(No Model.) 3 Sheets—Sheet 1.

# J. N. BRITZ.

## DRIVING GEAR FOR TRACTION ENGINES.

No. 421,902. Patented Feb. 25, 1890.

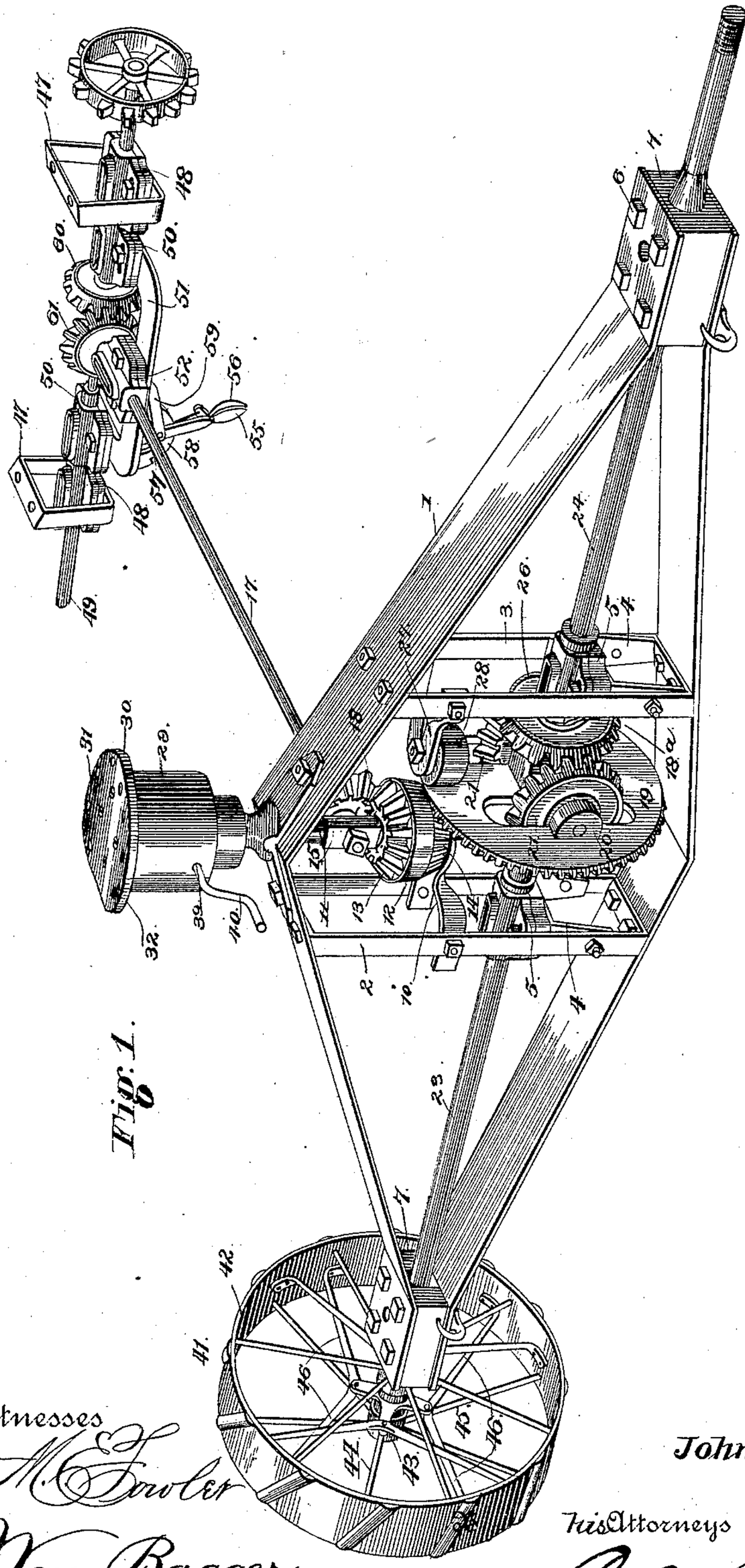

Fig. 1.

