

(No Model.)

2 Sheets—Sheet 1.

J. HARTMAN, Jr.

CABLE RAILWAY.

No. 389,887.

Patented Sept. 25, 1888.

Fig. 1.

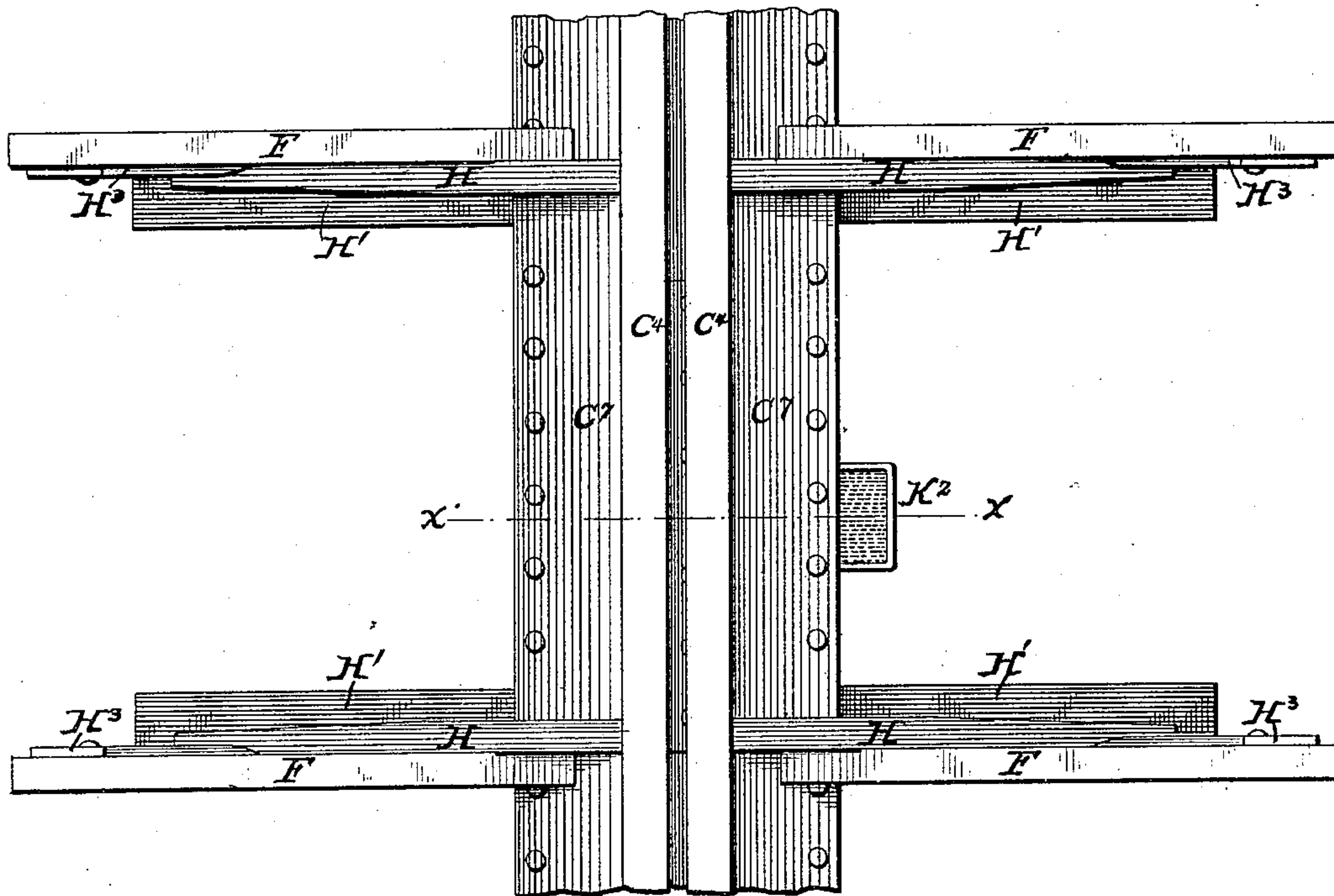
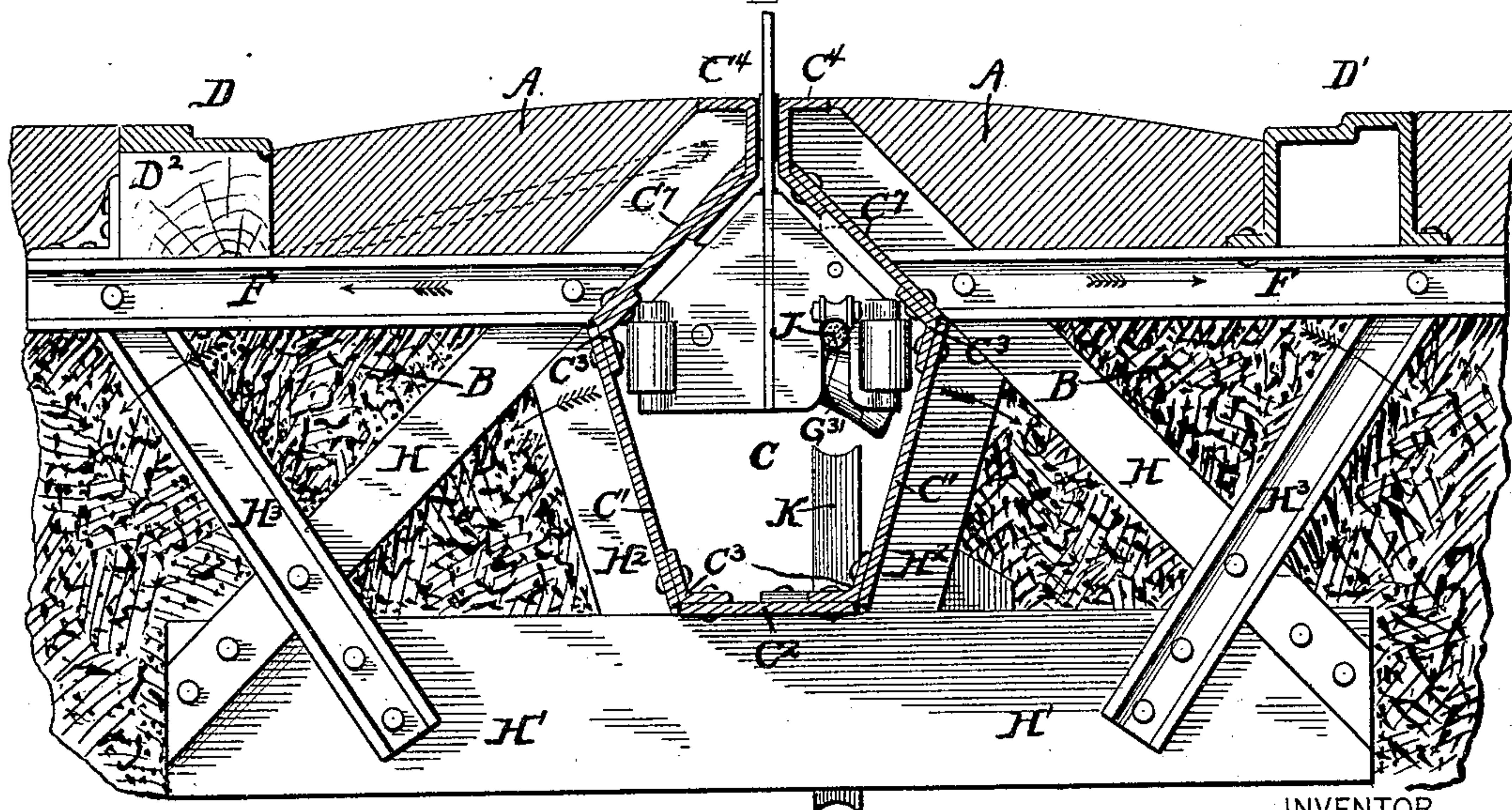


