

No. 619,043.

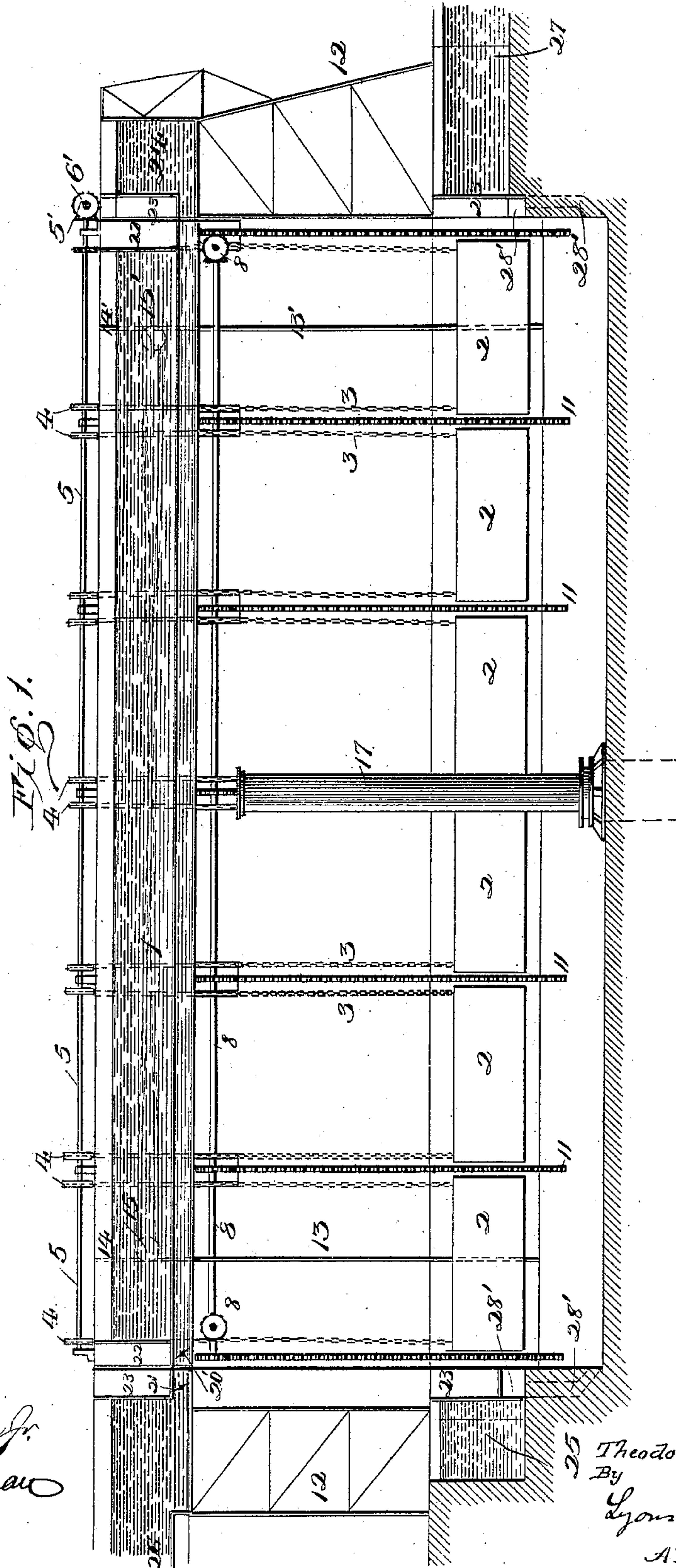
Patented Feb. 7, 1899.

T. G. HOECH.
CANAL BOAT ELEVATOR.

(Application filed Jan. 24, 1896.)

(No Model.)

2 Sheets--Sheet 1.



WITNESSES:

J. M. Fowler Jr.
F. T. Chapman

INVENTOR,

Theodor G. Hoeck,
By
Lyons & Birney
ATTORNEYS.

No. 619,043.

