(No Model.) 6 Sheets—Sheet 1.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

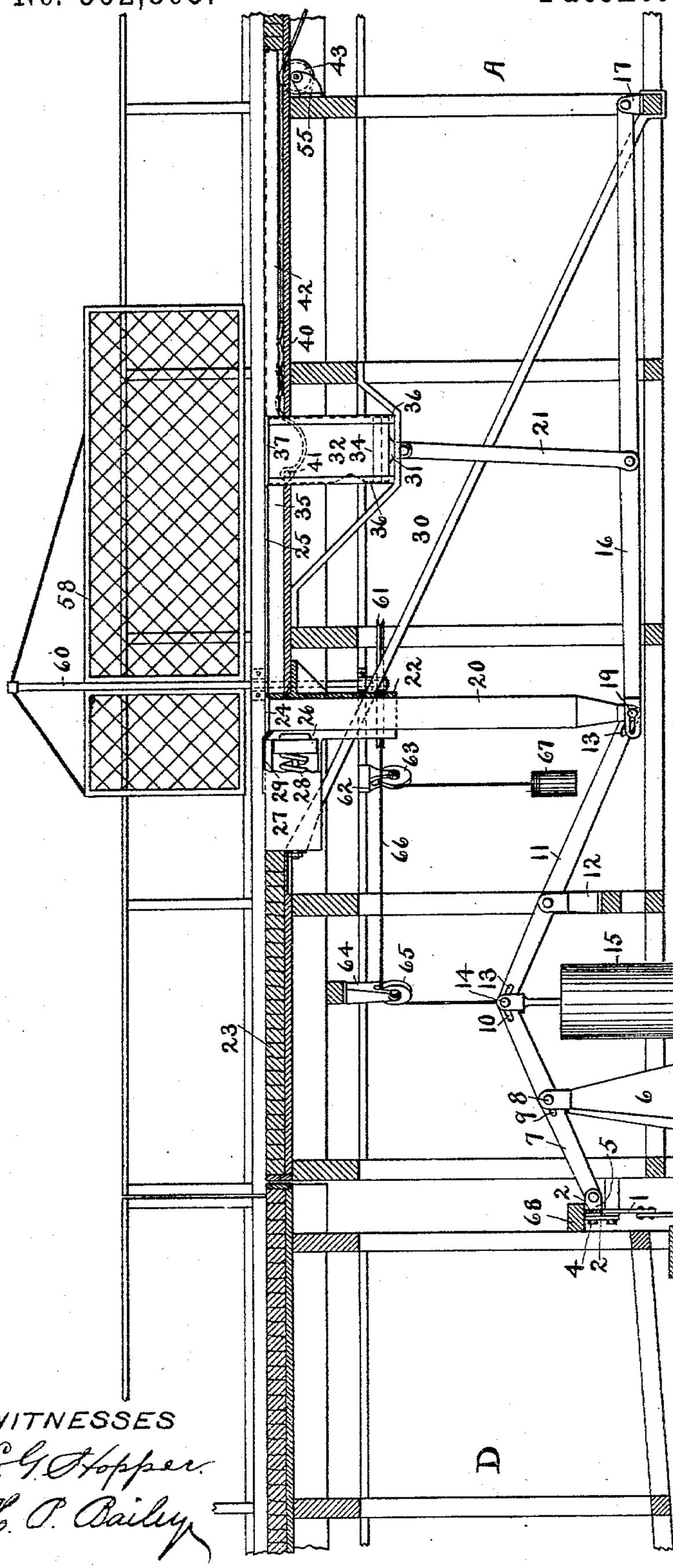


Fig. 1.

WITNESSES
L. G. Hopper.
H. P. Bailey

INVENTOR,
John Coup.
BY Burridge & Cutter,
ATTORNEYS.

(No Model.) 6 Sheets—Sheet 2.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

