(No Model.)

2 Sheets—Sheet 1.

J. L. HANSON.

TROLLEY SPRING.

No. 526,705. Patented Oct. 2, 1894.

Fig. 2.

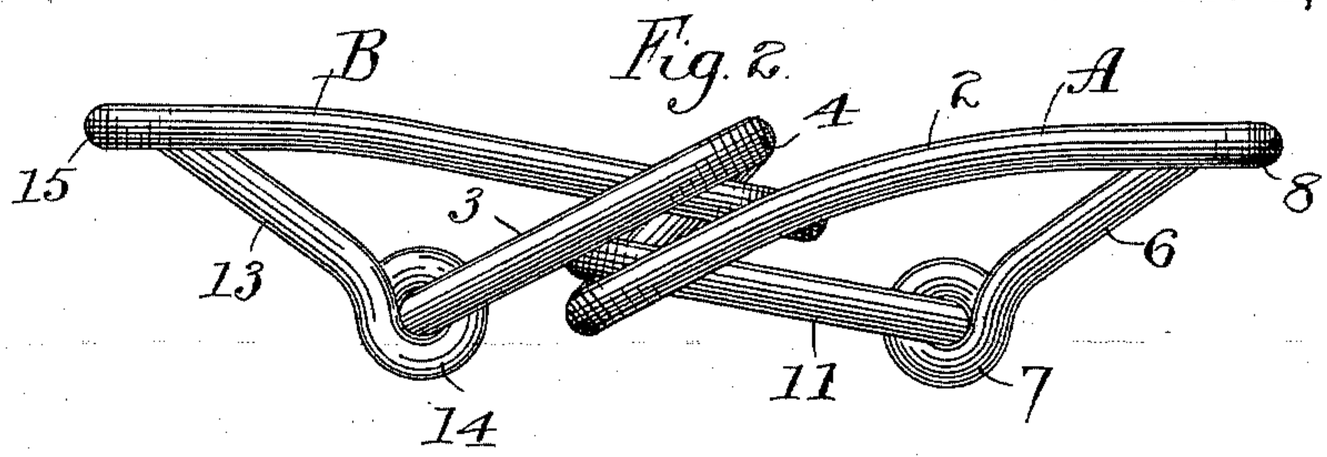
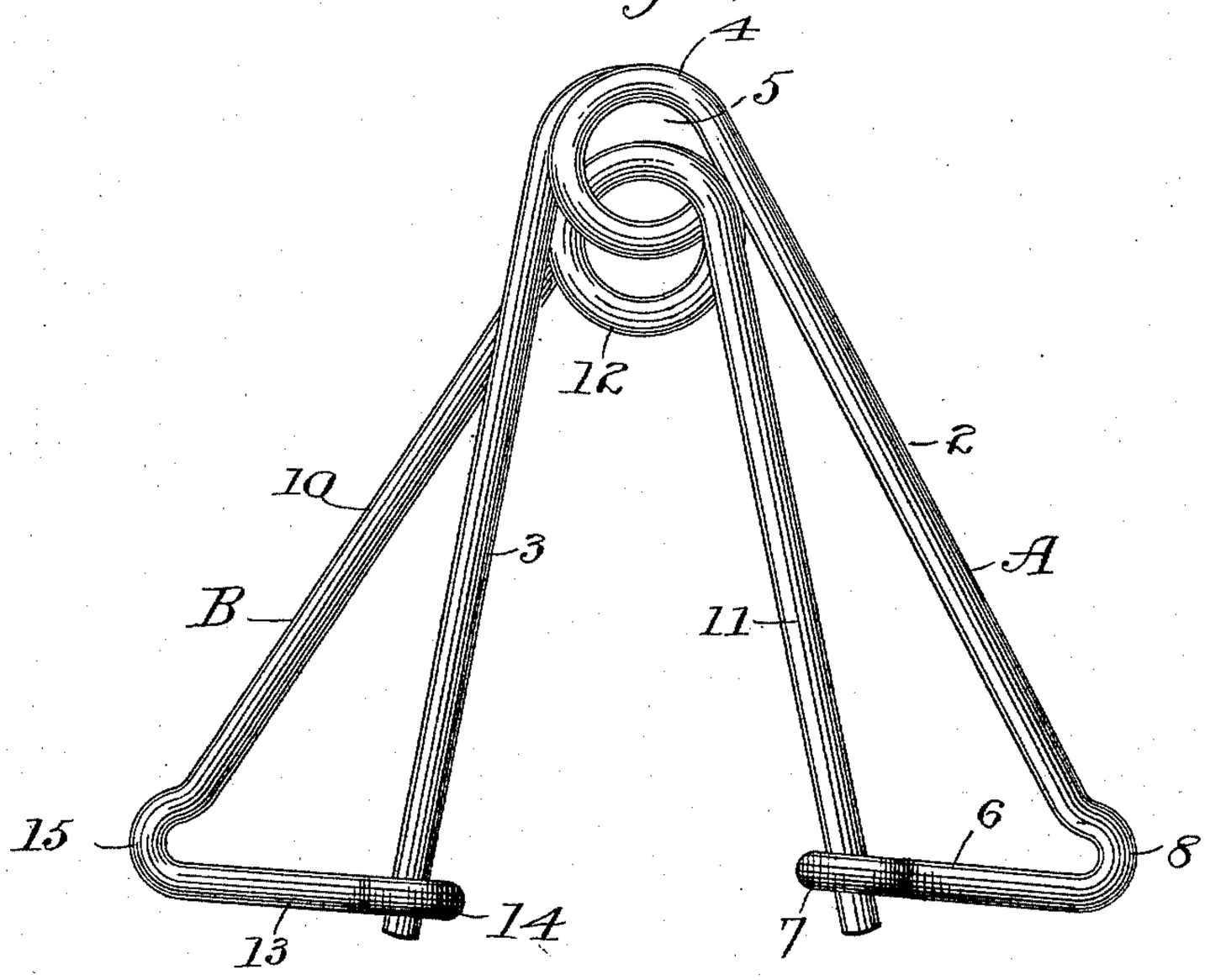


