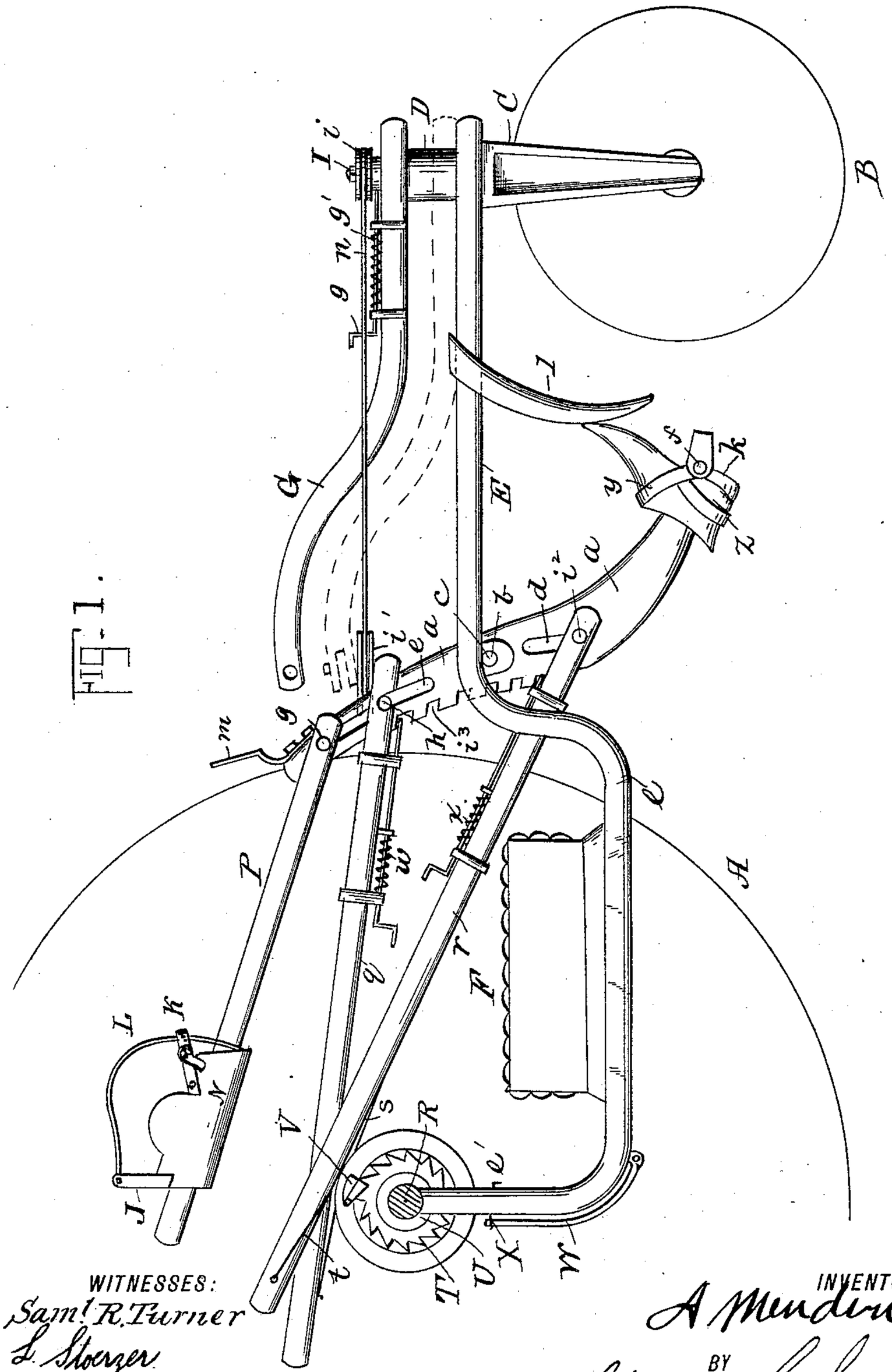
(No Model.) 2 Sheets—Sheet 1.

