L. MIDDLEDITCH.

GRIPPER MECHANISM.

APPLICATION FILED FEB. 1, 1917.

1,285,774.

Patented Nov. 26, 1918.

3 SHEETS—SHEET 1.

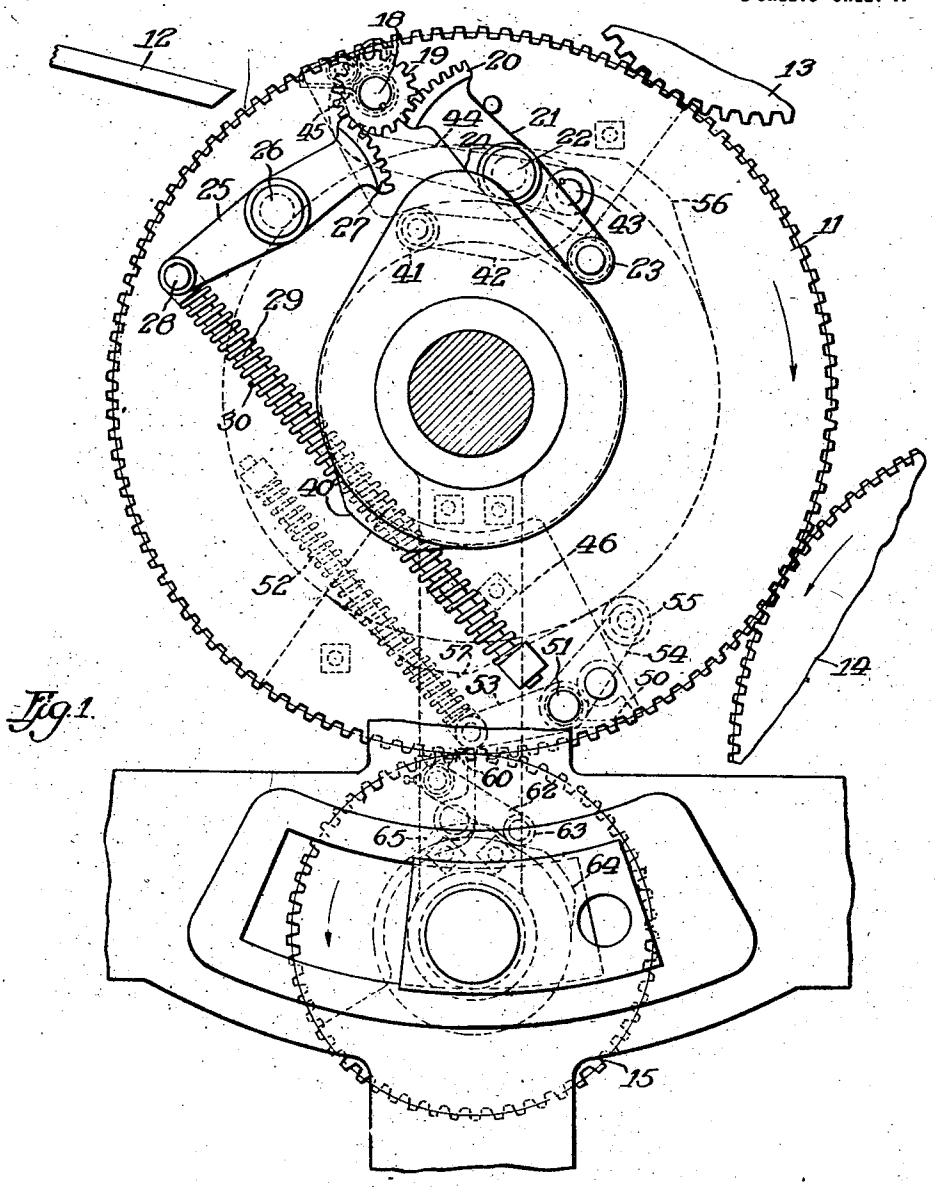



Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

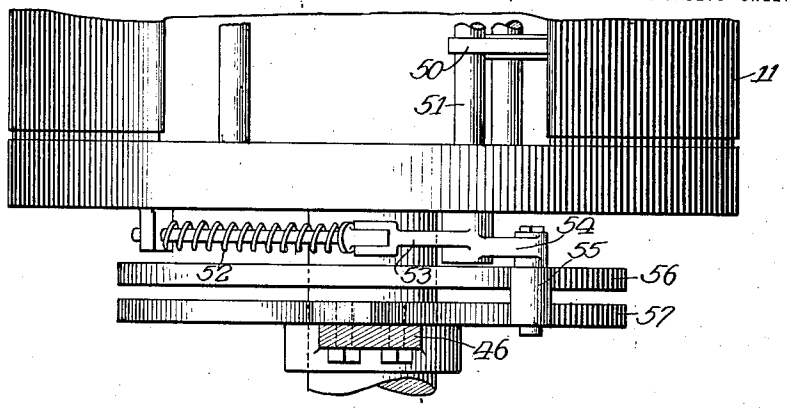



Fig. 3.

