M. H. AGAHAN.

MECHANICAL MOVEMENT.

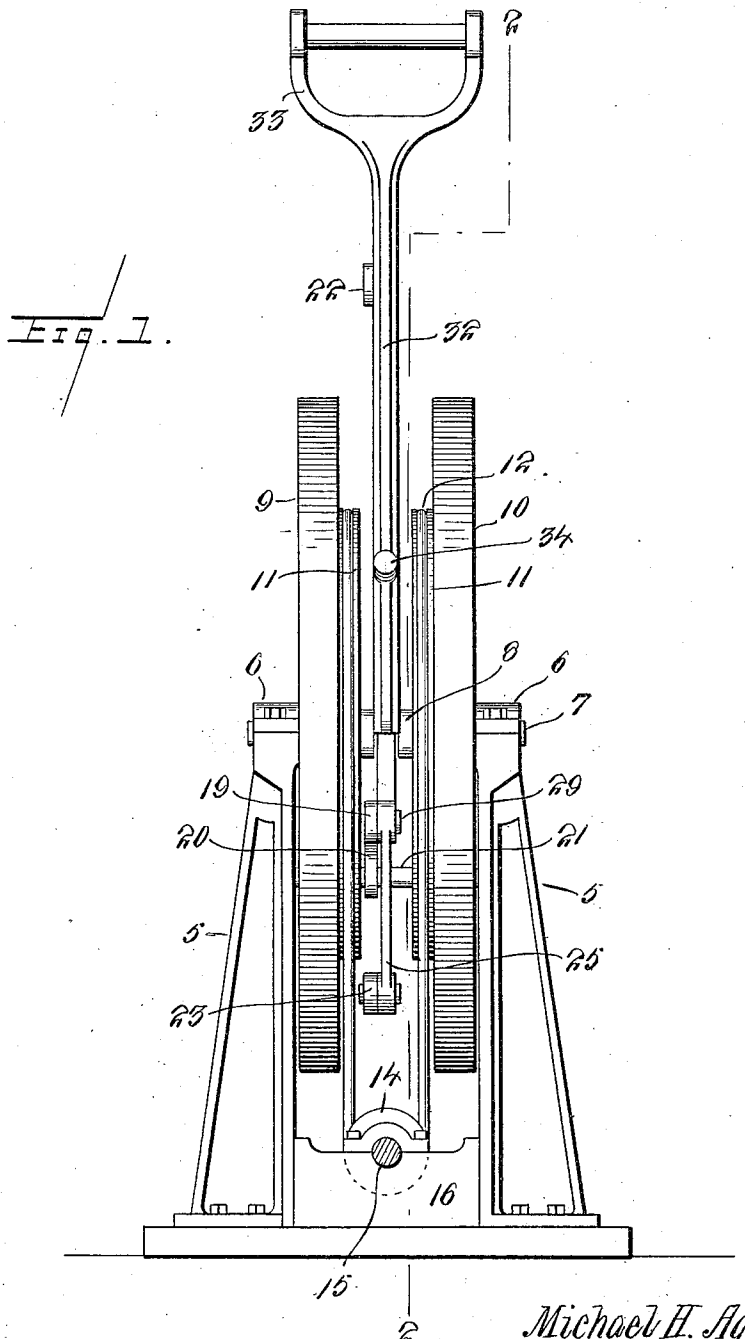
APPLICATION FILED OCT. 18, 1910. RENEWED MAY 28, 1912.

1,049,032.

