(No Model.) 5 Sheets—Sheet 1.

# DE LA FAYETTE REMINGTON.

## TRACTION ENGINE.

No. 377,274. Patented Jan. 31, 1888.

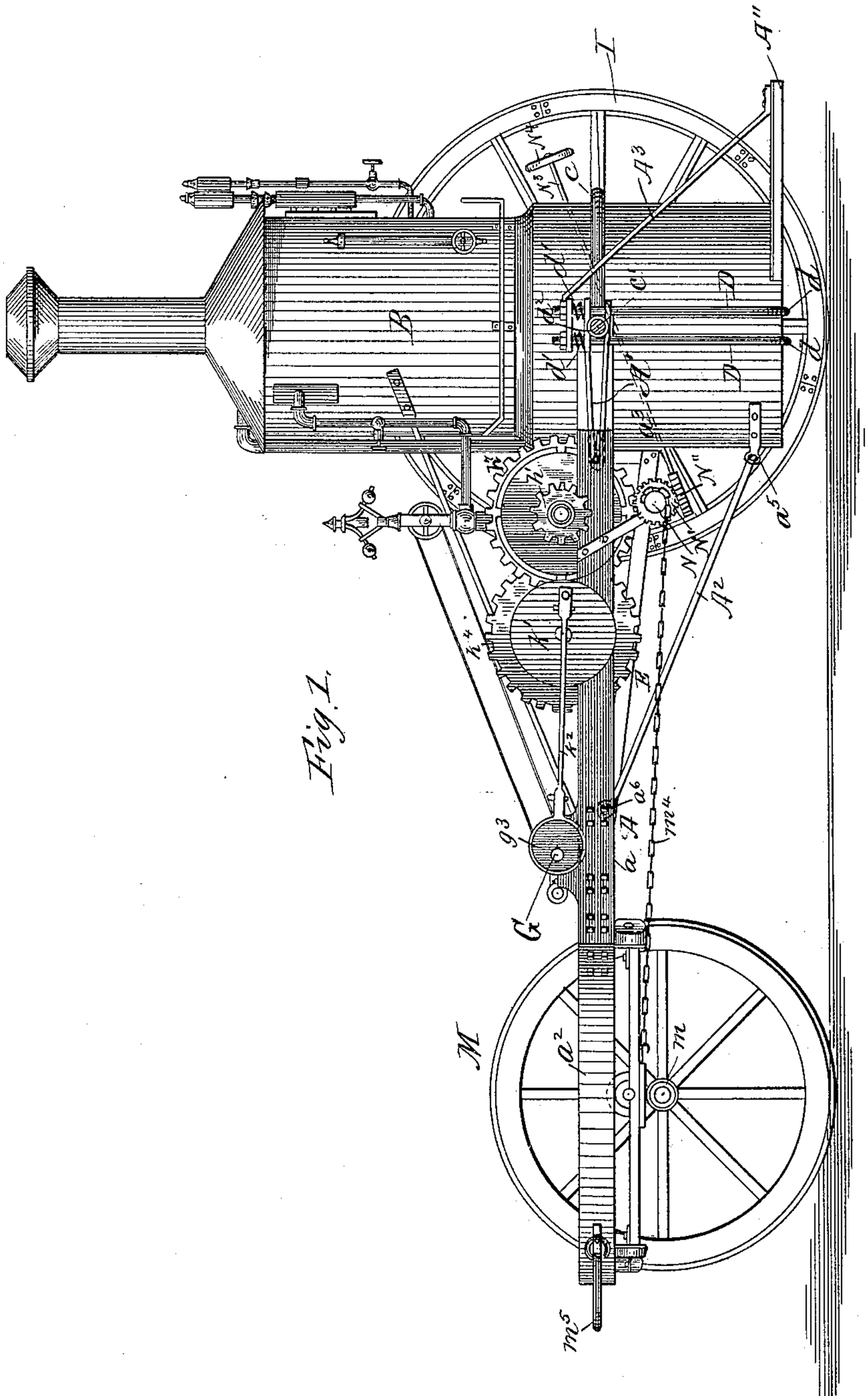

Fig. 1.

Witnesses:
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L. Seward Bacon

Inventor:
De L. Remington.
By Emmons & Co
Atty.

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# DE LA FAYETTE REMINGTON.

## TRACTION ENGINE.

No. 377,274. Patented Jan. 31, 1888.

