

## PATENT SPECIFICATION



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### PROVISIONAL SPECIFICATION

#### Improvements in Stylographs

We, THOMAS DE LA RUE AND COMPANY LIMITED, a company organised under the laws of Great Britain, and EDWARD GIBSON KNIGHT, British subject, both of 5 110, Bunhill Row, London, E.C.1, do hereby declare the nature of this invention to be as follows:—

This invention relates to stylographs, and particularly to those of the self-filling type.

Great difficulties have been experienced in obtaining correct and easy filling of self-filling stylographs and a steady flow of ink from these stylographs when in use. 15 These difficulties are mainly due to the fact that since the same point of entry is used both for the entry of ink, during filling, and for the entry of air, during use, it has generally been found necessary, to prevent escape of ink from the stylograph, 20 to make this point of entry in the form of a tortuous passage or passages and these passages frequently become air-locked owing to the surface tension of the ink blocking them, thus producing irregularity or cessation of the ink flow.

One endeavour to avoid these difficulties consisted in providing one small entry hole in the nozzle section, but this 30 resulted in diminution of the filling capacity and the danger that the hole became sealed by a globule of ink, thus again producing an air-lock.

The stylograph of the present invention 35 is designed particularly to overcome these difficulties.

According to the invention the nozzle section of a stylograph is formed with at least two holes at different levels longi- 40 tudinally of the nozzle section. There may be a series of holes at one level and another series at another level. This arrangement provides both ink-filling and air vent passages.

Preferably two series of holes are employed, with at least two holes in each series, one series being formed adjacent the base or inner end of the nozzle section, and the other at a substantial distance 50 from the first series along towards the outer or needle end of the nozzle section.

Preferably the apertured portion of the nozzle section is masked by the end of the

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nozzle section-carrier, and a collar may be provided around the nozzle section 55 beyond, that is to say nearer to the outer end of the section than, any of the holes. This collar lies within the carrier, being of slightly smaller diameter than the inside diameter of the carrier, and forms 60 a shield preventing leakage of ink due to heavy use of the stylograph or to an exceptional expansion of air inside the stylograph barrel.

In one form of stylograph according to the invention, adapted to be self-filled by any known means, e.g. by a plunger device, the nozzle section is hollow and adapted at its inner end to screw into a carrier screwed to the pen barrel, and at 70 its outer end provided with the usual metal nozzle through which extends, in use, the end of a weighted or spring-urged needle.

Adjacent its inner end the nozzle section 75 is pierced with three holes, substantially evenly distributed around the circumference of the section, these holes normally serving as ink inlets. Appreciably further towards the outer end thereof, the section is pierced with three more holes, 80 which normally serve as air vents, these holes being spaced for example similarly to the first series, both series of holes being within a chamber lying between the nozzle section and the carrier. 85

When filling, both series of holes serve as inlets for ink, but, after filling and when the stylograph is positioned with its needle point uppermost, the first and lower series of holes may still be choked by the residue of ink remaining in the chamber provided by the nozzle section and the carrier, but the second and upper series remain, or rapidly become, 95 uncovered and can therefore act as air vents. Furthermore, it is found in practice, that after a short period of use of the stylograph, any surplus ink remaining in the chamber is drawn into the body 100 of the stylograph with the air which is passing in to replace the ink which is being used.

Another difficulty experienced with the earlier types of stylograph was that the 105 ink remaining in the tortuous feed

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passages tended to be forced out due to the expansion of air by the heat of the body when the stylograph was carried upright in the pocket. This ink overflowed round

5 the top edge of the carrier, thus when the stylograph was next required for use the carrier was found to be wet with ink.

With the construction of the present invention, as soon as the stylograph is  
10 inverted for placing in the pocket, the whole of the ink in the nozzle section and the carrier flows back into the main body of the stylograph; and any surplus ink in the chamber between the nozzle section  
15 and the carrier likewise drains into the stylograph body, with the result that the outside of the stylograph will always be found to be dry no matter how much expansion of air may take place while the  
20 pen is being carried. This draining is due to such location of the series of vent holes that these holes are always subject to a different head of pressure whether the stylograph is point upwards or point  
25 downwards, this difference of pressure ensuring that one or the other series of holes invariably is, or quickly becomes, free to act as air inlets and thus equalise the pressure of air inside the barrel with  
30 that of the external atmosphere.

