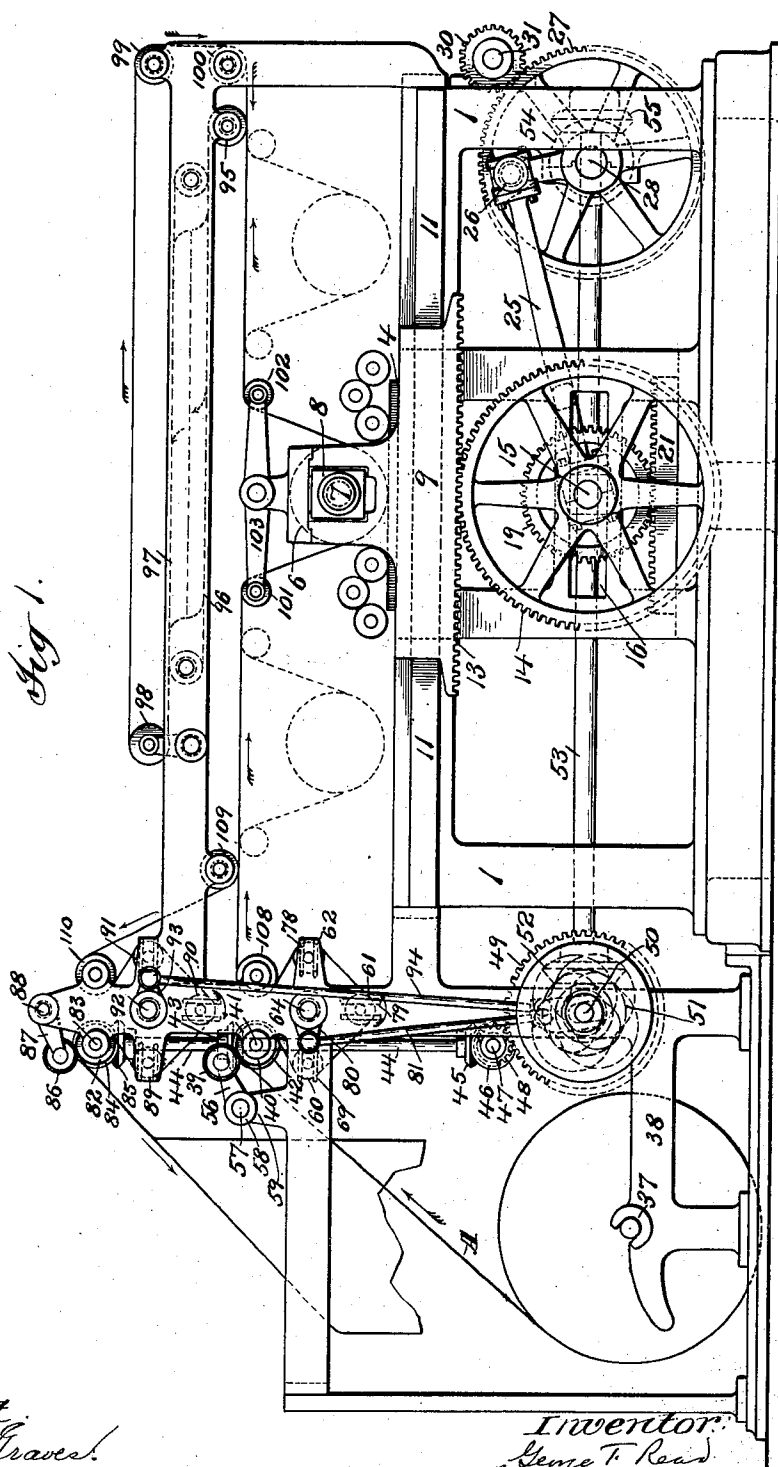


G. F. READ.
PRINTING MACHINE.

APPLICATION FILED MAR. 21, 1900.

NO MODEL.

