

Sept. 2, 1958

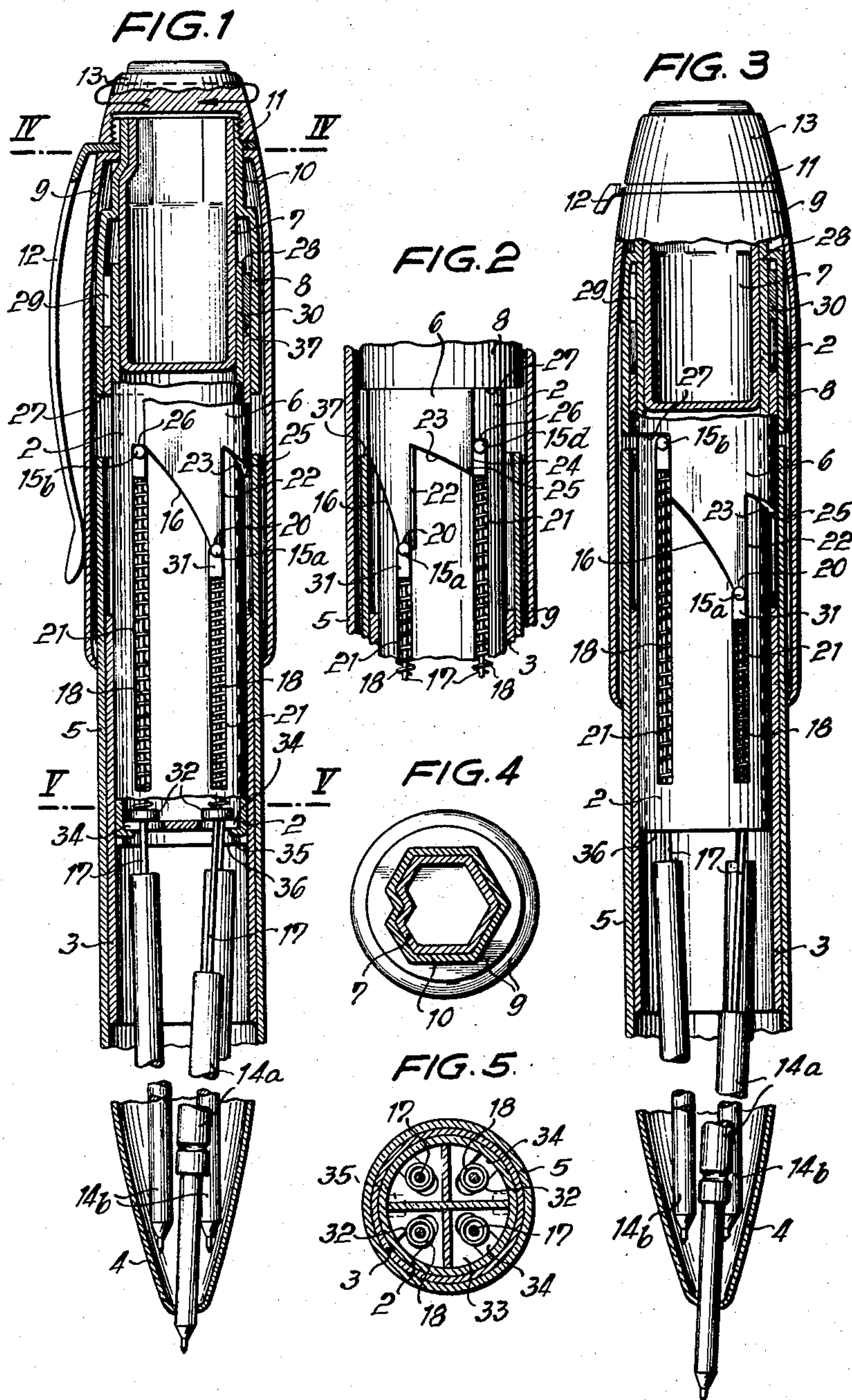
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2,849,983

