

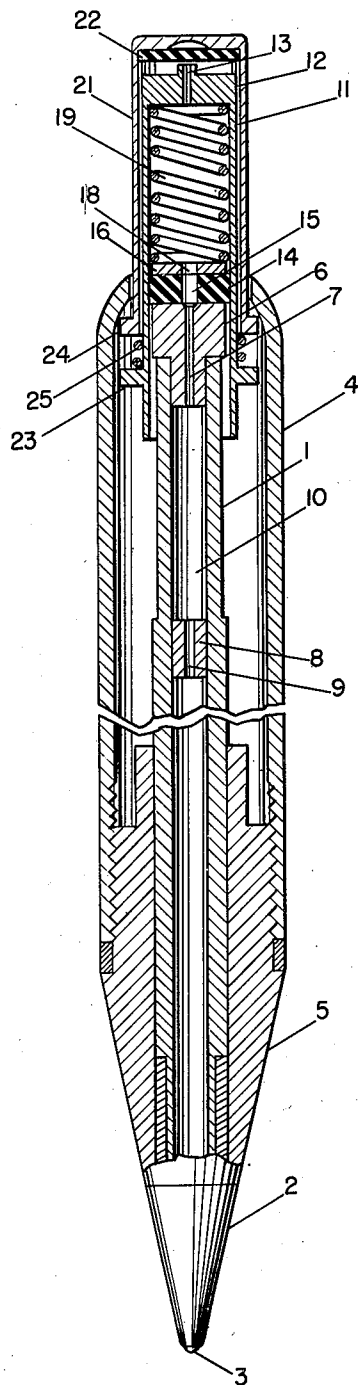
March 21, 1950

H. D. MORRIS

2,500,998

BALL-POINTED PEN

Filed Dec. 13, 1947



INVENTOR

H. D. MORRIS

BY *Pennington, Edwards, Smith & Barron*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,500,998

BALL-POINTED PEN

Hy D. Morris, Baldwin, N. Y., assignor to Universal Fountain Pen & Pencil Company, New York, N. Y., a copartnership

Application December 13, 1947, Serial No. 791,562

4 Claims. (Cl. 120-42.4)

1 This invention relates to ball-pointed fountain pens. Pens of this type are equipped with a small ball rotatably mounted in a socket at the tip of the pen to which viscous ink is fed through a conduit of small bore from an ink reservoir in the barrel of the pen. The writer causes the ball to rotate in its socket and roll over the surface written upon, thus transferring ink from the socket to the paper. It often happens particularly after long periods of disuse, that a bubble of air becomes lodged in the feed conduit, or the ink in the socket becomes dry, or the normal flow of ink is otherwise arrested so that the pen will not write, or, in any event, will not write freely and instantly.

In each of my copending applications, Serial No. 757,847, filed June 28, 1947, and Serial No. 753,523, filed November 1, 1947, I have disclosed and claimed a small air compressor mounted on such a pen and communicating with the ink reservoir. Air is compressed by means of a thumb-actuated plunger slidably mounted within a cylinder from which the compressed air enters the ink reservoir. In each instance means are provided for venting the air within the reservoir as soon as the flow of ink has been reestablished. The brief increment of pressure is enough, however, to expel any air entrapped in the feed conduit and to rehabilitate the pen as a writing instrument.

It is the object of the present invention to make certain improvements in the pens described in my earlier applications, particularly in the means for venting the compressed air as soon as it has performed its function.

I have illustrated a preferred embodiment of my invention in the accompanying drawing, the single figure of which is a longitudinal section through a ball-pointed pen equipped with my improvement.

The pen illustrated in this drawing comprises a metal tube constituting an ink reservoir 1 terminating in a conical tip 2 in the end of which is a writing ball 3, rotatably mounted within a socket. The ink passes from the reservoir to the ball through a fine feed conduit. These parts, which constitute the elements of the pen proper, are mounted within and upon a plastic barrel or housing 4 terminating at its forward end in a conical sleeve 5. The parts just described are common elements of a ball-pointed pen and, of themselves, form no part of my invention.

Mounted upon the upper end of the ink reservoir tube is a plug 6 having a fine central bore 7. Lower down in the tube is a smaller plug 8 like-

2 wise provided with a fine central bore 9 and press-fitted within the tube. The chamber 10 between the plugs 6 and 8 constitutes an ink trap which functions in a manner to be described presently.

Slidably mounted upon the plug 6 is a plunger cylinder 11 provided at its upper end with an axial nipple 12 having a fine bore 13. Within the cylinder 11 and overlying the upper end of the plug 6 is a rubber or neoprene washer 14 of slightly larger diameter than the plug and making air-tight frictional engagement with the walls of the cylinder and with the top of the plug. This washer is provided with a central bore 15. Overlying the washer 14 is a brass washer 16 also provided with a central bore 18. Lying within the cylinder 11 between the washer 16 and the end of the cylinder is a compression coil spring 19.

Slidably and loosely mounted upon the cylinder 11 is a second plunger cylinder 21 between the bottom of which and the end of the nipple 12 is a second rubber or neoprene washer 22. As shown in the drawing, the cylinder 21 is shorter than the cylinder 11. The latter is provided near its lower end with an annular flange 23 and the open lower end of the cylinder 21 with an annular flange 24, between which, and encircling the cylinder 11, is a second compression coil spring 25, weaker than the coil spring 19. This coil spring 25 normally holds the two cylinders in the relative positions illustrated with a space between the end of the nipple 12 and the washer 22, so that the interior of the ink reservoir 1 communicates with the atmosphere through bores 9, 7, 15, 18 and 13, the interior of the cylinder 11 and the space between the two cylinders 11 and 21 which are loosely interfitted. The housing 4 is curved inward at its upper end to prevent the cylinder 21 from slipping off.

