Aug. 28, 1956 G. R. BRODIE 2,760,773

ANGLE BAR FOR WEB PRINTING PRESS

Filed March 4, 1955 2 Sheets-Sheet 1

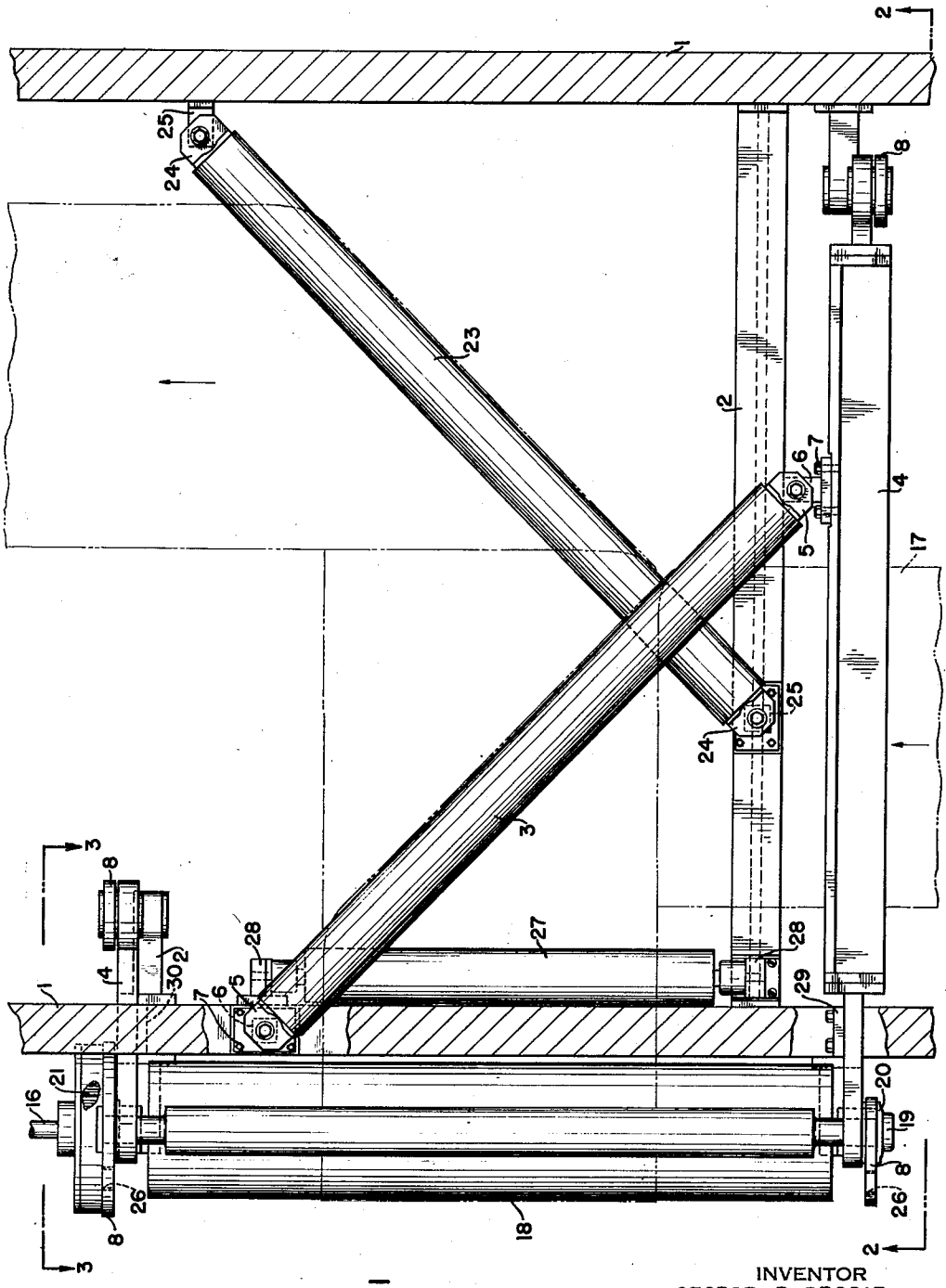


FIG. 1

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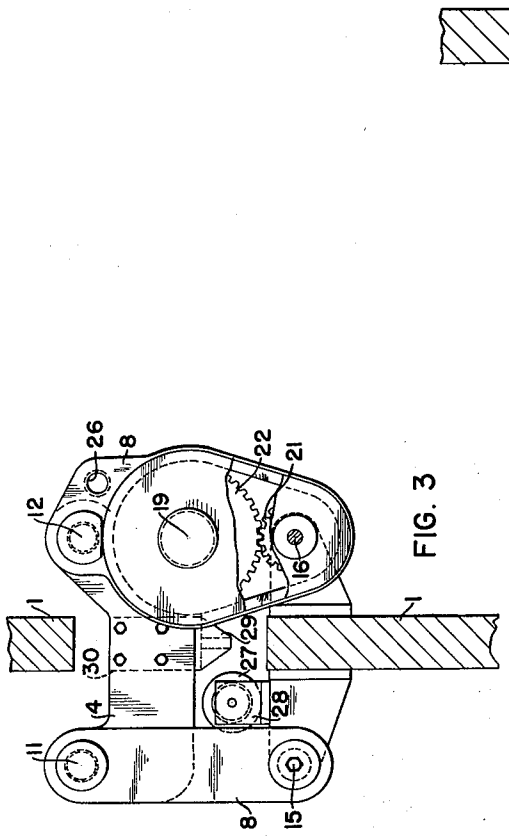


FIG. 3

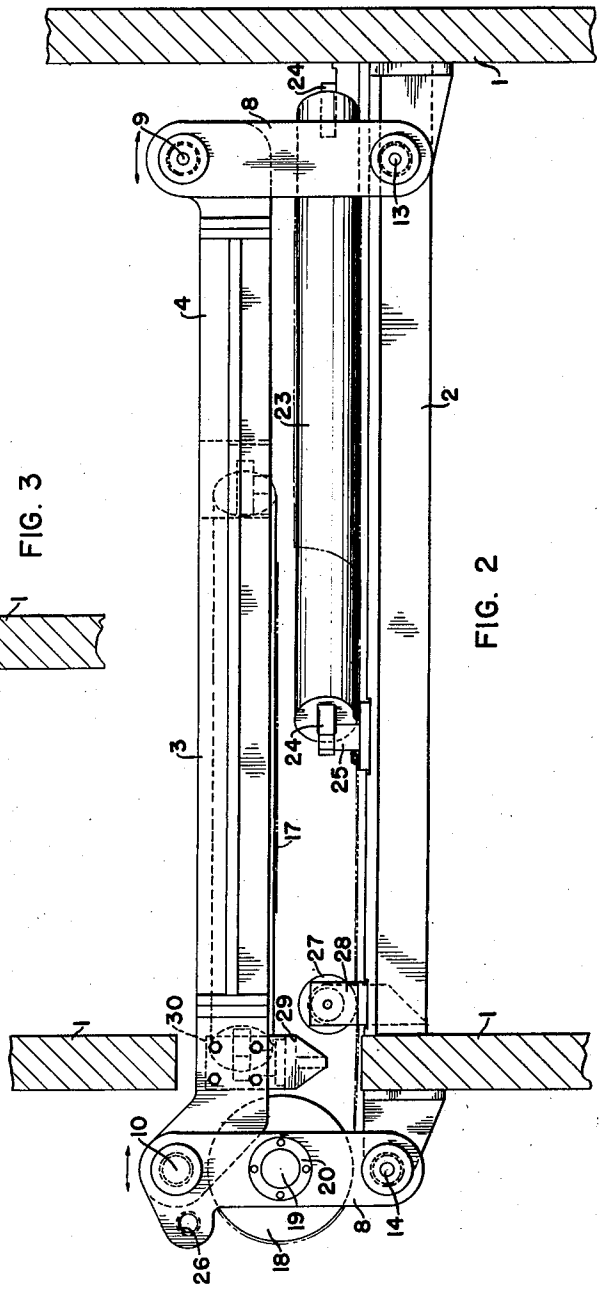


FIG. 2

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ANGLE BAR FOR WEB PRINTING PRESS

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4 Claims. (Cl. 271—2.1)

This invention relates to improvements in rotary web-fed printing presses, and more particularly to an improved angle-bar assembly especially adapted to use in conjunction with such presses.

