

June 15, 1926.

H. E. YOUNG

1,589,036

BRIDGE

Filed Dec. 19, 1921

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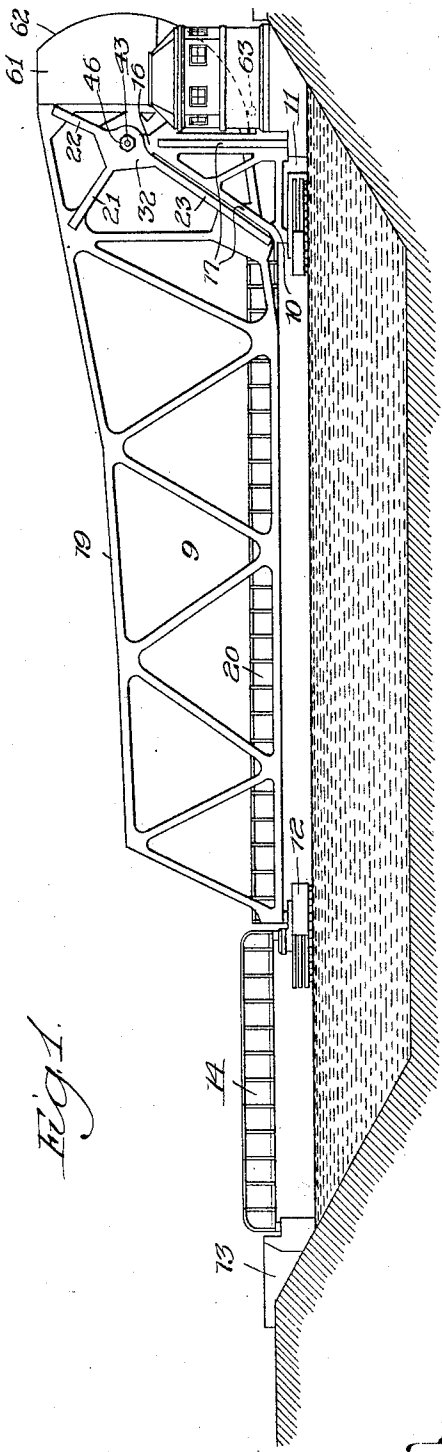


Fig. 1.

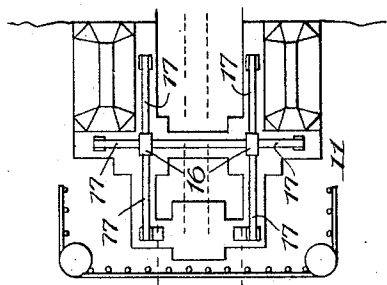
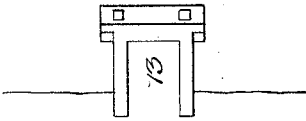
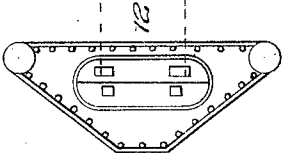


Fig. 2.



