

(No Model.)

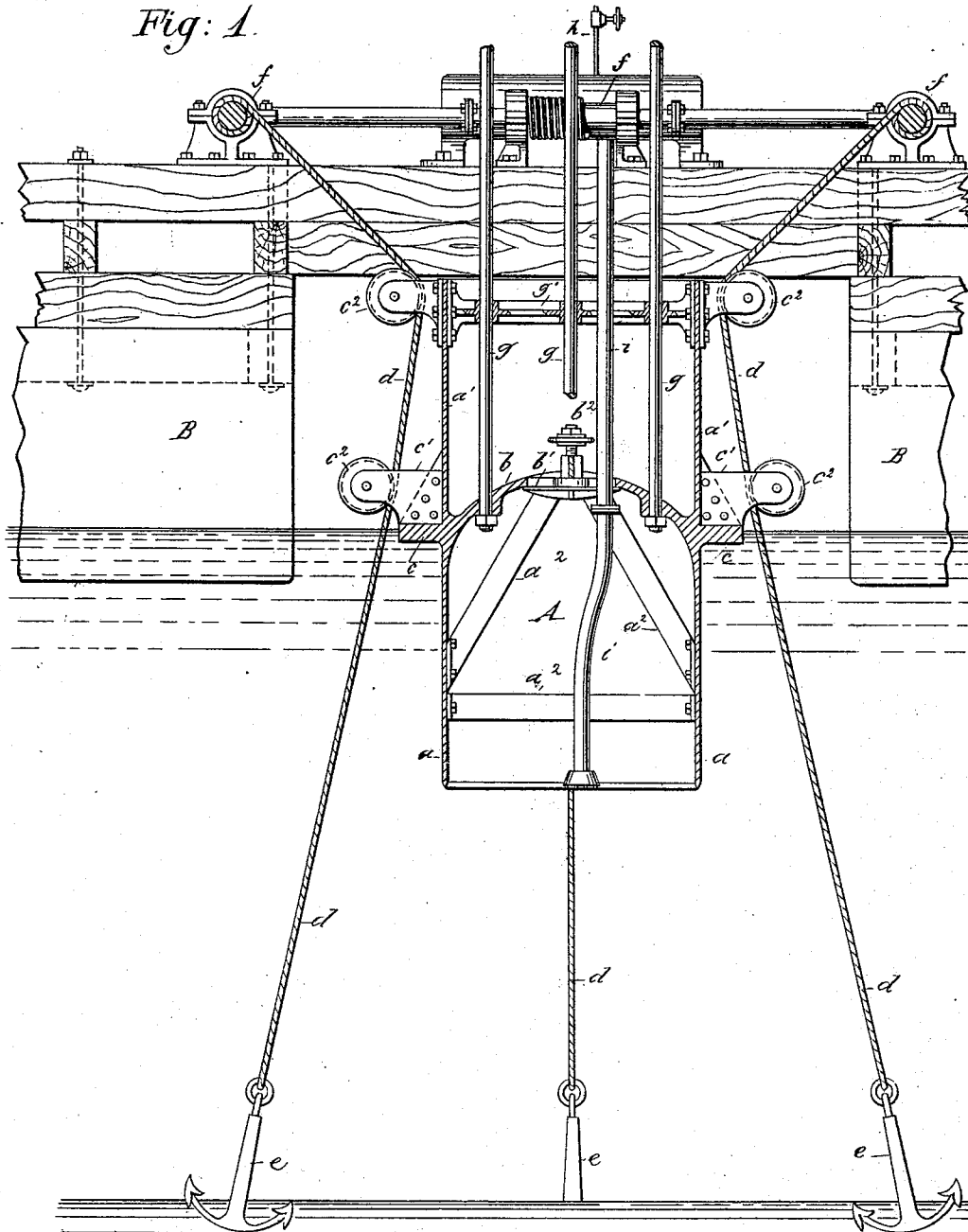
3 Sheets—Sheet 1.

A. CHECHONG & A. BALENSIEFER.
CAISSON FOR ERECTING BRIDGE PIERS.

No. 532,140.

Patented Jan. 8, 1895.

Fig: 1.



WITNESSES:

J. Mussblatt
Julius Ascher

INVENTORS

Adalbert Chechong
and Adolf Balensiefer
BY Charles Marx

ATTORNEY.

(No Model.)

