May 21, 1940. A. BALAZS 2,201,421

FOUNTAIN PEN FOR SOLID INK

Filed April 1, 1939

Fig. 1.

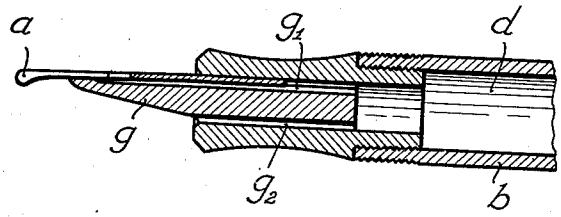
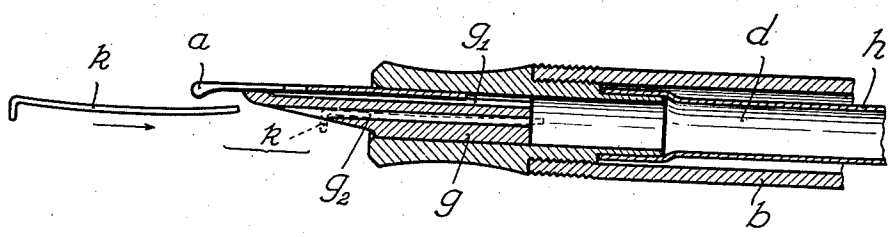


Fig. 2.



Inventor
Arthur Balazs
by Mock & Blum
Attorneys.

Patented May 21, 1940 2,201,421

UNITED STATES PATENT OFFICE

2,201,421

FOUNTAIN PEN FOR SOLID INK

Arthur Balázs, Budapest, Hungary

Application April 1, 1939, Serial No. 265,382
In Hungary April 23, 1938

2 Claims. (Cl. 120—42)

The invention relates to a fountain pen having a chamber adapted for the insertion of solid ink from the outside.

Fountain pens of the kind referred to are known in which the chamber for the ink pencil communicates on the one hand by means of a capillary transverse opening with the feed-line of the writing nib and on the other hand issues towards the outside in such a manner as to enable the pencil to be inserted into the chamber mentioned. The said known types of fountain pen operate in such a manner that the water introduced into the space for the storage of liquid dissolves, in the course of its flow to the writing nib along the feed line referred to, certain parts of the ink pencil, and thus reaches the writing nib in the form of coloured ink.

The said known type of construction possesses various drawbacks. In the first place, it will hardly permit the complete utilisation of the solid ink because a part of the same will always remain in an undissolved condition in the filling chamber mentioned. Another drawback of this type of design consists in that manufacturing of the capillary opening extending in the transverse direction and connecting the said filling chamber with the said feed line leading to the writing nib is expensive and connected with difficulties. The known type of design referred to presents substantial drawbacks as regards its method of operation also. Notably, atmospheric pressure starting from the filling chamber and passing through the capillary opening mentioned will in this case exercise its effect in the feed-line leading to the writing nib in that sense as to cause a certain resistance to the outflow of the water from the space for the storage of liquid and thereby also to its flow through the feed-line leading to the writing nib; accordingly, fountain pens of the known type referred to are not very suitable for uniform writing.

According to the present invention the drawbacks referred to are eliminated at least partly by the feature that the chamber for the insertion of solid ink is made to constitute a filling canal the inner end of which issues directly into the space for the storage of liquid of the penholder, the said canal enabling the solid ink to be pushed from outside directly into the interior of said space for the storage of liquid.

The first object achieved by means of the invention is that the solid ink pushed directly through the filling canal into the space for the storage of liquid will be dissolved in its total extent by the liquid available in said space so that it is not liquid to be coloured in the course of its path of flow to the writing nib but liquid ink already completely coloured that will pass from the space for the storage of liquid into the feed-line leading to the writing nib. This arrangement will ensure the perfectly uniform intensity of the colour of the writing ink during the whole time during which the store of liquid lasts, and will at the same time also enable a more simple type of construction to be obtained, as it dispenses with the capillary opening for the transverse connection of the filling chamber with the feed-line as used in constructions hitherto known. The invention also offers advantages of fundamental importance regarding the method of working because atmospheric pressure will, through the filling canal according to the invention, exercise its effects in the space for the storage of liquid in the sense that it will tend to move the liquid from the space of storage in the direction towards the writing nib. It follows herefrom that fountain pens fitted with the filling canal according to the invention will write more easily and particularly will start more easily than fountain pens not fitted with a filling canal of this type. In fact, the filling canal according to the invention will also enable a surprising improvement to be obtained in fountain pens of a cheaper type of design which, as well known, are owing to their less precise construction frequently presenting the tendency of failing to operate, particularly of not starting immediately when writing is begun. Thus, the filling canal according to the invention will enable fountain pens of a cheaper type to practically write just as uniform and start just as promptly as fountain pens of a more precise type which are, as is well known, many times as expensive.

One of the facts on which, among others, the invention is based is that, in case a filling canal is provided which issues directly from the outside into the space for the storage of liquid, the said liquid will neither flow out nor leak out, provided that the filling canal is constructed of a so small diameter, of the order of magnitude of about 1 mm., as required for the pushing-in of ink pencils, because a filling canal of the said diameter will still work in the manner of a capillary opening and, moreover, atmospheric pressure will counteract any flowing or leaking out of the liquid.

