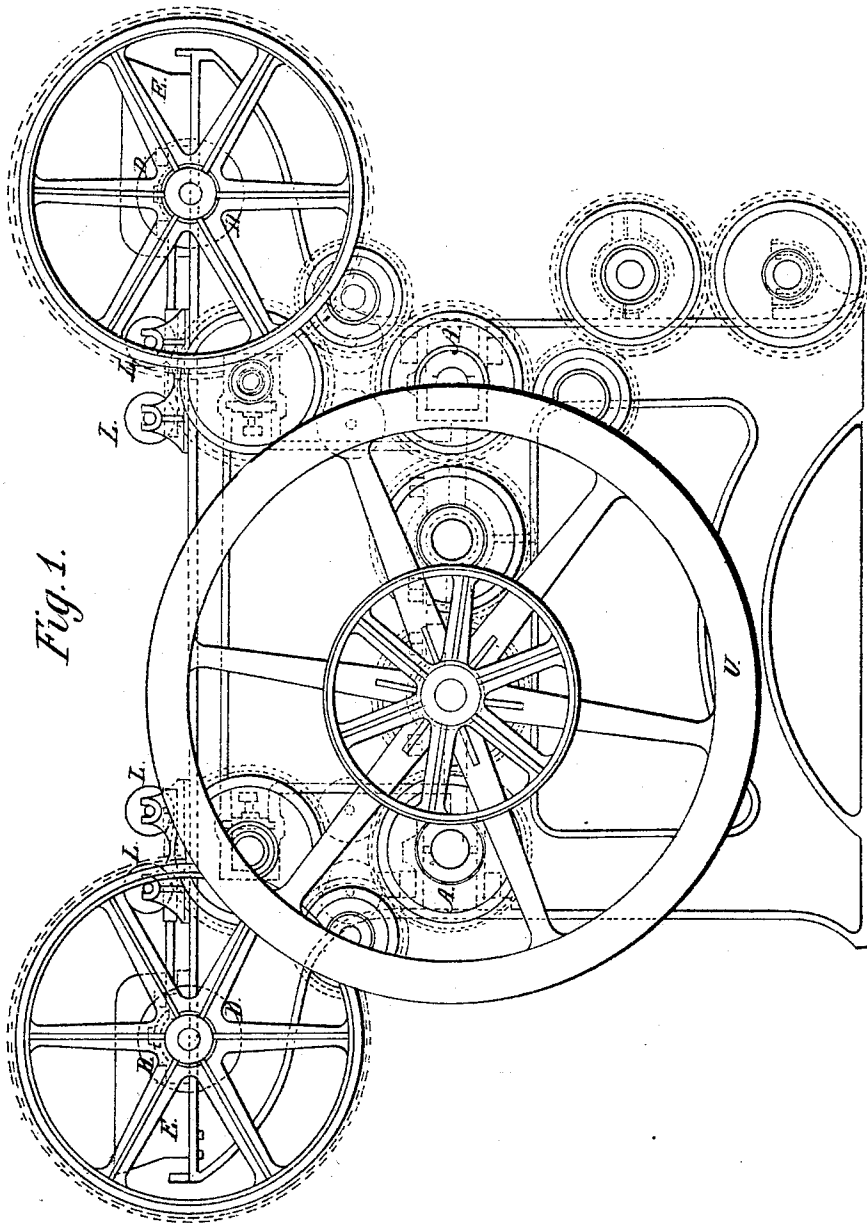


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PRINTING PRESS.

No. 8,386.

Patented Sept. 23, 1851.

