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ARTICULATED MOP

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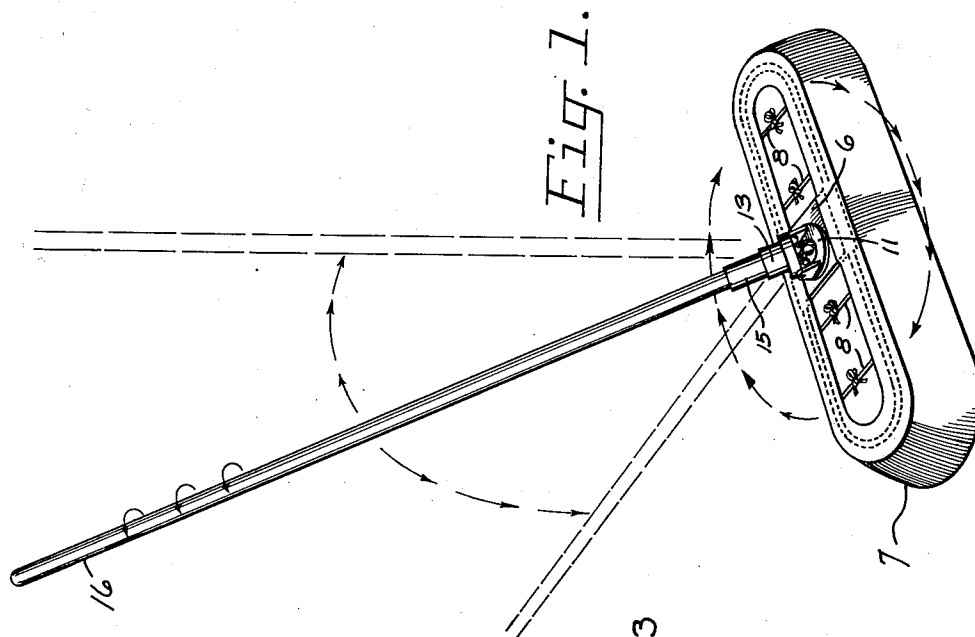


Fig. 1.

