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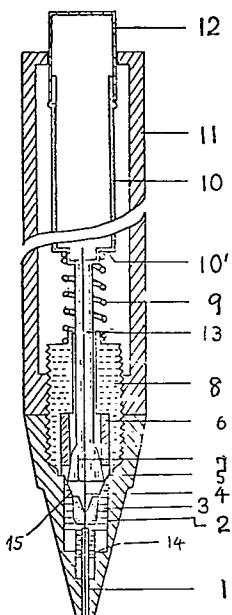
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㉘ Push type mechanical pencil.

㉙ Push type mechanical pencil having a chuck (7) for clamping a lead (4), the chuck being operable by a spring loaded push button (12). By pressing the push button, the chuck (7) comes out of engagement with a clutch element for releasing the lead (4) and pushes a lead guide member (3) forward. This lead guide member (3) is provided with the lead brake (2), so that the lead is driven forward together with the guide member (3).

In order to ensure that the lead (4) is in the correct writing position, when the push button (12) is actuated only one time, means (15, 16) are provided to transform the radial directed spring force of the chuck (7) into an axial directed force on the lead guide member (3). Preferably, the means is an inclined surface on the lead guide member (3) which transforms the radial directed spring force of the chuck (7) into an axial directed displacement of the guide member (3).



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#### Push type mechanical pencil

The invention relates to a push type mechanical pencil having a push button on a holder body for pushing the lead into the writing position.

A push type mechanical pencil is known in accordance with the prior art portion of claim 1 (e.g. DE-PS 18 15 535). In such a known pencil, also shown in fig. 1 of the present application, the push button must be pressed down strongly or more times to bring the lead in the correct writing position. The user of such a pencil cannot be sure that the lead is in the correct writing position after having pressed down the push button. Therefore he has to check the writing position before writing and often has to press down the push button again.

The advantage offered by the invention is that the lead

is brought in the correct writing position when the push button is actuated only one time by a light finger tip. Therefore the pencil can be brought very quick in the writing position at the beginning of the writing and also during the writing when the lead is used up. All in all, the use of the mechanical pencil is very comfortable.

One way of carrying out the invention is described in detail below with reference to drawings which illustrate two embodiments in which:

Fig. 1 is a longitudinal section of a known push type mechanical pencil,

Fig. 2 shows an inventive embodiment of such a known pencil according to fig. 1 in the same view,

Fig. 3 is a schematic view of another inventive embodiment.

The figures show a holder body having a main shaft 11 and an end portion 5 of conical form which is connected by a screw sleeve 8 with the main shaft 11. At the other end of the main shaft 11 a push button 12 is inserted displaceable in an opening and releasable connected with a lead supply tube 10.

At the front end of this tube 10 a shoulder 10' is provided for abutment of a spring 9 which rests on this screw sleeve 8 and presses the bush button 12 on the supply tube 10 in the shown projecting position.

At the front end of the supply tube 10 a shaft 13 is fixed with the bore for a lead 4. This shaft 13 extends through the screw sleeve 8 and is provided at the free end

with a chuck 7. This chuck 7 is provided with slots in the enlarged end portion of the shaft 13, e.g. three slots are provided so that the chuck has three clamp jaws. In the shown embodiment the outer diameter of the chuck 7 is conically enlarged in direction to the front end.

In the front end of this screw sleeve 8, a clutch ring 6 is inserted on the front end of which the clamp jaws of the chuck 7 abut. The clamp jaws are pressed by the force of the spring 9 against this clutch ring 6, so that these jaws which are elastic are pressed together and hold the lead 4 by clamping it there between. By pressing down the push button 12, the chuck 7 is released from the clutch ring 6 so that the clamp jaws of the chuck move outwardly due to their own elasticity giving free the lead in the bore of the shaft 13.

In the conical end portion 5 of the holder body a lead guide member 3 is displaceable inserted in a bore, diameter of which is greater than this one of the chuck 7. This lead guide member 3 is provided with a lead brake 2. This lead brake 2 can be made from rubber which is provided with a bore, the diameter of which is slightly smaller than the outer diameter of the lead 4. This lead brake 2 has an enlarged opening for facilitating the introduction of the lead 4 into the bore of the lead brake. At the front end of the lead guide member 3, a lead protecting tube 1 is fixed which is guided in a bore in the front end of the holder end portion 5. The lead guide member 3 is displaceable in the corresponding bore from the shown resting position into the writing position of the lead until this guide member 3 abuts on the shoulder 14 at the end of this bore.

