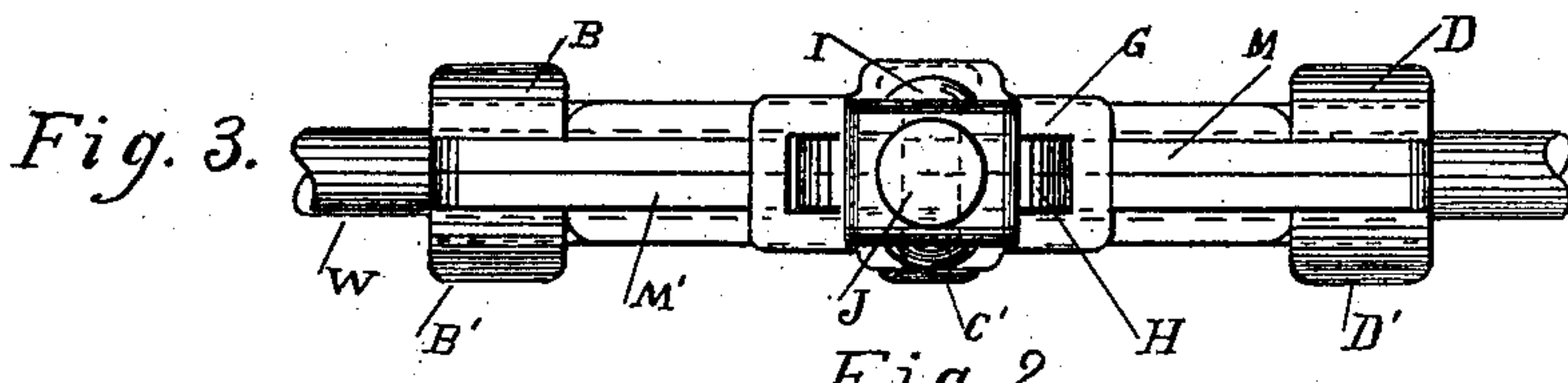


(No Model.)

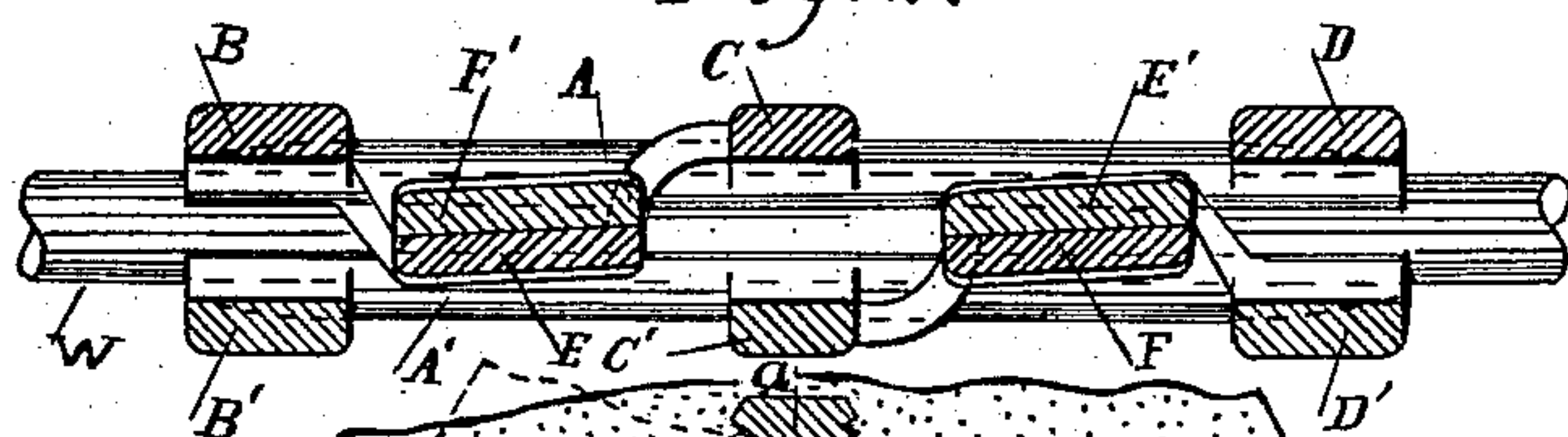
D. E. LAIN.  
TROLLEY WIRE HANGER.

