No. 699,910. Patented May 13, 1902.

J. T. CYR.

PIN WHEEL AND STAR WHEEL MOTION.

(Application filed Dec. 30, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2

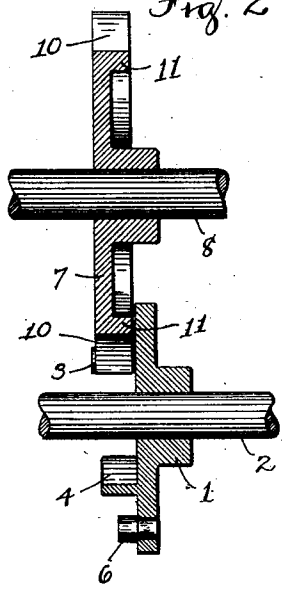


Fig. 1

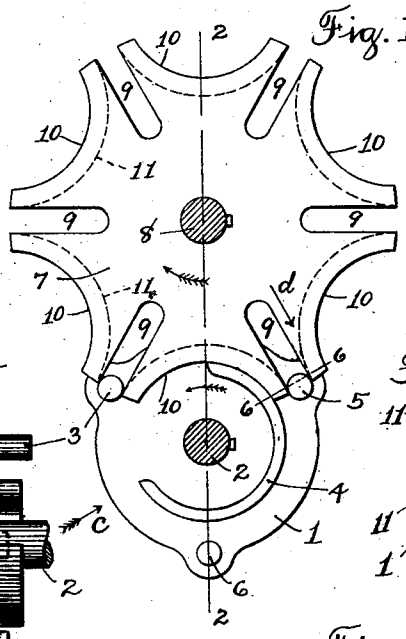


Fig. 5

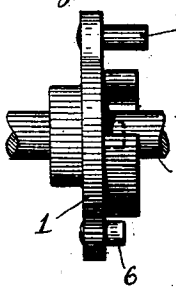


Fig 6

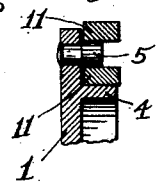


Fig. 4

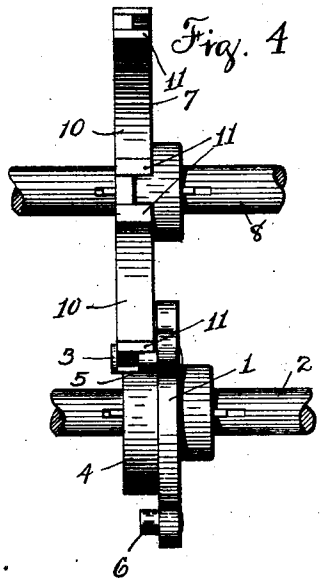
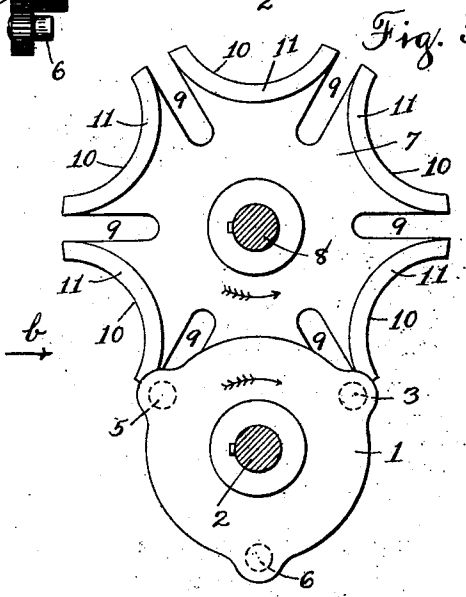


Fig. 3



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Fig. 7

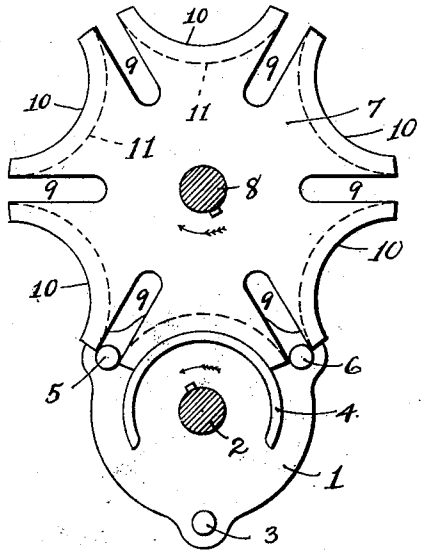
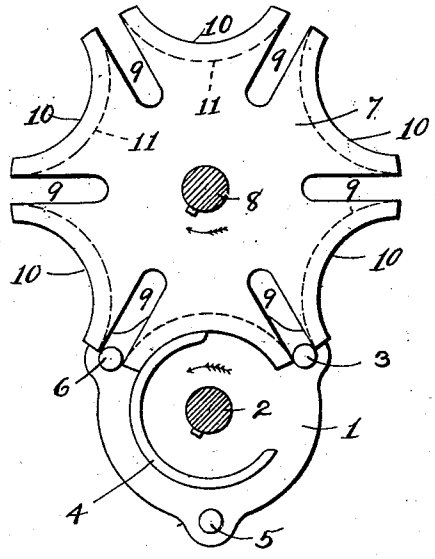


Fig. 8



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UNITED STATES PATENT OFFICE.

