

April 2, 1968

W. BOL ETAL

3,376,088

CABINET DRAWER AND DOOR OPENER

Filed July 19, 1966

4 Sheets-Sheet 1

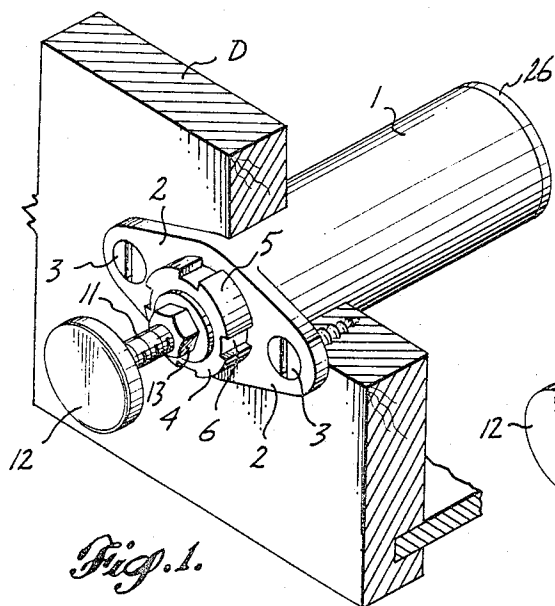


Fig. 1.

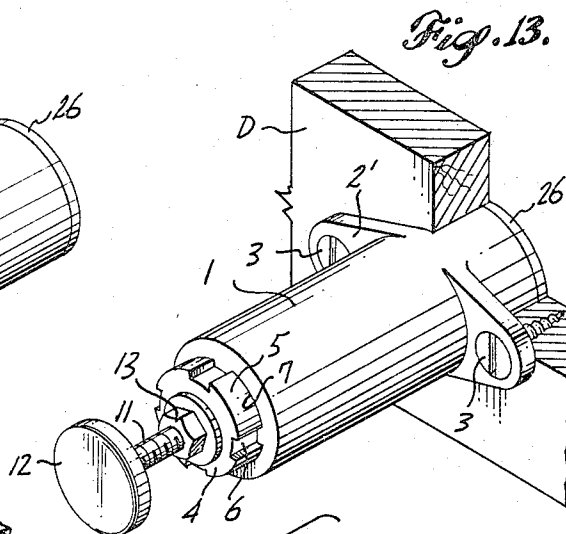


Fig. 13.

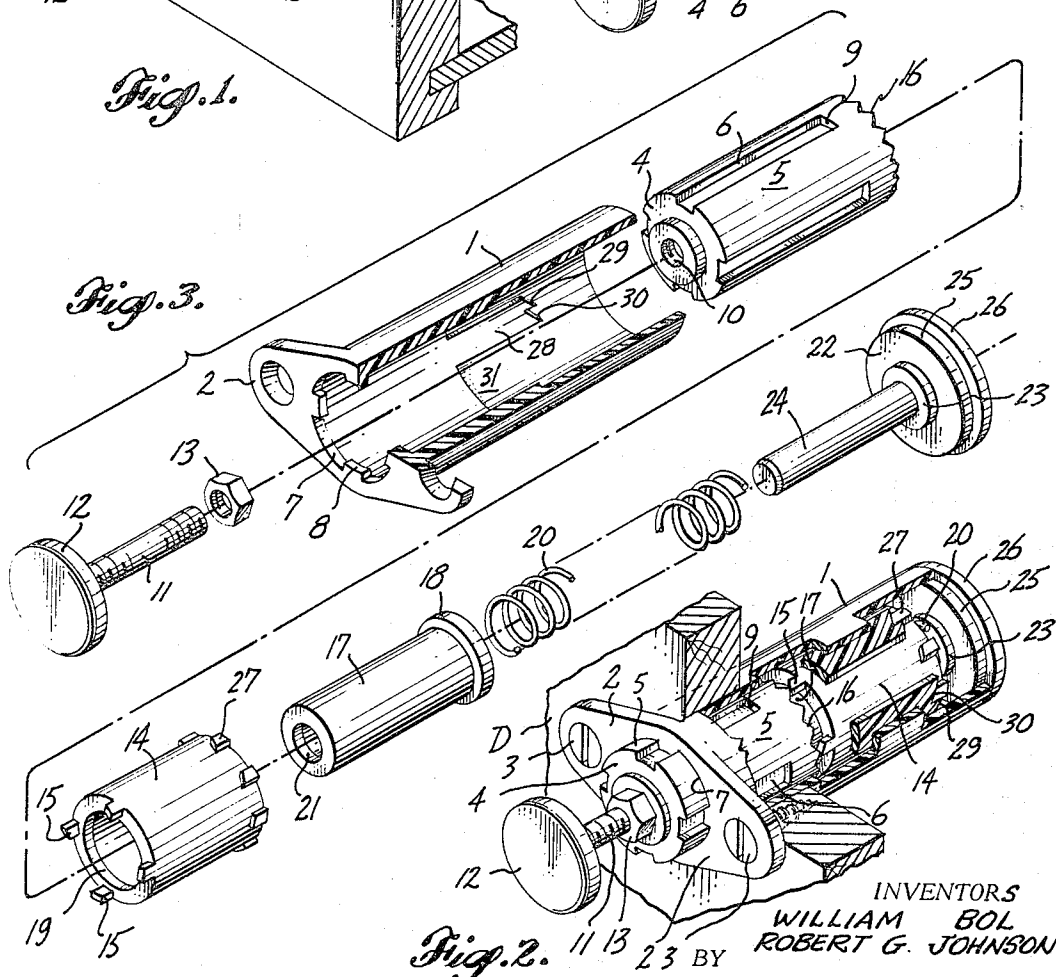


Fig. 3.

