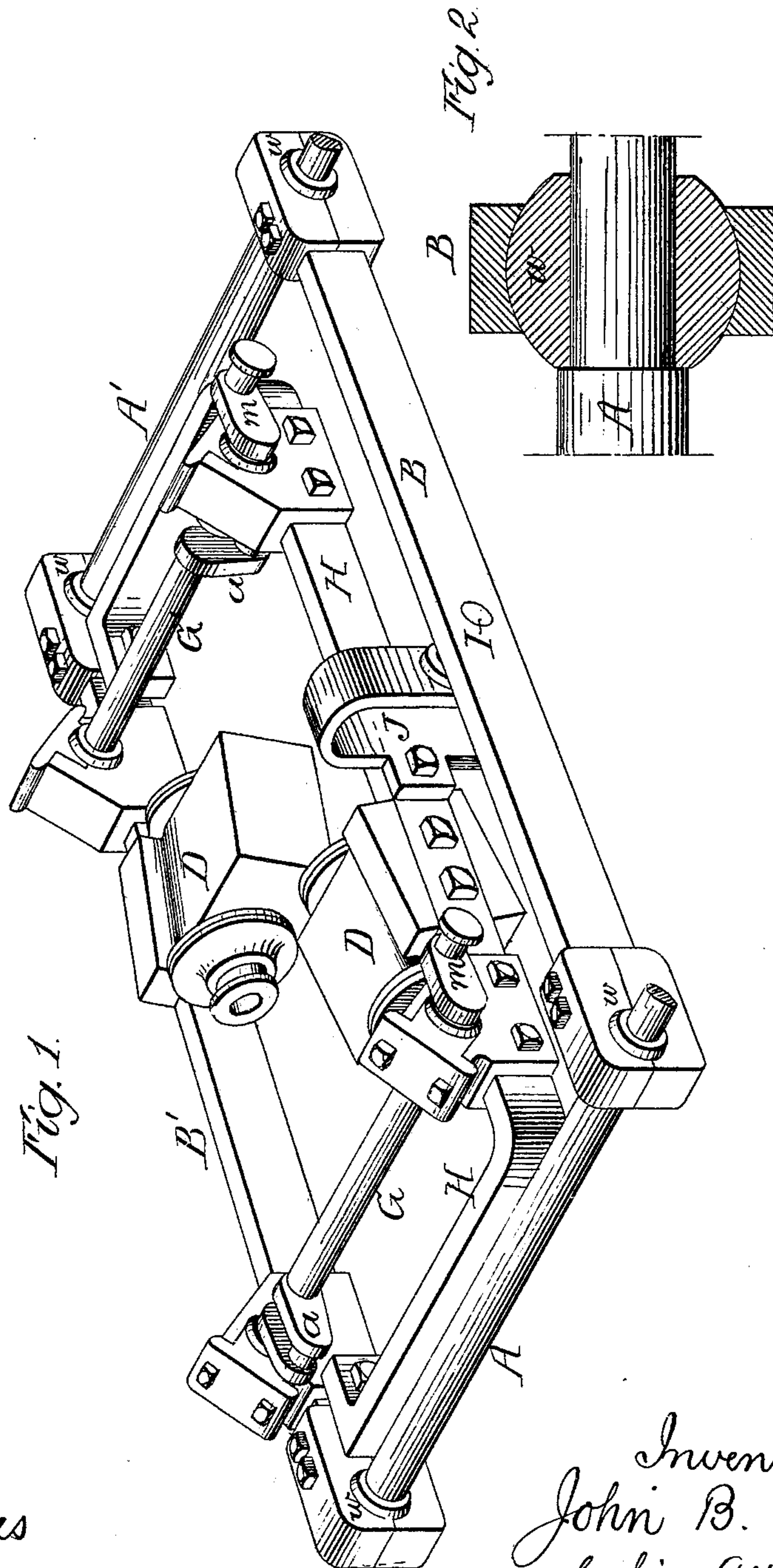


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Patented July 29, 1879.



