

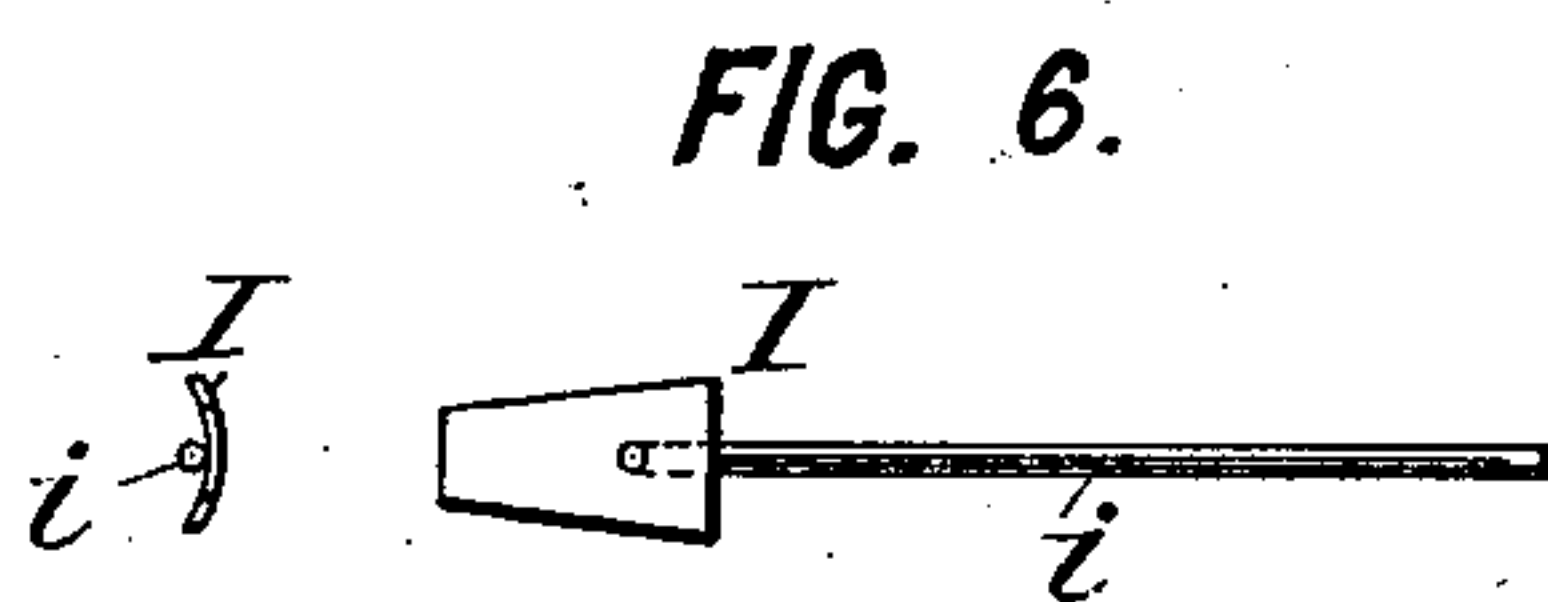
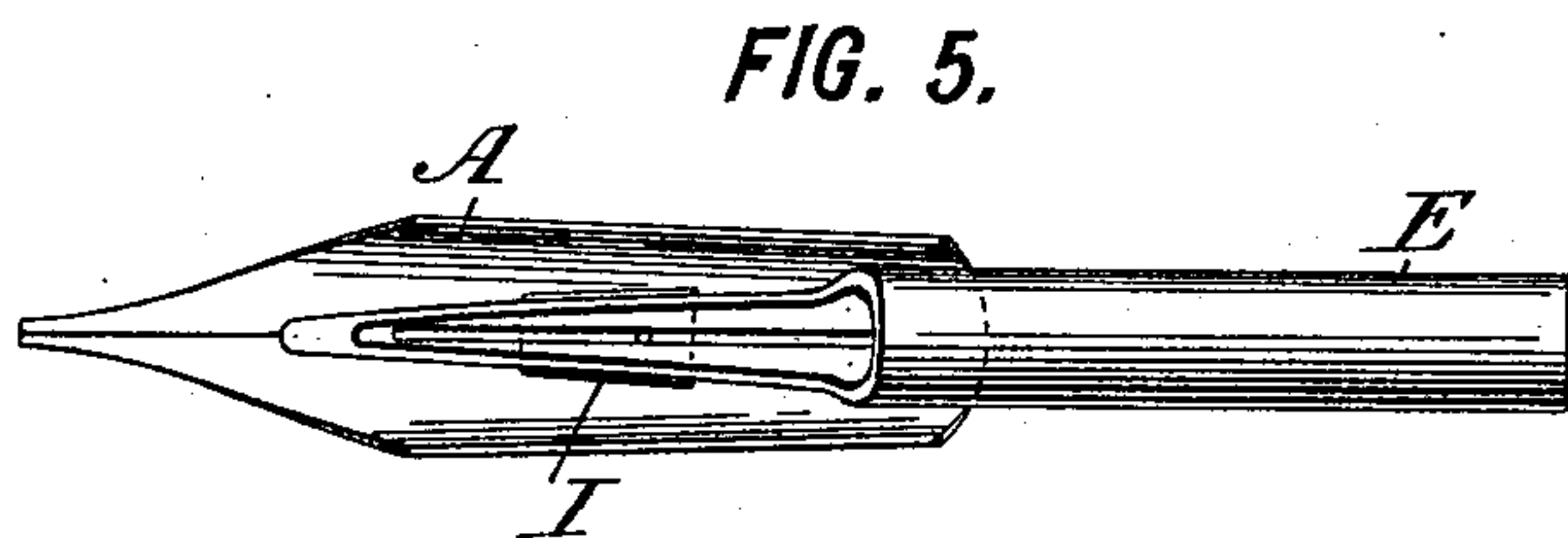