6 SHEETS—SHEET 1.



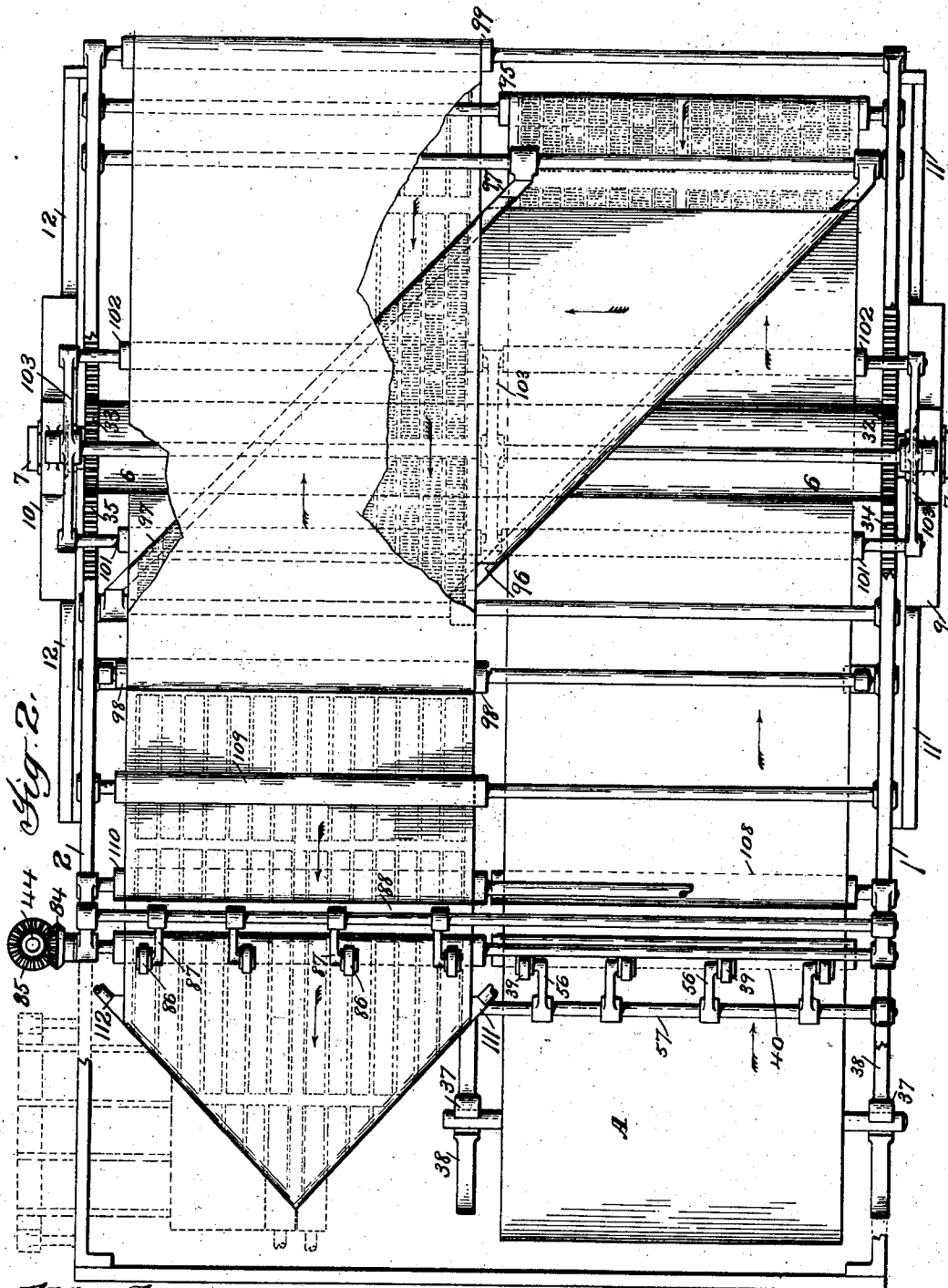
Attest.
J. A. Graves.
T. F. Schae

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G. F. READ.
PRINTING MACHINE.
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NO MODEL.

6 SHEETS—SHEET 2.



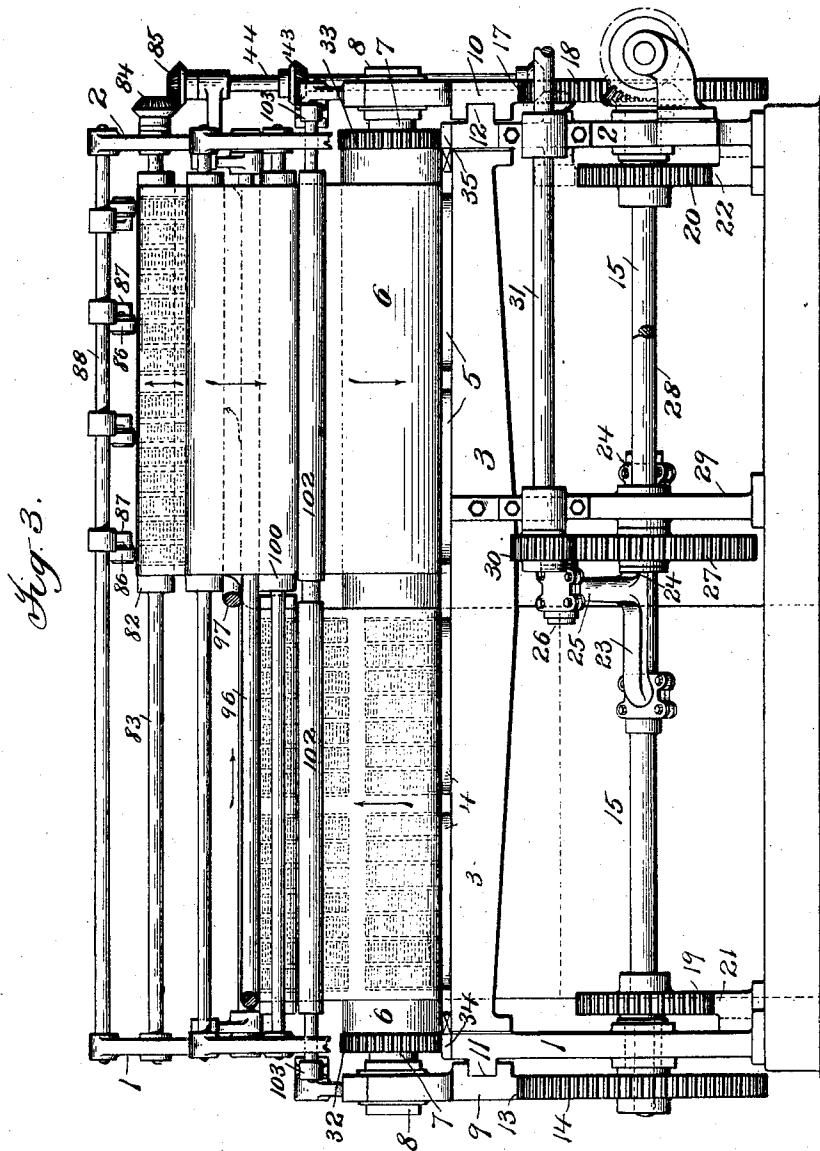
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APPLICATION FILED MAR. 21, 1900.

