

Aug. 21, 1934.

F. C. MARQUARDT

1,970,809

WIPING AND POLISHING MECHANISM FOR STEEL PLATE PRINTING MACHINES

Filed Oct. 10, 1932

3 Sheets-Sheet 1

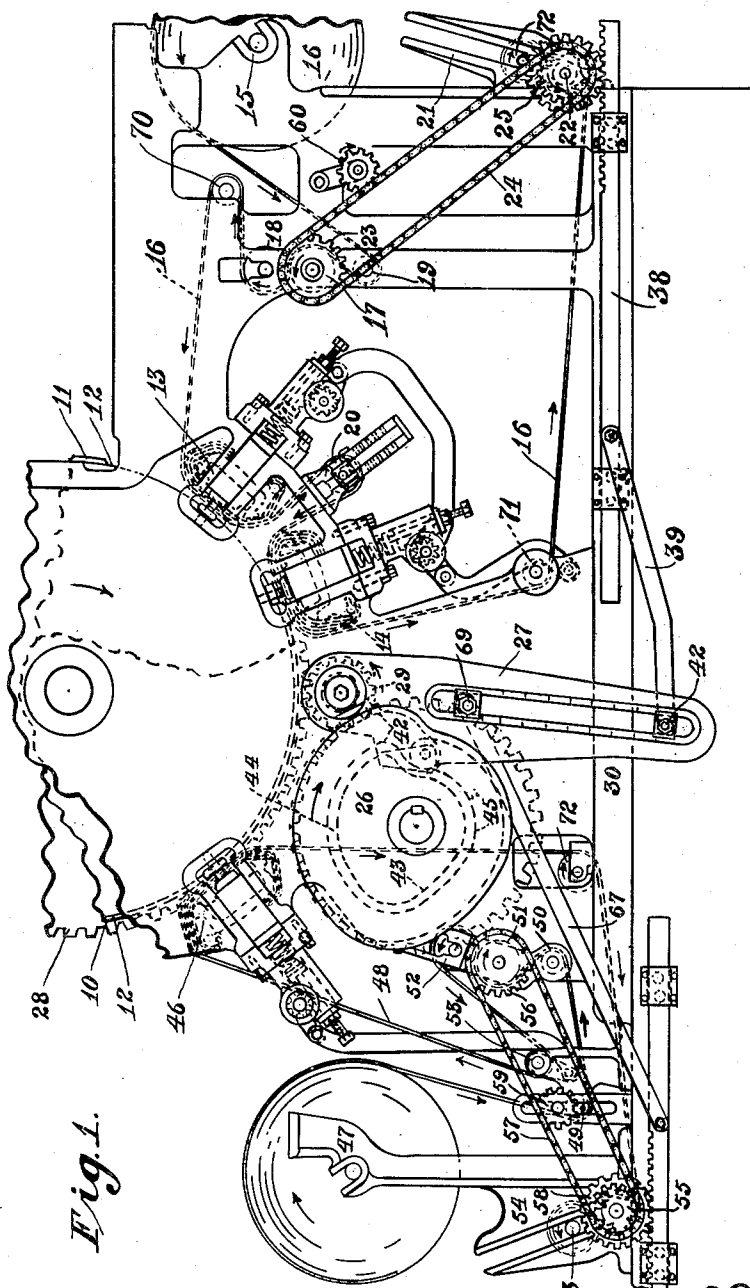


Fig. 1.

Frank C. Marquardt
INVENTOR
BY *Frank J. Westworth*
his ATTORNEY.

Aug. 21, 1934.

