[Second Edition.]

A.D. 1866, 19*th* SEPTEMBER. N° 2403.

Printing Machines.

LETTERS PATENT to Henry Smith Cropper, of Sneinton, in the County of Nottingham, for the Invention of "IMPROVEMENTS IN PRINTING MACHINES."—A communication from abroad by George Gordon, of New York, in the United States of America.

Sealed the 16th November 1866, and dated the 19th September 1866.

PROVISIONAL SPECIFICATION left by the said Henry Smith Cropper at the Office of the Commissioners of Patents, with his Petition, on the 19th September 1866.

I, HENRY SMITH CROPPER, of Sneinton, in the County of Nottingham, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN PRINTING MACHINES," communicated to me from abroad by George Gordon, of New York, in the United States of America, to be as follows:—

The Invention has for its object improvements in printing machines, and relates to a novel combination and arrangement of machinery whereby the operation of printing is greatly facilitated, and the necessity for skilled labour is to a great extent obviated. For this purpose the machine is put in motion by means of a treadle, or it may be by means of a strap or band from a steam engine or other suitable power acting upon a pulley on an axis to which continuous rotary motion is imparted, and from which by suitable gearing the various movements of the machine are obtained, the attendant having only to supply the sheets of paper to the machine and take them off when printed.

The platen is attached with capability of adjustment to a frame which is capable of turning upon an axis, to which the requisite motion is given at the times desired by means of a cam acting upon a truck or pulley carried by an arm fixed to the axis of the frame carrying the platen, the platen being locked in position whilst an impression is being given by means of fixed stops limiting the amount of motion given to the platen in the one direction, whilst other stops mounted on an axis prevent its moving in the opposite direction, the latter stops being acted upon by means of a cam so as to keep them out of action when not required, whilst a spring operates to throw them into action when allowed to do so by the cam.

The bed of the press or that part to which the form of type is fixed and the inking apparatus are carried by a frame which is capable of vibrating upon an axis at the lower part of the machine to and from the position for giving the impression, such frame being acted upon by connecting rods, one end of each of which is connected to the said frame, whilst their other ends are connected to crank pins, one of which is fixed to a disc, the other being fixed to the cam giving motion to the platen.

The inking apparatus consists of an ink-distributing disc formed in two parts, the central portion being caused to revolve step by step in one direction, whilst the outer or annular portion thereof revolves in the other direction; the inking rollers are carried by arms capable of turning upon an axis carried by the frame to which the type bed is fixed.

The following is a description of the mode in which motion is given to the ink-distributing apparatus and inking rollers:—The arms carrying the inking rollers are connected together by a cross bar, and to a pin on one of these arms a connecting rod is attached, the other end of which is pin-jointed to the framing of the machine; thus in the to-and-fro motion of the frame carrying the type bed a partial rotary motion is given to the arms carrying the inking rollers, which rollers being mounted in bearings carried by rods acted upon by springs are caused to run over the surface of the type and of the distributing disc, and after an impression has been given in the return motion of the arms carrying the inking rollers such arms give motion to the two parts of the distributing disc by means of a pin striking against one end of a bell-crank lever, to the other end of which a clawker or driver is pin-jointed; this clawker or driver takes into a ratchet wheel formed on the under side of the annular portion of the ink-distributing disc, and gives a step-by-step rotary motion thereto, and by bevilled gearing connected therewith gives a step-by-step rotary motion in the contrary direction to the central portion of such ink-distributing disc.

The machine is provided with two tables, upon one of which the blank paper is placed, whilst the other is to receive the printed paper. A frisket is attached by pin-joint to the platen, and is provided with an arm having a pulley thereon, which in the motion of the machine is caused to run in a cam course, and thereby hold or release the paper on the platen as required.

