

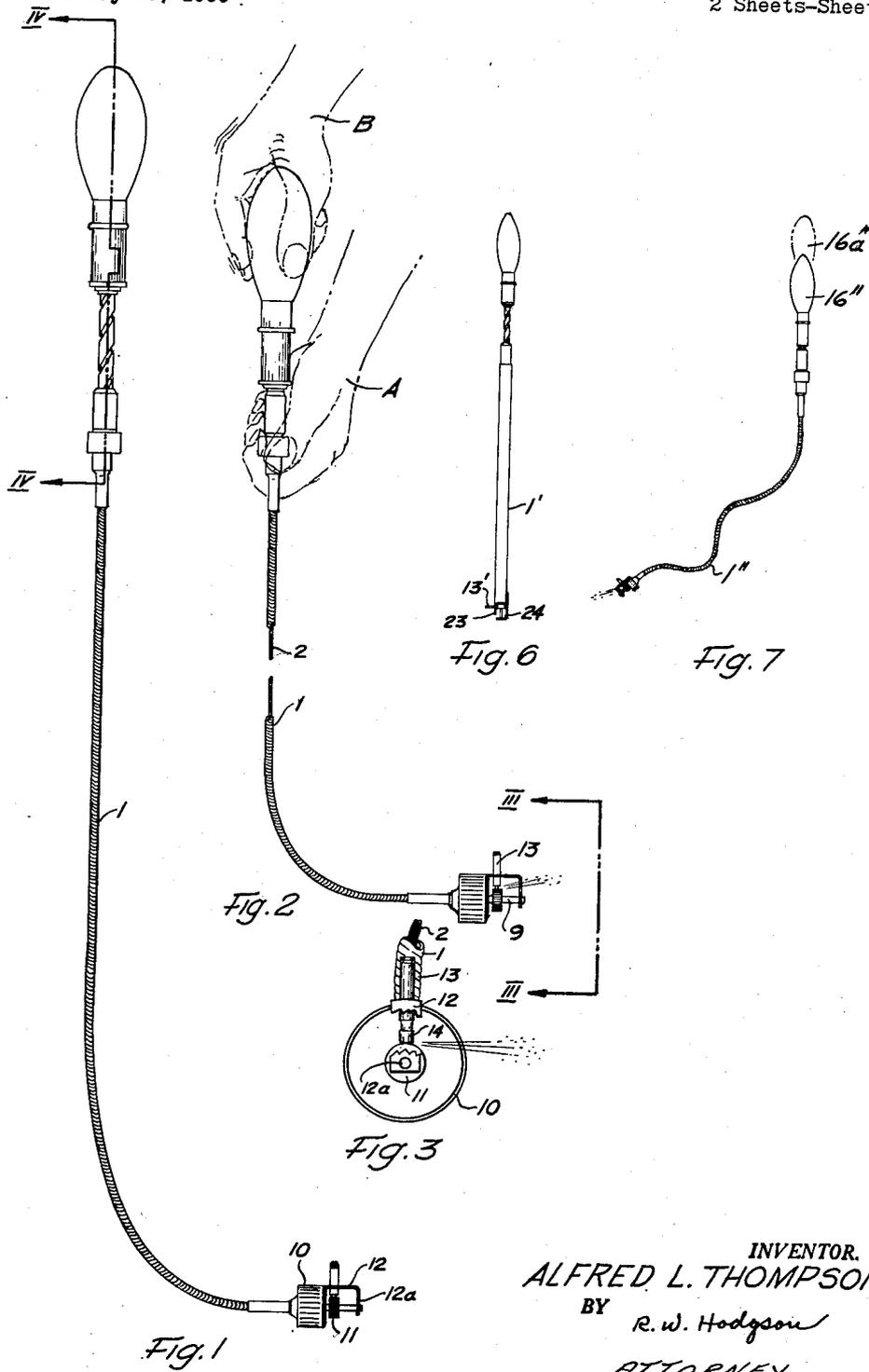
Feb. 19, 1957

A. L. THOMPSON  
FURNACE LIGHTER

2,781,653

Filed May 13, 1955

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

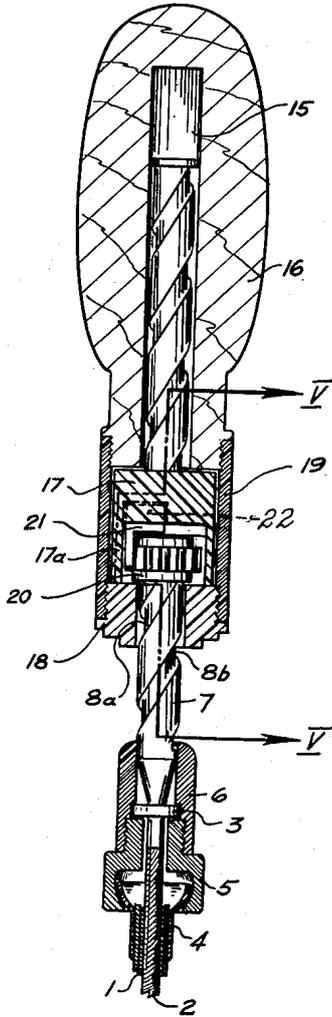


Fig. 4

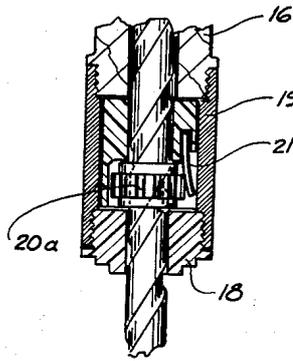


Fig. 5

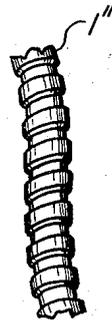


Fig. 8

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**FURNACE LIGHTER**

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4 Claims. (Cl. 67-6.1)

Generally speaking, the present invention relates to the spark-lighter art and, more particularly, pertains to a remotely manually operable lighter for gas-burning appliances.

In using fuel gas-burning appliances such as furnaces, heaters, ovens, and the like (all such will be referred to hereinbelow as furnaces), it is necessary on occasion to ignite flames therein. Even if the furnace uses a pilot light, the pilot light itself must be relit after the furnace has been shut down or the fuel gas supply interrupted. As the gas-burner is often in a location difficult of access, lighting it may be an awkward and unsafe task, holding a match near the burner may be difficult, and often results in the match-flame being blown out by air that rushes out of the burner, displaced by the gas; and if gas is allowed to accumulate outside the burner before the flame is applied, a small explosion occurs which may result in one being singed or even seriously burned. Automatic ignition systems, however, are expensive and often difficult or undesirable to install in an existing furnace. Thus the prior art furnace-lighting methods and apparatus, known to me, suffer from numerous disadvantages.

