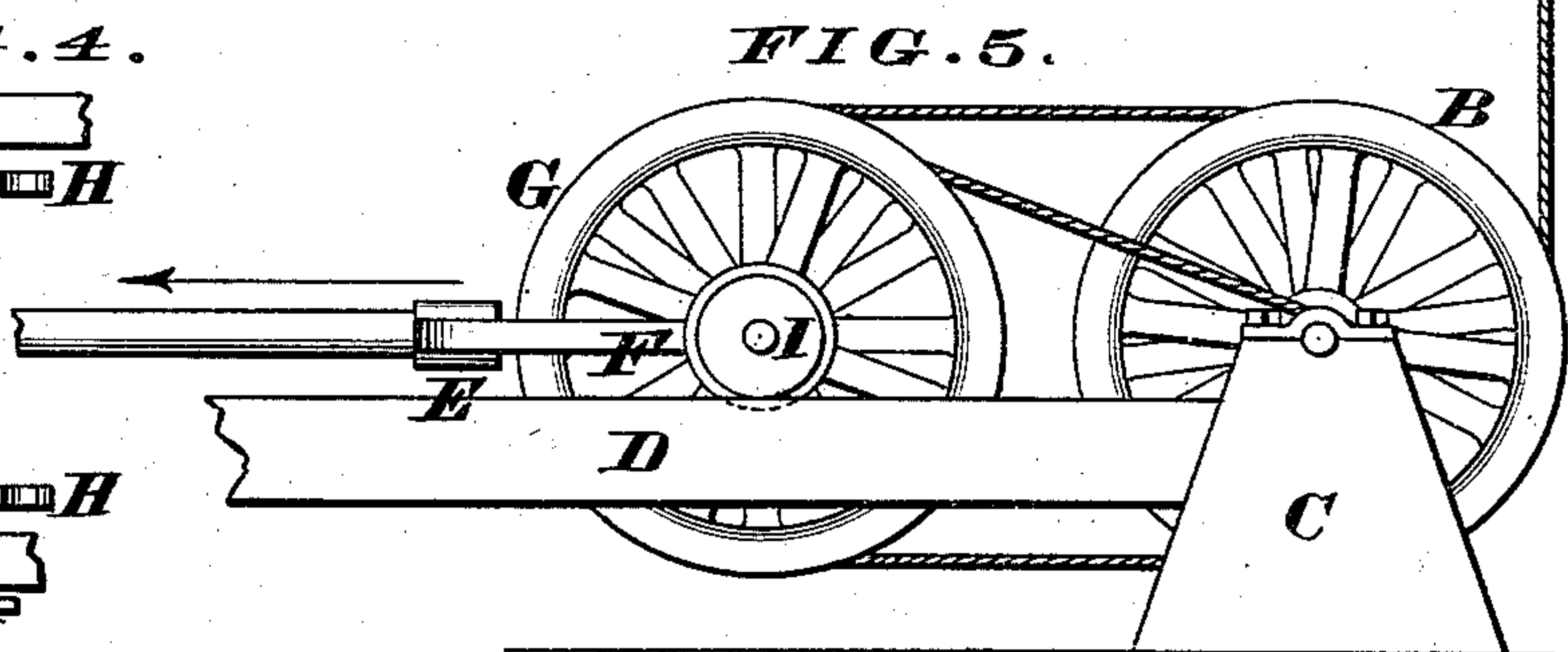
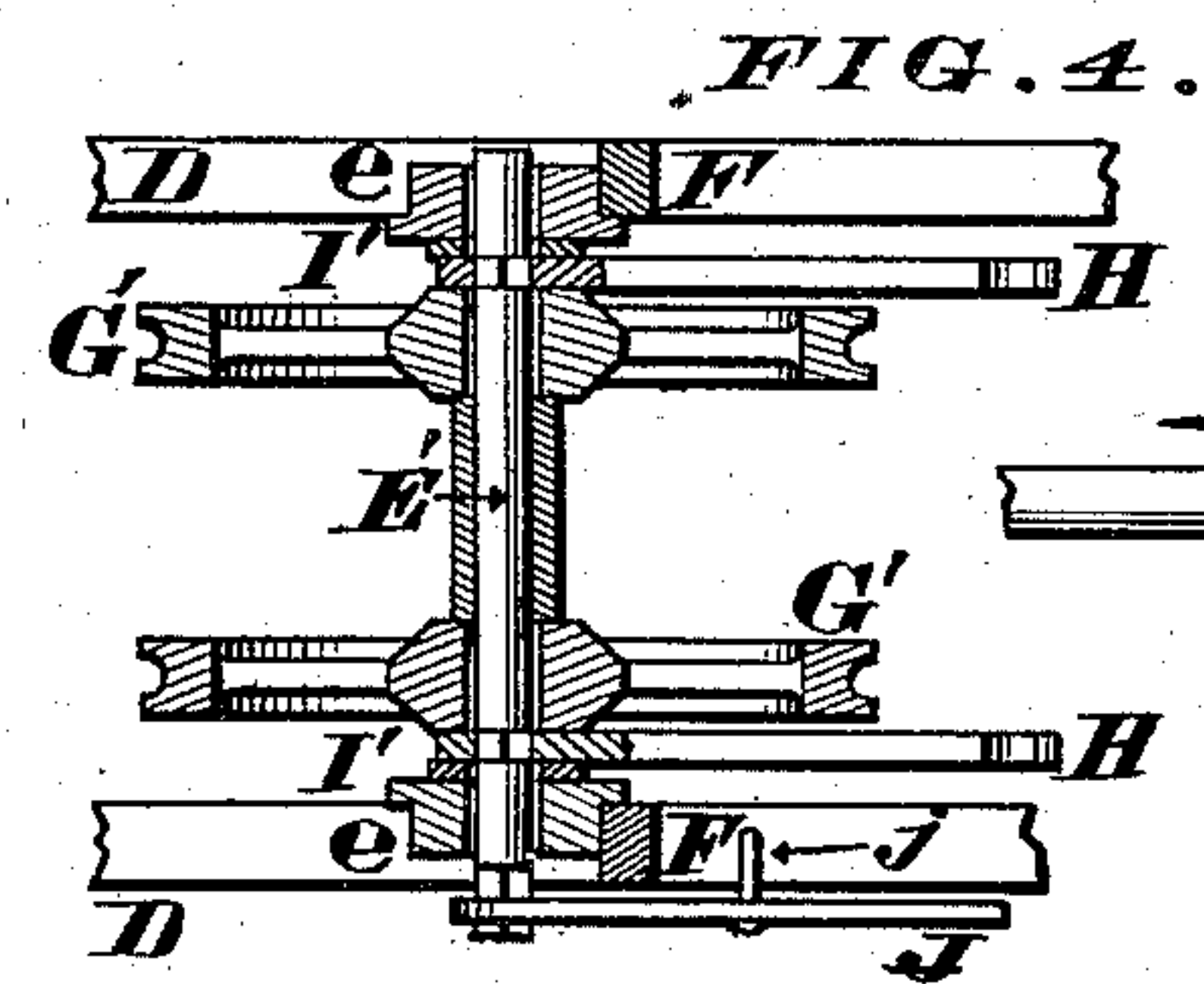