Fig. 2.

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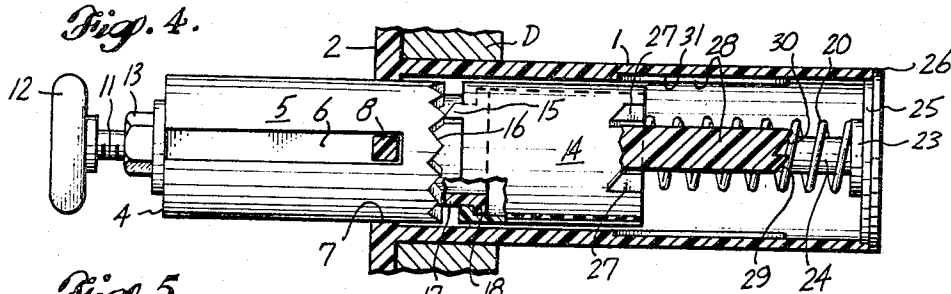
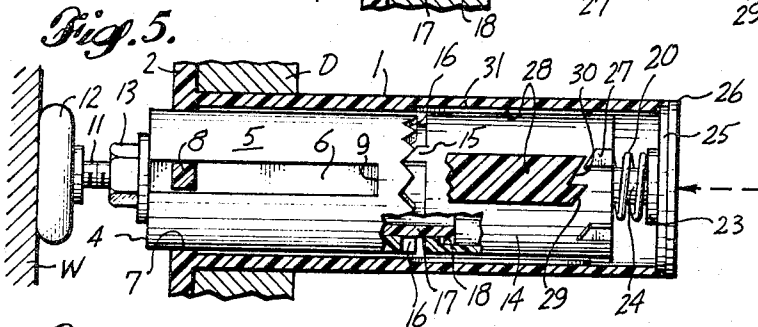
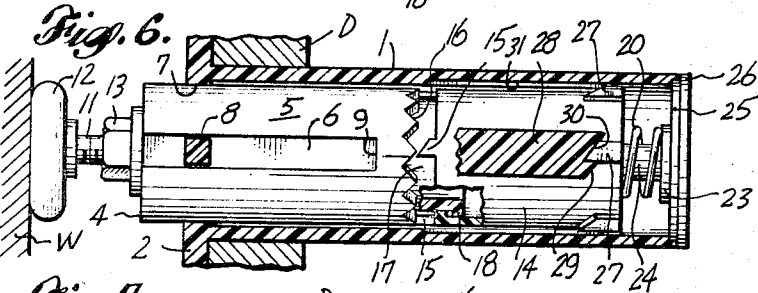
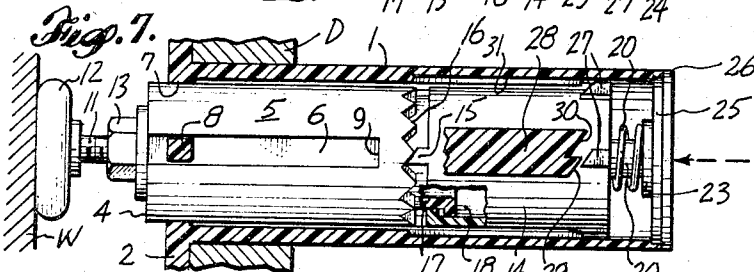
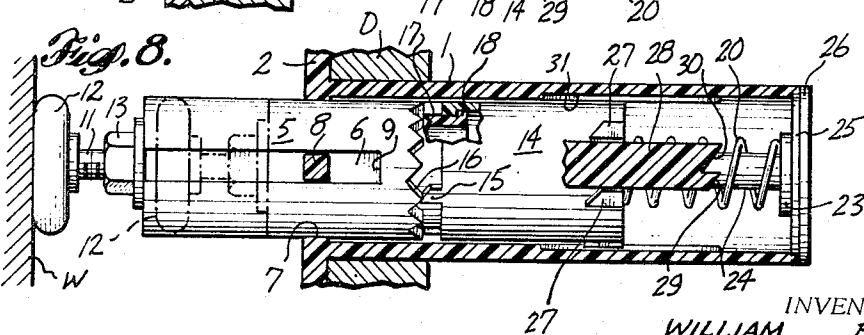
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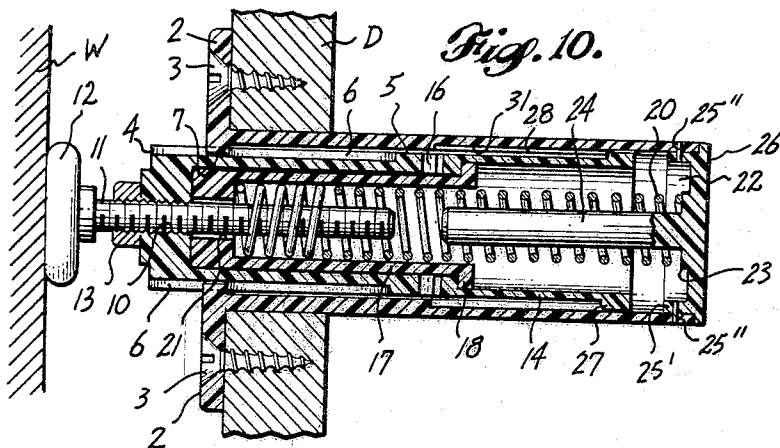
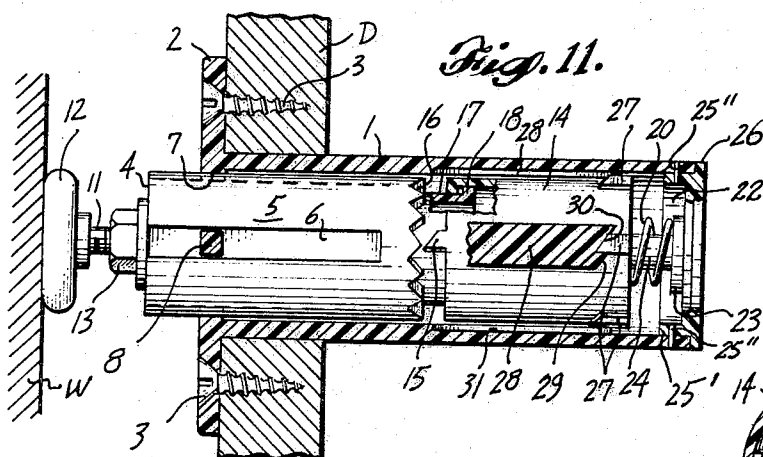
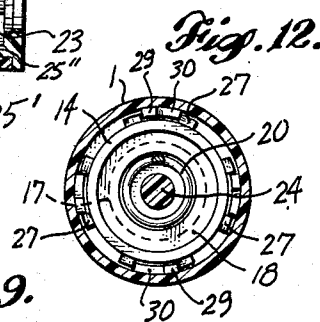
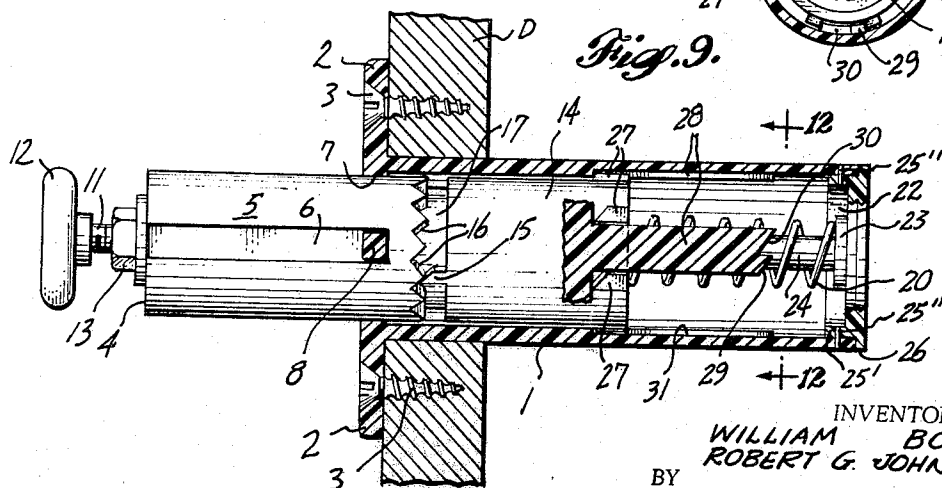
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3,376,088

