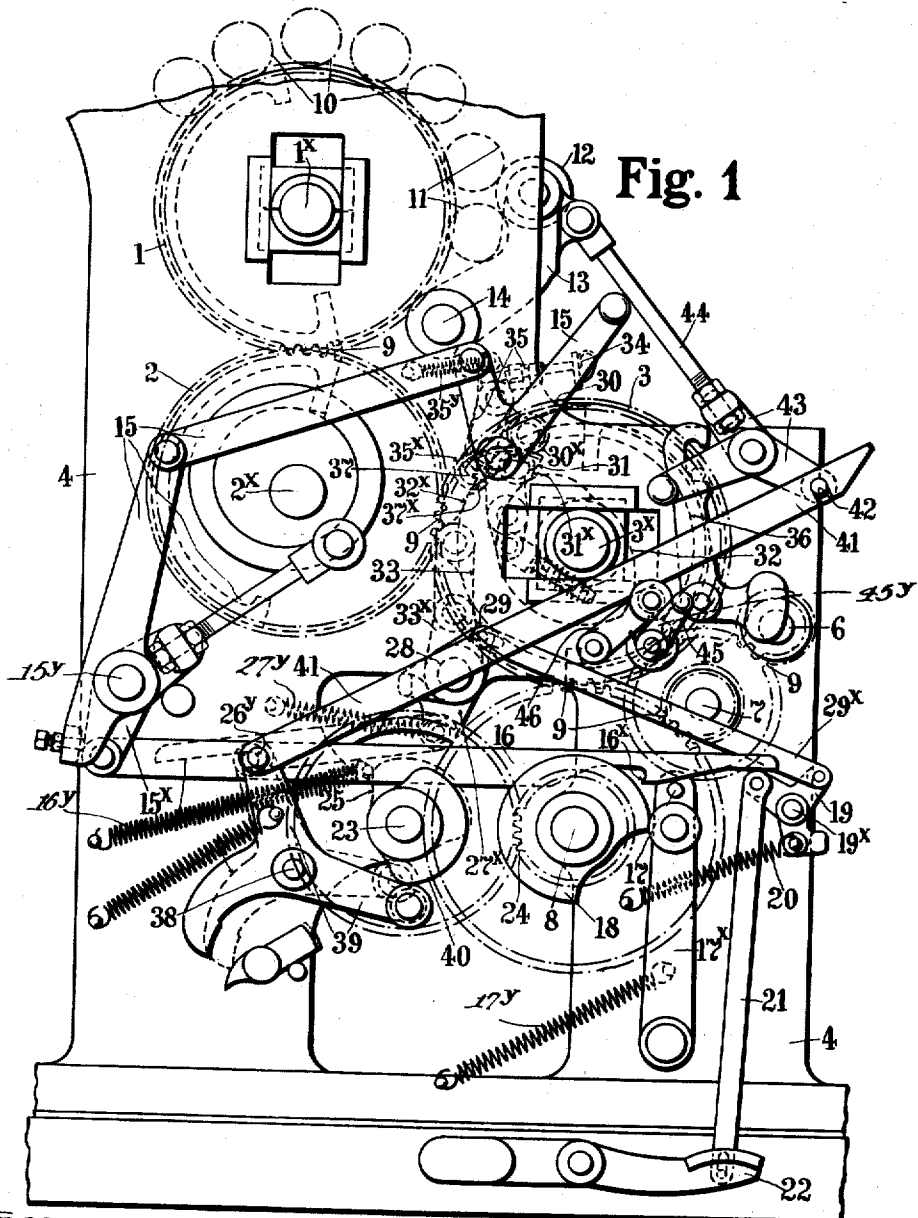


F. WAITE.
 ROTARY LITHOGRAPHIC OFFSET PRINTING MACHINE.
 APPLICATION FILED JUNE 22, 1911.

1,012,485.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.



Witnesses.
 M. E. Smoot.
 G. L. Lamb.

