

(No Model.)

F. W. ZIMER.
VELOCIPEDE.

No. 445,618.

Patented Feb. 3, 1891.

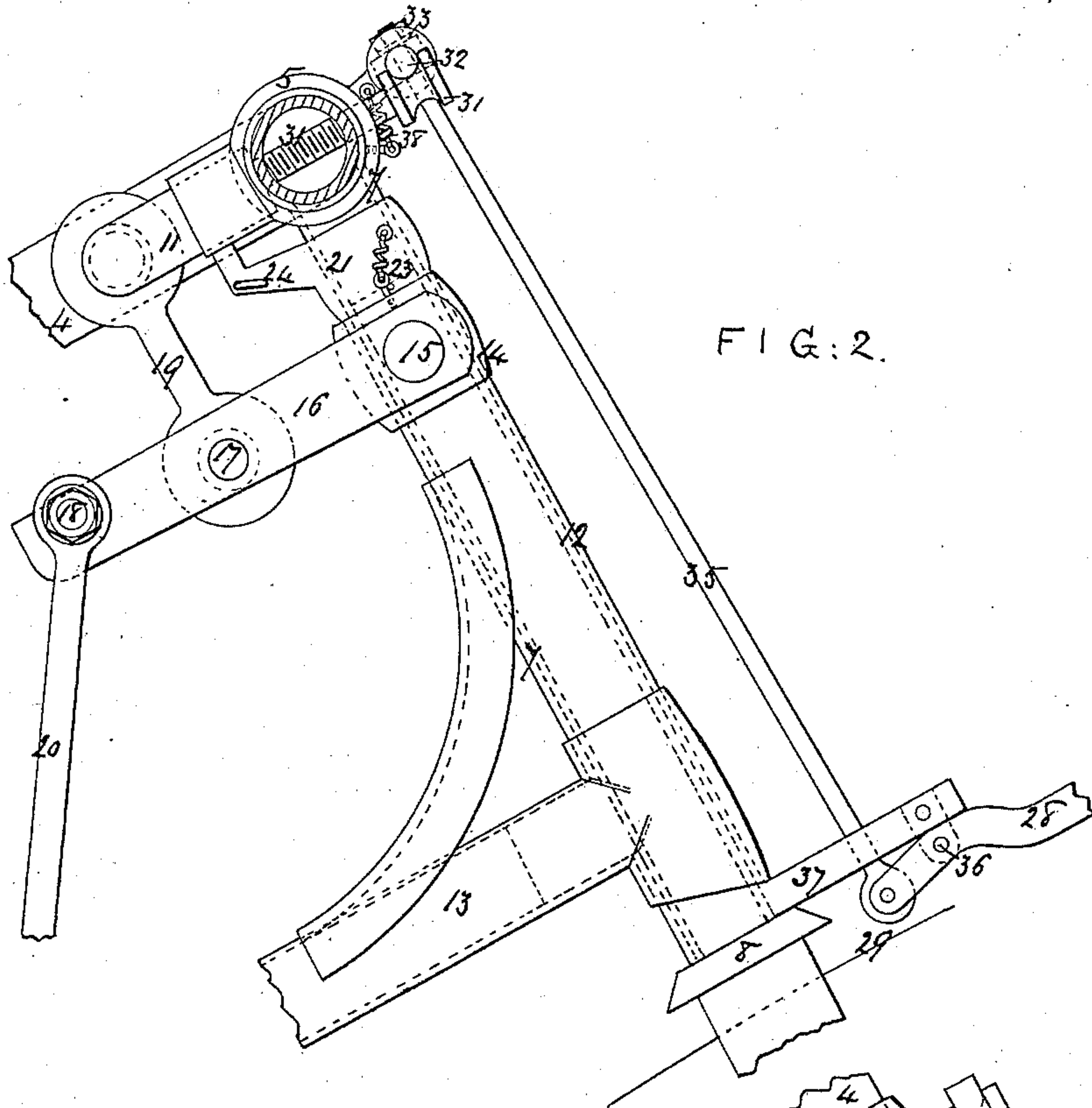


FIG. 2.

FIG. 1.

