(No Model.) 4 Sheets—Sheet 1.

W. SCOTT.

PRINTING MACHINE.

No. 584,274. Patented June 8, 1897.

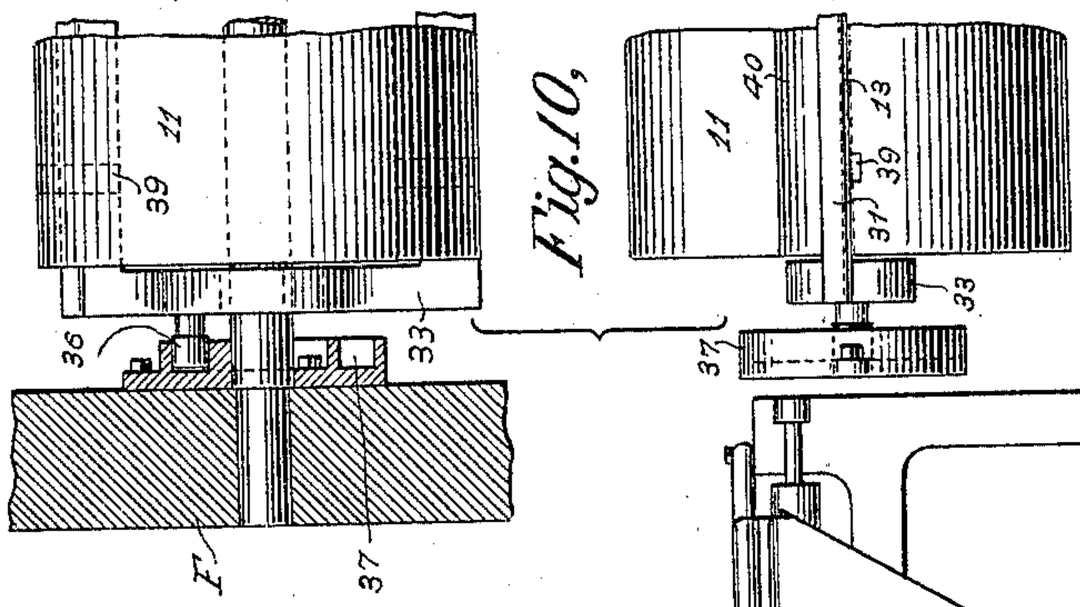

Fig. 10,

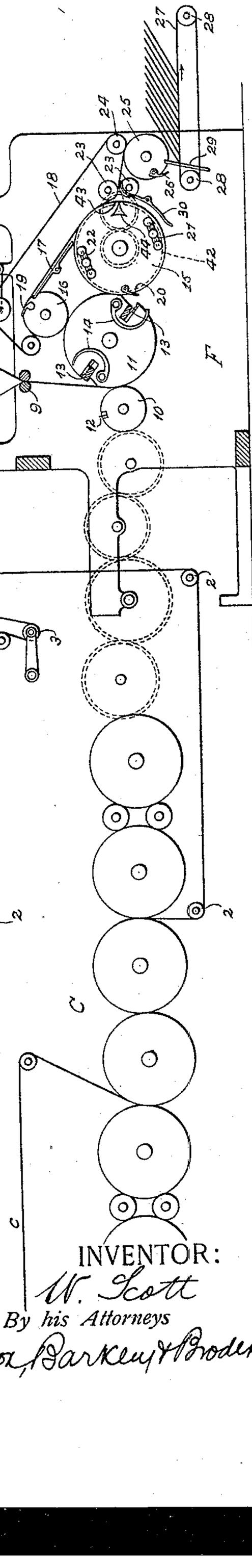

Fig. 1,

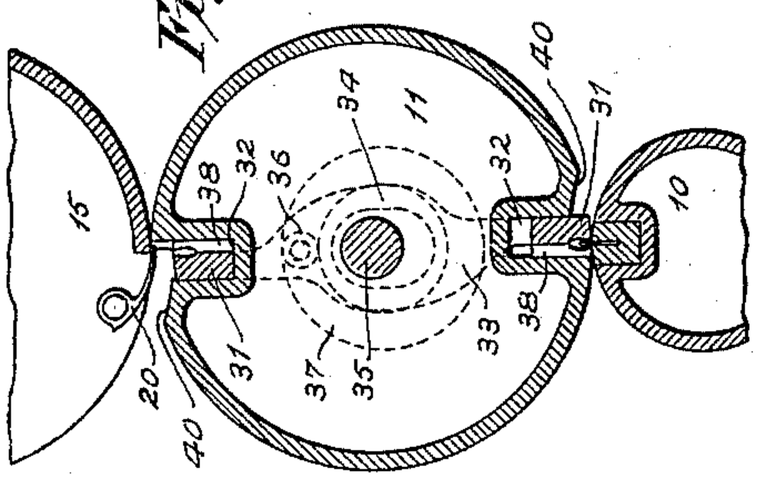

Fig. 11,

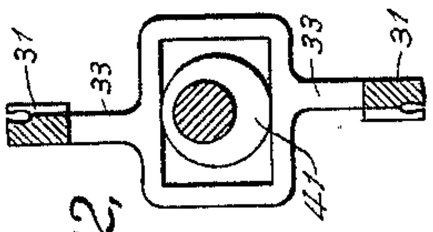

Fig. 12,

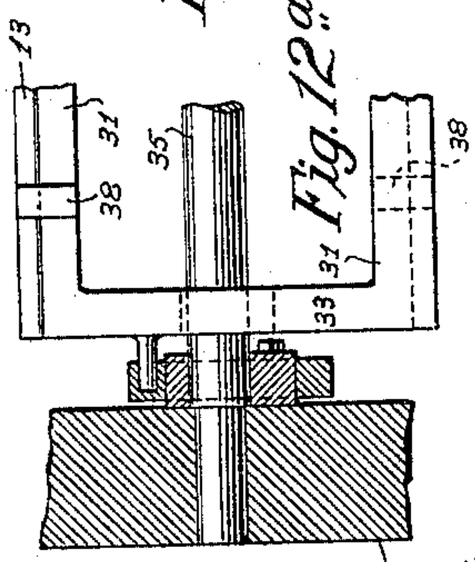

Fig. 12a.

WITNESSES:

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INVENTOR:

W. Scott

By his Attorneys

Wilcox, Barney & Broder

(No Model.)

4 Sheets—Sheet 2.

W. SCOTT.

PRINTING MACHINE.

No. 584,274. Patented June 8, 1897.

Fig. 17.

