

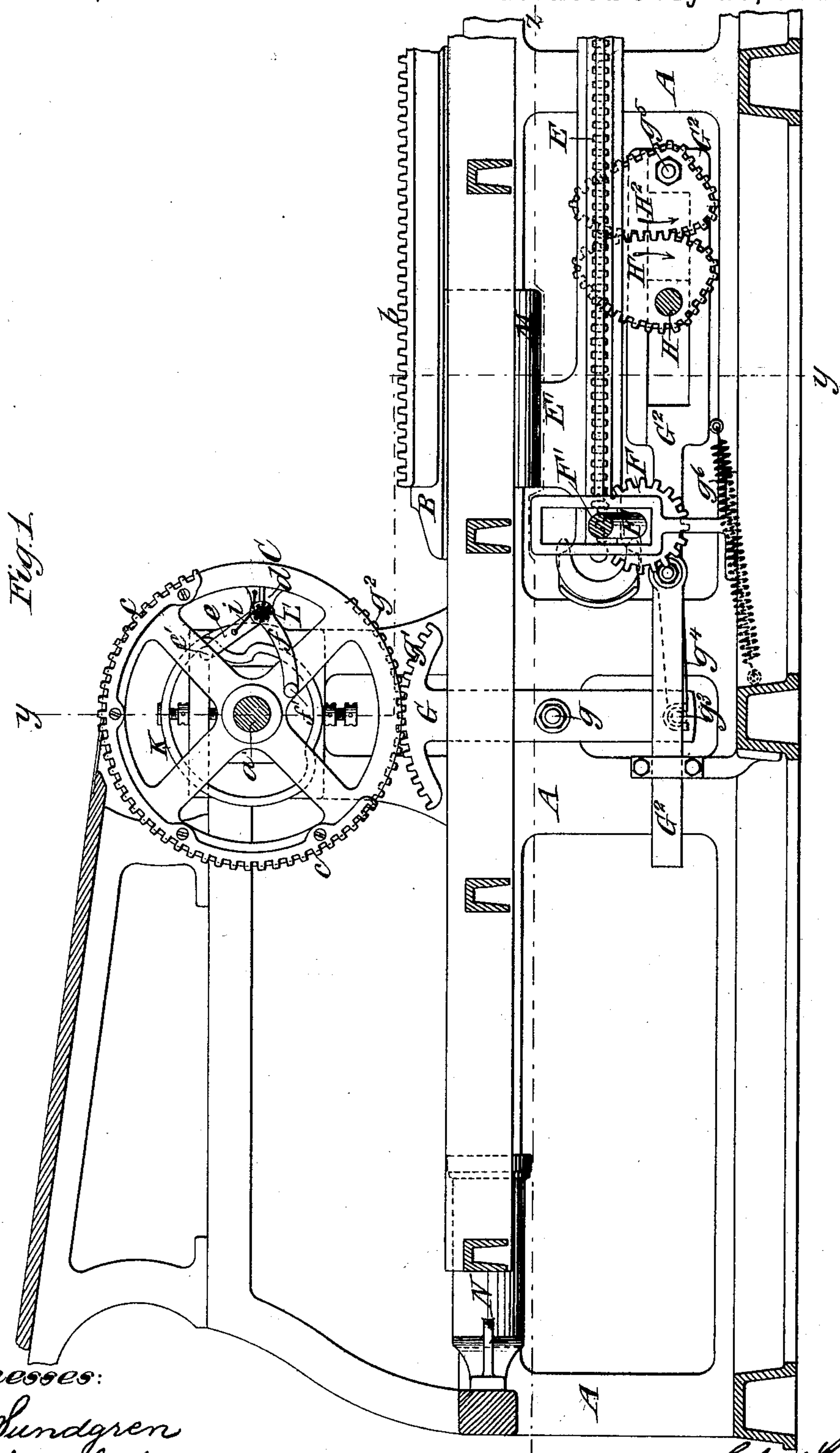
(No Model.)

5 Sheets—Sheet 1.

C. B. COTTRELL.
STOP CYLINDER PRINTING MACHINE.

No. 407,172.

Patented July 16, 1889.



Witnesses:

C. Sundgren

Arthur H. Gambles

Inventor: C. B. Cottrell
By Attorneys
Thomas & Smith

(No Model.)

5 Sheets—Sheet 2.

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Fig. 6.