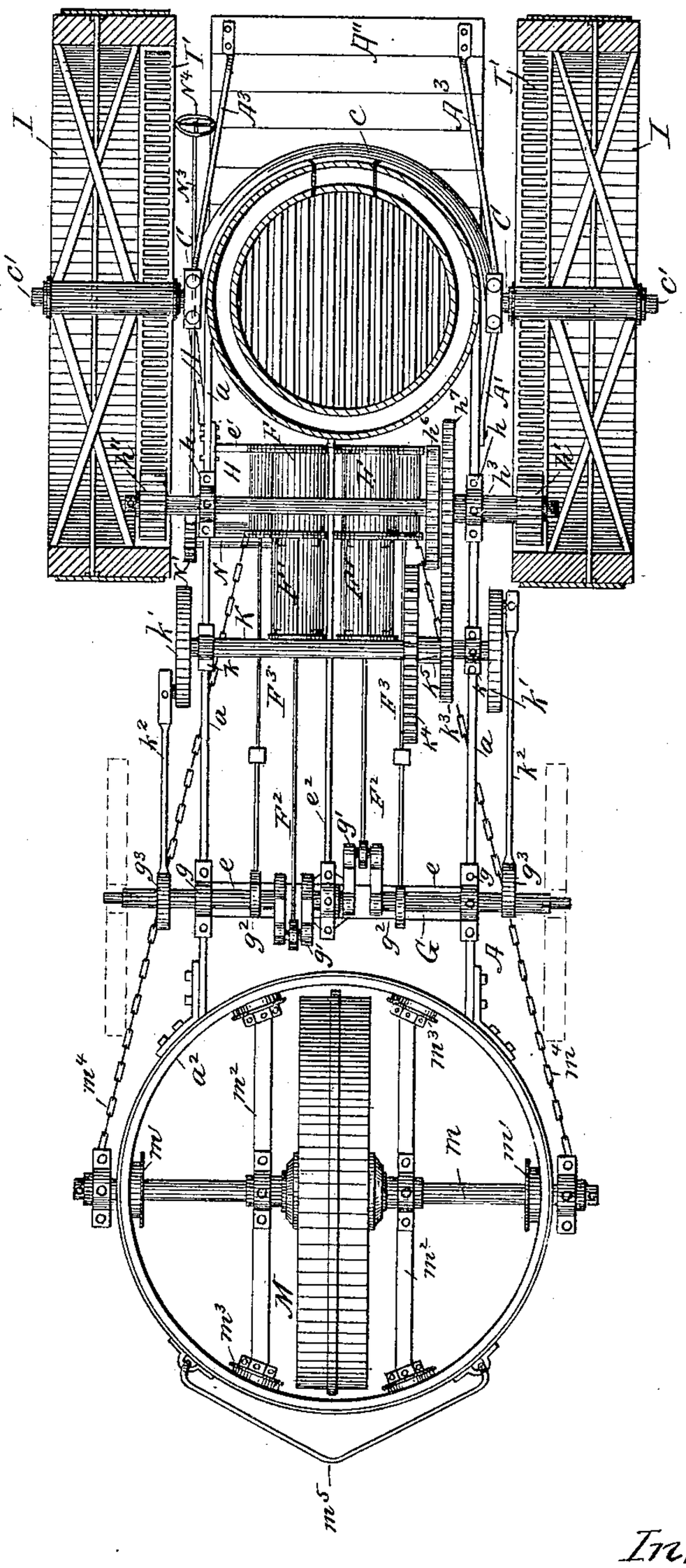

Fig. 2.

Witnesses:-
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By Seward
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# DE LA FAYETTE REMINGTON.

## TRACTION ENGINE.

No. 377,274. Patented Jan. 31, 1888.

Fig. 5.

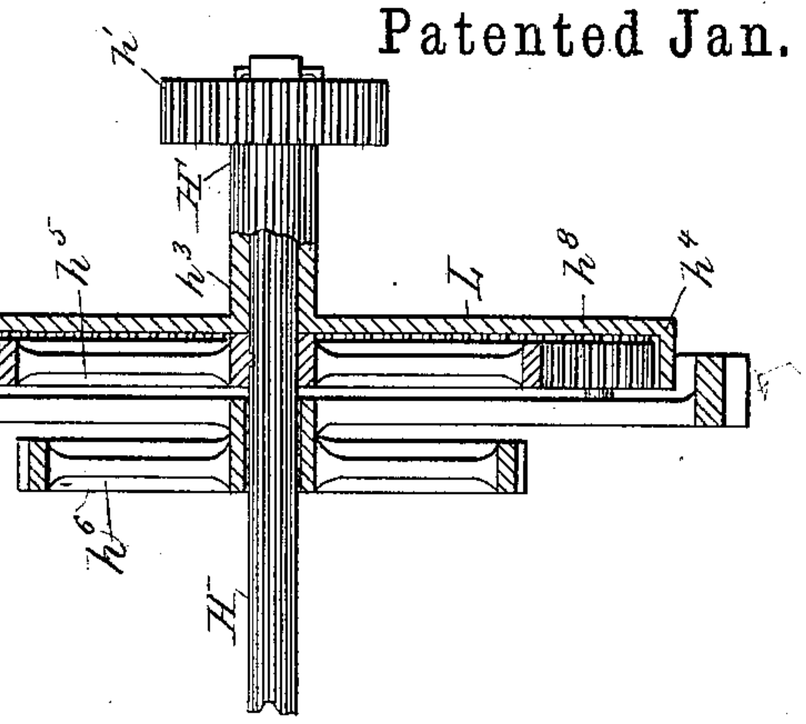



Fig. 3.

