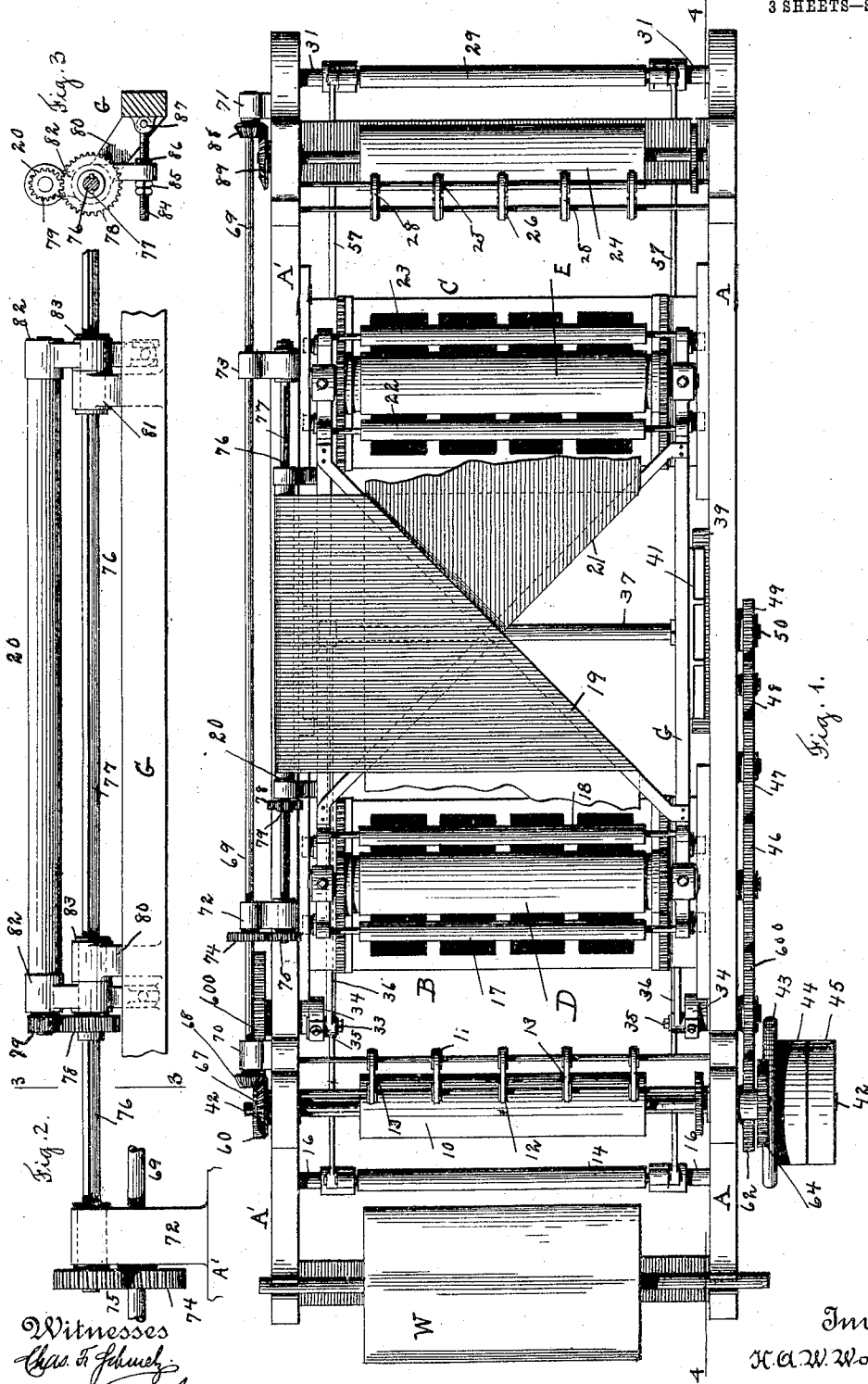


H. A. W. WOOD.
PRINTING MACHINE.

APPLICATION FILED JAN. 13, 1894. RENEWED SEPT. 12, 1901.

