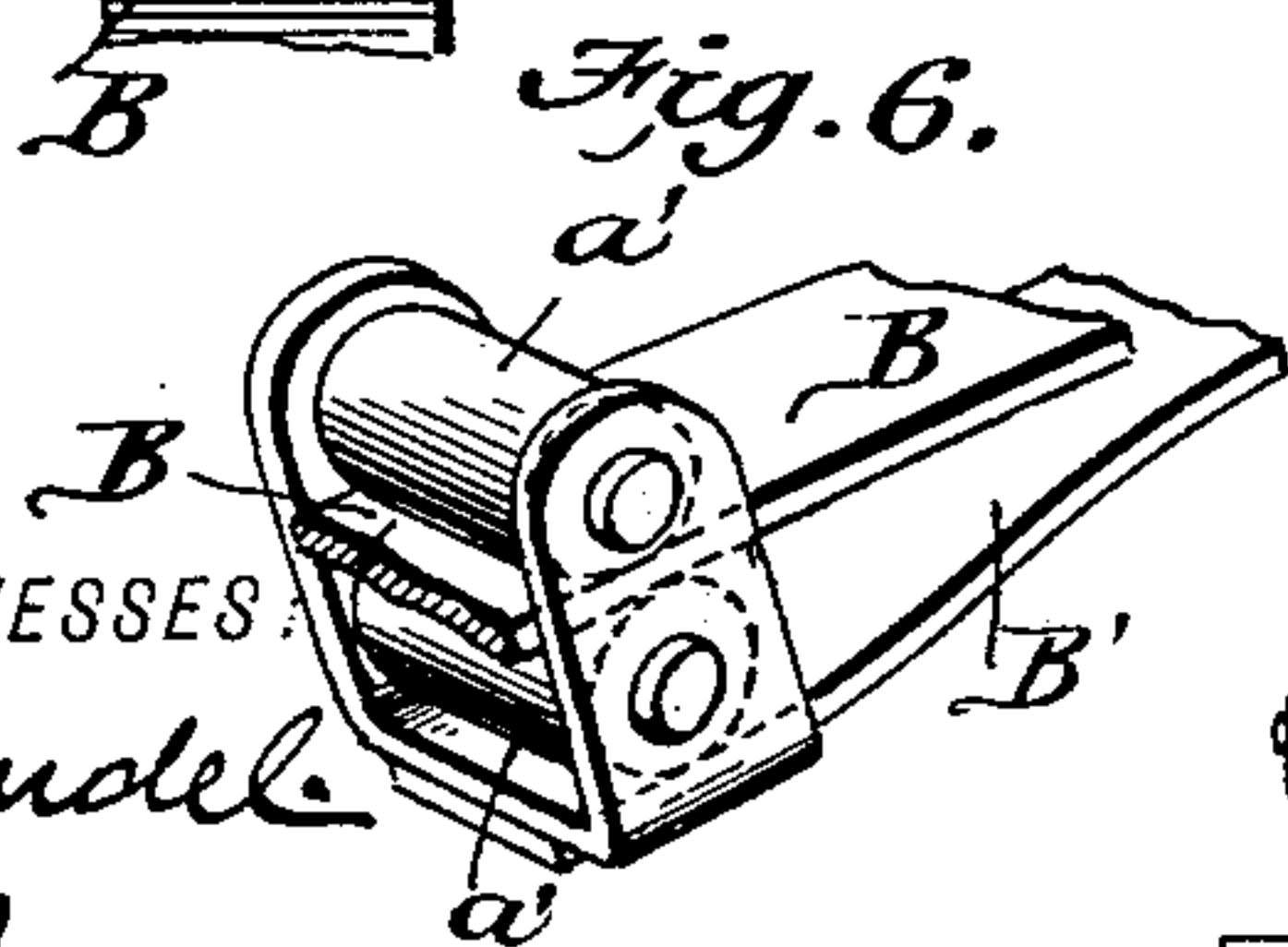
