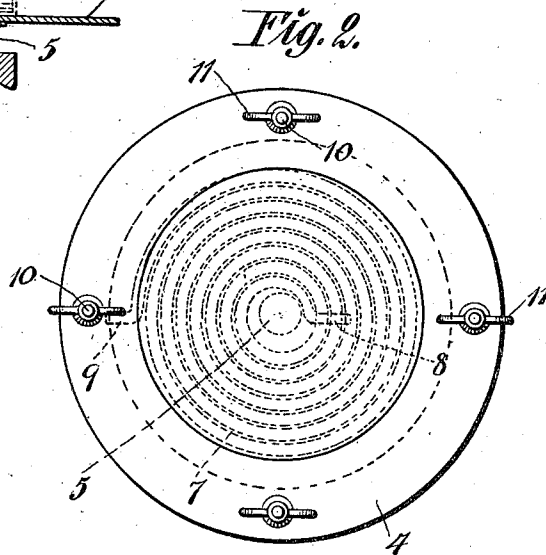
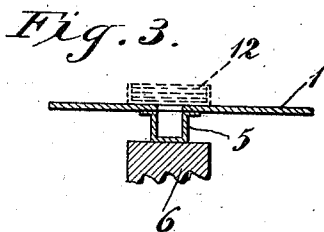
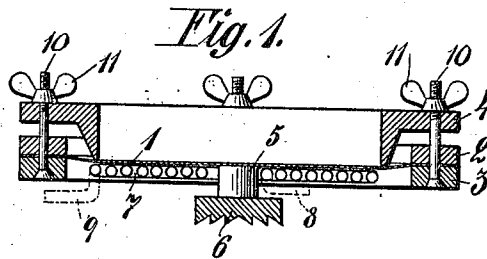


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COOLING DEVICE FOR TELEPHONE TRANSMITTERS.  
APPLICATION FILED AUG. 18, 1909.

989,588.

Patented Apr. 18, 1911.



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# UNITED STATES PATENT OFFICE.

CARL EMIL EGNÉR, OF STOCKHOLM, AND JOHAN GUNNAR HOLMSTRÖM, OF SALTSJÖ-STORÄNGEN, SWEDEN.

## COOLING DEVICE FOR TELEPHONE-TRANSMITTERS.

989,588.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed August 18, 1909. Serial No. 513,410.

*To all whom it may concern:*

Be it known that we, CARL EMIL EGNÉR, a subject of the King of Sweden, and resident of Blekingegatan 63<sup>A</sup>, Stockholm, in the Kingdom of Sweden, and JOHAN GUNNAR HOLMSTRÖM, a subject of the King of Sweden, and resident of Saltsjö-Storängen, in the Kingdom of Sweden, have invented certain new and useful Improvements in Cooling Devices for Telephone-Transmitters, of which the following is a specification, reference being had therein to the accompanying drawing.

The condition for attaining a telephone transmitter practical in every respect, which, when speaking toward the same, effects great variations in the electric energy, consists in great variations in the resistance being effected and in the transmitter being able to endure strong current. Great variations in the resistance are effected if a diaphragm is employed which is strained from its center outward and to which one or more electrodes are fixed in such manner, that they fully partake in the greatest oscillations of the diaphragm. If a strong current passes through a transmitter with a strained diaphragm, the great variations of the resistance will however, cease very soon, which is chiefly due to the fact that the strained diaphragm has lost the valuable oscillating properties, imparted to the same by the straining.

This invention relates to an arrangement, owing to which the properties of the strained diaphragm are maintained even when a strong current passes through the transmitter. A closer study of the alterations effected in the diaphragm by the heat generated by the current shows that the diaphragm loses the tension at and immediately in the vicinity of the place or places where it supports an electrode owing to a local generating of heat. The heat removes the concentrated oscillating action of the electrode proper effected by the straining of the diaphragm. The said injurious influence of the heat on the strained diaphragm is removed by providing at or in the vicinity of the diaphragm a cooling device. Such a device very suitable in the said respect is shown in the accompanying drawing in a cross

section in Figure 1 and a plan view in Fig. 2. Fig. 3 is a cross section of a modified form of the invention.

The diaphragm is jammed between the rings 2 and 3 and strained by the ring 4, which is forced inward by suitable means as for instance screw bolts 10, with thumb nuts 11, until a suitable straining has been imparted to the whole diaphragm. In order to make effective the forcible oscillations at the center part of the uniformly strained diaphragm a body 5 cylindric or of any other suitable shape is fixed to the center part of the diaphragm and carries the electrode 6. In order to prevent the heat generated at the electrode 6 from being transmitted to the strained diaphragm 1 a preferably spiral pipe 7 is provided close by the diaphragm and adapted to contain a cooling liquid passing through the same. 8 is the inlet opening and 9 the outlet opening of the pipe. Owing to the body 5, which is made of steel or any other hard and durable material in order to provide the stability necessary for the transmitting of the oscillations of the diaphragm 1 to the electrode 6, the source of heat is located at some distance from the diaphragm, which fact will assist the cooling pipe in its functioning. Although the spiral shape of the pipe 7 is the most suitable any other suitable shape may be used.

The body 5 may be hollow, as shown in Fig. 3, and filled with a cooling liquid. The invention may be modified also in such way that a small receptacle or box 12 is fixed to the center of the diaphragm 1, as shown by dotted lines in Fig. 3, which box preferably communicates at its bottom with the hollow body 5 or is made integral with the same, and is filled with cooling liquid.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a telephone transmitter the combination of a strained diaphragm and a pipe provided in the vicinity of the diaphragm and containing a cooling medium, substantially as described and for the purpose set forth.

2. In a telephone transmitter the combination of a strained diaphragm, a spiral pipe provided in the vicinity of the dia-

phragm and containing a cooling liquid passing through the same.

3. In a telephone transmitter the combination of a strained diaphragm and a receptacle containing a cooling liquid and provided at the diaphragm, substantially as described and for the purpose set forth.

In witness whereof, we have hereunto

signed our names in the presence of two subscribing witnesses.

CARL EMIL EGNÉR.

JOHAN GUNNAR HOLMSTROM.

Witnesses:

ANNA SÖDERSTRÖM,  
ROBERT APELGREN.