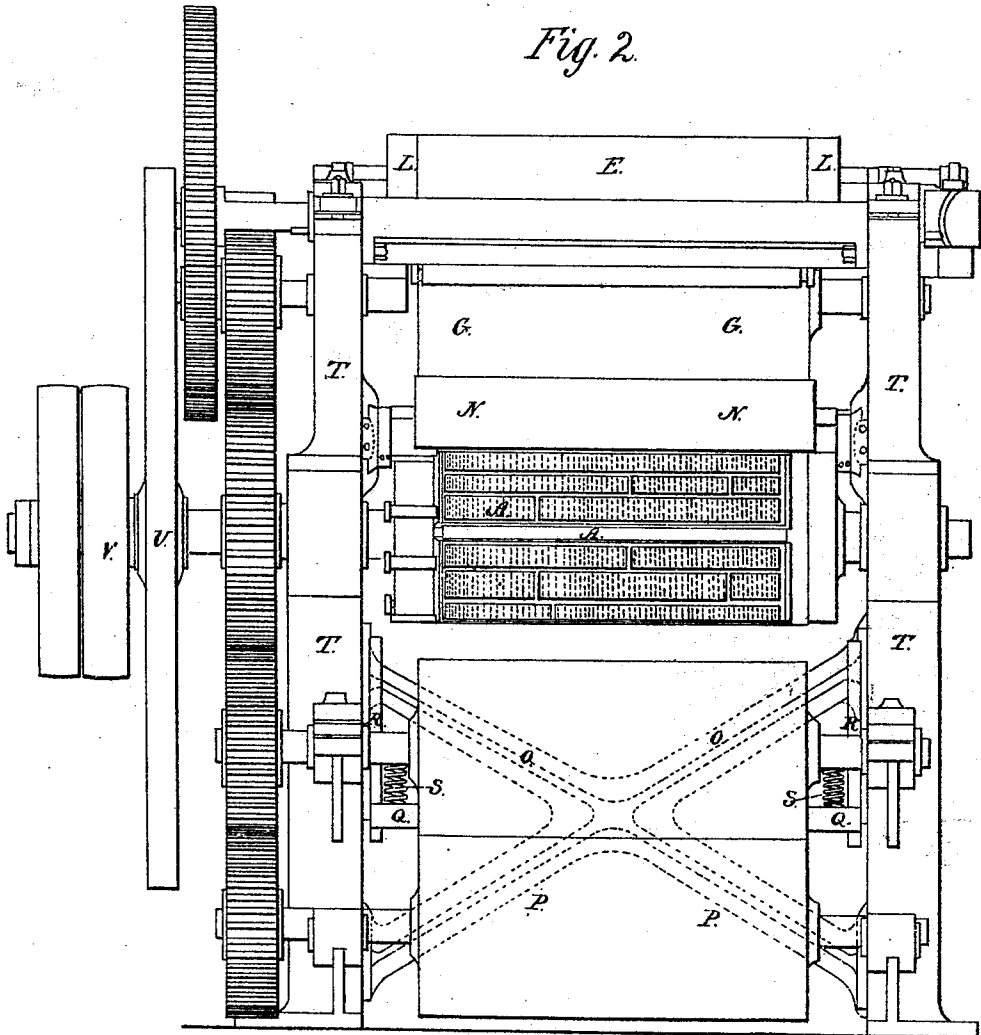


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Fig. 2.

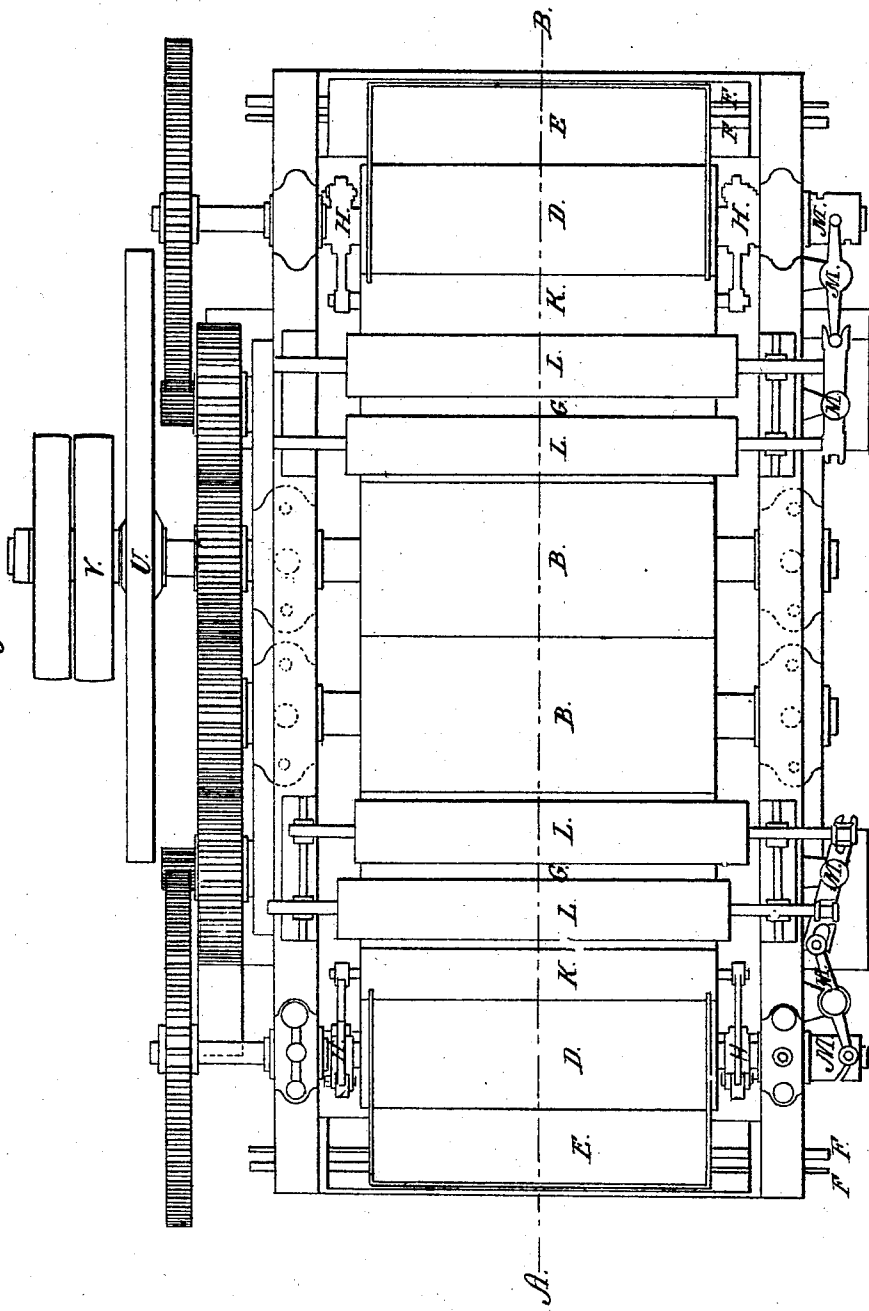


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Fig. 3.



