(No Model.) 4 Sheets—Sheet 1.

G. T. GLOVER.

LOGGING MACHINE.

No. 592,728. Patented Oct. 26, 1897.

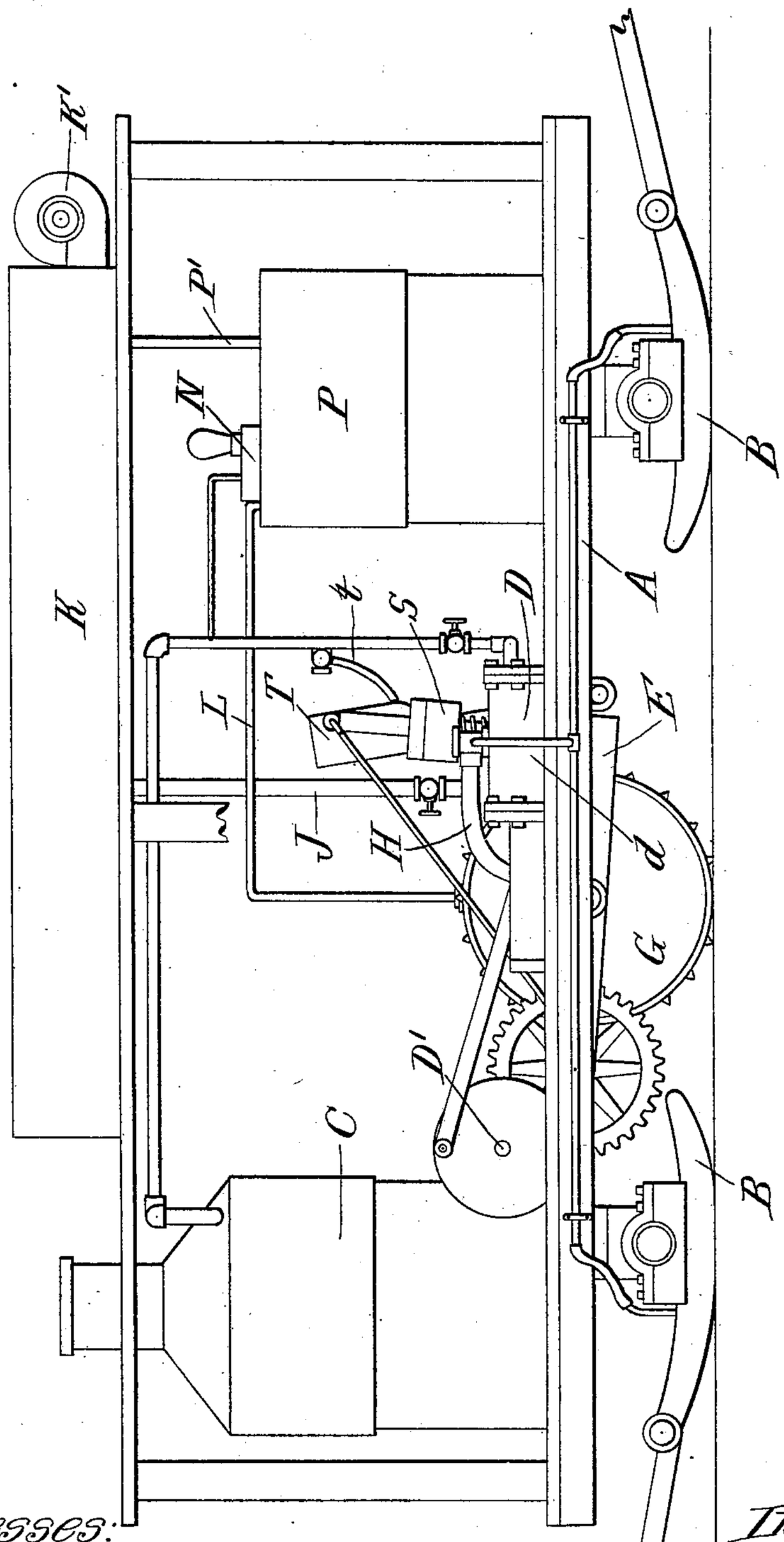

Fig. 1.