Inventor.
 Fred Waite
 by *[Signature]*
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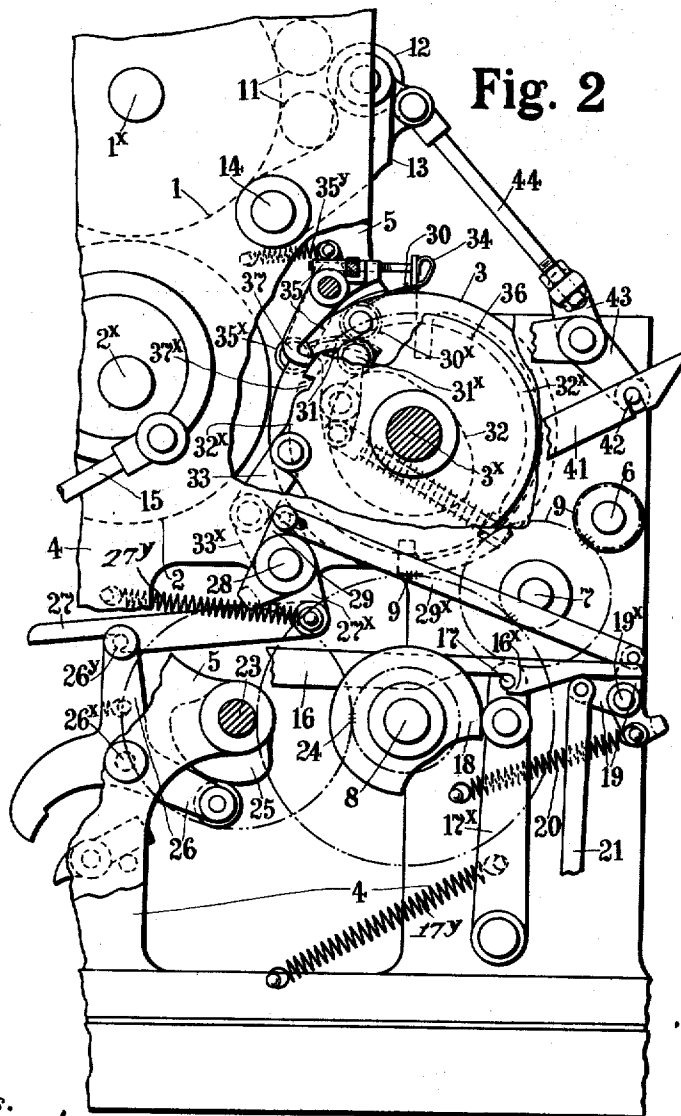


Fig. 2

Witnesses.
 M. E. Smoot.
 W. L. Lamb

Inventor:
 Fred Waite
 per *[Signature]*
 Attorney.

UNITED STATES PATENT OFFICE

FRED WAITE, OF OTLEY, ENGLAND.

ROTARY LITHOGRAPHIC OFFSET PRINTING-MACHINE.

1,012,485.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed June 22, 1911. Serial No. 634,707.

To all whom it may concern:

Be it known that I, FRED WAITE, a subject of the King of Great Britain, residing at Otley, in the county of York, England, have invented certain new and useful Improvements in Rotary Lithographic Offset Printing-Machines, and of which the following is a specification.

The invention relates to that type of rotary lithographic offset printing machine, comprising a rotary plate cylinder carrying the zinc design plate and with which ink distributing rollers and damping rollers co-act, the design on the said plate being transferred to a transfer cylinder, between which latter and an impression cylinder the paper passes and thereby contacts with the transfer cylinder to receive the impression. Such machines have hitherto been fitted with mechanism by which the transfer cylinder could be rocked away from the plate and impression cylinders, by the operator moving the necessary mechanical connections, and the mechanism for so throwing the transfer cylinder out of action has been capable of being so connected with the operating mechanism of the machine, that so long as a treadle was held down by the attendant, a rocking arm operated from the driving mechanism of the machine, mechanically acted to take the transfer cylinder away from the plate and impression cylinders and so hold the machine out of action, although the plate and impression cylinders would still be driven. It will be thus understood that this known transfer cylinder-withdrawing mechanism could be caused to hold the transfer cylinder out of action during such time as the attendant judged was necessary, but the object of the present invention is to provide additional mechanism in conjunction with the aforesaid transfer cylinder-withdrawing mechanism which will act automatically, if so desired, to bring the transfer cylinder out of contact with the plate and impression cylinders every alternate revolution, so as to allow double the amount of rolling by the ink and damping rollers of the plate cylinder, to that which it ordinarily receives when printing the maximum number of sheets.