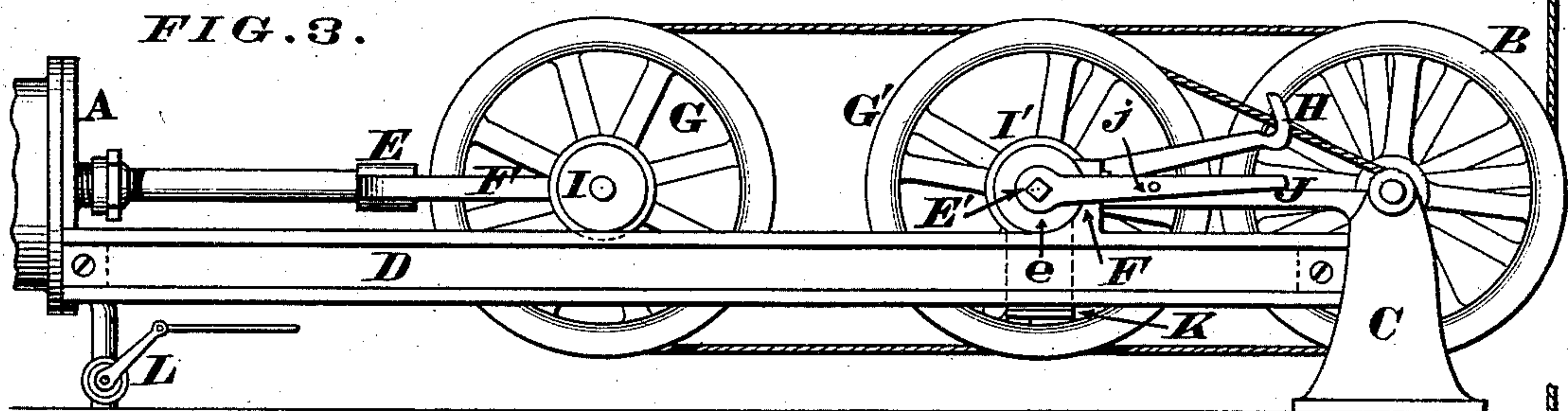
