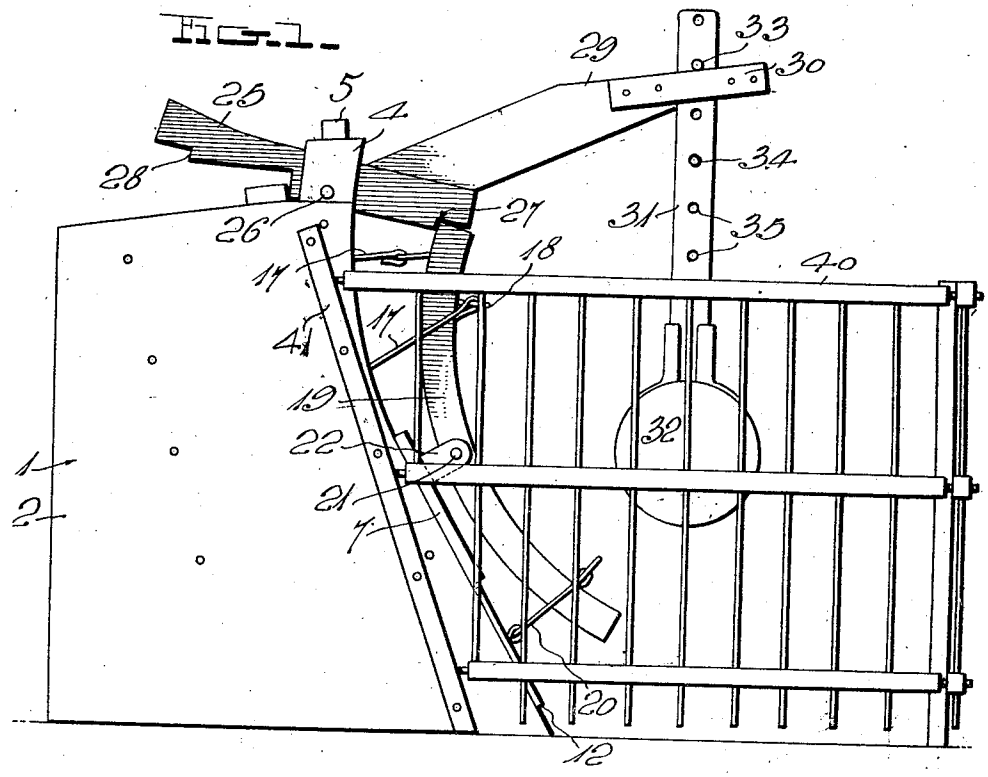
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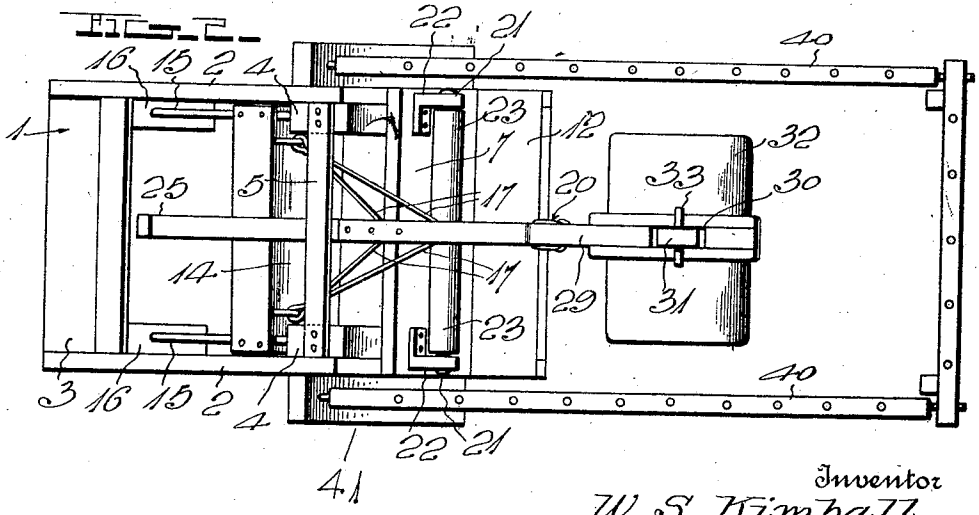
1,599,333

W. S. KIMBALL

AUTOMATIC FLOOD GATE

Original Filed Nov. 10, 1924 3 Sheets-Sheet 1





Inventor
W. S. Kimball

Witness
H. Woodard

By H. B. Williamson & Co
Attorneys

Sept. 7, 1926.

