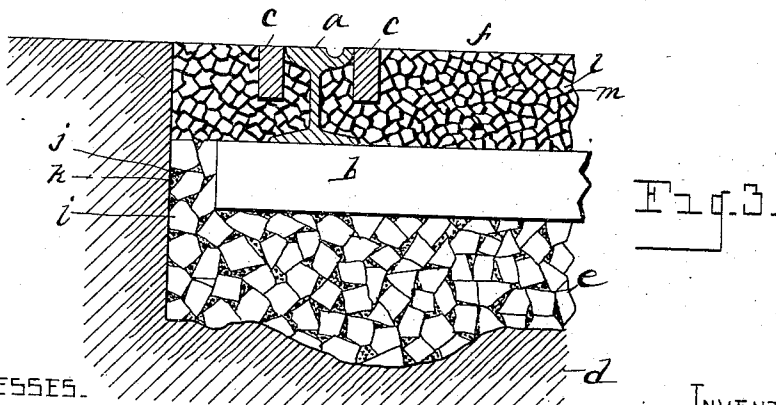
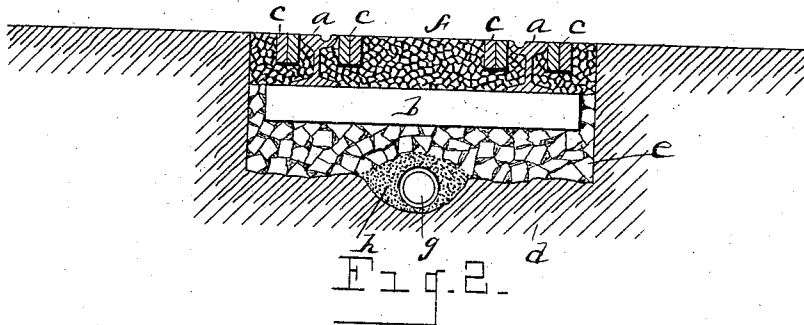
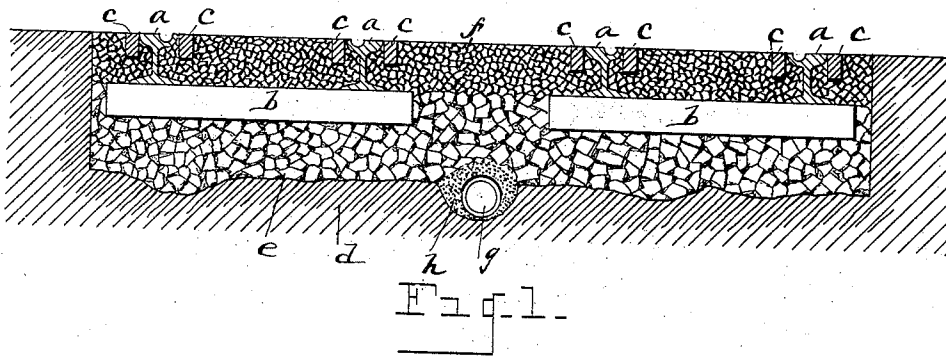


No. 842,202.

PATENTED JAN. 29, 1907.

S. G. HOWE.
RAILROAD TRACK CONSTRUCTION.
APPLICATION FILED SEPT. 4, 1906.



WITNESSES.

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SOLON G. HOWE, OF DETROIT, MICHIGAN.

RAILROAD-TRACK CONSTRUCTION.

No. 842,202.

Specification of Letters Patent.

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Application filed September 4, 1906. Serial No. 333,070.

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 Railroad-Track Construction, 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 to provide an improved cushioned railroad-track bed and bonded surface; and it consists of the construction hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in vertical cross-section, showing a double track. Fig. 2 is a similar view showing a single track. Fig. 3 is an enlarged detail view, also in cross-section.

I carry out my invention as follows:

In the drawings, *a* represents the rails of the track, and *b* the ties.