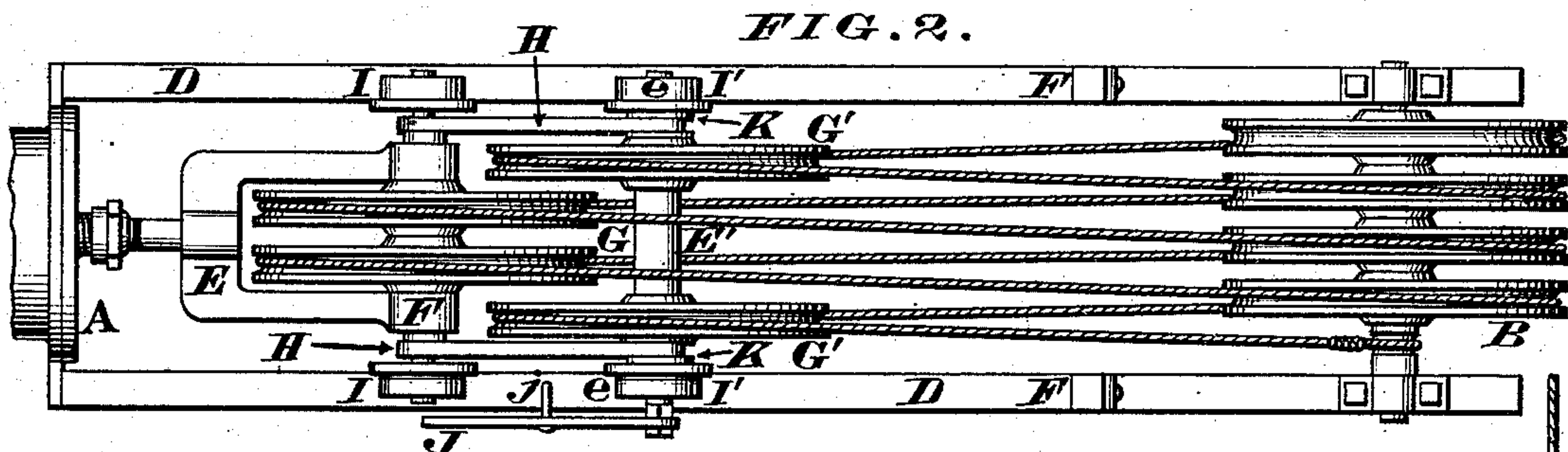
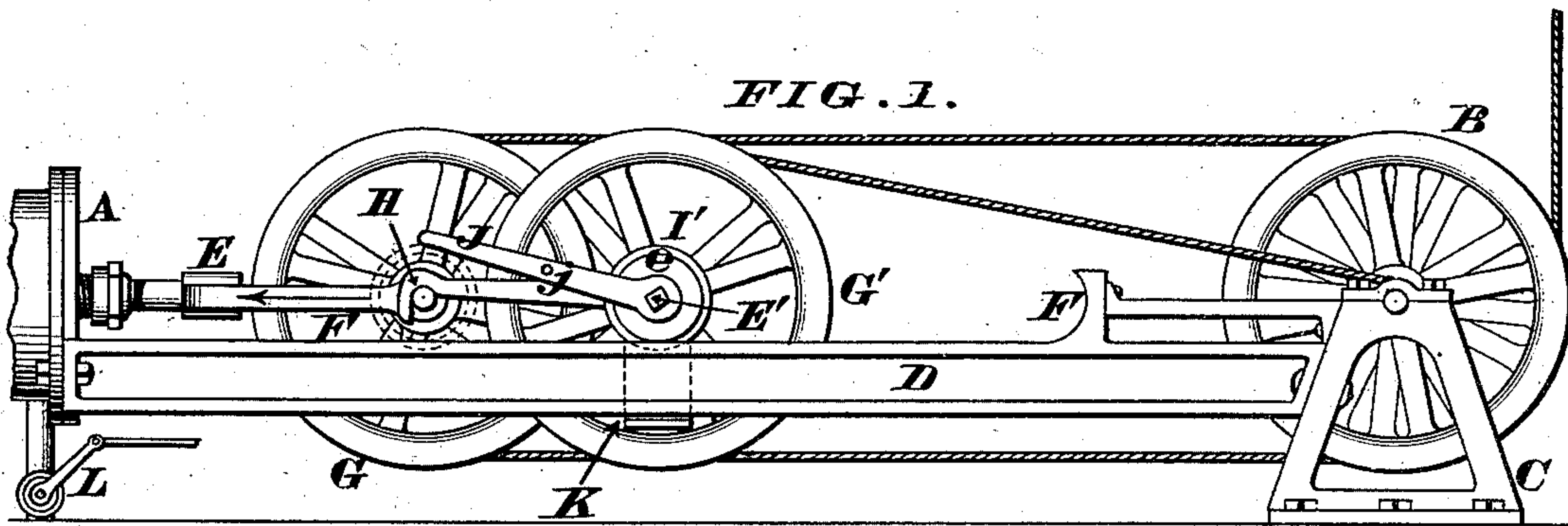