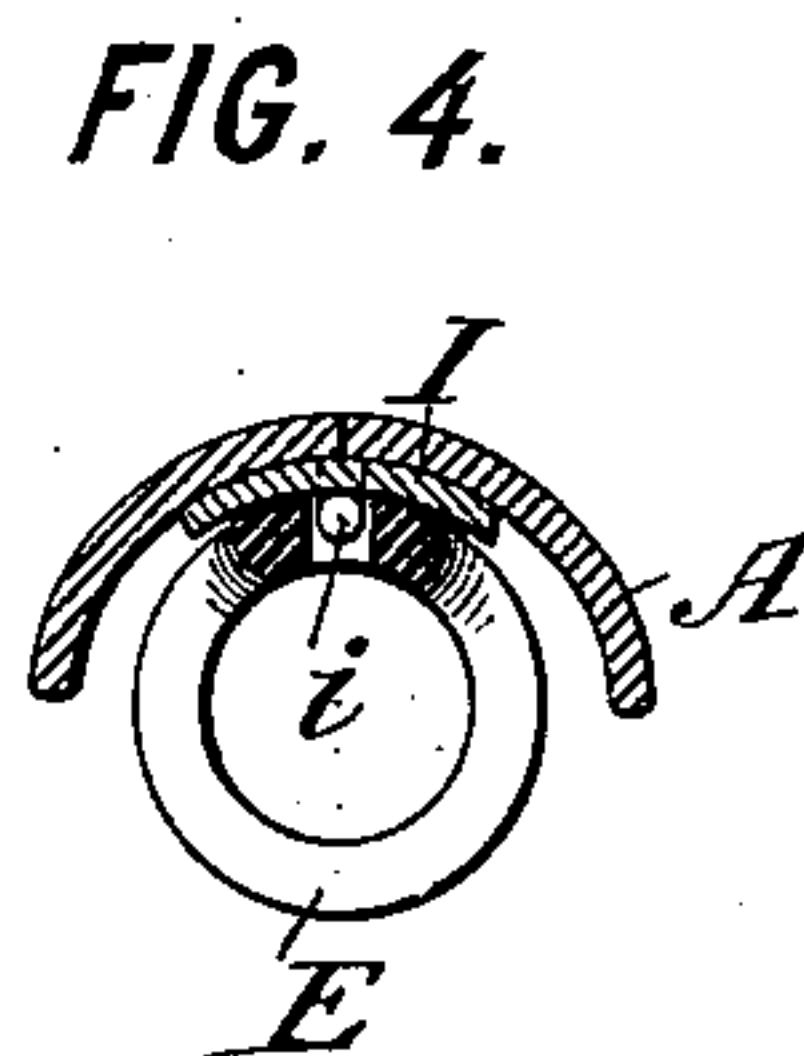
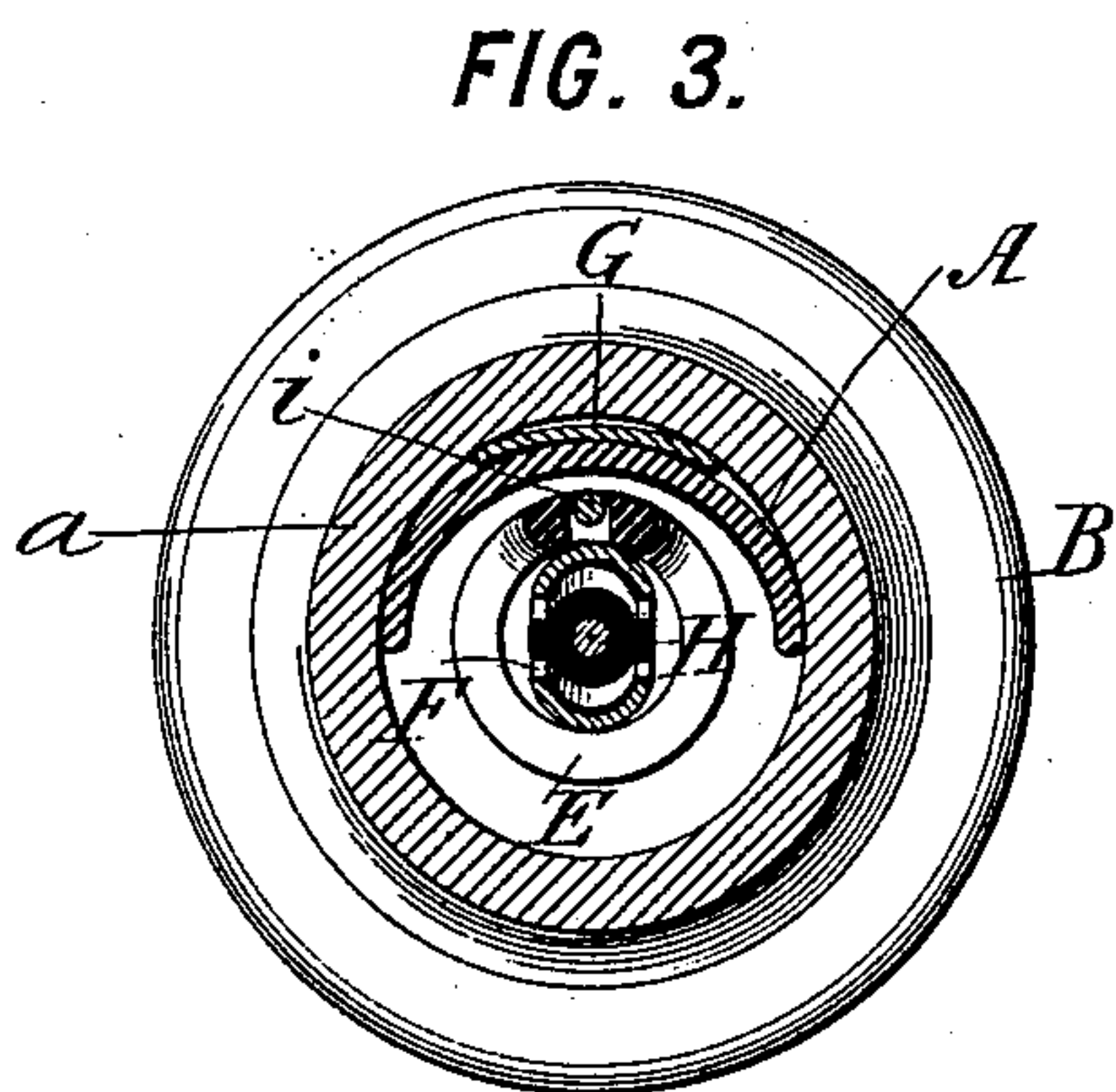