By the foregoing arrangement the platen is in a horizontal position, or nearly so, whilst the paper is being supplied thereto, the type bed being at the same time in a vertical position, or nearly so, thereby enabling the attendant to see the type whilst feeding the paper to the platen.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Henry Smith Cropper in the Great Seal Patent Office on the 18th March 1867.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY SMITH CROPPER, of Sneinton, in the County of Nottingham, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Nineteenth day of September, in the year of our Lord One thousand eight hundred and sixty-six, in the thirtieth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Henry Smith Cropper, Her special licence that I, the said Henry Smith Cropper, my executors, administrators, and assigns, or such others as I, the said Henry Smith Cropper, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN PRINTING MACHINES," a communication to me from abroad by George Gordon, of New York, in the United States of America, upon the condition (amongst others) that I, the said Henry Smith Cropper, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Henry Smith Cropper, do hereby declare the nature of the said Invention, and in what manner the same is

to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

The Invention has for its object improvements in printing machines, and relates to a novel combination and arrangement of machinery whereby the operation of printing is greatly facilitated, and the necessity for skilled labour is to a great extent obviated. For this purpose the machine is put in motion by means of a treadle, or it may be by means of a strap or band from a steam engine or other suitable power acting upon a pulley on an axis to which continuous rotary motion is imparted, and from which by suitable gearing the various movements of the machine are obtained, the attendant having only to supply the sheets of paper to the machine, and take them off when printed.

The platen is attached with capability of adjustment to a frame, which is capable of turning upon an axis, to which the requisite motion is given at the times desired by means of a cam acting upon a truck or pulley carried by an arm fixed to the axis of the frame carrying the platen, the platen being locked in position whilst an impression is being given by means of fixed stops limiting the amount of motion given to the platen in the one direction, whilst [illegible] stops mounted on an axis prevent its moving in the opposite direction, [illegible]tter stops being acted upon by means of a cam so as to keep them out of action when not required, whilst a spring operates to throw them into action when allowed to do so by the cam.

The bed of the press or that part to which the form of type is fixed and the inking apparatus are carried by a frame which is capable of vibrating upon an axis at the lower part of the machine to and from the position for giving the impression, such frame being acted upon by connecting rods, one end of each of which is connected to the said frame, whilst their other ends are connected to crank pins, one of which is fixed to a disc, the other being fixed to the cam giving motion to the platen.

The inking apparatus consists of an ink-distributing disc formed in two parts, the central portion being caused to revolve step by step in one direction, whilst the outer or annular portion thereof revolves in the other direction; the inking rollers are carried by arms capable of turning upon an axis carried by the frame to which the type bed is fixed.

The following is a description of the mode in which motion is given to the ink-distributing apparatus and inking rollers:—The arms carrying the inking rollers are connected together by a cross bar, and to a pin on one of these arms a connecting rod is attached, the other end of which is pin-jointed to the framing of the machine; thus in the to-and-fro motion of the frame carrying the type bed a partial rotary motion is given to the arms carrying the inking rollers,

which rollers being mounted in bearings carried by rods acted upon by springs are caused to run over the surface of the type and of the distributing disc, and after an impression has been given in the return motion of the arms carrying the inking rollers such arms give motion to the two parts of the distributing disc by means of a pin striking against one end of a bell-crank lever, to the other end of which a clawker or driver is pin-jointed; this clawker or driver takes into a ratchet wheel formed on the under side of the annular portion of the ink-distributing disc, and gives a step-by-step rotary motion thereto, and by bevilled gearing connected therewith gives a step-by-step rotary motion in the contrary direction to the central portion of such ink-distributing disc.

The machine is provided with two tables, upon one of which the blank paper is placed, whilst the other is to receive the printed paper. A frisket is attached by pin-joint to the platen, and is provided with an arm having a pulley thereon, which in the motion of the machine is caused to run in a cam course, and thereby hold or release the paper on the platen as required.

And in order that the Invention may be more fully understood and readily carried into effect, I will proceed, aided by the accompanying Drawings, more fully to describe the same.

Description of the Drawings.