P. P. LANE & S. R. SMITH.  
Hydraulic Elevators.

No. 158,951.

Patented Jan. 19, 1875.



Attest.

Wm. H. Layman,  
Walter H. Knight

Philander P. Lane  
Samuel R. Smith  
By Knight Bros

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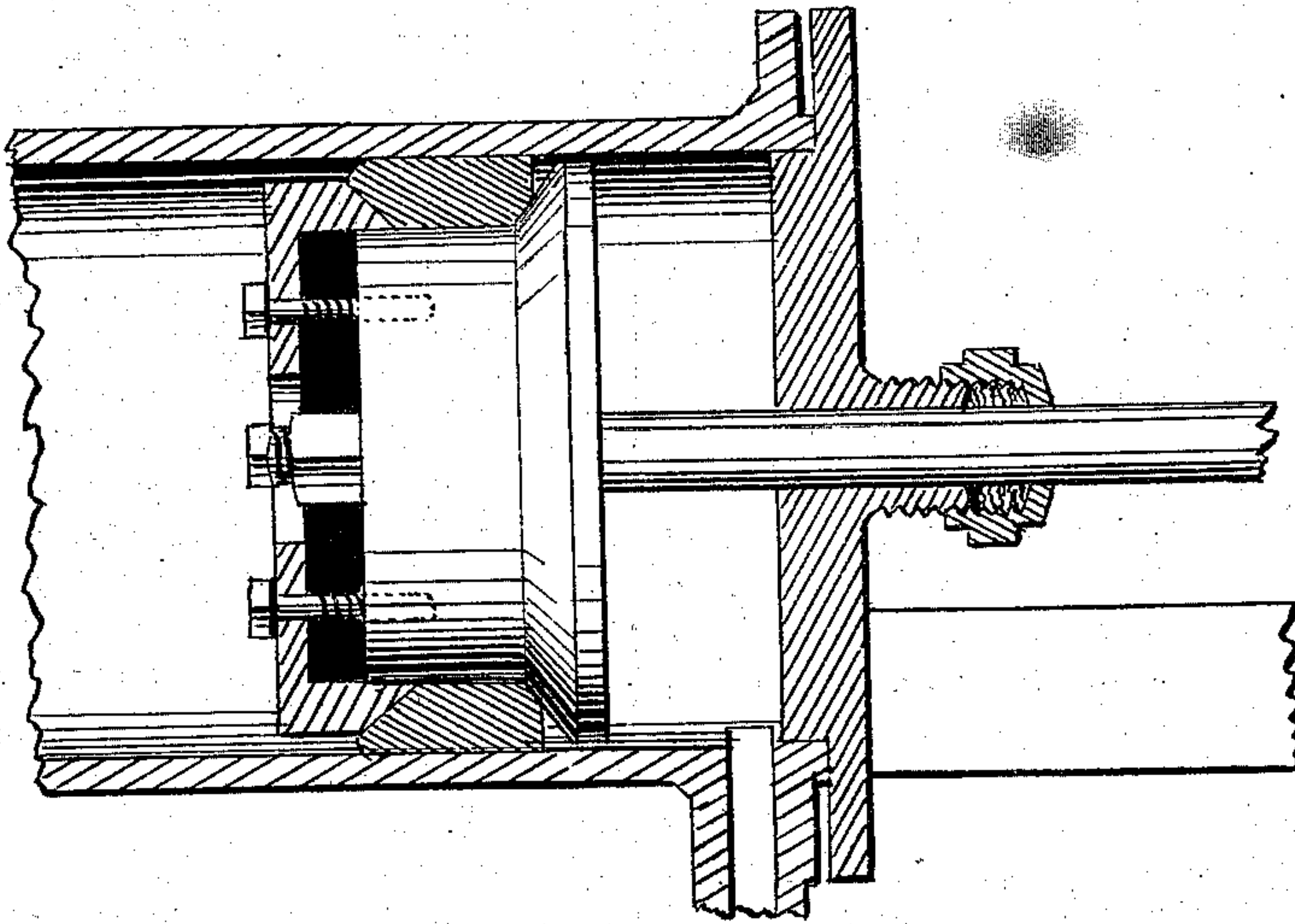
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*FIG. 6.*



