

April 23, 1929.

R. C. TAYLOR

1,709,923

ROAD CONSTRUCTION

Original Filed March 6, 1926

2 Sheets-Sheet 1

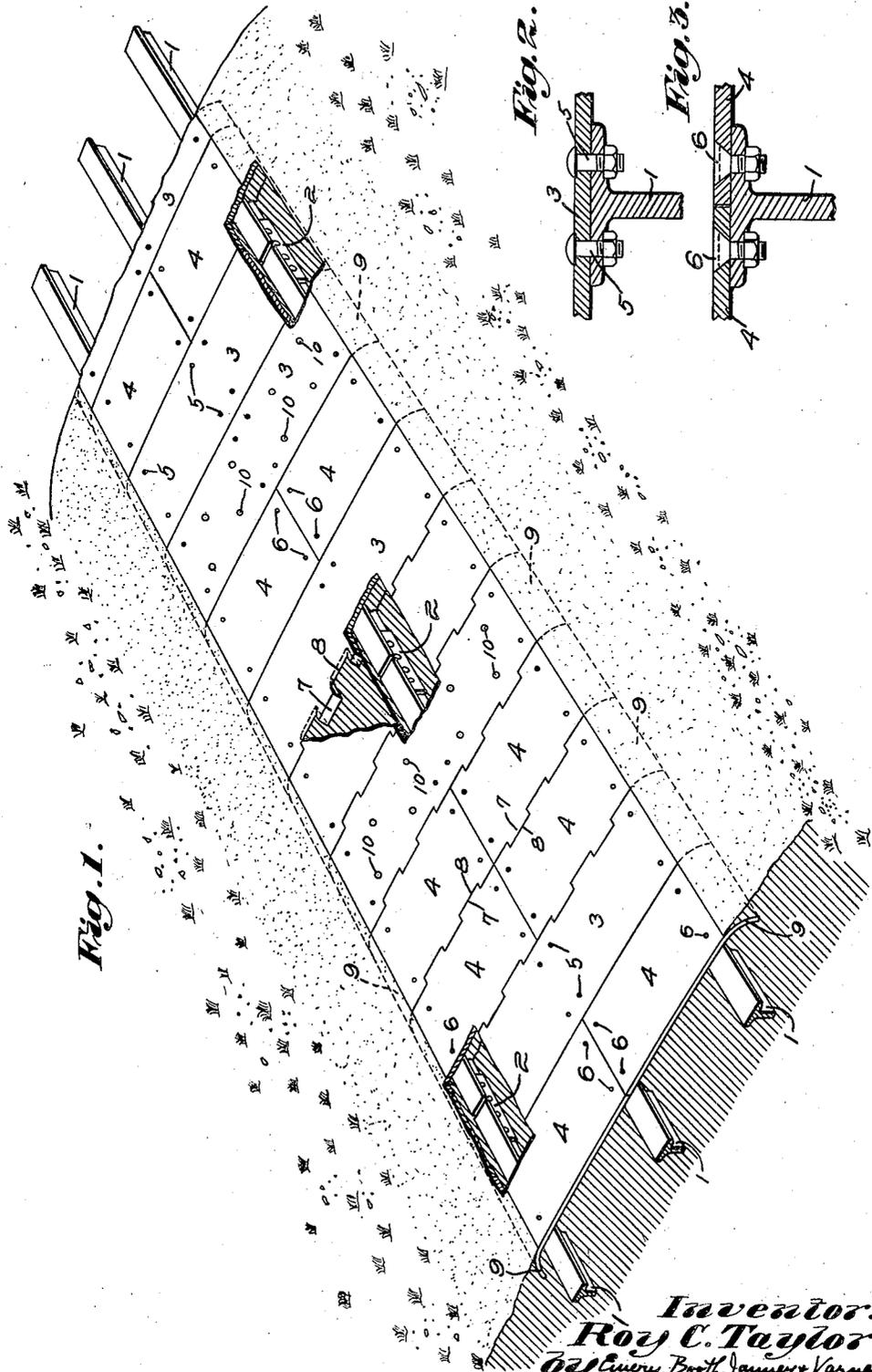


Fig. 2.