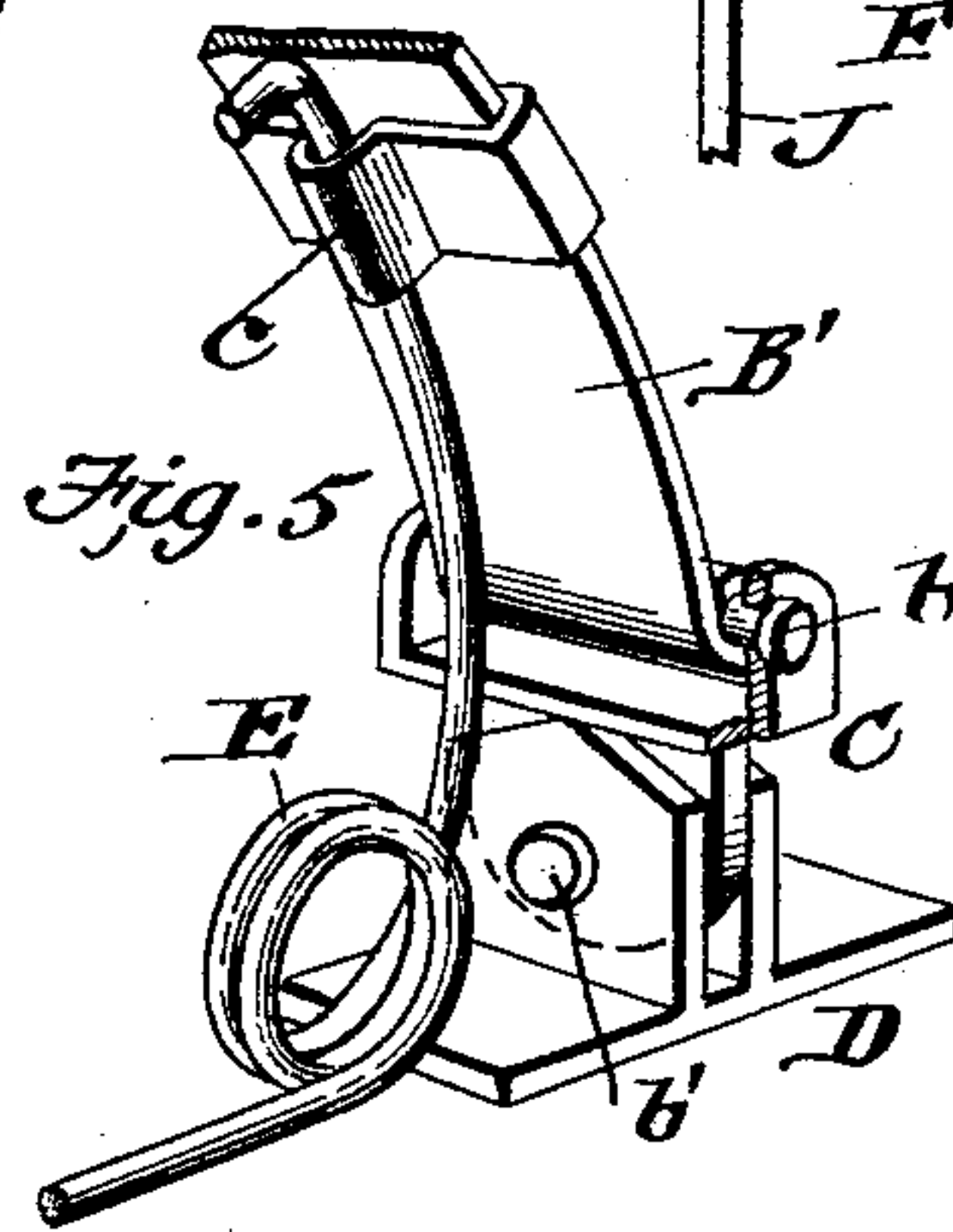
