

June 29, 1926.

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ROTARY WEB OFFSET PRINTING MACHINE

Filed June 30, 1924

2 Sheets-Sheet 1

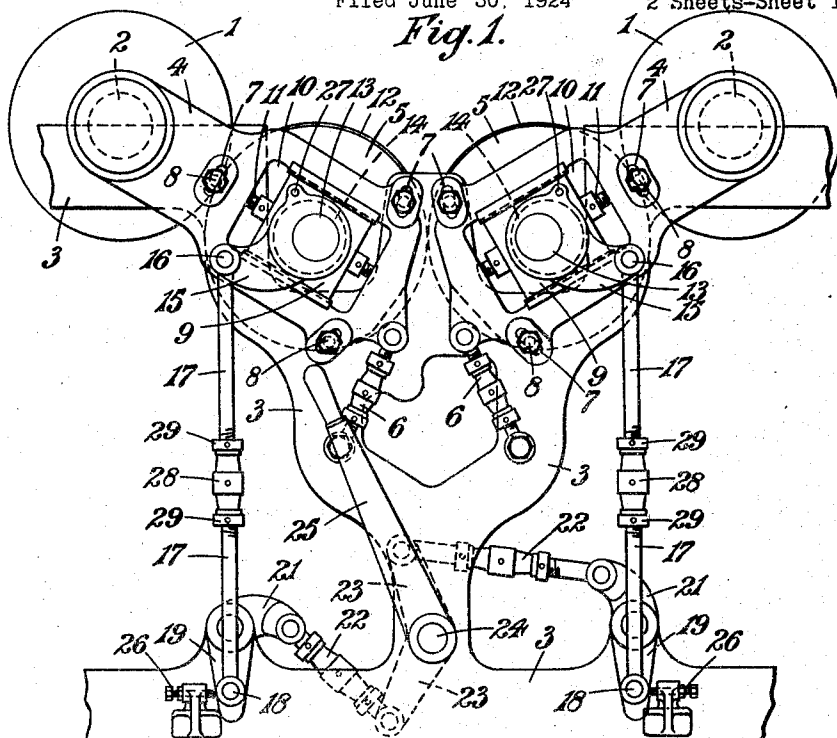
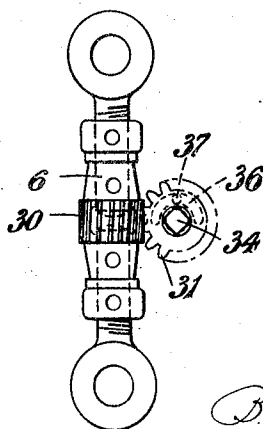


Fig. 3.



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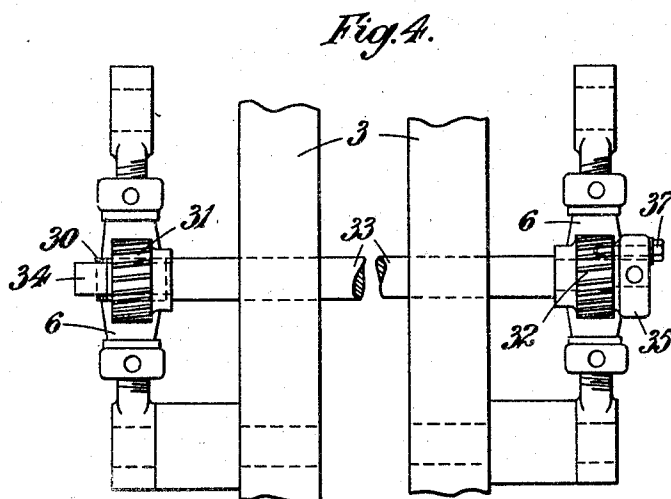
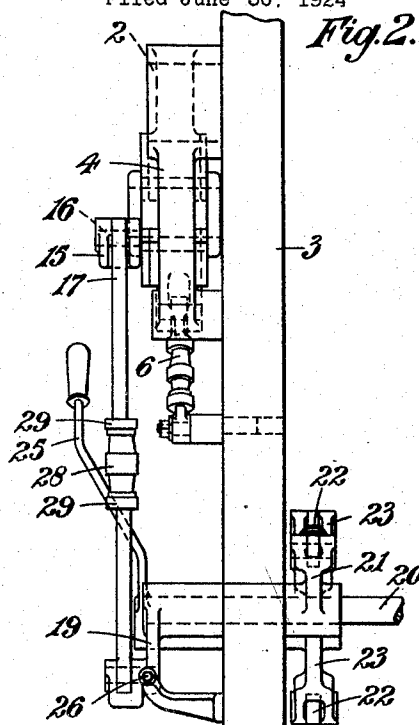
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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ROTARY WEB OFFSET PRINTING MACHINE.