Fig. 1.



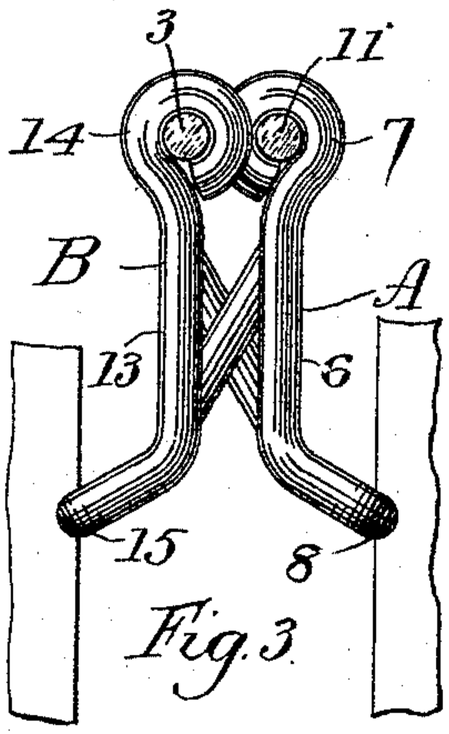


Fig. 3.

Witnesses:-
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(No Model.)

2 Sheets—Sheet 2.

J. L. HANSON.

TROLLEY SPRING.

No. 526,705.

Patented Oct. 2, 1894.

