A mop-drying device a bucket having a separation plate mounted therein, thereby separating an interior of the bucket into an upper chamber and a lower chamber. The strands of the mop are received in the upper chamber during clamping and twisting. The separation plate has a drain hole for draining water removed from the strands of the mop. A disc is rotatably mounted in the upper chamber and includes a central hole. A plurality of claws each has a first end pivotally mounted to the disc and a second end. The second ends of the claws are movable toward a center of the disc, thereby clamping the strands of the mop before twisting the strands of the mop. After the strands of the mop are clamped by the claws, the disc is further rotated to thereby twist the strands of the mop.
Fig. 1
MOP-DRYING DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a mop-drying device that includes a clamping means for clamping, e.g., distal portions of the strands of the mop before twisting it.

[0003] 2. Description of the Related Art

[0004] A mop is a common utensil for cleaning. A wide variety of devices have heretofore been provided for drying the strands of mop by twisting. It was, however, found that the result is not satisfactory, as the strands of the mop are not clamped in place during twisting. The present invention is intended to provide an improved mop-drying device that mitigates and/or obviates this problem.

SUMMARY OF THE INVENTION

[0005] It is the primary object of the present invention to provide an improved mop-drying device that includes a clamping means for clamping, e.g., distal portions of the strands of the mop before twisting it.

[0006] A mop-drying device in accordance with the present invention comprises:

[0007] a bucket adapted to receive a plurality of strands of a mop;

[0008] means mounted to the bucket for twisting the strands of the mop; and

[0009] means mounted to the bucket for clamping the strands of the mop before twisting the strands.

[0010] The bucket comprises a separation plate mounted therein, thereby separating an interior of the bucket into an upper chamber and a lower chamber. The strands of the mop are received in the upper chamber during clamping and twisting. The separation plate has a drain hole for draining water removed from the strands of the mop.

[0011] A disc is rotatably mounted in the upper chamber and includes a central hole. A plurality of claws each has a first end pivotally mounted to the disc and a second end. The second ends of the claws are movable toward a center of the disc, thereby clamping the strands of the mop before twisting the strands of the mop. In addition, a driving means is provided for driving the disc. After the strands of the mop are clamped by the claws, the disc is further rotated to thereby twist the strands of the mop.

[0012] In accordance with a preferred embodiment of the invention, a mop-drying device comprises:

[0013] a bucket comprising a separation plate mounted therein, thereby separating an interior of the bucket into an upper chamber adapted to receive a plurality of strands of a mop and a lower chamber, the separation plate having a drain hole, an inner periphery defining the upper chamber including an annular ledge;

[0014] a first disc comprising a plurality of slots;

[0015] a second disc rotatably supported by the annular ledge of the bucket, the second disc comprising a central hole defined therein and a plurality of claws pivotally mounted thereto, each said claw having a first end pivotally mounted to the second disc and a second end, each said claw further including a peg that is slidably guided in an associated said slot of the first disc;

[0016] the first disc being rotatably mounted in the upper chamber and between the separation plate and the second disc; and

[0017] means for driving the first disc;

[0018] wherein when the first disc is driven by the driving means, the second disc is driven to proceed with a first stage operation and a second stage operation, wherein in the first stage operation the second disc does not turn and the second ends of the claws on the second disc are moved toward a center of the second disc to thereby clamp the strands of the mop, and wherein in the second stage operation the second disc turns and thus twists the strands of the mop.

[0019] An inner periphery defining the upper chamber comprises an annular groove defined therein, the annular ledge defining a lower annular portion of the annular groove. An end cap has an annular hook engaged in the annular groove defining the upper chamber of the bucket. The second disc is rotatably held between an annular end face of the end cap and the annular ledge.

[0020] The end cap comprises an annular top face having an inner periphery and an outer periphery. A vertical outer skirt extends downward from the outer periphery of the annular top face and has a distal end. The annular end face and the annular hook of the end cap are formed on the distal end of the vertical outer skirt. The end cap comprises a conic inner skirt extending and tapering downward from the inner periphery of the annular top face, thereby defining a conic central through-hole through which the strands of the mop extend.

[0021] wherein

[0022] The annular end face of the end cap comprises a protrusion and the second disc comprises a resilient bulge on an upper side thereof. The resilient bulge of the second disc presses against the protrusion of the end cap during the first stage operation, and the resilient bulge of the second disc is then passed over the protrusion of the end cap to proceed with the second stage operation.

