

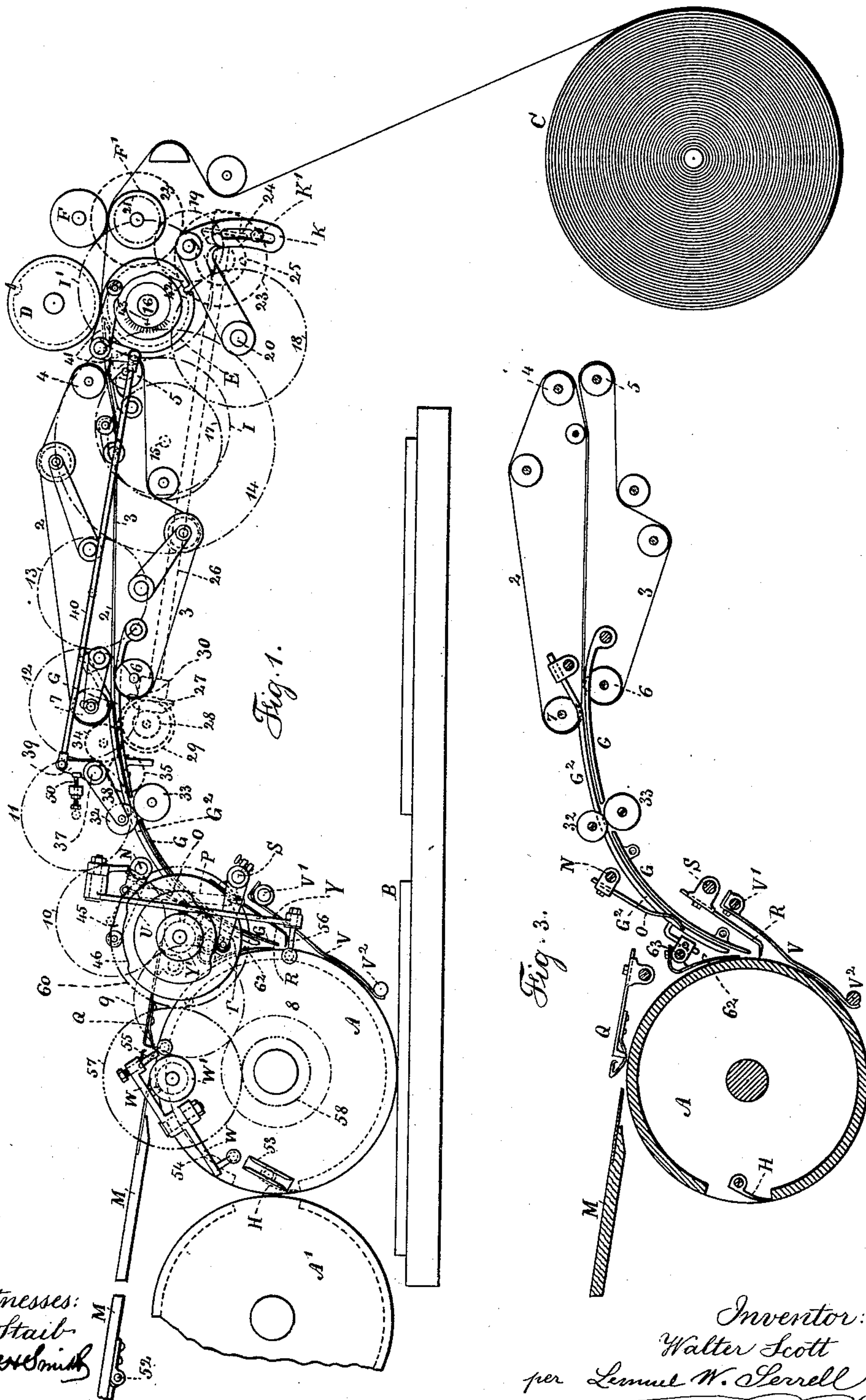
(No Model.)

2 Sheets—Sheet 1.

W. SCOTT.
PRINTING PRESS.

No. 482,204.

Patented Sept. 6, 1892.



