

Sept. 14, 1965

P. A. TRENTEL

3,205,520

MOP STRUCTURE

Filed Nov. 27, 1962

2 Sheets-Sheet 1

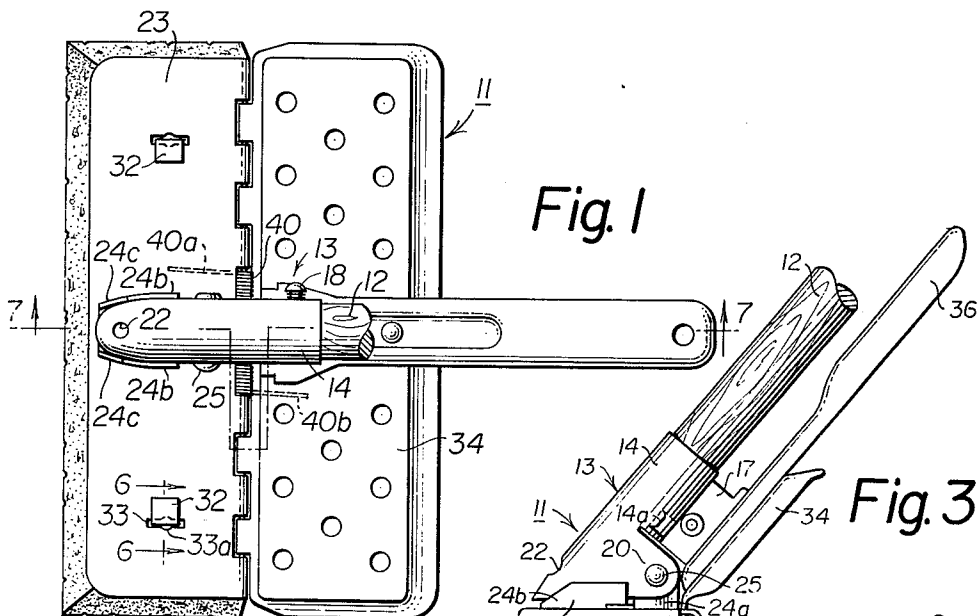


Fig. 1

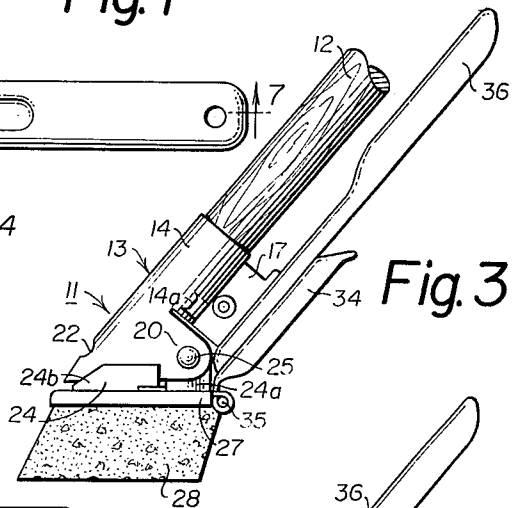


Fig. 3

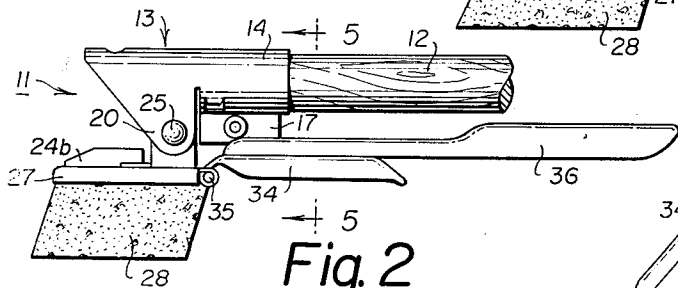


Fig. 2

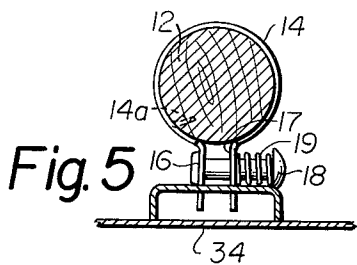


Fig. 5

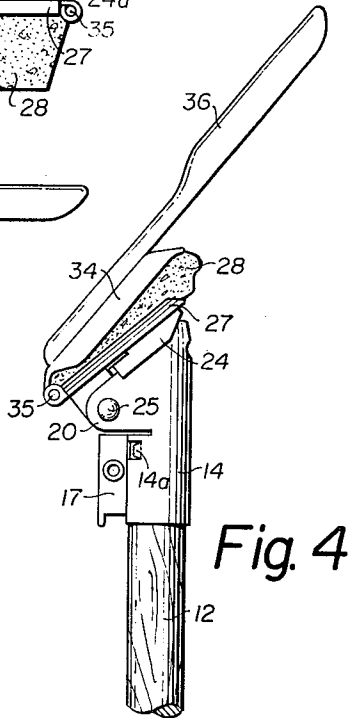


Fig. 4

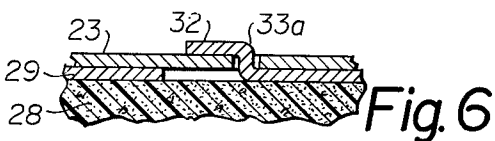


Fig. 6

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2 Sheets-Sheet 2

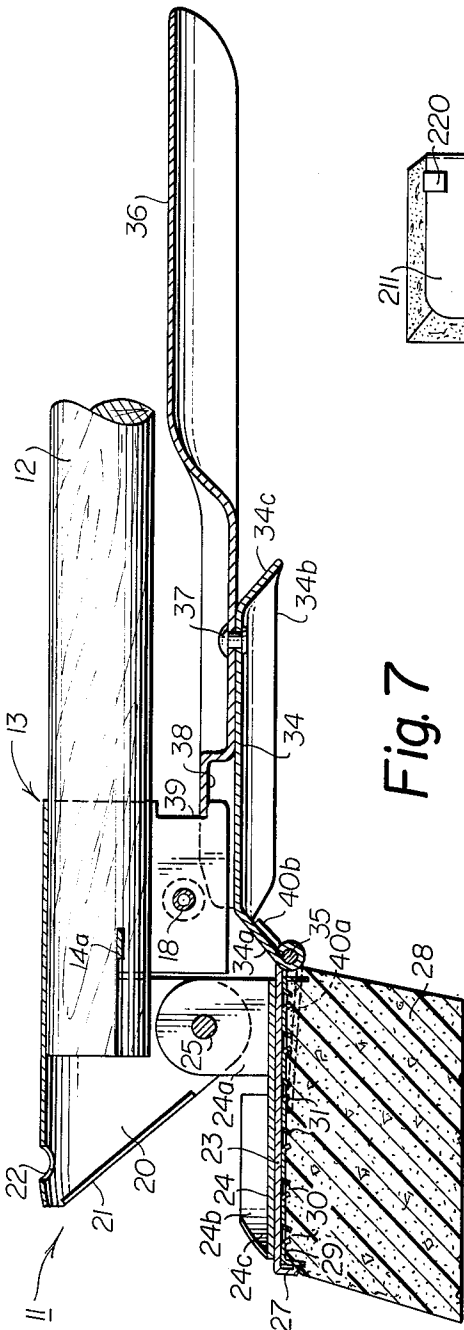


Fig. 7

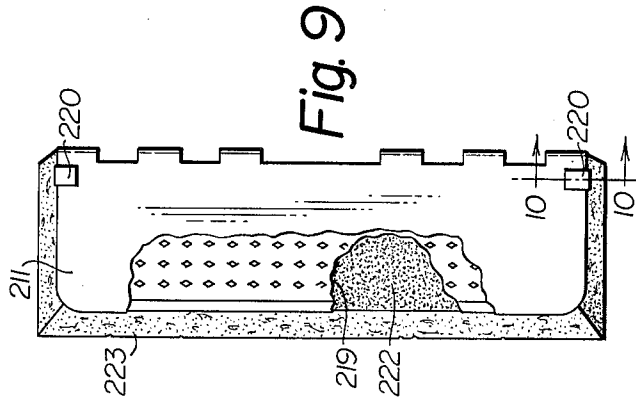


Fig. 9

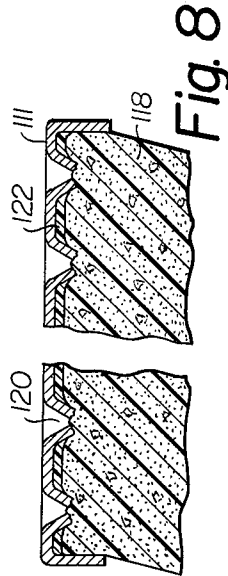


Fig. 8

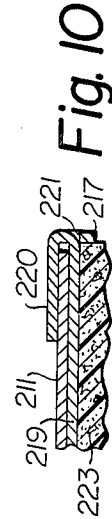


Fig. 10

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MOP STRUCTURE

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13 Claims. (Cl. 15-119)

The present invention relates generally to novel and improved structural arrangements which are particularly adapted to mops, and more specifically to improvements in the construction of squeeze mops.

Various types of squeeze mops have been provided in the past. While in certain aspects the invention has general applicability to all forms of mops, as well as to other structures, the invention is especially suited to that type of squeeze mop wherein a cleaning member, such as a sponge, is carried on a backing plate which is connected to a handle and a control or squeeze plate is associated with the backing plate in position to be swung over and compress the sponge to force water therefrom. Although this type of squeeze mop has had relatively wide commercial acceptance, certain disadvantages associated with the prior art constructions have limited their versatility and have made them relatively expensive.