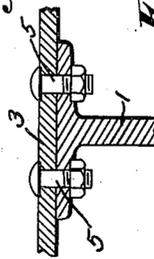
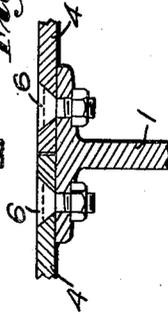


Fig. 3.



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Fig. 1.

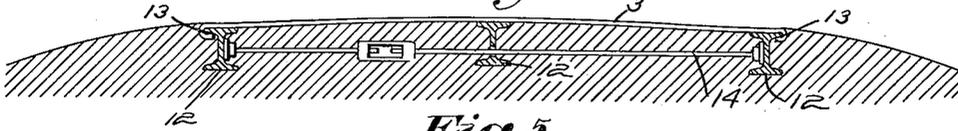


Fig. 5.

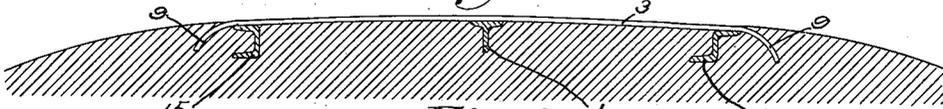


Fig. 6.

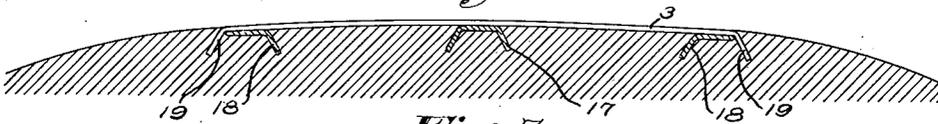


Fig. 7.

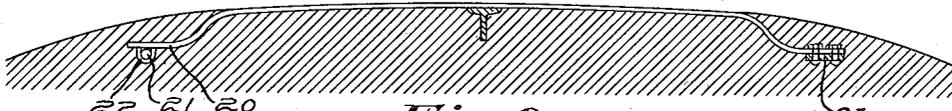


Fig. 8.

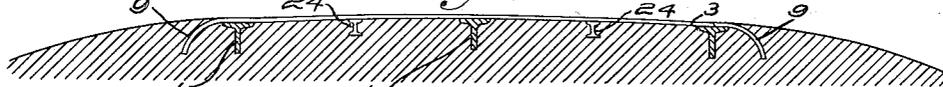


Fig. 9.

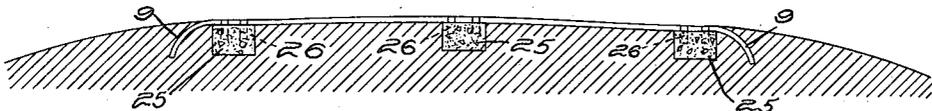


Fig. 10.

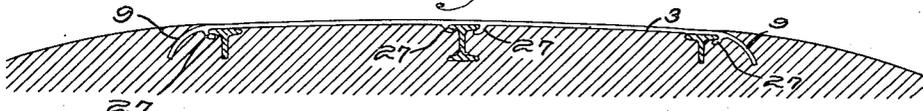


Fig. 11. 3a 3

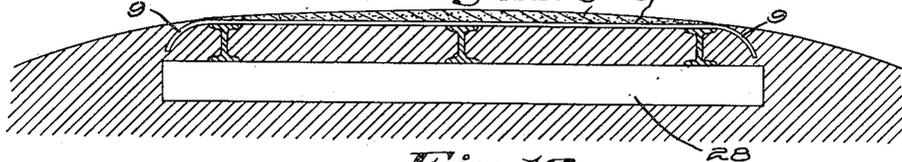


Fig. 12.



Fig. 13.

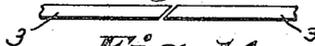


Fig. 14.



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UNITED STATES PATENT OFFICE.

ROY C. TAYLOR, OF BENTON, MAINE.

ROAD CONSTRUCTION.

Application filed March 6, 1926, Serial No. 92,700. Renewed November 10, 1928.