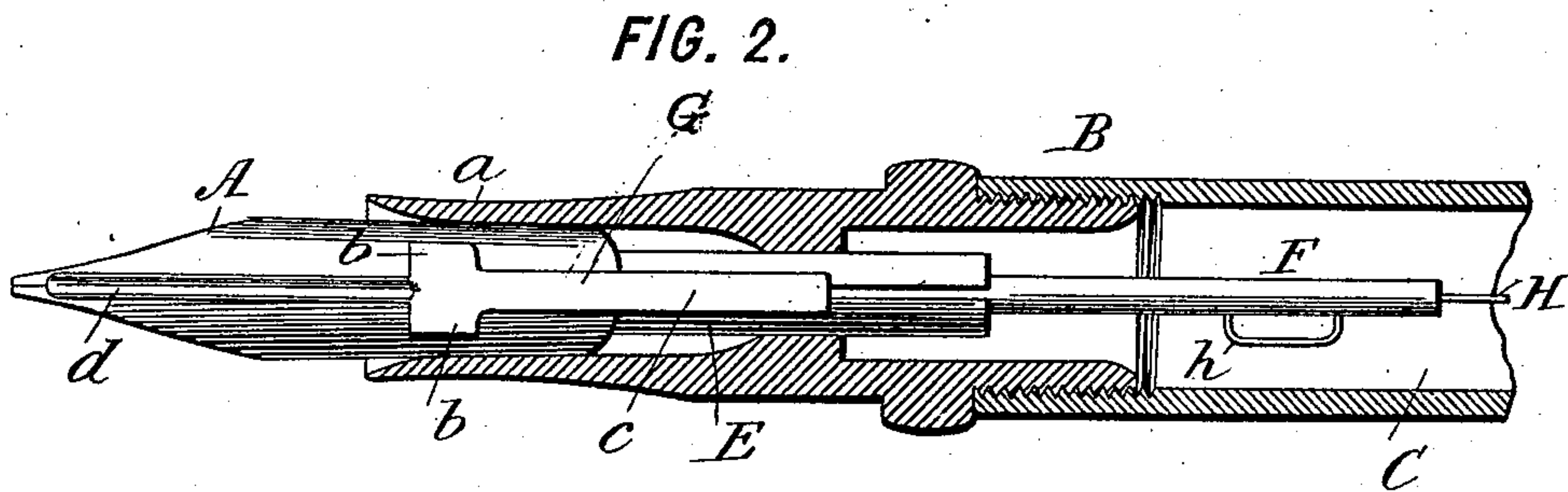
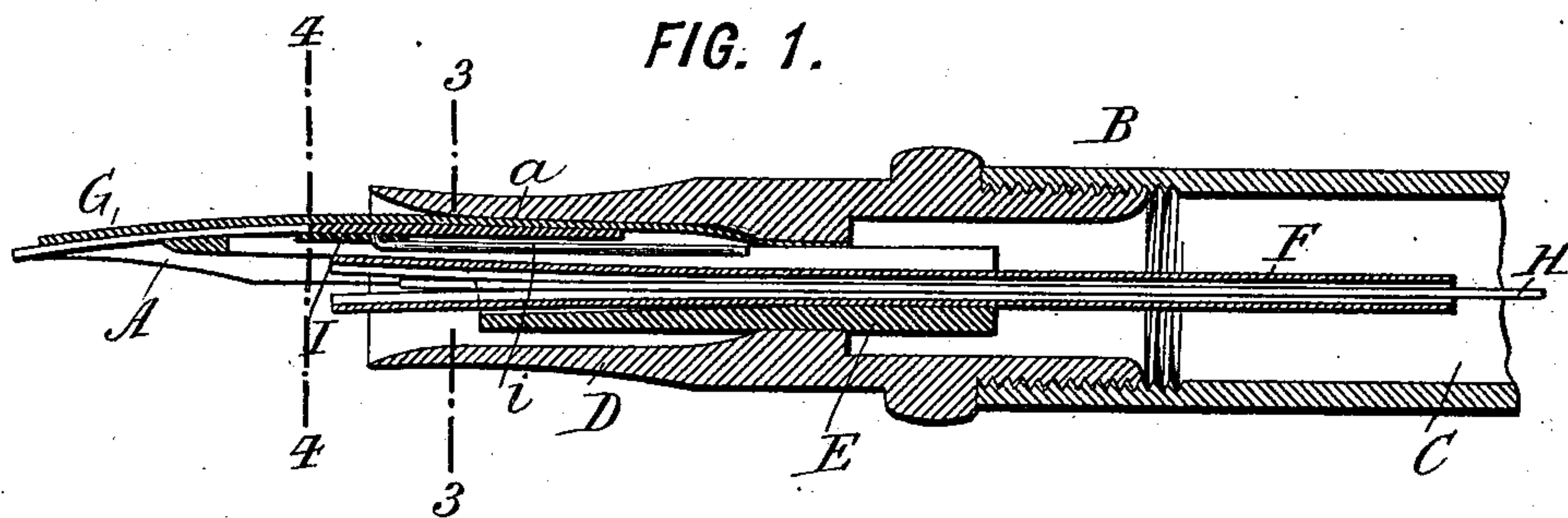
(No Model.)

