July 12, 1960 R. G. DEXTER 2,944,431

MOP WITH BUILT-IN SHAKING DEVICE

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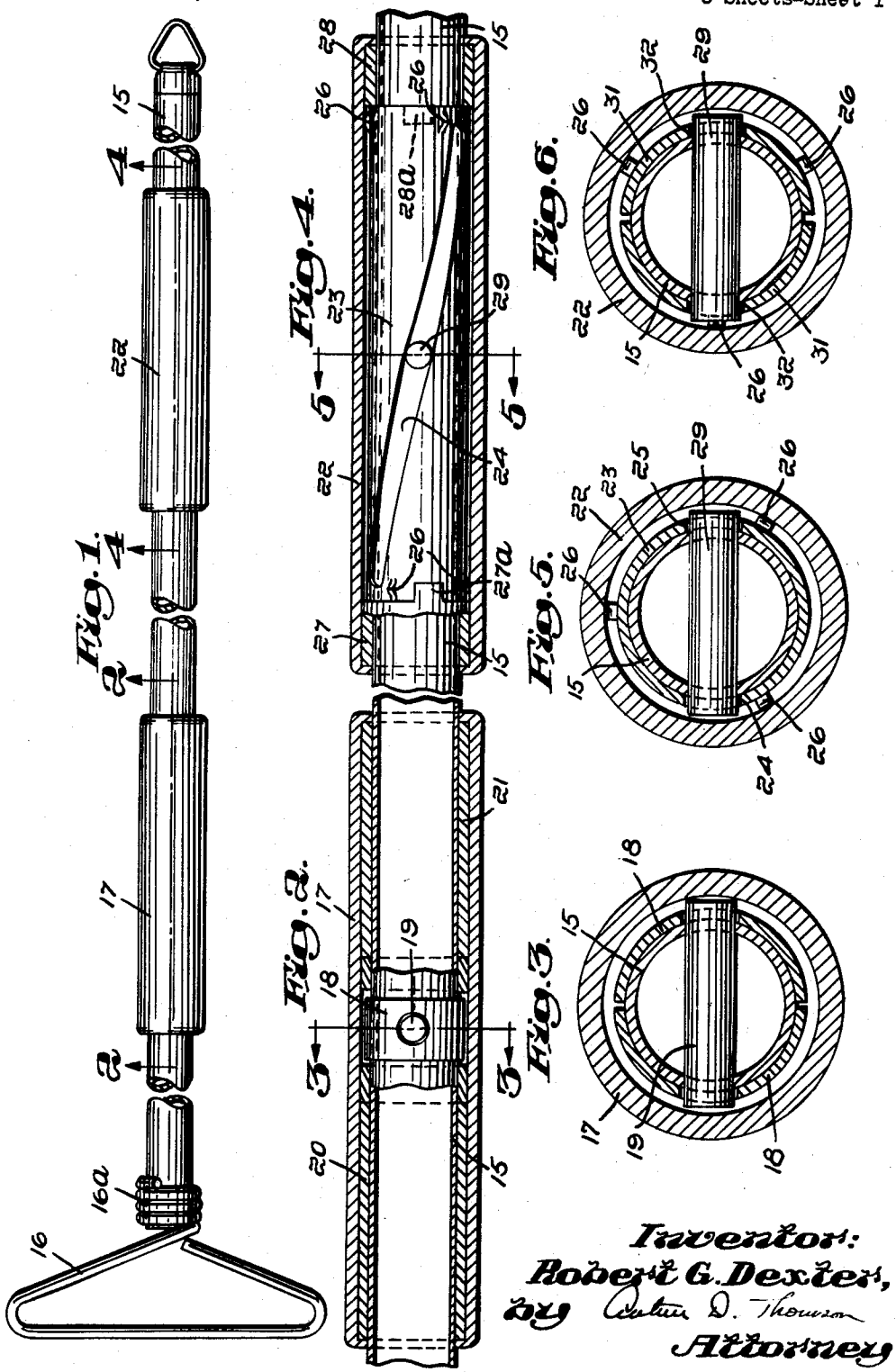

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Fig. 7.

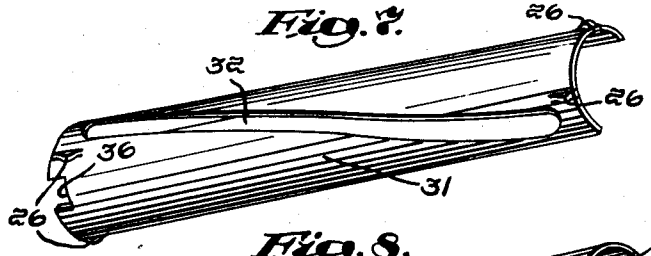

Fig. 8.

