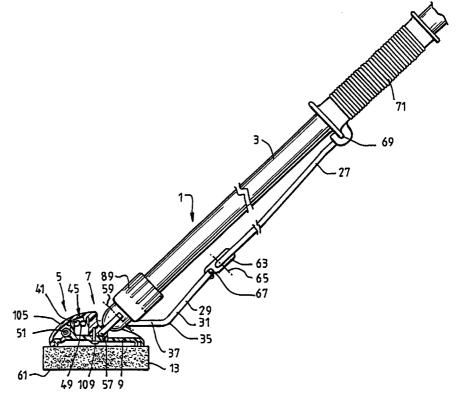
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(54) Title: MOPS

(57) Abstract

A mop is provided which has an elongate handle (3), a mop head (5), for carrying a squeezable sponge-like pad mop material (13). The mop has arm means (27, 29, 37, 39) which can be moved to effect squeezing of the mop material The mop has a two axis swivel connector (7) which has two mutually perpendicular axis (57 and 59). The arrangement is such that the mop head (5) can be swung to various angular orientations relative to the handle (3) and at the same time, the mop permits a two axis swivel connection and means to effect squeezing of the mop material (13). The mop also has the head provided with strengthening webs which resist torsional movement of the mop head as a consequence of squeezing of the mop material. The swivel connector (7) has a plate like part (73) with an axle (77) which defines axis (57). It also has a central opening (75) which defines an axis (59). Axis (59) is, in turn, provided by an axle (101) on another part (99). Part (99) can mate



with another part (85). Parts (85 and 99) form a tubular body with an internal screw thread. A collar (89) can be fitted over the external surfaces of the tubular body containing the screw thread (87). When the handle (3) is screw threaded into the screw thread of the body it radially expands the body tending to force it into tight engagement with the collar (89) and this, in turn, holds the assembly together.

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MOPS

FIELD OF THE INVENTION

This invention relates to mops and relates

particularly but not exclusively to synthetic foam head

mops.

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PRIOR ART

Hitherto, it has been known to provide mops with synthetic foam heads or similar material heads which can be squeezed. These mops differ from the traditional cotton thread mop. Many mops of this synthetic foam head type have been known in the past and some have incorporated mechanisms to assist squeezing of the mop. In one case, the mop head has a pair of wings which swing about an axis generally centrally of the mop handle in a direction which extends generally in the direction of pushing or pulling of the mop head by the mop handle. Such mop has a slideable collar which is fitted over the mop handle and pushing of the collar towards the mop head causes arm means to operate, to, in turn, swing the wings from an open position where they lie substantially co-plannar to a closed position where they are side-by-side and effect squeezing of the mop material.

Another known type of mop of this type has the mop head with a front portion and a rear portion relative to direction of pushing or pulling of the mop head by the mop handle. In this case, the front portion and rear portion are swingably connected together about an axis which extends transverse to the direction of pushing or pulling of the mop. A crank handle is provided on the mop handle which attaches with arm means to, in turn, cause swinging of the front portion and

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rear portion from an open co-plannar position to a closed side-by-side position to effect squeezing of the mop material.

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In all cases, the mop handle has been either rigidly fixed to the mop head or alternatively there has been a single pivot axis connection between the mop handle and the mop head. Clearly, such mops are unable to allow the mop head to be angularly orientated relative to the handle to fit in awkward positions during mopping owing to either the rigid connection of the handle to the mop head or the single axis swivel connection of the handle to the mop head.

In some mops of the squeezing type, the mop head is made of a synthetics plastics material and has been provided with internal strengthening ribs which run parallel to each other. We have realised that with such mop heads when operated to squeeze the mop material by operation of a crank handle to cause swinging of the mop head from an open coplanar position to a closed position that insufficient torsional rigidity is provided in the mop head itself. This, in turn, means that the mop material is not squeezed adequately as the opposed faces of the mop material are squeezed greater at one side than on the other side.

Further, in the case of a mop where the mop head has a pair of wings which swing about an axis generally centrally of the mop handle in a direction which extends generally in the direction of pushing or pulling of the mop head by the mop handle, when the wings are swung to lie substantially side-by-side to permit squeezing of the mop material, the mop material in the region of swinging of the wings tends to bunch and provide an unnecessary bulk to the squeezing. This, in turn,

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requires excessive force to be applied to effect the swinging closing movement of the wings.

OBJECT AND STATEMENT OF THE INVENTION

It is an object of the present invention to attempt to overcome one or more of the aforementioned problems.

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Therefore, according to a first broad aspect there may be provided a mop having an elongate handle, a mop head for carrying a squeezable sponge like pad mop material, said mop head being in a least two parts which can swing relative to one another so that in one swung condition the pad will be generally flat and unsqueezed and be useable as a mop, and in another swung condition so the pad will be squeezed,

mop squeeze arm means carried said mop head for causing said two parts to swing together between said one swung condition and said another swung condition,

there being a swivel connector interconnecting said mop head and said handle, said swivel connector having two mutually perpendicular swivel axis to enable said mop head to assume various angular orientations relative to said handle whilst said pad is engaged on a surface to be mopped,

there being stop means for preventing swivel movement of said mop head relative to said handle past a particular orientation when said squeeze arm is operated to squeeze said mop pad thereby permitting pressure to be applied to said mop head by said squeeze arm means to effect swinging of said two parts and squeezing of said pad.

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According to a second broad aspect of the present invention there may be provided a mop head having an elongated handle, a mop head carrying a squeezable sponge like mop material, said mop head having two wings supporting said mop material, each of said wings being separated by an intermediate mop head portion, said wings being swingable relative to said intermediate mop head portion about respective axis that extend along respective sides of said intermediate mop head portion, said axis being parallel to one another and extending in a direction of intended pushing or pulling of said mop head by said handle,

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the mop head being in a mop, in use, condition when the wings are open and generally co-plannar, and in a mop material squeezing condition when the wings are closed and side-by-side,

spring means urging said wings to said coplannar, in use, condition,

portion and said handle maintaining said mop head connected to said handle, said swivel connector having two mutually perpendicular swivel axis to enable said mop head to assume various angular orientations relative to said handle whilst a mop face of said mop material is fully engaged on a surface to be mopped,

said mop material being squeezable by operation of pushing a first squeeze arm towards said mop head,

said first squeeze arm being retained at one end relative to said handle and being retained at the opposite end to a second squeeze arm,

said second squeeze arm having a right hand arm and a left hand arm which respectively extend on the right hand side of said handle and the left hand side of

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said handle and pass over and contact tops of the corresponding wings of said mop head, said right hand arm and said left hand arm having respective end portions which are retained to said intermediate portion,

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said right hand arm, said left hand arm, and said end portions, acting to provide stops for said wings to maintain said wings in an open co-plannar position against the urging by said spring means, and when said first squeeze arm is pushed towards said mop head to cause pressure to be applied by said right hand arm and said left hand arm to the tops of the respective wings against the urging of the spring means to close said wing means to enable squeezing of said mop material,

said first squeeze arm having a first pivot axis where it is retained to said handle, said second squeeze arm having a second pivot axis where said end portions are retained to said intermediate portion, said first and said second pivot axis being generally parallel to one another,

said first squeeze arm and said second squeeze arm having two mutually perpendicular swivel axis connections where they are retained to each other, one of those axis being generally parallel to said first and said second pivot axis,

the various axis being such that said right hand arm and said left hand arm and said end portions will hold the wings substantially co-plannar regardless of the possible angular orientations assumed by the mop face to said handle.

