A. E. BROWN.

EQUALIZING TRUCK.

APPLICATION FILED JUNE 15, 1908.

907,964.

Patented Dec. 29, 1908.

6 SHEETS—SHEET 1.

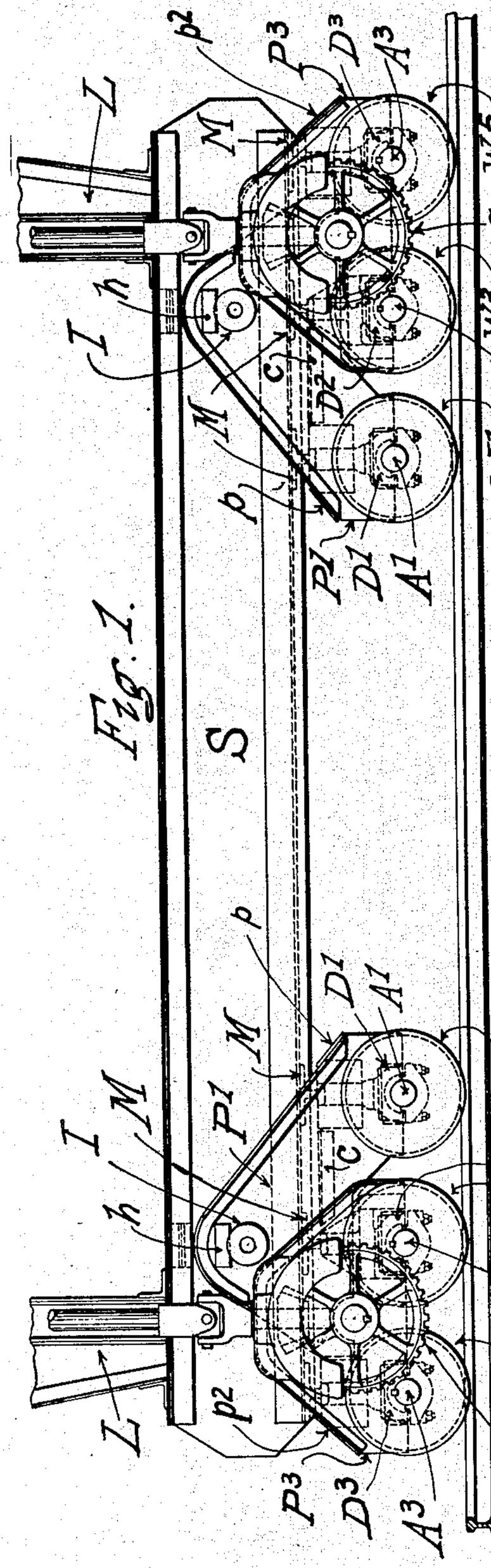

Fig. 1.

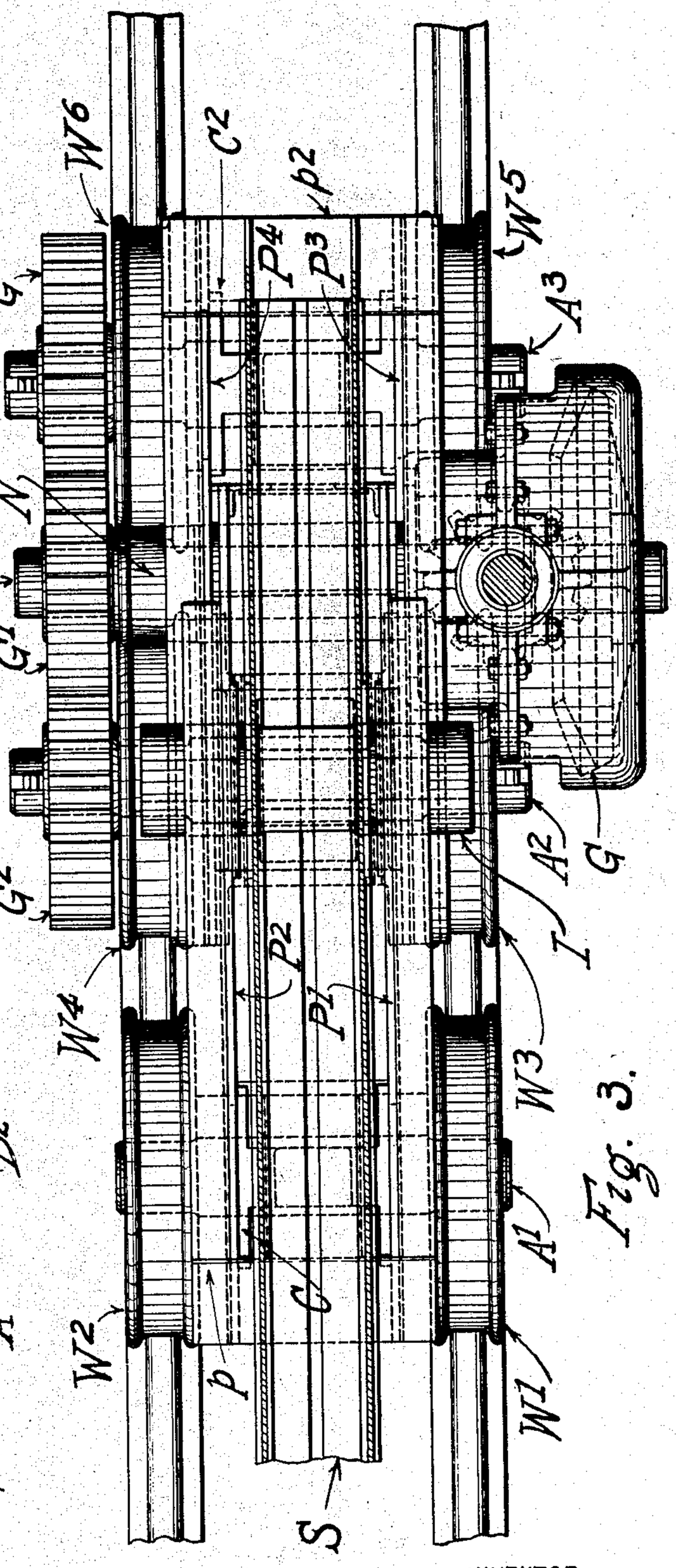

Fig. 3.

