

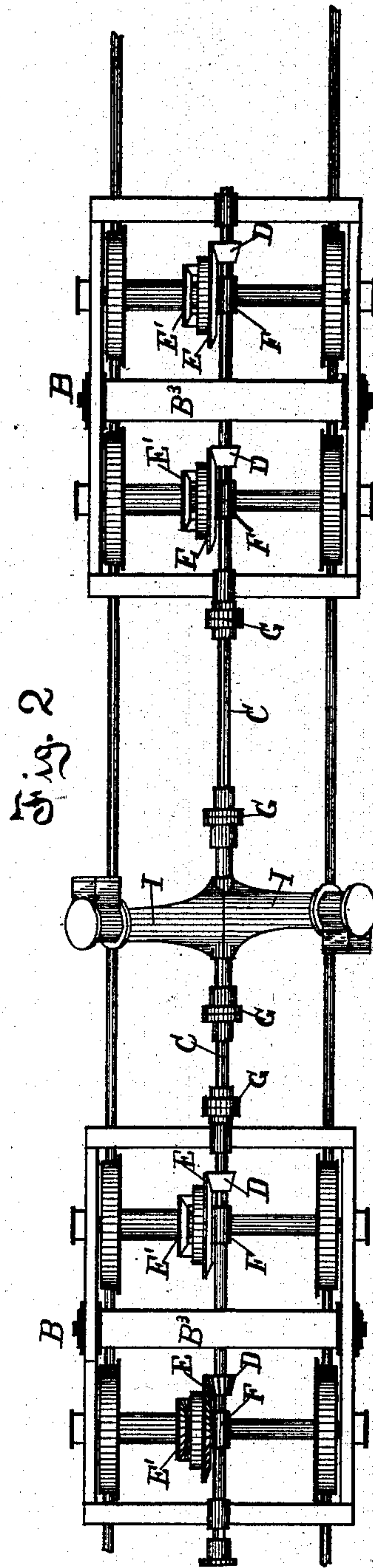
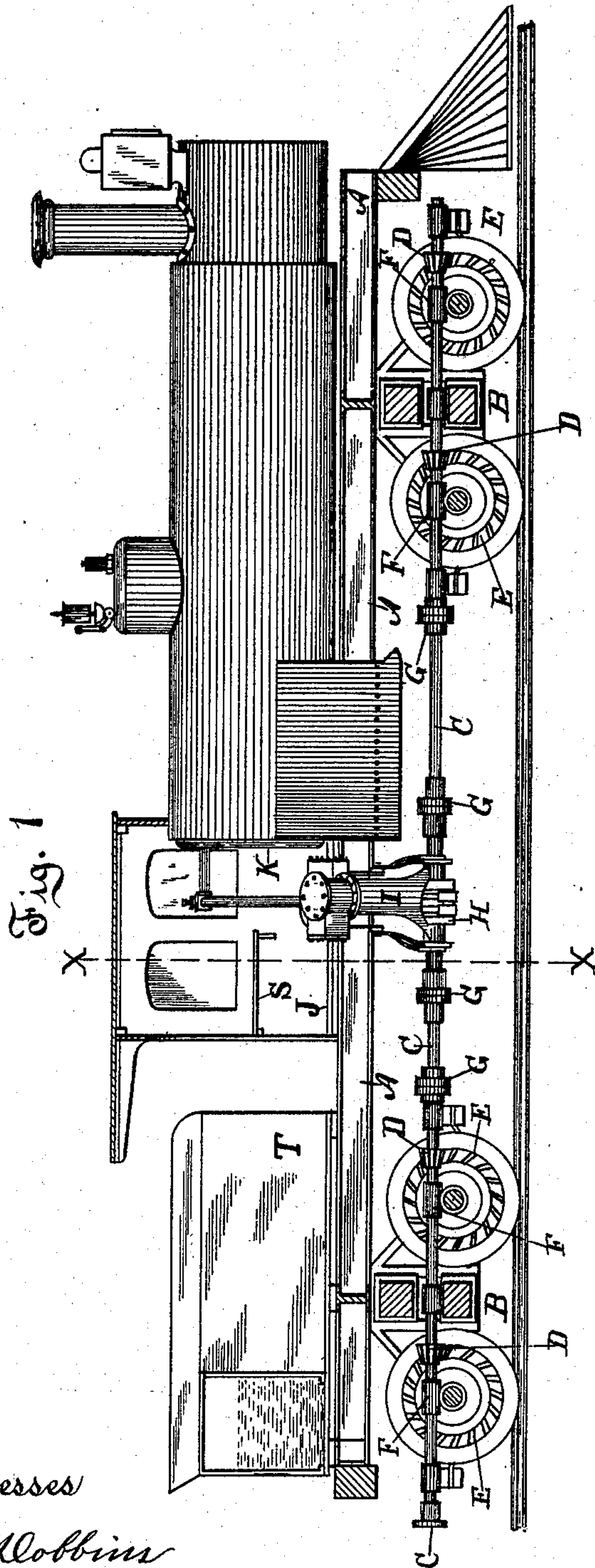
(No Model.)

