

Jan. 16, 1968

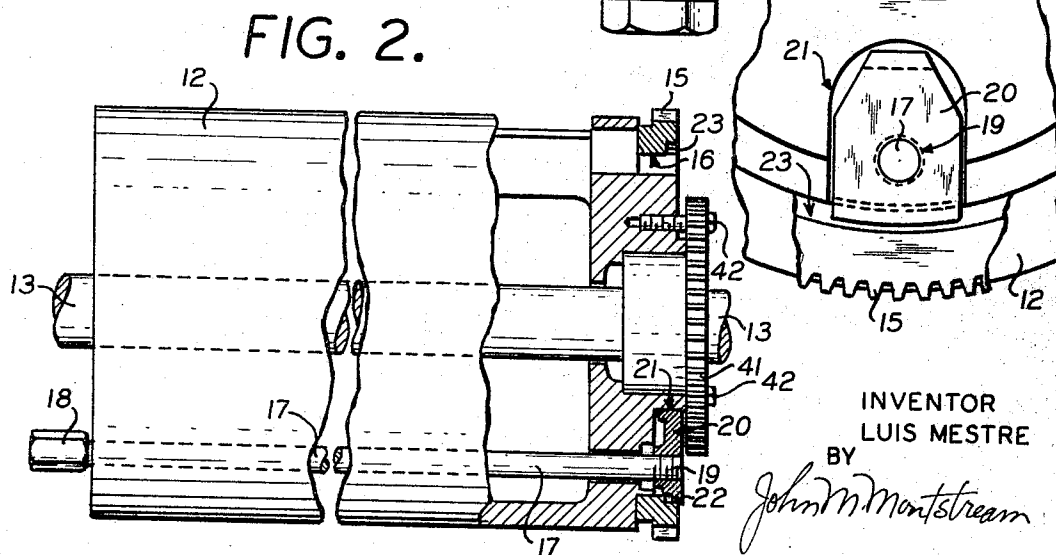
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3,363,554

IMAGE RAISING AND LOWERING MECHANISM

Filed Nov. 27, 1964

2 Sheets-Sheet 1



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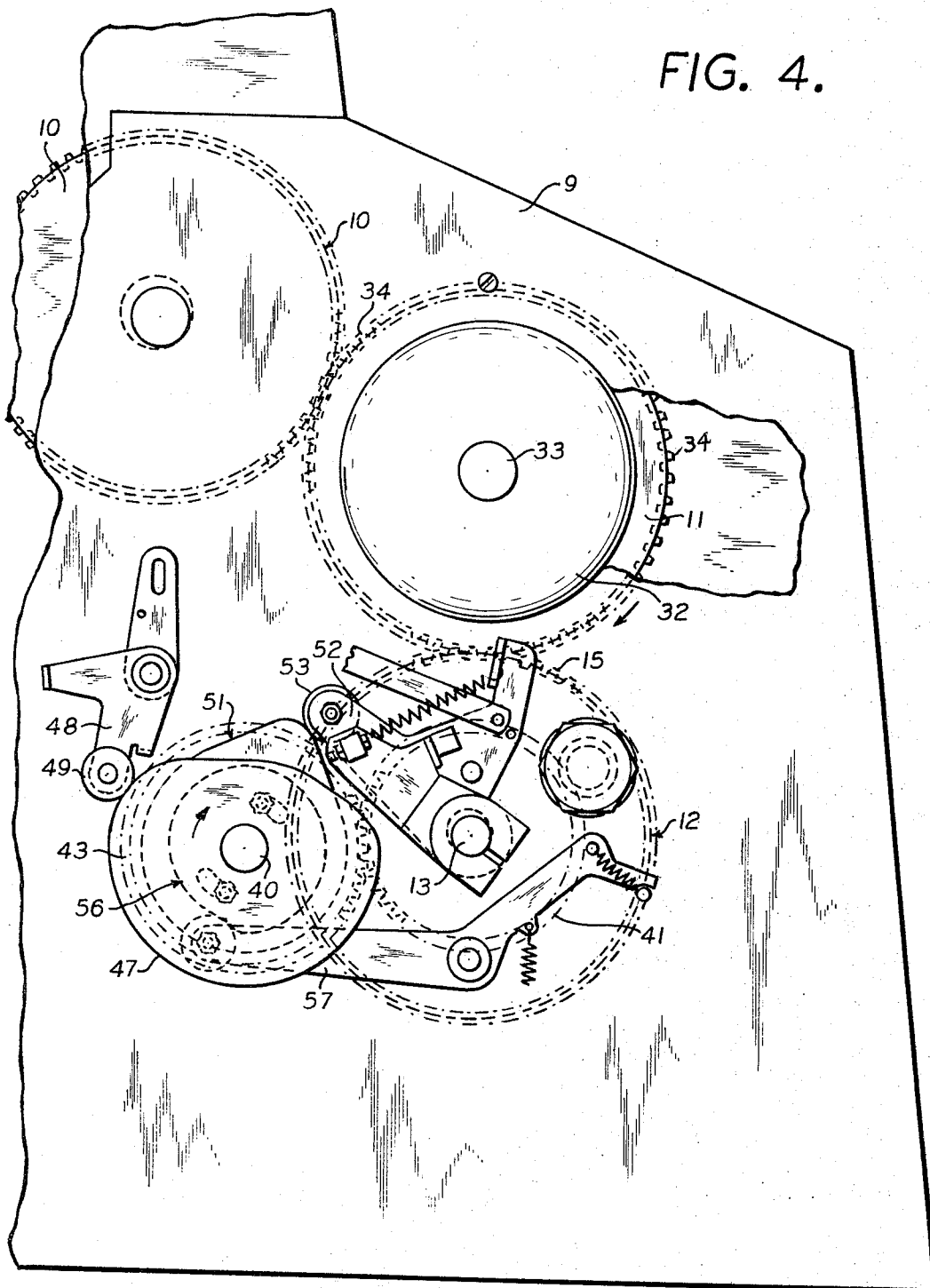
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IMAGE RAISING AND LOWERING MECHANISM