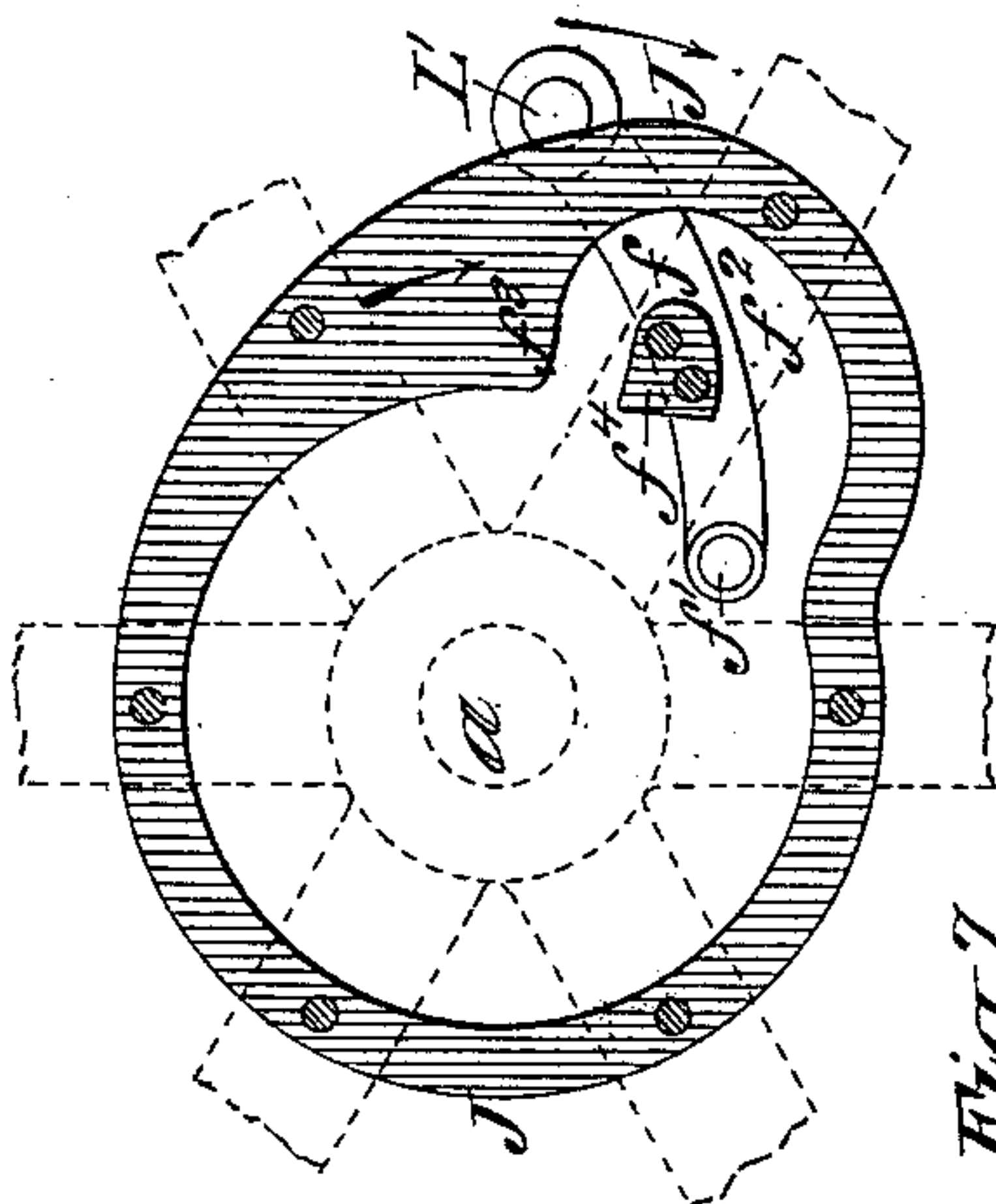


Fig. 7.

