W. A. WOOD.

SUSPENSION BRIDGE.

APPLICATION FILED JAN. 13, 1909.

951,874. Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.

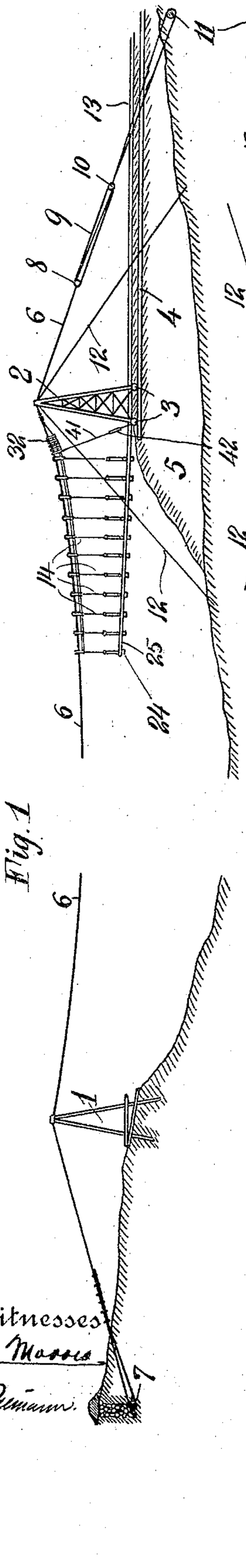

Fig. 1

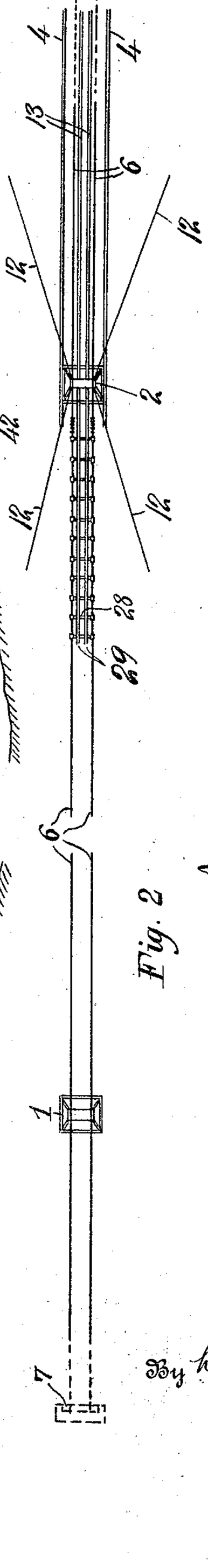

Fig. 2

