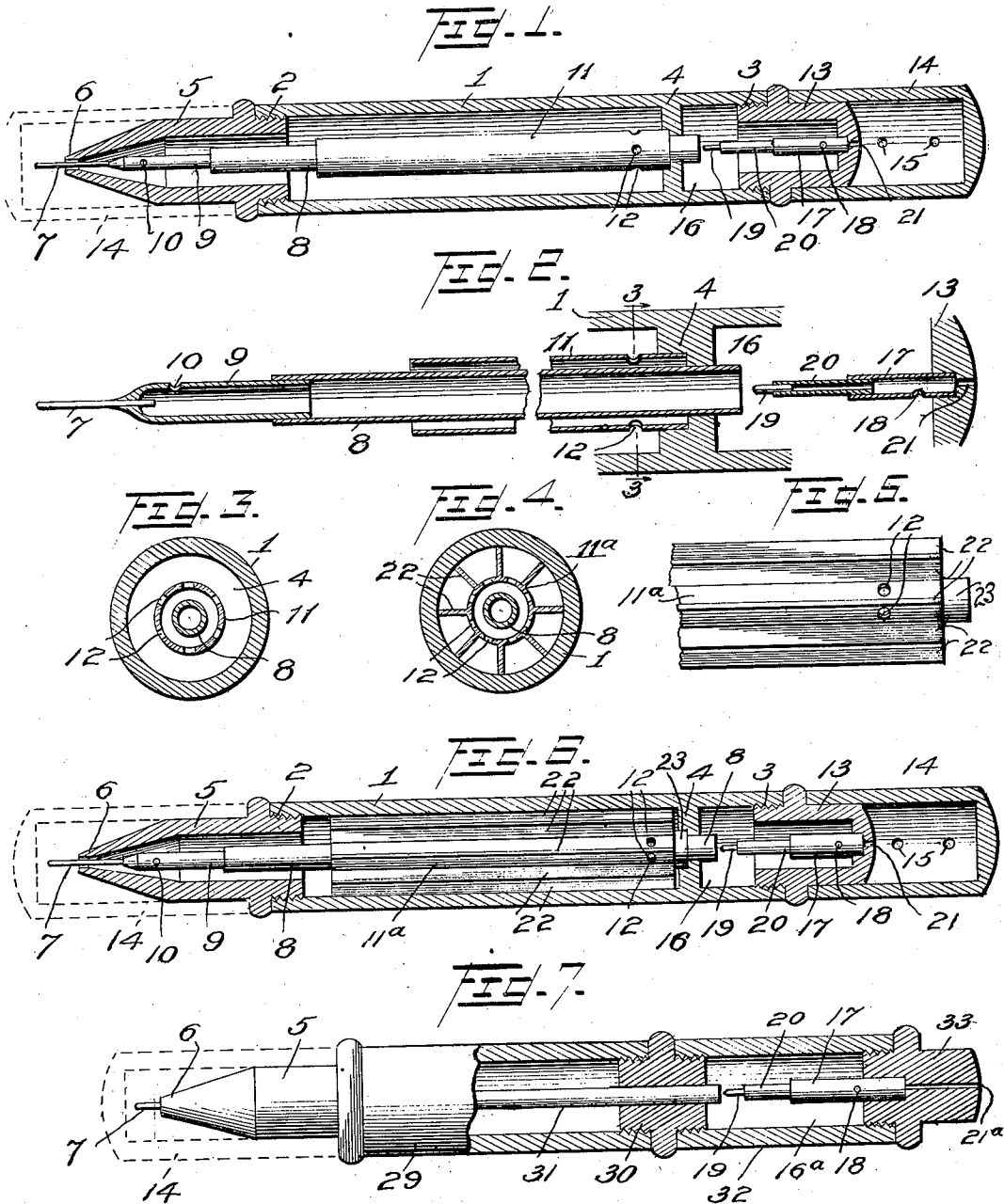


C. J. APP.
 WRITING IMPLEMENT.
 APPLICATION FILED APR. 14, 1919.

1,352,340.

Patented Sept. 7, 1920.



WITNESSES

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WRITING IMPLEMENT.

1,352,340.

Specification of Letters Patent.

