106. COMPOSITIONS, COATING OR PLASTIC. XR
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18. PLASTICS
Processes
Miscellaneous
866,517
Examiner

# UNITED STATES PATENT OFFICE.

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## MANUFACTURE OF TUBULAR OR HOLLOW BODIES FROM PLASTIC MATERIALS.

No. 866,517. Specification of Letters Patent. Patented Sept. 17, 1907.

Application filed December 1, 1906. Serial No. 345,954.

*To all whom it may concern:*

Be it known that I, LOUIS HERMANN RENTZSCH, a subject of the King of Saxony, residing at Meissen, in Saxony, Empire of Germany, have invented a certain new and useful Improved Manufacture of Tubular or Hollow Bodies from Plastic Material, of which the following is a specification.

It is well known to manufacture hollow bodies from plastic mass by exposing it to centrifugal action in a rotating mold, and on the other hand it is well known to add fibrous substances of organic or inorganic origin to the plastic material (cement or gypsum paste) used for manufacturing cast bodies, for the purpose of greater strengthening of the finished article. In attempts to combine these two well known processes, that is to say, to manufacture hollow bodies from plastic mass with the addition of fibers, by centrifugal action, it has been found that, owing to the difference in the absolute weights the action of centrifugal force was accompanied by the formation of layers which made it impossible to obtain in the finished work, a wall uniformly provided with fibers. This difficulty has been overcome by adding fibrous materials which have substantially the same absolute weight as the plastic mass itself, in the state in which it settles on the wall of the molds during the centrifugal action at which moment water is separated from it. This condition is, however, seldom fulfilled by the substances that come under consideration. The easiest way to attain the desired result is to select suitable fibrous materials when gypsum paste or other plastic materials or masses of small specific gravity is employed. If necessary, the absolute weight of the fibrous material must, therefore, be altered, as a rule, increased. This is done in the simplest manner by soaking it in water, but it can also be effected by impregnating it with suitable heavy substances, for instance with heavy metallic salts or silicates.

The impregnation of fibrous materials with substances dissolved in water or other liquid, or, if they are insoluble, suspended in the said liquids, has the advantage over weighting with simple water or simple liquid, that the impregnated fibrous materials do not lose quite so much in weight when they are subjected to pressure during the action of centrifugal force, for while pure water simply becomes separated from the fibers, on the contrary when a solution or a paste has been used, the greatest portion of the substances which were dissolved or suspended in water, remains on the fibers. There takes place, therefore, a precipitation of the substance in question on the fiber.

In cases in which the fibrous material, if completely saturated with water, would become too heavy, the proper weighting can be effected by first impregnating the fibrous material until complete saturation, and then removing a corresponding portion of the water in any suitable manner.

For the practical carrying out of the process, it is further necessary to take into consideration the modification of the weight of the artificially weighted fibrous materials during the whole treatment, since, after they are brought into contact with the plastic material, more water is absorbed or given off, or the weighting substance passes into solution. It is, therefore, an unstable value, and care must be taken that the weight should be correct at the proper moment. The most important conditions are those obtaining at the moment at which the material is deposited on the wall of the mold. For if the weight changes after that, that circumstance is of no importance, as the fibrous material becomes embedded after being deposited, and is held fast mechanically. The fibrous materials must, therefore, be added to the plastic mass at the proper moment before subjecting them to centrifugal action.

It is very difficult to give exact and definite instructions for the practical carrying out of the process according to this invention, as the conditions differ in each individual case. After, however, the reason why the fibers become stratified, and the possibility of avoiding such stratification by keeping the weights equal, have been properly understood, it will be easy to apply the invention to single cases in a proper manner. Nevertheless, as an example for the practical application of this process, the manufacture of a tube from cement with asbestos fiber insertion will be described. 2 kgs. of asbestos fibers are soaked in four liters of water, whereby a gelatinous paste is obtained which is thoroughly stirred. About a quarter of an hour afterwards the cement required for manufacturing the tube, about 10 kgs. is added to the said mass in the shape of a thick paste, and the two substances are quickly, but thoroughly, stirred together. It is not advisable to add the cement in dry state, as in that case it would absorb water from the asbestos, and thus render the fibrous material too light. The whole mass is then subjected for about half an hour to centrifugal action at about 1,000 revolutions per minute (assuming that a pipe of 2 meters in length, 150 milimeters outside diameter and 10 millimeters thickness of wall is to be made), and then the mold is allowed to stand for about 48 hours, until the mass becomes set, whereupon the mold is opened and the finished product withdrawn. Although it is preferably intended to manufacture cylindrical pipes with walls of uniform thickness throughout, the hollow bodies could also be formed with outer surfaces which are not round, that is to say, rectangular, square, polygonal or the like.