Application filed June 30, 1924, Serial No. 723,064, and in Great Britain July 12, 1923.

This invention relates to rotary web offset printing machines and has for its object to provide a new or improved construction whereby adjustments of a transfer cylinder relatively to the co-operating forme cylinder or forme cylinders, or forme cylinder and companion transfer cylinder can be readily effected without shifting of the forme cylinder or forme cylinders.

The invention comprises a transfer cylinder so arranged as to be adjustable relatively to the respective forme cylinder both angularly about the axis of the last named cylinder and radially towards and away from that axis.

The invention is applicable to machines for perfecting printing by either offset on both sides of a web, or offset on one side and direct printing on the other side, or for single side printing by offset.

The invention will now be described by reference to the accompanying drawings in which:—

Figure 1 is a side elevation of one constructional form adapted for offset printing on both sides of the web, only such parts of the machine being represented as are considered pertinent;

Figure 2 is an elevation as viewed from the right-hand side of Figure 1;

Figure 3 is a side elevation, and Figure 4 a view as seen from the right-hand side of Figure 3, showing alternative means for adjusting a transfer cylinder transversely of its axis.

The same reference numerals are used to indicate like or corresponding parts in the different arrangements illustrated in the drawings.

In the constructional form represented in Figures 1 and 2 there are provided two forme cylinders 1, the shafts or trunnions 2 of which rotate about stationary axes in the two sides frames 3 of the machine; of these two side frames only that on the near, or so-called plain, side of the machine is represented.

On extensions of the shafts 2 or, it may be, on separate stub shafts co-axial with those shafts, there are angularly adjustable different pairs of radius bars 4, the individual members of each pair being located at respectively opposite sides of the machine. Each of these pairs of radius bars 4 ro-

tatably supports a transfer cylinder 5 with a capacity for adjustment radially of the respective forme cylinder 1.

For attaining the aforesaid angular adjustment of the radius bars 4, the swinging end of each of the latter is attached to the respective machine frame 3 by a turnbuckle 6 pivoted at its respectively opposite ends to the said radius bar and machine frame. For enabling the radius bars 4 to be secured in any such adjusted position, they are formed with arcual slots 7 through each of which passes a bolt 8 threaded into the respectively adjacent machine frame 3, so that by tightening these bolts, the radius bars can be clamped hard against the said machine frames.

For attaining the aforesaid radial adjustment of the transfer cylinders 5 relatively to the forme cylinders 1, the bearing blocks 9 of the former are slidably mounted in slots 10 in the radius bars 4 and are adjustable in these slots by set screws 11 threaded into the said bars, and the heads of which are adapted to bear on respectively opposite sides of the bearing blocks.

With an arrangement such as the foregoing, the two transfer cylinders 5, without disturbance of their operative relationship with the forme cylinders 1, can be adjusted relatively to each other as might be called for for printing on webs of varying thickness, by releasing the clamping bolts 8, adjusting the turnbuckle 6, and again tightening the said bolts 8. Further, the said transfer cylinders 5 can be adjusted relatively both to each other and to the forme cylinders 1, by carrying out the just described procedure and, in addition, turning the set screws 11, thus permitting the making of adjustments such as might be called for by increases in the thickness of the rubber blankets 12 on the transfer cylinders 5, after the offset printing has been carried on for a time.

To provide for the tripping of the transfer cylinders 5, the shafts 13 of these latter, are journaled in eccentric bushes 14 which are angularly adjustable in the before-described bearing blocks 9, said bushes being turned by the operator through lever-and-link devices such as those next described.