Patented Sept. 7, 1920.

Application filed April 14, 1919. Serial No. 239,886.

To all whom it may concern:

Be it known that I, CASPER J. APP, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Writing Implement, of which the following is a specification.

This invention has reference to writing implements, and has more particular reference to the writing implements known as ink pencils or stylographic pens, but is useful in connection with fountain pens.

The object of the invention is to nullify the effects of heat upon the air in the reservoir of the writing implement, such heat coming from the hand of the user, or from the body of the user when the writing implement is carried in the pocket. Such heat acts through the air in the ink reservoir preventing flow of the ink, and when the ink supply is low causes flooding at the writing point. The heating of the air is also the cause of sweating on and around the nib, and ordinarily fluid-tight joints are made leaky by the expansion of the air in the reservoir.

The invention provides means for the automatic escape of confined air so that choking and leakage due to the effects of heat in expanding the air do not occur.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a longitudinal diametric section, with some parts in elevation, of a writing implement of the ink-pencil type.

Fig. 2 is a longitudinal diametric section on a larger scale than Fig. 1, showing some parts in section which appear in elevation in Fig. 1 and omitting some parts appearing in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section similar to Fig. 3 but showing a modified form of the structure. 55

Fig. 5 is a longitudinal elevation of a portion of the structure shown in Fig. 4.

Fig. 6 is a longitudinal section of a stylographic pen provided with the attachment illustrated in Figs. 4 and 5. 60

Fig. 7 is a view partly in elevation and partly in longitudinal section of an ink pencil of existing type but modified by the application of the invention thereto.

In the present non-self-filling types of pens and ink pencils the process of filling the reservoir usually confines air in the permanently closed end of the reservoir under the ink. When such air escapes it carries with it a film of ink that forms a bubble at the end nearest the pen or writing point completely preventing the flow of ink to the writing point. The air when it becomes warm, either by the hand in writing or by the body while the pen is in the pocket, expands and forces a film of ink out at the point. This is commonly termed sweating. Or the air forces its way out at the joints carrying with it a film of ink which not only soils the hands but the clothing as well. Frequently the expanding air, while the implement is being used for writing, accelerates the flow of ink, causing flooding at the point and blotting the work. 80

In the structure shown in Figs. 1, 2 and 3, there is shown a barrel or handle 1 interiorly threaded at the front and rear ends 2 and 3 respectively, and between these ends and relatively close to the end 3 the barrel has an internal diametric diaphragm 4. Threaded into the end 2 is a nozzle 5 which may be of customary construction and hence needs no special description. The point of the nozzle has a longitudinal passage 6 for a writing wire 7, the showing of Fig. 1 being that of a writing implement known as an ink pencil or stylographic pen. 85

Carried by and projecting through the diaphragm 4 is a tube 8 extending forwardly into the nozzle 5, and carried by the forward end of the tube is the rear end of a somewhat smaller tube 9 carrying the wire 7 at its forward end. The tube 9 near the wire 7 has a hole 10 through its wall. It is evident that the two tubes 8 and 9, which may be combined in one-piece constitute a hollow 105

carrier for the writing point 7 and serve to conduct surplus ink and bubbles away from the point, as will be described.

Carried by the diaphragm 4 in surrounding relation to the tube 8 is another tube 11 of less length than the tube 8 and open at the front end. Near the diaphragm 4 the tube 11 is pierced by a suitable number of holes 12.

The threaded end 3 of the barrel 1 is provided with a hollow plug 13 and a cap 14 is provided to slip on the plug 13, which can be also fitted to the exterior of the nozzle 5. The cap 14 is provided with one or more air holes 15, as is customary, so that the cap may be placed on or removed from the pen without producing air pockets or suction. The plug 13 and diaphragm 4 provide, between them, within the barrel 1, an overflow chamber or supplemental reservoir 16. Carried by and within the plug 13 is a short tube 17 with a perforation 18 near the rear end of the plug where the tube is supported and that end of the tube 17 remote from its support carries a short wire extension 19 through the intermediary of a flexible member 20. The tube 17 communicates with the exterior of the plug 13 by way of a small passage 21 in the plug.

