A. H. SMITH.

PRINTING MACHINE.

APPLICATION FILED OCT. 23, 1914.

1,282,131.

Patented Oct. 22, 1918.

3 SHEETS—SHEET 1.

Fig. 9.

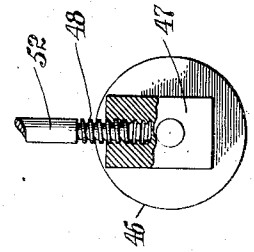


Fig. 1.

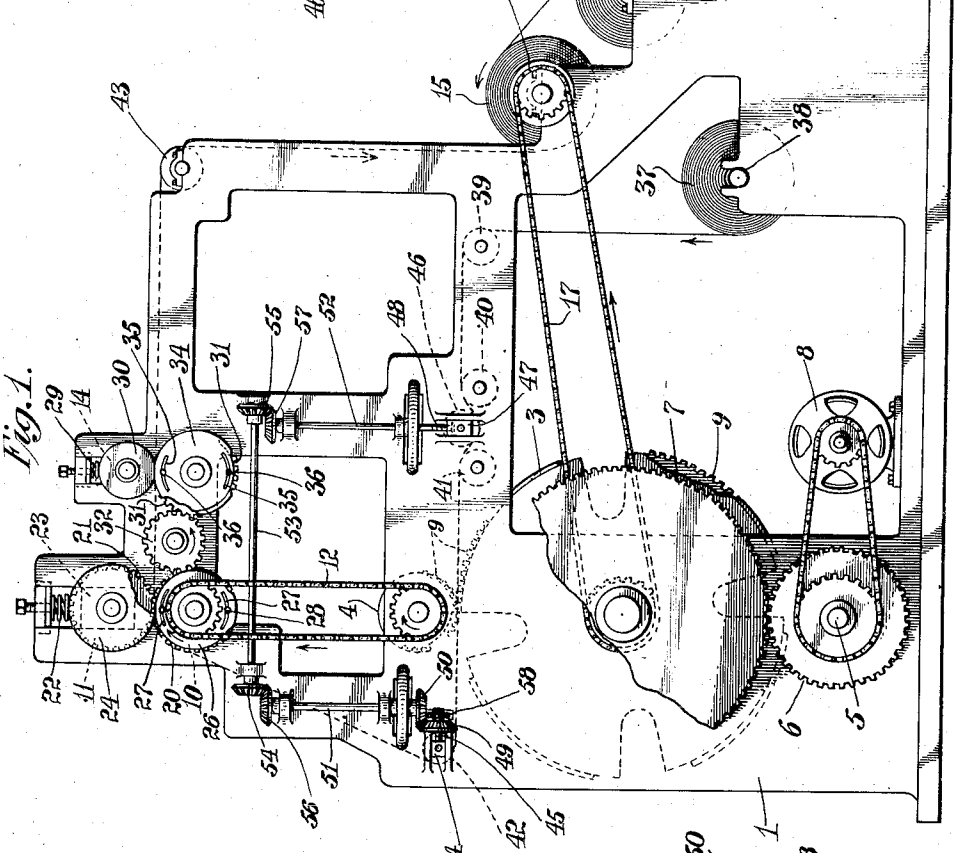
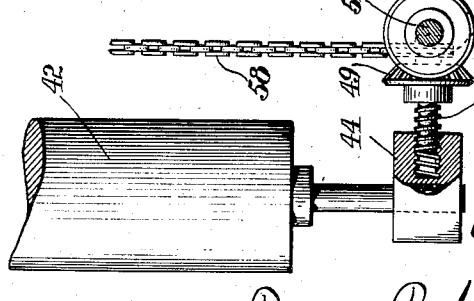


Fig. 8.



Attest:

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3 SHEETS—SHEET 2.

Fig. 4.

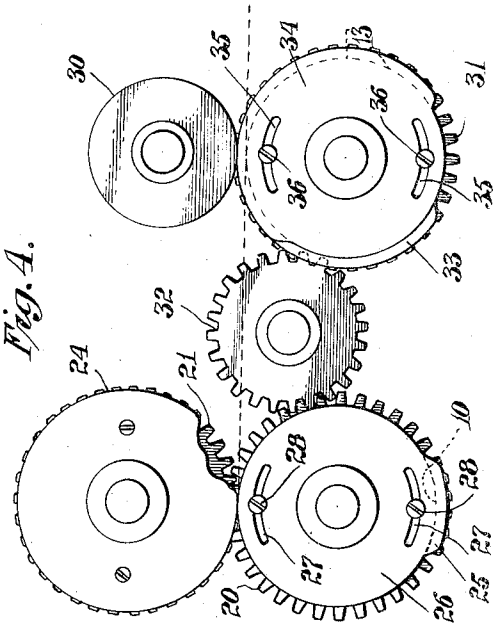


Fig. 5.

