No. 666,327. Patented Jan. 22, 1901.

G. F. READ.

WEB FEEDING AND COMPENSATING MECHANISM FOR FLAT BED PRESSES.

(Application filed July 10, 1899.)

(No Model.) 3 Sheets—Sheet 1.

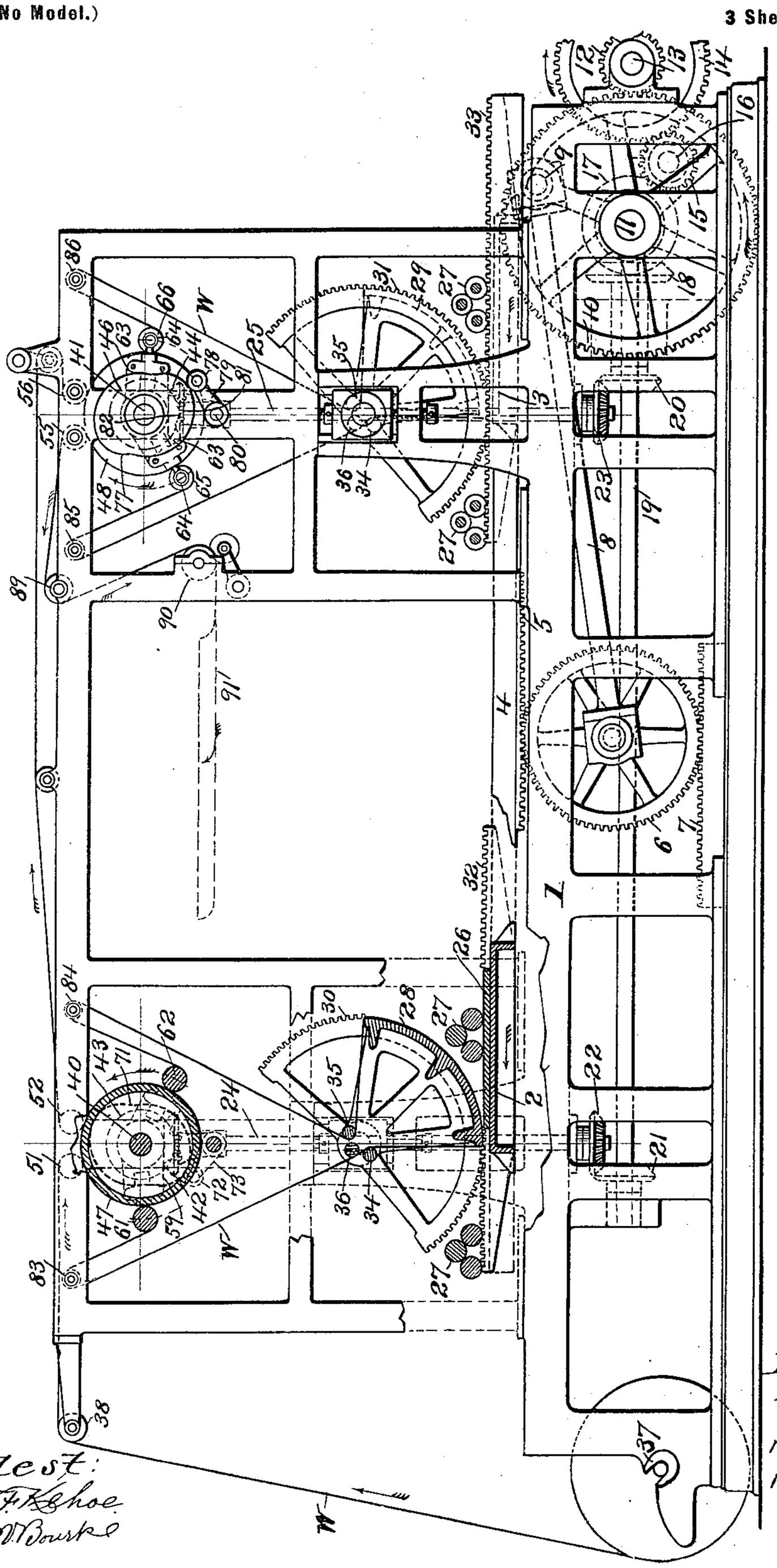

Fig. 1.

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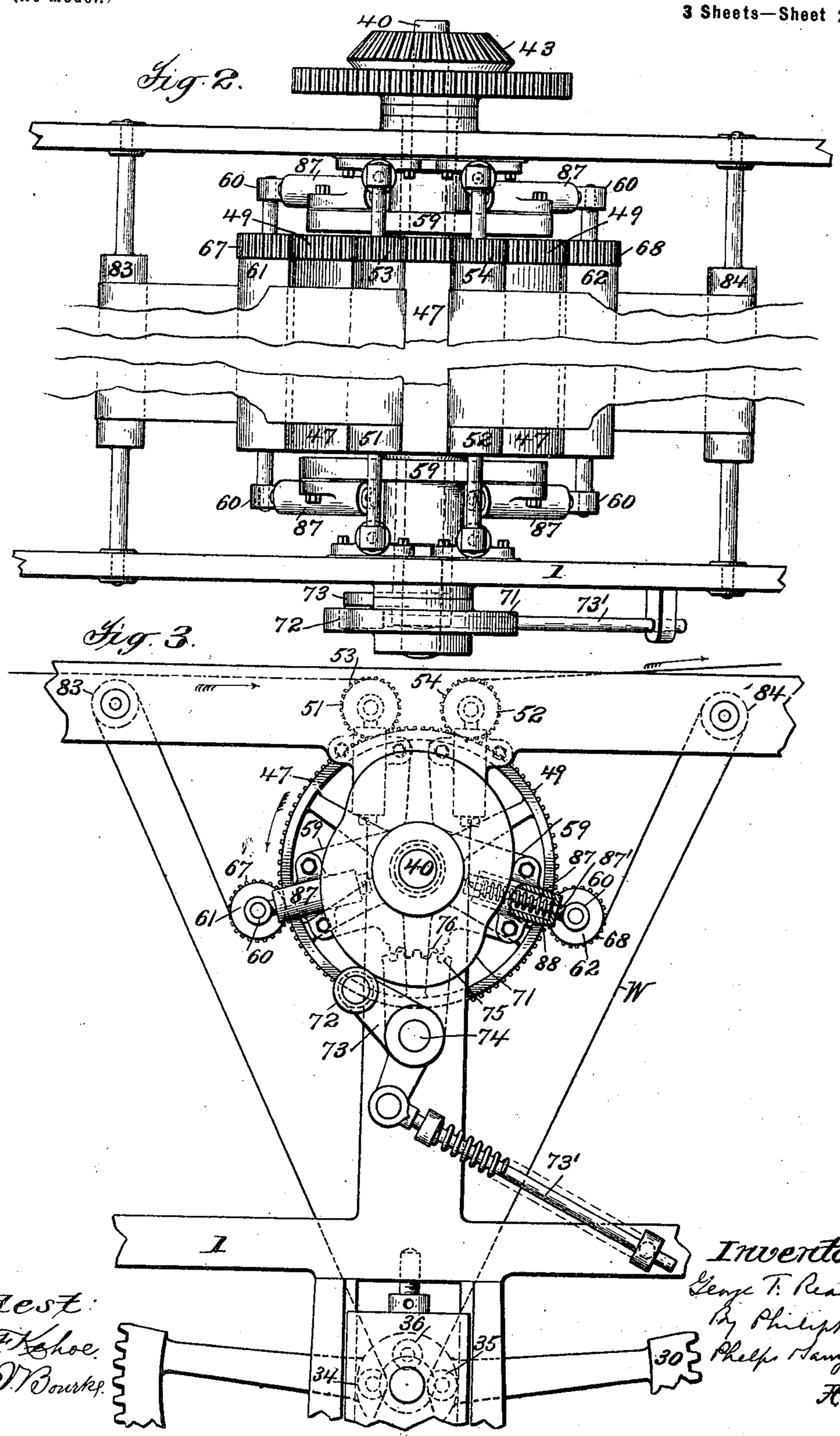
(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

