J. O. LANGGUTH.

VULCANIZED JOINT.

APPLICATION FILED JULY 28, 1917.

1,378,040. Patented May 17, 1921.

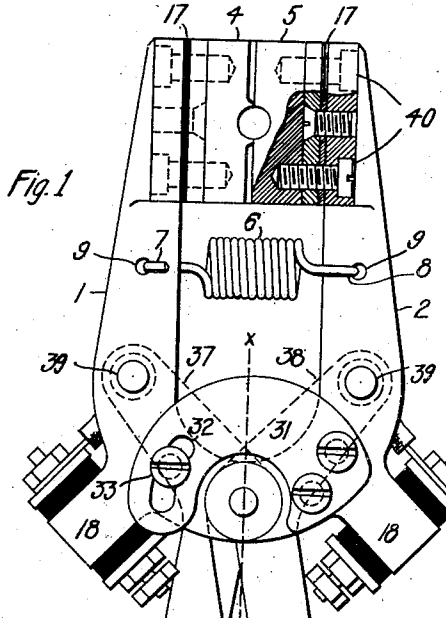

Fig. 1

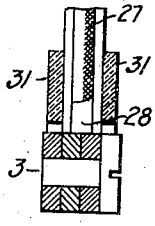

Fig. 2

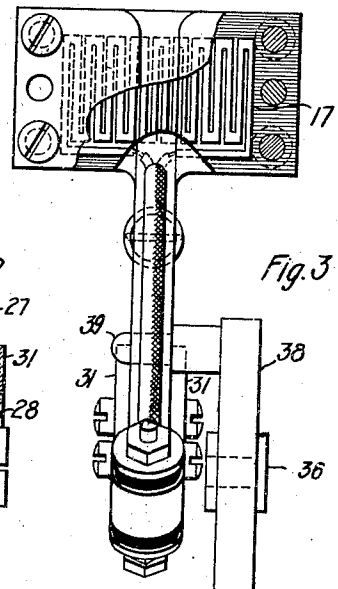

Fig. 3

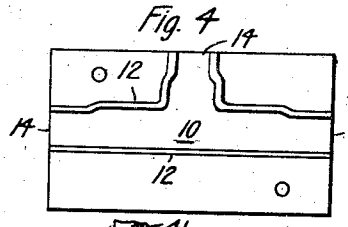

Fig. 4

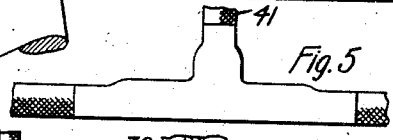

Fig. 5

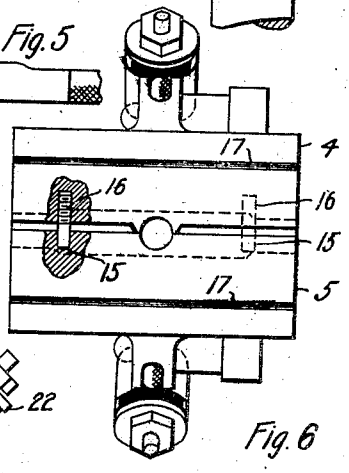

Fig. 6

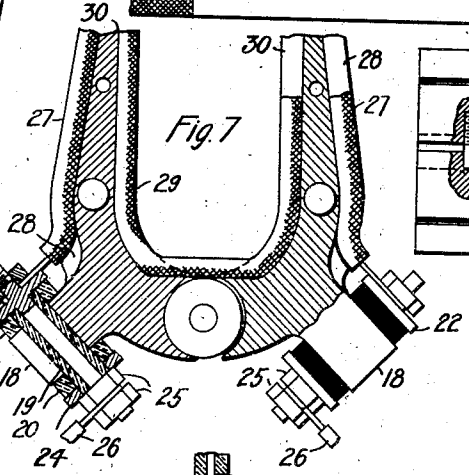

Fig. 7

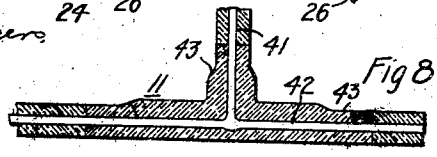

Fig. 8

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VULCANIZED JOINT.

1,378,040. Specification of Letters Patent. Patented May 17, 1921.

