No. 752,563. PATENTED FEB. 16, 1904.

C. L. KELLER.

BASCULE BRIDGE.

APPLICATION FILED FEB. 26, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

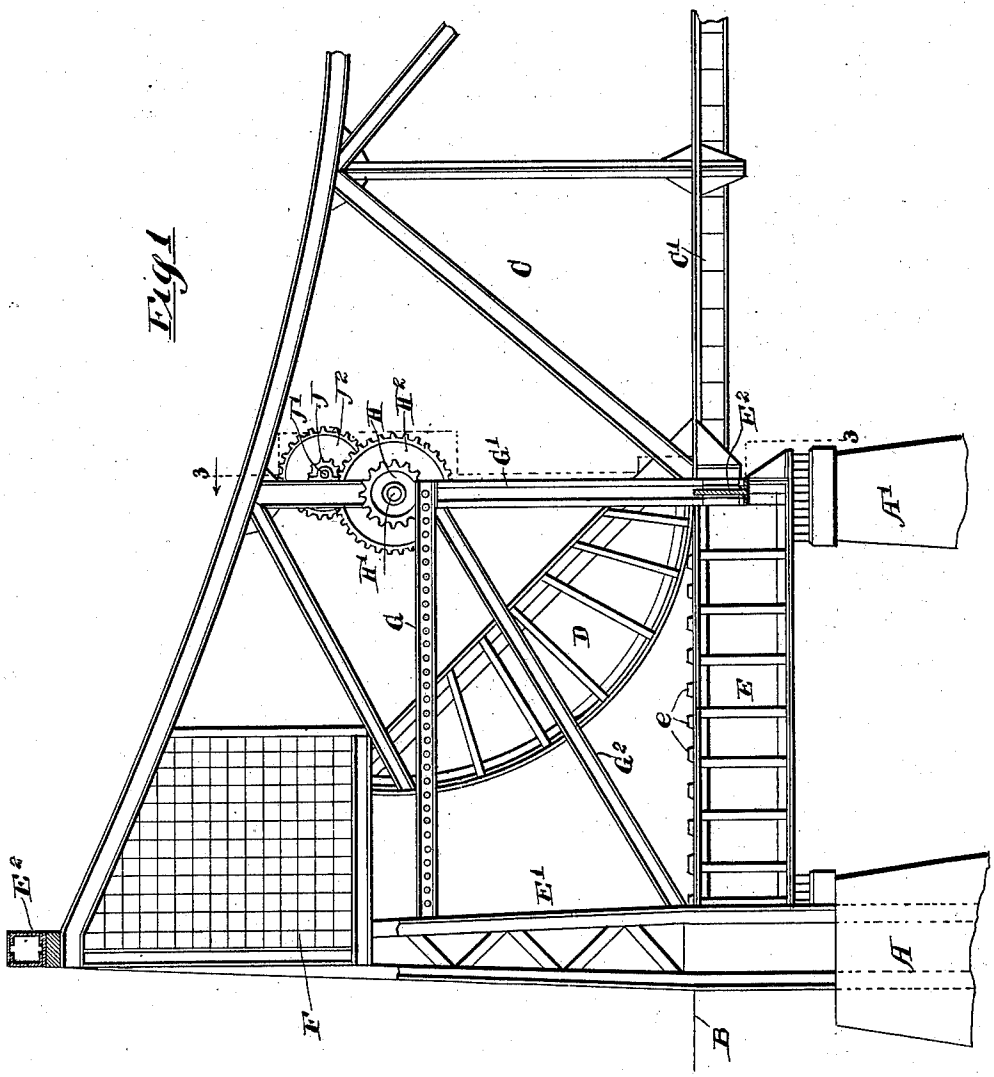
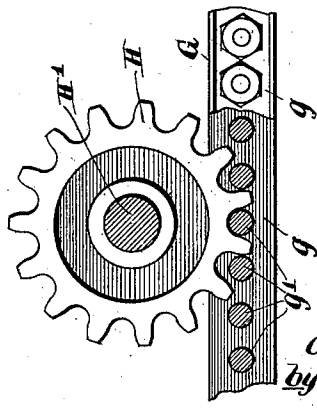



Fig. 4.




