

H. W. YERRINGTON.
DRAWBRIDGE GATE.

(Application filed Oct. 5, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

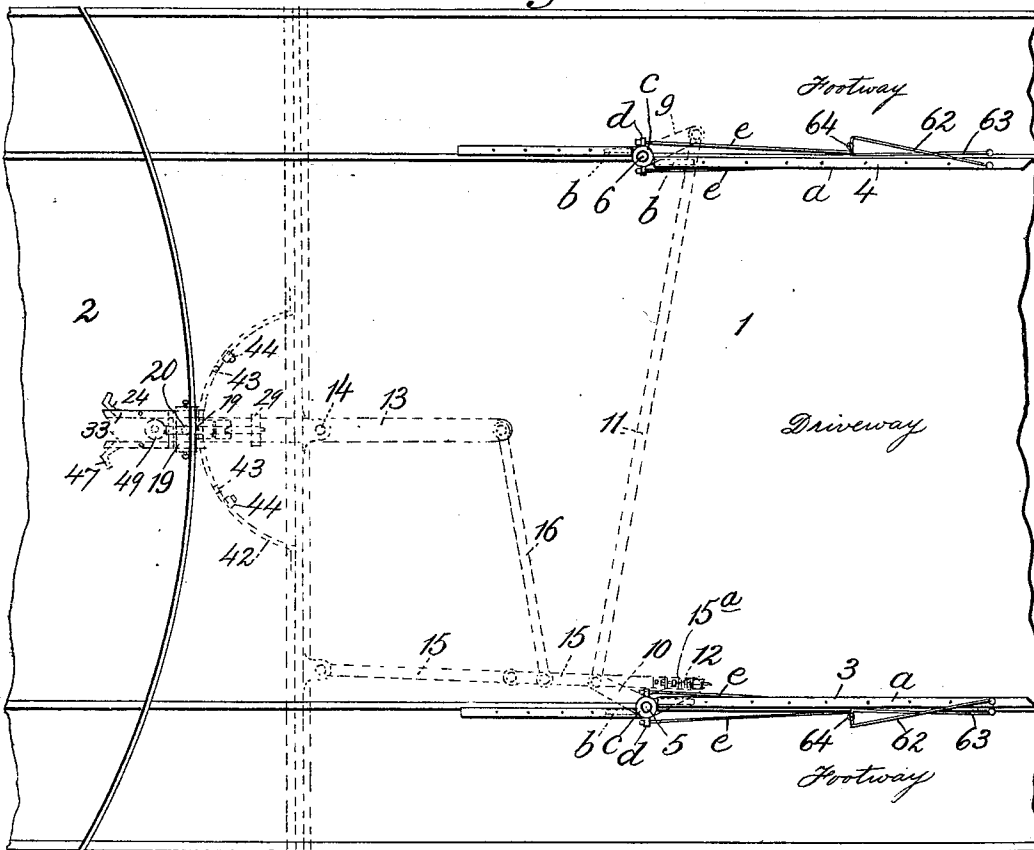


Fig. 2.

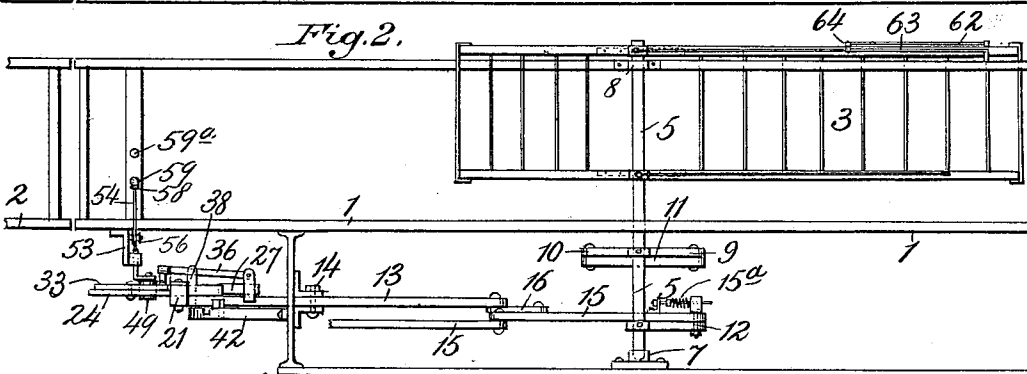


Fig. 3.

