Dec. 29, 1931. A. A. GOLDSTEIN 1,838,543

FOUNTAIN PEN AND THE LIKE

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Fig. 1.

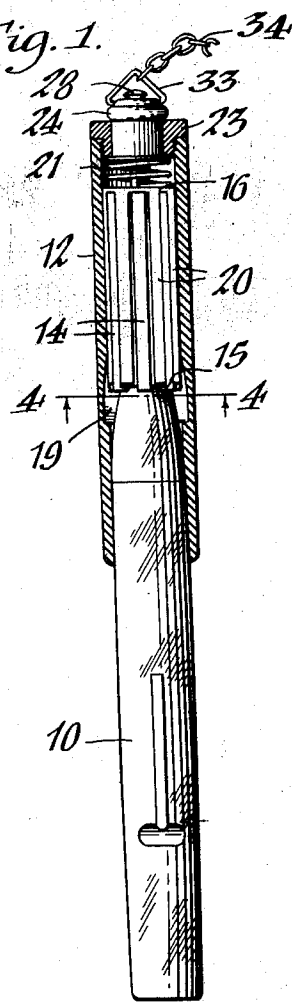


Fig. 2.

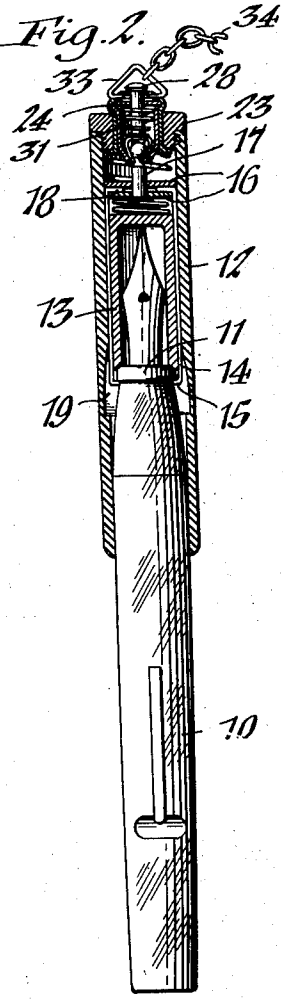


Fig. 3.

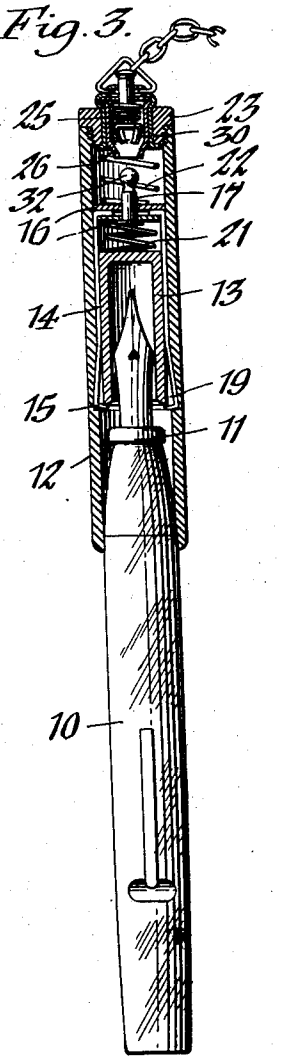
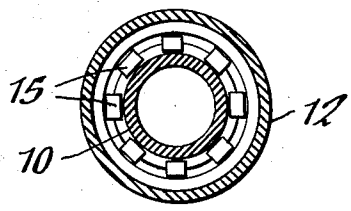


Fig. 4.



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Fig. 5.

