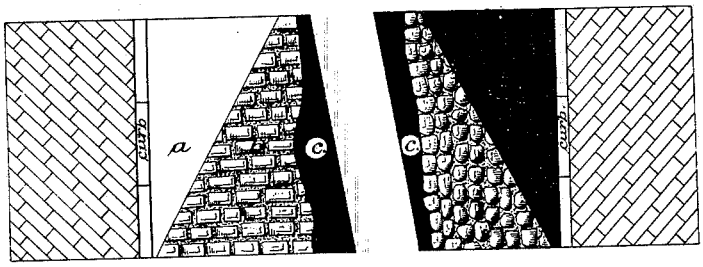
J. C. ROCK & J. W. PHILLIPS.

PAVEMENT.

No. 192,349. Patented June 26, 1877.

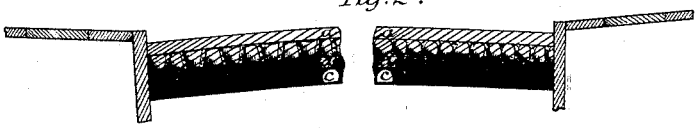
Fig: 1.



PLAN.

Roadway.

Fig: 2.



SECTION.

Attest.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PAVEMENTS.

Specification forming part of Letters Patent No. **192,349**, dated June 26, 1877; application filed May 3, 1877.

To all whom it may concern:

Be it known that we, JOSEPH C. ROCK and JAMES W. PHILLIPS, of the city and county of Washington, District of Columbia, have invented certain new and useful Improvements in Combination-Pavements suitable for all kinds of traffic; and we do hereby declare the following to be a clear, full, and exact description thereof, which will enable others skilled in the art to which it relates to make and use the same.

We have in this invention supplied a much-needed want in all cities of utilizing any rough, irregular, or rectangular form of stone, combined with an asphaltic and hydraulic foundation in such a manner as to form a cheap, durable, clean, healthy, and, in a great measure, noiseless pavement, well adapted to heavy traffic or travel upon business or more private streets, and at a much less cost than any other equally good stone, asphalt, or combination-pavement as now laid in the United States.

The constant concussion to which stone pavements laid with a loose gravel and sand foundation are subjected by traffic loosens the stones, and the surface drainage, having free access to foundation, washes the sand from under some of the stones, together with the insufficient solidity and compactness of foundation, permit them to drop below the regular plane surface of the pavement, thereby making it uneven and rough. In consequence of this process the concussion of traffic increases in violence, the pavement becomes of little value, and excessively rough and undesirable.

This process is for the purpose of remedying these defects, and the foundation herein proposed is composed of such a combination of asphaltic and hydraulic cement and other materials as to be of an elastic and solid nature, the base of broken stone, &c., giving it solidity, and the cushion-coat the elasticity, resisting the effect of concussion caused by heavy traffic, and preserving an uniform plane surface of pavement, and is impervious to water and frost.

Figure 1 is a broken top view, showing the different layers of the pavement. Fig. 2 is a vertical cross-section.

Referring to the drawings, *a* is a top coat of two inches (more or less) of the composition laid over the stones to form a smooth even surface. *b* is the stone blocks laid upon the foundation, the spaces between them being filled with the composition. *c* is the bituminous or hydraulic cement concrete foundation. *d* is a layer or cushion of fine bituminous concrete, upon which the stones are laid.

The road-bed being properly prepared with the necessary crown, we then spread evenly over the surface the following bituminous concrete—viz: Heated broken stone or gravel, mixed, either by hand or in a mixing-machine, with a hot solution of chemically-prepared bitumen in the proportion of twenty gallons of bitumen to one cubic yard of stone or gravel; or the following hydraulic-cement concrete—viz., six (6) wheelbarrows (twelve cubic feet) of broken stone; four (4) wheelbarrows (eight cubic feet) of gravel; five (5) wheelbarrows (ten cubic feet) of clean sharp river-sand; one (1) barrel Portland or other good hydraulic cement.

Either of the foregoing base-foundations are spread to the required depth—say from three to six inches, according to the use to which the street will be subjected—and rolled or rammed as laid.

Upon either of the foregoing foundations we spread a layer or cushion of finer or more flexible bituminous concrete, about two inches in depth, upon which we lay any kind of irregular-shaped or rectangular block stone, from four to eight inches in depth, with the largest and smoothest surface of the stone upward, at right angles with the line of the street. Each course of blocks is so laid that all longitudinal joints shall be broken by a lap. The stone is then tamped to embed it in the cushion-coat of the foundation, and also to form a smooth and even surface. Well-warmed fine gravel is then swept over the stones to fill all the interstices or spaces between them, and then into the interstices and over the stones the following composition is poured: Twenty-four quarts chemically-prepared bitumen; eighteen quarts carbojapanis or asphalt, artificial or natural distilled to the same consistency; ten gallons dry powdered stone and clay, (hard limestone, cement-stone, or bi-

tuminous shales preferred;) four ounces of sulphuric acid. (with or without;) ten pounds of oxide of iron; twenty-four ounces of rolled brimstone.

By "chemically-prepared bitumen" we mean bitumen from which all volatile, soluble, and light oils have been distilled. This composition to be hardened to suit a warmer climate, and softened for a colder very slightly.

The sulphuric acid, if used, is put in at a low temperature. The brimstone is put in by degrees, a little at a time, at 212° Fahrenheit. The oxide of iron is thoroughly dried and pulverized before using, and is put in the kettle when the material is very hot, and kept well stirred, the whole being subjected to a vulcanizing heat for from two and one-half to three hours, the heat not to exceed 330° Fahrenheit, nor be less than 290° Fahrenheit. This composition is then poured into the spaces, completely filling them and combining the stones, and is also poured over the stones. Thoroughly dry and well warmed, not hot or burned so as to destroy the bitumen, fine gravel or clean sharp coarse sand is spread upon the pavement, and is thoroughly rolled; or a top coat of two inches (more or less) of this composition may be laid over the stones, sufficient to form a smooth even surface, inclosing and combining a stone pavement within a concrete pavement.

We claim as new—

1. A street-pavement consisting of a concrete-base course, *c*, a cushion course or layer of finer concrete, *d*, the layer or course of stone *b*, and top or wearing-surface course *a*, composed of the ingredients herein specified, all constructed substantially as and for the purpose set forth.

2. In a street-pavement, the composition of matter consisting of chemically-prepared bitumen, carbojapanis or asphalt (artificial or natural distilled,) dry powdered stone or clay, (hard limestone, cement-stone, or bituminous shales preferred,) sulphuric acid, oxide of iron, and brimstone, treated in the manner specified, and for the purpose set forth.

JOSEPH C. ROCK.
JAMES WALLACE PHILLIPS.

Witnesses:
A. Y. LAKENAN,
FRANK HILSON.