CABINET DRAWER AND DOOR OPENER

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4 Sheets-Sheet 3



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W. BOL ETAL

3,376,088

CABINET DRAWER AND DOOR OPENER

Filed July 19, 1966

4 Sheets-Sheet 4

Fig. 14.

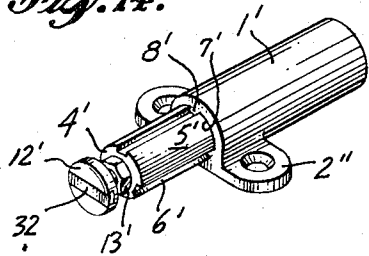


Fig. 18.

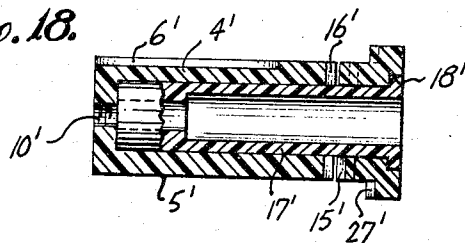


Fig. 15.

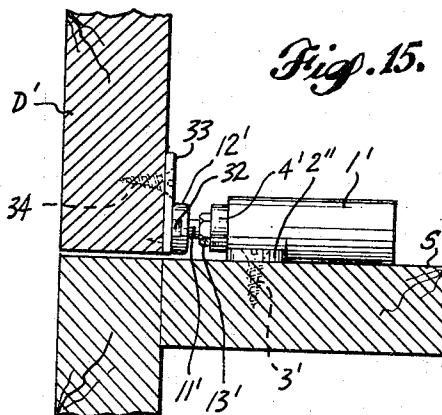


Fig. 17.

