

(No Model.)

J. E. MUSTARD.
TRACTION ENGINE.

No. 264,191.

Patented Sept. 12, 1882.

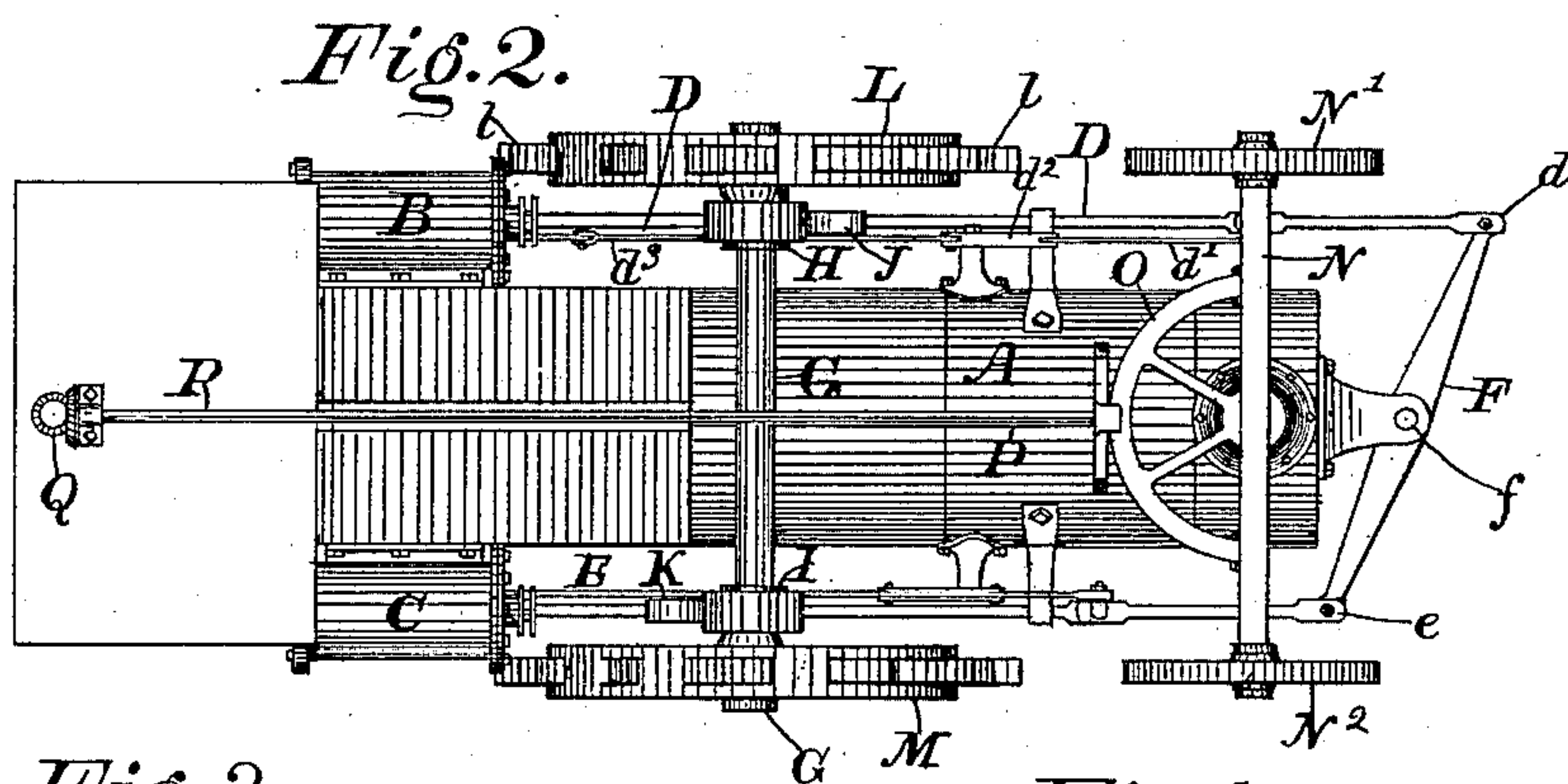
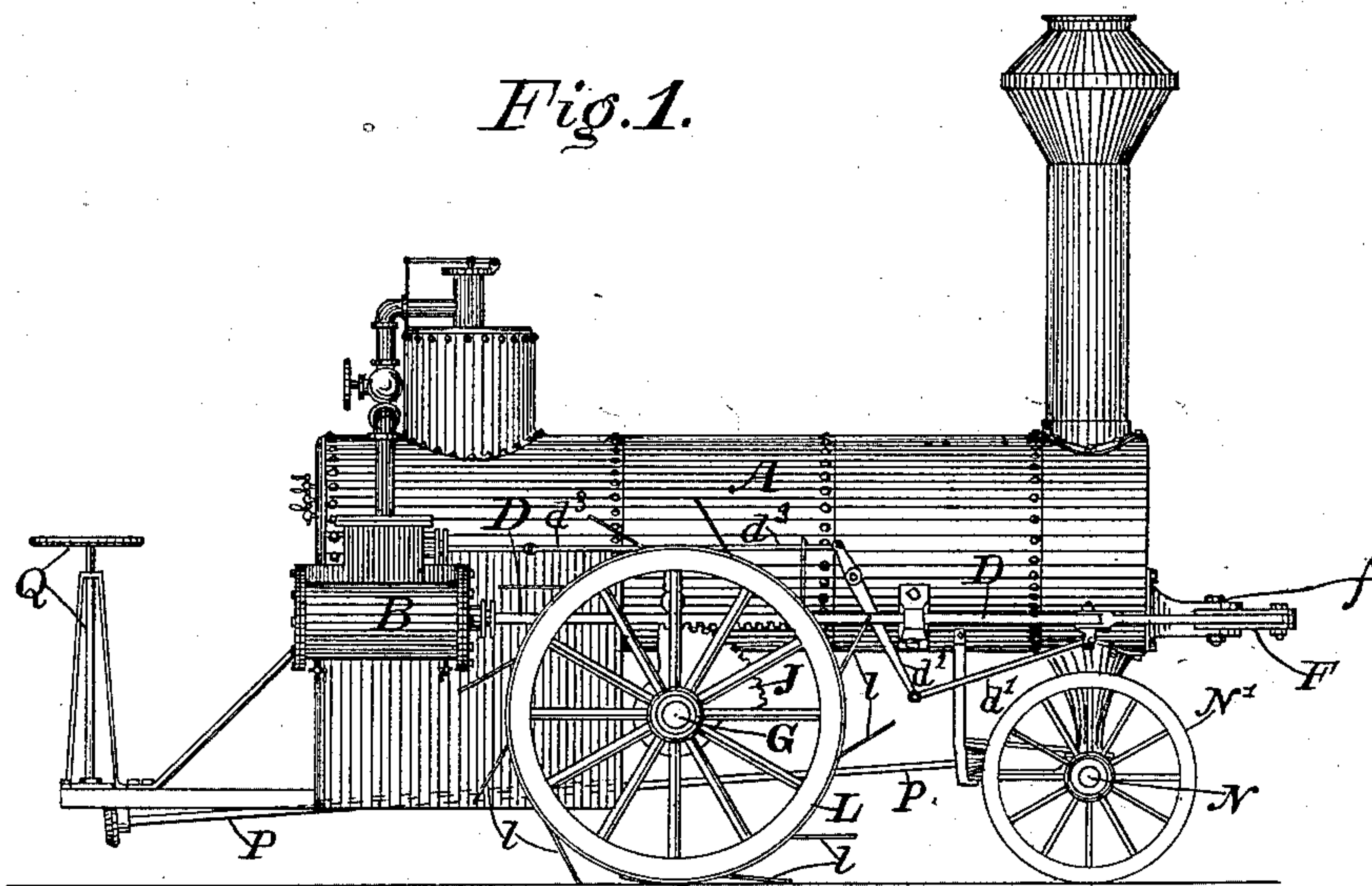


