No. 748,134. PATENTED DEC. 29, 1903.

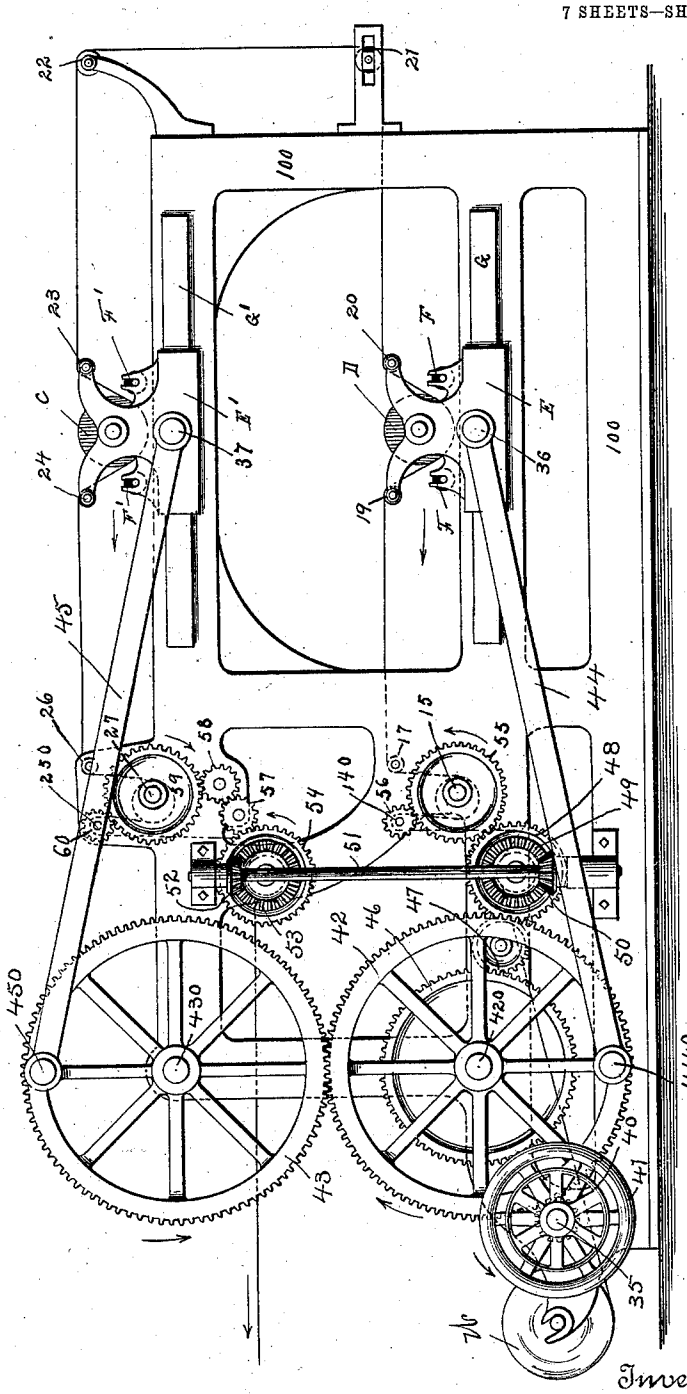
H. A. W. WOOD.

PRINTING MECHANISM.

APPLICATION FILED NOV. 10, 1894. RENEWED MAY 8, 1903.

NO MODEL. 7 SHEETS—SHEET 1.

Fig. 1.



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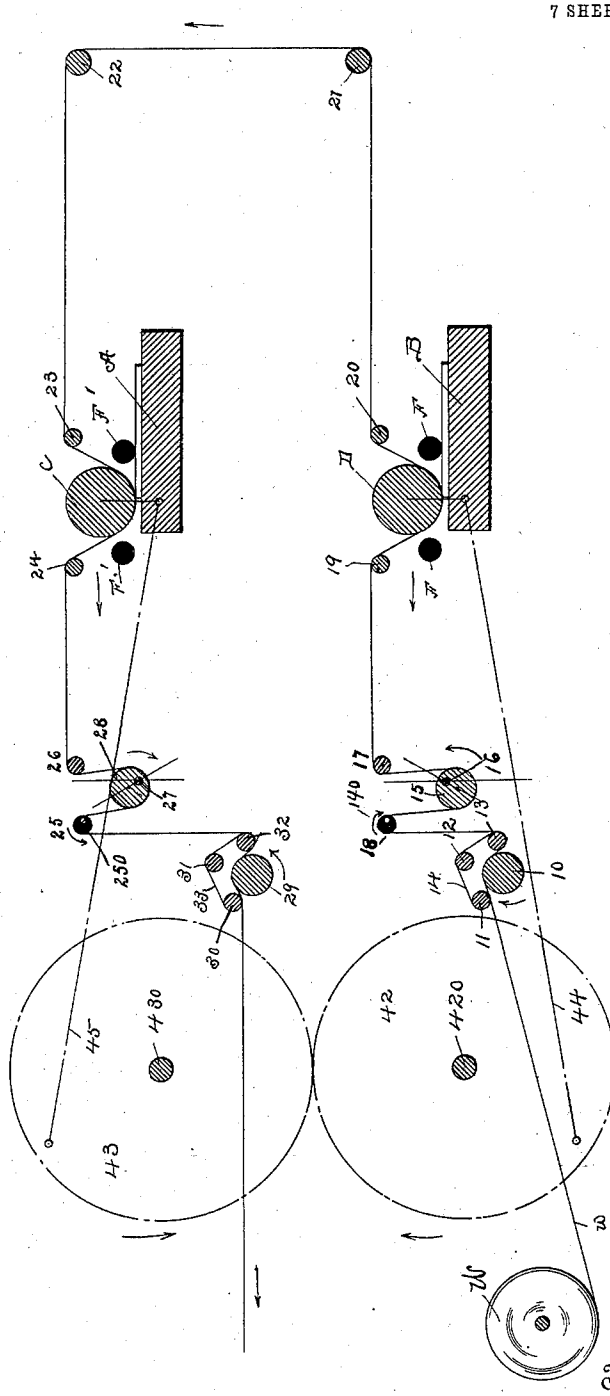
NO MODEL. 7 SHEETS—SHEET 2.

