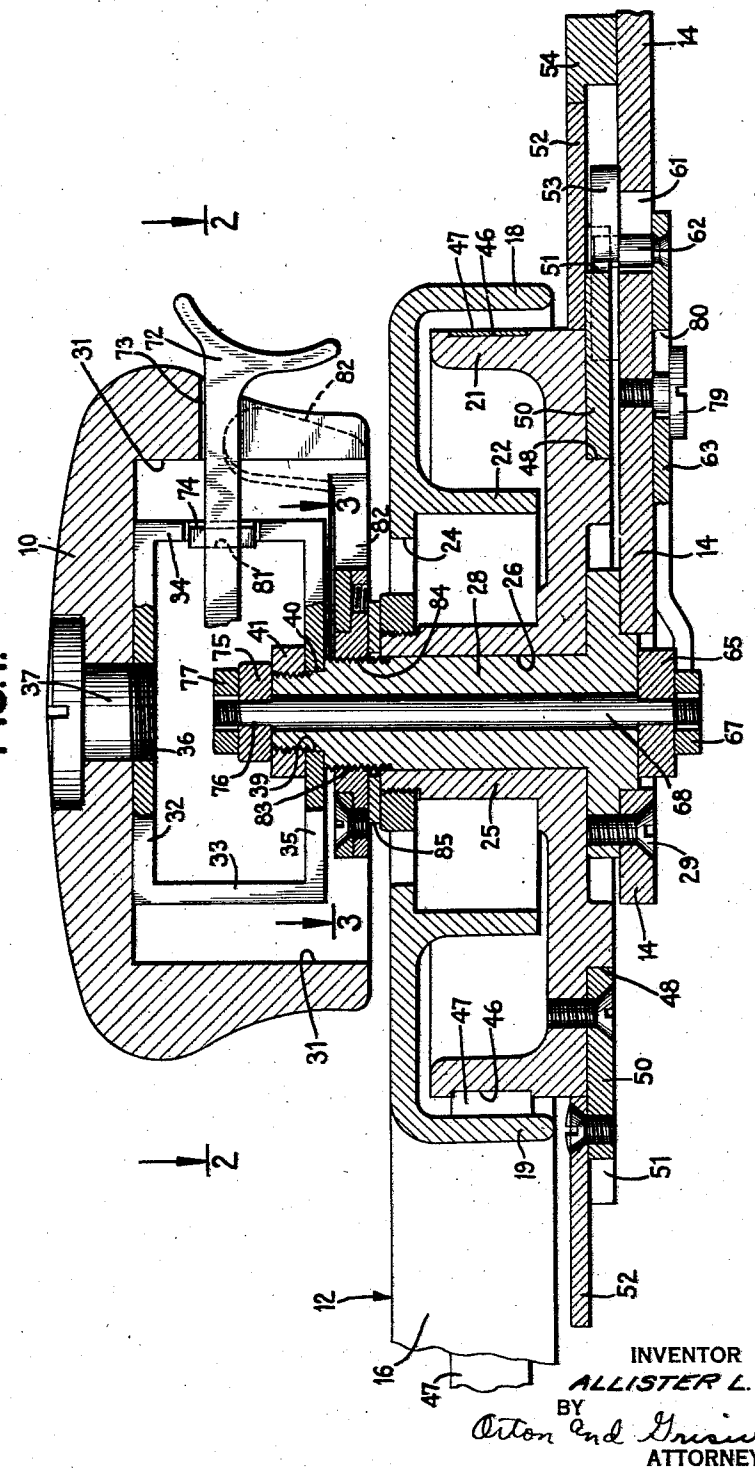
May 21, 1946. A. L. BAKER 2,400,733

DRAFTING MACHINE

Filed Nov. 9, 1939 3 Sheets-Sheet 1

FIG. 1.