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

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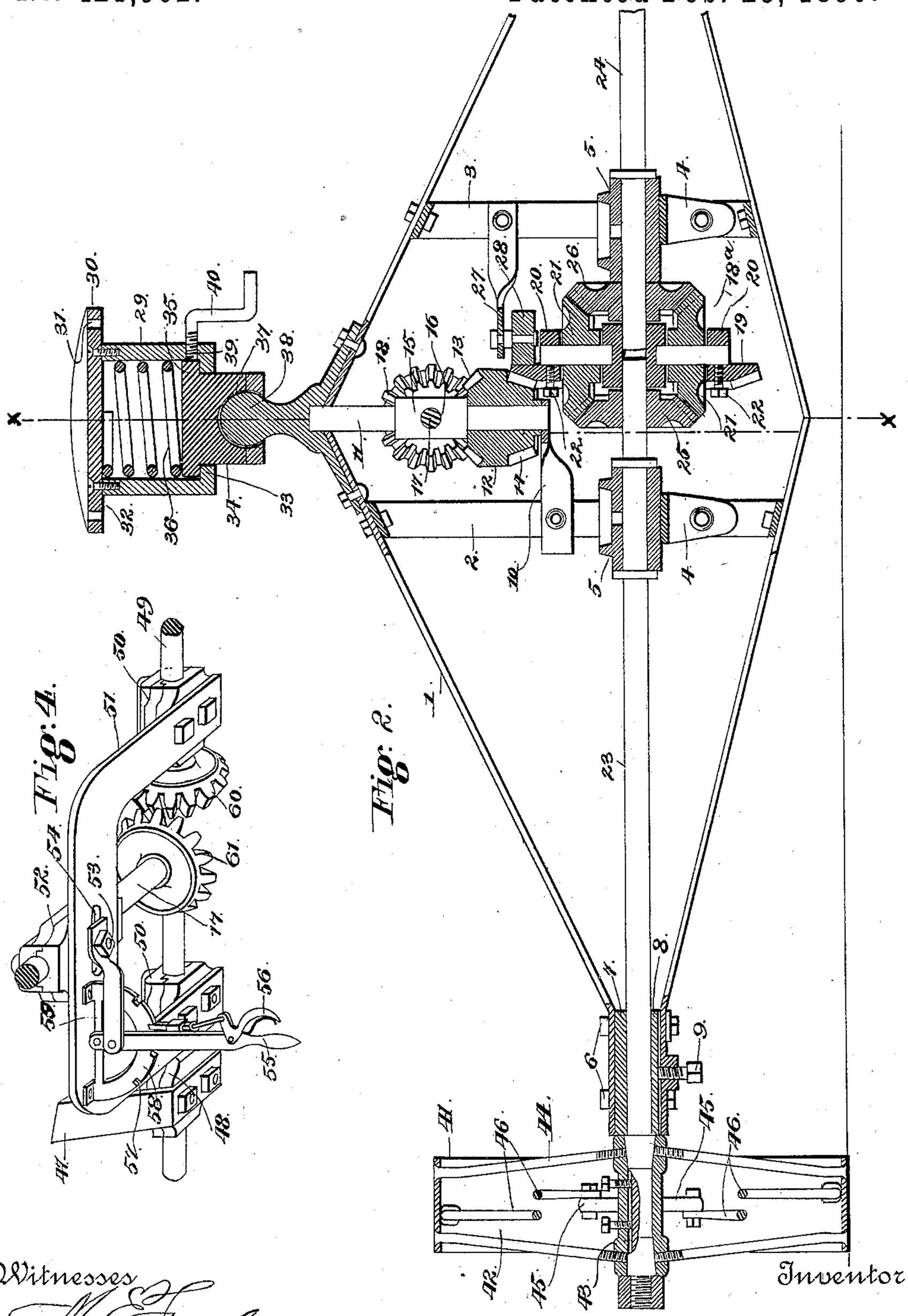

Fig: 2.



Fig: 4.

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(No Model.)

