

[54] ELECTRIC MOP

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[56]

References Cited

UNITED STATES PATENTS

598,602 2/1898 Keesee 15/41 A
2,127,051 8/1938 Atkinson 15/98

FOREIGN PATENTS OR APPLICATIONS

244,735 11/1926 Great Britain 15/49 C

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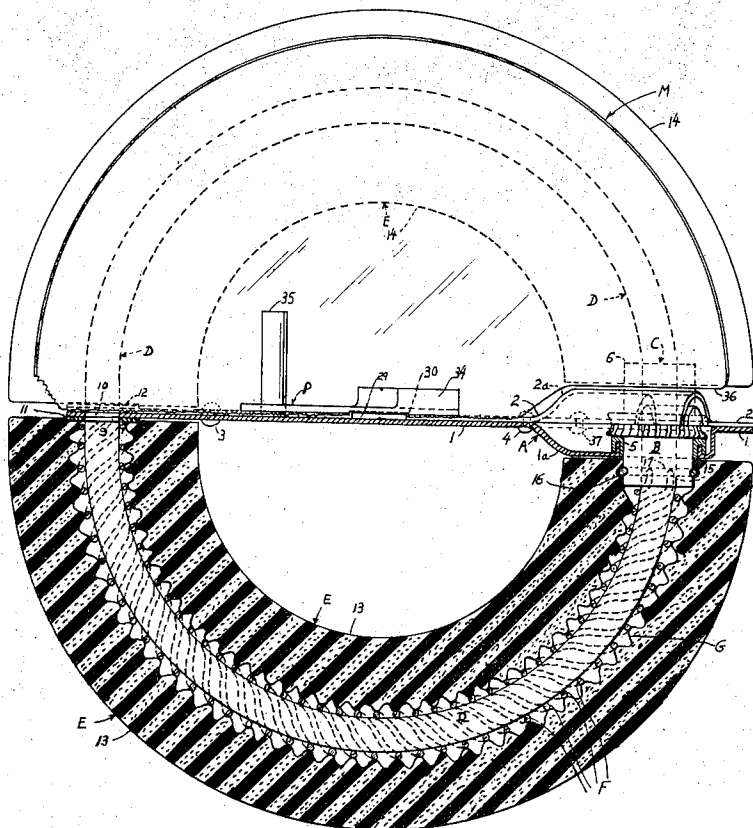
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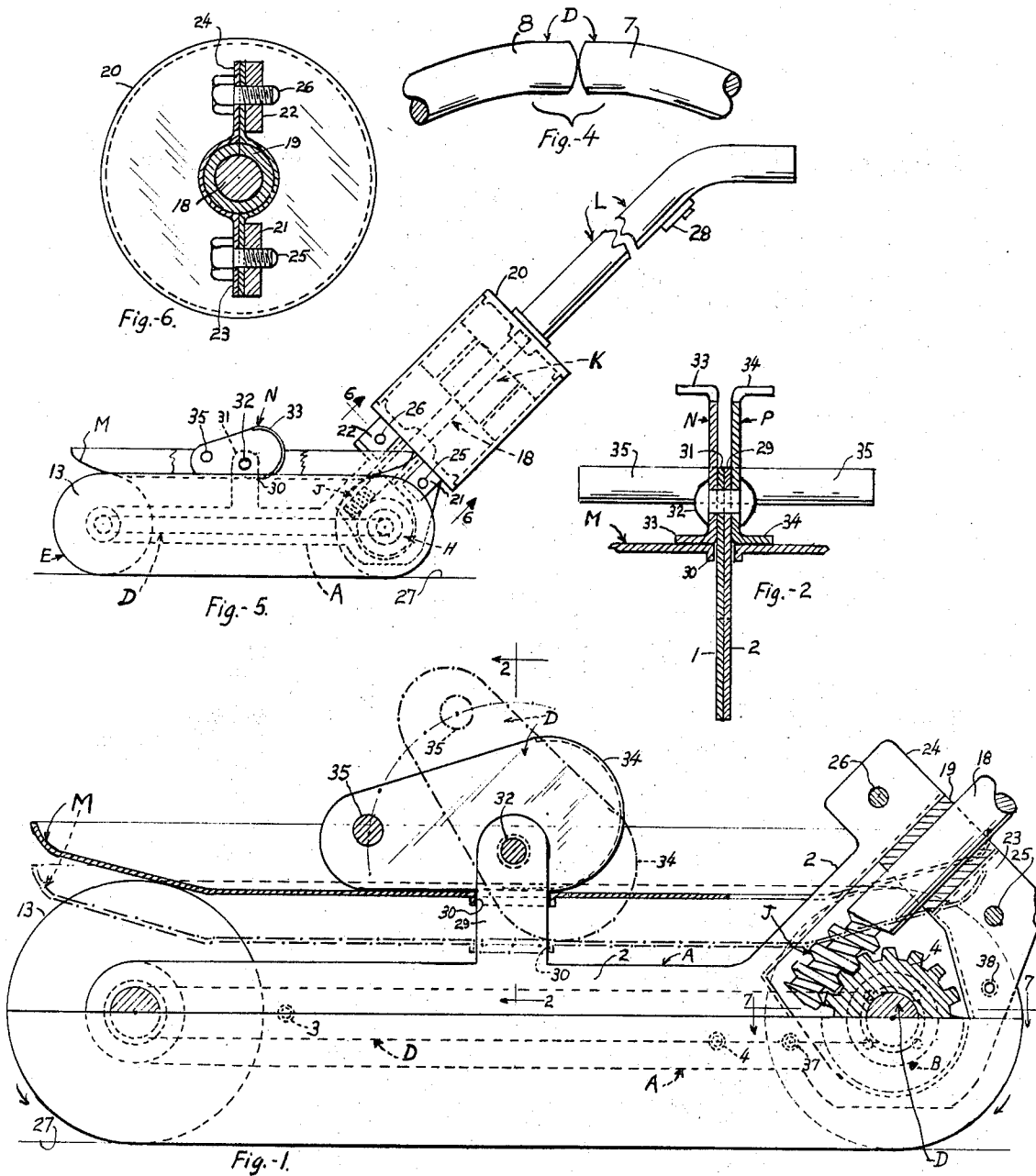
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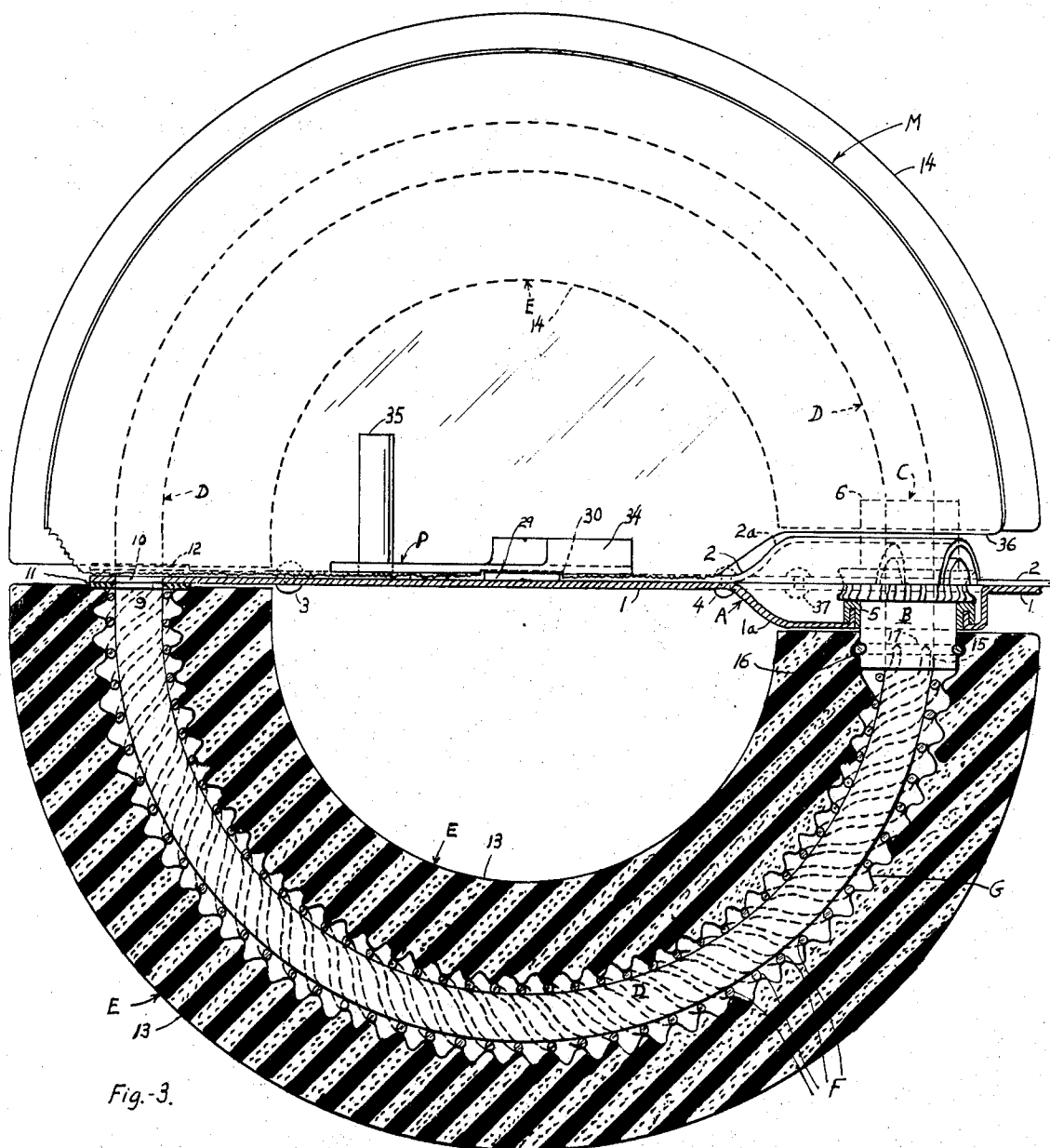
ABSTRACT

