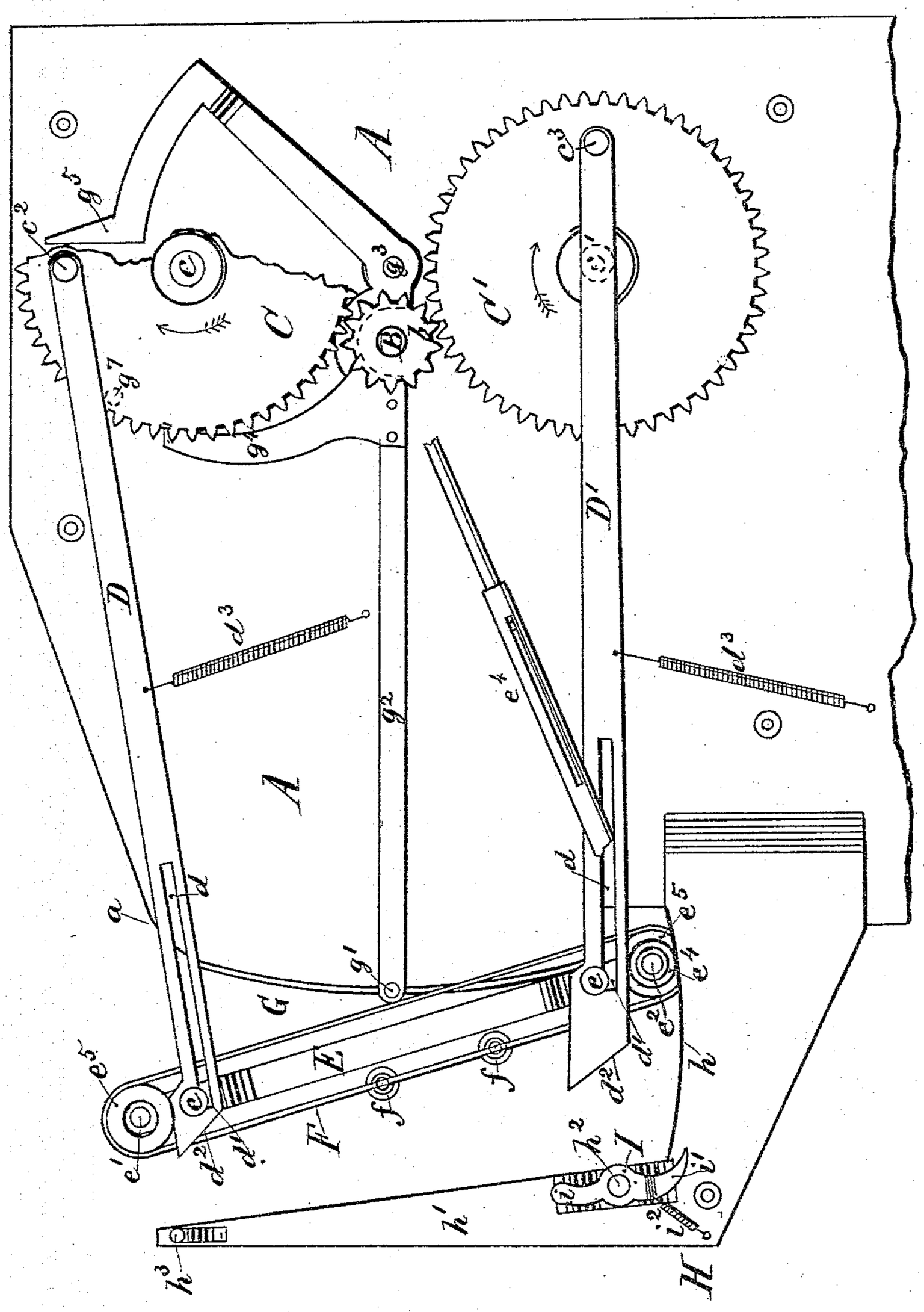
(No Model.) 5 Sheets—Sheet 1.

C. E. CLEMENT.

PRINTING PRESS.

No. 356,867. Patented Feb. 1, 1887.

Fig 1.



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Robt. L. Fenwick
J. F. Theodore Laney.

Inventor:
Charles E. Clement
by his attys
Mason Fenwick and Lawrence

(No Model.)

