Jan. 23, 1951 H. BROOKS 2,539,116

PENCIL WITH AUTOMATIC FEED MECHANISM

Filed March 26, 1949 3 Sheets-Sheet 1

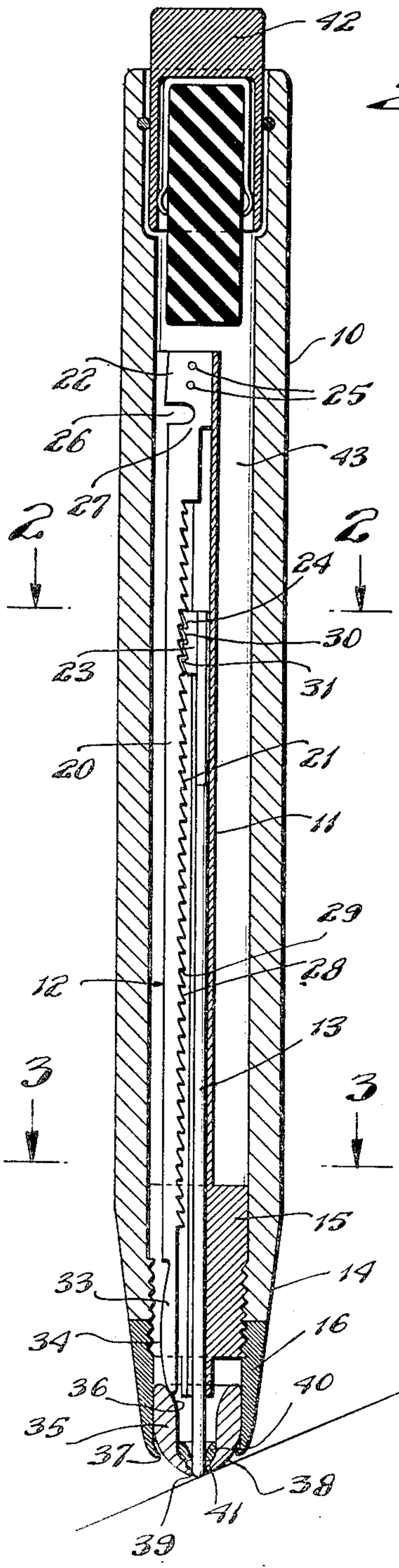


Fig. 1.

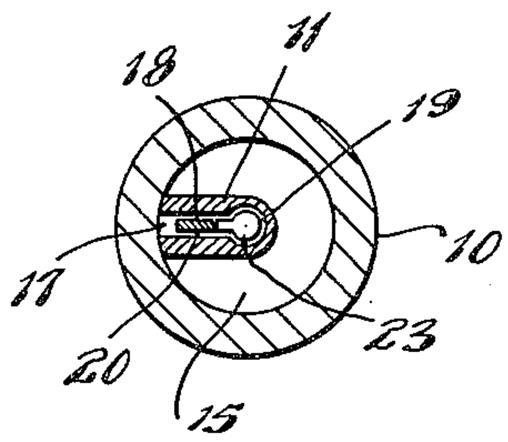


Fig. 2.

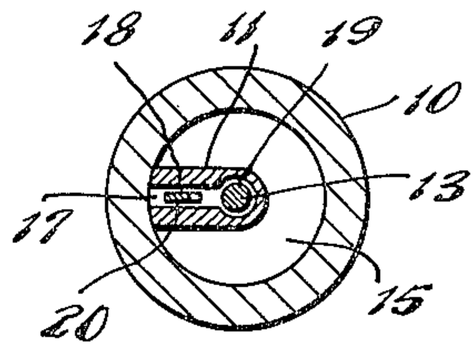


Fig. 3.

INVENTOR.
HAROLD BROOKS
BY
Clarke & Alt
ATTORNEYS

Jan. 23, 1951 H. BROOKS 2,539,116

PENCIL WITH AUTOMATIC FEED MECHANISM

Filed March 26, 1949 3 Sheets-Sheet 2

Fig. 4.