WITNESSES:

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D. H. Roberts

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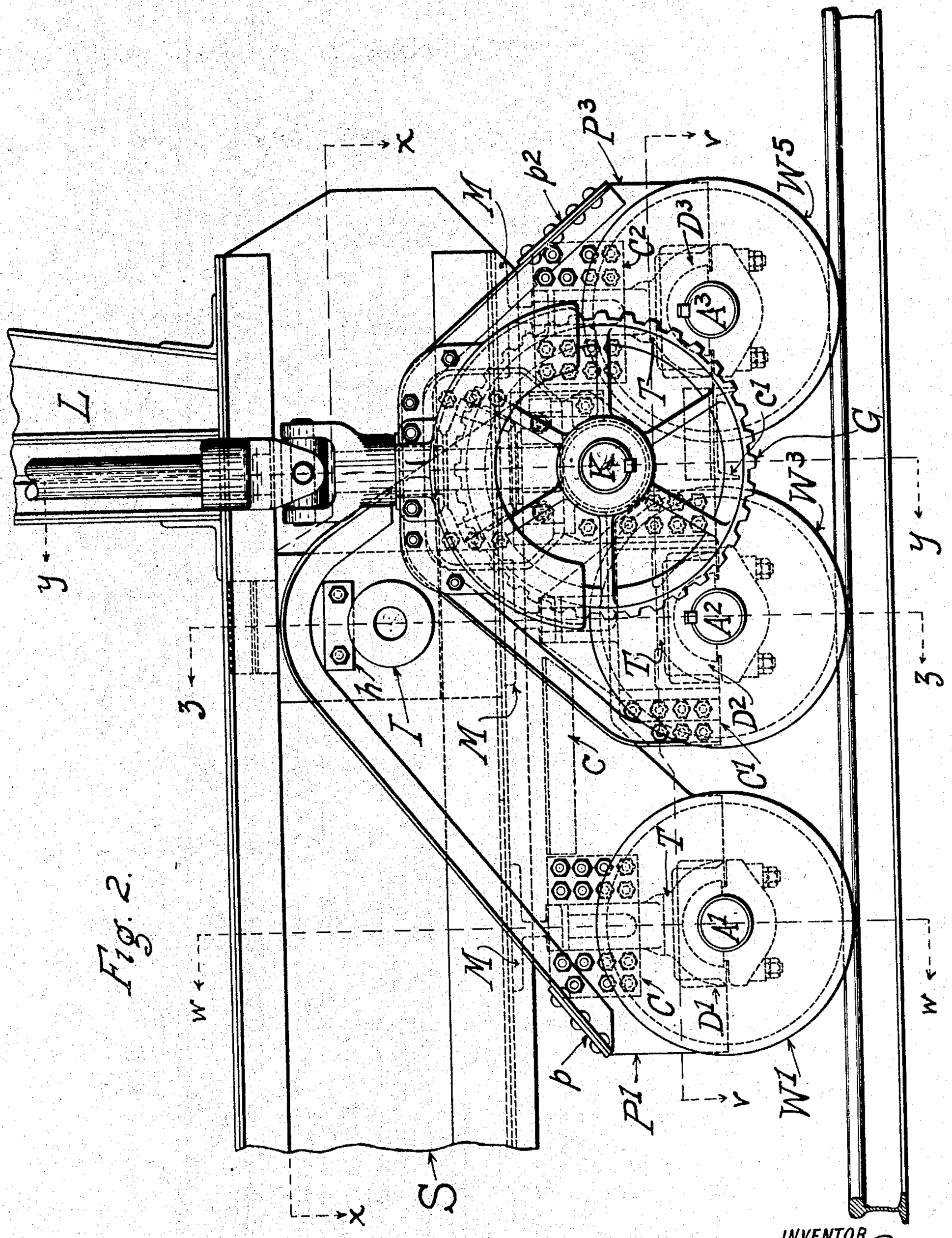

Fig. 2.