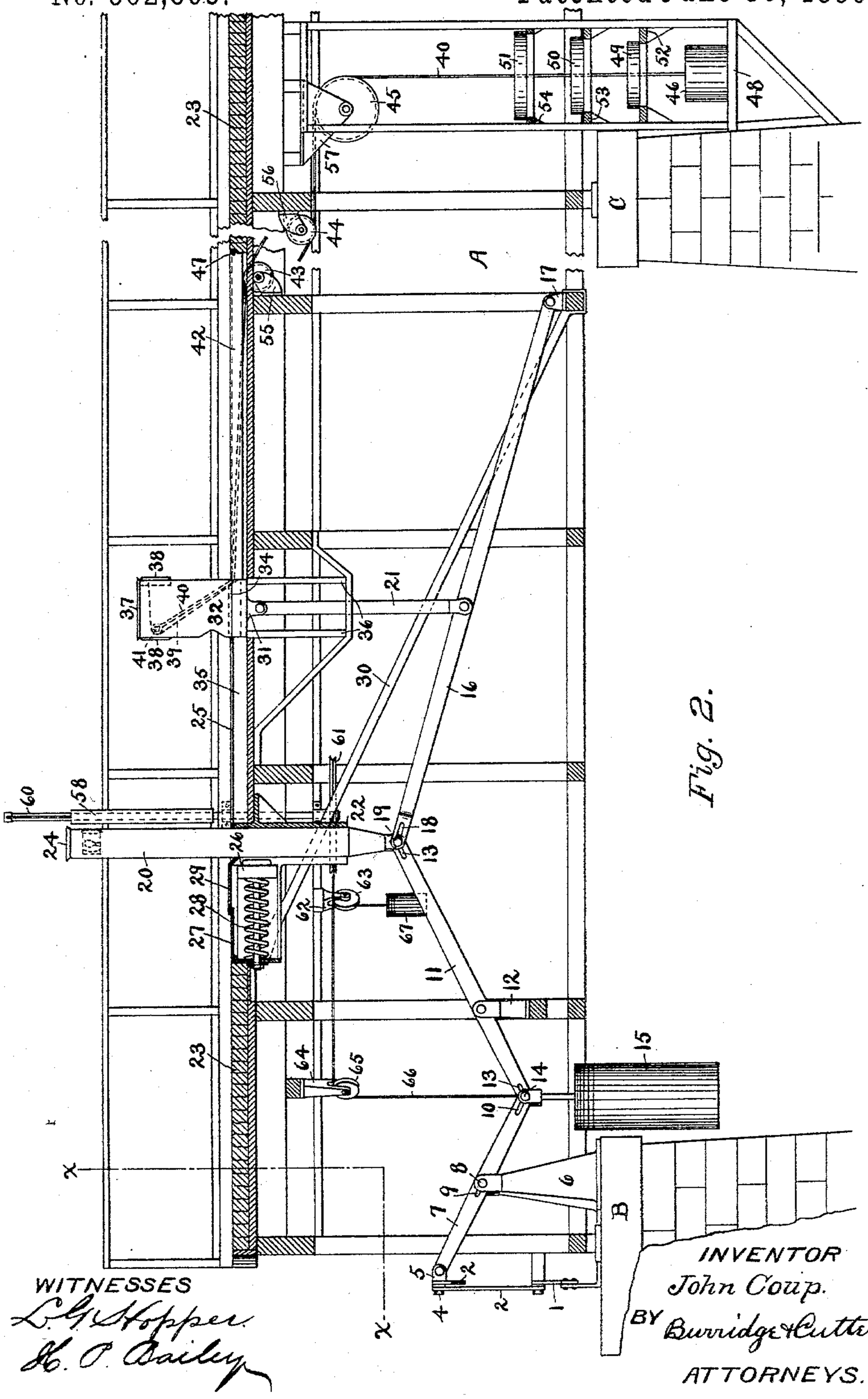


Fig. 2.

WITNESSES
L. G. Hopper
H. O. Bailey

INVENTOR
John Coup.
BY Burridge & Cutler,
ATTORNEYS.

(No Model.) 6 Sheets—Sheet 3.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

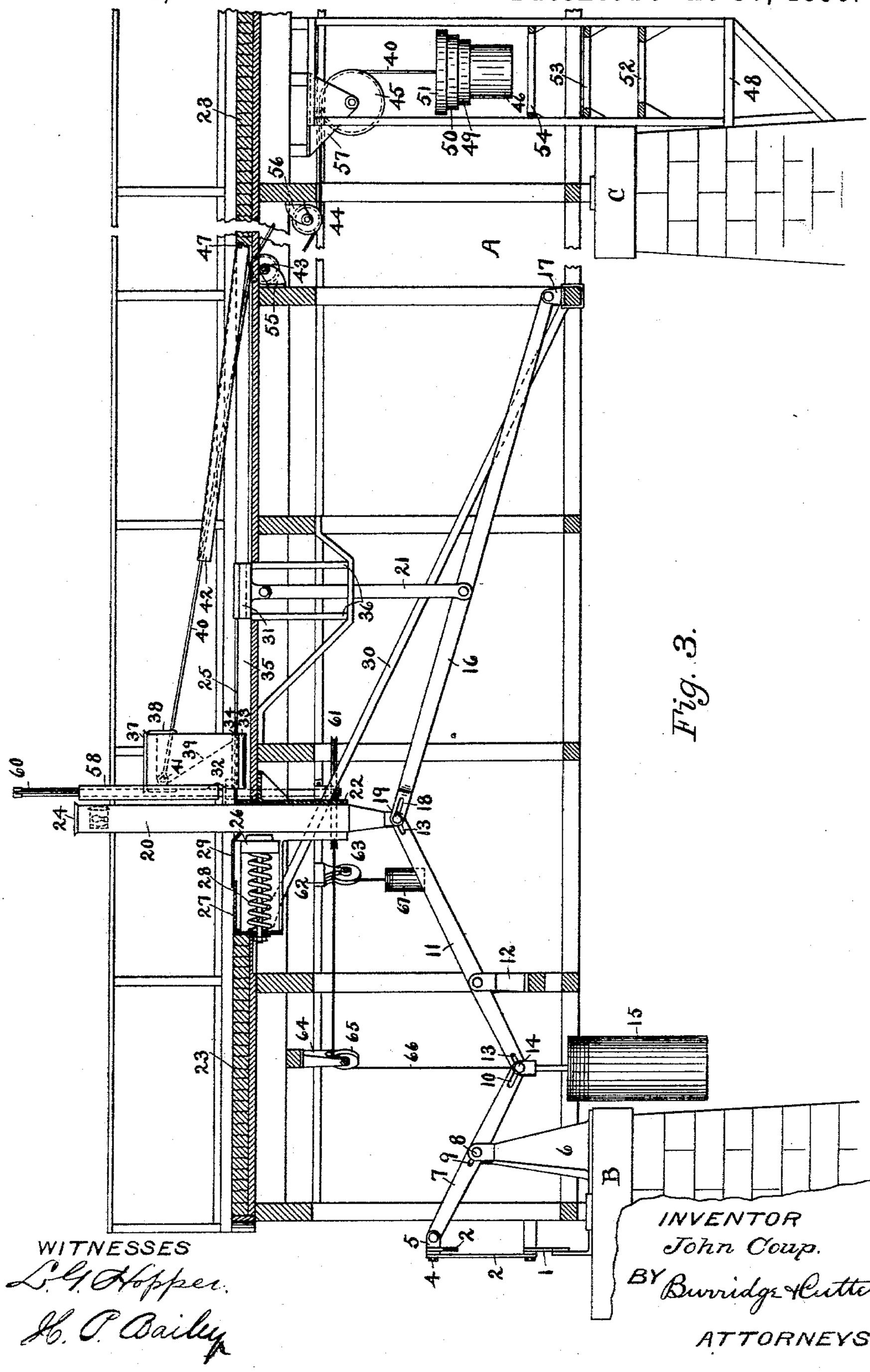


Fig. 3.