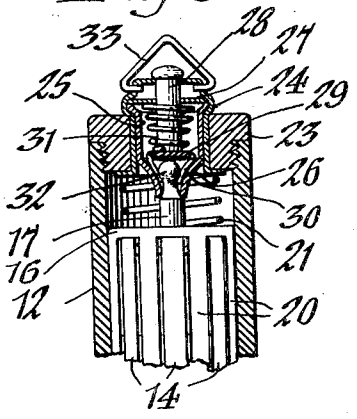
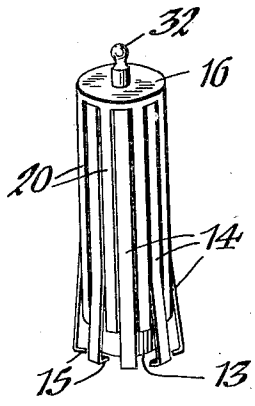


Fig. 6.



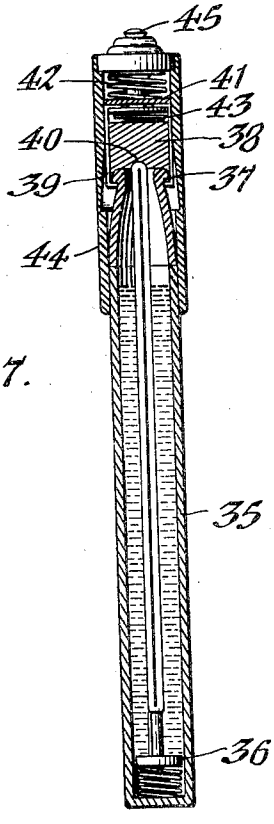


Fig. 7.

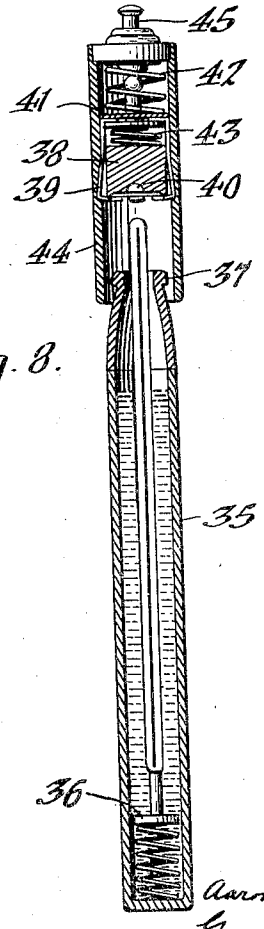


Fig. 8.

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UNITED STATES PATENT OFFICE

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FOUNTAIN PEN AND THE LIKE

Application filed May 17, 1928. Serial No. 278,412.

In fountain pens having a screw cap, the end of the pen holder or barrel abuts against a shoulder within the pen-protecting cap to prevent leakage, but unless the cap is tightly screwed upon the holder, the seal is imperfect and unreliable.

One of the objects of this invention is to dispense with the threaded joint between the cap and the pen-holder and provide the pen with a locking device which permits a quicker application and removal of the cap than such a joint.

A further object is the provision of a non-leaking fountain pen in which the parts are so constructed that the cap can be applied and reliably locked to the pen-holder by a sliding movement.

Another object is to provide the pen with these improvements without departing from the conventional form and appearance of such pens.

In the accompanying drawings:

Figures 1 and 2 are sectional elevations of a fountain pen embodying the invention, showing the cap locked in place. Figure 3 is a similar view showing the cap unlocked preparatory to removing it. Figure 4 is an enlarged cross-section on line 4—4, Figure 1. Figure 5 is an enlarged vertical section of the coupling device and the upper end of the main cap. Figure 6 is a perspective view of the sealing cap and its locking device. Figure 7 is a vertical section of a clinical thermometer containing the invention showing its cap locked. Figure 8 is a similar view showing the cap unlocked.

Similar characters of reference indicate corresponding parts throughout the several views.

10 indicates the barrel or pen-holder which may be of the conventional form, its tapering upper end having a rim or collar 11.

The main cap 12 is smooth-bored and slips over the smooth surface of the pen-holder instead of being connected therewith by the usual screw threaded joint.

