

(No Model.)

2 Sheets—Sheet 1.

A. T. CROSS.
Fountain Pen.

No. 229,305.

Patented June 29, 1880.

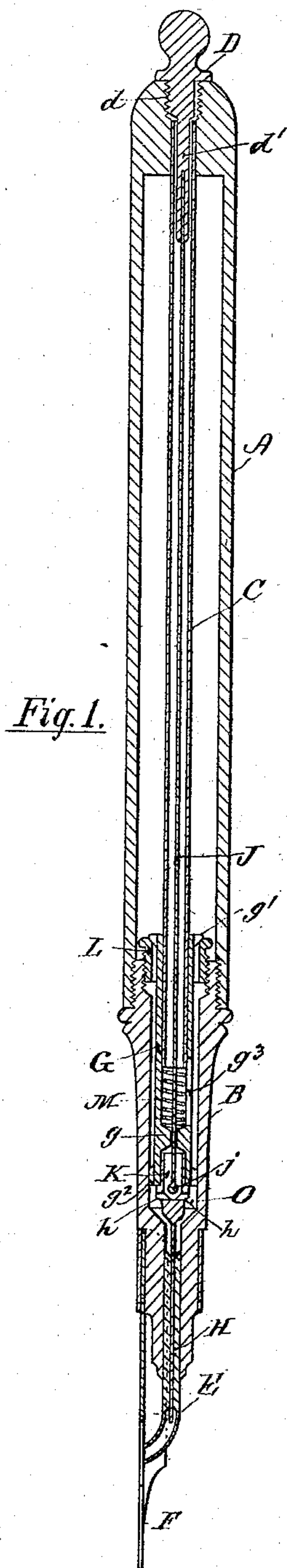


Fig. 1.

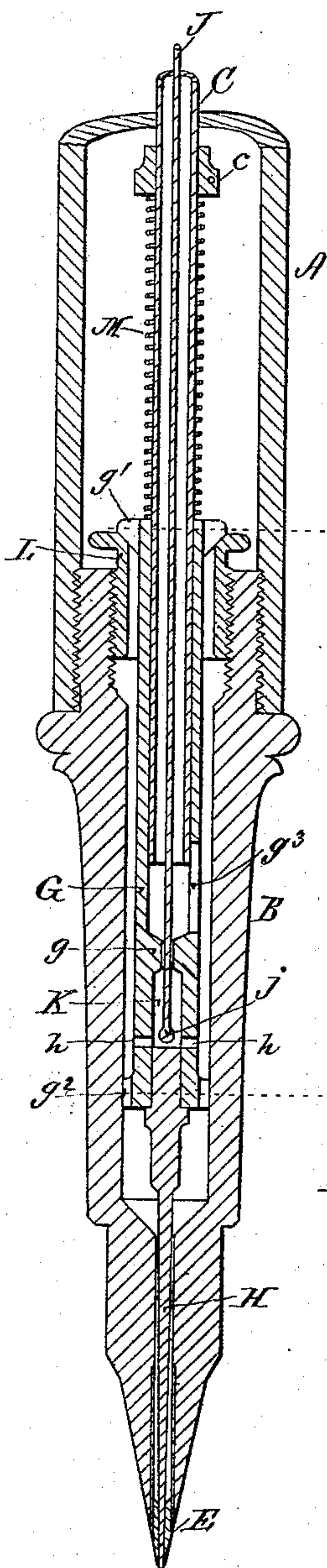


Fig. 3.

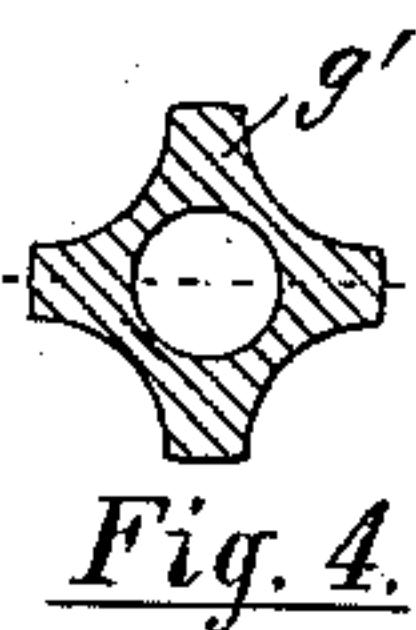


Fig. 4.