NO MODEL.

6 SHEETS—SHEET 3.



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No. 742,232.

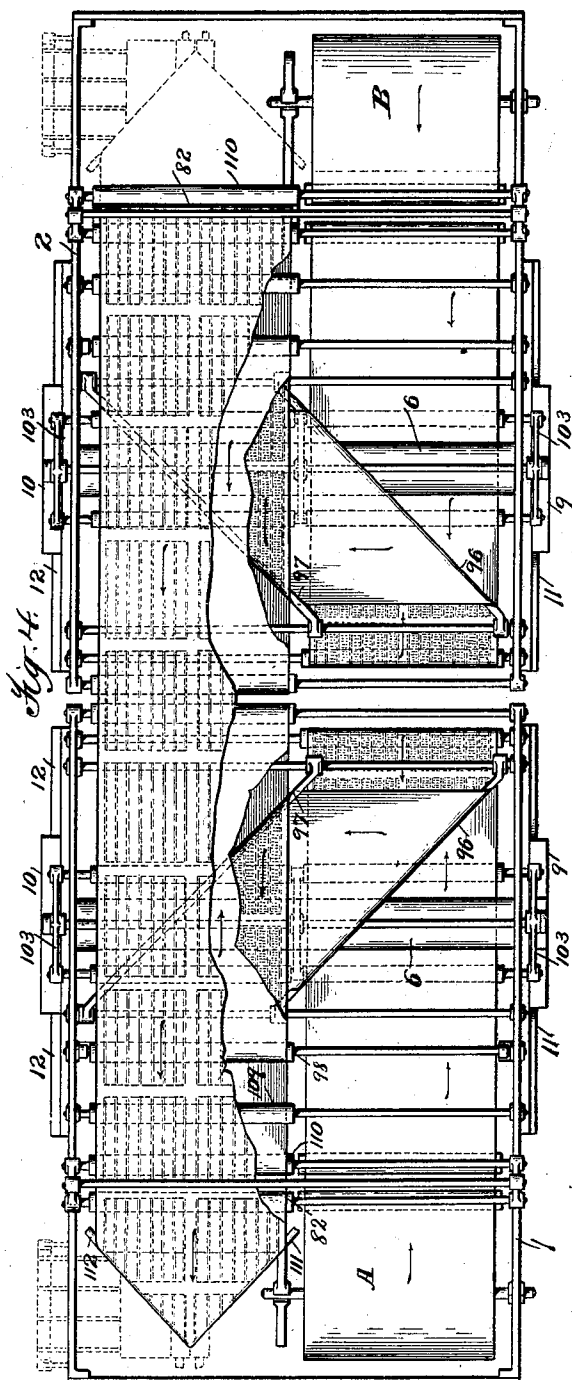
PATENTED OCT. 27, 1903.

G. F. READ.
PRINTING MACHINE.

APPLICATION FILED MAR. 21, 1900.

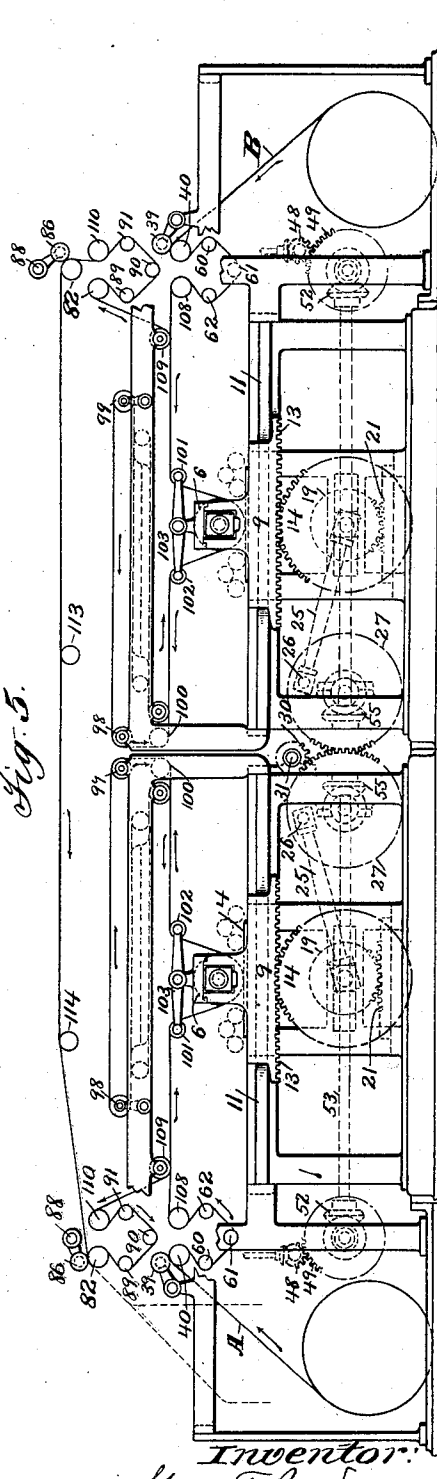
NO MODEL.

6 SHEETS—SHEET 4.



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O. F. Schae

Fig. 5.