INVENTOR
ALLISTER L. BAKER
BY
Orton and Griswold
ATTORNEYS

May 21, 1946. A. L. BAKER 2,400,733

DRAFTING MACHINE

Filed Nov. 9, 1939 3 Sheets-Sheet 2

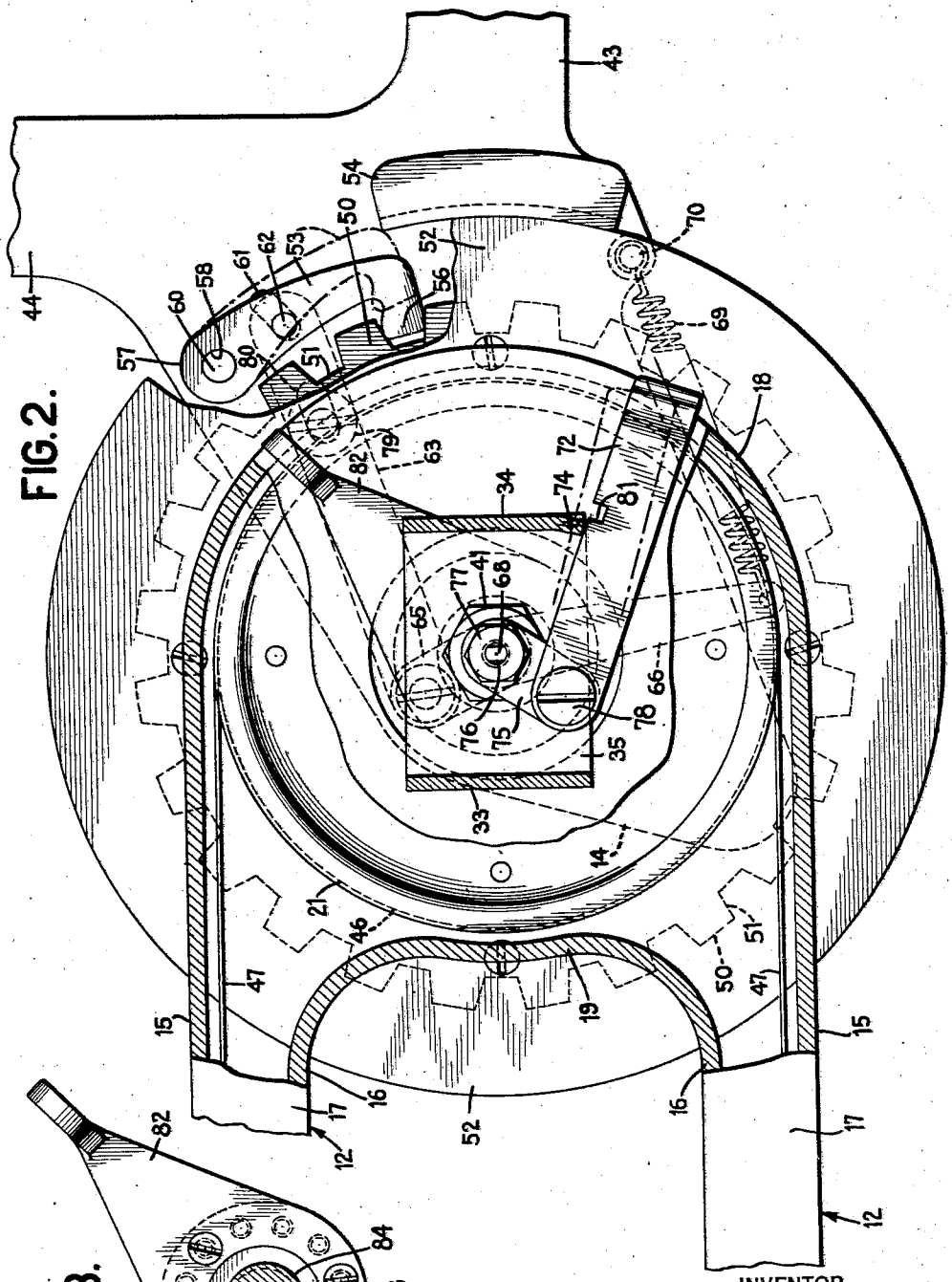


FIG. 2.

FIG. 3.