It is particularly preferred that said end portions of said right hand arm and said left hand arm

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be retained to said intermediate portion at a position forward of connection of said swivel connector, relative to the direction of pushing of said mop head when the mop head is orthogonal to the longitudinal axis of the handle.

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It is also particularly preferred that said first squeeze arm be retained to said handle by a collar which is slideably carried on said handle, so that pushing or pulling said collar along said handle towards or away said mop head will cause corresponding pushing or pulling of said first squeeze arm to effect respective closing or opening of said wings.

It is also particularly preferred at least one of said first pivot axis, said second pivot axis, said one of said two axis connections of said first squeeze arm and said second squeeze arm, or the retaining connection where said end portions are retained to said intermediate mop head portion and allow relative rotation of said end portions relative to said intermediate position have a frictional component for swinging which will act against cranking forces tending to lift a front edge or a rear edge of the mop material from a surface which is being mopped as a result of pushing or pulling of the mop head by the mop head handle, thereby attempting to maintain said mop surface substantially wholly in contact with said surface being mopped.

It is particularly preferred that the frictional component be at said one axis of said two axis connections of said first squeeze arm and said second squeeze arm.

It is also particularly preferred that said frictional component be at said one axis of said two

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axis connections of said first squeeze arm and said second squeeze arm, at said second pivot axis, and where said end portions are retained to said intermediate mop head portion.

According to a third broad aspect there may be provided a swivel connector for interconnecting, a mop head, or like head with a handle, said connector having a body part forming part of a swivel joint for cooperation with a corresponding mating part of that swivel joint.

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said body part having a bore at one end which is internally screw threaded to screw threadably receive a screw threaded end of a handle.

said body part having two portions, one portion forming one side half of said bore and the other portion forming the other side half of said bore

said connector having a collar externally fitted over the two portions adjacent the screw thread of said bore to hold said portions together,

the connector being such that when said threaded end of said handle is tightly screw threaded into said bore it will radially outwardly move said portions into engagement with internal surfaces of said collar and assist in holding the handle screw fixed relative to the connector.

According to fourth broad aspect there may be provided a mop head for a foam mop material pad or like mop material pad said mop head having two wings for supporting said pad, each of said wings being generally rectangular in shape and separated by an intermediate mop head portion, said wings being swingable relative to said intermediate mop head portion about respective axis that extend along respective sides of said intermediate

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mop head portion, said axis being parallel to one another and extending in a direction of intended pushing or pulling of said mop head by said handle,

the mop head being in a mop, in use, condition when the wings are open and generally co-plannar, and in a pad squeezing condition when the wings are closed and side-by-side,

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said mop head being of synthetic plastics material, each of said wings having a series of strengthening webs extending on an underside thereof so that the free end faces of said strengthening webs define a surface for engaging with said mop material, said webs being elongate, some extending perpendicular to said axis, some extending transverse to said axis, and some extending diagonally across opposite corners of each of said wings.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention can be more clearly
ascertained an example of a preferred embodiment will
now be described with reference to the accompanying
drawings wherein:

Figure 1 is a side view of the example where the mop head is shown in part cross-section.

Figure 2 is a front elevation of the mop head of the mop shown in Figure 1 in part cross-section.

Figure 3 is a plan view of the mop head.

Figure 4 is a side view of the mop showing cranking as a result of pushing the mop by the mop handle.

Figure 5 is a view similar to that of Figure 4 but showing opposite direction cranking as a result of pulling on the mop handle.

Figure 6 is an isometric view of a prior art mop showing inadequate squeezing of the mop material due to torsional movement of the wings of the mop head.

Figure 7 is an underneath view of a mop head showing strengthening to inhibit against torsional twisting.

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Figure 8 is a rear isometric view of the mop head shown in Figure 7.

Figure 9 is a detailed close up side view of the 10 mop head showing squeezing of mop material.

Figure 10 is a front isometric view in close up showing an intermediate part of the mop head.

Figure 11 is a transverse cross-sectional view along section line 11-11 of Figure 10.

15 Figure 12 is a detailed view of the intermediate portion from a back of the mop head.

Figure 13 is a view similar to that of Figure 12 but from a front of the mop head.

Figure 14 is a plan view of the intermediate 20 part of the mop head.

Figure 15 is a transverse cross-sectional view of a cover for the intermediate part taken along section line 15-15 of Figure 17.

Figure 16 is a plan view in part section of the cover shown in Figure 15 and Figure 17.

Figure 17 is an underneath isometric view of the cover.

Figure 18 is a transverse cross-sectional view along section line 18 of Figure 3.

Figure 19 is a plan view of part of a swivel connector.

Figure 20 is an end view of the part of the swivel connector shown in Figure 19.

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Figure 21 is a top view of the part of the connector shown in Figure 19.

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Figures 22 and 23 are a front view and a transverse cross-sectional view respectively of another part of the connector.

Figure 24 and Figure 25 are transverse crosssectional views of the connector parts shown in Figures 22 and 23.

Figure 26 is an exploded isometric view of the part shown in Figures 19 through 21 and 22 through 25.

Figure 27 is a transverse cross-sectional view of the parts of the connector interfitted with a mop handle.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now firstly to Figures 1 through 3 it can be seen that there is provided a mop 1 having an elongate mop handle 3 and a mop head 5. The handle 3 may be of any convenient material such as wood, plastics or tubular steel. The transverse cross-section of the handle 3 is preferably round although other cross-sections are not excluded. A two axis swivel connector 7 connects the mop handle 3 to the mop head 5. The swivel connector 7 will be described in detail in due course.

The mop head 5 is of synthetic plastics material such as PVC and is of generally elongate rectangular shape and has a pair of wings 9 which connect with an intermediate mop head portion 11. By observing each of the Figures 1, 2 and 3 it can be seen that the wings 9 and the intermediate mop head portion 11 extend substantially co-plannar when in an, in use, mop position where the mop head is orthogonal to the longitudinal axis of the mop handle 3. This is the

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orientation depicted in Figures 1, 2 and 3.

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A squeezable synthetic sponge mop material 13 such as of PVA is held to the mop head 5 by appropriate nuts or studs 15 (one on each of the wings 9) which locate within half hemispherical elongate recesses 17 formed in a top part of the wings 9. The arrangement is clearly shown in Figure 3. The wing nuts or studs 15, in turn, connect with threaded studs which form an integral part of the mop material 13 for use on mops. The fitting of the mop material 13 to the mop head 5 is in a known manner used in existing mops.

The mop head 5 has each of the wings 9 able to swing about the side edges of the intermediate portion 11. Thus, a right hand wing 19 relative to a user standing behind the mop head 5 and holding the mop handle 3, can swing about an axis 21 (see Figure 3), and the left hand wing 23 can swing about an axis 25. Thus, the wings 9 can swing from an open position where they lie substantially co-plannar to one another and also coplanner with the intermediate portion, to a closed position (shown in Fig.9) where they lie substantially side-by-side and effect squeezing of the mop material The hinged connection for swinging about the axis 21 and 25 can be effected by a respective groove 111 (see Figs. 9, 10, 12, 13 & 14) and the resultant thinning of plastics material which forms the mop head 5. techniques for providing hinging of plastics in this way are well known and will not be described further herein.