LEAD-CHANGE-PENCIL PROVIDED WITH SLOTLESS OUTER JACKET

Filed May 27, 1955

3 Sheets-Sheet 1



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FIG. 6

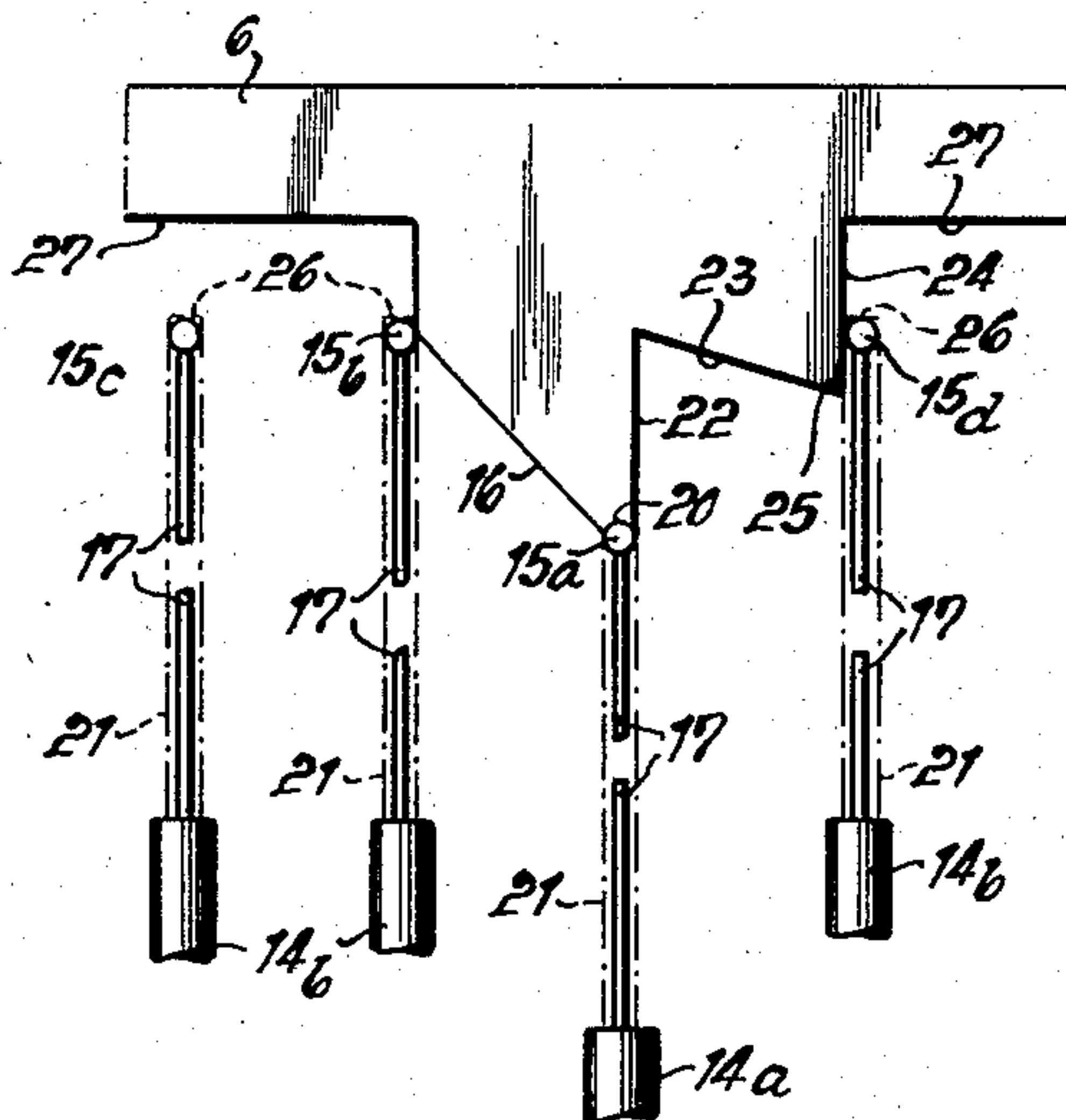


FIG. 7

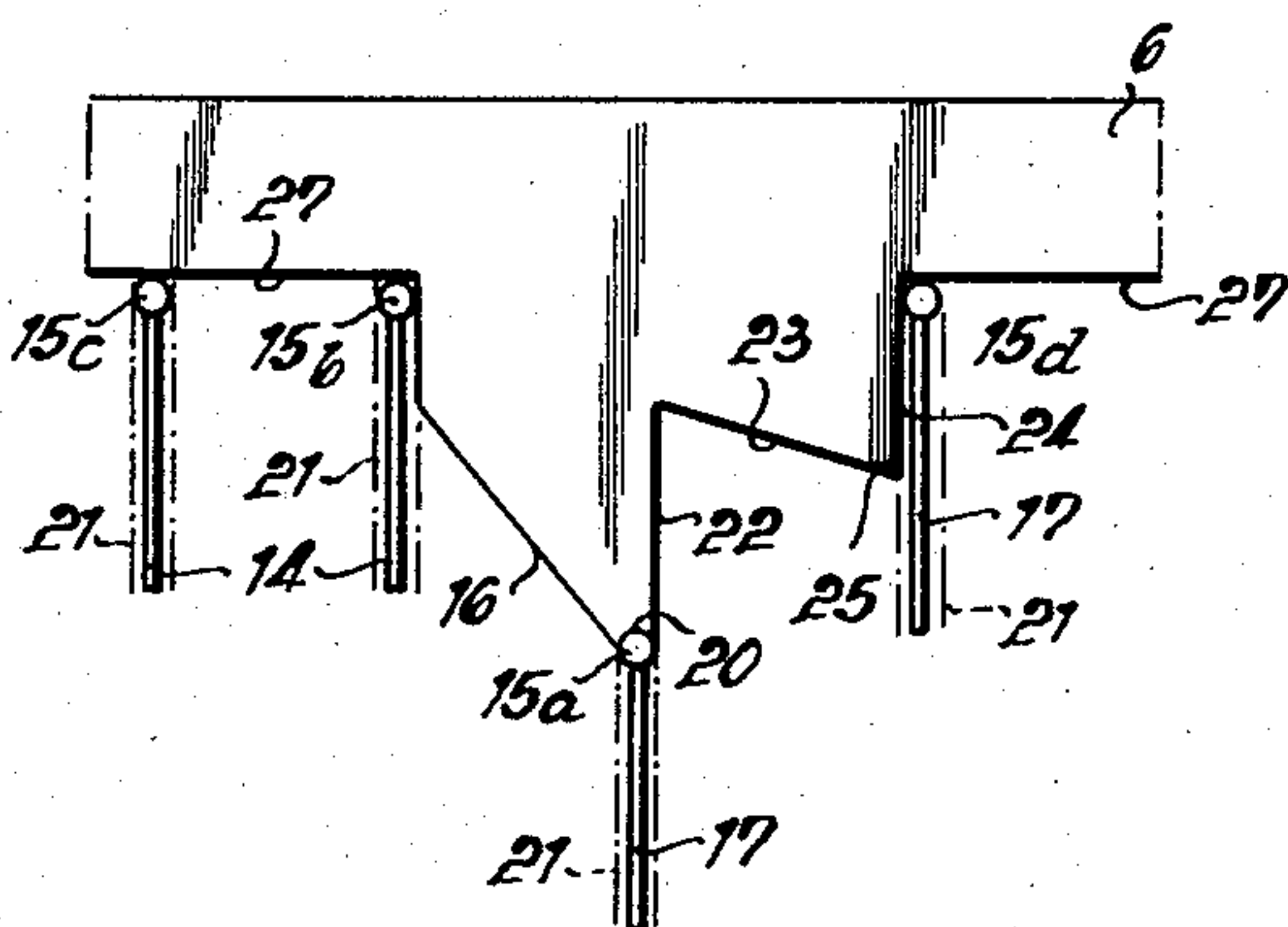