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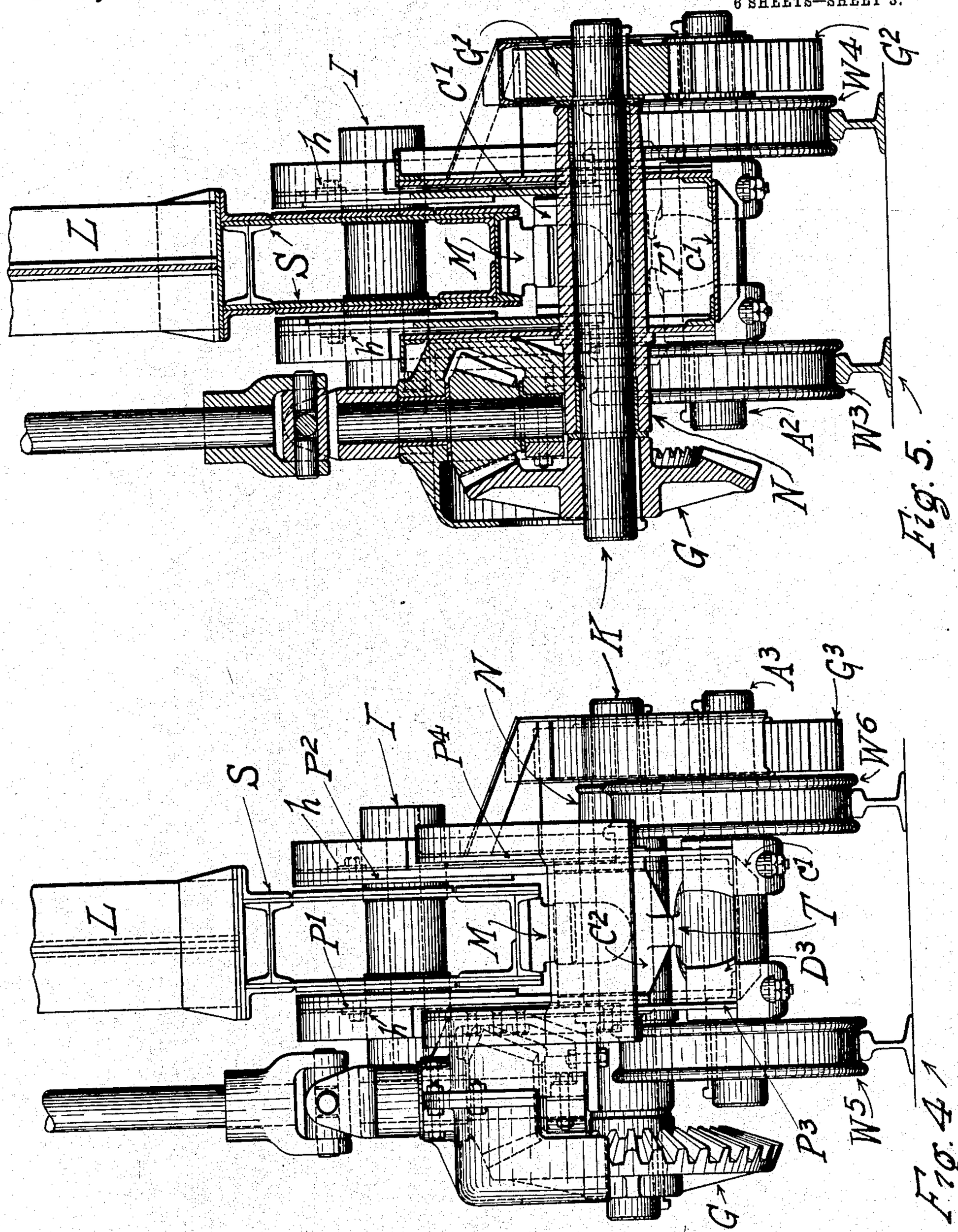

FIG. 5.

FIG. 4.

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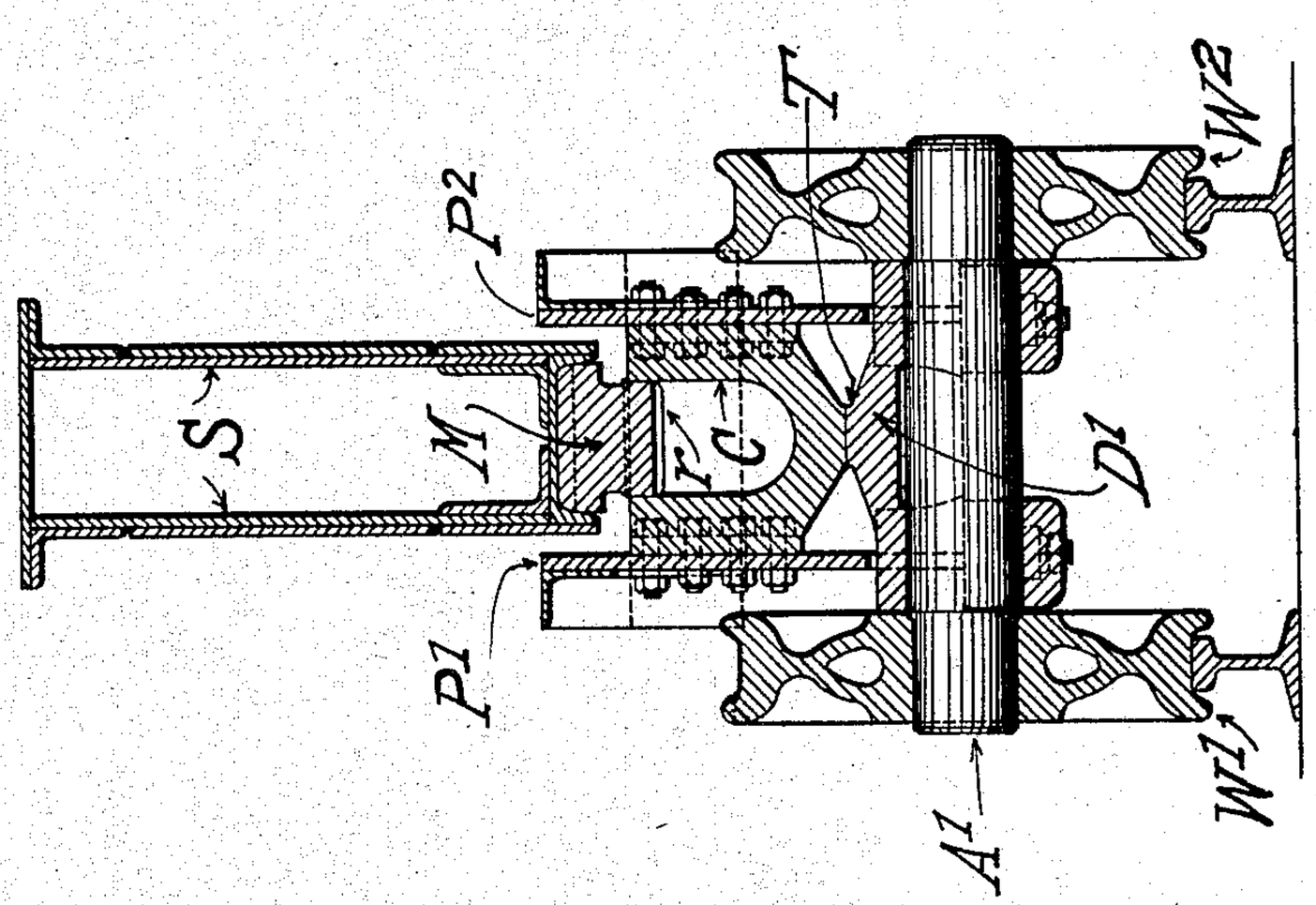