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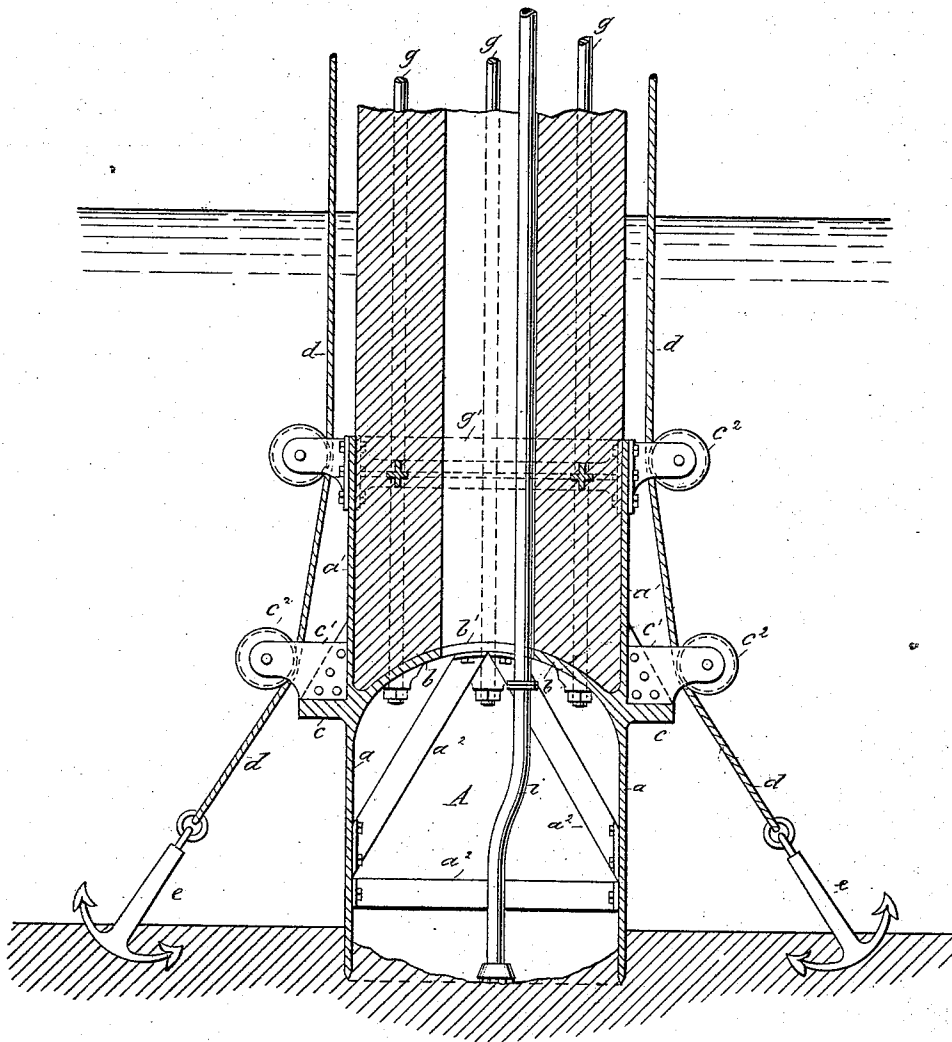
A. CHECHONG & A. BALENSIEFER.

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Fig. 2.



WITNESSES:

J. M. M. M.
James M. M.

INVENTORS

Adalbert Chechong
and Adolf Balensiefer
BY Charles H. H.

ATTORNEY.

(No Model.)