5 Sheets—Sheet 2.

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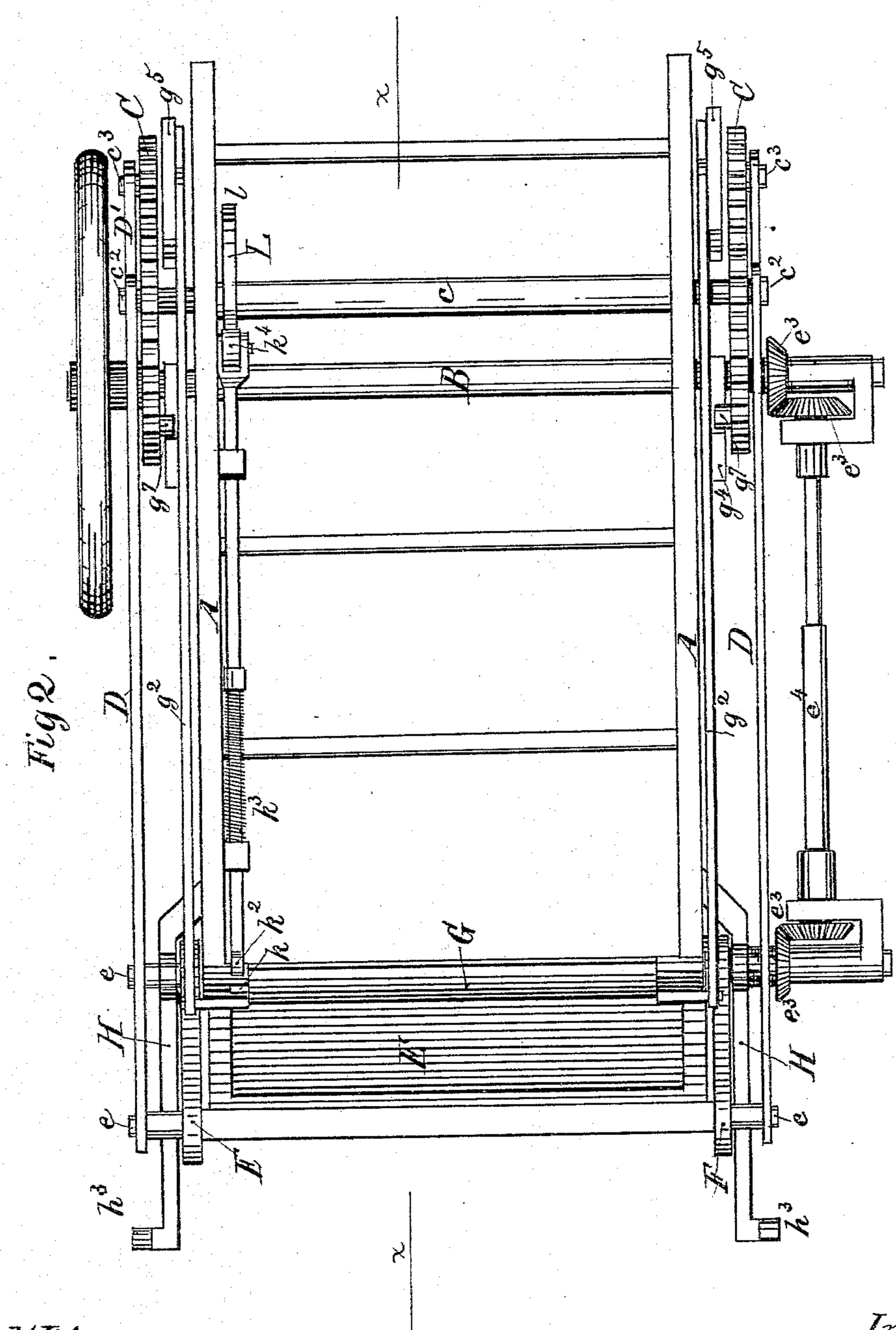

Fig 2.

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(No Model.) 5 Sheets—Sheet 3.

