

No. 672,959.

Patented Apr. 30, 1901.

H. E. NORRIS.
ELECTRICAL CONNECTOR.

(Application filed July 20, 1900.)

(No Model.)

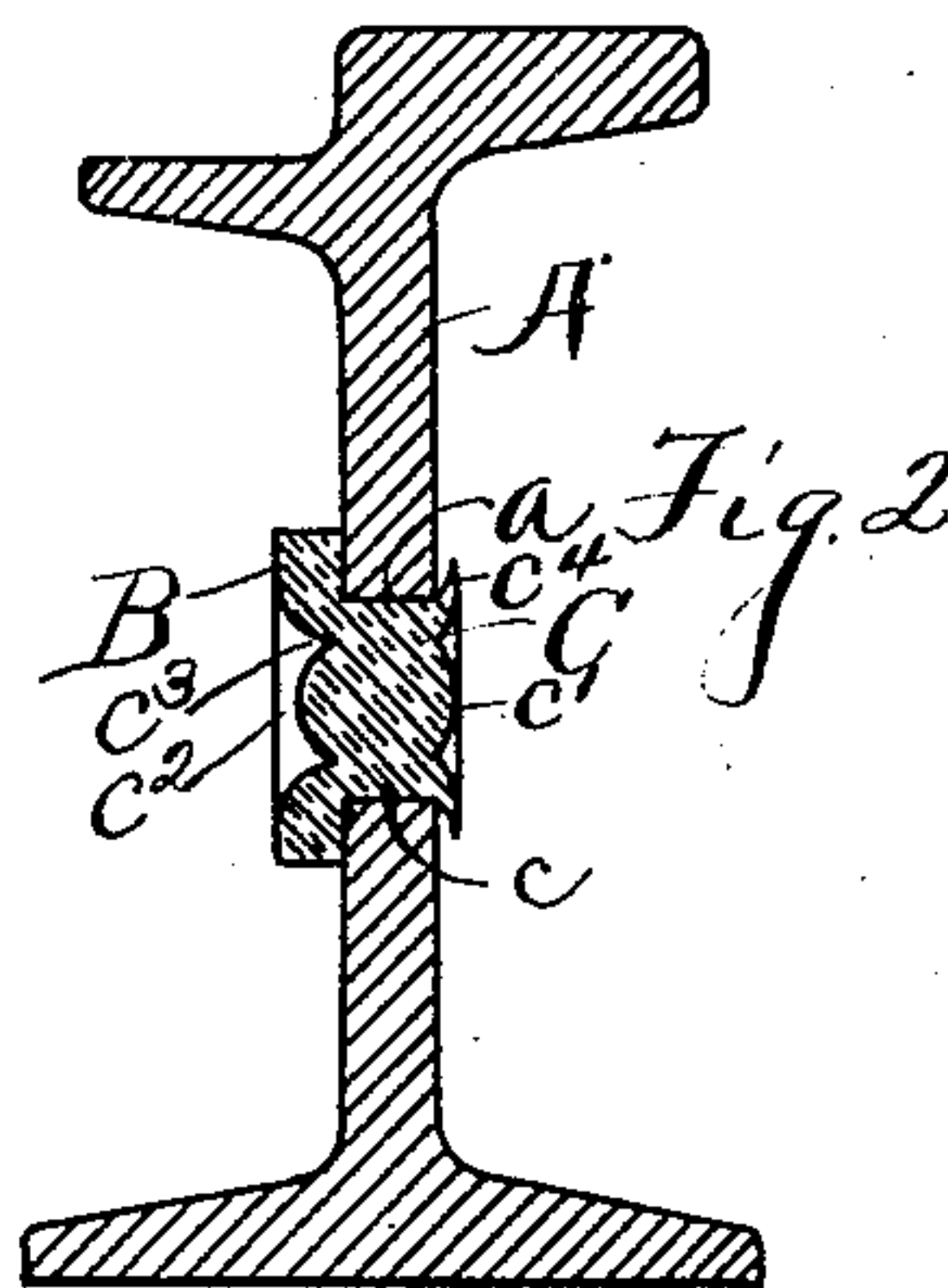
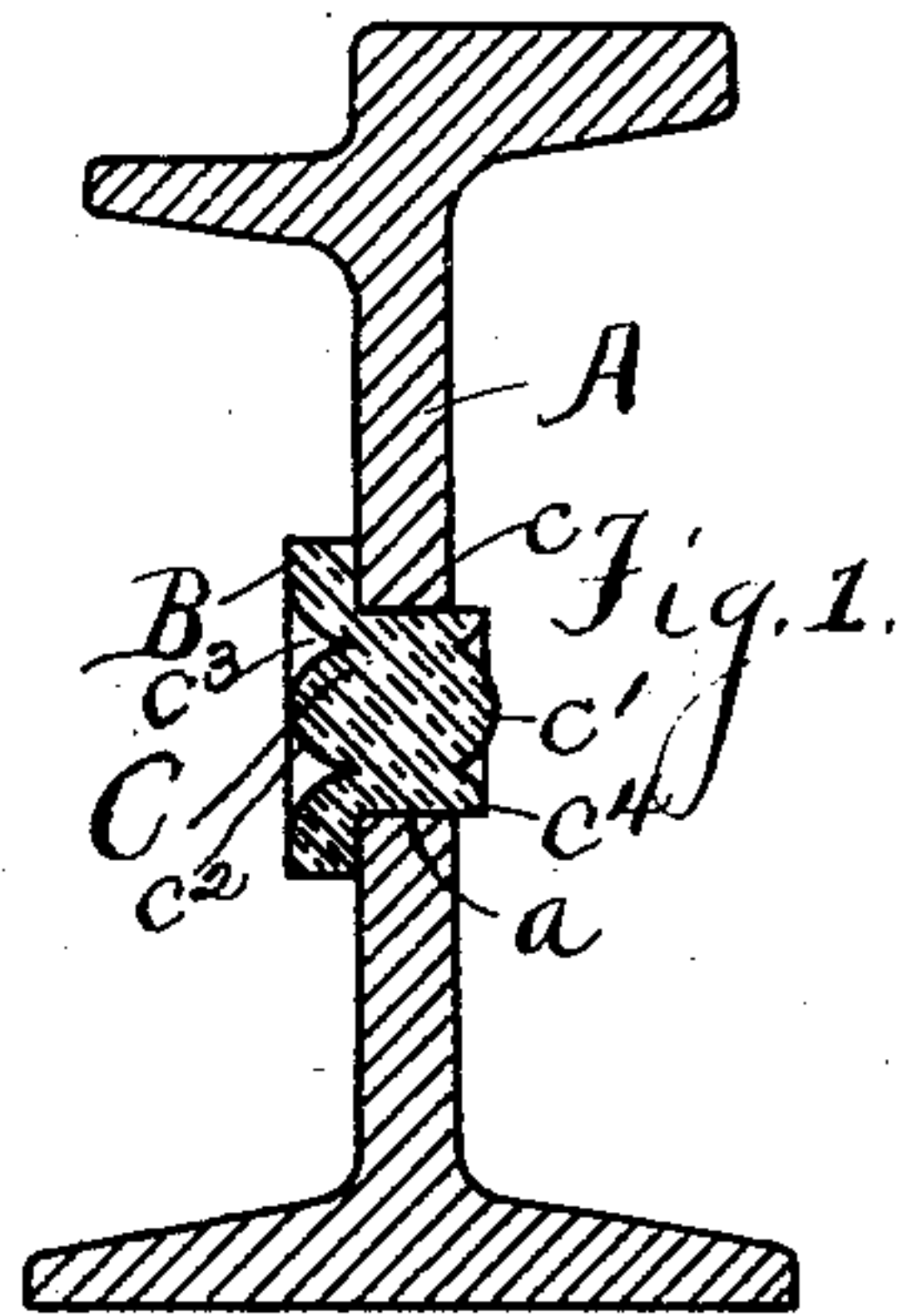