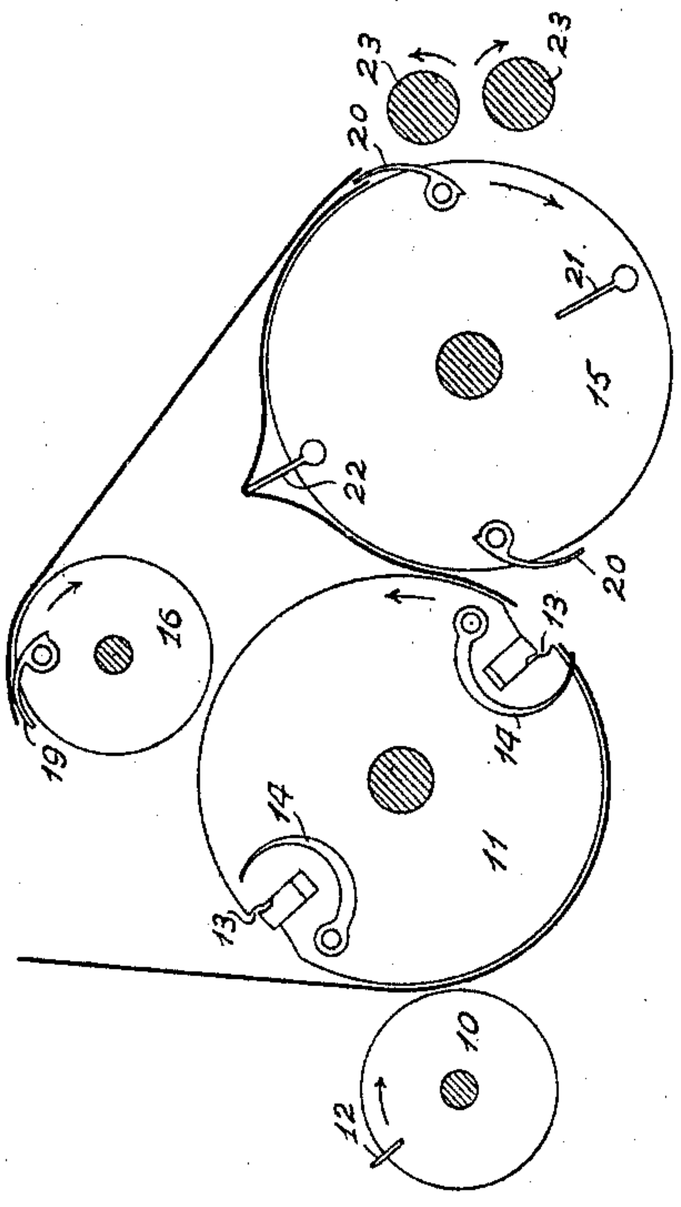


Fig. 18.

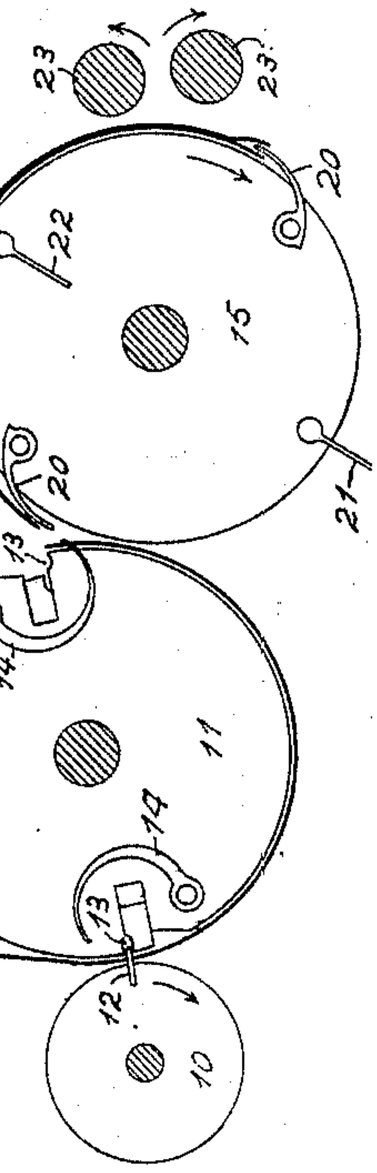


Fig. 2.

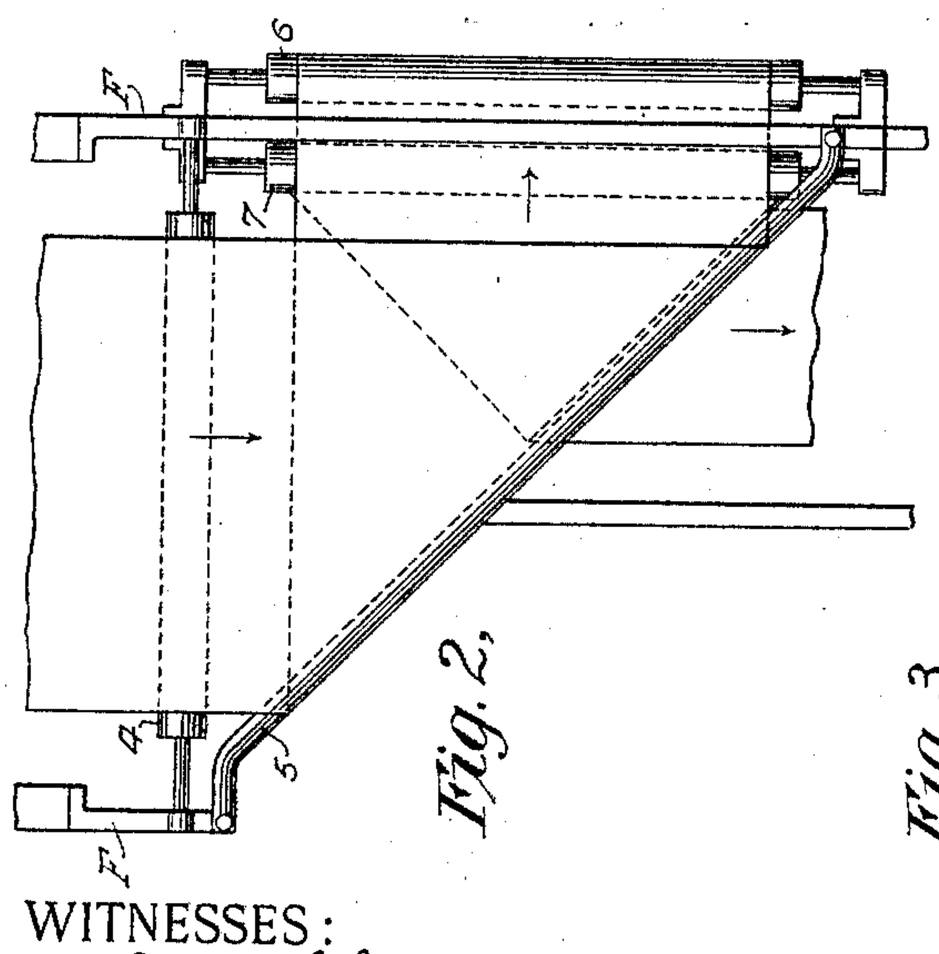
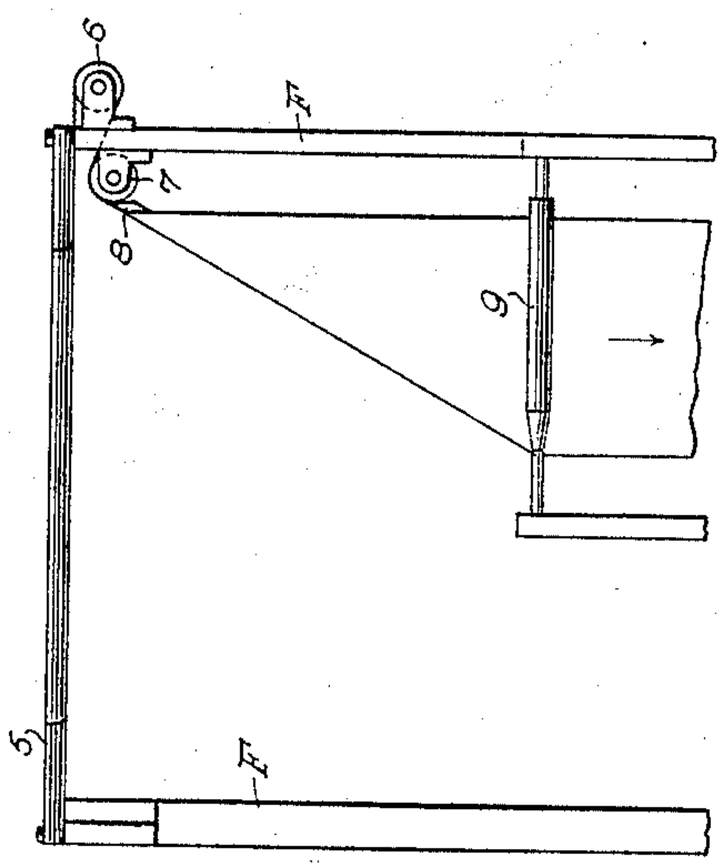