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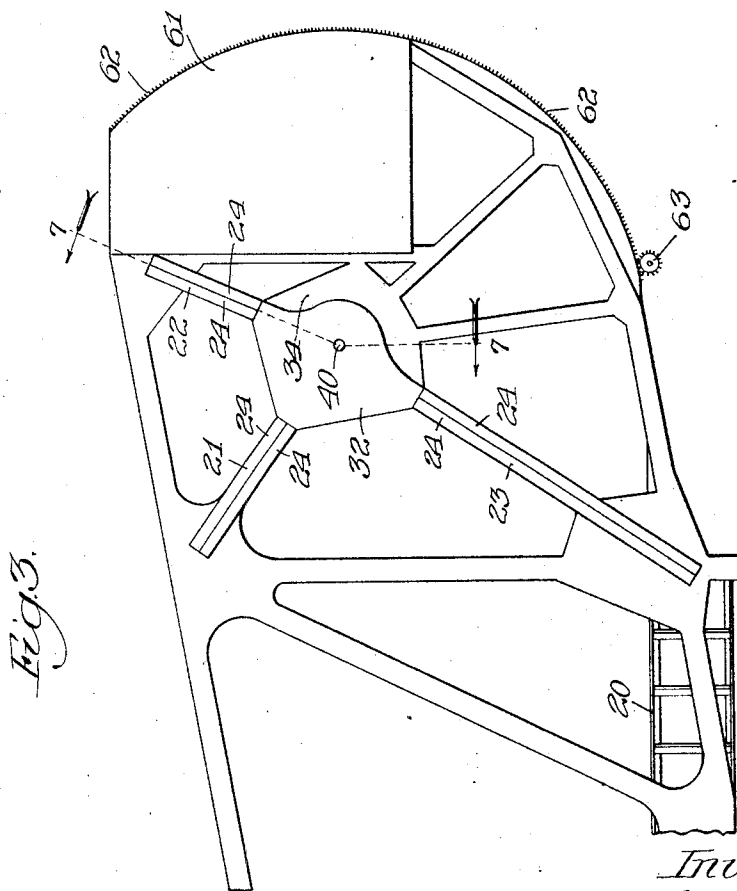
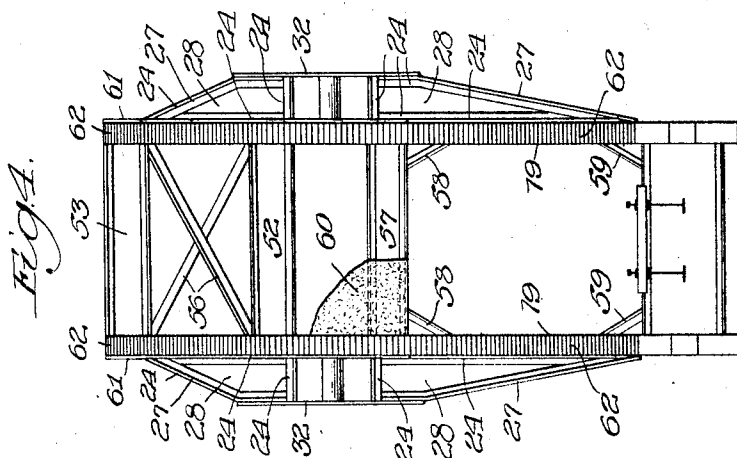
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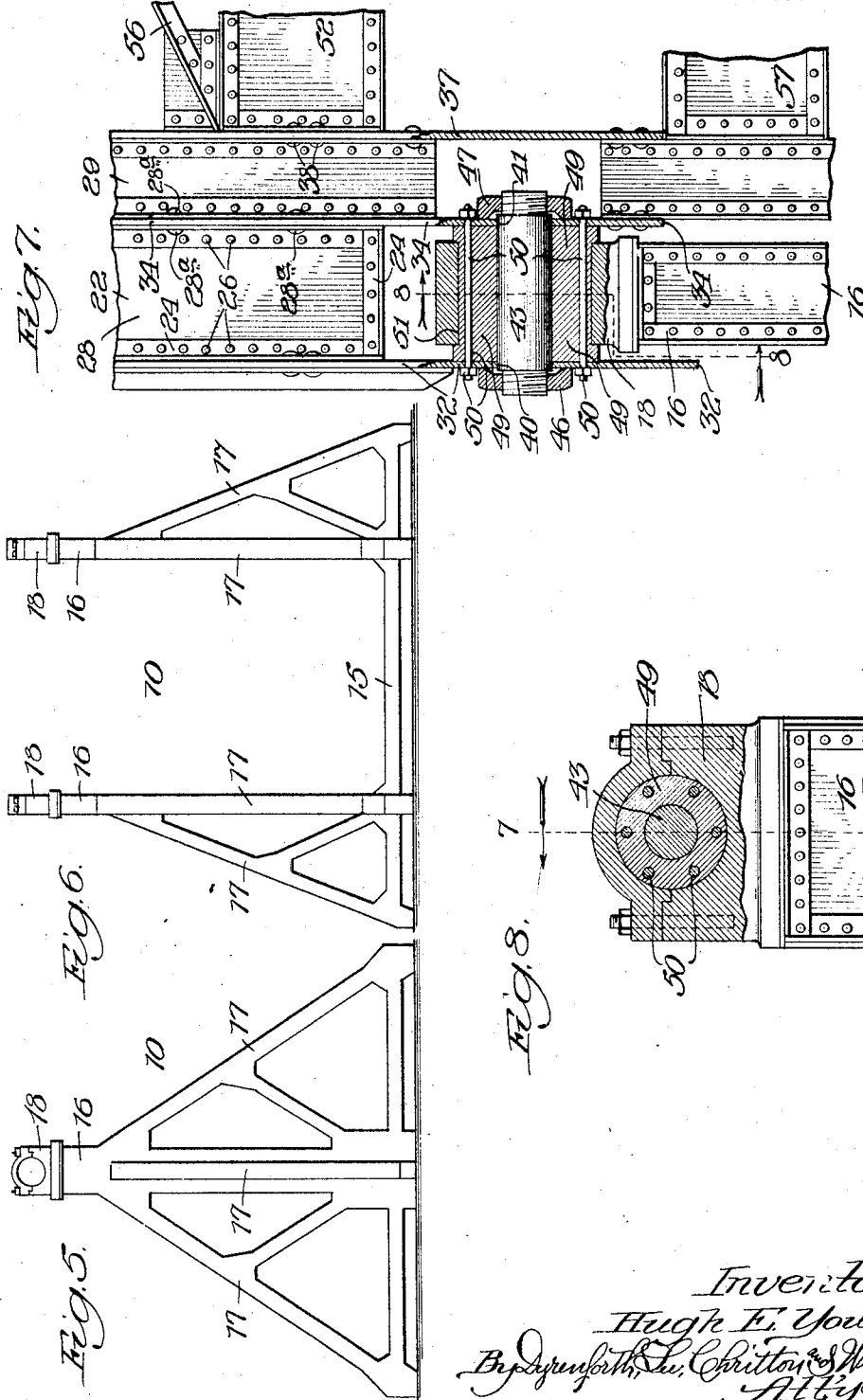
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Fig. 10.