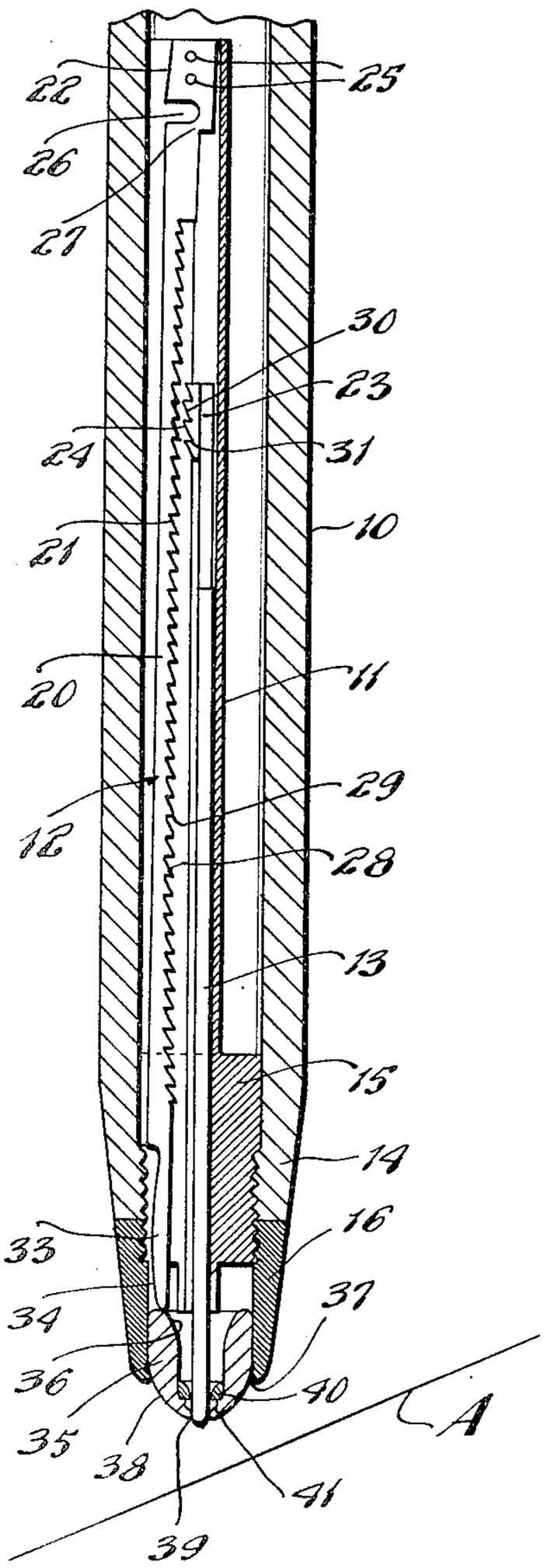
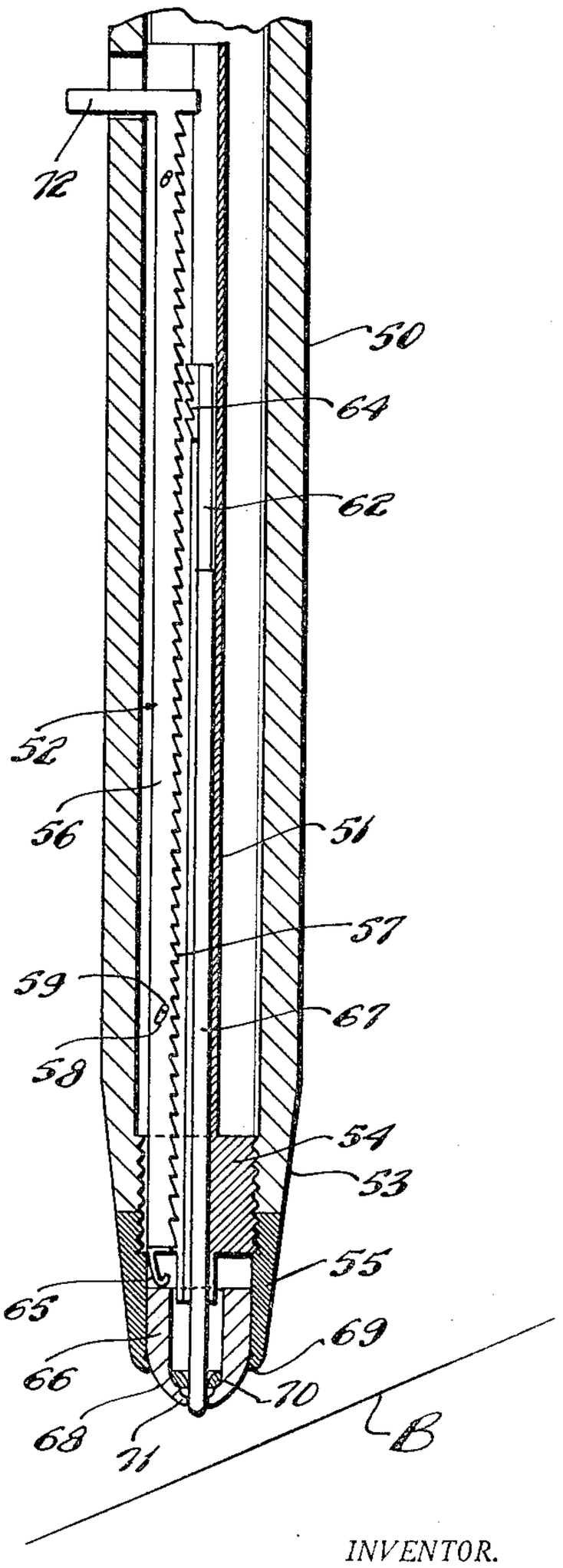