An electric mop that makes use of a toroidal cleaning element that is rotatably mounted on a ring-shaped axle with the electric motor rotating the toroidal cleaning element or mop on this circular axle. A novel mop wringing plate rests lightly on the top of the toroidal mop when the plate is in normal position and acts as a shield to protect the operator from any flying liquid that might accidentally be thrown off by the toroidal cleaning element as it is rotated about the ring-shaped axle. In addition, novel means is provided for forcing the plate down upon the toroidal cleaning element while it is rotating for wringing the cleaning element or mop of its dirty water.

12 Claims, 10 Drawing Figures







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ELECTRIC MOP

BACKGROUND OF THE INVENTION

Field of the Invention

Self-wringing electric mops usually are of the endless belt variety where the moving belt is made to pass between a pair of wringing rollers for squeezing out the dirty water and then is made to contact with the floor to continue the mopping operation. Another type of self-wringing electric mop makes use of one or more rotating drums, each having its outer cylindrical surface covered with a layer of mopping material. The drum brings its layer of mopping material into contact with the floor to be cleaned after which a pressure roller is yieldingly held against the drum for squeezing out the dirty water from the mopping material.

My invention introduces an entirely new type of electric mop where the cleaning element or mop is toroidal in shape and is caused to rotate about a ring-shaped axle. Another novel feature of my invention lies in the provision of a mop-wringing plate that when resting on the top of the toroidal cleaning element or mop in an inoperative position it will function as a shield to prevent the toroidal cleaning element as it rotates on its ring-shaped axle from throwing any liquid onto the operator. Novel means is used for moving the mop-wringing plate into an operative position where it will press upon the toroidal-shaped mop for wringing water from it as the mop is rotated on its circular or ring-shaped axis. The electric mop is simple in construction and consists of only a few working parts.

SUMMARY OF THE INVENTION

An object of my invention is to provide an electric mop that makes use of an entirely new type of cleaning element which is in the shape of a toroid and is rotatably mounted on a ring-shaped axle. Novel means is used for rotating the toroidal cleaning element or donut-shaped mop on its circular axis. The toroidal cleaning element rests on the floor to be cleaned and the rotation of the element on its ring-shaped axle is in such a direction as to cause the floor contacting portion to move toward the interior of the "donut." Therefore any water or foreign matter that might have a tendency to fly free of the toroidal cleaning element would do so within the confines of the "donut" and would be prevented from any vertical movement beyond the mop-wringing plate which in its inoperative position would function as a shield for the operator.

A further object of my invention is to provide a dish-shaped wringer plate that overlies and rests on the toroidal cleaning element when the plate is in inoperative position and functions as a shield to prevent any water and/or foreign matter from escaping beyond the confines of the space enclosed by the toroidal cleaning element and the plate. The wringer plate can be moved into an operative position where it will be pressed down upon the top of the toroidal element and squeeze this portion between the plate and the stationary ring-shaped axle so that during the rotation of the toroidal cleaning element about the circular axle, any water in the element will be squeezed out.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of the electric mop with certain portions being shown in section. The mop handle and the electric motor are not shown in this Figure.

FIG. 2 is a transverse section taken along the line 2—2 of FIG. 1.

FIG. 3 is a top plan view of FIG. 1 with about one-half of the device being shown in section.

FIG. 4 is a plan view showing the two ends of the stationary split ring-shaped axle on which the toroidal cleaning element rotates.

FIG. 5 is a side elevation of the entire electric mop and is shown on a smaller scale than that in FIG. 1.

FIG. 6 is a transverse section taken along the line 6—6 of FIG. 5 and shows how the electric motor is attached to the gear casing. FIG. 6 is at the same scale as that of FIG. 1.

FIG. 7 is a horizontal section through the worm gear and associate parts and is taken along the line 7—7 of FIG. 1.

FIG. 8 is a plan view with a part being shown in horizontal section of a modified form of electric mop where a single cylindrical mopping member is rotatably mounted on the circular mop supporting axle.

FIG. 9 is a vertical section taken along the line 9—9 of FIG. 8 and shows one half of the gear housing and associate parts.