2 Sheets—Sheet 1.

W. W. STEWART.  
FOUNTAIN PEN.

No. 549,165.

Patented Nov. 5, 1895.



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FIG. 7.

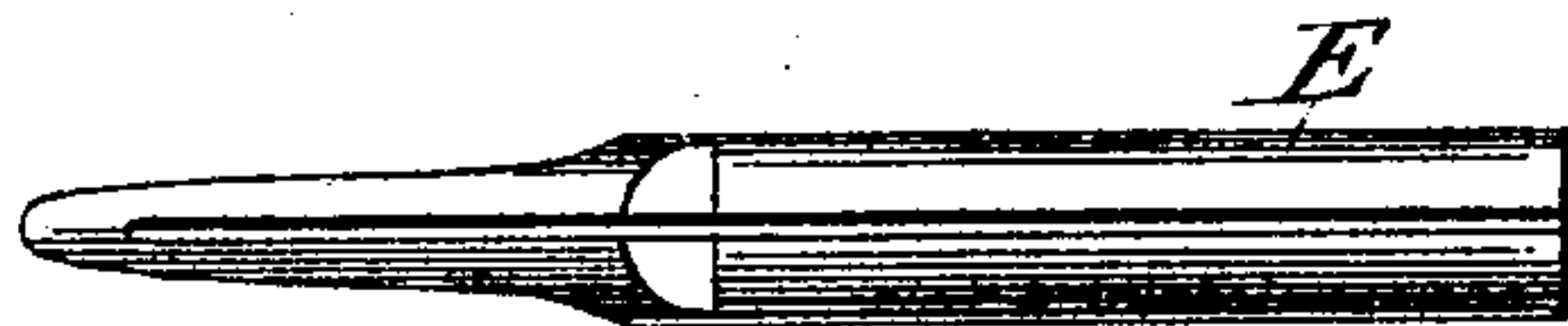


FIG. 8.



FIG. 9.

