

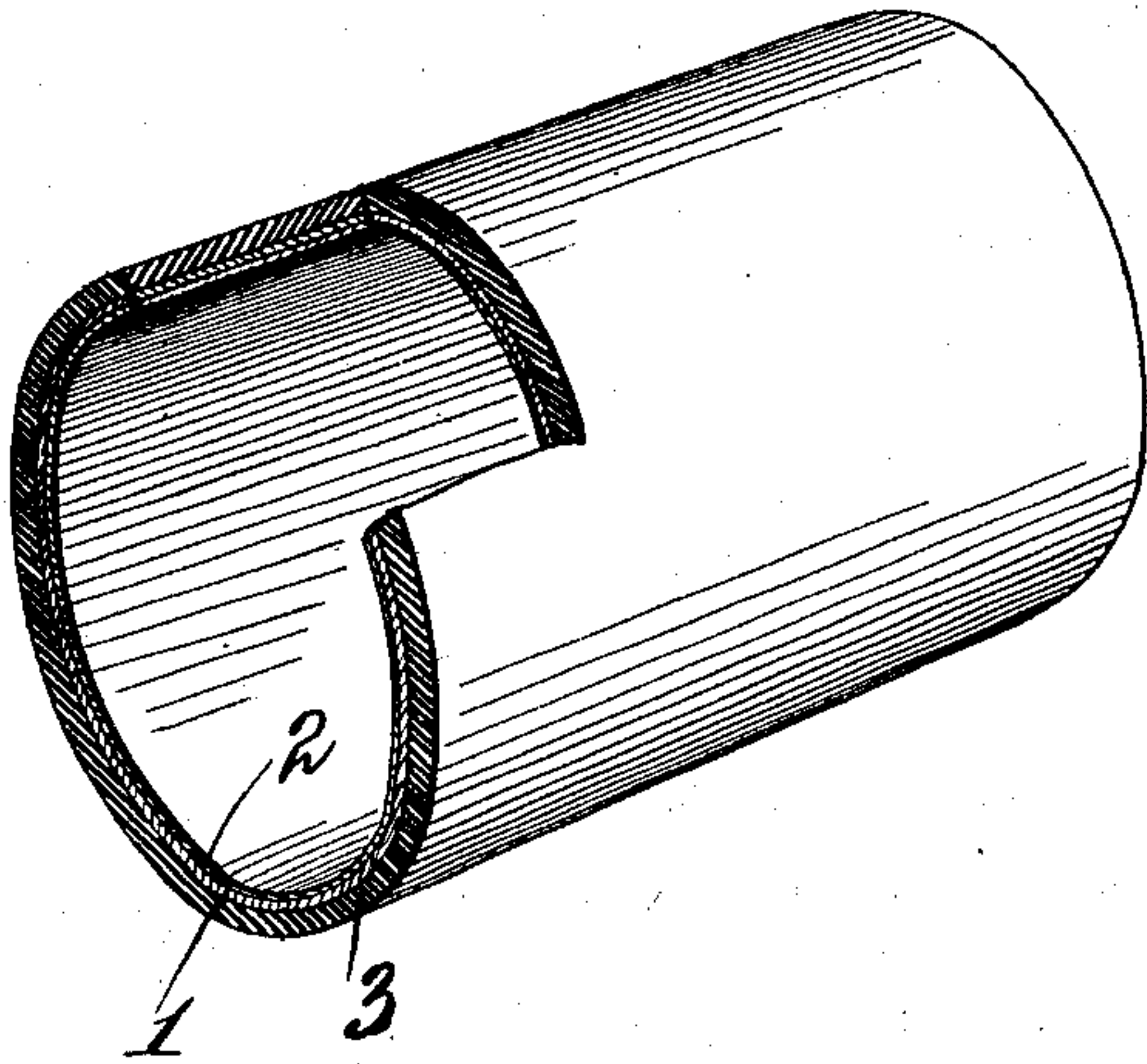
No. 751,454.

PATENTED FEB. 9, 1904.

L. A. BROWN & D. TREDWAY.
PIPE AND PROCESS OF MAKING SAME.

APPLICATION FILED SEPT. 12, 1903.

NO MODEL.



Attest:

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UNITED STATES PATENT OFFICE.

LEWIS A. BROWN AND DWIGHT TREDWAY, OF ST. LOUIS, MISSOURI.

PIPE AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 751,454, dated February 9, 1904.

Application filed September 12, 1903. Serial No. 172,895. (No model.)