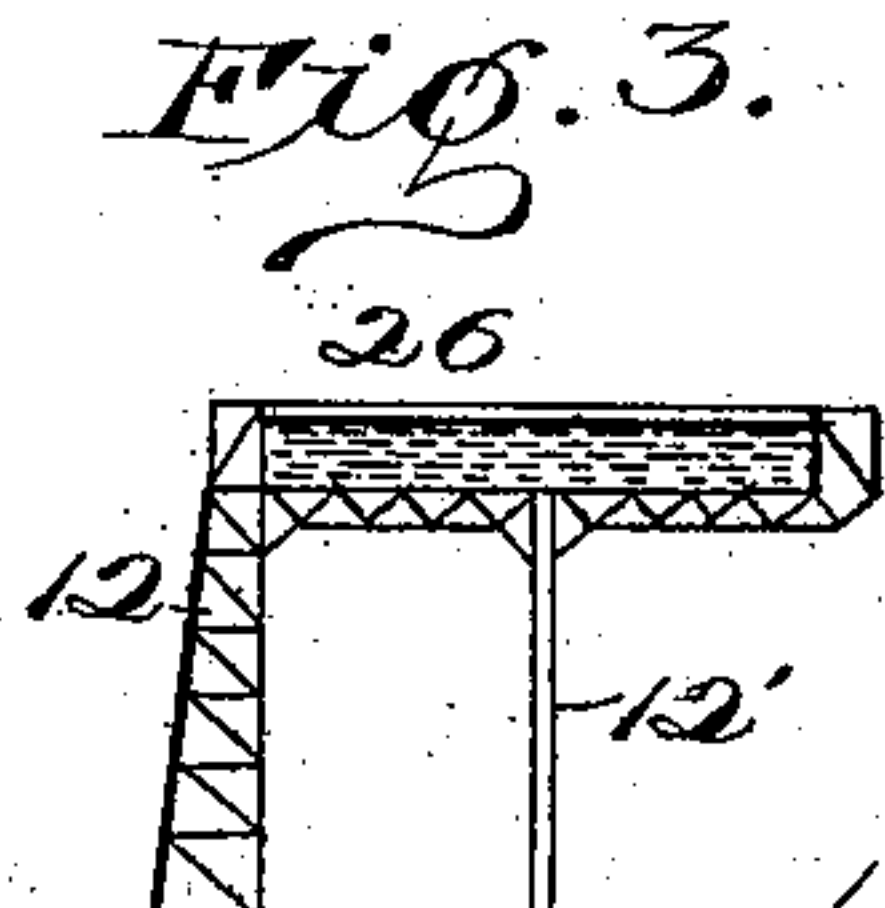
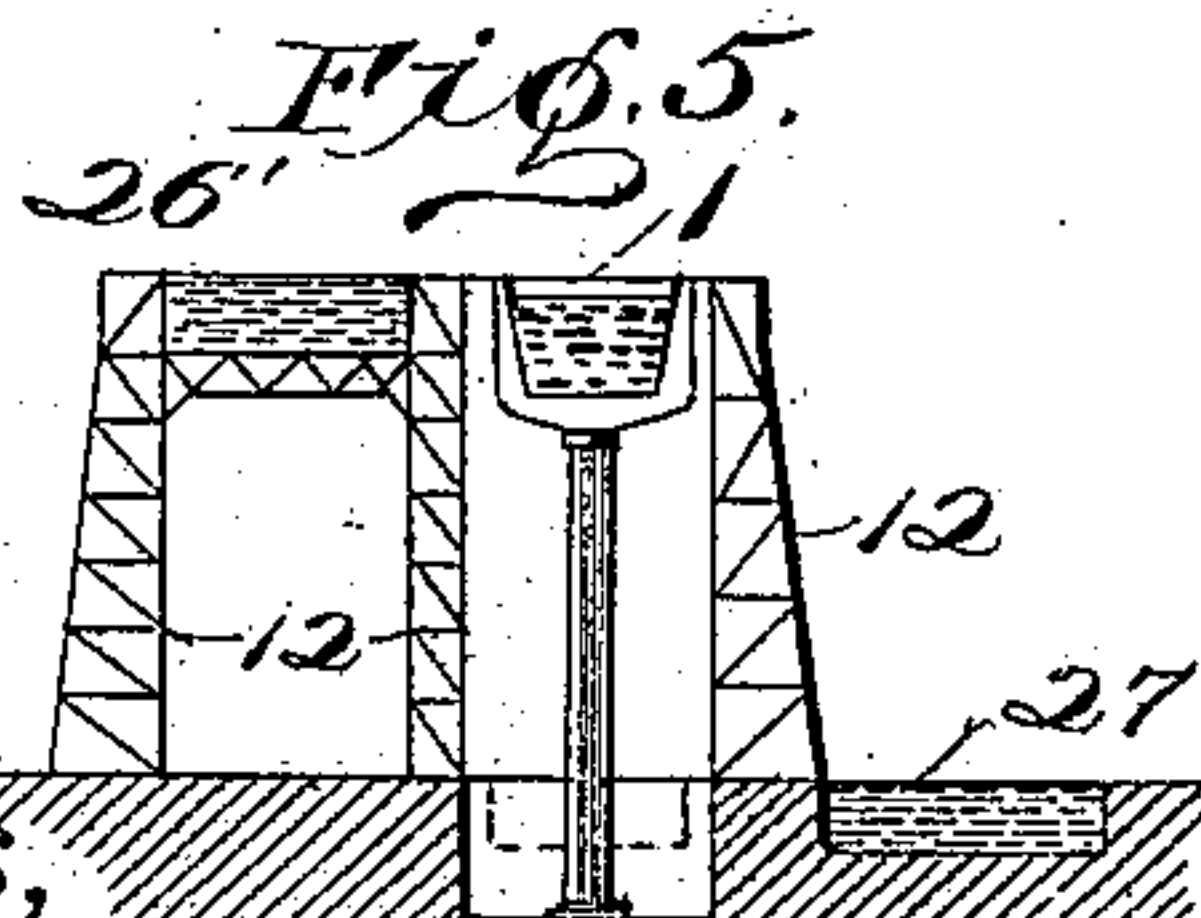