WITNESSES

L. G. Hopper.

H. C. Bailey

INVENTOR

John Coup.

BY Burridge & Cutler,

ATTORNEYS.

(No Model.) 6 Sheets—Sheet 4.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

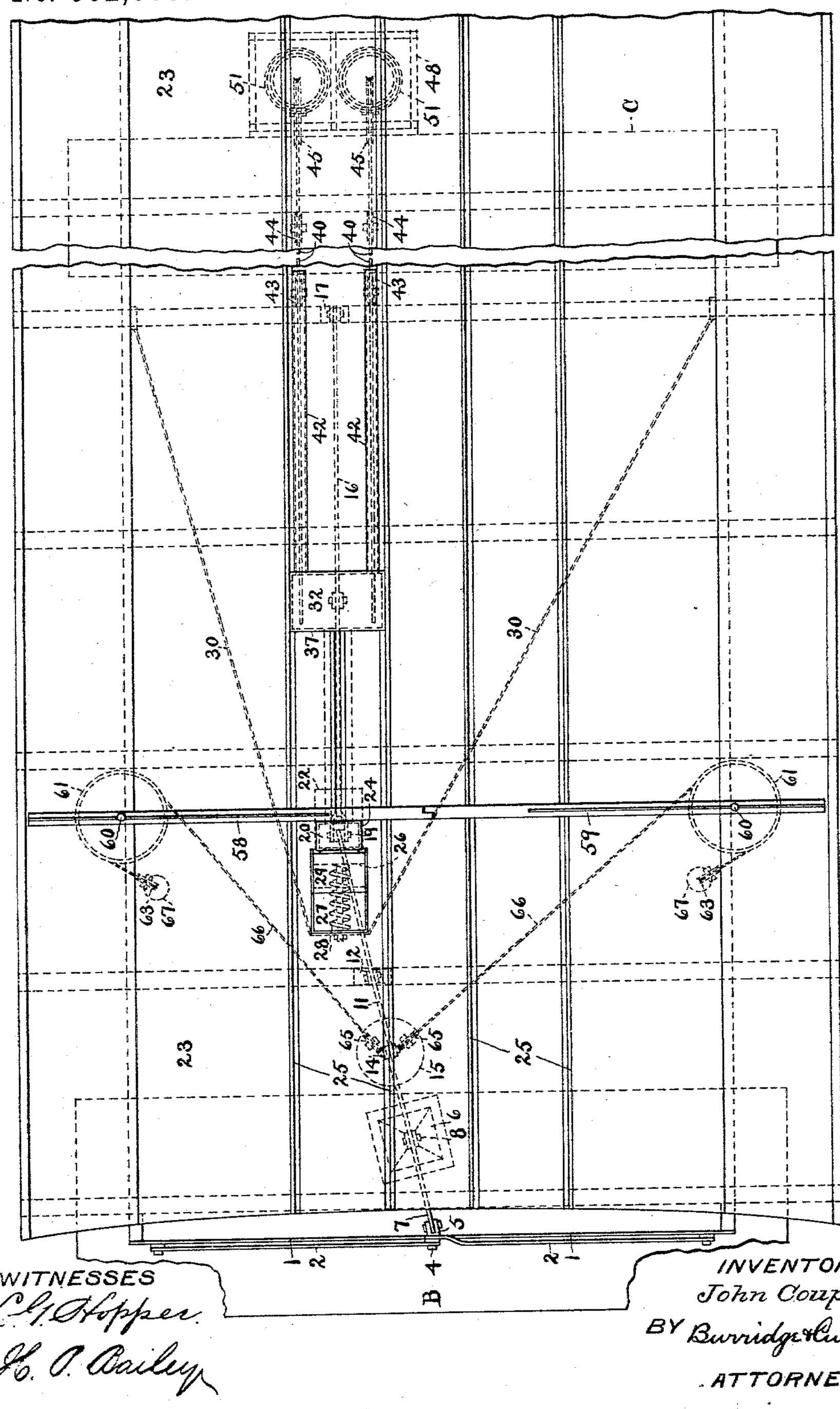


Fig. 4.

WITNESSES
L. G. Stopper.
H. A. Bailey

INVENTOR,
John Coup.
BY Burridge & Cutler,
ATTORNEYS.