If a stylograph as above described is used very heavily, for example if it is used to make a number of heavy dots causing the stylograph needle forcibly to  
35 hit the writing paper a number of times, the consequent sudden displacements of the weight attached to the needle or com-

pressions of the spring, may cause globules of ink to be exuded from the holes, to produce blots on the paper. 40

This difficulty may be overcome by arranging a ring-shaped collar on the nozzle section, the collar being slightly smaller than the internal diameter of the carrier and lying within it, and being  
45 located nearer the outer or needle end of the nozzle section than any of the holes. The collar thus provides a shield against which any escaping ink will strike and be retained partly by surface tension, in the  
50 chamber between the carrier and the nozzle section until such time as this ink is again absorbed into the body of the stylograph either by drainage when the stylograph is placed upright in a pocket  
55 for example, or is carried in with the air drawn in to replace the ink being used.

Sufficient space should be left between the circumference of the collar and the internal bore of the carrier to provide for  
60 easy filling of the stylograph, and the space may be supplemented by providing a slot or slots in or adjacent the circumference of the collar. Furthermore the surface area within the chamber may be  
65 increased by the provisions of slots or grooves in the carrier or nozzle section or in both of these parts.

Dated the 18th day of February, 1939.  
CARPMAELS & RANSFORD,  
Agents for Applicants,  
24, Southampton Buildings,  
London, W.C.2.

## COMPLETE SPECIFICATION

### Improvements in Stylographs

We, THOMAS DE LA RUE AND COMPANY  
70 LIMITED, a company organised under the laws of Great Britain, and EDWARD GIBSON KNIGHT, British subject, both of 110, Bunhill Row, London, E.C.1, do hereby declare the nature of this invention and in what manner the same is to  
75 be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to stylographs and  
80 particularly to those of the self-filling type.

It is an object of the invention to provide a stylograph giving a steady flow of ink when in use, i.e. one which does not  
85 have the common disadvantage of drying up when in use owing to ink blocking the air vent. It is a further object to provide a stylograph in which ink which  
90 may collect in the annular chamber between the nozzle section and its carrier

may readily drain back into the ink barrel when the stylograph is inverted so that the stylograph does not become messy when carried in the pocket.

These objects are achieved according to  
95 the invention by forming the nozzle section of the stylograph with at least two lateral holes at different levels longitudinally of the nozzle section. Preferably two series of holes are employed so  
100 that one series will lie adjacent one end of the annular chamber around the nozzle section and the other series at or near the other end.

For the sake of convenience, in describing  
105 the location of parts of the stylograph according to the invention, the stylograph is considered to be in the writing position with the writing point at its lower end.

A collar may be provided around the  
110 nozzle section below the lowest hole or holes. This collar lies within the carrier,

being of slightly smaller diameter than the inside diameter of the carrier, and forms a shield preventing leakage of ink due to heavy or clumsy use of the stylograph. The periphery of the collar may be provided with transverse grooves.

In one form of stylograph according to the invention, adapted to be self-filled by any known means, e.g. by a plunger device, the nozzle section is adapted at its upper end to screw into a carrier screwed into or otherwise attached to the pen barrel, and at its lower end provided with the usual metal nozzle through which extends, in use, the end of a weighted or spring-urged needle.

A stylograph in accordance with the invention is illustrated in the accompanying drawings in which figure 1 is an elevation of the stylograph showing the nozzle section and its carrier in section, figure 2 is a sectional view of the nozzle section on an enlarged scale, figure 3 is an elevation of the nozzle section and figures 4, 5 and 6 are sections respectively along the lines *a-a*, *b-b*, *c-c* of figure 3.

Referring to these drawings, 1 is the barrel of the stylograph which is of the self-filling type and may be filled by the usual plunger arrangement. 2 is the nozzle section carrier which is screwed into the barrel of the stylograph and 3 is the nozzle section which is screwed into its carrier 2. 4 is the metal nozzle through which passes a needle 5 attached to a weight 6. Means such as a cross bar 13 is provided to prevent the weight falling into the barrel.

