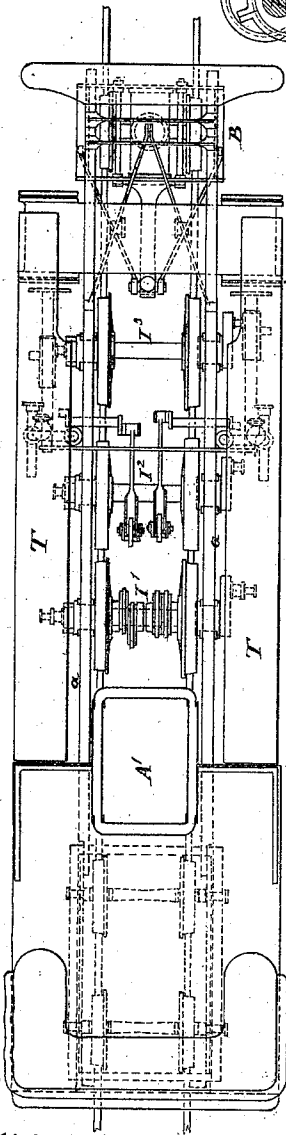


W. S. HUDSON.
Locomotive-Engines.

No. 133,859. Patented Dec. 10, 1872.

2 Sheets--Sheet 1.

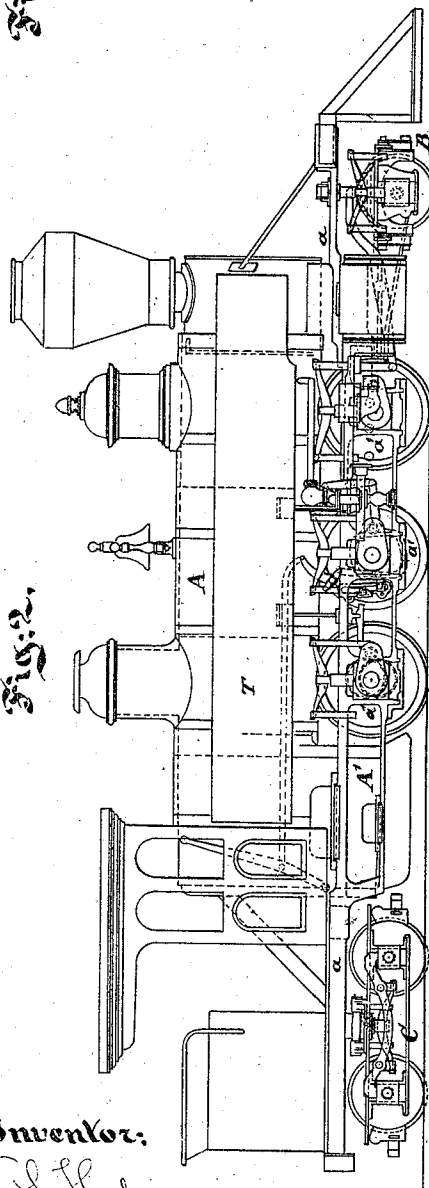
Fig. 1.



Witnesses:

A. Hermann.
W. Dey.

Fig. 2.



Inventor:

W. S. Hudson
by his attorney, T. S. Stearns

Fig. 3.

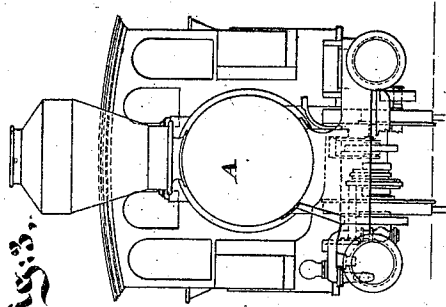
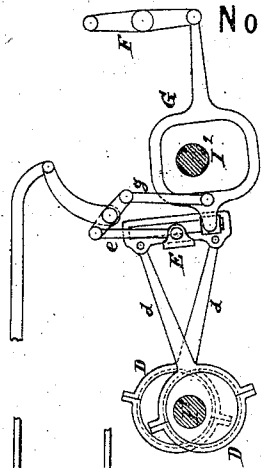


Fig. 4.



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Fig:4.

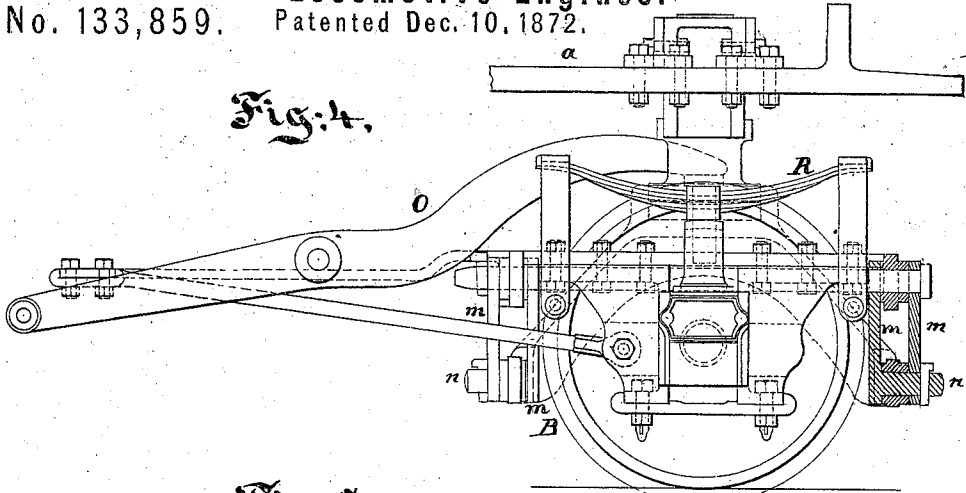


Fig:5.

