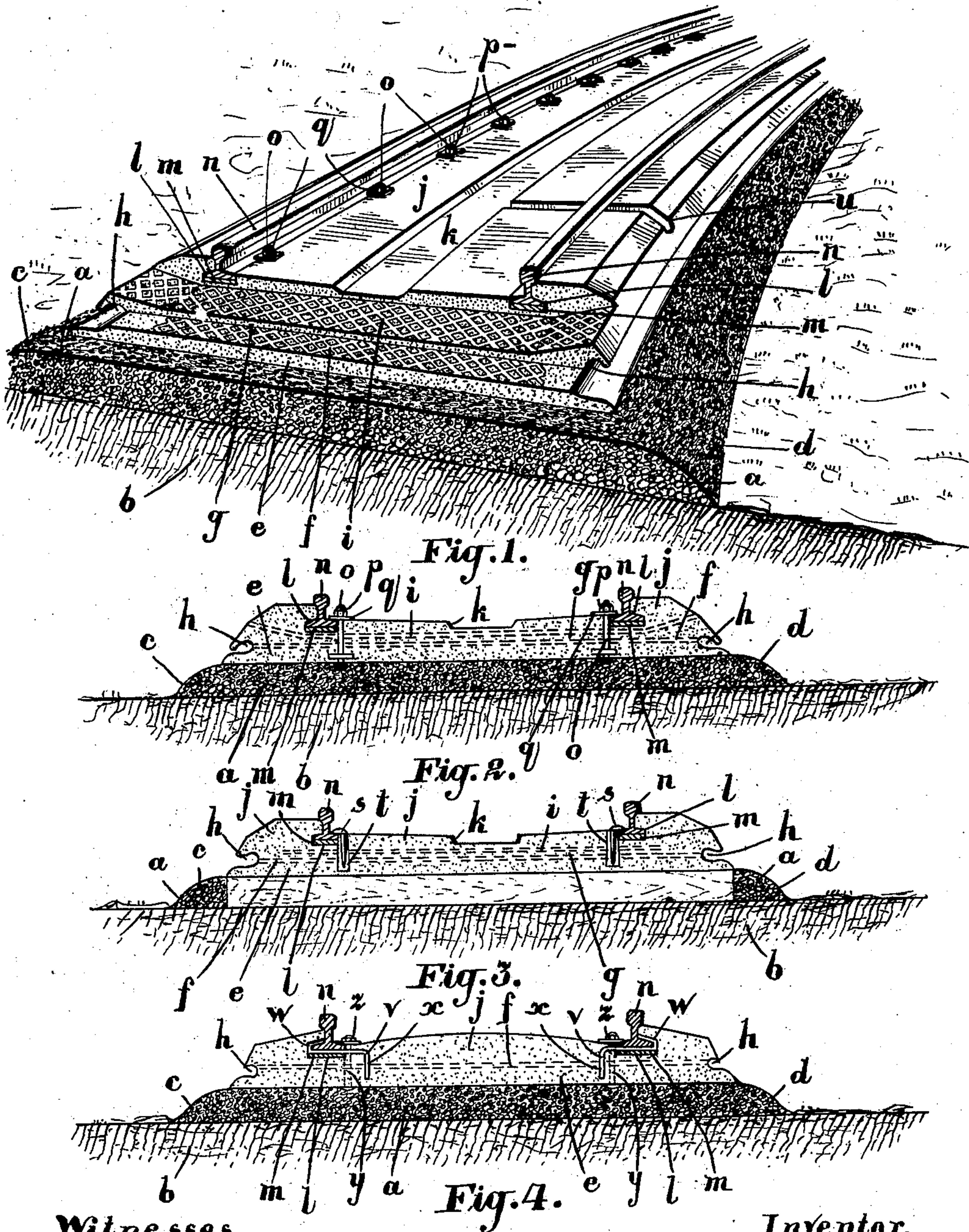


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J. W. MacKENZIE.
ROAD BED FOR RAILWAYS.
APPLICATION FILED SEPT. 24, 1903.

NO MODEL.



Witnesses.

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ROAD-BED FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 763,008, dated June 21, 1904.

Application filed September 24, 1903. Serial No. 174,470. (No model.)

To all whom it may concern:

Be it known that I, JAMES WILLIAM MACKENZIE, a subject of the King of Great Britain, residing at Barney's River, in the county of Pictou, in the Province of Nova Scotia, Canada, have invented certain new and useful Improvements in Road-Beds for Railways, of which the following is a specification.

My invention relates to improvements in road-beds for railways; and the object of the invention is to form a permanent road-bed for railways of all classes and entirely eliminate the use of wooden ties or sleepers and at the same time provide a safe and durable bed whereby the annoyance of dust and dirt is overcome, in which it shall be immaterial whether the new construction be used on existing railways over their present road-bed or on a new bed built up; and it consists, essentially, of a foundation of gravel on which is supported layers of concrete and expanded metal alternately, and rails arranged suitably in the top layer of concrete, the particular arrangement and construction being hereinafter more particularly described.

