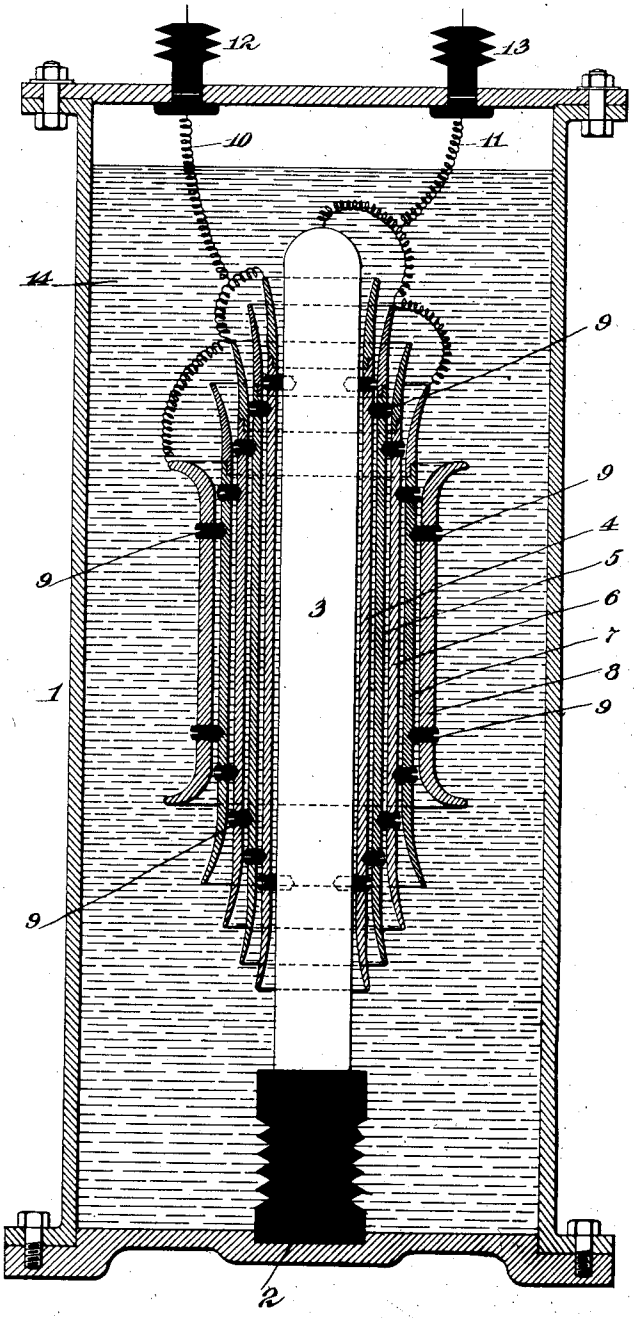
No. 867,579. PATENTED OCT. 8, 1907.

L. GERARD.

ELECTRICAL CONDENSER.

APPLICATION FILED JUNE 14, 1905.




Witnesses:

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LÉON GERARD, OF BRUSSELS, BELGIUM, ASSIGNOR TO PERCY THOMPSON, OF EAST ORANGE, NEW JERSEY.

## ELECTRICAL CONDENSER.

No. 867,579. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed June 14, 1905. Serial No. 265,259.

*To all whom it may concern:*

Be it known that I, LÉON GERARD, a subject of the King of Belgium, residing at Brussels, Belgium, have invented a certain new and useful Improvement in Electrical Condensers, of which the following is a description.

The object I have in view is to produce an electrical condenser which will permit of a close approximation of the condensing surfaces to obtain capacity, and will at the same time allow the use of currents of very high tension without endangering the permanency or efficiency of the apparatus.

In the drawing is illustrated in vertical section a construction designed to carry the invention into effect. The inclosing tank 1 of metal is provided with an insulator 2 secured centrally upon its bottom plate, upon which insulator is supported a metallic cylinder or rod 3 rising centrally in the inclosing tank and forming one of the condenser surfaces.

