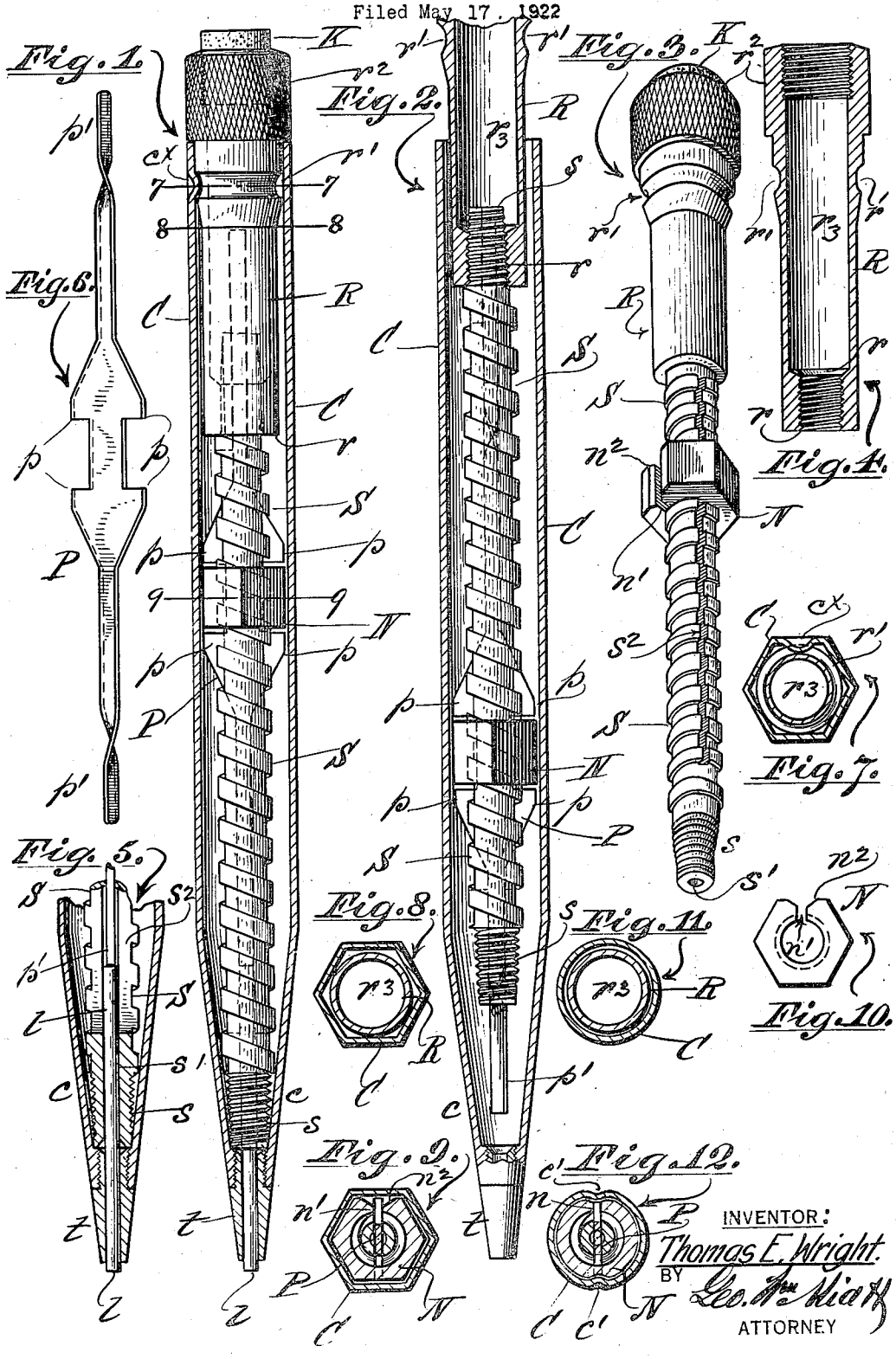
May 6, 1924. 1,493,178

T. E. WRIGHT

MECHANICAL PENCIL

Filed May 17, 1922



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Patented May 6, 1924. 1,493,178

UNITED STATES PATENT OFFICE.

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MECHANICAL PENCIL.

