(No Model.)

W. SCOTT.

FEEDING AND CUTTING MECHANISM FOR PRINTING PRESSES.

No. 506,798. Patented Oct. 17, 1893.

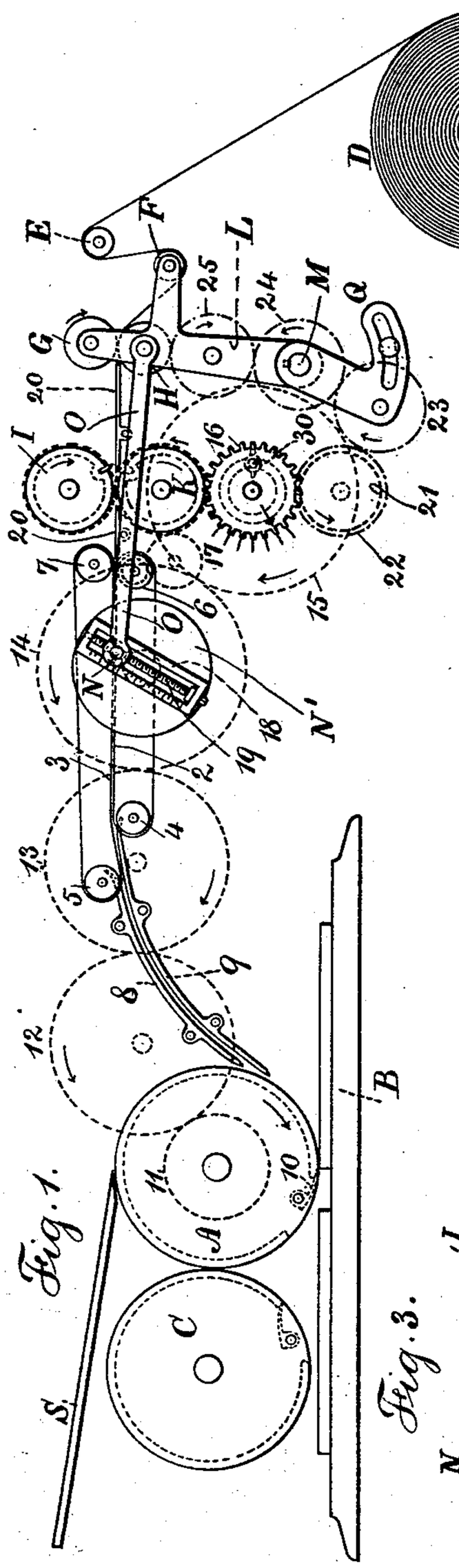

Fig. 1.

