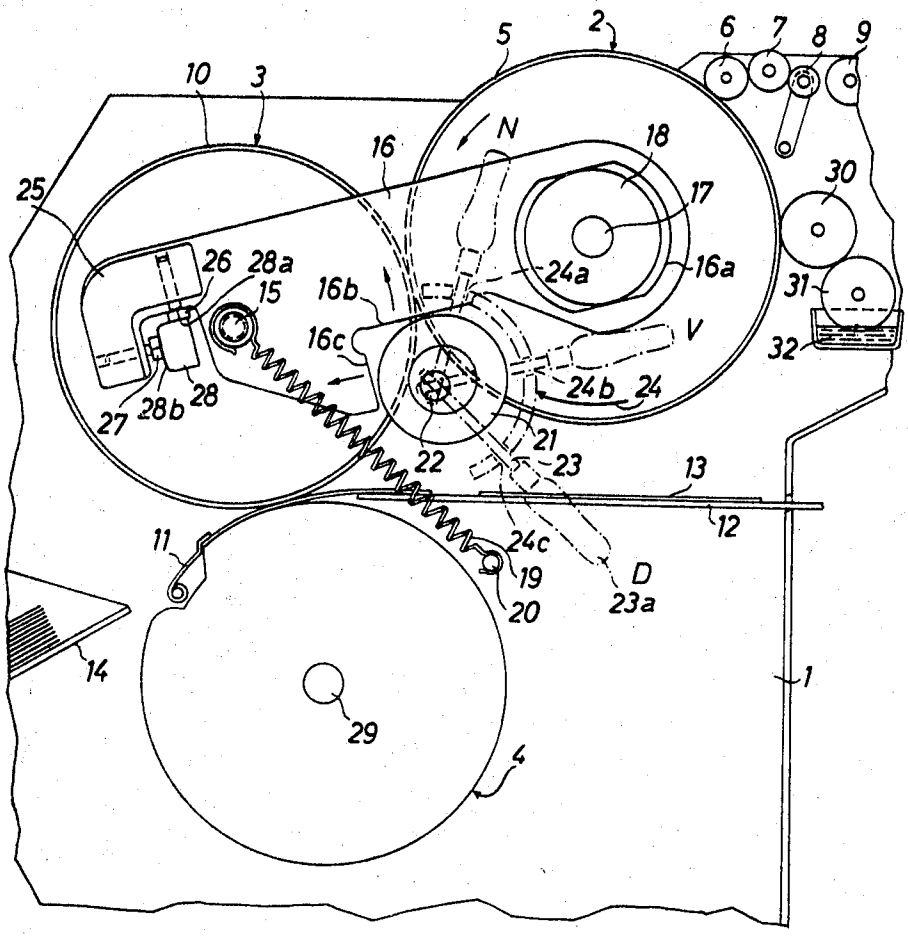
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ROTARY PRESS WITH TRANSFER ROLLER INTERRUPTER

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ROTARY PRESS WITH TRANSFER ROLLER INTERRUPTER

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ABSTRACT OF THE DISCLOSURE

An offset printing machine in which a blanket cylinder mounted on a carrier is movable relative to a master cylinder and a platen cylinder between three positions in which its peripheral surface respectively contacts neither, one or both peripheral surfaces of the other two cylinders, in which the carrier is biased by a spring to a position corresponding to one position of the blanket cylinder, and in which the carrier is movable by operating means to a pair of additional positions respectively corresponding to the other two positions of the blanket cylinder.

The present invention relates to printing machines in general, and more particularly to improvements in a mechanism which may be utilized to select the position of a cylinder in a printing machine.

In an offset printing machine, a rubber blanket cylinder normally rolls along a master cylinder and along a platen cylinder. The foil of the master cylinder transfers inked images to the blanket of the blanket cylinder and the latter transfers such images to fresh copy sheets which are fed into the nip between the blanket and the platen cylinder. The blanket cylinder is normally movable into and out of contact with the master cylinder and/or platen cylinder so that the printing operation is interrupted when the blanket cylinder moves away from the platen cylinder and that the transfer of ink from the master cylinder is terminated when the blanket cylinder moves away from the master foil.

Heretofore known mechanisms for moving the blanket cylinder with reference to the other two cylinders are very bulky, expensive, complicated and/or prone to malfunction. For example, such conventional mechanisms often comprise two entirely independent systems one of which moves the blanket cylinder with reference to the master cylinder and the other of which moves the blanket cylinder with reference to the platen cylinder.

