

D. CUSHING.
HORSE-POWER.

No. 174,948.

Patented March 21, 1876.

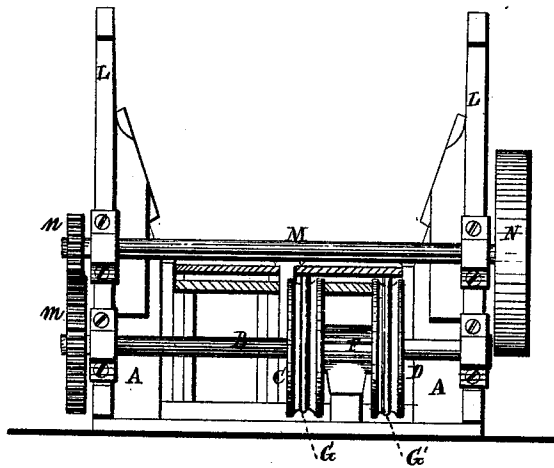


Fig. 1

WITNESSES

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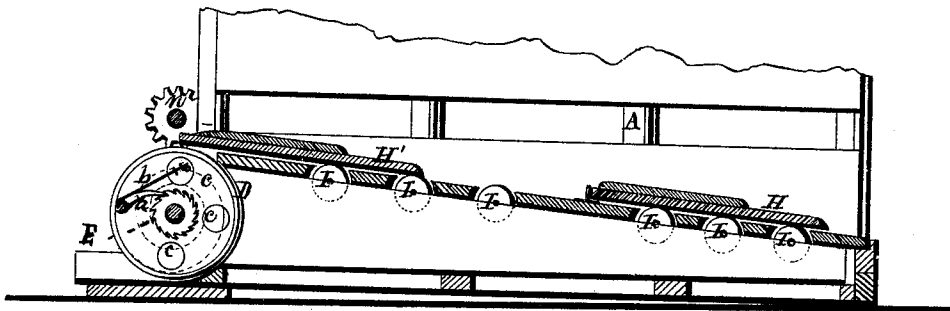


Fig. 2

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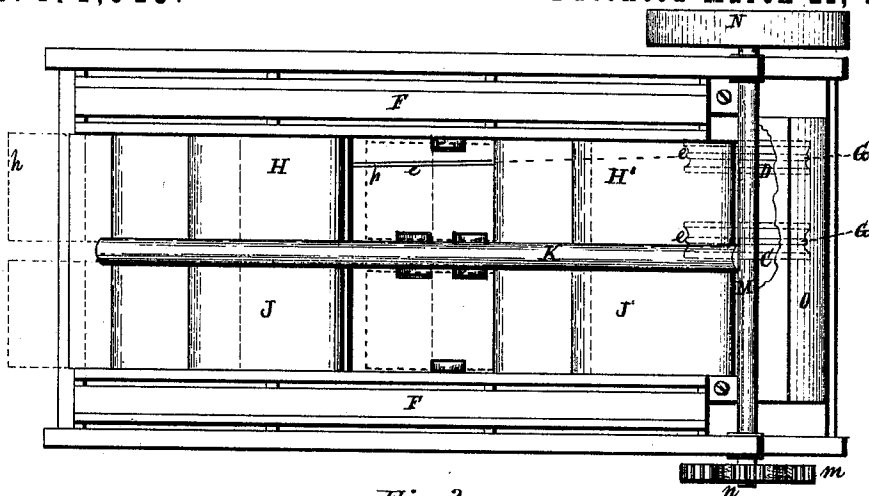


Fig. 3.

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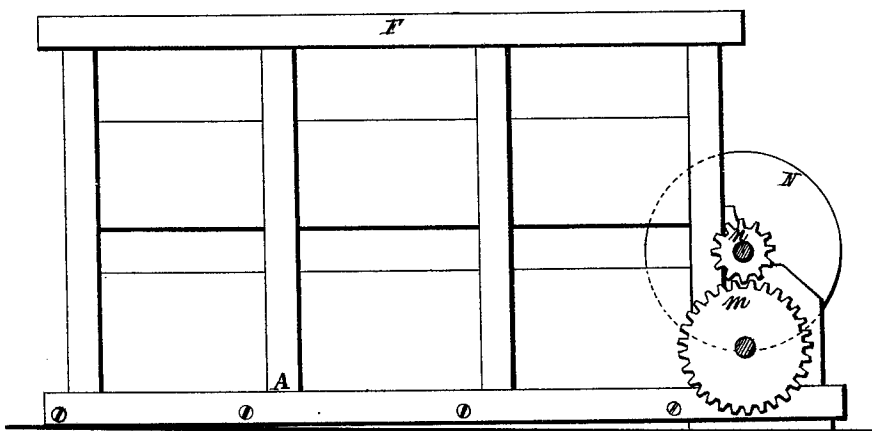


Fig. 4

UNITED STATES PATENT OFFICE.

DANIEL CUSHING, OF WHEELING, WEST VIRGINIA.

IMPROVEMENT IN HORSE-POWERS.

Specification forming part of Letters Patent No. **174,948**, dated March 21, 1876; application filed November 27, 1875.

To all whom it may concern:

Be it known that I, DANIEL CUSHING, of Wheeling, in the county of Ohio and State of West Virginia, have invented a certain new and Improved Horse-Power; and I do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawings, making a part of the same.

