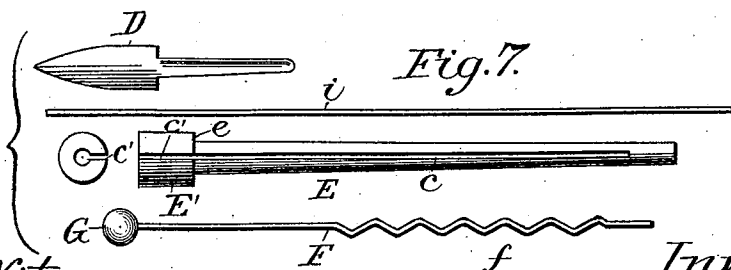
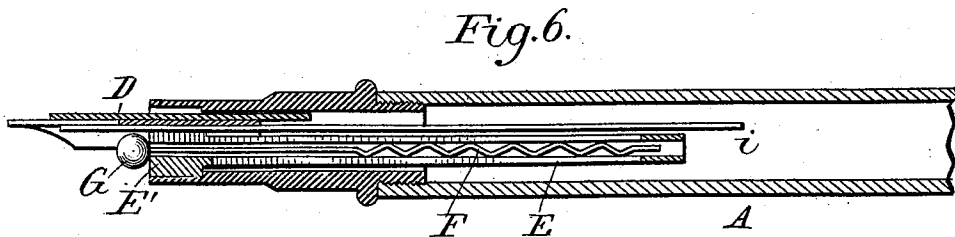
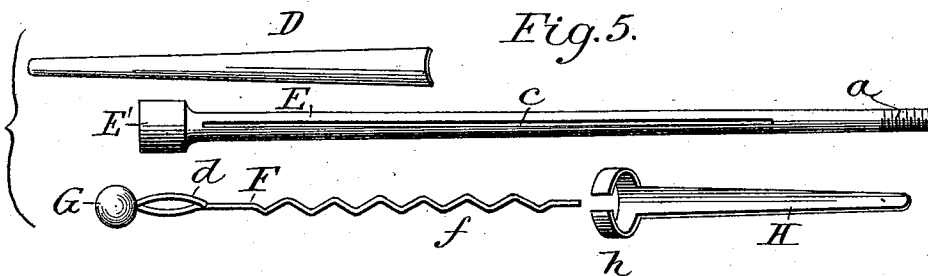
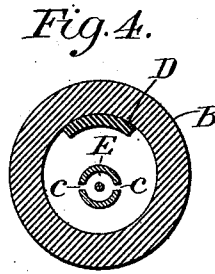
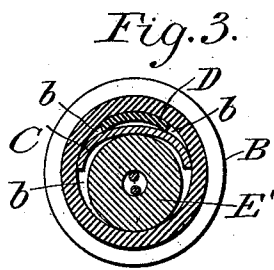
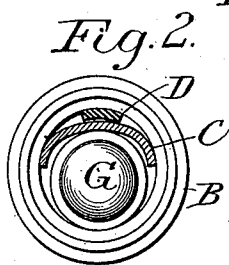
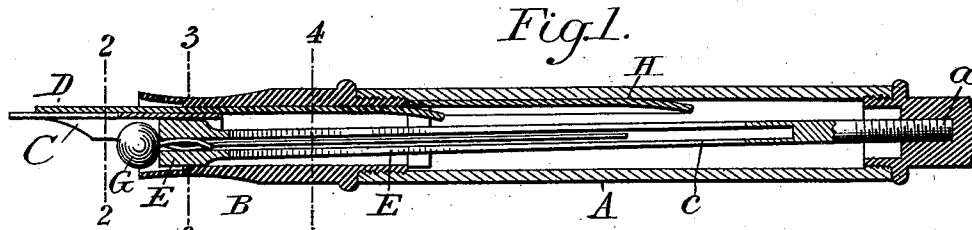


W. W. STEWART.
FOUNTAIN PEN.

No. 549,166.

Patented Nov. 5, 1895.