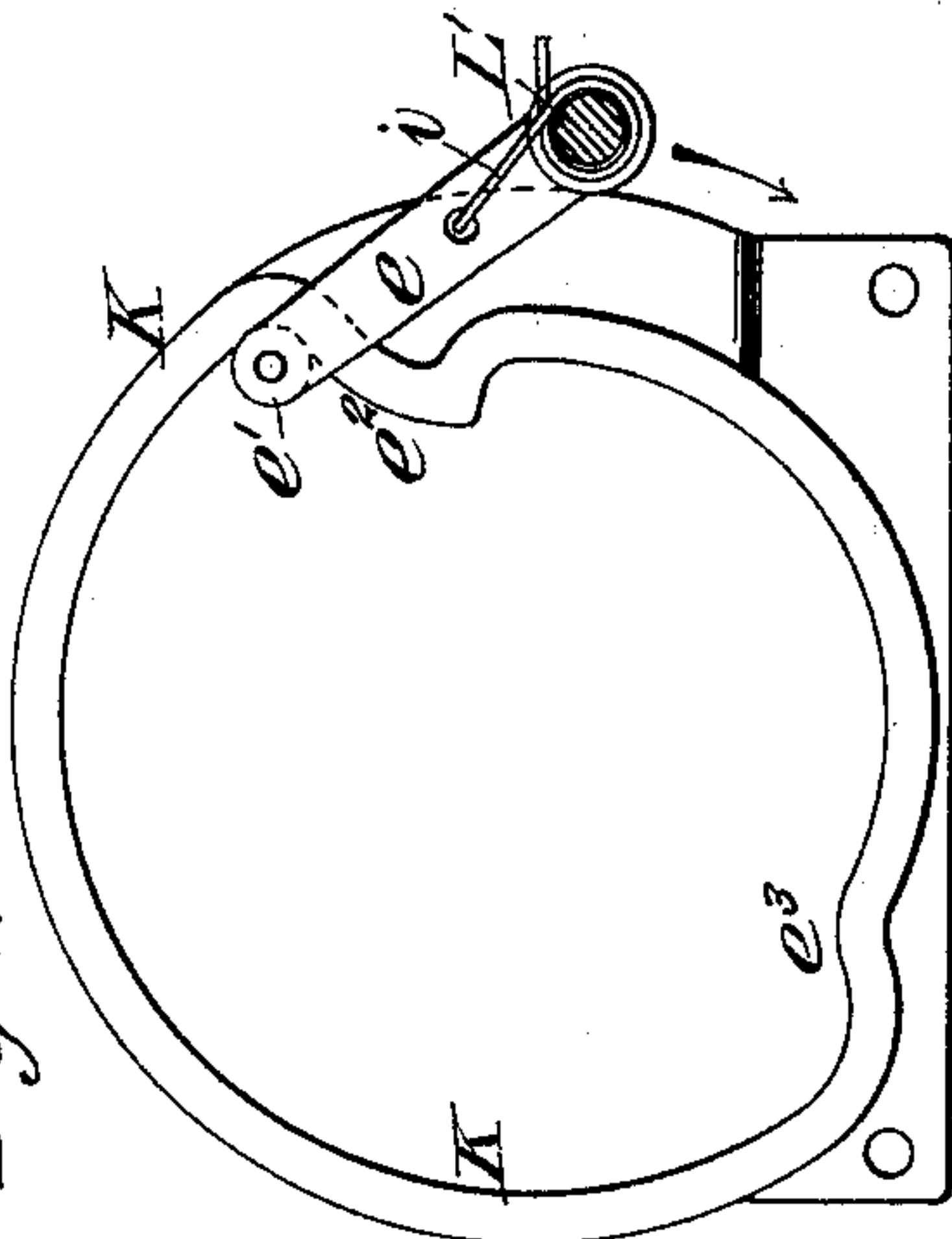
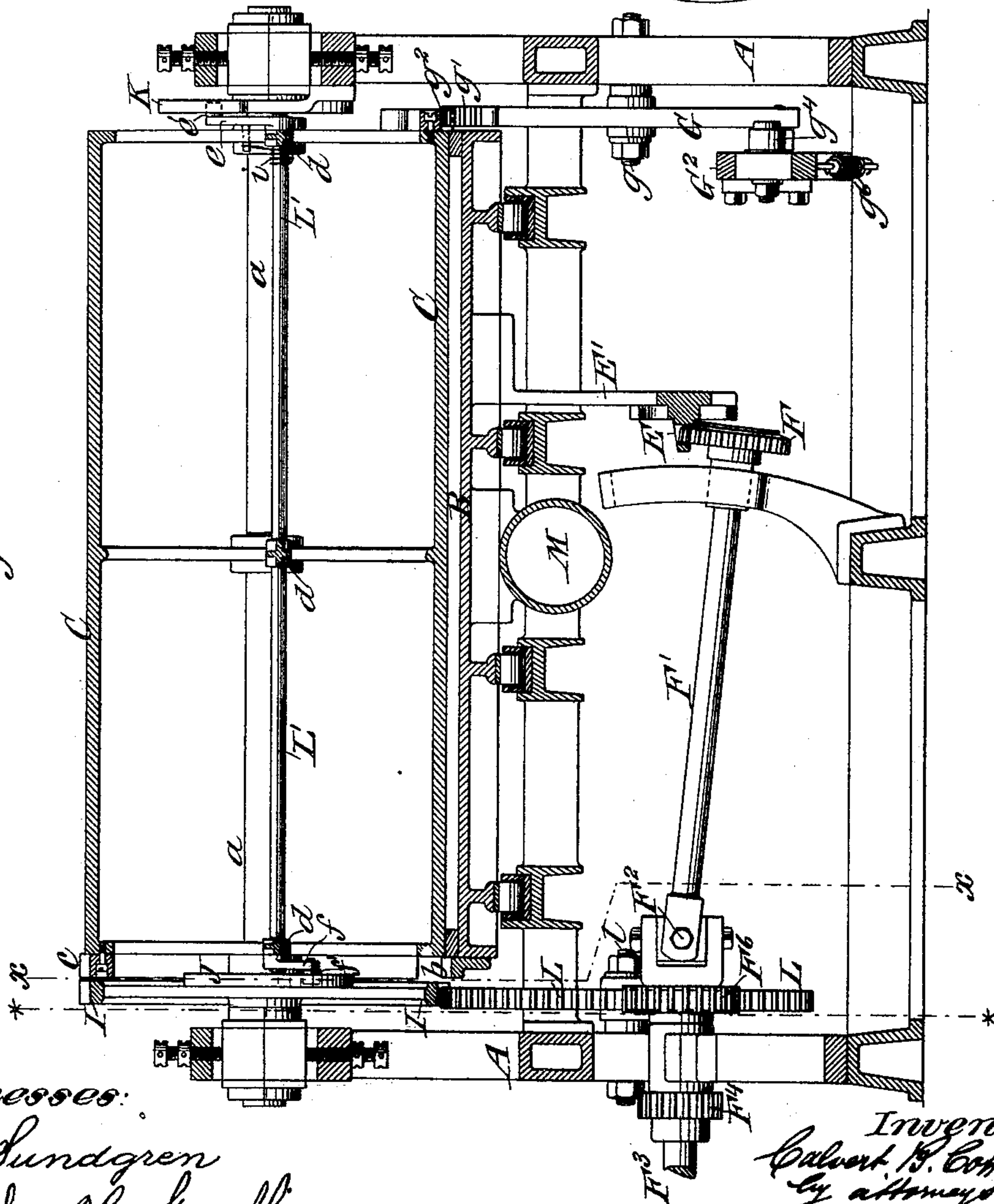


Fig. 2.



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(No Model.)

