

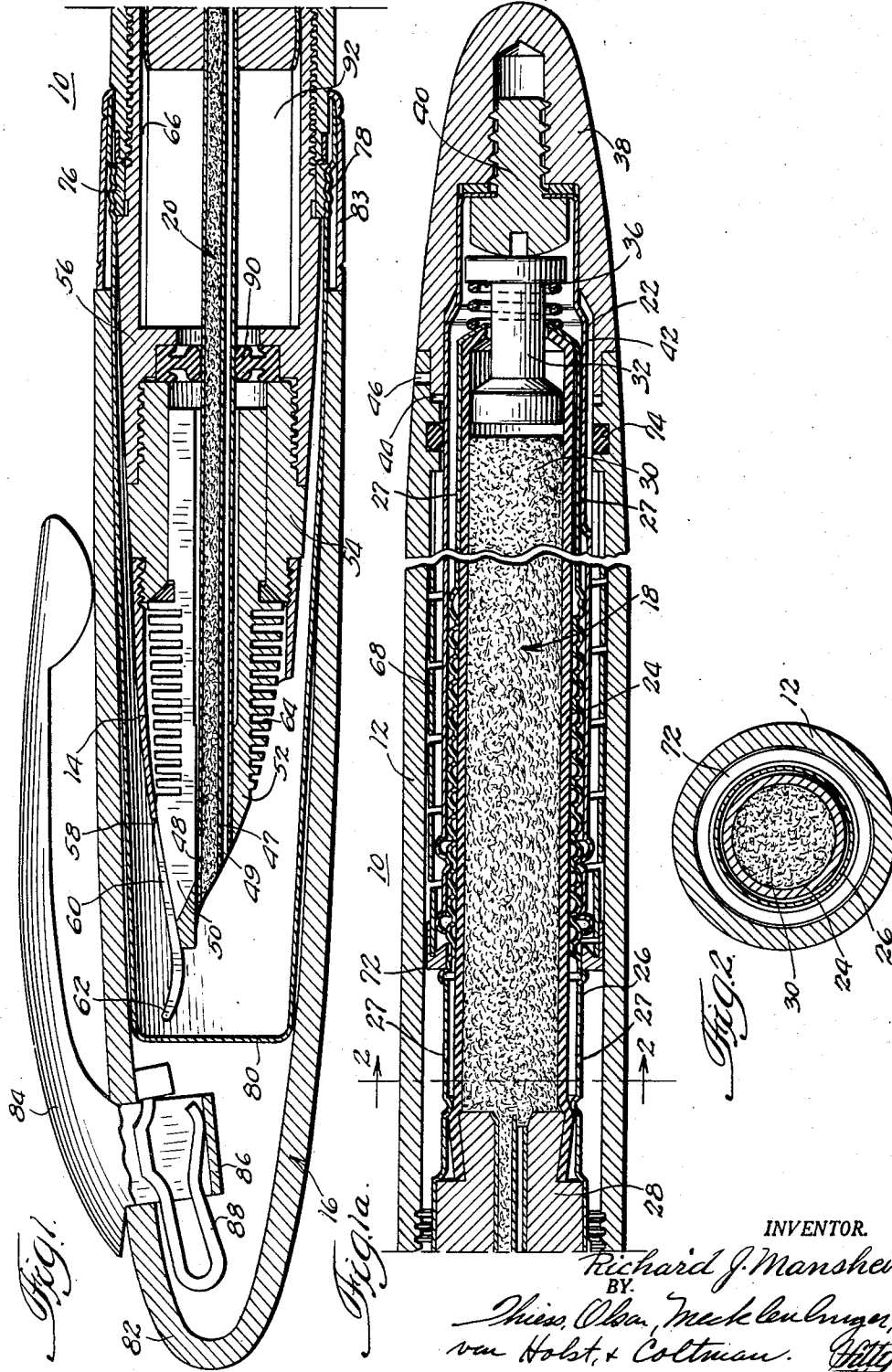
June 28, 1960

R. J. MANSHEIM

2,942,576

WRITING IMPLEMENT

Filed Oct. 17, 1955



INVENTOR.

