

W. S. HARMON.
MECHANICAL MOVEMENT.
APPLICATION FILED DEC. 22, 1910.

1,056,413.

Patented Mar. 18, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

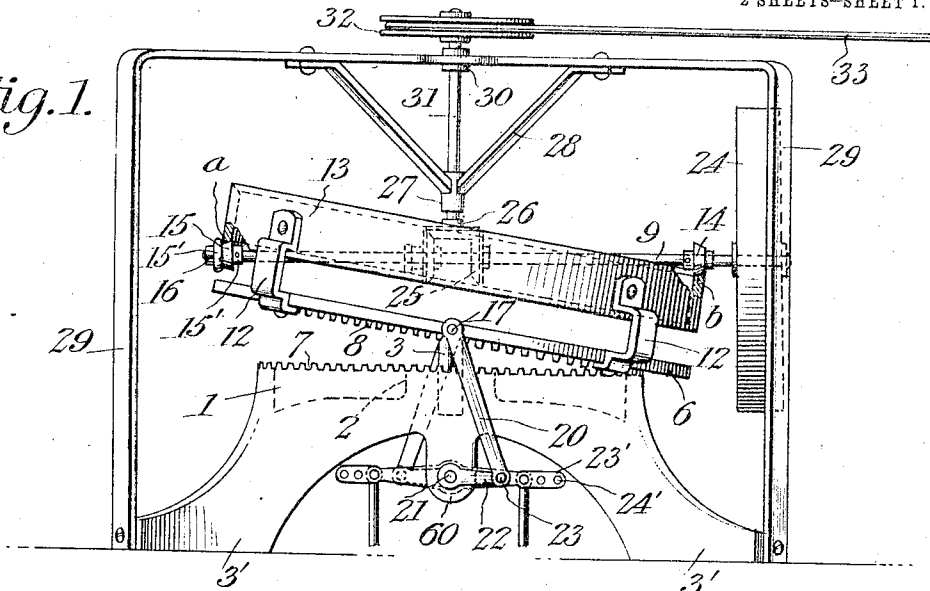


Fig. 2.

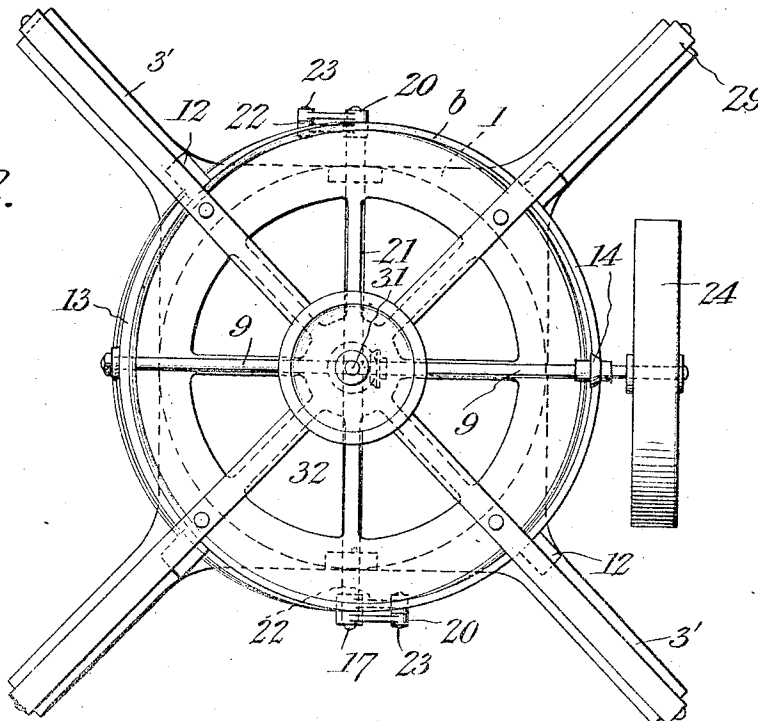
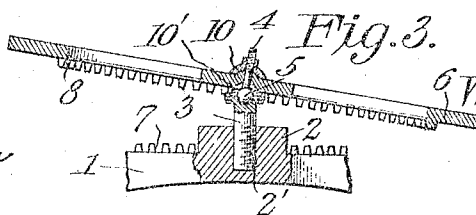


Fig. 3.



WITNESSES

Anton S. Belt
A. J. Barnham

INVENTOR

William S. Harmon

Geo. W. Sues
Attorney

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2 SHEETS—SHEET 2.

Fig. 4.

