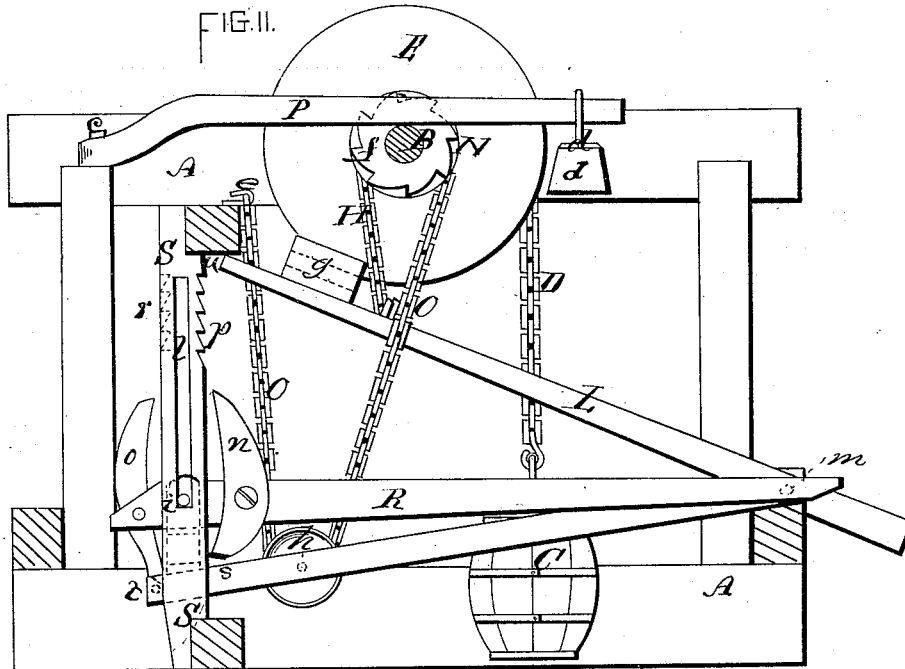
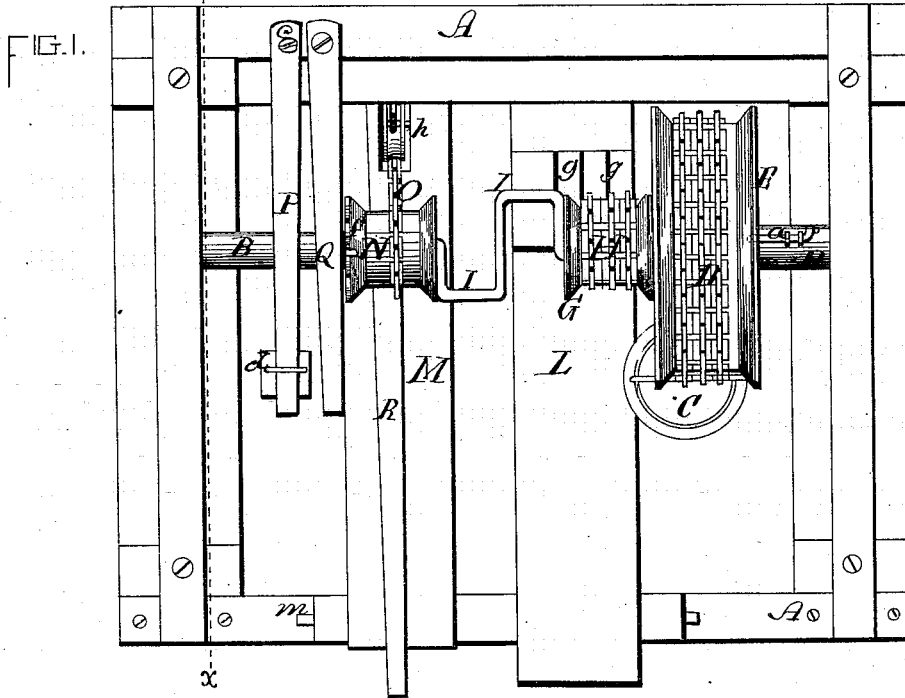


C. VAN De MARK.

Motor.

No. 164,407.

Patented June 15, 1875.



WITNESSES
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CHARLES VAN DE MARK, OF HILLSDALE, MICHIGAN.

IMPROVEMENT IN MOTORS.

Specification forming part of Letters Patent No. **164,407**, dated June 15, 1875; application filed May 5, 1875.

To all whom it may concern:

Be it known that I, CHARLES VAN DE MARK, of Hillsdale, in the county of Hillsdale and State of Michigan, have invented a new and improved power for applying the weight of persons as well as the force of their arms to drive machinery and produce other mechanical movements; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings making part of this specification—

Figure 1 being a top view of the machine in one of its simplest arrangements for applying the weight of the person to draw water from wells, or other intermittent movements, or to produce continuous effects by alternate applications of the weight; Fig. 2, a vertical section thereof in a plane indicated by the line *x x*, Fig. 1.

