

(No Model.)

S. T. RICHARDSON.
MECHANICAL MOVEMENT.

No. 604,417.

Patented May 24, 1898.

Fig. 1.

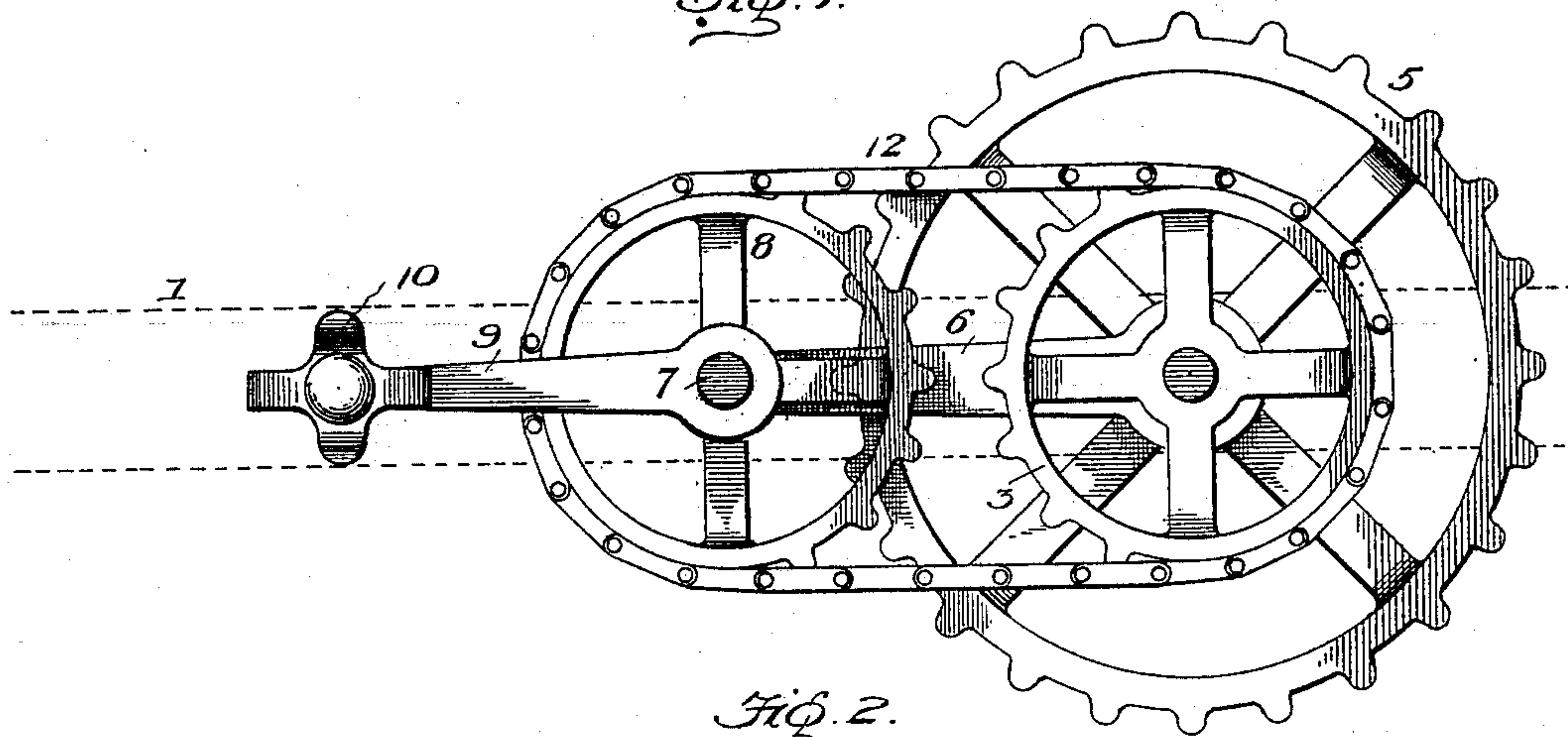


Fig. 2.

