W. D. EDGAR & W. S. DAY.

2 Sheets—Sheet 1.

Motor.

No. 201,761. Patented March 26, 1878.

Fig. 1.

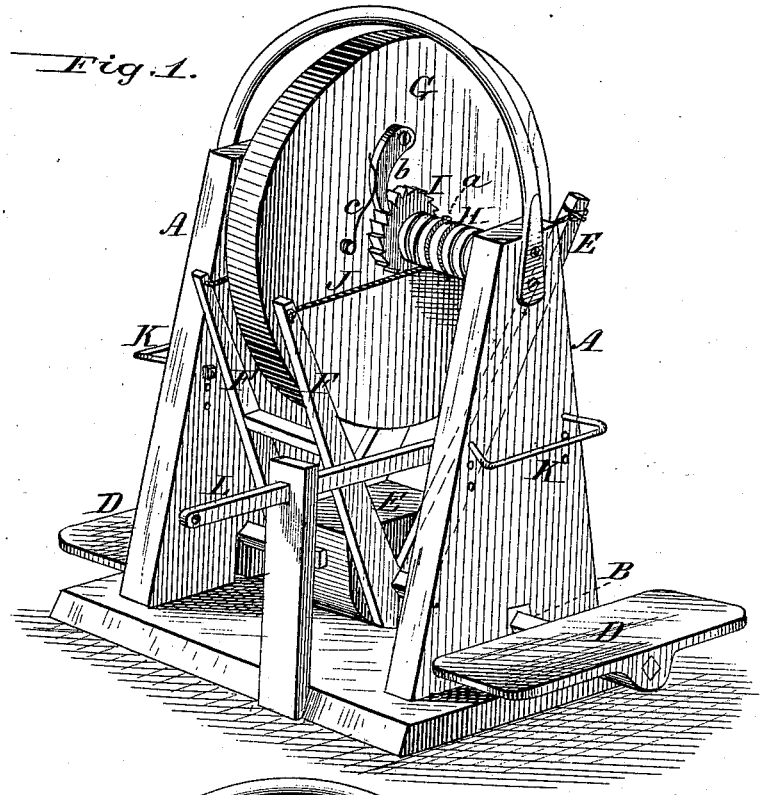


Fig. 2.

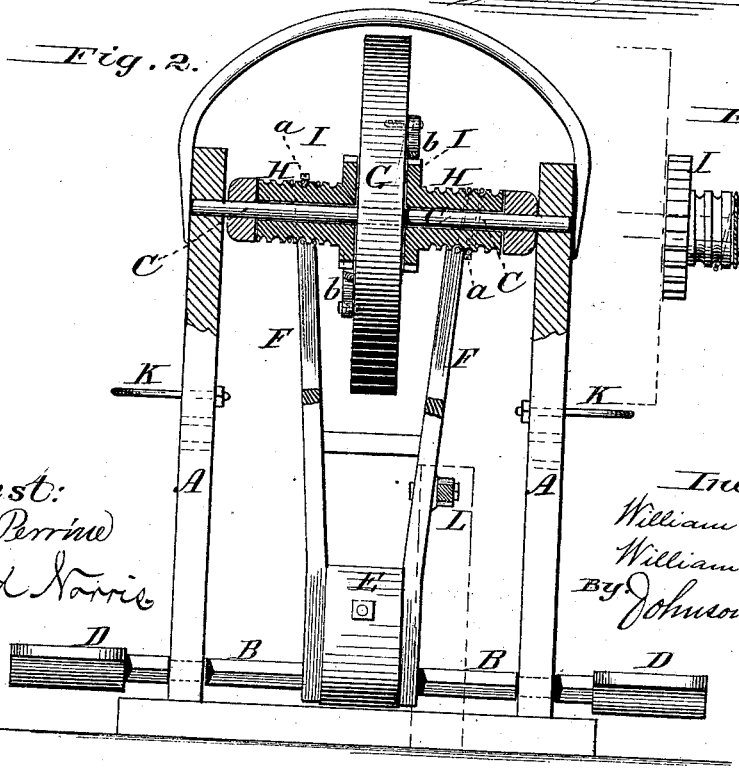
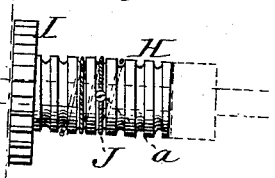


Fig. 3.



Attest:
H. D. Perrine
Floyd Norris

Inventors:
William D. Edgar
William S. Day
By Johnson & Johnson
Atty's

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

W. D. EDGAR & W. S. DAY.

Motor.

