(No Model.)

4 Sheets—Sheet 1.

M. POWERS.

TRACTION ENGINE

No. 510,707. Patented Dec. 12, 1893.

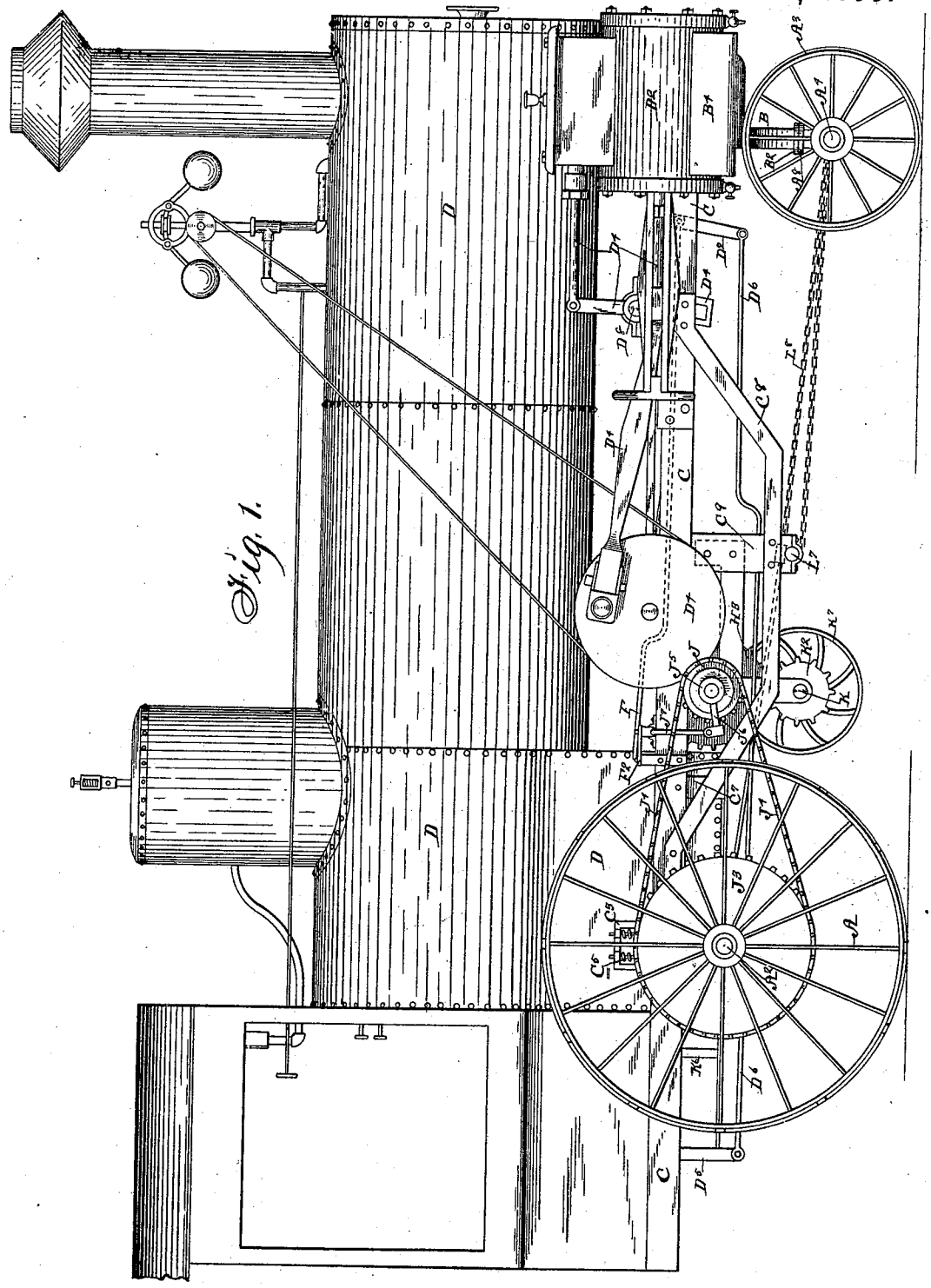


Fig. 1.