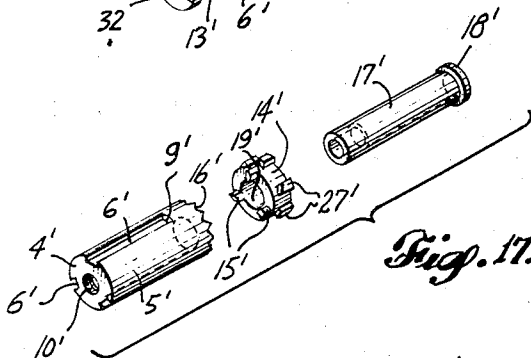
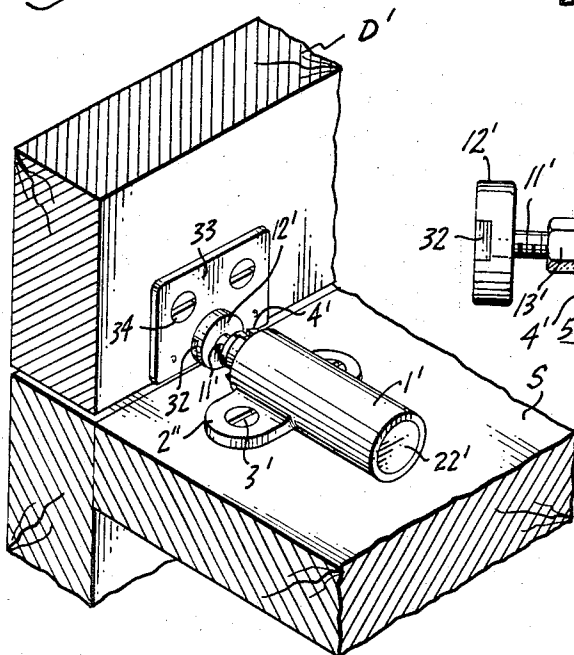
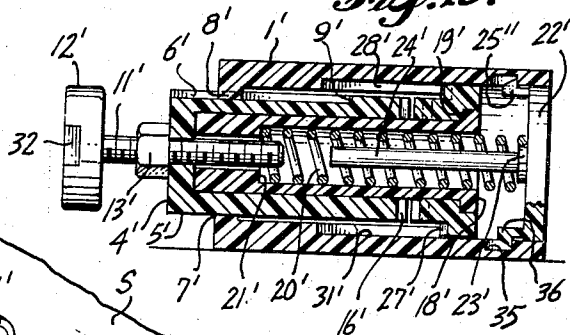


Fig. 16.

Fig. 19.



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1

3,376,088

CABINET DRAWER AND DOOR OPENER

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10 Claims. (Cl. 312—319)

ABSTRACT OF THE DISCLOSURE

A pusher for exerting an opening force on a cabinet door or drawer and interengageable between such cabinet door or drawer and stationary cabinet structure includes a plunger slidably received in a barrel. A compression spring interengaged between the plunger and the barrel can move them forcefully into relatively extended relationship. Intermittently operable latch means engageable between the barrel and the plunger to hold them in contracted condition at the end of one stroke and to permit relative extension of such parts during the next stroke include indexing projections and notches to effect relative rotation of a tubular latch element incrementally first to a position in which tubular latch element engages the barrel to hold the compression spring in contracted condition and then to a position in which the tubular member is released for movement lengthwise of the barrel by the spring, which simultaneously moves the plunger into extended relationship relative to the barrel.

A principal object of this invention is to provide a drawer or door pusher which can be mounted unobtrusively in cabinetwork in position for exerting a thrust on a cabinet drawer or door, and which will be hidden from view at least when the drawer or door is closed and be hidden from view even when the drawer or door is open. In any event the pusher is of compact structure so that it will not interfere appreciably with the capacity of a drawer or cupboard and will not be prominent in appearance.

Despite the compact character of the pusher it is an object to provide such a pusher which will produce a reasonably strong thrust and yet will be easy to operate. This operation also will be reliable and safe so that the drawer or door cannot be secured inadvertently in closed position so that it cannot be opened.

Another object is to provide such a drawer and door opener which is versatile and can be mounted in different attitudes and positions and which is adjustable to vary the location of the thrust-exerting parts while having a stroke of constant length.

It is also an object to enable the degree of thrust exerted by a particular pusher to be selected or altered for a pusher of given size, and the pusher can be produced in different sizes for different types of installations.

A further object is to provide such a pusher which is composed of few parts but can be assembled readily, and which pusher can either be of demountable construction or can be permanently assembled.

An additional object is to provide such a pusher which can be installed and removed quickly and easily.

A pusher capable of achieving the foregoing objects is composed principally of a plunger slidably received in a barrel or body and projecting beyond one end of such barrel or body mounted on a cabinet, and it is interengageable between the object to be pushed, such as a cabinet drawer or door, and stationary cabinet structure. A pushing force or thrust to open the drawer or door is produced by a compression spring interengaged between the plunger and the barrel expandable to move them

2

forcefully into relatively extended relationship. Latch means latchable between the barrel and the spring hold the spring in contracted condition and are releasable for movement of the plunger into extended position relative to the body by expansion of the spring. Such latch means includes a latch member rotatable relative to the body between a position slidable lengthwise of the body and a latched position in latching engagement with the body to limit its movement relative to the body in the extending direction of the plunger. Indexing means engageable between the rotatable latch member and the plunger effect rotation of the rotatable latch member relative to the body between latched and unlatched positions.

FIGURE 1 is a top perspective of a pusher shown installed in a drawer end, a portion of which is broken away, and FIGURE 2 is a similar view in which parts of the pusher are broken away to reveal internal structure.

FIGURE 3 is a top perspective of the pusher showing its components in exploded relationship.

FIGURES 4 to 8, inclusive, are side elevations of the pusher with parts broken away and showing the various components in different operative relationships.

FIGURE 9 is a side elevation of a pusher having a somewhat modified construction with parts broken away.

FIGURE 10 is a longitudinal axial section through such pusher, and FIGURE 11 is a view similar to FIGURE 9 with components in a different operative relationship. FIGURE 12 is a transverse section through the pusher taken on line 12—12 of FIGURE 9.

FIGURE 13 is a top perspective of a pusher similar to that shown in FIGURE 1 but having a different type of mounting structure.

FIGURE 14 is a top perspective of a pusher having still a different type of mounting structure and otherwise having a somewhat modified construction.

FIGURE 15 is a side elevation of such pusher installed as a cabinet door opener, and FIGURE 16 is a top perspective of the same pusher.