Figure 1 is a perspective view of a road-bed cut away to show my arrangement of foundation layers. Fig. 2 is a cross-sectional view of the bed as shown in Fig. 1. Fig. 3 is a cross-sectional view of the road-bed constructed over an existing road-bed using wooden ties or sleepers. Fig. 4 is a cross-sectional view of the bed, showing another manner of fastening the rail.

Like letters of reference indicate corresponding parts in each figure.

a is the foundation, of gravel, which rests on the ground *b*, made or otherwise, according to the country in which the railway is passing through. The gravel foundation *a* is shelved down on each side at *c* and *d*.

e is a layer of concrete covering the complete flat surface of the gravel foundation *a*.

f is a layer of expanded metal, preferably of perforated steel plate, placed immediately over the layer of concrete *e*. The layer *f* of expanded metal will be of the requisite strength, according to the requirements of the road. The expanded metal *f* is laid on the layers of concrete *e* while the latter is in a

sufficiently-softened state to allow the expanded metal to form its own seat.

g is a layer of concrete spread over the expanded metal *f* and extending beyond the said expanded metal *f* and forming an overhang at the edge of the concrete *e* to make the longitudinal passage or pocket *h*. It must be here understood that while I describe this road-bed as having this pocket formed on each of its sides for the convenience of telegraph, telephone, and other wires, yet the said pockets or passages are not essential and may be entirely omitted without interfering generally with the construction or the spirit of the invention.

i is a layer of expanded metal slightly elevated toward each side and extending clear to the edge of the layer of concrete *g* and finding a seat for itself in the said layer *g*. It will be seen that the layer *g* rises slightly at the sides to form a seat for the raised sides of the expanded metal *i*.

j is the top layer of concrete, which forms the surface of the road-bed, and in this layer will be found the water-trough *k*, extending centrally and longitudinally with the road-bed.

l represents pockets or grooves extending longitudinally with the road-bed in the top layer of concrete *j* and having a rubber, felt, or wood cushion *m*.

n represents rails placed in the pockets *l* and resting on the cushions *m*.

o represents bolts embedded in the concrete and having the threaded ends projecting upwardly immediately in proximity to the edge of base of the rails.

p represents nuts screwing on over the washers *q* and designed to securely hold in place the rails *n*, which are firmly held in place on the opposite side of the bolts *o* by the pockets or grooves *l*, in which they are inserted.

In Fig. 3, where the construction is shown as being built over the ties or sleepers, the differences in the arrangement of the road-bed are comparatively slight and consist mainly in the placing of the expanded metal in the layers, as shown, and in this figure it is also shown how the ordinary spike *s* may

be used by the dovetailing of a block of wood t immediately in proximity to the base in the concrete when making the road-bed. The spike s may be driven into the block of wood
 5 t to hold the same in position similar to the nuts p on the bolts o . u is a drain from between the tracks to the edge of the road-bed under the rail and may be repeated at intervals along the road-bed as frequently as necessary
 10 to prevent flooding between the rails.

In Fig. 4 I have shown a different method of retaining the rails in position. v is a metal plate holding the outer side of the base of the rail in its turned-over end w and passing be-
 15 tween the cushion m and the bottom of the rail and having the elbowed end x extending downwardly into the concrete to the expanded metal. y is a bolt extending upwardly through the concrete and through the metal plate v in
 20 immediate proximity to the inner side of the base of the rail. z is a nut correspondingly threaded to the top end of the bolt y and designed to be securely screwed thereon over the inner side of the base of the rail in order
 25 to clamp the said rail firmly to the metal plate. These plates and bolts are designed to replace the spikes mentioned in the foregoing, if considered desirable.

This road-bed is particularly adaptable for
 30 steam-railways, where the weight to be borne is very great; but it will answer just as well for electric railways, and it will be found to be durable and cheap as to maintenance. In the case of existing road-beds, where the
 35 sleepers are in use, then a new road-bed may be built right on top; but where a new road-bed entirely is made the grading may be done as formerly to receive the ballast of gravel, which is also my foundation road-bed, and
 40 then firmly rolled with a steam-roller and finished as explained in the foregoing.

The pockets l in the permanent way may be made as desired and will not be described here other than for the steam-railway, as
 45 they may be made to suit any form of rail and also to carry wires centrally or at the sides, or, in fact, wherever desired.