The invention further refers to the combination with such mechanism of means co-acting therewith, so that during the period of every alternate revolution, when the transfer cylinder is out of contact with the plate and impression cylinders, the grippers of the

impression cylinder shall be retarded in their action, that is, shall be caused to operate later and so omit taking a sheet of paper during that inoperative revolution, while with such combination, mechanism is provided so that when the closing of the grippers is retarded, the front feeding gage co-acting with the impression cylinder is held down to prevent the passage of the said paper sheet. Moreover in combination with the mechanism first mentioned according to this invention, means are provided to cause the damping of the plate carried by the plate cylinder, to take place automatically at every alternate revolution of the said cylinder if so desired, or if not so desired, permitting the plate to be damped at every revolution of the plate cylinder.

Referring to the accompanying drawings, Figure 1 is a side elevation showing the lower part of a rotary lithographic offset printing machine comprising the mechanisms according to this invention hereafter described, and Fig. 2 is a similar view of some of the parts shown at Fig. 1 partly in section and showing some of the parts in another position.

Referring to the drawings, there will be firstly described that transfer cylinder-withdrawing mechanism which is already known, but with which, as hereafter described, the mechanisms according to the present invention are calculated to co-act.

The plate or printing cylinder 1, the transfer cylinder 2 and the impression cylinder 3 are respectively mounted in end bearings 1^x, 2^x and 3^x carried by the side frames 4, 5, which cylinders are geared together and driven from the main shaft 6 by intermediate shafts 7, 8 and gearing 9. 10 are the ink distributing rollers and 11 the damping rollers which run in contact with the plate cylinder 1, and 12 is the water-trough roller revolvably mounted on the frame 13 pivoted at 14 to the side frames 4, 5.

The eccentric end bearing 2^x of the transfer cylinder 2 is coupled up to the hand-lever operating mechanism 15, and the arm 15^x of the rock shaft 15^y forming part of the said mechanism is pivoted to the horizontal rod 16 whose free end is formed with a hook 16^x, which latter, on the rod 16 being lowered, is caused to engage a stud 17 of a constantly moving rocking arm 17^x operated by a cam 18 on the shaft 8 and a contact maintaining spring 17^y. This hooked rod 16 is normally held in the up, or out of en-

gagement position, clear of the stud 17 of the rocking arm 17^a, by a pivoted trigger 19 actuated by means of a spring 20, and the said trigger 19 is coupled up by means of a connecting rod 21 to a treadle 22 as shown at Fig. 1; the arrangement being such that on the treadle 22 being depressed, the trigger 19 is rocked on its fulcrum 19^a against the action of the lifting spring 20 which allows the hooked rod 16 to fall into engagement with the stud 17 of the rocking arm 17^a as shown at Fig. 2, whereby a forward movement is imparted to the hooked rod 16, against the action of a returning spring 16^a, whereby the transfer cylinder 2 is automatically rocked away from the plate cylinder 1 and the impression cylinder 3, and thereby the said transfer cylinder becomes inoperative. On the treadle 22 being released, the trigger 19 is raised by its spring 20 so as to lift the hooked rod 16 out of engagement with the stud 17 of the rocking arm 17^a, and the spring 16^a acts on the rod 16 and returns the bearings of the transfer cylinder 2 to their normal position, bringing the latter cylinder into engagement with the plate and impression cylinders.

Now according to the present invention, the machine is fitted with a half-speed shaft 23, that is a shaft which is revolved once to every two revolutions of the cylinders 1, 2 and 3, and this shaft 23 is driven by spur gearing 24 from the shaft 8, through the medium of which the mechanisms hereafter described, according to this invention, are operated.

In order to bring the transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution so as to allow the plate cylinder to receive double the amount of inking and damping, a cam 25 is fixed on the half-speed shaft 23, and on the frame 4 at 26^a is pivoted a bell-crank lever 26 provided with a stud 26^b with which a hit-and-miss rod 27 is adapted to be connected and toward which stud 26^b the rod 27 is drawn by a spring 27^a; the said rod 27 is coupled up by means of a lever 27^b to a rock-shaft 28, which is turned in one direction by said spring 27^a; and said rod 27, when connected with the stud 26^b, causes the said shaft 28 to be rocked, against the tension of said spring 27^a once to every revolution of the half-speed shaft 23. This rock-shaft 28 is coupled up by a lever 29 and rod 29^a to the trigger 19 of the withdrawing mechanism by which the transfer cylinder 2 is rocked away from the plate cylinder 1 and impression cylinder 3, and seeing the rock-shaft 28 is only actuated once to every two revolutions of the transfer cylinder 2, the latter is rocked into the inoperative position every alternate revolution except when the hit-and-miss rod 27 is disconnected from the stud 26^b of the cam-