Patented Dec. 31, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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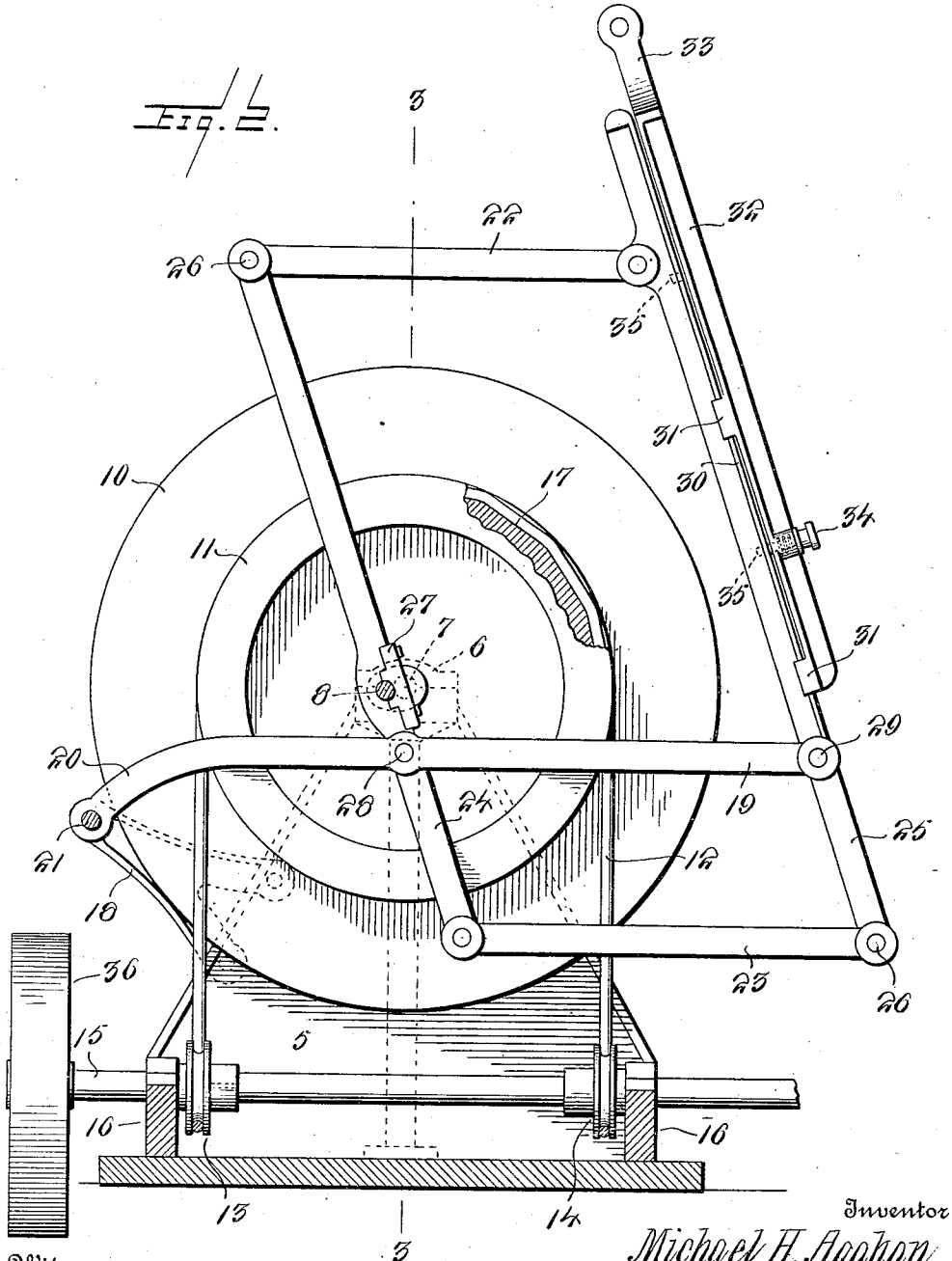
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