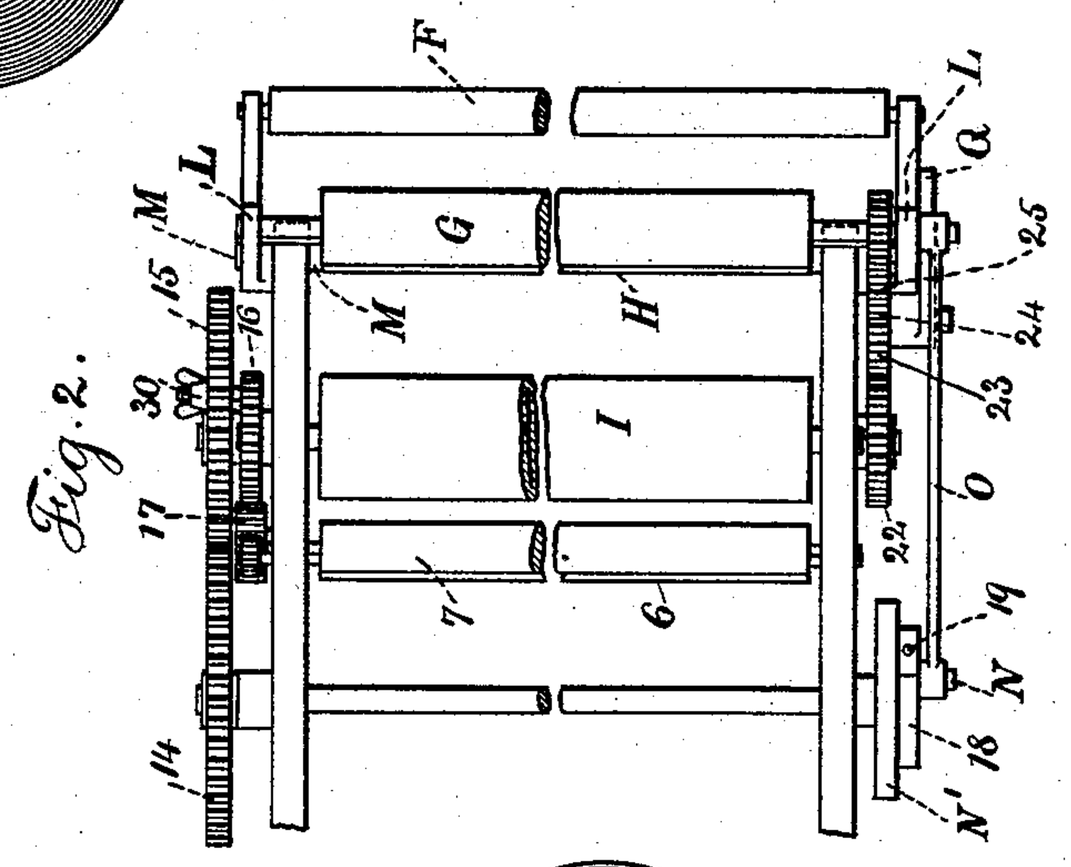

Fig. 2.

Fig. 3.

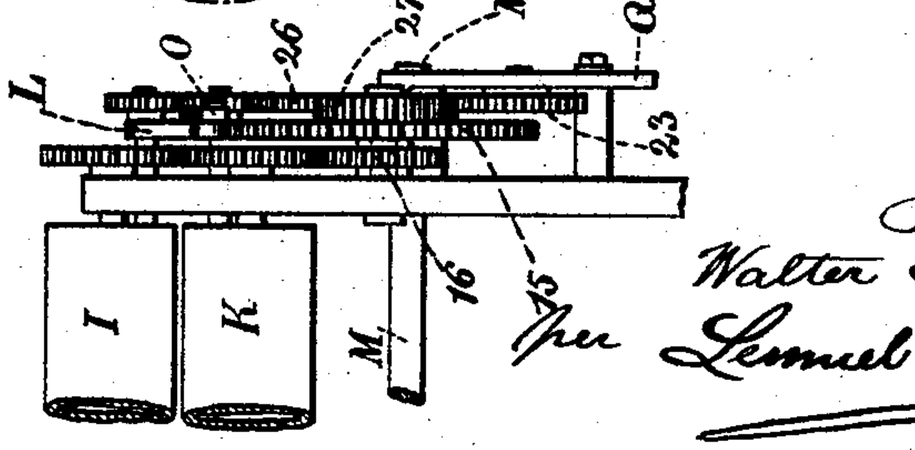

Fig. 4.

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WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

FEEDING AND CUTTING MECHANISM FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 506,798, dated October 17, 1893.

Application filed January 4, 1892. Serial No. 416,932. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Feeding and Cutting Mechanism for Printing-Presses, of which the following is a specification.

In patents heretofore granted to me, provision is made for feeding the paper at greater or less speed so as to supply sheets of different lengths each complete movement of the press, and the cutters are revolved once each complete movement of the press, and eccentric gears or differential gearing are made use of for giving to the cutters a speed approximating that of the paper at the time that the cut is effected.

