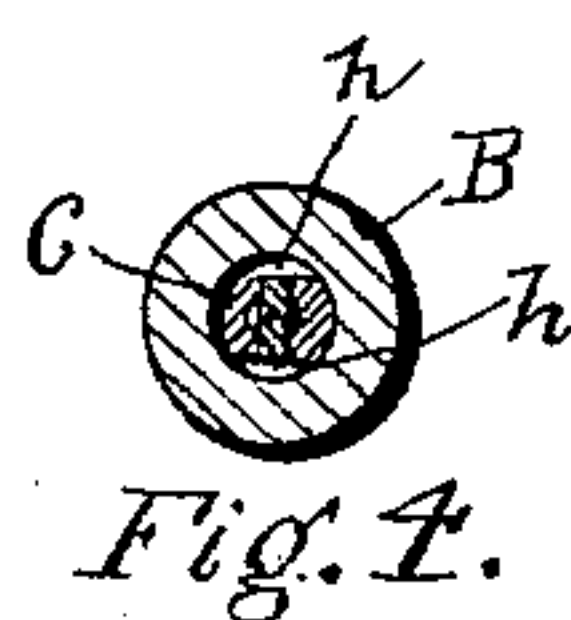
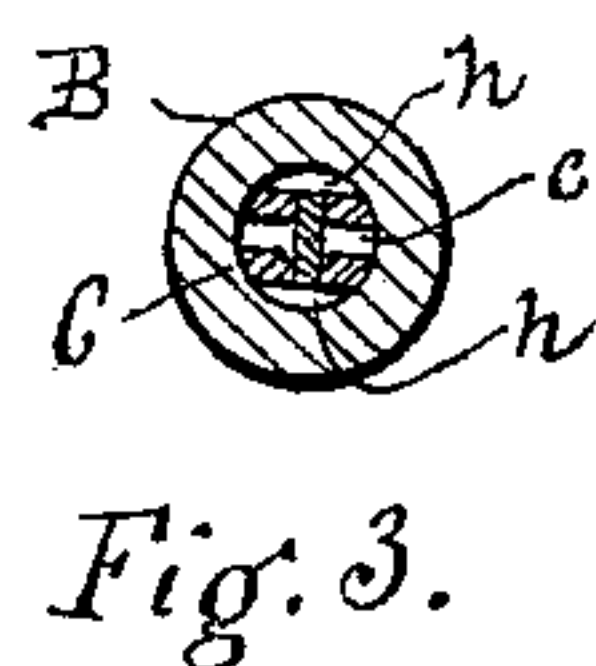
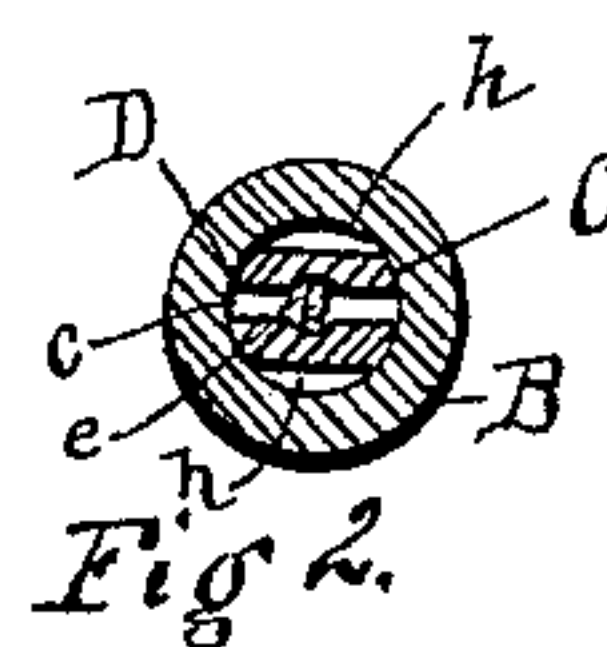
