

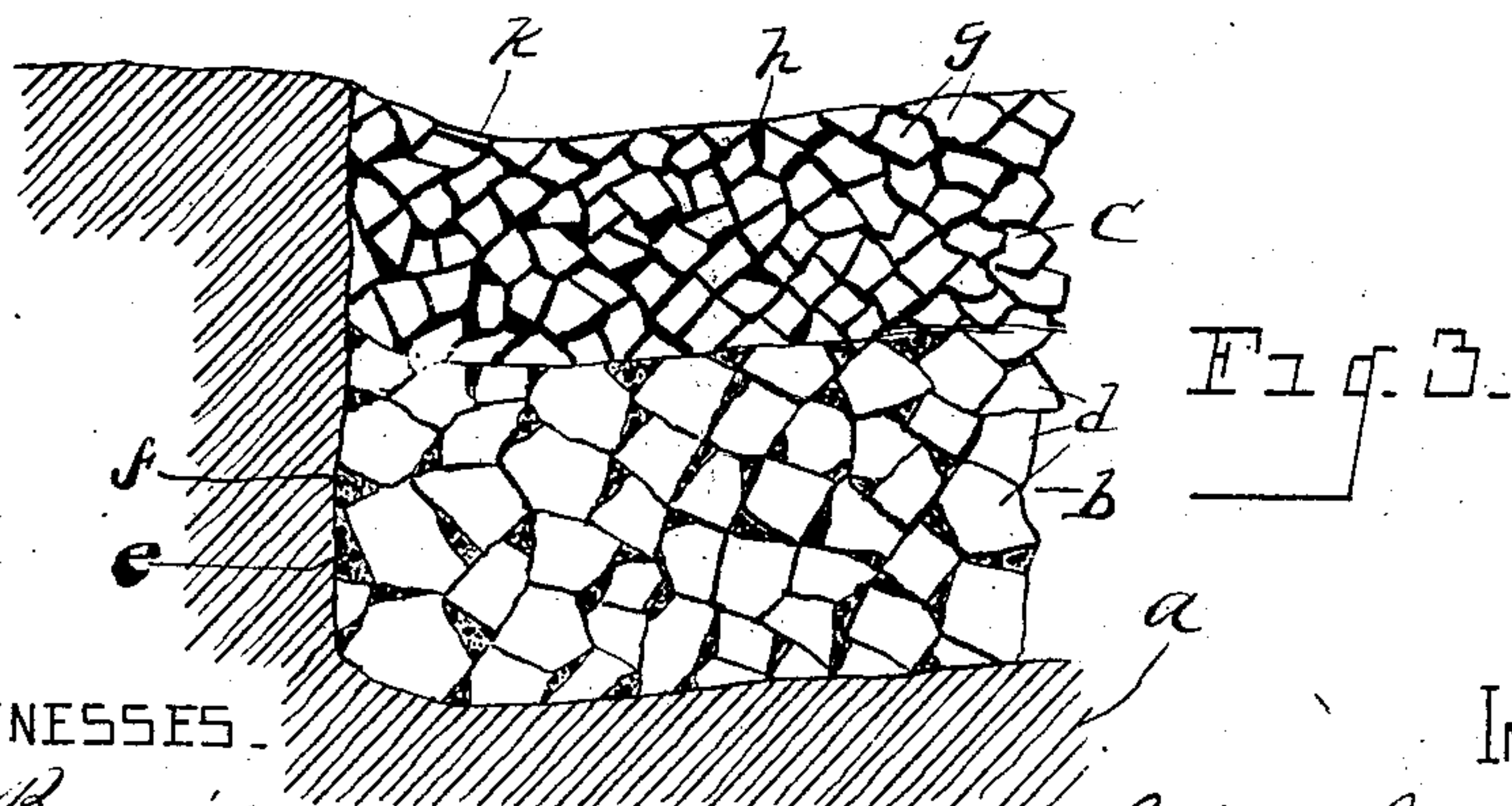
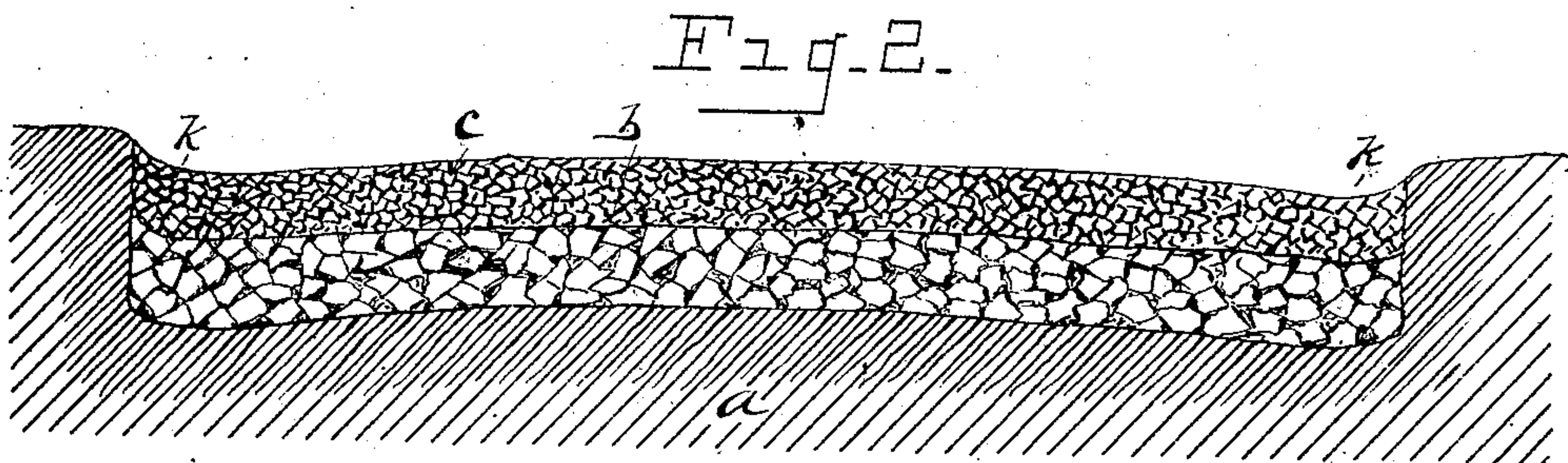