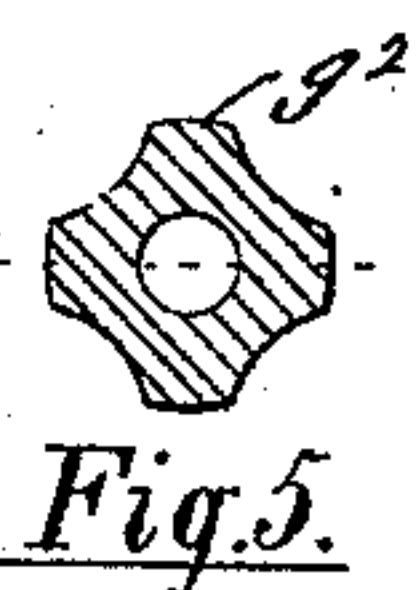


Fig. 5.

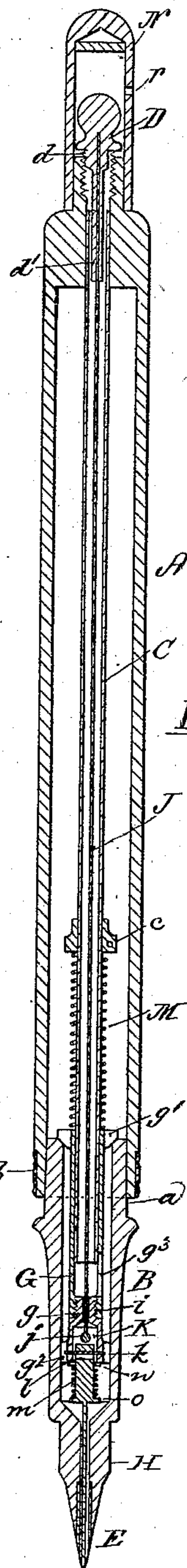


Fig. 2.

Witnesses.

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W. W. Hubbard

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(No Model.)

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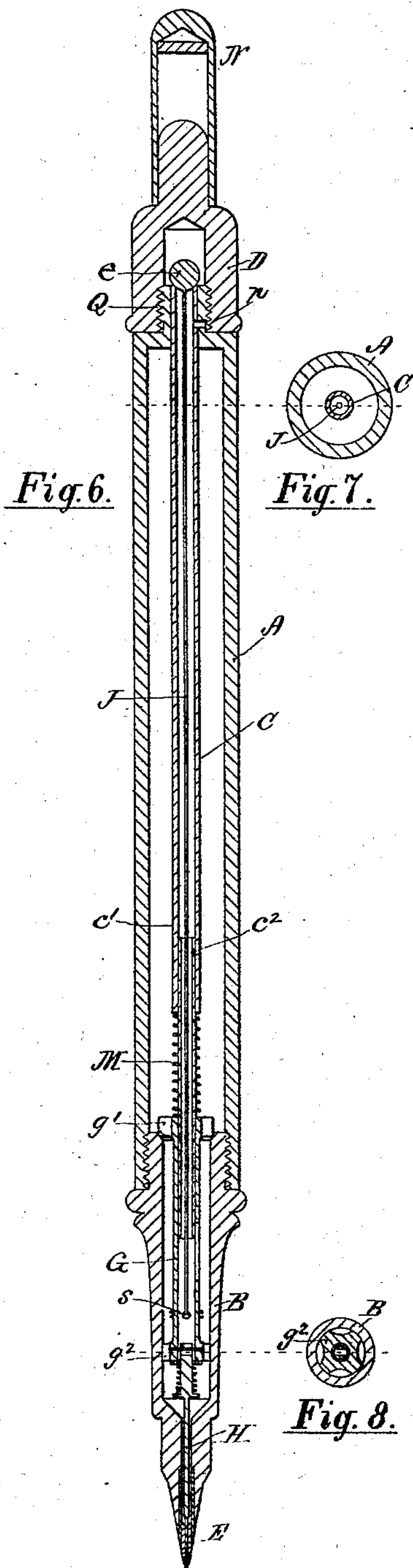


Fig. 6.

