(No Model.)

2 Sheets—Sheet 1.

C. R. BROTHWELL.

DRAW BRIDGE.

No. 408,370. Patented Aug. 6, 1889.

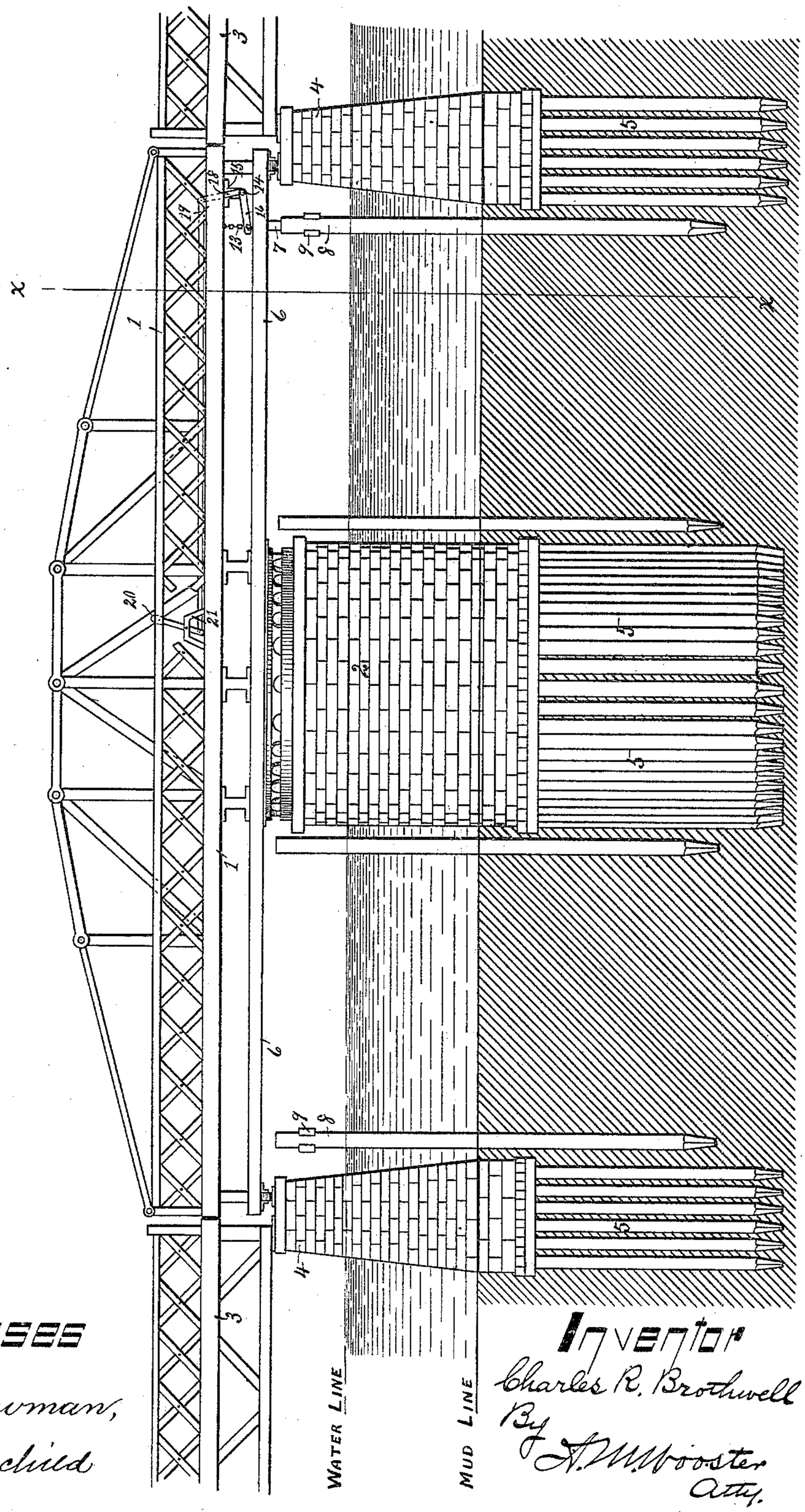

Fig. 1.

