J. B. STRAUSS.

BASCULE BRIDGE.

APPLICATION FILED MAR. 9, 1908.

1,150,643.

Patented Aug. 17, 1915.

2 SHEETS—SHEET 1.

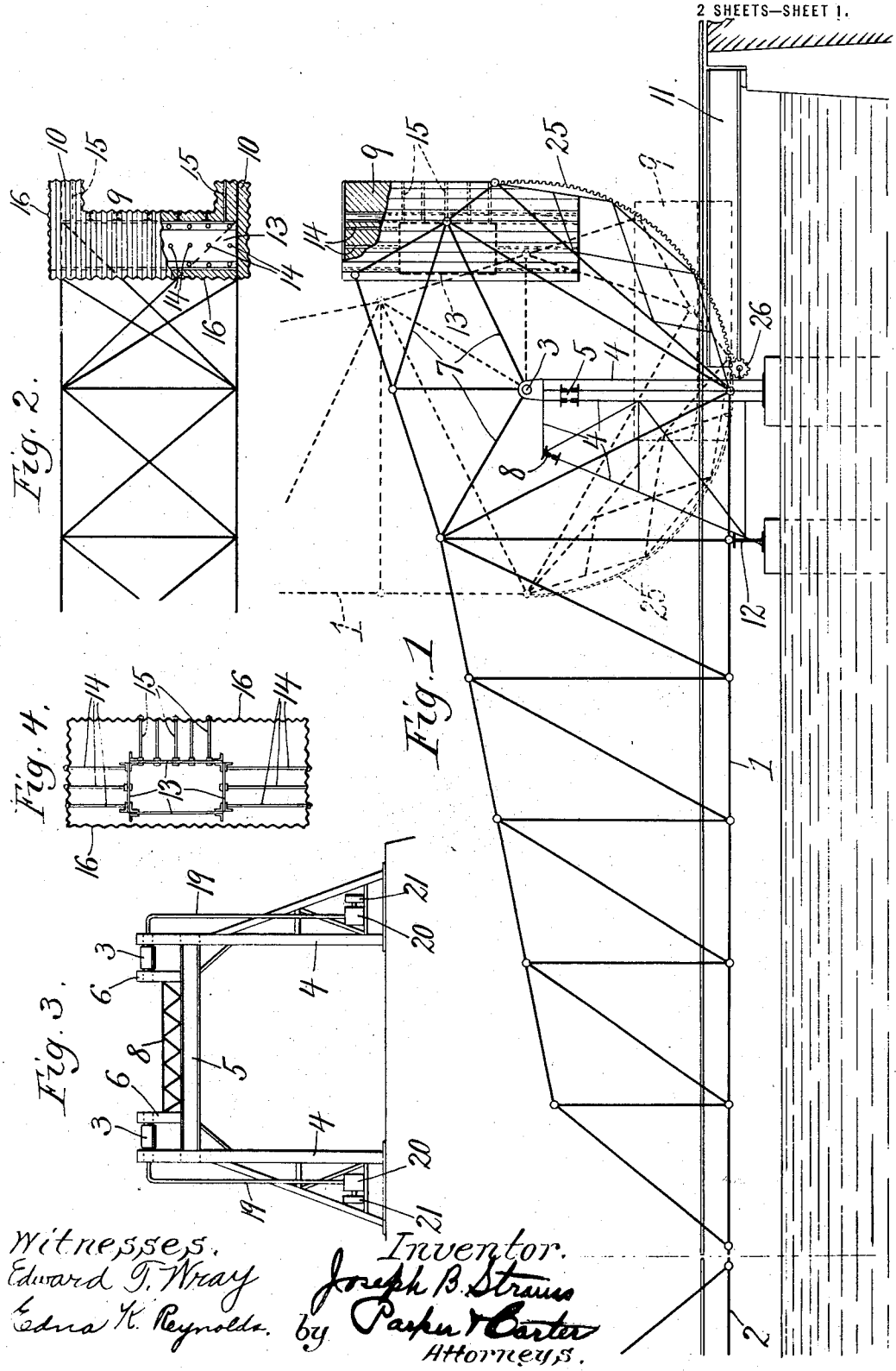

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

Witnesses.
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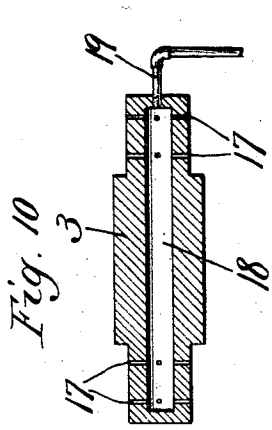