My invention relates to road construction, and, more particularly, aims to provide a road or highway of increased durability and general efficiency, and which, in accordance with the construction and method involved, may be rapidly laid out in finished condition.

In the drawings which show by way of example certain forms of my invention and illustrate a method of practicing the same:—

Fig. 1 is a perspective view of a section of roadway embodying one form of my invention and constructed in accordance with a method thereof;

Figs. 2 and 3 are detail sections showing examples of securing means;

Figs. 4 to 11 inclusive are respectively vertical transverse sections illustrating various modified forms of construction; and

Figs. 12, 13 and 14 are detail views.

It is a well known fact that even the most carefully constructed and expensive of the modern highways are not efficient under present traffic conditions and do not stand up under wear to any extent commensurate with their cost. They require constant attention to keep them in repair and at the best have a life of but a very few years. Replacement of such roads generally requires complete rebuilding, again involving excavation and filling as when the road was originally built. Also, in the more northerly parts of this country, particularly in the spring of the year, the roads are subject to the action of receding frost with resultant heaving and breaking up, often requiring complete resurfacing or even relaying of large sections of the road. No road has heretofore been devised which is capable of withstanding this frost action, or otherwise standing up under the severe service required of it.

In accordance with my invention I propose to employ a metallic stratum or course, preferably steel, in the form of plates along the desired path of travel, supported by impaction either upon the native earth or ground at the particular location involved or upon a sub-base formed by leveling, grading, rolling, filling or other foundation preparation as the local conditions or the type of traffic may require. In carrying out this broad principle of my invention various constructions and designs may be employed.

A road structure embodying my invention in the form illustrated in the drawings includes one or more rows or lines of longitu-

dinal girder-like tie elements or beams. As shown in Fig. 1 three rows of girders or beams 1 are employed, of T-shape in cross-section, placed in substantially parallel relation and suitably spaced. Obviously a greater or less number of rows or lines may be provided and they may be variously spaced transversely. The longitudinal elements in the adjacent lines are preferably offset or staggered as seen at the points broken away in said Fig. 1, said elements in each row being rigidly secured together in any suitable manner, as by plates and bolts as indicated at 2, 2, etc.

Upon the longitudinal element or elements are laid a continuous series of foundation-covering or base plates, plate-like members, or slabs, desirably of considerable area. Any suitable material of substantial strength and rigidity may be employed for forming said plates, whether metallic or other, but preferably they are of steel. Said surface plates preferably extend transversely of the road and may be of a length to extend across all of the longitudinal elements, as at 3, 3, etc., Fig. 1, or two or more plates may be placed end to end to give the desired width for the roadway, as shown at 4, 4, etc., in said figure. Said plates are secured to the longitudinal elements 1, 1, etc., in any suitable manner, as by bolting, riveting, welding, or otherwise, but preferably in such fashion as to leave their upper surface free of any objectionable projections. Said plate-like members, while preferably flat or substantially so, as contrasted with an irregular formation such as a marked corrugation, may be and, as shown in Fig. 1, are slightly arched to give a low crown to the road or any crown may be provided by the overlying wearing surface itself, referred to more fully hereinafter; see also Fig. 11.

One means of attachment is illustrated in detail in Fig. 2, comprising the roundheaded bolts or rivets 5, 5, extending through the plates and through the horizontal flange of the girder element. The bolt holes may be sufficiently enlarged to afford any slight allowance necessary, if any, for expansion purposes. Another method of attachment is illustrated in Fig. 3, wherein I have shown the plates secured by countersunk screw bolts 6, 6, enabling the plates to be assembled or removed without necessitating access to their under sides.

If desired, adjoining surface plates or certain of them may be interlocked in any suitable manner as, for example, by the beveled tongues 7 and corresponding recesses 8, Fig. 1.

5 The adjoining edges of the plates, whether straight or interlocking, may be merely abutted as in Fig. 12, or may be provided with an overlapping joint of any suitable character, such as shown by way of example in
10 Figs. 13 and 14. Where desired, the formation of all plates may be the same, so as to require but a single standard form of plate.