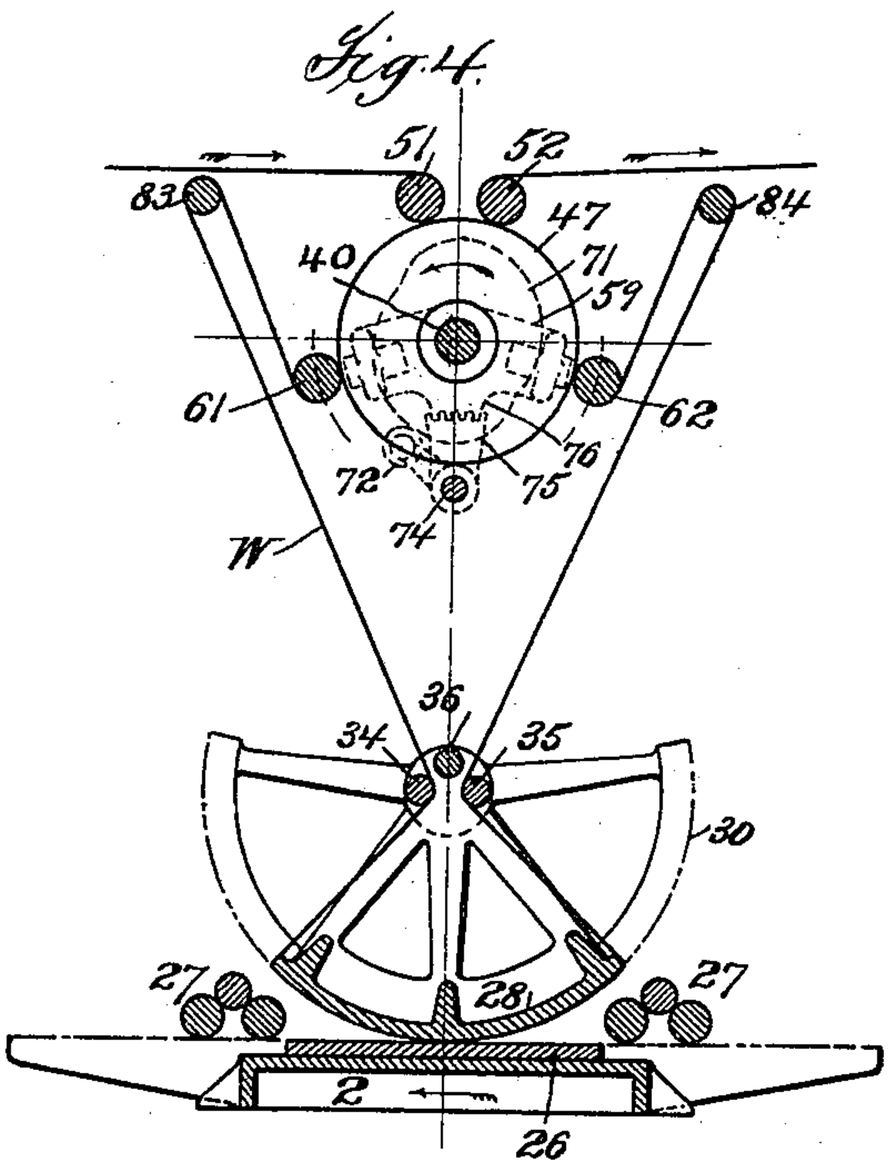


Fig. 5.