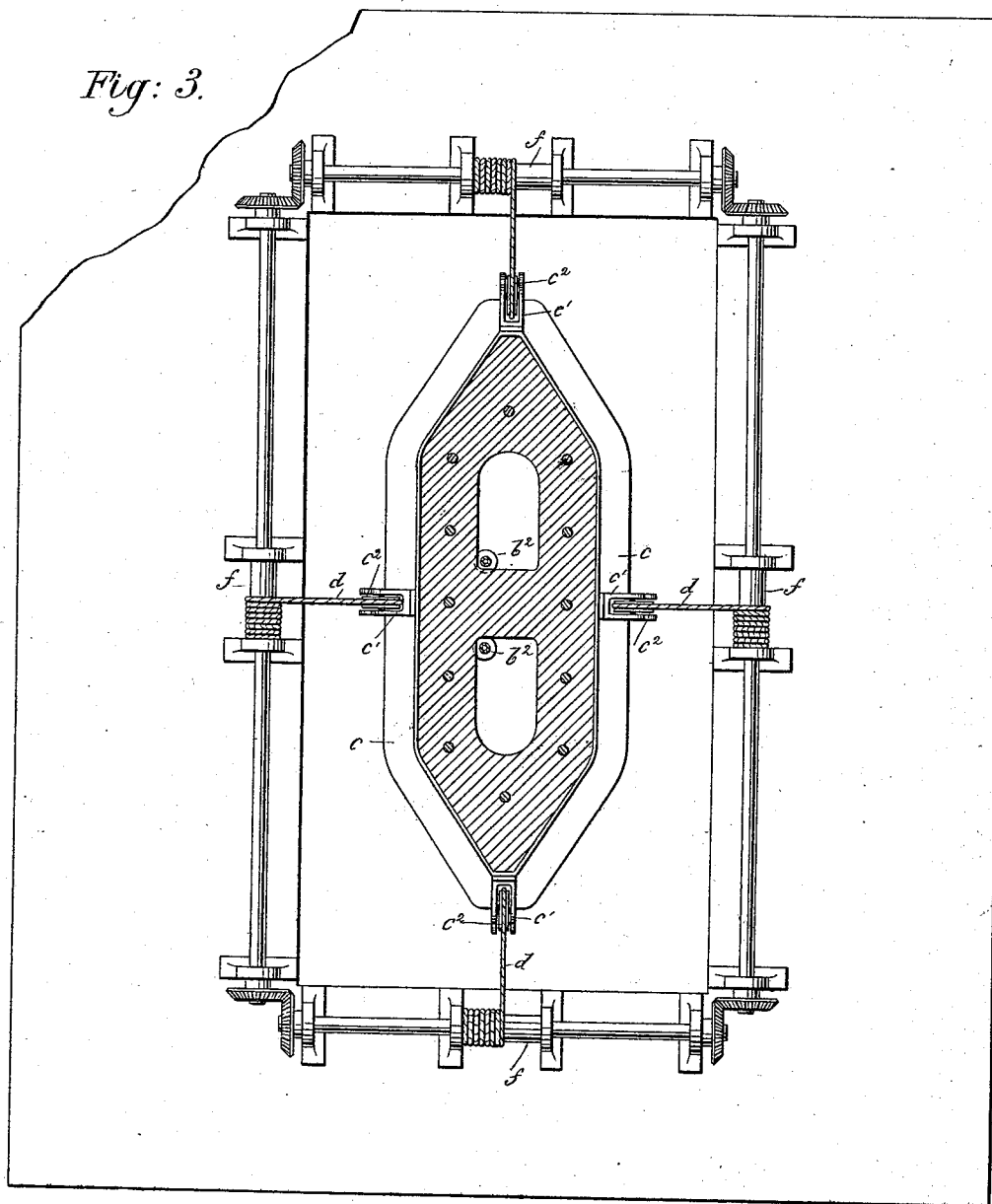
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A. CHECHONG & A. BALENSIEFER.
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Patented Jan. 8, 1895.

Fig: 3.



WITNESSES:

J. Muesblatt
J. A. Carter

INVENTORS

Adalbert Chechong
and Adolf Balensiefer
BY *Charles Kay*

ATTORNEY.

UNITED STATES PATENT OFFICE.

ADALBERT CHECHONG AND ADOLF BALENSIEFER, OF NEW YORK, N. Y.

CAISSON FOR ERECTING BRIDGE-PIERS.

SPECIFICATION forming part of Letters Patent No. 532,140, dated January 8, 1895.

Application filed July 9, 1894. Serial No. 517,028. (No model.)

To all whom it may concern:

Be it known that we, ADALBERT CHECHONG, a subject of the Emperor of Germany, and ADOLF BALENSIEFER, a citizen of the United States, residents of New York, in the county of New York and State of New York, have invented a certain new and useful Caisson for Erecting Bridge-Piers, of which the following is a specification.

Our invention has reference to improvements in caissons for erecting bridge-piers and consists in the novel arrangement and combination of parts hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 shows a vertical section of the caisson upon which the walls of the pier are erected above the water-level and the appliance for sinking the same together with the walls or stone work. Fig. 2 is a vertical section of the caisson with the walls or stone-work thereon partly completed and sunk into the ground, and Fig. 3 represents a top-view of the caisson and the means for holding the same in place.

Similar letters of reference indicate corresponding parts.

Referring to the drawings A represents a caisson of iron, the shape of which depends on the form of the respective piers to be erected. This caisson consists of the downwardly extending wall *a*, a flat or dome-shaped top *b* with one or more man-holes *b'* which are closed with covering plates so secured to the top-plate by means of screws *b²* or otherwise that no water or air can pass through the holes without removing the said screws or other closing devices and thereby detaching the covering plates from the top-plate, and of an upwardly extending wall *a'*. If desired, reinforcing braces *a²* may be applied to secure the solidity of the lower partition wall *a* of the caisson. One or more annular rings *c* are reliably attached outside to the walls of the caisson which have the purpose to reinforce the same and to carry brackets *c'* with pulleys *c²* for anchor cables, as explained hereinafter. It is evident that when the caisson is placed upon the water-level the air contained in the lower partition of the caisson will prevent the same from sinking and cause it to float on the water.