Fig. 10

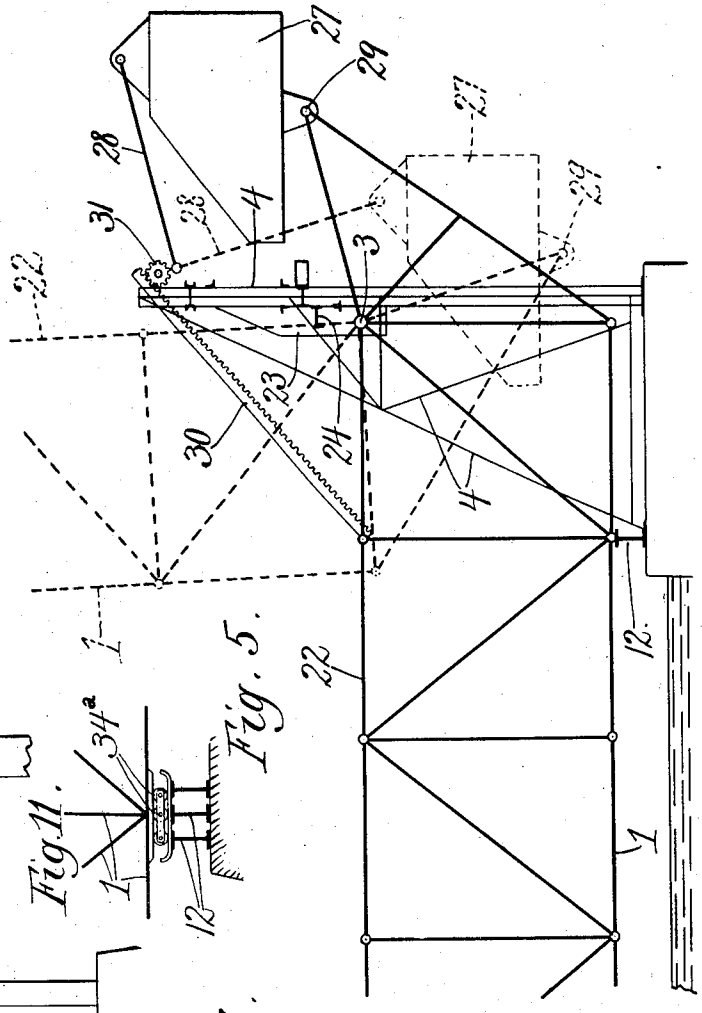

Fig. 5.

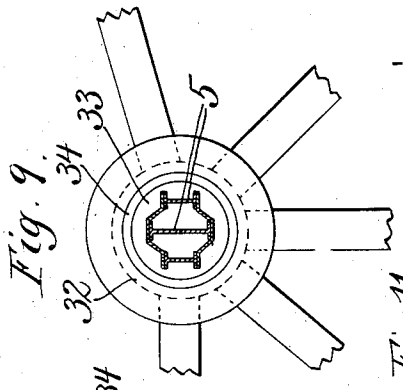

Fig. 9.

Fig. 11.

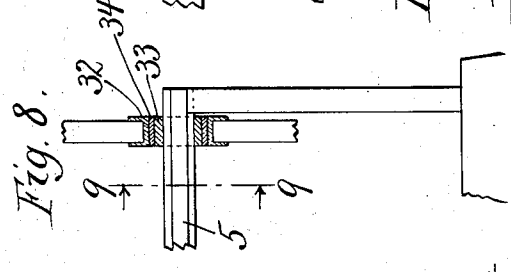

Fig. 8.

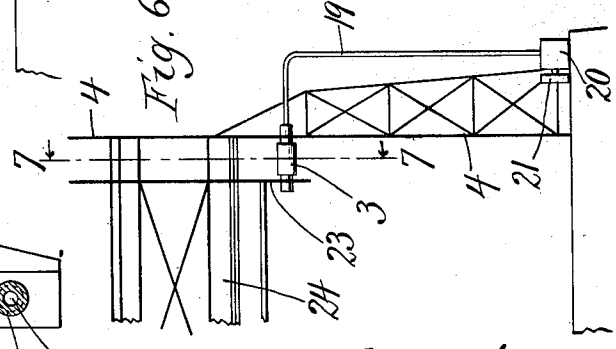

Fig. 6.