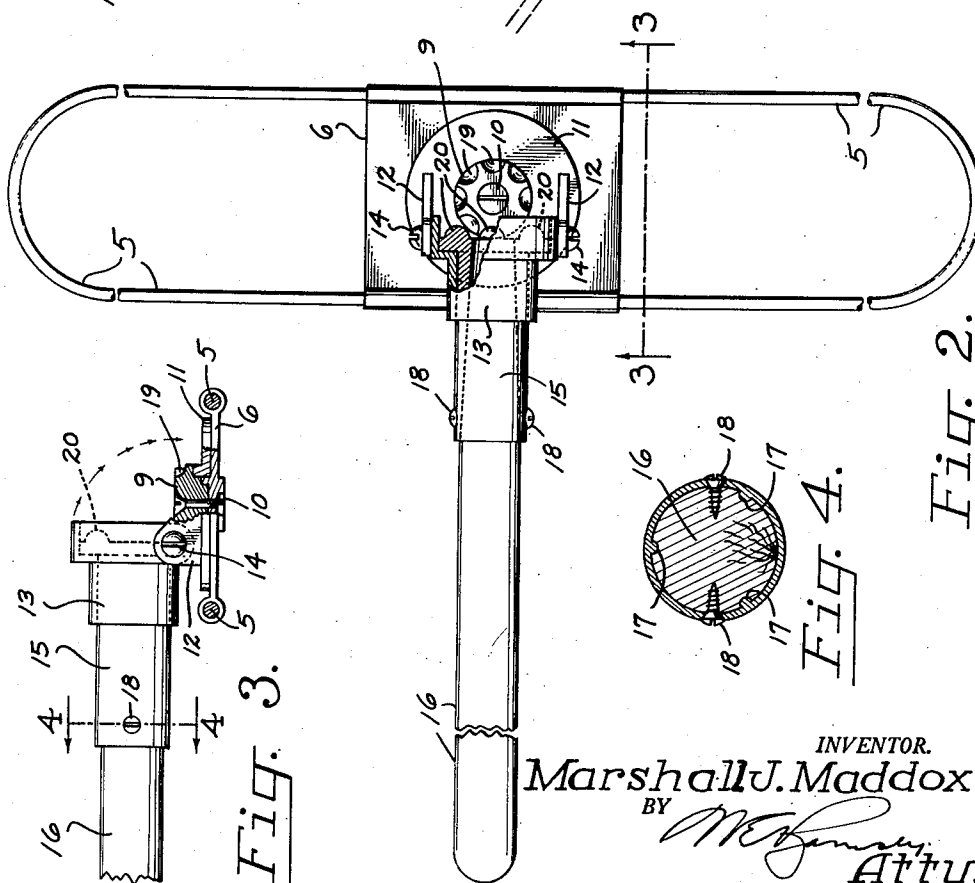


Fig. 2.

Fig. 3.

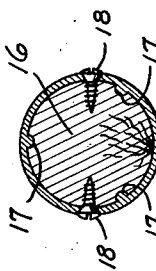


Fig. 4.

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## ARTICULATED MOP

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6 Claims. (Cl. 15—144)

This invention relates to an articulated and a rotatable support mechanism for joining the handle to the work head on a mop, a broom, a long handled tool, a brush, or the like in order to provide a controlled universal movement of these two parts relative to one another and thus to effect a more efficient cleaning or working operation.

One object of my invention is to provide an articulated and a rotatable support of the above type whereby a simple twist of the handle will rotate the work head through any desired portion of a full 360 degree circle, all while the handle is held in or is moved to any desired pivotal position about a horizontal axis. In function, this provides a universal movement since the work head and handle can move relative to one another both pivotally and rotationally.

While the instant invention is of equal utility when used on a broom, a brush, a tool, a vacuum cleaner hose, a squeegee, or other handle type instruments, the advantages best are summarized with respect to a specific exemplary use such as the well known dry mop which is used to clean floors. To this end, I provide a base member to which a cleaning element such as the dry mop may be attached. This base member carries an upstanding neck about which a support plate is mounted for rotation. An elongated, shell-like retainer is pivotally mounted upon the support plate for pivotal movement between a first position in which the retainer is horizontal and a second position in which the retainer is vertical. These are the desirable limiting positions for many handle-type tools and cleaning instruments which must pivot.

In cooperation with the above structure, there is provided an elongated handle support to which the conventional wooden mop handle may be attached. This handle support is carried for pivotal movement back and forth with the retainer and is journaled for rotation with respect thereto. The final element of the assembly consists of a rotation transmission mechanism which interconnects the neck and handle support in order to rotate the base member simply by twisting the handle support or handle. One essential feature of my invention is that this rotation of the base member is effective irrespective of the pivotal position or adjustment of the handle support. There thus is provided a simple structure whereby the handle of a mop can be pivoted about a horizontal axis to allow the head or base of the mop to reach under overlying obstructions and, at the same time, whereby the mop head can be rotated about a vertical axis simply by twisting the handle in order to make practical and convenient the cleaning of narrow floor areas, corners, or other similar areas affording limited access to the mop.

The cleaning operations of a janitor or custodian in a large public building are exemplary of the use of my invention. These cleaning operations present certain problems which are solved through the use of my novel structure. Firstly, it will be evident that a public building custodian is an hourly employee required to mop or clean large areas of floor and hall space in as little time as

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possible. For this reason, it is advantageous to utilize a large mop which will clean as wide a swath as possible with each pass. At the same time, a thorough cleaning job requires that many areas of limited access also be mopped. These latter include corners, areas under desks and other furniture, areas behind doors, and areas beneath radiators, beside or around filing cabinets, and the like. To meet the twin requirements of a large capacity mop for cleaning open areas and a compact or small mop for cleaning limited access areas, some janitors and custodians make it a practice to carry about a kit or bundle having mops of assorted sizes and shapes. I consider that an investment in such an assortment is unnecessary and is a needless expense. Accordingly, it is one object of my invention to provide a mop which, with a single unitary structure, will enable the user to clean a wide swath in open areas and a narrow or small swath in areas of either horizontal and vertical space restriction. Similar objectives with respect to other related instruments will present themselves to one skilled in this art.