Witnesses:
J. Stail-
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Att'y

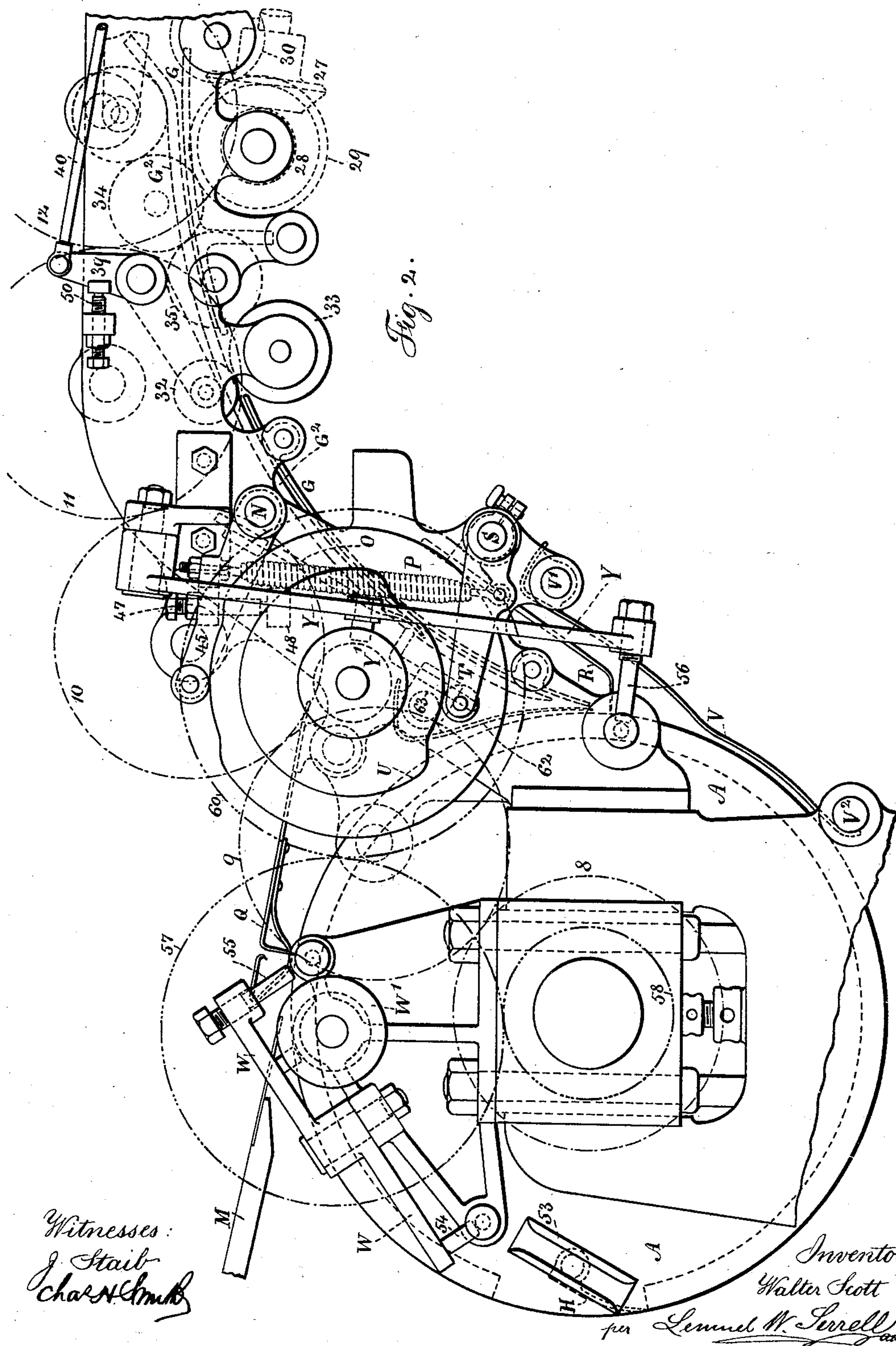
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 482,204, dated September 6, 1892.

Application filed September 11, 1891. Serial No. 405,369. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, of Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Printing-Presses, of which the following is a specification.

In printing-presses where a roll of paper is made use of the web has been fed in and perforated or cut off into sheets of the required length, and in almost all instances the speed of the sheet has been accelerated so as to separate one sheet from the other a considerable distance before the advancing end of the sheet reaches the grippers upon the impression-cylinder. This acceleration has usually been employed in order that the sheet may be moving at a speed corresponding, or nearly so, to that of the impression-cylinder at the time the grippers take the advancing end of the sheet.

