

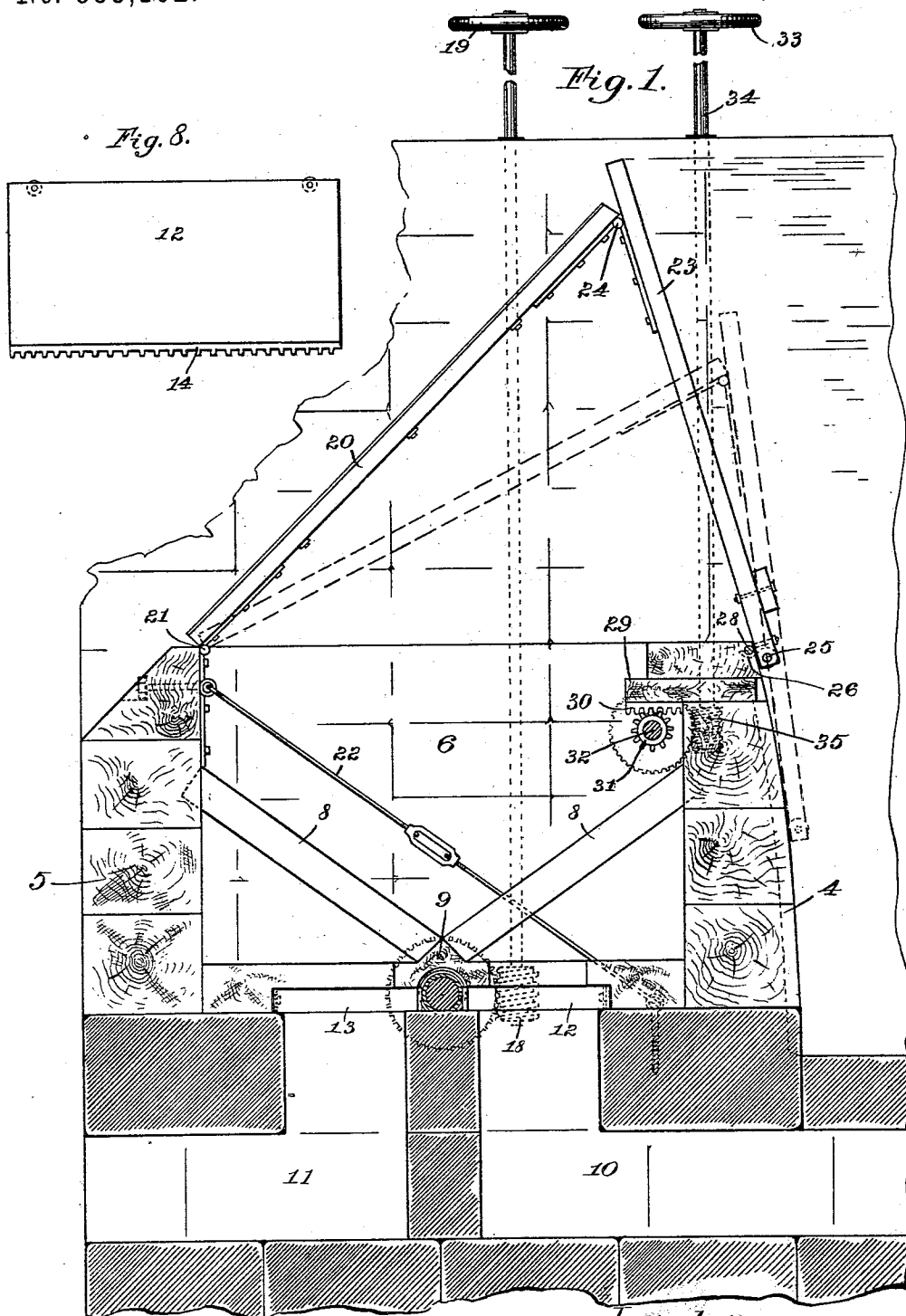
(No Model.)

2 Sheets—Sheet 1.

R. A. LANG.
HYDRAULIC SPLASH BOARD FOR DAMS.

No. 555,102.

Patented Feb. 25, 1896.



