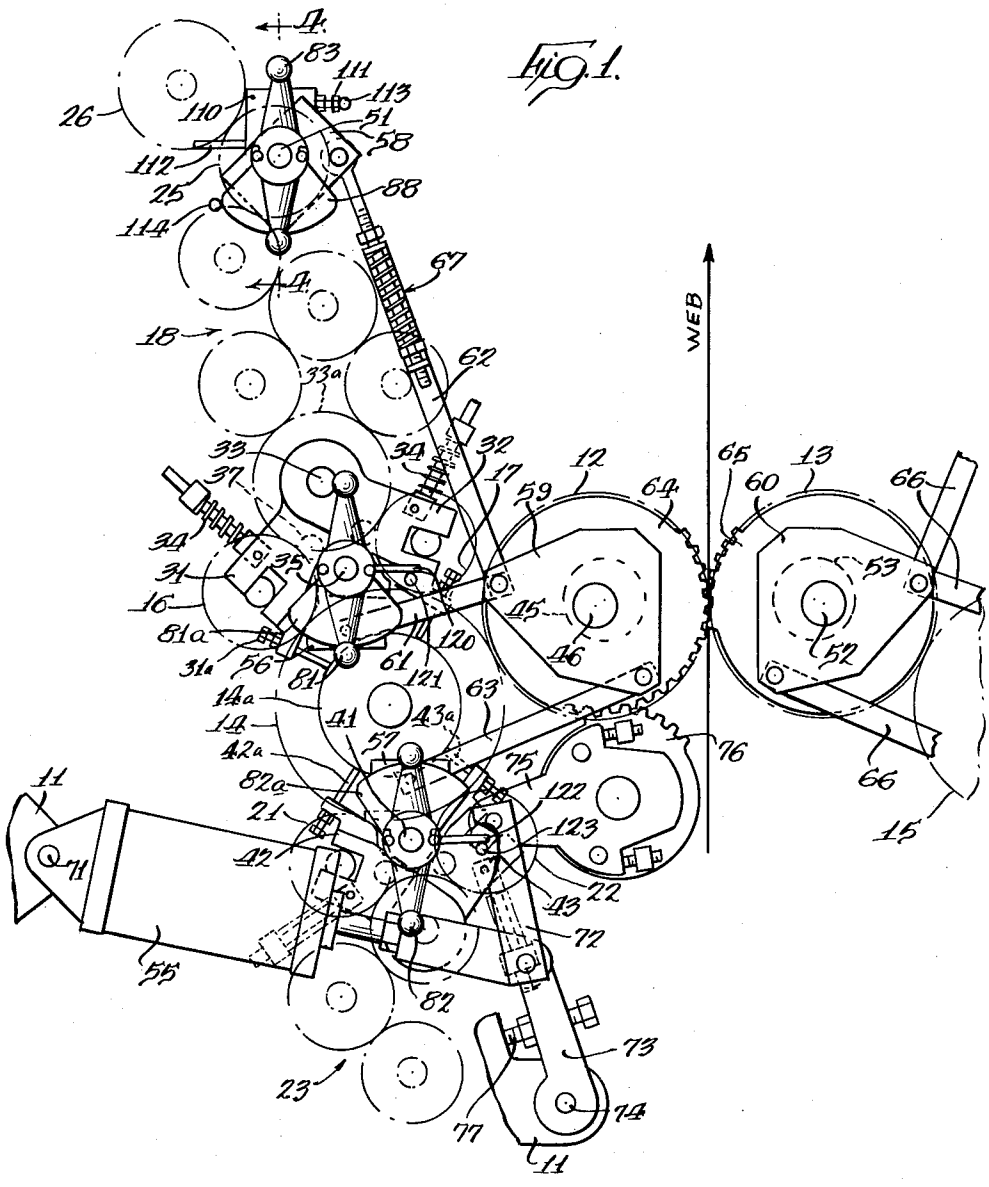
Dec. 11, 1962 L. S. TYMA, JR., ET AL 3,067,674

THROW-OFF MECHANISM FOR OFFSET PRESSES

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Fig. 1.



