

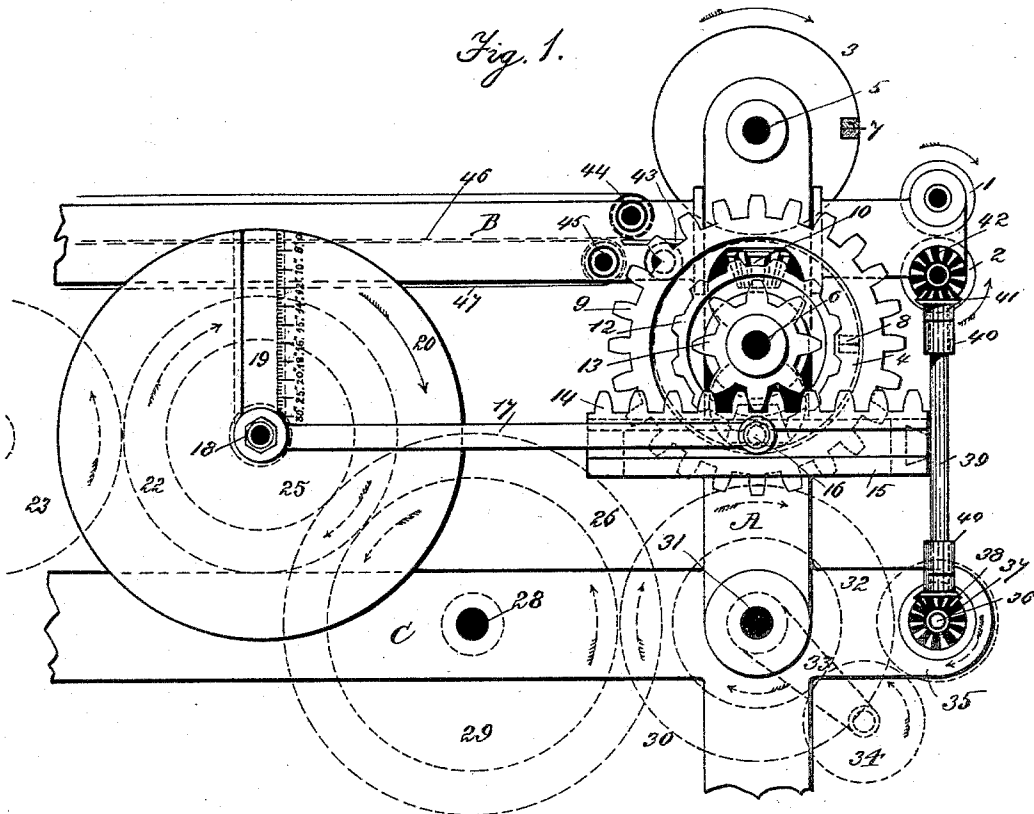
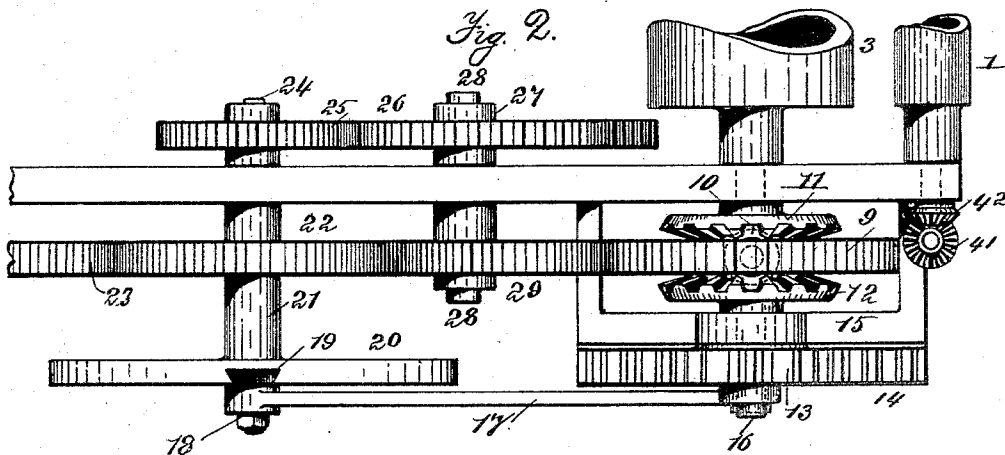
(No Model.)

