

(No Model.)

2 Sheets—Sheet 1.

D. BEST.  
TRACTION ENGINE.

No. 436,931.

Patented Sept. 23, 1890.

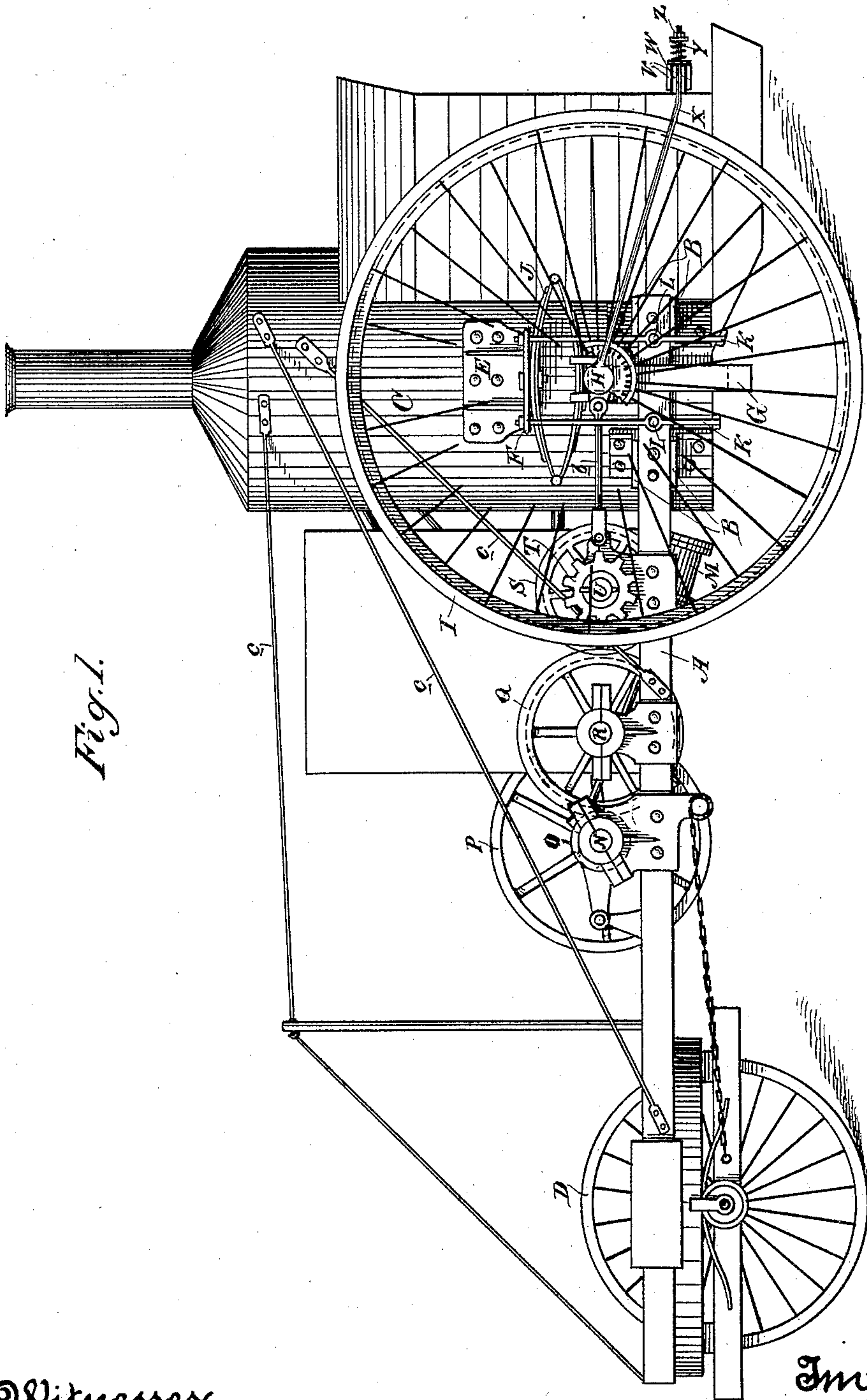


Fig. 1.

