

C. B. COTTRELL.

PRINTING-PRESS.

No. 177,808.

Patented May 23, 1876.

Fig. 1

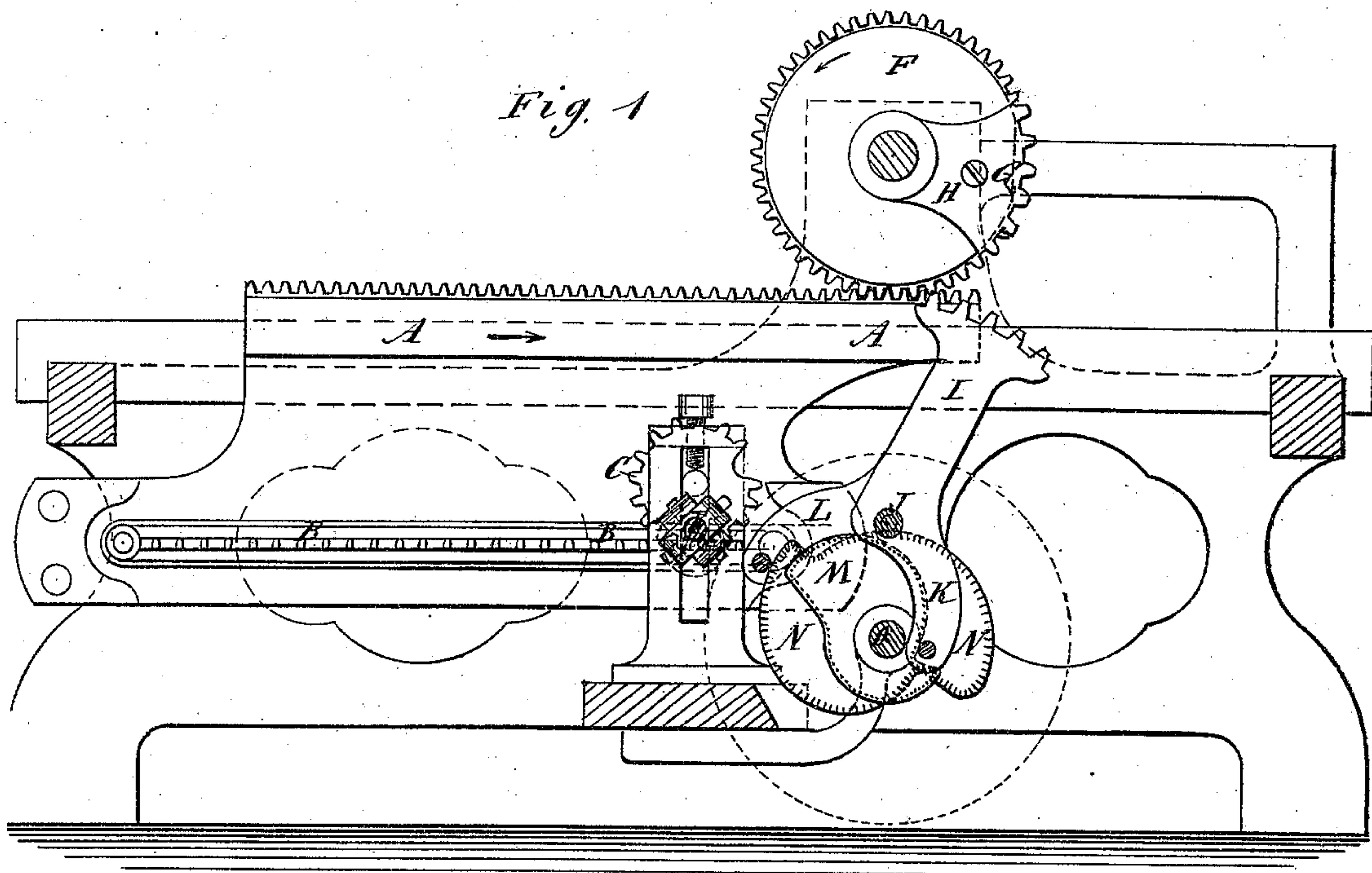