For example, the sponge cleaning member is customarily mounted at a fixed angle with relation to the mop handle so that it is difficult, if not impossible, to use the mop for cleaning under various articles, such as furniture and the like. Further, the usual mop having the sponge at a fixed angle to its handle cannot be conveniently and effectively used to clean walls and other surfaces which are not horizontal. Most prior art attempts to provide a squeeze mop having an angularly movable sponge mop head have been unacceptable because of the complexity of the construction involved and a characteristically difficult and inconvenient manner of use. Moreover, such conventional constructions usually have not been structurally stable and tend to collapse when pressure is applied to the handle during a cleaning operation.

Another objection to conventional sponge mop constructions, as well as to other mop structures, is the relatively high cost of manufacture which results in part from manual assembly operations that have been required. One such manual assembly operation has been the connection of the mop handle to the mop head. Customarily, this has been achieved by a handle socket and a pin which is secured through the end of the handle in the handle socket. Other conventional constructions have been to form a threaded end on the handle which is secured into a correspondingly threaded socket, and to provide a split handle socket in which the handle is secured by a clamping nut, such as a wing nut or the like. Each of these prior art practices has been expensive and has involved manual assembly operations which the present invention avoids.

A general object of the present invention is to provide a novel and improved adjustable angle mounting construction which permits an associated member, and particularly a force-transmitting member, to be adjusted and securely locked in a plurality of angularly related positions.