Surrounding the rod or cylinder 3 and arranged concentrically therewith and with each other are placed a number of metal cylinders 4, 5, 6, 7, 8, which may be supported in any suitable way, such for instance as by screws 9 of insulating material which pass through screw-threaded holes in each one of the cylinders into suitable depressions in the next inner cylinder, or in the case of the innermost cylinder into depressions in the central rod 3. These insulating screws 9 not only support the cylinders upon each other and upon the central rod, but also furnish a means by which the cylinders can be accurately centered upon each other and by which any tendency of the surfaces to change their relative positions will be prevented. The cylinders 4 to 8 have outwardly turned top and bottom ends so as to form between their surfaces spaces which gradually enlarge towards the ends of the cylinders. This construction gives a desirable form to the dielectric which occupies these spaces, since it distributes the electrical pressure evenly over the condensing surfaces and prevents disruptive discharges through the dielectric. With condensing surfaces parallel throughout their length, the pressure is greatest at the corners and edges. By making the condensing surfaces in the form of cylinders, corners and side edges are avoided, while by gradually increasing the thickness of the dielectric in an outward direction at both ends of the cylinders, the localizing of the pressure at the end edges is prevented and disruptive discharges through the dielectric are avoided.

The cylinders 4 to 8 may be made of cast metal with their surfaces machined so as to be truly concentric, and these surfaces are preferably highly polished, the cylinders being given a considerable thickness, which will not only permit this accurate machining of the surfaces, but will give the cylinders sufficient strength and stiffness to maintain their shape accurately. The cylinders are made of such progressively increasing diameters as may be necessary to bring the surfaces into the close approximation required to give the desired capacity. The central rod 3 is also turned to a true cylinder and its surface polished. The cylinders 4 to 8 are necessarily made progressively shorter from the innermost to the outermost cylinder in order to permit the proper configuration of their ends, but this can be done without material variation in the condensing surfaces since the shorter cylinders have a progressively greater diameter.

In order to permit the nesting of the cylinders upon each other, the upper flaring ends of the cylinders are made removable and are fitted to the body of the cylinders by means of rabbet joints which hold the removable end pieces concentric with the body of the cylinders. The central rod and the different cylinders are connected together electrically so as to form alternately different poles, which are joined to the conductors 10, 11 leading through insulators 12, 13 supported in the cover of the tank 1. The tank is provided with a filling of a liquid insulator 14, such for example as a heavy paraffin oil preferably dried before use, which liquid insulator also fills the spaces between the condensing surfaces and forms the dielectric between such surfaces. Owing to the heat produced at the condensing surfaces and in the dielectric, a circulation of the liquid dielectric between the condensing surfaces is effected, so as to keep such surfaces cool. The body of the liquid insulator in the tank is sufficiently great so that its temperature does not rise materially, or means may be provided for artificially cooling the liquid, as will be well understood.

This construction of condenser not only has the advantages before set forth, but is also one which can be cheaply manufactured by ordinary machine-shop operations. The number of condensing surfaces may be varied in accordance with the desired size and capacity of the apparatus, and for condensers of small capacity a single cylinder external to the central rod may be employed.

What I claim is:

1. In an electrical condenser, the combination of vertically arranged annular condensing surfaces separated by annular spaces having a gradually increasing width at the ends of such surfaces, an inclosing tank, and a liquid dielectric in said tank filling the spaces between the condensing surfaces and circulating therethrough, substantially as set forth.

2. An electrical condenser having condensing surfaces composed of several concentric open-ended annular plates, such plates from the one of smallest diameter to the one of largest diameter having a progressively increasing outward curvature towards their ends, substantially as set forth.

3. In an electrical condenser, the combination of con-

centric condensing surfaces having outwardly flared ends producing spaces of gradually increasing width towards the ends of the cylinders, such cylinders being made progressively shorter as their diameters are increased, and a liquid dielectric filling the spaces between the cylinders, substantially as set forth.

4. In an electrical condenser, the combination of a series of concentric condensing surfaces having flaring ends producing spaces of gradually increasing width at the ends of the cylinders, the ends of the cylinders being removable to permit the assembling of the cylinders, and a liquid dielectric filling the spaces between the cylinders, substantially as set forth.

This specification signed and witnessed this 12 day of June, 1905.

LEON GERARD.

Witnesses:
JAS. F. COLEMAN,
JOHN S. LOTSCH.