Oct. 5, 1965 B. D. ASTON 3,209,730

AUTOMATIC PENCIL

Filed June 7, 1963 2 Sheets-Sheet 1

Fig. 1.

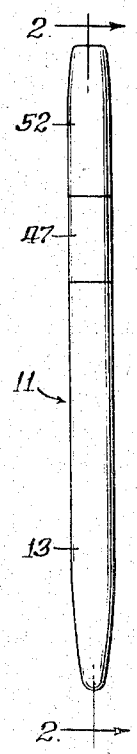


Fig. 2.

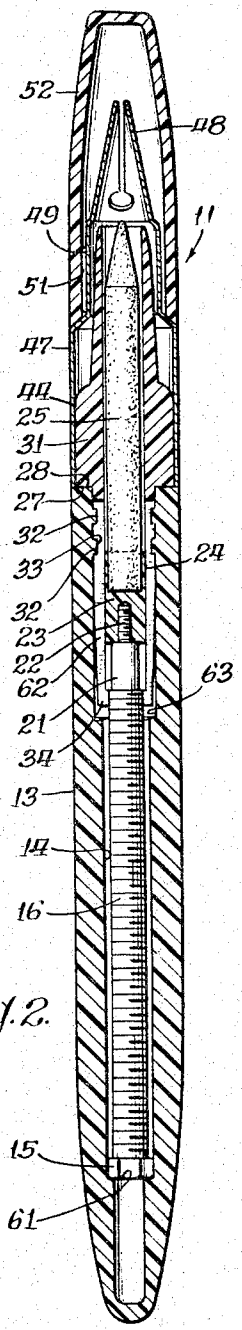


Fig. 3.

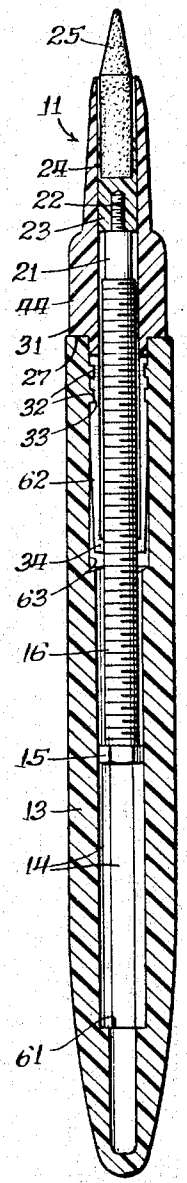
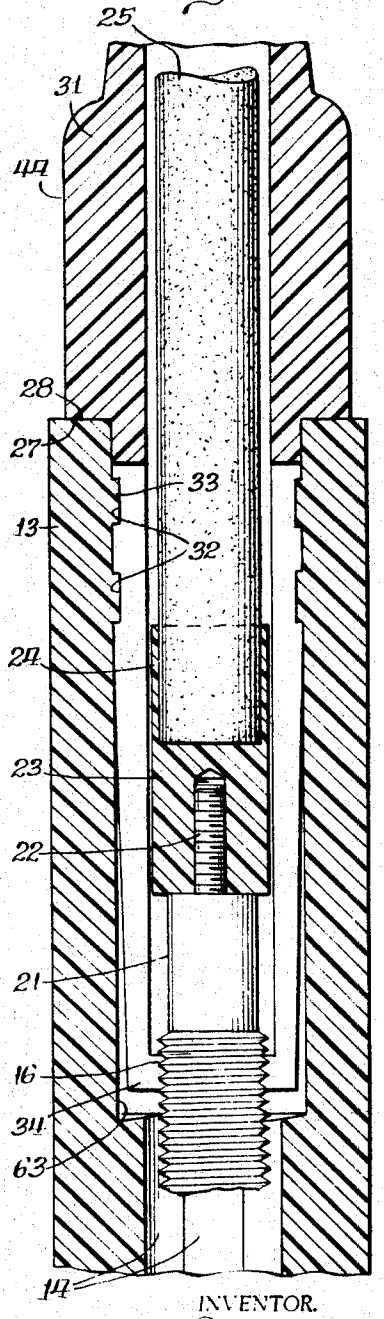


Fig. 4.



