

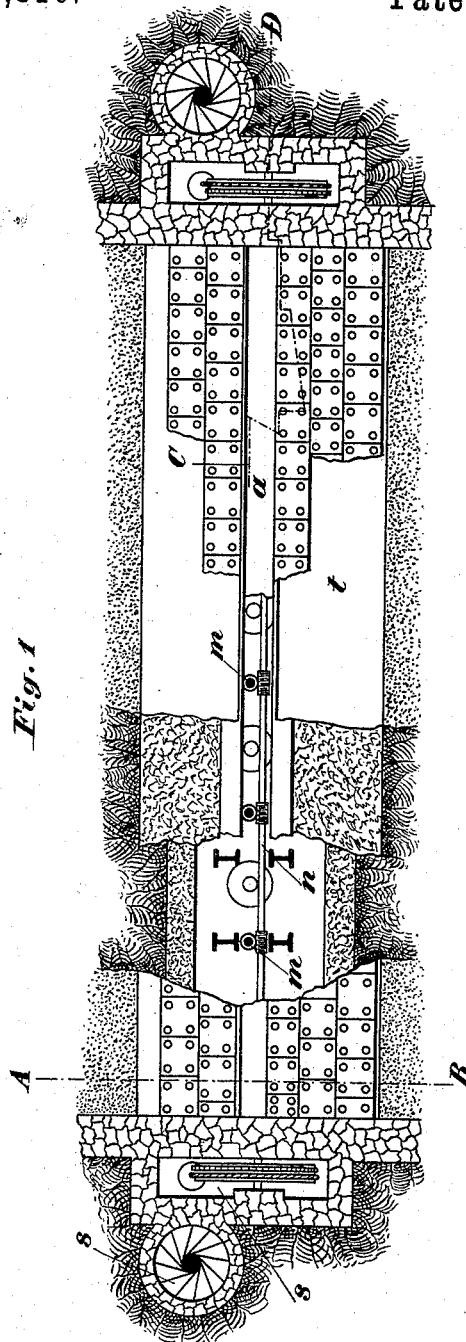
(No Model.)

4 Sheets—Sheet 1.

G. GUTTENBRUNNER.
AUTOMATIC WATER GATE.

No. 526,310.

Patented Sept. 18, 1894.



Witness.
M. B. Conner
W. W. Swartz

Inventor
Georg Guttenbrunner
by his Attorneys
T. R. Bakerwell & Sons

(No Model.)

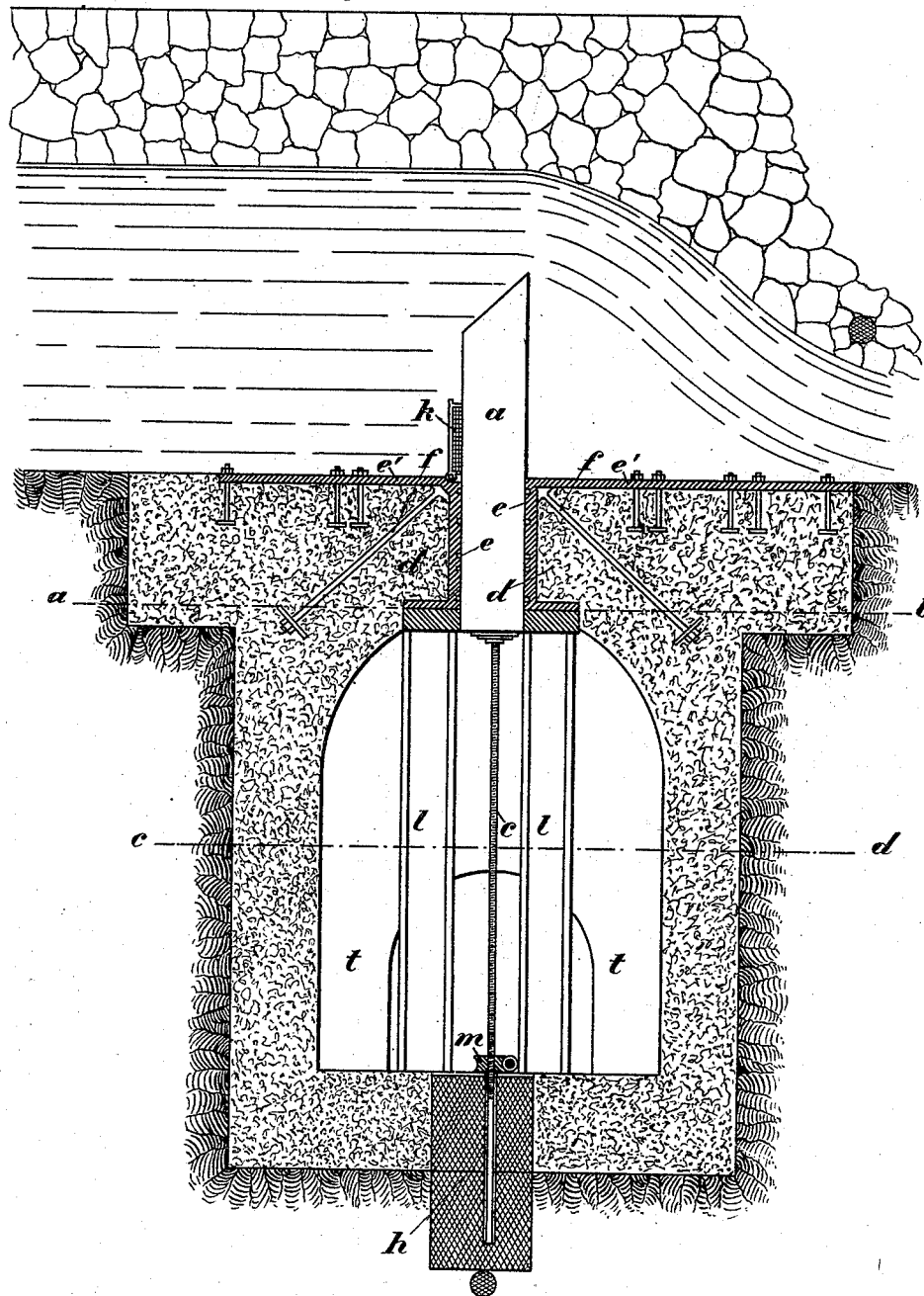
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Fig. 2 A-B



