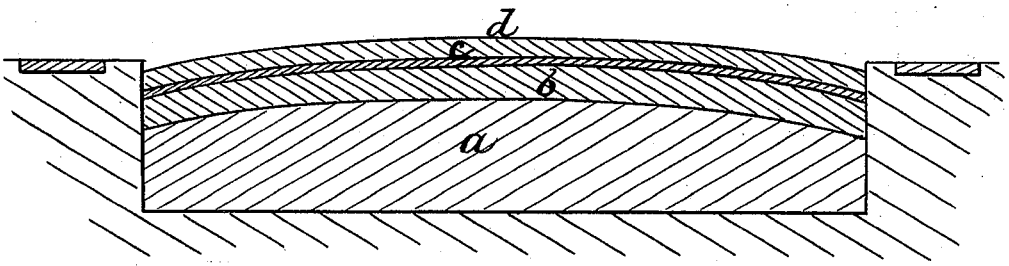
W. H. JONES.

Pavement.

No. 169,005. Patented Oct. 19, 1875.



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UNITED STATES PATENT OFFICE.

WILLIAM H. JONES, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN PAVEMENTS.

Specification forming part of Letters Patent No. **169,005**, dated October 19, 1875; application filed May 26, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. JONES, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Street-Pavements; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawing, which represents a cross-section of a street-pavement showing my invention.

My improvement relates to cement pavements in which the foundation is of stone and the covering is of coal-tar.

In the construction of such pavements much difficulty has been experienced: first, from the condition of the coal-tar, which, as ordinarily prepared, is either too friable or too soft, in the one case cracking and breaking up and allowing water to enter, and in the other yielding and rolling under tread and not furnishing a solid surface; second, in an imperfect construction of the substructure, being so porous and open that the cement strikes through, thus requiring a very heavy body, which is liable to crack and admit water, which, when frozen, heaves the pavement, thereby destroying it.

To obviate these difficulties my invention consists in forming the surface of the pavement of coal-tar distilled in a closed vessel till twenty-five per cent. of its body is removed, leaving the residuum in proper condition to be applied in a thin body, retaining all its natural elasticity and adhesion without making it brittle; also, in the construction of the road-bed as hereinafter described, whereby a "dam" or cut-off layer is interposed between the cement layer and substructure, by which means the cement is prevented from penetrating to any considerable depth, but is formed in a thin body, which is tough, elastic, and impermeable to water.

In the construction of my pavement I excavate the road-bed as usual to proper depth—say, about eighteen inches, more or less. I fill this excavation about ten inches deep with small stone or coarse stone chips, and properly break it down with sledges, filling the interstices with small stone chips to produce a level surface. This forms the foundation *a*. I next fill in on top of this a layer of coarse macadam or small broken stone, which, when thoroughly rolled, is about five inches in depth, and rests about three inches below the grade of the street. This forms the coarse filling *b* above the foundation. I next fill in a layer of fine stone-dust or sand, one inch, more or less, in depth, or enough to thoroughly cover the stone, which forms a "dam" or cut-off layer, *c*, to prevent the passage of the coal-tar through to the stone. I next fill in a layer of fine macadam about three inches deep, which is thoroughly rolled to make it solid and compact and present a perfectly smooth surface. This layer, when thoroughly rolled, fills up to the grade of the street. The material forming this layer should be fine, and the rolling action should be thorough in order to make it as hard and solid as possible. This layer forms the body *d* for receiving the cement.

To prepare the cement, I take ordinary coal-tar and place it in a closed retort or still, and apply heat beneath in the usual manner for distilling liquids. The distilling action is carried forward till twenty-five per cent., or thereabout, of the body of the coar-tar is removed, the residuum forming the cement which is used. The portion which is distilled off is the volatile matter, which, in quantity, is only a detriment to this use.