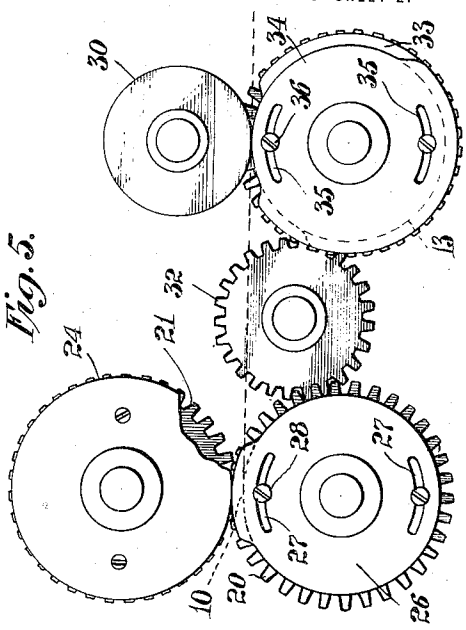
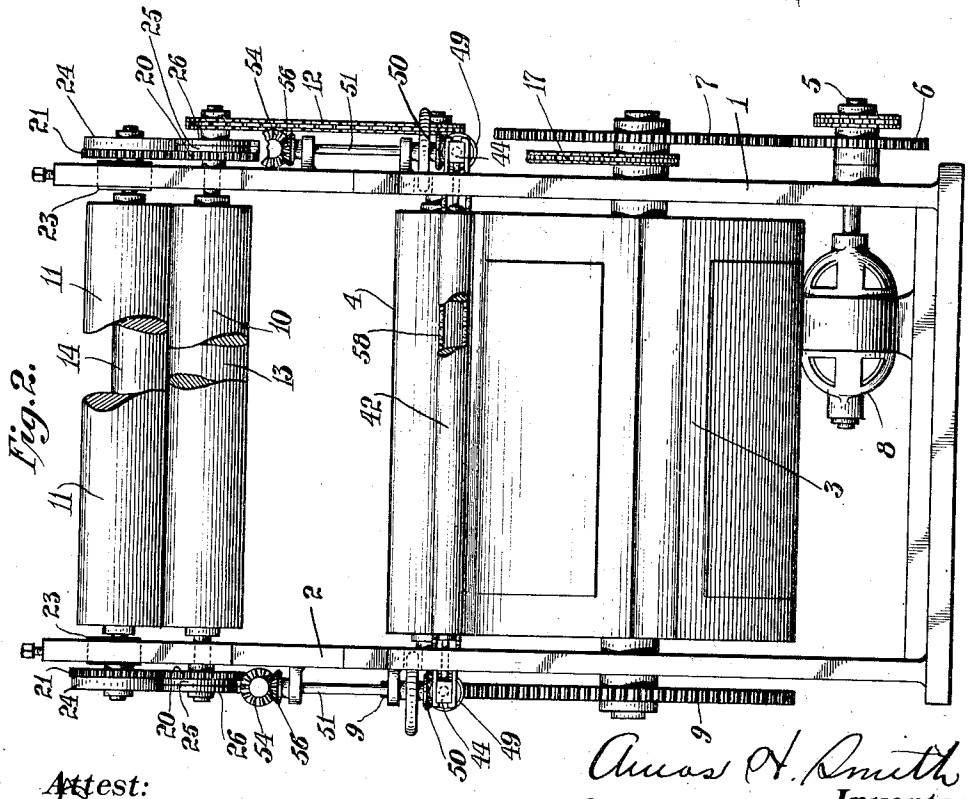


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 5.