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2 Sheets-Sheet 2

FIG. 4.



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IMAGE RAISING AND LOWERING MECHANISM

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6 Claims. (Cl. 101-248)

The invention relates to a simplified construction of mechanism for a printing press for raising and lowering, or adjusting, the location of the image on the printed sheets, and such that when the adjustment is made, the relationship of two or more other mechanisms of the press operated in timed sequence with the rotation of the main cylinder remains unaltered. More particularly image raising and lowering mechanism is provided which drives a single cam shaft on which cam shaft there is mounted a plurality of cams for operating other mechanisms in proper timed sequence with respect to the main cylinder. The mechanism of the invention is applicable to presses of the one drum stencil, two drum stencil, three cylinder press having an impression cylinder such as that illustrated herein, as well as other multi cylinder presses.

It is an object of the invention to construct a simple image raising and lowering mechanism or combination which when adjusted, does not alter the timed relationship of a plurality of other mechanisms, two or more of which must be accurately related as to the time of their operation to the rotation of the main or impression cylinder.

Another object is to construct a press having a single cam shaft for operation of a plurality of other mechanisms, two or more of which must be operated in accurate timed sequence with the main or impression cylinder.

Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment of the invention in which;

FIG. 1 is a plan view of portions of the three cylinders of a press;

FIG. 2 is a partial section of the impression cylinder;

FIG. 3 is an enlarged view of the gear clamping means; and

FIG. 4 is an end view of a portion of the press.

The three cylinder press illustrated includes a plate cylinder 10 on which a printing plate is mounted, a blanket cylinder 11 to which the ink impression is transferred from the plate, and an impression cylinder means including an impression cylinder 12 in contact with the blanket cylinder. The impression cylinder is rotatably mounted such as on a shaft 13 fixed to the frame 9. The impression cylinder carries sheet grippers, of any suitable construction, and such an impression cylinder means with sheet grippers is shown in Mestre Ser. No. 331,674 filed Dec. 19 1963. The grippers (not shown herein) grip a sheet which is fed to it from the top of a pile of sheets by sheet feeding mechanism and draws the sheet between the impression cylinder and the blanket cylinder so that the ink impression on the blanket cylinder is transferred to each sheet of paper. By adjusting the relative position of the impression cylinder, and hence its grippers, in relation to the blanket cylinder, the position of the ink impression on the sheet may be raised or lowered with respect to the top of the sheet.

The three cylinders of the press are driven at the same speed through meshing drive gears secured to each cylinder including a drive gear 15 which is adjustably mounted on one end of the impression cylinder. Any suitably adjustment mounting means may be used that shown being a gear bearing 16 carried at the end of the impression cylinder which bearing receives the driving gear. Means is provided to adjust the position of the driving gear on its bearing and hence relatively to the impression cylinder.

