(No Model.) 6 Sheets—Sheet 1.

L. C. CROWELL.

WEB PRINTING MACHINE.

No. 446,829. Patented Feb. 17, 1891.

Fig. 1.

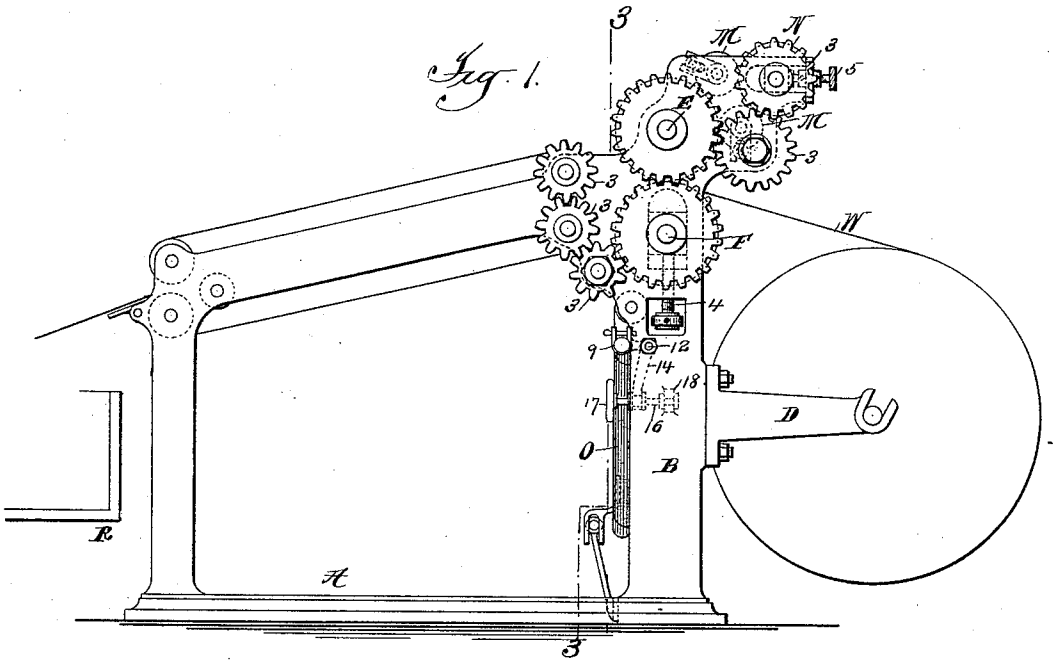
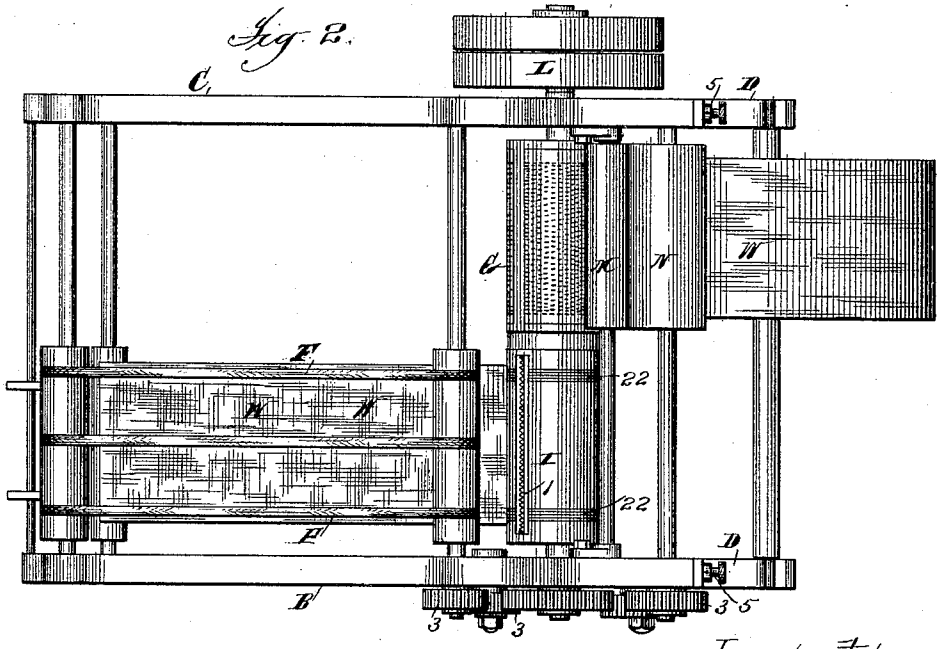