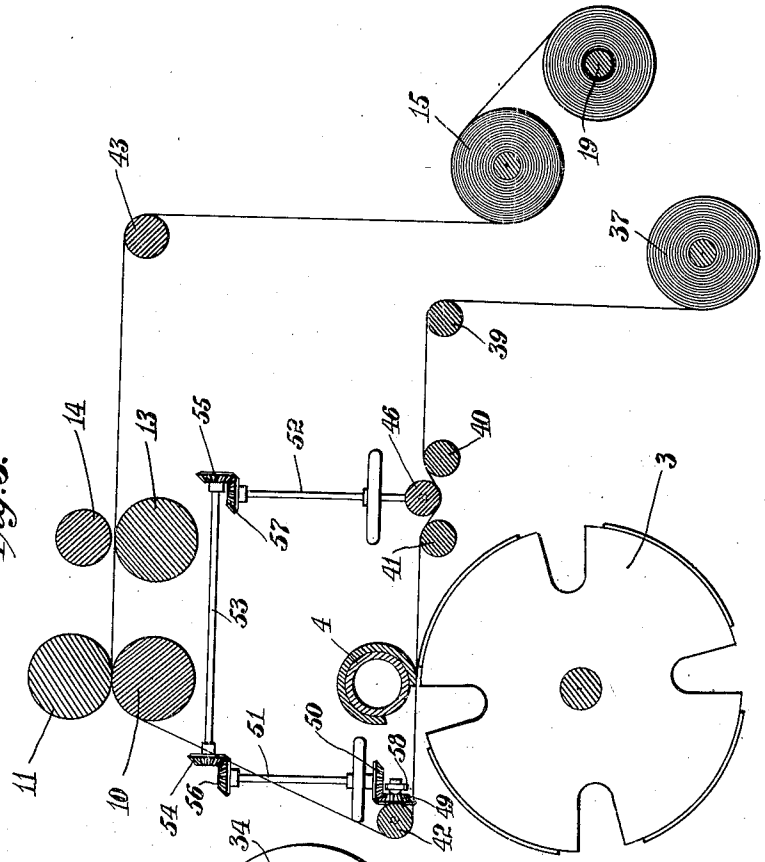


Fig. 6.

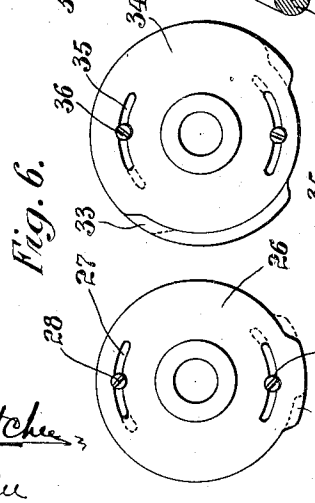
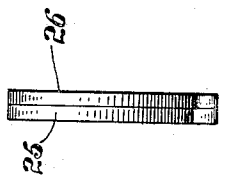


Fig. 7.



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UNITED STATES PATENT OFFICE.

AMOS H. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN BANK NOTE COMPANY, A CORPORATION OF NEW YORK.

PRINTING-MACHINE.

1,282,131. Specification of Letters Patent. Patented Oct. 22, 1918.

Application filed October 23, 1914. Serial No. 868,300.

To all whom it may concern:

Be it known that I, AMOS H. SMITH, a citizen of the United States, residing at the borough of Bronx, in the city of New York, county of Bronx, and State of New York, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to printing machines and more particularly to a type of machine having a rotary impression cylinder and adapted to print upon a web of paper.

In the ordinary web printing press whether perfecting or non-perfecting it is a customary practice to print upon the paper while it has continuous movement through the machine, and to use plates of uniform size for all work done on the particular machine, or on succeeding form cylinders in the machine. Ordinarily such presses are made to receive plates of standard sizes, particularly as to length, although under some conditions the width of such plates may be varied to adapt the machine to print upon different widths of web. The presses are designed to have a capacity defined by a certain definite lineal run of the paper per a given unit of time, and the feeding of the paper is constant and uniform. In this old type of press the register of succeeding impressions, when two or more colors are used in a print, is secured by the adjustment of the plates upon the form cylinder.

The type of press referred to above, is not adapted for use in printing from engraved, intaglio, or under-surface plates or for use in printing by means of any printing couple, the impression cylinder of which has an interrupted surface such as that found in an ordinary D-roll; nor is this machine adapted for use in connection with plates of different dimensions or requiring different quantities of feeding movement of the web during a unit of time.

A machine made in accordance with my invention, differs from the type of machine to which I have above referred, in the respect that while it prints upon a continuous web of paper, the feeding movement of the paper will be in accord with the rotary movement of the impression cylinder, or D-roll, and will continue only during that interval when said D-roll is in the operative relation to the printing surface. In this manner, I am enabled to secure an intermittent feed of the paper web and to so control this movement as to avoid waste of paper, or necessitate the use of printing plates of standard sizes upon the plate carrier. In the form of the invention shown, I secure the desired result by a feed mechanism independent of the printing couple but actuated in synchronism therewith, which feeding mechanism is so constructed as to be alternately operative, and inoperative upon the paper web. The controlling means for said feeding mechanism operates automatically, and may be so adjusted as to control the intervals when said mechanism is operative or inoperative.

