No. 741,341. PATENTED OCT. 13, 1903.

J. T. HOGAN.

MECHANICAL MOVEMENT.

APPLICATION FILED JAN. 2, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

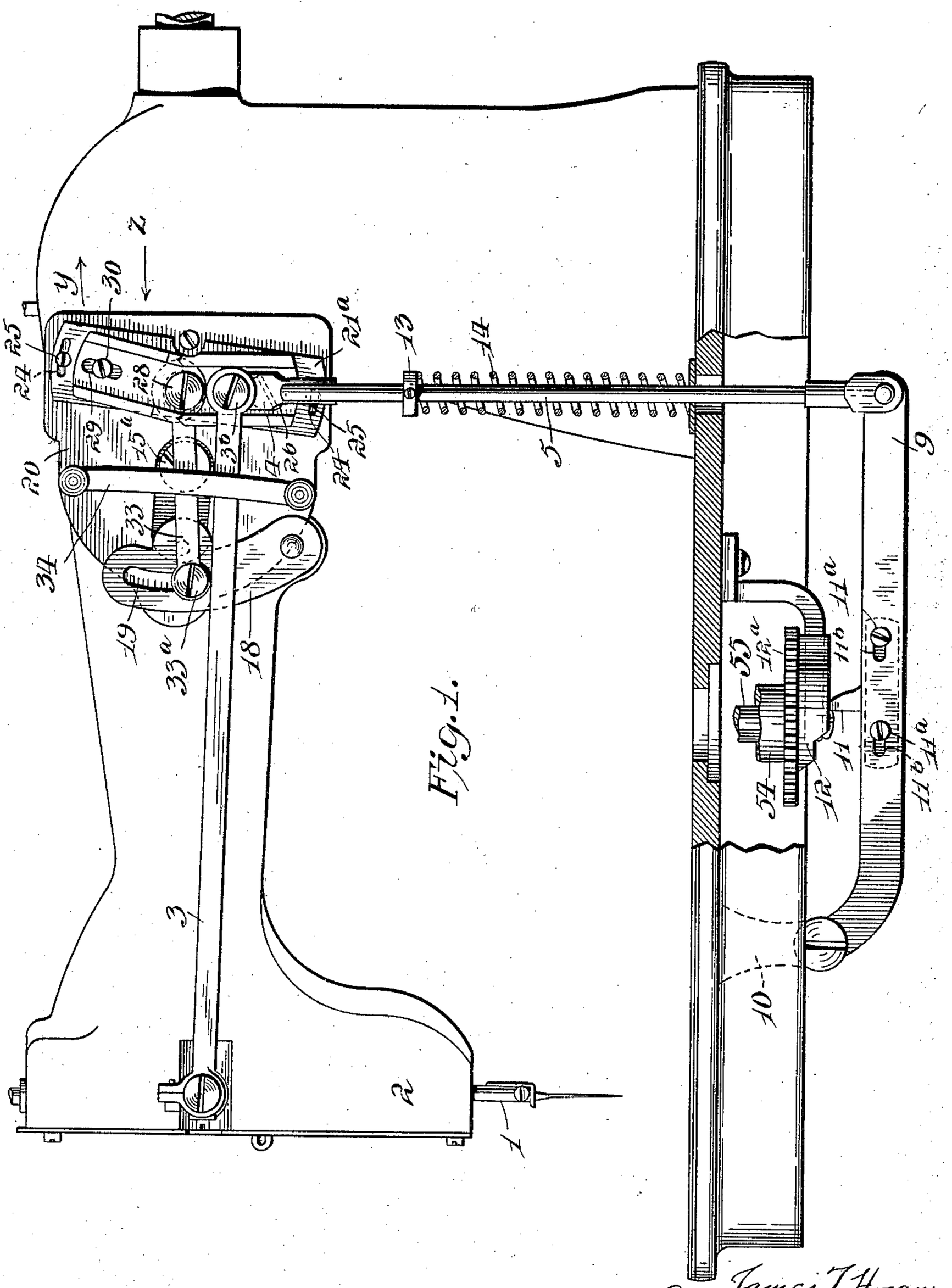

Fig. 1.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

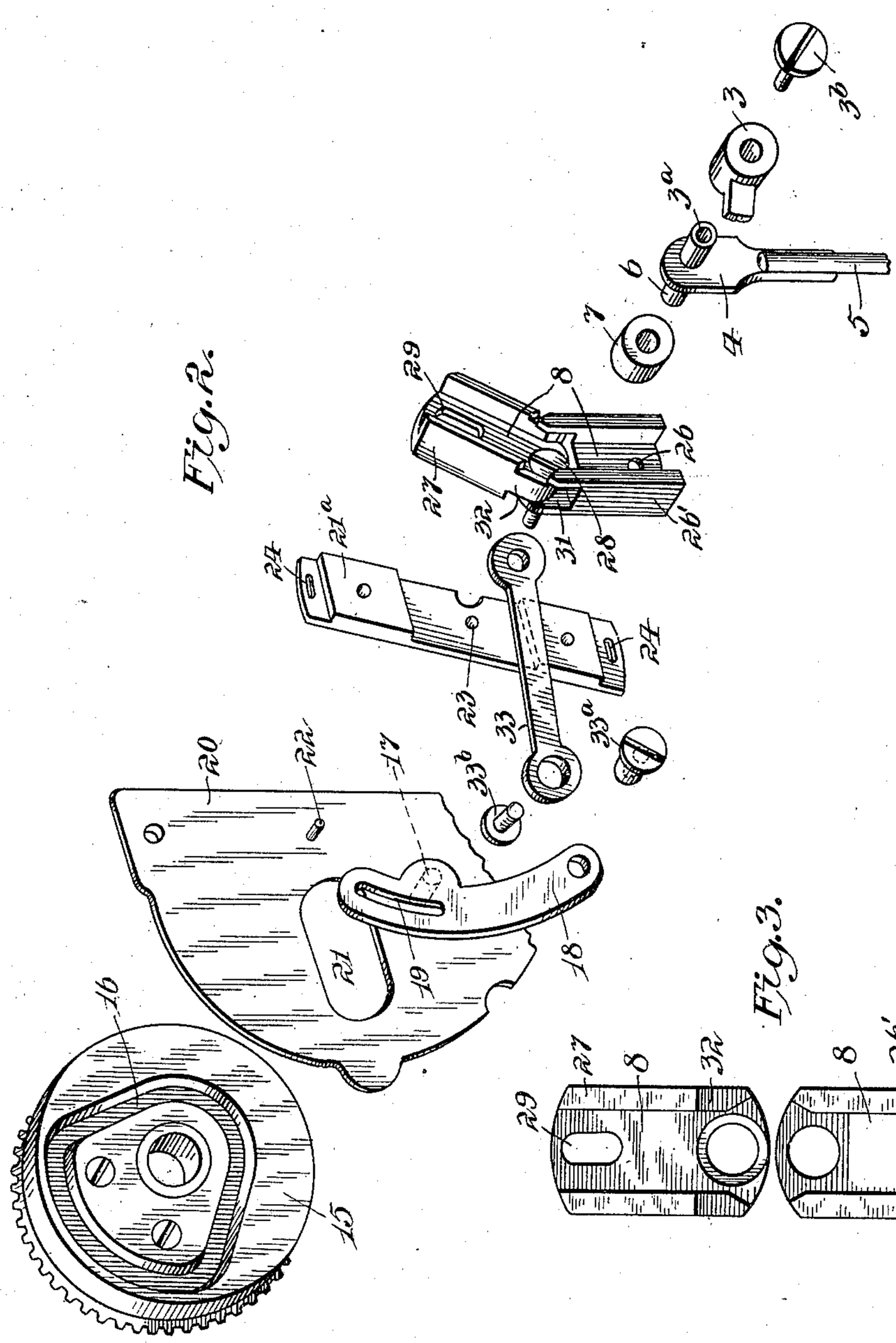

Fig. 3.