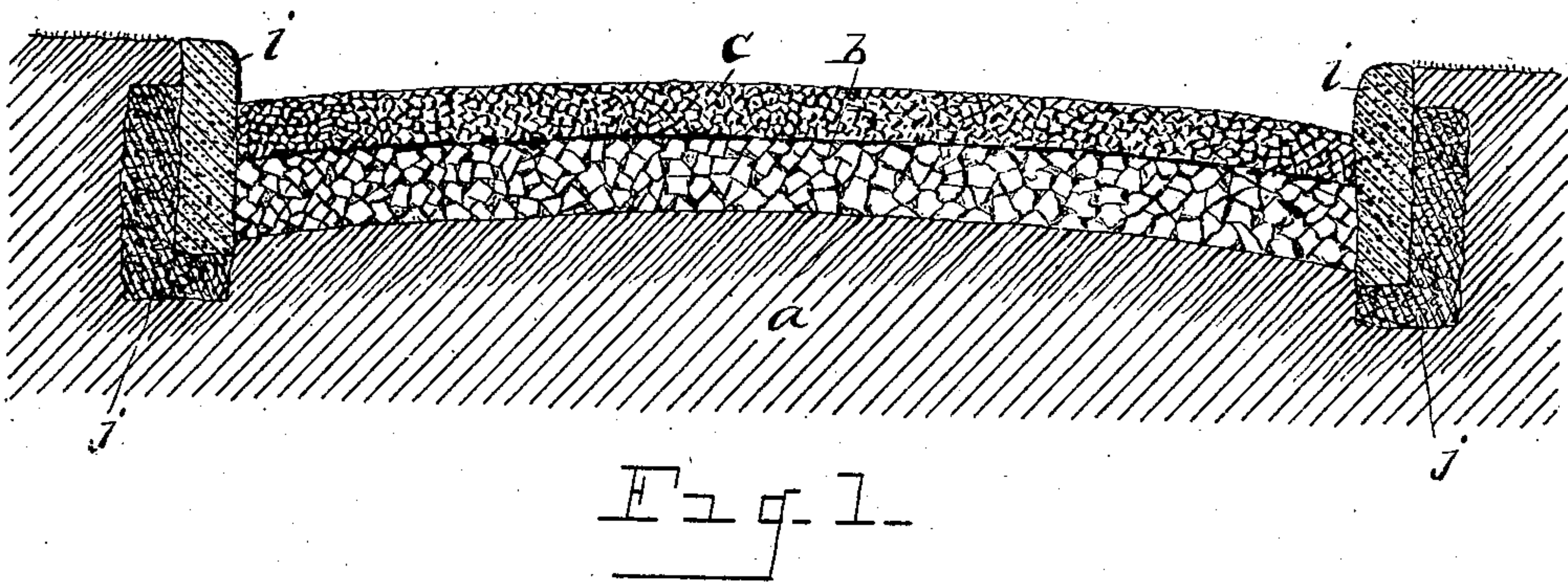
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PATENTED JAN. 29, 1907.

