W. MACIEJEWSKI.

PROCESS OF MANUFACTURING CORRUGATED TUBES.

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1,010,931. Patented Dec. 5, 1911.

Fig. 2.

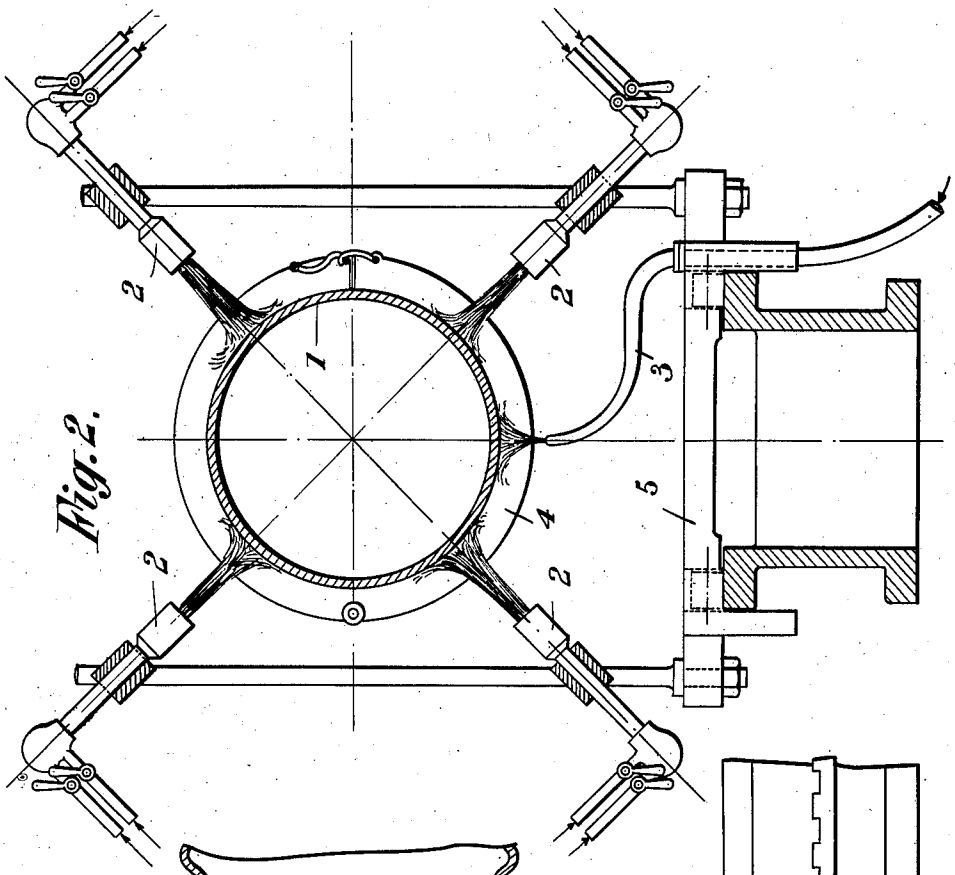
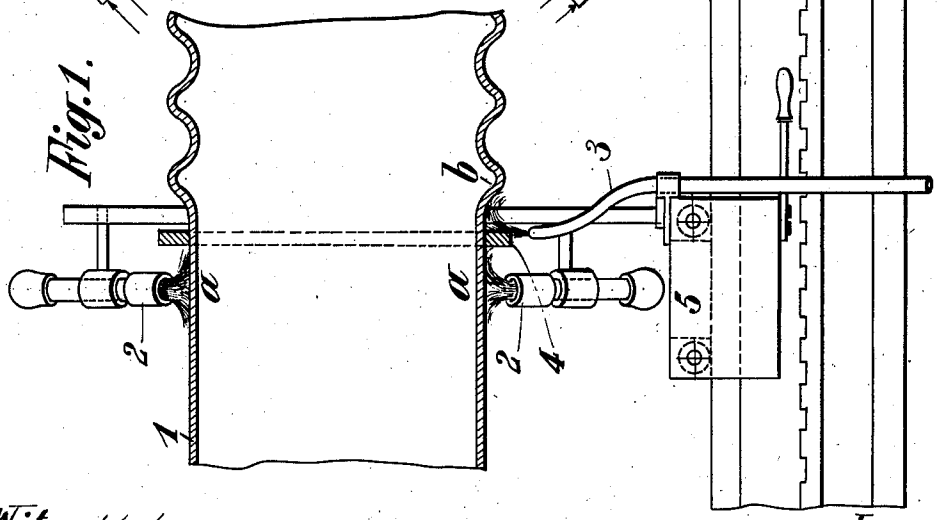


Fig. 1.



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PROCESS OF MANUFACTURING CORRUGATED TUBES.

1,010,931. Specification of Letters Patent. Patented Dec. 5, 1911.

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To all whom it may concern:

Be it known that I, WLADYSLAW MACIEJEWSKI, a subject of the Emperor of Russia, and resident of Warsaw, Russia, have invented a certain new and useful Process for Manufacturing Corrugated Tubes by Pressing a Tube Heated by Zones, of which the following is a specification.