A more specific object of the invention is to provide a novel and improved squeeze mop of the type described which is characterized by the provision of an adjustable angle mounting construction for the mop head, whereby the mop head can be adjusted and locked in a plurality of different angular positions with respect to the handle of the mop so as to adopt the mop for a variety of cleaning operations.

Another object of the invention is to provide a novel and improved squeeze mop wherein the mop head can be adjusted from a position where its working surface is

angularly related with respect to the handle of the mop to a position where the working surface is parallel to and offset from the handle.

A further object of the invention is to provide improvements in the manufacture of mop structures, and particularly in the manner of connecting the handles of the mops to the mop heads.

In accordance with the preferred form of the invention, the adjustable angle mounting construction, which is shown for purposes of disclosure as being embodied in a squeeze mop of the type described, includes a pivotal connection between a mop head plate for the cleaning member and a carrier bracket at the end of the mop handle, the pivotal connection being transverse to the longitudinal axis of the handle. The head plate is provided with a locking rib construction which cooperates to frictionally engage the carrier bracket and hold the mop head in a position of angular adjustment with respect to the mop handle. An actuating handle is connected to the head plate and is provided with an offset portion which cooperates with a recess formed in the carrier bracket to hold the mop head in another position wherein the working surface of the cleaning member is generally parallel to the mop handle. In this latter position, the squeeze mop can be conveniently and easily used to clean under low objects, such as furniture and the like, and to clean vertical walls and other surfaces.