A further object of my invention is to provide a novel rotation transmission means for interconnecting the handle and the base member of a mop whereby a positive, gear-type control of the rotation of the mop head is available without bending, stooping, fumbling or grasping and simply by twisting the handle with which the mop is manipulated. By this provision, the cleaning head of the mop will retain the selected position of rotational adjustment to clean either a wide or a narrow swath throughout a vigorous cleaning operation, even though the mop head inadvertently may come into contact with obstructions or the like during cleaning.

A further object of my invention is to provide a pivotal mop with rotation transmission means comprising mated and equispaced frusto-spherical depressions and hemispherical, tooth-like projections which are engageable one with the other throughout a full 90 degree pivotal adjustment. By this provision, a rotational adjustment of the mop head can be effected irrespective of the pivotal position of the mop handle. That is to say, a rotational adjustment can be effected as easily when the mop handle is in a horizontal position as it can when the mop handle is in a vertical position or in any position intermediate these two limiting positions. In areas of both horizontal and vertical obstruction, this provision is of substantial and of novel benefit to those who clean with mops.

These and other objects and advantages of my invention will become apparent during a consideration of the following detailed description, taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective view with movement direction arrows and dashed outlines indicating the various pivotal and rotational adjustments of the handle and mop head;

Fig. 2 is a foreshortened plan view partially broken away to indicate the manner in which the concave depressions on the neck of the base mate with the convex projections or teeth on the handle support to provide the rotational adjustment;

Fig. 3 is a detail view, taken substantially on the line 3—3 of Fig. 2, better illustrating the pivotal movement of the handle and the manner in which the rotational elements remain engaged during such a pivotal movement; and

Fig. 4 is a detail in cross section, taken substantially on the line 4—4 of Fig. 3, showing the manner in which the handle is fixed to the elongated handle support to assure that these two elements rotate as an integral unit when the handle is twisted.

In the preferred embodiment which is illustrated in the drawings, I provide an elongated wire-like loop 5 upon

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which the mop head base member 6 is mounted. A cleaning element such as the dry mop head 7 detachably is secured about the wire 5 and is held in place by employing plural draw strings 8. The janitor or housewife using the mop thus is enabled quickly and easily to change mop heads simply by loosening the draw strings 8 and attaching a different or a similar head.

As best illustrated in Fig. 3, an upstanding cylindrical neck 9 protrudes above and is fixed to the base member 6 by means of a nut and bolt assembly 10. In cooperation therewith, a flat circular support plate 11 is mounted upon the base 6 so as to encircle the neck 9 for rotation with respect thereto. Vertical movement of the support plate 11 is prevented by forming cooperating shoulders on the metal neck 9 and the metal plate 11 as shown in Fig. 3. In function, this arrangement allows the metal support plate 11 to rotate about a vertical axis corresponding to the vertical axis of symmetry of the fixed neck 9.

A pair of upstanding pivot ears 12 are mounted upon the support plate 11 adjacent the opposite sides of the cylindrical neck 9. Together with aligned apertures formed therein, these pivot ears 12 define a horizontal pivot axis which is tangential to the upper periphery of the neck as a comparison of Figs. 2 and 3 will indicate. Thus, a hollow, cylindrical retainer member 13 is pivoted, as by threaded bolts 14 which pass through the apertures in the ears 12. Referring to Fig. 3, this mounting of the retainer 13 allows a pivotal movement which may exceed 90 degrees by a few degrees and thus substantially is between a first position in which the retainer is horizontal with the longitudinal axis thereof normal to the longitudinal axis of the neck 9 and a second position in which the retainer is vertical and these axes coincide.