Fig. 3.

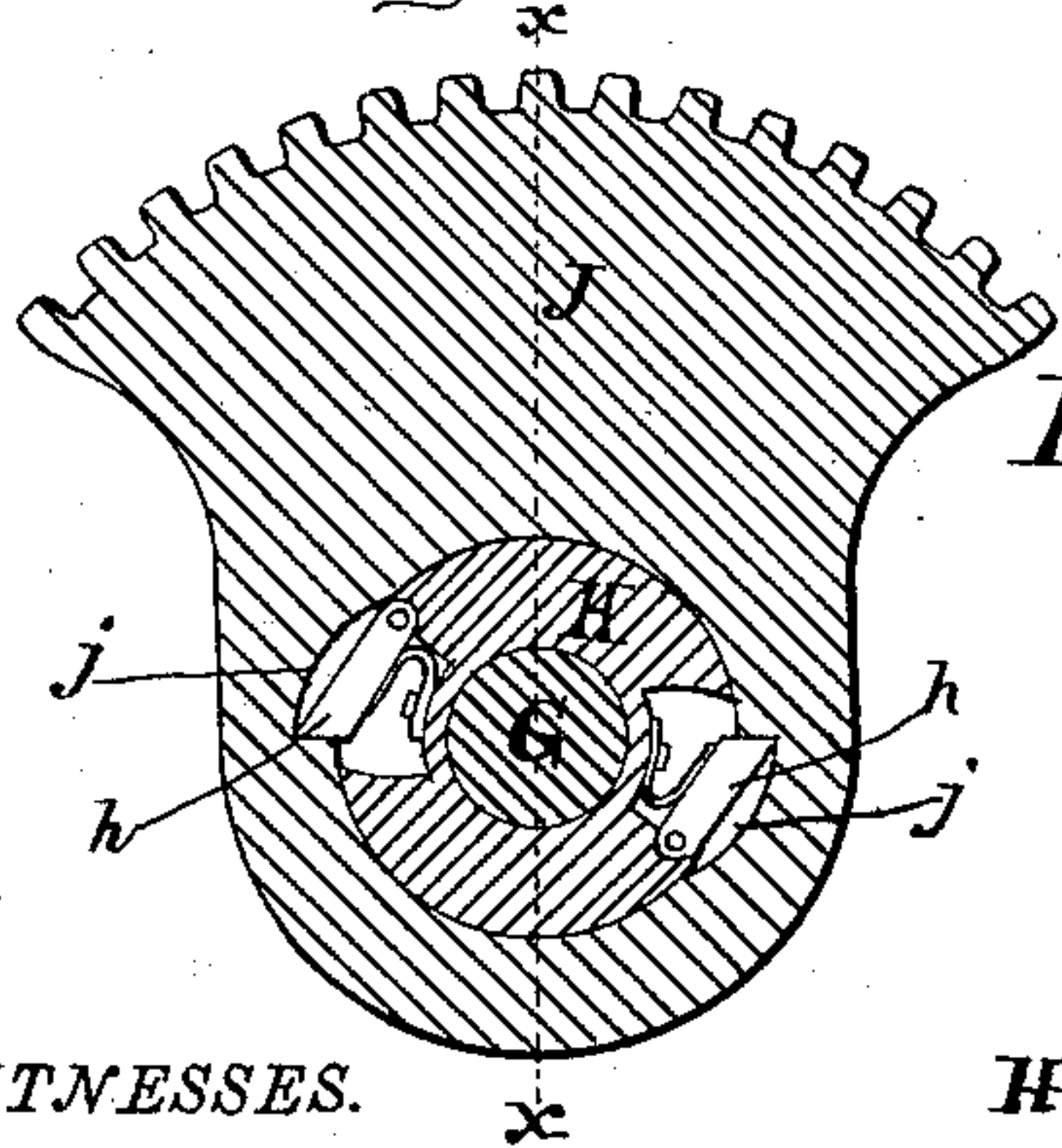


Fig. 4.