(No Model.) 6 Sheets—Sheet 5.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

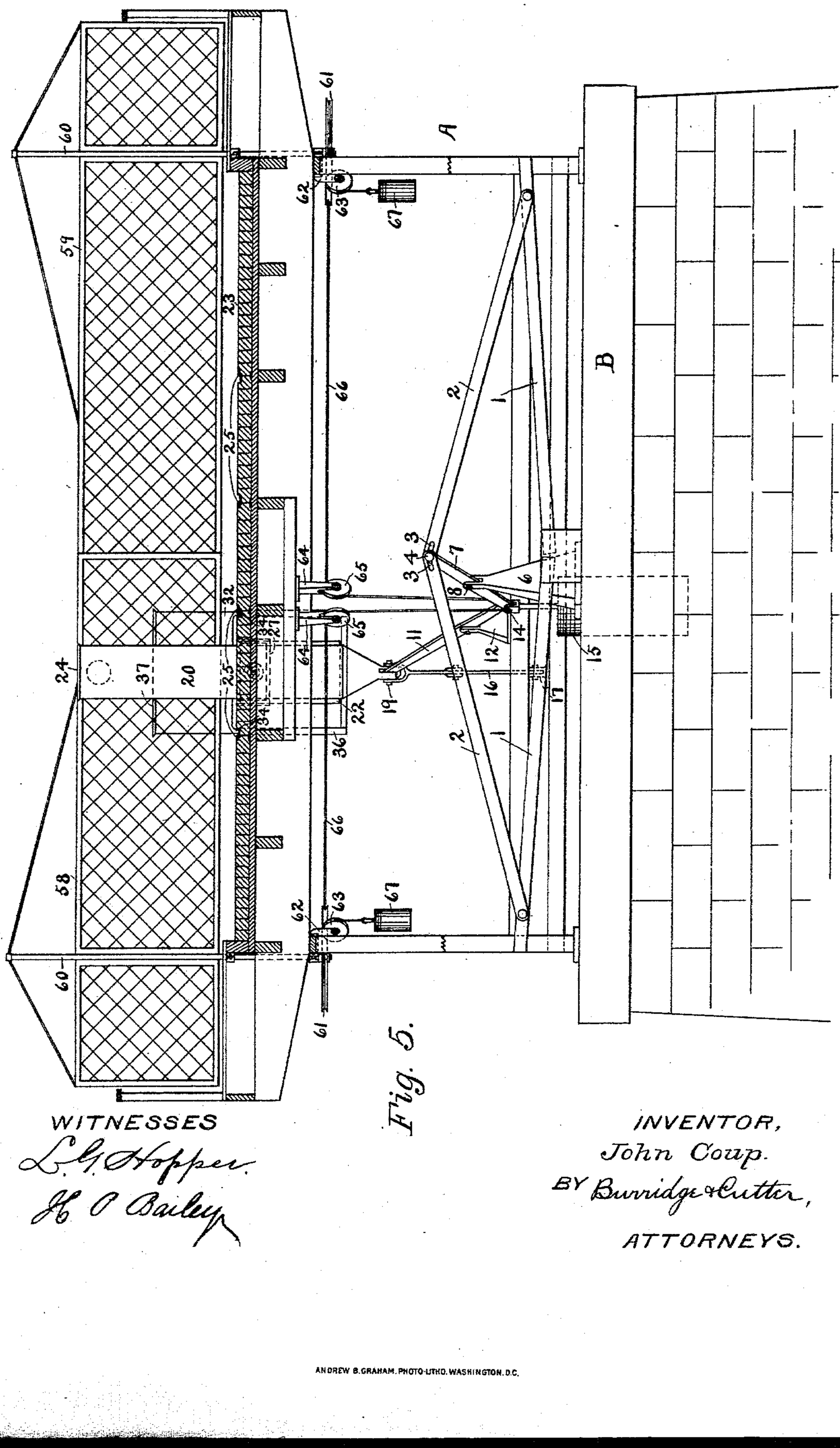


Fig. 5.

WITNESSES
L. G. Hopper.
H. C. Bailey

INVENTOR,
John Coup.
BY Burridge & Cutter,
ATTORNEYS.

(No Model.) 6 Sheets—Sheet 6.

# J. COUP.

## DRAWBRIDGE SAFETY DEVICE.

No. 562,805. Patented June 30, 1896.