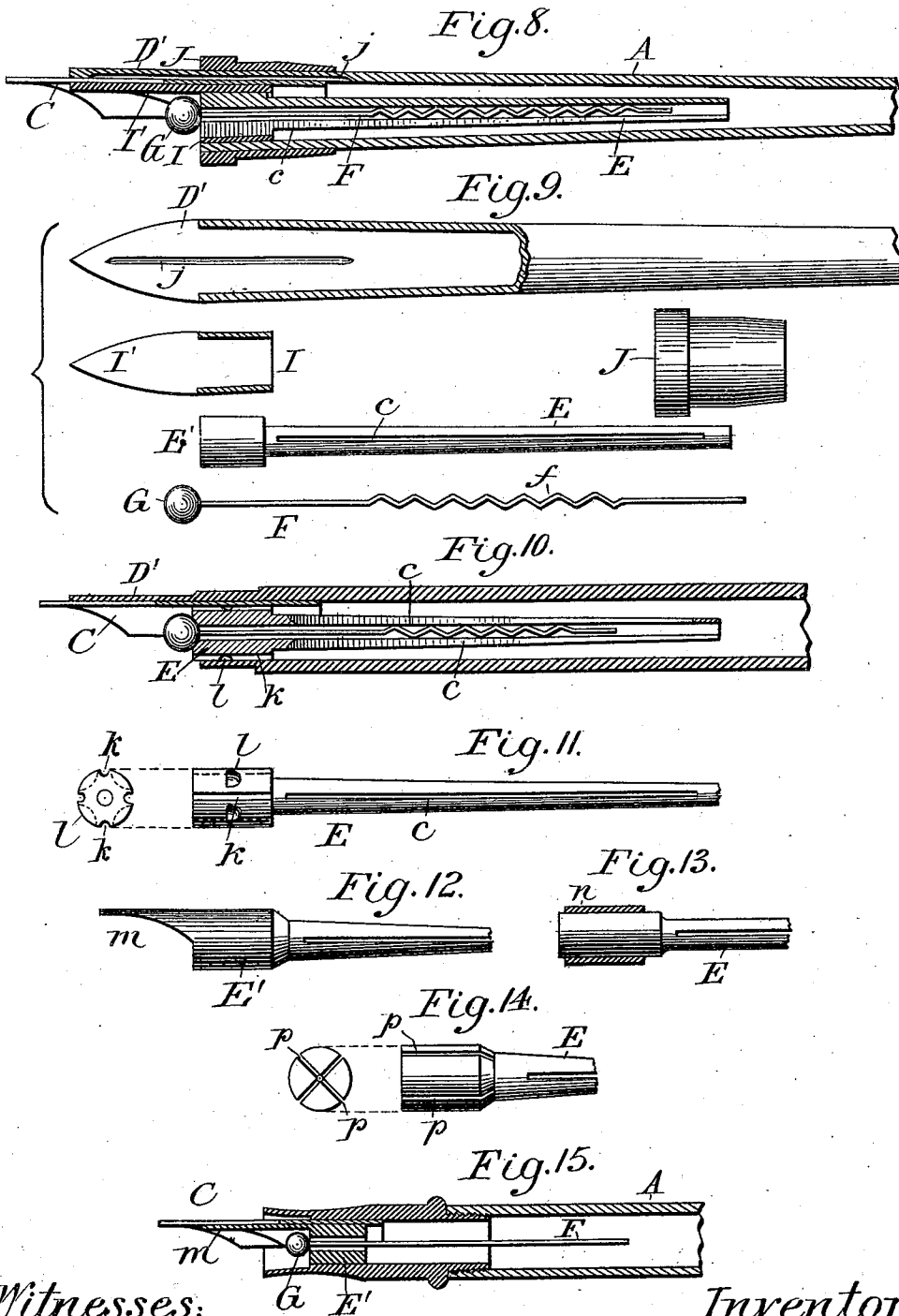
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UNITED STATES PATENT OFFICE.

WILLIAM W. STEWART, OF BROOKLYN, NEW YORK.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 549,166, dated November 5, 1895.

Application filed April 11, 1895. Serial No. 545,373. (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.

The object of this invention is to produce a fountain-pen which shall be cleanly, which may be easily filled with ink, and in which the flow of ink may be readily controlled. The construction provided by my present invention is especially adapted to large pens, although applicable to small pens. The construction of my improved fountain-pen is such that it can be filled with ink without unscrewing the nozzle or removing the pen by merely applying an ink-filler charged with ink to the exterior feeding-surfaces while the pen is inverted, the ink thus supplied being drawn by gravity and capillary action into the reservoir, while the air contained therein is expelled or exhales through interstices in the nozzle. My present invention therefore provides a specific construction coming within the generic principles laid down in my patent for fountain-pens, No. 542,450, granted July 9, 1895. This method of filling a fountain-pen from the exterior and without opening the holder is now called "self-filling."

The accompanying drawings illustrate different embodiments of my invention.

