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3,221,652

IMPRESSION CYLINDER COMBINATION FOR A PRESS

Filed Dec. 19, 1963

4 Sheets-Sheet 1

FIG. 1.

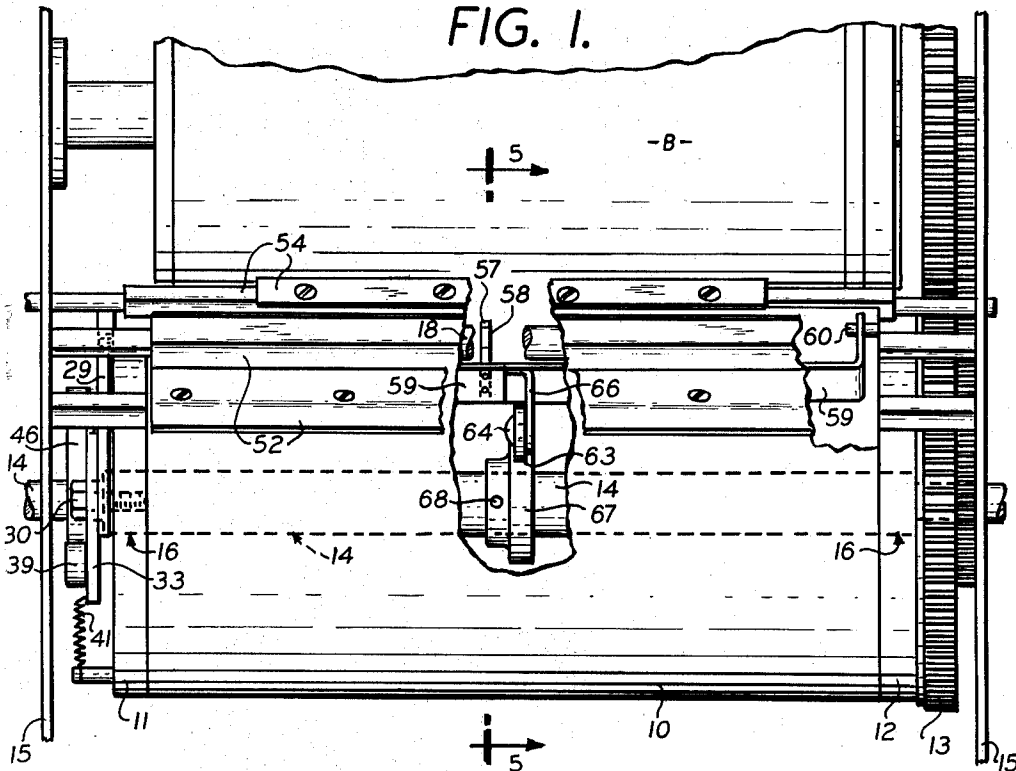
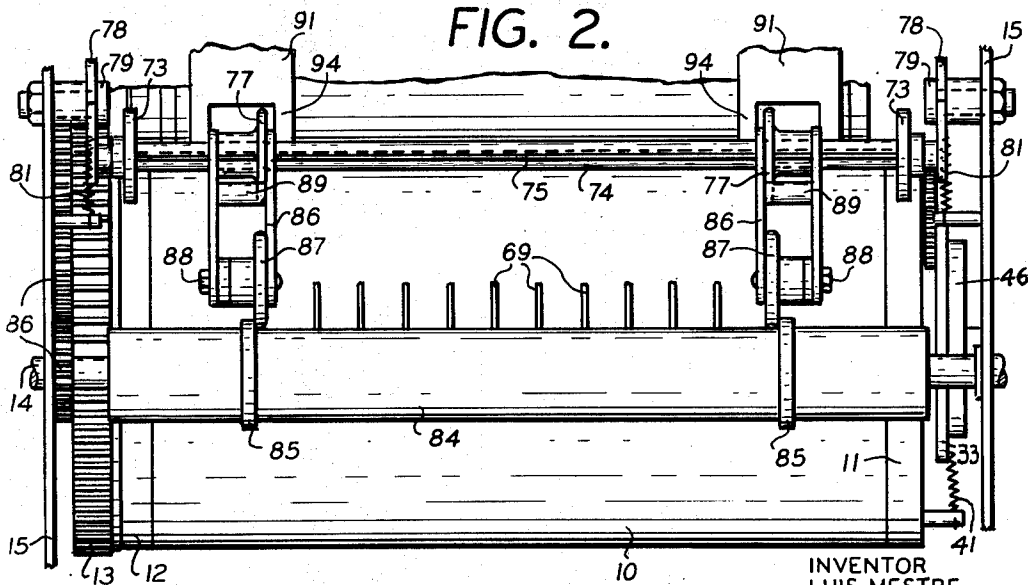


FIG. 2.