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Fig. 2.

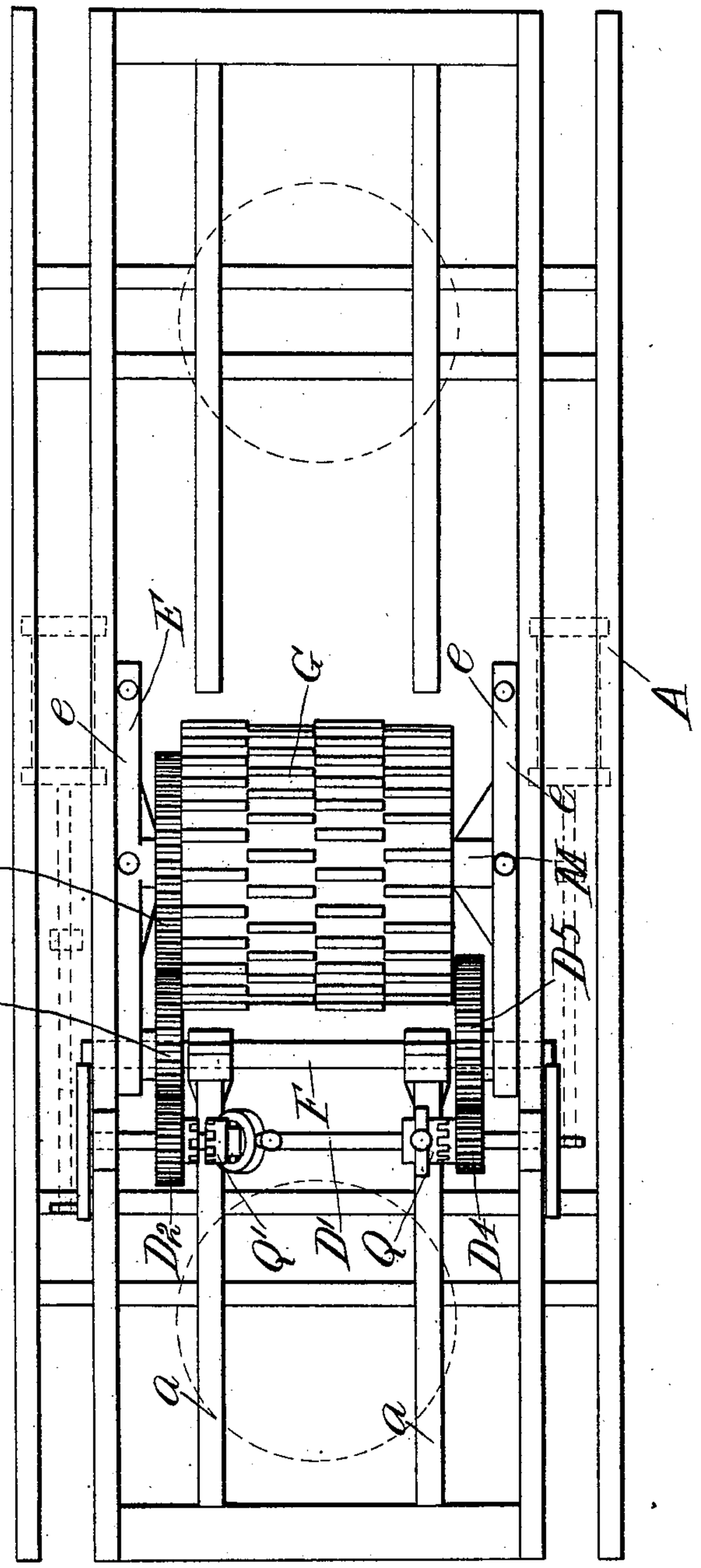

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Fig. 3.