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Oct. 5, 1965 B. D. ASTON 3,209,730

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Filed June 7, 1963 2 Sheets-Sheet 2

Fig. 5.

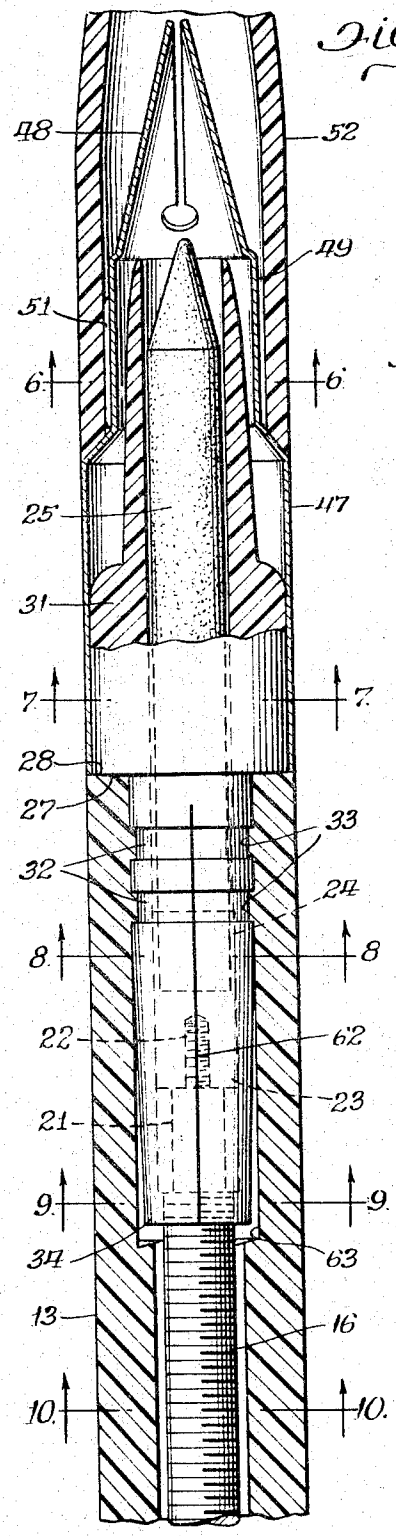


Fig. 11.

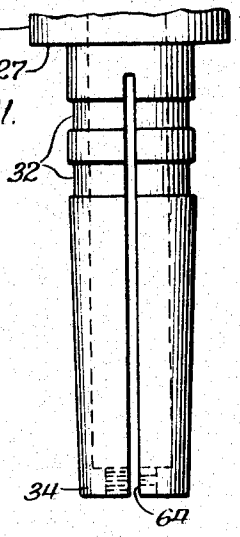


Fig. 6.

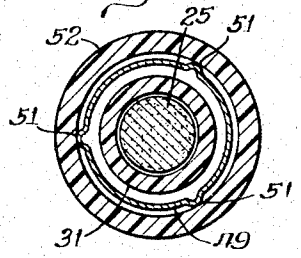
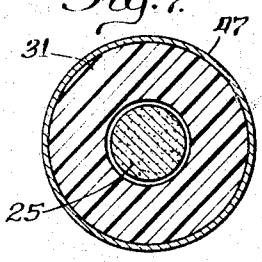


Fig. 7.



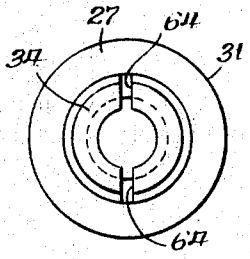


Fig. 12.

Fig. 8.

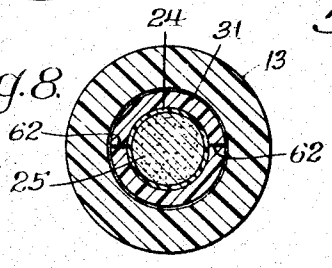
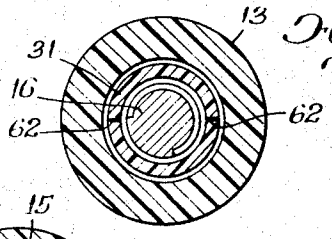


Fig. 9.



