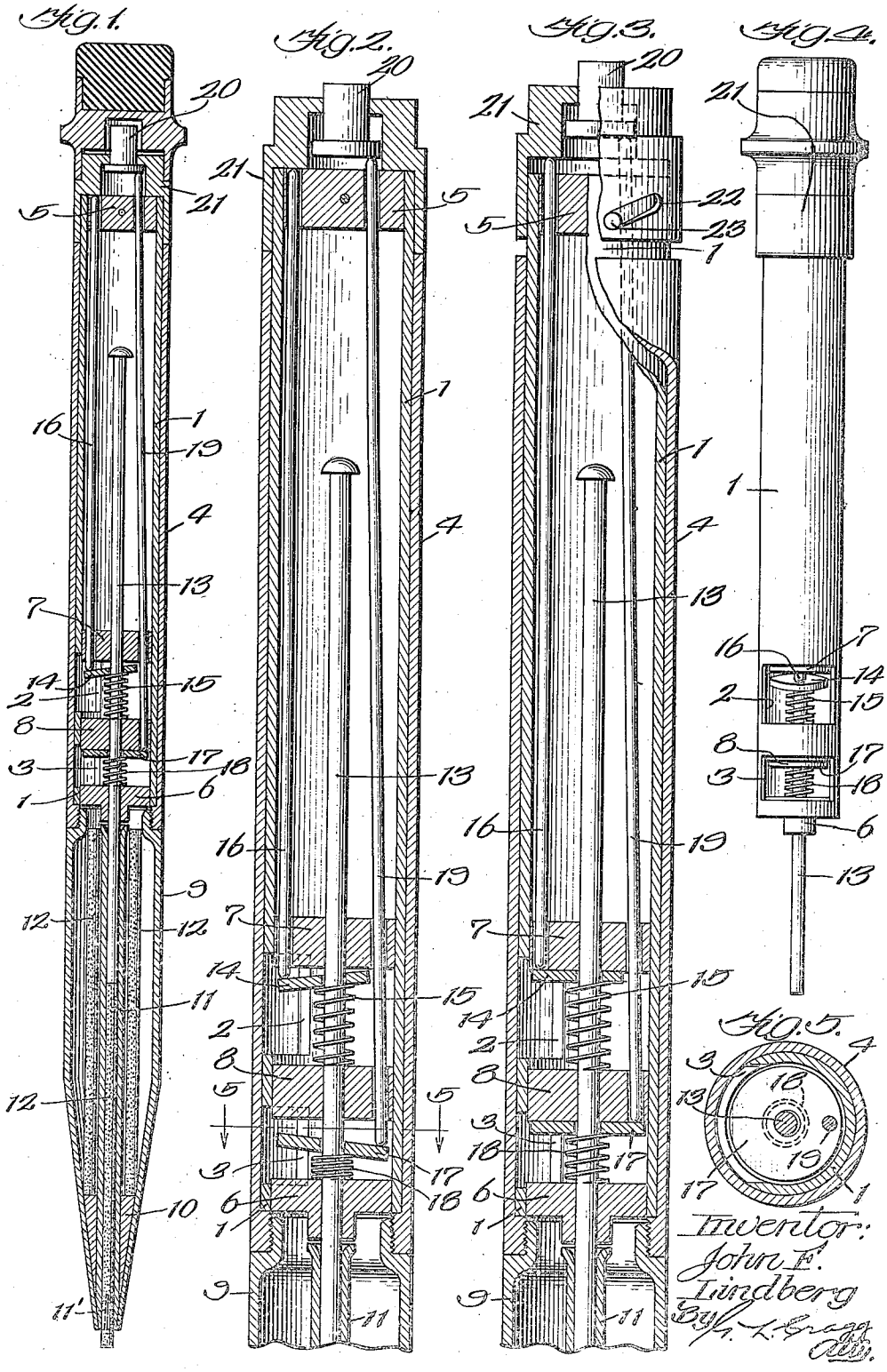
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J. F. LINDBERG

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UNITED STATES PATENT OFFICE.

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PENCIL.

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To all whom it may concern:

Be it known that I, JOHN F. LINDBERG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Pencils, of which the following is a full, clear, concise, and exact description.

My invention relates to pencils employing mechanism for positioning their leads or other rods of marking material.

The invention has for its general object the improvement and simplification of the mechanism for effecting forward or feeding movement of the marking element of the pencil. An important characteristic resides in a manually operated clutch which is interrelated with the marking element in a manner to enable the clutch to force projecting movement of the marking element when the clutch is operated and permit inward movement of this element. This clutch is supplemented by means which serve to hold the marking element in its projected position.