Fig. 2

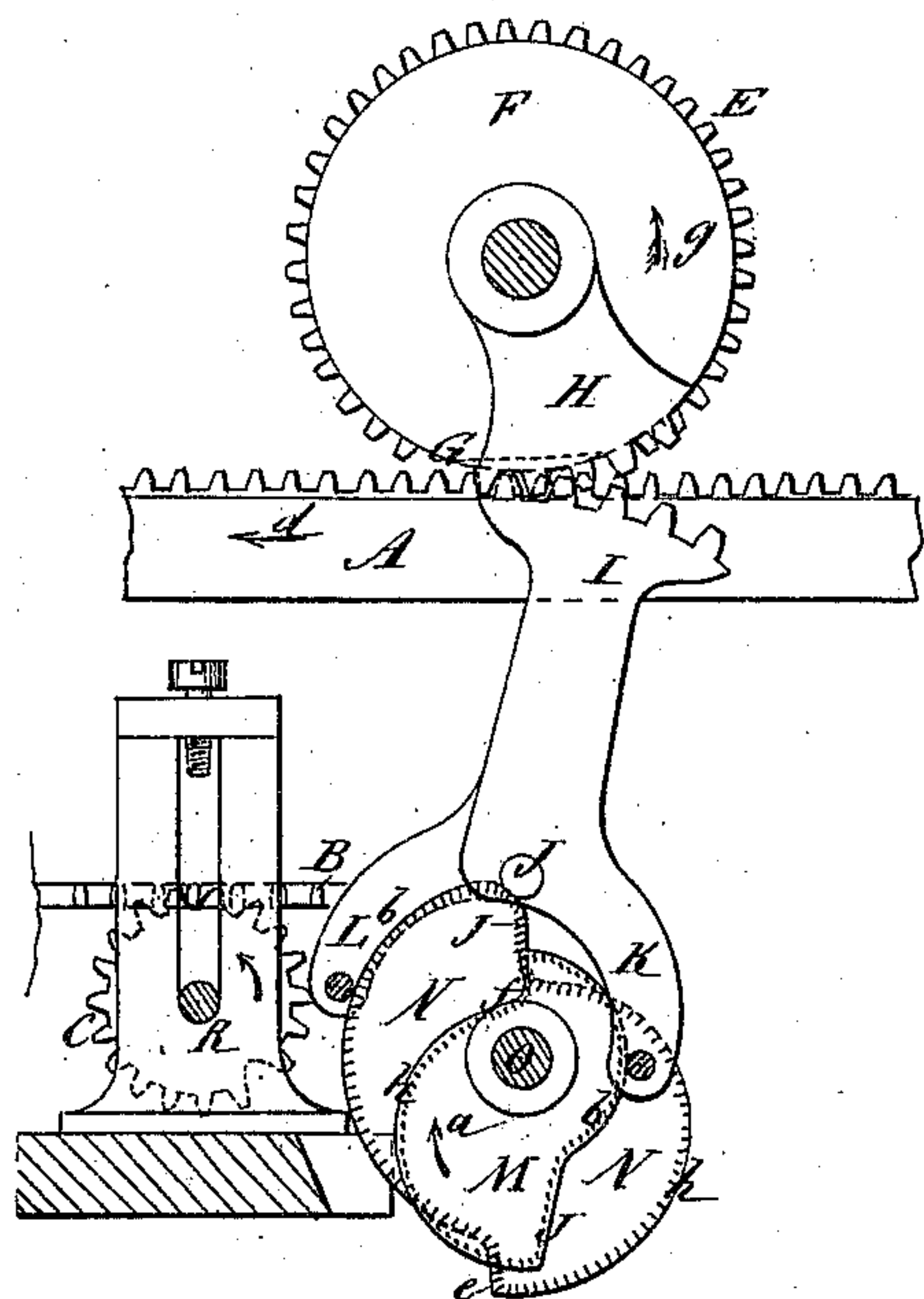
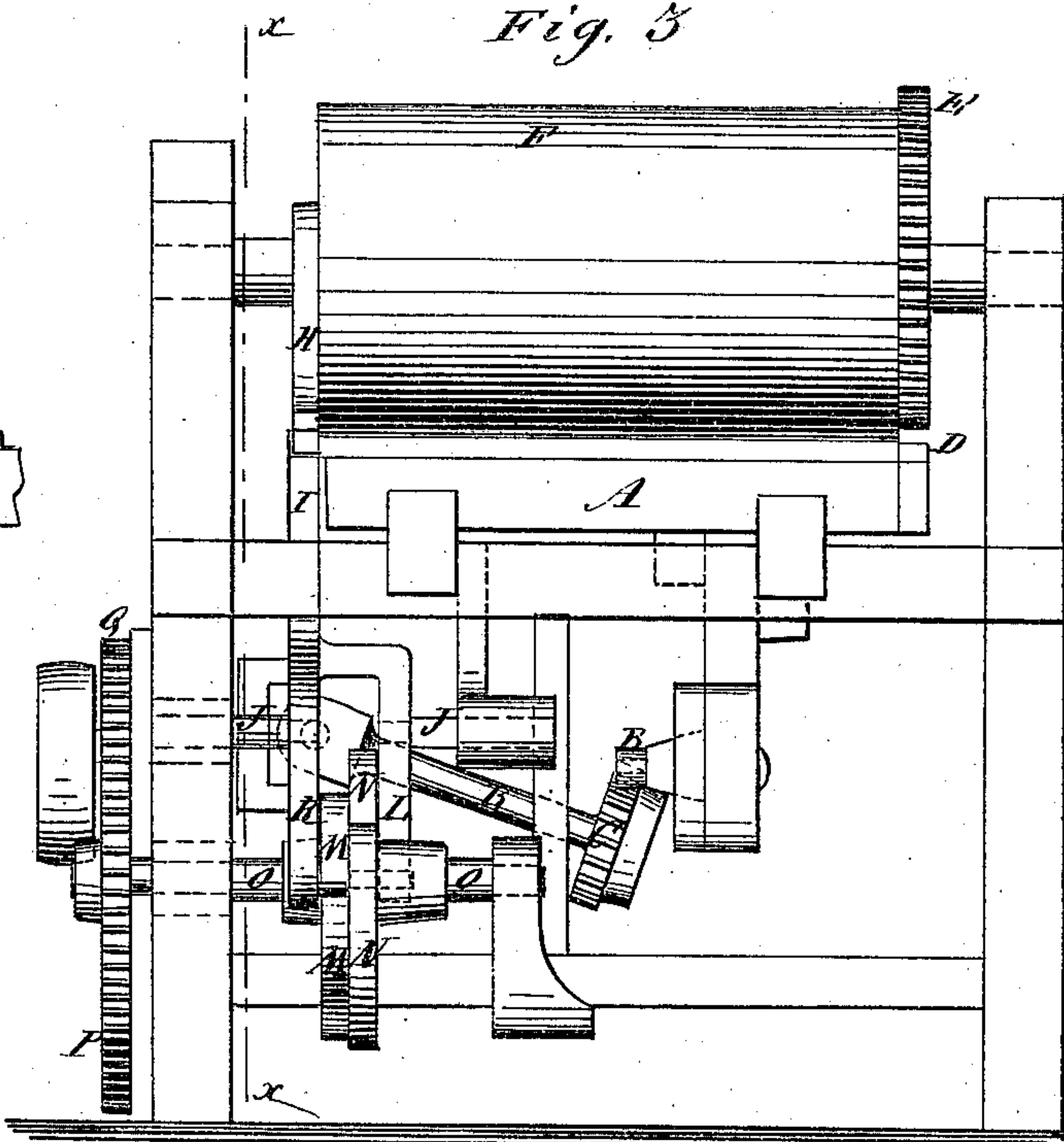