The wings 9 can be swung from the opened

30 position to the closed position by operation of a first squeeze arm 27 which, in turn, can push against a second squeeze arm 29 (see Figure 1). The second squeeze arm 29 has a right hand arm 31 and a left hand arm 33.

These arms have a bend 35 (see Figure 1) so that there is a right hand arm portion 37, and a corresponding left hand arm portion 39 which lie directly over the top of the respective right hand wing 19 and left hand wing 23. 5 The portions 37 and 39 terminate with respective end portions 41 and 43. These portions 41, 43 also extend over the top of the right hand wing 19 and left hand wing 23. Each of the free ends of the end portions 41 and 43 are welded together as shown by region 45 in 10 Figure 3 only. The intermediate portion 11 has an upstanding post 47 comprising walls 113,114,115. The post 47 contains cut-outs 116 which provide a groove 49 in which the end portions 41 and 43 can be received (this is shown in Figure 1 but in more detail in Figures 15 10 & 11). The region 45 locates within the body of the post 47 and in the groove 49 and retains the second squeeze arm 29 to the head 5 at the intermediate portion 11.

It should therefore be appreciated that in the 20 positions shown in Figures 1, 2 and 3, the right hand arm portion 37, left hand portion 39, and end portions 41 and 43, act as stops for said wings to maintain the wings in an open co-plannar condition. Spring means 51 is provided to urge the wings 9 to the co-plannar 25 position so that the respective right hand wing 19 and left hand wing 23 are stopped by the respective right hand arm portion 37 and end portion 41, and the left hand arm portion 39 and end portion 43. The spring means 51 is connected to upstanding posts 53 (see 30 Fig. 10) moulded to the respective right hand wing 19 and left hand wing 23. The spring means 51 therefore extends over the top of the intermediate portion 11 as shown in Figures 1,2, & 3. Accordingly, when the wings

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9 are closed so that they assume a side-by-side relationship, the spring means 51 is extended and applies a force to the respective wings 9 in a direction to swing them back against the stops. Thus, when the first squeeze arm 27 is pushed forwardly towards the mop head 5, forces will be applied through to the second squeeze arm 29 which will, in turn, cause the respective right hand arm portion 37 and left hand arm portion 39 to bear against the upper surface of the top of the mop 10 head 5 at the respective wings 9 to, in turn, swing those wings to the closed position. In this condition the right hand arm portion 37 and left hand arm portion 39 bear against a rear portion of the respective wings 19 or 23 near the position shown by arrow 55 (see 15 Fig.3). Thus, in this position, a relatively downwardly directed force is applied to the mop head 5 as the second squeeze arm passes over the top of the rear of the wings 9. In other words, the spacing apart of the right hand arm portion 37 and left hand arm portion 39 20 remain constant and the rear portion of the mop head 5 passes between those arms. During this motion, there is relative rotation of the end portions 41 and 43 to the mop head 5. The axis of rotation is about the longitudinal axis of both end portions 41 and 43. 25 Simultaneously with the above, the mop head will crank about a swivel axis 57 (to be described directly) so that the mop handle and the mop head are located by a stop 56 (see Fig.1 and Figures 15 through 18). This stop 56 allows forces from the first squeeze arm to be 30 applied to the wings 9 to cause them to swing to the closed side-by-side condition where the mop material is squeezed.

The swivel connector 7 has two mutually

perpendicular swivel axes 57 and 59 (see Figure 1 and Figure 18). Thus, in use, the mop head 5 can assume various angular orientations relative to the mop handle 3 whilst a mop face 61 of the mop material 13 is engaged 5 on a surface being mopped. Thus, it can be appreciated by viewing Figure 1, that the handle 1 can move in an upward or downward direction or in a side to side direction about the swivel axes 57 and 59. connection between the first squeeze arm 27 and the 10 second squeeze arm 29 retaining those two arms together is such that this movement can occur. Thus, it can be seen that a connector 63 of suitable material such as plastics material has a first pivot axis 65 and a second pivot axis 67. For up and down swinging movement of the mop handle 3 the first squeeze arm 27 and the second 15 squeeze arm 29 swing about the second axis 67. When the mop handle 3 swings from side to side, the first squeeze arm 27 and the second squeeze arm 29 swing about the first axis 65. During such movement, the second squeeze 20 arm 29 does not move substantially relative to the mop head 5.

The first squeeze arm 27 is retained relative to the handle 3 about a swivel axis 69. The swivel axis 69 is on a collar 71 which is slideably received over the mop handle 3. Typically, the first squeeze arm is operated to push or pull by moving the collar 71 upwardly or downwardly of the mop handle 3.

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Details of the connector 7 are shown in Figures 19 through 27. The swivel connector 7 has a plate like 30 first part 73 which is generally 'D' shaped which has a central opening 75 and an axle 77 supported by two arms 78. The axle 78 permits swinging of the first part 73 about axis 57. The axle 77 locates in a groove 81

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provided in the intermediate portion 11.

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The swivel 7 has a second part 83 which is formed of two halves 85 and 99. The first half 85 has a tubular body with a screw threaded half bore 87 into which a mop handle 3 can be threadably received. The external surface of the tubular body is inclined by a shallow taper angle such as of 1° or 2° to receive a collar 89 (see figures 26 and 27). The body has a forward hemispherical shaped end 91 with a plannar dropped down face 93. It also has an upstanding hollow stud 95.

The second half 99 is almost identical to the first half 85 except that it has an upstanding hollow pivot axle 101 with a radially extending peripheral rim 97. The internal size of the hollow axle 95 is sufficient to receive the stud 95 on the first half 85. The combined dimensions of the dropped-down faces 93 on both halves is equal to the thickness of the plate like first part 73 when the two halves are brought together.

The fact that the stud 95 locates within the pivot axle 101 ensures that the two halves 85 and 99 align correctly. The stud 95 also provides support for the axle 101.

25 longitudinal extending openings 103 which are provided to permit snap fitting of the first part 73 to allow the rim 97 to pass through the opening 75. Thus, when the rim 97 is passed through the opening 75, the first part 73 is retained located relative to the second part 83.

30 The two halves 83 are then joined together by the hollow collar 89 which is tightly slideable over the externally shallow tapered body of the tubular bore 87. The collar 89 has an internal raised rib 90 at its forward end and

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this is arranged to snap lock into a circumferentially extending groove 92 on the two halves 85, 99 near the bottom of the hollow body.

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The handle 3 has one end screw threaded to cooperate with the screw thread of the bore 87. Thus,
when the handle 3 is tightly screwed into the bore 87
(as shown in Figure 27) it causes the two halves to move
radially outwardly into engagement with the internal
surfaces of the collar 89 to assist in holding the
handle screw fixed to the connector. This also, in
turn, holds the first part 73 retained to the second
part 83.

The mop head 5 has an intermediate portion 11, top cover part 105 which has a corresponding groove 107 to the groove 81, and the top cover part 105 is held to the intermediate portion 11 by a screw 109 (see Figure 18). Thus, the grooves 81 and 107 hold the axle 77 of the first part 73 captive and provide bearing supports therefore for permitting rotation about the axis 57.

