No. 626,666.

Patented June 13, 1899.

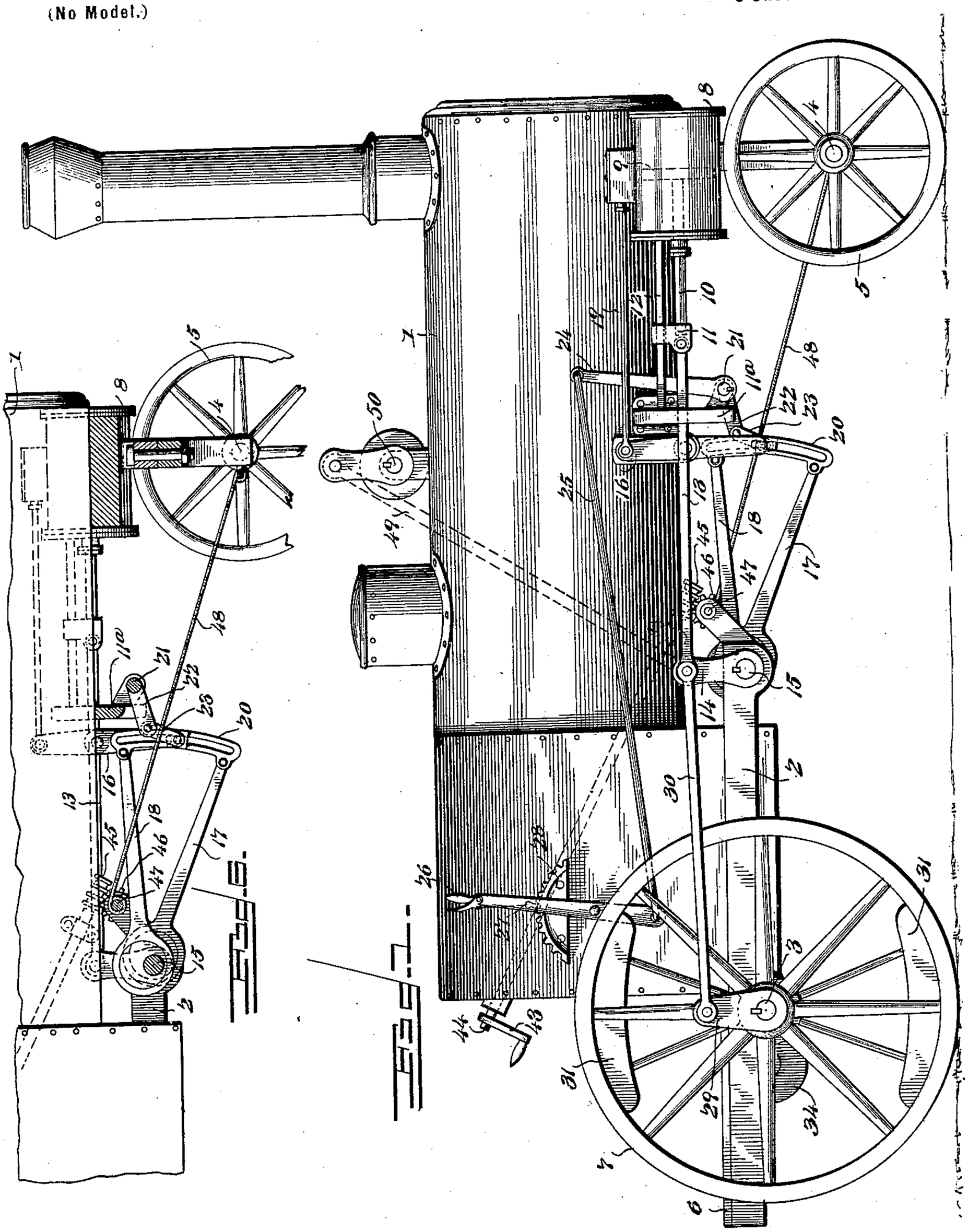
J. M. CHAPPEL.

TRACTION ENGINE.

