

(No Model.)

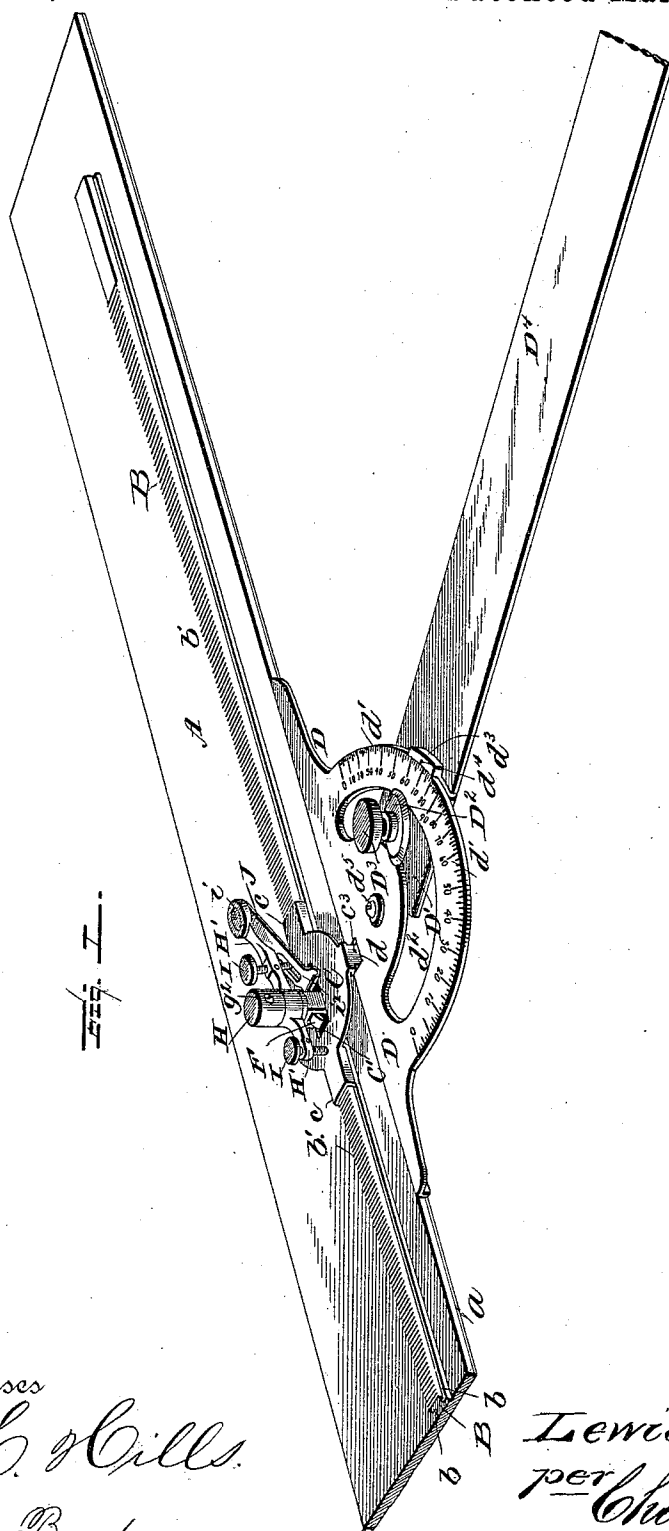
2 Sheets—Sheet 1.

L. MILLER.

COMBINED SECTION LINER AND PROTRACTOR.

No. 471,428.

Patented Mar. 22, 1892.