Fig. 7.

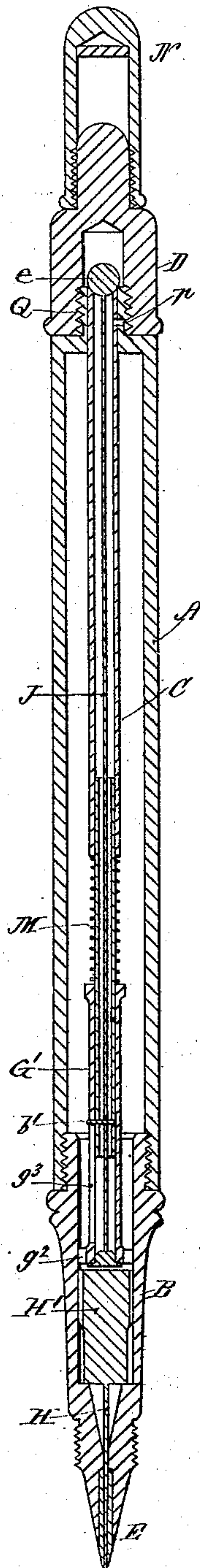


Fig. 8.

Fig. 12.

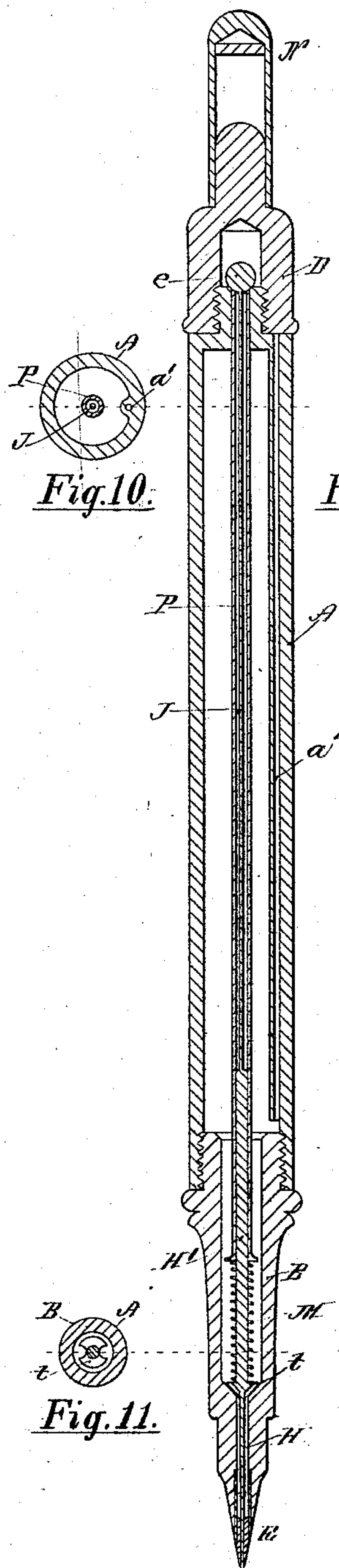


Fig. 10.

Fig. 9.

Fig. 11.

Witnesses.

Calvin E. Richards
W. W. Hubbard.

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Alonso J. Cross

UNITED STATES PATENT OFFICE.

ALONZO T. CROSS, OF PROVIDENCE, RHODE ISLAND.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 229,305, dated June 29, 1880.