Witnesses:

F. J. Bradbury.
W. C. Johnson.

Inventor:

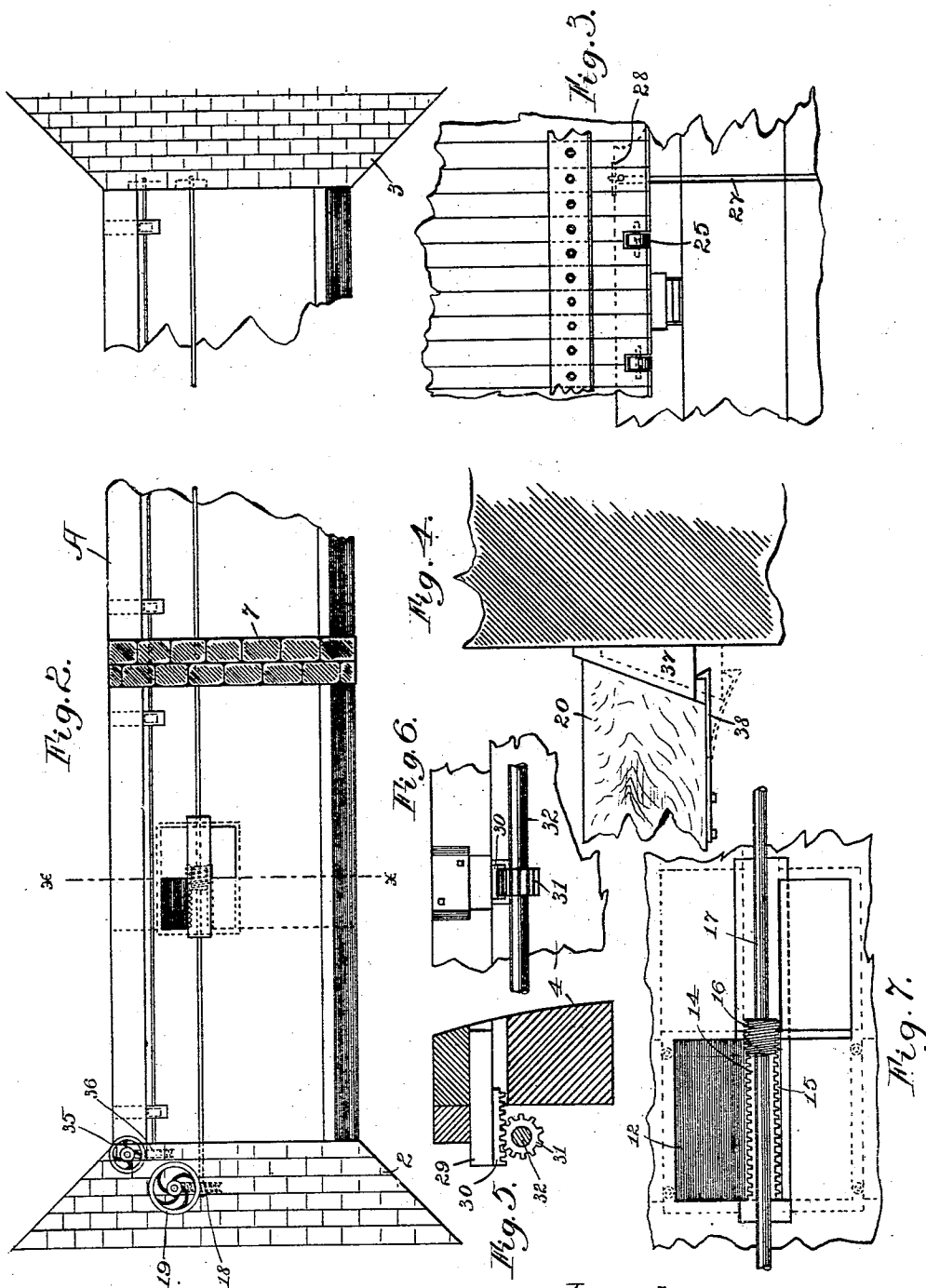
Robert A. Lang.

per: T. D. McNeill
Attorney.

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per: V. A. Merwin
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UNITED STATES PATENT OFFICE.

ROBERT ARTHUR LANG, OF EAU CLAIRE, WISCONSIN, ASSIGNOR OF TWO-THIRDS TO WILLIAM A. JONES, OF ST. PAUL, AND WILLIAM SAUNTRY, OF STILLWATER, MINNESOTA.

HYDRAULIC SPLASH-BOARD FOR DAMS.

SPECIFICATION forming part of Letters Patent No. 555,102, dated February 25, 1896.

Application filed April 15, 1895. Serial No. 545,738. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ARTHUR LANG, of Eau Claire, Eau Claire county, Wisconsin, have invented certain Improvements in Hydraulic Splash-Boards for Dams, of which the following is a specification.

