

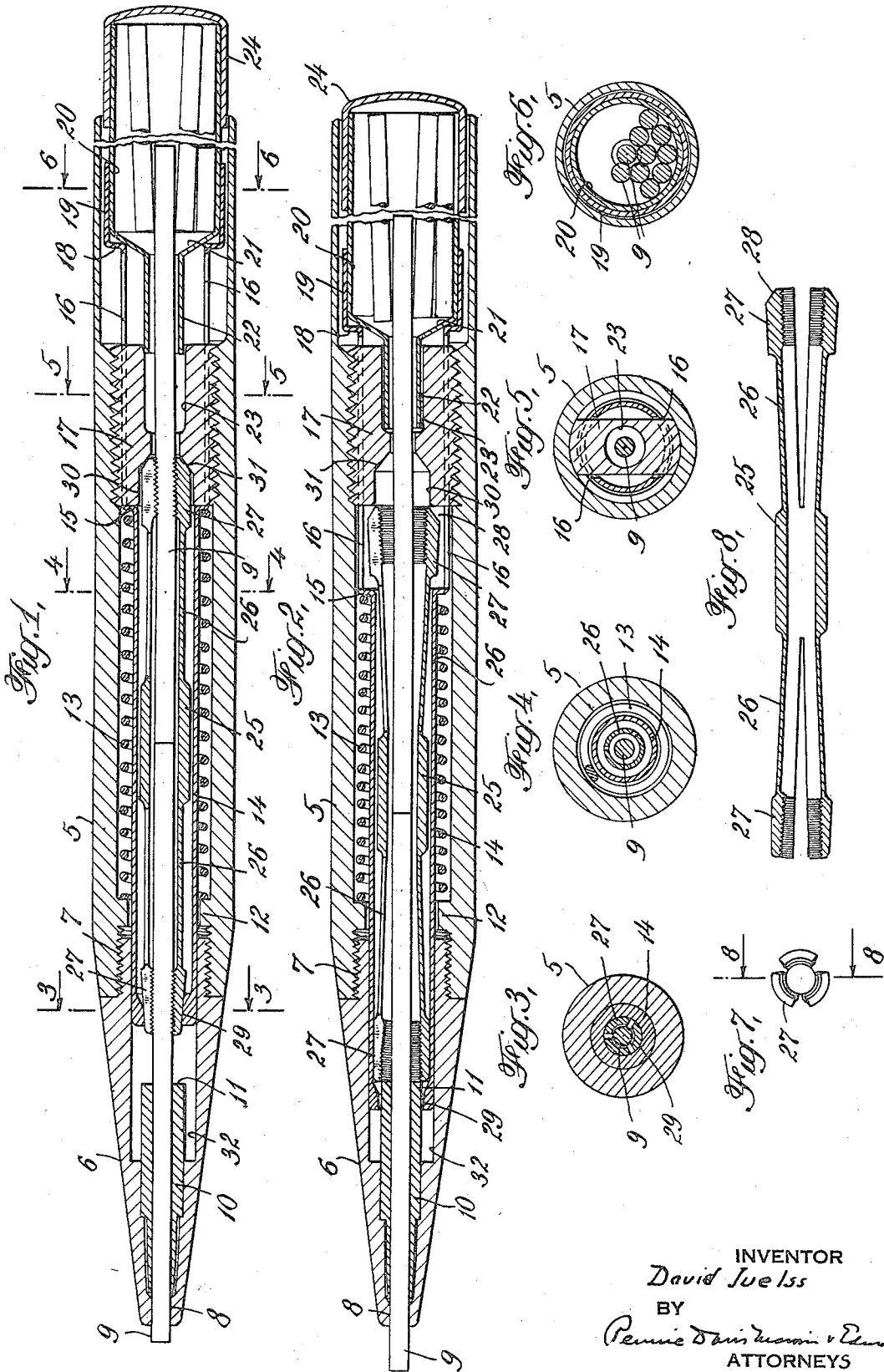
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MECHANICAL PENCIL

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MECHANICAL PENCIL

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This invention relates to mechanical pencils and particularly to improvements in pencils in which the lead is advanced by a step-by-step operation.