In the known embodiment according to the fig. 1 the front end of the chuck 7 lies against the end surface of the guide member 3. This end surface of the guide member is perpendicular to the longitudinal axis of the guide member as well as the surface on the front end of the chuck 7. By pushing down the push button 12, the chuck 7 is released from the clutch ring 6 whereby the guide member 3 is displaced forwardly together with the lead 4 by the chuck 7, the clamp jaws of which are opened by sliding on the end surface of the guide member 3 perpendicular to the longitudinal axis. The displacement of the guide member 3 and therefore of the lead 4 into the writing position depends on the degree of pressing down the push button 12.

According to the inventive embodiment shown in fig. 2, there is provided a funnel shape opening 15 in the lead guide member 3. The maximum diameter of this funnel shape opening 15 is greater than the outer diameter of the chuck 7 when the clamp jaws are held together by the clutch ring 6. The front ends of the clamp jaws lie against the inner surface of this funnel shape opening 15 in the shown resting position. This inner surface of the opening 15 is inclined with respect to the longitudinal axis in such a way that the diameter of this funnel shape opening 15 becomes smaller in direction to the front end of the pencil. In the shown resting position the guide member 3 is spaced apart from the shoulder 14 and the outer front edge of the clamp jaws of the chuck 7 lie against the funnel shape surface of the opening 15 in a certain depth of this opening 15 so that a force is exerted to the guide member 3 in front direction when the clamp jaws of the chuck 7 spread out due to their elasticity in radial direction.

When the push button 12 of the inventive embodiment is pressed down only a small distance, the elastic clamp jaws of the chuck 7 come free from the clutch ring 6 so that they snap outwardly in radial direction. During this snap action, the clamp jaws press against the inclined surface of the funnel shape opening 15 with their spring force so that the component of this spring force of the clamp jaws directed to the front end pushes the guide member 3 together with the lead 4 into the correct writing position determined by the shoulder 14 in the end portion 5 of the holder body. After releasing the push button 12, the chuck 7 is retracted into the clutch ring 6 by the spring 9 so that the lead 4 is held in the writing position.

During writing, the protecting tube 1 surrounding the lead 4 is shifted back into the end portion 5 together with the guide member 3 to such an extent as the lead 4 is used up during writing. When the lead 4 together with the protecting tube 1 should be shifted back into the pencil without writing, the push button 12 is pressed down. The lead 4 is slightly pressed against the sheet of paper or against the finger tip. In this way, the lead as well as the protecting tube 1 go easily back into the holding body of the pencil.

The guide member 3 can be easily displaced in the corresponding bore of the end portion 5.

Fig. 3 shows schematically another embodiment according to the invention. The means for transforming the radial directed spring force of the chuck 7 into an axial directed force on the lead guide member 3, which is in the embodiment according to fig. 2 the inclined inner

surface of the opening 15, are in the embodiment of fig. 3 two arm levers 16 which are pivoted e.g. on the holder body. The levers 16 are angle levers, the two arms of which can be arranged perpendicular with respect to each other. The one arm of the angle levers 16 is actuated by the clamp jaws of the chuck 7 in radial direction so that the other arms of the angle levers push against the rear end of the lead guide member 3 in axial direction.

In the embodiment according to fig. 3 no protecting tube is fixed on the lead guide member 3, however, such a protecting tube can be provided.

C l a i m s

1. Push type mechanical pencil having a holder body (5,11) in which a chuck (7) is displaceable by a spring loaded push button (12) from a lead clamping position into a lead releasing position in which the chuck (7) is out of engagement with a clutch element (6) holding the elastic clamp jaws of the chuck (7) together in the clamping position, further a lead guide member (3) with a lead brake (2) being displaceable in the holder body by the chuck (7) to bring the lead (4) in writing position, characterized in that there are means provided to transform the radial directed spring force of the chuck (7) into an axial directed force onto the lead guide member (3).
2. Push type mechanical pencil as claimed in claim 1, characterized in that the means for transforming the radial directed spring force of the chuck (7) is an inclined surface on the lead guide member (3) on which surface at least one of the elastic clamp jaws of the chuck(7) act by radial engagement.
3. Push type mechanical pencil as claimed in claim 2, characterized in that the lead guide member (3) is provided with a funnel shape opening (15) in which opening the chuck (7) is acting on the lead guide member (3).
4. Push type mechanical pencil as claimed in claim 1, characterized in that the means for transforming

the radial spring force of the chuck (7) are levers (16) with two arms which levers (16) are pivoted on the holder body in such a way that one arm of the levers is actuated by the clamp jaws of the chuck (7) in radial direction, whereas the other arm of the levers (16) act on the lead guide member (3) in axial direction.

