

(No Model.)

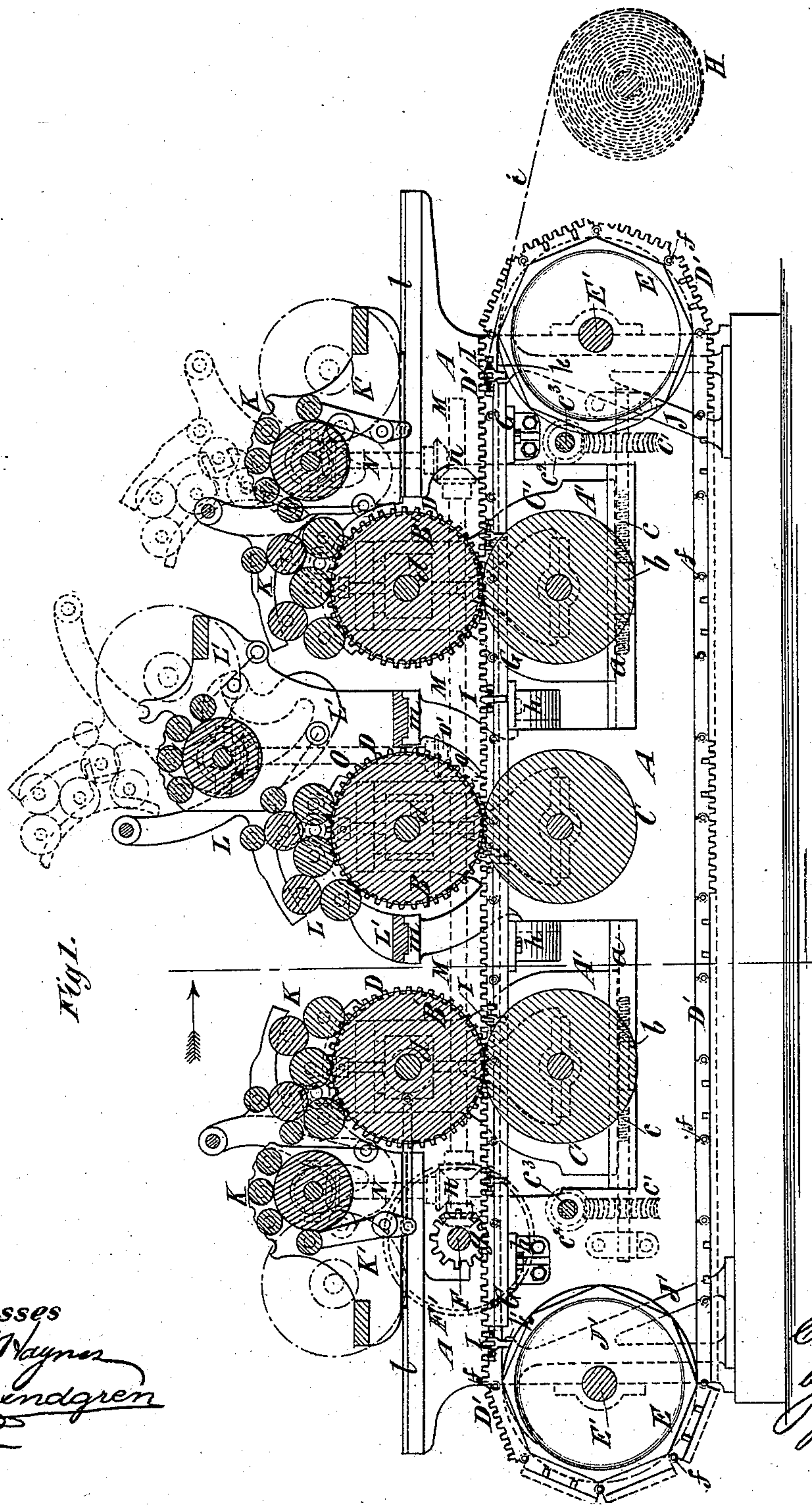
2 Sheets—Sheet 1.

C. B. COTTRELL.

PRINTING PRESS.

No. 290,747.

