(Model.)

# J. H. BATES.

## ARTIFICIAL STONE OR CONCRETE PAVEMENT.

No. 350,101. Patented Oct. 5, 1886.

Fig. 1.

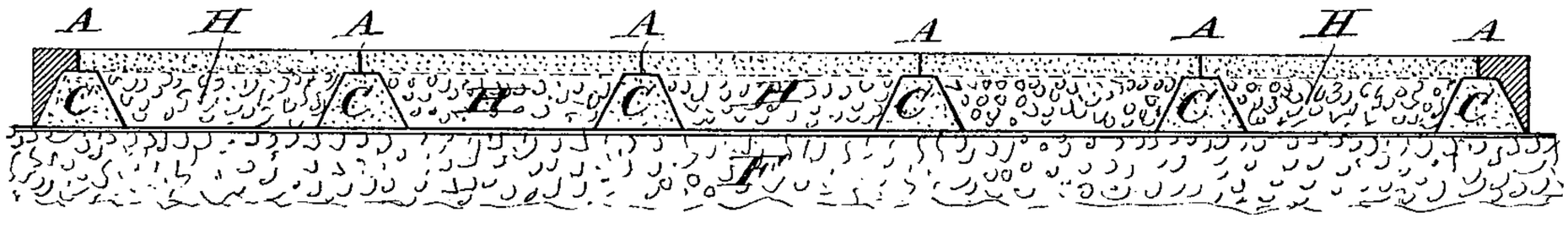



Fig. 2.