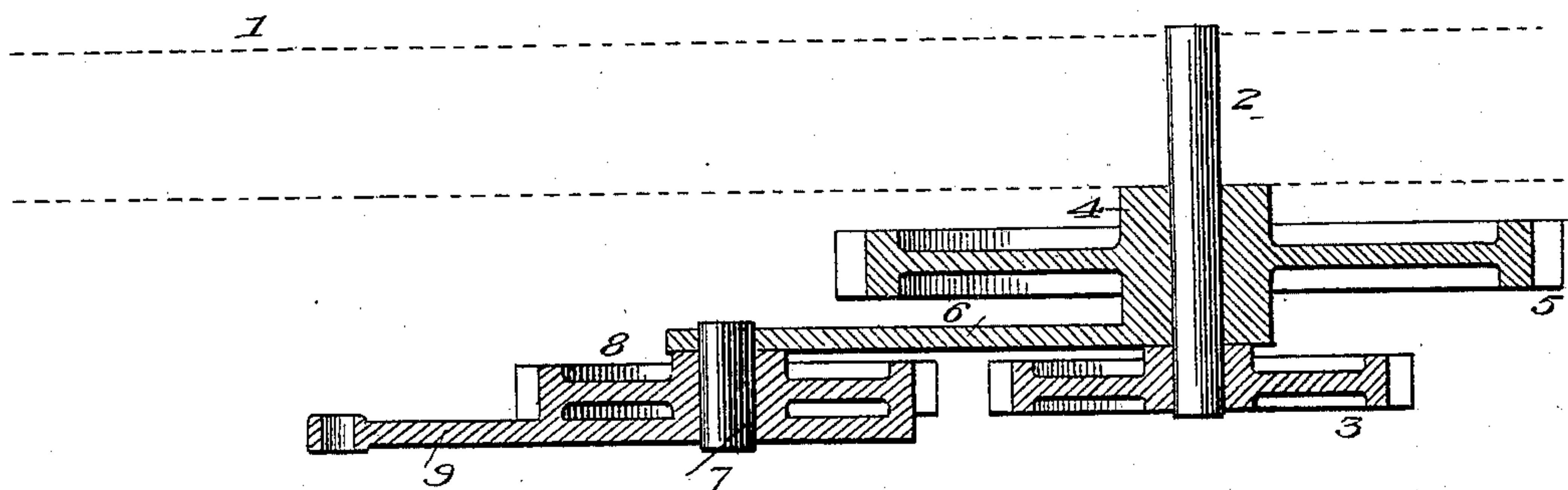
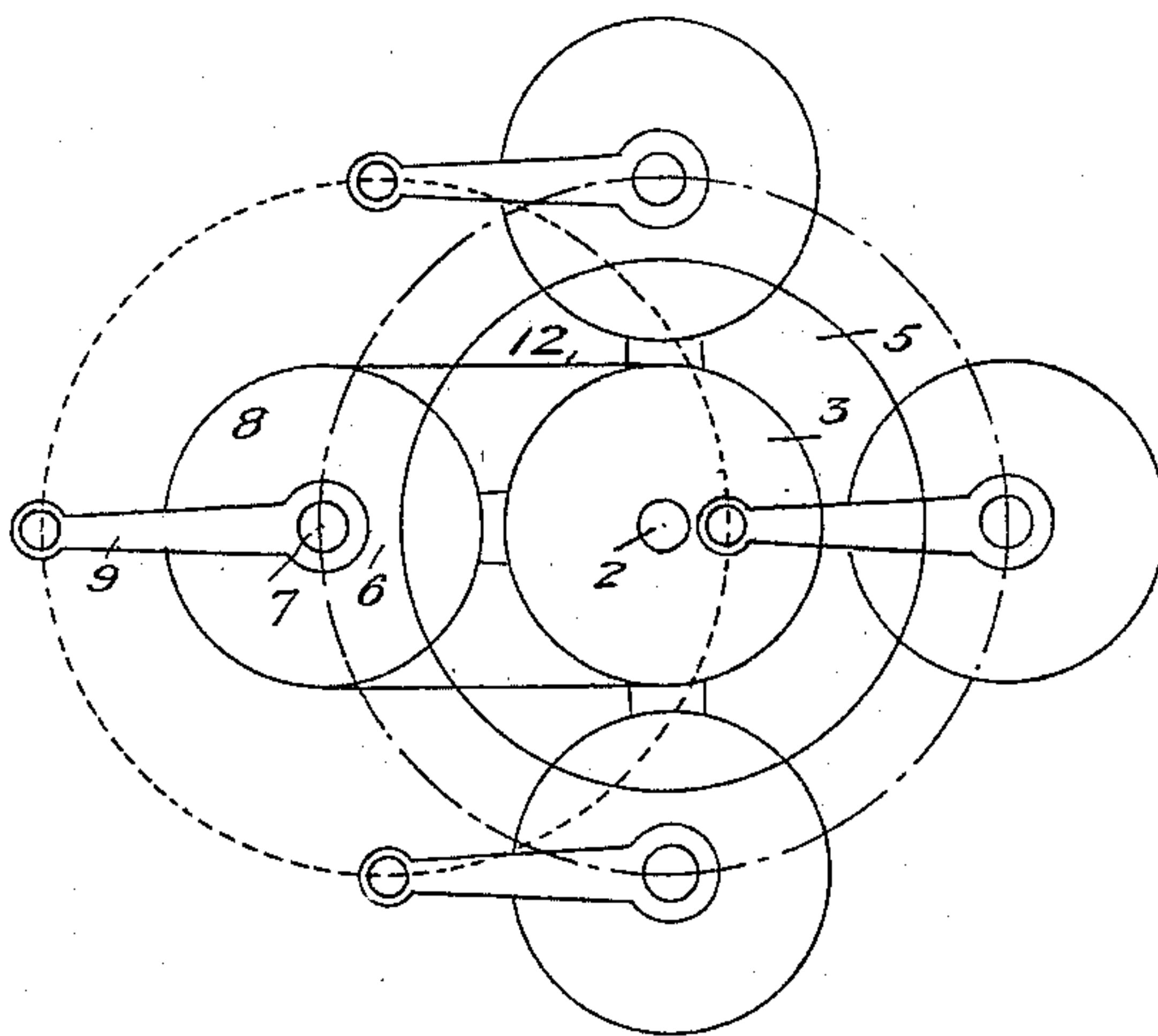


