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[56]

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[54] **ROTARY OFFSET PRESS WITH POSITION
 CONTROL OF OFFSET CYLINDER RELATIVE TO
 ADJACENT PRESS CYLINDERS**
 4 Claims, 4 Drawing Figs.

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ABSTRACT: The offset cylinder of a printing machine is brought into pressure engagement at predetermined time intervals first with the form cylinder and subsequently with the pressure cylinder by means of a lever system actuated by a cam disc freely rotatably mounted on the hub of a toothed driven wheel, with pawl means caring for temporary connection of the cam disc with the toothed wheel, with a two-arm lever controlling the position of said pawl means, the position of said two-arm lever controlled by a control lever.

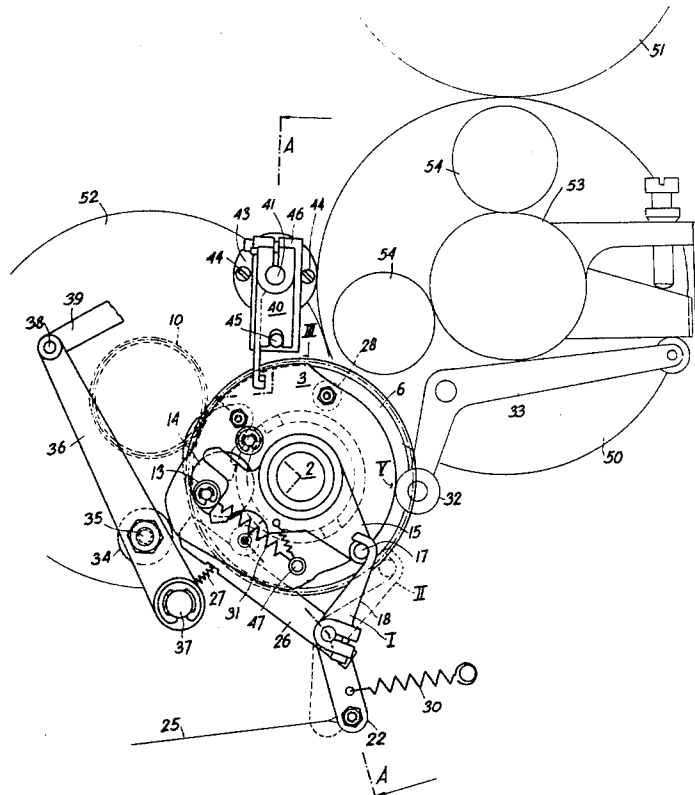
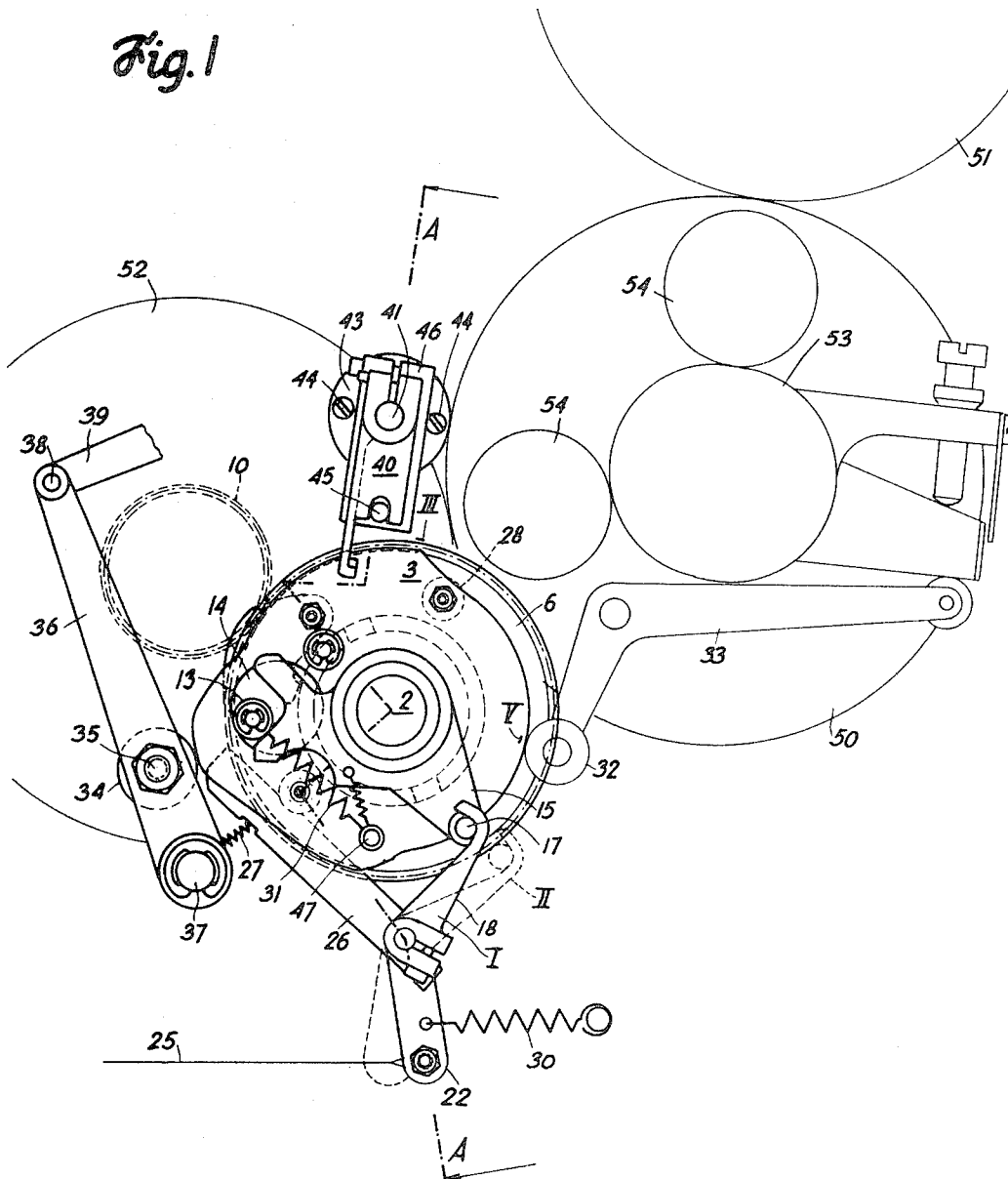


