

W. S. HUDSON.
Improvement in Locomotives.
No. 129,231.
Patented July 16, 1872.

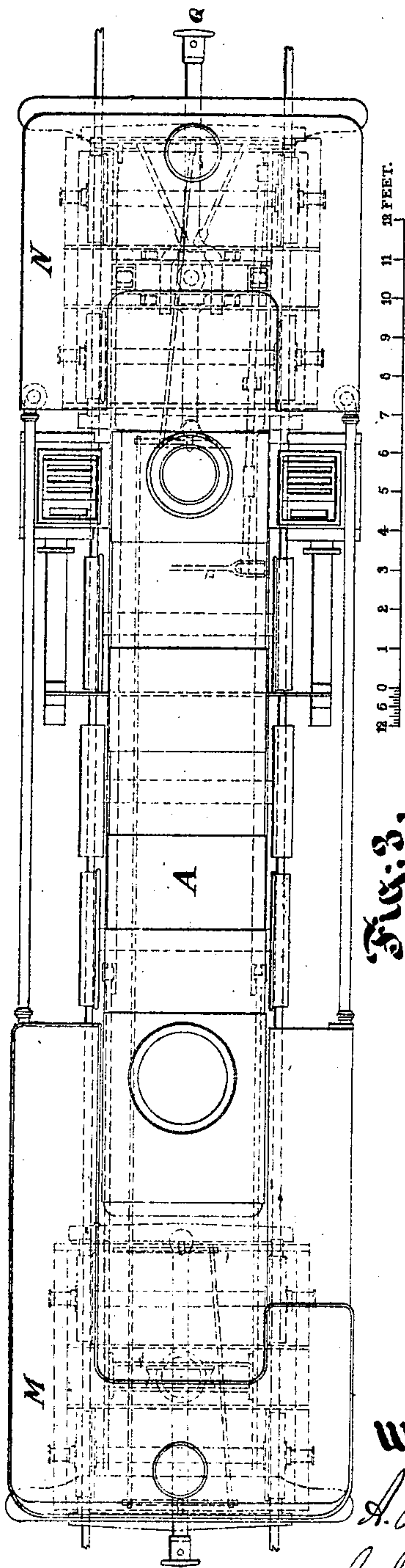


Fig. 3.

Witnesses,

A. Hoernum.
C. C. Livings.

Inventor,

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

Fig. 1.