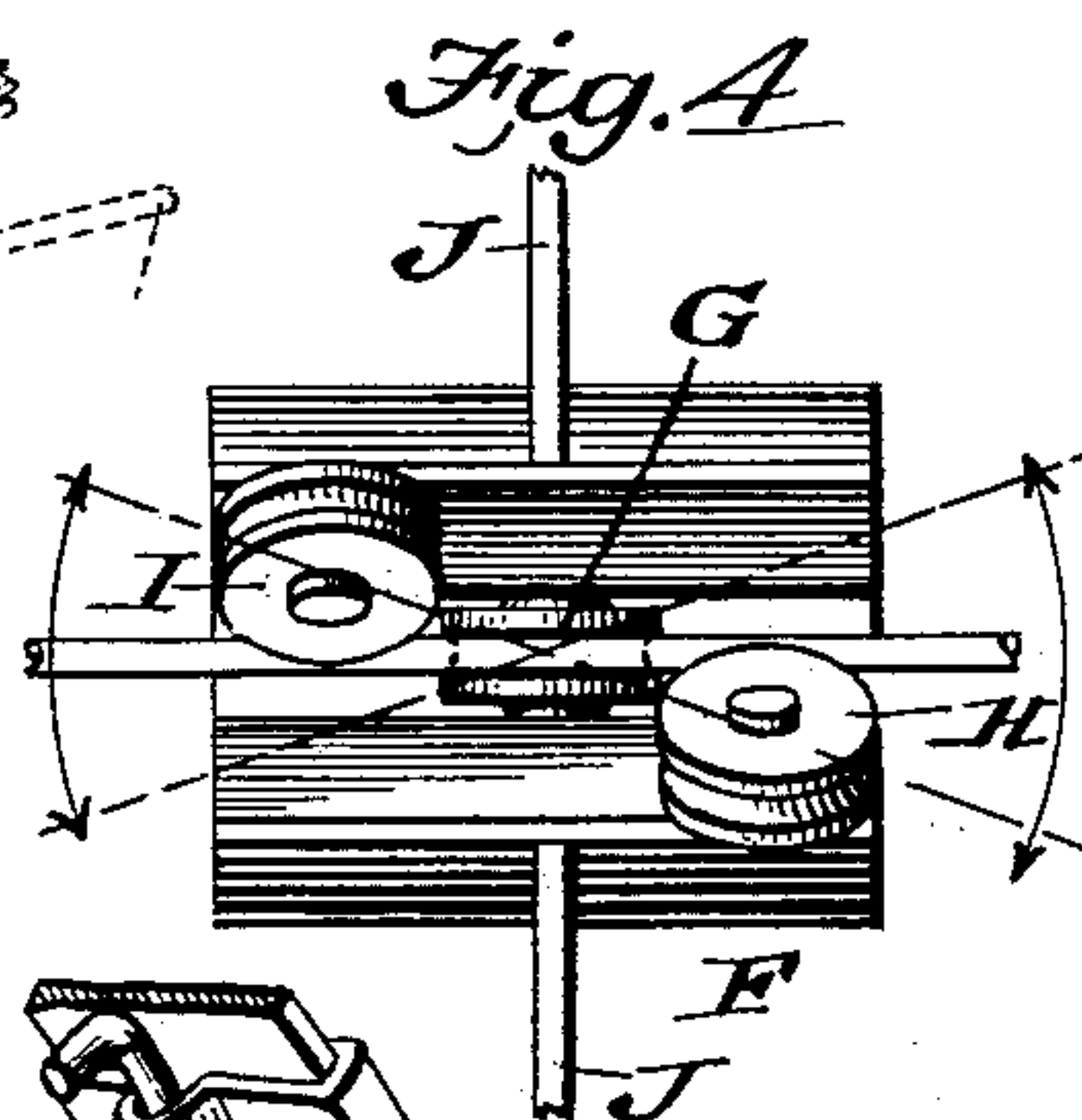
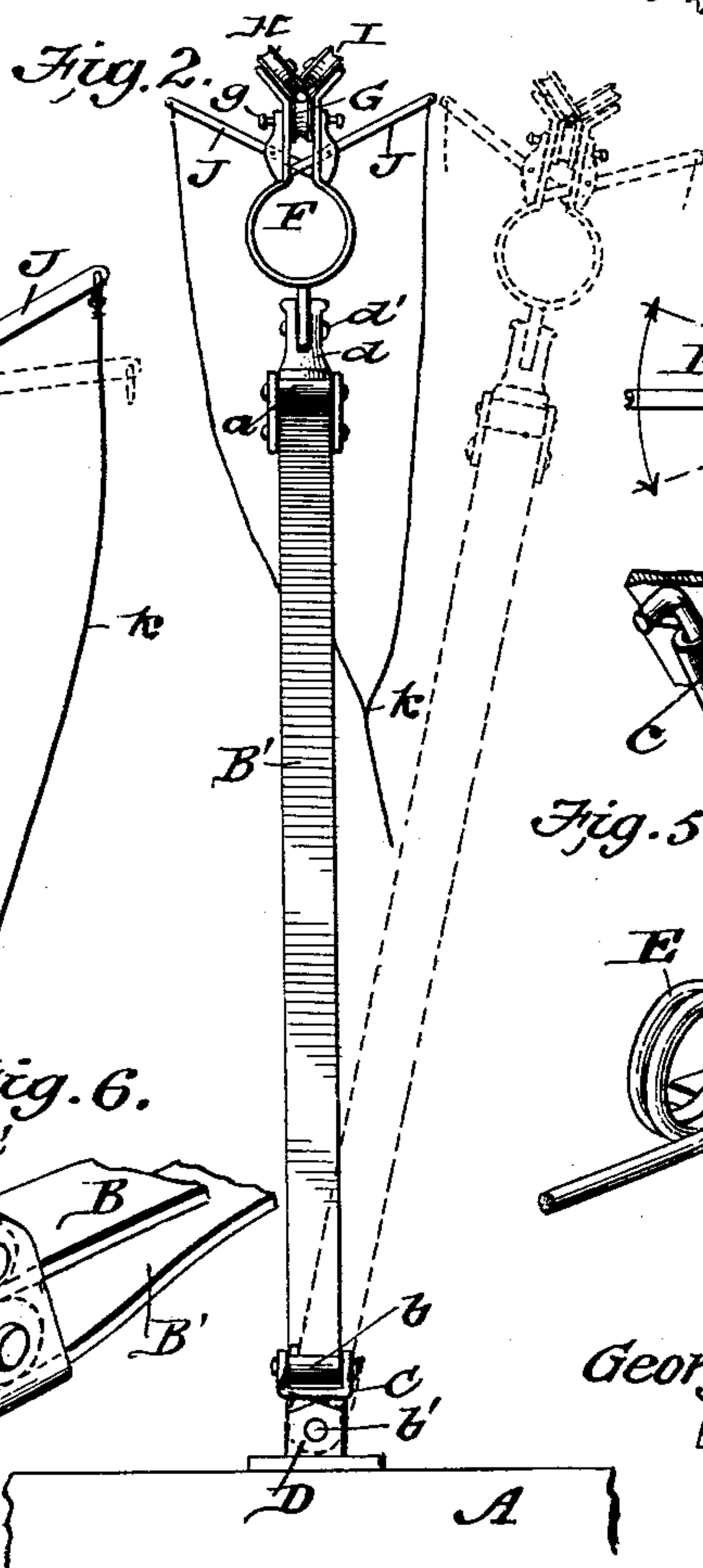