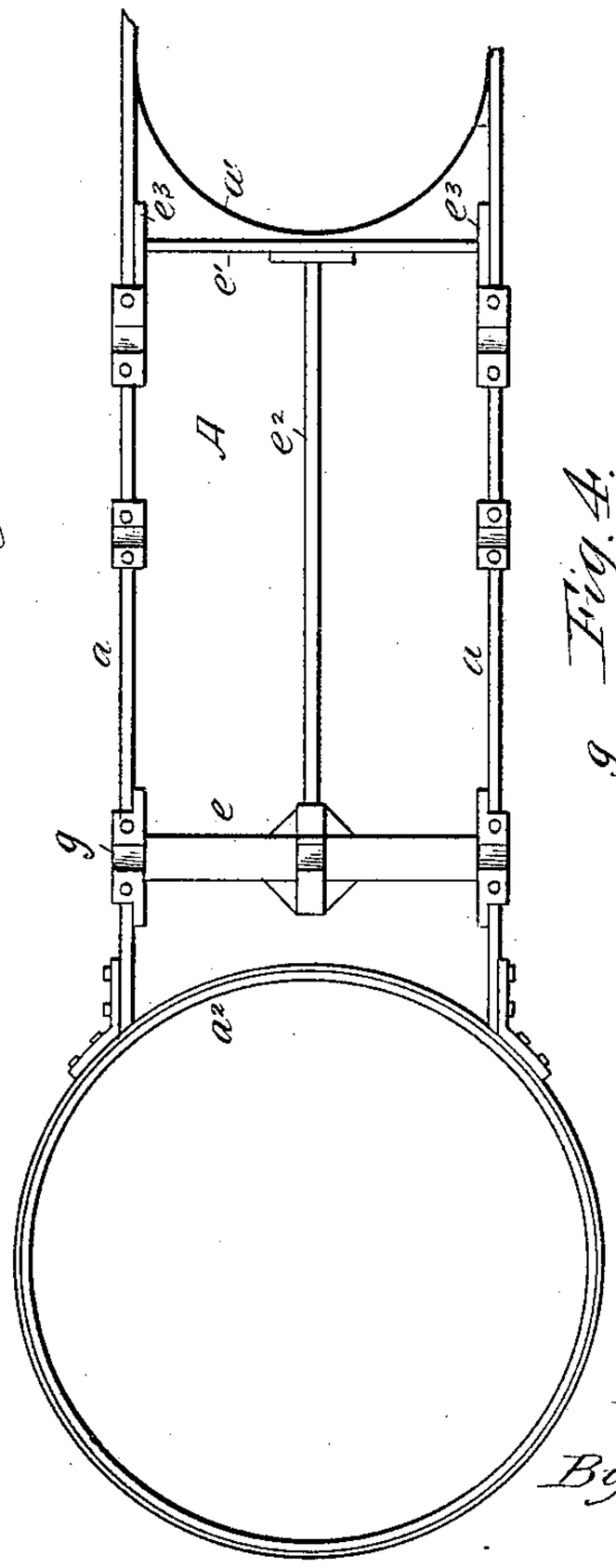
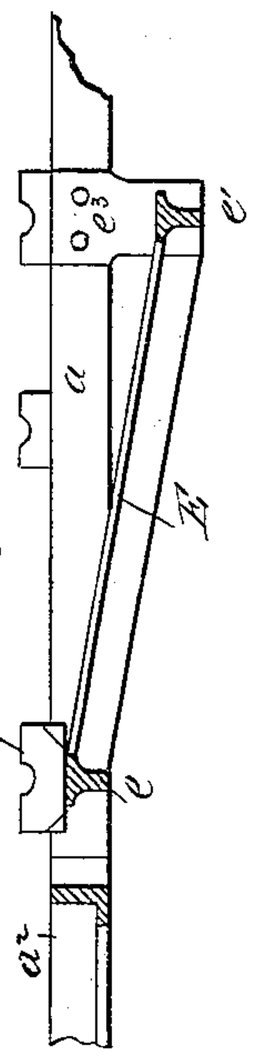



Fig. 4.




Witnesses:
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(No Model.) 5 Sheets—Sheet 4.

# DE LA FAYETTE REMINGTON.

## TRACTION ENGINE.

No. 377,274. Patented Jan. 31, 1888.

Fig. 7.