Fig. 2.



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(No Model.) 6 Sheets—Sheet 2.

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Fig. 3.

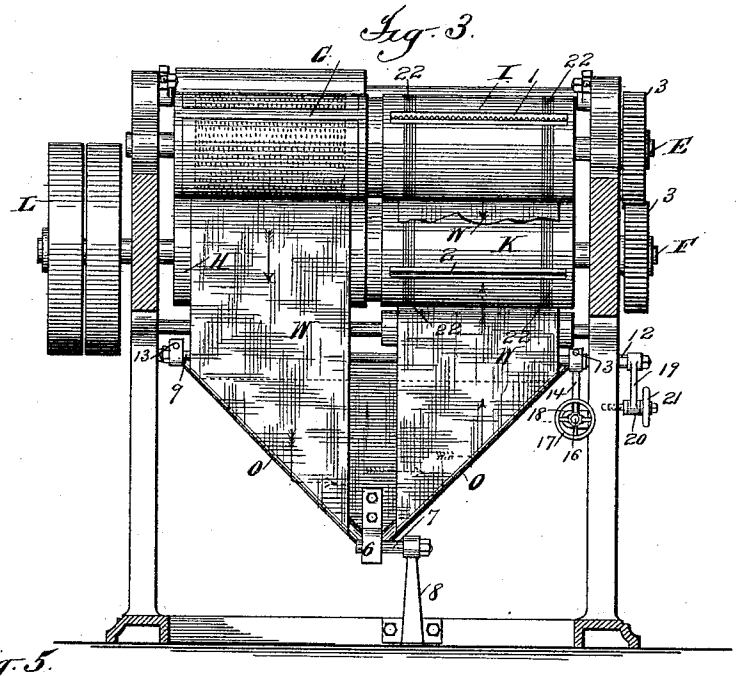


Fig. 5.

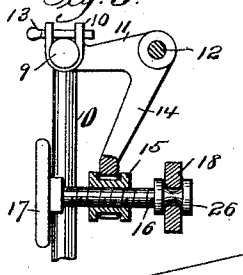


Fig 4.

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(No Model.) 6 Sheets—Sheet 3.

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Fig. 6.

