(No Model.) 2 Sheets—Sheet 1.

O. STEVENS.

TRACTION ENGINE.

No. 343,969. Patented June 15, 1886.

Fig. 2.

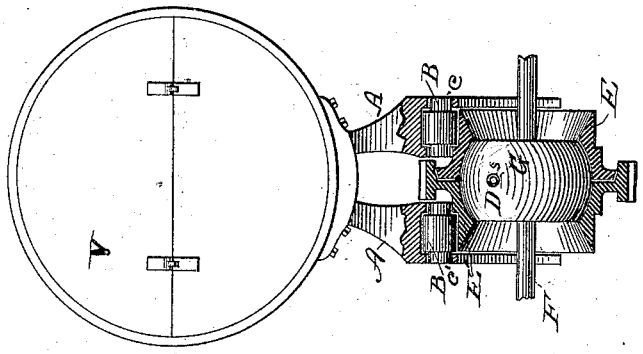

Fig. 1.

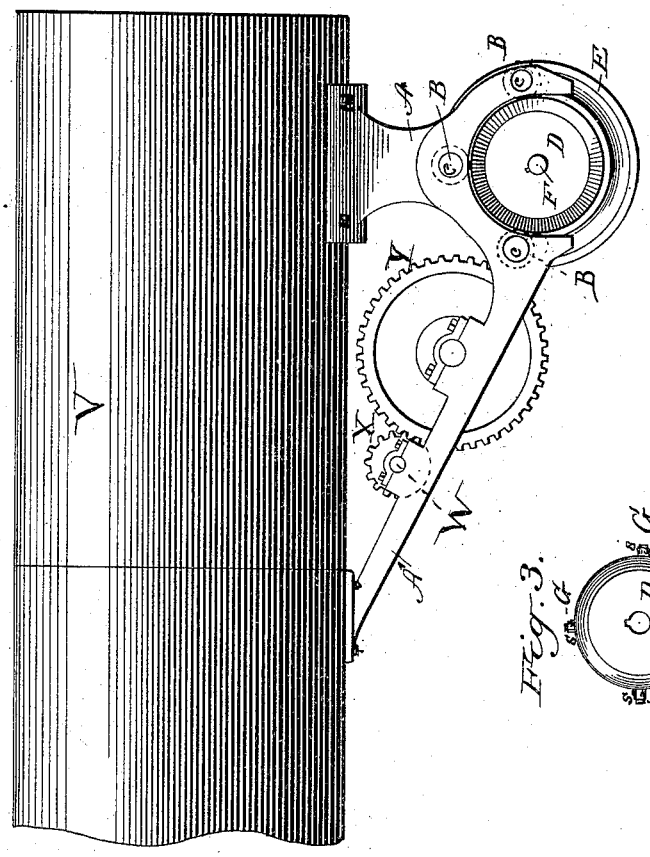

Fig. 3.

Witnesses:
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J. D. Farmer

Inventor.
Otho Stevens

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

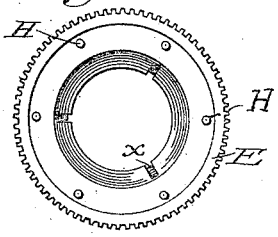


Fig. 6.

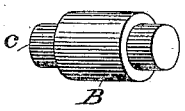


Fig. 5.

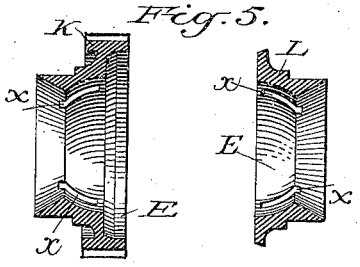


Fig. 9.

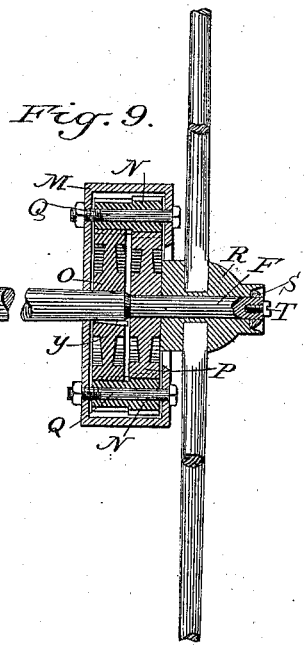


Fig. 7.

