

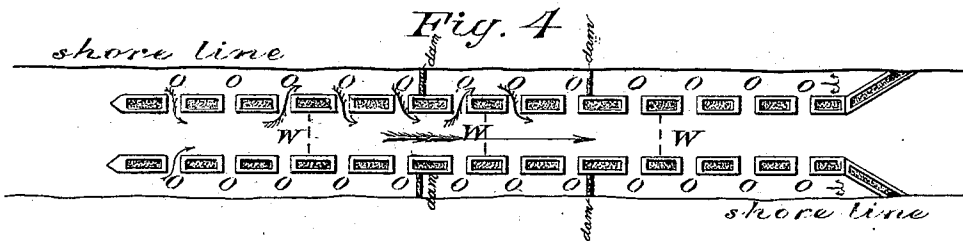
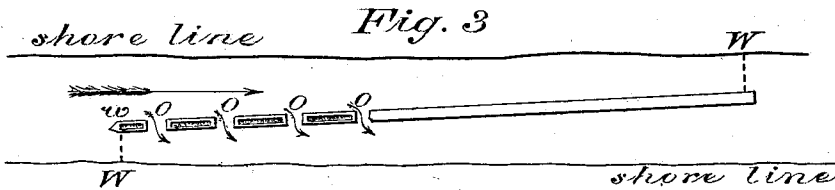
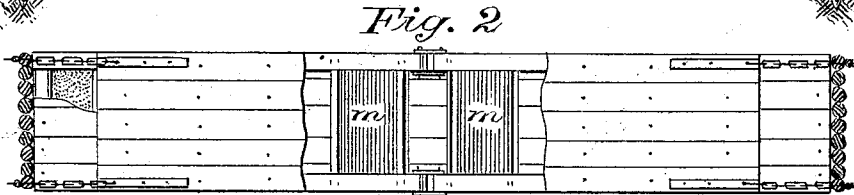
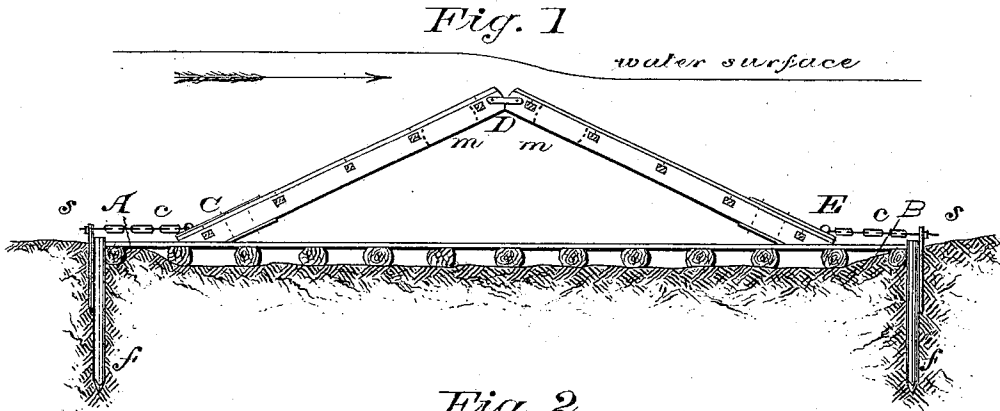
(No Model.)

H. HAUPT.

Device for Rendering Rivers Navigable.

No. 228,633.

Patented June 8, 1880.



Witnesses
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UNITED STATES PATENT OFFICE.

HERMAN HAUPT, OF PHILADELPHIA, PENNSYLVANIA.

DEVICE FOR RENDERING RIVERS NAVIGABLE.

SPECIFICATION forming part of Letters Patent No. 228,633, dated June 8, 1880.

Application filed March 6, 1880. (No model.)

To all whom it may concern:

Be it known that I, HERMAN HAUPT, of Philadelphia, Pennsylvania, United States, have invented a new and useful Improvement in Rendering Rivers Navigable, which invention is fully set forth in the following specification.

This invention relates to improvements in the apparatus, devices, and plans for rendering rivers and other natural or artificial channels navigable, for which a patent was heretofore granted by Letters Patent numbered 225,125, dated March 2, 1880; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to construct and use the same.

This invention consists in certain improved forms of wickets for obstructing the flow of water in a channel without obstructing the navigation thereof, and, in combination therewith, of piers with suitable openings and adapted to bring the water around from above the dam, the object to be attained in said improvement being to use a single form of wicket that will answer equally well for the ascending as for the descending navigation, which will obstruct the whole sectional area of a channel or any part thereof, either in width or depth, and which will be readily accessible for repairs, or detachable, if removal is desired, without requiring coffer-dams or the use of submarine armor.

The form of wicket which seems best to fulfill these conditions is represented in Figure 1, in which A B is a platform of plank, on which the wickets are placed. C D and D E are wickets inclined in opposite directions, and connected at the apex D by hinges or equivalent devices to form a double wicket; or the halves may be used separately as single wickets.

To the lower ends of the wickets which slide upon the platform A B short chains, C C, are attached. These chains terminate each in an eyebolt which passes through an anchoring-bar, *f*, of iron or other suitable material, driven into the bottom of the channel against the sheet-piling of the platform A B, which serves to hold the wicket firmly in position, but which

can be readily pulled up if the wicket is at any time to be removed.

The bolts S S, at the ends of the chains C C, serve to adjust the wickets so that they will be in line and the vertices at the desired elevation to retard so much of the flow as the proposed navigation may require.

