

No. 713,561.

Patented Nov. 11, 1902.

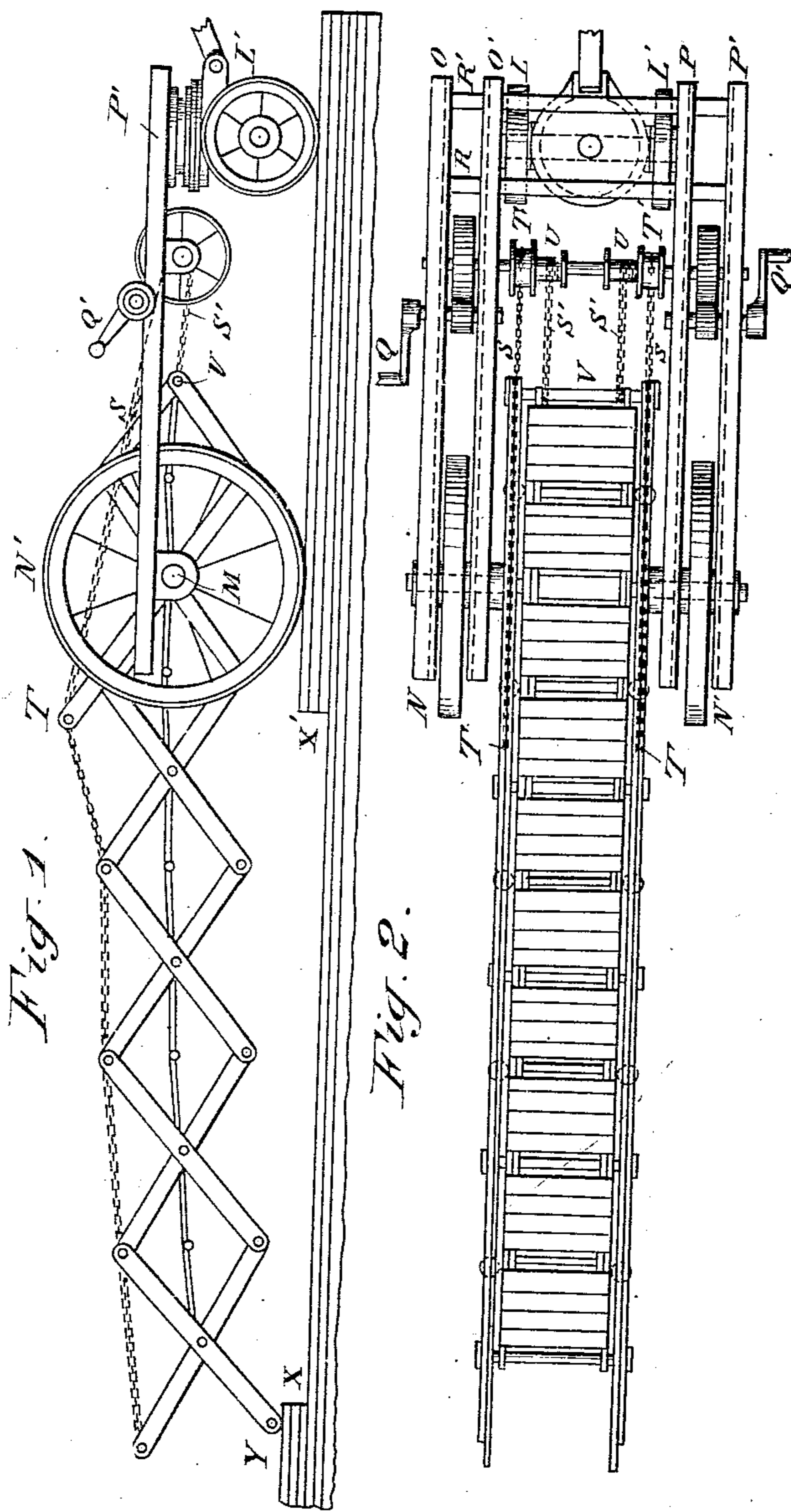
D. DOYEN.

COLLAPSIBLE OR FOLDING BRIDGE.

