

(No Model.)

3 Sheets—Sheet 1.

J. DERRIEY.
PRINTING MACHINE.

No. 423,911.

Patented Mar. 25, 1890.

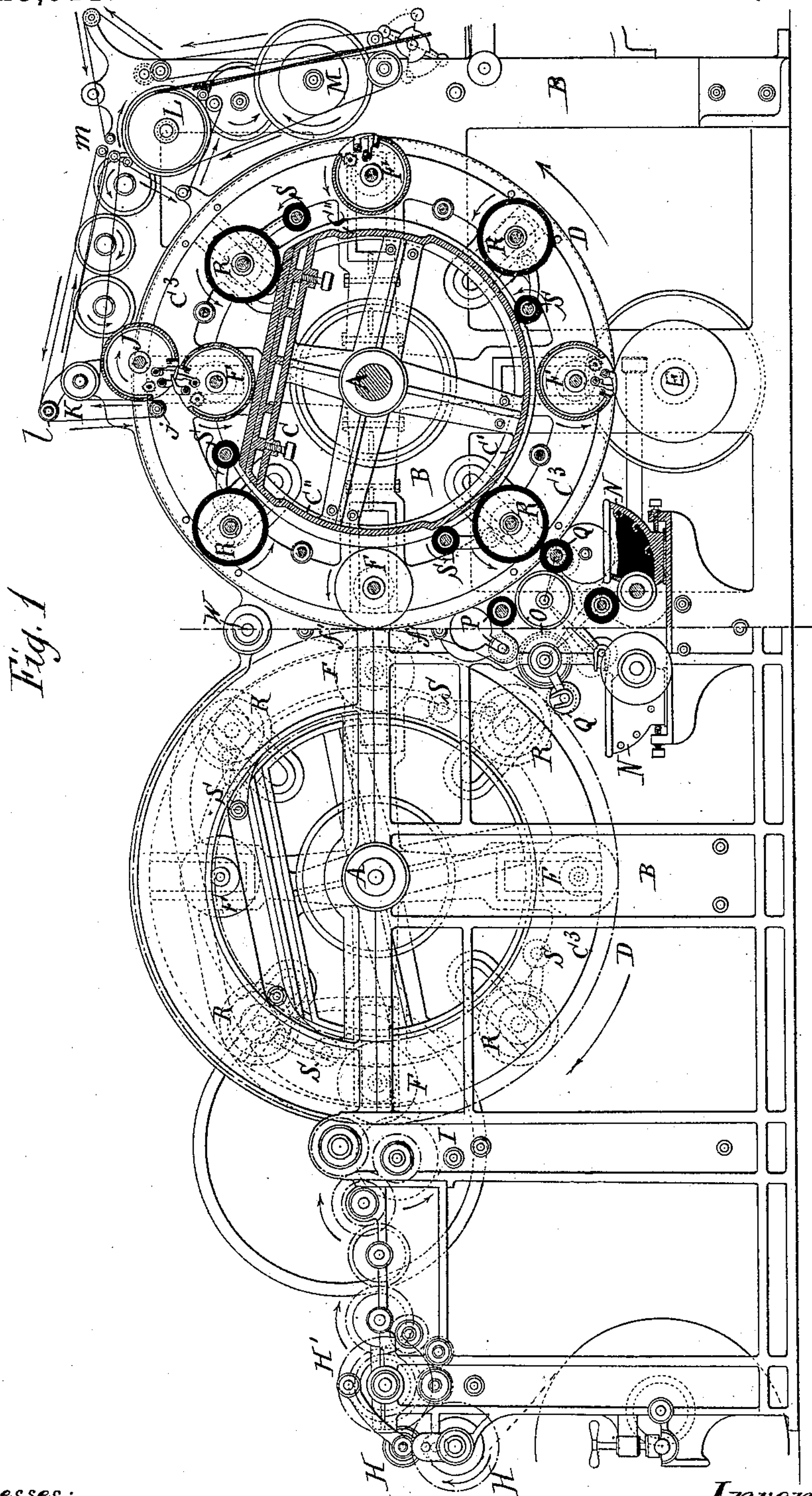


Fig. 1

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Inventor:
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By *Joseph Lyons.*
his Attorney.