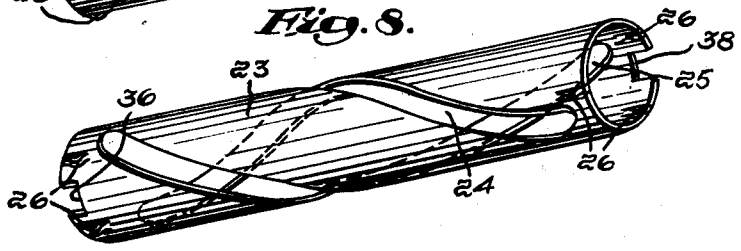

Fig. 9.

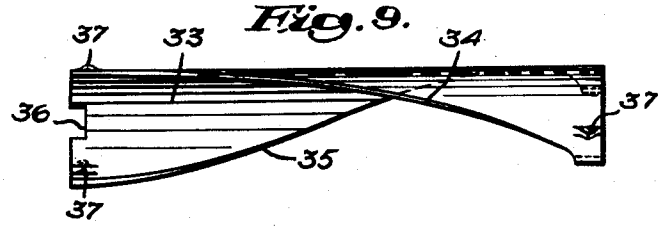

Fig. 10.

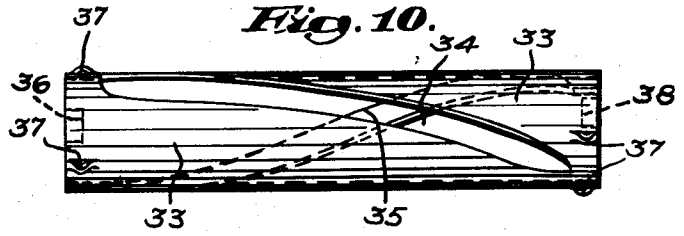

Fig. 11.

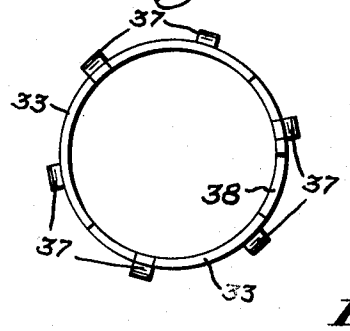

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Fig. 12.

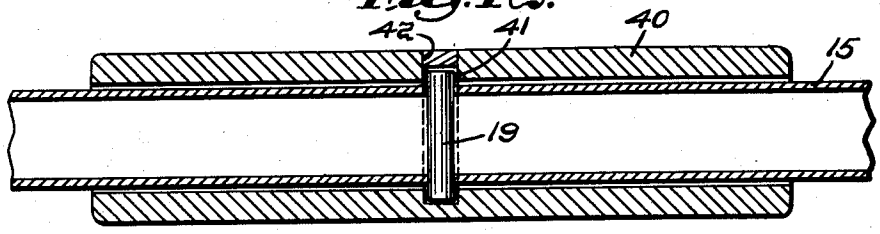


Fig. 13.

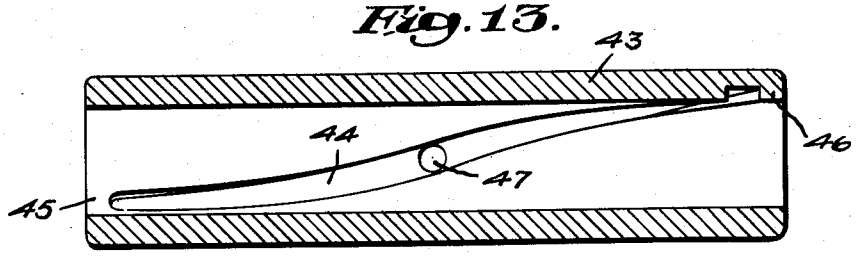


Fig. 14.

