S. D. Tillman,

Iron Pavement.

No. 104,513. Patented June 21. 1870.

Fig. 1.

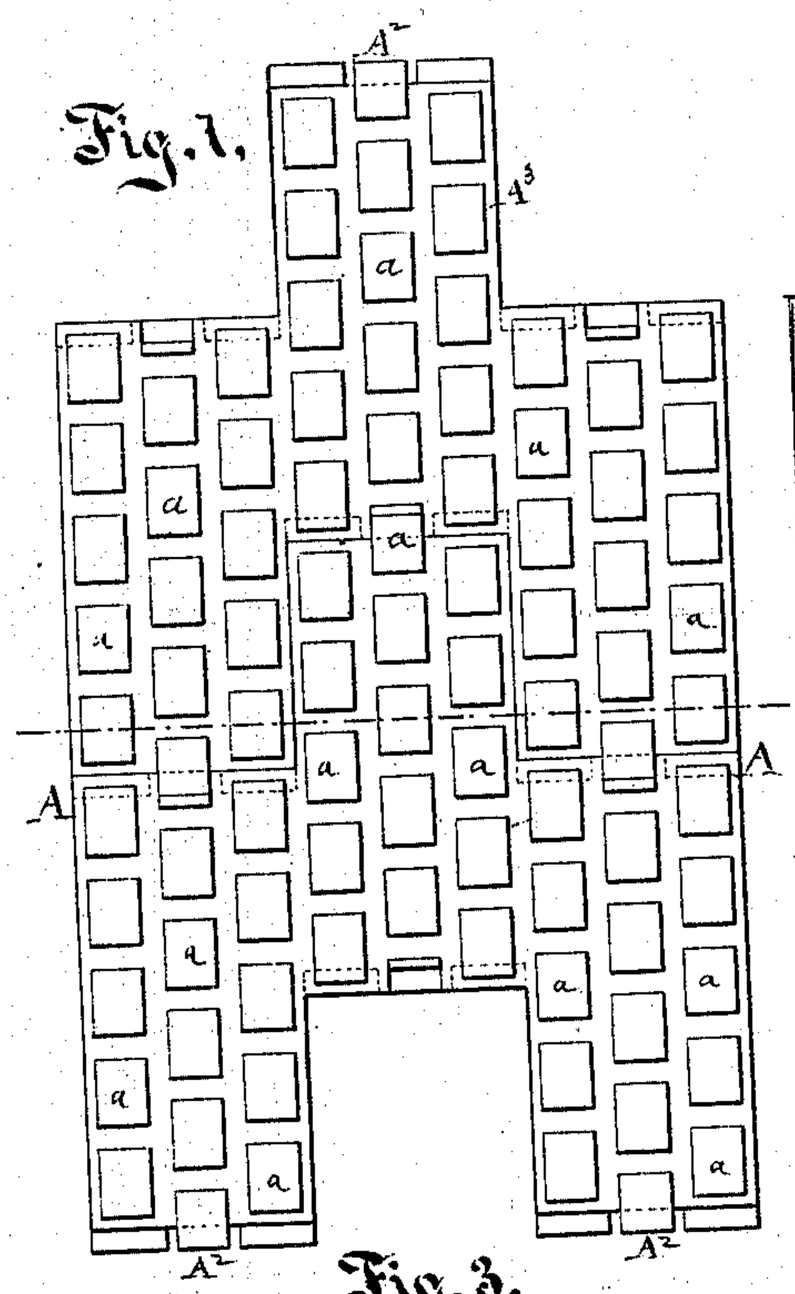


Fig. 2.