Patented Dec. 25, 1883.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

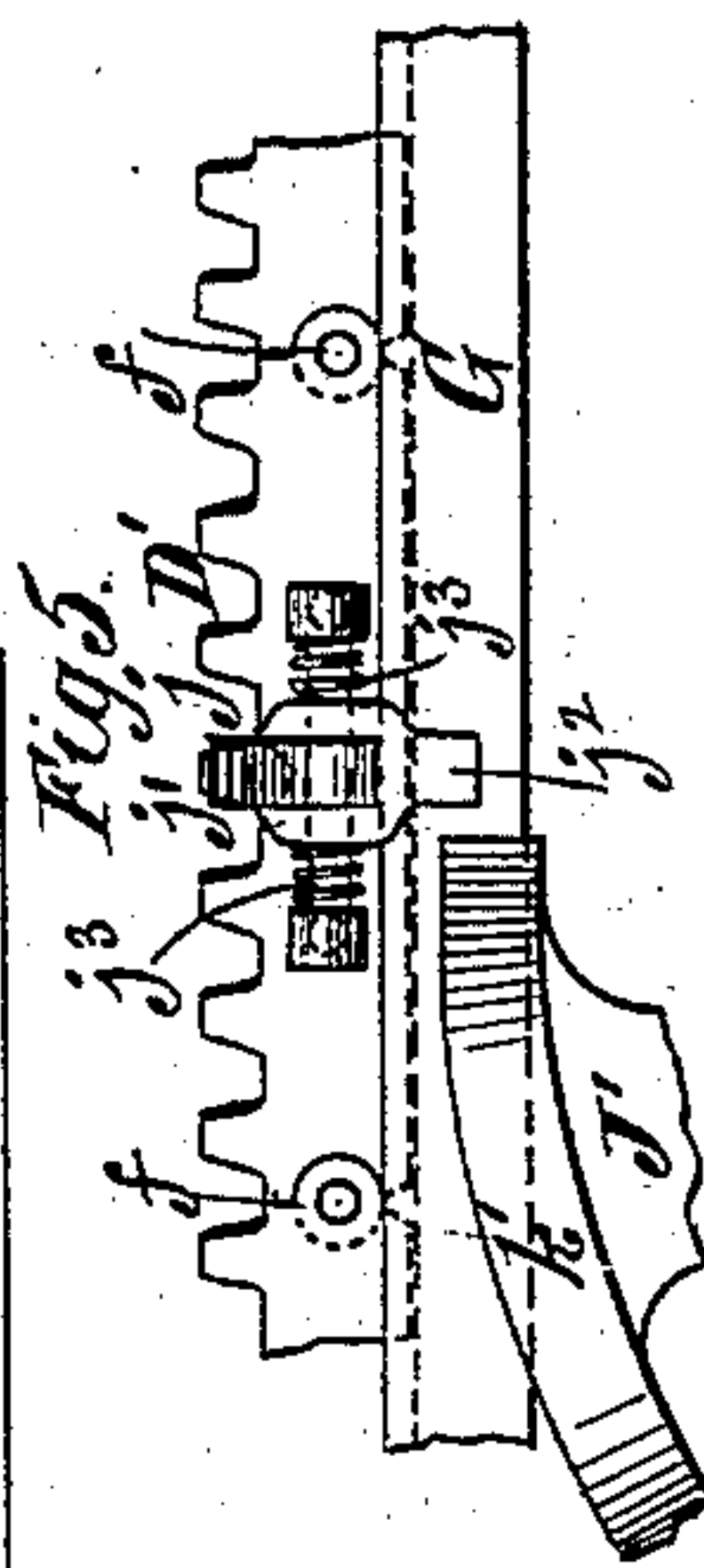
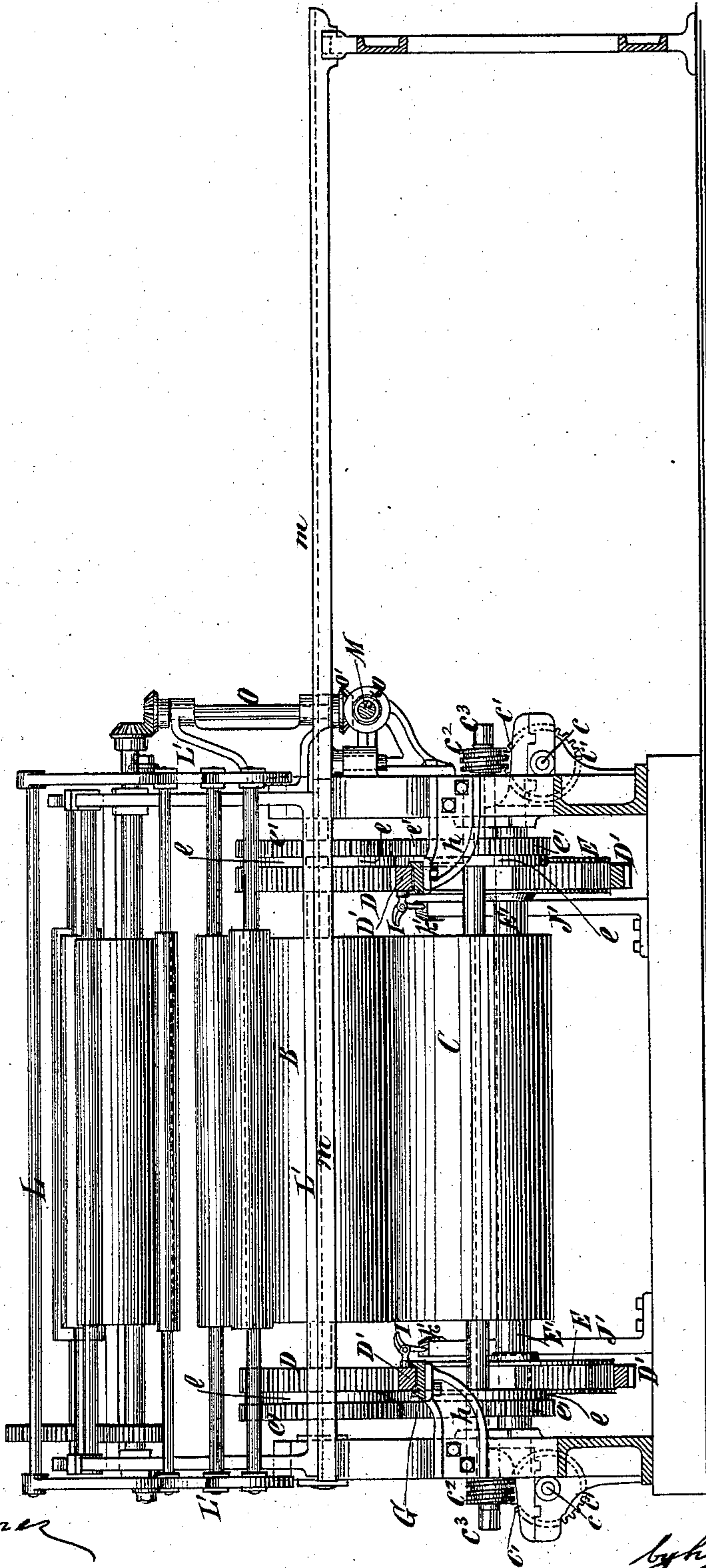