Generically speaking, the furnace lighter of the present invention comprises hollow longitudinal sleeve means, having a manually graspable first end and a second end longitudinally spaced from said first end; holder means borne fixedly on said second end; torque-transmitting means carried within said sleeve means, rotatable relative thereto, and having first and second ends rotatably held by said first and second ends of said sleeve means respectively, and being adapted to transmit torque from said first end to said second end; screw means attached to said first end of the torque-transmitting means in torque-imparting relationship thereto, said screw means having generally helical thread means thereon concentric with a longitudinal axis; follower means threadedly engaged with said thread means and adapted for longitudinal reciprocation along said screw means; said follower means and said thread means thus cooperating to form a screw-machine, whereby said torque-transmitting means may be rotated relative to said follower means, and relative to said sleeve means, when said follower means is forcibly reciprocated (not rotating relative to the sleeve means) along the screw means; said holder means carrying bearing means; serrated sparking wheel means connected fixedly to said second end of the torque-transmitting means (thus being rotatable thereby) and rotatably connected to said bearing means; said holder means also bearing a flint receptacle which holds flint means co-operably frictionally engageable with said wheel means to produce sparks when said wheel is rotated, whereby fuel-gas may be ignited. Said holder means, when the furnace lighter is to be used, is placed adjacent a gas burner; by manually gripping the sleeve means at said first end—which is thus spaced considerably away from the burner—and forcibly moving the follower means toward or away

from said first end, the furnace may be safely and surely lit.