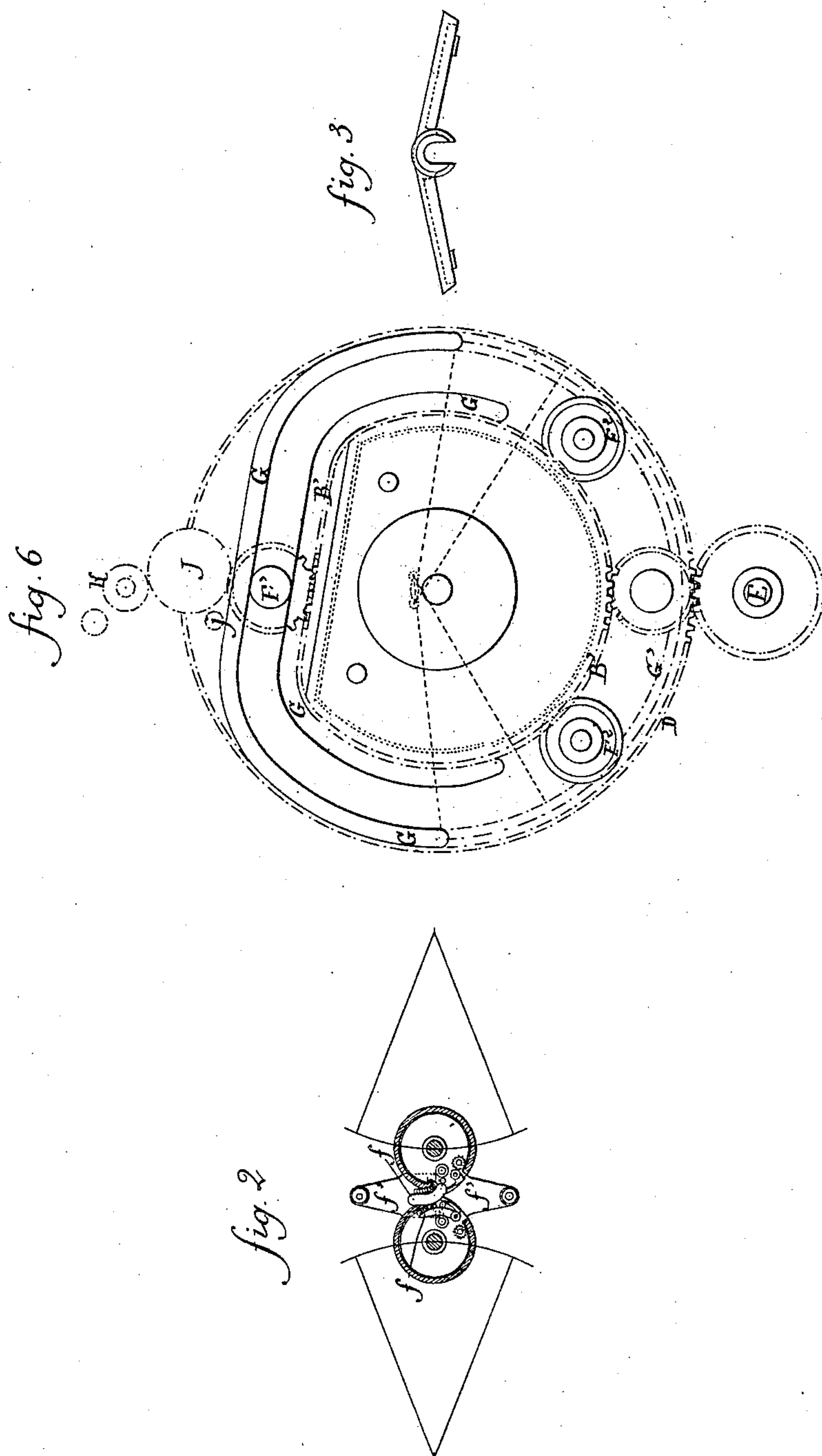
(No Model.)

3 Sheets—Sheet 2.

J. DERRIEY.
PRINTING MACHINE.

No. 423,911.

Patented Mar. 25, 1890.



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(No Model.)

3 Sheets—Sheet 3

J. DERRIEY.
PRINTING MACHINE.

No. 423,911.

