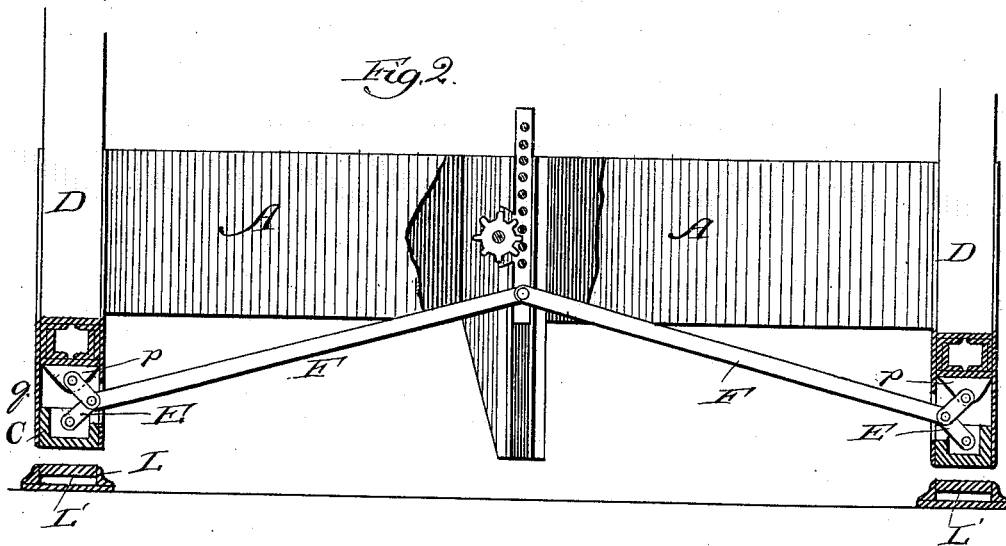
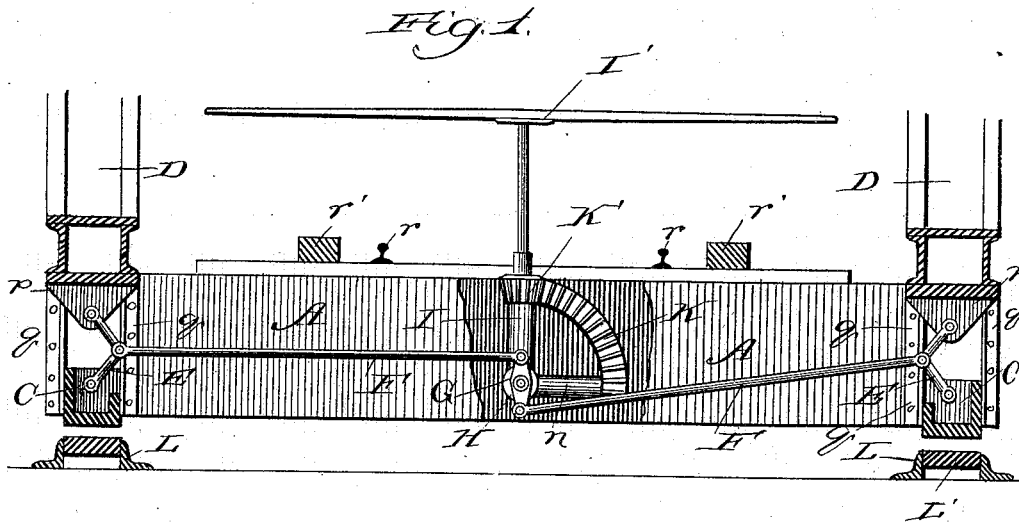


C. F. T. KANDELER.

BRIDGE.

No. 343,377.

Patented June 8, 1886.



Witnesses:  
C. F. T. Kandler,  
C. P. Hubbard.

Inventor:  
C. F. Theodor Kandler,  
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Attys.

(No Model.)

