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DRAFTSMAN'S DEVICE  
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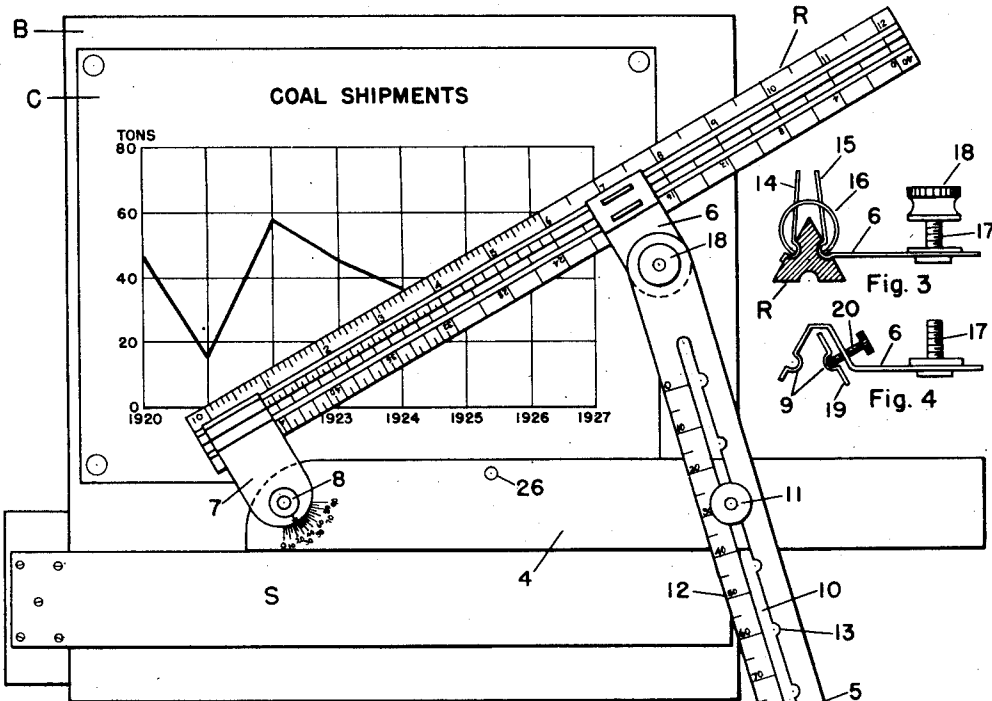