My invention relates to improvements in water-dams, its object being to provide an adjustable hydraulic splash-board therefor, together with means for operating the same.

To this end my invention consists in providing a dam-crest formed of front and rear walls with intermediate space, with which connect valve-controlled inlet and outlet water-conduits. Arranged upon the top of this is a pair of connected leaves, one of which is hinged to the crest of the dam, and the other slides up and down upon the face of the wall next the head of the water, the two constituting a splash-board, whereby the operating of the valves controls the inflow and outflow of the water through the conduits, by means of which the leaves are raised and lowered.

My invention further consists in the construction and combination hereinafter particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a cross-section of my improved dam-crest, showing the water-conduits, their controlling-valves, the construction of the walls of the crest, and the leaves mounted thereon. Fig. 2 is a plan view of the dam with the leaves removed. Fig. 3 is a detail of the lower edge of the splash-board leaf. Fig. 4 is a detail of the side edge of the hinged leaf, showing the packing-strip. Figs. 5 and 6 are details of the splash-board supports and their operating means, and Figs. 7 and 8 are details of the conduit-valves.

In the drawings the dam-crest A extending between the side walls 2 and 3 is made up of the inner and outer walls 4 and 5, with an intermediate space or hydraulic chamber 6. The dam-crest may be constructed in sections with one or more intermediate strengthening-piers 7, in which case each section, for the purpose of the following description, constitutes an independent dam-crest.

8 are interior braces resting upon the foot-block 9 with their upper ends socketed into the walls 4 and 5.

10 is the inlet-conduit connecting the reservoir or stream with the chamber 6, and 11 is the corresponding outlet-conduit. These conduits are respectively controlled by sliding valves 12 and 13. These are simultaneously operated by means of racks 14 and 15 upon the adjacent edges of the valves, which racks are engaged by the worm-gear 16 carried upon the shaft 17. This shaft is operated by a suitable gear connection 18 with the hand-wheel 19 upon the wall 2. The ports connecting the chamber 6 with the conduits are so arranged, whereby the valves in their travel serve respectively to simultaneously and equally, one to open and the other to close its port, as shown in Fig. 7, the outlet-conduit port being shown closed and the inlet-conduit port open.

The pressure-leaf 20, arranged between the side walls of the dam, is connected at its bottom by the hinge 21 to the top of the downstream wall 5 of the dam, this wall being strengthened against the thrust of the leaf by the tie-rod 22. Connected to the top of the pressure-leaf 20 by means of the hinge 24, is the upstream flap or leaf 23, the upper edge of the leaf 23 projecting above the pressure-leaf.

The lower end of the leaf 23 is provided with antifriction-rolls 25 and travels over the slightly-curved face of the wall 4, as indicated by the dotted lines in Fig. 1. The leaf is also provided with inwardly-projecting hooks 26, which travel in grooves 27 in the face of the wall, and are adapted to catch the stops or rods 28, fixed in the top of the wall, so as to limit the upward rotation of the leaves.

In order to furnish a support for the bottom of the flap-leaf 23 to permit of the drawing of water out of the hydraulic chamber underneath the leaves for purpose of repairs, I provide the series of sliding bars or stops 29, which are fitted with racks 30, engaged by pinions 31 upon the shaft 32, operated by means of the hand-wheel 33 upon the counter-shaft 34 through the medium of the worm 35 upon the counter-shaft meshing with the

worm-gear 36 upon the shaft 32, so as to drive the stops outward sufficiently for the splash-board leaf 23 to rest thereon, when the water can be exhausted from the chamber, while the splash-board and its connected leaf remain in raised position. In order to constitute close-fitting joints between the leaf 20 and the side walls I provide a wedge-shaped strip 37, fitted to the inclined edge of the leaf and crowded between the wall and leaf by a series of springs 38.

Operation: The leaves of the dam being lowered so that the leaf 20 closes the top of the structure and permits the free flow of water thereover, when it is desired to increase the height of the dam the hand-wheel 19 is turned to open the inlet-valve 12 and close the outlet-valve 13. Thereupon the inflow of water lifts the leaves until the splash-board leaf 23 is checked and held by the stops 28. When it is desired to again lower the leaves, the valve 12 is closed and the valve 13 opened so as to drain off the water, whereupon the splash-board leaf slides downward, as indicated by dotted lines, until the original position is resumed. In order to maintain the splash-board at any intermediate height, such as that indicated by dotted lines, the valve 12 is opened and the valve 13 closed until the required position is attained, whereupon by adjusting the valves to stand about equally open the level of the water in the chamber, and consequently the height of the splash-board, remain unchanged.