(Application filed June 11, 1901. Renewed Sept. 22, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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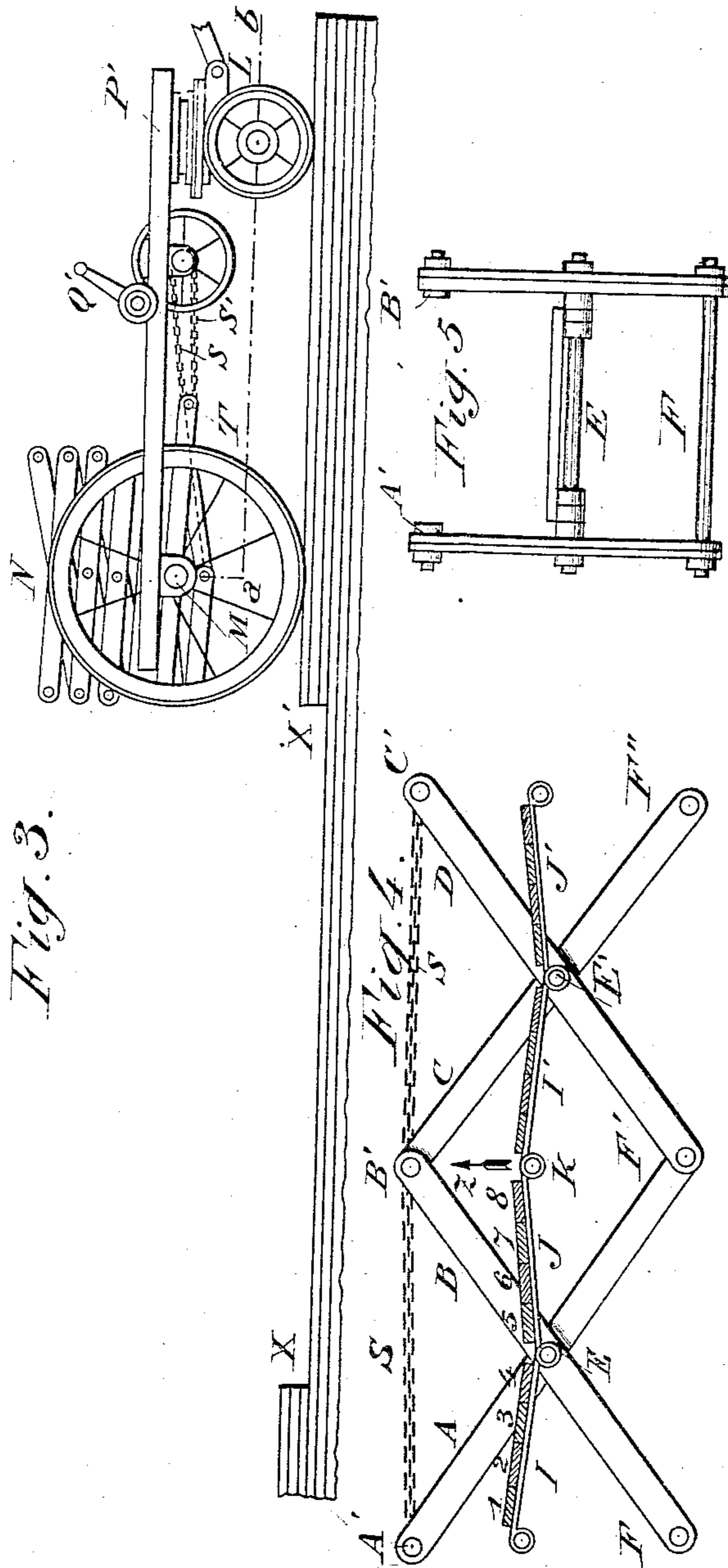
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COLLAPSIBLE OR FOLDING BRIDGE.

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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

DENIS DOYEN, OF BRUSSELS, BELGIUM.

COLLAPSIBLE OR FOLDING BRIDGE.

SPECIFICATION forming part of Letters Patent No. 713,561, dated November 11, 1902.

Application filed June 11, 1901. Renewed September 22, 1902. Serial No. 124,376. (No model.)

To all whom it may concern:

Be it known that I, DENIS DOYEN, a subject of the King of Belgium, and a resident of Brussels, Belgium, have invented certain new and useful Improvements in Collapsible or Folding Bridges, of which the following is a specification.

My present invention relates to collapsible or folding bridges, the object being to provide an improved construction enabling the bridge to be easily transported whenever desired and readily unfolded and set up across a river or the like for the passage of people or animals.

The invention consists in the construction and novel combination of parts fully described and claimed hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of the bridge as it appears when opened out. Fig. 2 is a corresponding top plan view. Fig. 3 is a side elevation of the collapsed or folded bridge. Fig. 4 shows a portion of the bridge with the collapsible floor thereof. Fig. 5 is an end view of the parts shown in Fig. 4.

The improved bridge is formed of levers pivotally connected to each other by means of brace-bars, and it will be sufficient to describe a series of four levers and their connections to give a clear understanding of this part of the invention.