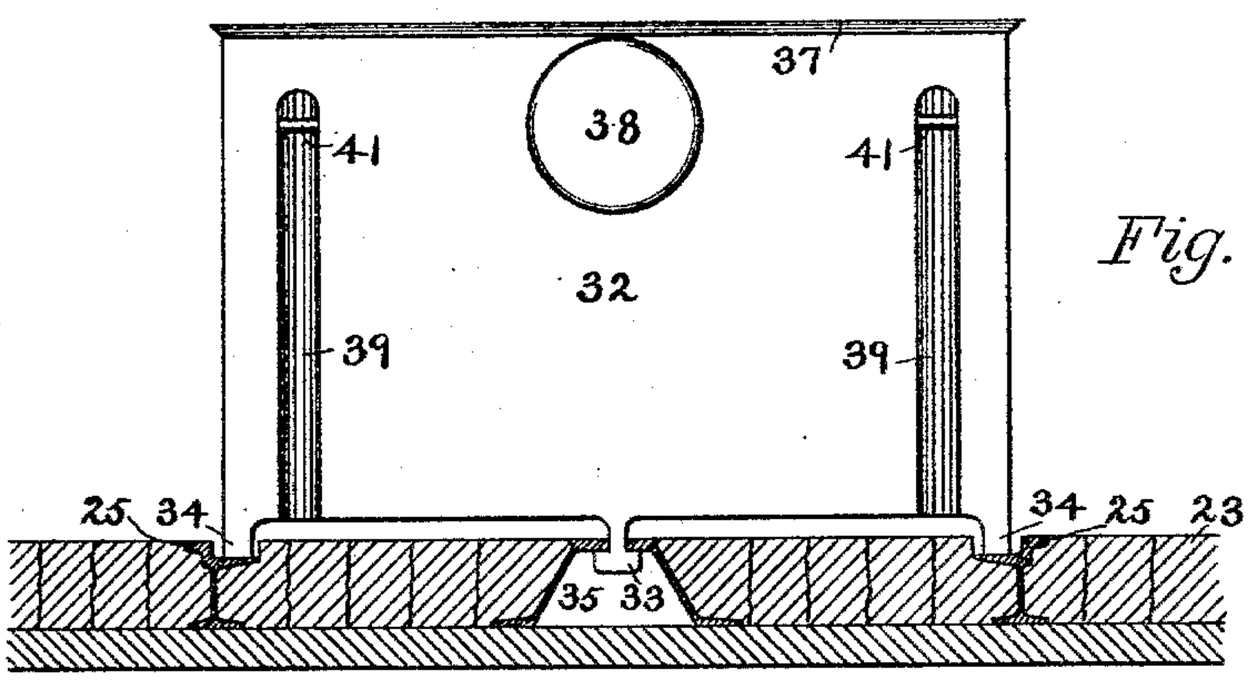


*Fig. 6.*

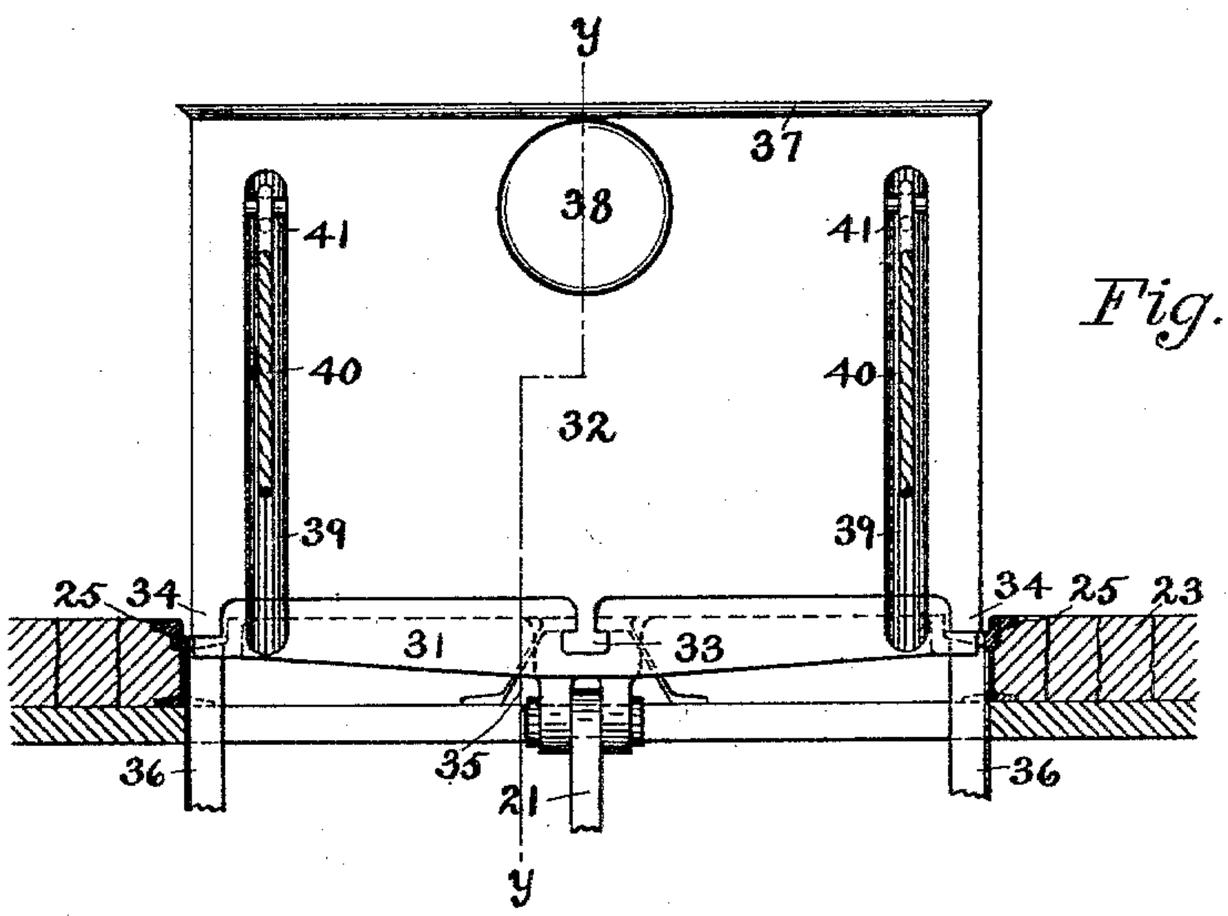


*Fig. 7.*

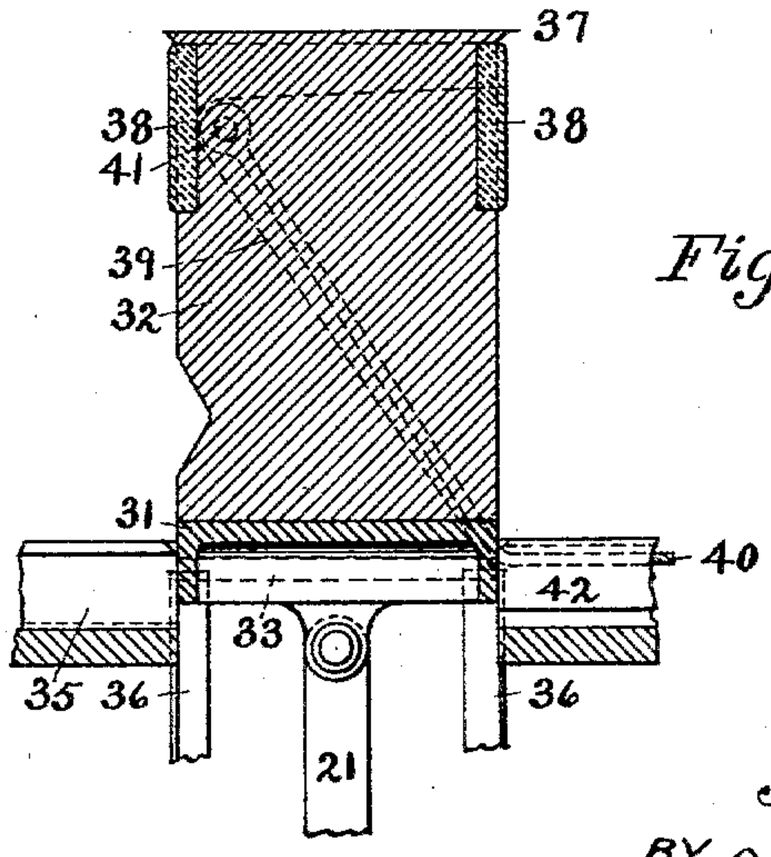


*Fig. 8.*

WITNESSES
L. G. Hopper.
H. P. Bailey

INVENTOR
John Coup.
BY Burridge & Cutter,
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

JOHN COUP, OF CLEVELAND, OHIO.

## DRAWBRIDGE SAFETY DEVICE.

SPECIFICATION forming part of Letters Patent No. 562,805, dated June 30, 1896.

Application filed May 1, 1896. Serial No. 589,886. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN COUP, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drawbridge Safety Devices, of which the following is a full, clear, and exact description.

My invention relates to a safety appliance or device to be attached to a bridge over which street-cars are accustomed to pass, and operated by the draw; and it consists of the several parts and combinations of parts hereinafter fully described and especially claimed.

The object of my improvement is to provide a safety device of the class designated above which is automatically operated by the swinging of the draw, positive and reliable in action, and preëminently capable of checking and finally stopping a street-car upon the approach of the same to the open draw, with the minimum amount of shock. This device also automatically closes one or both gates, as desired, to bar the passage of vehicles and pedestrians. When my appliance is properly incorporated with a bridge structure, it is practically impossible for serious accidents to occur, because of the open draw, either to people who are riding or walking. Human agency is not directly required in the manipulation of any part of the apparatus herein shown and described. Hence the liability of a failure of the same to operate in the proper manner and at the critical moment is immensely decreased.

That my invention may be seen and fully understood by those skilled in the art, reference will be had to the following specification and annexed drawings, forming a part thereof, in which—

Figure 1 is a side view of my device, showing the obstructions depressed by reason of the draw being closed; Fig. 2, a side view of said device, said obstructions elevated by reason of the draw being open; Fig. 3, a side view of the same, showing said obstructions elevated and the rear one forced forward; Fig. 4, a plan view; Fig. 5, a front view, the bridge being sectioned on lines *x x*, Fig. 2; Fig. 6, an enlarged rear view of the rear or traveling obstruction, showing the same clear of the plunger; Fig. 7, a similar view showing said obstruction connected to the head of said plunger, and Fig. 8 a section on lines *y y*, Fig. 7.