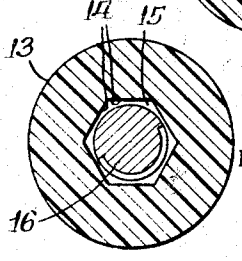


Fig. 10.

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AUTOMATIC PENCIL

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2 Claims. (Cl. 120—18)

This invention relates to so called automatic pencils, and more particularly to pencils which employ an advance screw for adjusting the position of the lead, crayon, or other marking member movably supported within the pencil.

In automatic pencils of the screw-feed type, for adjusting the writing or marking member therein to the desired position for use, the screw is generally advanced through a threaded nose member by turning one part of the pencil assembly with respect to another. This relative movement causes the screw to turn relative to the nose member, thereby advancing the screw through the cooperation of the threaded nose member therewith. Means are generally provided at either end of the screw travel for limiting further displacement thereof so that the internal parts are maintained in threaded connection. If there are no limiting means, the screw may become disengaged from the threads which advance it or retract it axially, causing the pencil elements to loosen or to fall apart. A problem is presented by such limiting means however, in that further advancing or retracting of the screw at the limits of its travel could cause the threads to bind and become locked and possibly damaged.

Accordingly, it is an object of this invention to provide an automatic pencil wherein thread lock and damage is prevented.

Another object of the invention is to provide an improved automatic pencil of simple and sturdy construction, and which may be assembled easily.

A feature of the invention is the provision of an automatic pencil incorporating a clutch construction which prevents thread lock at the limits of travel of the adjusting screw by permitting cross-slippage between threads.

Another feature of the invention is the provision, in an adjustable pencil, of a nose member having a resilient threaded end engaging an adjusting screw, with the resilient end having a pair of axially extending apertures which permit cross-slippage between the threads, and thereby serve as a clutch means in the operation of the pencil.

Still another feature of the invention is the provision, in a mechanical pencil, of a nose member having axially extending slots in a portion therein which permit that portion of the nose member to compress during assembly into the pencil housing to clear interengaging portions on the body and the nose member, and yet expand during the operation of the pencil when expansion or separation is required.

In the drawings:

FIG. 1 is an exterior view of an automatic pencil constructed in accordance with the invention;

FIG. 2 is a half section of the pencil taken along the line 2—2 of FIG. 1;

FIG. 3 is a half section of the pencil with the cap and sharpener removed and with the feed screw in an extended position;

FIG. 4 is an enlarged half section of a portion of the pencil;

FIG. 5 is an enlarged half section of a portion of the pencil revolved 90° from FIG. 2 and with the nose member partially unsectioned;

FIGS. 6–10 are sectional views taken along the lines 6—6, 7—7, 8—8, 9—9, and 10—10, of FIG. 5;

FIG. 11 is a partial view of the nose member of a further embodiment of the invention; and

FIG. 12 is an end view of the nose member of FIG. 11.

In practicing the invention, an automatic pencil is constructed to include a hollow housing. An adjusting screw is disposed within the housing and has a head which prevents rotation of the screw relative to the housing, but which permits the screw to travel axially within the housing. A stop in the housing engages the screw at one limit of its axial travel. The screw is advanced or retracted by an adjusting nose member which is rotatably mounted within the housing by interengaging portions on the housing and nose member. Such interengaging portions secure the nose member against axial displacement relative to the housing.

The nose member may be turned to advance the adjusting screw until the head thereof engages the nose member, preventing further axial displacement of the screw at the other limit of its axial travel. The nose member may also be turned to retract the screw down to its stop position within the housing. Conversely, the nose member may be held by the user of the pencil, and the housing rotated. Inasmuch as the screw is retained against rotation in the housing it will likewise turn, and will advance or retract, depending upon the direction of rotation of the housing.