Fig. 2.



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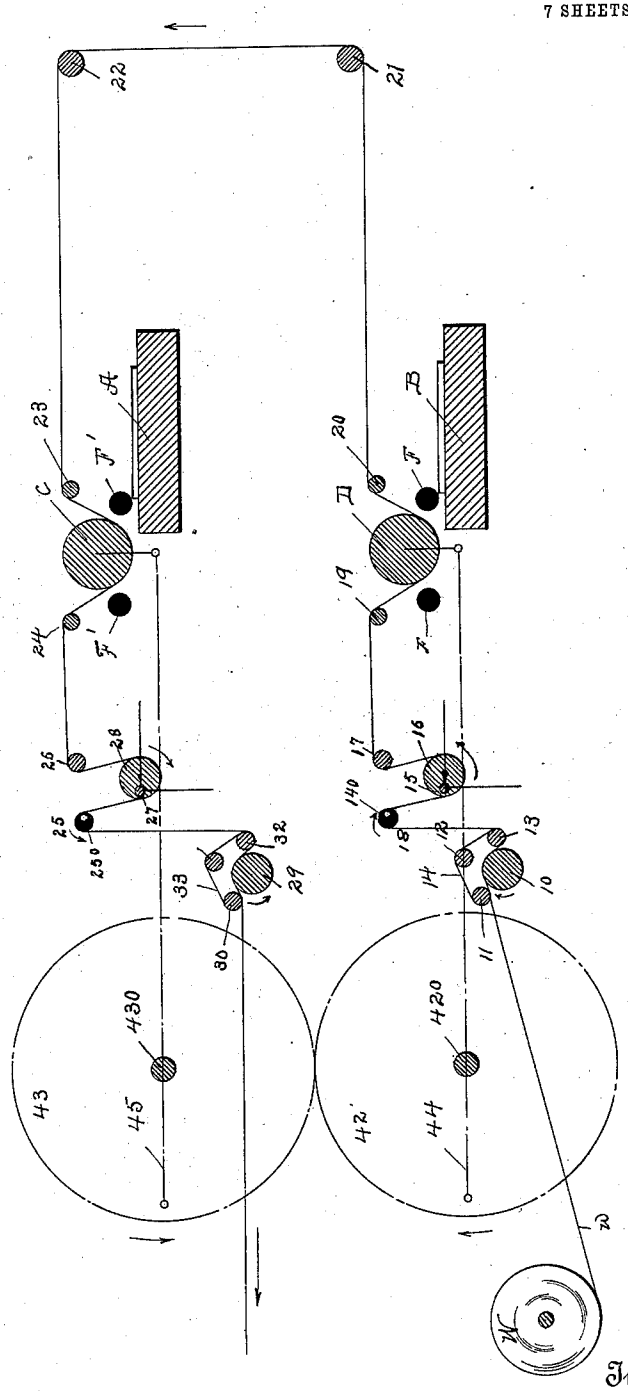
NO MODEL. 7 SHEETS—SHEET 3.

Fig. 3.



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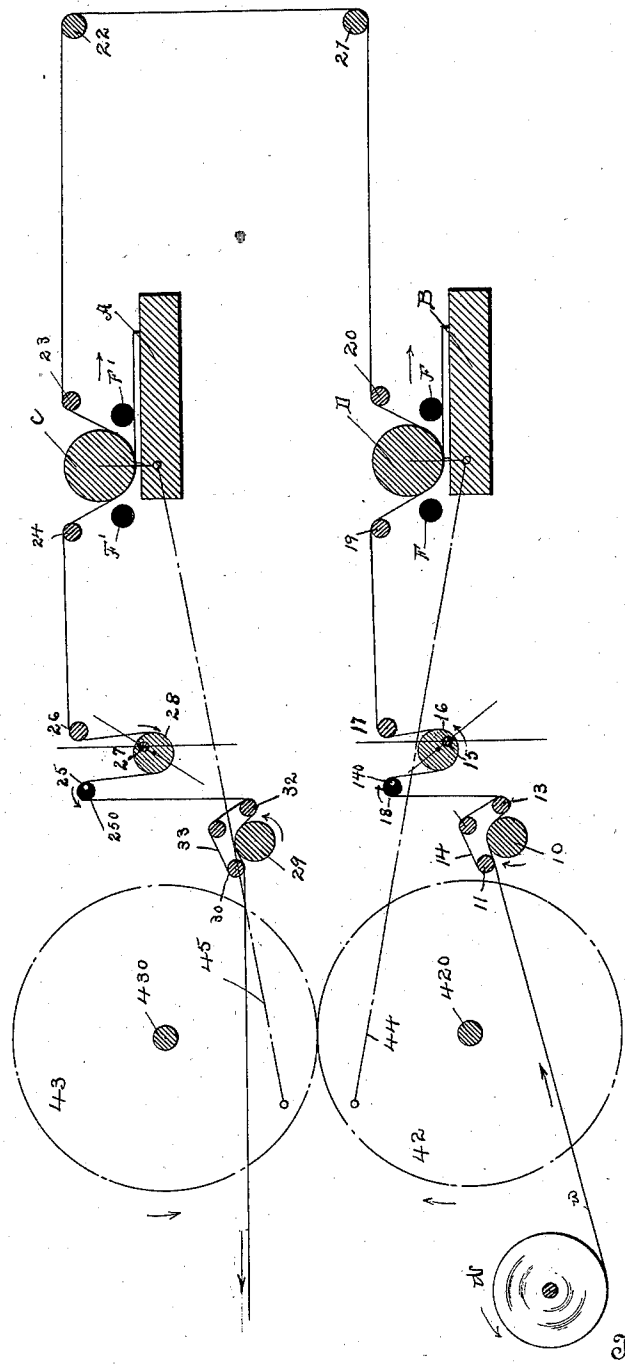
NO MODEL. 7 SHEETS—SHEET 4.