FIG. 10

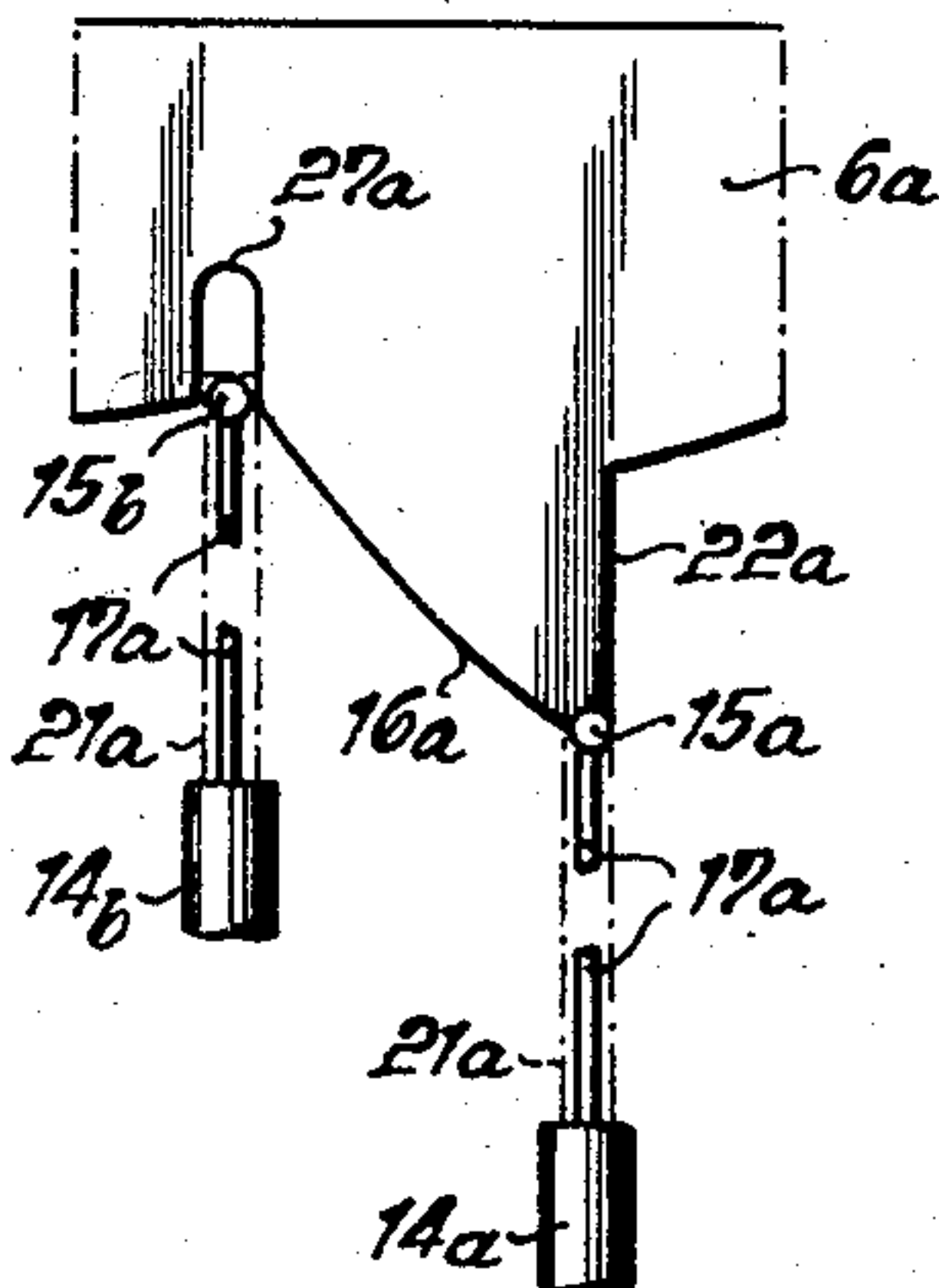
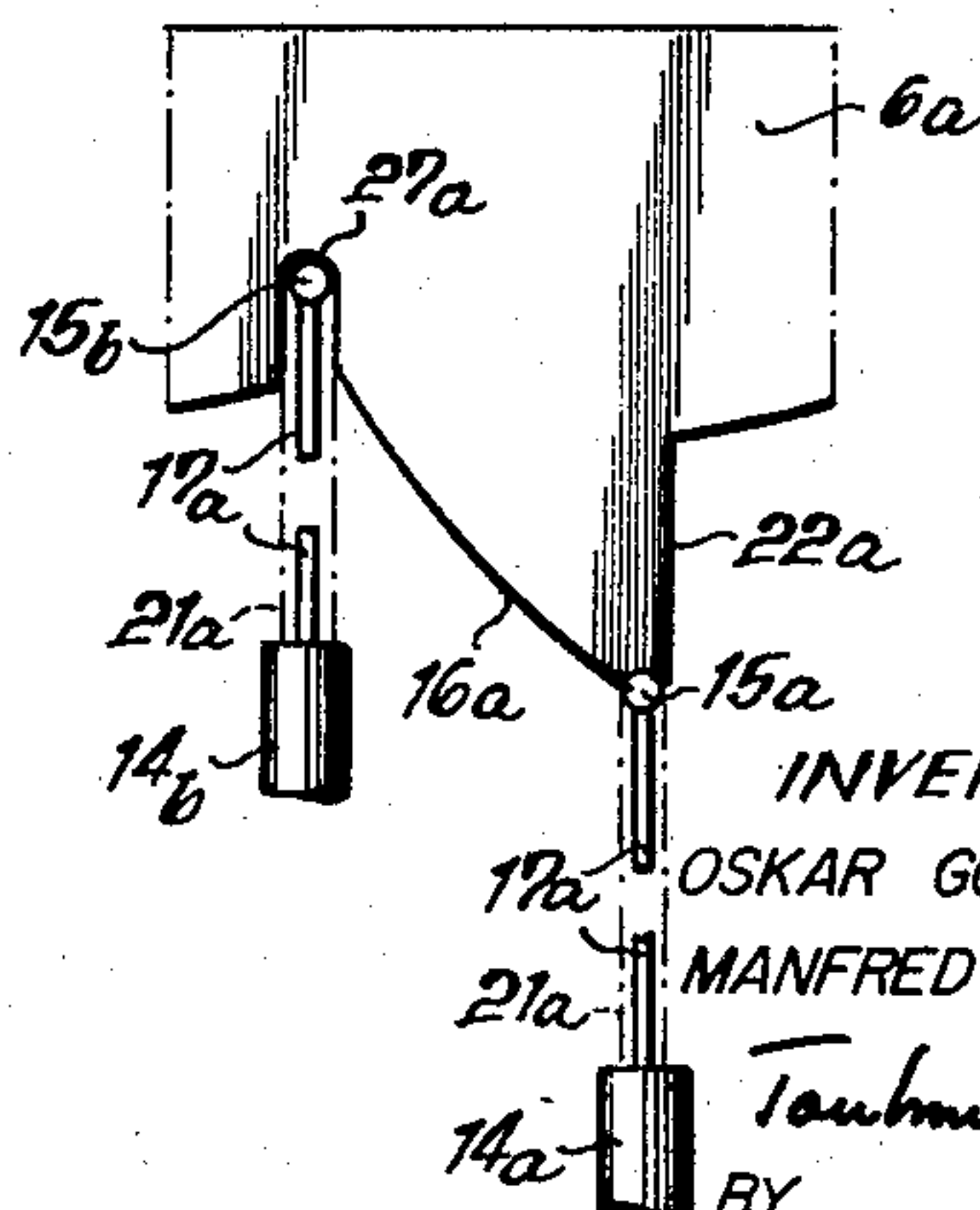


