(No Model.) 2 Sheets—Sheet 1.

W. H. & J. L. FREEMAN.

BOILER LEVELER.

No. 428,837. Patented May 27, 1890.

Fig. 1.

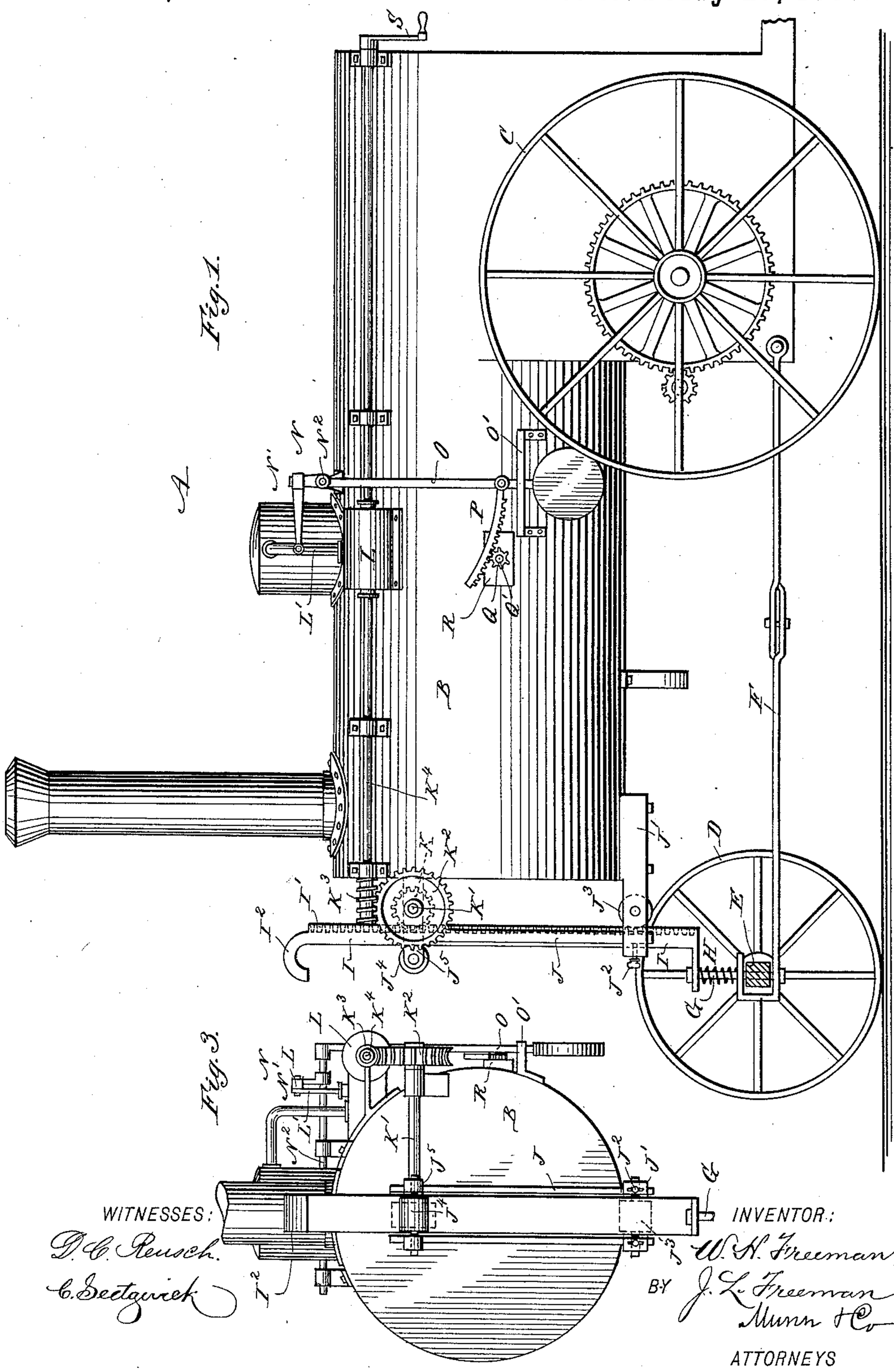

Fig. 3.

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C. Sedgwick

INVENTOR:

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(No Model.) 2 Sheets—Sheet 2.