Witnesses
L. C. Hills
E. H. Bond

Inventor
Lewis Miller.
per Cha. H. Fowler,
Attorney

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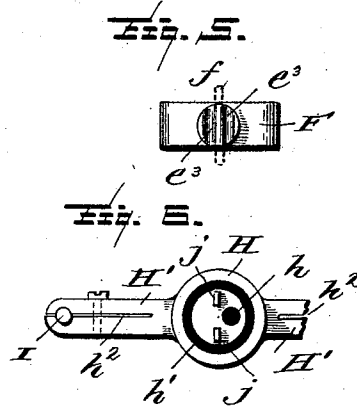
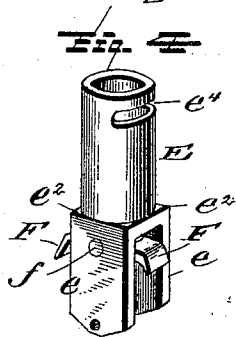
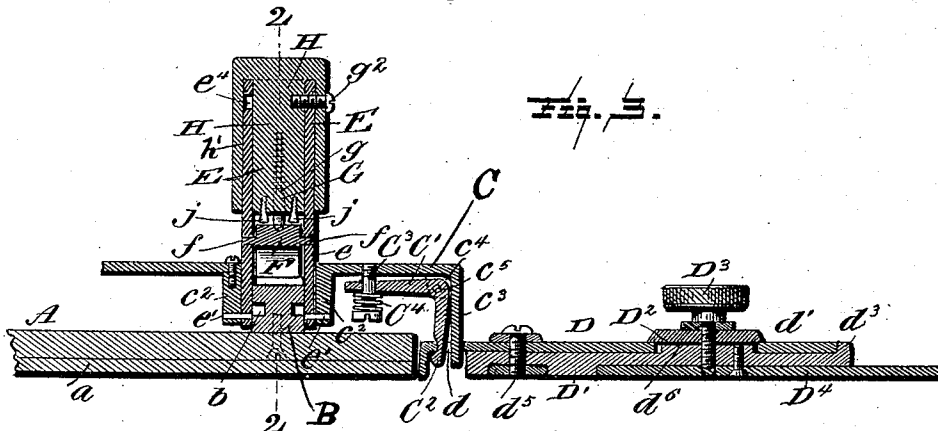
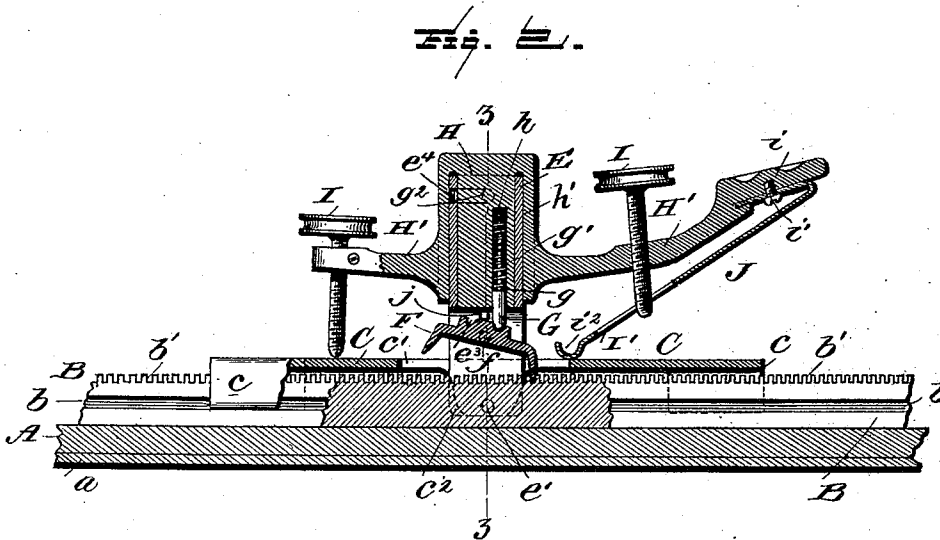
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UNITED STATES PATENT OFFICE.

LEWIS MILLER, OF OIL CITY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
FRANK H. TAYLOR AND GEORGE H. TORREY, OF SAME PLACE.

COMBINED SECTION-LINER AND PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 471,428, dated March 22, 1892.

