(No Model.)

H. J. ROHLF.

SAFETY GATE FOR BRIDGES.

No. 486,738. Patented Nov. 22, 1892.

Fig. 1.

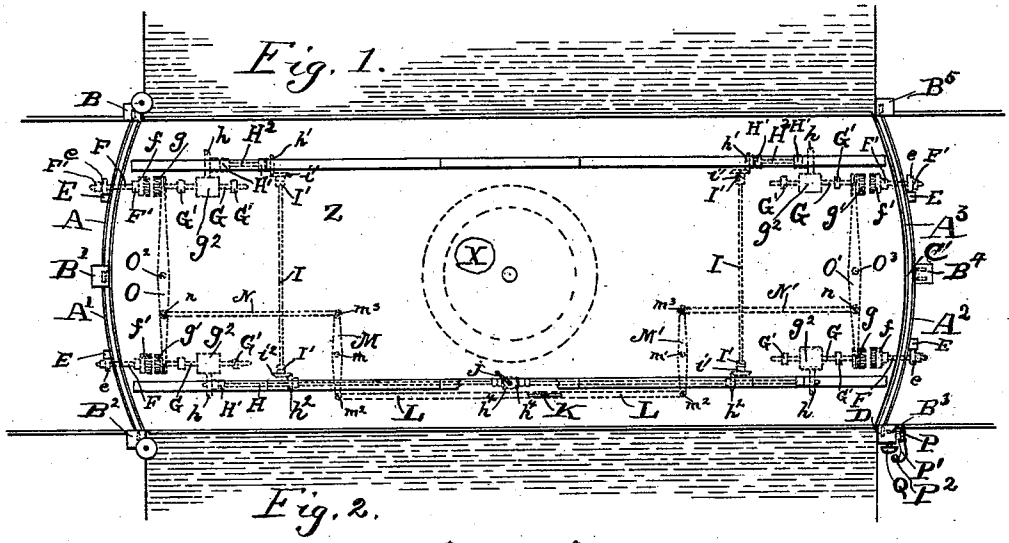


Fig. 2.

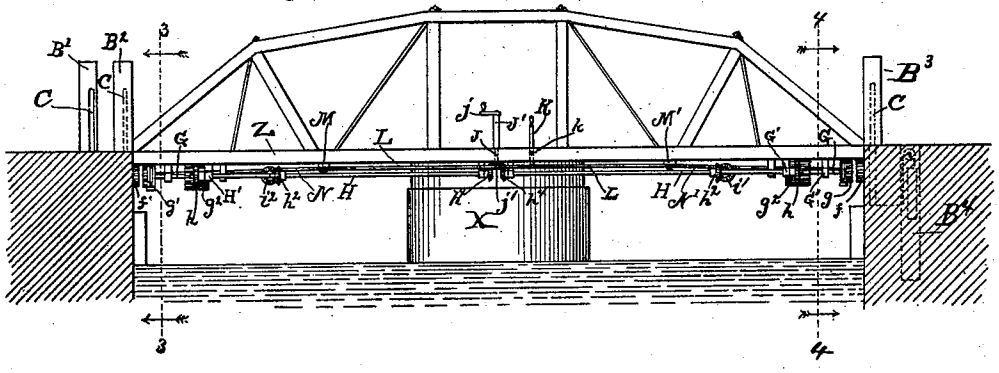


Fig. 3.

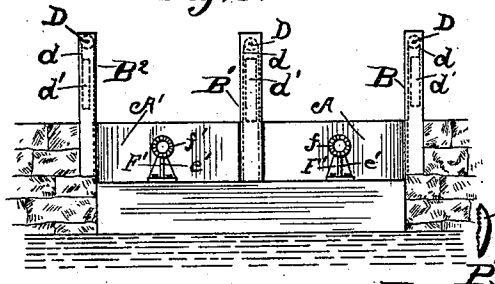


Fig. 4.