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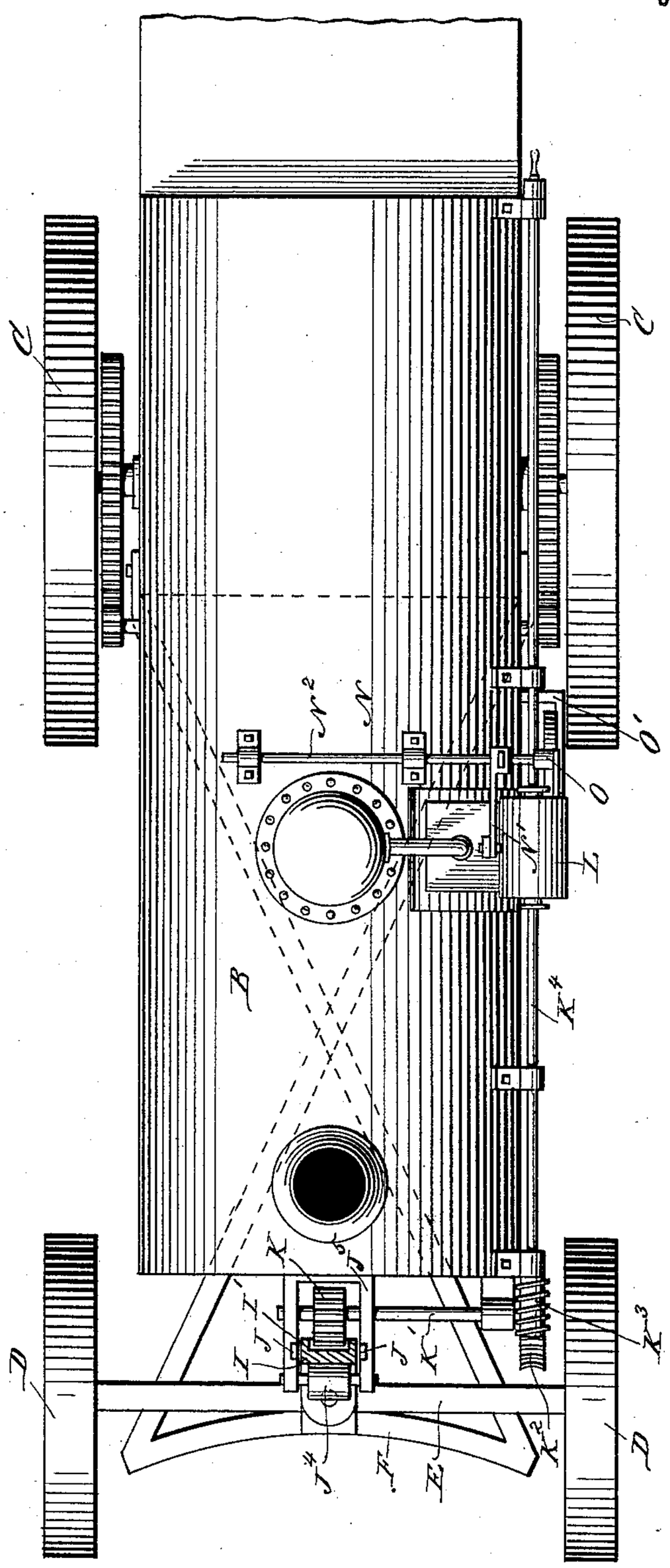

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM H. FREEMAN AND JOSEPH L. FREEMAN, OF SHELL, OHIO.

BOILER-LEVELER.

SPECIFICATION forming part of Letters Patent No. 428,837, dated May 27, 1890.

Application filed November 27, 1889. Serial No. 331,747. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. FREEMAN and JOSEPH L. FREEMAN, of Shell, in the county of Adams and State of Ohio, have invented a new and Improved Boiler-Leveler, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved device for conveniently and rapidly leveling the boilers of traction-engines.

The invention consists of certain parts and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied and with the front axle in section. Fig. 2 is a plan view of the same with parts in section, and Fig. 3 is a front end view of the same.

