(No Model.) 2 Sheets—Sheet 1.

N. M. SAATI.

MECHANICAL MOVEMENT.

No. 510,557. Patented Dec. 12, 1893.

Fig. 1.

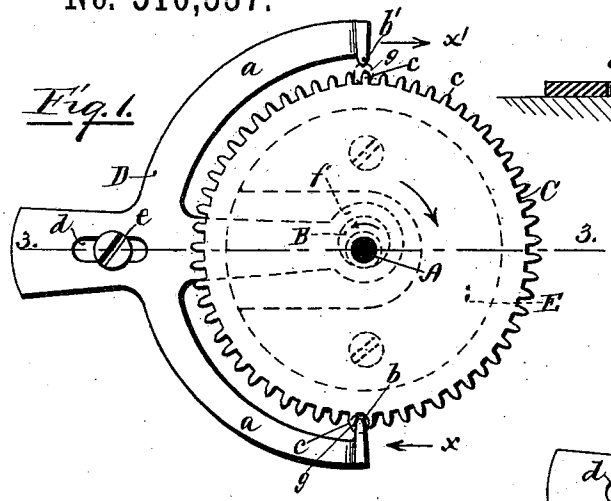


Fig. 3.

Fig. 2.

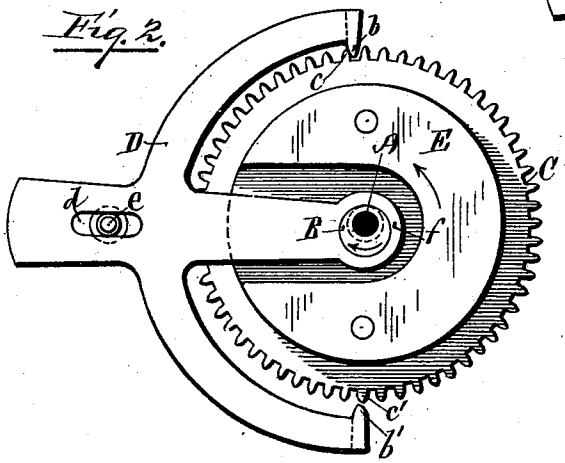


Fig. 4.

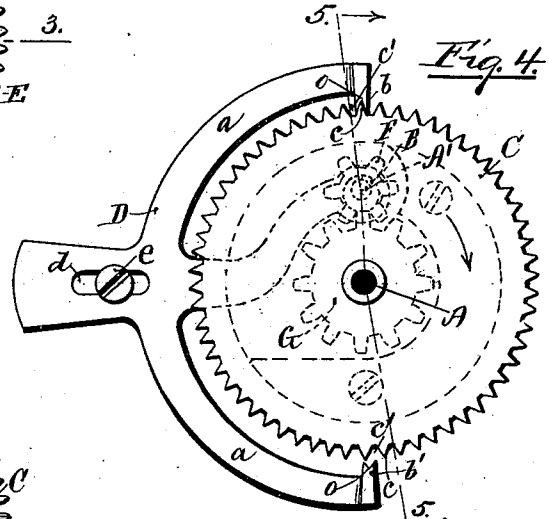


Fig. 5.

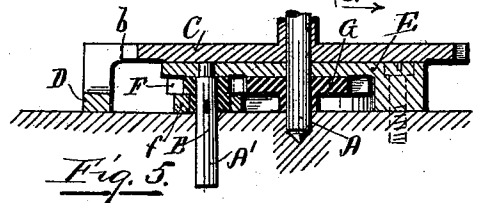


Fig. 7.