So-called angle-bars have been extensively used in web-fed presses. In general, they are round or elliptical bars or tubes which extend at an angle across the path of the web at points where the direction of travel of the web is to be changed.

These angle-bars serve several useful purposes. They may be used to shift the position of the web transversely with respect to the rollers of the press, or to reverse the web after it has been printed on one side so that it may be printed on the other side, or to assist in turning the web at right angles to its path of travel, e. g. where it is desired to direct the web from one press to an adjacent press, or any combination of these purposes.

These angle-bars usually extend across the web at an angle of 45°. The web passes over and partially around the angle-bar and leaves the bar in a direction usually 90° from that at which it approaches the bar.

Where it is desired to shift the position of the web transversely with respect to the press rollers, it is usually customary to use two cooperating angle-bars, the position of at least one of which is adjustable. The adjustable bar is adapted to be moved back and forth along the web in such a way that its forward edge is always parallel to its former position. Usually the web passes from the adjustable angle-bar to a roller positioned with its axis of rotation parallel with the initial path of the web. An adjustment of the position of the angle-bar causes the web to shift to right or left on the roller, the axis of which normally remains unchanged. Such adjustments are frequently necessary in order to center the printing on the web, or to provide the desired side margins.

Adjustment of the angle-bar has heretofore caused an objectionable change in the tension of the web. For instance, the movement of the angle-bar in a direction opposite that in which the web leaves the bar has caused an increase in tension on the web, while moving the angle-bar in the opposite direction has caused a loss in tension.

A primary purpose of the present invention is to provide means whereby such changes in tension of the web, due to adjustment of the position of the angle-bar, may be avoided.

This is accomplished in accordance with the present invention by a novel angle-bar assembly, whereby any change in the web tension, occasioned by an adjustment of the position of the angle-bar is avoided by an automatic simultaneous corresponding movement of the axis of rotation of the roller over which the web passes after leaving the angle-bar.

In general, the invention provides an angle-bar assembly

so constructed and arranged that the angle-bar and the following roller, respectively, are both movably supported and their supports are so linked together that any movement of the angle-bar, in either direction, is transmitted to the roller support in such proportion as to compensate for any change in tension of the web which would otherwise occur.

The novel assembly comprises a rigid support frame, supported by a plurality of parallel supporting links of equal length, each pivotally attached at one end to said frame and adapted to be pivotally attached at its other end to a fixed support, such as the press frame, so that lines drawn between the pivot points form a parallelogram, thereby permitting the supporting frame to be moved, with respect to the fixed support, while maintaining the frame parallel to its former position. A roller is supported at each end by supporting links attached to one end of the frame and is adapted to be rotated about an axis perpendicular to the direction of the movement of the supporting frame. This axis is positioned equidistant from the corresponding pivot points of the respective supporting links, and these supporting links are secured to the supporting frame so that a movement of the frame and attached angle-bar in either direction will, through the supporting links, cause a movement of the roller axis in the same direction a distance proportionate to the distance of the angle-bar movement.

This differential in the movement of the roller relative to the movement of the angle-bar is necessary for the reason hereinafter described. Where the web makes a 180° turn over the roller, a ratio of angle-bar movement to roller axis movement of 2:1 is necessary to maintain uniform web tension. However, it will be understood that where it is desired, for any reason, to change this ratio, such change may be accomplished by appropriate change in position of the roller axis with respect to the corresponding pivot points of the supporting links.