Fig. 1

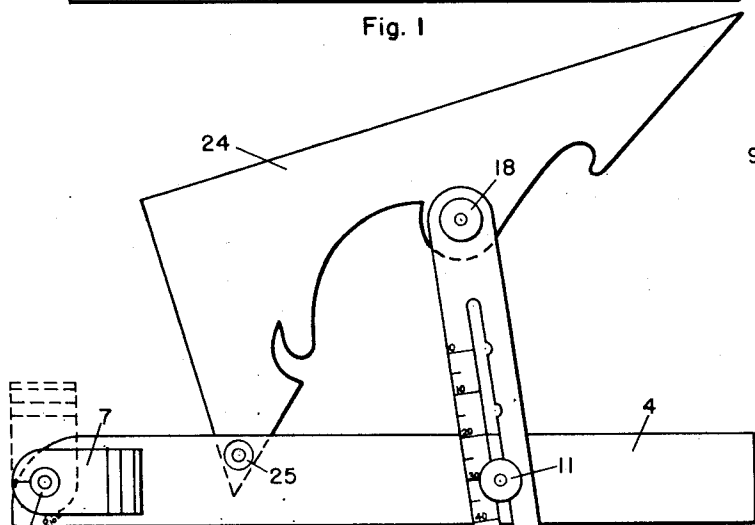


Fig. 2

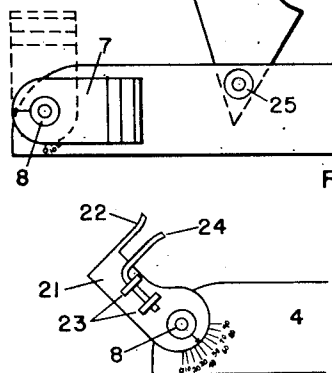


Fig. 6

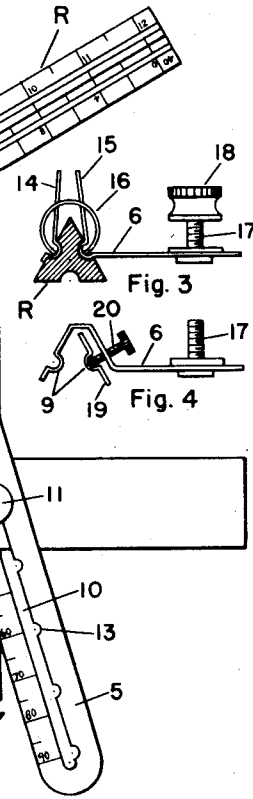


Fig. 3

Fig. 4

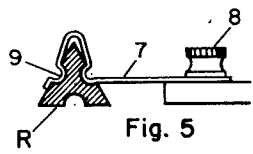


Fig. 5

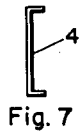


Fig. 7

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# UNITED STATES PATENT OFFICE

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## DRAFTSMAN'S DEVICE

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6 Claims. (Cl. 33—75)

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My invention relates to improvements in plotting devices for draftsmen in which is utilized a ruler provided with a plurality of graduated scales differing from each other and triangular in cross section. I preferably use a ruler of the type commonly known as an architect's, engineer's, or a chain scale. For convenience of reference such ruler will hereafter be referred to in this specification as an engineer's ruler.

Objects of my invention are to produce a universal plotting device which is especially useful in making charts; to produce an adjustable holder for an engineer's ruler or for a French curve one side and an end of which is formed as a right angle; to produce a drawing instrument embodying an engineer's ruler by means of which a user can quickly and accurately divide a given space into a plurality of equal spaces; and to produce a drafting device which is efficient, simple in construction, and cheap to manufacture.

The novel features which I believe are characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, as to both its organization and method of operation will best be understood by reference to the description which follows hereunder taken in conjunction with the drawing forming a part of my disclosure and in which:

Figure 1 is a plan view of one form of my invention illustrated in a position of use with respect to a T-square and a conventional drawing board on the latter of which is shown a line chart.

Figure 2 is a plan view of another form of my invention in which is utilized a French curve provided with a straight edge.

Figure 3 is a side elevation of a fastener or clamp for attaching an engineer's ruler to the adjustable arm forming a part of my holder.

Figure 4 is a modification of the device illustrated by Fig. 3.

Figure 5 is a side elevation of a structural detail illustrating a protractor clip mounted adjacent an end of the slide bar of my holder.

Figure 6 is a modification of the element illustrated by Fig. 5.

Figure 7 is an end view of the slide bar of my holder.

Similar numerals refer to similar parts throughout the several views.

Essentially, my invention consists of an engineer's ruler in combination with an adjustable holder for the same as well as of a novel holder on which such a ruler or a novel type of French curve may be mounted. In Fig. 1 my device is

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shown as lying on a drawing board B of the usual construction and in slidable engagement with a T-square S in position of use for drawing a graph on the line chart C.

As hereinbefore stated, the ruler may be of a conventional type. My holder however, consists of a slide bar 4 which may be of any suitable material and cross sectional shape, although in the embodiment illustrated I have selected a channel bar to minimize weight. Intermediate the ends of the bar and shiftably mounted thereon is an adjustable arm 5 upon one end of which is pivoted a fastener or clamp 6. Likewise, a protractor clip 7 is pivoted to one end of the bar 4. These two devices 6 and 7 detachably engage an engineer's ruler R.

From Figs. 1 and 5, it will be observed that one end of the clip is semi-circular in shape, is provided with an arrow, and is pivoted to the slide bar and may be clamped thereto by means of a knurled nut 8. In order to enable the device to be used as a protractor, the slide bar is provided with a protractor scale adjacent to such arrow, graduated from 0 to 90 degrees.

The clip is fabricated of a flat piece of spring metal and is shaped at one end to form an open triangle in cross section to conform to the cross sectional shape of an engineer's ruler, and inwardly projecting runners 9 are formed integral with the legs of such triangle to snugly engage the grooves or concavities ordinarily formed in such ruler.

