(No Model.)

C. A. ZIMMERMAN.

DRAWBRIDGE.

No. 486,552. Patented Nov. 22, 1892.

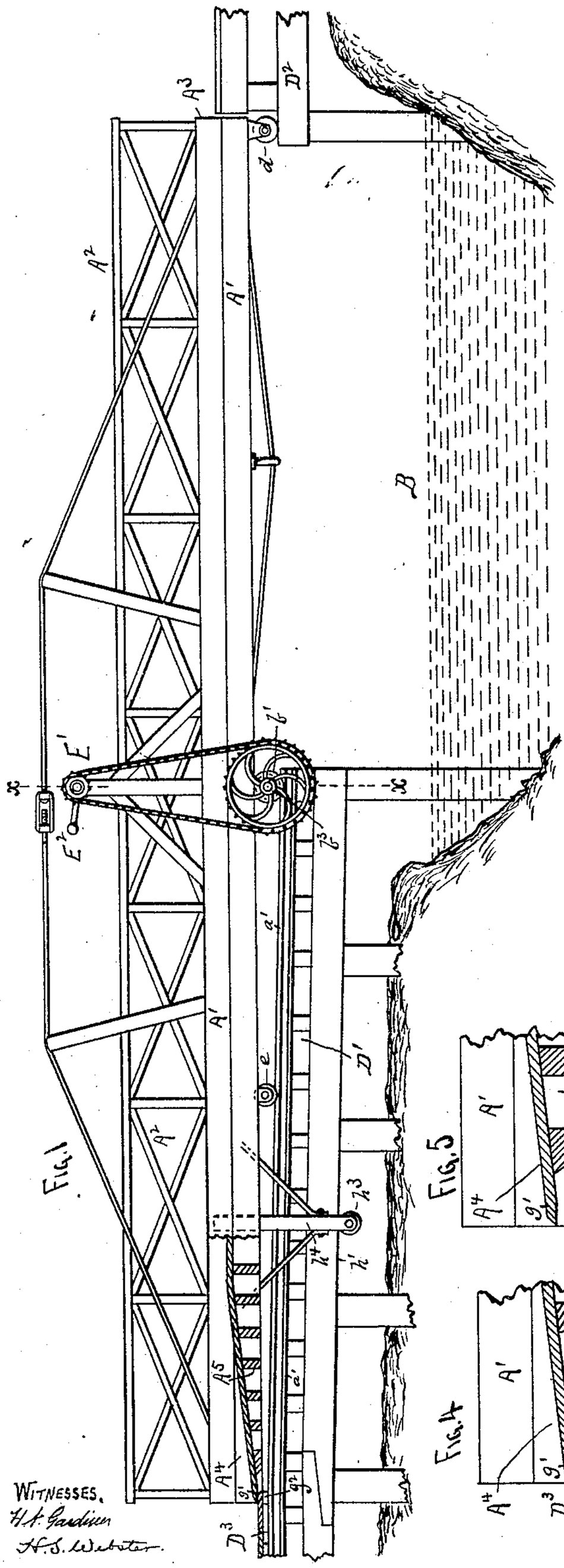

FIG. 1.

