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COMPLETE SPECIFICATION.

Improvements in Fountain Pens.

I, FRANK MICHAEL KEGRIZE, of 1718 Master Street Philadelphia, in the County of Philadelphia and State of Pennsylvania, United States of America, Clerk, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and 5 by the following statement:

This invention relates to fountain pens, the object being to provide a feed for fountain pens by means of which a regular flow of ink and air may be obtained at all times.

Many of the fountain pens now in use embody principles, or designs which 10 are intended to correct faults of one kind or another so as to secure the proper action of the ink and air in moving lengthwise of the feed. Where one defect is overcome, another defect is liable to arise resulting in a pen which is not wholly satisfactory. The principal defects which it is the object of this invention to overcome may be noted as follows. First, the necessity to give the pen 15 a jerk for the purpose of causing the ink to flow downward to the writing point after being idle for a while. Second, irregularity of the flow of ink sometimes too freely thereby allowing the ink to drop or flow from the writing point upon the paper, and at other times the refusal of the ink to flow at all. Third, the liability of the ink after placing the pen in the pocket, point upward, to over- 20 flow the reservoir and pen nib and feed and flow downward outside of the end section of the holder thereby soiling the clothes and fingers.

The fault first referred to is frequently caused by having too small or too narrow longitudinal ink ducts or grooves which taper to vary in depth or form and which therefore become accidentally clogged with dry ink or sediment 25 because of their being so shallow. The second fault is frequently caused by having the longitudinal duct too large or having too many interstices or small secondary capillary openings, the result being that too large a quantity of ink accumulates in the feed and under the pen, also the excessive entrance of air into the feed ducts and thence into the well resulting in allowing the ink to 30 drop unhindered from the pen point upon the paper or writing surface. In other designs some of which have separate grooves or holes intended to act one for the movement of the ink only and the other for the air only, the fault lies in that both grooves or holes become filled or choked with ink in which case the pressure is equalized in both grooves or holes and will not permit the 35 ink to flow from the pen. The third fault is usually caused by the construction of the feed in which the ink, while the pen is in writing position, fills the longitudinal duct entirely excluding air and when the pen is elevated from a writing to a vertical position as when in the pocket, the air bubble which forms at the inner end of the feed inside the well chokes the inner end of the duct 40 hindering the return of the ink to the well. The bubble will then be backed up or reinforced by the volume of air behind it and gradually advance upward through the duct pushing the ink ahead of it and causing the same to overflow and move downward along the outer surface of the pen holder, thus soiling the fingers and clothing.

5 With the above defects in view, I have designed an ink feed for fountain

[Price 8d.]



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pens employing a principle by means of which I obtain a balanced gravity of fluid or ink while the pen is held or used in writing position but when inverted, as when placed in the pocket, offering no resistance to the return of ink to the well. The feed hereinafter described is economical in manufacture and may be made out of a round bar of hard rubber with the aid of no other machinery than a simple circular or disk saw fixed on a rotary spindle. 5

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as hereinafter fully described, illustrated and claimed. 10

In the accompanying drawings:

Figure 1 is a longitudinal section through the end portion of a fountain pen, showing the improved ink feed and indicating by arrows the movement of the air and ink.

Figure 2 is a top plan view of the ink feed. 15

Figure 3 is a cross section through the rear portion of the feed.

Figure 4 is a cross section through the forward portion of the feed.

Figure 5 is a similar cross-section showing an improved shape of feed.

Figure 6 is a plan view of a pen point perforated to adapt it to this invention.

Figure 7 is a longitudinal section through the fountain pen showing an air inlet in the side of the feed. 20

Figure 8 is a plan view of the feed shown in Figure 7.

Figure 9 is a plan view of the pen used in Figure 7.

Figure 10 is a plan view of a feed of slightly modified form.

Figure 11 is a longitudinal section through the same. 25

Figures 12 and 13 are cross sections through the same, the rear and forward portions of the feed respectively.