When the top cover part 105 is fitted to the intermediate portion 11, a tongue 117 at a forward end of the cover part 105 fits into an opening 119 in the intermediate portion 11. Thus, when the cover part 105 is fitted over the intermediate portion 11 and held thereto by the screw 109 passing through an aperture 121 in the intermediate portion 11, the cover 105 substantially hides the spring means 51 and the end portions 41 and 43 of the right hand arm portion 37 and left hand arm portion 39 of the second squeeze arm 29.

The tongue 117 provides location of and support for the cover part 5 at the front of the mop.

Half circular cut-outs 123 are provided in side portions 125 of the cover part 105 and these act to hold

the end portions 41, 43 of the second squeeze arm 29 relative to the mop head 5. These cut-outs 123 ensure that the end portions 41 and 43 are maintained in the groove 81.

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By inspecting Figure 17 it can be seen that the cover 105 has an in-turned lip 129. This is also shown in Figure 18. The cover 105 can be clipped over the intermediate portion in an hinging manner from one side as shown in Figure 18 so that it can assume a correct position so that the fastening screw 109 can be passed through the aperture 121 to permit holding of the cover relative to the intermediate portion 11.

Referring now to Figure 6 which is a perspective view of a prior art mop having two wings, and shown in 15 the side-by-side relationship squeezing mop material, it can be seen that the second squeeze arm 29 applies a pressure from the first squeeze arm 27 via the external surfaces of the respective wings 9. The arrangement is such that there is an angle θ applied between the 20 opposed faces of the mop material 13. This occurs because of the relatively low torsional rigidity of each of the wings 9 and because of the resultant forces of the mop material 13 acting to push the wings 9 apart. Ideally, in order to provide effective squeezing of the 25 mop material 13, the wings 9 should not torsionally deflect as shown. In prior art mop heads the wings are usually made of a plastic material such as PVC. Longitudinally extending strengthening ribs are provided on the under surface of the wings 9 to provide lateral 30 support during mopping when the wings are extended in a co-plannar arrangement. However, no consideration has been made to the torsional problem outlined above. have determined that a plastics material mop head can be

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modified with strengthening ribs to alleviate the torsional problems of the prior art mop heads. In this connection, Figure 7 shows an arrangement of ribs to alleviate this problem. The ribs 129 are provided on the under surface of the wings 9 and generally comprise an outer perimeter wall or rib 131, with longitudinally extending ribs 133, a series of other ribs 135 which extend transversely, and further ribs 137 which extend diagonally across opposite corners of each of the wings 9. The free end faces of these strengthening ribs define a surface for engaging with the mop material.

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The shape of these strengthening ribs resists the torsional movement as exemplified in the prior art example of Figure 6.

Figure 8 shows that each wing 9 has an upwardly raised upper surface which is provided with recessed cup-shaped depressions 17 to permit fastening of the mop material as explained previously and so that the retaining means such as nuts or studs will be below the upper-most level of the raised upper surface.

Figure 9 shows an arrangement where the mop head 5 has the wings 9 swung to positions where they are in side-by-side arrangement and squeezing the mop material 13. It can be seen in Figures 12 and 13 that the undersurface of the intermediate mop head portion 11 is spaced away from the free end faces of the strengthening webs 133 through a distance 137. Thus, when the mop material, in the form of a synthetic foam mop, is attached to the mop head 5 it will not bear upon the undersurface of the intermediate mop head portion 11 when the wings 9 are co-plannar to one another in a mop, in use, position. This, in turn, provides a space 139 for the mop material 13 when the wings 9 are in the

side-by-side relationship shown in Figure 9. This, in turn, relieves pressure on the squeezing action of the mop material 13 as, otherwise, the mop material 13 would bunch up in the region of the intermediate portion 11 and resist closing of the wings 9 to squeeze the mop material.

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It should therefore be seen that the axis 69, 67 and 57 are substantially parallel to one another. It should also be seen that the axis 59 and 65 are substantially parallel to one another and mutually perpendicular to the axis 69, 67 and 57. Thus, it can be seen that the first squeeze arm 27 has a first pivot axis 69 where it is retained to the handle 3 and the second squeeze arm 29 has a pivot axis where the end portions 41, 43 are retained to the intermediate portion 11.

It should also be noted that the pivot axis along the end portions 41, 43 is also parallel with the axis 57, 67 and 69. The central longitudinal axis of the portions 41, 43 is positioned forwardly of the axis 57 and therefore forward of the swivel connector 7.

By observing Figures 4 and 5 it can be seen that when pushing or pulling the mop handle 3, the mop head 5 tends to crank either clockwise or anticlockwise.

Figure 4 shows the situation where the mop handle 3 is pushed relative to the mop head 5 such that the mop head 5 travels forwardly over a surface being mopped. Figure 5 shows the opposite where the mop handle 3 is pulled thus dragging the mop head 5 towards the operator of the mop. Thus, the mop head 5 tends to crank clockwise or anticlockwise. It has been found that if a frictional component is provided to swinging about at least one of the axis of the end portions 41, 43, axis 67, and axis

69, and also axis 57, that this cranking can be minimised. Preferably, the frictional component is at each of those axis although it appears that providing the component at axis 69 does not greatly assist in minimising the problem.

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Figure 1 shows that the intermediate, cover part 105 is held to the head 5 by a screw 109. tightening the screw 109 can cause increased frictional resistance to be applied to the axle 77 and or the end portions 41, 43 as the cover is drawn more tightly onto the head 5. It is also particularly preferred that the connector 63 has a tight frictional fit relative to the second squeeze arm 29 to apply frictional resistance to rotation about axis 67. It has been found that by providing frictional resistance to swinging about axis 67, that with only minimal frictional resistance applied at the other axis, the mop head 5 can be substantially inhibited from cranking in either clockwise or anticlockwise directions during normal mopping procedures. The exact amount of friction required is not clear but the swinging connection is such that to achieve this result there should be resistance which does not prevent free swinging of the first squeeze arm 27 relative to the second squeeze arm 29 unless considerable force is applied. The exact force is to be found by experimentation and moulding tolerances in the connector 63 relative to the second squeeze arm 29. is noted that the connection for permitting swinging about axis 67 is a snap fitting connection. Thus, the tolerances are devised to provide for the necessary frictional resistance. It should be noted that the first squeeze arm 27 and the second squeeze arm 29 are produced from round galvanised steel rod.

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Modifications may be made to the invention as would be apparent to persons skilled in the mop arts.

These and other modifications are deemed within the scope of the invention the nature of which is to be determined by the aforegoing description.

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CLAIMS:

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1. A mop having an elongate handle, a mop head for carrying a squeezable sponge like pad mop material, said mop head being in a least two parts which can swing relative to one another so that in one swung condition the pad will be generally flat and unsqueezed and be useable as a mop, and in another swung condition so the pad will be squeezed,

mop squeeze arm means carried said mop head for causing said two parts to swing together between said one swung condition and said another swung condition,

there being a swivel connector interconnecting said mop head and said handle, said swivel connector having two mutually perpendicular swivel axis to enable said mop head to assume various angular orientations relative to said handle whilst said pad is engaged on a surface to be mopped,

there being stop means for preventing swivel

movement of said mop head relative to said handle past a
particular orientation when said squeeze arm is operated
to squeeze said mop pad thereby permitting pressure to
be applied to said mop head by said squeeze arm means to
effect swinging of said two parts and squeezing of said

pad.