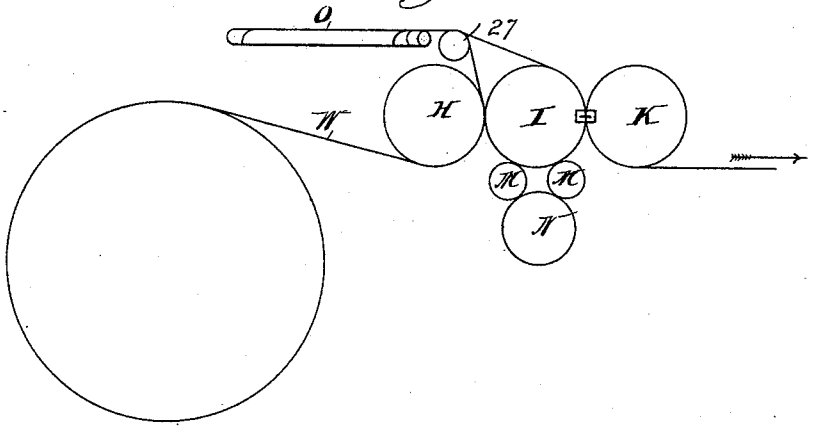
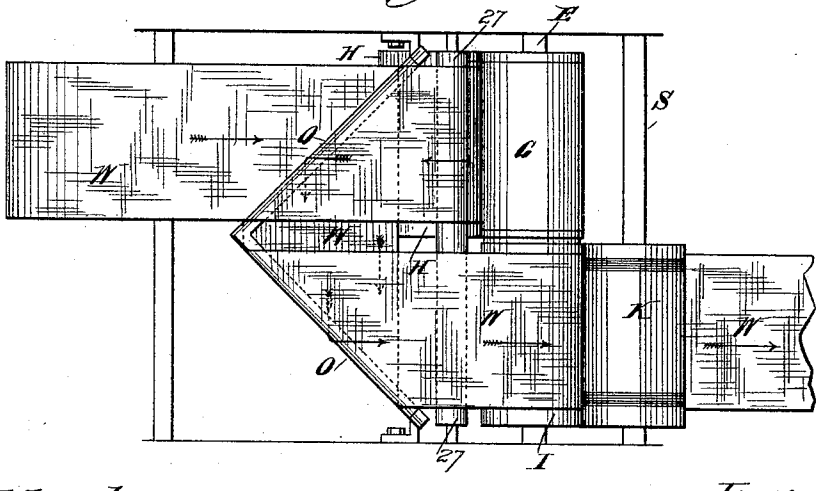


Fig. 7.



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Fig. 8.

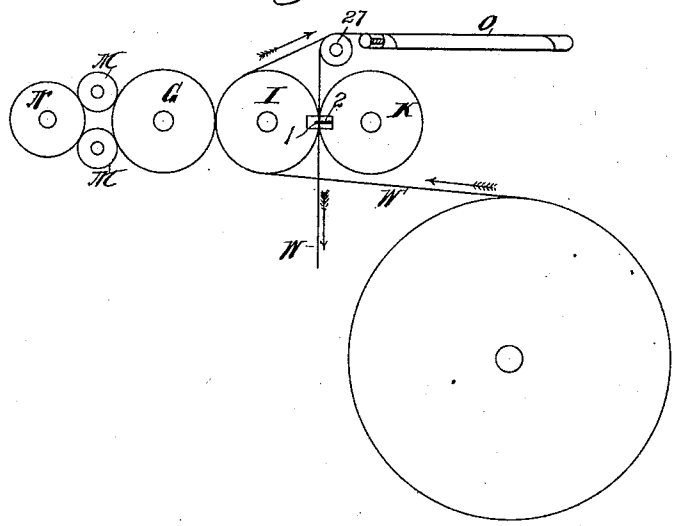
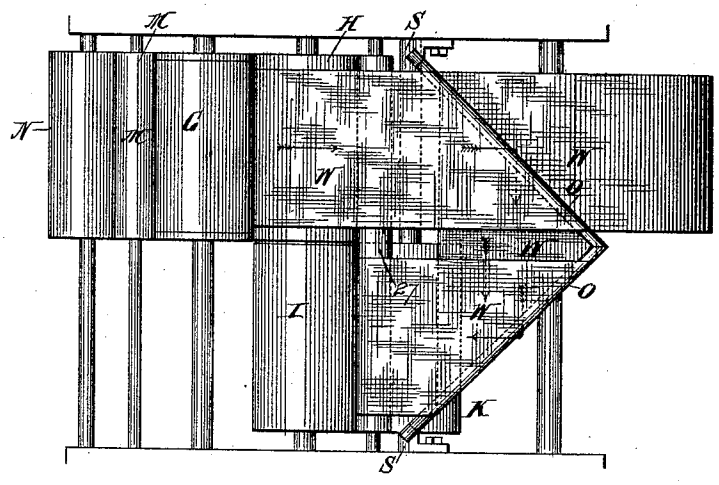


Fig. 9.