3 Sheets—Sheet 1.

G. D. GILBERT.
TRAMWAY LOCOMOTIVE.

No. 413,505.

Patented Oct. 22, 1889.



Witnesses

E. H. Lobbin
Bruce Dobbin

Inventor

George D. Gilbert

By Atlys. Hallen & Hallen

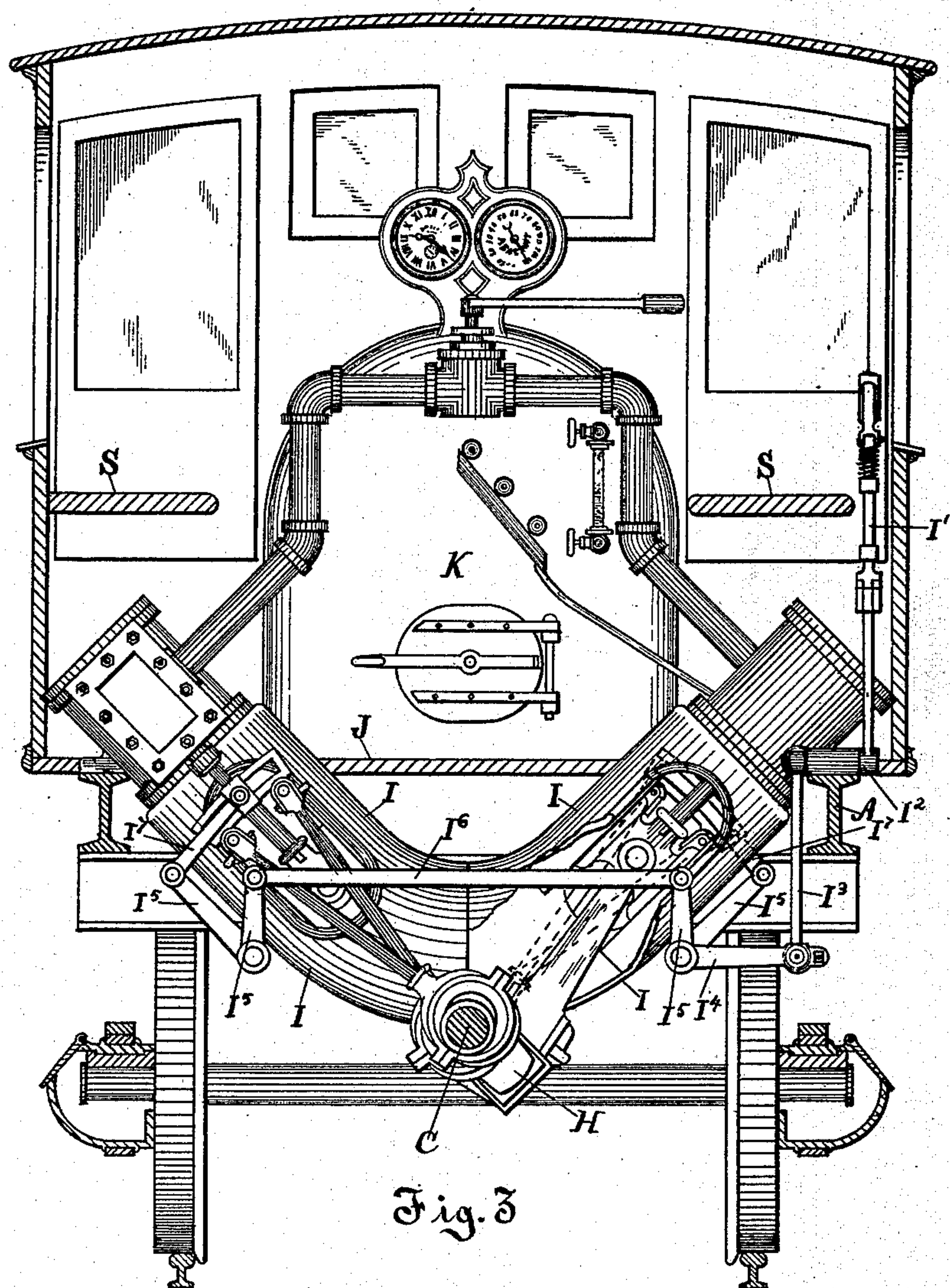
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3 Sheets—Sheet 2.