3 SHEETS—SHEET 1.



Witnesses
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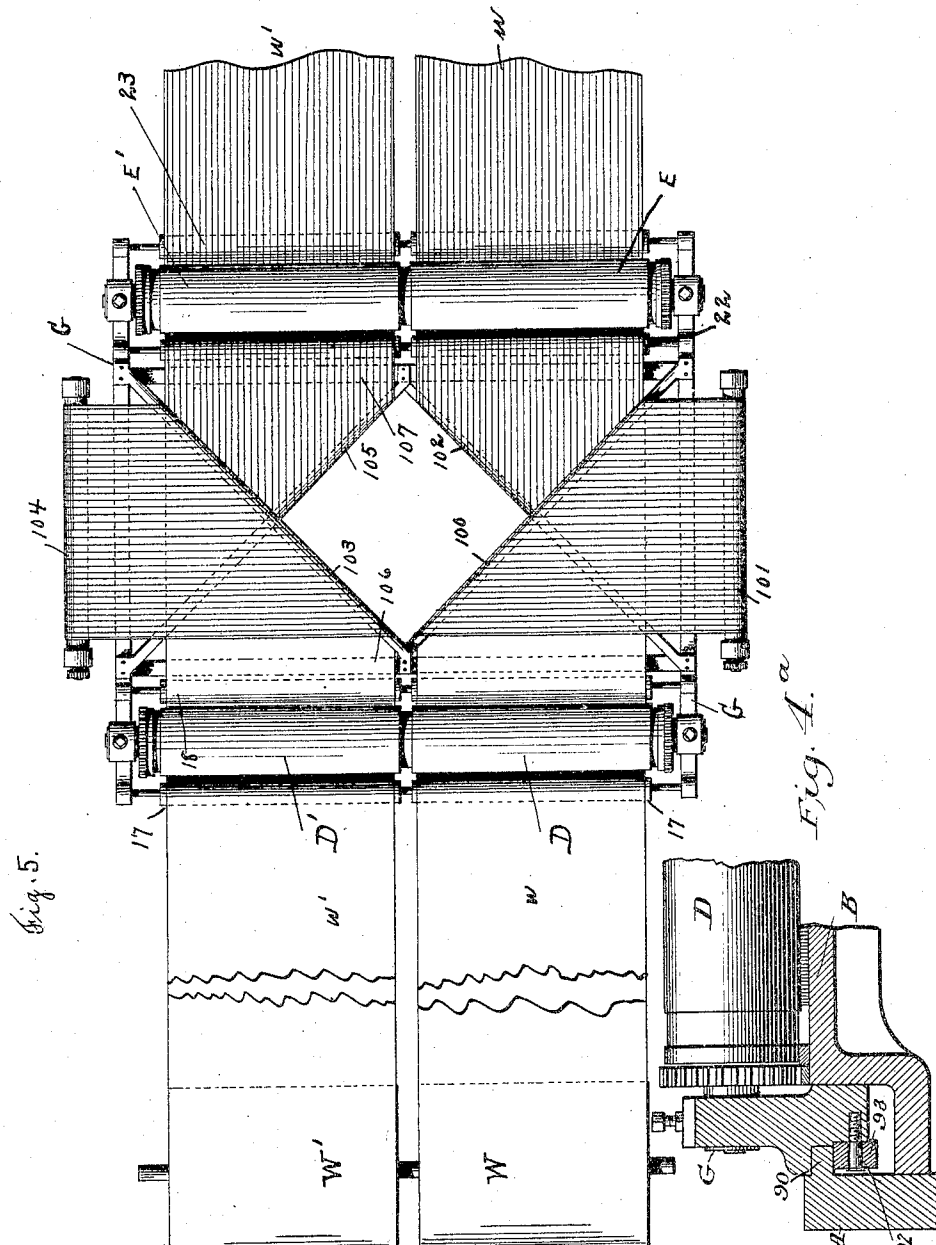


Fig. 5.

Fig. 4. a

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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-MACHINE.

SPECIFICATION forming part of Letters Patent No. 789,195, dated May 9, 1905.