Witnesses,  
Geo. H. Strong.  
J. H. Morse

Inventor,  
Daniel Best,  
My Attorney & Co.  
attys

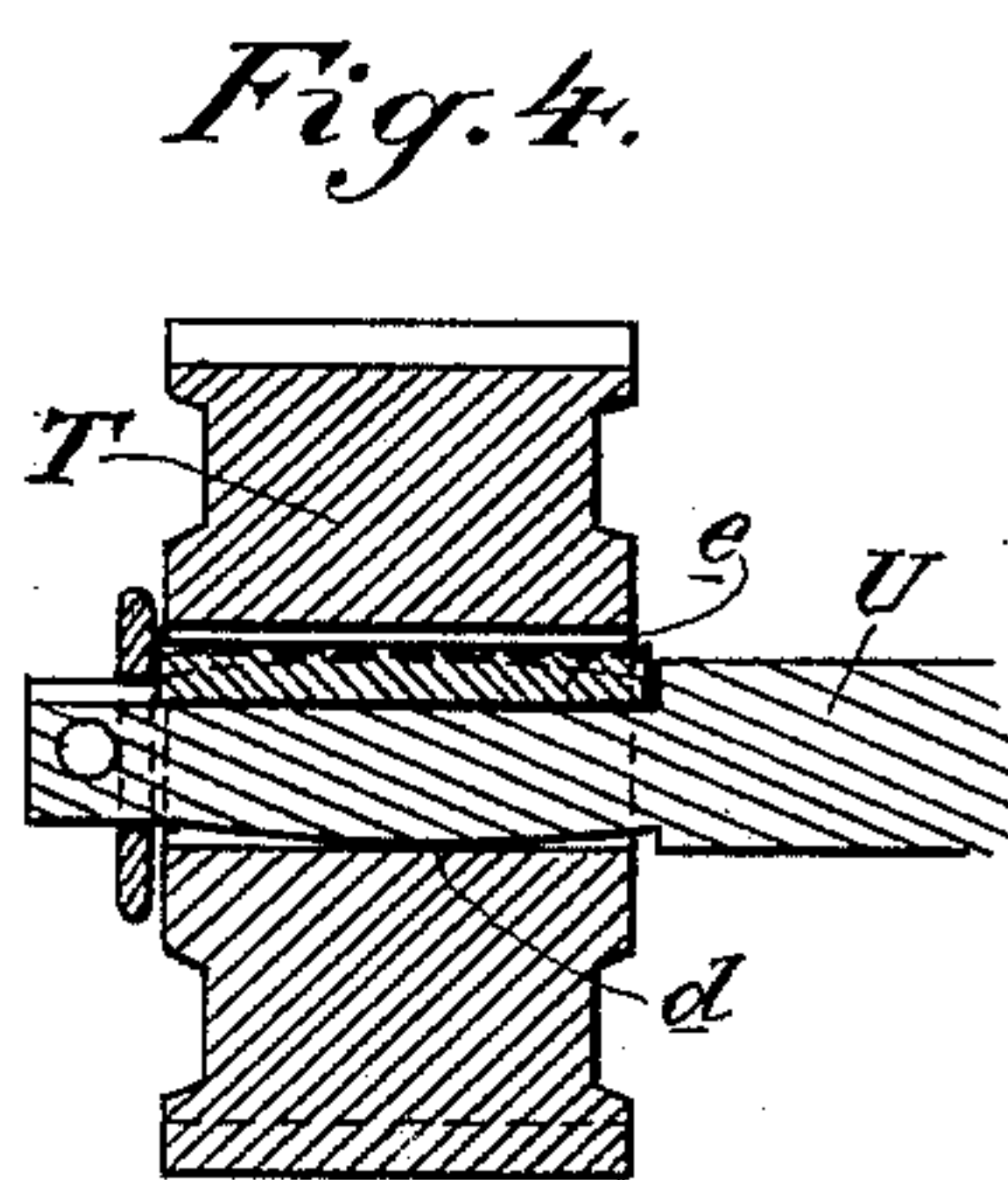
