2 Sheets—Sheet 1.

W. SCOTT.

Sheet-Delivering Apparatus for Printing-Machines.

No. 221,703. **Patented Nov. 18, 1879.**

Fig. 1

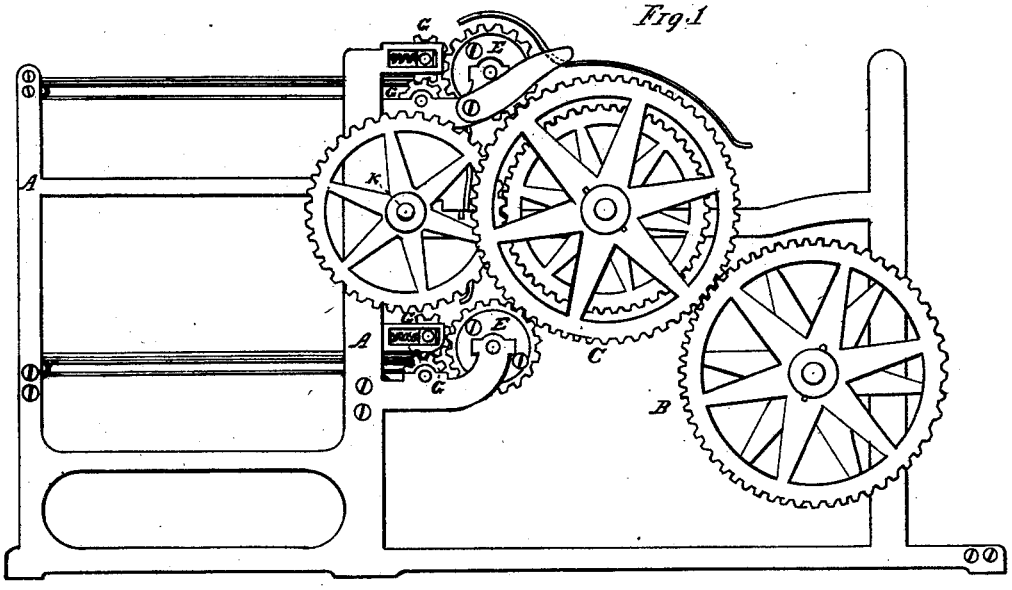
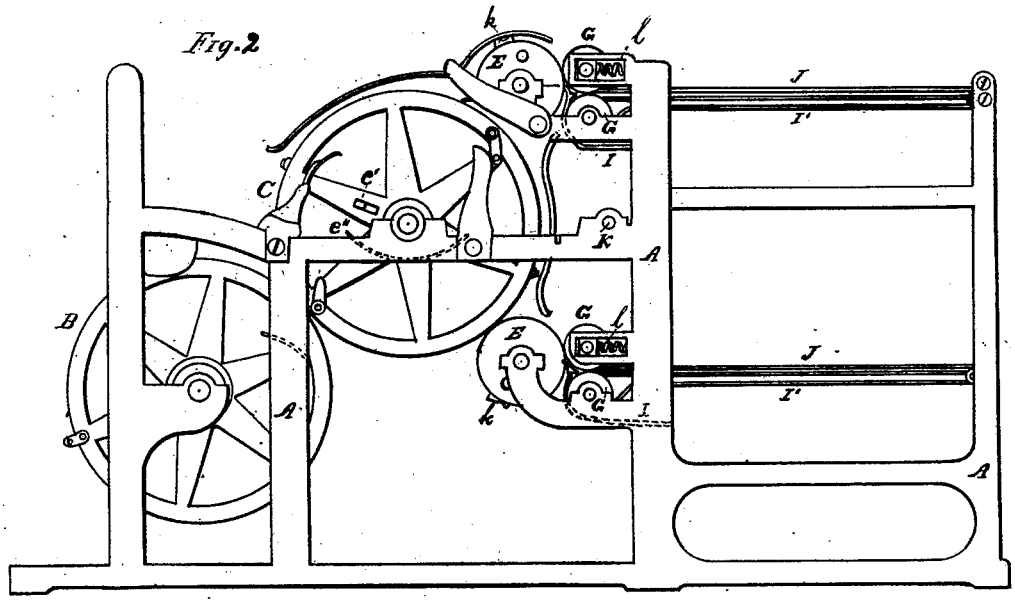


Fig. 2



WITNESSES.

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2 Sheets—Sheet 2.

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Sheet-Delivering Apparatus for Printing-Machines.

No. 221,703. Patented Nov. 18, 1879.