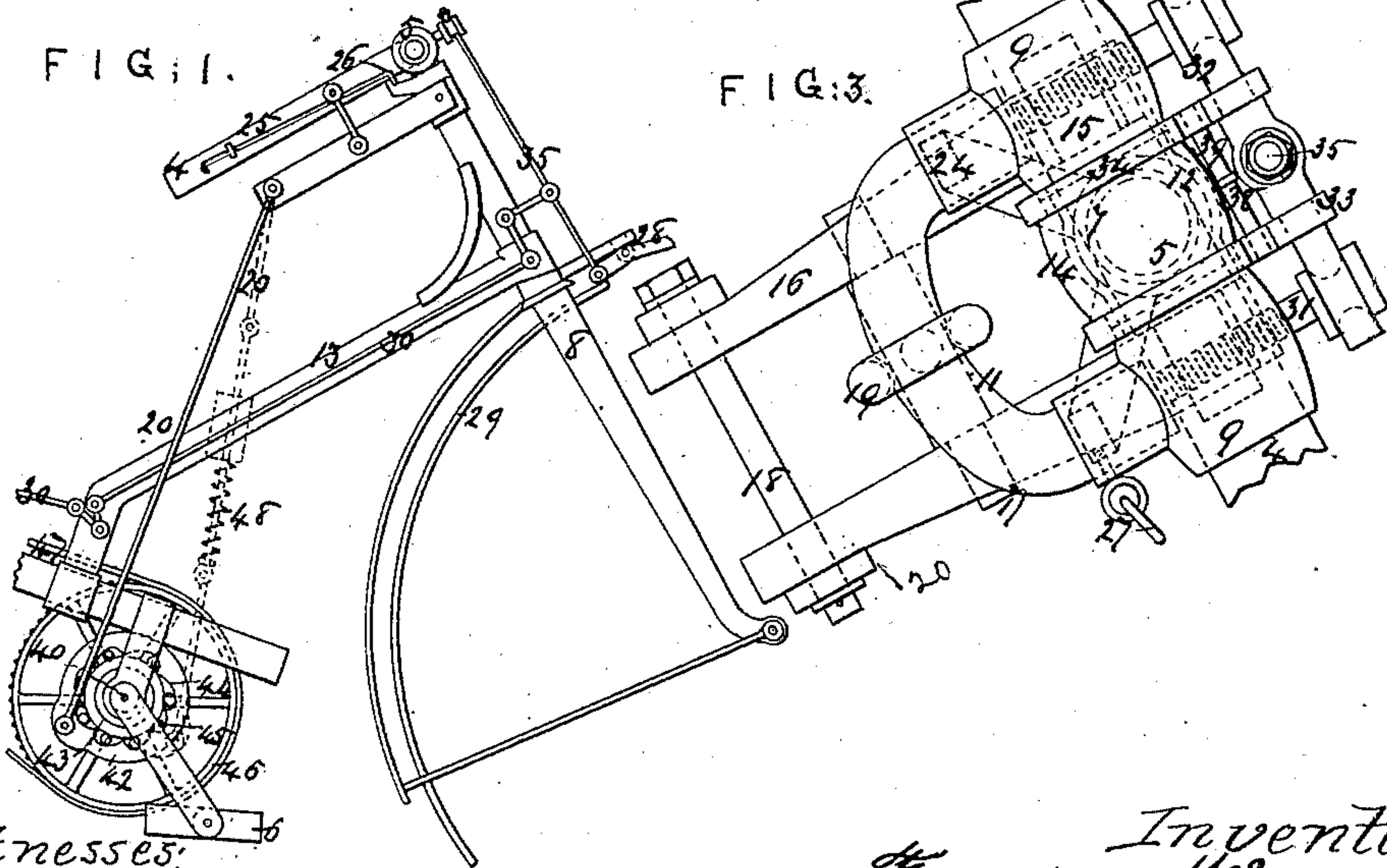


FIG. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK W. ZIMER, OF LONDON, ENGLAND.

VELOCIPEDE.

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Application filed March 13, 1890. Serial No. 343,711. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM ZIMER, a subject of the Emperor of Germany, residing at London, England, have invented
5 an Improved Combined Treadle and Hand Driving or Actuating Mechanism, of which the following is a full, clear, and exact description.