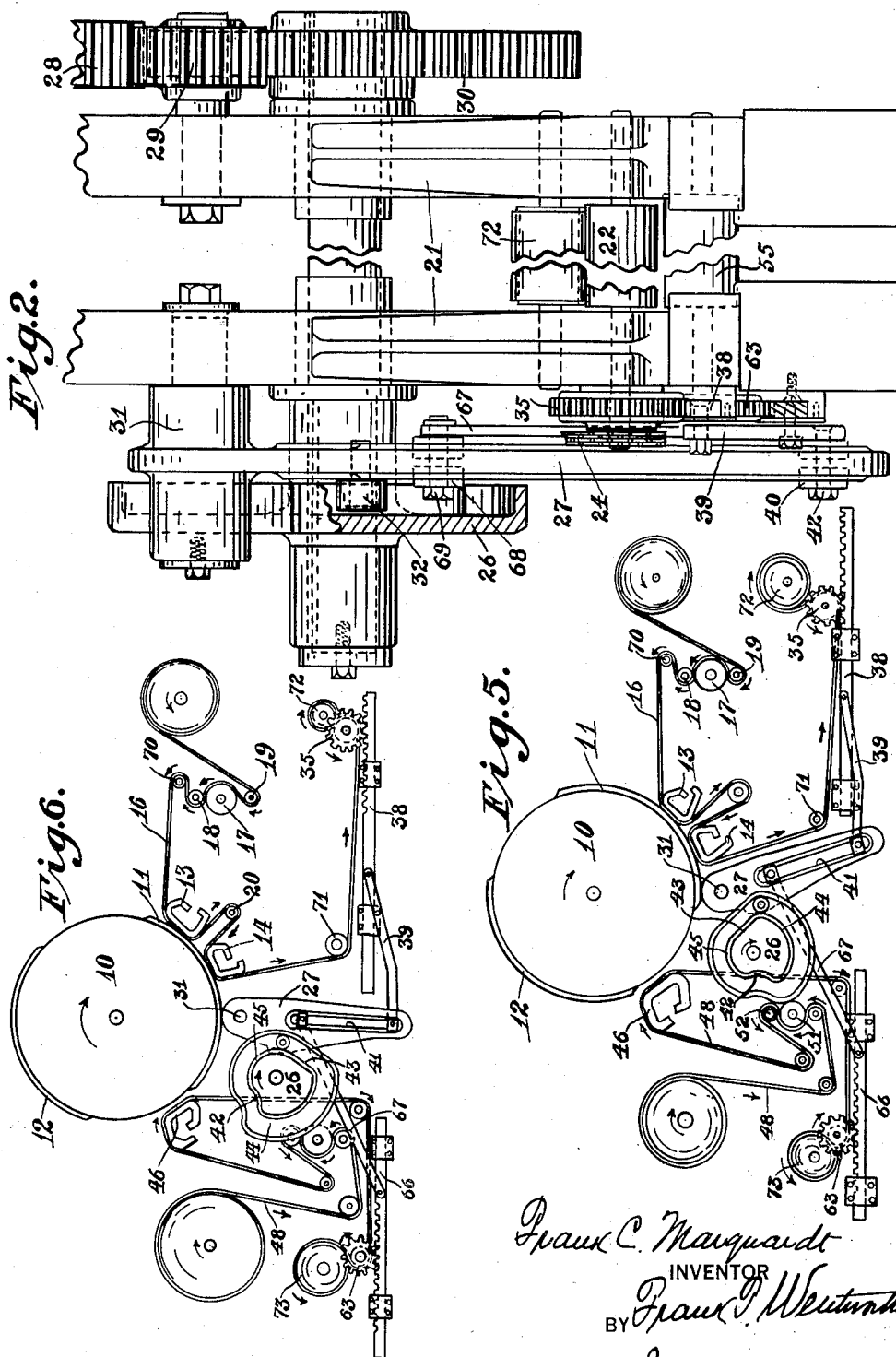
F. C. MARQUARDT

1,970,809

WIPING AND POLISHING MECHANISM FOR STEEL PLATE PRINTING MACHINES

Filed Oct. 10, 1932

3 Sheets-Sheet 2



Frank C. Marquardt
INVENTOR
BY *Frank J. Westworth*
ATTORNEY.

Aug. 21, 1934.

F. C. MARQUARDT

1,970,809

WIPING AND POLISHING MECHANISM FOR STEEL PLATE PRINTING MACHINES

Filed Oct. 10, 1932

3 Sheets-Sheet 3

Fig. 3.

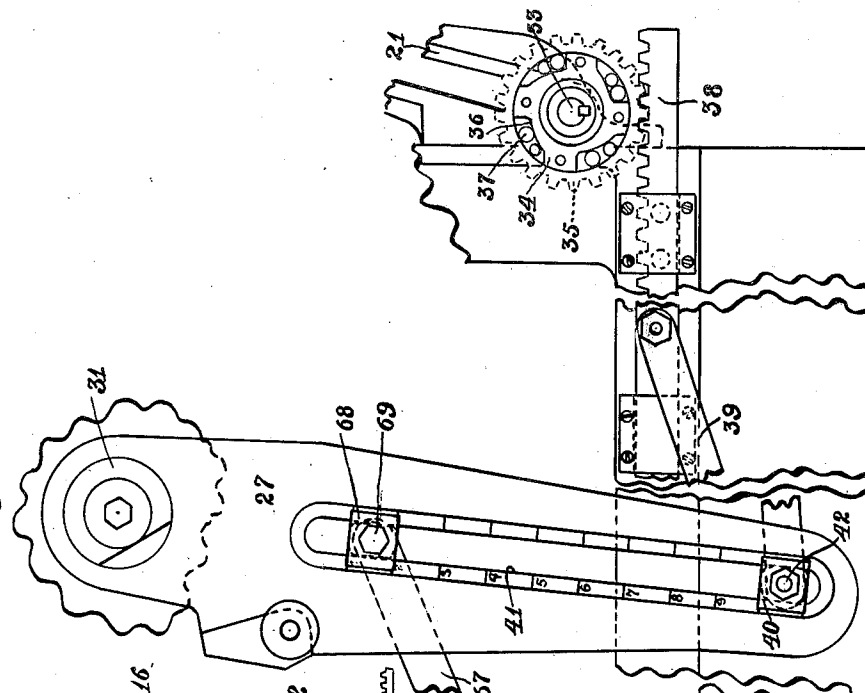
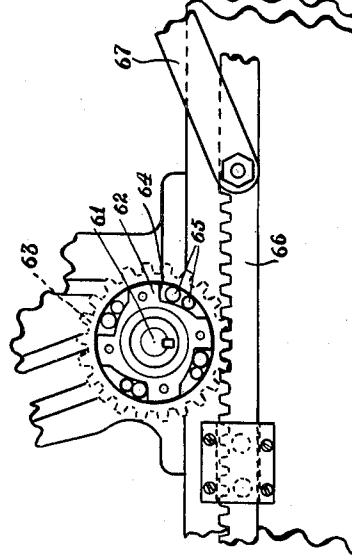
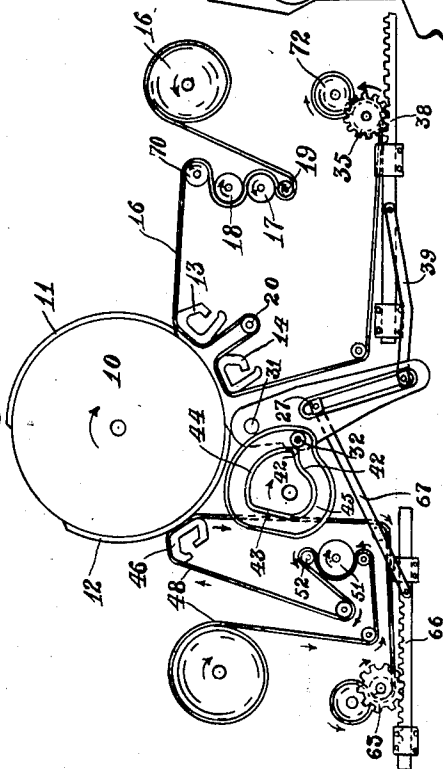


Fig. 4.



Frank C. Marquardt
INVENTOR
BY Frank J. Westmatt
ATTORNEY.

UNITED STATES PATENT OFFICE

1,970,809

WIPING AND POLISHING MECHANISM FOR
STEEL PLATE PRINTING MACHINESFrank C. Marquardt, Brooklyn, N. Y., assignor
to American Bank Note Company, New York,
N. Y., a corporation of New York

Application October 10, 1932, Serial No. 637,189

19 Claims. (Cl. 101-156)

My invention relates to wiping and polishing mechanisms for steel plate printing machines, and more particularly to a mechanism for imparting feeding movement to the wiping webs.

In steel plate printing machines it is necessary to remove the ink from the top or non-printing surface of a printing plate by means of a wiping web, and to impart a final polish to the plate with the incidental removal of any small quantity of ink which is not removed by the wiping web, by means of a polishing web prior to the making of the impression.