S. G. HOWE.

COMPOSITE ROADWAY AND THE PROCESS OF CONSTRUCTING THE SAME.

APPLICATION FILED AUG. 15, 1906.



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# UNITED STATES PATENT OFFICE.

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COMPOSITE ROADWAY AND THE PROCESS OF CONSTRUCTING THE SAME.

No. 842,201.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed August 15, 1906. Serial No. 330,693.

*To all whom it may concern:*

Be it known that I, SOLON G. HOWE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Composite Roadways and the Processes of Constructing the Same, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object an improved composite roadway and the process of constructing the same, the invention being adapted for country roads and city streets, the roadway being of superior construction, economy, and utility; and it consists of the construction and the process of forming the same hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 illustrates in vertical cross-section my invention as applied to a city pavement. Fig. 2 is a similar view showing my invention as applied to a country road. Fig. 3 is a fragmentary enlarged view.

My improved composite roadway consists, essentially, of two layers, formed and applied as hereinafter described.

For a country road, for example, where no curb is required my invention contemplates first digging a trench of suitable depth—say a depth of ten inches—the trench being of any desired width for the roadway, giving the subgrade or bed a sufficient curvature or crown to insure a proper drainage. The subgrade or bed is then rolled with a heavy roller until a desired degree of compactness is attained. This compactness may readily be tested, as with a pointed steel prod, and should spots be found not of a proper density or firmness my invention contemplates covering said spots with a layer of foundation composition, hereinafter set forth, then compressing the same by rolling or tamping until a proper firmness is obtained. Next upon this subgrade or bed my invention contemplates spreading a seepy foundation layer—i. e., a layer through which water will flow gently or slowly—in other words, a layer in which water will seep or ooze through said layer—composed of a mixture, hereinafter described, spread over the subgrade to a suitable depth—as, for example, a depth of six inches after being properly rolled and compacted. Upon this foundation layer I spread an upper

surface course or layer formed of a different mixture, as herein set forth.

My foundation mixture or layer is composed of crushed stone, as of crushed cobblestone, where the same is obtainable, although other kinds of crushed stone may be utilized, as crushed granite, trap-rock, or limestone, as they may be more easily obtained.

The crushed stones are to be crushed to give sizes varying, for example, from about one to two and one-half inches in largest dimensions. The crushed stones after being screened are then brought to the trench where the roadway is to be laid and mixed in any suitable manner by hand or by machine with a sufficient supply of sharp coarse sand and gravel, the gravel being preferably below a half an inch in size, or thereabout, the gravel and sand being a little more than enough to thoroughly fill the space or voids between the crushed stone. This crushed stone, sand, and gravel after being properly mixed, without water, is spread to the desired depth and thoroughly compacted by suitable means, as by a roller. When the same has been so compacted and tested by a prod, a spur-roller is preferably passed over the surface, so as to sufficiently loosen the top portions of the crushed stone to present a roughened surface for the reception of the upper layer or wearing course.

