April 15, 1924. 1,490,834

F. J. KRISTOFEK

PENCIL

Filed June 30, 1919

Fig. 1.

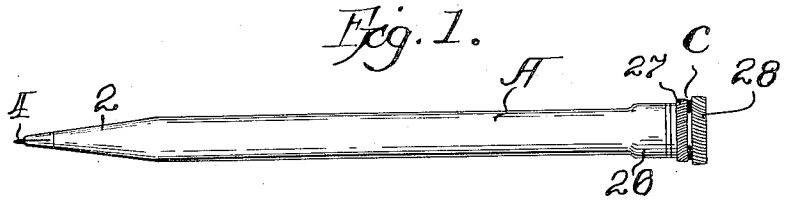


Fig. 2.

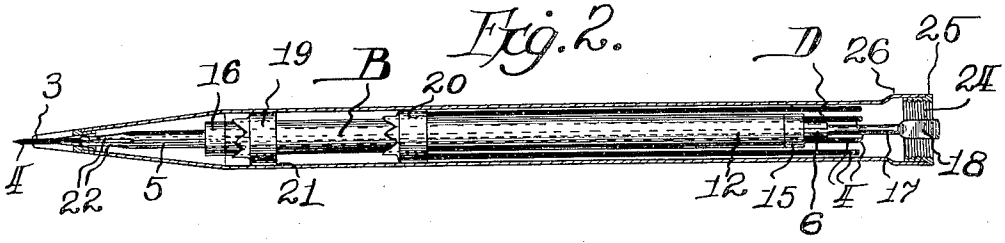


Fig. 3

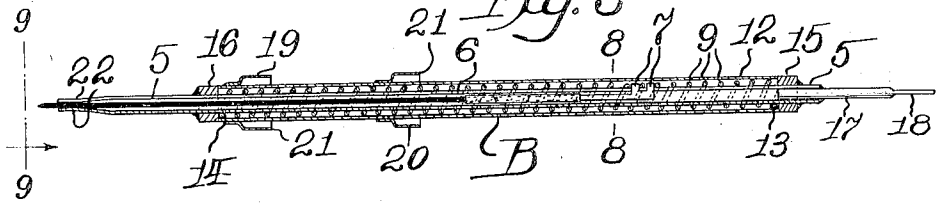


Fig. 4.

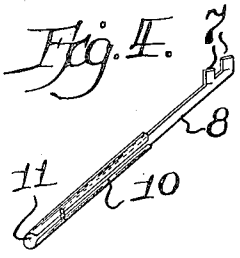


Fig. 6.

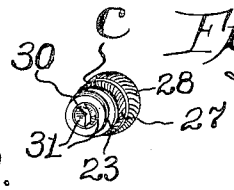


Fig. 8.



Fig. 5.

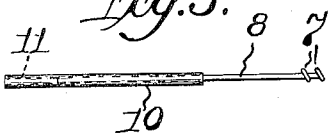
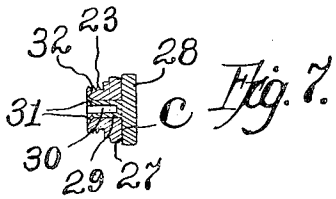


Fig. 7.



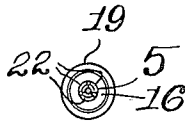


Fig. 9.

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Patented Apr. 15, 1924. 1,490,834

UNITED STATES PATENT OFFICE.

FRANK J. KRISTOFEK, OF ST. PAUL, MINNESOTA, ASSIGNOR TO BROWN & BIGELOW, OF ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA.

PENCIL.

Application filed June 30, 1919. Serial No. 308,624.

To all whom it may concern:

Be it known that I, FRANK J. KRISTOFEK, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Pencils, of which the following is a specification.

My invention relates to pencils having means for holding a very long, thin lead, together with propelling means for ejecting or withdrawing the lead in a simple and efficient manner.

It is an object of this invention to provide a lead propelling and holding mechanism which is complete in itself, so that after it is assembled it can be inserted in a pencil shell or casing to frictionally hold the assembled mechanism in the pencil casing against being freely removed therefrom and to hold a portion of the mechanism stationary with the pencil shell or casing, while a removable head is provided which engages the mechanism to rotate a portion of the same to propel the lead in the desired direction.

My invention further provides means whereby the lead is rotated as it is propelled in either direction, thus continually changing the position of the lead in writing as it is expelled from the pencil. Spring engaging and supporting fingers are provided which rotate with the lead as it slides through the spring fingers, the spring fingers being protected by the conical end of the pencil casing so that in use the fingers will hold the lead supported near the writing end of the pencil and are fully protected by the pencil casing.