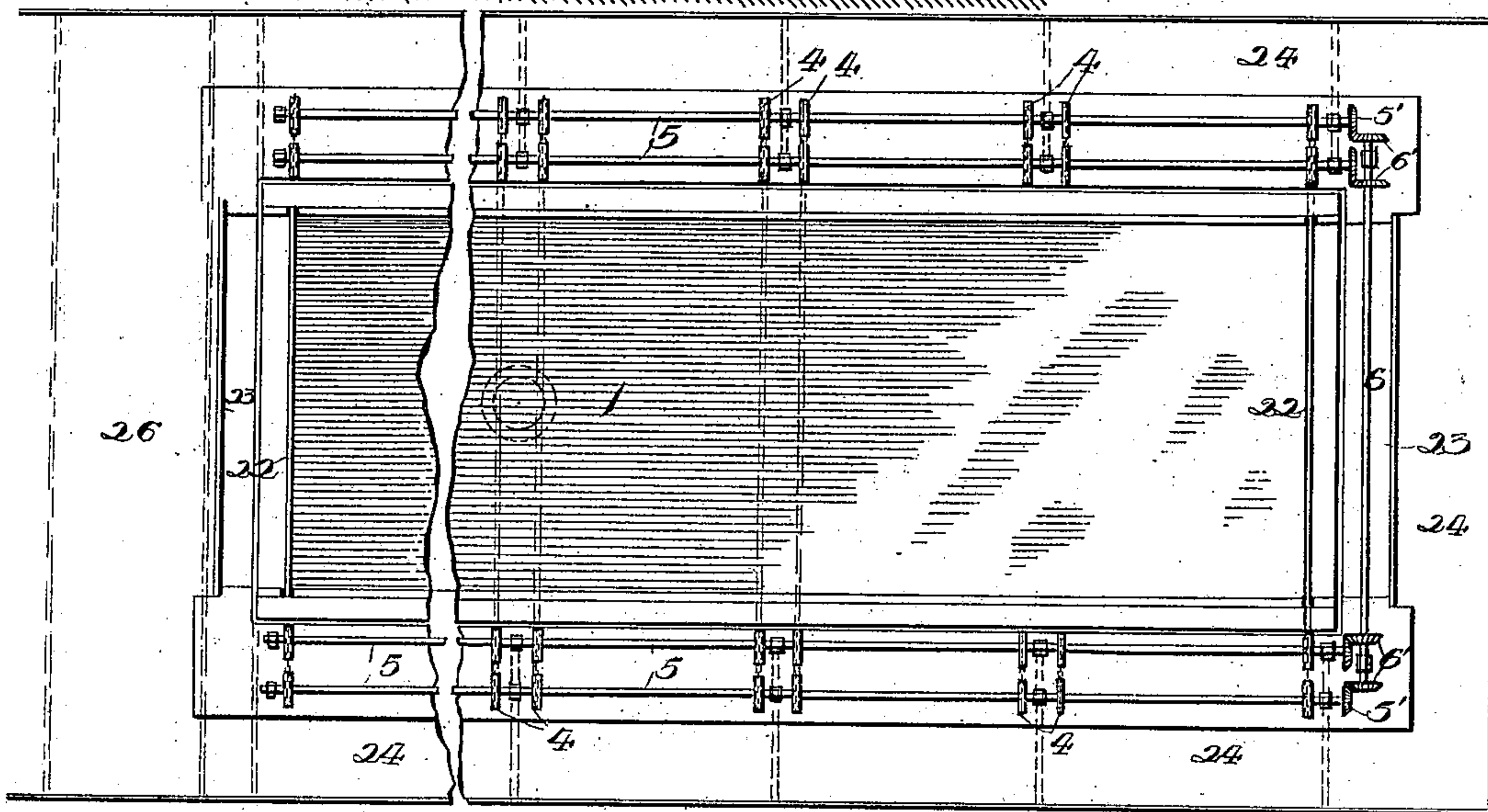
