4 Sheets—Sheet 1.

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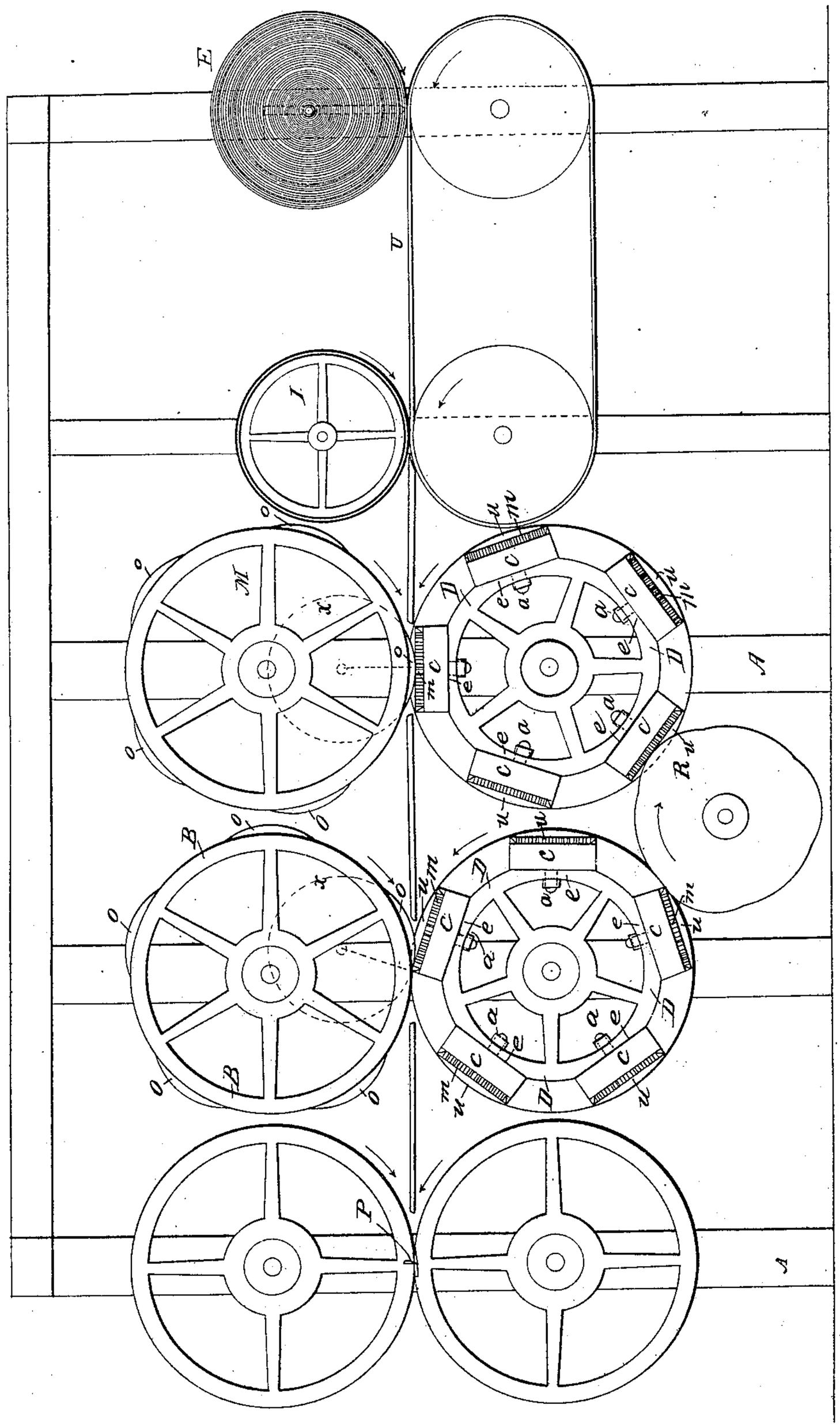
PRINTING PRESS.

No. 19,672. Patented Mar. 23, 1858.

Fig. 1.