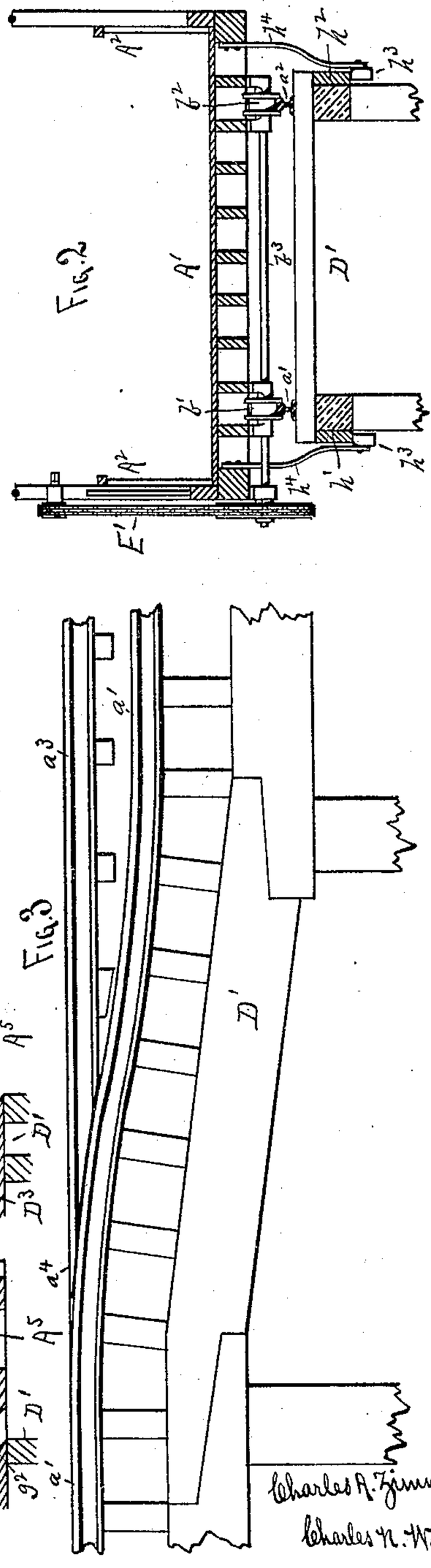

FIG. 2.

FIG. 3.

FIG. 5.

FIG. 4.

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CHARLES A. ZIMMERMAN, OF ST. PAUL, MINNESOTA.

DRAWBRIDGE.

SPECIFICATION forming part of Letters Patent No. 486,552, dated November 22, 1892.

Application filed September 25, 1891. Serial No. 406,801. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. ZIMMERMAN, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Drawbridges, of which the following is a specification.

This invention relates to drawbridges; and it consists in the construction, combination, and arrangement of parts, as hereinafter shown and described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a side elevation, partially in section. Fig. 2 is a cross-sectional view on the line X X of Fig. 1. Fig. 3 is an enlarged detail illustrating some modifications in the construction. Figs. 4 and 5 are enlarged details illustrating more fully the construction and manner of operation of the approach to the shore end of the bridge.

The construction of the framework and approaches of this bridge and the material employed will be varied according to the circumstances under which it is built and the location and size of the stream to be bridged; but for the purpose of illustration I have shown it in the drawings arranged for a small-sized wagon or foot bridge, although the invention is equally applicable to the largest bridges.

In the drawings, A′ represents the floor-frame, and A^2 the side frames or rails, the framework being either a little more than twice as long as the width of the channel B, so that when in place across the channel, as in Fig. 1, the portion of the framework over the approach D′ will be greater in bulk than the portion over the channel B, or the portion remaining on the approach D′ will be weighted to cause it to overbalance the portion over the channel. If required, to make the requisite overbalancing more certain the portion remaining over the approach D′ will be weighted whether it is longer or shorter than the portion over the channel. The approach D′ is provided with rails a' a^2, parallel with the sides of the bridge and upon which run flanged wheels b' b^2 on a shaft b^3, supported in suitable bearings beneath the floor-frame, as shown. This shaft b^3, with its wheels b' b^2, is connected to the bridge-frame at a point in close proximity to the end of the approach D′, next the channel B, and will thus support, substantially, the whole weight of the framework upon the wheels b' b^2, although small bearing-wheels *e* will be arranged beneath the framework, as shown, and adapted to run upon the rails a' a^2 as a slight support to the shore end of the bridge to prevent it from tilting downward, but are not designed to bear any substantial portion of the weight of the bridge. The bridge will be so balanced that substantially the whole weight will be borne by the wheels b' b^2, so that a great tractive force will be exerted upon the wheels to enable the bridge to be moved by them bodily along the rails when they are revolved. The end A^3, which rests upon approach D^2, is provided with wheels *d*, which serve to support that end when the bridge is closed. The wheels b' b^2 thus serve as traction-wheels to support the bridge upon the rails, and by applying power to the shaft b^3 to turn it the bridge will be moved bodily along the rails, the balancing of substantially the whole weight of the bridge upon the wheels b' b^2 greatly increasing the tractive force. For large bridges the shaft b^3 and wheels b' b^2 will be actuated by steam or other power; but for small bridges a simple chain-winch E′, as shown, will be all that will be necessary, which may be actuated by a crank E^2 from the floor of the bridge. The rails a' a^2 are shown set at a slight incline toward the channel, so that the bridge will run across the channel of its own volition, and thereby become a self-closing bridge. In the smaller sizes of bridges this incline can be of a pitch sufficient to cause the bridge to close freely of itself; but in the larger bridges the incline should be so slight that the bridge will not move so freely, as there would be danger in permitting so large a mass to move of its own volition rapidly. In such large bridges the incline will be just sufficient to assist the mechanism employed in actuating the shaft b^3 and wheels b' b^2, and a system of brakes would be required to control its motion. When the bridge is moved backward along the inclined rails, it begins to rise at the same time that it moves along the rails, and this compound movement is utilized to provide a simple means for forming the union between the floor D^3 or the ap-