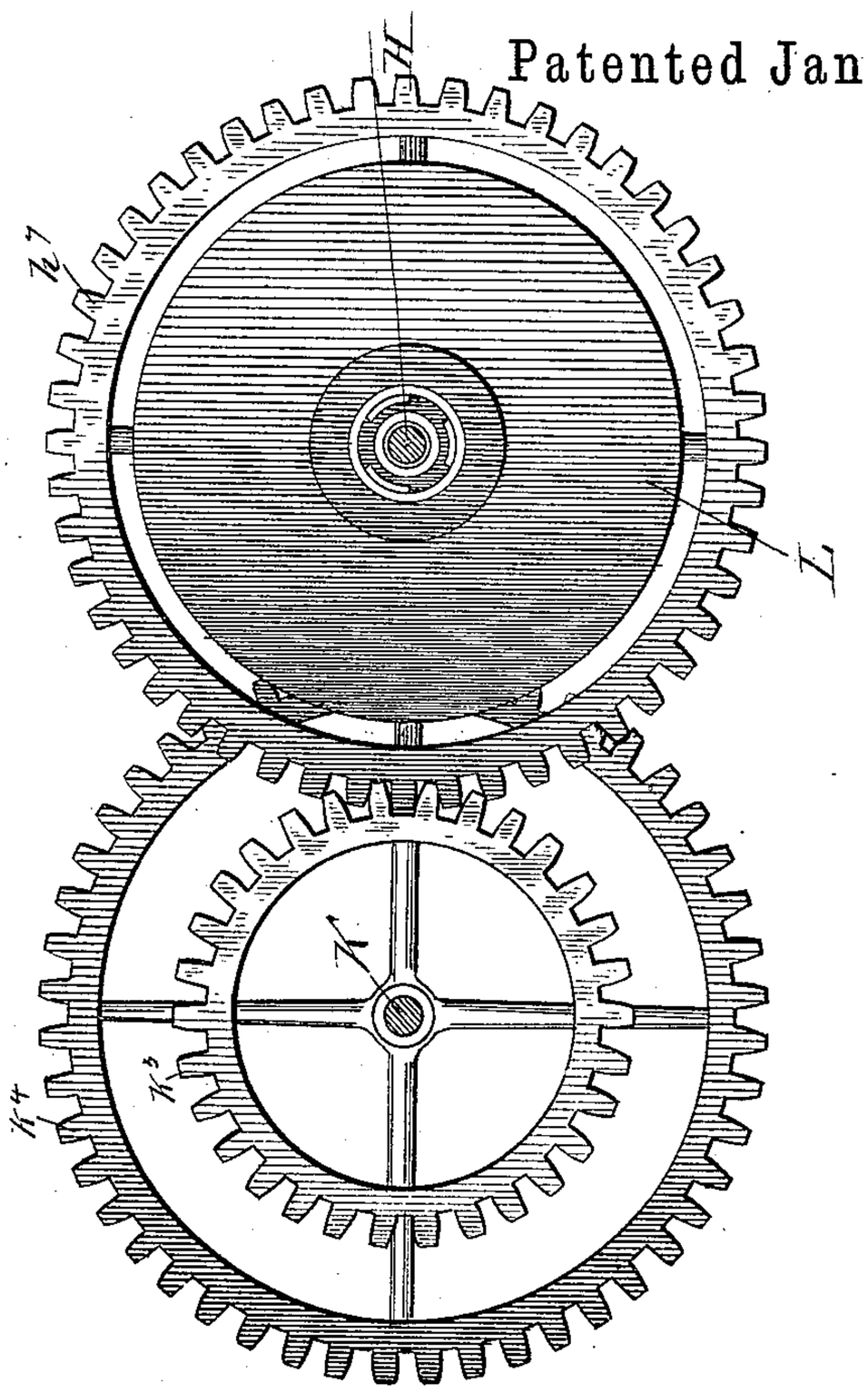
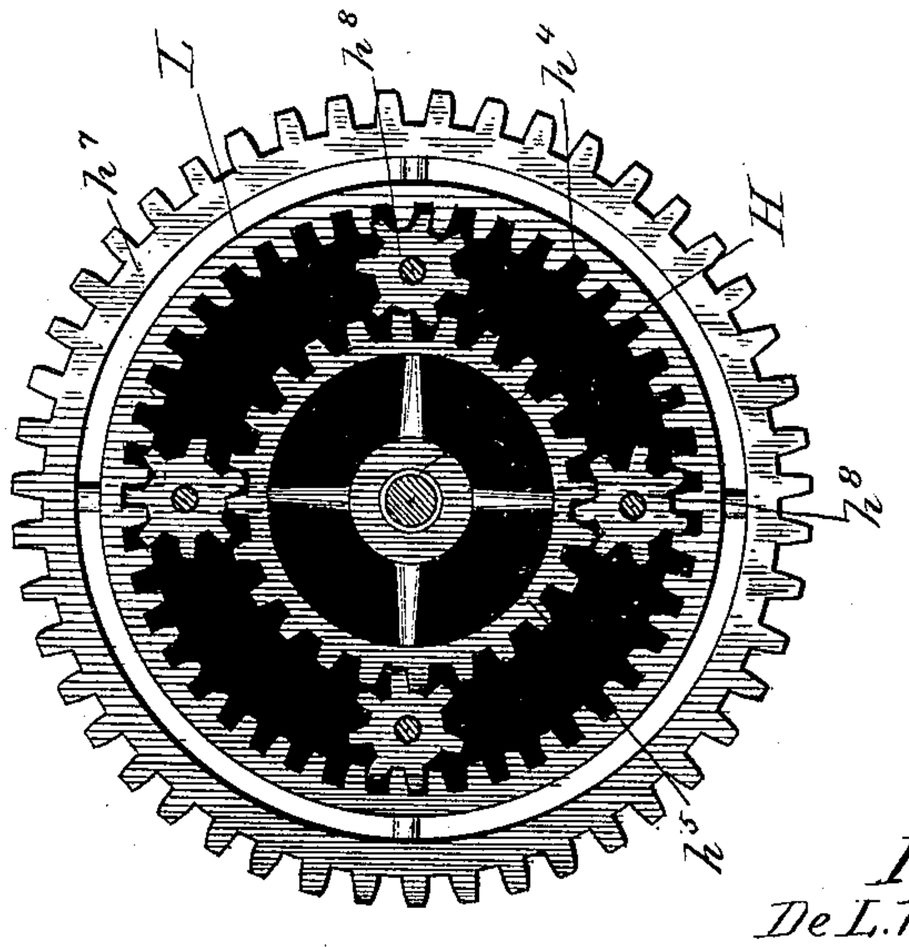



Fig. 6.

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(No Model.) 5 Sheets—Sheet 5.

# DE LA FAYETTE REMINGTON.

## TRACTION ENGINE.

No. 377,274. Patented Jan. 31, 1888.