Fig. 7.

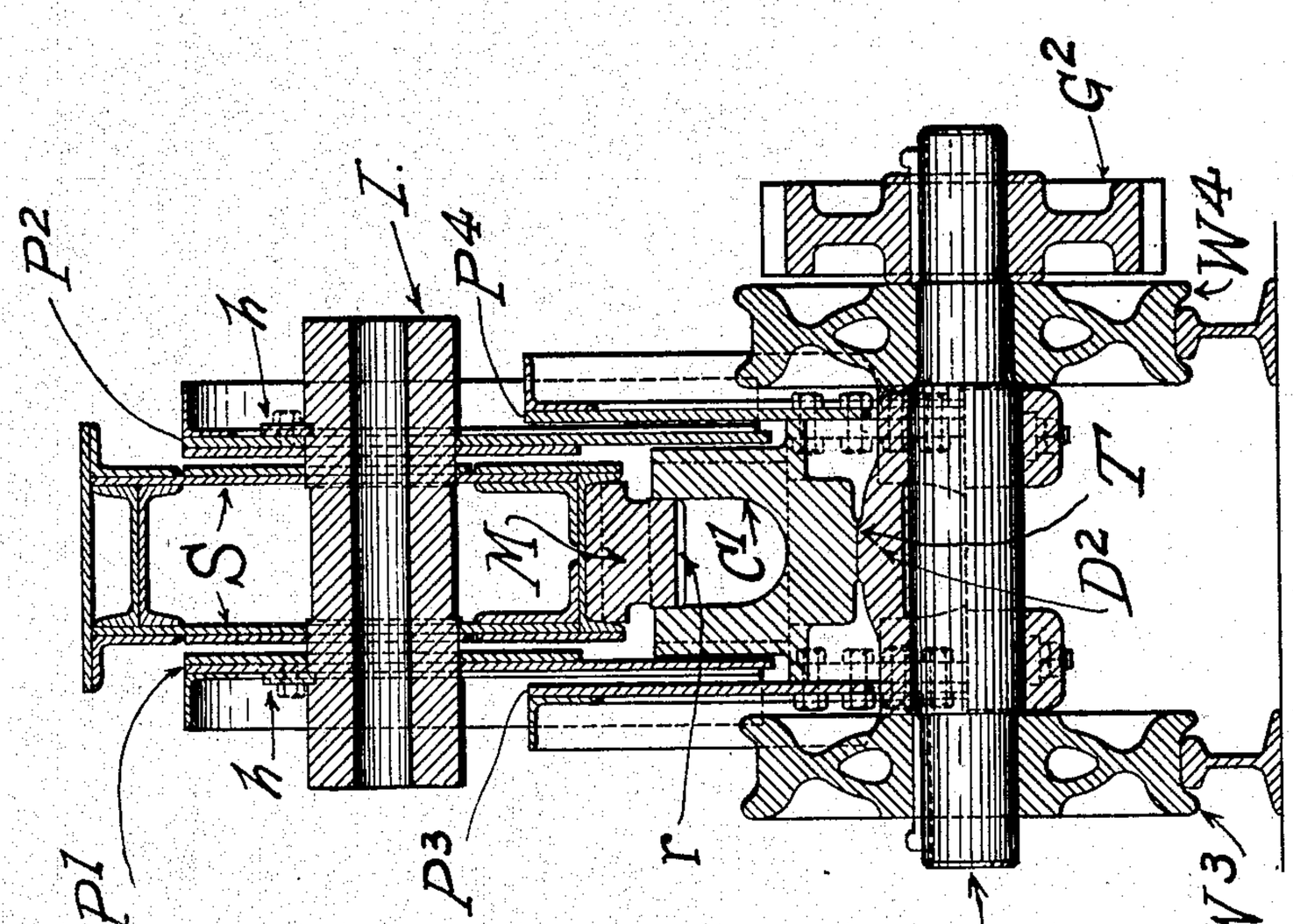

Fig. 6.