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To all whom it may concern:

Be it known that I, JOSEPH O. LANGGUTH, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Vulcanized Joints, of which the following is a specification.

My invention relates to vulcanizing apparatus, and it has special relation to a tool for the production of vulcanized joints between electric conductors.

One object of my invention is to provide a tool for forming vulcanized joints for connecting electric conductors consisting of one or more wires or the like mechanically connected together and having their joined portions surrounded by an integral vulcanized mass of insulating material.

Another object of my invention is to provide an improved electrically heated vulcanizing tong which shall be well adapted for making joints of the above indicated character and other vulcanized objects.

In the accompanying drawings, Figure 1 is an end elevational view of a pair of vulcanizing tongs constructed in accordance with my invention, parts being broken away. Fig. 2 is a sectional view on line X—X of Fig. 1. Fig. 3 is a side view, partly in elevation and partly in section, of one of the jaws and a portion of one of the handles of the tongs shown in Fig. 1. Fig. 4 is a side elevational view showing the working face of one of the jaws. Fig. 5 is a side elevational view of a vulcanized joint between two electric conductors formed in accordance with my invention and with the use of the vulcanizing tongs shown in Figs. 1 to 4. Fig. 6 is a plan view showing the jaws of the tongs in their cooperating or working position. Fig. 7 is a sectional view of the jaw arms shown in Figs. 1 and 3, and Fig. 8 is a side view of the same joint showing the vulcanized mass of insulating material in section.

When insulated electric conductors are to be joined together, it has heretofore been the practice to strip the insulation from the end of one conductor and from a short section of the other conductor, to twist the stripped wires together and to wind insulating tape around the joint. Such joints are satisfactory only so long as the tape remains in position, and when, as often happens, the tape becomes loosened in service, it is necessary to retape the joint, which is frequently a matter of difficulty, as in the case of joints which are inaccessibly located.

According to my present invention, I produce permanently insulated joints by first wrapping the joints with rubber tape or otherwise applying a vulcanizable material and completing the joint by applying heat and pressure by means of the specially shaped implement shown in Figs. 1 to 4 and 6 and 7. As shown in these figures, my vulcanizing implement comprises two arms 1 and 2 pivotally connected at 3 and carrying a pair of coöperating jaw members 4 and 5 at their free ends. The jaws are forced toward each other by a strong helical spring 6, the respective ends 7 and 8 of which are bent to engage holes 9 in the arms 1 and 2.

Each of the jaws 4 and 5 is provided with a depression 10 having the size and shape of the article to be vulcanized, the depression 10, in the present instance, conforming to the outline of the joint 11 shown in Figs. 5 and 8. The edges of the depression 10 are outlined by means of flanges 12 which, when the jaws 4 and 5 are forced together, engage one another in the manner shown in Figs. 1 and 6. The depressions 10 extend to one side and both end edges of the jaws, forming openings 14 to receive the conductors which are to be joined. In order to insure that the members shall always come together in the proper relation, the jaw 5 is provided with transverse recesses 15 which, when the jaws are brought together, receive pins 16 carried by the jaw 4. The jaws 4 and 5 may be heated by any suitable means, but I prefer to employ electric means for this purpose and I have accordingly shown these jaws provided with heating coils 17 that are supplied with current from any convenient source as follows. The ends of arms 1 and 2 that are connected by the pivot 3 are provided with outwardly and rearwardly projecting lugs 18 each of which is bored to receive an insulating sleeve 19 that projects beyond the sides of the lug sufficiently to receive insulating collars 20. A terminal bolt 21 is surrounded by each sleeve 19 and projects beyond its ends to receive binding nuts. One end of the bolt 21

is provided with an integral flange 22 and a nut 23, and its other end is provided with a washer 24 and two nuts 25. The ends of supply conductors 26 are clamped between the nuts 25, and the ends of insulated conductors 27 leading to corresponding terminals of the respective heating coils 17 are clamped between the flanges 22 and the nuts 23. The insulated conductors 27 are seated in grooves 28 in the outer sides of the arms 1 and 2 and an insulated conductor 29, which serves to connect the heating coils together in series between the conductors 27, is seated in grooves 30 in the inner sides of said arms.

The arms 1 and 2 are laterally supported and guided in operation by two segmental insulating plates 31, corresponding ends of which are rigidly fastened to the arm 2, and the other corresponding ends of which are provided with curved slots 32 that are concentric with the pivot 3 and receive guiding pins or screws 33 with which the arm 1 is provided.