A tube-like cylindrical handle support 15 is journaled within the hollow retainer 13 for rotation with respect thereto. These latter two elements are provided with cooperating shoulders (as revealed in the portion of Fig. 2 which is broken away) in order to prevent longitudinal movement of the handle support 15 with respect to the retainer 13. In addition, an elongated handle 16 fits within and is fixed to the handle support 15. Since it is essential that the handle and handle support rotate as an integral unit, I employ a plurality of raised lands 17, a force fit, and a pair of opposed wood screws 18 to join the wooden handle to the metal support 15. Thus, when the handle 16 is twisted as indicated by the direction arrows in Fig. 1, the handle support 15 is caused to rotate about the longitudinal axis of the handle itself.

As an important feature of my invention, I provide a rotation transmission means or mechanism which interconnects the neck 9 and the handle support 15 in order to rotate the base member 6 when the handle 16 is twisted. This rotation of the base member is effective in all pivotal positions of the handle support and handle. To this end, a plurality of equispaced concave or frusto-spherical depressions 19 are recessed in a circular pattern about the top or upper periphery of the neck 9. These depressions 19 are open to both the upper face and the peripheral side margin of the neck in order to mate with related elements which now will be described.

In cooperation with the above structure, the handle support 15 carries a plurality of equispaced hemispherical or convex teeth 20 which protrude in a circular pattern about the lower end of the support. These convex teeth are mated to the concave depressions 19 and an equal number (eight are shown) of depressions and teeth are provided. As is best illustrated in Fig. 2, the convex teeth 20 mesh and mate with the concave depressions 19 in order to rotate the base member 6 when the handle 16 is twisted. Additionally, since this gear-type rotation transmission means extends in a full circle about both the protruding inner end of the handle support 15 and the top of the neck 9, the base member 6 can be adjusted

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in rotation through a full 360 degrees, selective ones of the teeth engaging corresponding ones of the depressions during the adjustment.

In use, a mop head 7 is secured about the elongated wire loop 5 by means of the draw strings 8. Thereafter, the mop is ready for use in any normal mopping operation and, in addition, in any cleaning operation requiring a combination of pivotal and rotational adjustment. For example, the physical dimensions of the mop allow the cleaning of a wide swath with each pass of the mop when the head is arranged as shown in Fig. 1. Should it become necessary to lower the handle in order to reach under or through an area of limited access with the mop head, the pivotal mounting of the retainer 13 upon the apertured pivot ears 12 will allow such an adjustment to be effected quickly and readily. Such a pivotal adjustment is indicated by the vertical direction arrows and the dashed outlines of the handle in Fig. 1.

On the other hand, a thorough cleaning job requires that many areas of limited or confined access also be mopped. Such areas may include the corners of a room, areas under desks, radios, tables, and other furniture, areas behind doors, and areas beneath radiators or around filing cabinets and the like. To this end, it will be noted that I prefer a mop head 7 which is long and narrow. Thus, to use the mop in a corner, for example, the handle 16 is twisted as shown by the rotational direction arrows in Fig. 1. A one quarter turn or twist will rotate the mop head to a point where the longitudinal dimension lies fore and aft or at right angles to the position illustrated in Fig. 2. Since the mop head is in frictional contact with the floor and the long handle allows a good grip to be taken, the retainer 15 need not be held while this rotational adjustment is effected. After adjustment, of course, the narrow dimension of the mop easily will fit into the corner or other narrow area to effect the required cleaning action. Since the person using the mop grasps the handle 16 in manipulation of the mop, it further will be evident that the mop head 7 will remain in that position to which it is set so long as the grip on the handle is maintained. This is so even though a vigorous cleaning operation may cause the mop head inadvertently to bump against or come in contact with obstructions which otherwise would cause a free turning mop head to rotate out of adjustment. Still further, continued use of the mop head 7 may cause the string or yarn body thereof to take a set or to bend under or away from the direction in which the mop is pushed. Such a contingency easily is prevented when my invention is employed simply by twisting the handle 16 to rotate the entire mop head 7 through a 180 degree semicircle. Thereinafter, the forces generated in manipulating the mop will be imposed upon the mop head in the opposite direction. This provides a longer life and is of distinct advantage to the janitor, custodian, housewife, or other person employing my mop.