*Fig. 8.*

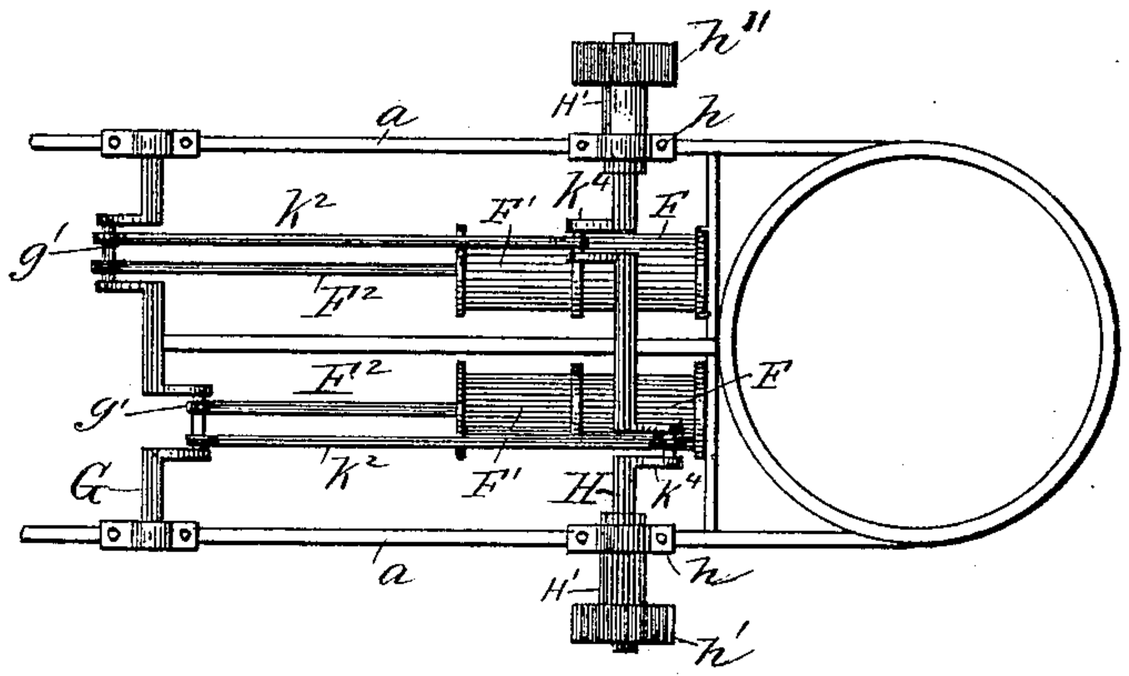
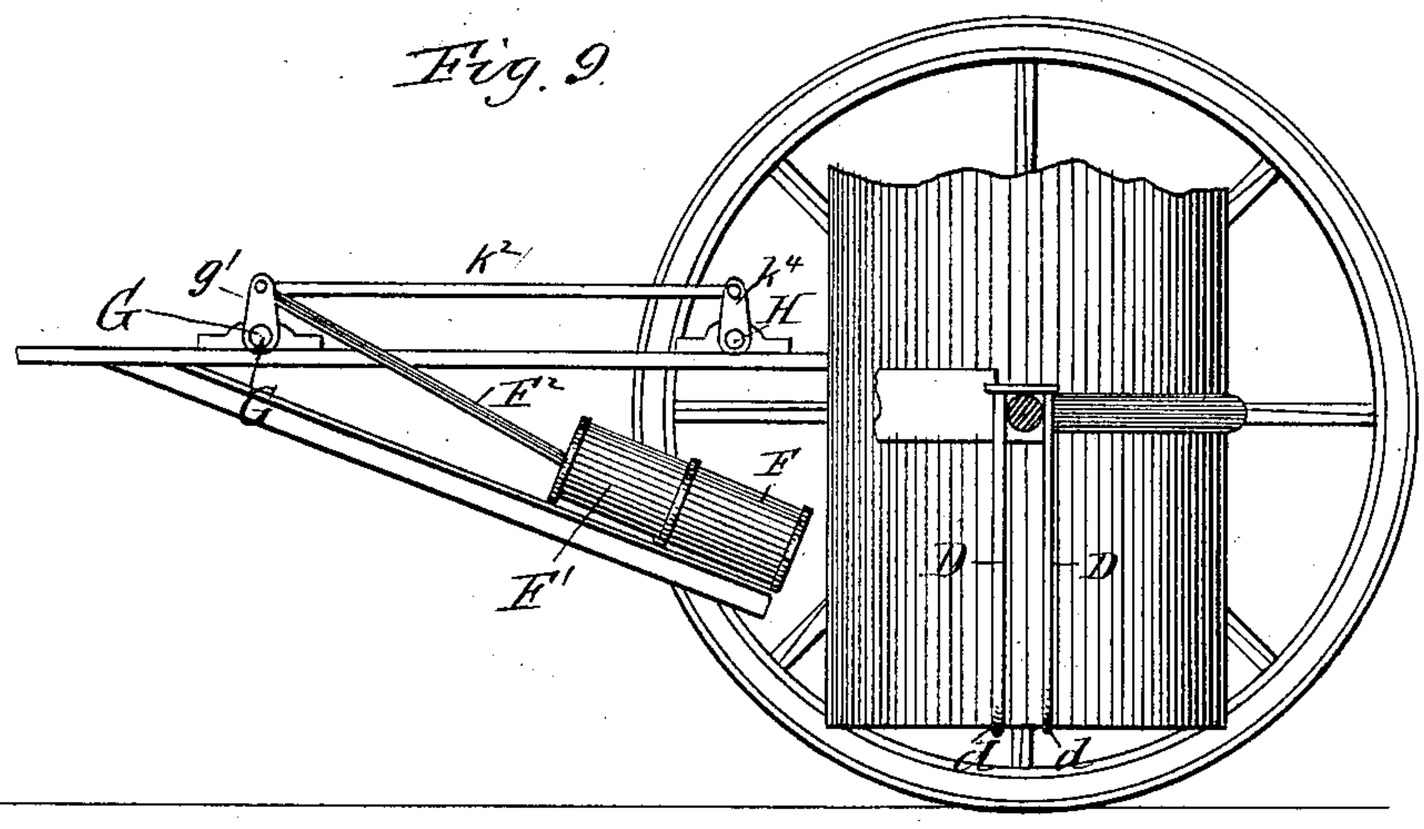



*Fig. 9.*




Witnesses:
C. R. Stuart,
L. Seward, Bacon.