FIG. 10 is a transverse section taken along the line 10—10 of FIG. 9 and shows portions of the two worm gears in mesh with the worm that is rotated by the motor.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In carrying out my invention I provide a gear housing indicated generally at A in FIGS. 1 and 3 and comprising two identical halves 1 and 2. The two halves 1 and 2 have elongated portions or extension arms abutting each other and secured together by any suitable means, such as by rivets 3 and 4. The gear housing A has its two halves 1 and 2 provided with portions 1a and 2a that are spaced from each other, see FIG. 3, and the portion 1a carries a bearing 5 which in turn rotatably receives a hub B, of a worm gear H, see also FIG. 7. The portion 2a in like manner carries a bearing 6 which rotatably supports a second hub C of the worm gear H whose axis is in alignment with the hub B. Both the bearing 6 and the hub C are shown in dotted lines in FIG. 3 and are shown in section in FIG. 7. The hubs B and C are integral with the worm gear H.

A circular stationary axle D has its end 7, see FIG. 4, received in the hub B, see also FIG. 7, and the hub can rotate freely about the end 7 without rotating the axle. In like manner the other end 8 of the stationary axle D is received in the hub C and the two ends 7 and 8 of the axle can abut each other as shown in FIG. 7. The hub C can freely rotate on the axle end 8. FIG. 4 shows that the axes of the two end portions 7 and 8 of the split ring axle D are in alignment with each other. In the side elevation of FIG. 1, a horizontal line is shown extending along the axial line of the split ring-shaped axle D. The structure appearing above this horizontal line or plane is shown in section and this section is along a vertical plane that lies between the two abutting identical halves 1 and 2, shown in FIG. 1.

Referring to FIG. 3, it will be seen that the split ring-shaped axle D has its mid-portion extending through two aligned openings 9 and 10 provided in the two identical flat portions of the halves 1 and 2 of the gear housing A. A washer 11 has an opening for receiving the axle D and the washer bears against the adjacent flat side of the gear housing half 1. In like manner another washer 12 has an opening for receiving the axle D and this washer bears against the adjacent flat side of the gear housing half 2, in the same Figure. The split ring-shaped axle D has its ends 7 and 8 supported by the hubs B and C of the worm gear H and the midpoint of the axle D that extends through the aligned openings 9 and 10 of the two identical halves 1 and 2, respectively, is supported by the flat portions of the halves 1 and 2 of the gear housing A.

I will now describe how a toroidal cleaning element E and comprising two identical halves 13 and 14, is rotatably mounted on the stationary ring-shaped axle D. I provide a plurality of coil springs F and show four of these mounted on one-half of the axle D, that extends from the rotatable hub B to the washer 11, see FIG. 3. The four coil springs F are interleaved with respect to each other and they have their ends 15 inserted into four openings formed in the outer end of the hub B, see also FIG. 7. The four openings in the hub B are spaced 90° away from each other and their axes parallel the central axis of the hub B. The other ends of the four coil springs F bear against the metal washer 11 and the washer will rotate with the coil springs on the axle D in a manner hereinafter described. In this way there will be no wearing action of the four spring ends against the washer 11 or against the gear housing half 1 as the four springs F rotate on the axle D. The other half of the ring-shaped axle D is provided with four coil springs, not shown, and similar to the springs F. The springs mounted on this other half of the circular axle D have their four ends received in four openings in the hub C, see FIG. 7, and the other ends of the four springs bear against the washer 12. No illustration of these last four helical springs is made because they are similar to the four springs F.

I mount a flexible corrugated tubing G over the four helical springs F and the tubing will also enclose one-half of the ring-shaped axle D from the hub B to the washer 11, see FIG. 3, where the tubing is shown in section by a single wavy line. The tubing G is designed to rotate on its semi-circular axis and to this end I secure the end of the tubing to the hub B. The end of the tubing G is slipped over the adjacent end of the hub B and a ring 16 encircles the portion of the tubing on the hub and presses the tubing into an annular groove 17 in the hub, see also FIG. 7, so that a rotation of the hub on the end 7 of the axle D will not only rotate the four helical springs G on the axle, but will also rotate the tubing G with the springs.

Each half 13 and 14 of the toroidal cleaning element E is preferably made from a pliable spongy material that will absorb water and can be compressed for squeezing the water therefrom, see FIG. 3. I have shown the one-half portion 13 of the toroidal cleaning element E in section in FIG. 3, and this cylindrical portion has a central bore that snugly receives the corrugated tubing G (which is shown in section in this Figure by a single wavy line) and also receives the four helical springs F plus one-half of the split ring-shaped axle D. It will be seen from this construction that a rotation of

the hub B, by a means presently to be described, will cause the four helical springs F to rotate on the arcuate portion of the axle D and the four springs in turn will cause the corrugated tubing G to rotate with the springs and to rotate the half 13 of the cleaning element E.

It should be understood that what I have described for the one-half cleaning element 13 of the toroidal cleaning element E is duplicated for the other half 14 of the cleaning element. Since the mounting of the other one-half cleaning element 14 is identical to that already shown and described for the one-half cleaning element 13, a detailed description for the one-half element 14 is not necessary. I therefore have shown the plan view of the one-half cleaning element in FIG. 3 in elevation rather than in section.