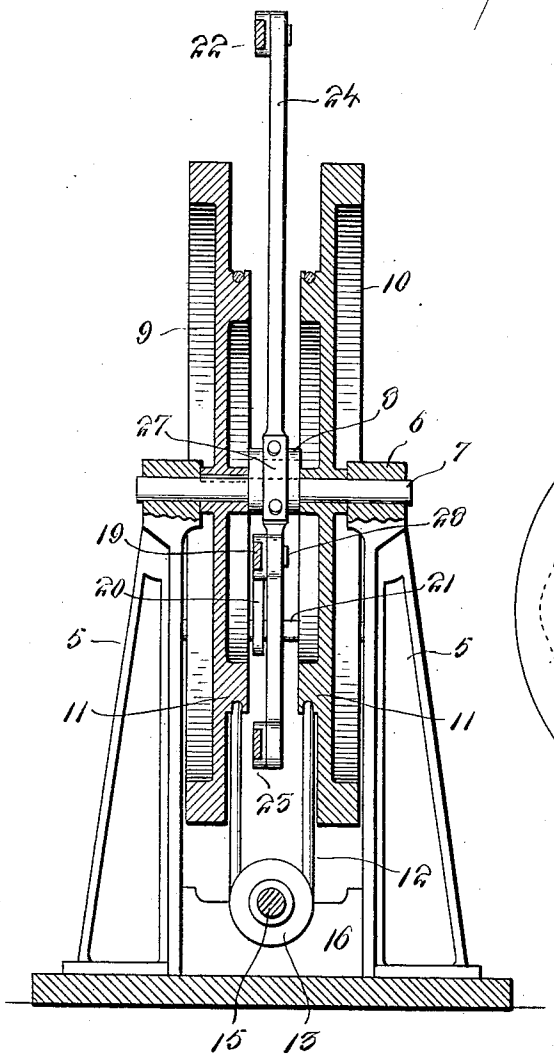
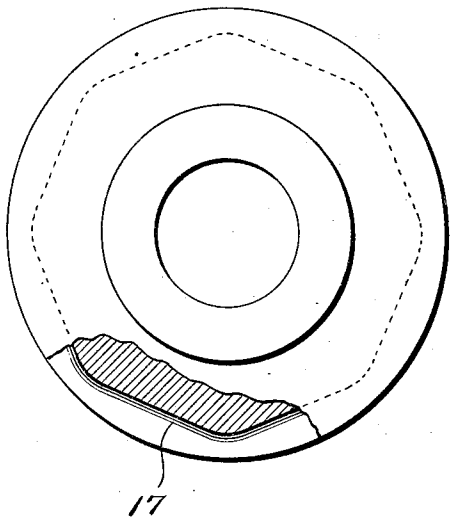


Fig. 4.



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MECHANICAL MOVEMENT.

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To all whom it may concern:

Be it known that I, MICHAEL H. AGAHAN, a subject of the Sultan of Turkey, residing at West Hoboken, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Mechanical Movements, of which the following is a specification.

The invention relates to mechanical movements and more particularly to the class of reciprocatory mechanism for producing rotary motion.

The primary object of the invention is the provision of mechanism in which a plurality of pivotally connected levers are arranged parallelogrammatically and cooperatively with a cranked shaft, whereby on reciprocatingly actuating the said levers the said shaft will receive positive rotary motion for driving shop machinery or that used in aeronautic or aquatic propulsions.

Another object of the invention is the provision of mechanism in which combined reciprocatory and rotary motions may be utilized for attaining driving power so that the possibility of an inertia during the operation thereof is overcome and at the same time the resistance between the coöperative parts is reduced to a minimum.

A still further object of the invention is the provision of mechanism of this character in which rotary motion may be imparted to a shaft by means of a set of manually reciprocated pivotally connected levers arranged in parallelogram so that the said shaft will be driven at a uniform speed.

A still further object of the invention is the provision of mechanism of this character which is simple of construction, thoroughly reliable and efficient in operation and inexpensive in manufacture.

In the drawings accompanying and forming part of this specification, is illustrated the preferred form of embodiment of the invention, which to enable those skilled in the art to carry the invention into practice, will be set forth at length in the following description, while the novelty of the invention will be pointed out in the claims succeeding the description.

In the drawings: Figure 1 is a front elevation of a device constructed in accordance with the invention. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is a sectional view on the line 3—3 of Fig. 2. Fig. 4 is a side elevation of one of the shaft pulleys, the same being partly broken away.