Fig. 3.



WITNESSES:
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H. W. Lloyd.

INVENTOR:
W. Scott
By his Attorneys
Wilcox, Barkley & Brodek

(No Model.)

4 Sheets—Sheet 3.

W. SCOTT.

PRINTING MACHINE.

No. 584,274. Patented June 8, 1897.

Fig. 4,

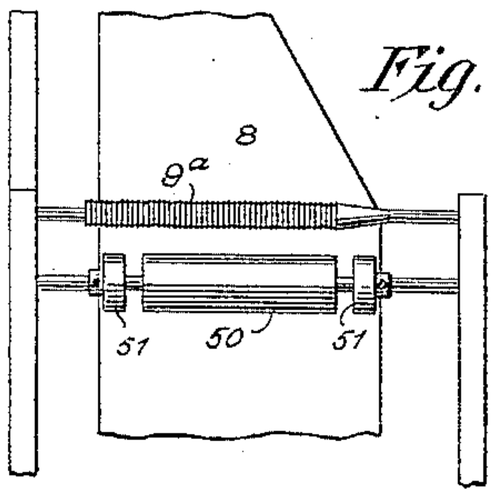

Fig. 5,

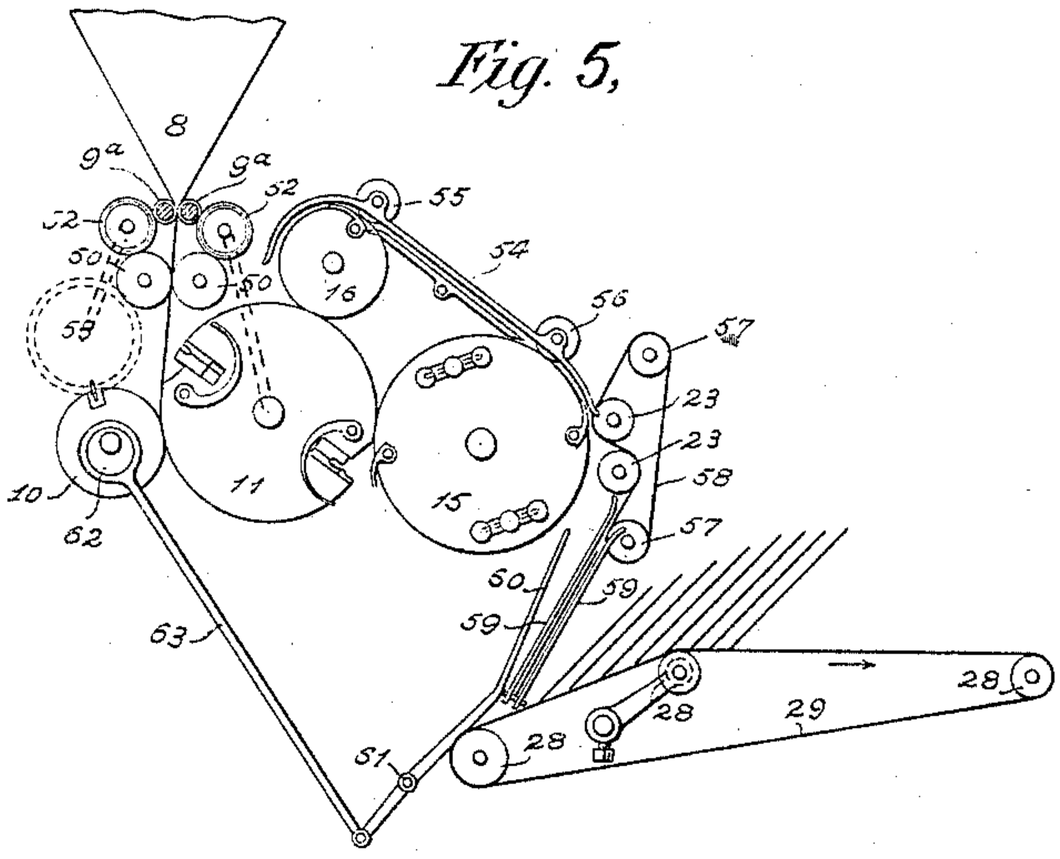

Fig. 9,

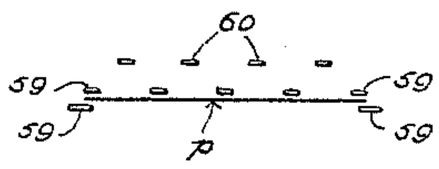

