(No Model.) 3 Sheets—Sheet 1.

W. SCOTT.

CUTTING AND FEEDING MECHANISM FOR PRINTING PRESSES.

No. 444,137. Patented Jan. 6, 1891.

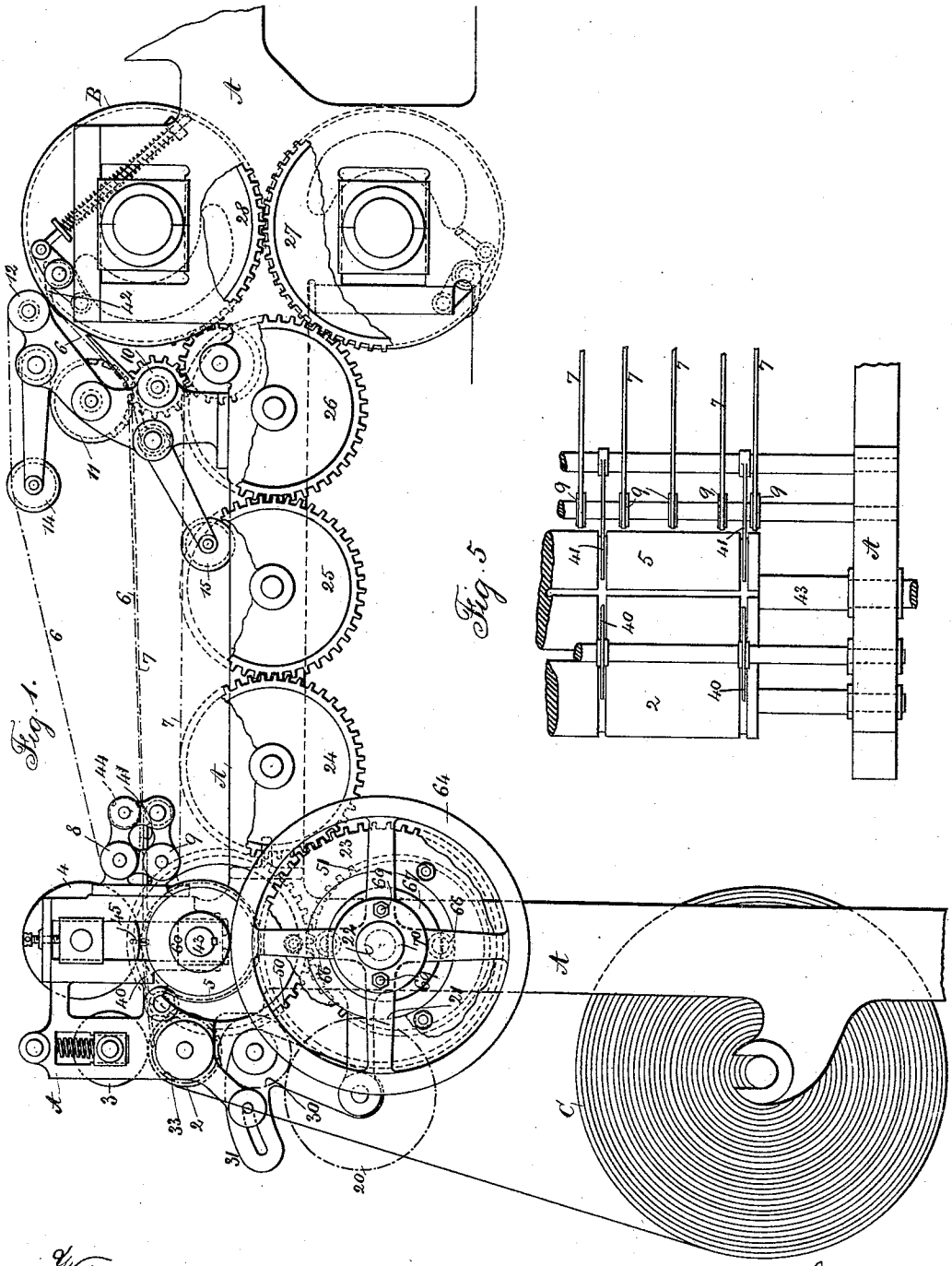


Fig. 1.