Similar reference characters are employed to designate corresponding parts throughout the several views of the drawings:—

Referring to the drawings by numerals, 5 designates the spaced vertical uprights which may be of any desirable shape and constructed from any suitable material, the same being supported upon any suitable foundation and are formed with alining bearings 6 in which is journaled a rotatable shaft 7, the same being formed between the bearings 6 with a medial crank 8, at opposite sides of which are disposed fly-wheels 9 and 10, the same being formed with the usual hubs surrounding the shaft 7. The fly-wheel 9 is suitably fixed to the said shaft, 7, while the fly-wheel 10 is loosely supported thereby.

Formed on the inner faces of the fly-wheels 9 and 10 are groove pulley flanges 11 forming pulley rims, the latter being formed integral with the said fly-wheels or made separate therefrom and attached thereto in any suitable manner and trained over these pulley rims 11 is an endless cable or belt 12, the latter being also trained over the groove pulleys 13 and 14, respectively, which are mounted upon a driven shaft 15 journaled for rotation in suitable bearings 16 connected with and rising from the foundation supporting the uprights 5, the pulley 14 being loosely mounted upon the said driven shaft 15, while the pulley 13 is suitably fixed thereto. It will be seen that when rotary movement is imparted to the fly-wheel 9 the endless cable or belt 12 will transfer such movement to the rotary shaft 15, but upon the rotation of this fly-wheel 9 and the shaft it will be noted that the fly-wheel 10 will be caused to rotate in a reverse direction to the said fly-wheel 9 and also the pulley 14 will rotate reversely to the direction of movement of the pulley 13 on the driven shaft.

As heretofore stated the fly wheel 10 is loosely supported upon its shaft and likewise the pulley 14 on its shaft so that on the travel of the cable or belt a continuous rotary movement will be imparted to the

shaft 15 in one direction with the least possible resistance and wear upon the cable or belt will be obviated. Thus it will be seen that during the continuous rotation of the shaft 15 an equilibrium of momentum is attained as driving energy is exerted at opposite sides of the axis of said shaft 15 while in motion.

The beds of the grooves in the pulley rims 11 and the pulleys 13 and 14, respectively, are provided with flattened surfaces 17 throughout the peripheries thereof; thus these surfaces will frictionally hold the endless cable or belt 12 from slipping upon the said pulley rims and pulleys within the grooves therein in which the said belt or cable is engaged, thus assuring positive drive therebetween.

Secured to the uprights 5 are rearwardly extending brackets 18 with which is connected a vertically swinging arm 19, the same being connected between the said brackets at its rear downwardly curved end 20 by means of a pivot pin 21. This lever 19 projects forwardly between the fly-wheels 9 and 10 below the shaft 7 and is pivotally connected with manually operated means, as will be more fully hereinafter described.

The manually operated means comprise a plurality of parallelogrammatically arranged levers 22, 23, 24 and 25 connected together by means of pivots 26, the lever 24 being provided medially of its length with a bearing 27 loosely receiving the crank 8 of the shaft 7, and below this bearing 27 is connected the arm 19 by means of a pivot 28 which arm 19 is further connected to the lever 25 by means of a pivot 29, the said pivots 28 and 29 being disposed equi-distant from the ends of the levers 24 and 25.

Formed on the lever 25 for a greater portion of its length are laterally extending flanges 30 slidably engaged by means of inturned guide ears 31 integral with and projecting laterally from an adjustable handle-bar or beam 32, the same being formed at its upper end with a loop hand grip 33. Carried by the handle-bar or beam 32 is a finger control spring held locking detent 34, the same being adapted to normally engage with any one of a series of notches 35 formed in the lever 25 so that upon changing the engagement of the detent 34 into any one of the said notches in the lever 25 the handle-bar 32 may be adjusted relative to the lever 25 for increasing or decreasing the leverage of the handle-bar as the occasion may require.

In operation the handle-bar 32 is reciprocated, thereby reversely altering the parallelogrammatically arranged pivoted levers 22, 23, 24 and 25, thus causing a vertically directed rise and fall of the swinging arm 19, and by the connection of the crank 8 in the shaft 7 with the lever 24, the said shaft will be rotated which motion will be transferred to the driven shaft 15 through the medium of the pulley and belt connections between the latter and the fly-wheels supported by the crank shaft.