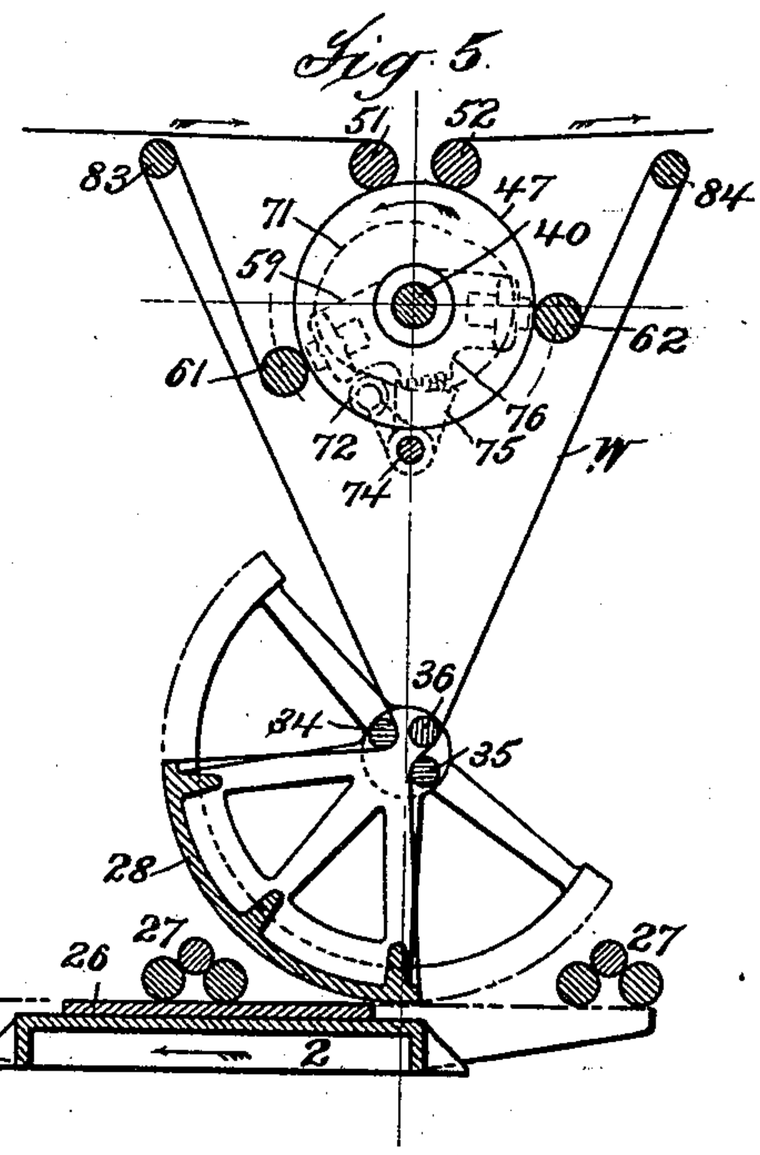


Fig. 6.

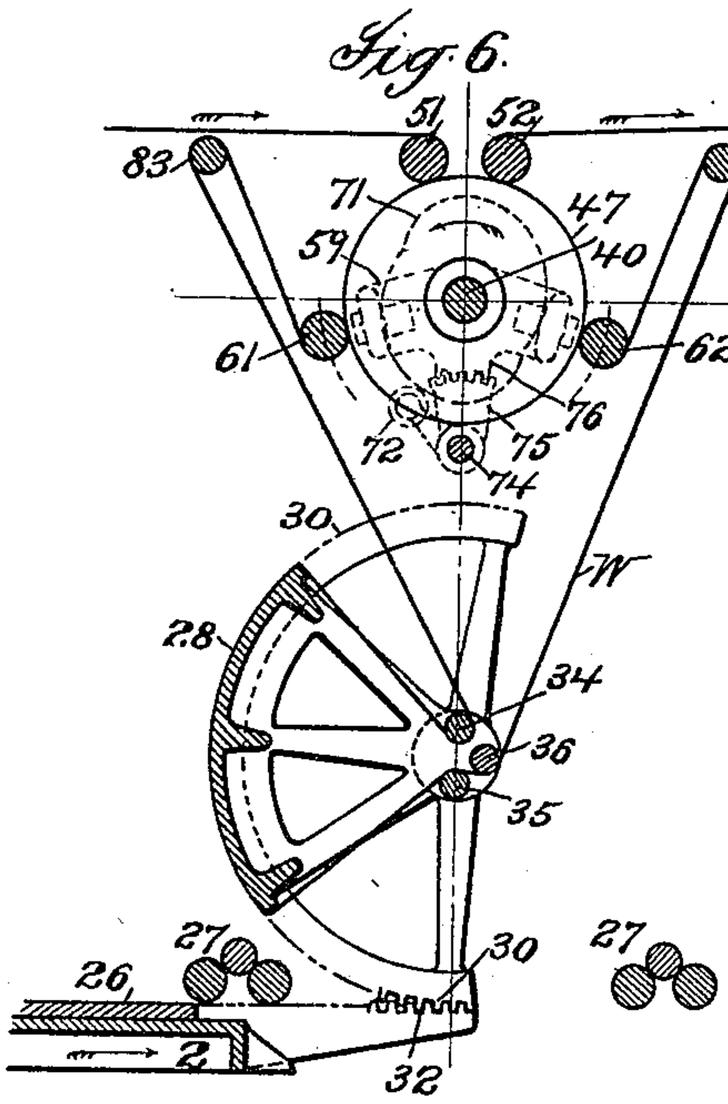
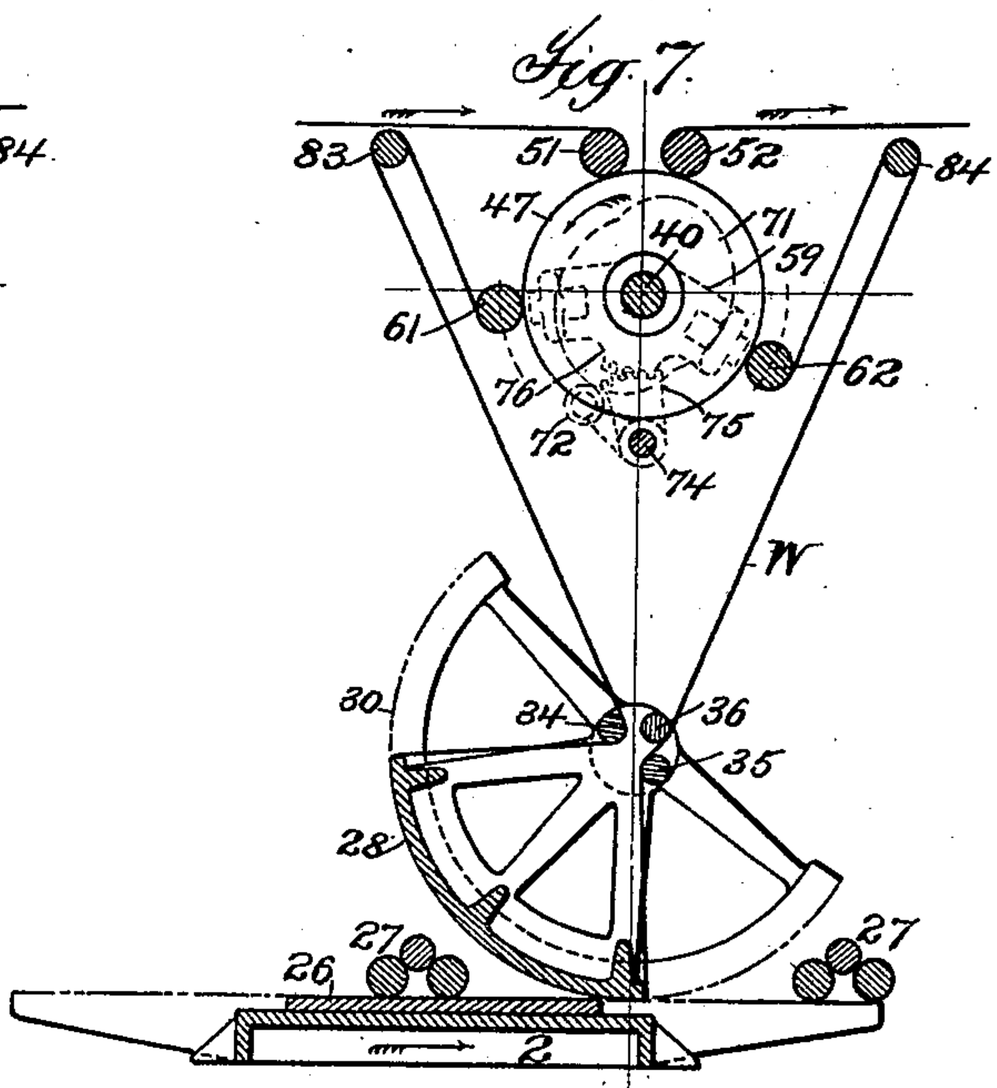