It is also an object of this invention to provide a resilient means or cushion for the writing lead so that in case the pencil is dropped on the point or projecting portion of the marking lead, the cushion or resilient means will prevent breaking of the lead and thereby give a pencil with a feature which is very desirable for practical and general use. The element forming the thread for the propelling mechanism also performs the function of cushioning the marking lead to prevent breaking of the same. In this manner the threaded or driving element performs two functions, namely, to propel the marking lead in either direction and to cushion the same against any severe shock transmitted to the projecting end of the same.

The invention further provides means for conveniently holding extra marking leads freely positioned about the propelling mechanism and removable by removing the pencil head.

A feature of the invention is to provide a removable head for the pencil barrel having a revoluble engageable member which is provided with means for detachably engaging the propelling mechanism, the pencil head when removed giving free access to the reserve lead holding chamber. It is also an object to provide a lead propelling means with a tooth or engaging member which engages the thread of the propelling mechanism at an angle similar to the pitch of the thread so as to reduce the friction and wear between the teeth of the thread engaging member.

In the drawing forming part of the specification:

Figure 1 is a side view of my pencil.

Figure 2 illustrates a large view of the pencil partly illustrated in longitudinal cross section.

Figure 3 is a longitudinal cross sectional view of the lead propelling mechanism as it appears when assembled.

Figure 4 is a detail view of a portion of the pencil.

Figure 5 is a plan view of a detail illustrated in Figure 4.

Figure 6 is a perspective view of the head of the pencil removed from the casing.

Figure 7 is a longitudinal cross section of the pencil head.

Figure 8 is a section on the line 8—8 of Figure 3.

Figure 9 is a view on the line 9—9 of Figure 3.

This pencil is composed of a thin-walled barrel A in which the lead holding and ejecting mechanism B is normally rigidly held against easy disengagement from the barrel. The pencil barrel A is formed of any suitable material, having a conical forward end 2 and an opening 3 at the apex thereof through which the marking lead 4, which is of a very thin or small diameter, freely extends into writing position.

The lead holding and ejecting mechanism B is composed of an inner tubular member 5 having an open slot 6 extending longitudinally throughout the greater part of the length of the same, through which

the teeth 7 of the lead holding member 8 pass so as to freely engage the coils of the spring thread member 9. The teeth 7 of a lead holding member 8 are bent at an angle, as illustrated in Figures 4 and 5, so as to engage the coils of the spring thread member 9 at an angle similar to the pitch of the coils, thereby reducing friction between the members in operation, and the member 8 has a lead holding tube 10 rigidly attached to its forward end by soldering or other suitable means so as to form a lead receiving socket 11, while the forward end of the member 8 forms an abutment for the lead in the socket 11, the tubular member 10 being of an extremely thin construction so as to pass through the opening 3 of the pencil to allow the butt of the lead to be removed from the socket 11 and a new lead inserted in the ordinary manner.

The spring thread member 9 is enclosed in a tubular housing 12 and is attached rigidly to the housing 12 on either end of the same at the points 13 and 14 by soldering or other suitable means so as to rigidly secure the spring thread member 9 only at its ends, leaving the coils between its ends free, but preventing it from rotating in the housing 12.

The free movement of the coils of the spring thread member 9 and the constructing of the thread member 9 of a suitable resilient nature forms a cushion for the lead 4 so that if the pencil is dropped and strikes on the lead it will not injure the same but the spring coils of the thread member 9 will allow the lead holding member 8 to move freely backward, thereby cushioning the lead sufficiently to prevent it from being broken, even if it is struck a sharp, hard blow on the end projecting from the writing end of the pencil, the apex of the conical end 2 also protecting the lead after it is forced back into the same in the opening 3. The cushioning of the lead 4 is very important and it will be readily seen that the spring thread member 9 performs two functions in the operation of the lead holding and propelling mechanism, acting to form a thread for the teeth 7 and to cushion any severe blow against the projecting writing lead of the pencil.

The tubular housing 12 is held in position on the member 5 by collars 15 and 16, which are rigidly secured to the member 5 by soldering or other suitable means, and hold the member 5 extending axially through the housing 12, while the member 12 is freely rotatable between the collars.