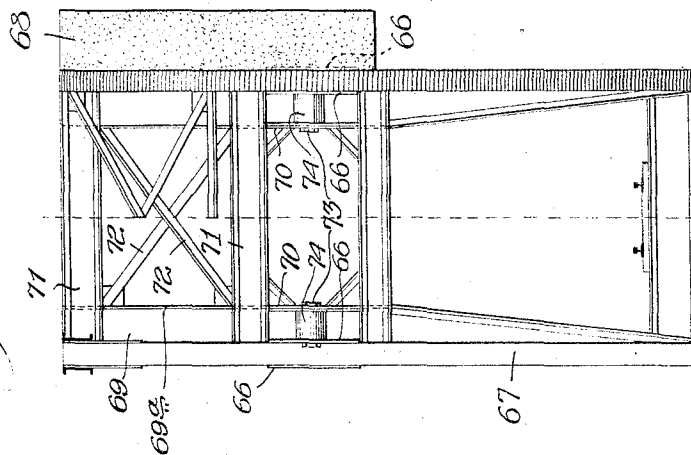
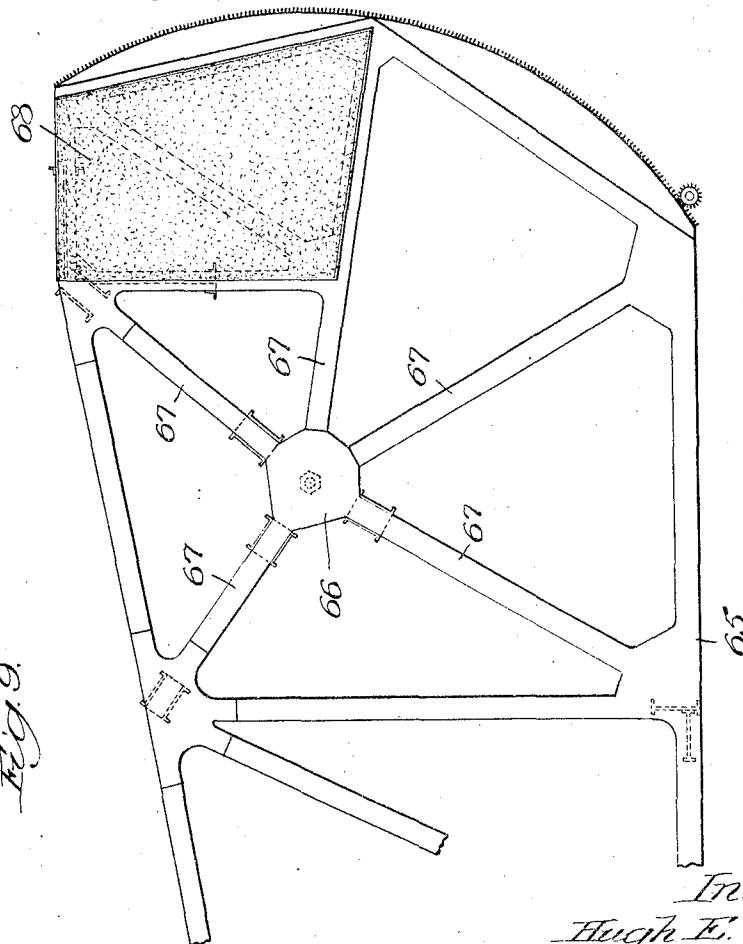