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Fig. 10.

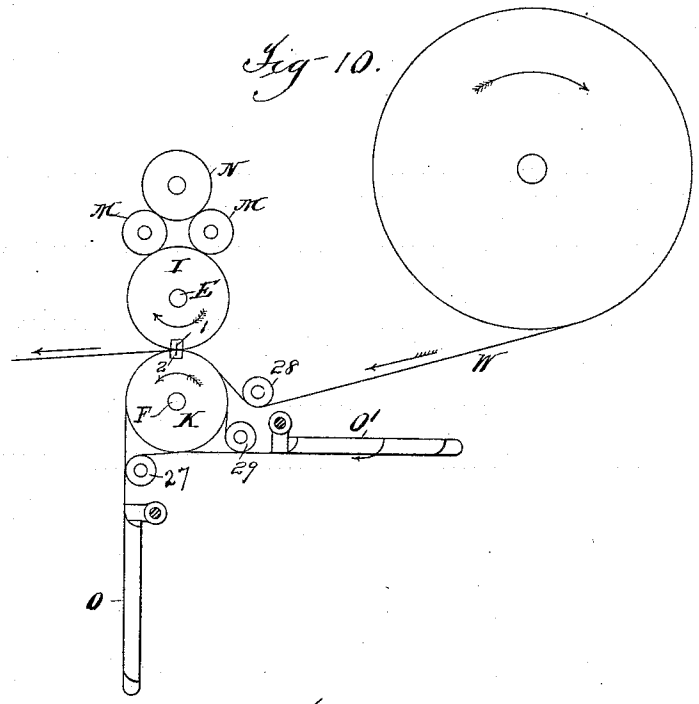
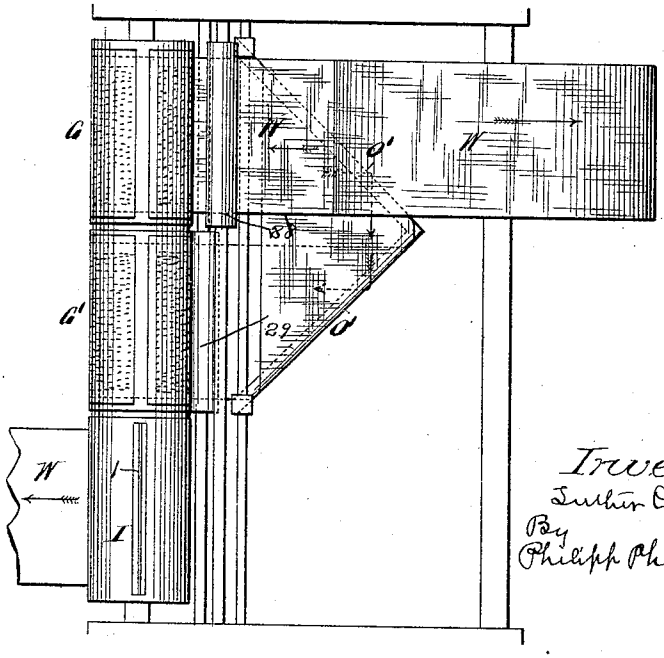


Fig. 11.



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(No Model.)

