

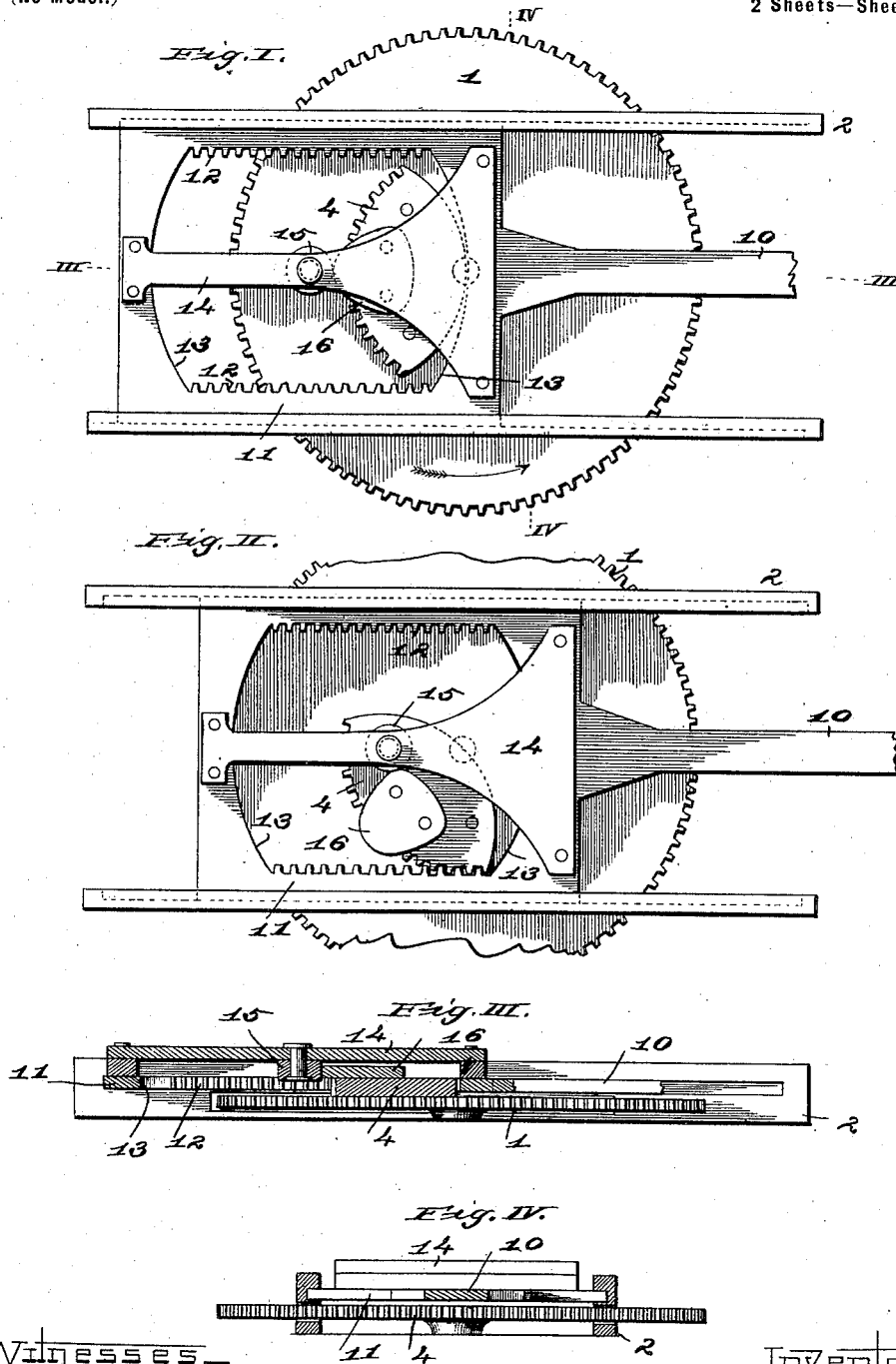
No. 676,970.

Patented June 25, 1901.

