Jan. 1, 1935. R. R. LUN 1,986,113

DAM CONSTRUCTION

Filed July 30, 1932

Fig. 1.

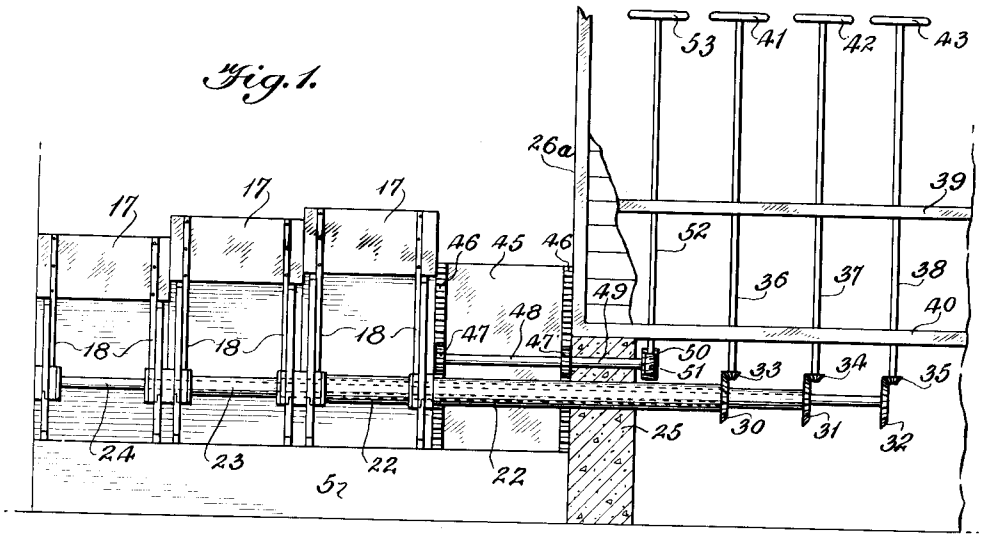


Fig. 2.

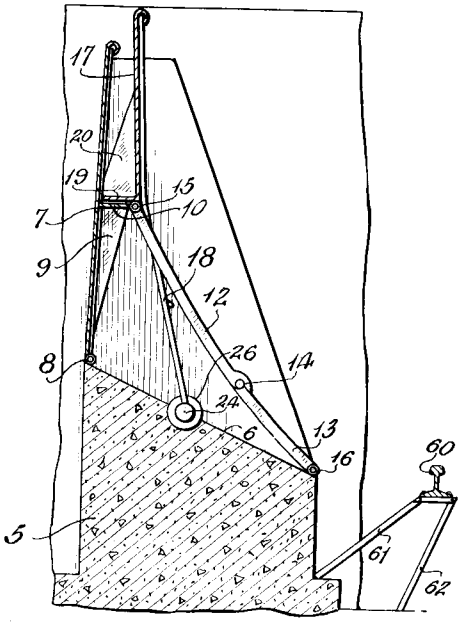
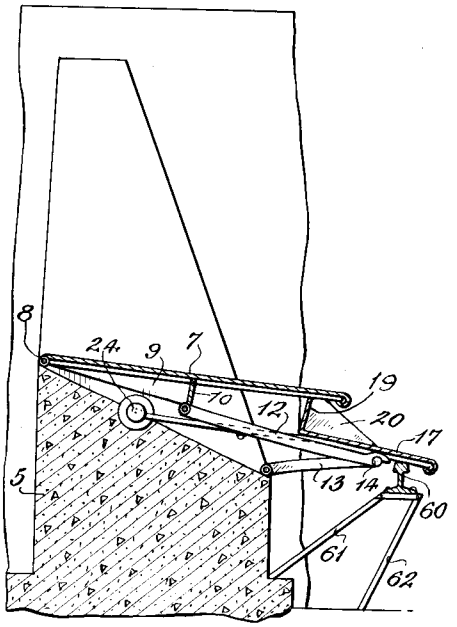


Fig. 3.



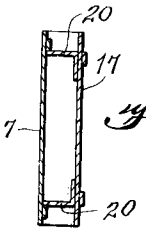


Fig. 4.

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1,986,113

UNITED STATES PATENT OFFICE

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DAM CONSTRUCTION

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Application July 30, 1932, Serial No. 626,972

6 Claims. (Cl. 61—27)

This invention relates to dam constructions and improvements therein particularly of the type shown and illustrated in my Patent No. 1,841,747, issued January 19, 1932.

The primary object of this invention is to provide an improved dam construction of the type set forth in the above mentioned patent wherein the flash boards are automatically tripped by the water overflow.

A further object of this invention is to provide a dam construction of the above mentioned type with manually operable means for raising the flash boards individually after the same have been tripped by the automatic tripping mechanism.

