June 22, 1948. I. CHESLER 2,444,004

WRITING IMPLEMENT

Filed Jan. 25, 1945

Fig. 1.

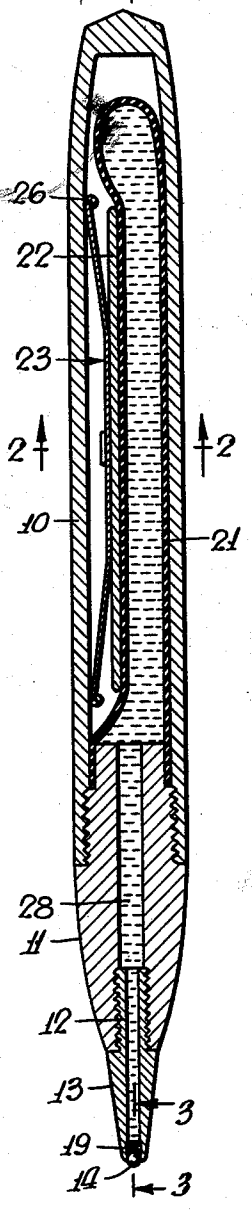


Fig. 2.

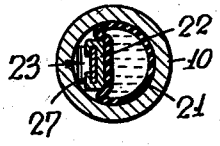


Fig. 4.

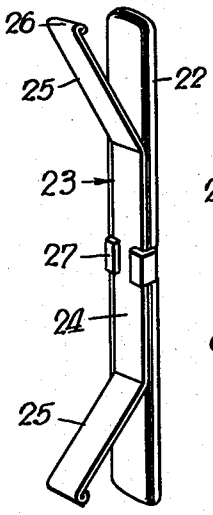


Fig. 5.

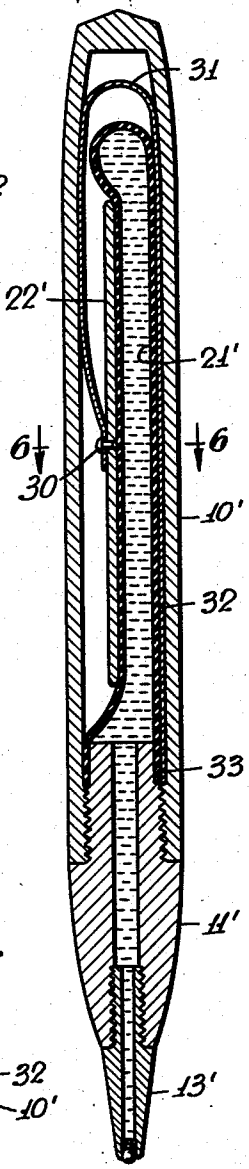


Fig. 7.

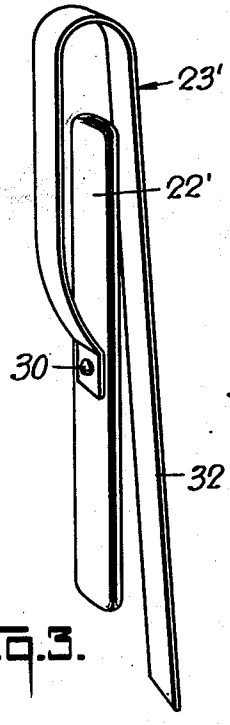


Fig. 6.

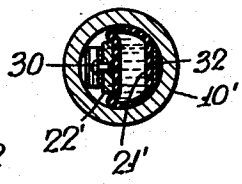
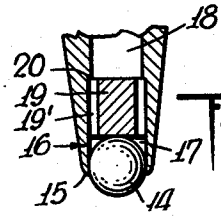


Fig. 3.



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Patented June 22, 1948 2,444,004

UNITED STATES PATENT OFFICE

2,444,004

WRITING IMPLEMENT

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Application January 25, 1945, Serial No. 574,498

7 Claims. (Cl. 120—42.4)

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The present invention relates generically to dispensers for applying minute quantities of liquid or paste, and in the specific and important application shown in the drawings is concerned with writing implements, more particularly with what may be correctly designated ink pencils or ball point writing pens.