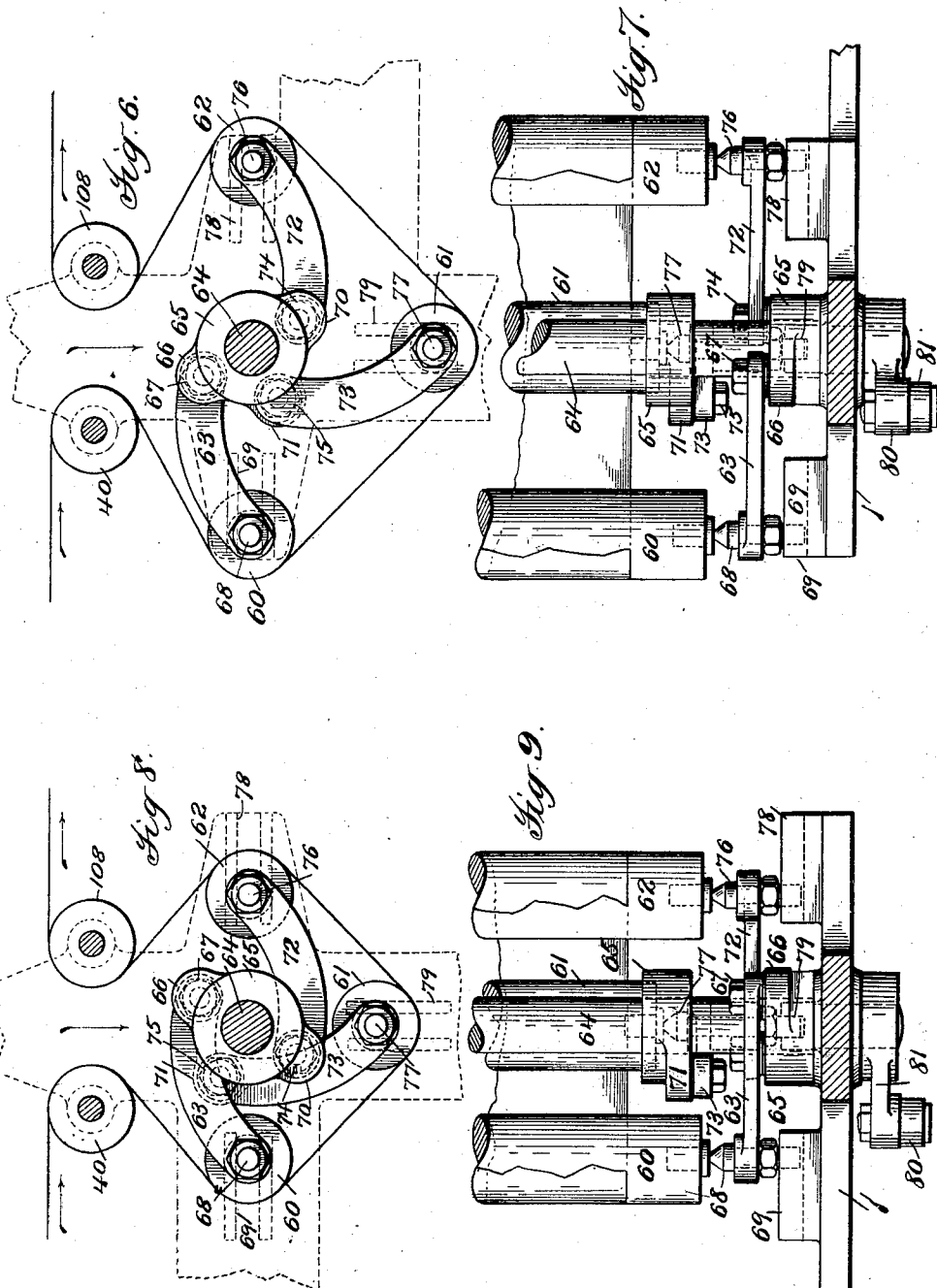


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APPLICATION FILED MAR. 21, 1900.

NO MODEL.

6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GEORGE F. READ, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERT HOE AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,232, dated October 27, 1903.

Application filed March 21, 1900. Serial No. 9,491. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. READ, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in printing-machines.

One of the objects of this invention is to produce a simple compact flat-bed printing-machine which is capacitated to either perfect a web or print the same in colors, as may be desired.

Another object of the invention is to produce a flat-bed printing-machine which is capacitated to print and perfect a plurality of webs, said webs being associated and delivered as a single product, or to print a single web in a plurality of colors on each side, or to print and perfect two single webs, said webs being delivered independently.

A further object of the invention is to produce a compact, efficient, and cheap web-controlling device which renders unnecessary the looping mechanisms heretofore used in this style of printing-machines.

A further object of the invention is to produce a compact and efficient means for reciprocating the cylinder of a flat-bed traveling-cylinder printing-machine.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a side elevation of a printing-machine constructed in accordance with the invention. Fig. 2 is a plan view of the construction shown in Fig. 1. Fig. 3 is an end view of the construction shown in Fig. 1 looking at the driving end of the machine. Fig. 4 is a plan view of another form of printing-

machine embodying the invention, the view 50 being on a smaller scale. Fig. 5 is a side view of the printing-machine shown in Fig. 4. Fig. 6 is an enlarged sectional detail view of the web-controlling mechanism preferably employed. Fig. 7 is a plan view of the construction shown in Fig. 6. Fig. 8 is a view similar to Fig. 6, but showing the parts in a different position. Fig. 9 is a plan view of the construction shown in Fig. 8. Fig. 10 is a view of a modified form of web-transferring mechanism. Fig. 11 is a diagram illustrating the movement of the web through the web-transferring mechanism shown in Fig. 10. Fig. 12 is a diagram illustrating the movement of the web through the machine shown in Figs. 4 and 5 when the same is arranged to print in colors on each side of the web.