Fig. 4

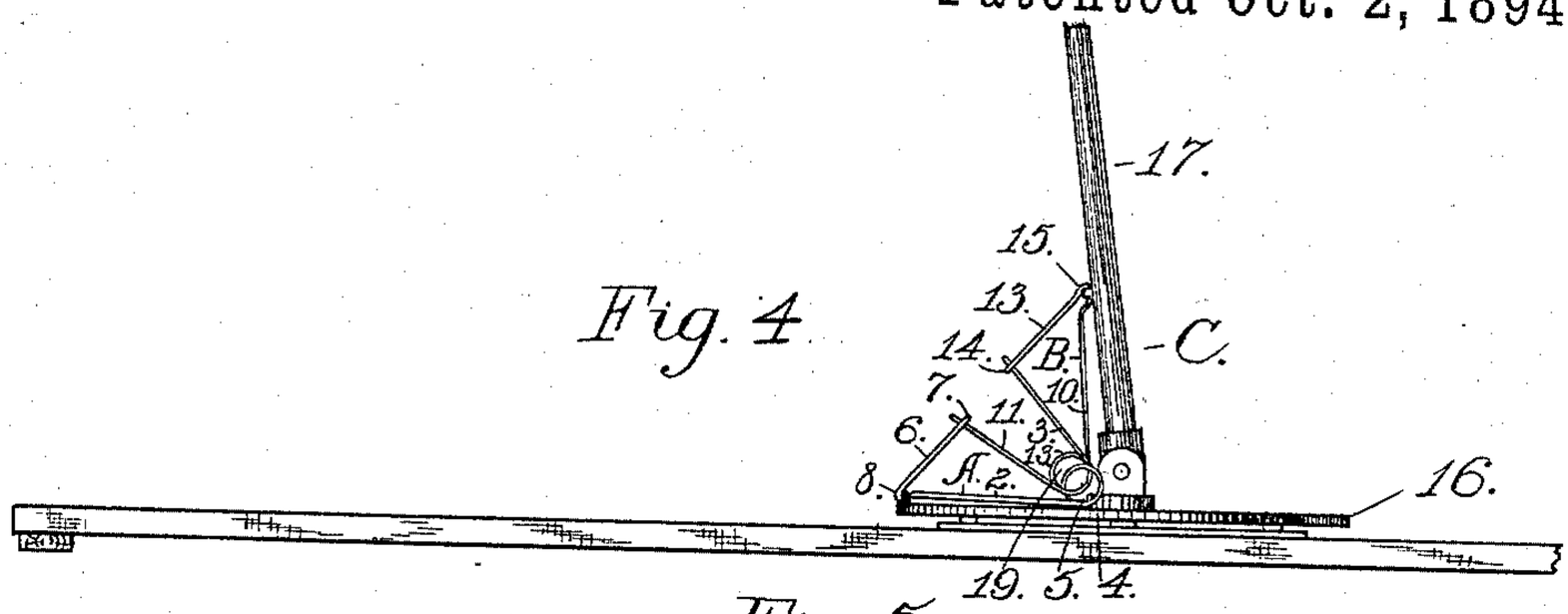


Fig. 5.