FIG. 11



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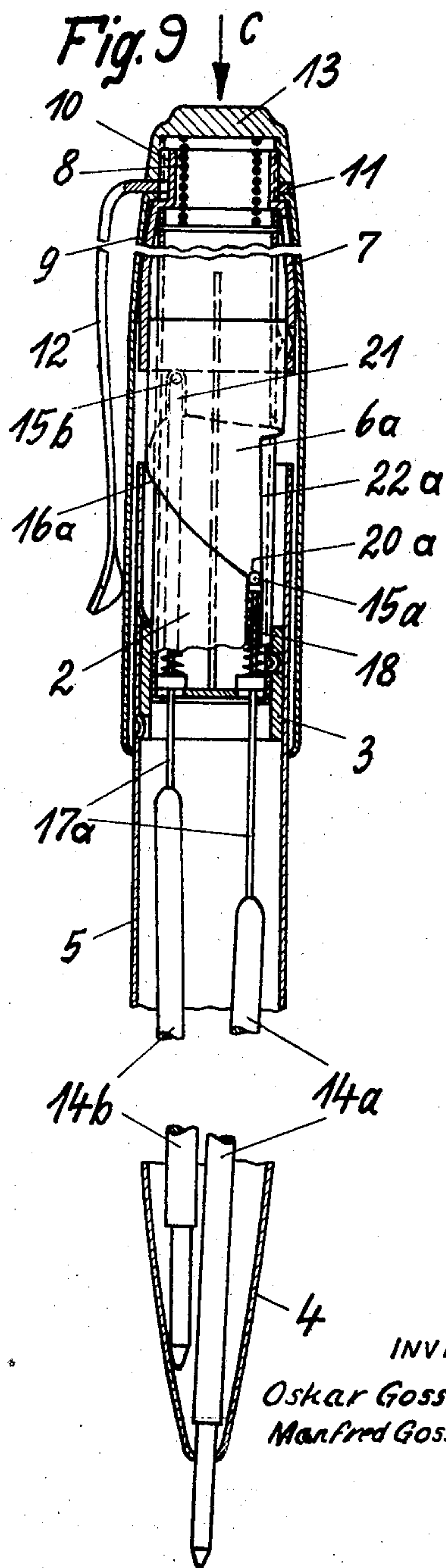
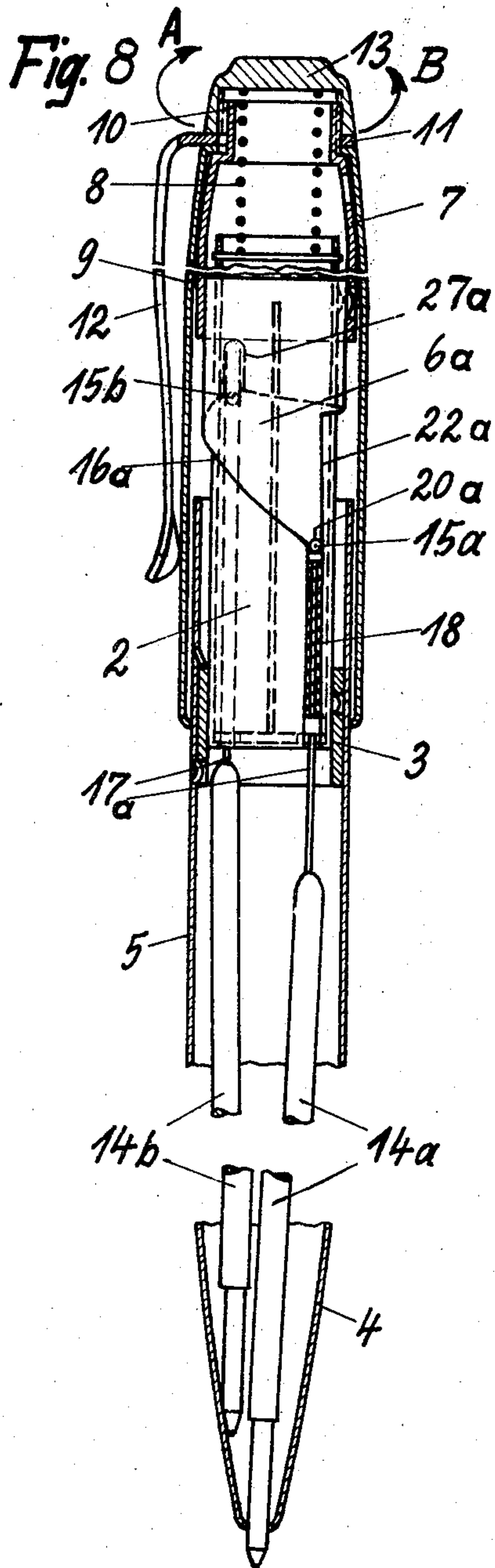
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3 Sheets-Sheet 3



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LEAD-CHANGE-PENCIL PROVIDED WITH SLOTLESS OUTER JACKET

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Application May 27, 1955, Serial No. 511,722

6 Claims. (Cl. 120—14.5)

The present invention relates to a lead change pencil provided with a slotless outer jacket and with lead carrier feed and return means adapted for operation by an end cap, whereby the lead carrier shanks and their return springs are housed in a guide casing arranged in the outer jacket of the pencil, and whereby the feed pins of the lead carrier shanks are guided in slots of said guide casing extending parallel to the longitudinal axis of the pencil, and whereby, upon actuation of the end cap, the feed pins slide along at the operating edge of an operating sleeve likewise arranged in the outer jacket, and can thus be fed into and out of writing position.

Lead change pencils of this type have the advantage of being operable exclusively through actuation of the end cap. They are not provided in the outer jacket with push handles and with guide slots for these push handles.

This application is a continuation-in-part of our pending patent application Serial Number 470,072, filed November 19, 1954, now Patent No. 2,826,173, issued March 11, 1958.

There are already known lead change pencils of this kind in which a guide casing connected with the end cap houses the spring pressed lead carrier shanks and guides their feed pins in slots, whereby these feed pins, upon rotation of the end cap, slide along at an operating edge of an operating sleeve stationarily arranged in the outer jacket, and are thus fed into and out of writing position. However, in this known form of construction the lead carriers can be locked only in one forward feed position, which simultaneously serves as writing position and as position for the regulation of the lead carriers, or for the insertion of a new pencil lead into the lead carrier. The lead carriers, therefore, have to project in their writing position from the writing end of the pencil to such an extent that they are unsatisfactorily supported in their writing position and for that reason can easily be damaged.

Contrary to this, the lead change pencil of the invention is characterized by the feature that, with the operating sleeve rigidly secured to the end cap or turn cap and with the casing for the lead carrier shanks rigidly secured to the outer jacket, the operating sleeve is rotatably and longitudinally shiftably arranged and for that purpose is provided with recesses, preferably with one recess, which, when the lead carrier located in writing position is fed into a second more advanced feed position, (regulating position), receives the feed pin or feed pins of the lead carrier or lead carriers located in their position of rest, so that these lead carriers retain their position unchanged in the conically tapered writing end of the pencil. A construction like this makes it possible to keep the pencil short.