Fig. 6,

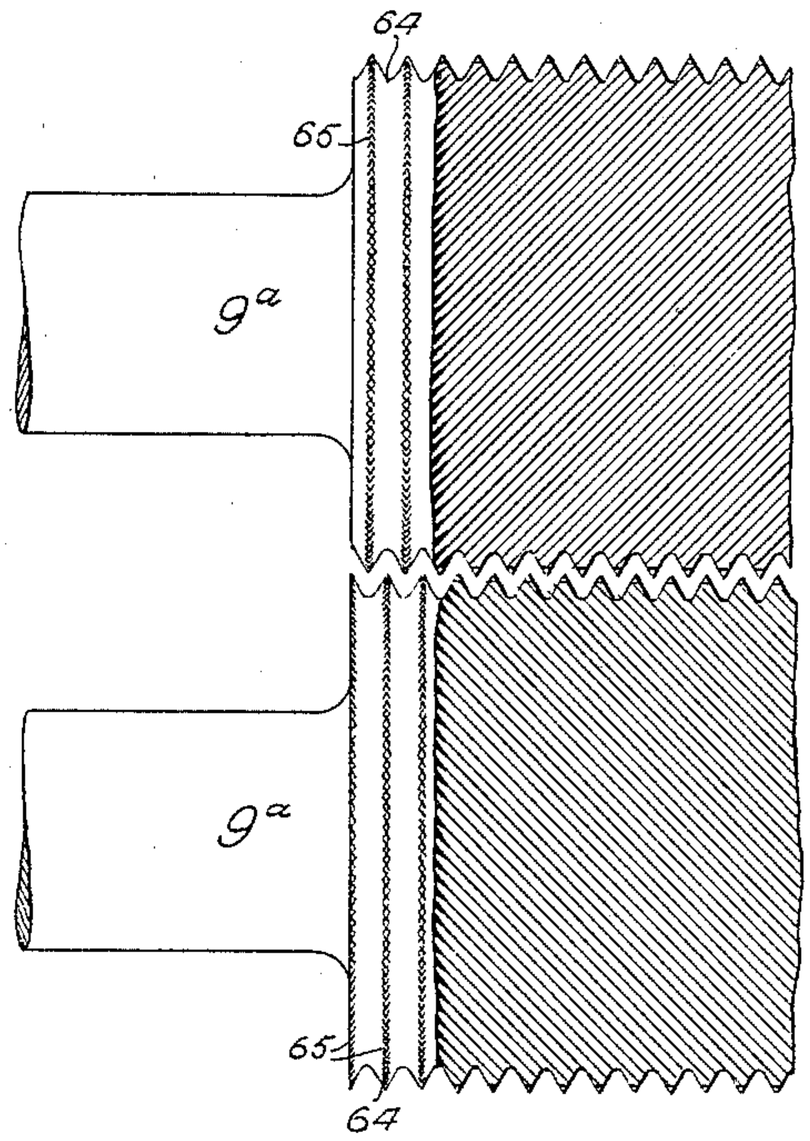

Fig. 7,

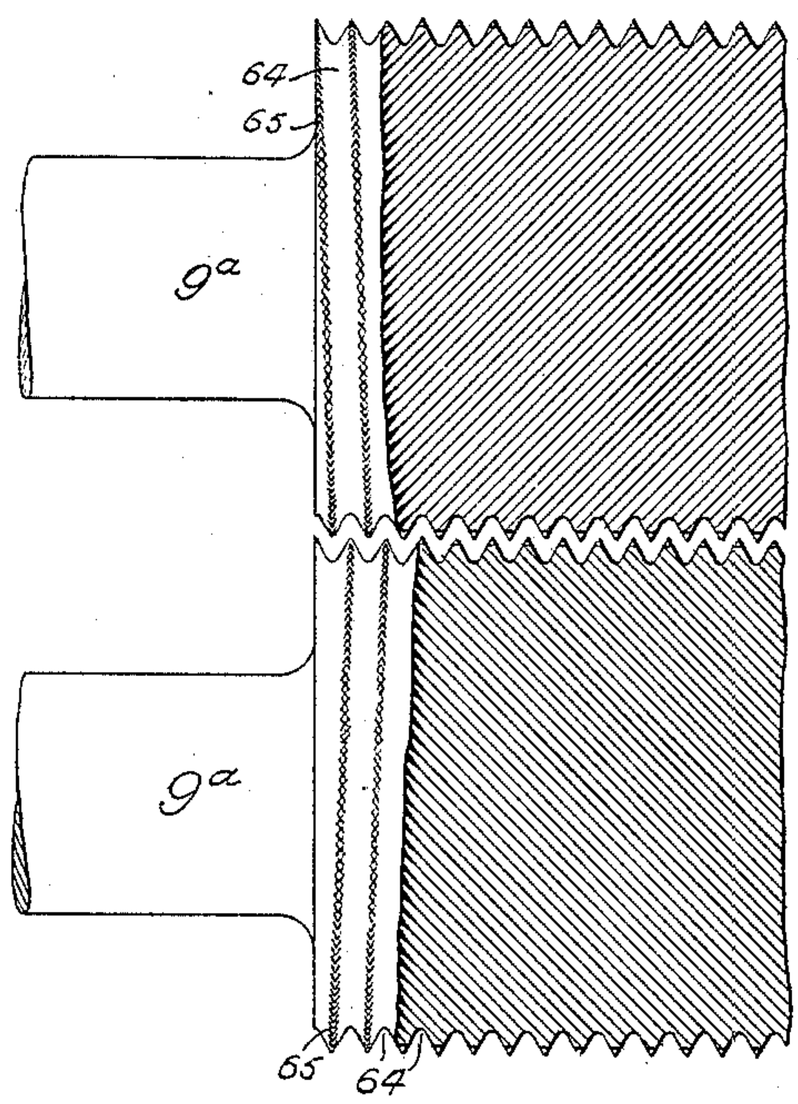

Fig. 8,

WITNESSES:

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INVENTOR:

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Wilcox, Barkley & Bodle

(No Model.)

4 Sheets—Sheet 4.

W. SCOTT.

PRINTING MACHINE.

No. 584,274. Patented June 8, 1897.