Witnesses:-

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NO MODEL. 4 SHEETS—SHEET 2.

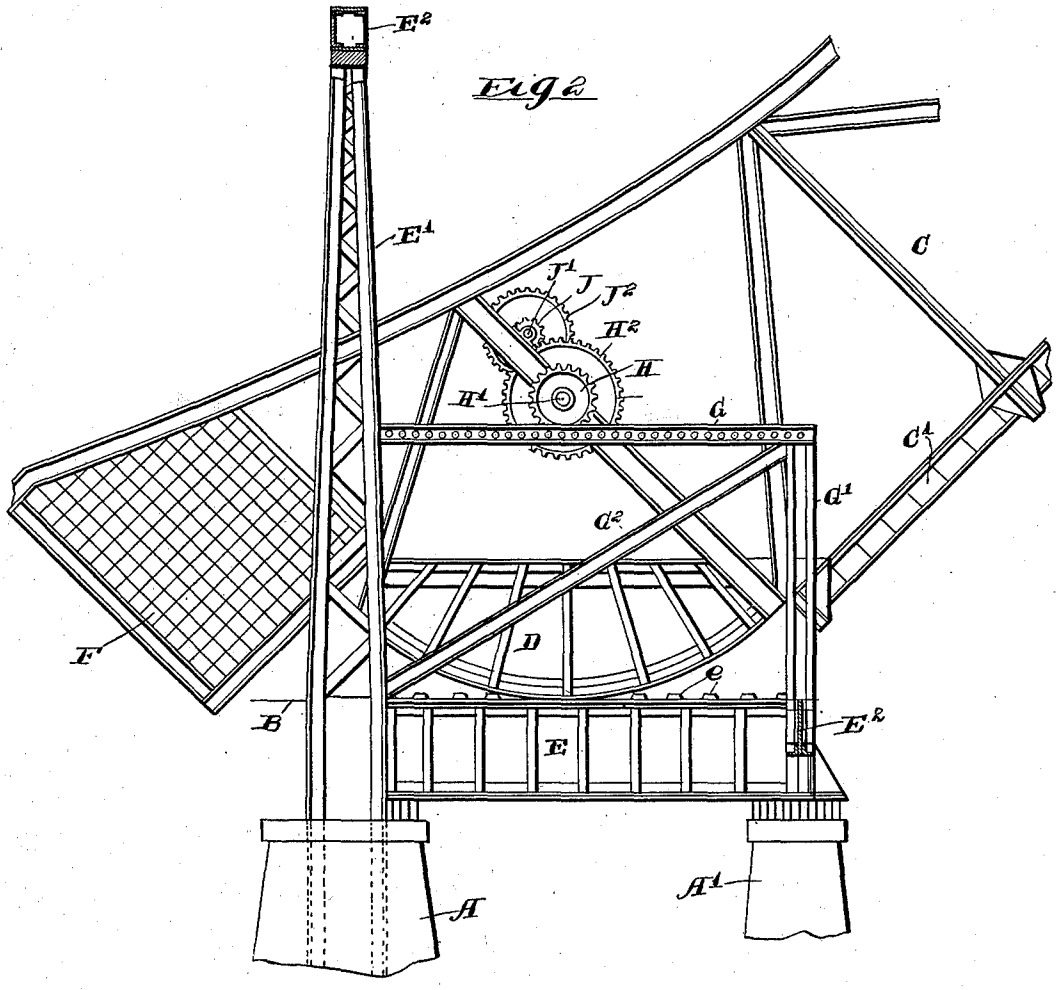


Fig 2

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