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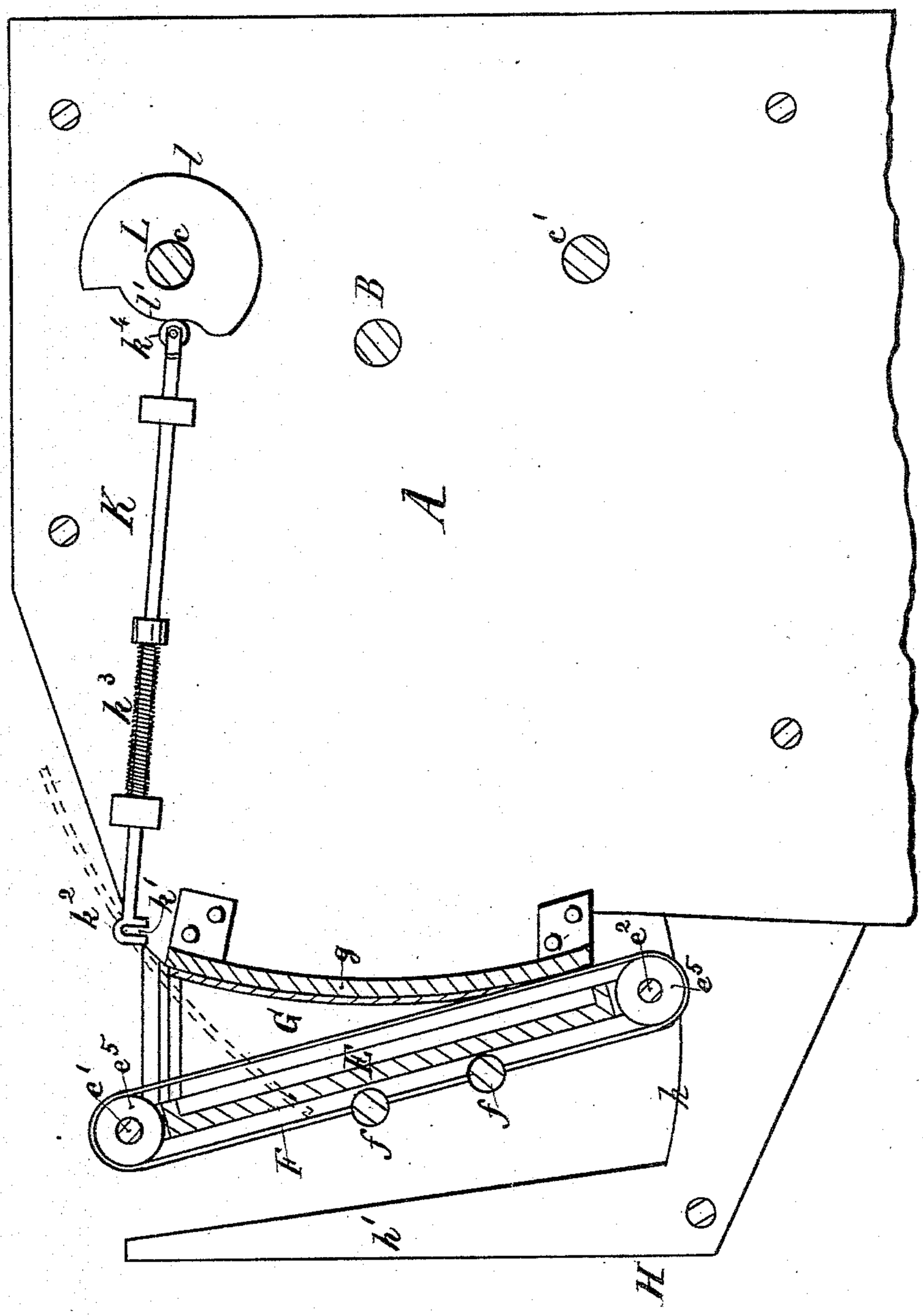
Fig 3.



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(No Model.) 5 Sheets—Sheet 4.

C. E. CLEMENT.

PRINTING PRESS.

No. 356,867. Patented Feb. 1, 1887.

Fig 4.