4 Sheets—Sheet 2.

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Fig. 2.

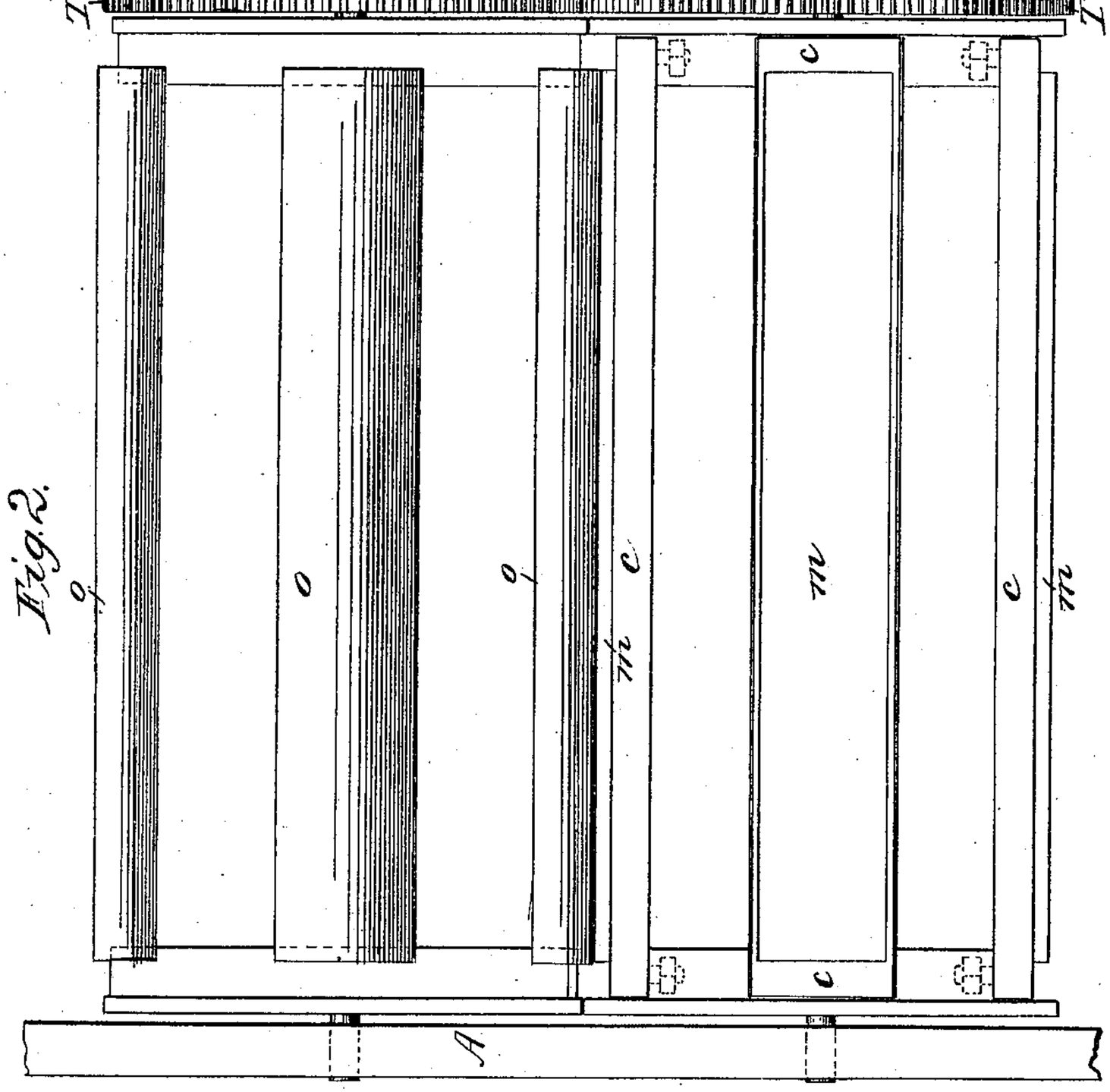


Fig. 3.

