T. Harrison
W. C. Buchanan } Horse Power.

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Fig. 1.

Patented May 9 1871

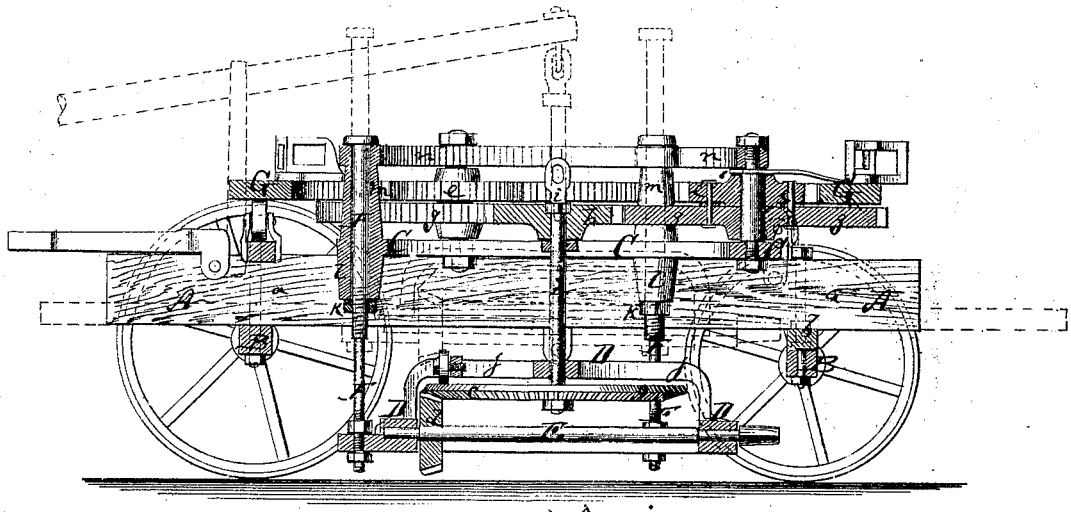
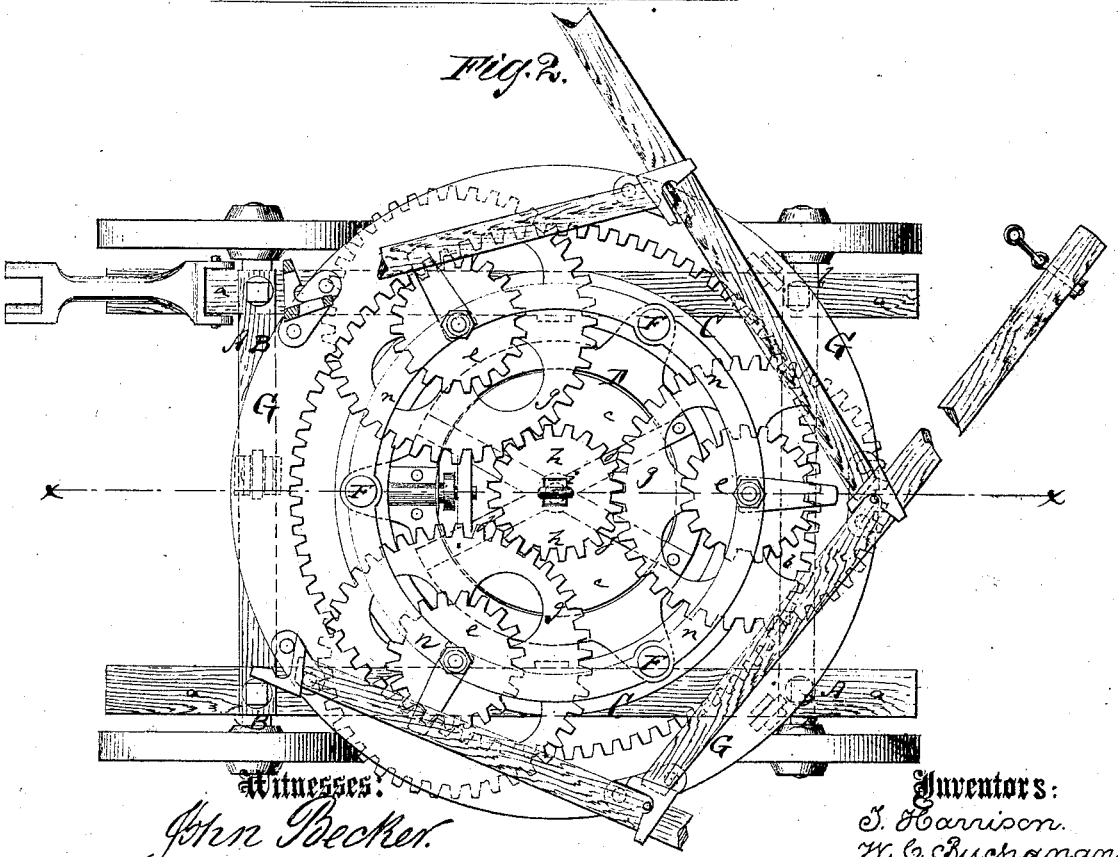


Fig. 2.