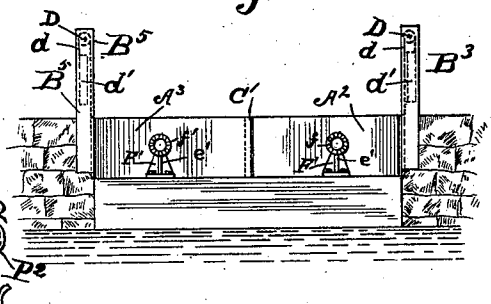
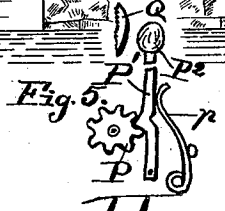


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SAFETY-GATE FOR BRIDGES.

SPECIFICATION forming part of Letters Patent No. 486,738, dated November 22, 1892.

Application filed August 29, 1892. Serial No. 444,385. (No model.)

To all whom it may concern:

Be it known that I, HENRY JOHN ROHLF, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety-Gates for Bridges, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to understand and make the same.

My invention relates to the construction of a safety-gate especially adapted to be used in connection with swinging drawbridges, although it is to be distinctly understood that my safety-gate can be used for highways, roads, and streets, at the crossing thereof of railroad-tracks.

The purpose of my invention is to obtain a safety-gate which when closed will form a part of the roadway designed to be closed by the raising of the gate; to obtain a gate whereof one-half only of the roadway need be closed at once on opposite sides of the drawbridge or railroad-track—that is to say, a gate whereof the portion covering the approach to the drawbridge or railroad-track on both sides of such drawbridge or railroad-track can be closed—preventing the driving of vehicles from either side onto the drawbridge or railroad-track, while the half of the safety-gate obstructing when raised the other half of the roadway, or the side thereof on which vehicles are driven from the drawbridge or railroad-track, is left open, so that when the safety-gate has been raised against the approach of vehicles from either side to the drawbridge or railroad-track such vehicles can drive off from such drawbridge or railroad-track before the remainder of the gate is closed, and the drawbridge or railroad-track thereby put in position to be used for the passage of vessels or trains.

A further object of my invention is to obtain a safety-gate for drawbridges or railroad-tracks which can be readily operated by a person standing on the drawbridge or railroad-track, that will be simple in construction, and durable in operation.

A further object is to obtain safety-gates of the kind named which will in the operation thereof automatically sound a bell or gong.

In the drawings named as accompanying and forming a part of this specification I have illustrated my safety-gates as being erected across a highway, road, or street at the two approaches of a swinging drawbridge.

In the drawings, Figure 1 is a plan view of a closed drawbridge with the gates in position at the approaches thereof, so that vehicles can pass over them onto and off from the drawbridge, and with the mechanism necessary in and about the operation of the gates indicated by broken lines, such mechanism being underneath the bridge; Fig. 2, a side elevation of the bridge with the supporting central pier and with the gates at the approaches thereof in the same position as in Fig. 1; Fig. 3, a front elevation of the gates at one end of the bridge, viewed on line 3 3 of Fig. 2 and looking in the direction indicated by the arrow; Fig. 4, a front elevation of the gates at the other end of the bridge, viewed on line 4 4 of Fig. 2 and looking in the direction indicated by the arrows; and Fig. 5, an elevation, on an enlarged scale, of a portion of the mechanism whereby the automatic striking of the bell or gong in the raising or lowering of the gates is attained.

The same letter of reference is used to indicate a given part where more than one view thereof is shown in the several figures of the drawings.

X is the pier of the bridge, and Z is the bridge.

A A′ are the gates at one end of the bridge, and A^2 A^3 are the gates at the other end of the bridge. All these gates are placed between the end of the bridge and the end of the approaches thereto, and a vertical movement is provided for in such gates to permit of their being raised to close the roadway of the approaches when desired. Gate A in its upward and downward movement is guided and controlled by the ends thereof moving in grooved guides in posts B B′, respectively, and gate A′ in its upward and downward movement is guided and controlled by the ends thereof moving in grooved guides in posts B′ B^2. Post B′, it will be observed, extends above the roadway in the same manner as do posts B B^2. This extension of post B′ above the roadway is not essential, except where the roadway is of considerable width.