A. MENDENHALL.

TRICYCLE.

No. 453,151. Patented May 26, 1891.

FIG. 1.



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(No Model.) 2 Sheets—Sheet 2.

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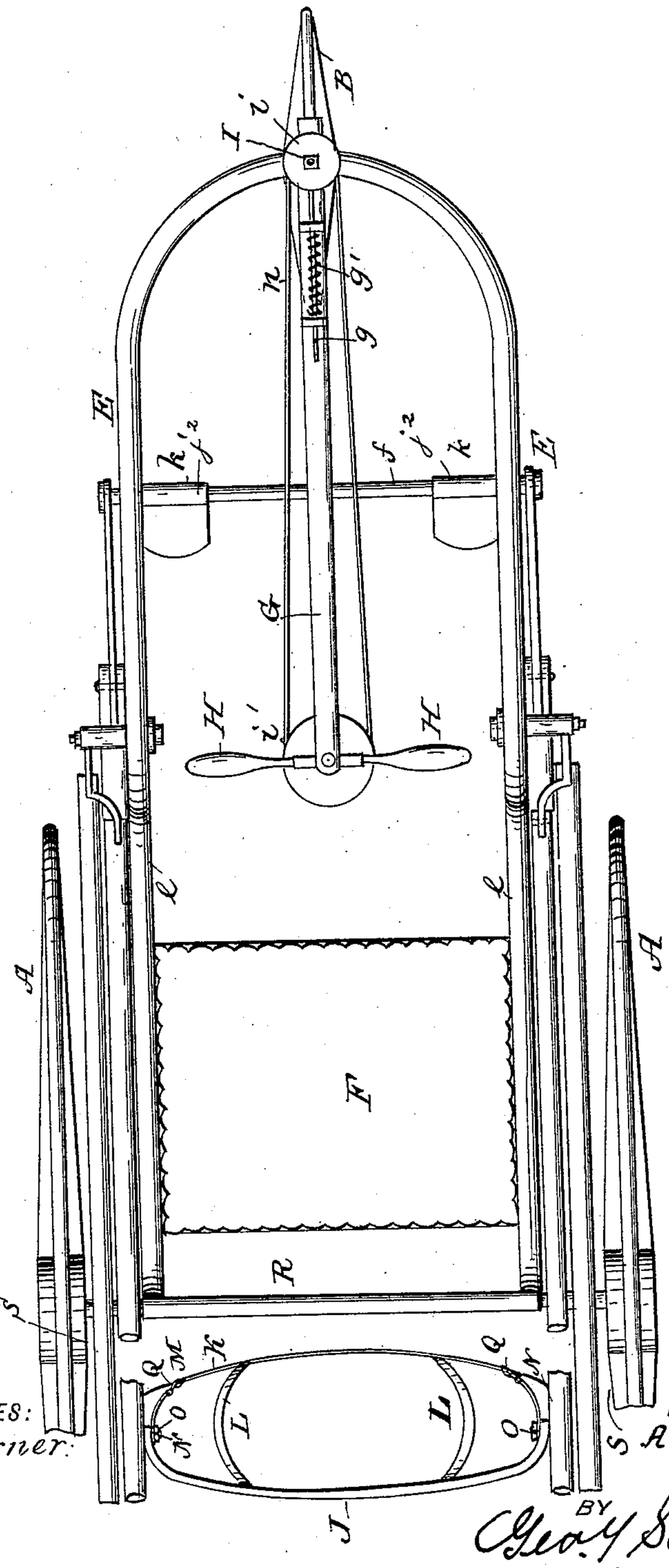
FIG. 2.



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UNITED STATES PATENT OFFICE.

AMOS MENDENHALL, OF UNIONPORT, INDIANA.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 453,151, dated May 26, 1891.

Application filed August 29, 1890. Serial No. 363,426. (No model.)