Figure 1 is a side view, Figure 2 is a back view, Figure 3 is a sectional side view shewing the parts in the position they would assume when the paper is being fed to the platen; Figure 4 is a sectional side view shewing the parts in the position they would assume at the moment of the impression being given; and Figure 5 is a plan of a printing machine constructed according to the Invention.

a, *a*, is the main framing; *b* is the main or crank axis, which may be put in motion as shewn in the Drawing by a treadle lever *c* connected therewith by means of a link or connecting rod c^1; or a drum or pulley may be mounted upon the crank axis *b*, and motion may be communicated thereto by a strap or band from a steam engine or other suitable power. On the main or crank axis *b* is fixed a toothed pinion b^1, which takes into and gives motion to the toothed wheel d^1 on the shaft or axis *d*. On the interior face of the toothed wheel d^1 is formed or affixed a cam *e*, which by acting upon the truck or pulley f^2 carried by the crank arm f^1 formed on or fixed to the shaft or axis *f* gives the required motions to the platen f^*, which is also carried by the shaft or axis *f*; *g* is the type bed which is carried by the frame g^1, supported with capability of vibrating upon the shaft or axis *h*, and the desired motions are communicated

thereto by two connecting rods i connected at one end to pins g^2 on the frame g^1, their other ends being connected to crank pins i^1, one of which is carried by the toothed wheel d^1 whilst the other is carried by the disc d^2, fixed on the shaft or axis d. The frame g^1 also carries the inking apparatus, which consists of an ink-distributing disc formed in two parts j^1, j^2, the centre portion j^1 being caused to revolve step by step in one direction whilst the outer or annular portion j^2 is caused to revolve step by step in the other direction, as will be hereafter described. The inking rollers k, k^1, k^2, are carried, as shewn at the ends of rods k^3, which work in suitable guides provided for them in the arms or frames l, and in the to-and-fro motion of the type bed g the inking rollers are caused to pass over the face of the type or other printing surface (which is secured in the type bed g in any suitable manner) and over the ink-distributing disc j^1, j^2, by means of the link or connecting rod m, one end of which is by pin-joint fixed to the main framing a, whilst the other is fixed by pin-joint to one end of the arms or frames l, thereby causing the frames l in the to-and-fro motion of the type bed g to turn on their axis so as to cause the inking rollers k, k^1, k^2, to run over the type or other printing surface and over the ink-distributing disc j^1, j^2, and in doing so just after the rollers have acted to ink the printing surface and as they are coming to their lowest position as shewn in Figures 1 and 3, a pin l^1 carried by one of the frames or arms l strikes against and lifts the weighted end of the bell-crank lever m^* on the pin or axis m^1, and by means of the clawker or driver m^2, pin-jointed to the upper end of the bell-crank lever m^* taking into teeth j^3 formed on the under side of the annular portion j^2 of the ink-distributing disc, gives motion to such annular portion j^2 of the disc in one direction which by the bevilled wheels j^4, j^5, j^6, gives motion in the other direction to the central portion j^1 of the ink-distributing disc. In order to govern the amount of motion given to the platen f^* and at the same time to lock it in position as shewn in Figure 4, whilst the impression is being given fixed stops a^1 are employed which prevent the projections f^3 on the frame f^4 moving too far in the one direction whilst stops a^2 mounted on the frame a^3 which is capable of rocking on the shaft or axis a^4 by falling into notches f^5 lock the platen in the desired position whilst an impression is being given, a cam n acting upon the truck or roller a^5, carried by the frame a^3, acts to keep the stops a^2 out of action and bring them into action at the times desired, a spring a^6 or other suitable means acts to keep the truck or pulley a^5 up to its cam. The platen as shewn is connected by screws and lock nuts to the frame f^4, in order to facilitate the adjustment thereof; the platen is also provided with a frisket o, pin-jointed thereto at o^1, an arm o^2 being connected to the frisket and having at its lower end a truck or pulley o^3

which is acted upon by the fixed cam surface *p*, so that after the impression has been given the frisket may first act to relieve the printed paper from the type or printing surface, and then stand in the position shewn at Figures 1 and 3 to enable a sheet of paper to be fed on to the platen. *q* is a table upon which the blank paper is placed, and *r* is a table to receive the paper after the impression has been given. By the foregoing arrangement the platen is in a horizontal position, or nearly so, whilst the paper is being supplied thereto the type bed being at the same time in a vertical position, or nearly so, thereby enabling the attendant to see the type whilst feeding the paper to the platen.