The means for rotating the half-toroidal cleaning elements 13 and 14 of the toroidal cleaning element E is shown in FIGS. 1, 3 and 5. It should be noted in FIGS. 3 and 7 that the hubs B and C are integral with a worm gear H. In fact, the worm gear H has the hubs B and C, and the worm gear meshes with a worm J, shown in FIGS. 1 and 5. The worm J forms an integral part of a motor shaft 18 that is journaled in a bearing 19, which in turn is mounted between the two halves 1a and 2a of the gear housing A, see especially FIG. 1 where the bearing 19 is shown in section. The motor shaft 18 extends from a motor casing 20 and the casing is provided with lugs 21 and 22 that are removably connected to ears 23 and 24, respectively, which are integral with the gear housing portions 1a and 2a and bolts or studs 25 and 26 connect the parts together. The lugs 21 and 22 have threaded openings for receiving the bolts 25 and 26.

FIG. 5 shows how the motor shaft 18 extends upwardly at an angle and how the electric motor K, mounted within the casing 20, has a direct drive connection from the motor shaft 18 to the toroidal cleaning element E by means of the worm J, worm gear H with its integral hubs B and C, the four spiral springs F connected to each hub, the corrugated tubings G, enclosing each set of spiral springs, and the tubular and half circular cleaning elements 13 and 14 pressing against the corrugated tubings and making up the toroidal cleaning element E. The toroidal cleaning element E will be rotated on the ring-shaped axle D in a direction that will cause the portion of the cleaning element that contacts with the floor 27 to have an inward sweeping direction toward the center of the toroid. The worm J and worm gear H will provide a gear reduction between the higher speed of the motor K and the lower speed of the rotating toroidal cleaning element E as the latter rotates on the ring-shaped axle D, as an axis. If desired to reduce the speed of the toroid E still further, a gear reduction mechanism, not shown, could be mounted in the motor casing.

A handle L has its lower end connected to the motor casing 20 so that the axis of the handle will coincide with the axis of the weight shaft 18 and with the axis of the cylindrical casing 20, see FIG. 5. The handle may be provided with an electric switch 28 for starting and stopping the motor K. It will be noted that the motor K and its casing 20 are mounted close to the gear housing A so as to keep the center of gravity of the device near the cleaning toroidal element E and thus prevent any tendency for the motor casing 20 and handle L to swing downwardly toward the floor 27 and raise the opposite end of the toroid E. Moreover, the weight of the

electrical motor K and casing 20 will press the toroidal cleaning element down upon the floor so as to increase the effective cleaning function of the electric mop. When the motor K is started and the toroidal cleaning element is rotated about its circular axle D, the parts will be evenly balanced and there will be no tendency for the mop to creep over the floor in any direction because the portion of the toroid that contacts the floor will have an inward movement toward the center of the toroid and all of the forces for moving the electric mop will balance each other. The machine can be made to move forwardly by tipping the handle in a forward direction because this will shift the weight toward the forward end of the toroidal cleaning element E, and traction of this forward end on the floor will be increased and the traction of the rear portion of the element E lessened with the result of a forward movement of the device over the floor. In like manner the device can be moved over the floor in any desired direction by tipping the handle L in the direction in which the operator desires the electric mop to move.

My electric mop has novel means for wringing the toroidal cleaning element from water when the operator so desires and this means makes use of a disc-shaped plate M for this purpose. The plate can also perform an additional function of acting as a splash shield for protecting the operator, see FIGS. 1, 2, 3 and 5. The disc-shaped wringer plate M has an outer diameter which is slightly less than the outer diameter of the toroidal cleaning element E, as shown in FIG. 3, where I illustrate only about one-half of the plate. Then in FIG. 1, I show the flat portion 2 of one-half of the gear housing A, provided with a vertical extension 29 that projects upwardly through a central slot 30 in the wringer plate M. The other flat portion 1 of the other one-half of the gear housing A also has a vertical extension 31, see FIGS. 2 and 5 that extends along the side of the vertical extension 29 and contacts this side so as to extend upwardly through the same central slot 30 in the wringer plate M.

The wringer plate M has a recess 36 for receiving the gear housing 1a and 2a and is free to move vertically on the two abutting extensions 29 and 31 of the flat portions 1 and 2 of the gear housing A. When the plate is in an inoperative position, as shown by the full lines in FIG. 1, the plate will rest lightly upon the top of the toroidal cleaning element E and will not exert any wringing effect on the cleaning element. It will further be seen from FIGS. 1 and 5 that the outer portion of the wringing plate is flared upwardly at a slight angle and the rim of the plate also has a slight upward curve. The plate M when in inoperative position acts as a shield or splash plate because it covers the open central portion of the toroidal cleaner E and any water escaping from the rotating cleaning element will be thrown inwardly and will strike the undersurface of the plate. In this novel and simple way the operator is protected from any dirty water striking him.

