

MOVABLE CRESTS FOR DAMS.

THE accompanying drawings show some types of automatic and hand-controlled flashboards, intended for use by the U.S. Reclamation Service. They were proposed by Gen. William L. Marshall, consulting engineer to the Secretary of the Interior, were described in an article in the May number of the "Professional Memoirs" of the Corps of Engineers, U.S. Army. The author calls attention to the fact that the two types shown at the top of the drawing are new but were patented by him some years ago, the straight or plane gate type (upper left-hand figure) having been in use since 1907 on one of the feeders of the Illinois and Mississippi Canal. Altered to suit local conditions, it is placed horizontally in the bottom of the feeder as an emergency stop gate, to rise and retain the canal level in case of a break in the banks. The particular gate was de-

until its nose is above water, when the current may act. It may be readily modified to be applicable to spans up to 100 ft., but is peculiarly adapted for use as an upper gate to a canal lock of 40 ft. or less span and not exceeding 10 to 12 ft. depth.

Later Types.—The two types at the bottom of the plate are believed to be novel, and have now been published for what they may be worth. They may be used by the United States freed from patent claims. Any one familiar with bear-trap dams will understand at a glance their working. The only features worth special remark are:—

1. The care taken to so arrange the hydraulic chambers as to cause mud and sediment to be swept by the motion of the gate into or near numerous water supply and exit pipes or "scruppers," and sufficient leakage to keep mud from accumulating. This leakage may be reduced to any extent by well-proved means.

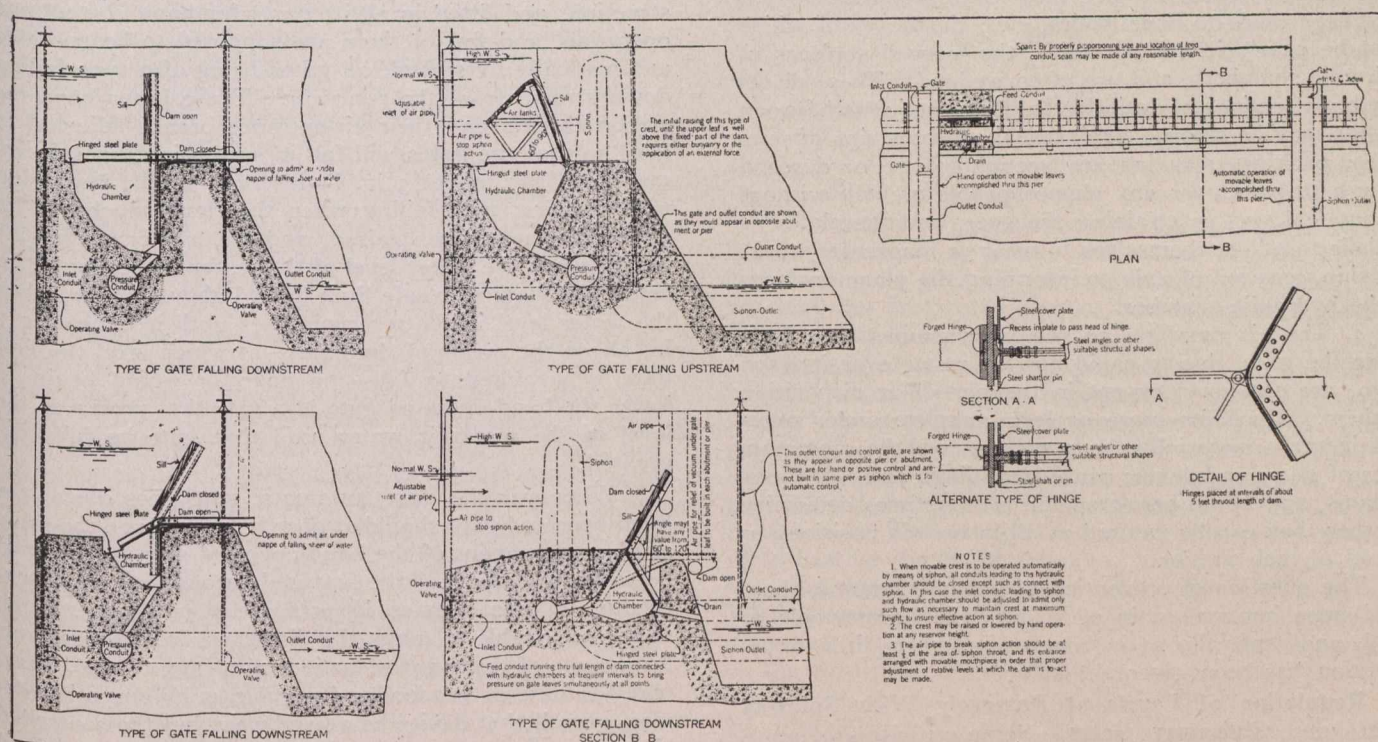


Fig. 1.—Types of Movable Dam Crests.

signed by Christopher Holth, mechanical engineer, and constructed by L. L. Wheeler, assistant engineer. The canal bank broke in 1910 and the gate automatically rose and closed the feeder, retaining the level in the feeder canal. It then repaid its cost.

The second type, at the top of the drawing (without the wooden drift shield and siphon), has also been in use since 1907 as upper gates on fourteen locks on the Illinois and Mississippi Canal, but the lower leaves or aprons of those gates were designed of sufficient size only to depress the gates automatically when the locks are filled to within 10 in. or less of the surfaces of the upper pools. Those gates have worked successfully since 1907, although there were defects in workmanship that were corrected, and at least one uncorrected defect in design that is of no practical importance so long as the canal levels are maintained. These gates were also designed under General Marshall's patents by Christopher Holth, but the completed designs were not submitted to him for correction. This type requires flotation or auxiliary power to raise it

2. The arrangement of piping for above purposes, and to secure uniform distribution of water pressures along entire length of gates by making main conduits of much greater capacity than that of all distributing pipes or conduits combined.

3. The siphon for automatic control of the gates during floods, in connection with, or rather, in addition to, hand control. These siphons "bleed" the supply mains before water in them may reach under pressure the small distributing pipes leading into hydraulic chambers, and have discharge capacities nearly equal to, but less than, the main conduits, so that (if the hand-operating devices be closed) whenever during a flood the water level above a dam reaches the level of the siphon throat or top, the siphon at once so "bleeds" the supply main that the preponderance of water pressure is at once changed from one side to the other of the axis of rotation of the gate, and it will fall and remain flat until the level in the reservoir falls below the air inlet to siphon, whereupon the siphon action is broken, the full pressure is again exerted