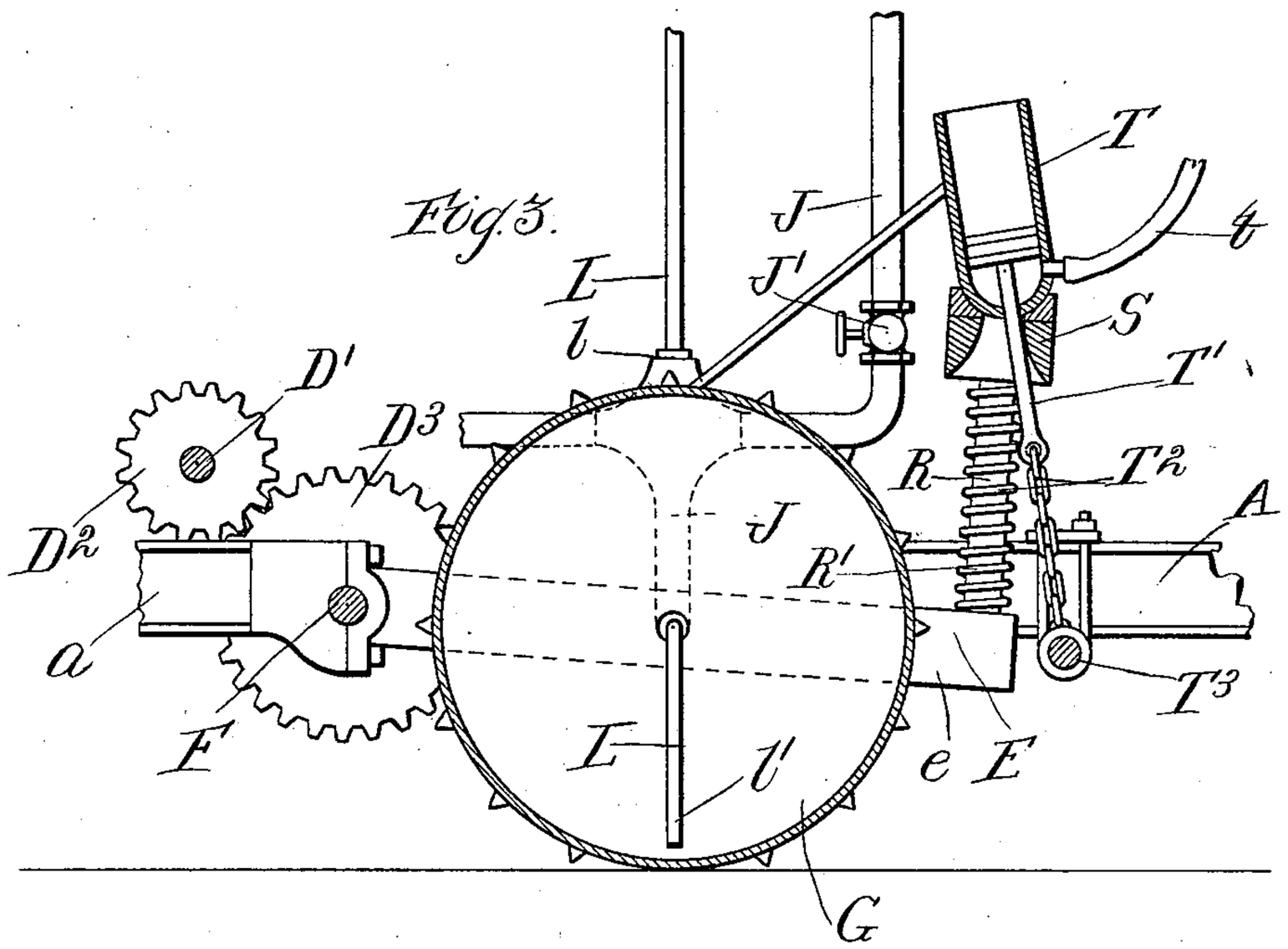