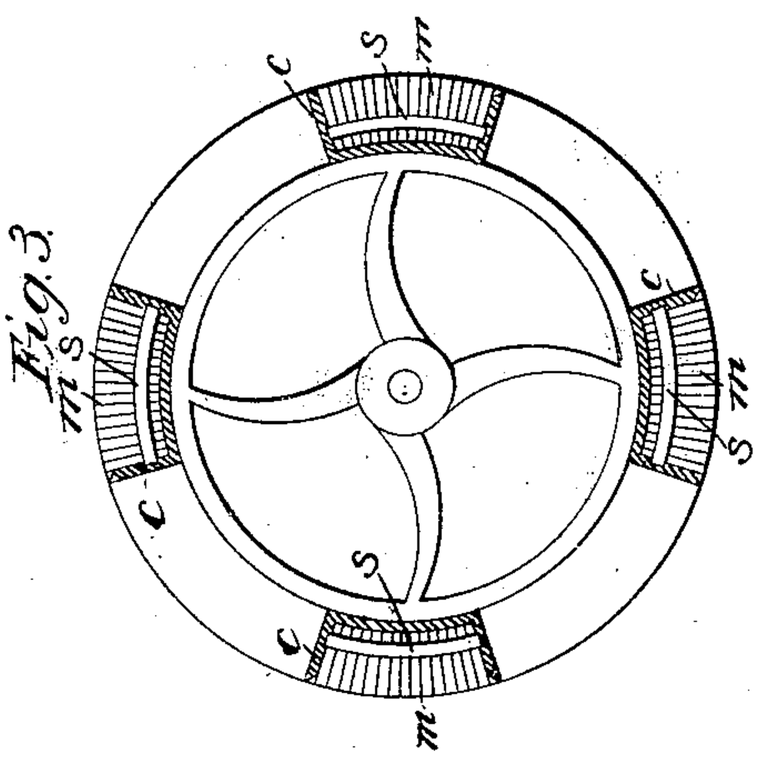


Fig. 4.

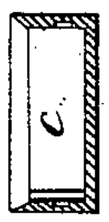


Fig. 5.

Fig. 6.

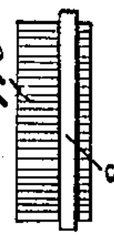
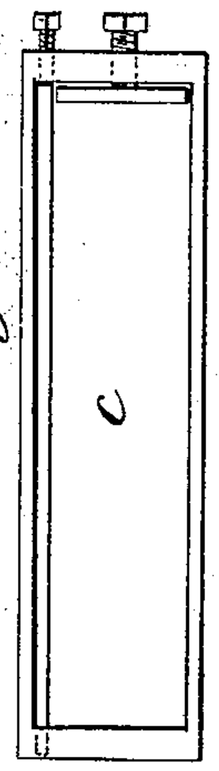


Fig. 7.