No. 201,761. Patented March 26, 1878.

Fig. 4.

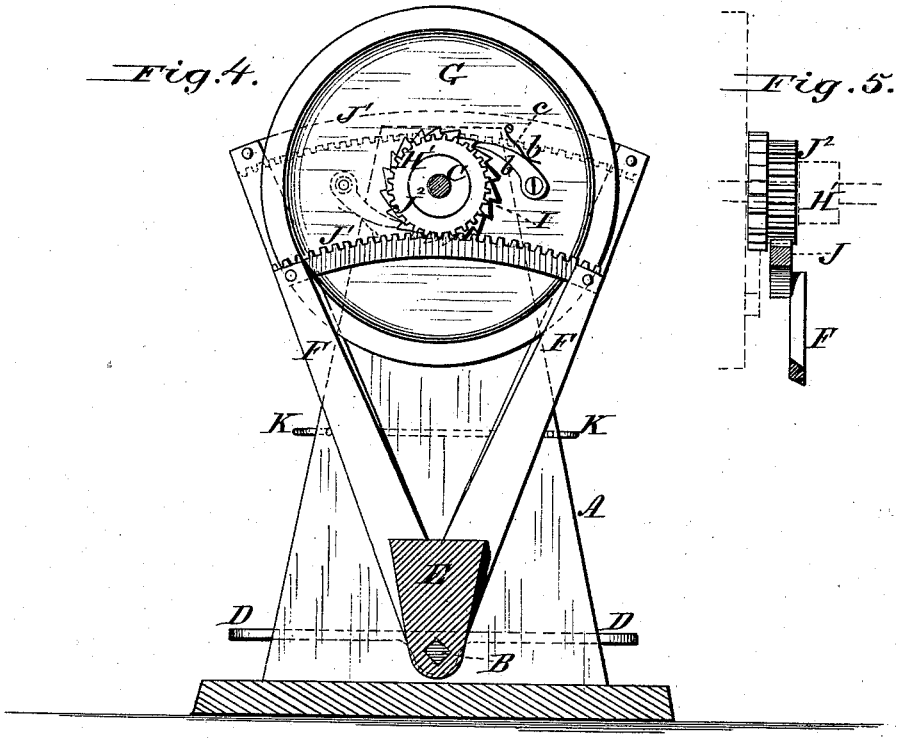
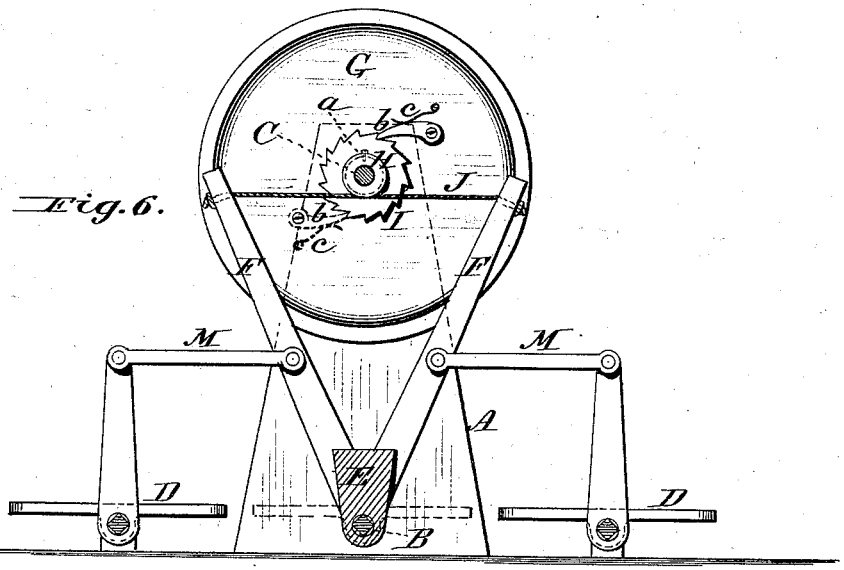


Fig. 5.

Fig. 6.



Attest:
H. C. Perine.
Floyd Norris

Inventors:
William D. Edgar,
William S. Day,
By. Johnson & Johnson
Atty's.

UNITED STATES PATENT OFFICE.

WILLIAM D. EDGAR AND WILLIAM SHERWOOD DAY, OF OTTAWA, KANSAS, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO SIMEON H. MERRILL, OF SAME PLACE.

IMPROVEMENT IN MOTORS.

Specification forming part of Letters Patent No. **201,761**, dated March 26, 1878; application filed February 2, 1878.