Fig. 4.



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NO MODEL. 7 SHEETS—SHEET 5.

Fig. 5.

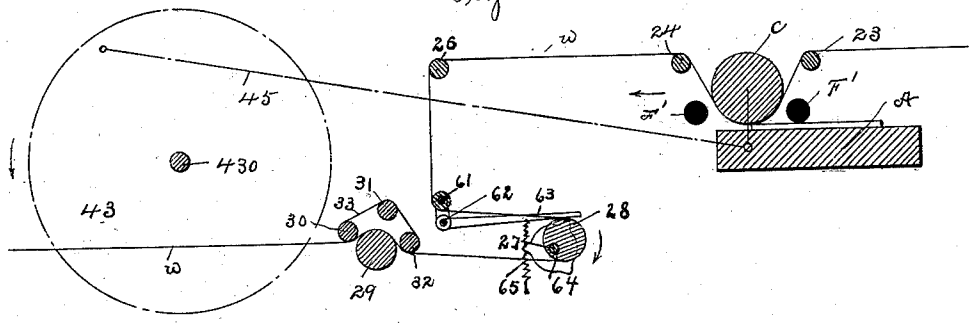
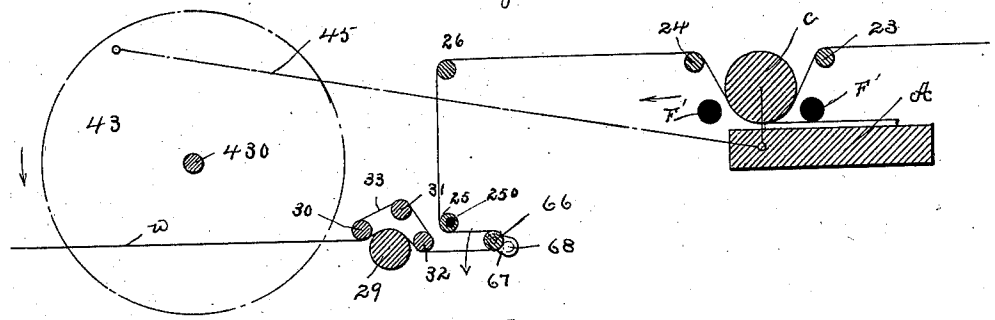


Fig. 6.



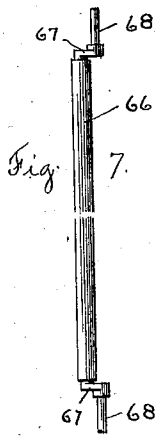


Fig. 7.

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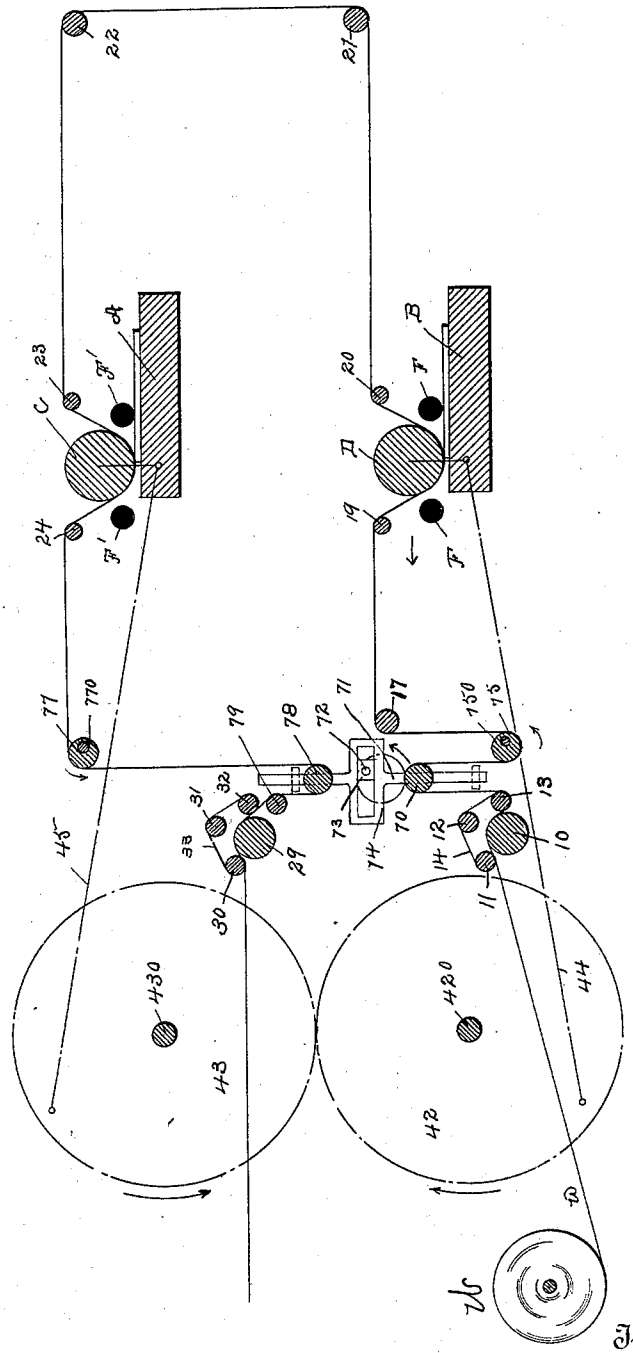
NO MODEL. 7 SHEETS—SHEET 6.

Fig. 8.