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4 Sheets-Sheet 2

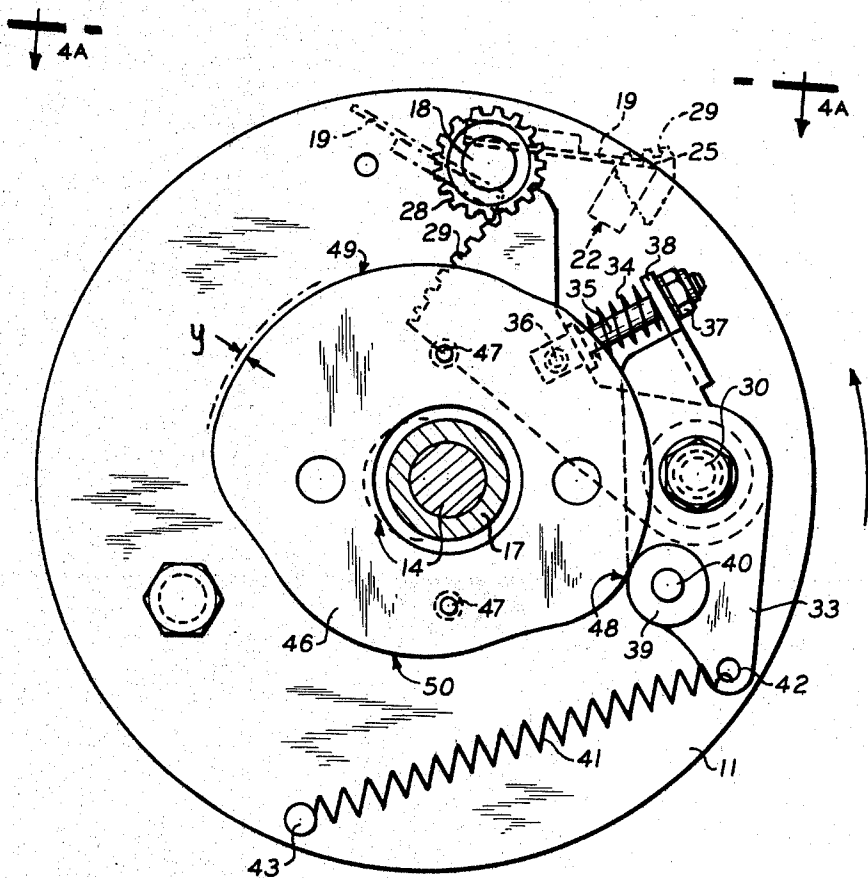


FIG. 3.

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4 Sheets-Sheet 3

FIG. 4.

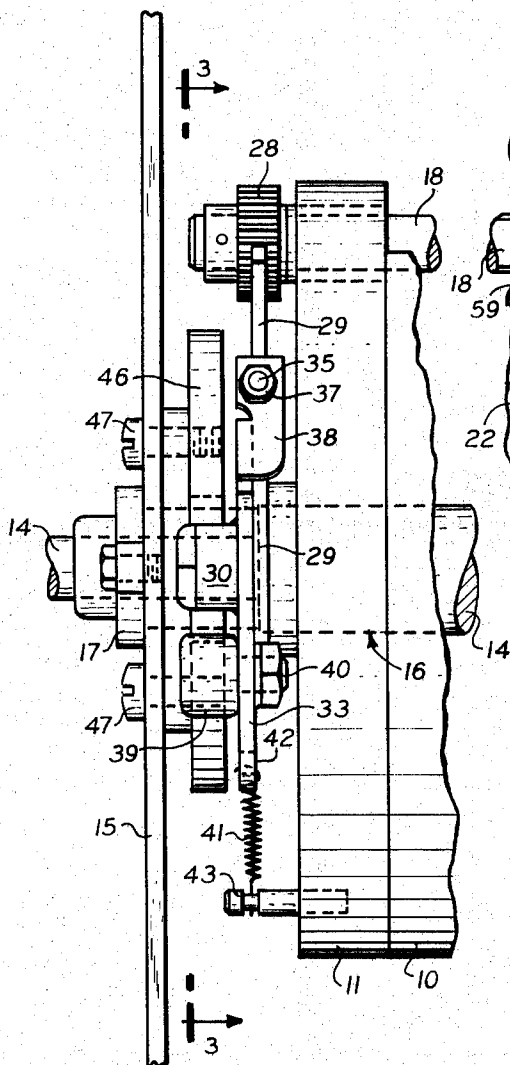


FIG. 4A.

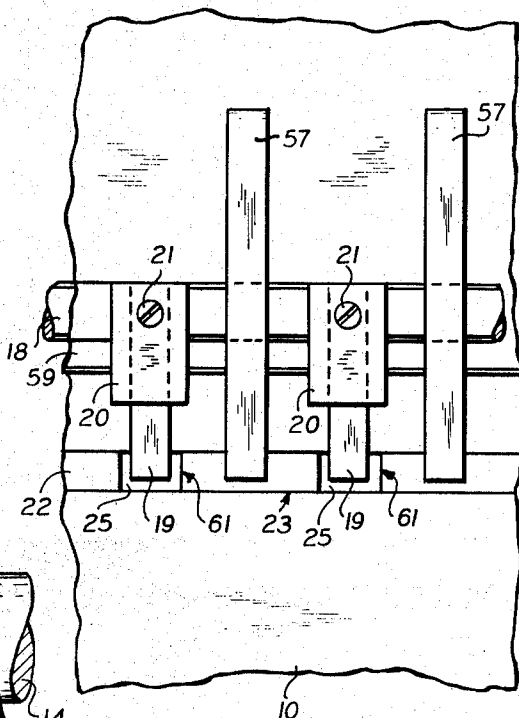
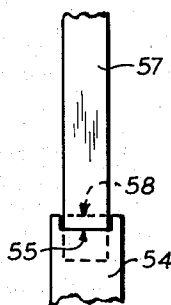


FIG. 4B.