WITNESSES:

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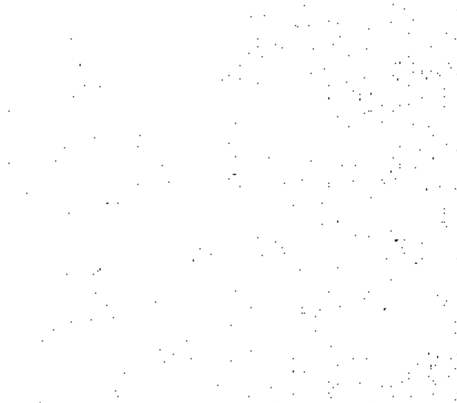

Fig. 12

Fig. 13

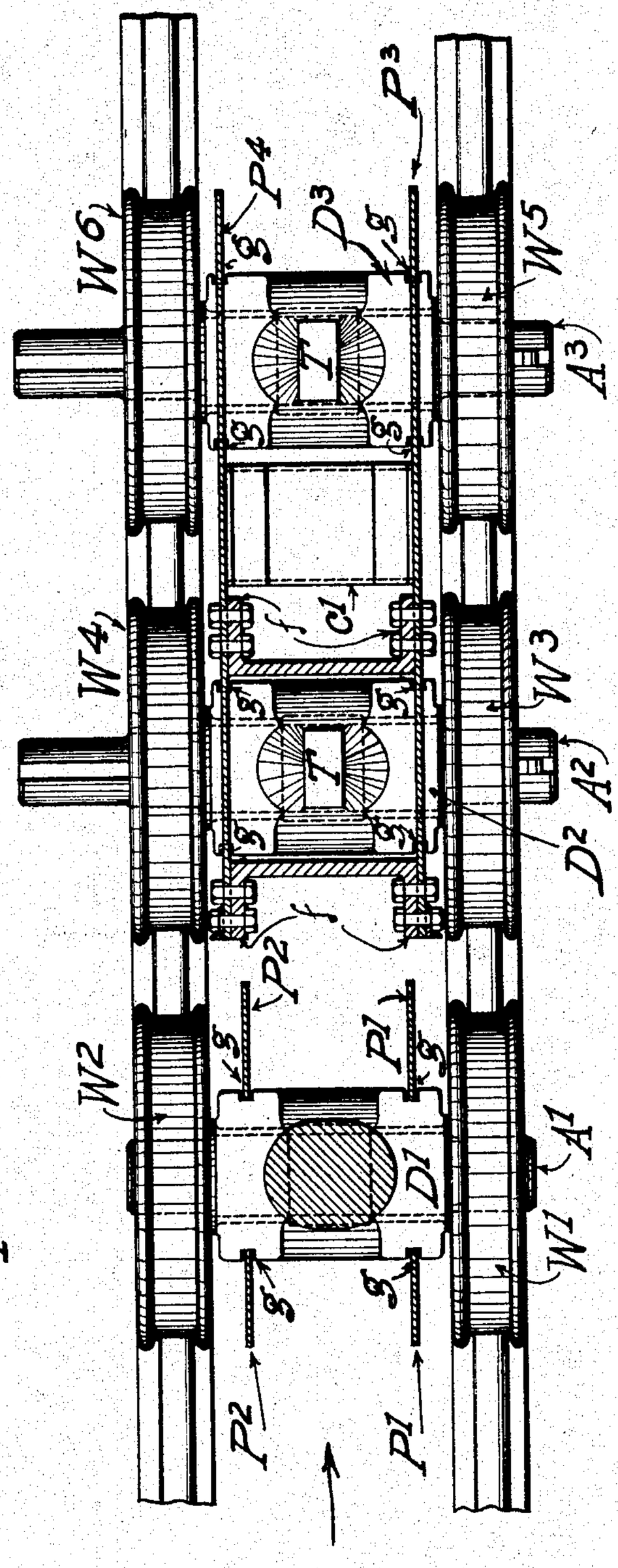

Fig. 9

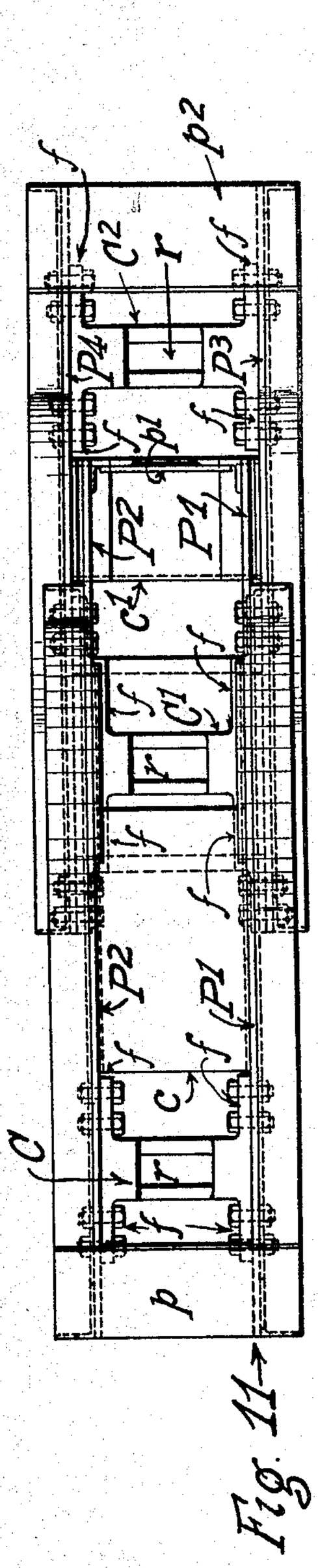

Fig. 11

WITNESSES:

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APPLICATION FILED JUNE 15, 1908.

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6 SHEETS—SHEET 6.

