July 31, 1962 J. JURNÝ 3,046,881

DEVICE FOR THE PRESSURE ADJUSTMENT OF PRINTING ROLLERS

Filed Aug. 22, 1960 3 Sheets-Sheet 1

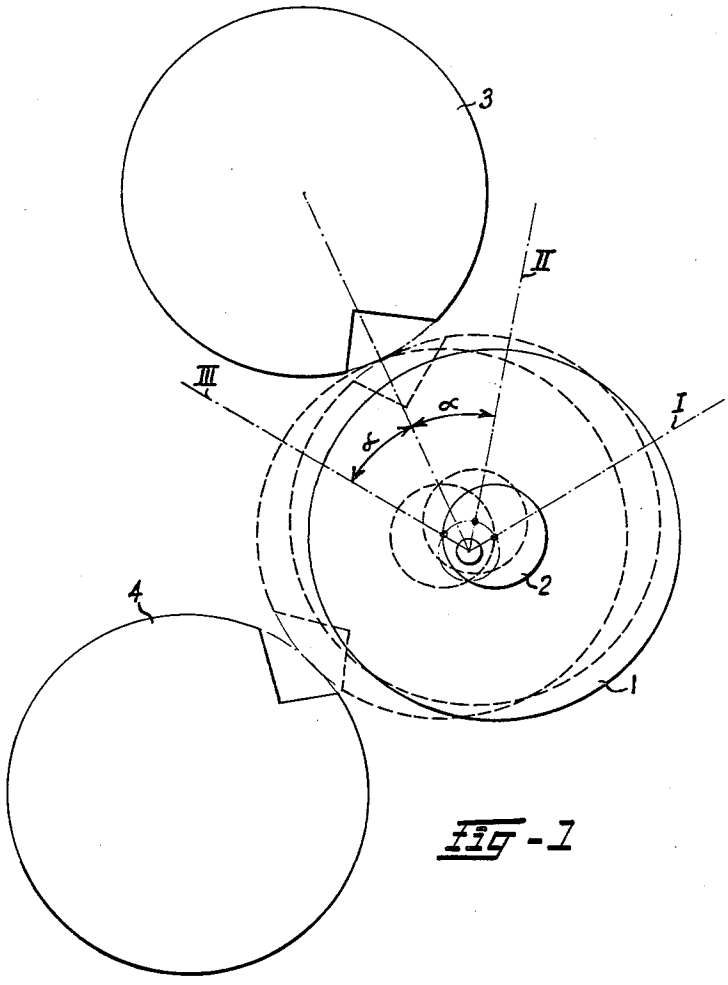


Fig - 1

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DEVICE FOR THE PRESSURE ADJUSTMENT OF PRINTING ROLLERS

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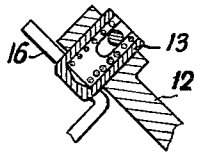