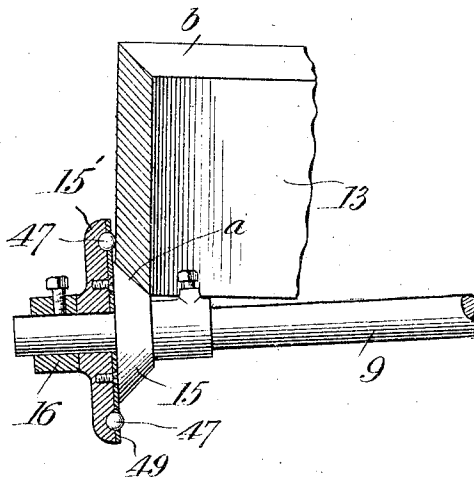


Fig. 5.

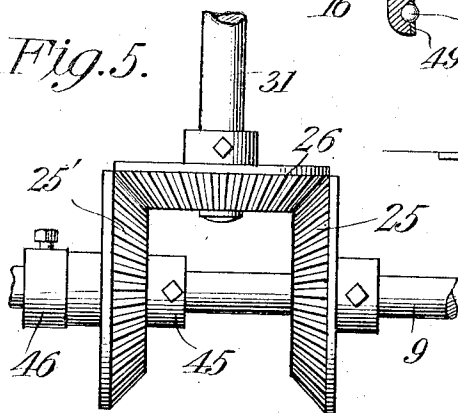


Fig. 6.

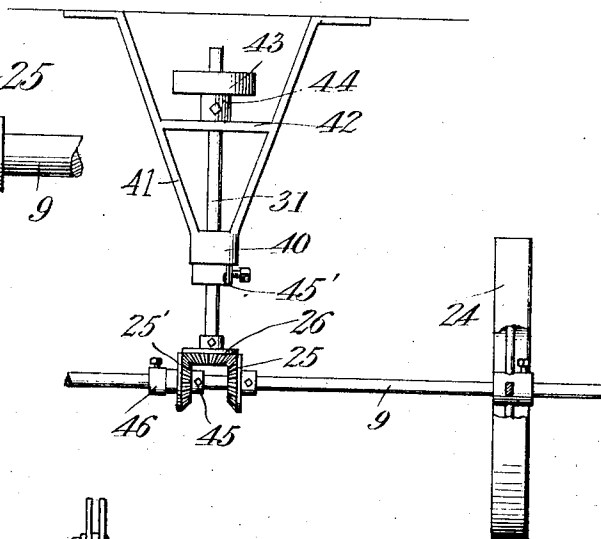
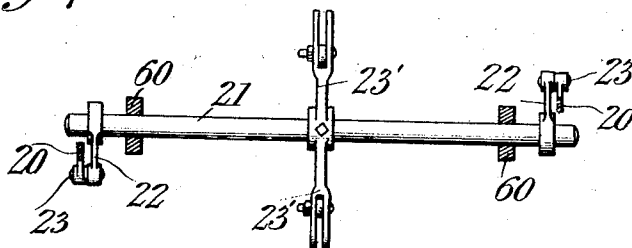


Fig. 7.



Witnesses

Fenton S. Belt
A. B. Farnham

By

William S. Harmon

Geo. W. Lues.

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM S. HARMON, OF ARLETA, OREGON.

MECHANICAL MOVEMENT.

1,056,413.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed December 22, 1910. Serial No. 598,685.

To all whom it may concern:

Be it known that I, WILLIAM S. HARMON, a citizen of the United States, and a resident of Arleta, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to novel improvements in mechanical movements.

The primary object of my invention is to provide a simply constructed and readily operated mechanism for utilizing the dynamics of a rapidly rotating and moving body.

Another object is to provide a means for converting the tilting motion of a swivelly held member into a vertical reciprocating motion.

A still further object is to provide a comparatively inexpensive mechanism for operating pump plungers and similar devices actuated by means of rock shafts.

A further object is to secure a fly wheel to a shaft capable of rotation at great speed, said shaft rotating upon two superposed bearings of a tiltably held member, the wheel traveling in a circle, the movement of said member being utilized to actuate a rock shaft.

With these and other objects in view, the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described and particularly pointed out in the appended claims, it being understood that changes in the specific structure shown and described may be made within the scope of the claims without department from the spirit of the invention.