6 Sheets—Sheet 6.

L. C. CROWELL.

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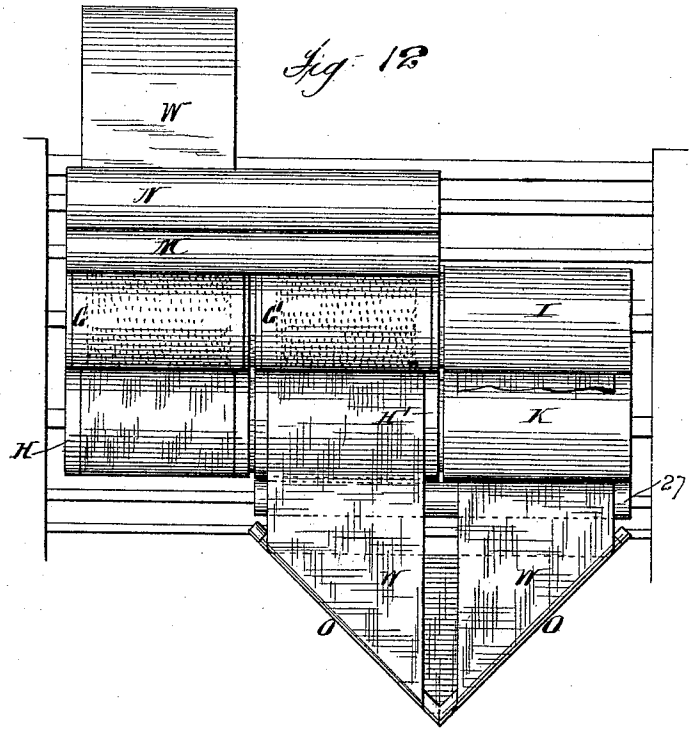


Fig. 12.

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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, STEPHEN D. TUCKER, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

WEB-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,829, dated February 17, 1891.

Application filed June 19, 1890. Serial No. 356,001. (No model.)

To all whom it may concern:

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

This invention relates to web-printing machines, its object being to provide a machine of this class in which the number of parts shall be reduced to a minium, and which shall be more simple and compact and require less adjustment than those heretofore in use.

A further object is to provide an improved means for adjusting the position of the web-turner used in certain well-known classes of web-printing machines.

With these objects in view my invention consists, generally, in combining with the printing-cylinders of a web-printing machine a web-turner and a pair of perforating or cutting rolls, one or both of the axes of which are in line with and preferably carried by the shafts of the printing-cylinders, and in various constructions and combinations of parts, all of which will be more particularly described in the specification, and pointed out in the claims.

While the features constituting the present invention are of general application in web-printing machines, they are especially designed for small machines used in printing circulars, bills, and small papers of all kinds for which a light, simple, and cheap machine is especially desirable.

For a full understanding of my invention a detailed description of a web-printing machine embodying the same will be given, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of a web-printing machine with my improvements, the perforating-rolls being carried, respectively, by the shafts of the type and impression cylinders. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section on line 3 3 of Fig. 1. Fig. 4 is a diagram showing the lead of the web. Fig. 5 is a detail of the means for adjusting the web-turner, and Figs. 6 to 12 show various modifications. Figs. 6 and 7 are respectively a side diagram and plan view of a construction in which one of the perforating-rolls is carried by the shaft of the type-cylinder. Figs. 8 and 9 are similar views of a construction in which one of the perforating-rolls is carried by the shaft of the impression-cylinder. Figs. 10, 11, and 12 are respectively a side diagram, plan view with the inking-rolls omitted, and a rear elevation of a perfecting-press.

Referring now particularly to Figs. 1 to 5, the frame of the machine shown consists of the base A, on which are mounted the side frames B C, in which is supported the printing and delivery mechanism. The side frames consist only of front and rear standards connected at their upper ends by a plate extending longitudinally of the machine, the frames being enlarged at the front of the machine sufficiently to provide bearings for the printing, inking, and cutting rolls, and each side frame being provided with a projecting arm D, forming supports for the web-roll, a very light and simple frame thus being formed. In this frame are mounted the shafts E F, the former carrying the type-cylinder G and the latter the impression-cylinder H. Upon these shafts are carried also the cutting-rolls, which, with the delivery mechanism shown, consist of a pair of perforating and feeding rolls I K, the former being provided with a perforating-blade 1 and the latter with a groove 2, and both being provided preferably with rubber bands 22 for increasing their hold upon the edges of the paper, all as shown in Fig. 3. The shaft F is driven by a pulley L, connected to any suitable source of power, and the two shafts E F are geared together by gears 3, as usual in this class of mechanism. The shaft F, carrying the impression-cylinder and grooved roll, is preferably mounted, as shown, in bearings adjustable by means of the screws 4 at each side of the frame, in order to secure the accurate adjustment necessary for the printing and perforating rolls.

