

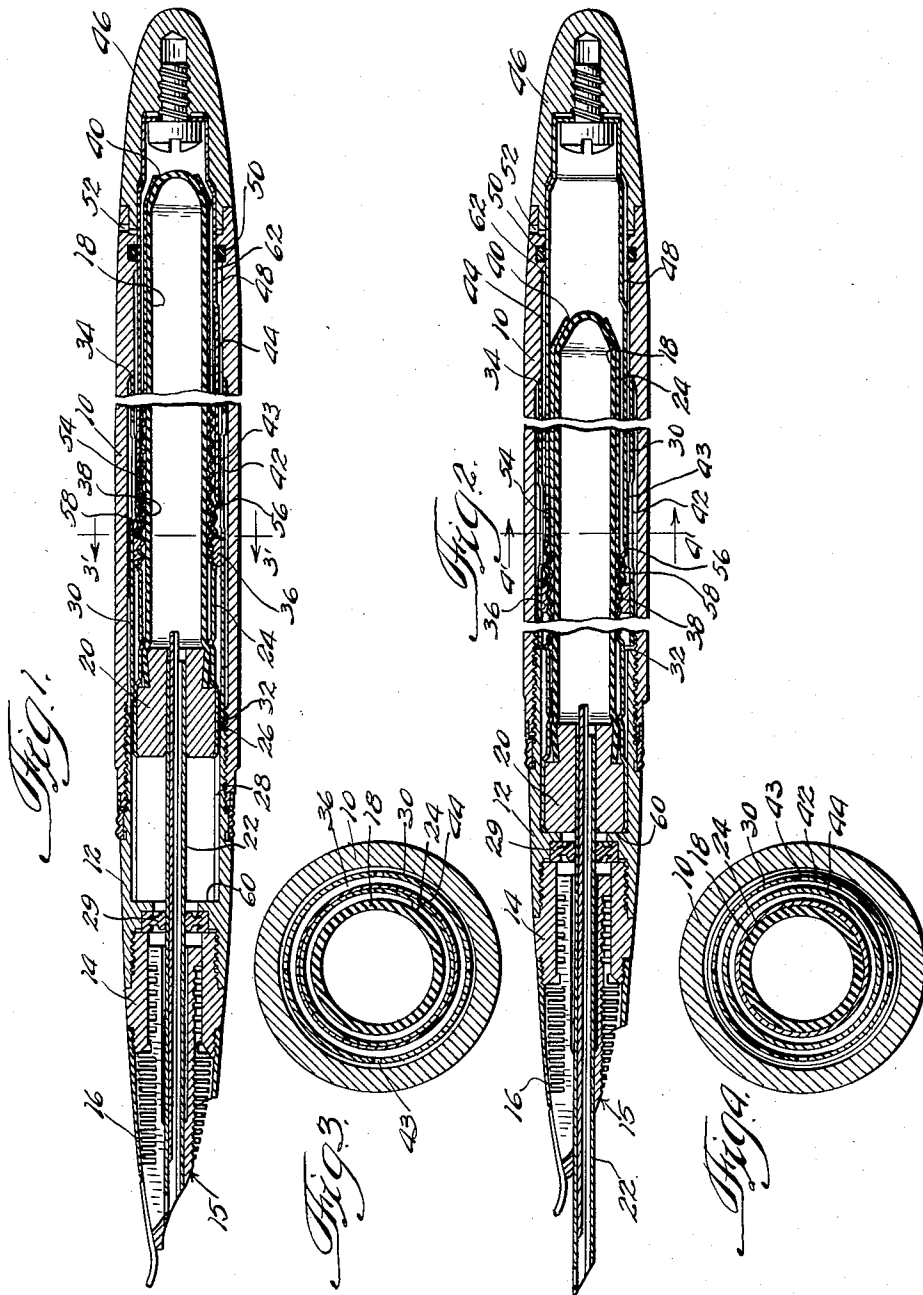
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2,831,460

WRITING INSTRUMENT

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2,831,460

WRITING INSTRUMENT

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8 Claims. (Cl. 120—47)

This invention relates to a writing instrument and has for an object the provision of an instrument having a filling tube which may be extended forwardly of the writing nib to permit filling of the reservoir.