To prevent the formation of slack between the feed mechanism and the printing couple, I provide a paper clamp mechanism, the operations of which are so timed with those of the feeding mechanism, that said clamp will be inoperative when the feeding mechanism is operative, and will become operative immediately upon the feeding mechanism becoming inoperative. This clamping mechanism, like the feeding mechanism, is provided with a controlling means whereby the duration of the clamping action thereof, may be synchronized with the inoperative interval of the feeding mechanism. When a rewinding mechanism is employed, this clamping mechanism will also be utilized to cause slippage in the friction drive of the rewinding reel and thus prevent a feeding movement of the web under the control of said rewinding mechanism.

To adapt the machine for use in making prints in two or more colors, I provide a registering mechanism, the essential characteristics of which are a capability of securing nicety in the adjustment of the paper relatively to the printing couple, and maintaining a relation of parts which will insure a continued run of the paper to register. I furthermore provide a controlling means for this registering mechanism which will create slack upon one side of the printing couple and take up this slack on the other

side thereof to permit the adjustment of the machine, even while it is running, to compensate for any slight loss of register due to stretching of, or shrinkage in, the paper.

The invention consists primarily in a printing machine embodying therein a printing couple including therein an intermittently operative impression cylinder and an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said paper will remain stationary during the non-printing interval; and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings:

Figure 1 is a side elevation of a machine embodying my invention with portions thereof broken away;

Fig. 2 is an end view of said machine;

Fig. 3 is a vertical longitudinal section through the machine;

Fig. 4 is a detail side view of the paper feed and the paper clamp mechanism showing the position of parts when the paper is being fed;

Fig. 5 is a similar view showing the position of parts when the paper is not being fed;

Fig. 6 is a detail side elevation of the controlling means for the feeding rollers and the clamping mechanism indicating in dotted lines the adjustment thereof to vary the quantity of the feed of the paper with each rotation of the machine;

Fig. 7 is an end elevation of one of said mechanisms;

Fig. 8 is a plan view in detail of a portion of the register mechanism; and

Fig. 9 is a side elevation of another portion thereof.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings I have illustrated it in connection with a machine embodying therein both a rotary impression cylinder and a rotary form cylinder, but the invention may be applied to machines using other types of form cylinders without substantial modification.

In the drawings the side frames of the machine are indicated at 1 and 2, the form cylinder at 3 and the impression cylinder or D-roll at 4. While the machine shown is an engraving, intaglio or undersurface printing press, the illustration of the printing couple is merely conventional and the inking, wiping and polishing mechanisms are omitted as such are old and well-known and are not material to an understanding of my present invention. At 5 I have shown the main power shaft of the machine carrying the gear 6 in mesh with a gear 7 through which power is transmitted to the form cylinder. Power may be derived from any desired source as the electric motor 8 belted to the shaft 5 of the gear 6.

In the form of the invention shown, the impression cylinder or D-roll 4 is continuously rotated by means of the meshed gears 9 thereon and upon the form cylinder shaft, although, if desired, any desired or well-known, means of rotating the D-roll either continuously or intermittently, may be employed. The form cylinder 3 is adapted to have mounted thereon one or more plates having printing surfaces with which the impression cylinder or D-roll 4 is adapted to be engaged during each rotation of the machine.

Associated with the aforesaid printing couple is a paper feed mechanism adapted to feed a continuous web of paper with relation thereto, said mechanism being operative to feed the paper only during the printing interval and becoming inoperative immediately upon the disengagement of the impression cylinder or D-roll 4 with the printing surface carried by the form cylinder. The peripheral velocity of this mechanism is so controlled as to be in accord with that of the printing couple.

In the form of the invention shown, this mechanism comprises a pair of friction rollers 10 and 11, one of which as 10 is driven from the impression cylinder or D-roll by the chain and sprocket mechanism 12. These rollers are so constructed and arranged that the feeding interval thereof will accord with the impression interval of the printing couple.

To adapt a machine to work with plates of different dimensions, I preferably provide the rollers 10 and 11 with continuous friction surfaces and use a controlling means whereby said surfaces will be pressed together when it is desired to feed the web, and will be automatically separated when it is desired to prevent a further feeding movement thereof. To insure accuracy in the operation of the feeding mechanism, and prevent the formation of slack between the feed mechanism and the printing couple, and also the feed of the web by the rewinding mechanism when such is used, I provide a clamping mechanism which is operative upon the web when the feed rollers 10 and 11 are separated and is inoperative thereon when said feed rollers are operative.

This clamping mechanism comprises oppositelv disposed members 13 and 14 having friction surfaces between which the paper web is adapted to pass after leaving the feeding rollers and controlling means for said clamping members, so constructed that

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the interval during which the clamp is operative will exactly coincide with the interval when the feed rollers are inoperative, and vice versa.