The second more advanced feed position is limited by the stop offered to a connecting sleeve, secured to the operating sleeve to be fed forward and to the turn cap, by the rear end of the casing for the lead carrier shanks.

The rearward position of the operating sleeve and of the turn cap is limited by the stop offered to the rear end of the operating sleeve by the forward end of a stop ring fastened on the casing for the lead carrier shanks, and preferably slotted on one side.

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The guide edge or operating edge of the operating sleeve may be of such steepness that the lead carrier, following the lead carrier in writing position, is still in its rearward position of rest.

The operating edge of the operating sleeve is further provided between its steep ascending portion and its vertically receding portion behind that steep ascending portion with a notch for the feed pin of the lead carrier located in writing position to engage in and to be supported in, and from which the feed pin can be released in both directions.

The operating edge may further be provided behind its steep ascending portion and vertically receding portion with a just slightly ascending portion followed by another vertically receding portion in such manner that the feed pin, preceding the one which is sliding into writing position, after its backward snapping into its position of rest, takes up at the moment the next-following feed pin arrives in writing position, a position behind a nose, and thereby prevents a backward rotation of the operating sleeve.

Additional features and advantages of the invention will be understood from a consideration of the following detailed description taken in connection with the accompanying drawings, forming a part of this specification and in which two embodiments of the invention have been shown by way of example. However, we wish to say that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appending claims.

In the drawings, in which like parts are referred to by the same reference numerals in all of the several figures,

Fig. 1 is a sectional view with parts in elevation of a four color pencil, with a lead carrier in writing position;

Fig. 2 is a fragmentary view of the four color pencil of Fig. 1, showing the operating sleeve in slightly displaced position;

Fig. 3 is a view of the four color pencil similar to that of Figure 1, but with a lead carrier in a second more advanced feed position (lead regulating position);

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

Fig. 5 is a cross-section on line V—V of Fig. 1;

Fig. 6 is a diagrammatic illustration of the operating edge of the four color pencil, with the lead carriers and feed pins in the position of Fig. 1;

Fig. 7 is a diagrammatic illustration of the operating edge of the four color pencil, with the lead carriers and feed pins in the position of Fig. 3;

Fig. 8 is a sectional view with parts in elevation of another embodiment of the invention showing a two-color pencil, with one lead carrier in writing position;

Fig. 9 is a view similar to that of Fig. 8 of the two-color pencil shown in that figure, but with one of the lead carriers advanced from writing position to lead regulating position;

Fig. 10 is a diagrammatic illustration of the operating edge of a two-color pencil, with the lead carriers and feed pins in the position of Fig. 6;

Fig. 11 is a diagrammatic illustration of the operating edge of a two-color pencil, with the lead carriers and feed pins in the position of Fig. 7.

In the embodiment of the four-color pencil according to the invention illustrated in Figures 1 to 7, the reference numeral 2 designates the casing for the lead carrier shanks which by means of an intermediate sleeve 3 is rigidly secured to the outer jacket 5 terminating in the conically tapered forward or tip portion 4. The operating sleeve 6 which envelops the rearward portion of casing 2 is connected via a connecting sleeve 8, serving simultaneously as supporting means for the magazine of the

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pencil leads, with the turn cap 9 and secured in position at the turn cap through polygonal formation of the narrower rear portion 10 of the connecting sleeve 8. The clip ring 11 provided with the clip 12 is adjusted in position about the aforesaid rear end 10 between turn cap 9 and end cap 13, which serves as cover for the magazine 7 and is screwed onto the threaded rearmost end of rear position 10 of connecting sleeve 8.

In the interior of the forward end portion 4, there are housed four lead carriers of which lead carrier 14a is shown in advanced position, and laterally disposed lead carriers 14b are withdrawn in the interior of end portion 4. The fourth lead carrier is only shown in Figure 6. These lead carriers are mounted on lead carrier shanks 17, which bear, at their free end, feed pins 15a, 15b, 15c and 15d. These feed pins protrude into longitudinal slots 21 provided in the casing 2, and are guided in the same.

About the lead carrier shanks 17 there are mounted return springs 18 which bear with their one ends, directed toward the pencil cap 13, against rearward end rings 31, carrying the aforesaid feed pins 15a, 15b, 15c and 15d respectively, and with their other ends, directed toward the pencil tip, against forward rings 32 which, in turn, rest on the bottom plate 33 of the lead carrier shank casing 2. This bottom plate 33 is provided with slots 34 through which the lead carrier shanks 17 extend forward into the interior of intermediate sleeve 3. The bottom plate 33 is secured in position by an inwardly bent flange 35 provided at the forward end 36 of casing 2.

Operating sleeve 16 is provided at its open end directed toward the tip of the pencil, with an operating edge 16 obliquely disposed relative to the longitudinal pencil axis. This operating edge 16 possesses at the portion thereof protruding maximally toward the tip of the pencil, a notch 20, and extends from this advanced notch in rearward direction parallel to the longitudinal axis of the pencil forming edge portion 22. This portion 22 extends rearwardly to the height of the rear ends 26 of longitudinal slots 21.

