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LATCH MECHANISM

Filed May 17, 1963

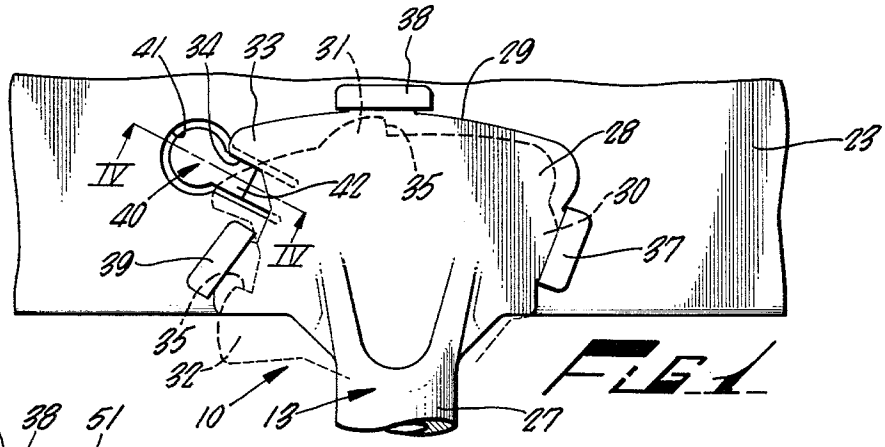


FIG. 1

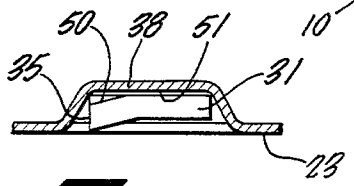


FIG. 5

FIG. 2

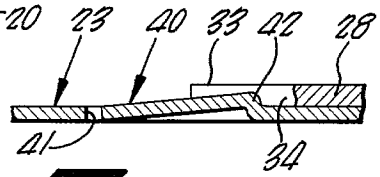


FIG. 4

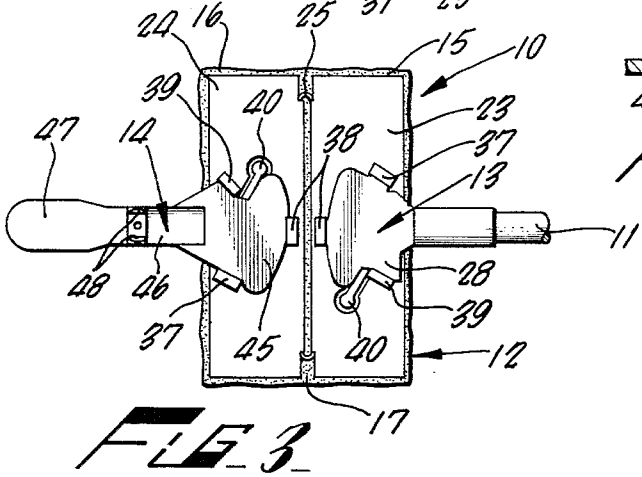


FIG. 3

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LATCH MECHANISM

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The present invention relates to latch mechanisms, and more particularly to latch mechanisms for mounting a handle to a mop head, for example.

While the present invention has relation to apparatus for coupling together a pair of structural elements in rigid but releasable connection, the invention is described herein in conjunction with a self-wringing mop as a presently preferred embodiment of the invention. A self-wringing mop according to the present invention constitutes an improvement over the self-wringing mop disclosed in United States Patent 2,869,161, issued January 20, 1959, to Virgil K. Cooper.

In presently available mops, whether or not of the self-wringing type, a mop handle is either secured hingably to a mop backing member or rigidly and non-releasably to an element for mounting the absorbent part of the mop.

As noted above, the present invention provides that the operating head of the mop is releasably yet rigidly connected to a mop handle. This connection is accomplished between a backing member and a mounting member connected to the mop handle and provides a simple, firm and quickly releasable connection between the mop handle and mop head. Actuation of the latch mechanism is accomplished rapidly without the use of special tools.

Generally speaking, the present invention provides latch means for releasably securing together a first member and a second member. The first member has a plurality of lugs projecting therefrom at locations defined according to a predetermined pattern. A corresponding plurality of lug receptacle means are disposed on the second member according to the predetermined pattern. A detent element is provided on one of the members and is engagable as described below with the other of the members. To assemble the members together into latched condition one of the lugs is engaged with a corresponding receptacle means and the members are pivoted relative to one another about the engaged lug and receptacle means until the remaining lugs and receptacle means are engaged. The detent element is so disposed that it is engagable with the other of the members when all lugs are engaged with their corresponding receptacle means to maintain releasable engagement of the lugs and receptacle means. The members are disengaged by disengaging the detent element from the other member and pivoting the members relative to one another in an opposite direction.