When the invention is embodied in a pencil the marking element is in the form of a rod of marking material such as graphite, such a rod being herein termed a lead irrespective of the material of which it is made. The lead (by which term I mean any rod of marking material) is not well adapted for engagement by any feeding device, which would be apt to weaken or break it. I therefore supplement the lead by a follower rod within and movable longitudinally of the pencil casing, this follower rod being preferably merely in separable pushing relation with the inner end of the lead whereby the pencil may readily be resupplied with lead. The aforesaid means for holding the lead in its projected position, therefore, preferably includes a gripping or pinching device operating directly upon the lead and an automatically operating clutch acting directly upon the follower rod, whereby inward and outward movement of the lead and the follower rod are both prevented. The manually operable clutch that effects projecting movement of the lead is desirably provided with an actuating rod whereby this clutch may be operated from the exterior of the pencil casing, this clutch having a spring for automatically placing it in released position when the actuating rod is released. The automatically operating clutch is provided with a spring for effecting its automatic application to the follower rod and is also provided with a releasing rod that is manually operable from the exterior of the casing. Both clutches are desirably in the form of rings that, in effect, surround the follower rod. A positioner is preferably provided that has engagement with the releasing rod and has cam connection with the pencil casing to afford adjustment for the releasing rod to prevent or permit it from functioning.

I will explain my invention more fully by reference to the accompanying drawing showing the preferred embodiment thereof and in which Fig. 1 is an axial sectional view of a pencil made in accordance with the preferred embodiment of the invention, the pencil being adjusted for use; Fig. 2 illustrates, on a larger scale, the upper portion of the structure shown in Fig. 1 with the manually operable clutch in the position it occupies when it is being operated to effect the feeding movement of the lead; Fig. 3 shows the elements illustrated in Fig. 2 with the manually operated clutch automatically restored by its spring and the automatically operating clutch released by the adjustment of its releasing rod, the actuating spring of the automatic clutch then functioning to release this clutch; Fig. 4 is a view in elevation of the upper part of the structure with a component element of the casing removed to illustrate one manner of manufacture and assembly; and Fig. 5 is a sectional view on line 5—5 of Fig. 2.

Like parts are indicated by similar characters of reference throughout the different figures.

The casing of the pencil may have a variety of forms and may be of any suitable construction. The casing illustrated includes a hollow cylinder 1 having openings 2 and 3 therein within which clutch mechanism may be inserted laterally of the casing before the casing is completed by the addition thereto of a jacket or sheath 4 that is assembled in tight engagement with the cylinder 1 so as to form therewith a unitary element. A plug 5 is in tight fit with and within the upper end of the cylinder 1; a plug 6 is in tight fit with and within the lower end of the cylinder 1; and plugs 7 and 8 are in tight fit with and within the lower end portion of

the cylinder 1 and between the plugs 5 and 6. The casing includes the lower cylindrical end portion 9 in threaded connection, at its upper end, with the lower end of the jacket 4 that extends below the cylinder 1. The casing portion 9 is desirably conically tapered at the writing end of the instrument to simulate the sharpening of a wooden pencil. A sleeve 10, with a conical exterior surface, is received in the conical end of the casing portion 9. The bore of the sleeve 10 is fixedly assembled with the guiding tube 11 that is co-axial with the pencil casing. Space intervenes between the guiding tube and the wall of the casing portion 9 to enable this casing portion to serve the purpose of a magazine to hold spare leads 12 that are useable in the pencil. The leads may readily be removed from their magazine element 9 by unscrewing this element from the jacket 4 for the casing. Each of these leads is adapted for sliding fit within the bore of the guiding tube 11. The lower end of this guiding tube is slotted, as indicated at 11′, to form a gripping or pinching device to engage the lower end of the lead that is in the guiding tube whereby this particular lead is prevented from dropping out of the pencil casing inasmuch as the lower end of the follower rod 13, that is employed to effect the feeding movement of the lead, preferably has only abutting and pushing engagement with the inner end of the lead. The gripping pressure exerted by the lower end of the guiding tube is sufficiently light to permit of the feeding movement of the lead and the insertion of a fresh lead through the lower end of the pencil casing into the tube 11. However, it is preferred to load the pencil by passing the lead into the upper end of the guiding tube whose bore is flared at its upper end to facilitate the insertion of the lead into the top.