In the drawings forming a part of this specification, and in which like numerals of reference indicate similar parts in the several views:—Figure 1 shows an elevational view with portions broken away of a mechanism embodying my invention. Fig. 2 shows a top view of my mechanical movement. Fig. 3 discloses a partly sectional detail of the supporting gudgeon. Fig. 4 is an elevational detail of the lower or end roller disclosing the arrangement of the ball bearing. Fig. 5 shows an enlarged detail of the driving and idler gears. Fig. 6 shows a modification of the driving shaft support, and Fig. 7 a detail of the rock shaft.

In carrying out the object of my invention I employ a base 1, having the securing feet 3', and the centrally disposed upstanding rack teeth 7. Centrally this base has a hub 2, having a threaded opening 2', within which there is adjustably held the socket gudgeon 3. Held within the socket of the gudgeon 3 is the sphere 5 of the bolt 4, this sphere being held in position by means of the cap 10', which has an opening permitting the end of the bolt 4 to be carried in a circular path. Held to the cap 10' is the plate 6 having the depending circularly disposed rack teeth 8 arranged for co-action with the rack teeth 7. This plate 6 has a centrally disclosed hemispherical socket arranged to receive the cap 10' as clearly disposed in Fig. 3., the nut 10 threading upon the bolt 4 to hold the plate 6 to the cap 10'. Secured to this plate 6 which is swiveled to the gudgeon 3 are the outwardly bowed brackets 12 which give firm support to the annulus 13, having the two parallel circular splayed bearing edges, *a* and *b*.

As disclosed in Fig. 1 there is an access space between the plate 6 and the annulus 13 and held within this access space is the end of the driven shaft 9, to which is adjustably secured the fly wheel 24. This fly wheel is fixed to the shaft 9 in a manner permitting the same being carried away from or toward the projecting end of the shaft 9.

In Fig. 1 the fly wheel 24 is shown at the end of the shaft 9. In Fig. 6 however where the shaft 9 is shown as very much longer than in Fig. 1, the fly wheel 24 is shown at a point intermediate of the ends of the shaft. Secured to the end of the shaft 9, opposite the fly wheel 24 is the conical roller 15 arranged for co-action with the lower splayed bearing *a*. In Fig. 1 this bearing *a* is shown as inclining toward the center of the annulus, while in Fig. 4 the lower bearing *a* inclines away from the center of the annulus. Held adjacent to the roller 15 is a cap 15', having a ball race within which are held a plurality of balls 47 held in position by means of the stay plate 49. The balls 47 are arranged to rotate against an outer peripheral surface of the annulus 13 and assist in taking up part of the end thrust of the shaft 9 when in operation. A cap 15' is held in position by means of the nut 16. Secured near the opposite end of the shaft 9 and arranged for

co-action with the upper circular splayed bearing 6 is the conical roller 14 which may be fixed or revolubly held to the shaft 9. As shown in Fig. 1 the roller 14 engages the upper bearing and the roller 15 the lower bearing, the shaft being held in a slightly inclined position, the highest end of the shaft being at the end which carried the fly wheel. It is of course understood that the angle of the shaft 9 may be increased in increasing the diameter of the intermediately disposed roller 14.

The instrumentalities described form a balanced member which is permitted a tilting movement within certain limits in being swivelly connected to the adjustably secured gudgeon 3. The tilting movement may be increased or decreased by raising or lowering the gudgeon 3.

Depending from the bearing 1 are the oppositely disposed bearing ears 60, within which bearings is held the rock shaft 21, the shaft having the rock arms 22, each carrying a pin 23, giving pivotal support to a connecting link 20, two such links being used and these links in turn are secured to the pins 17 projecting from the plate 6, as clearly disclosed in Fig. 1. Held immediately above the point marking the center of the base 1, is a driving shaft 31, this shaft carrying at its lower end a driving pinion 26. This pinion 26 meshes with the pinion 25 secured to the shaft 9. On rotating the shaft 31 a rotary movement is imparted to the shaft 9, which shaft at the same time is swung in a circle about the driving pinion 26. As the shaft 9 revolves it travels over the two parallel circular bearings, *a* and *b*, and in doing so tilts the annulus in its progressive movement. This tilting movement of the annulus and the connected plate 6 is converted into a reciprocating movement, and imparted to the rock shaft 21 by means of the members 20 and 22. As there is a tendency of the fly wheel 24 to travel away from the center marked by the gear 26, I prefer using an idler gear 25' shown in Fig. 4 which is held in mesh with the driving pinion 26 between the collars 45 and 46. In this way the idler 25' takes up part of the end thrust of the bearing 9.