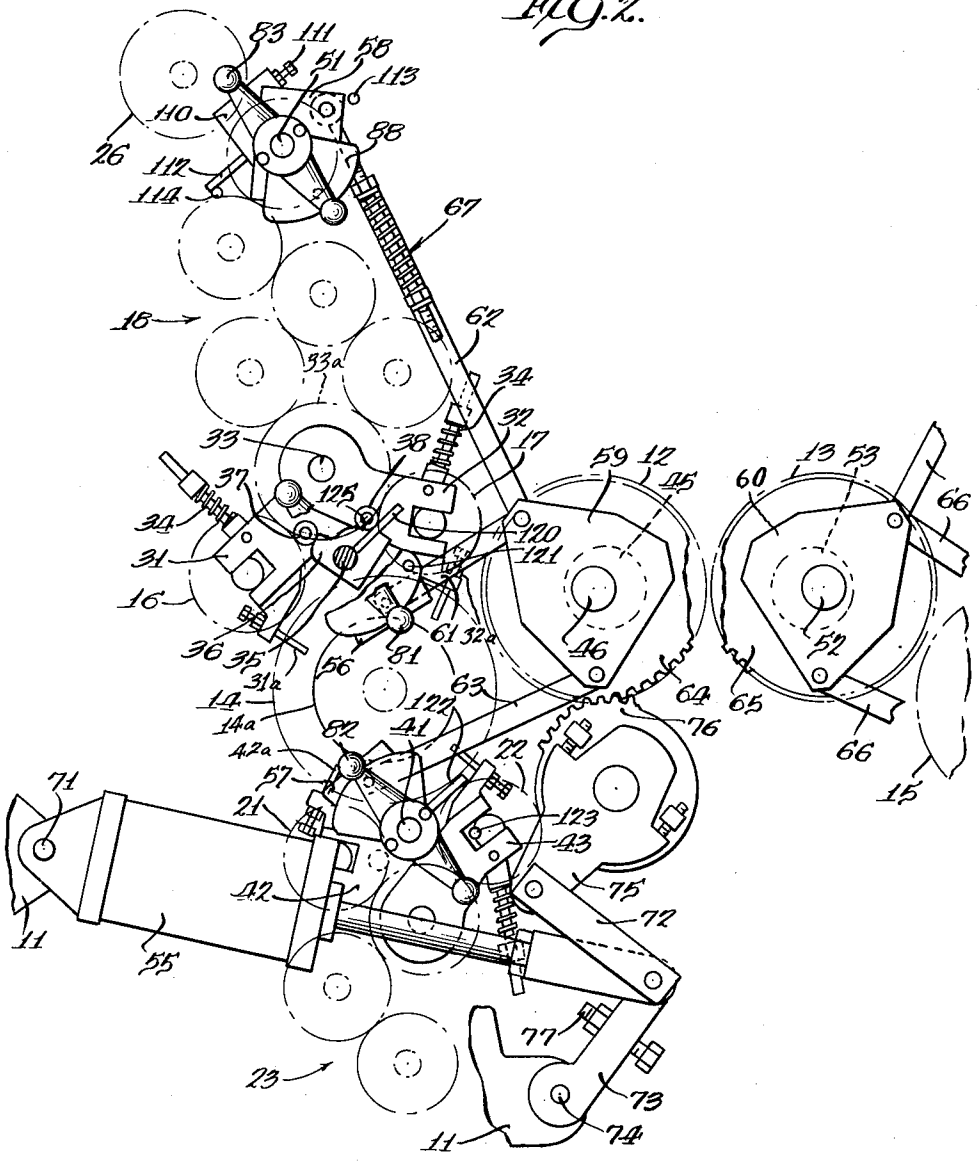
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Fig. 2.



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THROW-OFF MECHANISM FOR OFFSET PRESSES

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Fig. 3.

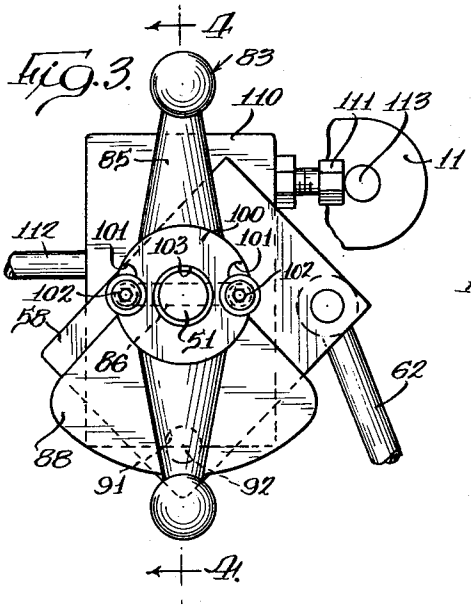


Fig. 4.

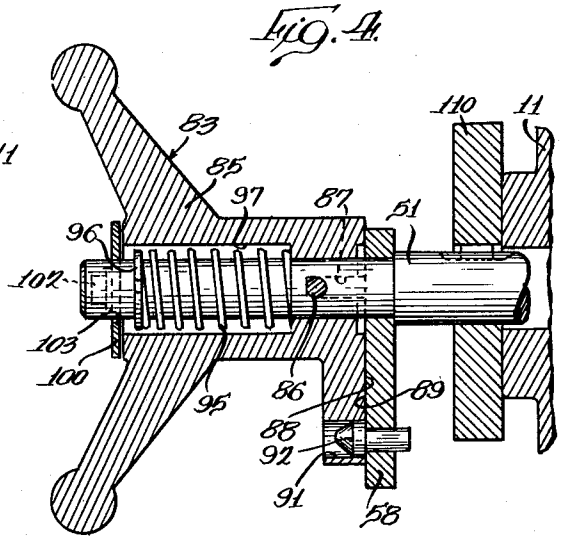


Fig. 5.