- 2. A mop as claimed in claim 1 wherein said mop head has an axis of swinging of its at least two parts which extends transverse to the direction of pulling or pushing of the mop head by the mop handle when the handle is orthogonal to the mop head, so that one of the two parts is a front part and the other part is then a rear part.
- A mop as claimed in claim 1 wherein said mop

head has an axis of swinging of its at least two parts which extends generally in the direction of pushing or pulling of the mop handle so that one part is a wing which extends from a right hand side of the central axis of the mop handle and the other part is another wing which extends from the left hand side of the central axis of the mop handle when the handle is orthogonal to the mop head.

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4. A mop having an elongated handle, a mop head for carrying a squeezable sponge like pad mop material, said mop head having two wings supporting said pad, each of said wings being separated by an intermediate mop head portion, said wings being swingable relative to said intermediate mop head portion about respective axis that extend along respective sides of said intermediate mop head portion, said axis being parallel to one another and extending in a direction of intended pushing or pulling of said mop head by said handle when said handle is orthogonal to the mop head,

the mop head being in a mop, in use, condition when the wings are open and generally co-plannar, and in a pad squeezing condition when the wings are closed and side-by-side,

plannar, in use, condition,
a swivel connector interconnecting said intermediate
portion and said handle maintaining said mop head
connected to said handle, said swivel connector having
two mutually perpendicular swivel axis to enable said
mop head to assume various angular orientations relative
to said handle whilst a mop face of said pad is fully
engaged on a surface to be mopped,

said intermediate position carrying stop means

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to prevent said mop head and said handle cranking past said stop means,

said pad being squeezable by operation of pushing a first squeeze arm towards said mop head,

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said first squeeze arm being retained at one end relative to said handle and being retained at the opposite end to a second squeeze arm,

said second squeeze arm having a right hand arm and a left hand arm which respectively extend on the right hand side of said handle and the left hand side of said handle and pass over and contact tops of the corresponding wings of said mop head, said right hand arm and said left hand arm having respective end portions which are retained to said intermediate portion,

said right hand arm, said left hand arm, and said end portions, acting to provide stops for said wings to maintain said wings in an open co-plannar position against the urging by said spring means,

and when said first squeeze arm is pushed towards said mop head said stop means will prevent cranking of said mop head relative to said handle past said stop means, pressure will then be applied by said right hand arm and said left hand arm to the tops of the respective wings against the urging of the spring means to close said wings to enable squeezing of said mop material,

said first squeeze arm having a first pivot axis where it is retained to said handle, said second squeeze arm having a second pivot axis where said end portions are retained to said intermediate portion, said first and said second pivot axis being generally parallel to one another,

said first squeeze arm and said second squeeze arm having two mutually perpendicular swivel axis connections where they are retained to each other, one of those axis being generally parallel to said first and said second pivot axis,

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the various axis being such that said right hand arm and said left hand arm and said end portions will hold the wings substantially co-plannar regardless of the possible angular orientations assumed by the mop face of said pad to said handle.

- 5. A mop as claimed in claim 4 wherein said end portions of said right hand arm and said left hand arm are retained to said intermediate portion at a position forward of connection of said swivel connector, relative to the direction of pushing of said mop head when the mop head is inclined for pushing.
- 6. A mop as claimed in claim 4 wherein said first
 20 squeeze arm is retained to said handle by a collar which
 is slideably carried on said handle, so that pushing or
 pulling said collar along said handle towards or away
 said mop head will cause corresponding pushing or
 pulling of said first squeeze arm to effect respective
 25 closing or opening of said wings.
- 7. A mop as claimed in claim 4 wherein at least one of said first pivot axis, said second pivot axis, said one of said two axis connections of said first squeeze arm and said second squeeze arm, or the retaining connection where said end portions are retained to said intermediate mop head portion and allow relative rotation of said end portions relative to said

intermediate portion, have a frictional component for swinging which will act against cranking forces tending to lift a front edge or a rear edge of the mop material from a surface which is being mopped as a result of pushing or pulling of the mop head by the mop head handle, thereby attempting to maintain said mop surface substantially wholly in contact with said surface being mopped.

8. A mop as claimed in claim 7 wherein said
10 frictional component is at said one axis of said two
axis connections of said first squeeze arm and said
second squeeze arm.

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- 9. A mop as claimed in claim 7 wherein said frictional component is at said one axis of said two axis connections of said first squeeze arm and said second squeeze arm, at said second pivot axis.
- 10. A swivel connector for interconnecting, a mop head, or like head with a handle, said connector having a body part forming part of a swivel joint for cooperation with a corresponding mating part of that swivel joint.

said body part having a bore at one end which is internally screw threaded to screw threadably receive a screw threaded end of a handle.

said body part having two portions, one portion forming one side half of said bore and the other portion forming the other side half of said bore

said connector having a collar externally fitted over the two portions adjacent the screw thread of said bore to hold said portions together,

the connector being such that when said threaded end of said handle is tightly screw threaded into said bore it will radially outwardly move said portions into

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engagement with internal surfaces of said collar and assist in holding the handle screw fixed relative to the connector.

- 11. A swivel connector as claimed in claim 10 wherein said collar is snap fittable over said portions.
- 12. A swivel connector as claimed in claim 10 wherein said part of the swivel joint is a pivot axle defining one swivel axis of said swivel connector.
- 13. A swivel connector as claimed in claim 12 wherein the pivot axle is provided on one portion only.

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- 14. A swivel connector as claimed in claim 12 wherein the pivot axle is carried by one portion and is hollow, and a stud carried on the other portion is provided to be received within the hollow pivot axle when the two portions are brought together, thereby locating both portions relative to one another.
 - 15. A swivel connector as claimed in claim 14 wherein the pivot axle has a raised radially outwardly extending rim adjacent a free end of the pivot axle to permit an axle recess in the corresponding mating part of the swivel joint to be snap fitted thereover.
 - 16. A swivel connector as claimed in claim 12 wherein the pivot axle has longitudinal axially extending reliefs in the side walls to permit flexing of those side walls during the snap fitting of said corresponding mating part thereover.
 - 17. A connector as claimed in claim 12 wherein the external surfaces of said body part which receive said collar have a shallow taper.
- 30 18. A connector as claimed in claim 10 wherein a snap lock groove is provided in the external surface of said body for receipt of a snap lock lip of said collar.

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19. A connector as claimed in claim 18 wherein said groove is adjacent a bottom of said bore.

20. A connector as claimed in claim 10 wherein the end of said body opposite to the end of the bore is hemispherical.

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- 21. A connector as claimed in claim 10 wherein the corresponding mating part is a plate which can swing about said pivot axle in a slot at the end of the body.
- 22. A connector as claimed in claim 21 wherein said slot is a closely fitting slot relative to the external surfaces of said plate.
 - 23. A connector as claimed in claim 21 where in said plate has an axle of a further swivel axle said further swivel axis being mutually perpendicular to the swivel axis of said swivel joint, thereby providing a two axis swivel joint connector.
- 24. A mop head for a foam mop material pad or like mop material pad said mop head having two wings for supporting said pad, each of said wings being generally rectangular in shape and separated by an intermediate mop head portion, said wings being swingable relative to said intermediate mop head portion about respective axis that extend along respective sides of said intermediate mop head portion, said axis being parallel to one another and extending in a direction of intended pushing or pulling of said mop head by said handle,

the mop head being in a mop, in use, condition when the wings are open and generally co-plannar, and in a pad squeezing condition when the wings are closed and side-by-side,

said mop head being of synthetic plastics
material, each of said wings having a series of
strengthening webs extending on an underside thereof so

that the free end faces of said strengthening webs define a surface for engaging with said mop material, said webs being elongate, some extending perpendicular to said axis, some extending transverse to said axis, and some extending diagonally across opposite corners of each of said wings.

