(No Model.) 3 Sheets—Sheet 1.

L. S. WOODBURY.

LOCOMOTIVE.

No. 383,790. Patented May 29, 1888.

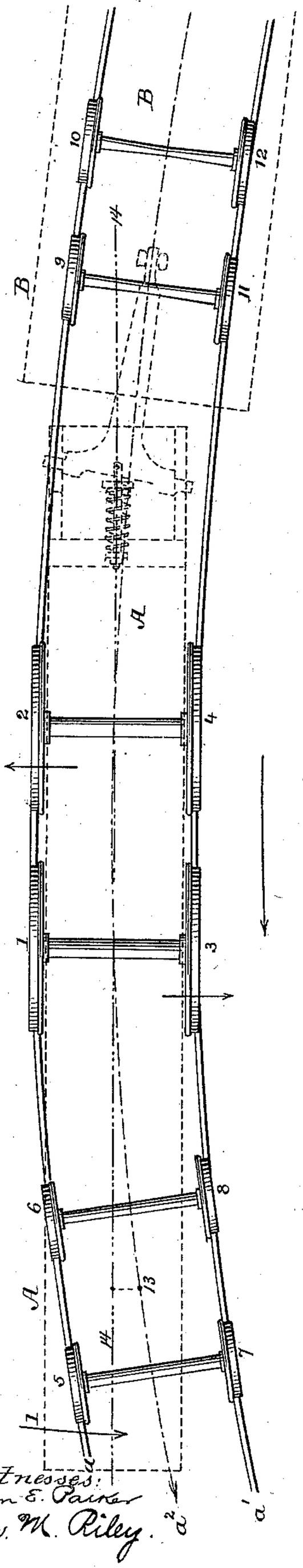

FIG. 1.

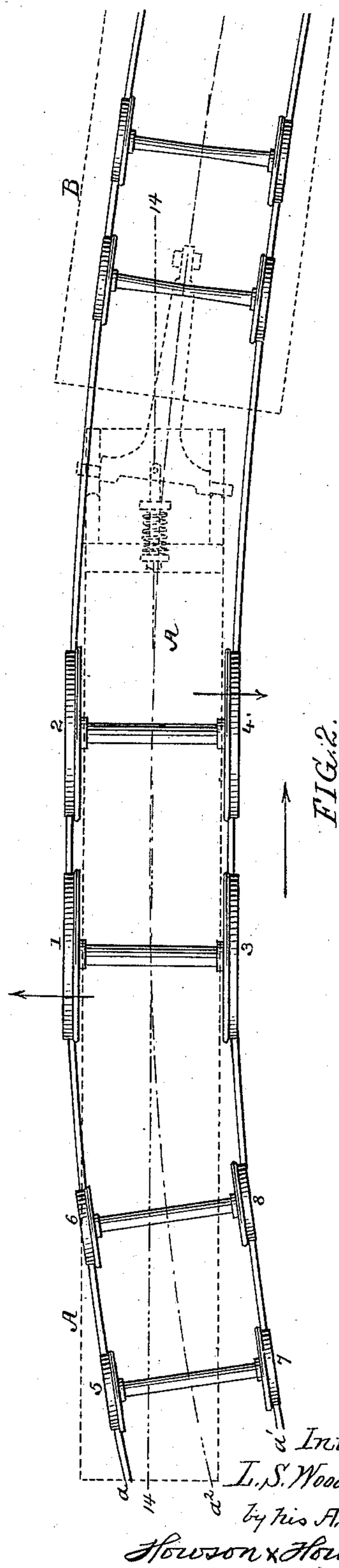

FIG. 2.

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Howson & Howson

(No Model.) 3 Sheets—Sheet 2.