Fig. 5

Witnesses
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Inventor:
Walter Scott
per Samuel W. Serrell
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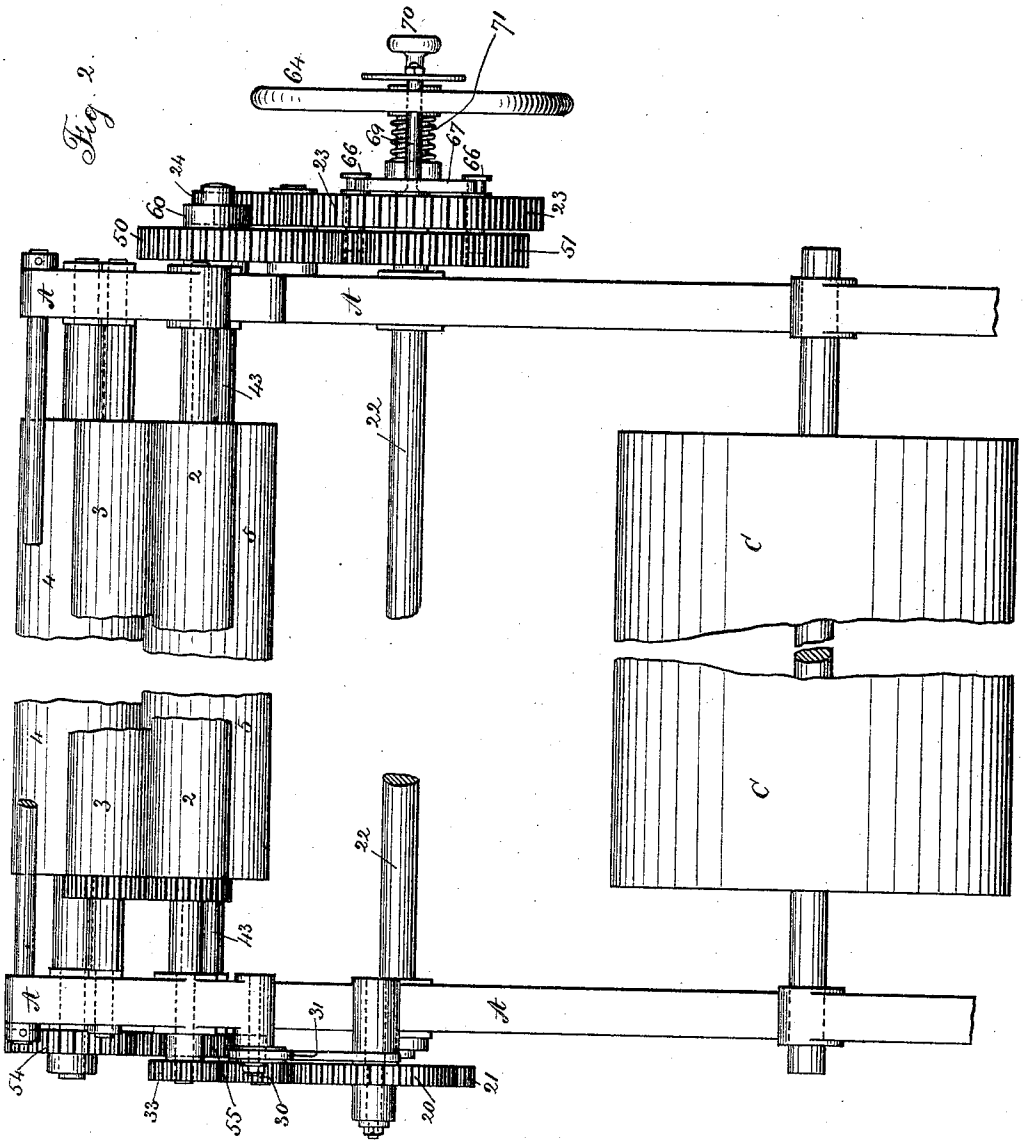
(No Model.) 3 Sheets—Sheet 2.