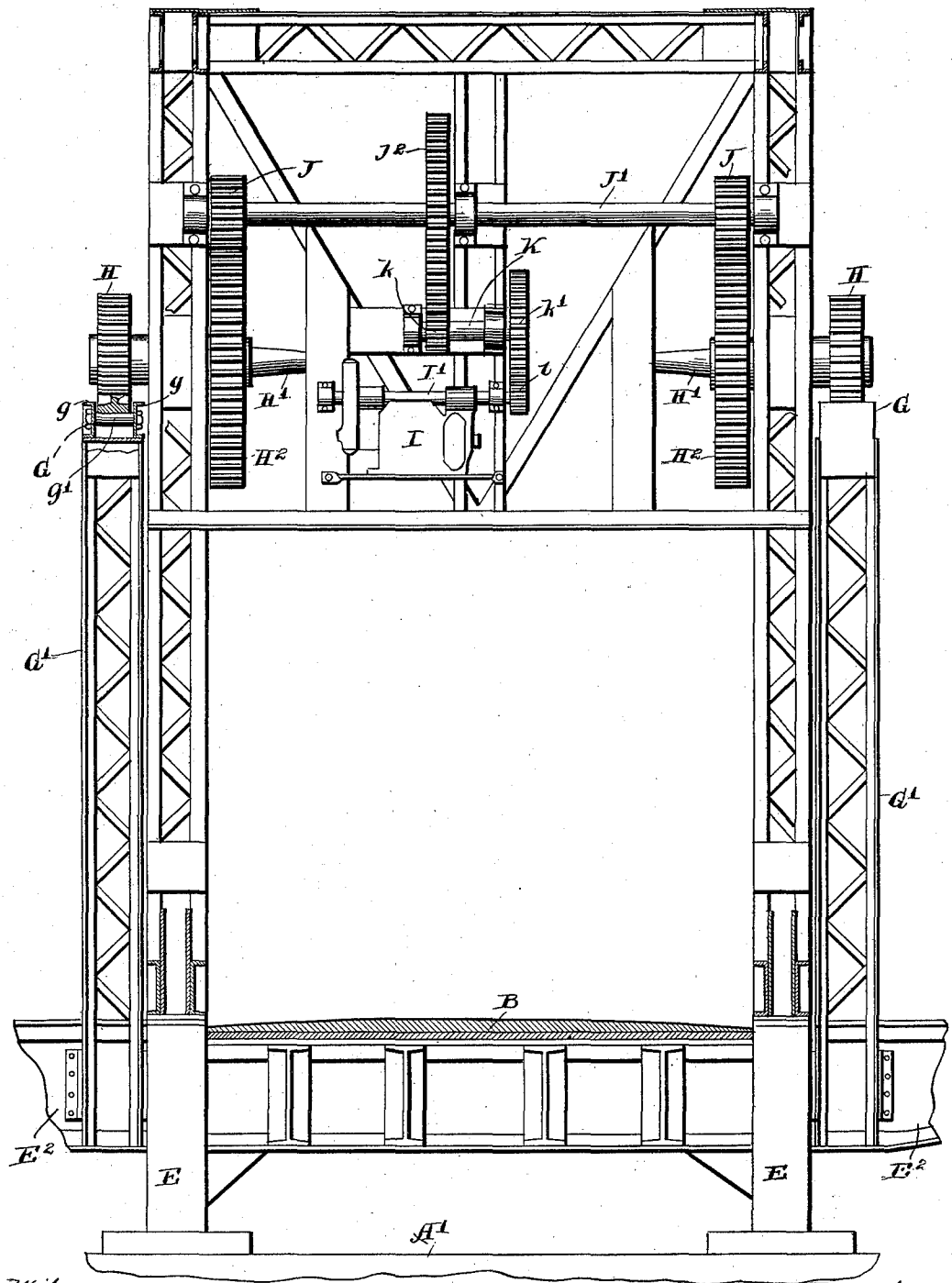
NO MODEL. 4 SHEETS—SHEET 3.

Fig 3

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NO MODEL. 4 SHEETS—SHEET 4.