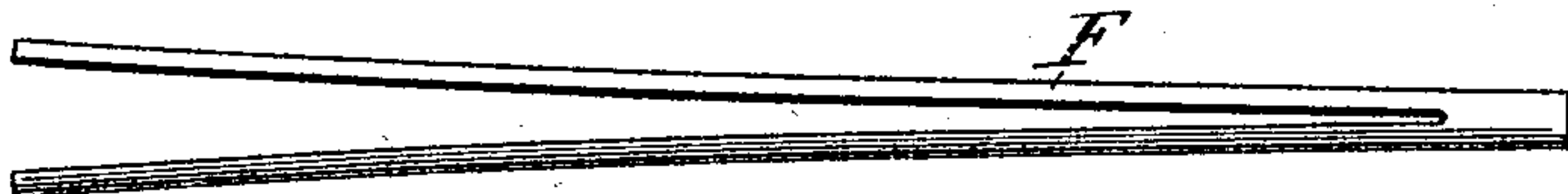


FIG. 10.

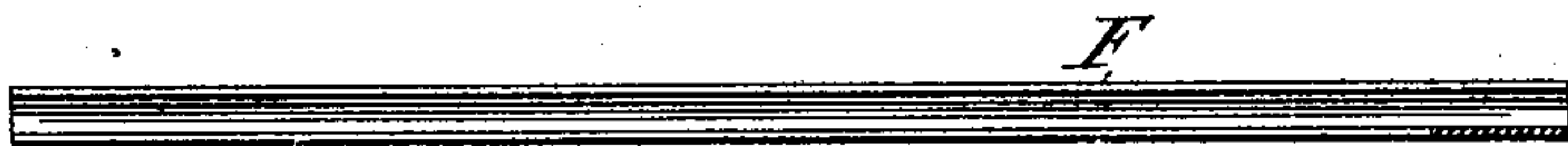


FIG. 11.

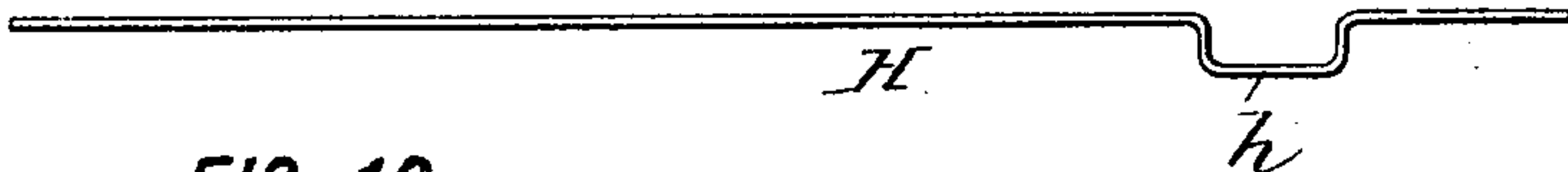


FIG. 12. G

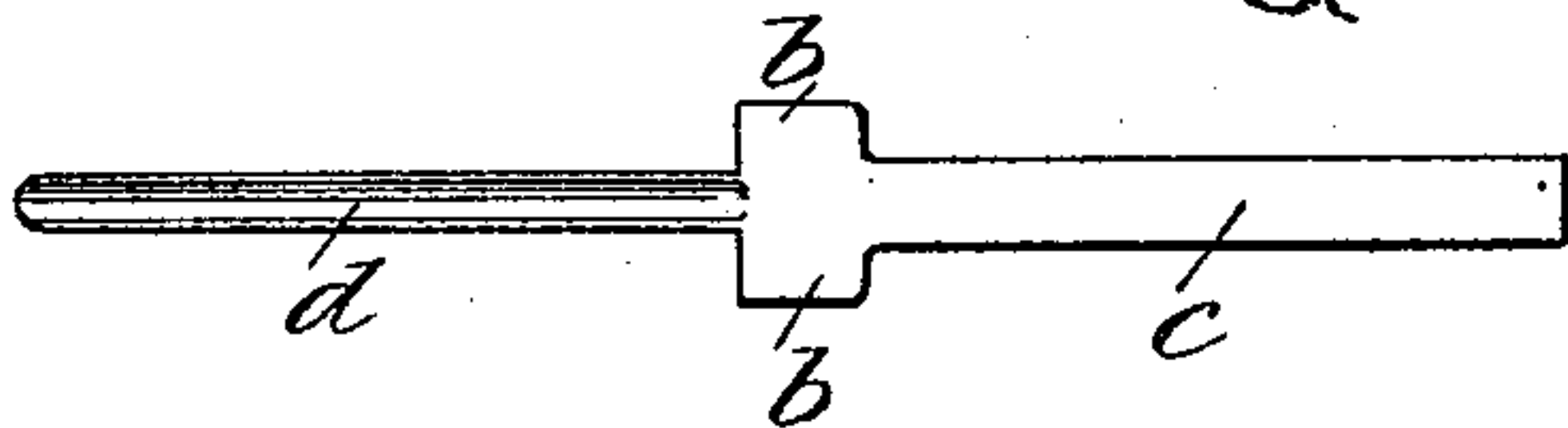
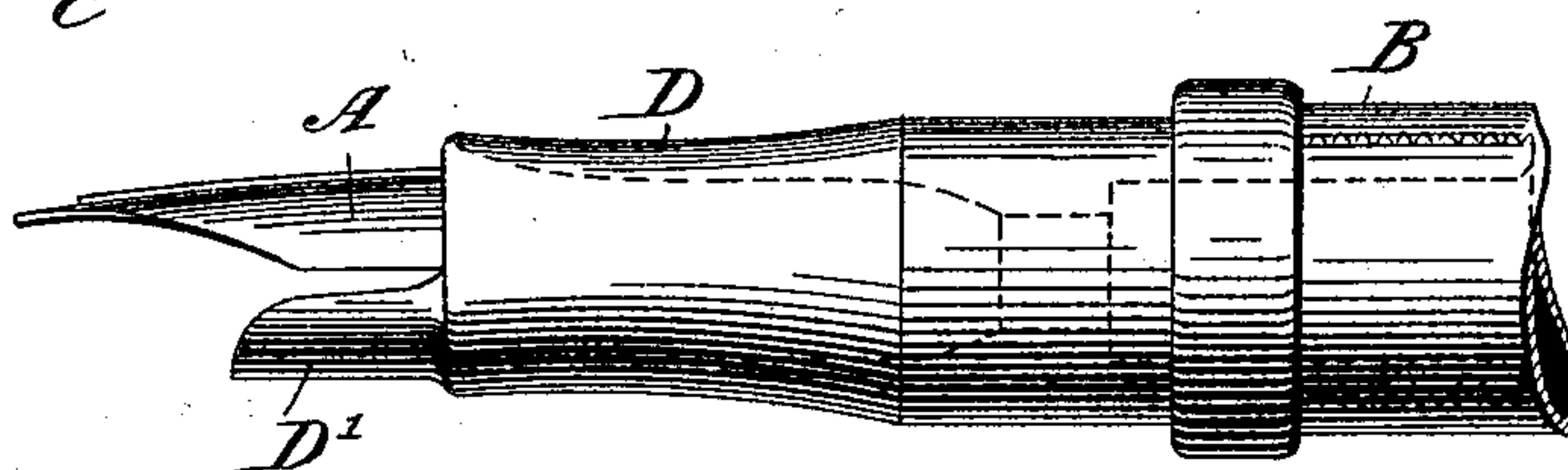