Referring to the drawings, and more particularly to Fig. 1, which illustrates one concrete embodiment of the invention, 1 and 2 indicate side frames of the machine, which may be of any usual or desired form. These frames serve to support a bed 3, on which the forms are mounted. In the machine shown the forms are arranged in pairs, one pair of forms 4 being located on one side of the bed and another pair of forms 5 being located on the other side of the bed. Coöperating with the forms 4 and 5 is an impression-cylinder 6, this cylinder being preferably and as shown a traveling cylinder. This cylinder may be supported and operated in any suitable manner. In the machine shown the cylinder is mounted on a shaft 7, said shaft being journaled in boxes 8, which are supported in a pair of side carriages 9 and 10. The carriage 9 moves on a way 11, cast or otherwise formed on or secured to the side frame 1, and the carriage 10 moves on a similar way 12, cast or otherwise formed on or secured to the frame 2. The cylinder may be reciprocated over the bed by any suitable or desired mechanism. Preferably, however, the carriage 9 is provided with a rack 13, said rack being engaged by a gear 14, which is mounted on a shaft 15. This shaft 15 is supported in the construction shown in sliding bearings which move in and are supported in slots 16 in the

side frames 1 and 2. Similarly the carriage 10 is provided with a rack 17, said rack being engaged by a gear 18, mounted on the opposite end of the shaft 15. The shaft 15 is further provided in the construction shown with gears 19 and 20, said gears engaging stationary racks 21 and 22, arranged on opposite sides of the machine. The shaft 15 is engaged by two arms 23 and 24 on a yoke-connecting rod 25, said yoke being connected to a crank-stud 26, which is mounted on a gear 27. The gear 27 is mounted on a crank-shaft 28, suitably supported in bearings, one of which is located in the side frame 2 and the other of which is located in a standard 29, mounted on the frame-bed. The gear 27 is driven from a pinion 30, mounted on a power-shaft 31, said shaft finding its bearings in the construction shown in the side frame 2 and the standard 29.

The construction just described for driving the cylinder is a modification of the multiplying railroad-gear, the operation of which is well understood by those skilled in the art. This construction is particularly adapted for use in flat-bed machines, because all the parts of the driving mechanism, except the gears which drive the carriages, are located beneath the bed and between the side frames, while the driving-gears are located close to the frame. An exceedingly compact and efficient driving mechanism is therefore produced.

In order to insure the rotation of the cylinder and to provide for an even movement of the cylinder in parallelism with the forms, it is preferably provided with ordinary register-gears 32 33, one of said gears being located at each side of the cylinder. The gear 32 engages with a register-rack 34, secured to the side frame 1, and the gear 33 engages a similar rack 35, mounted on the side frame 2.

The web is led into the machine from a web-roll, the same being supported in suitable bearings 37, formed on brackets 38, extending from the side frames 1 and 2. The web will preferably be continuously fed into the machine and to this end is led between a series of friction-rollers 39 and a cooperating feeding-roll 40. The roll 40 is mounted on a shaft 41, which extends from side frame to side frame and is preferably journaled in suitable bearings in said frames. Although, however, the shaft 41 extends entirely across the machine, the roll 40 extends only part way across, this roll being somewhat longer than the width of the web. The roll 40 is preferably a continuously-driven roll, and to this end the shaft 41 carries a miter-gear 42, said gear meshing with a similar gear 43 on an upright shaft 44, supported in suitable journals on the side frame 2. The shaft 44 carries on its lower end a bevel-gear 45, said gear meshing with a similar gear 46, mounted on a short stud 47, suitably supported on the side frame 2. Said stud 47 carries a pinion 48,

which meshes with a gear 49, which is carried on a shaft 50, said shaft being mounted in suitable bearings in the side frames. The shaft 50 further carries a miter-gear 51, which meshes with a similar gear 52, said gear 52 being mounted on a way-shaft 53, running longitudinally of the machine. This shaft 53 is driven in any suitable manner—as, for instance, by a miter-gear 54 on the crank-shaft, which meshes with a similar gear 55 on the shaft 53.

While a single roll might be used to cooperate with the roll 40, the construction is preferably that which has been before described, in which a series of rollers is used. The rollers 39 are mounted on arms 56, said arms being carried on a rod 57. The rod 57 is supported in bearings 58, formed on extensions 59 on the side frames. Only one of these bearings 58 is shown.

Inasmuch as the web is constantly fed into the machine by the operation of the roll 40 and the rollers 39, and inasmuch as in this class of machines the web is stationary during the time the printing operation takes place, it is obvious that means must be provided for disposing of the web which is fed in by the feeding mechanism during the time when the printing is performed. While any of the looping mechanisms ordinarily used in this style of machines may be used for this purpose, in the present machine the web which is fed in by the feeding mechanism during the printing operation is preferably taken care of by means of a web-controller. The construction of this web-controller may be varied within wide limits. Preferably, however, said web-controller includes a plurality of web-guides 60 61 62, around which the web passes, said guides being mounted so as to move toward and from a common center. During the time when the printing is taking place the guides are being moved away from the center, and consequently they take care of the web which is being fed in by the constantly-running feeding mechanism during the printing operation. As soon as the printing operation is completed the guides are moved toward their common center, thus operating to give up web to be drawn through the machine. The guides may be mounted in various ways, so as to give them a movement toward and from the common center which has just been described. Preferably, however, each of the guides is mounted in a pair of arms, said arms being connected to cranks on a shaft, whereby they are thrown in and out by the movement of the shaft. In the construction shown the guide 60 is carried by two arms 63, one at each end thereof. Only one of these arms is shown; but the construction at each end of the guide is identical. These arms 63 are connected and operated by a shaft 64, which extends across the machine from side to side. The arms 63 may be connected to the shaft 64 in any suitable or desired manner. In the con-

