No. 620,476. Patented Feb. 28, 1899.

H. C. MICHELL.

PIPE OR BOILER COVERING.

(Application filed Jan. 8, 1898.)

(No Model.)

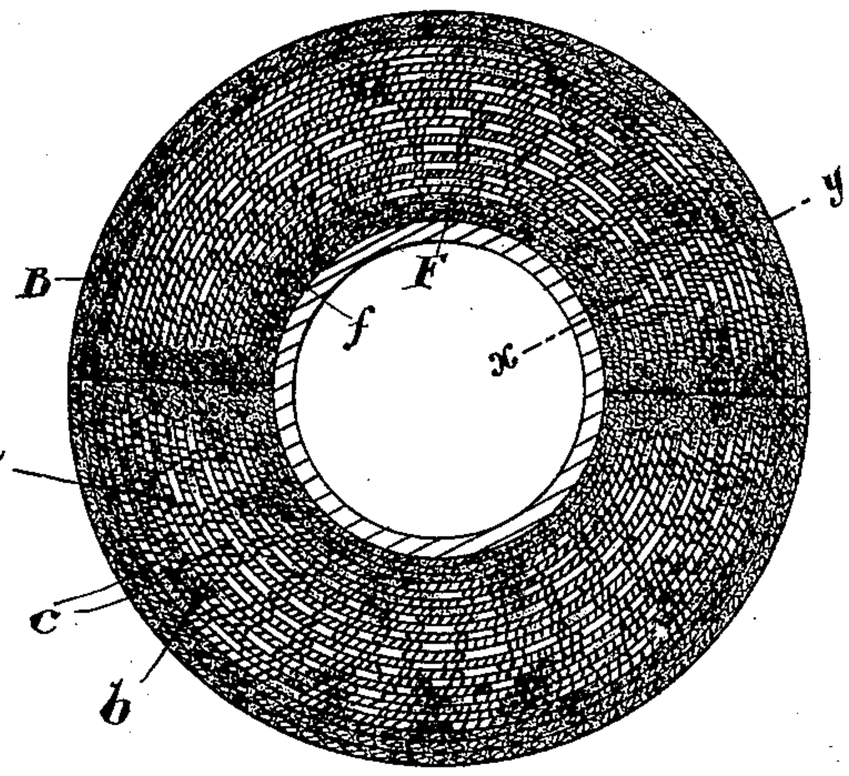

Fig. 1.

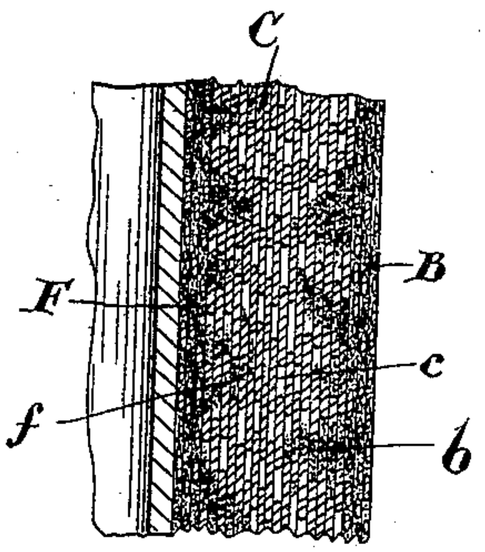

Fig. 2.