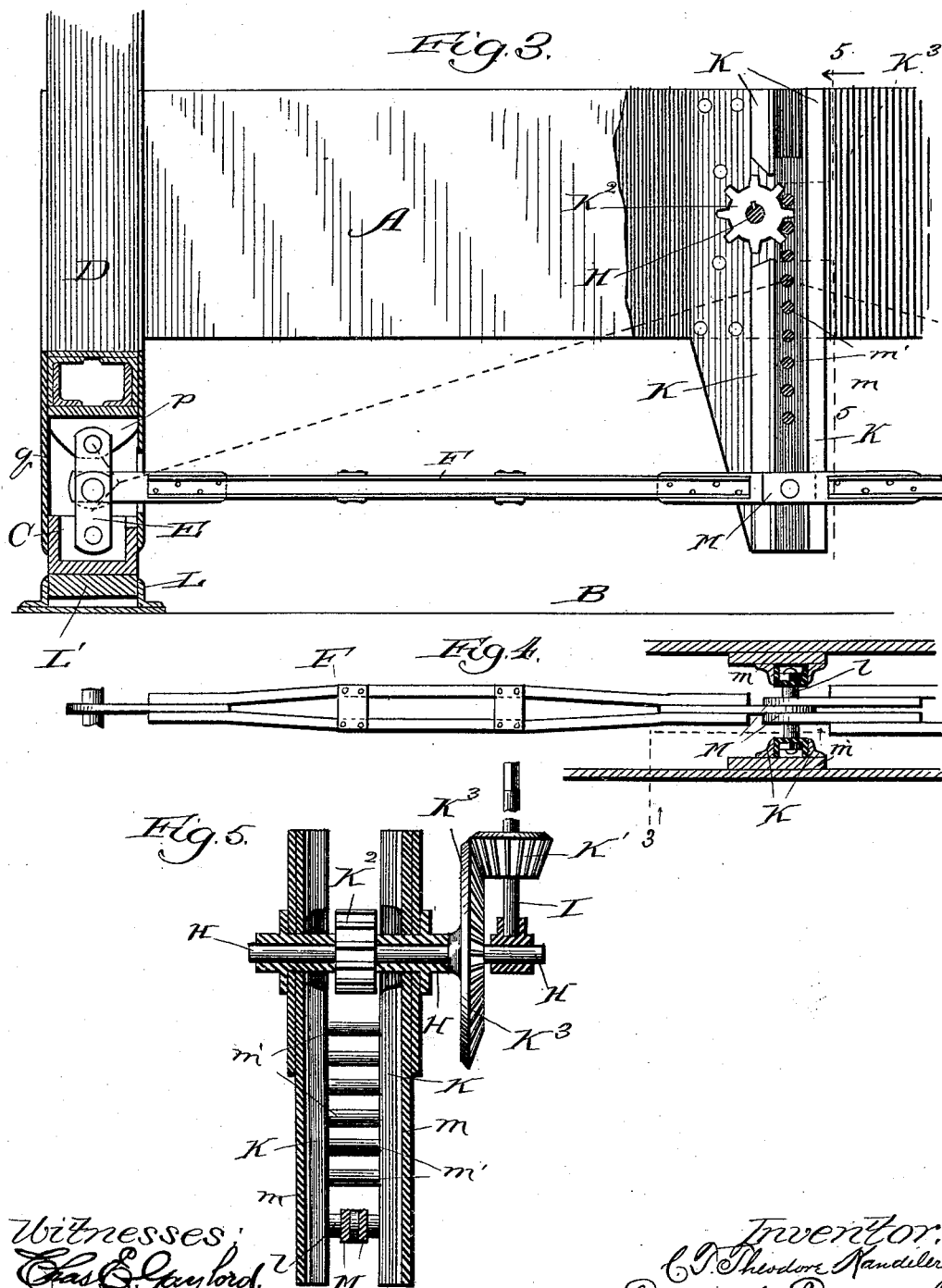
2 Sheets—Sheet 2.

C. F. T. KANDLER.

BRIDGE.

No. 343,377.

Patented June 8, 1886.



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# UNITED STATES PATENT OFFICE.

C. F. THEODOR KANDELER, OF CHICAGO, ILLINOIS.

## BRIDGE.

SPECIFICATION forming part of Letters Patent No. 343,377, dated June 8, 1886.

Application filed February 23, 1886. Serial No. 192,805. (No model.)