In my present improvements I provide for feeding in the web and cutting the same into sheets and for moving the web along with a uniform speed, or nearly so, in order to bring the advancing end of the sheet to the proper position for the grippers to seize the sheet and accelerate the speed of the same by imparting to the sheet the same speed as that of the impression-cylinder, and I feed the sheets to the impression-cylinder from the web at or about the level of the axis of the impression-cylinder, so that the upper part of the impression-cylinder is open for allowing the use of a feed-board for separate sheets, which sheets can be run in at the same time as the web where it is desired to print upon opposite sides of separate sheets, or the separate sheets can be fed by hand when the web cutting and feeding mechanism is not employed, thus adapting the press to the various kinds of work often required of the same, and where a flat reciprocating bed is made use of both the impression-cylinders can be uncovered by swinging back the feed-board to give access to such cylinders in preparing them for the printing.

I combine with the feeding mechanism gearing for varying the feed to regulate the length of sheet, and also a cutting or perforating mechanism and eccentric gears or differential crank mechanism similar to that represented in my patents Nos. 444,137 and 444,138 for causing the cutters or perforators to move

at or about the same speed as the paper when perforating or cutting the same, and I connect the conveying belts or tapes with the feed-rolls, so that they move at the same surface speed, or nearly so, as the paper, and I employ curved guides or a table for the sheets to pass over in their travel to the impression-cylinder and forwarding-rolls that act upon the sheets to cause them to move over the table or guides, and I make use of gages for the advancing edge of the paper to determine the position of the same accurately as it is taken by the grippers, and in some instances it is advisable to make use of movable detaining-fingers that prevent the sheet sliding down the inclined or curved table or guides adjacent to the impression-cylinder.

In the drawings, Figure 1 is a diagrammatic elevation representing the present improvements. Fig. 2 is a similar view, in larger size, of the forwarding devices and the gages; and Fig. 3 is a section of the impression-cylinders and the sheet-supplying devices upon a plane passing centrally through the press.

The impression-cylinders are represented at A A', and at B a type-bed is shown, which is to be reciprocated. The present improvements, however, may be employed in a printing-press having type-cylinders. The roll of paper is shown at C and the cutting-cylinders at D E, and F F' are the feed-rolls, and the web as it is cut or perforated passes between the sets of belts or tapes 2 and 3, which pass around the respective sets of rolls 4 5 6 7, and the advancing end of the web or sheets is led over the table or guides G to the impression-cylinder A. It is usually preferable to employ a table of sheet metal bent into the curved form represented, with guide-bars G² above the table and at a sufficient distance to allow the sheets to pass freely between the table and the guide-bars; but a range of guide-bars may take the place of the table G, and upon the impression-cylinder A there are grippers H, which are adapted to close upon and grasp the edge of the sheet below the lower edge of the table G, and by the devices hereinafter described the paper is fed along through the rolls F F', cut or perforated, and proceeds between the sets of belts or tapes 2 and 3 and over the table G with regularity until the advancing end of the sheet is caught by the

grippers H, and thereby the sheet is drawn along and accelerated by receiving the same speed as that of the impression-cylinder. If the paper has been perforated, the sheet that is taken by the grippers is pulled off and separated at the perforations, and if the sheets have been separated the acceleration of the same causes the advancing sheet to separate from the sheet which is being moved along at a regular rate corresponding, or nearly so, to that of the feed-rolls, and the advancing end of the sheet reaches the impression-cylinder in the proper time to be taken by the grippers H during the movement of the impression-cylinder A.

By the feature of my invention thus far described it will be apparent that when the feed-rollers are provided with changeable gearing to vary the length of the sheet the movement of the web of paper corresponds, or nearly so, to that of the feed-rolls up to the time that the grippers on the impression-cylinder grasp the sheet, and I connect the rolls that drive the sets of tapes or belts 2 and 3 with the feed-rolls, so that the speed of tapes is varied when the gearing is changed to regulate the length of sheet fed into the press at each complete printing operation.