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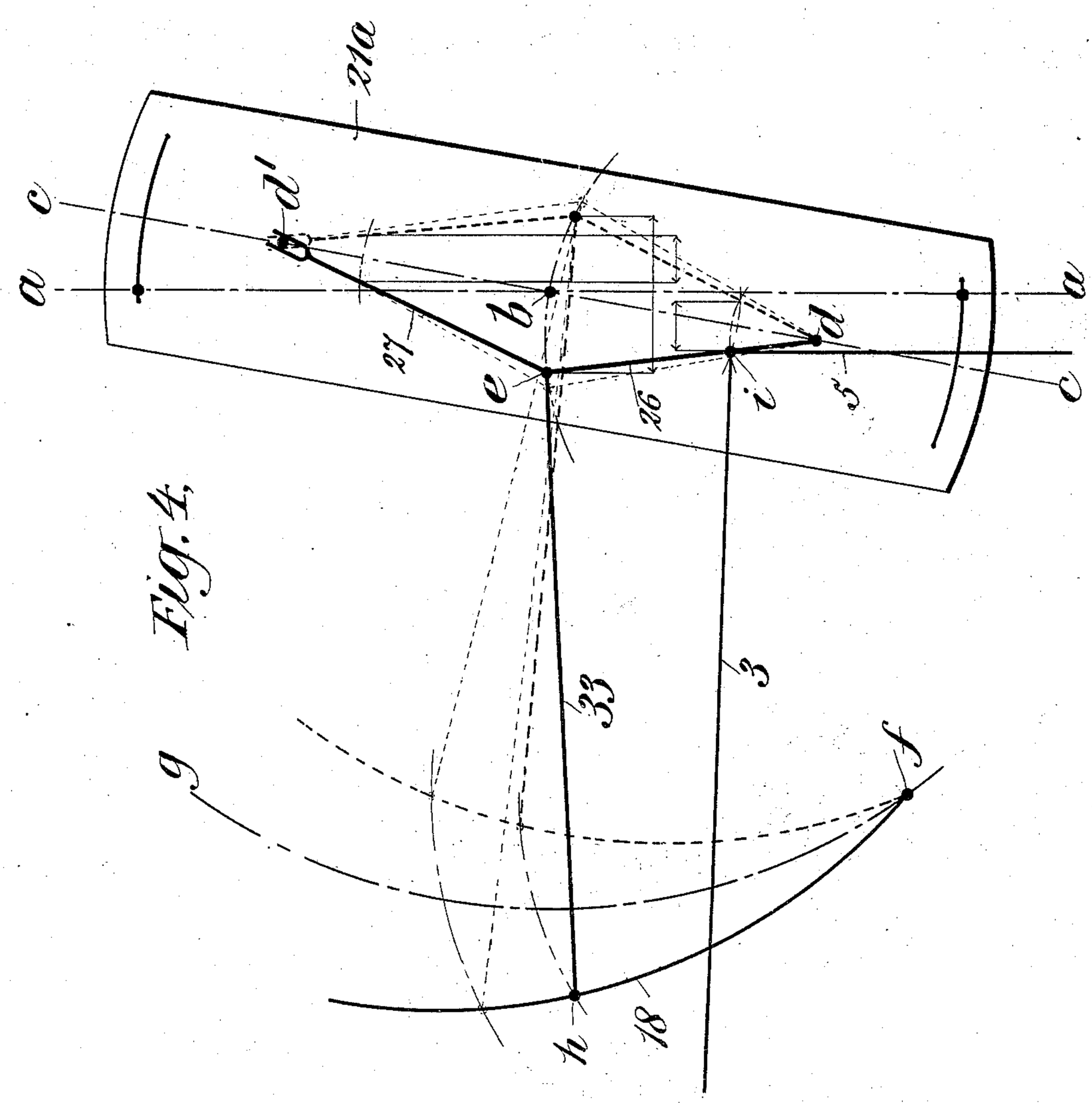
NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4.



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No. 741,341. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE NATIONAL MACHINE COMPANY, OF TROY, NEW YORK, A CORPORATION OF NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 741,341, dated October 13, 1903.

Application filed January 2, 1903. Serial No. 137,468. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. HOGAN, a citizen of the United States, residing in Jersey City, county of Hudson, and State of New Jersey, have invented a new and useful Improvement in Mechanical Movements, of which the following is a description.

My invention relates to mechanical movements, and particularly to that class or type of mechanisms by which rotary, oscillatory, or reciprocatory movements may be transformed into oscillating or reciprocating movement.