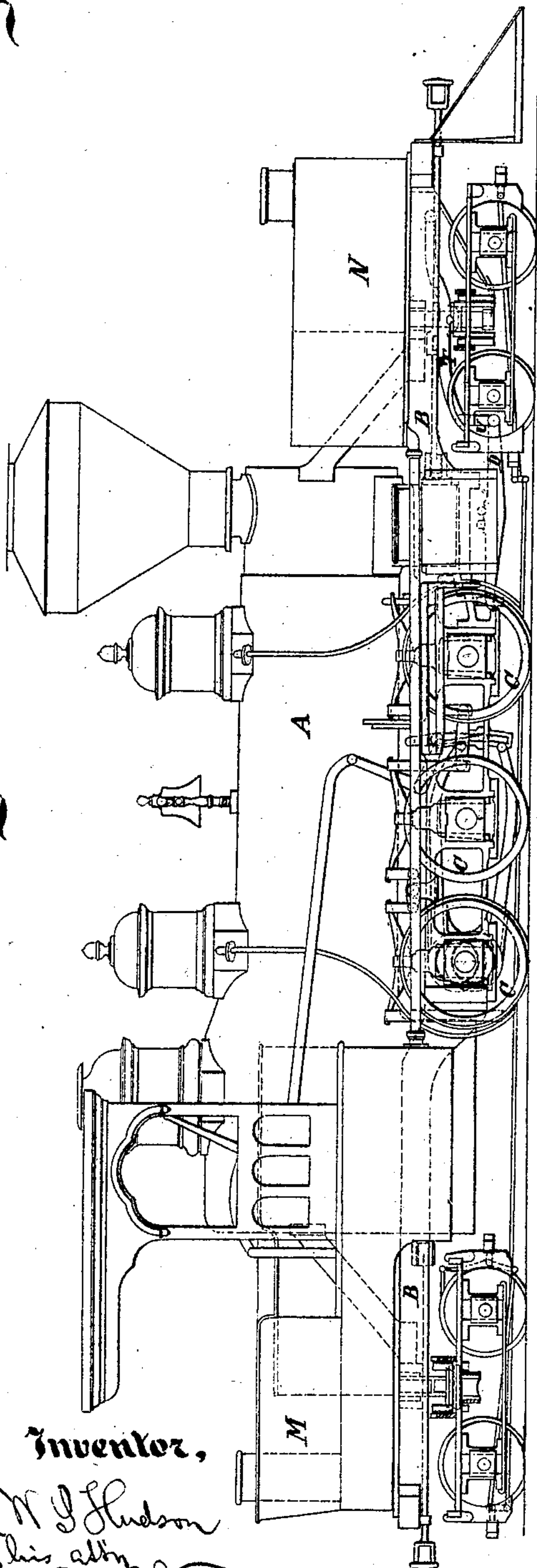
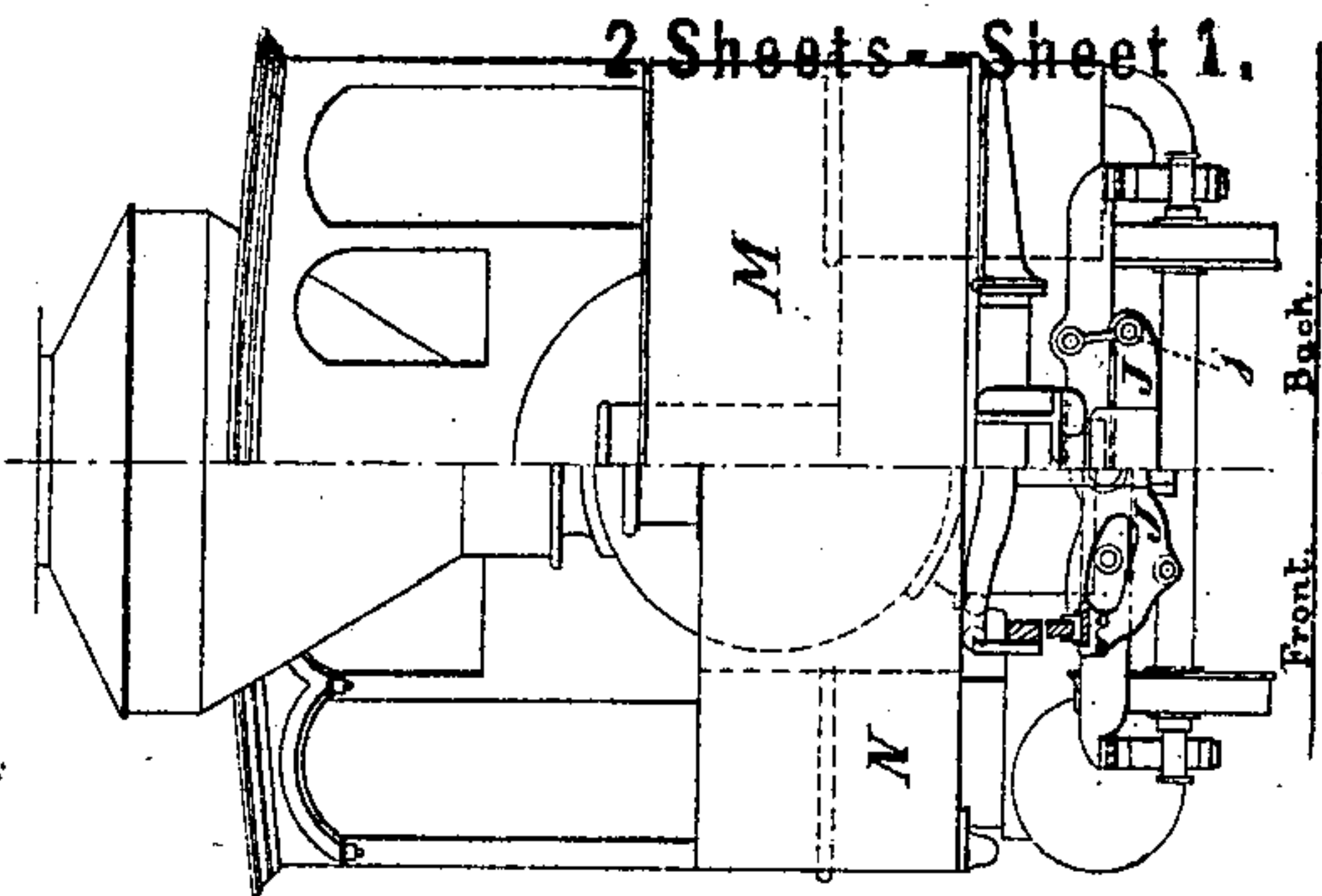


