

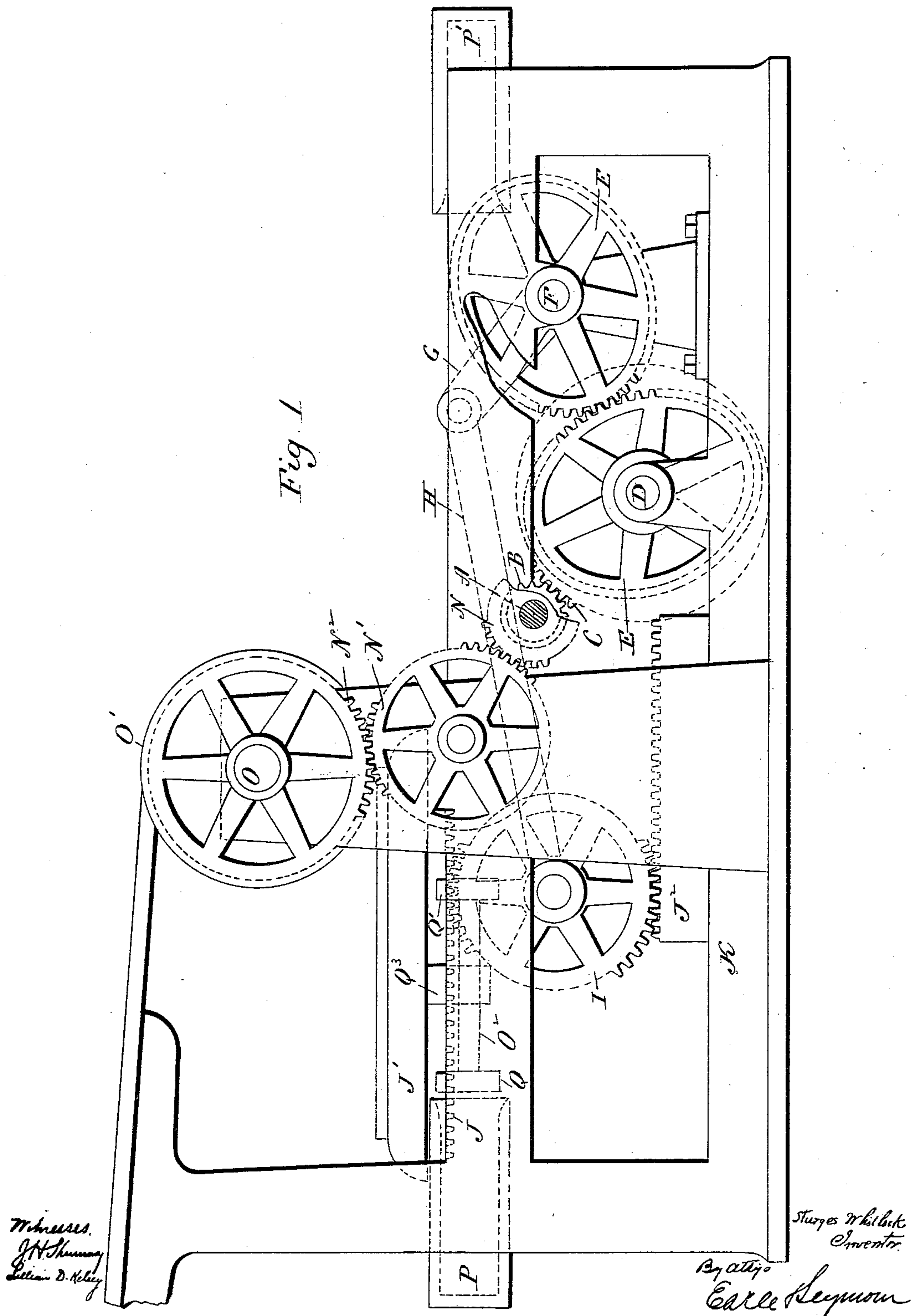
(No Model.)

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S. WHITLOCK.
BED MOVEMENT FOR PRINTING PRESSES.

No. 560,180.

Patented May 12, 1896.



(No Model.)