The adjusting means also clamps the gear in adjusted position. The adjusting means illustrated is a simple form including a clamp shaft 17 having a hexagonal head 18, shown projecting beyond the end of the impression cylinder, which clamp shaft is mounted to pass through the cylinder. The shaft shown extends lengthwise within the cylinder so that the cylinder may be adjusted from that side of the press where an operator usually stands. The clamp shaft carries a thread 19 on its other end on which thread is carried a clamping member 20 which may be held against turning such as by being received in a slot 21 in the end of the cylinder. This clamping member has a clamping surface 22 which engages a clamping surface 23 carried by the driving gear 15. The clamping surface of the driving gear is shown as the face of a circular recess.

The adjustment of the impression cylinder 12 with respect to its driving gear 15 is accomplished by unloosening the clamping member 20 such as by a socket 26 rotatably mounted on the press frame. A bracket 27 secured to the frame mounts this socket and the latter is positioned to be in circular alignment with the head 18 of the clamp shaft. This socket is spring pressed to inoperative position by a spring 28 and the socket is turned by a socket handle 29.

Upon turning of the impression cylinder, the clamp shaft head 18 can be brought into alignment with the socket 26. A hand wheel 32 for this purpose is secured to the shaft 33, which rotatably mounts the blanket cylinder on the frame. The shaft 33 is fixed to the blanket cylinder. Turning of the hand wheel rotates the blanket cylinder and its driving gear 34 and through the drive gear 15 on the end of the impression cylinder rotates the latter. When the head of the clamping shaft is in alignment with the socket, the socket is projected onto the head and by turning the socket and the clamp shaft, the clamp member is loosened which unclamps the drive gear 15 from the impression cylinder. With the socket still engaging the head of the clamp shaft, the impression cylinder is held stationary so that now upon turning of the hand wheel in one direction, the driving gear is turned on its bearing 16 on the cylinder and the relative position of the driving gear with respect to the impression cylinder with its grippers is changed. This necessarily changes the relative position of the impression cylinder with respect to the blanket and plate cylinder so that the impression transferred to the sheet is adjusted or shifted up or down. In other words the turning of the hand wheel changes the relative position of the image on the blanket cylinder with respect to the grippers of the impression cylinder to raise or lower the image as printed on the sheet. At scale 35 on the blanket cylinder with a fixed pointer 36 will aid in making the desired adjustment.

This changing of the relative position of the impression cylinder and of the image printed on the sheet does not alter the timed relationship of the other operating mechanisms of the press because these operations are controlled by cams carried by a single cam shaft 40 driven directly from the impression cylinder and hence this cam shaft remains fixed or stationary when the position of the drive gear 15 is adjusted. This is accomplished by providing a fixed driving connection between the impression cylinder means and the cam shaft shown as a gear 41 secured or fixed to the impression cylinder means by bolts 42 and particularly to the end of the impression cylinder for a construction in which the impression cylinder shaft is stationary with the impression cylinder rotating thereon. A drive connection is provided between this gear 41 and a gear 43 carried by the cam shaft of the same diameter as the gear 41 so that the impression cylinder and the

cam shaft are rotated at the same speed and their relative position remains unchanged.

The cam shaft carries a plurality of cams each of which operates some other mechanism in timed sequence with the rotation of the impression cylinder. One cam 47, FIG. 4, operates the paper feed mechanism by which a sheet is fed to the press or to the grippers on the impression cylinder. This sheet feeding mechanism which feeds the sheets one at a time off of the top of a pile of sheets is operated through a lever 48 having a cam follower 49 engaging the cam. A type of sheet feeder is shown in Patent No. 2,231,274 dated Feb. 11, 1964.

A second cam 51 is carried on the cam shaft which operates cylinder separating mechanism for separation of one or more of the cylinders under the control of sheet sensing and control mechanism in the event a sheet is not fed to the press. This cylinder separating mechanism is operated from a lever 52 having a cam follower 53 which engages the cam. A type of cylinder separating mechanism is shown in the Mestre application Ser. No. 360,158, filed Mar. 23, 1964. This application describes a mechanism which separates the plate cylinder from the blanket cylinder and separates the impression cylinder from the blanket cylinder. This cam may operate other forms of cylinder separating mechanisms which separate another cylinder or cylinders and it need not be the particular cylinder separating mechanism nor the particular cylinders shown in the application aforesaid.

