

No. 684,648.

Patented Oct. 15, 1901.

R. H. MARTIN.

APPARATUS FOR MOLDING FIBROUS MATERIAL.

(Application filed May 10, 1900.)

(No Model.)

Fig. 1.

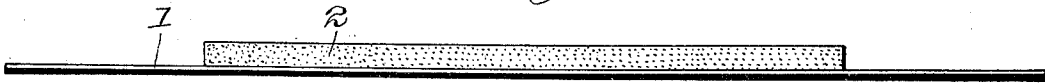


Fig. 2.



Fig. 3.

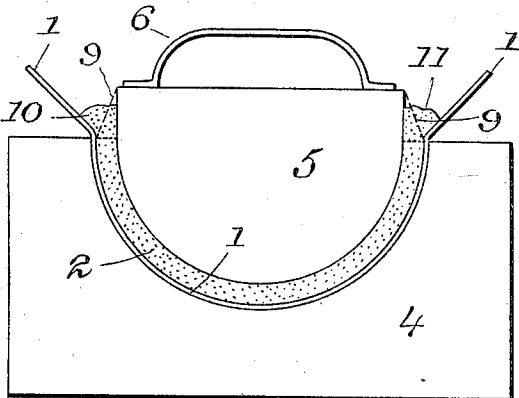


Fig. 4.

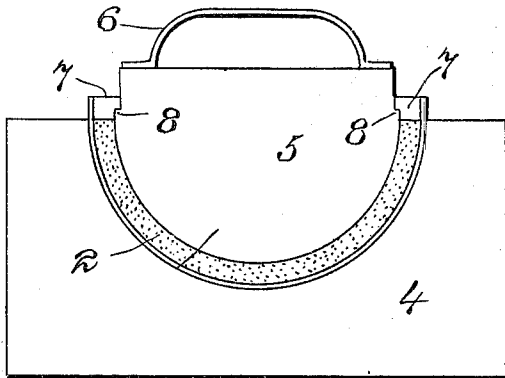
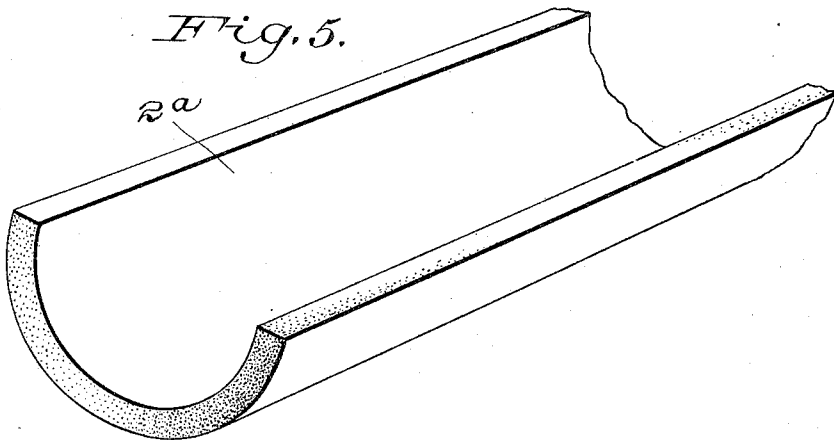


Fig. 5.



WITNESSES:

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ROBERT H. MARTIN, OF NEW YORK, N. Y., ASSIGNOR TO H. W. JOHNS MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

APPARATUS FOR MOLDING FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 684,648, dated October 15, 1901.

Application filed May 10, 1900. Serial No. 16,176. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. MARTIN, a citizen of the United States of America, and a resident of New York city, county of New York, State of New York, have invented certain new and useful Improvements in Apparatus for Molding Fibrous Material, of which the following is a specification.

My invention in general relates to an apparatus for forming layers of fibrous material into various curved shapes. More specifically, it consists of an improved apparatus for forming curved sections designed to serve as a non-heat-conducting covering for steam-pipes, &c. In the manufacture of such pipe-covering I preferably employ a material known in the trade as "fire-felt," which consists, ordinarily, of a layer or bat of asbestos fibers having intermingled therewith a sufficient quantity of some agglutinating compound, such as silicate of soda, for the purpose of causing the said fibers to adhere one to the other and form a self-sustaining mass. This product may be substantially that described and set out in Letters Patent of the United States No. 497,382, issued to me on the 16th day of May, 1893.

Heretofore it has been customary to make the sheets of fire-felt flat, inasmuch as it is impossible to so distribute the fibrous mass in a curved mold or on a curved former as to secure a resultant product of uniform thickness, which is of course essential. The flat sheets of fire-felt when thus made are of such thickness that it is impossible to bend them to any considerable curvature without buckling and cracking the material.

My invention overcomes the above-noted difficulties and enables me to produce complete and perfect sheets of fire-felt curved to any radius.