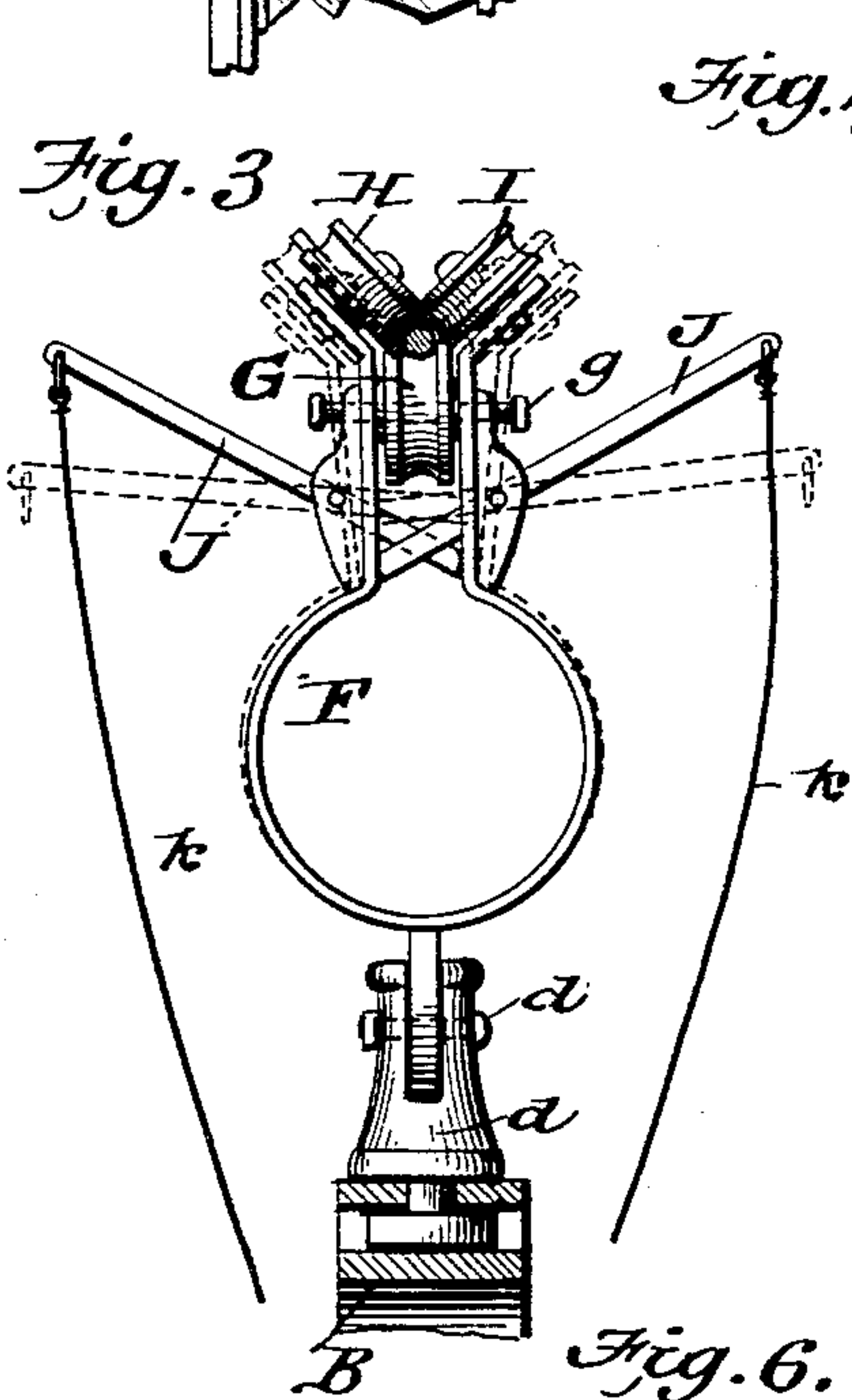