The inking mechanism may be of any suitable form, but preferably, for simplicity of construction, consists of the form-rolls M and the inking-roll N, the latter being a self-feeding roll or supplied with ink in any suitable manner. These rolls also are driven from the shaft F by gears 3, and the form-rolls are preferably mounted in spring-bearings, and the inking-roll made adjustable by screws 5, as shown.

For the purpose of transferring the web from the printing-rolls to the perforating-rolls I use a turner O, of the construction shown in my prior Letters Patent, No. 212,444, the operation of the turner in connection with the printing-cylinders and perforating-rolls being the same as that of the patent in connection with printing and perfecting cylinders.

For the purpose of adjusting the turner O so as to secure the correct registry and severance of the printed sheets I provide the following means: The turner O is provided at its lower end with a fork 6, which slides transversely of the machine on a short shaft 7, supported by a standard 8, projecting upward from the base-frame. The turner is carried upon a rod or shaft 9, which is supported in forks 10, formed in crank-arms 11, carried by a rock-shaft 12, supported in the side frames of the machine, the shaft 9 being held in position within the forks by pin 13, the withdrawal of which permits of the removal of the turner. The crank-arm 11 on one side of the machine is provided with a downwardly-extending arm 14, thus forming a bell-crank lever. This arm 14 is forked at its lower end and embraces a grooved nut 15, carried by and moving on a screw 16, mounted in the frame, and provided with a handle 17, by which it may be operated. For supporting this screw 16 a slotted lug 18 extends inward from the frame of the machine, and the screw is secured in said slot so as to rotate therein and move transversely of the machine, but to be held from longitudinal movement by shoulders 26. The rock-shaft 12 is mounted to slide in the frame, and is extended outside the same at one end, and the extended end is provided with an arm 19, which carries a screw 20, entering the side frame and provided with a handle 21, by which it may be operated, the movement of the screw 20 in the frame thus carrying the shaft 12 and turner O transversely of the machine, these parts being held in their adjusted position by the same screw.

The delivery mechanism may be of any form, but consists, preferably, of the single set of accelerated tapes P Q, by which the sheets are delivered to the packing-box R, the tapes P Q extending from rolls 23 next the perforating and feeding rolls to rolls 24 at the end of the machine, the rolls 23 being driven by gears 3 from the shaft F. These tapes are arranged, as is usual in this class of mechanism, so that the sheets are not nipped until they reach the end of the machine, when pressure upon the sheet by rolls 24 and 25, the latter, being placed below tape Q and above the line of movement of the same, snaps the sheet from the web at the line of partial severance.

The operation of the parts described will be readily understood from the drawings and a brief statement of the lead of the web. The web W passes from the web-roll at the front end of the machine upward between the type and impression cylinders G H, thence downward over roll 27 around the turner and upward in front of and between the perforating and feeding rolls I K, where the sheet is partially severed, and passes thence into the control of the accelerated tapes P Q, by which, as previously described, the sheet is fully severed from the web and delivered to the packing-box R.

For the purpose of adjusting the web-turner vertically it is necessary only to rotate the screw 16 in either direction, when the turner is raised or lowered, as desired, this upward and downward movement being permitted by the fork 6 moving freely upon shaft 7. For adjustment of the turner transversely of the machine the screw 20 is operated so as to carry the shaft 12 in either direction, this movement of the turner and shaft being permitted by the free movement of the screw 16 in the slotted lug 18 and of the fork 6 longitudinally of the shaft 7.