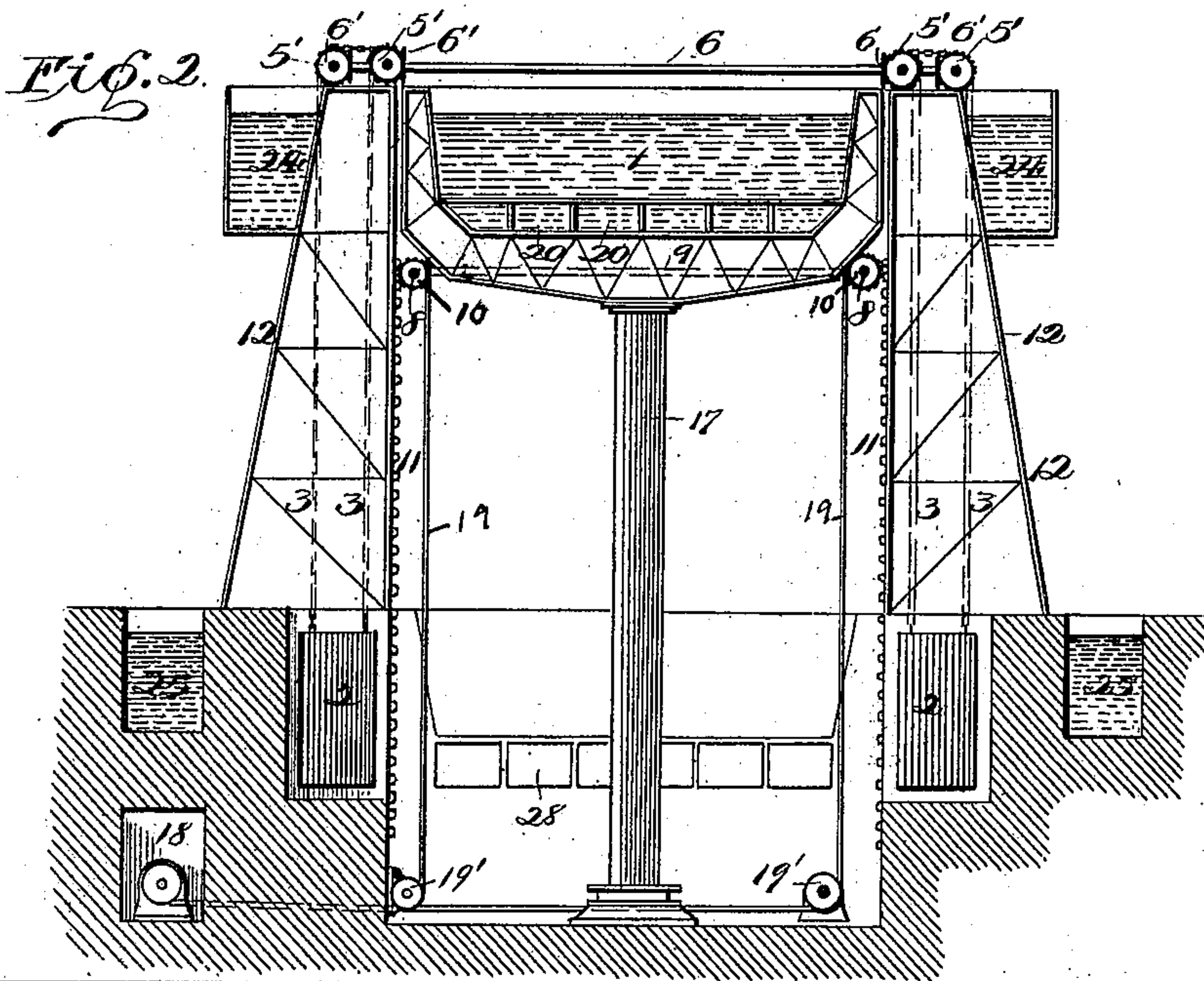
Patented Feb. 7, 1899.