The operating edge then advances slightly toward the pencil tip along edge portion 23, and then recedes again further parallel to the longitudinal pencil axis along edge portion 24, thus forming a shoulder 25. Edge portion 24 extends toward the pencil cap 13 by a determined distance, thus forming a recess 27, the significance of which shall be described further below. The operating edge then extends parallel to the longitudinal pencil axis toward the tip of the pencil and merges into the above-mentioned obliquely disposed operating edge 16.

The rear end 28 of the lead carrier shank casing 2 is devised to abut in a certain step of operating the pencil to be explained hereinafter, against the inner shoulder 28a formed in the connecting sleeve 8 by its narrower rear portion 10.

On the outer circumference adjacent the rearward end of casing 2, there is fastened a stop ring 30 which is preferably slotted on one side at 29. This stop ring 30 limits the rearward position of the operating sleeve 6 and turn cap 9.

In the modification of a two-color pencil according to the invention illustrated in Figures 8 to 11, like parts bear the same numerals as in Figures 1 to 7. Figures 8 and 9 show the central portion of the two-color pencil, and Figures 10 and 11 the operating sleeve 6a in a flattened diagrammatical view. Instead of providing an elongated recess edge 27 as in Figures 6 and 7, this embodiment possesses a narrow recess 27a.

The illustration of Figure 10 corresponds to that of Figure 6, that is to say, the lead carrier 14a is in writing position, while the illustration of Figure 11 corresponds to that of Figure 7, that is to say, to the position in which the lead carrier 14a is in its second more advanced feed position (lead regulating position).

Through rotation of the turn cap 9, and consequently

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also of the operating sleeve 6, in the direction indicated by the arrow (see Fig. 1), the lead carriers 14a and 14b are successively fed into forward position (see Figures 1 and 6) through forward feeding of their feed pins 15a, 15b, 15c, 15d at the operating edge 16 of the operating sleeve 6 against the resistance of their return springs 18 surrounding the lead carrier shanks 17, whereby the lead carriers 14a, 14b are fed into writing position.

In this position the return spring 17 of shank 15a presses the operating sleeve 6 and together therewith the connecting sleeve 8 and turn cap 9 rearwardly so that rear end surface 37 of sleeve 6 rests against stop ring 30 of shank casing 2 (see Figure 1). The lead 14a is thereby firmly held in writing position against pressure exercised on the tip thereof.

The ascent of the operating edge 16 at the operating sleeve 6 is, according to the invention, of such steepness that the feed pin 15b, following the feed pin 15a which is in writing position, is still in its rearward position of rest in its longitudinal guide slot 21 (see Figures 1 and 6).

The lead carrier 14a which is in writing position, can be fed through pressure exerted upon the end cap 13 or turn cap 9, against the resistance of its return spring 18, into a second more advanced feed position (lead regulating position, as shown in Figures 3 and 7), whereby according to the invention the feed pins 15b, 15c, 15d of all of the other lead carriers remain in the rearward recess 27 of the operating sleeve 6, so that the position of their lead carriers 14b in the conically tapered forward end 4 of the pencil is not changed.

Forward movement of the entire cap assembly and together therewith of lead carrier 14a to its more advanced position of Figure 3 is limited by the end surface 28 of casing 2 abutting against the inner shoulder 28a of connecting sleeve 8.

Upon releasing pressure on end cap 13, return spring 17 of shank 14a returns the operating sleeve 6 and the cap assembly connected therewith, to the position shown in Figure 1 by pushing the operating sleeve 6 back until its rearward end surface 37 abuts against ring 30 of casing 2.

There is no fundamental difference in the operation of the embodiment of the multi-color lead pencil shown in Figures 8 to 11.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a change color pencil of the slotless outer jacket type, comprising an outer jacket provided with a conically tapered writing tip; a guide casing arranged within said outer jacket and rigidly secured thereto and provided with a plurality of longitudinally extending parallel guide slots and having its rear end project from the rear end of said outer jacket; a plurality of lead carriers provided with lead carrier shanks; return springs mounted on said lead carrier shanks housed within said guide casing, said lead carrier shanks being provided at their rear ends with feed pins adapted to engage in and projecting through said longitudinally extending parallel slots of said guide casing for guidance therein; and a turn cap rotatably and longitudinally shiftably mounted on the rear end of said guide casing and surrounding the rear end of said outer jacket; the improvement of, in combination, an operating sleeve having an operating edge facing toward said writing tip, said operating sleeve having its rear end rigidly secured to said rotatable and longitudinally shiftable turn cap and snugly and rotatably and longitudinally shiftably surrounding the rear end of said guide casing; said operating edge of said operating sleeve being provided with a curved portion along which one of said feeding pins is advanced to move the lead carrier per-

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taining thereto into writing position, and a notch for receiving the feeding pin of one of said lead carriers therein, when said lead carrier is in writing position; said curved portion of said operating edge being of such steepness that the lead carrier next following a lead carrier which is being fed into writing position by rotation of said turn cap is still in its position of rest when the latter lead carrier reaches that writing position; said operating edge further comprising next to the rearward end of said curved portion at least one recessed portion extending from the upper ends of said guide slots away from said writing end and of such depth that subsequent additional longitudinal pressure exerted via said turn cap upon said operating sleeve feeds the lead carrier located in writing position into a second more advanced lead regulating position whereby the feed pins of the lead carriers at rest engage in said recessed portion of said operating edge.