A still further object of this invention is to provide an improved dam construction of the above mentioned character having manually operable means for raising the flash boards after the same have been automatically tripped which will be entirely out of the way of debris and water passing over the flash boards when the same are in their tripped position.

A still further object of this invention is to provide an improved dam construction of the above mentioned type having means for supporting the flash boards in their tripped positions to prevent logs and the like from causing breakage of the flash boards due to the heavy weight of the logs or debris thereon.

A still further object of this invention is to provide a dam construction having a series of flash boards having means for bracing the flash boards while in a vertical or operative position as well as in a horizontal or inoperative position, said means including vertical ribs formed on the flash boards for reinforcing the same while at the same time forming supports for the flash boards when the same are in a tripped position.

The salient feature of this invention comprises a series of nested tubes telescopically fitted within one another and each of said telescopic tubes are provided on one end with a bevel gear adapted to mesh with a bevel gear on a rotary operating shaft controlled by a hand wheel, while the opposite ends of the telescopic tubes are connected to the flash board tripping levers so that as the hand wheels are turned the telescopic tubes will be rotated independently of each other to pivot the flash board tripping levers and raise the same to cause the raising of the flash boards.

Other objects and advantages of the invention will become apparent during the course of the following description forming a part of this specification, taken with the drawing wherein,

Figure 1 is a rear longitudinal view of a dam construction showing the flash boards adjacent the control house and illustrating the rotary telescopic operating tubes connected to the flash board tripping levers and the manual control shafts;

Figure 2 is a vertical cross-sectional view taken on Figure 1 through a sectional area of one of the flash boards showing the vertical ribs for reinforcing the flash boards and the flash board tripping devices;

Figure 3 is a vertical cross sectional view similar to Figure 2 showing the flash boards in a tripped position and illustrating the manner in which the flash boards are supported as well as the flash board tripping devices; and

Figure 4 is a horizontal cross sectional view through the flash board and tripping mechanism showing a sectional area of one of the flash boards and one set of reinforcing ribs.

For the purpose of illustrating the invention, attention is directed to the drawing wherein is shown a preferred embodiment of the invention and wherein like reference characters will be employed to designate like parts throughout the same and wherein the reference character 5 will generally be employed to designate the cut away portion of a dam corresponding to the cut away portion B disclosed and described in my Patent No. 1,841,747 also having a corresponding sloping top wall 6 to the forward edge of which is pivotally mounted a series of flash boards 7 as at 8 and said flash boards are identical with the ones described and disclosed in my above mentioned patent with the exception that the flash boards 7 are provided with vertical reinforcing ribs 9 which are formed of angle bars tapering from the lowermost points upwardly to the shelves 10 formed on the flash board. This construction provides for the reinforcement of the flash boards 7 to prevent the same from bending or breaking when subjected to the heavy weight of the logs or the like.

The flash boards 7 are adapted to be held in a vertical position by means of a pair of pivoted levers, one pair being employed for each flash board as is shown in Figure 1 and each of the pivoted levers comprising sections 12 and 13 pivotally connected as at 14 and having their outer ends connected to the flash boards as at 15 and their lower ends connected to the rear of the top wall 6 as at 16. This construction is identical with the construction shown and described in Patent 1,841,747.

The trip boards 17 are secured to the upper

ends of pivoted levers 18 and are provided with shelves 19 adapted to overlap the shelves 10 and said trip boards are reinforced by vertical reinforcing ribs 20 which are angle shaped in cross section as clearly shown in Figure 4. The reinforcing ribs 20 extend upwardly from the shelf 19 on the trip board and one edge of the rib is fastened to the trip board by means of rivets or the like while the other edge extends upwardly in juxta-position to the flash board 7.

The lower ends of the pivoted bars 18 which support the trip boards are connected to a series of nested tubes telescopically fitted within each other and designated by the reference characters 22, 23, and 24. The nested tubes are rotatably mounted within each other and the outermost tube 22 may be journalled in a suitable bearing in a wall 25 of the dam construction and may further be journalled in a suitable bearing mounted on the slanting top wall 6. The first set of pivoted levers 18 adjacent the power house 26a are connected to the tube 22 while the next adjacent set of pivoted levers 18 are connected to the tube 23 and the next adjacent set of levers 18 of the trip board 17 are connected to the innermost tube 24. The trip board levers 18 are connected to the respective tubes 22, 23 and 24 in a rigid fashion whereupon rotation of the tubes will effect the pivoting of the trip board levers 18 about the axes of the corresponding telescopic tube. Journal bearings 26 may be provided for each of the telescopic tubes adjacent the point to which the pivoted levers are connected to reduce torsional strains.