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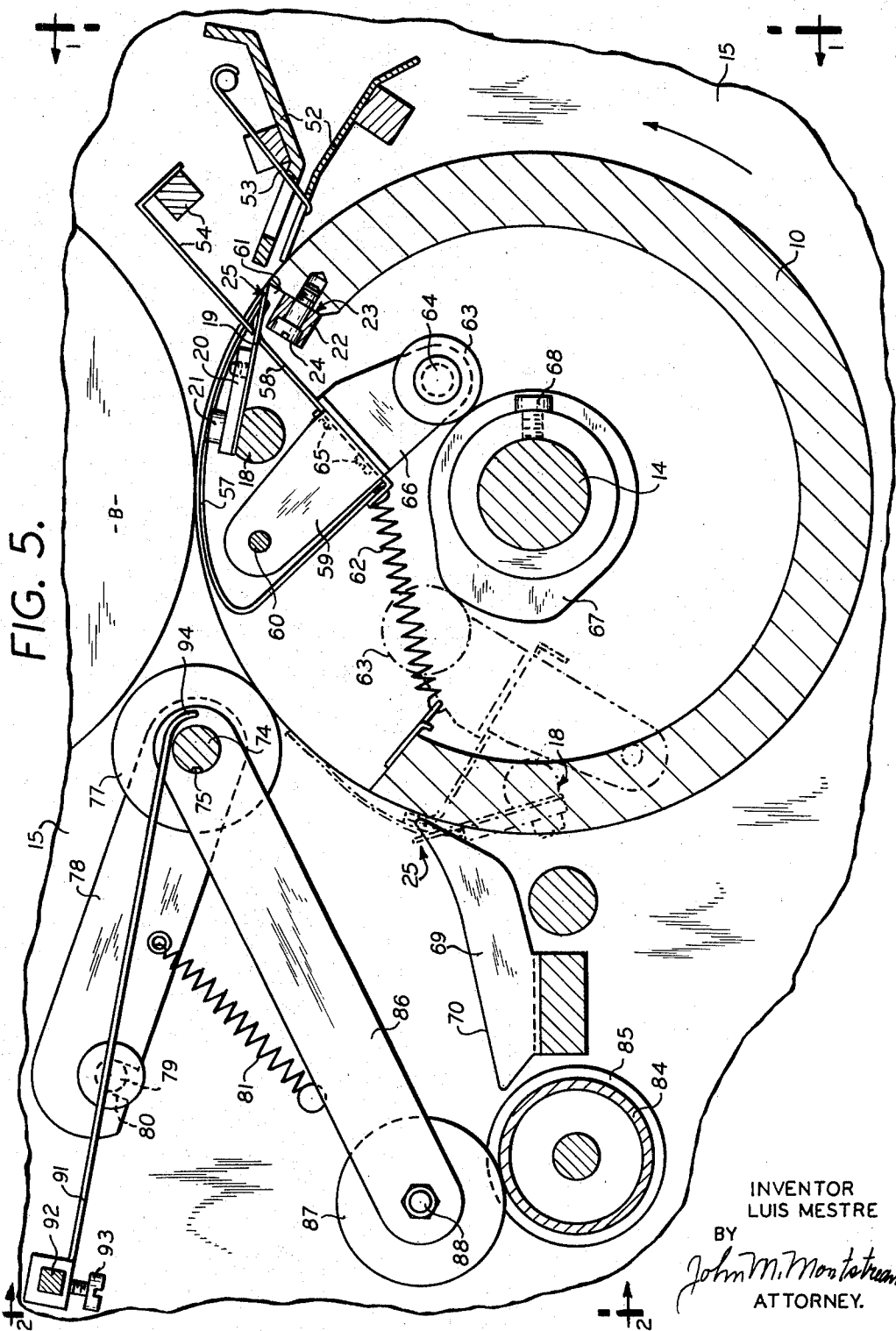
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3,221,652 IMPRESSION CYLINDER COMBINATION FOR A PRESS

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17 Claims. (Cl. 101-232)

The invention relates to an impression cylinder combination and an impression cylinder for a press. The impression cylinder is provided with sheet gripping means as well as part of a sheet stripping mechanism for stripping a sheet off of the cylinder. The sheet of paper is fed to the cylinder and clamped by the grippers as the impression cylinder rotates to draw the sheet between the impression cylinder and the blanket cylinder of the press. Thereafter, the grippers are released and sheet lifting means raises the leading edge of the sheet sufficiently so that stripping fingers engage the sheet and remove the sheet from the impression cylinder. The sheet is then delivered to a deposit tray or platform. The sheet is printed in the passage between the blanket cylinder and the impression cylinder.