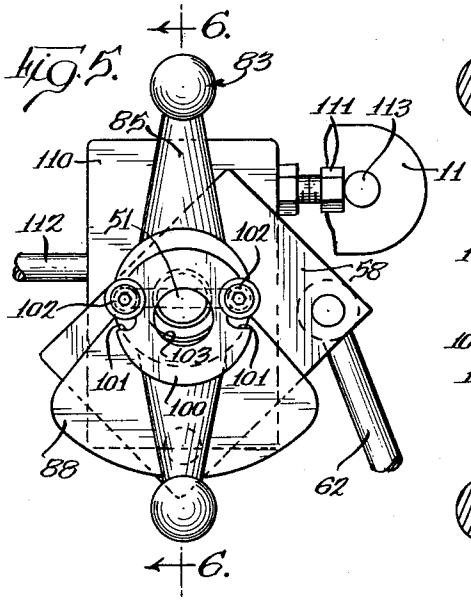
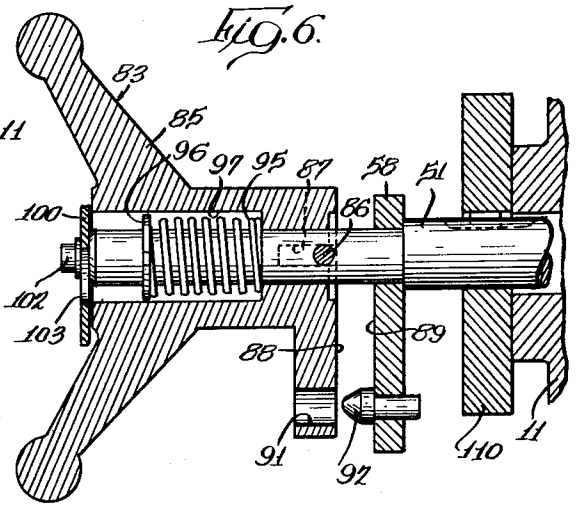


Fig. 6.



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3,067,674

THROW-OFF MECHANISM FOR OFFSET PRESSES

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9 Claims. (Cl. 101—218)

This invention relates to printing presses and concerns more particularly the roller and cylinder throw-off mechanisms commonly used on rotary offset presses.

A rotary offset press conventionally includes several pairs of cylinders and rollers which are in cooperative engagement during press running periods but which must be separated during various phases of press set-up and adjusting operations. In an offset perfecting press wherein each of a pair of blanket cylinders serves as an impression cylinder for the other, it is desirable to provide for separating the blanket cylinders from each other and their respective plate cylinders, separating the ink and water form rollers from the plate cylinders and to separate the roller feeding ink to the press inking train from the fountain roller.

In order to simultaneously effect such roller and cylinder separation, offset presses are often provided with throw-off mechanisms which mechanically link the eccentrics or cams that control the position of individual roller or cylinder pairs. In this way, a single actuator can simultaneously make each of the desired separations.

Since it is also desirable to separate or throw off certain pairs of the cylinders and rollers independently of the others, throw-off mechanisms usually permit manual operation of some of the individual cams or eccentrics in addition to simultaneous operation of the entire system.

It is the general aim of the present invention to provide an improved throw-off mechanism of the above type for offset printing presses.

It is an important object of the invention to provide an improved throw-off mechanism having novel structure that simply and economically permits either selective manual operation of individual throw-off devices or simultaneous mechanical operation of the entire mechanism, without disturbing the adjusted operating positions of the various members.

A further object is to provide an improved throw-off mechanism as described above which is very easy to operate, either manually or mechanically, which can be shifted from one mode of operation to the other with particular convenience and which does not require adjustment of contacts between members each time the mechanism is shifted from manual to mechanical operation. It is also an object to provide a throw-off mechanism of the above type which can be automatically changed from manual operation to mechanical operation.

Another object is to provide a throw-off mechanism of the character described that is completely reliable and troublefree in operation. For example, the parts cannot jam should the mechanical linkage for simultaneous operation be actuated while individual throw-off pairs are set for manual control.

It is still a further object to provide a throw-off mechanism as characterized above that permits the press operator to see clearly, at a glance, whether the individual throw-off devices are On or Off and whether they are set for manual or simultaneous mechanical control.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

FIGURE 1 is a fragmentary elevation of a press having most of its frame broken away and embodying a throw-off mechanism constructed in accordance with the present invention and the parts shown in position for press operation;

FIG. 2 is similar to FIG. 1 and shows an alternate position of the parts;

FIG. 3 is an enlarged elevation of a single one of the throw-off devices shown in FIG. 1;

FIG. 4 is a section taken approximately along the line 4—4 of FIG. 3, showing the parts in position for mechanical actuation.

FIG. 5 is similar to FIG. 3 but shows the parts in a different position of adjustment; and

FIG. 6 is a section taken approximately along the line 6—6 of FIG. 5, showing the parts in position for manual actuation.

While the invention will be described in connection with a preferred embodiment, it will be understood that we do not intend to limit the invention to that embodiment. On the contrary, we intend to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

Turning now to the drawings, there is shown in FIGS. 1 and 2 a portion of a rotary offset perfecting press having a side frame **11** of which only fragmentary portions are shown. Journaled in eccentric bushings supported by the side frame are a pair of blanket or image cylinders **12** and **13** which cooperate to print on both sides of a web traveling between the cylinders. Each of the blanket cylinders **12** and **13** serves as an impression cylinder for the other cylinder.

