No. 640,594. Patented Jan. 2, 1900.

D. SANFORD.

CRANK WHEEL.

(Application filed Jan. 4, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

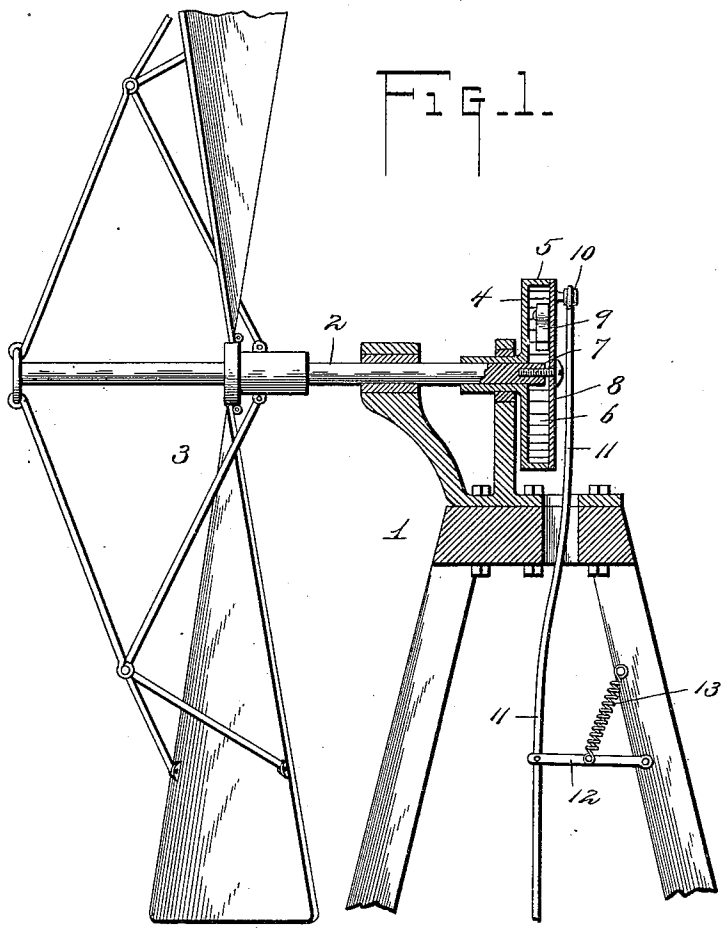


Fig. 2.

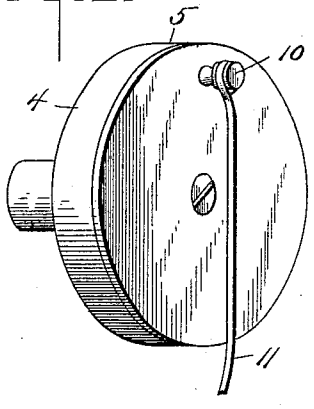
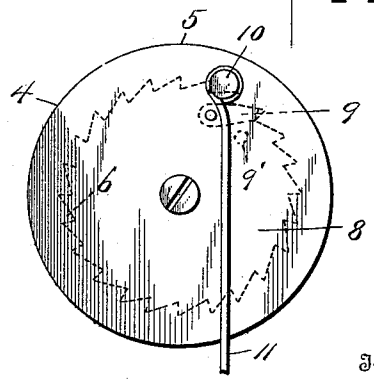


Fig. 3.



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FIG. 4.

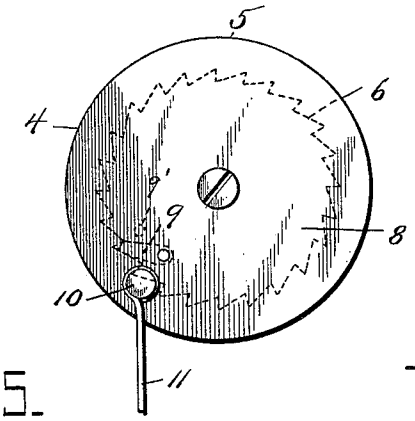


FIG. 5.

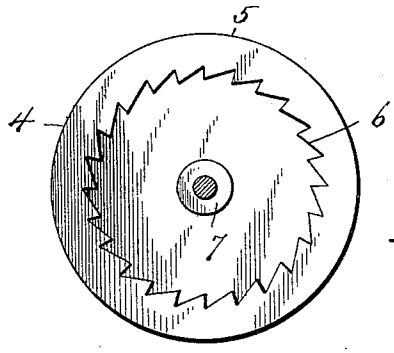


FIG. 6.

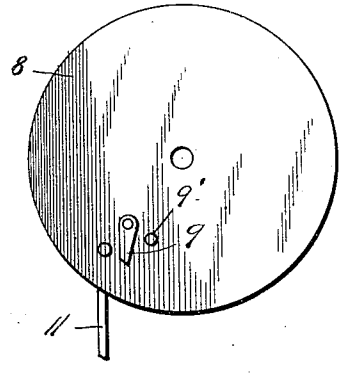
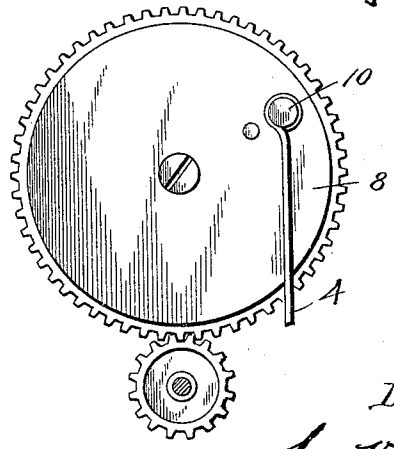


FIG. 7.