The construction described provides a very simple and convenient means of adjusting the turner, while the latter is held firmly in its adjusted positions, transverse movement being prevented by screw 21, vertical movement by screw 16 and nut 15, and swinging movement by fork 6 and shaft 7.

In the construction thus far described two shafts only are employed for carrying the printing-cylinders and perforating and feeding rolls, the latter being mounted in line respectively with the type and impression cylinders.

In Figs. 6 and 7 I have shown a construction in which three parallel shafts are used, one perforating-roll being mounted upon the shaft E of the type-cylinder, the grooved perforating-roll K being mounted upon an independent shaft S. In this construction the turner O is preferably placed above the printing-cylinders and the inking mechanism M N below the same, as shown; but any other arrangement of parts may be adopted. The lead of the web W is substantially the same as that described in connection with Figs. 1 to 4, the web passing first between the type and impression cylinders G H, thence upward over roll 27 and around the turner, and thence forward over the perforating-roll I on the shaft of the type-cylinder and downward between it and perforating-roll K to the delivery machanism.

In Figs. 8 and 9 I have shown a construction in which, as in Figs. 6 and 7, three parallel shafts are used for the printing-cylinders

and perforating-rolls, the perforating-roll I in this case, however, being mounted, not upon the shaft of the type-cylinder, but upon that of the impression-cylinder, the shaft S of the perforating-roll K being mounted between the shaft of the impression-cylinder and the web-roll. In this construction, also, the turner is preferably mounted above the printing-rolls; but the construction of Figs. 6 and 7 is varied, the type-cylinder G being placed between the impression-cylinder and the perforating-roll K and the inking-rolls M N outside the printing-roll and in the same horizontal plane. The web W is led upward between the type and impression cylinders, thence over roll 27 and around the turner and downward between the perforating-rolls I K to the delivery mechanism.

Figs. 10, 11, and 12 show one form of a perfecting-press of this type of machine. In this construction the usual pair of printing and perfecting cylinders are used, the perfecting type and impression surfaces G′ H′ being placed between the printing-cylinders G H and the perforating-rolls I K, all the printing and perforating rolls being mounted upon two shafts, as in the construction shown in Figs. 1 to 4. In this construction of a perfecting-press two turners are necessary, a second turner O′ being introduced to transfer the web for the perfecting-impression.

The arrangement of the parts may be varied widely, but a simple and convenient arrangement is shown, in which the shafts E F are arranged in a vertical plane, and the turner O′ is placed horizontally and the turner O vertically, the inking mechanism being placed above the printing-cylinders. The web W is led horizontally under the roll 28 to and between the printing-cylinders G H, thence around the cylinder H and over and around the turner O′, returning under the roll 29, then passing between the perfecting-cylinders G′ H′, thence downward around the roll 27 and over the turner O, returning below the perforating-roll I and horizontally between it and the perforating-roll K, whence the web passes to the delivery-tapes.

It will be seen that by my construction I provide a very simple and compact machine, in which the number of operating parts are greatly reduced, and that all these parts are mounted close together and driven by a single short train of gears. The use of intermediates for transferring power from one end of the machine to the other, as usual in printing-machines, is entirely avoided, the action of the parts thus being rendered more positive and accurate.

By mounting the perforating and feeding rolls upon the shafts of the type and impression cylinders the amount of adjustment necessary in the machine is lessened, these parts being always in adjustment relatively to each other, it being necessary therefore only to adjust the web-turner for the purpose of securing the accurate registry and perforation of the sheet, while it is preferable that the perforating-rolls should be carried by the shafts of the printing-cylinders, thus lessening the number of shafts to be driven and securing the relative accurate adjustment of these parts.

Some of the advantages of my machine, especially those of simplicity and compactness, may be obtained by mounting the perforating-rolls on independent shafts in line with the shafts of the printing-cylinders, and such construction forms a part of my invention.