In one generic form of the present invention, the sleeve means and torque-transmitting means are freely flexible along the greater part of their lengths to allow their being readily positioned adjacent to the gas burner of a furnace; in a second generic form, the sleeve means is rigid, for convenience if the second end must be maintained above the first end in use with a furnace; and in a third generic form, the sleeve means is laterally deformable (that is, manually flexible but capable of preserving a particular configuration under the forces encountered while it is being used)—e. g., in this third form the sleeve means may be constructed at least partly of "flexible conduit" such as is used in goose-neck lamps, flexible lubricating spouts, and similar devices—to allow igniting especially awkwardly placed burners and to allow "around-the-corner" use of the device as a precaution against one being burnt by a sudden flame.

In order to avoid excess wear and chipping of the flint means, in one preferred general form the present invention includes follower means (cooperable with said screw means as in the basic form) having a serrated ratchet-wheel portion; handle means bearing pawl means ratchetably cooperable with said ratchet-wheel portion, whereby when said handle means is moved linearly along said screw means in a first longitudinal direction said follower means is held in a fixed position relative to the handle means, and when said handle means is linearly moved in a second, opposite, direction said follower is (though fixed in longitudinal position) freely rotatable relative to the handle means; said screw means thus being rotated relative to the handle means (and relative to the sleeve means) when the handle and follower means are moved in said first direction, by the screw-machine cooperation of the follower and thread means—and said torque-transmission means thus being rotated; said torque-transmission means, screw means, and the wheel means at the second end having sufficient frictional engagement with the sleeve, bearing and flint means to remain fixed relative thereto when the handle and follower means are moved in said second direction (the follower rotating relative to screw and handle means). A forcible manual movement of the handle means in the first direction constitutes a "power stroke" which imparts a sudden rapid spin to the wheel means, which sparks as it rubs on the flint means; and manual movement of the handle means in the second direction constitutes a "return stroke" which resets the device for re-use.

From the above description of the basic form and various preferred forms of the present invention, it will be apparent to those skilled in the art that the hereinabove-mentioned disadvantages of the prior art are virtually entirely eliminated and overcome in and through the use of the present invention.

For example, by the use of the furnace lighter of the present invention any gas-burning furnace may be safely and surely lit. Further, the lighter may be used—and set for re-use—quickly and easily. And the construction of the lighter is simple and inexpensive.

With the above points in mind, it is an object of the present invention to provide a remotely manually operable furnace lighter adapted to frictionally spark and thus ignite a gas flame.

It is a further object of the present invention to provide a furnace lighter, as provided in the preceding object, in which a linear forcible manual motion of a remotely positioned handle provides the rotational motive force for the frictional sparking engagement of a sparking wheel and flint, said force being transmitted through a more or less flexible shaft.

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It is also an object of the present invention to provide a furnace lighter of the type set forth in the preceding objects, in which a ratchet action allows the rotation of the sparking wheel in one direction only.

Other and allied objects of the present invention will occur to those skilled in the art after a careful study of the present specification, the accompanying illustrations, and the appended claims.

To facilitate understanding, reference will be made to the hereinbelow-described drawings, in which:

Fig. 1 is an elevation of a preferred form of the present invention, in which the sleeve means is freely flexible;

Fig. 2 shows the method of operation of the device of Fig. 1 in a similar elevation;

Fig. 3 is an end elevation of the device of Fig. 1, as seen from the position indicated by line and arrows III—III of Fig. 2—portions of the device being broken away for clarity;

Fig. 4 shows a section of the device of Fig. 1 taken along the line and in the direction indicated by the line and arrows IV—IV of Fig. 1;

Fig. 5 shows a section of the device of Fig. 1 taken along the line and in the direction indicated by the line and arrows V—V of Fig. 4—the follower has been rotated slightly between the positions of Fig. 4 and Fig. 5 to show the ratcheting action;

Fig. 6 is an elevation of a modified form, with rigid sleeve means, of the furnace lighter;

Fig. 7 is an elevation of a second modified form of the furnace lighter in which the sleeve means is a deformable, shape-retaining flexible conduit; and

Fig. 8 shows a portion of the flexible conduit sleeve means used in the device of Fig. 7.

