Jan. 28, 1958 H. W. FAEBER 2,821,387

METHODS AND APPARATUS FOR VARYING WEB SIDELAY

Filed April 22, 1954 2 Sheets-Sheet 1

Fig. 1.

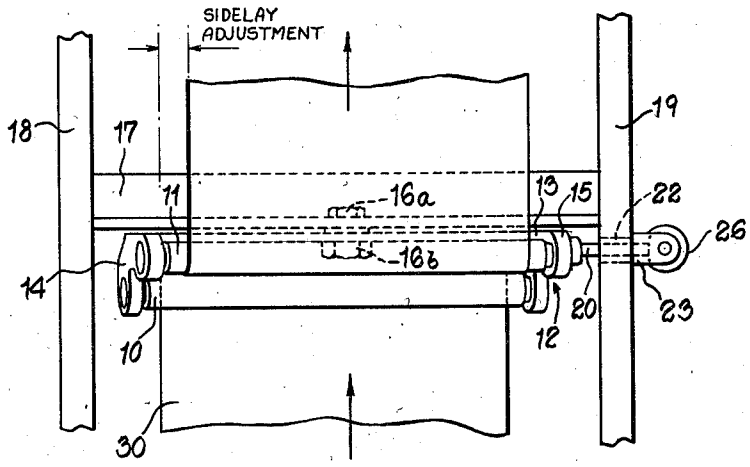
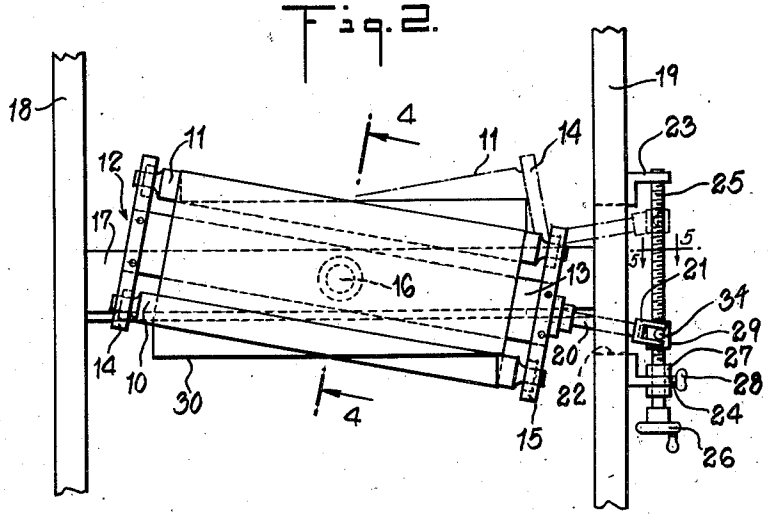


Fig. 2.



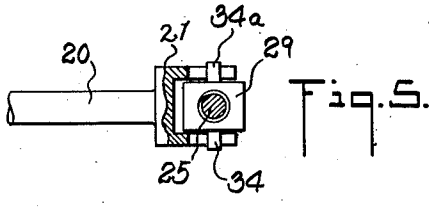


Fig. 5.

INVENTOR.
HARRY W. FAEBER
BY
Campbell, Brumbaugh, Free & Graves
ATTORNEYS

Jan. 28, 1958 H. W. FAEBER 2,821,387

METHODS AND APPARATUS FOR VARYING WEB SIDELAY

Filed April 22, 1954 2 Sheets-Sheet 2

Fig. 3.

