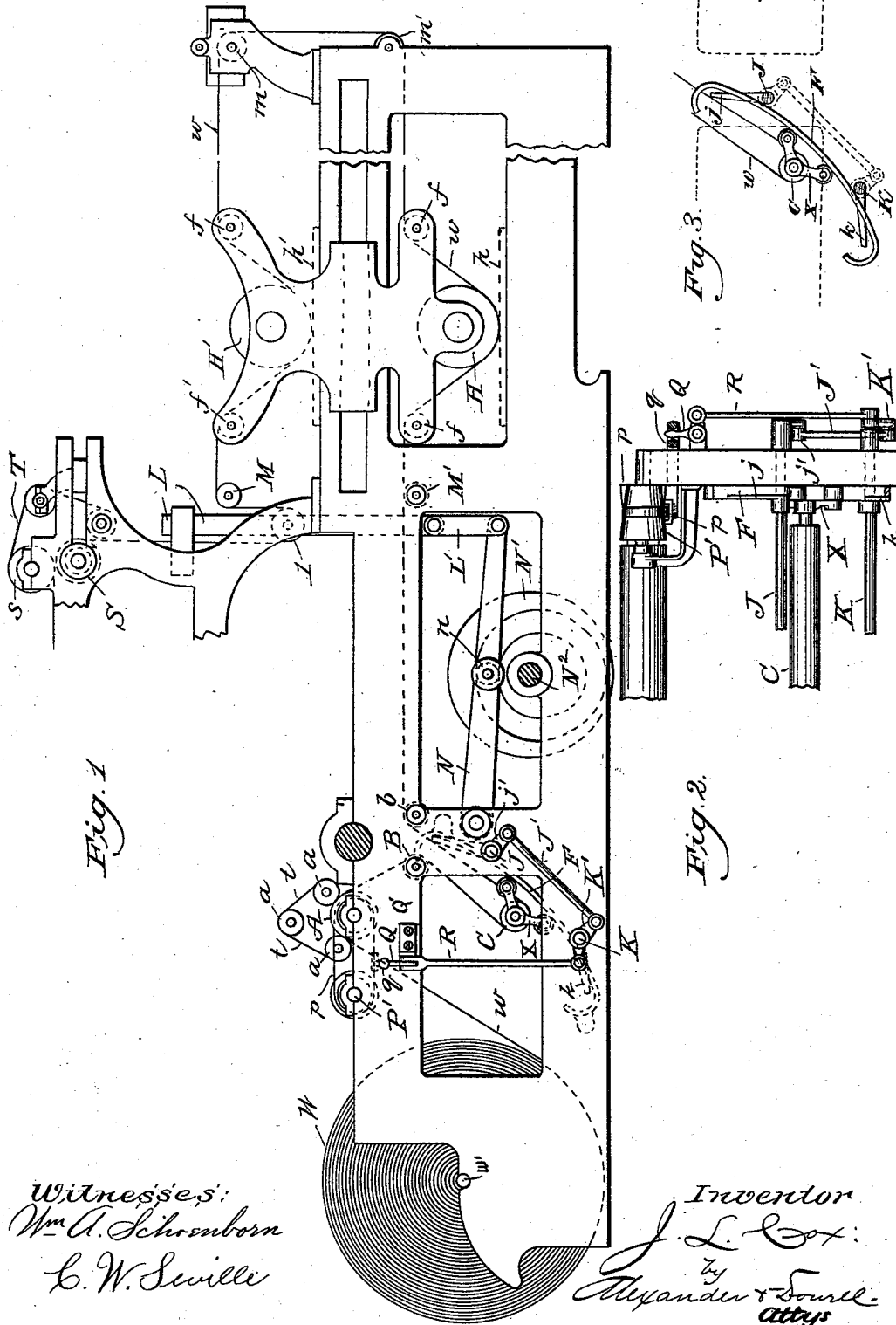


No Model.)

J. L. COX.
PAPER WEB FEEDING DEVICE.

No. 531,162.

Patented Dec. 18, 1894.



Witnesses:
Wm. A. Schrenborn
L. W. Swille

Inventor
J. L. Cox:
by
Alexander & Soule
Attys

UNITED STATES PATENT OFFICE.

JOSEPH L. COX, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO THE DUPLEX
PRINTING PRESS COMPANY, OF SAME PLACE.

PAPER-WEB-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 531,162, dated December 18, 1894.

Application filed December 9, 1892. Serial No. 454,653. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. COX, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Paper-Web-Feeding Devices and Automatic Feed-Governors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention is an improvement in paper web feeding devices for printing presses, especially designed for use with perfecting presses having flat beds and reciprocating cylinders such as are described in my Patents No. 459,813, of September 22, 1891, and No. 478,503, of July 5, 1892.