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UNITED STATES PATENT OFFICE.

THEOPHILUS HARRISON AND WILLIAM C. BUCHANAN, OF BELLEVILLE, ILLINOIS.

IMPROVEMENT IN HORSE-POWERS.

Specification forming part of Letters Patent No. **114,555**, dated May 9, 1871.

To all whom it may concern:

Be it known that we, THEOPHILUS HARRISON and WILLIAM C. BUCHANAN, of Belleville, in the county of St. Clair and State of Illinois, have invented a new and Improved Horse-Power; 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 make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 represents a vertical longitudinal section of our improved horse-power taken on the plane of the line *x x*, Fig. 2. Fig. 2 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts.

The object of this invention is to construct a mounted horse-power which has its power-conveying shaft low enough to connect directly with the tumbling-rod without requiring inclined or other inconvenient connections, and where the said conveying-shaft and appendages can be elevated sufficiently high from the ground to clear stumps and stones while the machine is being moved to or from the place of operation. The most valid objections to the horse-powers now in use are thereby overcome. The invention consists in the application of various new features and combinations, as hereinafter more fully described.

A in the drawing represents the frame of our horse-power mounted on the axles B and supporting the cast-iron bed-plate C. This frame consists of two large sills, *a a*, firmly bolted to the front bolster *b* and rear axle B and properly braced. D is an extra frame, which carries the bevel-wheel *c* and a pinion, *d*, and a horizontal shaft, E. This frame we call the "bevel-wheel frame." It is suspended from the main frame A of the power by peculiarly-shaped bolts F F, which hold it in position and permit it also to be vertically adjusted. The horizontal bevel-pinion shaft E is, by this suspended frame, held in a true line with the tumbling-rod, thus avoiding angle connections; at the same time this frame D can be raised from the ground so as to make the power transportable. These are obvious advantages. During transportation the levers, rods, braces, &c., can be placed on the axles, immediately under the bed-plate C, between the sills, and all carries easily, without additional cost to the power, thus saving the use of an extra wagon, or expense in making bolsters, or other arrangements for carrying these articles above the main wheels. G is the annular drive-wheel, toothed, to rotate three pinions, *e e*. These pinions are, respectively, mounted upon spur-wheels, *g*, which all gear into one pinion, *h*, in the center of the power. All these wheels and pinions are supported on the solid cast-iron bed-plate C. The center pinion *h*, hung on an upright shaft, *i*, has a central hole, of which the lower portion is bored out round to keep the pinion in its proper position on the shaft and relatively right to the spur-wheels that drive it, at the same time being loose on the shaft to permit the adjustability of shaft up and down, while the upper part of said hole is made square for the purpose of receiving the square upper end of the shaft *i* and driving it when in position for running. This upper part of the hole may be notched or made in any other manner that will answer the purpose of driving the shaft when thrown in gear.

The construction of the power, as far as it relates to the upper gearing G, *e*, *g*, and *h*, does not vary from other triple-gear powers, except as to the hole in pinion. On the lower plate of the adjustable frame D are boxes for the shaft E. To the bevel-wheel *c* is keyed the lower end of the shaft *i*. This shaft is guided in a frog-shaped casting, *j*, which projects from the lower plate of D, as shown in Fig. 1. The bolts F, which we call suspending-bolts, have their upper portions made larger than the lower, so that the nuts *k*, near their centers, when unscrewed, will readily drop down to allow the raising of the frame D. When the nuts are screwed to the bolts F, up against guide-tubes or nibs *l*, which project from the bed-plate C, the frame D is locked and cannot be raised. Another manner of making the frame D and upright-shaft *i* and box would be to extend a series of arms from this frame D above the arm of bed-plate, to which could be attached a journal-box immediately under or above the center pinion *h*, and said pinion could be tightly keyed to the shaft, and in the adjustment of raising and lowering all these parts the frame D, upright shaft *i*, and center pinion *h*, with box and supporting-arms, could all be movd