The arm 5 is shiftably mounted on the slide bar in any suitable manner, a convenient way being to provide the arm with a longitudinal slot 10 and affix the same to the bar by means of a clamping screw 11 extending through the slot.

In order to indicate the angle to which the curve is adjusted with respect to the slide bar, the arm 5 is provided with a longitudinally extending degree scale 12 graduated from 0 to 90 degrees and with corresponding indexing notches 13 spaced 15 degrees apart, starting with 0 degree, the slot extending between the scale and notches. Inasmuch as the most common angles used in drafting are 15, 30, 60 and 90 degrees, it will be obvious that speed in using my instrument may be attained by employing the notches in adjusting the angle of the curve.

The fastener or clamp 6 is mounted on the uppermost end of the arm and, except for the manner of mounting, it may be of any variety so long as it is quickly detachable. In the form shown it consists of two jaws 14 and 15 biased toward each other by means of a cylindrical

spring 16 through which the jaws extend. One of the jaws 14 is movable and carried by the spring and the other fixed, the fixed jaw being provided with a right angular extension upon which is mounted a screw threaded stud 17 extending through a hole in the end of the arm, whereby the clamp may be swung through a wide arc with respect to the arm and locked thereto by means of a knurled nut 18.

Instead of using a clamp, the device illustrated by Fig. 4 may be employed. This device is fabricated of a single piece of sheet metal, one end of which is shaped to form an open trapezoid conforming to the cross section of the ruler R and the other end of which is adapted to be mounted on the arm by the same means as the clamp. A bodily shiftable plate 19 is mounted between the legs of the trapezoid by means of a screw 20 to which the plate is swiveled and which has screw threaded engagement with one leg of the trapezoid. The shiftable plate and the cooperating leg of the triangle are also provided with parallel runners 9 adapted to snugly and slidably engage the grooves or concavities of the ruler.

Similarly, instead of using a protractor clip, it is within the spirit of my invention to employ an equivalent element such as is illustrated by Fig. 6. This device is designed to be pivoted on the bar in the same manner as the clip and consists of a flat piece of metal 21 having a cut out portion to provide a finger 22. Lugs 23 are formed on the element and extend at right angles thereto intermediate the ends thereof. Fixedly mounted in the lugs is a spring finger 24 oppositely disposed to the finger 22 and spaced therefrom sufficiently to enable both fingers to engage the grooves or concavities of the ruler.

In Fig. 2 I have illustrated my holder in connection with a combined straight edge and French curve 24 one end of which is pivotally and detachably connected to the slide bar by means of a quickly detachable locking device 25 extending through a suitable hole 26 intermediate the ends of the bar. The longer arm of the device is attached intermediate its ends to the end of the arm 5 by means of a stud and nut device 18 similar to the one heretofore described.

My combined holder and ruler is especially useful in making drawings charts of all kinds, and one of its novel features is the speed and accuracy with which either of the six scales on an engineer's ruler may be used to locate points on a chart by merely sliding my device along a T-square or other straight edge without any other manipulation.

If the main zero point on the ruler is placed anywhere along and over the chart abscissa and the ruler held in that position but slanted so that any other main division point on it is over any horizontal chart line, then dots placed on the chart directly opposite the subdivisions and main points on the ruler will constitute coordinates. Vertical and horizontal lines drawn through such coordinates parallel to the chart ordinate and abscissa, respectively, will be equally spaced apart vertically and horizontally, and the number of spaces will depend upon the number of subdivision points on the scale. If smaller spaces are desired, it is necessary to use a ruler provided with a scale having smaller subdivisions. It is just at this point that the flexibility and versatility of my device is demonstrable.

Instead of being limited to the use of a ruler having only a single scale and, consequently, a fixed number of subdivisions between its main

division points, I use a ruler having six scales each provided with a different number of subdivisions. For example, an engineer's ruler between its zero point and its first main division, is provided with six different scales divided into 10, 20, 30, 40, 50, and 60 subdivisions, respectively. Consequently, for all practical purposes any number of subdivisions can be accurately plotted on a chart by selecting an appropriate scale. Of course, this can be done by manually manipulating the ruler, but without the speed of operation and accuracy of results attained when such a ruler is used in conjunction with my holder.