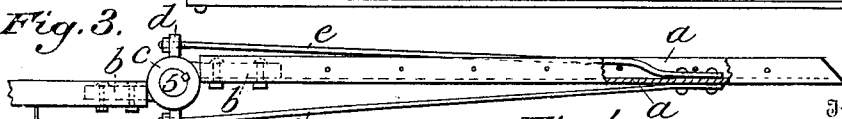
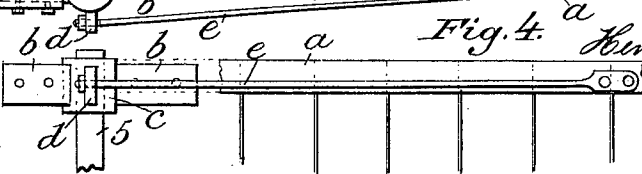


Fig. 4.



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Fig. 5.

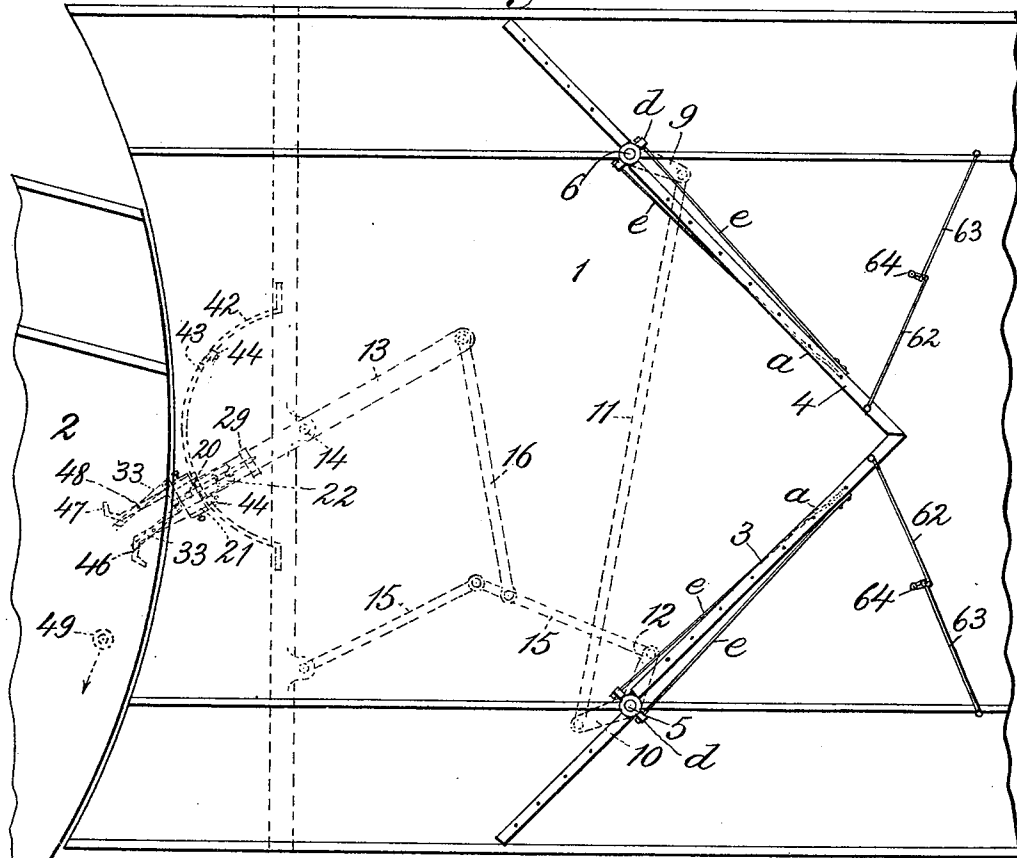


Fig. 6.

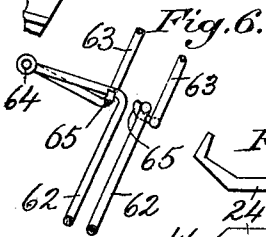


Fig. 7.



Fig. 8.

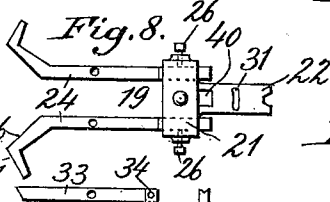


Fig. 10.

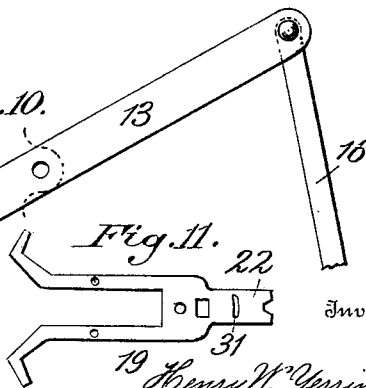


Fig. 9.