FIGURE 17 is a top perspective of selected internal components of the pusher shown in FIGURE 14 with such components in exploded relationship. FIGURE 18 is a longitudinal central section through the pusher components of FIGURE 17 with such components in assembled relationship.

FIGURE 19 is a longitudinal central section through the pusher of FIGURE 14.

While the pusher of the present invention can be made in various sizes and shapes for different types of installation, two typical pushers are shown in FIGURES 1 and 14 in particular which are especially suitable for use as a cabinet drawer opener and as a cabinet door opener, respectively. In both cases use of such an opener avoids the necessity of providing a drawer pull or a door pull by which a pulling force must be exerted on the drawer or door to open it. Instead, if the drawer or door is pushed inward slightly and then released, the opener will exert a sufficient thrust on the drawer or door at least to start opening movement of such drawer or door. The drawer or door can be closed simply by pushing it closed which will automatically cock the pusher preparatory to being tripped for effecting the next opening thrust.

In FIGURE 1 to 13 the pusher is shown as being composed of a barrel body 1 from which radial mounting ears 2 project oppositely. These mounting ears have apertures in them to receive screws 3 for securing such ears to the end wall D of a drawer, for example. In FIGURE 1 such ears project from one end of the barrel so that the adjacent portion of the barrel projects through an aperture in the drawer end and extends beyond it into the drawer. In the modified pusher of FIGURE 13 the

mounting ears 2' project oppositely from the barrel 1 near its opposite end, so that the length of the barrel between such mounting ears and the adjacent barrel end is substantially equal to the thickness of the drawer end D. Consequently, while the portion of the barrel beyond the ears 2' projects into and substantially through the drawer end D, such barrel end preferably is flush with the inner wall of the drawer so that the barrel does not obstruct the drawer at all. Such mounting ears could, of course, be placed at any other location desired along the length of the barrel.

In the end of the barrel 1 opening outward from the drawer is slidably received a plunger 4 having external lands 5 and grooves 6. The end of the barrel through which the plunger slides has an internal flange in which grooves 7 and lugs 8 are formed of a size and shape complementary to the lands 5 and grooves 6 of the plunger. The barrel lugs 8 fitted in the plunger grooves 6 and the plunger lands 5 fitted in the barrel grooves 7 prevent relative rotation of the plunger and barrel while guiding these components for relative reciprocation between contracted and extended positions. Extension movement of the plunger 4 relative to the barrel 1 is limited by engagement of the barrel lugs 8 with the blind ends 9 of the plunger grooves 6. Consequently, it is necessary to assemble the plunger into the barrel through the barrel end opposite that bearing the grooves 7 and lugs 8.

In the end of the plunger 4 which projects through the end of the barrel 1 is an internally threaded aperture 10 into which a bolt 11 having a smooth head 12 can be screwed. This bolt can be held firmly in any desired position projecting from the end of plunger 4 by a locknut 13 screwed tightly against the plunger end. The overall length of the combined barrel and plunger, whether in the contracted position of FIGURES 2 and 6 or in the extended position of FIGURE 4, can thus be altered to suit a particular installation space. The entire plunger and extension bolt assembly is thus movable as a unit relative to the barrel 1 between such contracted and extended positions.

The length of the barrel 1 exceeds considerably the length of the plunger 4 so that such barrel can accommodate within its end portion remote from its end through which the plunger 4 projects a reciprocable latch tube 14 shown best in FIGURES 3 through 8. Unlike the plunger 4, such latch tube is rotatable relative to the barrel 1, but such rotation is controlled so that it occurs step-by-step in a predetermined sequence of movements correlated with latching and unlatching of the tube with respect to the barrel to permit or limit relative longitudinal movement of these parts.

Relative rotation of the latch tube 14 and the barrel 1 is effected by production of a circumferential wedging force between coating inclined surfaces forming the ends of the indexing projections 15 on one end of the latch tube and the inclined sides of notches 16 on the adjacent or inner end of the plunger 4. Engagement of such notches with the projections is effected by movement of the plunger axially into the barrel in opposition to a spring force urging the barrel and plunger toward a relative extended relationship.

Within the latch tube 14 is a spring case 17. Such spring case preferably is both rotatable and slidable lengthwise relative to the latch tube. Relative extension movement of these parts is limited by interengagement of an external circumferential coupling flange 18 on one end of the spring case 17 with the internal circumferential coupling flange 19 on the end of latch tube 14 which carries the indexing projections 15. A helical compression spring 20 extends through the spring case 17 and the latch tube 14 in which it fits. One end of this spring bears on the shoulder formed by the internal flange 21 in the end portion of the spring case remote from the external coupling flange 18.

The spring 20, latch tube 14, spring case 17 and

plunger 4 are confined within the barrel 1 by an end cap 22 closing the end of such barrel opposite that through which the plunger 4 projects. The end of spring 20 remote from flange 21 bears on the spring seat boss 23 projecting from the inner side of the cap and the spring 20 is prevented from buckling by a stem 24 which projects from such boss into the interior of the spring, as shown in FIGURES 4 and 8. Movement of the cap into the barrel end is limited by the shoulder projecting beyond the periphery 25 of the cap formed by the radial flange 26, which shoulder abuts the end of the barrel 1 while the cap's periphery fits inside the barrel, as shown best in FIGURE 2.