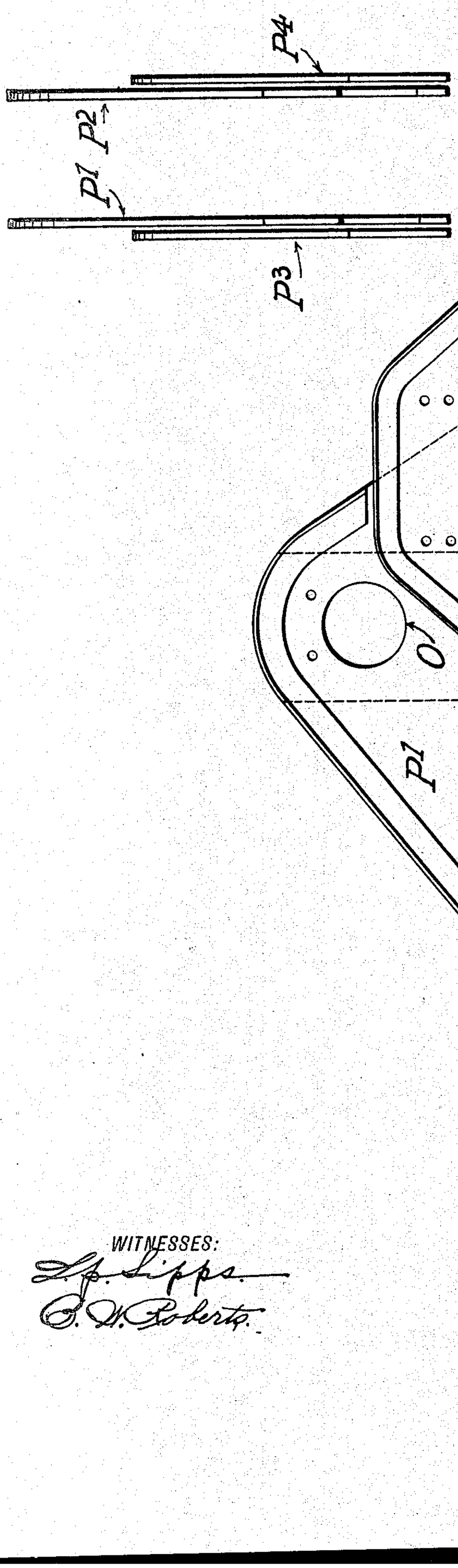

Fig. 10.

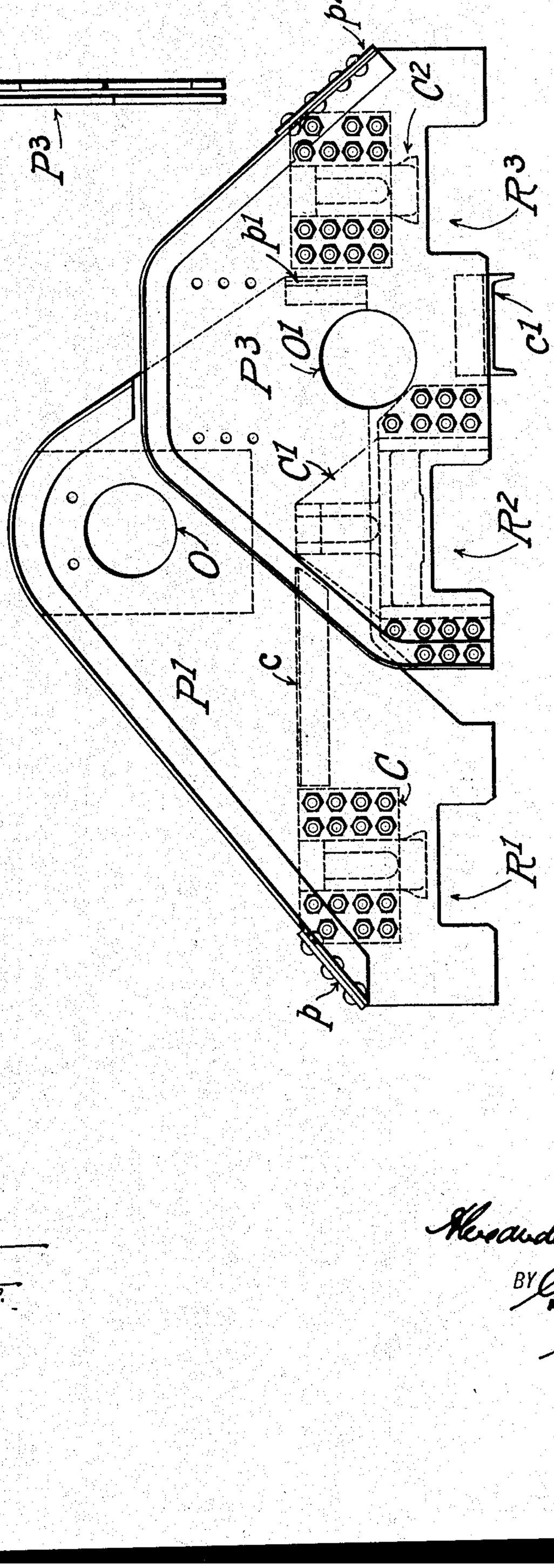

Fig. 9.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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EQUALIZING-TRUCK.

No. 907,964. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed June 15, 1908. Serial No. 438,677.

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Equalizing-Trucks, of which I hereby declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings as a part of the specification, wherein the same parts in every instance are designated by the same letters.

Said truck belongs to the general kind used to sustain and carry heavy superstructures, like bridge-tramways, unloaders and cranes, that travel, on surface rails from one point of service to another. Here there is, necessarily, a high degree of compression on the wheel-loads, which it is important, in every contingency, should be equally distributed among the several supporting wheels. It is not so difficult a problem to provide for such equal distribution with certain forms of truck, as those characterized by two, four or eight wheels, for instance, for the reason that a common frame-work can be employed when an even number of wheels, either in pairs or tandem, are used, in which the primary compression center can be located without difficulty. This is not so readily accomplished, however, when three wheels in tandem, or, three pairs of wheels are to be used. Nevertheless, there are certain conditions, or situations, where, the particular weight to be supported, according to accepted rules and calculations, require three tandem wheels or three couples of wheels, rather than any other number, and it is therefore desirable to ascertain the most advantageous manner of arranging these so as to insure the same stress upon each wheel under every circumstance.

