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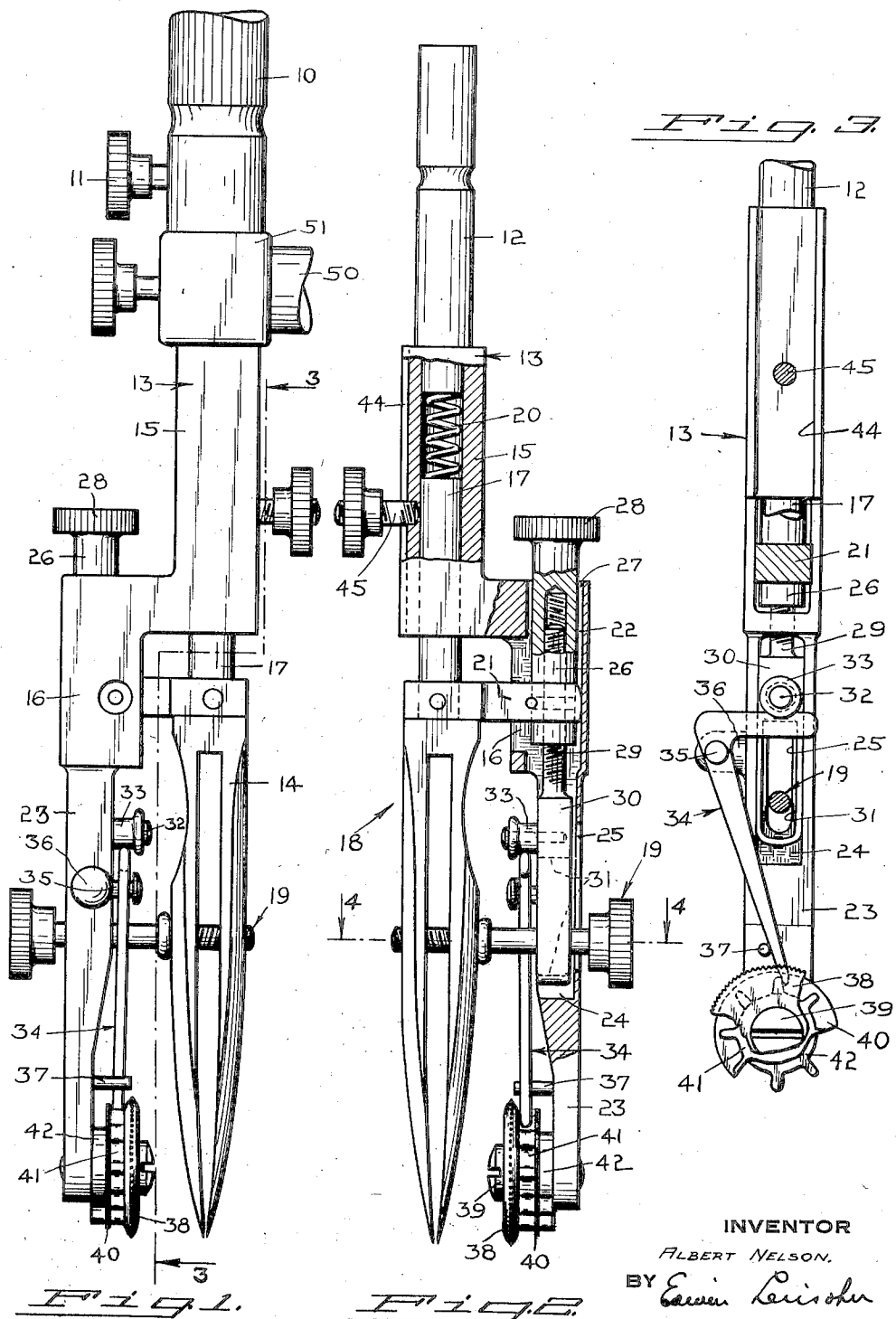
A. NELSON