Where the roadway is not so wide as to require post B′ to extend above the ground, the construction illustrated at the other end of the bridge—that is, at the right hand of Figs. 1 and 2 and in Fig. 4 and hereinafter described—is by me preferred, and in such construction the central post is lettered B^4 and does not extend above the roadway. Gate A^2 has a vertical movement, one end thereof moving in a groove therefor in post B^3 and the other end thereof being grooved or tongued into the adjacent end of gate A^3, while the outside end of gate A^3 moves vertically in grooves in post B^5. The groove in each of the several posts B B′ B^2 B^3 B^5 is lettered C, and the groove and tongue of the adjacent ends of gates A^2 A^3 are lettered C′.

D D are pulleys in posts B B′ B^2 B^3 B^4 B^5, respectively, over which pulleys the chain, cord, cable, or rope *d* extends, one end of such chain, cord, cable, or rope being secured to the gate counterbalanced thereby and the other end to weight *d*′. Two of these weights are attached to each gate and are made of suitable size to counterbalance such gate, so that it will remain either raised or lowered where placed.

When the roadway and bridge are to be used for the passage of vehicles, the gates are down.

To raise the gates I provide the following described mechanism: Back of each of the respective gates is placed a rack E, with which rack-gear *e*, secured rigidly on a shaft extending through a groove in the gate from the front thereof, intermeshes. The groove in each one of the several gates through which the shaft on which gear *e* is rigidly secured extends is lettered *e*′ and the shafts are lettered, respectively, F F F F. Each one of the shafts F F F F is rotatably journaled in bearings F F′ F′. On the drawbridge there are placed the shafts G G, journaled in bearings G′ G′, respectively, in such manner as that both a rotary movement may be given thereto and a longitudinal movement.

g g′ are clutch-wheels on the respective shafts G G, clutch-wheel *g* being adapted to be engaged with clutch-wheel *f* on shaft F or to be disengaged therefrom by longitudinal movement of shaft G in its journal-bearings G′, and clutch-wheel *g*′ being adapted to be engaged with or disengaged from clutch-wheel *f*′ on shaft F by longitudinal movement of shaft G in its journal-bearings. Clutch-wheel *f* is or may be identical in construction with clutch-wheel *f*′, and clutch-wheel *g* may be identical in construction with clutch-wheel *g*′, the difference in lettering of such clutch-wheels being adopted for convenience in hereinafter describing the operation of the machine; and the particular clutch-wheels illustrated in the drawings form no part of this invention, as other clutch-wheels of suitable form or shape may be substituted for the ones illustrated in the drawings.

g^2 is a gear-wheel, secured rigidly on shaft G, of sufficient depth to allow the longitudinal movement required in shaft G without the teeth of such wheel g^2 becoming out of engagement with gear-wheel *h* on shafts H H^2, respectively. Shafts H H^2 are respectively rotatably journaled in bearings H′ H′.

h′ is a beveled gear at one end of shaft H^2, engaging with beveled gear *i*′ on one end of shaft I. Shafts I I are respectively rotatably journaled in bearings I′ I′.

i^2 is a beveled gear at one end of shaft I′, intermeshing with beveled gear h^2 on shafts H H, respectively.

h^4 h^4 are beveled gears on shafts H H, respectively.

J is a vertical shaft rotatably journaled in bearing or standard J′, and *j* is a crank on the upper end of shaft J, by which it may be rotated.

j′ is a beveled gear on the lower end of shaft J, intermeshing with beveled gears h^4 h^4 on shafts H H. By the several shafts H H, H^2, I, and J, with the respective intermeshing gear-wheels thereon, as described, when the vertical shaft J is rotated by crank *j* or by other means, clutch-wheels *g g g*′ *g*′ will be rotated.