In the copending application of Lynn P. Martin, Serial No. 256,897, now Patent No. 2,769,427, filed November 17, 1951, and assigned to the same assignee as this application, there is disclosed a writing implement having a cartridge unit including a pneumatically collapsible writing fluid reservoir and a filling tube, said unit being longitudinally reciprocable within the barrel of the instrument whereby the filling tube is extended to a position forwardly of the writing nib in order to facilitate filling. As disclosed in that application, such an arrangement permits filling of the fluid reservoir without immersing the writing point directly into the body of fluid from which the implement is filled, thus eliminating the necessity of wiping or blotting the writing point or nib after the filling operation has been completed. This invention has for an object the provision of a mechanism for reciprocating a cartridge including a reservoir and a filling tube within the barrel of the instrument so that the forward end of the filling tube may be moved between extended and retracted positions.

A further object of this invention is the provision of a writing implement having a pneumatically collapsible reservoir of the type generally disclosed in Lynn P. Martin Patent No. 2,610,612, dated September 16, 1952, and including a filling tube which is reciprocable as a unit by relatively rotating different elements of the implement.

A still further object of this invention is the provision of an implement having a reciprocable cartridge unit including a filling tube and a pneumatically collapsible reservoir in which the plunger for collapsing the reservoir constitutes a part of the means for reciprocating the cartridge unit to filling tube extended and retracted positions.

An additional object of this invention is the provision of a friction clutch means cooperating between the plunger and the sleeve permitting the cartridge unit to be driven to its extended and retracted positions by the relative rotation of the plunger with respect to the barrel, thereby dispensing with the necessity of using springs for this purpose.

Further and additional objects will appear from the following description, the accompanying drawings and the appended claims.

In accordance with one embodiment of this invention, there is provided a writing implement comprising a barrel, a writing nib and a longitudinally reciprocable cartridge unit held against rotation within the barrel, said unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube. A rotatable sleeve held against longitudinal reciprocation is positioned within the barrel and includes threaded means which cooperate

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with threaded means on the cartridge unit in order to reciprocate the unit upon rotation of the sleeve with respect to the barrel. There is also provided a reservoir-collapsing plunger mounted for rotation and longitudinal reciprocation within the barrel between the unit and the sleeve, this plunger including a cap extending rearwardly of the barrel. Frictional holding means cooperating between the plunger and the sleeve when the plunger is in the retracted position are provided for engaging and rotating the sleeve upon rotation of the plunger whereby, when the cap and plunger are manually rotated with respect to the barrel, the cartridge unit is reciprocated to filling tube extended and retracted positions. This frictional holding means may include an inwardly extending annular deformation on the sleeve which is in frictional engagement with an enlargement on the forward end of the plunger tube when the plunger tube is in its retracted position. In addition there is preferably provided a releasable detent or locking means which may be formed by threads on the forward end of the plunger tube in cooperation with threads on the cartridge unit whereby the plunger is held against axial separation from the barrel when it is in the retracted position.

For a more complete understanding of this invention, reference will now be made to the drawing, in which

Fig. 1 comprises a broken longitudinal sectional view of a writing instrument constructed in accordance with one embodiment of this invention with the filling tube and plunger in the retracted positions, said instrument being shown conditioned for writing;

Fig. 2 is a similar to Fig. 1 except that it shows the filling tube in the extended position but the plunger in the retracted position;

Fig. 3 is an enlarged sectional view taken along the line 3'-3' of Fig. 1; and

Fig. 4 is an enlarged sectional view taken along the line 4'-4' of Fig. 2.