4 Sheets—Sheet 3.

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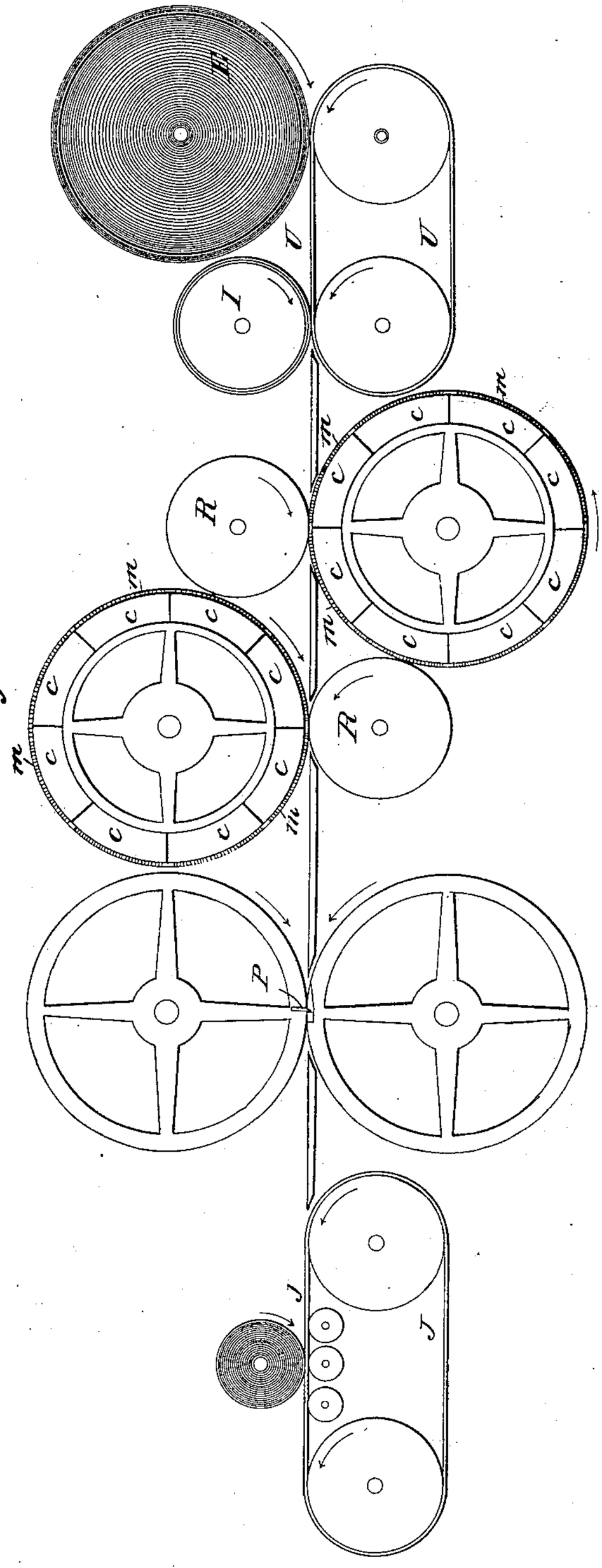
Fig. 8.



4 Sheets—Sheet 4.

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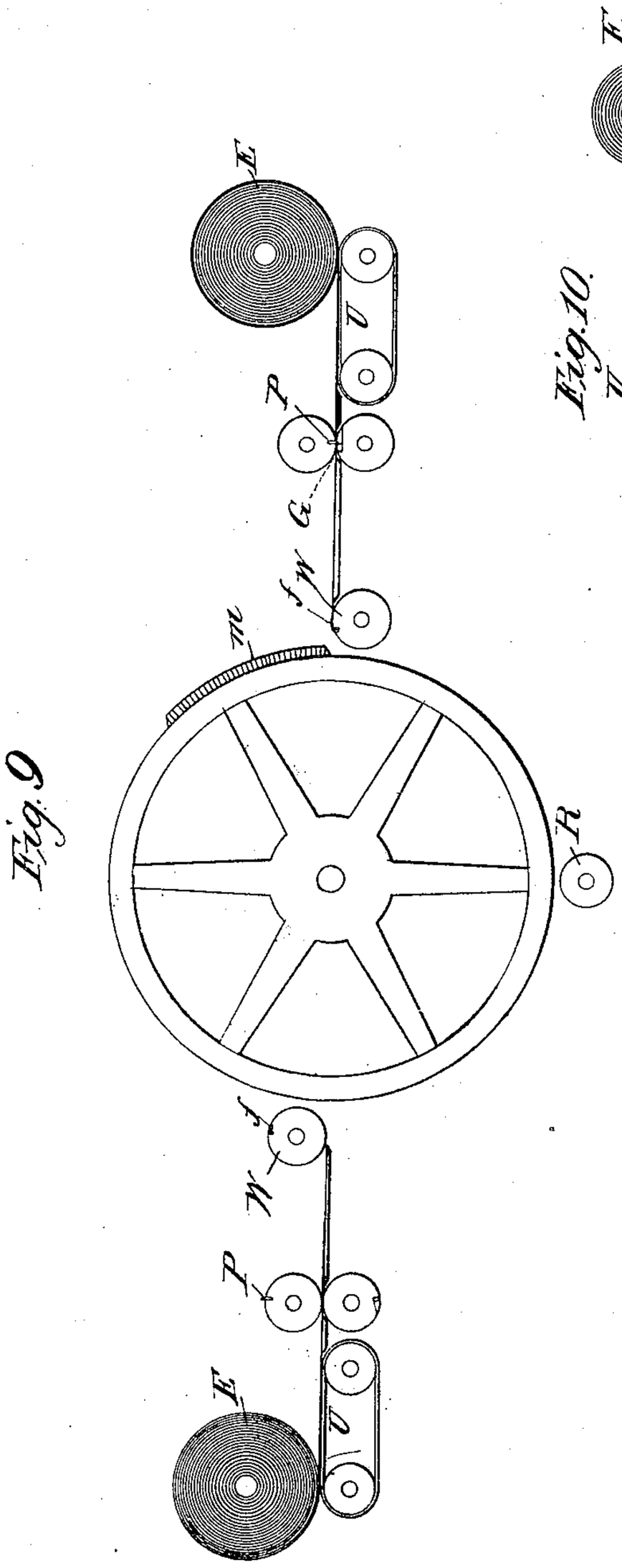