No. 486,583.

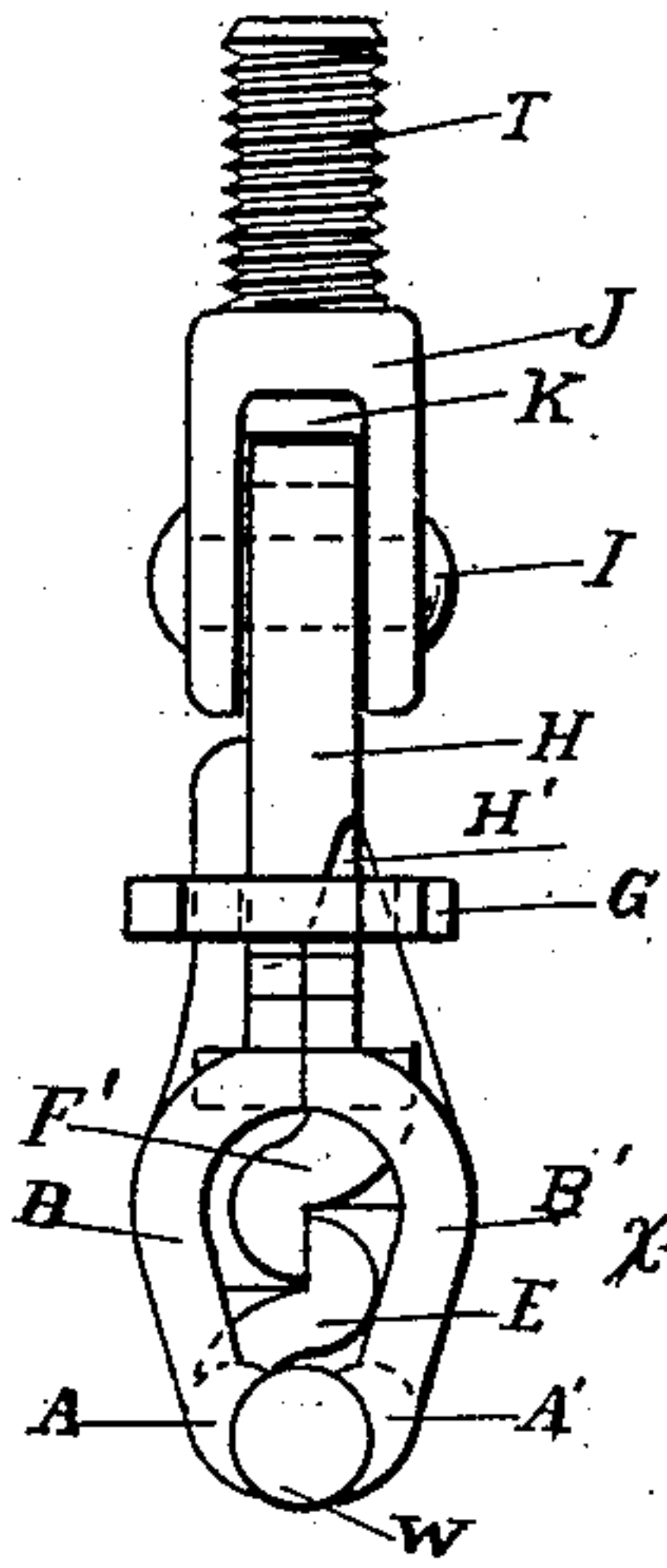