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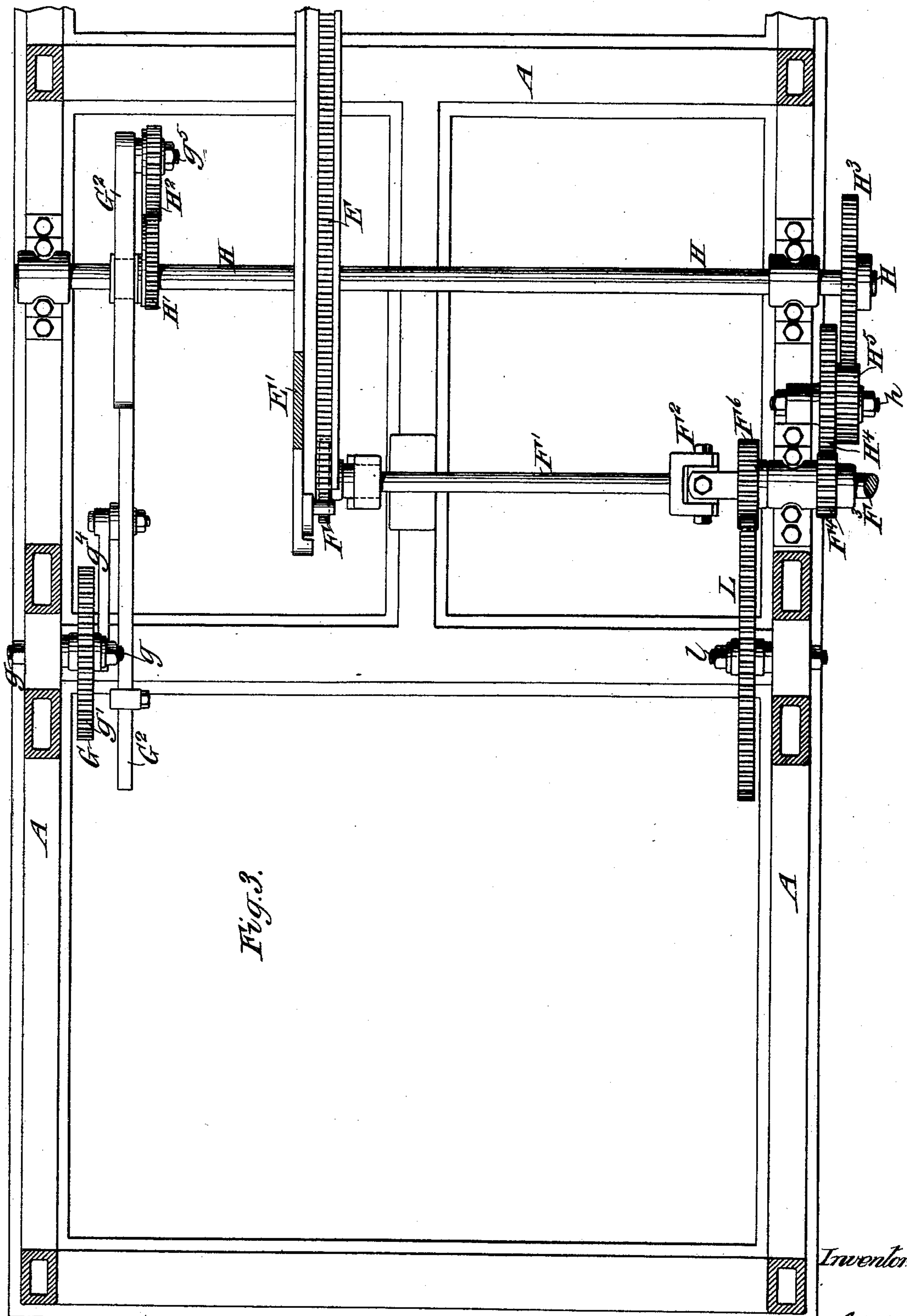


Fig. 3.

Inventor

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C. B. Cottrell
by *James V. Smith*