Fig. 9

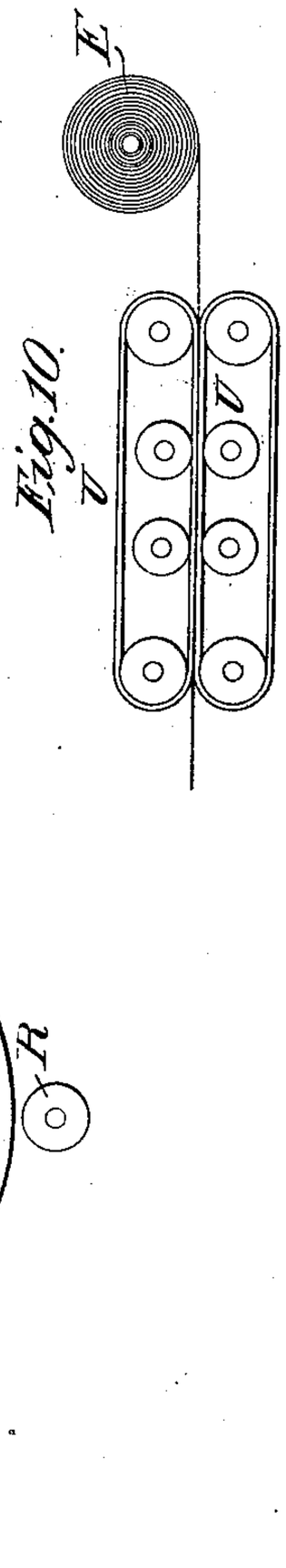

Fig. 10.

UNITED STATES PATENT OFFICE.

HENRY A. BILLS AND STEPHEN W. WOOD, OF WASHINGTON, DISTRICT OF COLUMBIA.

PRINTING-PRESS.

Specification of Letters Patent No. 19,672, dated March 23, 1858.

To all whom it may concern:

Be it known that we, HENRY A. BILLS and S. W. WOOD, of Washington, District of Columbia, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification.

Figure 1 represents a side elevation of our improved printing press with but the two lower set of rotating, flat, type forms, the upper type forms to print the opposite side of the sheet or sheets being but duplicates of the first set are not represented, not being deemed necessary here. Fig. 2 is an end elevation of Fig. 1 showing the gearing which connects and imparts motion to the several parts. Fig. 3 is a side elevation of a cylindrical type wheel or bed, with four columns of type secured thereto the columns being in section to show clearly the manner of keying in the type. Fig. 4 is a section of the stick or form for holding the type. Fig. 5 are side views of type showing the notch or groove by which they are keyed or fastened to their form. Fig. 6 is a side elevation of a line of type representing them as being set upon a flat form with their key in position the two ends of said key extending so as to enter grooves formed in the column lines. Fig. 7 represents a stick or form for holding type, detached; this form may contain type for a column and is secured to a rotating bed by nuts and bolts or in any other convenient manner. Fig. 8 represents the independent columns in separate and independent "sticks" or forms, secured to cylinders in the usual way; the opposite sides of the sheets being printed alternately. Fig. 9 represents a modified form of feeding printing presses from a continuous sheet, said sheet having a continuous motion; the type for one side of a sheet being locked into a form in the ordinary manner and secured upon the periphery of a cylinder, the sheet in this case being severed previous to being printed.