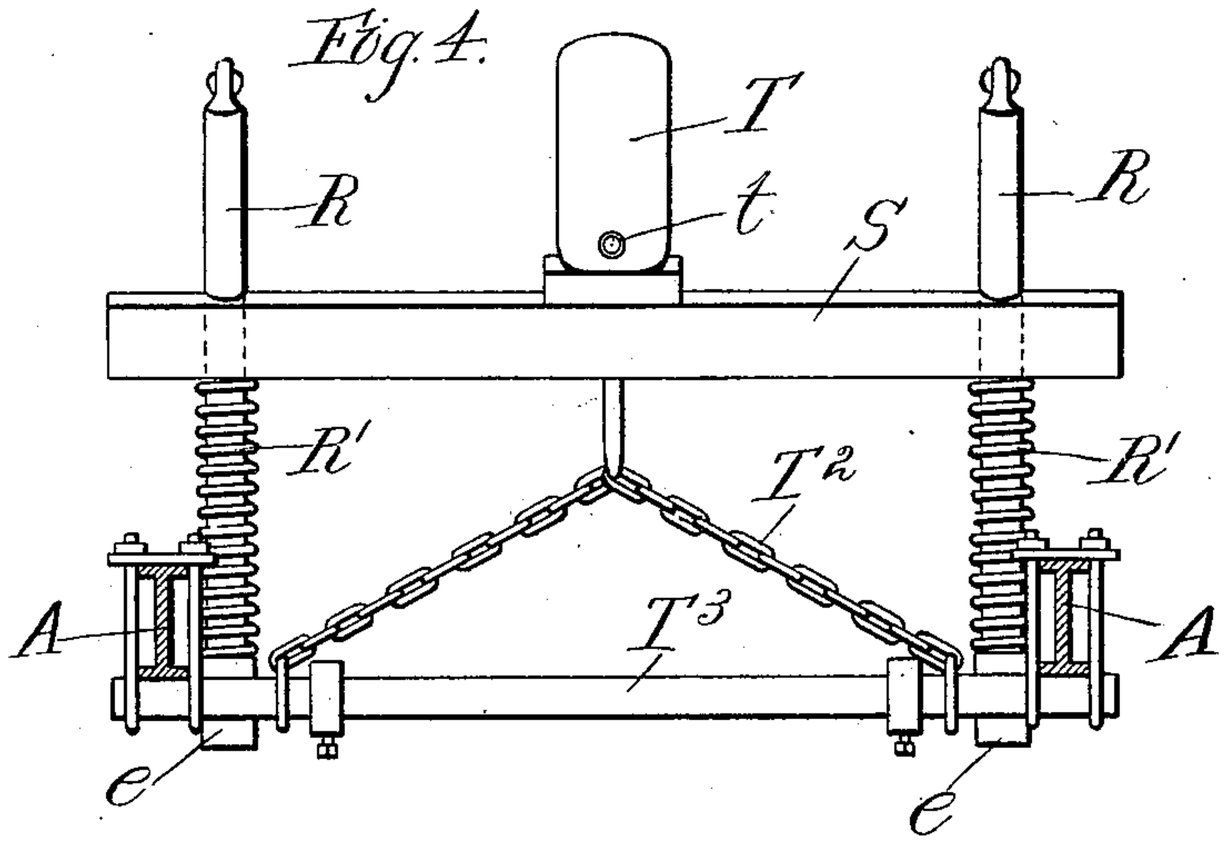