Fig-4

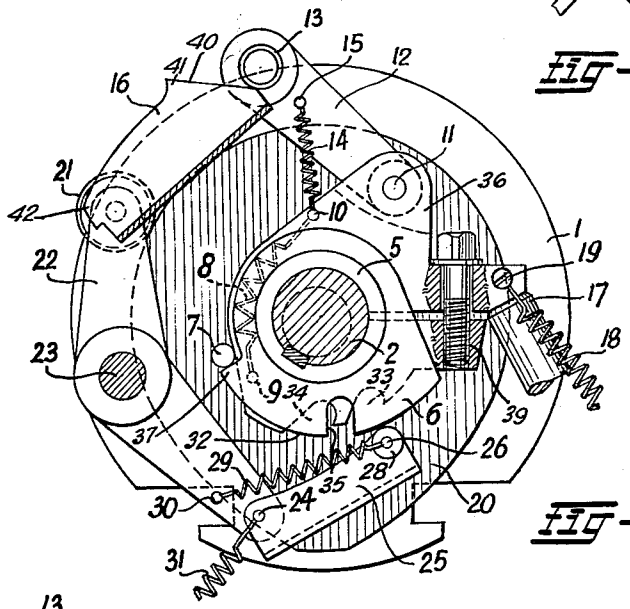


Fig-2

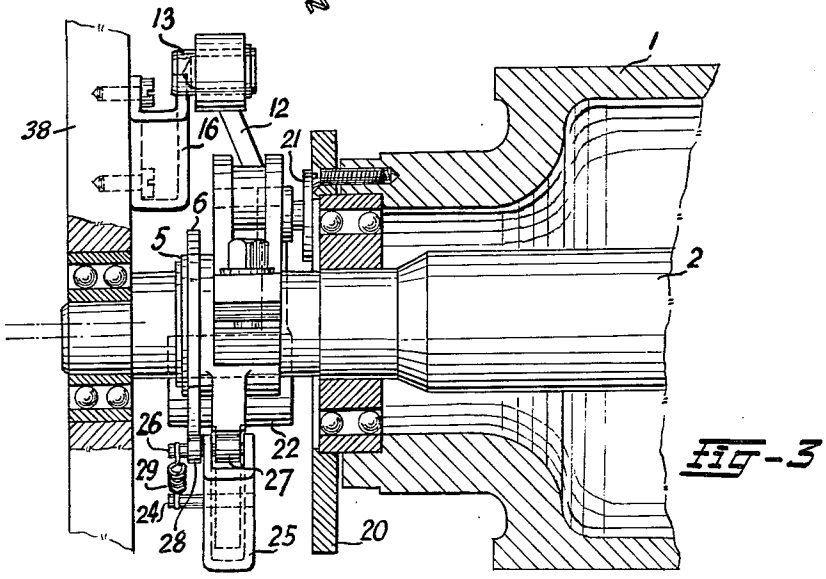


Fig-3

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DEVICE FOR THE PRESSURE ADJUSTMENT OF PRINTING ROLLERS

Filed Aug. 22, 1960 3 Sheets-Sheet 3

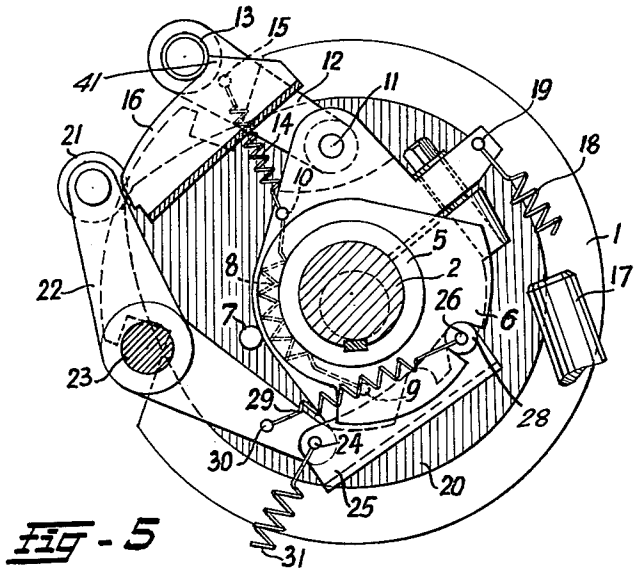


Fig - 5

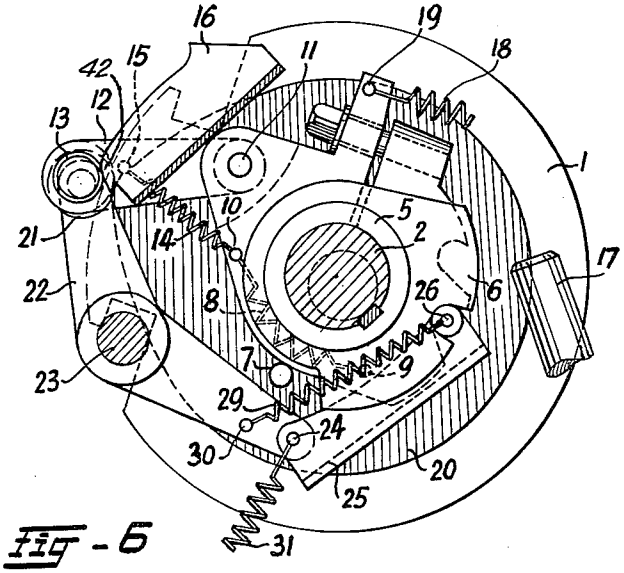


Fig - 6

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DEVICE FOR THE PRESSURE ADJUSTMENT OF PRINTING ROLLERS

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The present invention relates to a device for the pressure adjustment of printing rollers.