In the drawings of the modified forms, parts similar to those of the device of Figs. 1–5 are numbered similarly, but with singly primed numerals in Fig. 6 and doubly primed numerals in Figs. 7 and 8.

In the preferred form of the furnace lighter illustrated in Figs. 1–5, the sleeve means takes the form of the freely flexible sleeve 1. The torque-transmission means is in this form a flexible cable 2 with rigid terminal portions; at the first end of the cable, rigid terminal portion 3 is freely rotatable, but longitudinally retained, in a bearing held at the first end of sleeve means 1. The end of the sleeve connects to the hemispherical "ball" member 4, which rotates in "socket" 5 to form a universal joint (the joint allows kinkless, flexible operation of the sleeve—but is replaceable by a rigid connection if desired); socket member 5 is threaded to cap 6 to form the bearing through which terminal portion 3 passes—portion 3 then being continuous with the end of screw 7, in which a double thread 8a and 8b is cut at a large pitch angle. At the second end of the sleeve 1, the cable 2 is held in a fashion similar to that at the first end, having a rigid terminal portion 9 which rotates in bearing member 10 (which is held rigidly by sleeve 2) and extends outward, as shown, to hold serrated sparking wheel 11 and to rotate in bearing 12a. Bearing 12a is held by holder means, which in this form is a metal strap 12 connected fixedly to bearing member 10 and bears a flint holder 13 carrying a flint 14, which is biased against wheel 11.

The screw 7 can slide and rotate freely in recess 15 in handle 16, and in holes in the members (usually synthetic resin) 17 and 18, which are held together and on the handle by threaded sleeve 19. Members 17 and 18 longitudinally retain the follower 20, which threadedly engages the screw, but permit the free rotation of the follower. Follower 20 has a serrated ratchet wheel portion 20a; spring 21, embedded in a recess 22 in member 17, acts as a pawl; if the follower turns counter-clockwise relative to the handle end (relative to the user), as seen in Fig. 5 the spring 21 is lifted by the turning ratchet-teeth and lets them by; but a clockwise follower motion would (as seen best in Fig. 4) force spring 21 between a

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ratchet tooth and the wall 17a of member 17, so that motion of the follower would be prevented. This type of pawl has been found to reduce spring wear and fatigue as compared to other types of spring-pawl which also, of course, could be used with the follower.

As shown in Fig. 2 (as compared to Fig. 1), to use the device one grasps the first bearing and sleeve end (4, 5 and 6) with one hand A, drops the wheel-and-flint assembly into a desired location, and with one other hand B forces the handle 16 along the screw 7 toward the first bearing. This causes rotation of the screw (the follower being prevented from rotating by the pawl) in a counter-clockwise direction relative to the user (and hence clockwise as viewed from the opposite end as in Fig. 3).

In the modified form of Fig. 6, the sleeve means 1' is a virtually rigid tube connected rigidly (not with a ball-joint) to the bearings at each end, and the holder means consists of a flint-holding portion 23 and a bearing-holding portion 24.

In the modified form of Fig. 7 the sleeve 1'' is a deformable flexible conduit as shown more clearly in Fig. 8. At its first end the member 4'' is rigidly connected to the member 5'', but in other respects the furnace lighter of Figs. 7 and 8 is similar to that of Fig. 1. Two typical positions of the handle are shown at 16'' and 16a''.

Numerous modifications and variations of the present invention will occur to those skilled in the art after a careful study hereof. All such, properly within the basic scope and/or teachings of the present invention are intended to be included and comprehended herein as fully as if specifically described, illustrated and claimed herein.

For example, the handle recess 15 may contain a compression spring to automatically return the device to the position of Fig. 1 from that of Fig. 2.

It should be noted that the device may also operate by rotating the screw in a clockwise direction or by pulling the handle away from the first-end bearing, by changing the sense of the screw-threads, or the position of the pawl.