Fig. 8.



INVENTOR.
HAROLD BROOKS
BY
Clarke & Ott
ATTORNEYS

Jan. 23, 1951 H. BROOKS 2,539,116

PENCIL WITH AUTOMATIC FEED MECHANISM

Filed March 26, 1949 3 Sheets-Sheet 3

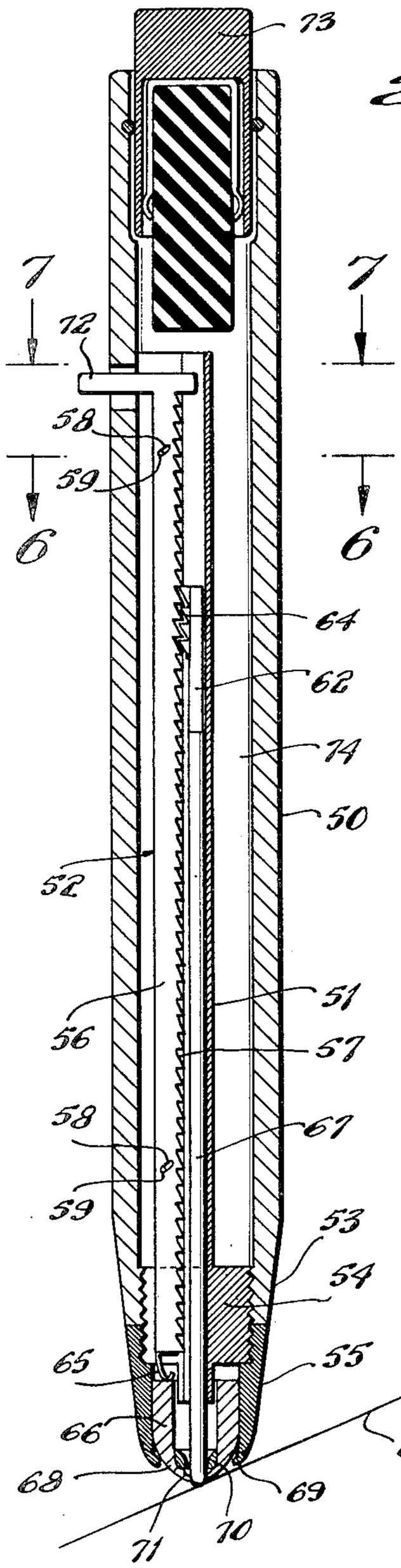


Fig. 5.

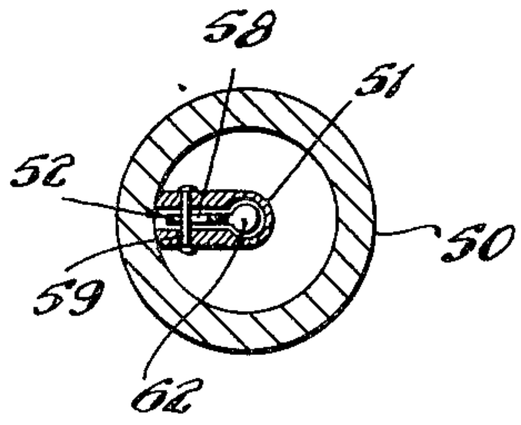


Fig. 6.