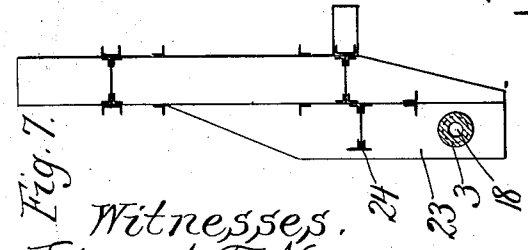

Fig. 7.

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UNITED STATES PATENT OFFICE.

JOSEPH B. STRAUSS, OF CHICAGO, ILLINOIS.

BASCULE-BRIDGE.

1,150,643. Specification of Letters Patent. Patented Aug. 17, 1915.

Application filed March 9, 1908. Serial No. 419,983.

To all whom it may concern:

Be it known that I, JOSEPH B. STRAUSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Bascule-Bridges, of which the following is a specification.

This invention relates to bascule bridges, and has for its object to provide a new and improved bridge of this description

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a view of a double leaf bridge embodying the invention; Fig. 2 is a plan view of the trunnion end of one of the moving leaves; Fig. 3 is a view showing one of the supporting devices for the moving leaf; Fig. 4 is a view showing the box girder of the counterweight; Fig. 5 is a view showing a modified construction; Fig. 6 is a view showing the supporting device for the moving leaf shown in Fig. 5; Fig. 7 is a sectional view taken on line 7—7 of Fig. 6; Fig. 8 is a sectional view of a trunnion showing a modified construction; Fig. 9 is a sectional view taken on line 9—9 of Fig. 8; Fig. 10 is a sectional view through one of the trunnions shown in Figs. 1 and 5; Fig. 11 is a detail view of the front support for the moving leaf.

Like letters refer to like parts throughout the several figures.

In Fig. 1 I have shown the moving leaf 1 and a portion of the moving leaf 2 of a double leaf bascule bridge, the two moving leaves being duplicates and swinging in opposite directions to open the bridge. The moving leaf 1 is supported upon trunnions 3 located above the bridge floor and means are provided for supporting both ends of the trunnions from supports located outside of the moving leaf. As herein shown there is provided at each side of the moving leaf and outside thereof the supports 4 which form what may be termed A-frames, each having two main members transmitting the loads to the foundations, said members connected by bracing, at least one of said members being inclined. These supports are connected together by the supporting cross piece 5 which may be of any suitable construction and which passes through the truss members above the roadway. The trunnions 3 are located above the cross piece 5 and are supported at their outer ends by the supports 4 and at their inner ends by the short supports 6 carried by the cross piece 5. The trunnions 3 may be fixed to the supports 4 and 6 so that the trusses rotate on them or they may be fixed to the trusses and rotate in bearings on the supports 4 and 6. It will be noted in this construction that one end of each trunnion is supported directly upon the support 4, and the other indirectly. It will be noted that by this construction means is provided for supporting the inner ends of the trunnions without the necessity of spreading out the trusses of the moving leaf as would be the case if an inside support were used, and that therefore said trusses may be brought close together, and may, as it were, be on the clearance line of the bridge, thus decreasing the cost of the bridge and the space required for it. By placing the trunnion supports outside of the moving leaf and connecting them through the trusses it will be noted that the said supports infringe on neither the trusses nor the clearance lines. It will further be seen that the supports for the overhead trunnions and the leaf mounted thereon clear each other during movement of the leaf. In this construction the trusses of the leaf may themselves form the traffic clearance lines.

In Fig. 1 the cross piece 5, which may be made up of girders, passes below the top chord of the trusses. The tail end of the trusses is built as a quadrilateral with the trunnion supports at its middle; the upper end of this quadrilateral is subdivided into a smaller quadrilateral lying entirely above the cross piece, and the entire weight of the bridge when swinging is transmitted through this auxiliary quadrilateral 7 to the trunnions. It will be noted that the main quadrilateral provides ample space for a horizontal girder 8 in connection with the cross piece to take the lateral thrust on the trunnions, and that all loads on the inside trunnion bearing are transmitted as before to the outside supports and thence to the foundation. The bracing of both the trusses and trunnion supports is uninterrupted and complete. The counterweight 9 is carried above the space between the trusses and is provided with side extensions 10 which inclose the girders 11 of the approach span when the bridge is opened. The floor of the moving leaf ends at a point substantially in the vertical plane of the trunnion and the floor of the approach span abuts the floor of the

moving leaf the floor of the approached span coming between the extensions 10 on the counterweight when the moving span is open.