Fig. 2.



WITNESSES:

A. C. Paige,
Geo. McArthur

INVENTOR

J. Hartman, Jr.
by his Atty,
Meyers & Co.

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Fig. 4.

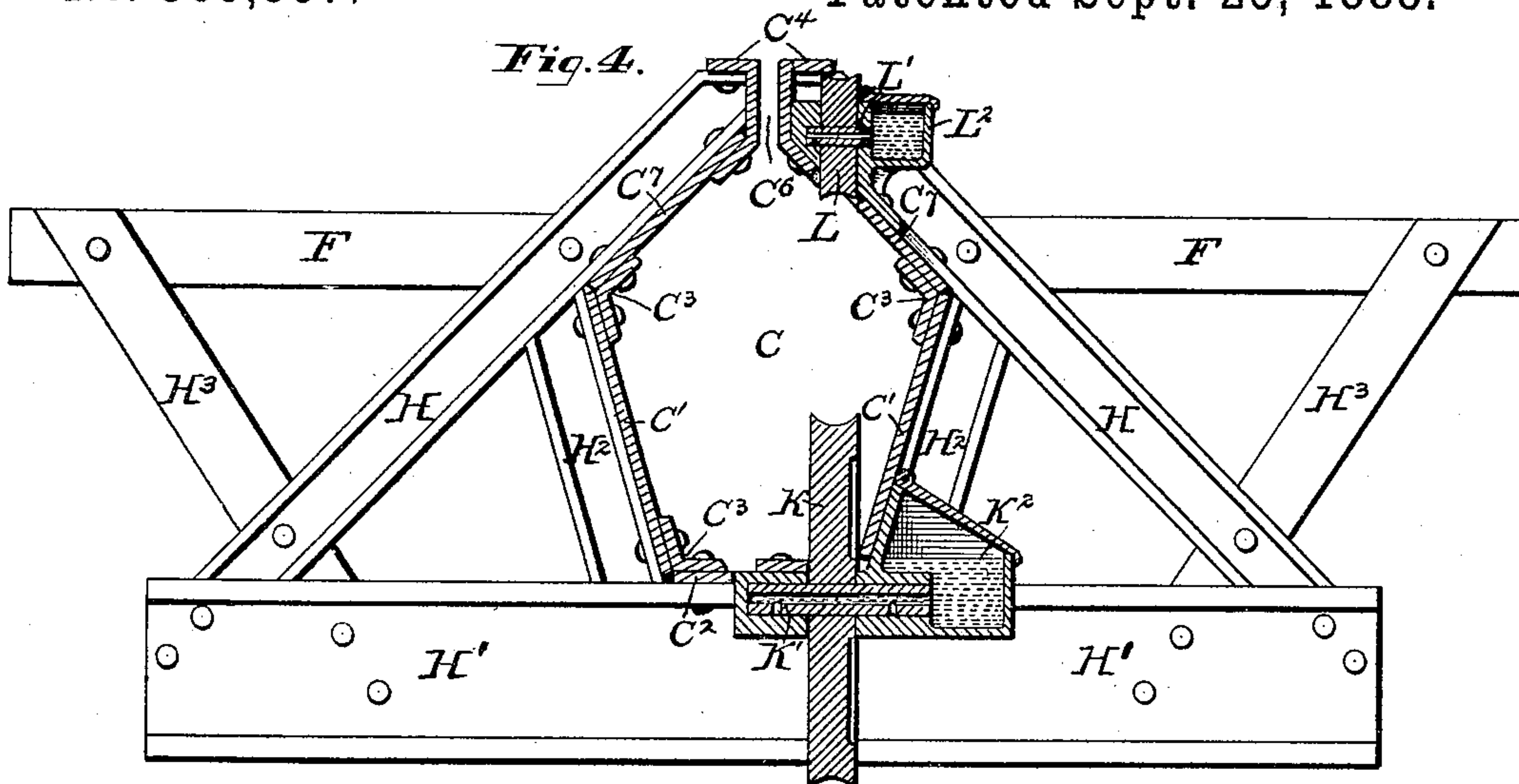


Fig. 5.