Fig. 3



WITNESSES:

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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF WESTERLY, RHODE ISLAND.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **177,808**, dated May 23, 1876; application filed July 3, 1875.

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Printing-Presses, of which the following is a specification:

My invention relates to that kind of printing-presses known as "stop-cylinder presses," and has for its object a novel construction, which will permit a greater celerity of operation.

Previous to my invention it has been customary, in the construction of stop-cylinder presses, to employ some mechanical movement which would impart to the bed a reciprocatory motion of irregular speed, the velocity of the bed gradually decreasing toward the end of its movement, or path of travel, in each direction, and to have the organization of the machine such that the impression-cylinder, which is driven from the reciprocatory bed, would become disengaged from the bed at about the moment when each of these parts had come mutually to a rest—that is to say, the organization has been such that the rack of the bed would run out of mesh or engagement with the gear of the impression-cylinder at the moment the bed was about to stop its movement forward, and would re-engage with said gear at about the moment said bed would start again on another forward movement. And it has been common to employ in such machines some means or contrivance by which the impression-cylinder, after having come to a stop, would be very slightly turned in the same direction in which it had been rotating before it stopped, and then held fast, to render impossible any accidental engagement or clashing of the bed-rack and cylinder-gear during the retrograde movement of the bed, and by which the impression-cylinder would be again set free, and slightly moved in the same direction, to permit a perfect re-engagement of the rack on the bed with the gear on the cylinder at the commencement of the next forward movement of the bed.