Fig. 4.

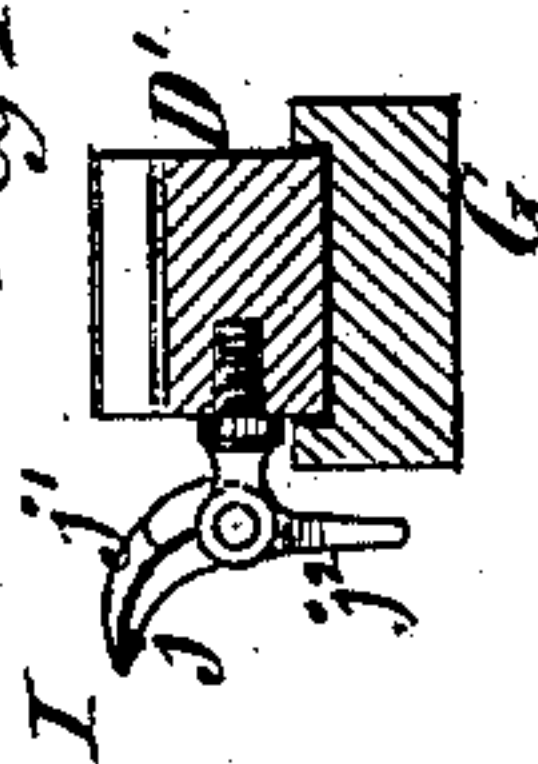
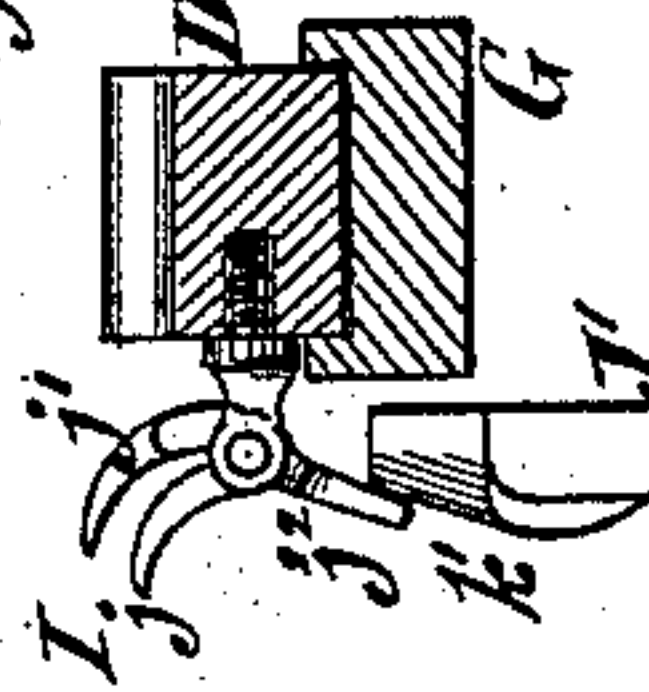


Fig. 3.



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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF STONINGTON, CONNECTICUT.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 290,747, dated December 25, 1883.

Application filed January 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, a citizen of the United States, and a resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Printing-Presses, of which the following is a specification.

My invention relates to continuous-web color-printing presses in which there are employed two or more pairs of type and impression cylinders, each provided with separate inking apparatus, and mounted in frame-work so constructed that the pairs of cylinders may be adjusted to cause the impression made by each pair of cylinders to exactly register with the impression or impressions made by the other pair or pairs of cylinders. In such a press it is of course of vital importance that the cylinders should all be driven at exactly uniform and unvarying speed, and that the driving mechanism should be of such a nature as to provide for the adjustment of each pair of cylinders in a lateral direction relatively to the other pair or pairs.

The invention therefore consists in certain novel mechanism for driving the cylinders, and in the combination of such mechanism and appurtenances with the two or more pairs of cylinders, as hereinafter described and claimed.

The invention also consists in the combination, with a pair of type and impression cylinders and main side frames comprising bearings for said cylinders, which are fixed laterally, of auxiliary side frames and means for adjusting them in said main side frames toward and from said cylinders, and pairs of type and impression cylinders journaled in said auxiliary frames, whereby provision is afforded for accurately adjusting the pairs of cylinders which are journaled in said auxiliary side frames relatively to the pair of cylinders which are journaled in said main side frames.

The invention also consists in the novel combination of a pair of cylinders, inking-rollers, and apparatus therefor, and a carriage for the inking apparatus, movable away from the cylinders in the direction of the length of the cylinders or on the side of the press, whereby provision is afforded for readily removing the type-cylinder from its bearings and substitut-

ing another cylinder therefor, as hereinafter described.

The invention also includes other features and combinations of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of a press embodying my invention. Fig. 2 represents a transverse vertical section thereof; and Figs. 3, 4, and 5 represent detail views on a larger scale, and which are hereinafter described.

Similar letters of reference designate corresponding parts in all the figures.

A designates the main stationary side frames of my press, which may be of any suitable form, and connected by suitably arranged stretchers.

B C designate, respectively, a type-cylinder and an impression-cylinder, which are journaled in suitable bearings in the side frames. These bearings are fixed—that is, they are not adjustable laterally—although the box of the type or upper cylinder, B, may be adjusted upward and downward in the usual way.