3 Sheets—Sheet 3.

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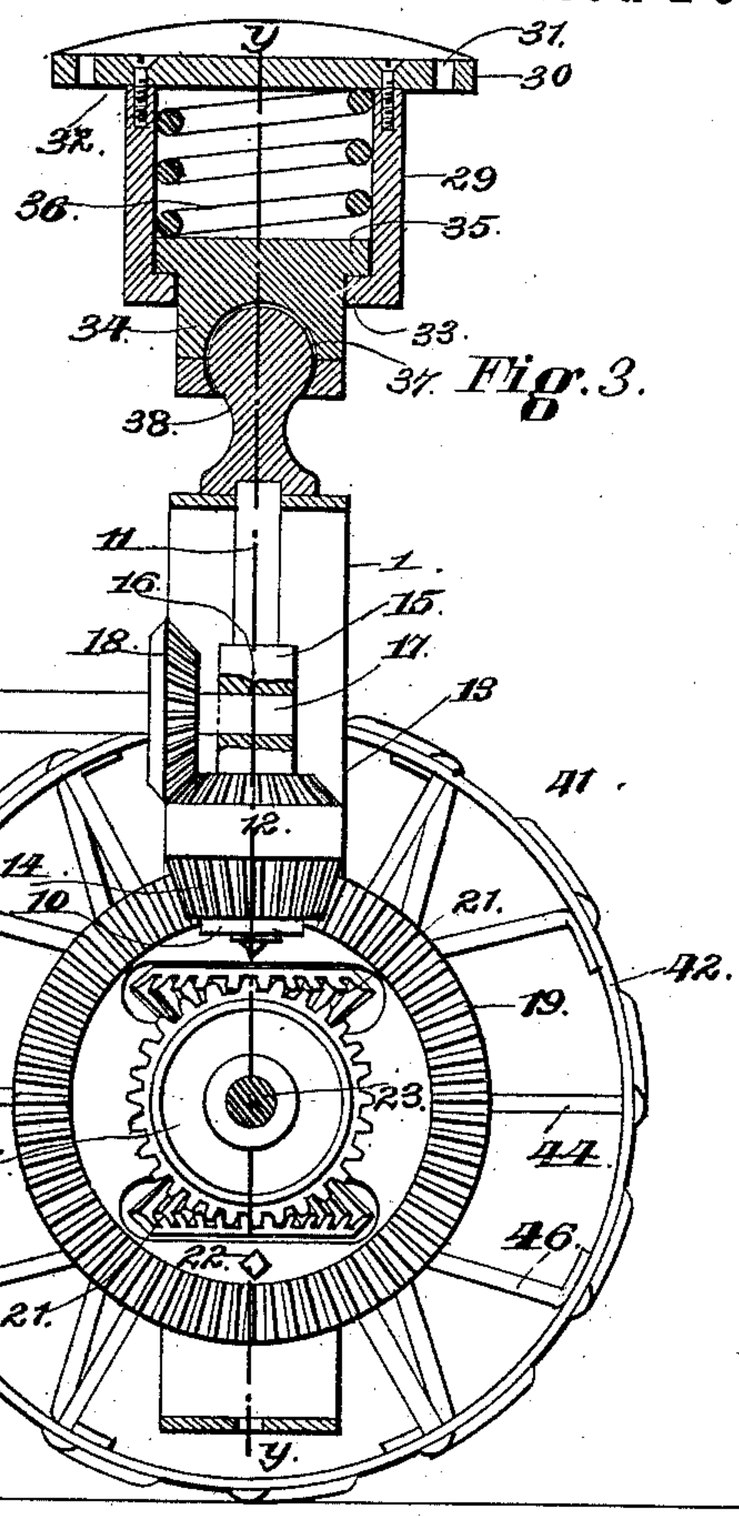
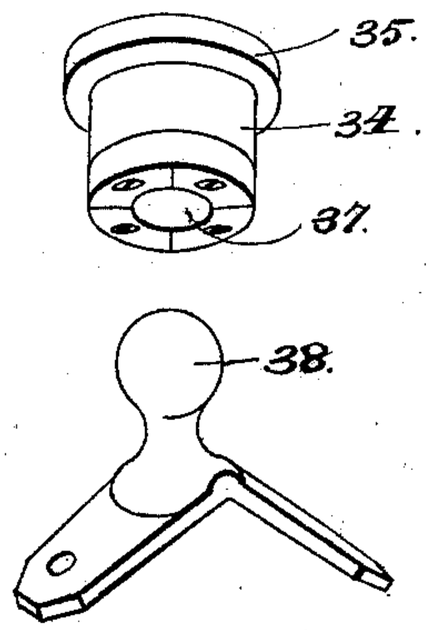



Fig. 3.

