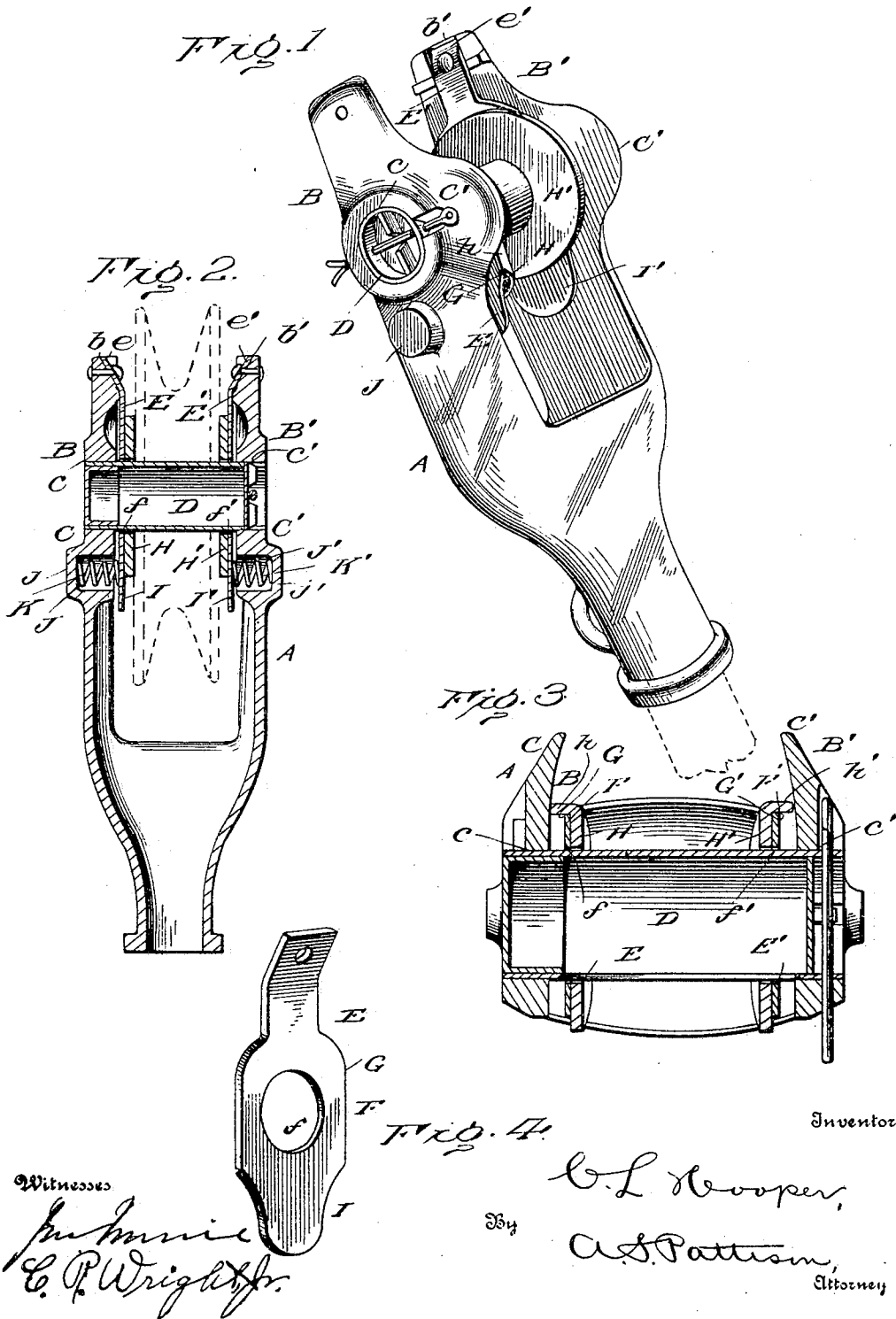


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PATENTED OCT. 10, 1905.

C. L. HOOPER.
TROLLEY HARP.

APPLICATION FILED DEC. 27, 1904.



UNITED STATES PATENT OFFICE.

CHARLES L. HOOPER, OF ROCHESTER, NEW YORK.

TROLLEY-HARP.

No. 801,718.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed December 27, 1904. Serial No. 238,510.

To all whom it may concern:

Be it known that I, CHARLES L. HOOPER, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Trolley-Harps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in trolley-harps.

The object of my invention is to provide a harp of this character in which the spring contact-plates are held in better contact with the hub of the wheel and there will be a compound contact between the harp and the said plates.

Another object of my invention is to provide means for preventing the washers from turning. Thus the wear of the hub is on the washer and not on the spring contact-plates.

In the accompanying drawings, Figure 1 is a perspective view of my improved harp, showing the trolley-wheel removed. Fig. 2 is a vertical sectional longitudinal sectional view. Fig. 3 is a transverse horizontal sectional view of Fig. 1. Fig. 4 is a detached enlarged view of the spring contact-plate and coacting washer.

Referring now to the drawings, A represents the harp, which, as shown, is of the ordinary structure provided with the upwardly-extending arms B and B', which are provided adjacent their upper ends with the enlarged portions C and C', through which passes the transverse horizontal openings *c* and *c'*, in which is mounted the shaft D. The said shaft as understood in harps of this character is held within the same against rotation, and any desired means can be employed for holding the same therein against rotation.