In the arrangement for the just-named purpose, represented in Figure 1, each of

the eccentric bushes 14 is provided with an outstanding arm 15 to which is pivoted by a pin 16 the upper end of a link 17 whose lower end, by a pin 18, is similarly pivoted to a downwardly-extending crank arm 19 fast to a rock shaft 20 journaled in the two side frames 3. On each of the two rock shafts 20 there is secured an arm 21 to which is pivoted one end of a link 22 the opposite ends of these links being pivotally connected one to the upper, and the other to the lower, arm of a two-armed lever 23. This lever 23 is rigidly secured to a shaft 24, journaled in the adjacent machine frame 3 (or in both of the frames 3) and having fast thereon a hand lever 25 whereby, through the just-described lever-and-link devices, the two eccentric bushes 14 can be turned into their terminal positions to trip or untrip the two transfer cylinders 5 simultaneously.

In Figure 1 the transfer cylinders 5 are shown in printing relationship and in this connection it will be observed that at that juncture, the axes of the pivot pins 16, 18, are aligned with the axis of the respective rock shaft 20, or the axis of the pin 18 may have been moved just beyond the dead centre position, so that there is no tendency for the transfer cylinders to move accidentally out of the said printing relationship. Adjustable stops 26 are provided for preventing the transfer cylinders 5 from being forced together with too great pressure.

It will be observed that, by reason of the arms 15 being as it were, anchored to the upper ends of the links 17, any angular movement of the radius bars 4 about the axes of the trunnions 2, or radial movement of the transfer cylinders 5 relatively to the forme cylinders 1, will effect slight rotation of the eccentric bushes 14 and consequently be causative of disturbance in the relationship of the transfer cylinders 5 to the forme cylinders 1. To avoid any such disturbance, each of the bushes has formed in it a hole 27, adapted to receive a locating pin (not shown in the drawing) and to register with a similar hole in the respective bearing block 9 when the parts are in normal adjustment so that the pin, by engaging with both of these co-axial holes will serve temporarily to lock the bush 14 to the block 9. The pivot pin 16 is also arranged so as to be readily removable from the arm 15 and link 17 and before an adjustment of a transfer cylinder 5 has to be made, the locking pin is inserted into the then registering holes of the respective bush 14 and block 9, and the pivot pin 16 is withdrawn from the arm 15 and link 17. The desired adjustment of the cylinder 5 is then effected by the previously described means, and after that, the length of the link 17 may be adjusted to bring the hole at the upper end of the latter

into register with that in the arm 15, by rotating a turnbuckle 28, forming part of said link, whereupon the pin 16 may be re-inserted in the arm 15 and link 17, and the locking pin removed from the hole 27. The turnbuckles 28 normally are fixed on the links 17 by lock nuts 29 which are released before the said turnbuckles can be adjusted.

If desired, the angular adjustment of each pair of radius bars 4, instead of being effected by independently adjustable turnbuckles at respectively opposite ends of the respective transfer cylinder 5, as represented in Figures 1 and 2, may be effected by the simultaneous actuation of both of the turnbuckles appertaining to said cylinder; for this purpose the two turnbuckles 6 would be operatively connected together preferably by means such as are next described with reference to Figures 3 and 4, which will permit of their simultaneous operation for coarse adjustment and independent operation for fine adjustment.

In the just-named arrangement, each of the turnbuckles has fast to, or integral with, it, a helical gear 30 which meshes with a similar gear 31 or 32, both mounted on the same horizontal shaft 33, the former fixedly and the latter with a capacity for angular adjustment thereon. The shaft 33 is rotatably supported in bearings in the two side frames 3, and has one of its ends formed with a square 34 for enabling it to be rotated by a crank handle applied to this squared end, while, on the other end of the shaft there is rigidly secured a collar 35 having a semi-circular slot 36 (shown in dotted lines in Figure 3) through which extends a bolt 37 threaded into the helical gear 32 which latter, but for the said bolt, would be free to rotate independently of the shaft 33.

