MOP DEVICE HAVING WRINGER MEANS TO SQUEEZE THE MOP ELEMENT

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My invention relates to a mop device.

Important objects of the invention are: to provide a foldable mop head which squeezes the water out of the sponge mop element; to provide a mop having a foldable mop head to squeeze the sponge mop element, which will clean easily corners formed between the base board and floor, and under low overhanging pieces of furniture and the like, to provide novel and simplified operating mechanism for folding the mop head easily, including toggle actuated bell cranks; to provide a mop head wider than the bottom diameter of the conventional household pail and which can be partially folded to enter the pail for cleaning the sponge mop element, by normal operation of the squeezing mechanism; to provide a relatively thick resilient sponge mop element which serves to hold the mop head in the open or non-wringer position; to provide a sponge mop element having a transverse recess between its ends to facilitate folding the mop element during wringing or squeezing operation; to provide a mop device of simplified and sturdy construction, having a readily changeable sponge mop element; to provide a stop element mounted upon the handle to limit the downward movement of the upper cross head and the upward movement of the lower cross head; and to provide resilient means to supplement the action of the resilient foldable mop head when it loses some of its resiliency due to use so that the mop head will be held in the proper open or non-wringer position.

Other objects and advantages of the invention will be apparent during the course of the description, and in the accompanying drawings, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same.

In the drawings, where for the purpose of illustration are shown preferred embodiments of the invention, the numeral 10 designates a handle for the mop device having an attaching element or head 11 rigidly secured to its lower end by a pin 12 or screw like. The head 11 is provided with a flat lower face 13 and the head carries four integral hinge knuckles 14 at the corners thereof, which are arranged outwardly of the handle 10, as shown. A pair of elongated generally rectangular stiff presser plates 15 are provided, and these presser plates carry transverse hinge knuckles 16, at their inner ends, and are preferably formed integral therewith. The hinge knuckles 16 interfit with the knuckles 14, as shown, and pins 17 extend through the interfitting knuckles, and serve to hingedly secure the presser plates to the head 11. The presser plates 15 are preferably provided along their longitudinal edges with low upstanding flanges or ribs 18, integral therewith, for increasing the stiffness of the presser plates.

Arranged beneath the presser plates 15 is a resilient and compressible sponge cleaning element or pad 19, preferably formed of cellulose sponge, or the like. The sponge cleaning element 19 is elongated and shaped as shown, and is preferably quite thick. I have found by experiments that good results are obtained in a household mop when the sponge cleaning element 19 is about one and five-eighths inches thick, by two inches wide. The sponge cleaning element 19 may be approximately eleven inches long and the sponge cleaning element extends for the combined lengths of the presser plates 15, and slightly beyond the outer ends of the same. These proportional dimensions are not critical, and may be varied according to the size of the mop desired.

Flat rectangular sponge backing plates 20 are cemented to the upper face of the sponge cleaning element 19 throughout the entire areas of the backing plates, and these backing plates cover the major portion of the top face of the sponge cleaning element, but the longitudinal edges are spaced somewhat inwardly of the marginal side and end edges of the sponge cleaning element, as shown. The inner ends 21 of the backing plates 20 are spaced apart for a substantial distance, and preferably terminate directly below the hinge pins 17. This arrangement leaves an uncovered portion of the sponge cleaning element 19 directly under the head 11 and flat face 13. At this point, the sponge cleaning element is provided in its top face with a transverse arcuate recess or groove 22 of substantial depth, for a purpose to be described, and this groove or recess is at the longitudinal center of the sponge cleaning element, for a purpose to be described. The recess 22 extends for the entire width of the sponge cleaning element 19 and through its opposite longitudinal sides, as shown.

Each backing plate 20 has secured thereto inwardly of its outer end, and at its transverse center, an upstanding screw 23, projecting through an opening 24 in the adjacent presser plate 15. Each screw 23 receives a winged nut 25 upon its upper end, which serves to releasably secure the adjacent pair of presser and backing plates 15 and 20 together in flat contact with the handle 10.

I provide novel operating mechanism for the hinged presser plates 15, including a slidable handle or tube 26, mounted for reciprocation upon the handle 10. The slidable handle 26 has rigidly secured to its lower end a cross head 27, provided at opposite sides of the handle with pairs of hinge extensions 28, integral therewith. The hinge extensions 28 extend longitudinally of the back of the presser plates 15, as shown. Relatively short toggle links 29 have corresponding ends pivotally secured at 30 to the extensions 28, and the opposite corresponding ends of the links 29 are pivotally connected at 31 to bell cranks or rocker arms 32.

The bell cranks or rocker arms 32 comprise upper and lower arms 33 and 34, arranged to form an angle of approximately 160 degrees between them, which may be varied as desired. The arms 33 are straight and are adapted to extend longitudinally with the links 29, Figure 1, and to lie at the sides of the handle 10. The arms 34 are somewhat bowed to provide clearance for the hinge knuckles 16, when the mop device is in the squeezing position, as shown in Figure 5.