It is an object of the invention to construct an improved gripping means carried by the impression cylinder to grip the leading edge of a sheet and pull it between the impression cylinder and blanket cylinder.

Another object is to construct an impression cylinder with an improved gripping means in combination with means for raising or projecting the leading edge of the sheet above the periphery of the cylinder whereby the sheet may be stripped from the impression cylinder.

Another object is to construct an impression cylinder combination having an improved sheet gripping means in combination with means to raise the sheet above the periphery of the cylinder so that the sheet may be stripped therefrom and including auxiliary sheet feeding means in contact with the impression cylinder which is easily adjustable laterally.

A still further object is to provide means which cooperates with a sheet stop to prevent the leading edge of the sheet from being projected under the stop.

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 thereof, in which:

FIG. 1 is a front view in reduced scale of the impression cylinder from the sheet feeding side thereof and with parts in section.

FIG. 2 is a rear view in reduced scale of the impression cylinder from the sheet exit side thereof.

FIG. 3 is an end view of the impression cylinder taken on line 3-3 of FIG. 4.

FIG. 4 is a partial view of the impression cylinder in full scale showing the operating means for the grippers.

FIG. 4A is a partial view of the grippers taken on line 4A-4A of FIG. 3.

FIG. 4B is a partial view of the sheet stop and the long fingers.

FIG. 5 is a cross-section through the impression cylinder taken on line 5-5 of FIG. 1.

The press is provided with a plate cylinder (not shown), a blanket cylinder B for engagement with a plate on the plate cylinder and an impression cylinder. An inking unit and a fluid, or water, until supply ink and fluid to the plate carried by the plate cylinder so that the plate image is transferred to the blanket cylinder. A sheet of paper is initially fed one at a time from a supply table (not shown) against stop means and into the open grippers carried by the impression cylinder which grippers close and draw the sheet between the blanket cylinder so that the impression carried by the blanket cylinder and

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the impression cylinder is transferred to and printed on the sheet. After the sheet has passed through the nip of the two cylinders, the gripping means is opened sufficiently so that sheet lifting means can function to lift or raise the leading edge of the sheet above the periphery of the impression cylinder. With the leading edge raised, the stripping mechanism functions to strip the sheet from the cylinder and deliver it to a deposit tray.

The impression cylinder 10 has a head 11 at one end thereof and a similar head 12 at the other end. A drive gear 13 is secured to the impression cylinder and particularly to the head 12 thereof to rotate the cylinder. The impression cylinder has shaft bearings 16, shown in simple form, which mount the cylinder for rotation on a nonrotatable and eccentric shaft 14 which is mounted on a frame 15 of any suitable construction such as frame bearings 17. The shaft is oscillatable in the bearings 17 in order to separate the impression cylinder from the blanket cylinder. The cylinder has a substantial gap in the periphery thereof.

Sheet gripping means is mounted on the impression cylinder which means includes a gripper shaft 18 extending between the heads of the cylinder and pivotally mounted thereon at the gap in the cylinder wall. A plurality of spaced grippers 19 are mounted on the gripper shaft in any suitable fashion and as illustrated includes a flat on this shaft and a gripper plate 20 and screw 21 for each gripper. The grippers have a small degree of flexibility as is well known. One end of the gripper shaft projects through the head 11. Suitable anvil means are provided for the grippers on the impression cylinder that shown being a separate anvil bar 22, which is secured to the edge or wall 23 of the gap in the cylinder by screws 24. An inclined outer surface 25 provides the anvil or clamping surface for the grippers with the leading edge of the sheet being clamped therebetween.

Operating means is provided to open and close the grippers once for each revolution of the impression cylinder in order to grip the leading edge of the sheet and pull the sheet between the impression cylinder and the blanket cylinder and beyond. The grippers are closed for about 90 degrees of one revolution of the cylinder and then the grippers are released. It is convenient to mount the operating means on the exterior side of the head 11. This operating means includes a pinion 28 secured to the end of the gripper shaft 18 which projects through the head 11. A movable rack 29 meshes with the pinion and the type of movement particularly shown is pivotal movement so that the rack is a segment or portion of a gear pivotally mounted on a pivot 30 which is carried by the head 11.