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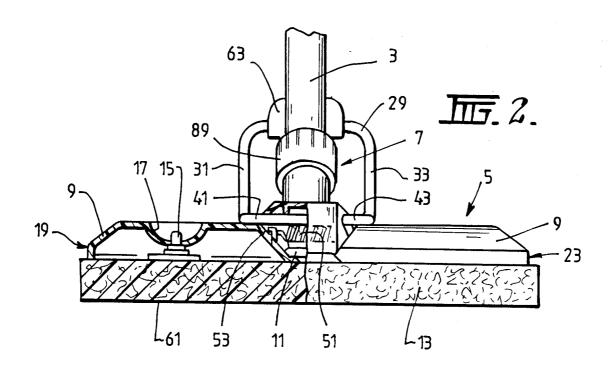
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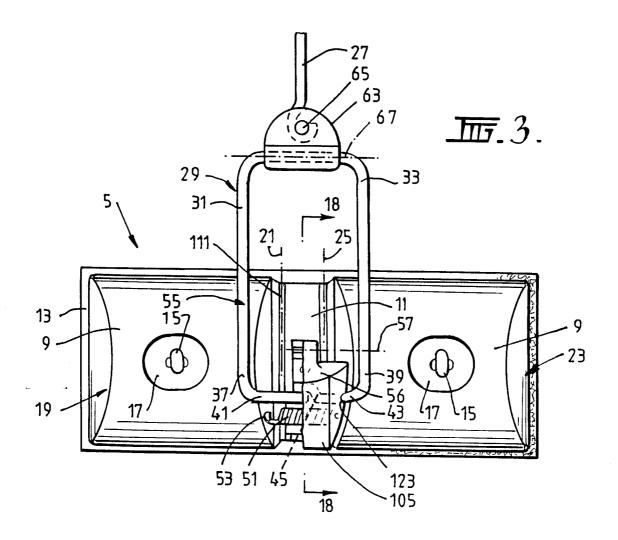
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- 25. A mop head as claimed in claim 24 wherein each wing has a peripherally extending wall which extends from the underside so that the free end faces of said wall are generally co-plannar with the free end faces of said strengthening webs.
- 26. A mop head as claimed in claim 24 wherein an upper surface of each of said wings is upwardly raised and provided with a recessed cup shaped depression with an aperture in a bottom of the cup shaped depression, the aperture permitting the passing of a mounting stud of the pad therethrough so that retaining means can be fitted over the mounting stud to hold the pad to the mop head and so the retaining means will be below the uppermost level of the raised upper surface.
 - 27. A mop head as claimed in claim 24 wherein the undersurface of the intermediate mop head portion is spaced from the free end faces of the strengthening webs so that it will not touch the upper surface of said pad when said wings are open and generally co-planner, thereby allowing a space for mop material to occupy when said wings are side-by-side in a pad squeezing condition.
- 28. A mop head as claimed in claim 24 wherein said intermediate portion carries a swivel joint part of a swivel connector for permitting a handle to be connected to said mop head via said swivel connector.
 - 29. A mop head as claimed in claim 28 wherein said

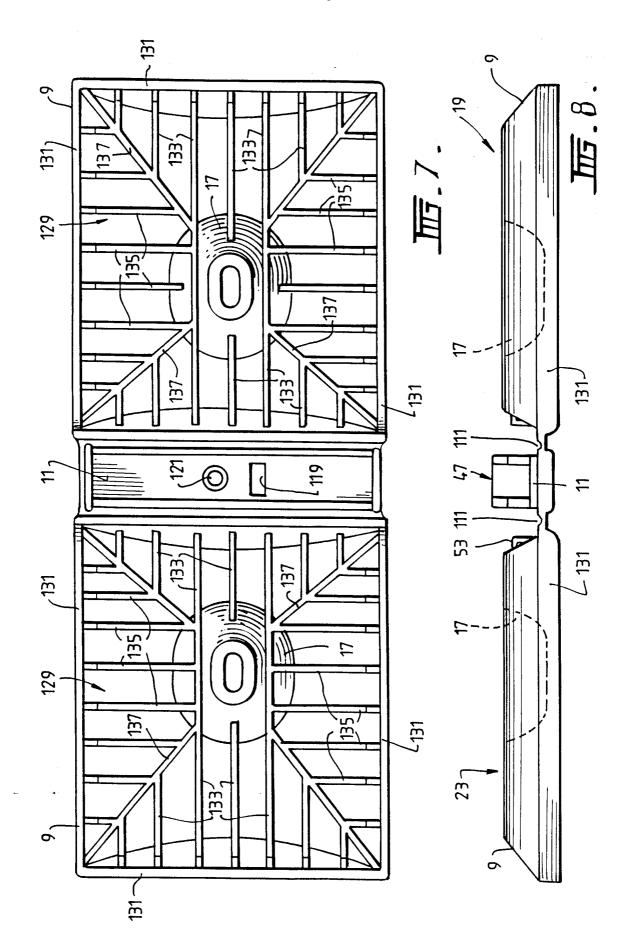
- 30 -

intermediate part carries a stop for inhibiting angular swivel swinging of said handle past a given angle where said handle is upright relative to said mop head.