Fig. 1



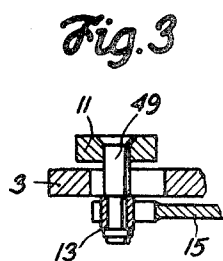
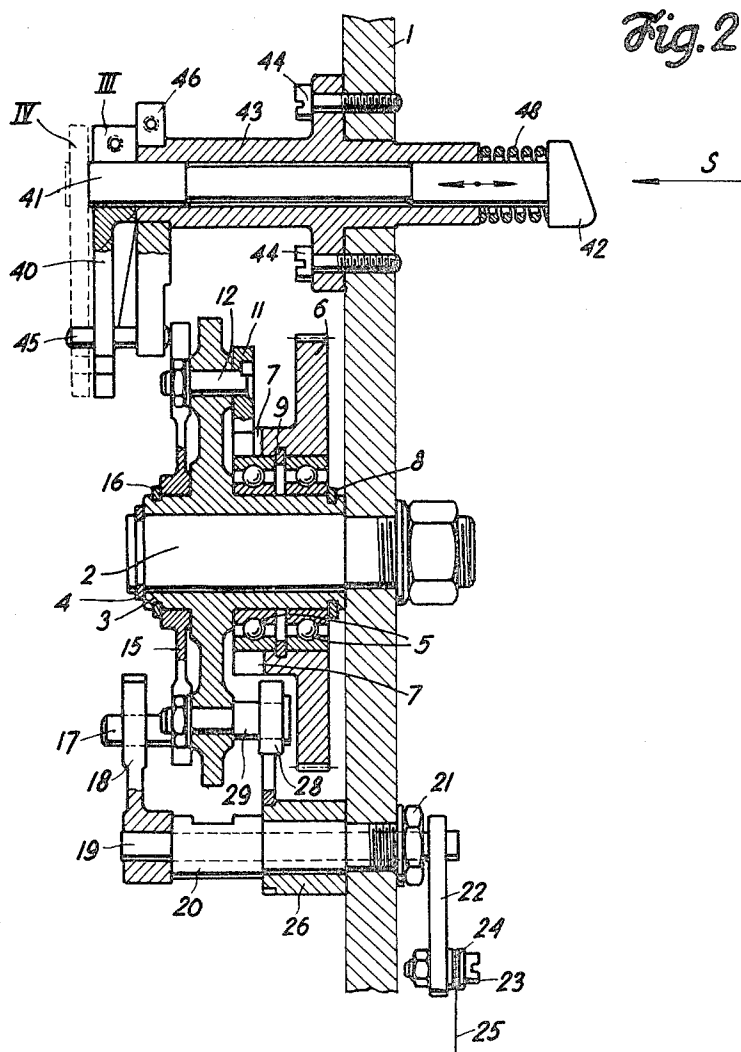
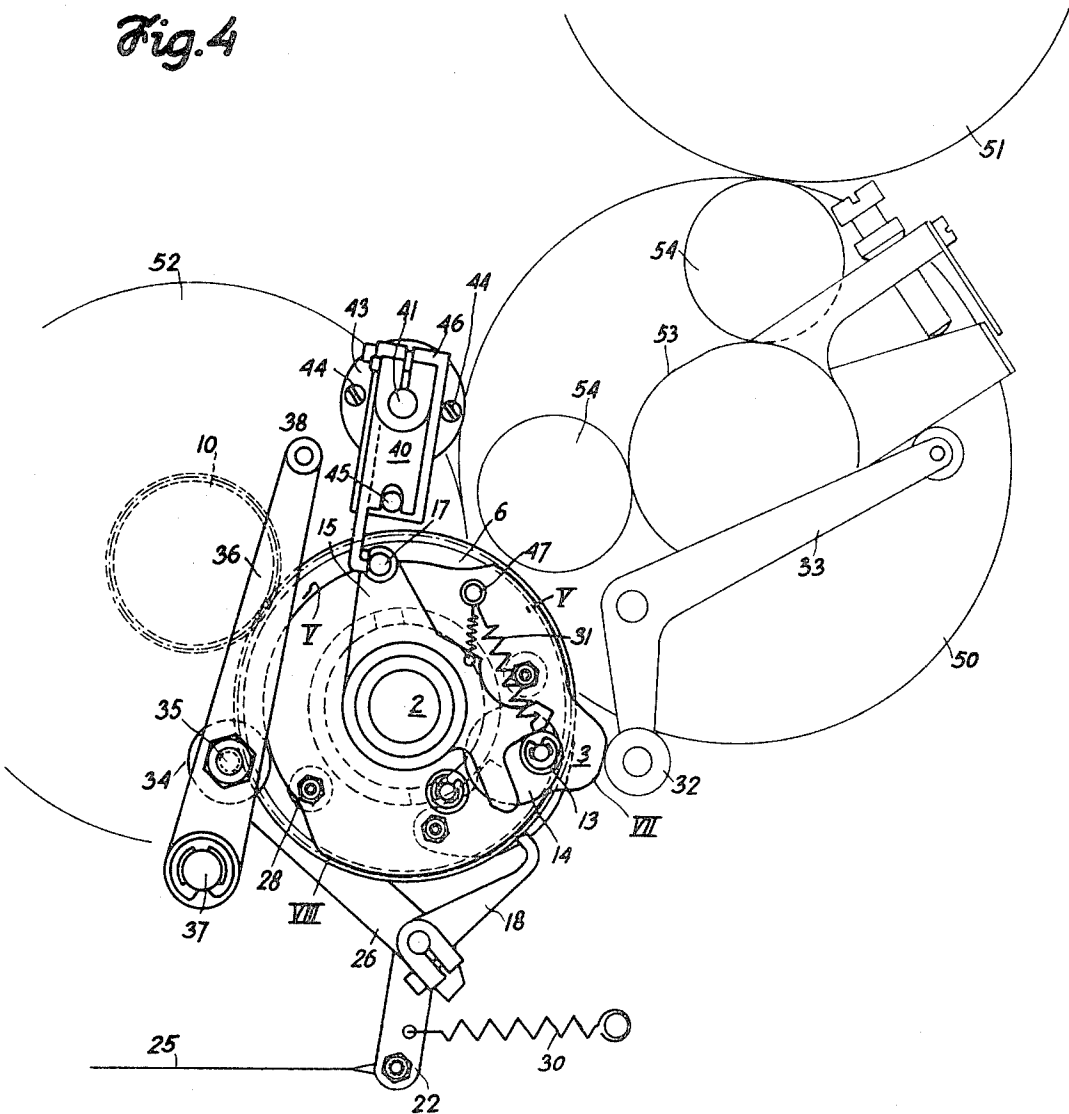