1,599,333

W. S. KIMBALL

AUTOMATIC FLOOD GATE

Original Filed Nov. 10, 1924 3 Sheets-Sheet 2

Fig. 3.

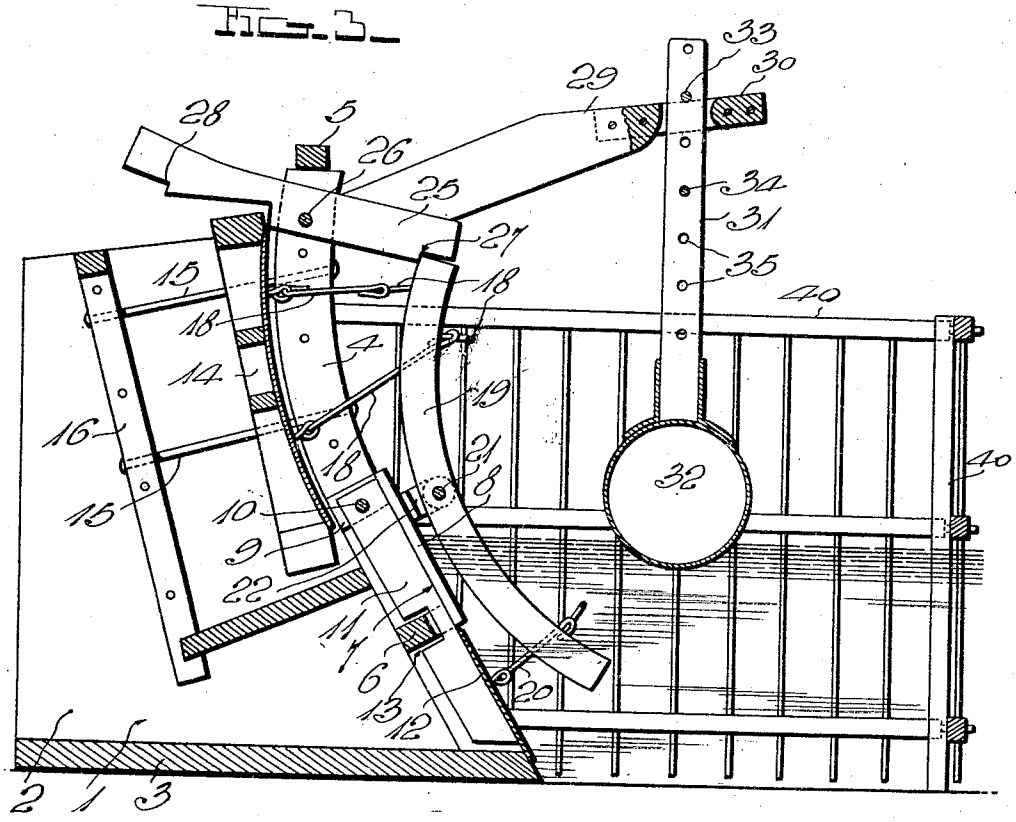


Fig. 6.

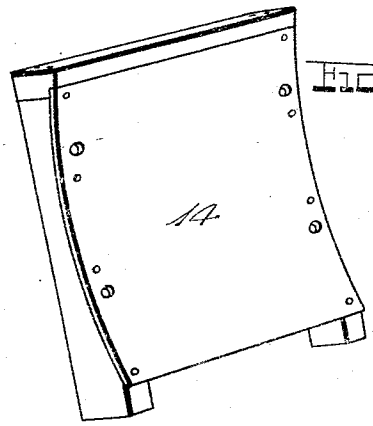
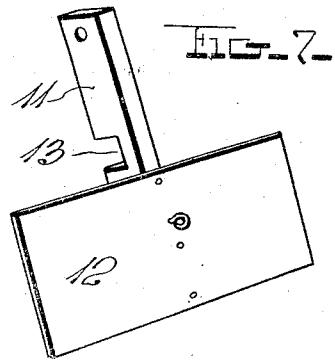


Fig. 7.