Fig. 9.



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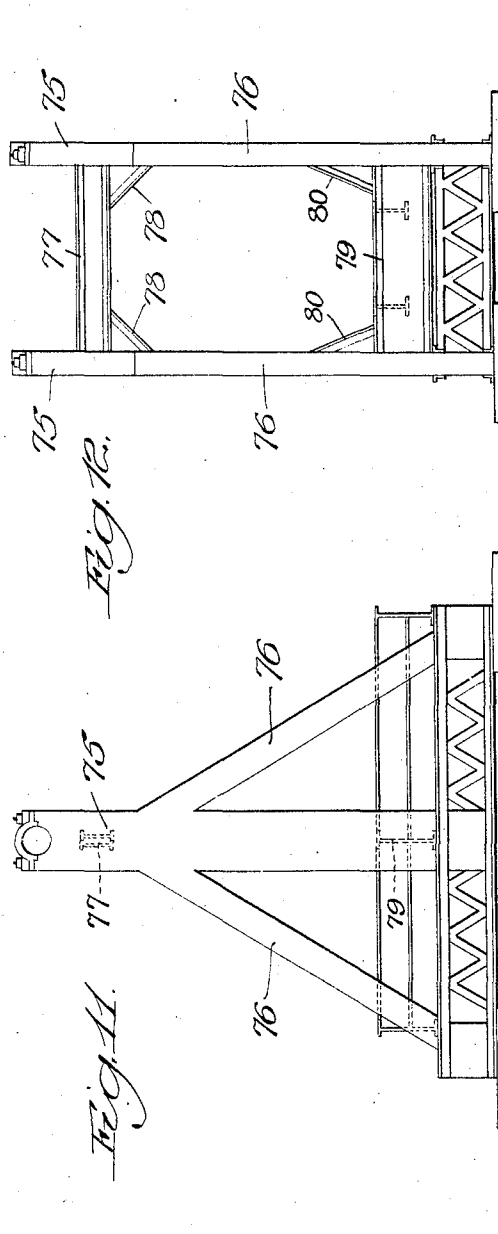
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UNITED STATES PATENT OFFICE.

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BRIDGE.

Application filed December 19, 1921. Serial No. 523,442.

My invention relates to improvements in bridges of the bascule type, and more particularly to such bridges in which the movable span rotates about a fixed horizontal axis. It will be fully understood from the following description, illustrated by the accompanying drawings, in which:

Figure 1 is a view in side elevation of a bridge construction embodying my invention.

