June 26, 1956 H. W. FAEBER 2,751,843

SELF-ADJUSTING FORM ROLL

Filed Aug. 29, 1952

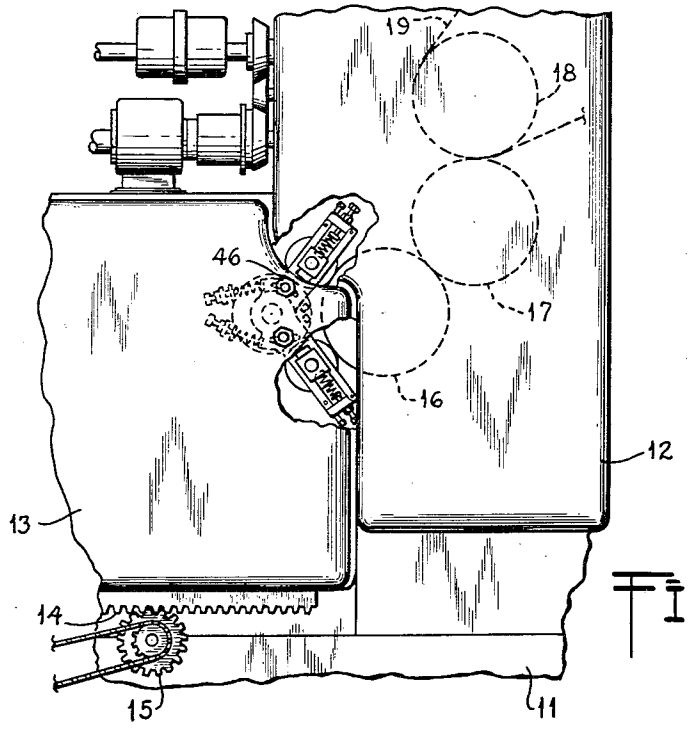


Fig. 1

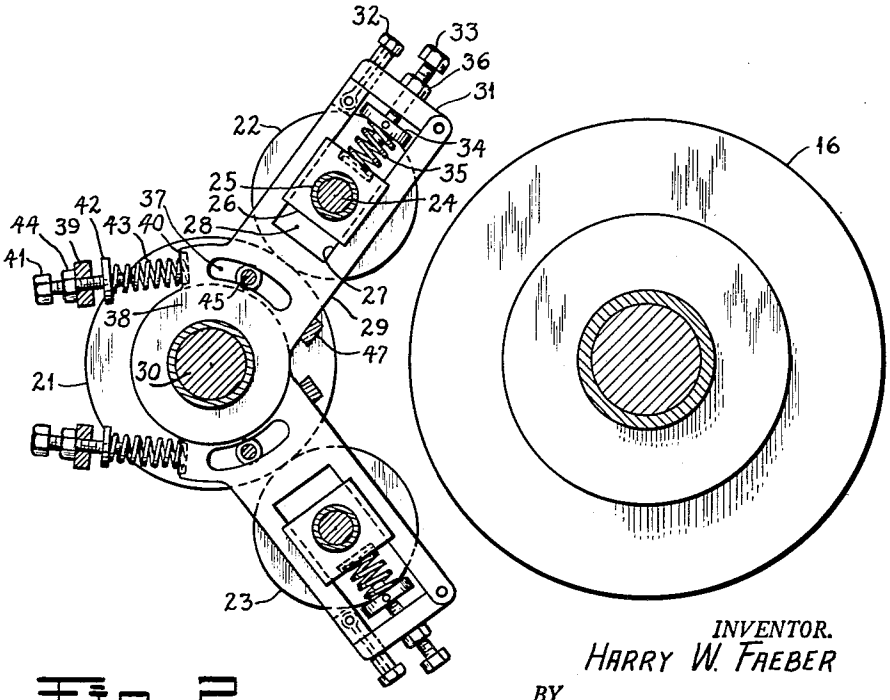


Fig. 2

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United States Patent Office 2,751,843
Patented June 26, 1956

2,751,843

SELF-ADJUSTING FORM ROLL

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Application August 29, 1952, Serial No. 307,056

4 Claims. (Cl. 101—349)

This invention relates to printing presses and, more particularly, to an improved method and apparatus for accurately adjusting the form rolls in the ink distribution system of a rotary press relative to both the distributor or vibrator roll and the plate or form cylinder.

