

No. 636,638.

Patented Nov. 7, 1899.

W. CRAMER.

MEANS FOR INTERCEPTING EARTH CURRENTS IN ELECTRICAL TRACTION.

(Application filed Aug. 19, 1899.)

(No Model.)

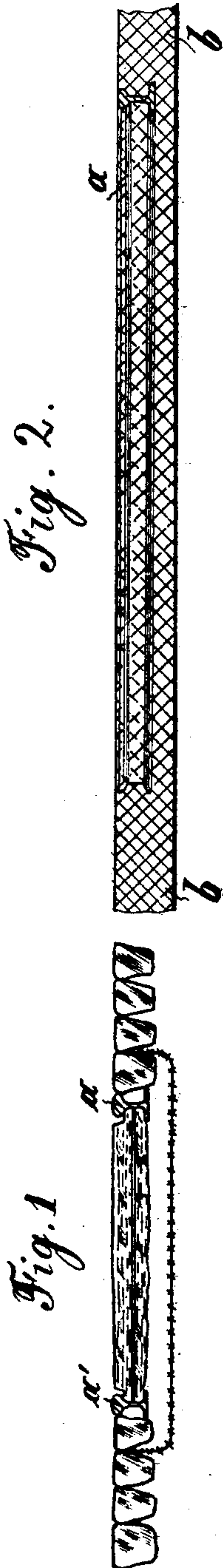
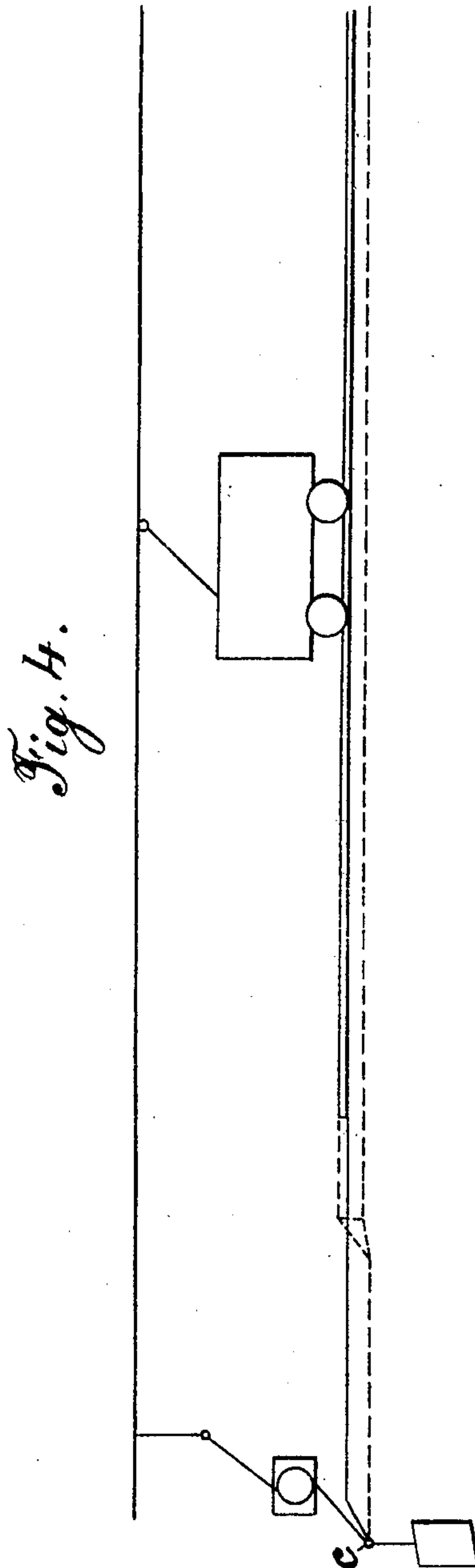
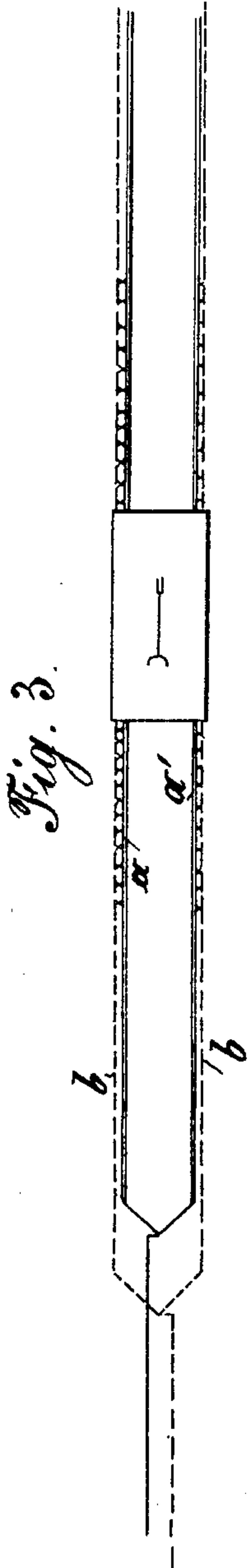