The object of my invention is to provide a mechanism connecting a driving and a driven means whereby the movement of the former may be transferred to the latter by a mechanism capable of attaining and sustaining high speed which will be light running, simple in structure, and which may be quickly and effectively adjusted for the purpose of varying the degree of movement in either of several positions.

With these objects in view my invention consists of the mechanism, parts, features, and combinations of elements hereinafter described and claimed.

In the drawings forming part of this specification, Figure 1 is a side elevation representing the parts and features of my mechanical movement, parts being broken away to show portions of a mechanism which may be employed to automatically vary the amount of movement transmitted, my mechanism being here shown as applied to a sewing-machine merely as an illustration. Fig. 2 is a detail perspective of the mechanism employed for transmitting motion, and Fig. 3 is an elevation of the toggle-plates of said mechanism separated. Fig. 4 is a diagrammatic view illustrating the principles of operation of my improved mechanical movement, showing particularly the centers and central lines of the parts.

The pitman 3 connects with some part to which reciprocating or oscillating movement is to be imparted. Herein a needle-bar 1 is illustrated, the same being carried in the ordinary vibrating gate common to buttonhole-sewing machines. This pitman at its other end is sleeved upon a pin 3^a, carried on the elongated flattened upper end 4 of the vertical bar or rod 5, whose inner side carries a pin 6, acting as a journal for an antifriction-roll 7, which runs in the track or guideway 8 of the members of the toggle mechanism hereinafter described. The end of the pitman is held to pin 3^a by a screw 3^b. The vertical rod 5 is connected pivotally at its lower end to a lever 9, fulcrumed to a hanger 10 on a suitable frame. Intermediate its ends the lever 9 is provided with a lug 11, adjustable by screws 11^a, passing through slots 11^b in lever 9, which contacts with the stepped cam 12 for the purpose of automatically shifting the vertical rod, as hereinafter described. Said vertical rod is provided with an adjustable collar 13 and is surrounded by a coiled spring 14, one end of which rests upon the frame and the other end of which is confined and controlled by said collar.

A cam-disk 15 is secured to a gear and supported on a short shaft, pin, or screw 15^a in a suitable frame and is operated by an ordinary gear from a driving-shaft. Said cam-disk is provided with a cam-groove 16, in which runs an antifriction roll or pin 17, carried by a lever 18, journaled in the frame and longitudinally slotted at 19. A plate 20 is secured to the frame and is slotted at 21 for the passage of said pin or roll 17. Said plate 20 carries a second plate 21^a, journaled centrally thereon by a pin 22, projecting therefrom and entering an aperture 23 in the secondary plate, said latter plate being circularly adjustable by means of curved slots 24 and adjusting-screws 25, entering the primary plate. The secondary plate has fulcrumed thereto at 26 the member 26′ of the toggle mechanism, the other member 27 being pivoted to the member 26′ at 28 and being longitudinally slotted at 29 for the passage of a guiding-screw 30. The member 26′ of the toggle mechanism is bifurcated at 31 on opposite sides, so as to receive the tongues 32 of the other member of the toggle mechanism, said parts sliding freely, so as to give ease of movement. A link 33 connects the fulcrum

28 of the toggle mechanism with the vibrating lever 18, in the slot of which the other end of said link is adjustable by the clamping-screw 33ª for the purpose of changing the extent of movement of the pitman. The slot 19 is preferably formed on arcs of circles drawn with the distance between the centers of the connecting-link 33 as a radius, the center being the center of the pivotal connection 28 at the moment the links are in their central position, and hence at the moment the pivotal connection 28 is coincident with the axis of rotation 22 of the plate 21ª. The bar 34, connected to the primary plate, extends transversely across the pitman 3 and is provided for the purpose of preventing the end of the latter and the end of the vertical bar or rod 5 from springing away from the track or guideway 8 in the toggle plates or members.

The stepped cam 12 for actuating the vertical rod which shifts the end of the pitman 3 relative to and along the toggle mechanism may be actuated by any suitable mechanism, such as gearing meshing with the gear 12ª, and said cam may be supported in any suitable manner on the frame, as by hub 54 and shaft 55. (Shown in the drawings as broken away and in place merely for illustration.) Said cam 12 may have any suitable conformation, this depending upon the movement determined upon and to be given to the rod 5 and transmitted to the pitman 3 for the purpose of sliding the latter along the toggle mechanism. Obviously various adjustments and many variations in movement may be produced by changing the character of the cam employed or by manipulating the lever by hand or foot for shifting the pitman along the toggle mechanism.