In my present invention instead of a positively operated roller for looping and tensioning the web between the feed and delivery mechanisms, I employ a gravital loop roller or governor which rests upon the web and takes up the slack of the infed web and tensions the latter by its weight, and the object of this invention is to provide novel means for controlling the action of the feed rollers and devices so that a sufficient amount of web will be always fed into the press according to the demand of the delivery and web shifting mechanism, and the proper tension of the portion of the web between the feed and delivery mechanism be maintained. In other words the paper web will be automatically fed into the press at a greater or less speed, according to the requirements of the delivery or web shifting mechanisms; or as may be necessary to compensate for unequal movements of the governor which would otherwise result in its failing to collect enough web to supply the delivery or web shifting device, or in its collecting more web than is required for the proper working thereof.

In the drawings, Figure 1 is a diagrammatical side elevation of a perfecting printing press with my improved web feeding devices. Fig. 2 is a detail view of the devices for changing the speed of the feed roll. Fig. 3 is a detail side view of the lever mechanism as shown in Figs. 1 and 2.

In the press represented in the drawings,

the type beds h, h' are arranged parallel one over the other, and the impression cylinders H, H' co-operate therewith. The web w is led in from the roll W , over a feeding and looping device hereinafter described, to and over a web guide roller M' , then between the cylinder H and bed h to and under a guide roller m' , up over a guide roller m , back between cylinder H' and bed h' to and over a roller M , then under a looping roller l , all substantially as in Patent No. 478,503 aforesaid, and then up over a delivery roller S over which it is drawn by coacting roller s and coaxing tapes T constructed substantially as set forth in my Patent No. 459,813. The cylinders and the web guide rollers f, f' are preferably reciprocated over the beds by means not shown, such for instance as described in my aforesaid patents.

The web looping roller l is journaled in reciprocating bars L which are connected at their lower ends by links L' to the free ends of vibrating levers N which are pivoted at their other ends to the main frame and are provided at an intermediate point with a wrist pin n which enters a cam groove in a wheel N' journaled on a suitably driven shaft N^2 , by which means the levers are vibrated. This mechanism is substantially the same in construction and operation as that which is fully shown and described in my application for Letters Patent, Serial No. 444,318, filed August 27, 1892, and need not be further described herein.

The web w of paper is led from roll W which is mounted on a carrying roll w' to a feed roller A over which it is drawn by means of tapes t, t , running over rollers a, a . The tapes t , operate substantially like the delivery tapes T . On one end of roll A is a cone pulley P which is driven by a belt p from an oppositely facing cone pulley p' mounted on a shaft P' which may be driven at a uniform speed by any suitable means not shown from any convenient power. By shifting belt p laterally on the pulleys, the speed of roller A may be increased or diminished.

From the feed devices the web is led over a roller B journaled on the main frame and under a governor roller C , then over a roller b journaled on the frame beside roller B , to

roller M'. The web is thus looped under the governor roller C which as shown is journaled in a wheeled carriage X traveling up and down on curved bars F attached to the main frame. The bars F are curved at their upper and lower ends to limit the movement of the carriage X.

J and K are rock shafts journaled in the frame transversely of and below bars F and respectively near the upper and lower ends thereof. Shaft J is provided with an upwardly extending crank arm *j* which lies beside bar F, and shaft K has a crank arm *k* also lying beside bar F so that when carriage X moves sufficiently up or down on the bars, its wheels will strike arm *j* or *k* and rock the respective shaft. On the outer end of shaft K is a double armed crank lever K' to one arm of which is pivotally connected one end of a rod J' the other end of said rod being connected to a crank arm *j'* on the end of shaft J so that the movements of the shafts J and K will be synchronous. The other arm of crank K' is connected to one end of a rod R the other end of which is connected to one arm of a bell crank lever Q pivoted on a bracket Q' attached to the main frame. The other arm of lever Q loosely engages a sliding belt shifter *q* which controls the position of belt *p*. Therefore, it will be seen that when shaft J is rocked by the carriage X striking arm *j*, the belt *p* will be shifted so as to accelerate the speed of roller A, and when shaft K is rocked by the carriage striking arm *k*, the belt will be shifted so as to diminish the speed; but so long as the governor roller and carriage move only the proper distance, up or down, the belt will be unshifted.

In the operation of the device in connection with presses such as are described in my patents aforesaid, the web is intermittently moved forward over the type but is continuously fed into the press. During the time the web is being imprinted the governor C descends and loops the web fed in by roll A so as to maintain it at an equal tension. Should too much be fed in, the governor carriage strikes arm *k* and consequently the belt is shifted so as to retard the feed. When the impression is over and the cylinder is off the type, the web is drawn forward (by the descent of roller *l* as described in my Patent No. 478,503 or by the action of the delivery roller and tapes as described in my Patent No. 459,813 or other suitable means) so as to present a fresh surface to be impressed. This movement of the web, being more rapid than the feed, is permitted by the governor C, which is pulled up by the web and lets off the loop (or enough of the loop) to supply the demand, and then immediately begins its gravitational descent, forming another loop of the infed web, and at the same time preserving the tension of the web between the feed and delivery. Should the length of web in the loop be insufficient (owing to slacking of speed of the feed roller) to supply the demand of the