The nose member includes an interiorly threaded end which engages the screw, and is constructed of resilient material. Two elongated apertures are formed in the nose member and extend axially from the threaded end a distance sufficient to permit resilient expansion of the threaded end. If the nose member continues turning at the limits of screw travel, the forces between the threads will cause the nose member to expand at the threaded end to permit the threads to cross-slip, thereby preventing locking of the threads and possible damage. The apertures may be made wide enough to permit the nose member to compress and clear the interengaging portions as it is assembled in the housing.

Referring now more particularly to the drawings, one example of the invention is illustrated as an automatic eye-brow pencil 11. The pencil is comprised of molded plastic parts and includes a hollow plastic tubular housing 13. Housing 13 is provided with a plurality of interior faces 14 which mate with the hexagonal head 15 of a feed screw 16 to prevent rotation thereof relative to the housing 13. Faces 14 guide head 15 to permit axial displacement of screw 16 to adjust the crayon, as will be explained subsequently.

The end of screw 16 at the end opposite the head 15 is formed with an unthreaded portion 21, and a small threaded nib 22. A crayon holder 23 is screwed onto nib 22 to be moved by screw 16. Crayon holder 23 has a cup-shaped end 24 which receives a crayon 25 so that the crayon moves with crayon holder 23, and hence with screw 16.

Screw 16 is adjusted by means of a nose member 31. Nose member 31 is formed of a resilient plastic or similar material and is secured in housing 13 by means of a shoulder 27 engaging open end 28 of housing 13, and by means of circumferential grooves 32 which interengage mating annular projections 33 on the inner wall of housing 13. The clearance between grooves 32 and projections 33 is sufficient to permit rotation of nose member 31 relative to housing 13, but their interengagement prevents axial displacement of nose member 31 relative to housing 13. Nose member 31 has a threaded interior end 34 which mates with the threads of screw 16. Accordingly, as nose member 31 is rotated relative to housing 13, screw 16 is displaced axially to move crayon 25 outwardly as it is consumed. This may be seen clearly by comparing FIGS. 2 and 3.

The outside large diameter 44 of nose member 31 receives metal sharpener 47 in frictional engagement. Sharpener 47 includes sharpener blades 48, and may be turned to cause nose member 31 to turn, driving the crayon into engagement with the sharpener blades. A few turns will then sharpen crayon 25. The small diameter 49 of sharpener 47 includes three ribs 51 over which slips a protective cap 52. The travel of screw 16 is limited at one end by engagement of head 15 with the lower interior end 61 of housing 13, and at the other end by engagement of head 15 with the threaded end 34 of nose member 31.

To prevent locking or binding of the threads at these two limits of screw travel, which locking could cause thread damage, a clutch construction is provided. The clutch includes two axially extending apertures 62 which may be cut or molded in the wall of nose member 31. These apertures extend from threaded end 34 to a point between grooves 32 and shoulder 27 to permit the respective portions of nose member 31 between the apertures to separate. Since the nose member 31 is made of plastic or other such resilient material, the inherent resiliency in the portions between apertures 62 permits separation under radial or transverse pressure, and a return to a closed condition when the pressure is removed. When the head 15 of screw 16 engages either the end 34 of nose member 31, or the end 61 of housing 13, further rotation of nose piece 31 causes the forces building up in the threads to separate the portions of nose member 31 between apertures 62. A widened interior chamber 63 is provided in housing 13 to accommodate the separation of the portions of the nose member. The resilient expansion permitted by apertures 62 and chamber 63 allows the threads to cross-slip, preventing locking and damage.

The apertures may be widened, as shown in FIGS. 11 and 12 by apertures 64. The wider apertures 64 provide the same cross-slippage between the threads as did narrower apertures 62, and in addition permit the inner portion of nose member 31 to compress when it is inserted in housing 13 during assembly. This facilitates the assembly operation since by compressing the nose member 31, it can easily clear projections 33 on the inner wall of housing 13. Once screw 16 is threaded in nose member 31, the nose member will no longer compress and a positive engagement between the threads is maintained. The apertures 64 may be formed in nose member 31 as it is molded, and may be of a width sufficient to leave sixty percent or more of the thread circumference engaged. This has been found to provide satisfactory operation. The less thread engaging screw 16, of course, the less force will be available to advance or retract the screw.