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

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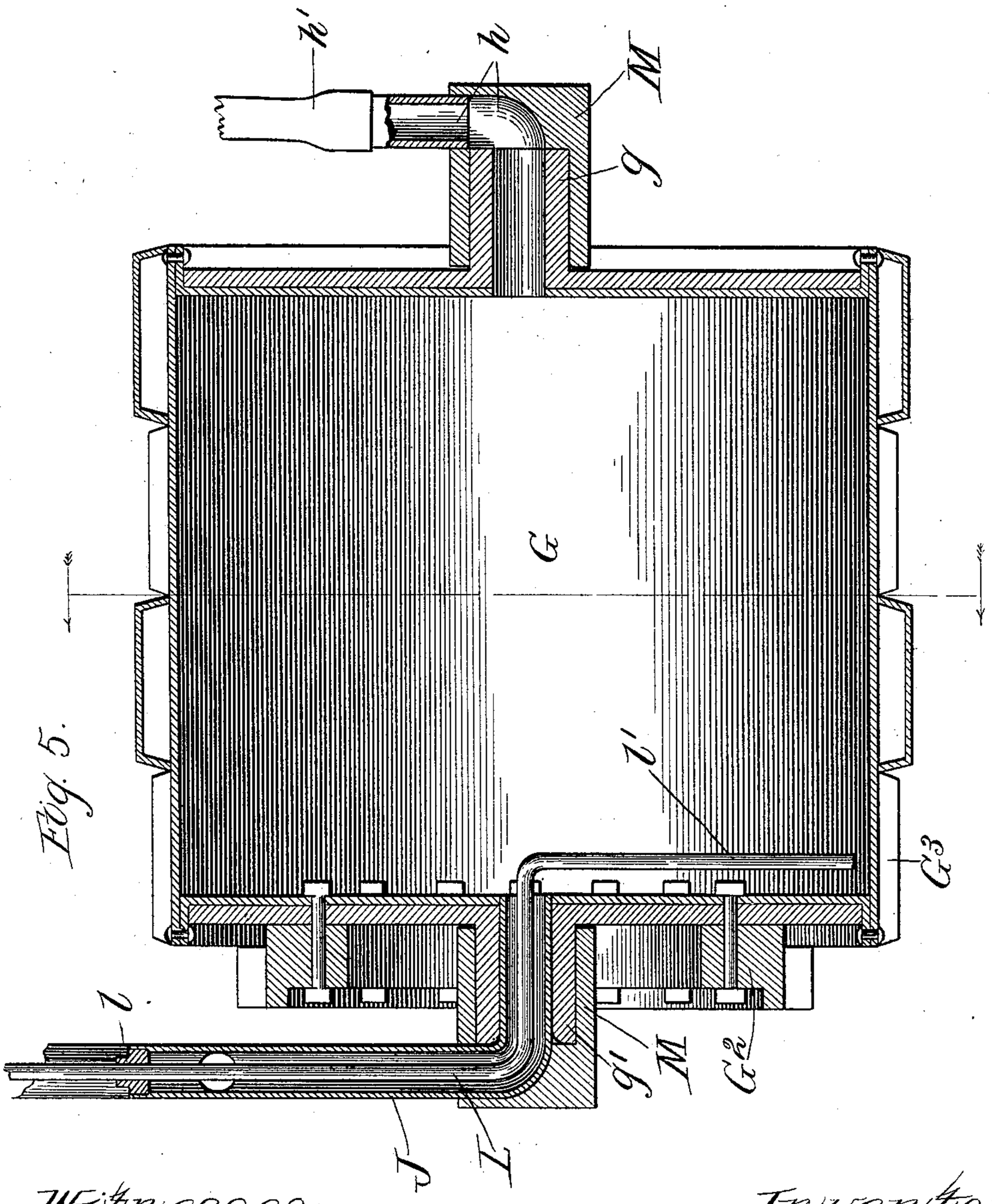

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE T. GLOVER, OF CHICAGO, ILLINOIS.

LOGGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,728, dated October 26, 1897.

Application filed August 10, 1896. Serial No. 602,242. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. GLOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Traction-Machines, of which the following is a specification.

My invention relates to traction machines or engines adapted for traveling over snow or ice roads, and involving a hollow or chambered traction-wheel, which is interiorly heated for the purpose of forming and maintaining such roads.

Prominent objects of my invention are to arrange for the thorough, economical, and effective heating of such hollow traction-wheel; to allow heated condensable vapors, such as steam, to be successfully and satisfactorily utilized for such purpose; to recover from the interior of the traction-wheel the products resulting from the condensation of such condensable vapors—such, for instance, as water; to devote the interior of the traction-wheel to useful purposes; to allow the tractive power of the wheel to be materially increased when the machine is in use without adding to its size, its real weight, or its cost of production, and at the same time to allow such tractive power to be varied in accordance with the requirements of the roads; to arrange for the maintenance of a continuous circulation of the motive fluid between the engine and the boiler which are usually employed for driving such traction-machines, and to provide certain matters of improved arrangement and construction tending to increase the efficiency of such traction machines or engines.