struction shown, however, the shaft 64 is provided with collars 65, one at each end, from which extend ears 66, the collars and ears in reality forming cranks. The arms 63 are connected to the ears 66 by means of bolts 67 or in any other suitable manner. The guide 60 may be connected to the arms 63 in any suitable or desired manner. In the construction shown, however, pins 68 pass through the arms 63, said pins having their ends formed to provide cone-bearings, which engage suitable sockets in the guide 60. The pins 68 preferably have their ends extended through the arms 63, said ends engaging guides 69, mounted on the side frames of the machine, the function of these guides being to cause the guide 60 to move toward and away from the center in a straight line, or substantially so. The collars 65 are provided with other sets of ears 70 and 71, and to these ears are connected arms 72 73, the connection being made by means of bolts 74 and 75 or in any other suitable manner. The arms 72 and 73 have pins 76 and 77 extending through them, said pins being formed to provide cone-bearings in which the guides 61 and 62 are supported. The ends of these pins 76 and 77 are extended through the arms and engage guides 78 and 79 on the side frames.

It is obvious that with the construction as described a partial rotation of the shaft 64 will cause the arms to move from the position shown in Fig. 8 to the position shown in Fig. 6, and this movement will be effected during the printing operation, so that the incoming web will be taken care of by the movement of the guides 60 61 62. When the printing operation is completed, the movement of the shaft 64 will be reversed, and the guides will thus give up the web to be drawn through the machine.

Any suitable means may be provided for rocking the shaft 64. In the construction shown the shaft is provided with a crank-arm 80, said arm extending outside the frame of the machine. This arm 80 has a rod 81 extending therefrom, said rod having a roller which engages a cam on the shaft 50, before described, the cam being indicated in dotted lines in Fig. 1.

The machine is provided with a constantly-running feeding-out mechanism, said mechanism being similar in all respects to the feeding-in mechanism, before described. In the construction shown this feeding-out mechanism consists of a roll 82, carried on a shaft 83, extending across the machine from side to side, said shaft being rotated by means of a bevel-gear 84, which engages with a similar gear 85 on the shaft 44, before described. Coöperating with the roll 82 are a series of rollers 86, carried on arms 87, which are mounted on a rod 88, extending across the machine from side to side.

A second web-controlling mechanism is also provided to operate in connection with the constantly-running feeding-out mechanism

just described. This mechanism will preferably be a duplicate of the one described in connection with the constantly-running feeding-in mechanism, and a specific description of it is therefore unnecessary. The operating-guides of this mechanism are marked 89, 90, and 91, respectively, and said guides are operated from a shaft 92. The shaft 92 has connected thereto a crank-arm 93, and to this arm is connected a rod 94, which is operated from a cam on the shaft 50, said cam being indicated in dotted lines in Fig. 1. In the construction shown the web after having passed between one set of forms and the traveling impression-cylinder is transferred laterally and is then led between the other set of forms and the other end of the impression-cylinder. The web may be transferred laterally by means of any of the ordinary well-known agencies commonly used in the printing art for this purpose, and the web may be either turned over during the operation of transferring it or not, according as it is desired to perfect it or print it in colors. Two forms of web-transferers are shown in the accompanying drawings.

Referring to Fig. 2, the transfer of the web is effected by two angle-bars 96 97, operating in connection with rollers 98 99, the web being passed first around the bar 96, then around the bar 97, then around the roll 98, and then around the roll 99. After receiving its first impression the web is led from the couple around a guide-roll 95, after which it passes to the angle-bars 96 97, as before described. After leaving the roll 99 the web passes around a guide-roll 100 and is again led to the couple, passing between the second set of forms and the other end of the cylinder. As is usual in such cases, the cylinder-carriages are provided with guides, one at each end of the cylinder, said guides operating to form the loop in which the cylinder travels. In the construction shown these guides are marked 101 and 102 and are mounted in cross-bars 103, which are mounted on the carriages 9 and 10, respectively.

The second form of web-transferring device is shown in Fig. 10. In this construction, which is a well-known one, the web after leaving the roll 95 passes over a pair of angle-bars 104 105. After leaving the bar 105 the web passes over a roll 106, then over a pair of rolls 107, after which it again goes to the couple.

The operation of the machine so far described will be obvious to any person familiar with the art to which it belongs. The web passes from the web-roll to the constantly-running feeding-in rolls 39 and 40 and then around the guides 60, 61, and 62 of the web-controller. After leaving the web-controller the web passes over a guide 108, then over the guide 101, then between the impression-cylinder and the forms 4, then over the guide 102, then over the guide 95, and through the web turning and transferring mechanism.

ism, it being supposed in this case that the machine is arranged to perfect. After the web has been transferred laterally and turned over by the turning and transferring mechanism it passes over the guide-roll 100, then over the guide 102, then between the impression-cylinder and the forms 5, then over the guide 101. From the guide 101 it passes over a guide 109, then over a second guide 110, then around the guides 91, 90, and 89 of the second web-controller, and then to the constantly-running feeding-out mechanism, of which 82 is the driven roll.