(Application filed June 29, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

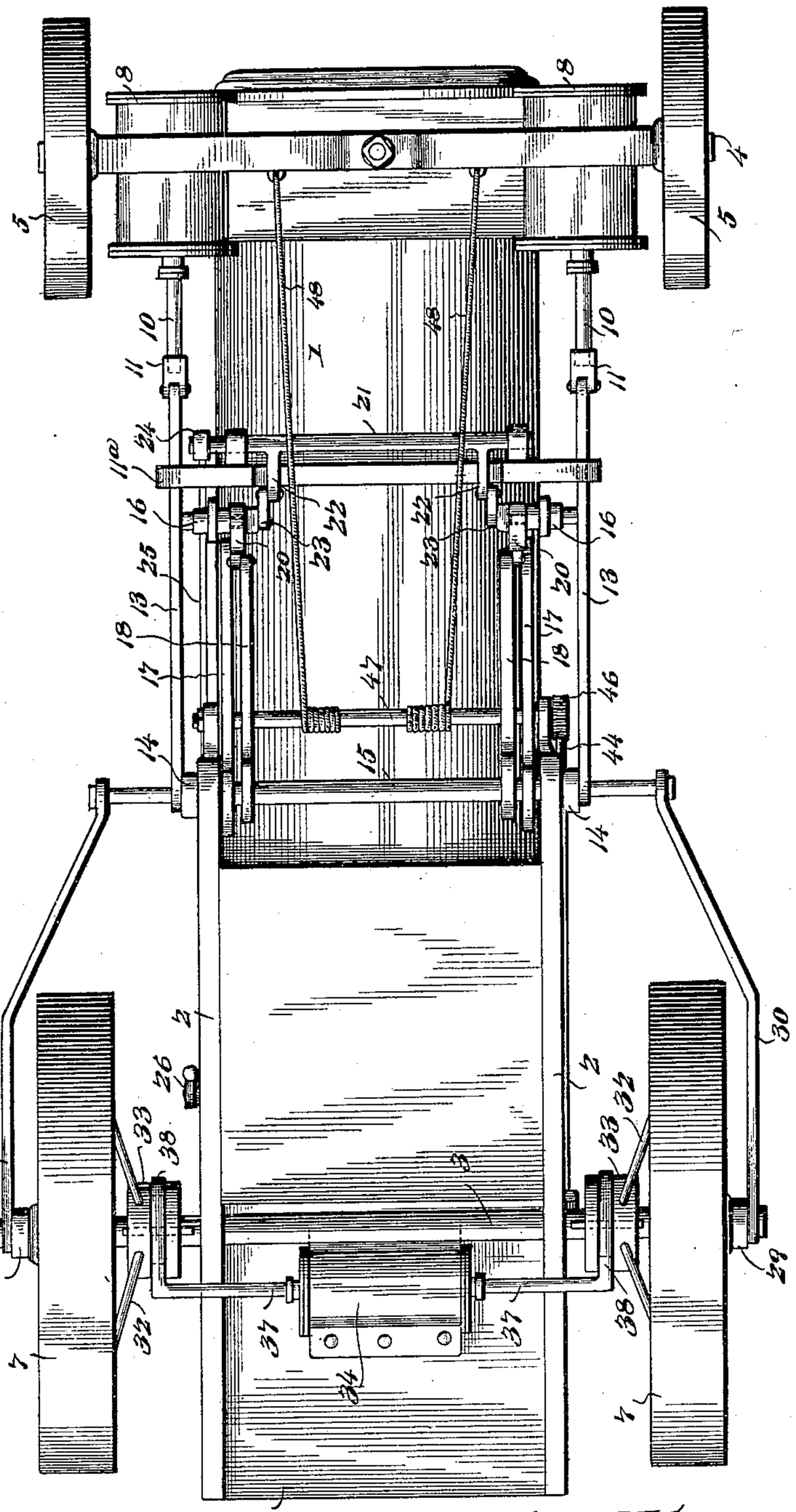

Fig. 2.

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3 Sheets—Sheet 3.

Fig. 3.