Fig. 4



ROTARY OFFSET PRESS WITH POSITION CONTROL OF OFFSET CYLINDER RELATIVE TO ADJACENT PRESS CYLINDERS

BACKGROUND OF THE INVENTION

This invention relates to an arrangement for bringing an offset cylinder of a printing machine in temporary pressure engagement with other cylinders of this printing machine.

Printing cylinders of offset printing machines are brought generally in pressure engagement by first approaching the offset cylinder towards the form cylinder and after transmission of the picture towards the pressure cylinder. This approachment and removal has to be performed within predetermined time intervals.

At actually known arrangements the offset cylinder is mounted by means of twin eccentric bushings or crank arms. Such a mounting enables an independent approachment of the offset cylinder both to the form cylinder and to the pressure cylinder.

A drawback of said arrangements is however that they require a special or an additional device for the control of these elements and a further device, which cares for the automatic approach of the inking and damping arrangement in the course of passage of the inactive part of the form cylinder within a subsequent time interval. Such devices are rather complicated and liable to failures.

At lighter printing machines, eccentric shafts, on which the offset cylinder is rotatably supported, are used for bringing the offset cylinder in pressure engagement by turning said shafts. A part of the device for turning the eccentric shaft is arranged directly on said shaft, another part on the sidewall of the printing machine.

This arrangement has the drawback, that the whole mechanism has to be dismantled when removing the offset cylinder. Another drawback is that it can be used only for a certain dislocation of the printing cylinders.

The whole arrangement is actuated by cams having the same rotating speed as the printing cylinders and as two speeds have to be applied for the subsequent function of the mechanism, the thus derived movement is accomplished within two equal time intervals. These intervals cannot however be utilized for printing cylinders having an inactive cylindrical part determined by a smaller angle than 100° and for a relative mounting of the printing cylinder at a larger angle than 90°. A still further drawback is that this arrangement cannot be used for speeds exceeding 7000 revolutions per hour, as due to the inertia of the offset cylinder its operation is not reliable. Another drawback is, that in case of disengagement from pressure at the introduction of the paper sheet the printing cylinders are brought simultaneously into their starting position in an unfavorable moment, so that a strip of a part of the transmitted ink is left on the printing plate. In the course of the subsequent printing this strip is reproduced on the first prints, which are thus depreciated.

SUMMARY OF THE INVENTION

It is an object of this invention to eliminate said drawbacks and to provide a control of the position of the offset cylinder which would allow an easy manipulation with the cylinder, an automatic pressure engagement of the printing cylinders at the required time intervals and an automatic removal of all printing cylinders from pressure engagement if no paper sheet is introduced, said removal being performed at the right moments, safeguarding that already the first prints are of high quality.

In accordance with this invention a cam disc is rotatably mounted on a bolt fixed on the sidewall of the machine, with a toothed wheel rotatably supported on the hub of said cam disc, said toothed wheel provided with at least one recess, a pawl mounted in rocking fashion on said cam disc, said pawl adapted for engagement with the recess of said toothed wheel, with a two arm lever mounted rotatably on the hub of said cam disc, whereby a roller mounted on said pawl engages with a

recess on the extremity of one arm of said two-arm lever, while an extension on the extremity of the second arm of the two-arm lever engages with a control lever.