This invention relates to improved combined treadle and hand driving mechanism,
10 which may be applied and used as means for propelling bicycles and other vehicles and boats and for imparting motion to or actuating machinery of various kinds.

15 The special object of the invention is to economize and utilize to the best advantage for the purpose required the whole available weight and lifting-power which man can bring into operation at a time; and to this end the
20 invention consists in so constructing and arranging such mechanism as that the weight and whole lifting-power of the operator exerted in directly opposite vertical or nearly vertical directions practically in a line with
25 the direction of the body are conjunctively utilized in the manner and by the means hereinafter described by causing him at each actuation of the mechanism to simultaneously depress one of a pair of treadle or like foot-
30 operated devices and lift by both hands a double handle-bar, each directly or indirectly operating on the shaft, levers, or connected mechanism to be actuated, hereinafter referred to as "the said shaft or connected
35 mechanism;" in consequence of which combined simultaneous and opposite directions of his energy he can exert a considerably increased effective power over that he could exert and can obtain and impart a more uni-
40 form or continuous motion than he could obtain and impart with any existing combined hand and treadle driving or actuating appliances, as at the time of his exerting such energy there is added to his weight the whole
45 lifting-power he is capable of exerting, as well as the additional momentum which the exercise of such lifting-power causes to be thrown onto such foot operating devices.

The improved mechanism is illustrated on
50 the accompanying drawings as applied to a velocipede.

Figure 1 represents a side elevation of part

of the vehicle with the improved mechanism applied thereto. Fig. 2 represents an elevation, partly in section, on an enlarged scale,
55 of the hand operating mechanism; and Fig. 3 represents a plan view of part thereof.

4 represents a double handle-bar, which is formed with handles occupying a relatively low position in the line of the body of the
60 operator when operating the mechanism, and which is mounted in a tubular boss 5 in such a manner that by the vertical or approximately vertical movements of the hands in a line with the body it can be reciprocated
65 about its axis which passes through the boss, and such movements are, as hereinafter described, caused to be effective in aiding in actuating the said shaft or connected mechanism, which is represented in the illustration given by the shaft 40. The boss is made
70 fast to a tube 7, rising from the fork 8, so that turning movements of the handle-bar about the axis of the tube will cause the vehicle or apparatus to which the improved
75 mechanism is applied to be steered or directed according to such movements of the handle-bar. Adjacent to each side of the boss there is made fast to the axial part of the handle-bar a tubular boss 9, to the two
80 of which bosses the ends of a segmental bar 11 are secured, with the bar concentric with the intersection of the axis of the handle-bar with the axis of the tube 7. The tube 7 is encircled by and works within a tube 12,
85 which is made fast to the backbone 13 of the machine, and has made fast to its upper end a tubular collar 14, formed with projecting lugs 15, on which are fulcrumed rearwardly-projecting levers 16, which are con-
90 nected by cross-bars 17 and 18, one of which is connected by a link 19 to the bar 11, and the other of which is connected by rods 20 to the said shaft or connected mechanism. The concentric disposition of the bar 11 allows of
95 the vehicle or apparatus to which the improved mechanism is adapted being steered or directed by the turning of the handle-bar about the axis of the tube 7 without interfering with the connection of the handle-bar
100 by the rods 20 or any equivalent connections with the said shaft or connected mechanism.

21 represents a tubular collar, which is loosely mounted on the tube 7 and can be