The opposite ends of the telescopic tubes are provided with bevel gears 30, 31 and 32 which are adapted to mesh with corresponding bevel gears 33, 34 and 35 secured to the lowermost ends of operating shafts 36, 37 and 38 which extend upwardly within the power house control room 26a and may be journalled in suitable bearing bars 39 and 40. Each of the shafts 36, 37 and 38 are provided with manual operating hand wheels 41, 42 and 43 so that the operator of the dam may raise the flash boards 7 after they have been tripped by flood water.

The normal fluctuating water level may be controlled by the vertically sliding gate 45 mounted in suitable guideways, not shown, and on the vertical edges of the spill way gate 45 there may be provided rack bars 46 adapted to be engaged by gear wheels 47 mounted on a horizontal operating shaft 48 journalled in the foundation wall 25, and the free end of the shaft 48 may be provided with a worm wheel 50 meshing with a worm 51 secured to the lowermost end of an operating shaft 52 which extends vertically within the power control house 26a and is provided with suitable bearings in a similar fashion to the vertical operating shafts 36, 37 and 38 so that a hand wheel 53 may be fastened to the upper end of the vertical shaft 52 and control the spill way gate 45.

Adjacent the rear wall of the dam 5 is provided a horizontal I-beam 60 supported by suitable supporting bars 61 and 62, the former being connected to the dam wall 5 in any suitable fashion while the latter may be connected to the lower portion of the dam. The purpose of the I-beam 60 is to support the flash boards and the trip boards when in position as shown in Figure 3 whereupon logs and debris will not cause their full weight to be supported by the flash boards and trip boards and as also shown in Figure 3, flash boards 7 are shown being practically supported by the vertical reinforcing ribs 9 resting upon the bearings or nested operating shafts 22, 23 and 24, while the outermost ends of the flash boards 7 may rest upon the shelves 19 carried by the trip boards thereby further supporting the weight of debris and logs which may accumulate upon the flash boards.

It is to be understood that any form of bearing may be provided for the nested operating shafts 22, 23 and 24 and that other changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:—

1. A dam construction comprising a spillway, a series of pivoted flashboards, adapted to be tripped automatically by water overflow and mutually independent means for raising the flashboards after they have been tripped comprising a series of nested tubes, each of said tubes having one of its ends connected to one of the flashboards whereby turning movement of the tube will effect the movement of the corresponding flashboards.

2. A dam construction comprising a water barrier having a spillway, a series of flashboards pivotally mounted in the spillway, means associated with the flashboards for automatically tripping the same upon an increased water overflow and means for manually raising the flashboards after they have been tripped comprising a series of telescopic tubes disposed horizontally in the spillway, one end of each tube being connected to a flashboard, a gear on the opposite end of each tube and a rotary control shaft for each tube having an inter-meshing gear for operating the tube and raising the flashboard.

3. A dam construction comprising a barrier extending across a water-way, said barrier having a spillway, a series of flashboards pivotally mounted in the spillway, a tube connected to each of the flashboards, said tubes being nested one within the other, a gear secured to the opposite end of each tube, independently operated shafts extending vertically and at right angles to the tubes, a gear wheel on the shafts adapted to mesh with the first mentioned gear, and a hand control wheel mounted on the upper end of each vertical shaft.

4. A dam construction comprising a barrier extending across a water-way, said barrier having a spillway, a series of flashboards mounted in the spillway, a series of tubes disposed on the top wall of the spillway and journalled thereon, each tube being connected to one of the flashboards to turn therewith, said tubes being so disposed as to be nested within each other in a telescopic fashion, a gear mounted on the opposite end of each tube, a series of vertical shafts extending at right angles to the tubes, a gear mounted on the lower end of the shaft adapted to mesh with the first mentioned gear and a hand control wheel secured to the upper end of the vertical shafts, each controlling wheel operating independently of the others.

5. A dam construction comprising a barrier adapted to extend across a water-way, said barrier having a spillway, a plurality of telescoped tubes disposed on the top wall of the spillway, journal bearings on the top wall of the spillway for the telescopic tubes, the outermost tube being of a shorter length than the inner tubes, a flashboard rigidly secured to one end of each nested tube, a gear wheel secured to the opposite end of each tube and means remote from the tubes for controlling the flashboards individually.

6. A dam construction comprising a barrier adapted to extend across a water-way, a spillway formed in the barrier, a series of nested tubes journalled on the top wall of the barrier, a series of flashboards pivoted to the top wall of the barrier, means for maintaining the flashboards in a vertical position, means for tripping the flashboards and wholly independent means for manually raising the flashboards after they have been tripped, said last named means comprising a connection between the nested tubes and the flashboards.

ROWLAND R. LUN.