Although a sponge cleaning member is usually provided, the invention contemplates a releasable connection between the cleaning member and the head plate so that different cleaning members, including buffers, waxing heads, and other implements, can be easily substituted for the disclosed sponge cleaning member. As will be discussed in more detail, the adjustable angle mounting construction and the releasable connection for the cleaning member cooperate to facilitate a wide variety of cleaning and other operations.

Another novel and improved feature of the invention which is applicable to mop structures in general, as well as to other constructions, is the improved manner of connecting the handle to the mop head. In the illustrated embodiment of the invention, this connection contemplates a split socket construction which forms a part of the carrier bracket and which receives one end of the mop handle. Opposite sides of the split socket are forced toward each other by a coil spring to securely clamp the mop handle in the socket. Because of this construction, the mop handle can be quickly attached to the carrier bracket during assembly of the mop. Moreover, it is easy to thereafter replace the handle by simply separating the socket.

Other objects and advantages of the invention will become apparent from the following detailed description and the accompanying drawings.

In the drawings:

FIGURE 1 is a top plan view of the head of a squeeze mop which embodies the novel features of the present invention and shows the mop handle partially broken away;

FIGURE 2 is a side elevational view of the structure illustrated in FIG. 1 with the mop head being shown in a position generally parallel to the mop handle;

FIGURE 3 is a side elevational view similar to FIG. 2 but with the mop head being shown in another operative position wherein it is angularly related to the mop handle;

FIGURE 4 is a side elevational view of the preferred squeeze mop structure showing the actuating handle thereof bringing the squeeze plate of the mop head into engagement with the sponge cleaning member for expelling water therefrom;

FIGURE 5 is a fragmentary cross-sectional view taken on the line 5-5 of FIG. 2;

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FIGURE 6 is an enlarged, fragmentary cross-sectional view taken on the line 6—6 of FIG. 1;

FIGURE 7 is an enlarged cross-sectional view taken on the line 7—7 of FIG. 1.

FIGURE 8 is a fragmentary vertical cross-sectional view of a modification of the mop head shown in FIGS. 1—7;

FIGURE 9 is a plan view, partially broken away, showing portions of a further modified mop construction of the invention; and

FIGURE 10 is an enlarged, fragmentary cross-sectional view taken on the line 10—10 of FIG. 9.

Referring now to the drawings, and to the preferred embodiment of FIGS. 1—7 in particular, the squeeze mop construction which embodies the principles of the invention is generally indicated by reference numeral 11. As shown, this squeeze mop construction includes a handle 12 to which the mop head structure is connected by a carrier bracket 13.

In accordance with the foregoing objects and advantages of the invention, the carrier bracket 13 is adapted to engage and secure the mop head structure to the handle 12 in a novel and improved manner. To this end, the carrier bracket 13 is provided with an integral tubular section 14 in the form of a split handle-receiving socket. Substantially parallel, adjacent flanges 16 and 17 (FIG. 5) are formed along the edges of the split tubular section 14 and receive means, such as a rivet 18, which carries a coil spring 19 that forces the edge flanges toward each other in a resilient manner. If desired, the tubular section 14 may be lanced or punched to provide an inwardly extending tang 14a. The provision of this tang assures against rotation of the handle 12.

By means of the novel handle securing construction, the mop can be assembled quickly and easily by forcing the handle 12 endwise into effective gripping engagement between the side flanges 16 and 17. Since the handle usually is wood the tang 14a will become embedded in the end portion of the handle when it is inserted between the flanges. Also, it will be seen that the side flanges 16 and 17 can be separated to facilitate removal and replacement of the mop handle.

As shown, the carrier bracket 13 further includes parallel ear sections 20 which extend laterally from the axis of the mop handle 12. These ear sections 20 are formed with inwardly extending flanges 21 (FIG. 7) which define an axially inclined, end abutment surface. An aperture 22 may be provided in the end of the carrier bracket opposite the split socket 14 for use in hanging the mop 11 on a suitable hook or hanger.