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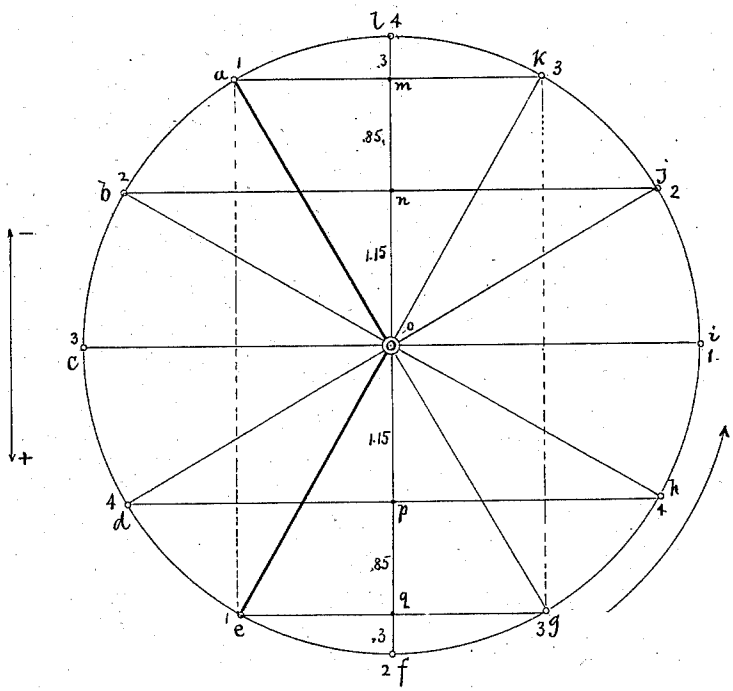
NO MODEL. 7 SHEETS—SHEET 7.

Fig. 9.



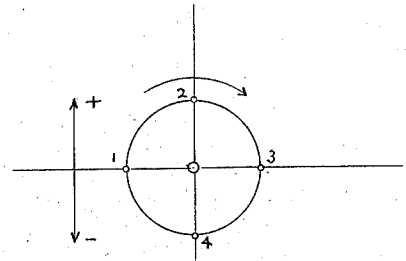


Fig. 10.

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No. 748,134. Patented December 29, 1903.

UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO DETROIT TRUST CO., TRUSTEE, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

PRINTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 748,134, dated December 29, 1903.

Application filed November 10, 1894. Renewed May 8, 1903. Serial No. 156,279. (No model.)

To all whom it may concern.

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Printing Mechanism, of which the following is a specification.

The aim of this invention is provide a new web-manipulating mechanism and to improve the construction of traveling-cylinder web-presses and other machines requiring an intermittent manipulation of the web.

To this end the invention consists of the parts and arrangements of parts described and claimed in this specification.

I have shown in the accompanying drawings certain applications of my invention, referring to which and in detail—

Figure 1 is a side elevation of a traveling-cylinder web-perfecting press with my inventions applied thereto. Figs. 2, 3, and 4 are diagrammatic sectional elevations illustrating the positions assumed by the various parts in operation. Fig. 5 illustrates a modification of the web-manipulating mechanism. Figs. 6 and 7 illustrate a further modification of the same. Fig. 8 is a view similar to Fig. 2, illustrating a modified form of web-manipulating device applied thereto; and Figs. 9 and 10 are diagrams which I will refer to for the purpose of explaining the action of my web-manipulating device.

The first part of my invention, that relating to the web-manipulating device, consists of an improved web-manipulating mechanism which is adapted to impart an intermittent movement to the web or a section of the same. This web-manipulating mechanism may be used in connection with any device or press in which such a movement of the web is desired—as, for example, in platen-presses, traveling-cylinder presses, traveling-bed presses, or rotary presses in which the printing cylinder or cylinders print only for a part of a revolution and in which the web is withheld during the non-printing period—and while I have shown the application of the same to a traveling-cylinder web-press I do not wish to be understood as limited to any application of my improved web-manipulating mechanism.

The purpose of my web-manipulating mechanism is to provide a device which while imparting an intermittent movement to the web or a portion of the web is essentially rotary in action and which is very simple and easy of manufacture.

In my application for patent, Serial No. 455,614, filed December 19, 1892, Patent No. 618,490, granted January 31, 1899, I showed and claimed a device which I termed a "rotary looper." This device consisted of a rotary cam-shaped cylinder which by its rotation imparted an intermittent movement to the web.

The essential web-manipulating mechanism of the device described and claimed in this specification consists of a rotary looper or a looper controlled by a rotary mechanism for imparting an intermittent movement to the web, in combination with a device I term a "corrector."

A rotary eccentric cylinder or its equivalent I have found will impart very nearly the proper conditions of rest and movement to the web, and I have found that by using with such a device a small auxiliary mechanism for correcting the error I can produce a very simple and efficient web-manipulating mechanism—that is, I may use a rotary cylinder for both the looper and corrector and get the desired result simply by setting them eccentrically or by using equivalent devices. This will make a device which is very efficient, as it is rotary in action, and also one which is very easy of manufacture, as no cam-surfaces have to be worked out and developed.

The second object of my invention is to improve the construction of traveling-cylinder web-presses, so that the jar and vibration of one cylinder will not effect the action of the other.

Referring now to the first four and seventh sheets of drawings, I will describe a traveling-cylinder web-press constructed after my invention.

100 represents a suitable framing for the machine, in which framing are arranged the two stationary beds A and B, (shown one over the other;) but of course any arrangement may be used. Coacting with the first bed B is a traveling impression-cylinder D, and co-

acting with the second bed A is a second traveling impression-cylinder C. The impression-cylinder D is mounted in suitable carriers or carriages E, which are arranged or mounted on gibs or guides G. The impression-cylinder C is arranged in similar carriers E′, mounted on the guides or gibs G′. The carriers E carry the form-rollers F F and the carriers E′ the form-rollers F′ F′, which are arranged to properly ink the forms placed on the two stationary beds and with which suitable inking apparatus is arranged, as well understood in this art and which it is not necessary to show and describe in this application. I provide a mechanism which will move the impression-cylinders simultaneously in the same direction over the stationary beds.