FIG. 13.



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# UNITED STATES PATENT OFFICE.

WILLIAM W. STEWART, OF BROOKLYN, NEW YORK.

## FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 549,165, dated November 5, 1895.

Application filed February 17, 1893. Serial No. 462,686. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM W. STEWART, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

This invention relates to fountain-pen-holders of the same general character as those covered in previous patents of mine.

My invention provides an improved construction designed to more perfectly control the flow of ink and the movement of air. In my improved pen the holder communicates with the pen-nib through the medium of a perforated nozzle, in which, by preference, is inserted a tubular feed-bar, and through this feed-bar passes a vent-tube, which is split or slitted. By this construction capillary spaces are formed, through which the ink may flow from the reservoir to the pen-slit and through which air in a finely-subdivided state may pass upward, its movement, however, being just sufficiently retarded to properly control the downward flow of ink. In the larger sizes of holders a wire or strand is extended through the vent-tube. A key or finger is arranged on the top or exterior of the pen, being wedged tightly in the nozzle and serving to cover the upper portion of the slit in the pen, while communicating with the supply of ink in the nozzle to lead it down upon the pen as a top-feed, although this is not essential. The vent-tube is adjustable up or down, in order to regulate the flow of ink and make the pen write freely or scantily, as may be desired by the writer.

My present invention is more directly an improvement upon that disclosed in my Patent No. 378,986, dated March 6, 1888.

Figure 1 of the accompanying drawings is a longitudinal mid-section, on an enlarged scale, of the lower part of a fountain-penholder constructed according to my invention. Fig. 2 is a longitudinal section thereof in a plane at right angles to Fig. 1. Fig. 3 is a transverse section thereof on the line 3 3 in Fig. 1 on a further enlarged scale. Fig. 4 is a similar cross-section on the line 4 4 in Fig. 1. Fig. 5 is an under side elevation of the pen and feed-bar or tubular plug removed. Fig. 6 shows in plan an end elevation a thin

curved plate or tongue introduced between the pen and feed-bar. Fig. 7 is a plan of the upper side of the feed-bar removed. Fig. 8 is a longitudinal section thereof looking from the under side. Fig. 9 shows the split vent-tube withdrawn. Fig. 10 is a longitudinal section thereof. Fig. 11 shows the central wire removed. Fig. 12 shows the top feed finger or key removed. Fig. 13 is a side elevation showing the addition of an under projection from the nozzle.

Let A designate the pen proper or pen-nib, which is preferably a gold pen, although a steel or composition pen may be used.

Let B designate the penholder as a whole. It is constructed of an upper tubular body-piece C, closed at the upper end, as usual, to form within it an ink-reservoir, and closed at its lower end by a nozzle D, within which the pen is held. This nozzle preferably screws into the tubular body C of the holder and is preferably formed with a contracted portion or throat *a* above the pen.