2,036,716

DOTTING PEN OR PENCIL FOR DRAWING

Filed June 23, 1934

2 Sheets-Sheet 1



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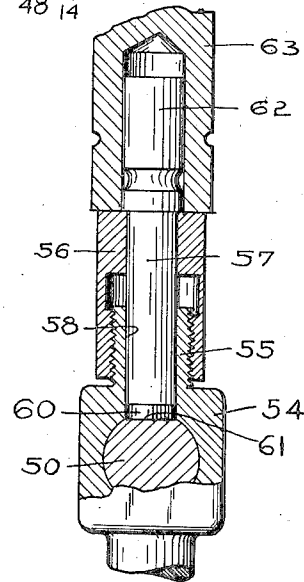
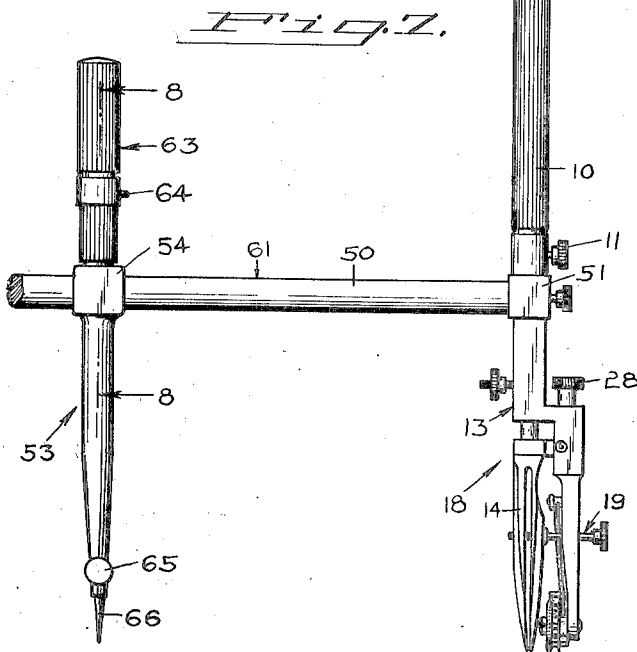
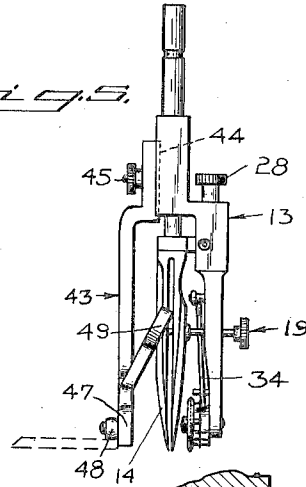
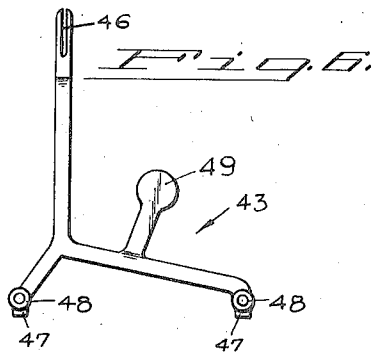
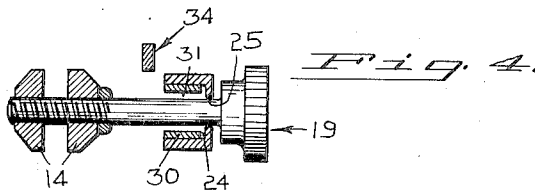
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DOTTING PEN OR PENCIL FOR DRAWING

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## DOTTING PEN OR PENCIL FOR DRAWING

Albert Nelson, New York, N. Y.

Application June 23, 1934, Serial No. 732,071

5 Claims. (Cl. 120—109.5)

My invention relates generally to drafting instruments and has reference particularly to improvements in the type of instrument which is used to produce broken or dotted lines as well as continuous lines and to enable a draftsman to execute such lines along straight edges and curves.

Instruments of this character are known professionally as dotting pens and pencils for drawing, and in the course of development many different constructions have presented themselves, each instrument showing some improvement possibly over another, but in none of them has the draftsman found an instrument upon which he could depend to produce very accurately dotted lines, dot and dash lines, or lines consisting of dashes or full lines, and which could perform along circles equally as well as along straight lines.