In some forms, the ratcheting may be eliminated for economy, if "wear-in" of the flint is not obnoxious.

The exact compositions, configurations, relative positionings and cooperative relationships of the various component parts of the present invention are not critical, and may be modified substantially within the basic teachings, spirit and scope of the present invention.

The embodiment of the present invention specifically described, illustrated and claimed herein is exemplary only, and is not intended to limit the scope of the present invention, which is intended to be interpreted in the light of the prior art and the appended claims only, with due consideration for the doctrine of equivalents.

I claim:

1. A remotely manually operable, spark-producing, furnace lighter, adapted to ignite a gas flame, comprising: hollow longitudinal sleeve means, having a manually graspable first end and a second end longitudinally spaced from said first end; holder means borne fixedly on said second end of the sleeve means; torque-transmitting means carried within said sleeve means, rotatable relative thereto, having first and second terminal portions rotatably connected to said first and second ends of the sleeve means respectively; screw means attached to said first terminal portion of the torque-transmitting means in torque-imparting relationship thereto, said screw means having a longitudinal axis and bearing generally helical thread means coaxial therewith; follower means threadedly engaged with said thread means and adapted for longitudinally reciprocation along said screw means; bearing means, carried by said holder means spaced from said second end of the sleeve means, serving to rotatably hold said second terminal portion of the torque-transmitting

means; serrated sparking wheel means connected fixedly to said second terminal portion of said torque-transmitting means between said bearing means and the second end of the sleeve means; flint receptacle means carried by said holder means, and flint means held thereby to be frictionally sparkingly engageable with said wheel means; whereby the forcible linear motion of the follower means along the screw means is transformed into a forcible rotational motion transmitted from said first end to said second end of the torque-transmitting means, resulting in the spark-producing rotational motion of the wheel means relative to the flint means, in frictional engagement therewith; said follower means having an encircling circumferential peripherally outwardly serrated ratchet-wheel portion around the inner threaded engagement of said follower means with said thread means; handle means; and spring pawl means carried by said handle means in peripheral virtually perpendicular relationship with respect to said peripherally outwardly serrated ratchet-wheel portion, cooperating with said serrated portion of the follower means to form a ratchet preventing the rotation of the follower means relative to the handle means when the handle means is moved in a first direction along the screw means, thus permitting the rotation of the screw means, and said ratchet allowing the rotation of the follower relative to the handle means when the handle means is moved in a direction opposite said first direction, thus preventing the rotation of the screw means.

2. A remotely manually operable, spark-producing, furnace lighter, adapted to ignite a gas flame, comprising: hollow virtually rigid longitudinal sleeve means, having a manually graspable first end and a second end longitudinally spaced from said first end; holder means borne fixedly on said second end of the sleeve means; torque-transmitting means carried within said sleeve means, rotatable relative thereto, having first and second terminal portions rotatably connected to said first and second ends of the sleeve means respectively; screw means attached to said first terminal portion of the torque-transmitting means in torque-imparting relationship thereto, said screw means having a longitudinal axis and bearing generally helical thread means coaxial therewith; follower means threadedly engaged with said thread means and adapted for longitudinal reciprocation along said screw means; bearing means, carried by said holder means spaced from said second end of the sleeve means, serving to rotatably hold said second terminal portion of the torque-transmitting means; serrated sparking wheel means connected fixedly to said second terminal portion of said torque-transmitting means between said bearing means and the second end of the sleeve means; flint receptacle means carried by said holder means, and flint means held thereby to be frictionally sparkingly engageable with said wheel means; whereby the forcible linear motion of the follower means along the screw means is transformed into a forcible rotational motion transmitted from said first end to said second end of the torque-transmitting means, resulting in the spark-producing rotational motion of the wheel means relative to the flint means, in frictional engagement therewith; said follower means having an encircling circumferential peripherally outwardly serrated ratchet-wheel portion around the inner threaded engagement of said follower means with said thread means; handle means; and spring pawl means carried by said handle means in peripheral virtually perpendicular relationship with respect to said peripherally outwardly serrated ratchet-wheel portion, cooperating with said serrated portion of the follower means to form a ratchet preventing the rotation of the follower means relative to the handle means when the handle means is moved in a first direction along the screw means, thus permitting the rotation of the screw means, and said ratchet allowing the rotation of the follower relative to the handle means when the handle means is moved in a direction opposite said

first direction, thus preventing the rotation of the screw means.

