May 30, 1950 F. VON ALLMEN 2,509,849

LEAD FEEDING AND HOLDING CONSTRUCTION FOR PROPELLING PENCILS

Filed Dec. 9, 1947 2 Sheets-Sheet 1

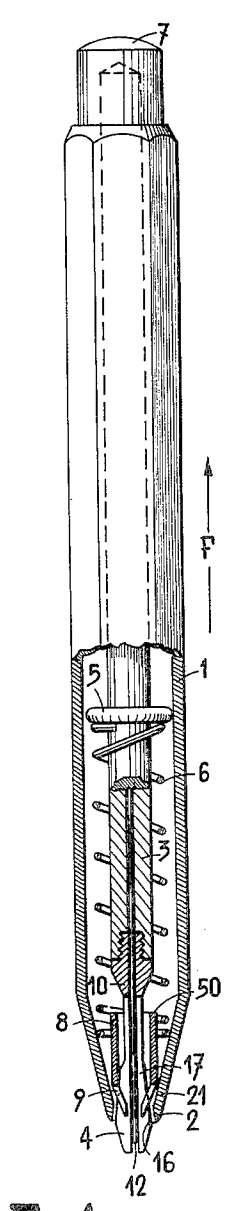

Fig. 1

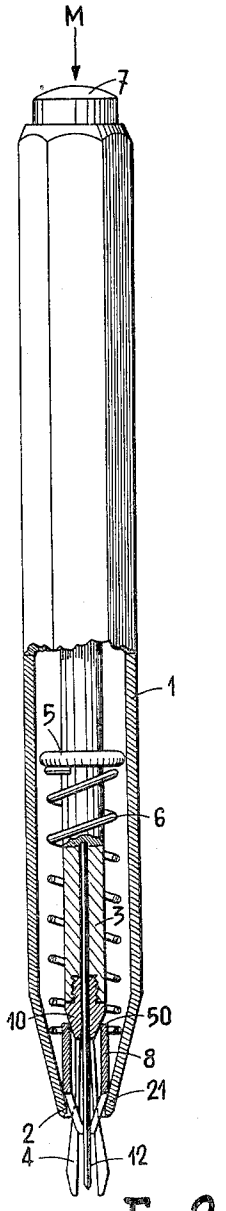

Fig. 2

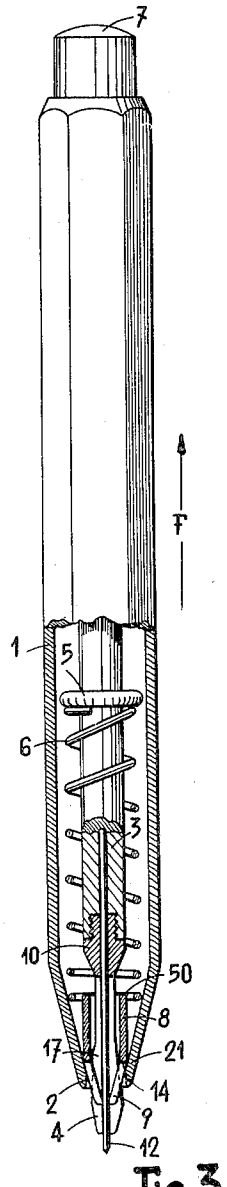

Fig. 3

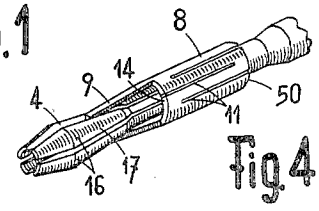

Fig. 4

INVENTOR
FRITZ VON ALLMEN
By Young, Emery & Thompson
Attys.