Witnesses:
H. J. Saulkey.
J. Ralph Orwig.

Inventor: Melvin Powers,
By Thomas G. Orwig, Attorney.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 2.

M. POWERS.

TRACTION ENGINE.

No. 510,707. Patented Dec. 12, 1893.

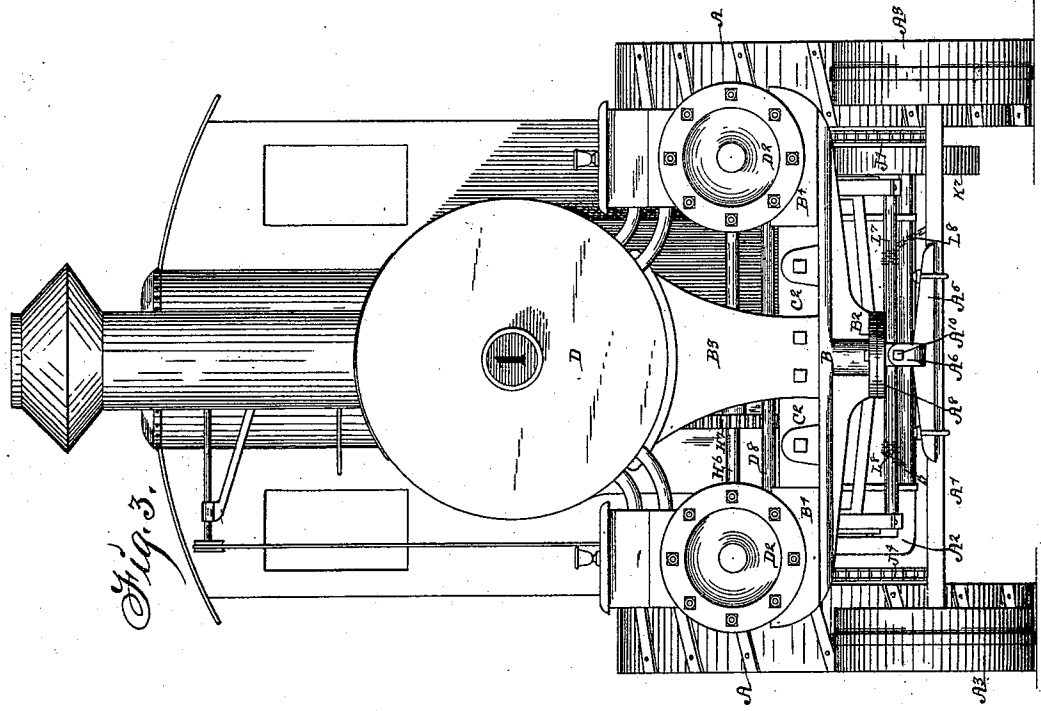


Fig. 3.