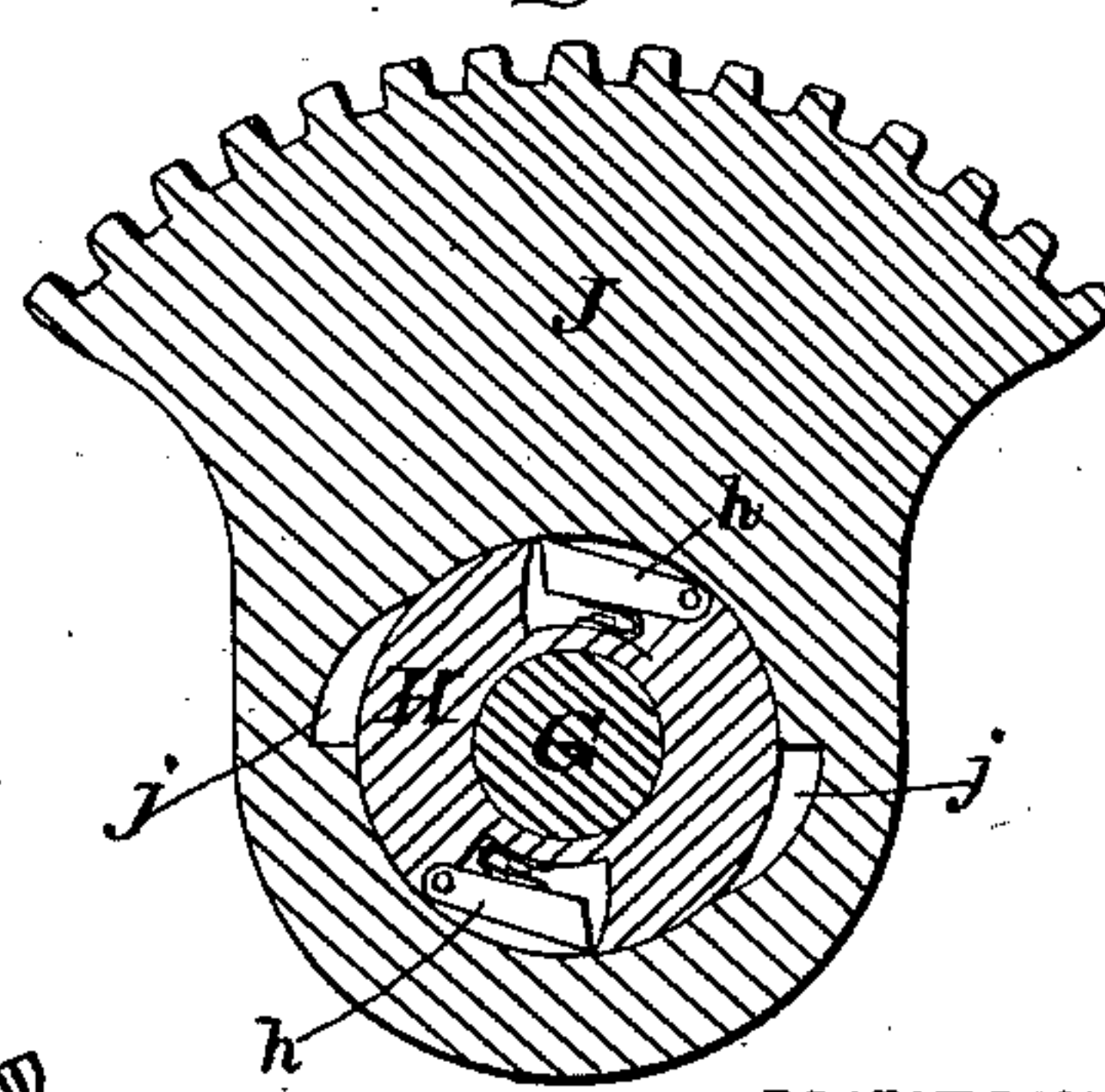
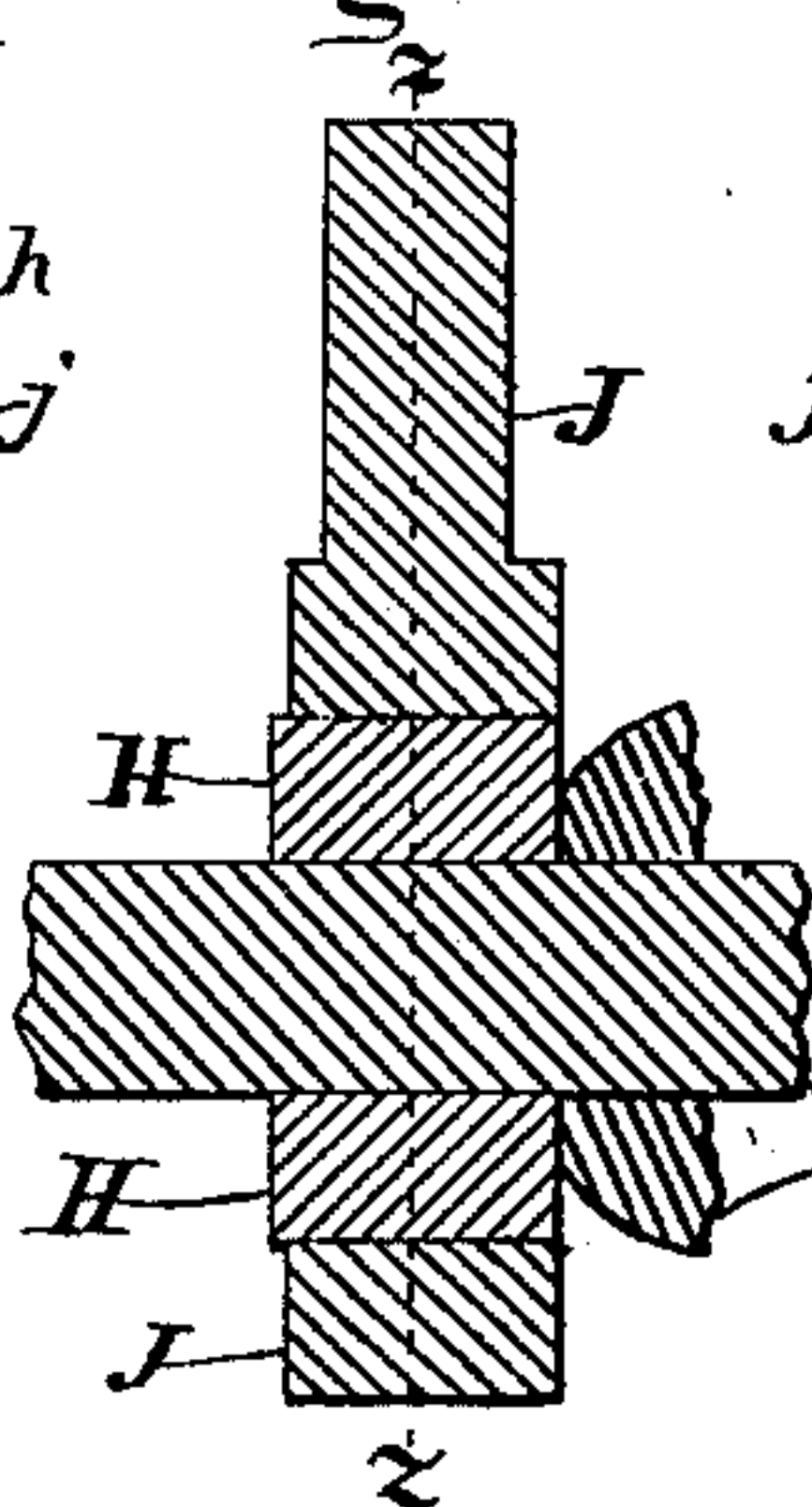