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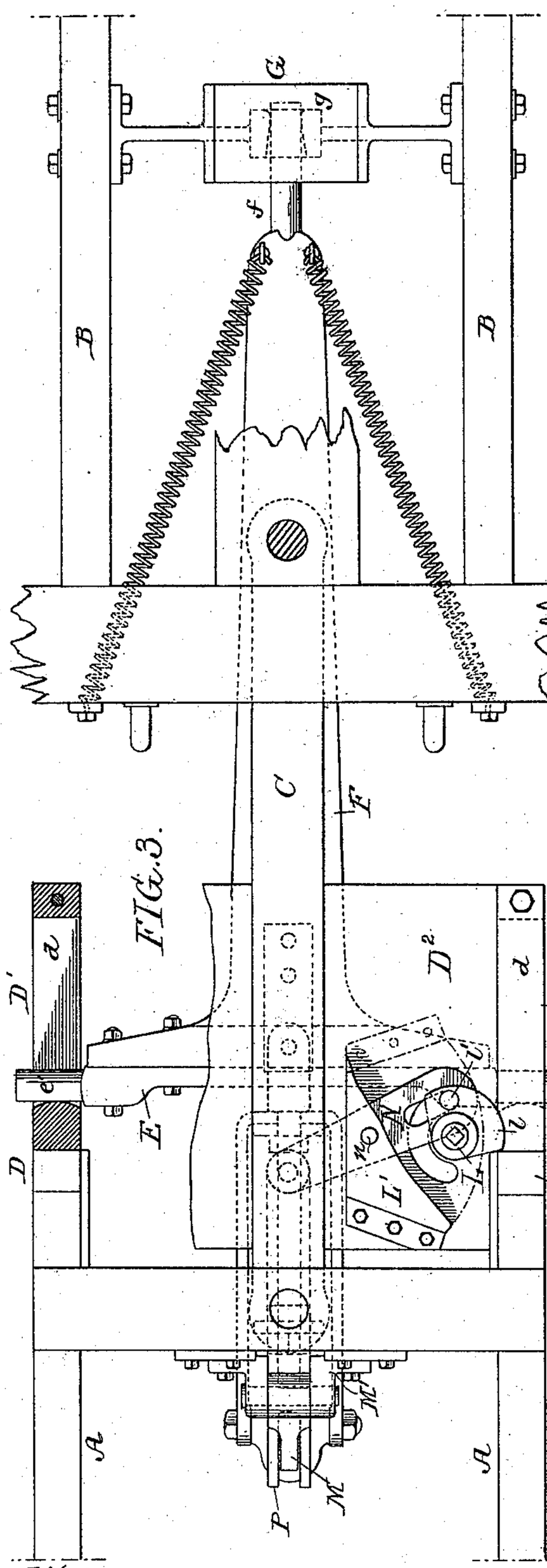

FIG. 3.