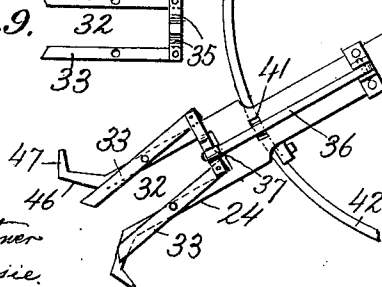
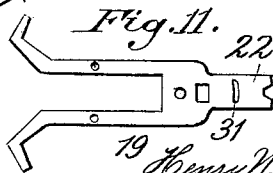


Fig. 11.



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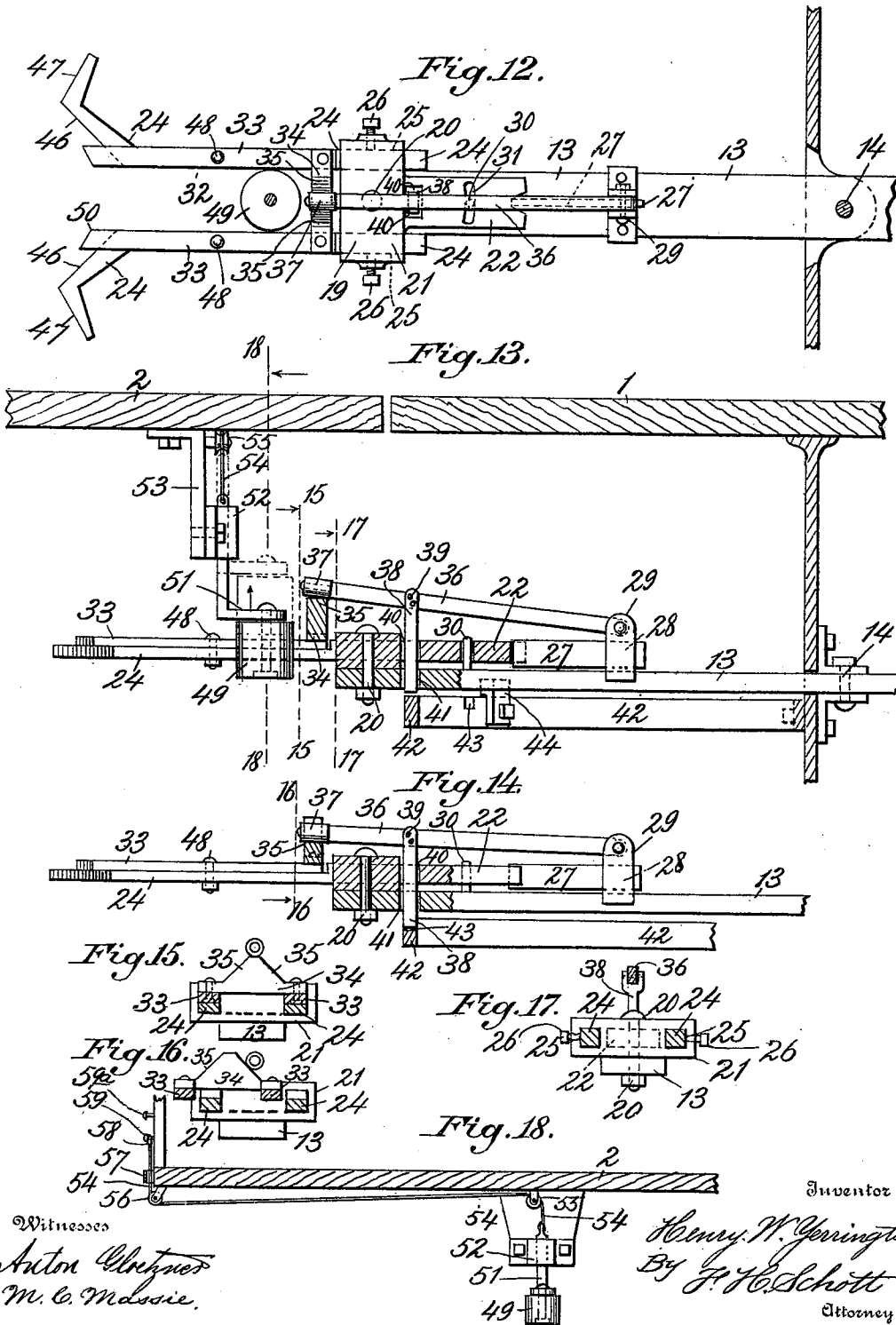
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4 Sheets—Sheet 3.