In stop-cylinder presses involving the customary construction and mode of operation, to which I have just referred, this serious objection to the principle of the machine has existed—viz., that the bringing of the engaged bed

and cylinder gradually and simultaneously to a state of rest, in order to stop the cylinder to permit the registering of another sheet during the back travel of the bed, has necessitated a comparatively slow performance of work by the press.

It has been well understood that by the organization of the machine so as to have the bed travel about as fast at or near the end of its forward stroke as during the middle of its stroke or travel, a great advantage would be gained, and it has been attempted to acquire this great advantage by the construction of machines with means for driving the bed with a nearly or quite uniform motion throughout the whole stroke of the bed; but it has been found in practice that a stop-cylinder press embodying such a desirable movement of the bed, but otherwise constructed on the well-known principle, would involve this serious objection, viz., that the impression-cylinder, becoming disengaged from the bed at a time when the former would necessarily be turning at a considerable velocity, would require to be checked in its rotation, and that the necessary sudden checking of the cylinder, and the dissipation of its momentum, would occasion a jar and strain so damaging and undesirable as to render presses embodying a uniform and more rapid movement of the bed throughout its stroke less desirable than the old-fashion stop-cylinder machines.

I propose by my invention to overcome the difficulties heretofore involved in the employment in a stop-cylinder press of a bed having a nearly or quite uniform motion throughout its movement, and adapted to travel at a rapid speed at the time of the disengagement of the bed and the impression-cylinder; and to this end and object my invention consists in the employment, in combination with the impression-cylinder, of a means for gradually taking up its momentum, and checking it during its disengagement from the bed.

I also propose by my invention to overcome the further difficulty heretofore encountered in attempts to make a stop-cylinder press with a bed having a rapid movement at the time of its engagement with the impression-cylinder; and to this end and object my invention further consists in the combination, with the im-

pression-cylinder, of means for gradually overcoming the inertia of the still cylinder, and setting it in motion with an accelerated movement before the engagement with it of the bed, so that the re-engagement of the bed and cylinder at such forward stroke of the bed will occasion no jar or strain on the parts.

To enable those skilled to more fully understand my invention, I will briefly describe the construction and operation, by reference to the accompanying drawings, of a machine in which are embodied the several features thereof in a form of carrying out my invention, which I have found so far to work well.

Figure 1 is a horizontal sectional elevation of a press containing my improvements, taken on the line *x x* of Fig. 3, showing the driving mechanism for the bed, and the mechanism for stopping and starting the cylinder, in side elevation, and illustrating the parts of the machine in that condition or relation in which they would be immediately after the complete engagement of the bed with the impression-cylinder, and the fulfillment by the starting device of its office in this direction. Fig. 2 is a detail sectional view on the same line, *x x*, showing the parts in the position in which they would be during the retrograde movement of the bed, and while the cylinder is held by the stop mechanism. Fig. 3 is an end elevation of the machine.

In the several figures the same part will be found designated by the same letter of reference.

A is the bed, which is driven back and forth with a uniform velocity or speed by means of the double rack B and pinion C, in a manner well known. D represents the usual rack on the bed, and E the spur-gear of the impression-cylinder, with which said rack engages during the taking of an impression. The teeth of the spur-gear E are cut away for a portion of their circumferences, as illustrated at the dotted line or space G. H is a toothed segment, which is arranged on the cylinder F, and I is a segmental toothed lever, that engages with the segment H, for the purposes of gradually stopping, holding still, and gradually starting the cylinder F, as will be presently explained. This lever is pivoted at J, and is provided with two arms, K and L, upon which act, respectively, two cams, M and N, said cams being on the same shaft O, which shaft is geared by spur-wheel P and pinion Q to the driving-shaft R. The direction of motion of the cams is indicated by the arrow *a*. (See Fig. 2.) When those portions *b* of the cams which are concentric with their centers of motion are in contact with the arms K L, the impression-cylinder is held still in the position shown at Fig. 2, and while the cylinder is thus held the bed travels backward in the direction indicated by arrow *d*, and the sheet to be printed is registered, as usual, on the cylinder. Just before the bed has come to the end of its movement, in the direction just mentioned, the projection *e* of cam N acts upon