The mechanism in the position shown in Fig. 1 will transform the rotary movement of the cam 15 16 into either reciprocatory or oscillatory motion of a given degree. This degree of movement may be changed automatically or manually, according to a predetermined design of cam 12 or desire of the operator, resulting in the production of various effects or movements in the driven mechanism, and it will be obvious that the degree of movement may be automatically or otherwise increased or diminished and that the movement imparted may be entirely on one side or the other of a given line or position. It will be noted that if the cam 12 be formed so as to allow the lug 11 to shift from one portion thereof to another the end of the pitman 3 may be carried into coincidence with the fulcrum of the toggle mechanism, thus obtaining the full movement of said mechanism and increasing the extent of vibration or reciprocation transmitted by said pitman. Accordingly as the end of the pitman is on one side or the other of the fulcrum of the toggle mechanism the working position of the end of the pitman 3 will be changed or located on one or the other side of a median line, and the extent of movement on either side of said line can be varied according to the position of the pin 3ª relatively to the fulcrum of the toggle mechanism. The extent of movement transmitted to the toggle mechanism may be varied by adjustment of the connection of the connecting-link 33 with the vibrating lever 18 along its slot 19, so that the amplitude of movement thereof may be increased or diminished even though the degree of vibrating movement transmitted to the lever 18 by the cam 15 16 remains constant, and because of the shape and form of the adjusting-slot 19 and of the relative positions and construction of the connecting parts the motion transmitted to the links will always be equal on opposite sides of a central line drawn therethrough regardless of such variations in extent of movement. Furthermore, it will be noted that an additional and different character of adjustment may be obtained through the medium of the secondary plate 21ª by swinging the same on its pivot 22 in the direction of the arrow *y*, Figs. 1 and 4—*e. g.*, the position of the toggle mechanism may be changed so as to change the position of the driving end of the pitman 3 relative to a given line, while an adjustment of said plate to the left or in the direction of the arrow *z*, Figs. 1 and 4, will result in changing the position of the toggle mechanism in the opposite direction and effect the movement of the driving end of the pitman on the opposite side of said given line.

The diagrammatic view Fig. 4 illustrates the principles of operation and the lines of movement of certain parts and also shows clearly the results obtained from some of the adjustments. In this figure most of the parts are represented by central lines and their centers of movement by dots. *a* designates a central or medial line representing the median line referred to in the foregoing description or a line parallel therewith, and it is upon the opposite sides of such a line that the working position of the end of the pitman may be changed or located as desired. *b* designates the axis of rotation of the plate 21ª. *c c* designate a straight line drawn through the center of the plate 21ª and passing through the axis *b*. *d d'* designate the axes of the pivotal supports between the outer ends of the toggle-links 26' and 27 and the plate 21ª, such points being located upon the line *c c* and substantially equidistant from the axis *b* upon opposite sides thereof. The distance between *d* and *b* is here shown as exactly equal to *d* and *e*, which is the distance between the pivotal centers of the lower toggle-link 26', the axis of pivotal connection between the link 26' and the link 27 being designated by *e*. The vibratory axis of the lever 18 is shown at *f*, the lever 18 being vibrated about its axis *f* upon equal sides of a medial line *f g*. The point of connection of the connecting-rod 33 with the vibrating lever 18 is designated by the reference character *h*, while at its opposite end it is connected to the toggle-links

at *e*. The line *f g* is an arc of a circle with the distance *e h* as a radius and drawn while the center *e* is coincident with the axis *b*. The arc *f g* represents the central line of the slot 19 of the lever 18 at the moment the lever is in its central position.