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Witnesses

S. L. Robbins.
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By his Attys: *Hallcock & Hallcock*

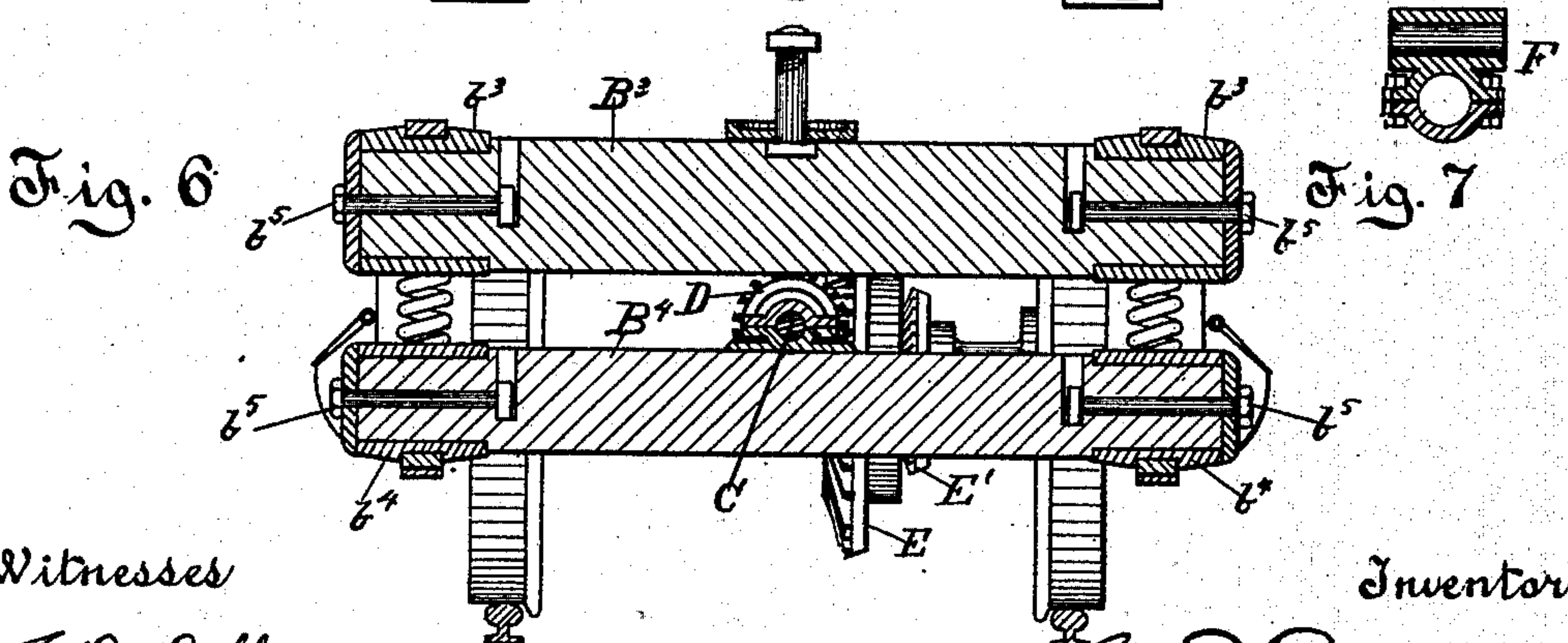
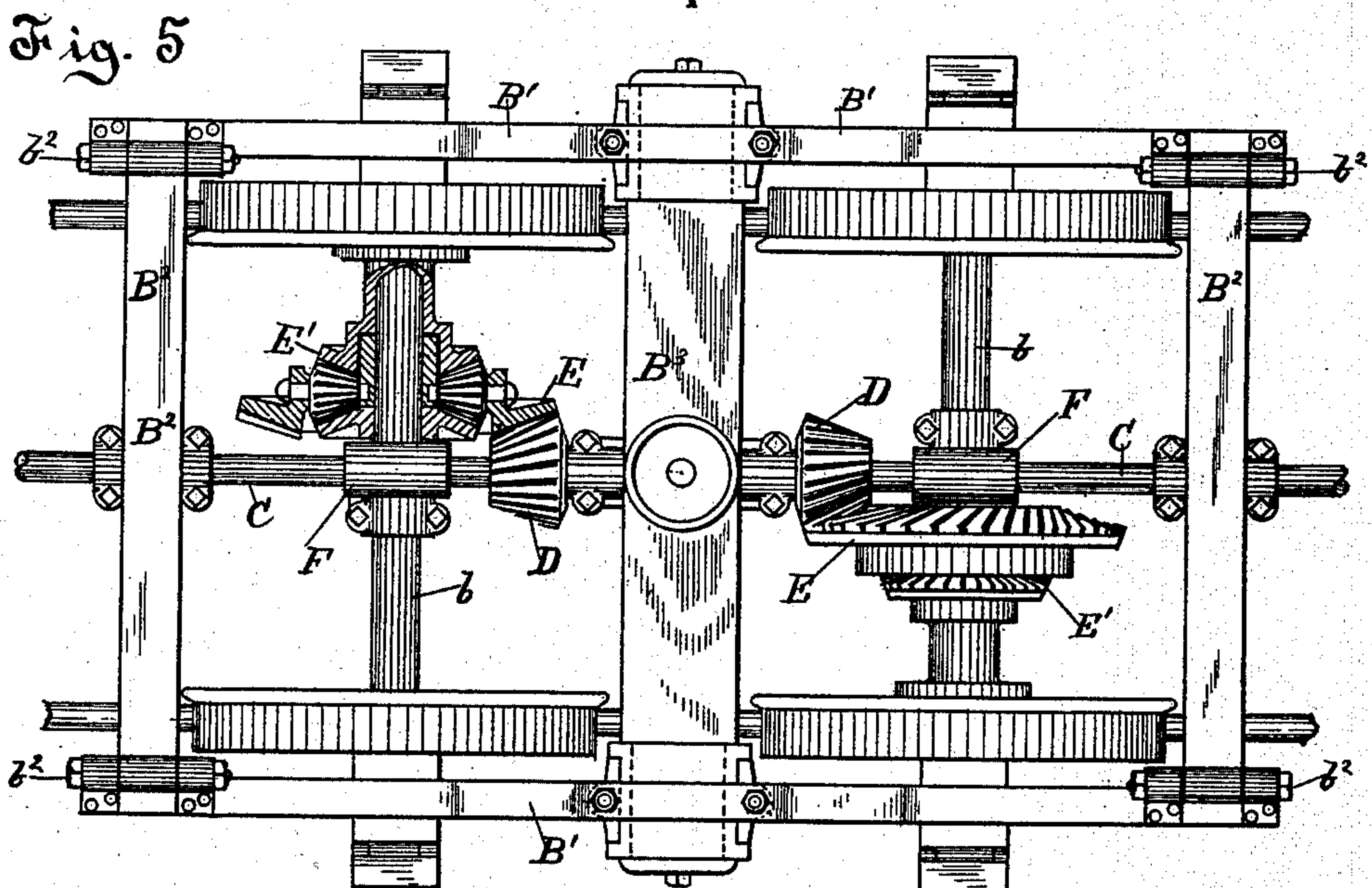
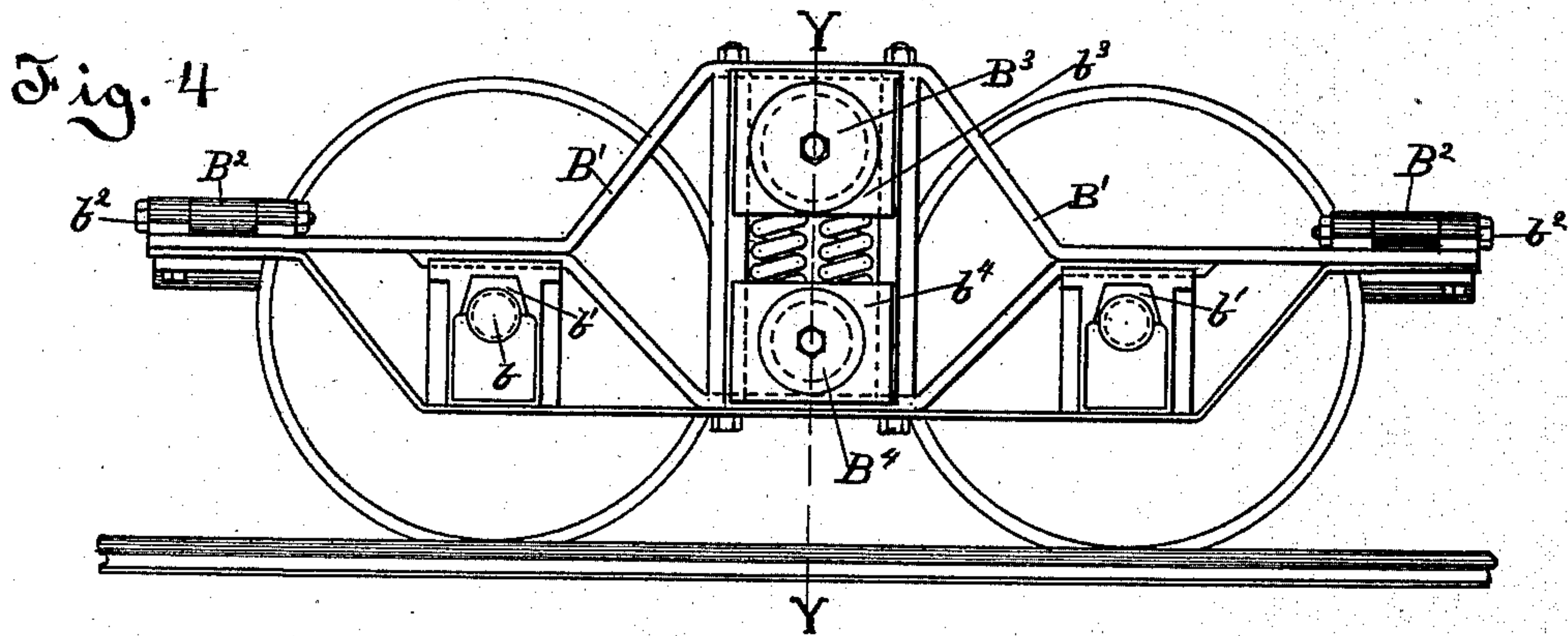
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3 Sheets—Sheet 3.