The nozzle section carrier 2 has a projecting skirt 7 which forms the lower wall of an annular chamber 8 surrounding part of the nozzle section. Adjacent the upper end of the annular chamber four lateral holes 9 are provided in the nozzle section. Lower down the two holes 10 are provided. Just beyond the holes 10 a collar 11 is provided upon the nozzle section this collar being slightly less in diameter than the internal diameter of the annular chamber 8. This collar may with advantage be provided with grooves or passages 12 in its periphery.

The collar 11 constitutes in effect the lower end wall of the annular chamber 8. In use when the stylograph is filled ink will enter the annular chamber 8 past the collar 11, through the grooves 12, and will pass from the annular chamber 8 to the body of the stylograph through the holes 9 and 10 in the nozzle section 3. When the stylograph is inverted, any surplus ink which may be present in the

annular chamber 8 will drain into the barrel 1 through the holes 9, the holes 10 providing the necessary air vents to allow it to do so.

When the stylograph is in use ink will flow out through the nozzle 4 and air to replace the ink as it is used will enter the annular chamber 8 and pass from the annular chamber into the body of the pen through the holes 9 and/or 10. Any ink present in the annular chamber will feed into the nozzle section through the holes 10.

It is an important advantage of the present invention that the steady and uniform flow of ink enables the stylograph to be graded to give writing of varying thickness, by making the needles of varying gauges. In order to indicate the gauge of any particular needle it is convenient to mark the weight 6 attached thereto, e.g. by colouring the weights in distinctive colours according to the different gauges of needle associated therewith.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A stylograph having a nozzle section formed with at least two lateral holes at different levels longitudinally thereof.

2. A stylograph having a nozzle section formed with at least two series of lateral holes at different levels longitudinally thereof.

3. A stylograph in which the nozzle section is apertured by at least two lateral holes or series of holes at different levels longitudinally thereof, the nozzle section being screwed into a carrier which projects around the apertured part of the nozzle section to form an annular chamber thereabout and a collar being provided on the nozzle section to constitute an end wall of the annular chamber, one hole or series of holes being at or near this lower end of the annular chamber and the other hole or series of holes being at or near the upper end of the annular chamber.

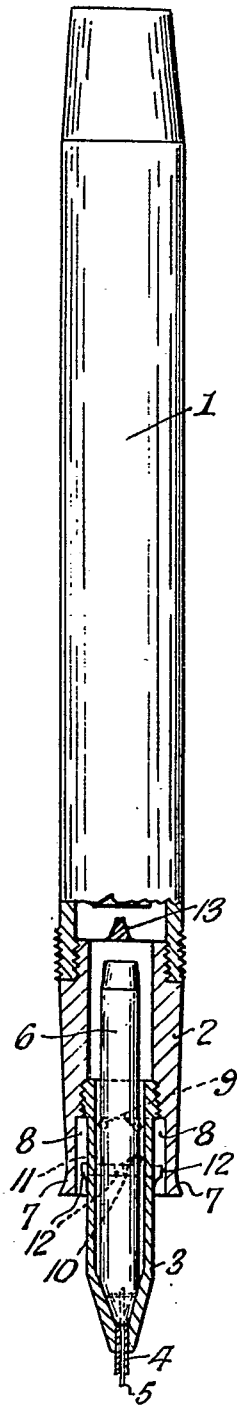
4. A stylograph as claimed in claim 3 in which the collar is provided with transverse grooves.

5. A stylograph substantially as described and as shown in the accompanying drawings.

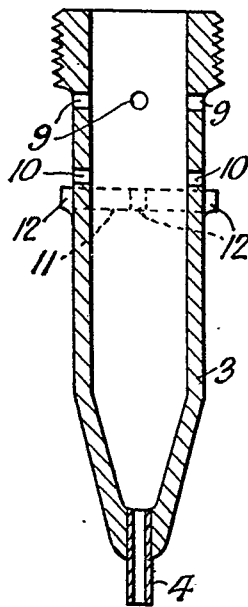
Dated the 26th day of October, 1939.

CARPMAELS & RANSFORD,  
Agents for Applicants,  
24, Southampton Buildings,  
London, W.C.2.

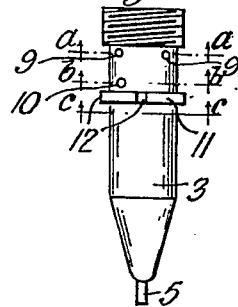
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



[This Drawing is a reproduction of the Original on a reduced scale.]