On each side of the cylinders B C are arranged other type and impression cylinders, B' C', which are like the cylinders B C; but instead of being journaled in the main side frames A, they are journaled in auxiliary frames A', which are mounted on slides *a*, and are capable of adjustment independently of each other toward and from the center of the press—that is, toward and from the central or middle cylinders, B C. As here shown, each auxiliary side frame A' has upon it a nut, *b*; and *c* designates a screw mounted in fixed bearings, so that it may not move lengthwise, and engaging with said nut.

Upon the screw *c* is secured a worm-wheel, *c'*, and *c''* is a worm or screw engaging with the worm-wheel. The two worms or screws *c''* on opposite sides of the press are mounted on the same shaft, *c'''*, which may be turned by a wrench applied to either end, and by turning the shaft both worms or screws will be operated and the frames A' at opposite sides advanced together. By this means I may adjust each outer pair of cylinders, B' C', independently of the other pair, toward and from the mid-

dle cylinders, B C, and the worm-wheels and screws employed for the purpose serve also to hold the side frames A', and the cylinders carried thereby in place after their adjustment.

5 This combination of the middle pair of cylinders, which are non-adjustable laterally, and one or more pairs of cylinders B' C' on each side thereof, adjustable toward and from the middle cylinders, forms an important feature of my invention; but, so far as some other features of the invention are concerned, I may use two or more pairs of cylinders, each pair being adjustable laterally relatively to the other.

10 It is often desired in presses of this class to remove the type cylinder and substitute another larger or smaller, as may be necessary, and the upper parts or caps of the housings which are formed in the side frames, A A', must therefore be removable. I make the bearings

15 of all the type-cylinders of solid blocks *d*, of the form shown dotted in Fig. 1, and I vary the distance between the lower surface of these blocks and the bearings or holes therein to suit cylinders of different diameters, and the

20 blocks always are intended to rest solidly in the bottom of their housings. For example, with a cylinder of large diameter the bearing or hole in its block *d* would be a considerable distance from the bottom thereof, while if the

25 cylinder be of lesser diameter the bearing or hole will be nearer the bottom thereof. The cylinders of each pair are provided with the usual bearers or bearing-rolls, *e*, which roll together and preserve the surfaces of the cylinders against injury, and are geared together

30 by wheels or gears *e'*. The bearers or bearing-rolls *e* consist of cylindric portions or surfaces inside of and close to the wheels *e'*. They may be formed by circular flanges on the inner sides of the wheels *e'*, made of the same

35 diameter as the pitch diameter of the said wheels. These bearers or bearing-rolls form no part of my invention.

I will now describe the mechanism for rotating the cylinders.

45 Upon the shaft of each type-cylinder B B', and near the ends thereof, are secured spur wheels or gears D, through which a positive and uniform motion is transmitted to said

50 type-cylinders, and through the wheels *e'* to the impression-cylinders.

At each side of the press, and in the same vertical planes as the spur wheels or gears D, are endless spur-toothed racks D', which in-

55 termesh with and drive said wheels or gears D, and through them the cylinders. Each endless rack is composed of rigid sections jointed or pivoted together at *f*, and the teeth are so spaced or formed that the space at the joint

60 between the end teeth of any two rack-sections is a proper tooth-space and of the same size of the spaces in each individual section. These endless racks are mounted on wheels E, which are of polygonal shape, or have poly-

65 gonal seats in which the rack fits, and both wheels are adapted to rotate freely as the rack

is moved over and around them. The shafts E' of the wheels E are journaled in the fixed side frames A, and are placed at such distance apart as to preserve the proper tension of the

70 racks. It might be desirable to make the bearings of one shaft E' slightly adjustable, to enable the racks to be tightened if their joints or connecting-pivots become much worn; but I have not thought it necessary to show such

75 an adjustment. The racks D' are in gear with all the type-cylinders B B', and transmit a uniform and steady motion to them, and the transmission of such motion is not interfered with in any way by the adjustment of the cylinders

80 toward and from each other. It is also evident that the adjustment of the cylinders will not in any way affect the tension of the endless racks, as would be the case if the wheels E were mounted on the shafts of the type-cyl-

85 inders at the opposite ends of the press.