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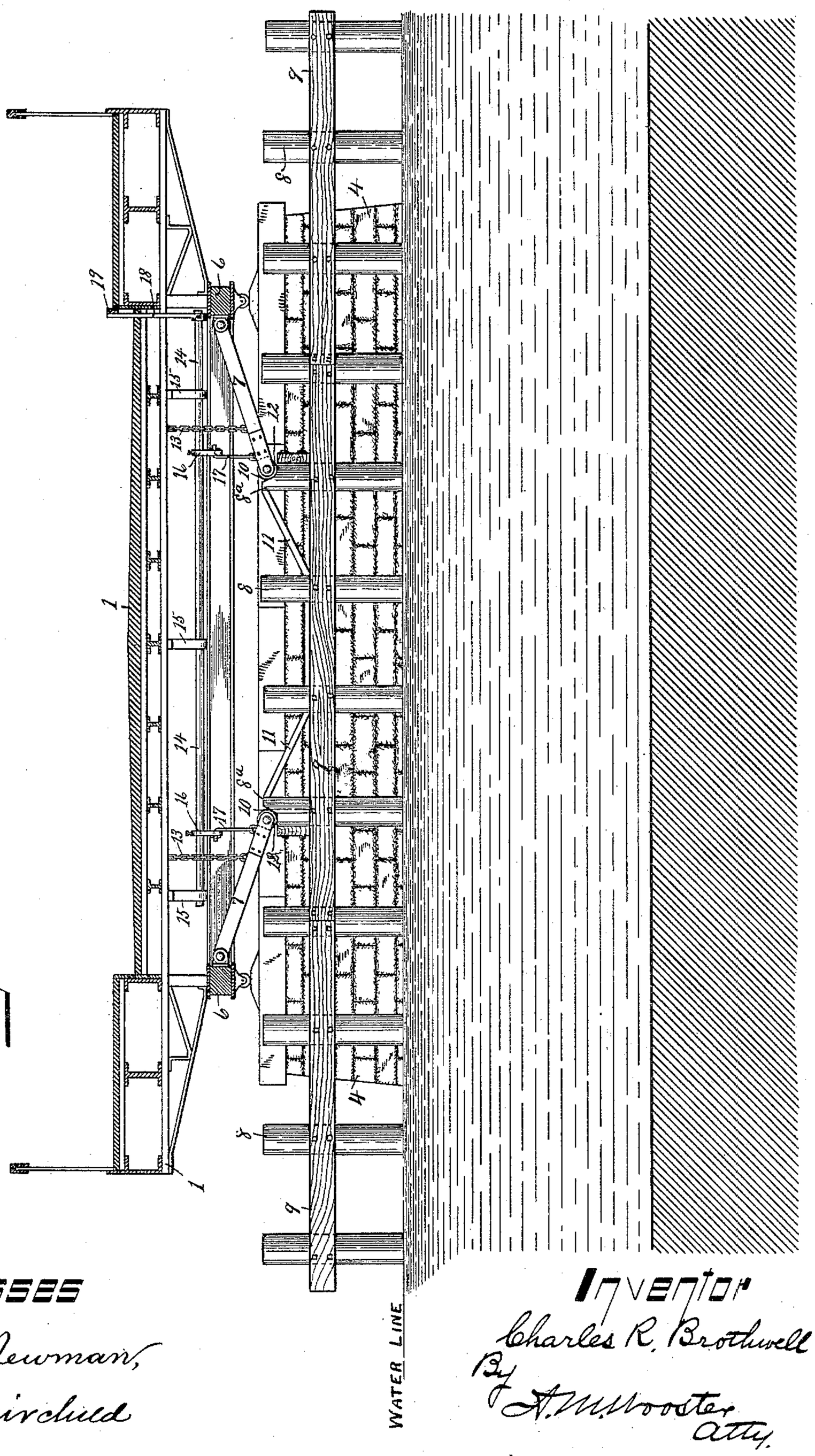

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES R. BROTHWELL, OF BRIDGEPORT, CONNECTICUT.

DRAW-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 408,370, dated August 6, 1889.

Application filed May 10, 1889. Serial No. 310,263. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. BROTHWELL, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Draw-Bridges; and I do hereby 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.