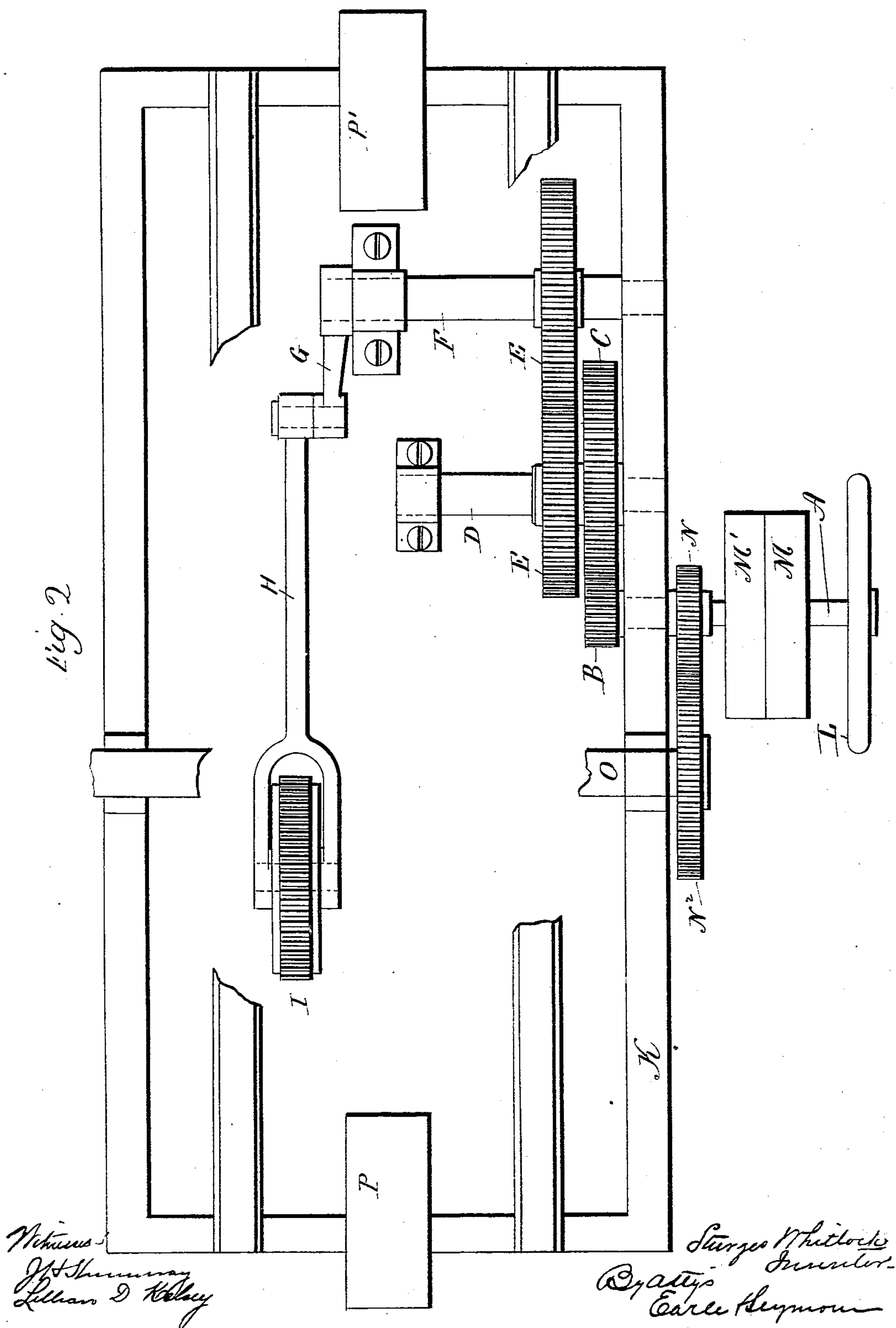
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