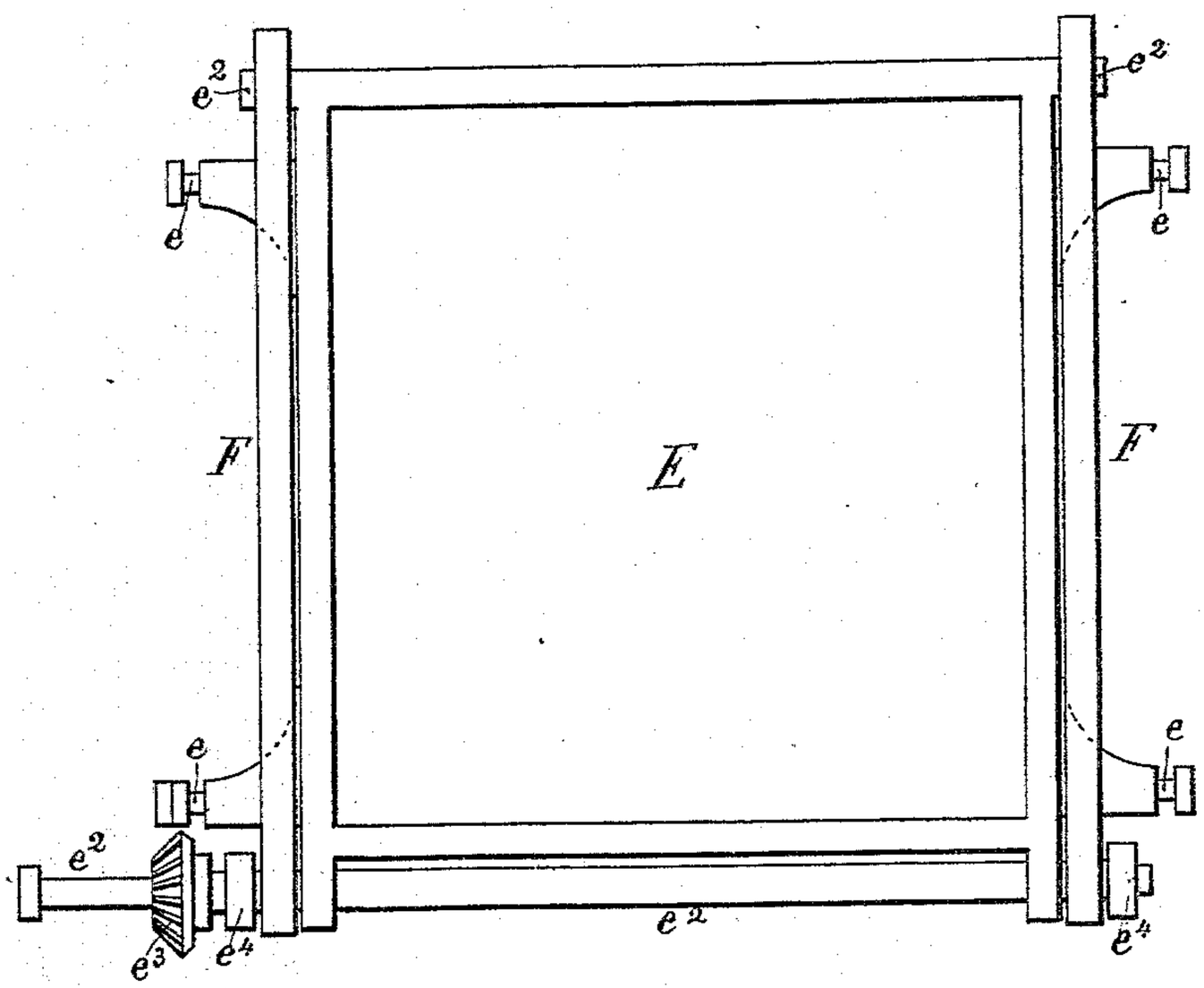
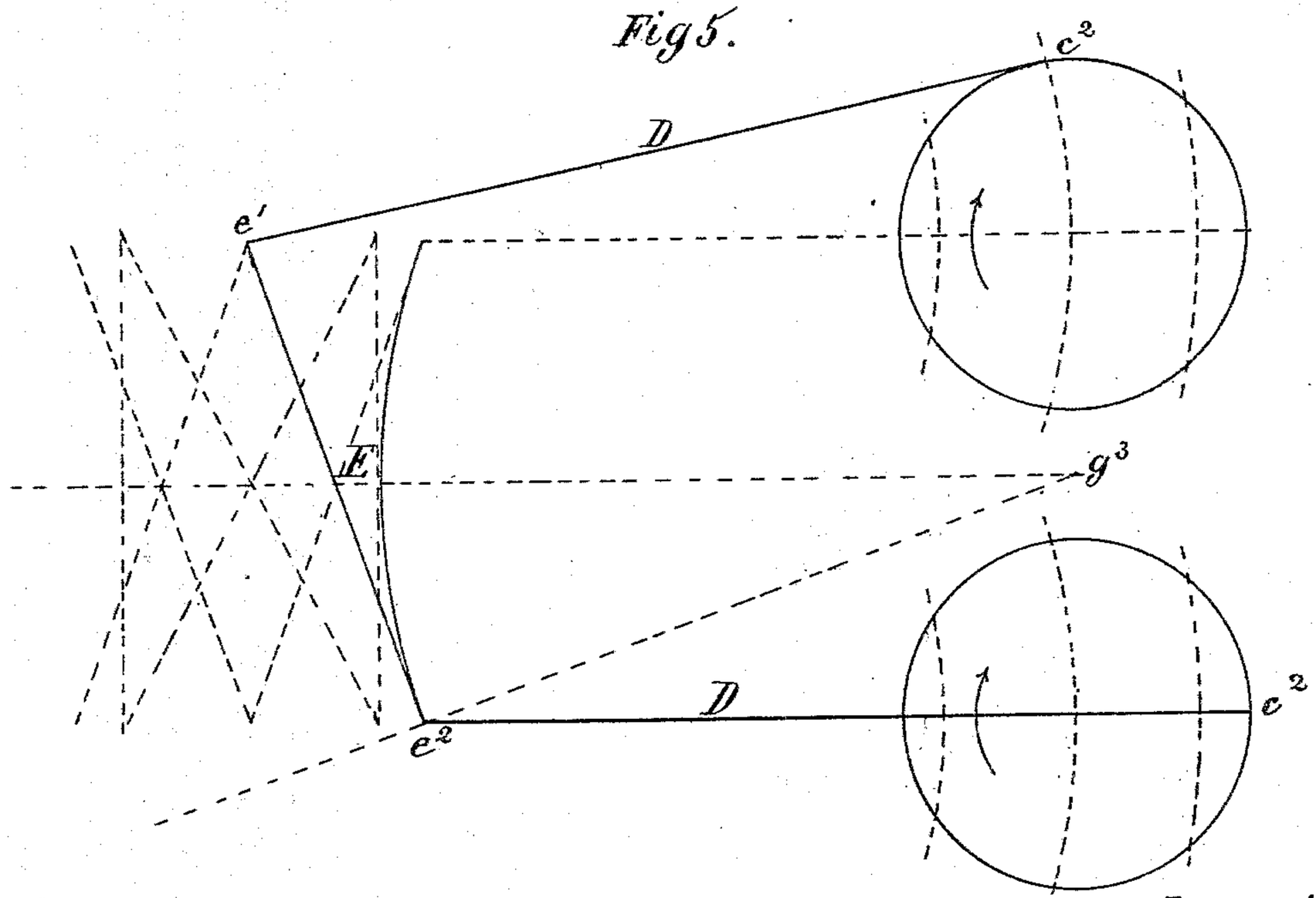