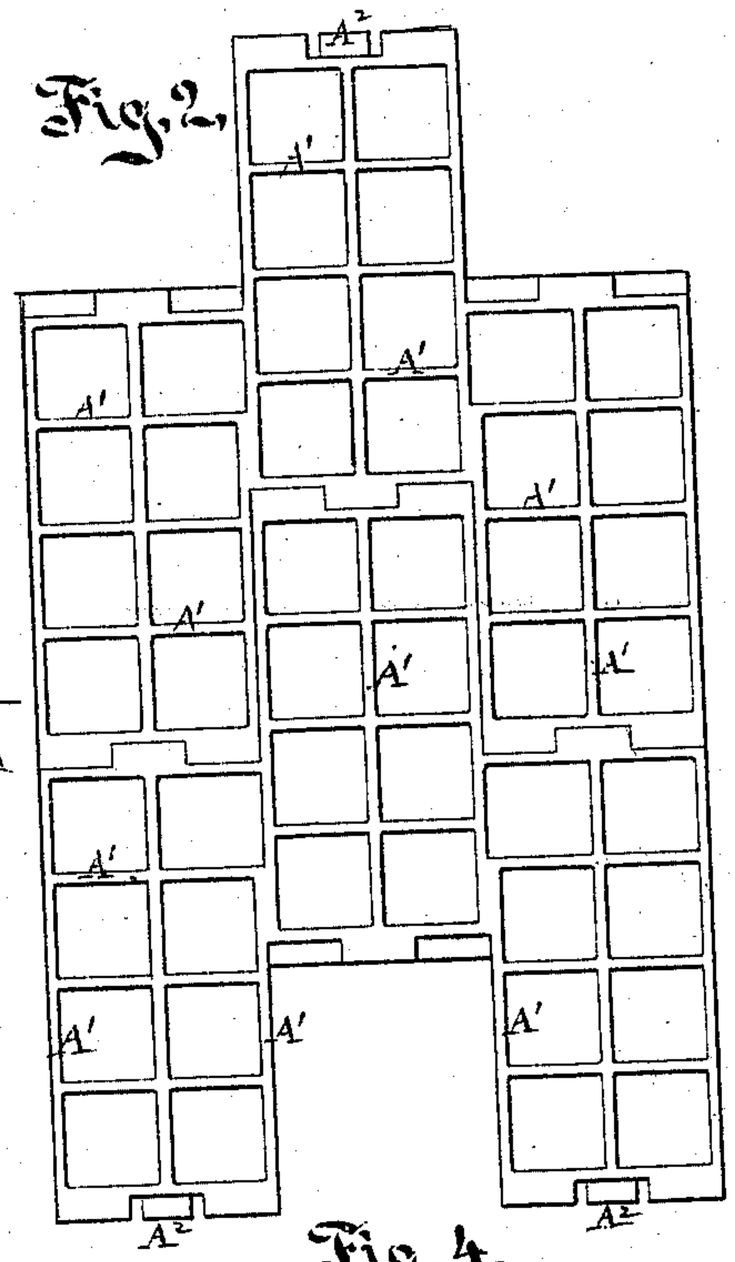


Fig. 3.

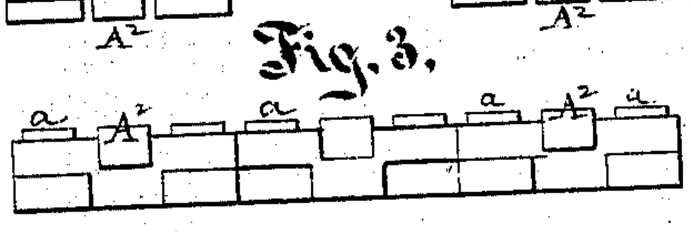


Fig. 4.

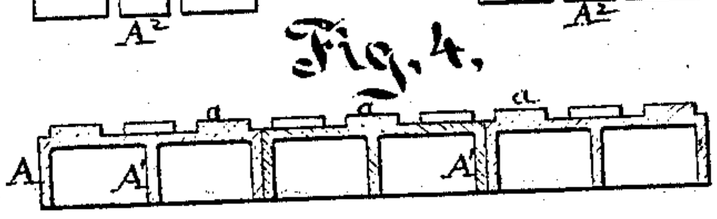


Fig. 8.

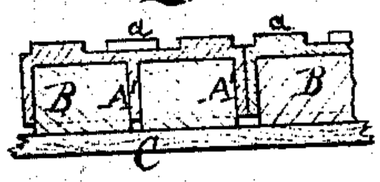


Fig. 5.