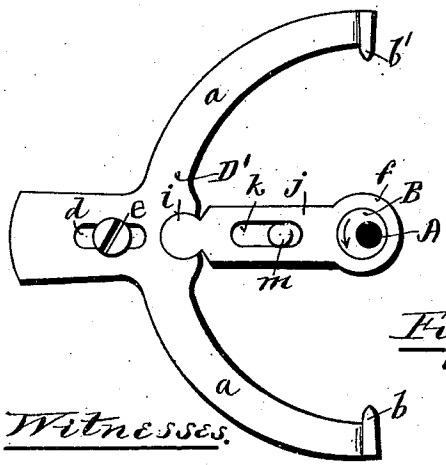
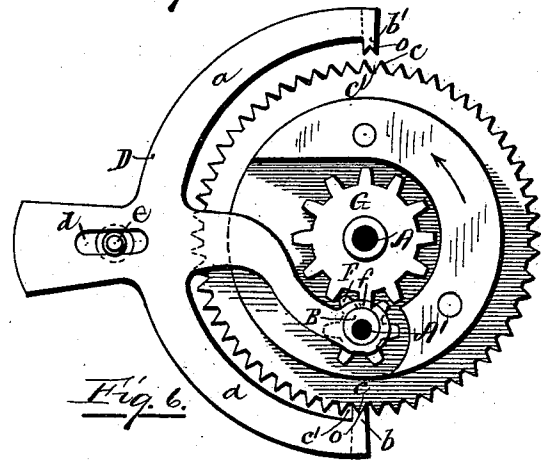


Fig. 6.



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(No Model.) 2 Sheets—Sheet 2.

N. M. SAATI.

MECHANICAL MOVEMENT.

No. 510,557. Patented Dec. 12, 1893.

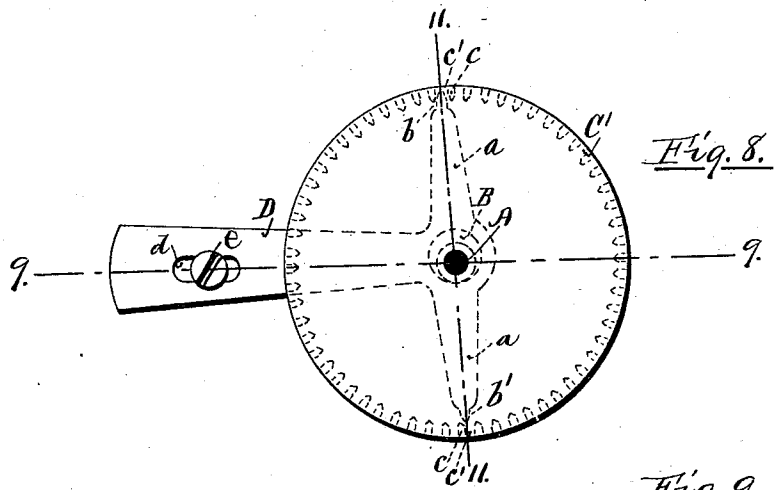

Fig. 8.

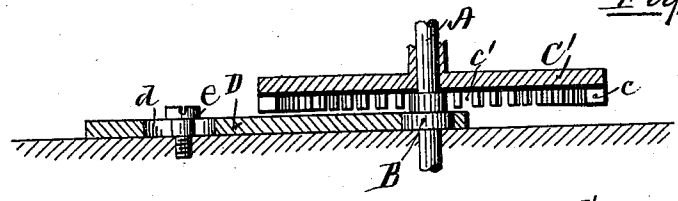

Fig. 9.

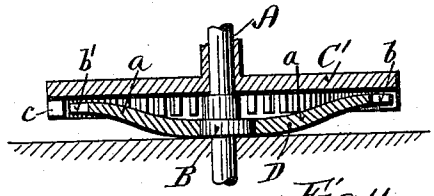

Fig. 11.

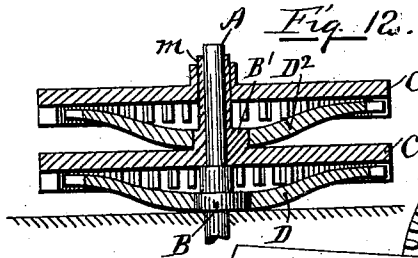

Fig. 12.

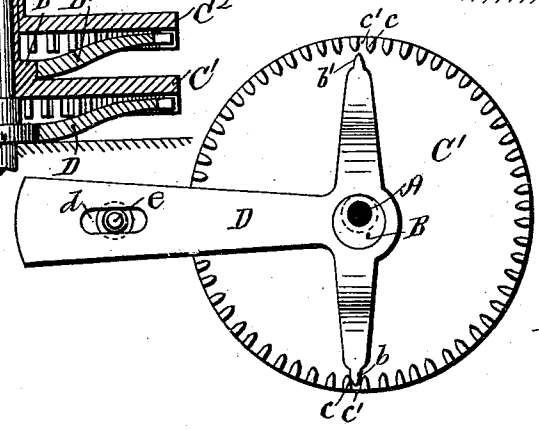

Fig. 10.