The degree of movement transmitted to the lever 18 by the cam 15 16 being constant and this movement being equal upon opposite sides of the line *f g*, the central line of the toggle-links being upon the line *c c* at the moment the central line of the lever 18 is upon the line *f g*, and the point of connection *e* between the lever 33 and the toggle-links being at such time coincident with the axis of rotation *b* of the adjustable plate 21ª, it will follow that any adjustment of the point *h* along the line *f g* will adjust the amplitude of movement imparted to the toggle-links substantially equally upon opposite sides of the medial line *c c*. This variation in amplitude of movement will be proportional at all points along the lines *d e e d'*, and hence will transmit proportionately greater or smaller movements to the pitman 3 in its various positions along same. Once the point *h* is correctly located and adjusted it may so remain in the working of the device, while variations in amplitude of movement of the connecting-rod 3 may then be obtained by shifting the point of connection between it and the toggle-links, (this point of connection being designated by reference character *i* in the diagram,) the greatest amount of movement being transmitted thereto when the point *i* is in coincidence with the point *e*. Shifting the point *i* equidistantly upon opposite sides of the center *e* will produce upon vibration of the toggle-links corresponding movements of the pitman 3, but positioned differently with respect to the line *a a*, the movement of vibration in each case being equal upon opposite sides of the line *c c* and the line *c c* being out of coincidence with the line *a a*. This position or location of movement with respect to the line *a a* may be shifted as desired by shifting the plate 21ª and hence the line *c c* upon the axis *b* to the desired extent, but such shifting of the line *c c* will in no way affect the amplitude of movement, only the position or location thereof.

These several mediums for securing the adjustments and the adjustments themselves are quite important and form features of my invention upon which I desire to place particular stress.

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

1. Movement-transmitting mechanism including a moving element, links connected together at their inner ends, and to the said moving element, and a support for the outer ends of said links, provided with means permitting its adjustment in the normal plane of movement of the said links and about an axis of rotation transverse of such normal movement, but holding it stationary during the normal operation of said mechanism.

2. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, a moving element, and links connected together at their inner ends and to said moving element, said links pivotally connected at their outer ends to said supporting-plate at points therein on opposite sides of the axis of rotation thereof.

3. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, a moving element, and links connected together at their inner ends and to said moving element, said links pivotally connected at their outer ends to said supporting-plate at points therein on opposite sides of the axis of rotation thereof, the axes of said pivotal connection being in lines parallel with said axis of rotation.

4. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, a link pivoted at one end to said plate on one side of said axis of rotation, another link pivoted at one of its ends to the opposite end of the first-named link and at its other end to the said plate on the other side of its said axis of rotation, the connection between one of the said links and the said plate permitting also limited movement transverse of its pivotal axis, and a moving element connected to said links and operating same.

5. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, toggle-links having their outer ends pivoted thereto at points on opposite sides of said axis of rotation, said links pivotally connected together at their inner ends, a moving element connected to said links for transmitting a vibratory movement thereto, and a pitman receiving movement from said toggle-links.

6. Movement-transmitting mechanism including a plate, adjustable about an axis of rotation, toggle-links pivoted toward their outer ends to said plate at points in a straight line passing through said axis of rotation, said toggle-links having their inner ends pivoted together, the axis of said pivotal connection adapted to be coincident with said axis of rotation at a certain point in the movement of said links, and a moving element connected to said links for transmitting a vibratory movement thereto.

7. Movement-transmitting mechanism including a plate, adjustable about an axis of rotation, two links pivoted together positively at their inner ends, one of said links pivoted positively toward its outer end to the said plate on one side of the axis of rotation thereof, the other of said links having a sliding pivotal connection with said plate on the other side of said axis of rotation, and a moving element connected to said links for transmitting a vibratory movement thereto.

8. Movement-transmitting mechanism in-

cluding a moving element, toggle-links connected together at their inner ends, and to the said moving element, a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection therewith, and an adjustable support for the outer ends of said links.

9. Movement-transmitting mechanism including a moving element, toggle-links connected together between their points of support, and to the said moving element, a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection therewith, and a plate supporting the said links toward their outer ends, said plate adjustably mounted but having means for holding it stationary during the normal operation of the mechanism.

10. Movement-transmitting mechanism including a moving element, toggle-links connected together between their points of support, and to the said moving element, a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection along both said links, and from one of said toggle-links to the other, and a plate supporting the said links toward their outer ends, said plate adjustably mounted but having means for holding it stationary during the normal operation of the mechanism.