Fig. 14,

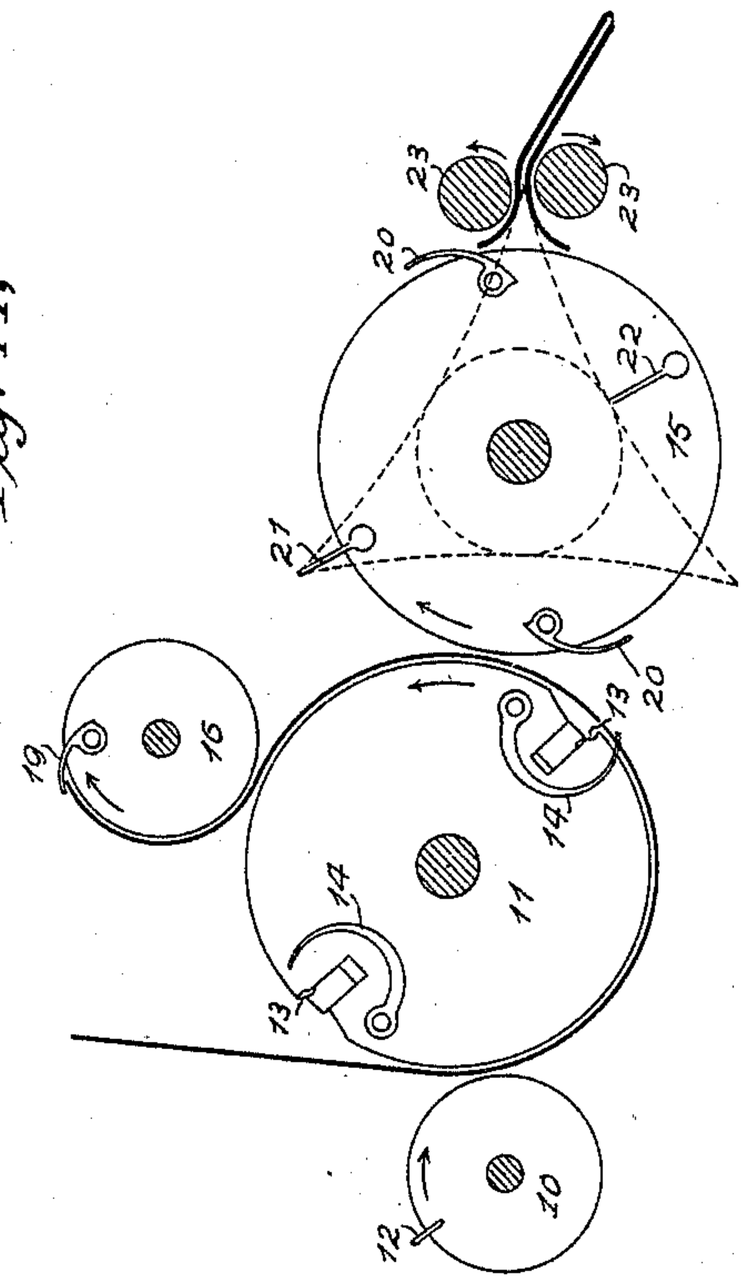


Fig. 16,

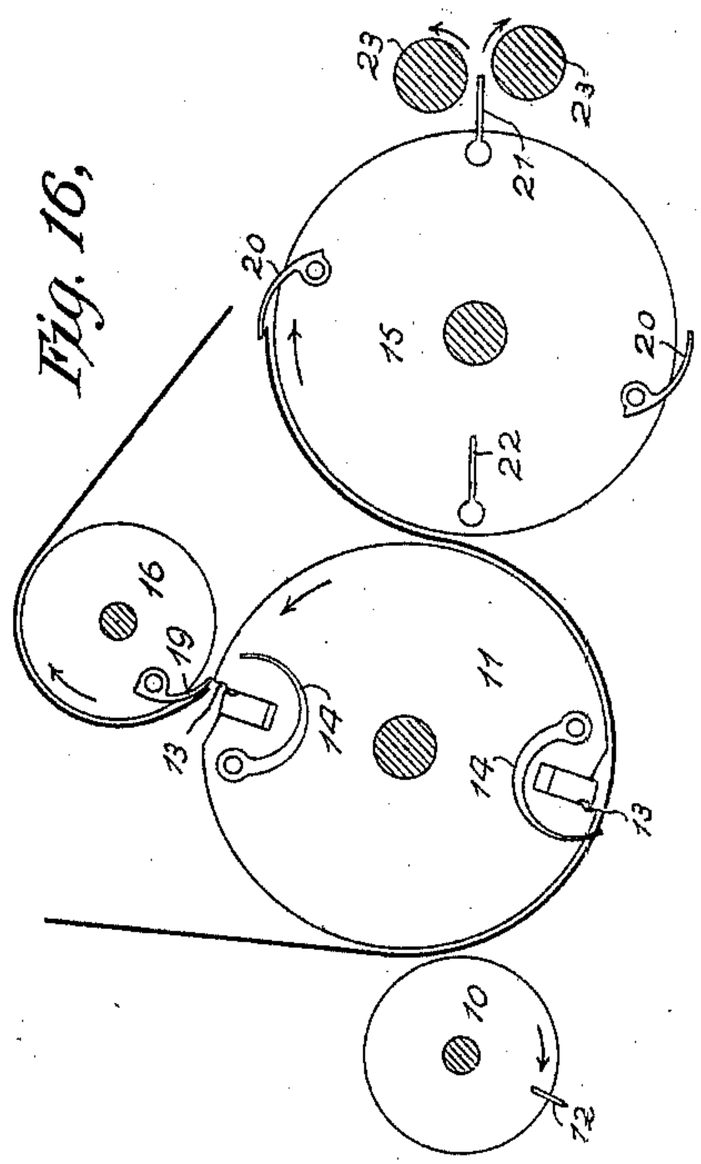


Fig. 13,

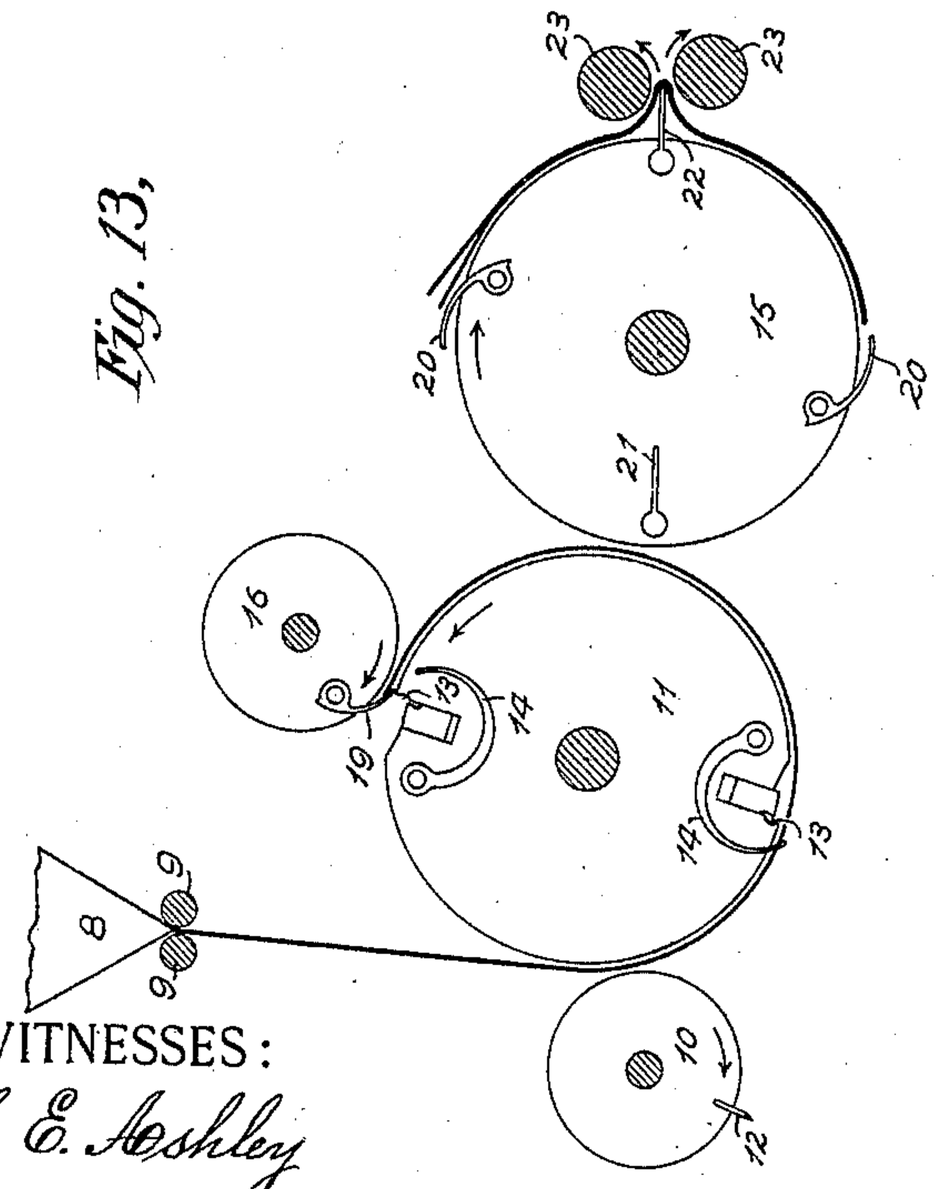
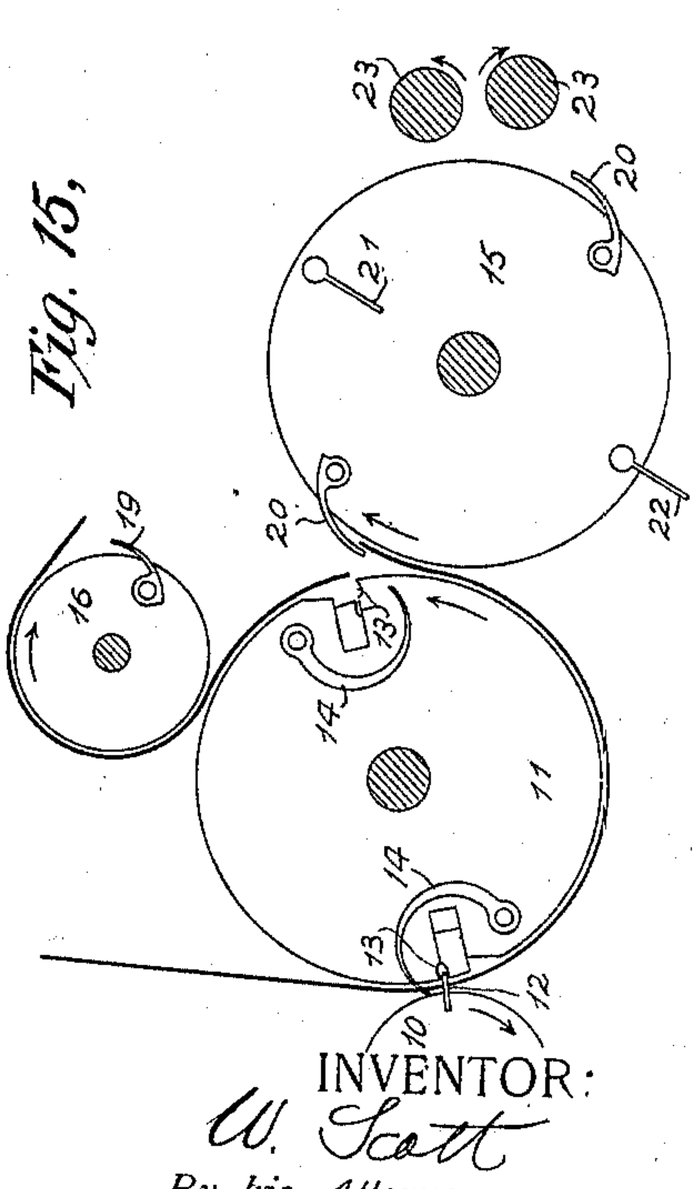


Fig. 15,



WITNESSES:

C. E. Ashley

H. W. Lloyd

INVENTOR:

W. Scott

By his Attorneys

Wilcox Barkley & Rodeck

UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,274, dated June 8, 1897.

Application filed June 24, 1895. Serial No. 553,804. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Delivery and Folding Apparatus, of which the following is a specification.

This invention relates to printing and folding machines which perfect one or more webs, fold the product longitudinally, and deliver the same with one or more cross-folds, and has for its objects the general improvement of the operation of this class of machines.

The invention consists, first, in web-perfecting machinery combined with means for folding the web or associated webs longitudinally, means for severing cuts from the so-folded web or webs, and means for taking or receiving the cuts at a number of different points and collecting or superposing the successive cuts and then folding them.

It also includes folding-rollers which cooperate with an internal guide for folding the web or webs longitudinally, said rollers being provided with circumferentially-extending threads or grooves, which threads may either lie in planes at right angles to the axis of the rollers or may extend spirally around the same after the manner of the screw-thread, and which may also have cuts or grooves extending across their tops, so as to make the contact between the rollers and the paper that of points with surfaces rather than surface with surface or line with surface.

It also includes a pair of cylinders for cutting or folding sheets, one of which cylinders is provided with a cutting or folding knife, and the other is provided with a longitudinal groove, in which there is an in-and-out-moving cutting or folding grooved bar and radial grooves in one side wall of the said longitudinal groove for the purpose of receiving the grippers of the delivery devices which take the products from said female cylinder.