The bell cranks or rocker arms are pivoted near their longitudinal centers by pins 35 or the like to the hinge extensions 36 of a lower or second reciprocatory cross head or sleeve 37, slidably mounted upon the handle 10, below the cross head 27. The lower ends of the bell cranks or rocker arms 34 are pivotally connected by pins 38 or the like to apertured brackets 39, rigidly mounted upon the presser plates 15 near their longitudinal centers.

The foregoing description is common to both forms of the invention.

In Figures 1 to 5 inclusive, a stop pin 40 is rigidly secured to the handle 10 and has its lower end engage with the cross head 37, to limit the upward travel of the same.

In operation, the thick resilient sponge element 19 normally maintains the presser plates in an open opposed
position at right angles to the longitudinal axis of the handle 10, as shown in Figure 1. When the bell cranks or rocker arms assume their position as shown in Figure 1, the arms 33 and toggle links 29 lie close to and substantially parallel to the handle 10. The cross head 37 then rests on the stop 40 and is resistively stopped against the stop by the sponge cleaning element 19. The handle 10 is now grasped in the usual manner and preferable at an inclination of about 45 degrees to the floor, with the elongated sponge element extending transversely of the mop handle. Pressure is now applied downwardly upon the handle 10, and that portion of the sponge cleaning element near the operator is consequently pressed, while the opposite or forward portion remains substantially uncompressed, and projects forwardly of the presser plates 15, to reach into corners or other inaccessible positions. This is illustrated in Figure 5. The arrangement renders it easy to clean corners between base boards and the floor and to clean under low pieces of furniture and the like.

When it is desired to squeeze water out of the sponge cleaning element 19, the reciprocating handle 26 is pushed downwardly or forwardly, and this causes the toggle links 29 to have their lower ends swung outwardly towards the positions shown in Figure 5. The bell cranks or rocker arms 32 are simultaneously swung to their positions shown in Figure 5, and the presser plates are swung downwardly and in substantially parallel positions for tightly squeezing the now transversely folded sponge cleaning element 19 between them, as shown in Figure 5. When the bell cranks 32 are swung upon their pivots, the presser plate 15 is moved to the substantially parallel position, as stated, and the toggle links 29 are of such a length that they are then arranged at substantially right angles to the handle 10, and the arrangement produces an increasing pressure upon the sponge cleaning element 19, and the maximum pressure occurs when the toggle links 29 are at substantially right angles to the handle 10, the upper arms and the toggle links 29 are close to and substantially parallel with the handle.

The selection of the recess 22 in the sponge cleaning element during this squeezing operation is very important, and should be particularly noticed. When the sponge cleaning element 19 is transversely folded and compressed, as shown in Figure 5, some of the compressed material of the sponge cleaning element may occupy the space afforded by the recess 22, and there is no undue jamming or crowding of the material of the sponge cleaning element 19 and the flat face 13. By virtue of the recess 22, the transversely folded sponge cleaning element may make only very slight contact with the face 13 or no contact at all with the face 13. Were it not for the recess 22, and the resultant ability of the central material of the folded sponge cleaning element to occupy the space afforded by the recess 22, the sponge cleaning element might prevent the uniform squeezing of the sponge cleaning element, and the provision of the recess 22 renders the mop a great deal more efficient in expelling the water from the sponge cleaning element 19, and also renders the toggle operating mechanism much easier to operate.

After the desired squeezing operation is completed, it is merely necessary to release the handle 26, and the resilient cleaning element returns automatically to their relative positions, as shown in Figure 1.

It should be noted that both cross heads 27 and 37 are moveable longitudinally of the handle 10 and are also movable with relation to each other, since the cross head 27 moves a greater distance than the cross head 37. In the beginning of the movement of both cross heads 27 and 37 together, but the movement of the bell cranks 32 immediately shift the pivots 31 outwardly, so that these pivots cannot remain in line with respect to the pivots 30 and 35.

In Figures 7 and 8, I have shown a slight modification of the invention. In these figures, the stop pin 40, Figure 1, is omitted and a stop ring 42 is used. This ring is mounted upon the handle 10 and is rigidly secured there to by a pin 43 or the like. The stop ring 42 is arranged to limit the upward movement of the cross head 37, as shown in full lines, and also limit the downward movement of the cross head 27, as shown by the spaced or dotted lines.

It sometimes happens that the sponge cleaning element will lose its resilience with use and age. Under these conditions, it may be desirable to supplement the resilient action of the sponge cleaning element, for retaining the presser plates 15 to the full open position. For this reason, the bell cranks 32 are arranged upon opposite sides of the arms 33 and attached to pins 45 secured to the arms 33. These pins are sufficiently long to clear the springs 44 to clear the stop ring 42 and cross head 37.

All other parts of the mop device shown in Figures 7 and 8 remain identical with the first form of the invention as shown in Figures 1 and inclusive and 5.