The ideal form of a railroad-track construction requires firmness with a degree of elasticity and even consistency in the structure of the bed all the way through rather than a condition of rigidity or looseness. To secure these conditions, several things are essential—first, a thorough rolling and compacting of the subgrade of the bed and the spreading on and rolling of a mixture of crushed stone, sand, and gravel into all the soft spots until such spots are made relatively even in firmness with the remainder of the subgrade; second, a perfect seepage and drainage, so that no water can remain on the grade or under ties to be churned into mud from the soil beneath or from any body of loam that may get into the bed mixture in track construction; third, a relatively even size of stones used in making the foundation-body of the road-bed; fourth, a cushioning of the stones in the track or foundation bed, which I secure by mixing therewith coarse sharp sand and gravel in sufficient quantity to fill all spaces or interstices between the stones when compacted. These features insure a road-bed of even firmness, and the sand and gravel cushion filling the space or interstices between the crushed stones forming the foundation-bed for the track gives a firmness without rigidity.

Where a wearing street-surface between and along the side of the rails of the track is desired, this may be had by filling above the cushioned foundation-bed and between the

tracks above the ties with a body of cobblestones, granite, or other suitable rock crushed to smaller sizes than the crushed stone of the foundation-bed, the same being thoroughly mixed with a suitable clay mortar, layers of brick or blocks of stone being arranged on either side of the rails, preferably to prevent the formation of ruts beside the rail. A suitable clay mortar may be formed, preferably of ferruginous clay mixed with water to a thick paste, the purpose of the same being to fill the interstices between the crushed stones when the stones have been pressed into place.

In constructing my improved railroad-track system I first make an excavation, preferably varying from twenty-four to thirty inches in depth, according to the character of the soil upon which the track is to be laid. If the soil consists of a firm gravel or clay, the shallower depth will answer. If the soil be a soft sand or loam, the greater depth will be required. The excavation having been made, my invention contemplates rolling my foundation mixture of crushed stone, sand, and gravel into any soft spots to fill the same, whereby all soft spots may be made to have an even consistency with the balance of the subgrade. This is a feature seldom, if ever, carried out in track construction. I next dig a trench for drain-tile, laying same on a thin cushion of sand and covering joints on top with strips of tarred paper to prevent the sand sifting into the tiles. I next surround and cover the same with a cushion of sharp coarse sand of a sufficient depth to prevent the crushed stone in the foundation layer striking and breaking the same when being rolled and compacted. The drain-tiles upon the subgrade are indicated at *g* and the coarse sand thereabout at *h*. Upon this subgrade and drainage-tile so formed I spread a layer of my foundation mixture composed of stone crushed to sizes varying from one to two and one-half inches in smallest and largest dimensions, these stones being first mixed with sharp coarse sand and fine gravel in sufficient quantity to fill all spaces between the stones when the mixture has been laid and compacted. This mixture I prefer to spread in layers of about four inches and roll or compact the same, repeating the process, adding as many layers of the foundation mixture as may be required, until the tie-grade is reached. I then lay the ties, string the tracks, couple the same together, fasten them to the ties,

jack the same to proper level or grade, and tamp portions of the foundation mixture under the ties until the same are firm and in proper position. The drain-tiles should lead
 5 to a catch-basin on a paved street or to a drainage-ditch in a country roadway. Then an additional quantity of the foundation mixture of crushed coarse sand and gravel is
 10 filled in between the ties and under the rails and tamped firmly in place. This will bring the foundation-grade up to the top layer, or even with the upper surface of the ties. This construction will form a firm but cushioned
 15 foundation-grade. After this foundation-grade has been so formed and firmly compacted in place by rolling and otherwise a top layer is spread thereupon, composed of crushed granite or cobblestones, preferably
 20 ranging from one-fourth to an inch in size in smallest and in largest diameters, the crushed granite or cobblestones being first mixed with a mortar made of clay having a proper consistency when wet to make a thick mortar or paste. In some cases I prefer to add,
 25 say, two to ten per cent. of limestone-dust or other analogous substance which will tend to give an increased degree of hardness to the mortar binder without, however, destroying its elasticity. When this mortar and crushed
 30 stone has been properly compounded, it is spread upon the foundation-grade to make the wearing-surface. The crushed stone will be so mixed with the mortar that the stone will take on a coating or covering of mortar,
 35 so that when the mixture is spread and rolled the mortar will fill all the spaces or interstices between the stones, making a compact and firm but slightly elastic body. In spreading this top layer I would first spread the mixture
 40 to a depth such as when rolled and properly compacted would be of a depth sufficient to support a brick or block-stone lining at the sides of the rail, such lining being indicated at *c*, the lining being formed of one or more
 45 bricks or blocks of stone laid side by side, as may be desired. In the drawings the subgrade is indicated at *d*, the foundation-grade of crushed stones mixed with sand and gravel being indicated at *e*, and the upper grade or
 50 wearing-surface being indicated at *f*. The space adjacent to the webs of the rails and adjacent to the outer top edges of the rails should thus be filled in with the top-layer mixture (crushed stone and clay mortar) and
 55 made smooth on the outer surface for the brick or stone lining to rest against, after which when the brick or stone lining has been set in place the space between the brick courses or linings should be filled with the top-grade mixture and rolled to surface or grade. The drain-tiles upon the subgrade are indicated at *g* and the coarse sand there-
 60 about at *h*. The crushed stone in the foundation course is indicated at *i*, the gravel at *j*, and the sand at *k*. The crushed stone in the