An elongated head plate 23 is provided in the squeeze mop construction 11 and a bracket 24 is secured to the upper surface of this head plate intermediate its ends. The bracket 24 has a pair of spaced, substantially parallel ears 24a which extend from the top surface of the head plate 23 between its ends and on one side edge thereof. The extending ears 24a of the head plate 23 are pivotally connected to the ear sections 20 of the carrier bracket 13, as by a rivet or equivalent member 25 adjacent one edge of the abutment surface defined by the flanges 21. This offset pivotal connection which is provided is such that the head plate 23 can be moved between one position in which the major portion of the head plate is contiguous to the flanges 21 (FIG. 3) and another position in which the head plate 23 is substantially parallel to the longitudinal axis of the carrier bracket (FIG. 2).

The bracket 24 also includes a pair of spaced, upstanding locking ribs 24b. As most clearly shown in FIG. 1, these ribs 24b are formed with slightly intumed end portions 24c for frictionally engaging the carrier bracket ear sections 20, 20 to securely hold the head plate in the position illustrated in FIG. 3. It will be apparent from this construction that, when the mop head plate is at the illustrated operative angle to the longitudinal axis of the handle 12, the cooperative engagement of the abutment

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flanges 21 with the head plate and of the locking ribs 24b with the outer surfaces of the ears 20 assure a strong, stable construction that will not collapse under the force exerted through the mop handle.

The mop head plate 23 has a downwardly extending flange 27 which is integrally formed along the ends and forward edge of the plate, and a cleaning member 28 is suitably connected to the mop head plate within the confines of this edge flange 27. In the illustrated embodiment of the invention which is shown to employ a sponge of any suitable construction as the cleaning member, a sponge backing plate 29 is provided on the upper surface of the sponge (FIG. 7). This backing plate 29 has a plurality of small apertures 30 and rough protruding edge portions 31 formed around the apertures. These protruding edge portions 31 may be provided by punching the backing plate 29 to form the apertures 30 or by otherwise roughening the lower surface of the backing plate. By providing a backing plate having a roughened surface and coating this surface with a suitable adhesive cement, the sponge 28 can be firmly connected to the backing plate.

The sponge backing plate 29 preferably is removably secured to the mop head plate 23 in order to facilitate replacement of the sponge and to permit other cleaning implements to be used. To this end, a pair of integrally formed tabs 32 extend from the backing plate 29 through cooperating slots 33 formed in the mop head plate 23. As best shown in FIG. 6, the tabs 32 are struck from the backing plate 29 and are bent over the upper surface of the head plate 23 to form a releasable connection therewith. It will be understood, of course, that the sponge 28 can be connected to the plate 23 by different means than that specifically shown in the drawings. For example, it may be desirable to connect the sponge or other cleaning member by threaded studs which are received through the head plate and secured by wing nuts or the like. To this end, the tab slots 33 are shown as being formed with centrally located holes 33a which are adapted to receive the connecting studs (not shown). In another arrangement, the backing plate 29 may be eliminated and the sponge connected to the plate 23 by an embedded wire clip which cooperates with the flanges 27 to hold the sponge in place.

The squeeze mop 11 also includes an elongated squeeze plate 34 that is of substantially the same shape as the mop head plate 23 but of slightly larger size. This squeeze plate 34 is pivotally attached to the rearward side edge of the mop head plate, as by a hinge pintle or pin 35. As shown, the squeeze plate 34 has a hinge edge portion 34a which is offset from the general plane defined by the mop head plate 23 so that the squeeze plate is, in turn, offset slightly from the plane of the mop head plate 23. As will hereinafter be described in more detail, this offset construction facilitates the squeezing action of the squeeze plate to aid in confining the sponge 28 and flanges 34b and a side edge flange 34c (FIG. 7) which extend at an angle from the generally flat surface of the squeeze plate to aid in confining the sponge 28 and forcing water therefrom, as indicated in FIG. 4. The squeezing action and position of the squeeze plate 34 is controlled by an actuating handle member 36 secured to the rear surface of the squeeze plate, as by a rivet 37 (FIG. 7). It will be seen that the provision of a sponge 28 having a parallelogram shape facilitates the swinging of the squeeze plate 34 into operative compressive engagement with the sponge without a counteracting, excessive force being exerted along the edge of the sponge mop adjacent the hinge pin 35.