To all whom it may concern:

Be it known that we, WILLIAM D. EDGAR and WILLIAM SHERWOOD DAY, of Ottawa, in the county of Franklin and State of Kansas, have invented certain new and useful Improvements in Motors; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In our motor we employ one or more laterally-operating platforms, mounted upon and fixed to the end or ends of a rock-shaft, or to the ends of a number of rock-shafts, in a manner to utilize the weight of the operator or operators in driving the motor, each platform being adapted for one or more operators in standing positions.

The main rock-shaft carries a hub permanently attached thereto, and from which project upward and outward two or more rigidly-secured arms or levers, to whose upper ends are connected the ends of a thong, rope, or chain, which passes several times around a grooved ratchet-sleeve mounted loosely upon the operating-shaft, which is arranged vertically above the rock-shaft, and by which said sleeve is driven to operate said shaft by a ratchet or ratchets and pawl carried by the driving-pulley, or by disks fixed upon said shaft in place of the pulley.

By this construction and arrangement the platforms are outside of the supporting-frame, and the power-transmitting levers are between the platforms.

It is important to relieve the friction of the ratchet sleeve or sleeves, and to render its working as easy as possible, and for this purpose the arms or levers are of such length as to cause the thong to operate in about a horizontal line. When we use more than one rock-shaft with its platforms, the additional rock-shafts are arranged on either side of the main rock-shaft, and they are connected to the power-transmitting levers by connecting-rods and standards, so that, when set in motion, they all work in unison.

Each platform may carry four operators, making twelve on each side of the frame, utilizing both their weight and strength, and producing a power equal to about an eighteen-horse-power engine.

The length of the arms or levers and their distance apart are such as to determine and regulate the velocity of the operating-shaft, and thereby dispense with double gearing usually employed in such machines for increasing speed.

Hand-holds for the operators are combined with the frame and the laterally-operating platforms, whereby the operators can hold themselves in standing position upon the platforms, and by pulling upward by said grasp-rail each may increase the force by which he operates the platform. This gives special advantage for operators or boys of light weight, and enables them to drive the motor with greater ease and comfort.

The arrangement of the long power-transmitting levers gives the advantage of using a connecting-rod from a steam-engine, and pivoting it to one of said levers between the platform-shaft and the driving-shaft to convert a reciprocating motion into a rotary motion.

It is obvious that, instead of the thong-connection with the driving-shaft, we may use cog-segments connecting the ends of the levers and working into corresponding pinions upon the ratchet-sleeves, and produce the same operation of the motor.

A vertical, inclined, or horizontal shaft can be driven by the construction and adaptation of the motor as we have combined its several operating parts.

Referring to the drawings, Figure 1 represents a view, in perspective, of a motor embracing our invention; Fig. 2, a vertical section in the line of the operating-shaft; Fig. 3, the grooved ratchet-sleeve for the operating-thong; Fig. 4, a cross-section, showing, as a modification, cog-segments carried by the arms or levers for operating the main shaft by pinions upon the ratchet-sleeves, instead of the

winding and unwinding thongs; Fig. 5, the ratchet, segment, and pinion connection; and Fig. 6 shows the construction and arrangement of three platform rock-shafts and the power-transmitting levers.

The operating parts of the motor are mounted in frame-standards A A, a rock-shaft, B, having its bearings in the lower part, and the driving-shaft C its bearings in the upper part thereof, and vertically in line. Upon one end or both of the rock-shaft is arranged a laterally-operating platform, D, upon which the operator stands to utilize his weight to operate the motor. A hub, E, is fixed upon the rock-shaft, and from it two or more oppositely outward-projecting arms or levers, F, rise to about a level with the driving-shaft, on which are arranged, on opposite sides of the driving-pulley G, a sleeve, H, having on its end next the pulley a ratchet-wheel, I, and on the circumference of these sleeves are formed spiral grooves, to receive and guide the winding and unwinding of a thong, rope, or chain, J, the opposite ends of which are secured to the upper or outer ends of the arms or levers F in such manner that the thong of one set of levers on one side of the driving-pulley shall wind and unwind from the top of the sleeves, while the thong of the other set of levers on the other side of the pulley will wind and unwind from the under side of the other sleeve. These thongs are secured in the middle of their length to the grooved ratchet-sleeves by screws or pins *a*, to prevent them from slipping, and they have a greater number of winds upon the sleeves than they unwind therefrom, to relieve the screw-fastening of strain as the sleeves are revolved first one way and then the other by the back-and-forth movements of the arms or levers, produced by the operator or operators upon the laterally-operating platform or platforms at the side of the motor.