In a presently preferred embodiment of the latch mechanism, the detent element is formed integral with the member on which the receptacle means are arranged. It is also preferred that the receptacle means be formed integral with the second member.

The above mentioned and other features of the present invention are more clearly set forth in the following detailed description and explanation of the present invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of a latch mechanism according to the present invention showing an alternate position of the mounting member in dotted lines;

FIG. 2 is a cross-sectional elevation view of a self-wringing sponge mop constituting a preferred embodiment of the present invention;

FIG. 3 is a top plan view of the self-wringing sponge mop illustrated in FIG. 2 in its open condition;

FIG. 4 is an enlarged cross-sectional elevation view taken along line IV—IV of FIG. 1; and

FIG. 5 is an enlarged cross-sectional view through an engaged lug and lug receptacle means.

In the following description and in the accompanying drawings identical character numbers refer to identical elements of structure.

Referring initially to FIGS. 1, 2, and 3, a self-wringing mop **10** is illustrated. The mop includes an elongated handle **11** which preferably is fabricated of wood, a body of moisture absorbent material **12**, absorbent material mounting member **13** which is secured to the lower end of the shaft, and a wringer arm **14**. In a presently preferred embodiment of the invention illustrated in the drawings, the moisture absorbent material comprises a pair of sponge-like pads **15** and **16** which are of elongated block shape and extend transversely to the longitudinal axis of handle **11**. Pads **15** and **16** preferably are fabricated from natural or plastic sponge-like material which is soft, porous and water absorbent. Pads **15** and **16** are disposed in side-by-side relationship and are preferably joined integrally along a common edge **17**. As is best seen in FIG. 2, in cross-sectional shape the pads each have a rectangular base portion **18** and **19**, respectively, surmounted by a front portion **20**, **21**, respectively, meeting at an apex angle of approximately 90°. Both pads are of the same shape and size with the base portions thereof being joined integrally along the common side. The particular angular shape of pads **15** and **16** is highly desirable to obtain the proper wringing action as will hereinafter be described.

One of a pair of elongated rectangular backing members **23** and **24** is secured by a suitable adhesive to the back of each pad for supporting the pad. Preferably each backing member is fabricated from heavy gauge sheet metal to provide a substantially rigid base for the sponge pads; a molded plastic may be used if desired. The backing plates are disposed parallel to one another and parallel to common edge **17** of pads **15** and **16**. As illustrated in FIGS. 2 and 3, the adjacent edges of backing plates **23** and **24** are rolled over to journal opposite sides of an elongated hinge loop **25** so that the backing plates are pivotable relative to one another about common edge **17** of pads **15** and **16**. The longitudinal edges of the backing plates which are spaced apart from the hinge connection define flanges **26** which extend into the body of sponge material.

Mounting member **13**, adapted for securing one of the identical backing plates to handle **11**, includes a socket portion **27** which is secured to the lower end of shaft **11** as by threading, stapling, gluing, or any other suitable means. From the socket portion there extends a planar portion **28** which has a peripheral edge **29** (see FIG. 1). A plurality of lugs or projections **30**, **31** and **32** extend integrally from the planar portion of the mounting member outwardly from peripheral edge **29** and preferably are disposed within the plane of planar portion **28**. As illustrated most clearly in FIG. 1, lug **31** is disposed substantially in line with the axis of shaft **11**. Lugs **30** and **32** preferably are spaced substantially equidistantly from lug **31** and are disposed transversely of the axis of shaft **11**. An extension **33** is provided from planar portion **28** of the mounting member at a location preferably between lugs **31** and **32** and defines a shoulder **34** opening counter-clockwise toward lug **32**. Preferably each of lugs **30**, **31** and **32** has a straight leading edge **35** which opens clockwise of the periphery of the planar portion.

It was briefly mentioned above that each of backing members **23** and **24**, provided as support means for the sponge pads, is identical. Accordingly, only backing member **23** will be described herein in detail. A plu-

rality of lug receptacles **37**, **38** and **39**, adapted for cooperation with lugs **30**, **31** and **32**, respectively, are disposed about a central location of backing member **23** according to a predetermined pattern which corresponds to the pattern according to which the lugs are extended from mounting member planar portion **28**. Preferably, receptacles **37**, **38** and **39** are formed integrally with backing member **23** by stamping out suitable recess portions, one of which is shown more clearly in FIG. 5. As illustrated in FIG. 1, receptacle **37** preferably opens slightly to the rear of plate **23**; that is, toward the edge of plate **24** which is secured to hinge member **25**. Receptacle **38** preferably opens directly toward the front or flanged edge of backing member **23**, and receptacle **39** preferably is disposed substantially parallel to receptacle **37** but opens in an opposite direction to the direction in which receptacle **37** opens.