Like letters designate corresponding parts in all of the figures.

The object of my invention is to produce a power whereby the simple weight of a person or persons alone, or combined with the power of the arms, may be utilized for driving machinery or doing mechanical work, such as drawing or raising water, driving sewing-machines, lathes, washing-machines, and churns and other analogous uses, so that the labor of the muscles may be relieved by the utilization of the weight of persons, requiring no exertion, or comparatively little, to produce the additional effect, substantially as herein set forth.

The construction for doing intermittent work, or for producing alternate actions of weight, to obtain a continuous mechanical movement, as shown in the drawings, I will proceed to describe.

Mounted in a suitable frame, A, a horizontal shaft, B, is employed, upon or through which the weight-power and arm-power of the person are applied. First, in the simplest form of the apparatus for applying the power intermittently, as, for instance, to draw water in a bucket, C, from a well, the chain or rope D of the bucket winds around a wheel, E, grooved in its periphery and situated on the shaft B. At one side of the bucket-wheel another, generally much smaller, wheel, G, is employed,

secured or coupled to the larger wheel, and grooved in its periphery, around which a chain, band, or rope, H, winds. When the power of the person's arms is to be employed in turning or assisting to turn the wheel E, this and the wheel G are coupled to the shaft B; but when the weight-power is alone to be used for doing the work, the wheels turn loose upon the said shaft. A suitable coupling is, therefore, required to couple the wheels E G to the shaft B, or to uncouple them therefrom, at will. Any convenient coupling may be used for the purpose. I have shown in the drawings a sliding bolt, *a*, situated lengthwise on the shaft, to be slid forward so as to take into a hole or holes in the side of the wheel E, for coupling the wheel to the shaft, and to be slid back from the wheel for uncoupling.

Since this operation of coupling and uncoupling is not very frequent, this simple coupling is not inconvenient. It is not necessary that the wheel G, through which the weight-power is applied, should be on the shaft B. It may be on a separate shaft, in any suitable position, and even some distance from the main shaft, and connected therewith by gearing, or by pulleys and a belt.

For applying hand-power to the apparatus the simplest device is a crank or cranks, I I, on the shaft B, being shown as in the middle of the shaft.

For applying the weight of the person to this purpose the rope or chain H, which winds around the driving-wheel G, is connected below with a platform or body-support, L, which has a movement downward, to draw upon the chain or rope, for producing the power, and a return upward movement to bring it into a position for acting again after its previous descent; the said rope or chain being wound around its wheel G, so that, as it unwinds, it will wind up the rope or chain D of the bucket C, and vice versa.

In the construction above described the weight of the bucket is applicable to automatically raising the platform or support after each descent thereof, by its counterbalancing force, as soon as the person steps off from the platform, so that a repetition of the operation is effected without effort of the person, except to step off from and again step upon the plat-

form; and if there is an excess of weight in the bucket beyond the balancing of the platform, it may be utilized in other ways, as, for instance, to raise, or partially raise, another bucket when two buckets are used in the well.

Whenever necessary or desirable, the hand-power applied to the crank or cranks I may be applied in addition to that of the weight. In this way much more work can be done by a person with no greater exertion of strength than with the hands alone.

The construction above described applies the power intermittently, and for the particular purpose of drawing water and other similar uses it is sufficient, and quite cheap and simple; but in many cases it is desirable to apply the weight-power either alternately for different purposes, or continually for one purpose, without intermission of time in returning the platform to its raised position. To effect this I employ one or more additional weight platforms or supports, acting alternately with the first.

In the drawings, one additional platform, M, is represented, being connected with the shaft B by means of another power-wheel, N, on the shaft, and another suspending rope or chain, O, winding around the said wheel, and connected with the said platform.

In the arrangement shown the power of this additional platform is applicable to doing some mechanical work other than to raise the bucket C, or its equivalent of work; but the driving-wheel N may be connected, by intermediate gearing, or belts and pulleys, with the driving-wheel G or the bucket-wheel E, so as to be applied to the same purpose therewith alternately with the power of the platform L. The rope or chain O is wound around the wheel N in the direction opposite to that of the chain or rope H on the wheel G, so that as one platform, L, descends the other platform, M, ascends, and vice versa, the force of one in action counterbalancing and raising the other empty platform without losing or employing any of the weight of the person for that purpose.