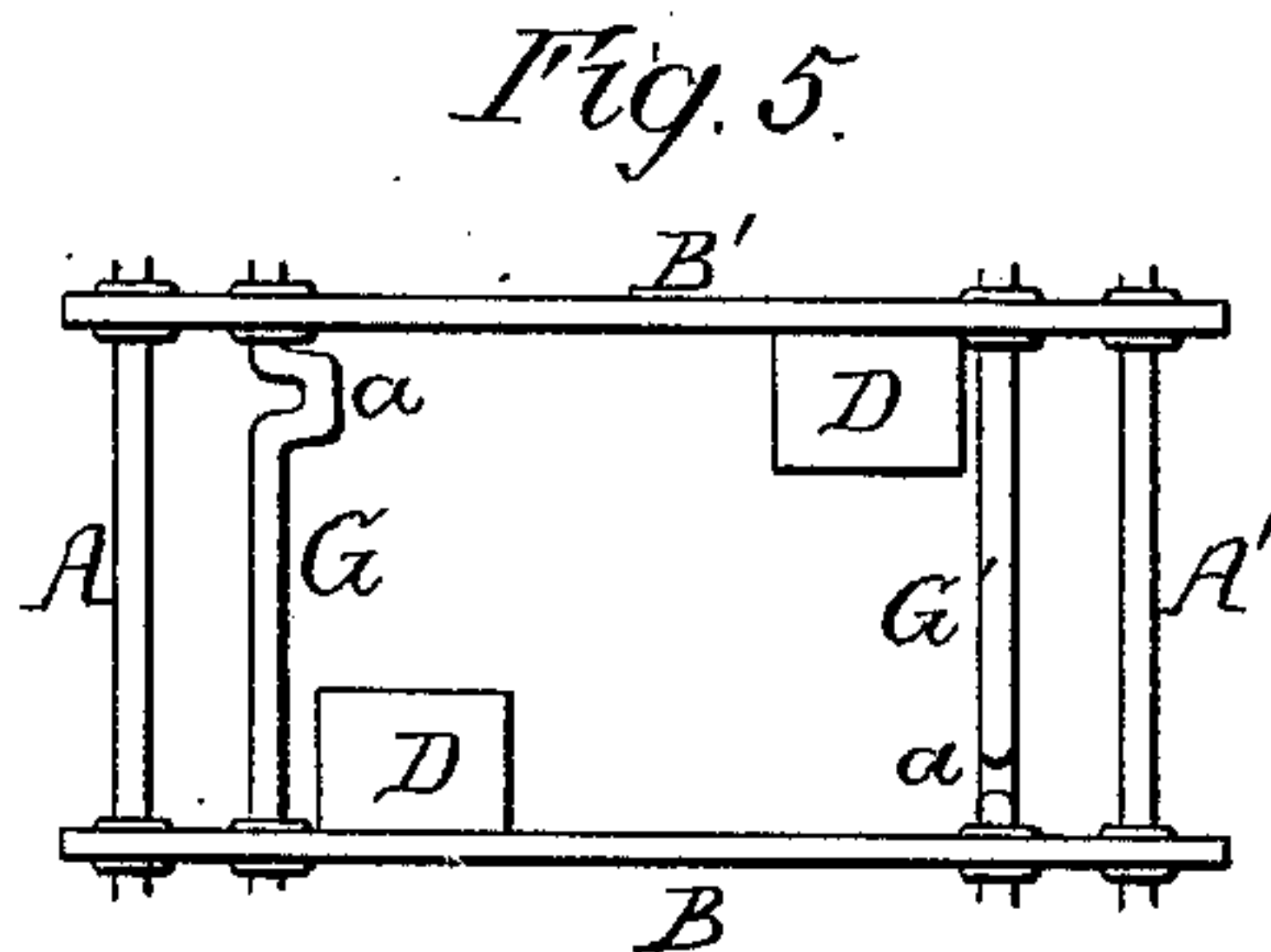
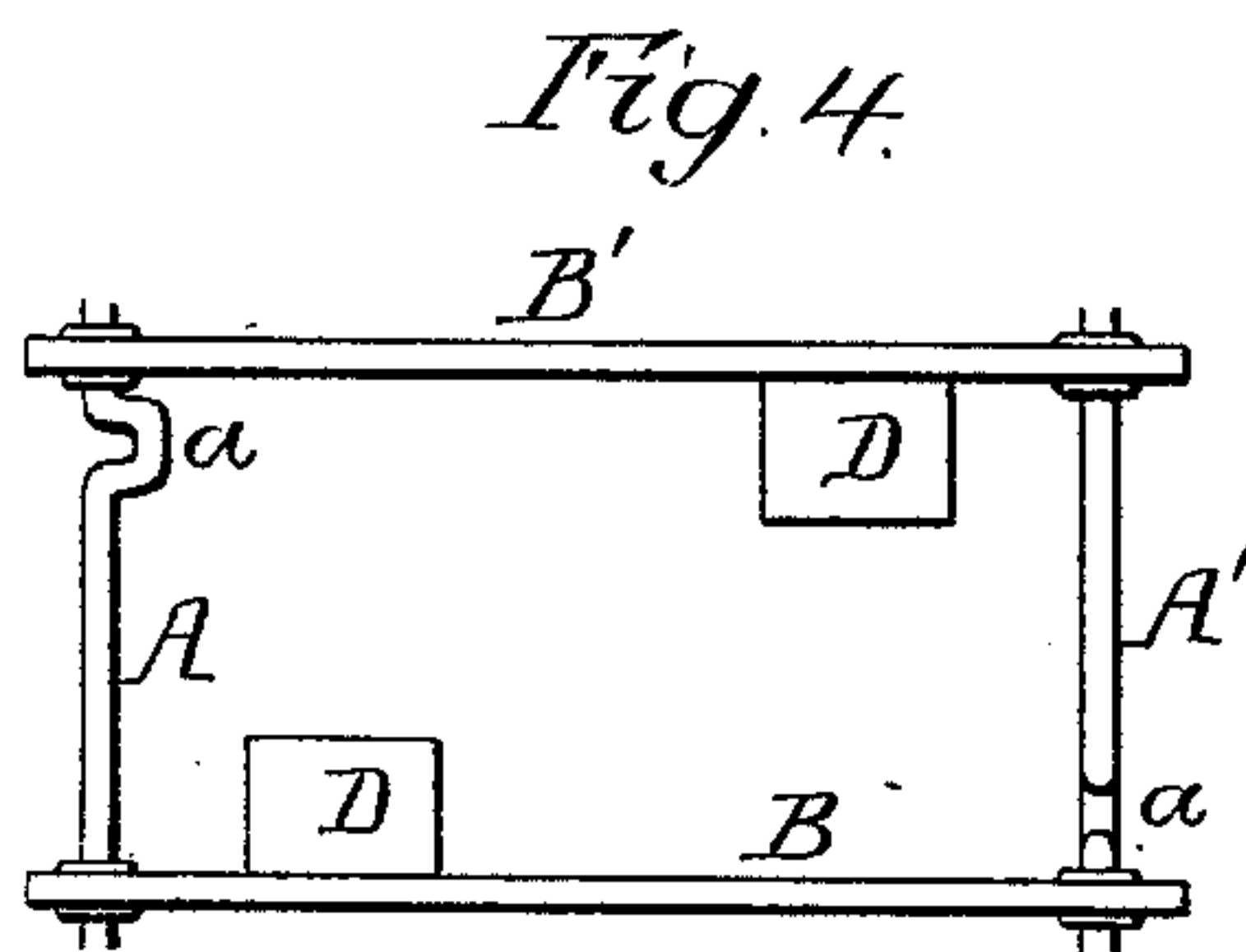