Fig 5.



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(No Model.) 5 Sheets—Sheet 5.

C. E. CLEMENT.

PRINTING PRESS.

No. 356,867. Patented Feb. 1, 1887.

Fig 6.

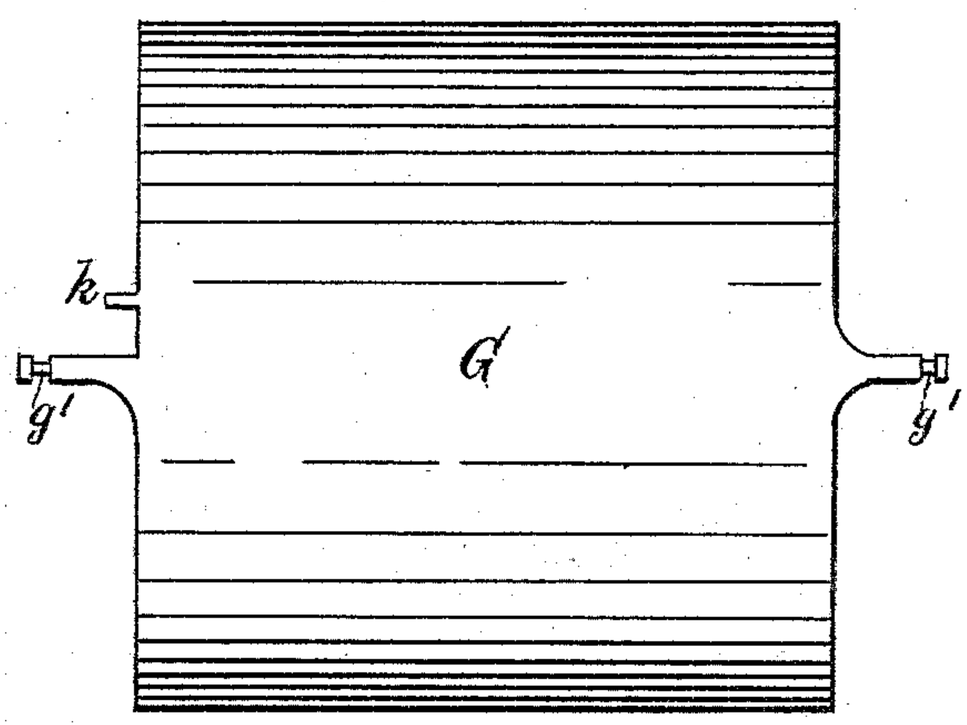
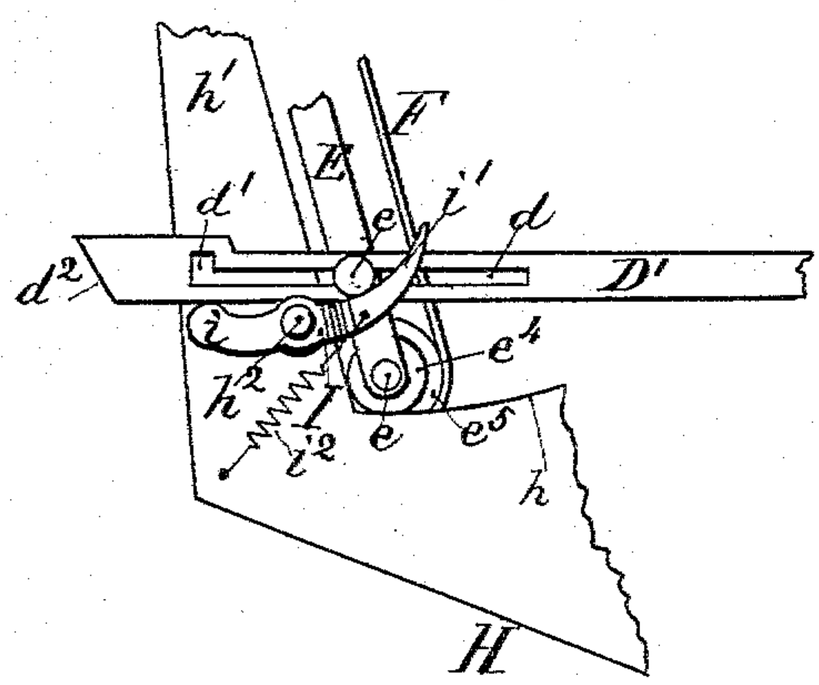