E. W. SWINDELLS.
MECHANICAL MOVEMENT.
(Application filed Aug. 11, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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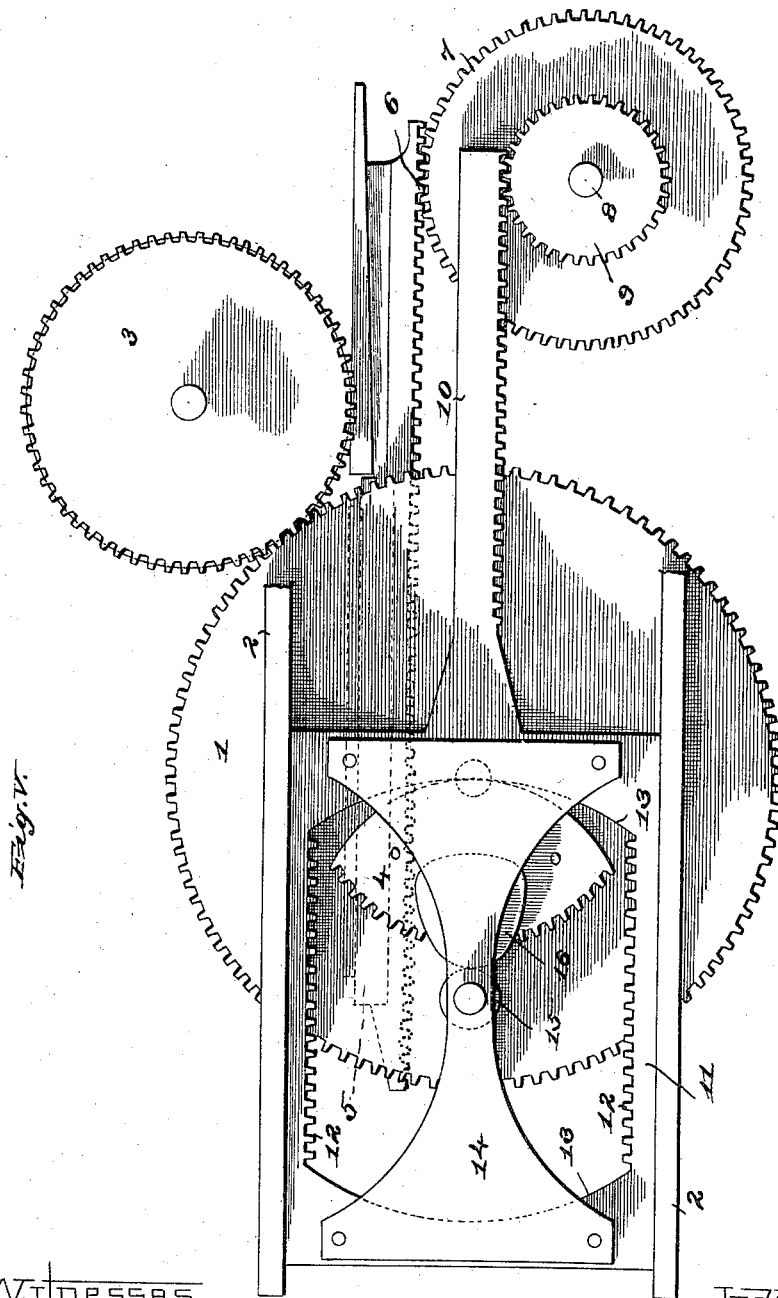
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UNITED STATES PATENT OFFICE.

EUGENE W. SWINDELLS, OF ST. LOUIS, MISSOURI.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 676,970, dated June 25, 1901.

Application filed August 11, 1900. Serial No. 26,665. (No model.)

To all whom it may concern:

Be it known that I, EUGENE W. SWINDELLS, a citizen of the United States of America, and a resident of the city of St. Louis, in the State of Missouri, have invented a new and useful Mechanical Movement, of which the following is a specification.

My invention relates to printing-presses, and has for its object to improve the movement of the type-bed. It consists in the mechanical movement hereinafter described and in the application thereof to a printing-press, as hereinafter described.