There have been numerous suggestions for the construction of pencils of the type described and some of these have been developed and used as commercial products. Most of the structures employed are intricate and delicate. The parts involve costly manufacturing operations and assembly of the parts to provide the finished pencils frequently presents difficulties which increases the expense of manufacturing. Some of the mechanisms fail after the pencils are in use for brief periods and hence are not entirely satisfactory.

It is the object of the present invention to provide a simple, rugged and effective mechanism which is relatively easy to manufacture and assemble and which affords a magazine pencil in which the leads can be fed as required by manipulation of a projecting member.

Other objects and advantages of the invention will be apparent as it is better understood by reference to the following specification and accompanying drawing in which:

Fig. 1 is a longitudinal section through the pencil showing the mechanism in writing position;

Fig. 2 is a similar view showing the mechanism displaced to advance the lead;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a section on the line 6—6 of Fig. 1;

Fig. 7 is an end elevation of the collet with the lead gripping members thereon; and

Fig. 8 is a section on the line 8—8 of Fig. 7.

Referring to the drawing, 5 indicates a casing of suitable material, for example metal or plastic, which is generally cylindrical in form though the cross-sectional contour may be circular, hexagonal or otherwise to afford a pleasing exterior appearance. At one end a tapered extension 6, which also may be of metal or plastic, is secured to the casing 5, for example, by threads 7. The extension 6 has an orifice 8 through which the lead 9 projects and is preferably provided with a tubular lead guide 10 fitting tightly therein and affording an abutment 11, the function of which will presently be apparent.

The casing 5 has an internal flange 12 affording a shoulder for a spring 13 and acting as a guide for a sleeve 14 having a shoulder 15. The spring 13 resting between the flange 12 and the shoulder 15 normally holds the sleeve in the position indicated in Fig. 1, but permits inward movement of the sleeve against the tension of the spring.

The sleeve 14 has slots 16 to receive a nut 17 which threadedly engages the inner surface of the casing 5, thus holding the parts in assembled

relation. The length of the slots 16 is such as to permit the necessary movement of the sleeve which is enlarged at its outer end to provide an abutment 18 and a cup 19 to receive the magazine 20. The magazine has a conical bottom 21 and a tubular extension 22 acting as a guide to direct the sticks of lead 9 into the lead passage 22 in the nut 17. A recess 23 in the lead 9 receives and guides the extension 22. A cap 24 on the magazine 20 closes the latter and extends beyond the casing 5 to afford the actuating means which may be manipulated with the finger of the user to depress the sleeve 14.

Loosely disposed within the sleeve 14 is a collet 15 having a plurality of resilient arms 26 at both ends thereof. Each of the arms carries a lead gripping member 27, the members at one end being provided with a cam surface 28. The arms 26 are biased outwardly so that the gripping members 27 release the lead when the collet is free as shown in Fig. 2.

At its lower end the sleeve 14 has a cam surface 29 which is adapted to ride upon the outer surface of the adjacent members 27, causing the latter to grip the lead. The nut 17 has a recess 30 terminating in a cam surface 31. When the adjacent members 27 of the collet 25 enter the recess 30 and the cam surfaces 31 and 28 are engaged, the adjacent members 27 will grip the lead. This is the normal writing position of the parts as shown in Fig. 1.

When the lead is to be advanced, the user depresses the cap 24, thus advancing the sleeve 14 against the tension of the spring 13. As the sleeve advances, it carries collet 25 with it by reason of the frictional engagement between the surface 29 with the adjacent members 27 until the end of the collet engages the abutment 11. At this point the sleeve continues to advance into the recess 32 around the lead guide 10, thus releasing the gripping members 27 which spring outwardly, leaving the lead in advanced position as shown in Fig. 2. Meanwhile, the members 27 at the opposite end of the collet have been withdrawn from the recess 30 so that the lead is free at both ends of the collet.

When the user releases the cap 24, the spring 13 moves the sleeve 14 backwardly, carrying the collet 25 with it. The members 27 at the upper end of the collet 25 enter the recess 30 and finally engage cam surfaces 31, thereby gripping the lead. The sleeve 14 continues its movement and the cam surface 29 rides over the adjacent members 27, causing them to grip the lead which is thus firmly held in writing position. The operation may be repeated as desired. The pieces of lead follow each other from the magazine 20 and are advanced gradually by successive operations as the lead is consumed.