Richard J. Mansheim

BY

Thies, Ober, Mecklenburger,  
von Holst, & Coltmann. *Attys.*

2,942,576

## WRITING IMPLEMENT

Richard J. Mansheim, Fort Madison, Iowa, assignor to W. A. Sheaffer Pen Company, Fort Madison, Iowa, a corporation of Delaware

Filed Oct. 17, 1955, Ser. No. 540,982

11 Claims. (Cl. 120-47)

This invention relates to improved writing implements and more particularly to an improved fluid filling and feeding system for fountain pens. The conventional basic fountain pen comprises a writing element or nib and a flexible sac or other pneumatic reservoir disposed rearwardly thereof for storing fluid to be fed to the writing nib. The reservoir is partially evacuated in some manner to draw writing fluid up through the writing element into the reservoir. Such constructions have exhibited certain characteristics which are undesirable but which have heretofore been considered necessary concomitants of a writing instrument capable of storing fluid. Among these detriments are the requirement of inserting the entire writing nib into a body of fluid when filling the reservoir and the dependence of fluid flow upon atmospheric conditions whereby excessive discharge of writing fluid may be experienced with changes in temperature, altitude and the like.

By this invention a fountain pen is provided which may be quickly charged with writing fluid without requiring the immersion of the writing element or gripping section of the fountain pen in a body of fluid. Furthermore, following the filling of the reservoir, fluid flow is substantially independent of variations in atmospheric conditions and the position of the instrument.

It is an important object of this invention to provide an improved fountain pen which may be quickly charged with fluid during filling and will provide flow to an associated writing element substantially independently of external conditions.

It is another object of this invention to provide an improved fountain pen having means for quickly charging a reservoir with fluid without immersion of the writing element or gripping section in a body of fluid.

It is another object of this invention to provide an improved fountain pen having a quickly chargeable reservoir functioning substantially independently of atmospheric conditions and variations therein.

It is another object of this invention to provide an improved quickly fillable fountain pen incorporating a capillary reservoir.

It is a still further object of this invention to provide an improved fountain pen utilizing a capillary reservoir and a noncapillary extensible filling tube associated therewith.

It is a still further object of this invention to provide an improved fountain pen having a capillary reservoir and a system whereby said reservoir may be forcefully charged with fluid by partially evacuating the reservoir.

It is a still further object of this invention to provide an improved fountain pen having common means for extending a filling tube forwardly of a writing element and forcefully charging a capillary reservoir with fluid.

Another object of my invention is to provide an improved fountain pen having a capillary reservoir wherein said reservoir is automatically vented when the fountain pen is conditioned for writing.

It is a further object of this invention to provide an

improved fountain pen having an extensible filling and feeding tube communicating with a capillary reservoir, said filling tube having generally coextensive filling and feeding paths, said feeding path being filled with material defining communicating capillary passages.

Further and additional objects of this invention will become manifest from a consideration of this specification, the accompanying drawings and the appended claims.

In one form of this invention a fountain pen is provided having a barrel and a writing element disposed forwardly thereof. A reservoir is contained within the barrel and has a filling and feeding tube extending forwardly therefrom, the reservoir and tube being axially shiftable between a writing position in which the forward tube end is adjacent to the writing element and a filling position wherein the end is disposed forwardly thereof. A common manually engageable means is provided for actuating additional means for extending the filling tube, partially evacuating the reservoir, and automatically venting the reservoir when the fountain pen is conditioned for writing. Furthermore, the filling tube is provided with an elongated channel of noncapillary dimensions to provide free fluid access to the reservoir, and a substantially coextensive channel containing material subdividing such channel into a plurality of communicating passages, said latter channel being in communication with the writing element. The pneumatic filling means of the instant invention is similar in certain structural and operational respects to that disclosed in Martin Patent No. 2,769,427.

For a more complete understanding of this invention reference will now be made to the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of the forward portion of a writing instrument incorporating the features of this invention;

Fig. 1a is a longitudinal sectional view of the rearward portion of the embodiment partially illustrated in Fig. 1; and

Fig. 2 is a transverse sectional view of the embodiment illustrated in Figs. 1 and 1a, taken on the line 2-2 of Fig. 1a.

Referring now to the drawings and more particularly to Figs. 1 and 1a, a fountain pen 10 is illustrated comprising generally a barrel 12, a writing element 14 disposed forwardly thereof, and a cap 16 covering said writing element when the fountain pen is not in use. A system of filling a reservoir and feeding fluid therefrom to the writing element 14 is provided and generally comprises a reservoir 18 disposed within the barrel 12 rearwardly of the writing element, a filling tube 20 extending forwardly from the reservoir and having an open forward end normally adjacent to the writing element, and a plunger 22 reciprocable within the barrel 12 for creating a partial vacuum within the barrel to collapse the reservoir and cause writing fluid to rise rearwardly through the filling tube 20 into the reservoir 18.