The preferred apparatus for carrying out my invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is an end elevation of a sheet of fire-felt in its first stage of manufacture, together with the flexible sheet which serves as a support or carrier therefor. Fig. 2 is a similar view showing a sheet having included within its thickness one or more layers of rolled fire-felt. Fig. 3 is an end elevation

showing the sheet molded and the members of the mold cooperating to give the same the required curvature. Fig. 4 is a similar view showing the flexible carrier of the mold provided with turned-up edges or strips, which, in connection with the mold members, serve to completely inclose the material and thereby produce a curved section finished throughout its entire surface; and Fig. 5 is a view in perspective of a section of the completed product.

Throughout the drawings like reference-figures refer to like parts.

1 represents a sheet of any flexible material, preferably cloth, strong waterproof paper, or a thin sheet of metal, such as tin, brass, or copper.

2 represents the layer or bat of non-conducting material spread on said sheet when the same is flat in the manner, if desired, described in my above-mentioned Letters Patent. As shown in Fig. 2, a layer or bat of such material may, if desired, include a suitable thickness 3 of rolled fire-felt, which latter, owing to its more compact structure, greater strength, toughness, &c., is preferably arranged to form the exterior surface of the covering after the section has been molded to the required curvature. The preferred form of mold for working such material comprises a base 4 and a former 5, together with the flexible sheet 1, above described, which cooperates therewith by serving as a support or carrier for the material in the mold, and in use lies between the upper and lower members thereof. The former 5 is substantially semicylindrical in cross-section, but may be varied as required for special work or to produce any desired curvature, and is provided with a handle 6 or other convenient means, by which it may be manipulated. The cooperating base member 4 is cut out to a curvature similar to that of the former 5, but of a sufficiently larger radius to accommodate the flexible sheet 1 and the layer of material 2 of the proper thickness between the former and the mold.

The method pursued in forming or molding the fibrous material in this apparatus is as follows: A layer of fibers is formed on the flexible sheet 1 when in a flat condition, as

shown in Figs. 1 and 2, by spreading the fibers thereon and intermingling the agglutinating material, which is preferably silicate of soda, which may be all in the manner fully set out in my Letters Patent above referred to. After this is done and while the mass is still damp and before it has begun to set the sheet of flexible material is placed upon the base with the superimposed fibrous mass and bent to the desired degree of curvature as the former enters the concavity of the base. The damp condition of the fibrous mass allows it to bend to any curvature, and the fibers adjust themselves gradually one to the other without buckling or cracking the mass of material and without any displacement sufficient to produce an unevenness in the thickness of the layer. The flexible sheet may be secured to retain the material about the former after it has been withdrawn from the base by having its edges turned up or by being provided with strips 7 7, secured thereto and adapted to interlock with shoulders or beads 8 8 of the former, as shown in Fig. 4. When thus constructed, the mold is of the closed type in that it completely surrounds the material and thereby finishes the product throughout its entire surface. This effect may also be more conveniently obtained by providing shoulders 9 9 upon the former in the manner indicated by dotted lines in Fig. 3, wherein it is not necessary to employ strips, &c., upon the flexible carrier-sheet. The material may be allowed to remain on the former or in the mold until it dries naturally, or, if desired, it may be removed therefrom and placed in a drying-room of high temperature. It then retains its shape of exact and even curvature and is ready to be applied to the particular steam-pipe or other body for which it was designed. The resultant product is shown in Fig. 5 and marked 2^a.

When the apparatus illustrated in Fig. 4 or modified as indicated by dotted lines in Fig. 3 is employed, the edges of the layer or section of the covering are formed square and clean, as shown in Fig. 5; but in the use of apparatus shown by full lines in Fig. 3

there is a surplus of material, as shown at 10 and 11, and after the molded article is withdrawn the edges are trimmed to the even shape shown in Fig. 5 by any suitable machine or tool.

The main advantage of my invention is that it produces an extremely light and tough sectional covering for pipes and bodies of any size and shape of extremely low heat-conducting power.

Having, therefore, described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. A mold for hollow forms comprising a concave base member, a forming member corresponding substantially to and cooperating with the base and a flexible non-elastic member intermediate the base and former adapted to bridge the concavity of the base as a support or carrier for the material to be molded, said flexible member together with the material being made to enter and conform to the mold under pressure exerted by the former in entering the concavity of the base, as specified.

2. The combination of a concave base, a removable convex former cooperating with the base, and a flexible non-elastic carrying-sheet cooperating with the former to inclose the material molded, said sheet and the contained material being made to enter and conform to the mold under the action of the former in entering the concavity of the base, as specified.

3. The combination of a concave base, a removable convex former cooperating with the base, and a flexible carrying-sheet interlocking with the former to inclose the material molded, said sheet and the contained material being made to conform to the mold under the action of the former in entering the concavity of the base, as specified.

Signed at New York this 7th day of May, 1900.

ROBERT H. MARTIN.

Witnesses:

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