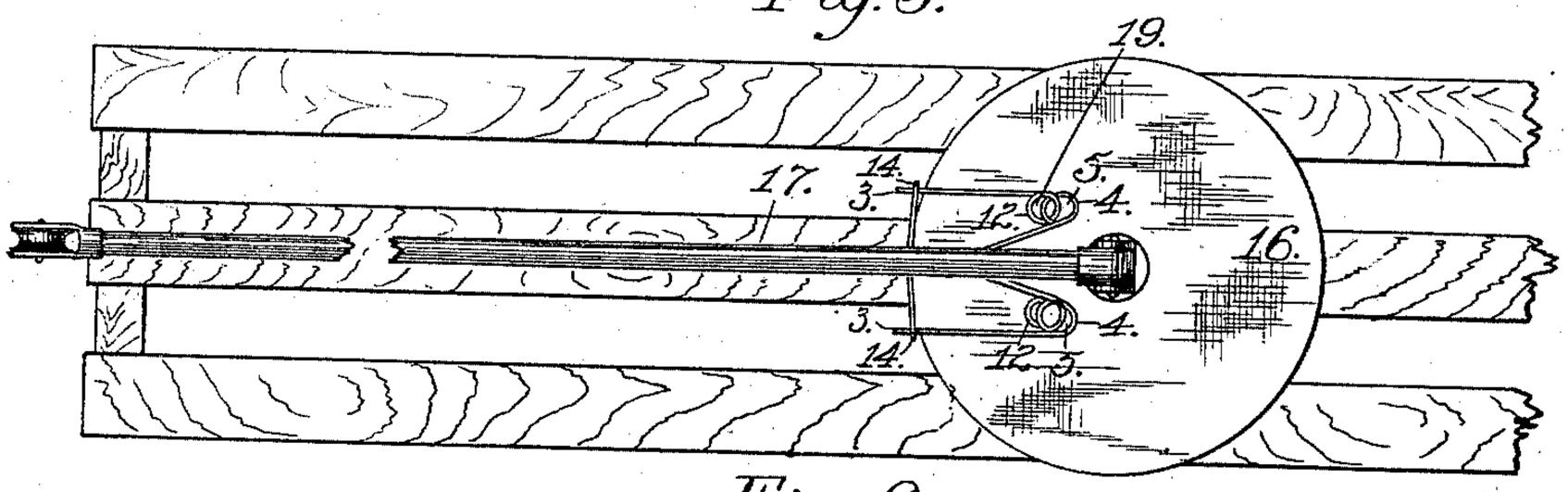
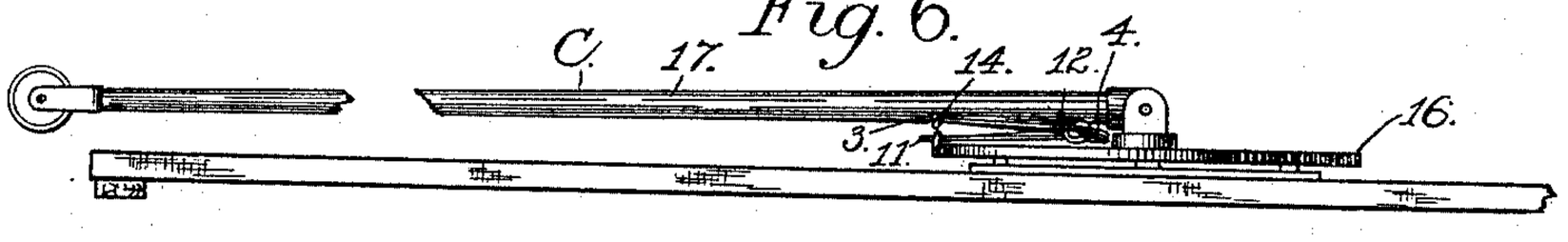


Fig. 6.



Witnesses:-

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UNITED STATES PATENT OFFICE.

JULIUS L. HANSON, OF THE UNITED STATES ARMY.

TROLLEY-SPRING.

SPECIFICATION forming part of Letters Patent No. 526,705, dated October 2, 1894.

Application filed May 14, 1892. Serial No. 433,008. (No model.)

To all whom it may concern:

Be it known that I, JULIUS L. HANSON, of the United States Army, have invented certain Improvements in Trolley-Springs, of which the following is a specification.

The object of my invention is to provide a spring for holding the trolleys of electric street cars against the wire. For this use a spring should have an even resilience throughout its range of movement, since the trolley on different portions of most systems of electric railways is used with varying heights of trolley wire, and often lowered when passing under viaducts to near the top of the car. In the case of the ordinary simple spring, its tension or resilience diminishes as it approaches its normal position and is therefore constantly varying. This is an objectionable feature in the use of the ordinary simple spring used for holding up a trolley, where it is desired to have the same amount of resilience or tension at one as at the other limit of the spring's action.

To this end my invention consists of a compound or double spring made up of a pair of similar interlocking clasp springs, each of which is made of a piece of spring wire having two straight members connected by a spiral spring bend, acting as a torsion spring when the ends of the members are closed together. One member is provided with an offset eye or hook extending in the direction of the end of the other member. One of the springs is slightly longer than the other, so that the spiral bend of the shorter can be interlocked with that of the longer, and held loosely and free to turn through a limited angle therein. The members of the springs are oppositely arranged, when interlocked, so that the eye of one may be engaged by the straight member of the other, the straight member standing between the eye members, but slightly out of alignment with them. Consequently when a compressing force is applied to the projecting ends of the eye carrying members, they are bent back turning about the axis of the device until in contact with each other, the other members at the same time being closed together. The simple closing movement of the individual clasp springs while thus interlocked, gives a rotary closing movement to the combined device. The compound spring is much more elastic than the individual springs, with a greater range of movement, the tension being substantially the same from one limit to the other.