Application filed May 17, 1922. Serial No. 561,604.

To all whom it may concern:

Be it known that I, THOMAS E. WRIGHT, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings and city and State of New York, have invented certain new and useful Improvements in Mechanical Pencils, of which the following is a specification.

My improvements relate to mechanical pencils, so called commercially, of the type in which the lead is forcibly projected through the tip thereof in a manner now well known in the art; and are designed to attain simplicity and economy in construction, as well as to facilitate manipulation as hereinafter fully set forth,—the invention consisting substantially in the specific combination and arrangement of parts and appurtenances described and claimed.

In the accompanying drawings I exemplify a practical embodiment of the essential features of my improvements in a pencil of the class designated, although I do not limit myself to the identical form and construction of component parts shown, since various modifications and equivalent mechanical expedients may be resorted to in details with like result, and without departing from the spirit and intent of my invention in this respect.

With this understanding,

Fig. 1, represents a central longitudinal section of a pencil casing, showing the adjunctive and contained parts in elevation: and in operative co-relation:

Fig. 2, is a sectional elevation showing the operative parts withdrawn in part from the casing:

Fig. 3, is a perspective view of the actuating screw, head, and nut:

Fig. 4, is a central longitudinal section of the tubular screw, head and lead magazine:

Fig. 5, is a sectional elevation of the lower or tip end of the pencil, showing a lead in position for use and advancement:

Fig. 6, is a perspective view of the push rod:

Fig. 7, is a transverse section taken upon plane of line 7—7 Fig. 1:

Fig. 8, is a transverse section taken upon plane of line 8—8 Fig. 1:

Fig. 9, is a transverse section taken upon plane of line 9—9 Fig. 1:

Fig. 10, is an end elevation of the actuating screw nut:

Fig. 11, is a transverse section like Fig. 8, and taken on plane of line 8—8, Fig. 1, showing a modification in the form of shell or casing;

Fig. 12, is a transverse section like unto Fig. 9, and taken on the same plane 9—9 Fig. 1, of the modification shown in Fig. 11.

The outer shell or casing C, of tubular construction, is formed with a truncated conoidal end portion c, into the extremity of which the tip t, is screwed, the axial channel in said tip t affording a close fit for the portion of the lead l, accommodated therein, so that the said lead l will be held normally against displacement by frictional contact or, technically, by a forced fit which will not however prevent the advance of the lead under screw pressure as hereinafter set forth.

The main portion of the tubular casing C, beyond the truncated conoidal end c, thereof, may be circular in cross section, (or substantially so) as shown in Figs. 11 and 12, or it may be of any polygonal form, or even triangular, in cross section, being so constructed as to prevent the rotation of the travelling nut N, which acts as the mount and vehicle for the lead feed plunger P, as subsequently explained—the peripheral surfaces of said non-rotative travelling nut N, being of course correspondingly formed for contactual engagement with the inner surfaces of said casing C whatever the form thereof in cross section.

Thus in all but Figs. 11 and 12 of the drawings the use, by way of exemplification, of an hexagonal nut N, is illustrated, the tubular casing C, being correspondingly hexagonal in internal cross section, whereas in said Figs. 11 and 12, the use of a nut N, essentially cylindrical, or of circular peripheral configuration, is illustrated, in which case the nut N is formed on one or more peripheral sides with a longitudinal groove n', and the body of the casing C, is correspondingly formed with one or more longitudinal ribs c', as indicated more particularly in Fig. 12, of the drawings.

The non-rotative travelling nut and plunger carrier N, is formed for engagement with the male screw thread S, which is pref-

erably reversible, so as to function when positioned in either direction. That is to say, each extremity of said nut-actuating screw S, is formed with a tapered nipple *s*, having a relatively fine peripheral screw thread as compared with the relatively coarse thread of the main or medial portion of said actuating screw S. By this duplication of nipple construction either end of the actuating screw S is adapted for engagement with the correspondingly screw-tapped (*r*) inner end of the rotor tube R, which latter also incidentally, functions as a holder for replacement leads *l*. This duplex nipple end configuration *s*, *s*, of the actuating screw S, is shown more particularly in Fig. 2 of the drawings.