The greatest difficulty encountered by users of this type of drawing instrument manifests itself in the failure of the dots and dashes to form accurately when any speed is attained and it is believed that this peculiarity is due mainly to the means used to transmit the rotary movement of a wheel into a reciprocating motion at a point where it can best be picked up by the marker.

The present invention is constructed particularly to overcome the possibility of the marker's failure to contact with the working surface at just the proper interval and for the set period during the movement of the instrument, whereby perfect uniformity of dot or dash or both is constantly maintained.

Failure to operate properly on the part of many of the so-called dotting pens and pencils is also believed to be due to the failure of the maker to provide means whereby the instrument may be held properly during operation, and in the present invention holding and guiding means are provided which insure just the correct position of the instrument during its movements over the working surface and consequently the proper traction for the wheel which operates the marking member.

Another object which has been attained by the present invention is the provision of means, in conjunction with the dotting instrument, of a holder and beam attachment whereby perfect circles may be executed consisting of dots, dots and dashes, or dashes.

One embodiment of my invention is described in the following specification, set forth in the

claims, and illustratively exemplified in the accompanying drawings, in which,

Figure 1 is an enlarged front elevational view of the drawing instrument;

Figure 2 is an enlarged rear elevational view of the same, parts being broken away;

Figure 3 is a sectional view taken on lines 3—3 of Figure 1, parts being broken away;

Figure 4 is a sectional view taken on lines 4—4 of Figure 2;

Figure 5 is an elevational view of the instrument having a guide mounted thereon;

Figure 6 is a side elevational view of the guide detached from the instrument;

Figure 7 is a side elevational view of the dotting pen mounted upon a beam compass; and

Figure 8 is an enlarged sectional view taken on lines 8—8 of Figure 7.

Referring to the drawings, 10 denotes a straight handle having an axial bore opening out of its lower end and a set screw 11 adjustable transversely of the wall of the bore to engage the shank 12 of a holder 13, which is adapted to interchangeably carry the marking implement, in the present illustration a ruling pen 14. The holder 13 comprises an arm 15, which is square in transverse section and from the upper end of which projects the shank 12, the arm 15 being disposed at one end of a lateral section, the opposite end thereof being integral with a downwardly directed arm 16 of the same transverse section as the upper arm 15, but slightly shorter in length. The upper arm 15 is provided with a bore opening out of the under side of the lateral section to receive the shank 17 of a ruling pen 14 which depends from the holder 13 and consists of a pair of nibs adjustable relatively of each other by means of a screw adjustment 19. The pen 14 and its shank 17 are yieldably urged in a downward direction by a helical spring 20 disposed within the bore between the closed end thereof and the free end of the shank 17. The head of the nibs of the pen 14 is provided with a lateral projection 21 which is directed toward the lower arm 16 and into a channel 22 disposed axially of the latter. Integral with the arm 16 and depending therefrom is an extension 23 having a channel 24 communicating with the channel 22, and a slot 25 arranged in the bottom wall of the channel 24, the slot 25 opening out of the outside wall of the extension. The slot 25 accommodates the shank of the screw adjustment 19 so that the nibs of the pen 14 may be regulated in the usual manner.

The pen 14 is adjusted axially with respect to the holder 13 by means of a sleeve 26 arranged axially of the channel 22 and clamped in upright position in the split end of the projection 21, the upper end of the sleeve 26 projecting through an opening 27 in the lateral portion of the holder 13 and having a knurled head 28 at its upper end. The bore of the sleeve 26 is threaded to receive an upright screw shank 29 of a slide 30 mounted to reciprocate axially of the lower channel 24.

