

SAMUEL B. BRITTAN.

Improvement in Concrete and Stone Pavements.

No. 120,236.

Patented Oct. 24, 1871.

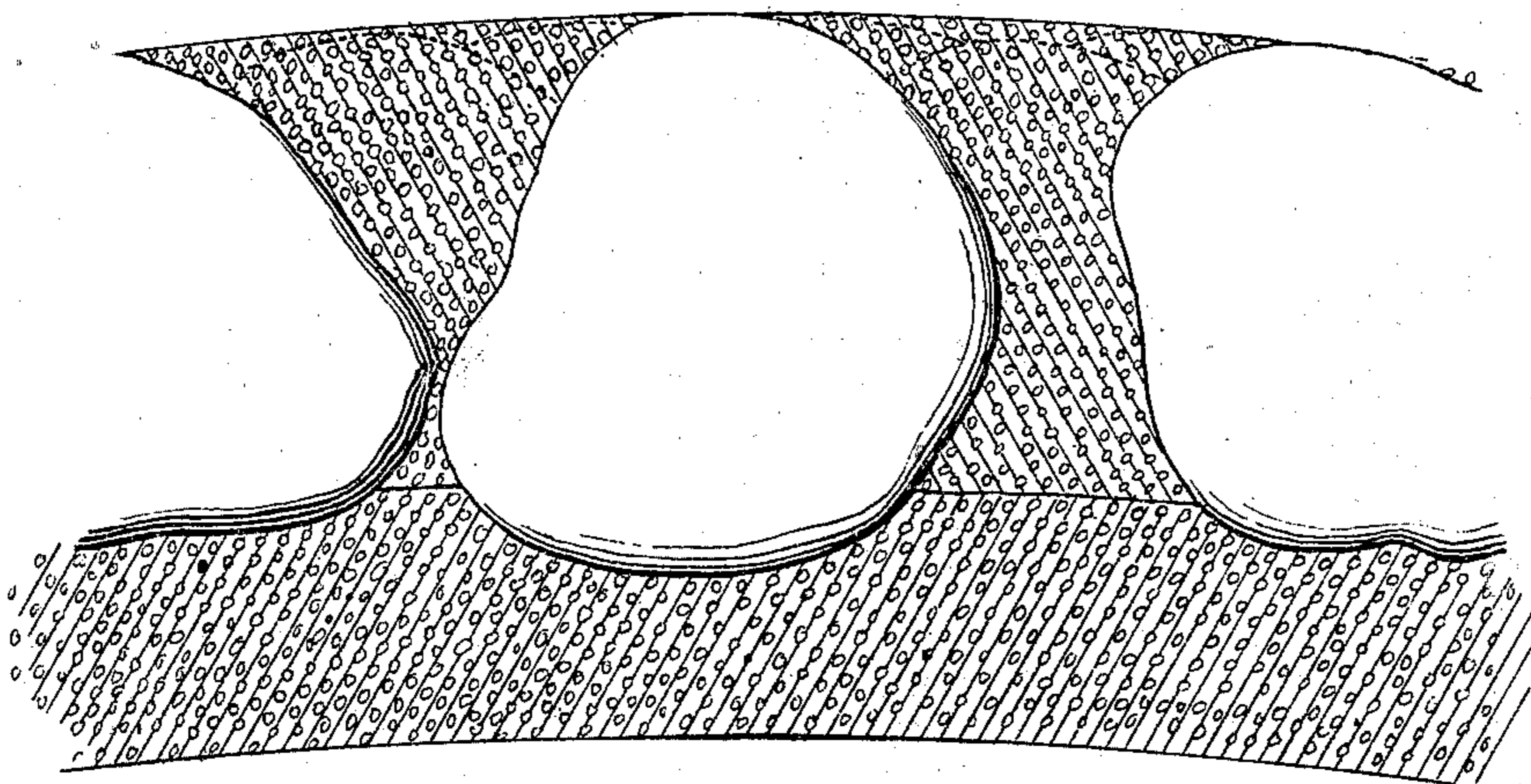


Fig. 1.