T. G. HOECH.
CANAL BOAT ELEVATOR.

(Application filed Jan. 24, 1896.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES,
J. M. Fowler,
F. J. Chapman.

INVENTOR,

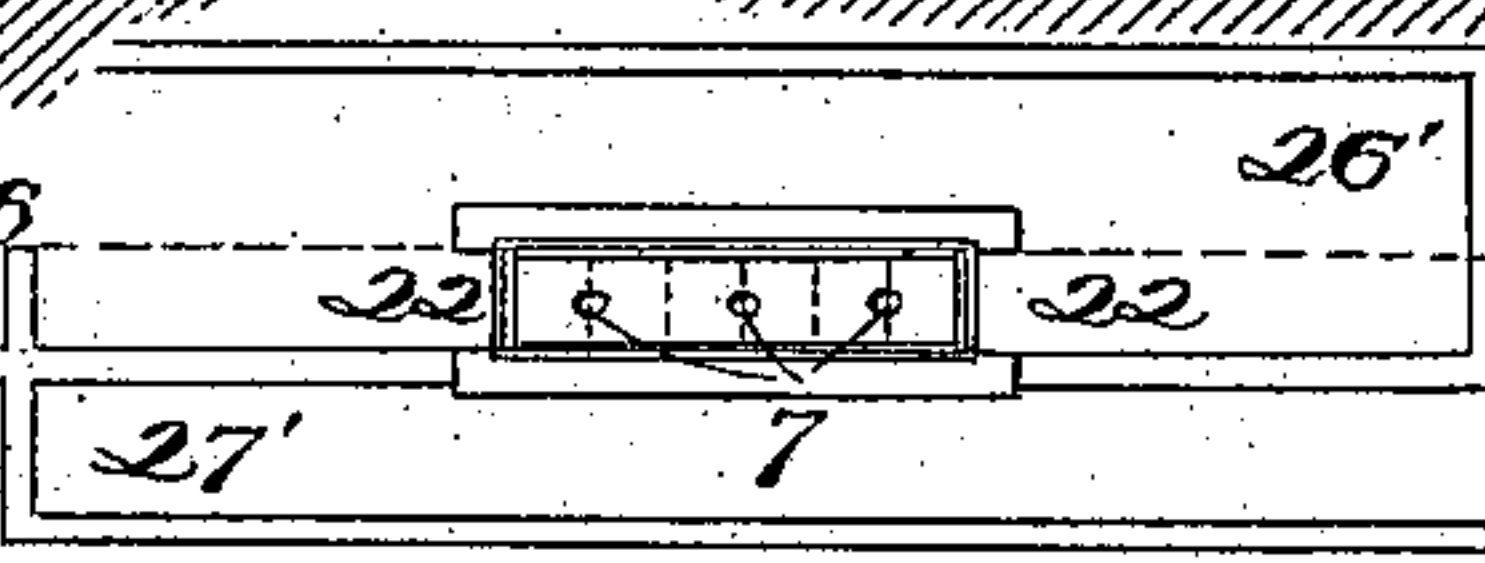
Theodor G. Hoech

By

Lyon & Birney

ATTORNEYS.

Fig. 4.



UNITED STATES PATENT OFFICE.

THEODOR G. HOECH, OF WASHINGTON, DISTRICT OF COLUMBIA.

CANAL-BOAT ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 619,043, dated February 7, 1899.

Application filed January 24, 1896. Serial No. 576,735. (No model.)

To all whom it may concern:

Be it known that I, THEODOR G. HOECH, a subject of the King of Prussia, Emperor of Germany, and a resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Canal-Boat Elevators, of which the following is a specification.

This invention has reference to improvements in canal-boat elevators in which in place of the ordinary well-known locks whereby canal-boats are transferred from one level to another by the filling or emptying of a fixed basin the boat and a sufficient body of water to float it are lifted or lowered bodily from one level to another. Such elevators offer many advantages over the ordinary locks, since there is but little or no flow of water from the upper to the lower level, and the boats may be transferred much more expeditiously. It has been proposed to effect this transfer by the use of two elevators balancing each other and one rising as the other is lowered. However, modern canal-boats are of large size, and counterbalancing elevators for the same must also be of large size. Their structure, therefore, becomes unduly complicated and expensive.

One object of my invention is to simplify and cheapen the structure of canal-boat elevators by using but one elevator and counterbalancing the same with any cheap material of suitable weight.

Another object of my invention is to provide means for guiding the elevator so as to maintain it always in a horizontal position.

Still another object of my invention is to reduce the weight of the elevator and the quantity of water necessary for the floating of the boats therein to a minimum, and thereby reduce the weight of the working parts and the power necessary to operate the elevator.

These and other features of my invention will be fully set forth in the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the improved canal-boat elevator. Fig. 2 is a cross-section of the same, and Fig. 3 is a plan view. Fig. 4 is a plan view on a smaller scale than in the preceding figures, showing an improved