The operating means also includes a lever 33 pivotally mounted on the pivot 30. The lever 33 oscillates or moves the rack through an operating connection including spring means which spring means oscillates the rack in a direction to pivot the grippers from open position to gripping position in contact with the anvil surface 25. The spring means connection particularly shown includes a spring 34, a screw 35 which is pivotally secured to the rack by a pin 36 and on which the spring is mounted. The spring engages the rack at a point spaced from the pivot 30. An adjusting nut 37 is provided at the other end of the screw to adjust the tension of the spring 34 and to provide a connection between the lever and the rack to open the grippers. The lever 33 has a flange 38 which is located between the end of the spring 34 and the adjusting nut 37 so that the rack is moved in a clockwise direction to open the grippers by the flange engaging the nut 37 upon clockwise movement of the lever. This provides a positive connection

between the lever and the rack to move the rack in a direction to open the grippers. Tightening or loosening of the nut 37 adjusts the degree of compression of the spring means 34 and thereby adjusts the pressure of the grippers 19 on the sheet and anvil 25. This adjustment also may be used to vary the timing a small amount. The lever 33 is pivoted by a cam hence the lever carries a cam follower 39 rotatably mounted on a pin 40 on the lever. A spring 41 has one end secured to a hole 42 in the lever and the other end is secured to the head 11. This spring propels the lever 33 in a clockwise direction as viewed in FIG. 3 and keeps the cam follower in contact with the cam and also moves the lever and rack in a direction to open the grippers.

The lever 33 is oscillated to close the grippers by a fixed cam 45 which is part of the operating means for the grippers. This cam is secured to the frame 15 in any suitable fashion such as by screws 47. This cam has a high land 48 which extends for approximately 90 degrees of the cam periphery. In the cam shown, there is an intermediate land 49 which is a little lower by y than the high land. The rest of the cam periphery is a low land 50. The intermediate land may be of any desired or necessary extent of the periphery of the cam and as shown, it is about 110 degrees. The intermediate land opens the grippers sufficiently to release the leading edge of the sheet but does not open the grippers fully in order to avoid adjacent fixed structure.

In operation the cylinder rotates and carries the grippers 19 and its operating means therewith except the cam 46 so that the cam follower 39 rotates around the periphery of the cam 46. The cam follower in passing from the low land 50 to the high land 48 pivots the lever 33 in a counter clockwise direction, FIG. 3, and through the spring means 34 pivots the rack 29 in a counter clockwise direction. This movement of the rack rotates the pinion 28 and the grippers 19 in a clockwise direction to bring the grippers from open position, shown in dot-dash lines, to closed position, shown in dotted lines in FIG. 3 and full lines in FIG. 5, with the grippers in contact with the anvil surface 25. At the proper moment before the grippers close, the top sheet of a pile of sheets of paper is fed from a supply platform (not shown) and fed over a guide plate 52, FIG. 5, where the sheet moves a sheet sensor 53, until the leading edge of the sheet engages a stop means 54. It is at this moment that the grippers 19 clamp the leading edge of the sheet and pull it with the cylinder between the impression cylinder 10 and the blanket cylinder B and beyond. The high land 48 is high enough so that when the grippers 19 engage the sheet, the lever 33 pivots a little bit more to increase the compression in the spring means 34 and assures a firm gripping of the sheet. When the cam follower 39 reaches the intermediate land 49 of the cam, the grippers are adjacent stripping position, and the lever 33 is pivoted by the spring 41 in a clockwise direction whereupon the flange 38 engages the nut 37 and propels the rack in an outward or clockwise direction which in turn rotates the pinion 28 in a counter clockwise direction sufficiently to partially open the grippers 19 to the position thereof shown by the dot-dash lines in FIG. 5. In this position the grippers are open sufficiently to strip the sheet from the cylinder and the grippers clear any fixed construction adjacent to the periphery of the impression cylinder.

Continued rotation of the impression cylinder brings the cam follower 39 to the low land 50 which opens the grippers to an opposite angular position, that is to the dot-dash position illustrated in FIG. 3, with the grippers out of the way below the periphery of the impression cylinder. In this position the grippers are ready to be operated to close on the next sheet. These grippers are known as "tumble grippers." It will be noted therefore that this spring means connection between the lever 33 and the rack for closing the grippers performs three func-

tions, first, it provides a yielding connection in the event that the grippers or other parts should be jammed for some reason in their movement thereby avoiding possible damage, secondly, the pressure applied to the grippers may be adjusted and thirdly, the timing of the closing of the grippers of the sheet may be adjusted slightly.

After the grippers have opened, other means assure that the sheet continues being fed onward by the impression cylinder in addition to the feeding action of the two cylinders, as will appear hereinafter. When the grippers have partially opened to the position shown in dot-dash lines in FIG. 5, stripping mechanism is provided to strip the sheet from the cylinder which mechanism includes lifting finger means to raise the leading edge of the sheet away from the periphery of the cylinder. This finger means, as shown, comprises a plurality of spaced long fingers 57 which extend from the anvil 24 rearwardly for a substantial distance in the gap in the cylinder and are located at or adjacent to the periphery of the cylinder. As shown, the long fingers extend rearwardly beyond the gripper pivot 18. The finger means preferably includes also a plurality of short fingers 58 which project generally radially. Both sets of fingers are secured to a finger frame 59 in any suitable manner such as by screws 65 and preferably the ends are welded together. The finger frame is mounted on the cylinder heads for movement. The finger frame shown is of U-shape form providing arms which arms are pivoted on pivots 60, one of which is carried by each head of the cylinder. The short lifting fingers are beneath the ends of the long fingers and both fingers are positioned between the grippers so that there will be no interference with the grippers. Normally the ends of the fingers 58 are bent nearly at right angles and rest in a notch 61 carried by the anvil bar 22. This sheet raising or finger means is located within the cylinder cavity and is mounted at the gap in the cylinder wall. The finger frame is projected to the position shown in FIG. 5 by a spring 62. The finger frame carries a bracket 66 carrying a cam follower 63 which is rotatably mounted on a pin or screw 64.