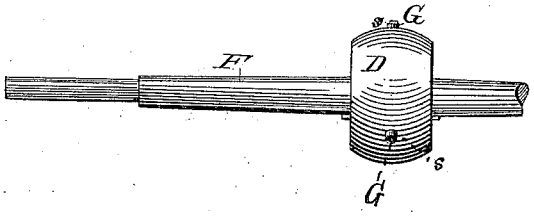


Fig. 10.

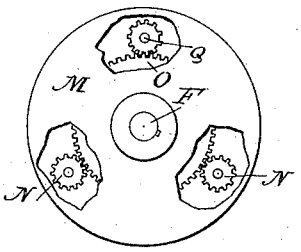
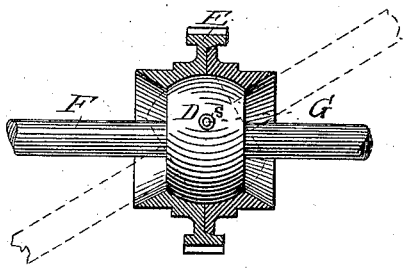


Fig. 8.



Witnesses:

J. C. A. Stevens

J. S. Farmer

Inventor:

Otto Stevens

UNITED STATES PATENT OFFICE.

OTHO STEVENS, OF SPRING VALLEY, MINNESOTA, ASSIGNOR OF ONE-HALF TO JEROME A. STEVENS, OF SAME PLACE.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 343,969, dated June 15, 1886.

Application filed July 24, 1884. Serial No. 138,694. (No model.)

To all whom it may concern:

Be it known that I, OTHO STEVENS, a citizen of the United States, residing in Spring Valley, in the county of Fillmore and State of Minnesota, have invented certain Improvements in Traction-Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention consists, first, in the means by which the boiler is mounted upon the front axle of the engine; second, in the improved construction and arrangement of the gearing whereby driving-power is communicated to the front axle and a swiveling movement is allowed thereto; and, third, in an improved device whereby a differential motion is allowed to the front wheels, to allow a free turning movement when the engine is directed out of a straight line, and the driving-gear still remain coupled to the axle when the engine is directed straight forward, all substantially as hereinafter set forth.

In the accompanying drawings, Figure 1 represents a side elevation of a portion of the boiler of a traction-engine, of the frame-work on which it is mounted over the front axle, and of the driving-gear for the front axle; Fig. 2, a front end view of the same, a portion of the gear being shown in vertical section in the plane of the axis of the front axle; Fig. 3, an end view of the gear-ball on the front axle; Fig. 4, a side view of the gear-socket used in connection with the gear-ball on the axle; Fig. 5, a central axial section of the two parts composing the gear-socket, shown separate, but opposite to each other; Fig. 6, a perspective view of one of the anti-friction rollers against which the socket-gear revolves; Fig. 7, a side view of the front axle, having the gear-ball thereon; Fig. 8, a side view of the front axle in part, and of the ball-gear thereon, in connection with an axial vertical section of the socket-gear around the ball-gear; Fig. 9, a side view of a portion of the front axle, a central vertical section of a part of one of the fore wheels on the said axle, and of the differential gear between the axle and wheel, and also of its inclosing and carrying case; Fig. 10, a side view of the differential-gear case, portions of its side being broken away to show the gearing within.

Like letters designate corresponding parts in all of the figures.