Witness
H. Woodard

Inventor
W. S. Kimball

By H. B. Wilson & Co
Attorneys

Sept. 7, 1926.

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W. S. KIMBALL

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FIG. 5.

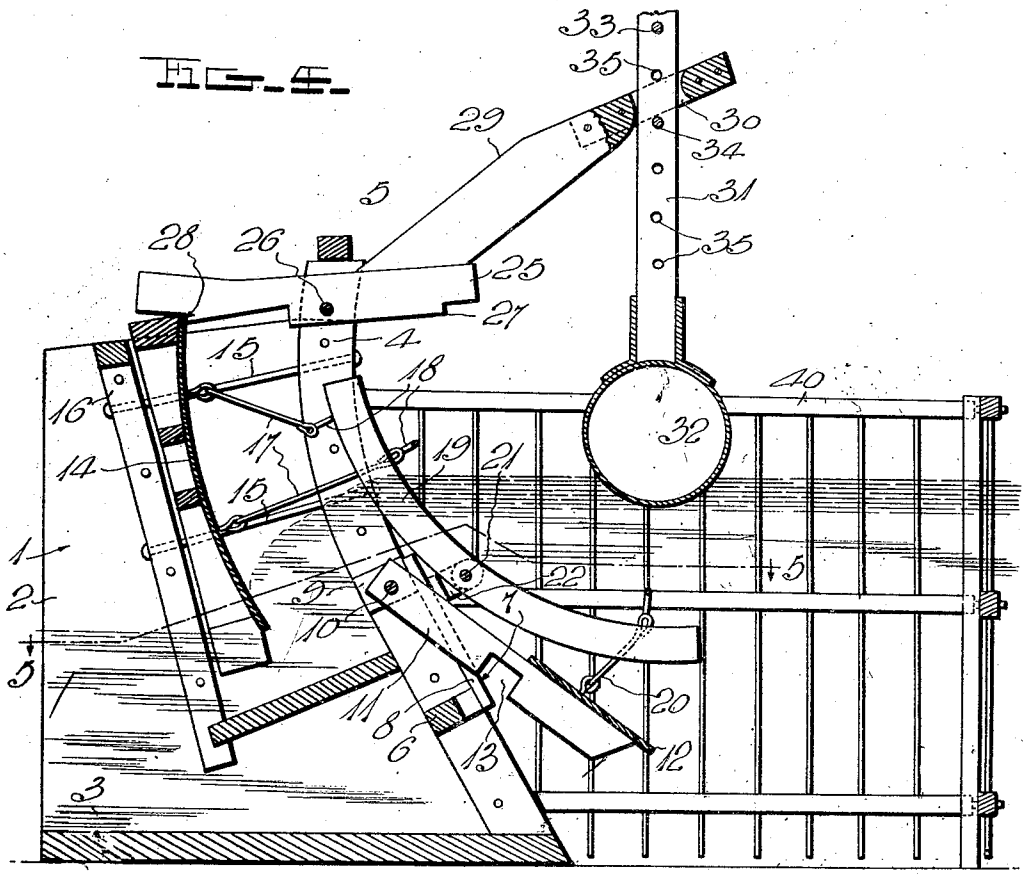
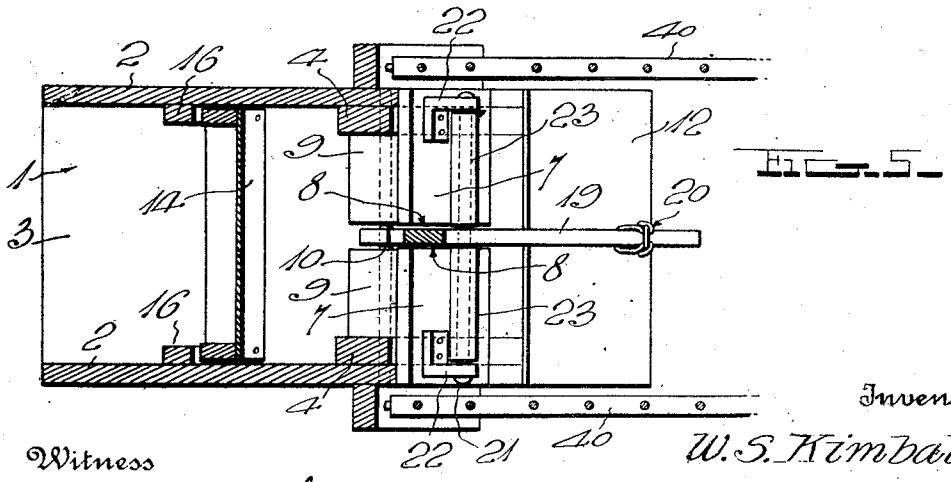