Figures 14 and 15 are plan views of other slightly modified forms of feed.

Similar reference numerals designate corresponding parts in all the figures of the drawings. 30

In carrying out the present invention, I employ a straight solid piece of cross sectionally round hard rubber 1 of suitable diameter to agree with the size of the holder or reservoir. By means of a circular saw, the ink duct 2 is cut into the inner end and lower side of said bar which forms the body of the feed, said cut slit or duct extending from a point near the rear or inner end of the feed to about half way the length of the feed where it terminates in a shoulder 3, said cut extending in depth and distance about equal to two thirds of the thickness of the body 1 of the feed. The body is then reversed and the other side presented to the saw which is then caused to cut a similar duct 4 from a point near the outer end of the feed inward to a point just behind the center of the feed, said cut or duct extending substantially two-thirds through the diameter of the feed and terminating at its inner end in a shoulder 5. The two ducts extend past or overlap each other so to speak thereby establishing a communicating passage 6 between the duct 4 and the duct 2 so that ink and air may pass from one to the other. 35 40 45

The outer end portion of the feed is cut away on opposite sides as shown at 7 to provide the feed with a reduced projecting end portion and the extreme end portion of the feed is also beveled or tapered as shown at 8 toward the under side of the writing point or pen point proper illustrated at 9. The pen point 9 is provided at the inner end of the usual slit 10 with an air opening 11 by means of which air is admitted to the duct 4. 50

The action of ink and air in the pen is as follows. When the pen is lowered from its inverted position to the writing position, the ink which surrounds the end portion protruding beyond the end section into the well enters the duct 2 advances rapidly along the end section through the communicating passage 6 thence along the outer duct 4 where it comes in contact with the pen point and fills the duct 4 up to the air hole 11 which hole is then closed by the ink thereby 55

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stopping the further entrance of air. A portion of the air during this operation which was contained in the ducts moves along the feed to the end of the inner portion thereof and escapes around said inner portion into the well and on to the top of the well so as to replace the ink. However, after the ink has
5 closed the air hole in the pen point, the air will not all have escaped from the feed for the reason that at the point where the two grooves communicate, a small obstruction is formed which has the effect of retaining a portion of the air in the form of a bubble. Another obstruction is formed by the rounded
10 inner end or surface 12 of the duct 2, said obstructing surface 12 being provided for the special purpose of retaining or holding a quantity of air as long as the pen is in writing position. At no time while the pen is in use, is the feed filled with ink only as is frequently the case with other pens; on the contrary the same quantity of air is almost constantly contained in the feed at the two points mentioned. After a sufficient quantity of ink has been used
15 in writing from beneath the pen point, the air hole becomes uncovered there by allowing a small quantity of air to enter the feed and advance along the upper surface of the end section of the pen until reaching the first obstruction it mingles with the air already at that point; a portion of this air then moves toward the second obstructing surface 12 mingling with the air contained at
20 that point, a portion of such air being finally released and moving into the well and on to the upper end thereof. This operation is repeated again and again until the well is entirely emptied of ink, when the feed finally runs dry and the pen ceases to write.

After using the pen for a while and placing the same in the pocket, the air
25 contained in front of the obstructions referred to moves upward toward the air hole in the pen, the ink at the same time flowing downward to the inner end of the feed and dropping into the well, thus preventing the over-flow of ink from the pen and the soiling of fingers and clothing.

From the foregoing description it will be seen that the feed contains at all
30 times the same quantity of ink and air while in writing position and the ink is therefore fed to the writing point with perfect regularity. At the same time no obstruction is made to the free movement of the ink when first placed in writing position and after ceasing to write and placing the pen in the pocket there is no obstruction to the flow of the ink back into the well.

35 A severe test to any fountain pen is found in using copying inks which always contain a heavy thick sediment. I have tested the ink feed hereinabove described in connection with such heavy writing ink and find after continued use of such feed that the fluid flows evenly and freely all the time. The flow of ink is just as regular and reliable while using thin ink or writing fluid.