In carrying out this invention I make use of a suitable train of gearing—such, for instance, as that represented at 8 9 10 11 12 13 14—for driving the shaft 15, and upon this shaft 15 is an eccentric-gear I to the gear I' upon the shaft 16 of the cutter E, and these eccentric-gears I and I' are to be fitted substantially the same as in my Patents Nos. 444,137 and 444,138, so that they can be adjusted to the proper position in relation to the cutter or perforator, and the cutter or perforator will be moving at the same speed, or nearly so, as the paper at the time the perforation or cut is made.

Upon the shaft 15 is a gear 17 to the gear 18, which drives a gear-wheel 19 upon a sector-arm K, which has the shaft 20 of the gear 18 for its center, and this gear 19 drives a wheel 21 upon the axis of the lower feed-roll, and by changing the size of this wheel 21 the speed of the feed-rolls can be varied, so as to supply a greater or less length of sheet at each revolution of the press. These parts are similar to those represented in my Patent No. 444,137. It is to be understood that the top and bottom feed-rolls F and F' are geared together, so as to travel at the same speed, and the sector-arm K is clamped in position by a bolt K' after the gear 21 has been changed.

Upon the shaft of one of the feed-rolls is a gear-wheel 22, and from this motion is given to the sets of belts 2 and 3 by any suitable gearing that is adapted to communicating to such belts a motion corresponding, or nearly so, to the surface speed of the feed-rolls. A convenient gearing for accomplishing this object consists of a wheel 23, bevel-gearing 24 25, and a shaft 26, extending to and driving the bevel-gearing 27 28, which gives motion

to the roll 6 and belts by intermediate gears 29 30. By this means the paper will be fed along the distance required for the proper length of sheet at each rotation of the cutter or perforator and the web or sheets will be continued in their movements until they arrive at the impression-cylinder and are taken by the grippers H.

It is advantageous to make use of the rolls 32 33 near the middle portion of the table or guides G for forwarding the sheets and preventing the risk of the friction interfering with the movement, and I have represented gear-wheels 34 35 for giving motion to the roller 33, and this motion may be at the same surface speed as the movement of the paper, or it may be accelerated, if so desired, for maintaining a slight tension upon the paper, and it is advantageous to provide a rock-shaft 37 with arms 38 for carrying the roller 32, so that such roller 32 can be raised or lowered by a connecting-rod 40 to a bent lever 41, having a roller or pin against which the cam 42 acts to raise the roller 32 at the proper time or to allow it to descend and rest upon the paper. This cam 42 is advantageously applied upon the shaft 16 of one of the cutting-cylinders, and the cam 42 is variable in its position upon such shaft, and it is preferably provided with a clamping-screw and with an index at 43, and this index can be marked with numbers having reference to the various lengths of sheet that may be cut off in the press, so that the roller 32 may be allowed to descend and grip the paper with sufficient force to separate one sheet from the next at the proper time for relieving the grippers H from the strain that would be necessary to pull the sheets apart on the line of perforations or to aid the grippers in accomplishing this object.

I have also shown a cross-shaft N and a set of fingers O, which are preferably made as springs or to yield, and the paper passes beneath these springs, and they may be allowed to remain upon the paper and apply a slight constant friction to the same as the paper passes below the fingers, so as to aid in keeping the paper to the curved table or guides G. I, however, prefer to make use of an arm 45 upon the shaft N, and a cam 46, which is circular, to hold the fingers out of contact with the sheet, except at a portion of its periphery, where there is a depression to allow the fingers to drop and steady the sheet at the proper place, and upon the arm 45 I have represented a lug with an adjusting-screw 47 and a lug 48 on the frame of the machine, so that by adjusting this screw 47 the pressure of the fingers upon the sheet can be regulated. The weight of the arm 45 may be depended upon for giving the pressure, or the spring P may be employed in addition.

I have also represented gages R upon the cross-shaft S, upon the end of which is an arm T, acted upon conveniently by the spring P to draw a roller at the end of the arm against a cam U. These gages R are in the proper

position for arresting the end of the sheet in the desired place for the grippers H to seize the same, at which moment the cam U draws back such gage R, so that the sheet is free to be moved by the grippers as they revolve with the impression-cylinder A.

I find it also advantageous to make use of steady-bars V, supported on cross-bars V' V², to prevent the back end of the sheet dropping as it is carried around by the impression-cylinder. I have represented a screw 50, passing through a lug upon the frame and acting against the arm 39 or a projection thereon to adjust the downward movement of the roll 32 and the pressure exerted by it upon the sheet of paper.