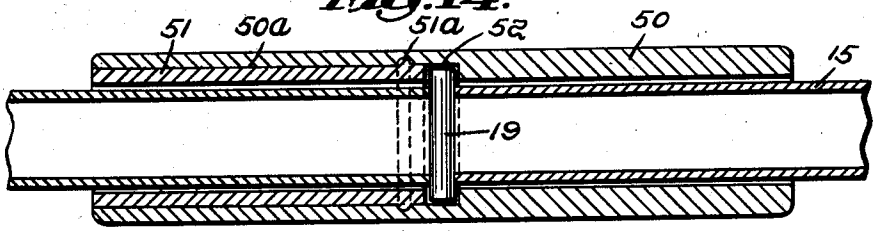
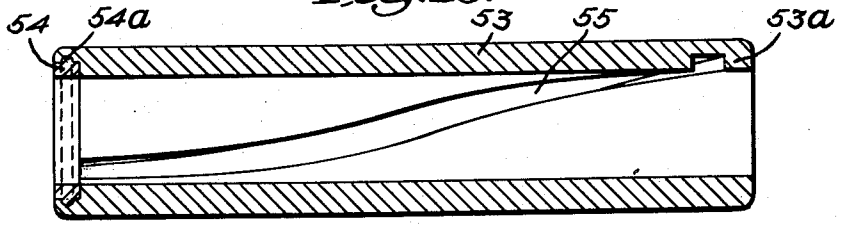


Fig. 15.



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MOP WITH BUILT-IN SHAKING DEVICE

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1 Claim. (Cl. 74—89)

This invention relates to dust mops, and more particularly to mops having built-in devices for shaking the mop head to remove dust and lint.

A number of prior devices have been developed for cleaning mop heads by agitating or beating the heads. These devices, in general, take the form of either machines in which the mop head is inserted or of attachments to the mop handle to facilitate shaking. The prior attachments, however, have been too cumbersome and expensive for general acceptance, especially for home use. Most of the dust mops now on the market consist simply of a head and a handle and the housewife cleans the head by shaking, or by beating the mop handle against the window-sill. Neither procedure is very effective for cleaning the head, and the handle is likely to be damaged if struck too hard.

The principal object of this invention is to provide a shaking device which can be readily built into a mop handle, which gives a highly effective shaking motion, which is simple, inexpensive, and light enough to be suitable for mops for household use, and which can be operated with a minimum of effort.

The device is applied to a mop having an ordinary handle of wood or metal. A tubular sleeve is mounted to rotate with respect to the handle but is anchored to the handle in the axial direction. Another such sleeve is mounted around the handle near the upper end and, attached to the inside of this sleeve, is a slide having one or more helical slots which engage a pin driven through the handle. The user holds the axially fixed sleeve in one hand and moves the other sleeve along with the slide back and forth to impart a rotary motion to the mop head.

In the drawings illustrating the invention:

Fig. 1 is a side view of a mop equipped with the shaking device;

Fig. 2 is a fragmentary cross-section, somewhat enlarged, taken along line 2—2 of Fig. 1;

Fig. 3 is a cross-section somewhat enlarged taken along line 3—3 of Fig. 2;

Fig. 4 is a fragmentary cross-section somewhat enlarged taken along line 4—4 of Fig. 1;

Fig. 5 is a cross-section somewhat enlarged taken along line 5—5 of Fig. 4;

Fig. 6 is a cross-section similar to Fig. 5 but showing a slide of the modified type illustrated in Fig. 7;

Fig. 7 is an isometric view of a modification of the slide;

Fig. 8 is an isometric view of the slide of Fig. 4;

Fig. 9 is a side view of another modification of the slide;

Fig. 10 is a side view of two of the split sleeves illustrated in Fig. 9 assembled;

Fig. 11 is an end view of the assembled sleeve of Fig. 9;

Fig. 12 is a cross-section of a modification of the reciprocating sleeve and slide assembly;

Fig. 13 is a cross-section of a modification of the axially fixed sleeve;

Fig. 14 is a cross-section of another modification of the axially fixed sleeve; and

Fig. 15 is a cross-section of another modification of the reciprocating sleeve and slide assembly.

In Fig. 1 the mop is illustrated as consisting of a handle 15 which may be solid or tubular and may be made of metal or wood, in the usual manner, and a wire loop 16 having a threaded portion 16*a* which engages the left-hand or lower end of the handle. A mop head of any suitable type is mounted on the wire loop when the mop is in use. A tubular sleeve 17, which is preferably made of metal or plastic, is mounted around the handle at an intermediate position. This sleeve is rotatable on the handle but is anchored in the axial direction by means of the construction shown most clearly in Figs. 2 and 3. A split ring 18 is mounted on the handle and has holes in which are engaged the ends of a pin 19 passing through the handle. The tubular sleeve 17 has inner collars 20 and 21 disposed on either side of the ring 18, the ring and pin thus serving to restrain axial motion of sleeve 17 along the handle. The collars may be pressed into sleeve 17 or, in the case of a metal sleeve, the sleeve ends may be spun over after the collars have been assembled. The split ring 18 may be omitted and collars 20 and 21 made long enough to engage the pin between them.