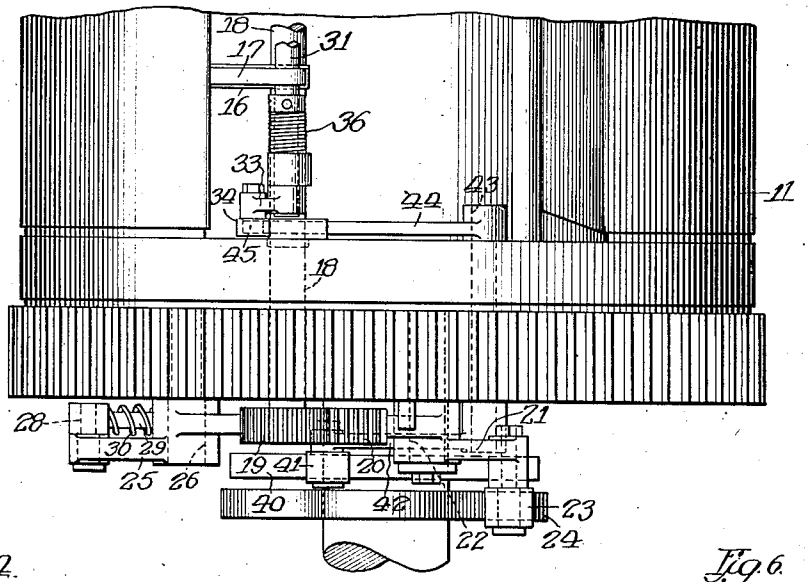



Fig. 4.

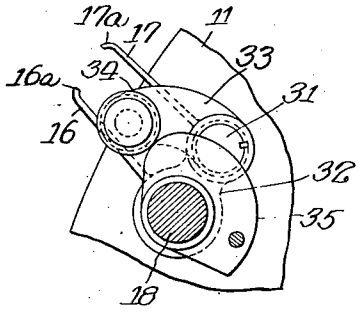



Fig. 6.

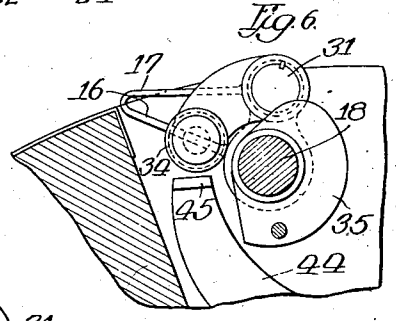
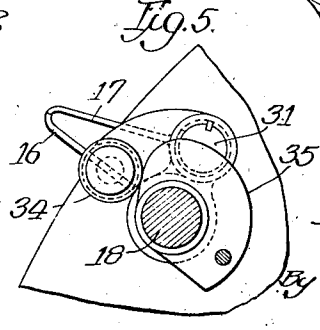



Fig. 5.




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3 SHEETS—SHEET 3.

Fig. 7.