INVENTOR
ALLISTER L. BAKER
BY
Dixon and Sherwood
ATTORNEYS

May 21, 1946. A. L. BAKER 2,400,733

DRAFTING MACHINE

Filed Nov. 9, 1939 3 Sheets-Sheet 3

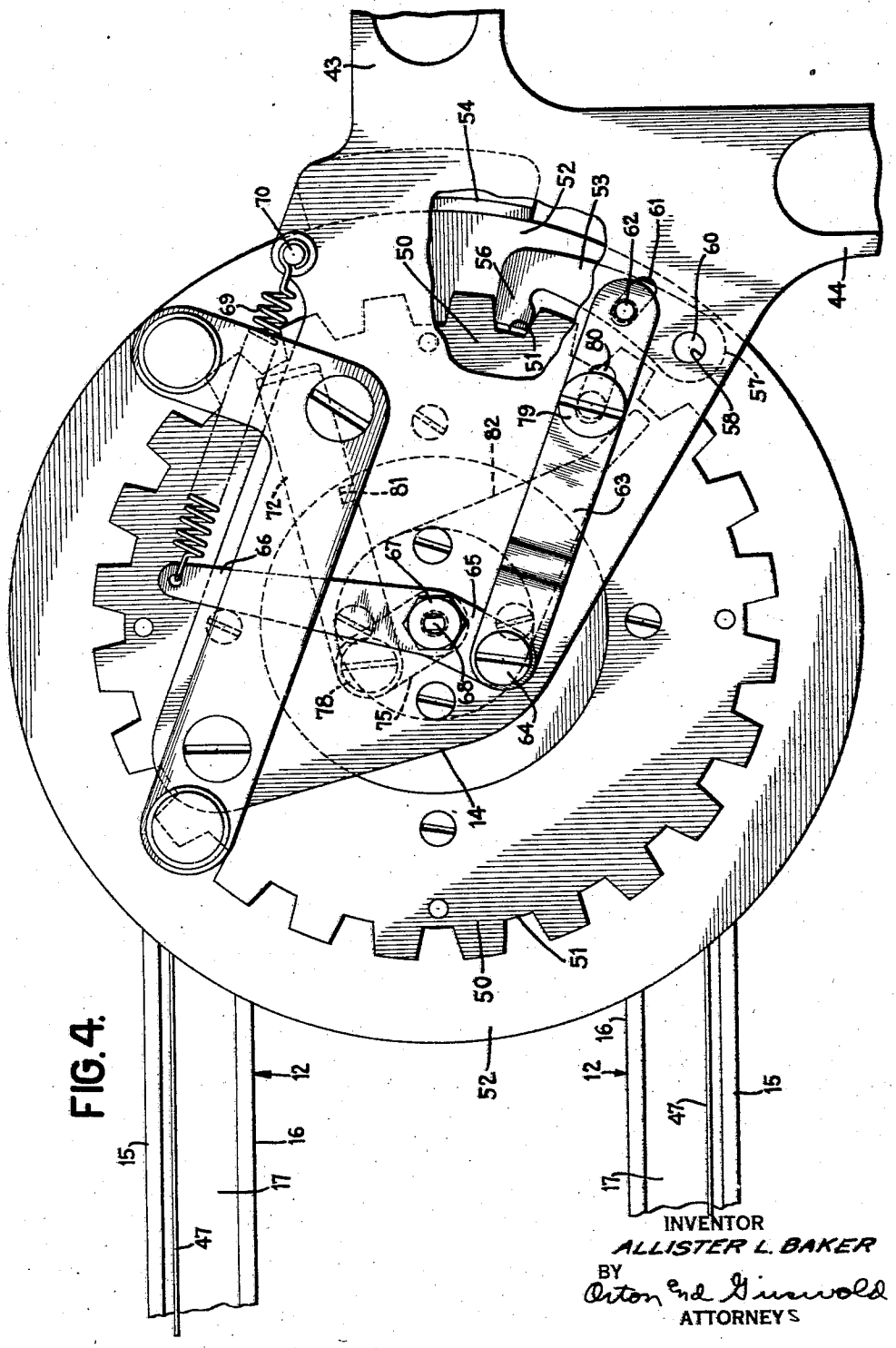


FIG. 4.

INVENTOR
ALLISTER L. BAKER
BY
Orton and Ginwold
ATTORNEYS

Patented May 21, 1946

2,400,733

UNITED STATES PATENT OFFICE

2,400,733

DRAFTING MACHINE

Allister L. Baker, Hoboken, N. J., assignor to Keuffel & Esser Company, Hoboken, N. J., a corporation of New Jersey

Application November 9, 1939, Serial No. 303,558

6 Claims. (Cl. 33—79)

This invention relates generally to parallel motion drafting devices of the kind in which the several tools which the draftsman handles most frequently are embodied, in principle, in one unit to obviate the necessity of a draftsman reaching about for a required tool and thereby enabling the draftsman to keep his attention concentrated directly upon the drawing.