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UNITED STATES PATENT OFFICE.

DELANO SANFORD, OF SCOTCH GROVE, IOWA.

CRANK-WHEEL.

SPECIFICATION forming part of Letters Patent No. 640,594, dated January 2, 1900.

Application filed January 4, 1898. Serial No. 665,507. (No model.)

To all whom it may concern:

Be it known that I, DELANO SANFORD, a citizen of the United States, residing at Scotch Grove, in the county of Jones and State of Iowa, have invented certain new and useful Improvements in Pumping Apparatus; 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 appertains to make and use the same.

My invention relates to pumps; and the object in view is to provide, in connection with a pump and motor, connecting means which will quicken the pumping action without correspondingly increasing the speed of the motor.

One of the great disadvantages of the ordinary construction of mills of this class is that where the stroke is slow considerable time is wasted in the back stroke or, in other words, in the descent of the pump rod and piston after the work or up stroke has been completed.

The object of my invention is to provide a crank-wheel which will automatically establish the connection between the wind-motor and the pump-rod during the upstroke and break the connection and permit the pump-rod to gravitate to its lowermost position to be again coupled to and elevated by the motor without requiring the loss of time which would be incident to a continued positive connection between the rod and motor.

To the accomplishment of this object, the invention consists in certain novel details of construction and in the arrangement of parts hereinafter specified.

Referring to the drawings, Figure 1 is a general view of the wind motor or mill provided with my crank-wheel and showing a portion of the pump-rod connected thereto. Fig. 2 is a perspective view, on a somewhat-enlarged scale, of the crank-wheel and its casing. Fig. 3 is a diagrammatical elevation of the crank-wheel, showing the pawl and ratchet-teeth in dotted lines, the pump being shown as ascending. Fig. 4 is a similar view showing the pump-rod as descending. Fig. 5 is an end view of the wheel-casing. Fig. 6 is a rear elevation of the crank-wheel; and Fig. 7 is a view of a modified form of my device, showing the casing provided with cogs and meshing with a pinion designed to be keyed upon a power-shaft.

Referring to the numerals on the drawings, 1 indicates a portion of the frame of a wind motor or mill, and 2 the power-shaft, journaled in suitable bearings and provided with the usual wind-wheel 3.

4 indicates what may be termed the "crank-wheel casing," screwed, keyed, or otherwise secured upon the shaft and provided with an annular flange 5, concentric with the power-shaft and having upon its inner face ratchet-teeth 6.

7 indicates a reduced extension upon the extremity of the power-shaft, and 8 indicates my improved crank-wheel loosely mounted upon the extension within the annular flange and provided with a loosely-pivoted gravity-pawl 9 upon its inner face, designed during the upstroke to engage the ratchet-teeth.

10 indicates a crank-pin secured in any suitable manner to the outer face of the crank-wheel adjacent to its periphery and to which is pivotally connected in any well-known manner a pump-rod 11, in turn connected at its lower end to a piston-rod of a pump. (Not illustrated.)

The pawl is limited in its movement in one direction by the teeth 6 and in the other direction by a pin or other suitable stop.

It will now be seen that when the piston has descended the pawl, which is pivoted eccentrically with respect to the crank-wheel, will engage one of the ratchet-teeth, and the crank-wheel will in this manner be coupled to the casing and will be rotated to cause the upstroke of the piston. As soon as the pawl reaches a position directly above or slightly beyond the center of the wheel it will gravitate out of engagement with the teeth of the casing, and the weight of the piston and pump rod will cause them to descend rapidly, when the pawl will again engage the ratchet-teeth at the lowermost point, and the piston will then ascend in an obvious manner. Thus the time usually lost on the downstroke will be minimized, and the pump-piston will be reciprocated almost, if not quite, twice to every revolution of the wheel-casing.

In order to cushion the pump-rod for the purpose of preventing accidental derangement of the parts incident to the dropping of

the rod, I prefer to employ an arm 12, pivoted at a convenient point upon the tower or motor frame and at its opposite extremity to the pump-rod, a spring 13 being secured at one end to the frame and at its opposite extremity to the arm. Thus the spring will resist the downward movement of the rod with sufficient force to prevent accident incident to the shock caused by the gravitation of the parts and will tend to assist the elevation of the piston.

Modifications in the form of gearing, and especially in the construction of the crank-wheel and clutch, may be resorted to without departing from the principle of the invention. I do not, therefore, desire to limit myself to the structural details set out, but reserve the right to change, modify, or vary them at will within the scope of my invention.

What I claim is—

1. In pumping apparatus, the combination of a continuously-rotating driving member, a pump-rod, and a clutching and releasing device attached to the driver to intermittently grasp and lift the pump-rod and intermittently release and drop it, substantially as described.

2. In pumping apparatus, the combination with a wind-wheel and wind-wheel shaft constituting a driving member, of a cylindrical casing fast thereon, a wheel mounted adjacent to the casing, a pump-rod connected eccentrically thereto, and a pawl mounted on said wheel adjacent to the pump-rod connection and designed to connect said wheel to the casing during a portion of its rotation, and to disconnect the wheel and casing during the remainder of the rotation of the wheel, whereby the pump-rod is free to descend independently of the casing.

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

DELANO SANFORD.

Witnesses:

WILLIAM D. SHEEON,

EDWARD C. HOLT.