Fig. 7.



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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 SAME PLACE.

WEB-FEEDING AND COMPENSATING MECHANISM FOR FLAT-BED PRESSES.

SPECIFICATION forming part of Letters Patent No. 666,327, dated January 22, 1901.

Application filed July 10, 1899. Serial No. 723,309. (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 city, county of Kings, and State of New York, have invented certain new and useful Improvements in Web-Feeding and Compensating Mechanism for Flat-Bed Presses, 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 flat-bed printing-machines printing on webs, and more particularly to the devices for feeding the webs to and away from the printing-couples in such machines.

It is particularly advantageous in feeding webs to printing machinery to keep the web in motion throughout as great a part of its length of travel through the machine as is possible and cause its motion to be as uniform as is possible. In rotary printing-machines of course the movement of the web is naturally constant and uniform throughout the entire machine; but in flat-bed web-printing machines the movement of the web is necessarily varied and usually intermitted during the period of taking the impression. It is therefore usual in such machines to feed the web into and out of the machine by continuously-operating feeding devices, by which a constant movement of the web from the web-supply roll or other source of supply to the delivery mechanism is secured. The movement of the web between these points is, however, as has been stated, never constant and uniform throughout its length, but varies according to the type of machine. In some machines, for instance, the web is stationary with respect to the entire surface of one member of the printing-couple during the printing operation, in others it is stationary with respect to both members, and in still others it moves with respect to the couple during the printing operation; but as the couple prints on both strokes of the movable member some parts of the web run in opposite directions during successive printing operations. Since, however, with all these types of machines it is desirable to feed the web continuously into and out of the machine, it is necessary to provide some mechanism by which the web so continuously fed into the machine during the printing operation shall be taken care of during the variation in movement at the time of impression and also to provide other mechanism which shall accumulate a sufficient amount of web during the printing operation to enable web to be continuously fed out of the machine during the printing operation.

The devices which have been used for the purpose of taking care of the slack produced by the infeeding mechanism during the printing operation and for supplying web to the outfeeding mechanism during the same operation are commonly known in the art as "loopers" or "looping mechanisms." These mechanisms have heretofore been mounted independently of the feeding mechanisms and intermediate the feeding in and out devices and the couple or couples. Furthermore, the looper which acted in connection with the continuous infeeding devices discharged simply the function of a slack-web controller. The looper, acting in connection with the continuous outfeed, has in some instances been relied upon to shift the web after the printing operation, but has not, so far as I am aware, ever been constructed so as to exercise a continuous outfeeding action on the web—that is to say, it has never acted as a part of the continuous outfeeding devices, its functions being confined to those of a slack-controller and web-shifter. Furthermore, in flat-bed machines employing more than a single printing-couple the feeding and looping mechanisms have been so located and arranged that a single set of such mechanisms has operated to feed the web to all the couples and a single set of such mechanisms has operated to feed the web away from all the couples. The result of this has been that very long lengths of web have had to be drawn through the machine and the drawing devices have acted at substantially a single point in the length of web. When, however, long lengths of web are handled in this manner, the parts of the web are necessarily subjected to different degrees of tension, and, furthermore, the web is stretched to a very considerable

degree and unequally at that, so that it is difficult to obtain register.

It is one object of this invention to improve the web-feeding devices of this class by doing away with the independent loopers and substituting therefor feeding mechanisms which feed directly to and from the couple or couples and which while operating to continuously feed web into and out of the machine shall also be so constructed as to compensate for and take care of the amount of web which is fed into the machine while the printing operation takes place and similarly to accumulate web to be fed out of the machine during the same operation.

A further object of the invention is to provide flat-bed machines of the class employing a plurality of printing-couples with independent feeding mechanisms for each couple which shall operate to feed the web to and away from the couples, thereby reducing very materially the length of web between the feeding devices and the length to be pulled through the machine by any single set of said devices.

A further object of the invention is to improve the guides by which the web is led to the printing-couple in that class of machines in which the web is stationary with respect to the entire surface of one member of the couple during the printing operation.