By the well known process for manufacturing corrugated tubes in which a smooth tube is heated by zones from the outside and is then compressed in the axial direction, corrugations can only be obtained at certain intervals which are not even small. The cause of this resides in that the heating of the tube at the places where the corrugations have to be produced, must be effected by means of blow pipes, it being advantageous to rotate during this operation the tube around its longitudinal axis. Now, the dart of the blow pipe spreads out when meeting the wall of the tube and after an intensive heating of the determined zone slides along the smooth wall of the tube. It is true that the thus produced heating of the neighboring parts of a tube having a cylindrical wall is not so intensive to be able to exert an objectionable influence during the operation of pressing. However if in the immediate neighborhood of the zone subjected to the heating there is a corrugation, the latter opposes a certain resistance to the expansion of the flame; it follows therefrom that the zone of heating spreads over the corrugation considered and that when the tube is subsequently axially compressed, not only a new corrugation is formed but also an undesirable deformation of the neighboring wave is produced. In this manner the corrugation previously formed is always pressed in and impaired when the following corrugation is produced. In order to remedy this drawback, one has been obliged until now to produce the corrugations at relatively large intervals from each other and this independently from the thickness of the wall of the tube and from the intensity of the source of heat in such a manner that the dart of the blow pipe striking the wall of the pipe would be unable even after having been spread out, to reach and heat the neighboring corrugation. Therefore, in cases where the tube has to be provided with corrugations continuing each other the process cited above cannot be employed. This limited possibility of applying the process with heating by zones of the tube and the subsequent axial pressing of the latter is corrected according to the present invention by the fact that during the heating of one zone on which the corrugation has to be formed, the neighboring surface of the tube *i. e.* the surface which is positioned between the said zone of heating and the neighboring finished corrugation is insulated from the action of the flame and is cooled for instance by placing on the tube a ring of fire proof material and by blowing or spraying on the said surface of the tube or of the corrugation air or another gas or a liquid or a mixture of liquid and air. This cooling and limitation of the neighboring corrugation prevents the undesirable heating of the neighboring wave produced by the lateral spreading of the dart of the blow pipe flame on the wall of the pipe and consequently the bending at a non-desired spot during the compression. In the contrary the formation of the corrugation when the axial compression is produced is thus limited only to the place or zone where the heating has been performed. This process consequently allows even with tubes having thick walls and requiring the use of intensive sources of heat, to produce corrugations at any desired intervals and this also in such a manner that, as this is required in many cases, the corrugations flow continuously into each other, which was entirely impossible in the process known until now. The special formation or construction of the insulating ring, of the cooling device as well as of the heating device is, as readily understood, an arbitrary one; it is preferably effected in such a manner that the cooling device together with the heating device is positively advanced step by step as in the process described above when the heating of a determined zone has been effected to the required degree. The heating device may also be shaped in any desired manner although it be recommendable to employ for it blow pipe dart flames. Considering this it may be advantageous or even necessary to rotate the tube to be corrugated while a determined zone is heated or cooled. The cooling fluid is supplied by means of pipes or nozzles which may be arranged in a simple or multiple set at the periphery of the tube at a suitable distance from each other. The action of the cooling may be continued not only during the duration of the heating proper but also, if re-

quired, during the subsequent process of pressing.

The accompanying drawing, given by way of example, shows one form of embodiment of a device allowing of the execution of the process described above and in this drawing:

Figure 1 shows a side elevation view of the device, the tube to be corrugated being shown in longitudinal section; Fig. 2 shows a cross sectional view of the same.

The tube 1 to be corrugated has been shown as being provided already with a number of finished corrugations and a new corrugation has to be formed at *a* and this in such a manner that like the corrugations already shown it immediately follows the last corrugation *b* or continues the latter. The zone heating of the tube is carried out at *a* by means of blow pipe flames which are produced by means of a mixture of air and gas supplied by pipes 2. The tube to be corrugated is itself slowly rotated to this end. Now, according to the present invention, before a new corrugation is formed, a ring 4 made of fire proof material is applied to the tube and a cooling medium is supplied through pipe 3 during the heating of the required zone of the tube 1. As shown by Fig. 1, the said cooling medium flows against the neighboring corrugation *b* and the insulating ring so that the blow pipe flame which, after having met the spot to be heated spreads over the surface of the tube, is kept away from the neighboring corrugation *b* and rendered inoperative by the insulation and the supply of the cooling medium. As further shown by the drawing, the tube 3 supplying the cooling medium is arranged on the same carriage 5 which also carries the blow pipes producing the dart flames and is advanced step by step in the usual manner either by hand or by means of automatic devices.

The insulating ring 4 may be removed and may easily be applied to any desired spot of the tube.

It will in some cases be sufficient to employ only one of said means *i. e.* either only the cooling or only the insulation. This depends in each peculiar case upon the strength of the blow pipes and upon the dimensions of the tube to be corrugated.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:

1. The herein described process of manufacturing corrugated tubes consisting in subjecting a tube to a forced flame to heat same in zones, protecting the metal of the tube adjacent the heated zone from the forced flame by an insulated means and by cooling it and compressing the tube axially.

2. A process for manufacturing corrugated tubes consisting in heating the tube to be corrugated by zones, protecting the corrugation which is adjacent to the zone to be heated, from the action of the flame by an insulating means and by cooling it and compressing the tube axially, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

WLADYSLAW MACIEJEWSKI.

Witnesses:
W. KEMWJKI,
B. GLISZERYNSKIL.