A third cam 56 is carried by the cam shaft which operates a control mechanism for the cylinder separating mechanism which includes a lever 57 having a cam follower 58 thereon which engages the cam. This control mechanism controls the operation of the cylinder separating mechanism when a sheet is fed and when not fed to the press. The control mechanism is under the control of sheet sensing means. Application Ser. No. 360,158 above shows a type of mechanism for accomplishing this control of the operation of the cylinder separating mechanism.

A fourth cam 60, FIG. 1, may be carried by the cam shaft which operates sheet stop mechanism which may be separately provided on the press to stop the leading edge of a sheet of paper at the proper position to be gripped by the grippers of the impression cylinder. This cam will not be provided in a construction of impression cylinder means which carries stop means mounted on the impression cylinder. This sheet stop mechanism is operated from a lever 61 having a cam follower 62 which engages the cam. Such stop operating mechanism is shown in Mestre 2,859,692, dated Nov. 11, 1958.

A fifth cam 63 is carried by the cam shaft which operates jogging mechanism carried by a delivery tray which receives the printed sheets to align the sheets in the tray. This jogging mechanism is operated by a lever 64 having a cam follower 65 which engages this cam. Such sheet jogging mechanisms are well known on presses and collators. The jogging mechanism need not be in precise timed relation with respect to the rotation of the impression cylinder although it is desirable.

A sixth cam 68 may be provided on the cam shaft which operates an auxiliary sheet feeding mechanism located adjacent to the cylinders which is helpful in feeding relatively thinner sheets which have a greater tendency to buckle. This cam operates a lever 69 having a cam follower 70 engaging the cam 68. Such auxiliary sheet feeding means are well known.

A simplified construction is provided for two or more of the operating cams mounted on the cam shaft each of which cams operate other mechanism in proper timed sequence with respect to the rotation of the impression cylinder. With a driving connection for the cam shaft which is connected at all times with the impression cylinder

der these various mechanisms are always in the proper timed relation with respect to the rotation of the impression cylinder and its grippers. In other words, when the relative position of the drive gear carried on the impression cylinder is shifted, the timed relation of the rotation of the cam shaft remains fixed with respect to the impression cylinder and its grippers through the fixed driving connection in the gears 41, 43.

This invention is presented to fill a need for improvements in image raising and lowering mechanism. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. This disclosure illustrates the preferred means of embodying the invention in useful form.

I claim:

1. An image raising and lowering mechanism for a printing press comprising a press frame, a blanket cylinder and a plate cylinder rotatably mounted on the press frame and each having a drive gear meshing together, impression cylinder means mounted on the frame including an impression cylinder, sheet grippers carried by the impression cylinder, and a shaft carried by the frame and mounting the impression cylinder for rotation, a single drive gear, mounting means carried by the impression cylinder means and mounting the drive gear for adjustment circumferentially thereon, clamping means carried by the impression cylinder means and engaging the drive gear to secure the same in adjusted position on the impression cylinder means; a cam shaft rotatably mounted on the frame adjacent to the impression cylinder, a driving connection between the impression cylinder and the cam shaft having a one to one ratio to rotate the latter therewith; a plurality of cams secured to the cam shaft including two or more of a sheet stop mechanism cam, a cylinder separation mechanism cam, a control mechanism cam for control of a cylinder separating mechanism, a sheet feeding mechanism cam, an auxiliary sheet feeding mechanism cam and a jogging mechanism operating cam; and means to loosen and tighten the clamping means for circumferential adjustment of the drive gear with respect to the impression cylinder means.

2. An image raising and lowering mechanism as in claim 1 including a handle connected with the blanket cylinder to turn the same and to turn the impression cylinder drive gear relatively to the impression cylinder for image adjustment when the impression cylinder clamping means is released.

3. An image raising and lowering mechanism as in claim 1 in which the cam shaft carries at least three of the aforesaid cams.

4. An image raising and lowering mechanism as in claim 1 in which the cam shaft carries at least four of the aforesaid cams.

5. An image raising and lowering mechanism as in claim 1 in which the cam shaft carries at least five of the aforesaid cams.

6. An image raising and lowering mechanism as in claim 1 in which the cam shaft carries all six of the enumerated cams.

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