[0023] In an embodiment of the invention, the driving means comprises a crown gear rotatably mounted in the lower chamber of the bucket. A bevel gear shaft is rotatably supported by the separation plate and includes a first end with a bevel gear that meshes with the crown gear. The bevel gear shaft further includes a second end that is connected to the disc to rotate therewith. An operative rod has a first end attached to the crown gear to move therewith and a second end extending beyond the bucket for manual operation.

[0024] The crown gear includes an extension. A return spring has a first end attached to the extension and a second end attached to the bucket, thereby returning the crown gear and the operative rod. In addition, a holding means is provided for holding a handle of the mop during clamping and twisting of the strands of the mop.
[0025] Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. 1 is an exploded perspective view of a mop-drying device in accordance with the present invention.

[0027] FIG. 2 is an exploded perspective view of a disc of the mop-drying device in accordance with the present invention.

[0028] FIG. 3 is a sectional view of the mop-drying device in accordance with the present invention.

[0029] FIG. 4 is a sectional view taken alone line 4-4 in FIG. 3.

[0030] FIG. 5 is a sectional view similar to FIG. 3, wherein an operative rod is pressed for drying a mop.

[0031] FIG. 6 is a sectional view taken along line 6-6 in FIG. 5.

[0032] FIG. 7 is a schematic sectional view in an enlarged scale illustrating positional relationship between the disc and an end cap of the mop-drying device at a first stage of drying.

[0033] FIG. 8 is a view similar to FIG. 7, illustrating positional relationship between the disc and the end cap at a second stage of drying.

[0034] FIG. 9 is a sectional view similar to FIG. 6, illustrating drying operation of the mop-drying device.

[0035] FIG. 10 is a sectional view illustrating a second embodiment of the mop-drying device in accordance with the present invention.

[0036] FIG. 11 is an enlarged view of a circle in FIG. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0037] Referring to FIGS. 1, 3, and 4, a mop-drying device in accordance with the present invention generally includes a bucket 1, a first disc 2, a second disc 3, and a drive unit 4. The bucket 1 is substantially a hollow cylinder having a separation plate 10 mounted in a mediate portion thereof, thereby separating an interior of the bucket 1 into an upper chamber 11 and a lower chamber 12. Water removed from strands 5 of the mop is collected in the upper chamber 11 and drained via a drain hole 11a in the separation plate 10 and a drain pipe 13. An annular groove 15 is defined in an inner periphery of the upper chamber 11 and located above the separation plate 10. An annular ledge 14 defines a lower annular portion the annular groove 15 provides a support for the second disc 3. An end cap 16 includes a portion engaged in the annular groove 15, which will be described later.

[0038] Referring to FIGS. 1 and 3, the end cap 16 includes an annular top face 160 having an inner periphery and an outer periphery. A vertical outer skirt 161 extends downward from the outer periphery of the top face 160. A conic inner skirt 163 extends and tapers downward from the inner periphery of the top face 160, thereby defining a conic central through-hole 162, best shown in FIG. 1. The conic inner skirt 163 guides the strands 5 of the mop into the upper chamber 11 of the bucket 1. An annular hook 165 is formed on a lower end of the vertical outer skirt 161 for releasably engaging with the annular groove 15 of the bucket 1.

[0039] Referring to FIGS. 1, 2, and 4, the second disc 3 includes a plurality of claws 31 mounted thereto and a central hole 30 defined therein. Each claw 31 includes a first end pivoted to the second disc 3 by a pivotal member 33 at 32. Each claw 31 further includes a peg 34 on an underside thereof, which will be described later. The second disc 3 further includes a resilient bulge 36 on an upper side thereof. The end cap 16 further includes a substantially spherical protrusion 166 on an annular end face thereof that faces away from the top face 160. Operation of the resilient bulge 36 and the protrusion 166 will be described later.

[0040] As illustrated in FIG. 3, the first disc 2 is rotatably mounted in the upper chamber 11 and between the second disc 3 and the separation plate 10. The first disc 2 may be driven in either clockwise or counterclockwise direction by the drive unit 4. In this embodiment, the power unit 4 includes a crown gear 43 with a shaft 43a that is rotatably supported by a lower portion of the bucket 1. An operative rod 44 projects outward from the crown gear 43 and extends out of the bucket 1 for manual operation. A return spring 45 is mounted in the lower chamber 12 of the bucket 1 and includes a lower end attached to a bottom of the bucket 1 and an upper end attached to an extension 44a of the crown gear 43, thereby returning the crown gear 43 and the operative rod 44 to their original positions. In this embodiment, the extension 44a is an extension of the operative rod 44. In addition, a bevel gear shaft 41 has an end securely attached to a center of the first disc 2 to rotate therewith. The bevel gear shaft 41 is rotatably supported by the separation plate 10 and includes a bevel gear 42 on the other end to rotate therewith. The bevel gear 42 meshes with the crown gear 43. Thus, when the operative rod 44 is pushed downward, the bevel gear 42 is turned via transmission by the crown gear 43, thereby turning the first disc 2. An additional bevel gear (the lower one in FIGS. 1 and 3) may be provided to provide a stable support during rotation of the crown gear 43.