In the hitherto known small size printing machines, such as offset machines, the pressure adjustment of the rollers is effected by shifting the offset roller against the metal foil roller, from which the design is rolled on to the offset rubber and, after rolling, the offset roller is shifted against the counterpressure roller at the moment, when the paper starts passing between the offset and counterpressure rollers.

According to the main feature of the present invention the successive adjustment of all three rollers to the required pressure is carried out on a given impulse by a simple mechanism automatically by means of a cam and the disengagement of the rollers is effected by a spring.

In order that the invention may be clearly understood and readily carried into practice, it will now be described in detail on hand of an exemplary embodiment, as shown in the accompanying drawings.

FIGURE 1 shows in a diagrammatic representation the principle of adjusting printing rollers in various positions.

FIGURE 2 shows in a diagrammatic representation the mechanism according to the invention in an elevational view, partly in section,

FIGURE 3 shows the mechanism in a side view, partly in section, in disengaged position, i.e. when the rollers are not subjected to any pressure,

FIGURE 4 shows a detail of the mechanism in a cross-sectional view,

FIGURE 5 shows the mechanism in a representation similar to FIG. 2, but in a position corresponding to the pressure adjustment between the metal foil and offset rollers and

FIGURE 6 is a similar representation showing the mechanism in a position in which all three rollers are subjected to pressure.

FIGURE 1 represents diagrammatically the pressure adjustment of printing rollers as carried out in conventional printing machines. The off-set roller 1 is mounted for rotation on an eccentric shaft 2, by the rotation of which the offset roller 1 approaches the metal foil roller 3 and counter-pressure roller 4. If the axis of eccentricity of the offset shaft 2 (FIG. 1) is in the position I, the rollers are not subjected to any pressure. If the shaft 2 is turned into position II, pressure is produced between the offset roller 1 and the metal foil roller 3 and by turning the shaft 2 into position III, pressure is produced between the offset roller 1 and the counterpressure roller 4. As, however, the angle α formed between connecting line of the axes of the metal foil roller 3 and the offset roller 1 and the axis of eccentricity of the shaft 2 when in position II, is equal to the angle α formed between said connecting line and the axis of eccentricity in the position III, also the pressure between the metal foil roller 3 and the offset roller 1 is equal in both positions.

In machines having an offset roller with an eccentric shaft the latter is turned usually by means of a hand lever, the lifting of which requires a considerable effort in order to overcome a powerful spring which, after being tensioned by means of the lever mechanism, causes in predetermined time intervals during rotation of the rollers the turning of the eccentric shaft. If both pressures are automatically relieved, when for example the paper feed mechanism fails to operate and does not feed any paper, the lever mechanism, which is tensioned by a powerful spring, returns to its initial position, causing usually an impact in the machine, which is detrimental to the fine adjustment of the exact mechanisms.

When pressure is adjusted between the offset roller 1 and the counterpressure roller 4, as shown by position III in FIG. 1, the axis of eccentricity of the offset shaft 2 traverses said connecting line of the centres of the metal foil roller 3 and the offset roller 1 at the moment, when the operative surfaces of these rollers lie opposite one another, with the result that undesirable impact pressures occur, which reduce the life of the rubber coating on the offset roller 1 and in particular of the metal foil, on which the design is wiped off and disappears.

With a view to the fact that the pressure adjustment is carried out by the pulling action of a powerful spring which has to be tensioned manually by means of a lever mechanism, the operation of which is determined by the required time intervals, the whole device is relatively intricate and the component parts thereof are stressed by considerable forces, with the result that the liability to failures is rather high and the pressure adjustment cannot be effected from a central place.