Fig. 2.



2 Sheets - Sheet 1.

W. S. HUDSON.

2 Sheets--Sheet 2.

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Fig: 4.

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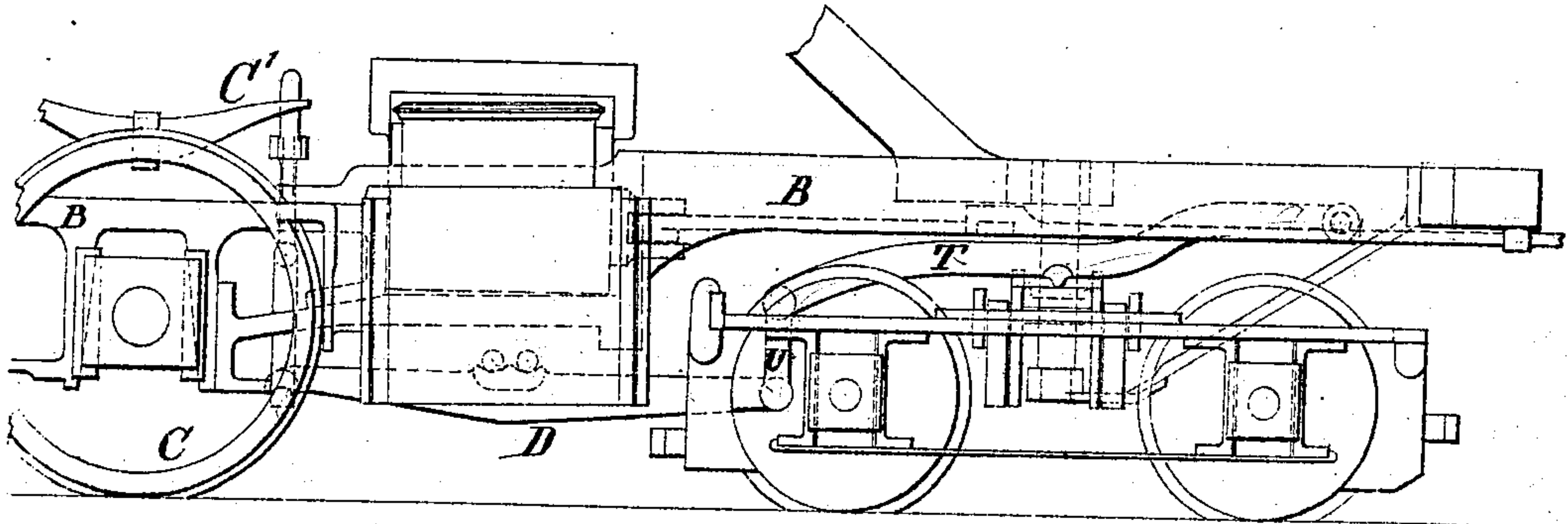


Fig: 5.