Fig. 5.



WITNESSES.

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JAMES E. MUSTARD, OF GLEN HALL, INDIANA.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 264,191, dated September 12, 1882.

Application filed May 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. MUSTARD, of the town of Glen Hall, county of Tippecanoe, and State of Indiana, have invented certain new and useful Improvements in Traction-Engines, of which the following is a specification.

The principal object of my said invention is to produce a means for driving road-engines in which the usual cranks and consequent dead-centers shall be avoided, while all the power shall be continuously utilized. This object is accomplished by mounting upon the hubs or shaft of the driving-wheels rack-wheels or segments which shall engage to drive said wheels when moved forward, but which shall turn loosely when moving backward; attaching rack-bars to the piston-rods of the engines, which shall engage with and drive these wheels or segments, and connecting said rack-bars by means of jointed rods, so that the force from both steam-cylinders shall operate upon each of said segments alternately as the segments move forward and back.

A second object of my invention is to produce for such engines driving-wheels which shall have more than the usual resistance against slipping. This object is accomplished by attaching to the faces of the rims of said wheels flat springs which project in the manner shown and give a greater bearing-surface on the ground than the common construction; and my invention consists in details of construction and arrangement, as will be herein-after more specifically set forth.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of an engine embodying my said invention; Fig. 2, an under side plan of the same; Fig. 3, a sectional view on the dotted line $z z$, and on an enlarged scale, of the gearing by which the motion is imparted to the wheels from the engine, the catch parts being engaged; Fig. 4, a view similar to Fig. 3, except that the catch parts are disengaged; and Fig. 5, a sectional view on the dotted line $x x$.

In said drawings, the portions marked A rep-

resent the boiler of a traction-engine; B C, the cylinders thereof; D E, the piston-rods of said cylinders; F, a cross-bar connecting said two rods together; G, the main or driving axle to the engine; H I, collars thereon, provided with catches; J K, toothed segments mounted upon the collars H I, the internal faces of the bearing, being provided with notches; L M, the main or driving wheels; N, the front axle; O, a segmental rack-bar attached thereto; P, a rod running from said rack-bar back to the stand of the engineer; and Q, a hand-wheel and staff by which said rod may be operated.