To raise the gate on one side of the roadway at one end of the bridge Z and on the other side of the roadway at the other end of the bridge, the shafts G G, whereon are respectively placed the clutch-wheels *g g*, must be moved longitudinally in the bearings thereof, so that such clutch-wheels will come in contact with clutch-wheels *f f* at opposite ends of the bridge on shafts F F, respectively, and to operate the gates on the remaining sides of the roadway at both ends of the bridge the shafts having thereon the clutch-wheels *g g*, respectively, must be moved longitudinally in their respective bearings, so as not to be intermeshed or in engagement with clutch-wheels *f f*, and the shafts G G, having thereon the respective clutch-wheels *g*′ *g*′, must be moved longitudinally in their respective journal-bearings G′ G′, so as to come in engagement or clutch with clutch-wheels *f*′ *f*′ on the respective shafts F F. To swing the bridge it is necessary that none of the clutch-wheels *g g*′ be in contact with any of the clutch-wheels *f f*′, respectively.

To move the shafts G G longitudinally, as above required, I provide the following mechanism: Lever K is fulcrumed to the bridge on pivot *k*, so that such lever can be actuated by a person standing on the bridge, and to the lower end of such lever K are secured the longitudinally-movable rods L L. One of the rods L extends to one end of lever M, and is secured thereto by pivot m^2, while the other of such rods extends to lever M′, to one end of which it is secured by a like pivot m^2. Lever M is fulcrumed to the bridge on pivot *m*, while lever M′ is fulcrumed to the bridge on pivot *m*′. The other end of lever M has secured thereto by pivot m^3 link N, which link extends to lever O, and is attached thereto by

pin *n*. Lever O is fulcrumed to the bridge on pivot O^2. Lever O extends from one of the shafts G at one end of the bridge to the other of the shafts G on such end of the bridge, and is attached to such shafts G G, so that a partial turning of such lever O will produce longitudinal movement in both of such shafts, one thereof being moved forward and the other backward, so that both clutch-wheels *g* *g'* may be freed from engagement with wheels *f f'*, respectively, or clutch-wheel *g* may be brought in engagement with clutch-wheel *f*, while clutch-wheel *g'* is brought farther away from engagement with clutch-wheel *f'*, or vice-versa, as desired. To move the shafts G G at the other end of the bridge at the same time by the movement of the lever K lever M' is connected to link N', such link N' being secured to lever O' by pivot *n*, and lever O' is fulcrumed to the bridge on pivot O^3 with the ends of this lever O' extending to and connected with the respective shafts G G in like manner as lever O at the other end of the bridge extends to and connects with shafts G G at such end.

When lever K is in a vertical position, as illustrated in Fig. 2, all of the clutch-wheels *g g g' g'* are freed from engagement with clutch-wheels *f f f' f'* on shafts F F F F, and the bridge may be turned. Before turning the bridge, however, the gates should be raised.

The operation of raising the gates is as follows: Assuming that teams or vehicles meeting each other pass to the right, as is ordinarily done, then the upper half of the bridge in Fig. 1, as such figure is held to be viewed, will be designed for travel extending from the right-hand end thereof (as viewed) toward the left-hand end thereof across the bridge and the lower half of such drawbridge will be designed for travel extending in the opposite direction. In such case when the bridge is to be opened it will be found desirable to raise the gates A' A^3 first, so that the travel may be intercepted from going onto the bridge but allowed to pass out or off therefrom over the gates A A^2, respectively. After all the vehicles on the bridge have passed therefrom the remaining gates A A^2 are then closed.