Having thus described the nature of the said Invention, and the mode in which the same is carried into effect, I would have it understood that I do not confine myself to the precise details herein shewn and described; but what I claim is, the peculiar combination and arrangement of printing machine substantially as herein shewn and described.

In witness whereof, I, the said Henry Smith Cropper, have hereunto set my hand and seal, this Fifteenth day of March, in the year of our Lord One thousand eight hundred and sixty-seven.

HENRY S. CROPPER. (L.S.)

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1872.

A.D. 1866, Sept. 19. Nº 2403.
CROPPER'S Specification.
(2nd Edition)

(2 SHEETS)
SHEET 1

FIG. 1.

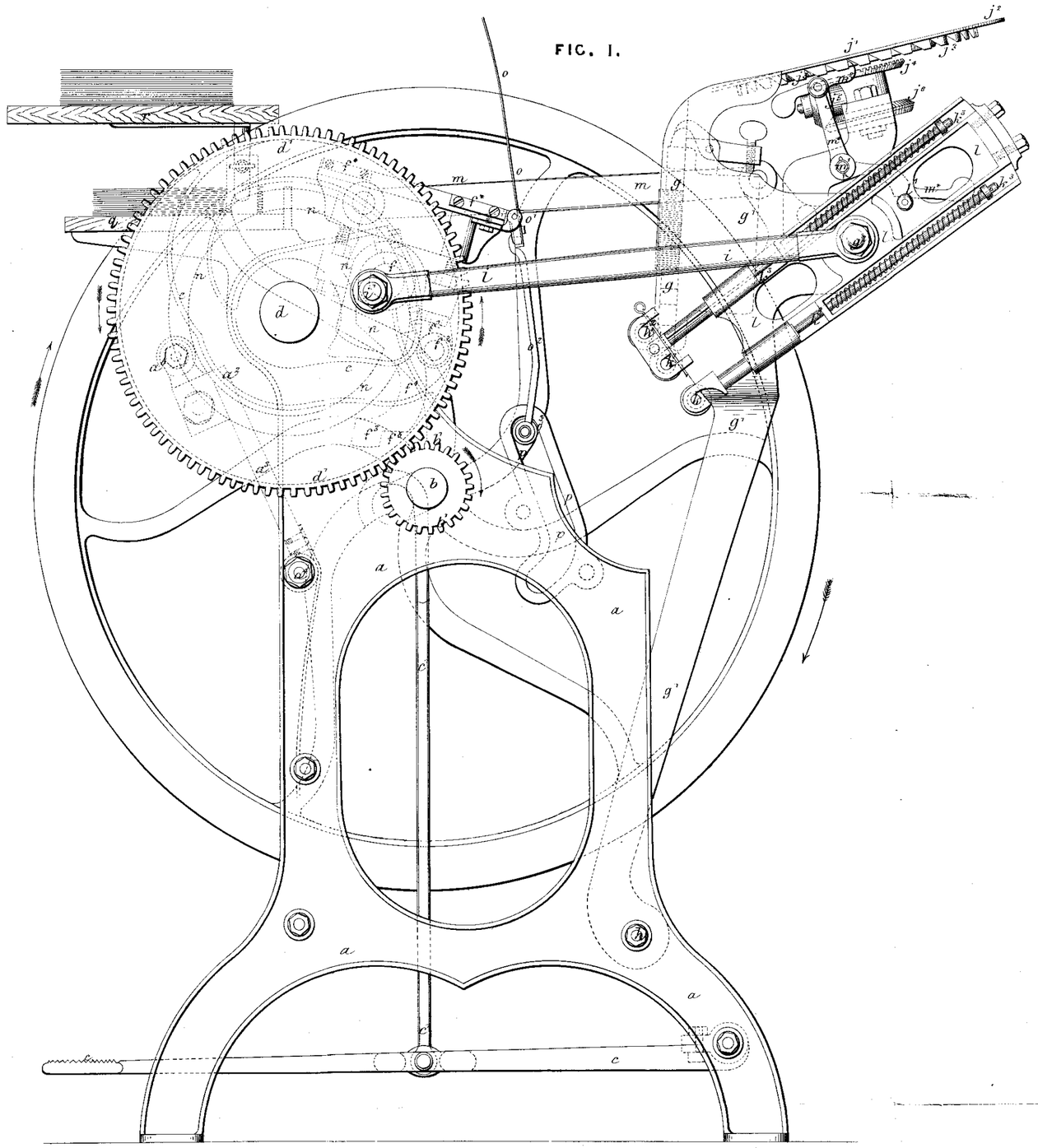
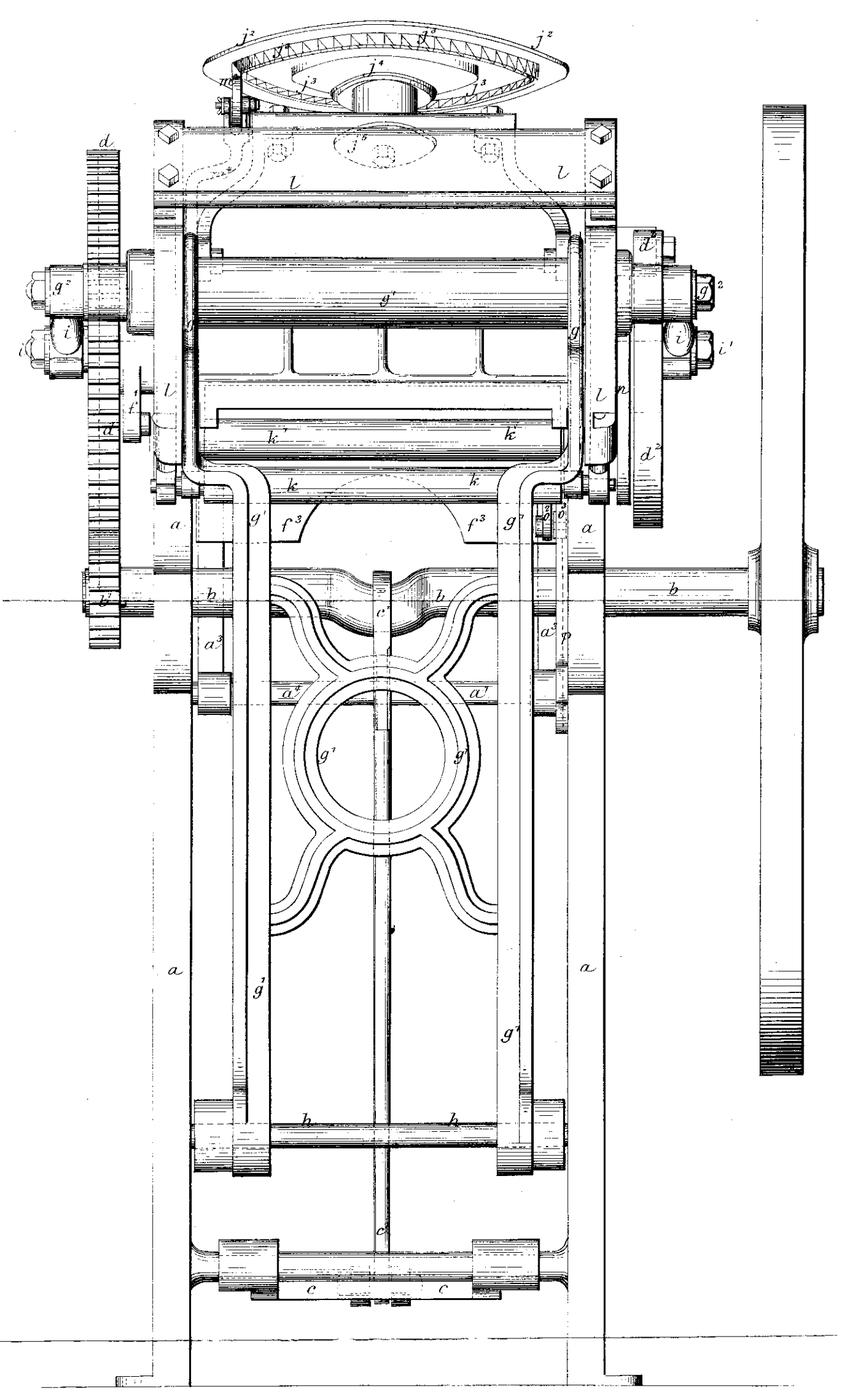


FIG. 2.