rocked bell-crank lever 26. This rocking of the transfer cylinder 2 into the inoperative position every alternate revolution, has the effect of causing the plate cylinder 1 to be inked by the distributing rollers 10 twice for every printing operation, while when the hit-and-miss arrangement is disconnected, the plate cylinder 1 is inked once for every printing operation and said hit-and-miss rod 27, with its appurtenances, constitutes means for disconnecting said cam-operated mechanism from said cylinder controlling mechanism, for that purpose.

In order to cause the grippers of the impression cylinder to operate later and omit taking a sheet of paper during the inoperative revolution of the latter cylinder, the following means are provided:—The impression cylinder grippers 30 are operated by the usual pinion 30^a, pivoted segment 31, runner 31^a and cam 32. The cam 32 instead of being fixed on its shaft as hitherto, is now regulatable by partial rotation so as to alternately cause the grippers 30 to operate later (and thus pass the sheet before closing) when the transfer cylinder 2 is out of contact with the plate and impression cylinders 1, 3, but which adjustment of the cam 32 enables the grippers to grip in the ordinary way when the transfer cylinder 2 is in contact with the plate and impression cylinders 1, 3. The cam 32 for this purpose is attached to a circular plate 32^a mounted on the shaft of the impression cylinder 3, which plate is connected by a link 33 and lever 33^a to the rock-shaft 28 in connection with the half-speed shaft 23, by which the gripping is retarded at every alternate revolution of the impression cylinder 3 when the hit-and-miss rod 27 is connected to the stud 26^b of the cam-rocked bell-crank lever 26; while when the rod 27 is disconnected, the grippers 30 are caused to operate at every revolution of the impression cylinder 3.

The front feeding gage 34, which has to lift to allow the grippers 30 to carry the sheet from the feed table, is mounted on a pivoted arm 35 provided with a runner 35^a by which it is forced down by a cam 36 against the action of a lifting-spring 35^b in the ordinary way; but when the double-inking motion is in action, the said gage 34 is made to only lift at every alternate revolution of the impression cylinder 3. This is accomplished by fixing a pawl 37 on the pivot of the gage arm 35 and forming a recess 37^a in the plate 32^a of the gripper-operating cam 32, into which recess 37^a the pawl 37 is free to enter when the machine is printing the maximum number of sheets, that is to say, when the plate 32^a is maintained in one position the pawl 37 drops into the recess 37^a each time the runner 35^a leaves the part of greater diameter of the cam 36, and then the gage 34 is lifted by the spring 35^b at

every revolution of the impression cylinder 3. When, however, the plate 32^x is partially adjusted in a retard direction into the position shown at Fig. 2, the pawl 37 is, as will be seen, held raised by the said plate 32^x and thus keeps the gage 34 down. The plate 32^x is partially rotated in a retard direction as aforesaid to retard the closing of the grippers 30 by the cam 32 accompanying the movement of the plate 32^x.

To control the damping mechanism, the following is provided:—To the frame 5 on a stud 38 coaxial with the stud 26^x is pivoted a bell-crank lever 39 adapted to be operated by a second cam 40 situated on the half-speed shaft 23, and this lever 39 is connected up by a hit-and-miss rod 41 to a stud 42 of a pivoted lever 43 attached by means of a connecting rod 44 to the frame 13 of the water roller 12, the arrangement being such that when the hit-and-miss rod 41 is connected to the stud 42 of the lever 43, the damping is caused to take place every alternate revolution of the plate cylinder 1, while a disconnecting lever 45 working in conjunction with a pivoted guide 46 is employed for lifting or throwing out of gear the hit-and-miss rod 41 when it is desired to damp the plate at every revolution of the plate cylinder 1. A cam, 45^y, Fig. 1, movable with the disconnecting lever 45, contacts with the pivoted guide 46 when said lever is turned inward by hand, and supports said guide in effective position until the lever 45 is pulled outward.