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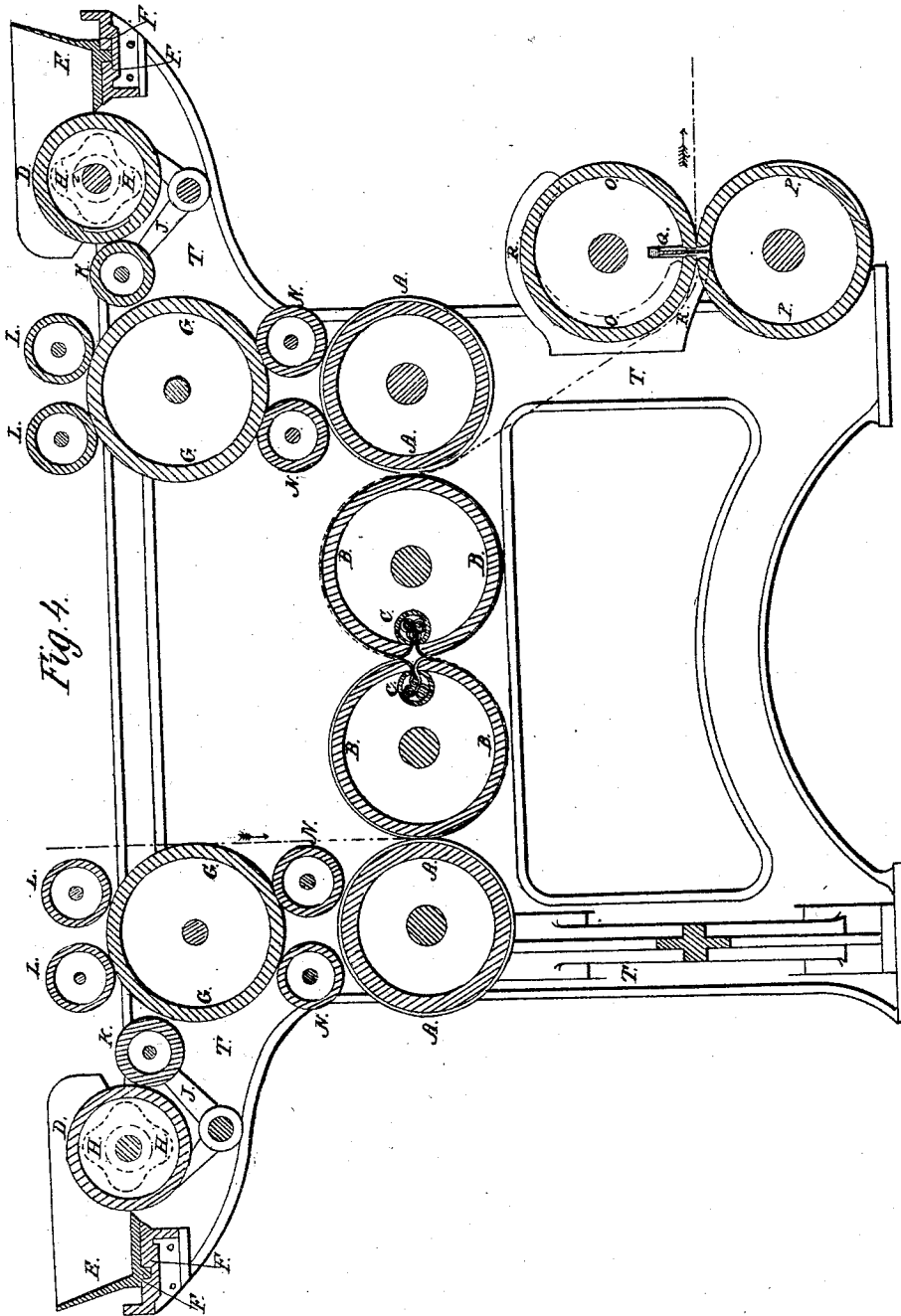


Fig. 4.

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9 Sheets—Sheet 5.

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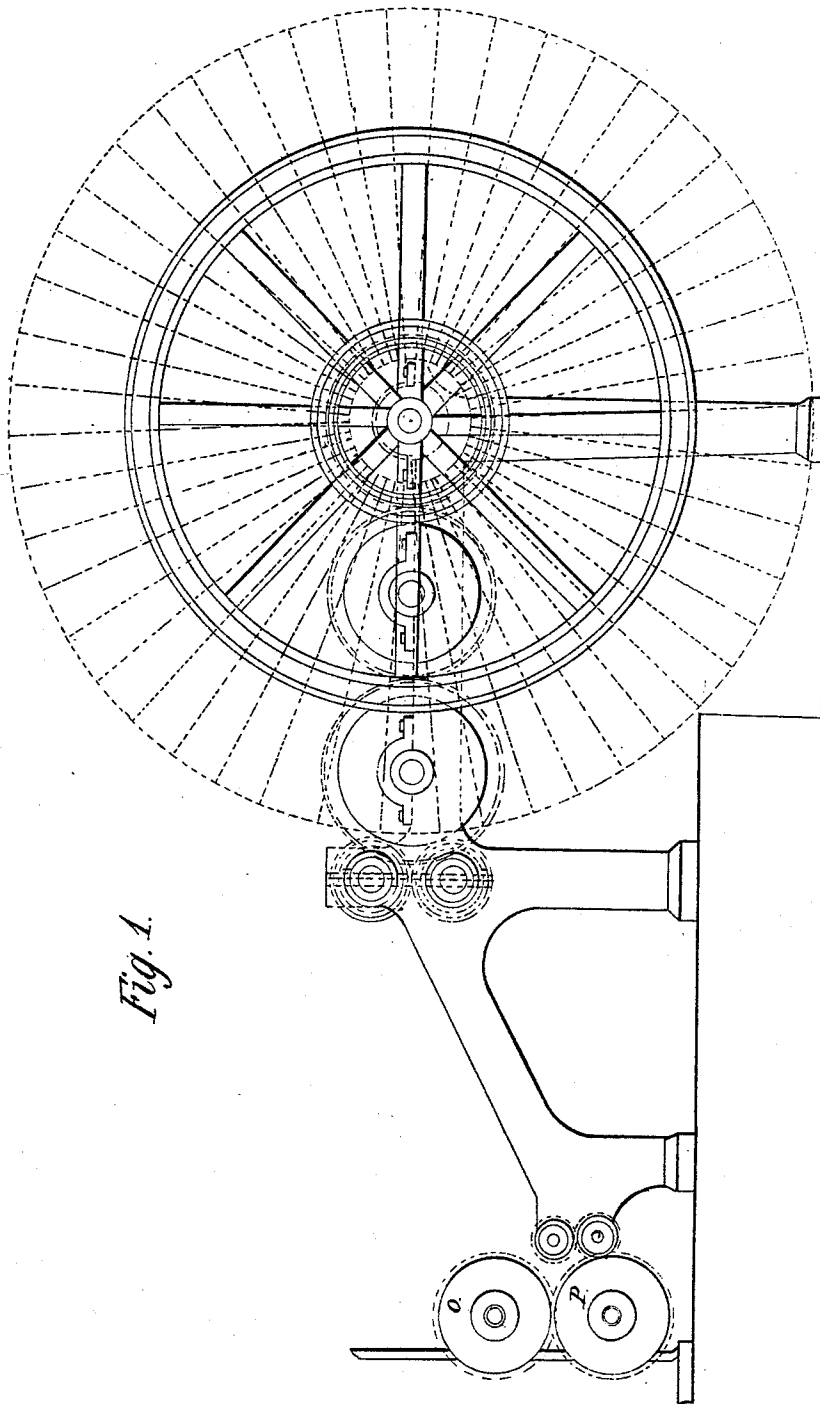