Application filed January 13, 1894. Renewed September 12, 1901. Serial No. 75,173.

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-Machines, of which the following is a specification.

The aim of this invention is to improve the parts and arrangement of parts used in traveling-cylinder web-printing presses; and to this end the invention consists of the devices described and claimed in this specification, and illustrated in the accompanying three sheets of drawings, in which—

Figure 1 is a plan of a printing-press embodying my improvements. Fig. 2 is an elevation, on an enlarged scale, of a part I term the "parallel roll." Fig. 3 is an end elevation showing the gearing for driving this parallel roll. Fig. 4 is a sectional elevation taken on the line 4 4 of Fig. 1, showing the operative parts of the press. Fig. 4^a is a detail view, on an enlarged scale, showing the way the carriers are mounted; and Fig. 5 is a plan of a carriage or carrier of a press of this character illustrating a modification.

My invention consists in improving and arranging the apparatus in a traveling-cylinder web-perfecting printing-press whereby the same can be conveniently and compactly arranged, and whereby the feeding and manipulating of the web is accomplished in a superior manner, and whereby a powerful driving mechanism for the impression-cylinders is provided.

Referring to the drawings and in detail, A A' represent the usual side frames of a press of this character. Mounted between the side frames are the stationary form-beds B and C, which preferably are arranged in the same horizontal plane and one in advance of the other.

G G represent two reciprocating carriers, in which are mounted the impression-cylinders D and E, which impression-cylinders carry the usual gears which mesh with stationary racks on the beds, so that the impression-cylinders will oscillate as they are reciprocated and so that they will register with

the beds. In effect, the two carriers G G constitute a single carriage, which carries the various reciprocating apparatus, and where I use the term "carriage" I mean to imply a framework or carriage which is adapted to carry the necessary parts. A turner device is arranged in the carriage between the two impression-cylinders and is adapted to turn the web over between the two impression-cylinders, so that, if desired, the press can be used as a perfecting-press.

Arranged at each side of each impression-cylinder are the usual form-rollers F F, which may serve to ink the forms so that an impression can be taken for each forward and backward movement of the impression-cylinders and to which ink may be supplied in any of the usual ways, not necessary here to show or describe.

Referring to Fig. 4, it will be seen that the web may be led into the press from any suitable source, as from the web-roll W. From the roll W the web is led around the continuously-running feeding-in cylinder or drum 10. Coacting with this drum 10 is a set of tapes 13. These tapes may be mounted on tape-pulleys 110, 11, and 12, which tape-pulleys are mounted on shafts journaled in the main frames, and which shafts may be driven by any suitable gearing, so that the tapes will turn with the feeding-in drum 10. By this means the web will be held tightly onto the drum 10, and by the rotation of the parts above described the web will be continuously and evenly unwound from the roll W. From the drum 10 the web passes around the vibrating looping-roller 14, which is mounted in arms 15, which arms 15 are journaled or pivoted on shaft 16, mounted in the main frames. From the looping feeding-in roller the web passes to the guide or roll 17, carried by the carriage. It will be seen that this path of the web involves very few turns and that the path of the web from the looper 14 to the guide 17 is a straight line, which is advantageous for fast manipulation of the web. From the roll 17 the web is led under the impression-cylinder D, then up around the guide or roll 18, carried by the carriage.

If desired, the web can be led directly from the roll 18 to the roll 22, also carried by the carriages, when it is desired to print twice on the same side of the web; but in most cases it is desired to perfect the web by the two impression-cylinders, and to accomplish this I arrange a turner device in the carriage between the two impression-cylinders. This turner device consists of the turner-bar 19, the parallel roll 20, and the turner-bar 21. The parallel roll 20 may be driven continuously by mechanism, as hereinafter described, so as to coax the web forward. The web is led up over the turner-bar 19, down around the parallel roll 20, and then up over the turner-bar 21, and it will be seen that by this path of the web through the turner device the first printed side of the web does not touch any of the turning or deflecting apparatus. From the turner or deflecting apparatus or from the roll 18, as the case may be, the web is led to the roll or guide 22, carried by the carriage, then under the impression-cylinder E up over roll or guide 23. From the roll or guide 23 the web passes to the looping-out roller 29, which is mounted in arms 30, which arms 30 are journaled on a common shaft 31, mounted in the side frames A A'. From the looping-out roller the web passes around the continuously-revolving delivery-drum 24, and coacting with this delivery-drum are tapes 28, which may be mounted on tape-pulleys 25, 26, and 27, and these tapes may be driven by any suitable gearing, so that the web will be continuously delivered from the drum 24. It will be seen that the web passes in a straight line from the guide or roll 23 to the looper 24, and it will also be seen that by this passage the intermittent feed of the web does not have to take place around corners, whereby the same can be done at a high speed, as there is little strain put on the web.