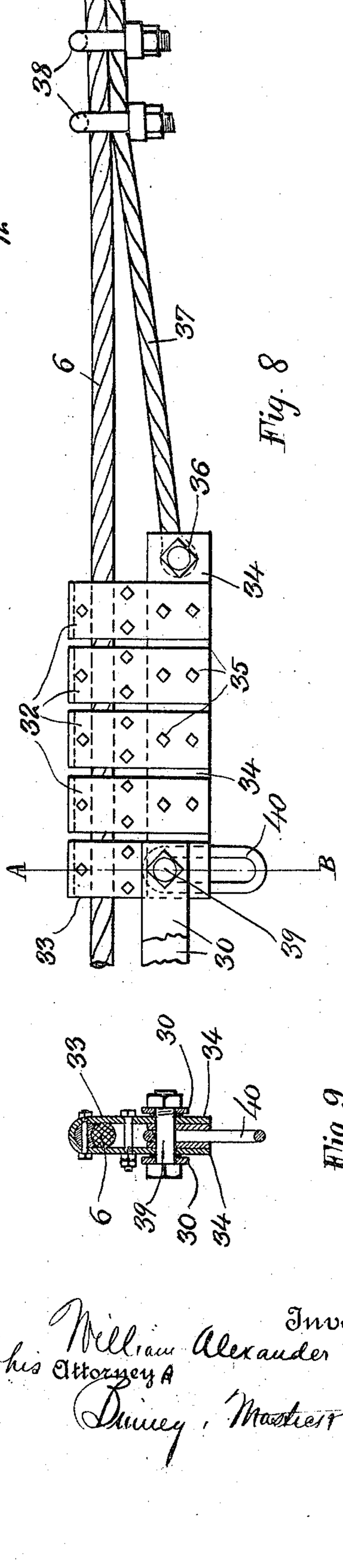

Fig. 8

Fig. 9

Witnesses
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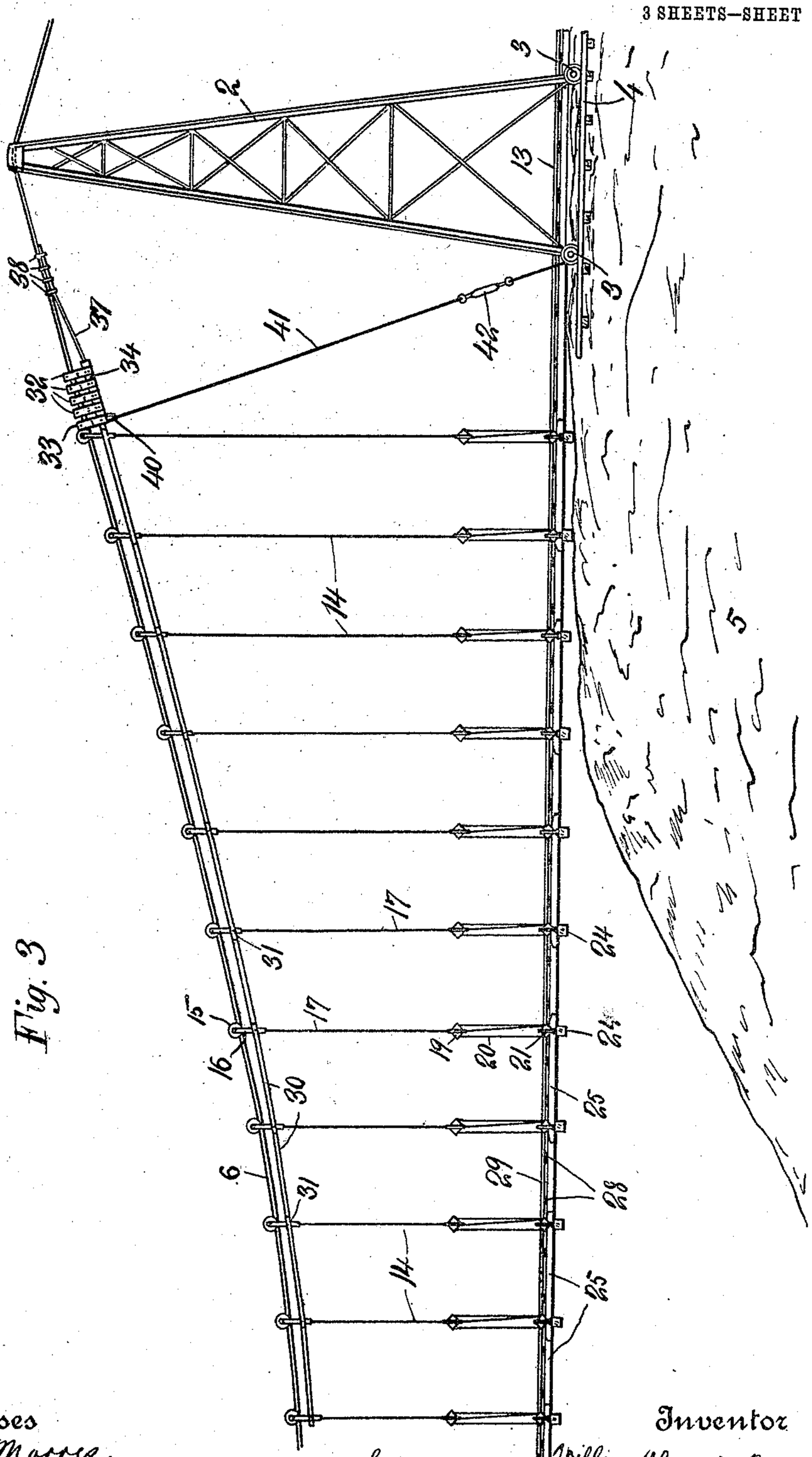

Fig. 3

Witnesses

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3 SHEETS—SHEET 3.