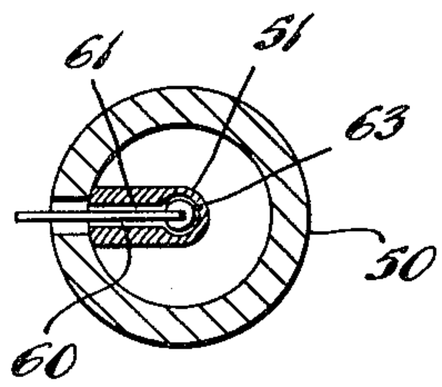


Fig. 7.

INVENTOR.
HAROLD BROOKS
BY
Clark & Att
ATTORNEYS

Patented Jan. 23, 1951

2,539,116

UNITED STATES PATENT OFFICE

2,539,116

PENCIL WITH AUTOMATIC FEED MECHANISM

Harold Brooks, New York, N. Y.

Application March 26, 1949, Serial No. 83,727

8 Claims. (Cl. 120—17)

1

This invention relates to a pencil which is constructed and arranged to automatically project the lead or marking stick by the actuation of the pencil in writing.

The invention comprehends a pencil which automatically feeds the end of the lead or marking stick outwardly as required by the actuation of the pencil in writing which movement of the lead or marking stick continues until the entire length thereof is consumed so that the writer can continue to write without interruption to feed the lead or marking stick.

Another object of the invention is to provide a pencil which is operative to project or feed the lead or marking stick when the pencil is raised from the writing surface.

Still another object of the invention is to provide a pencil of the indicated character which freely projects the lead or writing stick by the action of writing and which projects a sufficient length thereof beyond the lower end of the pencil to permit of continuous writing.

Still another object of the invention is to provide a pencil with automatic feed action in which the lead or writing stick is securely held against inward movement during the use thereof so that the required pressure of the lead or writing stick may be applied against the writing surface.

Still another object of the invention is to provide a pencil of the indicated character which is sturdy in construction, convenient to operate and use, which can be used for a long period without wear or adjustment, and which can be produced at a relatively small cost.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which the preferred embodiments of the invention are illustrated.

In the drawings:

Fig. 1 is a longitudinal sectional view of a pencil constructed in accordance with the invention and illustrating the same with the parts thereof disposed in position for writing and with the forward end of the pencil positioned on a writing surface.

Fig. 2 is a cross-sectional view taken approximately on line 2—2 of Fig. 1.

Fig. 3 is a similar view taken approximately on line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional view showing the pencil removed from the writing surface and the parts thereof moved to the position for projecting the lead or marking stick.

Fig. 5 is a fragmentary longitudinal sectional

2

view of a pencil constructed in accordance with the invention and illustrating a modified form thereof with the pencil disposed on a writing surface and the parts arranged in position for writing.

Fig. 6 is a horizontal sectional view taken approximately on line 6—6 of Fig. 5.

Fig. 7 is a similar view taken approximately on line 7—7 of Fig. 5.

Fig. 8 is a fragmentary longitudinal sectional view showing the pencil removed from the writing surface and the parts thereof moved to the position for projecting the lead or marking stick.

Referring to the drawings by characters of reference, the pencil includes an elongated barrel 10 within which is arranged a holder 11 and an automatic feed mechanism indicated generally by the reference character 12 which functions to feed or project the lead or marking stick axially of the holder 11. The barrel 10 is of circular formation in cross-sectional configuration and is formed with an internally threaded tapered lower end 14 in which the lower end 15 of the holder is threadedly secured with the protruding end thereof threadedly engaging a tapered tubular tip 16 for securing the same to the barrel 10 in prolongation of the tapered lower end 14.

The holder 11 is formed with a longitudinally extending slot 17 including a straight outer portion 18 of relatively narrow width and an inner portion 19 of substantially circular formation in cross-sectional configuration located centrally and axially of the barrel 10 with the outer portion 18 of the slot opening through one side of the holder and both the outer and inner portions 18 and 19 opening through the opposite ends of the holder.

