

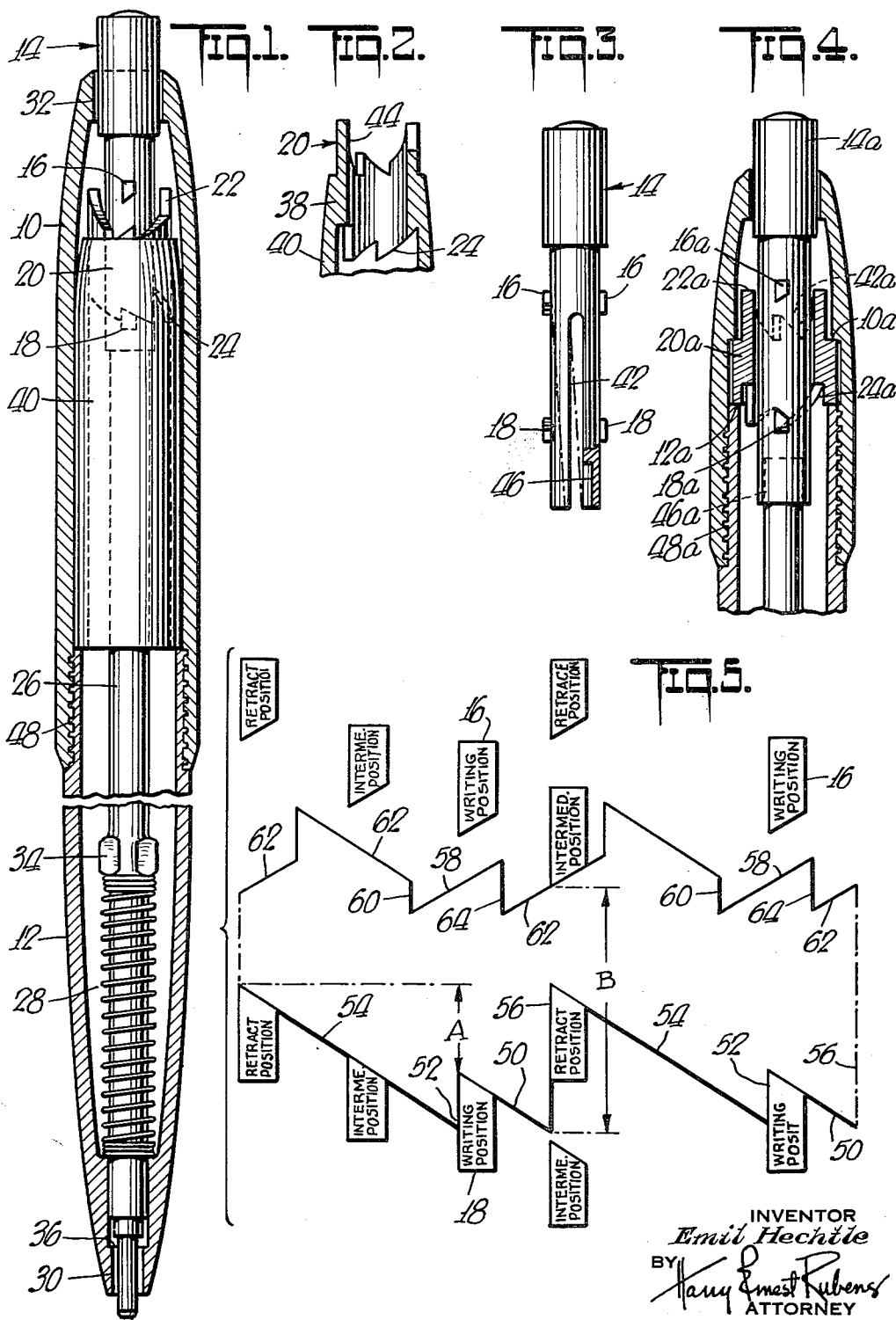
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WRITING DEVICE

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WRITING DEVICE

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My invention relates to writing devices, and more particularly to means for protracting and retracting the writing point thereof, such as, for example, the ball pointed cartridge in a pen.

It is among the objects of the present invention to provide a writing device with a simple and inexpensive push button mechanism, with the cartridge supported substantially axially within the writing instrument during the operation and use thereof. By maintaining the cartridge axially throughout its various positions, it is possible to increase the cartridge diameter, and consequently, its ink capacity. Conversely, the barrel can be reduced in diameter without loss of cartridge capacity.