FIG. 5.



Witness
H. Woodard

Inventor
W. S. Kimball

By H. R. Wilson & Co.
Attorneys

Patented Sept. 7, 1926. 1,599,333

UNITED STATES PATENT OFFICE.

WILLIAM S. KIMBALL, OF CARMEL, MAINE.

AUTOMATIC FLOOD GATE.

Application filed November 10, 1924, Serial No. 749,097. Renewed March 8, 1926.

It is well known that a great meany dams are subject to severe injury, if not total destruction, when flood conditions arise in the waters held in check thereby, unless some provision is made for permitting the excess pressure to escape. Flood gates, controlled in numerous ways, have heretofore been devised for this purpose, but it is the object of my invention to provide an improved form of gate which will be absolutely automatic in its operation and thus requires no manual attention whatever, the construction being such that the gate automatically opens upon predetermined rise of the water level and again automatically closes upon descent of the water level to or substantially to normal.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is a side elevation of a flood gate constructed in accordance with my invention.

Figure 2 is a top plan view.

Figure 3 is a vertical longitudinal sectional view showing the gate locked in its closed position.

Figure 4 is a duplicate of Fig. 3 with the exception that it illustrates the manner in which the gate is automatically opened by excessive rise of the water level.

Figure 5 is a horizontal sectional view as indicated by line 5—5 of Fig. 4.

Figures 6 and 7 are perspective views of the upper and lower portions of the gate.

In the drawings above briefly described, the numeral 1 designates a flume or passageway, which is shown as embodying opposed vertical side walls 2 and a bottom 3. Secured to the inner surfaces of the side walls 2, at the inlet end of the flume, I have shown two substantially vertical bars 4 whose upper ends may well curve toward the direction from which the water, held in check by the gate, is flowing. These bars are preferably connected at their upper ends by a transverse crown bar 5 and may well be further connected near their lower ends, by a second transverse bar 6. Rising a short distance from the bar 6 and extending from one side bar 4 to the opposite bar 4, is a stationary intermediate gate section 7. In the present showing, this stationary gate section is formed with a vertical slot 8 from its upper to its lower edge, and the upper portions of said section, at opposite sides of the slot, are secured to relatively short transverse bars 9, through which a pivot shaft 10 passes. Pivotally hung from this shaft, is an arm 11 carrying a lower gate section 12 for normally closing the space below the stationary gate section 7, as shown in Fig. 3. The arm 11 and the bar 6 are by preference jointly notched as indicated at 13 to permit swinging of said arm to the position disclosed in Fig. 3. Attention may here be directed to the fact that the gate section 12 is adapted to open toward the direction from which the water is flowing.

An upper gate section 14, of any desired construction, is mounted between the side walls 2 for normally closing the space above the stationary gate section 7 as shown in Fig. 3, this upper section 14 being adapted to open in the direction in which the water flows. This upper section is much larger than the lower section 12 and it is slidably mounted upon guide rods 15 which project from the bars 4 to additional vertical bars 16 secured to the inner opposed faces of the side walls 2. By suitable links 17, I have shown the upper and lower portions of the gate section 14, connected with eyes 18 on a substantially vertical lever 19 whose lower end is similarly linked at 20 to the lower gate section 12. This lever is fulcrumed between its ends on a transverse rod 21 whose ends may well be mounted in brackets 22 secured to the stationary gate section 7, spacing sleeves 23 being preferably mounted on the rod, between said brackets and the opposite sides of the lever to hold the latter in a centered position. The lever 19 is preferably curved as shown in the drawings.