May 30, 1950 F. VON ALLMEN 2,509,849

LEAD FEEDING AND HOLDING CONSTRUCTION FOR PROPELLING PENCILS

Filed Dec. 9, 1947 2 Sheets-Sheet 2

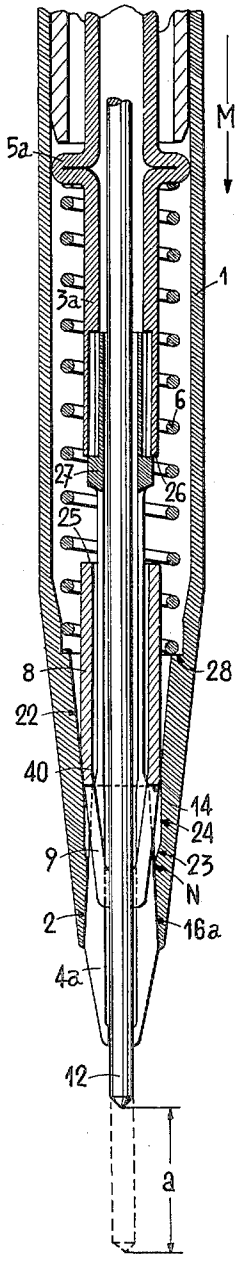

Fig. 5

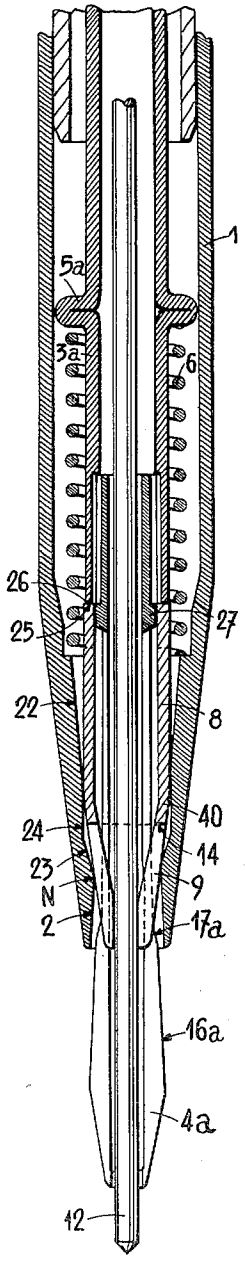

Fig. 6

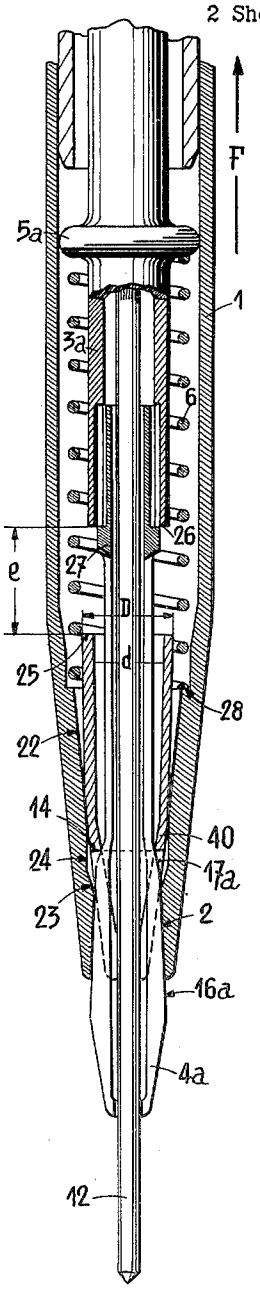

Fig. 7

INVENTOR
FRITZ VON ALLMEN
By Young, Quigg & Thompson
Atty's.

Patented May 30, 1950 2,509,849

UNITED STATES PATENT OFFICE

2,509,849

LEAD FEEDING AND HOLDING CONSTRUCTION FOR PROPELLING PENCILS

Fritz von Allmen, Geneva, Switzerland, assignor to Fabrique Suisse de Crayons Caran D'Ache S. A., Geneva, Switzerland, a corporation of Switzerland

Application December 9, 1947, Serial No. 790,611
In Switzerland September 10, 1947

8 Claims. (Cl. 120—17)

1

This invention relates to propelling pencils, and is particularly concerned with improvements in propelling pencils of the kind comprising a cylindrical housing tapered at one end, a lead-guiding tube provided at one end with contractible chuck jaws which protrude from the housing at the tapered end thereof and are subject to the action of a spring which tends to press the jaws into a seat provided in the said tapered end of the housing, whereby the said jaws are caused to grip a lead disposed between them, an operating member on the lead-guiding tube and protruding from the housing at the end opposite to the tapered end thereof, whereby the lead-guiding tube and the chuck jaws may be moved against the action of the spring, and an element co-axial with the lead-guiding tube and movable freely between two extreme positions, one of which is determined by a stop on the tube, said element having auxiliary jaws connected thereto by shank portions and operating during part of the forward movement of the lead-guiding tube to grip the lead and retain the same in an advanced position during part of the return movement of the lead-guiding tube.