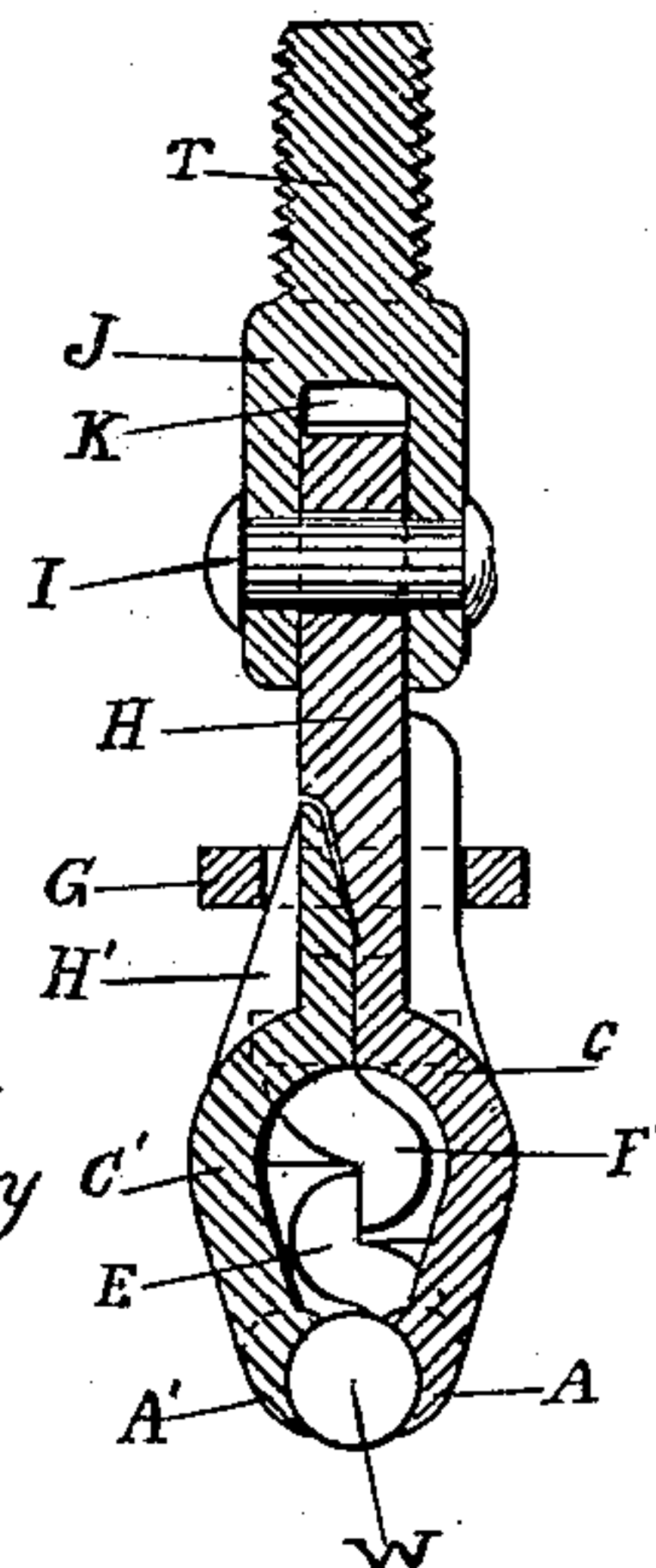
Patented Nov. 22, 1892.