A retaining lever fixed on an axle axially shiftable in a sleeve fixed on the sidewall of the machine cooperates with the extension on the second arm of the two-arm lever, the different positions of the cam disc being secured by retaining rollers cooperating with another spring loaded retaining lever. The ratio of revolutions of the toothed wheel driving the cam disc and of revolutions of the pressure cylinder is smaller than 1.

This arrangement has the advantage that the pressure engagement of the printing cylinders is accomplished automatically at predetermined time intervals by a more impulse of a press button or of a pull rod. If no paper sheet is introduced, all printing cylinders are automatically removed at the required time intervals while inactive parts of the printing cylinders are in engagement, so that high quality printing is obtained already for the first prints.

Another advantage is, that the whole arrangement is very simple and not liable to failures. One of the main advantages of this arrangement is furthermore the circumstance that the control cam of the whole system has half the number of revolutions of the printing cylinders so that the shape of the cam can be adjusted to any required functional interval and due to the relatively slow speed of the whole mechanism this arrangement operates reliably even at speeds exceeding 10,000 revolutions per hour. The arrangement has furthermore the advantage that disengagement from printing pressure is controlled by the shape of the cam and is equally accomplished within the required time interval. In addition this arrangement can control by way of a simple additional mechanism the approachment and removal of the spreader rolls of ink arrangements in the course of engagement of the inactive part of the form cylinder.

DESCRIPTION OF THE DRAWINGS

One of possible embodiments of the object of this invention is schematically shown in the accompanying drawings, where FIG. 1 is an elevation of the arrangement, FIG. 2 is a sectional side view with the section along the plane A-A indicated in FIG. 1, FIG. 3 is a sectional view if a detail with the section along the plane B-B indicated in FIG. 1 and FIG. 4 is an elevation of the arrangement similar as in FIG. 1 but in a position where the printing cylinders are in pressure engagement.

DESCRIPTION OF PREFERRED EMBODIMENT

With reference to the drawings a bolt 2 is fixed in the sidewall 1, with a cam disc 3 rotatably mounted on said bolt 2, secured against axial shifting by a retaining ring 4. A toothed wheel 6 is mounted by roller bearings 5 on the hub of the cam disc 3, the hub of the toothed wheel 6 provided with two recesses 7. The toothed wheel 6 is secured against axial shifting by retaining rings 8 and 9. The toothed wheel 6 meshes with a toothed driving wheel 10 indicated in the drawings only schematically on the axis of the pressure cylinder 52. The toothed driving wheel 10 has half the number of teeth of the toothed wheel 6. A pawl 11 fixed on a bolt 12 which itself is rotatably supported in the body of the cam disc 3 engages into the recesses 7 of the toothed wheel 6. A bolt 49 is fixed on the end of the pawl 11, which bolt 49 passes through an opening of the cam disc 3 and supports on its end a roller 13 engaging into a recess 14 of a two-arm lever 15.

The two-arm lever 15 is rotatably mounted on the hub of the cam disc 3 and is secured against axial shifting by a retaining ring 16. A bolt 17 is fixed on the second arm of this two-arm lever 15 engaging in the starting position into a recess of a control lever 18 fixed on one end of a shaft 19. The shaft 19 is mounted in a sleeve 20 fixed by means of a nut 21 in the sidewall 1 of the printing machine. A lever 22 is fixed on the opposite end of said shaft 19, with a roller 24 rotatably mounted on a bolt 23 fixed on the arm of said lever 22. A retaining lever 26 is rotatably supported on a shoulder of the

sleeve 20 loaded by a spring 27 and provided with a recess, with retaining rollers 28 rotatably mounted on bolts 29 fixed on the cam disc 3 adapted for engagement into said recess. A spring 30 is suspended with one end on the lever 22 and is fixed with its other end of the sidewall 1 and maintains the control lever 18 in the starting position indicated in FIG. 1 by full lines. A spring 31, suspended on the bolt 12 and on a suspending bolt 47 fixed on the cam disc 3 generates pressure of the pawl 11 into the recess 7 of the hub of the toothed wheel 6. A roller 32 mounted on a two-arm lever 33, which is part of a not shown device causing deviation of the shaft of the offset cylinder 50, engages with the cam disc 3. A cam 53 is fixed on the shaft of the offset cylinder 50 resting against supporting rollers 54. The cam 53 and the supporting rollers 54 are part of means for mounting the offset cylinder 50. The form cylinder is indicated as 51.