The top or wearing course is composed of crushed gravel or other stone of irregular shape of smaller dimensions than the crushed stone used in the lower or foundation course, the gravel-stones being crushed, preferably, to about one-half to one inch in largest size. Ground clay, preferably ferruginous clay, is mixed with a sufficient supply of water added to form a thick mortar, after which the crushed stone is added to the clay mortar. The clay mortar should be of sufficient quantity to coat the crushed gravel or stone and thoroughly fill the interstices. This top layer or body after being spread over the foundation layer is then subjected to heavy compression, as by a roller, whereby the clay mortar will be thoroughly compressed into all the spaces between the finely-crushed gravel or stone, this upper course or layer constituting the wearing-surface of the roadway. The clay mortar will also be forced in the operation of laying the roadway onto the exposed surfaces of the foundation layer, as upon the exposed surfaces of the larger



broken stone at the top of the foundation layer, forming a firm bond between the top and the foundation layers or courses. The top or wearing surface may be made of any desired depth, a depth of four inches after compression being a very suitable depth. The road-bed below the foundation-layer may, if necessary, as already described have any spots found to be not of proper density or firmness provided with a filling mixture similar to that of the foundation mixture—for example, the same being rolled or tamped down until all loose or soft spots are remedied, so as to obtain a thoroughly firm seepy bed. The firmness of the upper course or layer can be readily tested after rolling by a steel prod, as also the foundation layer, so as to make certain that each layer is of proper density and firmness. For a street-pavement the process of construction is essentially the same, with the addition of a curb and a suitable base and back for the curb.

In the drawings, *a* represents the road-bed of earth below the foundation course above described. *b* denotes the foundation layer, of coarser crushed stone, sand, and gravel, and *c* the top or wearing course of more finely crushed gravel or stone mixed with clay mortar. In the enlarged view Fig. 3, *d* represents the coarser crushed stone, *e* the particles of sand, and *f* the particles of gravel of the foundation layer, the sand and gravel being shown in the interstice between the broken particles of stone *d*. In Fig. 3 also the more finely crushed gravel or stone of the wearing surface or layer is indicated at *g*, the clay mortar being indicated at *h* filling the interstices between the particles of crushed stone *g* and coating said particles. In Fig. 1, *i* denotes a suitable curb of any desired construction, and *j* a concrete base and back for the curb. The construction of the roadway and the process of forming the same will now be clearly understood.

The advantages of this composite roadway are many and will be evident, as follows: For a country roadway where no curbing is desired gutters *k* may readily be formed, as by a supplementary roller attached to the side of the compression-roller. A special advantage of such a composite roadway is that it is comparatively inexpensive in construction and is easily and cheaply maintained. Should any soft spots or depressions develop under heavy traffic, repairs could readily be made by simply first cleaning such depressions, so as to make as good a bond as possible, and then filling the depression with a mixture such as above described, constituting the top or wearing course, and rolling or tamping the same firmly into place. The filling in the interstices of the crushed stone in the foundation layer makes a cushioned foundation for the upper layer or wearing-surface, while the clay mortar in the up-

per layer forms an effectual bond. Such a composite roadway will not be liable to injury by reason of heavy traffic. If vehicle-tires of proper width are used, the construction of the wearing-surface will prevent grinding or chafing of the materials, the wearing-surface being only subjected to the natural wear of ordinary usage. Indeed, heavy traffic would rather benefit the roadway than otherwise, as it would have a tendency to continually iron it out and compact it. By using crushed cobblestone throughout in the construction of the roadway and filling the interstices with sharp sand and gravel to form a lower seepy foundation course and filling the interstices of the upper course with clay mortar the tendency of the mixture to slip or move out of position is practically eliminated, and without such movement there would be but little chance for wear and creation of dust. The general uniformity of sizes of the crushed stones in the two courses, respectively, while insuring a compactness will not, however, develop a rigidity in one place and a softness or springy condition in another, but the construction will insure a body likely to remain firmly and continuously intact. The construction of the lower or foundation layer of such a roadway being pervious to water will allow a perfect seepage which will tend to keep the body in good condition and with proper subdrainage where the soil underneath the roadway will not properly absorb the moisture will insure a perfect condition at all times.