Inventor:
De L. Remington,
By Munn & Co
Attys.

# UNITED STATES PATENT OFFICE.

DE LA FAYETTE REMINGTON, OF WOODBURN, OREGON.

## TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 377,274, dated January 31, 1888.

Application filed August 3, 1887. Serial No. 246,056. (No model.)

*To all whom it may concern:*

Be it known that I, DE LA FAYETTE REMINGTON, a citizen of the United States, residing at Woodburn, in the county of Marion and State of Oregon, have invented certain new and useful Improvements in Traction-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of locomotive-engines which are designed to travel upon roadways and other surfaces without tracks, and which are also adapted to haul loads and to operate as stationary engines for running agricultural and other machines.

The objects of my invention are, first, to increase the power and speed of the engine without increasing its weight or cost, and to render the machine capable of traveling easily over hilly or uneven surfaces, and also over soft ground; second, to render the steering action simple and prompt in operation; third, to perfectly balance the boiler upon the supporting-frame, so as to avoid all strain upon the frame and engine while the machine is traveling over uneven surfaces; fourth, to so mount the engine upon the frame-work that it may be readily connected to and removed from said frame; fifth, to apply the motive power directly to the traction-wheels, and to allow for variations in speed of the wheels while the machine is turning around; sixth, to permit of ready variations in the speed of the machine, and to entirely disconnect the propelling-gear, so that the engine may operate as a stationary engine, and, last, to simplify and strengthen the machine as a whole.

The above objects I attain by means of the peculiar or novel features of construction and arrangement or combination of parts hereinafter disclosed in the description and claims.

In order that my invention may be fully understood, I will proceed to describe the same with reference to the accompanying drawings, in which the same reference-letters indicate the same or corresponding parts, and in which—

Figure 1 represents a side elevation of a traction-engine constructed in accordance with my invention. Fig. 2 represents a partly-sectional top plan view of the same. Fig. 3 is a detached plan view of the machine-frame and the cylinder-bed. Fig. 4 is a sectional view of the same on the dotted line 4 4 of Fig. 3. Fig. 5 is a detached view of the main driving-shaft and its gear-wheels, parts of the latter being shown in vertical section. Figs. 6 and 7 illustrate the construction and arrangement of the compensating gearing and the protecting-shield. Fig. 8 is a plan view of a modified construction and arrangement of the parts forming the connections between the crank-shaft and the driving or traction shaft. Fig. 9 is a broken side elevation of the same, showing the position or arrangement of the cylinders.

In the said drawings, A designates the main supporting-frame of the machine, said frame being constructed of wrought-iron and composed of the straight longitudinal side pieces, *a*, the rearwardly-curved semicircular piece *a'*, which connects the rear ends of the side pieces, *a*, and of the circular piece $a^2$, which is interposed between the front ends of the side pieces. The rear and front pieces, *a' a²*, are bolted to the side pieces, *a*, in the respective positions shown, and these parts constitute the main frame for supporting the operative parts of the machine.

B designates the boiler, which is of the vertical type, and which is bolted or coupled to the main frame at the points of union between the rear semicircular portion, *a'*, and the side pieces, *a*, of the main frame.

C designates the axle of the driving or traction wheels, said axle being curved or U-shaped, and embracing at its curved portion *c* the rear side of the boiler. The outwardly-extending portions *c'* of said axle C constitute the spindles upon which turn the hubs of the traction-wheels. This axle is connected to the main frame A by braces A', as shown in Fig. 1, the front ends thereof being pivotally or yieldingly connected to the rear portions of the side pieces, *a*, of the main frame, as shown at $a^3$, and their rear ends are secured, respectively, upon the upper and lower sides of the axle inside the wheel-hubs by hangers D, which pass through the ends of said braces, as will hereinafter be more fully described, connect the said axle with the main frame, and at the same time allow for the movements of the

axle relative to the boiler due to the up-and-down jolting of the latter when the machine is traveling over rough ground.

Four pendent arms or hangers, D, referred to above, support the boiler. They are curved inward at their lower ends, as shown at *d*, and engage under the bottom of the boiler, and the upper ends of these arms or hangers are inserted through the rear ends of the braces A′, and have springs *d′* upon them above the upper braces, A′, the said springs being confined between the said upper braces and the caps $d^2$, which are secured upon the upper ends of the arms by nuts, as shown. Light rods or braces $A^2$ are hinged at their forward ends to bolts $a^6$, secured to the side pieces of the main frame, as shown in Fig. 1, and at their lower or rear ends they are secured, by eyebolts $a^5$, to the sides of the boiler, so as to brace and hold the same in an upright position. Inclined braces $A^3$ are arranged, as shown, to extend from the upper ends of the hangers D to the rear edge of a foot-board, A″, which is bolted to the bottom of the boiler, and said braces likewise assist in supporting said boiler in an upright position. Thus it will be seen that the boiler is perfectly balanced upon the rear portion of the frame, so as to permit free movements of the latter while passing over uneven ground, and without materially disturbing the vertical position thereof.

