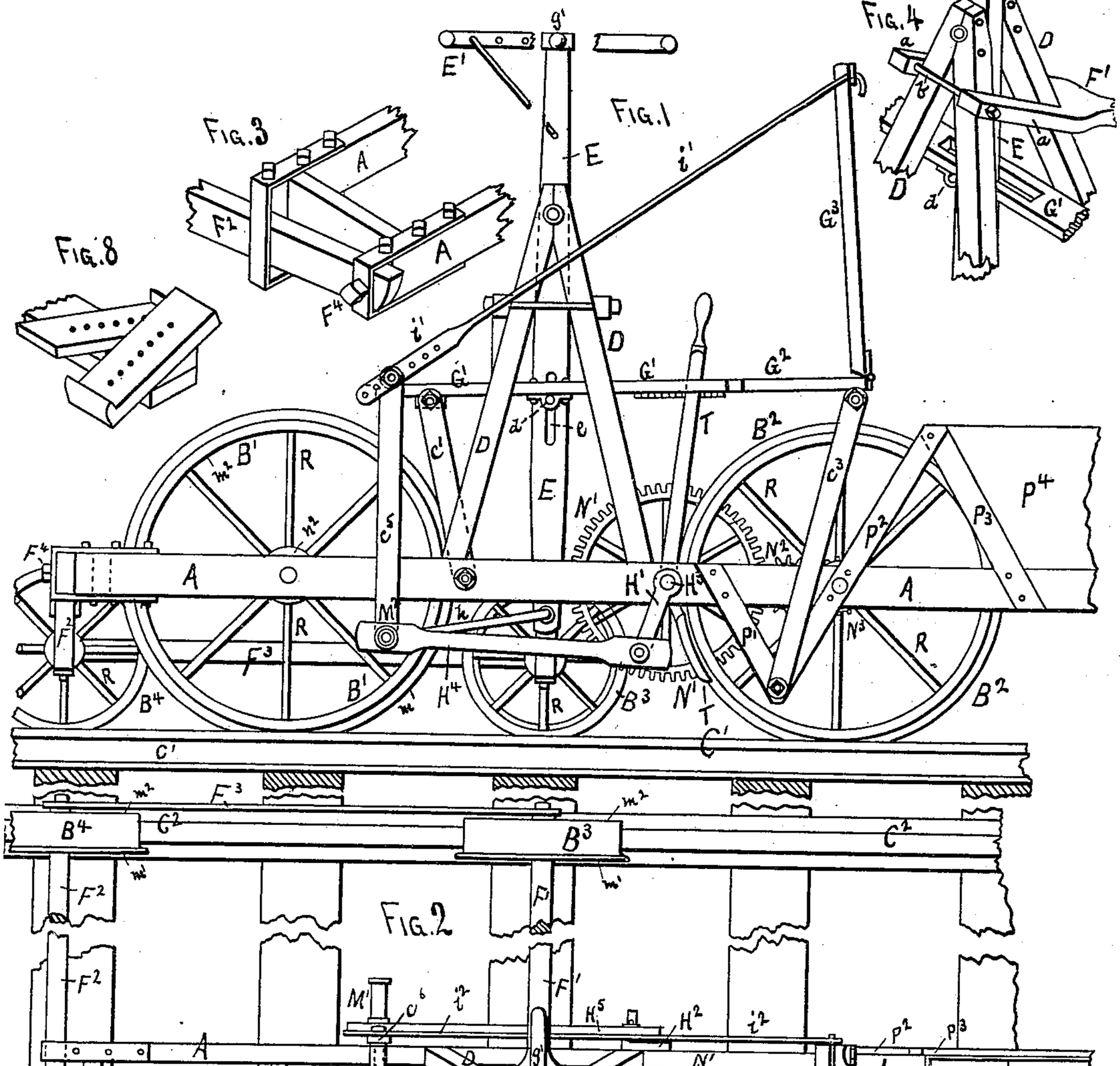
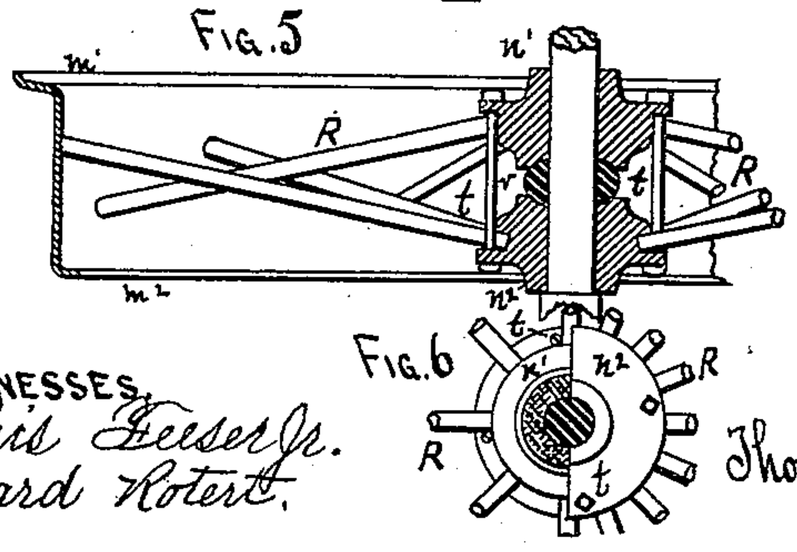
(No Model.)