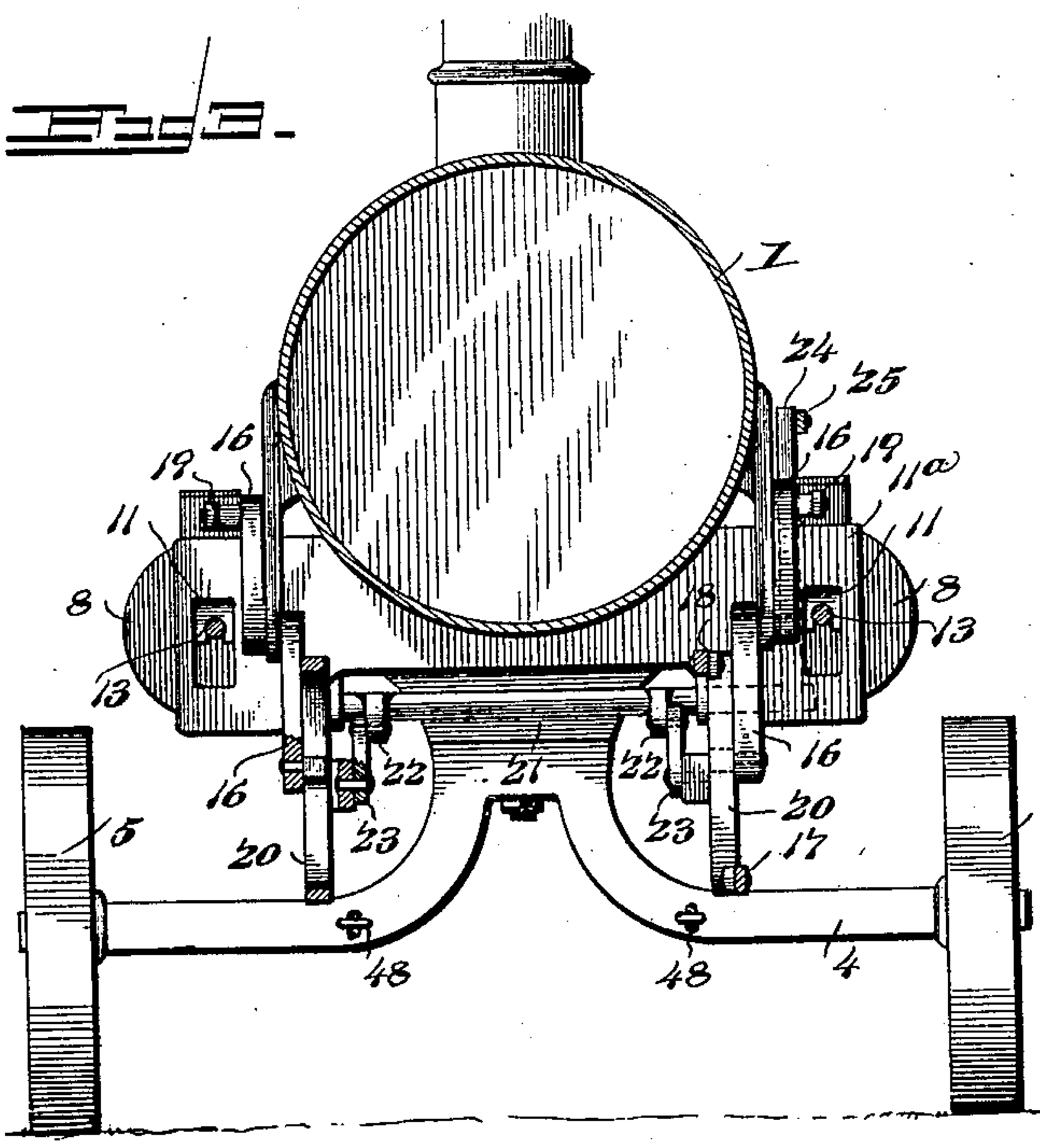


Fig. 5.