In the accompanying drawings, I have shown a rewinding mechanism consisting of a reel 15, driven by means of the friction disks 16, which are in turn actuated from the shaft of the form cylinder 3 through the chain and sprocket mechanism 17. Adjacent the rewinding reel are bearings 18 adapted to receive the arbors of a reel 19 of anti-offset paper adapted to be wound within the paper upon the reel 15.

The feed rollers 10 and 11 are adapted to be positively driven by the intermeshing gears 20 and 21 carried thereby respectively, and the roller 11 is normally thrust toward the roller 10 by means of the springs 22 acting upon bearings 23 slidably mounted in the side frames of the machine.

To accomplish the intermittent separation of the rollers 10 and 11, I provide the opposite ends of one of them as 11 with bearing disks 24 adapted to coöperate with cams carried by the other roller as 10. The height of the riser upon each of said cams is preferably such as to separate the friction surfaces of the rollers without disengaging the gears 20 and 21, thus avoiding any possibility of a loss of mesh of these gears and a resultant loss in the synchronism of said gears and the D-roll or momentary delay in the initiation of the feeding movement of said rollers.

The length of the riser will determine the inoperative interval of the feeding rollers, and to adapt the machine to a variable feeding movement of the paper in conformity with the requirements of plates of different sizes, I so construct said cams that the length of said risers may be varied as desired. To secure this result, I form said cam of two similar sections 25 and 26, one of which as 26 has segmental slots 27 therein through which project the clamping bolts 28 adapted to secure said cams in any adjusted position.

The clamping member 13 preferably consists of a rotatable cylinder having a friction surface, while preferably the member 14 is non-rotatable and is provided with angular arbors vertically movable in ways in the side frames 1 and 2. The member 14 is acted upon by the springs 29 having a normal thrust toward the member 13. The ends of the arbors of the member 14 have rotatably mounted thereon, however, circular disks 30 coöperating with the lifting cams rotatably mounted upon the arbors of the member 13. The said last named arbors also have loosely mounted thereon the gears 31 which are driven from the gears 20 by means of the intermediate pinions 32. The gears 20 and 31 are of the same diameter to insure accuracy in the timing of the operations of the feeding mechanism and the clamping mechanism.

The feeding cam coöperating with the disk 30 is composed of two sections 33 and 34 the first of which is secured to and movable with the gear 31 and the latter of which is provided with segmental slots 35, through which the clamping bolts 36 project in a manner to permit the setting of the disk 34 in any adjusted position relatively to the section 33. The cam disks 33 and 34 while similar in construction to the disks 25 and 26 differ therefrom in the length of the riser, the length of the riser upon the composite cam 33—34 when adjusted to its full length being equal to the length of the fall upon the cam 25—26 when the riser is adjusted for its shortest length. This construction results from the necessity for having the cam 33—34 operative during substantially the entire interval when the cam 25—26 is inoperative and having the clamping mechanism inoperative during the entire interval when the feeding mechanism is operative. The cams upon the gear 20 and upon the gear wheel 31 are set at 180° apart and the length of the risers upon these cams respectively is such that if taken together they would occupy a full 360°.

It is to be observed that while the feed rollers 10 and 11 are positively driven, the roller 13 is an idler roller and the member 14 is preferably non-rotatable in order to avoid any possible feed of the paper by the rewinding mechanism. The disk 30 is made rotatable merely to minimize wear thereon.

At 37 I have shown a roll of a continuous paper web mounted in suitable bearings 38. Guide rollers 39, 40 and 41 are arranged between said bearings 38 and the printing couple, a guide roller 42 is arranged between the printing couple and the rollers 10 and 11, and a guide roller 43 is arranged between the clamping mechanism and the rewinding reel.

To adapt the machine to printing in registering colors, I provide a registering mechanism adapted to vary the position of the web with relation to the printing couple, this mechanism being so constructed as to be capable of either advancing the web or withdrawing it. To secure the desired result, I provide means which will impart movement only to that portion of the web adjacent the printing couple thus permitting adjustment for register without disturbing the feeding mechanism or creating permanent slack in the web.