The boiler V, shown as a horizontal boiler, has a frame or casting, A, bolted to its under side, near its front end, the main part of the casting being directly over the front axle, F. A brace portion, A, extends obliquely backward and upward, and at its rear end is also bolted to the lower side of the boiler. This frame or casting not only serves as a strong and firm support for the front end of the boiler, but it has mounted upon it the gearing by which power is communicated to the front axle. Thus, though any construction of transmitting-gear may be employed, I have indicated in Fig. 1 a driving-shaft, W, a driving-wheel, X, on the said shaft, and an intermediate gear-wheel, Y, between the gear-wheel X and the gear-socket E, which matches with the said gear-wheel Y. For the purpose of mounting this transmitting-gear the frame or casting is divided, and has an opening in its middle lengthwise thereof, as shown, to receive the said gear and furnish bearings for their shafts or journals. The brace part A receives the driving and transmitting gear. The main part of the casting forms a spider, in which is mounted and partly incased the gear-socket E, and in the latter is incased the gear-ball D on the axle F, for allowing a turning or swiveling movement to the said axle while it is being rotated by the gearing, including the said gear-socket. The gear-socket has no shaft or journal proper to turn in bearings of the case A, and this is to allow a large extent of swiveling movement to the front axle, as indicated by dotted lines in Fig. 8, there being wide openings in the sides of the gear-socket to allow the said axle to turn to oblique positions; but in order to properly mount the gear-socket in the casting A, the peripheries of the two sides of the gear-socket are made cylindrical, or otherwise equivalently formed, to serve as enlarged journals or ways upon which sets of anti-friction rollers B B are mounted by their journals *c c* in the spider of the casting A, whereby the socket-gear is held in place and turns with little friction.

The gear-socket E is made in two parts, as

shown in Fig. 5, for introducing the ball-gear D therein, one part, K, having the gear-teeth formed thereon and the other part, L, fitting into the open side of the part K. The two parts are secured together by bolts H H, as shown in Fig. 4, or in any other suitable or usual manner for similar constructions.

The ball-gear D, rigidly keyed to the front axle, F, is coupled to the socket-gear E by means of projecting pins G G, fitting and playing in grooves *x x*, formed in the interior periphery of the gear-socket. These coupling-pins are provided with steel anti-friction sleeves *s s*, whereby the friction is reduced when the ball swivels in the socket.

For forming the differential gear between the front axle and each wheel thereon a gear-wheel, O, is fastened to the axle, and another gear-wheel, P, is fastened to the hub R of the wheel, as shown in Fig. 9, the axes of the two gear-wheels being in line and the two wheels being side by side, but not in contact with each other. Of course the gear-wheel P is to be loose on the axle. This gear-wheel is a little less in diameter than the gear-wheel O, and gears into a set of double pinions, N N, formed in one, one being larger than the other, and having their journals in bearings of the inclosing and carrying case M, as clearly shown. From the above-described construction it is obvious that the gear-wheel P will turn a little more rapidly than the other. The effect is that when the engine is going straight forward the gear-wheels and their pinions lock the wheel on the axle without turning thereon; but if the engine is directed out of line the wheel that travels in the largest curve, either going backward or forward, will turn faster than the other wheel, this connecting-gear freely allowing it, without any binding or straining of parts, while no resistance whatever is offered to the free turning of the engine, either to the right or left.

I claim as my invention—

1. In combination with the boiler V, the frame or casting A, provided with the brace portion A′, on which the transmitting drive-gear is mounted, and with a spider in which is mounted the socket-gear E, substantially as and for the purpose herein specified.

2. The combination of the casting or frame A, provided with a set of anti-friction rollers, B B, turning in bearings thereof, the socket-gear E, turning in a spider of the casting and having enlarged journals revolving in contact with the friction-rollers, and the ball-gear D, having projecting pins G G, provided with anti-friction sleeves *s s*, which play in grooves *x x* of the socket-gear, substantially as and for the purpose herein specified.

3. The combination of the front axle having a gear-wheel, O, thereon, the wheel-hub R, having a gear-wheel, P, thereon, of a little smaller diameter than the gear-wheel O, and the double pinions N N, one a little larger in diameter than the other, gearing respectively into the said gear-wheels, substantially as and for the purpose herein specified.

In witness whereof I have hereunto subscribed my name this 9th day of June, A. D. 1884.

OTHO STEVENS.

Witnesses:
CHAS. E. ROBISON,
ASA R. BURLESON.