To the attainment of the foregoing and other useful ends I propose to allow the heated, spent, or exhausted vapors coming from the engine to be discharged into the hollow wheel and to condense therein, and to withdraw such products of condensation therefrom and return them to the boiler, the hollow traction-wheel being, to such end, constructed so that it can be utilized as a condensing-tank or reservoir for condensing such exhaust-vapors and for holding the products of condensation. By such arrangement, the exhaust from the engine is recovered, a continuous circulation of motive fluid is maintained without material loss between the boiler and engine, the interior of the wheel is utilized both as a condenser for the engine-exhaust and as a feed tank or reservoir for the boiler, and the additional effective weight which the condensed vapors give to the traction-wheel increases materially the tractive power of the latter, and such increased tractive power can be varied in accordance with the requirements of the roads by varying the extent of accumulation of the products of condensation within the wheel. Condensable vapors other than the exhaust of the engine could, of course, be discharged into the interior of the hollow traction-wheel, so as to gain the advantages of utilizing the same as a condenser and a tank or reservoir and of the increased tractive power which the added weight gives to the wheel; but I consider the previously-mentioned arrangement a matter of further improvement, for the reason that by it the spent or exhausted vapors, which are frequently wasted, are repeatedly recovered and returned again to the boiler.

In the accompanying drawings, Figure 1 is a side elevation of a tractor embodying my invention. Fig. 2 is a top plan of the same with certain parts omitted. Fig. 3 is a side elevation, on a slightly-larger scale, of the traction-wheel and its operating and supporting mechanism. Fig. 4 is an end elevation of the same. Fig. 5 is a vertical section of the traction-wheel and connection on a still larger scale, said section being taken on a plane passing through the axis of rotation of the wheel.

The engine-truck A can for certain purposes be mounted upon wheels, but as a special and preferred arrangement it is supported upon runners B. The engine-truck is shown as carrying a boiler C and steam-engine D, from which the traction propelling wheel or wheels can be driven. For the broader purposes of my invention, however, I may employ any variety of motor utilizing condensable vapors in its operation.

The frame or truck E of the propelling attachment is desirably situated between the ends of the engine-truck and has a hinge or pivotal connection with the same. As a convenient arrangement the truck E comprises the beams *e*, Fig. 3, and the ends of these beams are connected to the ends of the beams *a* on the engine-truck by means of the shaft or rod F, which extends between said beams.

The traction propelling-wheel G is arranged

between the beams *e* of the truck E and is adapted for a condensing-tank and reservoir. To such end the wheel is constructed hollow, as best shown in Fig. 5, and is tightly closed, so as to contain, without leakage, any fluid matter, either in a gaseous or liquid form, which may be discharged into it.

The exhaust-pipe H of the engine is connected with the interior of the wheel G, the hub *g* of the latter being provided with a bore into which fits the pipe-section *h*, which latter is attached by the flexible tubular connector *h'* to the exhaust-pipe H. The wheel G is provided with means for withdrawing the water formed by the condensation of the steam and is also desirably provided with means for permitting an excess of steam to pass out of the wheel. As a simple arrangement the other hub *g'* of the traction-wheel G is similarly bored, and a water-pipe L is extended within such bore and into the interior of the wheel and is connected with a suitable pump N, adapted for pumping water or the like from the wheel. The end *l'* of the pipe L, which is within the wheel, is desirably extended to substantially the bottom of the latter, whereby the wheel may be practically emptied by the pump. By such arrangement the water resulting from the condensation of the exhaust, which latter is discharged within the wheel for the purpose of heating the same, may be allowed to accumulate within the wheel and so add materially to its weight and tractive power, and such additional weight may be varied at will by pumping more or less of such water of condensation out of the wheel. By such arrangement also the interior of the wheel is utilized as a condenser for the exhaust-steam and also as a feed tank or reservoir for the boiler or for other purposes. The water removed from the traction-wheel could be returned directly to the boiler, but as a preferred arrangement it is discharged into a suitable supply-tank P, whence it is fed into the boiler as desired. The interposition of the supply-tank P between the traction-wheel and the boiler allows of an independent regulation of the water-level in the two latter.