It is a common practice to support each end of each form roll in printing presses on an arm which is pivoted about the axis of the distributor roll. The end of the form roll is slidable on the arm radially of the pivot point to permit independent adjustment of the position of the form roll relative to both the distributor roll and the plate cylinder. The position of each end of the form roll relative to its associated distributor roll is determined by a radially-acting set screw and the position of the former relative to the plate cylinder is determined by a push rod acting generally perpendicularly to the arm. The contact pressure between the form roll and the distributor roll and between the former and the plate cylinder are accordingly determined by the position of the form roll relative to these latter members. Thus the adjustment of the form roll has heretofore been accomplished in an indirect manner.

The principal object of the present invention is to provide a method and apparatus for predetermining the desired contact pressure between the form roll and the distributor roll and plate cylinder and permitting the form roll to assume whatever position is required to provide the desired contact pressures.

In accordance with the invention each form roll is supported radially and circumferentially with respect to the distributor roll and the radial pressure of each form roll is adjusted relative to the distributor roll. Next, each form roll is pivoted about the distributor roll by a resilient force such as to produce the desired pressure of the form roll with respect to the plate cylinder. Preferably, the circumferential movement of each form roll is limited while the roll is making contact with the plate cylinder in locked-up position to prevent the form roll from dropping in the gap between plates on the plate cylinder.

In order that the invention may be more fully understood, it will now be described with reference to the accompanying drawings wherein:

Fig. 1 is a side elevation view of the portions of a printing press with which the present invention is concerned, the side of the press being partially broken away for purposes of illustration, and

Fig. 2 is a side elevation view showing the novel manner in which form rolls are supported relative to a distributor roll and a plate cylinder.

Referring now to Fig. 1, a printing press comprising a base frame 11 on which is mounted a press side frame 12 and an ink distribution carriage 13 is shown in locked-up position. The side frame 12 is fixed to the frame 11, but the ink distribution carriage 13 is movable toward and away from the printing mechanism carried by the frame 12 by means of a rack 14 which meshes with a drive pinion 15.

Upon the side frames 12 there are journaled a plate

cylinder 16, a blanket cylinder 17 and an impression cylinder 18. A paper web 19 is fed by suitable web supply mechanism (not shown) to the impression cylinder 18 and travels on through the other conventional portions of the press not related to the present invention.

The ink distribution carriage 13 includes the usual ink fountain, fountain roll, doctor roll and various ink distributing rolls (not shown) which supply ink to a distributor roll 21 and, by means of form rolls 22 and 23, to the plate cylinder 16. The distributor roll 21 is journaled in the carriage 13 and is adapted to be reciprocated along its shaft 30, by a mechanism outside the scope of the present invention, to smooth the distribution of the ink film applied thereto.

Each end of each form roll is similarly supported, and the following description of the support of the journal 24 of the form roll 22, illustrated in detail in Fig. 2, is typical. The journal 24 is rotatably mounted in a bearing 25 which is secured in a hanger 26 on an arm 29, which latter member is pivotable about the shaft 30 of the distributor roll 21. The hanger 26 is adapted to slide along the arm 29 between guideways 27 formed by the sides of a slot 28 which extends radially of the shaft 30. The outer end of the slot 28 is bridged by a header member 31 which is pivoted on one side of the slot and secured by a swing bolt and nut 32 on the other side of the slot. The header member 31 is centrally bored and threaded to receive a set screw 33 which is directed radially of the axle 30. The set screw 33 extends through the header member 31 and is provided near its inner end with a thrust collar 34 that is pinned or otherwise secured to the screw. A helical compression spring 35 acts between the thrust collar 34 and a recess in the hanger 26 and serves to apply a resilient inward pressure tending to force the form roll 22 against the distributor roll 21. The amount of pressure may be adjusted by turning the set screw 33 and fixed against misadjustment by a lock nut 36 which bears against the outer face of the header member 31.