The unitary structure thus formed is laid over the native ground, sub-base or foundation of whatever nature and impacted with
15 or embedded into it, said ground having previously been graded, rolled or otherwise prepared properly to receive and support said structure. The shanks of the longitudinal elements quickly work down into the underlying material or are filled about by said material and the attached foundation covering
20 or base plates are compacted with the ground surface to provide a continuous, unitary road formation. In this manner the superimposed layer or covering surface for the sub-base, bound together independently of the underlying ground by its longitudinal elements, adapts itself to the natural earth and,
25 as it were, forms for itself its own foundation. As stated, said metal foundation-covering plates are preferably steel, and desirably rolled steel, and accordingly have the required strength but yet possess sufficient
30 inherent flexibility available under traffic conditions to prevent cracking and breaking down of the road as in the case of concrete or cement roads, by conforming to and impacting with the foundation or sub-base on
35 which said plates rest, and in which the metallic structure is partly or wholly imbedded. The inherent weight of the structure, together with the embedding of the several elements and the impaction of the
40 whole with the ground, contribute to produce a continuous and solid formation, the solidity of which tends to be constantly increased with the passage of traffic over it.

Desirably the said plates are carried down
45 at the edges of the structure, as indicated at 9, 9, Fig. 1, sloping off upon a long curve or angle affording a beveled finish or shoulder for the road structure and also aiding in firm engagement with the ground. In some instances one or more of the surface plates may
50 be pierced, as at 10, Fig. 1, to assist in the firm engagement of the superstructure with the underlying ground, or to aid in binding surface material.

55 The materials employed in my road superstructure may be and preferably are of standard form and construction, such as the structural steel elements already available upon a commercial scale, or they may be of
60 other form and are readily manufactured

and easily transported to any point in condition for immediate laying or building into my road structure.

While, as previously stated, any suitable material may be employed for the plates and
65 for the longitudinal tie elements, I have generally found steel preferable; any of the known noncorrosive steels or alloys may be used to advantage. Before laying the structure, all parts, if metallic, may be coated upon
70 their several surfaces with corrosion and weather-resisting substances, such as bitumastic, asphalt, or the like, and covered with a heavy coating of sand or other suitable protective material. A similar additional coating
75 may be applied to all exposed metal parts when the several elements have been assembled and secured together in preparation for laying. Both the upper and under faces of the surface plates are preferably thus treated and
80 after laying and impacting the road formation the entire upper surface may be given a final coating of an asphaltic nature, generally combined with sand or other finishing substance, or, if desired, the entire road surface may be finished off with a layer of
85 cement, asphalt, or other surfacing material, such, for example, as indicated at 3^a, Fig. 11.

From the foregoing it will be apparent that my invention may be variously embodied, and
90 in Figs. 4 to 11 I have illustrated a number of modified constructions all within the broad principle of the invention and typifying different means for practicing the method thereof. In said figures parts not otherwise
95 referred to may be similar to those already described.

As shown in Fig. 4 a series of three longitudinal metallic elements are employed, in
100 this instance in the form of I-beams 12, to which the surface plates are secured. Said plates in this instance, or in connection with any other form of longitudinal element, may be formed with down-turned flanges or hook-like portions 13 at their side edges, adapted to
105 engage the upper flanges of the beams. An adjustable spreader 14 may be employed to retain the plates in locked position on the beams.

Under varying conditions of the soil different structural forms of longitudinal elements may be found preferable, including, in
110 addition to the T-beams and I-beams already mentioned, the channel form of beam such as shown at 15 in Fig. 5, or the Z-beam appearing at 16 in said figure. Again a beam or girder of the inverted channel form, as at
115 17 in Fig. 6, may be preferable. As shown in said Fig. 6, the outer beams 18 may have one flange omitted and the surface plates may be formed with a down-turned flange 19
120 against which the outer beams abut. Obviously many different forms of longitudinal elements or combinations of forms are possible, any of which may be found preferable,
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depending upon the particular ground conditions, and any of the various plate formations and securing means may be employed with the different longitudinal elements.