Arranged within the outer portion 18 of the slot is a longitudinally extending ratchet bar 20 forming part of the automatic feed mechanism 12 and which bar is provided with ratchet teeth 21 on the inner longitudinal edge thereof. The ratchet bar 20 is of a thickness to slidably fit the outer portion 18 of the slot and the same is formed with a widened upper end 22 which is secured to the holder to permit of swinging movement of the ratchet bar toward and away from a cylindrical retaining member 23 located within the cylindrical portion 19 of the slot 17 and having ratchet teeth 24 projecting into the outer portion 18 thereof and adapted to engage with the ratchet teeth 21 of the said bar.

The ratchet bar 20 is secured to the holder 11 by spaced cross pins 25 at the upper end there-

of and adjacent thereto the bar is formed with a laterally extending recess 26 which forms a narrow neck 27 between the inner edge of the bar and said recess. The narrow neck 27 permits swinging movement of the lower portion of the bar and the same is secured to the holder 11 so that the ratchet portion thereof is tensioned to normally swing outwardly so as to free the ratchet teeth 24 of the retaining member 23 from the ratchet teeth 21 of the ratchet bar 20, as illustrated in Fig. 4 of the drawings.

The ratchet teeth 21 are defined by longitudinally spaced downwardly and inwardly directed edges 28 each being disposed between and connected at its opposite ends with the inner and outer ends respectively of adjacent horizontally disposed edges 29 spaced longitudinally of the bar. The ratchet teeth 24 of the retaining member 23 are similarly defined by longitudinally spaced downwardly and inwardly directed edges 30 each extending between and connected at its opposite ends with the outer and inner ends respectively of adjacent horizontally disposed edges 31 whereby the edges 30 of the ratchet teeth 24 slide over the edges 28 of the ratchet teeth 21 when the ratchet bar 20 is disposed in the outward position illustrated in Fig. 4 of the drawings.

The ratchet bar 20 is provided with a reduced lower end 33 which is formed with an arcuate outer edge 34 defining a cam edge which extends to the extreme lower end thereof. The reduced lower end 33 projects into a tubular reciprocatory element 35 having an arcuate inner peripheral face 36 defining a cam face against which the cam edge 34 of the ratchet bar 20 engages. The tubular element 35 protrudes through the lower end of the tip 16 with the inwardly directed annular rim 37 of the tip engaging the semi-spherical arcuate portion 38 of said element to limit the outward movement thereof. The tubular element 35 is arranged axially of the holder 11 with the end of the lead or marking stick 13 disposed in the restricted opening 39 in the semi-spherical portion 38 thereof and with the outer end or writing surface of the lead or marking stick located flush with the curved outer face of said semi-spherical portion. A cylindrical clutch member 40 tightly fits within the tubular element 35 and said clutch member is formed with circumferentially spaced inwardly directed spring fingers 41 which engage with the lead or marking stick 13 to effect outward movement thereof with the outward movement of the tubular element.

In operation and use the pencil is disposed on a writing surface such as indicated by the reference character A in Fig. 1 of the drawings and upon application of pressure against the writing surface the tubular element 35 is moved inwardly so as to force the cam face 36 thereof against the cam edge 34 of the ratchet bar 20 to thereby swing the same inwardly against the outward tension of said bar and to force certain of the teeth thereof into engagement with the teeth of the retaining member 23 to hold the same in position. When the retaining member 23 is thus engaged by the ratchet bar 20, the horizontal edges 31 of the teeth of the retaining member engage against the horizontal edges 29 of the teeth of the ratchet bar to thereby prevent inward or upward movement of the retaining member and the lead or marking stick 13.

When the pencil is lifted from the surface A the normal tension of the ratchet bar 20 below the neck 27 moves the bar laterally and cams the tubular element 35 downwardly and outwardly and moves the ratchet teeth 21 of the bar out of engagement with the ratchet teeth 24 of the retaining member 23. The downward and outward movement of the tubular element 35 carries the clutch member 40 therewith together with the lead or marking stick. The tubular element 35 also moves downwardly by gravity when the pencil is lifted from the writing surface so that the movement thereof feeds the lead or marking stick downwardly a short distance in the holder 11. The release of the retaining member 23 permits the same to move downwardly in the holder 11 so that the lower end thereof rests upon the upper end of the lead or marking stick. When the lower end of the pencil is again brought to bear on the writing surface, the tubular element 35 thereof is forced inwardly to again cause the ratchet bar 20 to engage the retaining member 23 to hold the same in position to prevent inward movement of the lead or marking stick. It will also be understood that during writing the tubular element 35 has a slight inward movement by pressure thereof against the writing surface so as to expose the writing surface of the lead or marking stick beyond the end of said tubular element.

