

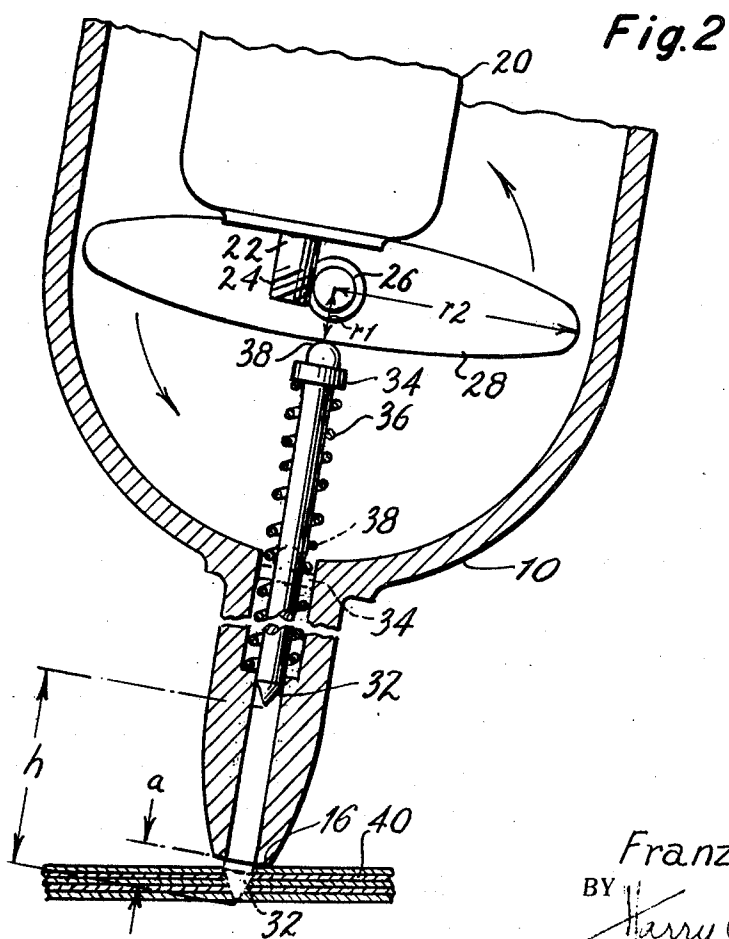
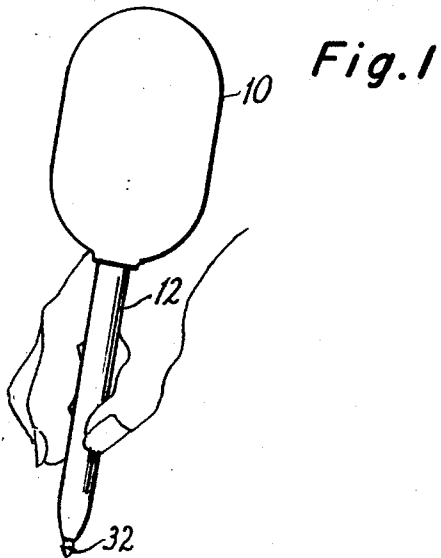
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3,509,786

WRITING INSTRUMENT

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3,509,786

WRITING INSTRUMENT

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No. 784,157

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2 Claims

ABSTRACT OF THE DISCLOSURE

A writing instrument is disclosed and shown in the drawing which includes a handle, housing a drive unit for reciprocating a needle arranged in a shaft fixed to said handle to produce a writing formed by successive perforations by means of the reciprocating needle. The inventive feature relates to the location and stroke of the needle such that the needle projects from the shaft only for a short fraction of the interval of time between successive perforations; the writing produced cannot be removed and thus enables an effective security to be achieved against forgery.

The present invention relates to a writing instrument, and is a continuation-in-part to my application Ser. No. 610,352 filed Jan. 19, 1967, now abandoned.

It is known that certain documents to be written by hand such as for example travel and air-travel tickets are often forged by mechanically or chemically obliterating or erasing the original destination and inserting a new one. It has therefore already been proposed to use so-called security paper which mostly has on the side to be written on a layer which is sensitive to mechanical or chemical contact, in which any inadmissible contact leaves behind clear, lasting traces. Such paper enables an effective security against forgery, but it is relatively expensive and is often also so sensitive that damage can occur even with normal handling.