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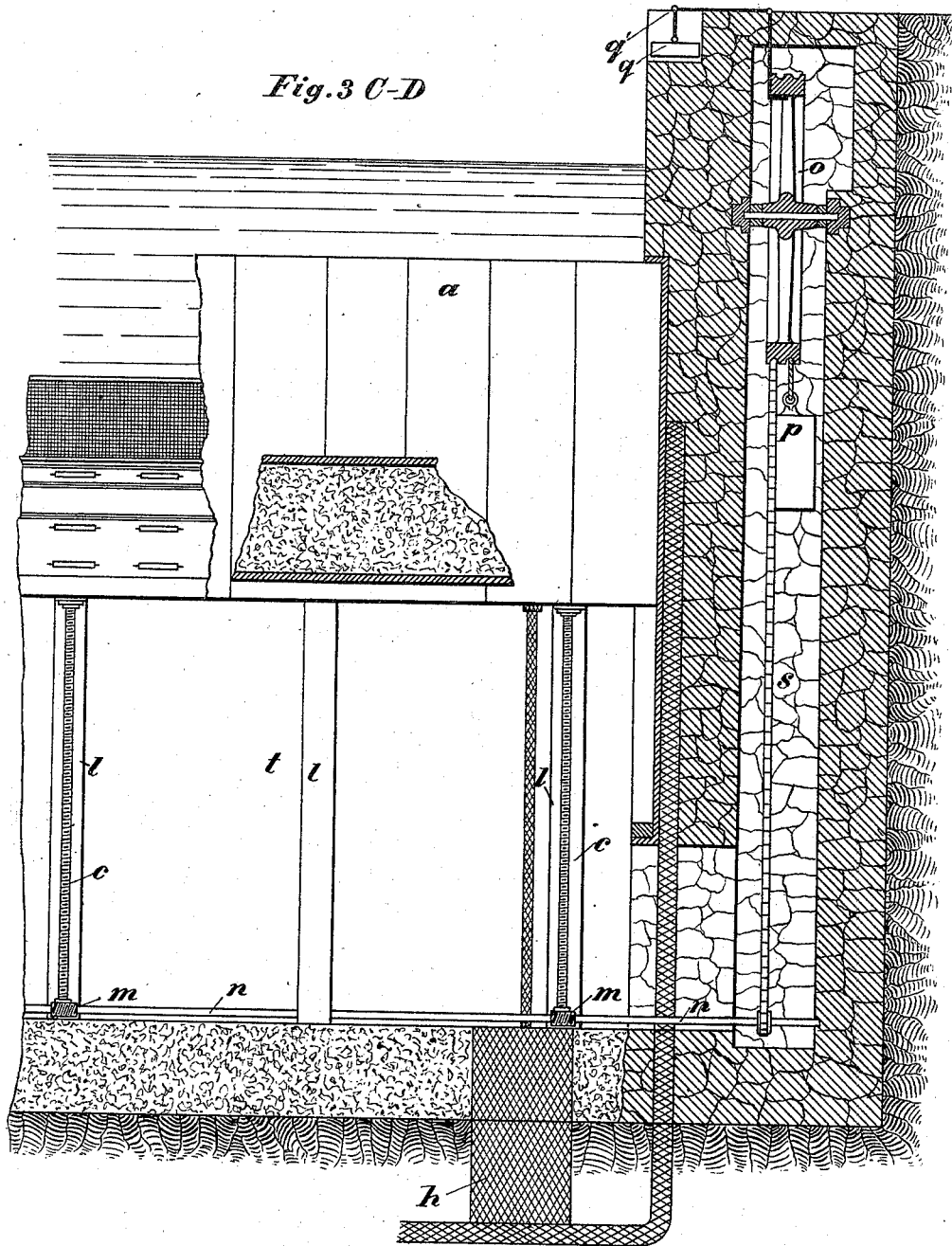
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Fig. 3 C-D