In FIGS. 1, 2, 3 and 5, I show a pair of cam-shaped members N and P that are pivotally connected to the two upright extensions 31 and 29, respectively, by a slightly loose rivet 32. The cam member N has a cam-shaped flange 33 while the cam-member P has a cam-shaped flange 34. A handle 35 extends transversely through the cam members N and P at a point removed from the rivet 32. It will be seen from this construction that when the operator wishes to wring the toroidal

cleaning member E from water, he grasps the handle 35 and swings the cam members N and P in a clockwise direction when looking at FIG. 1. This will move the wringer plate M downwardly into the dot-dash line position and will compress the upper portion of the cleaning element E toward the stationary circular axle D. The electric switch 28 can be closed and this will cause the motor K to rotate the toroidal cleaning element E about its circular axle D in the manner already described. The wringer plate M, while in its operative position, will squeeze the water out of the rotating toroidal cleaning element E.

The extension arms 1 and 2 of the two identical halves (a right and a left) of the gear housing A can be formed and cut by punch and dies. The arms are flat excepting the portions 1a and 2a that house the gearing. When the electric mop is used, the operator can lift the device by the two handles L and 35 and placed in a cleaning solution, not shown, for causing the toroidal cleaning element to absorb the solution. Then the device can be lifted out of the solution by the same two handles and placed on the floor to be cleaned. When the operator wishes, he may wring the cleaning solution out from the toroidal cleaning element E by swinging the cam members N and P into almost a vertical position in the manner already described for forcing the wringer plate M into the rotating toroidal cleaning element for squeezing the solution from the element.

It will be noted from FIG. 1 that the outer diameter of the worm J is no greater than the diameter of the motor shaft 18. This permits the operator to pull the shaft 18 and worm J out of the gear housing without the necessity of opening the housing by removing the rivets 3 and 4 and the additional rivets 37 and 38 for the housing. I have found that when using four interleaved coil springs F instead of a single coil spring, there is less "play" because the number of turns for the four coil springs is reduced by four times as against a single coil spring.

I have shown a modified form of my electric mop in FIGS. 8, 9 and 10. In this modified form the toroidal cleaning element E' is substantially coextensive with the length of the split ring axle Q. The left half of FIG. 8 is shown in top plan elevation while the right half is shown in a horizontal section taken substantially along the plane of the circular axis of the split ring axle Q, the axle Q being shown in elevation. Since the toroidal cleaning element E' is not formed into two lengths as is true of the cleaning element E shown in FIG. 3, the gear housing R has its flat portions 50 and 51 shortened in length because the axle Q is not supported at its midpoint and the modified form differs from the form shown in FIG. 3 in this respect.

Before describing the gear housing F in further detail, it is best to set forth the particular change in the gearing mechanism from that shown in FIG. 3, for rotating the cleaning element E' in FIG. 8. The ends of the split ring stationary axle Q have reduced portions that are rectangular in cross section and are received in slots provided in the ends of a stationary stub shaft S. The stub shaft extends through an opening in a shaft supporting plate 52, see also FIG. 9 where the plate is shown in section. The plate 52 is positioned between a pair of bevelled gears 53 and 54 and the plate has an extension 52a that is gripped between the inner surfaces of the flat portions 50 and 51 of the gear housing R. FIG. 9 illustrates the stud 25 that connects the gear housing R

to the motor housing 20, as extending through an opening in the plate 52. The stub shaft S is welded to the plate 52.

The bevel gear 53 has a hub 55 which rotates in a bearing that is supported by the part 50 of the gear housing R, see FIG. 8. One end of the corrugated tubing G' is slipped over the hub 55 and is held in place by a ring 56 that clamps the tubing end in an annular groove formed in the hub. The tubing G' is shown in section by a single wavy line in the right half of FIG. 8. The other bevel gear 54 has a hub 57 which rotates in a bearing that is supported by the part 51 of the gear housing R. The flat portions 50 and 51 have portions that are spaced apart to receive the plate 52 and the bevel gears 53 and 54 as is clearly shown in FIG. 8. The other end of the corrugated tubing G; is slipped over the hub 57 and is held in place by a ring 58 that clamps the tubing end in an annular groove formed in the hub.

The toroidal cleaning element E' is identical to the cleaning element E except that it is not divided into two half lengths. In FIG. 3 the cleaning element E has one half length extending from the hub B to the washer 11 and the other half length extends from the hub C to the other washer 12. This is due to the fact that the split stationary axle D is supported at its midway point by the two halves 1 and 2 of the gear housing A. In the modified form shown in FIG. 8, the mid point of the split ring axle Q is not supported by the flat portions 50 and 51 of the gear housing R. This permits the cleaning element E' to be of a single length that extends from the hub 55 of the bevel gear 53 to the hub 57 of the bevel gear 54. Therefore, the flat portions 50 and 51 of the gear housing R extend only a short distance beyond the center of the toroidal cleaning element E'.