In propelling pencils of this kind, axial pressure on the operating member, such as a knob protruding from the end of the housing, causes advancement of the lead to a predetermined extent and the operation thereof is generally very effective.

In the known constructions of pencils of this kind, however, the auxiliary jaws which retain the lead in an advanced position during part of the return movement of the lead-guiding tube which takes place on release of axial pressure on the operating member, are arranged entirely at the rear of the contractible chuck jaws and the shank portions connecting them to the lead-guiding tube. Consequently, once the remaining length of the lead becomes shorter than the length of the chuck jaws, including the shank portions and mounting thereof, plus the axial distance of displacement of the auxiliary jaws, it is no longer possible to cause the lead to advance by pressing the operating member. When this occurs, the user may think that the mechanism for the advancement has gone wrong, as he cannot see that the rear end of the lead can no longer be engaged by the auxiliary jaws. In some cases, he will then dismantle the propelling pencil in an endeavour to cause it to function again in a normal manner, but cannot always assemble it correctly.

Moreover, the auxiliary jaws engage the lead

2

through longitudinal slots in the lead-guiding tube, which renders the manufacture of this part somewhat more expensive.

The present invention has as its object to provide a propelling pencil of the type described, which is equally effective in operation but obviates the disadvantages enumerated above.

More specifically, the invention has for its object to provide an improved propelling pencil of the type described whereby advancement of the lead may take place until it is almost entirely used.

According to the present invention, the improved propelling pencil is characterised by the fact that the auxiliary jaws are each positioned between two adjacent jaws of the contractible chuck and are connected to a radially resilient sleeve, the arrangement being such that by co-operation with the interior wall of the tapered end of the housing, said auxiliary jaws may be caused to grip the lead during forward movement of the sleeve and to frictionally engage the housing to retain the lead in an advanced position during part of the return movement of the lead-guiding tube effected by the said spring. The auxiliary jaws may comprise convergent parts adapted to engage frictionally with the interior wall of the tapered end of the housing and the release of the sleeve from frictional engagement with the housing during return movement of the lead-guiding tube may be effected by engagement of an enlargement of the chuck jaws including an externally tapered part adapted to engage the said sleeve for effecting movement thereof out of engagement with the said tapered end of the housing.

The invention is hereinafter described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Fig. 1 is a side elevation, partly in section, illustrating one embodiment of propelling pencil according to the invention, showing the lead gripped between the chuck jaws;

Fig. 2 is a similar view showing the chuck jaws in the extreme advanced position wherein the auxiliary jaws grip the lead;

Fig. 3 is a similar view showing the position occupied by the parts during the return movement of the operating member;

Fig. 4 is a view in perspective showing the relative disposition of the chuck jaws and the auxiliary jaws; and

Figs. 5, 6 and 7 are part longitudinal sections on a larger scale similar to Figs. 1, 2 and 3 respectively, illustrating a modification.

The housing 1 of the propelling pencil having a cylindrical inner wall is formed with a tapered end which is provided with an internal tapered seat 2. A lead-guiding tube 3 carrying at one of its ends spring chuck jaws 4, is subject to the action of a spring 6 which engages an annular flange 5 on the tube 3 and tends to hold the jaws 4 against the seat 2, which thus co-operates with the front part 16 of the rearwardly tapered part 16—17 formed by the exterior surface of the tapered shank portion of the jaws 4. The lead-guiding tube terminates at its other end in a push-knob 7 protruding from the housing 1.

The shank portions of the chuck jaws 4 extend from a part 10 screwed to the tube 3 and on the sleeve 8 converging arms forming auxiliary jaws 9 are provided, each jaw 9 being positioned between two adjacent jaws 4 of the chuck. The sleeve 8 is freely movable in relation to the chuck jaws 4 between two extreme positions, one of which is determined by stop means, such as the part 10, associated with the tube 3, and the other by the externally tapered or enlarged part of the chuck jaws 4. The sleeve 8 is provided with longitudinal slots 11 to secure radial resilience. The auxiliary jaws 9 converge towards the front ends and are adapted to co-operate with the interior wall of the tapered end of the housing towards the end of the forward movement of the lead-guiding tube so as to cause the jaws 9 to grip the lead and to engage the sleeve 8 frictionally with the housing 1 for retaining the lead in an advanced position.