Figures 1 to 5 show the preferred form, Fig. 1 being a longitudinal mid-section, Figs. 2, 3, and 4 sections on a larger scale on the lines 2, 3, and 4, respectively, in Fig. 1, and Fig. 5 showing the internal parts removed. Figs. 6 and 7 illustrate another form or modification, Fig. 6 being a longitudinal mid-section, and Fig. 7 showing the internal parts removed. Figs. 8 and 9 illustrate another form or modification, Fig. 8 being a longitudinal mid-section, and Fig. 9 showing, partly in section, the various parts separated. Figs. 10 and 11 show another construction, Fig. 10 being a longitudinal mid-section, and Fig. 11 an end and side elevation of the feed-bar removed. Figs. 12, 13, and 14 show modifications of the feed-bar or stopper. Fig. 15 is a section of a further modification.

In its general construction my invention constitutes an improvement upon the con-

struction shown in my Patent No. 354,664, dated December 21, 1886. In that patent a feed-bar passes through the opening or throat in the nozzle and extends into the reservoir, its outer end serving as a bearing for the pen, which is thrust into the annular space between it and the nozzle and fastened therein by a key or wedge. In that patent, however, the feed-bar fits the throat of the holder somewhat snugly, so that to provide ducts for the passage of ink and air grooves are made in the interior of the nozzle or on the exterior of the bar. I now arrange the bar so that it nearly fills the throat or passage and yet leaves sufficient space around it for the desired movement of ink and air. I make the bar tubular, as before, and fill its bore with a wire or irritant to maintain the fluidity of the ink.

Referring to Figs. 1 to 5, let A designate the tubular holder or reservoir; B, the nozzle or pen-holding section which screws into the reservoir; C, the writing-pen; D, a top feed-bar or key laid over the pen and extending back into the nozzle, and E the feed-bar or stopper-bar extending from the exterior through the nozzle and into the reservoir. In this construction it extends through the reservoir and is screw-threaded at its upper end *a*, which screws into the closed upper end of the reservoir. The lower end of the bar E is enlarged at E' to form a partial stopper for nearly closing the throat or passage through the nozzle. Sufficient space is left between the stopper-head and nozzle to admit the pen C and key or top feed-bar D. The heel of the pen is best thrust somewhat back of the head E', so that it projects into the mass of ink in the lower part of the reservoir, the ink filling the interstices *b b*, Fig. 3, around the stopper, pen, and top feed. The proportions are such that these interstices are sufficiently contracted to hold the ink by capillary attraction and prevent it rolling out or bleeding. The main feed-bar E extends beyond the nozzle and into the main portion of the reservoir, and in the construction shown extends entirely through the reservoir, being fastened to the upper end thereof, as shown. The bar E is tubular, being bored through either for its entire length, or for the greater portion of its length. In addition, it is formed on one or more sides with a slit *c*,

formed by sawing through from the exterior into the bore, this slit extending longitudinally to or through the head E'. In this construction the slit is shown as not entering the head. Through the bore is thrust a wire F of polished non-corrodible metal, as gold or silver. This wire fits firmly enough into the bore to prevent its falling out, and it has on its outer end a head or ball G, which is accessible and may be engaged by the finger to more or less draw out the wire. It is shown pressed in in Figs. 1, 6, 8, and 10. This adjustability is for the purpose of controlling the flow of ink to the pen, the flow being less free when the wire is pushed in so as to bring the ball close against the outer end of the bore, and being more free when the wire is drawn farther down, so as to move the ball away from the opening of the bore. To enable the wire to fit tightly enough to avoid slipping out and yet not be so large as to wholly fill or seal the bore, the wire is crinkled or corrugated, as shown at *f* in Fig. 5, so that its projecting corrugations will bear against the bore or fit frictionally in the slit *c* and serve to hold the wire in place. As a further means for holding the wire frictionally in place, it is doubled or bent back upon itself so as to form a tongue or spring-arm *d* on its lower end, which tends to spring open in the bore of the feed-bar and hold the wire frictionally in any position.

In Figs. 1 to 5 the bar E is shown as slitted through longitudinally on opposite sides, forming two opposite slits *c c*, as shown best in Fig. 4, the wire F extending through the bore or duct between them. This construction thus approximates to that shown in my said Patent No. 542,450, wherein I have explained the principles governing the construction of a "self-filler" fountain-pen.