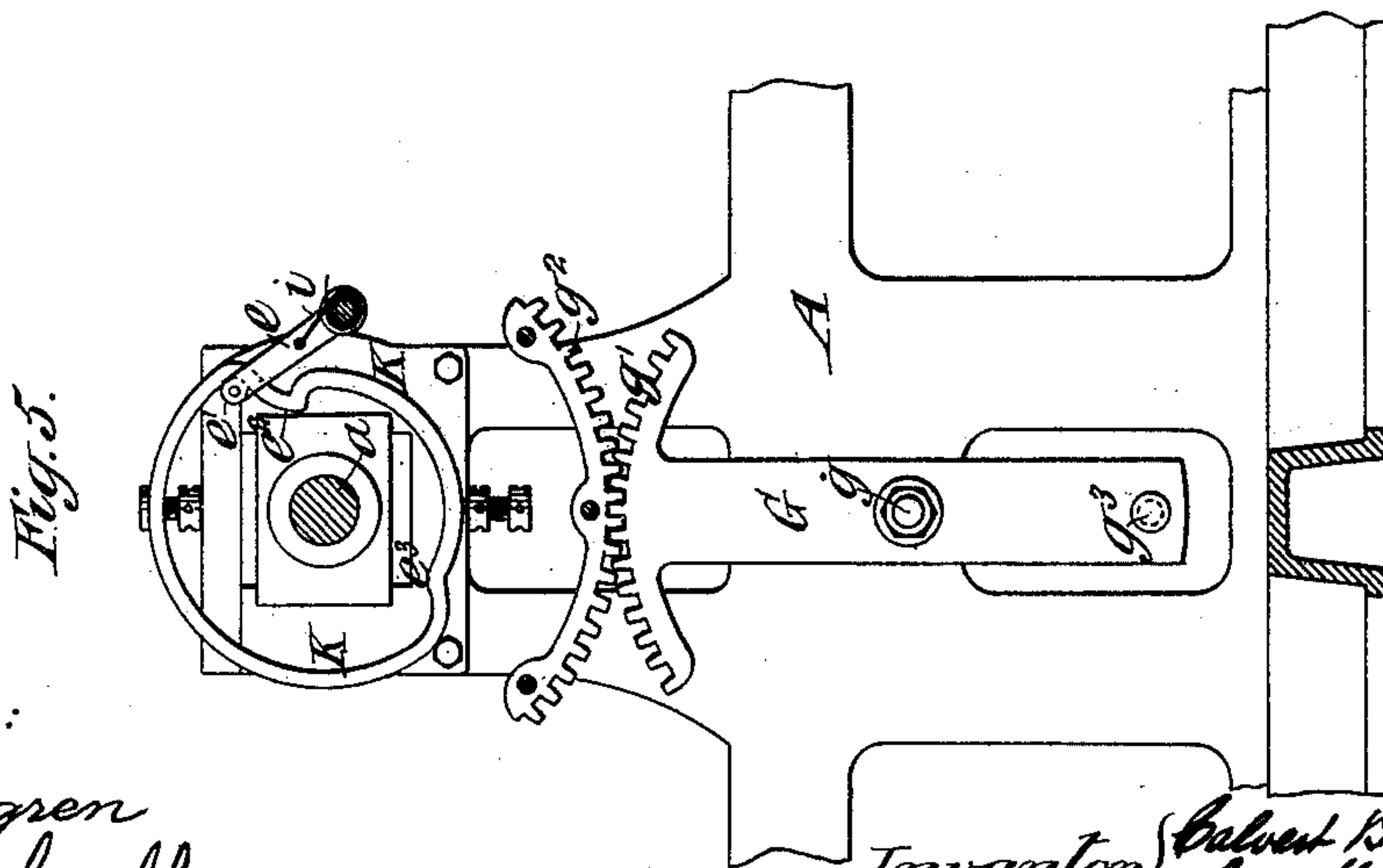
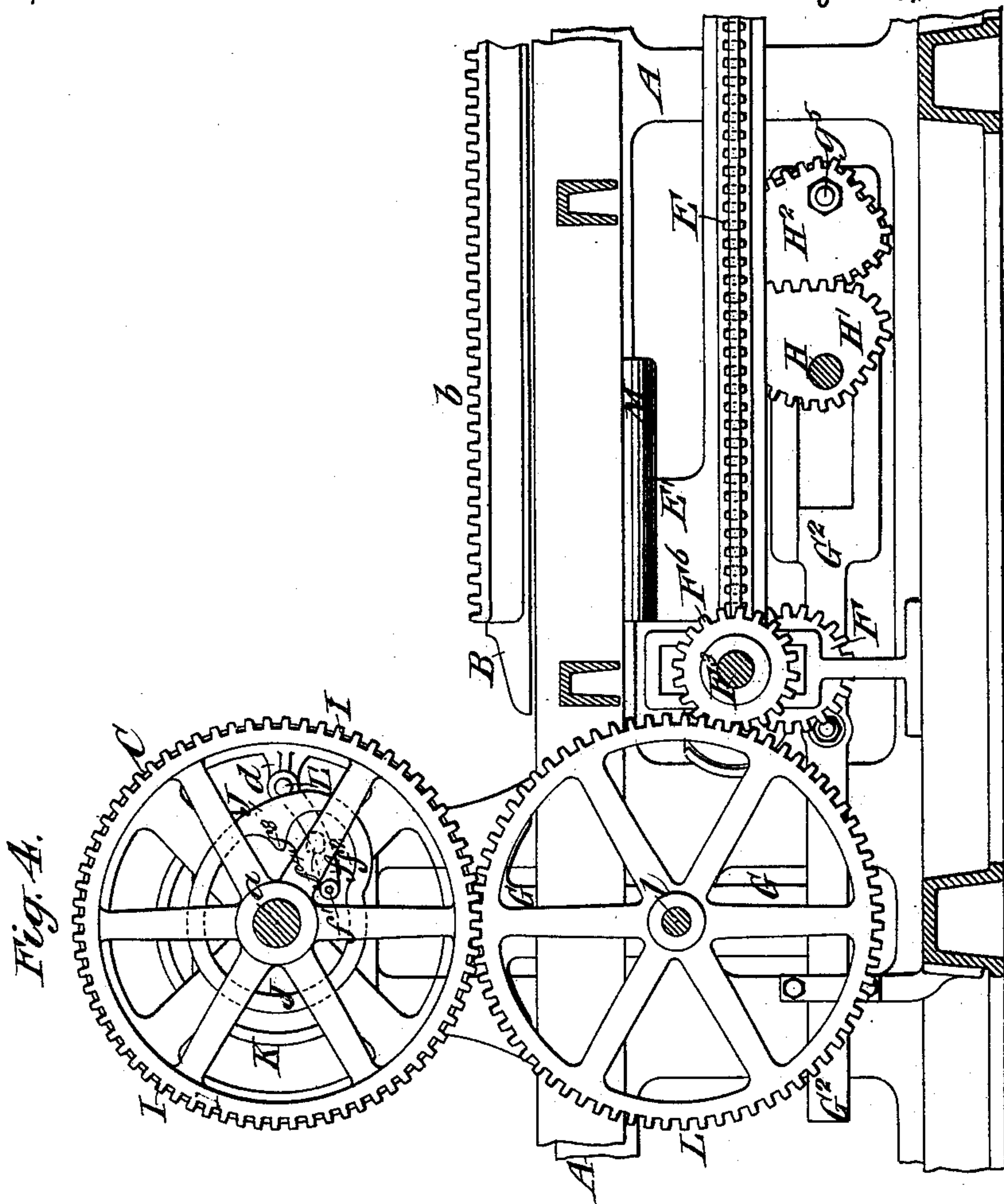
(No Model.)