Accordingly, it is an important object of the present invention to provide a printing machine, particularly an offset printing machine, with a novel and improved mechanism for changing the position of the blanket cylinder with reference to the master cylinder and/or platen cylinder in such a way that all changes can be carried out exclusively in response to movement of the blanket cylinder.

Another object of the invention is to provide a mechanism of the just outlined characteristics which can be adjusted to select the exact pressure between the blanket cylinder and one or both other cylinders.

A further object of the invention is to provide an offset printing machine which embodies the above outlined mechanism, wherein such mechanism occupies little room, and wherein the position of the blanket cylinder can be adjusted by exertion of a small force and in a very simple and time-saving manner.

An additional object of the invention is to provide an adjusting mechanism which, though especially suited for use in an offset printing machine, can be utilized with advantage in certain other types of printing machines as well as in all such apparatus wherein a rotary cylindrical body should be moved into rolling contact with one or more additional cylindrical or other bodies.

Briefly stated, one feature of my invention resides in the provision of a printing machine whose frame supports two rotary cylindrical members having peripheral surfaces spaced from each other and a cylinder whose axis of rotation is parallel with the axes of the cylindrical members. The cylinder is movable between first, second and third positions in which its peripheral surface respectively contacts the peripheral surface of neither, one and both cylindrical members and such movements of the cylinder are brought about by a novel mechanism including carrier means rotatably supporting the cylinder and movable therewith in directions normal to the axes of the cylindrical members, a biasing device for urging the carrier means to a position corresponding to one position of the cylinder (for example, to the third position in which the cylinder is in contact with both cylindrical members), and an operating device for moving the carrier means to a pair of additional positions respectively corresponding to the other two positions of the cylinder.

In accordance with another advantageous feature of my invention, the printing machine also comprises a blocking unit which determines the minimum distance between the axis of the cylinder and the axes of the first and second cylinders.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved printing machine itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of a specific embodiment with reference to the accompanying drawing.

The single figure of the drawing is a fragmentary side elevational view of an offset printing machine which embodies my invention, the front side wall of the machine frame having been removed.

Referring to the drawing in detail, the offset printing machine comprises a frame 1 which supports the shafts 17, 29 of two cylindrical members 2, 4 respectively constituting the image carrying or master cylinder and the impression or platen cylinder of the machine. A third cylinder 3, called rubber blanket cylinder, is movable between three positions in the first of which its peripheral surface is out of contact with the peripheral surfaces of the cylindrical members 2 and 4, in the second of which its peripheral surface contacts the peripheral surface of the cylindrical member 2, and in the third of which its peripheral surface is in contact with the peripheral surfaces of both cylindrical members. This third position of the cylinder 3 is shown in the drawing. The cylindrical member 2 carries on its periphery a master foil 5 which is formed with symbols representing letters, numerals, designs and/or other indicia and cooperates with the roller-shaped applicator 6 of a customary inking unit which further comprises rollers 7, 8 and 9. The machine also comprises a conventional wetting or moistening unit including a wetting roller 30 which is in contact with the master foil 5, a tank 32, and a withdrawing roller 31 which dips into the tank 32 and transfers a film of moisture to the roller 30. The cylindrical members 2 and 4 are driven in a counterclockwise direction, as viewed in the drawing.

The cylinder 3 is provided with a rubber blanket 10 and the cylindrical member 4 carries a conventional paper gripper 11 which withdraws fresh copy sheets 13 from a table 12 and delivers printed copy sheets into a tray 14. The sheets 13 are imprinted during travel through the nip between the rubber blanket 10 (which receives ink from the master foil 5) and the peripheral surface of the

cylindrical member 4. The paper gripper 11 opens and closes automatically in response to rotation of the cylindrical member 4 and such opening and closing of the gripper is effected by a fixed cam (not shown which is mounted on the frane 1.