With more particular reference to the drawings, the writing implement there shown comprises a barrel 10 including a gripping section 12 threadedly secured to the forward end thereof. Forwardly of the gripping section 12 is secured a nib holder 14 on which is mounted a writing nib 16 and in the axial bore of which is mounted a feed bar 15 in the usual manner. A cartridge unit is mounted for longitudinal reciprocation within the barrel 10. This cartridge unit includes a flexible sac reservoir 18, a plug support 20 for the reservoir, a forwardly extending filling tube 22 and a protector tube 24 for the collapsible reservoir. The cartridge unit as above indicated is reciprocable within the barrel 10 between the positions shown respectively in Figs. 1 and 2 and the unit is held against rotation within the barrel by means of deformations 26 formed in the forward end of the protector tube 24 and plug 20 which ride within corresponding longitudinal grooves 28 provided on the inner surface of the gripping section 12. A gasket 29 is secured between the nib holder 14 and the gripping section 12 having a central opening through which the tube 22 is reciprocated and providing a seal to prevent leakage of writing fluid from the feed bar rearwardly into the barrel.

An axial sleeve 30 is mounted for rotation within the barrel 10 and is held against longitudinal movement by means of the rearward end 32 of the gripping section 12 and a shoulder 34 formed on the inner rear surface of the barrel 10. This rotatable sleeve 30 has a threaded collar 36 soldered or otherwise secured to the forward end thereof. If desired, the threads could be rolled in the forward end of the sleeve. The collar or other threaded

means threadedly engages threads 38 formed on the mid-section of the protector tube 24 forwardly of the rearward end thereof, it being noted that the protector tube is vented by an opening 40 in its rearward end to permit the pneumatic collapsing of the sac 18, as will be hereinafter more fully described. The sleeve 30 is also provided with an inwardly extending annular deformation or constriction 42 in the mid-section thereof which cooperates with elements hereinafter to be described to cause the rotation of the sleeve 30 and the consequent reciprocation of the cartridge unit. That portion of the mid-section of the sleeve 30 which constitutes the constriction 42 is provided with a plurality of longitudinal slits 43 which impart resiliency or flexibility to the side walls of the sleeve in that area.

A plunger including a tubular member 44 having an unvented rear end and including a cap member 46 extending from the rearward end of the barrel 10 is provided for pneumatically collapsing the sac reservoir 18 and for reciprocating the cartridge unit to the filling tube extended and retracted positions. A plunger of this general type is disclosed in the above referred to Martin Patent No. 2,610,612 and reference is made to the disclosure in that patent for a full understanding of the mode of operation of the plunger tube for effecting the collapsing and permitting the subsequent expanding of the flexible sac to fill the reservoir with writing fluid. Thus the tubular member 44 is provided with a longitudinal groove 48 in its rearward end which spans a packing gland 50 within the barrel whereby the interior of the barrel is freely vented to the atmosphere through a vent 52 when the plunger tube is in the position shown in the drawings. Also the plunger tube 44 is provided with an aperture 54 in the forward end thereof for also venting the interior of the barrel when the plunger is pulled or extended to its most rearward position, a condition which is not shown in the drawings.

It will be noted that the plunger tube is positioned between the protector tube 24 and the sleeve 30. The forward end of the plunger tube 44 is deformed to provide an outwardly extending annular bead or shoulder 56 which frictionally engages the interior side walls of the constriction 42 in the mid-section of the sleeve 30 when the plunger is in the retracted position shown in the drawings. Also the forward end of the plunger tube 44 is provided with threads 58 which are also engageable with the threads 38 formed on the forward end of the protector tube 24. Thus when the threads 58 are in engagement with the threads 38, a condition shown in both Figs. 1 and 2, the plunger is held against axial reciprocation with respect to the cartridge unit and, because of the fact that the threaded collar 36 on the sleeve 30 is also engaged with the threads 38, the plunger is also held against longitudinal reciprocation with respect to the sleeve and the barrel.

It will be understood that the filling tube 22 and the feed bar 14 have much the same structure and cooperate in much the same manner as disclosed in the above referred to Martin Patent No. 2,769,427 and accordingly it is not believed to be necessary here to discuss these structures and their function in any great detail.