It will be evident that when the series of levers arranged in parallelogram are reciprocated by reason of their fulcrum connection with the arm 19, the crank 8 of the shaft 7 will be rotated in a circle and the said arm 19 serve as a resistance for altering the parallelogram in the movement of the levers. The shaft 7 will be driven in a uniform manner with the least possible resistance and by reason of the fly-wheels the impetus will be constant, and require the least possible leverage for the operation of the device. Upon the driven shaft 15 is fixed a fly wheel 36 of the ordinary well-known construction.

Having thus described the invention, what is claimed as new is:—

1. The combination with a pair of rotary elements, of fly wheels mounted upon one of said elements, one of said fly wheels being fixed thereto while the other is loose thereon, pulleys upon the other rotary element, one of said pulleys being fixed to the said last named element while the other is loose thereon, pulley rims fixed to the fly wheels, a driven endless cable trained over said pulley rim, the pulleys and parallelogrammatic mechanism having crank connections with one of said rotary elements for operating the same and a resistance fulcrum for the said mechanism.

2. The combination with spaced vertical stationary uprights, of a crank shaft journaled therein, fly wheels mounted upon said shaft one of said fly wheels being fixed thereto and the other loose thereon, pulley rims on the fly wheel, a driven shaft at right angles to the axis of movement of the crank shaft, pulleys on said driven shaft, one of said pulleys being fixed thereto and the other loose thereon, an endless cable trained over the said pulley rims and pulleys, and a series of pivotally connected levers fulcrumed on said uprights and disposed in a parallelogram system and connected with said crank shaft for rotating the same.

3. The combination with spaced vertical stationary uprights, of a crank shaft journaled therein, fly wheels mounted upon said shaft one of said fly wheels being fixed thereto and the other loose thereon, pulley rims on the fly wheel, a driven shaft at right angles to the axis of movement of the crank shaft, pulleys on said driven shaft, one of said pulleys being fixed thereto and the other loose thereon, an endless cable trained over the said pulley rims and pulleys, a series of pivotally connected levers fulcrumed on said uprights and disposed in a parallelogram system and connected with said crank shaft

for rotating the same and an extensible handle bar connected with one of the levers of the parallelogram system.

4. In mechanism of the class described a pair of spaced vertical uprights, a shaft journaled in said uprights and having a crank, fly wheels mounted upon the shaft at opposite sides of the crank, one of said fly wheels being fixed to the shaft and the other loose thereon, a driven shaft, journals supporting the said shaft, pulleys arranged on the shaft, one of said pulleys being fixed to the shaft and the other loose thereon, pulley rims formed on the fly wheels, an endless cable trained over the pulley rims and the pulleys and mechanism connected with the crank for turning the same.

5. In mechanism of the class described, a shaft journaled for rotation and having a crank, fly wheels mounted upon the said shaft, one of said fly wheels being fixed to the shaft and the other loose thereon, a driven shaft, journals supporting the said driven shaft, pulleys arranged on the driven shaft, one of said pulleys being fixed to the said shaft and the other loose thereon, pulley rims formed on the said fly wheels, an endless cable trained over the pulley rims and the pulleys, a fulcrum arm pivotally supported, and a series of pivotal levers arranged in parallelogram and connected with the said arm and the crank.

6. In mechanism of the class described, a shaft journaled for rotation and having a crank, fly wheels mounted upon the said shaft, one of said fly wheels being fixed to the shaft and the other loose thereon, a driven shaft, journals supporting the said driven shaft, pulleys arranged on the driven shaft, one of said pulleys being fixed to the said shaft and the other loose thereon, pulley rims formed on the said fly wheels, an endless cable trained over the pulley rims and the pulleys, a fulcrum arm pivotally supported, a series of pivotal levers arranged in parallelogram and connected with the said arm and the crank, and adjustable manually operated means connected with the said levers.

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

MICHAEL H. AGAHAN.

Witnesses:
F. O. PARKLEE,
BENNETT S. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."