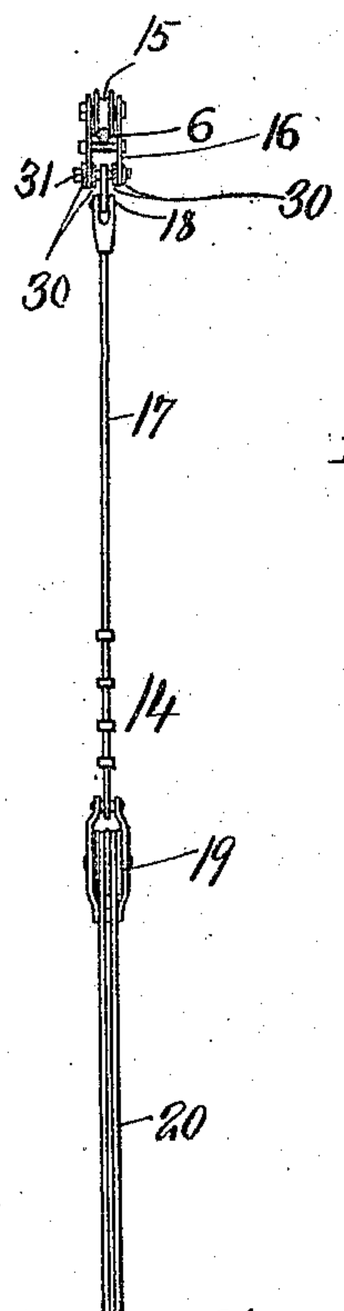
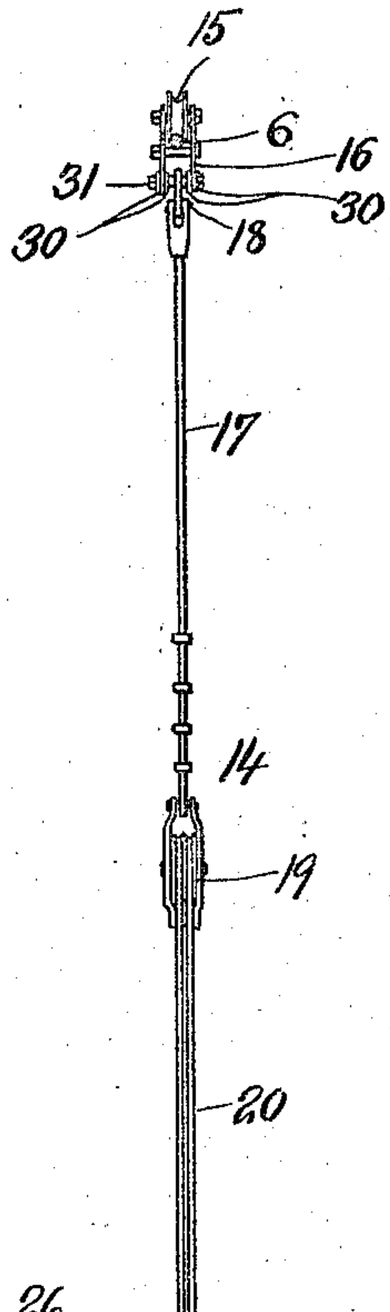