The sheet lifting or finger means may include the short fingers 58 solely or the long fingers solely although for the sheet lifting function alone the short fingers are more desirable and are the essential lifting finger means. The primary purpose of the long fingers is to provide a peripheral surface coextensive with the cylinder periphery for a large part of the cylinder gap and to cooperate with the stops 54 to prevent the leading edge of a sheet from being projected under the stop. The long fingers and short fingers are conveniently in the same cross-sectional plane and in this position they necessarily function together.

Finger operating means is provided to move the finger frame and its fingers outwardly and beyond the periphery of the cylinder. This operating means includes a finger cam 67 which is secured to the fixed shaft 14 such as by a screw 68. For most of the rotation of the cylinder, the fingers 57 and 58 are retracted but when the grippers are partially opened, that is in the dot-dash position of FIG. 5, the cam follower 63 rides up on the high portion of the cam 67 which projects the finger frame 59 and the ends of the long fingers 57 and the short fingers 58 radially outwardly. With the fingers located underneath the leading edge of the sheet, when the fingers raise above the periphery of the cylinder, the leading edge of the sheet is projected above the periphery. Immediately thereafter, the leading edge of the sheet rides over stripping fingers 69 fixed to the frame which have points adjacent to the periphery of the cylinder and therefore pass under the raised leading edge of the sheet. The sheet then follows the upper surface 70 and strips the sheet from the cylinder. The stripping fingers are located to come between the grippers and the lifting finger means.

Auxiliary sheet feeding means is provided to assure continued feeding of the sheet after the grippers have

opened and also to keep the sheet in a desired path to a deposit platform. The auxiliary feeding means includes a pair of driving rolls 73, FIG. 2, secured to a feed roll shaft 74 which has a key slot 75 extending the length thereof. Each driving roll engages the periphery of its respective cylinder head 11 and 12 which heads extend beyond the ends of the blanket cylinder so that the feed rolls engage the impression cylinder solely. The feed roll shaft rotates a pair of feed rolls or disks 77 which are slidable along the feed roll shaft by being keyed to the shaft through the key slot 75 so that each is rotated by the shaft and yet are adjustable axially or laterally along the shaft for sheets of different width or as desired. The feed roll shaft 74 is rotatably carried by a feed roll frame shown as a pair of arms 78 which are pivotally mounted on the frame 15 on a pivot 79 carried by the frame which pivot is received in a pivot bearing which is preferably a slot 80 in the arm for easy removal and mounting of the arms of the auxiliary feed means on the pivot. A spring 81 connected with the arm releasably retains the pivot in the slot 80 and also presses the drive rolls 73 into contact with its respective head of the impression cylinder as well as presses the feed rolls 77 into contact with the sheet of paper on the periphery of the cylinder. The feed rolls 77 are slightly smaller in diameter than the drive rolls 73 by about .001 of an inch which is approximately the thickness of a sheet or a little less. The feed rolls 77 are adjustable axially for different widths of sheet or as desired.

The auxiliary sheet feeding means may also include a second feed roll 84, having a pair of spaced ridges 85 thereon. This roll is rotatably mounted on the frame and is driven by a gear train 86 from one of the cylinders such as the impression cylinder. Pressure means is provided to keep the sheet in contact with the second feed roll 84 which means includes a pressure roll frame 86 of suitable construction that shown including a pair of spaced arms secured together such as by a spacer 89 and bolt 88. This frame is pivotally mounted on the roll shaft 74 and movable axially thereon. A feed roll 77 is shown as located between the arms of each pressure roll frame so that the roll is adjustable axially therewith. The other end of the pressure roll frame carries a pressure roll 87 rotatably mounted on a bolt or screw 88 carried by the arms of this frame which bolt also serves to hold the arms of the frame in spaced relation. These rolls contact the feed roll 84 and press the sheet thereagainst to continue the feeding of the sheet to a deposit tray or platform (not shown).

Means are provided to easily shift or adjust the position of each feed roll 77 axially along the roll shaft 74, as well as its pressure roll frame 86 and pressure roll 87. This means includes an adjusting bracket 91 for each feed roll, and hence for each pressure roll frame, slidably mounted on a square mounting rod 92 secured to the frame and forming a part thereof. Each adjusting bracket is secured in adjusted position by a clamp screw 93. The bracket has a fork 94 at the end thereof so that the fork straddles the feed roll, or particularly pressure roll frame 86, and the ends of the fork are curved to gain greater engagement with the sides of the frame 86. The square rod 92 supports the bracket away from contact with the rotating feed roll shaft 74 and yet provides ample contact with the pressure roll frame to move the same axially on the roll shaft. After proper adjustment, the bracket is clamped to the mounting rod 92 by a clamp screw 93 so that the feed roll 77 as well as the pressure roll frame and the pressure roll 87 remain in adjusted position. With this adjusting bracket, the operator does not have to reach into the narrow space between the blanket cylinder and impression cylinder to adjust the position of the auxiliary feed means. Also the locking means or screw 93 which secures the parts in adjusted position, is also spaced well away from the im-

pression cylinder. The second feed roll 84 is located on the exit side of the stripping finger means 69.