Fig. 1.

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9 Sheets—Sheet 6.

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Fig. 2.

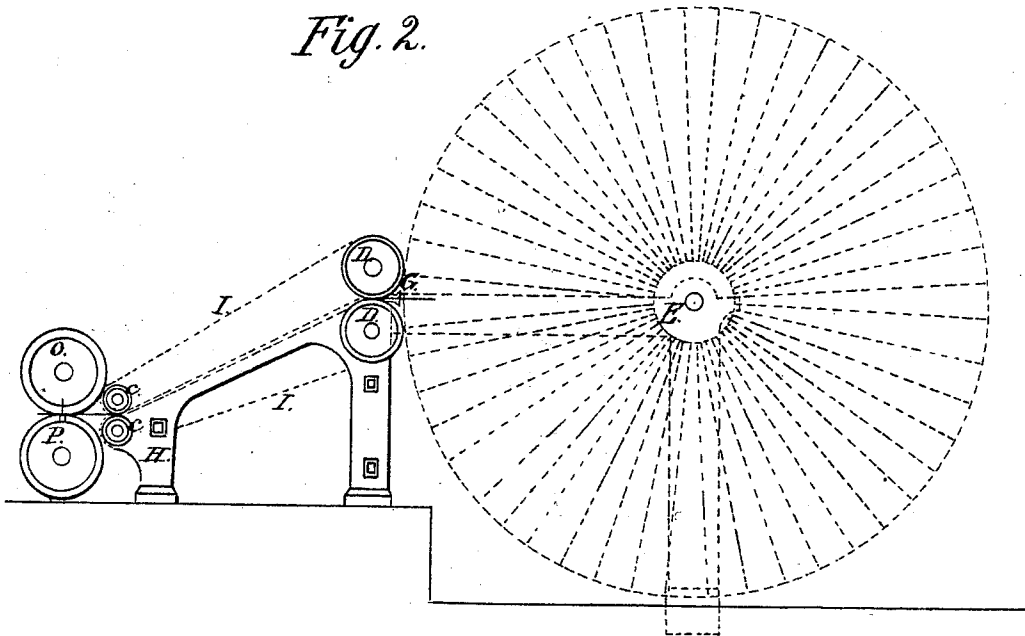
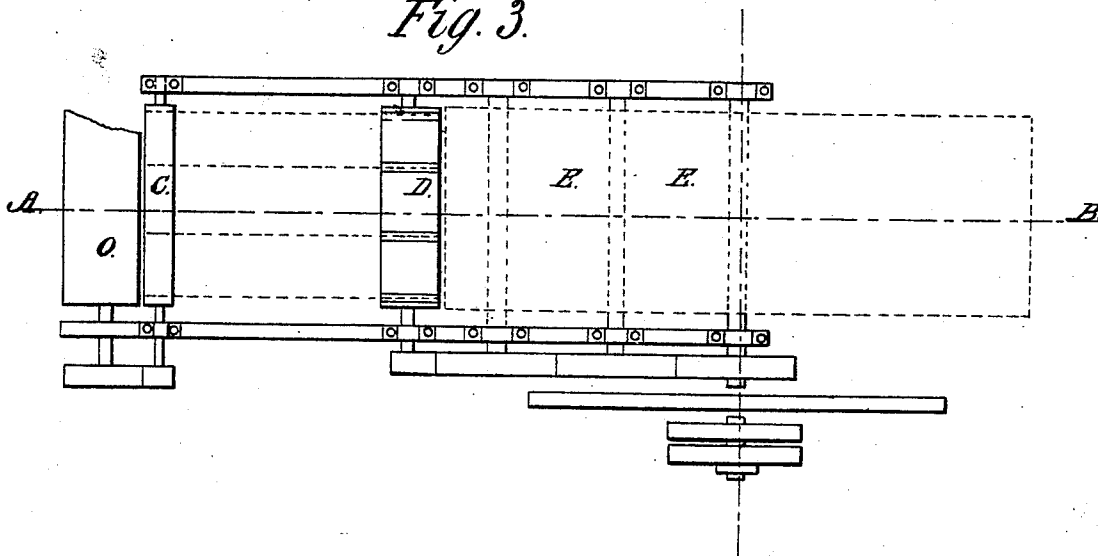


Fig. 3.