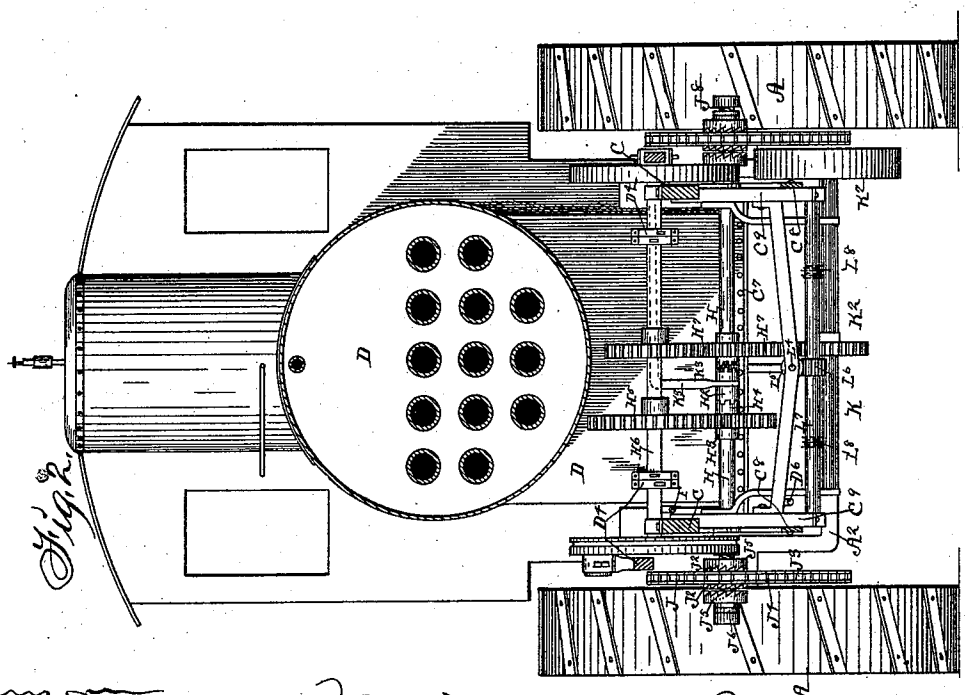


Fig. 2.

Witnesses:
W. J. Sankey.
J. Ralph Orwig.

Inventor:
Melvin Powers.
By Thomas G. Orwig, Attorney.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 3.

M. POWERS.

TRACTION ENGINE.

No. 510,707. Patented Dec. 12, 1893.

Fig. 4.