40 The construction of the feed hereinabove described also has an advantage in that no special shape of end section is required, the bore of the end section being the same except for the short distance where it is recessed to form the pen seat 14. Any desired shape of pen may be employed as long as it is provided with the air hole 11. The grooves 2 and 4 constituting the ink ducts
45 may be provided with flat bottoms as shown for example in Figures 10, 11, 12 and 13 or said grooves may be provided with V-shaped bottoms as shown, for example, in Figures 2, 3, 4 and 5, the V-shaped bottoms increasing the capillary effect and movement of the ink to and from the pen nib according to the position of the fountain pen at the time. The groove 2 may be V-shaped
50 while the forward groove 4 has a flat bottom as shown in Figure 14 or the reverse arrangement may be adopted as shown in Figure 15 in which the forward groove 4 has a V-shaped bottom and the rear groove 2 a flat bottom. Instead of admitting air through the perforation 11 in the pen point 9, an ordinary pen such as shown in Figure 9 may be employed and air admitted
55 through one or more perforations 15 in the sides of the projecting portion of the feed as shown for example in Figures 7 and 8, the operation being the same in both cases. However, by providing air holes in the sides of the feed, the use

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of an extra long nibbed pen is permitted thereby combining a greater degree of flexibility and a greater flow of ink.

By cutting away the sides of the projecting portion of the feed in the manner illustrated in Figure 5 and making the same quite narrow beneath the pen nib a distinct advantage is obtained as said shape of feed prevents the ink from accumulating in too great a quantity around the feed and under the pen nib and thereby overcomes the liability of the surplus ink dropping from the pen by reason of such over accumulation. In other words, by flattening the sides of the projecting portion of the feed and making the same quite narrow, the feed, externally, works on the non-capillary principle. By beveling the extreme end portion of the feed as shown at 8 ample clearance is provided for between the feed and the surface being written upon.