I do not include in my invention an endless band, chain, or belt for operating the type-cylinders, as such devices have before been used; but they are not nearly so advantageous

90 as my endless rack, for many reasons. The chains or bands heretofore used have had lugs or pins on their inner sides, and hence it has been necessary to place one or both of the chain-wheels over which they drive directly

95 on the shaft or shafts of the cylinder or cylinders. When so arranged and combined, every adjustment of the cylinders laterally, no matter how slight, varies the tension of the chains, which is a great disadvantage. My endless

100 racks are very strong; they transmit a smooth and uniform motion to the cylinders; the wheels into which they gear for driving are entirely separate from and independent of the wheels on which they are supported. The spur-wheels

105 D rest upon their upper and exterior surfaces, and the cylinders can be lifted out without disconnecting the racks from the wheels E, which carry them, and they are altogether more reliable and desirable for the purpose

110 than are chains or bands such as have been used. The racks may be driven by imparting a positive rotation to the wheels E at one end of the press; but I prefer to drive them by pinions or spur-wheels gearing into their

115 faces, and I have so represented the driving mechanism in this example of my invention.

F designates a shaft extending transversely across the machine, and provided with pin-

120 ions or spur-wheels *g*, which mesh into the racks D'. Upon said shaft is also secured a driving-pulley, F', for the reception of a driving-belt. It is very essential that the racks D' should be supported opposite the points of

125 their engagement with the spur-wheels D, so that they will gear into said wheels to their pitch-line and avoid slip.

Below the upper or driving portion of each rack I arrange a rest, slideway, or support,

130 G, therefor, which is supported upon brackets *h*, projecting from the side frames A. As

here shown, these rests or slideways extend from one end to the other of the machine, past all the spur-wheels D and the driving-pinions g, and they form adequate supports for the racks, and prevent any tendency of the racks to ride over or move out of gear with the wheels D. The slideways G are here shown as having flanges at the sides, or have recessed bearing-surfaces, as shown in Fig. 1, and the racks are thereby held in place laterally as well as vertically. The whole lower or interior surface of the racks may slide on the slideways G; or I may provide them with rollers at the joints. The racks D' not only serve as drivers for the type-cylinders, but they also serve as carriers for the continuous web, i, of paper, which is taken from a roll, H, as shown dotted in Fig. 1.

Upon the inner sides of the racks are grippers I, which grasp the web as they arrive at the upper or operative part of the racks, and are released therefrom as they reach the opposite end of the press. The construction and operation of these grippers will be best understood from Figs. 3, 4, and 5. Each gripper I is composed of a fixed or rigid jaw, j, and a pivoted movable jaw, j', having a depending tail, j². Coiled upon the pin by which the movable jaw is pivoted to the fixed or rigid jaw is a spring or springs, j³, which tends to hold the movable jaw tightly closed on the fixed or rigid jaw.

At the end of the machine at which the roll H is located are stationary cams k, formed upon standards J, and of the form shown in Figs. 3 and 5. As the grippers are brought by the racks opposite these cams their tails j² are acted on by the cams, and their movable jaws j' are opened to take in the web, and are at once closed by the action of the springs j³.

At the opposite end of the machine are other stationary cams, k', formed upon standards J', and as the grippers reach these cams their movable jaws are opened and the web released from them. Any number of grippers may be employed on each rack.

I will now describe, briefly, the inking apparatus; but I do not make any claim to the arrangement or manner of combining the several rollers and devices, my invention being limited to the manner of supporting and adjusting or moving the apparatus as a whole.

Each of the end cylinders, B', has an inking apparatus, K, which is supported in a carriage, K', that is movable toward and from the cylinder upon ways l, formed on the side frames A. If it is desired to remove either cylinder B' from its bearings, all that is necessary is to raise the inking-rollers, as shown in dotted outlines at the right hand of Fig. 1, and then move the carriage K' away from the cylinder. The middle type-cylinder, B, is likewise provided with an inking apparatus, L, supported in a carriage, L'; but this carriage, instead of being movable transversely to the cylinder, is movable lengthwise thereof along

tracks or ways m, extending horizontally from the side of the press, as shown in Fig. 2. When it is desired to remove the cylinder B from its bearings, the inking-rollers are lifted or swung upward, as shown in dotted lines in Fig. 1, and the carriage L' is then moved horizontally away from the cylinder. In a press of this class it is very advantageous to have the inking apparatus of the middle cylinder movable lengthwise of the cylinder, as there is not room between the cylinders to admit of its being moved transversely to the length of the cylinder or lengthwise of the press. If more than three pairs of cylinders be employed, the carriages carrying the inking apparatus of all cylinders except the end ones will be made capable of movement in the same direction as the carriage L', here shown.