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Fig. 7

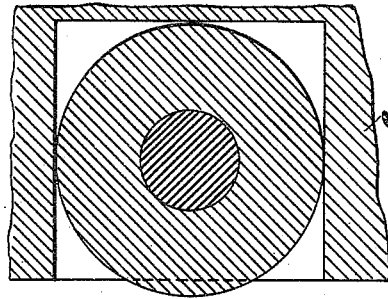


Fig. 5

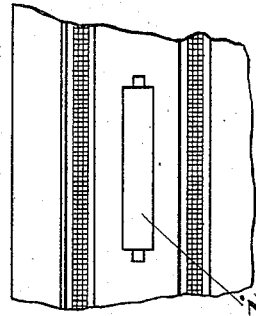


Fig. 4

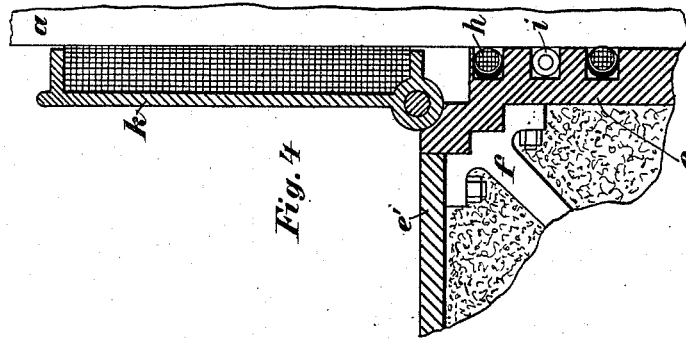
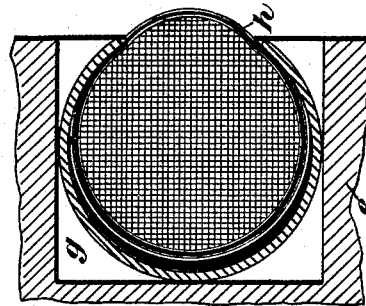


Fig. 6



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UNITED STATES PATENT OFFICE.

GEORG GUTTENBRUNNER, OF VIENNA, AUSTRIA-HUNGARY.

AUTOMATIC WATER-GATE.

SPECIFICATION forming part of Letters Patent No. 526,310, dated September 18, 1894.

Application filed September 26, 1893. Serial No. 486,558. (No model.)

To all whom it may concern:

Be it known that I, GEORG GUTTENBRUNNER, I. and R. captain, of 10 Roter Hof, Vienna, in the Empire of Austria-Hungary, have invented a new and useful Automatic Water-Power for Tunnels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to weirs or overflow sluices in water courses and consists in an improved arrangement or construction of a vertically adjustable weir and the combination of the same with mechanism for lowering it self-actingly when the water above the weir rises above a predetermined level; the object of my invention being by this means to prevent or materially reduce the rise of the back-water and the inundations and consequent damage resulting from most permanent weirs in case of floods.

On the drawings appended hereunto Figure 1 shows a plan of the weir partly in section; Fig. 2, a cross section A B, Fig. 1; Fig. 3, a longitudinal section C D, Fig. 1; Fig. 4, the cover, guides and packing for weir in section; Fig. 5, the guide wall with packing and friction rollers in front view; Fig. 6, details of the packing; Fig. 7, details of the friction rollers.

The body of the weir consists of a hollow girder or caisson *a* of riveted boiler plates suitably stiffened and stayed inside by angle irons and stays. To the bottom of this a number of spindles *c* are attached by means of which the weir can be raised or lowered. The weir body *a* is guided in a slot in the arch *d*, Fig. 2, of a tunnel *t* built in below the weir and the corners and surfaces of the guiding slot are protected by metal plates *e* *e*, and solidly secured by anchor stays *f f*. In order to prevent water from entering the tunnel, the plates *e e* are formed with grooves or recesses *g g* (Fig. 6) into which packings *h h* saturated with tar or other fatty substance are placed and pressed tightly against the weir body *a*; or hydraulic packings of U shaped leather may be used instead thereof. For the reduction of friction the plates *e e* further contain in recesses arranged therein friction rollers *i i* or balls, Figs. 5 and 7.

