PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: DERRICK JOHN SILVER

842,854

Date of filing Complete Specification: Sept. 19, 1956.

Application Date: July 1, 1955. *No. 19177/55.*

Complete Specification Published: July 27, 1960.

Index at acceptance:—Class 146(3), P11(E1 : G).
International Classification:—B43c.

COMPLETE SPECIFICATION

Improvements in or relating to Reservoir Writing Instruments

We, MENTMORE MANUFACTURING CO. LIMITED, a Company registered under the laws of Great Britain, of Platignum House, Tudor Grove, London, E.9, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in writing instruments and is particularly concerned with improvements in reservoir writing instruments of the kind (hereinafter referred to as being of the 'kind specified') wherein at least a part of the reservoir for the writing fluid is constituted by a flexible sac disposed within a housing and communicating with a writing point which extends externally of the housing and means is provided for deforming the sac to expel at least a part of the contents of the reservoir so that when the writing point is immersed in a supply of the writing fluid and the sac is allowed or caused to assume its undeformed configuration, writing fluid is drawn into the reservoir.

According to the present invention, in a reservoir writing instrument of the kind specified the means for deforming the sac comprising a liquid disposed in a fluid-tight manner within the housing and arranged to surround at least a part of the sac and means for applying pressure to the liquid to cause the latter to deform or collapse said part of the sac.

Preferably the pressure applying means is a piston disposed within the housing and spring means is conveniently provided to urge the piston in a direction to release the pressure applied to the liquid.

One example of a reservoir writing instrument embodying the invention will now be described with reference to the single figure of the accompanying drawing which is a sectional view of the instrument taken in a plane containing the axis of the instrument.

The reservoir writing instrument comprises an open-ended flexible sac 1 disposed with clearance within a substantially cylindrical housing 2 with its open end secured in a fluid-tight manner over the inner end of a hollow tube 3 which extends through one end wall 4 of the housing 2 as a close sliding fit. The thickness of this end wall 4 is greater than the thickness of the remainder of the housing 2 to provide a support for the tube 3 for a large part of its length. The inner end of the tube 3 is of a smaller diameter than the remainder thereof and the tube 3 is formed intermediate its length with an annular enlargement 5 adapted to engage the inner end of the end wall 4. A feed-bar 6 of normal construction extends into the tube 3 from the outer end thereof and a nib 7 is fitted between the feed-bar 6 and the internal surface of the tube 3 adjacent the outer end of the latter, the nib 7 and feed-bar 6 being a push-fit within the tube 3. A washer 8 of a suitable material, e.g. polythene, surrounds and is carried by the inner end of the tube 3 and is so dimensioned that it bears at its periphery against the internal surface 9 of the housing 2 in a fluid-tight manner. This internal surface 9 is substantially cylindrical for at least a part of its axial length so that when the tube 3 is caused to move axially into the housing carrying the washer 8 with it, the latter engages the internal surface 9 of the housing 2 in a fluid-tight manner throughout its stroke. A helical compression spring 10 is disposed around the sac 1 and bears at one end against a fixed abutment within the housing 2 and at its other end against the washer 8 (for against a stop rigidly secured to the washer 8 or to the tube 3) so that the tube 3 and the writing point are urged by the spring 10 away from the interior of the housing 2 to a writing position in which the annular enlargement 5 engages the inner end of the end wall 4 which limits the amount by which the tube 3 can extend from the housing 2. The fixed abutment in this example is provided by a plug 11 which

[*Price 3s. 6d.*]

is screwed in a fluid-tight manner into the end of the housing 2 remote from the end wall 4, although it will be appreciated that it may be provided in any suitable manner, *e.g.* by an annular collar which is a push fit in the housing 2 or by an annular shoulder formed integrally with the internal surface 9 of the housing 2. It will be further appreciated that the amount by which the tube 3 can extend from the housing 2 may be limited by the engagement of the washer 8 with the inner end of the end wall 4, in this case the annular enlargement 5 being omitted. The space 12 between the internal surface 9 of the housing 2, the external surface of sac 1 (when the latter is filled or undeformed) the plug 11 and the washer 8 is filled with a suitable liquid which is inert to the materials of the housing 2, the sac 1 and the spring 10. A suitable liquid is 5% sodium benzoate solution. It will be understood that the part of the housing defining the space containing the liquid is constructed to be fluid-tight and that the washer 8 seals off that end of the housing through which the tube 3 passes from the part of the housing containing the liquid. It will be appreciated that the plug 11 provides access to the interior of the housing 2 for the purpose of assembly and repair of the instrument and also enables the space for the liquid to be completely filled with the liquid before the plug 11 is screwed into position to close this space. It will be further appreciated that the plug 11 may be omitted in which case the end of the housing represented thereby is made integrally with the housing and the latter may be made in two parts which are joined together end to end to provide a fluid-tight joint intermediate the length of the housing whereby access may be had to the interior thereof.