The device according to the invention aims at removing the aforesaid disadvantages and shortcomings. According to the main feature of the invention the successive adjustment of all three rollers to the required pressure is carried out on a given impulse by a simple mechanism automatically by means of a cam and for relieving the pressure a relatively weak spring is used, the purpose of which is merely to return the eccentric shaft into its original position, so to avoid undesirable impacts in the machine. High pressures between the metal foil and offset rollers are also eliminated during the pressure adjustment, because the turning of the eccentric shaft is effected in that position only, where the relieved portions of the rollers are facing each other. This is the reason why the rubber coating cannot be damaged nor the design on the metal foil wiped off.

Reference will now be made to the accompanying drawings, in which one possible embodiment of the invention is shown in a diagrammatic representation in FIGS. 2 to 6.

A sleeve 5 is secured to an eccentrically rotating shaft 2 of the offset roller or cylinder 1. Mounted for rotation on the hub of the sleeve 5 is a rocker arm 6 bearing with its tooth 37 on a fixed abutment 7, against which it is permanently drawn by a spring 8 secured on a pin 9 provided in the rocker arm 6 and fastened with its other end to a pin 10 which is fixed in the sleeve 5. A part of the surface of the rocker arm 6 is provided with a spiral track 32 having a radial recess 35. The sleeve 5 likewise has in a part of its surface two recesses 33, 34 and one side of the sleeve 5 is shaped as a bifurcated arm 36 in which a control lever 12 is pivotally mounted with one of its ends on a pin 11, said lever 12 carrying at its other end a spring-loaded slidable guiding pin 13 as shown in FIG. 4 in a cross-sectional view.

The control lever 12 is permanently pressed by a spring 14, suspended on a stud 15, against the surface of a guide rail 16 secured in the sidewall 38 of the machine. An arm 39 of the sleeve 5 is constantly pressed against an abutment 17 by means of a spring 18 which is suspended on a bolt 19 fixed in the sleeve 5. Secured to a flange of the offset roller 1 is a cam 20, along which a roller 21 of a two-armed lever 22 is adapted to roll. The lever 22 is mounted on a pivot 23, which is fixed in the sidewall 38 of the machine.

Mounted for rotation in the other arm of the lever 22 on a pin 24 is a feed lever 25 carrying on a pivot 26 a feed roller 27 and a roller 28 cooperating with the rocker

arm 6. The feed lever 25 is constantly pressed into engagement by a spring 29 suspended on a stud 26 and on projection 30 in the two-armed lever 22. The two-armed lever 22 with the feed lever 25 is actuated by a spring 31 which is suspended on the pin 24 and secured with its other end in the sidewall 38 of the machine in such a manner that the roller 21 follows the track of the cam 20.

The device according to the invention operates as follows:

The cam 20 fixed to the offset roller 1 sets by its rotation the two-armed lever 22 and thus also the feed lever 25 into a swinging movement, the roller 28 of the feed lever 25 rolling along the spiral track 32 of the rocker arm 6. The latter is constantly drawn by the spring 8 against the fixed abutment 7, the roller 28 rolls along the rocker arm 6 and the roller 27 is not in operation for the time being. If the rocker arm 6 is turned (by means of a push button, link, cable, controlled for example from a central control box) so that its recess 35 and the recess 33 in the sleeve 5 are in register, the roller 28 engages the recess 35 in the rocker arm 6 and the roller 27 the recess 33 in the sleeve 5, causing by their rocking movement the turning of the eccentric shaft 2 of the offset roller 1. During this turning movement the guiding pin 13 travels along the slope 40 of the guide rail 16 until at the end of the turning movement it snaps behind a projection 41 on the rail 16 as shown in FIG. 5. Thus the return movement of the sleeve 5 is prevented and the offset roller 1 remains pressed against the metal foil roller 3 while the lever 22 returns to its starting position shown in FIG. 2.