As is well known in this style of machine, the web is stationary between the two web-controlling mechanisms during the printing operation. As the cylinder moves in one direction on its printing stroke, therefore the web-controller which operates in connection with the constantly-running feeding-in mechanism is operated to give its guides 60, 61, and 62 an outward radial movement. This movement continues during the printing stroke of the cylinder, and the guides operate, therefore, to take up the web which is fed into the machine during the printing stroke. The guides 89, 90, and 91 of the other web-controlling mechanism are, however, in their outward position at the time the cylinder begins its printing stroke. During the printing stroke, therefore, they are moved inward and give up web to the constantly-running feeding-out mechanism. As soon as the printing stroke is completed the guides 60, 61, and 62 are moved quickly inward and the guides 89, 90, and 91 are moved quickly outward. During the time when the cylinder is off impression, therefore, at one end of its stroke the guides 60, 61, and 62, operating in connection with the constantly-running feeding-in mechanism, operate to give up an amount of web equal to the amount which will be printed on the next stroke of the cylinder, and the constantly-running feeding-out mechanism operating in connection with the guides 89, 90, and 91 operate to pull through the machine an amount of web equal to that given up by the guides 60, 61, and 62. When the cylinder reaches the forms and is about to begin its return stroke, the web-controllers have their operation reversed and the web again remains stationary during the printing operation.

As the web passes from the feeding-out mechanism it may be delivered by any suitable form of delivery mechanism. In the construction shown this mechanism is an ordinary longitudinal folder, the angle-bars of which are indicated at 111 and 112.

The machine which has been so far described produces a four-page paper. If a product having more pages is desired, the machine may be constructed as shown in Figs. 4 and 5. The machine illustrated in these figures practically consists of two machines, such as have been before described, placed back to back. Each machine is or may be pro-

vided with its own web-supply and a complete set of feeding and controlling devices. In the construction shown the web from one of the machines is marked A and the web from the other machine is marked B. The web B in the present machine after leaving the constantly-running feeding-out roll 82 of the feeding-out mechanism passes over suitable guides 113 114 and meets the web A at any suitable point—as, for instance, at the constantly-running feeding-out roll 82 of the feeding-out mechanism belonging to the machine which operates on the web A. The two webs are therefore associated at this point and pass together over the longitudinal folder, an eight-page paper being thus produced. By providing each of these machines with a delivery mechanism they can be run independently, if desired, and in Fig. 4 a second delivery mechanism is indicated in dotted lines for the second machine.

The machine which has just been described is capacitated to print a single web in two colors on each side. When it is desired to produce a web thus printed in colors, the web-lead will be that indicated in Fig. 12. In this figure the web A after leaving the guide 102 of the first cylinder 6 passes directly to the guide 101 of the second cylinder 6, the web turning and transferring mechanism of the first machine being cut out. After passing between the second cylinder 6 and its set of forms 4 the web passes through the web transferring and reversing mechanism of the second machine. From this transferring and reversing mechanism it passes over the guide 102 of the second machine and between its impression-cylinder and the set of forms 5. It then passes over the guide 101 of the second machine, the guide 102 of the first machine, between the cylinder 6 of the first machine and its second set of forms 5, and then into that web-controlling mechanism of the first machine which coöperates with the feeding-out mechanism. With this arrangement of the web-lead, therefore, the web-transferring mechanism of the first machine and the feeding and controlling mechanisms of the second machine are not used.

It is to be understood that the invention is not to be limited to the specific details of construction shown and described in the foregoing specification.

What I claim is—

1. In a printing-machine, the combination with a frame, of a constantly-running feeding-in mechanism and a constantly-running feeding-out mechanism, a web-controller coöperating with each feeding mechanism, said feeding mechanism and web-controller being located at one end of the frame, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating one of these parts with relation to the other, means for leading the web between one end of the cylinder and one set of forms, means carried by the frame

and located between its ends for transferring the web laterally, and means for leading it between the other end of the cylinder and the other set of forms, substantially as described.

2. In a printing-machine, the combination with a frame, of a constantly-running feeding-in mechanism and a constantly-running feeding-out mechanism, of a web-controller cooperating with each feeding mechanism, said feeding mechanism and web-controller being located at one end of the frame, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating one of these parts with relation to the other, means for leading the web between one end of the cylinder and one set of forms, means carried by the frame and located over the couple for transferring the web laterally, and means for leading it between the other end of the cylinder and the other set of forms, substantially as described.

3. In a printing-machine, the combination with a frame, of a constantly-running feeding-in mechanism and a constantly-running feeding-out mechanism, a web-controller cooperating with each feeding mechanism, said feeding mechanism and web-controller being located at the end of the frame, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating the cylinder over the bed, means for leading the web between one end of the cylinder and one set of forms, means carried by the frame and located over the couple for transferring the web laterally, and means for leading it between the other end of the cylinder and the other set of forms, substantially as described.

4. In a printing-machine, the combination with a frame, of a constantly-running feeding-in mechanism and a constantly-running feeding-out mechanism, a web-controller cooperating with each feeding mechanism, said feeding mechanism and web-controller being located at the end of the frame, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating one of these parts with relation to the other, means for leading the web between one end of the cylinder and one set of forms, means carried by the frame and located over the couple for transferring the web laterally and reversing it, and means for leading it between the other end of the cylinder and the other set of forms, substantially as described.

5. In a printing-machine, the combination with a frame, of a constantly-running feeding-in mechanism and a constantly-running feeding-out mechanism, a web-controller cooperating with each feeding mechanism, said feeding mechanism and web-controller being located at one end of the frame, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating the cylinder over the bed, means for leading the web be-

tween one end of the cylinder and one set of forms, means carried by the frame and located over the couple for transferring the web laterally and reversing it, and means for leading it between the other end of the cylinder and the other set of forms, substantially as described.

6. In a web-controller, the combination with a group of web-guides around which the web passes, of means for directing the web toward and away from the guides, and means for causing the guides to move toward and away from each other, substantially as described.