5. Push type mechanical pencil as claimed in the proceeding claims,  
characterized in that a lead protecting tube (1) is fixed on the lead guide member (3).

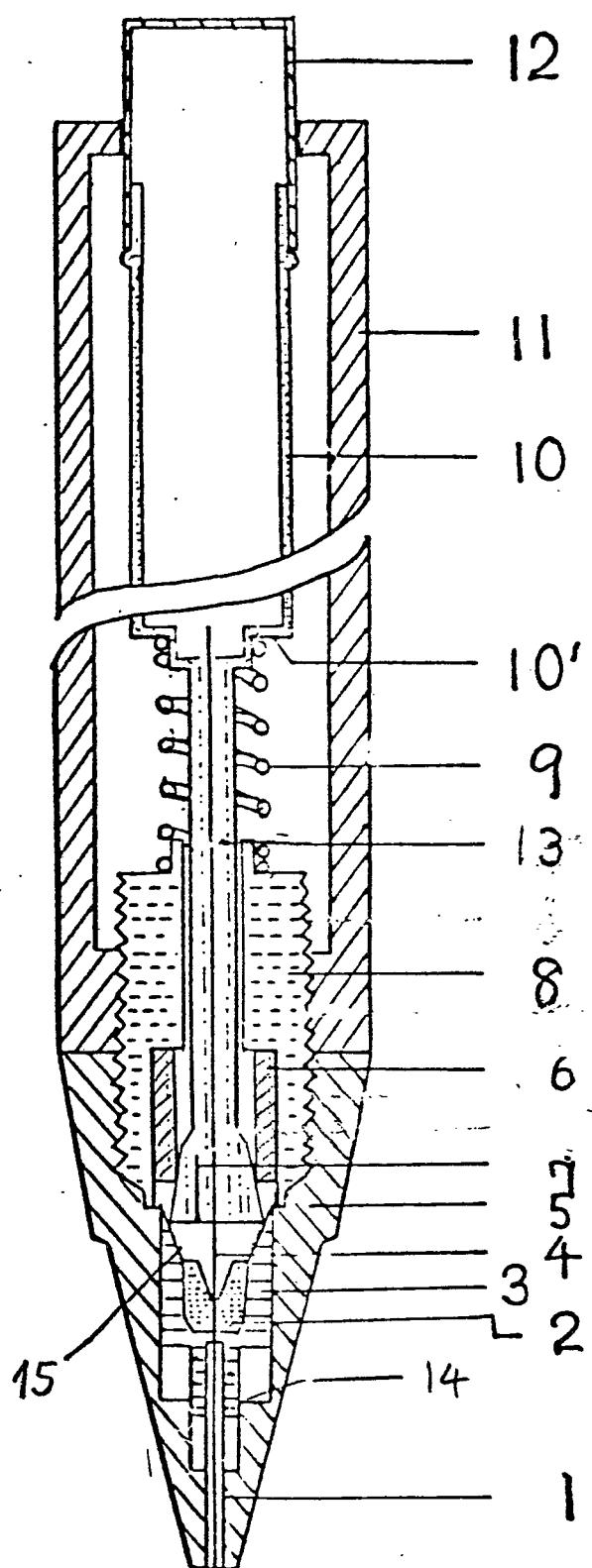


Fig. 2

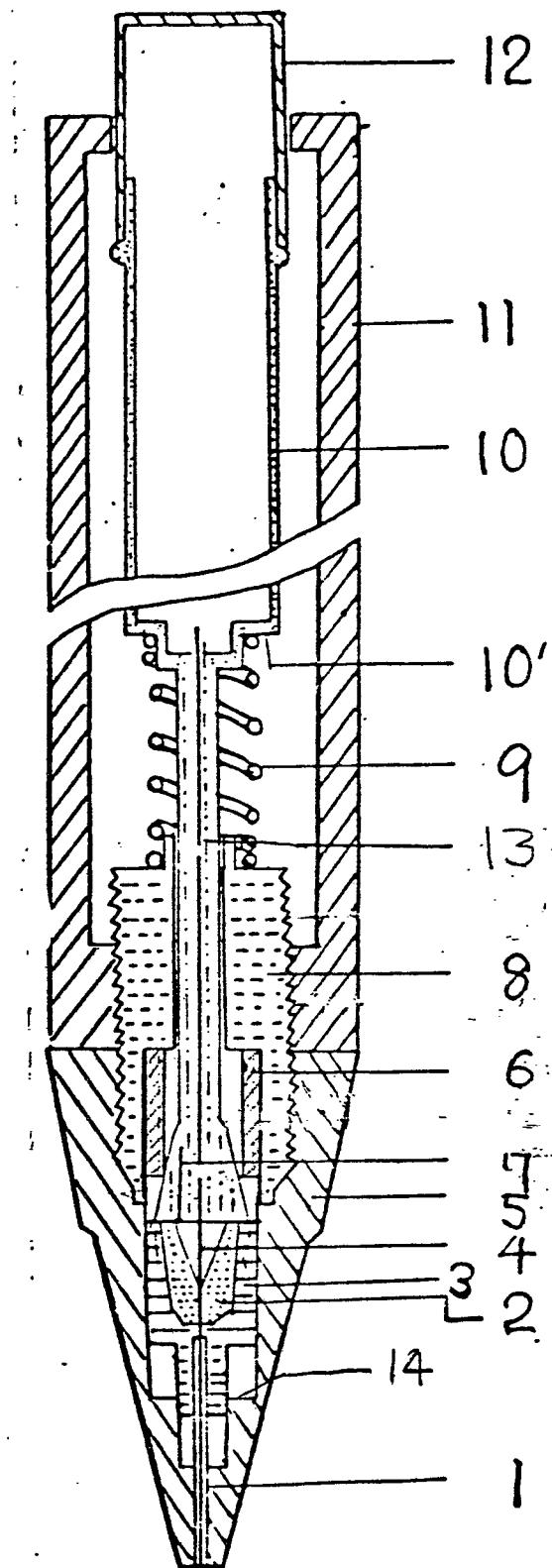


Fig. 1

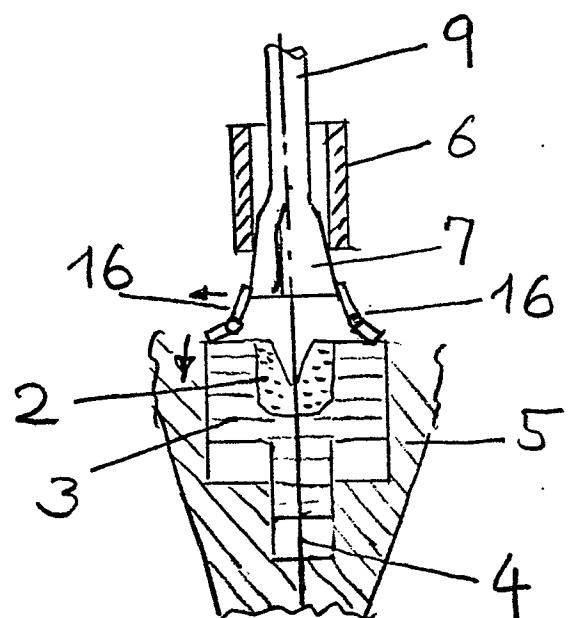


Fig. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>US - A - 3 864 046 (BUTKA)</u> * Column 3, line 37 - column 5, line 3 *	1,2	B 43 K 21/20 21/22
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A	<u>DE - A - 2 821 625 (ANCOS)</u> * Page 15, lines 10-24 *	1,5	
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A	<u>US - A - 2 370 250 (KUPCZYK)</u> * Column 2, lines 49-63 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
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A	<u>US - A - 1 702 780 (INGERSOLL)</u> -----	4	B 43 K 21/00
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CATEGORY OF CITED DOCUMENTS			
<p>X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons</p>			
&: member of the same patent family, corresponding document			
	The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner	
The Hague	09-09-1980	LAMMINEUR	