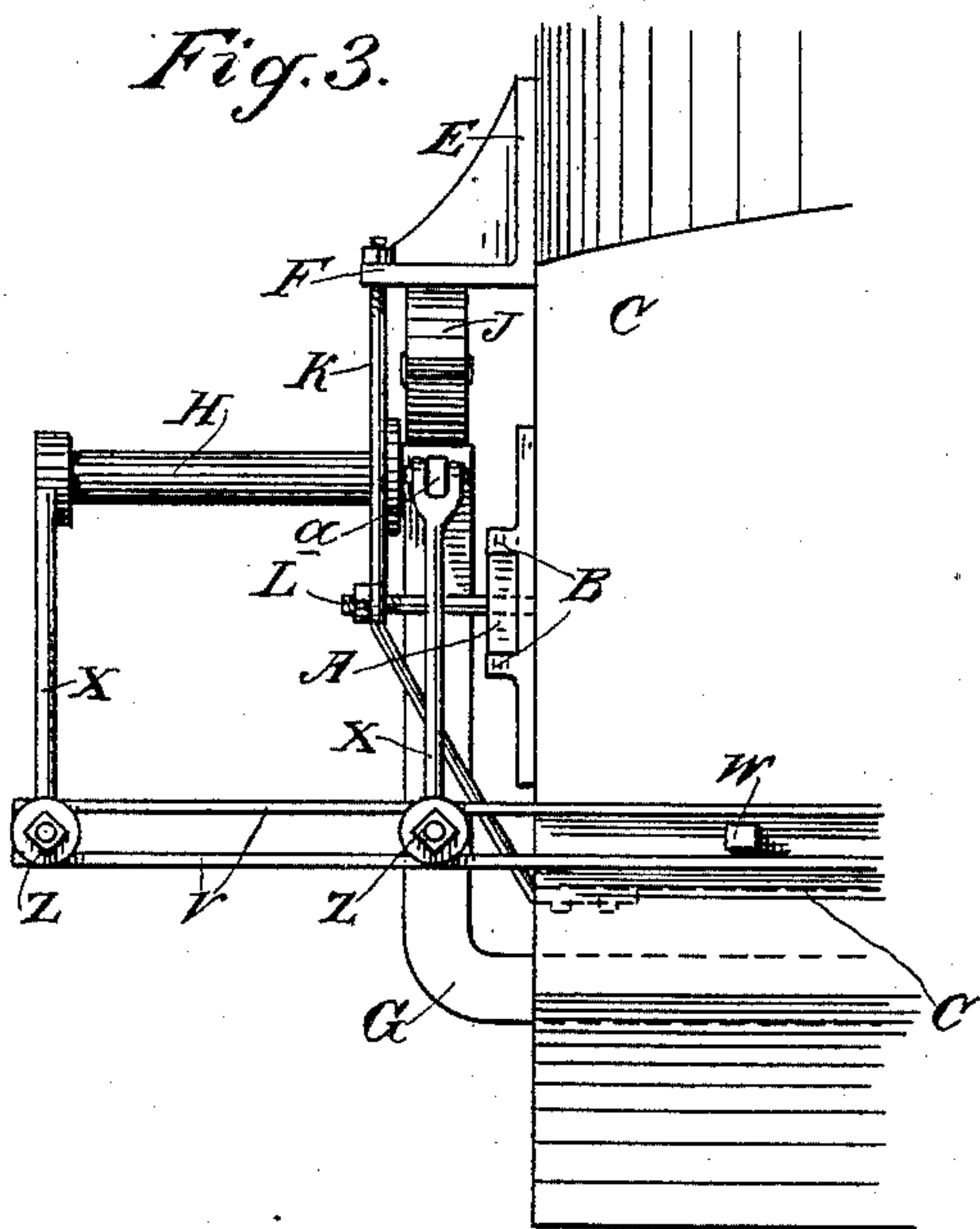
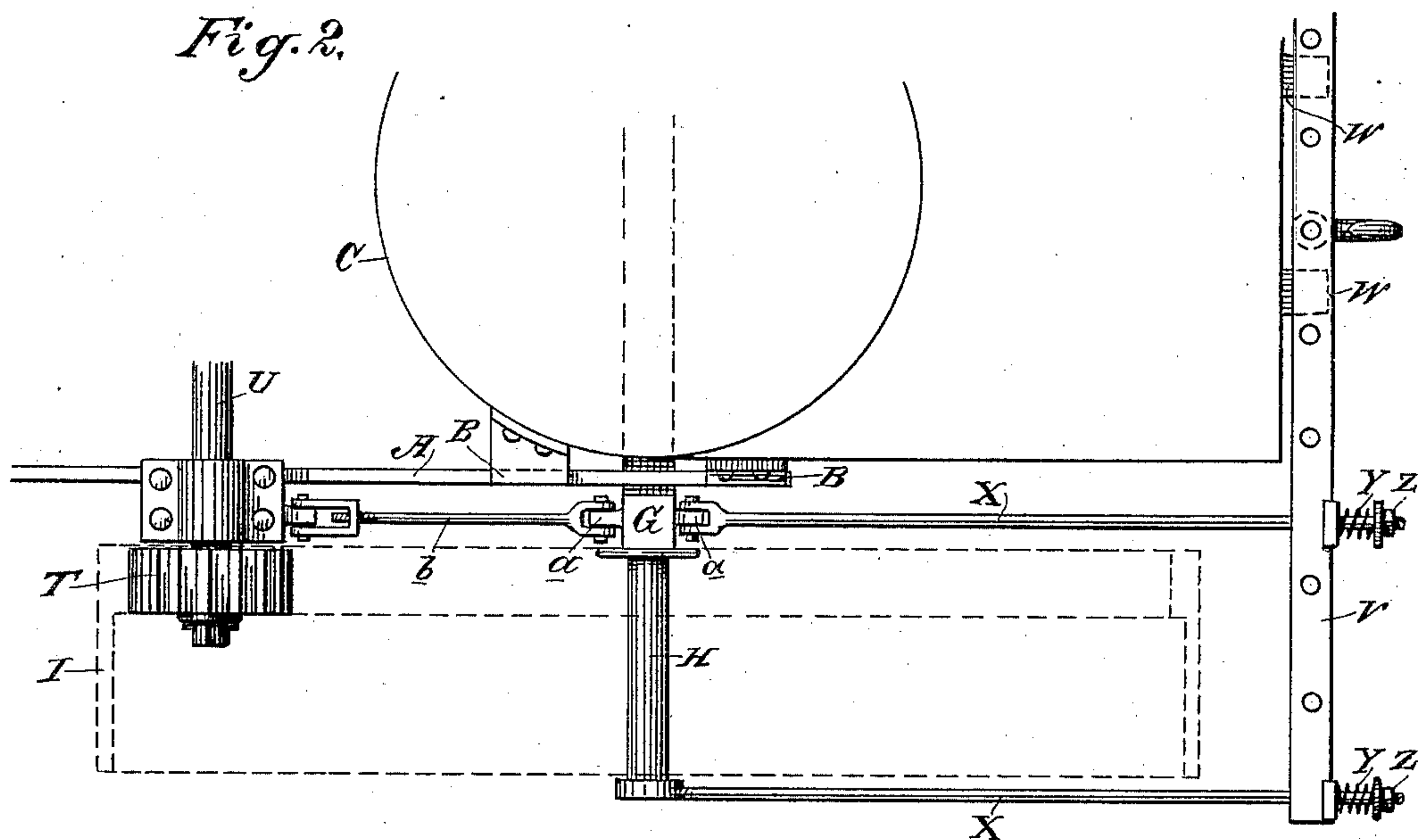
(No Model.)