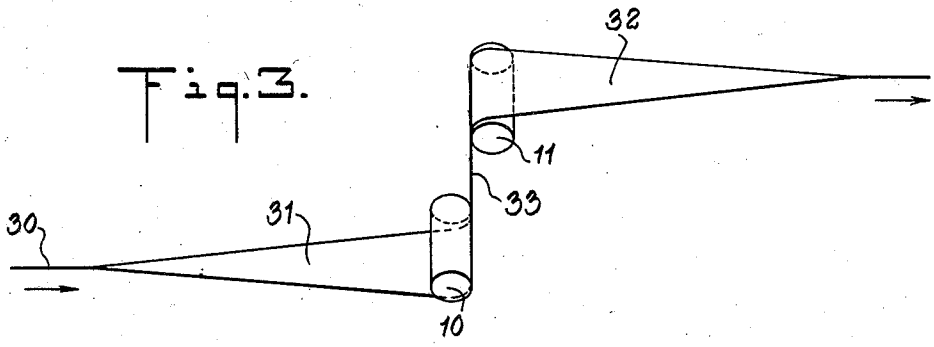
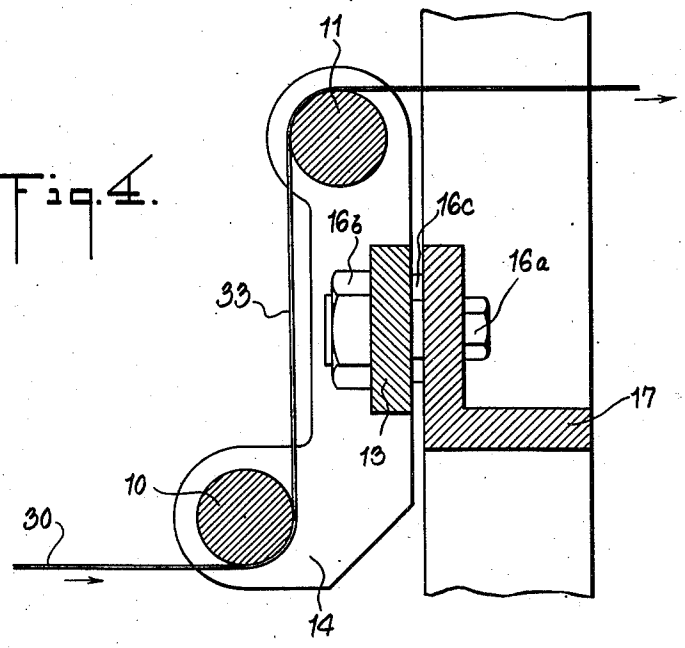


Fig. 4.



INVENTOR.
HARRY W. FAEBER
BY
Campbell, Brumbaugh, Free & Graves
ATTORNEYS

United States Patent Office 2,821,387
Patented Jan. 28, 1958

2,821,387

METHODS AND APPARATUS FOR VARYING WEB SIDELAY

Harry W. Faeber, Larchmont, N. Y., assignor to Time, Incorporated, New York, N. Y., a corporation of New York

Application April 22, 1954, Serial No. 424,907

3 Claims. (Cl. 271—2.6)

This invention relates to web guiding methods and apparatus and, more particularly, pertains to methods and apparatus for permitting sidelay correction of moving webs.

In the process of printing, it is often necessary to change the sidelay of the webs in order to guide them to various rolls in a proper path. Formerly, such sidelay correction was provided by a single roll or by a pair of rolls individually pivoted about an axis extending through one end thereof at right angles to the axis of rotation of the roll. Due to the disposition of the web on these rolls, movement of each roll about this latter axis resulted in a change of sidelay because of the increase in tension on one side of the web, which tends to climb or slide towards the high tension side just like a machine belt. Due to uneven tension, the web is liable to wrinkle and may even break if the rate of adjustment is too fast. Also, since change of sidelay is produced by increasing the tension on one side, the web continues to creep towards the high tension side as long as such increased tension remains in effect, i. e., as long as the roll is kept in the tilted position. This results in erratic over-correction.

Accordingly, it is an object of the present invention to provide apparatus for sidelay correction of a moving web lacking the above recited disadvantages.

It is another object of the invention to provide a change in the sidelay of a moving web by the adjustment of a simple screw mechanism for varying the angular disposition of two pivoted rolls.

These and further objects of the invention are accomplished by providing a pair of rolls, fixed relative to each other, and pivoted on an axis centrally disposed with respect to such rolls. A web lead approaching the device is 90° removed from the web lead between the rolls and a receding web lead is also 90° removed from the web lead between the rolls, resulting in a parallel relation between the approaching and receding web leads which travel in a common direction. Means are provided for swinging the rolls about the axis in order to secure a desired sidelay correction of the web.

These and further objects and advantages of the invention will be more readily understood when the following description is read in connection with the accompany drawings in which:

Figure 1 is a plan view of sidelay control apparatus constructed in accordance with the present invention;

Figure 2 is a view in elevation of the apparatus shown in Figure 1;

Figure 3 is a schematic diagram illustrating the manner in which a web is threaded through the rolls of Figure 1;

Figure 4 is an enlarged transverse section of apparatus according to the present invention taken on the line 4—4 of Figure 2 looking in the direction of the arrows; and

Figure 5 is a further sectional view taken on the view line 5—5 of Figure 2 looking in the direction of the arrows.

Describing the invention in detail with particular reference to Figures 1, 2, 4 and 5, two rolls **10** and **11** are journaled in a frame **12** consisting of a cross beam **13** joining two journal blocks **14** and **15**. The beam **13** is pivoted at its center point **16** by a stud **16***a*, a nut **16***b* and a spacer **16***c* (Figure 4) on a cross member **17**, joined at both extremities to supporting members **18** and **19** of a press frame (not shown).