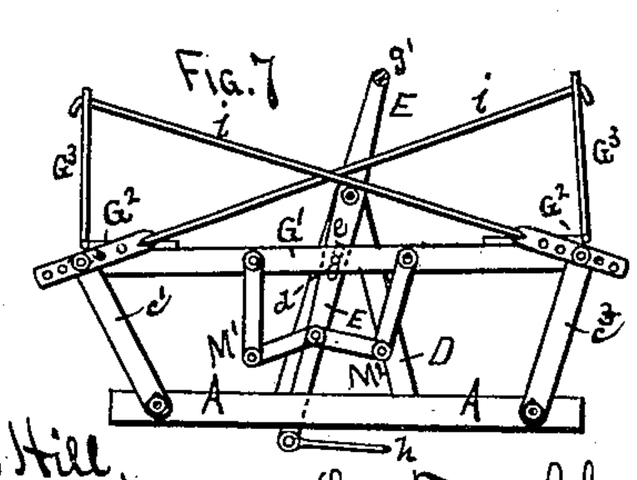
T. HILL.

MAN POWER.

No. 253,286. Patented Feb. 7, 1882.







Witnesses,
Louis Feeser Jr.
Edward Rotert.

Thomas Hill,
Inventor. By Louis Feeser & Geo. Atty's.

UNITED STATES PATENT OFFICE.

THOMAS HILL, OF TROY, ASSIGNOR OF ONE-HALF TO CHARLES COLBETH, OF KINNICKINNICK, WISCONSIN.

MAN-POWER.

SPECIFICATION forming part of Letters Patent No. 253,286, dated February 7, 1882.

Application filed July 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HILL, a citizen of the United States, residing at Troy, in the county of St. Croix and State of Wisconsin, have made certain new and useful Improvements in Man-Powers, of which the following is a specification.

This invention relates to that class of mechanism wherein human force is utilized as a motive power; and it consists in an arrangement of levers and treadles whereby the muscles of the legs, arms, and back are all brought into play, and also in the manner of constructing the frame and wheels, as hereinafter shown. I attain these objects by the use of the mechanism illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation, and Fig. 2 is a plan view, of a hand-car for railroads with my improved power applied thereto; Fig. 3, a detached detail view of a part of the forward end of the frame, showing the manner of pivoting the guiding-wheel frame; Fig. 4, a detached perspective view of a portion of the upper part of the standards, showing the manner of attaching the trailing-wheel frame thereto; Figs. 5 and 6, enlarged detail views of one of the wheels, showing the manner of constructing it; Fig. 7, a side view of the system of levers, &c., showing a variation in the manner of constructing them; Fig. 8, a detached perspective view of a portion of the treadles, showing a variation in the manner of connecting them.

This power may be applied to any desired mechanism—such as wood-sawing machines, fanning-mills, and other light machinery upon farms, &c., or to vehicles upon common roads; but for the purpose of illustration I have shown it as attached to a hand-car upon a railroad, to which it is especially applicable.

A is the frame, and B' B^2 two wheels, having flanges in the ordinary manner to enable them to run upon the rail C'.

D is an upright angular-shaped frame attached to the upper side of the frame A, in which the main operating-lever E is pivoted, as shown.

F' is a bar or rod connected by a yoke, *a*, and bolt *b* to the upper part of the frame D, (see Fig. 4,) and running downward at an angle, and provided at the lower end with a suitable flanged trailing-wheel, B^3, adapted to run upon the opposite rail, C^2, and serve as a support to keep the frame A and wheels B' B^2 in an upright position upon the track.

F^2 is another bar or rod pivoted at F^4 to the front end of the frame A, (see Fig. 3,) and running off at right angles to the frame A, and provided with a small wheel, B^4, running upon the rail C^2, ahead of the wheel B^3, the two bars F' F^2 being connected together by a bar, F^3, so that they will always retain their respective distances apart.

Hand-cars with two large wheels upon one rail and one small trailing-wheel rigidly connected to the frame of the large wheels, similar to the wheels B' B^2 B^3, and frames and bar A F', and adapted to run upon the other rail to keep the car in a perpendicular position, are not new; but, so far as I am aware, the introduction of the fourth wheel, B^4, connected to the main truck by a swivel-joint, is new.

The wheel B^3 prevents the car from tilting over toward the rail C^2; but nothing will prevent its tilting over in the opposite direction, in which event the wheel B^3 will be lifted from the track, and then, when the car tilts back again, the flange of this wheel is liable to strike the tread of the rail C^2 or fall down beyond it, and thus cause the car to run off the track, so that great care is necessary in operating such cars to prevent accidents; but by allowing the wheel B^4 a small amount of free play by the swiveled rod F^2 the car may be tilted away from the rail C^2 to a considerable extent without lifting the wheel B^4 from the track. Hence no danger exists from that cause.