The apparatus just described operates as follows: assume that flow of ink to the writing ball 3 is interrupted for any reason so that the pen fails to write, or writes with an inadequate flow of ink. The writer places his finger or thumb upon the outer end of the cylinder 21 and presses it downward against the light resistance of spring 25. This movement presses the washer 22 over the outer end of the nipple 12 and seals the ink reservoir and its connected parts from the atmosphere. Further downward pressure exerted by the writer's thumb causes the two cylinders to slide together relative to the ink reservoir, compressing the coil spring 19 and the air within the cylinder 11 and the reservoir 1. This slightly increased pressure within the reservoir forces a

3

minute quantity of ink through the feed conduit to the ball 3, so that the pen is immediately in condition for writing. Thereupon the writer releases his thumb and the springs 19 and 25 restore the parts to their initial positions. As the frictional resistance between the washer 14 and the inner face of the cylinder 11 is greater than that between the two cylinders, the spring 25 acts to remove the washer 22 from the end of the nipple 12, thereby reopening communication between the ink reservoir and the atmosphere, before the spring 19 retracts the cylinder 11. Thus it is impossible for the cylinder 11, moving outwardly under the impetus of the spring 19, to suck air in around the writing ball and undo the work previously accomplished.

As air can pass to the ink through the bore 9 of the plug 8, so ink might pass through the same bore in the reverse direction. If this should happen, this overflow would find itself within the chamber 10 or tube 1 between the two plugs 8 and 6. In order to pass from the chamber 10 to the outside, this ink would have to traverse the bore 7 of the plug 6, the cylinder 11, the bore 13 of the nipple 12 and the space between the two cylinders. This is practically impossible, so that the chamber 10 may be considered as an adequate ink seal.

The relative sizes of the various parts of the pen which have been found satisfactory, are shown in the drawing, although, of course, these may be varied as well as structural details. I have found that the bores 6, 7 and 13 may satisfactorily be .018 inch in diameter and that the difference between the external diameter of the cylinder 11 and the internal diameter of the cylinder 21, may satisfactorily be .007 inch.

I claim:

1. In a ball-pointed pen having a ball, an ink reservoir and a feed conduit connecting them, the combination of a cylinder slidably mounted on the ink reservoir to compress the air within the reservoir, a spring between the top of the reservoir and the bottom of the cylinder, an air vent in the bottom of the cylinder, a second cylinder slidably mounted on the first for closing the vent during the compression stroke, and means for moving the second cylinder to open the vent on the return stroke.

2. In a ball-pointed pen having a ball, an ink reservoir and a feed conduit connecting them, the combination of a cylinder slidably mounted on the ink reservoir to compress the air within the reservoir, a spring between the top of the reservoir and the bottom of the cylinder, an air vent in the bottom of the cylinder, a second cylinder slidably mounted on the first, a second spring normally holding the bottom of the second cylinder out of contact with the bottom of the first so that the interior of the ink reservoir is in communication with the atmosphere through the vent and the space between the two cylinders, the second spring being weaker than the first, whereby inward pressure on the bottom of the second cylinder seals the vent, and moves the

4

first cylinder against the resistance of the first spring to compress the air within the reservoir, and whereby release of pressure on the second cylinder permits the second spring to move the bottom of the second cylinder out of contact with the bottom of the first and open the vent to the atmosphere.

3. In a ball-pointed pen having a ball, an ink reservoir and a feed conduit connecting them, the combination of a cylinder slidably mounted on the ink reservoir to compress the air within the reservoir, means for preventing air leakage between the cylinder and the reservoir, a spring between the top of the reservoir and the bottom of the cylinder normally holding them a fixed distance apart, a vent in the bottom of the cylinder, a second cylinder loosely and slidably mounted on the first for closing the vent during the compression stroke, the friction between the two cylinders being less than that between the first cylinder and the reservoir, and a second spring, weaker than the first, normally holding the second cylinder in vent-opening position, whereby pressure on the bottom of the second cylinder closes the vent, moves the first cylinder against the resistance of the first spring, and compresses the air within the reservoir, and release of that pressure permits the second spring to move the second cylinder to open the vent and restore atmospheric pressure within the reservoir.

4. In a ball-pointed pen having a ball, an ink reservoir and a feed conduit connecting them, the combination of a cylinder slidably mounted on the ink reservoir to compress the air within the reservoir, a spring between the top of the reservoir and the bottom of the cylinder, an air vent in the bottom of the cylinder, a second cylinder slidably mounted on the first for closing the vent during the compression stroke, and a second spring for moving the second cylinder to open the vent on the return stroke, said second spring being weaker than said spring between the top of the reservoir and the bottom of the cylinder.

HY D. MORRIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
445,317	Jones	Jan. 27, 1891
562,842	Minich	June 30, 1896
884,412	Oberdverster	Apr. 14, 1908
1,319,556	Baker	Oct. 21, 1919
1,346,184	Dickinson	July 13, 1920
2,435,123	Biro	Jan. 27, 1948

FOREIGN PATENTS

Number	Country	Date
26,902	Germany	1883

Certificate of Correction

Patent No. 2,500,998

March 21, 1950

HY D. MORRIS

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 1, line 18, for the serial number "753,523" read 783,523; column 3, line 21, for the words "or tube" read *of tube*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of June, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.