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UNITED STATES PATENT OFFICE.

ROBERT J. EBERTS AND J. LAWRENCE LEE, OF NEW YORK, N. Y.; SAID
EBERTS ASSIGNOR TO THE AMERICAN HEATING AND POWER COMPANY,
OF SAME PLACE.

NON-ABSORBING AND HEAT-INSULATING MATERIAL.

SPECIFICATION forming part of Letters Patent No. 266,954, dated October 31, 1882.

Application filed September 25, 1882. (No model.)

106-92

To all whom it may concern:

Be it known that we, ROBERT J. EBERTS and JOHN LAWRENCE LEE, of the city, county, and State of New York, have made a new and
5 useful invention of a Non-Absorbing and Heat-Insulating Material, which may be used as an inclosing envelope for steam or other pipes, which material at the same time provides protection against moisture and conduction of
10 heat, of which the following is a specification.
We manufacture our heat-insulator and non-absorbing concrete material in the following way: As the first ingredient of the new compound we employ spent tan-bark. The re-
15 quirements of this ingredient of our composition are that it should be a non-conductor of heat itself, should be capable of fine division, and should also be capable of receiving and retaining a coating of some liquid or semi-
20 liquid material. When we use tan-bark we dry the material in a kiln preferably, or in any other desired way, the heat employed being sufficient to drive off all moisture, while at the same time the heat must not be so great as to
25 injure the material. We find it best to use the material in pieces of about the third of an inch in each dimension, though larger or smaller pieces will do, but not so well. After the spent tan-bark has been thoroughly dried it is
30 necessary to treat it with some substance which will make it water-proof and preserve it from decay, and this treatment is best accomplished by coating the surface of the pieces of tan-bark with tar and asphalt made liquid by heat. We
35 do not confine ourselves to this particular method or to these materials for rendering the tan-bark water-proof and preventing it from decaying. When we use tar and asphalt we find that good results are obtained by using in
40 bulk equal parts of tar and asphalt and in bulk as much tan-bark as the two portions of tar and asphalt combined. We thoroughly incorporate this mixture, while hot, by stirring, the heat being sufficient to keep the tar and
45 asphalt liquid, while it is not sufficient to injure any of the ingredients of the mixture. The result of this mixture will be pieces of tan-bark coated with tar and asphalt. To more certainly prevent the adherence of the pieces

of tan-bark, a little plaster may be stirred into
the composition before it becomes completely
cool, sufficient plaster being added merely to
deprive each of the coated particles of tan-bark
of their adherent qualities. This mixture, when
made, can be kept in barrels until it is desired
to form with it and with the material which
will be further on described our insulating and
water-proof compound; but it may, if desired,
be immediately mixed with some material or
materials which will cause it to set and become
hard. To accomplish this purpose we have
found it best to use hydraulic cement—such as
Portland or Rosendale cement—clean sharp
building-sand, and evenly-ground alabaster
or plaster-of-paris, together with a sufficient
amount of water to give the mass a plastic con-
dition. We have found the best proportions
to be equal parts of cement, sand, and alabas-
ter, the bulk of the three materials as a whole
being about equal to the bulk of the tan-bark,
tar, and asphalt after having been mixed. We,
however, do not confine ourselves to this par-
ticular compound as a setting or binding ma-
terial, as other materials which will set or bind—
as will cement and sand or plaster—will give a
good result. Neither do we confine ourselves to
the particular amounts of materials above
stated, as good results can be obtained even
if these amounts are varied, and it may be un-
der certain circumstances necessary to vary
the amounts for producing articles having con-
ditions suited to different purposes. A suffi-
cient amount of water is to be used when the
tan-bark covered with tar and asphalt is to be
mixed with the setting or binding materials to
make the mass plastic; but no more water is
to be used than is necessary for accomplishing
this result. Even when the tan-bark covered
with the tar and asphalt is still hot the mix-
ture may be made with the setting material or
materials; but we consider it best to allow the
tan-bark coated with the tar and asphalt to
cool before we mix it with the materials made
plastic by water.

Immediately after all the materials are
mixed and incorporated one with the other,
and before they are given time to set, the
compound is ready to apply to the surface to

be insulated and protected. Take, for example, a steam-pipe placed below the ground. In this situation a wooden box may be made which surrounds the steam-pipe, and of sufficient size to give the required thickness between the inside of the box and the surface of the pipe or pipes to be insulated for the insulating material, and this may be from two to six inches. The plastic compound is packed in this box around the pipe, and is then allowed to set, the superfluous moisture either being evaporated naturally or being driven off by the heat of the pipe or pipes insulated.

In some cases it is advisable to apply paper or hair-felt to the pipe before the insulating and water-proof compound is placed around it. The material is put into the box around the pipe while in its plastic condition, which condition is due to the water, as above described. The mass is then well rammed into the box around the pipe, precisely as concrete would be applied in a like situation. The material in a short time sets and becomes hard, when it will be found that it will possess a certain degree of elasticity. If greater elasticity and tenacity are desired in the resulting article, hair, fine wire, or suitable fibrous material may be stirred into and thoroughly incorporated with the compound while plastic, and it is well not to use as much hair or fibrous material as is ordinarily used in the mixing of building-mortar, and we find it best to use a better and stronger quality of fiber than is used with mortar.

The accompanying drawing, which is a view in cross-section, illustrates the application of the compound to an underground main or pipe.

A is the main or pipe, and B a layer of paper or felt applied to the surface of the pipe. D is the containing box or trough; and C represents the insulating material, rammed into the box around pipe A in the manner specified above.

When the material is used upon pipes having flanges or other projecting parts which are liable to move by reason of the expansion of the pipes, sufficient room must be left between the material and the pipes to allow for this movement, and in the case of plain smooth pipes it is well to use a paper or hair felt which will furnish a sufficient space between the pipe and the insulating material to allow of the motions of expansion, and should the paper or felt be burned away an air-space will be left. Our material while still plastic

may be compressed in hydraulic or other presses, and may then, after being removed from the mold, be allowed to set, or it may be allowed to set while under compression. In this way very compact, durable heat-insulating and non-absorbent compositions will be produced, incapable of igniting, and suitable for lining walls, partitions, &c., or for paving cellars and the like, in which latter event it is desirable to set the blocks of compressed composition in asphalt.

The leading features of our composition are the spent tan-bark, dried and coated with a water-proof and preserving coating, and then the mixing of this compound with a material capable of setting, which will enable it to be placed around the article to be insulated, and then hardened while in position.

What we claim, and desire to secure by Letters Patent, is—

1. The heat-insulating and water repelling material herein described, consisting of finely-divided tan-bark, dried and coated with a suitable waterproofing material and mixed with cement, sand, &c., or other material or materials capable of setting.

2. The process of making the heat-insulating and water-repelling material herein described, which consists of, first, drying finely-divided tan-bark, then, second, coating it with a water-proof material, then, third, of mixing with a suitable mass formed of materials capable of setting the prepared tan-bark, and, lastly, permitting the mass to set around the article to be insulated and protected.

3. As a heat-insulating and water-repellent material for packing steam-pipes and similar purposes, finely-divided tan-bark coated with tar and asphalt and embedded in cement, substantially as described.

4. A concrete for incasing steam or hot-water mains or for similar uses, composed of finely-divided tan-bark having the individual particles coated with water-proof material, compacted into a solid mass with cement by means of compression, substantially as described.

5. As a heat-insulating and water-proof material, the admixture of tan-bark and tar and asphalt and hair or other fiber, substantially as described.

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Witnesses:

JOHN S. MORRISON,
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