A second sleeve 22, which may be called the "operating sleeve," is mounted on handle 15 near its upper end, that is the right-hand end as viewed in Fig. 1. Inside the sleeve 22 is a cam sleeve or slide generally indicated by the numeral 23, having helical slots 24 and 25, as shown in Figs. 4, 5 and 8. Slide 23 may be press-fitted into sleeve 22 but preferably carries stamped-out tabs 26 which tightly engage the inner wall of sleeve 22 to prevent relative rotational movement of the two sleeves and to center the inner sleeve longitudinally in the outer sleeve. A pair of collars 27 and 28 are mounted, one in either end of sleeve 22, to restrain axial movement of slide 23 with respect to the outer sleeve and to serve as bearings on the handle for the outer sleeve. These collars may be pressed in or may be retained by spinning over the ends of sleeve 22. The collars carry tabs 27*a* and 28*b* which engage in notches in the ends of the slide to anchor the slide against rotation in the outer slide. A pin 29 passing through the handle 15 engages in slots 24 and 25. The entire assembly consisting of sleeves 22 and slide 23 and collars 27 and 28, is rotatable with respect to handle 15 and axially movable along the handle to the limit of slots 24 and 25.

Sleeve 17, which may be termed the "holding sleeve," is mounted at a convenient distance from sleeve 22 so that an operator may grasp the two sleeves with her hands. To operate the shaking device, the operator grasps sleeve 17 with one hand and pushes sleeve 22 quickly back and forth and with the other hand, thus imparting a rotary motion to the mop handle by operation of slots 24 and 25 and pin 29. This rotary motion is much superior to a simple back and forth shaking motion for cleaning purposes as it causes the strands to separate and fly out, thus freeing dust and lint more readily. Slot 24 preferably extends more than a quarter turn around the handle, for example between a quarter turn and a half turn. A rotary travel of about 137° has been found satisfactory. This amount of rotary travel permits the handle to build up sufficient rotational speed so that when the direction is reversed by reversing the axial direction of motion of the sleeve 22, a quick jerk is imparted to the mop head mounted on wire 16. Very effective cleaning is thus obtained.

In the modification shown in Figs. 6 and 7, the slide,

instead of being a one-piece tubular sleeve, as in Figs. 4 and 8, is composed of two semi-tubular members **31**, which are identical in construction. Each of these members carries a slot **32** forming a partial helix. When the two members are assembled on the handle, they cooperate with pin **29** to rotate the handle when sleeve **22** is moved back and forth, as previously described.

In the modification shown in Figs. 9, 10 and 11, the cam sleeve assembly is made up of two metal stampings of generally helical form, as illustrated in Fig. 9. Each stamping has recessed portions **34** and **35** along its longitudinal edges, and end portions **36** and **38** which are full half circles but are disposed at an angle with respect to each other. When the end portions of the two stampings **33** are placed together, the recessed edge portions **34** and **35** define helical slots which are equivalent to slots **24** and **25**.

The axially anchored sleeve in the form shown in Fig. 13 consists of a single molded plastic piece **40** having an internal circumferential groove **41** in which the projecting ends of pin **19** are engaged. The permit assembly of the sleeve on to the mop handle **15**, a hole **42**, communicating with groove **41**, is provided in piece **40**. The sleeve is slid over the handle, the hole **42** is aligned with the holes which have been bored in the mop handle to receive the pin. The pin is inserted and hole **42** is then closed, for example by a plug of plastic which is either press-fitted or cemented in.

The modified form of slide shown in Fig. 14 consists of a single molded sleeve **43**, having a pair of spiral internal grooves **44** closed at the ends by walls **45** and **46** which serve as end stops. A hole **47** is provided communicating with one of the grooves **44**. The sleeve is assembled on to the mop handle in the same manner as the sleeve of Fig. 13, that is, by aligning hole **47** with holes in the handle, inserting pin **29**, and plugging hole **47**.