My invention relates to draw-bridges in general, and has for its object to provide a yielding abutment or stop adapted to be engaged by the draw, which shall be wholly disconnected from the piers of the bridge, so that no matter how great may be the striking force of the draw in closing no shock whatever will be communicated to other parts of the bridge. With this end in view I have devised the novel construction of which the following description, in connection with the accompanying drawings, is a specification, numbers being used to denote the several parts.

Figure 1 is a side elevation of a draw-bridge, the draw being in the closed position; and Fig. 2 is a transverse section of the draw on the line *x x* in Fig. 1, looking toward the right, the scale being greatly enlarged.

It is of course apparent that the blow communicated to the adjacent parts of bridges by the stopping of the draw in closing is tremendous. In the bridge to which my novel invention has been applied the weight of the draw itself is upward of three hundred tons. It is, furthermore, well understood that the piers of draw-bridges are necessarily built upon spiles. It follows, therefore, that no matter how solidly the masonry may be built the repeated heavy blows which it is compelled to withstand in closing the draw must necessarily tend to seriously injure it in time. In order to lessen the blow imparted to the pier in closing, it has been common heretofore to close the draw very slowly. This, however, is seriously objectionable on account of the obstruction to travel, the delay being equally vexatious both at railway-bridges and at bridges designed for ordinary traffic. It has, furthermore, been common, in order to lessen the shock to the masonry to a certain extent, to provide stop devices that would yield at a certain pressure and allow the draw to swing past. This arrangement, also, is objectionable, as it only partially overcomes the difficulty, and, furthermore, adds greatly to the delay of traffic, as it is necessary to reverse the movement of the draw and turn it back to place. As a matter of fact in large cities, and, in fact, upon all bridges of importance, it has been imperatively demanded in the interests of traffic that the delay attendant upon opening and closing the draw should be greatly reduced. This demand has led to the adoption of other than manual power to operate the draw.

In the draw-bridge to which my invention is applied the draw is opened and closed by an electric motor, and so easily and rapidly is the draw manipulated that it is not uncommon to open the draw, allow a vessel to pass, and close it again ready for traffic within three minutes, which is in itself a feat of engineering unparalleled in bridges of this class.

It is obvious that no piers could possibly be built on spiles that would for a long period of time withstand the blows of a three-hundred-ton draw operated at such a high rate of speed. I overcome the difficulty entirely by causing the blow of the draw in closing to be entirely received and taken up by a yielding abutment—in the present instance a row of guard-spiles firmly braced together and wholly independent of the bridge proper.

In the drawings, 1 denotes the draw; 2, the central pier or abutment by which it is supported; 3, the inner ends of the bridge proper, and 4 the inner piers or abutments which support the ends of the bridge and the ends of the draw, all of these piers being shown as supported on spiles 5.

It will of course be understood that the construction of the draw and the bridge proper has nothing to do with my present invention.

6 denotes the side stringers of the draw, and 7 stop projections, (preferably pivoted latches,) the outer ends of which are connected to the inner sides of the stringers. In practice it is only necessary to place these projections or latches at one end of the draw, as it is customary to turn the draw continuously forward in opening and closing, vessels keep-

ing to the right side of the central pier both in going up and down, and the draw swinging forward away from the vessel as it enters and closing behind it as it passes through. The draw may of course be turned in either direction and makes a complete half-turn each time it is opened and closed. I therefore place stop-latches at one end only of the draw, but place at the inner side of each of the side piers an abutment consisting, preferably, of a series 8 of guard-spiles, which are rigidly braced together in any suitable manner, as at 9 in the drawings. In each series 8 of guard-spiles are two spiles which I designate specifically as 8^a, which are so located relatively to the projections or stop-latches on the draw as to be engaged thereby at the exact instant that the draw is wholly closed. Each of the stop-spiles 8^a is provided with a shoulder 10 to receive the blow of the stop-latch, and upon the inner side of each of these stop-spiles is an incline 11, extending from the top of said spile down to the brace of the next spile, the purpose of which will presently be explained. At the ends of the stop-latches I preferably place rollers 12, one of which rides up one of the inclines 11 each time the draw is closed.