On the end position of the latch tube 14 are provided latch lugs 27 projecting radially outward from the surface of the latch tube, and which are spaced circumferentially of it. Preferably several of these latch lugs are provided spaced apart circumferentially distances equal to the circumferential width of guide ribs 28 projecting inwardly from the inner surface of the barrel 1, and which are elongated lengthwise of the barrel for a distance at least as great as the longitudinal stroke executed by the latch tube during relative movement of the plunger 4 and barrel 1 between extended and retracted positions. In the end of each guide rib remote from the open end of the barrel through which plunger 4 projects is a latch-releasing shoulder 29 and a latch socket 30 engageable by an end of a latch lug 27. The end of such latch lug which engages such latch-releasing shoulder and latch socket is inclined circumferentially of the latch tube, and such latch-releasing shoulder and the opposite entering side of the latch socket are inclined complementally to the inclination of such latch lug end.

When a latch lug is urged in a direction to press its inclined end against an inclined latch-releasing shoulder 29, the resulting wedging action effects rotation of the latch tube 14 carrying such lug relative to the barrel body until such lug can slide alongside the guide rib 28. Similarly, when a latch lug 27 is pressed toward the end of a guide rib 28 at its side opposite its latch-releasing shoulder, the inclined end of such lug cooperating with the inclined side of the latch socket will wedge such lug circumferentially to rotate the latch tube 14 relative to the barrel 1 until the end of the latch lug seats in the bottom of the latch socket. Such engagement of the latch lug in the latch socket will restrain rotation of the latch tube in either direction relative to the barrel 1 and also will prevent the spring 20 from moving the latch tube longitudinally of the barrel toward its open end to move the plunger into its extended position.

As shown best in FIGURE 3 the guide ribs 28 are spaced apart circumferentially to provide guide grooves along which adjacent latch lugs 27 can move, as indicated in FIGURES 4 to 8, so that the plunger 4 can move into its extended position relative to the barrel. Such extension movement produced by the force of spring 20 is terminated by engagement of the blind ends of the plunger grooves 6 with the barrel lugs 8 as shown in FIGURE 9.

The procedure for assembling the various components of the opener shown in FIGURES 1 to 8 and 13 is indicated by the exploded arrangement of the components shown in FIGURE 3. First, the plunger 4 can be inserted into the end of the barrel or body at least to the position shown in FIGURE 2. The spring case 17 can then be inserted into the end of latch tube 14 remote from the internal flange 19, and the compression spring 20 can be inserted into this spring case. Next the stem 24 of the end cap 22 can be inserted through the spring, and the assembled components 14, 17, 20 and 22 can then be slid into the body 1 behind the plunger 4. The periphery 25 of the end cap and the flange 26 can be secured to the body end in any suitable fashion, such as by bonding if desired for the assembly to be permanent.

After the internal parts have been assembled into the barrel body 1 in the manner described, the bolt 11 can

5

be screwed into the threaded aperture 10 in the projecting end of the plunger after the locknut 13 has been threaded onto such bolt. The bolt head 12 should be smooth and made of durable material so as not to become worn by repeated engagement with a reaction surface. Such bolt head can be made of molded plastic material such as nylon or could be formed integral with the bolt, being made of brass or stainless steel. The body 1, plunger 4, latch tube 14, spring case 17 and end cap and stem can all be made quickly and economically of molded plastic material such as nylon. These parts should be reasonably hard and strong, and the surfaces should be rather smooth and slippery to reduce friction, but the requirements for such material are not particularly exacting. The spring 20 will of course be made of conventional spring steel. The various parts could be made of metal but they could not be cast to sufficiently close tolerances as easily as if made of plastic. If the parts are made of metal, however, the cap could be soldered to the body and if made of plastic the cap can be bonded to the body by suitable adhesive.

In FIGURES 9, 10 and 11 a different type of cap construction is shown in which an axial flange or skirt 25' projects inwardly concentrically with the spring seat boss 23. When the cap is fitted onto the end of the barrel such skirt will project into the body end and may be secured to such body end by pins 25'' extending through the body and the flange. It is desired to secure such a cap permanently to the barrel, the pins 25'' can be headless and driven into the assembly until their outer ends are flush with the outer surface of the barrel. If it is desired to enable the opener to be demounted readily, such pins could be headed so that they could be withdrawn and, if desired, the pins could be threaded and their outer ends or heads could be formed with a screwdriver slot enabling them to be unscrewed.

When a drawer opener of the type shown in FIGURES 1 to 12 or that shown in FIGURE 13 has been installed in the inner end wall D of a drawer, for example, as shown in FIGURES 1, 2, 4 to 11 and 13, the plunger 4 initially can be in its extended position relative to the body 1, as shown in FIGURES 4 and 9. As the drawer is pushed inwardly the head 12 eventually will engage a stationary wall W of the cabinet behind the drawer as shown in FIGURE 8. As the drawer is pushed farther inward toward closed position, the body will be moved closer to the head 12, which is held stationary by its engagement with the wall W, from the position of FIGURE 4 until the broken-line relationship is reached, which is the latched or cocked position of FIGURE 6.

During contracting movement of the barrel 1 and the plunger 4 the spring seat end of spring case 17 is bottomed within the plunger as shown in FIGURE 10. As mentioned above, the plunger 4 is held against rotation relative to the barrel 1 by engagement of the body lugs 8 in the plunger grooves 6. Also, the latch tube 14 will be held against rotation relative to the barrel 1 by engagement of latch lugs 27 with sides of the guide ribs 28 as long as these parts are in circumferential registry. As the body 1 is pushed inward relative to the plunger 4 from the position of FIGURE 4 to that of FIGURE 5, the spring 20 will be compressed increasingly between the spring seat 23 and the bottom of the spring case 17.