The wire 19 carried by the connecting member 20 is placed in close relation to the rear open end of the tube 8. The purpose of the wire is to break any bubbles or films of ink which may occur at the rear open end of the tube 8, and consequently may be made in any form, or of any material, by means of which such purpose may be accomplished. A vibration of the wire 19 is set up by the movements of the pen in writing, all of such movements being transmitted to the wire 19 through the intermediary of the flexible member 20. Thus any film or bubble tending to form at the rear end of the tube 8 is instantaneously broken.

Instead of providing a simple tube 11 with a series of perforations near the rear end close to the diaphragm 4 a tube 11^a may be used, this tube being similar to the tube 11 except that between the perforations 12 it has a series of outstanding fins 22 defining channels each terminating near the rear end of the tube 11^a. The tube 11^a with its fins 22 may be made of sheet metal stamped into shape or may be made of any suitable material. However, Figs. 5 and 6 show the end 25 of the tube 11^a is fixed in the diaphragm 4. When any of the parts are made of metal such metal should be of an ink-proof type.

In Fig. 7 there is shown a means whereby an ink pencil 29 of known construction is provided with the invention, the construction of the invention being similar to that of Fig. 1. A double-ended plug 30 is

the pen 29 and this plug carries a tube 31 similar to the tube 8 of Figs. 1 and 2, the tube 31 extending entirely through the plug 30. Applied to that end of the plug 30 remote from the barrel of the ink pencil 29 is a sleeve 32 constituting a prolongation of the barrel and also providing an air reservoir 16^a. Another plug 33 is screwed into that end of the sleeve 32 remote from the plug 30 and carries a film-breaking pin 19 mounted in a flexible member 20 in turn carried by a tube 17 having a perforation 18 therein. The tube 17 is mounted in the plug 33, which latter is provided with an air passage 21^a leading to the atmosphere.

When a pen such as shown in Fig. 1 is filled the nozzle 5 is removed and ink is poured into the barrel, but instead of imprisoning an air bubble at the inner end of the ink reservoir, as frequently happens in pens as ordinarily constructed, air finds free course through the perforations 12 into the tube 11 and out of the forward end thereof, thus avoiding any possibility of the formation of any air bubbles in the pen barrel. In the non-self-filling types of pens and ink pencils the confined air, at the closed end of the barrel finds its way to the nozzle as a bubble and completely prevents flow of ink to the pen point. When confined air becomes warm from the hand of the user, or from the body of the carrier while the pen is in the pocket, a film of ink is often forced out of the point, this being termed sweating, or otherwise exudes from the pen, whereby either soiling of the clothing or of the hands results. Should expansion occur because of the heat of the body when the pen is being carried or because of the heat of the hand in the act of writing, ink will be forced into the tube 8 through the perforation 10 and ultimately find its way into the supplemental reservoir or overflow chamber 16, air in the latter escaping to the atmosphere through the perforation 18 and tube 17. Should a bubble be formed at the rear open end of the tube 8 it is met by the point or projection 19 and broken, the ink being deposited on the walls of the overflow chamber 16 and so fails to find its way out of the pen and consequently neither sweating nor leaking happens. Furthermore, expansion of the air under the heat of the hand or of the body produces no pressure within the pen barrel and there is no acceleration of the flow of ink causing flooding at the writing point.

The tube 11 is slightly larger than the tube 8 and is shorter, and, preferably, is made of ink-resisting metal. Besides preventing trapping of air in filling, as already referred to, the tube provides a circulation within the ink reservoir as the ink consumed provides more space for air. This air would expand when heated by the hand, resulting in an

accelerated flow of ink to the point, but the tube 11 also provides room for the expansion of the air and the space between the tubes 8 and 11 being much cooler than the space in the ink reservoir adjacent to the walls of the barrel, the air will there contract and prevent the acceleration of ink flowing to the point. Since the tube 11 has no mechanical work to perform it may be made of very thin material and hence will not displace much ink, and being simple in construction can be economically manufactured.

Of course the tube construction shown in Figs. 4 and 5 or other construction of like function may be substituted for the tube 11, with the advantage of providing many channels for the flow of ink and air.

The structure of Figs. 4 and 5 has advantages over the tube 11 because it prevents the confined air as a whole from becoming heated by the hand or body and the reservoir can be filled without regard to the angle at which it is held.