A further object of the invention is to produce a compact, cheap, and simple feeding device which can be located directly over the printing-couple, thereby making it possible to decrease both the length and the height of the 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 described, and more fully 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 diagrammatic elevation, partly in section, of a printing-machine having my improved web-feeding mechanism applied thereto. Fig. 2 is a detail plan view, on an enlarged scale, of one of the feeding mechanisms, illustrating the gearing by which the parts are driven. Fig. 3 is a side view of one of the feeding mechanisms, also on an enlarged scale; and Figs. 4, 5, 6, and 7 are diagrammatic views illustrating the position of the parts of the feeding mechanism during different parts of the printing operation.

Referring to the drawings which illustrate one embodiment of the invention, 1 indicates the frame of a flat-bed perfecting printing-machine. The machine is supplied with the usual ways, on which are mounted the form-beds 2 and 3. These beds may be driven in any desired way, but are preferably connected for simultaneous movement by a bar 4, which has on its under side a rack 5. The rack 5 is engaged by a railroad-gear 6, of ordinary construction, said gear running on a stationary rack 7 and being operated by means of a crank-rod 8, which is connected to a crank-pin 9, carried on a gear-wheel 10, said gear-wheel being mounted on a shaft 11, which is carried in bearings at one end of the machine. The gear-wheel 10 is driven by a reducing-pinion 12, mounted on a shaft 13, said shaft also carrying a gear 14, which is driven from a pinion 15, mounted on a shaft 16, which is the power-shaft of the machine. The shaft 11 is preferably further provided with a miter-wheel 17, (indicated in dotted lines in Fig. 1,) which meshes with a miter-gear 18, (also shown in dotted lines,) said gear being carried on a way-shaft 19. The way-shaft 19 is provided with miters 20 and 21, engaging miters 22 and 23, said miters being carried on vertical shafts 24 and 25, the purpose of which will be hereinafter explained.

The beds 2 and 3 are provided with printing-surfaces 26 of any suitable description, said surfaces being inked by rolls 27, mounted in any usual or desired manner. The impression members of the couples consist of segment-surfaces 28 29, said surfaces being driven by segment-gears 30 31, which mesh with racks 32 33 on the beds in the usual manner.

The construction of printing-couple illustrated in this application is generally similar to that shown in the application of John H. Stonemetz, Serial No. 708,846, filed March 13, 1899—that is to say, the web in its passage to and away from the printing-segment passes substantially through the center of oscillation of the segment and is therefore held stationary with respect to the segment during the printing operation. While, however, this type of machine has been selected to illustrate a specific embodiment of the invention, it is to be understood that the invention is by no means limited in its use to machines of this character. On the contrary, it is adapted for use with any flat-bed machine which prints on a web and in which the web is fed continuously into and out of the machine.

The web in the machine shown is led to the segment over a guide 34 and away from the segment over a guide 35, these guides being located substantially, though not exactly, at the center of oscillation of the segment. In the application of the said John H. Stonemetz before referred to these guides 34 35 consist of stationary bars. I prefer to construct these guides in the form of rollers which are free to be driven by the friction of the web passing thereover. In order, furthermore, to prevent the outgoing and incoming portions of the web from coming in contact with each other in the extreme positions of the segment, I introduce between the rollers 34 35 an intermediate separating device 36, which is preferably, though not necessarily, also in the form of a roller. By referring to the diagram shown in Fig. 6 the operation of this intermediate spacing-guide

will be clearly understood. It will be seen that were it not for the presence of this guide the incoming and outgoing portions of the web would when the segment is in its extreme positions both be strained over the roller 34; but by using the intermediate spacing-guide 36 the incoming portion of the web alone runs over the guide 34, the outgoing portion of the web being kept away from said guide 34 by the intermediate spacing-guide.

The web W is fed into the machine from a web-roll mounted in bearings 37, suitably located in the machine. In the machine shown the web passes over the guide-roll 38, mounted in suitable arms 39, and then passes into the feeding device, by which it is fed to the first couple. After passing through the first couple it is again led into the feeding device to be fed away from the first couple and passed into the feeding device for the second couple. After passing through this device and through the second couple it is again led into the feeding device to be fed out of the machine, whence it is passed to any suitable delivery, to be hereinafter described.

The feeding mechanism is constructed to perform not only the function of a feeding mechanism, but also that of a compensating or web-controlling mechanism. Various and widely-differing feeding mechanisms may be devised, by which the web will be continuously fed and the feed properly compensated for by the feeding mechanism itself, and by which therefore the generic invention may be carried into effect. In the machine shown the frame is provided with suitable standards, which are preferably, though not necessarily, in line with the standards which carry the boxes in which the impression-cylinder is mounted, there being a pair of these standards for each printing-couple. In each pair of standards is mounted a shaft, these shafts being respectively marked 40 and 41. The shaft 40 is in the present machine driven by a miter-gear 42, mounted on the shaft 24, before described, said gear meshing with a miter-gear 43, carried on the shaft 40. In the same way the shaft 41 is driven by a miter 44, carried on the shaft 25, said gear meshing with a gear 46 (indicated in dotted lines in Fig. 1.) While the driving mechanism before described is a convenient and satisfactory one, it is to be understood that the invention is not limited thereto. The shafts 40 and 41 may be driven by any desired mechanism.

In the machine shown the shafts 40 41 carry feeding-cylinders 47 and 48, these cylinders being preferably provided with gears 49, the purpose of which will be hereinafter explained. In the machine shown there is provided in connection with the cylinder 47 a pair of web guiding and directing rolls 51 52, which in the preferred form of the invention are also arranged to act as feeding-rolls. These rolls are therefore arranged in contact with the cylinder 47 and are preferably provided with gears 53 and 54, which are in mesh with the gear 49, before described. In the same manner the cylinder 48 has operating in connection therewith guiding and directing rollers 55 and 56, which are also feed-rollers. These rollers 55 and 56 are also preferably provided, respectively, with gears similar to gears 53 54, said gears being in mesh with a gear on the shaft of the feeding-cylinder. It will be readily understood from the lead of the web disclosed by the drawings that the continuously-driven cylinder 47, acting in connection with the roller 51, operates to constantly feed the web into the first printing-couple, and the cylinder 47, operating in connection with the roller 52, operates to continuously feed the web away from said first printing-couple. In the same manner the cylinder 48, operating in connection with the roller 55, operates to constantly feed the web into the second printing-couple, and the cylinder 48, operating in connection with the roller 56, operates to continuously feed the web out of the printing-couple.