JOSEPH T. CYR, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PIN-WHEEL AND STAR-WHEEL MOTION.

SPECIFICATION forming part of Letters Patent No. 699,910, dated May 13, 1902.

Application filed December 30, 1901. Serial No. 87,657. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH T. CYR, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Pin-Wheel and Star-Wheel Motions, of which the following is a specification.

My invention relates to a pin-wheel and star-wheel motion, technically termed "Geneva motion," in which a continuous rotation of the pin-wheel as a driver communicates an intermittent rotary motion to the star-wheel. In the ordinary construction of this motion there is a liability of the star-wheel moving or turning or not being held rigidly in position after the driver-pin on the revolving pin-wheel passes out of the radial slot or recess in the periphery of the star-wheel and before the curved offset flange on the pin-wheel engages a sufficient portion of the corresponding-shaped recess in the periphery of the star-wheel to lock or hold the star-wheel and prevent its rotation until the continued rotation of the pin-wheel causes the driver-pin to engage the next radial slot or recess in the star-wheel to communicate another partial rotation thereto in the ordinary and well-known way.

The object of my invention is to prevent any moving or turning of the star-wheel except when it is engaged by the driver-pin of the rotating pin-wheel and to provide additional means for locking or holding the star-wheel in proper position during the entire period of its rest or dwell, so that it cannot move after the driver-pin on the rotating pin-wheel passes out of the radial slot or recess in the periphery of the star-wheel and until the driver-pin again enters the next radial slot or recess in the continued rotation of the pin-wheel.

In carrying out my invention I provide in addition to the ordinary driver-pin on the pin-wheel two additional shorter pins which are attached to the pin-wheel on the same side as the longer driver-pin and on the same arc of a circle as the driver-pin, with the three pins equal distances apart. I provide on the side of the star-wheel contiguous to the pin-wheel and at the edges thereof curved extensions or flanges between the radial slots, the curvature of which is concentric with the curvature of the recesses or depressions in the periphery of the star-wheel between the radial slots and the width of which is a little less than the distance between the curved offset flange on the pin-wheel and the two shorter pins thereon, all as will be hereinafter more fully described.

Referring to the drawings, Figure 1 is a side view of a pin-wheel and star-wheel motion embodying my improvements. Fig. 2 is a vertical section on line 2 2, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 corresponds to Fig. 1, but shows the reverse view of the pin-wheel and star-wheel motion. Fig. 4 is an edge view of the parts shown in Fig. 3 looking in the direction of arrow *b*, same figure. Fig. 5 is an edge view of the pin-wheel mounted on its shaft looking in the direction of arrow *c*, Fig. 1. Fig. 6 is a sectional detail on line 6 6, Fig. 1, looking in the direction of arrow *d*, same figure. Fig. 7 corresponds to Fig. 1, but shows a different position of the pin-wheel; and Fig. 8 corresponds to Fig. 1 and Fig. 6, but shows a different position of the pin-wheel.

In the accompanying drawings, 1 is the pin-wheel, in this instance keyed on a shaft 2, which is rotated continuously by any well-known means. The pin-wheel 1 has the driver-pin 3 and the curved offset flange 4 in the ordinary way. The pin-wheel 1 also has the two additional pins 5 and 6, shorter than the driver-pin 3 and on the same side of the pin-wheel as said pin. The three pins 3, 5, and 6 are equal distances apart and in the same arc of a circle.

The star-wheel 7 is in this instance keyed on a shaft 8 to communicate an intermittent rotary motion thereto. The star-wheel 7 has in this instance six radial slots or recesses 9 in its periphery to be engaged by the driver-pin 3 of the pin-wheel 1 to communicate an intermittent rotary motion to the star-wheel 7 in the usual way. Intermediate the radial slots 9 the periphery of the star-wheel 7 has

the concave curved depressions or recesses 10, the curvature of which corresponds to the curvature of the offset flange 4 on the pin-wheel 1 in the ordinary way.

Upon the side or face of the star-wheel 7 contiguous to the pin-wheel 1 and at the edges of the star-wheel are curved flanges or extensions 11, the curvature of which is concentric with the curvature of the depressions or recesses 10 in the periphery of the star-wheel and the width of which is a little less than the width or distances between the curved offset flange 4 on the pin-wheel 1 and the two shorter pins 5 and 6. (See Fig. 1.)