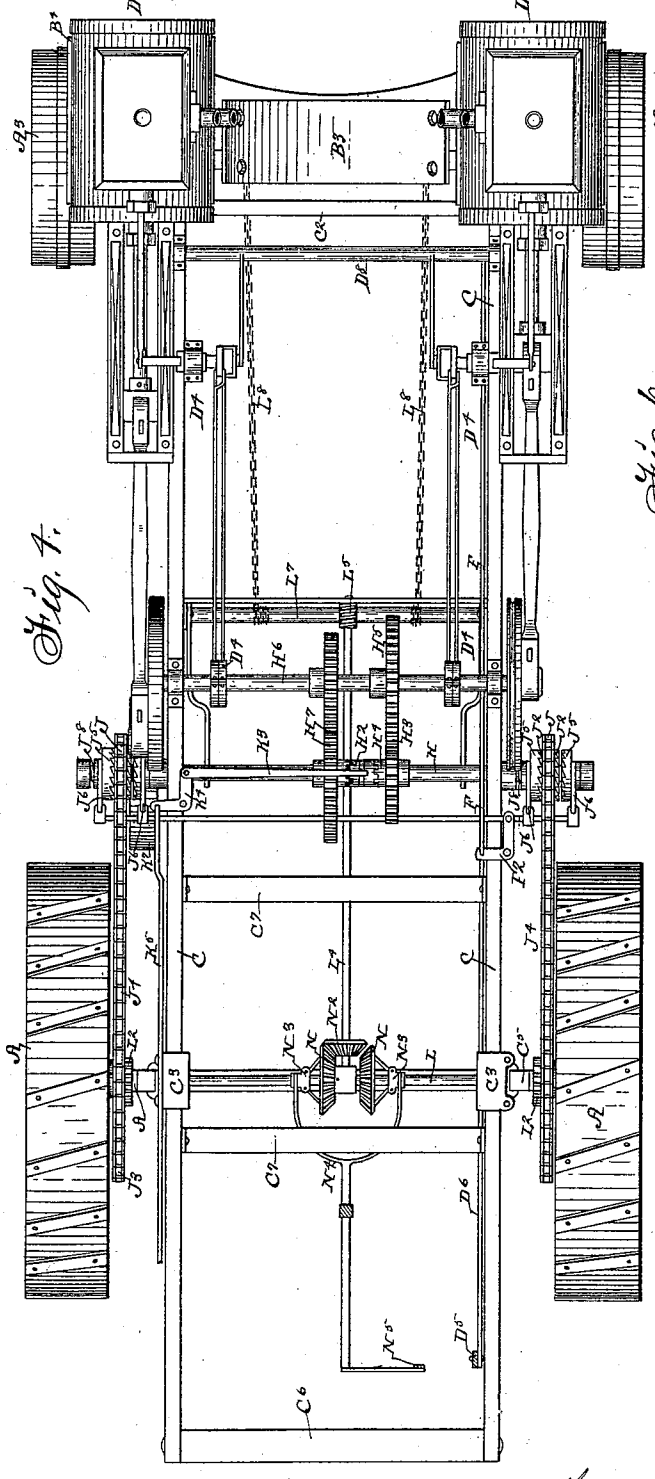


Fig. 6.

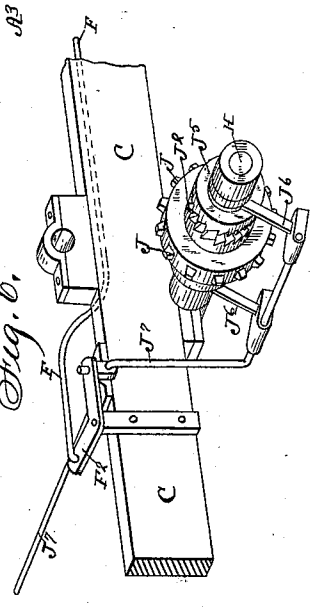
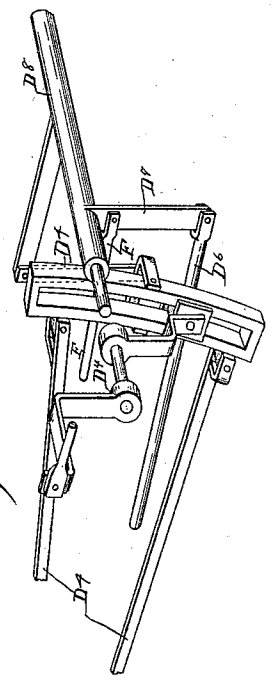


Fig. 5.



Witnesses:
W. J. Saukey.
J. Ralph Orwig.

Inventor: Melvin Powers,
By Thomas G. Orwig, Attorney.

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

(No Model.)

4 Sheets—Sheet 4.

M. POWERS.

TRACTION ENGINE.

No. 510,707. Patented Dec. 12, 1893.

Fig. 8.

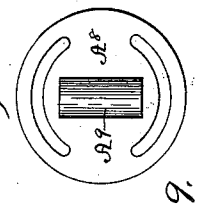


Fig. 9.