Instead of an air-tight cylinder of iron, as described in the former patent, the power of flotation is, in this form, communicated to the wicket by air-boxes *m m*, placed on one side or on both sides of the apex, and curved and protected by the plank of the wicket, each wicket being in the form of a sled, between the runners of which, at the forward end, the air-boxes are placed. These air-boxes should be made of galvanized iron or other non-corrosive material, and should be of such size as will give the wickets just sufficient power of flotation to hold them against the force of the current and the pressure of the difference of head, but not to exert any considerable excess of buoyant power, so that the force required to depress them by the pressure of a passing boat will be the least possible.

For the purpose of adjustment a plug may be inserted in the air-boxes and water admitted when the air-space is in excess of the required power of flotation.

The attachment of the wickets to the anchorage by means of chains secures important advantages. On one side the chain acts as a hinge, around which the side of the wicket nearest to an approaching vessel can rotate as the wicket sinks, while on the other side the attached chain will permit the foot of the wicket to lift and allow the water within the triangle to be expelled, carrying with it any silt or mud therein contained and preventing deposits. This action may be further facilitated by leaving a foot or more of open space at the bottom of the down-stream wicket, as there is no danger of drift catching on this side; but the up-stream slope must be as smooth as possible.

In case of a rise of water in the channel the consequent increase of velocity will increase the pressure and cause the wicket to sink to some extent, thus automatically enlarging the area of discharge when such enlargement is required. A vessel in motion carries a wave

in front of its bows, forming a cushion of water, which would reach and commence to depress the wicket before the bottom of the vessel came in contact with it, thus relieving the effect of any slight concussion, and making the angle of incidence more acute if actual contact were not entirely prevented.

Fig. 1 represents an elevation, Fig. 2 a plan, and Fig. 5 a section, of the improved wicket.

In Fig. 3 is shown an angulated pier placed in the channel, by which the approach to the wickets is made funnel-shaped and the space to be closed by them reduced.

By making openings *o o o o o* through the pier immediately below the line of wickets *w w*, sufficient to discharge the flow of the channel, the height of the water below the fall will be increased, the sudden fall obliterated in whole or in part and replaced by an inclined surface, over which ascending boats can pass with less resistance, the inclination of the inclined surface being regulated by the size and position of the openings. These openings may, as in Fig. 4, be placed on both sides of the boat-channel, which, in very wide channels, will be desirable.

Where streams are very small, the amount of water limited, and the fall great, it will be necessary to dispense with separate channels for the ascending and descending navigation, Fig. 4. In that case two piers may be constructed, one on each side of the boat-channel, and the line of wickets may cross at or near the middle.

By a series of openings, *o o o o o*, the water may be taken out of the channel at several points and at any required distance above and discharged below the line of wickets, thus obliterating the fall at the wickets entirely and substituting a long inclined plane almost without descending current, and leaving the gravity of the ascent as the chief resistance to be overcome. Such a combination of wickets and piers would also be applicable to overcoming falls and to forming chutes in dams.

In a long chute, as represented in Fig. 4, several sets of transverse wickets, *w w w w*, may be employed, which, closing the area entirely, except leakage, will oppose the greatest possible retarding influence to the flow and prevent acceleration in the velocity of descent, while the water-passages through the piers, if closed with adjustable wickets, will give an inclined plane of nearly uniform slope, without the velocity of current due to the inclination of the chute.

Waste-weirs should be provided near the head of such chute, to discharge quickly during floods the excess of water above the amount required for purposes of navigation, and thus prevent the flow down the chute of any greatly increased volume at high velocity which might interfere with the ascending navigation. To fulfill this condition cases

may arise where a guard-lock at the head of the chute to regulate the-admission of water may be required.

I do not claim, simply and broadly, the use of conduits and side wickets or openings to retard velocity in a chute and raise the level of the water below a dam, as that device has been previously proposed by others; but I do claim the conduits or side passages in a chute to lead the water from points (more or less numerous) above a dam, weir, wickets, or other obstruction in the channel to points below, in combination with said obstructions, where formed by wickets or other equivalent devices, by whatever name they may be called, of such description as to be sustained in position by a power of flotation, adjustable or otherwise, and which power can be overcome by the application of moderate pressure from passing boats, but sufficient, when the boats have passed, to cause the wickets to rise, resume their position, and retard the direct flow of water in the channel, substantially as described.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Double wickets, applicable to either ascending or descending navigation, composed of two single wickets turned in opposite directions, forming a triangle with a hinge at the apex, and anchored by chains at the base, adjustable for alignment and elevation, and removable if desirable, substantially as described.

2. A pier, either angulated or parallel, dividing a channel into two portions, in combination with wickets to retard the flow in both the ascending and descending channels, or either of them.

3. The improvement of navigation in a channel by means of wickets placed across the same, to form dams at such intervals that the fall over said dams will not be excessive, and of conduits or side passages taking water from one or more points above each line of wickets, discharging it at one or more points below said line of wickets and on one side or both sides of the channel, for the purpose of forming, by the combination of said conduits and wickets, inclined planes of gentle inclination and with but slight velocity of descending current, and at the same time, by lowering the level of the water above and raising it below the wickets, to obliterate the fall at the wicket in whole or in part.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HERMAN HAUPT.

Witnesses:

PHILIP MAURO,
C. J. HEDRICK.