J. W. ROBERTSON

Fly-Wheel.

No. 210,633. Patented Dec. 10, 1878.

Fig. 1.

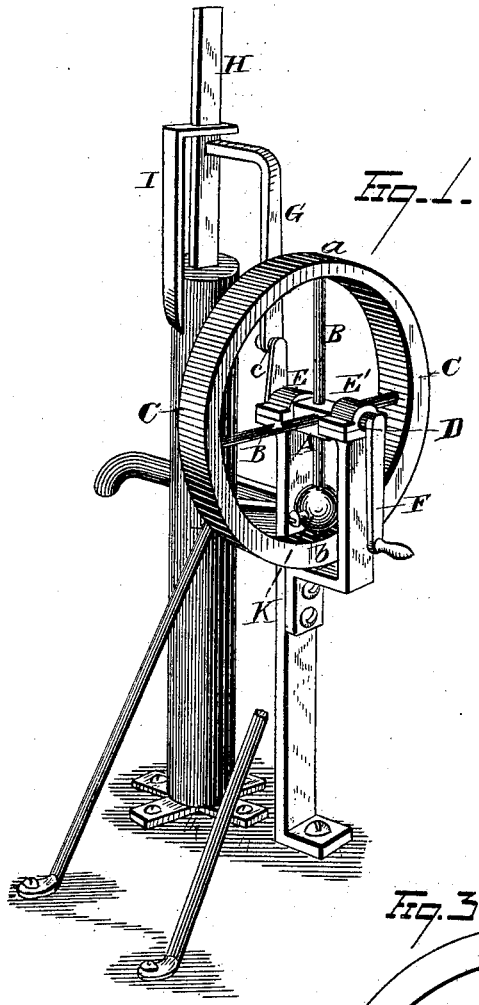


Fig. 2.

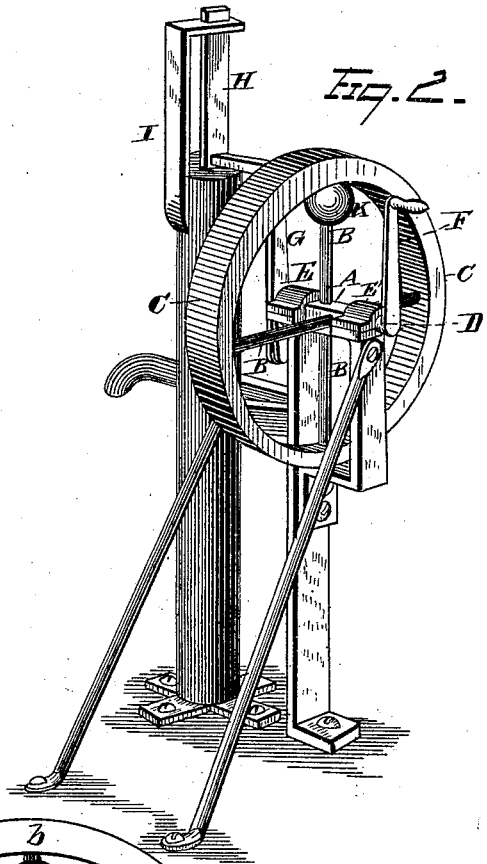
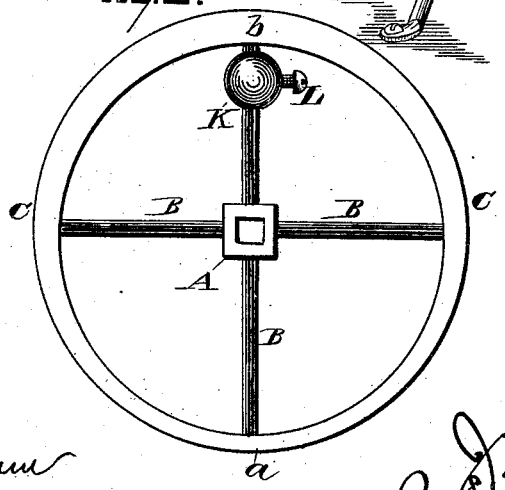


Fig. 3.