The clay mortar used as a binder if of a proper consistency will bond the small irregular-shaped pieces or particles of crushed stone constituting the upper or wearing surface of the roadway, the only requisite being a suitable degree of moisture, which when not had by rainfalls can be had by sprinkling. This clay binder and crushed stone body forming the upper layer after a hot day will absorb water readily, so that by passing a sprinkling-cart over it at sundown the tendency would be to very materially cool the atmosphere, and the body would absorb sufficient water over night to maintain a certain degree of dampness and eliminate the formation of dust on the surface during the following day. Such a seepage of water as I provide in my foundation layer in other kinds of pavement are detrimental, and therefore other forms of pavement must be made impervious to water in a well-known manner. Other kinds of pavement laid upon a customary concrete foundation are supposed to be impervious to water, thereby excluding the allowance of water and air needed for shade-trees on the sides of the streets.

What I claim as my invention is—

1. A composite roadway comprising a foundation seepy layer composed of a mixture of coarsely-crushed stone gravel and



sand spread over and compressed upon the bed of the roadway, and a seepy wearing-body or upper surface layer composed of a mixture of more finely crushed stone and clay mortar spread over and compressed upon the foundation body or layer, whereby water will seep through the entire roadway, substantially as described.

2. A composite roadway comprising a foundation seepy layer composed of a mixture of coarsely-crushed stone gravel and sand spread over and compressed upon the bed of the roadway, and a seepy wearing-body or upper surface layer composed of a mixture of more finely crushed stone and clay mortar spread over and compressed upon the foundation body or layer, the gravel and sand of the foundation layer filling the interstices between the crushed stone, and the clay mortar coating the crushed stone of the upper layer and filling the interstices therebetween, whereby water will seep through the entire roadway, substantially as described.

3. A composite roadway comprising a foundation layer composed of a mixture of coarsely-crushed stone gravel and sand spread over and compressed upon the bed of the roadway in a dry condition, and a wearing-body or upper surface layer composed of a mixture of more finely crushed stone and clay mortar spread over and compressed upon the foundation layer, the layers of said roadway being pervious to moisture, the gravel and sand of the foundation layer forming a seepy cushion, and the clay mortar of the upper layer forming a bond, whereby water will seep through the entire roadway, substantially as described.

4. The process of constructing a composite roadway consisting of first mixing coarsely-crushed stone gravel and sand in a dry condition, spreading the mixture over and compressing the same upon the road-bed to form

a seepy foundation layer, and then spreading upon the foundation layer a mixture of more finely crushed stone and clay mortar and compressing the same upon the foundation layer to form an upper seepy course or wearing-surface, whereby water will seep through the entire roadway, substantially as described.

5. The process of constructing a composite roadway consisting of first excavating a trench, compressing the soil and filling soft places therein with a previously-prepared mixture of crushed stone gravel and sand compressed therein, then spreading thereupon a seepy foundation layer consisting of a previously-prepared mixture of crushed stone gravel and sand, and compressing the same in place, and then spreading upon the foundation layer an upper seepy layer consisting of a previously-prepared mixture of more finely crushed stone and clay mortar and compressing the same in place upon the foundation layer, whereby water will seep through the entire roadway, substantially as described.

6. A two-course composite roadway or pavement comprising a foundation layer composed of a previously-prepared mixture of coarsely-crushed stone gravel and sand spread over and compressed upon the bed of the roadway, and a wearing-body or upper surface layer composed of a previously-prepared mixture of crushed stone and clay mortar spread over and compressed upon the foundation body or layer, the said layers being pervious to moisture whereby water will seep through the entire roadway.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SOLON G. HOWE.

Witnesses:

JAMES F. HILL,  
N. S. WRIGHT.