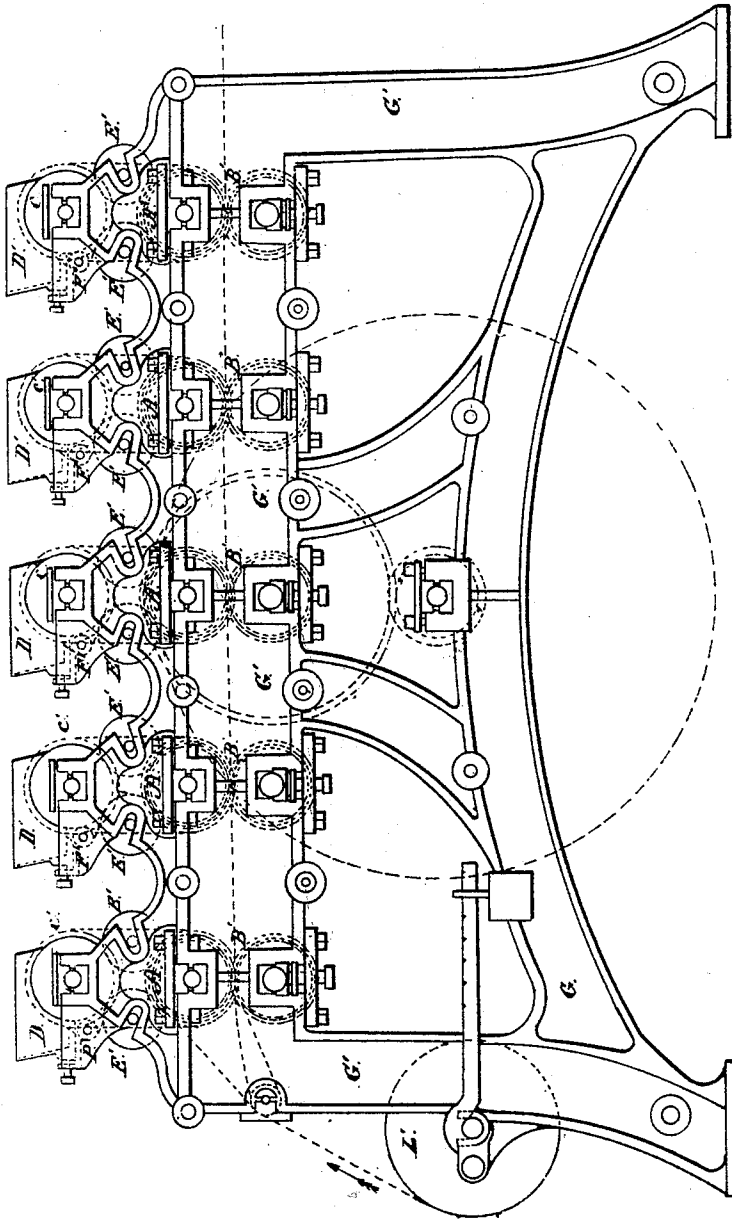


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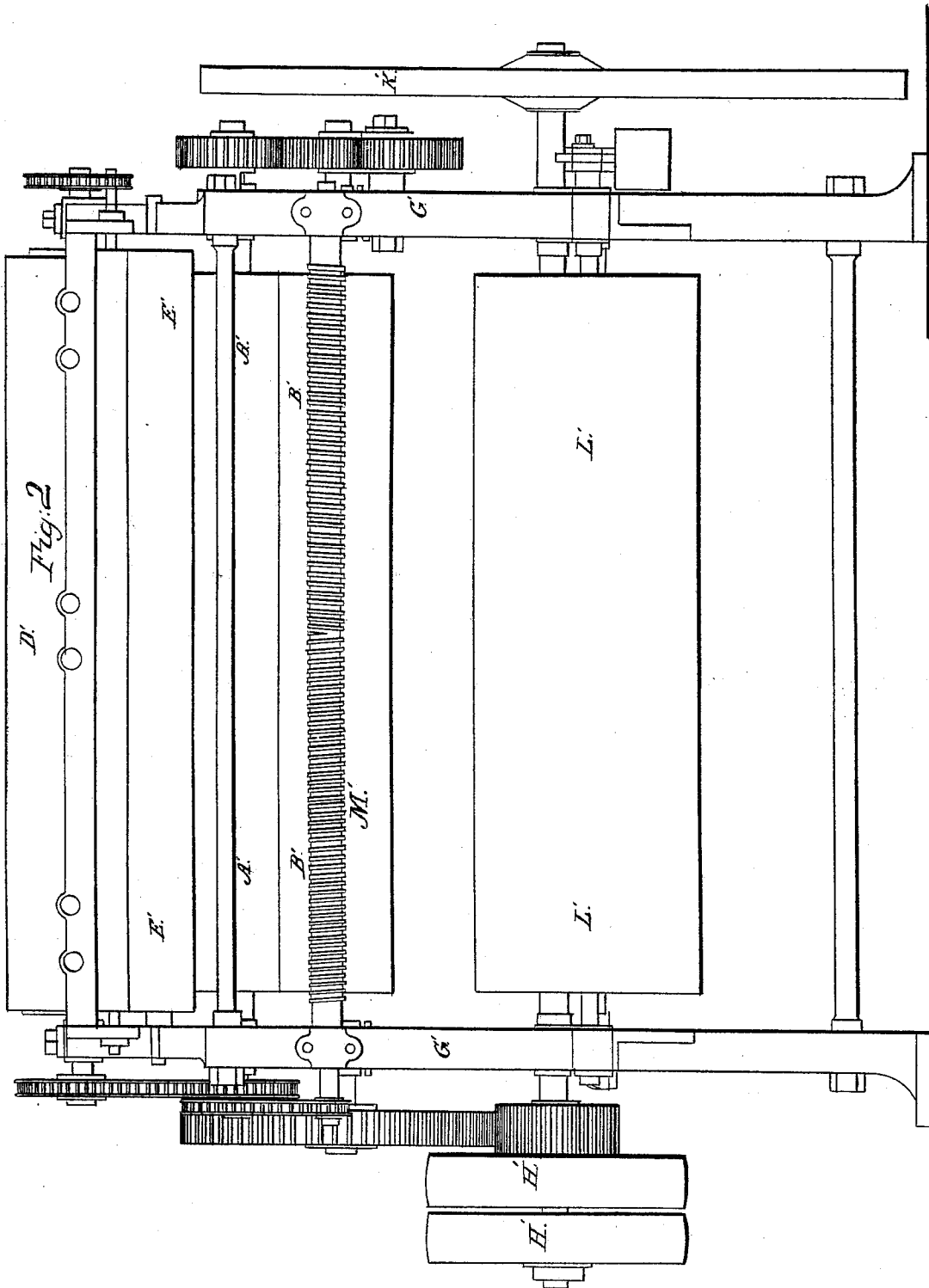
Fig. 1.