In consequence of bringing the sheet to the impression-cylinder by the devices before described the upper part of the impression-cylinder is entirely open, so that access is easily obtained for applying overlays to such impression-cylinder and for regulating the tympan-sheet, and I also avail myself of the conditions before named for applying to the press a feed-board M, the same being preferably hinged at 52, so that the feed-board can be swung up and out of the way of both the impression-cylinders A and A', and when the sheets are fed by hand a gage Q is usually required for arresting the edge of the sheet, and this gage Q is to be upon a rock-shaft and lifted by any suitable means, (not represented in the drawings,) whereby the sheet is allowed to pass beneath such gage Q.

The grippers H are to be of any usual character. I have represented the cam-slot 53 at the end of the gripper-shaft, as usual, and I provide pins 54, 55, and 56 for acting in this cam-slot to open or close the grippers, and it will be apparent that the pin 54 always acts to open the grippers and the pin 55 acts to close the grippers when such grippers take a sheet fed from the feed-board M, and the pin 56 acts to close the grippers for taking a sheet from the table or guides G. These pins 54, 55, and 56 are to be acted upon in any usual manner, as in ordinary printing-presses; but it will be borne in mind that when the pin 55 is used to close the grippers for a hand-fed sheet the pin 56 will not be in action, and the reverse. As a convenient means for actuating these pins, I have shown a lever W, carrying at its ends the pins 54 and 55 and a cam W' for acting upon the same, and I have also represented a lever Y for the pin 56, which lever is acted upon by the cam Y'. When the before-described improvements are employed with a two-revolution press, the cam W' revolves once for each two revolutions of the impression-cylinder A, and I have represented the gearing as adapted to this movement, the cam W' being upon the hub of a wheel 57, driven by the gear 58 on the shaft of the impression-cylinder A, and the cams 46 and U are revolved at the same speed by a gear 60, gearing with the wheel 57, so that the pin 56 for the grippers and the gages R

will be properly operated for the grippers H to take the sheet every second revolution from the table or guides G.

It is advantageous to make use of stationary guide-fingers 62 upon a cross-bar 63 between the lower end of the table G and the gage Q, so that a sheet may be fed in by hand; if the gage Q is raised, and passed down upon the gage R, either to be taken by the grippers H and printed, or to be taken by the grippers at the same time that they take an automatically-fed sheet, in order that the sheet fed in by hand may pass through the press at the same time as a sheet fed automatically. In this case the sheets may each receive an impression upon one surface.

It will be noticed that by the before-described improvement the feed-rolls can be adapted to supplying the proper length of sheet and the cutters or perforators adjusted to move at the proper speed when cutting, and the web of paper can be carried along by the forwarding belts and rollers until it arrives at the gages R, the train of gearing being disconnected in any suitable manner. The press can then be moved until the grippers are in position for seizing the end of the sheet, and it will only then be necessary to connect the train of gearing for the automatic sheet-supplying devices to move in harmony with the rest of the press. In Fig. 3 I have represented one set of grippers H for the cylinder A; but the present improvement is available with any well-known impression-cylinder, regardless of the number of grippers provided upon such cylinder.

Rods and forwarding-rolls are the well-known equivalents of tapes or belts in printing-presses and may be used in my improved press.

I remark that with some kinds of work the automatic feeding mechanism may be sufficiently accurate without the use of the movable gages, and the detaining-fingers are not always necessary, and with some qualities of paper and characters of printing the forwarding-rolls 32 33 may not be required.

In cases where the sheet has been fed to the downwardly-moving side of the impression-cylinder and a roller with or without tapes has served to pass the sheet to the impression-cylinder considerable space has been necessarily occupied, which in a perfecting-press usually would interfere with the proper position and action of the inking-rolls.

By my present improvement the inclined table or guides are curved and the advancing end of the sheet is pressed by the curvature against the surface of the impression-cylinder, so that it is in the proper position for the grippers to seize the same, whereas in cases where the sheet has been fed up by a flat table the action of the grippers is uncertain.

I claim as my invention—

1. The combination, in a two-revolution perfecting-press having two impression-cylinders, of feeding, cutting, and forwarding

mechanism for supplying sheets from a roll, and a curved and downwardly-inclined table or guides at the downwardly-moving side of the impression-cylinder, whereby the sheets are
5 passed to the impression-cylinder directly from the curved surface, substantially as set forth.