Cooperating with the blanket cylinders **12, 13** are a pair of plate cylinders **14, 15**, respectively. A pair of form rollers **16** and **17** transfer ink to the plate cylinder **14** from an inking train **18** and a second pair of form rollers **21** and **22** transfer water to the plate cylinder **14** from a water conveying train of rollers **23**. It will be understood that duplicate inking and moistening rollers are provided for the plate cylinder **15**.

The parts so far described operate in the conventional manner for offset presses. Briefly, the prepared offset printing plates are secured to the periphery of the plate cylinders **14, 15**. The web to be printed is threaded between the blanket cylinders **12, 13** and the press is brought into operation. The plates on the cylinder **14** are first moistened by the form rollers **21, 22** and then inked by the form rollers **16, 17**. The plate cylinder **15** is similarly moistened and inked.

The images thus produced on the plate cylinders **14** and **15** are transferred to the respective blanket cylinders **12** and **13** and are thereafter pressed onto the web traveling between the blanket cylinders.

When getting an offset press ready for operation, a number of make-ready steps and adjustments must be made, such as threading the press with the web to be printed and mounting or changing the plates on the plate cylinders, which make it necessary to separate selectively certain ones of the cooperating rollers and also cylinder pairs. In the illustrated press construction, provision is made for separating the ink form rollers **16, 17** and the water form rollers **21, 22** from the plate cylinder **14**, for separating the blanket cylinders **12, 13** from each other and from the plate cylinders **14, 15**, and for separating an ink pickup roller **25** in the inking train **18** from its ink supply roller **26**. By way of comparison, FIG. 1 shows all of these cooperating roller and cylinder pairs in operative engagement and FIG. 2 shows these roller and cylinder pairs "thrown off," that is, separated from one another.

The ink form rollers **16, 17** are supported for radial shifting movement by mounting their respective shafts on a pair of arms **31** and **32** which are pivoted on a shaft **33**. The shaft **33** also supports an inking arrangement

roller 33*a* which supplies ink to the rollers 16, 17. Each of the arms 31, 32 is engaged by a compressed spring 34 anchored to the frame so as to bias the respective form rollers 16, 17 toward the plate cylinder 14. Engagement between the rollers 16, 17 and the cylinder 14 is controlled and adjusted by adjustable screws 31*a* and 32*a*, mounted respectively on the arms 31, 32, which engage, under the urging of the springs 34, a fixed stop in the form of a bushing 14*a* for the plate cylinder 14. By adjusting the screws 31*a*, 32*a*, proper contact between the rollers 16, 17 and the cylinder 14 can be established and this selected contact will be maintained whenever the screws 31*a*, 32*a* are urged by the springs 34 against the bushing 14*a*.

For radially shifting the rollers 16, 17, a shaft 35 is journaled transversely of the press frame and is provided near each end with a cam 36 which cooperates with cam followers 37 and 38 secured to the respective arms 31 and 32 (see FIG. 2). When the shaft 35 is rotated counterclockwise, as seen in FIG. 2, the cam followers 37, 38 ride up onto raised portions of the cam 36 so as to swing the arms 31, 32 against the biasing force of the springs 34 and lift the ink form rollers 16, 17 from the plate cylinder 14 to the positions shown in FIG. 2. Rotation of the shaft 35 in a clockwise direction from the position illustrated in FIG. 2 allows the cam followers 37, 38 to ride down from the raised portions of the cam 36 with the result that the springs 34 urge the arms 31, 32 about the shaft 33 until the screws 31*a*, 32*a* abut the bushing 14*a*. This returns the form rollers 16, 17 into proper operating contact with the plate cylinder 14, as shown in FIG. 1. Since the arms 31, 32 swing about the shaft 33, which is the axis of the roller 33*a*, the form rollers 16, 17 remain in proper operating contact with the roller 33*a* in both their FIG. 1 and FIG. 2 positions.

A similar mechanism is provided for radially shifting the water form rollers 21, 22 from the plate cylinder 14. A shaft 41 is journaled transversely in the press frame approximately parallel to the previously described shaft 35. The shafts of the rollers 21, 22 are mounted on pivoted, spring biased arms 42, 43, respectively, and cam or cam follower means similar to those described above in connction with the ink form rollers 16, 17 are mounted on the arms 42, 43 and the shaft 41. Contact between the water form rollers 21, 22 is adjusted and maintained by adjustable screws 42*a* and 43*a* carried respectively by the arms 42, 43 so as to engage the bushing 14*a*. Thus, the water form rollers 21, 22 are biased into adjusted engagement with the plate cylinder 14 when the parts are in their FIG. 1 position. Rotation of the shaft 41 in a counterclockwise direction swings the arms 42, 43 so as to shift the form rollers 21, 22 out of contact with the plate cylinder 14, as shown in FIG. 2.

The blanket cylinder 12 includes a shaft 46 extending from each end. In order to separate the cylinder 12 from both the plate cylinder 14 and the associated blanket cylinder 13, the shaft 46 is carried eccentrically by a rotatable bushing 45 at each end of the cylinder. The bushings 45 are journaled or mounted for rotation about an axis extending transversely of the press frame so that rotation of the bushings 45 in a clockwise direction from the position shown in FIG. 1 to the position shown in FIG. 2 carries the cylinder 12 out of contact with both the cylinder 13 and the plate cylinder 14.