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Patented Oct. 22, 1889.



Witnesses

E. D. Robbins.
Frederick Robbins

Inventor

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By his Attys.

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UNITED STATES PATENT OFFICE.

GEORGE D. GILBERT, OF CORRY, PENNSYLVANIA.

TRAMWAY-LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 413,505, dated October 22, 1889.

Application filed August 9, 1889. Serial No. 320,206. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. GILBERT, a citizen of the United States, residing at Corry, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Tramway-Locomotives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to locomotives intended for use on tramways; and it consists in certain new and useful improvements in the construction of the same, as will be hereinafter fully set forth, and pointed out in the claims.

My invention is illustrated in the accompanying drawings as follows:

Figure 1 is a longitudinal vertical section with some of the parts in elevation. Fig. 2 is a top or plan view of the running-gear and engine. Fig. 3 is a transverse vertical section on the line $x x$ in Fig. 1. Fig. 4 is a side elevation of one of the trucks. Fig. 5 is a top or plan view of one of the trucks. Fig. 6 is a transverse vertical section of one of the trucks, taken on the line $y y$ in Fig. 4. Fig. 7 is a longitudinal view of one of the boxes F.

Letters of reference denote parts as follows:

A marks the bed-frame of the locomotive; B B, the two trucks; B' B', the side frames of the trucks; B² B², the cross-bars at the ends of the truck-frames; B³ B⁴, the central cross-bars of the trucks; b , the axles; C, the longitudinal centrally-located propelling-shaft; D, the pinions on said shaft; E and E', the gearing on the axles; F, the double right-angle boxes which receive the shaft C and the axles b ; G, universal joints in the shaft C; I, the driving-engines; and I', I², I³, I⁴, I⁵, I⁶, and I⁷, the gearing by which the link-movements of the engines are simultaneously controlled.