Reciprocating movement is imparted to the pen 14 through the slide 30 which is slotted at its lower end to form an opening 31, the shank of the screw adjustment 19 projecting through the slot or opening 31 and then through the slot 25. The upper portion of the slide 30 on the side directed toward the pen 14 carries a pin 32 upon which a flanged roller or follower 33 is rotatably mounted. The pen 14 and connected parts are constantly being urged in a downward direction with respect to the holder 13 by the spring 29 and in order to lift the pen and its nibs away from the drawing surface to break the line a means is used to lift the follower 33 at predetermined intervals relative to the movement of the pen along the drawing surface.

The means used to reciprocate the pen 14 comprises an inverted L-shaped lever 34, which is pivotally mounted at its angle on a pin 35 projecting from a post 36 mounted on the rear face of the extension 23. The free end of shorter arm of the lever 34 engages under the follower 33 and the longer arm projects downwardly at an angle over the inside face of the extension. The spring 20 is held under constant tension because the shorter arm of the lever 34 holds the follower from being forced down to its lowest position by means of a stop pin 37 projecting from the extension 23 in the path of the longer arm of the lever.

It will be seen that, as the lever 34 rocks about its pivot 35, the entire pen 14 is raised and lowered with respect to the holder 13 and its extension 23. In the operation of an instrument of this character the reciprocating movement of the pen must be imparted to the latter simultaneously with its movement along the line to be marked. The movement of the instrument along the drawing surface is picked up by a wheel 38 which has a tapered edge that is serrated, the wheel 38 being rotatably mounted on a bearing screw 39 which is screwed into the extreme lower end of the extension for support. The wheel 38 is spaced from the adjacent face of the extension 23 and is provided with a hub which fills the intervening space. The hub comprises a center disc 40 and two ratchet sections 41 and 42 on opposite sides of the disc. The lower free end of the longer arm of the lever 34 is yieldably held in contact with either section of the hub, so that when the ratchet teeth thereof move against the lever the latter is rocked and the pen lifted. In the construction illustrated, the lever 34 is operating in the section 41 of the hub and this section comprises a plurality of uniformly spaced teeth which cause the pen to rise and drop at regular intervals along its line of travel, thereby producing dots. The other section 42 is provided with a pair of teeth, which, when the lever 34 is moved over into contact with the same, causes the pen to be lifted off the drawing surface for two short intervals to make a dot and then to remain on the surface to make a line thus producing a dot and dash line. It will be appreciated, of course, that other wheels may be provided which have hubs embodying dif-

ferent arrangements of teeth to give other types of broken lines.

The particular advantage of the present lever arrangement is in the fact that a small traction wheel 38 and ratchet may be used, the teeth thereof imparting a substantial movement to the longer arm of the lever 34 which is transformed into a much shorter movement in the pen because of the proximity of the follower 33 to the pivoted point of the lever.

It has been found desirable to provide other means of guiding a dotting instrument of this character than just the handle 10, and in order to meet this situation I provide a guide 43 in the form of an inverted Y-shaped metal member, the upper end of the stem thereof being offset to fit in a groove 44 in the inside face of the upper arm 15 of the holder 13.

The guide 43 is attachably connected to the holder 13 by means of a set screw 45 mounted in the arm 15 and projected through a slot 46 in the offset portion of the guide. The lower portion of the stem stands away from the pen 14 and the ends of the arms are turned downwardly to provide lugs 47. Rollers 48 are mounted upon the arms at the upper ends of the lugs 47 so that when a curved or straight edge is used as a guide for the instrument, the rollers 48 will rest upon the upper surface of the edge while the lugs 47 will be held against the upright side of the edge, as shown in Fig. 5. The arms of the guide 43 are of different lengths, the longer being disposed in the direction of movement of the pen to form its dots and lines, and is provided with an offset branch finger piece 49 to be held between the fingers of the draftsman to guide the entire device along the edge. The use of the guide 43 is particularly desirable because it provides a point of support for the pen on the side thereof opposite the wheel 38 and insures proper positioning of the pen with respect to the drawing surface.

If it is desired to make full unbroken lines with the present instrument, the sleeve 26 is rotated by means of its knurled head 28 until the projection 21 is at the bottom of the channel 22 and the nibs of the pen 14 project below the lower edge of the wheel 38. The instrument may then be used as a straight ruling pen without bringing the wheel 38 and the means for reciprocating the pen into action.