In Fig. 1 the driving shaft 31 is given support within the standard 29 above, while below the shaft 31 is held within the bearings 27 supported by means of the brace arms 28. In Fig. 6 I show a modification in which the driving shaft 31 is adjustably held in that the shaft 31 rotates within the bearings 40 and 42, held by the bracket 40 which is secured to a suitable support overhead. The collars 45 and 44 control the position of the shaft 31 which above is provided with the driving pulley 43. This pulley gives support to a suitable driving belt. In Fig. 1 I have shown a grooved

pulley 32 engaged by the driving belt 33. In Fig. 7 I have shown a detail of the rock shaft 21 disclosing the pump arms 23' to which the pump plungers are secured.

The shaft 9 is automatically and mechanically balanced and held in a horizontal or other desired plane. In order to insure the pins 17 being held immediately above and in alinement with the rock shaft 21, I have employed the intermeshing rack teeth 7 and 8. While the annulus 13 and plate are shown as two distinct and separate parts connected by means of the brackets 12, it should be understood that the annulus and plate could be cast in one by providing a groove within which the projecting end of the shaft 9 could travel. After the shaft 9 has been started and set in motion the same can be given a high rate of speed with but a slight expenditure of driving power resulting in a rapid and powerful stroke being imparted to the pump arms 23'.

From the foregoing it will be seen that broadly my invention comprises an equilibrated member having two parallel circular bearings, a revolving shaft with a fly wheel supported and guided by said bearings, means to swing said shaft about a fixed center located intermediate of its ends, and mechanisms connecting said equilibrated member to a rock shaft.

A device constructed according to my invention is comparatively inexpensive and the working elements are all readily accessible and adjustable.

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

1. In combination, a supporting base provided with circularly disposed rack teeth, a gudgeon adjustably secured to said base, and an equilibrated member adjustably secured to said gudgeon having rack teeth for co-action with said base rack teeth.

2. The combination with a suitable supporting base, of a rock shaft, a gudgeon extending from said base at right angles to said rock shaft, an annulus secured to said gudgeon, and a shaft having one end engaging the upper and the opposite end the lower edge of said annulus.

3. The combination with a suitable supporting base, of a rock shaft, a gudgeon extending from said base at right angles to said rock shaft, a carrying means extending from said gudgeon, an annulus secured to said carrying means, and a revolubly held shaft having one end engaging the upper edge and the opposite end the lower edge of said annulus.

4. The combination with a suitable supporting member, of a balanced member having two superposed circular bearings, a shaft supported and guided by said bearings, a driving pinion, a driven pinion meshing

with said driving pinion secured to said traveling shaft, and an idler upon said shaft meshing with said driving pinion.

5 5. The combination with a supporting base having a set of circularly disposed up-
standing rack teeth, of a gudgeon carried by
said supporting base, a plate swiveled to
said gudgeon having a series of circularly
disposed rack teeth for co-engagement with
10 said first mentioned rack teeth, a rock shaft,
means to connect said plate to said rock
shaft, an annulus having splayed edges serv-
ing as bearings, brackets to secure said annu-
lus to said plate, a shaft, rollers upon said
15 shaft in engagement with the splayed bearing
edges of said annulus, a fly wheel adjustably
secured to said shaft, a gear fixed to said shaft
intermediate of its ends, a suitably support-
ing driving pinion meshing with said gear
20 and an idler pinion revolubly secured to
said shaft meshing with said driving pinion.

6. The combination with a supporting
base having a series of up-standing circularly
disposed rack teeth, of a rock shaft
25 held to said supporting base, arms extend-
ing from said rock shaft, a gudgeon having

a socket adjustably secured to said base, a
bolt having a spherical head within said
socket, a cap holding said spherical head
within said socket, a plate having a series 30
of circularly disposed rack teeth carried by
said bolt, said teeth arranged for co-action
with said first mentioned rack teeth, a nut
to secure said plate to said bolt, links piv-
oted to said plate and connected to said 35
arms, an annulus having two parallel
splayed circular bearings, brackets to se-
cure said annulus to said plate, a shaft, con-
ical rollers carried by said shaft in engage-
ment with said circular bearings, a fly wheel 40
adjustably secured to said shaft, a pinion
secured to said shaft, a suitably supporting
driving pinion meshing with said shaft pin-
ion, and an idler upon said last mentioned
shaft meshing with said driving pinion. 45

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

WILLIAM S. HARMON.

Witnesses:

GLENN E. HARMON,

MORRIS W. VAN BILLIARD.