Patented Mar. 25, 1890.

fig. 5

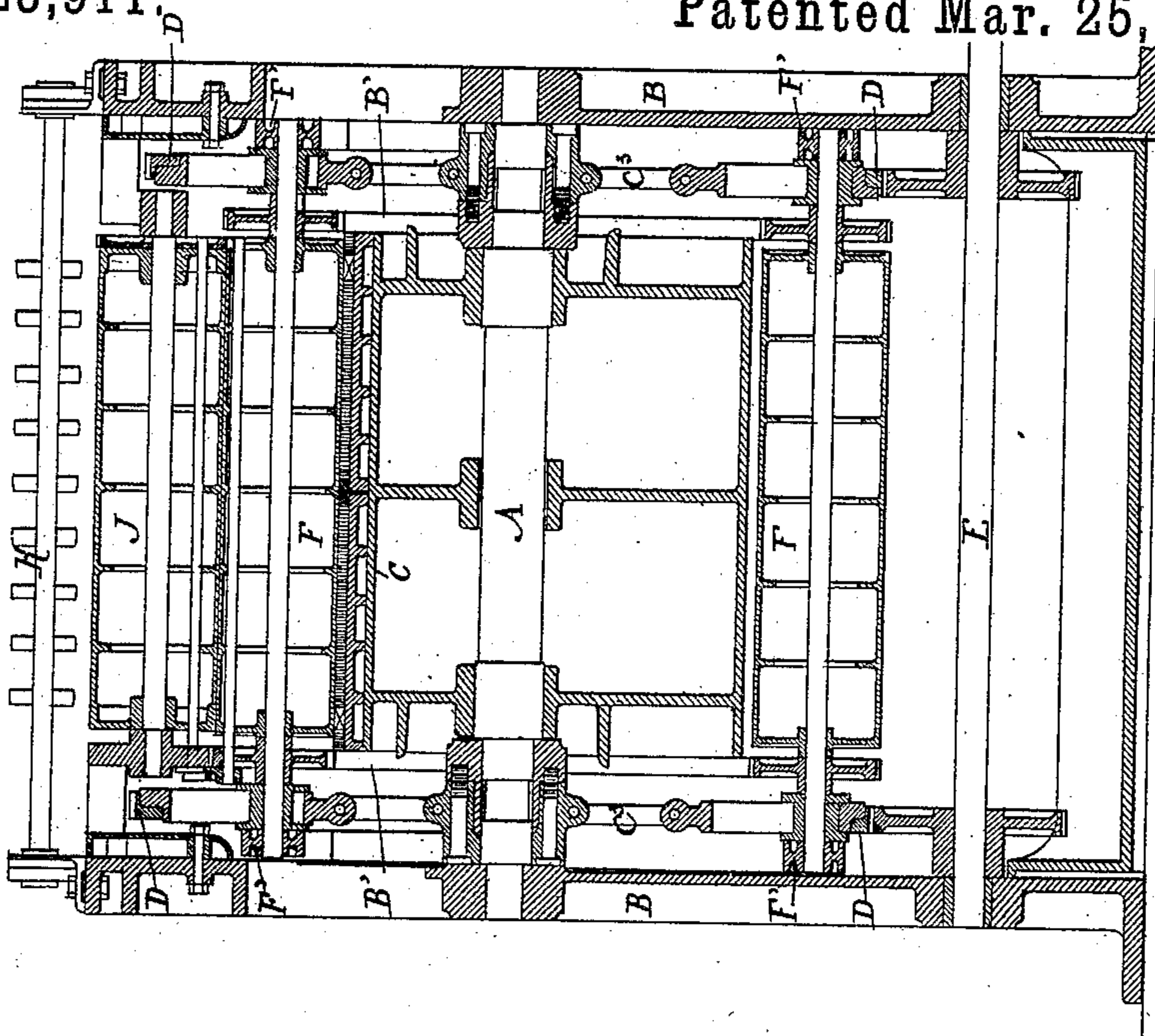