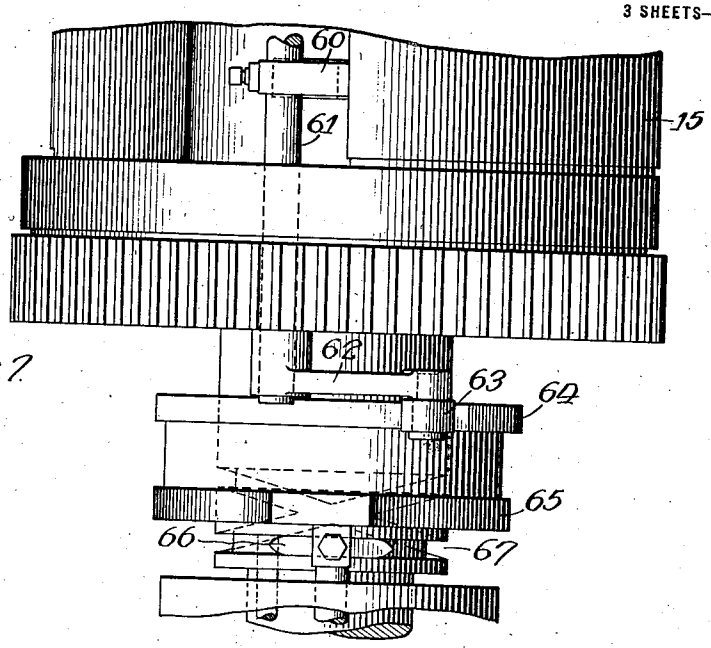
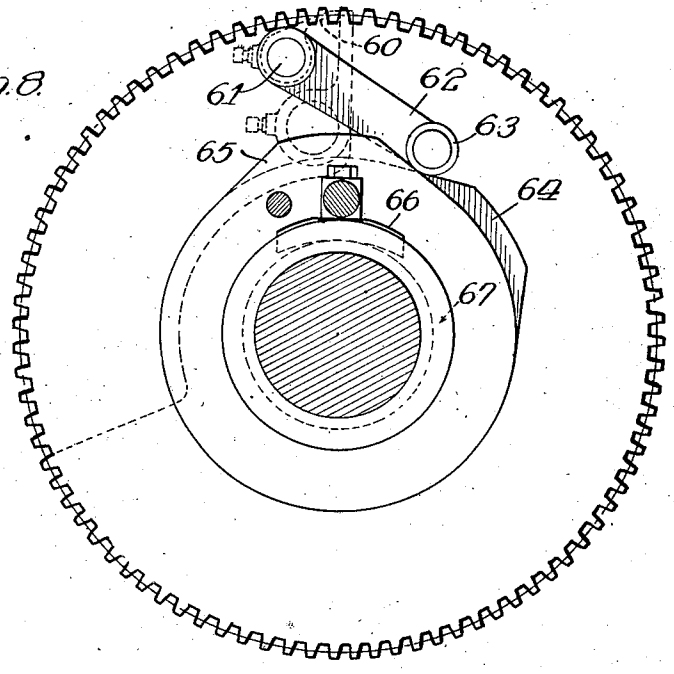



Fig. 8.




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# UNITED STATES PATENT OFFICE.

LYMAN MIDDLEDITCH, OF SCARSDALE, NEW YORK.

## GRIPPER MECHANISM.

1,285,774. Specification of Letters Patent. Patented Nov. 26, 1918.

Application filed February 1, 1917. Serial No. 145,832.

*To all whom it may concern:*

Be it known that I, LYMAN MIDDLEDITCH, a citizen of the United States, residing at Scarsdale, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Gripper Mechanism, of which the following is a specification.

This invention, while applicable to printing presses generally, is especially designed, as hereinafter illustrated and described, for use in connection with two-color and perfector presses of the type set forth in my copending application Serial No. 103,126, whereby the danger of smearing of the sheets by contact with under guides is avoided.

The characteristic features of the invention are the gripping of the sheets while at rest by grippers also at rest at the moment of engagement, or moving at a speed corresponding to that of the fed sheet if the latter is in motion; the ready adjustment of the device to vary the relative speed of the fed sheet and the grippers from an exact correspondence as indicated above to any difference in speed desired up to the full speed of the cylinder; the engagement of the sheet at a point beyond the periphery of the printing cylinder and the subsequent carrying of the same in the usual manner by engagement at a point on the periphery; and the projection of the grippers beyond the cylinder periphery to grip the sheets and their retraction thereafter together with the meeting edge of the gripped sheet to or immediately within the periphery. Other novel and advantageous features of the construction and operation will be readily apparent to those skilled in the art to which the invention pertains.

In order that the invention and the manner of its employment may be readily understood, a preferred embodiment of the same is set forth in the accompanying drawings and in the following detailed description predicated thereon. Obviously the invention is susceptible of embodiment in other and varied constructional forms, wherefore the drawing and description are to be taken in an illustrative and not in an unnecessarily limiting sense. In the drawings

Figure 1 is an end elevation of the impression cylinder and the transfer cylinder of a printing press such as that shown in my co-pending application hereinabove referred to, the relative position of the feed board, delivery cylinder and the plate cylinder being indicated thereon;

Fig. 2 is a bottom plan view of the far end of the impression cylinder shown in Fig. 1;

Fig. 3 is a top plan view of the near end of the said impression cylinder;

Figs. 4, 5, and 6 are detail views showing the relative position of different parts of the gripping mechanism at successive stages of operation;

Fig. 7 is a top plan view of the near end of the transfer cylinder; and

Fig. 8 is an end view of said transfer cylinder.