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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 510,557, dated December 12, 1893.

Application filed September 21, 1892. Serial No. 446,489. (No model.)

To all whom it may concern:

Be it known that I, NOWMAN M. SAATI, a subject of the Sultan of Turkey, residing at Providence, in the State of Rhode Island, have invented a new and useful Mechanical Movement, of which the following is a specification.

My invention relates to a mechanical movement adapted for reducing the rate of rotation in mechanical devices, and it consists in a toothed wheel actuated by means of a branching lever, and an eccentric or crank, to cause the alternate engagement of the spurs of the lever with the teeth at the opposite edges of the wheel, to impart a rotary movement thereto, as hereinafter fully set forth.

Figure 1, represents a top view showing one form of my invention. Fig. 2, represents an under view of the same. Fig. 3, represents a vertical section taken in the line 3, 3, of Fig. 1. Fig. 4, represents a top view showing a modification. Fig. 5, represents a vertical section taken in the line 5, 5, of Fig. 4. Fig. 6, represents an under view of the same. Fig. 7, represents a top view of a compound lever, adapted to impart a movement to the toothed wheel, in a reverse direction from that shown in Fig. 1. Fig. 8, represents a top view, showing a crown wheel, and the engaging lever arranged for operation at the inner side of the teeth of the wheel. Fig. 9, represents a vertical section taken in the line 9, 9, of Fig. 8. Fig. 10, represents an under view of the crown wheel and the branching levers. Fig. 11, represents a vertical section taken in the line 11 of Fig. 8. Fig. 12, represents a sectional view as in Fig. 11, showing a plurality of toothed wheels, eccentrics, and engaging levers, upon the same axis.

In the accompanying drawings, Figs. 1, 2 and 3, A represents the driving shaft, B an eccentric, secured to said shaft, C a toothed wheel of any desirable number of teeth arranged loosely upon the shaft A, and D is a lever, provided with the branching arms *a*, *a*, having at their ends the upturned diametrically arranged engaging spurs *b*, *b'*, adapted to engage with the teeth *c* of the wheel. The lever D is provided with a guide slot *d*, adapted to receive the fulcrum stud *e*, and with the circular head *f*, adapted to fit the eccentric B, and between the eccentric B and lever D, and the wheel C, is placed the bridge E, which is attached to a supporting plate F.

When the shaft A is rotated in the direction shown by the arrow in Fig. 1, the diametrically arranged opposite engaging spurs *b*, *b'*, will be caused to move in the circles *g*, *g*, to alternate engagement and disengagement with the teeth of the wheel C; and when the spur *b* is in engagement with the tooth *c*, of the wheel, movement will be imparted thereto in the direction of the arrow *x*, and upon the continued rotation of the shaft A the opposite spur *b'* will be brought into engagement with the tooth *c*, which will be moved in the direction of the arrow *x'*, thus imparting motion to the wheel C in the same direction as before, which direction will be opposite to that of the shaft A; and the continued rotation of the shaft A, will cause the continued rotation of the wheel C, tooth by tooth, and upon the reversal of the rotary movement of the shaft A, a reverse rotary movement will be imparted to the toothed wheel C, and either one or the other spurs *b*, *b'*, will be at all times in engagement with a tooth of the wheel, so that the wheel cannot be made to skip a tooth and thus operate with uncertainty.