In summary, it will be seen that I have provided a mop which will meet the twin requirements of a large capacity mop for cleaning open areas and a compact or small mop for cleaning limited access areas. This mop is provided in a single unitary structure which utilizes a novel rotation transmission means for interconnecting the handle and base of the mop. Since the concave and convex elements of this transmission means always are in engagement and are meshed or mated irrespective of the pivotal position of the handle, a positive, gear-type control is provided in effecting a rotation of the mop head. Furthermore, such a positive control is available without bending, stooping, fumbling, or grasping and simply by twisting the handle with which the mop normally is manipulated. This articulated and rotatable support is of equal utility when employed on a broom, brush, tool, vacuum cleaner, mop, squeegee, or other handle-type instrument with which universal relative adjustment is desirable.

I claim:

1. A pivotal mop adapted for rotational adjustment by

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twisting the mop handle, comprising a mop head base member having upstanding means defining a vertical axis, support means mounted for rotation about said vertical axis, an elongated retainer means mounted upon said support for pivotal movement about a horizontal axis between a first position in which the longitudinal axis of the retaining means is normal to the said vertical axis and a second position in which these axes coincide, said longitudinal axis of the retainer means being perpendicular to the horizontal axis about which the retainer means is pivoted, handle support means carried for pivotal movement with said retainer and for rotation with respect to and about the longitudinal axis of the retainer, and gear type rotation transmission means including a plurality of equispaced teeth in a circular pattern on one of the handle support and upstanding means mating with a plurality of equispaced depressions in a circular path on the other for interconnecting said upstanding means and said handle support to rotate said base member in response to a rotational twist of the handle support about said longitudinal axis while the handle support is arranged in or intermediate said first and second pivotal positions.

2. In a pivotal mop adapted for a full 360 degree rotational adjustment by twisting the mop handle, a mop head base member having an elongated upstanding neck protruding thereabove, said neck having a plurality of equispaced concave depressions recessed about the upper periphery thereof, support means mounted for rotation about said neck, an elongated retainer means mounted upon said support for pivotal movement between a first position in which the longitudinal axis of the retaining means is normal to the longitudinal axis of said neck and a second position in which these axes coincide, and an elongated handle support means to which a handle may be attached carried for pivotal movement with said retainer and for rotation with respect thereto about an axis that is perpendicular to the pivotal axis of the retainer means, said handle support carrying a plurality of equispaced convex tooth means mated to said depressions for rotating said base member when the handle support is twisted while in or intermediate said first and second pivotal positions.

3. An article of manufacture, comprising a base member to which a cleaning element or the like may be attached, circular means fixed to said base member to define a vertical axis and having a plurality of equispaced frusto-spherical depressions recessed in a circular pattern about the upper periphery thereof, a support plate means mounted for rotation with respect to said base member about said vertical axis, an elongated retainer means mounted upon said support plate for pivotal movement about a horizontal axis between a first position in which the longitudinal axis of the retaining means is normal to said vertical axis and a second position in which these axes coincide, and an elongated handle support means to which a handle may be attached carried for pivotal movement with said retainer and for rotation with respect to and about the longitudinal axis of the retainer, said longitudinal axis of the retainer means being perpendicular to the horizontal axis about which the retainer means is pivoted, said handle support carrying a plurality of equispaced hemispherical tooth means arranged in a circular pattern and mated to and engageable with said frusto-spherical depressions for rotating said base member when the handle support is twisted while in or intermediate said first and second pivotal positions.