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C. B. COTTRELL.
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No. 407,172.

Patented July 16, 1889.



Witnesses:

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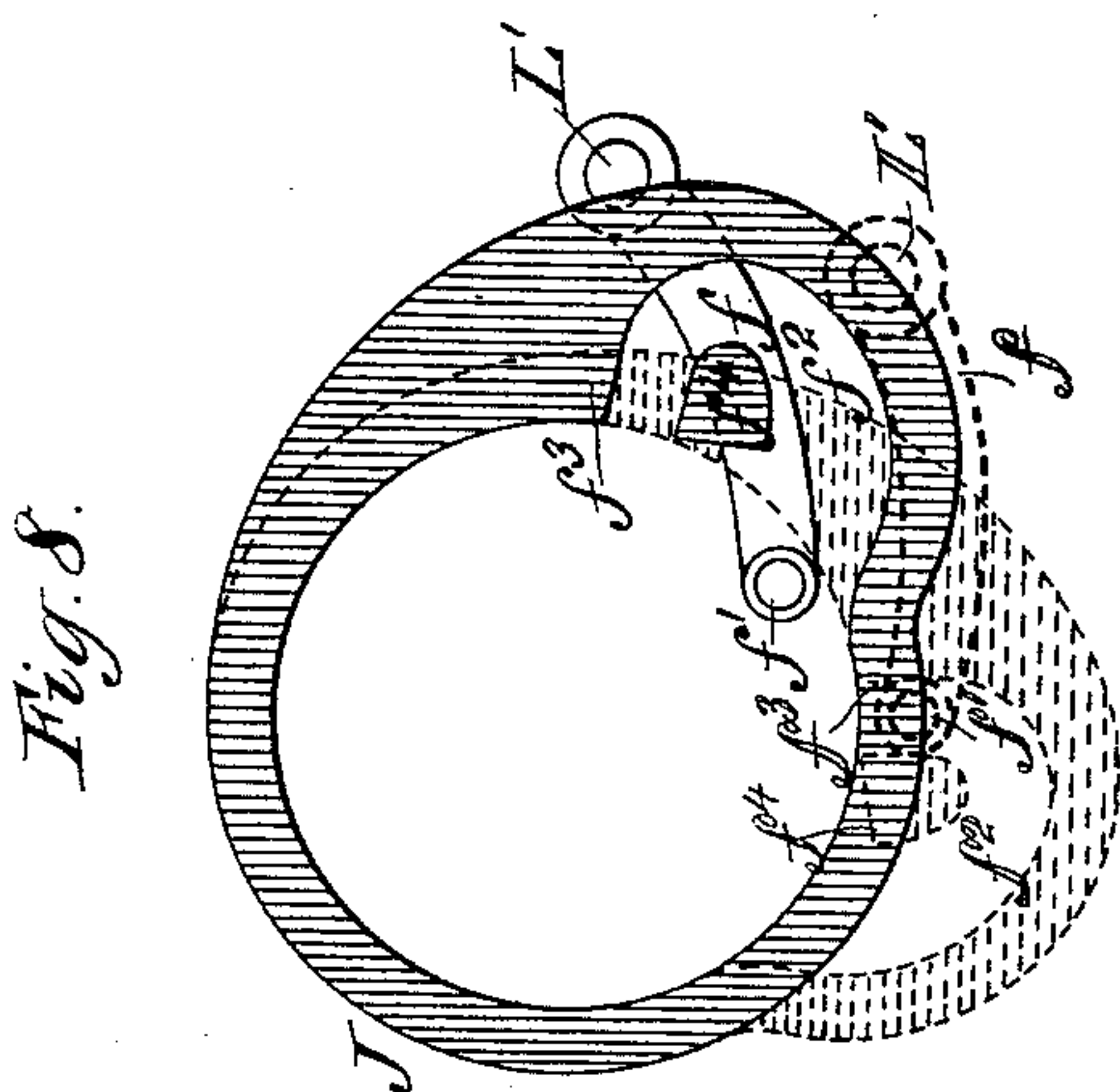
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Patented July 16, 1889.



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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF STONINGTON, CONNECTICUT.

STOP-CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 407,172, dated July 16, 1889.

Application filed August 25, 1888. Serial No. 283,773. (No model.)

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Stop-Cylinder Printing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to the class of printing-machines or printing-presses known as "stop-cylinder," which comprise a reciprocating bed for carrying the printing-form and an impression-cylinder which is in gear with the bed and derives rotary motion therefrom while the latter is moving in one direction for printing, but which is out of gear from the bed during the movement of the bed in the opposite direction, and is stopped during the whole or the greater part of the last-mentioned movement. In such printing-presses the rotation of the cylinder is commonly started by means of a cam-actuated lever carrying a toothed sector, which gears with teeth on the cylinder and which passes out of gear as the latter comes into gear with the bed.

The object of my invention is to bring the cylinder into gear with the bed without shock while both are moving at full speed; and my invention consists in the novel combinations hereinafter described and claimed by which this object is accomplished.