2 Sheets—Sheet 2.

D. BEST.  
TRACTION ENGINE.

No. 436,931.

Patented Sept. 23, 1890.



Witnesses,  
Geo. H. Strong.  
J. H. Hulse

Inventor,  
Daniel Best.  
By Dewey & Co. atty



# UNITED STATES PATENT OFFICE.

DANIEL BEST, OF SAN LEANDRO, CALIFORNIA.

## TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 436,931, dated September 23, 1890.

Application filed April 29, 1890. Serial No. 349,947. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL BEST, a citizen of the United States, residing at San Leandro, Alameda county, State of California, have invented an Improvement in Traction-Engines, and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in traction-engines; and it consists in details of construction whereby the working of the engine is much improved.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of my engine. Fig. 2 is a plan view of the draft device. Fig. 3 is a rear end view of the same. Fig. 4 is a longitudinal cross-section of the drive-pinion T.

A is the main frame of the engine, which serves for the attachment of the journal-boxes of the bearing-wheels and for the support of the engine from which power is derived, the boiler and furnace at one end, the steering-wheel at the other end, and all the minor parts necessary for the operation of such an engine. At the rear end the side bars of this frame, which are formed of iron of sufficient strength, extend between lugs B, which are formed by means of strong angle-plates riveted to the sides of the boiler C, above and below the side bars A, so as to allow the bars to pass between these lugs and be riveted through the plates upon which the lugs are formed, and thus form a rigid and strong support for the boiler C.

At the front end of the frame A is journaled the steering-wheel D, with its guiding-circle and other mechanism, whereby it is allowed to turn from side to side, and a means by which it may be turned in this manner for the purpose of steering the machine. This mechanism not being any portion of my present application, will not be further described in this place.

Upon the sides of the boiler C are fixed strong plates or supports E, having the outwardly-projecting brackets F, and the bent or crank axle G, which extends across beneath the bottom of the boiler, extends upward along the sides of the boiler beneath the bracket

F, having the outwardly-projecting axles or spindles H, upon which the main bearing and driving wheels of the engine are journaled.

Between the brackets F and the top of the bent axle G are fixed the springs J, which are made of any suitable or desired pattern and resting upon the axles or the boxes, within which they are secured at this point. The weight of the boiler and the rear portion of the machine is supported upon the springs J through the intervention of the brackets F.

Brace-rods K have their lower ends bolted beneath the boiler and extend outwardly and upwardly, as shown, to the outer ends of the brackets F, having screw-threads and suitable nuts by which they are adjusted, and bolts L also pass through the rods K and through the side bars of the frame A, thus holding these parts rigidly together.

The engine-bed is secured to the main frame A, so that the cylinders M of the engine are set at any desired inclination, and by means of the usual piston and connecting rods power is transmitted from the engine to the main crank or driving shaft N, which carries upon it a gear-pinion O, and also, if desired, a fly or balance wheel P. The gear-pinion O meshes with the gear-wheel Q upon the shaft R, and this again transmits motion through the gear-wheel S and the pinions T, which are mounted upon the shaft U of the gear-wheel S. From the pinions T power is transmitted to the toothed segments within the peripheries of the main driving and bearing wheels, which are mounted upon the axles H, as before described, this portion of the mechanism not being essentially different from that shown in other similar machines.

Across the rear of the fire-box of the boiler are fixed strong bars or plates V, and between these plates stout lugs W extend from the rear of the boiler and its furnace and are fixed thereto below the level of the doors. The space between the plates V is sufficient to allow the lugs W to move up and down as much as the boiler to which they are attached moves upon its springs.

Connected with the bars or plates V upon each side of the boiler are the rods X, and they extend a short distance behind the bars



and are surrounded by stout spiral springs Y, the tension of which is regulated by means of nuts Z. These springs hold the plates against the rear of the boiler and by their elasticity maintain a contact while allowing the vertical movement of the boiler upon its springs. The rods X extend forward, as shown, upon each side of the boiler, and are connected with lugs *a*, which project from the sides of the crank-axle G, both exterior to and inside of the main bearing and driving wheels I. Upon the forward sides of the axle are similar lugs, and rods *b* extend from these lugs and are connected with the journal-boxes of the shaft U, which are mounted upon the frame so that when the machinery is set in motion the pull of the wheels is transmitted directly through these rods *b* and X to the bars V, which extend across the rear of the boiler, and the draft-power is thus applied directly to this bar and there is no tendency to twist or turn the bent axle G out of its position by reason of the torsional pull or strain upon it, this being all relieved by reason of the direct connection before described. It will also be manifest that the rods or links *b* form radii between the shafts U and H, and as the machine rises and falls upon its springs J while the wheel-base is not thus affected these links *b* serve to maintain the pinion T always in mesh with the segments of the bearing and driving wheels.