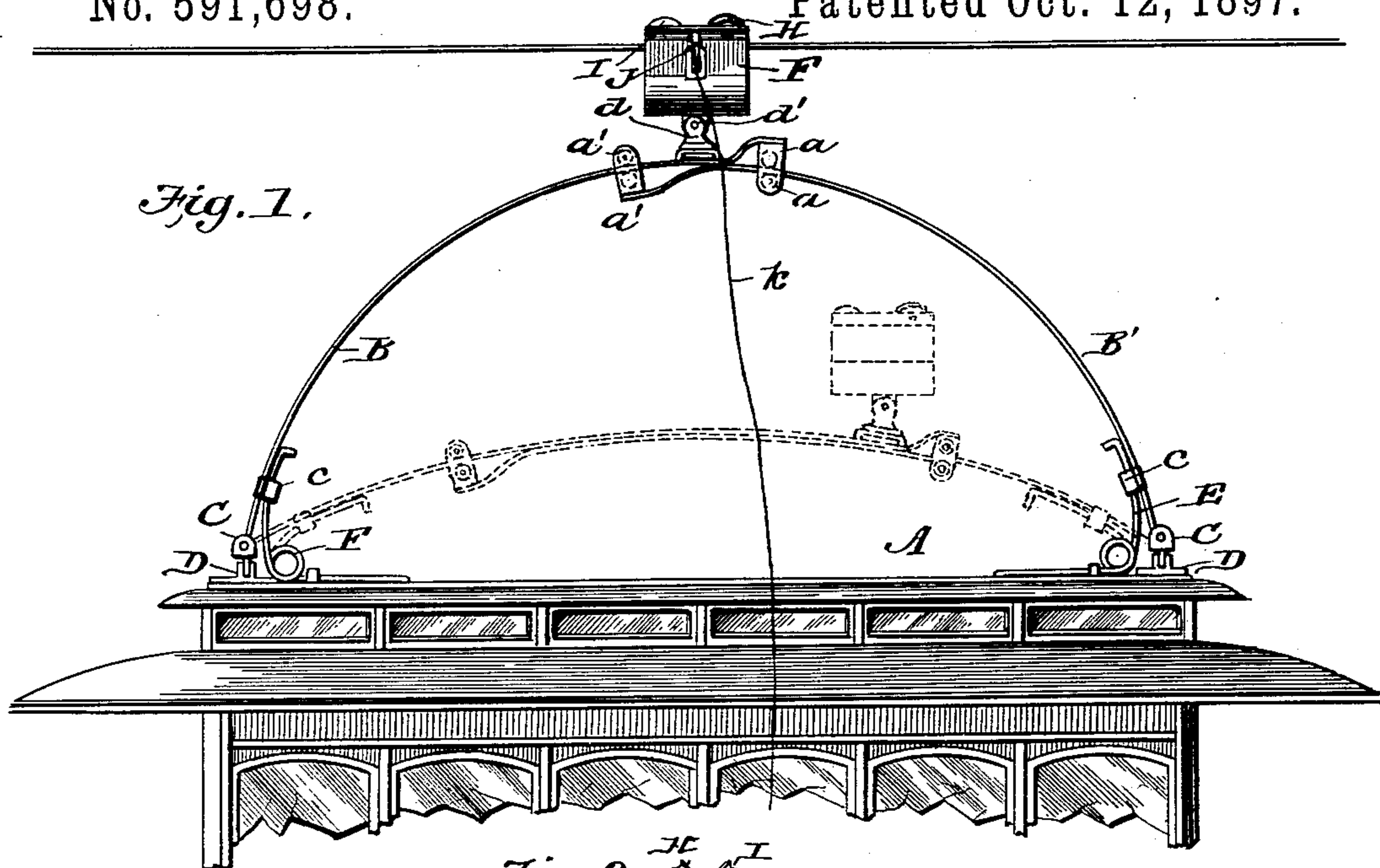