Having reference to the drawings the impression cylinder is indicated at 11, the feed board at 12, the delivery cylinder at 13, the plate cylinder at 14, and the transfer cylinder at 15.

The present invention has more particularly to do with the construction and operation of the sheet taking grippers by which the sheet is taken from the feed board 12 by the impression cylinder 11. These grippers comprise two members which will be referred to as the lower grippers 16 and the upper grippers 17 having inwardly turned portions or jaws $16^a$ and $17^a$. The lower gripper 16 is carried by the gripper shaft 18 having fixed thereon a pinion 19 in mesh with a segment 20 carried by an arm 21 fulcrumed at 22 and carrying upon its opposite end a cam roll 23 arranged to travel upon a cam 24 which cam is fixedly mounted upon the frame of the press. Another lever arm 25 fulcrumed at 26 has a segment end 27 also in mesh with the pinion 19, the opposite end of the lever 25 being pivoted at 28 through a rod 29 surrounded by the compression spring 30, whereby the segment 27 is caused to act upon the pinion 19 to maintain the cam rolls 23 in contact with the cam 24. The function of the cam 24 acting through the mechanism just described is to rotate the gripper shaft 18 and thereby move the same between the positions indicated in Figs. 4, 5 and 6.

The upper gripper shaft 31 is loosely mounted in an arm 32 extending from the gripper shaft 18. A gripper operating arm 33 is fixed upon the shaft 31 and carries at its free end a cam roll 34 which is arranged to travel upon the cam 35 fixedly mounted in the cylinder. A torsion spring 36 upon

the shaft 31 holds the cam roll 34 in contact with the cam 35. It will be observed that as the shaft 18 of the lower gripper 16 is operated by the mechanism previously described, the cam rolls 34 will follow the contour of the cam 35 under the influence of the torsion spring 36 and the upper gripper 17 will thereby be caused to progressively move through the positions indicated in Figs. 4, 5 and 6.

The result of the combined movement of the upper and lower gripper shafts and with them the grippers 16 and 17 is to first open the grippers to the position indicated in Fig. 4 and, while moving them both in a direction counter to the movement of the impression cylinder, to also close the same in the position indicated at Fig. 5 upon the sheet presented by the feed board 12, and thereafter while in a closed positon to continue their movement counter to that of the impression cylinder and also inwardly toward the periphery thereof bringing the grippers and the forward edge of the sheet held by them to the usual position at the periphery of the impression cylinder.

It will be obvious that by an appropriate adjustment of the cam 24, the grippers may be caused to close upon the sheet sooner or later, either while the grippers have a motion relative to the sheet in a forward or a rearward direction, or are at a standstill at the moment of gripping a sheet. The adjustment illustrated is such as to cause the grippers to be absolutely at rest at the moment of gripping the sheet, the radial line of the cylinder passing through the center of the lower gripper shaft 18 and the jaws of the grippers $16^a$, $17^a$.

So much for the construction and operation of the mechanism whereby the sheet is taken by the grippers. In order to effect the release of the sheet at the proper moment for transferring the same to the grippers of the transfer cylinder, it is necessary to provide for the movement of the upper grippers independently of the lower grippers, and this is accomplished in the manner following:

Upon the frame of the press is mounted a cam 40 upon which travels a cam roll 41 carried by an arm 42 keyed upon a shaft 43 which carries another arm 44 having a deflected nose 45 arranged to underlie the cam roll 34 in the closed position of the grippers as indicated in Fig. 6. It will be clear that as the cam roll 41 is lifted by the high point 40 of the cam, the nose 45 of the arm 44 will engage the cam roll 34 and lift the same free of the cam 35 rocking the gripper shaft 31 and opening the grippers to release the sheets.