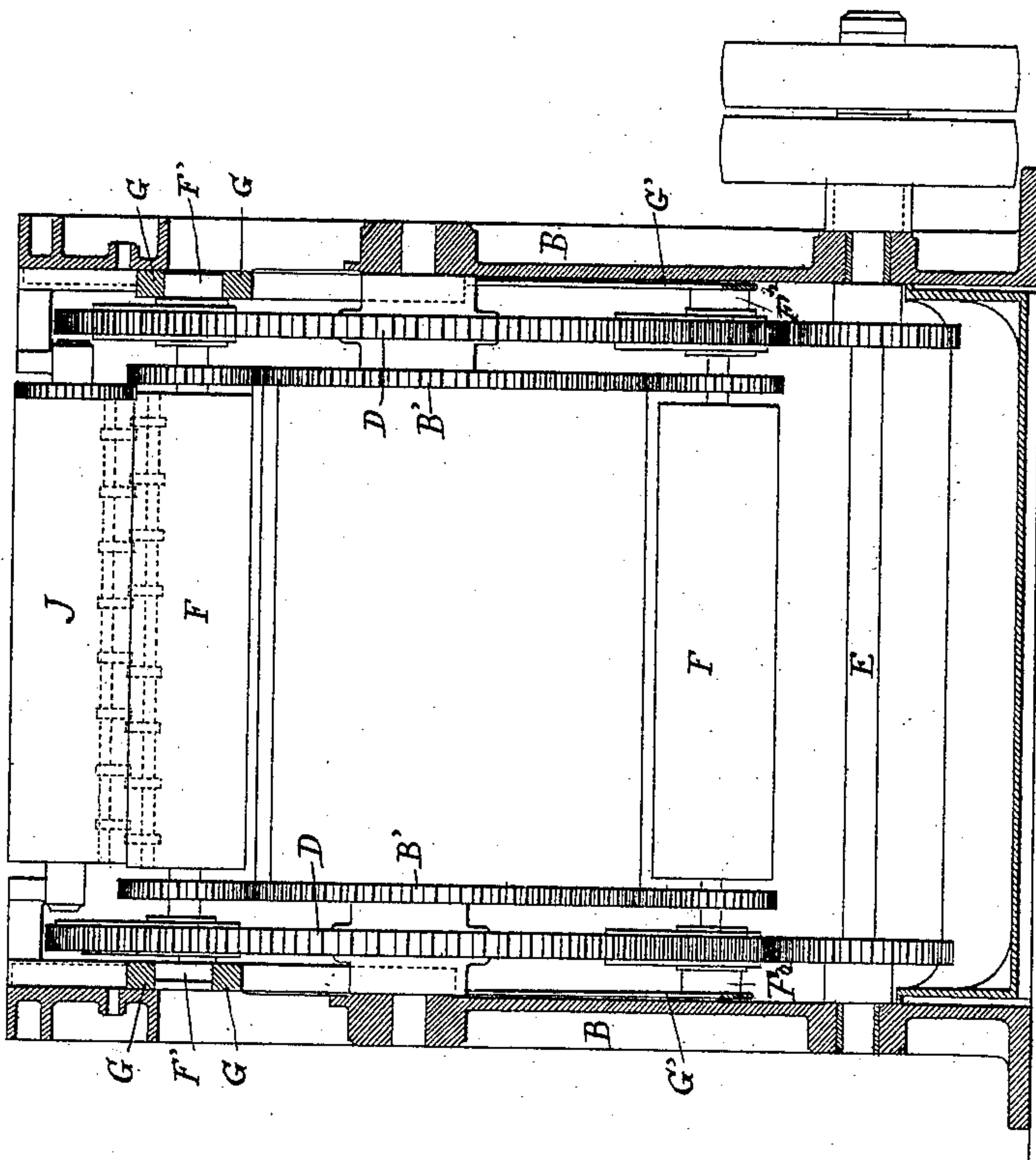