Fig. 4



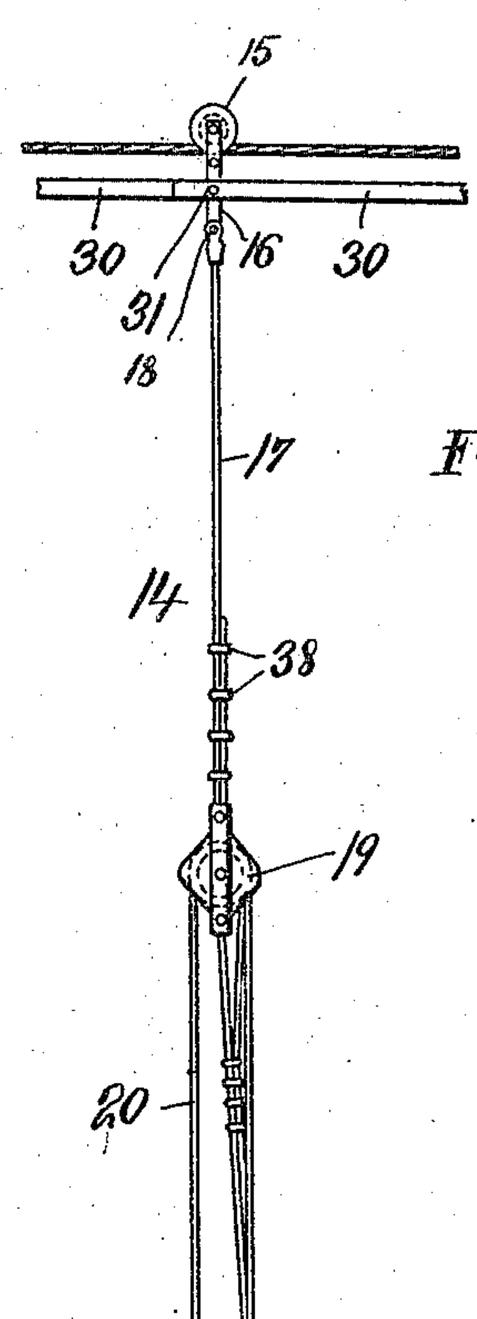
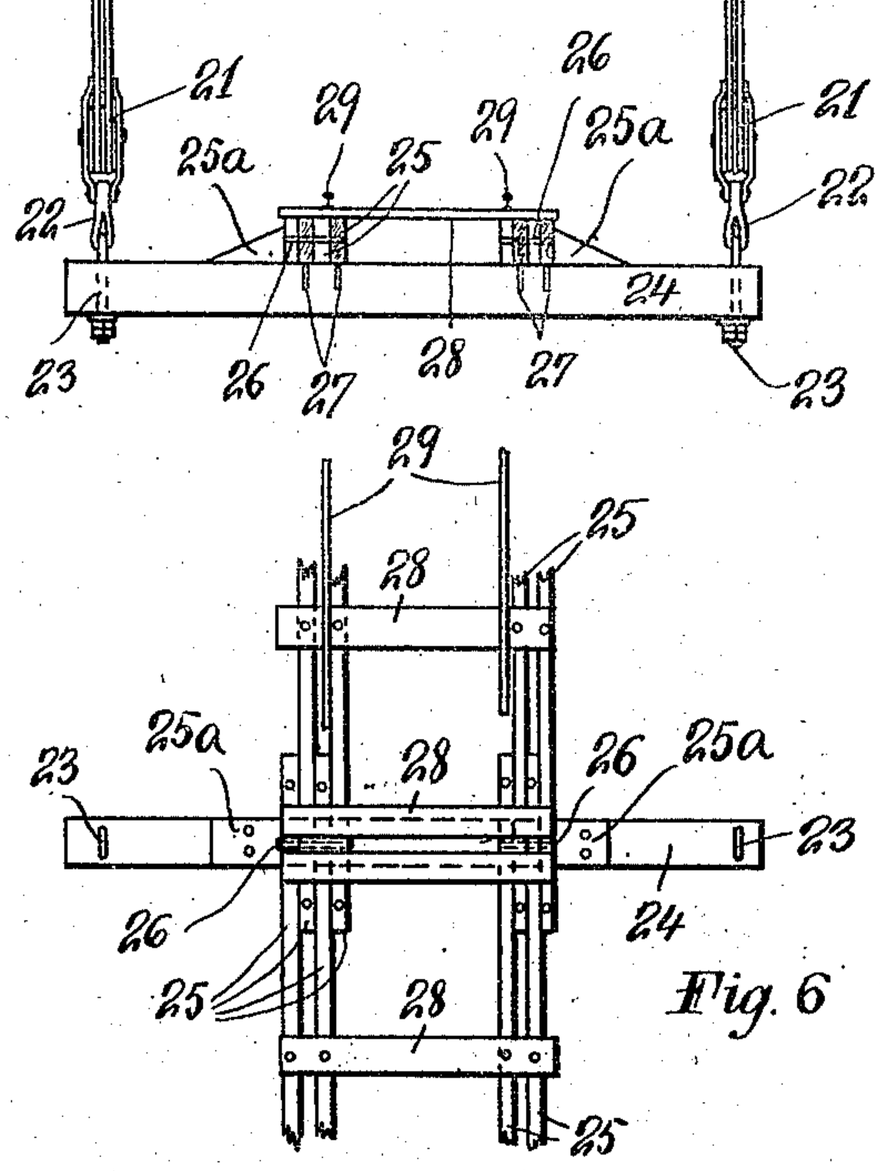