The present invention is based upon the problem of producing a writing instrument which produces on normal paper writing which is guaranteed safe from forgery, and which cannot be removed in any manner. The invention consists in a writing instrument having a needle forming a nib, this needle being movable in the longitudinal direction by means of a driving unit built in the housing of the instrument, so that it projects beyond the handle of the instrument guiding the needle only during a part of its forward stroke, for the purpose of perforating the writing paper. A battery or mains operated motor advantageously constitutes the driving unit, as used for example in electric razors or tooth brushes. As experiments have shown, writing can be effected with such a writing instrument in normal-writing and at the usual writing speed without the writing paper being torn by the needle, if care is taken that the needle projects from the instrument shaft quickly and only for a short time for the purpose of perforating the writing paper. This is advantageously achieved by the needle projecting from the shaft only for a short fraction of the interval of time between two successive perforations (i.e. two successive front end positions of the needle). The arrangement is advantageously such that the needle point projects beyond the shaft for example only for one fifth of the total stroke of the needle. The writing produced by means of this writing instrument is formed by perforations made continuously at short distances (fractions of a millimeter), which of course cannot be removed.

In order that the invention may be more clearly understood, reference will now be made to the enclosed drawings which show the embodiment thereof by way of example, and in which:

FIG. 1 shows a side view of the instrument in partial section, and FIG. 2 shows the operating part of the instrument in axial partial section, to a larger scale.

Referring to the drawings, the writing instrument shown has a housing 10 with a drive motor 20 built therein which can drive a needle 30 located in the handle 12 to and fro in a longitudinal direction via a suitable control. As FIG. 2 shows, the stroke h of the needle 30 amounts to about five times the distance a (perforation stroke), over which the needle 30 projects with its point 32 in its front end position, by the handle 12. Thus, the writing needle 30 is only in contact with the writing paper 40 for a relatively short time so that even at high writing speed (movement of the nib parallel to the writing carrier) the needle cannot become caught in the writing carrier to tear the latter, i.e. the distance over which the writing end can normally move the nib forward from the handle 12 within the time when the needle 30 is projecting, is practically nil. Writing is thereby produced in the writing carrier 40 which is formed by more or less closely set perforations. A subsequent erasure of the writing which has once been set is impossible. The rounded face 16 of the handle 12 facilitates smooth continuous writing over the paper material 40.

A particular advantage of this security writing consists in that a relatively large number of copies can be produced at the same time instead of only one sheet. The perforation stroke a can be chosen to be so great that in addition to the original, six or seven copies can also be satisfactorily perforated. The weight of the writing instrument has to be so great, due to the necessary installation of a drive motor 20, that the needle 30 cannot knock the instrument sliding with the shaft point (at an angle which is as steep as possible) on the writing carrier 40 from said latter.

Sheets are advantageously used as writing papers which are provided with a (carbonized) inked layer or with a "giving" and "receiving" layer. The ink taken by the needle from such a layer is wiped off at the edge of the hole of the perforation produced in the next sheet, whereby the usual inked writing is produced. On the other hand, it is possible to provide in the writing instrument itself an ink reservoir supplying the needle 30 as is shown in U.S. Pat. No. 473,207.

The drive motor for the needle can be an oscillating motor or a rotor-driven motor as shown; it can be battery-driven or supplied from the mains; however a spring motor could also be used.

The rotor 22 may as shown in FIG. 2, terminate in a worm gear 24 driving the worm wheel 26 integrally mounted to the cam 28. Thus the rotor of the motor causes the cam to rotate.

The needle 30 has a collar 34 positioned above a spring 36 supported in a spring pocket 14 formed in shaft 12. The spring continuously urges the needle head 38 against the cam 28 during rotation causing the needle point 32 to move in and out of the writing paper 40. The speed of the motor can be conventionally varied to accommodate the writing unit to different writing speeds. Also the cam may be replaced to cause the needle to project further for small distances to accommodate additional layers of the writing paper.

The difference between the two radii r_1 and r_2 represents the stroke of the needle. Due to the steep curvature of the needle from r_1 to r_2 the downward movement of the needle is accelerated resulting in a great punching force. In place of the return spring, the head of the needle can be slidably enclosed in a groove of the cam so that it is in constant engagement with the surface thereof.

The described writing instrument, is simple in construction and also produces an effortless, normal writing, produces, by perforating the writing paper, an easily legible

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writing which can also be inked if desired and which is safe against forgery; it is particularly suitable for filling in air travel tickets and similar documents.

I claim:

1. A stylus assembly for a writing instrument comprising a tubular handle, a perforating stylus or needle positioned axially in the tubular handle, and a housing at one end of the handle for containing a reciprocating mechanism for driving said needle, said tubular handle characterized by a round writing face at the other end thereof for smoothly engaging a writing surface during writing, and a length sufficient to house the entire needle for the greater portion of its reciprocating movement, whereby the entire weight and pressure of the writing instrument is supported on the round writing face of the handle during writing, and the needle projects from the handle only a small distance, compared to its overall movement, and

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for a small period of time compared to the total time of the reciprocating movement.

2. In the writing instrument of claim 1, whereby the needle projects from the handle a distance of about $\frac{1}{8}$ of its total stroke.

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153,084 10/1920 Great Britain.

MILTON S. MEHR, Primary Examiner

U.S. Cl. X.R.

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