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MECHANICAL PENCIL

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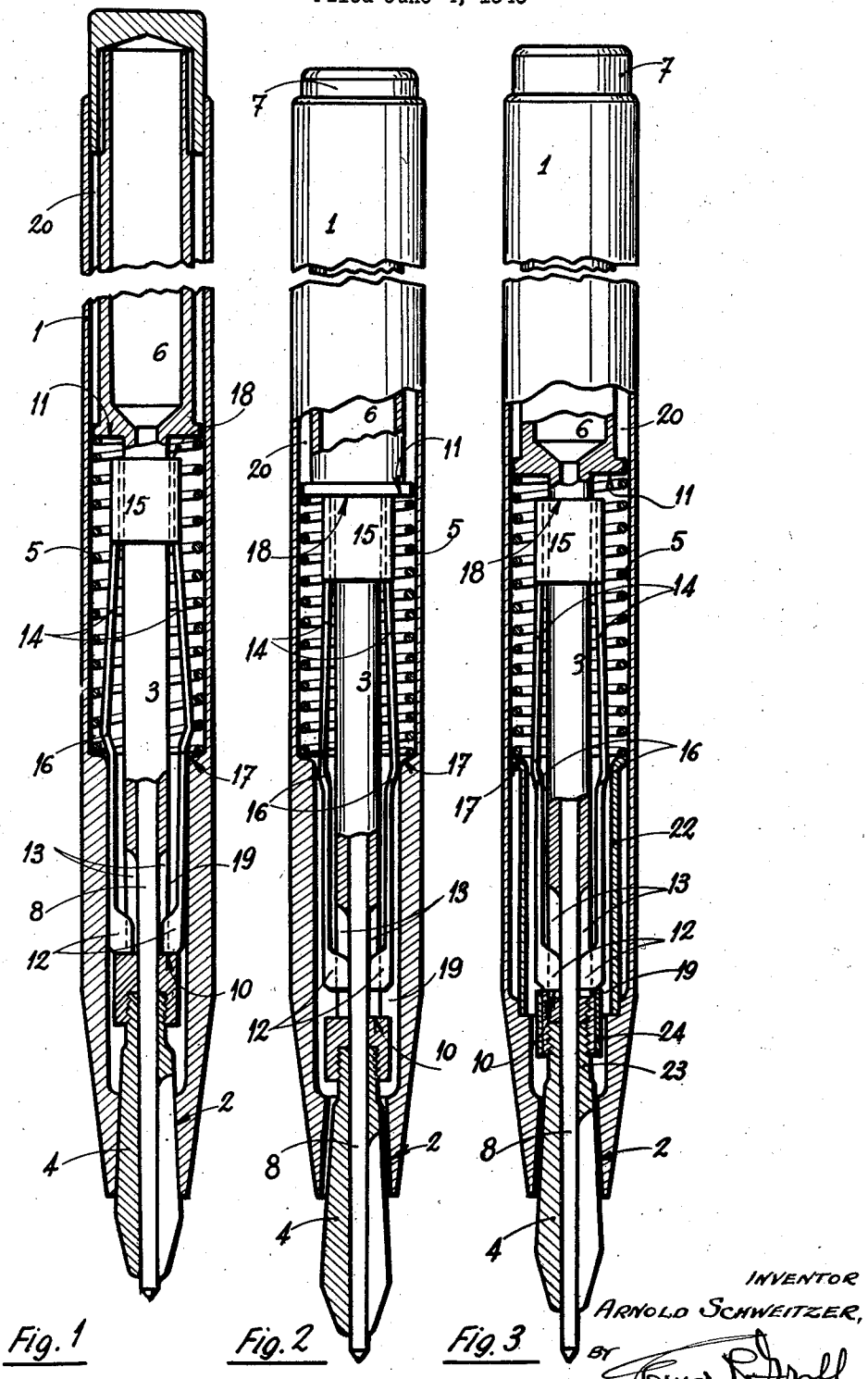

Fig. 1 Fig. 2 Fig. 3

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MECHANICAL PENCIL

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The present invention relates to mechanical pencil and is an improvement over a type of pencil comprising an outer shell having at one end a conical seat, a lead guiding tube carrying at one end jaws clamping the lead when in said seat, a controlled spring urging the tube inwardly and the jaws to their seat, auxiliary jaws normally urged to lead clamping position through openings in the tube, but retracted from lead clamping position by a central cam during the spring-urged back stroke of the tube.

This otherwise satisfactory pencil structure has the disadvantages of a high production cost, of the complicated shape of the auxiliary jaws and of the difficulty of accurately positioning the cam retracting the auxiliary jaws.

These and other disadvantages are overcome by the embodiment of the present invention.