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL T. RICHARDSON, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-THIRD TO ALBERT E. HOLLAND, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 604,417, dated May 24, 1898.

Application filed October 19, 1897. Serial No. 655,710. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL T. RICHARDSON, a citizen of the United States, residing at Baltimore, in the State of Maryland, have
5 invented certain new and useful Improvements in Mechanical Movements; and I do declare the following to be a full, clear, and exact description of the invention, such as
10 it appertains to make and use the same.

My invention has relation to mechanical movements, and more particularly to that class of pedal-motors wherein increased leverage is provided at the point of greatest effect; and the object is to simplify the construction and increase the efficiency of the
15 same.

To these ends the invention consists in the construction, combination, and arrangement
20 of the device, as will be hereinafter more fully described, and particularly pointed out in the claim.

It is a well-known and unalterable law that the radius of a circle is its limit of power, and
25 assuming that the center of a gear or pulley wheel is its fulcrum it is clear that one half of the diameter will transmit no more power than is applied to the other half. Therefore the greater the distance between the center
30 of motion and the center of the crank-pin the larger will be the circle described by the crank-pin. Now if by any device a crank can be made to describe a circle the diameter of
35 which will be less than twice the distance between the center of motion and the crank-pin the usefulness is apparent. That this end has been attained I will endeavor to explain in the following drawings and specification.

The same references indicate the same parts
40 in the invention.