To all whom it may concern:

Be it known that I, AMOS MENDENHALL, a citizen of the United States, residing at Unionport, in the county of Randolph and State of Indiana, have invented certain new and useful Improvements in Tricycles; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 the letters of reference marked thereon, which form a part of this specification.

My invention relates to tricycles, and has for its object, first, to utilize the upper portion of the body and the pushing and the pulling force of the feet as the means of propulsion, the seat being the center of the forces; second, to construct and arrange the parts in a simple and efficient manner, whereby the maximum amount of energy can be obtained for propelling the vehicle; third, to proportion and dispose the parts in such a manner that the strong muscles of the body, the legs and the arms are exerted in the act of driving the machine almost entirely in the direction of their length rather than crosswise, and, fourth, to obviate dead-centers in the operation of the machine, and to apply the force as near as possible at right angles to the dead-centers.

The improvement consists in the novel features and the peculiar construction and combination of the parts, which will be hereinafter more fully described and claimed, and which are shown in the accompanying drawings, in which—

Figure 1 is a side view, parts being broken away, of a vehicle embodying my invention. Fig. 2 is a top plan view, parts being broken away, and the shoulder-gear being broken away and carried farther to the rear, so as not to obstruct the parts which would otherwise be hidden thereby of the machine.

In the drawings similar letters denote corresponding parts.

The frame which supports the operating parts of the machine is approximately U-shaped, as seen in the plan view, Fig. 2, and is placed within the closed end in the front. The side bars E E of the frame have a depressed portion *e'* just in front of the axle R to receive the seat F, and may form parts of the same bar, which is curved between its ends, or they may be separate pieces and secured to the curved front. The fork C is journaled at its upper end in the sleeve or boss D, which is fastened to the frame, and is provided at its lower end with the pilot-wheel B. The steering-lever G is placed on the upper end of the fork, and held thereon by the nut I. The inner end of the steering-lever extends within convenient reach of the driver on the seat F, and is provided with the handle-bar H. In some instances the lever G may be dropped to a lower level and held at its forward end to the boss D, or mounted loosely thereon, as required, and the upper end of the forks will be provided with the pulley *i*, around which the front end of the band *n* passes, the inner end of the band passing around the pulley *i'* at the inner end of the lever or mounted on any other convenient part of the machine. The lever G will be held on the upper end of the fork and be prevented from slipping thereon by the latch-bolt *g*, which is held on the lever G by suitable keepers, the said latch-bolt being projected into the opening in the upper end of the boss by the spring *g'*. The seat F is supported at its ends on the side bars of the frame, and is arranged in the depressed portion *e'* of the said side bars.

Like letters of reference denote the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by letter, A is the rim of the driving-wheel.

B is the small front or guide wheel.

C is the fork, in which the guide-wheel is journaled. D is a boss or bearing for the journal of said fork.

E E are the side frames of the machine, which couple the three wheels together.

F is the seat, which is supported upon the frame-bars E and secured thereto by bolts, clips, or in any other suitable manner.

G is an arm extending backward from the fork on the guide-wheel to a position within easy reach of the hands of the rider when seated on the machine, and provided at its rear end with handles H H, a spring-bolt *q* being mounted on said arm and adapted to engage the fork C to prevent said arm from slipping thereon.

I′ is a nut on the top of the fork C to hold it in position.

Referring particularly to Fig. 2, J is a semi-circular or, rather, semi-elliptical piece of wood or metal, which serves as a back piece to the rider.

K is a strap of leather, webbing, or other suitable material, which passes around the breast of the rider.

L L denotes a strap, which passes over the shoulder of the rider. The strap K is secured in position and released when desired by means of short straps M of the same material, which pass under the plates N, which plates are secured by bolts O passing through them, through back piece J, and rear end of bars P. The connection between the straps M and K is made by means of buckles secured to the former at Q, and the connection, by means of bolt O, with bar P is made adjustable by providing two or more holes in bar P for each of said bolts, so that the framework and straps may be adjusted forward or backward, thus shortening or lengthening the bar P, so as to suit persons of different lengths of arms. The bars P may be let into or otherwise securely fastened to the back piece J, so that there will be no possibility of these parts slipping upon each other while in operation.