When it is desired to fill the reservoir the writing point is inserted in a volume of ink so that it bears against a surface, *e.g.* the floor of a container for the ink, and the housing 2 is urged axially downwards towards the ink to produce relative axial motion between the housing 2 and the washer 8 carried by the tube 3 to reduce the volume of the space 12 occupied by the liquid and the sac 1 (the fit between the feed-bar 6 and the nib 7 and the tube 3 being sufficiently close to prevent motion of the nib 7 and feed-bar 6 relative to the tube 3 under such conditions). This relative motion applies a pressure to the liquid within the space 12 which causes the latter to deform and collapse the sac 1 and expel the contents of the reservoir therefrom. The pressure applied to the housing 2 is then removed and the housing 2 moves relative to the tube 3 under the influence of the spring 10 until the writing point assumes the writing position relative to the housing 2, thus moving the washer 8 relative to the housing 2 in the sense to increase the volume of the space 12 occupied by the liquid and the sac 1. This causes the sac 1 to expand from the collapsed or deformed condition to its normal configuration and so, due to the sub-atmospheric pressure then prevailing within the sac 1, causes ink to flow from the volume of ink within which the writing point is immersed to the interior of the sac. The instrument then has a volume of ink stored in the sac and is ready for use.

It will be appreciated that a writing instrument constructed as described can be filled with one hand only.

WHAT WE CLAIM IS:—

1. A reservoir writing instrument of the kind specified wherein the means for deforming the sac comprises a liquid disposed in a fluid-tight manner within the housing and arranged to surround at least a part of the sac and means for applying pressure to the liquid to cause the latter to deform or collapse said part of the sac.

2. A writing instrument according to claim 1 wherein the pressure applying means is a piston disposed within the housing.

3. A writing instrument according to claim 2 wherein the piston comprises a washer which bears at its periphery against the internal surface of the housing in a substantially fluid-tight manner and which is attached to the inner end of a hollow tube which extends as a close sliding fit through one end wall of the housing, a nib and a feed-bar being disposed as a push-fit within the outer end of the tube, and the open end of the sac being secured in a fluid-tight manner over the inner end of the tube.

4. A writing instrument according to claim 2 or 3 wherein spring means is provided to urge the piston in a direction to release the pressure applied to the liquid.

5. A writing instrument according to claims 3 and 4 wherein the spring means is a helical compression spring, disposed around the sac and bearing at one end against an abutment and at the other end against a stop attached to the tube.

6. A writing instrument according to claim 5 wherein the one end of the spring bears against the washer.

7. A writing instrument according to claims 5 or 6 wherein the other end of the spring bears against a plug screwed into the end of the housing remote from said one end wall.

8. A writing instrument according to claim 7 wherein the liquid is disposed within a space bounded by the internal surface of the housing, the external surface of the sac, the washer and the plug.

9. A writing instrument according to claims 3 and 4 or any one of claims 5 to 8 wherein a stop is provided on the tube adapted to engage a part fixed relative to the housing to limit the movement of the tube relative to the housing under the influence of the spring.

10. A writing instrument according to

claim 9 wherein the stop is an annular enlargement formed on the tube.

11. A writing instrument according to claim 9 or 10 wherein the part fixed relative to the housing is the one end wall thereof.

12. A writing instrument according to any one of claims 2 to 11 wherein the liquid is a 5% sodium benzoate solution.

13. A reservoir writing instrument of the kind specified constructed, arranged and adapted to operate substantially as herein described with reference to the single figure of the accompanying drawing.

For the Applicants,
RAWORTH, MOSS & COOK,
Chartered Patent Agents,
75, Victoria Street, London, S.W.1.