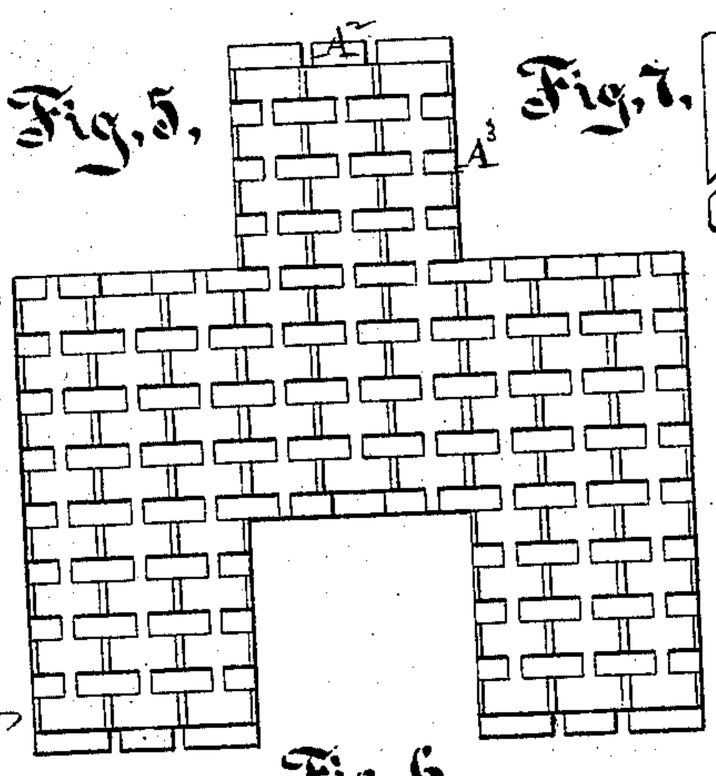
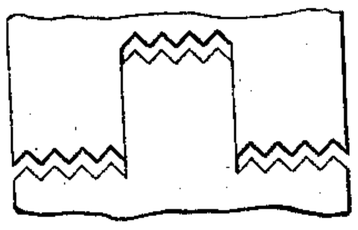


Fig. 7.



Witnesses,

W. C. Ally

H. A. Stafford

Inventor,

Samuel D. Tillman

by his attys

D. D. Stetson & Co

Fig. 6.

United States Patent Office.

SAMUEL D. TILLMAN, OF JERSEY CITY, NEW JERSEY.

Letters Patent No. 104,513, *dated June* 21, 1870.

IMPROVEMENT IN METALLIC PAVEMENTS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, SAMUEL D. TILLMAN, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Pavement; and I do hereby declare that the following is a full and exact description thereof.

In my patent dated March 27, 1860, I have described a form of surface which is smooth to the wheel and rough to the horse, but, to serve perfectly, the wheel must have a tire which would touch a flat surface across its whole width, which in practice is not the case after a wheel has been used for a considerable time.

Rounded tires (and all tires are liable to become rounded by wear) are provided for and run more smoothly on my present form, which, in its several modifications, allows the wheel either to slightly descend from the grade surface and to roll over the longitudinal channels, provided between the elevations, or to run wholly on the lowest surface. I can vary the forms of the elevations within wide limits, but their arrrangement in lines, and the general proportionment of the parts, are important.

I have also devised novel modes of distributing the load over blocks of such, or other sections of iron pavement, and have introduced wood blocks in connection, to elastically support cellular surface pieces, or iron, upon a strong foundation of plank, or the like, all of which points I esteem to be important.

I will proceed to describe what I consider the best means of carrying out my invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a top view of two sections or pieces of the iron part of my improved pavement.

Figure 2 is a view of the same from below.

Figure 3 is an end elevation, and

Figure 4, a cross-section.

All these figures represent one and the same form.

Figure 5 is a plan view of a different form, but which may afford some of the advantages of my invention.