11. Movement-transmitting mechanism including a moving element, toggle-links connected thereto, a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection with the said toggle-links, a support for said toggle-links, and means permitting adjustment of said support but holding same stationary during the normal operation of the mechanism.

12. Movement-transmitting mechanism including a moving element, toggle-links connected thereto, and a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection therewith from a point common to both said links to points on either side thereof.

13. Movement-transmitting mechanism including a moving element, toggle-links connected thereto, a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions of connection therewith from a point common to both said links to points on either side thereof, a support for said toggle-links, and means permitting adjustment of said support but holding same stationary during the normal operation of the mechanism.

14. Movement-transmitting mechanism including an adjustable supporting-plate, toggle-links carried thereby by pivotal connection therewith toward their outer ends, said links pivoted together at their inner ends, a pivoted lever, means for imparting thereto a constant degree of movement, and a link connecting said toggle-links with said pivoted lever, and capable of adjustment with said pivoted lever to various points toward and away from the axis of its pivotal support.

15. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, toggle-links having their outer ends pivoted thereto at points on opposite sides of said axis of rotation, said links pivoted together at their inner ends, a pivoted lever, means for imparting thereto a constant degree of movement, and a link connecting said toggle-links with said pivoted lever and capable of adjustment with said pivoted lever to various points toward and away from the axis of its pivotal support.

16. Movement-transmitting mechanism including a plate, adjustable about an axis of rotation, toggle-links pivoted toward their outer ends to said plate at points in a straight line passing through said axis of rotation, said toggle-links having their inner ends pivoted together, the axis of said pivotal connection adapted to be coincident with said axis of rotation at a certain point in the movement of said links, a pivoted lever, means for imparting thereto a constant degree of movement, and a link connecting said toggle-links with said pivoted lever, and capable of adjustment with said pivoted lever to various points toward and away from the axis of its pivotal support.

17. Movement-transmitting mechanism including a plate, adjustable about an axis of rotation, toggle-links pivoted toward their outer ends to said plate at points in a straight line passing through said axis of rotation, said toggle-links having their inner ends pivoted together, the axis of said pivotal connection adapted to be coincident with said axis of rotation at a certain point in the movement of said links, a pivoted lever, means for imparting thereto a constant degree of movement, a link connected to said toggle-links and to said lever, the point of connection of said link with said lever being adjustable along various points in an arc of a circle drawn from the point of connection of the said link with said toggle-links when the said toggle-links and the said lever are in their central positions.

18. Movement-transmitting mechanism including a plate adjustably supported about an axis of rotation, toggle-links having their outer ends pivoted thereto at points on opposite sides of said axis of rotation, said links pivotally connected together at their inner ends, a pivoted lever, means for imparting thereto a constant degree of movement, a link connecting said toggle-links with said pivoted lever, and capable of adjustment with said pivoted lever to various points toward and away from the axis of its pivotal support, and a pitman deriving motion from said toggle-links, having means for adjusting it to varying positions along said toggle-links.

19. Movement-transmitting mechanism including a moving element, a toggle mechan-

ism connected thereto, a pitman connected to the latter, means for shifting the pitman relatively to the toggle mechanism including a rod, and a cam for actuating the same.

20. Movement-transmitting mechanism including a moving element, a toggle mechanism connected thereto, a pitman connected to the latter, means for shifting the pitman relatively to the toggle mechanism including a rod, a cam for actuating the same in one direction and a spring for actuating the same in the other direction.

21. Movement-transmitting mechanism including a moving element, a toggle mechanism connected thereto, a pitman connected to the latter, means for shifting the pitman relatively to the toggle mechanism including a rod, a lever supporting said rod and carrying a lug, and a cam for operating upon the lug.

22. Movement-transmitting mechanism including a supporting-plate 21^a adjustable upon an axis of rotation 22, toggle-links 26′ and 27 pivotally secured thereto and carried thereby, a connecting-link 33 connected at one end to said toggle-links, a vibrating lever 18 adjustably connected to the link 33 at its other end, a pitman 3 adjustably engaging said toggle-links, and means for varying the position of engagement of said pitman with respect to said toggle-links substantially as set forth.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES T. HOGAN.

Witnesses:
CHAS. MCCHAPMAN,
M. B. HOARE.