A releasable lock construction is provided to secure the mop head in the position illustrated in FIGS. 2 and 7. As shown, the lock construction is formed by an offset shoulder portion 38 on the actuating handle 36 and a cooperating recess or notch 39 formed in the upper ends of the edge flanges 16 and 17 of the carrier bracket 13.

This lock construction is such that the actuating handle 36 can be pulled generally upwardly along the handle 12 and parallel to the axis of the tubular section 14 to move the shoulder 38 axially beyond the ends of the edge flanges 16 and 17. The handle then is swung in behind the flanges to engage the shoulder within the notch or recess 39 as shown in FIG. 7.

The above locking action is against the resilient action of a coil spring 40 which is suitably engaged with and carried by the assembly of the mop head plate 23 and the squeeze plate 34, the coil spring 40 normally acting to urge the squeeze plate and the mop head plate apart. As shown, the coil spring 40 is positioned on the hinge pin 35 and has one end 40a thereof engaging the lower surface of the mop head plate 23 so that it is biased toward the inclined flange surfaces 21 of the carrier bracket 13. The other end 40b of the coil spring 40 engages the front undersurface of the squeeze plate 34 so that the squeeze plate is urged towards the edge flanges 16 and 17.

It will be seen from the illustrated construction that, when the actuating handle 36 is pulled upwardly to effect the described locking action, the mop head plate 23 will be pivoted against the biasing action of the coil spring 40. Thus, when the lock is released by axially pulling the handle 36 to disengage the shoulder 38 from within the notch 39, the spring 40 will again urge the mop head plate 23 into contact with the flange surfaces 21 of the carrier bracket 13. If necessary, a slight compressive force can be exerted against the mop head plate 23 through the handle 36 so as to force the locking ribs 24b into positive engagement with the associated outer surfaces of the ears 20 of the carrier bracket.

FIGURE 8 shows a modification of the invention wherein a sponge 118 is in direct engagement with a mop head plate 111. A plurality of rough surfaced apertures 120 are formed in the plate 111 and the sponge 118 is directly cemented thereto by a layer of suitable adhesive 122. The roughened surfaces and the projecting metal portions around the apertures 120 again facilitate a good bond between the sponge and the plate to which it is secured.

FIGURES 9 and 10 show a further modification of the sponge cleaning member and the connection between the sponge and the mop head plate. In this embodiment, the mop head plate 211 carries a backing plate 219 secured thereto. This backing plate 219 is received between end flanges 217 of the mop head plate, and a pair of end securing tabs 220 are provided on the backing plate 219 to be folded over and passed through slots 221 formed in the end flanges 217, whereby a good interlocking engagement is obtained between the backing plate 219 and the mop head plate. The sponge 223 is preferably secured to the backing plate by an adhesive layer 222 in the same manner as the structures shown in FIGS. 1-7.

As used herein, the term "adjustable angle mounting construction" will be understood to include the structure of the mop head plate, the offset pivotal connection between the head plate and the relatively fixed carrier bracket 13, the locking rib formation 24b which cooperates with the carrier bracket to maintain the head plate in one position of angular adjustment against an abutment surface of the carrier bracket, the biasing spring 40 and the locking arrangement formed by the actuating handle 36 and a portion of the carrier bracket which cooperates to secure the head plate in another position of angular adjustment.

While especially adapted for squeeze mops of the type described, the novel adjustable angle mounting construction also is useful in other types of structures requiring an angularly adjustable mounting bracket, and particularly a bracket capable of being easily manipulated and withstanding loads in each position of adjustment. As will be apparent from the above description, these advantages are obtained with the invention by the spring 40 which

urges the head plate into engagement with the sloping abutment surfaces 21 of the carrier bracket 13 and the locking ribs 24b which engage the sides of the carrier bracket. In this position a load can be exerted along the mop handle without causing the adjustable angle mounting construction to move or collapse.

By simply pulling the actuating handle 36 and manipulating the offset shoulder portion 38 into the locking recess 39, the head plate can be pivoted and locked in a position substantially parallel to the axis of the carrier bracket. When the handle 36 is subsequently released from engagement with the carrier bracket, the head plate will be spring-urged toward its former position.

