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by his Attorney
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UNITED STATES PATENT OFFICE.

WILLIAM F. GOODWIN, OF METUCHEN, NEW JERSEY.

IMPROVEMENT IN HORSE-POWERS.

Specification forming part of Letters Patent No. **111,634**, dated February 7, 1871.

To all whom it may concern:

Be it known that I, WILLIAM F. GOODWIN, of Metuchen, county of Middlesex, State of New Jersey, have invented certain new and useful Improvements in Horse-Powers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a perspective view of my improved horse-power. Fig. 2 is a longitudinal sectional view. Fig. 3 is a vertical section, and Fig. 4 is a view, of the line-shaft.

The invention relates to that class of powers in which the line-shaft is provided with a screw or thread, with which the cogs or teeth on the master-wheel are made to engage, and impart to said shaft as many complete revolutions during each revolution of the master-wheel as there are cogs on said wheel.

The invention consists in, first, inclosing the entire working parts of the power in a tight shell or case, by means of which they are completely protected from dirt, thus enabling the operator to keep the gearing thoroughly lubricated, whereby the friction is greatly reduced and the durability of the machine much increased; and second, in supporting the inner or rear end of the line-shaft upon an adjustable pivotal bearing, the object of this peculiar form of bearing being twofold: first, to receive the end-thrust which is imparted to the shaft from the master-wheel upon an anti-friction bearing, and, secondly, to provide for a proper adjustment of the thread upon the shaft relative to the cogs upon the master-wheel, as it is well known that by maintaining a proper relation between the pitch of the cogs and that of the face of the thread much of ease and efficiency with which the machine can be worked, as well as its durability, depends.

In the drawing, A A' represent the base or body of the machine, consisting of a circular bottom, A, and a rim, A', provided with lugs a, having perforations, a'. B is a top or cap, circular in its general outline, to conform to and fit closely the rim A', but expanded into perforated ears b, which correspond to and match lugs a, in order that it (the cap) may be firmly secured to the body by means of bolts

b', Figs. 1 and 3, these parts A A' B thus forming a shell or case adapted to receive and inclose the master-wheel H, Figs. 2 and 3.

The master-wheel H is provided upon its periphery with cogs of a peculiar form, which will be hereinafter explained, and keyed to shaft C, which is supported at its lower end in step C' in the center of bottom A, the upper end of said shaft being supported in a sleeve or tubular bearing, B', cast, by preference, in the same piece with cap B.

D represents a head, rigidly attached to the upper end of shaft C, and mortised, as at d, for the reception of the sweeps or arm, to which the horses are to be attached. E is a cylindrical chamber, projecting from one side of shell A A' B in the same horizontal plane. E¹ E² are bearings formed in each end of chamber E for the reception of line-shaft F, bearing E¹ being removable, and secured in place by pin e, or its equivalent. e¹ is a pivotal bearing, the thread of which engages with a corresponding thread in the shoulder at one end of chamber E, as is plainly shown in Fig. 2. e² is a jam-nut, used to secure the pivot e¹ in any position to which it may have been adjusted.

F is the line-shaft, mounted in the bearing in chamber E, as just described. It is provided with a screw-thread, F', Figs. 2 and 4, and has a conical bearing in its inner end, at f. G represents a band-wheel applied to shaft F; but it is evident that a universal or tumbling joint may be applied in place of the band-wheel.

The cogs on master-wheel H are not placed on lines parallel with its axis, but run diagonally across its peripheral face at an angle corresponding to the pitch of screw F'.

I usually prefer to construct the screw F' with a double or auger thread; but this may not be essential.

If it should be found necessary, shaft C may be still further supported at its upper end by means of a bracket cast upon or secured to cap B.

It will be readily seen that c', besides affording an anti-friction support for shaft C against end-thrust, also serves as a means for adjusting the relation of the screw and master-wheel as the parts become worn.

As will be seen in Fig. 2, the pitch of the working-faces of the cogs on the master or worm wheel H, and the corresponding bevel on that face of the thread with which the cogs engage, is such that the cogs do not bear upon said thread until they (the cogs) are in full mesh; and that as they are passing out of mesh their outer ends are last to leave the thread.

By this construction and adaptation I am enabled to avoid much of the friction which is usually attendant upon the operation of worm-wheels; and I also avoid the lateral thrust upon shaft F consequent upon the ordinary construction, in which the beveled working-face of the thread is more nearly perpendicular to the longitudinal axis of the shaft or screw.

I have found by repeated experiments that by making the working-face of my screw with a bevel equal to the pitch of the screw, the faces of the teeth of the master or worm wheel which engage with the screw being beveled to correspond with the screw, and then so adjusting the parts that they (the teeth) shall not act upon the screw until they are in full mesh, I can operate my machine with less power than is required with any other construction with which I am acquainted, because I avoid nearly all of the lateral thrust upon shaft F that is produced when they are formed in the usual manner.

It is also evident that if the number of threads on the screw be increased, the num-

ber of revolutions of the shaft F to each revolution of wheel H will be diminished; but the power will be increased in the same ratio.

The machine may be secured to a platform or any desired support by means of bolts *b'*.

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

1. In a horse-power, the adjustable pivotal bearing *e'*, in combination with the screw-shaft F and master or worm wheel H, substantially as set forth.

2. In combination with line-shaft F, the pivotal bearing *e'* and the removable bearing *E'*, constructed as shown, for supporting said shaft in chamber E, as described.

3. In a horse-power, a screw-shaft having a thread the working-face of which has a bevel equal to the pitch of the screw, in combination with a master or worm wheel the teeth of which have their working-faces beveled to correspond with the bevel on the thread of the screw, substantially as set forth.

4. In combination with the worm-wheel H and screw-shaft F, the inclosing shell or casing A A' B, provided with the sleeve B', for supporting the upper end of the worm-wheel shaft, and with the chamber E, supporting shaft F, substantially as described.

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Witnesses:

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