3 Sheets—Sheet 1.

C. KAHLER & L. E. BROOKES.
PAPER FEEDING AND CUTTING DEVICE.

No. 380,288.

Patented Mar. 27, 1888.



Witnesses.

John J. Kahler,
Harry T. Jones.

Inventor,
Carvad Kahler,
Leonard E. Brookes.

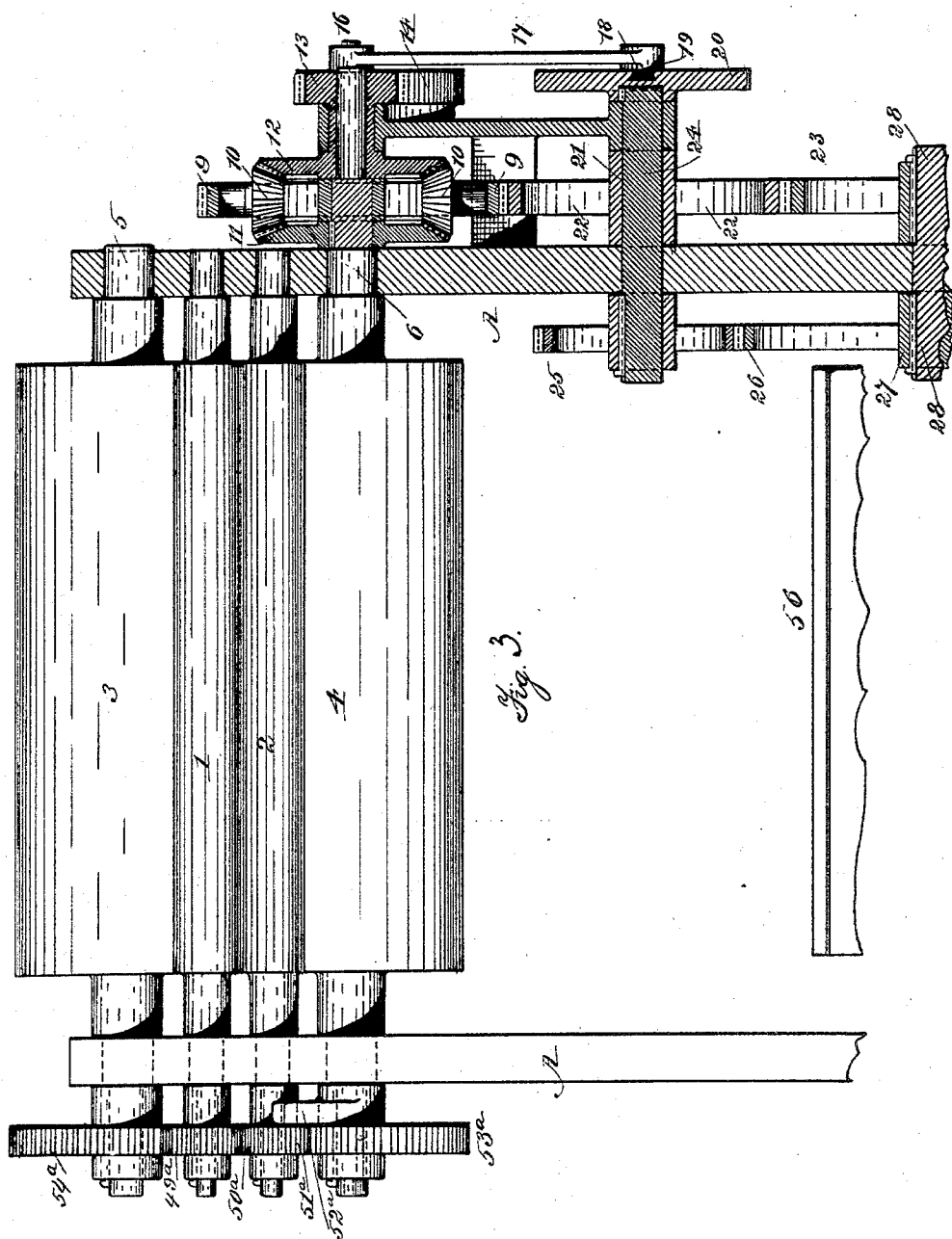
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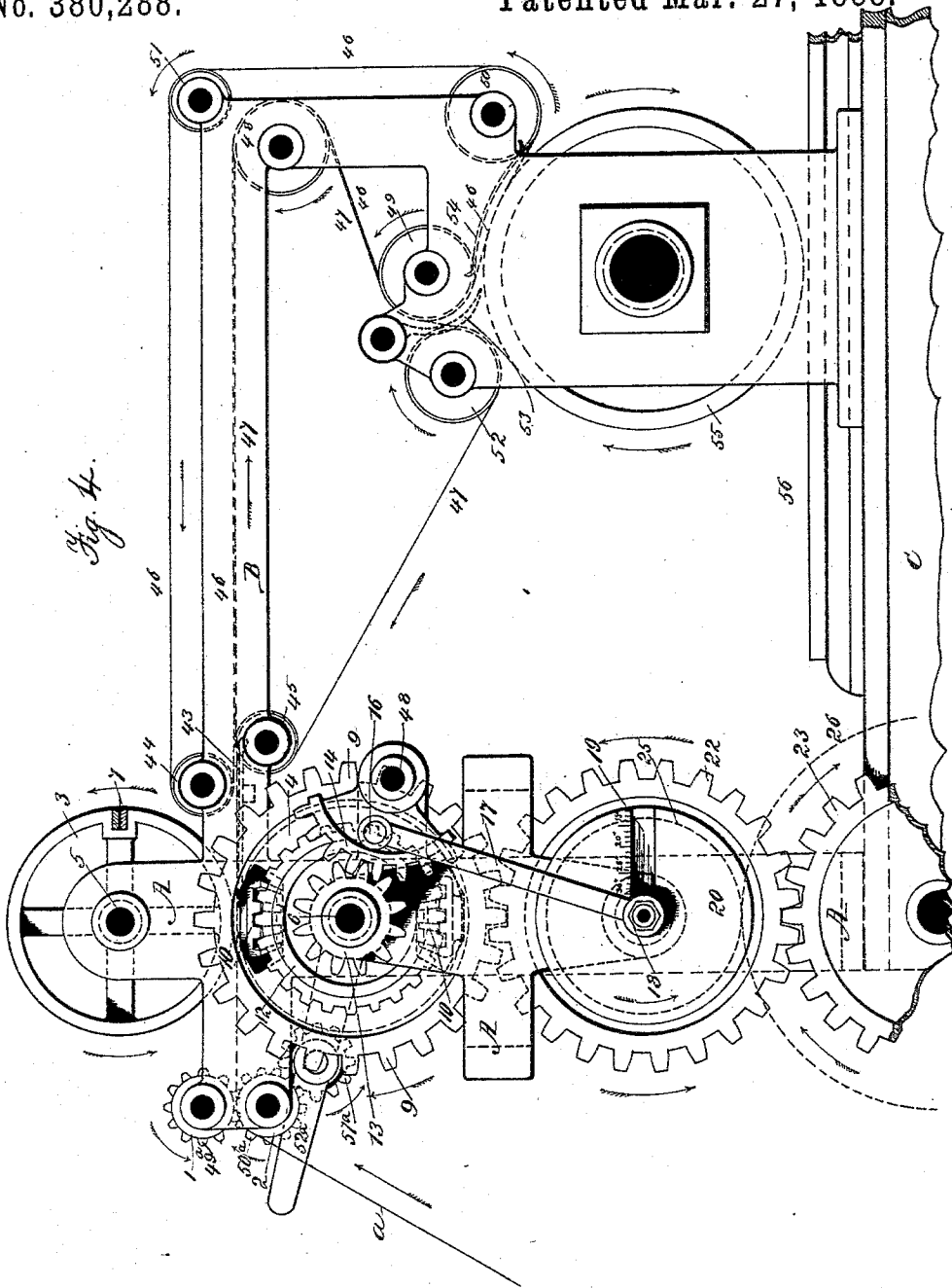
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UNITED STATES PATENT OFFICE.