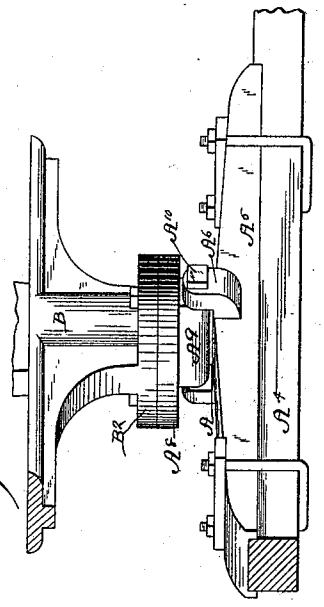
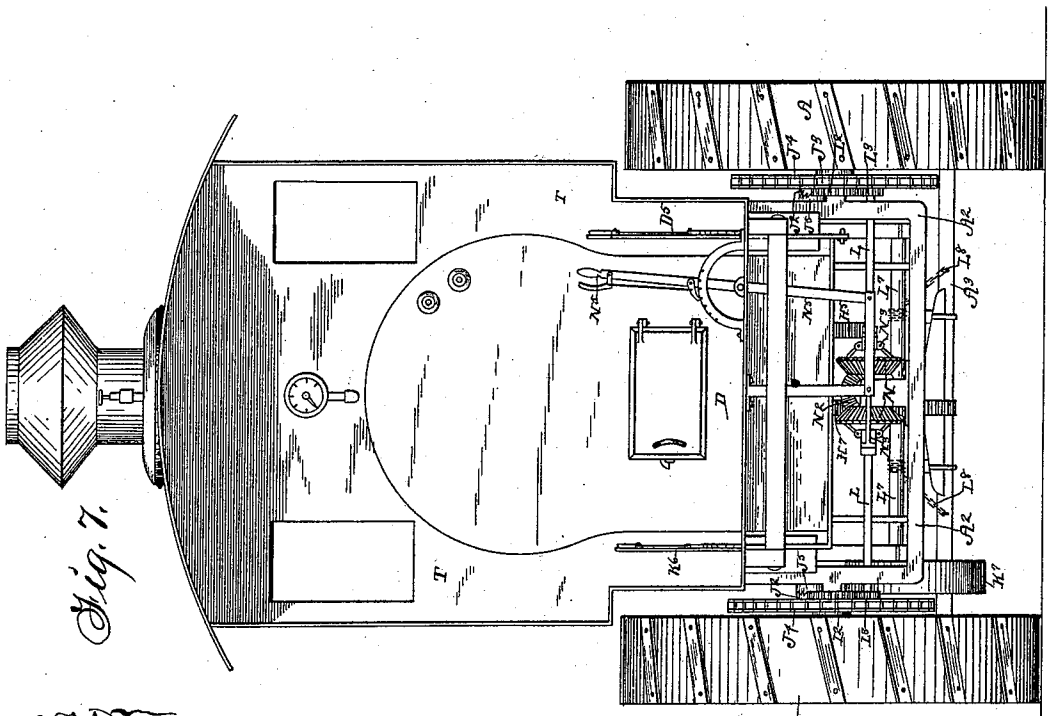


Fig. 7.



Witnesses:
W. J. Saulkey.
J. Ralph Orwig.

Inventor: Melvin Powers,
By Thomas G. Orwig, Attorney.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MELVIN POWERS, OF DES MOINES, IOWA.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 510,707, dated December 12, 1893.

Application filed April 18, 1893. Serial No. 470,927. (No model.)

To all whom it may concern:

Be it known that I, MELVIN POWERS, a citizen of the United States of America, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Traction-Engines, of which the following is a specification.

The objects of my invention are, first, to provide improved means for supporting the operative mechanism of a traction engine and also the boiler, independently of each other.

A further object is to provide a bolster or saddle adapted to support the forward end of the boiler and also two steam cylinders on opposite sides of the boiler and out of contact therewith.

A further object is to provide improved means for operating the steering mechanism by means of power generated by the engine proper and controlled by means of a lever within the cab.

A further object is to provide a simple, strong and durable fifth wheel which shall be so arranged that the engine mechanism will maintain an approximately horizontal position irrespective of the inequalities in the surface of the road.

A further object is to provide simple, durable and effective means arranged to be operated by the same lever which controls the engine reversing mechanism, whereby the traction wheels of the engine are reversed and which will also allow the traction wheels to operate independently of each other either when advancing or moving backward as required in turning.

My invention consists primarily in the construction and arrangement of the supporting frame of the machine.

My invention consists further in the construction of a bolster or saddle for supporting the forward end of the boiler and also two steam cylinders on opposite sides thereof.

My invention consists further in the construction, arrangement and combination of the steering mechanism.

My invention consists further in the construction and arrangement of the means for reversing the traction wheels of the engine and in the combination of the same with the mechanism for reversing the engine, so that they will be reversed simultaneously, by the manipulation of a single lever.