Shortly after the body has been moved to the left, as seen in FIGURE 5, far enough to shift the right end of the guide ribs 28 beyond the latch lugs 27, the inclined sides of indexing projections 15 will bear against the inclined sides of indexing notches 16 near their separating peaks in the position of FIGURE 4. Wedging pressure between the inclined sides of the indexing notches 16 and the inclined ends of the indexing projections 15 will exert a torque on the latch tube 14 tending to rotate it relative to the body 1 in a counterclockwise direction as seen in FIGURE 12. Such wedging action will cause the latch tube 14 to rotate from the position of FIGURE 4 to the position of FIGURE 5, and the indexing projections 15 will

6

slide into the bottoms of their respective indexing notches 16 to the position shown in FIGURE 5. It is desirable that a plurality of such indexing projections be provided, spaced equidistantly circumferentially around the latch tube 14, so that the pressure of the plunger on the latch tube projections will be distributed uniformly circumferentially.

As the pressure on the bolt head 12 is relieved, the pressure of spring 20 will move the barrel 1 to the right as seen in FIGURES 5 and 6 relative to latch tube 14 and press the inclined entrance sides of the latch sockets 30 against the complementally inclined ends of latch lugs 27. The latch tube 14 will be rotated from the position of FIGURE 5 toward the position of FIGURE 6 because of the wedging force exerted by such engagement of the inclined ends of the lugs 27 and the latch sockets. Such movement will continue until the latch lugs seat in the bottoms of the sockets as illustrated in FIGURE 6.

With the latch tube 14 in the cocked position of FIGURE 6 the spring 20 is held contracted against exertion of force on the plunger 4 by the engagement of lugs 27 in the latch sockets 30. Consequently, this plunger will remain in the position of FIGURE 6 instead of being pushed into extended position relative to barrel 1. Rotation of the latch tube 14 into the position of FIGURE 6 has, however, been sufficient so that the indexing projections 15 have been rotated past the crests between adjacent indexing notches 16 so that again the inclined ends of the indexing projections 15 may bear lengthwise of the pusher on inclined sides of indexing notches 16.

If the drawer is now pushed inward a short additional distance, as indicated by the broken arrow at the right of FIGURE 7, the body 1 and guide ribs 28 will be pushed relative to the plunger 4 and latch tube 14 so that the ends of such ribs have been withdrawn from the latch lugs 27 and they are clear of sockets 30. Continued movement of barrel 1 to the left will engage the inclined ends of lugs 15 with the inclined sides of indexing notches 16 and exert sufficient pressure between such inclined surfaces to effect counterclockwise rotation as seen in FIGURE 12 of the latch tube 14 until the lugs 15 have seated in the notches 16 with which they were engaged, as shown in FIGURE 7.

Such rotation of the latch tube 14 moves the latch lugs 27 into positions indicated in FIGURE 7, in which the inclined ends of the latch lugs 27 are in longitudinal registry with the inclined latch-releasing shoulders 29. If the inward pressure on the drawer is released under such circumstances the force of spring 20 will press the latch lugs 27 and the latch-releasing shoulders 29 together. Because of the inclination of these surfaces relative to the direction of force a wedging action will be produced which will effect further rotational force on the latch tube 14 in the counterclockwise direction as seen in FIGURE 12, causing lug 15 to climb out of notch 16 along its lower inclined edge, as seen in FIGURE 7, and thereby permitting simultaneous rotation of latch tube 14 until the latch lugs slip past the guide ribs 28 to the position of FIGURE 8. The body can then continue to move to the right, and the spring 20 will effect such movement. The latch tube in turn will press against the plunger 4 to cause it to move into its extended relationship to the body 1. Because such plunger cannot move to the left as seen in FIGURE 8 since it is bearing against the cabinet wall W, the barrel body 1 and the drawer end D to which it is attached will be forced to the right. The thrust thus exerted on these parts will move the drawer into a partially open position.

When the drawer is opened farther simply by pulling on it, the pusher will be drawn outwardly with the drawer, while the parts are maintained in the relationship shown in FIGURE 4. When it is desired to close the drawer, it will simply be pushed inward until the bolt head 12 engages the cabinet wall W, and then the pushing force will be continued to move the bolt and plunger through the

broken lines illustrated in FIGURE 8 relative to the barrel 1. Such movement will continue until the lugs 27 have been shifted beyond the right ends of the guide ribs 28 as previously explained, whereupon the engagement of the indexing projections 15 and the indexing notches 16 will effect rotation of the latch tube 14 into the position of FIGURE 5. As pressure on the drawer is released the components will move into the cocked position of FIGURE 6 in the manner previously explained.

The opener shown in FIGURES 14 to 19, inclusive, operates on the same principle as that described in connection with FIGURES 1 to 13 above. The opener of FIGURES 14 to 19, however, is particularly adapted for use in connection with a cabinet door rather than a drawer. In this instance the barrel body 1' has mounting ears 2'' projecting from opposite sides of the body and disposed in a plane which is tangential to a side of the body so that the body can be secured in position with such side engaging a mounting surface, as shown in FIGURES 15 and 16. The body can be secured in such a position by screws 3' extending through apertures in the ears 2''. The mounting surface S can be one side of a shelf located adjacent to a door D' in closed position.

Within the barrel 1' is received the plunger 4' having lands 5' and grooves 6' which fit notches 7' and lugs 8' at the end of the barrel 1' like the corresponding parts of the opener described previously. Such lugs engage the blind ends 9' of the grooves 6', and an internally threaded aperture 10' in the end of the plunger receives the bolt 11' having the head 12'. Such bolt is secured in place by the locknut 13'. A latch tube 14' has projections 15' co-operating with the indexing notches 16' on the end of the plunger 4'. Spring casing 17' fits within the latch tube 14' and plunger 4', and its external coupling flange 18' engages the internal coupling flange 19'. The spring 20' fits within the spring case 17' as shown in FIGURE 19. Opposite ends of such spring bear against the internal flange 21' of the spring case and encircle or bear on the spring seat boss 23' on the cap 22'.