A short shaft 32 is journaled in the side frame A and carries on the inner end of the same a crank 34, which crank 34 carries a crank-pin 33, which may be adjusted by the screw 35. The crank-pin 33 connects by pitman 36 to a shaft 37, and on this shaft 37 are mounted two traveling gears 38, which mesh with racks 39, mounted on the side frames, and these racks 39 may be made adjustable and secured in place, if desired, as by means of screws 40. The gears 38 mesh with racks 41, secured on each of the carriers G of the carriage. A similar shaft 32 and connections to the shaft 37 are mounted in the other frame, A', and the two shafts 32 are connected by suitable gearing, so as to turn synchronously, whereby the carriages will be reciprocated forward and backward.

42 represents a shaft which may constitute the driving-shaft of the machine and to which power may be applied by any suitable means, as by means of tight and loose pulleys 44 and

45 and the balance-wheel 43. Mounted on this shaft 42 are pinions 60, which engage gears 600, secured on each of the short shafts 32, and by this means the cranks for driving the cylinders are turned synchronously.

From the gear 600, carried by the side frame A, a shaft 50, journaled in the two side frames, is driven by means of intermediates 46, 47, and 48 and gear 49, secured on said shaft 50. The gear 49 is made one-half the size of the gears 600, whereby the shaft 50 will turn twice for each forward and backward movement of the impression-cylinders. Mounted on this shaft 50 are cams 51. Journaled in the side frames A A' is a shaft 52, which carries vibrating arms 53, each of which arms carries a stud 54 and a roller 55, bearing on one of the cams 51.

The two sets of vibrating arms 15 and 30, which carry the looping-rollers, are connected together by means of links 57, and one of the vibrating arms, 53, is connected, as by means of connection 56, to each of these links 57.

Springs 59 are arranged between stationary parts and collars 58, fitted on the links 57, and by this means the rolls 55 will be kept nicely against the cams. By this means the looping, feeding-in, and feeding-out rollers will be positively and nicely actuated. Other forms of cams, such as box-cams, may be used.

From the gear 60 on the side frame A the feeding-in drum 10 and its coacting tapes are continuously rotated, as by means of gears 61, 62, 63, and 64, whereby the web will be continuously fed into the machine.

On the rear end of the shaft of the cylinder 10 is mounted a bevel-gear 67, which drives a bevel-pinion 68, fast on the end of the parallel shaft 69, which is journaled in brackets 70, 71, 72, and 73, secured to the main frame A'. Mounted on the shaft 69 is a gear 74, which meshes with and drives a gear 75, which is secured on the end of the parallel shaft 76, which shaft has one or more keyways 77 cut therein. This parallel shaft 76 is journaled in brackets 72 and 73, secured to the side frame, and also in brackets 80 and 81, carried by the rear carriage-frame G.

Journaled in and arranged to move with the brackets 80 and 81 are sleeves 83, which have keys which fit into the slots in the shaft 76, and fitting on one of these sleeves is a gear 78. Brackets 82 are hung on these sleeves, and in the outer ends of these brackets 82 the parallel shaft 20 of the turner is mounted. The parallel roll 20 is driven from the gear 78 by means of a gear 79, secured to the end of the same.