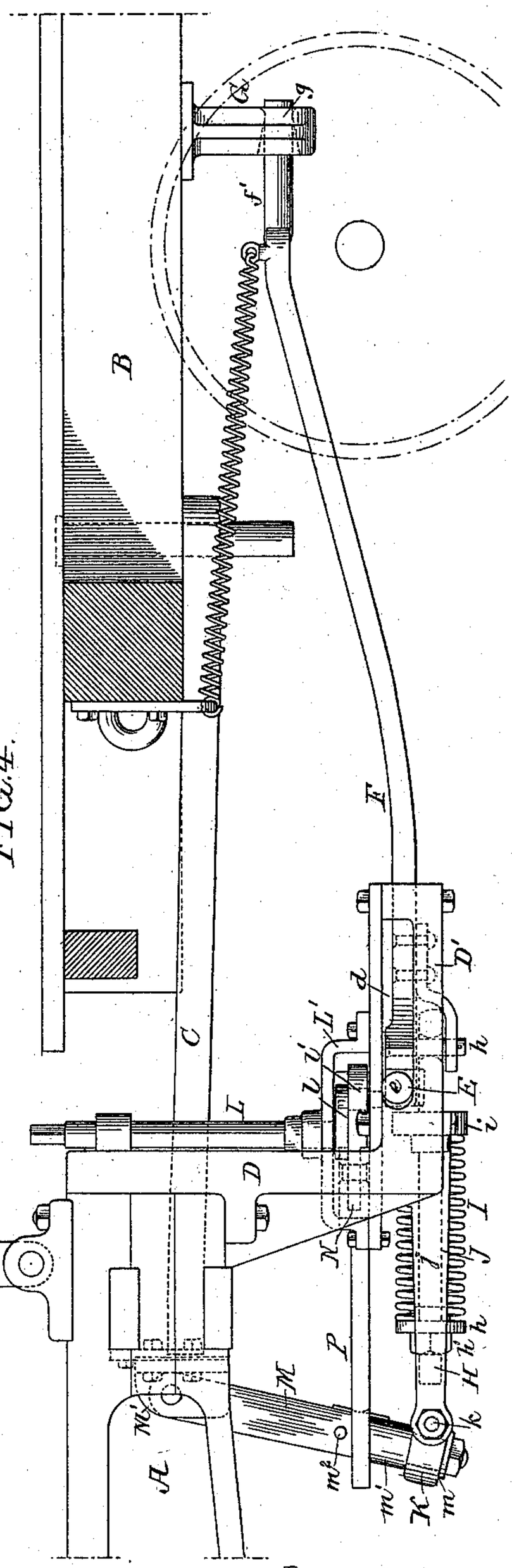

FIG. 4.

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(No Model.) 3 Sheets—Sheet 3.

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LOCOMOTIVE.

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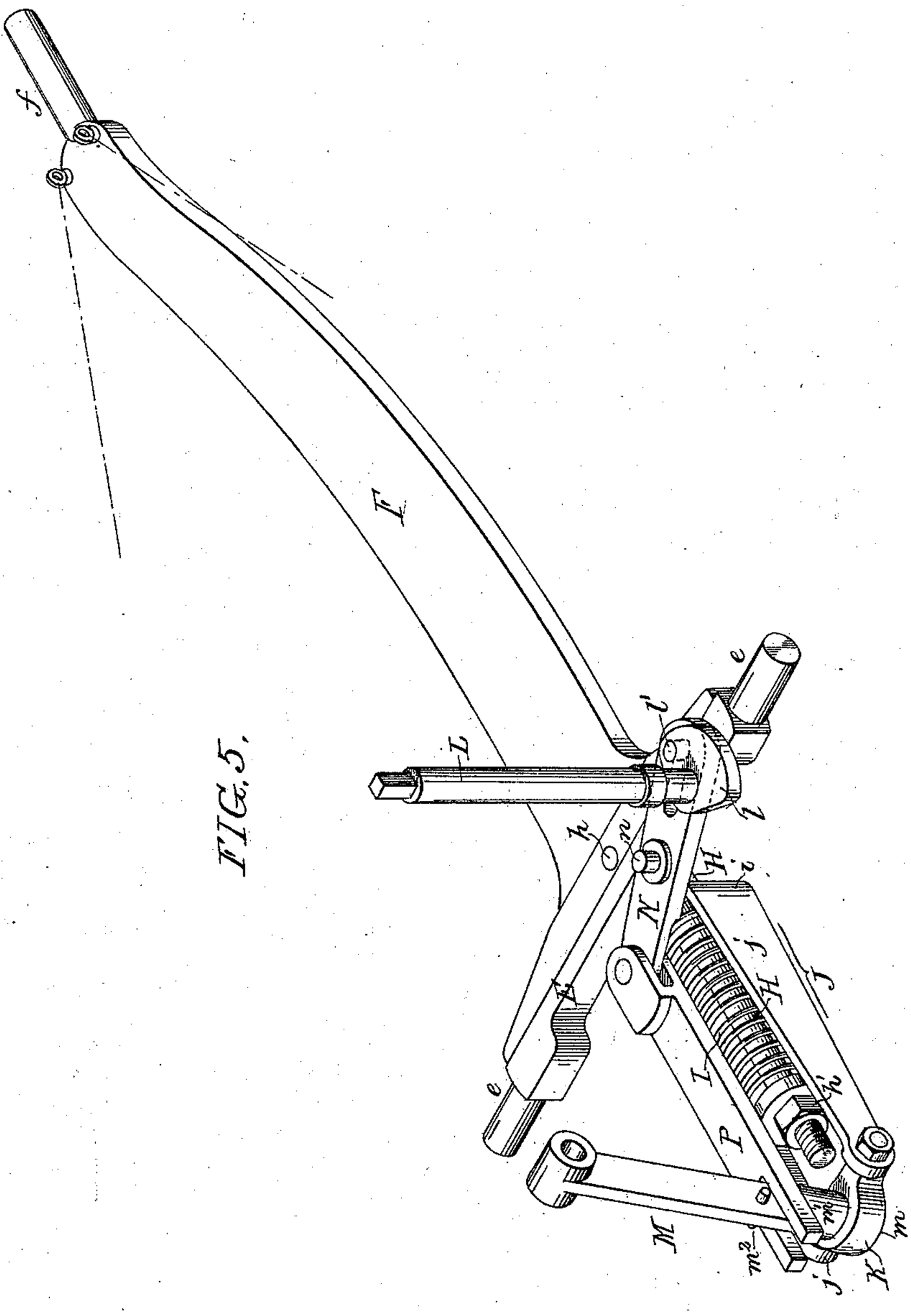
FIG. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

