A. T. CROSS.

FOUNTAIN PENS.

No. 190,130. Patented May 1, 1877.

Fig. 2.

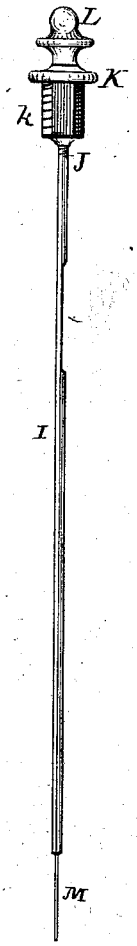

Fig. 1.

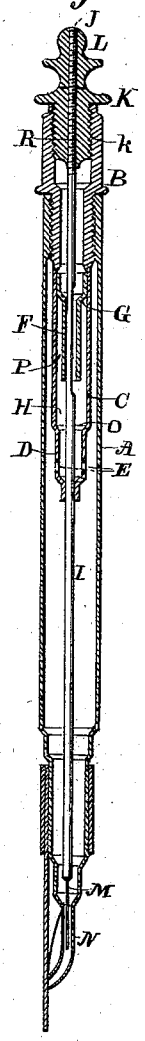

Fig. 3.

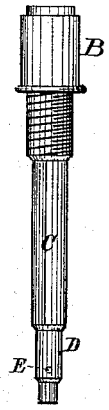

Fig. 4.

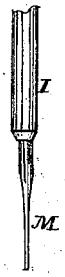

Fig. 5.

Witnesses:

Socrates Scholfield

Benjamin Cross.

Inventor.

Monzo T. Cross.

UNITED STATES PATENT OFFICE.

ALONZO T. CROSS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN FOUNTAIN-PENS.

Specification forming part of Letters Patent No. **190,130**, dated May 1, 1877; application filed September 8, 1876.

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:

The nature of my invention consists in a certain mode of combining the needle and valve with the air-tube and outer case, and in so regulating the seating of the valve and the opening or closing of the vent-orifice that both points may be properly controlled and operated by means of the same screw.

It also consists in enlarging the chamber of the air-tube at a short distance above the lower air-holes, for the purpose of more effectually preventing the ink from being forced from the ink-reservoir back into the tube, and thence out of the upper vent-orifice.

It also consists in forming an inverted annular space between the sides of the air-tube and an inner tube secured at any suitable point above the lower air-orifices.

It also consists in flattening the needle, so that it will tend to keep its tube free from sediment and ready for action under all circumstances.

Figure 1 is a longitudinal section of my improved fountain-pen. Fig. 2 is a longitudinal view of the valve-spindle and its attachments. Fig. 3 is an exterior view of the air-tube. Fig. 4 is an enlarged edge view of the flattened needle. Fig. 5 is a side view of the same.

In the drawing, A is the outer case; B, a cap-piece screwed into the upper end of the case A, and having attached to it the air-tube C, the lower end of which is constructed so as to form a tube, D, of less diameter than the main tube C, and extending for a short distance above the orifices E E, thus forming, with the valve-spindle I, an annular space, O, at the lower end of the chamber H of the air-tube. At about the middle of the air-tube I secure the tube F by means of the flange G at its upper end, thus forming an annular space, P, at the upper end of the chamber H. The valve-spindle I is furnished with a screw, J, at its upper end, upon which is placed the milled nut K, having the screw-thread *k* cut upon its surface, and cut away on one side, so as to furnish an inlet-passage for air to enter the air-tube.

When the nut K is placed in proper position on the valve-spindle, the check-nut L will serve to hold it in place. The needle M is made cylindrical at its upper end, but is flattened below, so as to act like a reamer in removing the ink sediment which collects in the tube N.

The needles used in fountain-pens have heretofore been invariably made in cylindrical or tapering form, and have never heretofore been flattened, which improved construction serves to keep the flow of ink free under all conditions.

The check-nut arrangement at the upper end of the valve-spindle is also a great improvement over the devices heretofore employed, for the reason that, by its use, the opening of the air-vent and the raising of the valve from its seat may both be effected simultaneously by means of the same screw, the position of the nut K being so regulated that the valve will be first brought down to its seat, and then allow the springing of the valve-spindle I to let the lower side of the milled flange of the nut K strike against the upper end of the cup B, thus closing the air-passage R, formed by cutting away the threads of the screw *k*. It is evident that without this check-nut arrangement it would be impracticable to make the two extreme closing-valves of the pen operate together in the same direction, both opening or closing at the same time while rigidly connected to each other.

The contracted tube D and the tube F, by means of their obstructing capillary attraction with the valve-spindle I, serve to prevent the ink from being forced out of the vent-orifice when the pen is being used, and is held in a reversed position. The valve-spindle I passes down through the center of the air-tube, through the tubes D and F, and the position of the valve is regulated by means of the screw *k*, the air-tube C at the same time remaining fixed with relation to the outer case A; but when the fountain is to be filled with ink, all of the several parts may be removed together by unscrewing the cap-piece B, to which the air-tube C is permanently attached. The valve-spindle I is filed away at the tube F, in order to allow the air to pass from the upper to the lower chamber of the air-tube.

I claim as my invention—

1. The combination of the valve-spindle I, air-tube C, and case A, each part, respectively, being contained within the other, and made separately removable, substantially as described.

2. The nut K and check-nut L, for regulating the simultaneous opening or closing of the air-vent and the lower valve in fountain-pens.

3. The short annular capillary chamber O, combined with an upper air-chamber having a greater area in its cross-section.

4. The air-tube C, divided into upper and lower chambers by means of the tube F and flange G, forming the inverted annular space P in the lower chamber.

5. The flattened needle M, combined with the tube N, substantially as described.

ALONZO T. CROSS.

Witnesses:
SOCRATES SCHOLFIELD,
BENJAMIN CROSS.