In the form of the invention shown, I provide means operative upon opposite sides of the printing couple whereby slack in the web may be created upon one side thereof and be simultaneously taken up upon the other side thereof. This mechanism com-

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prises a support or supports 44 for the guide roller 42, slidably mounted in the side frames of the machine and acted upon by feed screws 45 to impart the desired reciprocatory movement thereto. Mounted between the guide rollers 40 and 41 is a vertically reciprocatory roller 46 mounted in a support or supports 47 acted upon by the feed screws 48. The feed screws 45 and 48 are of substantially the same pitch, so as to secure equality in the movement of the rollers 42 and 46. Carried by each of the screws 45 is a beveled gear 49 in mesh with a gear 50 carried by the shaft 51. The screw 48 is carried by, and rotatable with a shaft 52 which is operatively connected with the shaft 51 by means of the shaft 53 and the beveled gears 54 and 55 carried thereby, and the beveled gears 56 and 57 carried by the shafts 51 and 52 respectively. The various gears are so set that as the guide roller 42 is moved toward the printing couple the roller 46 will be simultaneously moved downwardly with the same quantity of movement; and as the roller 42 is moved away from said printing couple said roller 46 will be raised. Either or both of the shafts 51 and 52 are provided with hand wheels 59—60 by which they may be actuated.

The power transmission mechanism extending from the screws 45 to the screw 48 upon one side of the machine is connected to a similar mechanism on the opposite side of the machine so as to cause simultaneous uniform movement of both ends of the rollers in any desired manner. In the drawings, I have shown a chain and sprocket mechanism 58 extending from one gear 49 to the other gear 49 upon the other side of the machine.

The operation of the herein described machine is substantially as follows:

In starting a run of the press, the end of the web is drawn from the paper roll 37 and passed over the guide rollers 39, 40 and 41 and under the roller 46, thereafter being passed between the form cylinder 3 and impression cylinder or D-roll 4 and about the guide roller 42. From the roller 42, the web is passed between the feed rollers 10 and 11 and the clamping members 13 and 14, the latter of which may be separated manually to permit the passage of the paper. The end of the paper is then secured to the rewinding reel 15.

It will be observed that in order to permit the passage of the paper between the form cylinder and the impression cylinder or D-roll the latter must not be in engagement with a plate upon the frame.

Since the riser of the cam 25—26 is so set as to be operative to raise the feed roller 11 when the form cylinder is not in engagement with a plate, and since the riser of the cam 33—34 is set in a relation diametrically opposite to that of the riser upon the cam 25—26, said feed rollers 10 and 11 will be separated and said clamping members 13 and 14 will be in engagement with each other, when threading the paper through the machine.

When power is applied to the machine the form cylinder 3 and the impression cylinder or D-roll 4 will be rotated and the chain and sprocket mechanism 12 will rotate the feed-roller 10 and through the gears 20 and 21 the feed roller 11. At the same time the gear 31 carrying the cam 33—34 will be rotated through the idler pinion 32. When power is first applied to the press, the riser of the cam 25—26 will be engaged with the disk 24, and the disk 30 will be engaged with the fall of the cam 33—34. Hence there will be no feeding movement of the paper as the cam members 13 and 14 will prevent the friction drive 16 of the rewinding reel 15 exerting a pull upon the paper beyond said clamping members.

With the continued operation of the machine, however, the riser of the cam 25—26 will pass the disk 24 permitting the springs 22 to force the roller 11 downwardly to an extent to develop the requisite friction upon the paper to insure the feeding movement thereof.

Simultaneously with this movement of the roller 11, the elongated riser upon the cam 33—34 will engage the disk 30 and raise the clamping member 14, thus permitting the rewinding mechanisms to take up the slack resulting from the feeding movement of the rollers 10 and 11. The initiation of the feeding movement by the rollers 10 and 11 and the release of the clamping mechanism will occur substantially simultaneously with the initial engagement of the impression cylinder or D-roll with the plate, or other printing surface, upon the form carrier 3; and by reason of the fact that the peripheral velocity of the feed roller conforms to that of the form cylinder and the D-roll, the paper will be fed at the proper speed.

At that interval when the impression cylinder or D-roll passes from its engagement with the plate upon the form carrier, the riser upon the cam 25—26 will become operative upon the disk 24 to raise the feed roller 11 and make said rollers inoperative to cause a further feeding movement of the web. Simultaneously with the lifting of the roller 11 against the tension of the springs 22, the riser upon the cam 33—34 will become inoperative as to the disk 30 permitting the clamping member 14 to descend under the control of its springs 29, thus instantly arresting the feeding movement of the paper by the rewinding mechanism.

It will thus be observed that I secure with a continuously operating printing couple, an intermittent feed of a web in relation there-

to, thus permitting that dwell between impressions which is essential in some classes of printing, as from engraving, intaglio or undersurface plates, and permitting the impressions to be brought closely together upon a web with a resultant material saving of paper.

With a continued run of the press, the feeding rollers 10 and 11 will be actuated to make them operative and inoperative alternately, the operative interval corresponding with that interval when the impression cylinder or D-roll 4 is in operative engagement with a plate upon the form carrier 3; and the clamping mechanism will be actuated to make it inoperative and operative alternately, the inoperative interval coinciding with the operative interval of the feeding rollers and the operative interval corresponding with the inoperative interval of the said rollers.