*To all whom it may concern:*

Be it known that I, C. F. THEODOR KANDELER, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bridges; and I hereby declare the following to be a full, clear, and exact description of the same.

My improvement relates to the class of draw-bridges; and it relates particularly to means for adjusting the ends of such bridges when closed and previous to opening them. It is quite common to provide draw-bridges, especially railroad draw-bridges, with mechanism whereby after the bridge has been closed its ends are propped upon their respective piers to prevent the advent of a train upon one end from tilting the bridge, and thus raising the opposite end, which propping mechanism requires to be loosened before swinging the bridge from its closed position.

To accomplish the aforesaid operations, two kinds of mechanism are known to me to have been used hitherto—one comprising wedges driven under or withdrawn from underneath the corners of the bridge upon the piers, and connected at each end of the bridge with a screw, both being actuated either from the center of the bridge by a key and connected for the purpose with a centrally-located arbor by intermediate gearing, or each actuated separately from arbors toward the respective ends of the bridge, and the other comprising toggle-levers connecting vertically-movable parts of the supporting-corners of the bridge at each end, and actuated to prop or release the end, as required, by means of a screw or worm connected with each end pair of toggle-levers operated in either of the ways indicated in mentioning the wedge-propping contrivance.

Each of the propping devices referred to presents an objection of its use, which renders any improvement very desirable that will materially overcome it, the objection consisting in the enormous friction produced in operating the mechanism which is very great in the wedge and screw contrivance, requiring, as can be shown by a simple mathematical demonstration, the exertion of a force equal to three times the resistance to overcome the latter, and almost as

great with the toggle and worm or screw contrivances, which latter are themselves but forms of wedges.

It is my object to provide means for the above-named purpose, which shall be operative with comparatively little attendant friction and of simple construction, and also auxiliary propping means to produce compensation for the settling of the piers, and of the central support upon which the bridge is swung; and to this end my invention consists in the general construction of my improvement; and it also consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

In the drawings, Figure 1 illustrates a sectional end elevation of part of a draw-bridge and the adjacent pier, showing my preferred improved mechanism for adjusting the end of the bridge, which is represented as released from the propping effect of the mechanism previous to swinging the bridge; Fig. 2, a similar view showing a modified construction of my adjusting mechanism; Fig. 3, a similar view of a longitudinally-broken portion of the bridge, showing the modified construction of the adjusting mechanism, and representing the end of the bridge as propped in its closed position; Fig. 4, a plan view of the strut of the construction shown in Figs. 2 and 3; and Fig. 5, a sectional view taken on the line 5 5 of Fig. 3.

A is the end-floor-beam which supports, indirectly, but in a common manner, the track  $r$ , and also the guard-rails  $r'$ ; and B denotes the pier for supporting the end of the bridge. CC are cast-iron blocks between lateral guides  $q$  riveted, as shown in Fig. 1, to the end floor-beams, A, or, as shown in Fig. 2, each to a truss, D, of the bridge. To the trusses D castings  $p$  are secured. Each casting  $p$  is connected with a cast-iron bearing or block, C, by means of a toggle-lever, E, and the toggle-levers, at opposite corners of the end of the bridge, are connected, each at its joint, by means of a strut, F, with a link or lever, G, toward opposite ends of the same, which is secured at its center upon the end of a horizontal shaft, H, provided with a rigid arm,  $n$ , carrying toward its extremity a segmental rack, K, en-

gaging with a beveled pinion, K', on the arbor I. The arbor I may, for the sake of convenience, be near the center of the bridge and operated by the same key which is used to swing it, when the shaft H will be sufficiently long to extend to the center and will carry the rack K on the arm *n* at a position to cause engagement of the rack with the pinion K; or the arbor may be located toward the end of the bridge, when the shaft H will not have to be so long.