Fig 5

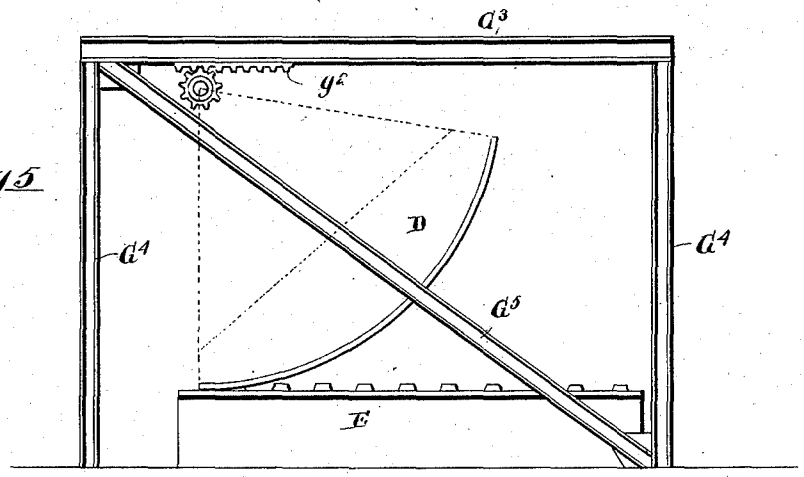



Fig 6

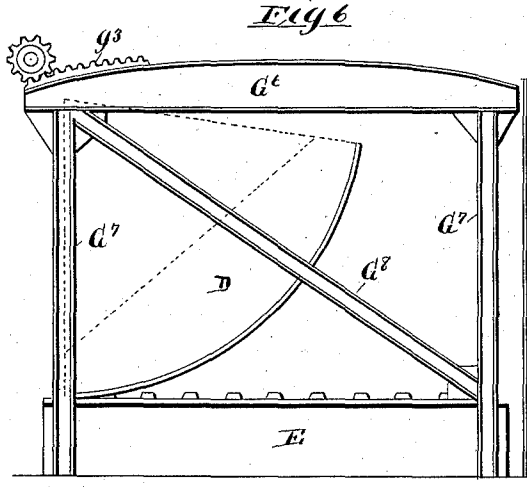



Fig 7

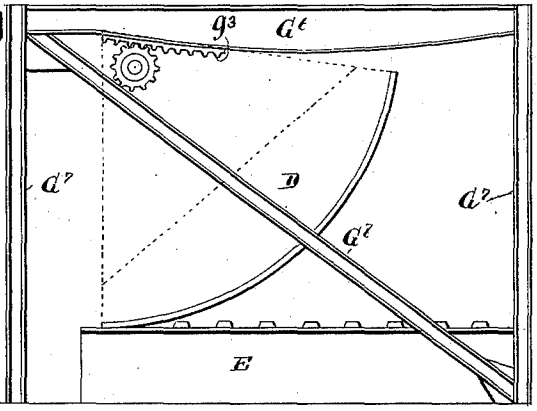



Fig 8

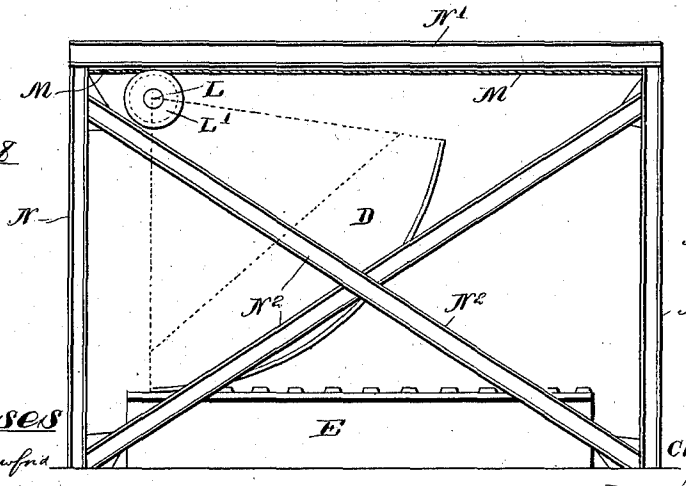
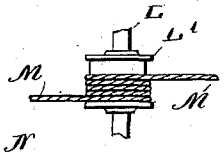



Fig 9




Witnesses
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No. 752,563. Patented February 16, 1904.

# UNITED STATES PATENT OFFICE.

CHARLES L. KELLER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SCHERZER ROLLING LIFT BRIDGE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## BASCULE-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 752,563, dated February 16, 1904.