Fig 7.



Witnesses:
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Inventor:
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Mason Fenwick and Lawrence

UNITED STATES PATENT OFFICE.

CHARLES E. CLEMENT, OF NASHUA, NEW HAMPSHIRE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 356,867, dated February 1, 1887.

Application filed March 5, 1886. Serial No. 194,137. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. CLEMENT, a citizen of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Printing-Press, of which the following is a specification.

My invention relates to double-joint printing-presses; and it consists of certain constructions and combinations of parts, hereinafter described and specifically claimed, whereby certain improved results and advantages are secured.

In the accompanying drawings, Figure 1 is a side view of my invention, wherein a number of wheels are omitted and one wheel partly broken away in order to better expose to view certain important parts. Fig. 2 is a top view, and Fig. 3 a broken vertical central section of the same in the line *x x* of Fig. 2. Fig. 4 is a detail view of the bed and the inking-frame. Fig. 5 is a diagram illustrating the action of the bed-gear. Fig. 6 is a detail view of the platen, and Fig. 7 is a detail view of a release mechanism employed in connection with the bed-gear.

A in the drawings designates a suitable frame, to which the main or driving shaft B is suitably hung, with its ends extending beyond either side of the frame. To the ends of the main shaft B toothed wheels *b*, Fig. 1, are attached, each of which gears into a pair of toothed wheels, C C and C′ C′, of equal size and number of teeth. The wheels *b b* are also of equal size and number of teeth, and thus a uniform motion of the wheels C C C′ C′ will be secured. The wheels C C are attached to a shaft, *c*, and the wheels C′ C′ to a shaft, *c*′, and both shafts are parallel with the main shaft B and are suitably hung to the frame A. The wheels C C are provided with crank-pins c^2 c^2, and the wheels C′ C′ with crank-pins c^3 c^3. The crank-pins c^2 c^2 stand in one line, and the crank-pins c^3 c^3 stand in one line; but the radial position of these two lines (or two pairs of crank-pins) is such that when one is in the highest or lowest position the other occupies a middle position, or the two pairs of crank-pins stand at right angles to each other.

To each crank-pin c^2 a connecting-rod, D, is attached, and to each crank-pin c^3 a connecting-rod, D′, is attached. These four connecting-rods are each provided with longitudinal slots *d*, which slots terminate with an upward step, *d*′. Beyond the steps *d*′ the connecting-rods D D D′ D′ terminate with a slope, d^2, for a purpose hereinafter shown. By means of the slots *d* the connecting-rods D D D′ D′ move upon pins *e* of an ordinary straight printing-bed, E, when this bed is not at work; but when the bed is at work the said pins are engaged with the steps *d*′.

Four suitable tension-springs, d^3, hold the connecting-rods D D D′ D′ down, and thus secure the engagement of the steps *d*′ with the pins *e*. The pins *e* are fastened to the bed E at or near its ends, and by this construction the bed assumes a rocking motion when the wheels C C′ revolve.