Through the nozzle is inserted a feed-bar E, constructed, preferably, of a tube fitting into the throat *a* and slitted along its upper side from its upper end, which projects into the holder down nearly to its lower end, which lies against the pen, so that the slit thus formed constitutes a capillary line or channel communicating from the body of ink in the holder down to the slit in the pen-nib. The lower end of the bar is cut away on the under side, so that it forms a tongue or finger lying against the pen. The pen A rests on the upper side of the feed-bar and is wedged in place between the bar and the interior of the nozzle, so that it is tightly held.

Through the tubular bore of the feed-bar is inserted a tube F, which I call a "vent-tube." This tube is sufficiently smaller than the feed-bar, so that it fits loosely therein and may be moved easily up or down, but yet tightly enough to retain its position after adjustment. It is split along both sides from one end nearly to the other, as shown in Figs. 9 and 10, so that two fingers or tongues are formed which are given a tendency to spread apart, as shown in Fig. 9. By reason of this tendency the vent-tube when inserted in the feed-bar presses outwardly against the bore thereof, by which its fingers are held closed



nearly together, leaving free capillary spaces along the split portions on the opposite sides of the tube. The bore in the feed-bar is not cylindrical, but is slightly tapered, as shown in Fig. 8, being larger at the lower end, while at the upper end it is small enough to fit the vent-tube somewhat closely. It results from this construction that the split halves of the vent-tube are held together above the feed-bar and in the upper portion of the feed-bar, and that they are permitted to gradually recede from each other as the lower end of the feed-bar is reached. This flaring of the bore in the feed-bar is not wholly essential, but is desirable, as it affords the most perfect construction.

The vent-tube may be rotated in the feed-bar to any position so as to bring its slits either in a vertical or horizontal plane, or in any intermediate inclined plane, the best results being believed to be attained by the arrangement in a horizontal plane, as shown in Fig. 3, so that the slits in the vent-tube are brought out of direct communication with the capillary slit in the feed-bar. The vent-tube may be pushed up or down in order to leave more or less of the lower portion of the capillary slit in the feed-bar exposed, or if need be, to wholly cover it. By this adjustment the flow is regulated to suit the individual requirements of the writer.

On top of the pen is placed a top feed finger or key G. (Shown detached in Fig. 12.) This is formed of a thin plate widened at its middle portion to form wings *b b*, having a shank *c* extending upwardly therefrom and a feed-finger *d* extending downwardly therefrom. It is introduced above the pen with its shank *c* entering the throat *a*, which is over the capillary slit in the feed-bar, while its finger *d* projects down along and over the slit in the pen. The wings *b b* are made long enough to strike the inner walls of the throat, and so that they are pressed down thereby, as shown in Fig. 3, and consequently by reason of their elasticity they serve to wedge the key or top feed-plate in place.

Through the bore of the vent-tube F is inserted a wire or strand H of sufficient size to nearly fill the bore. This wire is shown removed in Fig. 11. It is adjustable up or down in the bore in order not only to clear the passage, but also to regulate the flow of ink and thereby adapt the pen for different kinds of writing and the requirements of different individual writers. This adjustment is effected by unscrewing the nozzle D from the body C of the holder, thereby exposing the portion of the wire projecting above the nozzle, and to facilitate its engagement it is formed with a laterally-extending loop *h*, into which a knife-blade or other similar object may be inserted to slide the wire up or down.

In Fig. 6 is shown a thin plate or tongue I, which, for convenience, is mounted on a wire or rod *i* being fixed thereto. This plate I is

inserted on top of the feed-bar and between it and the pen, as shown in Figs. 1, 4, and 5. By lying across the under side of the pen it lifts the latter off from the surface of the feed-bar and insures the maintenance of a space between the two, thereby reducing the suction which is liable to occur if they are too close. The wire or rod *i* is dropped into the capillary slit in the top of the feed-bar, where it serves to prevent the displacement of the tongue or plate I, and it has also the advantage of affording a means for handling this minute tongue in taking the pen to pieces. This tongue I is not always used, its purpose being to prevent the ink collecting in a drop beneath the pen and falling off, forming a blot. Some fountain-pens are fairly satisfactory in their operation with the one exception that at times the ink will drop from the pen. With such pens the insertion of this tongue under the pen and across the narrow feed-duct or capillary-slit serves to let air and ink pass while cutting any bubbles and so controlling the flow as to prevent the collecting of the ink in a drop which would fall from the pen. The tongue I may be riveted to the pen A, if preferred.

I prefer to construct all the parts of my fountain-penholder of hard rubber, except the wire H and the top feed-plate G, which I prefer to make of metal. The tongue I may be of metal, hard rubber, or quill. If metal be used, it should be of gold, in order not to tarnish, and the wire *i* is preferably of gold.