The ink feeding roller 25 is rotatably mounted on a shaft 51, secured transversely of the press frame, which supports the roller 25 eccentrically with respect to the axis of the shaft 51. Rotation of the shaft 51 in a counterclockwise direction from its FIG. 1 to its FIG. 2 position carries the roller 25 away from the ink supplying roller 26.

It will be understood that the other half of the illustrated press is provided with similar devices for shifting the ink feeding roller, ink form rollers and water form rollers between their operating the throw-off positions.

The blanket cylinder 13 is journaled on shaft 52 carried eccentrically in bushings 53, corresponding in construction and operation to the bushings 45 and the shaft 46, and the ink and water form rollers which cooperate with the plate cylinder 15, but are not illustrated, are mounted and operated in a manner corresponding to the above described constructions.

In order to shift or throw off all of the movable cylinders and rollers at the same time, each of the shafts, 35, 41, 45, 51, and corresponding parts on the other half of the press, carries a crank member and all of the crank members are linked to an actuator 55. In the preferred embodiment, the crank members are in the form of plates; the shaft 35 carrying a plate 56, the shaft 41 carrying a plate 57, the shaft 51 carrying a plate 58 and the bushing or shaft 45 carrying a plate 59. On the other half of the press, the bushing or shaft 53 carries a plate 60. The plates 56 and 59 are coupled by a link 61, a link 62 couples the plates 58 and 59 and a link 63 couples the plates 57 and 59. Gear segments 64 and 65 associated with the plates 59, 60 respectively, couple the bushings 45 and 53 for equal and opposite rotation. A series of links 66 couple the plate 60 with the corresponding crank plates on the half of the press which is not illustrated.

Preferably, the link 62 includes a spring biased lost motion portion 67 which permits the link 62 to lengthen against the biasing force of a spring. The parts are proportioned so that the link 62 is slightly elongated against the resistance of the spring when the shaft 51 and the bushing 45 are in their FIG. 1 positions and thus the lost motion portion 67 is effective to resiliently urge the ink pick-up roller 25 into contact with the ink supply roller 26.

The actuator 55 is anchored at 71 to the press frame 11 and is coupled at its other end to a toggle linkage including links 72 and 73. The link 73 is pivoted at 74 to the frame 11 and the link 72 is secured through an arm 75 to a gear segment 76 which is in meshing engagement with the gear segment 64, that is associated with the bushing 45 and the blanket cylinder 12. A stop 77 carried by the link 73 is provided for engaging the press frame 11 and establishing a normal or rest position for the toggle linkage.

To effect simultaneous throw-off, the actuator 55 is caused to collapse the toggle linkage by driving the links 72, 73 toward the right in FIG. 1, thus drawing the pivoted arm 75 downwardly and rotating the gear segment 76 counterclockwise to the position shown in FIG. 2. This rotates the blanket cylinder gear segment 64 and the associated crank plate 59 in a clockwise direction with the result that the links 61, 62 and 63 simultaneously rotate the shafts 35, 41 and 51 in counterclockwise directions. Concurrently, clockwise movement of the gear segment 64 rotates the gear segment 65 for the blanket cylinder 13 in a counterclockwise direction causing the rollers and blanket cylinder on the other half of the press to be thrown off through the action of the crank plate 60 and the associated links 66.

Driving the actuator 55 in the reverse direction so as to straighten out the toggle links 72, 73 returns the various shafts, and the cylinders and rollers positioned thereby, to their operating positions shown in FIG. 1.

In carrying out the invention, certain of the crank plates are freely journaled on their respective shafts and these shafts are provided with shiftable handles for either manually rotating the associated shaft independently or for locking the shaft to the associated crank plate so that the actuator 55 can rotate the shaft. Since operation of the press requires independent throw-off of the ink form rollers 16, 17, the water form rollers 21, 22, and the ink pick-up roller 25, the shafts 35, 41, and 51 respectively are each provided with shiftable handles 81, 82 and 83 respectively and the associated crank plates 56, 57 and 58 are freely journaled on the respective shafts 35, 41 and 51. Since the handles 81, 82 and 83 and their associated structure are substantially identical, only the assembly

including the handle 83 will be described in detail and it will be understood that the assemblies including the handles 81, 82 are similarly formed and arranged.

The handle 83 includes a body 85 (see FIGS. 3 to 6) which is coupled to the shaft 51 adjacent to the crank plate 58 by a pin 86 mounted in the shaft and slidably received in a slot 87 formed in the body. The handle 83 is thus secured to the shaft 51 against relative rotation but is axially shiftable toward and away from the crank plate 58 as a result of the sliding engagement of the pin 86 within the slot 87.

To secure the crank plate 58 to the shaft 51 so that the actuator 55 can rotate the shaft, the handle 83 and crank plate 58 are provided with mating portions 88 and 89, respectively, having interengaging pin-and-opening connections including a circular opening 91 in the handle portion 88 and a pin 92 projecting from the plate portion 89. When the portions 88, 89 are in abutment, the pin 92 is received within the opening 91 so as to rotatably lock the handle 83 to the crank plate 58. This in turn locks the crank plate to the shaft 51 and establishes a mechanical connection from the actuator 55 to the shaft. Sliding the handle 83 to the left, as viewed in FIG. 6, so as to separate the pin 92 from the opening 91, releases the connection between the handle and the crank plate so that the shaft 51 can be rotated by manually manipulating the handle 83 independently of the actuator 55 and the other members of the system.