5 Referring to Fig. 7, I have there shown a road structure embodying my invention and which employs but a single underlying beam 1 beneath the surface plates. Said plates in this instance are provided at their side edges with outwardly extending flanges or base portions 20 adapted to rest directly upon the ground and functioning in the manner of the outer lines of longitudinal elements previously described. Said plates are held in proper side-by-side relation by any suitable securing means, such as the longitudinal rods 21 passing through eyes 22 upon the plates, or by attachment to a longitudinal plate 23.

Occasionally additional or auxiliary longitudinal tie members may be employed in conjunction with the main elements, such construction being illustrated in Fig. 8. One or more of such auxiliary members 24 may be provided at suitable positions intermediate the main longitudinal elements 1, 1.

While I have referred above to steel or other metallic girders my invention contemplates the use in suitable instances of reinforced concrete girders, slabs or the like. Referring to Fig. 9, the longitudinal elements 25 there shown are of concrete construction, having set in them the bolts or like plate attaching means 26. Still another construction is illustrated in Fig. 10, wherein the plates are provided with struckdown portions, securing lips or the like 30, arranged either to permit the plate to be sprung over the beam or to be slid over the flanges in the manner illustrated.

Occasionally a ground formation may be met which requires even further support for the road structure and at such time I may employ, in combination with the superstructure, cross ties or sleepers such as indicated at 28, Fig. 11. These may be of any suitable material including metal, concrete, creosoted wood, or the like.

From the foregoing it will be understood that my invention contemplates broadly the provision of a continuous or substantially continuous metal or other road stratum adapted to be supported principally by impaction with and embedding in the underlying ground or sub-base. An overlaid road constructed in accordance with my invention is to a large extent self-draining, since the substantially continuous and impervious surface will prevent the entrance of surface water directly to the underlying ground. It also makes possible the use of additional sub-surface drainage, as at any unusually damp locality, and in a manner not practicable with road constructions hertofore known, as by the positioning of farm tile or the like below the

65 crown of the earth foundation, and arranged to distribute or carry off collecting moisture through occasional outlets.

A continuous unitary superstructure such as described possesses a substantial inherent rigidity which enables it even to resist the buckling and heaving effect so frequently occurring as the frost leaves the ground in the spring of the year. Repair requirements are thus reduced to a minimum, and moreover, due to the preferred detachable plate construction, such repairs as may occasionally be necessary can be readily effected by the removal and replacement of a single plate or a series of plates at any desired point, with a minimum of labor and expense, and with little or no interruption of traffic.

My invention is not limited to the particular embodiments thereof shown and described herein by way of example, and may be practiced in other ways than by the specific means disclosed, the scope of the invention being set forth in the following claims.

I claim:

1. In a road construction, one or more longitudinal lines of metal beams, the beams of each line connected end-to-end, metal plates arranged on said beams to present a continuous surface lengthwise the road, said plates being secured to the beams to provide a unitary structure adapted to rest upon and be embedded in the foundation material and to be supported by impaction therewith throughout substantially the entire under surface of said structure.

2. A road construction having along its central portion, in combination with a suitable base, a continuous series of metal plates, the individual plates being bound together by lines of longitudinally united metal beams to form a continuous structure of substantial inherent rigidity but capable of flexing under heavy loads, said structure being impacted over substantially its entire under surface with the underlying base.

3. In a road structure, a multiplicity of metal plates, longitudinally extending metallic means uniting said plates into an integral structure resting upon and impacting with the underlying material over substantially its entire undersurface, and covering means at the upper face of said plates to provide a traffic-receiving road surface.

4. In a road, in combination with a foundation or sub-base, an uninterrupted, rolled steel, plate-like structure and longitudinally extending connecting means therefor, said structure overlying and intimately contacting with said foundation or sub-base to constitute in cooperation therewith a steel-bonded, continuous-bearing road-base.

5. A highway construction comprising, in combination, a foundation or sub-base, longitudinal beams carried thereby and a sub-

stantially continuous metal road-base supported in part by direct impactation upon said foundation and in part upon said beams.

6. A highway construction comprising, in combination, a foundation or sub-base and an overlying substantially continuous flexible metallic plate-like road-base having longitudinal girder-like connecting elements.