(No Model.)

G. K. SHRYOCK.  
TROLLEY.

No. 591,698.

Patented Oct. 12, 1897.



WITNESSES:  
*W. D. Bloudek*  
*Edw. W. Byrum*

INVENTOR  
*George K. Shryock.*  
BY *Munn & Co.*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

GEORGE K. SHRYOCK, OF JOHNSTOWN, PENNSYLVANIA.

## TROLLEY.

SPECIFICATION forming part of Letters Patent No. 591,698, dated October 12, 1897.

Application filed April 23, 1897. Serial No. 633,491. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE K. SHRYOCK, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Trolleys, of which the following is a specification.

The object of my invention is to provide a cheap, effective, and safe trolley for connecting an electric car to an overhead conducting-wire, which trolley will not be liable to fly off and lose its connection when descending a steep grade or fly off and break the cross-wires, and which shall always be ready for use in traveling either forward or backward without any change in its adjustment, and which shall also accommodate itself in a yielding manner to vibrations in a vertical plane and also to the lateral swaying of the car or wire whenever the latter move out of alinement with each other.

My invention consists in the peculiar construction and arrangement of means for connecting the trolley to the top of the car and also in the construction and arrangement of the trolley and means for engaging it with and disengaging it from the wire, as will be hereinafter more fully described.

Figure 1 is a side elevation of the trolley and its support on the top of a car, showing in dotted lines the automatic adjustments of the trolley. Fig. 2 is an end elevation of the same. Fig. 3 is an enlarged end view of the trolley, with means for opening and closing the wheels for receiving and discharging the wire; and Figs. 4, 5, and 6 are details.

In the drawings, A represents the top of a car, upon which near each end is mounted a curved and flat spring B and B', which springs arch upward and inwardly toward each other and are connected with a freely-slipping lap-joint having two friction-rollers *a a* and *a' a'* on the end of each spring, the pair of rollers at the end of each spring embracing the body part of the other spring at some distance from its end and lying one above and the other below the spring and adapted to travel along the length of the same with great freedom as the springs move up and down with a varying arch, as shown by dotted lines in Fig. 1.

The flat arched springs B B' are arranged in a plane longitudinal to the car and at their

ends are connected to the car, through a bracket-coupling C, with a universal joint which has an axis *b*, Fig. 5, transversely to the car and another *b'* longitudinal to the car, the axis *b* connecting the spring to the bracket with a hinge-joint and the axis *b'* connecting the bracket to the short standards D on top of the car with a hinge-joint which permits the arch-springs B B' to swing from side to side, as shown in dotted lines in Fig. 2.

To hold the arch-springs up and to maintain them in a vertical plane, an elbow-spring E with several coils at its angle is fastened under each arch-spring, one arm of said elbow-spring being rigidly attached to the top of the car and the other arm being loosely extended through a loop or keeper *c* on the under side of the arch-spring, so that the depression of the arch-springs compresses the elbow-spring, while a lateral deflection of the arch-springs exerts a torsional strain on the elbow-springs, the latter thus serving to bring back the arch-springs to their normal position as against deviation in all directions.

