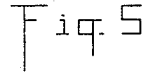
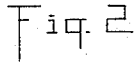
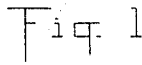


2 Sheets—Sheet 1.

No. 418,027.

Patented Dec. 24, 1889.



inventors:

Benjamin R. Hoyt  
Louis Fracher

By James Whittemore Atty.

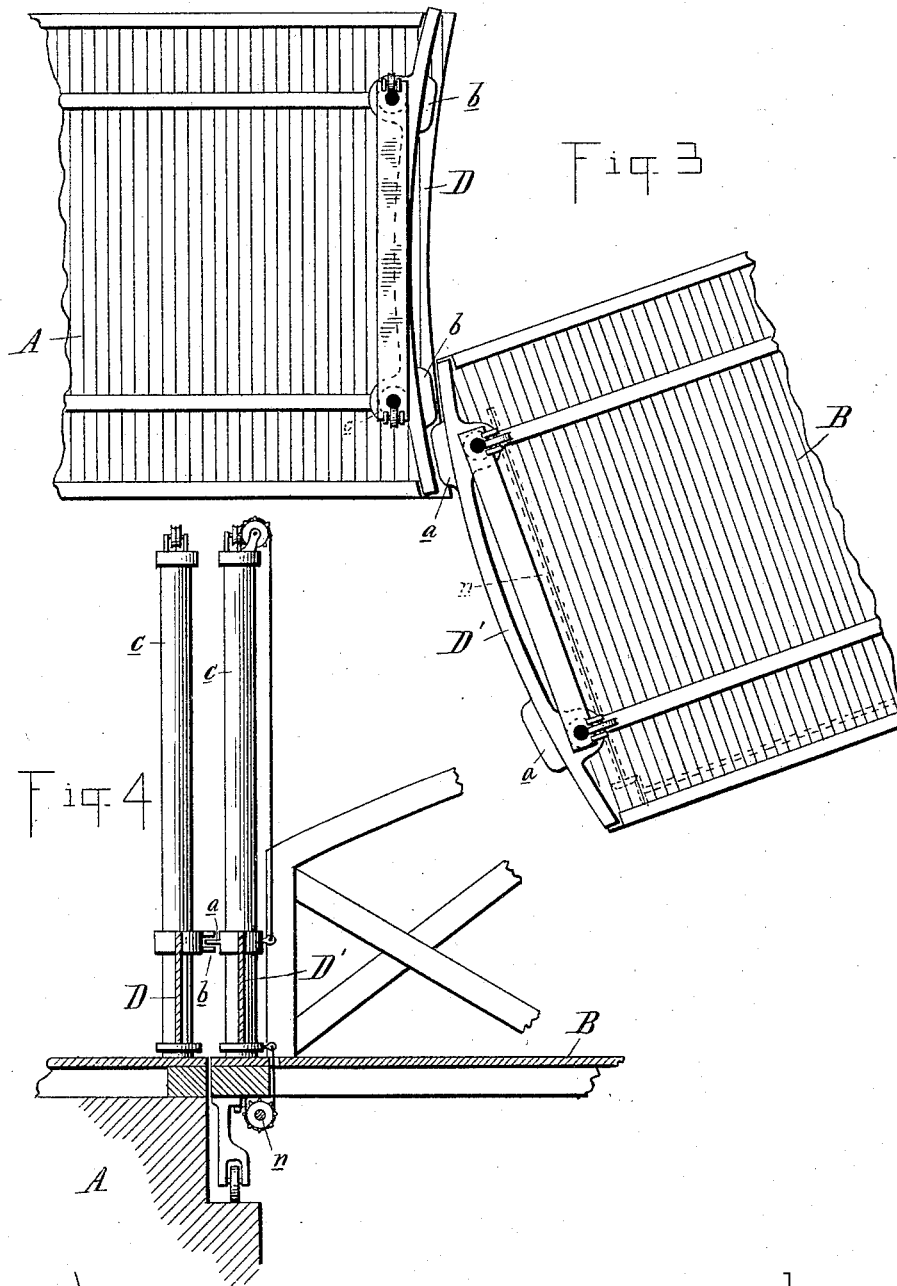
(No Model.)

2 Sheets—Sheet 2.

B. R. HOYT & L. FRACHER.  
SAFETY GATE FOR DRAW BRIDGES.

No. 418,027.

Patented Dec. 24, 1889.



Witnesses:  
*P. M. Hulbert*  
*E. M. Ready*

Inventors:  
Benjamin R. Hoyt  
Louis Fracher  
By *James Whittemore* Atty.