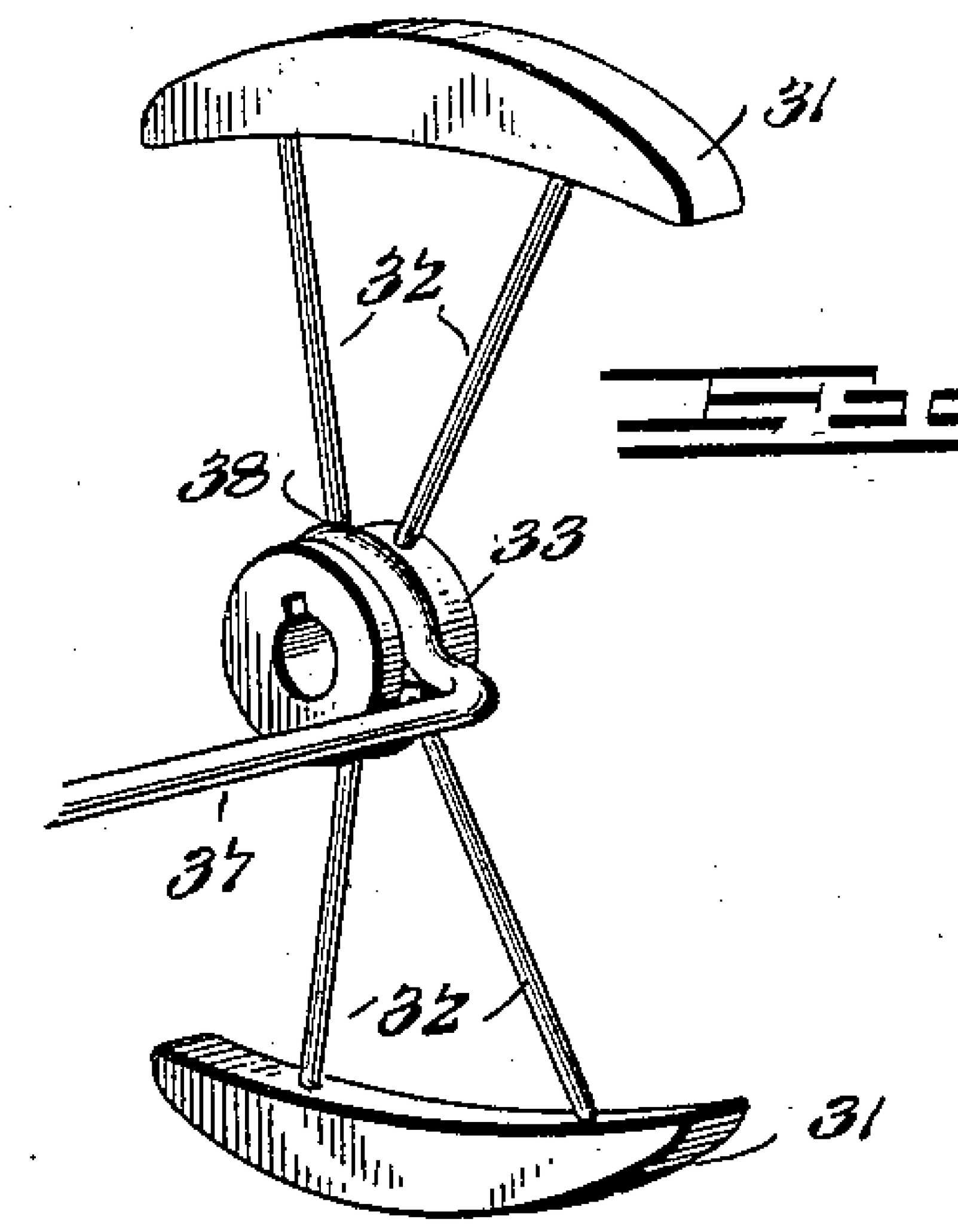


Fig. 7.