A front shoe or support 12 is located ahead of the trunnion support which shoe becomes the fulcrum when the bridge is closed, the live load ahead of this shoe being balanced by the dead load on the trunnion support. By properly spacing the two supports all uplift on the foundations can thus be avoided, the span when open balancing about the trunnions and when closed about the shoe. The counterweight may be formed in any desired manner. I prefer to form it of concrete or concrete-steel. As herein shown I prefer to provide a box girder 13 consisting of a series of horizontal and vertical girders having a series of projecting pieces, or extensions 14 and 15, the girders and pieces 14 and 15 being embedded in the concrete. I also prefer to provide a surrounding corrugated metal box 16. By means of this construction the weight of the counterweight is properly supported by the box girder and attached parts, and transferred through them to the trusses of the moving span when the bridge is in the closed and open position, the points where the strains come varying as the position of the leaf varies.

In some constructions the moving leaf is so heavy that the pressure tends to squeeze out the oil. As herein shown I provide a means for properly oiling the trunnion bearings under such conditions. In this construction the trunnions 3 are made hollow, as shown in Fig. 10, there being holes or openings 17 connecting with the hollow space 18 so that the oil may escape to the bearing surface. Some means is provided for forcing oil under pressure into the bearing. As herein shown a pipe 19 is connected with a pump 20 which may be operated in any desired manner, such as by a separate motor 21. It will be seen that by this means pressure enough will be supplied to force the oil into contact with the bearing surface, this pressure being regulated as desired. The moving leaves are operated in any desired manner, as, for example, by means of the rack 25 and pinion 26, the pinion being operatively connected with a suitable motor.

As shown in Fig. 5 the trunnions 3 are located in the top chord 22 of the moving leaf. In this construction the trunnion 3 has its inner end supported by a downwardly projecting part 23 fastened to the cross piece or cross support 24. In this construction the trunnion supports run above the trunnions, and the counterweight 27 is pivotally connected thereto by means of a link 28, said counterweight being pivotally connected at 29 with the tail end of the bridge. The bridge is operated by means of the operating strut 30 connected to the top chord of the bridge, and having a rack which engages a pinion 31 connected with a suitable motor.

In Figs. 8 and 9 a modified construction for movably supporting the span is shown. In this construction the trusses of the moving leaf are mounted directly upon the cross piece 5, there being a suitable bearing for this purpose. As herein shown a sleeve 32 is fastened thereto in any desired manner. A bearing face 33 is fastened to the cross piece, and a loose sleeve 34 is located between them, the bearing faces being the engaging faces of this loose sleeve with the parts 32 and 33.

In the bascule bridge herein shown the supports for the outer ends of the trunnions are located outside of the boundaries of the moving leaf, and there are means provided for transmitting the pressures on the inner ends of the trunnions to these outer supports, these means being located beyond the clearance lines of the bridge. The front support 12 is preferably provided with a series of rollers 34a upon which the moving leaf rests when closed. These rollers permit longitudinal movement of the moving leaf due to expansion and contraction of the metal.

I claim:

1. A bridge comprising a moving leaf, trunnions upon which it is supported, said trunnions located above the bridge floor, supports for the trunnions located on the outside of the leaf, and means for supporting both ends of the trunnions from these outside supports.

2. A bridge comprising a moving leaf, trunnions upon which it is mounted, said trunnions located above the bridge floor, supports on the outside of the leaf upon which the outer ends of the trunnions are supported, the inner ends of said trunnions being at one side of said supports, and means for supporting the inner ends of the trunnions upon the said outside supports.

3. A bridge comprising a moving leaf having trusses bounded by the traffic clearance lines, said trusses mounted on trunnions located above the bridge floor, and supports for said trunnions transmitting the load to the foundations entirely on the outside of the trusses said supports connected together independent of the leaf above the traffic clearance line and so as not to interfere with the movement of the leaf in opening or closing.

4. A bridge comprising a moving leaf, trunnions therefor, located above the bridge floor, supports for said trunnions located outside the moving leaf, and a connecting member between said supports and passing through the trusses.

5. A bascule bridge comprising a moving

leaf, trunnions therefor located above the bridge floor, a support for one end of each trunnion located outside of the trusses of the moving leaf, a cross piece passing through said trusses and connecting said supports, supports for the other ends of said trunnions connecting the trunnions with said cross piece.