WITNESSES

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# UNITED STATES PATENT OFFICE.

PHILANDER P. LANE AND SAMUEL R. SMITH, OF CINCINNATI, OHIO,  
ASSIGNORS TO LANE & BODLEY, OF SAME PLACE.

## IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **158,951**, dated January 19, 1875; application filed  
December 11, 1874.

*To all whom it may concern:*

Be it known that we, PHILANDER P. LANE and SAMUEL R. SMITH, both of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Hydraulic Lifts or Elevators, of which the following is a specification:

Our improvements relate to that class of hydraulic elevators the motion of whose cage or platform is derived from a moving piston, operating through the instrumentality of a cable, whose lower end is secured to some fixed object, and whose other end is rove around two sets of sheaves, of which one set is in fixed bearings, and the other set ("travelers") in traveling bearings, which, being fastened to the piston-rod, are made capable of being drawn away from the said stationary set.

The parts being thus arranged and attached, admission of water to the cylinder causes its piston to retract, dragging the traveler with it, so as to haul on the free end of the cable with a speed relatively greater than that of the piston, proportional to the number of traveling sheaves employed.

Our invention, while applicable to all elevators of this class, is especially designed for those in which one or more of the traveling sheaves is made capable of being disconnected from or connected with the traveling bearing, so as to create a differential power, and thus enable the operator to economize water in the case of light loads, or to apply the full force of the lift with heavy loads.

In hydraulic hoists of this description the stationary sheaves and the travelers have always been separated by the entire length of the actuating-cylinder.

This arrangement, while it has the advantage of great compactness, is subject to defects, which much more than counterbalance such advantage. One of these defects is that of subjecting a large portion of the cable to the deleterious action of the water which escapes in less or greater quantities from the cylinder. Another is that the portions of the cable most subject to deterioration from the above cause are wholly or partially hidden by the cylinder, and, consequently, more liable to escape observation. Still another objection

is the necessity of employing as much greater length of cable as the length of the cylinder multiplied by the number of sheaves, both stationary and traveling. These defects we avoid by placing both sets of sheaves at the same end of the cylinder—namely, that end which is nearest to the platform—the stationary set being secured at such distance from the cylinder as to permit the interposition and traverse of the traveling set. For this purpose we interpose between the cylinder and the housing of the stationary sheaves a rigid frame, which may also serve as ways for the cross-head of the travelers. To this cross-head the piston-rod is united, but so as to act by a pulling instead of a thrusting motion, as heretofore, the piston-rod being presented toward instead of from the stationary sheaves. In that form of the apparatus which includes one or more separable travelers this arrangement possesses the advantage of enabling the change for light or heavy loads to be made at the proper time and place—namely, when the platform is at its lowest position.