Application filed November 11, 1891. Serial No. 411,605. (No model.)

To all whom it may concern:

Be it known that I, LEWIS MILLER, a citizen of the United States, residing at Oil City, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Combined Section-Liners and Protractors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

This invention relates to certain new and useful improvements in appliances designed for use by draftsmen and architects, being a combined section-liner and protractor, the two being designed for use conjointly or separately, as may be most desirable.

The invention has for its objects, among others, to provide an improved appliance of this nature which shall be reliable and accurate in its movements, simple as regards adjustments and change of movements, as well as reliable and durable. The protractor is readily detachable from the section-liner blade, thereby furnishing in reality two distinct devices very necessary in making and completing drawings. I provide means for regulating the length of stroke and also for permitting movement in either direction. I also provide for the movement of the device along the graduated bar without engagement of the pawl. The operating-lever is of novel construction and arrangement. It has its fulcrum or pivotal point below the surface of the plate. The spring which throws it back to its normal position is free at one end, so as to roll instead of sliding, thus making the movable action more accurate.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a perspective view of the device complete with the main bar and the protractor-arm broken off. Fig. 2 is a vertical

longitudinal section on the line 2 2 of Fig. 3. Fig. 3 is a vertical cross-section on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of the cylinder or upright center part of the operating-lever detached, with the pawl shown in position therein. Fig. 5 is a top plan of the pawl removed. Fig. 6 is a bottom plan of the cylinder-cap removed.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates a bar, which may be of any suitable material—wood or iron, or a combination of both, if desired—and of any suitable length and width. It may or may not be provided upon its under face with a layer of felt *a*. Upon its upper face is a longitudinal bar B, which may be affixed thereto in any suitable manner and extends substantially the entire length thereof parallel with the edge and at the required distance therefrom, as seen in Fig. 1. This bar is provided with guide-grooves *b* upon its edges, as shown, and upon its upper face it is provided with a plurality of transverse notches or teeth *b'*, as seen, said notches or teeth being arranged very close together, provision being made for the pawl catching in every notch or every two or more, as occasion may require, as will be explained hereinafter.

C is a plate having diametrically-opposite portions *c*, which are in the form of sleeves designed to loosely embrace the bar B, as seen in Figs. 1 and 2, and serve as guides for the plate in its movements over the said bar. This plate is also provided with a substantially central elongated opening *c'*, which extends in line with the guide loops or portions *c*, as seen in Figs. 1 and 2, and centrally upon opposite sides of this opening the plate is provided with depending lugs or ears *c''*, as seen best in Fig. 3, for a purpose which will soon be made apparent. Centrally upon its front edge is provided the depending lug or lip *c'''*, which is of such length as to extend below the upper face of the bar B, as well as the upper face of the bar A, as seen best in Fig. 3. At the angle it is provided with small lugs or ears *c''''*, as seen best in Fig. 3, and between these ears or lugs is pivoted on a horizontal transverse

pivot or pivots c^5 the angle-lever C' , the rear or inner face of the vertical arm of which is preferably notched, as seen at C^2 , and the horizontal arm of which has a hole for the reception of the screw C^3 , which passes therethrough and is secured in the under side of the plate C , as seen in Fig. 3, a spring C^4 being arranged around the said screw between the head of the same and the under side of the horizontal arm of the angle-lever, so as to normally throw the lower end of the vertical portion inward, as seen in Fig. 3, to hold the protractor in position.

Any form of protractor may be employed in connection with the section-liner. I have shown what I consider the preferable form. It is constructed as follows: D is a plate having one edge designed to rest square against the edge of the bar A , as seen in Figs. 1 and 3, such edge being turned over at right angles, as seen in said views, and at its mid-length it is provided with an opening d for the reception of the depending portion c^3 of the plate C and the vertical arm of the lever C' , as seen in Fig. 3, the parts being connected together by placing the plate D with its edge against the edge of the bar A and then forcing the said vertical parts into the hole or opening d , and when they have entered therein the spring C^4 serves to hold them firmly in that position, as will be readily understood from Fig. 3.