The rotor tube R, is held in position normally on the outer end of the casing C, by means of an inturned snap shoulder or boss c^x, as shown more particularly in Figs. 1 and 7 of the drawings, said snap boss c^x, engaging with the sides of an annular groove r', on the peripheral surface of the rotor tube R, and thereby preventing longitudinal movement in either direction of the rotor R, and of the actuating screw S attached thereto as aforesaid.

The end section r^2, of the rotor tube R, protuberant beyond the end of the casing, constitutes the handle or knob for manipulative purposes, being preferably, although not necessarily, of cylindrical form and knurled peripherally, or otherwise formed to facilitate finger dexterity. The outer end of said rotor tube R, is also threaded internally, or otherwise formed for secure contactual engagement with a closure member K consisting preferably of a rubber tip which may be utilized for erasive purposes as in the case of ordinary rubber tipped pencils, thus answering a double function in that it also constitutes a detachable lid or cover for the lead replacement compartment r^3.

The actuating screw S, is slotted diametrically and longitudinally between and proximately to, the nipple extremities *s*, *s*, thereof, said slot s^2, being for the accommodation of the lead-feed plunger P. The latter is formed medially with shoulders *p*, *p*, for engagement with the opposite sides of the non-rotative travelling nut N, which latter is formed with a slot n' on one side thereof to admit of its straddling said lead-feed plunger P. Both ends p', p', of the plunger P, are of the same length and configuration, and hence, like the actuating screw itself, the plunger is reversible, and will function in either direction, its office being to transmit the motion and power derived from the actuating screw S through the medium of the non-rotative travelling nut N, on which it is mounted, to the lead *l*, positioned in the tip *t*, and in the bore s' of the nipple *s*, involved, as indicated more particularly in Fig. 5 of the drawings.

The non-rotative nut N, is, on one side, formed with a concave flare n^2, to admit of its insertion or withdrawal, past the snap boss c^x, of the tubular casing C, and this concave flare n^2, is preferably coincident with, and constitutes the entrance to, the slot n', formed for the reception of the shank or medial portion of the type feed plunger P. This construction of nut N, will be understood by reference more particularly to Fig. 10, of the drawings.

It is obvious from the foregoing that, with the parts assembled and in the relative positions shown for instance, in Fig. 1, the turning of the rotor R in either direction will cause the actuating screw S, to advance or retract the non-rotative nut N, and with it the lead-feed plunger P. Thus the pressure on the inner end of the lead *l*, in the tip *t*, may be relaxed, as when it is desired to force the outer end of said lead backward into said tip *t*, or augmented, as when it is desired to force the end of said lead *l*, outward beyond the tip *t*, to compensate for wear etc.

When it is desirable to effect replacement of a lead *l*, a sharp pull on the rotor R will release it from the snap boss c^x of the casing C, and permit of the withdrawal therefrom, bodily, of the actuating screw S, non-rotative nut N, and plunger P,—the said snap boss c^x, affording the only resistance to be overcome in this respect.

When the operative parts are then withdrawn from the casing C, the rotor R, may be unscrewed from the nipple *s* of the actuating screw S, to which it was attached, and a fresh lead *l*, may be withdrawn from the reservoir *r* through the tap hole.

This being accomplished, the rotor is again screwed onto the actuating screw S, but to the opposite nipple *s*, thereof,—or in other words the actuating screw S, is inverted or reversed, so as to bring the non-rotative nut N and plunger P into operative position for immediate use after the operative parts are again inserted in the casing C, thus obviating the necessity for rotating the nut N on the actuating screw S, back to the starting point so as to bring the feed plunger P into position for action on the replacement lead *l*. The latter is inserted in the bore s', of the reversed or tip end nipple of the actuating screw S, it being understood, of course, that both ends of the said screw S are alike in structure and that the nipples *s*, *s*, are duplicates.

Thus prepared for renewal of pencil service, the operative parts are forcibly reinserted in the tubular casing C, until the snap boss again engages with the annular groove r', in the periphery of the rotor R, when the device again is ready for immediate use.

An important feature to be noted in this connection, is the fact that there is absolutely no unscrewing of parts involved in either the withdrawal or reinstatement of the operative parts as related to the container or casing C, a simple pull or push exerted in alignment with the central longitudinal axis of said parts as assembled being amply sufficient to overcome the resistance of the snap boss c^x, which functions as an absolute lock in this respect, while admitting of the turning of the rotor R and actuating screw S.