The filed drawing is partly colored.

Drawn on Stone by Malby & Sons.

London Printed by George Edward Eyre and William Spottiswoode
Printers to the Queen's most Excellent Majesty 1872

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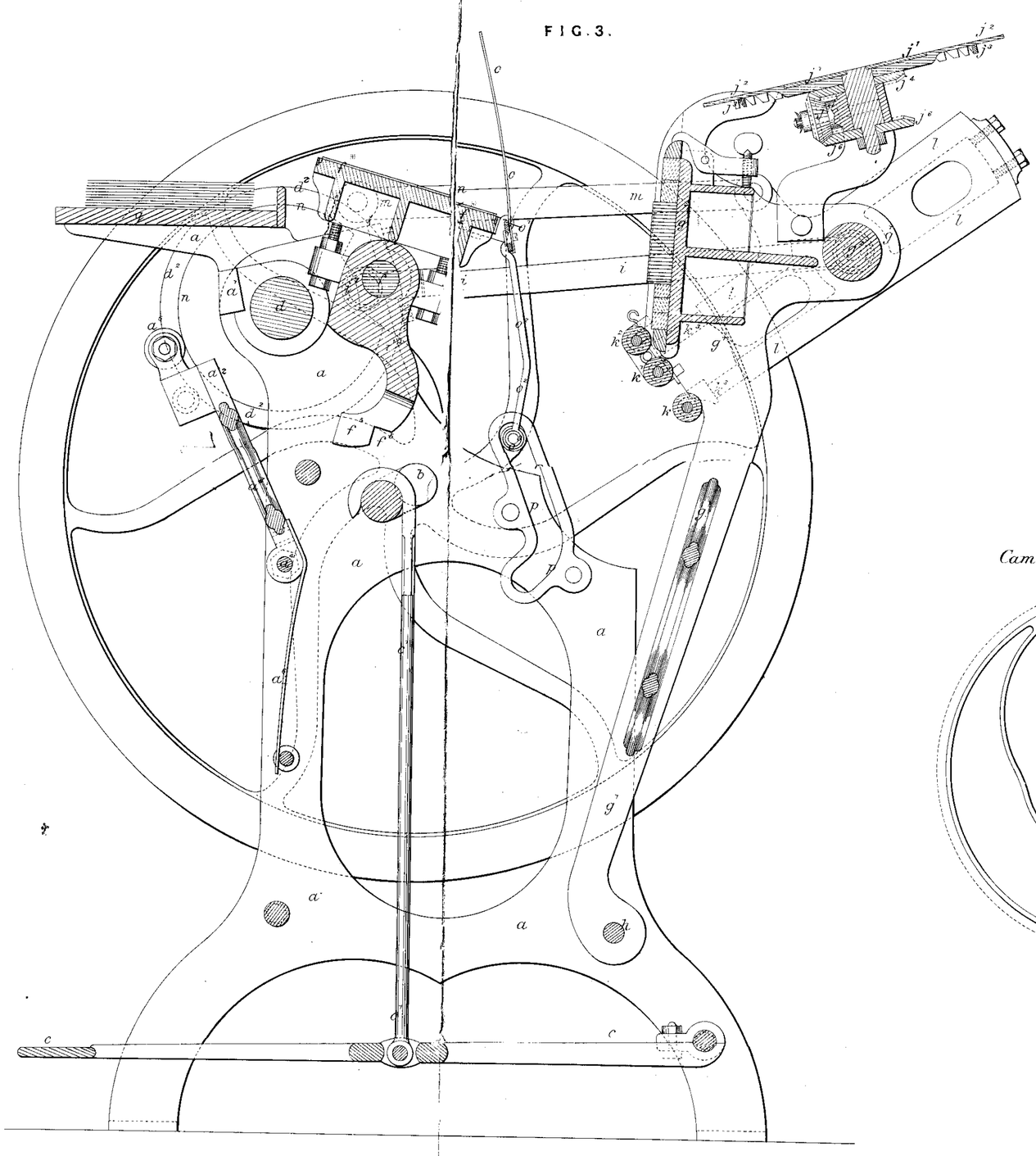
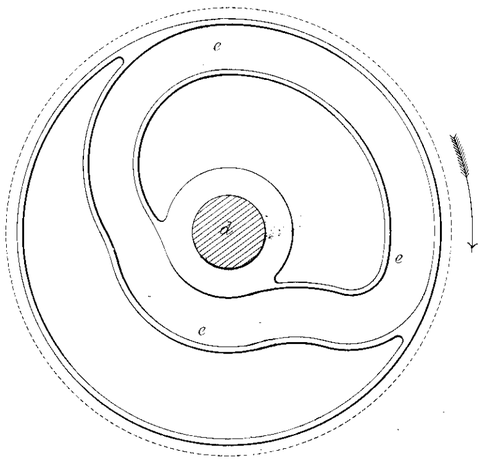
(2 SHEETS)
SHEET 2