W. SCOTT.

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Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

W. SCOTT.

CUTTING AND FEEDING MECHANISM FOR PRINTING PRESSES.

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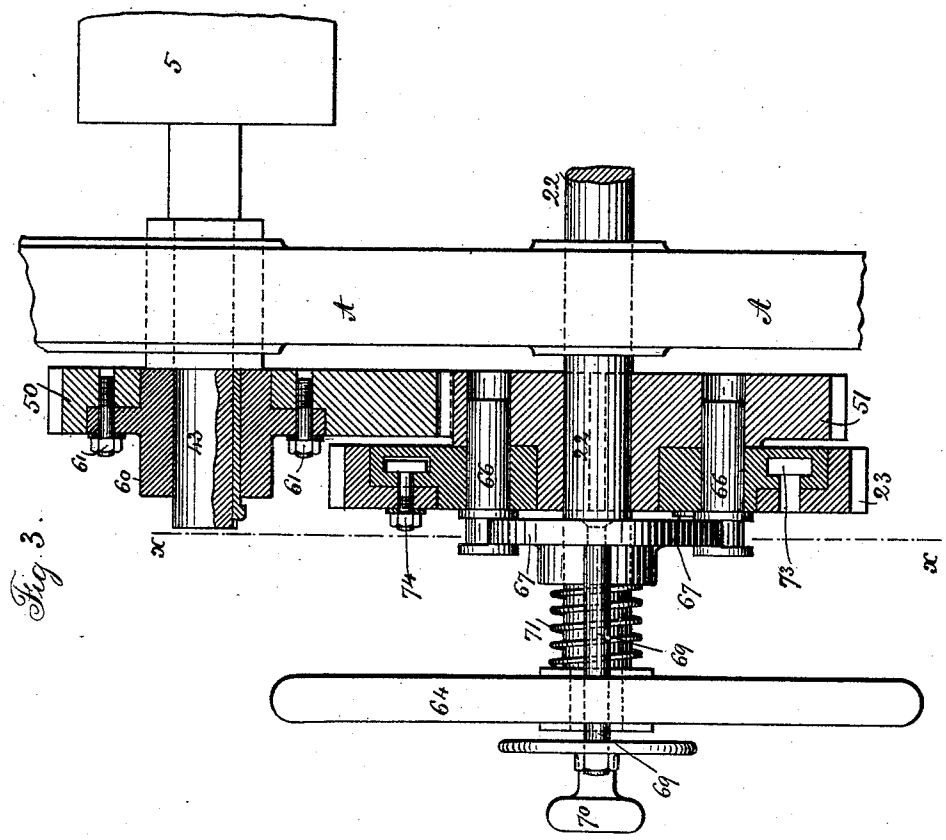


Fig. 3.

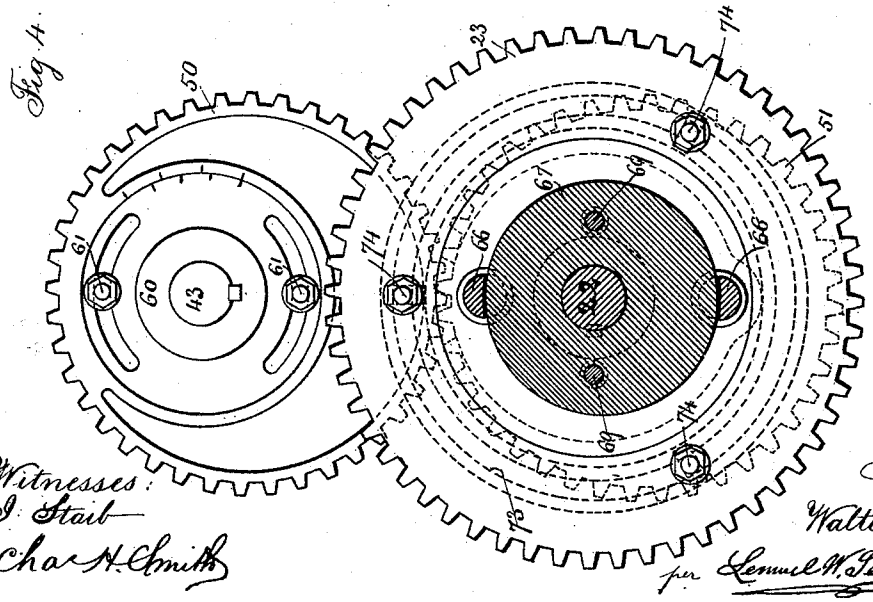


Fig. 4.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

CUTTING AND FEEDING MECHANISM FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 444,137, dated January 6, 1891.