The handle 83 may be maintained in locked engagement with the crank plate 58 for mechanical operation by the actuator 55 or clear of the crank plate so that the shaft 51 and the roller 25 are isolated from the system and can be positiond as desired by the press operator simply by turning the handle.

The handle 83 is maintained in engagement with the crank plate 58 by a spring 95 which surrounds the shaft 51 and is anchored to it by a snap ring 96. The spring is disposed in a recess 97 formed in the handle and bears against the inner end of the recess to produce a force on the body 85 acting toward the crank plate so the handle is urged into contact with the plate or the pin 92. If the pin is alined with the opening 91, it will enter the opening and the portions 88, 89 will abut. When the parts are in this relationship, the shaft will be rotated by actuator 55.

To maintain the handle clear of the crank plate so that the shaft 51 is isolated from the system and the ink pickup roller 25 can be independently moved "On" or "Off", a simple lock 100 in the form of an annular washer is provided having a central opening 103 large enough to fit loosely around shaft 51. The lock 100 is loosely held over the open end of the recess 97 by two studs 102 which fit into notches 101 formed in the opposite sides of the lock. The lock 100 thus has limited movement transverse to the axis of shaft 51 between two positions. In one position, shown in FIGS. 3 and 4, the opening 103 is alined with the shaft 51 so that it will slide over the shaft allowing the handle to move longitudinally on the shaft. In the other position, shown in FIGS. 5 and 6, the center of the opening 103 is below the center of the shaft 51, a position which can be achieved only when the handle has been pulled outwardly until the lock is clear of the shaft.

The handle 83 is easily placed in the position shown in FIGS. 5 and 6 by simply pulling it outwardly, against the force of the spring 95, until the holding lock 100 clears the end of the shaft. The lock will then drop downwardly, by its own weight, to the FIGS. 5 and 6 position in which it covers a portion of the end of the shaft 51. When the handle is released, the spring 95 urges it toward the crank plate and the washer engages the end of the shaft to block further movement of the handle. As a result, the shaft 51 becomes isolated from the linkage system and may be rotated as desired by turning the handle. Thus, the roller 25 may be moved into or out of contact with the ink supply roller 26 independently of the movement of the other units of the throw-off system. Obviously, the handle 83 need be pulled outwardly only sufficiently far to clear the pin 92 from the hole 91 in order to manually rotate the shaft 51. It is not necessary to drop the lock 100 before making this adjustment.

Connection between the handle 83 and the crank plate 58 to reestablish the roller 25 in the throw-off system so that it is controlled by the actuator 55 can be accomplished easily and quickly. By pulling outwardly on the handle, the force of the spring 95 is relieved from the lock and it can be easily raised so that the central opening 103 is alined with the shaft 51. The handle is then allowed to move toward the plate 58 under the urging of the spring 95, the end of the shaft 51 passing through the opening 103, until the pin 92 fits into the opening 91 so as to couple the actuator 55 to the shaft 51.

Pursuant to the invention, the shaft 51 is provided with stops for limiting rotation between predetermined limits and the portion 88 of the handle 83 is sufficiently wide to abut the pin 92 in all relative positions of the shaft 51 and the crank plate 58. The stop structure for the shaft 51 includes a stop plate 110 keyed to the shaft and provided with an adjustable set screw 111 and a projecting rod 112. The set screw 111 cooperates with a pin 113 mounted on the press frame 11 and the rod 112 cooperates with a second pin 114 also mounted on the press frame 11 (see FIGS. 1 and 2). It can be seen that engagement of the set screw 111 and the rod 112 with their respective pins 113, 114 limits rotation of the shaft 51 within predetermined limits.

The portion 88 of the handle is segmental in shape as can best be seen in FIGS. 3 and 5. The linkage coupling the crank plate 58 to the actuator 55 limits movement of the crank plate between predetermined limits. The pins 113 and 114 limit rotation of the handle 83. The segmental portion 88 is proportioned so that the pin 92 will abut the handle portion 88, or drop into the opening 91, in all relative angular positions which could be assumed by the crank plate 58 and the handle 83. Thus, locking engagement between the crank plate 58 and the shaft 51 is always assured after the handle 83 has been separated from the crank plate for manually rotating the shaft. To reestablish locking engagement between the crank plate 58 and the control shaft 51, the lock 100 is lifted to permit the end of the shaft 51 to pass through the aperture 103 and allow the spring 95 to move the handle 83 toward the crank plate. If the pin 92 is not alined with the opening 91, it simply abuts the segmental handle portion 88 and the next time that the actuator 55 is operated to move the crank member 58, the movement of the pin 92 across the portion 88 will bring it into alinement with the opening 91. Then the handle portion 88, under the urging of the spring 95, will snap tightly against the plate 58 with the pin 92 entering the opening 91 to reestablish direct mechanical drive from the actuator 55 to the control shaft 51.