In order to provide for rotation of the frame **12** about the pivot **16**, a bar **20** having a U-shaped member **21** integral with the free end thereof is joined to the frame **12** in any conventional manner and extends through an opening **22** provided in the supporting member **19**.

Mounted on the member **19** are two brackets **23** and **24** which journal a screw **25** carrying an adjusting handle **26** at one end thereof. Collars **27** and **27***a* hold the screw **25** endwise with respect to the bracket **24**, which is provided with a set screw **28** to permit the screw **25** to be locked at any desired point. Also carried by the screw **25** is a screw follower **29** having pins **34** and **34***a* extending therefrom engaging the U-shaped member **21** on the bar **20** (Figure 5).

In a typical operation of the invention, a web **30** is fed to the rolls **10** and **11**, as shown in Figure 3, with web leads **31** and **32** being as long as possible. It is necessary for the web **30** to approach to and recede from the sidelay apparatus at exactly right angles to a web lead **33** between the rolls **10** and **11** for proper operation of the device.

The handle **26** is next adjusted to provide the necessary change in sidelay, shown in Figure 1. Due to the center pivoting of the frame **12** at the point **16** and the 90° angle the approaching and the receding web leads **31** and **32** make with the web lead **33**, the web **30** will be steered sidewise, as shown in Figures 1 and 2, without increasing the tension on the web at one edge as against the tension at the other edge. In other words, the web tension remains equalized between both side edges of the web. This has two advantages. First, it minimizes stress concentration and the resulting danger of web breaks. Second, it avoids "over correction" of sidelay, which is one of the most serious drawbacks of sidelay devices using the principle of increasing the tension at one edge of the web and thus causing the web to creep sidewise in that direction due to the well-known tendency of belts and other web-like materials to "climb towards the high side."

True steering is provided, since the web lead **33** between the rolls **10** and **11** assumes an angular position with respect to the web **30**. This guides the web **30** to the new desired sidelay position. Also, since the web leads **31** and **32** are at right angles to the web lead **33**, it is clear from the geometry of the arrangement that the web **30** is not forced to slide sideways but follows a true circular path around the rolls **10** and **11**. Furthermore, due to the simultaneous movement of both of the rolls **10** and **11** about the center point **16**, the tension on either side of the web **30** remains identical regardless of the angular position of the frame **12**.

It will, of course, be understood that the above described embodiment of the invention is illustrative only and modification thereof will occur to those skilled in the art. For example, the screw adjusting mechanism for the arm **20** may be replaced by other equivalent means such as a hydraulic piston or a positioning servo mechanism. Therefore, the invention is not to be limited to the specific apparatus disclosed herein but is to be defined by the appended claims.

I claim:

1. A method for varying the sidelay of a moving web comprising the steps of passing the web through two par-

allel rolls in fixed relation on opposite sides thereof and with the web lead between said rolls perpendicular to the approaching and receding web leads, swinging said rolls about an axis parallel to and midway between two planes for varying the web sidelay, each of said planes being defined by the axis of one of said rolls and the direction of movement of the web, and maintaining equal tension at both edges of the web during the swinging movement of the rolls by steering the web around the rolls to its new position.

2. A method for varying the sidelay of a moving web comprising the steps of providing a pair of parallel rolls rotatably mounted in a frame centrally pivoted for movement about an axis perpendicular to said rolls, feeding the web to said rolls with the approaching and receding web leads perpendicular to the web lead between the rolls and parallel to said axis, angularly moving the frame through a desired angle about said axis for moving the web sidewise, and maintaining equal tension at both edges of the web during angular movement of the frame by steering the web around the rolls to its new position.

3. Apparatus to vary the sidelay of a moving web

comprising a pair of parallel rolls of equal diameter, a frame rotatably supporting the rolls, a member pivotally supporting said frame for angular movement about a first axis equidistant from the axes of said rolls, means to move said frame angularly on the pivot member about said first axis, the axes of the rolls respectively lying in two parallel planes each perpendicular to the first axis and displaced from each other along the first axis a distance equal to the diameter of said rolls, the rolls adapted to receive the web on opposite sides thereof with the approaching and receding web leads being parallel to the first axis, whereby the web lead between the rolls will be perpendicular to the approaching and receding web leads and angular movement of the frame on the pivot member about the first axis will steer the web as it travels around the rolls to a new sidelay position with equal tension on both sides thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,634,984 Dickhaut ---------- July 5, 1927