fig. 4



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UNITED STATES PATENT OFFICE.

JULES DERRIEY, OF PARIS, FRANCE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 423,911, dated March 25, 1890.

Application filed October 25, 1888. Serial No. 289,142. (No model.) Patented in France November 10, 1886, No. 179,562; in England June 28, 1887, No. 9,167, and in Germany July 15, 1887, No. 43,941.

To all whom it may concern:

Be it known that I, JULES DERRIEY, a citizen of the Republic of France, and a resident of Paris, Department of the Seine, France, have invented certain new and useful Improvements in Printing-Machines, (patented in France November 10, 1886, No. 179,562; Great Britain, June 28, 1887, No. 9,167, and Germany July 15, 1887, No. 43,941,) of which the following is a specification.

For the improved printing-machines which form the subject of this invention the composition of the type or movable characters is made in the ordinary way; but the type are inclosed in a frame, preferably with a closed bottom. The frames with their type or characters are placed at the upper part of two immovable drums having a flat part made on purpose to receive them. This flat part is arranged in such manner on each of the drums that it presents an inclination calculated so that while capable of printing the whole sheet the impression-cylinders, hereinafter described, will present their grippers in a suitable position for passing the sheets forward. Around each of these immovable drums run impression cylinders or rollers, the number of which will depend upon the production desired. They are arranged so as to balance each other. The impression cylinders or rollers have a movement of translation around the drums and a rotary movement on their own axes, the two constituting what is known as a "planetary motion." The axis of each of these cylinders or rollers has also a reciprocating motion toward and from the center of the fixed drum in order that in all the parts of the forms the cylinders shall always be in contact with them whatever be the distance of the different points of these forms from the axis of the drums around which the impression cylinders or rollers run. At one of the ends of the machine is placed the roll of paper. The sheets are separated before printing and taken successively by each of the impression cylinders or rollers that run around the first drum. They are printed by the forms placed on this first drum, then passed on to the cylinders or rollers running around the second drum, printed on the other

side by the passage of these cylinders over the forms on the second drum, then passed on to a taking-off cylinder, which directs them either to a gathering-cylinder and receiver or to a mechanical folder, or alternately to a receiver and a folder, as may be desired. The ink troughs or fountains, to the number of two, are fixed one for each drum, and the distribution of the ink is separately effected for each drum. The inking of the form is effected by rollers which move around the fixed drums, being drawn into the same movements as the impression cylinders or rollers.

Having stated in general terms the principle and nature of the invention, I will describe more fully the manner of carrying it into effect and will refer to the annexed drawings, which illustrate a machine in which the improvements are embodied.

In the drawings, Figure 1 is a side elevation, partly in section, of the machine. Fig. 2 represents the mechanism or devices for transferring the sheets from the first drum to the second. Fig. 3 represents a table with double incline for receiving the forms. Fig. 4 is an end elevation showing the gearing and driving arrangements. Fig. 5 is a transverse section of the machine through the center of the second drum. Fig. 6 is a detached view of the rack B' and other parts of the mechanism.

As already mentioned, there are two immovable or fixed beds in the shape of drums. They are formed of a strong central shaft A, mounted in the frame B and having radial arms, which carry the periphery or drum proper. This is composed, first, of a flat part C, constituting the type-bed; secondly, of a circular part C', on which the inking-rollers run to spread the ink, and which is of a radius less than the circular part of greater radius, followed by the lower part of the impression-cylinders, and, thirdly, of two intermediate small circular parts or recesses C'' C'', of less radius than the preceding. These latter parts are made simply to avoid the dressing or polishing of these parts of the surface, because they are not required to work the inking-rollers.

The flat part or type-bed is provided with

screws, on which the frames carrying the forms are placed. By these screws the forms are more or less raised in order to regulate the impression or pressure which, when once
5 adjusted, should be the same for all the impression cylinders or rollers, which pass successively over the forms.

The edges of each of the drums are provided with a rack B'; (best seen in Fig. 6,) reproducing in part their contours. This rack has a flat portion and a circular portion, these portions being connected together by curved portions. The number of teeth in the rack is calculated so that the cylinders which gear
10 with it may make a determined number of turns, which always brings the grippers exactly to the positions necessary for taking hold of, printing, and releasing the sheet. In the arrangement shown in the drawings the number of turns will be four. The cylinders, by the effect of centrifugal force, always have a tendency to follow the greater radius. When they are in gear with the cylindrical portion of the rack B', they are at the end of
15 frames in which their journals or bearings slide, and cannot go farther. A little before reaching the flat portion where the impression takes place, rollers F' F', placed at each of the ends of the spindle of each cylinder engage in a fixed guideway G at each side, and which follows the contour of the rack B', their bearings being free to slide in the frames owing to the breaking up of the movement resulting from the translation around the
20 drum and the action of the guideways G.

The forms before being placed in position are first deposited on a table with two inclines, (see Fig. 3,) which is placed on a cross-bar W between the two drums. By simply
40 removing temporarily one of the pairs of inking cylinders or rollers from each drum the forms can be slid off to the required position on the drums. When the forms are all in place on the drums, the inclined table is removed.