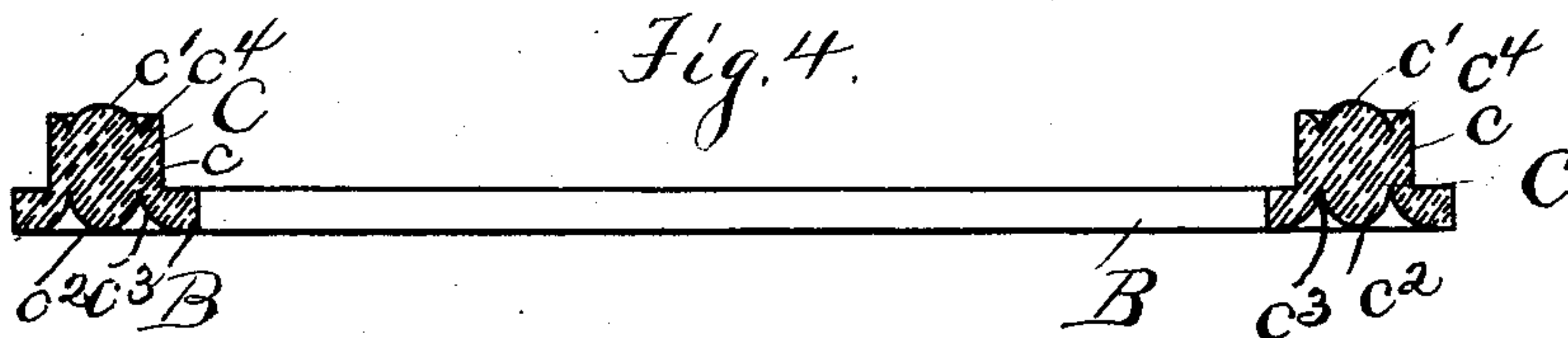
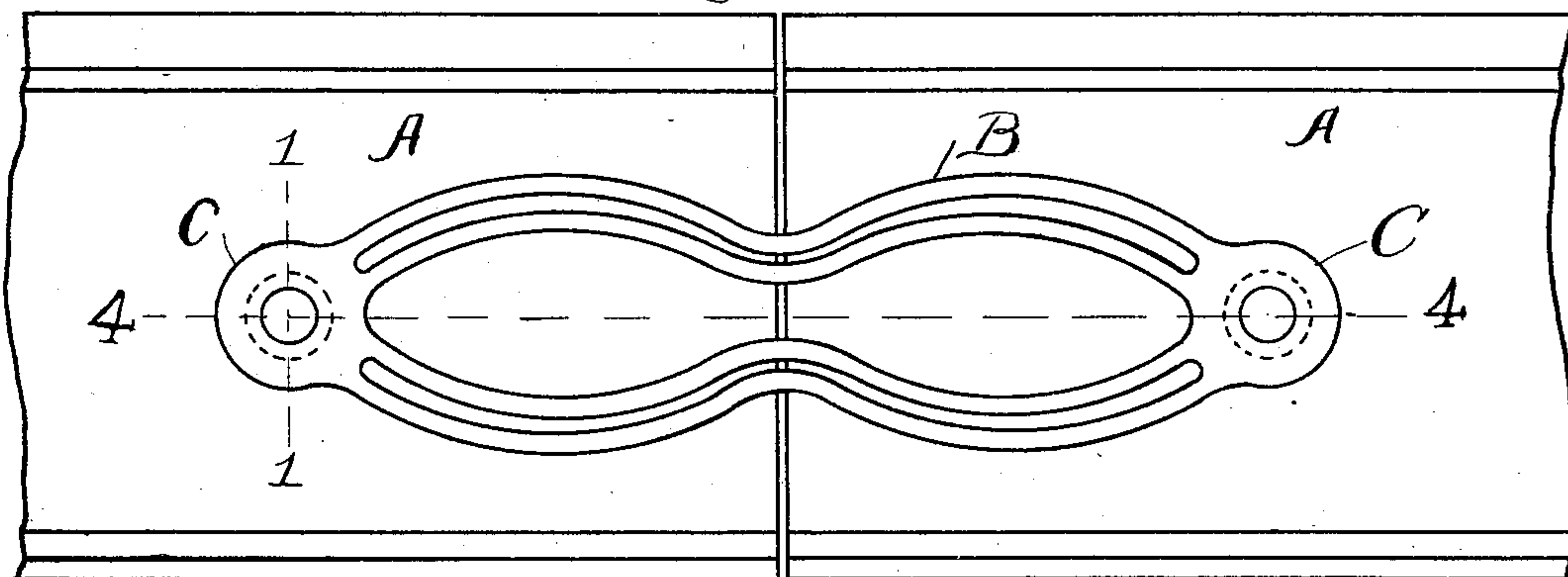