Similar letters and figures of reference designate like parts in the drawings and specification.

Double tracks are generally employed at the present time, and it is intended to place my appliance at each end of the bridge adjacent to the draw, the obstructions being located between the rails of the right-hand track, going and coming. In the case of a single track two devices must be employed, as before; but the obstructions will, of course, appear between the rails of the same track. Only one complete device is shown and described, but from the foregoing it will be understood that said device must be duplicated at the corresponding end of the bridge across the draw-span.

The section of the bridge A shown in the drawings is carried upon the piers B and C, and the abutting end of the draw D, when closed, rests on said pier B. The beams 1 1 extend across the front of the bridge A and are riveted to the bridge structure, and the long levers 2 2 have their extreme opposite ends pivoted to said beams. The slots 3 3 appear in the adjacent ends of the levers 2 to receive the stud 4 of the coupling 5. The stand 6 rests upon the pier B and has the lever 7 connected to the top thereof by the pin 8, which passes through said top and the slot 9 in said lever. The lever 7 is pivotally attached at its front end to the coupling 5 and has the slot 10 in the opposite end. The lever 11 is pivotally connected, intermediate of its ends, to the stand 12, which is secured to the bridge structure, and said lever has the slots 13 13 in opposite terminals. The pin 14 passes through the slots 10 and 13 in contiguous ends of the levers 7 and 11, and the counterweight 15 depends from said pin. The lever 16 is pivoted at its rear end to the stand 17, attached to the bridge structure, and has the slot 18 in its front terminal. The pin 19 passes through the slots 13 and 18 in adjacent ends of the levers 11 and 16 and connects the same to the base of the obstruction 20. The base of the plunger 21 is pivoted to

the lever 16 about midway of the ends of said lever. The movement of the levers hereinbefore referred to renders the presence of the several slots therein necessary in order to permit of sliding connections, since the distances between the fixed and changeable points vary, as will appear more clearly hereinafter.