The boiler A, cylinders B C, and many other parts are similar to parts performing the same service in other engines, and need no special description.

The rods D and E are simply ordinary piston-rods for a portion of their length. For another portion they are rack-bars, while the forward portion is jointed, and is simply a connecting-rod connecting the other portions to the bar F. Attached to these rods, at or near their joints, is the rod d' , which is one of a series of rods, $d' d^2 d^3$, which run to and actuate the slide-valves of the cylinders. As will be readily seen, this engine is arranged so that one of these rods, D or E, moves forward while the other moves backward. As the segments J K only engage when moving forward and slip loosely around the collars H I when moving backward, it will be seen that by reason of these two rods D and E, being connected by the beam F, all the power of both cylinders is exerted, first on one segment, and through it and the collar on which it is mounted to the axle and wheels, and then on the other segment, and similarly on the axle and wheels. This arrangement insures that all the power of the engine shall be exerted at all times upon the axle and wheels without any diminution by reason of dead-centers or otherwise.

The bar F is constructed in something of the form of a walking-beam to an engine, is pivoted to a bearing on the engine by the pivot f , and to the ends of the rods D E by the pivots $d e$. It serves as a means of connecting the rods D E together and of transmitting power from one to the other.

The axle G is simply the main driving-axle of the engine.

In the construction shown the wheels L M and collars H I are secured rigidly thereto, and it thus causes all of said parts to move together. An equivalent construction, so far as my invention is concerned, would be to mount said wheels and collars loosely on the axle and attach the collars rigidly to the wheels. The collars H I are attached rigidly either to the axle or the wheels, according to whether the wheels are to turn with the axle or on the axle. Each is provided with one or more spring-catches, *h*, (see Figs. 3 and 4,) which occupy recesses in its peripheral surface, and are adapted to engage with notches *j* in the inside surface of the hubs of the segments J K. As will be readily seen, these notches slip over the catches when the segments are moving backward, and thus do not affect the position of the collars; but when moving forward engage with said catches and carry the collars with them, thus turning the wheels L M (either directly or through the axle G) and driving the engine forward. The segments J K are mounted loosely on the collars H I, and are provided with notches *j*, (see Figs. 3 and 4,) with which the catches *h* engage, whereby when said segments are moved forward said collars are rotated, and with them the wheels L M. The segments are driven by the rack portions of the rods D E, which engage therewith.

The wheels L M are or may be like any ordinary traction-wheels, except that a series of springs, *l*, are secured to the face thereof in such manner that one or more will rest flat on the ground at all times. This gives, instead of the usual small bearing-surface on the face of each wheel, a much larger one, and consequently causes a much greater friction and less liability to slip as the wheels are driven forward.

The axle N is similar to the front axle of any

ordinary vehicle, and carries the ordinary wheels N' N².

The segmental rack-bar O corresponds to the "fifth-wheel" of an ordinary vehicle, and is operated to move the axle N around, and thus change the course of the engine.

The rod P and hand-wheel Q constitute the means whereby the person in charge of the engine can operate the rack O and the front wheels, and are provided with appropriate gear-wheels as a means of connection, as shown.

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

1. The combination, in a road or traction engine, of the two cylinders B C, the cogged and jointed rods or bars D E, the cross-bar F, axle G, collars H I, having spring-catches therein, segments J K, having teeth to engage with the bars D E and notches to engage with the collars H I, and wheels L M, substantially as shown and described, and for the purposes specified.

2. In a traction or road engine, the combination of the permanently-located cylinders B C, the cogged and jointed rods D E, the cross-bar F, and the segments J K, whereby the force of both cylinders may be applied to one segment without rocking said cylinders or deflecting those portions of said rods which serve as piston-rods from a straight course, substantially as shown and specified.

3. In a road or traction engine, traction-wheels L M, provided with spring-arms *l*, substantially as shown and described, and for the purposes specified.

In witness whereof I have hereunto set my hand and seal, at Glen Hall, Indiana, this 4th day of May, A. D. 1882.

JAMES E. MUSTARD. [L. S.]

In presence of—

JOHN W. GAY,
ROBERT CARTER.