Application filed April 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, ALONZO T. CROSS, of Providence, in the State of Rhode Island, have invented an Improvement in Fountain-Pens, of which the following is a specification.

My invention relates to that class of fountain-pens where the upper end of the reservoir is closed air-tight and air is admitted to the ink at the lower end of the ink-chamber, and it provides convenient means for clearing the fine tube at the lower end of the ink-chamber, or at the point of the pen, from interfering sediment or ink deposit, without the necessity, as heretofore, of either opening or partially opening the ink-chamber, with consequent liability of soiling the fingers with ink.

It also provides means for preserving the proper relative position of the ink-delivering tube and its inclosed clearing-spindle, under slightly varying conditions, in the connecting-joint between the point-section and the main reservoir, thus rendering it practicable to use a friction-joint for this connection, with consequent cheapness of manufacture.

Figure 1 is a central longitudinal section of a common fountain-pen provided with my improvement. Fig. 2 is a central longitudinal section of a stylographic fountain-pen provided with my improvement. Fig. 3 is an enlarged section, showing the point-section of a stylographic pen and the lower portion of the central air-tube and the reservoir. Fig. 4 represents a transverse section, taken at the accompanying dotted line, through the upper end of the spindle-carrying guide in Fig. 3. Fig. 5 represents a transverse section, taken at the accompanying dotted line through the lower end of the spindle-carrying-guide. Figs. 6, 9, and 12 are central longitudinal sections of a stylographic fountain-pen, showing modifications of my improvement. Figs. 7, 8, 10, and 11 are transverse sections of Figs. 6 and 9, respectively, taken at the accompanying dotted lines.

In the accompanying drawings, Fig. 1, A represents the ink-reservoir; B, the point-section; C, the central air-tube; D, the vent plug or valve; E, the ink-delivering tube, and F the writing-pen.

Upon the lower end of the air-tube C is placed the loosely-sliding spindle-carrying

guide G, to the lower end of which the tube-clearing spindle H is rigidly attached. The spindle H passes loosely through the contracted bore of the tube E, its point extending into the enlarged lower portion of the tube. The bore of the spindle-carrying guide G is contracted at the point *g* to receive the fine-wire connection J, extending between the spindle-carrying guide and the vent-valve D, the wire passing loosely through the contraction *g*, and being secured to the guide by means of the enlargement or head *j* within the chamber K at the upper end of the spindle.

The vent-valve D is provided with a stem or guide, *d'*, extending loosely for a short distance into the air-tube, and the screw-thread *d* of the valve is cut away upon one side, in order that the air may enter the tube as soon as the flange of the valve is raised from its seat upon the upper end of the outer case or reservoir, A.

The wire J is fitted tightly into the stem or guide *d'* of the valve, the swivel-joint in the spindle-carrying guide G serving to permit the valve to be turned for the purpose of opening or closing the vent, or for disconnecting the valve from the reservoir, the position of the head *j* and the contraction *g* being such that the screw-thread *d* may be entirely removed without raising the guide G from its seat upon the upper end of the point-section.

The spindle-carrying guide G is provided at its upper end with the stop *g'*, cut away, as shown in Fig. 4, to allow the passage of ink from the main ink-chamber into the point-section, and with an enlargement, *g*², at the lower end, also cut away, as shown in Fig. 5, to allow the passage of ink to the point of the pen. The enlargement *g*², nearly fitting the bore of the point-section, serves to preserve the central position of the spindle in its passage through the contracted bore of the tube E.

At the upper end of the point-section is placed the hollow screw L, by means of which the position of the lower end of the guide G may be adjusted with reference to the contracted aperture or throat at the lower end of the chamber O, in order to allow a more or less rapid flow of ink to the point of the pen, according as it is desired to write in a more or less shaded style.