The nature of our invention consists first in setting type upon flat, rotating forms or beds in separate and independent columns arranged alternately upon the peripheries of cylinders, with corresponding cylinders upon whose peripheries are secured segments of impression cylinders which press upon the type always in a line perpendicular with their surfaces; said cylinders being geared together by cog wheels of corresponding size rotate with the same velocity. Second, in notching or grooving type so as to receive keys flush with their surfaces, the ends of said keys extending into grooves formed in the column lines, or secured to the bed or form in any other convenient manner.

To enable others skilled in the art to make and use our improved printing press, we will proceed to a description of the same in detail.

Like letters indicate similar parts in all the figures.

A, in the accompanying drawings represents the frame the front or one side being removed to exhibit the parts more distinctly, constructed of any suitable material and in any desired form.

D, are rotating beds or forms composed of a sufficient number of flat surfaces (*e*), upon which the columns (*c*) are secured, to correspond with the number of columns desired to print upon each sheet. To these flat surfaces (*e*) the sticks or forms (*c*) containing a column of type are secured by nuts and bolts (*a*) or in any other convenient manner. These flat columns are secured alternately upon the many sided rotating beds or forms (D) in order that straight type may be used, also that they may be set in flat forms in the usual manner, instead of being set upon a cylinder or in the arc of a circle. By this arrangement, every alternate column is printed by each set of type, the first set or those nearest the roll (E) (or coil) of paper, leave every alternate column blank, which blank columns are printed by the second set of type arranged alternate to the first.

To press the paper upon the type to leave their impression, a cylinder (M) of the desired diameter to correspond with the type forms or beds (D) is placed, for convenience in this instance, directly above the type and supported in suitable bearings. To the periphery of this wheel or forming a part thereof, are secured segments of circles (*o*) arranged alternately so as to correspond with the alternate columns of type; these segments of circles (*o*) correspond with the spaces (*u*) formed by setting the columns of type in flat beds or forms. Hence it will be seen, that as the paper is carried through between the type and wheels (B and M) by

its margin, and middle if necessary, the segments (*o*) of the dotted circles (*x*) roll upon the faces of the columns of type (*m*) always in a line perpendicular with their centers, and parallel with the shaft of the type.

To print both sides of a sheet by once passing through the press, a second set of type in alternate columns, with their corresponding segmental cylinders may be arranged, and which is our intention in constructing a press complete; a second set of cylinders and type being but a duplicate of the first, we do not deem a detailed description of them necessary.

The "stick" or form in which the type are secured may be made of any desired dimensions, the type being secured therein by wedges in the usual way or by keys with or without said wedges or they may be "fused" forming a solid mass upon the cylinder. To secure type in position by keys, or their equivalent, which is designed particularly when setting them upon a cylinder or in the arc of a circle as shown in Figs. 8 and 9, the column lines are grooved, see Figs. 3 and 4—to receive the ends of said keys (S); the type (*m*) being notched as seen in Fig. 5, to receive the keys flush with their surfaces. When columns are set in flat forms as represented in Fig. 1, the type may be secured by wedges, or keys may be employed if preferred, or fusing may be substituted.

To supply presses with paper, a roll (E) or it (the paper) may be coiled if preferred, of any desired size may be placed upon an endless belt (U) of felt, leather or other suitable material, which belt runs with the same velocity as the type; if used from the coil a belt may be dispensed with. The ends of the shaft passing through this roll of paper, extend into slotted guides formed in the frame as seen in dotted lines behind the roll (E) Fig. 1, which retains said roll in position, always permitting it to remain in contact with the belt, (U) the friction of which rotates said roll at the proper velocity regardless of its size.