The shafts 35 and 41 are similarly provided with stops for restricting their rotation between predetermined limiting positions. The shaft 35 carries a rod 120 which cooperates with a pin 121, and the shaft 41 carries a rod 122 which cooperates with a pin 123 (see FIG. 1). The pins 121, 123 are secured to the press frame 11 and limit rotation of the control shafts 35, 41 in a clockwise direction. The shaft 35 is limited in its counterclockwise movement by the seating of the cam follower 38 in a depression 125 formed in the cam 36 (see FIG. 2). A similar depression in the cam carried by the shaft 41 limits rotation of this shaft in a counterclockwise direction. As can be seen in FIG. 1, each of the handles 81, 82 are provided with segmental portions 81*a* and 82*a* which correspond to the handle portion 88 and thus the pin and locking arrangements (not shown) for the handles 81, 82 and their associated shafts 35, 41 are brought

into locking alinement for mechanical operation in the same manner as the opening 91 and the pin 92 associated with the handle 83 and described above.

It can now be seen that there has been provided an offset press throw-off mechanism in which all of the throw-off shafts can be simultaneously operated by the actuator 55. In addition, by simply pulling any one of the handles 81, 82 or 83 outwardly, the mechanical connection will be broken and the associated shafts can be individually rotated to throw-off the associated rollers. Since the operator simply pulls the desired handle, it can be seen that the shift from actuator operation to manual operation is quite simple. To again link the manually operated control shaft to the actuator 55, the operator simply shifts the handle lock upwardly and allows the handle to move under the urging of its spring into abutment with the adjacent crank plate. The pin and recess connections interlock when the actuator 55 is again cycled and the system is in readiness for mechanical operation. Because of the segmental shape and size of the handle portions 88, 81*a* and 82*a*, engagement of the handles and the pins on their cooperating crank plates is assured without jamming during transitions from manual to actuator control.

It is also possible for the operator to pull the desired handles and manually manipulate the throw-off shafts without shifting the handles sufficiently far to cause the washer locks to drop and lock the handles in their manual, FIG. 6, positions. As a result, the throw-off mechanism can be automatically changed from manual operation to mechanical operation by cycling the actuator 55 and without again adjusting the handles on their locks.

As a further feature of the invention, the stop rods 112, 120, 122 are resilient so that there is flexibility in establishing limit positions for the throw-off linkage. The arm 75 and the gear segment 76 can therefore be relatively adjusted to obtain the proper spacing between the blanket cylinders when the parts are in their FIG. 1 operating positions. This slightly rotates the bushings 45, 53 and the plates 59, 60 and thus changes the limit positions of the links 61, 62, 63. Because of the resilience of the rods 112, 120, 121 these slight changes are absorbed easily without expensive and time consuming adjustments of all the linkage limit stops.

In addition, it should be recognized that the operating positions of the members of the system which are capable of independent operation are established by adjustable stops 31*a*, 32*a*, 42*a*, 43*a* and 111 not directly associated with the throw-off system itself. Therefore, it is possible to operate the members by either mechanical or manual throw-off and to change from one to the other without affecting their adjusted operating positions.

It can be seen that the preferred embodiment disclosed is particularly economical to manufacture. It will also be appreciated that the operator of the press can easily, by a quick glance, establish whether any particular control handle is set for actuator or for manual operation since the relative positions of the ends of the control shafts and the washer-like locks carried by the handles can be readily seen from the side of the press.

We claim as our invention:

1. In an offset press having a frame carrying rollers and cylinders, a throw-off mechanism comprising, in combination, a plurality of rotatable members journaled on parallel axes in said frame, each of said members carrying means for shifting respective ones of said rollers and cylinders upon rotation of said member, each of said members having a crank member mounted thereon, means coupling said crank members so that they move in unison, a drive anchored to said frame for rotating said coupled crank members, certain of said crank members being freely journaled on their respective rotatable members, handles rotatably locked on those rotatable members carrying said journaled crank members, said handles being shiftable into and out of locking engagement with the crank members on their rotatable members, and stops for arresting rotation of said handle carrying rotatable members at the limits of rotation imparted by said means so that said rotatable members can be rotated between predetermined limit positions by either manual manipulation of said handles or through said drive.

2. In an offset press having a frame carrying rollers and cylinders, a throw-off mechanism comprising, in combination, a plurality of rotatable members journaled on parallel axes in said frame, each of said rotatable members carrying means for shifting respective ones of said rollers and cylinders upon rotation of said rotatable member, each of said rotatable members having a crank member mounted thereon, means coupling said crank members so that they rotate in unison, a drive anchored to said frame for rotating said coupled crank members, certain of said crank members being freely journaled on their respective rotatable members, and handles rotatably locked on those rotatable members carrying said journaled crank members, said handles being shiftable into and out of locking engagement with the crank members on their rotatable members.