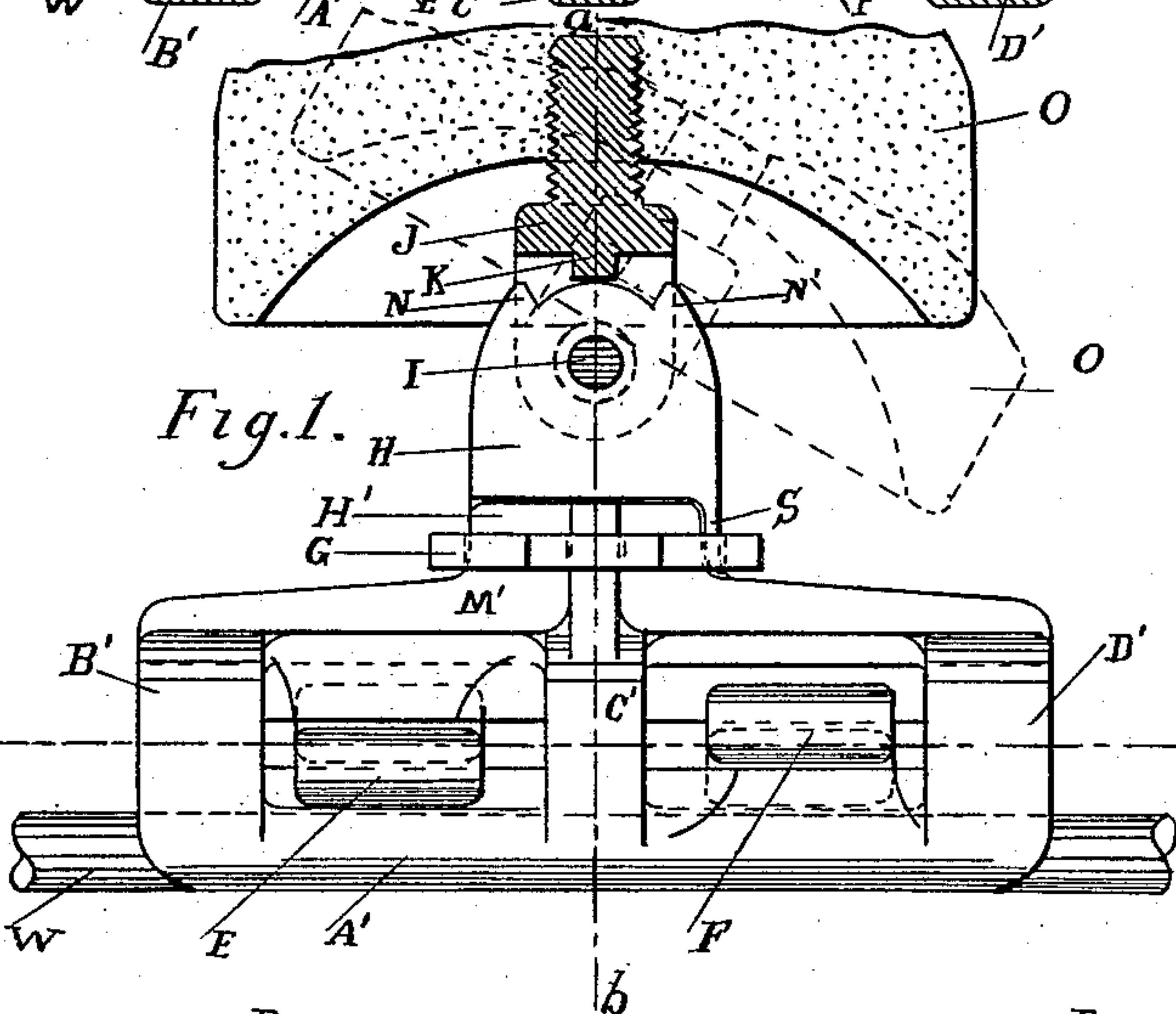
*Fig. 5.*



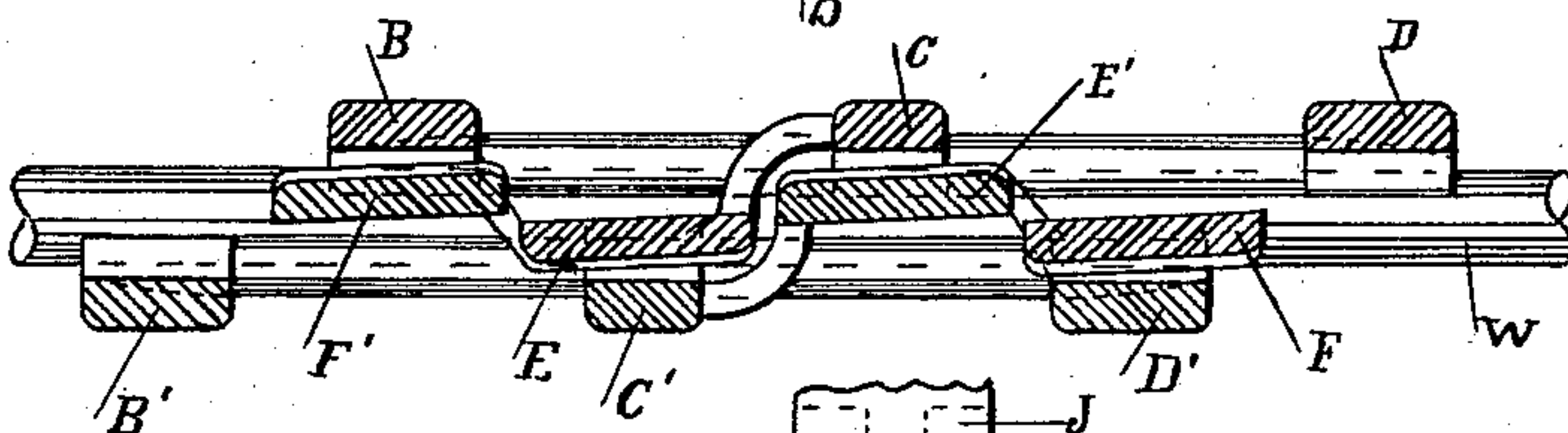
*Fig. 4.*



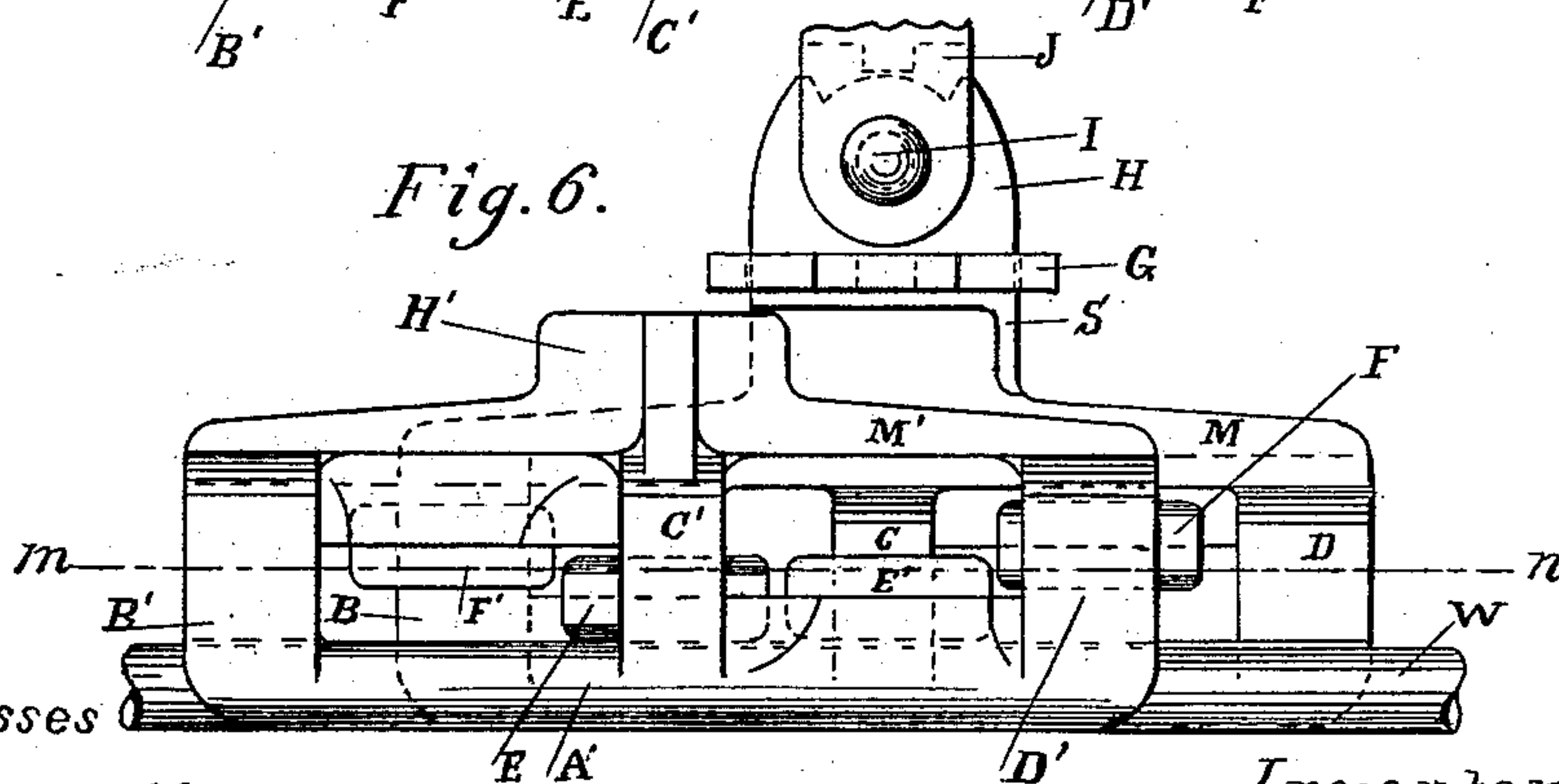
*Fig. 1.*



*Fig. 7.*



*Fig. 6.*



Witnesses

Edmund Müller  
Chas. Steinmetz.

Inventor  
David E. Lain.



# UNITED STATES PATENT OFFICE.

DAVID E. LAIN, OF YONKERS, NEW YORK.

## TROLLEY-WIRE HANGER.

SPECIFICATION forming part of Letters Patent No. 486,583, dated November 22, 1892.

Application filed April 11, 1891. Serial No. 388,610. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID E. LAIN, a citizen of the United States, and a resident of the city of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Trolley-Wire Hangers, of which the following is a specification.

My invention relates to an improved form of hanger or clamp for suspending the trolley-wires of electric railways; and the objects of my invention are to provide a hanger that shall be easy to attach to and remove from the wire and that shall allow the wire to move longitudinally a short distance in either direction under the span-wire without either tilting up the hanger or bending over the insulator so far as to be in the path of the moving trolley or come in contact with the hanger; also one that shall be simple and strong in construction, not likely to become detached from the wire, and offering