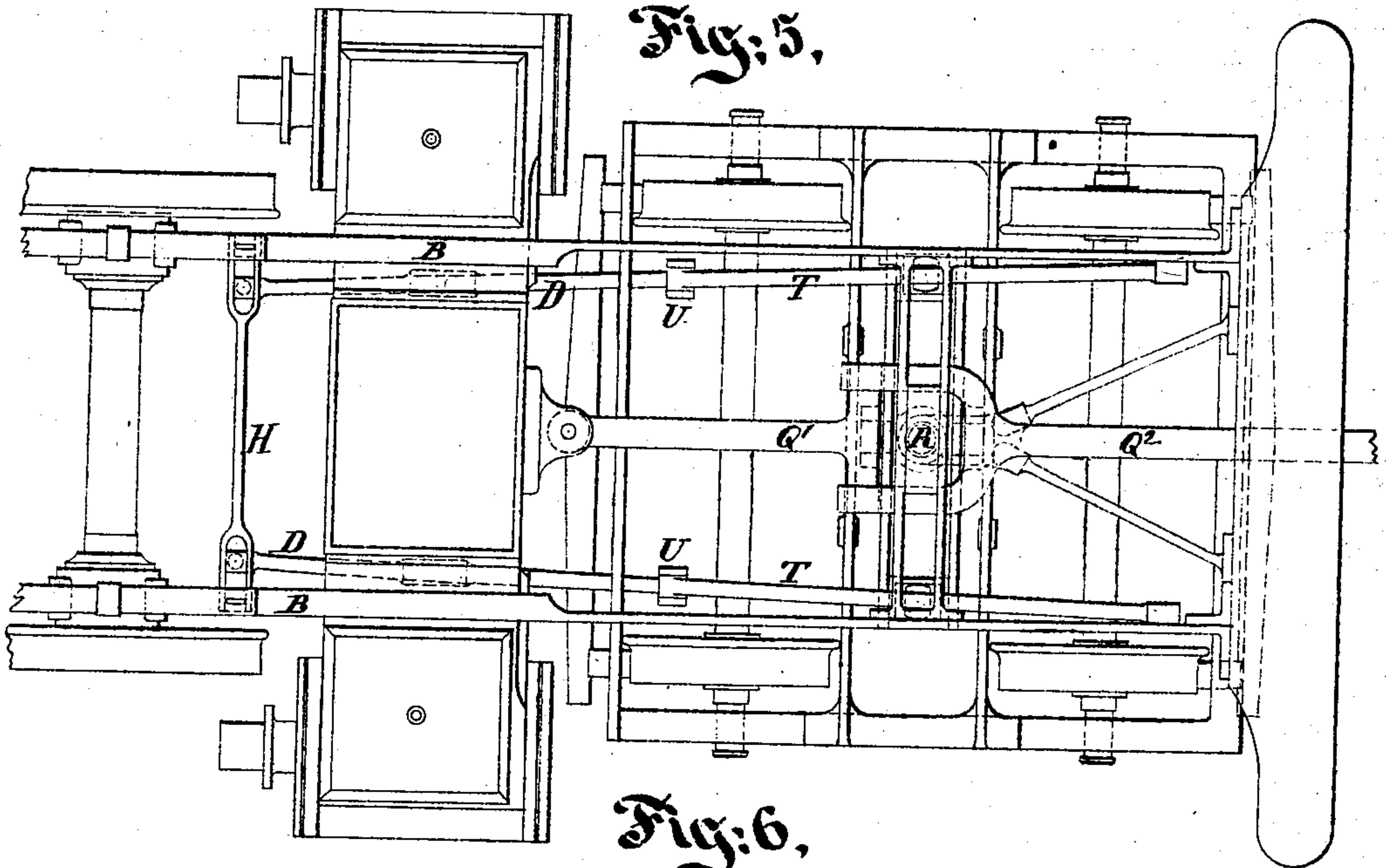