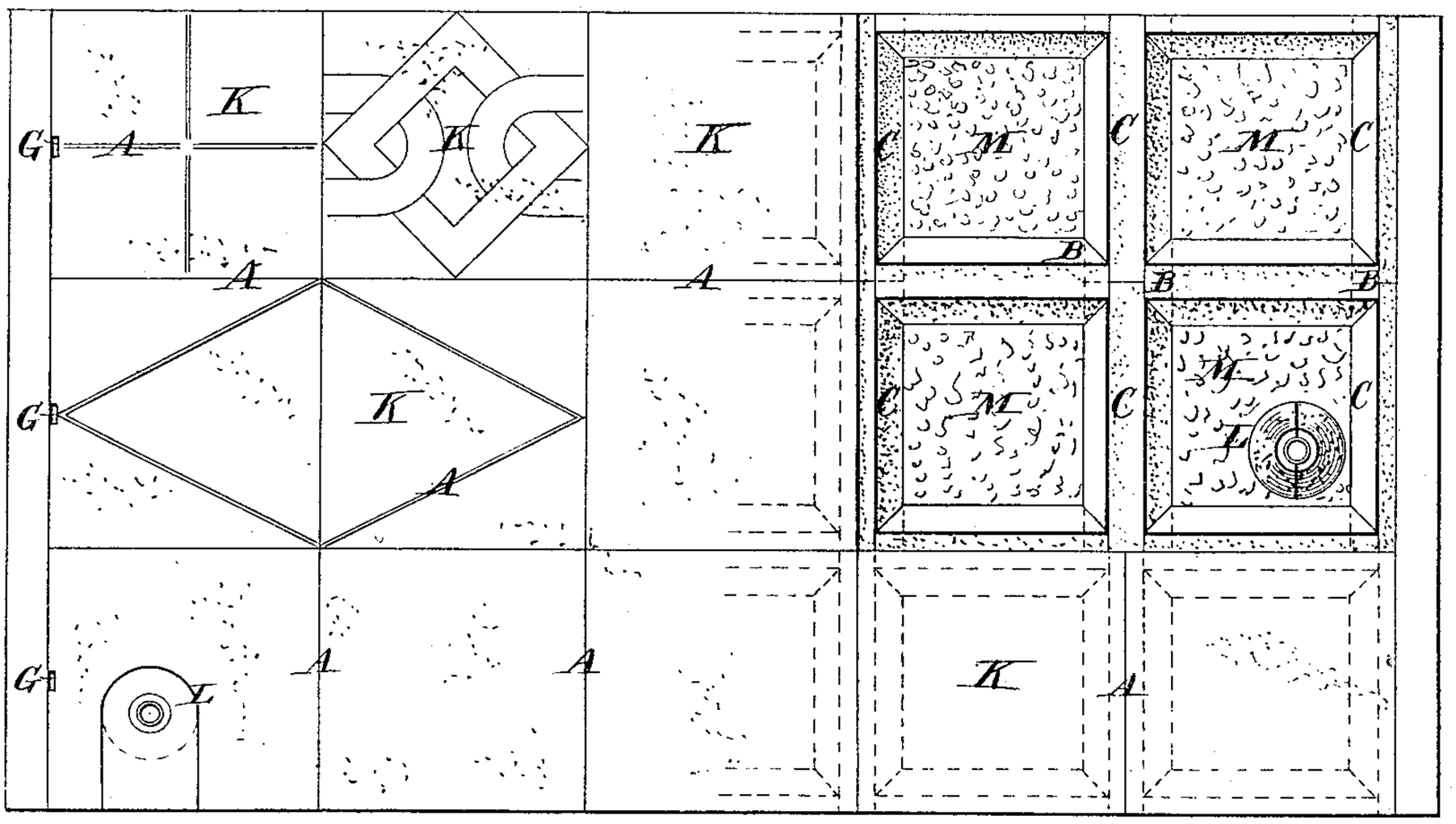



Fig. 3.

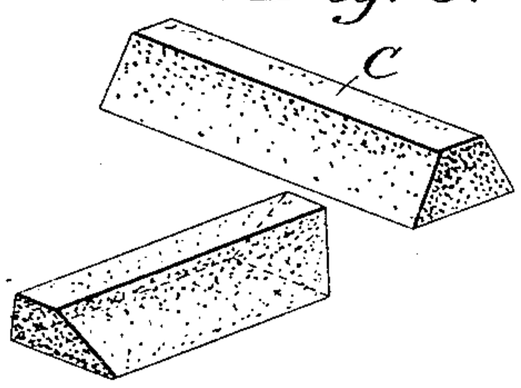



Fig. 4.

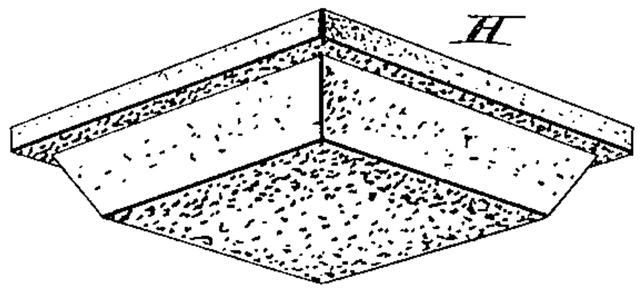



Fig. 5.

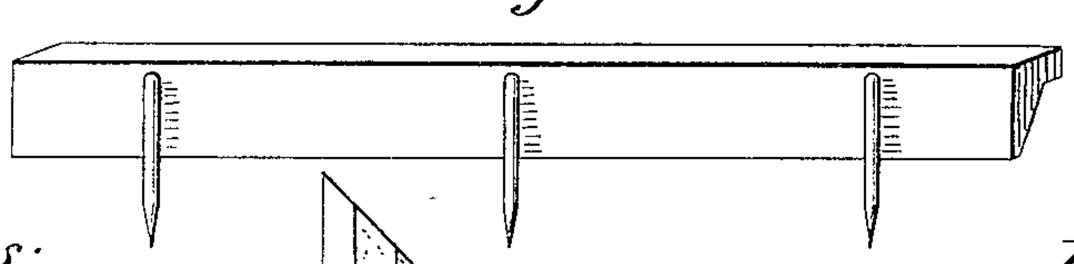
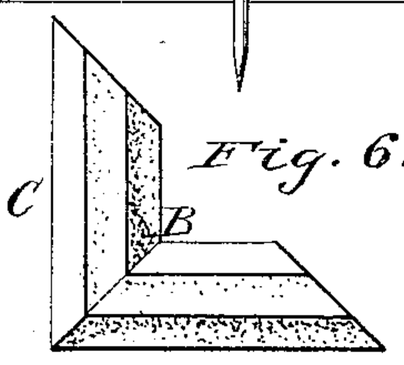


Fig. 6.

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# UNITED STATES PATENT OFFICE.

JOHN H. BATES, OF POTTSVILLE, PENNSYLVANIA.

## ARTIFICIAL-STONE OR CONCRETE PAVEMENT.

SPECIFICATION forming part of Letters Patent No. 350,101, dated October 5, 1886.

Application filed April 27, 1886. Serial No. 200,302. (Model.)

*To all whom it may concern:*

Be it known that I, JOHN H. BATES, a citizen of the United States of America, residing at Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Artificial-Stone or Concrete Pavements, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to the manufacture, form of blocks, and method of laying, removing, and relaying of pavements and floors composed of concrete or artificial stone, or of such concrete in connection with supporting-blocks of natural stone, concrete, or other suitable substances, and is designed to produce a hard, smooth, and ornamental pavement for vestibules, halls, cellar-floors, sidewalks, and all other places to which it is suitable at a greatly less cost than natural stone.