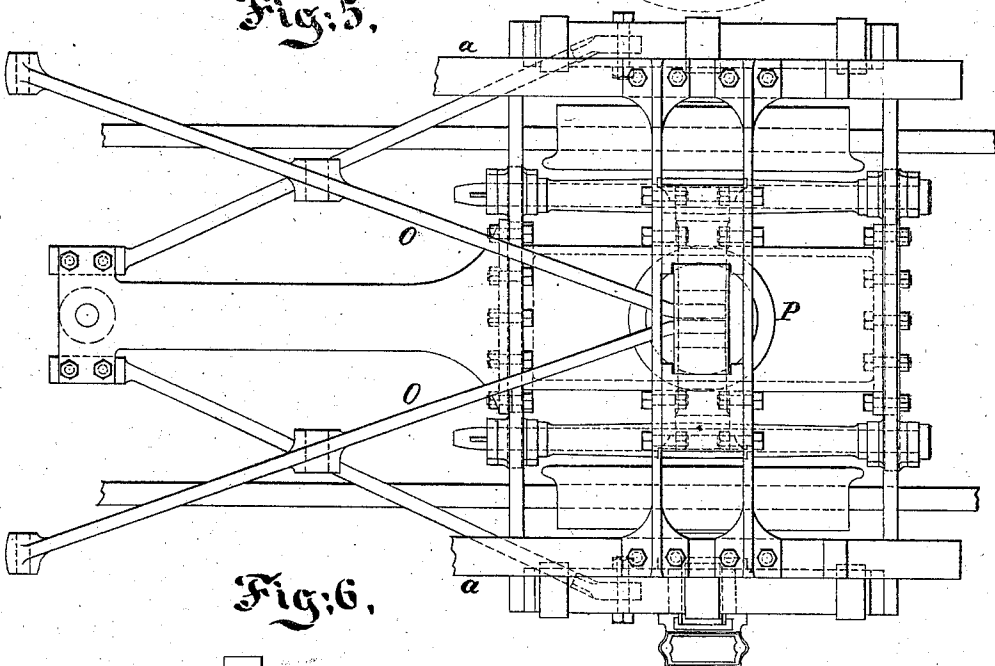
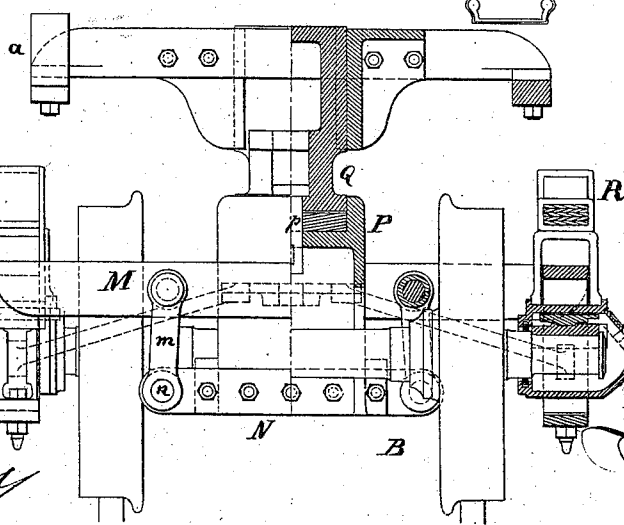


Fig:6.



Witnesses:

A. Hornum.
W. C. Dey

Inventor:

W. S. Hudson
by his atty,
J. S. Stetson

UNITED STATES PATENT OFFICE.

WILLIAM S. HUDSON, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN LOCOMOTIVE-ENGINES.

Specification forming part of Letters Patent No. 133,859, dated December 10, 1872.

To all whom it may concern:

Be it known that I, WILLIAM S. HUDSON, of Paterson, Passaic county, New Jersey, have invented a certain Improvement in Locomotive-Engines, of which the following is a specification:

The invention is more particularly intended for very narrow-gage locomotives. It allows the boiler to be kept as low down as the diameter of the driving-wheels will admit, with a low center of gravity of the whole structure; it allows the furnace to be made as wide as is necessary without distorting the engine-frame; brings all the bearings outside of the wheels; allows the use of swing-links with the trucks at each end, with all the lateral play required; and, in short, admits of making a reasonably-large engine, adapted for narrow-gage roads, to run equally well, either end first, around curves of short radius.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a plan view, showing the working parts, with the barrel of the boiler and the upper works removed; Fig. 2 is a side elevation complete; Fig. 2^a is a side elevation of certain details detached, on a larger scale; Fig. 3 is a front elevation, the right-hand side showing the work at the extreme front and the left-hand side showing the work a little further back; Figs. 4, 5, and 6 show certain portions on a larger scale; Fig. 4 is a side elevation, partly in section, of the forward half-truck and the adjacent parts; Fig. 5 is a plan view of the same; and Fig. 6 is a front view, partly in section, showing the same parts.