CONRAD KAHLER AND LEONARD E. BROOKES, OF CHICAGO, ILLINOIS.

PAPER FEEDING AND CUTTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 380,288, dated March 27, 1888.

Application filed January 23, 1888. Serial No. 261,563. (No model.)

To all whom it may concern:

Be it known that we, CONRAD KAHLER and LEONARD E. BROOKES, residing at Chicago, in the county of Cook and State of Illinois, and citizens of the United States, have invented a new and useful Improvement in Paper Feeding and Cutting Devices, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation showing a straight reciprocating rack and devices co-acting therewith for severing the sheets from a continuous web of paper. Fig. 2 is a top or plan view of the devices of Fig. 1. Fig. 3 is an end elevation, partly in section. Fig. 4 is a side elevation showing a reciprocating segmental rack instead of a straight rack, as in Fig. 1.

The object of this invention is to construct a machine by which sheets of varying length can be cut or severed from a continuous roll or web of paper, and to accomplish this end it is not alone sufficient that the feeding-rollers should feed a small quantity of the web or roll at each revolution, but also that the speed of the cutting mechanism coincide with the speed of the web at the line of severance of the latter, or otherwise the knife will act to tear the paper and in other ways interfere with the proper operation of the devices, and this bringing of the cutting-cylinders to the same speed as that of the roll or web of paper being acted upon constitutes the gist of this invention; and its nature consists in the several parts and combinations of parts hereinafter described, and pointed out in the claims.

In the drawings two forms of carrying out the subject-matter of the invention are shown, one of which (shown in Figs. 1 and 2) has a straight reciprocating rack for regulating the speed, and the other (shown in Figs. 3 and 4) has a reciprocating segmental rack for the same purpose, and with the different racks a slight variation in the arrangement of the driving-gear is shown; but in both forms the spirit of the invention is embodied.

The feeding-cylinders 1 and 2 are each mounted upon a shaft, which shafts are supported in suitable boxes on the main frame of the machine, and forward of these feeding-cylinders in the arrangement shown are located

the cutting-cylinders 3 and 4, the cylinder 3 being mounted on a suitable shaft, 5, and carrying a cutting-blade, and the cylinder 4 being mounted on a suitable shaft, 6, and carries a matrix, 8, to coact with the cutting-blade 7, and the shafts 6 and 8 are supported in suitable boxes in the upright A of the frame, or in any other suitable manner. One end of the shaft of the cutting-cylinder 4 projects beyond the support A, and on this projecting end is loosely mounted a gear-wheel, 9, which carries within its periphery beveled pinions 10, located in line with each other on opposite sides of the center of the wheel, and these beveled pinions 10 mesh with a beveled gear-wheel, 11, keyed or otherwise firmly secured to the end of the shaft 6, adjacent to the beveled gear-wheel 9; and mounted on the end of the shaft 8, to mesh with the beveled pinions 10, is a beveled gear, 12, corresponding to the beveled gear 11, to the hub of which is secured a pinion, 13, and this pinion and the beveled gear 12 connected therewith are fixed, in that they are not revolved by a direct connection with the end of the shaft 8.

As shown in Figs. 1 and 2, the pinion 13 meshes with the teeth of a straight rack, 14, which rack is supported in a groove or guide-way formed therefor in a support, 15, extending out from the frame of the machine, and, as shown, this support 15 also carries a box for the sleeve connecting the beveled gear-wheel 12 and the pinion 13. The rack 14, Figs. 1 and 2, has projecting from its outer face a pin or pivot, 16, to which is connected the end of a rod, 17, the other end of which is connected to a wrist pin or pivot, 18, having a dovetailed face or body to enter a dovetailed groove, 19, in a disk, 20, making a connection between the rack and the disk which can be varied in the distance from the center of motion of the disk to vary the movement of the rack, as herein-after described. This disk 20 is keyed or otherwise secured to the end of a shaft, 24, on which shaft is loosely mounted the hub 21 of a gear-wheel, 22, which meshes with a gear-wheel, 23, driven in any suitable manner. The shaft 24 is supported in a suitable box on the frame, and to the inner end is keyed or otherwise secured a gear-wheel, 25, which meshes with a gear-wheel, 26, having a hub or center, 27,

keyed or otherwise firmly secured to the end of a shaft, 28, also supported in a suitable box on the frame, and having keyed or otherwise firmly secured to its outer end a gear-wheel, 29, which meshes with the gear-wheel 22. As shown in Fig. 1, the driving-gear 23 is at one side of the gear 22, and the driving-gears 26 and 29 are on the opposite side, and with this arrangement the gear-wheel 29 meshes with the gear-wheel 30 on a shaft, 31, supported in boxes on the frame of the machine and having mounted thereon a gear, 32, and an arm, 33, which carries a gear, 34, meshing with the gear 32, so that the rotation of the gear 30 will drive the gear 32, and this gear will drive the gear 34. The gear 34 can be moved into or out of mesh with a gear, 35, on a shaft, 36, supported in boxes on the frame and having thereon a beveled gear, 37, which meshes with a beveled gear, 38, on a shaft, 39, supported in boxes 40 on the frame, and this shaft 39 has secured to its opposite end a beveled gear, 41, which meshes with a beveled gear, 42, on the end of the shaft of the feeding-roller 2 in the arrangement shown in Figs. 1 and 2.