As the impression cylinders or rollers surround and have to move around the central drum, they are held and conducted by two movable frames C³ which turn on the fixed
50 shaft of the drum. These frames are each made in two pieces to allow of their being placed in position on the central shaft without disturbing the main framing. These two pieces when connected on the shaft form a large ring, comprising four slotted bearings for the journals of the impression-cylinders to slide in, as already explained, and four other slotted bearings for the journals of the inking-rollers. The bearings for the impression-cylinders and for the inking-rollers alternate with each other. The outer part of the main movable frames C³ is formed by a toothed wheel D, which serves to cause the continuous rotation around the central shaft
60 of the frames carrying the impression-cylinders and inking-rollers. Two of the wheels are driven simultaneously by gearing from

the driving-shaft E, and they gear with like wheels of the other drum, so as to give them the desired motion.

As the impression cylinders or rollers, which are marked F, and of which in the arrangement shown in the drawings there are four to each drum, have to receive a double rotary motion and to move in and out, they should
70 be as light as is consistent with the necessary strength. They are therefore made of cast or foundry steel instead of cast-iron, as usual. Each of these cylinders or rollers is provided with grippers for taking hold of the sheet and with the devices necessary for holding and tightening the blanket. The shaft of each cylinder or roller carries at each end beyond the cylinder itself a toothed wheel gearing with the rack fixed to the edge of the
75 central drum, then a bearing sliding in the frame reserved for the purpose in the main movable frame, and then a roller F' for insuring the inward and outward movement of the cylinder relatively to the drum. The movement of the cylinders F F' around the central shaft is obtained, as already explained, by the toothed wheels D on the movable frames C³. The rotary motion of the cylinders or rollers on their axes is obtained by the running of
80 the toothed wheels at their ends on the rack B'. The inward and outward movement at the time of the passage of the cylinders over the forms is produced by the guideways G, which at each of their ends are concentric with the drum-shaft, with a curve forming an entrance at their lower part and rectilinear at their middle portion (see Fig. 6) and parallel to the line of the forms, and they have connecting-curves in order that the rollers on
85 the ends of the cylinders may pass without shock from the cylindrical part into the flat part. The inward and outward movement of the cylinders is the result of the circular movement of the movable frames C³ and of the action of the guideways G on the rollers at the ends of the impression-cylinders. This breaking up of the movement is taken up by a sliding of the bearings in their frames, these bearings being at the end of their frames
90 when the cylinder is in action on the circular part of the rack B' and thus resisting the effect of the centrifugal force. The bearings then occupy the different positions necessary to preserve the regular contact of the cylinders with the form through the action of the guideways G, which at the proper points are parallel with the form.

The paper to be printed is placed on a reel at one end of the machine and is unwound
95 therefrom by means of two cylinders H H, whose speed is calculated to draw a length equal to one sheet during one revolution of the cutting-cylinder H'. The sheet cut off is carried by tapes to the lower part of a cylinder I, around which it passes until it is taken hold of by the grippers of one of the impression-cylinders F.

The sheet is fed to the impression-cylinders

with sufficient speed to deliver the same to the grippers of the impression-cylinder as they come around—that is, with a speed equal to the rotary speed of the impression-cylinders around their axes plus the speed of their movement around the central drum. The sheet when taken hold of by the grippers of one of the cylinders F winds around this cylinder. To keep it against the cylinder rollers can be employed bearing against the central part of the sheet, these rollers being fixed on rods turning in supports attached to the bearings. Each of the cylinders thus covered with its sheet of paper runs this sheet over the forms and prints it on one side and then passes it over the line of the centers of the two drums. A corresponding cylinder F of the second drum then takes the sheet and prints it on the other side by running it over the second set of forms.

The transfer of the sheets from the one drum to the other is insured as follows: On a piece f' , attached to the main frame, are fixed two cams or abutments f , the one to open the grippers of the cylinders of the first drum which bring the printed sheet, the other to close the grippers of the corresponding cylinder of the second drum in order that the sheet may be carried over the line of the centers of the cylinders, as it would be in a machine in which the cylinders are on fixed axes. All the cylinders successively transfer the sheets at the same point, the grippers opening and closing.