Fig. 2 is a plan view of the structure shown in Fig. 1, with the movable span omitted as is also the stationary span indicated on Fig. 1 to the left of the movable span.

Fig. 3 is a view in side elevation of the trunnioned end of the movable span.

Fig. 4 is a view in end elevation of the end of the span shown in Fig. 3, viewing the structure from the right hand side of this figure, with a portion thereof broken away.

Fig. 5 is a view in side elevation of the support for the movable span.

Fig. 6 is a view in end elevation of the support of Fig. 5.

Fig. 7 is a broken section taken on the line 7-7 on Figs. 3 and 8 and viewed in the direction of the arrows.

Fig. 8 is a broken detail section taken at the irregular line 8-8 on Fig. 7 and viewed in the direction of the arrows.

Fig. 9 is a side elevation of the supported end of a movable span of a modified form of construction, the support being omitted.

Fig. 10 is an end elevation of the span of Fig. 9.

Fig. 11 is a side elevation of a support for the span of Fig. 9, and

Fig. 12 is an end elevation of the support of Fig. 11.

Referring generally to the arrangement of parts shown in Fig. 1, numeral 9 represents a movable span trunnioned at one end, the end at the right hand side of this figure, on a support represented at 10 and shown as surmounting an abutment or pier 11 at one side of the channel which the span 9 is shown as partly spanning. The outer end of the span 9 bears upon a pier 12 rising from the bed of the channel and from pier 12 a stationary span 14 extends to an abutment 13 at the other side of the channel.

The support 10 is shown in Figs. 5 and 6 as a unitary structure presenting spaced main uprights 16 shown connected by a

strut 15 and suitable braces represented at 17, the upper end of the uprights 16 being formed with journal boxes 18 in which the movable span 9 is trunnioned as hereinafter described.

The movable span 9, the main portion of which may be constructed in any suitable way, is shown as composed of side-frames 19 and a floor structure 20 spanning the space between said side frames and connected therewith in any suitable manner, as for example in accordance with common practice.

The side-frames 19 are shown as each provided with an outrigger construction shown as affording the radiating outriggers, or brackets, 21, 22 and 23 shown diagrammatically in Fig. 1, but detailed in Figs. 3, 4 and 7, the construction of these outriggers being similar except as to specific dimensions, which are varied in accordance with the stresses to be supported. Each outrigger, as shown, is formed of steel angles or angle irons 24 arranged in back-to-back relation and plates, or webs, 28 secured to these angles and filling the spaces therebetween. The angle irons serve to stiffen the outriggers and the plates are riveted to the flanges of the angle irons between which they are interposed as represented at 26 in Fig. 7, the ends of the angle irons 24 forming the outer stiffening portions of the outriggers being inclined, if desired, toward the respective side-frames, as represented at 27. The outriggers 21, 22 and 23 are secured, for example, by riveting, as shown at 28^a, to similarly radiating structural members or struts 29 forming a part of the side-frames at the supported end of the bridge, these members radiating from the point of support of the frame. The outriggers 21, 22 and 23 are secured to and support a plate 32 aligned with plates 34 and 37 secured to the outside and inside of the truss members 29 of the frame.

The plates 32 and 34, one set thereof at each side frame 19, are apertured at 40 and 41, respectively, and located in these apertures are shafts 43, there being one shaft for each side frame. The shafts 43 are provided with nuts 46 and 47 screwing on the ends thereof and firmly clamping the plates 32 and 34 against the sleeves 49 which are bolted to the plates 32 and 34 as by the annular series of bolts 50 extending therethrough, the outer surfaces of the

sleeves 49 being grooved as indicated at 51, at which portions they are journaled in the bearings 18, the parts just referred to forming trunnion bearings for the movable span 5 9 at opposite sides thereof.