Fig. 2.



Witnesses.

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SAMUEL B. BRITTAN, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN CONCRETE AND STONE PAVEMENTS.

Specification forming part of Letters Patent No. 120,236, dated October 24, 1871.

To all whom it may concern:

Be it known that I, SAMUEL B. BRITTAN, M. D., of the city of Newark, Essex county, and State of New Jersey, have invented a new, useful, and durable pavement, suitable for public streets, roads, private carriage-ways, and for a variety of other purposes to which the same may be adapted, which I would have known and designated as the Concrete and Cobble Combination Pavement; and I hereby affirm that in what follows there will be found a plain, specific, and complete announcement and description of the materials and methods employed in the composition and construction of the same.

In the accompanying drawing, which is made a part of this specification, Figure 1 represents a transverse section of my pavement enlarged, and showing the point of union between the concrete bed and the concrete filling the interstices of the cobble stones. Fig. 2 is a sectional view of my pavement in proper position.

As preliminary to the proper description of the said concrete and cobble combination pavement I may be allowed to submit a brief statement of certain well-known facts.

It is true that while the small boulders or cobble stones—still chiefly used for paving our streets—never really wear out by attrition, still the pavements formed of such continue in a proper condition for use but a short time. The necessity for frequently taking up the stones and relaying the same results from two general causes, namely: The ground beneath is not equally solid in all places, and the stones are seldom or never of the same shape nor of uniform dimensions. From these two causes the stones settle unequally, and hence the surface of the roadway soon becomes so uneven as to necessitate the relaying of the pavement. Moreover, the unequal spaces between the upper surfaces of the stones—inevitable in consequence of their varying sizes and irregular forms—render the paved way so broken and uneven on its surface that great damage is done to horses and vehicles that are constantly driven over such pavements. The destruction of property from this cause alone is immense, and in some of our larger cities is estimated at millions of dollars annually. It is also well known that various wooden pavements are subject to rapid destruction by the constant action of the elements. Exposure to the atmospheric

changes, and especially to the ever-varying degrees of moisture resulting from the alternations of light and darkness, and sunshine and storm, soon occasion putrefaction in the albuminous parts of the sap, and, subsequently, decomposition of the fibrous portions of the wood. I am aware that several processes have been employed to protect wood from destructive effects of oxygen and moisture, and that certain metallic solutions and oleaginous compounds have been more or less used and with gratifying results; but none of these have, as yet, inspired sufficient confidence in the public mind to secure their general adoption. With rare exceptions the wooden pavements, hitherto made and now in use, have been subjected to no such treatment by any effectual process; and hence, as experience has clearly proved, they soon yield to the active agents of chemical decomposition. It is especially worthy of remark that the rival claims of wood pavements, under the several patents already granted, have all been based upon certain peculiarities in respect to mechanical construction. These differences, however, are believed to be of little or no importance, since in this respect any one of them is good enough. The all-important consideration is the comparative inherent durability of the materials employed; for when once the wood begins to rot the most perfect mechanical construction does not afford the least possible security for the preservation of the pavement; the decay of a few blocks here and there is quite sufficient to destroy the integrity of the whole structure. Moreover, in the judgment of many distinguished chemists, physiologists, and physicians the decay of large masses of wood in the streets of our great cities most inevitably exerts a most unfavorable influence on the public health. It is believed that wood pavements, if adopted on any extended scale, will be found to be wholly incompatible with proper sanitary conditions. This objection to wood as a material for paving streets appears to be one of the gravest importance, and hence wood should not be used for such purposes. It is also to be observed that so many and various are the uses to which lumber is applied, and so rapid is the destruction of wood in this country, that—for all places and purposes where other and less valuable materials may be employed with equal or greater advantage to private and public interests—the