disposition of the canal-levels relative to the elevator. Fig. 5 is a cross-section of the structure shown in Fig. 4, the section being taken through the elevator; and Fig. 6 is a cross-section through the same beyond one end of the elevator.

Referring to the drawings, and more particularly to Figs. 1, 2, and 3, there is shown a tank 1, which is of such size and shape that it will contain a canal-boat, together with sufficient water to float the same. This tank 1 is supported by one or more hydraulic pistons 17, to the top of which it is secured, the said piston or pistons being such as are used in ordinary hydraulic elevators and of such working length as to move the tank 1 from an upper canal-level 26 to a lower canal-level 27, or vice versa. The cylinders for these pistons 17 are sunk in the ground in the ordinary manner, but are not shown, except by dotted lines in Figs. 1 and 5, and all operating mechanism for the same is omitted from the drawings for the sake of simplicity. The tank 1 when in its lower position is received in a well 28, provided for the purpose, so as to bring it coincident with the lower canal-level, and from the surface of the ground on each side of this well rise a series of towers 12, serving to guide the tank above the ground to the upper canal-level. On top of each series of towers 12 there are journaled two parallel shafts 5 5, extending the length of the said series of towers, each shaft having fixed thereon a number of pulleys 4 4. Chains 3, secured to the tank, pass upward from the same over the pulleys 4, which of course have their peripheries adapted to receive chains, and thence downward to weights 2, located between and capable of moving up and down between the towers 12 of each series. These weights, which may be of iron, stone, or concrete or the like or simply boxes filled with sand, gravel, earth, or water, serve the purpose of counterweights for the tank, so that the piston or pistons 17 have a comparatively small weight to lift. It will be understood, of course, that with hydraulic pistons the counterweights 2 will underbalance the tank, so that when elevated by the piston or pistons it will return to the lower position by its own weight. However, I may use other means for operating the tank than by means of the hydraulic pistons. For