For the delivery of the printed sheets each of the impression-cylinders F of the second drum presents its grippers at the upper part after having printed about two-thirds of the sheet. A special cylinder J, mounted in a stationary part of the machine—that is to say, turning only on itself—has grippers which seize the sheet abandoned by the grippers of the impression-cylinder F. The grippers of the cylinder J abandon the sheet as soon as they have passed a roller j , which is fitted with bands running from this roller to a roller K and to two rods l and m . The roller K has bands which pass around it and go as far as the rod m , and only three narrow tapes passing along the whites or margins of the printed sheet go from the roller K to the cylinder J. All these tapes have a speed greater than the circumferential speed of the cylinder J. Guided by the three tapes in the margins, the sheet rises tangentially to the cylinder J, sufficiently held by the tapes to be pulled, but not to be torn. The greater speed of the tapes has for object to keep the sheet tight, the movement of the cylinders causing this peculiarity, that when the impression-cylinder F moves away from the cylinder J the distance between the point of contact of the impression-cylinder F with the type and the point at which the sheet touches the cylinder J diminishes. The tapes hold the sheet to the roller K as soon as it has left the type and then guide it to a gathering-cylinder I, which

delivers the sheets to a receiver M. As these arrangements are analogous to those which have hitherto been employed, they do not need special description.

The machine is provided with two ink troughs or fountains N N for the forms of the two drums, respectively. From each fountain ink is taken to a circular distributing-table O, above which is a distributing-roller P. A second roller Q pivots around the table and gives ink to each of the large rollers R for inking the form as these rollers pass. The latter spread their ink over the lower circular portion of the fixed drum. Behind each of these rollers is a smaller supplementary roller S, held by a jointed lever which allows it to come in contact alternately with the lower part of the drum, so as to take up ink therefrom and spread the same thereon, and with the form, so as to supply ink thereto. The large rollers R have at their ends guide-rollers F^2 , running in guideways G' . (Shown in Fig. 4 and indicated in dotted lines in Fig. 6.) These guideways cause the rollers R to come in contact with the lower portion of the fixed drum, while the guideways G cause the rollers to come in contact with the form. The impression-cylinders do not come in contact with the circular part of the drum.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be carried into practice, I declare that what I claim, and desire to secure by Letters Patent, is—

1. In a printing-press, the combination of a stationary bed comprising an ink-distributor and a printing-form with alternating ink-rollers and impression-rollers adapted to roll over the stationary bed, all substantially as described.

2. In a printing-press, the combination of a stationary bed comprising an ink-distributor and a printing-form with alternating ink-rollers and impression-rollers, means, substantially as described, for holding the ink-rollers in contact both with the ink-distributor and the printing-form, and means, substantially as described, for holding the impression-rollers out of contact with the ink-distributor, and a guide for holding the same to the printing-form, all substantially as described.

3. In a printing-press, the combination of a stationary drum comprising an ink-distributing surface and a printing-form, with a series of alternating inking and impression rollers adapted to travel around the stationary drum, all substantially as described.

4. In a printing-press, a stationary drum comprising a cylindrical ink-distributing surface and a flat and inclined printing-form, in combination with alternating inking and impression rollers adapted to travel around the stationary drum, all substantially as described.

5. In a printing-press, a stationary drum comprising a cylindrical ink-distributing sur-

face and a flat printing-form, in combination with a series of alternating inking and impression rollers, guides for holding the inking-rollers in contact both with the ink-distributing surface and the printing-form, guides for holding the impression-rollers in contact with the printing-form, and means for keeping the said impression-rollers away from the ink-distributing surface, all substantially as described.

6. In a printing-press, a stationary drum comprising a central shaft, a cylindrical ink-distributing surface, and a flat type-bed for carrying the form, in combination with a frame adapted to rotate on the shaft and provided with slotted bearings, inking and impression rollers surrounding the drum and alternately mounted in said bearings, guides for holding the inking-rollers against the ink-distributing surface and form, a guide for holding the impression-rollers against the form, and means for holding them away from the ink-distributing surface, all substantially as described.

7. In a printing-press, the combination of

a fixed central drum comprising an ink-distributing surface, a type-bed, and central shaft, with movable frames for carrying the inking and impression rollers and adapted to turn on the central shaft, said frames being made in two pieces, all substantially as described.

8. In a printing-press, the combination, with two stationary drums, each having an inclined type-bed, of a removable table provided with two inclines, all substantially as described.

9. In a printing-press, the combination, with two stationary inclined type-beds and a cross-bar between the type-beds, of a table provided with two inclines, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULES DERRIEY.

Witnesses:

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ALBERT CAHEN.