A roller 34 rotatably mounted on a bolt 35 fixed on a lever 36 equally engages with the cam disc 3. The lever 36 is mounted in rocking fashion on a bolt 37 fixed in the sidewall 1 of the printing machine. A bolt 38 is fixed on one end of the lever 36, supporting one end of a rod 39 controlling a not shown device for bringing into engagement and for removal of spreader cylinders of ink and damping arrangements. In the position as indicated in FIG. 1 a retaining lever 40 fixed on an axle 41 cooperates with the bolt 17, on the opposite end of which axle 41 a slip sheet 42 is fixed. The axle 41 is axially shiftably supported in a bushing 43 fixed by means of screws 44 in the sidewall 1. The retaining lever 40 is secured against turning by means of a slot at the extremity of an arm, into which slot a locking bolt 45 engages, fixed on a lever 46 mounted on a shoulder of the bushing 43. The retaining lever 40 is maintained in its starting position by a spring 48.

The described structure operates as follows:

The starting position I is indicated in FIG. 1. In the course of operation of the machine, the toothed wheel 6 is steadily turning, receiving its rotating motion from the toothed wheel 10. The cam disc 3 is at rest, as the dent of the pawl 11 is lifted by the roller 13 leaning against the recess of the two-arm lever 15 and does not therefore engage into the recess 7 of the hub of the toothed wheel 6. The cam disc 3 is in the rest position secured by the retaining roller 28 engaging into a recess of the retaining lever 26.

The transfer of the printing cylinders into mutual pressure engagement is accomplished so, that by means of a not shown press button or rod the control cable 25 is actuated, deviating thus the control lever 18 from position I to position II and releasing the bolt 17 of the two-arm lever 15. The roller 13 in the recess 14 of the two-arm lever is released, releasing in turn also the pawl 11, the dent of which contacts due to the pull force of the spring 31 with the hub of the toothed wheel 6. At a moment determined by the operating cycle of the machine where a recess 7 in the hub of the toothed wheel 6 passes below the dent of the pawl 11, the dent of the pawl 11 fits into the recess 7 and the toothed wheel 6 is thus firmly connected with the cam disc 3. The cam disc 3 is rotating and causes a deviation of the lever 36 by means of the roller 34. The inking cylinders are brought into pressure engagement with the printing plate at the moment, where the inactive part of the form cylinder 51 passes below the spreader rollers. In the position, where the inactive parts of the form cylinder 51 and of the offset cylinder 50 are turned one opposite the other, the roller 32 starts to come into engagement with the circumferential curve of the cam disc 3 in position VI and a not shown device cares for the approachment of the offset cylinder 50 towards the form cylinder 51 by means of the two-arm lever 33. At the moment, where the inactive parts of the offset cylinder 50 and of the pressure cylinder 52 are one opposite to the other, the roller 32 starts to come into engagement with the formed circumference of the cam disc 3 in position VII. Said arrangement causes due to a further movement of the two-arm lever 33 an approachment of the offset cylinder 50 towards the pressure cylinder 52.

In this position however the bolt 17 strikes the extension of the retaining lever 40 and the two-arm lever 15 is stopped. The roller 13 strikes the inclined part of the recess 14 causing the dent of the pawl 11 to leave the recess 7 of the hub of the toothed wheel 6. The cam disc 5 comes thereby to rest and is again secured in its position by the second retaining roller 28 engaging into the recess of the retaining lever 26.