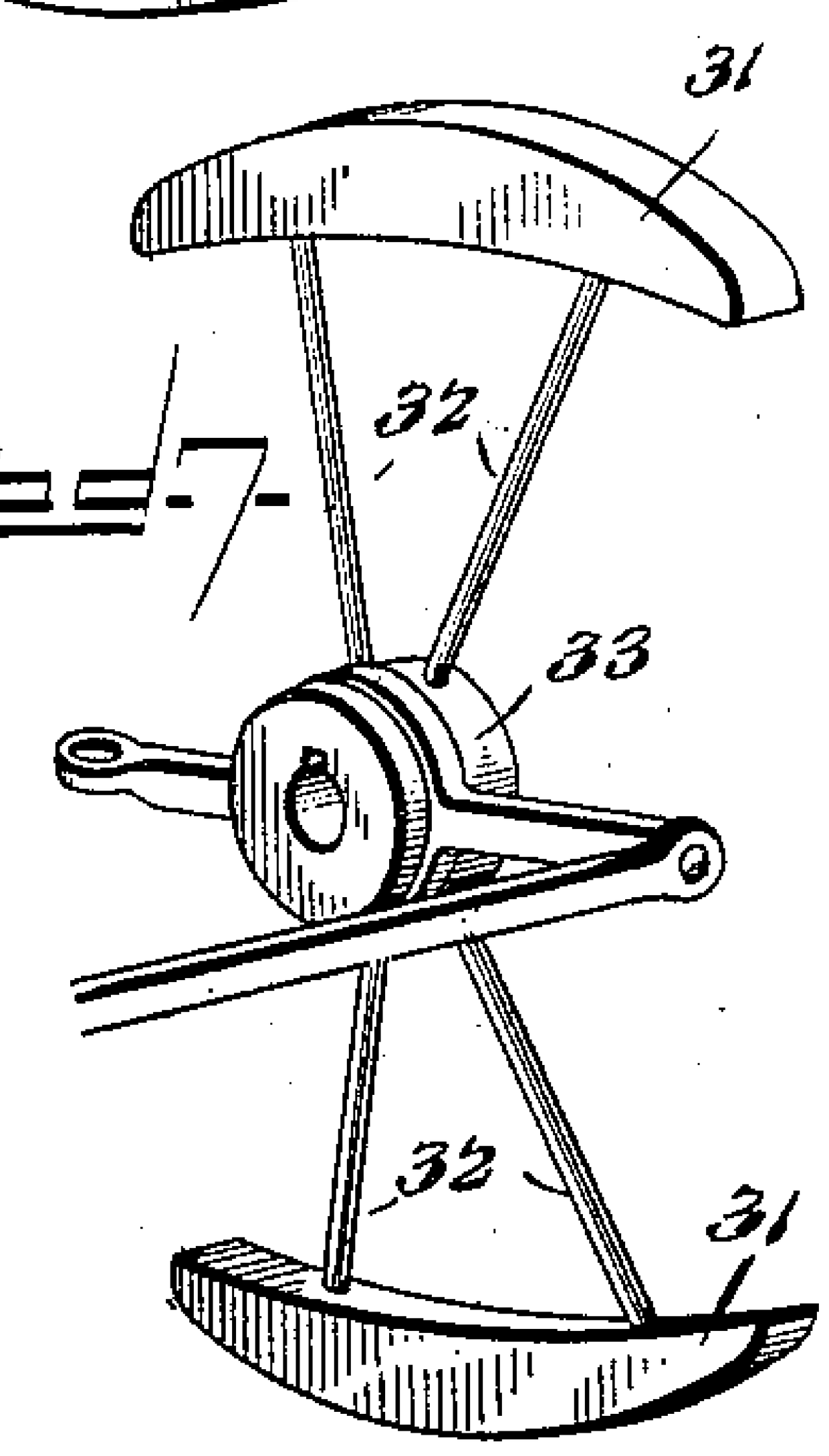
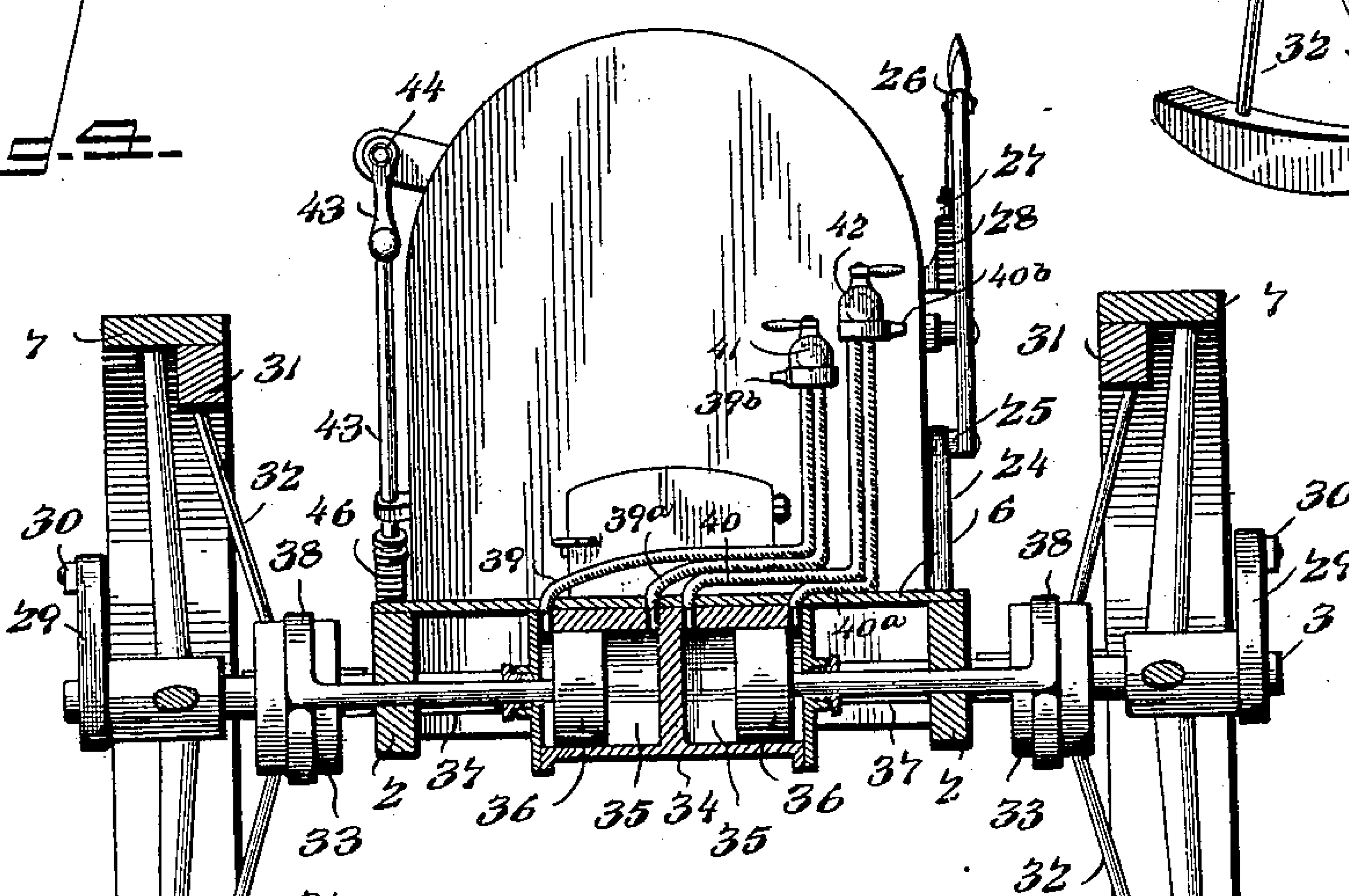