One of the salient features in my invention is the use of the expanded metal in the man-
 50 ner described, so that railways may use lighter rails in the construction, as the continuous solid construction of concrete and expanded metal accounts easily for the difference in the weight of the rails. In concrete road-beds
 55 the frost causes them to rend or crack, and by the use of expanded metal the concrete is bound together and prevented from spreading or opening. If through accident or other-
 60 wise the concrete should show a tendency to crack, the metal will provide the necessary strength to retain the whole body of concrete in a substantially solid mass. The expanded metal is preferably formed of perforated steel plates, which when expanded form diamond-
 65 shaped openings, and the metal thus formed

when placed in the concrete is preserved indefinitely from rust. In the event of the road-bed being laid in sections the metal is to be so arranged between the sections as to bind
 70 the same together.

What I claim as my invention is—

1. In a road-bed for railways, the combination with a foundation of suitable material having a flattened upper surface, of a body of
 75 concrete laid on the said flattened surface in layers, and having suitable pockets or grooves, and a layer of metal interposed between the layers of concrete, as and for the purpose specified.

2. In a road-bed for railways, the combination with a foundation of suitable material, of a body of concrete laid thereon in layers and
 80 having suitable pockets or grooves, and a layer of metal interposed between the layers of concrete, as and for the purpose specified. 85

3. In a road-bed for railways, the combination with a foundation of suitable material having a flattened upper surface, of a body of
 90 concrete laid on the said flattened surface in layers and having suitable pockets or grooves, and a layer of expanded metal interposed between the layers of concrete, as and for the purpose specified. 95

4. In a road-bed for railways, the combination with a foundation of suitable material
 95 having a flattened upper surface, of a body of concrete laid on the said flattened surface in layers and having parallel longitudinally-arranged grooves or pockets, rails introduced
 100 into said grooves or pockets, and bolts embedded in said concrete in proximity to the bases of the said rails, having nuts on their projecting upper ends designed to hold the rails securely in the grooves or pockets, as
 105 and for the purpose specified. 105

5. In a road-bed for railways, the combination with a gravel foundation and layers of
 110 concrete laid thereon, of a sheet of perforated expanded metal interposed between the afore-said layers and continuously extended along the road-bed, suitable rails introduced into the
 115 concrete and over the expanded metal, and means for fastening said rails to the concrete, as and for the purpose specified. 115

6. In a road-bed for railways, the combination with a gravel foundation and layers of
 120 concrete laid thereon, of a sheet of perforated expanded metal interposed between the afore-said layers and continuously extended along the road-bed, suitable rails introduced into the
 125 concrete and over the expanded metal, metal plates holding said rails and embedded in the concrete, and bolts extending through the concrete and metal plates in proximity to the rails and with nuts securing the latter in
 130 position, as and for the purpose specified. 125

7. In a road-bed for railways, the combination with a foundation of suitable material
 135 having a flattened upper surface, of a body of concrete laid on the said flattened surface in 130

layers and having parallel longitudinally-arranged grooves or pockets, rails introduced into said grooves or pockets, and bolts embedded into said concrete in proximity to the bases of the said rails, having nuts on their projecting upper ends designed to hold the rails securely in the grooves or pockets, and a water-trough centrally situated between the rails in the upper surface of the concrete, as and for the purpose specified.

8. In a road-bed for railways, the combination with a foundation of suitable material having a flattened upper surface, of a body of concrete laid on the said flattened surface in layers and having parallel longitudinal grooves or pockets, rails introduced into said grooves or pockets, and bolts embedded into said concrete in proximity to the bases of the said rails, having nuts on their projecting upper ends designed to hold the rails securely in the grooves or pockets, a water-trough centrally situated between the rails in the upper surface of the concrete, and longitudinal pockets along the edge of the body of concrete, as and for the purpose specified.

9. In a road-bed for railways, the combination with a gravel foundation having a flattened upper surface, a body of concrete in layers, of a layer of expanded metal interposed between the lowermost layer of concrete and that immediately above, a second layer of expanded metal having upwardly-

turned outer sides supported by elevated portions of the second layer of concrete, a top-most layer of concrete over the said second layer of expanded metal and having suitable grooves or pockets longitudinally arranged, and suitable rails introduced into said pockets or grooves, as and for the purpose specified.

10. In a road-bed for railways, the combination with a gravel foundation having a flattened upper surface, a body of concrete in layers, of a layer of expanded metal interposed between the lowermost layer of concrete and that immediately above, a second layer of expanded metal having upwardly-turned outer sides supported by elevated portions of the second layer of concrete, a top-most layer of concrete over the said second layer of expanded metal and having suitable grooves or pockets longitudinally arranged, suitable rails introduced into the said pockets or grooves, and a water-trough centrally situated between the rails and having suitable drains therefrom, as and for the purpose specified.

Signed at the city of Halifax, in the county of Halifax, Province of Nova Scotia, this 18th day of September, A. D. 1903.

JAMES WILLIAM MACKENZIE.

Witnesses:

JOHN BERNARD CURRIE,
FRED WALTER DUNN.