I will now describe how motion is transmitted to the inking apparatus; but I do not make any claim thereto.

Upon the side of the press is arranged a horizontal shaft, M, which is rotated by bevel-gears from the driving-shaft F, and connected with each inking apparatus K is a vertical shaft, N, which is connected with and rotated from the shaft M by pairs of bevel-gears n. The shafts N are fitted to bearings on the carriage K', and are movable with said carriages toward and from the middle cylinder, B.

Supported on the carriage L' of the middle cylinder, B, is a vertical shaft, O, which receives motion from the shaft M by bevel-gears o o'; and in order to enable the carriage L' to be moved as described, the wheel o on the shaft M should be fitted thereto with a feather, so that it may be moved out of engagement with its fellow wheel when the carriage is to be shifted.

Although I have only shown the racks D' as engaging with spur-wheels D upon the type-cylinders B B', such wheels might be placed on the shafts of the impression-cylinders C C', and the said impression-cylinders would then transmit motion through the wheels c' to the type-cylinders.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with two or more pairs of type and impression cylinders adjustable laterally toward and from each other, of spur-wheels on the shafts of the said cylinders, and endless spur-toothed racks, engaging with but supported independently of said wheels, for imparting motion to said cylinders, substantially as described.

2. The combination, with two or more pairs of type and impression cylinders adjustable laterally toward and from each other, of spur-wheels D on the shafts of the type-cylinders, and the endless spur-toothed driving-racks D', engaging with but supported independently of the wheels D, and composed of rigid sections having teeth upon their outer faces and pivoted together, all constructed and adapted to operate substantially as described.

3. The combination, with two or more pairs of type and impression cylinders, of spur-wheels upon the shafts of said cylinders, endless spur-toothed driving-racks gearing into said wheels, and supporting-wheels for said racks made separate from and entirely independent of the spur-wheels with which the racks engage, and arranged outside of and beyond said cylinders, substantially as described.
4. The combination of two or more pairs of type and impression cylinders, the spur-wheels D, the endless racks D', the polygonal supporting-wheels E, and the pinions *g*, engaging with said racks, substantially as described.
5. The combination, with two or more pairs of type and impression cylinders, of spur-wheels on the shafts of the cylinders, endless spur-toothed racks engaging with said spur-wheels, grippers attached to said racks, and supporting-wheels around which said racks pass, and which are made separate from and independent of said spur-wheels, and are arranged outside of or beyond said cylinders, substantially as described.
6. The combination, with two or more pairs of type and impression cylinders, of spur-wheels upon the shafts of said cylinders, endless spur-toothed racks engaging with said wheels, other wheels for carrying the said racks, and slideways or supports for the racks opposite their points of engagement with said spur-wheels, substantially as described.
7. The combination of the pairs of cylinders B C B' C', spur-wheels D, endless spur-toothed racks D', wheels E, carrying said racks, and slideways G, supporting said racks, and holding them laterally as well as vertically, substantially as described.
8. The combination of the pairs of cylinders B C B' C', the spur-wheels D, the racks D', the wheels E, carrying said racks, the grippers I, the stationary cams *k k'*, and the slideways G, substantially as described.
9. The combination, with a pair of type and impression cylinders and main side frames comprising bearings for said cylinders, which are fixed laterally, of auxiliary side frames and means, substantially such as described, for adjusting them in said main side frames toward and from said cylinders, and pairs of type and impression cylinders journaled in said auxiliary frame, substantially as described.
10. The combination, with a pair of type and impression cylinders, of a main frame wherein they are journaled, an inking apparatus for said cylinder, a carriage wherein the inking apparatus is supported, and tracks or ways whereon said carriage may be moved in a direction lengthwise of the cylinders, substantially as described.

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Witnesses:

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