To feed a continuous sheet of paper to a press where the type are set upon the periphery of a cylinder in the usual manner, that is, with one, or more forms, containing a page of matter, the paper may be severed before entering the press, the supply being taken from the roll or coil at a rate that, at the time the type have made one revolution, and presented themselves to print the succeeding sheet, the desired quantity of paper will have presented itself and the knife (P) will have severed the sheet in time to allow the fingers (*f*) to seize the severed part and carry it around the cylinder (*w*) to be printed; the paper from the roll or coil moving constantly. In Fig. 9, the paper, in red lines, is represented in two positions. At (G) the knife has just severed the sheet while at the opposite side the sheet is but half fed to the knife, as the type have made but half their revolution.

The method of conveying away the printed sheets being no part of our invention, we omit further mention of it here.

To dampen the paper to prepare it for the press, we have arranged a wheel (I) which may be made of or covered with any suitable material to absorb moisture; this wheel is placed so as to roll upon the paper, and being supplied with moisture in any convenient manner, and running with the same velocity as the paper, dampens it sufficiently and equally to receive the desired impression. Several wheels may be arranged through which the paper may pass if one be found insufficient, or if preferred, it may pass through steam to receive the required dampness; or, two or more endless belts of felt or other suitable material to absorb moisture may be employed; the paper being fed between these belts which are moistened by moist rollers or in any other convenient way; rollers or their equivalents may be used to press these belts together upon the paper if necessary, as seen in Fig. 10. To separate (or nearly so) the printed matter into sheets, after or before being printed, we have constructed a revolving knife (P) which revolves once for every sheet and at the same velocity with the type, or at the speed required to sever the sheet in time to be, or after it has been printed. This knife may sever the sheets entire, or may leave small parts uncut at the two sides or margin and in the middle, in order to have sufficient strength to re-roll the printed sheets as hereinafter described and shown in Fig. 8.

J, represents an endless belt running at the same velocity with the type and endless belt or belts (U), by which the paper is supplied. The printed sheets upon this endless belt (J) are re-rolled by its friction, being nearly severed by the rotating knife (P).

The rotating type beds, (D) the segmental cylinders, (M and B) the rotating wheels carrying the knife, (P) the endless belt supplying the paper from the roll or coil, the endless belt rolling up the printed sheets nearly severed, the cylinders or cylinder for dampening the paper and the ink roll for inking the type, all move with the same velocity, being geared together by cog wheels (T).

To print newspapers, the paper from the coil or roll passes beneath the dampening cylinder or between the damp, endless belts, thence over the first set of type where every alternate column is printed, thence over the second set of type where the alternate columns, blank, are printed completing one side

of the sheet, thence beneath a corresponding or duplicate set of type not represented, which print the opposite side, thence between the dividing knife (P) where the printed sheets are (or nearly so) severed, and thence to the endless belt (J) where they are re-rolled when the issue is ready for distribution.

When round cylinders are employed and the type secured upon their peripheries, as seen in Figs. 8 and 9—the type may be fused, instead of keying or wedging them upon said cylinder or arc of a circle, rendering them a solid mass.

The manner of inking the type being no part of our invention, we represent a single roll (R) as being sufficient reference.

Having thus fully described our improved printing press, what we claim therein as new and desire to secure by Letters Patent is—

1. Setting a form of type upon flat, rotating forms or beds in separate and independent columns arranged alternately upon the peripheries of cylinders, with corresponding cylinders upon whose peripheries are segments of impression cylinders, the whole arranged substantially as described.

2. Grooving or notching type and keying them in single lines, across the columns, by independent keys to a bed or form in the manner and for the purpose substantially as set forth.

HENRY A. BILLS.
S. W. WOOD.

Witnesses:
R. C. PAGE,
JAMES T. M. IVER.