LEANDER S. WOODBURY, OF CALUMET, MICHIGAN.

LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 383,790, dated May 29, 1888.

Application filed February 20, 1883. Serial No. 264,583. (No model.)

To all whom it may concern:

Be it known that I, LEANDER S. WOODBURY, a citizen of the United States, residing at Calumet, Houghton county, Michigan, have invented certain Improvements in Locomotives, of which the following is a specification.

The object of my invention is to guide locomotives when running backward by so connecting the locomotive-frame to the tender that the tender will guide the locomotive in substantially the same manner as the small bogie-truck under the forward end of the locomotive.

In the accompanying drawings, Figure 1 is a diagram illustrating the side thrust at different points when the locomotive is moving forward. Fig. 2 is a diagram illustrating the action of my improved backward guide. Fig. 3 is a plan view, partly in section, of sufficient of a locomotive and tender to illustrate my invention. Fig. 4 is a side view, partly in section, of Fig. 3. Fig. 5 is a perspective view of the parts detached from the locomotive.

Referring, in the first place, to Figs. 1 and 2, which are plan views of a curve portion of a railroad-track, *a a'* being the rails and a^2 the center line, the body A of the locomotive is shown in dotted lines, and the four driving-wheels 1 2 3 4 and forward truck-wheels, 5 6 7 8, are shown in full lines, as are also the four forward wheels, 9 10 11 12, of the truck, the body of which is shown by dotted lines. When a locomotive is moving forward, the front truck guides it around curves—as, for instance, in Fig. 1. The center 13 of the truck, although on the center line, a^2, of the track, is at one side of the center line, 14, of the body of the locomotive. This truck is connected to the body through the medium of links. The tendency of the truck is to draw the head of the locomotive over in the direction of the arrow 1, consequently forcing the driving-wheel 3 on one side hard against the track *a'* and the driving-wheel 2 hard against the track *a*, allowing the locomotive to travel the curve at a high rate of speed without danger of being derailed; but if the direction of the locomotive were reversed and moved backward at a high rate of speed, when it struck a curve the rear drivers, 2 and 4, would in all probability be derailed, as the forward truck would still force the wheels 2 and 3 hard against their respective tracks, the body of the locomotive having no tendency to move around the curve, but, in fact, to jump off at a tangent and become derailed, as has been fully tested.

If the rear of the locomotive is guided in substantially the same manner as the forward end, by attaching the guide-bar at the rear end to a point on the tender, as soon as the locomotive is reversed, the tender drags the rear of the locomotive over, as shown in Fig. 2, the wheel 4 bearing hard against the rail *a'* and the wheel 1 against the rail *a*, so that the same effect is had as if the locomotive were moving forward.

I have found by practical tests that a locomotive can travel at about the same rate of speed backward as forward without danger of the locomotive being derailed, and I have so constructed the connecting device that when the locomotive is moving forward the guiding-connection with the tender is released. This guiding-connection is especially applicable to locomotives that have to be driven as much backward as forward.