Application filed June 19, 1886. Serial No. 205,693. (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 Cutting and Feeding Mechanism for Printing-Presses, of which the following is a specification.

In printing-presses in which the paper is supplied from a roll or web the paper is cut off into sheets and printed and these sheets have generally been of uniform length; but in some instances the paper has been fed in by separate rollers that are moved at the proper speed, so that the sheet can be cut of the desired length.

In my present improvements the paper is fed in by independent rollers driven by changeable gears so that the speed of the same in proportion to the speed of the other parts of the press can be varied; and the cutting-cylinders do not measure the paper, the paper, passing freely through between them, and the cutters act once for each revolution of the press to separate the sheet from the web. If no other provision were made, the cutter when coming into contact with the web of paper might be traveling faster or slower than the paper, and hence such paper might be torn or injured by the cutter. I therefore provide for varying the speed of the cutter when acting upon the paper in order that such cutter may be moving at the same speed, or nearly so, as the paper. By my improvement I am enabled to cut off longer or shorter sheets according to the size of the form printed from, so that the press is adapted to the printing of different sizes of sheets, which is a great convenience, especially in job-work.

My present improvements may be used with a flat bed for the types or with a cylinder for types or stereotypes, or it may be used in a press in which both sides of the sheet are printed in succession.

In the drawings, Figure 1 is an elevation representing the improved devices and the connections from the impression-cylinder. Fig. 2 is an end elevation of the two side frames and parts connected therewith. Fig. 3 is an elevation partially in section of the coupling devices for the cutting-cylinder. Fig. 4 is an elevation of the driving and eccentric gears, the coupling being in section at the line x x, and Fig. 5 is a partial plan view at one end of the cutting and feeding cylinders, the upper cutting and feeding cylinders and also the upper tape-rollers being removed.

A portion of the frame of the machine is represented at A and the impression-cylinder is shown at B.

The roll of paper is represented at C, and the paper passes off from the same between the feeding-rollers 2 and 3 and between the cutting-rollers 4 and 5, that separate the sheets from the web; and there are sets of endless belts 6 and 7 passing around the pulleys or rollers 8 9 10 11 12, for conveying the sheet to the impression-cylinder B, and 14 and 15 are tightening-rollers for the belts.

The shaft of the feed-roller 2 is preferably in fixed bearings upon the frame A, and the shaft of the roller 3 is preferably supported by bearings in slides on the frame A, there being springs or other devices to keep the roller 3 toward the roller 2 and cause the said rollers to grasp the paper and feed the web along at the same surface-speed as the rollers travel.

In order to give motion to these rollers 2 and 3, I make use of a gear-wheel 20, that receives motion from any other convenient portion of the press. I have shown the same as in gear with the wheel 21 over the shaft 22, and this shaft 22 revolves once for each revolution of the impression-cylinder B, the gear-wheels 23 24 25 26 27 28 being represented in Fig. 1 as communicating motion from the impression-cylinder B to the shaft 22.