The cam 46 is a simple form of cam in that the periphery provides the active surface or element for closing the grippers and the spring 41 is the active element for opening the grippers. This cam and spring constitute cams means to close and open the grippers. Similarly the cam 67 and spring 62 constitute operating means for the lifting and stop means or finger cam means for projecting and retracting the finger means. The cam 46 is shown as being secured to a fixed part that shown being conveniently the frame 15, however, the cylinder shaft 14 is also essentially a fixed part. The shaft 14, as shown, is an eccentric shaft which is oscillated to move the impression cylinder away from the blanket cylinder when the sensing means responds to no sheet being fed to the grippers. The shaft is, therefore, essentially fixed. The cylinder herein may be used with that type of press in which the shaft is fixed and separation of the press cylinders is achieved by movement of one or both of the other cylinders.

The stop means against which the leading edge of the sheet is projected to locate it for the grippers includes a plurality of stop fingers 54, one being provided for each long finger 57. The end of each stop finger has a groove 55 to receive the long finger 57 so that it is impossible for a sheet to be projected under the stop fingers. The long fingers serve as a guard, therefore, in cooperating with the stop fingers. The stop fingers are pivotally mounted on the frame and moved into and away from stop position by known means in timed sequence with the rotation of the cylinder so that they pivot away when the grippers clamp a sheet. The long fingers or guards have an outer curve surface which is the same as, or closely approximates, the curvature of the periphery of the cylinder. The finger has an anvil end at the anvil and a rear end which is adjacent to, and as shown extends somewhat rearwardly of, the pivot 60. This pivot is below the curved surface so that it is the anvil end which is projected outwardly and retracted. The long finger and short finger constitutes a unitary sheet lifting and guard means and particularly with their ends welded together which means is pivotally mounted. The sheet lifting and stop means, or sheet lifting and guard means, formed by the fingers and their associated mechanism constitutes a unit which may be added to existing cylinders having an extensive cylinder gap. Some of the advantages of this construction are that it is simple and inexpensive to manufacture, and simplifies the cylinder construction as well.

This invention is presented to fill a need for improvements in impression cylinder combination for a press. 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.

What is claimed is:

1. An impression cylinder combination for a press comprising cylinder means including a cylinder having a periphery, a head secured to the cylinder at each end thereof, and shaft bearings in the heads adapted to receive a shaft on which the cylinder rotates; a gripper shaft pivotally mounted in the heads, sheet gripping means carried by the gripper shaft including a plurality of spaced grippers, anvil means carried by the cylinder adjacent to the periphery thereof and located to be engaged by the grippers; and operating means operatively connected with the gripper shaft to pivot the same to open and close the grippers including a pinion secured to the gripper shaft, a rack meshing with the pinion, rack mounting means mounting the rack for movement on a head, an operating lever, an operating lever pivot carried by the head and pivotally mounting the lever at a midportion of the lever

providing the lever with a rack operating end and a cam follower end, the rack operating end being disposed radially outwardly from the rack, and an operating connection between the rack operating end of the operating lever and the rack to open and close the grippers including spring means between the rack operating end of the lever and the rack to move the rack through compression of the spring means in a direction to pivot the grippers to closed position in contact with the anvil means.

2. An impression cylinder combination as in claim 1 including sheet lifting finger means comprising a plurality of spaced fingers, finger mounting means carried by and within the cylinder including pivot means spaced forwardly from the gripper finger shaft and movably mounting the lifting fingers for movement of the fingers to and from a retracted position below and a projected position above the periphery of the cylinder and the fingers being located between the grippers.

3. An impression cylinder combination as in claim 2 including a shaft on which the cylinder is mounted for rotation thereon, and finger operating means connected with the lifting finger means to move the same to projected and retracted position including a finger cam secured to the shaft to project the finger means outwardly.

4. An impression cylinder combination as in claim 1 in which the gripper operating means includes a fixed gripper cam engaging the operating lever to pivot the same and pivot the grippers into contact with the anvil means, and a cylinder shaft received in the shaft bearings on which the cylinder rotates.

5. An impression cylinder combination as in claim 4 in which the gripper cam has a high land of about 90 degrees extent and a following intermediate land to partially open the grippers and a low land to fully open the grippers.

6. An impression cylinder combination as in claim 4 in which the rack mounting means is the lever pivot which mounts the rack for pivotal movement.

7. An impression cylinder combination as in claim 4 including means to adjust the compression of the spring means.

8. An impression cylinder combination as in claim 4 in which the operating connection includes a positive connection between the lever and the rack to move the latter in a direction to open the grippers.