The obstruction 20 operates through the sleeve 22, which is secured to the bridge structure and extends into an opening in the bridge-floor 23. The obstruction 20 has the beveled flange 24 surrounding the top to fit over the upper end of the sleeve 22, when said obstruction is depressed, for the purpose of excluding water from said sleeve. When the obstruction 20 is depressed, its top is level with the upper surface of the floor 23. Said obstruction is located between the rails 25 of the right-hand track a suitable distance from the end of the bridge A. The cushioned buffer 26 is situated in the box 27 in front of the obstruction 20, and the stiff spiral spring 28 is interposed between the end of said box and said buffer. The box 27 is preferably integral with the sleeve 22 and has the sliding cover 29 at the top. The bottom of the box 27 and the front of the sleeve 22 are open to permit the obstruction 20 to be forced over against the buffer 26, and the cover 29 slides forward out of the way in such an event. The box 27 is steadied and strengthened by means of the braces 30 30, passing from the front of said box backward to be made fast to the bridge structure. The upper part of the box 27 is received into an opening in the floor 23, and the top of said box is flush with the upper surface of said floor. The sleeve 22 is narrower than the box 27, which permits the buffer 26 to bear against said sleeve, and said buffer is thereby prevented from normally coming into contact with the obstruction 20.

The plunger 21 is some distance back of the obstruction 20, below the center of the right-hand track, and has the head 31 pivotally attached to the top thereof, said head being nearly as long as the distance between the vertical portions of the rails 25. The traveling obstruction 32 is about as long as the head 31, to which said obstruction is normally connected by the central depending lug 33. The lug 33 registers with a corresponding slot in the head 31 when the obstruction 32 is resting on said head and, so far as a vertical movement is concerned, the two latter act together. The obstruction 32 is provided with the feet 34 34, which slide on the upper inside flanges of the rails 25 under certain conditions hereinafter explained, and the lug 33 travels in the slot 35, provided for that purpose in the floor 23, between the two obstructions. The obstruction 32 may be equipped with rollers or wheels, if desired, in place of the feet 34, or they may be attached to said feet. The guides 36 are bracketed to the bridge structure and the head 31 and obstruction 32 operate between said guides and through an opening in the bridge-floor. The beveled flange 37 surrounds the top of the obstruction 32 for the purpose of closing the opening in the floor 23, through which said obstruction operates, when the latter is depressed. The top of the obstruction 32, when depressed, is flush with the upper surface of the floor 23. The inside flanges of the rails 25 are cut away sufficiently to allow the head 31 and the obstruction 32 to pass up and down between. The yielding buffers 38 38 are set into opposite faces of the obstruction 32, at the top, and project slightly to lessen the shock of a blow on said obstruction. The recesses 39 39 are made in the back of the obstruction 32 and the ropes 40 40 are attached in the deepest parts of said recesses to said obstruction by the pins 41 41.

The ropes 40 pass from the obstruction 32 back through the inverted troughs 42 42, over the sheaves 43, 44, and 45, to the weights 46 46. The rear end of each trough 42 is pivoted at 47 to the floor 23. The troughs 42 are immediately back of the obstruction 32 and the tops of said troughs are on a level with the upper surface of the floor 23 when down in their normal position. The weights 46 normally rest upon the bracket 48, and above each of said weights are the auxiliary weights 49, 50, and 51, supported, respectively, on the shelves 52, 53, and 54. Each rope 40 passes through the weights 51, 50, and 49 to the weight 46, and each of said weights is larger in diameter than the one below. Each of the shelves 52, 53, and 54 has an opening therein sufficiently large to permit the weight below to pass through. Enough slack is left in the ropes 40, when the obstruction 32 is depressed and the weights 46 rest on the bracket 48, to permit said obstruction to be elevated without disturbing said weights. The sheaves 43, 44, and 45 are journaled to the hangers 55, 56, and 57, respectively, which are secured to the bridge structure, and the bracket 48 is attached to said structure and the back of the pier C.

The gates 58 and 59 are rigidly attached to the vertical rods 60 60, and the combined length of said gates is equal to the width of the bridge A, including sidewalks. The lower terminals of the rods 60 extend through and below the floor 23 and are journaled to the bridge structure. The large horizontal sheaves 61 61 are fast to the lower ends of the rods 60. The hangers 62 62 are secured to the bridge structure in front of the sheaves 61, and said hangers carry the sheaves 63 63. The hangers 64 64 are attached to the bridge structure above the weight 15 and carry the sheaves 65 65. The ropes 66 66 are fastened to the pin 14 and extend upward therefrom to pass over the sheaves 65, around the rod-sheaves 61, and over the sheaves 63. The counterweights 67 67 depend from the ropes 66 beneath the sheaves 63.

Assuming that the draw D is closed with the beam 68 resting on the levers 2 and the several members of my device standing as

shown in Fig. 1, the operation of said device is as follows: Swing the draw D in either direction, and as the beam 68 releases the levers 2 the counterweight 15 draws down the contiguous ends of the levers 7 and 11 and elevates the opposite end of said lever 11 and the adjacent end of the lever 16, thereby forcing the obstructions 20 and 32 upward until they stand as shown in Fig. 2. The upward movement of the levers is limited by the stud 4 and the pin 19 coming in contact with the adjacent ends of the respective slots in which they operate. When the counterweight 15 drops, it draws down the ropes 66, and they in turn elevate the counterweights 67 and act on the sheaves 61 and the rods 60. The turning of the rods 60 by the movement of the ropes 66 closes the gates 58 and 59, the counterweights 67 being heavy enough to accomplish this object and the travel of said ropes sufficient for that purpose. The approach to the open draw is now closed to cars, vehicles, and pedestrians. Now in case a car becomes unmanageable through any cause, it will first strike the obstruction 32 and force it forward. The lug 33 on the bottom of the obstruction 32 slides out of the plunger-head 31 and into the slot 35 in the floor 23 when said obstruction is struck by a car, and the obstruction rides on the upper inside flanges of the rails 25. The forward movement of the obstruction 32 draws on the ropes 40 and elevates the weights 46, 49, 50, and 51, one pair after the other. The increasing weight on the ropes 40 tends to check the impetus of the force behind the obstruction 32 with the minimum amount of shock, until said force is spent or said obstruction reaches the gate 58 and the obstruction 20, where further movement is stopped altogether. The buffer 26 decreases the shock of compact between the obstructions 32 and 20, as before explained. The driving forward of the obstruction 32 causes the ropes 40 to elevate the front ends of the troughs 42. Said troughs are thus brought into contact with the bottom of a car and assist in checking the same. When the force behind the obstruction 32 has been removed, the weights 46, 49, 50, and 51 draw said obstruction back into contact with the head 31 again, said weights assuming their former positions.