arm L, and the depression *f* of cam M comes adjacent to the arm K, and thus the cylinder, through the medium of the segmental lever I and the toothed segment H, is started in the direction indicated by arrow *g*.

The cams effect the rotation of the cylinder in such a manner that by the time the bed starts forward and the teeth of its rack come into perfect mesh with the teeth of the impression-cylinder gear, the pitch-line of said gear will be moving at the same speed as that of the said rack, and thus the bed and cylinder will come into a harmonious engagement, however rapid may be the movements of the parts.

As soon as the bed and cylinder are in perfect engagement, and the latter is driven by the former, the toothed segment H runs out of mesh with the segmental lever I, and the latter is then swung back to the left by the action of the eccentric portions *h* of the cams on the arms of said lever.

Just before the bed reaches the end of its movement to the right, the parts *j* of the cams, acting on the arms of the segmental lever I, cause the teeth of the latter to re-engage with those of the segment H, and these two parts for an instant work in unison with each other and with the traveling bed; but the opposite sides of the teeth in mesh become the working side immediately, and the moment the rack of the bed runs out of gear with the wheel of the cylinder the toothed lever I begins to brake up or retard the motion of the cylinder, the momentum of the latter is gradually taken up, and the cylinder is brought to a standstill with the toothless portion G of its gear adjacent to the rack of the bed, and the latter travels back, as before described.

It will be understood that by the means described I am enabled to take hold of the impression-cylinder before it becomes disengaged from the bed which drives it, and slow it down to a dead stop from the speed at which it was traveling when the bed let go of it; and that no matter how fast both the bed and cylinder may have been traveling at the moment of their disengagement, the latter can be brought to a dead stop without any jar or sudden strain on the parts of the machine. In other words, that, by the employment, in connection with the cylinder, of some means for gradually stopping it, I am enabled to utilize successfully the principle of a bed driven with as great speed at the end of its forward stroke as can possibly be employed during the middle of its stroke. It will, of course, be understood that the usual blank (or toothless) space on the face of the cylinder-gear should be somewhat longer than is usual in the old-fashion stop-cylinder presses—proportionately, to some extent, to the size of the cylinder and the designed speed of the bed.

I do not wish to be understood as considering the toothed segment and the segmental toothed lever, nor the peculiar devices shown for operating the said lever, as indispensable

parts of my invention, for any suitable friction device or appliance, and other means of operating the device which is employed to control the movements of the impression-cylinder in the manner described, may be employed without departing from the spirit of my invention, the gist of which rests in the ideas, first, in the use, in connection with the cylinder, of some suitable means for gradually checking it or slowing it down to a dead stop; and, second, of the use, in combination with said cylinder, of some suitable means for starting the cylinder with an accelerated motion, as described.

It is not material what sort of mechanical movement be employed, in connection with the bed, for the purpose of imparting to it the desirable reciprocatory movement described, or any movement which renders necessary the presence of some means for checking the cylinder and starting it up at a proper speed to run in with the bed.

Having so fully explained my invention, and the best mode of carrying it out now known to me, that any skilled person can make

and use it, what I claim as new, and desire to secure by Letters Patent, is—

1. In a stop-cylinder press, in which the impression-cylinder travels at quite, or nearly, its maximum speed at the time of its disengagement from the driving-bed, the combination, with said cylinder, of means, substantially as described, for gradually taking up its momentum, and bringing it to a stop, as set forth.

2. In a stop-cylinder press, in which the cylinder-driving bed moves at quite, or nearly, its maximum speed at the time of its engagement with the cylinder, the combination, with said cylinder and bed, of means, substantially as described, for gradually overcoming the inertia of the cylinder, and so moving it with an accelerated velocity that it and the bed shall come into engagement with a common rate of speed.

C. B. COTTRELL.

Witnesses:

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ALEX. F. ROBERTS.