In Fig. 1, the parts of the propelling pencil are shown in the working position, the lead 12 being held tight by the jaws 4 which are caused to contract by the action of the spring 6 in the direction F, which draws the front part 16 of the rearwardly tapered part of said jaws 4 into the seat 2.

The propelling pencil hereinbefore described operates in the following manner:

In order to cause the lead to advance, axial pressure is exerted in the direction M on the push-knob 7 against the action of the spring 6 in order to bring the parts of the propelling pencil into the position shown in Fig. 2.

The push-knob 7 moves the lead-guiding tube 3 and the jaws 4 until the part 10 comes in contact with the rear edge 50 of the sleeve 8. Thereupon, on further displacement of the knob 7, the sleeve 8 is moved axially and the jaws 9 come into contact with the interior wall 21 of the tapered end of the housing which progressively stops axial movement of the sleeve accompanied by radial contraction thereof so as to cause the jaws 9 to grip the lead 12 at the same time as the jaws 9 become wedged in the tapered end of the housing.

The lead 12 is advanced in the same degree as the push-knob 7 because, during the forward travel of the latter, it is carried along by the shank parts of the jaws 4, said shank parts exerting sufficient radial resilient pressure to engage the lead frictionally.

When pressure on the push-knob 7 is released, the spring 6 effects the return movement of the lead-guiding tube 3 and of the jaws 4 in the direction F. During the first part of this return movement, the sleeve 8 is held by the wedging of the auxiliary jaws 9 against the interior wall 21 of the tapered end of the housing. These jaws therefore hold the lead 12 in the advanced position to which it has been moved by the action of pressing the knob 7, while the jaws 4 slide on said lead.

In the second stage of the return movement (Fig. 3), the rear part 17 of the effective tapered part of the jaws 4 engages the front edge 14 of the sleeve 8, so that this latter is disengaged from the interior wall 21 and moved in the direction F. The auxiliary jaws 9 disengage automatically from the lead owing to the radial resilience of the sleeve 8.

Finally, in the third stage of the return movement, the front part 16 of the rearwardly tapered part of the jaws 4 again co-operates with the seating 2 of the housing 1 in order to bring about the effective gripping of said jaws on the lead 12, the lead-guiding tube 3 being thereby arrested.

The parts of the propelling pencil are then again in the working position shown in Fig. 1.

The propelling pencil hereinbefore described, although it comprises a small number of components, as compared with known pencils, functions very reliably. None of the components, which are of the simplest form, require precise machining. Furthermore, assembly is easy, so that the improved propelling pencil is inexpensive to manufacture.

The lead 12 can be advanced in the manner described until it is almost completely used up.

In view of the fact that the annular space between the lead-guiding tube 3 and the interior wall of the housing is free above the flange 5, it is possible to provide in this space a lead chamber communicating with the lead-guiding tube.

In the modification illustrated in Figs. 5, 6 and 7, the inner wall of the tapered end of the housing 1 has, between two conical bores 22 and 23, a cylindrical bore 24 of which the effective diameter is slightly smaller than the external diameter D of the sleeve 8, as can be seen in Fig. 7, this sleeve terminating at the rear end in an annular edge 25. The unit formed by the sleeve 8 and the auxiliary jaws 9 is of substantially the same form as that described in connection with Figs. 1 to 4. The lead-guiding tube 3 has a stop in the shape of a cylindrical extension 26 and the chuck jaws 4*a* have, where they are fixed to the lead-guiding tube, a collar 27 the diameter of which is approximately the same as the internal diameter *d* (Fig. 7) of the sleeve 8, said collar 27 serving to locate the sleeve 8 co-axial with the extension 26. As in the embodiment described above, the jaws 4*a* comprise on their exterior surface two rearwardly tapering parts, a front part 16*a* and a rear part 17*a*.

