

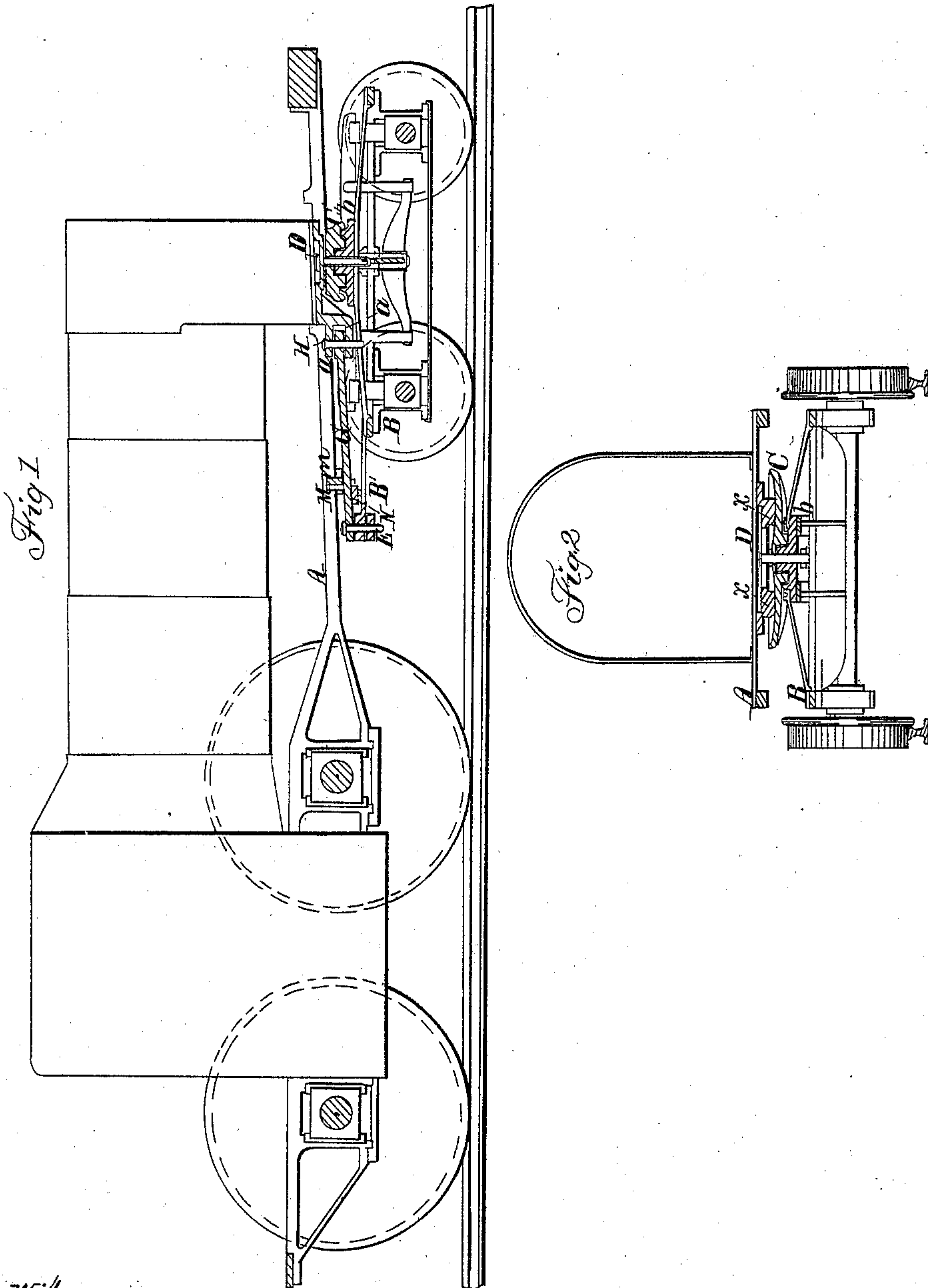
W. S. HUDSON.

Car Truck.

2 Sheets—Sheet 1.

No. 42,193.

Patented Apr. 5, 1864.