Fig. 5



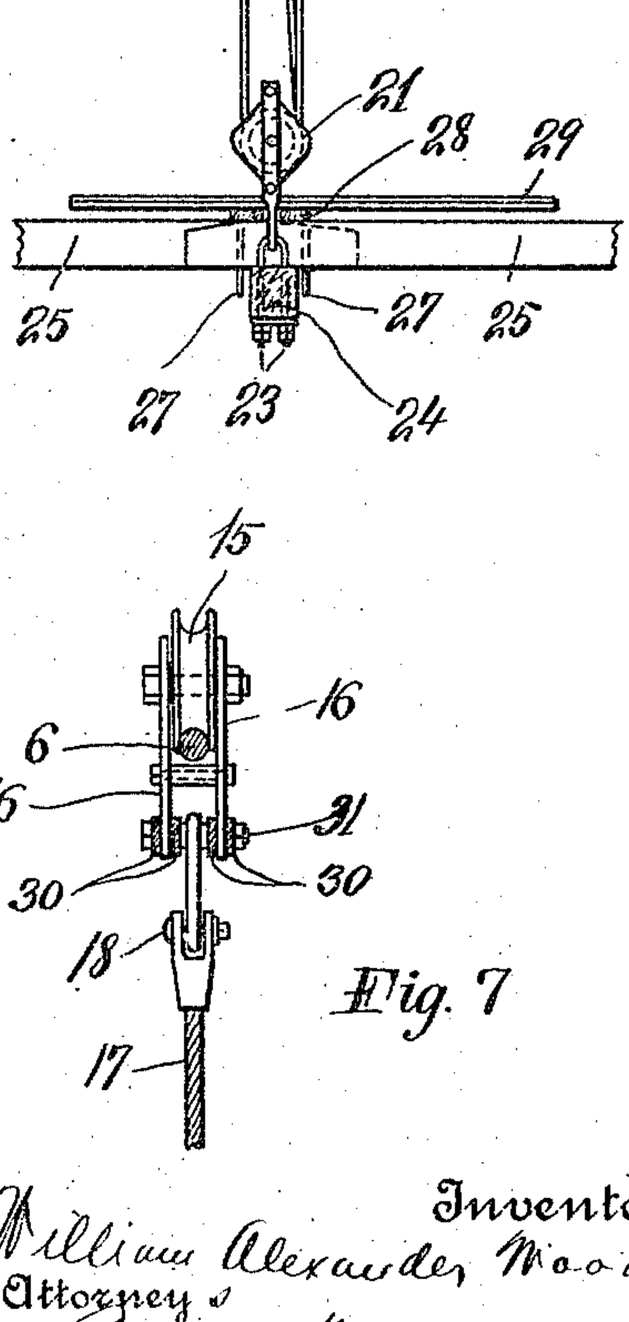


Fig. 6

Fig. 7

Witnesses

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By his Attorneys

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UNITED STATES PATENT OFFICE.

WILLIAM ALEXANDER WOOD, OF NEW YORK, N. Y.

SUSPENSION-BRIDGE.

951,874. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed January 13, 1909. Serial No. 472,111.

To all whom it may concern:

Be it known that I, WILLIAM ALEXANDER WOOD, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Suspension-Bridges, of which the following is a specification.

This invention relates to improvements in suspension bridges and has as its object a bridge which may be suspended from a cableway, is flexible in its structure and may be adjusted on said cableway as to its position. Such a structure finds application for example, in connection with railway and other construction work where it is desired to fill depressions and make embankments. Heretofore, if the filling is done from cars running on tracks, the tracks have extended only to the edge of the depression and unless care is taken, the cars are liable to run off the track into the depression or else expensive trestles have to be constructed extending over the depression. In the first instance, even if the cars do not leave the track, the dumping of material is not done in the most effective place and in the second instance, the trestle is itself buried in the dumped material, thus adding the cost of the trestle to the cost of erection. I obviate both of these objections by my invention in which I provide a means for extending the track over the depression without building a trestle, for dumping the material where required and for moving my structure along the track or way as the work progresses.

In the following I have described, in connection with the accompanying drawings, one means illustrating the application of my invention, the features thereof being more particularly set forth hereinafter in the claims.