It is among the objects of the invention to provide a liquid or paste dispenser such as a writing implement, of simple relatively inexpensive construction, which is substantially proof against flow stoppage on the one hand, or excessive flow, flooding or waste, on the other, regardless of the temperature, humidity or atmospheric pressure conditions under which the implement is being used, which in the writing implement embodiment requires substantially no service or replacement, but inherently includes a sufficient supply of ink to last for years, even to outlast the implement itself, which makes a line that is substantially smudge-proof and requires no blotting, and which will write with substantially equal effectiveness, whether the writing surface is upright, or horizontal, above or below the writer's hand.

Another object is to provide a writing implement of the above type, in which the pressure exerted against the writing point may be set or adjusted to correspond with the character of ink and conditions of use of the implement.

A feature of the invention is a writing implement or other applicator of the type referred to, with a ball point seated and confined in a rigid walled ball socket at the forward end of a writing tip that is mounted upon a rigid casing or barrel. The implement includes a reservoir which comprises a flexible wall, preferably the wall of a flexible sac encompassed by the barrel. The body of ink or other incompressible liquid substantially completely fills the reservoir without voids, that is it fills the entire cavity from one face of the sac wall to the ball point. Sustained pressure is exerted against the sac wall to cause said wall to become displaced in direction to diminish the volumetric capacity, preferably the cross sectional area of the reservoir as ink or other liquid is dispensed at the ball point, thereby to maintain the reservoir wall at all times in intimate engagement with the entire surface of the ink or other liquid body remaining in the device and accordingly preventing the formation of voids in the reservoir.

The sustained pressure against the sac is preferably exerted by an agency confined within the barrel, desirably by a mechanical pressure device. Preferably spring pressure serves for the

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purpose, exerted by a presser unit which applies sufficient pressure to overcome the resistance of a sac of conventional type that is distended when empty and to press the column of ink forward, affirmatively to urge the ball point against its seat. The presser unit is confined within the barrel and comprises a resilient element, preferably a bowed leaf spring element and an associated reaction element, both of said elements extending longitudinally, one preferably engaging the barrel and the other the sac.

In the accompanying drawings, in which are shown one or more of various possible embodiments of the several features of the invention,

Fig. 1 is a view in longitudinal cross-section of one embodiment of the invention,

Fig. 2 is a view thereof in transverse cross-section on line 2—2 of Fig. 1,

Fig. 3 is a view in longitudinal cross-section on a larger scale taken on line 3—3 of Fig. 1,

Fig. 4 is a perspective view of the presser bar assembly,

Fig. 5 is a view similar to Fig. 1 of an alternative embodiment,

Fig. 6 is a view in transverse cross-section, taken on line 6—6 of Fig. 5, and

Fig. 7 is a perspective view showing the embodiment of presser assembly shown in Fig. 5.

Referring now to the drawings, there is shown an ink pencil embodiment of the invention. The rigid casing or barrel 10 is of familiar one-piece construction, having a closed rear end and an open forward end. Upon said forward end is threaded thereon the section 11 into the forward end of which is threaded at 12 the writing tip 13 which has a rigid walled socket for a movable writing point, preferably in the form of a ball 14 maintained in place by the inturned lip 15 at the forward end of the tip. The ball is lodged in a cage 16 in the tip defining an annular cavity 17 about the inner hemisphere of said ball to which ink passes through axial bore or channel 18 in the tip. The bottom of the cage 16 is formed by the end of a fluted rod 19 resting on a narrow shoulder 20 defined by the border between the cage 16 and the bore 18, the flutings 19' which extend inward well beyond shoulder 20 affording ready egress of the ink from the bore 18 to the annular cavity 17. Thus the ball is supported wholly by rigid walls of the socket.

Mounted and securely affixed upon the inner end of the section 13 is a tubular sac 21 normally distended to open position and of more or less conventional type.

The sac and the section are charged with ink

which may be of any desired viscosity depending upon requirements from a free flowing ink to a thick paste. The ink must carry substantially no entrapped air. To this end a filling tube (not shown) is simply introduced into the point end of the section (devoid of its ball-carrying tip) and as the ink is admitted through said tube into the sac, the tube is gradually withdrawn, the ink as it rises in the sac, thereby expelling the air upward through the upstanding section 11.