Other objects are to provide a simplified push-button mechanism useful wherever a position switching device may be usefully employed; to provide a protract-retract push-button mechanism with a reduced number of parts; with parts that may be assembled with each other prior to installation into the housing of the device; and with parts that may be sprung into interlocking position as a sub-assembly.

These and other objects are accomplished and my new results obtained as will be apparent from the device described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing, in which:

FIG. 1 is a longitudinally sectioned view of a writing device embodying my invention with the writing element in protracted position.

FIG. 2 is an enlarged fragmentary sectioned view of a circular cam means forming a part of the protract-retract mechanism.

FIG. 3 is a sectioned view of the push-button plunger forming the contacting means of the protract-retract mechanism, the dot-dash lines of the slotted lower portion representing the compressed position for insertion into the circular cam means.

FIG. 4 is a sectioned fragmentary view of a pen with a modified mechanism with the writing element in protracted position.

FIG. 5 is a view of the developed shape of the circular cam means with the various positions of the contacting means shown in position thereon.

The essential elements of my writing device comprise a hollow cap 10 having a hollow body 12 threaded or force fitted thereto, a contacting means shown in FIG. 1 in the shape of push-button plunger 14 having upper and lower lugs 16 and 18 respectively, integral therewith, a circular cam means shown in the shape of a toothed ring 20 having upper and lower teeth 22 and 24, respectively, upon which the lugs 16 and 18 alternately ride, a writing element 26 illustrated as a ball point cartridge containing an ink reservoir, and a spring 28.

The hollow body 12 is provided with an opening 30 for projecting the cartridge therethrough. The cap 10 similarly contains an opening 32 through which the push-button member projects for manual manipulation.

One end of the spring engages the flange 34 formed on the cartridge, which confines the spring against the shoulder 36 formed on the inner surface of the body.

The toothed ring 20 and push-button plunger 14 are shown in enlarged view in FIGS. 2 and 3, respectively. The ring 20 may possess an outwardly extending shoulder 38 provided with a cap engaging portion 40 for immovably supporting the ring to the cap. Other means

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may be employed for preventing the ring from rotating with respect to the cap.

The push-button plunger 14 is preferably made of resiliently flexible material, and is longitudinally slotted as at 42 throughout its lower half to permit the lower lugs 18, and attached portion of the slotted plunger, to be sprung towards each other, as is shown in dot-dash lines. In this position the plunger is inserted freely through the hollow opening 44 of the ring 20, until the upper lugs 16 engage the upper teeth 22. The sprung portions are then released, the lower lugs 18 assuming their proper position for engaging lower teeth 24. This enables the two parts to be interlocked in a unitary assembly.

The teeth and lugs possess sloping faces to facilitate a camming action, one with respect to the other. Matching lugs and teeth are diametrically provided. This insures a balanced action, preventing the moving parts from binding one upon the other. The slotted end of the plunger is recessed as at 46, to permit the end of the cartridge to be contained therein under pressure of the spring 28.

The interlocked parts are inserted through opening 48 of the cap and press-fitted to, or immovably positioned on, the inner wall thereof with one end of the plunger projecting through opening 32 to form a push-button. The body 12 containing the cartridge and spring is then press-fitted or threaded to the cap, as shown, placing the spring under tension, and lifting the end of the cartridge against the plunger. This forces the lower lug 18 to engage the lower teeth 24. In the position, for example, shown in the developed view of the ring in FIG. 5, lugs 18 are held on the sloping faces forming cam surfaces 50 by tooth 52 in a protract or writing position. In the retract position, lugs 18 are held on cam surfaces 54 by teeth 56. The lugs, when so positioned, are moved and supported under action of spring 20. The upper lugs are free of the teeth in these positions. To obtain a change of position, the push-button plunger is depressed, causing two lugs 18 to be moved out of their respective writing positions until free of teeth 52. At this point, upper lugs 16 engage cam surfaces 58 which causes a relative movement between plunger and ring until lugs 16 come to rest against teeth 60. Releasing the pressure on the push-button plunger permits the spring 20 to lift the plunger until lower lugs 18 engage cam surfaces 54 where the relative movement is continued until teeth 56, or the retract position, is reached.

A repetition of the respective movements of the plunger and ring will lower lugs 18 and free them from lower teeth 56, causing upper lugs 16 to engage upper cam surfaces 62, causing the relative motion until lugs 16 are stopped by teeth 64. When the plunger is free of the depressing pressure, the spring pressure lifts the plunger, causing lower lugs 18 to engage cam surfaces 58, repeating the relative motion until stopped by teeth 52 in the original starting, or writing, position.