The invention will be further described and illustrated with reference to the accompanying drawings, which represent a particularly advantageous embodiment of the invention, and of which:

Fig. 1 is a plan view of the angle-bar assembly,

Fig. 2 is a front end view along line 2—2 of Fig. 1, and

Fig. 3 is a rear end view of the left hand portion along line 3—3 of Fig. 1, partly broken away to show the roller driving gears.

The side frames of a printing press are indicated at 1, and a stationary cross-frame member is indicated at 2. An adjustable angle-bar 3 is secured at each end to a rigid supporting frame 4, as by means of end flanges 5, bolted to lugs 6, which are in turn secured to frame 4 by means of bolts or machine screws 7.

The frame 4 is supported at each end by supporting links 8, as more clearly shown in Fig. 2 of the drawing. Each of these supporting links is pivotally fastened at one end to frame 4 at points 9, 10, 11 and 12, respectively, and pivotally fastened at its other end to a fixed support, for instance the press side frame 1 and cross-frame member 2, as pivotal points 13, 14, 15 and 16, respectively.

These supporting links are all of equal lengths so that lines drawn from their pivotal points are equal, and also the stationary pivot points are so positioned that the centre lines of the supporting links are parallel. Consequently, lines drawn between the pivot points form a parallelogram, and the frame 4 and angle-bar 3 attached thereto may be swung to the right or to the left, to effect the desired shift of the web, without effecting any change in the angle of the bar with respect to the direction of

travel of the web and little or no change with respect to the plane of the web.

In the apparatus illustrated by the drawings, the angle-bar supporting frame 4 is somewhat L-shaped, comprising the side members and the cross member 29 secured thereto at 30. It will be understood, however, that a supporting frame of that particular construction is not essential to the invention. The frame may be rectangular and be supported at each corner. It may be so constructed as to have two parallel sides suitably tied together by cross members to provide rigidity.

As shown more clearly in Fig. 1, the paper web 17 in passing over angle bar 3 is turned at right angles to its former direction of travel. In line with its new direction of travel, there is a roller 18 supported at each end by shafts 19 provided with bearings 20 which are in turn supported by two of the supporting links 8.

The axis of rotation of the roller is positioned intermediate the ends of the supporting links and parallel to the initial path of the web, i. e. perpendicular to the path of the web leaving angle-bar 3. The axis of rotation of roller 18 also lies in a plane parallel to the plane of movement of angle-bar 3.

When it is desired to shift the position of the web with respect to the press rollers, the angle-bar 3 is moved by moving frame 4 to the right or to the left. This causes a corresponding movement of the axis of rotation of roller 18, but since that axis is positioned intermediate the pivot points 12 and 16 (see Fig. 3), the movement of the roller axis will be proportionately less than the movement of the angle-bar 3. By positioning the axis of roller 18 midway between the pivot points of the supporting links, the movement of the roller axis will be just half that of the angle-bar.

It is usually desirable that roller 18 be positively driven. However, by reason of the fact that the axis of roller 18 is subject to change in position, special provisions for driving the roller are necessary.

As a particularly advantageous means of driving the roller, I provide rotary driving means, for instance gear 21, positioned with its axis of rotation at the stationary pivot point 16 of the roller supporting links, as more clearly shown in Fig. 3, so as to be adapted to rotate about an axis coinciding to the pivot point about which the roller axis is adapted to swing. The driving means 21 cooperates with a driven means, for instance, gear 22, secured to the roller shaft 19, and their location is not disturbed by the swing of the roller axis 19 about the pivot points 14 and 16.

It is usually necessary or desirable that the web leaving the roller 18 be passed over a second angle-bar such as indicated at 23 in order to direct it along a path parallel to its initial path. This is essential where the purpose is to turn the web after the first printing so that it may be printed on the reverse side. The second printing may be accomplished on the same press, or on a second press positioned alongside of and parallel to the first press.

Any shifting or aligning of the web for the second printing can usually be accomplished by adjustment of angle bar 3 and therefore the position of angle-bar 23 may be fixed.

In the drawing, the angle-bar 23 is shown secured in a fixed position to the press side frame 1 and cross-frame 2 by end flanges 24 and lugs 25 fastened to the press frame.