To the extreme upper and lower edges of the bed E shafts e' e^2 are suitably hung, the shaft e^2 being connected with the main shaft B by means of miter-gears e^3 e^3 e^3 e^3 and an intermediate quill-shaft, e^4, which adjusts itself to the varying distance of the shafts e^2 and B. These shafts e' e^2 are provided at their outer ends with pulleys e^5, of equal size, over which two belts, F, are stretched. The belts F are suitably provided with a number of inking-rollers, *f*, which in their circuit or travel around the bed are kept close to the printing-surface or type.

Opposite the bed E a curved platen, G, is placed upon a suitably-shaped stationary false platen, *g*, fastened to the end of the frame, and is held there by means of two bolts, *g*′, attached to either side and about midway of the platen G, and two arms, g^2, pivoted to the frame A at g^3, in a central position with the wheels C C′ and with the curve of the platen. The arms g^2 are provided with curved arms g^4 and tappets g^5, the arms g^4 and tappets g^5 being in range of crank-pins g^7 on the wheels C, whereby the platen is operated, as will be seen. The shaft e^2 of the printing-bed E is provided with a roller, e^4, at each end, and these two rollers travel upon the suitably-curved surfaces *h* of two angular arms, H, of the frame A, and thus the weight of the bed and its connecting-rods is supported, and the bed is guided and held in the proper position during its entire operation. This operation of printing may occupy the time of about one-half a revolution of the wheels C C′, and it begins as soon as the

crank-pin c^3 arrives at the remotest point of its leverage or its off-point of dead leverage. At this time the crank-pin c^2 stands at the point of greatest leverage and the lower end of the bed E touches the platen G, which holds the paper to be printed. This first stage of operation is illustrated in Fig. 1.

As the wheels C C′ keep on revolving, the crank-pins c^3 gradually move the lower portion of the bed E away from the platen, and the crank-pins c^2 draw the upper portion of the bed E toward the upper portion of the platen until it arrives at the end of its stroke, when the said portions of the bed and platen touch each other. By this operation the bed E is caused to rock over the platen G from end to end and gradually print the paper thereon. At the same period of time the inking-rollers f are carried over the back of the bed E, where they cannot interfere with the printing. After this described operation of printing the bed E is moved away from the platen G in a backwardly-inclined position, owing to the fact that the crank-pins c^3 have finished one half of their return-stroke, while the other crank-pins, c^2, are just beginning their return-stroke. Thus the bed E moves a short distance toward the arm H until the slopes d^2 of the lower connecting-rods, D, strike two pins, h^2, on the upright portion h' of the arms H, whereby the said connecting-rods are moved upward and the lower pins e are disengaged from the steps d'. When the rollers e^4 come in contact with the upright portion h', the slots d are in line with the pins e, and the connecting-rods D finish their stroke without moving the bed E. Before the rollers e^4 arrive at the upright portions h' the slopes d^2 of the connecting-rods D′ strike the upper portions, i, of the pawls I, hung to the pins h^2, and turn up the lower hook-shaped portions, i', of the same, into which the lower pins e are moved by the steps d'. Thus the slopes d^2 gradually swing the pawls I from their original vertical positions into horizontal positions, as shown in Fig. 7, whereby the lower pins e become locked to the pawls and are held stationary. At the same time the two upper connecting-rods, D D, are moved toward the upright portions h' of the arm H, and having arrived at a proper position the upper slopes, d^2, come in contact with two pins, h^3, on said uprights, along which pins they slide up until the lower surfaces of the connecting-rods arrive upon said pins and the slots d are in line with the pins e. After the pins e have arrived in the slots d the connecting-rods D D D′ D′ finish their respective return-strokes and begin their forward strokes, while the bed E is held stationary, and the inking-rollers f f travel over the printing-surface thereof and supply it with a fresh charge of ink. During the same time the crank-pins g^7 of the wheels C come in contact with the tappets g^5 of the arms g^2, depress them, and cause the arms g^2 to move the platen G upward. When the bolts g' arrive near the upper edges a of the frame A, a pin, k, on one side of the bed enters the slot k' in a head, k^2, of a spring-bolt, K, suitably hung to the inside of the frame A. This spring-bolt K bears, by means of a tension-spring, k^3, and a friction-roller, k^4, upon a revolving cam, L, on the shaft c. Before the pin k enters the slot k' the roller k^4 bears upon the high surface l of the cam, and thus keeps the slot k' of the head k^2 in line with the approaching pin k; but after the pin k has fully entered the slot k' a low surface, l', of the cam L has arrived opposite the roller k^4, and in consequence of it the bolt K is moved by the spring k^3 nearer the axis of the cam, thereby pulling the pin k with it. Thus the platen G is swung over the end portion of the false platen g, as illustrated by the dotted lines in Fig. 3. When the upstroke of the arms g^2 is finished, the platen G lies upon the top of the frame in a suitable position for the operator to remove the printed paper and attach a fresh sheet of blank paper. After this the stroke of the connecting-rods D′ D′ is reversed, and their slopes d^2 leave the pins h^2 and release the ends i' of the pawls I, which, by means of ordinary tension-spring, i^2, are swung back to their normal vertical positions, and the lower pins e become engaged with the steps d' of the connecting-rods with the aid of the tension-springs d^3. About this time the high surface l of the cam L has arrived at the roller k^4, which is thus pushed back, thereby swinging the platen back upon the upper portion of the false platen g. The pins g^7 now come in contact with the arms g^4 and force them away, thereby causing the arms g^2 to move the platen G down to its normal position upon the false platen g. During this operation the connecting-rods D D gradually leave the pins h^3, and as their slopes d^2 descend thereon the upper pins e and the steps d' become again engaged, and thus the press is ready for another imprint.