FIG. 3.



Cam e shewn separately.



Cam n shewn separately

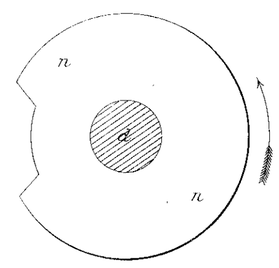


FIG. 4.

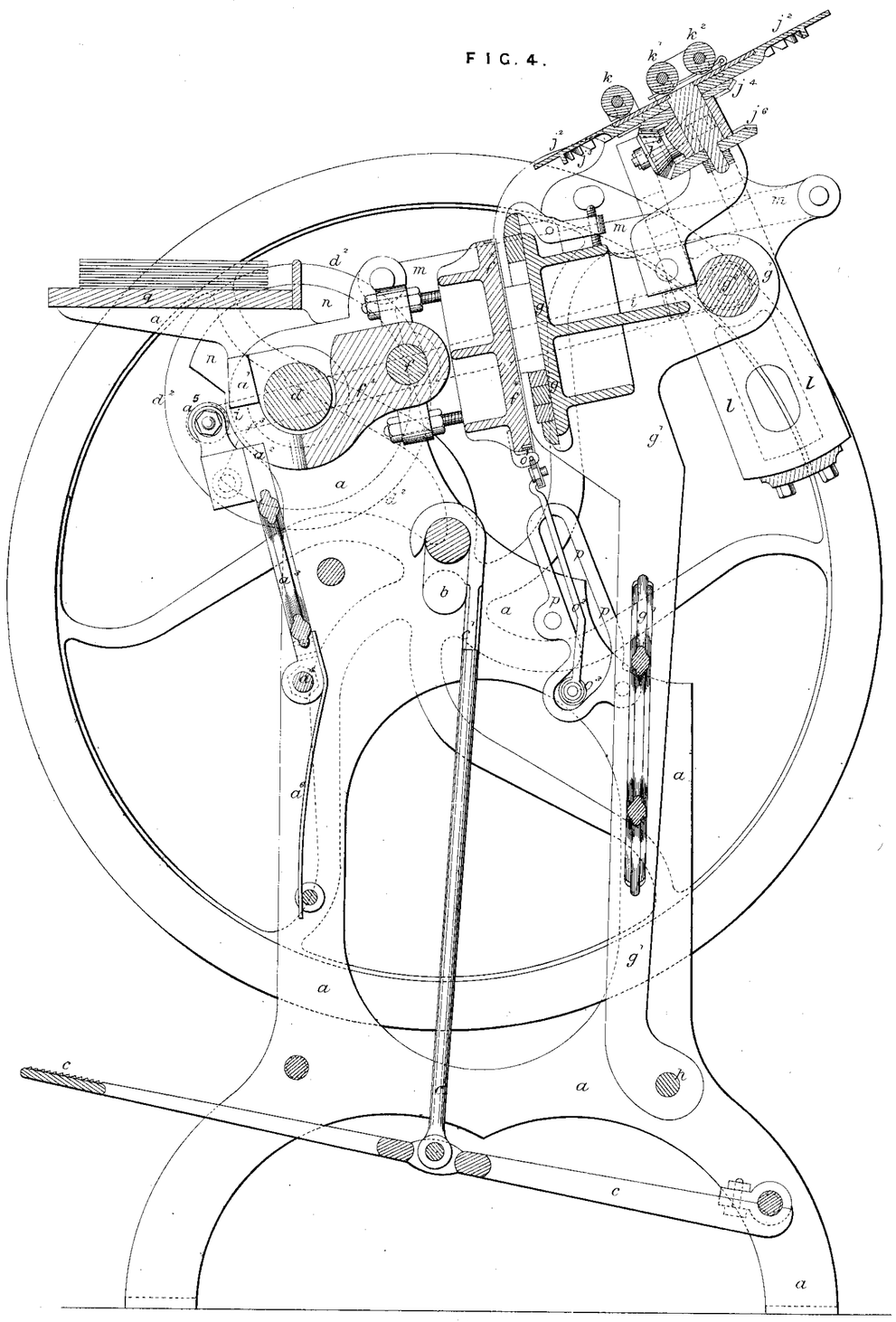
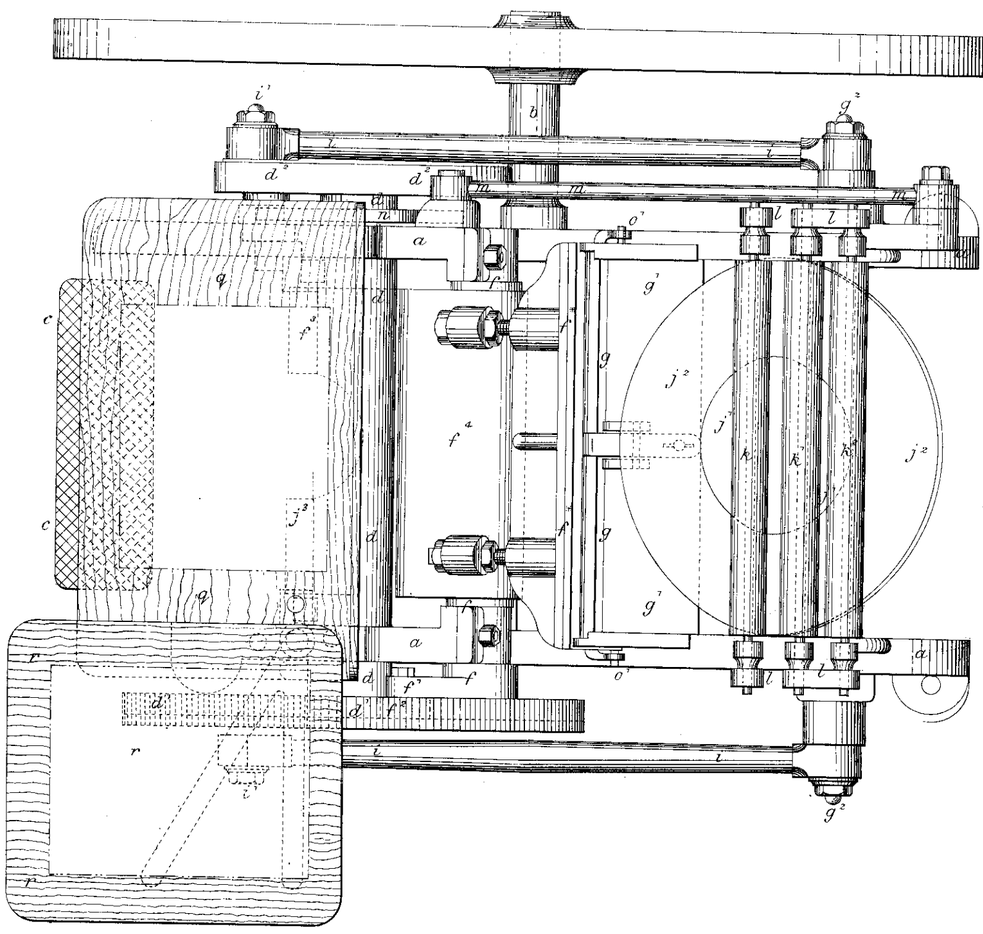


FIG. 5.



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