The follower rod 13 has sliding fit within the bores formed in the plugs 6, 7 and 8 that are co-axial with each other and with the bore of the guiding tube 11 with which said follower rod also has sliding fit. The automatically operable clutch 14 is disposed within the opening 2 between the plugs 7 and 8, this clutch being desirably in the form of a ring through which the follower rod passes and which ring grips the follower rod when the ring is tilted by the automatic action of a clutch spring 15. The plug 8 serves as an abutment for the lower end of said spring and the lower end of the releasing rod 16 constitutes a fulcrum upon which the ring clutch 14 is rocked by the spring 15. The rod 13 forms a supplementing part of the marking element structure, being formed of metal to withstand the operation of the clutches. The clutch 14 normally serves to hold the follower rod 13 against material upward movement so that this follower rod serves as an abutment for the lead 12 that is within the guiding tube 11 whereby the inward movement of this lead is normally prevented. The manually operable clutch 17 is desirably also in the form of a ring through which the follower rod 13 also passes, this clutch being normally released from effective engagement with the follower rod by means of the spring 18. The lower end of this spring has the plug 6 for its abutment and the upper end of the spring normally presses the clutch 17 fully against the bottom face of the plug 8 as illustrated in Figs. 1, 3 and 4. When the lead is to be further projected from the writing end of the structure, the actuating rod 19, which may be operable from the exterior of the casing in a manner to be set forth, is inwardly moved against one side of the ring 17 to tilt this ring to engage it with the follower rod and thereafter to move this ring downwardly in company with the follower rod to effect the desired forward or feeding movement of the lead which feeding movement is preferably about a sixteenth of an inch for each operation of the feeding clutch 17. The feeding movement of the follower rod is permitted by the automatically operated clutch ring 14 as is obvious. When the feeding clutch 17 has been operated the actuating rod 19 is released whereupon the spring 18 forces the clutch 17 into the releasing position illustrated in Figs. 1, 3 and 4, the automatic clutch 14 at once operating to prevent inward movement of the follower rod.

When said follower rod is moved upwardly, as for example when the pencil is to be reloaded, the releasing rod 16 may be moved upwardly, in a manner to be set forth, whereupon the clutch 14 is moved against the bottom face of the plug 7, as illustrated in Fig. 3, by means of its spring that then operates as a releasing spring. The follower rod may now be readily moved inwardly either through the agency of a lead forced inwardly through the writing end of the pencil structure or when the casing portion 9 is separated from the balance of the casing. After the pencil has been reloaded the releasing rod 16 is restored to its normal position to enable the clutch 14 automatically to function to prevent the inward movement of the follower rod while permitting its forward feeding movement.

Any suitable means may be employed for making the clutches operable from the exterior of the casing. In the embodiment of the invention illustrated the upper end of the actuating rod 19 is engageable by a button 20 movable longitudinally of the casing. Whenever this button is pressed inwardly as by tapping it upon a table or by means of the thumb, the clutch 17 is actuated to effect feeding movement of the lead. The outer end of the releasing rod 16 desirably

has an abutment in the form of a cap 21 which houses the button 20. This cap is provided with a cam slot 22 in its skirt. The cam pin 23 is carried by the casing and enters the cam slot. The cap is rotatable upon the upper end of the cylinder 1 to bring it into or out of pressing engagement with the releasing rod 16. When the cap is in its outermost position the automatic clutch 14 is released, Fig. 3. When the cap is in its innermost position the releasing rod positions the clutch 14 to enable it to be automatically operated by its spring.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown as changes may readily be made without departing from the spirit of my invention, but having thus described my invention I claim as new and desire to secure by Letters Patent the following:—

1. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, normally disengaged but when operated, engaging the follower rod to subsequently effect its forward movement to cause projecting movement of the marking element and permitting reverse movement of this rod; and an automatically operating clutch within the casing and interrelated with the follower rod to prevent material return movement thereof.

2. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to subsequently effect its forward movement to cause projecting movement of the marking element and permitting reverse movement of this rod; and an automatically operating clutch within the casing and interrelated with the follower rod to prevent material return movement thereof, this automatically operating clutch being provided with a releasing rod that is manually operable from the exterior of the casing.

3. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; and a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, normally disengaged but when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod.

4. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, normally disengaged but when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element; and a device, carried by the casing, in gripping engagement with the marking element to hold it in its projected position when the clutch is released.

5. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; and a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element, this clutch being in the form of a ring surrounding the follower rod and provided with a spring for releasing it when the actuating rod is released.

6. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open

at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element, this clutch being in the form of a ring surrounding the follower rod and provided with a spring for releasing it when the actuating rod is released; and a device, carried by the casing, in gripping engagement with the marking element to hold it in its projected position when the clutch is released.

7. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element, this clutch being in the form of a ring surrounding the follower rod and provided with a spring for releasing it when the actuating rod is released; and an automatically operating clutch within the casing and interrelated with the follower rod to prevent material return movement thereof, this automatically operating clutch being provided with a releasing rod that is manually operable from the exterior of the casing, this automatically operating clutch being in the form of a ring surrounding the follower rod and having a spring for effecting its clutching engagement with the follower rod when the releasing rod is not operated, said releasing rod normally holding the automatically operating clutch in position to function.

8. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and provided with an actuating rod manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element, this clutch being in the form of a ring surrounding the follower rod and provided with a spring for releasing it when the actuating rod is released; and an automatically operating clutch within the casing and interrelated with the follower rod to prevent material return movement thereof, this automatically operating clutch being provided with a releasing rod being in the form of a ring surrounding the follower rod and having a spring for effecting its clutching engagement with the follower rod when the releasing rod is not operated, said releasing rod normally holding the automatically operating clutch in position to function; and a positioner engageable with the releasing rod and in cam connection with the casing to prevent or permit the functioning of the automatic clutch.

9. A pencil including a casing; a marking element in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a ring clutch surrounding the follower rod within the casing and manually operable from the exterior of the casing to effect forward movement of the follower rod to cause projecting movement of the marking element; and a spring for automatically releasing said clutch.

10. A pencil including a casing, a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a ring clutch surrounding the follower rod within the casing and provided with an actuating rod manually operable from the exterior of the casing to effect forward movement of the follower rod to cause projecting movement of the marking element; and a spring for automatically releasing said clutch.

11. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable lon-

gitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a friction clutch engaging the follower rod within the casing and manually operable from the exterior of the casing to effect forward movement of the follower rod to cause projecting movement of the marking element; and a spring for automatically releasing said clutch.

12. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a friction clutch engaging the follower rod within the casing and provided with an actuating rod manually operable from the exterior of the casing to effect forward movement of the follower rod to cause projecting movement of the marking element; and a spring for automatically releasing said clutch.

13. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod; and a clutch in holding engagement with the follower rod, there being a releasing element for the latter clutch in cam connection with a portion of the casing.

14. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod; a clutch in holding engagement with the follower rod; and a releasing rod for the latter clutch, there being a releasing rod actuating element in cam connection with a portion of the casing.

15. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod; and a clutch provided with a spring for bringing it into holding engagement with the follower rod, there being a releasing element for the latter clutch in cam connection with a portion of the casing.

16. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod; a clutch provided with a spring for bringing it into holding engagement with the follower rod; and a releasing rod for the latter clutch, there being a releasing rod actuating element in cam connection with a portion of the casing.

17. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with

the inner end portion of said marking element; and a clutch in holding engagement with the follower rod, there being a releasing element for the clutch in cam connection with a portion of the casing.

18. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch in holding engagement with the follower rod; and a releasing rod for the clutch, there being a releasing rod actuating element in cam connection with a portion of the casing.

19. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; and a clutch provided with a spring for bringing it into holding engagement with the follower rod, there being a releasing element for the clutch in cam connection with a portion of the casing.

20. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch provided with a spring for bringing it into holding engagement with the follower rod; and a releasing rod for the clutch, there being a releasing rod actuating element in cam connection with a portion of the casing.

21. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; and a clutch in holding relation to the rod of marking material to prevent return movement thereof, there being a releasing element for the clutch in cam connection with a portion of the casing.

22. A pencil including a casing; a marking element, in the form of a rod formed of marking material, within and movable longitudinally of the casing which is open at the writing end of the pencil to permit of the projection of the forward end portion of the marking element; a follower rod within and movable longitudinally of the casing, said follower rod being engageable with the inner end portion of said marking element; a clutch within the casing and manually operable from the exterior of the casing, said clutch, when operated, engaging the follower rod to effect its forward movement to cause projecting movement of the marking element and subsequently permitting reverse movement of this rod; and an automatically operating manually releasable clutch within the casing and interrelated with the follower rod to prevent material return movement thereof.

In witness whereof, I hereunto subscribe my name this nineteenth day of August A. D., 1920.

JOHN F. LINDBERG.