The pinion 30 is upon a gudgeon upon the sector 31, the center of the sector being the shaft of the gear 20, and this pinion 30 gears into a wheel 33 on the shaft of the roller 2. By this arrangement I am able to change the gear 33 and put upon the shaft of the roller 2 a larger or a smaller gear and adjust the sector 31 to bring the pinion 30 into the proper place for gearing into this wheel 33. By the aforesaid arrangement I am able to pass through between the feed-rollers 2 and 3 a greater or a less length of paper for each revolution of the impression-cylinder B—that is to say, if the gear 33 is large the speed of the roller 2 will be slower than it will when the gear 33 is small, and it is only necessary to change this gear 33 and adjust the position of the gear 30 for feeding in the desired length

of paper each complete revolution of the press. The cutting-cylinders 4 and 5 do not touch each other and the sheet passes freely through between them, and it is preferable to make use of the bridge-bars 40 to lead the paper from between the feed-rollers 2 and 3 along and between the cutting-cylinders 4 and 5, and from these the paper passes over the bridge-bars 41 and between the sets of belts 6 and 7 that carry the sheet to the grippers 42 of the impression-cylinder; and I remark that the sets of belts 6 and 7 should travel at the same surface-speed as the impression-cylinder B; but the distance between the set of rollers 8 and 9 and the set of rollers 10 and 11 is as great as the length of the longest sheet. Hence the sheet will pass in between the belts 6 and 7, and will be carried forward by them, and when the advancing end of the sheet reaches the rollers 10 and 11, such sheet will be nipped and moved at the same speed as the belts; but this will occur after the sheet has been cut off the web of paper, as hereinafter described.

It will be understood that the sheet must be separated from the web each revolution of the press, and hence that the shaft 43 of the roller 5 must revolve once for each revolution of the shaft 22, but if these two shafts were geared together by ordinary gear-wheels the cutter 45 might be moving slower than the paper when a long sheet was passing in, or faster than the paper when a short sheet was passing in. To overcome this difficulty I connect the shafts 22 and 43 by the eccentric-gears 50 and 51. These gears are the same size, so that the shafts 22 and 43 make the same number of revolutions. The shaft 22, however, runs at a uniform speed, while the shaft 43 receives an accelerated and retarded movement—that is to say, when the portion of the gear 50 that is farthest from the shaft 43 is in gear with the portion of the gear 51 that is nearest to the shaft 22 the shaft 43 will receive a retarded or slower movement, and when the portion of the gear 50 that is nearest to the shaft 43 is in gear with the portion of the wheel 51 that is farthest from the shaft 22 the rotary movement of the shaft 43 will be accelerated. If, now, the gear 50 is adjusted upon its shaft 43 in relation to the position of the cutter 45, said cutter 45, at the time it acts upon the paper, may be moving at the same speed as the paper, or nearly so, and hence make the proper separation of the sheet from the web without tearing or injuring such paper. The eccentric-gears may be either circular or elliptical.

I remark that the cutting-rollers 4 and 5 are geared together by the gear-wheels 54 and 55, so that the two rollers move together, and the cutter 45 may be within the roller or cylinder 5; but usually it is most convenient to place the cutter 45 in the roller 4, and provide in the roller 5 the slot or groove into which such cutter 45 passes.

Any desired means may be made use of for adjusting the position of the eccentric-gear 50 in relation to the cutter 45. A convenient device is represented in the drawings, the same consisting in a hub or disk 60, keyed upon the shaft 43, around which hub and disk is the eccentric-gear 50, and there are segmental slots in the disk 60, through which the bolts 61 pass into the eccentric-gear 50, and there may be divisions upon the disk 60 and upon the adjacent parts of the wheel 50 for facilitating the adjustment of the positions of the parts for cutting off the designated lengths of sheets.

The eccentric gear-wheel 51 is preferably attached permanently upon the shaft 22, and it is often desirable to revolve the hand-wheel 64 and the gear-wheels 21, 20, 30, and 33, so as to draw in the paper between the rollers 2 and 3 to enter the paper ready to starting the press, and at the same time the cutting-cylinders 4 and 5 should be revolved by this same hand-wheel 64, so as to cut off the advancing end of the web of paper at the proper place. In order to do this without turning all the other parts of the press I provide the locking-pins 66, passing through the gear-wheel 23 into the eccentric-gear 51, and there is a sliding disk 67 around the shaft 22 to receive the hook-ended heads of the pins 66, and the rods 69, attached to the disk 67, pass through the hand-wheel 64, and are provided with a head or follower 70, which the workman can grasp and pull away from the hand-wheel 64 to move the disk 67 and draw out the pins 66 and allow the shaft 22 and hand-wheel 64 to be rotated without turning the wheel 23. Hence this shaft 22 will turn the feed-rollers 2 and 3 and the cutting-cylinders 4 and 5 by the gearing that is connected to said shaft 22 and thereby draw in the end of the web of paper and cut the same off square, and the loose end piece can be drawn out from between the belts 6 and 7 and the paper left in the proper position for starting the press, and when the train of gearing from the impression-cylinder has revolved the gear 23 around to the proper point the spring 71 will move the disk 67 and project the pins 66 into the holes in the wheel 51 and connect the parts, so that the shaft 22 and feeding and cutting rollers will receive their motion in harmony with the rest of the press. I remark that the two pins 66 should be at different distances from the center of the shaft 22, so that the locking action can only occur at the proper place.