Under the conditions above described, it will be observed that the length of the risers upon the cams 25—26, and 33—34 determines the duration of the feeding interval of the web, which must correspond with the size of the plate from which the impression is being made as to the length of said plate. Hence, if plates of different sizes are used upon the machine, to effect the maximum saving of paper, cams having risers of different lengths must be used, the length of said risers being determined by the size, or length, of the plate.

By using sectional cams as above described, having similar cam risers upon each section, I am enabled to adjust the length of said risers upon said cams so as to avoid the necessity for the substitution of cams when setting the machine for a run with plates of any particular size. For instance, if it is desired to run the machine with a plate smaller than that for which the machine is set at any time, the clamping bolts 28 and 36 are released and the section 26 is turned in either direction according to the position of the plate upon the form carrier, and the said section is reset by means of the said bolt in its adjusted position. This elongation of the risers upon said cam 25—26 will have the effect of prolonging the inoperative interval of the feeding rollers. Then the cam section 34 is turned in the same direction as that of the cam section 26 and to the same extent, thus shortening the riser upon the cam 33—34, without changing the position of the initial rise of the cam in a way to vary the relative initial operation of either cam. By varying the length of the risers the quantity of the feeding movement of the paper may be regulated.

It will be observed that as to time, the effect of the feeding rollers and of the cam mechanism are always reversed and that this reversal extends through all of the adjustments of the said cam, hence when the riser of the cam 25—26 is set for its shortest length, the riser of the cam 33—34 will be set for its greatest length, and vice versa.

When the clamping mechanism is inoperative, the member 13 acts merely as a guide roller for the web, but inasmuch as the gear 31 is loosely mounted upon the arbor of said roller, the rotation of said roller is entirely independent of that of said gear which is thus permitted to turn continuously with the feed roller 10. While the feeding roller 10 rotates continuously, it will have no operative effect in feeding the paper except when the roller 11 is in the operative relation thereto.

In order to adapt the machine for use in color work, I preferably provide the registering mechanism which I have described. In running a web through the machine, which web has already received one impression, it is necessary to have a succeeding imprint in register therewith. If it is found that as a result of loss of register, it is necessary to advance the web slightly, either of the hand wheels 59—60 are turned so as to rotate the screws 45—48 in a manner to raise the roller 46 and simultaneously thrust the roller 42 away from the impression cylinder or D-roll. The result of this operation will be the creation of slack between the D-roll and the roller 46, which slack will be taken up by the advance of the roller 42. If it be desired to withdraw the paper slightly either hand wheel 59—60 is turned in the opposite direction with the resultant creation of slack between the roller 42 and the D-roll, which slack will be simultaneously taken up by the roller 46 which will be forced downwardly simultaneously with the retraction of the roller 42. By connecting the mechanisms controlling the rollers 42 and the roller 46 by means whereby said rollers are simultaneously operated, and to the same extent, I am enabled to effect a movement of only that portion of the web adjacent to the D-roll and form cylinder. By limiting the length of the section of web acted upon by the registering mechanism, I am enabled to secure extreme nicety in the movement of the paper; and a movement which does not require any variances in the adjustment of any other part of the machine. Hence, this registering mechanism may be advantageously used in conjunction with a paper feed mechanism, and permits the construction of a machine embodying such a feed mechanism, wherein adjustment for securing register may be had without disturbing the relation of the feeding mechanism to the web, or requiring any change in the adjustments of said feed mechanism.

It is not my intention to limit the inven-

tion to the precise details of construction shown in the 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 printing machine embodying therein a printing couple including an intermittently operative impression cylinder, an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said web will remain stationary during the non-printing interval, a pair of friction members between which the web passes after leaving said paper feed mechanism, a rotatable cam adjacent one of said members, and a contact member carried by and movable with the other member adapted to coöperate with said cam to separate said members, when said feeding mechanism is operative whereby said web will be held against movement when said paper feed mechanism is inoperative.

2. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder, an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said web will remain stationary during the non-printing interval, means whereby the operative interval of said paper feed mechanism may be varied to permit the use of printing surfaces of different lengths, a pair of normally set friction members between which the web passes after leaving said paper feed mechanism, a rotatable cam adjacent one of said members consisting of a plurality of parallel sections each having a riser thereon, and means whereby said sections may be adjusted to vary the operative length of said risers, and a contact member carried by and movable with the other member adapted to coöperate with said cam to separate said members when said feeding mechanism is operative whereby said paper will be held against movement when said paper feed mechanism is inoperative.

3. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder and intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval, and said web will remain stationary during the non-printing interval, means whereby the operative interval of said paper feed mechanism may be varied to permit the use of printing surfaces of different lengths, a pair of friction members between which the web passes after leaving said paper feed mechanism, means whereby said friction members may be made inoperative during the operative interval of said paper feed mechanism, means whereby the inoperative interval of said friction members may be varied to accord with the variance in the operative interval of said paper feed mechanism, and registering means independent of, and capable of actuation during the operative interval of, said paper feed mechanism.

4. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder, an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said web will remain stationary during the non-printing interval, a pair of friction members between which the web passes after leaving said paper feed mechanism, a spring acting upon one of said friction members to normally project it toward the other, and intermittently operative means adapted to separate said members, when said feeding mechanism is operative whereby said web will be held against movement when said paper feed mechanism is inoperative.

5. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder, an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said web will remain stationary during the non-printing interval, a friction roller over which the web passes after leaving said paper feed mechanism, a reciprocatory non-rotary friction member coöperative therewith and intermittently operative means adapted to move said reciprocatory member away from said friction roller when said feeding mechanism is operative and said web will be held against movement when said paper feed mechanism is inoperative.

6. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder, an intermittently operative paper feed mechanism adapted to feed a continuous paper web in relation to said printing couple whereby the feeding movement of said web will continue during the impression interval and said web will remain stationary during the non-printing interval, a friction roller over which the web passes after leaving said paper fe

mechanism, a reciprocatory non-rotary friction member coöperating therewith a rotary cam adjacent said friction roller and a rotatable disk carried by and movable with said reciprocatory friction member whereby said friction member will be raised when said feeding mechanism is operative and said web will be held against movement when said paper feed mechanism is inoperative.

7. A printing machine embodying therein a printing couple including an intermittently operative impression cylinder, a pair of coöperating feed rollers adapted to receive a continuous paper web after it leaves said printing couple, intermeshing gears carried by said rollers respectively, means driving one of said gears in synchronism with said printing couple, a cam rotatable with one of said rollers, a coöperating contact rotatable with the other roller whereby said rollers will be separated during the inoperative interval of said impression cylinder, a friction roller over which said paper web passes after leaving said feed rollers, a reciprocatory friction member coöperating therewith, a gear driven in synchronism with the gears of said feed rollers, a cam carried by and rotatable with said last named gear and a contact coöperating with said last named cam carried by and movable with said reciprocatory friction member, said cams respectively being so set that when said feed rollers are separated, said friction roller and said friction member will be together and when said rollers are together said friction roller and said friction member will be separated.

8. A printing machine embodying therein a printing couple, a guide roller on one side thereof, a reciprocatory support therefor, a fixed guide roller upon the other side of said couple, a roller acting upon a continuous web of paper passing about said guide rollers, a reciprocatory support for said last named roller, feed screws acting upon said reciprocatory supports respectively and means for simultaneously rotating said screws whereby the rollers carried by said supports are simultaneously actuated to form slack on one side of said couple and take up said slack on the other side thereof.

9. A printing machine embodying therein a printing couple, a guide roller upon one side thereof, a reciprocatory support for said guide roller, a feed screw acting thereon, a bevel gear carried by said feed screw, a pair of guide rollers upon the other side of said couple, a roller operative upon a continuous paper web passing over said guide rollers intermediate the rollers of said pair, a reciprocatory support for said last named roller, a shaft carrying a feed screw acting upon said support, a shaft carrying a bevel gear coöperating with the gear upon said first named feed screw, means whereby motion is transmitted from one of said shafts to the other and means whereby one of said shafts may be manually turned.

10. A printing machine embodying therein a printing couple, a guide roller on one side thereof, a reciprocatory support therefor, feed screws adjacent the opposite ends of said support, each of said feed screws carrying a bevel gear, a pair of guide rollers upon the other side of said couple, a roller operative upon a continuous paper web passing over said guide rollers intermediate the rollers of said pair, a vertically reciprocatory support therefor, vertical shafts carrying feed screws operative upon said last named support adjacent the opposite ends thereof, vertical shafts carrying bevel gears in mesh with the bevel gears carried by said first named feed screws, connections respectively between said shaft carrying the bevel gear and said shaft carrying the feed screws, adjacent the corresponding ends of said supports whereby motion is transmitted from one shaft to the other, means carried by one of said shafts whereby it may be manually turned and operative connections between the means for actuating said feed screws at one end of said guide roller and means actuating the screws at the other end thereof.

In witness whereof I hereunto affix my signature in the presence of two subscribing witnesses this 22nd day of October, 1914.

AMOS H. SMITH.

Witnesses:
T. T. WENTWORTH,
JUDITH PARDEE.