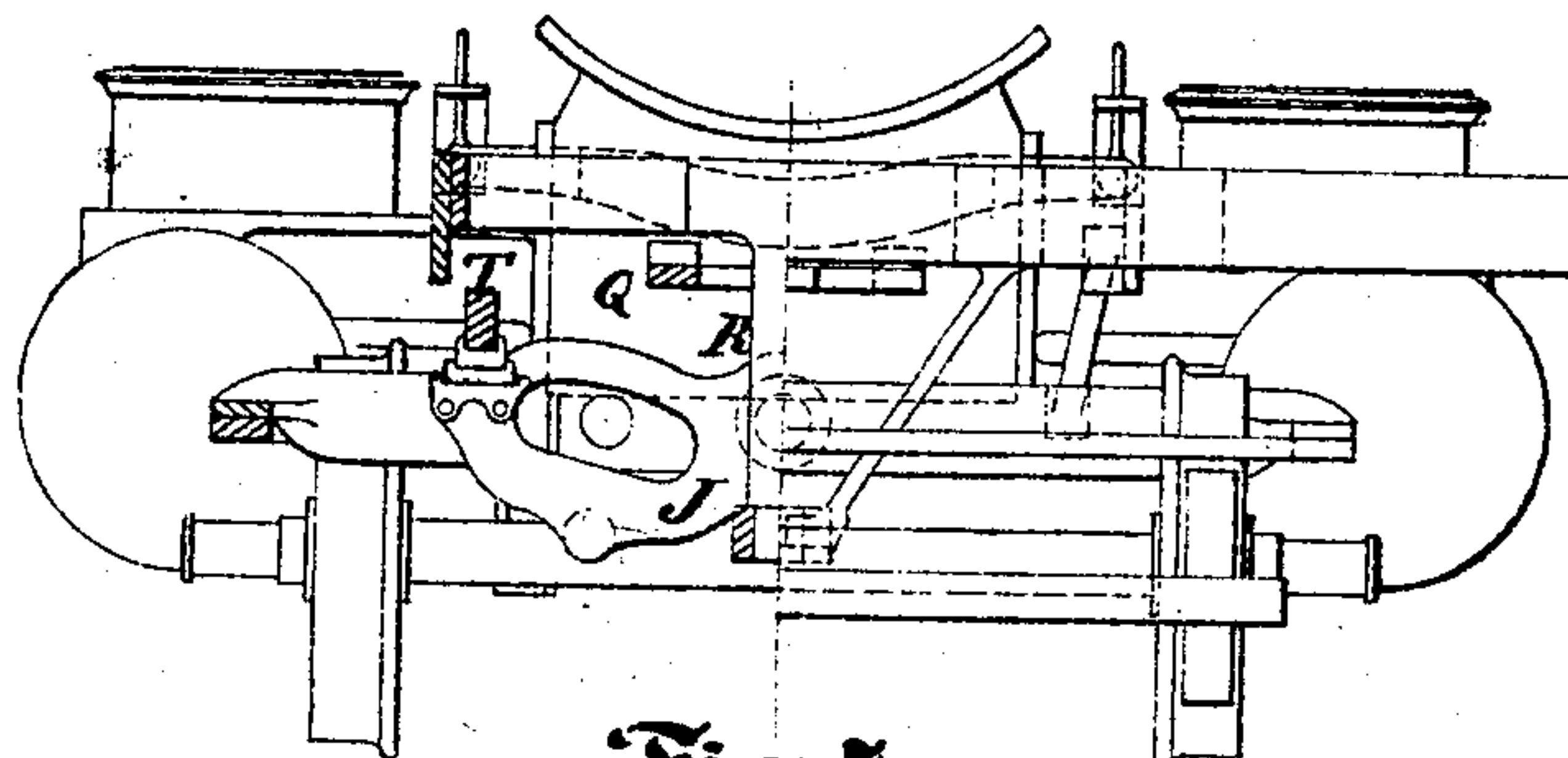