The driving-pulley G is fixed upon the main shaft, and carries ratchet-pawls *b* on each side, which are held in place, with the ratchets I of the sleeves, by springs *c*, in such manner that the pawls act alternately to drive the pulley and its shaft continuously in the same direction, so as to drive machinery by a band from the pulley or by the shaft alone. For this purpose the teeth of the ratchets stand in the same direction, and while one pawl is acting the other moves over the teeth of its ratchet.

The laterally-rocking platform, as before stated, is to utilize the weight of the operator, and is arranged upon the rock-shaft outside of the frame-standard; and for the purpose of enabling him to hold himself in position while operating the rocking platform, a grasp hold or rail, K, is secured to the standard a suitable distance above the platform. This grasp-hold also serves the purpose of allowing the operator to increase his weight or pressure by pulling upward, and thus operate the rocking platform with greater ease and steadiness.

For boys and operators of comparatively light weight, this feature gives an important advantage. The grasp-hold is also made adjustable for operators of different height, and it may be adjustably secured in any suitable way.

The position of the arms or levers and the thong with respect to the operating-shaft is such as to give a horizontal pull upon the sleeve, and thereby reduce its friction upon the shaft, and render its working easier. By this arrangement of the arms or levers and connecting-thong, the velocity of the driving-shaft can be increased or diminished by the length and distance apart of the arms or levers, and this is determined according to the character of the machinery to be driven.

The arrangement of the arms or levers gives the advantage of driving the motor by a connecting-rod, L, Fig. 1, from a steam-engine, in place of the rocking platforms, said connecting-rod, when used, being pivoted to one of said arms or levers.

It is obvious that segment-racks J^1 J^1 may take the place of the winding and unwinding thongs J, and answer the same purpose in connection with the long arms or levers, said segment-racks being arranged to operate upon the upper and lower sides of pinions J^2 on the sleeves H′, and connecting the upper ends of the rock-shaft arms or levers.

A balance-wheel is intended to be used on the main shaft, and in some cases the band-wheel would not be used; but the shaft may be vertical, and provided with disks to carry the spring-pawls, and for the sleeved ratchets to work against, as in the case of a mill or corn-sheller.

Instead of four arms or levers, two only may be used, in which case the ends of the sleeves will join each other.

In running a vertical shaft by the segment-gearing, the cogs would be arranged upon the side of the segments, and the pinions would turn one upon the other.

The arrangement of the rocking platform at the side or sides of the motor gives the advantage of using operating-platforms for separate operators, each adapted to carry one or more operators.

When more than one operating-platform is used to increase the power of the motor, the supplemental platforms are arranged upon rock-shafts on each side of the main rock-shaft, and they are connected to the power-transmitting-levers by connecting-rods M, and vertical arms F′, as shown in Fig. 6, so that the several platforms must operate together, and communicate their combined force to the operating-levers. In this arrangement the several rock-shafts have their bearings in the frame, and each platform has a capacity for standing-room for one or more operators, and is combined with the grasp-hold for the purpose stated.

We claim—

1. In a motor, the platform D, or platforms, arranged upon the end or ends of a rock-shaft

or rock-shafts, substantially as described, in combination with the hub E, fixed on said shaft, and the long levers F, fixed to said hub, and adapted for operating the driving-shaft, as set forth.

2. The combination, with the rock shaft or shafts, end platforms, and the frame, of grasp-holds for the operator or operators.

3. The combination, with the rock shaft or shafts, end platform or platforms, and the frame, of adjustable grasp-holds for the operator or operators.

4. The combination, with the rock-shaft hub arms or levers and the driving-shaft grooved ratchet-sleeves which they operate, as described, of the engine connecting-rod L, pivoted to one of said hub rock-shaft arms or levers, for the purpose set forth.

5. The motor hereinbefore described, consisting of the rock-shaft, an operating-platform at one or both the ends thereof for the operator or operators to stand upon, a fixed hub on said shaft, from which long arms or levers rise outwardly, ratchet-sleeves connecting with said arms or levers, and driving the band-wheel or main shaft by pawls carried thereby, all constructed for operation substantially as hereinbefore set forth.

6. The combination, with the main rock-shaft, its platforms, and power-transmitting levers, arranged for operation as described, of the supplemental platforms connected with said levers, for operation as herein set forth.

In testimony that we claim the foregoing we have affixed our signatures in the presence of two witnesses.

WILLIAM D. EDGAR.
WILLIAM SHERWOOD DAY.

Witnesses:
H. F. SHELDON,
E. H. PARAMOS.