2. The combination, with the impression-cylinder of a printing-press, of a feed-board
10 for hand-feed above the impression-cylinder, means for supplying and cutting sheets automatically, a table or guides at one side of the impression-cylinder, over which the automatically-supplied sheets pass downwardly to the
15 impression-cylinder, and forwarding-rolls for regulating the passage of the sheet over the said guides or table to the impression-cylinder, substantially as set forth.

3. The combination, with the impression-cylinder of a printing-press, of a feed-board
20 for hand-feed above the impression-cylinder, feed-rolls and changeable gearing for varying the length of sheet supplied, cutters for perforating or separating the sheets, a table
25 or guides at one side of the impression-cylinder, over which the automatically-supplied sheets pass downwardly to the impression-cylinder, and forwarding-rolls for regulating the passage of the sheets over said guides or table
30 to the impression-cylinder, substantially as set forth.

4. The combination, with an impression-cylinder and its grippers of a printing-press, of forwarding belts or rolls, cutters for per-
35 forating or separating the web, feed-rolls and changeable gearing for varying the speed of the feed-rolls and the length of paper fed in for each sheet, eccentric gears or their equivalents for giving to the cutters or perforators
40 a speed corresponding, or nearly so, to that of the paper at the time such paper is cut or perforated, gearing connecting the feed-rolls, and forwarding-rolls, whereby the latter are caused to move at the same or nearly the same
45 speed as the sheets of paper, and a table or guides at one side of the impression-cylinder for supplying the sheets in a downward direction to such impression-cylinder, substantially as set forth.

5. The combination, with the impression-cylinder and its grippers, of a feed-board and gages adapted to sheets supplied by hand, a
50 table or guides extending from the impression-cylinder at one side thereof, automatic feeding and cutting mechanism for supplying sheets from a roll of paper, and changeable mechanism for operating the grippers to take the sheet as the same is fed by hand or auto-
55 matically, substantially as set forth.

6. The combination, in a two-revolution perfecting-press having two impression-cylinders, of feeding, cutting, and forwarding mechanism for supplying the sheet from a roll, a curved and downwardly-inclined table

or guides at the downwardly-moving side of the
65 impression-cylinder, and a feed-board at the upper part of the same impression-cylinder, substantially as set forth.

7. The combination, with the impression-cylinder and its grippers, of an inclined table
70 or guides at the downwardly-moving side of the impression-cylinder, a forwarding-roll for moving the paper down the inclined table or guides, fingers acting upon the paper to steady the same and to check its movement down the
75 table, and mechanism for bringing the fingers and forwarding-roll into action, substantially as set forth.

8. The combination, with the impression-cylinder and the automatic feeding mechanism, of a downwardly-inclined and curved
80 table or guides for pressing the sheet in a curved condition against the downwardly-moving side of the impression-cylinder to be taken by the grippers thereof, substantially
85 as set forth.

9. The combination, with the impression-cylinder and grippers of a printing-press, of a table or guides extending out from one side
90 of such impression-cylinder, forwarding tapes or belts and their rollers, feed-rolls, and cutting or perforating cylinders, changeable gearing for varying the speed of the feed-rolls, gearing connecting the feed-rolls and the rolls
95 for the belts for driving the latter at the same or nearly the same speed as the feed-rolls, a pair of forwarding-rolls, and mechanism, substantially as specified, receiving its motion in harmony with one of the cutting-cylinders for
100 bringing the forwarding-rolls into action in harmony with the cutting devices, substantially as set forth.

10. The combination, with the impression-cylinder and its grippers, of a downwardly-
105 inclined table or guides at the downwardly-moving side of the impression-cylinder, feeding and cutting mechanism, the gages R for the advancing end of the sheet, contiguous to the impression-cylinder, fingers acting against the paper to steady the same upon
110 the table, and mechanism for moving the fingers and the gages, substantially as set forth.

11. The combination, in a printing-press, with the revolving impression-cylinder and its grippers, of a feed-board for hand-feed
115 above the impression-cylinder, automatic mechanism for supplying sheets, and a downwardly-inclined table or guides at the downwardly-moving side of the impression-cylinder and over which the automatically-sup-
120 plied sheets pass, substantially as set forth.

Signed by me this 8th day of September, 1891.

WALTER SCOTT.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.