G. H. E. DAVIS.

DRAWING APPARATUS.

APPLICATION FILED JAN. 19, 1920.

1,374,363. Patented Apr. 12, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

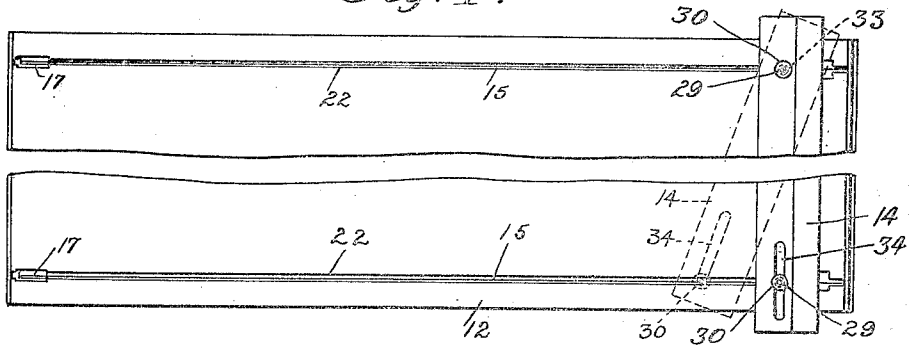


Fig. 2

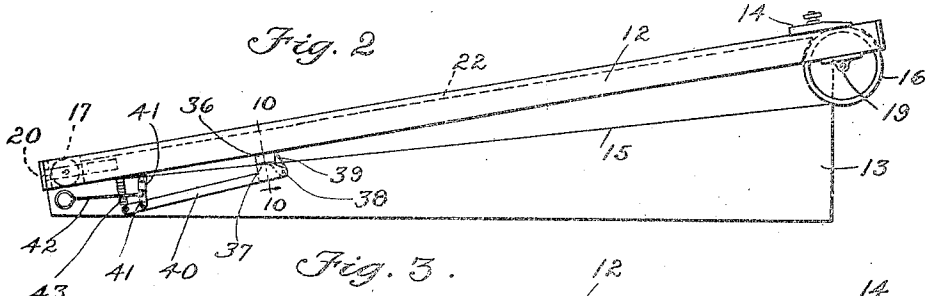


Fig. 3.

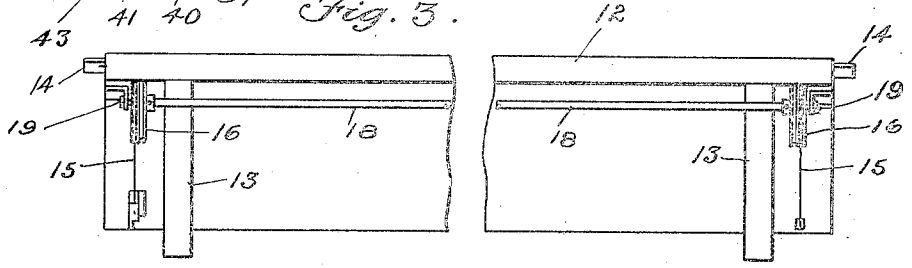
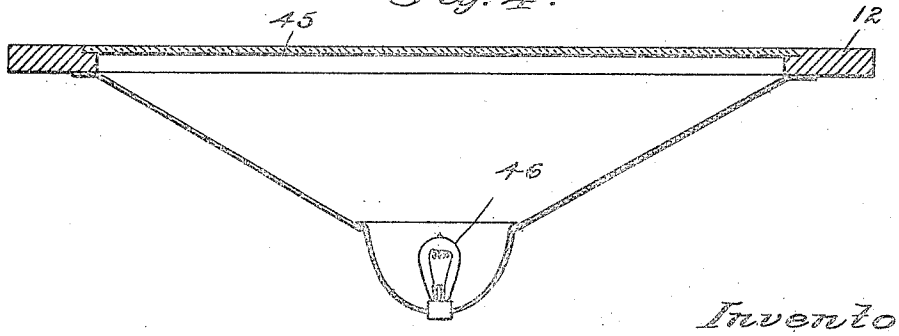