The invention will be discussed in greater detail below with reference to the drawing on which two embodiments of the invention, shown by way

of example, are represented, each one in the form of a part longitudinal section.

Figure 1 is a longitudinal section of the device.

Figure 2 is a similar section of a modification in which the solid ink filling canal or chamber is differently located and a sac is utilized.

On Fig. 1, *a* denotes the writing nib, *b* the penholder, *d* the usual space for the storage of liquid, and *g* an inserted plug, in which the feed-line g_1 conducting the liquid from the space *d* to the writing nib *a* is provided in the form of a peripheral groove.

g_2 denotes the chamber for the insertion of solid ink which is constructed according to the invention in the form of a canal the inner end of which issues directly into the space *d* for the storage of liquid whilst its other end issues freely towards the outside. The solid ink inserted into the canal g_2 or set on to its external mouth can be pushed from outside directly into the space *d* for the storage of liquid through the canal g_2 by any desired means, e. g. by means of a thin metal rod. As appears from Fig. 1, it is exclusively through the space *d* for the storage of liquid that the feed-line g_1, on the one hand, and the canal g_2, on the other hand, mutually communicate. Further, it appears from the drawing that external atmospheric pressure will exert its effects within the spaced *d* for the storage of liquid in such a sense that it will tend to force the liquid out from the space *d* through the feed line g_1 towards the writing nib *a*. At the same time, external atmospheric pressure will prevent the liquid from flowing or leaking out from the storage space *d* in which latter, as well known, a certain pressure below the atmospheric rules.

The type of construction according to Fig. 2 differs from that according to Fig. 1, in the first place, by the fact that the filling canal g_2 for the solid ink is not provided on the cylindrical surface of the inserted plug *g* in the form of a groove open on one side but it constitutes a longitudinal borehole; moreover, Fig. 2 illustrates the rod *k*, already mentioned in connection with Fig. 1, and serving for pushing the solid ink into the space *d* for the storage of liquid, which latter is according to the example shown in Fig. 2 provided in the usual form by the interior of a flexible tube *h* made of rubber or the like. On Fig. 2, the push rod *k* is shown drawn in full lines outside, and drawn in dotted lines inside the filling canal g_2, which shows that the push rod *k* possesses such a length as to enable the solid ink to be pushed by hand, by means of the said push rod *k*, through the canal g_2 into the liquid space *d*.

The push rod is preferably constructed so as to possess a diameter smaller by, for instance about 0.1 to 0.2 mm., than the filling canal g_2, so as to ensure that it will be possible for atmospheric air to leak through the filling canal g_2 into the space *d* for the storage of liquid also when and if the push rod *k* is situated in the interior of the filling canal g_2. Dropping out of the push rod *k* from the filling canal g_2 during the process of writing may be prevented in any way desired, preferably by making the rod *k* slightly bent so that it will fix itself resiliently in the straight bore-hole g_2.

The filling of the liquid space *d* with liquid can be effected by means of any pumping device of a known type suitable for this purpose, and in view hereof this part of the fountain pen has not been represented on the drawing at all.

Another important advantage offered by the invention is that it is also possible to fit existing fountain pens subsequently with the filling canal g_2 according to the invention which measure will, as already men ioned, result, particularly in the case of fountain pens of a cheaper and less precise type, in a quite surprising improvement of their operation.

Another advantage of the fountain pen according to the invention consists in the fact that it can be used without any alteration for liquid ink as well as for solid ink, in which latter case as liquid preferably ordinary water is employed. Further, the solid ink to be used must not be in the form of ink pencil but it may be granulated or in any other form of small particles or granules.

The invention may be carried into effect in many ways differing from the embodiments illustrated by way of example. Thus, for instance, it is not necessary to arrange the two canals g_1 and g_2 parallel to each other as it is also possible for the filling canal g_2 to assume, relatively to the feed line g_1, any other position desired. Moreover, it is not absolutely necessary to provide the filling canal g_2 for the solid ink on the insert plug *g* as it would also be possible to provide this canal on some other part of the fountain pen.

What I claim is:

1. In combination, a fountain pen comprising a chamber adapted for the insertion of solid ink from the outside, wherein the said chamber constitutes a filling canal issuing by its inner end directly into the space for the storage of liquid of the pen holder, the said canal being of such form as to enable the solid ink to be pushed from the outside directly into the interior of said space for the storage of liquid, and a push rod adapted to be inserted into and held by the walls of said filling canal, said rod being of such shape and configuration whereby when said rod is in inserted position in said canal a free passage exists from the outside into the liquid storage space of the fountain pen.

2. A device of the character described comprising a fountain pen having a chamber adapted for the insertion of solid ink from the outside wherein the said chamber constitutes a filling canal issuing by its inner end directly into the space for the storage of liquid of the penholder, the said canal being of such form as to enable the solid ink to be pushed from the outside directly into the interior of said space for the storage of liquid, and a push rod of such length for the filling canal as to enable the solid ink to be pushed by hand, with the aid of said push rod, into the space for the storage of liquid, the said filling canal constituting a straight opening and said push rod being bent so that it may fix itself resiliently within said straight canal.

ARTHUR BALÁZS.