

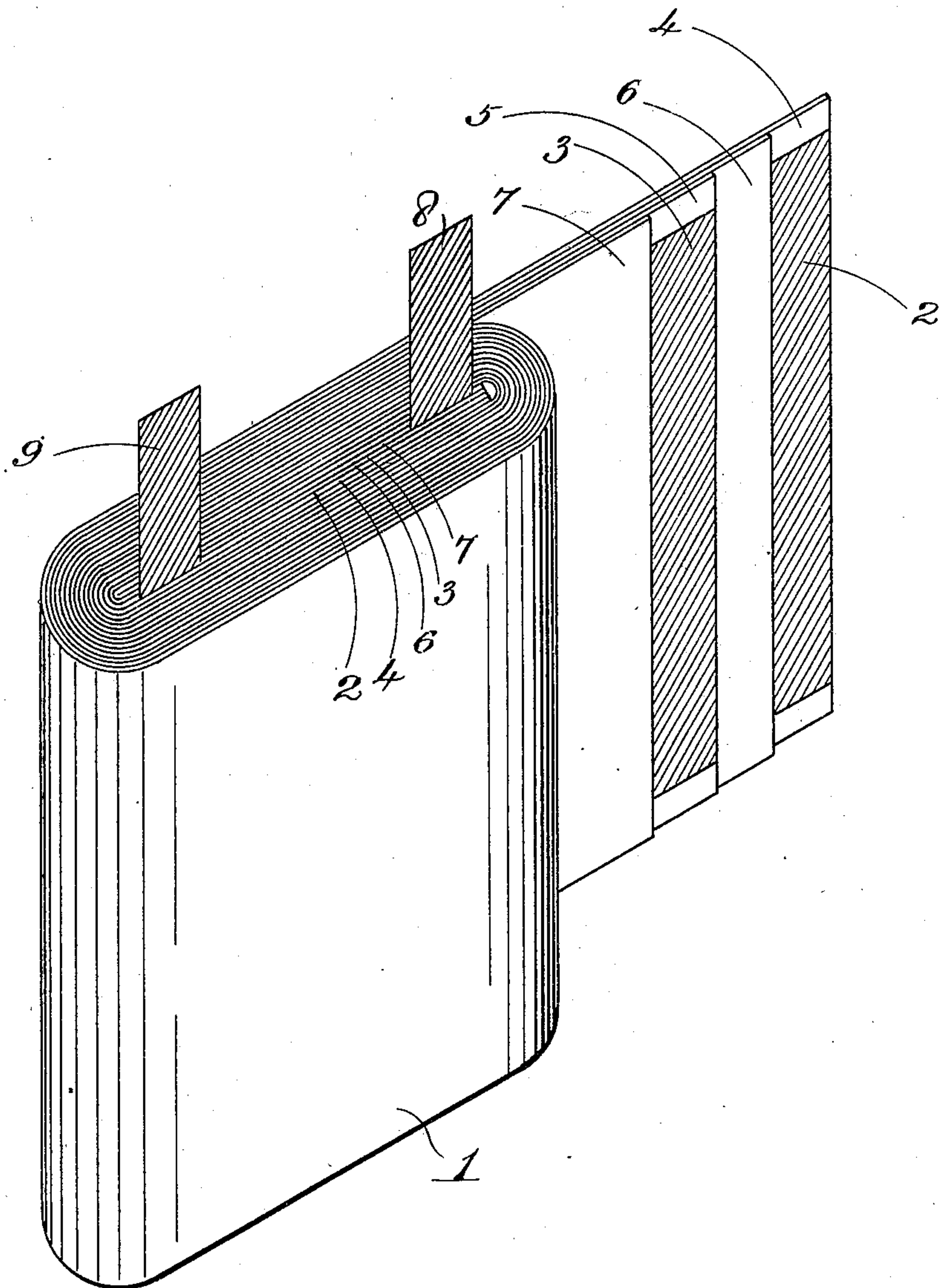
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Patented Apr. 15, 1902.

G. F. MANSBRIDGE.
ELECTRICAL CONDENSER.

(Application filed Nov. 16, 1900.)

(No Model.)



Witnesses
Edwin D. Bartlett
Albert V. Teale

Inventor
George Frederick Mansbridge
per. Herbert Leffert Jones
Attorney

UNITED STATES PATENT OFFICE.

GEORGE FREDERICK MANSBRIDGE, OF WIMBLEDON, ENGLAND.

ELECTRICAL CONDENSER.

SPECIFICATION forming part of Letters Patent No. 697,507, dated April 15, 1902.

Application filed November 16, 1900. Serial No. 36,784. (No model.)

To all whom it may concern:

Be it known that I, GEORGE FREDERICK MANSBRIDGE, a subject of the Queen of Great Britain, residing at 25 Haydons Park Villas, Wimbledon, in the county of Surrey, England, have invented a new and useful Improvement in Electrical Condensers, of which the following is a specification.

My invention relates to electrical condensers, and has for its object to cheapen the construction of these devices.