instance, I may overbalance the tank by the weights 2, so that it will at all times tend to rise to the upper level, and then use chains 19, fastened to the under side of the tank and passing downward into the well 28, and from thence around pulleys 19' to a motor 18 of any suitable kind conveniently located. The chains 19 will be operated to pull the tank down against the action of the weights 2 when it is desired to bring it to the lower canal-level.

Other means may be employed to lift and lower the tank—as, for instance, the tank may be formed with a false bottom to constitute a chamber 20, provided with suitable valves or gates 20' at the ends, and these gates are coincident with valved ducts 21 coming from the upper canal-level 26 and a basin 24, which surrounds the tank when in the upper position, the said basin being a continuation of the canal-level 26 and suitably supported by the towers 12. In this instance the tank is normally overbalanced by the weights 2, so as to be lifted to the upper level thereby, and when it is desired to lower the tank water is admitted to the chamber 20, or if there be more than one chamber to a sufficient number of them to overbalance the counterweights 2, when the tank will fall to the lower level. In order to again raise the tank, the water in the chamber or chambers 20 is allowed to escape through ducts 28' into the well 28, thereby lightening the tank sufficiently to permit the weights 2 to lift it. The water that has flowed from the chamber or chambers 20 may be pumped or otherwise removed from the well 28.

In place of the chamber or chambers 20 at the bottom the tank could be fitted with chambers at the sides for the same purpose; but this is so obvious that I have not deemed it necessary to show this form.

In order to use as little water as possible in the tank for floating the canal-boats, I provide a gate 22 at each end of the tank and a similar gate 23 in the canal-levels 26 and 27 and in the basin 24 on the upper level and in the basin 25 on the lower level, so that as a boat enters or leaves the tank the water which it replaces or which replaces it may flow in or out through the gate at the other end. By this arrangement the exchange of boats may be quickly effected and the tank need be but a few inches larger than the boat it is to receive. Since the weight of the water in the tank forms the largest single item of the total weight of the moving parts of the elevator, the construction of the tank with gates at both ends enables me to considerably lighten the load, and consequently the weight of all the parts necessary for sustaining, counterbalancing, and moving the tank.

In order to insure the maintenance of the tank in a horizontal position when moved up or down, I provide means for preventing it from tipping either longitudinally or laterally, the leveling mechanism employed being

so arranged that any tendency to tip on one side or end is counteracted by an opposing tendency automatically brought into play at the other side or end, as will presently appear. A mechanism constructed to act in this manner I call a "reactive leveling mechanism."

One form of reaction leveling mechanism is as follows: Each shaft 5 has at the rear end a bevel-gear 5', meshing with a bevel-gear 6' on a shaft 6, extending across the rear end of the tank. More than one shaft 6 may be used if the system of shafting be elevated so as to clear the boats. In this manner all the shafts 5 are caused to move together at the same rate, and all the pulleys 4 must therefore also move at the same rate and simultaneously. Consequently should the tank tend to tip in any direction such tendency would be counteracted by the interconnected system of shafting 5 6, because any tipping of the tank would tend to rotate the pulleys 4 on that side or end at a different rate than on the other side or end, and since the pulleys can only rotate with the same speed it will at once be seen that the tank cannot tip, but must maintain at all times a horizontal position.

Either in conjunction with the means just described for maintaining the trough in a horizontal position or in place thereof I may use another reaction leveling mechanism.