# UNITED STATES PATENT OFFICE.

BENJAMIN R. HOYT AND LOUIS FRACHER, OF DETROIT, MICHIGAN.

## SAFETY-GATE FOR DRAW-BRIDGES.

SPECIFICATION forming part of Letters Patent No. 418,027, dated December 24, 1889.

Application filed October 16, 1889. Serial No. 327,242. (No model.)

*To all whom it may concern:*

Be it known that we, BENJAMIN R. HOYT and LOUIS FRACHER, citizens of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Safety-Gates for Draw-Bridges, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to new and useful improvements in bridge-gates especially designed for swinging draw-bridges.

The invention consists, first, in providing the swinging draw with gates at the ends of the draw, which gates operate in conjunction with the gates at the stationary ends of the bridge; second, in combining the operating mechanism of said gates with the mechanism for swinging the draw in such a manner that they are adapted to be operated independent of each other; and, further, in the peculiar construction, arrangement and combination of the various parts, as more fully hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a draw-bridge of known construction and provided with our improved bridge-gates. Fig. 2 is an elevation of one of the extension ends of abutments of the bridge with the gates shown in closed position. Fig. 3 is a plan of the abutting ends of the stationary parts of the bridge and of the draw, the latter being partially swung out of position. Fig. 4 is a vertical central section through the bridge-gates when closed. Fig. 5 is a detail perspective view of the mechanism for transmitting motion either to the gates or to the draw.

A are the stationary ends or abutments of a bridge.

B is a swinging draw.

C is the abode of the bridge-tender, in which the operating-machine is housed, and D D' are the respective gates guarding the ends of the stationary part of the bridge and the ends of the draw. These gates are substantially of known character, in so far that they are drawn up or down to open or close the passage-way across the bridge. Our invention consists in placing one of such gates at the end of the stationary part and one at the adjoining end of the draw in such close proximity

to each other and provided with suitable devices that if the draw is closed the gates are connected together so that they may be raised and lowered jointly. To this end we preferably provide one of the gates with a tenon *a*, which engages into a corresponding mortise *b* on the adjoining gate. This mortise-and-tenon engagement we preferably form on the upper rail at two places on opposite sides of the center of the bridge, at or near the point where the vertical guide-posts *c* of the gates are placed. By this arrangement it will be seen that if the draw is closed the raising or lowering of one of the gates will likewise carry the other gate; or any construction having a like purpose may be used instead of the mortise-and-tenon connection.

To bring the gates in as close proximity as possible and obtain better constructive advantages, we preferably construct them upon a curve with the center of the draw as a radius, as shown in Fig. 3.

We apply the operating mechanism to the gates at the end of the draw, and instead of deriving the movement from the movement of the draw, as in the ordinary construction, we derive it from the motive power which operates the draw. To this end we journal at the side of the draw, and in suitable bearings or other convenient place which will not interfere with the motive power, the shaft *e*. The power which operates the draw is applied in any suitable manner. Upon the shaft we arrange a sliding sleeve, which carries a pinion *f* and a gear-pinion *g*. This sliding sleeve is controlled by means of a hand-lever *h*, which is arranged in convenient proximity to the place of the bridge-tender and operates, through suitable connection, to move the sliding sleeve upon the shaft *e*, to throw it either in engagement with the gate-operating mechanism or with the mechanism for swinging the draw.

The mechanism for operating the gates may be arranged in different ways. In the drawings we show two shafts *j*, journaled in suitable bearings and running from the center toward the opposite ends of the draw, the inner end of each being provided with a bevel-gear *k*, adapted to engage with the beveled pinion *g*, and the outer end being provided with a suitable beveled pinion *m*, which en-

gates with a corresponding pinion on the transverse shaft *n*, which is journaled in suitable bearings near the end of the draw. The same construction is applied to both ends of the draw, the other end of the draw being provided with the same device. Motion is derived from these transverse shafts *n* to raise and lower the gates by any one of the known ways—such as by means of endless chains passing over sprocket-pinions, or, preferably, by means of endless belts or ropes, which, when the gates arrive at their upper or lower positions, are adapted to slip, and thereby prevent any damage.

The gates are counterbalanced in the usual manner, and other usual provisions are made for the safe operation of the same.

We do not confine ourselves to the particular construction of the gate-operating devices, as it is obvious that different modifications may be made—such as, for instance, shown in dotted lines in Fig. 5, wherein the arrangement is shown for transmitting motion from the pinion *g* to a suitable chain gearing to the transverse shafts *n*.