Fig. 9.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN M. CHAPPEL, OF ENNIS, TEXAS.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 626,666, dated June 13, 1899.

Application filed June 29, 1898. Serial No. 684,743. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CHAPPEL, a citizen of the United States, residing at Ennis, in the county of Ellis and State of Texas, have invented a new and useful Traction-Engine, of which the following is a specification.

My invention relates to traction-engines, and has for its object to provide a simple, compact, and efficient construction and arrangement of parts adapted for traction purposes or for driving machinery, such as threshers.

The primary object of my invention is to provide a gearless engine of the class described or one wherein the use of intermeshing gears for communicating motion from one part to another is avoided.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of an engine constructed in accordance with my invention. Fig. 2 is a bottom plan view of the same. Fig. 3 is a transverse section showing in elevation the valve mechanism. Fig. 4 is a transverse section taken through the clutch-operating mechanism. Fig. 5 is a detail view in perspective of one of the clutches. Fig. 6 is a partial longitudinal section showing the valve mechanism and connections. Fig. 7 is a detail view in perspective of a clutch member, showing a lever connection between the hub thereof and the piston-rod.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a boiler, which may be of any approved construction, supported at its rear end by a frame having side beams 2 and a rear axle or driving-shaft 3 and at its front end by a front or steering axle 4, having steering-wheels 5. The side frame-bars are extended rearwardly beyond the boiler to support a platform 6, and loosely mounted upon the rear axle or driving-shaft are driving-wheels 7.