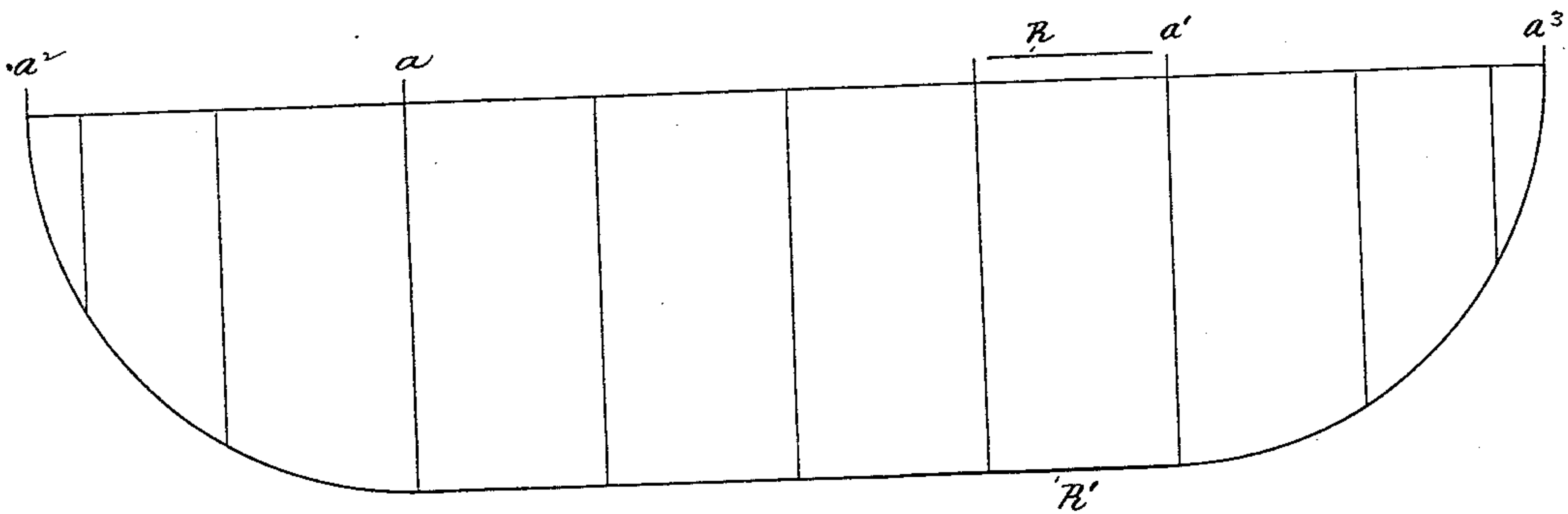
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Fig. 3