Passing through the lower ends of the brackets 82 are bolts 84, which are pivoted to the carriage-frame, as at 87, and on these bolts are mounted check-nuts 85 and 86. By this means the roll 20 can be swung about the shaft 76 as a center by adjusting the check-

nuts 85 and 86 and by this means can be slightly adjusted to obtain register of the web between the two impression-cylinders.

It will be seen that by the gearing previously described the roll 20 will be continuously turned in a direction to coax the web from one impression-cylinder to the other. This is intended to help the feed of the web, and the movement of the web around the turner due to the reciprocation of the carriage will cause the web to slip on the roll 20 independent of this rotation. In actual practice the rotation of the roll 20 will help the web through the turner when the feed takes place and will not affect the web while a portion of the same is held stationary between the two loopers.

In some cases I contemplate omitting the gearing for driving the parallel roll 20 and letting the same run freely or making the same a stationary roll, as found desirable.

On the end of the shaft 69 is mounted a bevel-pinion 88, which meshes with and drives a bevel-gear 89 and by this means the feeding-out cylinder 24, and by suitable gearing its coacting tapes are continuously driven.

The carriers G are mounted so as to be capable of movement on the gibs or guides 90, which project in from the side frames, the beds being dropped to permit the carriage-rollers to fit under these gibs 90. On the outer sides of the carriers are mounted studs 92, and on these studs rollers 93, which bear on the under sides of the gibs 90, are placed, and by this means the upward thrust on the carriers due to the impression will come on the rolls and will thus make an easy running or reciprocating carriage.

The operation of my press is thought to be clear from the previous description.

The web between the loopers 14 and 29 is held stationary while the cylinders are moving in impression, the web running through the turner on this movement, but not being shifted or changed. When the cylinders are off the impression in either direction, the loopers are moved to the right, which will shift the web relatively to the form-beds and which will allow the next printing movement of the cylinders to make a fresh impression.

It will be seen that the path of the web through this machine is very simple and that few turns are put in the same, whereby the feed can quickly and positively take place. This is accomplished by moving the looping feeding-in and feeding-out rollers substantially parallel to the movement of the impression-cylinders, whereby the web may pass directly from the looping feeding-in roller to the guiding mechanism of the carriage and directly from the guiding mechanism of the carriage to the looping feeding-out roller, and it will be seen that this path of the web saves two corners over the usual and old constructions, around which it is necessary to drag or

pull the web. Also it will be seen that the continuously-rotating drum and coacting tapes form an improved means for continuously feeding the web into and out of the press. Also it will be seen that a crank-actuated driving mechanism is used and that the same is housed inside of the side frames and out of the way. This is an important point in practice, as there is considerable danger to the pressman when the crank is mounted on the outside of the press, although it is evident that similar driving mechanism can be arranged on the outside of the frame of the press, if desired. Also it will be seen that the improved mounting of the carriages, as before described, aids in the fast running of the machine.

In Fig. 5, in the third sheet of the drawings, I have shown a further carrying out of my invention. In this particular case I have arranged the carriage and impression-cylinders so that two webs $w w'$ can be printed and these webs can be led in from the two rolls W and W', or a single wide web may be split into sections, if preferred. In this instance the impression-cylinders D D' and E E' are made of sufficient width to accommodate the two webs. The web W is turned out to the front side of the press over the turner-bar 100, down over the roll 101, and then up over the turner 102 to the second impression-cylinder E. The web W' is turned out to the rear side of the press over the top bar 103, down over the roll 104, and up over the turner 105 to the second impression-cylinder E'. By this means, if desired, I can use two independent webs in the machine.

Some of my improvements, especially those relating to the looping mechanism, are capable of use in a machine which prints upon one side of a web or in a machine in which but one impression-cylinder is employed. For example, in the machine shown in the drawings I can use either impression-cylinder alone—for example, the first impression-cylinder D—in which case the web would be led from the guide 18 directly to the feeding-out looper 29, or in case I should desire to use the second impression-cylinder E alone the web would be led from the feeding-in looper 14 directly to the roll 22. When one cylinder is thus used alone, of course the form-rollers F F' of the idle cylinder are removed. The machine as thus used constitutes, in effect, a single-cylinder machine.