further use of wood should be discouraged. There are other important objections to the pavements already named; but a detailed statement is quite unnecessary, and a discussion of the same would be manifestly out of place in this connection. Serious objections are also urged against all the other street pavements now in common use. It is thought that the movement of vehicles over the Belgian pavement occasions quite as much noise as their passage over one made of cobble stones. The Macadam road, whether under that name or otherwise designated as the Telford pavement, is always either dusty or muddy. The particles of stone, reduced by constant trituration to the minutest subdivisions, float in the atmosphere when the wind blows and as often as they are disturbed by other causes. The fine particles of stone are taken into the respiratory organs by inhalation and deposited over the mucous surfaces, causing irritation and inflammation of the delicate lining membranes of the organs, unnatural expectoration, catarrh, bronchial and pulmonary diseases. For these reasons the streets of cities that are much traveled should not be covered with loose and pulverized stone.

I have not given place to these preliminary observations from a desire to disparage the just claims of any pavement now in use, but simply with a view of respectfully recognizing the more important objections which are everywhere urged against their adoption.

Now, it is the object of my combination to furnish a street pavement that will be sufficiently smooth to satisfy the reasonable demands of all; that will enable us to economize in this department of our municipal expenses; and that will be durable beyond any pavement now in use; a pavement that will at once obviate all the principal objections already noticed, and avert the evils which are inseparable from the general adoption of either of the rival pavements now claiming the precedence of superior merit.

It will be perceived from the subjoined description of my invention that I propose to utilize a vast quantity of material that is likely to be otherwise worthless for any practical purpose. I refer to the cobble stones which now form by far the greater portion of the pavements of all our American cities. I here submit an explicit statement of the constituents and description of the method employed in the composition and construction of my concrete and cobble combination pavement.

The materials used are the present cobble stones and a concrete made of gravel, broken stone, sand, marble-dust, coal-ashes, coal-dust, cinders, &c.,

rendered adhesive by mixing the same with pine pitch, roofers' pitch, tar, petroleum, and asphaltum in combination, the dead-oil from which the gaseous products of coal have been eliminated, or, indeed, any oleaginous or bituminous substances whatever that may be the cheapest and most convenient, provided they serve the purpose. Whether any one of the articles just enumerated be used alone as the adhesive medium, or any two or more of them be combined, in whatsoever proportions, is unimportant if the composition shall be found to answer the end proposed, which is the production of a concrete possessing the requisite qualities of solidity and elasticity.

My method may be thus briefly described: Having the surface of the road-way properly graded a layer of coarse concrete, prepared of materials already specified, is spread over the ground to the uniform depth of three or four inches. On this concrete base the cobble-stones are then set in the usual way and partially driven down by the use of any implement that may be most conveniently employed for that purpose. A concrete prepared of very fine gravel, sand, pulverized stone, coal-ashes properly screened, and cement (any two or all of these combined with such of the before-mentioned adhesive materials as may be selected) is then spread over the cobble-stones, rolled down, and rammed in between the stones until the interstices are completely filled up to the highest level of the cobble-stones, thus barely leaving the higher portions of their upper surfaces visible. The whole is then thoroughly rammed down together until every stone is fairly driven home, always preserving the proper grade of the street, the uniform surface of the pavement, and otherwise having strict reference to the specifications herein contained.

It will be observed that I do not limit myself to or in the use of any one or more of the solid materials named above; nor do I confine myself to the adoption of any one, two, or more of the adhesive substances usually employed in the several concretes now in use. Moreover, I do not seek protection for any new combination of such materials; nor for any precise method in mixing the elements of the concrete; nor, in fact, for any rule or specific proportions; but

What I do claim as both new and useful, and for which I desire to secure Letters Patent, is—

The pavement herein described, constructed of the materials and by the mode specified.

S. B. BRITTAN, M. D.

Witnesses:

J. W. WHITEHEAD,
JOHN A. STROUBE.

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