turned about the axis thereof to a limited extent. It is normally kept by a spring and stopping devices 23, respectively, connected to it and to the collar 14, in such a position
 5 as will cause projecting rests 24, with which it is provided, to support the handle-bar in the position indicated in Fig. 2, and will then only allow of the handle-bar being reciprocated above such supported position in actuating the said shaft or connected mechanism.
 10 The collar 21 can, however, by a connected pull-rod 25, bell-crank 26, and chain 27, actuated by the pull of a finger or by any other suitable means, be turned about the axis of
 15 the tube 7 from such supporting position to a position in which it will cease to support the handle-bar, and will allow of the latter being lowered below its normally-supported position, in which event it will be operative in
 20 applying the brake 28 to the front wheel 29, (*vide*) Fig. 2; or by means of suitable connections 30, it may also be operative in applying a brake on a rear wheel or wheels or on any convenient part of the vehicle or apparatus
 25 to which the mechanism is applied. The handle-bar is caused to be operative in such manner at such times by means of adjustable rods 31, which are screwed into the bosses 9 through its axis, and consequently partake of
 30 the said vertical reciprocations, but reversely being on the opposite side of such axis. When the collar 21 is turned about its axis, as aforesaid, and the handle-bar is depressed below its said supported position, the circumferentially-grooved ends of the rods 31 engage with
 35 the projecting ends of a cross-rod 32, which is supported by arms 33, projecting from loosely-mounted collars 34, encircling adjacent turned parts of the boss 5 or of the bosses
 40 5 and 9, and is connected by a depending rod 35 to the brake 28, centered at 36 to a bearing 37, projecting from the fork, and such brake and any connected brake is or are consequently applied and can be applied with
 45 the whole weight of the upper part of the body of the operator bearing on the handle-bar, which is a considerable advantage. The cross-rod 32 and the brake 28 are normally kept in position ready for such actuation by
 50 a spring 38, connected to a cross-bar 39 and to the boss 5. The said vertical lifting movements of the handle-bar are rendered effective in actuating the said shaft or connected mechanism, as aforesaid, by connecting the
 55 rods 20 or any equivalent connecting means thereto by a clutch-operating device, by a ratchet and pawl, by levers, or by any suitable means which will allow of the unimpeded lowering of the handle-bar after each actuation for the next following operation. Such
 60 device in the illustration given is represented by a recessed clutch 42, which is caused to be reciprocated about the axis of the shaft 40 by the movements of the rods 20. The clutch surrounds the hub 43 of the shaft and is formed
 65 with inclined recesses 44, fitted with rollers 45, of a less diameter than the greatest depth of

the recesses, so that as the clutch is reversed by the lowering of the handle-bar the rollers
 45 will freely follow and will not interfere 70 with the turning of the shaft by the operation of the pedals 6, (which at any time may alone be operated if the operator desires to rest on the handle-bar in its supported position;) but
 when the clutch is brought into operation at 75 each lifting operation of the handle-bar the rollers 45 are jammed between it and the hub of the shaft, and the lifting-power of the operator is thus utilized. If the motion of the
 shaft 40 be desired to be communicated to 80 any other axle of the vehicle or apparatus to which the mechanism is applied, such may be effected by a chain-wheel 46 and connecting-chains 47 or by bevel-gearing or in any other convenient or appropriate manner, and 85
 by such means motion may be given, for example, to a paddle or screw-propeller shaft or to the axle of a grindstone. The lateral turning of the handle-bar may be likewise utilized for steering or guiding purposes by suitably connecting it to the rudder attachments 90 or to the part to be actuated, and the braking movement of the handle-bar may likewise be utilized in stopping or reversing the paddles or in disconnecting the gearing. The vertical 95
 reciprocations of the handle-bar may also be utilized for steering or directing purposes, in like manner as hereinbefore described with reference to the utilization of such movements for braking purposes. It will be seen 100
 that in the hereinbefore-described improved arrangement the total lifting-power of both hands exerted in the line of the body is applied at each actuation of the handle-bar simultaneously with the depression of each 105
 treadle.

In the hereinbefore-described arrangement the clutch-operating device is actuated directly by the upward pull of the handle-bar, as aforesaid; but the said lifting-power may 110
 be indirectly applied by causing it to compress a spring 48, linked to the clutch, and to simultaneously raise the latter into operative position, so that on the handle-bar being lowered the required energy of the spring will be 115
 operative in actuating the clutch.

I am aware that it is not novel to use the hands and feet conjunctively and simultaneously in driving mechanism or the like, and that various arrangements of combined 120
 treadle and hand driving mechanism now exist, in some of which the hands and feet are conjunctively and simultaneously used in horizontally, or approximately so, pushing and pulling in reverse directions connected hand 125
 and pedal levers in which the weight or gravity of the operator is not to any material extent utilized; in another of which arrangements the hands alternately pull up independent pivoted hand-levers respectively 130
 permanently connected to and giving a downward thrust to pedal-levers upon which one of the feet simultaneously acts also with a downward thrust, and in another of which a

forwardly-placed pivoted handle is oscillated by the forwardly-extended hand or hands so as to aid by its connection to clutches on the pedal-shaft in the driving or propelling operation, and I lay no claim to any such arrangements.