Witnesses,
Thomas D. Stinson
W. Henderson

Inventor;
William S. Hudson

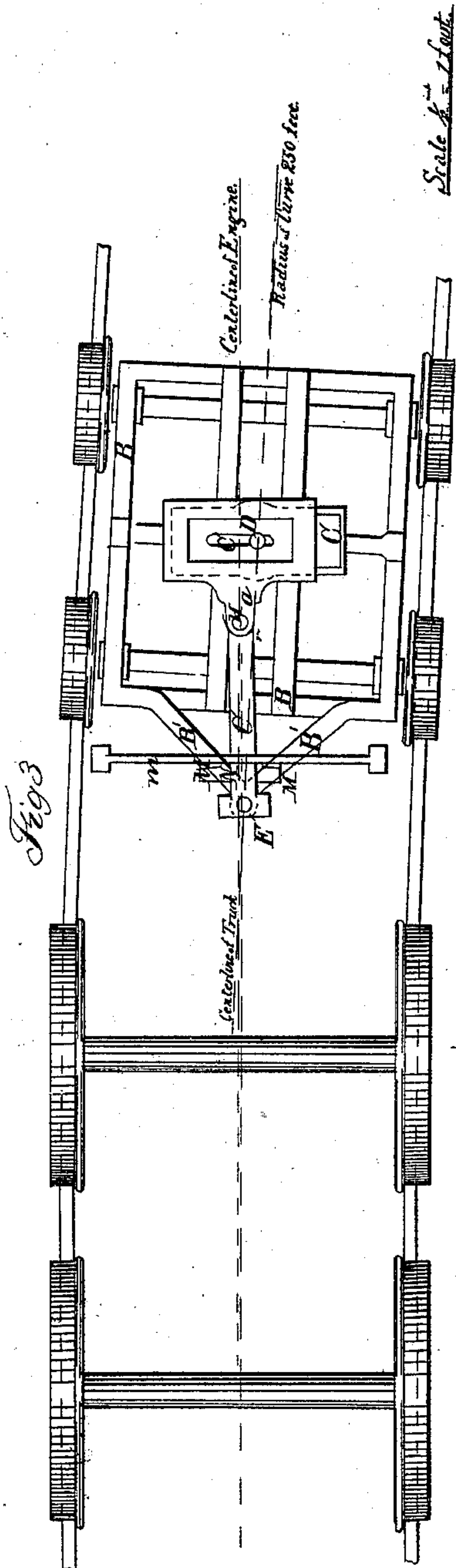
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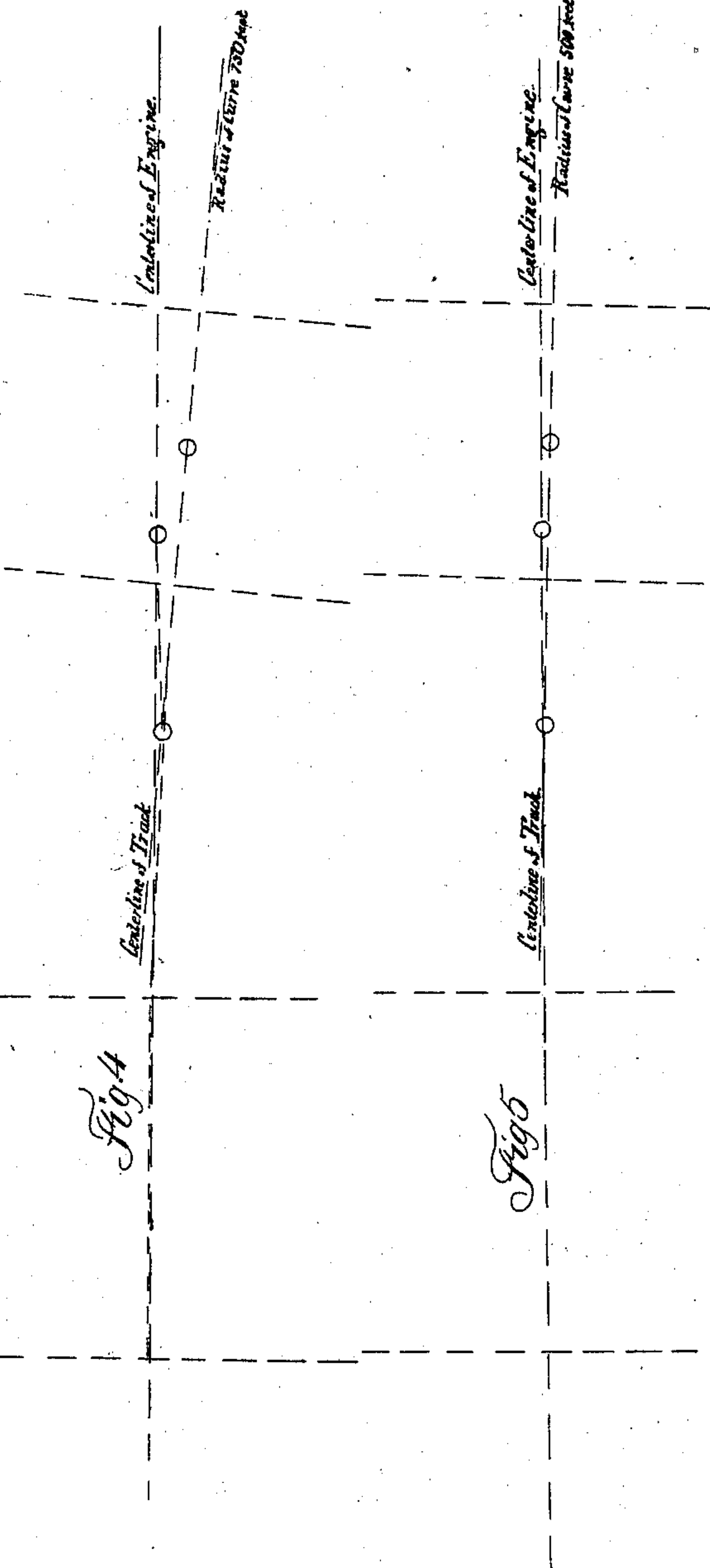
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Scale 1/4\"/>