3. A remotely manually operable, spark-producing, furnace lighter, adapted to ignite a gas flame, comprising: hollow freely flexible longitudinal sleeve means, having a manually graspable first end and a second end longitudinally spaced from said first end; holder means borne fixedly on said second end of the sleeve means; torque-transmitting means carried within said sleeve means, rotatable relative thereto, having first and second terminal portions rotatably connected to said first and second ends of the sleeve means respectively; screw means attached to said first terminal portion of the torque-transmitting means in torque-imparting relationship thereto, said screw means having a longitudinal axis and bearing generally helical thread means coaxial therewith; follower means threadedly engaged with said thread means and adapted for longitudinal reciprocation along said screw means; bearing means, carried by said holder means spaced from said second end of the sleeve means, serving to rotatably hold said second terminal portion of the torque-transmitting means; serrated sparking wheel means connected fixedly to said second terminal portion of said torque-transmitting means between said bearing means and the second end of the sleeve means; flint receptacle means carried by said holder means, and flint means held thereby to be frictionally sparkingly engageable with said wheel means; whereby the forcible linear motion of the follower means along the screw means is transformed into a forcible rotational motion transmitted from said first end to said second end of the torque-transmitting means, resulting in the spark-producing rotational motion of the wheel means relative to the flint means, in frictional engagement therewith; said follower means having an encircling circumferentially peripherally outwardly serrated ratchet-wheel portion around the inner threaded engagement of said follower means with said thread means; handle means; and spring pawl means carried by said handle means in peripheral virtually perpendicular relationship with respect to said peripherally outwardly serrated ratchet-wheel portion, cooperating with said serrated portion of the follower means to form a ratchet preventing the rotation of the follower means relative to the handle means when the handle means is moved in a first direction along the screw means, thus permitting the rotation of the screw means, and said ratchet allowing the rotation of the follower relative to the handle means when the handle means is moved in a direction opposite said first direction, thus preventing the rotation of the screw means.

4. A remotely manually operable, spark-producing, furnace lighter, adapted to ignite a gas flame, comprising: hollow laterally deformable longitudinal sleeve means, having a manually graspable first end and a second end longitudinally spaced from said first end, holder means borne fixedly on said second end of the sleeve means; torque-transmitting means carried within said sleeve means, rotatable relative thereto, having first and second terminal portions rotatably connected to said first and second ends of the sleeve means respectively; screw means attached to said first terminal portion of the torque-transmitting means in torque-imparting relationship thereto, said screw means having a longitudinal axis and bearing generally helical thread means coaxial therewith; follower means threadedly engaged with said thread means and adapted for longitudinal reciprocation along said screw means; bearing means, carried by said holder means spaced from said second end of the sleeve means, serving to rotatably hold said second terminal portion of the torque-transmitting means; serrated sparking wheel means connected fixedly to said second terminal portion of said torque-transmitting means between said bearing means and the second end of the sleeve means; flint receptacle means carried by said holder means, and flint means held thereby to be frictionally sparkingly engageable with said wheel means; whereby the forcible linear motion of the

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 a forcible rotational motion transmitted from said first  
 end to said second end of the torque-transmitting means,  
 resulting in the spark-producing rotational motion of the  
 wheel means relative to the flint means, in frictional en-  
 gagement therewith; said follower means having an en-  
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 tionship with respect to said peripherally outwardly ser-  
 rated ratchet-wheel portion, cooperating with said ser-  
 rated portion of the follower means to form a ratchet  
 preventing the rotation of the follower means relative to

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the handle means when the handle means is moved in a  
 first direction along the screw means, thus permitting the  
 rotation of the screw means, and said ratchet allowing the  
 rotation of the follower relative to the handle means when  
 the handle means is moved in a direction opposite said  
 first direction, thus preventing the rotation of the screw  
 means.

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