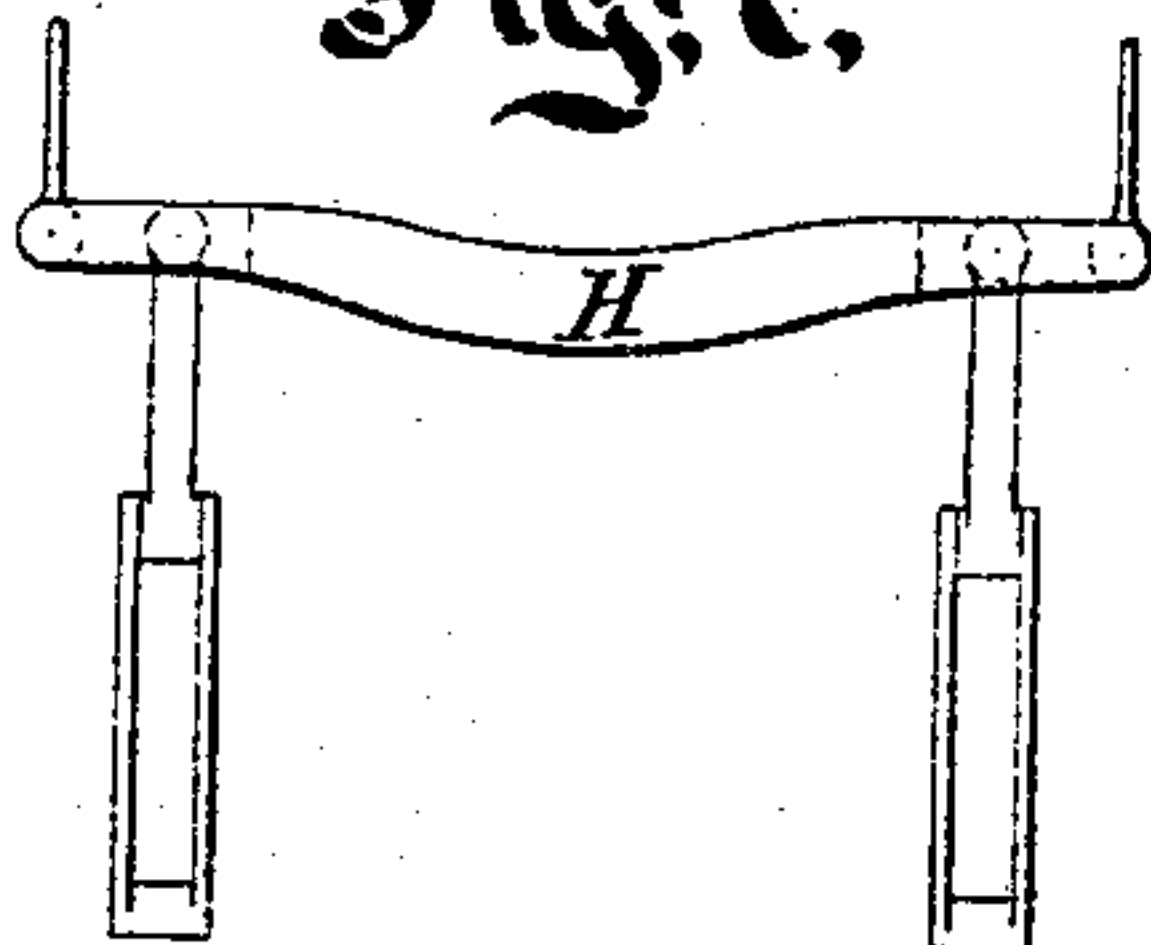