Fig. 3

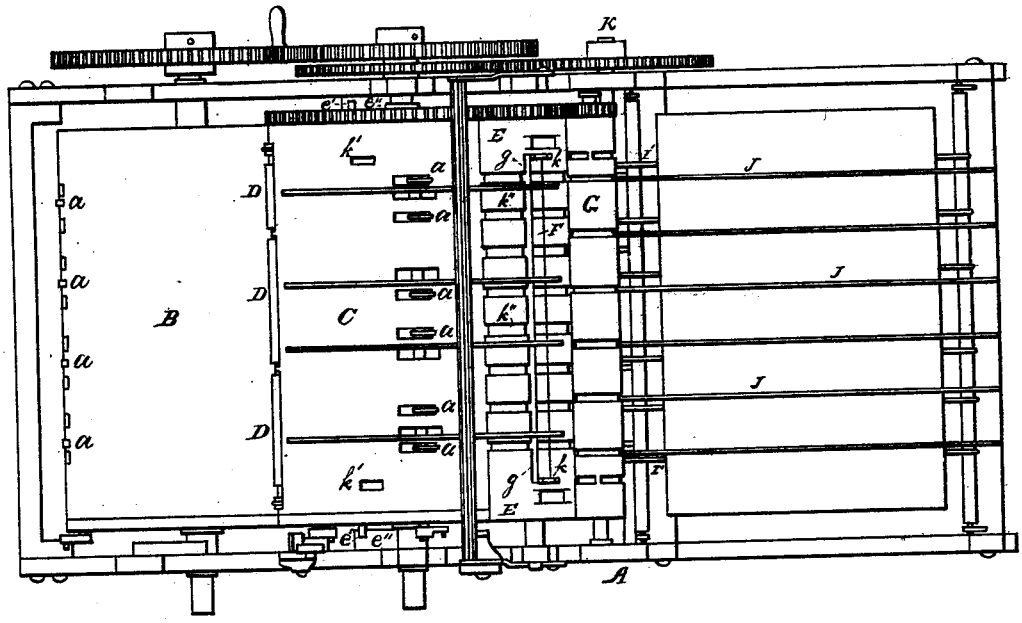


Fig. 4

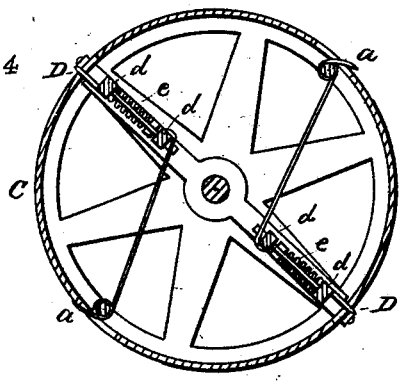
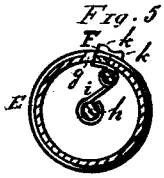


Fig. 5



WITNESSES.

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UNITED STATES PATENT OFFICE

WALTER SCOTT, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN SHEET-DELIVERING APPARATUS FOR PRINTING-MACHINES.

Specification forming part of Letters Patent No. **221,703**, dated November 18, 1879; application filed October 31, 1874.

To all whom it may concern:

Be it known that I, WALTER SCOTT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Delivery Apparatus for Printing-Machines, of which improvements the following is a full, clear, and exact description, which will enable others skilled in the art to which my invention appertains to make and use the said improvements, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a side elevation of folding mechanism embodying my improvements; Fig. 2, a side elevation of the opposite side thereof; Fig. 3, a top or plan view of the same; Fig. 4, a vertical cross-section of one of the cylinders; and Fig. 5, a like section of another cylinder.

Like letters of reference indicate like parts.

The object of my invention is to improve the construction and operation of the mechanism employed in connection with printing-machines for automatically folding the printed sheets; and to that end my invention consists in certain novel features, substantially as hereinafter described, relating to the said mechanism.

In the drawings, A represents that part of the frame which supports the folding mechanism. In the example shown, B represents the last cylinder of the printing-machine. C is the first cylinder of the folding mechanism, and is geared to the cylinder B. The cylinders B and C are each provided with gripers *a a*, operating in the usual manner, for shifting the sheets from one cylinder to the other.

D D are radial yielding blades or creasers, made either continuously or in sections, and arranged longitudinally along the cylinder C, which is slotted to allow them to project through its periphery. The blades are attached to a stock, *d*, having projecting ends arranged in radial slots in the ends of the cylinder. *e e* are springs holding the edges of the blades a little beyond the periphery of the cylinder. *e' e'* are projections from the stocks, and *e'' e''* are cams attached to the frame, and constructed and arranged for intermittent contact with the pins *e' e'* during the rotation of the cylinder, and so that this contact will draw the blades within or flush with the cylinder while the blades are passing the cylinder B. It is immaterial whether the blades are yielding or not, so long as they are prevented, by means of cams or otherwise, from contact with the cylinders B and E E, except as they enter the jaws of the latter cylinders.

