M. MEIROWSKY.

ELECTRIC CONDENSER AND PROCESS OF MAKING THE SAME.

APPLICATION FILED NOV. 30, 1914.

1,173,452.

Patented Feb. 29, 1916.

Fig. 2.

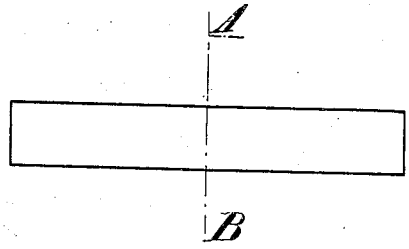


Fig. 1.

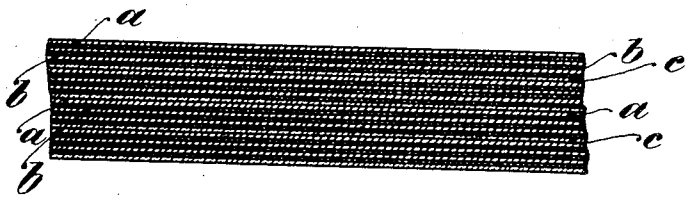
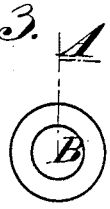


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

MAX MEIROWSKY, OF PORZ-ON-THE-RHINE, GERMANY.

ELECTRIC CONDENSER AND PROCESS OF MAKING THE SAME.

1,173,452. Specification of Letters Patent. **Patented Feb. 29, 1916.**

Application filed November 30, 1914. Serial No. 874,893.

To all whom it may concern:

Be it known that I, MAX MEIROWSKY, subject of the King of Prussia, German Emperor, residing at Porz-on-the-Rhine, Germany, have invented certain new and useful Improvements in Electric Condensers and Processes of Making the Same, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to electric condensers and to a process of making the same.

It has heretofore been proposed to make plate-shaped condensers by impregnating paper with resin, oil, paraffin or other impregnating agents and, after inserting the requisite metallic layers, compressing the same in a press, heat being applied in certain cases. Condensers made in this manner have, however, series defects.

Resin, oil, paraffin and the like are substances which soften at moderate temperatures. Therefore the material may be subjected to only relatively slight stresses. When stressed severely the temperature rises more and more and the dielectric is finally punctured. Paraffin softens at a temperature of about 40° C. and resin at about 60° C. In addition, the substances adapted for the purpose mentioned are hygroscopic. Paraffin possesses a relatively small adhesive capacity. Consequently the individual layers are not intimately connected together, and can be lifted one from another after being compressed. In such a condenser very thin layers of air between the individual layers cannot be avoided, and such a condenser therefore causes considerable noise, when it is subjected to a difference of potential, and it is also heated considerably. The penetration of air into ready-made condensers can also not be avoided. Consequently it has heretofore been customary to immerse such condensers in an oil-bath or to cast a suitable mass around them in order to protect them from moisture or mechanical forces. Further, they are provided for the same purpose with a casing of sheet-metal or wood. All these protective devices are complicated and most of them are insufficient. For example, it may be mentioned that water is liberated from the oil, and electric conductors have to be passed through the oil-bath. It has also been proposed heretofore to employ as an impregnating and binding agent for the dielectric a synthetic resin, particularly a condensation product from phenols and formaldehyde. Synthetic resin, however, in its original state, in which it is used for impregnation, contains a high percentage of alkalis and other substances which are still in it when it is employed. These substances render synthetic resin almost unusable for a condenser.

A primary object of my invention is to obviate the injurious action of the alkalis and other disturbing substances in synthetic resin used in condensers. To this end I make the dielectric of alternate layers of paper and synthetic resin consolidated or welded together. For example, well glazed paper is coated with the resin material. This material can be dried by exposing it to a suitable temperature before its insertion into the press, so that sheets of paper having a dry layer of synthetic resin are obtained. A suitable number of these sheets arranged with the requisite layers of metal arranged between them are consolidated by means of severe pressure in a press, whereby the synthetic resin undergoes the known process of conversion under the influence of pressure and heat. The alkalis or the like still contained in the layers of resin in spite of the preliminary drying operation constitute no danger because the layers of resin, which in section under the microscope can be clearly distinguished from the layers of paper, are connected with the latter in series and are subjected to no considerable differences of potential.

The condenser made in this manner has an exceeding great resistance to moisture and is very refractory. The individual layers are so intimately connected together under the high pressure in the press that it is impossible for air or moisture to penetrate between them. The condenser has a solid structure like that of the hardest wood and, accordingly, can be worked on machine-tools and be otherwise used in the art. It is not necessary to provide it by means of paraffin, oil or some other moldable or impregnating material with a protective casing, as is the case with ordinary condensers. It has a rigid structure and resists the maximum stresses to which it is subjected in practice, because the dielectric not only carries the electrically conducting intermediate layers, but at the same time imparts to the condenser its internal and external stability. Owing to air spaces no longer being able to occur it is also possible to make con-

densers of the type described for the highest voltages.

Condensers for testing-voltages of 260,000 volts have already been made and there is no doubt that the voltage itself need not be kept within any practical limits, while the maximum voltage of plate-shaped condensers impregnated with paraffin or resin may not exceed 800 to 900 volts. Consequently it is possible to make plate-shaped high tension condensers. Another advantage of my improved condensers is that they can be employed in moist air because they are only slightly hygroscopic.

In the accompanying drawing:—Figure 1 is a cross-section, enlarged, taken on the line A—B in Fig. 2 or Fig. 3 through a condenser made according to the hereindescribed process, Fig. 2 shows an improved condenser having the well-known external form of a plate-shaped condenser, and Fig. 3 is an end elevation of an improved condenser having the form of the well-known tubular condenser.

Referring to the drawing, the layers of paper are designated *a*, the layers of resin *b*, and the metallic layers *c*.

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

1. An electric plate condenser characterized by the dielectric consisting of layers of paper and synthetic resin arranged alternately and consolidated together.

2. A process for making an electrical plate condenser consisting in coating glazed paper with synthetic resin, drying said coating of resin, applying plates of metal alternately with the sheets of resin coated glazed paper and consolidating said glazed paper and resin, with said metallic plates by subjecting the same to the action of pressure and heat.

In testimony whereof I have affixed my signature in the presence of two witnesses.

MAX MEIROWSKY.

Witnesses:
J. WIJNEN,
J. D. ZIESECKY.