The protractor may be readily detached when necessary. It may be used separately or in conjunction with the section-liner, as may be desired. The outer portion of the plate D is in the form of a semicircle, as seen in Fig. 1, and this semicircular portion d' is divided and subdivided into degrees, as shown in Fig. 1. The said plate D is also provided with a curved slot d^2 , in which works the thumb-screw, as seen in Figs. 1 and 3.

D' is a plate beneath the plate D and having at its forward end a centrally-arranged upturned portion d^3 , as seen in Figs. 1 and 3, arranged on the arc of a circle to closely fit the semicircular outer edge of the plate D , as seen in said Figs. 1 and 3. This portion d^3 is provided with an indicating-mark d^4 , as seen in Fig. 1. The plate D' is pivoted to the plate D by a pivot-pin d^5 , as seen in Figs. 1 and 3, and has a raised portion d^6 , (see the same figures,) which works in the curved slot of the plate D , and into this raised portion and into the protractor-arm D^4 , which is secured to the underside of the plate D' in a depression therein, as seen in Fig. 3, is screwed the threaded shank of the thumb-screw D^3 , (see Fig. 3,) a cap-piece D^2 being provided to keep the plate D perfectly true and horizontal.

It will be readily understood how by loosening the thumb-screw the protractor-arm can be turned round on its pivot to the desired angle and then securely fastened in such position by tightening the said thumb-screw.

It is deemed important that, instead of having a single point or mark for setting the arm or blade to the degree-points, the larger surface d^3 is employed outside and up to the level with the protractor-plate and thereon graduated the vernier, so as to enable me to read closer than simply by degrees. As before stated, this is my preferred form of protractor; but it will be readily understood that any other desired form may be employed in connection with my improved section-liner.

Between the ears or lugs c^2 of the plate C is pivoted the cylinder E , which is provided with the parallel lugs or ears e , which fit between the said ears or lugs c^2 sufficiently loose to permit of easy movement, the pivots e' being held in the ears, as seen in Fig. 3, the cylinder being provided upon its outer face above the ears with a shoulder or shoulders e^2 , as seen in Fig. 4. These ears or lugs e are arranged within the hole or opening c' of the plate C and are adapted to move therein.

F is a pawl pivoted between the ears e of the cylinder on a transverse pivot f , held in said ears, the said pawl having its ends turned in opposite directions and slightly inclined, as seen best in Fig. 4, and upon its upper face it is provided with the transverse grooves or depressions e^3 , for a purpose which will hereinafter be explained. The cylinder E near its upper end is provided with a horizontal slot e^4 , the object of which will soon appear.

G is a vertical pin having its lower end rounded, as seen best in Figs. 2 and 3, and designed to rest in one or the other of the grooves or depressions e^3 , as seen in said Fig. 2. It is provided with a shoulder g , against which impinges the spring g' , as seen in Fig. 2, which spring surrounds the pin or bolt. This pin or bolt and spring work in a vertical passage h in the cap-piece H , which has an annular interior recess h' for the reception of the upper end of the cylinder, as seen in Figs. 2, 3, and 6, the cap-piece being inserted over the cylinder and the two secured together by a screw g^2 , passed through the cap and through the slot e^4 of the upper end of the cylinder, as seen in Figs. 2 and 3. The cap-piece has extending therefrom in opposite directions the arms H' , which are slitted, as seen at h^2 , (see Fig. 6,) to provide elasticity, and in each of these arms is adjustably held a thumb-screw I , said screws being arranged at equal distances from the center of the cylinder or cap-piece. One of these arms is longer than the other, as seen in Figs. 1 and 2, and the longer of the two has its extremity formed into a milled nut or other provision i , as shown in Figs. 1 and 2, and upon the under side thereof is secured in any suitable manner—as, for instance, by a screw i' —one end of a flat spring J , which extends in an inclined direction and has its lower end curved upward, as seen at i^2 in Figs. 1 and 2, the spring being longitudinally slotted, as shown in Figs. 1 and 2 at I' , for the working of the screw on that arm.