Fig. 5.




Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN N. BRITZ, OF AURORA, ILLINOIS.

## DRIVING-GEAR FOR TRACTION-ENGINES.

SPECIFICATION forming part of Letters Patent No. 421,902, dated February 25, 1890.

Application filed October 23, 1889. Serial No. 327,952. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN N. BRITZ, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a new and useful Driving-Gear for Traction-Engines, of which the following is a specification.

This invention relates to driving-gear for traction-engines; and it consists in an improved mechanism for conveying motion to the front wheels of a traction-engine, the construction and operation of which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of my improved driving-gear. Fig. 2 is a transverse vertical sectional view taken on the line *z z* in Fig. 3. Fig. 3 is a longitudinal vertical sectional view on line *x x* of Fig. 2 and looking in the direction of the compensating gearing. Fig. 4 is a detail view of the compensating gear. Fig. 5 is a detail view, on a larger scale, of the universal joint by means of which my improved driving-gear is connected to the under side of the boiler.

Like numerals of reference indicate like parts in all the figures.

1 designates a rhombic frame or truss, within which my improved driving-gear is mainly supported. The upper and lower sides of said frame are connected by a pair of vertical links 2 and 3, between the sides of which are secured stirrups 4 4, supporting the journal-boxes 5 5, which are of ordinary construction. Between the outer ends of the top and bottom pieces of the frame 1, which are connected by means of clips or bolts 6, are secured the journal-boxes 7. The latter are provided in their lower sides with vertically-adjustable bearing-blocks 8, which may be forced in an upward direction by means of set-screws 9 for the purpose of compensating for wear. The vertical link 2 is provided with an inwardly-extending bracket 10.

11 designates a short vertical shaft journaled in the bracket 10 and in the upper corner of the frame 1. Loosely journaled upon the lower end of the shaft 11 is a wheel 12, the upper side of which has a miter-gear 13 and the lower side or face of which has a bevel-gear 14. The shaft 11 is provided above the wheel 12 with an enlarged portion 15, having a perforation 16, affording a bearing for the front end of a longitudinal shaft 17, which serves to transmit motion from the engine to the driving-gear, and the front end of which has a miter-gear 18, meshing with the miter-gear 13 of the wheel 12.

18ª designates the compensating gear, which comprises a large bevel-wheel 19, the hub and rim of which are provided on diametrically-opposite sides with bearings for the short shafts 20, carrying pinions 21. The bearings for the said shafts are provided with set-screws 22, by means of which the shafts may be locked when it shall be desired to keep them from revolving. The shaft which constitutes the front axle is composed of two parts or sections 23 and 24, the inner ends of which are journaled in the boxes 5 5, and the outer ends of which are mounted in the boxes 7 7. The inner end of the shaft 24 extends through the hub of the bevel-wheel 19 of the compensating gear, which is journaled loosely upon the said shaft. The shafts 23 and 24 are provided near their inner ends with pinions 25 and 26, meshing with the pinions 21 of the compensating gear, said pinions 25 and 26 being mounted securely upon their respective shafts. The link 3 of the frame is provided with an inwardly-extending bracket 27, at the inner end of which is journaled a vertical wheel or traveler 28, bearing against the rim of the bevel-wheel 19 of the compensating gear, and serving to steady the motion of the latter and to prevent it from getting out of alignment.

29 designates the cylindrical casing, to the upper end of which is attached a plate 30 by means of bolts 31, said plate being of a larger diameter than the casing around which it extends, so as to form a flange 32, by means of which it may be bolted to the under side of the boiler of an ordinary traction-engine. The cylindrical casing 29 is provided at its lower end with an inwardly-extending annular flange 33.

