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H. P. CLAUSEN.

PROCESS OF MAKING ELECTRIC CONDENSERS.

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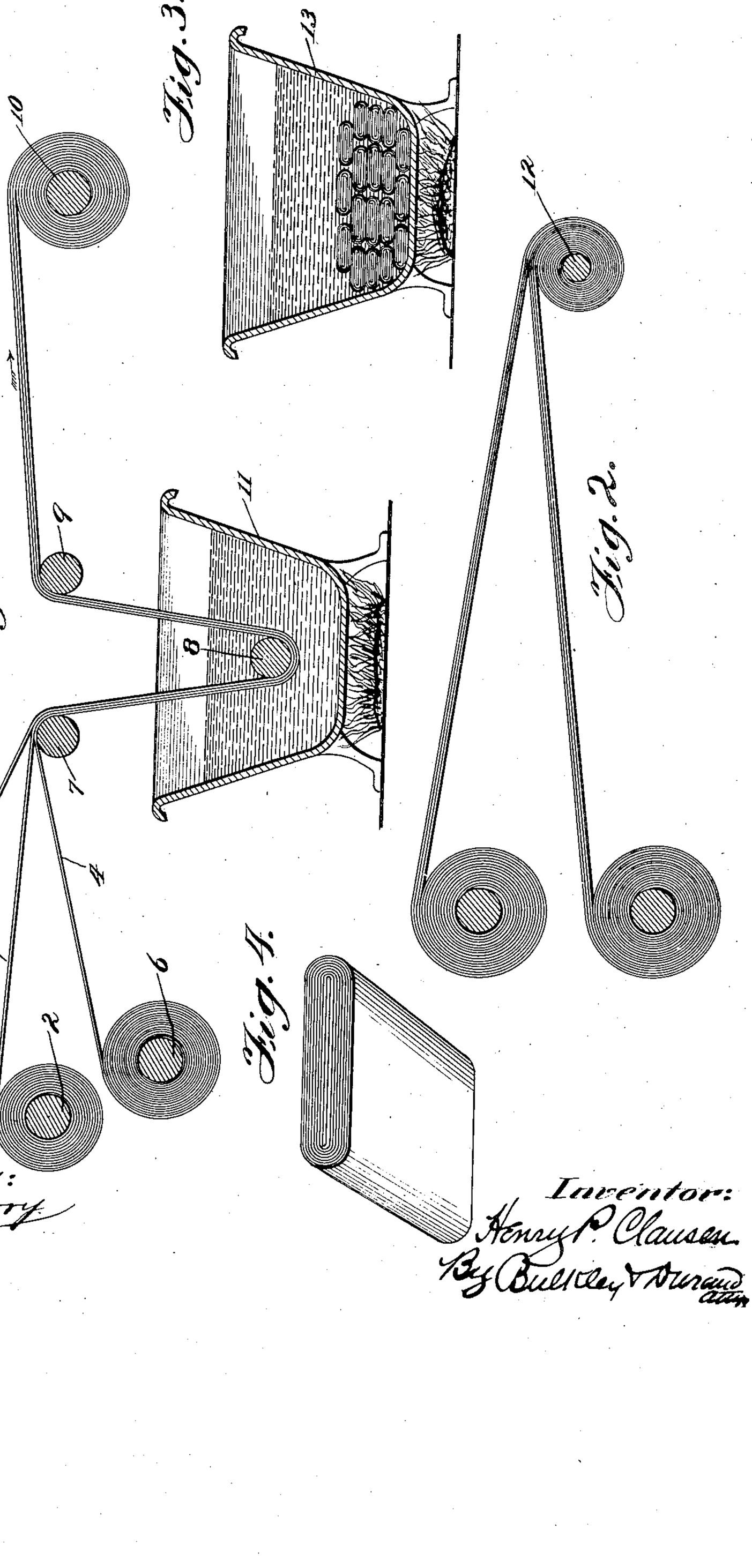

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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PROCESS OF MAKING ELECTRIC CONDENSERS.

No. 836,863. Specification of Letters Patent. Patented Nov. 27, 1906.

Application filed February 2, 1903. Serial No. 141,460.

To all whom it may concern:

Be it known that I, HENRY P. CLAUSEN, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Processes of Making Electric Condensers, of which the following is a specification.

A common form of electric condenser consists of a flattened roll composed of a plurality of thin metal sheets or strips, with interposed strips or sheets of dielectric. Ordinarily the metal strips which form or constitute the plates of the condenser are of metal foil—such, for example, as tin-foil—while the interposed sheets of dielectric may consist of paraffined paper or other like non-conducting material, and, as stated, the metal and dielectric thus rolled together in alternate layers is preferably subjected to pressure after the roll has been removed from the apparatus, and this flattened mass of metal and dielectric after being subjected to any further desired treatment and after being suitably incased or mounted then constitutes the completed article. Condensers of this character are employed in great numbers, particularly in telephone systems, and it is consequently necessary, or at least desirable, that the cost of manufacturing these condensers be reduced as much as possible, and while a cheap article is desirable it must also be of an efficient and reliable character.