An operating rod 17 is provided, one end of which projects into the rear end of the member 5 and is rigidly secured thereto by soldering or other suitable means, while the other end of the rod is flattened at 18 and forms a suitable engaging end so as to be engaged to operate or rotate the member 5 and the collars 15 and 16 when the housing member 12 is held against rotation in the pencil barrel A. Cup-like collars 19 and 20 are rigidly secured to the housing in any suitable manner and positioned from each other spaced apart near the forward end of the housing 12. These collars engage the inner surface of the barrel shell A so as to frictionally hold the lead holding and propelling means in the barrel against movement and in such a manner that their edges 21 would be inclined to bite into the inner surface of the barrel A to hold the lead propelling means against easy removal from the barrel. However, it should be borne in mind that the propelling mechanism can be removed from the barrel by using sufficient force and engaging the end 18 of the operating rod. It would only be desirable to remove the operating mechanism B in order to place a new operating means in the barrel A, as it should be clearly understood that ordinarily the mechanism B is not removed from the barrel A but is so positioned that the engaging end 18 projects slightly from the rear end of the pencil barrel.

The forward end of the tubular member 5 which contains and protects the marking lead 4 when it is held in the pencil is slit and bent inwardly to form spring fingers 22, which engage the surface of the lead 4, forming a support for the same, which are freely adjustable to the surface of the marking lead or to allow the member 10 to slide through the fingers 22 and to project out of the opening 3 when it is desired to insert a new marking lead in the socket 11. The supporting fingers 22 are positioned in the conical end 2 of the barrel A as close to the apex and opening 3 of the conical portion as possible so as to form a support for the projecting end of the marking lead 4, in this manner holding the marking lead rigid for use. As the marking lead is propelled out of or withdrawn into the holding and propelling mechanism B, it rotates together with the member 5 and supporting fingers 22, sliding through the fingers and out of the opening 3 or being withdrawn sufficiently into the pencil barrel A to protect the marking end.

An operating head C is removably held to the rear end of the barrel A of the pencil by the threaded collar 23, which engages in the threads 24 of the collar 25, the collar 25 being rigidly held in any suitable manner in the enlarged rear end 26 of the pencil barrel A and the collar 23 being formed with a suitable finger engaging flange 27 with a serrated surface so that it can be easily engaged and removed from or rigidly secured to the pencil barrel. An operating

button 28 is formed with a shank 29 which extends through the collar 23, the shank 29 being split to form an engaging slot 30, the inner end of the shank 29 being expanded to form engaging flanges 31, which engage the beveled surface 32 formed on the inner end of the collar 23, and thereby hold the operating button freely rotatable to the collar 23 and against disengagement therefrom. The operating button 28 is a little larger in diameter than the flange 27 of the collar 23 and is also formed with a serrated finger engaging surface so that it can be freely operated to rotate it in the collar 23. The slot 30 of the shank 29 engages the flattened end 18 of the operating rod when the operating head C is attached to the pencil barrel A so that when the operating head C is rigidly secured to the pencil by engaging and rotating the button 28, the mechanism B can be readily operated to propel the lead 4 in either direction in the pencil.

The cup-shaped collar 20 forms a stop for the inner end of the magazine chamber D formed about the rear end of the operating mechanism B so that extra marking leads 4 can be held in the pencil barrel A and by removing the operating head C a new marking lead can be taken from the magazine chamber and inserted in the socket 11 when the socket is extended from the writing end of the pencil barrel A. The peculiar construction of the operating and lead holding means allows the use of an extremely long marking lead and it will be noted that the tubular member 5 will protect the body of the marking lead against breaking, even should the pencil be dropped on a hard surface. This is an important feature of my invention, together with the cushioning of the marking lead by the spring coils of the spring thread member 9, so that whether the pencil is dropped on its point or marking lead or on its side, the lead is very well protected and will not readily break, the only portion which can break off when the pencil is dropped on its side would be that which projects from the ends of the fingers 22, as the portion remaining inside of the tubular member 5 is sufficiently protected against breaking when dropped.

The construction of the pencil is very simple, inexpensive to manufacture while it contains the practical features which are desirable for a pencil of this nature. The fact that the propelling and lead holding means are assembled before being inserted in the barrel is very important in the production of the pencil and extremely simplifies the construction and manufacture of the same. When the lead holding and propelling mechanism B is forced into the thin, shell-like barrel A, the collars 19 and 20 hold the same centrally rigidly in the barrel, thus holding the housing 12 and the spring thread member 9 stationary against rotation in the barrel casing A, and the collars 15 and 16 will hold the rotatable parts, such as the operating rod 17, the member 5 and the lead holding member 8, with its socket 11, against longitudinal movement in the pencil. However, the lead holding member 8 is freely movable longitudinally by operating or rotating the rod 17 to cause the teeth 7 to travel in either direction on the thread spring member 9, so that when the head C is in position on the pencil, by operating the button 28 the marking lead can be propelled in either direction.

The conical writing end 2 of the pencil A is fitted with a split spring tip, which is adapted to engage the marking lead 4 to hold it steady in the pencil and to allow the socket 11 to be ejected out of the opening 3 in the spring tip of the pencil A to replace or insert a new marking lead.