Furthermore, the reversibility of the actuating screw S, and the feed plunger P, is an important factor in facilitating replacement manipulation, the substitution being conveniently effected with a minimum expenditure of time and labor as compared with the prior state of the art.

Another advantage I attain over said prior state of the art is, cheapness combined with durability, the operative parts being simple both in construction and operation, and well calculated to withstand the rough usage to which such implements are liable to be subjected. There are no complicated mechanical expedients involved, and internal stress and wear is practically eliminated.

What I claim as my invention and desire to secure by Letters Patent is,

1. A mechanical pencil of the character designated comprising a tubular casing formed with a lead holding tip, a lead-feed plunger, formed with lateral shoulders for engagement with a travelling nut, said travelling nut on which said plunger is mounted, means for rendering said nut non-rotative within the casing, a longitudinally slotted actuating screw engaging said non-rotative nut, and extraneous means for turning said actuating screw on its axis in either direction, substantially in the manner and for the purpose described.

2. A mechanical pencil of the character designated, comprising a tubular casing internally polygonal in cross section and formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, said nut conforming peripherally to the internal cross section of the casing, a longitudinally slotted actuating screw engaging with said non-rotative nut and extraneous means for turning said actuating screw on its axis in either direction, substantially in the manner and for the purpose described.

3. A mechanical pencil of the character designated, comprising a tubular casing internally hexagonal in cross section and formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, said nut conforming peripherally to the internal hexagonal cross section of the casing, a longitudinally slotted actuating screw engaging with said non-rotative nut, and extraneous means for turning said actuating screw on its axis in either direction, substantially in the manner and for the purpose set forth.

4. A mechanical pencil of the character designated, comprising a tubular casing formed with a lead-holding tip, a reversible lead-feed plunger, a travelling nut on which said reversible plunger is mounted, means for rendering said nut non-rotative within the casing, a longitudinally slotted reversible actuating screw engaging said non-rotative nut, and extraneous means for turning said actuating screw on its axis in either direction, substantially in the manner and for the purpose described.

5. A mechanical pencil of the character designated, comprising a tubular casing formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, means for rendering said nut non-rotatable within the casing, a longitudinally slotted actuating screw engaging said non-rotatable nut, a rotor attached to said actuating screw and protruding beyond the casing, and means for retaining said rotor in position against longitudinal movement in either direction while permitting of the turning thereof on its longitudinal axis in either direction, substantially in the manner and for the purpose described.

6. A mechanical pencil of the character designated, comprising a tubular casing formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, means for rendering said nut non-rotatable within the casing, a longitudinally slotted actuating screw engaging said non-rotatable nut, a rotor attached to said actuating screw and protruding beyond the casing, and means for retaining said rotor in position against longitudinal movement in either direction while permitting of the turning thereof on its longitudinal axis in either direction, said means comprising a peripheral annular slot on said rotor, and an engaging snap boss on the casing, for the purpose, and substantially in the manner described.

7. A mechanical pencil of the character designated, comprising a tubular casing formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, means for rendering said nut non-rotatable within the casing, a longitudinally slotted actuating screw engaging said non-rotatable nut, a rotor attached to said actuating screw and protruding beyond the casing, and means for retaining said rotor in position against longitudinal movement in either direction while permitting of the turning thereof on its longitudinal axis in either direction, said rotor being formed with a lead-replacement com-

partment having a detachable closure therefor substantially in the manner and for the purpose described.

8. A mechanical pencil of the character designated comprising a tubular casing formed with a lead holding tip, a reversible lead-feed plunger, a travelling nut on which said plunger is mounted, means for rendering said nut non-rotatable within the casing, a longitudinally slotted actuating screw engaging said non-rotatable nut, a rotor attached to said actuating screw and protruding beyond the casing, and means for retaining said rotor in position against longitudinal movement in either direction while permitting of the turning thereof on its longitudinal axis in either direction, said rotor being formed with a lead-replacement compartment having a detachable closure consisting of a rubber eraser, for the purpose and substantially in the manner set forth.

THOMAS E. WRIGHT.

Witnesses:
FLORENCE MIATT,
DOROTHY M. CARMICHAEL.