I claim as my invention in combined treadle and hand driving mechanism—

1. In combination, a double handle-bar 4, working on a horizontal axis and provided with duplicate angular extensions or handles, by both of which acting simultaneously it can be vertically reciprocated about such axis, a vertical or approximately vertical support 7, carrying the axial part of the handle-bar and connected to the steering device 8, a framing 12, supporting the support 7 and permitting of its being turned about its axis by lateral movement of the handle-bar, an extension 11, projecting from the near side of the axial part of the handle-bar concentric with the intersections of the axis of the handle-bar and of its support 7, lever-like under extensions 16, projecting from the framing 12 and adapted to be reciprocated in a vertical plane, a connection 19, connecting the extensions 11 16 in all positions of the handle-bar, extensions 33 34, projecting from the opposite side of the axis of the handle-bar and loosely mounted thereon and connected with a brake device 28, normally occupying an inoperative position, under extensions 31, projecting from the axial part of the handle-bar, an adjustable device 21, arranged to normally prevent the handle-bar from being lowered sufficiently to cause the extensions 31 to operate the extensions 33 34, but permitting of such movement and actuation when laterally displaced, a clutch-operating device 42 or the like on the shaft of the mechanism to be operated, and treadles for operating such shaft by the feet in a normal manner, and connections 20 from the extensions 16 to such clutch or like device 42, so arranged as to permit of the unimpeded lowering of the double handle-bar between following depressions of the treadles and of the raising thereof by both hands coincidentally with the depression of each treadle, as set forth.

2. In combination, the vertically-reciprocating double handle-bar 4, laterally-adjustable support 7, supporting-frame 12, connected extensions 11 and 16, oppositely-projecting extensions 33 34 31, adjustable device 21, clutch-operating device 42 or the like on the shaft of the mechanism to be operated, treadles or the like for operating such shaft by the feet, and spring connections 20 48 from the extensions 16 to such clutch or like device 42, so arranged as to be compressed by

the upward pull of the double handle-bar effected by both hands coincidentally with the depression of each treadle and as to be automatically operative in actuating the clutch during each lowering movement of the handle-bar, as set forth.

3. In combination, the vertically-reciprocating double handle-bar 4, laterally-adjustable support 7, supporting-frame 12, connected extensions 11 and 16, clutch-operating device 42, shaft operated by treadle, and connections 20 from the extensions 16 to such clutch, so arranged as to permit of the unimpeded lowering of the double handle-bar between following depressions of the treadles and of the raising thereof by both hands coincidentally with the depression of each treadle, as set forth.

4. In combination, the vertically-reciprocating double handle-bar 4, laterally-adjustable support 7, supporting-frame 12, connected extensions 11 and 16, clutch-operating device 42, shaft operated by treadles, and spring connections 20 48 from the extensions 16 to such clutch, so arranged as to be compressed by the upward pull of the double handle-bar effected by both hands coincidentally with the depression of each treadle and as to be automatically operative in actuating the clutch during each lowering movement of the handle-bar, as set forth.

5. In combination, the vertically-reciprocating double handle-bar 4, clutch-operating device 42, shaft operated by treadles, and connections 20 from such handle-bar to such clutch, so arranged as to permit of the unimpeded lowering of the double handle-bar between following depressions of the treadles and of the raising thereof by both hands coincidentally with the depression of each treadle, as set forth.

6. In combination, the vertically-reciprocating double handle-bar 4, clutch-operating device 42, shaft operated by treadles, and connections 20 48 from such handle-bar to such clutch, so arranged as to be compressed by the upward pull of the double handle-bar effected by both hands coincidentally with the depression of each treadle and as to be automatically operative in actuating the clutch during each lowering movement of the handle-bar, as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

F. W. ZIMER.

Witnesses:

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