7. In a web-controller, the combination with a group of web-guides around which the web passes, said guides being arranged about a common center, of means for directing the web toward and away from the guides, and means for moving the guides toward and away from the center, substantially as described.

8. In a web-controller, the combination with a group of web-guides arranged about a common center, of means for directing the web toward and away from the guides, and means for causing the guides to move radially toward and away from the center, substantially as described.

9. In a web-controller, the combination with a shaft, of a group of web-guides arranged about the shaft, means for directing the web toward and away from the guides, means for rotating the shaft, and means intermediate the shaft and the guides to cause them to move toward and away from the shaft as it rotates, substantially as described.

10. In a web-controller, the combination with a shaft, of a set of cranks thereon, pairs of arms connected to the cranks, a web-guide supported in each pair of arms, and means for rotating the shaft, substantially as described.

11. In a web-controller, the combination with a shaft, of a set of cranks thereon, pairs of arms connected to the cranks, a web-guide supported in each pair of arms, means for rotating the shaft, and means for causing the guides to move in a straight line when the shaft is rotated, substantially as described.

12. In a web-controller, the combination with a pair of side frames, of a shaft mounted therein, cranks on the shaft, pairs of arms connected to the cranks, a web-guide carried in each pair of arms, ways on the side frames, extensions from the arms engaging the ways, and means for rotating the shaft, substantially as described.

13. In a printing-machine, the combination with a constantly-running feeding-in mechanism, of a web-controller including a group of guides about which the web is led, means for causing the guides to move toward and away from each other, and means for directing the web away from the guides, substantially as described.

14. In a printing-machine, the combination

with a constantly-running feeding-in mechanism, of a web-controller including a group of guides arranged about a common center, the web being led around the guides, means
5 for causing the guides to move toward and away from the center, and a guide over which the web is led after leaving the controller, substantially as described.

15. In a printing-machine, the combination
10 with a constantly-running feeding-in mechanism, of a web-controller including a group of guides about which the web is led, a shaft, sets of cranks on the shaft, pairs of arms connected to the cranks, each of the group of
15 guides being supported in a pair of arms, means for rotating the shaft, and a guide over which the web is led after leaving the controller, substantially as described.

16. In a printing-machine, the combination
20 with a constantly-running feeding-in mechanism, of a web-controller including a group of guides arranged about a common center, the web being led about the guides, means for causing the guides to move toward and
25 away from each other, a guide over which the web is led after leaving the controller, a printing-couple consisting of a cylinder and a bed carrying two sets of forms arranged side by side, means for reciprocating the cylinder
30 over the bed, means for directing the web between one end of the cylinder and one set of forms, means for transferring the web laterally and leading it between the other end of the cylinder and the other set of forms, a constantly-running feeding-out mechanism, a
35 web-controller operating in connection with said mechanism, said controller including a group of guides arranged about a common center, and means for moving the guides toward and away from each other, substantially
40 as described.

17. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms
45 arranged side by side, means for reciprocating one of the elements of each couple with relation to the other, a transferring mechanism for each couple, and feeding and delivery mechanisms for each couple located on the
50 same side of the couple, the couples being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially as described.

18. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating one of the elements of each couple with
60 relation to the other, a transferring mechanism for each couple, said mechanism being located over the couple, and feeding and delivery mechanisms for each couple located on the same side of the couple, the couples being
65 placed back to back, whereby the product from each couple may be led to its own deliv-

ery or the products of both couples may be led to one delivery, substantially as described.

19. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating one of the elements of each couple with relation to the other, a transferring and reversing mechanism for each couple, and feeding and delivery mechanisms for each couple
70 located on the same side of the couple, the couples being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially
75 as described.

20. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating one of the elements of each couple with relation to the other, a transferring and reversing mechanism for each couple, said mechanism being located over the couple, and feeding and delivery mechanisms for each couple
85 located on the same side of the couple, the couples being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially
90 as described.

21. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating the cylinder over the forms, a transferring mechanism for each couple, and feeding and delivery mechanisms for each couple located on the same side of the couple, the couples
100 being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially as described.

22. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating the cylinder over the forms, a transferring mechanism for each couple, said mechanism being located over the couple, and feeding and delivery mechanisms for each couple located on the same side of the couple, the couples being placed back to back, whereby the
110 product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially as described.

23. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating the cylinder over the forms, a transferring and reversing mechanism for each couple, and feeding and delivery mechanisms for each couple located on the same side of the
115
120
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couple, the couples being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially as described.

24. The combination with a printing-couple, of a second couple, said couples each consisting of a cylinder and two sets of forms arranged side by side, means for reciprocating the cylinder over the forms, a transferring and reversing mechanism for each couple, said mechanism being located over the couple, and feeding and delivery mechanisms for each couple located on the same side of the couple, the couples being placed back to back, whereby the product from each couple may be led to its own delivery or the products of both couples may be led to one delivery, substantially as described.

25. In a printing-machine, the combination with a pair of side frames, of a bed carrying

two sets of forms arranged side by side, said bed being supported by the side frames, a pair of carriages, a cylinder supported in said carriages and cooperating with the forms, said carriages having racks connected therewith, a shaft extending across the machine, gears on each end of the shaft and meshing with the racks on the carriages, a railroad-gear mechanism connected with the shaft said mechanism including an operating-crank, the parts of said railroad-gear mechanism being located between said frames and beneath the bed, substantially as described.

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

GEORGE F. READ.

Witnesses:

F. W. H. CRANE,
L. ROEHM.