Similar letters of reference indicate corresponding parts in all the figures.

The drawing represents the novel parts with so much of the ordinary parts as is necessary to indicate their relations thereto.

A is the boiler, and *a a* the frames, which extend along each side to perform their ordinary functions of connecting and supporting the several parts. The driving-wheels have outside bearings *a' a'*, and the fire-box A' fills the entire breadth across between the frames *a a* in rear of the driver. This throws a

large proportion of the weight on the rear end of the structure, which I support by a rear truck under an extension of the frames. It gives the advantage of a wide furnace with a narrow-gage engine and with straight frames. I provide a two-wheeled truck, B, at the forward end of the structure, connected by links to allow lateral motion, and pivoted to the locomotive by means of a triangular frame extending rearward, forming what is sometimes called a Bissell half-truck. I extend each frame, *a*, rearward, either in a single piece or by splicing and firmly bolting, so as to make rigid connections and form a support in the rear of the furnace by a four-wheeled truck, C, with long swing-links for lateral motion. It may be practicable, by proper connections, to guide this rear truck, an arm extended forward and pivoted to the locomotive making it a Bissell truck; but I have not so represented it. It is in this example self-guiding.

The valve-motion is of the character known as the Allen link, the link being raised while the connection between it and the valve-stems is moved in the opposite way.

The eccentrics are marked D D, and are keyed on the axle I¹ of the hinder driving-wheels. The links E, worked by the eccentric-rods *d d*, are mounted a little in rear of the axles I² of the middle driving-wheels, and held up by suspension-links *e e*.

The valves and valve-stems may be of an ordinary description, and are omitted to avoid confusion. Yoke-formed connections G extend forward from the link-blocks to the proper arms of the rock-shafts F. Their rear ends are held up by suspenders *g g*, connected to arms opposite to those which hold up the other set of suspenders *e e*. These connections G loosely embrace or pass astride of the axle I² of the middle drivers. The yokes therein are large enough to allow of the play necessary both forward and backward and upward and downward without touching the axles I². Thus the rock-shaft is mounted over the space between the forward drivers I³ and the middle drivers I², and the links E in the space between the middle drivers I² and the rear drivers I¹.

A portion of the water is carried in a rear tank on the hinder extension of the frames *a a*.

Other and large portions are carried in side tanks T T, the weight of which latter bears entirely on the driving-wheels, as will be understood.

The driving-wheels equalize between themselves and the forward trucks by a system of equalizing-levers extending along the sides and connecting by a cross equalizing-lever just behind the cylinders to a single central equalizing-lever which reaches forward to the half-truck B.

On a narrow-gage railroad, instead of, as usual, presenting a confined space within the narrow base for the several mechanisms, my arrangement allows ready access to all the parts for oiling and repairs.

The construction of the front truck B involves some peculiarities to which I attach importance, inasmuch as they provide space for all the lateral motion desired, with a wide distance between the points of suspension of the swinging supports. I suspend the weight of that portion of the locomotive to the truck by means of links *m*, which depend from the main-truck frame M at the widely-spread points shown. There are two of the links, *m*, at each of the points of suspension, one inside and the other outside of the frame M. The lower end of each pair carries a short pin, *n*, which supports a stout cross-piece, N, bolted to or forming a part of the center casting P, which latter receives the weight through the two oblique equalizing-levers, O O. The casting P is high enough in the middle to clear the axle, but extends down at the front and back to hold the cross-pieces N at the proper level.

The truck-frame M is supported upon the boxes through the medium of springs R. The king-pin *p* is adapted to rise and sink in suitable guides Q in the main frame of the locomotive.

The suspending-links *m* may be longer or shorter, according to the freedom desired for such lateral motion. They can swing across the path of the wheels without touching, and may be suspended nearly as wide apart as the whole gage of the track.

I claim as my invention—

1. The fire-box A', extended across the whole width of the driving-wheels, with the frames *a*, outside bearings *a'*, and the rear truck C, all arranged substantially as and for the purposes herein specified.

2. The three or more pairs of driving-wheels *I*¹ *I*² *I*³ and the link mechanism D E G, combined and arranged as herein specified.

3. The duplicate swing-links *m*, one of each pair arranged outside and the other inside of the truck-frame, in combination with the parts M and N, constructed and operating as specified.

4. The center casting P and cross-bars N in the half-truck B, arranged relatively to the outside bearing truck-frame and widely-spread swing-links *m*, as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 17th day of September, 1872, in the presence of two subscribing witnesses.

WM. S. HUDSON.

Witnesses:

THOMAS D. STETSON,
WM. C. DEY.