It is necessary to adjust the gearing to insure the end of the sheet reaching the grippers 42 at the proper time. To effect this I make the gear-wheel 23 in two parts, connected together by bolts, the hub portion having an undercut face-groove 73, containing the heads of the bolts 74 that pass through the rim portion of the said wheel. By slackening these bolts 74 the shaft 22 can be turned by the hand-wheel 64 and the relative positions of the parts so adjusted that the end of

the sheet will reach the grippers 42 at the right time, after which the nuts of the bolts 74 are tightened. It is not necessary to loosen these bolts 74, except when adjusting the parts to bring the cutting devices into their proper position to the grippers.

My improvement in regulating the speed of the paper is available with the press even in cases when the speed of the cutting-knife is not varied, as such cutting-knife may be moving slower than the paper without injury, as the action of the cutter is only momentary.

More than one cutter may be used on the cutting-cylinder, and the cutters may be of any desired character—such, for instance, as a rapidly endwise-moving shear operated momentarily at the proper time.

My devices for feeding the paper and cutting it off into sheets of the desired size may be used for cutting up sheets from a web whether the same are printed or not.

The bearings for the roller 11 should be adjustable, so as to properly nip the paper and move the same as it passes with the tapes between the rollers 10 and 11.

The rollers 8 and 9 should be sufficiently separated for the advancing end of each sheet to pass in freely between the tapes 6 and 7, and the roller 44, above the tapes, causes such tapes to come together at the opposite sides of the sheet, so as to move the sheet along between the tapes as rapidly as the paper is supplied, and the sheet is carried at the speed of the tapes as soon as it is separated from the web. The clutch that separates the feeding and cutting mechanism from the press also allows the printing devices to be run or moved separately from the paper in inking up the form or in adjusting the parts

I claim as my invention—

1. The combination, in a printing-press, of rollers for feeding in the web of paper, cutting-cylinders that act to cut the paper but not to feed the same, ranges of belts for carrying the paper to the printing mechanism, gearing for varying the speed of the feeding-rollers, and eccentric-gearing for giving motion to the cutting-cylinders and for regulating the speed of motion of the cutter when acting upon the paper, substantially as set forth.

2. The revolving shaft 22, changeable gearing and feed-rollers 2 and 3 for feeding in the paper, the cutting-cylinders 4 and 5, the eccentric-gears 50 and 51 for communicating motion to the cutting-cylinders, and the adjustable connections, substantially as specified, for varying the positions of the eccentric-gear in relation to the cutter, substantially as set forth.

3. The combination, with the cutting-cylinders, of the eccentric-gears 50 and 51, mechanism for adjusting the gear 50 in relation to the cutter, the shaft 22 and hand-wheel for moving the same, the gear-wheel 23, and a clutch or coupling pins for disconnecting the gear 23 from the shaft 22 and thereby allowing the cutting-cylinders to be revolved by hand, substantially as set forth.

4. The combination, with the cutting-cylinders, of the shaft 22 and gearing for connecting the same with the cutting-cylinders, the train of gearing from the press, and the gear-wheel 23, made in two parts and having a rim that is adjustable in relation to the other part of the wheel for adjusting the position of the cutter in order that the end of the sheet may reach the impression-cylinder at the proper time, substantially as set forth.