The pinion *f* carried by the sliding sleeve forms the means for transmitting motion to the draw when it is thrown, by a suitable movement of the lever *h*, into engagement with the operating mechanism which moves the draw, such as the circular rack *l* on top of the supporting-pier *o* of the draw, with which the pinion *f* is adapted to engage by moving the sleeve in the proper direction, which at the same time throws the beveled pinion *g* out of engagement with the operating mechanism of the gates.

In practice, the parts being arranged and constructed substantially as shown and described, it will be seen that the device is adapted for operation as follows: Before opening the draw the bridge-tender throws his lever *h* into the proper position to transmit the power to the gate-operating mechanism to lower the gates at the draw, and by the connection of the same with the gates at the stationary part of the bridge raises the latter simultaneously. As soon as this is accomplished the bridge-tender throws his lever into the proper position to throw the gate-operating mechanism out of gear, and to throw the bridge-operating mechanism into gear. After closing the gate again the proper adjustment of the lever *h* will then raise the gates, and as soon as it is accomplished the bridge-tender throws the lever *h* into normal position, in which all the parts are out of gear.

The principal advantages which we accomplish by our invention are, first, we lower the gates before the draw moves from its position, and correspondingly open the gates only after the draw is fully closed; and, further, there is the same safety on the draw that there is on the bridge. Thus no accident can occur from walking off the bridge when open, which is by no means a rare occurrence, as

it is well known that many accidents have happened from leaving the ends of the draw unguarded when open, and even if there are provisions made for closing the ends of the draw it is generally accomplished by manual labor in drawing chains or gates across the opening. With our construction it will be seen that the whole operation is under the control of the bridge-tender without requiring of that functionary any more labor than required in the ordinary construction of draws.

In an invention of this kind of course it is difficult to provide a construction which is adapted to all the various kinds of swinging draw-bridges in ordinary use; but we are satisfied that the principles involved in our invention may be applied under different circumstances and require nothing more than the ordinary exercise of mechanical skill.

What we claim is—

1. In gates for swinging draw-bridges, the combination of two gates arranged at the adjoining ends of the stationary and movable part of the bridge, respectively, and having interlocking parts, whereby the gates are adapted for joint operation when the draw is closed, substantially as described.

2. In gates for swinging draw-bridges, the combination of two rising and falling gates arranged at the adjoining ends of the stationary and movable part of the bridge, respectively, and of interlocking tongues and grooves formed on said gates, respectively, whereby the same are adapted for joint operation, substantially as described.

3. In gates for swinging draw-bridges, the combination of four rising and falling gates *D*, mounted in pairs at opposite sides of the draw and the adjoining ends of the draw, respectively, of interlocking parts—such as tongues and grooves—between the gates of each pair, and of actuating connection between the gates of the draw and the motor for swinging the draw-bridge, substantially as described.

4. In gates for swinging draw-bridges, the combination, with the motor and draw-operating mechanism, of a shifting gear and lever in said mechanism, and gates at the ends of the draw, provided with operating mechanism actuated by the motor through the medium of the shifting-gear in the draw-operating mechanism, substantially as and for the purpose described.

5. In gates for swinging draw-bridges, the combination, with the motor and draw-operating mechanism, of a shifting-gear and shifting-lever in said mechanism, vertically-operating gates at the ends of the draw, similar gates at the adjoining ends of the bridge, adapted to interlock with the gates of the draw, and operating mechanism for raising and lowering the gates of the draw through the medium of the shifting-gear in the draw-operating mechanism, substantially as described.

6. In gates for swinging draw-bridges, the

combination of the interlocking gates D D',  
mounted at the stationary ends of the bridge  
and the ends of the draw and adapted for  
joint operation, the combined draw and gate  
5 operating mechanism embodying the motor,  
the shaft *e*, operated thereby, the shifting-  
gear composed of a collar sliding on said  
shaft and carrying the pinion *f* and bevel-  
gear *g*, the circular rack *l*, adapted to engage  
10 with the pinion *f*, the longitudinal shaft *j*,  
having beveled pinions *k*, adapted to engage  
with the bevel-pinion *g*, the transverse shaft

*n*, operating the gates, and the shifting-lever  
*h*, all arranged to operate substantially as de-  
scribed. 15

In testimony whereof we affix our signatures,  
in presence of two witnesses, this 16th day of  
September, 1889.

BENJAMIN R. HOYT.  
LOUIS FRACHER.

Witnesses:

ED. MCBREARTY,  
P. M. HULBERT.