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

HARRY E. NORRIS, OF NORTHEAST, PENNSYLVANIA.

ELECTRICAL CONNECTOR.

SPECIFICATION forming part of Letters Patent No. 672,959, dated April 30, 1901.

Application filed July 20, 1900. Serial No. 24,282. (No model.)

To all whom it may concern:

Be it known that I, HARRY E. NORRIS, a citizen of the United States, residing at Northeast, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Connectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electrical connectors; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claims.

The object of the invention is to provide an electrical connector, preferably in an integral piece, with terminals which may be inserted into holes in electrical conductors, such as street-railway rails, and there secured so as to form a perfect electrical contact.

The invention is illustrated in the accompanying drawings, as follows:

Figure 1 shows a section on the line 1 1 in Fig. 3 with the terminal of the connector in position in a rail and previously to being expanded. Fig. 2 shows a similar section with terminal expanded. Fig. 3 shows a side elevation of the connector in position. Fig. 4 shows a section of the connector on the line 4 4 in Fig. 3.

A marks the railway-rails, the ends only of which are shown.

B marks the body portion of the connector, and C the terminals. The connector is preferably cast in one piece from some highly-conductive metal, such as copper. The terminal portion c is of a size to just fit the opening a in the street-railway rails. On the inside of the terminal is a tapered protuberance c' , which extends from about the same plane as the inner surfaces of the rails. On the outside of the terminal there is a similar protuberance c^2 . The outside of the terminal is preferably provided with a depression c^3 , which preferably extends back to the plane of the outer surface of the rail. A protuberance c^2 extends from the bottom of this depression. Surrounding the tapered protuberance c' is an annular rib c^4 .

In securing the connector to the rail the

terminal C is put in position in the hole a . A pressure device is applied to the terminal on the outer faces of the tapered protuberances c' and c^2 , and sufficient pressure is exerted to upset these protuberances, pressing the metal inwardly to the position shown in Fig. 2. The effect of this upsetting or compressing the metal forming the protuberances c' and c^2 and the intermediate metal is to press the metal on the outer surface of the terminal into intimate contact with the surfaces of the hole a . By making the protuberances tapered the effect of the compression of these protuberances is to expand the terminal portion with a pressure very much less than what would be necessary to upset the entire terminal. In addition to this the expansion of the terminal is more uniform throughout its length than is the case where the entire cross-section of the terminal is directly upset or compressed. By providing depressions c^3 , so as to have the bottom of the protuberance c^2 on a line with the plane of the outer surface of the rail, the effect of the upsetting of the protuberance c^2 is applied directly to the terminal portion of the connector.

The tube by which the terminal is expanded may also be arranged to head over the annular rib c^4 . This secures the terminal firmly in the rail and at the same time draws the body portion B of the connector into contact with the rail, so that the amount of surface in contact is increased.

By making the connector entirely of one piece it has a uniform efficiency as to conductivity, so that a smaller connector may be used with safety than connectors which are built up of several pieces.

What I claim as new is—

1. A connector-terminal, having the terminal portion, c ; and a tapered protuberance having a base of less diameter than the terminal portion, said protuberance extending from the end of the terminal.

2. A connector-terminal comprising a terminal portion, c ; a body portion connected with said terminal portion, said body portion having a depression, c^3 , therein; and a protuberance of less diameter than the terminal portion, c , extending outwardly from the bottom of the depression, c^3 .

3. A connector-terminal comprising a ter-

- minal portion, c ; a body portion connected with said terminal portion, said body portion having a depression, c^3 , therein; and a tapered protuberance extending outwardly from the
5 bottom of the depression, c^3 .
4. A terminal for connectors having the terminal portion c , formed of one piece, and having an annular rib, c^4 , at its inner end for the purpose described.
- 10 5. A terminal for connectors having a terminal portion, c , an annular rib, c^4 , at its inner end, and a protuberance within said rib.
6. A terminal for connectors having a terminal portion, c , an annular rib, c^4 , at its inner end and a tapered protuberance within
15 said rib.
7. A terminal for connectors comprising the terminal portion, c ; a protuberance at each end of said terminal portion of less diameter
20 than said terminal portion.

8. A terminal for connectors comprising the terminal portion, c ; and a tapered protuberance at each end of said terminal.

9. A terminal for connectors comprising the terminal portion, c ; a tapered protuberance
25 at each end of said terminal of less diameter than said terminal portion.

10. A connector having the body portion, B; the terminal, C, comprising the terminal portion, c ; the tapered protuberances, c' and
30 c^2 , of less diameter than the terminal portion, c ; the annular rib, c^4 , at the inner end of said terminal; and the depression, c^3 , in the connector portion around the protuberance, c^2 .

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

HARRY E. NORRIS.

Witnesses:

JUSTIN P. SLOCUM,
H. C. LORD.