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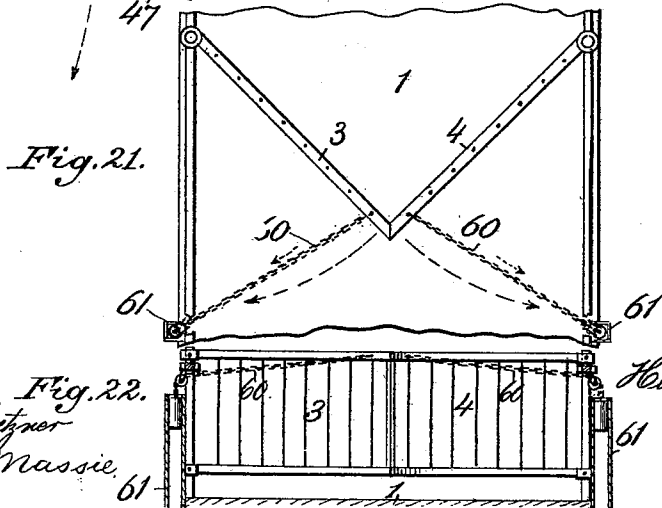
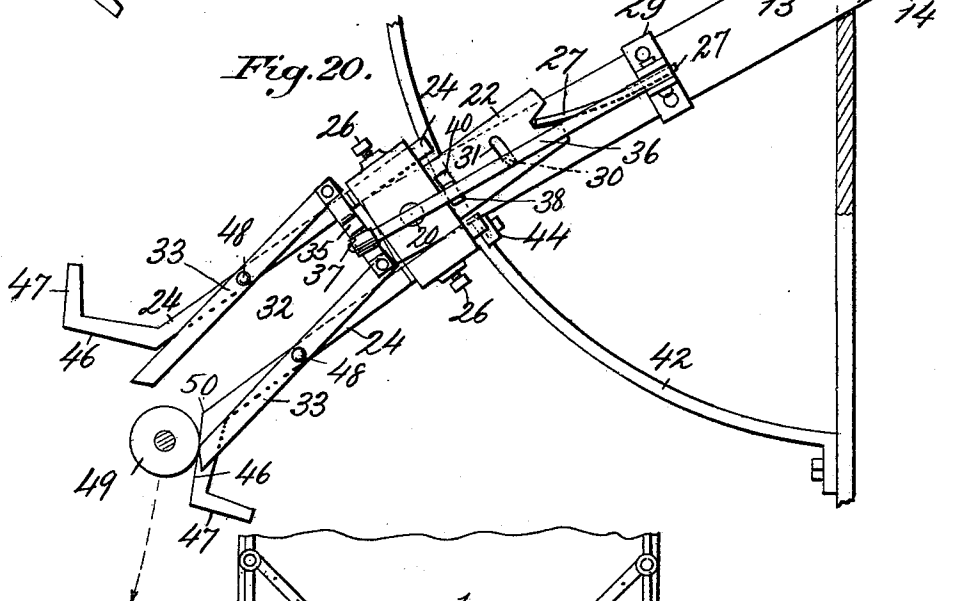
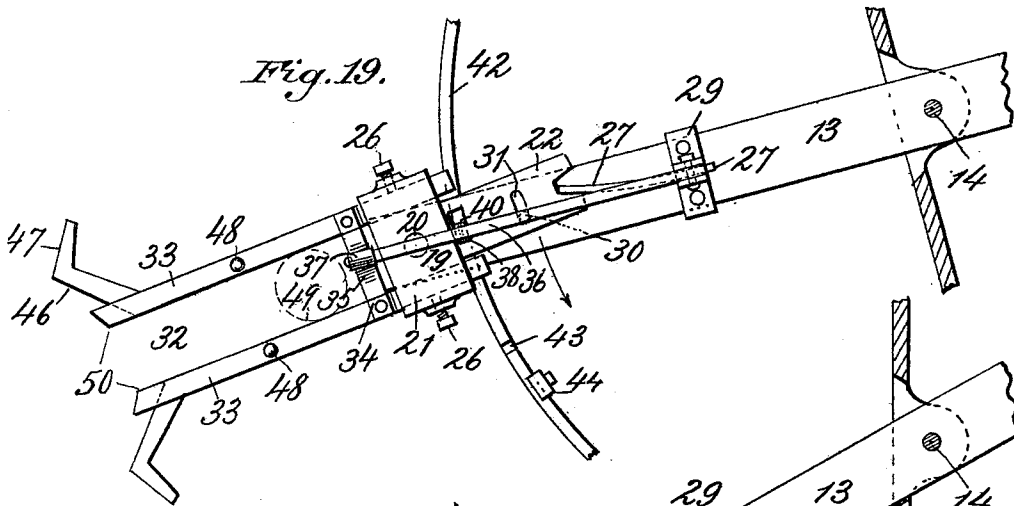
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

HENRY W. YERRINGTON, OF OCEANIC, NEW JERSEY.

DRAWBRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 645,991, dated March 27, 1900.