It includes other combinations of devices, as will hereinafter appear.

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view showing the cylinders of three rotary perfecting-presses, which presses are placed one above another in the same framework, (not shown,) a longitudinal folder at one end of these machines, said folder having its folding-rollers parallel or substantially so to the cylinders of the printing-machine, collecting and folding devices, and a delivery at the end of the machine. Fig. 2 is a plan view of the folder. Fig. 3 is an end view of the same. Fig. 4 is a view showing the circumferentially-grooved folding or drawing rolls, also the drawing-rolls having adjustable collars thereon. Fig. 5 is a view of the folding and drawing rolls, transversely cutting device, delivery apparatus, and the wipers for the folding and drawing rolls. Figs. 6, 7, and 8 are detail views of the grooved folding or drawing rolls. Fig. 9 is a cross-section of the slats and packer of the delivery devices. Fig. 10 shows in the upper part one view of one end of the female cutting or folding cylinder and in the other end a view at right angles to the one just named. Fig. 11 is a cross-section of the last-named cylinder and the coacting folding or cutting cylinders and the delivery-cylinder. Fig. 12 is a modification of the means for operating the in-and-out-moving bars of the folding or cutting cylinders shown in Figs. 10 and 11. Fig. 12ª is another modification of the same, showing eccentric fast to framework and the strap connected to and moving the bars. Figs. 13, 14, 15, 16, 17, and 18 are diagrammatic views of the cutting, collecting, and folding devices in various successive positions of the same.

That form of the invention shown in the accompanying drawings will now be described.

The references A B C represent three rotary pefecting printing-presses composed of impression and form cylinders and suitable inking apparatus. Webs *a b c* of these machines are led to them from rolls in any suitable or usual manner, and the perfected webs are led around suitable rollers in fixed bearings, as 2, and adjustable take-up rollers 3 to the roller 4, at which point the webs are associated and are led over the turning-bar 5, rollers 6 7, the triangle, former, or internal guide 8, and between the folding or drawing rolls 9. The former 8 may be of any suitable construction. The rollers 9 may likewise be of suitable construction and may perform the function of

fold-laying rollers merely or they may have the additional function of drawing-rolls.

From the rollers 9 (see Fig. 1) the folded web or webs pass directly to the cutting-cylinders 10 11, at which point they are or may be severed into sheets. The cylinder 10 is provided with a knife 12 and the cylinder 11 with a number of cutting-grooves 13, depending upon its size relative to cylinder 10. The cylinder 11 is also provided with sets of sheet-retainers, as pins 14, equal in number to the number of grooves 13. Contiguous to the cylinder 11 are the cylinders 15 16, so placed with relation thereto and to each other that the sheet taken by the cylinder 16 from the cylinder 11 and by it delivered to the guides 17 and tapes 18 is superposed upon and in register with the next sheet (which is taken from the cylinder 11 by the cylinder 15) at the point where the tapes 18 meet the said cylinder 15. The cylinders 15 and 16 are provided with grippers 20 and 19 for the purpose of taking the sheets from the cylinder 11 in the manner hereinafter described. The cylinder 15 is also provided with two rotary folding-blades 21 22, which coact with the folding-rollers 23 to fold the superposed cuts transversely. The folded products are taken from the rollers 23 by the cylinders 24 25, the latter of which is provided with grippers 26 for the purpose.

From the cylinder 25 the products are delivered to the traveling tapes 27, which run upon rollers or pulleys 28 and are delivered at the end of the machine. A suitable stop 29, coacting with the cylinder 25 and tapes 27, prevents the products from being carried beyond the place desired. Since the pins, grippers, tapes, folding-plates, &c., are or may be operated by any means commonly used for the purpose, such means are not herein described or shown, it being understood that all these parts are properly timed, as common, to perform their functions. Thus the pins 14 are protruded to fix the leading end of the web at the moment the knife 12 severs the sheet or sheets therefrom. That set of pins 14 which delivers sheets to the grippers 20 and the cylinder 15 are withdrawn at the time the said grippers take the leading end of the sheet, while that set of pins 14 which delivers sheets to the grippers 19 of the cylinder 16 are withdrawn at the time such grippers take the sheets. The grippers 20 and 19 are closed at the moment they take sheets from the cylinder 11 and are or may be opened shortly after they pass the points of contact of the tapes 18 with their respective cylinders. The folding-blades 21 22 may be operated in any usual or suitable manner for protruding them to fold the product between the rollers 23. A set of guides 30 may be used to direct the products over the lower of the two rollers 23.

A description in detail of the cylinder 11 will now be given in so far as the cutting-grooves thereof are concerned. These grooves are placed in two bars 31 at opposite sides of the cylinder. These bars 31 are placed in the longitudinal radial grooves 32 of cylinder 11 and are connected together by means of the cross-bars 33, of which one is shown in Fig. 10 and the other in Fig. 11. These bars 33 are slotted at 34 to pass the shaft 35 of the cylinder 11 and are each provided with an antifriction-roller 36 on a stud projecting therefrom. This antifriction-roller 36 works in the closed eccentric-groove 37 in a plate fixed to the framework F of the machine. It is understood, of course, that there are or may be such antifriction-roller and grooved plate at each end of the cylinder 11. The bars 31 are provided with ribs 38, which fit within grooves 39 in one side wall of the grooves 32, above named. These ribs 38 are of such length that when the bar 31 is in its outward position they complete the side of the groove 13, which is formed by the wall of the slot 32. This construction of the bar 31 and the receiving-slot 32 enables the points of the grippers 19 and 20 to pass underneath the copy or product lying on the cylinder 11 and so grip it to transfer it to the cylinders 15 or 16, as the case may be. The forward or leading edge of the groove 32 is beveled off, as at 40, to allow the said grippers to pass freely.

Instead of the closed eccentric-groove 37 eccentrics 41 may be used to operate the bars 31. (See Fig. 12.)

The folding-knives 21 22 of the cylinder 15 may be operated at suitable times by any suitable means—such, for instance, as are shown in United States Patents Nos. 191,494, 214,067, 214,068, 215,844, 225,666, or British Patent No. 3,105 of 1875. The devices shown for this purpose in Fig. 1 consist of the circular guide 42, which is provided with a guide-notch 43 at a point about opposite rollers 23, and the rotating cam 44, which is driven from the axis of cylinder 15 by suitable gears 45, as shown.