In my present invention the cutting cylinders are revolved at a substantially uniform speed, and the feed rolls are provided with change gears so as to vary the length of sheet fed in each complete movement of the press, and the feed rolls are mounted in a frame so as to be moved towards or from the cutting cylinders, and a movement is communicated to the frame of the feed rolls in such a way that the speed of paper, at the time of the cut, corresponds or nearly so to the speed of movement of the cutter; that is to say, when a small sheet is being fed into the press, the frame and feed rolls are drawn toward the cutter at the time the cut takes place, in order that the speed of movement of the sheets by the rotation of the feed rolls and by the swinging movement of the frame, may equal or nearly so the speed of movement of the cutters, and when a large sheet is being introduced the frame and the feed rolls may be moved away from the cutters, in order that the speed of motion given to the paper by the feed rolls may be lessened at the cutter, so as to coincide or nearly so with such movement of the cutter, and an equalizer is used between the feed rolls and the roll of paper to unify the action in drawing off the paper. The sheets as cut off, are conveyed away to the impression cylinder and pass through downwardly inclined guides that deliver the sheets to the grippers upon the impression cylinder, and at the under side of such impression cylinder, so that the sheet does not have to be reversed as it is grasped by the grippers; and a feed table is provided above the impression cylinder and at the opposite side thereof to the automatic supply, so that the sheets may be fed into the press by hand or automatically, by properly adjusting the cams that act upon the grippers, as in my application Serial No. 405,369, filed September 11, 1891.

In the drawings, Figure 1 is a diagrammatic side view illustrating the devices made use of by me. Fig. 2 is a diagrammatic plan view of the feed rolls and cutting cylinders. Fig. 3 is a diagrammatic elevation of a modification of the apparatus, and Fig. 4 is a side elevation illustrating the gearing that may be made use of for driving the feed rolls.

The impression cylinder A is of any ordinary character. I have represented the same in connection with a bed B, upon which the forms rest, and this bed is to be reciprocated, and the sheet after it receives one impression, is to be taken by the grippers upon the second impression cylinder C for printing the opposite side of the sheet, but my improvement may be availed of in connection with type cylinders instead of a reciprocating bed.

The roll of paper is represented at D, and the paper passes over a stationary roll E, around a moving roll F and between the feed rolls G, H and between the cutting cylinders I, K and between the sets of tapes or belts 2, 3, and the downwardly inclined guide bars 8, 9 to the grippers 10 on the impression cylinder A. The rolls 4, 5, 6 and 7 are for the tapes or belts 2, 3.

The cutting cylinders I K may be rotated in any desired manner. I have represented gear wheels 11, 12, 13, 14, 15 and 16 for communicating motion from the impression cylinder A to the lower cutting cylinder K; and in a press of the character illustrated, the cutting cylinders are rotated once for every two revolutions of the impression cylinder A, and I have represented an intermediate gear 17 for driving the roll 6, the intermediate gear 17 acting upon a gear that is smaller than the roll 6 in order that the sets of tapes or belts 2 and 3 may be moving slightly faster than the surface speed of the cutting cylinders, so as to apply a slight tension to the sheet to keep the same out straight.

The feed rolls G and H are supported by frames L permanently fastened to the rock shaft M, so that the rollers are vibrated by

the frames upon the rock shaft and moved toward or from the cutting cylinders by any suitable mechanism.

I have represented the crank pin N as rotated by a disk N′ upon the shaft of the gear 14, and from this crank pin a connecting rod O extends to one of the frames L, and it is advantageous to mount the crank pin N upon a block in guide slides 18 and to provide an adjusting screw 19 so that the radius described by the crank pin can be increased or lessened, and the crank pin can also be moved to either side of the shaft or axis of the gear wheel 14 and disk N′. I provide upon the frames L arms for carrying the take up roller F. It will now be apparent that as the feed rolls G and H are vibrated by and with the frames L, the speed of movement of the web of paper, as it passes between the cutting cylinders I K, will be varied, because the feed rolls G H are being rotated to move the paper along with a uniformity of speed, and when the movement of the web, as communicated by the feed roll, is augmented by the feed rolls moved bodily toward the cutting cylinders, the paper will be traveling faster, and when the feed rolls are carried bodily away from the cutting cylinders the web will be moving slower. Hence by the regulation of the position of the crank pin N, the motion given to the frames and feed rolls can be varied to cause the paper to travel between the cutters at the same speed or nearly so as the cutters when the cut is being made; and the cutting cylinders do not touch each other but allow the paper to move freely between them at whatever speed may result from the combined action of the movement of the feed rolls upon their axis and the swinging of the feed roll frames with the rock shaft. If the paper passed directly from the roll D to the feed rolls G H it would be drawn off at a greater speed when the feed rolls are moving away from the roll of paper than when they are moving toward it, and this might be injurious to the paper, but by passing the web of paper around the stationary roller E and then around the take up roll F before reaching the feed rolls, the speed of movement of the web, as drawn off from the roll, is rendered nearly uniform, because the take up roll F, when moving away from the roll of paper, gives us sufficient slack to allow for the movement of the feed rolls, and when the feed rolls are going toward the roll of paper, the roll F takes up the slack that would otherwise be produced.