up or down together. While, as in Fig. 1, the frame D is lowered for operating the machine, the shaft E is brought down near enough to the ground to permit the direct coupling to the tumbling-rod, thus obviating the necessity of angles, and the consequent wear and loss of power on couplings and boxes. The frame D, with horizontal shaft E and perpendicularly-adjustable shaft *i*, is so arranged that when the power is to be used it is firmly braced and secured to the ground in the ordinary way. Then the long bolt, passing under the sills, and supporting the frame D in its elevated position, is removed, which permits the lowering of the frame D until the bevel-pinion shaft E is on a true line with the tumbling-rod. Then the nuts *k*, which are loose on the bolts F, are screwed up hard and tight against the nibs or projections *l*, that extend down from the bed-plate to near the bottom of the sills. By tightening these nuts the frame D is held securely down. The bolts F, it will be seen, serve to hold the entire power firmly together, at the same time being adjustable to raise and lower the frame D. They have, therefore, three distinct uses—first, holding the frame D securely down; second, allowing the raising of the frame and acting as guides; third, holding the entire power together. The bed-plate C and its construction is to be considered in connection with the bolts. Vertical nibs *m*, on the bed-plate, project upward to sustain the circular plate *n* above the gearing. Other nibs, *l*, project down to near the sills. These nibs or projections are tubular, and in line to constitute guides for the bolts F. They are cast solid to the bed-plate, and make the whole power very solid and rigid. While these nibs, we think, are the best means for the said purpose, yet a plate might be cast, or an additional or second bed-plate made and bolted on the bottom of sills, through which the bolts might pass. This, however, adds extra pieces and work without being as good and firm as the nibs.

When the power is to be transported the nuts *k* are unscrewed and dropped down over the bolts, and the frame D is raised and fastened up between the sills.

We are aware that frames with wheels have been made, and made adjustable and staked to the ground, and fastened also by complex arrangements to the power; but our improvement consists in suspending the adjustable frame from the power without separately connecting it with the ground.

In this power, constructed as it is, we have ample room to carry levers, rods, braces, jacks, &c., under the bed-plate and between the sills. All other portable powers have devices, bolsters, &c., arranged above the main wheel, which arrangements are complex, troublesome, and expensive. They also make the powers top-heavy and more liable to upset in traveling over uneven roads, while our placing these heavy articles right on the axles makes it almost impossible to upset the power.

The devices and bolsters on other powers are expensive because they are extra work and material added to the powers, while on ours all these levers, rods, &c., rest on the axles, without a particle of expense or any need of adjustable bolsters, &c. These standards, bolsters, &c., are also troublesome because they must be put on and off each time the powers are moved and set. The frame D, when raised, can be held up in suitable manner either by pins, bolts, levers, or other devices.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The vertically-adjustable bevel-wheel frame D, made substantially in the manner herein shown and described, and applied to a horse-power in the manner specified.

2. The suspending-bolts F, with their upper lengths made larger than the lower lengths, so that the threads on the upper lengths will require nuts large enough to pass loose over the lower lengths, as set forth.

3. The bed-plate C of the power, provided with projecting nibs *l* and *m*, that extend downwardly and upwardly, and serve as guides for the bolts F, substantially as and for the purposes set forth.

4. The center pinion *h*, made with one part of the hole round and the other portion square or notched, to be thrown in or out of gear, as described.

5. The upright shaft *i*, keyed tight to the bevel-wheel *c* in the frame D, and loose in the center pinion *h* above, and squared at the upper end, substantially as and for the purposes set forth.

6. The adjustable bevel-wheel frame D, in combination with the suspension-bolts F, as described.

7. The combination of the bevel-wheel frame D, suspending-bolts F, and bed-plate C, all arranged as specified.

8. The combination of the bevel-wheel frame D, suspending-bolts F, upright-shaft *i*, and bed-plate C, all arranged as specified.

9. The combination of the bevel-wheel frame D, suspending-bolts F, upright-shaft *i*, bed-plate C, and center pinion *h*, all arranged substantially as herein shown and described.

10. The combination of the bed-plate C, suspending-bolts F, and upper circular brace-plate *n*, by which the whole power is firmly bound together, as set forth.

11. A mounted horse-power, so constructed and arranged that the levers, rods, and other devices used for moving it can be transported on the axles under the bed-plates, as set forth.

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