Figure 6 is an end view of the same. In this modification, (figs. 5 and 6,) the elevations are wave-shaped, or ridge-like, with rounded hollows, or partially cylindrical channels between. This form is particularly adapted for rounded tires.

Figure 7 shows a modification which may be of consequence in some situations.

Figure 8 shows the wood blocks in position thereon, parts upon the plank or other firm foundation.

Similar letters of reference indicate like parts in all the figures.

A is the body of my improved form of iron block, strengthened on the under side by flanges, A^1, which are combined and self-bracing, the object being to secure the greatest strength with the least weight of metal.

It will be seen that the hollows or cells, on the under side, are squares of equal size. They are filled with wooden blocks B with the grain upright, (see fig. 8)

The depth of these wooden blocks B is a little greater than that of the flanges A^1. When thus filled with wood the bottom of the compound block presents a checkered surface pressing on a plank bed, C, which rests directly on the foundation or road-bed.

In the edges of these compound blocks are small projections, A^2, which fit into corresponding recesses in the adjacent blocks, so that the blocks are mutually supported by being interlocked or dovetailed together on two sides.

If these dovetails, or provisions for interlocking, above described are not near enough to prevent the toe-calk of a horseshoe from sinking in between the blocks, the edges of the blocks may be zigzaged, as shown in fig. 7.

The general large rectangular form or outline of my blocks is peculiar, and involves a very important advantage.

Each is made with a wing, A^3, extending about one half of the length of one of its sides, of a width about one-third of such length.

There is a corresponding recess on the opposite side equal to such wing, so that, when two of my entire compound blocks are properly matched together, not only the small projections A^2 fit into the corresponding small recesses in the other, as has been practiced with many previous pavements, but also, the wing or large projection A^3 of one, will just fill the large corresponding recess of the other, as shown in figs. 1 and 2.

This construction and arrangement distribute the pressure or disturbing force due to the presence of a loaded wheel on the edges or junctions of the blocks, so that the load on the edge of one block is caused to be communicated, by means of the wings and corresponding recesses, to the middle of the next block. In other words, the wing A^3 reaching from the edge of one block nearly to the center of the adjacent block, transfers a portion of the load not to the edge but to near the center of its neighbor, so that there is no tendency to tilt, and both are held up firmly.

This obviates the difficulty which arises when blocks are simply squares, because, in such case, though interlocked, there is a tendency to a tilting of both blocks when bearing loads along the line of contact.

When it is intended to use these blocks for covering the whole or the main part of the roadway, the blocks may be fastened sidewise to each other by small

side projections, not represented, in each block, which match into slots in the adjoining block; but when these blocks are to be used as a tramway they are made of such width, say eighteen inches, that two lines of them placed parallel to each other, at the proper distance apart, along the usual wagon track, will accommodate all the ordinary range of widths of vehicles having their wheels from four feet six inches to six feet apart. These proportions may be varied, so as to adapt the tramway to the vehicles in use in different localities.

The iron blocks, being cast from one pattern, are cheaply and rapidly prepared, and fit into each other, forming a solid and continuous tramway.

The interior lower spaces in these blocks can be filled in with concrete, or sand, and they may be laid down directly on a sand, concrete, gravel, or other foundation, and, in such case, a portion of the advantage of my invention will be realized. But they will make a preferable tramway or pavement when laid, as I prefer, on planks C, having the same or greater width, which are to be firmly planted on a smooth foundation, and receiving the pressure from the iron portion A through the upright block B, arranged as described and shown in fig. 8.

All the wood used in connection with these blocks may be subjected to any of the usual processes employed for preserving it.

I will now refer again to the peculiarities of the upper surface of the iron, and will explain some of the variations which may be made.

The wearing-surfaces of these blocks, whether used to cover the whole roadway or only as a tramway, are made virtually rough to the horse's feet and smooth to a carriage-wheel by arranging the grade surfaces, which consist of small squares, or parallelograms, *a*, separated so far from each other in the longitudinal line of the road that the toe or heel-calk of the horse's shoe may sink into the shallow depression a little more than a half an inch wide and from a quarter to a half inch deep between such grade surfaces, and thereby give the animal a firm foothold.

