Dec. 14, 1937. T. BECHER 2,101,973

DOUBLE WALLED SLUICE GATE

Filed Jan. 27, 1936

Fig. 1.

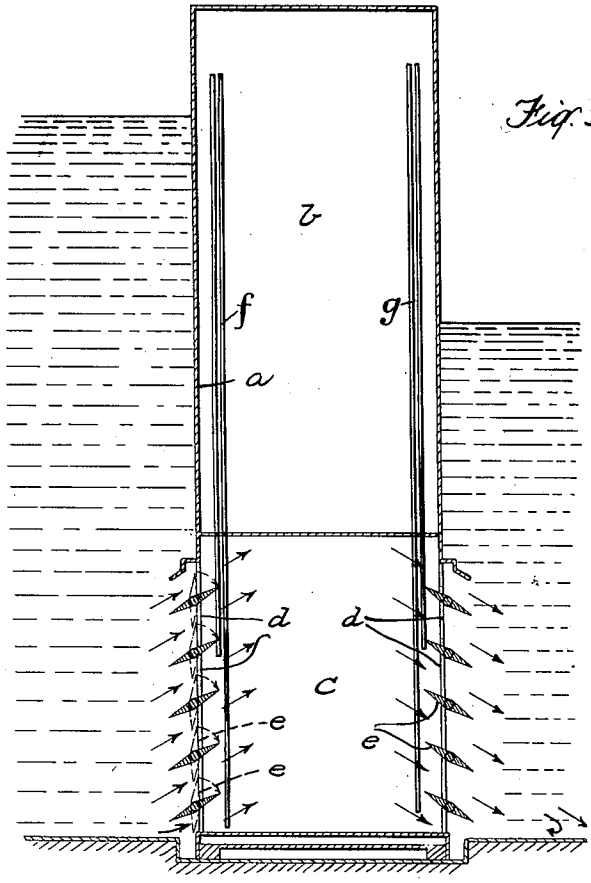


Fig. 2.

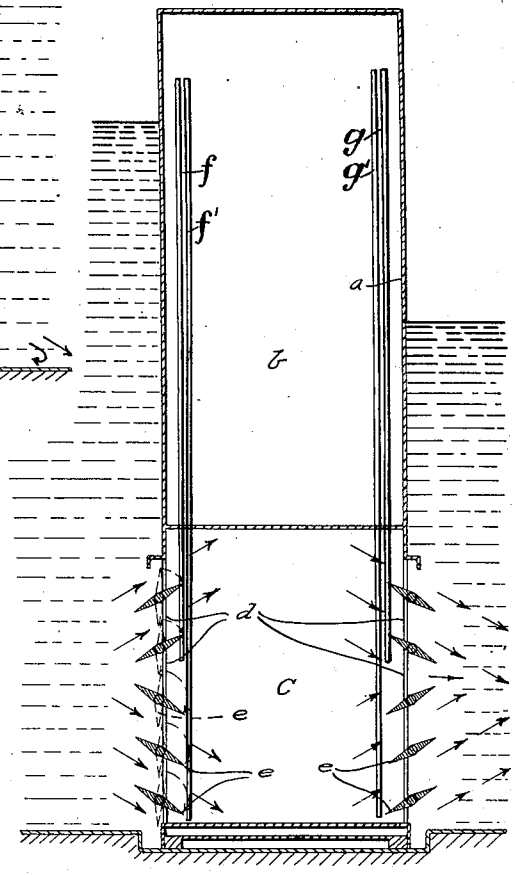
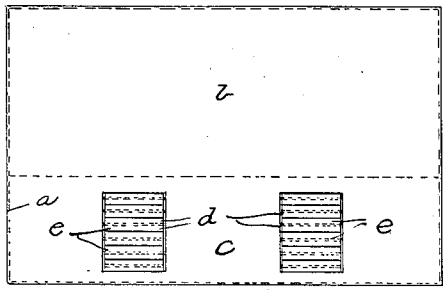


Fig. 3.



INVENTOR
THEODOR BECHER
BY Alfred Stein
His ATTORNEY

Patented Dec. 14, 1937

2,101,973

UNITED STATES PATENT OFFICE

2,101,973

DOUBLE WALLED SLUICE GATE

Theodor Becher, Wiesbaden, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg A. G., Nuremberg, Germany, a corporation of Germany

Application January 27, 1936, Serial No. 60,979
In Germany February 11, 1935

2 Claims. (Cl. 61—22)

My invention relates to sluice gates, and the like.

The present invention has for its object to improve in connection with the water discharge passages of sluice gates the device in which guide-elements are provided both at the entrance aperture and the exit aperture of those passages, the said elements being so shaped and arranged that they will reduce the energy of flow of the water streaming from the head-water to the tail-water side of the gate, or into the sluice-chamber. This object is attained by the direction of the flow of the water being so changed that the currents of water will impinge upon one another, or that the currents of water will impinge upon the masonry of the gate.