Application filed February 26, 1902. Serial No. 95,675. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. KELLER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bascule-Bridges; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to bascule or lift bridges of that kind wherein the bridge is opened and closed by the swinging movement of a movable span or spans in a vertical plane, and refers more particularly to the location and construction of the actuating devices for the movable span.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

As shown in the drawings, Figure 1 is a view in side elevation of the inner or shore end of one leaf of a two-leaf bascule-bridge and its associated piers and approach. Fig. 2 is a similar view, in side elevation, showing the movable span partially lifted. Fig. 3 is a transverse section taken on line 3 3 of Fig. 1. Fig. 4 is a detail view illustrating the construction of the operating strut and pinion. Fig. 5 is a detail view showing a modified arrangement of the operating strut and pinion wherein the pinion is located beneath the strut. Figs. 6 and 7 are detail views showing modifications in which the racks are curved. Figs. 8 and 9 show a modification in which winding-drums and cables are used instead of a rack and pinion.

As shown in said drawings, A A′ designate shore-piers, on which is supported the bridge leaf or span and the inner end of its approach. Said piers are made of masonry or constructed in any other suitable manner.

B designates the approach floor or roadway, which is herein shown as supported on the piers A A′.

C designates as a whole the movable leaf or span of the bridge.

The bridge illustrated is of the kind or type known as a "through-bridge," and it embraces two trusses and a bridge-floor or floor-frame C′, supported on the lower parts of the trusses and adjacent to the lower chords thereof, so that the said trusses rise above the level of the floor or roadway of the bridge.

It will of course be understood that the bridge illustrated may be either a highway or railway bridge and that the term "floor" as herein used refers to the floor-frame of a railway-bridge by which the track-rails are supported and which may have no flooring, as well as to the flooring of a highway-bridge, such as is herein illustrated.

At the inner or shore end of the span the same is provided with rolling segments D D, which are attached to and form parts of the trusses of the movable span and are adapted to rest and roll on horizontal supports E E, which are located on either side of the approach-floor B. Anchored columns E′ E′ are located at either side of the bridge-approach, and the bridge-trusses are at the inner or shore end of the span extended beyond the rolling segments, so as to form integral arms, which are adapted for contact with limiting-stops on the columns E′ E′. These stops are formed by a horizontal beam or girder $E^2$, which is attached to the tops of the anchored columns and extends transversely over the approach B. The extensions of the trusses when the span is closed or in horizontal position bear upwardly against said girder, as shown in Fig. 1, and thereby holds from downward movement the free end of the span. The bridge illustrated is therefore one of what is known as "cantaliver" bridge, or one wherein the complete bridge consists of two spans which meet each other between the abutments and wherein both spans are held in their horizontal positions by limiting-stops, such as those afforded by the beam or girder $E^2$ or like means. It will be understood, however, in case of a single-span lift-bridge the rising and falling end of the span may rest when closed on an abutment at the opposite side of the waterway, in which case said limiting-stops will not be required and the anchored columns E′ may be omitted.

The bridge-span illustrated is also provided with counterbalance-weights F, which are attached to the bridge-trusses with their centers of gravity outside of and above the rolling segments.

The supports E for the rolling segments D are shown as having the form of girders which rest on the piers A A′. The bearing-faces of the rolling segments and the top surfaces of the supports or girders are provided with means for preventing the slipping or shifting of the segments on the said supports, the same, as herein shown, consisting of teeth *e e*, arranged at intervals along the girders, and holes or recesses in the curved faces of the segments adapted to receive or engage said teeth.