In the form of machine selected to illustrate the invention the web is stationary, as has been explained, with respect to the entire surface of the segment impression-surface of each printing-couple during the printing operation. Compensating devices must therefore be provided to take care of the web which is constantly fed in during the printing operation and to supply web to be constantly fed out during the same operation. In the preferred form of the invention these compensating devices form a part of the feeding mechanism, and they may be variously constructed. In the machine shown the bearings of the shaft 40 are extended through the standards of the machine-frame, and mounted upon these bearings are rocking levers 59, these levers carrying at their opposite ends suitable bearings 60, in which are mounted rolls 61 62. In the same manner the bearings of the shaft 41 are provided with rocking levers 63, which carry bearings 64, in which are mounted rolls 65 66. The rolls 61 and 62 are preferably provided with gears 67 and 68, which are in mesh with and are therefore constantly driven by the gear 49. In the same manner the rolls 65 and 66 are preferably provided with gears similar to the gears 67 and 68 and which are constantly in mesh with and driven by the gear on the shaft of the feeding-cylinder. The purpose of thus driving the rolls 61 62 and 65 66 is to cause them to feed the web into and out of the respective printing-couples with which they coöperate. As before stated, these rolls also act as compensators to take up the slack of the web which is constantly fed in during the printing operation and to provide web to be constantly fed out during the printing operation. In order to effect their compensating function, it is necessary that the rollers be given a bodily movement additional to the movement on their axes by which the feeding

is accomplished. This compensating movement of the feeding-rolls may be effected in various ways and through various mechanisms.

In the machine shown the shaft 40 is provided with a cam 71, which operates on a bowl 72, carried on an arm 73, which arm is connected to a short shaft 74, suitably mounted in one of the standards of the frame. The shaft 74 carries inside the frame a segment 75, which meshes with segment 76, formed or carried on the rocking lever 59. In the same manner the shaft 41 carries a cam 77, which operates on a bowl 78, carried by an arm 79, mounted on a shaft 80, said shaft carrying a segment 81, which meshes with a segment 82, suitably formed or carried on the rocking lever 63. The arms 73 and 79 may be caused to hold their bowls up against the cams in any suitable way, as by spring-rods 73′, as indicated in Fig. 3. It is obvious that as the shafts 40 and 41 revolve the rocking levers 59 63 through the mechanism described will be given an oscillating movement corresponding to the eccentricity of the cams, and the rolls 61, 62, 65, and 66 will therefore also be given an oscillating movement in addition to the rotary movement produced by the gears before described. Suitable guides are also provided, in connection with which the combined feeding-rollers and compensators operate. The guides are in the form of bars or rolls suitably mounted in the frame of the machine. The guide 83 coöperates with the roll 61 and the guides 84, 85, and 86 coöperate with the rolls 62, 65, and 66, respectively.

In order to enable the rolls 61, 62, 65, and 66 to be moved outward in order that the web may be threaded between them and the feeding-cylinders 47 and 48, these rolls are preferably mounted in sliding spring-controlled bearings. Each end of the rock-levers 59 63 is provided with a socket 87, into which extends a pin 87′, these pins being held in the sockets by means of springs 88.

After the web has been printed and passed out through the feeding mechanism for the second couple it is led over suitable guides 89 90, which may or may not be driven rolls, to any suitable delivery mechanism, as turning-bars 91, which are preferably located in the space between the impression members of the printing-couples.

The operation of the machine will be readily understood from the foregoing in connection with the following brief description: The web W is led over the guide 38, between the cylinder 47 and the rolls 51 and 61, then over the guide 83, between the guides 36 and 34 on the impression-segment, around the face of the impression-segment, between the guides 35 and 36, over the guide 84, then between the rolls 62 and 52 and the cylinder 47, then over suitable guides 92 93 to the feeding mechanism for the second couple. It is then led between the rolls 56 and 66 and the cylinder 48, then between the guides 35 36 of the second impression member and around its segment-face, between the guides 34 36, then over the roll 85, then between the rolls 63 55 and the cylinder 48, over the guide 89, and out to the delivery mechanism. With the web led as described, it being remembered that the rolls 47 49 and the rolls 51 and 52, 55 56 61 62 65 66 are continuously-running rolls, it will be understood that the web is fed continuously into and out of each of the couples of the machine.

Referring to Fig. 1, which shows the parts of the machine in the position they occupy when the printing begins, disregarding the second printing-couple, the operation of which is precisely like that of the first, it will be seen that as there is no movement of the web around the impression-segment, and as the rolls 47, 51, and 61 are feeding web constantly into the machine and the rolls 47, 52, and 62 are constantly feeding web out of the machine, there must be a downward movement of roll 61 to take up the web which is continuously fed into the machine and a movement of the roll 62 to supply the web which is continuously fed out of the machine. The cam 71, through the connections 72, 73, 74, 75, and 76, operates the rocking lever 59, so as to move the roll 61 downward and the roll 62 upward. The position of the parts in the middle of the stroke is shown in the diagram Fig. 4. The diagram Fig. 5 illustrates the parts in the position they occupy at the end of the printing stroke, at which time a new length of web must be fed past the surface of the impression-segment, so that an impression may be had on the reverse movement of the bed. In order to accomplish this, the rocking lever 59 is rocked, so as to move the roll 62 downward and the roll 61 upward. During this upward movement of the roll 61 it gives up the web it has accumulated during its downward movement, and at the same time it continues to operate, in connection with the cylinder 47, to feed forward the web. The roll 62 in its downward movement also continues to feed web away from the couple and also to forward through the couple the web given up by the infeed. This upward movement of roll 61 and the downward movement of roll 62 continue until the parts have passed through the position shown in the diagram Fig. 6, which illustrates the positions occupied at the end of the stroke of the bed and until the parts reach the position shown in the diagram Fig. 7, at which time the second printing is to take place. During the second printing the movement of the rolls is again reversed, and the cycle of operations described continues for successive printings.