In the operation of the pressure-leaf 20 the wedge 37, fitted between the inclined edge of the leaf and the side wall of the dam, makes a practically water-tight joint. When there is any pressure inside the hydraulic chamber it forces the strip like a wedge between the leaf and side wall of the dam, closing the space so that practically no water escapes from the chamber. The leaf will now move freely, the friction of the strip sliding against the vertical wall being so small as not to interfere with the movement, the water and the slimy vegetable growth on the wall and strip serving as a lubricant therefor. The strip readily accommodates itself to any changes in size of the space to be packed, and the springs keep it from falling out of place when the pressure is relieved.

I claim—

1. A rising-and-falling water-gate, comprising in combination the downstream pressure-leaf hinged at its bottom to the top of the downstream wall of the dam, and the upstream flap or leaf hinged to the top of said pressure-leaf and slidable upon the face of the dam.

2. In combination with a dam, a rising-and-falling water-gate, composed of the lower or pressure leaf hinged to the top of the dam, the flap-leaf hinged to the top of the pressure-leaf and slidable upon the face of the dam, and means for admitting water underneath said leaves to raise the same.

3. In combination with a dam having an open-top hydraulic chamber and valve-controlled inlet and outlet conduits, a splash-board made up of the pressure-leaf hinged to the crest of the dam, the flap-leaf hinged to the top of the pressure-leaf, and slidable vertically upon the face of the dam.

4. In a rising-and-falling water-gate, the combination with the wall of the dam and the sliding leaf, of the adjustable stops upon said wall for supporting said leaf.

5. The combination with the wall or other fixed part, and the adjacent movable gate or leaf, of the interposed adjustable wedge-shaped strip.

6. The combination with the wall and the adjacent gate or leaf, of the wedge-shaped strip carried by said gate or leaf and adapted to bear against said wall.

7. The combination with the wall and the adjacent movable gate or leaf, of the interposed wedge-shaped strip and its pressure-springs.

8. The combination with the wall and the adjacent movable gate, of the wedge-shaped strip carried by said gate, and means for holding the same in bearing-contact with said wall in the different adjusted positions of said gate.

9. In a water-gate, the combination with the side wall, and the movable leaf, of the interposed wedge-shaped strip carried by said leaf, and the springs for holding said strip in constant contact with said wall.

10. The combination with the dam having an open-top chamber therein, of the valve-controlled conduits for admitting water thereinto and discharging it therefrom, the side walls at the end, the flap-leaf slidable up and down the upstream face of the dam and working between said side walls, and the pressure-leaf fitted between the side walls and hinged to the top of the other leaf and to the top of the dam on its downstream side.

11. In a structure of the class described, the combination with the dam and the side walls extending above the same, of the leaf slidable up and down on the upstream face of the same and between said side walls, means for supporting said leaf in raised position against the pressure of the water on the other leaf, and the valve-controlled means for lifting said gate by means of the water confined by the dam.

12. The combination with the dam, of the included hydraulic chamber and the side or channel walls extending above the same, the valve-controlled conduits for admitting water to and discharging it from said chamber, the water-gate slidable vertically upon the upstream face of the dam between said side walls, and the pressure-leaf hinged to the downstream face of the dam.

13. The combination with the dam consisting of the upstream and downstream walls with an intermediate top space or chamber, the inlet and outlet conduits, their oppositely-

operative valves and the side walls extending above the top of said dam, of the water-gate fitting closely and slidable between said side walls upon the upstream face of the dam, and the leaf interposed between and hinged to the top of the gate and the rear wall of the dam, and fitting between said side walls.

14. In combination with the dam having an included open top hydraulic chamber provided with valve-controlled inlet and outlet conduits, the upstream face of the wall being slightly convex, and the side walls extending above said dam, of the leaf fitted closely between said side walls and hinged to the top of the rear wall of the dam, the gate

fitted to and slidable between said side walls upon the convex face of the dam, the hinge connecting its top with the top of said leaf, and the antifriction-rolls carried by its bottom and bearing upon the face of said dam.

15. The combination with the dam, and the vertically-slidable gate working upon the face thereof, of the sliding stops or supports working in the wall of said dam and adapted to be thrust outward to support said gate thereon.

In testimony whereof I affix my signature in presence of two witnesses.

ROBT. ARTHUR LANG.

Witnesses:

A. J. MARSH,

W. W. LUELKEMAN.