Other advantages incident to the peculiar construction of our apparatus will be hereinafter explained.

Figure 1 is a side elevation, illustrating that condition of our elevator in which all the traveling sheaves are effective. Fig. 2 is a plan of the same. Fig. 3 is side elevation, showing the separable travelers uncoupled, and, consequently, in their inactive condition. Fig. 4 is a horizontal section through the separable travelers. Fig. 5 shows a modification in which none of the traveling sheaves are separable. Fig. 6 is a longitudinal section of our cylinder, showing the form of piston we prefer to use.

The cylinder A differs from that of the ordinary apparatus only in having its closed end toward the hatchway and stationary sheaves B, whose pedestal or bearing C is held at the proper distance from, and at the same time firmly united to, the cylinder by beams D, which may also serve as the guides or ways for cross-head E, or traveling bearing of sheaves G, and for the cross-head E' of the separable travelers G', which latter are capable of being coupled to the travelers G



by hooks H, which, when a light load is to be elevated and economy of water is desired, are engaged over the cross-head E of the said travelers G. When, on the other hand, the platform is heavily loaded, the hooks H are disengaged, so as to throw the gang G' temporarily out of service, and to enable the use of a full stroke of the piston with a corresponding greater expenditure of water, and greater exertion of power. I I' are friction-rollers to enable the cross-heads to travel easily along the ways. In the disengaged or idle position of the gang G', hubs e (or other member) bear firmly against cored posts F, and co-act with the stress of the cable to hold said gang G' at rest. In the normal position of the travelers G their cross-head E is so near that of the separable gang G' that the hooks H are easily engaged over the cross-head E, and the first outward action of the gang G operates to take up the slack provided for this purpose, after which both gangs travel in company.

In the above arrangement, the piston-rod, operating wholly by a pulling action, no trembling or buckling can occur, and a much lighter rod may be used. J is a hand-lever attached to one end of the cross-head or shaft E' upon which the traveling sheaves G' are loosely journaled, and this lever is provided with an inwardly-projecting pin, j, that bears upon the frame of the machine when said sheaves are disengaged from the piston cross-head E, as shown in Figs. 2 and 4. As the coupling-hooks H are also attached to said shaft or bearing E', it will be understood that, by properly manipulating the lever J, the intermediate set of sheaves can be readily attached to, or disengaged from, the cross-head carried by the piston of the machine. Depending from the shaft or bearing E' of the traveling sheaves G are flanged hangers K, which engage under the tracks D, and there-

by act to prevent displacement of said bearing. L is a cock or valve for admitting water into, and discharging water from, the cylinder A, which cock may be of any approved construction, and operated either by hand or automatically by the machine.

In Fig. 6 we illustrate the form of piston that we prefer to use in connection with our hoisting apparatus.

We claim as new and of our invention—

1. A hydraulic lift-engine, having two sets of sheaves, one stationary and one traveling, both of them located at one end of the cylinder.

2. The stops or abutting-posts, which bear against the hubs or other member of the separable travelers, and which co-act with the hoisting-cable to hold said travelers to their inert position, corresponding with the lowest position of the platform, as and for the purpose explained.

3. The cross-head that carries the set of main traveling sheaves adapted to run up so as to permit an easy engagement or disengagement of the hooks of the separable travelers, in the manner specified.

4. In combination with the hydraulic cylinder, the fixed and traveling sheaves, (one portion of the traveling sheaves being detachable,) and the stop, to arrest the motion of the detachable portion of the sheaves, the whole combined so as to enable the connection and disconnection of the detachable portion of the traveling sheaves when the platform is at or near the bottom of its run, substantially as set forth.

In testimony of which invention, we hereunto set our hands.

PHILANDER P. LANE.  
SAML. R. SMITH.

Attest:

GEO. H. KNIGHT,  
JAMES H. LAYMAN.