upper course is indicated at *l* and the clay mortar at *m*.

This form of construction insures a perfect seepage and drainage—a matter very essential to a staple roadway. The structure
 70 is also so formed as to make an easy removal and replacement of parts possible in case it becomes necessary to repair the same, while the cushion construction of the foundation bed or grade would insure a needed degree of
 75 elasticity, while also maintaining a proper degree of firmness, which are conditions needed to a lasting surface of the track system itself, as well as to the life of the cars and motors running upon the tracks. These
 80 advantages are only possible where a certain degree of uniformity exists in the composite formation of the road-bed and where a given degree of firmness is possible while retaining an open, porous condition of the
 85 foundation-bed sufficient to allow a free seepage and a given amount of elasticity. These advantages I secure in my improved cushion railroad-track bed and bonded surface in a superior and efficient degree.
 90

What I claim as my invention is—

1. The process of constructing a railway-track road-bed consisting of first compacting the subgrade of the road-bed and firmly filling the soft places therein with a mixture of
 95 crushed stone, sand and gravel, then laying thereupon tile drain-pipes and covering the same with sand, and spreading and compacting upon the subgrade and drain-pipes a foundation-bed of crushed stone with coarse
 100 sand and gravel to form a cushioned foundation-bed, finally locating upon said foundation-bed railroad-ties and securing railway-rails upon said ties, then adding an additional course of foundation mixture com-
 105 posed of crushed stone, sand and gravel and compacting the same upon the underlying bed to a height equal to the upper surface of the ties, then superimposing upon said foundation-bed a top layer of crushed stone
 110 mixed with clay mortar and compacting the same thereupon, locating against the sides of the rails a lining to prevent rutting, and adding between the linings another course of the top-layer mixture composed of crushed stone
 115 mixed with clay mortar and compacting the same in place.

2. The process of constructing a railway-track road-bed consisting of first compacting the subgrade of the bed and firmly filling the
 120 soft spots in the subgrade with a mixture of crushed stone, sand and gravel, then digging and laying in a trench in this subgrade drain-tile located upon a thin layer of coarse sand, and properly covered at the joints, surround-
 125 ing and covering the tiles with coarse sand or gravel, spreading and compacting thereupon a foundation course composed of crushed stone mixed with coarse sand and gravel and firmly compacting the same to form a cush-
 130

ion-bed, placing the railroad-ties upon said bed, and the railway-rails upon said ties, then adding an additional layer of foundation mixture composed of crushed stone, 5 mixed with sand and gravel compacted upon the underlying bed to a height, when compacted, equal to the upper surface of the ties, then superimposing upon said layer a top mixture of crushed stone mixed with 10 clay mortar and compacting the same upon the underlying course, placing a suitable lining against the sides of the rails to prevent rutting, and adding upon the foundation so formed, between the linings, a layer of top 15 mixture composed of crushed stone mixed with mortar and compacting the same into place.

3. A railway-track road-bed and bonded surface comprising a cushioned foundation layer composed of coarsely-crushed stone, 20 gravel and sand mixed together and compacted upon the subgrade of the roadway, railway ties and rails supported upon said bed, and a wearing-body or surface layer composed of a mixture of more finely crushed 25 stone and clay mortar compressed upon the underlying bed, substantially as described.

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

SOLON G. HOWE.

Witnesses:

N. S. WRIGHT,
E. M. SPIELBURG.