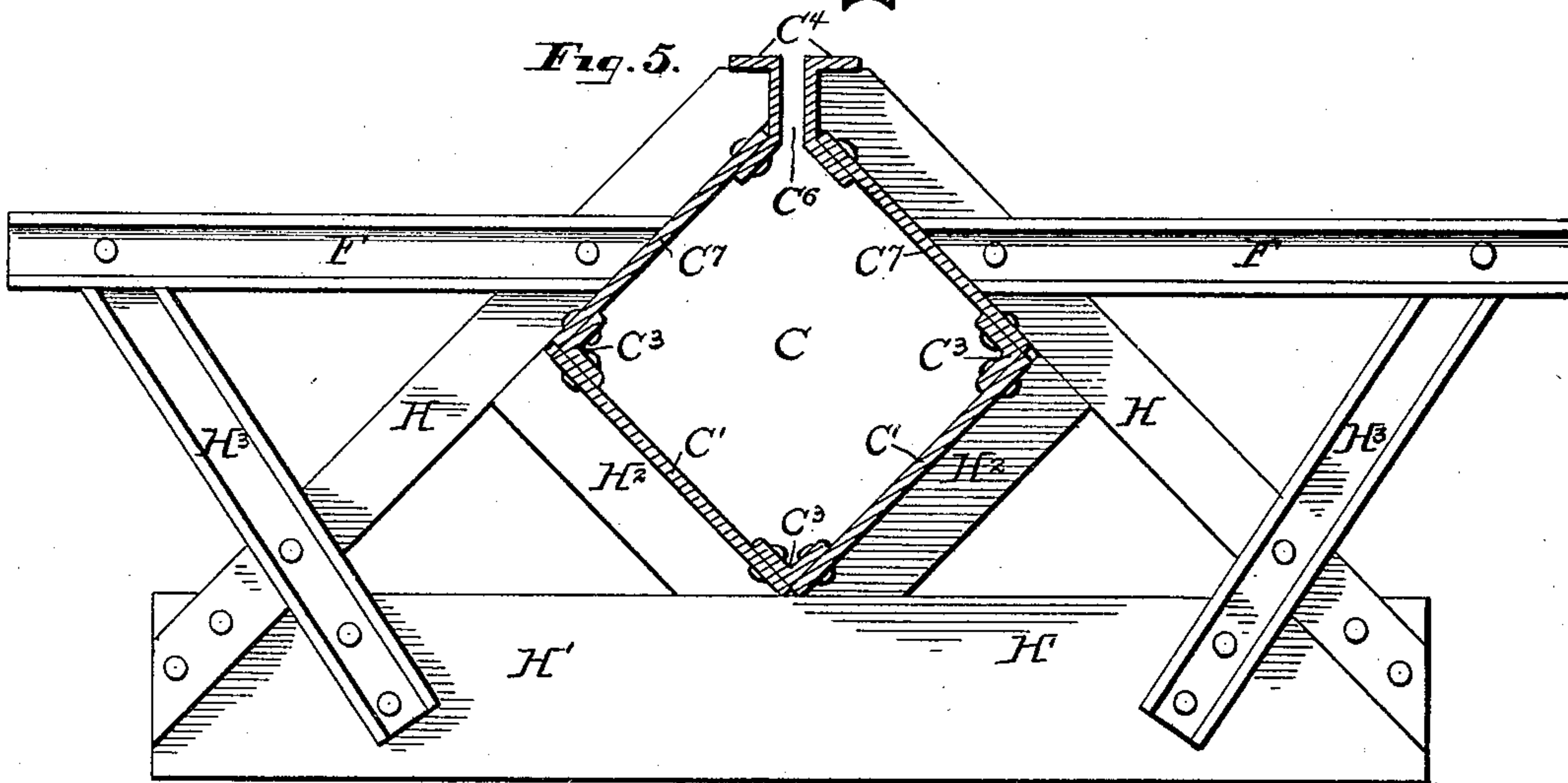
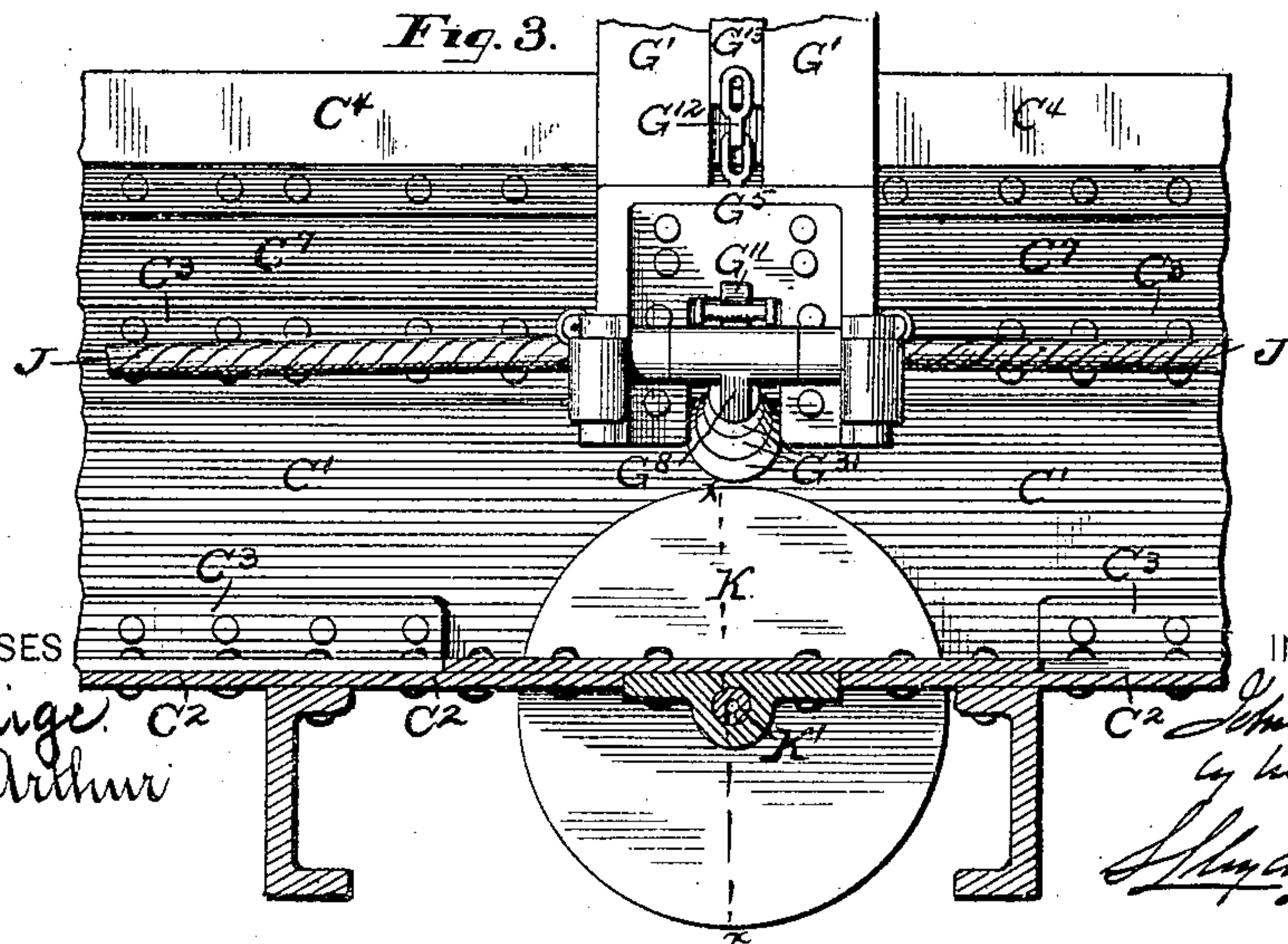