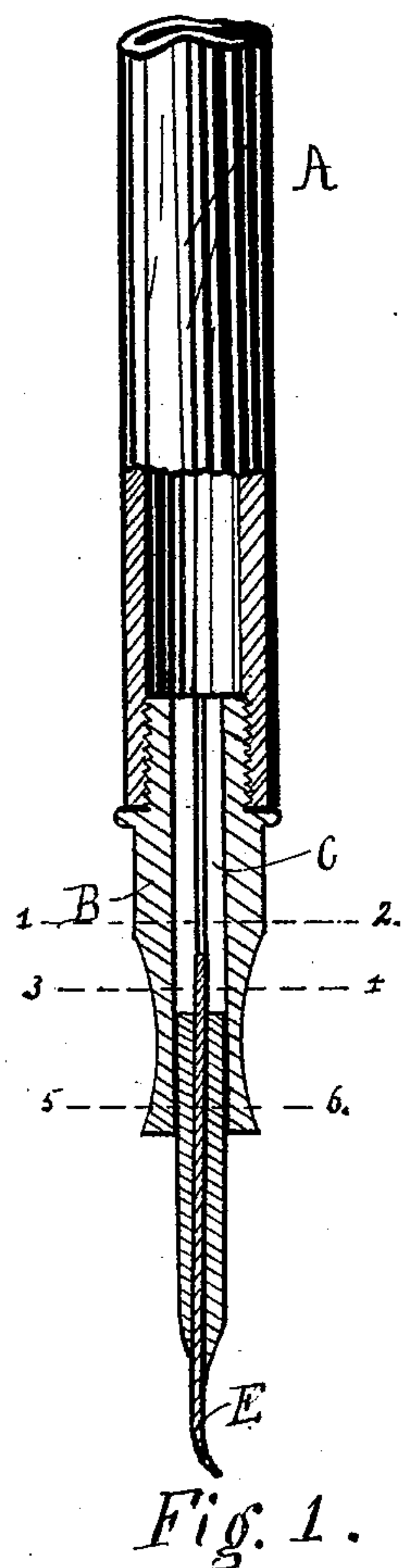
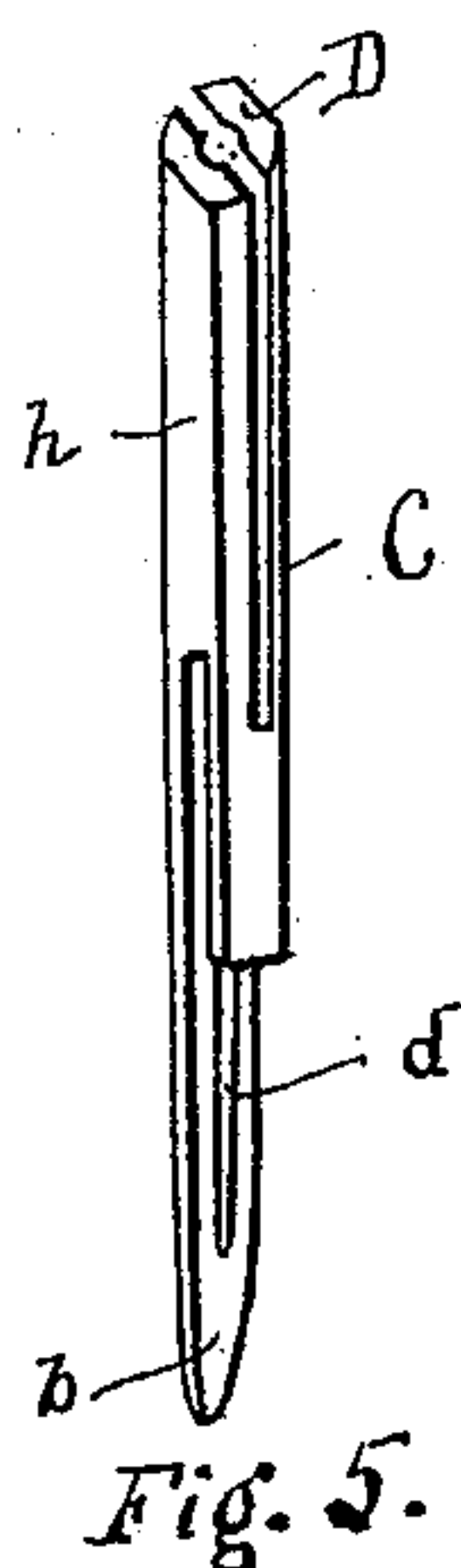