The side frames 19 are rigidly connected together in any desirable manner, above the portion 20 to insure the desired rigidity of the movable span and to distribute its weight 10 between the inside portion of the trunnion, which supports plate 34, and the outside of the trunnion, which supports plate 32. Such connecting means includes a series of cross-struts located above the portion 20 of the span a distance sufficient to provide the desired clearance between them and the vehicles using the bridge, and connecting the side frames 19 together in the planes of the outriggers 21 and 22, as represented in the drawings, particularly Figs. 3 and 7. These cross-members, represented at 52 and 53, may be of any desirable construction; for example, as shown in Fig. 7, and the end flanges thereof may be secured to the truss 15 members 29 of the side frames by riveting, as represented at 38, of one end of cross-member 52. If desired, cross-members 56 may be employed which connect with the cross-members 52 and 53 and also with the 20 adjacent members of the side frames. An additional connecting member or cross-strut between the side frames is represented at 57. Kneebraces represented at 58 and 59, the former connecting with the member 57 and 25 with members of the side frames and the latter with the portion 20, may be employed, if desired. The side frame members 21 and 22 together with the cross members 52, 53 and 56 form moment-resisting rigid frames 30 which extend cross-wise of the length of the span and radiate from the axis upon which the span pivots.

The movable span may be counterweighted in any desirable way, as for example by 35 means of a block of concrete properly positioned thereon to produce the counterweighting function. In the arrangement shown the counterweight is located at the upper right hand corner of the structure in Fig. 3, a 40 portion of this counterweight being represented at 60, it preferably completely filling the space between the side frames 19 and being of a cross-sectional shape and size corresponding generally to plates 61 secured to 45 the outer surfaces of the side frames 19.

The movable span is shown as provided with curved racks 62 meshing with pinions 63, which may be driven in any suitable 50 manner and through the medium of which the span may be moved into and out of closed position.

It will be noted that each side frame of the bridge is supported on a short bearing 55 member, its weight being distributed over the bearing member on both sides of the

support for the latter. In the form above described the supporting columns are outside of the side frames, the members designated outriggers serving to distribute a part 70 of the load upon the opposite sides of the supporting columns. In Figs. 9 to 12 a modified form of construction is illustrated in which the supporting columns are placed inside the side frames.

Referring more particularly to these figures of the drawing, the numeral 65 indicates the supported end of a side frame of the movable span, which is provided with gusset plates 66, from which the struts 67 radiate to form the truss members of the frame. In 80 the upper corner of the side frames counterweights 68, which may suitably be masses of concrete, are secured to the side frames on their outer sides, the centers of gravity of the counterweight masses being disposed at a short radial distance from the pivot 85 center of the frames.

On the inside of the span, each side frame has secured to it along two or more of the struts 67 the lateral supports, or webs 69, to which are secured the plates 69^a. To these 90 plates a gusset or bearing plate 70 is secured in alinement with the bearing plates 66 of each side frame and spaced from the inner of said bearing plates 66. Between the respective strut members 67 of the two side frames the transverse chords 71 and suitable struts 72 are provided, forming trusses 95 which aid in supporting the bearing plate 70.

The supporting pin 73 of each side frame passes through the inner plate 66 and the plate 70 and between the inner plate 66 and the plate 70 a sleeve 74 surrounds the pin 100 and is secured to the gusset plates in any suitable manner, for example, as described in connection with the preceding modification. It will be noted that the bearing pin 73 for the span does not extend beyond the side frame on the side opposite the support- 105 ing gusset plate 70.

The bearing members, or sleeves, 74 normally rest in suitable bearings, provided on supporting columns 75, shown in Figs. 11 and 12. These columns are suitably braced 110 in their own plane by the struts or braces 76 and at right angles thereto by the cross strut 77 and the knee braces 78 and also by the floor-beam 79 and its braces 80.

Although the present invention has been described in connection with detailed specific forms of construction embodying the same, it is not intended that these shall be regarded as limitations upon the scope of the invention except in so far as included in 120 the accompanying claims.

I claim:

1. A bascule bridge having a supporting member, a bearing pin with a surrounding sleeve-portion supported on said supporting 125 130

member, a movable span having a side frame supported on said bearing pin on one side of said supporting member, and a member secured to said side frame and spaced therefrom, said member being supported on the bearing pin on the opposite side of said supporting member and in part supporting the movable span.