With a full sized crayon mounted in crayon holder 23, and with the crayon in retracted position as shown in FIG. 2, head 15 of screw 16 seats against the bottom 61 of the housing so that the screw can be retracted no further. If nose member 31 is then turned relative to housing 13 to drive screw 16 further in the retractable direction, the threaded end 34 of nose member 31 separates sufficiently to permit cross-slippage between the threads, preventing thread lock. Nose member 31 may be turned in the opposite direction relative to housing 13 to advance the crayon into a position for use as shown in FIG. 3. Of course, as the crayon is used it will be gradually consumed. When the crayon is entirely gone, the crayon holder 23 will protrude out of the end of nose member 31 so that the crayon may be replaced. At this position, head 15 will engage the interior end 34 of nose member 31 to prevent further outward displacement of the crayon holder. At this position, the threaded end 34 of nose member 31 will once again separate, because of the apertures 62 or 64, to permit the threads to cross-slip.

Cross-slippage of the threads is also advantageous in assembling the pencils and in replacing the crayon. This

is because it is unnecessary to rotate the screw 16 to position it in the nose member 31. During assembly, the screw has to be inserted in the end 34 of nose member 31. This is accomplished by simply forcing the screw in, letting the threads slip in an axial direction until it is in the desired position. Also, when the crayon is replaced, the screw is in its further advanced position, and once the new crayon is inserted the screw may simply be pushed back to its furthest retracted position without tediously turning the nose member.

It may therefore be seen that the invention provides an improved automatic pencil which utilizes a feed screw and wherein thread lock and damage is prevented by a novel clutch construction. The feed screw may be advanced or retracted within predetermined limits of travel, at which limits the clutch construction provides slippage between threads if further turning of the nose member occurs. Moreover, the pencil is easily assembled, and the replacement of the writing member is simplified.

I claim:

1. A mechanical pencil including in combination,

a tubular housing having an open end and a bore extending substantially the entire length thereof,

a threaded screw in the housing bore having a head on one end thereof shaped to correspond to at least a portion of the length of the housing bore and having marking-member-connecting means at the other end thereof, with said screw moving between two axial limiting positions in the housing and maintained against rotation in the housing bore,

a marking member having a support therewith adapted for releasable connection with the marking-member-connecting means on the screw and being axially movable with the screw,

a single member in said housing bore for both encasing the marking member for its axial movement and for connecting with the screw in a continuous threaded connection for its entire axial travel and at each of the two axial limiting positions, said single member having a threaded section at its inner end for said connection,

means locking said single member in said housing bore against removal therefrom but permitting relative rotation between said housing and said single member,

with said single member having a plurality of axially extending apertures at said threaded-section end forming transversely spreadable resilient portions at that end with a threaded portion on each resilient portion, said resilient portions permitting a corresponding transverse spreading of the threaded portions thereon,

said housing bore wall being spaced away from said single-member resilient portions a distance to permit said spreading within said bore,

and with said single member and said resilient portions thereon remaining in the same axial locked position within said housing bore when the threaded screw is at each limiting axial position and in threaded connection therewith, but with the resilient portions being urged outwardly with continued relative rotation of the single member and the housing by the interaction of threads on the screw and on the resilient portions so that slippage will occur between the threads at a screw-limiting position and the screw and threaded portions will not separate axially nor bind with respect to one another,

said marking member being disconnectible from the screw and removable from the single member to replace a marking member in the pencil while the single member is locked in the housing.

2. The combination of claim 1 wherein said limiting positions for said threaded screw are provided by means comprising a portion of said housing at one limit of axial movement of said screw, and a portion of said single

member at the other limit of axial movement of said screw, and wherein said apertures comprise a pair of axially extending oppositely disposed slits.

References Cited by the Examiner

UNITED STATES PATENTS

2,041,299 5/36 Nevmayer ---------- 120—18 X

2,979,029 4/61 Nelnikoff ---------- 120—18 X
3,106,908 10/63 Gretz ---------- 120—18
3,115,118 12/63 Anderson et al. ---------- 120—18

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