little or no impediment to the passage of the trolley. I attain these objects by the device illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a front elevation of the hanger attached to the trolley-wire and suspended from an insulator. Fig. 2 is a plan view of Fig. 1 from the top in section on the line *xy*. Fig. 3 is a plan view of Fig. 1 from the top. Fig. 4 is an end elevation of Fig. 1 in section on the median line *ab*. Fig. 5 is an end elevation of Fig. 1. Fig. 6 is a front elevation of the hanger about to be clamped to the wire, and Fig. 7 is a plan view of Fig. 6 from the top on line *mn*.

Similar letters refer to similar parts throughout the several views.

My improved hanger is of the kind that secures the wire by clamping it between grooved jaws which extend more or less below the horizontal diameter of the wire.

Referring to Figs. 1 to 5, the clamp consists of two essentially-similar frames, respectively composed of grooved jaws *A* and *A'*, between which the wire is clamped, backbones *M* and *M'*, parallel with these jaws, pillars *B*, *C*, and *D* and *B'*, *C'*, and *D'*, respectively connecting the backbone of each frame to a jaw. There are also inclined plane lugs *E* *F* and *E'* *F'*, respectively connected to each frame between the pillars and so placed that when the

frames are together on the wire the lugs *E* and *F'* interlock with each other and have their inclined plane faces lying against each other, and lugs *F* and *E'* similarly interlock with each other with their plane faces lying together.

Projecting upward from the backbone *M* is an ear *H*, to which a fork *J*, having a threaded body *T*, is attached pivotally with a rivet *I*. In the crotch of fork *J* is a rib *K*, which limits the revolution of the fork on the rivet by coming in contact with either of two lugs *N* and *N'* on the ear *H*. The threaded body *T* of the fork *J* is screwed into an insulator *O*. The relative positions of the hanger and insulator, when the fork has revolved as far as possible to the right hand, are shown in Fig. 1, with the insulator and fork in dotted lines.

Projecting upward from near the middle of the backbone *M'* is an ear *H'*, which when the two frames are together on the wire lies in a recess in ear *H* and is stopped from further motion toward the right hand on *H* by coming in contact with rib *S* on the ear *H*. A ring *G*, large enough to fit over and pass around the two ears *H* and *H'* when *H'* lies in the recess of *H*, is put over ear *H* before the fork is riveted fast. There is room enough between the top of ear *H'* as it lies in the recess in ear *H* and the bottom of fork *J* for the ring *G*.