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PRINTING PRESS.

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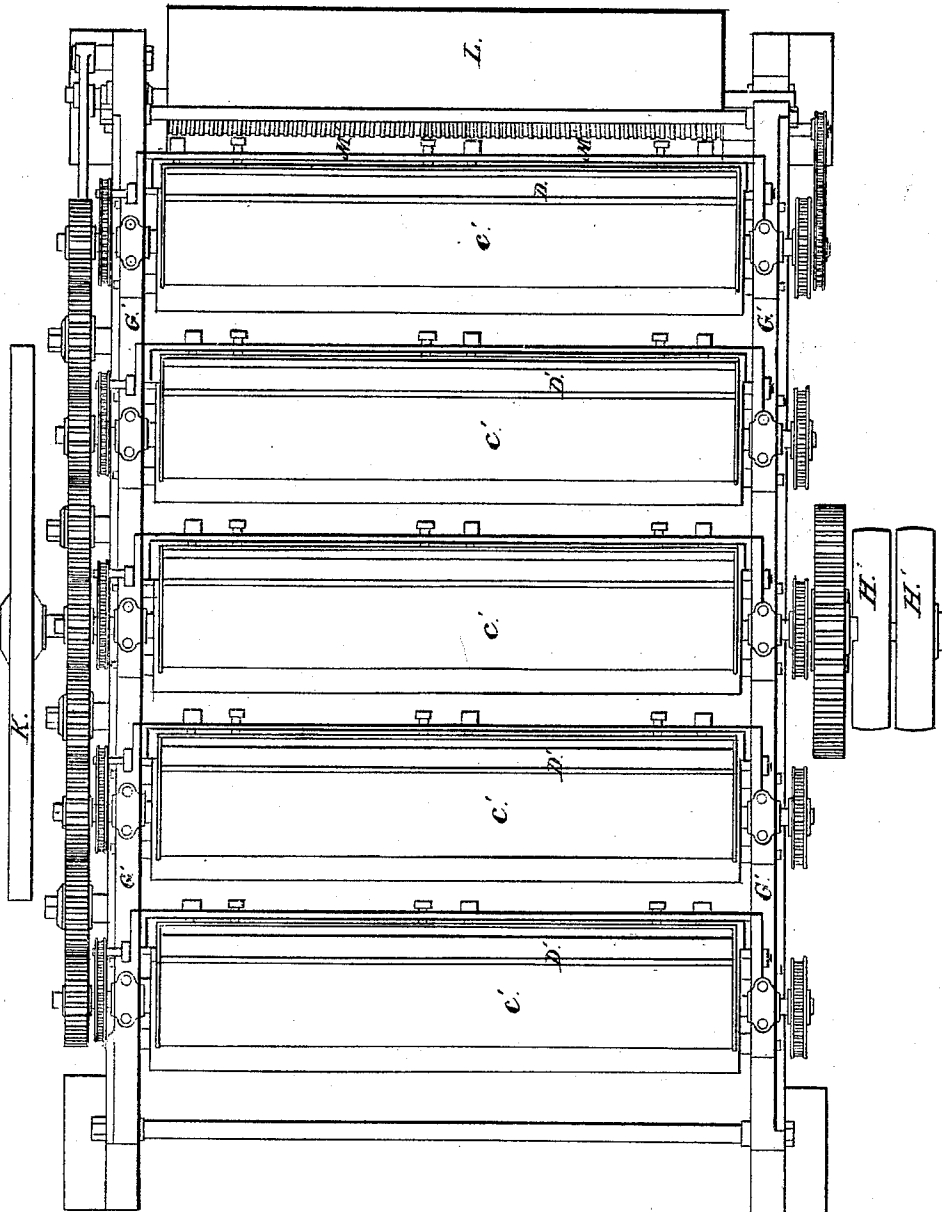


J. WORMS.
PRINTING PRESS.

No. 8,386.

Patented Sept. 23, 1851.

Fig. 3.



UNITED STATES PATENT OFFICE.

JACOB WORMS, OF PARIS, FRANCE, ASSIGNOR TO J. PHALEN.

PRINTING-PRESS.

Specification of Letters Patent No. 8,386, dated September 23, 1851.

To all whom it may concern:

Be it known that I, JACOB WORMS, of Paris, in the Republic of France, have invented certain new and useful Improvements in the Art of Letter Press and other Printing; and I do hereby declare that the said invention is fully and exactly described in this specification, reference being had to the drawings which make part of it, marked
10 Sheets 1, 2, 3, and 4, and to the numeral-figures and letters marked upon the said drawings.

My invention may be summarily designated as the printing with rapidity, either
15 in ink or colors, by the aid of certain apparatus herein described, a continuous sheet of paper or stuff on one or both sides, and of cutting and folding the same.

Having first prepared cylindrical stereotypes, I will proceed to describe the mode
20 of using them for producing impressions.

The stereotypes for letter press printing are always in two or more pieces, and are fastened by aid of counter-sunk screws, upon
25 wooden or metal cylinders, which make part of the press or apparatus for printing. The plates of stereotype are separated, when placed upon these cylinders, by bars corresponding to the margin of the printing.
30 The stereotypes for the printing of stuffs and paper hangings, may be also made in several pieces, but must encircle entirely the printing cylinder.