In printing-presses of small size, to which the improvements constituting this invention are especially applicable, it will be found that supports at each end, as shown, will be sufficient for the shafts carrying the printing-cylinders and perforating-rolls. In large machines, however, it will sometimes be found desirable to provide a central support for these shafts.

It will be understood that the delivery mechanism and inking mechanism may be of any desired form, these features constituting no part of my invention, and that other devices commonly used in web-printing machines—as, for instance, numbering, dating, folding, and pasting mechanisms—may be used in the machine in which the present invention is embodied.

What I claim is—

1. In a web-printing machine, the combination, with the type and impression cylinders, of a web-turner and a pair of cutting or perforating rolls the axis of one of which is in line with the axis of the type or impression cylinder, substantially as described.

2. In a web-printing machine, the combination, with the type and impression cylinders, of a web-turner and a pair of cutting or perforating rolls the axes of which are in line with the axes of the type and impression cylinders, substantially as described.

3. In a web-printing machine, the combination, with the type and impression cylinders, of a web-turner and a pair of cutting or perforating rolls, one of which is carried by the shaft of the type or impression cylinder, substantially as described.

4. In a web-printing machine, the combination, with the type and impression cylinders, of a web-turner and a pair of cutting or perforating rolls carried by the shafts of the type and impression cylinders, substantially as described.

5. In a web-printing machine, the combination, with a pair of printing and perfecting type and impression cylinders and a web-turner for transferring the web for the perfecting impression, of a pair of cutting or perforating rolls having their axes in line with the axes of the type and impression cylinders, and a web-turner for transferring the web to the cutting-rolls, substantially as described.

6. In a web-printing machine, the combination, with a pair of printing and perfecting

type and impression cylinders and a web-turner for transferring the web for the perfecting impression, of a pair of cutting or perforating rolls carried by the shafts of the type and impression cylinders, and a web-turner for transferring the web to the cutting-rolls, substantially as described.

7. The combination, with a web-turner, of a rock-shaft provided with arms on which the turner is supported, means for rocking said shaft for raising or lowering the turner, and means for shifting said shaft longitudinally to adjust the turner sidewise, substantially as described.

8. The combination, with a web-turner, of a rock-shaft provided with arms by which the turner is supported, means for rocking said shaft for raising or lowering the turner, means for shifting said shaft longitudinally to adjust the turner sidewise, and means for securing the turner against swinging movement while permitting the vertical and sidewise movement, substantially as described.

9. The combination, with the web-turner O, of rock-shaft 12, having arms 11, on which the turner is supported, arm 14 on said rock-shaft, and screw 16, mounted in the frame and engaging said arm to rock the shaft, substantially as described.

10. The combination, with the web-turner O, of rock-shaft 12, having arms 11, on which the turner is supported, arm 14 on said rock-shaft, screw 16, mounted in the frame and engaging said arm to rock the shaft, and fork 6 and shaft 7, securing the turner against swinging movement, substantially as described.

11. The combination, with the web-turner O, of rock-shaft 12, having arms 11, on which the turner is supported, said rock-shaft being mounted to slide transversely of the frame, arm 14 on said rock-shaft, screw 16, mounted in the frame to slide sidewise while held from longitudinal movement and engaging arm 14 to rock the shaft, and screw 21, entering the frame and carried by said rock-shaft for moving the shaft endwise, substantially as described.

12. The combination, with the web-turner O, of rock-shaft 12, having arms 11, on which the turner is supported, said rock-shaft being mounted to slide transversely of the frame, arm 14 on said rock-shaft, screw 16, mounted in the frame to slide sidewise while held from longitudinal movement and engaging arm 14 to rock the shaft, screw 21 entering the frame and carried by said rock-shaft for moving the shaft endwise, and fork 6 and shaft 7 for preventing swinging movement of the turner, substantially as described.

13. The combination, with a web-turner, of a rock-shaft provided with arms on which the turner is supported, and means for rocking said shaft for adjusting the turner, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:
T. H. PALMER,
T. F. KEHOE.