The details and arrangements herein described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each

form-bed, and a turner device mounted in the carriage in the path of the web between the impression-cylinders.

2. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, and a turner device arranged in the carriage in the path of the web between the two impression-cylinders, said turner device consisting of two turner-bars and a parallel roll.

3. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each of said form-beds, and a turner device arranged in the carriage in the path of the web between the two impression-cylinders, consisting of two turner-bars and a parallel roll, with gearing for driving the parallel roll.

4. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, and a turner device also carried by the carriage, and arranged in the path of the web between the two impression-cylinders, said turner device consisting of two turner-bars and a parallel roll, the parallel roll being adjustable for the purpose of obtaining register between the two impression-cylinders.

5. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each of said form-beds, a turner device arranged in the carriage in the path of the web between the impression-cylinders, consisting of two turner-bars and a parallel roll, the parallel roll being continuously driven by gearing, and adjustable for the purpose of obtaining register between the two impression-cylinders.

6. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, a turner device arranged in the carriage in the path of the web between the two impression-cylinders, consisting of two turner-bars and a parallel roll, a constantly-driven parallel shaft, and gearing carried by the carriage, whereby the parallel roll will be constantly rotated from the parallel shaft.

7. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, a turner device arranged in the carriage in the path of the web between the two impression-cylinders, consisting of two turner-bars and a parallel roll, a constantly-driven parallel shaft, brackets pivoted and adjustable on this shaft carrying the parallel roll, and gearing between the parallel roll and the parallel shaft, whereby the shaft will transmit motion to the parallel roll, independent of the movement of the carriage.

8. The combination in a web-printing press

of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, guides carried by the carriage whereby the web can be directed under each impression-cylinder, and guides whereby the web can be led from one impression-cylinder to the other, of means for feeding the web into and out of the press, and two loopers adapted to shift or feed the web relatively to the form-beds, the web passing directly from the feeding-in looping-roller to the guide directing the web to the first impression-cylinder, and directly from the guide directing the web from the second impression-cylinder to the looping feeding-out roller.

9. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, and a turner device arranged between the impression-cylinders, means for feeding the web continuously into and out of the press, and two loopers vibrating substantially parallel to the movement of the traveling carriage.

10. The combination in a web-printing press of two form-beds, a traveling carriage carrying an impression-cylinder coacting with each form-bed, and a turner device arranged between the impression-cylinders, means for feeding the web into and out of the press consisting of rotating drums and coacting tapes, and two looping-rollers arranged to move substantially parallel to the movement of the impression-cylinders.

11. The combination in a web-printing machine of a stationary form-bed, a traveling carriage carrying an impression-cylinder cooperating therewith, guides for the web arranged in said carriage, one at each side of the impression-cylinder, a looping device for shifting the web arranged at each side of the cylinder, means for feeding the web continuously in and out of the press, the parts being so arranged that the web passes directly from the feeding-in looping device to the guide at one side of the impression-cylinder, and from the guide at the other side of the impression-cylinder to the feeding-out looping device.

12. The combination in a web-printing press of a stationary form-bed, a traveling carriage carrying an impression-cylinder cooperating therewith, guides for the web arranged in said carriage, one at each side of the impression-cylinder, looping devices arranged at each side of the impression-cylinder and moving substantially parallel with the movement of the reciprocating carriage, means for feeding the web into and out of the machine, the parts being so arranged that the web passes directly from the feeding-in looping device to the guide at one side of the impression-cylinder, and from the guide at the other side of the impression-cylinder to the feeding-out looper.

13. The combination in a web-printing ma-

chine of two stationary form-beds, a traveling
impression-cylinder coacting with each form-
bed, guides for the web arranged at each side
of each of the cylinders and moving there-
5 with, feeding-in and feeding-out loopers,
means for feeding the web into and out of the
press, the parts being so arranged that the
web passes from the feeding-in looper directly
to the guide at one side of the first impres-
10 sion-cylinder, and from a guide at one side of

the second impression-cylinder directly to the
feeding-out looper.

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

H. A. WISE WOOD.

Witnesses:

HENRY W. COZZENS, Jr.,

B. WOOD.