My invention consists further in certain details of construction, arrangement and combination of parts hereinafter set forth, pointed out in my claims and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the complete traction engine. Fig. 2 is a transverse sectional view through the line $x\,x$ of Fig. 1. Fig. 3 is a front view of the complete traction engine. Fig. 4 is a top or plan view of the carriage supporting frame and operative mechanism, with the boiler removed. Fig. 5 is an enlarged detail perspective view of a detached portion of the piston reversing mechanism showing the operating rods connected therewith. Fig. 6 is an enlarged detail perspective view of a detached portion of the traction wheel reversing mechanism showing the connection of the same with the rods which also serve to transmit motion to the engine reversing mechanism. Fig. 7 is a rear view of the complete traction engine. Fig. 8 is an enlarged bottom view of the under plate of the fifth wheel and Fig. 9 is an enlarged detail perspective view of the fifth wheel connective parts.

Referring to the accompanying drawings the reference letter A is used to designate the traction wheels mounted on the axle A^2, and A^3 the forward or steering wheels mounted on the axle A^4.

A^5 is a brace mounted on the axle A^4 and provided with the concaved surface A^7 for purposes hereinafter set forth.

A^8 designates the lower portion of a fifth-wheel provided with a convex projection A^9 adapted to rest in the aforesaid concaved surface and be securely retained therein by means of a bolt A^{10} extended through the aforesaid lugs and also through the projection A^9. This arrangement will support the weight of the machine upon the brace A^5 and allow either wheel of the forward truck to be elevated without moving the fifth wheel proper from the horizontal position and also securely retain the said parts in the same relative position.

B designates a bolster or saddle to support the boiler and cylinders. Its under portion B^2

is formed into the upper part of a fifth wheel to mate with the aforesaid fifth wheel section A^8.

As it is a feature of my invention to support the operative mechanism out of direct contact with the boiler, I provide a central support B^3 formed on or fixed to the said bolster or saddle adapted to secure the steam cylinder.

The reference letter C is used to designate the straight side portions of the supporting frame of the device. These parts extend throughout the entire length of the machine and a forward portion C^2, preferably integral with the side portions, rests upon the bolster B and is securely bolted thereto.

C^3 designate frames attached to each side portion C of the supporting frame near their rear ends and adapted to receive the vertically sliding bearings C^4 which rest upon the springs C^5 and have the axle A^2 admitted therein to thereby provide vertically-adjustable, cushioned bearings for the traction wheels.

C^6 designates the rear cross piece of the supporting frame.

C^7 C^7 are hangers fixed to the side portions C and bent downwardly to receive and support the fire box of the boiler.

C^8 are trusses fixed to the side pieces C to strengthen said side pieces and also to support operative mechanism C^9 being the upright connecting piece of the said truss.

D designates the boiler and fire box having its forward end mounted in the support B^3 and its rear is in the hangers C^7.

D^2 D^2 are steam cylinders of the ordinary construction located on opposite sides of the boiler and resting in the support B^4. The general reference symbol D^4 is used to designate the piston shafts, eccentrics, reversing mechanism, &c., common to steam engines. This reversing mechanism is adapted to be operated by means of a lever D^5 at the rear end of the machine connected with a rod D^6 running parallel with the side portions of the frame and attached to an arm D^7 projecting downwardly and rearwardly from a rock shaft D^8 mounted in the forward part of the supporting frame in an ordinary manner. Attached to the same arm D^7 is a rod F extended rearwardly to a bell crank lever B^2 mounted on the side portions of the supporting frame. It will now readily be seen that upon a reversal of the usual engine reversing mechanism, the bell crank lever F^2 will be operated. This, in turn, will set in motion the traction wheel reversing mechanism, which will next be described.

H designates a shaft rotatably mounted in suitable bearings secured to the side pieces C of the supporting frame.

H^2 is a double clutch device having a sliding through non-rotatable connection with the approximate central portion of the said shaft.

H^3 is a gear wheel loosely mounted on the shaft H and provided with a clutch device H^4 on the inner end portion of its hub adapted to engage the clutch H^2.

H^5 designates a gear wheel, of a diameter large by comparison with the wheel H^3 with which it is in mesh and which is fixed to a shaft H^6 operated directly by the engine in the ordinary way.

The gears designated by the reference symbol H^7 are for the same general purpose as the gears H^3 and H^5, namely, the transmission of power from the shaft H^6.