To all whom it may concern:

Be it known that we, LEWIS A. BROWN and DWIGHT TREDWAY, citizens of the United States, and residents of St. Louis, Missouri, have invented new and useful Improvements in Pipes and Processes of Making the Same, of which the following is a specification.

This invention relates to the production of a composite article or structure (such as a pipe) consisting of a body of metal and an adherent coating of insulating, acid-resisting, and protective material. The composition utilized as the coating is composed, essentially, of the following ingredients, preferably combined in the following proportions—viz., sand about fifty-five per cent., sulfur about thirty-five per cent., cement about ten per cent. Variation of these proportions is permissible, as is also the addition of other ingredients, such as lamp-black. We have discovered that this composition, which has the properties of resisting all corrosive influences and of forming a complete protection against electrolysis, unites permanently with the metallic body and has a coefficient of expansion approximating that of iron and steel so closely that between very wide ranges of temperature (from freezing-point or below up to the point at which the composition softens) no separation ensues. The coating, moreover, has great compressive strength, so that it reinforces the pipe or other article to which it is applied and permits of the use of relatively thin metal. We have applied the invention successfully to sheet-iron.

In the accompanying drawing, which forms part of this specification, the composite structure consists of a thin metallic pipe 1, which may be of sheet-iron or other metal having its interior galvanized, as indicated at 2, and united to an exterior covering 3 of the composition described above.

In making the composite article the metallic body (galvanized on one side, if desired) is treated on the exterior by the known process called "pickling," after which it is ready for the application of the protective coating, in the application of which the following procedure is preferred: The sulfur is liquefied by the application of heat to about 280° Fahren-

heit, and the proportion of cement, either natural or artificial, is mixed therewith by agitation. The sand is then heated to a much higher temperature than the liquid sulfur and cement—say about 500° Fahrenheit—and while in that condition is poured into and thoroughly mixed with the sulfur and cement. It is found that when the sand is heated to a temperature considerably higher than the sulfur it distributes itself more readily and uniformly through the mass, the grains becoming separated and each incased, as it were, with a film of sulfur. When the sand is introduced at a low temperature, it tends to form lumps and of course would immediately lower the temperature of the sulfur. With the sand at a higher temperature much less stirring is required to form a uniform mixture. Meanwhile the mixed ingredients assume throughout a uniform thermic condition, which is finally regulated to about 300° Fahrenheit, whereupon the mass becomes viscid and ready for application.

The required amount of the material may be placed upon the pipe either by dipping the latter into the viscid mass and removing it to allow the material which adheres there to cool or by inclosing the pipe in a mold and pouring the material therein until the mold is filled and allowing the material to cool and then removing the mold. In the first instance any required thickness of material may be coated around the pipe by repeated dipping and cooling and in the latter instance by enlargement of the mold used. To strengthen the adhesive union between the material and the metal, the latter should, as hereinbefore stated, be thoroughly cleansed prior to the application of the former in order that the material may at all points adhere directly to the metal. The obvious result is to form a continuous unbroken union between the material and metal over the entire surface of the latter, thereby strengthening them both and producing a strong durable pipe at low expense and one thoroughly protected from electrical action and corrosion and from the deleterious results produced by alkali and acid substances upon all forms of metal with which they come into contact.

The composition herein described as preferable and as giving the best results is specifically claimed in application Serial No. 171,530, filed September 1, 1903.

5 We claim—

1. A composite article consisting of a metallic body and an adherent coating or layer of a composition containing sand, sulfur and cement.
- 10 2. A composite structure consisting of an iron body, and an adherent coating or layer composed of sand, sulfur and cement.
3. A metallic pipe having an adherent protective covering composed of sand, sulfur and
15 cement.
4. A metallic pipe having a galvanized interior and a protective covering composed of sand, sulfur and cement.
5. A sheet-metal pipe having an adherent
20 coating of a composition containing sand, sulfur and cement.

6. The process of forming a composite structure, such as a pipe, by liquefying sulfur, mixing cement and sand therewith, reducing the temperature until the mixture is in a plastic state, and applying it to a metallic surface, thereby uniting the two materials together. 25

7. The process of coating a metallic body, such as a pipe, by fusing sulfur, mixing cement therewith, introducing sand at a higher temperature than the fusing-point of sulfur, cooling to a plastic state and then applying to the metallic body. 30

In testimony whereof we hereto set our hands, this 4th day of September, 1903, in the presence of two witnesses. 35

LEWIS A. BROWN.
DWIGHT TREDWAY.

Witnesses:

H. IVERS,
F. E. HAYWARD, Jr.