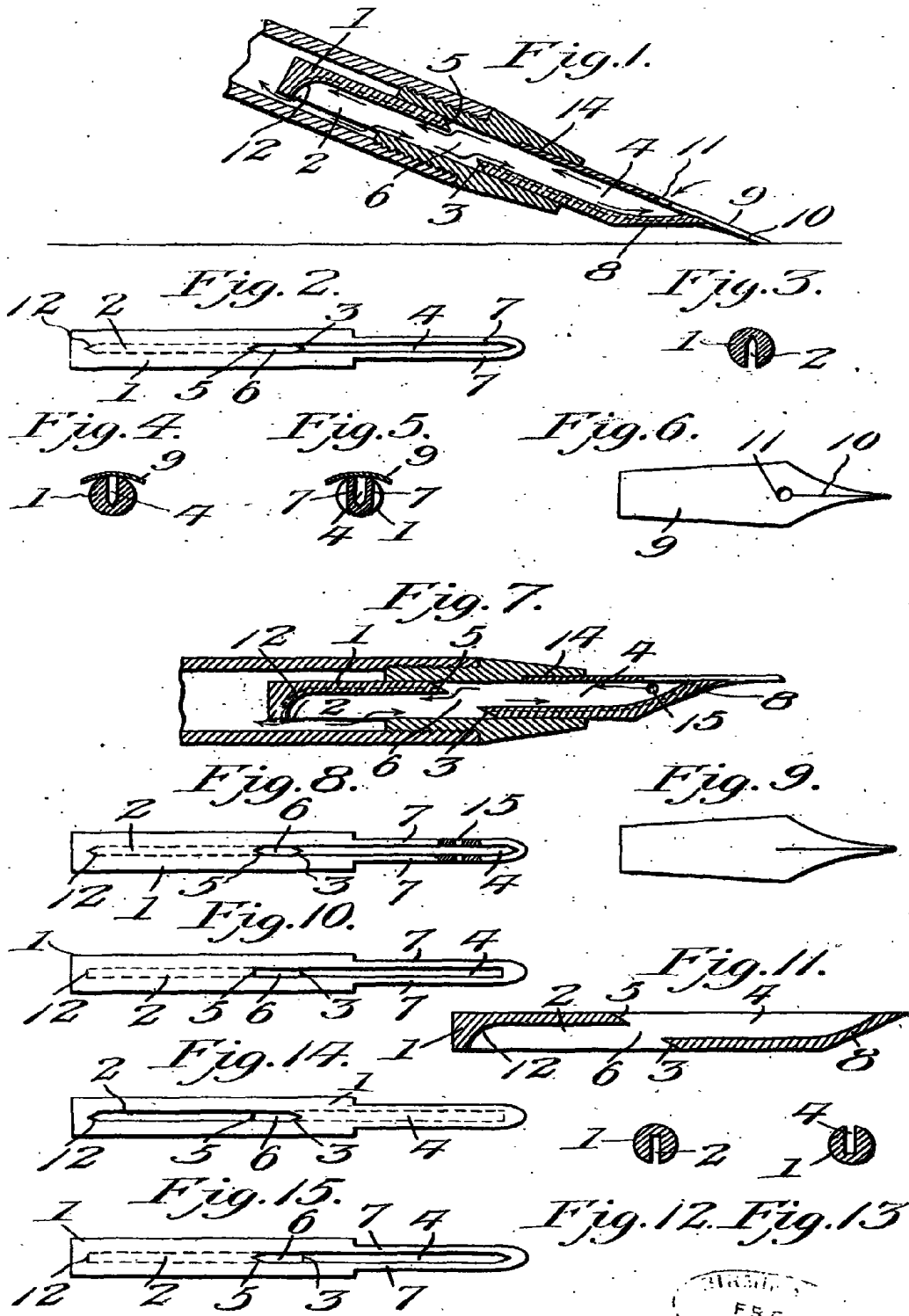
Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. A fountain pen feed embodying two ducts extending lengthwise thereof and arranged at opposite sides of the body of the feed and communicating at a point intermediate the ends of the feed.
2. A fountain pen feed embodying two longitudinal ducts which overlap and communicate at a point intermediate the ends of the feed, and an air obstructing surface at the inner end of one of the said ducts.
3. A fountain pen feed embodying two longitudinal ducts which overlap and communicate at a point intermediate the ends of the feed, and an air chamber at the inner end of one duct.
4. A fountain pen feed embodying two longitudinal ducts which overlap and communicate at a point intermediate the ends of the feed, and an air obstructing surface at the inner end of each duct.
5. A fountain pen feed comprising a cylindrical body provided at one side with a groove extending from a point near one end toward the opposite end and having a depth greater than one-half the diameter of the body, a second duct extending from a point near the opposite end of the body lengthwise thereof and arranged at the opposite side said ducts overlapping and communicating at a point intermediate the ends of the feed, and an air obstructing surface at the inner end of one of said ducts.
6. A fountain pen feed comprising a cylindrical body extending beyond the inner end of the outer pen section and provided with a duct extending from near the outer end lengthwise thereof toward the opposite end, a second duct extending from near the inner end outward toward the opposite end and arranged at the opposite side of the body, said ducts having a depth greater than one-half of the thickness of the feed and overlapping and communicating at a point intermediate the ends of the feed, and an air obstructing surface at the inner end of one of said ducts.
7. A fountain pen feed embodying two ducts extending lengthwise thereof and arranged at opposite sides of the body of the feed and communicating at a point intermediate the ends of the feed, the projecting portion of the feed beneath the pen nib being provided with one or more air holes.
8. A fountain pen embodying two ducts extending lengthwise thereof and arranged at opposite sides of the body of the feed and communicating at a point intermediate the ends of the feed, the projecting portion of the feed beneath the pen nib being cut away at opposite sides and made relatively narrower or of less thickness than the main body of the feed.

Dated this 29th day of March 1904.

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

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