With one type of rotary steel plate printing machines, it has been the practice to hold the wiping and polishing webs against movement with, or counter to that of, the plate during the wiping and polishing operations, although the platen over which said webs pass receive a lateral reciprocating movement to prevent the formation of ink streaks upon the non-printing surface of the plate.

The wiping webs, in addition to removing the surplus ink, accumulate the ink at the parting line between the web passing over the wiping platen and the plate, thus providing surplus ink which is distributed about the plate and forced into the lines of the design in a manner to effectively pack these lines, or thoroughly fill them with the ink.

Prior to my invention it was the practice to so construct the wiping mechanisms for rotary steel plate printing machines of the type to which the invention relates, as to secure a longitudinal feeding movement of the wiping or of the polishing web by mechanisms having a fixed predetermined operative effect, so that irrespective of the character of the design upon, or of the size of, the plate, the same quantity of web was fed with each cycle of operations of the machine. Great difficulty has always been experienced in securing a proper feeding of the web without possibility of the formation of creases and wrinkles therein, due to the stresses to which the web is subjected during the wiping or the polishing operation, this difficulty, however, being more pronounced with a wiping web than with a polishing web because the major portion of the cleaning of the plate results from the action of the wiping web thereon.

In printing from an intaglio, engraved or undersurface steel printing plate, there is great wastage of ink because of the necessity for applying ink to the non-printing or top surface of as well as in the lines of the design upon the plate, and the subsequent removal of the larger portion of such surface ink. The amount of ink

applied varies in accordance with the character of the design and with the size of the plate. The use of a wiping web having a progressively increased degree of saturation by the ink in the direction of movement of the plate, ensures a more perfect wiping operation, and a more perfect wiping results in a more perfect polishing.

A proper conditioning of the wiping web is largely dependent upon the aggregate amount of ink applied to the plate and the length of web fed following each wiping operation. In steel plate printing machines, in use prior to my invention, the usual practice was to provide an intermittently actuated web feeding mechanism for imparting fixed feeding movement to both the wiping and polishing webs irrespective of the character of the design upon the plate, or of the length of the plate. With a short plate, it was necessary to apply a greater quantity of ink to the plate in order to secure a proper degree of saturation of the wiping web and a proper packing of the lines of the design, while with a long plate, it was necessary to apply less ink to the plate in order to prevent an over-saturation of the wiping web. Consequently, in the inking of plates, the efficiency of the wiping mechanism particularly, and of the polishing mechanism incidentally, was determined by the amount of ink applied to the plate, this amount being regulated by the adjustment of the ink fountain. Such adjustment was difficult to secure with any degree of accuracy, and as a consequence the usual practice was to provide ink upon the plate considerably in excess of that actually required for its proper inking, thus ensuring, at all times, a minimum saturation of the wiping web.

The amount of ink applied to the plate had to be at all times sufficient to secure a proper conditioning of the length of the wiping web determined by the fixed quantity of feed thereof by the wiping mechanism, the size, character or design upon the plate being of secondary consideration. Hence, the wastage of ink was always greater than would be normally required by the character of the plate itself.

Furthermore, the feeding of a fixed length of both the wiping and polishing webs, irrespective of the requirements of the plate itself, made it necessary to stop the machine at certain intervals in order to place new rollers of wiping and polishing web in the machine. Whenever a new web is supplied to the machine, a proper conditioning of this web was necessary before the machine could again be used for making an imprint.

With the above conditions in mind, I have pro-

vided a web actuating mechanism for advancing either the wiping or the polishing web or both prior to each wiping or polishing operation wherein the mechanism may be so adjusted as to regulate the length of web fed with each actuation of said mechanism with regard to the size of the plate and the character of the lines of the design thereon, thus permitting the adjustment of the supply of ink to the inking rollers solely with regard to the plate requirements. By thus regulating the feed, particularly of the wiping web, the proper conditioning of the web is determined by the quantity of ink upon the non-printing surface of the plate necessary for securing a proper filling and packing of the lines and the plate need not be supplied with an excess of ink solely for the purpose of conditioning the wiping web.

It is obvious that with an efficient wiping action, the quantity of ink, which must be removed by the polishing web, will be almost negligible so that the rapid soiling of the polishing web is avoided and its sole function becomes that of bringing the top or non-printing surface of the plate to its normal bright finish by removing any film spots thereon caused by the oil vehicle of the ink. With this condition, only a slow intermittent feeding movement of the polishing web is necessary, and by the mechanism of the invention, it is possible to regulate this feeding movement to accord with the efficiency secured by the wiping mechanism, as well as the size of the plate. When referring to the size of the plate, its length is meant, since the width of different plates has no influence upon the proper conditioning of the wiping web, and the action of the polishing web beyond that the feeding movement of each web must be determined by some portion of each plate where the inking or polishing is most difficult.

When the mechanism of the invention is used for feeding both the wiping and the polishing webs, its construction must be such as to secure a differential feeding interval of the wiping web and the polishing web, since one of these webs may be operative as to one plate, while the other is operative as to another plate and each web must be fed during an interval while the other is operative upon a plate. The length of polishing web fed with each actuation of the mechanism of the invention is shorter than that of the wiping web so that the construction of the mechanism must be such as to permit such variation in the quantity of the length of each web fed with each actuation of the mechanism. When the mechanism is applied to both the wiping and the polishing webs, its construction is also such as to permit the independent adjustment of the mechanism to vary the length of feed of either web independently of that of the other.

By the mechanism of the invention, I am enabled to adapt the wiping and polishing mechanism to the requirements of different plates and effect a material saving of ink by avoiding unnecessary wastage of ink resulting from the practice heretofore followed, of determining the quantity of ink applied to a plate mainly by the necessity for securing a certain degree of saturation of the wiping web. This will be more fully referred to hereinafter.

The invention consists primarily in a wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a web feeding mechanism adapted to advance the web toward said platen, a take-up mechanism adapted to draw said web across said platen, an

intermittently operative actuating means for said feeding and said take-up mechanisms including therein a member having a fixed quantity of movement, and means whereby said actuating means may be adjusted to regulate the quantity of web fed and taken up with each actuation of said means without varying the quantity of movement of said member; and in such other novel features and combination of parts as are herein-after set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a side view of the lower portion of a rotary steel plate printing machine, showing the wiping and polishing mechanism of the invention;

Fig. 2 is an end view thereof;

Fig. 3 is a condensed enlarged view of a portion of the actuating means;

Fig. 4 is an illustrative view showing the position of parts immediately following the operation of the actuating means to advance the wiping web;

Fig. 5 is a similar view showing the position of parts immediately following the advancement of the polishing web; and

Fig. 6 is a view similar to Fig. 4, showing the position of parts immediately prior to the advancement of the polishing web.