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UNITED STATES PATENT OFFICE.

WILLIAM S. HUDSON, OF PATERSON, NEW JERSEY.

IMPROVED MODE OF CONNECTING TRUCKS TO LOCOMOTIVES.

Specification forming part of Letters Patent No. 42,193, dated April 5, 1864.

To all whom it may concern:

Be it known that I, WILLIAM S. HUDSON, of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in the Means of Connecting Trucks to Locomotives; and I do hereby declare that the following is a full and exact description thereof.

The accompanying drawings form a part of this specification, and represent the novel parts, with so much of the locomotive as is necessary to understand fully its construction and operation.

Figure 1 is a central longitudinal vertical section through the truck and its attachments. Fig. 2 is a central vertical transverse section through the same parts. Fig. 3 is a plan view of the truck and its connections, and represents also the driving wheels and axles. Fig. 4 is a diagram showing the relations of the centers and center lines on a short curve. Fig. 5 is a corresponding diagram, showing the relations on a curve of larger radius.

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

Tints are employed to aid in distinguishing parts, and do not imply differences in material. The material of the whole may be iron or steel.

The inventions of Levi Bissell and others, several of which have been patented at different times, provide for allowing a side movement of the locomotive upon the truck, on entering curves in the road, and also give a tendency in the locomotive to keep the center line of the truck when traveling on a straight track. Mr. Bissell also provides for pivoting the truck to a fixed point on the locomotive by means of an arm extending a considerable distance to the rear. It is found in practice and can be demonstrated by mathematics that a truck thus pivoted, and with the locomotive allowed to move sidewise upon the truck, the adjustment will be very perfect for a certain amount of curvature; but it is the fact on most railroads, if not on all of any considerable length, that the curves are not of uniform radius, but vary very greatly. Mr. Bissell's device answered admirably for a straight track, and for one variety of curve; but for all curves greater or

less than that for which the machine is constructed such a device is at fault.

My invention is intended to realize all the advantages of Mr. Bissell's, and to allow the machine to adapt itself to all varieties of curve which are met with in ordinary practice.

To enable others skilled in the art to make and use my invention, I will proceed to describe it by the aid of the drawings and the letters of reference marked thereon.