The extreme upper ends of the arms B and B' of the harp are provided with the outwardly-beveled depressions *b* and *b'*, and resting in said depressions are the upper bent ends *e* and *e'* of the spring contact-plates E and E', the said ends being bent, as shown, for the purpose of normally holding the lower ends thereof in an inward position, thus holding the same by their spring tension against the hub of the trolley-wheel, which I will now proceed to describe. The said spring contact-plates E and E' have intermediate their ends the enlarged rounded portions F and F', which are provided with enlarged transverse shaft-receiving openings *f* and *f'*, through which the shaft D passes, the said openings being of a size considerably larger than the shaft in

order that said plates may have a free movement thereon without binding against the shaft. The outer faces of said spring contact-plates E and E' are provided with one flat cut-away portion G and G', and surrounding the said shaft D, on the inside of said spring contact-plates E and E', are enlarged washers H and H', which have one edge thereof turned outwardly at *h* and *h'*, and said outwardly-turned edges are adapted to overlap the flat cut-away portions G and G' of the plates E and E', and thus the washers are locked upon the contact-plates and held against rotation. It will be seen that by this structure the wear of the hub is between the hub and washer and not the washer and the spring and prevents the spring from wearing at all. It is much easier to replace the washers than the plates, as the same can be done by simply removing the shaft, while, on the other hand, both the plates and the washers have to be removed before the plates could be replaced. The said contact-plates E and E' are provided with the downwardly-extending portions or ears I and I' below the shaft, and the harp or arms B and B' opposite the same on the inner sides are provided with depressions or rounded recesses J and J', and, as shown, the arms on the outside are provided with the raised portions *j* and *j'*, into which said recesses extend, thus affording a deeper recess for the springs. Resting within said recesses J and J' are coiled springs K and K', which normally expand outward and have their outer ends bearing against the ears I and I' and normally forcing the same inwardly toward each other, thus forming additional spring tension for the same caused by forcing the same outwardly for the insertion of the trolley-wheel. These springs, as will be readily seen, not only serve as additional means for more firmly holding the contact-springs against the washers and the washers forming a perfect contact with the hub of the wheel at both points above and below the shaft, but the springs also form an additional contact between the said contact-plates and the harp. It will be readily seen by this that the contact-plates E and E' have both their upper and lower ends in electrical contact with the arms of the harp, thus producing a more perfect harp, and the lower contact also serving the additional means of more firmly holding the plates in contact with the hub of the wheel, as heretofore described.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and secured to the arms at one end and a connection between the opposite ends of said contacts and the arms.
2. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and having one of the ends secured to the arms, and a spring connection between the opposite ends of said contacts and said arms.
3. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and having their upper ends secured to the ends of the arms, and a spring connection between the lower ends of said contacts and said arms.
4. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and secured to the ends of the arms, and springs carried by the arms and normally engaging and forcing the lower ends of said contacts inwardly.
5. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and secured to the ends of the arms, and coil-springs carried by the arms and normally engaging and forcing the lower ends of said contacts inwardly.
6. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and secured to the ends of the arms, springs within recesses in the said arms, and normally engaging and forcing the lower ends of said contacts inwardly.
7. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts embracing said shaft and secured to the ends of the arms, the said arms having inwardly-extending recesses adjacent the lower end of said contacts, and coil-springs within said recesses and normally engaging the lower ends of said contacts and forcing the same inwardly.
8. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts consisting of downwardly-extending portions embracing the shaft and a connection between said contacts and the arms below the shaft.
9. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts consisting of downwardly-extending portions embracing the shaft, and a spring connection between said contacts and the arms below the shaft.

10. A trolley-harp comprising parallel arms, a shaft supported by said arms, spring-contacts consisting of downwardly-extending portions embracing the shaft, and coil-springs carried by the arms and engaging the contacts below the shaft.

11. A trolley-harp, comprising parallel arms, a shaft supported by said arms, spring-contacts consisting of downwardly-extending portions embracing the shaft, washers on the inside of said contacts and embracing the shaft, means for locking the washers against rotation with the contacts and coil-springs carried by the arms and engaging the contacts below the shaft.

12. A trolley-harp comprising parallel arms, a shaft supported by said arms, spring-contacts engaging the trolley-wheel and secured to the arm above the shaft, and spring connections between the harp and contacts below the shaft.

13. A trolley-harp comprising parallel arms, a shaft supported by said arms, contacts adapted to engage the trolley-wheel and secured to the arms at one end and a connection between the opposite ends of said contacts and the arms.

14. A trolley-harp, comprising parallel arms, a shaft supported by said arms, contacts adapted to engage the trolley-wheel, and having one of the ends secured to the arms, and a spring connection between the opposite ends of said contacts and said arms.

15. A trolley-harp comprising parallel arms, a shaft supported by said arms, contacts consisting of downwardly-extending portions adapted to engage the trolley-wheel and a connection between said contacts and the arms below the shaft.

16. A trolley-harp comprising parallel arms, a shaft supported by said arms, contacts consisting of downwardly-extending portions adapted to engage the trolley-wheel, and coil-springs carried by the arms and engaging the contacts below the shaft.

17. A trolley-harp comprising parallel arms, a shaft supported by said arms, contacts consisting of downwardly-extending portions adapted to engage the trolley-wheel, and coil-springs carried by the arms and engaging the lower ends of the contacts below the shaft and adapted to normally hold the same inwardly in engagement with the trolley-wheel.

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

CHARLES L. HOOPER.

Witnesses:

GEORGE H. BAILEY,
FRANK DARTT.