Like numerals refer to like parts throughout the several views.

In the accompanying drawings, I have illustrated the invention in connection with a steel plate printing machine having a plate cylinder 10 adapted to receive two plates 11 and 12. Since the wiping and polishing mechanisms, in their operation cooperate only with the plates upon the plate cylinder, the drawings omit all other mechanisms of the machine, such mechanisms being old and well known in the rotary steel plate printing art.

The wiping mechanism comprises two platens 13 and 14 extending longitudinally of the cylinder 10, these platens being of the usual construction and being actuated in the usual manner, it being customary as heretofore stated to impart a reciprocatory movement to these platens longitudinally of the cylinder to avoid streaking of the plates and ensure a more complete filling of the lines of the design upon the plate. Adjacent the platens 13 and 14 is a support 15 for a roll of wiping web shown at 16. Between said support and the platens are a pair of feeding rollers 17 and 18 adapted to frictionally engage the web 16 and advance it towards the platens 13 and 14. The web passes about a guide roller 19 in its run from the roll of web to the feeding rollers. These rollers are set sufficiently tight to resist any drag of the plate upon the portion of the web passing about the platens 13 and 14 during the wiping operation. The platens 13 and 14 are spaced slightly apart and between them, the web 16 passes about a weighted guide roller 20, which serves to take up any slack.

Below the support 15 is a support 21 for the rewind reel, consisting of slotted arms permitting upward movement of the rewound web with the gradual increase in its diameter with a continued operation of the machine. Below the slotted arms is a take-up or rewind roller 22. One of the feed rollers, 17, carries a sprocket wheel 23 which is connected by a sprocket chain 24 with a sprocket wheel 25 carried by the arbor of the rewind reel 22. The feeding roller 17 and the take-up roller 21 are the same diameter as are the sprockets

23 and 25 so that the length of web drawn from the supply reel is the same as the amount of web rewound upon the rewind reel.

This general arrangement and construction is old and well known in rotary steel plate printing machines, my invention relating more particularly to the actuating means operative upon these old or similar mechanisms for the purpose of imparting and timing the actuation thereof and for controlling the length of web 16 fed with each actuation thereof.

Mounted adjacent the plate cylinder 10 is a rotatable housed cam 26, and mounted adjacent this cam is a rock arm 27. The cam 26 is connected with a gear 28 upon the plate cylinder through an idler gear 29 and a gear 30 carried by the cam. The gear 30 is of one-half the diameter of the gear 28 upon the plate cylinder so as to receive one complete revolution for each plate upon the cylinder 10. If three plates are used upon said cylinder, the gear 30 will be one-third the diameter of the gear 28, the ratio of these gears always being such as to impart to the cam, one complete revolution for each plate upon the plate cylinder.

The rock arm 27 is pivoted at one end thereof at 31, and carries an anti-friction roller 32 engaging the cam 26.

Carried by the arbor 31 of the take-up or rewind reel is a friction ratchet clutch member 32. Mounted upon this clutch member is a gear wheel 33. The member 32, about the periphery thereof, is provided with a plurality of tapered recesses 34 in which are seated one or more balls or cylinders 35. This general type of ratchet clutch is old and well known, being used in connections where the driving member, by movement in one direction will carry the driven member with it, and in its movement in the opposite direction will disengage it from the driven member so as to permit it to move freely in relation thereto.

Mounted in suitable guideways adjacent the take-up or rewind roller 22 is a rack 38 enmeshed with the gear 35. The rack 38 is reciprocated by means of a connecting rod 39 pivotally connected with said rack and with a block 40 adjustably mounted in an elongated slot 41 in the arm 27.

The block 40 is secured in any adjusted position in relation to the slot 41 by means of end clamps and a lock nut 42. By the above construction, movement of the rock arm 27 in one direction, to the right, will impart contra-clockwise movement to the gear 35, and impart similar movement to the balls or cylinders 37 in the recesses 36 in a manner to set the clutch and impart contra-clockwise movement to the take-up or rewind reel 22, and movement of the arm 27 in the opposite direction, to the left, will impart clockwise movement to the gear 35 resulting in movement of the balls or cylinders 37 in a direction to permit them to move freely in the recesses 36 and thus impart no movement to the said take-up or rewind reel.

The quantity of movement of the rack 38 and the gear 35 may be varied by changing the radius at which the arm 27 acts upon the connecting rod 39 by the adjustment of the pivot block 40 longitudinally of the slot 41. Obviously the nearer this block is to the pivot 31, the shorter will be the movement of the rack 38. In this manner the length of feed of the web may be varied, and there may be a considerable range in the length of the web fed as the arm 27 in the actual machine is long, the rack 38 being located adjacent the base of the machine, partly for this purpose and partly

for a more convenient location of the rewind mechanism.

By the foregoing construction it will be noted that the feeding rollers 17 and 18 and the take-up roller 22 are intermittently actuated by the actuating means consisting of the cam 26, rock arm 27, the connecting rod 39, the co-operating rack 38 and gear 35 and the ratchet clutch mechanism 35, 36 and 37, and that the movability of the connecting rod 39, radially of the rock arm 27, permits the adjustment of this mechanism in a manner to regulate the quantity of web fed and taken up with each cycle of operations of the actuating means. This result is secured notwithstanding that the rock arm 27 receives a fixed quantity of oscillatory movement with each rotation of the cam 26.

The cam 26 is provided with substantially diametrically opposite rises and falls, the rise being indicated at 42 and the fall at 43, the cam except at the rise and fall having two portions at different radii from the axis of the cam as shown respectively at 44 and 45. The spacing of the rise and fall of the cam approximately 180° apart, is for the purpose of securing a proper timing in the feeding of the wiping web 16 in relation to each plate 11 and 12, and also a proper timing in the feeding of the polishing web as a result of the movements of the rock arm 27. A rise and a fall on the cam, of course are necessary if the actuating mechanism is used to cause the feeding of either the wiping web or the polishing web alone, but the locating of the cams in the manner described is necessary when the rock arm 27 is used to cause the feeding of both wiping and polishing webs.