The mechanism for operating the sliding clutch will be described hereinafter, the object of the foregoing being to show how the shaft H is rotated by the engine. The means provided at both ends of this shaft H for imparting motion to the traction wheels being identical in construction but one will be described.

J designates a sprocket wheel loosely mounted upon one end portion of the shaft H and having the beveled toothed clutches J^2 J^2 formed on the ends of its hub and inclined in opposite directions.

J^3 designates a sprocket wheel fixed to the axle of the traction wheels, and J^4 a sprocket chain connecting the aforesaid sprocket wheels.

J^5 J^5 designate clutch devices having sliding non-rotatable connections with the shaft H the one mounted inside the sprocket wheel J and having its teeth adapted to mesh with the clutch device formed thereon and the other outside the said wheels and having its teeth adapted to mesh with those on the outside thereof. Each of the said sliding clutches has an annular groove formed therein for the reception of a bifurcated lever J^6 which is fixed to a rod J^7 which in turn is connected with the aforesaid bell crank lever F^2.

J^8 designates springs normally exerting a yielding pressure on the clutch devices J^5 to hold them toward their mating clutches but which will allow the clutch devices J^5 to rotate rearwardly relative to the inclination of the clutch teeth, that is the clutch device J^5 will rotate the sprocket wheel J when operated in one direction and will not engage said sprocket wheel when rotated in an opposite direction.

K designates a shaft rotatably mounted in the supporting frame beneath the shaft. This shaft is operated by means of a gear wheel K^2 in mesh with the gears H^7.

The hereinbefore mentioned clutch device H^2 is arranged to be placed in engagement with one of the aforesaid trains of gear wheels to operate the traction wheels or in engagement with the remaining train of gear wheels to operate the belt wheel K^7 by means of a rod K^8 operating in an annular groove formed in the said clutch device, and having the other end attached to a bell crank lever K^6 mounted upon the supporting frame and operated by means of a rod K^5 and a lever K^6.

The steering mechanism comprises a shaft L rotatably mounted in a suitable part of the

frame, and adapted to be operated by means of the gear wheels L^2 and L^3 fixed respectively to the axle of the traction wheels and the said shaft and in mesh with each other.

L^4 designates a rotatable shaft mounted in suitable bearings with its one end in close proximity to the shaft L and its forward end provided with a worm gear L^5 adapted to mesh with the gear wheel L^6 which in turn is mounted on a rotatable shaft L^7. This shaft has the steering chains L^8 wound thereupon in different directions and attached to the front axle.

N N designate bevel gear wheels loosely mounted on the shaft L, and N^2 is a like wheel adapted to mesh with either of the aforesaid wheels and mounted on the shaft L^4.

N^3 N^3 designate friction clutch devices of the ordinary construction to engage the gear wheels N N. They have a sliding non-rotatable connection with the shaft L and are adapted to be operated, that is, brought into position to engage either of the said bevel gear wheels by means of the bifurcated lever N^4 which in turn is connected with and adapted to be operated by the lever N^5. As the shaft L is being rotated at all times during the operation of the traction wheels it will be obvious that it is only necessary to connect the shaft L with the shaft L^8 in order to operate the steering device, and when either of the friction clutch devices are made to engage either of the bevel gear wheels when in mesh with the gear wheel on the shaft L^8 the steering chains will be operated to steer to one or the other side, governed by the substituting of one of the wheels N for the other.

In the construction of the devices I prefer to mount a suitable cab T on the rear end of the frame and have the lever which controls the engine and traction wheel reversing mechanism for throwing the traction wheels in and out of gear, and also the steering mechanism controlling lever contained within the cab in convenient positions.

Having thus described the construction, operation and function of each separate part and sub-combination of the engine in its turn, a description of the unitary action of the device is deemed unnecessary.