A B C D, Fig. 4, represent two pairs of levers crossing each other at their medial points and pivotally connected at these points by means of brace-bars E. The lower ends of said levers are pivotally connected to each other by means of brace-bars F F' F'', while the upper ends thereof are connected by means of pivotal bolts A' B' C'. To each upper end of the levers are attached cords or chains S S to form the hand-rails. The floor of the bridge is formed of long-hinged ferules I J I' J', to which are secured wooden cross-planks 1 2 3 4 5 6 7 8, forming the floor proper. The floor is somewhat raised at the axis k to increase the strength thereof. When the bridge is collapsed or folded, the brace-bars and the levers A B C D are moved to each other and the several parts of the floor are moved in the direction of the arrow z. The chains G H are also folded, so that the

entire bridge will occupy but a small space in the collapsed position. The bridge will be completely unfolded when the floor thereof forms a nearly horizontal surface.

In order to facilitate transportation of the bridge, the latter is mounted on a truck, as shown in Fig. 1, having front wheels L L' and rear wheels N N', mounted on an axle M, extending through the centers of four levers of the bridge to support the latter and enabling it to oscillate on said axle. The front and rear wheels are connected by means of four girders O O' P P', Fig. 2, connected by means of brace-bars R R'. Mounted on said girders is a capstan adapted to be operated by means of the crank-handles Q Q' to fold and unfold the bridge. The cords or chains S S are attached to levers T T and wound upon the rollers T' T' of the capstan. The object of said chains is to collapse the bridge by actuating the crank-handles, and in order to facilitate this manipulation the levers T T are made somewhat longer. The cords S' S' are attached to the brace-bar V and wound upon the rollers U U of the capstan. The object of the chains S' S' is to unfold the bridge. The rollers T' U are made of diameters varying in accordance with the length of the levers T T, so that the chains or cords wound upon said rollers have always the same tension as the cords or chains unrolled for the purpose of giving the bridge equal rigidity in any operative position.

Fig. 1 shows the bridge in its operative position—across a river X X', for instance—one end Y of the bridge resting on the ground, while the opposite end is supported by the axle M. The bridge when opened out will be of an arched form by reason of the levers having different lengths. Thus the arms of the levers A B C D, Fig. 4, above the floor of the bridge are longer than F F' F''. These differences in length are determined in accordance with the entire length of the bridge and the arch to be formed. In order to unfold the bridge, the capstan is actuated in one direction, whereby the bridge is slightly oscillated, as it is retained by the cords or chains S S, which are unrolled, while the cords or chains S' S' are wound upon the capstan.

The weight of the bridge increases in pro-

portion as it is unfolded, and this weight will be balanced by the distance $a b$ and the weight of the truck, Fig. 3.

In order to effect the collapse of the bridge, the capstan is actuated in opposite directions, the cords $S S$ acting to fold the bridge, while the cords $S' S'$ act to retain the bridge until the bridge is brought to the position shown in Fig. 3.

The truck may be constructed as a motor-vehicle, the motor thereof serving to actuate the capstan. In certain cases the parts of the collapsible bridge may be removably connected to enable same to be transported by the porters. The improved bridge may also be employed without a transporting-truck, the bridge being then stationarily mounted in place on one side of a river and unfolded and collapsed whenever desired.

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

1. In the improved collapsible bridge, the combination with a series of pivotally-connected pairs of levers, adapted to be unfolded and collapsed and suitable brace-bars connecting said pairs of levers, of a wheeled truck supporting said levers and brace-bars, one end of the series of crossed levers being hinged to the rear axle of said truck, substantially as set forth.

2. In the improved collapsible bridge, the combination with a series of pivotally-connected pairs of levers, adapted to be unfolded and collapsed and suitable brace-bars connecting said pairs of levers, and a collapsible floor connected to the pivotal bolts of said levers and adapted to form a nearly horizontal

surface, of a wheeled truck, supporting said parts, one end of the series of crossed levers being hinged to the rear axle of said truck, substantially as set forth.

3. In the improved collapsible bridge, the combination with a series of pairs of levers, crossing each other and pivotally connected at their crossing-points, the arms of the levers above the crossing-points being longer than the lever-arms below said crossing-points, suitable brace-bars connecting said pairs of levers, and a collapsible floor connected to the pivotal bolts of said levers and adapted to form a nearly horizontal surface, of a wheeled truck, supporting said parts, substantially as set forth.

4. In the improved collapsible bridge, the combination with a series of pivotally-connected pairs of levers, adapted to be unfolded and collapsed and suitable brace-bars connecting said pairs of levers, and a collapsible floor connected to the pivotal bolts of said levers and adapted to form a nearly horizontal surface, of a wheeled truck, supporting said parts, a capstan mounted on said truck, cords or chains attached to levers of the bridge and adapted to be wound upon the capstan, and other cords attached to a brace-bar of the bridge and adapted to be unrolled from the capstan while the first-mentioned cords are wound upon the same, substantially as set forth.

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

DENIS DOYEN.

Witnesses:

C. SCHER,

GREGORY PHELAN.