The operation of my pin-wheel and star-wheel motion will be readily understood by those skilled in the art. The continuous revolution of the shaft 2 communicates a continuous revolution to the pin-wheel 1, and the engagement of the driver-pin 3 with a radial slot 9 in the star-wheel 7 communicates a partial revolution to said star-wheel, in this instance a one-sixth revolution, and then there is a dwell of the star-wheel. In my improved construction of the pin-wheel and star-wheel motion as the driver-pin 3 on the pin-wheel 1 leaves a radial slot 9 in the star-wheel 7 after communicating a partial revolution to the star-wheel 7, as above described, one of the shorter pins, as 5, (see Fig. 1,) is just entering the outer end of the next radial slot 9 and engaging the inner edge of the curved flange or extension 11 at the edge of the star-wheel 7, and one end of the curved offset flange 4 on the pin-wheel 1 is engaging the curved recess or depression 10 in the periphery of the star-wheel 7, the flange or extension 11 passing between the pin 5 and the flange 4, as shown in Fig. 6. With the pin 5, the flange 11 on the star-wheel 7, and the flange 4 on the pin-wheel, in the position above described and shown in Fig. 1 the star-wheel 7 is held or locked securely in its position, and any movement thereof due to backlash or other causes is prevented. In the continued revolution of the pin-wheel 1 the pin 5 travels over the inner edge of the curved flange 11 on the star-wheel 7, being short enough to pass free of the flat face or surface of the star-wheel contiguous to the pin-wheel, and the curved flange 4 passes over the outer edge of the curved recessed portion 10 in the periphery of the star-wheel 7 until the pin 5 passes out of the radial slot 9. As the pin 5 passes out of the radial slot 9 the pin 6 passes into the first radial slot 9, as shown in Fig. 7, and occupies the position of the pin 5 shown in Fig. 1 and acts to hold and lock the star-wheel 7 when released from the pin 5. In the continued revolution of the pin-wheel 1 the pin 6 travels to the outer end of the next radial slot 9 and the driver-pin 3 to the outer end of the previous radial slot 9, as shown in Fig. 8, to communicate another partial revolution to the star-wheel 7, after which partial revolution the star-wheel 7 and pin-wheel 1 will be in the position shown in Fig. 1, and the operation of locking the star-wheel in position will be repeated, as above described. It will thus be seen that during the entire period of rest or dwell of the star-wheel 7 the curved flange or extension 11 on the star-wheel 7 is engaged and held between the curved flange 4 and one of the pins 5 or 6 on the pin-wheel 1 and is thus locked securely in position during such time.

The advantages of my improvements will be readily appreciated by those skilled in the art. The star-wheel is firmly locked every time it comes to a stop. In the ordinary construction the star-wheel is left loose just at the time the operating-pin comes out of the radial slot, and at that very time if the strain is to be held back the pin cannot hold the star-wheel steady.

It will be understood that the details of construction of my improvements may be varied, if desired, and my pin-wheel and star-wheel motion may be used in connection with any mechanism in which an intermittent rotary motion from a continuous rotary motion is desired.

Instead of a star-wheel with six radial slots, as shown, a star-wheel with four radial slots or eight or more radial slots may be used, if preferred.

I have shown in the drawings and described pins on the pin-wheel for engaging the radial slots in the star-wheel to lock the same; but it will be understood that instead of pins rolls mounted on pins or other equivalent devices may be used, if preferred.

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

1. In a pin-wheel and star-wheel motion, a pin-wheel having a driver-pin, a curved flange or extension, and two shorter pins, the three pins being on the same arc of a circle and equal distances from each other, and a star-wheel, having radial slots in its periphery, and concave recesses or depressions intermediate said slots, and curved flanges or extensions on one side near the edge, substantially as shown and described.

2. In a pin-wheel and star-wheel motion, a pin-wheel, having a driver-pin, a curved flange or extension, and two shorter pins, the three pins being on the same arc of a circle, and equal distances from each other, and a star-wheel, having radial slots in its periphery, and concave recesses or depressions intermediate said slots, and curved flanges or extensions on one side near the edge, the width of said flanges being a little less than the width or distance between the curved flange on the pin-wheel and the two shorter pins thereon, substantially as shown and described.

3. In a pin-wheel and star-wheel motion, means for locking or holding the star-wheel in position during its rest or dwell, consist-

ing of a curved flange or extension on the pin-wheel, two shorter pins on the pin-wheel, in the same arc of a circle as the driver-pin, and equal distances apart, and a curved flange or extension on the star-wheel, which extends between the two shorter pins and the curved flange on the pin-wheel, when the star-wheel is at rest, substantially as shown and described.

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