Apparatus for letter-press printing. See drawings, Sheet No. 2.—The machine or apparatus which I employ for letter press printing is represented by the drawings of
35 Sheet 2; of these, Figure I, represents a front elevation: (the cog-wheels in this are indicated by a double circle in blue ink.) Fig. II, is a side elevation. Fig. III, is a plan. Fig. IV, is a section on the line A B of Fig. III.

The same letters indicate the same objects.
45 A, A, cylinders of wood or metal, to which the stereotype plates are attached. B, B, cylinders covered with cloths or blankets. C, C, small cylinders for stretching these blankets. D, D, inking tables or cylinders of cast iron or other substance. E, E,
50 troughs of cast iron or other metal, holding the ink. F, F, wedges or props for fixing the ink trough against the cylinder D.

G, G, other inking cylinders of cast iron. H, H, cams or lifts on the cylinder D. J, 55 bent lever, by which a go and come movement is communicated from the cam-wheel H to the cylinder K. K, K, cylinders of gelatine, or roller composition, which take the ink from D and carry it to G. L, L, 60 other similar cylinders, which spread the ink on G. These cylinders have a rotary movement from the friction caused by the weight, and also a lateral go and come movement. M, system of levers, by which 65 the lateral go and come movement is communicated to the cylinders L. N, N, cylinders of gelatine or roller composition, which receive the ink from G, and apply it directly to the type. O, cylinder of cast iron having 70 a groove parallel to its axis, containing a knife or saw. P, cylinder of same substance, having a similar groove. Q, saw or knife placed in the groove of the upper cylinder O. This serves to cut the paper 75 (after it has been printed on both sides) into the proper lengths. R, eccentric curbs, against which the ends of the saw Q, press. S, spiral springs, pressing on the saw. T, frame work of cast iron, in which the axles 80 of the cylinders are engaged. U, fly wheel. V, wheel for band to communicate the motive power.

Mode of printing letter-press.—This machine is constructed to print on both sides 85 the sheet, and in consequence there are two cylinders, A, A, each bearing a different stereotype plate. An inspection of the drawings and reference to the foregoing explanations will show its operation. The 90 ink coming from the troughs E, E, passing by the roller K, to the cylinder G, is taken by the rollers N, N, and by them deposited on the surface of the type. All these cylinders have a rotary movement, which (except for L, L,) is communicated by the pinions or cog wheels attached to their axles, and represented in Fig. I. The cylinders or rollers N, N, are mounted on grooved 100 pieces, and are furnished with cushions or pads, by means of which they may be made to press more or less tightly on the surface of the inking cylinders G, G, and of the type cylinders A, A, and so give out a greater or less quantity of ink. 105

The paper usually employed is a continu-

ous sheet, or what is called endless paper: This is mounted or placed on or near the machine and follows the sinuous course indicated by the red line of Fig. IV. Passing
 5 the pressing cylinder B, it is printed on one side, and then passing over the second pressing cylinder B, it is printed on the other side by the second cylinder A.

- 10 *Mode of cutting and folding the paper.*—After leaving this, the paper may be received on a single cylinder, taking the place of the two cylinders O, P, or it may pass between them and be cut:—the diameter of
 15 these and the wheel work connected with them should be carefully adjusted in such a way that the saw shall strike in the margin between the printed sheets. The saw is longer than the cylinder, and its extremities
 20 are constantly pressed down by the spiral springs S, S, while it is restrained by the curbs R, R, from cutting the paper before the moment when the grooves of the two cylinders are opposite one another. These
 25 two cylinders O, P, serve also to fold or to facilitate the folding of the printed matter which comes to them. This is done by placing at convenient distances on the circumference of one of them one or more ribs or
 30 wires, sufficiently prominent to make a mark in the sheet, without being so sharp as to cut it. The other cylinder has grooves corresponding to these ribs, which may be both perpendicular and parallel to the axis. For
 35 folding newspapers, the method I adopt is to place the ribs alternately on one and the other cylinder. The sheets then come out cut at the proper lengths, and by means of these ribs slightly crimped or marked by
 40 lines at the proper distances, so that they can be easily folded up fan fashion, when they are ready to be distributed to the public: much time and labor are thus saved.

- 45 If the matter which has been printed is for volumes, which are required to be glazed or hot pressed, I attach to my machine, in place of the cylinders O, P, the apparatus and cylinders now usually employed for hot
 50 pressing, after passing between which, the paper may be led through the cylinders O, P, the position of which in regard to the other parts will, in this case, require to be slightly modified.

- Apparatus to receive the printed sheets.*
 55 *See drawings, Sheet No. 3.*—If newspapers or other matter requiring great celerity be printed, the sheets will leave the cylinders O, P, with such rapidity, that it will be difficult to receive and arrange them in a
 60 proper manner. The apparatus and the process which I employ to obviate this inconvenience, are represented by the drawings of Sheet No. 3. This apparatus is attached to my afore-described machine.

Of these drawings Figure I, is a front elevation. Fig. II, is a section on line A B of Fig. III. Fig. III, is a plan. The scale of these is one-tenth the size of the machine, that of the other sheets Numbers 2, and 4, being one-fifth.

O, and P, represent the cylinders already described of Sheet 3, and this machine takes up the paper as it comes from them, but when it is employed with the cylinder O, P, a saw is used in them which does not entirely
 75 sever the paper in sheets. C, C, are two small cylinders placed directly after and parallel with O, P. These are connected by means of cords or bands, with other cylinders D, D, placed at a convenient distance. Now the paper on coming out but half severed, passes between the cylinders C, C, and then on the bands to the cylinders D, D, which having from their greater diameter, a
 80 quicker movement on their peripheries than C, C, tear asunder the filaments by which the sheets were attached. These last on leaving the cylinders D, D, pass through the tunnel G, and are deposited in the radii of the wheel E. This is of a size sufficient to
 85 receive one of the sheets on its radius. These radii, made of brass wire, or of paste-board, are placed so as to form any required number of compartments, and the movement of this wheel is so regulated by the pinion
 90 and wheels attached, that each compartment shall receive one sheet. As the wheel turns the sheets are laid hold of at the side opposite to G, and smoothly piled.