2. In a change color pencil of the slotless outer jacket type, comprising an outer jacket provided with a conically tapered writing tip; a guide casing arranged within said outer jacket and rigidly secured thereto and provided with a plurality of longitudinally extending parallel guide slots and having its rear end project from the rear end of said outer jacket; a plurality of lead carriers provided with lead carrier shanks; return springs mounted on said lead carrier shanks housed within said guide casing, said lead carrier shanks being provided at their rear ends with feed pins adapted to engage in and projecting through said longitudinally extending parallel slots of said guide casing for guidance therein; and a turn cap rotatably and longitudinally shiftably mounted on the rear end of said guide casing and surrounding the rear end of said outer jacket; the improvement of, in combination, an operating sleeve having an operating edge facing toward said writing tip, said operating sleeve having its rear end rigidly secured to said rotatable and longitudinally shiftable turn cap and snugly and rotatably and longitudinally shiftably surrounding the rear end of said guide casing, and stop means associated with said turn cap in the interior of the latter, said stop means serving for limiting forward shifting movement of said turn cap relative to said guide casing, when pressure is exercised on said turn cap in the direction of the pencil axis toward said writing tip, and stop means associated with said guide casing adjacent the rear end thereof for limiting the rearward movement of said operating sleeve and turn cap by the rear end surface of said operating sleeve abutting against said guide casing stop means, under the effect of said return springs, when pressure on said turn cap in axial direction ceases; said operating edge of said operating sleeve being provided with a curved portion along which one of said feeding pins is advanced to move the lead carrier pertaining thereto into writing position, and a notch for receiving the feeding pin of one of said lead carriers therein, when said lead carrier is in writing position.

3. A change color pencil as specified in claim 1, in which said operating sleeve provided with said operating edge is so devised that said operating edge on the side of said notch opposite said curved portion recedes in vertically rearward direction, and that rotation of said operating sleeve by means of said turn cap in either direction releases said feed pin from said notch.

4. A change color pencil as specified in claim 1, in which said operating sleeve provided with said operating edge is so devised that rotation of said operating sleeve by means of said turn cap in one direction feeds a lead carrier by means of its feed pin along said curved portion of said operating edge and at the foremost end of said ascending portion causes said feed pin to engage in said notch adapted for the support of the lead carrier by means of its feed pin in writing position, and that continued rotation of said operating sleeve in the same direction causes the feed pin of the respective lead carrier to slip out of said notch and owing to the pressure of its return

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spring along a vertically rearwardly extending portion of said operating edge, and thereupon along a slightly forwardly ascending portion of said operating edge, and at the end of said slightly ascending portion behind a second vertically rearwardly extending portion of said operating edge, locking thereby said operating sleeve against rotation in the opposite direction.

5. In a selective color pencil of the slotless outer jacket type, an outer jacket having a tapered writing tip with an opening therein, a guide casing rigidly secured within said outer jacket and having a plurality of parallel longitudinal guide slots, said guide casing projecting from the rear end of said outer jacket, a plurality of lead carriers each having a lead carrier shank, a laterally extending feed pin on each of said lead carrier shanks and projecting through a corresponding guide slot, return springs on each of said lead carrier shanks, a turn cap mounted on the rear end of said guide casing for both rotatable and longitudinal movement and surrounding the rear end of said outer jacket, an operating sleeve mounted on the rear end of said guide casing for both rotatable and longitudinal movement thereon and attached to said turn cap, said operating sleeve having an operating edge facing toward said writing tip and engageable with said feed pins, said operating edge comprising a curved portion sloping toward said writing tip end from a point even with the upper ends of said guide slots so that rotation of the operating sleeve will cause the feed pin on the carrier shank to ride upon said curved portion to urge the corresponding lead carrier outwardly through the opening in the writing tip end, said operating edge further comprising a recessed portion extending from the beginning of said curved portion away from said writing tip end of such depth whereby longitudinal movement of said turn cap will feed the lead carrier in writing position to a more advanced lead regulating position and the feed pins of the remaining lead carriers will be received in the recessed portion and said remaining lead carriers will not move longitudinally.

6. In a selective color pencil of the slotless outer jacket type, an outer jacket having a tapered writing tip with an opening therein, a guide casing rigidly secured within said outer jacket and having a plurality of parallel longitudinal guide slots, said guide casing projecting from the rear end of said outer jacket, a plurality of lead carriers each having a lead carrier shank, a laterally extending feed pin on each of said lead carrier shanks and projecting through a corresponding guide slot, return springs on each of said lead carrier shanks, a turn cap mounted on the rear end of said guide casing for both rotatable and longitudinal movement and surrounding the rear end of said outer jacket, an operating sleeve mounted on the rear end of said guide casing for both rotatable and longitudinal movement thereon and attached to said turn cap, said operating sleeve having an operating edge facing toward said writing tip and engageable with said feed pins, said operating sleeve having an operating edge with a cam surface thereon for engaging a feed pin of said lead carrier shank to urge said lead carrier shank outwardly through the opening of the writing tip end into writing position upon rotation of the turn cap, said operating edge further comprising a common recess to accommodate the feed pins of the remaining lead carriers upon longitudinal movement of the turn cap to advance the lead carrier in writing position to a more advanced regulating position whereby the remaining lead carriers will not move longitudinally.

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