The accompanying drawings show my invention in the best form now known to me; but many changes in the details might be made within the skill of a good mechanic
45 without departing from the spirit of my invention as set forth in the claim at the end of this specification.

Figure 1 is a side elevation of a mechanical motor or movement embodying my invention.
50 Fig. 2 is a central horizontal section of the same with the chain omitted. Fig. 3 is a dia-

grammatic outline showing the position of the crank at four different points in a revolution.

1 represents a support, and 2 a stud-shaft rigidly fixed thereto, and 3 represents a sprocket-disk fastened on the outer end thereof, so that neither the shaft 2 nor the disk 3 revolve.

4 represents a hub or sleeve loosely mounted on said stud-shaft 2 and is firmly fastened to
60 a sprocket-wheel 5 and revolves therewith.

6 is a radial arm, in the outer end of which is provided a stud 7 and is fastened to the sprocket-wheel 5, or 4, 5, 6, and 7 may be manufactured as one of the integral parts of the
65 motor or movement.

8 represents a sprocket-wheel corresponding with sprocket-disk 3 and is loosely mounted on stud 7 on its axis, but does not revolve in its own plane, and to permit this the stud
70 7 revolves in said sprocket-wheel 8.

9 is a crank fastened to the sprocket-wheel 8 and is provided with a handle, pedal, stud, or crank-pin 10 in its outer end.

12 is a sprocket-chain encompassing
75 sprocket-disk 3 and sprocket-wheel 8 and has not the usual running movement of the ordinary sprocket-chain, because neither 3 nor 8 revolve around their centers.

It will be clearly seen that if the sprocket-disk 3 and the sprocket-wheel 8 are uniform—
80 that if radial arm 6 and crank 9 be placed in such position that they both stand out from the stud-shaft 2, on the same radial line therefrom, with sprocket-chain encompassing both—the
85 chain will hold crank 9 in line with crank 6 only until the crank-pin 10 is pushed down or up, when 8 will begin a revolution around 3, and the chain will, as it winds around 3, prevent 8 from revolving around its own center by unwinding off of it, and at the same
90 time it will keep crank 9 in continuous parallelism with that radius throughout its entire travel around disk 3, which compels the crank-pin 10 to describe a circle eccentric with stud-shaft 2. Now it will be seen that the circle
95 just described by crank-pin 10 is only about half the diameter of a circle that would be described by the combined length of radial arm 6 and crank 9 if done by the usual method.
100 The advantages gained are that the diameter of the circle, instead of the radius, is used for

leverage at the starting or prime point, and that any radius in a pulley or wheel can be used as a starting-point, from perpendicular to horizontal, by holding radial arm 6 and crank 9 in line on the radius required until disk 3 and wheel 8 are geared up with chain 12.

In the diagrammatic view, assuming that the parts are rotating in the direction of the arrow, it will be seen that at the beginning of the downward movement of the pedal the crank extends radially from the center of rotation of the sprocket-wheel 5, so that the greatest leverage is attained at the point of greatest vantage, and on the upward movement or return stroke of the pedal, when of course the power is inapplicable, the pedal traverses a path which leads it toward the center of the wheel 5, thus causing it to travel in a circle, as shown by the dotted line, which is eccentric to the path of the stud 7, which of course travels in a circular path concentric with the stud-shaft, as shown by the broken line in Fig. 3, and it will thus be seen that

increased leverage is secured and foot-pressure exerted at the most available point and just where the same can be most easily and readily utilized.

Having thus described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

A pedal-motor movement comprising a fixed sprocket-disk 3, and a sprocket-wheel 5, adapted to rotate on the axis of said disk and formed with the radial arm 6, carrying the stud 7 in combination with the sprocket-wheel 8, journaled on said stud and provided with crank 9, and the sprocket-chain 12 encompassing said disk and wheel 8, substantially as and for the purpose set forth.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

SAMUEL T. RICHARDSON.

Witnesses:

ALBERT P. STROBEL,
ALBERT EDWARD HOLLAND.