Fig. 3.



WITNESSES

A. C. Paige
Geo. M. Arthur

INVENTOR

J. Hartman, Jr.
by his Atty
J. H. Wagoner

UNITED STATES PATENT OFFICE.

JOHN HARTMAN, JR., OF PHILADELPHIA, PENNSYLVANIA.

CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 389,887, dated September 25, 1888.

Application filed August 19, 1885. Serial No. 174,833. (No model.)

To all whom it may concern:

Be it known that I, JOHN HARTMAN, Jr., a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cable Railways and Conduits; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable others skilled in the art to make and use the said invention.

This invention relates to cable railways and conduits located at the grade or in the plane of roadways or thoroughfares used for other travel. There have been experienced in such railways hinderances and inconveniences in operation consequent upon the expansion by freezing of the soil in which the conduit for masking and protecting the cable is placed, pinching and constricting the conduit so that the gripping mechanism was impeded in its progress, and the wheels used for supporting and guiding the cable demanded frequent lubrication at times when access to them could only be had by interrupting travel.

The object of this invention is, by an improved construction of conduit and wheels, to avoid these difficulties, as herein described and claimed.

I will now proceed to describe the mode of making and using the said invention, referring in so doing to the drawings annexed and the letters of reference marked thereon.

Figure 1 is a plan view of the improved conduit and its braces, the pavement and covering earth or concrete being omitted; Fig. 2, a transverse section of the roadway, showing an end view of the conduit with its bracings and the guiding-wheels, cable, and grip; Fig. 3, a central vertical lengthwise section of the conduit, showing a side elevation of the grip, the cable, and the guiding-rollers. Fig. 4 shows a vertical section through the plane indicated by the dotted line *xx* in Figs. 1 and 3, showing a lower guiding-roller and its lubricating apparatus; and Fig. 5 shows a modification in the form of the conduit in transverse section.

The same letters of reference apply to the same parts in the several figures.

A represents the pavement of the roadway; B, the ballast, concrete, or earth supporting the same; C, the chamber or space of the ca-

ble-conduit; D and D', the tracks or rails for supporting the cars; D², the sill or stringer supporting the rail D from the cross bar or tie F. The rail D' is of metal and of such form as to be directly attached to the cross-tie F without the intervention of timber.