The removable operating head allows free access to the lead magazine chamber, which is long and freely carries the extremely long marking leads 4, so that the equivalent marking lead to several ordinary pencils can be easily carried by my pencil without increasing the diameter of the pencil beyond the size of the ordinary commonly used pencil. These features are very important in a practical device and are accomplished by the peculiar construction of the lead holding and propelling mechanism B.

In accordance with the patent statutes I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims:

1. A pencil comprising a barrel, a lead holding and propelling means, comprising a tubular housing, spacing means for holding said housing against rotation in said barrel in a manner to form a magazine thereabout, a spring-like thread member having its ends secured in said housing, the coils positioned between the ends of the spring-like thread member being free to move longitudinally to form a resilient driving thread for a marking lead, a tubular slotted member rotatably held in said housing and a lead holding and propelling means rotatable with and slidably held in said rotatable tubular member, whereby when said tubular slotted member is rotated said lead holding means will be simultaneously rotated and moved longitudinally in said pencil to propel a marking lead in either direction in said pencil.

2. A pencil comprising a barrel formed of thin material, a propelling means adapted to be frictionally held in said pencil barrel with an annular magazine space thereabout, said lead propelling means comprising, a slotted tubular member, an enclosing housing, a resilient spring-like thread member having its ends secured to said enclosing housing with its coils between its ends free to move in said housing to form a cushioning means and a driving means for a marking lead held in said pencil, whereby when said slotted tubular member is rotated, a marking lead will be propelled in said pencil.

3. In pencil, the combination with a barrel and lead propelling unit rigidly contained therein, said propelling unit including forwardly projecting spring fingers adapted to support a marking lead and an operating rod rigidly secured to the rear end of said propelling unit, means adapted to space said unit in said barrel to form an annular magazine chamber thereabout and a detachable operating head comprising a member adapted to engage said propelling unit rod on the rear of said propelling unit and a closure collar for the magazine which is adapted to secure the head to the rear end of said pencil.

4. A pencil having a barrel which is adapted to contain a lead holding and propelling means, an operating rod projecting from the rear of said propelling means and a removable operating head including, a collar adapted to form with said head a closure for the rear end of said pencil barrel, said operating head being slotted to removably engage said operating rod.

5. In a pencil of the class described, a barrel, a rotatable lead enclosing tube, collars rigidly secured to said tube, a tubular housing extending between said collars, a helical driving element adapted to be enclosed and rigidly secured on its ends to said housing, collars secured to said housing adapted to frictionally hold said housing rigid in relation to said pencil barrel to hold said lead enclosing tube freely rotatable axially in said pencil, a lead receiving socket slidably held within said lead enclosing tube having teeth which are bent at an angle similar to the pitch of said helical driving element and adapted to be engaged by the same to propel a marking lead when said lead enclosing tube is rotated and said pencil barrel is held stationary, spring fingers adapted to engage said marking lead as it is propelled out of said lead enclosing tube, an operating rod rigidly secured to the rear end of said lead enclosing tube and a removable pencil head having means for clutching said operating rod to rotate said lead enclosing tube to propel said marking lead into or out of said pencil.

6. In a pencil, the combination with a barrel and lead propelling unit rigidly contained therein, of means adapted to space said unit away from said barrel in a manner to form a magazine about said unit and a detachable unit operating head including an attaching collar for engaging the rear end of said barrel and an operating button.

7. In a pencil, the combination with a barrel and lead propelling unit fixed therein, of means adapted to space said unit away from said barrel to form a magazine thereabout and an operating unit for said propelling means, including a closure collar for the magazine and an operating button, having a shank extending through said collar which is adapted to hold said button and collar rotatably together.

8. In a pencil, the combination with a barrel and lead propelling means fixed therein, means adapted to space said propelling means from said barrel to form a magazine open at the rear end of said barrel and an operating unit for said propelling means comprising a button and closure locking collar, said button being rotatably secured to and extending through said collar.

9. In a pencil, in combination with a barrel and lead propelling unit rigidly contained therein, of means adapted to space said unit in said barrel to provide a magazine therein and a unit operating head, detachable from said propelling unit, including an attaching collar for engaging the rear end of said barrel and an operating button.

10. A pencil including a barrel, a lead propelling unit fixed therein in a manner to form a space for extra marking leads and an operating head provided with a slotted end adapted to detachably engage said operating unit to operate the same in attached position.

11. A pencil including a barrel, a lead propelling unit rigidly fixed therein in a manner to form a magazine for extra marking leads, a detachable operating head including a slot for engaging said propelling unit and adapted to form a closure for the magazine when in operating position.

FRANK J. KRISTOFEK.