In the position illustrated in FIGS. 2 and 7, the squeeze mop can be used conveniently to clean under furniture and other objects. Moreover, the mop can be used effectively to clean walls and similar surfaces which require that the mop handle be generally parallel to the working surface of the cleaning member. This unique versatility further is enhanced since the disclosed sponge can be easily and quickly replaced by other cleaning implements, and the position of the mounting head adjusted to suit the desired operation which is to be performed.

It will be understood that the novel and improved tubular connecting construction which comprises another aspect of the invention and includes the split socket 14 and the clamping spring 19 also has applicability in other environments, since it provides a means by which a handle can be easily connected and disconnected with associated structure. As distinguished from prior art arrangements, this construction does not require special threading on the handle or other expensive connecting provisions, such as a connecting pin or the like. Another advantage which is particularly utilized in the disclosed arrangement of the squeeze mop employing an adjustable angle mounting construction is that the illustrated straight mop handle can be replaced by handles of different configurations which are best suited to the versatile cleaning operations that can be performed with the novel mop structure. For example, a U or hook-shaped handle can be used for the purpose of cleaning relatively inaccessible surfaces, such as the tops of cabinets or automobiles and the like.

In view of the foregoing detailed disclosure, many modification and variations will be obvious to those skilled in the art. Therefore, it is to be understood that, within the scope of the appended claims, the invention can be practiced otherwise than as specifically shown and described.

What is claimed is:

1. A cleaning tool comprising a handle, bracket means carried by said handle, plate means, a cleaning member carried by said plate means, pivot means connecting said plate means to said bracket means, said bracket means having first and second spaced portions, said first portion establishing a first cleaning position wherein said handle extends at an angle to said plate means and away from said cleaning member, said plate means being pivotal to a second cleaning position angularly spaced from said first cleaning position, said cleaning member being exposed for a cleaning operation in said second position, first releasable lock means on said first portion and said plate means, said first lock means being operable to lock said plate means in said first position, and means connected to said plate means at a location spaced from said pivot means, said connected means and said second portion including second releasable lock means cooperable to lock said plate means in said second position.

2. The construction claimed in claim 1 including spring means for urging said plate means toward said first position.

3. An adjustable angle mounting construction comprising a carrier bracket member, said bracket member having an end surface, a head plate member, pivot means

connecting said head plate member to said bracket member for movement between one position wherein the major portion of said head plate member is contiguous to said end surface and another position angularly spaced from said one position, said pivot means being offset from said plate member and disposed along one side thereof, locking means on at least one of said members for lockingly engaging the other of said members when said plate member is in said one position, and actuating means on said plate member for moving it to said another position, said actuating means including a handle pivotally connected to said head plate member and means releasably engageable with said carrier bracket member when said plate member is in said another position, said releasably engageable means being formed by an offset section of said handle and said carrier bracket member including a recess in which said offset portion is engageable.

4. A cleaning tool comprising a tool handle, a carrier bracket member on one end of said tool handle, a head plate member pivotally connected to said carrier bracket member on one side of said tool handle, said head plate member being movable between one position where it is contiguous to a surface defined by said carrier bracket member and another position where it is generally parallel to said handle, friction locking means on one of said members, said locking means being engageable with the other of said members when said head plate member is in said one position, a cleaning member carried by said head plate member, and an actuating handle pivotally connected to said head plate member for moving it to said another position, said actuating handle and said bracket member including means releasably engageable to maintain said head plate member in said another position.

5. The tool as claimed in claim 4 including means releasably connecting said cleaning member to said head plate member.

6. The tool as claimed in claim 4 including means detachably connecting said tool handle to said carrier bracket member, said detachable connecting means comprising a split handle-receiving socket formed integrally with said carrier bracket member, and a spring resiliently urging said socket into clamping engagement with said tool handle.

7. A squeeze mop of the type described comprising a tool handle, a carrier bracket on said tool handle, said bracket having an axially inclined surface and a recess, a head plate, a sponge carried by said head plate, an offset pivot connection between said head plate and said carrier bracket, said pivotal connection being located adjacent an edge of said inclined surface and along one side of said plate so that said plate is movable between one position contiguous to said inclined surface and another position substantially parallel to said handle, a squeeze plate hinged to said head plate along said one side, and an actuating handle secured to said squeeze plate, said actuating handle including means engageable with said recess of said carrier bracket to hold said head plate in said another position.