While the bubble breaking device, shown in Figs. 1, 2 and 7, appears as a three-section structure, such construction is not obligatory for any arrangement by which the bubbles may be broken, as quickly as formed, will answer.

What is claimed is:

1. In a writing implement of the non-self-filling type, an ink reservoir closed at one end, and means for conducting air bubbles formed in the closed end during the filling operation away from that end and toward the filling end, said means being rigidly supported by the closed end of the reservoir.

2. A writing implement comprising an ink reservoir, a writing device at one end of the reservoir, a diaphragm closing the other end, and a tube forming an air duct rigidly connected to the diaphragm and extending from the rear toward the front of the reservoir and open at the front end to the reservoir, the rear end being provided with a series of perforations arranged in advance of the connection of the tube to the diaphragm, whereby that end also is open to the reservoir.

3. A writing implement comprising an ink reservoir, a writing device at one end of the reservoir, a diaphragm closing the other end, and a tube forming an air duct connected to the diaphragm and extending from the rear toward the front of the reservoir and open at the front end to the reservoir, the rear end being provided with perforations arranged in advance of the connection of the tube to the diaphragm, and the outer face of the tube having channels formed thereon.

4. In a writing implement of the non-self-filling type, an ink reservoir closed at one end, a tube for conducting air bubbles formed in the closed end during the filling

operation away from that end, toward the filling end, said tube being rigidly supported at the closed end of the reservoir and being closed by its support, said tube being spaced from the filling end and from the reservoir wall, perforations provided in the tube near the rigidly supported end, the tube being open at the filling end, whereby when the filling implement is introduced into the reservoir to fill the same the ink passes down into the space between the bubble-conducting tube and the reservoir walls and then moves into said tube.

5. A writing implement comprising an ink reservoir, a hollow carrier for a writing point, said carrier extending lengthwise of the reservoir and having an opening at the forward end into the reservoir, and said carrier extending through the rear wall of the reservoir and there open, a supplemental reservoir at the rear of the ink reservoir receiving the open end of the carrier, and means for conducting bubbles formed in the rear end of the reservoir away from said end, said means surrounding and being spaced away from said carrier.

6. A writing implement comprising an ink reservoir, a hollow carrier for a writing point, said carrier extending lengthwise of the reservoir and having an opening at the forward end into the reservoir, and said carrier extending through the rear wall of the reservoir and there open, and a supplemental reservoir at the rear of the ink reservoir receiving the open end of the carrier, the ink reservoir also containing a tube surrounding the carrier and supported by the said rear wall and opening at both ends into the ink reservoir.

7. A writing implement comprising a hollow body member forming a reservoir, said body member having a nozzle at one end, forming the front end of the writing implement, and a wall at the rear end defining the corresponding end of the reservoir, said body having an extension at the rear end and a closure therefor defining a supplemental reservoir, a tube extending lengthwise of the reservoir and through the wall at the rear of the reservoir into the supplemental reservoir and constituting at the front end a carrier for a writing device extending through the nozzle into writing position, said tube opening into the reservoir adjacent to the writing device and at its rear end opening into the supplemental reservoir, and another tube in the main reservoir and carried by the rear wall of the reservoir in surrounding relation to the first-named tube, said second-named tube being freely open at the free end adjacent to the nozzle and having perforations at the rear end within the main reservoir.

8. A writing implement comprising a hollow body member forming a reservoir, said

body member having a nozzle at one end forming the front of the writing implement and a wall at the rear end defining the corresponding end of the reservoir, said body
 5 having an extension at the rear end and a closure therefor defining a supplemental reservoir, a tube extending lengthwise of the reservoir and through the wall at the rear of the reservoir into the supplemental reservoir
 10 and constituting at the front end a carrier for a writing device extending through the nozzle into writing position, said tube opening into the reservoir adjacent to the writing device and at its rear end opening into the sup-
 15 plemental reservoir, and another tube in the main reservoir and carried by the rear wall of the reservoir in surrounding relation to the first-named tube, said second named tube being freely open at the front end adjacent to
 20 the nozzle and having perforations at the rear end within the main reservoir, and said second named tube having channels formed on its surface.