34 designates a block mounted to slide vertically in the casing 29, and having a flange 35 to retain it in said casing. Between the block 34 and the plate 30 at the upper end of the casing is interposed a stout coiled spring 36, tending to force the block 34 in a down-

ward or outward direction. The lower or outer end of the block 34 is provided with a socket 37, forming a seat for a ball 38, which is suitably attached to the upper side of the frame 1, which latter is in this manner universally joined to the under side of the boiler, which is supported upon the said frame. It will be seen that the supporting-spring 36 forms a cushion to prevent jarring and injury to the machine in passing over rough roads.

In order to make the machine perfectly stiff and rigid when it is employed as a stationary engine, I provide the cylindrical casing 29 with a set-screw 39, extending through one of its sides and having at its outer end a crank 40, by means of which it may be manipulated so as to bear against the vertically-sliding block 34 and hold the latter securely in position. It will be seen that in this manner the frame of the driving-gear may be connected to the boiler in an exceedingly rigid manner.

41 41 designate the supporting-wheels, which are firmly keyed or otherwise secured upon the outer ends of the shafts 23 and 24. The said supporting-wheels, which are constructed of iron, are composed of the rims 42 and hubs 43, connected by the spokes 44. The hubs 43 are provided with rigidly-extending arms 45, which are connected with the rim by means of truss-braces 46, thereby forming a very strong and durable and at the same time an inexpensive wheel.

47 47 designate a pair of links or stirrups secured firmly under the boiler and supporting the boxes or bearings 48, in which is journaled a counter-shaft 49. 50 50 designate a pair of boxes mounted loosely upon the said counter-shaft and having attached to their under sides a forwardly-extending horizontal frame 51, supporting a box 52, in which the rear end of the longitudinal shaft 17 is mounted. The said box 52 has a bolt 53 extending downwardly through a slot 54 in the frame 51, thus making the said box transversely adjustable upon the said frame. To the under side of the latter is pivoted a lever 55, having a spring-lever 56, adapted to engage any one of a series of notches 57 in a segmental bracket 58, secured to the under side of said frame, thereby retaining the said lever 55 in any position to which it may be adjusted. The lever 55 is connected with the bolt 53 of box 52 by means of a link 59, thus enabling the said box and the rear end of the shaft 17 to be adjusted transversely by means of the lever 55. The front end of the shaft 17, being mounted, as hereinbefore described, in the vertical shaft 11, is enabled to accommodate itself to the said transverse adjustment of its rear end. The counter-shaft 49 is provided with a pinion 60, adapted to mesh with a pinion 61 upon the rear end of shaft 17. The latter may be adjusted as described, so as to throw the pinions 60 and 61 into or out of gear, as occasion may require.

Motion may be imparted to the counter-shaft 49 from the driving mechanism of the engine by means of a sprocket-wheel and chain, spur-wheel and pinion, bevel-gear, or in any other suitable manner, according to the kind of engine to which my improvement may be applied. In some engines the power may be applied directly to the rear end of the shaft 17, and I reserve the privilege of so doing when the circumstances of the case render it possible.

The operation of my invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. By means of the shaft 17 and the intermediate gearing motion will be transmitted from the engine direct to the front wheels. At the same time the compensating gear makes an independent connection between the inner ends of the shafts upon which the said front wheels are mounted. By means of the set-screws 22 the pinions 21 may be locked, so as to cause the front wheels to operate simultaneously, as is desirable when the machine is transported over muddy and marshy roads.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a traction-engine, the combination of a frame arranged under the front end of the boiler, the vertical links connecting the upper and lower sides of said frame, journal-boxes supported upon stirrups in the said links, journal-boxes at the outer ends of the frame, a pair of transverse shafts journaled in said boxes in a line with each other, supporting-wheels at the outer ends of said shafts, compensating gear connecting the inner ends of said shafts, and mechanism for transmitting motion to the same from the driving mechanism of the engine, substantially as set forth.

2. In a traction-engine, the combination of a frame arranged under the front end of the boiler, the vertical links connecting the upper and lower sides of said frame, a bracket extending laterally from one of said links, a shaft journaled vertically in said bracket and in the top of the frame, a wheel mounted loosely upon said shaft and having a miter-gear and a bevel-gear upon its upper and lower sides, respectively, a longitudinal shaft having its front end journaled in the short vertical shaft and having the pinion meshing with the miter-gear of the wheel journaled upon the latter, a pair of transverse shafts journaled in the main frame in a line with each other and having their inner ends connected by means of the compensating gear meshing with the bevel-gear upon the wheel journaled on the short vertical shaft, supporting-wheels at the outer ends of said transverse shafts, and mechanism for transmitting motion to the longitudinal driving-shaft from the driving mechanism of the engine, substantially as set forth.