Apparatus to print paper hangings and woven fabrics. See drawings, Sheet No. 4.—The apparatus which I have just described, although more especially intended for letter
 95 press printing, may still also serve for stuffs and paper hangings; but for printing these, it is more convenient to give a different arrangement to parts of the machine, inasmuch as it is necessary to print them only on one side, and as the proper application of the colors requires a different system of rollers.
 100 The drawings of Sheet 4, represent my rotary machine as modified for the purpose of printing stuffs and paper hangings. It must be clearly understood that this is done by means of cylinders bearing stereotype or
 105 plates in relief, fastened by clamps or screws, as before described.

In sheet 4, Fig. I, is a front elevation, (the cog and groove wheels are marked in this by a double circle of red ink.) Fig. II, is an end elevation. Fig. III, is a plan.

The same letters indicate the same objects.

A', A', cylinders of wood or metal, to which the stereotype plates, or the plates in relief are attached. B', B', pressing cylinders covered with cloth. C', C', cylinders which receive the color. D', D', troughs containing the colors. E', E', rollers of

gelatine covered with vulcanized india rubber, or other proper substance, which take the colors from the cylinder C'. F', F', brushes mounted on rollers, which serve to equalize the color on the cylinders. G', frame work of cast iron. H', H', wheels by which the motive power is given. K', fly wheel. L', cylinder or beam from which the matter to be printed is unrolled. This is kept in place by a lever and movable weight. M', double screw to smooth out the wrinkles of the stuff or paper, which passes over it before reaching the printing cylinders.

The red-arrow marked line shows the passage of the printed matter. An inspection of the above named drawings will show clearly the working of the machine. This is intended to print in five different colors, but any number of colors may be used by increasing the number of cylinders, there being no limit to these but the motive power to be disposed of. As a general rule, for varied designs one cylinder is necessary for each color, as the plate of each cylinder represents the parts which are to be struck in one color only. This rule may be modified where the figures to be printed are parallel lines, in which case by proper divisions in the inking trough and in the brushes, several colors may be applied to one cylinder. The color trough, like the ink trough before described, may be advanced to or drawn back from the metal cylinder C'; the color received upon this is equalized by the brushes upon the roller F', (which has not only a rotary, but a go and come movement) and is then taken up by the cylinders E', E', to be deposited on the surface of the printing cylinder A'. These two cylinders E', E', although made of gelatine or other composition, must have an envelop of vulcanized caoutchouc or some other impermeable substance, which cannot be attacked by the colors. The lower cylinder B', may be covered with cloth, but as in order to insure a clear impression, considerable pressure is necessary, it is better that it should be covered with vulcanized caoutchouc. I place also, between the screws and cushions of the axles of the cylinders A', B', bands of vulcanized india rubber; these by their elasticity serve to correct any defect in the perfect cylindricalness of the stereotype or printing plate, and also to husband the motive power employed.

The power is received by a large cog wheel attached to the center cylinder B', from a pinion on which is the fly K'. This last is not necessary when inanimate power is used, but is essential when the machine is worked by hand. The cog wheel cylinders B', B', communicate with cog wheels of similar diameter A', A', so that their movement is the same. Between each of the cylinders

B', B', there is an intermediate cog wheel, in order that they may all turn in the same direction. The coloring cylinders D', D', receive their motion by chains and grooves from A', A', and in the same way, give rotary motion to the brushes F', F'. The color cylinders E', E', derive their rotary movement from friction against D', D'.

In the instance of the machine just described, the printing cylinder is above the pressing or taking up cylinder: I reserve to myself, however, the right to place them vertically, if I find it more convenient, as also to vary the position of other parts of my machine, such displacing or varying being merely a matter of convenience, the general working of the machine being still the same.

Having now described fully the nature of my invention and its application, I will here observe that engraved or sunken cylinders have been already used for the printing of woven fabrics, but these are very expensive to manufacture compared with the cylinders prepared as I have described. I wish it also to be understood that in the apparatus described, I do not confine myself to the exact details herein set forth, for these must necessarily vary with the size of the matter to be printed, or with the greater or less rapidity with which the movements are to be executed. It must also be understood that I do not claim individually or separately any of the parts of the apparatus or machinery, but

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

1. In combination with the ink troughs E, and printing cylinders A the arrangement of the cam cylinders D, reciprocating cylinders K (operated by the levers J) and L (operated by the levers M), and cylinders G and N, for receiving, carrying and distributing the ink from the said trough to the said cylinders.

2. I claim in combination with the printing cylinders, the cylinders O, P, provided with a spring knife or saw Q, operated by cams R, and also with alternate ribs or projections and grooves for the purpose of nearly severing the filaments of the paper as it passes through between said rollers; and for the purpose also of creasing the paper for the more easily folding it.

3. I claim in combination with the partially cutting, and creasing cylinders O, P, the different sized cylinders C, D, geared together, for the purpose of tearing apart the partially cut paper—the cylinders C, holding, and the increased motion of the cylinders D, at their periphery (they being the larger) drawing the paper sufficiently to separate it.

4. I claim in combination with the sep-

arating cylinders C, D, the tunnel G, for
guiding, and the wheel E, divided into a
suitable number of compartments, for re-
ceiving the sheets, as they are delivered from
5 the machine, the whole being constructed
substantially as herein described, and for
the purposes fully set forth.

In testimony whereof I have hereunto set
my hand and seal.

JACOB WORMS. [L. s.]

Witnesses:

JOSHUA BRANDON,
JOHN BARTLY.