[0041] As illustrated in FIG. 1, the first disc 2 includes a plurality of slots 21 corresponding to the claws 31. The peg 34 of each claw 31 is slidable guided in an associated slot 21. Thus, when the first disc 2 is turned, the second disc 3 is turned. The vertical outer skirt 161 of the end cap 16 retains the second disc 3 in place yet allows the second disc 3 to rotate when the latter is driven by the first disc 2.

[0042] As illustrated in FIGS. 1 and 3, the second disc 3 is rotatably held between the annular end face of the end cap 16 and the annular ledge 14 of the bucket 1. The peg 34 of each claw 31 on the second disc 3 is slidable guided in an associated slot 21 of the first disc 2 such that the claws 31 pivot about an axis of the pivotal member 33 when the first disc 2 turns.

[0043] When in use, after placing the strands 5 of the mop into the upper compartment 11 via the conic through-hole 162 of the end cap 16, the operative rod 44 is pushed downward from a position in FIG. 3 to a position in FIG. 5, the crown gear 43 is turned to drive the first disc 2 and then the second disc 3. During driving of the second disc 3 by the first disc 2, the resilient bulge 36 of the second disc 3 is initially pressed against the protrusion 166 of the end
cap 16, as shown in FIGS. 6 and 7; namely, the second disc 3 does not turn in the beginning. Instead, the second end of each claw 31 on the second disc 3 moves toward a center of the second disc 3, thereby clamping the distal portions of the strands 5 of the mop (the first stage operation). Further rotational movement of the first disc 2 forces the resilient bulge 36 of the second disc 3 to pass over the protrusion 166 of the end cap 16, as shown in FIG. 8; namely, the second disc 3 is free and thus rotates together with the first disc 2. The strands 5 of the mop is twisted to remove the water therein, thereby drying the mop, best shown in FIGS. 5, 8 and 9 (the second stage operation). After operation, the operative rod 44 is released, the crown gear 43 and the operative rod 44 are returned under the action of the return spring 45, and the claws 31 of the second disc 3 move away from the center of the second disc 3. The strands 5 of the mop are released and thus may be removed via the conic through-hole 162 of the end cap 16.

[0044] FIG. 10 illustrates a modified embodiment of the mop-drying device, wherein the drive unit is replaced by a motor 46 having an output shaft 47 that is rotatably supported by the separation plate 10. An end of the output shaft 47 is securely engaged with the first disc 2 to rotate therewith. Thus, the user may push a switch 48 to activate the motor 46 to thereby dry the mop. In addition, a support plate 17 is mounted on top of the bucket 1 and a pair of tubular members 183 is mounted to an end face (not labeled) of the support plate 17. The end face of the support plate 17 has an opening (not labeled) to allow passage of the strands 5 of the mop. Each tubular member 183 has a spring 181 received therein, and a lower end of a post 18 is received in the tubular member 183. Each post 18 has an upper end in the form of a V-shape support 182 (FIG. 11) for supporting an end edge of a mounting plate 7 of the mop 5. Thus, the handle 6 of the mop may be retained upright and remain still during drying of the mop.

[0045] According to the above description, it is appreciated that the mop-drying device firstly clamps the strands of the mop and then twists the strands to remove the water in the strands of the mop. The water-removing operation is more efficient than conventional mop-drying devices.

[0046] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the invention as hereinafter claimed.

What is claimed is:

1. A mop-drying device comprising:
   a bucket adapted to receive a plurality of strands of a mop;
   means mounted to the bucket for twisting the strands of the mop; and
   means mounted to the bucket for clamping the strands of the mop before twisting the strands.

2. The mop-drying device as claimed in claim 1, wherein the bucket comprises a separation plate mounted therein, thereby separating an interior of the bucket into an upper chamber and a lower chamber, the strands of the mop being received in the upper chamber during clamping and twisting, the separation plate having a drain hole.

3. The mop-drying device as claimed in claim 2, wherein a disc is rotatably mounted in the upper chamber and includes a central hole, a plurality of claws each having a first end pivotally mounted to the disc and a second end, the second ends of the claws being movable toward a center of the disc, thereby clamping the strands of the mop before twisting the strands of the mop.