8 represents the driving-cylinders, in which operate pistons 9, of which the stems 10 are connected to the cross-heads 11, fitted for reciprocatory movement upon guides 12, the rear ends of said guides being supported by brackets 11^a, projecting laterally from the body of the engine. Also connected with the cross-heads are pitmen 13 for communicating motion to the crank-arms 14 on a transversely-disposed crank-shaft 15, said crank-shaft serving to operate the valve mechanism, which includes rocker-arms 16 and eccentric-rods 17 and 18. The upper arms of the rockers are connected with valve-stems 19, and upon the other arms thereof are mounted compensating levers 20, adapted for sliding adjustment, said eccentric-rods 17 and 18 being pivotally connected to the compensating levers, adjacent to the opposite ends thereof. The adjustment of these compensating levers upon the rockers is accomplished by means of a rock-shaft 21, having arms 22, connected by links 23 with the compensating levers, an operating-arm 24, extending upwardly from the rock-shaft, and a connecting-rod 25, extending to a hand-lever 26, mounted near the rear of the engine and within reach of an operator occupying the platform or deck. This hand-lever may be secured at the desired adjustment by any suitable means, such as a pawl 27 and a toothed segment 28.

From the arms of the crank-shaft motion is communicated to crank-arms 29 on the driving axle or shaft by means of connecting-rods 30, whereby said shaft rotates continuously during the operation of the driving mechanism. When it is desired to connect either or both driving-wheels with the driving-shaft, one or the other, or both, of a pair of clutches located, respectively, in operative relation with said driving-wheels should be operated. The construction of clutch which I have illustrated in the drawings includes oppositely-located shoes 31, connected by yielding thrust-rods 32 with a collar 33, which is mounted for axial sliding movement upon the axle or driving-shaft and is keyed thereon to prevent independent rotary movement and enable the shaft to communicate motion to the collar and thence to the clutch-shoes. The clutch-shoes are yieldingly held out of contact with the inner surface of the driving-wheel rim by the spring tendency of the thrust-rods, but are adapted to be forced into snug frictional contact therewith when the collar is moved

outwardly from the shaft or toward the plane of the driving-wheel. The means employed for operating these clutch-collars is such as to enable me to thrust either or both clutches into operation in order to facilitate the control of the engine, as hereinafter fully explained. The mechanism disclosed for accomplishing this movement of the collars includes a clutch-operating cylinder 34, having independent piston compartments or chambers 35, in which operate pistons 36, connected by piston-rods 37 with rings 38, mounted upon the clutch-collars. In connection with each compartment or piston-chamber of the cylinder are two conductors 39 39^a and 40 40^a, and each pair of conductors is controlled by a valve 41 42 to enable the operator to discharge live steam from the boiler into either piston-chamber at either side of the piston located therein, said valves also controlling exhaust-ports 39^b 40^b, whereby when steam is admitted to a piston-chamber through one of the pairs of conductors controlled thereby the companion exhaust-port is opened to allow the escape of fluid in front of the piston. Thus independent means are provided for controlling the movement of the pistons in the two chambers of the cylinder, and therefore in turning the engine one of the clutches may be engaged with the coöperating driving-wheel to communicate motion from the driving-shaft to said wheel, while the other is allowed to remain loose, and thus at rest. This enables me to make abrupt turns and avoids a circuit of large diameter, which is necessary with the ordinary forms of traction-engine steering-gears now in common use. Furthermore, it will be seen that when one driving-wheel is clutched to the driving-shaft the entire power of the two driving-cylinders, communicated thereto through a common crank-shaft, is applied to said wheel, whereby the same power is utilized in turning as in driving the engine in a straight path.

Any suitable form of steering connections may be employed, such as a steering lever or arm 43, connected to a worm-shaft 44, carrying a worm 45, which meshes with a worm-gear 46 on a drum 47, flexible connections 48, consisting of cables or chains, extending from said drum (and wound thereon in opposite directions) to the steering-axle.

An important advantage of the construction above described resides in the fact that as either driving-wheel may be connected with the driving-mechanism while the other driving-wheel is allowed to remain at rest abrupt turns may be made with facility and under the complete control of the operator.

Furthermore, when it is desired to utilize the engine for stationary driving purposes, as in operating a thresher or other machine, the connecting-rods between the crank-shaft and the driving-shaft may be removed, and corresponding connecting-rods 49 may be employed to connect said crank-shaft with an auxiliary driving-shaft 50, mounted in a convenient position upon the body of the engine, said auxiliary connecting-rods being indicated in dotted lines in Fig. 1.