The residuum is drawn off from the still, and, in a hot state, is then poured in three successive spreadings from buckets upon the road-bed already prepared, and is thoroughly stirred to level and even it. A comparatively thin layer only is required, just sufficient to cover and fill the surface, much thinner than in ordinary cement-pavements, and the thinness of the layer is one merit, since it is more elastic, and consequently much more enduring, than a thick friable layer, as well as much cheaper. When the cement is laid, sand or fine stone-dust is spread over it and rolled in while the cement is hot.

One important advantage in the construction of this pavement is the preparation of the cement. Having been a street-contractor and manufacturer of roofing for many years, I have experimented largely with coal-tar, and, as ordinarily applied, it is very imperfect. If the volatile elements of the tar, or

any considerable portion thereof, are left in the cement, it is soft, sticky, and lacks in substance. If they are burned out by setting fire to the mass, or by boiling in kettles in the open air, as has heretofore been done, the residuum will be thick, turgid, and, when applied, exceedingly brittle. This is owing partially to too much loss of the lighter qualities, which necessarily pass off; but in a great degree to the burning of the material, forming thereby a powdery sediment, that is dry and lacks in adhesion. When applied upon a pavement, such a cement will soon crack and break, and thereby admit water.

By distilling the coal-tar in a closed still, I remove the volatile matters without burning the material, and without the loss of the elastic and adhesive qualities necessary for a cement of this kind. I do not claim broadly, however, distilling coal-tar, as this has before been done. But in the course of my experiments I have found it necessary in the production of a perfect cement for street-pavements to remove, by distillation, a specific quantity of the lighter elements, which is twenty-five per cent., or approximating that amount, of the whole body of coal-tar. This removes just enough of the volatile matter to prevent softness of the cement, but leaves enough to unite with the solid matter and retain all the elasticity and adhesion necessary to prevent brittleness. The material produced is hard, solid, tough, elastic, and exceedingly tenacious; will not crack under cold nor soften under the sun. As a consequence I can use a very thin layer, thereby avoiding the great body of cement heretofore necessarily used, and thereby greatly reduce the cost.

Another advantage in my invention arises from the use of the solid layer of sand or fine stone-dust interposed between the cement and the substructure, the same forming a "dam" or cut-off to the cement, so that it cannot pass through into the stone. Sand or stone-dust, as is well known, is a perfect barrier to the passage of coal-tar. By this means I cover only the top of the road-bed with cement and prevent its passage to the stone; whereas, in all other cement pavements with which I am acquainted, the cement is allowed to penetrate the stone, thereby necessarily requiring a heavy body and rendering it so thick that it will crack and break. In my invention the cement simply penetrates the upper layer of macadam, but does not pass the sand. When properly prepared the street is water-proof, and its arched form in cross-section will throw the water to the gutters. I am aware that sand has before been placed on the stone as a filling for the same; but not, so far as I am aware, for the purpose of forming a cut-off or dam to the cement.

A pavement, made in the manner above described, will stand the test of both heat and cold, as I have demonstrated in practical use, the thin coating of cement prepared by the distilling being so elastic as to prevent breakage, and effectually shutting out water, and also made at much less expense.

Having thus described my invention, I do not claim broadly a layer of sand placed upon the foundation of stone; but

What I claim as new is—

1. A cement covering for a street-pavement, consisting of the residuum of coal-tar distilled in a close vessel till twenty-five per cent., or approximating that amount, of its bulk is removed, as herein described.

2. A street-pavement, consisting of a foundation-layer of small stone or coarse stone chips, a body-layer of coarse macadam, a dam or cut-off layer of sand or fine stone-dust, a surface-layer of fine macadam, and a cement covering of coal-tar with twenty-five per cent. of its bulk removed by distilling in a closed vessel, the whole combined, as described, so that the cement in a thin body permeates the upper layer, but is prevented from passing through to the substructure by the dam or cut-off layer of sand, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM H. JONES.

Witnesses:
R. F. OSGOOD,
J. N. COLE.