The present invention has for its object a lead-holder of the type cited above and which tends to avoid the inconveniences mentioned owing to the fact that a stationary clamping organ is provided in the shell, the arms of the auxiliary jaws having a portion cooperating with said stationary clamping organ in such a manner as to cause the elastic application of said auxiliary jaws on the lead engaged in said leads guiding tube when said control member is actuated against the action of said restoring spring, and so as to maintain said auxiliary jaws and said lead in a fixed position with respect to said shell while said leads guiding tube performs a portion of its back stroke, this back stroke being caused by said restoring spring when said control member is released by the operator, whereby the automatic forwarding of the lead between the clamping jaws is produced.

The annexed drawing shows diagrammatically and by way of example two forms of construction of the lead-holder.

Fig. 1 is a view of an axial section of a form of construction with some portions removed, the lead being clamped in its position of service between the clamping jaws.

Fig. 2 is a similar view, with the clamping jaws in a forwarded position.

Fig. 3 is a similar view of a second form of construction, the lead being in a forwarded position between the clamping jaws, these latter being represented in an intermediate position taken during their back stroke.

The lead-holder represented on the drawing by way of example comprises after the fashion of other known lead-holders:

An outer shell 1, of general cylindrical shape, with a pointed end in which a conical seat 2 is

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provided. A leads guiding tube 3 carrying at one of its ends clamping jaws 4 emerging from this pointed end of the shell, is subjected to the action of a restoring spring 5 tending to maintain jaws 4 applied on conical seat 2. This leads guiding tube bears at its other end a leads magazine 6 covered by a control member 7 emerging from the end of shell 1 opposite to the clamping jaws 4.

The lead feeding device of the invention comprises a member sliding freely along the leads guiding tube 3 between two extreme positions determined by two abutments 10 and 11. This sliding member is provided with two auxiliary jaws 12 traversing the wall of the leads guiding tube 3 through longitudinal openings 13. These auxiliary jaws are borne by elastic arms 14 rigidly connected at one end to an annular portion 15 engaged over the leads guiding tube 3. Arms 14 have a shoulder 16 cooperating, when the control member 7 is actuated, with a clamping organ constituted by a shoulder 17 of shell 1, and on which rests the restoring spring 5 of the leads guiding tube. The portion of the shell 1 located between this shoulder 17 and the pointed end has an axial hole 19 of a smaller diameter than the bore 20 of the portion of the shell extending from this shoulder to the other end.

In Fig. 1, the elements of the lead-holder are represented in the position of rest, the lead 8 being maintained in its position of service by clamping jaws 4. These latter are applied on the lead owing to the action of the restoring spring 5 tending to jamb the jaws in conical seat 2.

When the user desires to cause the forwarding of the lead between the clamping jaws, it is sufficient for him to exert an axial pressure on the control member 7 against the action of the restoring spring 5 in order to bring the various members of the lead-holder into the position represented in Fig. 2.

Control member 7 drives with it leads magazine 6 leads guiding tube 3 and clamping jaws 4, all these parts being rigidly connected one to the other. During this movement, abutment 11 constituted by the frontal face of magazine 6 comes in contact with a rear face 18 of the ring portion 15 of the sliding member and drives the latter for the latter portion of the forward stroke of the control member 7.

During the movement of the sliding member, shoulders 16 of elastic arms 14 slide over shoulder 17 of the shell and enter hole 19 of smaller diameter, which causes the clamping of auxiliary jaws 12 upon the lead 8 (Fig. 2).

As previously indicated, the jaws 4 cooperate

with the conical seat 2 to grip the lead firmly when the pencil is used for writing. When the jaws 4 are disengaged from their conical seat 2 as shown in Figure 2, they still clamp the lead with less force than they do when the jaws are in contact with the seat 2. In other words, the jaws 4 clamp the lead with different degrees of firmness. When the lead is in writing position the same is firmly gripped by the jaws because they are drawn into the socket by the spring 5, but when the control member 7 is moved to push the tube 3 downwardly the jaws are moved out of the seat 2 but the jaws 4 still clamp the lead with sufficient friction to prevent the lead from falling from between said jaws. As shown in Figure 2 the lead 8 has been given a displacement of the same magnitude of the control member 7. When the jaws 4 are moved out of the socket as the displacement stroke of the tube 3 proceeds, the auxiliary jaws 12 which have been applied by virtue of the shoulder 16 of the members 14 riding over the shoulders 17, the lead 8 will be pushed through the jaws a sufficient amount to provide the additional length of lead for writing purposes.

When the user releases control member 7, restoring spring 5 causes a back motion of leads guiding tube 3 and clamping jaws 4. Nevertheless, the sliding member, the elastic arms 14 of which are brought together in the inside of hole 19 of shell 1, is maintained stationary with respect to the shell by the friction of arms 14 and the walls of the hole 19. Auxiliary jaws 12 maintain thus the lead in a fixed position with respect to shell 1 and the jaws 4 can slide over the lead.