In oder to separate the jaws 4 and 5 against the force exerted by the spring 6, I provide a pair of levers 34 and 35 that are pivotally connected together at 36 and the short arms 37 and 38 of which diverge and are pivotally connected to the arms 1 and 2 by means of studs 39.

By reason of the relatively great length of the long arms of the levers, which serve as handles, the jaws may be readily separated although the spring 6 is of great strength. One pair of tongs may, if desired, be adapted for making vulcanized articles of different sizes and shapes by providing several pairs of jaw members adapted to be removably attached to the arms 1 and 2 of the tongs by means of screws 40 or otherwise.

The manner in which my vulcanizing tongs are used to make joints between electric conductors is illustrated in Figs. 5 and 8, in which the end of an insulated conductor 41 is shown connected to an intermediate portion of an insulated conductor 42. The end of the conductor 41 is soldered or otherwise joined to the conductor 42, and a mass of vulcanizable material 43, rubber tape, for example, is wrapped around the joint. The working jaws 4 and 5 of the vulcanizing tongs are then applied to the joint and clamped firmly together by the spring 6 and the jaws are then heated to complete the vulcanizing operation.

Vulcanized joints may be rapidly made in the manner described above and, when so produced, are permanently and thoroughly insulated, since the insulating material is transformed by the vulcanizing heat and pressure into a coherent and integral mass.

While the implement which I have shown and described is well adapted for the production of such vulcanized joints, it is to be understood that it may also be employed for vulcanizing other objects by properly shaping the working jaws.

It is also to be understood that the process steps and materials which I have mentioned may be variously modified without departing from the spirit and scope of my invention and I desire, therefore, that no limitations shall be imposed upon my invention except such as are indicated in the appended claims.

I claim as my invention:

1. A vulcanizing implement comprising two pivotally connected members, working jaws carried by the said members, heating elements disposed in the jaws and means for conducting electric current to the heating elements.

2. A vulcanizing implement comprising two pivotally connected members and working jaws carried by the said members, the said working jaws being provided with cooperating depressions conforming in shape to an object to be vulcanized and with cooperating flanges surrounding the said depressions.

3. A vulcanizing implement comprising two pivotally connected members and working jaws carried by the said members and provided with coöperating T-shaped depressions and with raised flanges surrounding the said depressions.

4. A vulcanizing implement comprising two pivotally connected members, and working jaws carried by the said members, and provided with coöperating pins and openings for preventing relative lateral movements of the said jaws.

5. A vulcanizing implement comprising two pivotally connected members, and working jaws carried by the said members and provided with coöperating pins and openings for preventing relative lateral movement of the said jaws and also provided with coöperating depressions conforming in shape to an object to be vulcanized and with raised flanges surrounding the said depressions.

6. A vulcanizing implement comprising two pivotally connected members, working jaws carried by the said members and provided with coöperating pins and openings for preventing relative lateral movement of the said jaws and also provided with cooperating depressions conforming in shape to an object to be vulcanized and with raised flanges surrounding the said depressions, and means for electrically heating the said working jaws.

7. A vulcanizing implement comprising two pivotally connected arms provided with working jaws having depressions conforming in shape to an object to be vulcanized, a spring for forcing the jaws into working relation, and jaw-separating levers pivotally

connected together independently of said pivotally connected members and making operative engagement with said members between their pivotal connection and the working jaws.

8. A vulcanizing implement comprising two pivotally connected members provided with working jaws and with resilient means for forcing said jaws toward each other and separating levers connected to said members between their pivotal connection and said working jaws.

9. A vulcanizing implement comprising two pivotally connected members provided with electrically heated working jaws and terminal devices, a spring for holding said jaws in engagement with the work, and a pair of separating levers engaging said members between their pivotal connection and said jaws.

10. A vulcanizing implement comprising two pivotally connected members provided with working jaws, a closing spring and segmental guides, and a pair of separating levers pivoted together independently of said members and connected thereto between their pivotal connection and said jaws.

11. A vulcanizing implement comprising two pivotally connected members, removable working jaws carried by the said members, and means for electrically heating the working jaws.

In testimony whereof, I have hereunto subscribed my name this 20th day of July, 1917.

JOSEPH O. LANGGUTH.