Another type of molded sleeve is shown in Fig. 14. Here the sleeve is made of two tubular pieces **50** and **51**, preferably made of slightly flexible plastic. Piece **50** constitutes the main body of the sleeve and has an internal recess **50***a* extending from one end in to the center. Piece **51** is pressed into this recess and has a rib **51***a* which snaps into a shallow groove in piece **50**. Piece **51** can be assembled with piece **50** after the latter has been placed on the shaft and slid over pin **19**. When the two pieces are assembled, they form a circumferential groove **52** in which pin **19** rides.

The type of sleeve shown in Fig. 15 is likewise made up of two tubular pieces of plastic **53** and **54**. Piece **53** constitutes the main body of the sleeve, and has a pair of oppositely disposed internal spiral grooves **55** (only one of which is shown) closed at the right-hand end by an end wall portion **53***a*. The other end is internally recessed to the radial depth of grooves **55** and receives piece **54**, which has a rib **54***a* engaging a shallow circumferential groove in piece **53**. Piece **54** serves as an end wall closing the left-hand ends of grooves **55**, and may be pressed into the piece **53** after the latter has been placed on the handle and pin **29** has been engaged in grooves **55**. The two-piece sleeves shown in Figs. 14 and 15 function in the same manner as the one-piece sleeves of Figs. 12 and 13, respectively, but are somewhat easier to mold and assemble. It is understood that the plastic material of which these two-piece sleeves are made should be substantially rigid, with just enough flexibility to permit ribs **51***a* and **54***a* to be forced in the seat in the respective circumferential grooves.

Among the constructions shown in Figs. 1 through 11, the tubular one-piece slide, such as sleeve **23**, may be

preferable in some instances as it permits a large angular range for slots **24** and **25**. The split sleeve form shown in Fig. 7 is somewhat easier to manufacture and assemble and may be preferred in some cases for this reason. The split form of sleeve shown in Figs. 9 through 11 permits a longer angular range for the slots than that of Fig. 7 and may be assembled as readily. The operation of all three of these types of slides is very similar.

The slots in which pin **29** rides should be disposed at a gradual enough angle so that the pin will ride back and forth easily but the angle should, nevertheless, be sufficiently steep to provide the desired speed of rotation to the handle in a reasonable reciprocating travel of sleeve **22**. For example, a helix angle of about 16° has been found satisfactory for slots **24** and **25** or the equivalent slots of the split forms of slides, or slots **44** or **55**. About 30° is the maximum helix angle which will operate without too much resistance. If the slot is much steeper than this, the sleeve tends to twist in the user's hand. The lower limit for the helix angle is determined by such considerations as the length of axial travel and the amount of rotary travel of the handle desired.

The shaking attachment here described does not add appreciably to the size, expense, or weight of the mop, and does not interfere with the use of the mop in the usual manner. The easy operation of the cleaning device encourages frequent cleaning of the mop head and thus ensures maximum efficiency and long life of the mop head.

It is understood that the positions of the axially fixed sleeve and the operating sleeve on the handle can be varied, as desired. For example, their positions can be reversed so that the operating sleeve is between the mop head and the fixed sleeve.

What is claimed is:

A mop comprising an elongated handle having a longitudinal axis, a pair of tubular grip members having smooth outer walls, means rotatably mounting said handle in one of said grip members and securing said handle and said one grip member against substantial relative movement along the handle axis, a pair of cam follower projections on diametrically opposite sides of said handle, the other of said grip members being provided with a pair of diametrically opposite longitudinally helical cam slots in the inside of said other grip member and arranged one in sliding camming engagement with each of said cam follower projections for oscillating said handle by relatively longitudinally reciprocating said other grip member while holding said one grip member relatively stationary, said slots being disposed at a helix angle angle of not more than 30° with respect to said handle axis.

References Cited in the file of this patent

UNITED STATES PATENTS

1,445,335	McIntosh	Feb. 13, 1923
1,470,687	Clarke	Oct. 16, 1923
1,612,524	Monohon	Dec. 28, 1926
1,710,190	Regan	Apr. 23, 1929
1,818,948	Hamblen	Aug. 11, 1931
1,835,837	Alles	Dec. 8, 1931
1,960,089	Rabb	May 22, 1934
2,042,892	Granger	June 2, 1936
2,160,835	Davids	June 6, 1939
2,195,472	Szucs	Apr. 2, 1940
2,495,846	Johnson	June 31, 1950

FOREIGN PATENTS

625,392	Great Britain	June 7, 1949