Application filed October 5, 1899. Serial No. 732,607. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. YERRINGTON, a citizen of the United States, residing at Oceanic, in the county of Monmouth and State of New Jersey, have invented certain new and useful Improvements in Drawbridge-Gates; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention, which is an improvement on my Patent No. 499,867, relates to mechanism for automatically operating the gates of swing and draw bridges by the swinging of the draw; and it has for its objects, first, to provide simple mechanism for opening and closing the gates quickly and without appreciable jar to the gates or bridge; second, to provide mechanism for locking the gates in their closed position; third, to provide a device for protecting the closed gates from injury or interference, which device is connected with the gates and moved by them out of the way when they are open and not in need of protection, and, fourth, to provide an improved form of braced gate. These objects I accomplish by the mechanism shown in the accompanying drawings, in which—

Figure 1 is a plan view of my improved mechanism, showing the draw closed and gates open. Fig. 2 is a side elevation of the same. Fig. 3 is an enlarged plan view, partly in section, of one of the gates. Fig. 4 is a side elevation of the same. Fig. 5 is a plan view showing the draw open and gates closed. Fig. 6 is a detail view of one of the gate-guards. Fig. 7 is a plan view of the main lever detached. Fig. 8 is a plan of the auxiliary bifurcated lever, the parallel-lever frame being removed therefrom. Fig. 9 is a plan view of the parallel-lever frame detached. Fig. 10 is a plan view of modified form of main lever. Fig. 11 is a plan view of a modified form of auxiliary bifurcated lever. Fig. 12 is an enlarged plan view of the locking mechanism, showing the main lever unlocked. Fig. 13 is a longitudinal sectional view of the same. Fig. 14 is a view similar to Fig. 8,

showing the main lever locked. Fig. 15 is a transverse section on line 15 15 of Fig. 13. Fig. 16 is a similar section on the line 16 16 of Fig. 14. Fig. 17 is a transverse section on the line 17 17 of Fig. 13. Fig. 18 is a transverse section on the line 18 18 of Fig. 13. Fig. 19 is an enlarged plan view of the locking mechanism, showing the position of the parts before being locked. Fig. 20 is a similar view showing the main lever locked; Figs. 21 and 22, a plan and an elevation, respectively, of a modified form of gate-guard.

The numeral 1 indicates the fixed or permanent structure of the bridge, provided with the foot and drive ways, as shown, and 2 the pivoted draw-span of the bridge.

3 and 4 represent the gates, which are fast on and turn with the vertical gate-posts 5 and 6. These posts are supported in step-bearings 7 7, secured to the bridge below the floor, as shown, and their upper ends turn in bearings 8 8, fixed to the railing separating the foot and drive ways. Each gate closes an entire footway and one-half of the driveway. The upper and lower rails of each gate consist of angle-irons *a a*, bolted to lugs *b b*, projecting from a hub or boss *c*, keyed or set-screwed to the gate-post, as shown. Each hub has projecting from it two lugs *d d* at right angles to lugs *b b*. The lugs *d d* are perforated and serve to hold the ends of stay-rods *e e*, the other ends of which are secured to the angle-iron *a* of the gate at a suitable distance from the end. By means of the nuts shown bearing against the lugs *d d* the stay ends can be tightened, thus strongly bracing the gates, as shown in Figs. 4 and 5.

Crank-arms 9 and 10 are secured to posts 6 and 5, respectively, under the bridge-floor and are connected by a rod 11, pivoted to their outer ends. The post 5 is further provided with a crank-arm 12, secured to said post near its lower end.

A lever 13 is pivoted to the end guides below the floor of the bridge at 14 and will be designated as the "main lever." This lever is adapted to be acted upon by mechanism connected with the draw to open and close the gates, with which it is connected by levers, to be now described.

15 15 represent a pair of toggle-levers, one of which is fulcrumed to the outer end of arm

12 and the other to the end girder on one side of the main lever. The inner ends of said levers are pivoted together and one of them is connected by a rod 16 to the inner end of the main lever 13. Rod 16 is pivoted to lever 15 at a short distance from the toggle-pivot.

An auxiliary bifurcated lever 19 is pivoted to the upper surface of the main lever at the point 20, as shown. This auxiliary lever is formed of a body-piece 21, a projecting piece or tail 22, and two adjustable jaws 24 24, which are held in holes 25 25 of the piece 21 on each side of the center by means of the set-screws 26 26.