5. The combination, with printing mechanism adapted to print upon different-sized sheets, and the conveying-belts for the sheets, of a feeding mechanism, substantially as specified, having a variable speed for supplying the proper length of paper, a cutter for separating the web into sheets, gearing, substantially as specified, for varying the speed of the cutter to correspond, or nearly so, at the time of cutting to the speed of the paper, and mechanism for adjusting the position of the cutter in relation to the printing mechanism, substantially as set forth.

6. The combination, with rollers for feeding paper from a web and a pair of revolving cutting-rolls, of changeable gearing connecting the cutting and feeding rolls for varying the speed of the paper and the length of the sheet, and variable gearing for regulating the movement of the cutter, so as to approximate the speed of the paper at the time of the cut, substantially as specified.

7. The combination, with the impression-cylinder and the cutting-cylinders for separating the web of paper into sheets, of gearing for connecting the cutting and printing mechanism, and an automatic clutch for connecting the parts at the right point after being disconnected for moving either part of the press separately, substantially as specified.

8. In a printing-machine, the combination of rollers for feeding the web of paper, a rotary cutting-knife that acts to cut or perforate the paper, ranges of belts for carrying the paper to the printing mechanism, gearing for varying the speed of the feeding-rollers, and eccentric-gearing for giving motion to the cutting-knife and for regulating the speed of the cutter when acting on the paper, substantially as set forth.

9. The combination, with the printing mechanism, rolls for supplying a web of paper from a roll, and a cutting mechanism, of changeable gearing for varying the speed of the feeding-rolls, gearing for driving the cutting mechanism and adjustable gearing for connecting the cutting and printing mechanism, and an index or indicating divisions upon or connected with the gearing to aid in adjusting the parts to adapt the press to different lengths of sheets, substantially as set forth.

10. The combination, with the printing mechanism and rollers for supplying the pa-

per, of gearing for varying the speed of the feed-rolls and the length of paper supplied, a cutter for perforating or separating the paper, a train of gearing between the cutting mechanism and the printing mechanism having a two-part wheel, and a clamping device for holding the parts of the gearing after they have been adjusted to bring the advancing end of the sheet properly to the printing mechanism.

11. The combination, with the printing mechanism and rollers for supplying the paper, of gearing for varying the speed of the feed-rolls and the length of paper supplied, a cutter for perforating or separating the paper, a train of gearing between the cutting mechanism and the printing mechanism, and a two-part wheel having an annular groove and clamping-bolts for holding the parts of the gearing after they have been adjusted to bring the advancing end of the sheet properly to the printing mechanism.

12. The combination, with the printing mechanism and the rollers for supplying the paper, of gearing for varying the speed of the feed-rolls and the length of paper supplied, a cutter for perforating or separating the paper, a train of gearing between the cutting mechanism and the printing mechanism, and clutch mechanism for separating the cutting and feeding mechanism from the printing mechanism when entering a fresh web of paper and for reconnecting the parts in their proper relative positions to bring the advancing end of the sheet properly to the printing mechanism.

13. The combination, with the cutting-cylinders, of the train of gearing from the press, and the gear-wheel 23, made in two parts and having a rim that is adjustable in relation to the other part of the wheel for adjusting the position of the cutter in order that the end of the sheet may reach the impression-cylinder at the proper time, substantially as set forth.

14. The combination, with a printing-press and the feeding-rolls and variable gearing for feeding different lengths of sheets, of a cutter and gearing for giving to such cutter a faster speed in one portion of its revolution than another, and adjustable gearing for causing the cutter to act on the paper when its speed approximates the speed of the paper, substantially as specified.

15. The combination, with the impression-cylinder in a printing-press, of feeding and cutting mechanism and gearing connecting the cutting mechanism with the impression-cylinder, and a clutch adapted to connect at one place only in its revolution, for insuring the proper position of the sheet to the printing mechanism after the feeding and cutting devices have been moved separately from the press in entering the web, substantially as specified.

Signed by me this 10th day of June, A. D. 1886.

WALTER SCOTT.

Witnesses:
GEO. T. PINCKNEY,
WILLIAM G. MOTT.