The traction-engine A, of any approved construction, is provided with the usual boiler B, supported at the rear end on the wheels C and at its front end on the wheels D, connected with each other by an axle E, connected to the fire-box of the boiler by the reach F, secured to the said axle by a bolt G. The latter extends upward a short distance and carries a spring H, on the top of which rests the lower end of a rack I, extending vertically on the front end of the boiler. The rack I has side flanges I′, bearing on vertical guide-bars J J, secured at their lower ends in the sides of a forked bracket J′, secured to the front end of the boiler B at the bottom of the latter. The bars J J are held to place on the bracket J′ by set-screws J^2, and in the said bracket is journaled a roller J^3, forming a guide for the toothed front of the rack by abutting against the edges of the flanges I′. The upper part of the rack I rests with its back on a roller J^4, journaled in a bracket J^5, secured to the front plate of the boiler B. The upper end of the rack I is provided with a hook I^2, adapted to engage the roller J^4 when the rack is moved into its lowermost position. This prevents the detachment of the rack from the brackets J^5 and the bars J.

The rack I is in mesh with the gear-wheel K, secured on a shaft K′, extending transversely and mounted to turn in suitable bearings in the bracket J^5. On the outer end of the shaft K′ is secured a worm-wheel K^2, meshing in a worm K^3, secured on one end of a shaft K^4, mounted to turn in suitable bearings on the boiler B and extending longitudinally on the same, at the same time forming the shaft for a rotary engine L, of any approved construction, fastened to the middle or either end of the boiler B and fed from the same.

The rotary engine L is provided with an automatic stopping, starting, and reversing mechanism N, connected with the valve of the engine L by an L-shaped arm N′, pivotally connected with the outer end of the stem L′ of the engine-valve.

The arm N′ is secured on a transversely-extending shaft N^2, mounted to turn in suitable bearings on the boiler B. On the front end of the shaft N^2 is secured a pendulum O, which is in its natural position when the traction-engine stands on level ground, and holds the valve of the engine L closed, so that the steam to the engine is shut off and the engine is not running. When the traction-engine travels up an incline or passes down a grade, the pendulum swings either to the right or left, thus opening the engine-valve and permitting steam to operate the engine L either in a forward or backward direction.

The pendulum O is guided in a suitable guideway O′, secured on the boiler B, and is also rigidly connected with a segmental rack P, in mesh with a pinion Q, secured on a shaft Q′, mounted to turn in a box R, secured on the boiler B and filled with oil or other suitable fluid. A fan-wheel is secured on the shaft Q′ inside the box R, and runs in the liquid, so as to serve as a governor for the pendulum to prevent a too-sudden swinging motion of the pendulum in starting or stopping the engine L.

The engine-shaft K^4 extends to the rear end of the boiler B, and is provided with a crank-arm S for turning the shaft K^4 when the boiler B is without steam and it is desired to raise or lower the boiler.

The operation is as follows: When the traction-engine A is moved forward by the mo-

tive agent generated in the boiler B in the usual manner, and it travels on level ground, then the boiler-leveler is in the position shown in Fig. 1. The front end of the boiler is supported by the rack-bar I on the spring H. When the traction-engine travels up a grade, the pendulum O swings to the right and the engine-valve is opened so as to admit steam. The engine is now running, and turns the shaft K^4 in one direction. The movement of the shaft K^4 causes a revolving of the shaft K′ by means of the worm K^3 and the worm-wheel K^2. The movement of the shaft K′ causes a like movement of the gear-wheel K, which moves the rack I upward until the boiler B is level. The movement of the boiler to a level causes a return of the pendulum to its former position, whereby the engine-valve is again closed and the engine is stopped. When the traction-engine travels down a grade, the pendulum swings to the left, so as to reverse the engine L, thus reversing the movement of the shaft K^4, so that the shaft K′ turns in an opposite direction and the rack I is moved downward until the boiler is level. The pendulum O then swings back to its normal position and the engine-valve is closed, so as to stop the engine L.

Thus it will be seen that by a very simple device the boiler B is automatically leveled while on the road. It will also be seen that by leveling the boiler it equalizes the weight of the engine on all four wheels, whether going up or down a hill or traveling on a level road. By having the boiler level the front wheels are prevented from slipping off the road in going uphill when the traction rear wheels strike stones or other obstructions on the road. It will further be seen that by having the boiler level at all times, whether going up or down hill, the tubes in the boiler are kept under water, thus preventing a reduction of the heating capacity. It will further be seen that the boiler B can be placed in an inclined position, so that the mud can be scraped out at the water-legs of the boiler near the fire-box, as the water will then be in the front part of the boiler. The rack I is of course raised when the front end of the boiler B is opened for cleaning or other purposes.

