(No Model.)

J. STARKA.

BRIDGE GATE.

No. 342,270. Patented May 18, 1886.

Fig. 1.

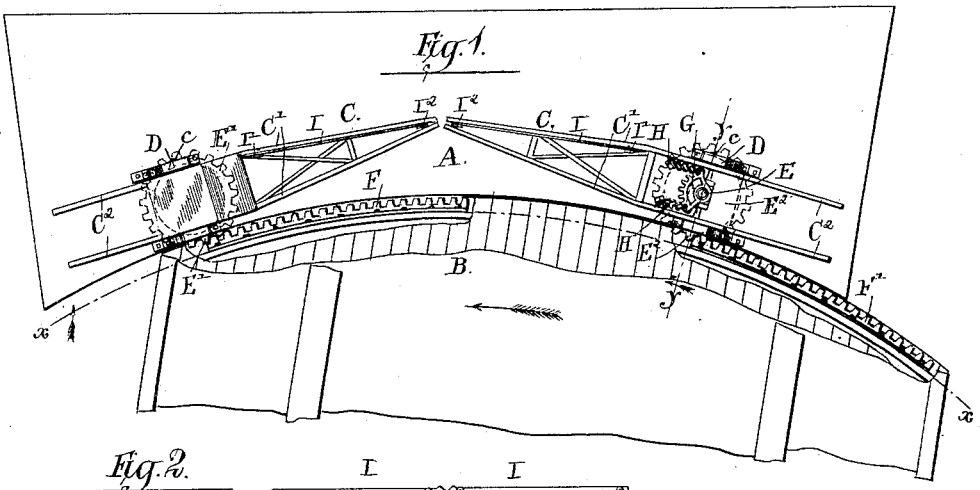


Fig. 2.

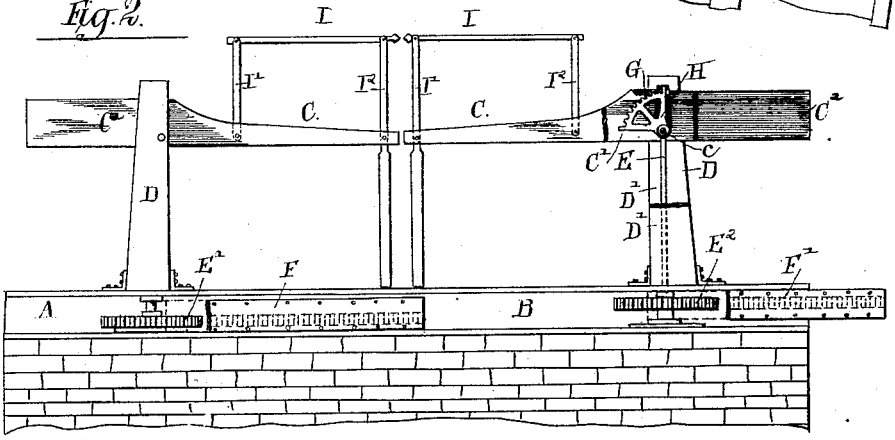


Fig. 3.

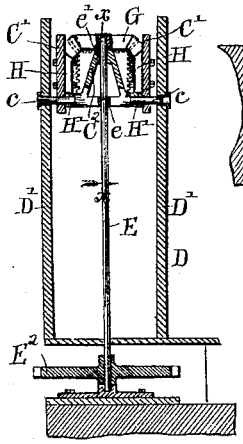


Fig. 4.

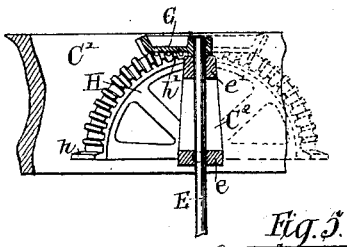


Fig. 5.

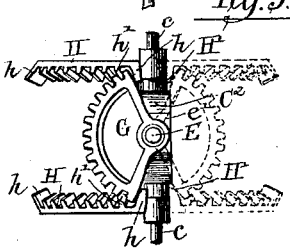
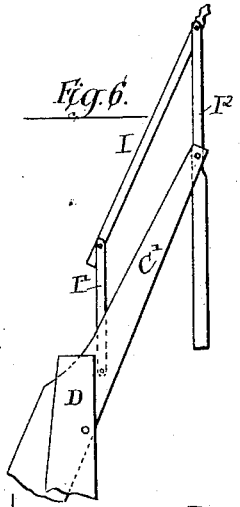


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEF STARKA, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO CELESTIN HURT, OF SAME PLACE.

BRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 342,270, dated May 18, 1886.

Application filed November 5, 1885. Serial No. 181,944. (No model.)

To all whom it may concern:

Be it known that I, JOSEF STARKA, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bridge-Gates; 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 an improved bridge-gate of that class comprising one or more pivoted arms or sweeps constructed to swing in a vertical plane; and it consists in the matters hereinafter described, and pointed out in the appended claims.