A resiliently biased detent element **40** is connected to backing member **23** at a location preferably disposed between receptacles **38** and **39**. Preferably detent element **40** is formed integrally with backing member **23** by forming a substantially U-shaped opening **41** in the backing member to define a cantilevered portion of the backing member, which cantilevered portion comprises the detent element. It is therefore preferred that the backing member is fabricated from a material which has at least nominal resilience. An off-set portion **42** of the detent element intermediate its supported and unsupported ends is raised above the plane of the adjacent backing element as at **42**. As shown in FIG. 4, off-set portion **42** of the detent element may be moved from its normally raised position into aligned coplanar register with the adjacent portion of the backing member by resiliently deforming or deflecting the cantilevered detent member about its supported root end. As seen in FIG. 1, the unsupported end of the detent element is accessible for manual depression when the mounting member is coupled to the backing member.

Wringer arm **14** has connected thereto a planar portion **45** which is configured substantially identically to planar portion **28** of mounting member **13**. From wringer arm planar portion **45** there extends a semi-cylindrical section **46** adapted to nest over socket portion **27** of mounting member **13** (see FIG. 2) and which terminates in a laterally flanged grip portion **47** which may be manually engaged to actuate the self-wringing mop. Actuation of the mop includes moving the wringer arm from an operated condition of the mop (shown in FIG. 2), wherein the sponge pads are disposed for mopping action on a floor or the like, to a wringing position in which the sponge pads are disposed between the backing members and are compressed between the backing members to wring moisture from the sponge pads. For a more complete explanation of the operation of the self-wringing sponge United States Patent 2,869,161 is referred to.

It is a feature of the present invention that the backing members **23** and **24**, secured to sponge pads **15** and **16**, respectively, are releasably but rigidly secured to mop handle **11** by means of mounting member **13** in cooperation with wringer arm **14**. As illustrated in FIG. 3, mounting member **13** is releasably engaged with backing member **23** and wringer arm **14** is releasably engaged with backing member **24**. When the mop is in its operating condition, the wringer arm is held to socket portion **27** of the mounting member by a pair of resiliently biased spring grip fingers **48** which engage mounting member socket portion **27** and in cooperation with the semi-cylindrical portion **46** of the wringer arm, maintain a secure alignment of the wringer arm relative to mounting member **13** and to mop handle **11**. Since backing members **23** and **24** are identical, and since planar portions **28** and **45** of mounting member **13** and wringer arm **14**, respectively are identical, only the connection of the mounting member to backing member **23** will be described herein in detail.

To engage mounting member **13** with backing member **23**, planar portion **28** of the backing member is juxtaposed with backing member **23** substantially as shown in FIG. 1; that is, mounting member planar portion **28** is engaged against the upper surface of the backing member. Lug **30** is inserted into receptacle **37**. As illustrated in FIG. 5, each of lugs **30**, **31** and **32**, has the leading edge **35** thereof depressed slightly to define a cam upper surface **50** of the lug which engages an under surface **51** of the corresponding receptacle. After lug **30** is engaged in receptacle **37**, the mounting member is pivoted relative to the backing member about the point of engagement of lug **30** with receptacle **37**. As the mounting member planar portion is pivoted relative to the backing member, lugs **31** and **32** engage receptacles **38** and **39**, respectively; such engagement is facilitated by the camming action between surfaces **50** and **51** of the lugs and receptacles, respectively. Detent element **40** is disposed in backing member **23** so that it is engaged by the under surface of extension **33** as lugs **31** and **32** move into engagement with receptacles **38** and **39**, respectively. The camming action of the lugs with the receptacles forces the mounting member toward the backing member to depress detent element **40**. The locations of extension **33** on the mounting member and of detent element **40** on the backing member are such that shoulder **34** of extension **33** passes over off-set portion **42** of the detent element when lugs **31** and **32** move into secure engagement with their corresponding receptacles. According, detent element **40** moves from a depressed condition into its normal position, illustrated in FIG. 4, so that off-set portion **42** abuts shoulder **34** of the mounting member planar portion **28** and thereby secures the mounting member into a latched or securely engaged condition with backing member **23**. Movement of the lugs into the corresponding receptacles ceases when edges **35** of the lugs abut in the respective receptacle recesses. The backing member is disengaged from mounting member **13** merely by depressing the unsupported end of detent element **40** to move detent element off-set portion **42** from abutment with shoulder **34**. Thereafter the lugs may be disengaged from their corresponding receptacles by a process which is the reverse of that described above.