Now referring to the actuating mechanism by which the bridge-leaf is opened and closed, G G designate operating-struts which are arranged horizontally above and at either side of the approach exterior to the planes of the bridge-trusses and the rolling segments. In the particular construction herein shown said struts G are supported at their outer ends by means of columns G′, which are attached to the girders E′ E′ by means of brackets $E^2$, which extend outwardly from the said girders and to which the said posts or columns G′ are rigidly secured at their lower ends. The brackets $E^2$ illustrated are adapted for supporting the foot-path of the roadway, but are utilized for the attachment of the said columns, as above described. At their opposite or inner ends the struts G are shown as secured to the anchored columns E′ E′, which latter are of course located outside of the plane of the trusses and the rolling segments, so that they are in position for the support of the said struts. The struts may, however, be supported otherwise than by the anchored columns in case the same be not present or if for some other reason it may be found convenient to otherwise support the struts. Said struts are, moreover, braced or held from horizontal movement or from shifting endwise under the strains coming thereon in the lifting of the bridge-span by means of oblique braces $G^2$, reaching from the outer end of said struts downwardly to the bases of the anchored columns E′. The said struts G are provided with or formed to constitute rack-bars and are engaged by gear-pinions H, mounted on the movable bridge-span and driven by actuating means on said span—such, for instance, as an electric motor I. The gear-pinions H, which are located at the opposite sides of the bridge-span in position to engage the operating-struts, are herein shown as mounted on the outer ends of short shafts H′, which are provided with rigidly-attached gear-wheels $H^2$, located inside of the trusses and arranged to intermesh with gear-pinions J J on a transverse horizontal shaft J′, which extends across the span between the trusses. Said shaft J′ is shown as driven from the motor I by means of gearing consisting of a counter-shaft K, having a gear-pinion *k*, which intermeshes with a spur-wheel $J^2$ on the shaft J′, and having also a gear-wheel *k′*, which intermeshes with a gear-pinion *i* on the driving-shaft I′ of the motor I.

In the construction shown in Figs. 1, 2, and 3 the operating-struts G are straight and are arranged horizontally, so that they are parallel with the upper or supporting surfaces of the girders E, and the axes of rotation of the pinion H are arranged concentrically with respect to the rolling segments D, so that the path of movement of said pinion as the bridge-span turns or rolls on the supports for the rolling segments will be straight and horizontal and the gear-pinions will remain in engagement with the straight operating-struts during the lifting or swinging movement of the span, the operation of the parts in this respect being clearly shown in Figs. 1 and 2.

The operating-struts G may be constructed in any suitable manner to afford necessary racks or gear-teeth for engagement with the pinions H, as shown in Figs. 1 to 4 said operating-struts consisting each of two parallel beams *g*, in which are secured transverse pins *g′*, Fig. 4, which pins are adapted for engagement with the teeth of the gear-pinion H.

It is not essential that the actuating-pinions H when used in connection with the stationary operating-struts in the manner described should be arranged above the operating-struts, as they may be placed below the same, as shown in Fig. 5, wherein the operating-strut indicated by $G^3$ is provided with a rack-bar $g^2$ on its lower edge and supported by two columns $G^4$ $G^4$ and oblique brace $G^5$. Moreover, it is not essential that said pinions should be arranged concentrically with the bearing-surfaces of the rolling segments, it merely being necessary if the arrangement of the actuating-pinions be not concentric to give such curvature to the operating-struts as may be required for maintaining the pinions in engagement with the struts during the movement of said pinions, a construction in which the pinions are arranged eccentrically with respect to the rolling segments and the stationary operating-struts are provided with curved racks, as shown in Figs. 6 and 7, Fig. 6 showing the pinions above and Fig. 7 showing them below the operating-struts and curved rack-bars $g^3$ thereon. The operating-struts indicated by $G^6$ $G^6$ in Figs. 6 and 7 are shown as supported by columns $G^7$ $G^7$, attached at their lower ends to the outer faces of the segment-supporting girders E or other stationary parts and as held from endwise movement by oblique braces $G^8$ $G^8$.

Fig. 8 illustrates a modification in which the shaft L, driven by a motor on the span, as described, is provided each with a winding-drum L′, on which are wound two cables M M, each of which is attached at one end to one of two posts N N and at its opposite end

to the drum. The parts are so arranged that when the drum is turned one cable will be wound upon and the other unwound from the drum, so that the drum will be carried backward or forward between the posts, according to the direction in which the drum is turned. The posts N N will be connected by a strut N′, the posts and strut being located in position corresponding with that of the columns G′ and E′. (Shown in Figs. 1 to 3.) Inclined braces $N^2$ $N^2$ are shown as arranged to hold in place the upper ends of the posts N N, said braces being located outside of the plane of movement of the winding-drum.