Referring to Figs. 6 and 7, where the two frames are shown in their first position on the wire, it may be seen that lug *E* is connected to jaw *A* and lug *F'* is connected to backbone *M'* in such a way that when the jaw *A'* is moved toward the right hand on the wire *W*, jaw *A* remaining stationary, lug *F'* interlocks with lug *E* and the inclined plane faces of the two lugs slide on each other. Now these faces lie together in the same plane, which is inclined at an angle to a vertical plane through the longitudinal center line of the wire *W*, and it cuts this plane in a line that is perpendicular to the center line of the wire. Hence the motion described will have the effect of pulling the jaw *A* against the wire and the backbone *M'* against the backbone *M*. This will also pull the jaw *A'* against the wire, since the backbone *M'* is rigidly connected to jaw *A'* by the pillars *B'*, *C'*, and *D'*; also, it may be seen that lug *F* is connected to backbone *M* and lug *E'* to jaw *A'* in such a way



that the motion of jaw A', just described, will cause lug E' to interlock with and slide upon lug F, and since the faces in contact are inclined similar to those of lugs E and F', to which they are parallel, this movement together of jaws A' and A will also cause the backbones M and M' and the jaws A and A' to be clamped together by the movement on each other of lugs F and E'. Therefore the effect of moving the two frames endwise more nearly to a position of opposition after the inclined plane lugs have interlocked is to bring the jaws more firmly together on the wire, and the clamping force obtained from moving the inclined plane lugs on each other is carried from the backbones, which are used as a fulcrum through the pillars at each end and the middle of the frames to the jaws about the wire. Thus the clamping force in this hanger is applied at the very ends of the jaws, where it is most needed.

To attach this hanger to the wire, the part A M is taken and the threaded body T of the fork J is screwed into the insulator O, Fig. 1, which has already been suspended from the span-wire. (Not shown.) The trolley-wire W is then placed in the groove of jaw A, and the ring G is carried up against the lower end of the fork J. The part A' M' is then taken and placed, as shown in Figs. 6 and 7, with the groove of A' on the wire and lugs F' and E' falling to either side of lug E. Part A' M' is then driven toward the right hand on part A M until further progress is stopped by the ear H' coming in contact with rib S. Then ring G is allowed to drop down around ears H and H', as shown in Figs. 1 to 5. The ring G, when around both ears, prevents the frames from slipping apart endwise, and also from opening along the back. If the clamp is properly proportioned to the wire, it will be firmly secured by the time the two frames stand opposite to each other, and to loosen the clamp, so that the wire may be moved through it, the ring G is first raised above ear H', when frame A' M' is driven back toward the left hand until the wire is sufficiently loose between the jaws to allow it to slip through them. The clamp is then shoved to the desired place and again clamped fast, as above described.

From the foregoing it may be seen that the clamp here described can be easily and quickly attached to and removed from the wire; that a limited pivotal movement is provided for between the hanger and the insulator by which the advantages of both the pivotal and rigid method of making this connection are obtained without the disadvantages of either; that the greatest possible simplicity and strength are combined, since the clamping force is obtained from parts that are very near the wire, and this force is applied at the very ends of the jaws; that in the form here shown it can be cast in metal from simple patterns and may come from the mold perfect and ready for use; that it is not

likely to become detached from the wire because the parts that clamp and hold the hanger together are rigidly connected to it, and hence cannot be loosened by jars or vibrations, and also that this clamp can be constructed with the jaws passing as little or less distance below the horizontal diameter of the wire than any other similar hanger because of the great clamping force obtained in this construction. Consequently the obstruction to the passage of the trolley may be as little or less in this form than in any other. A part of these very desirable results might be obtained in the same general way, but with constructions varying in detail from what I have here shown. Hence I do not want to be understood as limiting myself to the precise method of construction here described.

I am aware that trolley-wire hangers are used that are rigidly connected to the supporting-insulator, and also that there are others which are pivotally connected to the insulator; but I do not know of any other hanger that is pivotally connected to the insulator and yet has the movement between the parts that may turn so limited that the insulator can never come within the path of the trolley while on the wire.

I am also aware that it is not new to make a hanger in which the wire is clamped between grooved jaws; but I do not know of any hanger other than the one here described in which the wire is clamped and held between grooved jaws by the movement on each other of parts that are rigidly connected to the jaws.