The lower end of the core or central part of the cap-piece is provided with the depending projections or pins *j*, as seen in Figs. 3 and 6.

With the parts thus constructed the operation is as follows: The parts being assembled, as shown, pressure upon the end *i* of the long arm *H'* will depress that end and cause the pin or bolt *G* to depress that end of the pawl, as seen most clearly in Fig. 2, and move the plate *C* and all its attached parts along on the toothed bar *B*. The length of the stroke can be regulated by the set or thumb screws *L*. To reverse the stroke, and consequently the direction of movement of the plate *C* and its parts, swing the thumb or finger rest *i* around to the opposite side, moving it in the direction toward the protractor-plate. This will cause the bolt *G* to engage the other groove or depression *e*³ in the upper face of the pawl and depress that end and cause the plate *C* to move in the opposite direction, the construction being such that the bolt *G* cannot leave the upper face of the pawl *F* when reversing. By swinging the thumb-rest round at right angles to the bar *B* the pins *j* bear upon the upper face of the pawl upon opposite sides of its pivot, and thus keep both ends from engagement with the teeth of the bar *B*, when the plate *C* and its parts may be moved by hand along the bar *B* in either direction.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. In a section-liner, a double pawl and a rack-bar, combined with means for keeping both ends thereof elevated and a revoluble cap-piece carrying means engaging said pawl, as set forth.

2. The combination, in a section-liner, with the rack-bar, of a pivoted double reversible pawl, a spring-actuated pin for actuating it in both of its operative positions, and a revoluble cap-piece, as set forth.

3. The combination, in a section-liner, with a rack-bar, of a pivoted double reversible pawl having transverse depressions upon its upper face, a spring-actuated vertically-slidable pin designed to engage either of said depressions, and a revoluble cap-piece slidably supported over the rack-bar, as and for the purpose specified.

4. The combination, in a section-liner, with the double pawl and rack-bar, of the cap-piece and its pins for engaging the same upon

opposite sides of its pivot to hold the ends of the pawl off the rack-bar, as and for the purpose specified.

5. The combination, in a section-liner, with the pivoted double pawl provided upon its upper face with transverse depressions, of the spring-actuated vertical pin at right angles thereto and the cap-piece and its pins for acting on the pawl upon opposite sides of its pivot, as set forth.

6. The combination, in a section-liner, with the cylinder and its pivoted double pawl, of the cap-piece and its pins and means for reversing the cap-piece, as set forth.

7. The combination, in a section-liner, with the pivoted cylinder having curved horizontal slot, of the cap-piece, the double pivoted pawl, the bolt, the thumb-rest, and the means securing the cap-piece and cylinder and working in said slot, as set forth.

8. The combination, in a section-liner, with the rack-bar, the pivoted double pawl, and the means for operating the same, slidably supported on the rack-bar, of the spring attached to a part of said operating means, as and for the purpose specified.

9. The combination, in a section-liner, with the rack-bar, the pivoted double pawl, the bolt, the cylinder, and cap-piece, of the spring attached to one of the arms of the cap-piece and the adjusting thumb-screws carried by the arms of said cap-piece, as and for the purpose specified.

10. The combination, with the rack-bar and the pivoted double reversible pawl and its operating means slidably supported on the rack-bar, of a rolling spring carried by a part of said operating means, as set forth.

11. The combination, with a section-liner having plate provided with depending portion and spring-retainer, of a protractor held to the section-liner by said depending portion and retainer, as set forth.

12. The combination, with a section-liner having depending portion and spring-actuated pivoted retainer having adjustable spring, of means engaging one end of a protractor detachably held to the section-liner thereby, as set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LEWIS MILLER.

Witnesses:

J. H. PAYNE,
P. M. SPEER.