looping or delivery rollers, the governor carriage would run up on the bars and strike arm *j* thereby causing the shifting of belt *p* so as to increase the speed of the feed roller, and should the length of web in the loop become too great so that the proper tension of the web is endangered, the carriage would descend and strike arm *k* thereby causing the shifting of belt *p*, so as to retard the speed of the feed roller. Thus the reciprocating governor will eventually so regulate the position of the belt *p*, that the amount of web fed in will be exactly what is required by the delivery, and any slight variations in the demand of the delivery be compensated for, and should the governor exceed or fall short of the proper movement at any reciprocation, it will by so doing automatically cause the feed to be so retarded or increased as to immediately compensate for its erroneous movement.

The variable speed governor for controlling the tension and feed of webs may be applied to various forms of presses and I do not limit myself to its use in connection with the press indicated in the drawings.

Having described my invention, what I claim as new, and desire to secure by Letters Patent thereon, is—

1. The combination in a web feeding device, of devices for forwarding the web from its source of supply, an intermittently acting feed governing device arranged in the path of the web beyond the forwarding devices, and means for regulating or adjusting the action of the forwarding devices from the action of the feed governing device, substantially as described.

2. The combination of a looping roller, a paper feed mechanism between the paper carrying roll and roller, and mechanism substantially as described whereby said feed mechanism is controlled by the movement of said roller, substantially as described.

3. In a printing press the combination of a governor roller for looping the web located between the feed and printing mechanisms, a feed mechanism for drawing the web from the said roll, the cone pulleys and belt for driving said feed mechanism, and mechanism whereby the belt is shifted to retard or accelerate the speed of the feed mechanism controlled and actuated by the said governor roller, substantially as and for the purpose specified.

4. In a printing press the combination of a feed mechanism, a paper delivery, a governor roller for looping the web between the feed mechanism and printing mechanism, and mechanism for retarding or accelerating the speed of the feed mechanism operated by the governor roller when it exceeds or falls short of its desired length of travel, substantially as described.

5. The combination of a feed mechanism driven by cone pulleys and belt, the belt shifter, a vibrating governor roller located between the feed and printing mechanisms, the

rock shaft and the arms thereon adapted to be alternately shifted by the governor roller, and the connections between said rock shafts and the belt shifter, substantially as specified.

5 6. The combination of the feed mechanism, the governor roller movably mounted on bars, the vibrating arms at opposite ends of the bars, the connections between said arms and mechanism operated thereby for varying and
10 controlling the speed of the feed mechanism, substantially as described.

7. In a printing press the combination of the printing devices, a web carrying roll, a feed mechanism, for drawing the web from the web
15 carrying roll, a governor web looping roller between the feed mechanism and printing devices, and mechanism for varying the speed of the feed mechanism controlled by the governor roller, substantially as and for the purpose
20 set forth.

8. The combination of mechanism for producing an impression, and web delivery mechanism, a web looping roller interposed between the printing mechanism and delivery
25 for intermittently drawing the web forward, with a web feed and a governor roller adapted to form a loop in the web between the web feed and printing mechanism, and means substantially as described for regulating the
30 speed of said feed controlled by said governor roll, substantially as and for the purpose described.

9. The combination of mechanism for taking an impression, a web feed, a governor roll,
35 a speed regulator for the feed rollers controlled by the position of the governor roller, a delivery mechanism, a positively actuated looping roller co-acting therewith, and web guide rollers, all constructed and arranged to
40 operate substantially as and for the purpose specified.

10. The combination of two type beds, two impression cylinders, a delivery mechanism, and a web feed, and web guide rollers for con-

ducting the web from the roll successively 45 between the beds and cylinders and thence to the delivery, a web feed looping roller interposed between the second bed and the delivery, and mechanism for positively reciprocating said roller, with a governor roller
50 interposed between the web feed and first bed adapted to maintain the tension of the web and means for regulating the speed of the feed controlled by said governor roller, substantially as described. 55

11. The combination of the type beds, two impression cylinders, a delivery mechanism and web feed, and web guide rollers for conducting the web successively between the
60 beds and cylinders and thence to the delivery, a web looping roller interposed between the second bed and the delivery and mechanism for positively reciprocating said roller; with a governor roller interposed between the web
65 feed and first bed adapted to tension the web, and mechanism controlled by the excessive rise or descent of the governor roll for increasing or diminishing the speed of the feed, substantially as and for the purpose described.

12. The combination of two type beds arranged one above the other, and two impression cylinders coacting therewith for taking
70 an impression, a paper feed, a governor roll mounted on curved bars, a speed regulator mechanism for the web feed controlled by the position of the governor roll, a delivery mechanism, a positively actuated looping roller
75 coacting therewith, and web guide rollers, all constructed and arranged to operate substantially as and for the purpose described. 80

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH L. COX.

Witnesses:

ALEX. S. STEUART,
ARTHUR E. DOWELL.