The fountain-pen is filled by unscrewing the nozzle from the holder and filling the latter with ink by means, preferably, of a dropper and then screwing back the nozzle. The pen is not at once fit for use, as the surfaces of the hard rubber are not readily wetted by the ink, requiring to be soaked or saturated before they will afford the requisite capillary cling for properly controlling the ink. Before the holder has been properly soaked the ink will run out in drops, but after soaking for several hours the flow becomes properly regulated by capillary action. At first the vent-tube F should be adjusted so far down that it will cover the capillary slit in the feed-bar. This gives the minimum flow. If a freer flow is desired, the user will gradually push the vent tube upward until the flow is sufficiently augmented to satisfy his requirements. When the vent-tube is adjusted to its lowest position, it closes the under side of the capillary slit in communication with the pen and prevents the admission of air at this point, so that the flow, which in reality is controlled by the facility with which the air may mount into the holder is restricted; but by adjusting the vent-tube upwardly continually more of the capillary slit is uncovered and the flow is proportionately augmented.

For ordinary writers the wire H is adjusted well up in the holder, in order to give the maximum flow. For a less flow it has to be



slid lower down. The wire, while loosely fitting the bore so as to leave a contracted passage for minute and saturated air-bubbles around it, is held firmly in position by its loop *h* passing out of the bore through the slit in the tube *F*, and as this tube is held together by being confined in the feed-bar it embraces both branches of the protruding loop with sufficient frictional cling to hold the wire in place.

My improved fountain-pen has proven itself, by practical use, very perfect in operation. It has the advantage that in practical use no stoppage of the flow occurs by reason of any clogging of the passages, since several contracted or capillary longitudinal spaces or passages are provided, so that if one is choked a flow can continue through the others. The air may pass upward through some of these spaces while the ink descends through others. Ordinarily the air will ascend through the center of the vent-tube, the wire therein being employed to assist this movement and subdivide any bubbles that may form in the tube and tend to choke it. The entering air is very thoroughly subdivided, being reduced to the condition of minute saturated bubbles constituting froth or foam, these bubbles being too small to choke the passage, so that they are powerless to obstruct the flow of ink, while, by existing in great numbers, they sufficiently oppose the movement of ink to afford an ample control over it and thereby prevent its flowing too freely.

Ordinarily the wire *H* will be used only for large pens. For smaller pens this wire may be omitted and the vent-tube made with a smaller bore, or instead of a vent-tube a vent-bar may be used, split so that its legs will tend to fly apart, as shown in Fig. 9.

In Fig. 13 I have shown the nozzle *D* constructed with an extension *D'* projecting on the under side beneath the pen *A* and serving to constitute a short socket to prevent the ink from dropping off from the pen, by holding a small quantity of ink, and consequently serving to saturate the air to soften or render less tenacious the air-bubbles which pass upward. By thus partly inclosing the space beneath the pen the tendency of the ink to drop from the pen is greatly reduced. In some cases an external tubular extension is employed, in which case the prolongation *D'* may be housed entirely within this extension so as to be hidden, becoming thus an additional reservoir for holding a small supply of ink down near the pen, or the under extension may be made of a separate piece inserted between the feed-bar and the nozzle.

A special vent may be made to lead to it from the reservoir, if desired.

I claim as my invention the following-defined novel features or improvements, substantially as hereinbefore specified, namely:

1. In a fountain pen, a holder having a nozzle combined with a tubular feed-bar extended through the nozzle and communicating with the pen, and an elastic split vent tube inserted through the bore of the feed-bar engaging the bore frictionally, so as to be adjustable up and down, and its legs tending to spring apart so that when they project below the feed-bar they diverge.

2. In a fountain pen, a holder having a nozzle combined with a tubular feed-bar inserted in said nozzle and communicating with the pen, said feed-bar having a flaring bore largest at the lower end, and a split vent tube inserted through the bore of said feed-bar, whereby its opposite sides form divergent fingers.

3. In a fountain pen, a holder having a nozzle, a feed-bar passing through said nozzle and having a longitudinal bore, a vent tube inserted in the bore of said feed-bar, and a wire traversing the bore of said tube and formed with an abrupt loop above the feed-bar and within the ink reservoir for engaging it to adjust it longitudinally and thereby to regulate the flow.

4. In a fountain pen, a holder having a nozzle through which extends a longitudinal slitted tube, combined with a wire traversing the bore of said tube and formed with an abrupt loop extending laterally through the slit in said tube, and elastically embraced thereby so that it is held frictionally in any position to which it may be adjusted.

5. In a fountain pen, the combination with the pen-nib and feed-bar fitting against the under side thereof, of an interposed thin plate or tongue *I* serving to slightly separate them beneath the nozzle, whereby the dropping of ink from the pen is prevented.

6. In a fountain pen, the combination with the pen-nib and feed-bar, the latter having a longitudinal slit on the side next the pen, of a thin plate or tongue *I*, and an attached wire or bar *i*, the tongue adapted to be inserted between the feed-bar and pen, and the wire to be inserted in the slit in the feed-bar.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM W. STEWART.

Witnesses:

ARTHUR C. FRASER,  
CHARLES K. FRASER.