By employing the construction above described, or a substantial equivalent thereof, it will be seen that when the upper gate section 14 is moved from the position of Fig. 3 to that of Fig. 4, by the water pressure, the lower gate section 12 will also be moved from the position of Fig. 3 to that of Fig. 4. Similarly, by connecting the upper and lower sections of the gate in some adequate manner, it is insured that closing of the lower gate section 12, when the water level has receded, will correspondingly close the upper section 14.

Novel means are provided for locking

the gate sections, and in the present disclosure such means is effective to hold them in either open or closed position. At 25, I have shown a substantially horizontal locking lever which is fulcrumed between its ends upon a transverse rod 26, extending between the upper portions of the bars 4, the rear end of said lever having a shoulder 27 which normally engages the upper end of the lever 19 so as to lock the gate sections closed as shown in Fig. 3. This same lever also is provided at its front end with another shoulder 28, which when the gate sections are opened, is adapted to engage the upper section 14 as shown in Fig. 4, to hold said section open until the lever is released. This lever is provided with a rearwardly extending operating arm 29 and upon the rear end of this arm, I have shown an appropriate vertical guide 30 which receives a vertical bar 31, sustained by a float 32, said bar 31 having upper and lower abutments 33 and 34 disposed respectively over and under the guide 30 and adjustable longitudinally of said bar, so that they may be moved different distances apart. In the present showing, the abutments are in the form of pins and to effect adjustment of these pins, they may be inserted through any of the openings 35 in the bar 31.

The abutments 33 and 34 are set in such a manner that they permit vertical movement of the bar 31 with respect to the arm 29, as the float 32 rises to some extent, upon ascent of the water level behind the gate, but upon further rise of the water, the lower abutment 34 forces upwardly upon the arm 29, thus rocking the lever 25 and disengaging its shoulder 27 from the lever 19. The outward pressure of the water against the large gate section 14, then moves this section to the open position shown in Fig. 4 and at the same time, the lower section 12 is moved rearwardly or inwardly to its open position. As soon as the gate section 14 reaches its outermost position, it snaps into engagement with the shoulder 28 and this shoulder will hold the two connected gate sections in their open positions, until a sufficient amount of water has escaped through the open gate, to permit the float 32 to drop to the required extent for releasing the lever 25 from the gate section 14. By the time this release has taken place, the water level has so receded that the water pressure against the lower gate section 12 is greater than that against the upper section 14, whereupon said lower section is forced to its closed position, causing simultaneous closing of the upper section 14. When the two sections are closed, the lever 19 engages the shoulder 27 and thus said sections are locked in their closed position until automatically released by further ascent of the level of the water.

It will be seen from the above that I have provided an extremely simple and inexpensive flood gate, yet one which will be very efficient and desirable and will be entirely automatic. As excellent results may be obtained from the general construction disclosed, it may well be followed, but the present disclosure is for illustrative purposes only, and within the scope of the invention as claimed, numerous modifications may be made.

I have shown an open-work guard or fence structure 40 around the operating portions of the gate and such a structure is preferably employed, to protect said operating parts against floating debris. This guard or fence is shown secured to the inclined bars 41 which are attached to the side walls 2 of the flume or passageway.

I claim:

1. A flood gate comprising an upper gate portion mounted for opening movement in the direction of flow of the water, a lower gate portion mounted for opening movement in the opposite direction, the two gate portions being connected to cause the opening movement of the upper portion to open the lower portion and to cause closing movement of said lower portion to close said upper portion, means for locking the upper gate portion in closed position, and means for automatically releasing said locking means upon predetermined rise of the water level.

2. A flood gate comprising an upper gate portion mounted for opening movement in the direction of flow of the water, a lower gate portion mounted for opening movement in the opposite direction, the two gate portions being connected to cause the opening movement of the upper portion to open the lower portion and to cause closing movement of said lower portion to close said upper portion, means for locking the two gate portions in either open or closed position, and means for releasing said locking means upon predetermined rise of the water level when the gate portions are locked closed and upon predetermined descent of the water level when said gate portions are locked open.