Fitted within the main cap 12 is a spring-pressed longitudinally sliding sealing cap and pen protector 13 adapted to bear at its open lower end against the upper side of the rim 11, to prevent leakage of ink from the pen-holder into the main cap. The sealing cap is automatically coupled to the pen-holder preferably by devices which operate to lock said cap by a sliding or non-rotary movement of the main cap 12 on the pen-holder and which release the sealing cap without requiring rotation of the main cap. The locking or coupling device illustrated in the drawings by way of example consists of a circular series of spring catches or fingers 14 embracing the sealing cap and having noses 15 adapted to engage under the rim 11 of the pen-holder, as shown in Figure 2. These catches are carried by a slidable head or abutment consisting of spaced disks 16 rigidly secured to a central stud 17, the shanks of the catches being provided at their upper ends with lips 18 which are confined between said disks, compelling the catches to move up and down with them. The lower portions of these shanks are normally bent outwardly at an angle to the bodies thereof, as shown in Figures 3 and 6, so that they tend to spring away from the sealing cap into an annular groove or recess 19 formed in the bore of the main cap, thereby releasing the rim 11 and permitting said cap to be removed from the pen-holder. Spacers or bars 20 depending from the upper disk 16, serve to keep the catch-shanks at the proper distance apart.

A suitable spring 21, preferably of spiral form, is interposed between the closed end of the sealing cap and the lower side of the abutment 16, and a similar spring 22 is interposed between the upper side of said abutment and a plug 23 screwed into the upper end of the main cap. In the locked position of the parts, said abutment is held stationary in the main cap and the lower spring 21 is compressed so as to press the sealing cap 13 against the rim 11. Any suitable means may be employed for locking the abutment in position, but this is preferably accomplished by a stud and socket fastener. As best shown in Figure 5, this comprises a thimble 24 secured in a central opening of the plug 23, and a cylindrical casing or socket-member 25 secured against movement in said thimble and having at its

lower end a convergent throat 26 and closed at its upper end by a plate 27. The latter has a central opening in alinement with an opening in the closed upper end of said thimble, which openings receive a headed slidable stem 28. To the lower end of this stem is secured a plate 29 provided with convergent spring-fingers 30 forming a clutch which is pressed into the throat by a spring 31 applied to the stem 28. The stud 17 of the abutment has a ball-shaped head 32 adapted to enter said convergent throat and snap into the socket formed by the clutch fingers 30, when the main cap 12 is passed over the pen-holder, as shown in Figure 2. The small lower end of said throat is large enough to pass the ball head of the stud but the throat formed by the clutch fingers when seated in the stationary throat is smaller than said head, preventing separation of the parts under the downward pressure of the spring 22. But, upon lifting or withdrawing the stem 28 of the clutch fingers by placing the thumb nail under its head, or otherwise, said fingers are free to spread, releasing the stud and allowing the abutment 16 to descend under the recoil of the spring 22, thus carrying the spring catches 14 to the position shown in Figure 3, in which they expand into the recess 19 and become disengaged from the rim 11, permitting the main cap to be removed from the pen-holder.

The noses of the spring catches, while locking the sealing cap to the pen-holder also serve as stops for retaining said cap in the embrace of its shanks when the main cap is removed, keeping these parts assembled as a unit. For this purpose, the sealing cap is somewhat larger in diameter than the rim 11 and the noses 15 of the spring catches and the depth of the recess 19 are so proportioned that the catches after releasing the rim still remain in engagement with the sealing cap.

As shown, a folding link 33 may be fastened to the upper end of the thimble 24 for the attachment of a safety chain 34 by which the main cap may be secured to the owner's person.

When the closure is off the pen-holder, the members of the stud and socket fastening are disconnected, the abutment 16 is lowered, the sealing cap is depressed and the lower portions of the spring catches are expended and occupy the recess 19, as shown in Figure 3. Upon applying the main cap to the pen-holder, the rim 11 of the latter meets the sealing cap and pushes it up into the position shown in Figure 2, thereby interlocking the rim with the spring catches 14 which are pressed inward by the ungrooved portion of the wall of the main cap. By this movement the spring 21 is compressed, the abutment 16 is raised, the upper spring 22 is likewise compressed and the headed stud 17 is interlocked with the socket member 26, temporarily locking the abutment in that position.