R is the axle for the driving-wheels. S are the inner surfaces of the hubs of the same.

T is a ratchet band-wheel or ring of metal rigidly secured to the hub, so that it will not turn thereon.

U is another metallic band, sleeve, or ring around the ratchet-ring T, and arranged to turn thereon about one-third of a revolution back and forth, more or less. By the side of this ring U is another similar to it. Each ring or band U is about one-half the width of the ratchet-ring T, and has an independent movement forward and backward on said ratchet-ring, each having a pawl V, which engages the teeth of the ratchet-ring T on the forward stroke and to slide over the same on the backward stroke. The driving-wheels are intended to work loosely upon the spindles in the manner of ordinary sulkies or buggies.

W is a luggage-carrier, the lower end being hinged to the frame-bar E, while the upper end can be lowered or raised at will by means of a chain, cable, rope, or strap X to be fastened on a pin or hook *e′*.

a a is an upright or power-receiving lever having a bearing *b*, secured to the frame-bar E. *c* is the journal on which the said lever *a* is pivoted and works back and forth.

d e are slots through the lever *a*, through which bolts i^2 and *h* pass, and in which said bolts may be moved up and down as occasion requires, as herein described.

P, *q*, and *r* are arms, which may be made of any suitable material, such as wood or metal, each of which arms is to be forked at its forward end, so as to embrace or straddle the lever *a*, being connected with the said lever by the bolts *g*, *h*, and i^2, which pass through such forks, said bolts being provided with heads on one end and nuts on the other.

On the rear portions of the arms P is secured the back frame or shoulder-gear, consisting of the strap L, breast-strap K, and the back-rest J.

To arm *r* on the under side is attached a strap or other substitute, such as a cord, chain, or strip of metal *s*, which passes backward over the top of the pawl-ring U and is rigidly secured thereto at its rear end.

t is a small cord or wire fastened at the back end to the arm *r*, and at the forward end to the front edge of the pawl-ring U. The joint width of the strap *s* and cord or wire *t* should not exceed the width of the pawl-ring U, upon which they work side by side. All the parts just described as connecting the arm and pawl-ring are duplicated in the strap U and the cord or wire V to connect the arm *q* with the duplicate pawl-ring, hereinafter mentioned, but not shown in the drawings.

w and *x* are latch-bolts secured on bars *q* and *r* by proper loops or eyes, and are held normally in a forward position by suitable springs in either of a series of notches l^3 in the rear edge of the lever *a*. Each of these bolts is shown as being in the notch farthest from the center of the motion of said lever *a*. They can be withdrawn by hand, and the ends of the arms *q* and *r* forced toward the center of motion, and the bolts entered in the proper notches, thereby increasing the power of each stroke, of course at the expense of speed. This arrangement will be found very beneficial in running on roads partially level and partially hilly, also in making a short turn when about to start before any momentum has been acquired, as the moving of the arms of the machine without a corresponding movement on the other side would be equivalent to having wheels of different diameters, or running-wheels of the same diameter at different speeds, thereby turning the machine without reference to the position of the guide-wheel.

At the lower end of the lever *a* is a rod, which may be made of gas-pipe, as at *f*.

k in Fig. 1 represents a shoe for the left foot.

y z is a leather gear for the foot, with a buckle on the top for opening and closing the same when putting it off or on.

j^2 is a leather tube encircling the rod *f*, to which the foot-gear is attached.

l is a stop for the foot, bolted to the frame-bar E, and by its use the rub-block or brake *m* is prevented from coming in contact with the drive-wheels; but when it is desired to lock the wheels with the brake the toes of the feet are turned inward, so as to pass this stop and be pushed farther forward, thus forcing the top of the lever *a* backward and bringing the brake in contact with the wheels.

