Dec. 7, 1937. T. BECHER 2,101,234

SLUICE GATE

Filed Jan. 18, 1936

Fig. 3.

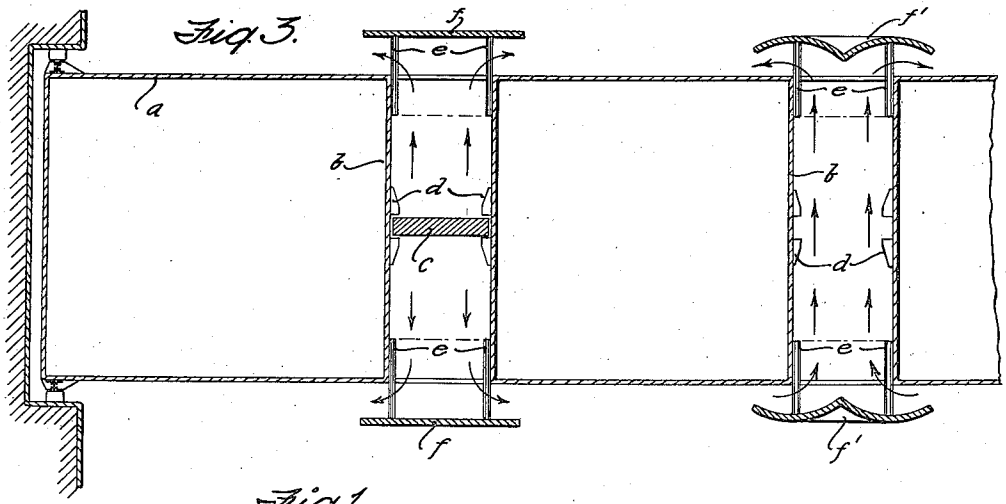


Fig. 1.

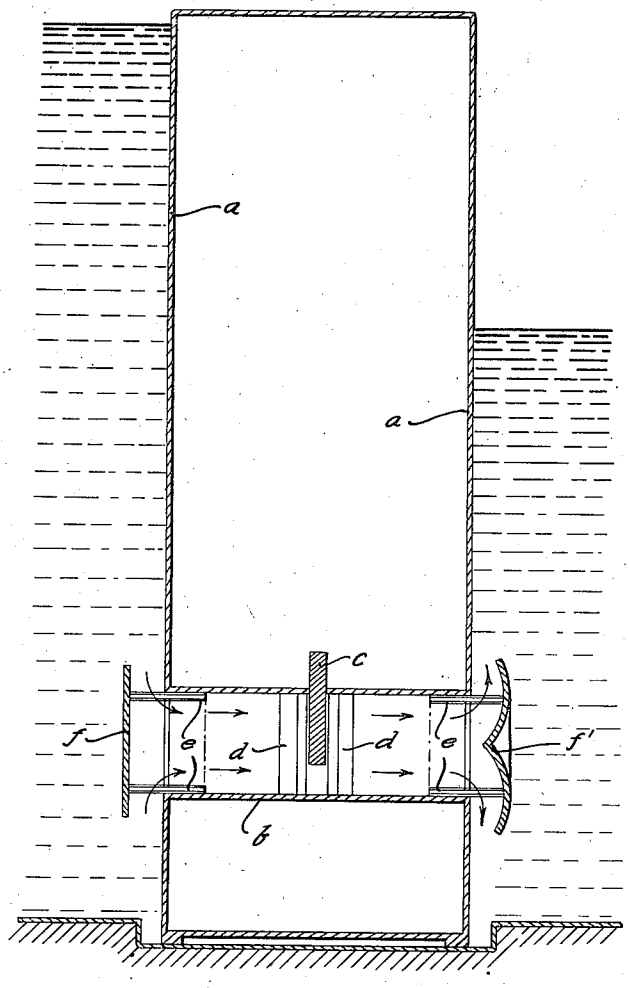


Fig. 2.

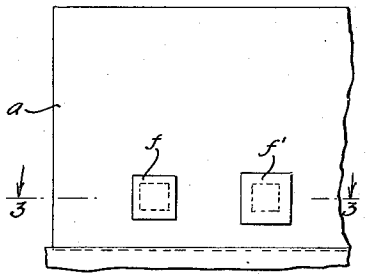
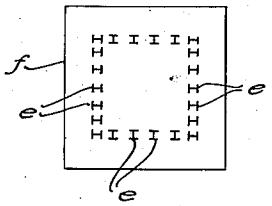


Fig. 4.



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Patented Dec. 7, 1937 2,101,234

UNITED STATES PATENT OFFICE

2,101,234

SLUICE GATE

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Application January 18, 1936, Serial No. 59,775
In Germany January 18, 1935

4 Claims. (Cl. 61—22)

My invention relates to locks and more particularly sluice constructions.

In such plants the water discharge ports are usually provided in the sluice gate, which arrangement, however has the drawback that the energy of the water flow arriving from the head-water can strike the vessels in the sluice chamber and can cause a lively surging or turbulent motion of the water in the sluice chamber subjecting the hawsers to strong jerky strains which can become so great that the hawsers are liable to snap. It is, therefore, not possible in such cases to hold the vessels securely, and besides, the hawser holding devices provided on the banks can stand the strong jerky strain only for a comparatively short time making it necessary to substitute new ones for them.