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

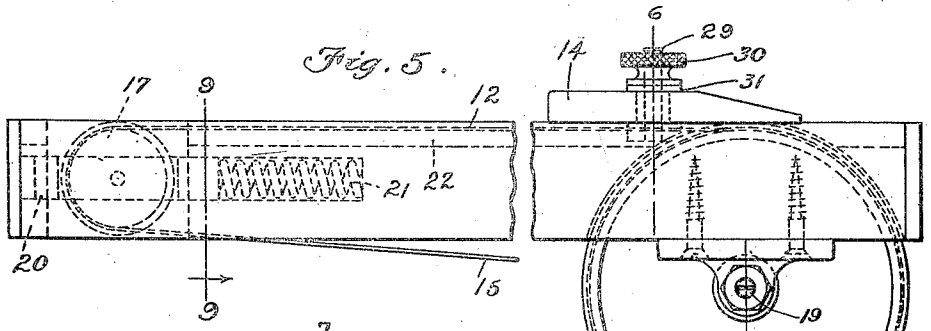


Fig. 6.

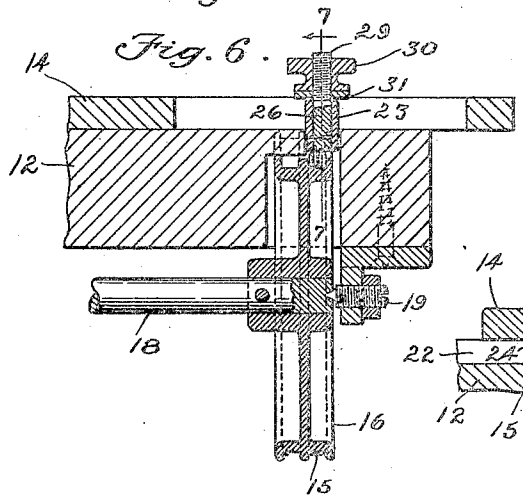


Fig. 7.

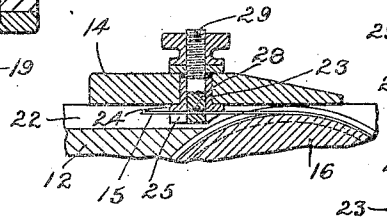


Fig. 8.

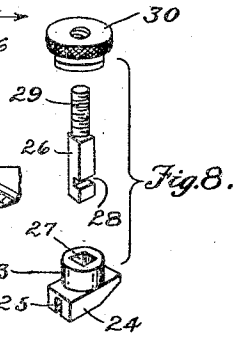


Fig. 9.

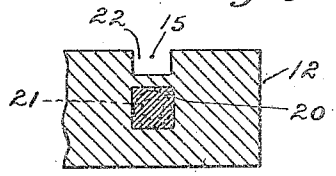


Fig. 10.

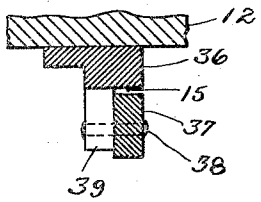
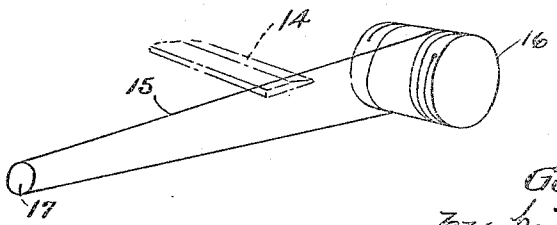


Fig. 11.



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UNITED STATES PATENT OFFICE.

GEORGE H. E. DAVIS, OF LYNN, MASSACHUSETTS.

DRAWING APPARATUS.

1,374,363. Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed January 19, 1920. Serial No. 352,458.

To all whom it may concern:

Be it known that I, GEORGE H. E. DAVIS, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Drawing Apparatus, of which the following is a specification.

This invention relates to apparatus used by draftsmen and comprises a drawing-board and a ruler movable on the top surface of the board to guide a ruling pen applied to paper supported by the board.

One object of the invention is to provide improved means for maintaining the ruler in a predetermined angular position on the board and permit free movement of the ruler over the board when the draftsman desires to form parallel lines.

Another object of the invention is to provide improved means for locking the ruler against movement on the board when the ruler is in any desired position.

To these and other related ends the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is a top plan view of a drawing apparatus embodying the invention, portions being broken away.

Fig. 2 is an elevation looking toward one of the edges of the apparatus.

Fig. 3 is an elevation looking toward the outer end of the apparatus.

Fig. 4 is a sectional view of the board, illustrating means for illuminating drawing paper superimposed thereon.

Fig. 5 is an enlargement of portions of Fig. 2, the locking means shown by Fig. 2 being omitted.

Fig. 6 is a section on line 6—6 of Fig. 2.