4. The mop-drying device as claimed in claim 3, further comprising means for driving the disc.

5. The mop-drying device as claimed in claim 4, wherein the disc is further rotated after the strands of the mop are clamped by the claws to twist the strands of the mop.

6. The mop-drying device as claimed in claim 5, wherein an inner periphery defining the upper chamber comprises an annular groove defined therein, further comprising an end cap that has an annular hook engaged in the annular groove, the disc being rotatably held between an annular end face of the end cap and an annular ledge that defines a lower annular portion of the annular groove.

7. The mop-drying device as claimed in claim 6, wherein the end cap comprises an annular top face having an inner periphery and an outer periphery, a vertical outer skirt extending downward from the outer periphery of the annular top face and having a distal end, the annular end face and the annular hook of the end cap being formed on the distal end of the vertical outer skirt.

8. The mop-drying device as claimed in claim 7, wherein the end cap comprises a conic inner skirt extending and tapering downward from the inner periphery of the annular top face, thereby defining a conic central through-hole through which the strands of the mop extend.

9. The mop-drying device as claimed in claim 8, wherein the driving means comprises a crown gear rotatably mounted in the lower chamber of the bucket, a bevel gear shaft being rotatably supported by the separation plate and including a first end with a bevel gear that meshes with the crown gear, the bevel gear shaft further including a second end that is connected to the disc to rotate therewith, further comprising an operative rod having a first end attached to the crown gear to move therewith and a second end extended beyond the bucket for manual operation.

10. The mop-drying device as claimed in claim 9, wherein the crown bear includes an extension, further comprising a return spring having a first end attached to the extension and a second end attached to the bucket.

11. A mop-drying device comprising:
   a bucket comprising a separation plate mounted therein, thereby separating an interior of the bucket into an upper chamber adapted to receive a plurality of strands of a mop and a lower chamber, the separation plate having a drain hole, an inner periphery defining the upper chamber including an annular ledge;
   a first disc comprising a plurality of slots;
   a second disc rotatably supported by the annular ledge of the bucket, the second disc comprising a central hole defined therein and a plurality of claws pivotally mounted thereto, each said claw having a first end pivotally mounted to the second disc and a second end, each said claw further including a peg that is slidably guided in an associated said slot of the first disc;
   the first disc being rotatably mounted in the upper chamber and between the separation plate and the second disc; and
means for driving the first disc;

wherein when the first disc is driven by the driving means, the second disc is driven to proceed with a first stage operation and a second stage operation, wherein in the first stage operation the second disc does not turn and the second ends of the claws on the second disc are moved toward a center of the second disc to thereby clamp the strands of the mop, and wherein in the second stage operation the second disc turns and thus twists the strands of the mop.

12. The mop-drying device as claimed in claim 11, wherein an inner periphery defining the upper chamber comprises an annular groove defined therein, the annular ledge defining a lower annular portion of the annular groove, further comprising an end cap that has an annular hook engaged in the annular groove, the second disc being rotatably held between an annular end face of the end cap and the annular ledge.

13. The mop-drying device as claimed in claim 12, wherein the end cap comprises an annular top face having an inner periphery and an outer periphery, a vertical outer skirt extending downward from the outer periphery of the annular top face and having a distal end, the annular end face and the annular hook of the end cap being formed on the distal end of the vertical outer skirt.

14. The mop-drying device as claimed in claim 13, wherein the end cap comprises a conic inner skirt extending and tapering downward from the inner periphery of the annular top face, thereby defining a conic central through-hole through which the strands of the mop extend, wherein

15. The mop-drying device as claimed in claim 13, wherein the annular end face of the end cap comprises a protrusion and the second disc comprises a resilient bulge on an upper side thereof, the resilient bulge of the second disc pressing against the protrusion of the end cap during the first stage operation, the resilient bulge of the second disc being then passed over the protrusion of the end cap to proceed with the second stage operation.

16. The mop-drying device as claimed in claim 11, wherein the driving means comprises a crown gear rotatably mounted in the lower chamber of the bucket, a bevel gear shaft being rotatably supported by the separation plate and including a first end with a bevel gear that meshes with the crown gear, the bevel gear shaft further including a second end that is connected to the disc to rotate therewith, further comprising an operative rod having a first end attached to the crown gear to move therewith and a second end extending beyond the bucket for manual operation.

17. The mop-drying device as claimed in claim 16, wherein the crown bears includes an extension, further comprising a return spring having a first end attached to the extension and a second end attached to the bucket.

18. The mop-drying device as claimed in claim 11, further comprising means for holding a handle of the mop during clamping and twisting of the strands of the mop.