My improved spring can be employed efficiently in a great variety of places, and in fact in nearly all places where common springs are employed and a uniform tension is essential, by suitable adjustment and modification of the parts.

My invention more fully appears in the following description and claims, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view of my improved spring, shown expanded. Fig. 2 is an end view of the same. Fig. 3 is an opposite end view of it closed, the bearing points of the spring being shown in contact with the objects between which it is placed and upon which it acts, these objects being shown conventionally. Fig. 4 is a side elevation of the spring applied to a trolley arm. Fig. 5 is a plan of the same with the arm lowered. Fig. 6 is an elevation of the same.

As shown in the drawings my device is made up of individual clasp springs A and B similar in construction, but of slightly different proportions. The spring A has the straight members 2 and 3, substantially equal in length, and connected by means of the spiral bend 4, forming an eye 5, which increases the elasticity of the spring. The member 2 has its end inturned in the direction of the end of the member 3, and is provided with a hook. The angle formed by the inturning of the end 6 is preferably given an outward or reverse bend forming a point 8 adapted to fit into a socket or dimple in the object against which it bears, thus holding them in engagement. The spring B has the members 10 and 11 of exactly similar form to the members 2 and 3, but slightly shorter, and the spiral bend 12 similar to the bend 4, within which it may be interlocked, as shown in the drawings. The member 10, has also the inturned part or arm 13, provided with the hook 14, and the angle point 15 corresponding to the point 8.

The springs A and B are connected together by interlocking their spiral bends, the bend 12 being held loosely in the eye 5. The mem-

ber 11 is then inserted into the hook 7 and the member 3 into the hook 14, as shown in Fig. 1. The points 8 and 15 being pressed together cause the members of the springs A and B to close slightly, and as the bend 12 turns in the eye 5, the points 8 and 15 close with a swing or rotary motion, the parts thus assuming the relative positions shown in the drawings.

In applying my compound spring to the trolley arm of an electric street car, either one or two sets may be used, depending upon the resilience of the spring and the weight of the arm. In Figs. 4, 5 and 6 of the drawings two sets of the springs are shown applied to the trolley C, the angle points 8 of the springs being secured to the revolving base 16, and the opposite points 15 to the arm 17. The peculiar features of the compound spring, namely: the small force required to hold it closed, the even resilience throughout its range of movement, and the approximate right angle between the members 10 and 12 when the spring is open to its limit, make the spring particularly appropriate for this use.

I claim—

1. The trolley spring made up of the two similar clasp springs having their spiral bends interlocked, and the ends of their members oppositely connected.

2. The combination with the trolley pole, of the similar bent springs, means for loosely connecting their bends together, and means for attaching the ends of the members of one to the opposite members respectively of the other, substantially as described.

3. The combination with the trolley pole, of the pair of similar clasp springs having their bends or eyes adapted to be loosely interlocked, one member of each being provided with a hook, the straight member of one interlocking or engaging the hook member of the other.

4. The combination with the car and trolley pole, of the pair of clasp springs, one member of each having an inturned end provided with a hook and an outer point or projection, the bends of the springs being adapted to be loosely interlocked and the straight member of one engaged by the hook of the other, substantially as described.

5. The combination with the car and trolley pole, of the pair of similar clasp springs each having a spiral spring bend forming an eye, one member of each spring having its end inturned in the direction of the end of the straight member and provided with a hook, an oppositely projecting point carried by the hook member, said spiral bend being adapted to be loosely interlocked and the straight member of the one spring engaged by the hook member of the other spring, and the outwardly projecting points serving as means for engaging the car and pole, substantially as described.

In testimony whereof I have hereunto set my hand this 25th day of April, 1892.

JULIUS L. HANSON.

In presence of—
T. D. MERWIN,
H. S. JOHNSON.