The spindle-carrying guide G is provided upon one side with a slot, g^3 , opposite the lower end of the air-tube C, in order to allow for the desirable adjustment of the position of the guide without changing the point for admitting air to the ink-chamber. Side openings, h , are made in the upper enlarged hollow end of the spindle H, or in the lower end of the guide G, in order to provide for the free circulation of ink within the inclosed chamber K.

The tube E is frictionally held in the bore of the point-section, and is thus made extensible, in order to permit the employment of pens F of different lengths, the corresponding adjustment of the clearing-spindle and guide being made by means of the hollow screw L.

In using the pen the vent-valve is to be first slightly raised from its seat in order to admit air to the tube C. Then, if through obstruction in the tube E the ink fails to flow with the desired readiness to the point of the pen, the valve D is to be wholly unscrewed and drawn back, thus sliding the spindle-carrying guide G upon the air-tube C against the downward thrust of the spiral spring M, placed below the end of the air-tube, and also moving the spindle H within the tube E. The sudden release of the valve D from the fingers allows the spring M to impart a rapid downward movement to the spindle and guide, thus forcibly ejecting the ink through the tube E against the under side of the pen F.

The difficulty of starting the flow of ink for writing in ordinary fountain-pens of this class, where the column of ink is supported by a vacuum, has greatly tended to prevent their extended use; but my above-described improvement provides, in a vacuum fountain-pen, convenient means for forcibly expelling the ink from the lower portion of the ink-chamber whenever desired.

In Fig. 2 the point-section B is attached to the reservoir A by means of a friction-joint, a , causing the upper end of the point-section to be pressed more or less within the outer tube, A, forming the reservoir, the end of the tube A, preferably made of hard rubber or similar material, being strengthened by means of an encircling metal band, b .

The spring M (shown in Fig. 1 as below the lower end of the air-tube within the guide) is in this case placed above the guide upon the outside of the air-tube, being held between the fixed collar c and the guide.

The stop g' , made with open spaces for the passage of ink, as shown in Fig. 4, rests against the upper end of the point-section B, thus preserving the proper relative positions of the lower end of the spindle H and ink-delivering tube E, whether the point-section is passed more or less into the outer tube at the friction-joint. The position of the spindle H relatively to the stop g' may be changed by means of the adjusting-screw i , the guide G being made in two parts, united by means of a screw-thread. The spindle H is attached to the guide G by means of the pin k passing

through the slot l in the enlarged upper portion of the spindle, and the spindle is forced downward by means of the slight spiral spring m , operating between the loose washer n and the collar o upon the enlarged portion of the spindle, and the guide G is provided with a slot, g^3 , opposite the lower end of the air-tube, as in Fig. 1.

The spring M, which imparts movement to the guide G, is to be made stronger than the spring m , which operates the writing-spindle, in order that the guide G may be held firmly while in the act of writing, allowing the spindle H to vibrate with the movement of the pen. Connection is made by means of the wire J, loosely connected to the guide G, through the air-tube, to the stem of the vent-valve D.

In ordinary cases, in writing with this stylographic fountain-pen, the ink will flow readily from the writing-point upon slightly raising the vent-valve from its seat; but in case the pen has been unused for some time, or if the ink is not clear from dirt or sediment, so that the flow does not commence at the instant of raising the vent-valve, then, by simply unscrewing the valve and drawing the point of the spindle H back to the limit of the movement of the guide and suddenly releasing the same the spring M, acting against the guide, will throw the spindle downward, the guide operating as a plunger to forcibly eject a small quantity of ink through the tube at the writing-point, thus effectually clearing and starting the pen. The point-cap N may now be placed upon the upper portion of the handle or reservoir, the necessary supply of air passing to the vent-valve, and thence to the air-tube through the hole r in the side of the cap.

Fig. 3 represents a stylographic fountain-pen with the spindle H rigidly attached to the guide, and with a hollow adjusting-screw, L, at the upper end of the point-section, for regulating the position of the point of the spindle.