By closing the draw D the beam 68 depresses the levers 2, elevates the counterweight 15, and produces a reverse movement of the several coacting levers to that caused by the opening of said draw. The obstructions 20 and 32 are depressed and the gates 58 and 59 opened. But one of the gates 58 or 59 need be automatically operated in the manner hereinbefore described, if it is desired to close the other gate by hand, after permitting any pedestrians who may be between the draw and said gates to pass through. This provision may be desirable, in some cases, for the accommodation of people who cannot get of off the draw in time to pass through the automatically-closing gates.

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

1. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, a rising-and-falling plunger operated by said levers, and a traveling obstruction carried by said plunger, substantially as and for the purpose set forth.

2. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, a rising-and-falling obstruction and plunger operated by said levers, and a traveling obstruction carried by said plunger, substantially as and for the purpose set forth.

3. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, a rising-and-falling plunger operated by said levers, a head on said plunger, and a traveling obstruction detachably connected to said head, substantially as and for the purpose set forth.

4. The combination in a drawbridge safety device, of a rising-and-falling plunger carrying a traveling obstruction, ropes attached to said obstruction, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

5. The combination in a drawbridge safety device, of a rising-and-falling plunger, a head on said plunger, a traveling obstruction detachably connected to said head, ropes attached to said obstruction, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

6. The combination in a drawbridge safety device, of a rising-and-falling plunger carrying a traveling obstruction, inverted troughs pivotally attached in a slot to the bridge-floor, ropes passing through said troughs and fastened to said obstruction, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

7. The combination in a drawbridge safety device, of a rising-and-falling plunger, a head on said plunger, a traveling obstruction detachably connected to said head, inverted troughs pivotally attached in a slot to the bridge-floor, ropes passing through said troughs and fastened to said obstruction, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

8. The combination in a drawbridge safety device, of the levers 7 and 11, a counterweight depending from their contiguous ends, the levers 2 pivotally connected to the front of the bridge and actuated by the draw and said counterweight, and an obstruction pivotally attached to the rear end of said lever 11 and

adapted to be raised and lowered by said levers, substantially as and for the purpose set forth.

9. The combination in a drawbridge safety device, of the levers 7, 11 and 16 pivotally connected, a counterweight depending from the contiguous ends of said levers 7 and 11, the levers 2 pivotally connected to the front of the bridge and actuated by the draw and said counterweight, and an obstruction pivotally attached to the adjacent ends of said levers 11 and 16 and adapted to be raised and lowered by the operation of all of said levers, substantially as and for the purpose set forth.

10. The combination in a drawbridge safety device, of a sleeve and a box, a rising-and-falling obstruction operating through said sleeve, and a spring-actuated buffer in said box adjacent to the front of said obstruction, substantially as and for the purpose set forth.

11. The combination in a drawbridge safety device, of a sleeve and a box, a sliding cover on said box, a rising-and-falling obstruction operating through said sleeve, and a spring-actuated buffer in said box adjacent to the front of said obstruction, substantially as and for the purpose set forth.

12. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, one or more vertical rods journaled to the bridge structure and carrying gates, sheaves fast on the lower ends of said rods, and other sheaves supporting ropes having counterweights at one end and connected with said levers at the other end, said ropes passing around said rod-sheaves and turning the same when said levers are actuated, thereby closing or opening said gates, substantially as and for the purpose set forth.

13. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, a rising-and-falling obstruction operated by said levers, one or more vertical rods journaled to the bridge structure and carrying gates, sheaves fast to the lower ends of said rods, and other sheaves supporting ropes having counterweights at one end and connected with said levers at the other end, said ropes passing around said rod-sheaves and turning the same when said levers are actuated, thereby closing or opening said gates, substantially as and for the purpose set forth.

14. The combination in a drawbridge safety device, of a series of levers actuated by the draw and a counterweight, a rising-and-falling obstruction and plunger carrying a traveling obstruction, operated by said levers, one or more vertical rods journaled to the bridge structure and carrying gates, sheaves fast to the lower ends of said rods, and other sheaves supporting ropes having counterweights at one end and connected with said levers at the other end, said ropes passing around said rod-sheaves and turning the same when said levers are actuated, thereby closing or opening said gates, substantially as and for the purpose set forth.

15. The combination in a drawbridge safety device, of a traveling obstruction, one or more inverted troughs pivoted in a slot to the bridge-floor back of said obstruction, and ropes weighted at one end passing through said troughs and fastened to the upper part of said obstruction, whereby the front ends of said troughs are elevated beneath a car which is driving forward said obstruction, substantially as and for the purpose set forth.

16. The combination in a drawbridge safety device, of a traveling obstruction, ropes attached thereto, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

17. The combination in a drawbridge safety device, of a traveling obstruction, inverted troughs pivoted in a slot to the bridge-floor, ropes passing through said troughs and fastened to said obstruction, and weights and auxiliary weights arranged to be lifted by said ropes when said obstruction is forced forward, substantially as and for the purpose set forth.

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

JOHN COUP.

Witnesses:
F. A. CUTTER,
H. H. MUNN.