Referring to the drawings herewith filed, the following is a description:

Figure 1 is a section through the pavement, showing its several parts and their relations. The letter F shows the foundation, C the "joint rest-blocks," and H the surface or pavement blocks.

Fig. 2 shows a plan of the pavement, A indicating the joints of the paving-blocks and the lines of the joint rest-blocks underneath and supporting them. The four upper and right-hand squares have the paving-blocks removed, showing B, the joint rest-blocks, in position and fitted to each other, and M the spaces to be filled with paving-blocks. K is the surface of the blocks, plain or ornamented. L shows water-plug or other obstructions.

Figs. 3 and 6 represent the joint rest-blocks separated, and show the ends squared, beveled, and mitered, as required. Fig. 6 shows a paving-block in perspective.

Fig. 4 is a perspective view of one of the surface-blocks.

Fig. 5 shows a specimen of a wooden frame to be held in place by iron pins or other device, against which the paving-blocks are molded in situations where required. G shows the iron pry-boxes along the edge of the pavement, placed convenient for use in lifting them, the character and use of all which will more fully appear in the following description.

I prepare for, make, and lay my pavements as follows: For outdoor work and all situations where solid foundations are required the ground is to be excavated to a sufficient depth—from six to thirty inches, according to the requirements of climate and strength—and filled in with any kind of coarse material—broken stone, brick-bats, furnace-slag, &c.—tamped or rolled solid. This is covered with a layer of sand, ashes, or other dry material, and also tamped. On this is placed about one inch of concrete, hereinafter described, to be also compacted to a level surface with a broad iron tamp or heavy roller. This constitutes the foundation, as shown by F, Fig. 1. For vestibules, halls, cellars, and other covered places, where so much strength is not needed, most of this foundation may be omitted, and the concrete used on the clay or sandy bottom. The foundation being prepared, the whole area is laid off into blocks of suitable size and shape, due regard being had to use, appearance, projections, and obstructions, by the use of lines stretched from peg to peg, or other usual device. The blocks C in Fig. 1 are then placed in position along the lines as determined, and set in plastic concrete as a mortar, leaving the spaces as shown at M in Fig. 2. These joint rest-blocks are to be made of concrete molded of proper shape, as shown. They are to be of lengths suitable for handling, or to suit the size and shape of the pavement-blocks, as determined, or with reference to the space to be covered and the taste of the purchaser. The surface will be flat, the sides beveled, and the ends squared, beveled, or mitered, as required, to fit closely up to each other, and as shown at B in Fig. 1 and in Figs. 3 and 6. Their usual dimensions will be one inch wide on the top, four inches on the bottom, three inches thick, and from eighteen to thirty-six inches long. They are to be made in advance of use to stand for several weeks and long enough to become thoroughly crystallized and hard. Blocks of the same shape and for the same use may be made of natural stone or any artificial material of sufficient strength. I regard all blocks thus made as within the scope of my invention. Having placed these rest-blocks in position, as described, the pavement proper is then to be made as follows: A rack

or wooden frame is to be used, shaped to suit the paving-blocks, as already determined, and so placed that the inner surface will rest exactly along the line of the center of the rest-blocks to receive the paving concrete hereinafter described. Along the outer edge, and where obstructions or other causes require, mold-boards of suitable shape must be used—such as are shown in Fig. 5—and held in position by iron pins or other device. To prevent the concrete blocks, which are to be molded between and over the rest-blocks, from sticking and to leave them free to be removed from their bed at pleasure, I use "dividers" as follows: On the surface of the concrete of the foundation sand is sprinkled one-eighth of an inch in depth and gently tamped to a firm and level surface. A solution of clay and water of the consistency of cream is applied with a brush to the sides and the upper surface of the rest-blocks and the inner surface of the wooden molds and edges of adjoining blocks, to keep the paving-blocks separate while being molded and hardening, while allowing them to fit perfectly close. The next step in the process is to mix the concrete and mold the pavement. The concrete is prepared as follows: Three parts of clear sand and two parts of Rosendale or other good hydraulic cement are mixed in a dry state until thoroughly incorporated, and then as much water added as the mixture will take. Broken stone or clean gravel of sizes from one-fourth to one and one-half inch, in the proportion of eight parts to the preceding five, is then added, and the whole stirred together until every particle of stone or gravel is coated. While in the plastic state this concrete is placed in the molds and tamped solid to form the joint rest-blocks. The concrete to be used to form the paving or surface blocks is made as follows: Equal parts of sand and cement are mixed, as above, into a plastic mass, and this is spread one-half an inch deep over the concrete of the foundation, heretofore described, to form the lower part of the paving-block. Then a concrete of equal parts of cement, sand, and crushed stone, mixed as above, is placed on top of the former and filled in to the top of the wooden molds and the surface straight-edged. The material is then worked over with a wooden float. After allowing it to stand for a few moments to become slightly stiff, it is rolled with a light roller of wood about three inches in diameter having a corrugated surface. This drives down all larger particles of stone or sand, and brings the air and finer materials to the surface. As soon as the superfluous water on the surface has been absorbed or evaporated, it is again rolled with a roller of similar dimensions, but of iron or steel and with a smooth surface. These processes put down the whole mass a quarter of an inch below the top of the rack and render it solid and impervious. When this is done, more of the concrete of equal parts of cement and sand is used to fill the frame to the top again, and then leveled, rolled smooth, and floated and polished in the usual manner. One block being thus finished, the next is left blank, and the frame or mold is removed to the second space, which is finished in a like manner. The next row is taken in alternate blocks opposite the blanks, and then the blank blocks are in a like manner filled in without the use of the frame, until the whole is completed, care being taken to keep the edges separated by clay wash, as described. In the finish of the surface the paving-blocks may be left plain or stippled or lined in patterns, according to the taste and with the usual tools.