A further advantage of the construction described resides in the fact that the driving mechanism is compactly arranged and is devoid of toothed gearing or analogous power-absorbing devices which by increasing the friction detract materially from the effective power of the engine, and also in the fact that the valve mechanism is such as to enable the operator standing upon the platform or deck to efficiently control the lead of the valves, and thus by suiting the supply of steam to the load economize in the use of the motive agent, and hence of the fuel.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a traction-engine, the combination with a crank-shaft and means for imparting rotary motion thereto, of valve mechanism including an intermediately-fulcrumed rocking lever, a compensating lever mounted for sliding movement upon a pivot at the extremity of one arm of the rocking lever, eccentric-rods, actuated by eccentrics on said crank-shaft, connected with the arms of the compensating lever at opposite sides of its fulcrum, a rock-shaft having a crank-arm connected by a link with the compensating lever, and means including a hand-lever for communicating motion to the rock-shaft, substantially as specified.

2. In a traction-engine, the combination with a crank-shaft, and means for communicating rotary motion thereto, of a driving-axle having crank-arms, connecting-rods between said crank-arms and corresponding arms on the crank-shaft, driving-wheels, and clutch mechanism for connecting the driving-wheels with the driving-shaft, substantially as specified.

3. In a traction-engine, the combination with a crank-shaft and means for communicating rotary motion thereto, of main and auxiliary driving-shafts having crank-arms, driving-wheels loosely mounted upon the main driving-shaft, connecting-rods for communicating motion from the crank-shaft to one of said driving-shafts, and clutch mechanism for locking the driving-wheels to the main driving-shaft, substantially as specified.

4. In a traction-engine, the combination with a crank-shaft and means for communicating rotary motion thereto, a driving-shaft having crank-arms, connecting-rods between said crank-arms and the crank-shaft, driving-wheels loosely mounted upon the driving-shaft, and independent clutch mechanisms for locking the driving-wheels to the driving-shaft, substantially as specified.

5. In a traction-engine, the combination

with a crank-shaft and means for communicating motion thereto, of a single driving-shaft having crank-arms connected respectively with said crank-shaft, independent driving-wheels loosely mounted upon the driving-shaft, and independent clutch mechanisms for locking the driving-wheels to the driving-shaft, substantially as specified.

6. In a traction-engine, the combination with a driving-shaft and means for communicating rotary motion thereto, of independent driving-wheels loosely mounted upon the driving-shaft, clutches each having oppositely-disposed clutch-shoes, a clutch-collar mounted for axial movement upon the driving-shaft, and yielding thrust-rods connecting each clutch-shoe with the clutch-collar, a clutch-cylinder having independent piston-chambers, and pistons operatively connected respectively with the clutch-collars, and means for actuating either of said pistons, substantially as specified.

7. In a traction-engine, the combination with a driving-shaft and means for communicating rotary motion thereto, of driving-wheels mounted upon the driving-shaft, and a clutch in connection with each driving-wheel, the same having diametrically opposite clutch-shoes for contact with the inner surface of the coöperating driving-wheel rim, a clutch-collar mounted for axial movement upon the driving-shaft and keyed thereto, and yielding thrust-rods connecting each clutch-shoe with the collar and adapted to separate the clutch-shoes for contact with the wheel-rim when the clutch-collar is moved toward the plane of the wheel, substantially as specified.

8. In a traction-engine, the combination with a driving-shaft and means for communicating rotary motion thereto, of driving-wheels loosely mounted upon the driving-shaft, clutch-collars mounted for axial movement upon the driving-shaft, separable clutch-shoes connected with each clutch-collar and adapted to be spread into contact with the inner periphery of one of the driving-wheels, a clutch-cylinder having independent piston-chambers, pistons operating in said chambers and having their rods connected respectively with said clutch-collars, and pairs of conductors in communication with the piston-chambers of the cylinder at opposite ends, each pair of conductors having a controlling-valve arranged in operative relation with a feed-port and an exhaust-port, and reversible to introduce motive fluid into either piston-chamber at either side of the plane of the piston located therein, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN M. CHAPPEL.

Witnesses:
JAS. M. WALKER,
O. L. BACKLOUPE.