The reservoir comprises a flexible sac 24 contained within a supporting sheath 26 which is secured in a forward bushing 28 and is threaded along a substantial portion of its length. A flexible material 30 is contained within the flexible sac 24 and is a means which defines a plurality of communicating capillary passages, spaces or interstices. The material 30 may be selected from a group including various comminuted and flocculated materials of a compressible material, sponge rubber, flexible communicating tubes, aerated plastics, and the like. The rearward end of the sheath 26 and the rearward end of sac 24 have central apertures which are normally closed by a valve plug 32. The plug 32 is urged into sealing engagement with the flexible sac 34 by the coil spring

36. However, the plunger 22 threadedly engages the sheath 26 whereby an end cap 38 which is supported on the end of plunger 22 by a machine screw 40 is drawn into abutting and conforming relationship with the otherwise open end of the barrel 12. End cap 38 provides a manually operable means for controlling additional means, to be described, for extending a filling tube partially evacuating the reservoir 18 and automatically venting the reservoir. When in this position the head of screw 40 engages plug 32 urging it inwardly against the force of spring 36, thus venting the reservoir 18 to the internal cavity of the barrel 12. This internal cavity is, in turn, vented to the atmosphere through a longitudinal recess 42 formed in the plunger 26, an annular recess 44 between the barrel 12 and end cap 38, and a venting aperture 46 formed in the barrel 12. Thus, when charged with writing fluid, the reservoir is not subject to inadvertent discharge as a result of changes in atmospheric conditions as the pressure is, at all times, equalized.

The filling tube 20, extending forwardly from the reservoir 18 through a central aperture in the bushing 28, has a generally circular cross section subdivided into two independent channels by a divider 47. One of the channels defined thereby is filled with a material 49 which provides a plurality of communicating passages between the open end of the tube 20 and the reservoir. The material 49 may be the same as the material 30 contained within the reservoir or may be any material selected from the group described above provided only that the capillary forces are such that writing fluid is drawn forwardly through the filling tube from the reservoir to a point adjacent the writing element 14. A transverse capillary slit 48 is provided in the tube and is in communication with a corresponding capillary slit 50 formed in a feed bar 52. Feed bar 52 comprises means for defining a capillary passageway between the filling tube 20 and writing element 14.

The feed bar 52 is mounted in a supporting collar 54 and is surrounded by the writing element 14 which threadedly engages the supporting collar 54. The collar 54 is, in turn, threaded into a gripping section 55 which threadedly engages the forward end of barrel 12. The writing element 14 is provided with a conventional pierce 58 and slit 60 which carry fluid from the feed bar 52 to the writing point 62. Thus fluid communication is provided during writing from the capillary passages of the reservoir through the filling tube and feed bar to the writing point. The noncapillary channel defined by the divider 47 is utilized primarily in filling the reservoir 18 with fluid. The provision of a noncapillary channel greatly facilitates and accelerates filling of the reservoir, as will be described in greater detail hereinafter. Following a filling operation the noncapillary channel will remain charged with fluid and to prevent any danger of this fluid being discharged inadvertently, a small area of the feed bar 52 is provided with comb cuts 64 which are of capillary dimensions and will retain excess fluid.

The reservoir 18 and filling tube 20 are reciprocable as a unit between the writing position herein illustrated and a forward filling position in which the forward open end of the filling tube 20 is disposed substantially beyond the writing point 62. Reciprocation of the reservoir and filling tube is accomplished by rotation of the end cap 38 and the plunger 22 carried therewith. Splines 66 are provided in the inner wall of the gripping section 56 and are engaged by correspondingly formed portions of the bushing 28 and sheath 26 whereby the reservoir and filling tube are axially reciprocable while being restrained against rotation. Therefore, rotation of the plunger 22 which is in threaded engagement with the sheath 26 causes axial motion of the reservoir and filling tube. The reservoir and filling tube are urged to a forward position by the flat helical spring 68 which is normally under compression between a shoulder (not shown) formed in

barrel 12 and a collar 72 which abuts against a deformed portion of the sheath 26.