3. In an offset press having a frame carrying rollers, a throw-off mechanism comprising, in combination, a plurality of parallel shafts journaled in said frame, each of said shafts carrying means for radially shifting the axis of respective ones of said rollers upon rotation of said shaft, each of said shafts having a crank member mounted thereon, means coupling said crank members so that they rotate in unison, a drive anchored to said frame for rotating said coupled crank members, certain of said crank members being freely journaled on their respective shafts, handles on those shafts carrying said journaled crank members, said handles being mounted on said shafts adjacent to said crank members for axial but not rotational movement relative to the shafts, interengageable elements for rotatably locking said handles and said adjacent crank members upon axial movement of each handle in one direction, means biasing each handle in said direction, and locks for releasably holding said handles against the bias of said means with said elements disengaged.

4. In an offset press having a frame carrying rollers, a throw-off mechanism comprising, in combination, a plurality of parallel shafts journaled in said frame, each of said shafts carrying means for shifting respective ones of said rollers upon rotation of said shaft, each of said shafts having a crank member mounted thereon, means coupling said crank members so that they move in unison, a drive anchored to said frame for rotating said coupled crank members, one of said crank members being freely journaled near the end of its shaft, a handle mounted at said end of the shaft adjacent to said crank member, said handle being secured to its shaft against relative rotation and for shifting movement toward and away from said adjacent crank member, said handle and adjacent crank member having opposed portions with interengaging pin and recess elements for rotatably locking said handle and said crank member upon engagement of said portions, a spring anchored to said shaft and mounted within said handle for urging said handle toward said crank member, and a slidable lock mounted on said handle for engaging said shaft in one position so as to hold the handle away from said crank member against the urging of said spring, said lock being slidable to a second position so as to clear said shaft and allow the handle to move toward said crank member.

5. A throw-off mechanism for offset presses comprising, in combination, a journaled shaft coupled to a press member for shifting the axis of said member upon rotation of the shaft, a crank member journaled on said shaft, a drive for rotating said crank member, a handle mounted on said shaft adjacent to said crank member for axial but not rotational movement relative to the shaft, interengageable elements for rotatably locking said handle

and said crank member upon axial movement of said handle in one direction, means biasing said handle in said direction, and a lock for releasably holding said handle against the bias of said means with said elements disengaged.

6. A throw-off mechanism for offset presses comprising, in combination, a journaled shaft coupled to a press member for shifting said member upon oscillation of the shaft, a crank member journaled on said shaft, a drive for rotating said crank member between predetermined limits, a handle mounted on said shaft adjacent to said crank member for axial but not rotational movement relative to the shaft, interengageable elements for rotatably locking said handle and said crank member upon axial movement of said handle in one direction, means biasing said handle in said direction, and stops for limiting the rotation of said shaft between said predetermined limits, said elements being formed to snap into engagement under the urging of said means when said crank member is rotated within said limits.

7. A throw-off mechanism for rollers of printing presses comprising, in combination, a journaled shaft coupled to a press member for shifting said member upon rotation of the shaft, a crank member journaled near one end of said shaft, a reciprocating drive for oscillating said crank member, a handle mounted at said end of the shaft adjacent to said crank member, said handle being secured to said shaft against relative rotation and for shifting movement toward and away from said crank member, said handle and crank member having opposed portions with interengaging pin and recess elements for rotatably locking said handle and said crank member upon engagement of said portions, a spring anchored to said shaft for urging said handle toward said crank member, and a slidable lock mounted on said handle for engaging said shaft in one position so as to hold the handle against the urging of said spring, said lock being slidable to a second position so as to clear said shaft and allow the handle to move toward said crank member.

8. A throw-off mechanism for offset presses comprising, in combination, a journaled shaft coupled to a press member for radially shifting said member upon rotation of the shaft, a crank member journaled near one end of

said shaft, a reciprocating drive for swinging said crank member between predetermined limits, a handle mounted at said end of the shaft adjacent to said crank member, said handle being secured to said shaft against relative rotation and for shifting movement toward and away from said crank member, said handle and crank member having opposed portions with interengaging pin and recess elements for rotatably locking said handle and said crank member upon engagement of said portions, a spring anchored to said shaft and mounted within said handle for urging said handle toward said crank member, a slidable lock mounted on said handle for engaging said shaft in one position so as to hold the handle against the urging of said spring, said lock being slidable to a second position so as to clear said shaft and allow the handle to move toward said crank member, and stops for limiting the rotation of said shaft between said predetermined limits, said opposed portions being sufficiently wide to abut said pin in all relative positions of said handle between said limits for causing automatic locking engagement between the pin and recess elements upon release of said lock.

9. An offset press comprising, in combination, a frame, a plurality of pairs of cooperating rollers rotatably mounted in said frame, one roller of each of said pairs being mounted for radial shifting movement relative to the other roller of said pairs, said shiftable rollers being biased toward their respective cooperating rollers, adjustable stops for resisting movement of said biased rollers and thus controlling the engagement between said cooperating pairs of rollers, means for shifting said biased rollers against said bias so as to throw off said roller pairs, a manual operator for each of said means, and a linkage coupling each of said manual operators, said linkage including releasable connections so that each of said means can be operated either manually or through said linkage without disturbing the adjusted engagement between the roller pairs.

References Cited in the file of this patent

UNITED STATES PATENTS

2,853,943 Royer ---------- Sept. 30, 1958