FIG. 9 illustrates a face view of the flat portion 51 of the gear housing R and shows the plate 52 in section. The flat portion 50 of the gear housing R is identical to the flat portion 51 except that one is a right hand part and the other a left hand part. It will be noted from FIGS. 8 and 9 that the flat portion 51 has a vertical extension 59 that projects through an opening 60 provided in a discshaped mop wringer member M'. In like manner the flat portion 50 has a vertical extension 61 and FIG. 8 only shows a portion of the extension. The vertical extension 61 also projects upwardly through the opening 60 in the mop wringer member M'.

The mop wringer member M' normally acts as a splash plate as it rests lightly on top of the toroidal cleaning member E' because the rotation of the cleaning member on the ring-shaped stationary shaft Q is in a direction that the portion of the cleaning member that contacts the floor will be in an inward direction toward the center of the toroid. Any tendency of the cleaning member to throw any water or foreign matter upwardly will be stopped by striking against the underside of the member M'. In this way the modified form performs in the same manner as the form shown in FIG. 3.

The mop wringing member M' can be moved downwardly to compress the upper portion of the toroidal mop E' in the same manner as that already illustrated and described for the form of the device shown in FIG. 3. Referring to FIG. 8, I provide two cam members N' and P' that are pivotally connected to the vertical extensions 59 and 61 by a rivet 62 that extends through openings 63 in the vertical extensions, see also FIG. 9.

The cams N' and P' operate in the same manner as the cams N and P shown in FIGS. 1, 2 and 5. When the cams N' and P' are manually swung into operative position, the cam-shaped flanges will engage with the wringer plate M' and will move it downwardly so as to compress the upper portion of the toroidal mop. A rotation of the mop on the stationary ring-shaped axle Q will squeeze the soiled water from the mop.

The motor that drives the motor shaft 18 in the modified form of the electric mop is not shown in FIG. 9 because it is identical to that shown in FIG. 5. Also, the handle for moving the device over the floor is not shown in FIG. 9 because it is similar to the handle L illustrated in FIG. 5. The operation of the modified form of the invention is similar to that already described for the form shown in FIGS. 1 to 7 inclusive and no further description is deemed necessary.

The ends 7 and 8 of the circular axle D, see FIG. 4, are in alignment with each other and the axes of these ends lie in a single straight line so that they will readily be received in the axial bore of the worm gear J, this bore also extending through the hubs that are integral with the worm gear. The mid portion of the axle D that extends through the openings 9 and 10 in the flat portions 1 and 2 of the gear housing A, see FIG. 3, and through the washers 11 and 12 that abut the flat portions, may also be straightened for a short distance if necessary so as to compliment the combined lengths of the shaft ends 7 and 8.

I claim:

1. An electric mop comprising:

- a. a ring-shaped non-rotatable shaft;
- b. a toroidal cleaning element rotatably mounted on said non-rotatable ring-shaped shaft;
- c. means for rotating said toroidal cleaning element about said non-rotatable ring-shaped shaft, using said shaft as a circular axis; and
- d. a handle operatively connected to said non-rotatable shaft for moving the shaft and toroidal cleaning element over the floor so that the plane of the ring-shaped shaft will parallel the plane of the surface over which the mop is moved.

2. An electric mop comprising:

- a. a toroidal cleaning element;
- b. means for rotating the toroidal cleaning element about its ring-shaped axis;
- c. a handle operatively connected to said cleaning element for moving the toroidal cleaning element over the floor so that the plane of the ring-shaped axis will parallel the plane of the floor;
- d. said toroidal cleaning element includes a ring-shaped stationary shaft and a spongy elongated cylindrical member having a central bore for receiving said ring-shaped stationary shaft; and
- e. the means for rotating said toroidal cleaning element includes an electric motor operatively connected to said spongy elongated cylindrical member for rotating it about said stationary ring-shaped shaft.

3. An electric mop comprising:

- a. a toroidal cleaning element;
- b. means for rotating the toroidal cleaning element about its ring-shaped axis;
- c. a handle operatively connected to said cleaning element for moving the toroidal cleaning element over the floor so that the plane of the ring-shaped axis will parallel the plane of the floor;