WITNESSES

E. F. Nottingham

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JAMES W. ROBERTSON, OF FRIEND, NEBRASKA.

IMPROVEMENT IN FLY-WHEELS.

Specification forming part of Letters Patent No. **210,633**, dated December 10, 1878; application filed October 23, 1878.

To all whom it may concern:

Be it known that I, JAMES W. ROBERTSON, of Friend, in the county of Saline and State of Nebraska, have invented certain new and useful Improvements in Balance-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in balance-wheels; the object being to provide a balance-wheel of such construction that the weight of the wheel opposite the crank may be varied to equalize the strain on the journals of the balance-wheel, whereby the power required to actuate the balance-wheel will not vary materially by reason of the varied load or resistance on the crank.

In the accompanying drawings, Figure 1 is a view, in perspective, of my improved balance-wheel as applied to a pump. Fig. 2 is a similar view, showing the balance-wheel in a different position. Fig. 3 is a detached view of the balance-wheel.

A represents the hub, B the spokes, and C the rim, of my improved balance-wheel. The spokes B may be arranged "staggering" or straight, as desired. The rim C is constructed with its inner surface eccentric to its periphery or outer surface, thus disposing the weight of the wheel in such a manner that it shall gradually increase from a point, *a*, to a point, *b*, diametrically opposite the point *a*. The hub A is mounted upon a shaft, D, the journals of which are supported in suitable bearings E E′.

Crank F is attached to or formed solid with one end of the shaft or axle D, and is located immediately opposite the point *b* of the balance-wheel, which is the heaviest portion thereof.

To the wrist-pin *c* is journaled one end of the pitman G, while its opposite end is connected with a plunger-rod, H, the latter being retained in a vertical position by means of a guide, I.

As the pump is operated it will be observed that when the plunger is in its lowest position the heaviest portion of the balance-wheel will be uppermost, and as the plunger commences to rise, carrying with it the column of water on its top, the heavier portion of the balance-wheel is carried over the dead-center, and serves, by its weight, to assist in overcoming the increased load on the crank, and thus partially counterbalance it.

When a certain fixed condition of things can be relied upon, the balance-wheel, as above constructed and connected with the driven machinery, will work smoothly, and operate practically to counterbalance the load on the crank; but in practice the conditions for operating the driven machinery are constantly being varied, and hence a balance-wheel constructed as above described, while well adapted to work in some instances, in others it would not counterbalance the load on the crank. This is due, in part, to the different strokes required, and the variable resistances to be overcome—as, for instance, a pump will raise a column of water of a certain height at one season of the year; but in a dry season, the supply being diminished, the height of the column in the well is decreased, and hence the load on the crank is variable.

Again, the continuous wear on the various parts of the machine all operate to prevent its being possible to provide a balance-wheel of fixed construction which will operate as a perfect equalizer under all circumstances. To provide for such changes and conditions, I apply a shifting weight, K, to the spoke B, which extends from the hub to the heaviest part of the rim, and provide said weight with a set-screw, L, or other equivalent means, whereby the weight may be secured at any desired point between the hub and rim of the balance-wheel.

When the load on the crank is so great that it is not counterbalanced by the weighted rim of the balance-wheel, the weight K is moved toward the rim until the weight and load do counterbalance each other, and then the crank will operate smoothly.

My improvement prevents any halting of the machinery while in operation, and any uneven strains and wear on the journals of the balance-wheel.

I do not limit myself to the application of the balance-wheel to pumps, as it is evident that it is equally well adapted to be used for all the general purposes of a balance-wheel.

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

The combination, with a balance-wheel provided with an eccentric-shaped rim, of a weight adapted to be adjustably secured to one of the spokes of the balance-wheel, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of October, 1878.

JAMES W. ROBERTSON.

Witnesses:
H. F. MORTON,
C. E. FRIEND.