The present improved device is designed and especially suited to the gates of marine sluices and to water gates constructed as floating gates, the particular advantage in either case being that no separate discharge tubes need be provided in the gate-body.

The essential novel features of the present invention are that, first, the passages are formed by spaces which constitute portions of the lower half of the gate, are bounded at their tops, and are open at the end-faces of the gate, and are accessible through apertures at the front and at the rear of the same, and that, second, there are provided in said apertures guide-members which can be obliquely so adjusted as to change the direction of the currents of water, and constitute in their entirety closures for said apertures, in the manner of Venetian blinds.

The oblique adjustment of said guide-member can be effected in several ways. Thus, for instance, the members lying at the front in the direction of flow may be so adjusted as to direct the water obliquely upwards, that is to say in the direction toward the top of the passage-forming space, which top, if the sluice gate is constructed as a floating gate, may at the same time form the bottom of the floating box, or said members may be so adjusted as to direct the water obliquely downwards, i. e. toward the bottom of said space. The water entering into the said space and impinging upon the top or upon the bottom of the same will thereby lose the greatest part of its energy of flow. It is, however, likewise possible to adjust the said members located on one and the same side partly obliquely upwardly and partly obliquely downwardly, so that some of the individual currents produced by the subdivision of the main current will flow toward the top and some toward the bottom of the discharge space. This occurs when the members acting in the first-mentioned manner are the upper ones and the members acting in the other manner are the lower ones, but also the reverse arrangement may be used, in which case the individual currents impinge upon one another about in the middle portion of the discharge space, and form eddies which considerably contribute to annihilate the energy of flow.

All that has been said in the preceding paragraph relates to the members on the front side of the gate, that is to say on the entrance side of the openings therein, but the same applies to the members on the rear side of the gate, or on the discharge side thereof.

The angle to which the members are adjusted depends upon the special circumstances. It is, in general, suited to the purpose in view to arrange the members at an angle of about 45°, but as regards the members on the entrance side, they may, if desired be adjusted to assume a horizontal position which presents the advantage that the entrance losses become very small.

The invention is shown diagrammatically and by way of illustration in the acompanying drawing in which Figure 1 is a vertical transverse section through a sluice gate embodying the present invention. Figure 2 is a similar view as Fig. 1 showing the movable members in different positions. Figure 3 is a front view of the gate, drawn to a considerably smaller scale.

In the drawing, *a* denotes the sluice gate which is made with double walls, *b* the floating chamber designed to reduce the weight of the gate, and *c* the lower space in the gate for the discharge of the water from the head-water to the tail-water side of the gate. The apertures *d* at the front and at the rear of said space are each provided with a plurality of movable members *e*, all of which are shown (in full lines) in open position, the positions of the members being, however different in Figs. 1 and 2. In Fig. 1 the members on the left-hand side are so adjusted that the individual currents of water are directed obliquely upwards, as indicated by the arrows, whereas the members on the opposite side are so adjusted as to direct the individual currents obliquely downwards, also as indicated by the arrows. The first-mentioned currents are, thus, directed toward the top of space *c*, but their direction is changed again on leaving the space because of the position of the members at the right-hand side. The energy of flow of the water is, therefore, twice reduced, first by the members on the left-hand side and then by the members

on the right-hand side where there arise eddies (as indicated) by which the energy of flow is practically annihilated.

When the left-hand members are in the dotted-line position, the entrance aperture of the gate is completely closed, the members in this position being like a closed Venetian blind.

In Fig. 2 the upper members on the left-hand side are directed obliquely upwards while the lower members on that side are directed obliquely downwards, whereas the members on the right-hand side have a reverse arrangement. On the left-hand side, the currents of water are therefore directed partly toward the top of the space *c* and partly toward the bottom thereof, whereas on the right-hand side they are directed against one another whereby eddies are formed which practically annihilate the energy of flow of the streaming water.

The vertical broken lines appearing within the walls of the sluice gate shown in Figs. 1 and 2 and which in Fig. 1 are designated *f* and *g* respectively denote rods connected to the movable members *e* for adjusting their positions. In Fig. 2 double broken lines are shown within the walls of the sluice gate, which lines being marked *f* and *f'* and *g* and *g'* respectively denote rods connected respectively to the upper and lower sets of the movable members *e* for moving them to different positions.

From Fig. 3 it appears that there may be provided in a gate a plurality of sets of members. In Fig. 3 two such sets are shown by way of example, but I wish it to be understood that I consider also a larger number of sets of movable members as falling within the scope of this invention.

I claim:

1. In a double walled sluice gate, in combination with the walls having apertures therein to permit water to flow through the enclosed inner space from one side of the gate to its other side, movable members provided in said apertures for closing the same, and means operatively associated with said members for moving them to various angular positions.

2. In a double walled sluice gate, in combination with the walls having apertures therein to permit water to flow through the enclosed inner space frome one side of the gate to its other side, flap-like members movably mounted in said apertures for closing the same and arranged in groups, and means operatively asociated with said members so as to move those of one group to different angular positions from the members of another group.

THEODOR BECHER.