The polishing mechanism will now be described. This comprises a single platen 46, spaced from the wiping platens 13 and 14 in the direction of movement of the cylinder 10. Adjacent the platen roller is a support 47 for a reel of polishing web 48. The web passes from the roll about the guide roller 49 and between a pair of feeding rollers 50 and 51 adapted to frictionally engage the web 48, and advances it toward the platen 46. After leaving the feed roller 51, the web passes about guide rollers 52 and 53.

Adjacent and below the support 47 is a support 54 for the rewind reel consisting of slotted arms permitting upward movement of the rewind web with its gradual increase of diameter with a continued operation of the machine. Below the slotted arms of the support 54 is a take-up or rewind roller 55.

One of the feed rollers 51 carries a sprocket wheel 56 which is connected by a sprocket chain 57 with a sprocket wheel 58 carried by the arbor of the rewind reel 55. An idler sprocket wheel 59 co-operates with the sprocket chain 57, a similar idler sprocket wheel 60 co-operating with the sprocket chain 24. Both these idler sprockets serve merely as tensioning devices.

Carried by the arbor 61 of the polishing web take-up or rewind roller 55 is a friction ratchet clutch member 62. Mounted upon this clutch member is a gear 63, and within tapered recesses 64 about the periphery of the member 62 are seated one or more balls or rollers 65. This ratchet clutch is of the same construction as that heretofore described as a part of the actuating mechanism for the wiping web take-up or rewind mechanism, with the exception that the recesses 64 are set oppositely to the recesses 36, so that with the setting of the clutch mechanism operative upon the take-up or rewind roller 55, said

roller will receive a clockwise movement, whereas with the setting of the clutch mechanism operative upon the take-up or rewind roller 22, the setting of the clutch results in a contra-

clockwise movement of its roller.

Mounted in suitable guideways adjacent the take-up or rewind roller 55 is a rack 66, the teeth of which are enmeshed with the gear 63. This rack 66 is reciprocated by means of a connecting

rod 67 pivotally connected with said rack and with a block 68 adjustably mounted in the elongated slot 41 in the arm 27. The block 68 is secured in any adjusted position along the slot 41 by means of end clamps and lock nuts 69.

The wiping web 16, in passing from the roller 18, passes about a guide roller 70 and across the platen 13, and from the platen 14 about the guide roller 71 to and about the rewind roller 22.

The roll of rewound wiping web is shown at 72

and the reel of rewound polishing web is shown at 73. The cam 26, the rock arm 27, the connecting rod 67, the rack 66 and the members of the clutch mechanism 62—65 constitute an intermittently operated actuating means for feeding the polishing web, the movability of the connecting rod 67 radially of the rock arm 27, permitting the adjustment of this actuating means in a manner to regulate the quantity of web fed and taken up with each cycle of operations of said actuating means.

In the embodiment of the invention shown in the drawings, the rock arm 27 and the cam 26 are common to the actuating means for the mechanisms for feeding the wiping web and the polishing web. This, however, is largely a matter of expediency, since by it an accurate timing in the feeding of the two webs in relation to each other is more readily secured than with two independent rock arms and cams.

The operation of the herein described wiping and polishing mechanism is substantially as follows:—

The determination of the quantity of wiping web fed prior to the wiping of each plate is of greater importance than a regulation of the quantity of polishing web fed. This is because any saving of ink is accomplished through a proper regulation of the wiping web. Therefore, if desired, the rock arm 27 and its actuating means 26 may be used solely to actuate the wiping web feeding mechanism. As a practical matter, however, it is preferable to utilize these parts to also actuate the polishing web feeding mechanism, since regulation of the quantity of polishing web fed prior to the polishing of each plate is highly desirable, mainly in the interests of a saving of the polishing web.

I will therefore first describe the operation of the mechanism as to the feeding of the wiping web, and then describe its operation in relation to the polishing web. This, I will follow with a description of the timing in the actuation of the two webs, notwithstanding that the rock arm 27 and cam 26 are a common source of power or actuating means for both web feeding mechanisms.

In feeding the wiping web through the machine, it is drawn from the roll of web mounted in the support 15, passed about the guide roller 19, between the feeding rollers 17 and 18, about the guide roller 70, over the platen 13, below the tensioning roller 20, over the platen 14, around the guide roller 71 to and about the rewind roller

22 the end being wound upon the spool of the rewind reel 72.

Referring more particularly to Fig. 4 of the drawings, the plate 11 has been inked and is about to engage the wiping web 16. The arm 27, in this view, is shown in its extreme position to the right, with the roller 32 passing from the rise 42 of the cam 26 and just entering upon the high concentric portion 44 of said cam. The parts will remain in this position until the fall 43 of the cam moves the rock arm 27 to its extreme left position shown in Fig. 6, the position of parts shown in Fig. 5 being that immediately preceding the movement of the rock arm 27 to the left.

This movement of the arm 27 to the left will impart no movement to the take-up or rewind roller 22, since movement of the rock arm to the left will impart a clockwise movement to the gear 35 which will disengage or release the clutch and permit a free movement of said gear.

Following this movement of the arm to the left, it will remain stationary during an interval corresponding with the low concentric cam surface 45. Consequently, the wiping web will remain immovable during the entire interval following the movement of the rock arm 27 by the rise 42, until toward the completion of a full revolution of the cam 26, said rock arm is moved to the right by said rise 42, since while the arm 27 remains stationary by reason of the engagement of the roller 32 with concentric portions 44 and 45 of the cam and is moved by engagement with the fall 43, no movement is imparted to the take-up or rewind roller 22. With the movement of the rock arm 27 by the rise 42, however, which movement will be to the right, the rack 38 is actuated by the connecting rod 39 in a manner to impart a contra-clockwise movement to the gear wheel 25, which movement will force the balls or rollers 37 toward the shallow part of the recesses 36 in the clutch member 34, thus setting the clutch so as to impart contra-clockwise movement to said take-up or rewind roller 22.