Wringer arm **14** is engaged and disengaged with backing member **24** by a process identical to that described above.

Use of the latch mechanism described above in a self-wringing mop of the type described provides for convenient replacement of used sponge pads. The sponge pads are bonded or glued to their associated backing members such that they cannot become disengaged from the backing member during normal use of the mop. The backing members are securely engaged with the mounting member and with the wringer arm by a positive mechanical interlock, rather than by a sliding fit as disclosed in Patent 2,869,161. To replace a used sponge element, it is only necessary to unlock the mounting member and wringer arm from the respective backing members of the sponge unit, and to reengage these members with the corresponding backing members of a replacement sponge unit.

The invention has been described above in conjunction with a self-wringing mop since the latch mechanism provided by the present invention presently finds its greatest utility in such an article. It should be understood, however, that the novel latch mechanism described may be used to rigidly but releasably secure together a multitude of articles. For example, the latch mechanism may be used to secure a window washer's squeegee to a suitable handle.

While the invention has been described above in conjunction with specific apparatus, this has been by way of

example only and should not be considered as limiting the scope of the present invention.

What is claimed is:

1. Latch means for securing a substantially planar first member to a substantially planar second member, the first member having three lugs extended therefrom essentially in the plane thereof at spaced apart locations according to a predetermined pattern, three lug receptacles formed integrally in the second member and raised in the same direction from the plane thereof at positions located according to the predetermined pattern, a cantilevered resiliently deformable detent element formed integral with the second member independent of the receptacles and resiliently deformable relative thereto, the detent element having a portion normally raised above the adjacent portion of the second member in the direction of the lug receptacles and movable into alignment with the said adjacent portion by depression of the free end of the detent element, the members being configured and arranged so that the first member is attachable to the second member by juxtaposing the first and second members in essentially parallel relation and by engaging a selected one of the lugs with a selected one of the lug receptacles and pivoting the first member in the plane thereof relative to the second member about said one receptacle to engage the remaining lugs and receptacles, the detent element being disposed on the second member so that the first member depresses the detent element against the resilient bias thereof as the remaining lugs are engaged, the detent element engaging the first member when the lugs are engaged to maintain said engagement.

2. Latch means according to claim 1 wherein each lug defines a cam surface on the side thereof opposite from the second member and each receptacle defines a cam engaging surface, engagement of the cam and cam engaging surfaces during engagement of the first and second members moving the first member toward the second member.

3. Latch means according to claim 1 wherein the first member includes an extension portion defining a shoulder disposed on the first member so that the extension moves over the normally raised portion of the detent element as the lugs and receptacles are moved into engagement to depress the same and said portion of the detent element returns to its normally raised position when the lugs and receptacles are engaged to abut the shoulder and to prevent counter-pivotal movement of the members.

4. In a mop comprising a substantially planar backing member, a moisture absorbent mop element secured to one side of the backing member, a mop handle, and a mounting member secured to one end of the handle, means for rigidly and releasably securing the mounting member to the backing member including a substantially planar portion of the mounting member spaced from the handle, at least three lug means extending from the mounting member planar portion in the plane thereof according to a predetermined pattern, a plurality of lug receptacle means corresponding in number to the number of lug means raised from the backing member and arranged about a central location thereof according to the predetermined pattern, and a resiliently biased detent element connected to the backing member, the detent element being disposed so that when a selected one of the lug means is engaged in a corresponding receptacle means and the mounting member planar portion is juxtaposed to the backing member in essentially parallel relation and is pivoted relative to the backing member about the engaged lug and receptacle means, the remaining lug and receptacle means are engaged and the detent element engages the mounting member to maintain releasable rigid engagement of the lug and receptacle means.

5. Apparatus according to claim 4 wherein the backing member comprises a piece of sheet metal having the mop element secured to one side thereof, the detent element is formed integral with the backing member, the receptacle means are formed integral with and are raised from the other side of the backing element.

6. Apparatus according to claim 5 wherein the detent element includes a portion normally raised above said other side of the backing member and which is deflectable into a position in substantial register with said backing member other side, said portion of the detent element being disposed in its normal position when all lug and receptacle means are engaged for abutting the mounting member to maintain said releasable rigid engagement.

7. Apparatus according to claim 6 wherein the mounting member defines a shoulder disposed so as to be abutted by the normally raised portion of the detent element when the lug and receptacle means are engaged.

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