(No Model.)

J. G. GRAY.  
FOUNTAIN PEN.

No. 538,960.

Patented May 7, 1895.



Witnesses  
J. West  
J. Donath

John Gordon Gray  
Inventor  
Per his atty  
Mark Willis Collet

# UNITED STATES PATENT OFFICE.

JOHN GORDON GRAY, OF PHILADELPHIA, PENNSYLVANIA.

## FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 538,960, dated May 7, 1895.

Application filed March 23, 1892. Serial No. 426,164. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GORDON GRAY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fountain-Pens; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of fountain pens in which the ink is fed downward by gravity through a plug in the nozzle which does not extend into the reservoir (a channel being cut in the plug for that purpose) and the ink carried over the pen point in a channel down which it can flow without the aid of any capillary attraction.

It has for its object increasing the certainty with which the feed will act so that all the "skipping" will be avoided and the ink can not flood the pen even if used to the last drop.

It consists essentially in a channel, substantially out of contact with the air, cut in the plug and leading down to the point where the ink will be discharged, combined, in my preferred form, with air channels, non-communicative with the said ink channels and of a size such that a downflow of ink through them will practically not occur, and in various details of construction which will be set forth in the following portions of my specification and illustrative drawings, in which—

Figure 1 represents the nozzle, feed, and a portion of the reservoir of my fountain-pen. Fig. 2 is a cross-section thereof on the lines 1 2 of Fig. 1; Fig. 3, a cross-section on the line 3 4 of Fig. 1. Fig. 4 is a cross-section on the lines 5 6 of Fig. 1. Fig. 5 is a view of the plug by itself, the flattening of the nozzle at the sides being enlarged slightly out of proportion.

A is the reservoir, E the pen proper and B the nozzle. In the nozzle B I place the plug C, which need not extend into the reservoir and which in practice I construct with its upper end terminating a short distance below the top of the nozzle. In this plug I cut the channel down which the ink flows by gravity. This channel

connects the reservoir with the pen proper and is preferably continued down by a groove *d* in the feed tongue *b* on the top of the pen proper down which the ink will be carried by gravity along the top of the pen proper, as, by so doing the ink is discharged in small quantities near the nibs of the pen. This, of course, will be still further improved, by bringing this groove *d* down to a point over the split as thereby the motion of the nibs will take the ink from the groove down to the pen proper. I make this channel to be without any substantial connection with the outer air, the more completely it is isolated from which the better, as the ink will flow down in a continuous column, unmixed with air bubbles and will not clog or dry in the pen by exposure to air, and this will make the pen easy to write with even when the writing is just begun.

When I construct the channel in the form of a slit or cut *c* I prefer to make it sufficiently large, especially at the top to make a very great difference in size between it and the air passage or passages, so as to take full advantage of the principle that, where two apertures are made in the bottom of a close vessel containing a liquid the tendency of the liquid will be to flow down the larger allowing the air to flow up the smaller provided, of course, both are of a size suitable to have this mutual action. I also generally cut a preferably circular groove *e* in the center of the inside of the pieces forming the sides of the slit or cut *c* which I continue down to the groove *d* for this purpose. I find it preferable to isolate this slit or cut *c* by making the parts of the plug immediately surrounding it to fit tightly in the nozzle though a loose plug which permits the air to ascend in a thin sheet between the interior of the nozzle and the plug may be employed in addition to the channels *h, h*.

In the preferred form of my device, I conduct the air up into the reservoir by a channel or channels, placed at the side of the plug, which allow the air to flow up. This channel or these channels are made proportionately small with reference to the channel formed by the cut or slit *c*, in order to secure the mutual action of the ink and air as above described. In practice I construct this channel or these channels by squaring off a small portion of the circumference of the plug at



the side of the plug, as shown by the letter *h* so that the air will flow up between the plug and the nozzle. I prefer also to make the portions of the plug between these channels and  
 5 the ink channel to fit tightly against the nozzle and isolate the air channel or channels from the ink channel, so that the ink will flow down and the air up without interfering with each other.

10 By placing the air channels against the sides of the nozzle I secure the direct passage of the air into the reservoir along the sides of which it is supposed to rise until it reaches the top of the pen.

15 When writing the ink brought to the pen proper by gravity and lying thereon will be spilled on the top of the pen and where my preferred form is used at the split of the nibs, the air flows up the air channels at the sides,  
 20 which action will continue so long as a drop of ink remains in the reservoir or nozzle.

An offset *r* is shown in Fig. 6 placed above the feed tongue. It is not an essential feature of my invention.

25 While I have described several forms of

my invented device I do not limit myself to the strict mechanical forms shown therein as changes may be made without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

In a fountain pen, the combination with a nozzle, of a plug fitting closely therein and provided with the squared off sides *h, h*, at the sides of the plug, a slit perpendicular to  
 35 the pen proper extending from the heel of the pen to the reservoir end of the plug and provided with an enlarged central opening, the pen proper and a tongue extending over  
 40 the top of the pen proper, and provided with a groove in the face thereof which is in contact with the pen proper, extending from the ink channel to the split in the pen proper substantially as described.

In witness whereof I have hereunto set my  
 45 hand this 19th of January, A. D. 1892.

JNO. GORDON GRAY.

Witnesses:

MARK WILKS COLLET,  
 ANDREW J. CULLETON.