Upon lifting the stem 28, as before described, said socket member is disengaged from the stud-member and the abutment is depressed by the spring 22, carrying the lower free portions of the spring catches 14 down opposite the recess 19 into which they expand, as before described, clearing the rim 11 of the pen-holder and permitting the cap to be removed.

It will be noted that by the closure described, the same is both locked and sealed by one and the same sliding movement. This is a quicker action than that of rotating the cap on the pen-holder, or vice versa, which is necessary when they are connected by a threaded joint.

While affording these advantages, the improvement requires no reconstruction of the main parts of the pen but enables them to be made along commonly-adopted lines.

The improved closure is also applicable to similar articles comprising a liquid fountain or receptacle, such for instance as clinical thermometers. A device of this kind is illustrated in Figures 7 and 8. In this embodiment, the receptacle 35 is filled nearly to the top with alcohol or other sterilizing liquid, and the thermometer rests on a spring-supported disk 36. As in the fountain pen construction, the receptacle has a rim 37 at its upper end upon which a sealing cap or block 38 seats and under which the catches 39 engage, the bottom of this cap having a centering cavity 40 which receives the upper end of the thermometer. The other elements including the slidable abutment 41,—the springs 42 and 43 are the stud-and-socket lock for said abutment are the same in construction and operation as those of the pen construction. Upon applying the main cap 44, the sealing cap depresses the thermometer fully into the receptacle, the spring 43 is compressed, forming a tight seal and the catches 39 interlock with the rim 37, holding the main cap in place. To unlock the latter the headed stem 45 is withdrawn to release the abutment 41, as in the first described construction, disengaging the catches from said rim and releasing the cap.

I claim as my invention:—

1. A closure for a liquid receptacle, comprising a self-contained unit including a main cap,—a sealing cap slidable within the main cap, resilient means for pressing the sealing cap downwardly against the mouth of the receptacle, an expansible spring catch housed within the main cap for locking said sealing cap to the mouth of the receptacle, the main cap embracing said catch in its applied position to contact the same into locking engagement with the receptacle, and means for coupling said catch to the main

cap when the latter is detached from the receptacle.

2. A device of the character described, comprising a liquid receptacle, a main cap adapted to extend over the upper portion of the receptacle, a sealing cap telescopically fitted within the main cap for engaging the receptacle-mouth, resilient means for pressing the sealing cap against the mouth of the receptacle, means contained within the main cap for locking the sealing cap to and holding it against displacement from the receptacle in one position of the parts, and means connecting said main cap with said locking means in another position of the parts.

3. A closure for a liquid receptacle, comprising a main cap, a spring-pressed sealing cap within the main cap adapted to seat against the mouth of the receptacle, a radially-movable spring-catch within the main cap adapted to interlock with the receptacle, and means for coupling said catch to the main cap.

4. A closure for a liquid receptacle, comprising a main cap, a spring-pressed sealing cap in the main cap adapted to seat against the mouth of the receptacle, an abutment slidable in said main cap, locking means movable with abutment and adapted to engage the receptacle, and means for separably connecting said abutment with the main cap.

5. A closure for a liquid receptacle, comprising a main cap, a sealing cap sliding in said main cap, a slidable abutment arranged between the closed ends of said caps, a spring interposed between said abutment and the closed end of the sealing cap, a second spring interposed between said abutment and the closed end of the main cap, a coupling between said abutment and the main cap, and automatic locking means carried by said abutment and adapted to interlock with the receptacle.

6. A closure for a liquid receptacle, comprising a main cap, a sealing cap sliding in said main cap, a slidable abutment arranged between the closed ends of said caps, a spring interposed between said abutment and the closed end of the sealing cap, a second spring interposed between said abutment and the closed end of the main cap, co-operating stud and socket members secured to said abutment and the main cap, respectively, one of said members being accessible from the exterior of the main cap, and automatic locking means carried by said abutment and adapted to interlock with the receptacle.