Having thus described the construction of the parts and the relation they bear to each

other, I will now proceed to describe their co-operation and combined action. Supposing the rider to be in the seat, as shown in Fig. 1, his shoulders would be thrown back and his feet forward. Hence the first action would be to push forward with the shoulders and pull back with the feet. Both of these forces would be exerted to force the arm *q* forward, thus pulling the pawl-rings, similar to *u*, and turning one of the pawl-rings forward. During this operation the arm *r* is carried back, ready to be carried forward by the forward motion of the feet and backward motion of the shoulders. Each movement backward or forward of both shoulders and feet takes part in propelling the machine forward, while at the same time the hand grasps the handle H as a brace as well as a guide, the wheel B being turned by moving said handles to right or left, thus guiding the machine in its course. Each of the wheels A and B may be provided with fenders of obvious construction to prevent contact of the clothing or other part of the rider therewith. For steering purposes solely it is sufficient to have the outer end of the arm G rigidly attached to the upper end of the fork; but when it is desired to use said arm G as a brace or stay to the hands and arms of the rider when pushing and pulling with the feet and the shoulders it becomes necessary to have the said arm G in line with the shoulders and the fork C at all times, and to this end the front end of the arm G is rigidly secured to the boss, and which forms a substantial and permanent support therefor. Under these conditions the advantages of the pulley *i'*, band *n*, and the pulley *i* can be readily appreciated, as it admits of the steering being effected without the turning of the arm G either to the right or the left, which would detach from the qualities of the arm G as a substantial stay or brace. To have the arm G made solid with the boss D would be objectionable, in that it would interfere with the rider in getting on or off the seat. Hence it has been found expedient to fasten the arm G to the boss D by latch-bolt *g'*, so that it can be loosened from the said boss D and turned to one side. After the rider is in the seat, the arm G can be swung to position and held in place by the bolt *g'* engaging with the boss D.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a vehicle to be propelled by the rider, the combination, with a power-receiving lever having connection with the driving-wheels, of a shoulder-gear to positively connect the upper part of the body of the rider with the said lever, whereby a swaying movement of the rider will effect a propulsion of the vehicle-hub, as specified.

2. In a vehicle propelled by manual power, the combination, with a power-receiving lever having connection with the driving-wheels, of a foot-gear and a shoulder-gear to positively connect the foot and upper portion of the rider, respectively, with the said lever, whereby the combined action of the body and foot will serve to propel the vehicle, substantially as hereinbefore specified.

3. In combination, the frame-bars E, the lever *a*, pivoted to said bars and provided with notches on its rear edge, and the bars *q* and *r*, adjustably connected with the lever *a* and having spring-bolts *w* and *x*, as set forth.

4. In combination, the frame-bars E, the stops *l*, secured thereto, the lever *a*, pivoted to bar E and having a foot-rest at its lower end, the brake *m* at its upper end, and the driving-wheels, as set forth.

5. In combination with the pivoted lever *a*, the bar P, pivoted near its top, the back-rest, breast and shoulder straps connected to said bar P, the seat F, and the frame-bars E, as set forth.

6. In combination, the frame-bars E, the guide-wheel and fork having rod G and handles H, the lever *a*, pivoted to the frame-bars, the seat F, the foot-rest at lower end of lever *a*, and the back-rest connected to the upper end of said lever, as and for the purpose set forth.

7. In a tricycle, the combination, with the luggage-carrier having pivoted connection with the frame of the vehicle, of the cords *x* for raising and lowering the said carrier and holding it at the located position, substantially as described, for the purpose specified.

8. In a tricycle, the combination, with a frame, of a lever pivoted thereto, a foot-rest upon the said lever below its pivoted point, a shoulder-gear adapted to receive the shoulders of the operator upon the said lever above its pivoted point, and a connection between the said lever and driving-wheels, as described.

In testimony whereof I affix my signature in presence of two witnesses.

AMOS MENDENHALL.

Witnesses:

WILLIAM J. DAVISSON,

JAMES H. JEFFREY.