It will be recognized that these various parts correspond to the parts of the opener shown in FIGURES 1 to 12, which are similarly numbered, although the size and proportions of some of these parts are different. Similarly the stem 24', the latch lugs 27' and the guide ribs 28' are similar to the correspondingly numbered parts of the opener shown in FIGURES 1 to 12 and function in a similar manner. In this instance, however, the opener is shown as being installed in a position reversed end-for-end from that disclosed in FIGURES 1 to 12. As has been explained, in such figures the opener is mounted on the movable element, namely the drawer, whereas the device of FIGURES 15 and 16 is mounted stationarily, and the head 12' is engageable with the movable element, which in that instance is a cabinet door. It would, of course, be possible to mount the opener of FIGURES 1 to 12 on or in the wall W in a position such that the head 12 of the pusher would engage the back of the drawer. Similarly, the device of FIGURES 14 and 19 could be mounted on the door in a position such that the head 12' would engage a stationary element of the cabinet.

Where the opener is mounted stationarily as shown in FIGURES 15 and 16 for opening a door, it may also be desirable for the pusher to be capable of holding the door closed when it has been moved to closed position. For this purpose a magnet 32 is shown as being embedded in the head 12' of the pusher, which magnet can simply be a bar magnet. A plate 33 of magnetic material is mounted on the cabinet door D' by screws 34 in a position for engagement with the magnet 32 when the door is closed, as shown in FIGURES 15 and 16. The body 1' should be secured on the shelf S in a position such that when the opener is in cocked condition and the magnetic plate 33 is in engagement with the bolt head 12', the outer surface

of the door D' will be flush with the outer surface of the cabinet.

In order to open the door D' thus held closed, it is merely necessary to press the door inward a distance sufficient to trigger the door opener in the manner described above and then release the door. The spring 20' will drive the plunger 4' outward to force the door open; and, when the shoulders 9' of groove 6' engage the lugs 8' to interrupt outward movement of the plunger, the door will continue to move toward open position because of its inertia and will thus pull the magnetic plate 33 away from the magnet 32. The door can be closed simply by swinging it into a position so that the plate 33 will engage the head 12', and then the door is pushed farther inward so that its outer surface moves beyond the outer surface of the cabinet to cock the opener.

The opener of FIGURES 16 and 19 is shown as having a cap 22' somewhat different from the cup 22 of the opener shown in FIGURES 1 to 13. In this instance the cap is of a size to fit within the bore of the barrel 1' in the inner wall of which sockets 35 are provided. Hooks 36 integral with the cap 22' project axially inward from opposite sides of the marginal portion of the cap in positions corresponding to the sockets 35. The radially outer ends of the hooks are inclined so that even though their points project radially beyond the circumference of the cap 22' the hooks can pass into the end of the barrel by being bent slightly toward each other as a result of wedging engagement with the barrel end. As the cap is pushed into the end portion of the barrel far enough so that the hooks come into registry with the sockets 35, such hooks being of resilient character will snap outward into locking engagement with such sockets to secure the cap in place on the barrel.

We claim as our invention:

1. An opener for cabinet drawers, doors and the like comprising an elongated body, mounting means for mounting said body on a cabinet, a plunger projecting beyond one end of said body and movable lengthwise relative thereto between extended and contracted positions compression spring means retracting between said body and said plunger and expansible for effecting an opening thrust by relative extension movement of said body and said plunger, and latch means latchable between said spring means and said body for holding said spring means in contracted condition and releasable for movement of said plunger into extended position relative to said body by expansion of said spring means.

2. The opener defined in claim 1, in which the body is a barrel, the plunger is slidably received in the barrel body and the spring means are located in the barrel, the latch means being engageable with the barrel to hold the spring means in contracted condition relative to the barrel.

3. The opener defined in claim 1, in which the latch means are releasable automatically from the body by further contraction of the plunger and body beyond their contracted relationship when the latch means are latched.

4. The opener defined in claim 1, and stop means engageable between the body and the plunger for limiting extension movement thereof.

5. The opener defined in claim 1, in which the plunger includes means for varying its effective length.

6. The opener defined in claim 1, in which the mounting means includes ears carried by the body.

7. The opener defined in claim 1, in which the latch means includes a latch member rotatable relative to the body between a position slidable lengthwise of the body and a latched position in latching engagement with the body to limit its movement relative to the body in the extending direction of the plunger.

8. The opener defined in claim 7, and indexing means engageable between the rotatable latch member and the plunger for effecting rotation of the rotatable latch mem-

9

ber relative to the body between latched and unlatched positions.

9. The opener defined in claim 8, in which the indexing means includes wedging means engageable to effect relative rotation of the rotatable latch member and the plunger.

10. The opener defined in claim 1, in which the plunger is generally cylindrical, the body has a generally circular opening in one end through which the plunger slides, the plunger has lands and grooves on its outer surface extending lengthwise thereof, and the body opening has notches and lugs complementary to and engageable with the lands

10

and grooves of the body to limit relative rotation of the body and plunger.

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JAMES T. McCALL, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,376,088

April 2, 1968

William Bol et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, line 40, "positions" should read -- positions, --; line 41, "retracting" should read -- reacting --; line 51, cancel "body"; line 59, "opened" should read -- opener --. Column 9, line 7, "opened" should read -- opener --.

Signed and sealed this 7th day of October 1969.

(SEAL)

Attest:

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Commissioner of Patents