proach D′ and the end A^4 of the bridge, so that there will not be a gap between their adjacent edges. This feature is shown in Figs. 1, 4, and 5, where the floor of the bridge is shown inclined for a short distance back and with the end plank g' overhanging the end plank g^2 of the flooring D^3 of the approach D′. The framing A^5 beneath the inclined portion A^4 of the bridge-flooring is of less thickness than at other points, so that the bridge will only have to rise a short distance for the framing A^5 to clear the floor D^3.

In Fig. 4 is shown in enlarged details the construction of the shore end of the bridge and its approach when the bridge is closed, and in Fig. 5 are shown the same parts when the bridge is partially open or with the shore end run upward on the inclined rails a' a^2 a short distance and passed over the approach D′. By this simple arrangement an unbroken joint is formed between the end of the bridge and the approach thereto when the bridge is closed. When this form of bridge is employed for a railroad-bridge, the same principle of construction is employed, except that the rails a' a^2 are continued into or united to the rails of the main line of the railroad (see Fig. 3) and the rails a^3 on the bridge arranged to coincide with them, the ends of the bridge-rails being cut off at an angle on their under side, so that their points are wedge-shaped and rest upon the upper surface of the main rails, as shown at a^4, whereby no unevenness or gaps occur between the contiguous surfaces. When thus employed, the rails a' a^2 will be formed in a slight compound curve instead of on a straight incline, so as to avoid any abrupt change in the line of the upper surfaces.

Another advantage derived from the curving form of the rails a' a^2 is that when first starting to move the bridge, the rise is more gradual and increases as the movement continues, so that a less power will be required to overcome the inertia of the bridge.

Upon the sides of the approach D′ are arranged guide-rails h' h^2, beneath which are guide-rollers h^3, supported by suitable hangers h^4 from the frame A′ of the bridge to serve as safety-guards and employed as a measure of precaution to retain and support the shore end of the bridge in event of any overloading of the channel end. It is not intended that these guards shall bear any strains except in event of an overloading of the channel end, and they will therefore merely run back and forth as idlers at all other times.

Under some circumstances it may be desirable to arrange the bridge to be self-opening instead of self-closing, in which case the inclination of the rails a' a^2 will be reversed and trend downward away from the channel B; but the principle and mode of operation and results produced would be substantially the same.

Having thus described my invention, what I claim as new is—

1. In a drawbridge, the approach D′, having the rails a' a^2 set at an incline, the bridge mounted upon said rails by traction-wheels, and means for actuating said traction-wheels to open and close said bridge, substantially as and for the purpose set forth.

2. In a drawbridge, the approach D′, having the rails a' a^2 set at an incline, the bridge mounted upon said rails by traction-wheels, and with its shore end formed with an incline d, substantially corresponding with the surface of the approach, and with the lowermost edge of said incline overlapping the outermost edge of said approach, and means whereby said traction-wheels may be actuated, substantially as and for the purpose set forth.

3. In a drawbridge, the approach D′, having the rails a' a^2, the bridge mounted upon said rails by traction-wheels and supported wholly thereby, and means for actuating said traction-wheels and safety-guards h' h^2 h^3 h^4, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES A. ZIMMERMAN.

Witnesses:
H. B. WEBSTER,
C. N. WOODWARD.