A is the framing or the main body of the locomotive. B is the framing or main body of the truck. C is an intermediate casting, and D is a king bolt, which passes down through the parts and performs its ordinary function. The truck B is provided with a stout center plate, *b*, which is held central and allowed to turn with tolerable freedom under the intermediate casting, C, in the manner represented.

C is formed on its upper surface in the manner represented, and adapted to support the locomotive on the two double-inclined planes presented. This is very closely analogous to the arrangement of the inclined planes described in Mr. Bissell's patent, above referred to, and which is dated August 4, 1857. It differs, however, in the fact that the piece C, on which the double inclined planes are formed, is not, as in Mr. Bissell's invention, fixed rigidly to the truck, but is allowed to swivel thereon by turning on the center plate, *b*. The forward end of the locomotive on striking a curve moves sidewise, and in doing so climbs up the inclined planes, and on leaving the curve and again entering on a straight part of the road it slides down again to the position represented, the action in this respect being similar to that in Mr. Bissell's device.

B' is a projection or stout extension from the rear of the truck B. Its extremity is adapted to receive a pin, E, which secures to it the rear extremity of a stout link or radius-bar, G. The forward end of this bar G is connected by a corresponding pin, H, to the lugs *a*, as represented. These lugs *a* are fixed to the framing or body of the locomotive, and by the aid of the link G and the pins E and H serve to relieve the center bearing of the truck from all or nearly all of the strain due to the forward

and backward motion of the engine. In running forward, the strain on the link G is tensile, and in running backward it is thrusting; but in all ordinary cases these strains are not severe.

M M are stout arms extending downward from the stout cross-bar *m*, which is attached to the frame A. They are connected by the cross part N, which stands beneath the link G, as represented. The arms or stops M are wider apart than the breadth of the link G, and allow a limited play of this link from side to side; but they are of sufficient strength to resist the strain, when in consequence of an inequality in the track, or of any serious derangement of the action, the truck endeavors to turn itself too far around on its center bearing. In other words, the arms M M allow the truck to vibrate or swivel as far as is ever necessary in practice on the shortest curves, but forbid its turning any farther than is so required. The horizontal parts *m* and N also allow some tilting or vertical oscillation of the truck, but forbid this motion extending beyond certain very narrow limits. In case the rear end of the truck tends to tip down too low, it is restrained by the contact of the link G with the cross part N, and in case the rear end of the truck tends to lift too high, the motion is restrained by the contact of the link G with the cross-bar *m*.

All the pins may be secured by nuts, split keys, or other well-known means, and the center bearing of my truck, as also the eyes or joints at E and H and the inclined planes on the top of C, may be lubricated by any ordinary means.

The diagrams 4 and 5 illustrate the positions of the parts on curves of different radius. They are intended to show the importance of my invention in allowing the rear center E to vibrate freely between the limits M M. In these diagrams the black dotted lines show the curvature of the road. The red line shows the center line of the engine, and the blue line the center line of the truck. It will be observed that the position of the pin E is considerably one side from the center line of the engine. This indicates the amount of play or lateral motion which is required to give perfect freedom to the truck on curves up to these degrees, with the center E in a position no farther in the rear of the truck than is here represented. I can by extending the arm or projection B', and lengthening the link G so as to carry the back center E farther rearward on the machine, finally reach a point where a less degree of play will suffice; but it will be observed that the blue line, which indicates the center line of the truck prolonged, does not cross the red line, which indicates the center line of the engine at the same point when traversing on the two different curves, so that there cannot be found any point where the center E may be held abso-

lutely rigid without impairing the freedom of motion in traversing curves of various radii. If all the curves on a road were of uniform radius—say a radius of five hundred feet—the point where the center line of the truck crosses the center line of the engine in Fig. 3 might be fixed so as to hold the extended rear arm of the truck in a fixed position on the body of the locomotive, and the effect would, in such case, be perfectly correct after a curve had been fairly entered on, and of course would be correct in traversing straight lines; but there are no such roads, and if there were the action of such a machine would still be imperfect in entering upon and leaving curves. My invention provides for all these varieties of situation.