Electrical condensers for commercial and other uses have been hitherto usually manufactured from tin-foil and tissue-paper, the paper being soaked in paraffin-wax and the condenser being built up of alternate layers of such paper and tin-foil. To secure good results as regards insulation and capacity, great skill is required in the manufacture, and the cost of the tin-foil forms a considerable proportion of the total cost of the finished article. In order to reduce the cost of production, it has been proposed in lieu of constructing the condenser of a number of separate sheets of metal foil, alternating with sheets of dielectric, to roll up two continuous strips of a conductor with interposed strips of insulation, the two strips of conducting material forming the two plates of the condenser. It is not, however, feasible to employ this method in the manufacture of condensers constructed of pure tin-foil, because it has not been found possible to obtain strips of tin of a length greater than about three or four feet without increasing the thickness of the tin-foil to such an extent as materially increases the cost and weight of the condenser when complete. A foil composed of an alloy of tin and lead is sometimes used in this manner of manufacture; but the weight and bulk of these condensers are necessarily greater than with condensers made of pure tin-foil.

According to my invention I obviate the above difficulties by using paper coated on one side with metal in a finely-divided state, the paper forming the dielectric and the finely-divided metallic coating forming the plate. Such paper can be obtained in strips of as great a length as desired and condensers of any required capacity can be readily manufactured by the method of rolling above mentioned. The paper coated with finely-divided

metal may be made by any suitable method. For example, I have found that the material known as "tin-foil paper," commonly used for wrapping tea, coffee, and the like, is fairly suitable for the purpose, and is obtainable in large quantities at a cheap rate. This paper is coated with tin in such a fine state of subdivision that when held to the light it is semi-transparent; but experiment shows that the continuity of the metallic coating can in the process of manufacture of the foiled paper be without difficulty made sufficiently good to enable it to be used as a plate of an electrical condenser. As is well known, this tin-foil paper is prepared by applying to the paper finely-divided tin in the form of a paste, suitable means being provided to insure a sufficiently-even distribution of the paste. The pasted paper is afterward passed under heated calenders, so as to burnish and consolidate the coating of tin. The use of a sufficient quantity of tin and the proper calendering of the paper, so as to render the conducting-surface practically continuous, are important details in the manufacture of satisfactory and suitable tin-foil paper for building condensers according to this invention.

It is preferable for the satisfactory manufacture of condensers according to this invention that the foiled paper be provided with a clean unfoiled margin on at least one side throughout its length.

It will be obvious that a further increase in continuity of the metallic coating may be effected by the use of two sheets of paper with their metallic sides face to face instead of a single sheet; but with suitable paper I have not found this course necessary. Obviously, also, condensers may be constructed by applying two coatings of tin to one sheet of paper, but on opposite sides thereof, an uncoated margin being left as before, the coated strip being then rolled up with an uncoated strip in the same manner as with two coated strips.

To obtain a very high insulation, I prefer to interleave the coated paper with strips of thin unfoiled paper, so as to obtain a double thickness of dielectric, as in ordinary condensers.

In the accompanying drawing I have illustrated one form of condenser constructed ac-

According to my invention, the strips forming the condenser being shown partly unwound and broken off for illustration purposes.

The condenser 1 consists of the two plates 5 2 and 3, which consist of coatings of finely-divided metal on the strips of paper 4 5, which are provided with unfoiled margins. Said strips of paper, each of which is coated on one side with metal in a finely-divided state, 10 are separated from one another by means of strips 6 7 of thin unfoiled paper, so as to obtain a very high insulation. Tin-foil connecting-lugs 8 9 are provided, one of which makes contact with the coating 2 and the 15 other of which makes contact with the coating 3, said lugs being connected in a finished condenser to the terminals of the condenser by any suitable means. The coatings may, however, be directly connected with the ter- 20 minals, if desirable.

It is to be understood that I do not confine myself to the particular construction or arrangement as shown in the accompanying drawing, but that the scope of my invention 25 is set forth by the claims.

The drying and paraffining processes may be carried out either before the condenser is built up or afterward in any of the well-known ways. It will also be understood that 30 I do not confine myself to the use of the tin-foil paper above mentioned, although that is very suitable for the purpose. Paper coated

with finely-divided silver or other metal applied in any suitable manner may be employed.

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What I claim is—

1. As an article of manufacture an electrical condenser consisting of two strips of paper wound up together in the form of a roll, each of said strips being coated on one 40 side with metal in a finely-divided state.

2. As an article of manufacture an electrical condenser consisting of the combination of two strips of paper each of which is coated on one side with metal in a finely-divided state, with a plurality of strips of un- 45 coated paper interposed between said coated strips.

3. As an article of manufacture, an electrical condenser consisting of two pairs of 50 strips of paper wound up together in the form of a roll, each of said strips being coated on one side with metal in a finely-divided state, and each pair of strips having the metallic sides face to face in contact with one 55 another.

In testimony whereof I have hereunto set my hand to this specification in the presence of two subscribing witnesses.

GEORGE FREDERICK MANSBRIDGE.

Witnesses:

HERBERT ARTHUR MARSHALL,
CLEMENT LEAR.