I have represented guide bars at 20 for the paper to rest upon in passing toward and away from the cutting cylinders so that these guide bars will properly pass the paper along to the tapes or belts 2, 3.

The gearing for giving the proper movement to the feed rolls may be of any desired character. I have represented in Fig. 1 a gear 21 receiving its motion from the gear 16, and a change gear 22 on the same shaft, and the gear 23 is upon a movable arm having the rock shaft M for its pivot, so that this gear 23 can be moved into gear with the changeable gear 22 whatever the size of the latter may be, so as to regulate the speed of the feed rolls through the train of gearing 24 and 25. In Fig. 3 I have illustrated a simpler gearing in which the gear wheel 23 on the movable arm Q gears to an intermediate wheel 26 having the rock shaft M as its axis and acting directly upon a gear upon the axis of the lower feed roll H, and in this instance the gear 23 receives motion from the change gear 27 upon the axis or shaft of the wheel 15.

By applying upon the guide slides 18 a scale or index as shown at R, the position of the crank pin N can be indicated according to the length of sheet that is to be fed in each complete movement of the press, and this index R should be marked to correspond with the change gear 27 or 22, so that when the length of sheet is determined by the change gear 27 or 22 the crank pin can be set to a corresponding mark so that the paper will be moving at the proper speed when the cut takes place.

The feed board S is adjacent to the impression cylinder A and is at the opposite side thereof to the guide bars 8, 9, and the grippers 10 can be set to take the sheet from the feed board S or from between the guide bars 8, 9 according to whether the feed of the paper is automatic or by hand; and in consequence of the guide bars 8, 9 bringing the sheet down to the impression cylinder A upon the lower portion thereof, the sheet is moving in the proper direction as it is presented to the grippers, and such grippers draw down the sheet from between the guide bars 8, 9, and such sheet is properly presented to the form or type cylinder. Thereby I am enabled to easily change the press from a hand feed to an automatic feed.

I remark that the cutting cylinders may entirely separate one sheet from the next; or they may perforate the paper, the parts being so positioned that the sheet will be torn off at the line of perforations by the nipping action of the belts or tapes 3 upon the roll 4 when the advancing end of the sheet reaches this point, or nipping and forwarding rolls of any desired character may be applied at any portion of the length of the path over which the sheet passes.

The differences in the length of sheet fed in renders it necessary to vary the position of the cut in relation to the impression cylinder, in order that the sheet may reach the grippers at the proper moment to be grasped by such grippers. With an impression cylinder in such a press as is illustrated in the drawings, it is necessary that the impression cylinder make two revolutions to each sheet cut off. If an index is in the train of gearing between the impression cylinder and cutters to indicate the adjustment required to bring the parts into the proper relative positions as aforesaid, such adjustment is re-

quired on one of the wheels rotating once for each two revolutions of the impression cylinder to prevent confusion in consequence of the index passing more than once around such wheel. I have shown the wheels 12, 13, 14 and 15 as each rotating once for every two revolutions of the impression cylinder A, and hence the index for the above purposes can be on either wheel. I have shown the index on the wheel 15, and in this case the wheel can be loose on the shaft of the wheel 16 and held to such wheel 16 by the bolt 30 passing into an undercut circular groove in the wheel 16 so that the parts can be clamped after adjustment, and the index can be on the wheel 15, there being a pointer on the adjacent part of the wheel 16. By this means the parts can be turned independently of each other when the bolt 30 is loose in varying the length of sheet and adjusting the cutting action, and the index on 15 can be worked so as to indicate the place where the gears are to be clamped for specified sizes of sheets.