E E are cylinders geared to the cylinder C and slotted longitudinally, as shown at *g g*. F F are bars or rockers arranged in the slots *g g*, and flush, or nearly flush, with the cylinders in which they are set. These bars are mounted on rods *h h*, having bearings in the ends of the cylinders, and *i i* are springs holding the bars against one edge of the slots, as shown in Figs. 3 and 5.

k k are small projections on the bars F F, and *k' k'* are slots or recesses in the cylinder C to receive the parts *k k* when these parts should not strike the said cylinder, as will be hereinafter more fully explained.

k'' k'' are annular grooves in the cylinders E E.

G G G G are small rollers, arranged in pairs, each two forming a pair being geared to each other, and the upper one of each pair being geared to the cylinders E E, respectively. The upper roller of each pair is yielding, being pushed against the cylinders E E by means of the springs *l l*. The rollers in each pair are in contact, or nearly in contact, with each other, and annular grooves are sunken therein, as shown.

I I are guides to shift the sheets from the cylinders E E to the rollers G G. I' I' are tapes arranged over the lower rollers of each pair. J J are guards to retain the sheets on the tapes.

The operation of the folding mechanism now described is as follows: The sheets are conveyed from the cylinder B to the cylinder C by means of the gripers *a a* during the rotation of the cylinders, which, in the example shown, are each constructed to receive and shift two sheets. The blades D D lie across the center of each sheet, and when the blades reach the jaws or bars F F the latter open slightly to receive them, owing to the contact at that time of the projections *k k* with the cylinder B. This contact, however, is of short duration; but while the bars F F are thus pushed from one side of the slots in which they lie to

the other the blades, by entering the openings thus made, carry the central part of each sheet into these openings. The continued rotation of the cylinders draws the blades from these openings and carries the projections *k k* from the cylinder B. The springs *i i* now cause the jaws to close upon the sheets thus pushed into them. The sheets are by this time released by the gripers *a a*, and are carried around once folded upon the cylinders E E. The continued rotation of the cylinders E E carries the folded sheets to the guides I I, which shift the sheets from these cylinders to the rollers G G, between which they pass, and are thus delivered upon the tapes, the projections *k k* striking the upper rollers, G G, of each pair in time to release the sheets from the cylinders E E as soon as the sheets reach the same rollers. The sheets may then be carried from the tapes without being further folded; or the operation of further folding them may be performed in the usual manner. When two cylinders, E E, are employed in connection with the cylinder C, as shown, the sheets are delivered alternately, first to one of the latter cylinders and then to the other.

It will be perceived that the folded sheets are thus delivered upon two sets of tapes, first upon one and then upon the other, and that the sheets are distributed from one press-cylinder, B, to different places to be further folded, thus giving ample time for the latter operation without interfering with the speed of the press.

The cylinders B and C, in the examples shown, are of the same diameter, and the cylinders E E are one-third of this diameter, and the rollers G G make five revolutions while the cylinders E E make three. These dimensions and proportions, however, may be varied, due regard being had to the number of sheets carried at the same time by the cylinder C, the number of cylinders E E employed, and the speed of each rotated part, it being understood that the sheets are all of the same size.

The projections *k k* may be provided with anti-friction rollers.

Only one cylinder, E, may be employed when the only object is to deliver the sheets folded to the same place, and two or more may be employed to deliver them in this condition to two or more places. One or more cylinders, E, of proper size, may also be employed, each in connection with four or more rollers, G G, for the purpose of delivering the sheets folded to different places.

The jaws or bars F F may be made in sections.

The knives D D may be arranged on the cylinder B when convenient.

If the cylinders or rollers should be rotated in the direction opposite from that indicated, corresponding changes should be made in the manner of gearing the rollers G G to the cylinders E E.

I am aware that the combination of two folding-rolls, one provided with a folding-blade and the other with a griping-blade, is old; also, that the use of mechanism for automatically controlling the leading end of a sheet and delivering it within the range of a rotating folding mechanism is old; also, that the combination of a folding-blade mounted in a revolving carrier, and automatically projected to double a sheet, a companion carrier provided with means for holding said doubled sheet, and mechanism for automaticallly controlling the forward end of the sheet so that its central portion shall be acted on by the folding mechanism, is old; and, finally, that a folding-blade mounted in a revolving carrier, and automatically projected to double a sheet, nipping devices mounted in a companion carrier, which receive said doubled sheet in combination with gripers for controlling the position of the sheet so that its central portion may be acted on by the folding device, is old.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The cylinder C, provided with the gripers *a a*, and with the radially-yielding creasers D D, in combination with one or more cylinders, E E, arranged externally to the cylinder C, and carrying the yielding jaws F F, having thereon the projections *k k*, arranged for contact with the cylinder C during the rotation of the machine, substantially as and for the purposes specified.

2. A folding-cylinder provided with yielding jaws, held shut by means of springs, which jaws are provided with projections arranged for contact with contiguous rollers to open the jaws, substantially as described.

WALTER SCOTT.

Witnesses:
F. H. HERRING,
F. F. WARNER.