Upon full extension of the reservoir and filling tube the plunger 22 may be disengaged from the sheath 26 by a slight further rotation of the manually operable end cap 38. Thereafter the plunger 22 may be reciprocated within the barrel 12 independently of the reservoir and filling tube to cooperate as means for partially collapsing reservoir 18. A sealing ring 74 is disposed in a recess formed in the barrel 12 and engages the outer wall of the plunger 22 to define a sealed enclosure within the barrel and plunger. Therefore, upon moving the plunger inwardly into the barrel, the barrel and plunger form compressive means whereby the air within the barrel is partially compressed to collapse the flexible sac 24. The sac 24 is sealed by the extended plug 32 so that the compressed air within the barrel chamber cannot pass therethrough into the sac, filling tube, and consequently to the atmosphere. The sheath 26 surrounding flexible reservoir 24 has a plurality of apertures 27 for communication between the cavity defined by plunger 22 and the flexible sac 24. Upon complete retraction of the plunger 22 into the barrel 12 the longitudinal recess 42 defines means which by-passes the sealing ring 74, permitting air to escape therebeyond and thus by relieving the compressive force, permitting the flexible sac to extend to its normal position, consequently drawing fluid through the filling tube 20 into the reservoir 24. This operation may be repeated several times whereby the force filling means described above will quickly and completely charge the reservoir with fluid. When the reservoir is completely charged the end cap 38 is rotated in such a manner that the plunger 22 engages the correspondingly threaded portion of sheath 26 retracting the reservoir and tube into the barrel 12 against the force of spring 68. The retraction of the reservoir causes the plug 32 to engage the head of screw 40, thus opening the valve at the rearward end of the reservoir and venting the reservoir to the atmosphere. The shaped end of sheath 26 and plug 32 thus comprise means defining a vent opening. As a capillary reservoir is not dependent upon air pressure either for retaining fluid therein or for feeding fluid to the writing point, it is desirable to relieve any possible pressure therein so that the fountain pen will not inadvertently discharge fluid under conditions of varying temperature or atmospheric pressure. A flexible seal 90 is provided in the gripping section 56 to isolate the feed bar 52 from the reservoir area therebehind. This will prevent the accumulation of writing fluid in the cavity 92.

A small threaded collar 76 is disposed between the barrel 12 and gripping section 56 to receive a correspondingly threaded portion 78 of the fountain pen cap 16. The threaded portion 78 forms a part of an internal metal shield 80 which encloses the writing element and is contained within the cap housing 82 conventionally formed of a plastic material. The shield 80 and cap housing 82 are secured together by band 83. A pocket clip 84 is secured in the cover 16 in any conventional manner. In this particular embodiment the pocket clip has a loop 86 which extends through a rectangular aperture in the housing 82 to receive a U-shaped spring 88 whereby the clip is resiliently maintained against the housing.

While one particular embodiment of this invention has been described herein in detail it will be clear that one skilled in the art may apply the teaching of this invention to many embodiments; for example, various flexible sacs and capillary materials may be employed with the valve technique for automatic venting when the fountain pen is conditioned for writing. Furthermore, the use of a single straight substantially rigid filling tube defining a filling path of noncapillary dimensions and an adjacent feeding channel containing material defining a

5

capillary path may be utilized with many pen structures and various reservoirs.

Without further elaboration, the foregoing will so fully explain the character of my invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, while retaining certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material substantially filling said reservoir and defining a plurality of communicating passages of capillary dimensions; a substantially straight open-ended tube extending forwardly from said reservoir and in fluid communication therewith; means defining capillary passageways extending forwardly from said reservoir and connecting said reservoir and said writing element; and means for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means actuated by said plunger means for venting said reservoir when said plunger means is in the retracted position.

2. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material substantially filling said reservoir and defining a plurality of communicating passages of capillary dimensions; means defining a substantially straight capillary path extending forwardly from said reservoir; means defining a transverse capillary passageway connecting said path and said writing element; a substantially straight open-ended noncapillary filling tube extending forwardly from said reservoir; and means for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means actuated by said plunger means for venting said reservoir when said plunger means is in the retracted position.

3. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material substantially filling said reservoir and defining a plurality of communicating passages of capillary dimensions; means defining a substantially straight capillary path extending forwardly from said reservoir; means defining a transverse capillary passageway connecting said path and said writing element; a substantially straight open-ended noncapillary filling tube extending forwardly from said reservoir, said capillary path and said filling tube being formed into an integral unit; and means for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means actuated by said plunger for venting said reservoir when said plunger means is in the retracted position.