Figure 1 represents a longitudinal vertical section of a printing-press embodying my invention, taken in the line $x x$ of Fig. 2 and viewed looking from the left. Fig. 2 represents a transverse vertical section taken about on the line $y y$ of Fig. 1. Fig. 3 represents a horizontal section taken on about the line $z z$ of Fig. 1. Fig. 4 represents a vertical section of parts of the press, taken parallel with the side framing in the line $x x$ of Fig. 2. Fig. 5 is a side view, partly sectional, of the starting-lever and the teeth of the cylinder with which said lever gears and a part of the mechanism which constitutes my improvement. Fig. 6 and 7 are side views, on a larger scale than the other figures, of parts of the mechanism which constitutes my improvement. Fig. 8 is a diagram illustrating two positions of the mechanism shown in Fig. 6.

Similar letters of reference designate corresponding parts in all the figures.

A designates the framing of the press, B the bed, and C the cylinder, which may all be and are represented as substantially like the corresponding parts of other stop-cylinder presses, the cylinder being furnished around a little more than half its periphery with teeth c to gear with a toothed rack b on the bed for driving the cylinder during printing.

In the example of my invention which I have illustrated I have represented the bed as driven by means of a rack-and-pinion movement—such as is known as the "Napier" or mangle movement—by which the bed has given to it a uniformly rapid speed, and I will here remark that in carrying out my invention I prefer to use such a movement, and that one effect of my invention is to permit the use of such a movement in a stop-cylinder press without any shock being produced by the coming of the cylinder into gear with the bed while the latter is moving at full speed. E designates the mangle-rack of such a movement secured to the bed B by a rigid hanger E' , and F designates the mangle-wheel carried by the knuckle-shaft F' , which is jointed at F^2 to the main shaft F^3 of the machine, upon which is usually placed the driving-pulley and from which all parts of the machine derive motion. In connection with the mangle-motion I use air-springs for arresting the bed at each end of the stroke. The cylinder M of one of the air-springs is shown in Figs. 1, 2, and 4, and its plunger N in Fig. 1.

G designates the cam-actuated lever furnished with a toothed sector g' , for stopping and starting the cylinder by its engagement with teeth g^2 on the cylinder, as shown in Figs. 1 and 5. This lever is fulcrumed upon a pin g , secured in the framing, and is furnished with a pin g^3 , to receive the gab-hook g^4 of a bar G^2 , which slides in or on suitable guides on the framing and which derives the necessary motion for operating the sector-lever for stopping and starting the cylinder from a cam on a shaft H, which works in bearings in the framing of the machine. This cam-shaft takes the place of the cam-shaft

commonly employed in stop-cylinder presses; but as in carrying out this invention it is desirable to impart a more than usual length of movement to the lever G, I propose here to employ in place of the ordinary cam two cam-shaped gear-wheels or toothed cams H' H^2 , such as constitute part of the invention which is the subject of my application for Letters Patent, Serial No. 242,233, filed June 23, 1887, but which constitute no part of the present invention, the said toothed cam H' being fast upon the cam-shaft H and the other one H^2 being pivoted upon a pin g^5 , fast upon the sliding bar G^2 . The said cams have plain bearing-surfaces which correspond with the pitch-lines of their teeth. The said cams, which rotate in the direction of the arrows shown in Fig. 1, serve to move the bar G^2 to the right, and its return movement may be produced by any suitable means—as, for instance, by a spring g^6 , Figs. 1 and 2, connecting the said bar with the framing, as shown in Fig. 1. The cam-shaft derives motion from the main shaft F^3 through gearing shown in Fig. 3, consisting of a spur-gear F^4 on the main shaft, a spur-gear H^3 on the cam-shaft, and two intermediate gears H^4 H^5 , arranged on a fixed stud h and gearing, respectively, with the spur-gears F^4 and H^3 .

I, Figs. 2 and 4, is a toothed wheel fitted loosely to the shaft a of the cylinder, close to one end of the latter. This toothed wheel, which constitutes one of the important elements of my invention, has while the machine is working a constant rotary motion at the precise speed which the cylinder must have for printing, and is for that purpose constantly in gear with the main shaft F^3 . The said wheel and the cylinder are furnished with a clutch mechanism, whereby the said wheel may be positively connected with the cylinder at the time of the bed-rack b coming into gear with the teeth c of the cylinder, but uncoupled therefrom all the time the cylinder is stationary and while it is being started and stopped by the sector-lever G g' . The toothed wheel I is represented as geared with the main shaft F^3 by means of an intermediate gear L, (see Figs. 2, 3, and 4,) which turns freely on a fixed stud l , secured in the framing, and which always gears with the said wheel I and with a gear F^6 on the main shaft.

The clutch mechanism to be employed for bringing the loose wheel into positive connection with the cylinder at the time of the bed-rack coming into gear with the cylinder must be such as to make the said connection very gradually.

I will now proceed to describe a clutch mechanism which I have found well adapted to the purpose.

J, Figs. 2, 4, 6, and 8, is a clutch in the form of a ring, which is fastened to the wheel I on that side thereof next the cylinder.

K is a fixed cam-ring secured to the framing of the machine at the opposite end of the

cylinder to that at which the wheel I and clutch-piece J are situated.

L' is a rock-shaft arranged parallel with the axis of and passing through the cylinder, wherein it is supported in bearings d d , as shown in Figs. 1 and 2. On one end of this shaft L is an arm e , Figs. 1, 2, and 7, which is furnished with an anti-friction roller e' , which runs against the inner surface of the fixed cam-ring, and on the other end of the said shaft L is an arm f , Figs. 1, 2, and 6, carrying a pin which is furnished with an anti-friction roller f' , which is always within the clutch-ring J. A spring i , Fig. 1, coiled around the said shaft and having one end secured to the arm e and the other end to one of the bearings d of the shaft L' , serves to press the arm e always outward, with its roller e' always in contact with the interior of the cam-ring K, and at the same time tends to keep the arm f toward the axis of the cylinder.