Before raising cog-rack I the supporting-bars which rest in loops on side of the forked bracket J′ should be drawn forward to let boiler rest on the axle while cog-rack is raised to clean flues.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. In a boiler-leveler, the combination, with the boiler, the front axle, and the straight rack-bar J, loosely attached thereto, of the worm-gear secured to the boiler, and the shaft K^4, arranged alongside the latter, all as shown and described.

2. In a boiler-leveler, the combination, with a rack supporting the front end of the boiler, of a gear-wheel meshing into the said rack, an engine for turning the said gear-wheel, and an automatic stopping, starting, and reversing mechanism for the said engine, substantially as shown and described.

3. In a boiler-leveler, the combination, with a rack supporting the front end of the boiler and carried by the front axle, of a gear-wheel in mesh with the said rack, a reversible engine for turning the said gear-wheel, and a pendulum for operating the valve of the said engine, substantially as shown and described.

4. In a boiler-leveler, the combination, with a rack supporting the front end of the boiler and carried by the front axle, of a gear-wheel in mesh with the said rack, a shaft carrying the said gear-wheel and provided with a worm-wheel, and a second shaft carrying a worm in mesh with the said worm-wheel, and also provided with a crank-arm for turning the said second shaft in either direction, substantially as shown and described.

5. In a boiler-leveler, the combination, with a flanged rack supported on the front axle, of bars forming a guide for the sides of the said rack, a bracket held on the boiler and supporting the said bars, and a second bracket also held on the boiler and carrying a friction-roller engaging the back of the said rack, substantially as shown and described.

6. In a boiler-leveler, the combination, with a flanged rack supported on the front axle, of bars forming a guide for the sides of the said rack, a bracket held on the boiler and supporting the said bars, a second bracket also held on the boiler and carrying a friction-roller engaging the back of the said rack, and a gear-wheel journaled in the said second bracket and in mesh with the said rack, substantially as shown and described.

7. In a boiler-leveler, the combination, with a flanged rack supported on the front axle, of bars forming a guide for the sides of the said rack, a bracket held on the boiler and supporting the said bars, and a second bracket also held on the boiler and carrying a friction-roller engaging the back of the said rack, and adapted to be engaged by a hook on the upper end of the said rack, substantially as shown and described.

8. In a boiler-leveler, the combination, with a front axle, of a bolt held on the said axle, a spring coiled on the bolt, a rack held on the said bolt and resting on the said spring, and a gear-wheel supported on the front end of the boiler and in mesh with the said rack, substantially as shown and described.

9. In a boiler-leveler, the combination, with a front axle, of a bolt held on the said axle, a spring coiled on the bolt, a rack held on the said bolt and resting on the said spring, a gear-wheel supported on the front end of the boiler and in mesh with the said rack, and an engine held on the boiler provided with a stopping, starting, and reversing mechanism and adapted to turn the said gear-wheel, substantially as shown and described.

10. In a boiler-leveler, the combination, with

a front axle, of a bolt held on the said axle, a spring coiled on the bolt, a rack held on the said bolt and resting on the said spring, a gear-wheel supported on the front end of the boiler and in mesh with the said rack, an engine held on the boiler provided with a stopping, starting, and reversing mechanism and adapted to turn the said gear-wheel, and an intermediate mechanism for connecting the engine-shaft with the said gear-wheel, and consisting of a worm held on the engine-shaft and a worm-wheel in mesh with the said worm and secured on the shaft of the said gear-wheel, substantially as shown and described.

11. In a boiler-leveler, the combination, with a front axle, of a bolt held on the said axle, a spring coiled on the bolt, a rack held on the said bolt and resting on the said spring, a gear-wheel supported on the front end of the boiler and in mesh with the said rack, an engine held on the boiler provided with a stopping, starting, and reversing mechanism and adapted to turn the said gear-wheel, and a roller supported on the front end of the boiler and resting on the back of the said rack, substantially as shown and described.

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JOSEPH L. FREEMAN.

Witnesses:
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LEWIS BEHM.