I claim as my invention—

1. The combination in a feeding and cutting mechanism, of revolving cutting devices, feed rolls, changeable gearing for driving the feed rolls to supply the proper length of sheet, and means for moving the feed rolls bodily toward and from the cutting cylinders and an equalizer between the feed rolls and the roll of paper, substantially as set forth.

2. The combination in a feeding and cutting mechanism, of cutting devices rotating at a fixed speed, feed rolls and changeable gearing for varying the speed of the feed rolls, a frame for supporting the feed rolls and means for moving the feed rolls and frame toward and from the cutting cylinders, and means for taking up and letting out the web as it passes between the roll and the feed rolls, substantially as set forth.

3. The combination with the cutting cylinders whose surface speed is fixed, feed rolls and means for varying the surface speed, means for changing the distance between the cutting cylinders and the feed rolls and a web equalizing device between the feed rolls and the roll of paper, substantially as set forth.

4. The combination with the cutting cylinders rotating at a given speed, of feed rolls, changeable gearing for driving the feed rolls, a rock shaft, a frame carried by the rock shaft and supporting the feed rolls and mechanism for vibrating the rock shaft and frame and moving the feed rolls toward and from the cutting cylinders and a take up between the feed rolls and the roll of paper, substantially as set forth.

5. The combination with the cutting cylinders and mechanism for driving the same, of feed rolls, a rock shaft and frame supported by the rock shaft, and carrying the feed rolls a stationary roll over which the web passes and an equalizing roll moving in unison with the feed rolls, substantially as set forth.

6. The combination with the cutting cylinders and means for driving the same at a uniform speed, of feed rolls and mechanism for varying the action of the feed rolls and thereby the length of paper fed each movement of the press and mechanism for moving the feed rolls toward and from the cutting devices, a take up roller for acting upon the web between the feed rolls and the paper roll, tapes or belts for conveying the sheet or web of paper and gearing for driving the tapes at a slightly faster speed than the surface of the cutting cylinders, whereby sheets of different lengths are cut and fed into the press and the speed of the paper roll rendered nearly uniform, substantially as set forth.

7. In a printing machine, the combination with cutting cylinders geared to revolve and cut one sheet for each two revolutions of the impression cylinder, feed rolls, a frame and rock shaft for supporting the same, and an adjustable crank pin and connecting rod for moving the frame and feed rolls bodily toward and from the cutting cylinders, and a take up between the feed rolls and the roll of paper, substantially as set forth.

8. The combination with the impression cylinder, the tapes or belts and their roll, of cutting cylinders and gearing for driving the same at a uniform speed or nearly so, feed rolls and changeable gearing for varying the lengths of sheets fed into the press, an adjustable crank pin and connections for giving motion to the feed rolls bodily toward and from the cutting cylinders, and an index by which the crank pin can be adjusted to adapt the lateral movement given to the feed rolls to the change gear that regulates the length of sheet, substantially as set forth.

9. The combination with the impression cylinder and the cutting mechanism, of a train of gearing connecting them together, one gear in said train rotating once for each two revolutions of the impression cylinder, an index for setting the parts and a clamping device for holding the gear when set, and feed rolls and mechanism for varying the action of the same and the length of sheet fed to the press, substantially as set forth.

10. The combination with cutting mechanism moving at substantially uniform speed, of feeding devices and means for varying the action of the same and consequently the length of sheet fed, and mechanism for acting on the paper to render the speed of movement at the time of cut nearly the same as the speed of movement of the cutter, and mechanism acting on the web between the roll and feeding device to maintain a nearly uniform surface speed of the roll substantially as specified.

Signed by me this 23d day of December, 1891.

WALTER SCOTT.

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