The amount of turning movement of the roller 22 is determined by the length of the reciprocatory movement of the rack 38, and this in turn is determined, not alone by the quantity of movement in arc of the rock arm 27, but by the distance which the pivot block 40 is set from the pivot 31 about which the arm 27 has movement. With an increase of the radius at which this block is set, there will be an increased feeding movement of the wiping web 16, notwithstanding that the rock arm 26 has a constant range of oscillation.

The cam 26 has one full revolution for each plate 11 or 12 carried by the plate cylinder 10. Consequently the arm 27 will have one full direct and return oscillation for each plate upon said cylinder. The rise 42 upon the cam 26 is so set in relation to the space between plates upon the cylinder that its movement to the right will be completed prior to the engagement of the forward edge of a plate with the portion of the web 16 about the platen 13, and following the disengagement of the preceding plate, as 12, from the portion of the web passing about the platen 14. Consequently, all movement of the web 16 will occur while it is not engaged with any plate.

The length of the rise 42 is such that a full feeding movement may be imparted to the web 16 when the largest plates, which are used upon the machine, are mounted upon the cylinder 10, or when succeeding plates are most closely spaced

in relation to each other. Plates of different lengths are used upon these machines, but the number of plates is always the same, that is to say, if a machine is designed to have the plate

5 cylinder carry two plates, there are never more than two plates mounted upon the plate cylinder, while if the machine is designed to carry three plates, there are never more than three plates mounted upon said cylinder.

10 As heretofore explained, to ensure a proper conditioning of the wiping web in order to effectively fill and pack the lines of a design upon the plate, it is necessary that this web shall be saturated or partially saturated to a degree which

15 will prevent or retard the absorption of the ink with the movement of the plate in relation to the wiping web so that as each portion of the plate leaves the web, or is about to leave the web, there is no tendency of the web, by capillary attraction, to draw ink from the lines of the design. In fact, with a proper degree of saturation of the wiping web, this web itself will supply ink to some of the lines rather than pick the ink therefrom. This conditioning of the web requires

20 the application of ink to the plate, not only with regard to the filling of the lines, but also with regard to the amount of ink which must be absorbed by the web. With a short plate the amount of ink applied to the plate must be increased, as

25 compared with a long plate, in order to furnish sufficient ink for the conditioning of the wiping web. At least that was the condition prior to my invention.

With the wiping mechanism of the invention, however, when a short plate is mounted upon the cylinder 10, instead of increasing the quantity of ink applied to the plate, the connecting rod 39 is moved radially of the arm 27, the amount of this movement being governed largely by the

40 length of the plate.

When the block 40 is set closer to the axis 31 of the arm 27, the throw of the rack 38 is decreased and the turning movement of the gear 35 and the take-up or rewind reel 22 is reduced. As a consequence, the quantity of wiping web fed will be reduced, and with the shortening of the amount of web fed, the available ink for conditioning the web will be sufficient to secure the desired degree of saturation without increasing the quantity of ink applied to the plate. For example, assuming that with a large plate and a six-inch wide platen, the web, with each actuation of the roller 22, is fed four inches, each plate is subjected to four inches of unsaturated web and

55 there will be two inches of saturated web passing over the platen 13. The web passing over the platen 14 is always saturated or partially saturated with ink. The supply of ink upon the top or non-printing surface of a large plate will be sufficient to partially saturate this four inches of fresh web and will increase the degree of saturation of the partially saturated two inches of web adjacent the platen 13. With a small plate, however, the area of the plate will be such that if the plate is inked to the same extent as the long plate, assuming that the short plate is only half the length of the long plate, there will not be sufficient ink to secure a desired degree of saturation of the four inches of fresh web. By cutting down the length of web fed to two inches instead of four, there will be sufficient ink upon the short plate to properly condition this two inches of web, and it will take three feeding movements of the web, instead of only two, before six inches pass from the platen 13 as with

the long plate, so that two-thirds of the web, instead of only one-third, following each feeding movement, will have absorbed ink, one-third from two plates, and one-third from one plate. In this manner, the shortening of the length of web fed

80 will ensure the maintenance of the web in proper condition without increasing the amount of ink applied to a short plate as compared with a corresponding area on a large plate.

By trial impressions the connecting rod 39

85 may be adjusted radially of the arm 27 to any extent which it is found ensures a proper inking of the plate. With some designs more ink may be required to fill in the lines and less will be available for conditioning the web, but the

90 actuating means for feeding the web may be adjusted to accommodate the wiping mechanism to this condition. This adjustability of the actuating means for the wiping web feeding mechanism effects a saving of the wiping web as well as of ink, when small plates are used upon the cylinder 10. Also, by regulating the length of feed of the wiping web, over-saturation of the web, resulting in streaking of the plate may be avoided.

100

By the use of the mechanism of the invention, not only are economies effected as to ink and web, but it is possible to so set the machine as to secure a more uniform inking of succeeding plates with the avoidance of losses resulting from the making of defective impressions.

105

Referring to Fig. 5 of the drawings, the relation of parts is such that the plate 12 has passed from engagement with the polishing web 48, at which time the rock arm 27 is in its extreme right position, the roller 32 being about to enter the fall 43 of the cam 26. With the continued rotation of said cam, the arm 27 will be moved to the left imparting a direct reciprocation to the rack 66 and a clockwise rotation to the gear 63. This movement of the gear 63 will move the balls or rollers 65 toward the shallow part of the recesses 64, thus setting the clutch mechanism in a manner to turn the take-up or rewind roll 55 in a clockwise direction. Movement of this roller and of the sprocket wheel 58 carried thereby, through the sprocket chain 57 and sprocket wheel 56, will actuate the feeding rollers 51 and 52 in a manner to draw polishing web 48 from its roll and advance it toward the polishing platen 46, the slack thus created being taken up by the take-up or rewind roller 55 and wound upon the rewind reel 73.

110

115

120

125

The movement of the rock arm 27 will, when completed, establish a relation of parts, as shown in Fig. 6, the succeeding plate 11 not yet having engaged the polishing web 48 passing about the platen 46. With the continued rotation of the cam 26, the rock arm 27 will remain stationary throughout the engagement of the roller 32 with the low concentric cam portion 45, but said arm will receive reciprocation to the right from the rise 42 of the cam, following which the arm will remain stationary during the engagement of the roller 32 with the high concentric cam portion 44.