Therefore what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a trolley-wire support, of a hanger for attachment to the wire, an insulator for preventing electrical communication between the hanger and a supporting device, a pivotal connection between the hanger and the insulator, and means for limiting the motion on this pivot to such an extent that the insulator can neither come in contact with the hanger nor in the path of a trolley when moving on the wire supported by the hanger, substantially as and for the purpose described.

2. The combination, in a trolley-wire hanger, of grooved jaws that partly embrace the wire and means for clamping these jaws to the wire by moving them endwise together and on the wire, substantially as and for the purpose specified.

3. The combination, in a trolley-wire support, of a hanger consisting of grooved jaws that partly embrace the wire, means for clamping these jaws to the wire by moving them endwise together and on the wire, an insulator for preventing electrical communication between the hanger and a supporting device, a pivotal connection between the hanger and the insulator, and means for so limiting the movement about the pivot that the insulator can neither come in contact with the hanger nor



within the path of the trolley while moving on the wire held in the hanger, substantially as and for the purpose specified.

4. The combination, in a trolley-wire hanger, 5 of two grooved jaws which partly embrace the wire and lugs with inclined faces, rigidly attached to each jaw or rigid extensions there- 10 to, said lugs being so disposed that each lug of one jaw interlocks with a lug of the other jaw, which by sliding on each other clamp the 15 jaws together when they are moved endwise nearer to opposition on the wire, substantially as and for the purpose described.

5. The combination, in a trolley-wire hanger, 15 of two grooved jaws, lugs with inclined faces rigidly attached to each jaw and to rigid extensions thereof, and means for preventing further movement of the jaws endwise on 20 each other when they have been brought opposite to each other, substantially as and for the purpose described.

6. The combination, in a trolley-wire hanger, 25 of two grooved jaws, lugs with inclined faces rigidly attached to each jaw and to rigid extensions thereof, means for preventing further movement of the jaws endwise on each other 30 when they have been brought opposite to each other, and means for preventing the jaws from moving apart on each other, substantially as and for the purpose specified.

7. The combination, in a trolley-wire hanger, 35 of two grooved jaws, each constituting the lower member of a frame, two other parts, each parallel to a jaw and each constituting 40 the upper member or backbone of a frame, cross-pieces or pillars rigidly connecting each backbone to a jaw, and two lugs attached to each frame, each lug having an inclined face next to the frame to which it is attached, 45 these lugs so arranged that when the two frames are put face to face, but not exactly opposite to each other, with a wire between the grooved jaws, each lug on one frame may interlock with a lug on the other frame in- 50 clined face to inclined face, substantially as and for the purpose specified.

8. The combination, in a trolley-wire hanger, 55 of two grooved jaws, each constituting the

lower member of a frame, two other parts, 60 each parallel with a jaw and each constituting the upper member of a frame, cross-pieces or pillars connecting each upper member with a 65 lower member, two lugs attached to each frame, one to the lower member and one to the upper member, each of said lugs having an in- 70 clined plane face next to the plane face of the frame to which it is attached and so placed that when the two frames are brought face to face, but not quite opposite to each other, with 75 a wire between the grooved jaws, each lug of one frame may interlock with a lug of the other frame, and as the frames are moved to nearer opposition the interlocked lugs may 80 slide upon each other, an ear extending upward from the middle of each upper member, the ear of one frame being larger than the 85 ear of the other frame and having in one side a recess, in which the smaller ear may lie, and also provided with a projecting part which comes in contact with the smaller ear when 90 the two frames stand opposite to each other on the wire, a ring which may encompass both ears when they lie together, a hole through the larger ear, two projecting lugs on the top of the larger ear, a fork having a hole through 95 its prongs, a threaded body and a rib in its crotch, a rivet or bolt passing through the fork and larger ear, connecting them together in such a manner that the fork can revolve 100 about the rivet or bolt in either direction until stopped by the coming in contact of the rib in the crotch of the fork and a lug on the top of the ear, and an insulating-body provided with a nut for the reception of the 105 threaded part of the fork and suitably prepared for attachment to a span-wire, all substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of April, 1891.

DAVID E. LAIN.

Witnesses:

JAMES S. FITCH,  
O. B. WARING.