- d. said toroidal cleaning element includes a split-ring stationary shaft, a worm gear with an integral hub on each side and an axial bore extending there-through for receiving the ends of said stationary shaft;
 - e. a plurality of coil springs rotatably mounted on said shaft and having their ends connected to said hubs so that a rotation of said worm gear will cause its hubs to rotate said coil springs about said ring-shaped shaft as an axle;
 - f. a spongy elongated cylindrical member having a central bore lined with a corrugated tubing, said tubing receiving the coil springs and shaft, and said tubing and spongy elongated cylindrical member being rotated about said ring-shaped shaft when said worm gear rotates said coil springs; and
 - g. an electric motor and motor shaft with a worm meshing with said worm gear for rotating the latter and the coil springs and the spongy elongated cylindrical member about the ring-shaped shaft as an axis.
4. The combination as set forth in claim 2: and in which
- a. a disc-shaped mop wringer overlies said toroidal cleaning element and has its center coinciding with the center of said ring-shaped shaft, said disc-shaped mop wringer normally resting on top of said toroidal cleaning element; and
 - b. means for moving said disc-shaped mop wringer against said toroidal cleaning element for compressing the latter as it is rotated about its ring-shaped shaft for squeezing water therefrom.
5. The combination as set forth in claim 4: and in which
- a. said means for rotating said spongy elongated cylindrical member will cause the latter to rotate about the ring-shaped shaft so that the portion of the rotating cylindrical member that contacts with the floor will be moving inwardly toward the center of the ring-shaped shaft so that any foreign material or water being thrown free of the cylindrical member due to centrifugal force will strike the under-surface of the disc-shaped mop wringer, whereby it will function as a splash preventing disc.
6. An electric mop comprising:
- a. a housing made up of two halves providing a portion for receiving gears and two flat abutting portions;
 - b. a worm gear rotatably mounted in said housing and having an integral hub on each side and an axial bore extending therethrough;
 - c. a split ring stationary shaft having its ends receivable in the bore in said worm gear, said abutting flat portions of said housing having aligned openings therein for receiving and supporting the mid-portion of said stationary circular shaft and dividing the shaft into two half length portions;
 - d. a plurality of coil springs rotatably mounted on each half length portion of said shaft and having their ends that are adjacent to said hubs, connected to said hubs so that a rotation of said worm gear will rotate said springs on said shaft;
 - e. a toroidal cleaning member made from a spongy elongated cylindrical member for each half length of said shaft and having a bore for receiving the shaft and the coiled springs, whereby a rotation of

- said worm gear will rotate the coil springs and the spongy elongated cylindrical members; and
 - f. means for rotating said worm gear.
7. The combination as set forth in claim 6: and in which
- a. a corrugated tubing lines the bore in each of said spongy elongated cylindrical members, said tubing enclosing the coil springs rotatably mounted on said shaft.
8. The combination as set forth in claim 6: and in which
- a. the means for rotating the worm gear includes a motor driven shaft with a worm formed thereon and meshing with said worm gear;
 - b. a motor casing enclosing said motor; and
 - c. a handle extending from said motor casing and being in alignment with said motor shaft.
9. The combination with claim 6: and in which
- a. a disc-shaped mop wringer overlies and normally rests upon said toroidal shaped cleaning member, the two flat abutting portions of said housing each having a vertical extension that projects through a central slot in said disc-shaped mop wringer;
 - b. a cam member for each vertical extension and a common pivot for securing both cams to said extensions; and
 - c. a handle interconnecting said cams and adapted to be manually swung for causing the cams to move the disc-shaped mop wringer against said toroidal cleaning member for compressing it so as to cause water to be squeezed therefrom when said cleaning member is rotated about its ring-shaped stationary axle.
10. An electric mop comprising:
- a. a housing made up of two halves providing a portion for receiving gears and two flat abutting portions;
 - b. a stub shaft supporting plate mounted in the gear receiving portion of said housing;
 - c. a stationary stub shaft carried by said plate and having an axial bore at each end, the axis of said shaft extending at right angles to the plane of said plate;
 - d. a split ring stationary shaft having its ends receivable in the bores at the ends of the stub shaft;
 - e. a bevel gear rotatably mounted on each end of said stationary stub shaft and received in the gear receiving portion of said housing;
 - f. a toroidal cleaning member made from a spongy elongated cylindrical member having a length substantially the same as the length of said stationary ring-shaped shaft so that the ends of said member will be disposed adjacent to said gears, means operatively connecting each end of the toroidal cleaning member to the adjacent bevel gear, whereby a rotation of said gears in unison and in the same direction will rotate said cleaning member on its ring-shaped stationary shaft; and
 - g. a worm meshing with both bevel gears for rotating them and the toroidal cleaning member.
11. The combination as set forth in claim 10: and in which
- a. a disc-shaped mop wringer overlies and normally rests upon said toroidal cleaning member, the two flat abutting portions of said housing, each having a vertical extension that projects through a central slot in said disc-shaped mop wringer;

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- b. a cam member for each vertical extension and a common pivot for securing both cams to said extension; and
- c. a handle interconnecting said cams and adapted to be manually swung for causing the cams to move the disc-shaped mop wringer against said toroidal cleaning member for compressing it so as to cause water to be squeezed therefrom when said cleaning member is rotated about its ring-shaped stationary

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- axle.
12. The combination as set forth in claim 10: and in which
- a. the worm is driven by a motor shaft and motor, said motor being enclosed in a motor casing; and
 - b. a handle extending from said motor casing and being in alignment with said motor shaft.

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