13 denotes chains, to which the stop-latches are connected, and which act to limit their downward movement when the draw is moving—that is, so that said latches shall not drop down below the plane of engagement with the guard-spiles. The stop-latches may be operated in any suitable manner. I have shown a transverse shaft 14, journaled in brackets 15 under the roadway of the draw. 16 denotes arms extending outward from this shaft, and 17 links connecting these arms to the stop-latches. 18 denotes an operating-arm extending upward from said shaft, ordinarily through a slot at the side of the roadway, and 19 an operating-rod extending from arm 18 to the center of the draw or to any convenient place for controlling the latches. In the present instance I have shown rods 19 as connected to an operating-lever 20, which is connected to a suitable frame-work 21, to which it is locked in position in the same manner as a railway-switch lever.

As it is necessary that the motor by which the draw is manipulated should be placed at the center thereof, I preferably for convenience operate the stop-latches also from the center. Suppose, now, that it is desired to open the draw. The latches are raised and held at the raised position until the draw has moved a short distance, when they are released, their downward movement being limited by chains 13. All further action of the stop-latches is automatic.

It will be apparent that the ends of the stop-latches will swing in a circle in the horizontal plane, the center of motion of the draw being the center of said circle, it being of course understood that the ends of the draw are curved in arcs of another concentric circle and that the ends of the bridge proper are curved to correspond therewith. Suppose that the draw is closing from left to right. As it approaches the position illustrated in Fig. 2 the left stop-latch will clear all of the guard-spiles in series 8 until it reaches the left spile designated as 8^a, which it will engage. It is, furthermore, apparent that the right stop-latch will clear all of the spiles except the right spile designated by 8^a. In practice just before the engagement of the left stop-latch with the left spile 8^a the lower end of the right stop-latch will engage the right incline 11, and the roller will ride up said incline until the instant the left stop-latch engages the shoulder on the left guard-spile 8^a, when the right stop-latch will ride over the top of the right spile 8^a and engage the shoulder upon said spile. The operation would be exactly the same were the draw to be swung to the closed position from right to left. The left stop-latch would then ride up the left incline and the right stop-latch would engage the shoulder 10 of the right spile 8^a. As the entire series of guard-spiles is rigidly braced together, it is obvious that the shock of the blow in closing the draw does not have to be withstood by the special spile 8^a, which is engaged by the stop-latch, but is communicated by the braces 9 to the entire series, each spile in the series withstanding its proper portion of the blow. I find in practice in closing the draw of the bridge to which my invention has been applied that when a stop-latch strikes one of the spiles 8^a the draw will swing four inches, slightly more or less, beyond its closed position, but will be instantly returned to its closed position by the resiliency of the spiles, where it will remain firmly locked against movement in either direction, as is clearly shown in Fig. 2. As the blows of the draw in closing come as often from one direction as the other, it results that the spiles are not displaced in the slightest.

It is obvious that should the spiles become broken or injured in any way any one or the entire series may be replaced at comparatively slight expense, and that under no circumstances can the slightest injury result to the piers of masonry from the closing of the draw.

Having thus described my invention, I claim—

1. The combination, with a swinging draw having a suitable stop projection, of a yielding abutment independent of the bridge, which is adapted to be engaged by said projection, as and for the purpose set forth.

2. The combination, with a swinging draw having stop-latches, of a series of guard-spiles suitably connected together, two of said spiles being engaged by the stop-latches when the draw reaches the closed position.

3. The combination, with a swinging draw having stop-latches pivoted thereto and means, substantially as described, for raising and lowering the stop-latches, of a series of

guard-spiles connected together, two of said spiles being engaged by the stop-latches when the draw reaches the closed position.

4. The draw having stop-latches with rollers at their outer ends, in combination with a series of guard-spiles connected together, two of said spiles having shoulders 10 and inclines 11, so that as the draw is swung to the closed position one of said latches will ride up one of the inclines and then drop to the engaged position and the other latch will strike the other shoulder squarely, thereby stopping the movement of the draw.

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

CHARLES R. BROTHWELL.

Witnesses:
A. M. WOOSTER,
A. B. FAIRCHILD.