A truck arrangement of this nature is the purpose and object of the present invention.

In the drawings Figure 1 represents the end sill and lower part of the legs of an unloader supported by six wheels according to the form herein described. Fig. 2 is an enlarged view of such a truck. Fig. 3 is a sectional plan view on the lines *x x*, of Fig. 2. Fig. 4 is an end view on the lines *y y*, of Fig. 2. Fig. 5 is a sectional end view on the lines *y y*, of Fig. 2. Fig. 6 is a sectional end view on the lines *z z*, of Fig. 2. Fig. 7 is a sectional end view on the lines *w w*, of Fig. 2. Fig. 8 is a sectional plan view on the lines *v v*, of Fig. 2. Fig. 9 is a side elevation of frame-plates used. Fig. 10 is a diagrammatic end view of the relative position of said frame-plates, when in place. Fig. 11 is a plan view of said plates in their operative place. Fig. 12 is a plan view of a hollow pin-bearing detail, and, Fig. 13 is an end view thereof.

Referring now more particularly to said figures, S (Figs. 1 and 2) is a sill in an unloader structure, on the end of which rest the two legs L, of said structure. The sill here is assumed to be of the usual box-girder type, generally used in such connections, with said legs riveted to its top flange. Beneath said sill and legs, respectively are six-wheel supporting trucks, similar, one to the other, in all respects, and each made up of three pairs of wheels connected with a frame-work to be described. Referring, therefore, to but one of said trucks, for the purpose of description, said pairs consist respectively of the wheels W^1 and W^2, W^3 and W^4, and W^5 and W^6. These wheels are severally keyed to the axles A^1, A^2 and A^3, which pass through and turn within bearings or housings D^1, D^2 and D^3 to which are bolted two pairs of parallelly-related frame-plates or pieces P^1 and P^2, and P^3 and P^4. As shown these plates or pieces are of arch-like contour. They are of steel or like substance, and, as also shown, are duly reinforced, and stiffened by angle-irons, and subordinate plates for the purpose. The plates P^1 and P^2, constituting one of such pairs are higher and longer than the plates P^3 and P^4 constituting the other of said pairs. Near the upper part of P^1 and P^2 are holes or apertures O, and, at a relatively lower part of P^3 and P^4, are similar holes or apertures O^1, for purposes that will hereinafter appear. At the lower edges of said plates are squared recesses R^1, in the plates P^1 and P^2, and R^2 and R^3, in the plates P^3 and P^4.

The recesses R^1, R^2 and R^3 should be so interspaced, one with respect to the others, that the recesses R^1, in the plates P^1 and P^2 will always be at points that are twice the distance from the vertical plane of the point or aperture O on a horizontal line, that the point or aperture O^1 is from O. As will be readily understood, the aperture O^1 must always have its vertical through the middle point between the recesses R^2 and R^3, or, rather, that the recesses R^2 and R^3 must

always be equidistant from and on each side midway of such vertical. P^1 and P^2 must each also have a semi-circular recess of suitable dimensions to register and correspond with the aperture O^1. The normal arrangement for these plates, in the device under consideration, is in pairs, as stated, the pair P^3 and P^4 being exterior to and partially inclusive of the pair P^1 and P^2 (Figs. 9 and 10). Said pairs are held together, the last named, by cross-pieces p and p^1 and a separator-channel c, that pass between and are bolted or otherwise fastened to the opposite plates composing the pair, and, the pair P^3 and P^4 are held together by the plate cross-piece p^2, and channel cross-piece c^1, likewise extending between and fastened to the same. Certain flanged castings C, C^1 and C^2 also extend between and are bolted to said plates through the said side flanges f, the casting C between P^1 and P^2 and C^1 and C^2 between P^3 and P^4 (Fig. 11). Said castings are of the socket type, and are provided with central vertical recesses r, (Fig. 6) to effect an engagement with the sill S. This engagement is accomplished by means of T-shaped castings M that are fastened crosswise of the sill immediately above the several pairs of wheels and which penetrate and engage said vertical recesses. The object, as will become evident, is to transmit any side thrust of the wheels through the box-bearings D^1, D^2 and D^3 and castings C, C^1 and C^2, to the sill itself. When, in their destined places, said castings C, C^1 and C^2 are in contact with and upon a rocker or ball-bearing protuberance T on the upper surfaces of box-bearings D^1, D^2 and D^3 (Figs. 6, 7 and 8). These box-bearings are inserted in the several recesses R^1 etc., and extend cross-wise, severally, between the plates P^1 etc., being provided with vertical side-grooves g to permit them to be so inserted, the vertical edges of said recesses occupying said grooves. The bearings are given such vertical dimensions that they will come into contact or engagement with the castings C etc., at said protuberance T, before the upper horizontal edges of the recesses R^1 etc., are met, thereby leaving a desirable clearance, immediately below such edges, at the points referred to, to allow a rocking action of said box-bearings in their described engagements with the castings C etc.

The axle A^1 passes through the bearing D^1 and engages the wheels W^1 and W^2; the axle A^2 similarly passes through the bearing D^2 and engages the W^3 and W^4 with one end of the axle last referred to projecting beyond the wheel W^4, and, the axle A^3, in like manner passes through the bearing D^3 and engages the wheels W^5 and W^6, projecting beyond W^6.