The presser unit is confined within the barrel and is stressed so as to react against the sac wall of the reservoir in direction substantially at right angles to the axis thereof, such as to reduce the ink confining cross sectional area thereof. The presser unit may comprise a resilient element, preferably a bowed leaf spring element and an associated reaction element, both of said elements extending longitudinally, one preferably engaging the barrel and the other the sac. With this arrangement, the pressure exerted by the presser unit is substantially as great when the sac is nearly empty as when it is full, and is therefore substantially uniform. In one embodiment, the presser unit, best shown in Figs. 1, 2 and 4, may comprise a reaction element consisting of straight rigid bar 22 of width but little less than the diameter of the sac and of length nearly equal to that of the sac, which has affixed to the middle thereof a bowed leaf spring 23, the center section 24 of which rests against the bar and the end sections 25 of which extend obliquely outward and are rounded at their extremities 26. Inturned lateral tongues 27 at the middle of the bar, embracing the edges of the spring maintain the parts assembled.

After first applying the tip 13, the presser bar and spring assembly 22—23 is now introduced into the barrel together with the ink-filled sac 21 and the section 11 is screwed home upon the barrel the ball valve 14 in the tip preventing the forcing out of ink from the implement under the pressure of the completely collapsed spring 23. The spring urged presser bar 22 exerts a sustained pressure upon the wall of the sac in the assembly, which is transmitted through the body of ink in the sac and through the bore 28 in the section to the tip, thereby to maintain the movable ball writing point 14 seated against the inturned lip 15. The body of ink has no voids, whether of air, gas or empty space and thus presents an incompressible column of liquid which reliably transmits the pressure of the presser unit to the ball.

In the writing operation, the ball picks up ink from the annular cavity 17 in amount adequate to make a thin non-smudging line, without the need for blotting. As the ink is thus slowly used, the sustained resilient pressure exerted against the sac by the spring-urged presser bar 22 causes ink to feed forward sufficiently, constantly to maintain the annular cavity 17 filled with ink, but no leak occurs since that pressure always maintains the ball 14 against the seating lip 15. When the sac has been emptied after long use, the implement would be returned to the factory or service station for refilling.

It will of course be obvious that the pressure exerted upon the presser bar may be originally adjusted, depending upon the strength or setting of the spring 23 used. Thus, for the use of a very viscous ink, higher spring pressure might be used than for a more fluid ink.

The embodiment of Figs. 5, 6 and 7 is generally similar to that described (except for the construction of the resilient presser bar assembly), and its mode of operation is the same as that above set forth. The bar 22' is similar to that of Fig. 1, but the spring 23' secured as by rivet 30 at one end to the middle of the presser bar extends rearward in a reverse turn as at 31 about the inner extremity of the sac 21' and thence longitudinally therealong at 32. Thus the ink filled sac 21' with the presser bar assembly associated therewith and the spring thereof embracing the length of the sac, may be introduced into the barrel, so that the long free arm 32 of the spring extends longitudinally along the inner wall of the barrel 10' and the inner end of the section 11' preferably clamps said free arm against the wall of the barrel as shown at 33.

This embodiment, like that of Figs. 1, 2 and 3, admits of adjustment or setting of the sustained pressure upon the ink by changing the curvature 31 at the reverse turn of the leaf spring 23'.

Both embodiments of the implement will write on a vertical surface or on a horizontal surface, regardless whether the surface be below or above the hand. The propulsion, depending upon spring pressure, the flow of ink does not vary with atmospheric pressure and there is no flooding under subatmospheric pressures such for instance as are encountered in an airplane.

While the invention is by no means limited to any particular use, it finds a particularly advantageous field of application as a pocket ink pencil or ball point writing pen, which will unfailingly make an ink line that is smudge-proof and requires no blotter. It can be used in lieu of the familiar indelible or copying pencil since it makes an ink line and its point applies sufficient pressure to make excellent carbon copies. It is also very useful for check signatures.

The teachings of the present invention may be advantageously applied by way of example as a leak proof dispenser, combined with an applicator for cosmetics, such as lip rouge, mascara and perfume. Such cosmetics, preferably in viscous or pasty form, would be used within the cartridge in place of the ink in the implement above described, and the ball or other applicator point would of course be of much larger diameter for ease of application without irritation to the delicate skin of the lips. The difficulty of making a lip stick soft enough for ready application, and yet solid enough not to melt in warm weather, the need for pointing the stick and for providing a propel and repel case would all be obviated by the present invention.