It will now be understood that when the hit-and-miss rod 27 is connected to its bell-crank lever 26 and the hit-and-miss rod 41 is disconnected from its lever 43, the plate on the plate cylinder 1 will receive double the amount of rolling by the ink and water rollers 10, 11 to that which it receives when printing the maximum number of sheets, and that the half-speed movement by which this is effected simultaneously controls the gripping mechanism by causing it to operate in conformity to the frequency of contact of the transfer cylinder 2 with the plate cylinder 1 and impression cylinder 3; and further, that the inking and damping arrangements, the latter being independently connected to the half-speed movement, are free to be operated together or separately as may be desired so as to enable the plate cylinder 1 to be inked and damped either once or twice or inked twice and damped once for every printing operation.

What I claim as my invention and desire to secure by patent is:—

1. In a rotary lithographic offset printing machine of the type specified; the combination with a plate cylinder, a transfer cylinder, an impression cylinder, inking and damping rollers in juxtaposition to the plate

cylinder, transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, mechanism operated by said cam to co-act with said transfer cylinder-controlling mechanism to operate the latter to move said transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution of said cylinders to permit said plate cylinder to receive a double action of the inking and damping rollers, and means for disconnecting said cam-operated mechanism from said cylinder-controlling mechanism to cause said plate cylinder to receive only a single action of said inking and damping rollers.

2. In a rotary lithographic offset printing machine of the type specified; the combination with a plate cylinder, a transfer cylinder, an impression cylinder, inking and damping rollers in juxtaposition to the plate cylinder, transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, mechanism operated by said cam to co-act with said transfer cylinder-controlling mechanism to operate the latter to move said transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution of said cylinders to permit said plate cylinder to receive a double action of the inking and damping rollers, paper gripping mechanism carried by said impression cylinder, means for operating said gripping mechanism to cause same to seize and release the sheet of paper at proper times, and retarding mechanism operated by said cam on said half-speed shaft to retard the action of

said gripping mechanism to cause same to omit gripping a sheet of paper during alternate inoperative revolutions of said impression cylinder, and means for connecting and disconnecting said cam-operated mechanism from said transfer cylinder-controlling mechanism to cause said plate cylinder to receive a double or only a single action of said inking and damping rollers, and for throwing into and out of operation said mechanism for retarding the action of said gripping mechanism.

3. In a rotary lithographic offset printing machine of the type specified; the combination with a plate cylinder, a transfer cylinder, an impression cylinder, inking and damping rollers in juxtaposition to the plate cylinder, transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, mechanism operated by said cam to co-act with said transfer cylinder-controlling mechanism to operate the latter to move said transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution of said cylinders to permit said plate cylinder to receive a double action of the inking and damping rollers, paper gripping mechanism carried by said impression cylinder, means for operating said gripping mechanism to cause same to seize and release the sheet of paper at proper times, and retarding mechanism operated by said cam on said half-speed shaft to retard the action of said gripping mechanism to cause same to omit gripping a sheet of paper during alternate inoperative revolutions of said impression cylinder, a front feeding gage co-acting with said gripping mechanism of the impression cylinder, means for holding said front feeding gage onto said impression cylinder, and to lift same to allow said gripping mechanism to carry a sheet of paper, and mechanism operated from said half-speed shaft to hold said gage down to prevent passage of said paper sheet when said transfer cylinder is inoperative, and means for disconnecting said cam-operated mechanism from said transfer cylinder-controlling mechanism to cause said plate cylinder to receive only a

single action of said inking and damping rollers, and for throwing into and out of operation said mechanism for retarding the action of said gripping mechanism and for holding down said gage to prevent passage of said paper sheet.

4. In a rotary lithographic offset printing machine of the type specified; the combination with a plate cylinder, a transfer cylinder, an impression cylinder, inking and damping rollers in juxtaposition to the plate cylinder, transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, mechanism operated by said cam to co-act with said transfer cylinder-controlling mechanism to operate the latter to move said transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution of said cylinders to permit said plate cylinder to receive a double action of the inking and damping rollers, a pivoted frame, a water trough roller carried by said frame to contact with said damping rollers to supply water thereto, a second cam on said half-speed shaft, mechanism operated by said second cam to rock said frame carrying said water trough roller away from said damping rollers during every alternate revolution of said plate cylinder to cause the damping of the plate carried by the plate cylinder to take place automatically at every alternate revolution of said cylinder, and means for disconnecting said mechanism controlling said frame carrying said water trough roller to allow said water trough roller to remain in contact with said damping rollers to permit the plate to be damped at every revolution of the plate cylinder.