7. A highway construction comprising, in combination, a foundation or sub-base, longitudinal girders resting thereon, and a continuous-bearing metal road base secured upon said girders and receiving support from said foundation by contact therewith over substantially the entire undersurface of the road-base.

8. A highway construction comprising, in combination, a foundation or sub-base and an overlying substantially continuous flexible metallic plate-like road-base having longitudinal girder-like connecting elements, said road-base supported throughout, between and adjacent said connecting elements, by the underlying foundation.

9. A highway construction comprising, in combination, a foundation or sub-base, longitudinal girders, and overlying metal road-base plates, the several elements connected one to another to provide a unified metal road structure, said underlying foundation furnishing substantially continuous support to the plates and girders.

10. In a road structure, a multiplicity of metal plates, and longitudinally extending metallic means uniting said plates into an integral structure resting upon and impacting with the underlying material over substantially their entire under surface.

11. In a road construction, in combination with a foundation or sub-base, a metallic covering and binding structure therefor comprising an uninterrupted series of rolled steel plates and longitudinally continuous means connecting the same, said structure being impacted upon and embedded in said foundation to conform intimately thereto, and a layer of surfacing material covering said structure, said plates permitting local internal yielding or flexing of the structure under traffic conditions and thereby resisting cracking and breakage, while uniting said foundation and surfacing material into a structurally continuous whole.

12. A road structure comprising, in combination with a foundation or sub-base, a series of steel plates arranged flatwise, longitudinal means connecting said plates to form a continuous steel structure impacting directly with the underlying foundation, said plates having downwardly extending portions adjacent the side edges of the road structure additionally to box in and confine the underlying material and aiding in the maintenance of the road shoulder.

13. A road structure comprising a multiplicity of steel plates arranged flatwise, one or more continuous longitudinal elements connecting said plates, the edges of said plates being constructed and arranged to prevent curling or other desirable deflections thereof, and means preventing vertical deflection of the edges of the plates adjacent the sides of the road.

14. A road structure comprising a multiplicity of steel plates, one or more continuous longitudinal elements connecting said plates, interlocking formations at the edges of adjoining plates to prevent relative transverse movement thereof, and other means for preventing vertical deflection of the plate edges.

15. A road construction comprising, in combination with a foundation or sub-base, a metallic integral load-sustaining structure positioned along and directly upon said foundation, said structure including a plurality of rows of steel beams placed end to end, said beams having a relatively broad horizontal portion and one or more depending flanges of substantial vertical extent, means uniting the adjoining beam ends, and a continuous series of rolled steel plates upon said horizontal portions of said beams, each plate being secured to each of its underlying beams.

16. A road structure comprising, in combination, a foundation stratum or strata of suitable road-forming material and of adequate weight to sustain the traffic load, a rolled sheet-metal stratum impacted upon the upper surface of said foundation stratum or strata, said metal stratum having a weight and strength sufficient to prevent indentation or bending thereof in normal use, and vertically flanged interconnecting means underlying said metal stratum and assisting to support and anchor the same.

17. In a road structure, the combination with a base stratum or strata of suitable material and weight to sustain the traffic load, of a layer of substantially flat, rolled metal as a distinct course or stratum of the road structure, impacted upon said base stratum or strata, and underlying longitudinal supporting means coacting with said metal course or stratum to confine said base stratum or strata.

18. In a road construction particularly for motorized traffic, in combination with a suitable foundation, one or more series of longitudinal elements substantially wholly embedded therein, and a multiplicity of rolled steel plates upon and secured to said elements to provide a substantially integral metallic structure lengthwise the road, bearing upon and confining said foundation and assisting to prevent entrance of surface moisture.

In testimony whereof, I have signed my name to this specification.

ROY C. TAYLOR.

CERTIFICATE OF CORRECTION.

Patent No. 1,709,923.

Granted April 23, 1929, to

ROY C. TAYLOR.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 105, for the word "from" read "form"; page 4, line 70, claim 13, for the word "desirable" read "undesirable"; same page, line 115, for claim numeral "18" read "16", and lines 94 and 106, for claim numerals "16 and 17" read "17 and 18"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of May, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

CERTIFICATE OF CORRECTION.

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