This invention relates to a drafting implement, and particularly to a device for engaging and holding a flexible spline at a fixed curvature in order that it may be used as a guide for a marking tool, such as a pen or pencil. Such splines are very frequently used in aeronautical drafting, for example, and a device for the purpose indicated must be capable of holding splines of widely or of minutely varying curvature, of appreciable lateral extent, and withal firmly, and yet must be readily adjustable from any one position to any other when that is desired.

In particular it is desirable that the restraining force by which the flexible spline is held to its curvature be applied along a line which is substantially perpendicular to a tangent through the point of engagement of the holding device with the spline. Unless this principle is observed, the holding device tends to be pulled askew, by the inherent resistance of the spline to change of curvature, with the result that the spline itself departs from the desired curvature.

It is the principal object of the present invention to provide a device of the nature and for the use indicated above. Among more specific objects, it is desirable, also, to provide a device of this nature which will be simple in construction, itself readily adjustable to accommodate various conditions of use, never so positively held that it cannot be shifted slightly in any of various directions, relatively inexpensive, and a device such as will not project unduly above the surface of the drafting board and thus interfere with the draftsman.

With these and other objects in mind, as will be apparent hereinafter, the present invention comprises the novel drafting spline holder, and the novel combination and arrangement of the several parts thereof with relation to one another and for use with known types of splines, all as shown in the accompanying drawings in a preferred form, and as will be hereinafter more fully explained and defined.

Figure 1 is a perspective view of such a spline holder in use.

Figure 2 is in the nature of a side elevation, being in fact a vertical sectional view from top to bottom of the drafting board, viewing in side elevation the spline holder applied thereto.

Figure 3 is a view similar to Figure 2, showing a somewhat modified construction.

The drafting board 1 may be of any desired form, and upon its surface, or upon a drafting sheet resting upon that surface, it is assumed to be the intention to draft a curved line to which the flexible spline 2 of known type is fitted. In order to hold the spline in this fixed curvature, the several elements of the present invention cooperate. The implement as a whole includes a plurality of blocks 3, supported in alignment transversely of the board, to which end they may be provided with retaining flanges 4, received in the undercut groove 5 of a guide bar 6. This bar may be supported upon a base strip 7 which may be an independent straight-edge, or which like the straight edge of a drafting machine may be supported at the opposite edges of the drafting board 1, and may be moved up and down the board. The particular nature of the supporting and guiding elements, if any, other than the blocks 3, is not material to the principles of this invention.

Each block 3 is rather broad, and stands up somewhat above the drafting surface of the board 1, although not to such an extent as to constitute a serious obstruction to the draftsman. However, the block's upper surface at all points stands appreciably above the height of the spline 2. Preferably, in the form illustrated in Figures 1 and 2, the upper surface of the block is ridged in the direction of the alignment of the blocks, such a ridge being indicated at 9. From this ridge the block slopes gently, at least toward that edge 8a which is nearer the spline 2, and as will shortly appear, the ridge 9 and this near edge 8a constitute alternate fulcrums. A similar result may be achieved in the form shown in Figure 3 by gently rounding the entire upper surface, as shown at 9b in Figure 3.

A clevis, generally indicated by the numeral 9, is pivotally mounted at 10 upon the block. The pivot axis generally parallels the ridge 9 and the edge 8a. These clevises may be of wire, and preferably each is of appreciable breadth corresponding to the breadth of the block to which it is pivotally mounted. Preferably the transverse portion 9a of each clevis is straight, and parallels the edge 8a and the ridge 9, but is located some distance outwardly of each, at the side of its block which is nearer the spline 2.

