

E. MORF.
METHOD OF COATING WITH ALUMINIUM.
APPLICATION FILED MAY 12, 1913.

1,154,651.

Patented Sept. 28, 1915.

Fig. 1.

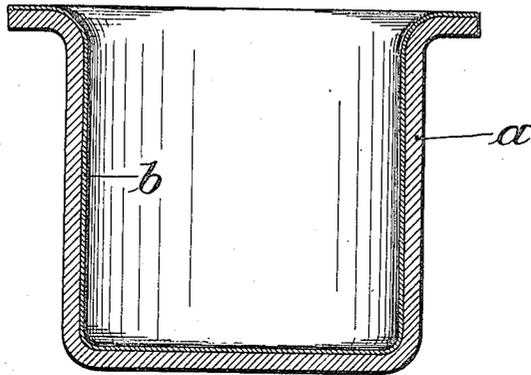
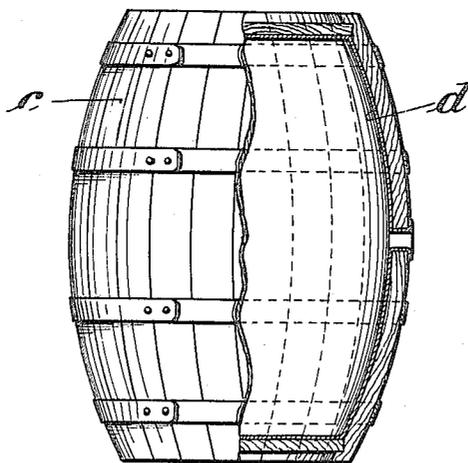


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

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METHOD OF COATING WITH ALUMINIUM.

1,154,651.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed May 12, 1913. Serial No. 766,940.

To all whom it may concern:

Be it known that I, ERIKA MORF, a citizen of the Swiss Republic, residing at Zurich V, in Switzerland, have invented certain new and useful Improvements in Methods of Coating With Aluminium, of which the following is a specification.

In various important branches of industry, among which are brewing, food-packing and the manufacture of nitric acid, there is a large demand for autogenously soldered aluminium receptacles, but such receptacles, though highly useful, are expensive in view of the high price of aluminium. The comparatively small strength of aluminium necessitates the use of thick walls for vessels made of that metal.

The object of the present invention is to secure the advantages of aluminium, in the manufacture of vessels of all kinds, at a reduced cost. To this end I apply a coating of aluminium to the inside of a vessel, or to both sides, by the operation of spraying. By this means I may produce a coating of any desired thickness, but generally a thickness of about $\frac{1}{16}$ mm. or even $\frac{1}{32}$ mm. is sufficient, by virtue of the fact that the hardness of the aluminium is increased at least 50% by the operation of spraying it, so that the coating wears very well.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a vertical section of a tank provided with an internal coating, and Fig. 2 an elevation, partly in section, of a barrel with internal coating.

In Fig. 1, *a* designates an iron tank, and *b* a coating of aluminium applied to the interior by the known method of spraying. I may apply the aluminium together with another metal, so as to obtain a coating of aluminium alloy.

It is well known that aluminium does not readily associate with other metals, and has a tendency, in conjunction with iron, copper and the like, to set up galvanic action, whereby decomposition is produced. But such action can only ensue in the presence of an electrolyte at the place of contact, and with a dense, closely united coating produced by spraying it is quite impossible for an electrolyte to be present. It is found in practice that the sprayed aluminium penetrates into the finest pores of the surface

coated, as for example of an iron surface, so that all traces of air and moisture are eliminated.

According to the purpose for which the receptacle is intended it may be desirable to have a coating of greater or less density. For obtaining a very smooth, highly polished surface the coating may be hammered, for example with a pneumatic hammer. The coating may also be treated by other means, for example by grinding, polishing with an abradant and the like. Experience shows that exceptional firm adherence is obtained with an aluminium coating applied to iron, and it appears that to some extent the two metals form an alloy at the contact surface, especially if the iron is heated before and during the spraying operation.

Vessels of iron and other metals coated with aluminium have many advantages over vessels of pure aluminium. They are cheaper, stronger, and more durable. Moreover, as the spray can be applied in any place, local repairs can be easily effected, for example in storage rooms or cellars where the vessels are used.

Tanks of concrete or artificial stone may be similarly treated, but care should be taken to first remove moisture from the surface, or other foreign substances liable to corrode the aluminium. To this end the surface, for example a concrete surface, may be carefully and uniformly heated before the aluminium is applied, and then provided with a coating of paraffin or the like. Paraffin thus applied penetrates into the pores, and thus prevents the presence of water between the coated surface and the aluminium. Paraffin has no injurious effect whatever on aluminium. Another coating of paraffin may be applied after the coating with aluminium. The treatment with paraffin may be adopted both in the case of metal receptacles and in the case of non-metallic receptacles coated with aluminium.

For the storage and transport of liquids, for example beer, it is of great advantage to use wooden casks internally coated with aluminium instead of being treated with pitch as heretofore. This is illustrated in Fig. 2, in which *c* designates a cask or barrel, the staves and head of which have an internal coating *d* of aluminium. It is found that aluminium adheres very firmly to wood, by

reason of the fact that the metal particles, thrown with great violence against the wood, penetrate the fiber, so that the coating bites into the wood and cannot peel off. In
5 the case of large barrels the coating can be applied to the finished barrel, but in the case of smaller barrels it is more convenient to coat the staves and heads before assembling them. The coating with aluminium is in
10 practice cheaper than pitching, because it does not require to be continually renewed, and also has hygienic advantages.

In connection with receptacles for foods and beverages it is generally desirable to
15 use a coating of aluminium as pure as possible, but for other purposes coatings of aluminium alloys are in many cases useful. Such coatings may, for example, be produced by directing a jet or jets of other
20 metal onto the surface simultaneously with a jet of aluminium.

What I claim as my invention and desire

to secure by Letters Patent of the United States is:—

1. The method of coating a receptacle 25 with aluminium, which consists, while heating the receptacle to be coated, of coating the surfaces with a pore-filling material, then spraying aluminium onto the surfaces thus coated, and finally cooling the thus 30 coated receptacle.

2. The method of coating a receptacle with aluminium, which consists, while heating the receptacle to be coated, of coating the surfaces with paraffin, then spraying alu- 35 minium onto the surfaces thus coated, and finally cooling the thus coated receptacle.

In witness whereof I have signed this specification in the presence of two witnesses.

ERIKA MORF.

PAUL ZOLLE,
CARL GRUND.