Under some conditions all of the steam exhausted into the traction-wheel fails to condense therein, thus necessitating an outlet of some sort for the surplus steam. As a simple arrangement a steam-outlet pipe J, having a suitable valve J', is placed in communication with the interior of the traction-wheel and is extended upward to a supplemental tank K, which latter is conveniently arranged upon the roof of the machine. Said steam-outlet pipe J is conveniently fitted within the bore of the hub *g'* and outside of the water-pipe L, as best shown in Fig. 5, and emerges from the latter by way of a steam-tight joint *l*, (shown in Figs. 3 and 5,) the whole thus forming a neat and compact steam and water connection with the traction-wheel. By such arrangement any steam failing to condense within the traction-wheel passes upward through the pipe J and into the supplemental tank K, where it is condensed. By such arrangement also the flow of steam from the traction-wheel to the supplemental tank can be regulated at will, and can also be regulated so as to allow substantially all of the steam exhausted into the wheel to pass directly to the tank, it being observed that such latter operation is sometimes desirable, for the reason that the traction-wheel and the water contained therein occasionally become so hot that the incoming steam fails to condense satisfactorily or the water already produced fails to pump advantageously.

The supplemental tank K is provided with a fan or blower K', which is adapted to facilitate condensation therein, and is connected with the supply-tank P by means of a pipe P', whereby the water condensed in the tank K can flow into said supply-tank. By such arrangement, it being understood that the water is fed from the supply-tank P to the boiler C in any well-known or suitable way, a continuous circulation of steam or water is maintained between the boiler and the engine, and at the same time the heat contained by the exhaust-steam is economically and advantageously utilized in thoroughly and effectively heating the traction-wheel.

With reference to the connections between the pipes H and J and the traction-wheel, it will be observed that the hubs *g* and *g'* of the wheel work in boxes M on the traction propelling-truck and that the pipe connections are fitted tightly in these boxes, but have a swivel or loose connection with the wheel. Hence the latter is free to turn without causing a leakage of steam.

The traction-wheel G is connected with the main driving-shaft D' of the engine, the form of connection shown consisting of means whereby the wheel may be run at two different speeds. The gear-wheels D^2 and D^4 are mounted on the driving-shaft D' of the engine, said wheels being of different sizes, provided with clutches Q and Q', by which they may be caused to rotate with the engine-shaft or not. Mounted on the pivotal shaft or rod F are a couple of gears D^3 and D^5, gearing with wheels D^2 and D^4, respectively. The wheel D^3 gears with the gear-wheel G^2, constructed to turn with the traction-wheel G. Hence for one speed the clutch Q may be thrown in, as in Fig. 2, when the power will be transmitted to the traction gear-wheel G^2 through the intervening gears D^4, D^5, and D^3. For the other speed the clutch Q is thrown out and Q' thrown in, when the power will be transmitted through wheels D^2 and D^3.

The traction-wheel may be provided with teeth, if desired, as G^3, which may be arranged to communicate with the interior of the wheel.

It is sometimes desirable to provide means for increasing the tractive power of the propelling-wheel to a still greater extent. To such end I have arranged in connection with the

tilting propelling-truck a cylinder provided with a piston, said cylinder being adapted to receive steam from the boiler and to force the piston so that pressure will be exerted downward on the traction-wheel. In Figs. 3 and 4 the beams *e* of the propelling-truck E are shown provided with the upwardly-extending rods or bars R, which are inclosed by the coiled springs R'. Supported upon these springs is the beam S, which extends transversely across the truck between the rods R and which supports in turn the cylinder T. The piston-rod T' of this cylinder is securely fastened to the frame of the engine-truck by means of the chains T^2 and the intervening rod T^3. Obviously when steam is admitted to the cylinder, as by the pipe *t*, pressure will be exerted to lift the piston. The latter being securely fastened, however, the cylinder T is forced downward, thereby pressing the beam S against the springs and forcing the truck E downward. In order to increase the force of such downward pressure, the traction-wheel is connected to the truck E between the point of attachment of the latter to the engine-truck A and the point where the pressure is exerted.