The bridge-gate herein shown as embodying my invention comprises two arms pivoted to standards at either side of the roadway over the bridge approach, and adapted to swing upwardly into a vertical position when the bridge is closed, and to fall into a horizontal position so as to meet over the roadway and close the latter when the bridge is open.

Means are provided for operating the gate-arms automatically when the bridge is swung in either direction, consisting of a novel arrangement of gearing, as will hereinafter fully appear.

In the accompanying drawings, illustrating my invention, Figure 1 is a plan view of a bridge-gate embodying my invention. Fig. 2 is a sectional elevation of the same, taken upon line *x x* of Fig. 1. Fig. 3 is a vertical transverse section, taken through a supporting post or standard, and a gate-arm, taken upon line *y y* of Fig. 1. Fig. 4 is an enlarged detail section of the gearing, taken upon line *x x* of Fig. 3. Fig. 5 is a detail plan view of the parts shown in Fig. 4. Fig. 6 is a detail view of the inner end of one of the gate-arms.

In the said drawings, A indicates the bridge-abutment; B, the end of the swing-bridge; C C, the gate arms, and D D standards supporting the arms.

E E are vertical shafts, mounted in the standards D D, and provided at their lower ends with gear-wheels E′ E², engaging gear-segments F F′ upon the vertical end face of the bridge below the level of the roadway. One of the rack-bars, F. and the wheel E′ engaged by it, is located in a plane below the other rack-bar, F′, and wheel E², thereby enabling the rack-bars at each side of the bridge to freely pass the wheels at the opposite side thereof in turning the bridge in either direction.

G is a segmental beveled gear, secured to the upper end of the shaft E, and H H are two segmental beveled gears or racks secured to the gate-arm C at opposite sides of the said shaft E concentrically with the pivots *c* of the gate-arm, both of said segmental racks being adapted to intermesh with the gear G upon the shaft, as will hereinafter more fully appear.

In the particular construction of the parts herein shown the gate-arms C each consist of two flat bars or strips, C′ C′, arranged parallel with each other at their parts adjacent to the posts, and brought together at their outer ends and properly braced to give lateral stiffness to the arms. The segmental racks H H are conveniently secured to the inner faces of the strips C′, and are preferably provided with hubs H′ H′, connected by radial arms with the racks, the pivots *c* of the arms being arranged to pass through the hubs, so that the racks will be held accurately concentric with the pivots, notwithstanding any shrinkage or warping of the strips C′ when the latter are made of wood. The standards D may be made in two pieces, D′ D′, as shown, or otherwise constructed at their upper ends to sustain the pivots *c*.

In order to afford suitable supports or bearings to the upper end of the shafts E, the pivots *c* are desirably rigidly fixed in the standards D, and are rigidly attached to or made in one piece with a metal yoke, C², located between the strips C′ and the racks H H, and suitably formed to provide one or more bearings, as *c c′*, for the said shaft. It is to be understood, however, that the details of construction in the parts above referred to may be varied in practice without departure from my invention. The racks H H each extend through one-fourth of a complete circle, and the gear G is arranged to intermesh with said racks in such manner that the gate-arms may

be turned through a quarter of a circle, or from a horizontal to a vertical position, or vice versa, by the rotation of the shaft and spur-gear G in either direction. For this purpose the said gear G is made to extend through an arc of about two-fifths of a circle, and is constructed to engage at its ends the portions of both racks when the gate-arm is either horizontal or vertical. The said racks are each provided at each end with a tooth, *h*, which rests in contact with the end tooth of the gear G when the latter is engaged at its ends with both racks, and the racks are mutilated by cutting away or shortening one or more of the teeth *h'* of the racks adjacent to the end teeth, *h*, thereof. By this construction, when the gate-arms are either horizontal or vertical and the end teeth, *h*, of the racks H H are engaged with the ends of the gear G, and the shaft E is turned in either direction, the said gear will immediately become disengaged from one of the racks and engaged with the other rack, so that the arms will be moved in the same direction, in whichever direction the shaft is turned. This result is due to the fact that the end tooth of the gear G will press against the tooth *h* of the rack toward which the gear is turned, and thereby move the rack into position for the engagement of the gear with the unmutilated teeth thereof, while the end teeth of the gear, which are engaged with the opposite rack, will move away from the end tooth, *h*, of the latter, so as to become disengaged entirely therefrom. The gear G, being semicircular, will make a half-turn in moving the arm through a quarter-circle, and when this movement is completed the end teeth of the gear G will come into contact with the teeth *h h* at the ends of the racks opposite to those first engaged by it. This construction in the rack H and gear G is clearly shown in Figs. 4 and 5, in which the parts are shown in full lines in the position taken by them when the gate-arm is horizontal, and in dotted lines in position when the gate-arm is vertical. The teeth at both ends of the gear G come into contact with the opposite teeth, *h h*, of the racks when the arms reach the upward and downward limits of its movement, so that said teeth act to positively stop the motion of the arms. Inasmuch as said teeth *h h* are liable to considerable strain in suddenly stopping the movement of the arms, said teeth are desirably made heavier and also longer than the other teeth, so that they will engage the end faces of the gear G as well as the end teeth of the latter. The curved rack-bars F F' upon the bridge are so located and arranged as to turn the gear-wheels E' E^2 and the shafts one-half a rotation in the swinging movement of the end of the bridge toward and away from the abutment. For this purpose the said rack-bars are made sufficiently long to give one complete rotation to said shafts, and said rack-bars are arranged upon the bridge in such manner that when the bridge is closed and the gate-arms open, or in a vertical position, the middle portions of said rack-bars will be in engagement with the gear-wheels E' E^2, so that when the parts are in this position and the bridge is moved in either direction the shafts will be given a half-turn before the rack-bars become disengaged therefrom, and will by the action of the gears G and H, as before set forth, thereby swing the gate-arms downwardly into a horizontal position. The gates having been left closed in the opening of the bridge, it is entirely obvious that in the approach of the bridge end to the abutment from either direction in closing it one of the ends of each rack-bar upon the bridge will encounter its corresponding gear-wheel and give the shaft belonging thereto a half-rotation before the bridge reaches its closed position.