A similar series of longitudinal grade surfaces is placed on either side of that first mentioned, but so arranged that the middle of each grade surface will be opposite the depression which separates the first-named grade surfaces; in other words, the grade surfaces, running side by side, alternate in position relatively to each other, so as to break up the transverse line of depressions into a series, each being less in length than the width of the ordinary wheel tire.

It is evident that the wheel tire when new will roll constantly on some portion of a grade surface, and will not descend from the true grade of the road.

When, however, such wheel tire becomes rounded by use, it will roll directly along the line over the longitudinal depressions formed by separating the grade surfaces, in this case made continuous, for the purpose of forming a track for a rounded wheel, which is still sustained on its true grade by bearing alternately on the grade surfaces on either side of such line of depression.

To accomplish this it is essential to have the grade surfaces so proportioned in width that a longitudinal depression will come directly under the middle of the tire of the ordinary wheel.

If the distance between wheels varied in all degrees from the narrowest to the widest, it is evident all wheels could not thus be provided for. But such is not the case. In the country the wheel-tracks are of uniform width, in order that the same beaten track may be used, and in the city there is also great uniformity inthe width of wheels of the same kind of vehicle, so that it is practicable to give each a smooth roadway.

In the instance just described, where the rounded wheel follows on the line of a longitudinal depression, the lowest portion of the tire does not reach the bottom of such depression, since the wheel is still sustained by alternating grade surfaces.

Another modification is, where the rounded wheel-tire runs directly on the lowest portion of the wearing surfaces, shown in figs. 5 and 6. In this case the wheel is kept in the true line of travel by a series of wave-like ridges corresponding to the lines of elevation *a*, and similarly marked, which divide the tramway or entire surface into six or other number of separate wheel-tracks. These may be continuous, or may be separated into a series of longitudinal ridges, as shown, having sufficient distance between each to give the horse a foot-hold when traveling directly over them, and also allow the water collected during rain to run off to the gutters on either side of the roadway.

When these ridges are continuous they will serve only for tramways, and the wearing-surface will consist simply of longitudinal grooves and ridges, and may be made of rolled iron or steel, or semi-steel, either plane on its under surface or correspondingly waved.

The sheets should be supported directly on a wood foundation correspondingly to the bed C, made to conform to the under surface of such rolled sheets or bars.

In the cases thus far described, it will be seen, the elevations and depressions on my improved block provide for a carriage-wheel running on the highest and on the lowest wearing-surface, as well as on an intermediate grade. When these improved blocks cover the whole roadway they may run into each other transversely, in which case the elevations must be changed, so as to preserve the same relation to the roadway which they have when the blocks are matched longitudinally, as already described.

Another modification is where I use for a tramway my block, having a perfectly smooth surface, or a surface made up of very minute elevations and depressions, which could not present any definite foothold for the horse.

In this case I make these blocks of cast-iron or of steel, with the wing and interlocking means, and with the upright and supporting-blocks B and bed C, as shown, and subject them to magnetism, so that each block is a permanent magnet of slight force, to which the iron or steel horseshoe will cling with sufficient force to prevent, or aid in preventing, the horse from slipping.

I claim—

1. The blocks A with extended wings A^3, and corresponding recesses matched and interlocked, as represented, so as to transfer a load on the edges to points near the center, and thus prevent tilting, as set forth.

2. The alternating arrangement of the elevations and depressions on the upper surface, so that, while there are continuously extended depressions lengthwise of the road which are adapted to partially or entirely receive the rounded tire of a wheel, the spaces between are divided into series of separate elevations, *a*, to afford a hold for the feet of the horses, but, by their alternating arrangement, support the wheel continuously, as herein set forth.

3. The wood blocks B, partially inclosed in the cellular iron part A A^1, and serving to support the latter with a slight elasticity, in combination, as shown, with the smooth and hard bed or foundation C, all substantially as and for the purposes herein set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

SAML. D. TILLMAN.

Witnesses:

WM. C. DEY,

H. E. PRICE.