PROVISIONAL SPECIFICATION

Improvements in or relating to Reservoir Writing Instruments

We, MENTMORE MANUFACTURING CO. LIMITED, a Company registered under the laws of Great Britain, of Platignum House, Tudor Grove, London, E.9, do hereby declare this invention to be described in the following statement:—

This invention relates to improvements in writing instruments and is particulrly concerned with improvements in reservoir writing instruments of the kind (hereinafter referred to as being of the 'kind specified') wherein at least a part of the reservoir for the writing fluid is constituted by a flexible sac disposed within a housing and communicating with a writing point which extends externally of the housing and means is provided for deforming the sac to expel at least a part of the contents of the reservoir so that when the writing point is immersed in a supply of the writing fluid and the sac is allowed or caused to assume its undeformed configuration writing fluid is drawn into the reservoir.

According to the present invention, in a reservoir writing instrument of the kind specified the means for deforming the sac comprises a fluid medium disposed in a fluid-tight manner within the housing and arranged to surround at least a part of the sac and means for applying pressure to the fluid medium to cause the latter to deform or collapse said part of the sac.

Preferably the fluid medium is a liquid and the pressure applying means is a piston disposed within the housing and spring means is conveniently provided to urge the piston in a direction to release the pressure applied to the medium.

One embodiment of the invention will now be described by way of example.

A reservoir writing instrument comprises an open-ended flexible sac disposed with clearance within a substantially cylindrical housing with its open end secured in a fluid-tight manner over the inner end of a hollow tube which extends through one end wall of the housing as a close sliding fit, the thickness of this end wall being greater than that of the remainder of the housing to support the tube for a large part of its length. A feed-bar of normal construction extends into this tube from the outer end thereof and a nib is fitted between the feed-bar and the internal surface of the tube adjacent the outer end of the latter, the nib and feed-bar being a push-fit within the tube. A washer of suitable material, e.g. polythene surrounds and is carried by the inner end of the tube and is so dimensioned that it bears at its periphery against the internal surface of the housing in a fluid-tight manner. This internal surface is substantially cylindrical for at least a part of its axial length so that when the tube is caused to move axially into the housing carrying the washer with it, the latter engages the internal surface of the housing in a fluid-tight manner throughout its stroke. A helical compression spring is disposed around the sac and bears at one end against an abutment formed on the internal surface of the housing and at its other end against the washer or against a stop rigidly secured to the washer or to the tube so that the tube and the writing point are urged by the spring away from the interior of the housing to a writing position which is defined either by stop means provided on the tube to engage the housing and limit the amount by which the tube can extend from the housing or by engagement of the washer with the inner surface of that end of the housing through which the tube projects. The space between the internal surface of the housing, the external surface of sac (when the latter is filled or undeformed) and the washer is filled with a suitable liquid which is inert to the material of the housing, the sac and the spring. A suitable liquid is 5% sodium benzoate solution. It will be appreciated that the part of the housing defining the space containing the liquid is constructed to be fluid-tight and that the washer seals off that end of the housing through which the tube passes from the part of the housing containing the liquid. For the purpose of manufacture and repair the housing may be constructed in two parts which are joined together in a fluid-tight manner. One of the parts may comprise the end of the housing remote from the writing point so that when the instrument has been assembled the liquid may be poured into the remainder of the housing and this end may then be screwed into position in a fluid-tight manner with or without the interposition of a sealing washer to complete the assembly.

When it is desired to fill the reservoir the

writing point is inserted in a volume of ink so that it bears against a surface, e.g. the floor of a container for the ink, and the housing is urged axially downwards towards the ink to produce relative axial motion between the housing and the washer carried by the tube to reduce the volume of the space occupied by the liquid and the sac (the fit between the feed-bar and the nib and the tube being sufficiently close to prevent motion of the nib and feed-bar relative to the tube under such conditions). This relative motion applies a pressure to the liquid which causes the latter to deform and collapse the sac and expel the contents of the reservoir therefrom. The pressure applied to the housing is then removed and the housing moves relative to the tube under the influence of the spring until the writing point assumes the writing position relative to the housing, thus causing the washer to move relative to the housing in the sense to increase the volume of the space occupied by the liquid and the sac. This causes the sac to expand from the collapsed or deformed condition to its normal configuration and so due to the sub-atmospheric pressure then prevailing within the sac, causes ink to flow from the volume of ink within which the writing point is immersed to the interior of the sac. The instrument then has a volume of ink stored in the sac and is ready for use.

It will be appreciated that a writing instrument constructed as described can be filled with one hand only.

For the Applicants,
RAWORTH, MOSS & COOK,
75, Victoria Street, London, S.W.1,
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1960.
Published by The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

842,854 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.