The tail 22 is notched at its outer extremity for the reception of the end of a spring 27. This spring, which is a strong flat piece of metal, is secured tightly in a socket 28 in a lug 29, fastened securely to the main lever, as shown. The purpose of the spring will be explained farther on. The vibration of the lever 19 is limited by a pin 30, projecting upward from the main lever and passing through a slot 31 in the tail 22, as shown. To the adjustable jaws 24 24 is pivoted a parallel-lever frame 32, (see Fig. 9,) the parallel levers 33 33 of which are connected at their outer ends on one side of the pivot by a bar or link 34, which carries at its center a double wedge or cam-surface 35, a flat upper portion connecting the two inclines, as shown in Fig. 15. The purpose of this double wedge is to raise and lower a locking-lever 36, pivoted to the lug 29 of the main lever, as clearly shown in Fig. 18, and extending over the auxiliary lever 19 and provided, preferably, with an anti-friction-roller 37 on its end, adapted to rest on the wedge 35. A rectangular locking-bolt 38 is fastened at 39 to the lever 36 and passes through a slot 40 in the lever 19 and through slot 41 in the main lever, as shown. A semi-circular band 42 is bolted to the girder below and in front of the pivot 14, which band is provided with two notches 43 43 in its rim at about thirty degrees on each side of the center line of the bridge, adapted to receive the end of the locking-bolt 38 when the same is lowered by means of the wedge 35. The band is further provided with two stops 44 44, secured to it, one on each side of a notch 43, as shown, adapted to engage the main lever to limit the movement of the latter at the time it becomes locked to the band.

The outer end of each jaw 24 24 projects about a foot beyond the piece 21 and is bent outwardly at an angle, as shown, forming a surface 46 several inches in extent, which surface is in turn bent backward, forming a guide-surface 47. The parallel-lever frame 32 is pivoted at 48 48 to the upper surface of the jaws 24 24 about midway of their length and rests on and remains parallel with the said jaws except when swung aside by a roller 49, adjustably secured to the under side of the draw-span at a point opposite the main lever. The levers 33 33 project at their free

ends 50 50 a short distance beyond the straight portion or surface of the jaws 24 24 and are beveled, as shown.

Roller 49 is pivoted to an angle-iron 51, which is square in cross-section and passes through a socket or guide 52, bolted to a depending bracket 53, which is bolted to the floor of the draw-span, as shown in Fig. 13. A chain or cable 54 is attached to the upper end of the angle-iron and passes over a sheave 55, secured to the bracket 53, and thence under the floor to the side of the draw, where it passes under a sheave 56 and up through a guide 57 to the end of the floor and terminating in a ring 58. This ring is slipped over a pin 59, thus holding the roller 49 in position between the jaws of the auxiliary lever. When it is desired to elevate said roller out of the path of the jaws of the auxiliary lever, the ring 58 is removed from pin 59 and slipped over a higher pin 59^a. (See Fig. 18.)

The operation of the device is as follows: The parts being in the position shown in Fig. 1, the draw is turned either to right or left by the usual means, which causes the draw-roller 49 to strike one of the jaws 24 and one of the levers 33 of the auxiliary lever 19, both of which are in line, one over the other, the effect of which is first of all to swing said lever on its pivot 20 against the action of spring 27 until the slot 31 strikes pin 30 on main lever, or nearly so. The blow of the roller is cushioned by said spring, thus relieving the main lever and bridge from jar. This position of the parts is shown in Fig. 19. The continued movement of the draw forces roller 49 along the inner side surface of the jaw and parallel lever, turning the main lever on its pivot, and thereby closing the gates by means of the connecting-rods and toggle-levers, as will be clear from an examination of Figs. 1 and 5, the spring 27 having immediately straightened itself and brought the main lever and auxiliary lever in line again. When the roller has nearly passed out of the jaws, it strikes the end 50 of the parallel lever which projects beyond the jaw 24 and turns the parallel-lever frame on its pivots 48 48, which carries the double wedge from under the roller 37 of the locking-lever 36, the roller passing from the flat top part of said wedge and rolls down the incline, thereby dropping the bolt 38 into a notch 43 in the band below, the main lever being at this movement directly over said notch and held there by contacting with stop 44 on the band, as shown in Fig. 20, which represents the position of the parts at the moment of locking. The main lever being now locked, the pressure of the roller will cause the auxiliary lever to turn a little and bend spring 27, as shown in Fig. 20. Roller 49 now rides over the surface 46 of the jaw 24 until it passes off the face 46 and guide 47, when the action of spring 27, tending to straighten itself, will swing the auxiliary lever back again to its former central position, the parallel-le-