The construction described in span-actuating device wherein the rotative motor-driven parts on the span are adapted to act in connection with stationary engaging means on the shore or bridge-approach to give the desired swinging movement of the span has the advantage over those prior constructions wherein the operating-strut is an endwise-movable part connected with the span and driven by actuating devices on the bridge-approach, for the reason that the actuating devices thus arranged do not extend shoreward for any considerable distance from the shore end of the bridge-span, so that less space is required for the bridge structure as a whole than in cases where the operating-strut is movable endwise. In some instances—as, for instance, where there is a railroad or highway crossing closely adjacent to the end of the movable span—space cannot be well spared for the projection of the endwise-movable strut outwardly over the bridge-approach, and in such cases the construction here shown is of great advantage, because the stationary operating-struts need not extend shoreward to any considerable distance past the inner ends of the supports $A^2$ $A^2$, on which the rolling segments rest.

Inasmuch as the advantages hereinbefore set forth will be obtained by the use of a rotative motor-driven part on the movable span when said part is driven by a motor located elsewhere than on the span, I do not desire to be limited to a construction embracing a motor mounted on or carried by the span, except as this feature is made the subject of specific claims.

While the construction embracing stationary operating-struts provided with ratchet-teeth and gear-pinions intermeshing with the same constitute an important feature of my invention and are herein claimed as a feature of my invention, means other than such racks and gear-pinions may be employed to afford operative connections between a rotating motor-driven part on the bridge-span, such as the shafts H′ H′ and stationary parts on the bridge-approach adapted to afford the desired swinging movement of the span. Such a device is shown in Fig. 8 and has been hereinbefore described. Actuating means for rolling lift-bridge spans embracing a rotative driven part on the bridge-span and connections between said driven part and a stationary part of the bridge-approach is therefore herein broadly claimed as part of my invention.

It will be understood that the actuating means herein described may be appiled to bascule-bridges which are movably supported otherwise than by rolling segments, and such actuating means is therefore broadly claimed without restriction to any specific form of bascule-bridge. Such actuating means may be used also in connection with deck as well as through bridges and in connection with the arch as well as the cantaliver form of bascule-bridges.

I claim as my invention—

1. The combination with the movable span of a bascule-bridge and means for supporting said movable span, of a rotative non-supporting part on the span, and means attached to a stationary part and operating in connection with said rotating part to give rising-and-falling movement to the span.

2. The combination with the movable span of a bascule-bridge and means for supporting said movable span, of a non-supporting rotative part on the span, a motor connected with said rotative part for driving the same, and means attached to a stationary part and operating in connection with said rotative part to giving rising-and-falling movement to the rotative span.

3. The combination with a rolling lift-bridge span provided with rolling segments, and supports on which said segments rest and roll, of a motor-driven, rotative part on the span, and means attached to a stationary support and operating in connection with said rotative part to give rising-and-falling movement to the span.

4. The combination with the movable span of a bascule-bridge and means for supporting said movable span, of actuating means embracing a motor-driven, revoluble, non-supporting pinion on the span, and a stationary operating-strut provided with a rack adapted for engagement with said pinion.

5. The combination with a bridge span or leaf provided with rolling segments, and stationary supports for said segments, of means for actuating the span comprising stationary operating-struts located at the sides of the rolling segments and provided with racks, and motor-driven gear-pinions on the span engaging said racks.

6. The combination with a bridge span or leaf provided with rolling segments, and stationary girders located on either side of the bridge-approach and affording supports for said segments, of operating-struts located above the level and outside of the planes of said girders, said struts being provided with

racks, and motor-driven gear-pinions on the span intermeshing with said racks.

7. The combination with a bridge span or leaf provided with rolling segments and stationary supports for said segments, of stationary operating-struts, gear-pinions on each side of the span, each mounted on a separate shaft, a driving-shaft extending across the span and connected by gearing with both pinion-shafts, and a motor mounted on the span and having operative connection with said driving-shaft.

8. The combination with the movable span of a bascule-bridge, and means for supporting said movable span, of a motor on the span, and means driven by said motor and operating in connection with non-supporting coacting parts on the bridge-approach to give rising-and-falling movement to the span.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 22d day of February, A. D. 1902.

CHARLES L. KELLER.

Witnesses:

C. CLARENCE POOLE,

GERTRUDE J. BRYCE.