In addition to the above I provide for various contingencies of such pavements, as shown on the figures, as follows: When gratings, water-plugs, horse-posts, or other obstructions are met, the rest-blocks are made of shapes to closely surround them, and the blocks coming up to the surface of the pavement, leaving the larger blocks free for removal, as shown at Fig. 2. As a means to facilitate removal to reach or lay drain, gas, water, or other pipes, or for any other purpose, I provide an iron box, which I call a "pry-box," placed at suitable intervals along the edge of the pavements, as shown at G, Fig. 2, the bottom resting on the concrete of the foundation and the top level with the surface. When set in place it is to be filled with sand to within an inch of the top, and then with concrete, making a smooth surface. When used this concrete must be chiseled out, that a crow-bar may be inserted. At the back and against the paving-block a flat iron plate is placed, so as to prevent the edge from being defaced in lifting. These devices are to be adjusted before the pavement is laid, so that it may be fitted to them, so as to require no cutting and leave no cracks.

I regard all metal boxes with an open side inserted in the pavement in the manner and for the use described as within the scope of my invention.

The advantages claimed for this pavement over others are—

First. Its permanence and solidity. The separate and free blocks of moderate size relieve it from danger of cracking by expansion and contraction, and the blocks of beveled edges give it a uniform and solid bearing, and the dividers, while keeping the blocks from adhering, form so close a joint as to exclude the effects of moisture and frost.

Second. Its convenience for removal and replacement to meet the requirements of change, repair, and improvements which are constantly going on in our cities. Concrete pavements of continuous sheets are found seriously objectionable, because of the necessity of cutting and destroying them to reach and lay pipes and wires below the surface, and the inconvenience of brick walks is submitted to because they can be removed and reset. The small blocks, beveled edges, pry-boxes, &c.,

described, meet the requisite conditions for a desirable stone pavement easily removed and relaid.

Third. Its cheapness in comparison with any good pavement of natural stone, or any composition and construction of equal durability and beauty, will not be overlooked. The cost of course must depend on the price of labor and the accessibility of the material; but comparatively the material is abundant and cheap, and no large amount of skilled labor is required under an intelligent superintendent.

What I claim, and desire to secure as my invention by Letters Patent, is as follows:

1. A pavement composed of joint rest-blocks having square or flat surface, beveled sides, and formed with beveled meeting portions, fitted together as described, and surface-blocks molded between and over the rest-blocks, the meeting sides of said surface-blocks extending over and resting upon the flat upper surfaces of the rest-blocks, and all being free for removal, substantially as described.

2. A pavement composed of a concrete foundation, rest-blocks formed with beveled sides and flat surface, as described, and surface-blocks separated from the rest-blocks by a wash of clay, all as and for the purposes described.

3. A concrete pavement of separate blocks having inserted at or near the edge thereof an iron pry-box, as and for the purposes set forth.

4. A pavement composed of joint rest-blocks having square or flat upper surfaces and beveled sides, and formed with beveled meeting portions, fitted together as described, and surface-blocks molded between and over the rest-blocks, having iron pry-boxes in or near the edge thereof, the meeting surfaces of the surface-blocks extending over and resting upon the flat upper surfaces of the rest-blocks, the blocks kept from adhering by a clay wash, all being free for removal and relaying, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. BATES.

Witnesses:

I. J. LICHTENBERG,

BERNARD J. DUFFY.