Witnesses—
J. H. Shumway.
Lillian D. Kelsey.

Sturges Whitlock—
Inventor.
By atty Earle Seymour

(No Model.)

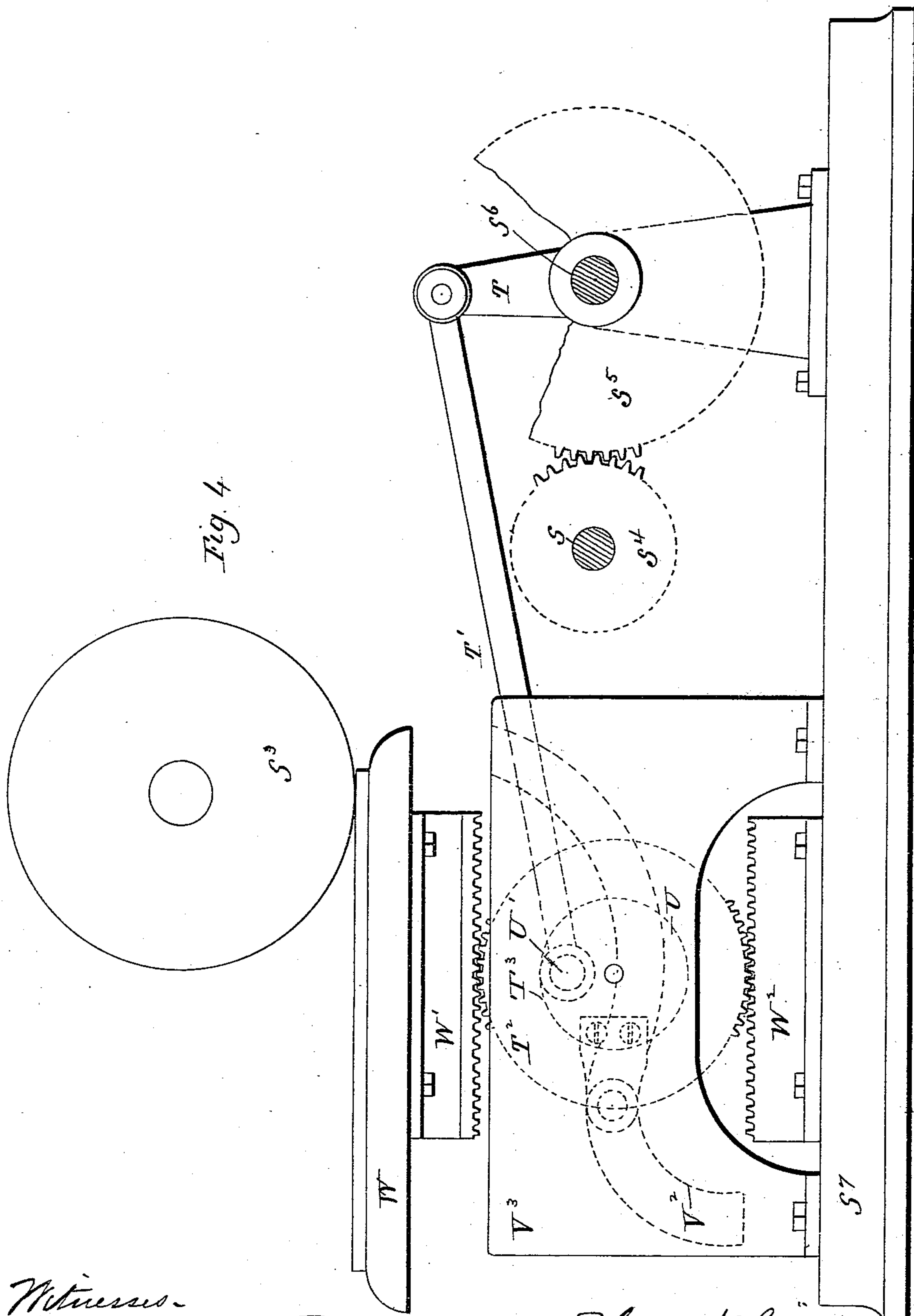
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Witnesses.

J. H. Sturges
Lillian D. Kelcey.

Sturges Whitlock -
President

Bratys. Earl Seymour

(No Model.)