Fig: 6.



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Fig: 7.



Witnesses,
Arnold Hoernum.
C. C. Livings

Inventor,
W. S. Hudson
By his attorney, J. J. Stetson

UNITED STATES PATENT OFFICE.

WILLIAM S. HUDSON, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN LOCOMOTIVES.

Specification forming part of Letters Patent No. 129,231, dated July 16, 1872.

Specification describing certain Improvements in Locomotives, invented by WILLIAM S. HUDSON, of Paterson, in the county of Passaic, in the State of New Jersey.

A rigid frame is extended rearward and made to support or form a part of the tender. It is also extended forward and made to support a tank at the front. There is a truck under the tender or extension at the rear, and another under the extension at the front, each of which is adapted to both swivel and move from side to side. The fire-box of the locomotive is overhung behind the rear of the drivers and is thus supported between the drivers and the truck at the rear. There are equalizing-levers, distributing the shocks between the driving-wheels and the truck, at the front.

The invention relates, first, to the front tank and laterally-moving truck under the same in their relation to each other and to the frame and body of the locomotive; second, to the mounting of a tank for water on each end of an extended framing rigidly connected to the body of the locomotive; and third, to the system of equalizing-levers extended outward, and including the support of one or both such tanks.

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 side elevation of the entire structure. Fig. 2 shows a half front and half rear elevation at a single view, the two sides being symmetrical; the single view is equal to a complete front and complete rear view; the left side represents the front. Fig. 3 is a plan view of the principal parts—the cab, smoke-pipe, sand-box, bell, steam-chests, and some of the levers and pipes are omitted. The remaining figures represent some of the work at the front on a larger scale. Fig. 4 is a side elevation. Fig. 5 is a plan view. Fig. 6 is an end elevation, partly in section. The right-hand side is an elevation from the front. The left-hand side is a vertical section in the plane just forward of the swing-beam; and Fig. 7 is a front view of what I term a partial cross-equalizer and its immediate connections detached from the other parts.

It will be understood that any part not here shown may be formed and connected in any ordinary or suitable manner.

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

A is the boiler and its fixed attachments, which may be in the ordinary form. B is a rigid frame-work, extended rearward to support a tank and the provisions for carrying fuel; and also extended forward to support another tank. A portion of the water supply is intended to be carried at each end of the machine, as will appear further on. There are three pairs of driving-wheels, marked C C C; the forward and rear pairs are flanged and form the guiding-wheel base. The frame B B extends along on each side of the structure, and performs its ordinary functions of properly sustaining the several working parts. It also extends forward and backward beyond the ends of the boiler, so as to perform other and unusual functions. These extensions may be the same piece of metal or several pieces firmly bolted; but it is important that they be strongly and rigidly connected, so that the whole shall form one firm carriage. A four-wheeled truck turning on a swiveling-pin or king-bolt is provided at each end with provisions for allowing the truck to both swivel and move laterally by means of a swing-beam. What I term the swing-beams are marked J, and the links j, which suspend them, allow the trucks to move to one side and the other in passing inequalities in the track, and allow the ends of the main body of the structure to stand over on one side or the other of the truck, as required in describing curves. The provisions for swinging and swiveling may be identical at each end with the means described for the truck of the ordinary locomotive in the patent issued to A. F. Smith, dated February 11, 1862.

In taking a supply of fuel or water all the fuel must be taken on the rear portion, which corresponds to the tender proper. A portion of the water required is stored in the tank M provided there; but more of the water is received in the forward tank N. Pipes, not represented, are provided for connecting either or both tanks at will to the feed-pump, or equivalent means for forcing the water into the boiler. As the water is consumed in the boiler in

the progress of the work, the engineer, by turning proper cocks, not represented, supplies the water to the pump from the forward or hinder tank at pleasure; and thus he can keep the long structure very equally loaded at each end; or if, from any reason, it be judged expedient to run with either end lighter, the water can be taken more rapidly from that end.

D D are equalizing-levers, extending fore and aft under the smoke-box, and serving to equalize between the forward truck and the forward drivers. Their rear ends bear on a partial cross equalizing-lever, H, which bears on the forward ends of the springs of the forward drivers. The several drivers equalize among themselves by an arrangement which is very clearly set forth in the drawing—that is to say, there is an equalizing-lever on each side—which equalizes between the front drivers and the middle drivers, and an equalizing-lever on each side further back, which equalizes between the middle drivers and the rear drivers. The arrangement of the springs and their actions on the equalizing-levers may be of the ordinary character.