Figure 1 is a front elevation of the power. Fig. 2 is a longitudinal section. Fig. 3 is a plan view. Fig. 4 is a side elevation.

Like letters of reference refer to like parts in the several views.

This invention is a horse-power, operated by the feet of a horse treading upon a movable floor or slides attached by cords or chains to ratchet-pulleys placed upon a shaft. Said shaft is rotated by a pawl and ratchet-wheel operated by the pulleys. The reverse movement of the pulleys is effected by the recoil of a spring inclosed therein. By an exact alternating action of the pulleys upon the shaft it is made to revolve uniformly and continuously in one direction.

The following is a more full and complete description of the machine:

In the drawing, A represents a frame, across the front end of which is journaled a shaft, B, Fig. 1. On said shaft is fitted, so as to revolve thereon, pulleys C D. Close to the side of each pulley is firmly secured to the shaft a ratchet-wheel, E, Fig. 2. To the side of each pulley is secured a pawl, *a*, so arranged as to engage the ratchet-wheels referred to, as will be seen in Fig. 2. Said pawls are kept in their engagement with the wheels by a spring, *b*, attached to the side of the pulley. Within each of the pulleys is a coiled spring, indicated by the dotted lines *c*, Fig. 2, a portion of which is seen through the openings in the sides of the pulleys. One end of the aforesaid springs *c* is attached to the pulley, whereas the other end is made fast to a sleeve or ring, F, through which the shaft runs, but without contact with the spring, the sleeve being a fixed point at the top of standard, (the standard is secured to the frame-work of the machine,) and controlling the action of the spring independently of the shaft. To the periphery of each of the pulleys is secured one

end of a cord or belt, G. The opposite ends of said cords or belts are attached, respectively, to slides H H', the cord G' to the slide H' and pulley D, and the cord G to the slide H and pulley C, substantially as shown in the drawing, Fig. 3, in which the dotted lines *e* indicate the cords or belts. Said slides move in the frame on friction-rollers I, Fig. 2. By the side of said slides H H' are slides J J', corresponding in character and operation to the slides H H', and from which they are separated by a bar, K. Said slides J J' are also to be connected to pulleys on the shaft B in the same manner substantially as are the slides H H', and which also move on friction-rollers, and are operated by the tread of the horse conjointly with the two slides H H'. The pulleys to which said slides J J' are to be connected are not shown, they being essentially the same or duplicates of the pulleys C D, and are to be placed on the shaft B, respectively, by their side.

The practical operation of the above-described machine is as follows: The horse is placed in the machine between the sides L, head toward the pulleys, with his hind feet upon the slides H J, respectively, while his front feet are in like manner upon the slides H' J'. The position of the slides while the animal is at rest is such as shown in Fig. 2. As soon as the horse is started into a walk the nigh front and hind feet, standing, respectively, on the slides H' H, will draw back said slides more or less distant, according to the length of the step, as indicated by the dotted lines *h*, Fig. 3. This movement of the slides draws upon the cords, whereby they are attached to the pulleys, thereby partially rotating them, which, in turn, rotates the shaft B by the engagement of the pawls with the ratchet-wheels E of the pulleys. The moment the animal lifts his feet the slides are again drawn forward by the recoil of the springs inclosed in the pulleys, which, by the backward movement of the slides, were wound up. During the time the slides H' H are being drawn forward by the springs, on lifting the feet therefrom, the slides J' J are being drawn back by the off front and hind feet of the horse, which, in like manner, will rotate the pulleys (not shown) to which they are sup-

posed to be connected, and thereby continue the rotation of the shaft by the pawls and ratchet-wheels, operating substantially in the same manner as the pulleys C D. The instant the off front and hind feet are lifted from the slides J' J they immediately move forward by the recoil of the springs inclosed in the pulleys, during which time the high feet are again upon the slides H' H, treading them back, thereby continuing uninterruptedly the revolution of the shaft, and so on alternately so long as the animal keeps walking. First the high feet operate the slides H' H, thereby rotating the shaft; then the off feet, operating the slides J' J, continue the rotation, producing a constant and uniform revolution of the shaft B, from which motion is communicated to the shaft M by the gearing *m n*, Fig. 4, from which shaft it is taken by a belt from the pulley N.

The relative movement of the several slides will vary according to the variable tread of the horse consequent of the difference in speed with which he may walk. This, however, can make no difference with the effective operation of the slides upon the shaft, as the alternating movement of the slides will produce a constant and uniform revolution of the shafts, as some one or more of the animal's feet will be at all times operating the slides, so that the motion of the shafts will not be intermittent, but constant. The relation of the

slides to the pulleys may be varied without changing the essential character of the invention.

To check and stop the movement of the machine a break can be used, applied thereto in any effective manner. To prevent the slides from striking with too much force on the end of the frame, also to prevent noise therefrom, a spring may be arranged between the frame and the ends of the slides upon which the slides may strike, thereby easing the blow and preventing noise.

For convenience and safety the pulleys are inclosed in a case O, Fig. 3, which is removable to gain access to the pulleys, &c.

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

1. The slides H' H, as arranged in relation to, and in combination with, the pulleys C D, connected therewith by cords or straps G' G and shaft B, substantially in the manner as described, and for the purpose set forth.

2. In combination with the slides H H', shaft B, pulleys C D, the ratchet-wheel and pawl E *a*, and spring *c*, substantially in the manner as described, and for the purpose specified.

DANIEL CUSHING.

Witnesses:

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L. R. CROSS.