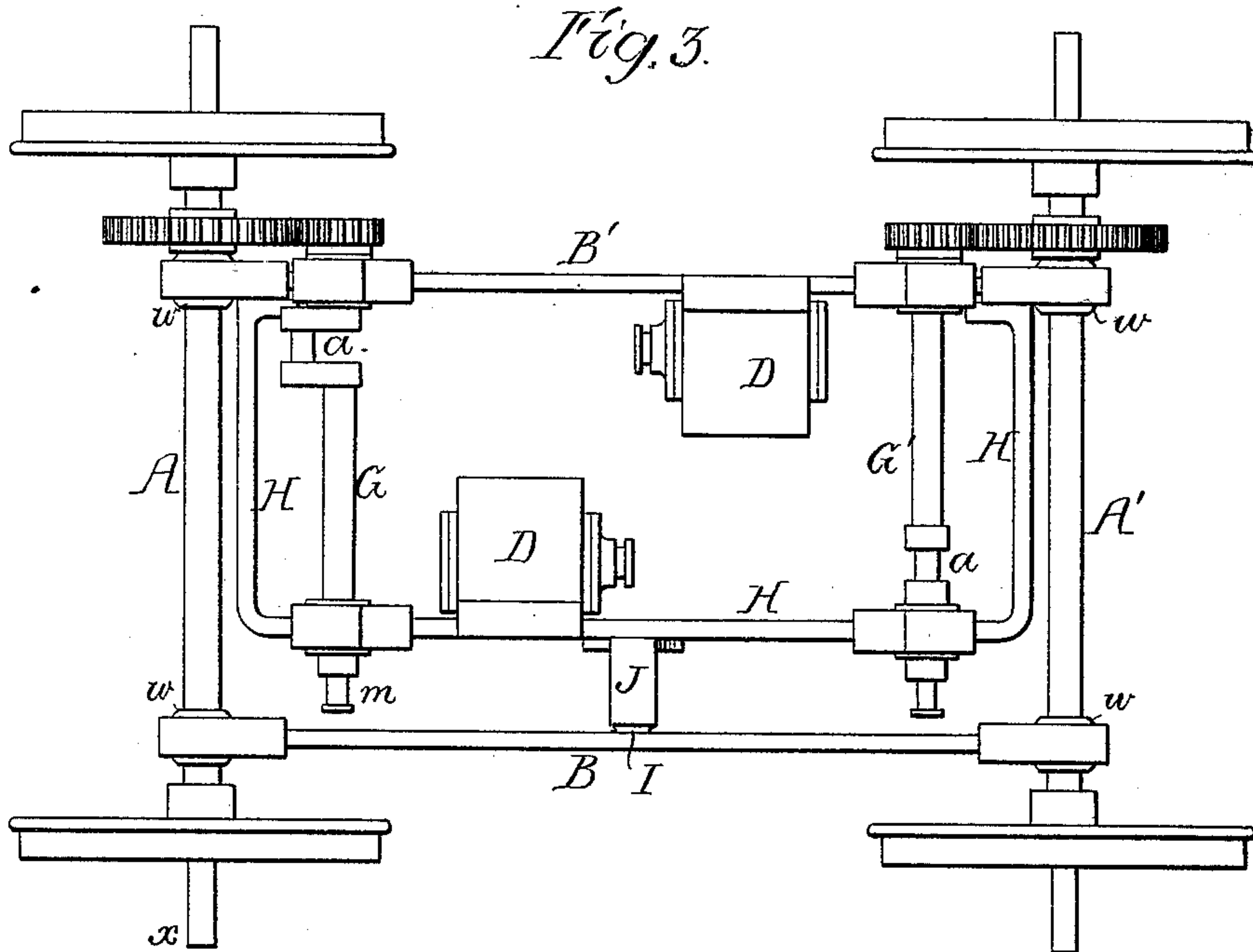
Witnesses  
McQuinn  
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Inventor.  
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# UNITED STATES PATENT OFFICE.