Our improved method of building bridge-

piers and other underground masonry is carried out as follows: Two or more floats *B* are brought to the spot where the pier is to be built and kept in the right place by means of anchors, in the manner the ships are anchored to the ground. Then the caisson is placed between the said floats and in any approved manner attached thereto, but so that the caisson can be lowered at will. In the drawings anchor cables *d*, attached to the anchors *e* in the ground, run over the pulleys *c²* and are then fastened to and wound upon rollers *f* on the floats or on a platform supported by the same, so that the caisson is guided between the floats by the said anchor cables. The rollers are, by means of bevel-gears, so connected with each other that by rotating one roller by hand or power, the same rotation is imparted to the other rollers and all rollers receive a simultaneous motion, so that the guidance of the caisson is completed in an entirely even manner in all portions thereof. Instead of this mechanism any other approved contrivance may be used to cause the same result.

As soon as the caisson, having a lower and an upper partition, as described, has received the required position on the water level between the floats, a wall of brick or any other building stones is erected within the side-wall *a'* of the upper partition of the caisson on the top-plate *b*, which may be also considered as a partition-wall of the caisson, so that in the middle of the same a shaft is left. According to the construction of the pier and the thereby conditioned shape of the caisson one or more such shafts may be left, it being understood that the lower ends of the said shafts terminate on the man-holes of the top-plate *b*, as indicated in Fig. 3. To strengthen the brick or stone-wall, vertical iron pillars *g* may be embedded in the same which may be connected with each other by horizontal braces *g'* that have the purpose to increase the strengthening power of the said iron rods and at the same time serve as supports for the necessary scaffolds.

It is evident that, in the proportion the masonry-work on the top or partition-plate *b* progresses, the weight of the same causes the loaded caisson to sink. If the air contained in the lower partition of the caisson is com-

pressed too much, so as not to allow a further sinking of the same with the walls thereon, a portion of the compressed air may be allowed to escape through the air pipe *h*, which reaches 5 from above the water level down to the top or partition-plate *b* and is for this purpose provided with the necessary valve. If necessary the sinking may be additionally regulated by any approved device connecting the 10 caisson or the walls thereon with the rollers *f* on the floats *B*. In this manner the pier-walls are built entirely above the water-level in open air, whereby all dangers for the workingmen caused by water or compressed air, 15 inevitable in the present methods of building bridge-piers in water, are prevented. If the water has such a depth that very high walls are to be erected, rings having additional pulleys *c*² are attached around the walls or 20 brackets bearing such pulleys are embedded in the walls from time to time and the anchor cables placed upon the same, so that thereby a correct perpendicular position of the caisson with the masonry thereon is always secured. When the caisson has thus reached 25 the ground, the lower partition of the same will be freed from the air, which is let out through the air-pipe *h*, as before described, and will be filled with water. The water is 30 then pumped out from the caisson through a pipe or hose *i*, reaching from the lower partition through the partition wall of the caisson to the surface and having the necessary valves, and the caisson thereby caused to sink 35 into the ground, as indicated in Fig. 2. If necessary, the ground may have been leveled before by divers, so that openings between the ground and the lower edge of the caisson-wall *a* are prevented as much as possible. As 40 soon as the caisson has sunk deep enough into the ground, the water is entirely pumped out, the man-holes opened by removing the screws of the covering plates thereof, and the earth within the lower partition of the caisson excavated by the workingmen entering the said 45 partition through the man-holes and brought to the surface, whereby the caisson with the masonry thereon will sink deeper and deeper

in the ground and reliably settle therein. The inner space is then filled up with cement, 50 ton, or any suitable masonry and thereby a reliable foundation for the pier created which may be strengthened by the ring *c* resting on the ground outside the caisson. Finally the shafts within the erected brick or stone walls 55 are filled up with cement or beton and the anchor-cables detached from the pulleys *c*² and the rollers *f*, whereafter the pier will stand firm and solid.

It is evident that our method of erecting 60 bridge-piers is simple, requires less labor and time than any other method known at present, and is connected with no danger for the workingmen.

Having thus described our invention, we 65 claim as new and desire to secure by Letters Patent—

1. A caisson for building bridge-piers consisting of an upper and a lower partition 70 formed by a partition plate, the walls of the upper partition being designed for a guide for the masonry to be erected on the partition-plate, the latter having man-holes and air and water pipes or hoses with valves to remove the air and water out of the lower 75 partition, and an outer reinforcing ring bearing pulleys for cables to hold the caisson in position substantially as set forth.

2. The combination of a caisson for building bridge-piers having an upper and a lower 80 partition, air and water discharge pipes or hoses and an outer reinforcing ring bearing pulleys, with floats having rollers, anchors sunk into the ground, and anchor-cables leading from the anchors over the said pulleys to 85 the rollers on the floats, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 6th day of July, A. D. 1894.

ADALBERT CHECHONG.
ADOLF BALENSIEFER.

Witnesses:

CHARLES KARP,
JACOB NUSSBLATT.