Near the end of the upper one of the arch-springs is mounted a short standard *d*, Fig. 3, to which is hinged at *d'* the trolley, so as to enable the latter to tilt or rock in a plane longitudinal with the car. This trolley is composed of a thin sheet of spring-steel F, having a circular bend (in cross-section) about its middle and lower part and having its two sides then extended upwardly and outwardly, as shown in Fig. 3. Within this spring-frame are arranged three trolley-wheels G H I, which are grooved at their peripheries and which securely hold the wire which passes between them. One of these wheels, G, is arranged in a vertical plane upon an axis *g*, which extends through the sides of the trolley-frame far enough to allow the latter to be spread apart to receive the wire between the other two wheels above. On the ends of the axle of wheel G are formed heads or knobs to prevent the sides of the frame from passing off the ends of the same. The other two wheels, H and I, are set inclinedly, one upon each side of the outwardly-flared upper edge of the trolley-frame, one in advance and the other behind the wheel G.

Between the three wheels thus referred to the wire is securely held, so that it cannot



get away. To receive and discharge the wire, the two upper wheels are adjusted away from each other by springing the sides of the trolley-frame away from each other, the length  
 5 of the axle *g* of the lower wheel *G* permitting this to be done. To-expand this frame conveniently, there are two levers *J J*, which are fulcrumed in the side parts of the trolley. Each lever *J* extends on one side of its ful-  
 10 crum downwardly and inwardly and bears at its end against the opposite wall of the trolley-frame and on the other side of its fulcrum it extends some distance outside and terminates in an eye to which are attached  
 15 cords *k*, which extend to a convenient point below and by pulling upon which the sides of the spring-frame of the trolley are expanded and the upper wheels separated from their grasp upon the wire. This same expansible  
 20 nature of the trolley-frame allows the latter to open and the two upper wheels to separate automatically when passing cross ties or hangers.

It will be seen that the trolley-frame is  
 25 hinged to its supporting-standard. This is necessary in order to allow the trolley to maintain its level position when it is adjusted down near the foot of the arch, as shown in dotted lines of Fig. 1.

30 The standard on the arch-spring is also swiveled to turn about a vertical axis, so as to allow the trolley to turn about a vertical axis in turning curves.

Having thus described my invention, what  
 35 I claim as new, and desire to secure by Letters Patent, is—

1. A trolley-support for the top of a car, consisting of two arched springs arranged longitudinally with the car and having each a  
 40 pair of rollers at its end receiving between them the body of the other spring, substantially as and for the purpose described.

2. A trolley-support for the top of a car, consisting of two arched springs arranged lon-  
 45 gitudinally with the car and having a lapped

and slip joint connection with each other at the top, and a universal joint for connecting the lower ends of the said springs to the car substantially as shown and described.

3. A trolley-support for the top of a car 50 consisting of two arched springs arranged longitudinally with the car and having a lapped and slip joint connection with each other at the top, and a separate lifting-spring for each arch-spring for forcing the arch-springs up 55 substantially as described.

4. A trolley-support for the top of a car, consisting of two arched springs arranged longitudinally with the car and having a lapped and slip joint connection with each other at 60 the top, a universal joint connecting these springs to the car, and supplemental lifting-springs for the arched springs substantially as and for the purpose described.

5. The trolley composed of a frame of elas- 65 tic sheet-steel bent to a circular cross-section at its lower side and then extended upwardly and outwardly in the form of flanges, and three wheels, one arranged vertically upon an axis that passes loosely through and extends 70 beyond the side walls of the trolley-frame, and the other two being arranged on the upper flanged edges on opposite sides of the center and inclining inwardly and downwardly substantially as and for the purpose de- 75 scribed.

6. The combination with the trolley-frame made of springing material, and the three wheels arranged thereon as described; of two levers each fulcrumed on one side of the frame 80 and extending inwardly and downwardly to bear against the inner wall of the other side, and cords for pulling upon the outer ends of the levers to expand and open the trolley substantially as and for the purpose described. 85

GEORGE K. SHRYOCK.

Witnesses:

JOHN WINGARD,

WILLIAM D. RIGHTNOUR.