4. A pivotal cleaning mop adapted for a full 360 degree rotational adjustment during use by twisting the mop handle, comprising a mop head base member having an elongated cleaning element secured thereto, an upstanding cylindrical neck detachably fixed to and protruding above said base member, a flat circular support plate means mounted upon said base member and encircling said neck for rotation with respect thereto, a pair of upstanding

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pivot ear means mounted upon said support plate adjacent the opposite sides of said cylindrical neck and together defining a horizontal pivot axis which is tangential to the upper periphery of the neck, a hollow cylindrical retainer means mounted upon said pivot means for pivotal movement between a first position in which the retainer is horizontal and to the side of said neck and a second position in which the retainer is vertical while straddling said neck, a cylindrical handle support means journaled within said hollow retainer means for rotation with respect thereto, an elongated mop handle fixed to said handle support for rotation therewith as an integral unit, and gear type rotation transmission means interconnecting said neck and handle support and including equispaced teeth in a circular pattern on one mating with equispaced depressions in the other of said neck and handle support to rotate the neck and base member when said handle is twisted while fixed in or moving between any position of pivotal adjustment intermediate said first and second pivotal positions.

5. In a pivotal cleaning mop adapted for rotational adjustment during use by twisting the mop handle, a mop head base member having a cylindrical neck member fixed to and protruding thereabove, said neck having a plurality of concave depressions recessed in a circular pattern about the upper periphery thereof, a support plate means mounted upon said base member and having an aperture encircling said neck for rotation of the plate with respect to the base, pivot means mounted adjacent the opposite sides of said cylindrical neck and together defining a horizontal pivot axis, a hollow cylindrical retainer means mounted upon said pivot means for pivotal movement between a first position in which the retainer is horizontal and a second position in which the retainer is vertical, a cylindrical handle support means journaled within said hollow retainer means for rotation with respect thereto, said handle support carrying a plurality of equispaced convex teeth protruding in a circular pattern about the lower end thereof and mated to said depressions to define gear means for rotating said base member in response to a twist of said handle support while the latter is in or intermediate said first and second pivotal positions, said plurality of depressions and teeth being equal in number to allow said handle support to mesh and to lie flush against said neck in the said second position of the parts.

6. A pivotal cleaning mop adapted for a full 360 degree controlled rotational adjustment during use by twisting the mop handle, comprising a metal mop head base member having an elongated narrow cleaning element detachably secured thereto, an upstanding cylindrical neck detachably fixed to and protruding above said base member, said neck having a plurality of equispaced frusto-spherical depressions recessed in a circular pattern about the upper periphery thereof and opening to both the upper face and the peripheral side margin of the neck, a flat circular metal support plate means mounted upon said base member and encircling said neck for rotation with respect thereto, a pair of upstanding pivot ear means made integral with said support plate and located adjacent the opposite sides of said cylindrical neck together to define a horizontal pivot axis which is tangential to the upper periphery of the neck, a hollow cylindrical metal retainer means mounted upon said pivot means for pivotal movement about said horizontal pivot axis between a first position in which the retainer is horizontal and a second position in which the retainer is vertical and straddles said neck, a cylindrical metal handle support means journaled within said hollow retainer means for rotation with respect thereto, said handle support and retainer having cooperating shoulder means preventing longitudinal movement of the support with respect to the retainer, and an elongated wood mop handle fixed to said handle support for rotation therewith as an integral unit, said handle support carrying a plurality of equispaced hemispherical tooth means protruding in a circular pattern about the lower end thereof and mated to said frusto-spherical

depressions to rotate said base member when said handle is twisted while in or intermediate said first and second pivotal positions, said plurality of depressions and tooth means being equal in number to allow said handle support to mesh and to lie flush against said neck in the said second position of the parts. 5

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