6. A bridge comprising a moving leaf, supports located outside the moving leaf, a cross piece connecting the said supports together above the clearance lines, trunnions upon which said leaf is mounted, said trunnions mounted on said supports and cross piece.

7. A bridge comprising a moving leaf, over-head trunnions upon which it is mounted, supports for said trunnions connected together above the roadway, and means for mounting the moving leaf thereon so that it will clear the supports and connection during its opening and closing movement.

8. A bridge comprising a moving leaf, over-head trunnions upon which it is mounted, a trunnion supporting device extending across the space between the trusses of the moving leaf, and an engaging part on the trusses adapted to engage said trunnions and to clear the trunnion supporting device when the moving leaf is operated.

9. A bridge comprising a moving leaf, trunnions upon which the leaf is mounted, supports outside the boundary of said leaf for directly supporting the outer ends of said trunnions, means separate from the leaf and common to both trunnions for transmitting the pressures on the inner ends of said trunnions to the supports for the outer ends thereof.

10. A bridge comprising a moving leaf, trunnions upon which the leaf is mounted, supports outside the boundary of said leaf for supporting the outer ends of said trunnions, means separate from the leaf for transmitting the pressures on the inner ends of said trunnions to the supports for the outer ends thereof, said means located above the clearance lines of the bridge.

11. A bridge comprising a moving leaf, over-head trunnions upon which the leaf is mounted, supports outside the boundaries of said leaf for supporting the outer ends of said trunnions, means for transmitting the pressures on the inner ends of said trunnions to the supports for the outer ends thereof the trunnions being simple beams with the load between the supports.

12. A bascule bridge comprising a moving leaf, over-head trunnions upon which it is mounted, supports for the outer ends of said trunnions, located exterior to the boundaries of the moving leaf, supports for the inner ends of said trunnions within the boundaries of the leaf, and a connection between said latter supports.

13. A bascule bridge comprising a moving leaf, upwardly projecting supports therefor, a cross support connecting said supports above the roadway, and a trunnion connection for the moving leaf mounted upon said cross support.

14. A bascule bridge comprising a moving leaf having through trusses mounted on trunnions located in the top chord, trunnion supports for said trunnions exterior to the moving leaf, and supporting the outer ends thereof, a cross connection between said supports located above the top chord of the trusses, supports for the inner ends of said trunnions by means of which the pressure thereon is transmitted to said cross connection.

15. A bascule bridge comprising a moving leaf, trunnions therefor which carry the entire dead load of the moving leaf when open, a floor for the moving leaf ending substantially in the vertical plane of the trunnions, so that the live load is all received on the moving leaf substantially in front of said trunnions, bearings for said trunnions, the stresses upon said trunnion bearings due to the dead load being always downward, a fulcrum stop in the path of the moving leaf forming a permanent part of the structure in front of the trunnions whereby the dead load on the trunnions is utilized to resist that portion of the live load on the moving leaf ahead of said fulcrum stop.

16. A bascule bridge comprising a moving leaf mounted on trunnions above the roadway, an A-frame support therefor comprising two outside supports, a connecting member between said supports above the roadway extending across the roadway, and resisting the vertical forces when the bridge is closed, and the vertical and horizontal forces when the bridge is open.

17. A bascule bridge comprising a moving leaf, a supporting device therefor comprising a trunnion and a roller support in front thereof engaged by the moving leaf when closed.

18. A bascule bridge comprising a moving leaf, a concrete counterweight extending across the leaf between the trusses and connected with said trusses, and a metal casing for the counterweight, said casing attached directly to the trusses of the moving leaf and spanning the space between them and cross girders connected to the trusses of the moving leaf and embedded in said concrete, said casing connected with said embedded girders and acting to protect the concrete.

19. A bascule bridge comprising a moving leaf, a concrete counterweight extending across the space between the trusses, a series of cross girders embedded in said counterweight, and extensions connected with said girders for supporting the counterweight upon the girders.

20. A bascule bridge comprising a moving leaf, a counterweight connected thereto and extending across the space between the trusses, said counterweight provided with side extensions adapted to pass by and between adjacent sections of the approach floor when the moving leaf is open.

21. A bascule bridge comprising a moving leaf, trusses forming part of said leaf, a counterweight comprising a resisting device made up of a series of girders in addition to the trusses of the moving leaf with which the counterweight is used, concrete surrounding said girders and in which they are embedded, the girders forming a resisting device for the counterweight load in all the various positions of the counterweight and transferring the effect of said counterweight to the trusses of the moving leaf.

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Witnesses:
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