The pencil is provided with an eraser 42 which is removably secured in the upper end of the barrel 10 to permit access to the chamber 43 surrounding the upper portion of the holder 11 for holding a supply of lead or marking sticks 13.

In the form of the invention illustrated in Figs. 5 to 8 inclusive of the drawings, the pencil illustrated therein consists of an elongated barrel 50 within which is arranged a holder 51 similar in construction to the holder 11 in the previous form of the invention and having an automatic feeding mechanism indicated generally by the reference character 52 arranged therein. The barrel 50 is provided with a tapered lower end portion 53 in which the threaded lower end 54 of the holder 51 is secured with the protruding end thereof threadedly engaging a tubular tip 55 for securing the same to the barrel 50.

The feeding mechanism 52 includes a ratchet bar 56 having ratchet teeth 57 extending along the inner longitudinal edge thereof similar to the ratchet teeth 21 in the previous form of the invention. In this form of the invention the ratchet bar is formed with elongated downwardly and outwardly directed apertures 58 adjacent the opposite ends thereof through which protrude cross pins 59 affixed at their ends to the holder 51 for mounting the ratchet bar in the outer portion 60 of the slot 61 for movement toward and away from a cylindrical retaining member 62 arranged in the circular inner portion 63 of said slot. The retaining member 62 is formed with ratchet teeth 64 similar to the ratchet teeth 24 of the retaining member 23 in the previous form of the invention and which engage with the ratchet teeth 57 of the ratchet bar 56 for securing the retaining member in position as illustrated in Fig. 5 of the drawings.

The ratchet bar 56 is formed with an arcuate shaped leaf spring 65 secured to the lower end thereof with the rebent end of said spring resiliently engaging against the upper edge of a tubular element 66 arranged axially of the barrel 50 and mounted for reciprocatory movement in the tip 55 with the lead or marking stick 67 protruding through the semi-spherical lower end 68

thereof. The tip 55 is formed with an inwardly directed annular rim 69 which is adapted to engage the semi-spherical end 68 of said tubular element forward of the inner curved portion thereof to limit the outward movement of said tubular element. A cylindrical clutch member 70 tightly fits within the tubular element 66 similar to the clutch member 40 in the previous form of the invention and which is provided with circumferentially spaced inwardly directed spring fingers 71 adapted to engage with the lead or marking stick 67.

The pencil operates in a manner similar to the pencil shown and described in connection with the previous form of the invention and upon application of pressure against the writnig surface B the tubular element 66 is moved inwardly so as to apply pressure to the spring 65 and force the ratchet bar 56 upwardly and inwardly so that certain of the ratchet teeth 57 thereof engage and hold the retaining member 62 in fixed position. The ratchet bar 56 is limited in its upward and inward movement by the cross pins 59 which engage against the lower ends of the apertures 58 when the bar is thus moved into engagement with the retaining member 62.

When the pencil is lifted from the surface B the weight of the ratchet bar 56 will cause the same to move downwardly and outwardly to dispose the cross pins 59 at the upper ends of the apertures 58 and to thereby free the retaining member 62 to permit the same to move downwardly in the holder so that the lower end thereof rests upon the upper end of the lead or marking stick. The downward and outward movement of the ratchet bar 56 moves the tubular element 66 downwardly which also is free to move downwardly by gravity so as to carry the clutch member 70 therewith to feed the lead or marking stick downwardly. When the lower end of the pencil is again brought to bear on the writing surface, the tubular element 66 thereof is forced inwardly to expose the marking surface at the end of the lead or marking stick, the leaf spring 65 against which the inner end of the tubular element 66 is engaged being sufficiently resilient to bend inwardly with the inward movement of said tubular element. The inward movement of the tubular element also moves the ratchet bar 56 upwardly and laterally so that certain of the teeth thereof engage with and hold the retaining member 62 in fixed position.

The lead or marking stick is inserted in the guide in the holders 11 and 51 in the forms of the invention illustrated through the openings in the tubular elements 35 and 66 respectively, the clutch members 40 and 70 permitting inward movement of the lead or marking stick while the fingers thereof engage the same for downward movement with the clutch members.