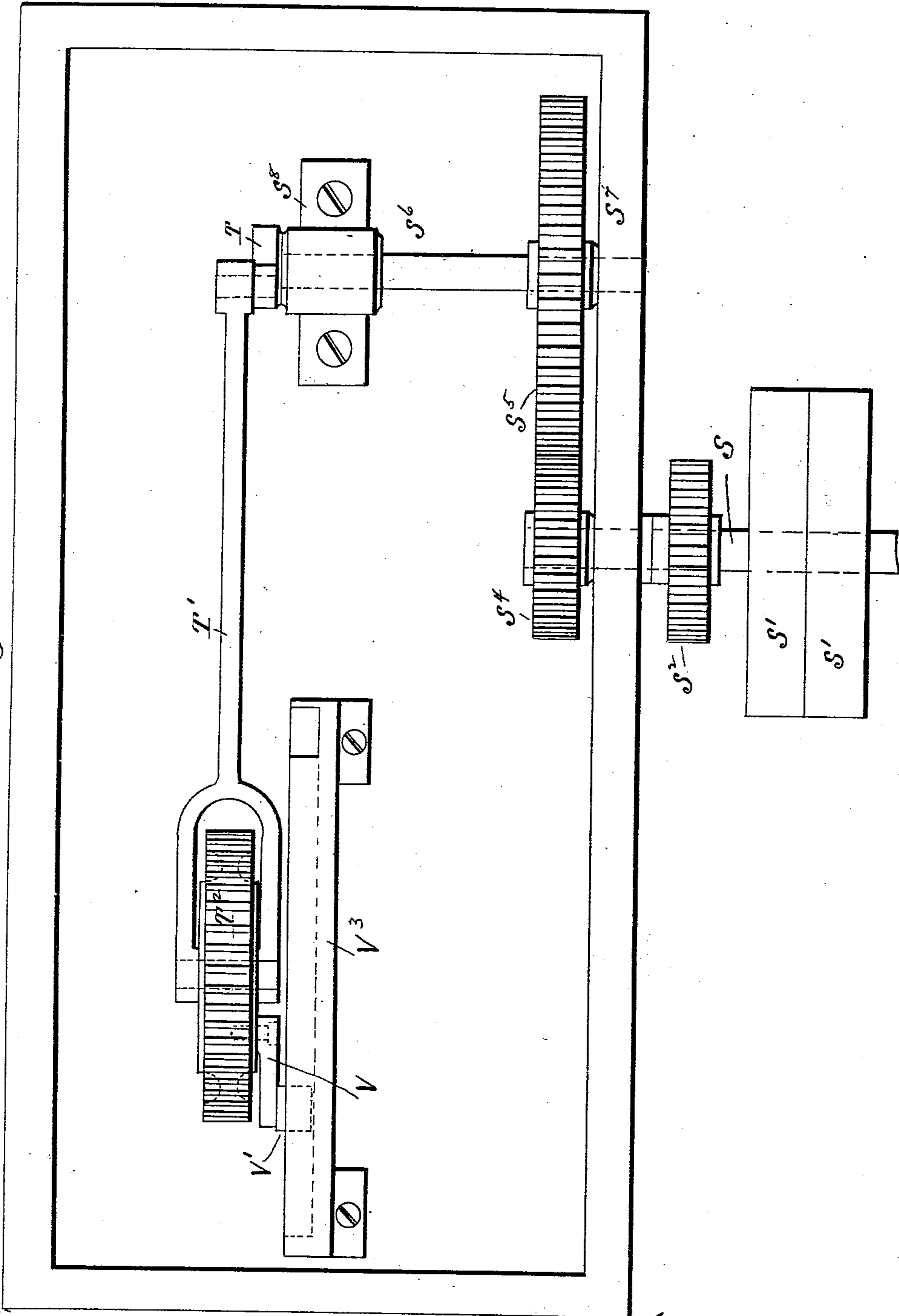
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S. WHITLOCK.
BED MOVEMENT FOR PRINTING PRESSES.

No. 560,180.

Patented May 12, 1896.

Fig. 5



Witness.
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Lillian D. Kelsey

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By atty. Earle Seymour

UNITED STATES PATENT OFFICE.

STURGES WHITLOCK, OF SHELTON, CONNECTICUT, ASSIGNOR TO THE
WHITLOCK MACHINE COMPANY, OF DERBY, CONNECTICUT.

BED-MOVEMENT FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 560,180, dated May 12, 1896.

Application filed December 23, 1895. Serial No. 573,057. (No model.)

To all whom it may concern:

Be it known that I, STURGES WHITLOCK, of Shelton, in the county of Fairfield and State of Connecticut, have invented a new Improvement in Bed-Movements for Printing-Presses; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in side elevation of one form which a printing-press containing my improved bed-movement may assume; Fig. 2, a plan view thereof, partly broken away; Fig. 3, a diagram showing the relative movements of the cylinder and bed; Fig. 4, a view in side elevation of one of the modified forms which my improved bed-movement may take; Fig. 5, a plan view thereof.

My invention relates to an improvement in bed-movements of the crank type for printing-presses of that class which have their impression-cylinders driven at a uniform rate of speed, the object being to produce a simple, compact, and effective device constructed with particular reference to fewness of parts, cheapness, ease of attention and repair, and efficiency.

With these ends in view my invention consists in the combination, in a printing-press, of an impression-cylinder, means for revolving the same at a uniform rate of speed, a reciprocating type-bed, and driving connections for the said bed, including a crank, and also including means for modifying the motion of the crank to conform the central portion of the motion of the bed to the motion of the cylinder, and to impart to it a differentiated movement near the ends of its throw.