As shown in Fig. 1, a series of rods, 43, is located between the cutting-cylinders 3 and 4 and tape-rollers 44 and 45 to bridge the space between these parts and deliver the severed sheets between the tapes 46 and 47, by which tapes the sheets can be delivered to the point desired.

The operation of the devices in the arrangement shown in Figs. 1 and 2 is as follows: The wrist-pin 18 is movable in the slot 19 of the disk 20, and at one side of the slot on the face of the disk is a graduated scale by which the wrist-pin can be adjusted in the slot, and when the wrist-pin is at the inner end of the slot, as shown in Fig. 1, no movement of the rod 17 will be had, as the wrist-pin 18 is at the center of motion of the disk, and with the parts in this condition the cutting-cylinders will be driven at full speed the entire revolution, as the beveled gear 12 is held stationary by means of the rack 14 and gear 13, and the gear 9, which meshes with the gear 30, and is driven thereby from the gears 22 and 29, will rotate and carry with it the beveled pinions 10, which, meshing with the beveled gears 11 and 12 on the shaft 6 of the cutting-cylinder 4, will rotate and impart a uniform speed to the cutting-cylinders so long as the beveled gear 12 is held stationary by the gear 13 and rack 14. A movement of the wrist-pin 18 outward in the slot 19 will cause the disk 20 to reciprocate the rod 17 and move the rack 14 back and forth, removing the lock for the beveled gear 12, so that this gear 12 will also have a rotation part of the time in the same direction as the beveled gear 11, and if this beveled gear-wheel were so rotated by means of the gear 13 and rack 14 for one revolution as fast as the gear 9 was running the beveled gear 11 would remain stationary, and on this basis if the beveled gear 12 was rotated at one-half of the speed of the gear 9 it would cause the beveled

wheel 11 and the cutting-cylinders 3 and 4, driven thereby, to run at half their normal speed during a certain portion of each revolution—that is, the cutting-cylinders make a revolution in a given time independent of the length of the sheet to be cut off, this time depending on the speed of the gear 9, driven from gear 23, the other mechanism only changing the speed of the cutting-cylinders at the time of cutting to correspond with the speed of the web, while during the remainder of their revolution they rotate at a different speed. It will thus be seen that on this principle by adjusting the wrist-pin 18 at any desired point on the graduated scale the movement of the rack 14 can be increased from nothing, or stationary, to a full stroke, and by thus giving the rack any desired throw to operate the gear 13 and beveled gear 12 at a variable speed from that of the driving-gear 9 a corresponding change is made in the speed of the beveled gear 11, and consequently in the rotation of the cutting-cylinders.

The average speed of the cutting-cylinders is not changed by the rack 14, but the action of the rack 14 is to decrease the speed of the cutting mechanism at the line of severance of the web; but the cutting-cylinders increase their speed during the balance of each revolution, so that for one complete operation of the press the cutting-cylinders each make a complete revolution.

The length of sheet is determined by the movement of the feed-rollers 1 and 2, and is changed by putting on a larger or smaller gear in place of the gear 35. This is the object of moving the gear 34 in and out of mesh. The variation in the speed of the cutting-cylinders does not determine the length of the sheet. This is determined by the speed of the feed-rollers 1 and 2. The variable movement of the cutting-cylinders is for the purpose of making the speed of the cutting mechanism coincide with the speed of the web at the line of severance of the same. The rack 14, having a variable length of movement by means of the adjustable wrist-pin 18, causes the speed of the cutting mechanism to coincide with the speed of the web at the line of severance of the same, which web is governed in its movement or travel forward by the feeding-rollers 1 and 2.