It will be understood that where the web is to be passed to an adjacent press, the second angle bar will be positioned on the second press so that the web may pass directly from roller 18 to the adjacent press and be aligned with the press by means of the second angle-bar.

In operation of the apparatus shown, the web 17, after having been printed on one side and passed over the drier, is passed around angle-bar 3 by which its path is turned at right angles toward the roller 18 (see Fig. 1).

The web then passes around roller 18 and from thence to the angle-bar 23. In passing over angle-bar 23, the web is turned over, and its direction is again turned at an angle of 90°. The distance from roller 18 to angle-bar 23 will, as previously indicated, depend upon the desired final path of the web.

As previously indicated, the desired alignment of the web passing from angle-bar 23 is effected by adjusting the position of angle-bar 3 by moving the supporting frame 4. This adjustment may be made, and the bar 3 held in the desired position, by any appropriate moving and clamping mechanism attached to frame 4 or to one or more of the supporting links 8, for instance at the point 26. Numerous mechanisms adapted to that purpose are available, and need not be particularly described here.

It will be observed that in the apparatus shown, the web passes in a single path from the angle-bar 3 to the roller 18. But the web passes to, and leaves, the roller 18 over two substantially parallel paths. With this arrangement, any movement of angle-bar 3 must be compensated for by a corresponding movement of the axis of roller 18 only half the distance of the angle-bar movement. Therefore, the axis of roller 18 has been positioned mid-way between the pivotal points of the supporting links 8. Where a lesser degree of compensation is required, the axis of roller 18 may be shifted further toward the pivotal points 14 and 16 in order to effect the desired change in the ratio of the roller axis movement to the angle-bar movement.

In the apparatus shown, the web leaving the roller 18 passes under idler roller 27 in travelling toward the angle-bar 23 so as to maintain constant the plane along which the web approaches angle bar 23, regardless of the position of roller 18. This roller 27 is rotatably supported by brackets 28 secured to the press cross-frame 2.

I claim:

1. An angle-bar assembly comprising a rigid supporting frame, a plurality of parallel supporting links of equal length, each pivotally attached at one end to said frame and adapted to be pivotally attached at its other end to a fixed support, so that lines drawn between the pivot points form a parallelogram, thereby permitting the frame to be moved with respect to the fixed support while maintaining the frame parallel to its former position, a roller supported by two of said links attached to one end of the frame, said roller being adapted to rotate about an axis perpendicular to the direction of said movement of the frame and the axis being positioned parallel to a line drawn through the corresponding pivot points of the respective two said supporting links attaching the said links to the frame, and an angle-bar secured to said frame, adapted to move therewith and positioned at an angle of 45 degrees with respect to a plane through the axis of rotation of the roller and lying in a plane parallel to a plane through said axis perpendicular to the first said plane.

2. In conjunction with a web-fed printing press, an angle-bar assembly comprising a rigid supporting frame, a plurality of parallel supporting links of equal length, each pivotally attached at one end to said frame and pivotally attached at its other end to the press frame, so that lines drawn between the pivot points form a parallelogram, thereby permitting the supporting frame to be moved with respect to the press frame while maintaining the supporting frame parallel to its former position, a roller supported by two of said links attached to one end of the supporting frame, said roller being adapted to rotate about an axis perpendicular to the direction of said movement of the supporting frame and the axis being positioned parallel to a line drawn through the corresponding pivot points of the respective two said supporting links attaching the said links to the frame, and an angle-bar secured to the supporting frame, adapted to move therewith and positioned at an angle of 45 degrees

with respect to a plane through the axis of rotation of the roller and lying in a plane parallel to a plane through said axis perpendicular to the first said plane.

3. The angle-bar assembly of claim 1 further characterized in that the roller axis is positioned midway between the pivot points of the respective supporting links.

4. The angle-bar assembly of claim 1 further characterized by means for rotating the roller comprising a

gear secured to one end of the roller and a co-acting gear positioned with its axis of rotation at a fixed pivotal point of the roller-supporting link at the corresponding end of the roll.

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