In Fig. 6 the wire J terminates in a ball or knob, e , at the upper end of the air-tube, covered by the vent-cap D, a side opening, p , being made through the side of the screw Q and connecting with the bore of the air-tube C, in order to admit air to the tube upon simply raising the vent-cap from its seat upon the upper end of the reservoir. The vent-cap D is to be entirely removed from the top of the reservoir, whenever it is desired to clear the point of the pen, by means of the backward movement of the spindle, as hereinbefore described.

The tube C is made in two parts, the portion c' being made of hard rubber and the portion c^2 of silver, or of a metal not readily corroded by the acids contained in ordinary writing-ink, and the spring M is placed upon the metal tube between the end of the tube c' and the spindle-carrying guide G. The wire J is connected to the guide by passing through the hole s in one side thereof and then passing around the body of the guide.

In Fig. 9 the wire J terminates in a ball or knob, e, at the upper end of a small metal tube, P, passing through the ink-chamber and out at the upper end of the reservoir, the air passing into the ink-chamber through the duct a', made in the side wall of the reservoir, being prevented from passing down the tube P by reason of its comparatively small bore, and by the thread of the screw closely fitting the screw-thread of the vent-cap.

The writing-spindle H is provided with an enlarged lengthened shank, H', to form a guide loosely passing into the bore of the tube P. The wire J is firmly secured in the upper end of the guide H', and the spring M is placed upon the guide H' between the lower end of the tube P and the grooved stop t at the lower end of the guide, which rests against the interior shoulder of the point-section.

By slightly unscrewing the vent-cap air will be admitted to the lower portion of the ink-chamber through the duct a', and in case it is desired to cleanse the fine tube E from sediment the vent-cap D is to be entirely removed and the spindle drawn back, as hereinbefore described, by means of the wire passing through the tube P, the downward movement of the spindle being limited by the point-section when the pen is closed and ready for use, and by the wire and knob, or by an equivalent stop, whenever the point-section is removed for the purpose of filling the reservoir.

In Fig. 12 the spindle-guide H' is held in the point-section and disconnected from either the air-tube or the main reservoir, and in this case the sliding extension G' upon the air-tube is to be drawn back by means of the connected wire J passing loosely through the air-tube, as hereinbefore described. The tube E may then be cleared by either shaking the guide H' back and forth longitudinally through the increased space between its upper end and the lower end of the sliding extension G', or by allowing the extension-piece G' to spring back suddenly by the action of the spring M, forcing the guide H' downward and ejecting a quantity of ink through the tube E. The sliding extension G'

is secured to the air-tube by means of the pin b' passing through the slot g³ in the side of the extension.

I do not claim in this application an air passage or duct made in the solid side or wall of the reservoir, as shown in Fig. 9, the same having been shown and claimed by me in a prior application.

I claim as my invention—

1. In a fountain-pen in which the column of ink in the reservoir is supported by atmospheric pressure, an ink-delivering tube of small diameter, in combination with an inclosed tube-clearing spindle, provided with means for forcible backward movement, passing through an inclosing-tube to the upper portion of the ink-reservoir, and operating against the downward action of a spring, substantially as described.

2. In a fountain-pen in which the column of ink in the reservoir is supported by atmospheric pressure, the combination of an air-supplying tube with a sliding extension forced downward to its stop by means of a spring, and provided with means for forcible retraction, passing through the air-tube to the upper portion of the reservoir, substantially as and for the purpose specified.

3. In a fountain-pen in which the column of ink in the reservoir is supported by atmospheric pressure, and an ink-delivering tube of small diameter, the combination of a tube-clearing spindle with the vent plug or valve by means of a loose swiveled connection passing through the air-supplying tube, substantially as described.

4. In a fountain-pen in which the column of ink in the reservoir is supported by atmospheric pressure, a point-section provided with a hollow screw at its upper end, to form an adjustable seat for a spindle-carrying guide operated downward by a spring, substantially as described.

ALONZO T. CROSS.

Witnesses:

CELIUS E. RICHARDS,
H. WILBER HUBBARD.