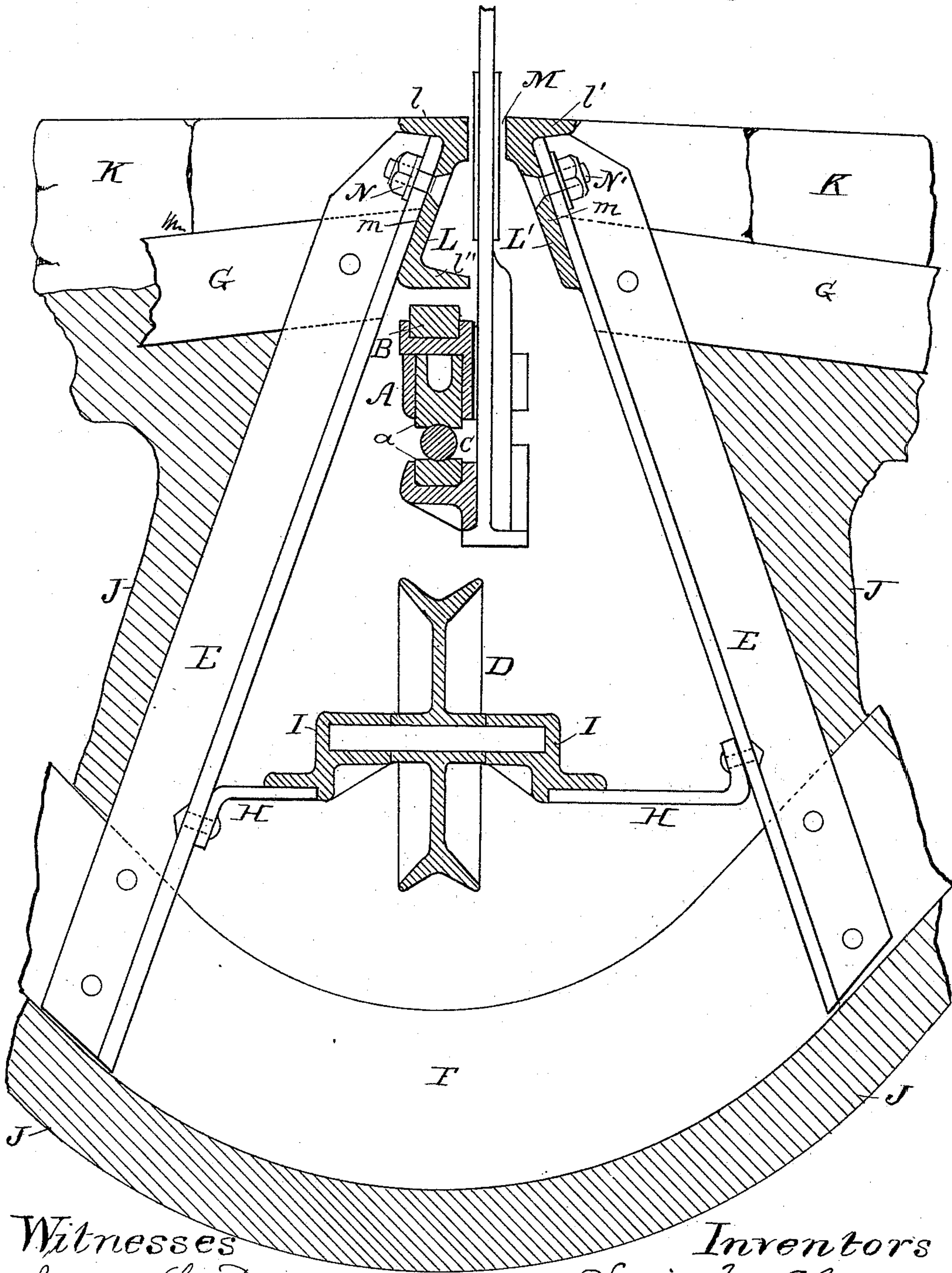


(No Model.)

L. M. CLEMENT & G. C. WATRISS.  
CABLE OR ELECTRIC STREET RAILWAY.

No. 409,926.

Patented Aug. 27, 1889.



Witnesses

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# UNITED STATES PATENT OFFICE.

LEWIS M. CLEMENT, OF OAKLAND, AND GEORGE C. WATRISS, OF SAN FRANCISCO, CALIFORNIA.

## CABLE OR ELECTRIC STREET-RAILWAY.

SPECIFICATION forming part of Letters Patent No. 409,926, dated August 27, 1889.

Application filed December 14, 1888. Serial No. 293,641. (No model.)