To close the gates A' A^3 the upper end of the lever K should be thrown toward the left, Fig. 2—that is, toward gate A'—thereby forcing rods L L to the right, and thus partially turning levers M M', respectively, and moving links N N' longitudinally to the left, thus turning levers O O', respectively, a slight distance around on the fulcrums O^2 O^3 thereof, respectively, in the direction in which the hands of a clock move, thus moving the shafts G G G G on which are clutch-wheels *g g g' g'*, respectively, longitudinally in their journal-bearings, so that the clutch-wheels *g'* to the lower left hand and the upper right hand of Fig. 1 will engage with the adjacent clutch-wheels *f' f'* while clutch-wheels *g g* at the upper left hand and lower right hand of Fig. 1 will be retracted from the adjacent clutch-wheels *f f*. When the several clutch-wheels are in the last-described position, the turning of the shaft J either by crank-arm *j* or by any other suitable power will turn the several connecting-shafts H H, I I, H^2 H^2, G G G G, and F F and gates A' A^3 will be raised. Lever K is then thrown to the extreme right-hand one of its possible positions and thereby the clutch-wheels *g g* are thrown into contact with the adjacent clutch-wheels *f f*. Turning of the shaft J will then raise into position the gates A A^2. The lever K is then again returned to a vertical position, thereby releasing all the several clutch-wheels *g g g' g'* from the adjacent clutch-wheels *f f f' f'* and the bridge can be opened. When the bridge is closed, the operation is repeated in order to close the several gates, the shaft J being turned into the opposite direction.

To give an alarm as the several gates or any one thereof is moved up or down in the guides therefor, the shaft on which is rigidly secured pulley D is extended to one side of the post in which it is rotatably mounted, and toothed wheel P is rigidly secured thereto and lever P', having at the upper end thereof hammer P^2, is mounted on such post with spring *p* tending to hold such lever against such toothed wheel. Rotation of the wheel P will produce a vibratory movement in lever P', causing hammer P^2 to strike against and sound gong or bell Q.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a safety-gate, the combination of a two-part vertically-movable gate located at each approach of a drawbridge or railroad-crossing, a vertical rack on each part of the gate, a slotted opening through each part of the gate, a rotatable shaft extending through the slotted opening, a gear-wheel at one end of the shaft, intermeshing with the rack on the gates and a clutch-wheel at the other end thereof, longitudinally-movable rotatable shafts having clutch-wheels thereon adjacent to the first-named clutch-wheels, a lever above the floor of the bridge, and connecting mechanism whereby such clutch-wheels can alternately be thrown into and out of engagement by longitudinal movement of the longitudinally-movable rotatable shafts, a rotatable vertical shaft extending above the level of the highway, and rotatable shafts having intermeshing gear-wheels thereon connecting the vertical shaft with the longitudinally-movable rotatable shafts, whereby rotation of the vertical shaft will produce rotation of such longitudinally-movable shafts, substantially as described.

2. In a safety-gate, the combination of a two-part vertically-movable gate located at each approach of a drawbridge or railroad-crossing, a vertical rack on each part of the gate, a slotted opening through each part of the gate, a rotatable shaft extending through

the slotted opening, a gear-wheel at one end of the shaft, intermeshing with the rack on the gates and a clutch-wheel at the other end thereof, longitudinally-movable rotatable shafts having clutch-wheels thereon adjacent to the first-named clutch-wheels, a lever above the level of the roadway and connecting mechanism whereby such clutch-wheels can alternately be thrown into and out of engagement by longitudinal movement of the longitudinally-movable rotatable shafts, a rotatable vertical shaft extending above the level of the highway, and rotatable shafts having intermeshing gear-wheels thereon connecting the vertical shaft with the longitudinally-movable rotatable shafts, posts having rotatable pulleys in the upper part thereof, flexible connections extending over the pulleys and attached at one end to the gates and at the other end to the counter-weights, a toothed wheel secured to the pulley-shaft and rotated thereby, a spring-lever resting against the toothed wheel, a bell-hammer on the spring-lever, and a bell, substantially as described.

3. In a safety-gate, a vertically-movable gate, a post having rotatable pulleys in the upper end thereof, a connection extending over the pulleys, one end whereof being attached to the gate and the other end to counter-weights, in combination with a toothed wheel rigidly secured to the shaft on which one of the pulleys is rigidly secured, a spring-lever resting against the toothed wheel, a bell-hammer on one end of such spring-lever, and a bell placed so that the hammer on the spring-lever will strike it when such spring-lever is actuated by the movement of the gate, substantially as described.

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