7. A closure for liquid receptacles, comprising a self-contained unit including a main cap, a sealing cap for the receptacle housed within the main cap between its ends slidable in the main cap into and out of sealing engagement with the receptacle-mouth, and means slidable in the main cap independently of the sealing cap and having expansible elements at its lower end for releasably locking the latter to the mouth of the receptacle.

8. A closure for liquid receptacles, comprising a main cap, a sealing cap for the receptacle slidable in the main cap, means slidable in the main cap independently of the sealing cap for locking the latter to the mouth of the receptacle, and means for coupling said locking means to the main cap.

9. A closure for a liquid receptacle, comprising a main cap having an internal recess, a carrier slidable in said cap, means for coupling the carrier to the cap, means tending to depress the carrier when uncoupled, a sealing cap within the main cap adapted to seat against the mouth of the liquid receptacle, and radially movable catches connected with said carrier to move therewith and adapted to interlock with the sealing cap, said catches being held in their locking position by the wall of the main cap in the elevated position of said carrier and allowed to expand into their unlocking position when brought opposite said recess by the depression of the carrier.

10. In a closure for a liquid receptacle, a head, a sealing cap, and spring catches carried by said head, the shanks of the catches embracing the sealing cap and their noses engaging the seating end of the sealing cap.

11. A closure for liquid receptacles, comprising a main cap having an internal recess, a sealing cap within the main cap adapted to seat against the mouth of the receptacle, a head in said main cap above the sealing cap, and spring catches carried by said head and adapted to interlock with the receptacle, the free portions of said catches being radially movable and tending to spring outward into said recess when unrestrained.

12. A closure for a liquid receptacle, comprising a main cap having an internal recess, a sealing cap slidable in said main cap, an abutment slidable in the main cap relatively to said sealing cap, spring catches carried by said abutment, arranged between said caps and adapted to interlock with the receptacle, the lower free portions of the catches being normally bent outward at an angle to their remaining portions and adapted to enter said recess when brought in register therewith, to disengage the catches from the receptacle.

13. A device of the character described, comprising an unthreaded liquid receptacle, an unthreaded main cap slidably fitted thereover, a sealing cap telescopically mounted within the main cap and movable relatively thereto into and out of sealing engagement with the receptacle-mouth, means for pressing the sealing cap downwardly against the mouth of the receptacle, and means for releasably coupling said caps to each other and to the receptacle.

14. A closure for a receptacle, comprising a self-contained unit including telescopically arranged inner and outer caps, the inner cap constituting a seal arranged for movement relative to the outer cap into and out of abutting sealing engagement with the receptacle-mouth, and the outer cap completely enclosing the inner cap in all positions thereof and adapted for engagement at its lower end directly with the receptacle about its mouth, and unitary means for releasably coupling said caps to each other and to the receptacle.

15. A closure for a receptacle, comprising a self-contained unit including telescopically arranged inner and outer caps, the inner cap constituting a seal arranged for movement relative to the outer cap into and out of abutting sealing engagement with the receptacle-mouth, and the outer cap completely enclosing the inner cap in all positions thereof and adapted for engagement at its lower end directly with the receptacle about its mouth, unitary means for releasably coupling the inner cap with the receptacle mouth in its sealed position and with the outer cap in its unsealed position, and means separate from said last-named means for preventing relative longitudinal movement of said caps and of the outer cap relative to the receptacle when the inner cap is in its sealed position.

16. A closure for receptacles, comprising a self-contained unit including a main cap slidable over the mouth of the receptacle, a sealing cap fitted within the main cap for sliding movement relative thereto, resilient means for pressing the sealing cap against the mouth of the receptacle, and a radially expansible element shiftable lengthwise of said caps and disposed between the contiguous side walls thereof for latching the sealing cap to the mouth of the receptacle in the applied position of the main cap.

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