Other letters marking minor parts will be referred to in place in the following general description.

In Letters Patent of the United States No. 393,896, issued to me December 4, 1888, I show, describe, and claim the same propelling-gear which I here show; but my present invention is not limited to the use of such gearing.

Where a centrally-located continuous driving-shaft is used, it must run either over or below the axles and driving-pinions on the shaft, and on the axles must be "skew-gears," and when power is being communicated from the shaft to the axles the tendency is for the shaft and axle to spring and throw the gears out of their proper plane. I have found it necessary to provide means for holding the shaft C and axle b rigidly in place, and the most convenient and serviceable appliance for the purpose I have found to be the double journal-boxes F. (Shown in Figs. 1, 2, 5, and 7.) This double journal-box has two shaft-openings—one at right angles to the other. The lower of these openings receives the axle b of the truck and the upper the shaft C. I make the lower box so that it can be clamped upon the axle, and the upper box I make solid and thread the shaft through it; but this detail may be varied. This box goes on the axle immediately in front of the driven gear E, and it holds the shaft C and axle b firmly against springing. Locomotives of this class are generally used on uneven and crooked roads, and as all the wheels are driving-wheels it is very desirable that they at all times set firmly upon the track. To secure this result, I make a jointed truck-frame, which is illustrated fully in Figs. 4, 5, and 6. The two central cross-bars B³ and B⁴ have round tenons on their ends, which set on boxes b^3 and b^4 , respectively, and are secured therein by bolts and caps b^5 . The cross-bars B² at the ends of the frames are hinged to the side frames B' by pivot-bolts b^2 . This combination gives flexibility to the frame of the truck, so that no matter how uneven the track may be the wheels will all rest upon it.

In locomotives of this class it is desirable that the engines act directly upon the propelling-shaft C and not through gearing, and that they be so placed as to counterbalance each other and as low down as possible. This I accomplish by setting the two engines in an inclined position and at right angles to each other, thus forming a V, with the shaft C at the apex and the cylinders at the upper extremities of the arms of the V. This arrangement is clearly shown in Figs. 1, 2, and 3. It will be observed that there is but one

crank H required in the shaft, and that the connecting-rod of each engine connects with the one wrist-pin. The engines, it will be seen, are nearly all below the floor of the cab, 5 and the parts not below the floor are below the side seats S and supported on the frame-work A. This arrangement not only economizes room, but it brings the weight of the engines well down between the wheels, 10 where it should be to avoid vibratory action and prevent top-heaviness. It will further be seen that the engines are placed in front of the fire-box K of the boiler, and that the fireman in passing fuel from the tender T to 15 the fire-box will stand above the engines. The link-movement valve-gears of the engine need not be described, as they are of ordinary construction; but the two valve-gears are connected together by the links I⁷ I⁷ I⁶ and the 20 bell-crank levers I⁵, and the operating-lever I¹ is connected with those parts by the rock-arm I², link I³, and the arm I⁴, extending from one of the bell-cranks I⁵, so that the engineer can govern both engines alike from his position in the cab. 25

What I claim as new is—

1. In a locomotive of the type herein shown, the combination, with the axles *b* and the skew-gears E thereon, the propelling-shaft C,

crossing said axles at right angles, and the 30 skew-pinions D thereon, meshing with the said skew-gears E, of the double-journaled boxes F, embracing the said axles and shaft, substantially as shown.

2. In a locomotive of the type herein shown, 35 the combination, with the side truck-frames B¹, carrying journaled boxes *b*³ and *b*⁴, of the middle cross-bars B³ and B⁴, journaled in said boxes *b*³ *b*⁴, and the end cross-bars B² B², hinged at each end to the said side frames B¹, 40 substantially as shown.

3. In a locomotive of the type herein shown, the combination of a boiler, a cab back of said boiler and over the firing-door of the fire-box of said boiler, a fuel-box back of said cab, 45 a longitudinal centrally-located driving-shaft below said boiler, cab, and fire-box, and two engines acting on said shaft, which are set at right angles to each other, with the said shaft at the apex of said angle, and placed mainly 50 below the floor of said cab and back of the fire-box of said boiler.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE D. GILBERT.

Witnesses:

JNO. K. HALLOCK,

WM. P. HAYES.