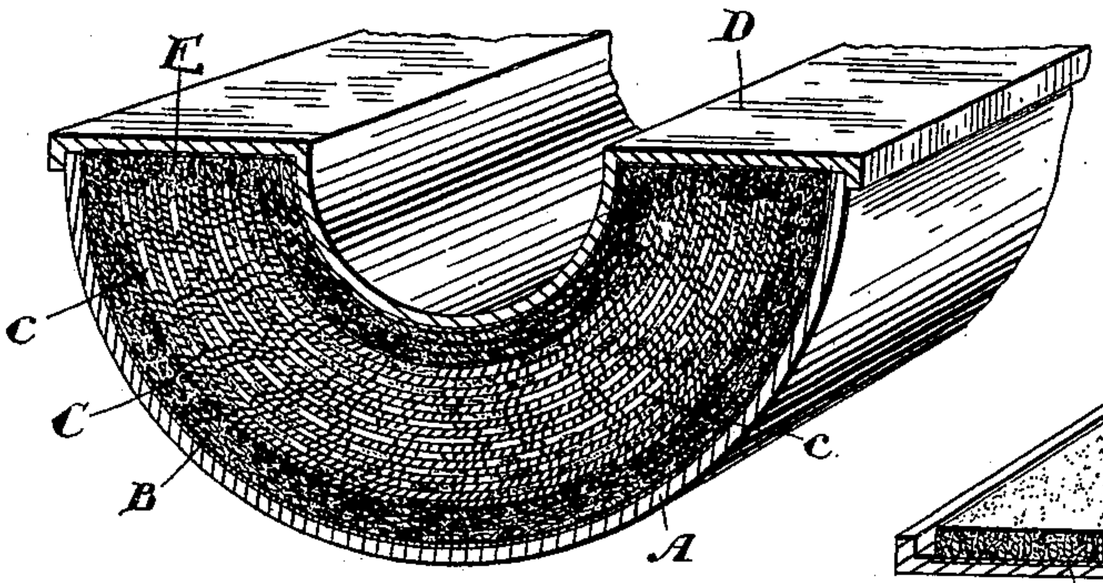

Fig. 3.

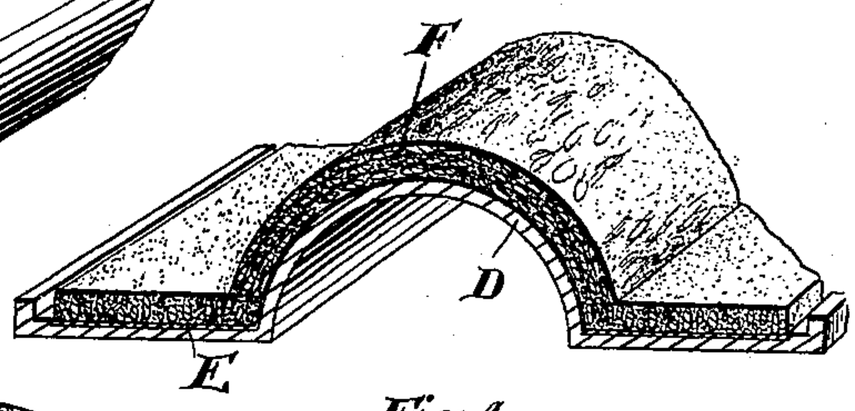

Fig. 4.

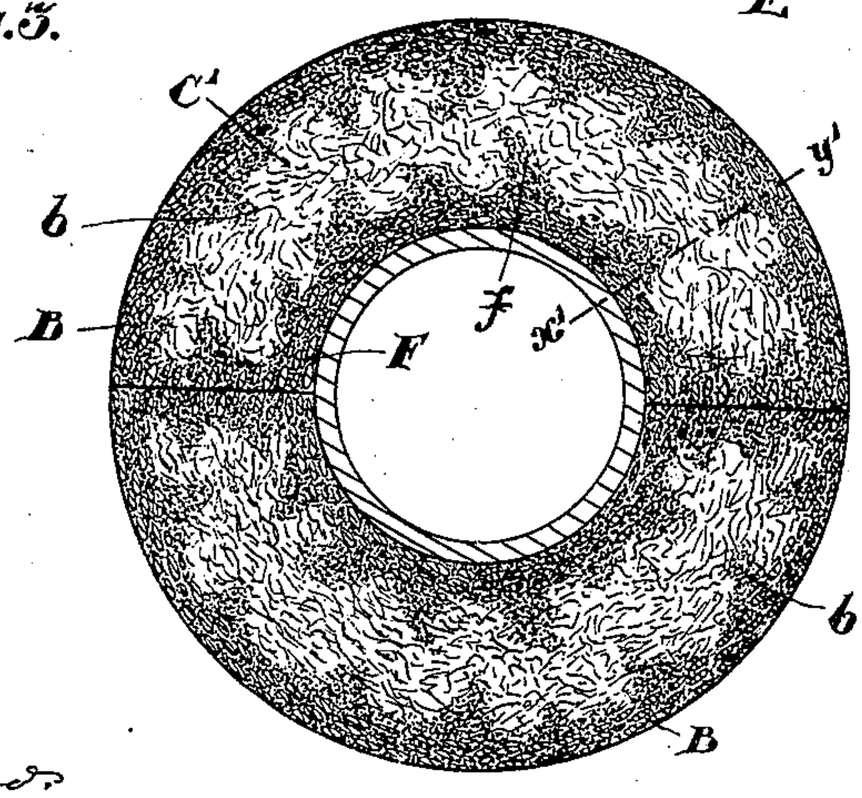

Fig. 5.