In the operation of the implement, assume that the implement is conditioned for writing and that the various parts are in the position shown in Fig. 1 with both the cartridge unit and the plunger in the fully retracted position within the barrel 10, and with the plunger tube 44 locked against axial separation from the sleeve 30 and the barrel 10 by virtue of the threads 58 being engaged with the threads 38 which latter are also in engagement with the threaded collar 36 secured to the sleeve 30. At this point the bead 56 is also in frictional engagement with the constriction 42 in the central section of the sleeve 30. In order to fill the implement, the cap member 46 is rotated, which movement, by virtue of the fric-

tional engagement between the annular bead 56 and the constriction 42, causes the sleeve 30 to turn. Inasmuch as the threads on the collar 36 are in engagement with the threads 38 on the protector tube and inasmuch as the cartridge unit is held against axial rotation within the barrel by means of the deformations 26 riding in the grooves 28 of the gripping section, the cartridge unit is upon continued turning of the cap member 46 extended to the position shown in Fig. 2. When the cartridge unit has been moved to the fully extended position (see Fig. 2), it will be noted that the plug 20 abuts against a shoulder 60 on the inner surface of the gripping section 12. At this point the threaded collar 36 and the threads 58 are still in engagement with the threads 38 on the protector tube. The cap is then turned further and its motion causes the threads 58 to become disengaged from the threads 38, this rotational movement being effected with sufficient force to overcome the frictional resistance between the annular bead 56 and the slitted constriction 42. When the threads 38 and 58 are disengaged, the plunger tube may be manually pulled rearwardly with sufficient initial force to disengage the bead 56 from the constriction 42, and the tube is then pulled to a fully extended position (a condition not shown in the drawings). The bead 56 abutting against a shoulder 62 in the barrel 10 prevents complete axial separation of the plunger when pulled to the rearward position.

The forward end of the extended filling tube 22 is then inserted into a body of writing fluid and the plunger is manually pushed forward to a retracted position. As will be understood from a consideration of Martin Patent No. 2,610,612, the fluid reservoir is thereby caused to collapse and then expand when the venting channel 48 spans the packing gland 50 whereby writing fluid is drawn into the reservoir through the filling tube 22. The sleeve and plunger are then once more in frictional engagement and the cap 46 is turned in the opposite direction to cause the engagement of the threads 38 and 58. Continued turning of the cap causes the cartridge unit to be retracted to the position shown in Fig. 1 as will be understood. The reservoir is now full and the implement is ready for use.

A feature of this construction is that the cartridge unit is positively driven when the cap 46 is rotated and it is not necessary to rely upon the action of springs for this purpose.

A further feature of this construction is that the filling tube must normally be moved to its fully extended position before the detent or holding means, constituting the threads 58 and 38, between the plunger and the cartridge unit are released whereby filling of the reservoir is not possible unless the filling tube 22 is fully extended.

While a particular embodiment of this invention is shown above, it will be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with said reservoir, said unit being held against rotation within said barrel, said filling tube being in fluid communication with said nib, a rotatable sleeve held against longitudinal reciprocation within said barrel, threaded means cooperating between said unit and said sleeve for positively reciprocating the unit upon rotation of the sleeve, and a reservoir-collapsing plunger sealingly engaging said barrel including a cap member and a tubular member mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve to extended and retracted positions, said tubular member being in frictional engagement with said sleeve when

in said retracted position whereby said sleeve is rotated upon rotation of said plunger.

2. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with said reservoir, said unit being held against rotation within said barrel, said filling tube being in fluid communication with said nib, a rotatable sleeve held against longitudinal reciprocation within said barrel, threaded means cooperating between said unit and said sleeve for positively reciprocating the unit upon rotation of the sleeve, a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging said barrel mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve to extended and retracted positions, and releasable detent means cooperating to hold said unit and said plunger against axial separation when both are in the retracted position within said barrel, said tubular member being in frictional engagement with said sleeve when in said retracted position whereby said sleeve is rotated upon rotation of said plunger.

3. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with said reservoir, said unit being held against rotation within said barrel, said filling tube being in fluid communication with said nib, a rotatable sleeve in said barrel including an annular deformation, said sleeve held against longitudinal reciprocation within said barrel, threaded means cooperating between said unit and said sleeve for positively reciprocating the unit upon rotation of the sleeve, and a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging the barrel, said plunger mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve to extended and retracted positions, said tubular member being in frictional engagement with said annular deformation when said sleeve is in said retracted position whereby said sleeve is rotated upon rotation of said plunger.

4. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with said reservoir, said unit being held against rotation within said barrel, said filling tube being in fluid communication with said nib, a rotatable sleeve having an inwardly extending annular deformation held against longitudinal reciprocation within said barrel, threaded means cooperating between said unit and said sleeve for positively reciprocating the unit upon rotation of the sleeve, a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging the barrel, said plunger mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve to extended and retracted positions, and releasable detent means on said unit and said plunger cooperating to hold said unit and said plunger against axial separation when both are in the retracted position within said barrel, said tubular member having an outwardly extending deformation in frictional engagement with said annular deformation when said sleeve is in said retracted position whereby said sleeve is rotated upon rotation of said plunger.

5. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with

said reservoir, said unit being held against rotation within said barrel, said filling tube being in fluid communication with said nib, a rotatable sleeve held against longitudinal reciprocation within said barrel, threaded means cooperating between said unit and said sleeve for positively reciprocating the unit upon rotation of the sleeve, a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging the barrel, said plunger mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve to extended and retracted positions, and releasable detent means on said unit and said plunger cooperating to hold said unit and said plunger against axial separation when both are in the retracted position within said barrel, said sleeve having an annular constriction and said tubular member having an outwardly extending deformation, said constriction and said deformation providing means for frictionally engaging said sleeve and said tubular member when said plunger is in the retracted position whereby said sleeve is rotated upon rotation of said plunger.

6. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir and a forwardly extending filling tube in fluid communication with said reservoir, said unit being held against rotation within said barrel, an axially rotatable sleeve held against longitudinal reciprocation within said barrel, threaded means on said unit and on said sleeve cooperating to positively reciprocate the unit upon rotation of the sleeve, a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging the barrel, said plunger mounted for rotation and longitudinal reciprocation within said barrel between said unit and said sleeve between extended and retracted positions, and releasable detent means including the threaded means on said unit and including threaded means on the forward end of said tubular member for holding said unit and said plunger against axial separation when both are in the retracted position within said barrel, said tubular member being in frictional engagement with said sleeve when in said retracted position whereby said sleeve is rotated upon rotation of said plunger.

7. A writing implement comprising a barrel, a writing nib disposed at the forward end of said barrel, a longitudinally reciprocable cartridge unit including a pneumatically collapsible writing fluid reservoir, a protector tube surrounding said reservoir, and a forwardly extending filling tube in fluid communication with said reservoir, said unit held against rotation within said barrel, rotatable sleeve held against longitudinal reciprocation within said barrel, threaded means on said protector tube and on said sleeve cooperating to positively reciprocate the unit upon rotation of the sleeve, a reservoir-collapsing plunger including a cap member and a tubular member sealingly engaging said barrel, said plunger being mounted for rotation and longitudinal reciprocation within said barrel between said protector tube and said sleeve between extended and retracted positions, and releasable detent means including the threaded means on said protector tube and including threaded means on the forward end of said tubular member for holding said unit and said plunger against axial separation when both are in the retracted position within said barrel, said sleeve having an annular constriction and said tubular member having an outwardly extending deformation, said constriction and said deformation providing means for frictionally engaging said sleeve and said tubular member when said plunger is in the retracted position whereby said sleeve is rotated upon rotation of said plunger.

8. A writing implement comprising barrel means, elongate sleeve means rotatably mounted in said barrel means, and having an internally threaded portion, pneumatically collapsible fluid reservoir means having a forwardly ex-

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tending fluid filling tube and a threaded portion in engagement with the threaded portion of said sleeve, said reservoir means mounted in said barrel for axial non-rotary movement between a writing and a filling position, and plunger means including a cap member cooperating with the rearward end of said barrel means and a tubular member sealingly engaging said barrel means for longitudinal reciprocation between a rearwardly extended position and a retracted position, said reservoir being collapsed upon motion of said tubular member to the retracted position, said tubular member frictionally engaging said sleeve means in the retracted position whereby

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rotary motion of said plunger means effects longitudinal motion of said reservoir means.

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