The inner periphery of the stationary cam-ring K, which is its operative surface, is constructed of two opposite concentric arc-formed portions of different radius united by steps e^2 and e^3 , as shown in Figs. 1 and 7. The interior of the clutch-ring J has an outward offset f^2 , within which is a shoulder f^3 , which is nearly radial to the cylinder, so that as the said clutch-ring revolves with the loose wheel I, and the anti-friction roller f' on one arm f is presented in front of it, the said shoulder may be presented directly behind the said roller for the purpose of driving the cylinder by wheel I and the clutch-ring. Opposite the shoulder f^3 there is within the clutch-ring and forming virtually a part of it a locking-piece f^4 , between which and the said shoulder there is just room for the roller f' .

In Figs. 1, 2, 3, 5, 7, and in bold outline in Fig. 8 the several parts are represented as in the positions at which they are when the cylinder is stationary and when the cams H H' are just about to commence to move the sector-lever in the direction of the arrow, (shown in the latter in Fig. 1,) for the purpose of starting the cylinder. The roller e' of the arm e of the rock-shaft L' is then at the outer end of the step e^2 of the cam-ring K. As the cylinder starts, the roller e' runs along the cam-step e^2 , and so produces the turning of the rock-shaft. At the time the cylinder commences to move the arm f of the rock-shaft has its roller f' free in the open central circular portion of the clutch-ring, but near one side of the entrance to the offset f^2 . The movement of the arm e produced by the cam-step f^3 causes the arm f to move outward and its roller f' to pass into the offset of the cam-ring. The wheel I, which is always moving at the proper speed at which the cylinder is to be driven for printing, and consequently now moving faster than the cylinder and faster than the movement of the roller f' with the cylinder, causes the shoulder f^3 of the offset f^2 of the clutch-ring to very gradually overtake the pin f' , as shown in dotted outline in

Fig. 8, just as the said roller, by the action of the cam-step e^2 on the roller e' , moves the pin or roller f' to a position in front of the said shoulder. This occurs a little while before the
 5 bed and the cylinder come into gear, and the cylinder will now be driven by the wheel I and its clutch mechanism at the proper speed, so that when the bed-rack b and the teeth c on the cylinder come into gear they will do so
 10 easily and without the slightest perceptible shock. After the bed and the cylinder have been long enough in gear, the wheel I has to be unclutched or disconnected from the cylinder. This is done by the roller e' of the arm
 15 e running over the step e^2 of the fixed cam-ring, which causes the turning of the rock-shaft in the proper direction and the proper distance to cause the roller f' of the arm f to pass away from the shoulder f^3 and out of the
 20 offset f^2 of the clutch-ring into the open central portion thereof, where it will be left free and permit the cylinder to be stopped at the proper time by the lever G.

The complete operation of the cylinder with
 25 my improvement may be briefly stated as follows: The cylinder is started at the proper time by the segment-lever and gradually brought up to the speed of the loose wheel I, and when the clutch connects the cylinder with
 30 the said wheel, which then carries the cylinder into gear with the rack on the bed for printing. The loose wheel I is unlocked from the cylinder before or when the printing is finished. The truck-roll on the mangle-motion then enters the shoe on the rack E, by
 35 which the bed is driven, and the bed is slowed down by the shoe and its momentum is arrested by the air-springs. The cylinder being then in gear with the bed is also slowed
 40 down. Just before the truck-roll passes the center of the shoe the teeth c on the cylinder pass out of gear with the rack b , so that the movement of the cylinder can be continued by the cam-actuated segment-lever, which
 45 takes the cylinder on up to the standstill, so that the bed can reverse without the rack b hitting the teeth c .

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

1. The combination, with the main shaft 50 and impression-cylinder and a bed having a rack for engaging with teeth on the said cylinder for driving the same during printing, a cam-actuated toothed sector-lever, and teeth upon said cylinder gearing with said lever 55 for starting the said cylinder, of a wheel loose upon said cylinder and in gear with the main shaft to run always in one direction and a cam-actuated clutch for clutching said loose wheel with the cylinder after the starting of 60 the same by the sector-lever and unclutching the said loose wheel from the cylinder after printing, substantially as herein set forth.

2. The combination, with the main shaft and impression-cylinder and a bed having a 65 rack for engaging with teeth on the said cylinder for driving the same during printing, a cam-actuated starting-lever, and teeth upon said cylinder gearing with said lever, of a wheel loose upon said cylinder to run always 70 in one direction, an intermediate wheel gearing with said loose wheel and with a gear upon the main shaft, and a clutch for clutching said loose wheel with and unclutching it from the cylinder, substantially as and for 75 the purpose herein set forth.

3. The combination, with the impression-cylinder of a printing-machine and a gear-wheel loosely attached thereto, of a clutch mechanism for connecting them together and 80 disconnecting them, consisting of a rotary clutch-piece attached to and rotating with said wheel, and a stationary cam and rock-shaft carried by said cylinder and having one arm for engaging with said rotary clutch-piece 85 and another arm engaging with said stationary cam for causing the engagement of the first-mentioned arm with the said rotary clutch-piece and its disengagement therefrom, substantially as and for the purpose herein 90 set forth.

CALVERT B. COTTRELL.

Witnesses:

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