ver frame, however, remaining swung with respect to the auxiliary lever, the position of the parts being that shown in Fig. 5. When the end 50 of the parallel lever has turned to position shown in Fig. 20, the draw-roller will travel on the face 46, which is bent at an angle parallel to the line of travel of the roller when moving over it, thus keeping a pressure on the auxiliary and main levers, whereby the main lever is held against the stop on the band. The pressure of the draw-roller on the surface 46, caused by the expansion and contraction of the draw, is variable, and the auxiliary lever is swung more or less accordingly. The surface 46 is long enough to insure that the main lever will always strike its stop on band and the locking-bolt drop into its notch before the draw-roller leaves said surface. The gates are now closed and cannot be opened until the locking-bolt has been withdrawn from its notch in the band, which is done by means of the draw-roller on its return to open the gates. In returning the roller first of all strikes the flared end or guide-surface 47, turning the auxiliary lever on its pivot until its tail 22 strikes pin 30 on main lever, the blow of the roller being cushioned by the spring 27, which, bending, relieves the main lever and bridge from jar, the auxiliary lever having been turned slightly. The roller next strikes the end 50 of the opposite parallel lever, swinging the lever-frame back again to position coinciding with the jaws of auxiliary lever, which has been swung into line again with the main lever by the spring 27, which after impact of the draw-roller immediately straightened itself and moving the double wedge under the locking-lever end or roller, thereby lifting the locking-bolt out of the notch in band and releasing the main lever, which is now turned on its pivot by the draw-roller moving in the jaws until it has reached the position shown in Fig. 1. This movement of the main lever straightens out the toggle-levers and opens the gates and holds them so, most of the jar being taken from the gates by the spring 15^a.

In order to protect or guard the gates from injury in case a team should run against them, as well as to prevent persons from getting behind them, I attach a protecting device consisting of a chain or flexible rod to the end of each gate near the meeting-point, the same extending in front of the gate and connecting with the railing of the bridge, leaving an angular space behind it to which access is thus cut off.

The guard-chains 60 60 (see Figs. 21 and 22) each pass from the end of gate horizontally, or nearly so, over a sheave secured to the railing of the bridge down into a casing 61, secured to the side of the bridge. A weight 62, secured to the end of each chain and moving in casing 61, keeps the chain taut. Instead of a chain I may use a guard consisting of a pair of rods 63 63, one pair being used for each gate. As shown in Fig. 5, one end of each rod 63 is

pivotaly secured to the rail separating the drive and foot ways and the other end formed with a short bend at nearly right angles to itself and terminating in an eye. Rod 62 is pivotaly secured to the outer end of a gate, having its other end bent and provided with an eye similarly to rod 63. A rivet passing through both eyes forms a joint 64 for the rods, permitting them to fold when the gate is opened, as shown in Fig. 1, so that each pair lies parallel with its gate and behind the same. A projecting stop or hook 65 (see Fig. 6) projects from rod 63 and engages the bend of rod 62, as shown, when the rods are extended in line, forming a straight pull by the gate, and thus keeping the rods taut.

If it is desired to close the gates when the draw is closed, as in the case of a runaway team or automobile, it is only necessary to raise the draw-roller out of the jaws by lifting the ring at the side of the bridge and engaging it with the upper pin 59^a, which will hold said roller up, allowing the gates to be closed independently of the swing-bridge by suitable means acting on the main lever and its connection with the gates. Instead of having the jaws of the auxiliary lever adjustable they may be made integral with said lever, as shown in Fig. 11.

In Fig. 10 the main lever is shown bifurcated or provided with a pair of jaws at its outer end, similar in form to the jaws of the auxiliary lever. A parallel-lever frame is pivoted to said jaws and carries a double wedge, as before. The lever is provided with a locking-lever having a bolt and is adapted to be acted on by the wedge of said parallel-lever frame, as before. In this case the auxiliary lever and spring are dispensed with, the bridge and gates not being relieved from jar. The operation is otherwise the same as before.

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

1. In a drawbridge the combination with a main lever, provided with a bifurcated lever and a cushioning device, of a pair of toggle-levers, a pair of pivoted gates, cranks and a connecting-rod connecting said toggle-levers and gates, and a projecting piece attached to the draw for engaging the bifurcated lever to open and close the gates, substantially as described.

2. A main lever for operating the gates of a drawbridge, provided with an auxiliary bifurcated lever consisting of a pair of jaws adjustably secured to the auxiliary lever which is adapted to engage with a cushioning device, a cushioning device consisting of a spring secured to the main lever, and a stop for limiting the vibrations of said bifurcated lever, substantially as shown and described.

3. A main bifurcated lever provided with a locking-lever having a bolt adapted to engage a locking-band for holding said main lever in position, and a parallel-lever frame

pivoted to the jaws of main lever and carrying a double wedge adapted to operate the locking-lever, substantially as shown and described.

5 4. A main lever for operating the gates of a drawbridge provided with a locking-lever having a locking-bolt adapted to engage a suitable stop or recess, an auxiliary bifurcated lever having pivoted to it a lever-frame carrying a wedge adapted to actuate said locking-lever, and a cushioning device interposed between said main and auxiliary bifurcated levers, substantially as shown and for the purposes set forth.