Drafting devices of this character are common in which adjacent ends of two arms are pivoted together, the free end of one arm being secured to the remote side of a drafting board while the free end of the other arm is provided with a head comprising a protractor and straight edges which are in fixed angular relation to move about the center of the protractor as an axis. Such straight edges have heretofore been so associated with the protractor as to be set and locked at any angle of the protractor or to be automatically stopped at predetermined intervals, but the instrumentalities effecting the setting of the straight edges with respect to readings on the protractor have been characterized by difficulty in the manual actuation of the locking device because of its inaccessibility.

One object of the present invention is a drafting device of the character described, wherein the locking devices for the straight edges are readily accessible for manipulation without moving the hand from the knob on the protractor head.

The invention also has for its object locking and stop mechanism for the protractor which may conveniently be actuated by the thumb of the hand manipulating the protractor to the desired relative position. In carrying this aspect of the invention into effect, a single control lever is preferably provided on the knob of the head, which is movable in one direction to permit the scales to move freely to any angular position but which, on release, will effect locking of the protractor at the nearest even predetermined position.

Another object of the invention is to free the protractor from control by the latching mechanism so that it may be freely moved from one position to the other by manipulation of the knob, the release being effected by the thumb, say, without removing the hand from the knob. To this end, provision is made for retaining the control lever in the head in latch releasing position.

The invention also resides in the details of construction by which a drafting device is made practical from the standpoint of ease and convenience in manufacture and durability and facility in use.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description, taken in connection with the accompanying drawings illustrating one embodiment by which the invention may be realized, and in which:

Figure 1 is a view showing the head of the drafting device of this invention, in vertical section;

Figure 2 is a view looking from above and showing the drafting head of Figure 1, parts being broken away to illustrate particularly the locking device of this invention;

Figure 3 is a detail view; and

Figure 4 is a view showing the head of the drafting device, looking from below in Figure 1.

Referring first to Figure 1, it will be noted that a knob 10 is turnable relative to the pulley 21 at the end of the arm 12 to adjust the position of straight edges carried in the frame member 14 with respect to the pulley which is, as will be understood, a member relatively fixed in orientation. Each of the arms 12 is illustrated in Figure 2 as consisting generally of a pair of spaced channeled shaped connecting members, respectively, comprised of the side walls or flanges 15, 16 connected by a top wall 17. The ends of the arm 12 are formed with a semi-cylindrical end wall 18 which is a continuation of the outside flange 15 and a flange 19 connecting the inner flange 16 at the free end. The space defined by the walls 18 and 19 may receive a pulley 21. Obviously the arms may assume any convenient structural shape.

The semi-cylindrical end of the arm 12 is provided, substantially concentric with the end wall 18, with a downwardly extending cylindrical boss or flange 22 and an axial aperture or bore 24. Within this wall 22 is mounted an anti-friction device, not shown, in which turns the journal 25 of the pulley 21. The journal 25 is formed with a bore 26 for the pivot pin 28 which is connected at its upper end to the hand knob 10 and at its lower end is fast as by screws 29 in the frame member 14 supporting the straight edges.

The knob 10 is recessed, as at 31 and receives a generally rectangular frame or box comprised of the top wall 32, end walls 33, 34 and bottom wall 35. The top wall 32 is formed with a threaded aperture 36 receiving a screw 37 by which the knob 10 and frame 32, 35 are united. The bottom wall 35 is apertured, as at 39, to receive the cylindrical surface 40 on the pivot pin 28, the latter

being clamped to the frame by nut 41. Thus, when the knob 10 is turned, the pivot pin 28 turns with it and turns the straight edge frame 14.

The straight edge frame member 14 lies in parallel relationship to the bottom of the pulley 21 with respect to which it is capable of turning and is, conveniently although not necessarily, in substantially the shape of a triangular plate, as shown in Figure 4, having an arm 43 extending in one direction and an arm 44 extending in a direction generally perpendicular thereto, the arms 43 and 44 being adapted to receive the straight edges, as will be understood. The frame 14 thus turns with the knob 10 and also is able to turn with respect to the pulley 21, latch means being provided to fix the straight edge frame 14 to the pulley 21 in mantaining the proper relationship with the lines on the drawing.