For these reasons it has been proposed, especially in connection with comparatively large sluices, to provide bye-pass channels to serve as discharge ports and disposed in the sluice-chamber walls on the sides of the gate, the arrangement being such that the streams of water flowing into the sluice chamber impinge upon one another in the middle portion of said chamber so that their energy of flow is annihilated to a very great extent, if not completely.

But that expediency, although answering the purpose, is very expensive if the sluices are of considerable size, as regards both their breadth and their depth, as in the case, for instance, of sluices for sea-going vessels. The reason for the great cost is the necessity to provide more than two such bye-passes in order to be able to conduct the large quantities of water to be dealt with.

The object of the present invention is to obviate such bye-passes by the discharge ports in the sluice gates being so designed that they will reduce very considerably, and in fact, annihilate the energy of flow of the water flowing through them. This object I attain by providing in front of the inlet aperture as well as close behind the outlet aperture of the discharge ports close to said apertures a guide element for dividing the water flow both while entering and leaving the ports into currents of opposite directions, so that the entering currents will impinge upon another and the leaving currents will flow away from one another, in both cases transversely with respect to the longitudinal direction of the sluice chamber. The first-mentioned currents of water which impinge upon one another annihilate thereby automatically and practically completely their energy of flow, while the currents of water at the discharge end of the ports are likewise prevented from exerting any harmful effects in that they flow transversely relative to the longitudinal direction of the sluice-chamber, upwardly and downwardly, or laterally, or in both ways, as the case may be. In either case the discharged currents flow along the tail-water surface of the sluice gate, where they are preferably so directed that they impinge upon the same, or upon the masonry thereof. These currents will, therefore, not in the least disturb the water in the sluice chamber so that no harm whatever can arise.

The above-mentioned guide-elements are held in proper position by means of rigid members of preferably such a shape as to assist in reducing the energy of flow of the streaming water. The holding members may be formed, for instance, by rods of double-T-irons or the like. The guide-elements themselves may be flat or curved in a manner suited to the particular purpose.

The invention is diagrammatically shown by way of illustration in the accompanying drawing in which Figure 1 is a vertical section through a sluice gate provided with water discharge ports and guide-elements designed according to this invention. Figure 2 is a front-view (head-water side) of a portion of the gate, drawn to a considerably reduced scale while Figure 3 is a horizontal section along the line A—B in Fig. 2, the scale being the same as that of Fig. 1. Figure 4 is a front-view of one of the guide-elements shown on the left-hand side of Fig. 3.

In the drawing, *a* denotes the sluice gate which is open at its ends and for the sake of diminishing its weight may be and preferably is provided with one or two air-chambers (not shown), at *b* are shown the discharge ports. *c* denotes a shutting-off slide provided in each of said ports *b* and guided between vertical ledges shown at *d*. A short distance away from the inlet openings and from the outlet discharge openings of the ports *b* are provided vertical guide elements which may be flat plates as shown at *f*, or curved plates as shown at *f'*. The two guiding elements near the inlet and outlet opening of one of the ports *b* may be flat plates, while the guiding elements near the inlet and outlet opening of the other port may be curved, or all the guiding elements may be flat or all curved plates. The plate on the tail-water side is, preferably, always curved so as to conduct the water towards the adjacent surface of the gate. The flow of the

water is indicated by the arrows in Figs. 1 and 3.

The number of the discharge ports and the size of their cross-sectional area depends, of course, on the individual circumstances of each case and also depends on the shape and size of the guide-elements. The discharge ports in a sluice gate and the guide-elements used in connection therewith may be different, as shown in Fig. 2.

The plates *f f'* are secured to the gate walls by means of rigid iron bars consisting preferably of T-iron or double-T-irons, as indicated in Fig. 4.

The manner of operation of this new arrangement and combination of parts does not require any further description, because it appears without any particular explanation from the drawing in which the arrows indicate the direction of flow of the water entering into, and leaving, the discharge ports of the sluice gate.

I claim:

1. In sluice gates having passageways transversely extending therethrough, in combination with the outer walls of the gate, guide elements spaced a short distance away from said outer walls in front of the ends of said passageways for transversely deflecting the flow of water while entering, and emerging from, said passageways, and means provided on the gate structure for supporting said guide elements in position.

2. In sluice gates having passageways transversely extending therethrough, in combination with the outer walls of the gate, curved guide-plates disposed a short distance away from said outer walls in front of the ends of said passageways for transversely deflecting the flow of water while entering, and emerging from, said passageways, and rigid members projecting from the inner walls of said passageways, holding said guide-plates in position.

3. In sluice gates having passageways transversely extending therethrough, in combination with the outer walls of the gate, guide-plates having two curves meeting in a central line and disposed a short distance away from said outer walls in front of the outlet of said passageways for transversely deflecting the flow of water while emerging from said outlets, and profile irons secured to the gate structure for holding said guide-plates in position.

4. In sluice gates having passageways transversely extending therethrough, in combination with the outer walls of the gate, flat guide-plates disposed a short distance away from said outer walls in front of the inlet end of said passageways, curved guide-plates similarly disposed as said flat guide-plates in front of the discharge end of said passageways, and means secured to the gate structure for supporting said guide-plates in position.

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