135

140

During the revolution of the cam 26, following the actuation of the rock arm 27 by the fall 43 of said cam, notwithstanding that before said fall again becomes operative, said arm will have received reciprocatory movement to the right, the take-up or rewind roller 55 will remain stationary since with movement of the rack 66 to the right, the gear 63 will receive a contra-clockwise movement and this will move the balls or

145

150

rollers 65 in a direction to disconnect this gear from the driven clutch member 62.

The connecting rod 67 may be adjusted radially of the arm 26 by means of the block 68 and the clamps 69 in a manner to regulate or control the quantity of polishing web fed with each complete revolution of the cam 26 or each complete direct and return oscillation of the rock arm 27.

The function of the polishing web is merely to remove any streaks of ink or any blotches of oil upon the non-printing surface of the plate, and since with an effective wiping action such are not present in any substantial amount, the polishing web becomes soiled very slowly. Consequently, as compared with a wiping web, the length of polishing web fed preparatory to the polishing of a plate is relatively much shorter.

With short plates the block 68 may be set closer to the pivotal support 31 of the rock arm 27, while with longer plates it may be set more remote from this support 31. The adjustment is mainly for the purpose of limiting the length of polishing web fed to that required to properly clean the non-printing surface of the plate, since with the shortening of the amount of web fed there is not only a saving in the consumption of the web during the run of the machine, but stoppage of the machine for the replacement of the soiled web by a fresh one is less frequent.

The adjustment of the block 68 is along the same slot 41 in the arm 27 which permits adjustment of the block 40 through which power is transmitted to the wiping web take-up or rewind roller 22, it being possible to utilize the same arm 27 as a part of the actuating means for both the wiping and the polishing mechanism because of the differential quantity of feed required for the wiping web and for the polishing web.

The use of actuating means, including an arm 27, which is common to both the wiping web and the polishing web feeding mechanisms is advantageous as it ensures accuracy in the timing in the feeding of these webs and permits the regulation of the quantity of either web fed without disturbing the adjustment as to the other web and without interfering with the timing above referred to.

The functioning of the actuating means in operating the different web feeding mechanisms individually, has heretofore been described but without regard to the timing factor. The spacing of plates upon the plate cylinder 10 affords an interval during which either the wiping web or the polishing web may be advanced, but this space is so short and the wiping platens and the polishing platens are so spaced that this interval does not coincide as to both of the webs. According to the position of the plate cylinder, the wiping of one plate may occur while another plate is being polished; one portion of a plate may be wiped while another portion of it is being polished; the polishing web may be operative upon a plate while the wiping web is inoperative, and the wiping web may be operative while the polishing web is inoperative. Consequently, the wiping web may be fed while the polishing web must be held stationary, since it is operating to polish a plate, and inversely, the polishing web may be fed while it is necessary to maintain the wiping web stationary because of its operative relation to a plate.

With movement of the rock arm 27 to the right, the wiping web actuating mechanism is caused to

advance this web, and consequently this movement must occur while a plate is disengaged from the web 16. Movement of the arm to the right, however, will merely turn the gear 63 without imparting feeding movement to the polishing web, which is necessary because at this time the polishing web 48 is in contact with a plate, or may be in such contact, according to the length of the plate. Movement of the rock arm 27 to the left occurs while the wiping web 16 is engaged with a plate, but following the disengagement of a plate with the polishing web 48. With this movement, the polishing web rewind roller 55 is actuated to advance the polishing web but the gear 35 is turned idly in relation to the driven clutch member associated therewith, so that the wiping web remains stationary.

By setting the rise 42 and fall 43 approximately 180° apart; by having each extend through an arc of the same degree as the smallest arc in the space between the largest plates used upon the cylinder 10; by imparting one full revolution to the cam 26 for each plate upon the cylinder, and determining the ratio of the gear 28 and the gear 29 by the number of plates upon the cylinder, to wit: two to one or three to one, it is possible to secure the timing of the feeding of the two webs in the manner above described and still maintain each web stationary during the full interval it is engaged with a plate, notwithstanding that during this interval the rock arm 27 receives reciprocatory movement in one direction since this movement will have no effect upon the web which at the moment is engaged with a plate.

The use of a ratchet clutch mechanism permits the intermittent actuation of both web feeding mechanisms, and the use of a ratchet friction clutch mechanism permits a close setting of the actuating mechanism to regulate the quantity of web fed.

The mechanism of the invention is heavy, durable and readily accessible, being located at one side of the machine.

Regulation of the quantity of feeding movement, as to either web, is secured by determining the effective leverage at which the arm 27 acts through the connecting rod 39 or 67 upon the rack 38 or 66. The length of the arm 27 is sufficiently great to permit the setting of the actuating means for the web feeding mechanisms respectively to meet the requirements of a plate of any size which may be used upon the machine.

It is not my intention to limit the invention to the precise details of construction shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention what I claim as new and desire to have protected by Letters Patent, is:—

1. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a web feeding mechanism adapted to advance the web toward said platen, a take-up mechanism adapted to draw said web across said platen, an intermittently operative actuating means for said feeding and said take-up mechanisms including therein a member having a fixed quantity of movement, and means whereby said actuating means may be adjusted to regulate the quantity of web fed and taken up with each actuation of said means without varying the quantity of movement of said member.

2. A wiping and polishing mechanism for steel

plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up mechanism adapted to draw said wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up mechanism adapted to draw said polishing web across said platen, an intermittently operative actuating means for said wiping web and said polishing web feeding and take-up mechanisms respectively, and means whereby the actuating means operative upon the polishing web feeding and take-up mechanism may be adjusted to regulate the quantity of polishing web fed and taken up with each actuation of said means.

3. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up mechanism adapted to draw said wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up mechanism adapted to draw said polishing web across said platen, an intermittently operative actuating means for said wiping web and said polishing web feeding and take-up mechanisms respectively, and independently adjustable means whereby the quantity of wiping web and the quantity of polishing web fed and taken up with each actuation of said means may be varied.

4. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the web toward said platen, a take-up roller co-operating with a rewind reel to draw said wiping web across said platen, a ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of wiping web fed and taken up with each actuation of said arm.

5. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up mechanism adapted to draw said wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up roller co-operating with a rewind reel to draw said polishing web across said platen, a ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of polishing web fed and taken up with each actuation of said arm.

nism and the quantity of polishing web fed and taken up with each actuation of said arm.

6. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up roller adapted to draw said wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up roller adapted to draw said polishing web across said platen, ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively, and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam, driving means for said cam, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts upon either connecting rod may be adjusted to regulate the movement of either of said clutch mechanisms independently of the other and the quantity of wiping web or polishing web fed and taken up with each actuation of said arm.

7. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the web toward said platen, a take-up roller co-operating with a rewind reel to draw said wiping web across said platen, a friction ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of wiping web fed and taken up with each actuation of said arm.

8. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up mechanism adapted to draw said wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up roller co-operating with a rewind reel to draw said polishing web across said platen, a friction ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of polishing web fed and taken up with each actuation of said arm.

9. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up roller adapted to draw said

wiping web across said platen, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up roller adapted to draw said polishing web across said platen, friction ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively, and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam, driving means for said cam, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts upon either connecting rod may be adjusted to regulate the movement of either of said clutch mechanisms independently of the other and the quantity of wiping web or polishing web fed and taken up with each actuation of said arm.

10. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a pair of feeding rollers adapted to advance the wiping web toward said platen, a take-up roller co-operating with a rewind reel to draw said wiping web across said platen, connections between said take-up roller and said feeding rollers, whereby said feeding rollers and said take-up roller are simultaneously actuated to feed and take up the same length of wiping web, a ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of wiping web fed and taken up with each actuation of said arm.

11. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up mechanism adapted to draw said wiping web across said platen, a polishing web, a pair of feeding rollers adapted to advance the polishing web toward said platen, a take-up roller co-operating with a rewind reel to draw said polishing web across said platen, connections between said take-up roller and said feeding rollers, whereby said feeding rollers and said take-up roller are simultaneously actuated to feed and take up the same length of polishing web, a ratchet clutch mechanism, the driven member of which is carried by said take-up roller, and the driving member of which includes a gear, a reciprocatory rack enmeshed with said gear, a cam, driving means for said cam, a rock arm actuated by said cam, and a connecting rod, one end of which is connected with said rack and the other end of which is connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts may be adjusted to regulate the movement of said clutch mechanism and the quantity of polishing web fed and taken up with each actuation of said arm.

12. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping platen, a wiping web feeding mechanism adapted to advance the wiping web toward said platen, a take-up roller adapted to draw said wiping

web across said platen, connections between said take-up roller and said feeding mechanism, whereby said feeding mechanism and said take-up roller are simultaneously actuated to feed and take up the same length of wiping web, a polishing platen, a polishing web feeding mechanism adapted to advance the polishing web toward said platen, a take-up roller adapted to draw said polishing web across said platen, connections between said last named take-up roller and said polishing web feeding mechanism, whereby said feeding mechanism and said take-up roller are simultaneously actuated to feed and take up the same length of polishing web, ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively, and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam, driving means for said cam, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby the effective leverage at which said arm acts upon either connecting rod may be adjusted to regulate the movement of either of said clutch mechanisms independently of the other and the quantity of wiping web or polishing web fed and taken up with each actuation of said arm.

13. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein a wiping platen, a wiping web feeding mechanism, a wiping web take-up mechanism, a polishing platen, a polishing web mechanism, a polishing web take-up mechanism, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder, whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, oppositely set ratchet clutches having driven members which are operative upon said take-up mechanisms respectively, and each having a driving member, connections between said driving members respectively and said arm, whereby each take-up mechanism will be actuated while the other is inoperative, and means whereby the effective leverage of said arm upon said last named connections respectively, may be independently regulated to vary the quantity of web fed and taken up with each reciprocation of said arm.

14. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein, wiping and polishing web platens, wiping and polishing web feeding mechanisms, wiping and polishing web take-up rollers, oppositely set ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby each take-up roller will be actuated while the other is inoperative, and the effective leverage of said arm upon said connecting rods respectively may be independently regulated to vary the quantity

of web fed and taken up with each reciprocation of said arm.

15. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein, wiping and polishing web platens, wiping and polishing web feeding mechanisms, wiping and polishing web take-up rollers, oppositely set friction ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby each take-up roller will be actuated while the other is inoperative, and the effective leverage of said arm upon said connecting rods respectively may be independently regulated to vary the quantity of web fed and taken up with each reciprocation of said arm.

16. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein, wiping and polishing web platens, wiping and polishing web feeding mechanisms, wiping and polishing web take-up rollers, connections between each feeding mechanism and the take-up roller co-operating therewith whereby the same length of web is simultaneously fed and taken up, oppositely set ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby each take-up roller will be actuated while the other is inoperative, and the effective leverage of said arm upon said connecting rods respectively may be independently regulated to vary the quantity of web fed and taken up with each reciprocation of said arm.

17. A wiping and polishing mechanism for steel plate printing machines embodying therein a wiping web platen, and means for feeding a wiping web across said platen, including therein a take-up mechanism, an intermittently operative

actuating means therefor including therein a member having a fixed quantity of movement, and means whereby said actuating means may be adjusted to regulate the quantity of web taken up with each actuation of said means without varying the quantity of movement of said member.

18. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein, wiping and polishing web platens, means for feeding wiping and polishing webs across said platens respectively including wiping and polishing web take-up rollers, oppositely set ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby each take-up roller will be actuated while the other is inoperative, and the effective leverage of said arm upon said connecting rods respectively may be independently regulated to vary the quantity of web taken up with each reciprocation of said arm.

19. A wiping and polishing mechanism for steel plate printing machines having a plate cylinder adapted to receive a plurality of spaced plates, embodying therein, wiping and polishing web platens, wiping and polishing web feeding mechanisms, wiping and polishing web take-up rollers, connections between each take-up roller and its associated web feeding mechanism, oppositely set ratchet clutch mechanisms, the driven members of which are carried by said take-up rollers respectively and the driving members of which each include a gear, reciprocatory racks enmeshed with said gears respectively, a cam having a rise and a fall substantially 180° apart, connections between said cam and said plate cylinder whereby said cam receives one full revolution for each plate on said cylinder, a rock arm actuated by said cam, and connecting rods each having one end connected with a rack and the other end connected with and adjustable radially of said arm, whereby each take-up roller will be actuated while the other is inoperative, and the effective leverage of said arm upon said connecting rods respectively may be independently regulated to vary the quantity of web fed and taken up with each reciprocation of said arm.

FRANK C. MARQUARDT.