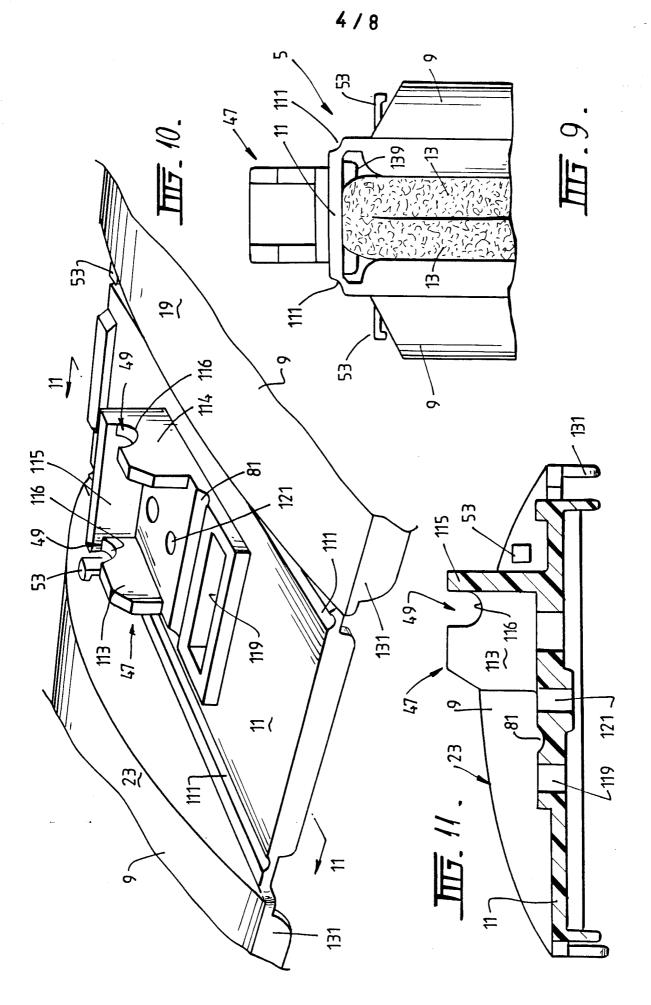




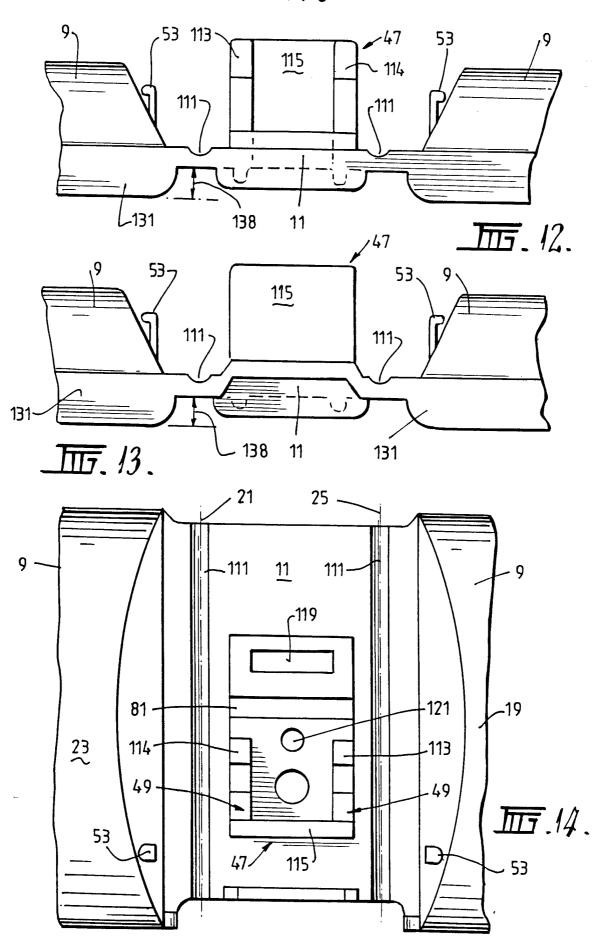
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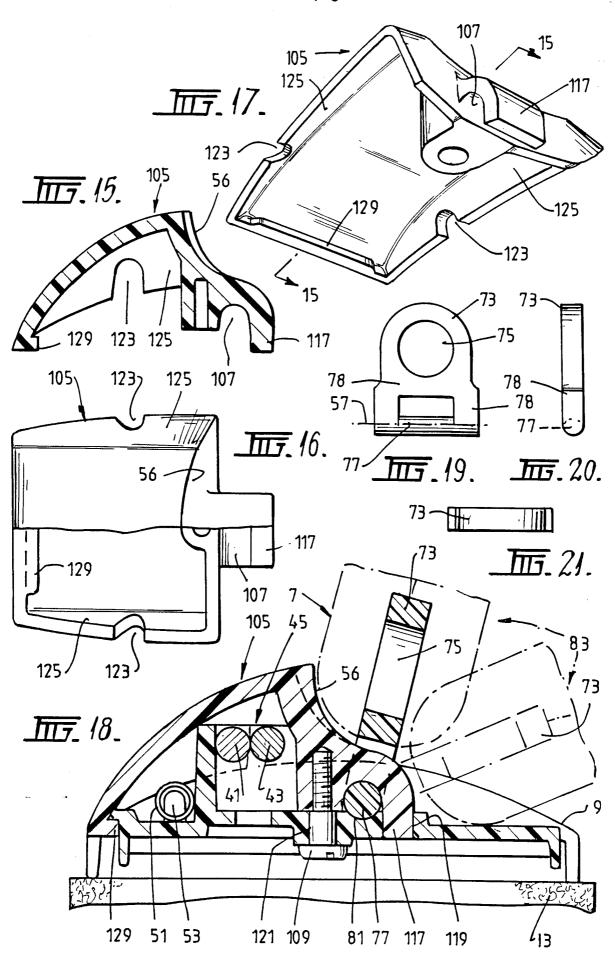


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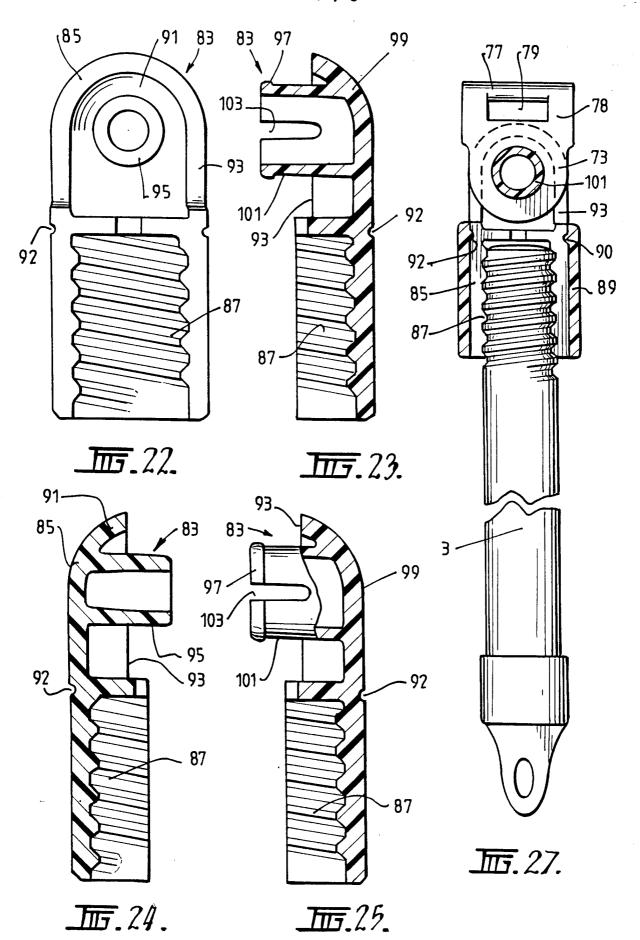


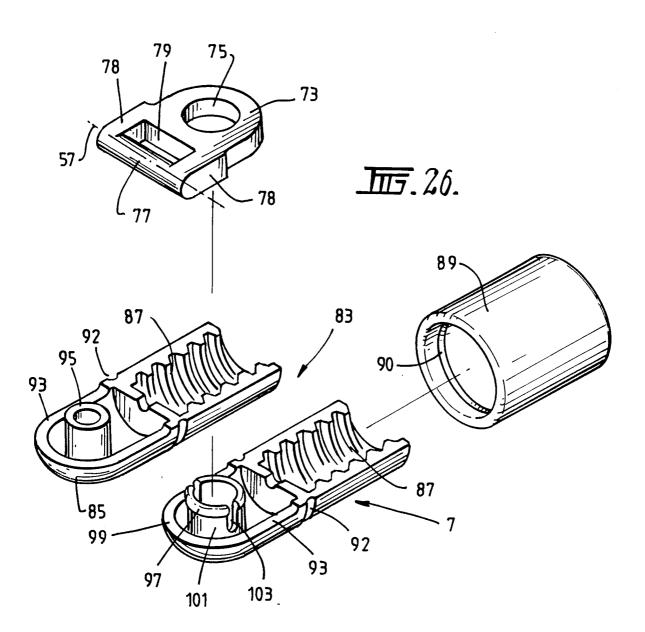
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International Application No. PCT/AU 98/00217