The free stroke of the sliding member is limited by in one direction the terminal walls of the two longitudinal slots 13, in which auxiliary jaws 12 are engaged. After a certain backward movement of the leads guiding tube, abutment 10 comes in contact with the auxiliary jaws (Fig. 3) and takes the sliding member along for the latter portion of the backward movement of the leads guiding tube. This movement of the sliding member causes the disengagement of the elastic arms 14 from the hole 19 and from the shoulder 17, and therefore the liberation of lead 8 from the auxiliary jaws. Towards the end of the back stroke of the leads guiding tube 3, clamping jaws 4 engaging with conical seat 2, become clamped on lead 8 (Fig. 1) and maintain same in its position of service.

From the above, it may be seen, that the described leads-holder, although containing only a very small number of parts as compared with known leads-holders operates in an absolutely safe manner.

Furthermore, no part or constitutive member of this leads-holder necessitates accurate machining. This peculiarity represents a great technical advantage and ensures a long service life to the described leads-holder. Lastly, the assembly of the latter is exceedingly easy and rapid as it does not necessitate any adjustment.

Furthermore, in the above described leads-holder the elasticity of arms 14 must be only sufficient to prevent a too high pressure from being exerted by auxiliary jaws 12 on lead 8. This elastic characteristic does not require any special property of the jaw arm 14. Further, the frictions are much smaller than in known leads-holders so that restoring spring 5 does not need to be strong.

In the form of construction represented in Fig. 3, a sleeve 22 with an axial hole 19 is slipped in the bottom of axial hole 20 of outer shell 1. The edge of this sleeve is shaped into a collar forming the shoulder 17 on which rests restoring spring 5. Clamping jaws 4 are carried by a tubular holder 23, the end of which is screw-threaded. The free end of the leads guiding tube 3 is also provided with a screw thread. A screw threaded nipple 24 holds together holder 23 and leads guiding tube 3.

From the inspection of Fig. 3, it may be seen that the assembly of the described leads-holder is very quick and easy. Indeed, after the sleeve 22 has been placed in the outer shell 1 and the sliding member has been slipped over the leads guiding tube and the nipple 24 has been screwed to the free end of the latter, it is sufficient to slip restoring spring 5 over the sliding member and to introduce the whole in the outer shell 1. By exerting a pressure on the end of the magazine 6, spring 5 is maintained in its compressed position and the clamping jaws 4 may be introduced through the pointed end of the shell and screwed into nipple 24. After filling magazine 6 with leads, and placing over it control member 7, the leads-holder is ready for use.

One of the great advantages of the described leads-holder consists in the fact that the amplitude of the forwarding movement of the lead 8 is always the same and equals the amplitude of the free stroke of the sliding member from one to the other of the two abutments 10 and 11.

I claim:

1. In a propelling pencil the combination comprising, an outer shell having a conical seat in one end, a lead guiding tube disposed in said shell, lead gripping jaws carried by the lower end of the tube and normally engaging said seat to firmly hold the lead in writing position, said jaws when projected out of the seat being adapted to clamp the lead less firmly to permit its movement between the jaws, spring means held at one end by said shell, a control member in said shell and connected to said tube and engaged by said spring means and thereby urged to a position projecting through the other end of said shell, means in said shell and guided by said tube and engageable at its upper end by said control member and having at its lower end auxiliary lead engaging and feeding jaws normally urged to lead releasing position, elongated openings in said tube providing said auxiliary jaws access to the lead and a path of movement lengthwise of said tube, cam means in said shell engageable by said auxiliary jaws after the outward propulsion of said tube by the inward movement of the control member and after the release of the lead by said gripping jaws and upon continued inward movement of said control member, said cam means urging said auxiliary jaws to lead clamping position, whereby inward movement of said control member will propel said tube in said shell outwardly of said casing and disengage said gripping jaws from said seat and thus partially release said jaws from the lead and then move said means guided by said tube and force said auxiliary jaws into engagement with said cam means to cause same to clamp the lead through said openings and to move the lead in said tube outwardly through said released gripping jaws and whereby upon release of said control member the ends of said openings move said auxiliary jaws and said means guided by said tube to a position in which said

auxiliary jaw means are disengaged from said cam means.

2. In a propelling pencil, the combination according to claim 1 and wherein said shell is provided with shoulder means holding said spring means and camming said auxiliary jaws upon continued inward movement of said control member.

3. In a propelling pencil, the combination according to claim 1 and wherein a sleeve is disposed within said shell for holding said spring means and camming said auxiliary jaws upon continued inward movement of said control member.

4. In a propelling pencil, the combination, according to claim 1 and wherein the means in said shell and guided by said tube is engageable at its upper end by said control member after initially stressing said spring.

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