By means of one or several hinged covers

or flaps *k k*, Figs. 2 and 4, which can be turned down in the direction of the current, the entry of water into the tunnel is prevented when the weir is sunk below the level of the water course.

Connected to the guide plates *e e* and supporting the arch of the tunnel, struts or pillars *l l* are fixed in the tunnel at suitable places so as to form continuations of the guide plates *e* on both sides, and serve to carry the mechanism for raising and lowering the weir. The spindles *c c* may be threaded and the nuts *m* thereon formed as worm-wheels operated by worms on the shaft *n*, or bevel wheels may be substituted for the worms and worm-wheels, or instead thereof the spindles *c c* may form part of or be attached to hydraulic rams, the pockets *h* into which the spindles descend being formed as hydraulic cylinders fitted with suitable valves. In each case local conditions or other circumstances will determine the most suitable kind of mechanism to be adopted for lowering or raising the weir.

The tunnel *t* ends on each side in vertical open shafts *s s* or communicates with such shafts in which the apparatus for actuating the shaft *n* is arranged. This consists, on one or each side of a chain wheel *o* round which and a chain pulley on shaft *n*, a chain is passed; another chain or rope being coiled round the wheel *o* and carrying a weight *p*. The wheel *o* is locked by a suitable locking arrangement so that the weight occupies its highest position when the weir occupies its normal position. The locking means, for instance a ratchet wheel and pawl or their equivalents are connected to floats *q q*, Fig. 3 in such a manner that when the water above the weir rises so as to raise the floats, the pawl is disengaged from the ratchet wheel. This may be done as indicated on the drawing by suspending the float from a bell crank lever *q'*, the vertical limb of which engages with a ratchet wheel fixed to the side of the chain wheel *o*. When the latter is liberated, the weight *p* descends and turns thereby the shaft *n* and worm-wheels *m* and the spindles *c c* are screwed down so that the weir is lowered. When in consequence thereof the water level falls, the float *q* sinks again and arrests the further descent of the weight *p*. In this way

the level of the back-water is kept at a predetermined height and inundations or other damages by floods are prevented.

Where hydraulic power is used operating the descent of the weir, the float is connected by levers and rods to the outlet valves of the hydraulic cylinders, the effect of which arrangement is the same as hereinbefore described. Obviously the floats *q* are preferably made adjustable with regard to the water level, so as to be able to vary the moment of the selfacting lowering of the weir as may be required.

In some cases it is desirable to lower part of the weir only. In such cases the weir body is made in suitable parts or divisions and these are packed not only in their fixed guides but also as regards the adjacent parts of the weir body in a similar manner as hereinbefore described. In these cases the mechanism for operating the spindles from the shaft or shafts *n* is arranged so that parts of it can be thrown into or out of gear, or the hydraulic lifting and lowering arrangements are correspondingly arranged.

After the subsidence of the flood, the weir body *a* is raised to its normal position by winding the weights *p* up again, for instance by turning the wheels *o* with hand spikes or other suitable means, or where hydraulic power is used by forcing water into the cylinders by any ordinary suitable pumping arrangements.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A water-way having a vertically movable gate or weir therein, mechanism arranged to lower said gate, and a float actuated by the change of level of the water and arranged to start and stop the gate-actuating mechanism; substantially as described.

2. A water-way, having a vertically movable gate extending transversely of the same, a

transverse tunnel underneath the water-way, means for raising and lowering the gate within said tunnel; and a float actuated by the water level and arranged to start and stop the gate mechanism substantially as described.

3. The combination with a waterway having a vertically adjustable gate, a transverse tunnel beneath the waterway, spindles within the tunnel arranged to carry the gate, means for raising and lowering said spindles; and a float actuated by the water level and arranged to start and stop the raising and lowering mechanism substantially as described.

4. The combination with a waterway having a vertically adjustable gate, a transverse tunnel beneath the waterway, spindles within the tunnel arranged to carry the gate, a shaft arranged to raise and lower the spindles, a locking device for the shaft, and a float arranged to operate said locking device; substantially as described.

5. A water-way having a transverse tunnel beneath the same, plates forming a slot in the upper face of the tunnel, a gate vertically movable within this slot, grooves within the plates forming the slot, and packing within these grooves; substantially as described.

6. A water-way having a transverse tunnel beneath the same, plates forming a slot in the upper face of the tunnel, a gate vertically movable within this slot, and friction balls or rollers in the slot-plates; substantially as described.

7. A water-way having a vertically movable gate, and a hinged valve arranged to close the slot in which the gate moves; substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GEORG GUTTENBRUNNER.

Witnesses:

F. BELMONT,

JOSEF ZEHTNER.