The operation of the mechanism shown in Fig. 1 is as follows: By turning the key I' in one direction, after the bridge has been closed, the rack K will be actuated by the pinion K' to turn the shaft H, thereby turning the lever G and straightening the toggle-levers E, whereby the bearings C will be forced against the supports L on the pier, and held there, affording a rigid foundation for the end of the bridge until it is desired to swing the latter, when the toggle-levers are bent to lift the end bearings, C, to permit the bridge to swing. These supports L may be increased or decreased in height by adding or removing metal blocks L', according as the piers at opposite ends of the bridge settle unevenly or the central support, upon which the bridge swings, settles, and the blocks always afford means for adjusting the propping mechanism with reference to the amount of vertical play of the ends of the bridge upon the piers.

Of course the propping mechanism is provided at each end of the bridge, though only shown in connection with one end, owing to the nature of the views selected to illustrate the invention.

The rack K, instead of being segmental, may be straight, as shown in Figs. 2 and 3, and comprise, as the most desirable construction for a straight rack used in this connection, side bars, *m*, connected by cross-rods *m'*, and operated to be raised for releasing the propping mechanism, and lowered to set it, by means of a pinion, K<sup>2</sup>, engaging with it, and supported upon the shaft H, carrying a beveled gear-wheel, K<sup>3</sup>, in mesh with the beveled pinion K' on the arbor I. When this last-named mechanism is used, I connect the toggle-levers E to the rack, toward its lower end, by means of the jointed strut-connection F, constructed preferably as shown in Fig. 3, where the break-joint is pivotally secured to a pin, *l*, extending, like the cross-rods *m'*, between the side bars, *m*, of the rack. With this last-named construction, in breaking the joints of the toggle-levers by raising the rack K with the turning in one direction of the arbor I through the medium of the intermediate gear, already described, the strut F is raised from its center or break joint, as shown in Fig. 2, and lowered by turning the arbor in the opposite direction to the position represented in Fig. 3, by lowering the rack to straighten the toggle-levers in propping the end of the bridge.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, and comprising propping toggle-levers, a rack with which the toggle-levers are connected, a pinion engaging with the rack, and means, substantially as described, for operating the pinion to move the rack and thereby actuate the toggle-levers, substantially as set forth.

2. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, and comprising toggle-levers, a rack with which the toggle-levers are connected, means, substantially as described, for moving the rack to actuate the toggle-levers, and adjustable supports L L' upon the pier, substantially as set forth.

3. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, and comprising bearing-blocks C, castings *p*, toggle-levers connecting the said castings and bearing-blocks and carrying the latter, a rack, K, with which the toggle-levers are connected, and means, substantially as described, for moving the rack to actuate the toggle-levers, substantially as set forth.

4. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, and comprising bearing-blocks C, castings *p*, toggle-levers connecting the said castings and bearing-blocks and carrying the latter, a rack, K, with which the toggle-levers are connected, means, substantially as described, for moving the rack to actuate the toggle-levers, and adjustable supports L L' upon the pier, substantially as set forth.

5. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, comprising bearing-blocks C, movable in guides *g*, supporting-castings *p*, toggle-levers E, connecting the said castings and bearing-blocks and carrying the latter, a rack, K, struts F, connecting the toggle-levers and rack, and means, substantially as described, for moving the rack to actuate the toggle-levers, substantially as set forth.

6. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, and comprising bearing-blocks C, movable in guides *g*, supporting-castings *p*, toggle-levers E, connecting the said castings and bearing-blocks and carrying the latter, a rack, K, struts F, connecting the toggle-levers and rack, a pinion engaging with the rack, and an arbor connected with the pinion and operated by a key to actuate the toggle-levers, substantially as described.

7. The combination, with a draw-bridge, of means for propping and releasing an end upon its pier, comprising bearing-blocks C, movable in guides *g*, supporting-castings *p*, toggle-levers E, connecting the said castings and bearing-blocks and carrying the latter, a shaft, H, carrying a lever, G, secured centrally upon

on its end, struts F, connecting the toggle-levers with opposite ends of the lever G, a segmental rack, K, an arm, *n*, rigidly connecting the rack with the shaft H, an arbor, I, carrying a beveled pinion, K', engaging with the rack and operated by a key, I', to move the rack to actuate the toggle-levers, and adjust-

able supports L L' upon the pier, the whole being constructed and arranged to operate substantially as described.

C. F. THEODOR KANDELER.

In presence of—

HENRY HUDSON,

JULIUS W. DYRENFORTH.