The pulley 21 is provided with a groove 46 for the endless belt 47 and is rabbeted in its lower peripheral edge, as at 48. Disposed within the rabbeted portion 48 is an annular plate 50 formed in its periphery at predetermined intervals with locking recesses 51 (Figure 2). Since the pulley 21 is relatively fixed in orientation and the latching plate 50 is immovably carried thereon, said latching plate is also relatively fixed in orientation. The recesses 51 bear a definite relation to the graduations on the protractor 52 whereby, in conjunction with cooperating locking devices 51, 53 about to be described, the straight edges may be fixed with respect to the protractor 52 at predetermined successive intervals, such as every fifteen degrees, with respect to an index as determined, say, on a vernier plate 54 carried with the frame 14. As a matter of fact, the position of the protractor 52 is determined by the position of the pulley 21 and the band 47. The frame 14 which carries the straight edges is moved relative to the protractor and the angular position of the straight edges with respect to lines on the drawings is determined by the engagement of the cooperating locking device or latch 53 (Figure 4) in a predetermined recess 51, it being contemplated that this cooperating locking device shall, in some circumstances, automatically snap into a recess 51 and thus permit a ready location of the straight edges through predetermined angles, such as angles of 15° or multiples thereof. Thus, the straight edge carrying frame 14 may be said to be relatively fixed with respect to the latching plate 50.

The cooperating latching member is shown in greater detail in Figures 2 and 4 as an angularly shaped levers 53 formed with a detent 56 at its one end which is shaped as to enter into and position itself in one of the recesses 51. The other extremity 57 of the arm 53 is formed with an aperture 58 for reception on a pin 60 mounted on the triangular plate 14. The latching lever 53 is normally urged toward the latching plate 50 by pin 62 on one end of a link 63 beneath the lower surface of the straight edge plate 14. Link 63 is held to the bottom of the plate 14 by the enlarged head of a screw 79 threaded into plate 14 and passing through a slot 80 in the link 63. The link is pivoted as at 64 to one end 65 of a lever 65, 66 and held, as by nut 67, on the lower end of a shaft 68. The other extremity 66 of the arm 65, 66 is connected by power storing means, shown as a tension spring 69, to a pin 70 on the plate 14.

Movement of the lever 65, 66 in a clockwise direction, as viewed in Figure 4, under the influence of the spring 69 will tend to urge the detent 56 of the latch member 53 into a recess 51 of the latch plate 50 or against the peripheral edge thereof and thus, when free to move, normally tends to engage the periphery of the latching plate or to enter a recess 51.

The latch 53 may be moved and held out of engagement in a recess 51 by a thumb-actuated member 72 which, in the illustrated embodiment, is conveniently disposed with respect to the knob 10 so that the operator may, in grasping the knob, actuate the member 72 by the thumb of the same hand. The member 72 conveniently slides in a passage 73 in the knob 10 and is free to move in the open side between wall 33 and wall 34 of the frame 32—35. This slide 72 is eccentrically connected with shaft 68. As shown, it is pivoted at its inner end to an arm 75 secured on the squared end 76 of shaft 68, on which it is held by a nut 77.

The plunger 72 is preferably pivotally connected to the arm 75 as by the pin, the head of which is shown at 78, so that the plunger may swing through an arc about pin 78. The slot in which the plunger 72 reciprocates is of a dimension, circumferentially, sufficient to permit the plunger to assume the full line position of Figure 2 and also the dotted line position in that figure. In the full line position the plunger 72 may be reciprocated to actuate the latch.

To retain the latch in inoperative position, as shown in dotted lines in Figure 2, that is, so that the straight edge plate 14 may be rotated freely, the plunger 72 is formed with a recess or slot 81 and a portion of the edge of wall 34 is cut out, and preferably displaced, as a tongue 74. Then, when the plunger is pressed inwardly and moved in a counter-clockwise direction, as viewed in Figure 2, the tongue 74 enters the notch 81 and retains the plunger in latch releasing position.

In order to hold the straight edges at points intermediate the registering positions of the notches 51, a clamping lever 82 (Figures 2 and 3) is provided. This lever is formed with a threaded aperture 83 in one end to serve as a nut which is threaded on to a threaded portion 84 of the pin 28. When the clamping lever is turned, it bears on a thrust bearing 85 and serves to draw upwardly the pin 28 and clamp or draw the straight edge carrying frame 14 or an element 87 of the pivot pin 28 by which the straight edge supporting plate is fixed to the pivot pin against the pulley to frictionally hold the straight edges at any desired angle.