It will be seen that the two impression-cylinders are mounted entirely independently of each other, so that the jar, vibration, or give of one cylinder will not be imparted to the other.

The usual way of mounting the two impression-cylinders in a press of this class is to mount them in a single carriage; but with this arrangement the jar and vibration of one cylinder will act on the other—that is, for example, if the first impression-cylinder should be arranged to print from heavy cuts or plates and the second cylinder from nice or fine matter it will be found that the jar or vibration of the first cylinder will be transmitted through the carriage to the second cylinder. By my improved mechanism, which consists of two independent carriages moving synchronously, which carriages are not rigidly connected together, being only connected to move together by their driving mechanisms, I get all the advantages due to a single carriage and due to a movement of the impression-cylinders in the same direction, and I also obviate the said difficulty.

The driving mechanism for the cylinders may be arranged as follows: A shaft 35, having suitable pulleys, is arranged so that power can be imparted to the machine, and from this shaft by means of a suitable pinion crank-wheels 42 on each side of the machine are driven. The crank-wheels 42 mesh with and drive similar crank-wheels 43, arranged above the same, as shown. The crank-wheels 42 carry suitable crank-pins 440, which are connected by pitmen 44 to wrist-pins 36 on the carriages E. The crank-wheels 43 carry suitable crank-pins 450, which are connected by pitmen 45 to wrist-pins 37, carried by the carriages E′. The crank-wheels 42 are arranged on a crank-shaft 420 and the crank-wheels 43 upon a crank-shaft 430. As the crank-wheels turn oppositely the pitmen are oppositely arranged, as shown, so that the impression-cylinders will move together either forward or backward. By this mechanism the cylinders will be reciprocated backward and forward over the beds synchronously and the jar or vibration of one will not be imparted to the other. The cylinders have the usual gears and the beds the usual racks, so that the cylinders will rotate during their reciprocating movement to properly register with the forms, as in the ordinary constructions of traveling-cylinder presses.

The path of the web through the press is as follows: The web w is continuously unwound from a web-roll W (which may have any of the usual friction devices) by means of cylinder 10 and tapes 14, which run around tape pulleys or rollers 11, 12, and 13. From the roll 13 the web passes up over a small eccentric cylinder 18, mounted upon a shaft 140, which cylinder I term a "corrector," around an eccentric cylinder 16, mounted upon shaft 15, which cylinder I term the "feeding-in looper," to a stationary guide or roll 17. From this point the web is led around the guide 19, the impression-cylinder D, and the guide 20, carried by the carriers E, around the stationary guide-rollers 21 and 22, one of which may be adjustable for the purpose of register, around the guide-roller 23, the impression-cylinder C, and guide-roller 24, carried by the carriers E′, to a stationary guide or roll 26. This path for the web will direct the same through the press, so that the web will be perfected. From the stationary guide or roll 26 the web is led around an eccentric cylinder 28, mounted upon a shaft 27, which cylinder I term the "feeding-out looper." From this device the web is led around a small eccentric cylinder 25, which is mounted upon a shaft 250, and which cylinder I also term a "corrector." From this point the web is continuously delivered to a folding-machine or any suitable delivery mechanism, including a cutting mechanism, by means of cylinder 29 and coacting tapes 33, which run around suitable tape-pulleys 30, 31, and 32.

As the press thus described will make an imprint on both the forward and backward movements of the impression-cylinders, the loopers are turned twice for every rotation of the crank-shafts, and preferably the correctors are turned a larger number of revolutions than the loopers for a purpose hereinafter described, in the particular instance shown three times to the loopers once. One suitable form of gearing that may be used to properly rotate these parts is as follows: On the crank-shaft 420 I arrange a gear 46, which by means of intermediate 47 drives a gear 48, arranged on the shaft of the feeding-in cylinder 10. The relation between the gears 46 and 48 is two to one, so that the cylinder 10 turns twice for every revolution of the crank-shaft. Meshing with gear 48 is a gear 55 of the same size, secured on the shaft 15 of the feeding-in looper, whereby the feeding-in looper will also make two turns for each cycle. Mounted on the shaft 140 is a pinion 56, which meshes with the gear 55, and the pinion 56 is made one-third the size of gear 55, so that the corrector 18 will make three revolutions to each revolution of the feeding-in roller. Also turning

with the gear 48 I arrange a bevel-gear 49, which by means of bevel-pinion 50, vertical shaft 51, bevel-pinion 52, and bevel-gear 53 imparts the proper motion to the shaft of the cylinder 29. Also arranged on the shaft of the cylinder 29 is a gear 54, which by means of suitable intermediates 57 and 58 and gear 59, arranged on the shaft 27 of the feeding-out looper, drives the feeding-out cylinder 29 and the feeding-out looper 28 turn for turn with the feeding-in cylinder 10. Arranged on the shaft 250 I provide a pinion 60, which meshes with gear 59, the relation being such that the corrector 25 will make three turns for every turn of the feeding-out looper 28. Suppose now that with a press arranged as described, the parts are timed as follows: First, the feed or movement of the web in the press between the rolls 17 and 26 will take place during two-sixths of a movement of the crank-shafts, the impression-cylinders being thrown off during this period; second, the still period of the web or impression period will occupy one-sixth of a revolution of the crank-shafts, and, third, the length of the sheet which it is desired to obtain is twenty-four inches.