In the arrangement shown a hollow pin-casting I passes through the aperture O and the sill S, thereby coupling the same together, and is duly secured, in place, by the pin-plate h. Through the aperture O^1 a hollow steel pin-shaft N passes, which is provided with flanges F, whereby said pin-shaft is exteriorly bolted, in said position, to the plate P^3. The plates P^1 and P^2, which engage and rest on said shaft, around their semi-circular recesses referred to, are thereby given a desirable support. A driving shaft K passes horizontally through said pin-shaft N, and projects outwardly therefrom at each end of N. One of these projecting ends engages a bevel-gear G, and, the other a spur-gear G^1, for driving said trucks, containing the spur-gears G^2 and G^3. The spur-gears G^2 and G^3 are, respectively, keyed to the projecting ends of the axles A^2 and A^3 and thus make the corresponding wheels W^3, W^4 and W^5 and W^6, the drivers of the truck.

Suitable power connections for the operation are indicated in the drawings.

By the form of frame-work for a six-wheeled truck above described it is plain that a full equalization and distribution of stress will occur under all conditions. Should, for instance, both wheels W^1 and W^2, composing the front pair, encounter an obstacle, in equal degree, (as a rail cross-wise of the track) said wheels in their plates P^1 and P^2 will tend to rotate upwardly around the point and connections at O, as a center, and the resistance and reaction, will be transmitted through said plates to the pin N on which said plates rest around their semi-circular recesses, and, by reason of the fact that O^1 is at the middle point between the pair of wheels W^3 W^4 and W^5 W^6, and, of the ability of said front pair to rock and adjust themselves around I, the stress must be equally divided up between the three pairs of wheels, and no one of them will be unequally subjected to the same. So, also, if the second or intermediately arranged pair, P^3 and P^4, encounter an obstacle or inequality in rail surface the adjusting or compensating rotation, in such case, will first be about the axle A^3. This movement and strain will raise, or tend to raise the pin shaft N and, by reason of the frame-plates P^1 and P^2 being seated thereon, a rotating of the latter around the pin-casting I must occur to a degree that will equally distribute said strain. If but one wheel of a pair meets a stone, or other obstacle, then the tendency is for such wheel, to lift against its mate, and a lateral rotating movement of the frame to occur. This is compensated for, at once, by reason of the rocker-bearing feature T, which permits a side-rocking to take place, under the conditions assumed, with the result that the sill, and the structure it supports, will meanwhile maintain a perfect equilibrium.

Having now described my said invention what I claim and desire to secure by Letters Patent is:

1. In a six-wheel truck for supporting a hoisting and conveying machine, or other structure, the combination of two pairs of said wheels connected to a frame-member, in parallel opposite relations to each other, at points equidistant from the vertical plane of the compression center of said member, and, a second lever-like frame-member, rotatively connected to said machine or structure, and having its inner arm-portion in bearing or engagement with said first named frame-member, at or on a line with said compression center, and having a third pair of said wheels connected to the other or forward arm-portion thereof at a point that is twice the distance from the vertical plane of said rotative connection that the distance from said last named plane is to the vertical plane of said compression center, substantially as shown and described

2. In a six-wheel truck for supporting a hoisting and conveying machine, or other structure, the combination of two pairs of said wheels connected to a frame-member by rocking connections in parallel opposite relations to each other, at points equidistant from the vertical plane of the compression center of said member, and, a second lever-like frame-member, rotatively connected to said machine, or truck, and having its inner arm-portion in bearing, or engagement with said first named frame-member, at or on a line with said compression center, and having a third pair of said wheels, likewise connected to the other or forward arm-portion thereof, at a point that is twice the distance from the vertical plane of said rotative connection, that the distance from said last named plane is to the vertical plane of said compression center, together with suitable laterally-rocking supports and connections between said pairs and said machine or structure substantially as shown and described.

3. In combination with a hoisting and conveying machine, or other structure, a six-wheel truck, made up of two frame-members, in one of which are mounted two pairs of said wheels, at points equidistant from the vertical plane that passes through the compression center of said member, and, in the forward end of said second member, which is rotatively connected to said machine or structure is mounted the remaining pair of said wheels, at a point that is twice the distance from the vertical plane of said rotative connection that the distance from said last named plane is to the vertical plane of said compression center, said second member being pivoted to said machine or structure, and being in rotative engagement or bearing with said first named member at said compression center, substantially as shown and described.

4. In a six-wheel structure for supporting a hoisting and conveying machine or other structure, the combination of one pair of said wheels, joined by suitable rocking connections to lever-like frame-plates, or members, provided for the purpose, that are rotatively connected to said machine or structure; similar plates or members for the remaining pairs to which said pairs are in like manner joined, the said plates and members being in rotative engagement, or connection, one with the other, at the vertical that extends midway between said last named pairs, the said first named pair being located in its said frame or member, at a point thereof which is twice the distance from the vertical plane of said rotative connection that the distance from said last named plane is to the vertical plane of said compression center, substantially as shown and described.

5. In a truck for supporting a hoisting and conveying machine, or other structure, the combination of a wheel therefor joined, by suitable rocking connections to a lever-like frame-plate or member, rotatively connected to said machine, or structure; two other wheels likewise connected to a second similar plate or member, the said plates or members being in rotative engagement, one with the other, on the vertical that extends midway between said two last named wheels, the said first named wheel being located, in its said frame, at a point thereof that is twice the distance from the vertical plane of said rotative connection that the distance from said last named plane is to the vertical plane of said compression center of said two remaining wheels, substantially as shown and described.

ALEXANDER E. BROWN.

In presence of—
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L. P. SIPPS.