9. An impression cylinder combination as in claim 4 including sheet stripping means including lifting finger means within the cylinder, the lifting finger means including a plurality of spaced fingers one being located between each pair of a plurality of pairs of grippers, mounting means within the cylinder and mounting the lifting finger means for movement of the fingers to projected position above and retracted position below the periphery of the cylinder, and cam means secured to the shaft and engaging the lifting finger means to move the same above the periphery of the cylinder when the grippers open and retract the same thereafter.

10. An impression cylinder combination as in claim 9 in which the cylinder has a gap in the periphery of substantial extent, the finger mounting means including pivot means carried by the heads spaced rearwardly from the gripper shaft to pivotally mount the finger mounting means, and the finger means comprises long fingers extending rearwardly from the anvil to a point beyond the gripper shaft for a substantial portion of the gap and located at or closely adjacent to the periphery of the cylinder.

11. An impression cylinder combination as in claim 10 in which the lifting finger means includes short fingers carried by the finger mounting means and extending generally radially of the cylinder and at least engaging the inner side of the ends of the elongated fingers.

12. An impression cylinder combination as in claim 10 including stop fingers pivotally carried by the frame including a stop for each long finger and having an end

and the end of each stop finger being adjacent to the long fingers in stop position.

13. An impression cylinder combination as in claim 4 including auxiliary sheet feeding means comprising roll frame means and pivot means for mounting the same on the frame, a roll shaft rotatably carried by the roll frame means, drive rolls secured to the roll shaft and engaging the cylinder heads to be rotated thereby, feed rolls slidably mounted on the roll shaft and driven thereby and located between the heads, spring means connected with the roll frame means to propel the rolls into contact with the cylinder, and feed roll shifting means for each feed roll and operatively connected with each feed roll and projecting rearwardly away from the cylinder to adjust the position of the feed rolls along the roll shaft.

14. An impression cylinder combination as in claim 13 in which the feed roll shifting means includes a rectangular opening therein to receive a rectangular bar carried by the frame.

15. An impression cylinder combination for a press comprising cylinder means including a cylinder having a periphery and a substantial gap in the periphery, a head secured to the cylinder at each end thereof, and shaft bearings in the heads; a shaft received in the shaft bearings on which shaft the cylinder is rotatably mounted; sheet gripping means carried by the cylinder means including an anvil at one end of the gap, a plurality of spaced grippers, gripper mounting means mounting the grippers for movement into contact with and away from the anvil, and operating means connected with the gripper mounting means to open and close the grippers; and sheet lifting and stop means including a plurality of spaced lifters, lifter mounting means carried by and within the cylinder and movably mounting the lifters for movement to and from a retracted position below and a projected position above the periphery of the cylinder, the lifters being located between the grippers and having an end at the anvil, and the lifters extending rearwardly from the anvil beyond the gripper mounting means for a substantial portion of the cylinder gap and located adjacent to the periphery and having a curvature the same as or approximating the periphery of the cylinder, and stop finger means pivotally mounted adjacent to the cylinder and movable into cooperating position with the lifters to form a sheet stop.

16. An impression cylinder combination as in claim 15 including a shaft received in the shaft bearings on which shaft the cylinder means rotates, in which the lifter mounting means for the sheet lifting and stop means is a pivot carried by the cylinder means located adjacent to the periphery of the cylinder and spaced from the anvil, and operating means connected with the lifter mounting means to pivot the latter including a cam carried by the shaft and engaging the lifter mounting means to pivot the latter outwardly.

17. An impression cylinder combination for a press comprising cylinder means including a cylinder having a periphery and a substantial gap in the periphery, a head secured to the cylinder at each end thereof, and shaft bearings in the heads; a shaft received in the shaft bearings on which shaft the cylinder is rotatably mounted; sheet gripping means carried by the cylinder means including an anvil at one end of the gap, a plurality of spaced grippers, gripper mounting means mounting the grippers for movement into contact with and away from the anvil, and operating means connected with the gripper mounting means to open and close the grippers; and sheet lifting and stop means including a plurality of spaced lifters, lifter mounting means carried by and within the cylinder and movably mounting the lifters for movement to and from a retracted position below and a projected position above the periphery of the cylinder, the lifters being located between the grippers and having an end at the anvil, the lifters extending rearwardly from

the anvil beyond the gripper mounting means for a substantial portion of the cylinder gap and located adjacent to the periphery and having a curvature the same as or approximating the periphery of the cylinder, the lifter mounting means including a pivot carried by the cylinder means located adjacent to the periphery of the cylinder and spaced from the anvil, operating means connected with the lifter mounting means to pivot the latter including a cam carried by the shaft and engaging the lifter mounting means to pivot the latter outwardly, the spaced lifters including a lifter frame, in which the lifters include long fingers secured to the frame spaced from the pivot

with ends adjacent to the anvil, and short fingers extending generally radially and having ends at least engaging the ends of the long fingers.

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EUGENE R. CAPOZIO, *Primary Examiner.*