2. A bridge comprising supports spaced apart, a movable span comprising side-frames each provided with an outrigger construction, and trunnions at which said span is supported on said supports, said outrigger constructions being formed with plate portions at which said outrigger constructions engage said trunnions and said side-frames having portions also engaging said trunnions, said plate portions being spaced from said portions of the side-frames, said plate portions and said portions of said side-frames being located at opposite sides of said supports.

3. A bridge comprising supports spaced apart, a movable span comprising side-frames each provided with an outrigger construction, and trunnions at which said span is supported on said supports, said outrigger constructions being formed with radiating outriggers, each of said side-frames and said outrigger constructions presenting portions which engage said trunnions at opposite sides of said supports, the said portions of said outrigger constructions being adjacent the points from which said outriggers radiate and spaced from said portions of the side-frames.

4. A bridge comprising supports spaced apart, a movable span comprising side-frames each formed of radiating members, outrigger constructions presenting radiating outriggers opposing, and connected with, the radiating members of said side-frames and cross-members connecting said radiating members together, and trunnions at which said span is supported on said supports, each of said side-frames and said outrigger constructions presenting portions adjacent the points from which said outriggers and said radiating members of the side-frame radiate which engage said trunnions at opposite sides of said supports, said portions of the outrigger constructions and said portions of the side-frames being spaced apart.

5. A bridge comprising supports spaced apart, a moving span comprising side-frames each provided with an outrigger construction, and trunnions at which said span is supported on said supports, said outrigger constructions being formed with radiating outriggers which incline at their outer ends toward said side-frames, each of said side-frames and said outrigger constructions presenting portions which engage said trunnions at opposite sides of said supports, the said portions of said outrigger constructions

being adjacent the points from which said outriggers radiate and spaced from said portions of the side-frames.

6. A bridge comprising supports spaced apart, a movable span comprising side-frames each provided with an outrigger construction, and trunnions at which said span is supported on said supports, each of said side-frames and said outrigger constructions presenting portions which engage said trunnions at opposite sides of said supports, said portions on the outrigger constructions being spaced from the said portions of said side-frames, and the portions of said side-frames from which said outrigger constructions extend being located in planes inside of said supports.

7. A bascule bridge having spaced supporting members, bearing members supported on said supporting members, and a movable span having side frames located to one side of said supporting members, said span having extensions at its sides through the medium of which said span is supported, each of said extensions being supported on one of said bearing members on each side of the said supporting member on which it is supported.

8. A bascule bridge comprising spaced-apart supporting members, a movable span formed of side frames located to the side of said supporting members, said side frames having extensions provided with portions at which the span is movably supported on said supporting members, and means whereby the force downwardly directed by said extensions against said supporting members is distributed uniformly over said bearing portions of said span.

9. A bascule bridge comprising spaced-apart supporting members, a movable span formed of side frames located to the side of said supporting members, extensions on said side frames at which said span is movably supported on said supporting members, means for bracing said extensions to counteract the moments induced by the location of said side frames to the side of said bearing members, and means whereby the force downwardly directed against said supporting members is distributed substantially uniformly over said bearing portions of said span.

10. A bascule bridge comprising bearing members spaced apart, and a movable span trunnioned on said members and comprising moment-resisting rigid frames extending crosswise of the length of the span and extending around the axis upon which said span is trunnioned, portions of said span being located to the side of said bearing members and other portions thereof, at which it is trunnioned on said bearing members, occupying substantially the same plane as said bearing members.

11. A bascule bridge comprising bearing members spaced apart, and a movable span trunnioned on said members and comprising moment-resisting rigid frames extending crosswise of the length of the span and extending around the axis upon which said span is trunnioned, portions of said span being located to the side of said bearing members and other portions thereof, at which it is trunnioned on said bearing members, presenting spaced apart portions arranged at opposite sides of said bearing members. 10

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