I will now describe the construction of the connecting parts.

Referring to Figs. 3, 4, and 5, A is the locomotive-frame and B the tender-frame, connected together by the usual link, *c*. Attached to the rear of the locomotive-frame are two frames, D, one at each side, connected together by a plate, D^2, the arms D' of each frame being slotted at *d'* and capped. In these slots rest the end portions, *e e'*, of a transverse bar, E, secured to an arm, F, extending some distance under the tender B, and having a reduced end, *f*, adapted to a socket, *g*, in a bracket, G, hung from the tender.

The frames D D alternately act as pivot-points for the bar E when the locomotive is passing over a curve—as, for instance, the portion *e* rests against the frame D and is practically stationary when the locomotive passes over a curve to the right, as in Fig. 2, while the portion *e* is practically stationary and is pivoted to the frame D when the rails curve toward the left.

A pin, *h*, passes through the center of the butt of the arm F and through an eye in a rod, H, which is provided at its outer end with

a nut, *h'*, and washer. On this rod H is a stiff spring, I, one end of which bears against the washer, while the other end bears against a cross-piece, *i*, of a yoke, J, having two arms, *j j*, which are connected to a swinging head, K, by a bolt, *k*. The end *m* of a lever, M, passes through this pivoted head, and is secured therein by a nut. The lever is pivoted to a bearing, M, secured to the frame of the locomotive.

In some cases the lever instead of swinging may be stationary, and the above described parts will work; but, as described hereinafter, I wish to throw the above-described mechanism out of gear when the locomotive is running forward and throw it in gear when the locomotive is running backward.

L is a vertical shaft having its bearings in brackets on the frame of the locomotive, and the shaft is squared at the top for the reception of a suitable lever or hand-wheel, and has a segment, *l*, at the bottom, provided with a pin, *l'*, which rests in a slot in a lever, N, pivoted at *n* to the plate D^2, the opposite end of this lever being pivoted to a bar, P, having at the opposite end a yoke, in which rests the lever M, the bar P resting on the shoulder *m'* on the lever, and being prevented from raising too far by a pin, m^2, on the lever. A plate, L', protects the working parts from dirt, &c., and also acts as a bearing for the vertical shaft.

The object of the last-mentioned device is to compress the spring I, so that the movement of the tender can be communicated to the locomotive through a stiff spring, and that when the lever N is in the position shown in Figs. 3 and 4 the spring is compressed and any movement of the truck on the curve will be communicated through the spring; but if the tension is taken off the spring by turning the vertical shaft about one-half turn until the pin *l'* is in the position opposite to that shown in Fig. 3 the lever N will be in the position shown by the dotted line 1, and the lever M released from the control of the bar P, and the spring I relaxed, so that when the truck moves while the devices are in the latter position it will have no effect on the locomotive.

Springs *g' g'*, when necessity requires, steady the outer end of the arm F, one end of each spring being attached to the arm and the other end attached to the tender-frame.

I claim as my invention—

1. The combination of the locomotive and a tender coupled thereto, with an arm projecting beneath the tender from the locomotive and laterally confined to said tender, all substantially as specified.

2. The combination of the locomotive and tender, with an arm, F, having extensions adapted to opposite bearings on the locomotive and having a bearing on the tender, a rod connected to said arm between the opposite bearings, and a spring interposed between the head of said rod and a bearing carried by the locomotive, all substantially as specified.

3. The combination of the locomotive and tender, a transverse bar, E, having bearing portions *e e*, slotted bearings for the latter on the locomotive, an arm attached to the bar and having a bearing on the tender, a rod connected to the arm, and a spring interposed between the head of the rod and a bearing on the locomotive, all substantially as specified.

4. The combination of the locomotive and tender, an arm adapted to a bearing on the tender, and having extensions, with opposite bearings on the locomotive, a rod connected to the arm, a spring interposed between the head of said rod and a link hung to an arm on the locomotive, a bearing for said arm, and means for moving said bearing into and out of position, all substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEANDER S. WOODBURY.

Witnesses:

C. H. VEEDER,

A. I. JONES.