The system of equalizing-levers employed at the front end of the structure forbid the boiler and the entire structure to incline to either side—in other words, it affords side-bearing supports. The hinder truck is centered and is not connected by equalizing-levers to the other work. The center R, through which the weight is transmitted from the forward end of the framing B to the swing-beam J of the forward truck below, is of small diameter, as represented. It must necessarily be central, and it is highly important that the draw-bar, by which the hauling is effected when the engine is running backward, shall extend past this point and be also exactly central. I overcome the difficulty by making the draw-bar Q with a yoke which loosely surrounds and incloses the center-pin or post R without touching it. The draw-bar is made in two parts, Q¹ and Q². The forward end Q² is forked, as shown, and two stout branches extend rearward past the center R, at a considerable distance therefrom, so as to allow all the freedom of motion which is ever required. The rear portion Q¹ of the draw-bar is made with a T-end, and the ends of the T or cross part are let up into recesses in the base of the branches of Q², as indicated in dotted lines in Fig. 4. The rear ends of the branches or forks are thickened to afford increased strength at this point, and the parts may be kept properly locked together by small bolts or other ordinary means, not represented.

It will be observed that both the forward and hinder trucks are four-wheeled and are entirely free or self-guiding, except as they are constantly drawn toward the center line of the locomotive by the action of the links j, through which the weight is transmitted thereto. There may be radius-bars, as described in the patent to Levi Bissell, of 1857; but I do not esteem them essential. On the

contrary, the flexibility of the entire structure, due to the trucks being free to move laterally, and being guided only by the rail, I consider an advantage in this long structure, owing to its easy self-acting adaptation in traversing reversed curves and switches.

The construction and arrangement of the system of equalizing-levers at the front deserves a special and minute description. The bearing points of the system upon the front truck, and which have the effect to throw upon the truck its proper share of the load, are at each side, near the ends of the swing-beam J. These bearings allow their shoes or supports to move forward and backward under them as the truck swivels, and provide for the slight rocking required by means of V-shaped pieces t, shown at or near the centers of the longitudinal levers T. The latter are crooked in the vertical plane, as shown in Fig. 4, and extend in nearly parallel positions fore and aft, as shown in the horizontal plan, Fig. 5. They bear upward at their forward ends on suitable bearing-joints, as shown under or within the main framing B. They also draw upward at their rear ends on links V, which connect them to the forward equalizing-levers D D. These latter levers, having their fulcrums under the forward end of the smoke-box, receive and support the weight of the locomotive efficiently at those points, and transmit the load and the shocks forward and backward, between the several other levers and springs, in a manner analogous to the ordinary well-known equalizing-levers. But the action of these equalizing-levers is peculiar in being partially equalized across from one side to the other, though not entirely. The cross-bar H serves as such partial cross equalizer. The levers D D stand considerably within the framing B, and they are thus connected to the cross-lever H at points considerably nearer the center than the bearing-springs C', which are over the forward driving-wheels. It follows that any shock received by the forward truck-wheels, and transmitted through the levers T and D to the cross-lever H, is felt to some extent by the springs on each side of the locomotive. But it is felt much more by those springs on the side of the locomotive where the shock is received. The system at the front of the entire structure is essentially a side-bearing system of supports. The partial equalizing across, due to the construction and arrangement of the lever H, does not defeat this end. The support at the rear of the entire structure is essentially and literally a center-bearing. The locomotive, therefore, rides over any twisted or irregular portion of the track in the long-approved manner due to the supporting of the locomotive on substantially three points—side-bearings at the one end, and center-bearing at the other end.

I claim as my invention—

1. The combination, with a locomotive, of a front tank, N, carried on a laterally-moving

truck, and connected by a rigid frame, B, common to both the locomotive and the tank, constructed and arranged substantially as specified.

2. The rigid frame B, extended both in front and in rear of the boiler, in combination with a tank mounted upon, and a laterally-moving truck under, each extended end, as herein specified.

3. I claim the levers D D and T T with the links V and the partial cross equalizing-lever

H, arranged relatively to each other and to the body of the locomotive, and laterally-moving truck supporting the extended end of the framing B, as herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

WM. S. HUDSON.

Witnesses:

ARNOLD HOERMANN,
C. C. LIVINGS.