The arrangement of a cooling or condensing tank or reservoir wheel may obviously be used for many purposes in addition to that already set forth. For instance, the interior of the wheel may be connected with the jacket surrounding the cylinder of a gas-engine or the like and water kept in circulation through the wheel and jacket by means of a pump, siphon, or other suitable apparatus, whereby the excessive heat of the cylinder is absorbed by the water in the jacket and dissipated when the water circulates in the wheel.

What I claim is—

1. In a traction-engine, the combination of a suitable source for supplying heated condensable vapors; a traction-wheel constructed with a chamber which is connected for receiving such vapors and is adapted to serve as a means of condensing the same as a result of the travel of the wheel over snow or ice roads, and adapted also to hold the products of condensation; and means for withdrawing the matters thus condensed from the chamber of said wheel, substantially as set forth.

2. In a traction-engine, the combination of an engine utilizing steam in its operation; a hollow traction-wheel connected for receiving into its interior the spent steam issuing from the engine; and adapted for condensing the same and for holding the water of condensation; and means for withdrawing such water from the interior of the wheel, as set forth.

3. In a traction-engine, the combination of a steam-actuated exhausting-engine; a hollow traction-wheel connected for receiving into its interior the exhaust from the engine, and adapted for condensing the same, and also for holding the water of condensation; and a pump for withdrawing such water from the interior of the hollow traction-wheel, as set forth.

4. In a traction-engine, the combination with a steam-boiler and a steam-utilizing engine, of a hollow traction-wheel connected for receiving the spent steam from the engine, and adapted for condensing the same and for holding the water of condensation; and a pump or the like arranged for withdrawing the water from the interior of the traction-wheel, and connected in circulating series between such wheel and the boiler, substantially as set forth.

5. In a traction-engine, the combination of means for supplying heated condensable vapors; a chambered traction-wheel connected for receiving such vapors into its interior; means for withdrawing therefrom the products of condensation; and condensing means connected with the wheel for receiving therefrom a surplus of uncondensed vapors, substantially as set forth.

6. In a traction-engine, the combination with a boiler and a steam-actuated exhausting-engine, of a hollow traction-wheel connected for receiving the exhaust from the engine; a pump for withdrawing the water of condensation from the interior of the traction-wheel; a boiler-supply tank arranged to receive such water from the pump; and a supplemental condensing-tank arranged to receive uncondensed steam from the traction-wheel, and connected for feeding the same, when it is condensed into water, into the supply-tank, as set forth.

7. In a traction-engine, the combination of the hollow traction-wheel constructed with a tubular hub; and a couple of pipes extending to the interior of the wheel and arranged one within the other, whereof the outer one is fitted within the bore of the tubular hub, as set forth.

8. In a traction-engine, the combination with a liquid-containing traction-wheel of a pump or the like connected for removing the liquid therefrom, as set forth.

9. The combination, in a tractor, of the traction-wheel supported in a tilting frame; and a pressure device arranged to exert a downward pressure on the tilting frame, the point of connection of the wheel and tilting frame being between the points of attachment of the tilting frame with the body of the tractor and with the pressure device, as set forth.

10. The combination, in a tractor, of the traction-wheel supported in a tilting frame; and a pressure-cylinder having its piston secured to the body of the tractor, and arranged to exert a downward pressure on the tilting frame by reason of the unyielding connection of the piston, the point of connection of the wheel and the tilting frame being between the points of attachment of the tilting frame with the body of the tractor and with the pressure device, as set forth.

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