CLASSIFICATION OF SUBJECT MATTER					
A47L 13/258; B25G 3/20, 3/28, 3/38; F16B 7/18	, 37/10				
International Patent Classification (IPC) or to bot	h national classification and IPC				
FIELDS SEARCHED					
mentation searched (classification system followed by	classification symbols)				
n searched other than minimum documentation to the ex	ctent that such documents are included in	the fields searched			
base consulted during the international search (name of	of data base and, where practicable, search	ı terms used)			
DOCUMENTS CONSIDERED TO BE RELEVAN	T				
Citation of document, with indication, where ap	opropriate, of the relevant passages	Relevant to claim No.			
AU 39323/68, A, (EVERYDAY BRUSHES LT Figure 5 and page 6 lines 1-9.	D) 8 January 1970	24, 25			
DE 2347667, A, (HENNING) Whole document		10-23			
EP 352542, A, (VENDO COMPANY) Whole document		10-23			
Further documents are listed in the continuation of Box C	X See patent family an	nex			
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the internation priority date and not in conflict with the appl understand the principle or theory underlying document of particular relevance; the claimed be considered novel or cannot be considered inventive step when the document of particular relevance; the claimed document of particular relevance; the claimed combined with one or more other such document of particular relevance; the claimed document of particular					
ual completion of the international search	Date of mailing of the international search report				
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N PATENT OFFICE					
(02) 6285 3929	Telephone No.: (02) 6283 2544				
	International Patent Classification (IPC) or to bot FIELDS SEARCHED Immentation searched (classification system followed by the searched other than minimum documentation to the expectation of document, with indication, where are all base consulted during the international search (name of the searched other than minimum documentation to the expectation of document, with indication, where are all all and	A47L 13/258; B25G 3/20, 3/28, 3/38; F16B 7/18, 37/10 International Patent Classification (IPC) or to both national classification and IPC FIELDS SEARCHED Imentation searched (classification system followed by classification symbols) The searched other than minimum documentation to the extent that such documents are included in a searched other than minimum documentation to the extent that such documents are included in a searched other than minimum documentation to the extent that such documents are included in a searched other than minimum documentation to the extent that such documents are included in the consultation of document, with indication, where appropriate, of the relevant passages AU 39323/68, A, (EVERYDAY BRUSHES LTD) 8 January 1970 Figure 5 and page 6 lines 1-9. DE 2347667, A, (HENNING) Whole document EP 352542, A, (VENDO COMPANY) Whole document Further documents are listed in the continuation of Box C al categories of cited documents: ment defining the general state of the art which is insidered to be of particular relevance the ational filing date ment which may throw doubts on priority claim(s) ich is cited to establish the publication date of er citation or other special reason (as specified) nent which may throw doubts on priority claim(s) ich is cited to establish the publication date of er citation or other special reason (as specified) nent which may throw doubts on priority claim(s) ich is cited to establish the publication date of er citation or other special reason (as specified) nent with once or more other succombination being obvious to a personal published prior to the international filing but later than the priority date claimed ual completion of the international search Date of mailing of the international sear of 4 June 1998 (04.06.98 Authorized officer Date of mailing of the international sear of 4 June 1998 (04.06.98 Authorized officer			

International Application No.
PCT/AU 98/00217

C (Continua	tion) DOCUMENTS CONSIDERED TO BE RELEVANT	:
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	GB 2088202, A, (NALIN MATIERE PLASTICHE SRL)	
Y	Figure 1 and page 2 lines 1-6	24, 25
	GB 2203932, A, (SPONTEX LTD) 2 November 1988	
Y	See page 10 lines 13-17	24, 25
	FR 2229511, A, (SABLE FRERES INTERNATIONAL S.A.) 13 December 1974	
A	whole document	1-29
	FR 2492719, A, (MANCRET PERE ET AL) 30 April 1982	
Α	whole document	10-23
	FR 2640 336, A, (JOUVE) 15 June 1990	
Α	whole document	10-23
Α	US 4165550 A (BURKE) 28 August 1979.	
11	whole document	1-29

International Application No. PCT/AU 98/00217

Box 1	Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)
This Interreasons:	rnational Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following
1.	Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
2.	Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3.	Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)
Box II	Observations where unity of invention is lacking (Continuation of item 2 of first sheet)
This Inte	rnational Searching Authority found multiple inventions in this international application, as follows:
See sı	applementary page
1.	As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2.	As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.	As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.	No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
Remark	on Protest
	No protest accompanied the payment of additional search fees.

International Application No. PCT/AU 98/00217

Continuation of Box II

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

- 1. Claims 1-3 & 4-9 are directed to a mop including a mop head, handle, mop squeeze arm means, a several connector and a stop means for preventing movement of said mop head relative to the handle past a particular orientation thereby permitting the mop head to be squeezed. The stop means is considered to be the first special technical feature comprises a first "special technical feature".
- 2. Claims 10-23 are directed to a swirl connector in which the body part has internal screw threads and is in two portions. The connector also has an external collar which fits over the body part, such that, when a handle is screwed into the body parts, the body parts radially expand and engage the collar. The radial spreading action and resultant engagement of the collar by the body parts is considered to be the second separate special technical feature. It is considered that claims 24-29 are directed to a mop head of the 'wing' type and each wing of the mop head has strengthening webs. These webs are considered to be the third separate special technical feature comprises a second "special technical feature".

Since the above mentioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

Information on patent family members

International Application No. **PCT/AU 98/00217**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member				
2347667			NO	FAMILY	MEMBER	
352542	AU	36183/89	CA	1326386	DE	68924674
	EP	352542	JP	2209612	NZ	229982
	US	4974888				
2088202	FR	2494578				
2203932	AU	15210/88				
2229511			NO	FAMILY	MEMBER	
2492719			NO	FAMILY	MEMBER	
4165550			NO	FAMILY	MEMBER	
	2347667 352542 2088202 2203932 2229511 2492719	Report 2347667 352542 AU EP US 2088202 FR 2203932 AU 2229511 2492719	Report 2347667 352542 AU 36183/89 EP 352542 US 4974888 2088202 FR 2494578 2203932 AU 15210/88 2229511 2492719	Report 2347667 NO 352542 AU 36183/89 CA EP 352542 JP US 4974888 2088202 FR 2494578 2203932 AU 15210/88 2229511 NO NO	2347667 NO FAMILY 352542 AU 36183/89 CA 1326386 EP 352542 JP 2209612 US 4974888 2088202 FR 2494578 2203932 AU 15210/88 2229511 NO FAMILY 2492719 NO FAMILY	Report 2347667 NO FAMILY MEMBER 352542 AU 36183/89 CA 1326386 DE EP 352542 JP 2209612 NZ US 4974888 V V 2088202 FR 2494578 V V 2203932 AU 15210/88 NO FAMILY MEMBER 2492719 NO FAMILY MEMBER

END OF ANNEX