Whenever it is desired to cause the rotation of the shaft A and the wheel C in the same direction with each other, the engagement lever D may be made of compound construction, as shown by D' in Fig. 7, so as to reverse the engaging movement of the studs *b*, *b'*, and thus cause the same rotary movement of the wheel C, as before; and in this case the branching arms, *a*, *a*, are provided with the guide slot *d* and fulcrum stud *e*, and with the circular socket *i*, to which is jointed the lever *j*, having a head *f* adapted to fit the eccentric B, and provided with the slot *k* adapted to receive the fulcrum stud *m*, so that, when the shaft A is turned in the direction of the arrow, the reverse engagement of the studs *b*, *b'*, by reason of the jointed construction of the lever D', will drive the wheel C, in the same direction with the shaft A. The engaging studs *b*, *b'*, of the branching lever D, or D', are so arranged relatively to the teeth of the wheel, that when the eccentric B

is in the position shown, the stud *b* will be in full engagement between the adjoining teeth at the side of the wheel, while the stud *b'* is held opposite the point of a tooth, at the opposite side of the wheel.

Another arrangement for driving the shaft A, and the wheel C, in the same direction, is shown in Figs. 4, 5, and 6, and in this case the lever D is also shown as adapted to make twice the ordinary number of vibrations, so that upon each complete vibration of the said lever, the wheel will be moved through the space of one-half of a tooth, instead of a whole tooth as before. The eccentric B instead of being placed upon the shaft A, is placed upon a driving shaft A', and at the side of the eccentric B is placed the pinion F, which engages with the gear G of twice its number of teeth, upon the shaft A. The eccentric B will thus be caused to revolve with twice the rapidity of the shaft A, and will also revolve in the reverse direction to that of the said shaft; and in order to move the wheel C for the space of one-half a tooth, at each complete vibration of the lever D, the engaging studs *b*, *b'*, instead of being pointed as shown in Fig. 1, are provided with a notch *o*, adapted to receive a tooth *c*, of the wheel, the said studs being at the same time of the proper thickness to enter the spaces *c'* between the teeth, and when the shaft A' is rotated, the stud *b* will first receive the top of a tooth *c*, and at the next vibration enter the space *c'* between the teeth, and so on, alternately, while the opposite stud *b'* will enter the space *c'*, and at the next vibration receive the top of a tooth *c*, and so on, alternately, requiring two full vibrations of the lever D, to produce a movement of one tooth in the wheel C.

Another modification of my invention is shown in Figs. 8 to 11, inclusive, in which a crown wheel C', is employed to turn loosely upon the shaft A, the eccentric B being attached to the said shaft; and in this case, the branching lever D may be employed to operate upon the inner side of the teeth *c* of the wheel C', the said lever being made to fit the eccentric B, and provided with the guide slot *d* adapted to receive the fulcrum stud *e*, and the branching arms *a*, *a*, of the lever D are provided with the tapering spurs *b*, *b'*, adapted to enter the spaces *c'* between the teeth of the wheel C', to cause the revolution of the wheel, by the alternate engagement of the said studs with the teeth *c* at the opposite edges of the wheel. The branching lever D, shown in Fig. 1, may also be employed with the crown wheel C', and in that case the rotation of the wheel C', will be reversed, when the shaft A is being rotated in the same direction as before.

This improved mechanical movement, is adapted for employment in watches and clocks, and in various registering machines requiring a greatly reduced rate of movement, and several sets of toothed wheels with operating eccentrics and branching levers, may be employed upon the same axis, as shown in Fig. 12, the second eccentric B' being attached to the side of the wheel C', and made to operate a lever D^2, which engages with the teeth of the wheel C^2, placed loosely either upon the shaft A, or upon the hub *m* of the wheel C', resulting in the greatly diminished movement of the wheel C^2.

I claim as my invention—

1. The combination with the toothed wheel and the eccentric, of the lever fitting the eccentric, and provided with the two diametrically arranged spurs which by engagement first with the teeth of one, and then the teeth of the other, of two opposite sides of the wheel, will cause the rotation of the said wheel, substantially as described.

2. The combination with the toothed wheel, of the eccentric, and the compound engaging lever fitting the eccentric, and having spurs adapted to engage alternately with the teeth at the opposite edges of the wheel, substantially as described.

3. The combination with the toothed wheel, and the eccentric, of the engaging lever fitting the eccentric, and having forked engaging spurs adapted to engage alternately with the points, and the sides of the teeth, at the opposite edges of the wheel, substantially as described.

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Witnesses:
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JAMES W. BEUMAN.