Generally stated, the object of my invention is therefore the production of electric condensers at a comparatively small cost of manufacture and to at the same time provide condensers which will be efficient and reliable in use.

Other and special objects are the provision of a process or method of manufacture which will facilitate handling and manipulation of the strips of metal and dielectric; the provision of a process or method which will insure against air-bubbles occurring between the metal and dielectric.

It is also an object, of course, to provide a process involving certain steps or features of improvement tending to increase the general efficiency of a process of this particular character.

To the foregoing and other useful ends my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a diagram illustrating the first step in my improved process for making electric condensers. Fig. 2 is a diagram illustrating the second step of the said process. Fig. 3 illustrates another step in said process. Fig. 4 is a perspective of the completed condenser before it is incased or mounted.

As thus illustrated my improved process for making condensers is of a character which insures the production of a high-class article at a comparatively low cost of manufacture and which I find to be very satisfactory and efficient in practice.

Preferably and preparatory to the first step a single sheet or strip of thin metal 1 is supported in the form of the roll 2, while a couple of strips or sheets of paper 3 and 4 are mounted in the form of similar rolls, as shown at 5 and 6. With this arrangement the sheet of metal is between two sheets of paper or dielectric, and the three end portions are then brought together and passed over the supporting-roll 7. After this the three-ply or composite sheet of metal and dielectric is then brought under the roll 8 and thence upwardly over the other supporting-roll 9 and is then led to the winding-in roll 10. The roll 8 is, it will be observed, preferably supported in a receptacle 11, which may contain boiling paraffin or other like substance. Thus when the roll 10 is operated and the paper and metal caused to travel in the direction indicated by the arrow, the three-ply or composite sheet is compelled to pass around the roll 8 and through the hot paraffin and thence upwardly over the roll 9. Upon passing over the roll 7 the sheets of paper or metal do, not of course, adhere to each other; but upon emerging from the paraffin the three sheets are found to be adhering tightly to each other, and this adhesive action is increased by causing the paper and metal to then pass over the roll 9, and, furthermore, this roll 9 serves to very effectually expel the air from any air-bubbles that may at such time exist between the metal and paper. Consequently when the paper and metal reaches the roll 10 it is then in the form of a single three-ply or composite

sheet composed of two sheets of paraffined paper with an interposed sheet or strip of metal—such, for example, as tin-foil. Two rolls of these three-ply or composite strips are then arranged together, substantially as shown in Fig. 2, and the three-ply or composite strips from each roll are then brought together and led over the winding-in roll 12. Upon this latter roll the two composite strips are wound tightly together in the form of a cylindric bundle or roll. When this bundle or roll is of the proper size or of the proper number of turns, it is then removed and subjected to pressure, so as to flatten it into the form shown in Fig. 4. These flattened condenser-rolls can then be subjected to a further waterproofing action, so as to make them absolutely air-tight and damp-proof—as, for example, by placing them in a receptacle 13 containing heated or boiling paraffin. After this the flattened condenser-rolls are then ready for any further desired or necessary treatment preparatory to mounting or incasing them, as will be readily understood without further description or explanation.

What I claim as my invention is—

1. The process of making electric condensers, which involves as steps, the drawing of two strips of paper and an interposed strip of metal through a liquid consisting of heated paraffin, so as to reduce the said sheet material to a three-ply or composite strip, and then rolling together two of said three-ply or composite strips, the said sheets or strips of material being held apart at a point or points in their path of travel before entering the liquid, but held flatwise against each other just before and at all times subsequent to entering the liquid, whereby the non-adhering surfaces of the sheets or strips at a point or points in their path of travel before they enter the liquid are caused to adhere to each other upon and after passing therethrough.

2. The process of making electric condensers, which consists in causing two sheets of dielectric and an interposed sheet of metal to pass through a liquid consisting of heated paraffin, so as to reduce the said sheet material to a three-ply or composite strip, rolling together two of said composite strips, flattening the roll thus formed, and then immersing the flattened roll in heated paraffin, the said sheets or strips of material being held apart at a point or points in their path of travel before entering the liquid, but held flatwise against each other just before and at all times subsequent to entering the liquid, whereby the non-adhering surfaces of the sheets or strips at a point or points in their path of travel before they enter the liquid are caused to adhere to each other upon and after passing therethrough.

3. The process of making condensers, which consists in bringing together two strips of dielectric having a metal strip therebetween, the passing of said three-ply strip over a roll whereby said plies are held securely together, the passing of said strips through a bath of heated insulating material, the rolling of two of said three-ply strips into a composite roll, the flattening of said roll, and the subjecting of said roll to an immersion in a bath of insulating material.

4. The process of making condensers, which consists in bringing together two strips of dielectric having a metal strip therebetween, the passing of said three-ply strip over a roll whereby said plies are held securely together, the passing of said strips through a bath of heated paraffin, the rolling of two of said three-ply strips into a composite roll, the flattening of said roll, and the subjecting of said roll to an immersion in a paraffin-bath.

Signed by me at Chicago, Cook county, Illinois, this 23d day of January, 1903.

HENRY P. CLAUSEN.

Witnesses:

WM. A. HARDERS,

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