Provision is also made in connection with the present invention to mount the dotting instrument upon a beam compass for the purpose of making circles and arcs of dotted lines, dot and dash lines, and full lines. To convert the instrument to a compass, the handle 10 is removed from the shank 12 of the holder 13, and a beam 50 with a head 51 at one end, having a transverse bore, is then fitted upon the upper arm 15 by allowing the shank 12 to project upwardly through the bore. The handle 10 is then replaced upon the shank 12, as illustrated in Figure 7. The beam 50 comprises a straight length of round bar which projects through a collar 54 of a pointer 53, the latter being slidably mounted on the beam 50. A threaded stud 55 projects upwardly from the collar 54 and is integral therewith. A nut 56 screws over the threaded stud 55 which is provided with a bore 58 and which tightly embraces a stem 57, the latter abutting a fiber disc 60 which is seated upon a flat longitudinal surface 61 of beam 50. The stem 57 has an upwardly projecting stud 62 which supports a handle 63 turning freely upon the stud and being allowed to revolve freely by

means of a set screw connection 64. To adjust the longitudinal position of the pointer 53, with respect to the instrument, nut 56 is unscrewed to release the pressure on disc 60. Below the collar projects a tapered holder having a set screw 65 at its lower end to engage a pivot pin 66 mounted in the bore of the holder. It is important to note, in connection with the use of the beam compass, that the pen 14 is again suspended between two supports, namely, the wheel 38 and the pivot pin 66 of the pointer 53, thereby insuring just the proper elevation for the pen in operation with respect to its drawing surface.

The very positive action of the reciprocating mechanism used to raise and lower the pen 18 enables the draftsman to operate a pen of this character at considerably more speed than would be possible where less leverage is provided in the means used to transmit the rotary movement of the contact or traction wheel into a straight reciprocating motion for the pen. That is to say, the longer arm of the lever 34 at its extreme end picks up its rocking movement, as a tooth in the ratchet sections 41 or 42 engages and pushes the lever out of its path, and the arc described in this movement can be great enough to insure a complete throw of the arm before the next tooth is brought into action. However, it requires only a very short movement of the pen to lift it out of marking contact with the drawing surface and such a movement is effected against a heavy spring tension by the proximity of the contact point of the shorter arm and follower to the pivotal point of the lever.

Having now described my invention and the manner in which the same may be operated what I claim and desire to secure by Letters Patent is:

1. In a dotting pen or pencil, a holder having an offset depending portion provided with an extension, a traction wheel mounted to revolve at

the lower end of the extension in contact with the drawing surface, a ratchet wheel turning with said traction wheel, a pen movable longitudinally in said holder, a spring in said holder and under tension to project the pen towards the drawing surface, means for initially setting the position of the pen longitudinally with respect to the holder and traction wheel, and a bell crank lever pivotally mounted on said extension adjacent its upper end, the lever having a long arm disposed at its end in the path of movement of said ratchet, and a shorter arm associated with the pen to lift the latter against the spring and away from the drawing surface.

2. A dotting pen, as claimed in claim 1, including a slide arranged to operate longitudinally of the extension, a follower carried by the slide and supported on the shorter arm of the lever, and means connecting the slide to the pen.

3. A dotting pen, as claimed in claim 1, including a slide arranged to operate longitudinally of the extension, a follower carried by the slide and supported on the shorter arm of the lever, and said initially setting means comprising a sleeve adjustable longitudinally of the slide and attached to the pen.

4. A dotting pen, as claimed in claim 1, in which the traction wheel comprises a disc having a tapered serrated edge, a hub having a plurality of ratchet wheels turning with the traction wheel and a disc arranged between the ratchet wheels to hold the end of the lever arm in the path of one or the other of said ratchets.

5. A dotting pen, as claimed in claim 1, including a stop arranged on the extension in the path of movement of the long arm of the lever towards the ratchet, whereby only the teeth of the latter engage the arm to swing the latter and lift the pen.

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