My invention further consists in a bed-movement having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention, as shown in Figs. 1, 2, and 3, I furnish the main driving-shaft A of the press with a small pinion B, located at its inner end and meshing into a gear C, mounted upon a shaft D, carrying an elliptic gear E, which in turn meshes into

another elliptic gear E', mounted upon a shaft F, the opposite end of which is furnished with a crank G, to which is attached the bed-pitman H, the outer end of which is forked for the reception of the multiplying-gear I, located below and meshing into a rack J, secured to the under face of the reciprocating type-bed J', and also meshes into a stationary rack J², located opposite the rack J aforesaid and secured to the frame K of the press. The main shaft A, before mentioned, is furnished with a balance-wheel L, with driving-pulleys M and M', and with a small gear-wheel N, which meshes into a large gear-wheel N', which in turn meshes into a gear N², mounted upon one end of the shaft O of the impression-cylinder O', whereby the same is driven at a uniform rate of speed. It will be seen from the foregoing that in the construction shown by the said figures of the drawings the power for driving the type-bed and printing-cylinder is taken from the same shaft.

For reducing the momentum of the type-bed at the ends of its stroke I by preference locate cylinders P and P' in line with each other, but at opposite ends of the machine-frame K, the said cylinders respectively receiving pistons Q and Q', located at the ends of a piston-rod Q², which is mounted in a hanger Q³, depending from the type-bed. When the piston Q enters the cylinder P, the air therein is compressed, with the effect of cushioning the action of the type-bed at one end of its stroke, while when the piston Q' enters the cylinder P' the air therein is compressed and the momentum of the type-bed reduced at the other end of its stroke; but it is not imperative that these cylinders and pistons should be employed, although my device is peculiarly well adapted for their use.

By varying the forms of the elliptic gears exactly the right relation of reciprocation in the type-bed to the revolution in the impression-cylinder is secured, whereby the bed and cylinder are caused to have the same speed when the printing is being done.

For illustration of the movement of the type-bed and cylinder I have introduced a diagram, which appears as Fig. 3 of the drawings. In this diagram the line R represents the path of the type-bed and the line R'

represents, diagrammatically, the path of the impression-cylinder. By means of correctly-made elliptical gears I am enabled to move the type-bed between the points a and a' on the diagram, the said points covering the central portion of the throw of the bed, at exactly the same rate of speed as the impression-cylinder moves in its revolution; but from the point a to the point a^2 at one end of the stroke of the type-bed and from the point a' to the point a^3 at the other end of the stroke of the bed, the said points covering the ends of the throw of the bed, the same has an unequal or differentiated or what is equivalent to a crank motion. Thus the bed moves gradually slower from the point a to the point a^2 and from the point a' to the point a^3 , and gradually faster from the point a^2 to the point a , and also gradually faster from the point a^3 to the point a' . These differentiated movements constitute the reversing of the bed at each end of its stroke. The movement of the bed between the points a and a^2 in either direction and the points a' and a^3 in either direction is slower than the movement of the bed between the points a and a' in either direction, so that I am enabled to operate the bed at a high speed. I am also able to confine the crank or end movements of the bed into a play under which an air spring or cushion will operate to the best advantage.

It is apparent that in carrying out my invention the particular means shown and described for moving the type-bed at a uniform rate in the central portion of its throw and at a differentiated rate at the ends of its throw may be varied.

One of the modified forms of my improved bed-movement is shown in Figs. 4 and 5 of the drawings, in which the main shaft S is furnished with driving-pulleys S' S'' , a gear S^2 , which communicates motion to the impression-cylinder S^3 , and a gear S^4 , meshing into a larger gear S^5 , mounted upon a horizontal shaft S^6 , journaled at its outer end in the machine-frame S^7 and supported at its inner end in a depending bearing S^8 . The inner end of the shaft S^6 is provided with a crank T , having a pitman T' connected to its outer end, the opposite end of the said pitman being forked to embrace a multiplying-gear T^2 , which has the form of an annulus, in the central portion T^3 of which is located a closely-fitting disk U , also embraced by the forked end of the pitman, which is eccentrically connected with it by means of a pin U' . The said disk U is provided with a rearwardly-projecting arm V , furnished at its outer end with an antifriction-roll V' , entering and traveling back and forth in a doubly-curved cam-path V^2 , formed in an upright frame or plate V^3 , rigidly secured to the machine-frame S^7 . The particular curvature of the path V^2 will be determined by the size of the impression-cylinder S^3 and will modify the normal action of the crank T and pitman T' ,