My present construction constitutes in part a modification or specific variation from the construction shown in my said Patent No. 542,450, the object being to adapt the construction to penholders for holding large pens. In my present construction, instead of flaring or bowing apart the two halves of the tubular feed-bar where it is divided by the slits, I have left the bar unchanged in shape and have introduced instead another means for securing the requisite continuous communication from the feeders adjacent to the pen to the lower or remote portion of the reservoir necessary to secure this self-filling action. I place in the holder a bar or tongue H, (shown separately in Fig. 5,) which forms an extension from the nozzle into the reservoir on one side thereof. For holding it in place in the reservoir I provide it with a split tube or spring-clip *h*, the arms of which tend to spring outward, and consequently cling against the walls of the holder. This tongue is first thrust into the holder and then the nozzle is screwed in, so that it screws up against the spring-clip, and its interior surfaces are brought into communication with the surfaces of the

tongue. This tongue serves the purpose of letting air flow up past a seal of ink or film in the annular space around the feed-bar. In other words, the tongue breaks up the annular space on one side and thereby renders the space irregular and reduces the film to varying degrees of thickness, while opening a fluid-passage past the film, so that the air, when even very slightly compressed by the inflow of ink in filling, may break through the thinner portion of the film by upturning it, and hence may freely escape or exhale upwardly to and through the nozzle.

By extending the stopper or feed-bar entirely through the holder and screwing it into the upper end thereof it is given a fixed position within the nozzle, so that the pen can be removed and replaced without danger of displacing the stopper, and the holder can readily be fitted with different pens. Thus the holder may be sold without any pen and be fitted by the purchaser with a pen to his liking.

In operation, the flow is readily adjusted by moving the ball G up or down, and the stopper-bar serves to keep the holder moist at the exterior and prevent drying and caking. Thus the dry air which enters the holder to gradually take the place of the ink which is used is tempered or moistened before entering the interstices, so that these interstices are kept free and prevented from choking or filling up. The ball-head G contributes to this result by preventing the direct entrance of air into the vents, the air having to pass around the ball and being thereby introduced into the semi-enclosed space within the end of the nozzle. After writing, when the pen is to be carried in the pocket, it is first inverted, whereby the suction in the holder draws back the ink which has been attracted to the pen, thereby freeing the exterior surfaces in order to prevent any overflow into the cap. The cap is then applied, as usual, and the pen placed in the pocket.

In the construction shown in Figs. 6 and 7 the stopper-bar E has its head E' of somewhat different shape, being formed with a shoulder *e*, which when pushed in strikes against an internal shoulder *g* in the nozzle and limits the movement of the stopper. The slit *c* on one side is extended entirely through the head of the stopper, as clearly shown in Fig. 7, where this portion of the slit is lettered *c'*. An under-feed wire *i* is provided, which is received in the slit *c'*, and its outer end projects against the under side of the pen, overlapping the slit thereof, so as to serve as an under feed or duct for conducting the ink to the under side of the pen, thereby supplementing the top feed D. This top feed is in this construction in the form of a metal plate or tongue of the shape in top view shown in Fig. 7.

Figs. 8 and 9 show a further construction, the stopper-head being slitted entirely through, as in Fig. 7, the top feed in this case

consisting of a finger or extension *D'*, prolonged from the holder *A*, and having, preferably, a groove *j* on its under side, as most clearly shown in Fig. 9. In this construction the nozzle is formed in one piece with the holder. To fill the larger opening thus made, a tubular sleeve *I* is provided which fits around the head of the stopper, thereby filling or nearly filling the space between the stopper-head and the interior of the barrel, with the exception of the space required for inserting the pen. This sleeve is formed with an under-feed projection or finger *I'*, which extends forward against the under side of the pen. The fit of this against the pen is sufficiently loose to leave narrow spaces between, such as will admit in connection with the groove *j*, of a sufficient passage or flow of ink. Ink and air may also pass through the bore in the feed-bar and its slit *c*. An outer sleeve or finger-piece *J* is applied over the nozzle portion of the holder.

Figs. 10 and 11 show a modification of my invention in which there is no separate nozzle, the body of the barrel or holder of the pen being provided with a forward projection or finger *D'*, constituting the top feed as in Fig. 8, which extends over the top of the pen. The feed-bar or stopper *E* is in this construction provided with slits *c c* on opposite sides, but not extended through the head, as in Fig. 1. The head is notched around its circumference with longitudinal notches or grooves *k k*, and in addition has transverse notches or recesses *l-l* Fig. 11, forming pockets or grips for holding a small mass of ink.