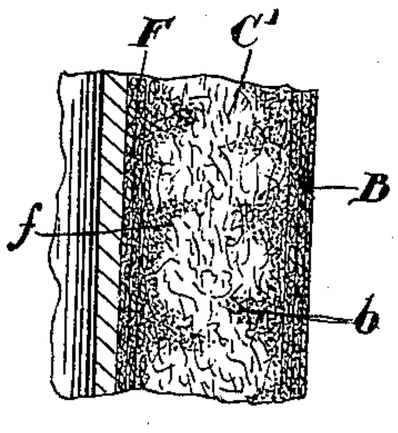

Fig. 6.

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UNITED STATES PATENT OFFICE.

HENRY COLBECK MICHELL, OF TORONTO, CANADA.

PIPE OR BOILER COVERING.

SPECIFICATION forming part of Letters Patent No. 620,476, dated February 28, 1899.

Application filed January 8, 1898. Serial No. 666,073. (No model.)

To all whom it may concern:

Be it known that I, HENRY COLBECK MICHELL, manufacturer, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Pipe or Boiler Coverings, of which the following is the specification.

My invention relates to improvements in non-conducting coverings for pipes and boilers, &c.; and the object of the invention is to devise a simple, cheap, and easily-made non-conducting covering for heated surfaces, especially pipes and boilers, which will have a maximum non-conducting property; and it consists, essentially, of a covering comprising, preferably, concentrically-arranged flakes of mica having the larger flakes to the outside and graduated smaller toward the inside of the covering, the covering being held intact laterally and longitudinally by a suitable binding medium impregnated into the outer and inner surfaces of the mass of mica, so as to form mound-like projections to hold the mass securely in place both laterally and longitudinally, as hereinafter more particularly explained.

Figure 1 is a cross-section of my non-conducting covering applied to a pipe. Fig. 2 is a longitudinal section through the line *x y*, Fig. 1. Fig. 3 is a perspective view of portion of the mold by which my pipe-covering is preferably formed, with a section of the pipe-covering thereon. Fig. 4 is a detail of portion of the mold for forming the inner portion of the pipe-covering, showing such mold in reverse position. Fig. 5 is a cross-section showing an alternative form of making my non-conducting covering. Fig. 6 is a longitudinal section through the line *x' y'*, Fig. 5.

In the drawings like letters of reference indicate corresponding parts in each figure.

I first sprinkle, preferably upon a sheet of paper or any suitable backing of the desired length or width to completely cover the interior of the mold A, mica in small flakes, laminæ, or particles. I next sprinkle my binding medium, preferably silicate of soda in solution, upon the mica previously superimposed upon the sheet, so that the mass now becomes soppy or spongy. The silicate of soda in solution being very sticky becomes impregnated or mixed with the mica. It may be necessary to follow out the above steps two or three times to attain the desired thickness. This spongy or soppy layer I lift into the mold and place it in concentric form, as indicated at B. I then fill in flake-mica or mica in lamina form C concentrically, as indicated in Fig. 3, thereby forming multitudinous air-spaces *c*. I preferably use larger flakes at the outside, decreasing in size toward the center. Upon the bottom of the top D of the mold I preferably place a sheet of paper E having, silicate of soda in solution mixed with mica, as hereinbefore described as to the layer C, such layer F also forming a soppy or spongy mass. Upon the bottom of the mold, previously filled as hereinbefore described, I turn the top, as indicated in Fig. 3. It will thus be seen that the concentrically-formed layers already in the mold will become incorporated to some degree with the concentrically-arranged layers C, hereinbefore described, similar to what the concentrically-arranged layers C will become incorporated with the layers B, the silicate permeating in both cases into the mica flakes or laminæ. This permeation of the inner strata of concentric layers of mica C with the outer layers is effected in a peculiar manner, as the silicate of soda in solution forces itself irregularly into the interior strata. The mold after the above steps are taken is put into a furnace, which has the effect of burning the paper out and boiling the silicate. As the silicate boils it bubbles up and cakes and becomes hard and forms itself into a series of irregular mound-like projections *b*, (see Fig. 2,) which extend into the central layers C and effectually key the mica flakes in position and prevent lateral or longitudinal displacement.