During this return movement of the two-armed lever 22 with the lever 25 the roller 27 slides out of the recess 33 provided in the sleeve 5 and engages its other recess 32 due to the fact the roller 28 travels in the recess 35 of the rocker arm 6, the latter following its movement. During further travel of the cam 20 the roller 27 starts again to turn the sleeve 5 until the guiding pin 13 snaps behind a second projection 42 in the guide rail 16 as shown in FIG. 6.

During the second return movement of the feed lever 25 the roller 27 travels along the run-out portion of the second recess 34 in the sleeve 5, which is higher than the start of the spiral track 32 of the rocker arm 6, shifting thus the roller 28 out of the recess in the rocker arm 6, which, pulled by the spring 8, returns to its initial position so as to abut against the stop 7. The spiral track 32 of the rocker arm 6 lifts the roller 28 and thus also the roller 27 during their return movement. In the course of further swinging movements of the feed lever 25 the roller 28 travels along the spiral track 32 of the rocker arm 6 and remains inoperative.

If, for instance, the paper feed mechanism fails to operate and does not feed any paper, a special known device, which is not shown in the drawing, causes the guiding pin 13 to be depressed and the sleeve 5, which is subject to the pull of the spring 18, returns to its initial position, where it abuts against the stop 17. When the sleeve 5 returns to its initial position the depressed guiding pin 13 travels along the side of the guide rail 16, avoiding thus the first projection 41 on the guide rail 16 and the roller 27 is likewise out of reach of the recess in the sleeve 5, because the roller 28 is raised by the rocker arm 6, with the result that the sleeve can return to its initial position and the rollers are relieved from pressure.

The entire device may be carried out as required in various modifications. The shaft can be turned, for instance, to several positions, under different angles, in various time intervals and with the possibility of returning to any desired position.

I claim:

1. A device for position adjustment of printing rollers in a printing machine, comprising an offset roller, a metal foil roller, and a counterpressure roller, a rotatable shaft carrying the offset roller for rotation about an axis radially spaced from the axis of rotation of said shaft, a sleeve with recesses mounted on said shaft, a rocker arm mounted for rotation on said sleeve, a roller track with a recess provided on the rocker arm, a cam rigidly connected to the offset roller, a lever mechanism adapted to be actuated by said cam, a feed lever carried by said lever mechanism and adapted to cooperate with said sleeve and rocker arm, a guide rail provided with retaining projections, a control lever pivotally connected to the sleeve, a slidable guide pin mounted in the control level and adapted for engagement with the projections on the guide rail to retain the control lever and thus the offset roller in the desired adjusted positions, said lever mechanism comprising a two-armed lever adapted to carry out rocking movements, said feed lever being attached to the two-armed lever, a roller on the feed lever adapted to cooperate with the rocker arm and another roller adapted to cooperate with the sleeve and to actuate said rocker arm and said sleeve when their respective recesses are in register to successively move said shaft from an initial inoperative position to a plurality of operative positions, and spring means adapted to return the shaft to the initial position thereof.

2. In an offset printing apparatus, in combination, a support; a shaft rotatable about an axis on said support between an inoperative position and angularly consecutive first and second operative positions; resilient means permanently urging said shaft into said inoperative position thereof; an offset cylinder freely rotatable on said shaft about an axis radially spaced from the axis of rotation of said shaft; cam means mounted on said cylinder for joint rotation; lever means pivotally mounted on said support and engaging said cam means for one reciprocating forward and backward movement of said lever means during each revolution of said cylinder; engagement means on said lever means and on said shaft engageable for actuating rotation of said shaft from said inoperative position to said first operative position, and from said first to said second operative position during respective forward movements of said lever means; and stop means on said support releasably engageable with said shaft for retaining the same in said operative positions thereof against the urging of said resilient means during backward movement of said lever means.

3. In an apparatus as set forth in claim 2, a blocking member movable on said shaft between a blocking position in which said member blocks engagement of said engagement means on said lever and on said shaft, and a releasing position in which said blocking member permits actuation of movement of said shaft by said engaging engagement means; and motion transmitting means responsive to movement of said shaft from said first to said second operative positions thereof for moving said blocking member from said releasing to the blocking position thereof during backward movement of said lever means.

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