3. In a traction-engine, the combination of the frame arranged under the front end of the boiler, the transverse shafts journaled in said frame in a line with each other, and having supporting-wheels at their outer ends, compensating gear connecting the inner ends of said shafts, a traveler arranged to bear against the main wheel of said compensating gear to steady the motion of the latter, and mechanism for transmitting motion to the compensating gear and transverse shafts from the driving mechanism of the engine, substantially as set forth.

4. In a traction-engine, the combination of a frame arranged under the front end of the boiler, the transverse shafts journaled in said frame in a line with each other, a compensating gear mounted upon the adjacent inner ends of said shafts and consisting of a bevel-wheel having pinions journaled in suitable bearings between its hub and spokes, set-screws extending through the bearings of said pinions and adapted to press against the shafts of the latter, pinions mounted securely upon the transverse shafts near their inner ends and meshing with the pinions of the compensating gear, supporting-wheels at the outer ends of the transverse shafts, and mechanism for transmitting motion to the driving mechanism of the engine, substantially as and for the purpose set forth.

5. In a traction-engine, the combination of a frame arranged under the front end of the boiler, the transverse shafts journaled in said frame in a line with each other, and having the supporting-wheels at their outer ends, the compensating gear connecting the inner ends of said shafts, a vertical shaft journaled in the main frame and having a wheel mounted loosely thereon and meshing with the main bevel-wheel of the compensating gear, a longitudinal shaft having its front end journaled in the said vertical shaft and provided with a fixed pinion meshing with the wheel mounted upon the vertical shaft and engaging the compensating gear, a transversely adjustable box supporting the rear end of said longitudinal shaft, a counter-shaft having a pinion adapted to mesh with a pinion upon the rear end of the longitudinal shaft, and mechanism for transmitting motion to said counter-shaft from the driving mechanism of the engine, substantially as set forth.

6. The combination of the transverse shafts having the supporting-wheels at their outer ends, the compensating gear connecting the inner ends of said shafts, a counter-shaft receiving motion from the driving mechanism of the engine, and a longitudinal driving-shaft having its front end journaled in a vertical vibrating shaft and its rear end mounted in a transversely-sliding box, a pinion upon the said rear end of the longitudinal shaft adapted to mesh with a pinion upon the counter-shaft, and a pinion at the front end of said counter-shaft adapted to transmit motion to the compensating gear through the medium of a wheel journaled upon the vertical shaft, in which the front end of said longitudinal shaft is mounted, substantially as and for the purpose set forth.

7. In a traction-engine, the combination of the frame having the driving-gear comprising the transverse shafts, having supporting-wheels at their outer ends and compensating gear connecting the inner ends, mechanism for transmitting motion to the compensating gear from the driving mechanism of the engine, a cylindrical casing mounted at the front end of the boiler, a block arranged to slide vertically in said cylindrical casing and having a socket in its lower end, a ball mounted upon the upper end of the frame containing the driving-gear and seated in the said socket, and a spring mounted in the latter above the vertically-sliding block, substantially as and for the purpose set forth.

8. In a traction-engine, the combination of the frame having the driving-gear comprising the transverse shafts, having supporting-wheels at their outer ends and compensating gear connecting their inner ends, mechanism for transmitting motion to the compensating gear from the driving mechanism of the engine, a cylindrical casing mounted under the front end of the boiler, a block arranged to slide vertically in said cylindrical casing and having a socket in its lower end, a ball mounted upon the upper end of the frame containing the driving-gear and seated in the said socket, a spring mounted in the latter above the vertically-sliding block, and a set-screw extending through the side of the cylindrical casing and adapted to bear against the vertically-sliding block, which may thus be retained securely in position, substantially as set forth.

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

JOHN N. BRITZ.

Witnesses:
CHARLES E. WEAVER,
JNO. M. RAYMOND.