9. A writing implement comprising an
 25 ink reservoir, a tube longitudinally disposed in the reservoir and opening through the rear wall of the reservoir, said implement also having a supplemental reservoir to the rear of the main reservoir and into which
 30 the tube opens, and a member in the second reservoir terminating short of the rear open end of the tube for causing the breaking of films or bubbles formed at the rear end of the tube within the supplemental reservoir.

35 10. A writing implement comprising a body member forming a reservoir with a nozzle at the forward end and a wall at the rear end, a tube extending lengthwise of the reservoir and through the rear wall
 40 thereof and opening into the reservoir at the nozzle end of the tube and there carrying a writing device extending to the exterior of the nozzle, a supplemental reservoir carried by the body of the writing im-
 45 plement at the rear of the main reservoir, and another tube in the supplemental reservoir opening into the latter and to the atmosphere, said last-named tube having a
 50 member extending toward the rear open end of the first-named tube but stopping short thereof to cause the rupturing of a film or bubble at the rear open end of the first-named tube within the supplemental reservoir.

55 11. A writing implement comprising a body member forming a reservoir with a nozzle at the forward end and a wall at the rear end, a tube extending lengthwise of the reservoir and through the rear wall
 60 thereof and opening into the reservoir at the nozzle end of the tube and there carrying a writing device extending to the exterior of the nozzle, a supplemental reservoir carried by the body of the writing imple-
 65 ment at the rear of the main reservoir, said

tube opening into said supplemental reservoir, and another tube in the supplemental reservoir opening into the latter and to the atmosphere, said last-named tube having a
 70 member extending toward the supplemental reservoir opening of the first-named tube but stopping short thereof to cause the rupturing of a film or bubble at said opening of the first-named tube within the supple-
 75 mental reservoir, said extension including a flexible portion to permit agitation of the film-breaking device.

12. A writing implement comprising a tubular reservoir body member with a rear-
 80 ward extension thereof, a division wall between the body member and rearward extension forming a supplemental reservoir, a nozzle for the front end of the reservoir, a plug for the rear end of the supplemental
 85 reservoir, a tubular member mounted in and extending through the division wall and at the forward end entering the nozzle and there carrying a writing point projecting from the front of the nozzle, said tube ad-
 90 jacent to the writing point having a passage therethrough opening into the main reservoir and also having a passage near its rear end opening into said supplemental reservoir, and another tube carried by the
 95 rear end of the plug and communicating through said rear plug end with the atmosphere and through its side passage with the supplemental reservoir, said last-named tube having a prolongation toward the rear
 100 end of the first-named tube but stopping short thereof and there provided with an agitable extremity in position to rupture a film or bubble formed at the rear open end of the first-named tube.

13. A writing implement comprising an
 105 ink reservoir, a writing device attached to the reservoir, a tube within the reservoir and extending from the writing device to the rear end of the reservoir, and a bubble-breaking device attached to the rear of the
 110 implement and stopping short of the rear end of said tube, said bubble breaking device being vibrated by the movements of the pen in writing.

14. A writing implement comprising an
 115 ink reservoir, a writing device attached to the reservoir, a tube within the reservoir and extending from the writing device beyond the rear end of the reservoir, a sup-
 120 plemental reservoir at the rear end of the ink reservoir and into which the tube opens, and a bubble-breaking device located within the supplemental reservoir and adapted to swing freely at the rear end of the tube, said bubble breaking device being set in
 125 motion by the movements of the pen in writing.

15. A writing implement comprising an
 130 ink reservoir, a writing device attached to the reservoir, a tube within the reservoir

and extending from the front to the rear end thereof, and a bubble-breaking device including a wire and an elastic member holding the wire in position to swing freely near the rear end of the tube.

radially of the tube from the outer surface thereof, said tube being open to the reservoir near its supported end and also at its opposite end.

In testimony that I claim the foregoing as my own I have hereto affixed my signature.

CASPER J. APP.

Witnesses:

N. M. TRENT,
B. F. COUSINS.

16. A writing implement comprising an ink reservoir, a writing device at one end of the reservoir, a diaphragm closing the other end of the reservoir, a tube supported by the diaphragm within the reservoir, fins running longitudinally with and extending