Referring to said first four sheets and to the seventh sheet of the drawings, the cylinders 10, 16, 28, and 29 would be made substantially twenty-four inches in circumference, and the correctors would be made substantially one-third of this. As the feed of the web through the press occupies two-sixths of a revolution of the crank-shaft, or two-thirds of a revolution of the feeding-in cylinder 10, two-thirds of the web will be fed through the press by the cylinders 10 and 29, and the other third must be fed through by the action of the loopers. During the impression period the feeding-in cylinder 10 will pay in eight inches of web, which must be taken care of by the feeding-in looper, and the feeding-out cylinder will pay out eight inches of web, which must be supplied by the feeding-out looper 28. The action of the feeding-in and feeding-out loopers is substantially the same, except that they act oppositely—that is, the looper 16 takes up as the looper 28 pays out and the looper 28 pays out as the looper 16 takes up.

I will describe at length the operation of the feeding-in looper 16, which explanation, with the above understanding, will also apply to the feeding-out looper.

Referring now to Fig. 9, I will describe the action of the feeding-in looper 16. In Fig. 9 I have divided a circle into twelve different divisions, or into divisions of thirty degrees each, this circle referring to one revolution of the looper. Suppose now we consider first that we wish to hold the web stationary in the press for four of these periods, or from the point *a* to *e*, or for one revolution of the looper, or one-sixth revolution of the crank-shafts. During each thirty degrees of revolution of the cylinder 10 two inches of web will be paid into the press, or during four of these periods eight inches of web will be paid into the press. In order to hold the web stationary, the looper 16 must take up this amount of web. As the looper is geared to make turn for turn with the cylinder 10, the resultant movement of the loop controlled by the looper 16 must be one-half of eight inches, or four inches, as there are two legs to the loop. Suppose now that we neglect the angular error of the looper due to its lateral throw and also the error due to the slightly-different peripheral wrap of the web on the looper. We may consider the eccentric point moved in a circle four times thirty degrees, or one hundred and twenty degrees, or from the point *a* to *e* of Fig. 9. The resultant movement—that is, the distance between *a* and *e*, or the distance *mq* of the diagram, Fig. 9—must therefore be four inches. Therefore the radius or the eccentricity of the looper, or *oa*, which we may call *r*, equals two seconds thirty degrees, or 2.3 inches. Therefore by making the eccentric radius of the looper 2.3 inches in one hundred and twenty degrees movement we can impart to the loop a movement of four inches, or take up eight inches of web; but this movement will not be an exactly correct movement to accomplish an even take-up of the web—that is, the resultant movement of the eccentric looper will increase as the eccentric point moves from *a* to *c* and will decrease as the eccentric point moves from *c* to *e*. Hence arises the necessity of the device I have termed the "corrector." During the first thirty degrees movement the eccentric point will move from *a* to *b* and will give a resultant movement of the loop equal to *mn*. *no* obviously equals $\frac{r}{2}$. Therefore *mn* equals *mo*, or two minus *no*, or $\frac{r}{2}$, or .85, and *no* equals 1.15. Therefore in the movement from *a* to *b* there is not enough movement imparted to the loop and in the movement from *b* to *c* there is too much movement imparted to the loop, and, further, between the points *c* and *d* too much movement is imparted to the loop and between the points *d* and *e* not enough movement is imparted to the loop. Now the corrector device, as before described, is geared to turn three times to the eccentric looper's once—that is, between the points *a* and *e*, or one-third of a revolution of the looper, the corrector will make one complete revolution. Suppose now that we make the radius of our corrector .15, or the error at the point *b*, and suppose we set the corrector so that the same will be taking up its web at its maximum speed when the eccentric of the looper is at the point *a*. In other words, referring to the diagram of Fig. 10, suppose that the eccentric point of our corrector is in position 1. Now as the looper turns thirty degrees or from *a* to *b*, the corrector will turn ninety degrees or from 1 to

2, and hence will move its loop the eccentric radius of the same or .15, the error of the looper. Hence during the period from *a* to *b* the combined movement of the looper and corrector will be one inch and two inches of web will be taken up. The looper from *b* to *c* moves 1.15, but the corrector during this period moves from position 2 to 3, hence gives out .15, whereby the difference of movement between the looper and corrector is one. Between the points *c* and *d* the looper will move its loop 1.15, but the corrector will give out .15, so that the movement of the loops will be one. Between the points *d* and *e* the main looper will take up .85 and the corrector moving from 4 to 1 will take up .15 of their respective loops. Hence the aggregate movement will be one. As the corrector makes one complete turn while the looper turns from the points *a* to *e*, the corrector will have no effect on the entire amount of web taken up by the main looper, the function of the corrector being to correct the error due to the angular error of rotation of the looper. Hence while the main looper turns one hundred and twenty degrees or from *a* to *e* eight inches of web will be accurately and positively taken up and the web beyond the point 17 will be held stationary. The feed of the web will take place while the eccentric looper moves from position *e* to *a* or during four-sixths of a revolution of the feeding-in looper. From the point *e* to *f* the main looper takes up .3 of an inch of its loop, and the corrector moving from points 1 to 2 takes up .15, or the combined take-up is .45, or the take-up of the web is .9 of an inch; but during this period two inches of web has been fed in by the roll 10. Hence the movement of the web in the press will be two inches minus .9 of an inch or 1.1 inches. From the point *f* to *e* the feeding-looper will pay out or move .3 of an inch and the corrector turning from position 2 to 3 will pay out .15 of an inch, or the combined pay out of both will be .45 movement of the loops or .9 of an inch movement of the web, which added to the two inches fed in by the cylinder 10 will give 2.9 inches movement. It will be seen that the movement of the web in the period while the feeding-looper turns from the points *e* to *g* commences at zero and gradually increases to full speed—that is, instead of there being a sudden pull on the web the movement of the web will be gradually accelerated and brought to its maximum in sixty degrees movement of the feeding-in looper. From the points *g* to *k* the feed of the web will be a constant—that is, there will be a two-inch movement imparted to the web during each thirty degrees, and this movement will be uniform by the inverse reasoning which was applied between the points *a* and *e*, or during this one hundred and twenty degrees eight inches of web will be fed in by the looper and eight inches of web will be fed in by the cylinder 10, or a total feed of sixteen inches will take place at a constant speed. From the points *k* to *l* the main loop will give out .3 of an inch of its loop or .6 of an inch of its web, and the corrector turning from the points 3 to 4 will let out .15 of its loop or .9 of an inch of web will be let out, which added to the two inches of web paid out by the feeding-in cylinder 10 will make a movement during this period of 2.9 inches. From the point *l* to the point *a* the feeding-in looper will take up .6 of an inch of web, and the corrector turning from the point 4 to 1 will take up .3 of an inch of web, which subtracted from the two inches paid in will give a movement of the web in the press of 1.1 inches. Therefore the total movement of the web from the point *e* to the point *a* will be 1.1 plus 2.9 inches plus sixteen inches plus 2.9 inches plus 1.1 inches or twenty-four inches. It further will be seen that the movement of the web between the points *k* and *a* will be gradually decreasing—that is, the movement of the web will be gradually stopped in sixty degrees movement of the feeding-in looper. Therefore the feed movement of the web will gradually commence, will be a constant for the principal portion of its movement, and will be gradually decreased. This is a very advantageous movement for the web, as no sudden strains are placed upon the same.