The spring 6 acting upon the flange 5 of the lead-guiding tube 3 and, through this, on the jaws 4*a* rests against a fixed annular stop 28 in the interior wall of the housing 1.

In order to advance the lead, the knob (not shown) is pressed to move the lead-guiding tube 3 and the jaws 4*a* from the working position (shown in Fig. 5) to the position of maximum advancement (shown in Fig. 6) in which the jaws 4 are opened. During this forward movement, the extension 26 pushes the sleeve 8 in the direction M by engagement with its rear edge 25, the collar 27 being already engaged in the sleeve 8 to locate the same. By the axial pushing action in the direction M the engagement of the part 40 of the sleeve 8 with the conical part 22 effects resilient contraction of the sleeve which is maintained by the engagement of the part 10 with the cylindrical part 24 of the inner wall so that the auxiliary jaws 9 are pressed firmly against

the lead during a further part of the forward movement to effect a positive feeding of the lead. Movement of the auxiliary jaws 9 is eventually arrested owing to the fact that they come into contact with the extremity of the small diameter of the conical part 23 at N (Fig. 6). The maximum travel carried out by the lead 12 and the jaws 4a is indicated at a (Fig. 5).

At the beginning of the return movement of the lead-guiding tube 3 and the jaws 4a in the direction of the arrow F under the influence of the spring 6 the sleeve 8 with the auxiliary jaws 9 remains held securely by the resilient contraction in the part 24 of the housing, so that the lead 12 retains its advanced position, although the jaws 4a have moved back. Towards the end of the return movement, the rear tapering part 17a of the jaws 4a strikes the front edge 14 of the sleeve 8 and causes the eventual release of the auxiliary jaws 9, since the part 40 of the sleeve 8 is brought back into the conical part 22 of the housing in the direction of its increase in internal diameter (Fig. 7). While this release of the auxiliary jaws 9 takes place, the lead is moved back to a slight extent until the front part 16a of the jaws engages the seating 2 of the housing, which increases the grip of said jaws on the lead 12 and thereby arrests the lead and its guiding tube, as in the embodiment first described above. Having been moved back over this small distance, the lead 12 has, in fact, advanced by the distance e (Fig. 7), i. e. the difference between the maximum advance a and the extent of its last stage of the return movement of the jaws 4a, from the position shown in Fig. 7 to that shown in Fig. 5.

I claim:

1. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from an abutment associated with the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part for cooperation with said seat, a spring acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portions relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by the said abutment, said sleeve element also having auxiliary jaws each positioned between two adjacent chuck jaws to project for engagement with the inner wall of said tapered end, and being radially resilient so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said auxiliary jaws are caused to engage the lead by co-operation of the said sleeve with the tapered end of the said housing, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead.

2. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from an abutment associated with the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part for cooperation with said seat, a spring acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portions relatively movable in the axial direction, the relative movement of the said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by the said abutment, said sleeve element also having auxiliary jaws each positioned between two adjacent chuck jaws and having externally convergent parts for co-operation with the interior of the tapered end of said housing, said sleeve being radially resilient so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said auxiliary jaws are caused to engage the lead by co-operation of the said externally convergent parts with the inner wall of the tapered end of the said housing, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead.

3. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from one abutment associated with the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part co-operating with said seat and a rear externally tapered part forming another abutment, a spring acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said seating whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portions relatively movable in the axial direction, the relative movement of said sleeve being limited by the said abutments, said sleeve element also having auxiliary jaws each positioned between two adjacent chuck jaws to project for engagement within said tapered end of said housing and being radially resilient so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said auxiliary jaws are engaged by said abutment associated with the end of the said tube and are thereby caused to engage the lead by co-operation of the said auxiliary jaws with the tapered end of the inner wall of said housing, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead, and until said abutment on said chuck jaws

engages said sleeve to move the same out of engagement with the inner wall of said tapered end of the housing to release the auxiliary jaws from the lead.

4. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from an abutment associated with the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part cooperating with said seat, a spring acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said seating whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portions relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by the said abutment, said sleeve element also having auxiliary jaws each comprising a convergent part positioned between two adjacent chuck jaws to project for engagement with the inner wall of the said tapered end of said housing and being slotted longitudinally to provide radial resilience so that, on forward movement of the lead tube resulting in expansion of said contractible chuck, the said auxiliary jaws are caused to engage the lead by co-operation of the said convergent parts with the tapered end of the said housing, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead.

5. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end and having an intermediate external flange, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from an abutment member detachably connected to the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part cooperating with said seat, a spring disposed between said external flange and said tapered end of said housing and acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portions relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by said abutment member, said sleeve element also having convergent arms forming auxiliary jaws and projecting for engagement with the inner wall of said tapered end, each of said auxiliary jaws being positioned between two adjacent chuck jaws and being radially resilient so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said convergent arms co-operate with the said tapered end of the said housing whereby said auxiliary jaws are caused to engage the lead, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead.

6. A propelling pencil comprising a housing having a tapered end including a seat, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising a tube split longitudinally to provide multiple jaws having shank portions separated by slots and connected to an abutment member screwed to the adjacent end of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part cooperating with said seat, a spring acting to press the said lead-guiding tube axially to draw said chuck jaws into the said seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portion relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by the said abutment member, said sleeve element also having convergent auxiliary jaws each positioned in one of said slots between two adjacent chuck jaws and having longitudinal slots extending alternately from opposite ends to provide radial resilience so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said convergent auxiliary jaws cooperate with the inner wall of said tapered end of the said housing whereby said auxiliary jaws are caused to engage the lead, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead.

7. A propelling pencil comprising a housing having a tapered end part including an end seating at its extremity and an internal tapered seat communicating at its small end with a cylindrical bore terminating in an annular abutment, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end and having an annular extension, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from a tubular element fitted within the said annular extension of the lead-guiding tube, said jaws having an enlargement including a rearwardly tapered part co-operating with said end seating, a spring acting to press the said lead-guiding tube axially to draw said chuck jaws into the said end seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portion relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said enlargement of said jaws and in the other direction by said annular extension of the said tube, said sleeve element

also having auxiliary jaws each positioned between two adjacent chuck jaws and being radially resilient so that, during forward movement of the lead tube resulting in expansion of said contractible chuck, the said auxiliary jaws engage said internal tapered seat whereby they are caused to grip the lead resiliently and thereafter slidably engage the said cylindrical bore to maintain grip on the lead during further forward movement, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead, during the latter part of said return movement, the said auxiliary jaws being moved by said chuck to disengage from said cylindrical bore to release the advanced lead.

8. A propelling pencil comprising a housing having a tapered end part including an end seat at its extremity and an internal tapered seat communication at its small end with a cylindrical bore terminating in an annular abutment, a lead-guiding tube axially slidable in said housing for positioning a lead co-axially with said tapered end and having an annular extension, an operating member on the said tube and projecting from the end of the housing opposite to the said tapered end, a contractible lead-gripping chuck protruding through the said tapered end of the housing and comprising multiple jaws having shank portions extending from a tubular element fitted into said annular extension, said tubular element having an external collar projecting at the lower end of said extension and said jaws having an enlargement including a rearwardly tapered part co-operating with said

seating and an abutment, a spring acting to press the said lead-guiding tube rearward to draw said chuck jaws into the said end seat whereby said jaws are caused to grip a lead, and a sleeve element on the said shank portion relatively movable in the axial direction, the relative movement of said sleeve being limited in one direction by the said abutment of said chuck jaws and in the other direction by said annular extension of the said tube, said sleeve element also having auxiliary jaws each positioned between two adjacent chuck jaws and being radially resilient so that, during forward movement thereof, by engagement of said annular extension with the end of said sleeve positioned by said collar, the said auxiliary jaws engage said internal tapered seat whereby they are caused to grip the lead resiliently and thereafter slidably engage the said cylindrical bore to maintain grip on the lead during further forward movement, and so that, during part of the return movement of the said lead-guiding tube, the said sleeve is frictionally held in said housing to retain the lead in advanced position while the said chuck jaws are retracted towards said seat to again grip the lead, during the latter part of said return movement the said auxiliary jaws being moved by said chuck to disengage from said cylindrical bore to release the advanced lead.

FRITZ VON ALLMEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
392,536	Bussler	Nov. 6, 1888