It is to be understood that the forms of my invention hereinafter shown and described are to be taken as preferred examples of the same and that various changes may be made in the shape, size and arrangement of parts, without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A mop, comprising a handle, an attaching head secured to the handle, presser plates having their inner ends arranged near the opposite ends of the attaching head, devices pivotally connected to the inner ends of the presser plates and the opposite ends of the attaching head, said devices being spaced from each other, a thick continuous cellulose sponge mop element arranged beneath and secured to the presser plates, the said sponge mop element being provided in its upper face and adjacent to its center with a long recess, said recess being open when the cellulose sponge mop element is substantially straight, said recess extending substantially downwardly from the center to a point below the opposite pivot device, the open recess having a substantial depth and its bottom wall being arranged opposite to the attaching head, the pivot devices being arranged near the ends of the open recesses outwardly and the same, and means to swing the presser plates toward each other upon the pivot devices to fold the cellulose sponge mop element into its intermediate portion at the recess, the recess providing additional space beneath the attaching head for receiving the upwardly crowding folded portion of the cellulose sponge mop element.

2. A mop, comprising a handle, an attaching head secured to the handle, presser plates having their inner ends arranged opposite to the opposite ends of the attaching head, devices pivotally connected to the inner ends of the presser plates and the opposite ends of the attaching head, said devices being spaced from each other and arranged above the cellulose sponge mop element arranged beneath and secured to the presser plates, the cellulose sponge mop element being provided in its upper face and adjacent to its center with a long recess, said recess being open when the cellulose sponge mop element is substantially straight, the open recess having a substantial depth and its bottom wall being arranged opposite to and spaced from the attaching head, and means to swing the presser plates toward each other upon the pivot devices to fold the cellulose sponge mop element upon its intermediate portion at the recess, the recess providing additional space beneath the attaching head for receiving the upwardly crowding folded portion of the cellulose sponge mop element.

3. A mop device comprising, a handle, a lower sleeve mounted upon the handle to move longitudinally thereof, an upper sleeve mounted upon the handle to move longitudinally thereof, presser plates to extend upon opposite sides of the handle, a sponge mop element arranged beneath and secured to the movable parts of the handle, the presser plates upon the handle so that the presser plates may be shifted to an open position at substantially the same time that the bell cranks are swung, each bell crank comprising an upper arm and a lower arm, the lower arm being inclined with respect to the upper arm and the projecting free ends of the lower arms and the presser plates at positions substantially outwardly of the pivotal mountings of the presser plates, means arranged adjacent to the lower ends of the upper arms to pivotally connect the bell cranks with the lower sleeves, the pivoted bell cranks being adapted to be swung
to a position in which the upper arms are arranged adjacent to and substantially parallel with the handle and the lower arms then diverge downwardly and hold the presser plates at substantially right angles to the handle, toggle links arranged between the free ends of the upper arms and the upper sleeve and pivotally connected therewith, the toggle links being of such a length that when the bell cranks have been moved to shift the presser plates to the closed position the toggle links will be at substantially right angles to the handle, the arrangement being such that the toggle links produce a continuously increasing leverage as the upper sleeve is moved downwardly and the maximum increased leverage occurs when the toggle links are close to the position at substantially right angles to the handle.

4. A mop device comprising, a handle, a lower sleeve mounted upon the handle to move longitudinally thereof, an upper sleeve mounted upon the handle to move longitudinally thereof, presser plates to extend upon opposite sides of the handle, a sponge mop element arranged beneath and secured to the presser plates, means to pivotally mount the presser plates upon the handle so that the presser plates may be shifted to an opened position at substantially right angles to the handle, toggle links arranged between the free ends of the upper arms and the upper sleeve and pivotally connected therewith, the toggle links being of such a length that when the bell cranks have been moved to shift the presser plates to the closed position the toggle links will be at substantially right angles to the handle, the arrangement being such that the toggle links produce a continuously increasing leverage as the upper sleeve is moved downwardly and the maximum increased leverage occurs when the toggle links are close to the position at substantially right angles to the handle, toggle links arranged between the free ends of the upper arms and the upper sleeve and pivotally connected therewith, presser plates to extend upon opposite sides of the handle, a sponge mop element arranged beneath and secured to the presser plates, means to pivotally mount the presser plates upon the handle so that the presser plates may be shifted to an opened position at substantially right angles to the handle, and to a closed position at which they are substantially parallel, bell cranks, each bell crank comprising an upper arm and a lower arm, the lower arm being inclined with respect to the upper arm, means pivotally connecting the free ends of the lower arms to pivotally connect the bell cranks with the lower sleeve, the pivot bell cranks being adapted to be swung to a position in which the lower arms will then diverge downwardly and hold the presser plates at substantially right angles to the handle, toggle links arranged between the free ends of the upper arms and the upper sleeve and pivotally connected therewith, the toggle links being of such a length that when the bell cranks have been moved to shift the presser plates to the closed position said toggle links will be at substantially right angles to the handle, the arrangement being such that the toggle links produce a continuously increasing leverage as the upper sleeve is moved downwardly and the maximum increased leverage occurs when the toggle links are close to the position at substantially right angles to the handle, means to limit the upward movement of the presser plates when they are shifted to the opened position at substantially right angles to the handle and to limit the downward movement of the presser plates when they are shifted to the closed position, and resilient means connected with the bell cranks and tending to swing the upper arms of the bell cranks toward said handle.

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