Thus two successive depressions on the push-button causes one complete revolution of the plunger and ring relative to each other. The slope of the cam surfaces and contacting surface of the lugs is sufficiently steep, say 30 degrees, for example, to facilitate the sliding action which translates the linear motion into one of rotation.

The longitudinal displacement A between the tops of cam portions 50 and 54, represents the net displacement between the protracted and retracted positions. The distance B must be slightly less than the distance between the lugs, which permits the teeth to be cleared during the relative rotation of the parts.

The relative motion may be achieved by fixing the position of the circular cam means and allowing the

contacting means to rotate, as is illustrated in FIG. 1, or by allowing the circular cam means to rotate as is shown in FIG. 4. In FIG. 4, parts similar to those shown in FIG. 1 are similarly numbered, but bear the suffix "a." The arrangement of parts is substantially identical with the parts illustrated in FIG. 1, except that the cap engaging surface 40 is omitted, and the ring 20a is permitted to rotate without interference, under propulsion of the push-button plunger 14a between a shoulder 10a formed on the inner surface of the cap, and shoulder 12a of the body.

The sleeve and push-button may be made of suitable metal or plastic material. In the form shown in FIG. 1, the inserted sleeve may be provided with a flat side which cooperates with an inner projection, for example, a rivet used to attach the clip to the cap, not shown. This acts as an obstacle to rotation of the sleeve with respect to the cap. This is in lieu of press fitting the parts together.

The sleeve and cap may be suitably shaped to permit the sleeve to be snap-fitted into the cap in proper position for use and either fixed in position, or allowed to rotate, as needed.

The springing of one slotted member to permit assembly to the other eliminates the necessity of making upper and lower lugs on separate parts to be fitted into each other on both sides of the ring.

The protract-retract mechanism of my invention provides the minimum number of parts needed for obtaining the required movement of the cartridge with a single push-button member. The parts are inexpensive to assemble. The result is an efficient construction at the minimum price possible. The cartridge, being moved linearly, may be enlarged in diameter to fit the housing, thus increasing the ink capacity over the cartridge that is required to swing from one position to another. The parts are substantial and not easily broken during operation.

My push-button mechanism is useful for other devices, for example, for utilization of the linear motion and/or rotation of either the ring or push-button plunger to turn an electric switch on or off, or for opening and closing a lock.

I have thus described my invention but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. A push button mechanism comprising a housing having an aperture, a one-piece plunger having a push-button head portion extending through said aperture, circular cam means having two sets of oppositely positioned cam surfaces one at each end of the cam means, contacting means having two longitudinally spaced apart lugs, with the cam surfaces positioned between the spaced apart lugs, each lug for engaging a corresponding set of cam surfaces, one of said means forming a part of said plunger, and resilient means urging one of the lugs and one of the sets of cam surfaces relatively toward each other into a position of rest, whereby successive longitudinal movement relative to each other of the contacting and cam means caused by depressing and releasing said plunger will successively cause a relative rotation therebetween, forcing the cam and contacting means to take successively different longitudinal positions of rest relative to each other, said plunger and contacting means being longitudinally slotted at one end and made of one piece of resiliently flexible material to permit the slotted plunger and contacting means to be flexed by compression enabling both to be positioned inside the cam means, and released to place both means in proper position for use with respect to each other.

2. A push button mechanism comprising a housing having an aperture, a one-piece plunger having a push-button head portion extending through said aperture, circular cam means having two sets of oppositely positioned cam surfaces one at each end of the cam means, contacting means having two longitudinally spaced apart lugs, with the cam surfaces positioned between the spaced apart lugs, each lug for engaging a corresponding set of cam surfaces, one of said means forming a part of said plunger, and resilient means urging one of the lugs and one of the sets of cam surfaces relatively toward each other into a position of rest, whereby successive longitudinal movement relative to each other of the contacting and cam means caused by depressing and releasing said plunger will successively cause a relative rotation therebetween, forcing the cam and contacting means to take successively different longitudinal positions of rest relative to each other, said plunger and contacting means being made of one piece of resiliently flexible molded plastic, one end of which is slotted to permit the slotted plunger and contacting means to be flexed by compression enabling both to be positioned inside the cam means, and released to place both means in proper position for use with respect to each other.

References Cited in the file of this patent.

FOREIGN PATENTS

38,292	Germany	Jan. 11, 1887
42,547	Germany	Feb. 29, 1888
80,470	Germany	Apr. 2, 1895
635,144	Great Britain	Apr. 5, 1950