Means are employed to urge the clevis 9, and particularly its transverse portion 9a, strongly downwardly toward the board, although the clevis can be pulled upwardly in opposition to this force. The simplest construction to these ends is provided by spring means such as are indicated at 9b, these being a continuation of the wire of which the clevis 9 may be constructed, reacting from the block itself to urge the transverse portion 9a downwardly toward the board.
Associated with each such block and its clevis, at least each that is to be employed in a given situation, is a narrow, rigid stick \( i \). Each stick is of some appreciable length, and is provided at its outer end with a pointed retainer \( 12 \), or similar holding means, whereby it will engage and hold down the spline \( 2 \). Each such stick \( i \) is passed beneath the transverse portion \( 9a \) of its block, and rests also either upon the ridge \( 8 \), as is shown in the dotted line position in Figure 2, or upon the edge \( 8a \), as in the full line showing of that figure, either such edge constituting a fulcrum, and the transverse portion \( 9a \) of the clevis constituting a point of application of force whereby the outer retaining member \( 12 \) is pressed strongly downwardly.

It will be observed that if the extension of a stick \( i \) beyond its block is rather appreciable, the gentle slope of the upper surface of the block \( 3 \) causes the stick to fulcrum at the ridge \( 8 \), and thus to attain maximum leverage to the point of application at \( 9a \) of the downwardly directed force. If, however, the projection of the stick is short, as, for example, at the left in Figure 1, then the fulcrum of the stick is at \( 8a \), and the leverage to the point of application of the force at \( 9a \) is less. By such means the sticks are caused to exert roughly equal forces at the spline. This effect is heightened, and an infinite variation in force is achieved, by the rounded alternative construction illustrated at \( b \) in Figure 3.

It has heretofore been noted that the blocks are quite broad with relation to the width of the sticks, and the transverse portion \( 9a \) of the clevis is similarly broad. The advantage of this lies in the possibility that notwithstanding the straight-line guide \( 6 \) for the blocks, and the impositiveness of the engagement of the sticks, any given stick may be canted or inclined laterally to an extent that permits its outer end at \( 12 \) to extend approximately perpendicular to a tangent at that point of curvature. This breadth of the blocks and clevises affords very considerable freedom of adjustment of the splines to various positions to achieve the end just indicated. Also it will be noted that each block may be slid lengthwise of the guide bar \( 6 \) to whatever position best suits it for the holding of a spline in a given position.

The base strip \( 7 \) with its blocks \( 3 \) may be left set up ready for use when required, and the entire assembly may, if desired, be detached from the drafting machine or from the board, and readily replaced when required.

I claim as my invention:

1. A device for use in retaining a flexible drafting spline at a fixed curvature upon a drafting board, which device comprises a plurality of blocks disposed in side-by-side alignment transversely of the board, means for supporting said blocks in said alignment and in spaced relationship, close to but standing above the board, a clevis pivotally mounted upon each block, to swing about an axis directed generally in the direction of their alignment, and all clevises having their transverse portions projected beyond that side of their respective blocks which is nearest the spline, means reacting between each clevis and its block to urge said transverse portion downwardly towards the board, and a plurality of rigid sticks, one for each block, bearing at one point upon the top of the block as a fulcrum, received beneath and urged downwardly by the transverse portion of its clevis, and at its distant end extending to a distance to bear downwardly upon the spline, whereby to retain the latter fixed in the vicinity of the point of contact.

2. A spline-holding device as in claim 1, wherein each block is crowned along a line generally parallel to the direction of their alignment, and intermediate the block's edges which are parallel to such direction, to afford an elevated fulcrum point distant from the transverse portion of the clevis for a less inclined, farther projecting stick, and an alternative fulcrum point located nearer the transverse portion of the clevis for a more steeply inclined, lesser projecting stick.

3. A spline-holding device as in claim 1, wherein the upper surface of each block is sloped gently from a ridge directed generally parallel to the direction of their alignment to the edge of the block which is nearest the spline, said ridge and said edge being higher above the board than the spline-engaging end of its stick, in any operative dispositions.

4. A spline-holding device as in claim 1, characterized in that each block and its clevis are materially broader than the width of a stick, whereby a stick may be inclined at a transverse angle to meet the curvature of the spline approximately at right angles to a tangent at the point where the stick will bear upon the spline.

5. A spline-holding device as in claim 1, wherein the block-supporting means comprises an undercut guide, and the several blocks are complementally shaped to slide along and be held by said undercut guide.

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No references cited.