The gear 22 runs loose on the shaft 24, and is driven by the gear 23, and drives the gear 29, keyed to the shaft 28, to which shaft is also keyed the gear 26, which drives the gear 25, keyed to the shaft 24, to which shaft is also keyed the disk 18, so that the gear 22 drives the disk through the intermediate gear, and the gear 29 meshes with the gear 30 in the arrangement shown in Fig. 1, which gear 30 meshes with and drives the gear 6; and connected with the gear 30, or to the shaft 31 of the gear, is the gear 32, which meshes with the gear 34 to drive the gear 35, and, through the beveled gears 37, 38, 41, and 42, drives the feeding-cylinders, imparting a uniform speed to the feed-cylinders and the cutting-cylinders,

by which, when the beveled gear 12 is locked, the web or roll of paper will be severed into sheets of the full length of cut; but when the beveled gear 12 is rotated by the gear 13 and rack 14 the cutting-cylinders during a portion of their revolution will have a variable speed from that of the feeding-cylinders, which speed is regulated by the adjustment of the wrist-pin 18 in its slot 19, the length of the sheet being regulated by the speed of the feed-rollers.

As shown in Figs. 3 and 4, instead of a straight reciprocating rack, 14, a segmental rack is used, to which the rod 17 is attached by the pin 16, and this rack 14 is mounted upon a suitable journal pin or pivot, 48, as shown in Fig. 4, so that it can be swung back and forth by the action of the rod 17. The gear-wheel 22, instead of having intermediate gear connecting it with the gear-wheel 9, meshes directly with such wheel and is driven by the gear-wheel 23, on the shaft of which wheel is secured the gear-wheel 26, which meshes with the gear-wheel 25 on the shaft 24, by which the disk 20 is driven, and instead of beveled pinions for driving the feeding-cylinders such cylinders are driven by a chain of gearing, as shown, which consists of a pinion, 49^a, on the shaft of the feeding-roller 1, which meshes with a pinion, 50^a, on the shaft of the feeding-roller 2, which pinion 50^a meshes with a pinion, 51^a, on a movable arm, 52^a, mounted on the shaft of the cutting-cylinder 4, on which shaft is keyed or otherwise secured a driving-gear, 53^a, which meshes with the pinion 51^a, and also meshes with a gear, 54^a, keyed to the shaft of the cutting-cylinder 3, and this train of gearing is located on the opposite side of the machine from the speed-regulating gearing, as shown in Fig. 3.

The operation of the construction shown in Figs. 3 and 4 is essentially the same as that described for Figs. 1 and 2, the only difference being in the movement of a straight reciprocating rack and a segmental rack, both of which movements, in effect, are the same so far as imparting a variable speed to the cutting-cylinders is concerned, as by moving the wrist-pin 18 outward in its slot 19 of the disk 20 the segmental rack can be varied in its throw and operate in the same manner as the straight rack.

As shown in Fig. 4, the delivery-tapes 46 and 47 lead to a series of pulleys, 48, and thence to a series of pulleys, 49, where they divide, the series of tapes 46 running to a series of pulleys, 50, thence to a roller, 51, and back to the roller 44; and the series of tapes 47 runs to a series of pulleys, 52, and thence back to the roller 45, and between the series of pulleys 49 and 52 are guide-fingers 53, and between the series of pulleys 49 and 50 are guide-fingers 54, by which the sheet of paper will be directed onto an impression-cylinder, 55, to receive on one side an impression from the form on a reciprocating bed-plate, 56, the intention being to show the use of the improvements in connection with a printing-press, it being understood, however, that the subject-matter of the invention is adapted for use with other machines and for other purposes than dividing a web or roll of paper into sheets for a printing-press.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with cutting-cylinders, of a rotary disk carrying an adjustable wrist-pin, a rack, a connecting-rod between the wrist-pin and the rack, and a driving-gear for the cylinders operated by the rack, substantially as and for the purposes described.

2. The combination, with the cutting-cylinders, of the rotary disk 20, adjustable wrist-pin 18, connecting-rod 17, a driving-rack, 14, pinion 13, gear 9, and beveled pinions 10, 11, and 12, substantially as and for the purposes described.

3. The combination, with the feeding-cylinders 1 2 and cutting-cylinders 3 4, of a rotary disk, 20, adjustable wrist-pin 18, rack 14, connecting-rod 17, pinion 13, gear 9, beveled pinions 10, 11, and 12, and a train of gearing for operating the parts, substantially as described.

4. The combination, with two rotary cutting-cylinders, of gearing for rotating the cylinders and a rack having a variable range of movement, substantially as described.

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