When, with the just described devices, it is desired to effect a coarse adjustment of a transfer cylinder 5 angularly and uniformly at both ends of the cylinder, about the axis of the respective forme cylinder 1, this is effected by rotating the shaft 33 so as to turn both of the turnbuckles 6 appertaining to that shaft, simultaneously and uniformly, when, on the other hand, it is desired to slightly raise or lower the transfer cylinder at one end only, this may be effected by releasing the bolt 37 (which normally is screwed up tight) and turning the shaft 33 to any extent within the limits determined by the slot 36, and after such adjustment again tightening the bolt 37.

Although only the turnbuckles 28 have been herein described as provided with lock nuts 29, it will be observed that the drawings show that in the preferred arrangement, all of the other turnbuckles included in the construction illustrated, are provided with similar devices.

Having described my invention, I declare that what I claim and desire to secure by Letters Patent is:—

1. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder contacting with one member of the couple, of means operative to hold the members of the printing couple rigidly in printing relationship with each other, means operative to hold one member of the couple rigidly in printing relationship with the forme cylinder, and means operative to adjust said last named member angularly about and radially towards and away from the axis of the forme cylinder without disturbing the latter.

2. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder, of a pair of radius bars angularly adjustable about the axis of the forme cylinder, bearings for one member of the printing couple carried by said bars, means operative to hold one member of the couple rigidly in printing relationship with the forme cylinder, and means acting on both ends of the bearings to adjust the latter in the respective radius bars radially relatively to the forme cylinder, and hold them rigidly in adjusted position in those bars.

3. In a rotary web offset printing machine, the combination with a printing couple comprising two transfer cylinders maintained in rigid printing contact with each other, and a forme cylinder maintained in rigid printing contact with each transfer cylinder, of a pair of radius bars rotatably supporting each of said transfer cylinders and angularly adjustable about the axis of each of the forme cylinders to vary the pressure between the transfer cylinders without disturbing the forme cylinders, and means operative to adjust the pressure between each transfer cylinder and the forme cylinder contacting therewith without disturbing the latter cylinder, and rigidly maintain the pressure relationship thus obtained.

4. In a rotary web offset printing machine, the combination with a printing couple comprising two transfer cylinders maintained in rigid printing contact with each other, and a forme cylinder maintained in rigid printing contact with each transfer cylinder, of a pair of radius bars angularly adjustable about the axis of each forme cylinder and rotatably supporting the respective transfer cylinder, means operative to hold the two transfer cylinders rigidly in printing relationship with each other, means operative to simultaneously adjust both pairs

of radius bars angularly, and means operative to adjust the pressure between each transfer cylinder and the forme cylinder contacting therewith without disturbing the latter cylinder, and rigidly maintain the pressure relationship thus obtained.

5. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder contacting with one member of the couple, of means operative to adjust said member, either at both ends independently or at both ends simultaneously, angularly about the axis of the forme cylinder, and means operative to adjust said member radially towards and away from that axis.

6. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder contacting with one member of the couple, of means operative to adjust said member, either at both ends independently or at both ends simultaneously, angularly about the axis of the forme cylinder, means operative to adjust said member radially towards and away from that axis, and devices adapted to lock said member against radial movement relatively to the forme cylinder during the time at which that member is being adjusted angularly about the axis of that cylinder.

7. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder, of a pair of radius bars angularly adjustable about the axis of the forme cylinder, clamping means adapted to secure said bars in their various positions of adjustment, eccentric bearings for one member of the printing couple carried by said bars and lever and link mechanism adapted to turn said bearings to adjust that member radially relatively to the forme cylinder.

8. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder, of a pair of radius bars angularly adjustable about the axis of the forme cylinder, eccentric bearings for one member of the printing couple carried by said bars, lever-and-link mechanism adapted to turn said bearings for adjusting that member radially relatively to the forme cylinder, means adapted to connect and disconnect the lever-and-link mechanism and eccentric bearings and means adapted to prevent the latter from rotating about their own axis when disconnected from said mechanism.

In testimony whereof I have affixed my signature hereto.

BENJAMIN JOSEPH JOHN GOULDING.