The pressure exerted by the form roll 22 against the plate cylinder 16 in locked-up position is determined by a helical compression spring 43 which tends to pivot the arm 29 about the shaft 30 with the result that the form roll 22 moves tangentially to the distributor roll 21 and does not disturb the adjustment therebetween. A hub 38 supporting the arm 29 is provided with a shoulder 40 containing a recess in which the end of the spring 43 is received. A lug 39 is provided on the side of the carriage 13 protruding inwardly. The lug 39 is bored and threaded to receive a set screw 41 which projects therethrough and extends parallel to the side of the carriage 13, terminating opposite the recess in the hub 38. A thrust collar 42 is secured near the inner end of the set screw 41 and is adapted to receive the other end of the helical spring 43. The force exerted by the spring 43 is adjustable by turning the set screw 41 and locking the same by means of a lock nut 44 which bears against the lug 39. A limit-stop lug 47 attached to the inner side of the carriage 13 restricts the pivotal motion of the arm 29 when the carriage 13 is in the open position.

An arcuate slot 37 is formed in the hub 38 concentric with the shaft 30. A bolt 45 extends through the slot 37 and projects outwardly through a borehole in the side of the carriage 13. A nut 46 (shown in Fig. 1) is threaded on the end of the bolt 45 and when tightened clamps the hub 38 against the side of the carriage 13. When the carriage 13 is in locked-up position, the form roll 22 assumes its final position with reference to the plate cylinder 16 in accordance with the force applied by the spring 43. Clamping the form roll 22 in this position prevents it from dropping into the gap between the plates on the plate cylinder 16.

It is not essential to clamp the hub **38** if there is no danger of wear or damage as the form roll passes over the edges of the plates on the plate cylinder **16**. In any case it is sufficient to limit the forward pivotal movement of the arm **29** to effect the desired protection of contacting surfaces.

Usually, a second pair of form rolls are employed in a rotary printing press and these additional rolls may be supported in the same manner as the pair illustrated. Accordingly, the invention is not limited to the particular embodiment shown but is to be limited only by the appended claims.

I claim:

1. In a printing machine having a plate cylinder and a distributor roll coupled in locked-up position by at least one form roll, the combination comprising means for adjusting the form roll comprising a radial arm pivotable about the axis of the distributor roll for supporting each end of the form roll radially and circumferentially of the distributor roll, means on each arm for pressing the form roll against the distributor roll with an adjustable resilient pressure, means for pivoting each arm toward the plate cylinder with a resilient pressure and means for clamping the pivotal position of each arm when the form roll is in contact with the plate cylinder in locked-up position.

2. In a printing press having a plate cylinder and a distributor roll coupled in locked-up position by at least one form roll, the combination comprising means for adjusting the form roll comprising an arm pivotable about the axis of the distributor roll for supporting an end of the form roll radially and circumferentially of the distributor roll, a radially-acting spring on said arm for pressing the form roll in against the distributor roll, a circumferentially-acting spring for pivoting said arm toward the plate cylinder, means for clamping the pivotal position of said arm when the form roll is in contact with the plate cylinder in locked-up position, and means for independently adjusting the forces exerted by said springs.

3. In a printing press having a plate cylinder and a distributor roll coupled in locked-up position by at least one form roll, the combination comprising means for adjusting the form roll comprising a radial arm pivotable about the axis of the distributor roll for supporting an end of the form roll radially and circumferentially of the distributor roll, a radially-acting spring on said arm for pressing the form roll in against the distributor roll, a circumferentially-acting spring for pivoting said arm toward the plate cylinder, means for independently adjusting the forces exerted by said springs, and means for clamping the pivotal position of said arm when in locked-up position to prevent dropping of the form roll in the gap between plates on the plate cylinder.

4. In a printing press having a plate cylinder and a distributor roll coupled in locked-up position by at least one form roll, the combination comprising means for adjusting the form roll comprising spaced radial arms pivotable about the axis of the distributor roll, guideways on said arms, a bearing for each end of the form roll slidably supported in a respective one of said guideways for radial movement with respect to the distributor roll, a radially-acting spring on each arm for pressing the form roll in against the distributor roll, a circumferentially-acting spring for pivoting each arm toward the plate cylinder, means for independently adjusting the forces exerted by said springs, and means for clamping the pivotal position of said arms when in locked-up position to prevent the form roll from dropping in the gap between plates on the plate cylinder.

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