In some failure of the supply conveyor occurs or an interruption of printing takes place, a not shown device shifts by means of the slip sheet 42 the axle 41 in direction of the arrow "S" moving the retaining lever 40 from position III to position IV. Thus the bolt 17 is released, so that the two-arm lever 15 is also released and the spring 136 forces again the pawl 11 into a position, where its dent comes in contact with the circumference of the hub of the toothed wheel 6 and enters the recess 7. The cam disc 3 is firmly connected with the toothed wheel 6 and is taken along thereby. In the course of this operation the roller 32 follows the shape of the cam disc 3 and at the end of position VII the offset cylinder 50 is removed again from the pressure cylinder 52 by means of the two-arm lever 33 and of a further not shown device. In the position where the roller 32 leaves the position VIII on the cam disc 3, the removal of the offset cylinder 50 from the form cylinder 51 is equally accomplished in the course of the respective intervals determined by the position VII and VIII of the cam disc 3, where the said printing cylinders in positions with their inactive parts facing each other. At the final phase of the movement the roller 34 mounted on the lever 36 follows the shape of the cam disc 3 in position VII and thus removes by means of the rod 39 the spreader cylinder of the ink arrangement from pressure engagement with the form cylinder 51. In the course of this rotation of the cam disc 3 and of the two-arm lever 15 mounted thereon, the bolt 17 strikes in the last phase of the movement the recess of the control lever 18 which is again returned into position I. Thus the dent of the pawl 11 is again removed from the recess of the toothed wheel 6 due to cooperation of the recess 14 of the two-arm lever 15 with the roller 13. The cam disc 3 is stopped and is again in its starting position secured by means of the retaining roller 28 in the recess of the retaining lever 26. At a further start of the supply conveyor and passage of the paper through the printing machine the whole cycle is repeated. If the mechanism is put into operation by means of the control cable 25 and if no paper sheet is introduced, the movement of the cam disc 3 comes not to a stop as at the moment of passage of the bolt 17 along the retaining lever 40 said lever is raised so that the bolt 17 passes below the extension of the retaining lever 40.

The cam disc 3 proceeds in its movement towards its starting position, so that the printing cylinders are immediately removed from pressure engagement. As the approachment and removal of the offset cylinder takes place in the course of the passage of the inactive part of the pressure cylinders no print of the picture from the offset cylinder to the surface of the pressure cylinder is accomplished.

I claim:

1. An arrangement for the control of the position of an offset cylinder of a printing machine at predetermined time intervals with respect to the form cylinder and with respect to the pressure cylinder comprising in combination:

- a stable bolt fixed to the sidewall of the machine, a cam disc mounted rotatably on said bolt,
- a toothed wheel rotatably supported on the hub of said cam disc, means for imparting to said toothed wheel a rotating movement, said toothed wheel provided with at least one recess,
- a pawl mounted in rocking fashion on said cam disc said pawl adapted for engagement in the recess of said toothed wheel,
- a two-arm lever mounted rotatably on the hub of said cam disc, the first arm of said two-arm lever provided on its extremity with a recess,
- the second arm of said two-arm lever provided with an extension,

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a spring loaded control lever mounted in rocking fashion on a bolt fixed in the sidewall of the machine, said control lever adapted for engagement with the extension of the second arm of the two-arm lever,
a roller mounted on the extremity of said pawl, said roller adapted for engagement with the recess on the first arm of the two-arm lever,
lever systems controlling the relative positions of the printing cylinders in dependence on the position of said cam disc.
2. An arrangement as set forth in claim 1 comprising furthermore:
a bushing fixed in the sidewall of the printing machine,

an axle mounted axially shiftably in said bushing, a retaining lever fixed on the extremity of said axle, said retaining lever adapted for engagement with the extension of the second arm of the two-arm lever.

3. An arrangement as set forth in claim 1 comprising spring loaded means retaining said cam disc in different predetermined positions.

4. An arrangement as set forth in claim 1 said means for imparting a rotating movement to said toothed wheel driving simultaneously the pressure cylinder of the printing machine at a speed exceeding the speed of the rotating movement of said toothed wheel.

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