E designates the bed-frame of the engine or cylinders. This frame is composed of the cross-pieces *e e′*, which are removably bolted at their ends to the side pieces, *a*, and of the longitudinal connecting-piece $e^2$, which braces the cross-pieces together, as shown in Fig. 4. The two cylinders F F of the engine are bolted at their rear ends to the rear cross-piece, *e′*, while the crank-shaft G extends horizontally above the front cross-piece, *e*, and the pillow-blocks *g* of said shaft rest upon the side pieces, *a*, at their points of connection with the front cross-piece, *e*. This bed-frame E, as shown in Figs. 1 and 4, is inclined downward toward the rear end of the main frame by reason of the front cross-piece, *e*, being bolted to the upper sides of the frame-pieces *a*, while the rear cross-piece, *e′*, is lowered by hangers $e^3$, removably bolted to the insides of and extending beneath said side pieces. This inclination of the bed-frame permits the engine-cylinders F, the cylindrical guides F′, and the pitmen or connecting-rods $F^2$ of the pistons and $F^3$ of the slide-valves to be conveniently arranged beneath and out of the way of the intermediate gear-shaft, K; also, as said bed-frame is removably bolted to the main frame, it can be taken out for such purposes as may be desired. The cross-heads of the piston-rods $F^2$ work within elongated cylindrical guides F′, whereby the reciprocatory movements of the pitmen or connecting-rods are rendered steady and the application of power is brought directly upon the crank-shaft. As shown in Fig. 2 of the drawings, the crank-shaft G is provided with two cranks, *g′*, set at right angles to each other, and also with two eccentrics, $g^2$, to which the valve pitmen or rods $F^3$ are connected.

H designates the driving-shaft, which extends across the machine-frame just in front of the boiler B, and which is journaled at its ends in pillow-blocks *h*, secured to the frame-pieces *a*. This shaft carries a bull-pinion, *h″*, at one end and a sleeve, $h^3$, at the other end, having a similar bull-pinion, *h′*. These bull-pinions engage the cogs of gear-rings I′ upon the inner surfaces of the rims of the drive or traction wheels I, which are of quite large diameter, (about seven feet for a forty-horse-power engine,) the bull-pinions engaging the said rims and imparting direct and positive action from the source of power to the drive-wheels. The sleeve $h^3$ turns freely upon the end of the drive-shaft, and has the bull-pinion *h′* at its outer end and a cap or shield, L, at its inner end, provided with an internally-geared wheel, $h^4$. A small gear-wheel, $h^5$, is secured upon the shaft within the cap or shield L and meshes with small pinions $h^8$, which are journaled upon stub-axles projecting from the face of a gear-wheel, $h^7$, and mesh with the internally-geared wheel $h^4$. The gear-wheel $h^7$ is journaled to revolve upon the drive-shaft H, and has a smaller gear-wheel, $h^6$, secured to it and revolving with it upon the shaft. By the employment of this balancing or compensating gearing between the two bull-pinions and upon the same shaft therewith said pinions will be driven with the same speed when the machine or engine travels in a straight line; but as soon as the engine is turned to either side, so as to bring one traction-wheel to a standstill or to cause it to revolve with less speed than the other, the said compensating gearing will permit one of said bull-pinions to either stand still and not revolve at all or to revolve at a slower speed than the other bull-pinion. This is a desirable provision, in that in turning the machine or engine the inner one of the traction-wheels, the one having the greater resistance to overcome, and hence requiring more power to turn it, is permitted to revolve more slowly than the outer traction-wheel, which has a greater distance to travel and less resistance to overcome.

K designates a shaft, which extends across the machine intermediately of the shafts G and H, and has bearings in pillow-blocks *k k*, secured to the side pieces, *a*, of the frame. At its ends this shaft carries crank-disks *k′*, which have their pins arranged oppositely or at right angles to each other, and are coupled by connecting-rods $k^2$ to eccentrics $g^3$ on the ends of the crank-shaft G, said eccentrics being also set at right angles to each other. In lieu of this construction and arrangement, however, the connecting-rods $k^2$ and $F^2$ may be joined to the cranks *g′*, which are widened for the purpose, and the shaft H may have cranks $k^4$, to which the rear ends of the connecting-rods $k^2$ are joined, as shown in Figs. 8 and 9.

Upon the shaft K are mounted two gear-wheels, $k^3$ and $k^4$, which are of unequal diame-

ters, cast together upon a sleeve, $k^5$, and keyed to the said shaft, so as to be moved horizontally thereon by a hand-lever pivoted to the frame, or by any other well-known and preferred means. These wheels are so arranged that when the smaller wheel, $k^3$, is brought into engagement with the larger gear-wheel, $h^7$, on shaft H the maximum speed will be imparted to the machine, while when the larger wheel, $k^4$, is brought into engagement with the smaller wheel, $h^6$, the lowest rate of speed is imparted to the machine. For example, if a speed of three miles an hour is desired, the wheels $k^4$ and $h^6$ are placed in mesh; or, if a twelve-mile speed is wanted, the wheels $k^3$ and $h^7$ are thrown into gear.

When the engine is to be driven and used independently of the traction-wheels—as for any kind of stationary work—the wheels $k^3$ and $k^4$ are shifted farther along the shaft until they are both out of gear with the wheels $h^6$ $h^7$ on the shaft H. Power can then be transmitted from the engine or crank-shaft G by means of belting passing over the pulleys secured upon its end, these pulleys being shown in dotted lines in Fig. 2.