In the drawings Figure 1 is a side elevation of a structure illustrating my invention as applied to railway construction work. Fig. 2 is a plan view of the structure shown in Fig. 1. Fig. 3 is a side elevation of a portion of the structure shown in Fig. 1 on a larger scale. Fig. 4 is an end view of one of the suspending means on an enlarged scale. Fig. 5 is a side view of the parts shown in Fig. 4, parts being broken away. Fig. 6 is a plan view of a portion of the track structure. Fig. 7 is an enlarged detail view of the suspending means. Fig. 8 is an enlarged detail view of the clamping means, and Fig. 9 is a sectional end view of the structure shown in Fig. 8 along the line A—B.

Similar numerals of reference indicate similar parts throughout the several views.

1 indicates a fixed tower on one side of the depression or cut to be filled, as shown in Fig. 1. 2 indicates a movable tower on the other side of the depression, mounted on wheels 3, 3 adapted to run on tracks 4, 4, resting on embankment 5.

6, 6 are cables passing over towers 1 and 2, guyed back to a deadman 7 at one end and fastened to pulleys 8 at the other end. Pulleys 8 are connected by suitable take-up ropes 9 with pulleys 10 which are in turn guyed back to a deadman 11. Pulleys 8 and 10 in connection with take-up ropes 9 afford means for adjusting the tension of cables 6, 6 and for taking up the slack therein. Tower 2 may be further held in place by guy lines 12, 12 fastened in any convenient manner.

13, 13 are tracks on embankment 5 adapted to support a suitable dump car or the like (not shown) and running through and under tower 2.

14, 14 are suspender means depending from cables 6, 6 and comprising a wheel 15 adapted to travel on cable 6 and journaled in a suitable bracket 16, a rope 17 depending from pin 18 in bracket 16 and in turn supporting a pulley 19 connected by means of a take-up rope 20 with a pulley 21 provided with an eye 22 adapted to support a bolt 23 passing through and supporting a cross-beam or tie 24.

25, 25 are timbers or ways extending from one cross-beam or tie 24 to the next, the ends of timbers 25 overlapping on cross-beams 24, as shown in Fig. 5, and being fastened to each other by pins 26 in such manner as to form a flexible joint. Timbers 25 are prevented from moving lengthwise over cross-beams 24, by pins 27 passed down through timbers 25 and projecting below on each side of cross-beams 24, as clearly shown in Figs. 4 and 5. Sidewise movement of timbers 25 is prevented by blocks 25ª spiked or otherwise fastened to beams or ties 24 at either side of timbers 25, as shown in Fig. 4. Ties 28 connect timbers 25 intermediate cross-beams 24 and serve to give rigidity to the structure. Tracks 29, 29 are adapted to be supported on ties 28 on

timbers 25 and are arranged to be in alinement with and in continuation of tracks 13, 13 on embankment 5.

Straps 30, of iron or similar rigid material, connect brackets 16, one with another, and are preferably of such length as to reach from one bracket to the next, said straps overlapping each other at the brackets and being pivotally connected therewith by a suitable pin 31, so as to form a flexible connection. Clamps 32, 32 similar in construction to clamp 33, shown in side view in Fig. 9, are adapted to clamp over cables 6 and to hold a strap 34 bolted thereto by suitable bolts 35. Strap 34 is provided with an eye 36 into which a cable or rope 37 is adapted to take, the other end of rope 37 being clamped to cables 6 by any suitable clamps 38. Clamp 33 is adapted to clamp over cables 6, straps 30 and 34 being pinned thereto by a suitable pin or bolt 39. Pin 39 carries a link 40 connected by rope 41 with turnbuckle 42 in turn fastened in any convenient manner to the base of tower 2.

In operation, with the bridge in the position shown in Fig. 1, the dumping cars may run from tracks 13, 13 onto tracks 29, 29 and then out onto the bridge structure where they may dump their loads. When the depression has been filled up to grade beneath the bridge structure, the clamps 32 and 38 and the rope 41 may be loosened and the bridge structure slid or pulled along cables 6 to its new position and fastened there. The suspending beams 14 may then be adjusted to accommodate them to the deflection of cables 6, tracks 5 extended and the work proceed as before. From time to time the guys holding tower 2 in position may be loosened and the tower slid along to a new position, the cables 6 being loosened and taken up again by pulleys 8 and 10 and take-up ropes 9. Instead of moving the whole bridge structure, it is obvious that when the depression has been filled up to grade beneath said structure, the bolts 23 may be detached from cross-beams 24, leaving the track in place and the suspending means moved along cable 6 to the new position and fastened there, the trackway structure being extended as hereinbefore described and connected with the trackway detached, so that instead of building new sections of track, as the work progresses, the portions detached from the suspended structure may be used for the permanent track. It is thus seen that the bridge may be advanced as the work progresses, always affording means for dumping in the easiest and most satisfactory manner and at a minimum of expense. All of the parts being flexible and the suspending means being adjustable as to length results in a structure extremely well adapted to the purpose.