so that the multiplying-gear T^2 will move the type-bed W at a uniform rate in the central portion of its throw and at a differentiated rate at the ends of its throw in substantially the manner illustrated diagrammatically in Fig. 3 of the drawings already described. The multiplying-gear, I may add, meshes into a rack W' , fixed to the lower face of the type-bed, and also into a rack W^2 , located opposite the rack W' and fixed to the frame S^7 of the machine.

Still other ways may be resorted to for modifying the action of the crank, so as to make the movement of the type-bed in the central portion of its throw uniform with the movement of the impression-cylinder.

I have spoken of modifying the action of the crank, which transmits the motion imparted to it without further modification other than change of direction to the type-bed. In using the language "modifying the action of the crank" therefore I mean to convey the idea that the crank does not have the action which cranks ordinarily have, but a modified or unusual action. The modification of the action of the crank I secure by the elliptic gear mechanism or the doubly-curved cam-path mechanism herein described, those mechanisms operating to modify the rotary motion transmitted to them from the rotary driving-shaft and to transmit that modified motion without intrinsic variation through the medium of the crank-shaft to the type-bed. Of course the modified rotary motion produced by the elliptic gears is transformed into reciprocating motion by the crank, which merely changes the direction of motion without further modifying it. So, too, the doubly-curved cam-path modifies the rotary motion of the driving-shaft, and the crank transforms the motion thus modified into reciprocating motion; but that is only a change of direction and involves no further modification of the motion. It will be understood, therefore, that the crank-shaft does not further modify the motion, but only changes its direction and transmits it without further modification to the type-bed. I would therefore have it understood that I do not limit myself to the construction shown and described, but hold myself at liberty to make such changes as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-press, the combination with an impression-cylinder, means for revolving the same at a uniform rate of speed, a reciprocating type-bed, and driving connections for the said bed including a crank, and also including means for modifying the motion of the crank to conform the central portion of the motion of the bed to the motion of the cylinder, and to impart to it a differentiated movement near the ends of its throw, substantially as described.

2. In a bed-movement for printing-presses, the combination with the bed thereof, of power connections for reciprocating the said bed to move the same at a uniform rate in the
5 central portion of its throw, and at a differentiated rate at the ends of its throw, including a crank and two elliptic gears, substantially as described.

3. In a bed-movement for printing-presses,
10 the combination with the bed thereof, of means for reciprocating the said bed, including two elliptic gears, a crank, a pitman, a multiplying-gear attached to the outer end of the pitman, a rack connected with the bed
15 and taken into by the said multiplying-gear, and a fixed rack also taken into thereby, substantially as set forth.

4. In a printing-press, the combination with
20 the main shaft thereof, of an impression-cylinder, driving connections between the said shaft and cylinder, a reciprocating type-bed, and driving connections between the said main shaft and bed, including a crank, and also including devices for modifying the ac-

tion of the crank to move the bed in the cen- 25
tral portion of its throw at a rate uniform with the movement of the impression-cylinder, and at a differentiated rate at the ends of its throw, substantially as described.

5. In a printing-press, the combination with 30
the main shaft thereof, of an impression-cylinder, driving connections between the said shaft and cylinder, a reciprocating type-bed, and driving connections between the said
35 main shaft and bed, including two elliptic gears constructed and arranged to impart movement uniform with the movement of the cylinder, to the bed, throughout the middle portion of its stroke, and differentiated movement at the ends of its stroke, substantially 40
as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

STURGES WHITLOCK.

Witnesses:

FRED. C. EARLE,
LILLIAN D. KELSEY.