In the accompanying drawings, which form part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure I is a side view of my device detached, showing the positions of the parts at the forward limit of movement. Fig. II is a like view showing the parts in an intermediate position. Fig. III is a horizontal sectional view of the device on the line III III of Fig. I. Fig. IV is a transverse section thereof on the line IV IV of Fig. I, except that the main driving-gear is shown in elevation; and Fig. V is a side elevation showing my movement applied to a printing-press.

My movement is designed to transmit motion to the type-bed of a printing-press in such a manner that during the printing operation its speed is exactly the same as the peripheral motion of the impression-cylinder, and each forward and backward motion of the type-bed will start up and slow down gradually.

The main driving-gear 1 is mounted in the framework 2 of the printing-press and meshes with a gear-wheel 3 on the impression-cylinder. The main driving-gear is preferably twice the diameter of the cylinder-gear, and the pitch-line of the cylinder-gear preferably coincides with the periphery of the cylinder. The driving-gear has fixed thereon and concentrically therewith a segmental gear 4, whose pitch-line is an arc of about one hundred and twenty degrees of a circle of one-half the diameter of the gear-wheel to which it is fixed. The peripheral motion of the toothed segment is thus one-half of the pe-

ripheral motion of the impression-cylinder. 50 It is preferable to have the untoothed edge of this segmental gear in the form of an arc of a circle of the same diameter as the toothed segment.

The bed 5 of the printing-press is mounted 55 in any suitable manner to reciprocate on the frame 2 below the impression-cylinder. This bed 5 has a rack 6, which meshes with a gear-wheel 7, mounted on a shaft 8, which is journaled in the frame. This shaft 8 also carries a gear 9 of one-half the diameter of the other gear 7. This smaller gear 9 is driven 60 by a rack 10, which is fixed to a cross-head 11, which slides in ways provided therefor on the frame. The motion of this bed is therefore 65 double the motion of the cross-head.

The cross-head 11 is a hollow frame whose inner edges are straight at the sides and concave curves at the ends. The straight sides are the same length as the toothed segment 70 and are toothed to constitute racks 12; but the curved ends 13 are preferably made smooth in the form of circular arcs of greater radius than the radius of the segment. The width of the frame between the pitch-lines of the side racks is the same as the diameter of the pitch-circle of the segmental gear, and this gear revolves between them in the same plane therewith, so that it engages one rack and then the other alternately. 80

It is obvious that during the engagement of the rack and gear the rate of motion of the cross-head to which the rack belongs will be one-half of that of the impression-cylinder, and consequently the rate of motion of the 85 bed will be the same as that of the impression-cylinder so long as the pitch-line of the teeth of the segmental gear is tangent to the pitch-line of the teeth of a side rack. In the construction just described this condition continues through one hundred and twenty degrees, or one-third of a revolution of the segmental gear. When the last tooth of the gear becomes disengaged, the momentum of the bed carries the curved end of the cross-head 95 against the untoothed edge of the gear, and the motion of the cross-head is thus gradually retarded until the dead-center is reached,

at which point the direction of motion is reversed, and the motion gradually increases until the teeth of the gear mesh with the teeth of the second rack. At this point the rate of
 5 motion of said cross-head becomes one-half of that of the impression-cylinder and continues at this rate through one-third of a revolution of the segmental gear, when the operation of gradually slowing down and reversing
 10 is again repeated. The motion of the bed of the press is therefore the same as that of the impression-cylinder and their register secured during the printing stroke or movement of said bed. To avoid the effects of momentum
 15 or backlash, the following device is provided: A plate 14 is fixed to the cross-head and carries opposite the central part of the opening therein a thimble or cylindrical collar 15, mounted on a stud. The segmental gear has
 20 fixed to it a cam 16, whose edge is so designed that throughout the operation of reversal the edge of the cam is so close to the thimble as to be practically in contact therewith. By
 25 this arrangement it is impossible for the momentum of the bed to produce the effects of backlash. It is obvious that the positions of the thimble and the cam may be reversed with the same result.