Fig. 7 is a section on line 7—7 of Fig. 6.

Fig. 8 shows in perspective the members of the clamp hereinafter described.

Fig. 9 is a fragmentary section on line 9—9 of Fig. 5.

Fig. 10 is a fragmentary section on line 10—10 of Fig. 2.

Fig. 11 is a diagrammatic perspective view, showing a portion of the ruler, one of the ruler-controlling strips hereinafter described, and supporting means for said strip.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 12 represents a drawing-board which may be supported in an inclined position on a horizontal table, by suitable supports 13. I hereinafter refer to the higher end of the board as the outer end, and the opposite end as the inner end, the edge faces of the board between the outer and inner ends being referred to as the edges.

14 represents a ruler which is movable on the top surface of the board.

Mechanism is provided for maintaining the ruler in a predetermined angular position on the board. Said mechanism includes a pair of elongated flexible rule-carrying strips 15, which are preferably composed of lengths of fine steel wire.

The end portions of each strip 15 are wrapped helically several times on, and positively secured to a main pulley 16, diagrammatically shown by Fig. 11. The intermediate portion of each band is maintained by a tension pulley 17, in the form of an elongated bight or loop having upper and lower stretches extending between the main pulley and the tension pulley.

The main pulleys 16 are preferably fixed to a transverse shaft 18 journaled on fixed pivots 19 at the outer end portion of the board. The tension pulleys 17 are preferably journaled in slides 20, which are normally held by springs 21, as indicated by Fig. 5, in position to exert tension on the stretches of the strip extending between the pulleys 16 and 17, the pulleys 17 being at the inner end portion of the board. The arrangement is such that the upper stretches of the strips 15 extend parallel with, and in close proximity to the opposite edges of the board, the upper side of the board being provided with longitudinal grooves or slots 22, through which said upper stretches extend, so that said stretches are somewhat below the top surface of the board, as indicated by Fig. 9. The lower stretches of the strip extend along or below the lower side of the board, as best shown by Fig. 2.

The ruler is provided with clamps engaging the upper stretches of the strips 15. Each clamp is preferably composed of the three members shown in perspective by Fig. 8. One of the clamp members is composed of a hub 23, occupying an opening in the ruler 14, and a head 24 formed on said hub and seated on the under side of the ruler, said head having a strip-receiving groove 25. Another member of the clamp is a stem

26, sildable in an opening 27, extending through the hub and head, and having a strip-receiving groove 28, and a threaded portion 29 projecting above the ruler. The third member of the clamp is a clamping-nut 30, engaged with the threaded portion 29, and seated on the upper side of the ruler, or as shown by Figs. 5, 6, and 7, on a washer 31 interposed between the nut and the ruler. The upper stretches of the strips 15 extend through the grooves 25 and 28 of the clamp members, the arrangement being such that when the nut 30 is turned in one direction the clamp is positively engaged with said upper stretch, so that the ruler may be locked to the two bands. When the ruler is thus locked, the ruler and strips may be moved in unison, the ruler being maintained in a predetermined angular position.

To enable the guiding edge of the ruler to extend either parallel with the ends of the board, or obliquely with relation thereto, I prefer the ruler with a circular opening 33, closely fitting and adapted to turn on the hub portion 23 of one of the clamps, said hub portion being cylindrical. I also provide the ruler with another opening 34 formed as an elongated slot, which receives the hub portion 23 of the other clamp. The length of the slot 34 is sufficient to enable the ruler to be swung to the dotted line position shown by Fig. 1.

It will now be seen that the ruler may be used to guide a ruling pen in making parallel lines at right angles with the opposite ends of the board, and with the ends of a sheet superimposed thereon, or lines which are oblique to said ends, the ruler being freely movable with the strips from end to end of the board.

The strips 15, the main pulleys 16, the shaft 18 to which said pulleys are fixed, the tension pulleys 17 and the clamps on the ruler, constitute a positive controlling mechanism, adapted to positively maintain a predetermined angularity of the ruler with relation to the edges of the board, and to permit movement of the ruler on the board without variation of its angularity. The positiveness of said controlling mechanism is due, first, to the fact that the end portions of the strips 15 are wrapped on, and positively secured to the main pulleys, and, secondly, to the fact that the main pulleys are fixed to the shaft 18, and necessarily rotate in unison. It will be seen, therefore, that neither strip can slip on the main pulley, to which it is secured, and that said strips must move in exact unison, so that if force were applied to either strip to move its stretches endwise, the other strip would necessarily be moved to exactly the same extent and in the same direction.

I provide means for locking the strips to prevent endwise movement of the stretches thereof, and confine the ruler against movement on the board. I preferably embody the strip-locking means in an inner jaw 36, fixed to the board and bearing on the lower stretch of one of the strips 15, and an outer jaw 37 pivoted at 38 to a suitably fixed support on the board, such as an ear 39 formed on the inner jaw 36. The outer jaw is movable toward and from the fixed jaw to clamp and release the interposed band 15, these movements of the outer jaw being preferably effected by means of a lever 40 fixed to the outer jaw, a pair of toggle links 41, one pivoted to the lever 40, and the other to the board, and a wire rod or handle 42 pivoted to the meeting ends of the links 41, and a spring 43 secured at one end to the board, and at the opposite end to the lever 40. When the toggle formed by the links 41 is active or straightened, it holds the jaw 37 separated from the jaw 36, as shown by Fig. 10, so that the strip stretch between the jaws is free to move endwise, the spring 43 being extended. When the toggle is broken by an endwise movement of the handle 42, the spring 43 contracts and causes the jaw 37 to clamp the stretch against the jaw 36, and thus lock the strip against endwise movement.

As shown by Fig. 4, the board 12 may be composed in part of a glass panel 45, and may be provided with an electric lamp 46 located under said panel.

The object of the strip-locking means is to prevent the ruler from sliding downward on the board by its own weight, when the board is tipped so that its outer end is much higher than its inner end.

I claim:

1. In a drawing apparatus, in combination, a drawing-board, a ruler movable on the top surface of the board, a pair of main pulleys, a shaft to which said pulleys are fixed, said shaft being supported by fixed bearings at one end portion of the board, a pair of tension pulleys supported by movable bearings at the opposite end portion of the board, elongated inextensible flexible strips, having end portions coiled on, and positively secured to said main pulleys, and intermediate portions maintained by the tension pulleys in the form of loops or bights, having upper and lower stretches, the upper stretches extending along the upper side of the board, and clamps carried by the end portions of the ruler and engaging the said upper stretches, said strips, main pulleys, shaft, tension pulleys and clamps constituting a controlling mechanism, adapted to positively maintain a predetermined angularity of the ruler relatively to the board, and to permit movement of the ruler on the board without variation of its angularity.

2. A drawing apparatus embodying the combination specified by claim 1, and including also locking means engaging the

lower stretch of one of said strips, to lock said controlling mechanism, and thereby prevent movement of the ruler on the board.

3. A drawing apparatus embodying the combination specified by claim 1, and including also locking means engaging the lower stretch of one of said strips, to lock said controlling mechanism, and thereby prevent movement of the ruler on the board, said locking means being embodied in an inner jaw fixed to the board and bearing on the lower stretch of one of the strips, and an outer jaw movable toward and from the fixed jaw, and provided with a lever and a spring, whereby it is normally held in position to lock said strip, and with a toggle whereby it may be displaced to release the strip.

4. A drawing apparatus embodying the combination specified by claim 1, the said clamps being provided with cylindrical hub portions, and the ruler being provided with a socket adapted to turn on the hub portion of one clamp, and with a slot receiving the hub portion of the other clamp, so that the angularity of the ruler may be varied, means being provided for securing the ruler to the clamps in any angular position to which it may be adjusted.

5. A drawing apparatus embodying the combination specified by claim 1, each of the said clamps being composed of a hub occupying an opening in the ruler, a head formed on the hub, seated on the under side of the ruler and having a strip receiving groove, a stem slidable in said hub and head and having a strip-receiving groove and a threaded portion projecting above the ruler, and a clamping-nut engaged with said threaded portion and seated on the upper side of the ruler.

6. A drawing apparatus embodying the combination specified by claim 1, each of said clamps being composed of a hub occupying an opening in the ruler, a head formed on the hub, seated on the under side of the ruler and having a strip receiving groove, a stem slidable in said hub and head and having a strip-receiving groove and a threaded portion projecting above the ruler, and a clamping-nut engaged with said threaded portion and seated on the upper side of the ruler, said hub being externally cylindrical and adapted to turn in the ruler, so that the angular position of the ruler may be varied, one of the ruler openings being a socket, receiving and adapted to turn on the hub of one of said clamps, and the other ruler opening being an elongated slot receiving the hub of the other clamp, and permitting variations of the angular position of the ruler.

In testimony whereof I have affixed my signature.

GEORGE H. E. DAVIS.