The action of the feeding-out looper and its corrector is the opposite of the feeding-in looper and its corrector before described and will properly pull the web through the press and deliver the same continuously.

The angular error before referred to—that is, the error due to the lateral throw of the loops by the loopers—may be easily corrected by making the correctors slightly larger in eccentricity and by giving the correctors a very slight lead—that is, the angular error is greatest when the looper is approximately at the point *c*, and when the looper is at this point the corrector is at the point 3 and giving out web. Hence by making the radius of the corrector slightly larger this error can be remedied. This angular error obviously depends upon the length of the legs of the loop.

As before stated, as the correctors make one complete turn for each one hundred and twenty degrees movement of the loopers the correctors will have no effect on the ultimate feed or movements of the web in the press, the function of the correctors being to transform the eccentric movements of the looper into practically a cam-action.

I contemplate making the eccentricity of the loopers and correctors adjustable, if desired, and also counterbalancing these parts so that the rotary action of the same will be smooth. The preferable arrangement is to place a corrector before the feeding-in looper and after the feeding-out looper, so that the condition of the web beyond the feeding-in looper to the feeding-out looper will be correct. As the correctors and the loopers turn

substantially in harmony with the web, there will be practically no slip of the web on the same, and a very even and exact movement will be imparted to the web, for I make the correctors one-third the diameter of the loopers and the loopers preferably about the size of the cylinders 10 and 29, and with this proportion there will be practically no slip of the web on either the correctors or loopers, a most advantageous result.

In Fig. 2 the press is shown with the feed as just commencing or with the eccentric point at *e* of the diagram Fig. 9. In Fig. 3 half the feed has taken place or the eccentric point of the feeding-in looper is at the point *i*, and in Fig. 4 the entire feed has taken place or the eccentric point is at *a*.

This web-manipulating mechanism may be applied, as before explained, to any variety of press in which it is desired to obtain an intermittent movement of a portion of the web.

The figures and proportions before referred to are merely illustrative, and of course the proportions and figures will be changed to suit the exigencies of the location to which my web-manipulating mechanism may be applied.

The correctors may be made to turn in other relations to the loopers—for example, if we determine that the loopers shall feed during one hundred and eighty degrees and hold the web stationary during one hundred and eighty degrees we would make our correctors turn twice for each revolution of the loopers.

In Fig. 5 I have shown a modification of corrector in connection with the feeding-out looper. In this device the web after leaving the last impression-cylinder passes around a guide 26, then around a corrector 61. This corrector 61 is journaled in short arms, which are mounted on a shaft 62, and this shaft is given a slight oscillating movement by means of an arm 63, which bears upon a cam 64, placed upon the shaft 29 of the feeding-out looper, the arm being kept against the cam by means of spring 65. The cam 64 is given three high points, so that the proper movements will be imparted to the corrector.

In Fig. 6 I have shown a modification of looper. In this device I have used a corrector such as is shown in the first four sheets of drawings, and I have placed the same to act on the web just after the same leaves the roll 26. The looper in this device consists of a roll 66, which is mounted in small crank-arms 67, which are carried by studs 68, so that the rotary movement of the shaft 66 will take up and pay out the loop between the corrector 25 and the roll 32.

In Fig. 8 I have shown another modification of loopers. In this device the web after leaving the roll 13 passes around the looper 70, which is carried by yokes 74, which yokes 74 are actuated by crank-pins and blocks 72 and 73, arranged on revolving crank arms or disks, and from the looper 70 the web is led around the corrector 750, mounted on a shaft 75, which corrector is substantially the same as shown in the first four sheets of drawings. From the last impression-cylinder the web is led around another corrector 77, mounted on a shaft 770, and then is led around a looper 78, also carried by the yokes 74, then over roll 79 to the feeding-out device. As the loopers 70 and 78 of this device are actuated by a crank, they impart a movement to the loops which is substantially that imparted by the eccentric loopers before described, and the operation of this device is substantially the same as that previously described, except that there is no lateral angular error. The correctors of this device will transform the movement of the web imparted by the crank-actuated loopers into the proper action.

The advantages of my device are obvious, as it is well known that a device which is essentially rotary in action possesses great speed as compared with other devices.

I am aware that many other modifications may be made in this mechanism, the essential feature of which is employing substantially a rotary or crank-actuated looper and correcting or transforming the movement of the web therefrom into the proper movement.

I do not claim in this application the broad idea of using two independent sets of carriers for the impression-cylinders and reciprocating the same independently, as that is claimed in my said Patent No. 618,490, dated January 31, 1899, previously referred to. The claims in this application for patent, which are directed toward the features of the independent carriers, are limited to reciprocating the two sets of carriers, so that both will move forward and both backward synchronously. Therefore I do not wish to be limited to the details and arrangements which I have described; but

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a looper and a corrector or correcting device.