As an improved construction in swinging gate-arms of the character herein shown, whereby said arms will afford a more substantial barrier to the open bridge-draw, I place above and parallel with each of said arms a bar, I, which is connected at one end with the arm by means of a link or rod, I', pivoted at its opposite extremities to the arm and bar, and is united with the arm at its opposite end by means of a bar, I^2, also pivoted to the bar and arm, and extended below the latter, and made of sufficient weight in its lower part to hang constantly vertical during the movements of the arm in such manner that the bar I will be sustained horizontally above the arm when the latter is horizontal, as shown in Fig. 1, and will be folded against the arm when it is vertical, as shown in Fig. 6. The bar I^2 is, as preferably constructed, located at the outer or free end of the arm, and adapted to rest at its lower end upon the ground or roadway, so as to sustain the arm when the latter is in its horizontal position.

The gate-arms C are herein shown as provided with parts C^2 C^2, extended outwardly beyond the standards D D, so as to close the foot-walls at the sides of the roadway, said parts C^2 C^2 being preferably made sufficiently heavy to counterbalance the weight of the arms. In carrying out my invention, however, the arms may be counterweighted by other means than that shown, and other well-known devices may be employed for closing the foot-walls in case devices for this purpose are necessary.

It is to be understood that the appended claims cover the devices, parts, and elements therein set forth, when said devices, parts, or elements are in form to obtain or perform any, either, or all of the advantages or functions obtained or performed by them in the particular construction thereof herein illustrated.

I claim as my invention—

1. The combination, with a pivoted gate-arm and a shaft for moving the latter, of a segmental gear upon the shaft, and two segmental racks upon the gate-arm, each of said segmental racks having a tooth or teeth adjacent to its end teeth cut away or shortened,

whereby the gate-arm may be raised or lowered by a rotary movement of the shaft in either direction, substantially as described.

2. The combination, with a swing-bridge provided with a rack-bar at its end, of a pivoted gate-arm, a vertical shaft provided with a gear-wheel engaging the said rack-bar, a segmental gear upon the shaft, and two segmental racks upon the gate-arms, each of said racks having one or more teeth adjacent to its end teeth cut away or shortened, whereby the gate-arm may be raised or lowered by the swinging of the bridge in either direction, substantially as described.

3. The combination, with a swing-bridge provided with two rack-bars located in different vertical planes, of two pivoted gate-arms, two vertical shafts provided with gear-wheels corresponding in location with and adapted to engage said rack-bars, segmental gears upon the upper ends of said shafts, and two segmental racks upon each of said gate-arms having one or more teeth adjacent to their end teeth cut away or shortened, substantially as and for the purpose set forth.

4. The combination, with a pivoted gate-arm and a shaft for moving the latter, of a segmental gear upon the shaft, and two segmental racks upon the gate-arm, the said segmental racks having long end teeth, *h h*, engaging the ends of the gear, and having its teeth *h'* adjacent to the teeth *h h* cut away or shortened, substantially as described.

5. The combination, with a pivoted gate-arm, comprising two flat sides or strips, C, and a vertical shaft, E, of a segmental gear, G, upon the shaft, and two segmental racks, H H, secured to the inner faces of the strips C' C' of the gate-arm, said segmental racks having one or more teeth cut away or shortened, substantially as described.

6. The combination, with a swinging gate-arm, of a bar, I, located above the arm, and pivoted bars or links I' I^2, connecting said bar I with the gate-arm, one of said bars being extended below the arm and made of sufficient weight to move the bar I when the gate is swung, substantially as described.

7. The combination, with a swinging gate-arm, of a bar, I, located above the arm, and pivoted bars or links I' I^2, connecting said bar I with the gate-arm, the bar I^2 at the free end of the arm being extended below the arm to sustain the latter when horizontal and made of sufficient weight to move the bar I when the gate is swung, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOSEF STARKA.

Witnesses:
C. CLARENCE POOLE,
CHAS. H. MANNING.