The stopper may itself be formed with a projection or finger constituting an under feed for the pen, as shown by *m* in Fig. 12. In case it is desired to use the holder with a smaller pen or with a given size of pen to employ a larger size of holder or nozzle, the superfluous space around the stopper may be closed by fitting over it a sleeve or ring *n*, as shown in Fig. 13. Such a ring or sleeve can have a feed-finger formed upon it, as shown at *I'* in Fig. 9. For further attracting moisture around the stopper the stopper or head of the feed-bar may be slitted longitudinally by cuts or slits crossing each other, so as to make it elastic, and provide additional interstices for holding ink, as shown in Fig. 14, where *p p* are the slits.

For using a small pen with a holder of the character provided by my present invention I may construct the stopper without any bar, the head *E'* only being used, as shown in Fig. 15. This figure shows it as being formed with a feed-finger *m* coming underneath the pen, as in Fig. 12. For such a small pen, the wire *F* forms a sufficient bar or extension of the stopper into the reservoir.

In my said Patent No. 354,664 and in other patents of mine the stopper filling the throat of the nozzle is arranged concentrically, so that the space around the stopper is annular, and the pen is held in the enlarged portion

of the nozzle and does not project into its throat or narrowest portion, feed grooves or ducts being in such case arranged to lead the ink to the pen. By my present construction I mount the stopper in the throat of the nozzle, and then by thrusting in the pen against one side of the stopper the latter is pressed into an eccentric position, so that the annular space is reduced on one side and enlarged upon the other, rendering it substantially crescent-shaped or menisciform. This menisciform space is subdivided by the shank of the pen and by the top feed-bar, so that it is cut up into the interstices *b b*. (Shown in Fig. 3.) These interstices, it will be observed, taper from a wider portion to their narrowest portions, where they terminate, so that they afford varying degrees of attraction for the ink, the liquid being attracted most strongly in the narrower spaces. Hence, when the pen is inverted for filling, the ink being drawn back into the reservoir, leaves the wider spaces free for the exhalation of air, the narrower spaces being utilized for conducting the applied ink downward into the reservoir.

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

1. A fountain pen having a reservoir holder, and a stopper partly filling the throat of the nozzle and pressed into an eccentric position by the pen so that the intervening space becomes menisciform, said stopper formed as a bar extending into the reservoir having a bore or duct through it, and a longitudinal slit communicating with said bore, and a wire partly filling said bore and having a head upon its exterior by which it may be adjusted therein.

2. A fountain pen having a reservoir holder, and a stopper partly filling the throat of the nozzle and pressed into an eccentric position by the pen so that the intervening space becomes menisciform, said stopper formed as a bar extending into the reservoir having a bore or duct through it, and a longitudinal slit communicating with said bore, and a wire formed in corrugations engaging said bore frictionally and partly filling it, and having a head at its end by which it may be adjusted.

3. A fountain pen having a reservoir holder, a stopper partly filling the throat of the nozzle and displaced eccentrically therein by the insertion of the pen so that the intervening space becomes menisciform, the nozzle extending beyond the end of said stopper so as to form a semi-enclosed chamber, a bore or duct through said stopper, a wire partly filling said bore and having upon its exterior a ball-shaped head partly inclosed within said chamber and adjustable toward or from the outlet of the bore, whereby it serves to regulate the flow and to moisten or temper the entering air.

4. A fountain pen having a reservoir holder, with a feeder extending from the reservoir

through the nozzle to the pen, combined with a tongue mounted in the reservoir and extending along its inner wall to form a continuation of the feeding surfaces of the nozzle, whereby the self-filling of the pen is facilitated.

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5. A fountain pen having a reservoir holder, with a feeder or bar extending within the reservoir, combined with a tongue within the reservoir extending along its inner wall and adapted to interrupt the annular space within the reservoir around said feed-bar to weaken the film and facilitate the self-filling of the pen.

6. A fountain pen having a reservoir holder, a stopper partly filling the nozzle, a pen inserted between said stopper and nozzle, and

a top feed-bar extending over the pen and through the nozzle to the reservoir, combined with a tongue H mounted within the reservoir and extending along its inner walls serving as a continuation of said feed-bar. 20

7. The combination with a fountain pen holder of a tongue H adapted to extend within the reservoir, having an elastic dividing ring *h* for holding it frictionally in place therein. 25

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

WILLIAM W. STEWART.

Witnesses:

ARTHUR C. FRASER,
GEORGE H. FRASER.