The compensating gearing is protected from dust by a shield, L, as shown in Figs. 6 and 7, which is secured to the outside of the wheel $h^7$ and covers the gear-wheel $h^5$ and the pinions $h^8$.

M designates the steering-wheel, which is located at the front end of the machine and revolves within the circular frame $a^2$. The axle $m$ of this wheel is provided at its ends with friction-rollers $m'$, which work on the under side of the circular frame $a^2$, and said axle is also supported by transverse parallel rods $m^2$, having rollers $m^3$ at their ends, which also work beneath said circular frame. The ends of the axle $m$ have rearwardly-extending chains $m^4$, which are secured to and wound in opposite directions upon a drum, N, which is journaled near the rear end of the frame and has a cog-wheel, N′, at one end, which is engaged by a worm, N″, at the forward end of an inclined shaft, $N^3$, which has a hand-wheel, $N^4$, at its upper rear end within reach of the engineer or driver, who usually stands upon the footboard A″. Thus, by revolving the hand-wheel and the worm-shaft, the drum will be revolved and wind one of the chains upon it while the other is unwound, according to the direction in which the hand-wheel is revolved, and thus turn the axle and direct the steering-wheel in any direction. This steering-gear may be substituted by any other known means which may be found suitable.

It will be seen that the great diameter of the circular frame $a^2$ permits the use of a very large steering-wheel, and this constitutes an important feature of my invention, as it not only facilitates the steering of the machine, but enables it to travel easily over rough and soft ground. The forward part of this circular frame is provided with a link, $m^5$, by which draft-power can be attached, if necessary or desired.

The operation of the machine is as follows: Steam being admitted into the cylinders from the boiler, the engine or crank shaft is revolved, thereby setting in motion the cranks and eccentrics thereon, and imparting motion to the connecting-rods or pitmen $k^2$ $k^2$, which in turn revolve the shaft K and the wheels $k^3$ and $k^4$, which in turn revolve the gears $h^6$ and $h^7$ on shaft H and impart motion to the bull-pinions $h'$ $h''$, which mesh with the internal gear-rings of the wheels I and propel the machine. The machine is a three-wheeled traction-engine, and is provided with two cylinders, and also with two sets of gearing, which are adapted to impart two different speeds and to be changed at the will of the engineer, as he desires to run fast or slow. The other parts of the machine or engine are familiar to those skilled in the art, and therefore need not be recited in detail herein.

The machine as a whole is simpler and more compact in its construction than previous machines of this class, and its arrangement of parts is such as to insure the utmost development of power and speed.

Having thus described my invention, what I claim as new therein is—

1. In a traction-engine, the combination of the main frame having the semicircular rear portion, the boiler secured thereto, and the curved or U-shaped axle passed around the rear side of the boiler and flexibly connected at its spindles to the frame, with the haugers engaging beneath the bottom of the boiler with their lower hooked ends, and slidingly connected to the axle at their upper ends, and the springs cushioning the vertical play of these hangers, as shown and described.

2. In a traction-engine, the combination of the main frame having the semicircular rear portion, the boiler secured thereto, the curved or U-shaped axle passed around the rear side of the boiler, the braces pivoted at their forward ends to the frame and secured at their rear ends to the spindles of the axle, the hangers engaging the bottom of the boiler with their lower hooked ends, and having their upper ends sliding vertically in the rear ends of the braces and connected above the same by caps, and the springs interposed between the caps of the braces and cushioning the hangers, as shown and described.

3. In a traction-engine, the combination of the main frame, the U-shaped axle surrounding the rear side of the boiler and having its bent spindle ends movably secured to the frame, the traction-wheels mounted upon the spindles of said axle and provided with cogged inner peripheries, and the driving-shaft journaled upon the frame and provided with the compensating gearing, and also with the bull-pinions at its ends engaging the cogs of said wheels, as shown and described.

4. In a traction-engine, the combination of the internally-cogged traction-wheels, the driving-shaft having bull-pinions engaging the cogs of said traction-wheels, the intermediate shaft

having gear-wheels engaging gear-wheels upon the driving-shaft and having crank-disks upon its ends, the engine or crank shaft having eccentrics upon its ends, and the connecting-rods or pitmen pivoted upon said eccentrics and crank-disks, as shown and described.

5. In a traction-engine, the combination of the main frame, the traction-wheels having internally-cogged peripheries, the yielding rear axle, the driving-shaft having bull-pinions engaging the said internally-cogged wheels, the intermediate shaft geared to said driving-shaft, the engine-shaft arranged forwardly of said intermediate shaft and driving-shaft, the connecting-rods for revolving said intermediate shaft, the engine-cylinders, and the piston-rods connecting with and revolving the engine-shaft, said engine-cylinders being supported from the main frame and arranged below said intermediate and driving shafts, as shown and described.

6. In a traction-engine, the combination of the main frame A, the curved axle C, the internally-cogged traction-wheels, the shaft H, provided with the compensating gearing, sliding sleeves and bull-pinions, the shaft K, mounted in front of shaft H, and provided with the gear-wheels $k^3$ $k^4$, and crank-disks $k'$ $k'$, the engine-shaft G, provided with the cranks and eccentrics, and the connecting-rods or pitmen, substantially as described.

7. In a traction-engine, the combination of the main frame A, the inclined bed-frame E, removably secured thereto, the cylinders mounted on said inclined bed-frame, and the shafts G, H, and K, arranged above said bed-frame, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

DE LA FAYETTE REMINGTON.

Witnesses:

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J. C. CLARK.