JOHN B. WARING, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENT,  
TO WARING CAR MANUFACTURING COMPANY.

## IMPROVEMENT IN ENGINE-FRAMES FOR STREET-CARS.

Specification forming part of Letters Patent No. **218,092**, dated July 29, 1879; application filed  
February 18, 1879.

*To all whom it may concern:*

Be it known that I, JOHN B. WARING, of New York city, have invented a new and useful Improvement in Engine and Frame for Street-Cars, of which the following is a specification.

My invention relates to driving mechanism for street-cars and other like vehicles in which compressed air or steam is used to actuate the pistons of the engines; and the main object of my invention is to make an engine and frame which shall not be injuriously affected by the shocks and jars resulting from the passage of the car-wheels over the imperfect joints or obstructions on the rails or by the yielding and recoil of the car-body.

This object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a perspective view illustrating the manner in which I prefer to carry my invention into effect; Fig. 2, a section of one of the bearings of the frame; Fig. 3, Sheet 2, a plan view of Fig. 1; Fig. 4, a diagram illustrating the simplest form in which the main feature of my invention is embodied, and Fig. 5 another diagram showing a modification of Fig. 4.

Referring to the latter diagram, A A' are the car-axles, furnished with the usual flanged wheels, and having journals revolving in the usual boxes adapted to hangers on the car-frame, which is supported on springs in the ordinary manner.

B B' are two bars of wrought-iron, carried by the axles, which revolve in suitable bearings in the said bars, the latter constituting the frame of the engine, and these bars may, if desired, be connected together by suitable stay-rods. To each bar is secured a cylinder, D, the piston of one cylinder being connected to a crank, *a*, of one axle, and that of the other cylinder to the crank of the other axle.

It will be seen that both engines and frame are carried by the axles, and are entirely independent of the car-frame and car-body, and therefore cannot be disturbed by the yielding and recoil of the said car-frame.

In the modification shown by the diagram, Fig. 5, two cranked shafts, G G', driven by the

engines, have their bearings in the bars B B' of the engine-frame, each crank being so geared to the adjoining axle that the latter shall revolve at a slower speed than the driving-shafts, which may be coupled together by additional cranks and connecting-rod.

The plan which I prefer, however, of carrying my invention into effect is that shown in Figs. 1 and 2, Sheet 1, and Fig. 3, Sheet 2, on reference to which it will be observed that there are the same frame-bars B B', carried by the axles, as in Figs. 4 and 5, and two driving-shafts, G G'; but there is also an additional or supplementary frame, H, the ends of which are permanently secured to the bar B', the frame having no connection with the opposite bar, B, excepting through the medium of a pivot, I, which is secured to the said frame H, and on which the bar B is at liberty to vibrate.

Each cranked driving-shaft has one of its bearings on the bar B', and the other bearing on the frame H, between which and the bar B there is room for the movement of the cranks *m m*, one on each shaft, the two cranks being coupled together by an ordinary connecting-rod, which it has not been deemed necessary to show in the drawings, the rod passing through an eye, J, of which the pin I forms a part, or to which the said pin may be secured.

Each bearing *w*, Fig. 2, of the bars B B' is rounded and confined to a concave socket of corresponding form in the bar.

The advantages of this arrangement in connection with the supplementary frame will be best understood by reference to the ground-plan, Fig. 3.

If we suppose the axle A to be tilted up at *x*, owing to an obstruction on the rail which the wheel at that end of the axle traverses, the movement imparted to the frame H through the medium of the pivot-pin will be very slight compared with the extent of the tilting movement imparted to the axle; in other words, the supplementary frame, carrying the cylinders and their adjuncts, is so far independent of the frame composed of the bars B B' that any sudden vertical movement imparted to the axles will have no such effect on the supplementary frame as to injure the

mechanism carried by the said supplementary frame. The rounded bearings *w*, moreover, readily accommodate themselves to any inclination which the main frame may assume owing to imperfections of or obstructions on the rails.

I am aware that in dummy-engines and steam street-cars the engine and its frame have been supported in part by one of the axles and in part by the frame of the car. This, therefore, I do not claim. Indeed this arrangement does not obviate the difficulties which my invention overcomes.

I claim as my invention—

1. The combination, with the axles, of a power-driven street-car or analogous vehicle, of a frame independent of the car-frame, and having bearings embracing both axles, which serve as the sole support for the said frame and for the engines secured thereto, all substantially as described.

2. The combination of the axles with a frame independent of the car-frame, and supported by and having bearings embracing the said axles, the cranked driving-shafts geared

to the axles, and the engine or engines carried by the said frame, substantially as described.

3. The combination of the axles, the bars B B', carried by the axles, the supplementary frame H, secured to one bar, pivoted to the other, and carrying the engines, with the driving-shafts G G', geared to the axles and carried partly by the supplementary frame and partly by one of the bars of the main frame, all substantially as set forth.

4. The combination of the frame and the engines attached thereto with the axles forming the entire support of both frame and engine and the rounded bearings by which the said frame is connected to the axles, all substantially as set forth.

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

J. B. WARING.

Witnesses:

WILLIAM J. COOPER,  
HARRY SMITH.