This device is capable of considerable modification without departing from my invention. Thus the segmental gear may be shorter or longer than one hundred and twenty degrees, in which case the cross-head is modified accordingly. So bevel-gearing may be used instead of spur-gearing, in which case the cross-head may be flatwise instead of sidewise, and it may be placed under the bed and between the side frames of the machine. The sizes of the gears may be varied without affecting
 40 the efficiency of the movement. So the action of the smooth edge of the segmental gear against the curved ends of the cross-head is a cam or wiper action, and the shape of the curves may be varied. So, too, the effect of
 45 backlash is overcome by the thimble and cam arrangement even without the cooperation of the curved ends of the cross-head. Other modifications may be made, and I do not wish to limit myself to the construction shown.

50 The principal advantages of my device are that it reduces the number of connections between the impression-cylinder and the bed to a minimum. It obviates the necessity for the driving-shaft between the cylinder and the
 55 bed usually found in cylinder-presses, and thus insures a minimum of lost motion in the connections between the cylinder and the bed and a consequent greater accuracy in register.

What I claim is—

60 1. A mechanical movement comprising a segmental gear having its back edge curved and an open cross-head arranged to reciprocate in a frame, the inner sides of said cross-head being formed into racks adapted to mesh
 65 with said gear and the inner ends thereof be-

ing curved on the inside with a larger radius than that part of the back edge of the gear, substantially as and for the purpose set forth.

2. A mechanical movement comprising a segmental gear, and an open cross-head arranged to reciprocate in a frame, the inner sides of said cross-head being formed into racks to mesh with said gear, and a thimble and a cam arranged to cooperate to prevent backlash, the thimble being mounted on
 75 either the segmental gear or on the cross-head, and the cam being correspondingly mounted on either the cross-head or the segmental gear, substantially as and for the purpose set forth.

3. A mechanical movement comprising a segmental gear having its back edge curved and an open cross-head arranged to reciprocate in a frame, the inner sides of said cross-head being formed into racks adapted to mesh
 85 with said gear and the inner ends thereof being curved on the inside with a larger radius than that of the back edge of the gear, and a thimble and a cam arranged to cooperate to prevent backlash, the thimble being mounted
 90 on either the segmental gear or on the cross-head, and the cam being correspondingly mounted on the cross-head or the segmental gear, substantially as and for the purpose set forth.

4. In a cylindrical printing-press, a bed movement comprising a segmental gear operatively connected to the driving-shaft and having its back edge formed into a cam, and an open cross-head arranged to reciprocate in the
 100 frame, the inner side of said cross-head being formed into racks adapted to mesh with said segmental gear and the ends thereof being curved on the inside with a larger radius than that of the back edge of the segmental
 105 gear, said cross-head having a rack fixed thereto, which meshes with a gear-wheel operatively connected with the type-bed, substantially as and for the purposes specified.

5. In a cylindrical press, a bed movement
 110 comprising a segmental gear operatively connected to the driving-shaft and an open cross-head arranged to reciprocate in the frame and having its inner sides formed into racks adapted to mesh with said segmental gear,
 115 and a thimble and a cam arranged to cooperate to prevent backlash, the thimble being mounted on either the segmental gear or on the cross-head and the cam being correspondingly mounted on either the cross-head or the
 120 segmental gear, said cross-head having a rack fixed thereto which meshes with the gear-wheel operatively connected with the type-bed, substantially as and for the purpose set forth.

6. In a cylindrical printing-press, a gear-wheel on the main driving-shaft, an impression-cylinder geared thereto and a reciprocating type-bed having a rack thereon, a segmental gear fixed concentrically on the driv-
 125
 130

ing-gear, an open cross-head having its sides
formed into racks adapted to coöperate with
said segmental gear and having its ends
formed into cam-surfaces adapted to coöper-
5 ate with the back edge of the segmental gear,
a rack fixed to the cross-head and coöperat-
ing with a gear-wheel on a shaft journaled in
the frame of the press and a second gear-
wheel on said shaft meshing with the rack on
said bed, substantially as and for the purpose to
set forth.

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