The shaft 15 of the cylinder 3 is parallel with the shafts 17, 29 of the cylindrical members 2, 4 and is rotatable in carrier means including two specially configurated levers 16 (only one shown) which are adjacent to the opposite axial ends of the cylinder 3. Each lever 16 is formed with an elongated slot 16*a* which receives with clearance a cylindrical enlargement or boss 18 on the shaft 17 of the cylindrical member 2. As clearly shown in the drawing, the levers 16 are rockable about the axis of the shaft 17 and the slots 16*a* also enable these levers to move in directions at right angles to the shaft 17. A biasing device, here shown as a helical spring 19, is connected to the shaft 15 and to a fixed pin 20. The function of this spring 19 is to bias the carrier means (including the two levers 16) to a position corresponding to the aforementioned third position of the cylinder 3 in which the rubber blanket 10 contacts the peripheral surface of the cylindrical member 4 and the master foil 5 on the cylindrical member 2.

A median portion of one of the levers 16 is provided with two mutually inclined faces 16*b*, 16*c* which preferably make with each other an angle of 90 degrees or thereabouts. These faces cooperate with an operating device which serves as means to move the lever 16 to two additional positions respectively corresponding to the first and second positions of the cylinder 3. The operating device includes a disk-shaped cam 21 which is mounted on the eccentric shaft 22 parallel to the axis 17 and turnable by means of a manually operable actuating handle 23*a*. The handle 23*a* has an elastic stem 23 which is secured to the shaft 22 and cooperates with a fixed detent device 24 having three recesses or notches 24*a*, 24*b*, 24*c*. When the handle 23*a* is moved to the position D and its elastc stem 23 snaps into the notch 24*c*, the peripheral surface of the cam is preferably out of contact with the faces 16*d*, 16*c* so that the spring 19 is free to maintain the cylinder 3 in the third position, i.e., in a position which the cylinder 3 assumes when the printing machine is in actual use. By withdrawing the stem 23 from the notch 24*c* and by turning the handle 23*a* so that the stem 23 snaps into the notch 24*b* (position V), the operator causes the blanket 10 to move away from the cylindrical member 4 but to remain in rolling contact with the master foil 5. The cylinder 3 will be moved to such (second) position prior to actual printing so that the blanket 10 is properly inked and will transfer clear and sharp imprints to the very first fresh copy sheet 13. By causing the stem 23 to snap into the notch 24*a* (position N), the operator maintains the cylinder 3 out of contact with the cylindrical members 2 and 4. The cylinder 3 will be held in such (first) position when the printing machine is idle. This insures that the blanket 10 and/or the foil 5 cannot undergo localized deformation which could develop in response to long-lasting abutment of the blanket against the foil and against the member 4 when the drive of the printing machine is at a standstill.

In the position V of the handle 23*a*, the cam 21 bears against the face 16*b* and keeps the blanket 10 away from the cylindrical member 4. In the position N of the handle 23*a*, the cam 21 bears against the faces 16*b*, 16*c* and keeps the blanket 10 away from the cylindrical member 4 as well as from the foil 5. Of course, the cam 21 can engage the face 16*b* and/or 16*c* in the position D of the handle 23*a* if the face of this cam is finished with sufficient precision to allow for satisfactory contact between the cylinder 3 (blanket 10) and the cylindrical members 2 and 4.

The printing machine also comprises a blocking unit which serves to determine the minimum distance between the cylinder 3 and the cylindrical members 2, 4 to thereby control the pressure upon the blanket 10 and master foil 5. The blocking unit comprises a first supporting element 25 which is fixed to or integral with the lever 16, a second supporting element 28 which is fixed to the frame 1 and is provided with two stop surfaces 28*a*, 28*b*, and two adjustable followers 26, 27 which are mounted on the supporting element 25. The followers 26, 27 are shown as screws whose heads respectively abut against the stop surfaces 28*a*, 28*b* when the handle 23*a* is held in the position D. The stop surface 28*b* is of arcuate shape and its center of curvature is located on the axis of the cylindrical member 2. By adjusting the axial position of the follower 26 and/or 27, the operator can select in advance the maximum compression of the blanket 10 under the action of the spring 19. When the handle 23*a* is moved from the position D to the position V, the cam 21 rocks the lever 16 in a clockwise direction whereby the follower 26 moves away from the stop surface 28*a* but the follower 27 slides along the surface 28*b* so that the distance between the shafts 15 and 17 remains unchanged. When rocked to the position N, the handle 23*a* causes the cam 21 to move the shaft 15 away from the shaft 17 so that the follower 27 also moves away from the stop surface 28*b*.