Obviously the angular adjustment of the cam 40 must be such as to open these grippers precisely at the moment when the sheet is taken by the grippers of the transfer cylinder. Where the transfer cylinder is shiftable from one position to another, as in the convertible press forming the subject matter of my copending application hereinabove referred to, it becomes necessary to provide for the automatic shifting of the position of the cam 40 in order to operate the grippers 16, 17 at a point coinciding with the radii of the impression and transfer cylinders. This may be done in many ways, but for purposes of illustration I have shown the cam 40 as being secured to an arm 46 which connects the axles of the two cylinders and consequently moves therewith, as the transfer cylinder is swung from one operative position to another.

The grippers for taking the sheet again from the transfer cylinder to lay the same upon the second impression surface of the impression cylinder 11 are indicated at 50, the same being mounted upon the gripper shaft 51 and held closed by the compression spring 52 acting upon the arm 53. The gripper opening arm 54 carries a cam roll 55 which travels upon the two cams 56 and 57. In order to open and permit the closing of the grippers 50 at a point corresponding to the variable position of the transfer cylinder 15, the cam 57 is made angularly adjustable, its position being automatically controlled by being secured to the arm 46 as was the case with the cam 40. The high point of the cam 56 which operates to open and permit the closing of the grippers 50 to deliver the sheets to the delivery cylinder 13 is fixed in its relation to the printing press frame as the point of delivery to the said cylinder 13 is constant.

The grippers of the transfer cylinder are indicated at 60 mounted upon the shaft 61 and controlled by the lever arm 62 carrying on its free end the cam roll 63 arranged to travel alternatively and successively during alternate revolutions upon the cams 64 and 65. These two cams 64 and 65 act to open and close the grippers 60 at the same point but upon alternate revolutions in order to take the sheet from the impression cylinder first grippers 16 and 17 and deliver it to the impression cylinder second grippers 50. In order to insure that the action of the grippers shall take place at the proper time regardless of the position of the transfer cylinder 15, the cams 64 and 65 are connected to the arm 46, whereby the point of operation coincides with the center line through the transfer cylinder and the impression cylinder axis.

The cams 64 and 65 are shifted axially in order to bring first one and then the other into operative contact with the cam rolls 63 by means of a block 66 traveling in a double cam groove 67 as is clearly shown in Fig. 7. Other and well known means might be em-

ployed for the shifting of the cams 64 and 65 and for the operation of the transfer cylinder grippers.

I claim:

1. The combination with a printing couple, of sheet-taking mechanism comprising a pair of gripper shafts, gripper members mounted on said shaft, one gripper shaft carried in fixed bearings in the cylinder, a radial arm fixed on said shaft, the other gripper shaft journaled in said arm, a second arm fast to the second gripper shaft, a cam roll carried by said second arm, means to rotate the first gripper shaft, a cam fixed on the cylinder about the first gripper shaft and arranged to act on the cam roll whereby to angularly position the second gripper shaft in its bearings to open and close the grippers at predetermined points in the rotation of the first gripper shaft.

2. The combination with a printing couple, of sheet-taking mechanism comprising upper and lower gripper members, a shaft carrying each of said members, the lower gripper shaft carried in fixed bearings in the cylinder, a radial arm fixed on said shaft, the upper gripper shaft journaled in said arm, a second arm fast to the second gripper shaft, a cam roll carried by said second arm, means to rotate the first gripper shaft, a fixed cam about the first gripper shaft, and arranged to act on the cam roll whereby to swing the second gripper shaft about the first gripper shaft and also to angularly position the second gripper shaft in its bearing to open and close the grippers at predetermined points in the rotation of the lower gripper shaft.

3. The combination with a printing couple, of sheet-taking mechanism comprising upper and lower gripper members, a shaft carrying each of said members, the lower gripper shaft carried in fixed bearings in the cylinder, a radial arm fixed on said shaft, the upper gripper shaft journaled in said arm, a second arm fast to the second gripper shaft, a cam roll carried by said second arm, means to rotate the first gripper shaft, a fixed cam about the first gripper shaft, and arranged to act on the cam roll whereby to swing the second gripper shaft about the first gripper shaft and also to angularly position the second gripper shaft in its bearing to open and close the grippers at predetermined points in the rotation of the lower gripper shaft, the lower gripper shaft having its mountings in the cylinder at a radial distance from the periphery of the cylinder less than the length of the gripper member, whereby the grippers will be projected beyond the cylinder periphery to take the sheet and will retract within the periphery of the cylinder bearers after taking the sheet.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LYMAN MIDDLEDITCH.

Witnesses:
PERCY L. BURTON,
F. A. FEDDERMAN.