8. A mop as claimed in claim 7 including locking ribs formed on said head plate, said ribs being frictionally engageable with said carrier bracket when said head plate is in said contiguous position.

9. A squeeze mop of the type described comprising a tool handle, a carrier bracket on said tool handle, said bracket having an axially inclined surface and a recess, a head plate, a sponge carried by said head plate, an offset pivot connection between said head plate and said carrier bracket, said pivot connection being located adjacent an edge of said inclined surface and along one side of said plate so that said plate is movable between one position contiguous to said inclined surface and another position substantially parallel to said handle, locking ribs formed on said head plate, said ribs being frictionally engageable with said carrier bracket when said head plate is in said contiguous position, a squeeze plate hinged to

said head plate along said one side, spring means between said head plate and said squeeze plate for urging said plates away from each other, and an actuating handle secured to said squeeze plate, said actuating handle including means engageable with said recess of said carrier bracket to hold said head plate in said another position.

10. A mop as claimed in claim 9 including means detachably connecting said tool handle to said carrier bracket, said detachable connecting means comprising a split handle-receiving socket formed integrally with said carrier bracket, and a spring resiliently urging said socket into clamping engagement with said tool handle.

11. In combination in a squeeze mop, a bracket for engaging a mop handle, an elongated mop head plate, means pivotally securing said mop head plate to said bracket but offset therefrom, said mop head plate being movable between a first position and an angularly spaced second position, sponge means operatively attached to said mop head plate and extending away from said bracket, an elongate squeeze plate pivotally secured to said mop head plate along corresponding edges thereof, spring means operatively engaging said plates and urging them apart, handle means secured to said squeeze plate, and cooperating releasable lock means formed on said handle means and said bracket, said lock means being engageable to hold said mop head plate in said second position substantially parallel to a handle engaging said bracket but with said lock means being releasable to enable said spring means to move said mop head plate to said first position.

12. In combination in a squeeze mop, a bracket having a tubular section for receiving a mop handle and having a pair of positioning ears extending therefrom, said bracket tubular section having a pair of adjacent edge flanges extending therefrom parallel to the axis thereof, an elongate mop head plate having a pair of parallel positioning ears and a pair of locking ribs extending therefrom, means engaging said ears to pivotally secure said mop head plate to said bracket but offset therefrom, sponge means operatively attached to said mop head plate and extending away from said bracket, an elongate squeeze plate of about the size of said mop head plate pivotally secured to said mop head plate along corresponding edges thereof, spring means operatively engaging said plates and urging them apart, a handle means secured to said squeeze plate and lying adjacent a handle engaging said bracket, and lock means formed on said handle means and said bracket flanges whereby pulling said handle away from said bracket in the direction of the axis of said tubular section and then release thereof can lock said lock means together and position said mop head plate parallel to said tubular section axis but with said lock means being releasable to enable said spring means to move said mop head plate toward said bracket with said locking ribs engaging said bracket.

13. In combination in a squeeze mop, a bracket having a tubular section for receiving a mop handle and having a pair of adjacent edge flanges extending therefrom parallel to said tubular section axis, a mop head plate pivotally attached to said bracket and movable from a first position adjacent said bracket at an angle to said tubular section axis to a position parallel thereto, sponge means operatively attached to said mop head plate and extending away from said bracket, a squeeze plate and handle means pivotally attached to a margin of said mop head plate to normally extend adjacent and substantially parallel to a handle engaged with said bracket, spring means operatively engaging said mop head plate and said squeeze plate and handle means to urge them apart to abut said mop head plate on said bracket, and interengaging releasable lock means formed on said bracket edge flanges and said squeeze plate and handle means to secure said squeeze plate and handle means to said bracket with said mop head plate parallel to said bracket tubular section when said lock means are engaged.

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DANIEL BLUM, *Primary Examiner.*CHARLES A. WILLMUTH, *Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,205,520

September 14, 1965

Paul A. Trentel

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 32, for "tank" read -- tang --; column 4, line 56, strike out "squeeze plate to aid in confining the sponge 28 and" and insert instead -- sponge 28. The squeeze plate 34 also may have end --; column 7, lines 54 and 55, for "actuting" read -- actuating --.

Signed and sealed this 3rd day of May 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents