Dec. 14, 1937. L. H. KLITSCHE 2,102,008

PARALLEL STRAIGHTEDGE

Filed March 30, 1936

FIG. 1

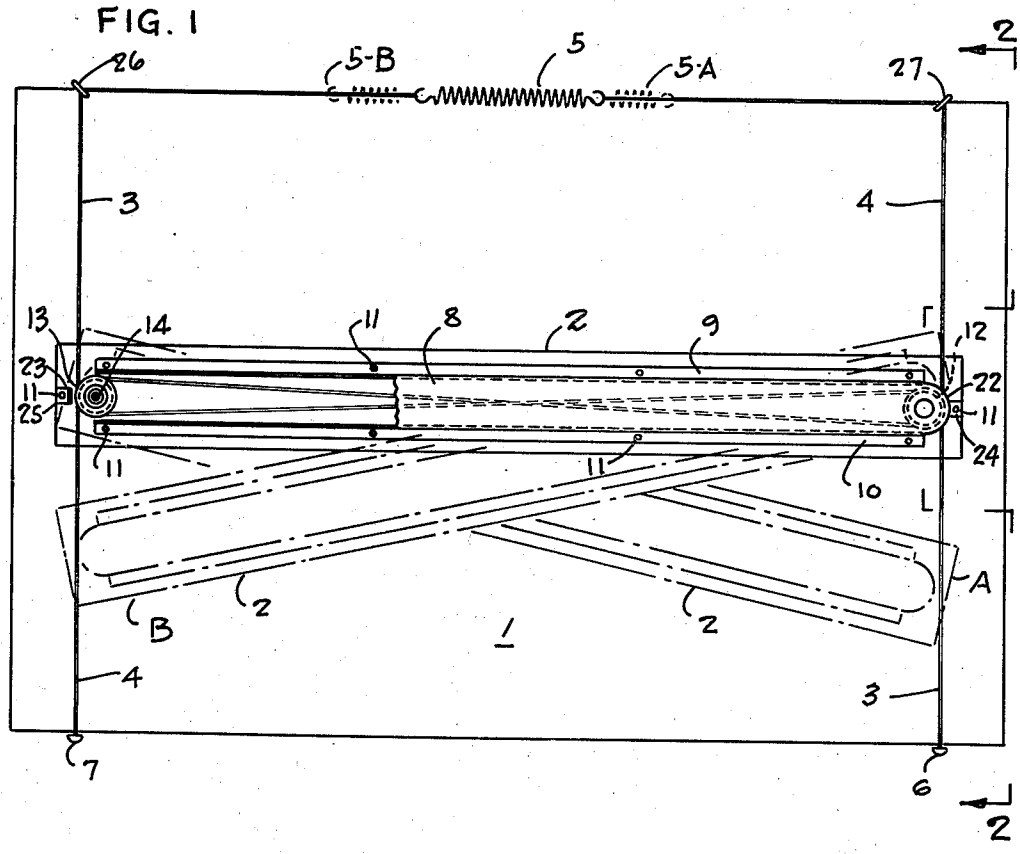
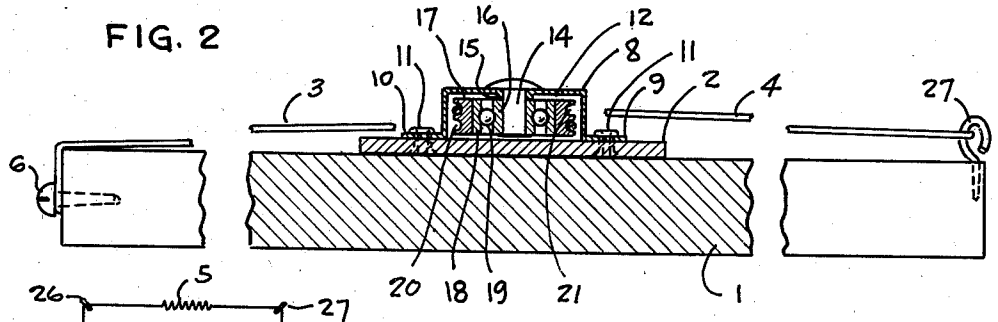


FIG. 2



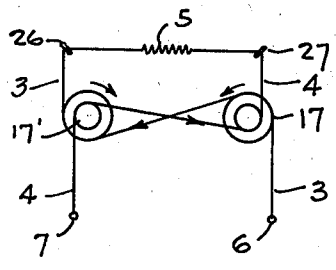


FIG. 3

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PARALLEL STRAIGHTEDGE

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6 Claims. (Cl. 33—80)

This invention relates to a parallel straight edge, such as used on drafting boards or the like.

The straight edge, as distinguished from a T-square of universal use, often employs a wire or twine, arranged near the edges of the board, for guiding the straight edge in its movement along the drafting board. Such wire or twine arrangements usually employ a series of pulleys fixed to the board.

The manner of passing the flexible element (the wire or twine) around the pulleys and of attaching the straight edge has been such that the movement of the straight edge inevitably causes a movement of the flexible element. There is also a probability that the straight edge will not be maintained in truly parallel positions, due to stretch or shrink of the element.

It is in general one of the objects of this invention to improve such parallel straight edge devices.

It is another object of this invention to provide a simple and effective parallel straight edge that is inexpensive, and that obviates the disadvantages above noted.

This invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawing accompanying and forming part of the present specification. This form shall now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

Referring to the drawing:

Figure 1 is a plan view of a straight edge incorporating the invention shown as installed on a drafting board, some of the parts of the straight edge being indicated in dotted lines;

Fig. 2 is an enlarged sectional view taken along the plane 2—2 of Fig. 1, but with some parts of the board broken away, to reduce the size of the figure; and

Fig. 3 is a diagram illustrating the manner in which certain elements of the straight edge device are assembled.

The drafting board 1 is shown as carrying the straight edge 2. This straight edge may be made of any appropriate material, such as wood.

The motion of the straight edge 2 along the board 1 is guided by the aid of a pulley arrangement in combination with a flexible element. This flexible element in the present instance can be made in two parts 3 and 4 joined by a resilient member, such as tension spring 5, adjacent the top of the board 1. The parts 3 and 4 can be appropriately made of strong twine or wire which resists stretch. Its free ends are fastened, as indicated at 6 and 7, to the lower edge of the board 1.

The straight edge 2 carries a channel shaped metal member 8 having the flanges 9 and 10, by the aid of which this member 8 can be attached permanently to the straight edge 2. For this purpose, hollow rivets 11 can be used. This member 8 forms with the straight edge a hollow housing through which certain portions of the flexible elements 3 and 4 extend, as will be hereinafter described. The member 8 supports, adjacent each of its extremities 22 and 23, pulley structures 12, 13. The axis of each of the pulley structures is formed by the aid of a stationary pin 14. This pin as shown most clearly in Fig. 2, has an axis normal to the plane of the straight edge and extends through an aperture in the member 8, that is formed by the inturned flange 15. The pin 14 can be so riveted over as to support the inner race 16 of a ball bearing structure for rotatably supporting the pulley proper 17. This pulley proper 17 is provided with an outer ball race 18; and a series of balls 19 are interposed between the inner and outer races 16 and 18 to provide free rotation of the pulleys. Each of the pulleys is furthermore provided with a pair of annular grooves 20 and 21 in which the flexible elements 3 and 4 are accommodated.

The ends 22 and 23 of the channel 8 can, if desired, have downward extensions 24, 25 through which a fastening means, such as a hollow rivet, can be passed.

The manner in which the flexible element 3—4—5 is looped through the pulley structures will now be described, especially in relation to Fig. 3. One end of the part 3 is fastened to the edge of the board 1 as by member 6, and extends upwardly around pulley 17 in a counterclockwise direction. The element then crosses to the left hand pulley 17′ where it passes over the pulley in a clockwise direction. Thence the flexible element passes upwardly and through an eye 26 and along the top edge of the board to the tension spring 5. The other part 4 of the flexible element extends from the tension spring 5 along the top edge of the board 1, through the eye 27, and then downwardly and around pulley structure 17 in a clockwise direction. Then it crosses over the board 1 and passes around pulley structure 17′ in a counterclockwise direction. It thence passes downwardly to be permanently attached as at 7.

If it be assumed, with this manner of looping the flexible element through the pulleys, that the straight edge 2 is moved downward, it is apparent that the pulley structure 17 will rotate in a counterclockwise direction, and pulley structure 17′ will rotate in a clockwise direction. The portions 3 and 4 cross between the two pulley structures. Any variation in the position of the straight edge 2 in moving up and down the board

does not require any change in the length of the flexible element 3—4—5. This is apparent because as the pulley structures 17 and 17' move up and down with the straight edge 2, they merely act to rotate these pulley structures.

The tension spring 5 keeps the parts 3 and 4 of the flexible elements under tension at all times. Any stretch or shrinkage merely results in a compression or extension of the spring 5 without causing any tilting of the straight edge. Furthermore, it is possible to hold one end of the straight edge rigidly and the other end can be swung so as to set the straight edge at an oblique angle, as illustrated by the dotted line positions. It can then be moved up and down the board at the new position.

Referring to Fig. 3, if pulley 17 is shifted downwardly to give the straight edge an inclination downward toward the right, the right hand portion of element 4 will be pulled downwardly and the right hand portion of element 3 tends to become slack. However, as elements 3 and 4 are connected at the top of the board and are slidable in eyelets 26, 27, the downward pull on part 4 takes up the slack in part 3 and no looseness actually occurs, the spring merely shifting to the right.

Thus if the straight edge is set at the inclination indicated by A, the spring 5 will be shifted to the position marked 5A. Similarly, for inclination B of the straight edge the spring will assume the position 5B. These oblique positions slightly change the required overall length of the flexible element 3—4—5; but this is taken care of by the spring 5.

Once the straight edge 2 is thus set for any angle within limits, it is restrained against any change in its angular setting. This is due to the fact that each pulley structure 17 or 17' is confined by parts 3 and 4 against any motion except one of rotation.

What is claimed is:

1. In a device of the character described, a straight edge member, a pair of pulley structures respectively supported adjacent opposite ends of the member, each pulley structure having a double groove, and a flexible element fixed at its ends, and adapted to be supported on a board, and passing around the pulleys in this order: from one end, around one groove of one pulley, then around one groove of the other pulley, then to the opposite edge of the board from the fixed end, and then to the other groove of the first pulley, then to the other groove of the other pulley, and thence to the other end, fixed adjacent the same edge of the board as the first end, the direction of the element around the pulleys being such that those portions of the element passing between the pulleys, cross each other, said element being adapted to confine the straight edge to movement in parallel adjusted positions when maintained at a constant length, and means included in said element to permit variations in length, whereby the inclination of the straight edge may be adjusted.

2. In a device of the character described, a flexible element having two parts and a tension spring joining the two parts, one end of each part being adapted to be joined adjacent one edge of a board, each part crossing the board and then passing toward the opposite edge of the board, and a straight edge member having pulley structures guiding the flexible element, the element being so guided by the pulleys that parallel movement of the straight edge causes rotation of the pulleys without necessitating a change in length of the element, the tension spring permitting changes in the length of the element in response to adjustments in the inclination of the straight edge.

3. In combination with a straight edge adapted to be used with a drawing board, means for maintaining the straight edge in parallel adjusted position as it traverses the board, including a pulley rotatably supported near each end of the straight edge, a flexible resilient guiding element having its ends fixed near one edge of the board and passing around the pulleys in this order; from one end, around one groove of one pulley, then around one groove to the other pulley, then to the opposite edge of the board from the fixed end, thence along said opposite edge, and then to the other groove of the first pulley, then to the other groove of the other pulley and then to the other fixed end, the direction of the element around the pulleys being such that those portions of the element passing between the pulleys, cross each other, said element being slidably secured to said other edge whereby the inclination of said straight edge relative to said edge may be varied without disconnecting the element.

4. The combination of claim 3, wherein the resilient flexible guiding member is formed of two substantially non-resilient members joined by a tension spring adjacent the opposite edge of the board.

5. In combination with a straight edge adapted to be used with a drawing board, means for maintaining the straight edge in parallel adjusted position as it traverses the board, including a pulley rotatably supported near each end of the straight edge, a pair of flexible guiding elements having one end of each fixed near one edge of the board and passing around and between the pulleys to the opposite edge of the board, so that as the straight edge is moved, the pulleys are caused to rotate in opposite directions without changing the combined length of said elements, means slidably securing the elements to said opposite edge, means connecting the ends together adjacent said edge, said means being adapted to maintain a constant tension in the elements, whereby the combined length of the elements can be varied to permit substantial alterations in the inclination of the straight edge relative to the edge of said board.

6. In combination with a straight edge adapted to be used with a drawing board, means for maintaining the straight edge in parallel adjusted position as it traverses the board, including a pair of pulley structures respectively supported adjacent opposite ends of the member, a flexible guiding element fixed at its ends and passing around the pulley structures so as to guide the straight edge in parallel adjusted position without change in length, and means to permit variations in length of said element, whereby the inclination of the adjusted position of the straight edge may be altered.

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