When the platforms are thus intended to counterbalance each other, and each unwinding rope or chain to wind up the other, the wheel G is to be coupled to the shaft B, as above described, as well as the wheel N; but when the two powers are to be separate in action one or both of the driving-wheels are to be uncoupled and turn freely on the shaft. The hand-crank I may be used in connection with either or both weights, the driving-wheel, which they are to assist at any time, being then coupled to the shaft. By alternately coupling and uncoupling the driving-wheels on the shaft, the crank-power and weight-power may be united in both weight operations, and yet the two powers be applied either to one purpose or to different purposes.

The coupling device may be such as to couple and uncouple automatically as the power-wheels turn one way, and then the

other. Thus the apparatus becomes capable of very varied and general mechanical uses.

In connection with the weight-power, especially where one intermittent weight-platform is employed, as in drawing water, it may be desirable to control the force, because persons differing very much in weight may operate the machine, and there may be sometimes much more power than is required for the particular purpose to be effected. Thus a water-drawing power may be arranged so that the weight of a child would raise the bucket of water, and when a heavy person should step upon the platform the operation would be too rapid and violent for safety.

In order to control the power and make it steady under such varying weights, or when the work to be done requires varying power, I employ a suitable brake to operate on the shaft B, or upon the driving-wheels G N, when the weight is excessive.

In the drawings, a lever-brake, P, is represented, being pivoted at one end, c, to the frame A, while the middle of the lever bears on the shaft B or an enlarged brake-pulley thereon. A weight, d, may be hung on the free end of the lever to produce the brake friction, being adjustable in position, so as to vary its leverage according to occasion. The person operating the platform-power can thus adjust the brake to his weight. He may also control the brake by the pressure of his hand on the lever if he desires. The brake-lever may be arranged to swing off or raise away from the shaft B, and not act thereon when it is not required. Besides the brake, a ratchet-wheel, f, and ratchet lever or pawl, Q, may be employed to prevent the bucket C, or other article to be lifted, from running back when partly raised, in case the person should step from the platform, or to hold it up when fully raised. This lever or pawl may be arranged to be thrown back or moved away from the ratchet-wheel when its use is not necessary. In stepping from one platform, L, to another platform, M, where the descent of the platform is considerable, steps, as shown at g g, on the platform L, may be employed, either arranged as shown or otherwise, as most convenient. Such steps may be on both or all of the platforms used.

In the drawings, the chain or rope O is represented as being attached at one end, e, to a fixed support, and extending thence down around an anti-friction pulley, h, in the platform M, and upward therefrom to the driving-wheel N. By this arrangement I double the motion of the driving-wheel with a given descent of the platform. And by similar means, or by gearing, any multiplication or diminution of motion may be produced, adapted to any particular purpose; and the motion may be extended in any direction, or any distance desired in any suitable or well-known manner.

In cases where great power is required, and not only the weight of the person on the platform, but the force of the arms, with addi-

tional leverage, may be desired, I employ, in connection with the platform, additional hand operating power, as shown in Figs. 1 and 2. A hand-lever, R, is provided at *i*, in bearings which project upward from the platform M, the ends of the pivot projecting and moving in slots *ll* of an upright ratchet-bar, S, shaped to be concentric in outline with the pivot *m* of the said platform. The lever R has two upwardly-pointing pawls, *no*, one on one, and the other on the other, side of the ratchet-bar, as shown, and taking, respectively, into sets of ratchet-teeth *p* and *r* on the said ratchet-bar. The construction and arrangement of these pawls and ratchet-teeth are such that when the platform is raised by vibrating the handle of the lever R up and down, the pawls will take alternately into their respective ratchet-teeth, and thereby gradually force down the platform with great power, which may be added to the weight of the person on the platform. As soon as the platform reaches the termination of its descent, the heels of the pawls strike guides *s t*, operating in such a way that the pawls are thereby automatically thrown back out of contact with the ratchet-teeth, leaving the platform free to ascend again. And when the platform reaches the termination of its ascending movement, these pawls, in a similar way, strike guides or cams *u*, which bring them again into action with the ratchet-teeth.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of revolving driving-wheels G N on a driving-shaft, B, weight-platforms L M, and cords or chains H O, connecting the respective wheels and platforms, for producing a continuous revolving motion by the weight of a person or persons, substantially as and for the purpose herein specified.

2. In combination with an ascending and descending weight-platform, M, a lever, R, pawl or pawls *no*, and ratchet-teeth *p r*, substantially as and for the purpose herein specified.

3. The combination of a revolving driving-wheel, N, a rope or chain, O, fixed at one end *e*, and a body-weight platform, M, provided with an anti-friction pulley, *h*, substantially as and for the purpose herein specified.

4. In combination with the shaft B, provided with a driving wheel or wheels, G N, operated by body-weight platforms L M, and pawl and ratchet-lever R, a brake-lever, P, provided with an adjustable weight, *d*, substantially as and for the purpose herein specified.

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Witnesses:

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E. M. GALLAHER.