Fig. 2.



WITNESSES  
Halter abbe  
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# UNITED STATES PATENT OFFICE.

WALTHER CRAMER, OF HAGEN, GERMANY.

MEANS FOR INTERCEPTING EARTH-CURRENTS IN ELECTRICAL TRACTION.

SPECIFICATION forming part of Letters Patent No. 636,638, dated November 7, 1899.

Application filed August 19, 1899. Serial No. 727,774. (No model.)

*To all whom it may concern:*

Be it known that I, WALTHER CRAMER, a subject of the German Emperor, residing at Hagen, Germany, have invented certain new and useful Improvements in Means for Intercepting Vagrant Earth-Currents in Electrical Traction; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The electric currents escaping to earth from the rails of electrical tramways (such as those with overhead conductors) in which the rails are used as return-conductors and which may be termed "vagrant" currents present the objection of causing the corrosion of gas and water mains, of affecting magnetic measuring instruments of precision, and of causing irregularities in the telegraphic and telephonic services. It has heretofore been attempted to avoid such objections by diminishing the potential differences between the various parts of the line—as, for instance, by the use of special feeding-wires for connecting the supply-station with the rails or special additional dynamos for equalizing the existing differences of tension.

The subject-matter of this invention consists in a means of intercepting the return-currents which may escape from the rails and of conducting them back to the supply-station without permitting them to exercise any injurious influence.

The invention consists in inclosing the track within a continuous shield of good conductive material which is not in conductive connection with the rails and which is connected with the same pole of the dynamo as the rails.

In the accompanying drawings, Figure 1 represents a cross-section of an electrical-tramway track provided with the shield in question. Fig. 2 is a side elevation of the

shield. Fig. 3 is a diagrammatic plan view, and Fig. 4 is a diagrammatic side view, of a tramway with an aerial conductor.

The rails *a a'*, which serve as return-conductors for the working circuits and the intervening portion of the track, are inclosed at a distance within a continuous trough-like metal shield *b*, passing beneath the rails and rising to the ground-level at either side of the track without, however, being in metallic connection with the rails. This shield, which is preferably made of wire-netting, wire-cloth, or the like, extends the whole length of the track and is embedded in the concrete foundation of the track and paving and is connected at the supply-station with the same pole of the dynamo as the rails. The vagrant currents which may leave the rails in consequence of differences of tension must pass the said shield in order to spread through the neighboring earth; but the shield being a much better conductor than the earth the electric currents follow the shield and are thereby conducted back to the supply-station without exercising any injurious influence on the surroundings.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

The combination with an electrical tramway whereof the rails are used as return-conductors, of a trough-like shield of good electrically-conductive material such as *b* inclosing the track or the rails at a distance and in connection at the supply-station with the same pole of the dynamo as that to which the rails are connected, for intercepting vagrant currents, substantially as specified.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WALTHER CRAMER.

Witnesses:

R. E. JAHN,  
OTTO KÖNIG.