What I claim as my invention, and desire to secure by Letters Patent of the United States therefor, is—

1. In a traction engine, the combination of the following elements, to wit; a bolster or saddle supported indirectly by the forward axle and adapted to support the forward end of a boiler and also a steam cylinder on each side of the boiler without being in direct contact therewith, a rear axle bent downwardly in its central portion and having vertically-adjustable, cushioned, bearings attached thereto, an oblong frame fixed to the forward bolster and mounted on said cushioned bearings at its rear end, as set forth, and cross pieces fixed to the sides of the frame and bent downwardly at the rear end of the frame to receive the cab, substantially in the manner set forth, for the purposes stated.

2. In a traction engine the combination of a bolster or saddle supported indirectly by the forward axle and having means for supporting the forward end of the boiler, and also the two steam cylinders without being in direct contact with the boiler, for the purposes stated, an oblong frame having its forward end mounted upon the aforesaid bolster or saddle and its rear end attached to the vertically adjustable cushioned bearings of the rear axle, trusses in the approximate central portion of the side pieces of the frame, to counteract vertical strain upon the frame, hangers secured to the sides of the frame and passed beneath the fire box to support it, and means for supporting all of the other operative mechanism of the device upon the said frame without being in direct contact with the boiler or fire box for the purposes stated.

3. In a traction engine an improved fifth wheel, comprising a brace secured to the forward axle, a concave formation on the top surface of said brace, integral projections at the forward and rear ends of said concave surface, a lower fifth wheel section having a longitudinally extending convex projection adapted to rest upon the aforesaid concave surface, a bolt to pass through the aforesaid integral projection of the brace and the convex projection to hold the latter in place, in combination with a fifth wheel of ordinary construction in the manner set forth for the purposes stated.

4. In a traction engine, an improved steering device, comprising a rotatable shaft mounted in suitable bearings in the rear of the forward wheels, chains or their equivalents fixed to opposite sides of the center of the axle of said forward wheels and wound in opposite directions upon the aforesaid rotatable shaft, a shaft rotatably mounted in suitable bearings directly above the rear axle, gear wheels fixed to the axle of the traction wheels, like gears fixed to said shaft and in mesh with the aforesaid gears, two bevel gear wheels loosely mounted on the said shaft, clutch devices slidingly and non-rotatably attached to the said shaft to engage said bevel gear wheels, a lever connected with said clutch devices whereby either of them may be rotated or both remain inoperative, as set forth, a shaft mounted in suitable bearings with a worm on its forward end and a bevel gear wheel on its rear end adapted to mesh with either of the aforesaid bevel gear wheels, a gear wheel fixed to said forward shaft, to be engaged by said worm, substantially as, and for the purposes, stated.

5. In a traction engine mechanism for automatically reversing the traction wheels of the device simultaneously with the engine reversing mechanism comprising a lever adapted to operate the usual engine reversing mech-

anism, a rod adapted to be operated by a movement of the engine reversing mechanism a rotatable shaft mounted in suitable bearings and geared to the engines to be operated thereby one or more sprocket wheels loosely mounted upon said shaft and connected with the traction wheels by means of a sprocket chain and suitable clutch devices actuated by the aforesaid rod whereby the said sprocket wheel is rotated forwardly or rearwardly by a reversal of the engine reversing mechanism for the purposes stated.

6. In a traction engine mechanism for automatically reversing the traction wheels of the device simultaneously with the engine reversing mechanism, comprising a lever adapted to actuate the usual engine reversing mechanism, a rod adapted to be actuated by the engine reversing mechanism, a shaft rotatably mounted in suitable bearings and geared to the engines substantially as set forth, one or more sprocket wheels loosely mounted on said shaft and connected with the traction wheels by means of a sprocket chain, two clutch devices constructed substantially as set forth and mounted on the said shaft on opposite sides of each sprocket wheel, having a sliding non-rotatable connection with the said shaft and adapted to engage the sprocket wheel in the manner set forth, and the means shown and described operated by the aforesaid rod for placing either of the said clutch devices in engagement with the sprocket wheel to operate the traction wheels in opposite directions substantially as set forth.

MELVIN POWERS.

Witnesses:
R. H. ORWIG,
THOMAS G. ORWIG.