Underneath the tank and journaled to the framework thereof are two longitudinal shafts 8, one on one side and the other on the other side. These shafts carry a number of gear-wheels 10, fixed thereto and meshing with vertical racks 11, secured to the inner faces of the towers 12, so that as the tank is moved up and down the gear-wheels will travel along the racks and, together with the shafts 8, will be rotated thereby. At each end the shafts 8 are connected by a cross-shaft 9, the said shafts 8 and 9 carrying intermeshing bevel gear-wheels, so that the entire system will be interconnected, as in the system of shafting 5 6, and the operation will be the same.

Another means for keeping the tanks in a horizontal position is illustrated in Fig. 1. Pulleys 15 15' are journaled to the tank at each end thereof. A chain or rope 13, fixed at a point 16 in the well 28, extends upwardly over the pulley 15, thence to and under the other pulley 15', and thence upward to a point 14' on the framework of the towers 12. Another chain or rope 13', fixed at a point 16' in the well 28, extends upwardly over the pulley 15', thence to and under the pulley 15, and thence upwardly to a point 14 on the framework of the towers 12. In this construction of the reactive guide any tendency of the tank to tip is resisted or counteracted the same as in the other forms described, as will be clear to those skilled in the art.

Referring now to Figs. 4, 5, and 6, there is shown a means whereby a boat may enter the tank while another one is leaving. For this

purpose the two levels 26 and 27 are extended into transfer-basins 26' and 27', respectively, around the tank-well, as shown in Fig. 4, so that boats may leave or enter at either end, and one boat may enter the tank as the other leaves. This enables the transfer of boats to be effected rapidly and also prevents any injury to the tank from careless handling of boats, which would be likely to occur if one end of the tank were closed against the entrance of boats. In Fig. 5 the manner of supporting the transfer-basin or shunting-level 26' around the elevator-well is shown, and in Fig. 6 the manner of supporting the upper canal-level 26 on towers 12 and posts 12' is indicated; also, in Fig. 4 a number of hydraulic pistons 17 are indicated in place of the one shown in Figs. 1 to 3.

Instead of operating the tank by means of the piston or pistons 17 or the chains 19 I may apply power to either or all of the reaction leveling devices.

It will be understood that my invention is not confined to the exact details of construction shown and described, since I may vary these details without departing from the spirit of the invention.

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

1. A canal-boat elevator consisting of a tank for receiving the boat, the aggregate weight of the tank and its contents being constant, constant counterweights for the tank and boat, the whole thus forming a counterbalanced system of constant weight, and independent means for moving the tank from one level to another, substantially as described.

2. A canal-boat elevator consisting of a tank for receiving the boat, the aggregate weight of the tank and its contents being constant, constant counterweights for the tank and boat, the whole thus forming a counterbalanced system of constant weight, independent means for moving the tank from one level to another and reactive leveling mechanism for the same, substantially as described.

3. A canal-boat elevator consisting of a tank for receiving the boats, and reactive

leveling mechanism for the tank, composed of a system of interconnected shafting connected to opposite sides of the tank and rotated by the movement of the same, whereby a tilting force brings into play a leveling action, substantially as described.

4. A canal-boat elevator consisting of a tank for receiving and transferring boats from one level to another and having a gate at each end, in combination with an extension of each canal-level constituting a transfer-basin opening into the rear of the tank, substantially as described.

5. A canal-boat elevator consisting of a tank for receiving the boat, the aggregate weight of the tank and its contents being constant, counterweights for the tank, and cables or chains passing over fixed pulleys and connecting the tank and counterweights, the whole forming a counterbalanced system of constant weight, and an independent means for moving the tank from one level to another, substantially as described.

6. A canal-boat elevator consisting of a tank for receiving the boat, the aggregate weight of the tank and its contents being constant, counterweights for the tank, cables or chains passing over fixed pulleys and connecting the tank and its counterweights, the whole forming a counterbalance system of constant weight and a hydraulic piston for moving the tank from one level to another.

7. A canal-boat elevator consisting of a tank for receiving the boat, racks along the walls of the pit in which it moves, pinions meshing with the racks and a system of shafting connected with the opposite sides of the tank, interconnected and carrying the pinions, whereby any tilting of the tank in its vertical movement brings into play a leveling force, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEODOR G. HOECH.

Witnesses:

F. T. CHAPMAN,
C. E. MARSHALL.