5. In a rotary lithographic offset printing machine of the type specified; the combination with a plate cylinder, a transfer cylinder, an impression cylinder, inking and damping rollers in juxtaposition to the plate cylinder, transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement

with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, a bell-crank lever rocked by said cam, a stud on one arm of said lever, a rock-shaft, bearings in the frame-work to carry said rock-shaft, an arm on said rock-shaft, a hit-and-miss rod pivoted to said arm, said rod having a notch calculated to engage said stud on said bell-crank lever whereby said rock-shaft is rocked by said cam in one direction, a tension spring to rock said rock-shaft in the opposite direction, and mechanism operated from said rock-shaft to cause said transfer cylinder-controlling mechanism to move said transfer cylinder out of contact with the plate and impression cylinders at every alternate revolution of said cylinders, to permit said plate cylinder to receive a double action of the inking and damping rollers.

6. In a rotary lithographic offset printing machine of the type specified; the combination with transfer cylinder-controlling mechanism comprising a shaft, means for revolving said shaft at a speed corresponding with the rotation of the printing cylinders, a cam on said shaft, an arm rocked in one direction by said cam, a spring to hold said arm in contact with said cam, a stud on said arm, a rock-shaft, bearings in the frame to carry said rock-shaft, an arm on said rock-shaft, a horizontal rod pivoted to said arm said rod having a notch therein adapted to engage said stud on said rocking arm, a trigger to normally hold said horizontal rod out of engagement with said stud on said arm, means connected with said rock-shaft to bring said transfer cylinder into and out of engagement with said plate and impression cylinders, means for operating said trigger to permit said notch of said horizontal rod to engage said stud on said rocking arm to bring said transfer cylinder out of engagement at each cam-actuated traverse of said horizontal rod; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, a bell-crank lever rocked by said cam, a stud on one arm of said lever, a rock-shaft, bearings in the framework to carry said rock-shaft, an arm on said rock-shaft, a hit-and-miss rod pivoted to said arm said rod having a notch calculated to engage said stud on said bell-crank lever whereby said rock-shaft is rocked by said cam in one direction, and a tension spring to rock said

rock-shaft in the opposite direction, a second arm on said rock-shaft, a connecting rod connecting said second arm on said rock-shaft to an arm of said trigger controlling the position of said horizontal rod to operate said trigger at every alternate revolution of said printing cylinders to bring said horizontal rod into engagement with said stud on said rocking arm to cause said transfer cylinder to be moved out of contact with the plate and impression cylinders at every alternate revolution.

7. In a rotary lithographic offset printing machine of the type specified; the combination with transfer cylinder-controlling mechanism to rock the transfer cylinder into and out of engagement with the plate and impression cylinders, means to normally maintain said transfer cylinder-controlling mechanism in an inoperative position with such transfer cylinder held in engagement with said plate and impression cylinders, and means operative at will to bring said transfer cylinder-controlling mechanism into connection with a moving member of the machine to cause said mechanism to automatically rock said transfer cylinder out of engagement with said plate and impression cylinders; of a half-speed shaft, means for revolving said shaft at half the speed of said cylinders, a cam on said shaft, a bell-crank lever rocked by said cam, a stud on one arm of said lever, a rock-shaft, bearings in the frame-work to carry said rock-shaft, an arm on said rock-shaft, a hit-and-miss rod pivoted to said arm said rod having a notch to engage said stud on said bell-crank lever to rock said rock-shaft in one direction, and a spring to rock said rock-shaft in the opposite direction, mechanism operated from said rock-shaft to actuate said transfer cylinder-controlling mechanism, paper gripping mechanism carried by said impression cylinder, an angularly adjustable cam on the shaft of the impression cylinder to operate said paper gripping mechanism to seize and release the sheet of paper at proper times, a circular plate on said impression cylinder shaft to which said gripper cam is fixed, a second arm on said rock-shaft, and a link connecting said second arm on said rock-shaft to said circular plate to angularly adjust said gripper cam to retard the action of said gripping mechanism to cause same to omit gripping a sheet of paper during alternate inoperative revolutions of said impression cylinder.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRED WAITE.

Witnesses:

ED. B. NICHOLLS,
FRED HAMMOND.