When manufacturing hollow bodies of cylindrical shape which must have uniform thickness of walls in

longitudinal direction, the cylindrical mold, as is well known, must be arranged horizontally. If the axis of rotation of the mold were not horizontal, the plastic mass, due to its gravity, would sink to the points situated lower down, and form at those points a thicker wall than at the points situated higher up.

If it be desired to produce conical tubular bodies, then a horizontal position of the axis of the rotating mold would form an obstacle to the formation of a uniform thickness of wall as the plastic material is driven by centrifugal force to that side of the mold which has the largest diameter. Whether this drawback becomes noticeable to a greater or lesser extent, depends both on the weight of the mass and on the angular speed with which the mold rotates, as well as on the angle which the casing of the mold forms with the axis of the mold. According to this invention, uniform distribution of the material on the conical wall of the mold is obtained by arranging the axis of the mold obliquely. The angular speed must of course be exactly determined so that the tendency of the centrifugal force to press the mass towards one side of the mold will be counteracted, that is so say, the tendency of the centrifugal force to press the mass towards the side having the greater diameter will naturally remain the same, but the action of the mass itself, under the influence of its gravity, will equalize the action of the centrifugal force by its tendency to press the mass towards the narrower side situated at a lower level.

As the angular speed of the centrifugal apparatus is generally given, although in different adjustable degrees, the oblique position of the axis of the mold corresponding to the given angular speed, must be ascertained by calculation, which can be done in each individual case without any difficulty. In addition to this method of utilizing the oblique position of the axis of the mold, it is of course, possible, by suitably changing the oblique position of the axis, to obtain a one-sided strengthening or thickening of the wall of the tube to be produced, and it is perfectly possible to make the increase of thickness in such manner as required for a given purpose.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The process of manufacturing hollow bodies from plastic material, consisting in mixing with the plastic material fibrous material of substantially the same absolute weight, and then subjecting the mass to centrifugal action in a rotating mold.

2. The process of manufacturing hollow bodies from plastic material consisting in mixing with the plastic material, fibrous material whose weight has previously been increased to that of the plastic material, and subjecting the mass to centrifugal action in a rotating mold.

3. The process of manufacturing hollow bodies from plastic material, consisting in mixing with the plastic material lighter fibrous material whose weight has been previously increased to the desired extent by impregnation with weighting substances and subjecting the mass to centrifugal action in a mold.

4. The process of manufacturing hollow bodies from plastic material, consisting in mixing with the plastic material lighter fibrous material whose weight has previously been increased to the desired extent by soaking in water, and subjecting the mass to centrifugal action in a mold.

5. The process of manufacturing hollow bodies from plastic material consisting in mixing with the plastic material, asbestos fiber previously saturated with water to increase its weight, and then subjecting the mass to centrifugal action in a mold.

6. The process of manufacturing hollow bodies from cement paste, consisting in mixing with the paste asbestos fiber previously saturated with water, and then subjecting the mass to centrifugal action in a mold.

7. The process of manufacturing conical hollow bodies from plastic material consisting in mixing fibrous material previously brought to the desired weight with the plastic material, and subjecting the mass to centrifugal action in a mold whose axis of rotation is obliquely disposed, the angle of obliquity depending upon the angular speed of rotation of the mold.

In testimony whereof I have signed my name to this specification in the presence of two subscribing winesses.

LOUIS HERMANN RENTZSCH.

Witnesses:
OTH. VOEN,
RICHARD G. WERKE.