*To all whom it may concern:*

Be it known that we, LEWIS M. CLEMENT, of Oakland, Alameda county, State of California, and GEORGE C. WATRISS, of the city and county of San Francisco, State of California, have invented a new and useful Improvement in Subways for Cable or Electric Street-Railways, of which the following is a specification.

Our invention relates to the construction of the slotted way through which the shank of the grip of a cable railway or collector of an electric railway, as the case may be, passes in operating the road.

The invention consists in the form or shape of the irons bounding the slotted way, in combination with a form of brake which operates upon the track formed by the under side of one or both of the said irons, as herein more particularly set forth, the object being to provide a convenient braking-surface while still resting the slot-irons upon and bolting them directly to the yoke-frames, so that simplicity and cheapness are maintained with greater strength, durability, and convenience than have heretofore been acquired in structures of this class using an underground brake.

Heretofore when the under side of the slot-irons has been used as a braking-surface ordinary channel-irons formed the slotted way, their webs being parallel both vertically and horizontally, leaving a space between said webs just the width of the slot and no more. This form entailed an expensive and inconvenient method of connection between these slot-irons and the yoke-frames, and no bolts could be safely put through the vertical webs, because, as they are always liable to get loose, they might easily encroach upon the path of the grip-shank and cause a disastrous breakage should this shank strike them. Besides this objection, even if the bolts could be safely used in the vertical webs, there was no way to put them in their holes after the two slot-irons were in place, the slot through which at least the bolts for one side must pass being less than an inch in width; hence, it followed that the fastening-bolts had to be put through the upper and lower flanges of the slot-irons.

Another shape of slot-irons capable of be-

ing used with a sub-surface brake has been applied in practice. It may be called the "reversed-Z shape," wherein the web drops from the outer instead of the inner edge of the surface flanges perpendicularly, the lower flanges extending still farther outward, leaving an unobstructed space between the vertical webs. The objection to this form is that it is not adapted to be rested solidly upon the yoke-frames if the sub-surface brake is used, but must rely upon its fastening-bolts for its support, while the further objection exists that the braking-surface is too far removed from the center line of the grip or brake handle.

The present form of slot-irons is designed to remove the objections which have in a large measure prevented the more general adoption of the sub-surface brake herein referred to, while offering the important advantage of simplifying and cheapening the structure.

In the accompanying drawing, forming part of this specification, the figure is a transverse sectional elevation of a subway, a part being broken away, which amply illustrates all there is involved in the invention.

A is an edge view of a combined grip and brake of any suitable form.

B is the brake-block, which is moved up and down by the same lever which opens and closes the grip-jaws *a* upon the cable C.

D is one of the cable-carrying sheaves.

E E are the side members of the yoke-frame; F, the transverse tie forming a part of the yoke-frame, broken away at each end; G, the transverse braces of the yoke-frame; H H, the supports for the bearings I I of the sheave-spindles.

J is a broken-away part of the concrete bed of the subway, and K is a portion of the street-surface paving.

The above parts are as in ordinary use, therefore an elaborate description will be unnecessary.

L L' are the slot-irons, which, in combination with a sub-surface brake, constitute the invention. The upper flanges *l l'* of both the opposing irons extend from the edge of the slot M two or three inches outward from the slot. From the edge next to the slot the webs *m* of the irons extend downward four or five



inches, (more or less,) at an angle parallel with that of the side members of the yoke-frame, as shown in the drawing. The slot-iron on the side where the brake-block is located is provided with a return-flange  $l''$ , extending from the lower edge of the web to as far inward as may be necessary to give a good bearing-surface for the brake-block, generally about two and a half inches.

10 The opposing slot-iron, if there be no brake-block on that side, need not have a return-flange. On the contrary, it is better it should not have one, for then there will be ample room to insert the fastening-bolts  $N'$  in their  
15 places. Otherwise it would be difficult to pass these bolts through the space which might be left between the edges of the opposing flanges.

The fastening-bolts  $N N'$  pass through the webs of the slot-irons and the side members  
20 of the yoke-frames. They should have countersunk heads, for, as they are liable to jar loose, the heads should be as far away from

the path of the grip-shank as possible. The upper flanges of the slot-irons rest upon the ends of the side members of the yoke-frame, 25 receiving a very thorough support therefrom.

When the subway is for an electric road, the brake may be an entirely separate piece of mechanism from the collector.

What we claim as our invention, and desire 30 to secure by Letters Patent, is as follows:

The herein-described slot-iron  $L$  for street-railways having subways to carry the actuating mechanism, consisting, essentially, of an upper surface flange  $l$ , bottom flange  $l''$ , and 35 a web  $m$ , passing diagonally from the inner edge of the upper flange to the outer edge of the lower flange, as and for the purposes set forth.

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Witnesses:

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