Heretofore, the actuating lever for the latch controlling the position of the straight edges has been disposed at a relatively low point with respect to the operating knob and proximate the plane of the straight edges. This has been inconvenient and it has generally required two hands to manipulate. By the present invention, it will be seen that the draftsman can readily release the catch while his hand is on the knob 10 and turn the frame 14, and the straight edges carried thereby, to the desired graduation on the protractor, when he can again release the plunger 72 and permit the spring 69 to move the latch into a selected recess 51. Again, when he has released the latch he can move the plunger into engagement with the retaining member 74 to retain the latch in off position so that the protractor may be freely moved to different angular positions.

Various modifications will occur to those skilled in the art in the composition, configuration and disposition of the component elements going to make up the invention as a whole as well as in

the selection and combination of features to accomplish the results sought, and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompany drawings, except as indicated in the appended claims.

What is claimed is:

1. In a drafting machine head, in combination, a tubular pivot pin formed at its lower end with a flange, a pulley rotatable about the pivot pin and formed therebelow with an axial recess receiving flange, a straight edge frame secured to the flange, a latching plate secured to the pulley above the straight edge frame, said straight edge frame being formed with an aperture, a latch pivotally mounted on the frame proximate the aperture for coaction with the latching plate, a shaft within the tubular pivot pin, an arm on the shaft below the frame, and a link connecting the arm with the latch for actuation thereof between latched and unlatched position.

2. In a drafting machine head, in combination, a tubular pivot pin formed at its lower end with a flange, a pulley rotatable about the pivot pin and formed therebelow with an axial recess receiving the flange, a straight edge frame secured to the flange, a latching plate secured to the pulley above the straight edge frame, said straight edge frame being formed with an aperture, a latch pivotally mounted on the frame proximate the aperture for coaction with the latching plate, a shaft within the tubular pivot pin, a lever arm mounted intermediate the ends thereof on the lower end of the shaft, and a spring extending between one arm of the lever and the frame.

3. In a drafting machine head, in combination, a tubular pivot pin formed at its lower end with a flange, a pulley rotatable about the pivot pin and formed therebelow with an axial recess receiving the flange, a straight edge frame secured to the flange, a latching plate secured to the pulley above the straight edge frame, a latch pivotally mounted on the frame for coaction with the latching plate, a shaft within the tubular pivot pin, a lever arm mounted intermediate the ends thereof on the lower end of the shaft, and a spring extending between one arm of the lever and the frame.

4. In a drafting machine head, in combination, a tubular pivot pin, a pulley rotatable about the pivot pin, a straight edge frame secured to the pivot pin, a latching plate secured to the pulley above the straight edge frame, said straight edge frame being formed with an aperture, a latch pivotally mounted on the frame proximate the aperture for coaction with the latching plate, a shaft within the tubular pivot pin, a bell crank lever mounted intermediate the ends thereof on the lower end of the shaft, one free end of said lever being shorter than the other, a spring extending from the longer arm of the lever to the frame, and a link extending from the shorter arm of the lever to the latch to actuate the same.

5. In a drafting machine head, in combination, a tubular pivot pin, a pulley rotatable about the pivot pin, a straight edge frame secured to the pivot pin, a latching plate secured to the pulley above the straight edge frame, said straight edge frame being formed with an aperture, a latch pivotally mounted on the frame proximate the aperture for coaction with the latching plate, a shaft within the tubular pivot pin, a frame having at least one vertical edge carried by the pivot pin, an arm on the shaft within the frame, a plunger pivoted to the end of the arm, said pivoted plunger being formed with a notch so positioned as to engage the vertical edge in one position of the arm to retain the latch in open position.

6. In a drafting machine head, in combination, a tubular pivot pin formed at its lower end with a flange, a pulley rotatable about the pivot pin and formed therebelow with an axial recess receiving the flange, a straight edge frame secured to the flange, a latching plate secured to the pulley above the straight edge frame, said straight edge frame being formed with an aperture, a latch pivotally mounted on the frame proximate the aperture for coaction with the latching plate, a shaft within the tubular pivot pin, a frame having at least one tongue carried by the pivot pin, an arm on the shaft within the frame, a plunger pivoted to the end of the arm, said pivoted plunger being formed with a notch so positioned as to engage the tongue in one position of the arm to retain the latch in open position.

ALLISTER L. BAKER.