The boiler is suitably stayed to the frame A by means of the bracing-rods *c*, extending from its upper part toward the forward end of the frame, to which these rods are bolted at suitable different points.

In order to relieve the pinions T of any strains which may occur from irregular movements of the bearing-wheels I or other parts, that portion of the shaft U upon which the pinions are fitted is made with a swell or globular shaped portion *d* at the point where the pinion is fitted, and the interior of the hub of the pinion is bored out so as to fit this swell, as shown. The pinion is keyed to the shaft so as to be rotated with it by means of a feather or key *e*, fitting into a deep groove or key-seat in the swell portion of the axle U and into a corresponding groove or channel in the pinion. The pinion is held in its place by any suitable stop, pin, washer or other device upon the shaft U, exterior to the pinion, and while the pinion is thus allowed to roll from side to side upon this swell or curved shape of the shaft it will be caused to rotate with the shaft by reason of the key or feather. The rocking motion thus allowed to the pinion, however, keeps it in perfect mesh with the gear-segments in the interior of the main driving-wheels and prevents any strain upon the teeth of the pinion or segments which would be likely to fracture them. All these devices are designed to improve the working and durability of my engine.

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

1. In a traction-engine, the main bearing-frame, the boiler supported thereon, in combination with the angle-iron or bracketed frame having lugs between which the side bars of the frame are bolted and secured and upon which the boiler is supported from the frame, substantially as herein described.

2. In a traction-engine, the main frame having its rear end secured between lugs which are fixed to the boiler, a crank-axle extending beneath the boiler and upward along the sides, with spindles upon which the bearing-wheels are fitted, brackets fixed upon the sides of the boiler, and springs fitted between said brackets and the crank-axle, substantially as herein described.

3. The crank-axle extending beneath the boiler upwardly along its sides and having the spindles for the main bearing and driving wheels, the brackets fixed to the sides of the boiler, and springs resting upon the axles and having the brackets supported upon them, in combination with the adjusting and brace rods, substantially as herein described.

4. In a traction-engine, the main frame, engines mounted thereon, and gearing through which power is transmitted to drive the bearing and traction wheels, in combination with the bars V, extending across the rear of the engine or boiler frame, and the brace-rods X and *b*, connecting said bars with the up-turned ends of the crank-axle and with the journal-boxes or engine-frame, substantially as herein described.

5. In a traction-engine, the main frame, engine mounted thereon, and gearing through which power is transmitted to drive the bearing and traction wheels, the crank-axle having spindles upon which said wheels are journaled and extending across beneath the boiler, lugs extending from the rear of the boiler, and plates above and below said lugs, rods X, passing through said plates, having their forward ends connected with the crank-axle by lugs or boxes and their rear ends provided with springs Y, and holding and adjusting nuts Z, substantially as herein described.

6. In a traction-engine, the main frame mounted upon the bearing-wheels at the rear and the steering-wheel at the front, the engine and boiler mounted upon said frame, gearing by which power is transmitted from the engine to drive the traction-wheels, segmental gear-sections fixed within the bearing-wheels, and pinions engaging said sections, through which power is transmitted from the engine to drive the wheels, said pinions being mounted loosely upon a swell or convex portion of the shaft, with a key or feather by which power is transmitted from the shaft to the pinion, while the latter is allowed to rock upon the convexity of the shaft and adjust



itself to varying positions of the teeth of the segments, substantially as herein described.

5 7. A traction-engine having the main frame, engines, machinery, and boiler supported upon springs from the driving-wheel axle, pinions engaging gears through which motion is communicated to the driving-wheels, and rods or links connecting the pinion-shaft with the

driving-wheel axle, substantially as herein described.

In witness whereof I have hereunto set my hand.

DANIEL BEST.

Witnesses:

WILLIAM W. REID,  
GEO. S. SCOTT.

10