Instead of one tower being fixed, as shown in the drawings, both towers may be movable and a suspension bridge structure of the type described provided at either end of the cableway. The towers, or one of them, being movable permits the use of a much shorter tower than would be necessary if both towers were fixed, the moving of the tower advancing the fulcrum nearer the work and hence shortening the span, the take-up ropes 9 taking up the cable and hence decreasing the deflection thereof.

It is obvious that the details of construction may be readily varied without departing from the spirit of the invention and I do not restrict myself to the details as shown and described.

What I claim and desire to secure as Letters Patent is:

1. A suspension bridge comprising a cableway, means for supporting the same, a flexible bridge suspended from said cableway and means for moving said bridge on said cableway.

2. A suspension bridge comprising a cableway, means for supporting the same and a flexible bridge detachably suspended from said cableway.

3. A suspension bridge comprising a cableway, means for supporting the same, a flexible bridge detachably suspended from said cableway and means for adjusting said bridge vertically with relation to said cableway.

4. A suspension bridge comprising a cableway, means for supporting the same, a flexible bridge suspended from said cableway, means for adjusting said bridge vertically with relation to said cableway and means for moving said bridge horizontally on said cableway.

5. A suspension bridge comprising a cableway, movable means for supporting the same, a flexible bridge suspended from said cableway and means for moving said bridge horizontally along said cableway.

6. A suspension bridge comprising a cableway, means for supporting the same, at least one of said means being movable and a flexible bridge suspended from said cableway.

7. In combination with a bridge and a cableway for supporting the same, a fixed and a traveling tower over which the cableway is adapted to pass and means for holding the traveling tower in position.

8. A suspension bridge comprising a cableway, means for supporting the same, a bridge structure, means for detachably suspending said bridge structure from said cableway and a rigid connection from one to another of said suspending means.

9. A suspension bridge comprising a cableway, means for supporting the same, a bridge structure, adjustable means for suspending said bridge structure from said cableway and a rigid connection from one

to another of said suspending means pivotally connected to said suspending means.

10. A suspension bridge comprising a cableway, means for supporting the same, cross-beams, means for suspending said cross-beams from said cableway, means connecting said cross-beams one with another and hinged together on said cross-beams and ties joining said connecting means intermediate said cross-beams.

11. A suspension bridge comprising a cableway, means for supporting the same, cross-beams, adjustable means for suspending said cross-beams from said cableway, means connecting said cross-beams one with another and hinged together on said cross-beams, means preventing lengthwise and sidewise displacement of said connecting means on said cross-beams and ties joining said connecting means intermediate said cross-beams.

12. A suspension bridge comprising a cableway, means for supporting the same, one at least of said supporting means being movable, cross-beams, adjustable means for suspending said cross-beams from said cableway, means permitting lengthwise movement of said suspending means on said cableway, means for holding said suspending means in a fixed position with relation to said cableway, a rigid connection from one to another of said suspending means hinged to said suspending means, means connecting said cross-beams one with another and hinged together on said cross-beams, means preventing lengthwise and sidewise displacement of said connecting means on said cross-beams and ties joining said connecting means intermediate said cross-beams.

13. A suspension bridge comprising a cableway, dead-men to which the respective ends of said cableway are fastened, towers over which said cableway is adapted to pass, one of said towers being fast and another of said towers being movable, a track on which said movable tower is adapted to travel and a bridge suspended from said cableway.

14. A suspension bridge comprising a cableway, means for supporting the same, a trackway, suspension means depending from said cableway and detachably connected with said trackway and means for moving said suspending means along said cableway independent of said trackway.

15. A suspension bridge comprising a cableway, means for supporting the same, a trackway, means detachably connected with said trackway for suspending said trackway from said cableway and means for moving said suspending means along said cableway to provide for the extension of said trackway.

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

WILLIAM ALEXANDER WOOD.

Witnesses:
A. D. GRAULICH,
K. G. LE ARD.