The conduit C is inclosed by walls C' and C' of plate metal, and with a bottom, C², also of plate metal, which are united by angle-irons C³ in the usual mode by rivets. The upper edges of the side walls, C', are braced and stiffened lengthwise by angular channel-bars C⁴, riveted to the plates with their upper flanges turned horizontally outward, and with such a space between the bars C⁴ as to permit the shaft or plate of the gripping apparatus to slide freely between them.

The plates C' C² and angle bars C³ and channel-bars C⁴ of the conduit C are braced vertically by diagonal braces H, formed, preferably, of channel-iron, and secured by rivets to the bars C⁴ at the upper and inner ends, and at the lower and outer ends to the base plate or sill H', as shown in Figs. 1, 2, 4, and 5, also formed of channel-iron. The bottom C² of the conduit C rests upon and is fastened to the center of the sill H'. From the sill H', secured to the lower side of the plates C' of the channel C, are braces H², of channel-iron, having their upper ends secured to the braces H directly under the point of attachment of the inner ends of the cross-ties F. The outer ends of the cross-ties F are supported by the braces H³, of channel-iron, which extend obliquely downward and inward from the cross-ties F to the sill H', to which they are securely fastened, and may be also fastened at the place of crossing to the braces H by bolts or rivets.

The sill H' is made of such depth as to be incapable of springing perceptibly when weight is placed upon it. The oblique direction of the braces H² and H³ causes any weight placed upon them through pressure upon the sills F to tend to move their upper ends in the direction of the arrows marked upon them, thus tending to open the cleft C⁶ between the bars C⁴. This tendency to open the cleft is resisted by the tensile strength of the braces H and the stiffness in vertical direction of the sill H', which, assisted by the weight of concrete or earth, B, resting thereon, and the load resting upon the rails

D and D', so that while all tendency to close the cleft C⁶ by superimposed weight is avoided the widening thereof is also prevented, the opposing strains being transmitted to the sill H', where they neutralize each other.

The upper surface of the conduit C in the portion formed of the plates C' being oblique, any compression from the expansion of the ground resulting from freezing of moisture contained therein is prevented from pinching or closing the cleft C⁶ by being reflected upward, the ground in contact with the outer surface of the plate C' sliding thereon when pressed horizontally against it by freezing, and confined at the sides of the roadway or street, as frequently occurs, by deep curbstones and by buildings with intervening pavements located on the roadsides.

In the conduit C, at one side from the center, is the cable J, which is supported by grooved wheels or pulleys K, turning upon spindles or shafts K', which shafts are tubular and perforated and extend into the oil receptacles or fountains K², from which they receive oil-supply. The wheels K are so located that the plane of the center of the groove coincides with that of the line of the cable J, and the shafts are partially below and the oil-receptacles outside of the conduit C. The pulleys K should be balanced, so as to avoid vibration and jarring in running. In the same vertical plane as the cable J at the base of all ascending grades is another roller or pulley, L, also provided with a tubular perforated shaft, L', and oil-reservoir, L², the function of which pulley is to prevent abrasion and friction of the cable J against the upper side of the conduit when under strain. By the system of lubrication above described an economy of both labor and oil in lubricating the pulleys is effected, and

by having the wheels K to project below the bottom plate, C², the conduit may be of less height and cost and of greater strength and stiffness than is otherwise practicable.

G is the gripping mechanism attached to the car (preferably to the axles or axle-boxes) without the intervention of the usual bearing-springs, so that the relative level of the rails and the grip shall remain constantly the same irrespective of the load upon the car.

Having described my invention and the mode of making and operating the same, what I claim is—

1. An improved cable railway, consisting of a conduit formed of plates secured together by angle-braces longitudinally and so braced and counterbraced vertically and laterally to a foundation-sill and the rails that vertical compression shall tend to spread the side thereof and lateral compression of soil shall be deflected, in combination with cable-supporting wheels partially within said conduit and provided with automatic lubricating-spindles and reservoirs, substantially as set forth.

2. In a cable railway, the combination of a tubular conduit having its upper surfaces inclined so as to elude lateral compression from frost, with rollers projecting into its upper portion and provided with oil-reservoirs and automatically-lubricating spindles, substantially as and for the purpose set forth.

3. In a cable-railway conduit, the combination of the plates C', C², and C⁷, angle-bars C³, channel-bars C⁴, braces H, H², and H³, and sills H' and F, constructed and arranged substantially as and for the purpose set forth.

JNO. HARTMAN, Jr.

Witnesses:

JAMES P. PETT,
JOHN B. DEVINE.