2. The combination of a looper imparting a varying movement to its loop, and a corrector or correcting device.

3. In a web-manipulating mechanism, the combination of a rotary looper and a corrector or correcting device.

4. In a web-manipulating mechanism, the combination of a rotary looper and a rotary corrector.

5. In a web-manipulating mechanism, the combination of a rotary eccentric looper and a corrector.

6. In a web-manipulating mechanism, the combination of a rotary eccentric looper and a rotary eccentric corrector.

7. In a web-manipulating mechanism, the combination of a looper imparting a variable movement to its loop, and a rotary corrector turning a number of times for each complete movement of the looper.

8. In a web-manipulating mechanism, the combination of a rotary looper and a rotary corrector making a number of rotations for each rotation of the looper.

9. In a web-manipulating mechanism, the combination of a looper and a corrector acting three times to every action of the looper.

10. In a web-manipulating mechanism, the combination of a rotary looper and a rotary corrector turning three times to every turn of the looper.

11. In a web-manipulating mechanism, the combination of a rotary eccentric looper and a rotary eccentric corrector turning a number of revolutions to every revolution of the looper, said looper being said number of times the size of the corrector.

12. In a web-manipulating mechanism, the combination of a rotary eccentric looper and a rotary eccentric corrector making three turns for every turn of the looper, and one-third the size of said looper.

13. In a web-manipulating mechanism, the combination of means for continuously moving the web, a looper imparting a varying movement to a loop of said web, and a corrector.

14. In a web-manipulating mechanism, the combination of means for continuously moving said web, a looper imparting a varying movement to a loop of said web, and a corrector arranged between said means and said looper.

15. In a web-manipulating mechanism, the combination of means for continuously moving the web, a rotary looper and a corrector, the looper and a corrector turning so that their peripheries travel with the web.

16. In a web-manipulating mechanism, the combination of means for continuously moving the web, as a rotating cylinder or drum and coacting tapes, a rotary looper and a corrector, the looper making turn for turn with said drum.

17. In a web-manipulating mechanism, the combination of means for continuously moving the web, as a rotating drum and coacting tapes, a rotary looper and a corrector, said looper making turn for turn with said drum, and being of the same size as said drum.

18. In a web-manipulating mechanism, means for continuously feeding the web in and out, loopers for imparting varying movements to loops of the web, and correctors for the loopers.

19. In a web-manipulating mechanism, means for continuously feeding the web in and out, loopers and rotary correctors.

20. In a web-manipulating mechanism, the combination of means for continuously feeding the web in and out, rotary loopers consisting of eccentrically-mounted cylinders, and correctors for the loopers.

21. In a web-manipulating mechanism, the combination of means for continuously feeding the web in and out, rotary loopers and correctors, each consisting of an eccentrically-mounted cylinder.

22. In a web-manipulating mechanism, the combination of means for continuously feeding the web in, a corrector, a feeding-in looper, a feeding-out looper, a corrector, and means for continuously feeding the web out, arranged in the path of the web in the order specified.

23. In a web-manipulating mechanism, the combination of means for continuously feeding the web in and out, rotary loopers and rotary correctors arranged to bear on and travel with the web.

24. In a web-manipulating mechanism, the combination of means for feeding the web in and out, and rotary loopers and correctors having substantially a peripheral speed equal to the movement of the web.

25. In a web-manipulating mechanism, the combination of means for feeding the web in and out consisting of rotary cylinders and tapes, and rotary eccentric loopers making turn for turn with the feeding-cylinders and of substantially the same size.

26. The combination in a traveling-cylinder web-printing press of two stationary form-beds, a traveling impression-cylinder coacting with each form-bed, carriers for each of said impression-cylinders, a driving mechanism for each of said sets of carriers arranged to reciprocate the same, so that both will move forward and both backward synchronously, said sets of carriers being independently arranged and connected to move together only by their driving mechanisms, guides for the web, and a web-manipulating device.

27. The combination in a traveling-cylinder web-printing press of the framing, two stationary form-beds arranged in said framing, two sets of gibs or guideways on said framing, two sets of carriers mounted on said guideways, an impression-cylinder carried by each of said sets of carriers, means for reciprocating the carriers so that the same will both move forward and both backward synchronously, said sets of carriers being independently arranged and connected only through the reciprocating mechanism, guides for the web, and a web-shifting device.

28. The combination in a traveling-cylinder web-press of the framing, two stationary type-beds arranged in said framing one over the other, two sets of gibs or guideways on said framing parallel with said bed, two sets of carriers mounted on said gibs, an impression-cylinder mounted in each of said carriers, means for reciprocating the carriers so that both the cylinders will move both forward and both backward synchronously, said sets of carriers being independently arranged and connected only through the reciprocating mechanism, guides for the web, and a web-shifting device.

29. The combination in a traveling-cylin-

der web-press of the stationary form-beds B and A, the traveling impression-cylinders D and C coacting therewith and printing both forward and backward, carriers E in which the cylinder D is mounted, carriers E′ in which the cylinder C is mounted, said carriers E and E′ being independent of each other, and connected only through the driving mechanism, intermeshing crank-wheels 42 and 43, pitmen 44 and 45 connected therefrom to said carriers so as to reciprocate both carriers forward and both backward synchronously, guides for the web, and a web-shifting device.

30. The combination in a traveling-cylinder web-printing press of two horizontally-arranged stationary form-beds, a traveling impression-cylinder for each form-bed, two independently-arranged sets of carriers for said impression-cylinders, a driving mechanism for each of said sets of carriers arranged to positively reciprocate said carriers, so that both will move forward and both backward synchronously, whereby said carriers are independently arranged, and are connected to move together only through the driving mechanisms, guides for the web, and a web-manipulating device.

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

H. A. WISE WOOD.

Witnesses:
WM. J. DALY,
JAS. H. CRAFT.