Some of the advantages due to certain features of my invention may be separately enumerated, as follows: First, by reason of the freedom for a slight play or lateral movement of the arm B', extending rearward from the truck, as represented, in combination with the lateral movements of the locomotive upon the truck, my parts are compelled to assume very nearly the correct positions, but are allowed sufficient freedom to adjust themselves with absolute nicety to every variety of conditions; second, by reason of my link G, arranged as described, in combination with the above, I relieve the inclined planes and the center bearing D, &c., from all undue fore-and-aft strain, and am able to work forward or backward over all ordinary inequalities and obstacles without danger of fracture or derangement; third, by reason of the limited freedom for vertical oscillations of my truck, attained as described, I provide for accommodating the truck to all the ordinary inequalities of the road without allowing the violent oscillations and plunges to which some kinds of truck, absolutely free in this respect, are liable to be subjected; fourth, by reason of my swivel-piece C being mounted centrally upon the truck, and arranged to receive and support the weight of the forward end of the locomotive, in the manner described, I am able to adapt trucks which have been already constructed in the ordinary manner to allow the side motion of the locomotive upon them with much less labor and expense than by any means previously known, and in the manufacture of new locomotives or trucks am able to dispense with much weight by reason that the two bearing-points X X may be nearer together than is allowable in Mr. Bissell's or any other previously-known device for the purpose, and I insure that the weight of the forward portion of the locomotive is thrown, under all conditions, upon the center of the truck. Mr. Bissell provided a swiveling piece between his truck and the forward end of the locomotive; but it swiveled on a king-bolt or center, which was not fixed relatively to the truck, but, on the contrary, was fixed rela-

tively to the locomotive. It followed, from his defective arrangement of these parts, that the forward end of the locomotive was always supported on a pintle or bearing directly under its center line; but the weight was thrown upon the truck at points which shifted toward one side or the other with every movement of the locomotive thereupon. I believe such a shifting of the weight alternately from one side to the other on the truck to be a very serious evil, while the supporting of the front end of the locomotive by a point directly under its center was but a slight advantage. My invention, by reversing these conditions, involves a very important improvement. I throw the weight always on the center of the truck, and, although this involves an apparent evil, by supporting the front end of the locomotive on a point which changes alternately from side to side, this evil is so slight as to be almost or quite inappreciable, and is practically of no importance. The rear and main portions of the locomotive are very efficiently supported on the four or more driving wheels, and the change of the point of support a few inches to one side or the other of the center line at the forward end produces no sensible effect on the drivers, and even if it should, the latter are so guided, provided the truck keeps the track, that no evil can result therefrom; but the ability of the truck to keep the track and the freeing of this important member as far as possible from disturbing influences is a point of immense importance, involving the lives, in many instances, of a great number of passengers. The old arrangements, by shifting the weight to one side, did impair, I think, very seriously the ability of the truck to keep the track, and this evil, especially in passing a broken rail or any seriously-defective point in the track, became very disastrous. The

difference between my invention and the old arrangement of these parts is sufficient to, in many instances, turn the scale, or decide the question whether an express train running at full speed over a certain imperfection in the road shall maintain its position and pass unharmed or shall leap from the track and cause great destruction.

Having now fully described my invention, what I claim as new in locomotives, and desire to secure by Letters Patent, is as follows:

1. An arm, B', extending rearward from the truck and confined between limits, so as to allow a slight freedom for the swiveling motions of the truck, substantially as and for the purpose herein set forth.

2. In combination with the above, the employment of the link G, pivoted to the rear end of the arm B' and to a fixed point, H, upon the body of the locomotive, and arranged to operate substantially in the manner and for the purpose herein set forth.

3. In combination with the limited freedom for vibrations of the arm B', the employment of the cross parts m and N, adapted to allow a limited freedom for vertical vibrations or oscillations of the truck, substantially as and for the purpose herein set forth.

4. In locomotives, the employment of the intermediate piece, C, or its equivalent, connected by a swivel-joint to the truck, and arranged to operate substantially as and for the purpose herein set forth.

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

WILLIAM S. HUDSON.

Witnesses:

THOMAS D. STETSON,
W. A. HENDRICKSON.