One use of my invention is illustrated by Fig. 1. It is assumed that the number of tons of coal shipped from a particular mine during the years 1920 to 1924, inclusive, were 46 tons in 1920; 16 tons in 1921; 58 tons in 1922; and 36 tons in 1924, or any multiple thereof. An appropriate chart C having grid lines is selected in which the curve shown is plotted with tons as the ordinate against years as the abscissa. The 10 scale on an engineer's ruler should preferably be used because its subdivisions will exactly indicate the numbers of tons involved. The ruler is then mounted in the holder and the latter placed on a drawing board against a T-square with the 0 point of the ruler over the abscissa and any main division point of the ruler over any horizontal line on the chart. It will be seen that by merely sliding the subdivision point indicating 16 on the ruler is directly over the 1921 grid line, a dot placed on the chart at that point will represent 16 tons of coal shipped during that year. The other data is indicated in the same way, and the dots on the chart are then connected by a line to complete the graph. Suppose, however, that the scale of the chart is 0 to 360 tons and 140 tons were shipped during the year 1923. In that case the 10 scale on the ruler could not be used because its main divisions are not divided into the appropriate number of subdivisions. Consequently, the ruler would be mounted in the holder so that the 60 scale would face the draftsman and then the point indicated on the chart as above described.

It will be observed that although the use of the arm 5 is desirable to provide rigidity, nevertheless my holder is capable of practical use without utilizing it, not only for drawing line charts and other drawings but also as a protractor, by merely clamping the ruler in position by screwing down the nut 8 to lock the protractor scale 7 to the slide bar 4.

I am aware of the fact that plotting devices employing holders for flat rulers and designed to be slid along a straight edge have heretofore been proposed, but such devices required the holder to be equipped with special devices for mounting the same on a straight edge or for adjusting them on a straight edge, or required the holder, board and straight edge to be formed as a more or less unitary structure; and not any of them attained the versatility made possible by employing a ruler provided with a plurality of different scales. Accordingly, I claim as new and desire to secure by Letters Patent:

1. In an instrument of the kind described, the combination with a holder of an engineer's ruler triangular in cross section and provided with grooves along the sides thereof, the said holder comprising a slide bar, a protractor clip pivoted to the end of said bar and provided with runners engaged in grooves of said ruler, an adjustable

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arm having a longitudinal slot therein and a clamp pivoted on an end thereof, the said clamp being provided with runners engaging grooves in said ruler, a locking device carried by said arm for locking said clamp to said arm, and an additional locking device carried by said bar for locking the arm to the bar in various positions of adjustment.

2. In an instrument of the kind described, the combination with a holder of a ruler triangular in cross section and provided with a plurality of scales, the said holder comprising a slide bar, a protractor clip pivoted to the end of said bar and provided with means for detachably engaging said ruler, an adjustable arm having a longitudinal slot therein and a clamp pivoted on an end thereof, the said clamp being provided with means for engaging said ruler, a locking device carried by said arm for locking said clamp to said arm, and an additional locking device carried by said bar for locking the arm to the bar in various positions of adjustment.

3. A holder adapted for use with an engineer's ruler triangular in cross section and provided with grooves along the sides thereof comprising a slide bar and a protractor clip pivoted to an end of said bar, said clip having runners adapted to engage the grooves in said ruler.

4. A holder according to claim 3 including a locking device associated with said bar and said clip for locking the clip in any position of angular adjustment with respect to said bar.

5. A holder adapted for use with an engineer's ruler triangular in cross section and provided with grooves along the sides thereof comprising a slide bar, an adjustable arm having a longitudinal slot therein and a clamp pivoted on an end thereof, the said clamp being provided with runners engaging the grooves in said ruler, a locking device carried by said arm for locking

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said clamp to said arm, and an additional locking device carried by said bar for locking the arm to the bar in various positions of adjustment.

6. A holder adapted for use with an engineer's ruler triangular in cross section and provided with grooves along the sides thereof, comprising a slide bar, an adjustable arm having a longitudinal slot therein and a clamp pivoted on an end thereof, the said clamp being provided with runners adapted to engage the grooves in said ruler, and a locking device carried by said bar for locking the arm to the bar in various positions of adjustment.

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