6

4. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material substantially filling said reservoir and defining a plurality of communicating passages of capillary dimensions; means defining a substantially straight capillary path extending forwardly from said reservoir; means defining a transverse capillary passageway connecting said path and said writing element; a substantially straight open-ended noncapillary filling tube extending forwardly from said reservoir, said capillary path and said filling tube being formed into an integral unit, said unit being mounted for longitudinal movement between a retracted writing position and an extended fluid filling position; and means for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means actuated by movement of said plunger for venting said reservoir when said plunger means is in the retracted position.

5. A fountain pen comprising a barrel, a writing element disposed forwardly of said barrel, a flexible reservoir within said barrel, flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions, a substantially straight rigid filling and feeding tube extending forwardly from said reservoir and defining a noncapillary path therethrough, means for reciprocating said tube between an extended filling position and a retracted feeding position, material extending substantially the length of said tube and filling a portion of the cross section thereof, said material defining a capillary path between said reservoir and the forward end of said filling tube, means defining a transverse capillary path between the forward end of said filling tube and said writing element, and means for partially collapsing said reservoir.

6. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions; a substantially straight rigid filling and feeding tube extending forwardly from said reservoir; means for reciprocating said tube between an extended filling position and a retracted feeding position, said means comprising means restraining said tube against rotation, means resiliently urging said tube to the extended position, a rotatable plunger cooperating with said barrel to define a sealed chamber, and threaded means connecting said tube and said plunger; material extending substantially the length of said tube and filling a portion of the cross section thereof, said material defining a capillary path between said reservoir and said writing element; means providing a seal between said plunger and said barrel, said plunger being reciprocable in said barrel; a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger is in the retracted position; and normally closed valve means venting said reservoir when said plunger is in the retracted position.

7. In a fountain pen, a barrel; a writing element disposed at the forward end of said barrel; a flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions therein; said plurality of capillary passages being in fluid communication with said writing element; compressive means comprising a telescoping cylinder mounted in said barrel for partially collapsing said flexible reservoir and said material, and vent

means to relieve the compression in said barrel when said fountain pen is conditioned for writing.

8. In a fountain pen; a barrel; a writing element disposed at the forward end of said barrel; a sealed flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions therein; said plurality of capillary passages being in fluid communication with said writing element; and means mounted in said barrel for forcefully filling said passages comprising compressive means for partially collapsing said flexible reservoir and said material, means in said barrel to relieve said compressive means to permit said flexible reservoir to expand and draw fluid therein, vent means actuatable between an open and a closed condition in said flexible reservoir, and common operating means for said compressive means, said relief means and said vent means whereby said capillary passages are vented when said compressive means has been relieved.

9. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions, said passages being in communication with said writing element; and means mounted in said barrel for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means operable by said plunger means for venting said reservoir when said plunger means is in the retracted position.

10. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions; means defining capillary passages extending forwardly from said reservoir and in fluid communication with said writing element, and

means in said barrel for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal when said plunger means is in the retracted position, and normally closed valve means actuated by said plunger means for venting said reservoir when said plunger means is in the retracted position.

11. A fountain pen comprising a barrel; a writing element disposed forwardly of said barrel; a sealed flexible reservoir within said barrel; flexible material completely filling at least the major forward portion of said reservoir and defining a plurality of communicating passages of capillary dimensions; means defining a substantially straight capillary path extending forwardly from said reservoir; means defining transverse capillary passageways connecting said path and said writing element; and means for forcefully filling said passages comprising plunger means cooperating with said barrel to define a sealed chamber and axially movable in said barrel between an extended and a retracted position, means providing a seal between said barrel and said plunger means, a portion of said plunger defining a recess spanning said seal and venting said barrel when said plunger means is in the retracted position, and normally closed valve means actuated by said plunger means for venting said reservoir when said plunger means is in the retracted position.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

35	Re. 23,683	Segre	July 7, 1953
	2,610,612	Martin	Sept. 16, 1952
	2,640,216	Gottlieb	June 2, 1953
	2,642,043	Miessner	June 16, 1953
	2,769,427	Martin	Nov. 6, 1956
40	2,811,947	Rigondaud	Nov. 5, 1957

##### FOREIGN PATENTS

	21,631	Great Britain	Oct. 13, 1908
	822,691	France	Sept. 27, 1937
45	133,105	Sweden	Sept. 25, 1951