3. A flood gate comprising an upper relatively large gate section mounted to open in the direction in which the water flows, a lower comparatively small gate section mounted to open in the opposite direction, a substantially vertical lever fulcrumed between its ends and connected at said ends with the upper and lower gate sections respectively, to produce simultaneous opening and simultaneous closing of said sections, a locking member engageable with said lever to hold the gate sections closed, and means operatively connected with said locking member for automatically releasing the same

upon predetermined rise of the water level.

4. A flood gate comprising an upper relatively large gate section mounted to open in the direction in which the water flows, a lower comparatively small gate section mounted to open in the opposite direction, a substantially vertical lever fulcrumed between its ends and connected at said ends with the upper and lower gate sections respectively, to produce simultaneous opening and simultaneous closing of said sections, a locking lever fulcrumed between its ends over the first named lever and the upper gate section, the rear end of said locking lever having a shoulder co-operable with said first named lever for locking the gate sections in closed position, the front end of said locking lever having a shoulder co-operable with the upper gate section for locking it in open position, and means operatively connected with said locking lever for releasing it from the first named lever upon predetermined rise of the water level and for releasing it from said upper gate section after the water level has receded to a predetermined extent.

5. A flood gate comprising an upper relatively large gate section mounted to open in the direction in which the water flows, a lower comparatively small gate section mounted to open in the opposite direction, a substantially vertical lever fulcrumed between its ends, and connected at said ends with the upper and lower gate sections respectively, to produce simultaneous opening and simultaneous closing of said sections, a locking lever fulcrumed between its ends over the first named lever and the upper gate section, the rear end of said locking lever having a shoulder co-operable with said first named lever for locking the gate sections in closed position, the front end of said locking lever having a shoulder cooperable with the upper gate section for locking it in open position, an operating arm extending rearwardly from said locking lever and having a guide, a vertical bar slidable through said guide and having relatively adjustable abutments at the upper and lower sides thereof, and a float for supporting and operating said vertical bar.

6. A flood gate comprising an upper gate portion mounted for opening movement in the direction of flow of the water, a lower gate portion mounted for opening movement in the opposite direction, the two gate portions being connected to cause the opening movement of the upper portion to open the lower portion and to cause closing of said lower portion to close said upper portion, means for locking the two gate portions in either open or closed position, a vertical bar having a lost motion connection with said locking means for releasing the latter from its gate-closed position when the bar rises to a predetermined extent, and for releasing said locking means from its gate-open position when said bar lowers to a predetermined extent, and a float for controlling the vertical movement of said bar.

7. A structure as specified in claim 6; said lost motion connection between said locking means and said vertical bar, comprising a guide through which the bar passes slidably, and relatively adjustable abutments on said bar disposed respectively over and under said guide.

8. A flood gate comprising a water passage having opposed vertical side walls, an intermediate stationary gate section extending between said side walls, a lower inwardly movable gate section under said stationary section, means pivotally mounting said lower gate section, an upper relatively large gate section over said stationary section and adapted to open outwardly, means slidably mounting said upper gate section, a substantially vertical lever fulcrumed between its ends on said stationary section and having its upper and lower ends linked to the upper and lower gate sections respectively, a substantially horizontal locking lever co-operable with the upper end of the first named lever for locking the upper and lower gate sections in closed position, said locking lever being also co-operable with the upper gate section to lock the latter in its open position, and automatic controlling means for said locking member including a float adapted to ride on the surface of the water held in check by the gate.

9. A flood gate comprising an upper gate portion mounted for opening movement in the direction of flow of the water, a lower gate portion mounted for opening movement in the opposite direction, the two gate portions being connected to cause the opening movement of the upper portion to open the lower portion and to cause closing movement of said lower portion to close said upper portion, means for locking the upper gate portion in closed position, and means for releasing said locking means.

In testimony whereof I have hereunto affixed my signature.

WILLIAM S. KIMBALL.