The teachings of the present invention when a suitably large point is used, are also applicable to paste and mucilage dispensers. The invention has the further advantage in such application, that the body of paste or mucilage is not exposed to the air, and so does not harden or form an obstructing film on the contents of the dispenser as is inherently the case with conventional squeegee and other rubber mouth mucilage tubes that operate on the principle of admitting air into the system to help feed out the paste.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent of the United States is:

1. A writing implement comprising a barrel having a tip with a rigid walled ball socket at the forward end thereof, a ball writing point snugly mounted in said socket for free rolling movement and supported wholly by the rigid walls thereof, a reservoir within said barrel and including an elongated open-ended sac of flexible material having the open end affixed to said tip for communication between said sac and said socket, said sac extending longitudinally within said barrel and being charged with a column of ink substantially in the absence of voids therein, the outer face of the sac being free from contact with the ink, and means confined within said barrel and inaccessible from the exterior of the assembled implement, said means exerting substantially uniform sustained pressure along at least a major portion of the length of the sac at substantially right angles to the axis thereof, progressively to collapse the sac as ink is rolled out at the ball point and to urge the sac wall at all times into intimate engagement with the column of ink confined hereby, and to exert forward pressure therethrough against the ball point.

2. The combination recited in claim 1, in which the pressure exerting means is a spring presser unit exteriorly laterally of the sac and confined within the barrel.

3. A ball point writing implement comprising a rigid one-piece casing, having a closed rear end and an open forward end, means providing a rigid-walled ball socket at said forward end, a ball writing element snugly mounted in said socket for free rolling movement, means providing a longitudinal feed conduit mounted upon the forward end of said casing connecting at its front end with said socket, reservoir means in said casing comprising a sac wholly of flexible material, open at its forward end and closed at its rear end, connected at its forward end to the rear end of said feed conduit and filled with ink, and resilient means confined within said casing exteriorly of and constantly exerting pressure against said flexible sac.

4. A writing implement comprising a barrel having a tip thereon, a reservoir leading to said tip and comprising a sac encompassed by said barrel, a writing point in the form of a ball confined in and seated against an inturned lip on the outer end of the tip, ink substantially filling said reservoir, and a presser unit comprising a bowed leaf spring in stressed condition within said barrel, disposed lengthwise thereof, confined inaccessibly from the exterior of the assembled implement and exerting sustained pressure against said ink charged sac in direction to reduce the effective cross sectional area defined by the inner surface thereof.

5. A writing implement comprising a barrel having a tip thereon, and a normally distended sac therein affixed at its open end to said tip, a writing point in the form of a ball confined in and seated against an inturned lip on the outer end of the tip, ink substantially filling the sac and the space intervening between said seated ball and said sac substantially without voids, and presser means confined in said barrel and comprising two elements both disposed lengthwise of the barrel exteriorly of said sac and along one side thereof, and pressing against said sac and said barrel, one of said elements being a bowed leaf spring element in stressed condition and the other being a reaction element, that element which engages the sac extending substantially the length of the latter.

6. A writing implement comprising a barrel having a section, a ball point in said section, a seat therefor at the outer end of said section, a normally distended sac mounted on the inner end of said section and confined in said barrel, said sac being filled with ink substantially in the absence of entrapped air, and a resilient presser unit confined within said barrel and exerting sustained pressure against said ink containing sac, said unit comprising a presser bar longitudinally of said sac, and a leaf spring attached at its middle to the middle of said bar and engaging the barrel wall at its ends.

7. A writing implement comprising a barrel having a section, a ball point in said section, a seat therefor near the outer end of said section, a normally distended sac mounted on the inner end of said section and confined in said barrel, said sac being filled with ink substantially in the absence of entrapped air, and a resilient presser unit confined within said barrel comprising a presser bar longitudinally of the sac, and a spring attached at one end to near the middle of said bar and looped about the end of said sac, and extending longitudinally of said sac and against the wall of said barrel.

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