The pencil includes a minimum number of parts which may be produced easily and cheaply

by simple mechanical operations. Assembly of the parts is facilitated by the simplicity of the structure. It is necessary merely to drop the collet 25 into the sleeve 14, insert the nut in the slots 16 and screw the nut into the casing against the tension of the spring 13. The magazine 20 with the cap 24 thereon is then inserted in the cup 19 and the pencil is ready for operation.

Various changes may be made in the structure as described without departing from the invention or sacrificing the advantages thereof.

I claim:

1. In a mechanical pencil, a casing, a collet having resiliently biased lead gripping means at opposite ends thereof and operating mechanism adapted when actuated to advance the gripping means and propel the lead and to release the gripping means when the operating mechanism is retracted.

2. In a mechanical pencil, a casing, a collet having resiliently biased lead gripping means at opposite ends thereof, and operating mechanism, including a sleeve frictionally engaging the gripping means at one end of the collet and adapted when actuated to advance the gripping means and propel the lead and to release the gripping means when the operating mechanism is retracted.

3. In a mechanical pencil, a casing, a collet having resiliently biased lead gripping means at opposite ends thereof, stationary means adapted to hold the gripping means at one end of the collet in gripping relation to the lead, and operating mechanism adapted when actuated to advance the gripping means and propel the lead and to release the gripping means when the operating mechanism is retracted.

4. In a mechanical pencil, a casing, a collet having resiliently biased lead gripping means at opposite ends thereof, and operating mechanism, including a sleeve frictionally engaging the gripping means at the other end of the collet, adapted when actuated to advance the gripping means and propel the lead and to release the gripping means when the operating mechanism is retracted.

5. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet having resiliently biased lead gripping means at opposite ends thereof and means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position.

6. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, and means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position.

7. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position, and an abutment to limit movement of the collet when the sleeve is advanced to propel the lead.

8. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet having resiliently biased lead gripping means at opposite ends thereof, means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position, manually actuable means to advance the sleeve and resilient

means to retract the sleeve when it is released.

9. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position, manually actuable means to advance the sleeve and resilient means to retract the sleeve when it is released.

10. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position, an abutment to limit movement of the collet when the sleeve is advanced to propel the lead, manually actuable means to advance the sleeve and resilient means to retract the sleeve when it is released.

11. In a mechanical pencil, a casing, a sleeve reciprocable therein, means permitting actuating of the sleeve in one direction, resilient means to retract the sleeve, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof and means for holding the gripping means in gripping position when the sleeve is retracted.

12. In a mechanical pencil, a casing, a sleeve reciprocable therein, means permitting actuating of the sleeve in one direction, resilient means to retract the sleeve, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, and means for holding the gripping means in gripping position when the sleeve is retracted, including a cam surface at one end of the sleeve adapted to engage the gripping means at one end of the collet and a stationary member having a cam surface to engage the gripping means at the other end of the collet.

13. In a mechanical pencil, a casing, a sleeve reciprocable therein, a lead magazine supported in the sleeve, means permitting actuation of the sleeve in one direction, resilient means to retract the sleeve, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof and means for holding the gripping means in gripping position when the sleeve is retracted.

14. In a mechanical pencil, a casing, a sleeve reciprocable therein, a lead magazine supported in the sleeve, means permitting actuating of the sleeve in one direction, resilient means to retract the sleeve, a collet movable with and relatively to the sleeve and having resiliently biased lead gripping means at opposite ends thereof, and means for holding the gripping means in gripping position when the sleeve is retracted, including a cam surface at one end of the sleeve adapted to engage the gripping means at one end of the collet and a stationary member having a cam surface to engage the gripping means at the other end of the collet.

15. In a mechanical pencil, a casing, a sleeve reciprocable in the casing, a lead magazine supported in the sleeve, a collet having resiliently biased lead gripping means at opposite ends thereof and means on the casing and sleeve adapted when engaging the lead gripping means to hold them in gripping position.