Although I describe silicate of soda as the preferable binding and locking medium for the mica laminæ, it will be understood that any other suitable non-combustible binding medium may be employed.

In Figs. 3 and 4 I show the manner of making one half of the pipe-covering, and the other half (shown in Fig. 1) would be made in the same manner. When the molds are placed together and put in the furnace, the

skin formed by the silicate would be continuous alike around the concentric as well as the radial portions, thereby completely encircling the mica.

In Figs. 5 and 6 I show an alternative form, in which I use a mass C′ of hollow particles of mica not necessarily concentric—in fact, mixed in any way. The outer and inner layers B and F of the mica, permeated with the silicate in this case, also form a series of mound-like irregular projections *b* and *f*, projecting inwardly into the mass of particles and effectually serving to key the mica both from longitudinal and lateral displacement. The cover is formed in this case in the mold in the manner hereinbefore described, with the exception that there are no concentric layers. This keying of the mica in position allows of multitudinous air-spaces. In Fig. 1 these multitudinous air-spaces are formed between the concentrically-arranged flakes, as indicated, and being irregular and arranged concentrically they act like so many non-conducting deflecting-plates, which, in the opinion of eminent scientists, accounts for the extraordinary heat-non-conductivity of this covering.

In Fig. 5, in which the alternative form is shown and which of course is a cheaper construction, the dead-air spaces are formed in the heterogeneously-mixed mass of particles C′. It will thus be seen that I utilize to a maximum extent the two greatest non-conducting agencies—viz., dead-air spaces and mica.

What I claim as my invention is—

1. A non-conducting covering comprising a mass of mica particles, and a binding medium located outside of the mica mass having projecting portions extending thereinto, substantially as described.

2. A non-conducting covering comprising a mass of mica particles, and a binding medium located on opposite sides of the mica mass having irregular projections extending thereinto, substantially as described.

3. A non-conducting covering comprising a mass of concentrically-arranged flakes or laminæ of mica, and a binding medium located outside of the mass having projecting portions extending thereinto, substantially as described.

4. A non-conducting covering comprising concentrically-arranged flakes or laminæ of mica forming multitudinous non-communicating interstices and a binding medium incorporated into the outer concentric flakes of mica and forming irregular mounds in the interior whereby the laminæ are keyed or locked in place as and for the purpose specified.

5. A non-conducting covering comprising concentrically-arranged flakes or laminæ of mica forming multitudinous non-communicating interstices and arranged with the larger flakes to the exterior and decreasing in size to the interior of the covering and a suitable binding medium permeating the outer portion of the layers having projecting portions extending into the space between the flakes.

6. A non-conducting covering comprising the mass of concentrically-arranged flakes or laminæ of mica, comminuted flakes at the exterior of the mass of concentric flakes, and a binding material incorporated with the comminuted flakes and extending in between the concentrically-arranged flakes, substantially as described.

7. A sectional cylindrical covering comprising laminæ of mica, the binding material at the outside and inside of the same and on the adjacent abutting edges of the sections whereby the said sections of such covering are maintained in shape and fitted together as and for the purpose specified.

8. A method of forming a non-conducting covering for boilers and the like consisting in spreading upon suitable backings to form the outer and inner layers of the covering, a composition comprising a damp or wet binding medium intermixed with mica particles, superimposing upon the outer layer flakes or laminæ of mica in concentric layers placing the inner and outer layers together to inclose the central laminæ and finally subjecting the whole to a suitable drying process whereby the binding medium is hardened and permeates into the mass as and for the purpose specified.

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Witnesses:
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