It will be understood from the foregoing description that while the feeding mechanisms for each couple are continuously operating they act intermittently so far as delivering the web to and away from the couple is concerned. Furthermore, since the compensating rollers are so arranged with respect to the

cylinder 47 that the web is nipped between them and the cylinder, these rollers act as feeding-rollers and constitute a part of the "feeding mechanism" properly so-called. The construction, furthermore, forms a feeding mechanism which operates to deliver the web directly to and directly away from each cylinder without the interposition of intermediate looping mechanism.

It is to be understood that many modifications of the construction are possible. Thus, for instance, the constantly-running web guiding and directing rolls 51, 52, 55, and 56, while preferably arranged so as to both guide and feed, may be arranged to perform only a guiding function. So, too, while these rolls are preferably positively driven, they may be arranged to be turned by friction, or if arranged to act as guides only they need not be driven at all. So, also, the rolls 61 62 65 66, while preferably arranged substantially in contact with and to be driven by the cylinders with which they coöperate, may be driven in other ways than by the cylinders and may perform their feeding function in connection with devices other than the cylinders. Furthermore, as it is new, so far as I am aware, to arrange rolls which act purely as compensating rolls, as herein shown and described, it is to be understood that the rolls 61 62 65 66 may be arranged so as not to act as feeding-rolls, but to act solely as compensating rolls.

Many other modifications, which need not be herein specifically stated, are possible. The invention is not, therefore, to be limited to the specific construction shown and described, but includes all modifications and changes which fall within its spirit and scope.

What I claim is—

1. In a flat-bed printing-machine employing a plurality of couples, the combination of a continuously-operating independent feeding mechanism for each couple which operates to feed the web to and away from said couple, and compensating devices by which the movement of the web is controlled, substantially as described.

2. In a flat-bed printing-machine employing a plurality of couples, the combination of a continuously-operating mechanism for each couple acting to feed the web to and away from said couple, means whereby the web is held stationary with respect to one member of each of the couples during the printing operation, and compensating devices by which the web is controlled, substantially as described.

3. In a flat-bed printing-machine employing a plurality of couples, the combination of a feeding mechanism for each couple which operates to feed the web toward and away from the couple, and compensating devices by which the web is controlled, said compensating devices forming a part of the feeding mechanisms, substantially as described.

4. In a flat-bed printing-machine employing a plurality of couples, the combination of a continuously-operating mechanism acting to feed the web to and away from each couple, means whereby the web is held stationary with respect to the surface of one member of the couple during the printing operation, and compensating devices by which the web is controlled, said compensating devices forming a part of the feeding mechanisms, substantially as described.

5. In a flat-bed web-printing machine employing a plurality of couples, the combination with each couple of a combined feeding and compensating mechanism, said mechanism being located substantially over the couple, as described.

6. In a flat-bed printing-machine, the combination with the printing-couple, of a continuously-operating feeding mechanism acting to feed the web directly and intermittently to the couple, substantially as described.

7. In a flat-bed printing-machine, the combination with the printing-couple, of a continuously-operating feeding mechanism acting to feed the web directly and intermittently away from the couple, substantially as described.

8. In a flat-bed printing-machine, the combination with the printing-couple, of a continuously-operating feeding mechanism acting to feed the web directly to and directly away from the couple, substantially as described.

9. In a flat-bed printing-machine, the combination with a printing-couple, of a continuously-operating feeding-in mechanism by which the web is fed to the couple, a continuously-operating feeding-out mechanism by which the web is fed away from the couple, and means whereby one of the continuously-operating feeding members of each feeding mechanism is caused to operate also as a compensating mechanism, substantially as described.

10. In a flat-bed printing-machine, the combination with a printing-couple, of a feeding mechanism consisting of continuously-operating feeding-in members acting at two points on the web to feed it forward, continuously-operating feeding-out members acting on the web at two points to feed it forward, and means whereby a part of each feeding mechanism is caused to act as a compensating mechanism, substantially as described.

11. In a flat-bed printing-machine, the combination with a feeding-roll, of means coöperating therewith whereby the web is continuously advanced, and means whereby the feeding devices are also caused to act as compensating devices, substantially as described.

12. In a feeding mechanism, the combination with a set of infeeding-rolls and a set of outfeeding-rolls, of means coöperating with the rolls whereby they act to continuously advance the web, and means whereby a roll of each set is caused to act as a compensating device, substantially as described.

13. In a web-feeding mechanism, the com-

bination with a feeding-cylinder, of means coöperating therewith to direct the web to and away from the cylinder, two rollers operating in connection with the cylinder to feed forward the web, and means whereby said rollers are caused to act as compensating devices, substantially as described.

14. In a flat-bed printing-machine, the combination with a feeding-cylinder, of means coöperating therewith to feed the web into and out of the machine, two rollers also cooperating with the feeding-cylinder, and means whereby said rollers are caused to act as compensating devices, substantially as described.

15. In a flat-bed printing-machine, the combination with a feeding-cylinder, of two rollers coöperating therewith to feed the web into and out of the machine, two other rollers also coöperating with the cylinder to feed the web into and out of the machine, and means whereby the last two rollers are caused to act as compensating devices, substantially as described.

16. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is continuously driven, a set of continuously-driven rollers operating in connection with the cylinder to feed the web into the machine, a set of continuously-driven rollers operating in connection with the cylinder to feed the web out of the machine, and means whereby a roller of each set is caused to act as a compensating device, substantially as described.

17. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is driven, means for directing the web toward and away from the cylinder, two rollers mounted in bearings carried on the shaft of the cylinder, means whereby the rollers are continuously driven, and means whereby the rollers and their bearings are given a vibrating movement whereby the rollers are caused to act as compensating devices, substantially as described.

18. In a printing-machine, the combination with a feeding-roll, of means for rotating it on its axis, means coöperating therewith whereby the roll is caused to feed forward the web, and means for giving the roll an additional movement to cause it to act as a compensating device, substantially as described.

19. In a printing-machine, the combination with a feeding-roll, of means for continuously rotating it on its axis, means coöperating therewith whereby the roll is caused to feed the web, and means for giving the roll an additional movement to cause it to act as a compensating device, substantially as described.

20. In a web-feeding mechanism, the combination with a cylinder, of means for continuously rotating it, a set of feeding-in rolls continuously driven from the cylinder and operating in connection therewith to feed the web into the machine, a set of feeding-out rollers continuously driven from the cylinder and operating in connection therewith to feed the web out of the machine, and means whereby a roll of each set is caused to act as a compensating device, substantially as described.

21. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is continuously driven, a gear revolving with the cylinder, a set of feeding-in rolls, pinions on the shaft of said rolls engaging the gear, a set of feeding-out rolls, pinions on the shaft of said feeding-out rolls also engaging the gear, whereby all the rolls are continuously rotated on their axes, and means whereby a roll of each set is given a vibrating movement to cause it to act as a compensating device, substantially as described.

22. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of means for directing a web toward and away from the cylinder, rocking levers carried on the shaft of the cylinder, two feeding-rolls carried by the levers, means for continuously driving the rolls, and means for rocking the levers, substantially as described.

23. In a web-feeding mechanism, the combination with a cylinder, of a continuously-driven feeding-in and a continuously-driven feeding-out roll coöperating therewith, a pair of levers mounted on the shaft of the cylinder, compensating devices carried by the levers, and means for rocking the levers, substantially as described.

24. In a web-feeding mechanism, the combination with a cylinder, of means for driving it, a feeding-in and a feeding-out roller coöperating therewith, a lever mounted on the shaft of the cylinder, compensating devices carried by the lever, and means for rocking the lever, substantially as described.

25. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is continuously driven, a cam mounted on the shaft of the cylinder, a continuously-driven feeding-in and a continuously-driven feeding-out roller coöperating with the cylinder, a lever, compensating devices carried by the lever, and means whereby the cam is caused to move the lever, substantially as described.

26. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is continuously driven, a cam mounted on the shaft of the cylinder, a continuously-driven feeding-in and a continuously-driven feeding-out roller coöperating with the cylinder, a lever mounted on the shaft of the cylinder, compensating devices carried by the lever, and means whereby the cam is caused to move the lever, substantially as described.

27. In a web-feeding mechanism, the combination with a cylinder, of means whereby it is continuously driven, a cam rotating in unison with the cylinder, a continuously-driven feeding-in and a continuously-driven feeding-out roller coöperating with the cylinder, a lever mounted on the shaft of the cylinder, compensating devices carried by

the lever, and means whereby the cam is caused to move the lever, substantially as described.

28. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of a gear rotating therewith, a feeding-in and a feeding-out roller driven from the gear, a cam on the shaft of the cylinder, a rocking lever on the shaft of the cylinder, feeding-in and feeding-out rollers carried by the lever and driven by the gear, and means whereby the cam is caused to rock the lever, substantially as described.

29. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of means for directing the web to and away from the cylinder, rocking levers mounted on the shaft of the cylinder, feeding-in and feeding-out rollers carried by the levers, means whereby said rollers may be moved toward and away from the cylinder, and means for rocking the levers, substantially as described.

30. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of means for directing the web to and away from the cylinder, a rocking lever mounted on the shaft of the lever, spring-mounted bearings carried by the lever, feeding-in and feeding-out rollers mounted in the bearings, and means for rocking the lever, substantially as described.

31. In a printing-machine, the combination with a printing-couple consisting of a reciprocating bed and a segment, of means for oscillating the segment about an axis, and two rollers located near the axis of oscillation of the segment and serving as guides over which the web is led to and away from the segment, substantially as described.

32. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of a continuously-driven feeding-in roll and a continuously-driven feeding-out roll coöperating therewith, a cam on the shaft of the cylinder, a rocking lever mounted on the shaft of the cylinder, compensating devices carried by the lever, a segment-gear on the lever, a shaft, a segment-gear on the shaft, and an arm also mounted on the shaft and having a bowl extending into the path of the cam, substantially as described.

33. In a flat-bed printing-machine, the combination with a printing-couple, of a continuously-driven cylinder, continuously-driven feeding-in and feeding-out rolls coöperating with the cylinder, means for oscillating the rolls, and suitable guides over which the web is led to the printing-couple from said oscillating rolls and from said couple to the rolls, said guides acting in connection with the rolls to control the movement of the web, substantially as described.

34. In a flat-bed printing-machine, the combination with a printing-couple, of a continuously-driven cylinder, a set of continuously-driven feeding-in rollers, a set of continuously-driven feeding-out rollers, means for oscillating a roller of each set so that it will act as a compensating device, and suitable guides between the printing-couple and the oscillating roller, said guides acting in connection with the rollers to control the movement of the web, substantially as described.

35. In a flat-bed printing-machine, the combination with a printing-couple, of means whereby the web is held stationary with respect to one member of the couple during the printing operation, a continuously-driven feeding-cylinder, a set of continuously-driven feeding-in rolls coöperating with the cylinder, a set of continuously-driven feeding-out rolls coöperating with the cylinder, means whereby a roll of each set is given an oscillating movement, and suitable guides over which the web is led from the oscillating feeding-rolls to the couple, said guides operating in connection with the oscillating rolls to control the movement of the web, substantially as described.

36. In a flat-bed printing-machine, the combination with a reciprocating bed, of an impression member mounted in suitable bearings, standards above said bearings, a web-feeding and compensating mechanism mounted in said standards, a vertical shaft located alongside the standards, and means whereby said shaft is caused to drive the feeding and compensating mechanism, substantially as described.

37. In a printing-machine, the combination with a printing-couple consisting of a flat bed and a segment, of means for oscillating the segment about an axis, a guide located near the axis of oscillation of the segment and over which the web is led to the segment, a second guide also located near the axis of oscillation of the segment and over which the web is led away from the segment, and an intermediate spacing-guide, substantially as described.

38. In a printing-machine, the combination with a printing-couple consisting of a flat bed and a segment, of means causing the segment to oscillate about an axis, two rollers located near the axis of oscillation of the segment, and serving as guides over which the web is led to and away from the segment, and an intermediate roller serving as a spacing-guide, substantially as described.

39. In a web-feeding mechanism, the combination with a continuously-driven cylinder, of continuously-driven feeding-in and feeding-out rollers for feeding the web to and away from the cylinder, rocking levers mounted on the shaft of the cylinder, spring-mounted bearings carried by the levers, feeding-in and feeding-out rollers mounted in the bearings, and means for rocking the levers, 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.