The operation of this folding device is illustrated in Figs. 13 to 18, inclusive, in which the parts are lettered to correspond with Fig. 1 and in which the view Fig. 13 illustrates the position of the parts at the moment the cylinder 15 is folding the sheets out between the rollers 23 and the grippers 19 of cylinder 16 are taking a sheet from the cylinder 11, the corresponding pins 14 being withdrawn.

The view in Fig. 14 illustrates the positions of the parts during the transfer of the sheet to the cylinder 16 and just before the grippers 20 of the cylinder 15 take the leading end of the web or sheet on the cylinder 11.

Fig. 15 illustrates the positions of the parts just after the grippers 20 have taken the leading end of the sheet or web from the cylinder 11 and at the moment the cylinders 10 and 11 are severing the web or webs.

Fig. 16 illustrates the positions of the parts just previous to the moment when the leading edges of the sheets taken by the cylinders 15 and 16 are about to meet on the cylinder 15 in register.

Fig. 17 illustrates the positions of the parts

just after this register has been obtained, and Fig. 18 illustrates the positions of the parts just previous to the folding out from the cylinder 15 between the rollers 23.

Reverting to the modifications shown in Figs. 4, 5, 6, 7, and 8, the reference 8 marks the longitudinal former and the reference 9^a the improved fold-laying or drawing rolls hereinbefore mentioned. In addition to the rollers 9^a there are provided the drawing-rolls 50, between which the webs pass on their way to the cutting-cylinders 10 11. On the shafts of the drawing-rolls 50 are placed adjustable collars 51 for coaction to bear on the margins of the webs. These collars 51 are loose on the shafts of the rolls and are held in the desired position by means of set-screws or the like. (Not shown.)

Between and bearing upon both the rollers 9^a and rollers 50 are suitable wipers 52, composed of suitable fabric, as cotton cloth, wound upon a shaft or cylinder and bearing against both said sets of rolls. These rolls 52 may be borne by adjustable arms, so as to be capable of at all times being kept in contact with both sets of rolls 9^a and 50. The reference 53 marks a gear for operating certain parts. In lieu of the tapes 18 suitable guides 54 may be employed, which guides may be provided with pulleys or rollers 55 56, bearing, respectively, upon the cylinders 15 and 16.

Instead of delivering the sheets by means of the cylinder 25, as in Fig. 1, the same may be done by means of tapes 58, (which pass about rollers 57 and the lower of the two rollers 23,) the guides 59, a vibrating packer 60, and the tapes 29. The packer 60 is pivoted at 61 and receives motion by means of the eccentric 62 and strap 63.

In Fig. 9 is illustrated the positions of the slats of the guides 59 and packer 60, which push the product *p* from between the end sets of slats 59 onto the tapes 29, whence they are taken by an attendant.

The structure of the rolls 9^a is illustrated in Figs. 6, 7, and 8. In Fig. 6 the rolls are shown as provided with alternate ridges and depressions extending circumferentially thereto at right angles to the axis. The tops of the ridges or threads are notched or cut into, so as to form points or short lines upon the top of the ridge or thread. The tops of the threads of one roller 9^a are preferably opposite the depressions of the other roller, so that the points of contact of the rollers with the opposite sides of the web are preferably on the hit-and-miss principle and not opposite each other. In Fig. 7, instead of having the thread 61 run straight around the roller 9^a the same passes around the roller in a helix, the tops and bottoms of the threads of the two rollers being also preferably so placed that they do not act directly opposite each other on the webs.

It will be observed that the tops of the threads of each roller 9^a are shown as extending within or across the longitudinal line joining the tops of the threads of the other roller 9^a. This is the preferred arrangement, as it gives a bite on the webs.

I remark that the principles of construction of the cutting members of the cutting-cylinders 10 11 are applicable also in the case of folding-cylinders. Hence I do not limit this part of my invention to the uses above described.

I may also remark that many changes in details, elements of combinations, &c., may be made without departing from the spirit of this invention.

Of course it is understood that the presses hereinbefore described are intended to have two forms abreast of their form-cylinders and that these forms may be placed thereon with their columns running either longitudinally or circumferentially thereof, preferably the latter.

Instead of grippers on the cylinders 15 and 16 pins may be used, as on cylinder 11, in which case the bars 31 may be fixed relatively to said cylinder 11.

The collecting devices may coact with either of the cutting-cylinders by being placed properly with respect thereto for that purpose.

No claim is made herein to the subject-matter comprising the printing-presses, the guides 2 3 4, turner 5, rollers 6 7, and the longitudinal folder with its cylinders or rollers parallel to the cylinders of the presses, inasmuch as this subject-matter forms the basis of claims in my pending application, filed on the 7th day of April, 1897, serially numbered 631,089.

Having thus fully described my invention, what I claim as new, and desire Letters Patent for, is—

1. The combination of web-printing machinery, means for folding the web or associated webs longitudinally, means for severing the same transversely, and means for receiving the cuts from one of the cutting devices at different points and superposing and folding them transversely, substantially as described.

2. The combination of web-printing machinery, means for folding the web or associated webs longitudinally, cutting-cylinders for severing the same transversely, two cylinders for alternately receiving the cuts from one of the cutting-cylinders, and means for superposing and folding the cuts transversely, substantially as described.

3. In a machine for folding webs longitudinally, the combination with the internal guide, of external folding-rollers provided with circumferentially-extending threads, the tops of the threads of each roller being opposite the bottoms of the threads of the other, substantially as described.

4. In a machine for folding webs longitudinally, the combination with the internal guide, of external folding-rollers provided with circumferentially-extending threads, the tops

of the threads of each roller being opposite the bottoms of the threads of the other, and cuts or grooves across the threads, substantially as described.

5. The combination of two cylinders for cutting or folding sheets, a cutting or folding knife on one of said cylinders, two oppositely-placed in-and-out-movable bars on the second cylinder, delivery devices having grippers for taking the sheets from said second cylinder, and mechanism for moving said bars one in from and the other out to their positions for coaction with said knife, whereby the said grippers are unobstructed and the sheets are severed, substantially as and for the purposes described.

6. The combination with a female cutting-cylinder, a longitudinal groove therein, an in-and-out-moving cutting or folding bar in said groove, delivery devices having grippers, and radial grooves in one side wall of said longitudinal groove, whereby the grippers may pass the cutting-bar and lap under the margins of the products, substantially as described.

7. The combination of a sheet-carrier, as the cutting-cylinder 11, first and second take-off cylinders, as cylinders 16 and 15, means for transferring sheets from the first to the second take-off cylinder and superposing them on the sheets thereon, and folding devices, substantially as described.

Signed at New York, in the county of New York and State of New York, this 21st day of June, A. D. 1895.

WALTER SCOTT.

Witnesses:
CHARLES A. BRODEK,
R. W. BARKLEY.