It is often sufficient if the stop surface 28*a* is located in a plane which is normal to the line connecting the axes of the shafts 15, 29 and if the surface 28*b* is located in a plane which is normal to the line connecting the axes of the shafts 15, 17. The movements of the cylinder 3 away from the cylindrical member 2 and/or 4 are rather small so that such shaping of the stop surfaces 28*a*, 28*b* normally insures satisfactory transfer of images to the blanket cylinder (position V) and to the copy sheets 13 (position D).

It is clear that the position of the stop surfaces 28*a*, 28*b* and followers 26, 27 can be reversed without departing from the spirit of my invention. Also, the detent device 24 can be replaced by other suitable detent devices which are capable of releasably holding the cam 21 in one of its three positions. The spring 19 can be replaced by one or more torsion springs or analogous resilient elements which can permanently urge the levers 16 and the cylinder 3 to a desired position. It is also within the purview of the present invention to mount the levers 16 of the carrier means on the shaft 29 of the cylindrical member 4.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of my contribution to the art and, therefore, such adaptations should and are intended to be comprehended with the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is:

1. In a printing machine, in combination, first and second rotary cylinder members having peripheral surfaces spaced from each other; a cylinder having an axis of rotation parallel with the axes of said members and being movable between first, second and third positions in which its peripheral surface respectively contacts the peripheral surface of neither, one, and both of said members; carrier means rotatably supporting said cylinder and movable therewith in direction normal to said axis, said carrier means comprising two mutually inclined faces; biasing means cooperating with said carrier means for urging the latter to a position corresponding to one position of said cylinder; and an operating device for moving said carrier means to a pair of additional positions respectively corresponding to the other two positions of said cylinder, said operating device comprising a cam movable between three positions in one of which said cam permits said biasing means to maintain said carrier means in said one position, in another of which said cam bears

against at least one of said faces to maintain said carrier means in one of said additional positions and in a third of which said cam bears at least against the other of said faces to maintain the carrier means in the other additional position.

2. A structure as set forth in claim 1, wherein said first and second cylindrical members and said cylinder respectively constitute the master cylinder, the platen cylinder and the blanket cylinder of an offset printing machine.

3. A structure as set forth in claim 1, wherein said carrier mean is rockable about and is movable transversely of the axis of one of said cylindrical members and wherein said cam is rotatable about an eccentric axis which is parallel to the axis of said cylinder, said mutually inclined faces making an angle which at least approximates a right angle.

4. A structure is set forth in claim 1, wherein said carrier means is rotatable about the axis of one of said cylindrical members.

5. A structure as set forth in claim 1, further comprising a blocking unit for determining the minimum distance between said cylinder and said cylindrical members, said blocking unit comprising fixed supporting means and adjustable followers provided on said carrier means, one of said followers abutting against said supporting means in the second position of said cylinder and at least the other follower abutting against said supporting means in the third position of said cylinder.

6. A structure as set forth in claim 1, further comprising detent means for releasably holding said operating device in positions which correspond to the first, second and third positions of said cylinder.

7. A structure as set forth in claim 1, further comprising manually operated actuating means for moving said operating device to positions respectively corresponding to the first, second and third positions of said cylinder.

8. A structure as set forth in claim 1, wherein said biasing device comprises resilient means connected with said

carrier means and arranged to bias said cylinder to the third position thereof.

9. A structure as set forth in claim 1, wherein said first cylindrical member comprises a shaft and said carrier means comprises lever means having elongated slot means receiving said shaft with such clearance that the carrier means is rockable on and can move transversely of said shaft.

10. A structure as set forth in claim 1, and including a blocking unit for determining the minimum distance between the axis of said cylinder and the axes of said cylinder members, said blocking unit comprises fixed supporting means having a pair of mutually inclined stop surfaces and two adjustable followers provided on said carrier means, one of said followers abutting against one of said stop surfaces in the second position of said cylinder and at least the other follower abutting against the other stop surface in the third position of said cylinder.

11. A structure as set forth in claim 10, wherein one of said stop surfaces is substantially normal to the line connecting the axis of said cylinder with the axis of one of said cylindrical members and the other stop surface is substantially normal to the line connecting the axis of said cylinder with the axis of the other cylindrical member.

12. A structure as set forth in claim 10, wherein one of said stop surfaces is a curved surface having its center of curvature on the axis of one of said cylindrical members.

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