The means employed for holding the paper upon the platen G are the ordinary well-known means, and I have not deemed it necessary to describe them. The same may be said about the inking apparatus supplying the inking-rollers f, for which almost any of the known constructions will answer.

In the diagram Fig. 5 the successive positions of the printing-bed E at equal periods or stages of operation are shown, as when the connecting-rods and the printing-bed are permanently connected in the ordinary way. In this figure the printing-bed E is shown in three positions tangential to the curve of the platen G. The positions available for printing are all lying between the two extreme tangential positions, and while the printing-bed is moving between these two positions, under my present construction, it is firmly connected with the connecting-rods D D D′ D′, while the other five positions, which are not available for printing, are avoided, and thus I am enabled to

make my frame and the quill-shaft much shorter than heretofore.

The main advantages of my press over others is a great reduction of pressure between the bed and platen when compared with presses which print a whole surface at once—as, for instance, a Franklin press. For a surface of ten by fifteen inches generally a pressure of about four hundred pounds is required per square inch, and if the actual printing-surface in my machine is not more than one-half inch by eighteen inches the pressure required for a fair imprint is only eight pounds to the square inch. Thus, while $10 \times 15 \times 400$ pounds= 60,000 pounds of pressure, and which are necessary to produce an imprint upon a surface of 10×15 inches, or one hundred and fifty square inches at once, with the old or Franklin press, with my invention a surface is printed at the rate of $\frac{1}{2} \times 18$, or nine square inches successively, with eight pounds pressure only to the square inch. In other words, an instant impression of one hundred and fifty square inches area requires sixty thousand pounds pressure, while the same area can be traveled over at the rate of seventy-two pounds of pressure to nine square inches printing-area successively in a short space of time.

What I claim as my invention is—

1. In a printing-press, a straight-surfaced, rocking, and reciprocating bed, in combination with a curved platen and suitable operating parts, substantially as and for the purpose described.

2. The combination of the crank-wheels C C′, connecting-rods D D D′ D′, having slots *d*, with steps *d′*, the straight printing-bed E, having pins *e*, and the arms H, having pins h^2 h^3, and locking-pawl I, substantially as and for the purpose described.

3. The combination of the rocking and reciprocating printing-bed E, the inking-belts F, having inking-rollers *f*, the shafts e' e^2, having pulleys e^5, the shaft B, quill-shaft e^4, and miter-wheels e^3, substantially as and for the purpose described.

4. In a printing-press, the combination of a straight oscillating bed having pins *e e*, a curved platen adapted to receive equal pressure from the form in that position of its movement which is required for taking a full impression, the connecting-rods D D′, each having slot *d* and step *d′*, and the wheels C and C′, with their connecting crank-pins c^2 c^3, substantially as described.

5. The combination of a rocking and reciprocating straight printing-bed, the curved platen G, arms g^2, having curved arms g^4 and tappets g^5, and the wheels C, having crank-pins g^7, substantially as and for the purpose described.

6. The combination of a rocking and reciprocating straight printing-bed, a curved oscillating platen having an eccentric-pin, *k*, the spring-bolt K, having a slotted head, k^2, and the operating-cam L, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. CLEMENT.

Witnesses:
BERNARD B. WHITTEMORE,
ELMER H. WHITE.