15 5. A main lever provided with a locking-lever having a locking-bolt, and a bifurcated lever carrying a movable wedge and adapted to be acted on by a projecting piece secured to the draw for actuating the locking-lever, substantially as shown and described.

20 6. A main lever provided with a spring secured to it, a stop-pin, and an auxiliary lever provided at one end with a pair of adjustable jaws and notched at its other end to engage the spring of the main lever and having a slot to engage the stop-pin of main lever, substantially as shown and described.

25 7. A main lever provided with a bolt-hole, a stop-pin, a socket, a spring secured in said socket, a lever pivoted to said socket and having a locking-bolt, auxiliary bifurcated lever having a bolt-hole, a slot to embrace the stop-pin of main lever and notched at its end to engage the spring of main lever and adjustable jaws provided with a parallel-lever frame carrying a double wedge, all arranged and operating substantially as shown and described.

30 8. A main lever provided with a spring, a locking-lever having a locking-bolt, and an auxiliary bifurcated lever having its jaws integral and provided each with a double outward bend, and a parallel-lever frame provided with a double wedge, substantially as shown and for the purposes set forth.

45 9. A main lever provided with a spring, a locking-lever having a locking-bolt, and an auxiliary bifurcated lever having adjustable jaws each of which is provided with a double outward bend, and a parallel-lever frame, fulcrumed to said jaws and provided with a wedged surface, substantially as shown and for the purposes set forth.

50 10. A main lever provided with a spring, a locking-lever having a bolt, and an auxiliary lever adapted to engage said spring and allow passage of said bolt and provided with a pair of adjustable jaws each having at its end a double outward bend forming surfaces adapted to engage a projecting piece carried by the draw, and a parallel-lever frame fulcrumed to said jaws and consisting of a pair of levers projecting somewhat beyond the straight portion of said jaws and connected at their other ends by a link provided with a

double wedge, substantially as shown and for the purposes set forth.

11. The combination with a main lever provided with a locking-lever having a locking-bolt, an opening for the passage of said bolt, and an auxiliary lever having an opening adapted to register with bolt-opening in main lever, of a band provided with notches adapted to receive the locking-bolt, and means connected with said auxiliary lever for operating the locking-lever, substantially as shown and described.

12. The combination with a main lever provided with a locking-lever having a locking-bolt, an opening for the passage of said bolt, and an auxiliary lever having an opening adapted to register with the opening in main lever for passage of the bolt, of a band provided with stops and notches to receive the bolt, of a double wedge carried by a lever-frame fulcrumed to said auxiliary lever and a projecting piece carried by the draw adapted to operate said lever-frame, substantially as shown and for the purpose set forth.

13. In a drawbridge the combination with the gates, of a main lever provided with a spring, a locking-lever having a bolt, an opening for said bolt, a stop-pin, a lug, an auxiliary lever adapted to engage the spring and provided with an opening for a bolt, a slot to embrace stop-pin of main lever and adjustable jaws having each a double outward bend at its end and provided with a parallel-lever frame carrying a double wedge, a locking-band provided with notches and stops, a pair of toggle-levers connected with the gates and said main lever, and a projecting piece carried by the draw for engaging said auxiliary lever to open and close the gates, substantially as described.

14. A guard or protector for a closed gate, consisting of a flexible member attached to a gate near its end and extending in front of said gate and connected to a fixed portion of the bridge so as to inclose an angular space in front of the gate when closed, and adapted to be moved out of the way by the gate in opening.

15. A gate-guard consisting of a pair of flexible bent levers pivoted to each other at their bent ends, and to the gate and a fixed portion of the bridge respectively at their other ends so as to leave a space behind them in front of said gate, and adapted to be folded out of the way by the gate in opening.

16. A gate-guard consisting of a pair of flexible levers pivoted to the gate and to the bridge respectively and having each a short bend, the levers being pivoted together at the end of said bends, one of the levers having a stop at the bend adapted to engage the bend of the opposite lever, when said levers are extended in line and the gate is closed, and adapted to be folded out of the way by the gates in opening.

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17. A gate-frame consisting of a pivot-post,
a pair of hubs secured at suitable distances
apart on said post, each of said hubs having
a pair of oppositely-projecting lugs, adapted
5 each to be attached to a rail of the gate, and
a second pair of lugs intermediate of the first-
mentioned pair adapted to retain the ends of
stay-rods, a pair of rails secured to the first-
mentioned pair of lugs, stay-rods connecting
10 said rails with the second pair of lugs, and

suitable uprights connecting the rails, sub-
stantially as shown and for the purpose set
forth.

In testimony whereof I affix my signature
in presence of two witnesses.

HENRY W. YERRINGTON.

Witnesses:

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WM. T. VAN NEST.