In order to insert the lead or marking stick in the guide in the holder 51 in the form of the invention illustrated in Figs. 5 to 8 of the drawings, the ratchet bar 56 is moved out of engagement with the retaining member 62 by grasping the projecting upper end 72 of said ratchet bar to manually move the ratchet bar downwardly and laterally. This permits of the sliding of the retaining member 62 upwardly in the guide in the holder as the lead or marking stick is inserted therein.

As illustrated in Fig. 5 of the drawings, the pencil also includes an eraser 73 which is removably fitted in the upper end of the barrel 50 for storing a supply of lead or marking sticks 67 in

the space 74 surrounding the upper portion of the holder 51.

What is claimed is:

1. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide for a marking stick, a retaining member slidable in said guide and having ratchet teeth on one portion thereof, a longitudinally extending bar secured to the holder for swinging movement toward and away from said retaining member and normally tensioned for lateral swinging movement away from said retaining member, said bar having ratchet teeth extending longitudinally thereof adapted to engage the ratchet teeth of said retaining member for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged, said tubular element and said bar having cam surfaces adapted to engage to move the bar laterally into engagement with the retaining member to thereby prevent inward movement of the marking stick when said tubular element is moved inwardly by bearing engagement of the protruding end thereof against a writing surface, and said ratchet bar being adapted to move laterally when the pencil is lifted from engagement with the writing surface to cam the tubular element downwardly and carry the marking stick therewith for feeding the same downwardly.

2. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member adapted to engage the inner end of said marking stick and having ratchet teeth on one portion thereof, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, said bar having ratchet teeth extending longitudinally thereof adapted to engage the ratchet teeth of said retaining member for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, and a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said ratchet bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

3. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick and having ratchet teeth on one portion thereof, a longitudinally extending bar connected with the holder by slot and pin connection for limited movement toward and away from said retaining member, said bar having ratchet teeth

extending longitudinally thereof adapted to engage the ratchet teeth of said retaining member for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, and a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said ratchet bar being adapted to move by gravity out of engagement with said retaining member when the pencil is lifted from engagement with the writing surface to free said retaining member for downward movement by gravity in said guide, and said tubular element moving downwardly with said ratchet bar for feeding the marking stick downwardly therewith.

4. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, means carried by said bar and said retaining member adapted to engage for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, and a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

5. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, means carried by said bar and said retaining member adapted to engage for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, and an annular clutch member fitted in said tubular element and having fingers adapted to engage the marking stick for moving the marking stick downwardly with the downward movement of the tubular element and permitting of inward movement of the tubular element relative to the marking stick, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

6. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, means carried by said bar and said retaining member adapted to engage for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, and a spring secured to the lower end of said bar and having a rebent lower end adapted to resiliently engage the inner end of said tubular element for tensioning the same, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

7. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, means carried by said bar and said retaining member adapted to engage for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, and an annular clutch member fitted in said tubular element engaging the marking stick for moving the marking stick downwardly with the downward movement of the tubular element and permitting of inward movement of the tubular element relative to the marking stick, said tubular element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward

movement of the marking stick with the inward movement of the tubular member, and said bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

8. In a pencil, a barrel, a holder arranged within the barrel and having a longitudinally extending guide adapted to receive a marking stick, a retaining member arranged in said guide and adapted to engage the inner end of said marking stick, a longitudinally extending bar mounted for limited movement toward and away from said retaining member, means carried by said bar and said retaining member adapted to engage for holding the retaining member in fixed position to prevent inward movement of the marking stick in the guide, a tubular element mounted for reciprocatory movement in the forward end of the barrel and having a protruding end in which the lower end of the marking stick is arranged with the writing surface exposed at the open end, and a spring secured to the lower end of said bar resiliently engaging the inner end of said tubular element for tensioning the same, said tubular

element being moved inwardly by bearing engagement of the protruding end thereof against a writing surface to thereby move said bar into engagement with the retaining member for holding the same in said fixed position to thereby prevent inward movement of the marking stick with the inward movement of the tubular member, and said bar being adapted to move out of engagement with said retaining member when the pencil is lifted from engagement with a writing surface and to thereby move said tubular element downwardly in the barrel for feeding the marking stick downwardly therewith.

HAROLD BROOKS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,777,871	Becker	Oct. 7, 1930

FOREIGN PATENTS

Number	Country	Date
189,666	Switzerland	May 18, 1937