G' is a flat plate connected to the frame A by four pivoted standards, c' c^2 c^3 c^4, so that it may swing back and forth, and provided with a seat, G^2, and back-support G^3, and connected to the main operating-lever E by a bolt, *d*, passing through a slot, *e*, in the lever E, so that when the operator, sitting upon the seat G^2 with his back against the support G^3, pushes the upper part of the lever E forward by the handles g' g^2 with his arms, he also utilizes the muscles of his back to push the plate G' and lower part of the lever E backward, thereby gaining a great advantage in power, as well as relieving the arms from the whole strain. The lower end of the lever E is connected by a bent

rod, *h*, to the lower parts of the two pivoted standards c^5 c^6, projecting down from the forward end of the plate G′; and the standards c^5 c^6 are also connected by their lower ends to cranks H′ H^2 upon a shaft, H^3, by rods H^4 H^5, by which the motion of the lever E and plate G′ is communicated to the shaft H^3. Foot-treadles M′ M^2 are attached to the outer ends of the bent rod *h*, upon which the feet of the operator rest, to utilize the muscles of the legs to assist in working the machine. Gear-wheel N′ and pinions N^2 N^3 connect the shaft H^3 to the shaft of the rear wheel, B^2. By this simple arrangement the power of nearly all the muscles of the body is brought into action, especially those of the back, arms, and legs, and in a way to get the greatest possible amount of work from them with the expenditure of the least possible amount of force.

The back-support G^3 will be connected to the forward end of plate G′ by rods i' i^2, which are adjustable, so that it may be adapted to suit the length of arm, &c., of the operator. The treadles M′ M^2 may also be made adjustable for the same purpose.

The rear pivoted standards, c^3 c^4, it will be observed, are arranged with their lower ends forward of their upper ends, so that the rear end of the plate G′ will fall during its backward stroke and rise during its forward stroke. Hence the weight of the operator will assist the plate in its backward stroke, while in pulling the lever E backward the operator naturally raises himself from the plate, and thus prevents his weight retarding the return-stroke. These rear standards, c^3 c^4, it will also be observed, are pivoted at their lower ends below the frame A, so that a much greater curve of the rear end of the plate G′ is secured than at the forward end, so that the operator is raised and lowered to a less extent than he would be if the standards were shorter. The supports for the pivots of the lower ends of these standards consist of two braces, P′ P^2, connected together at their lower joints, and through which the standards are pivoted, and the rear braces, P^2, are supported by two other braces, P^3, so that a very strong light frame is formed.

P^4 is a baggage-receptacle, secured to the rear of the frames A and P^3.

In this style of vehicle all the parts must be as light as possible, and at the same time be very strong and stiff. Hence I form the wheels B′ B^2 B^3 B^4, as shown in Figs. 5 and 6, with the tire of one single piece of sheet metal with the flange m' crimped outward from its rim, while the inner rim, m^2, is also crimped inward to stiffen the tire without adding to its weight.

The hub consists of two parts, n' n^2, adapted to be drawn together by bolts *t*, while the spokes R are formed of gas-pipe and set at an angle to the sections of the hub, as shown, so that when the sections of the hub are drawn together the spokes will be drawn toward each other at the bottom and press outward upon the tire, and thus tighten all the parts and hold them firmly together. A ring or packing of rubber, *v*, is placed between the sections n' n^2 of the hub to prevent moisture or dirt getting upon the axle at this point.

A brake, T, will be applied to the wheel B^2 in any desired manner to control the movement of the car.

Fig. 7 shows a variation in the manner of constructing my power when it is desired to adapt it to two or more operators; but the construction and operation are substantially the same. By slight variations it may be applied to almost any mechanism requiring a light, easily-operated power.

The handles on the lever E may be made adjustable, as shown at E′ in Fig. 1, to adapt it to the length of the arms of the operators.

Fig. 8 shows an enlarged perspective view of a portion of a pair of the treadles detached, showing a variation in the manner of constructing them, so that they may be adjusted to adapt them to different-sized persons.

What I claim as new is—

1. The combination and arrangement of the frame A D, lever E, plate G′, and back-support G^3, substantially as set forth.

2. The combination and arrangement of the frame A D, lever E, plate G′, back-support G^3, pivoted standards c' c^2 c^3 c^4, and treadles M′ M^2, connecting-rods H^4 H^5, bent rod *h*, and crank-shaft H′ H^2 H^3, whereby the power of the levers may be communicated to the mechanism it is desired to operate, substantially as set forth.

3. The combination and arrangement, with the frame A, wheels B′ B^2, and rigidly-held trailing-wheel B^3, of the guiding-wheel B^4, connected flexibly to the frame A and axle of the wheel B^2, substantially as and for the purpose set forth.

4. The combination and arrangement of the plate G′, back-support G^3, and adjustable tie-rods i' i^2, whereby the angle of the back-support may be adjusted, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS HILL.

Witnesses:
C. N. WOODWARD,
LOUIS FEESER, Sr.