(No Model.)

P. F. HELTZEL.

HYDRAULIC MOTOR.

No. 348,010. Patented Aug. 24, 1886.

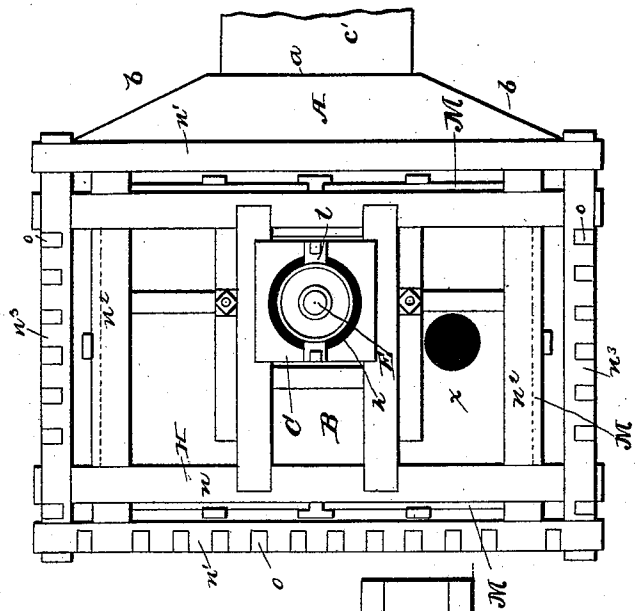

Fig. 3.

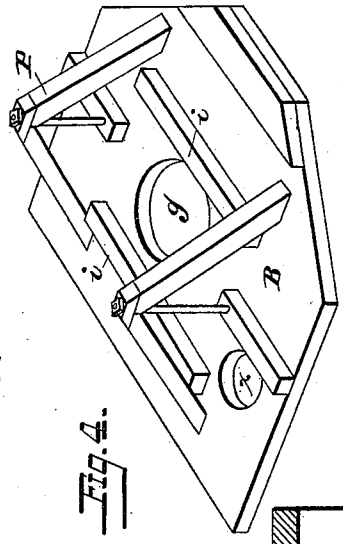

Fig. 4.

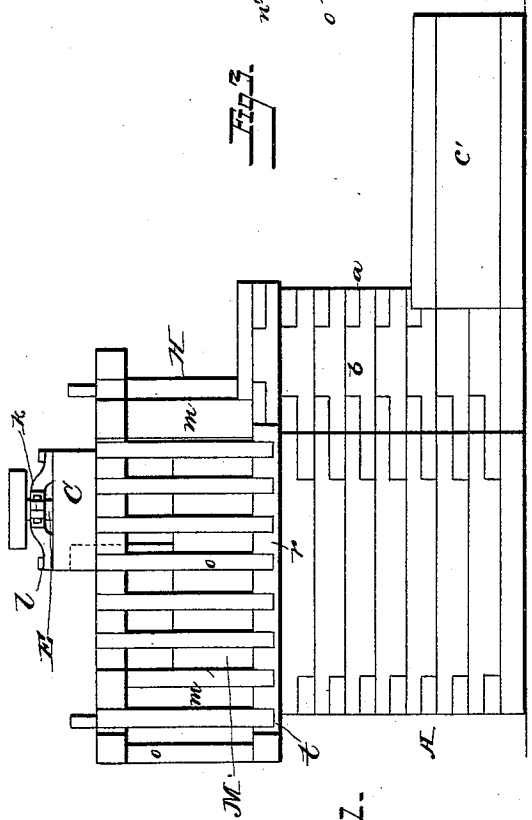

Fig. 1.

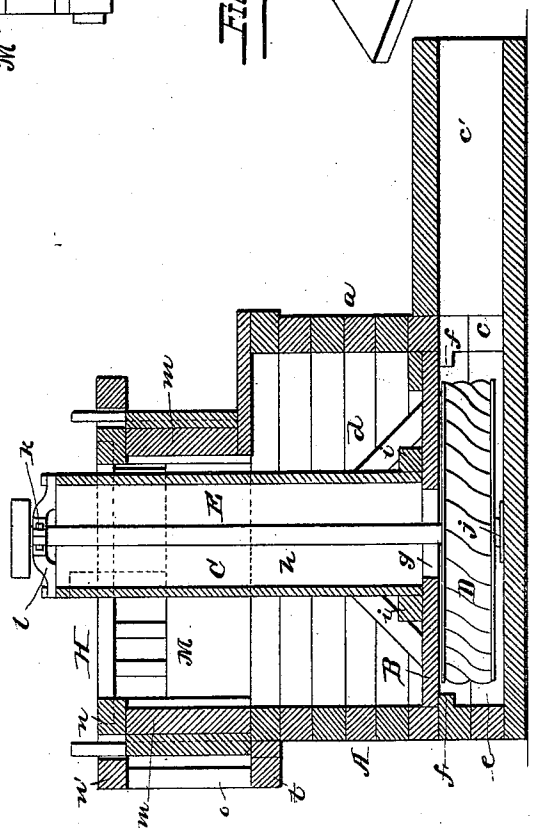

Fig. 2.

Attests:
John G. Hinkel
A. E. Fairsmann.

Inventor:
Peter F. Heltzel,
by Foster & Freeman
Attys.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

PETER F. HELTZEL, OF FOND DU LAC, WISCONSIN.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 348,010, dated August 24, 1886.

Application filed January 29, 1886. Serial No. 190,201. (No model.)

To all whom it may concern:

Be it known that I, PETER F. HELTZEL, a citizen of the United States, residing at Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification.

My invention relates to improvements in hydraulic motors; and it consists, principally, in the construction and arrangement of the flume or casing inclosing the power-wheel, whereby the body portion of the flume or casing is adapted to be sunk below the bed of the water-course, thus greatly facilitating the passage of water to the wheel and materially increasing the power obtained.

It further consists in the details of construction, all as fully set forth hereinafter.

In the drawings, Figure 1 is a side view of a flume embodying my invention. Fig. 2 is a sectional elevation. Fig. 3 is a plan view, and Fig. 4 is a detached view in perspective, of the water-board.

The body A of the flume is of any desired construction, and may be made of any suitable material, the form shown being that found best suited for the purpose intended, and consists of an approximately rectangular case with its rear side, *a*, cut away at the corners to present inclined or beveled faces *b'*, which direct the water passing through the flume to a central opening, *c*, in the side *a*, through which it escapes. The interior of the flume is subdivided horizontally into chambers *d e* by a removable partition or water-board, B, resting on suitable brackets or ledges, *f*, secured to the walls of the flume, and said partition is provided with a feed-opening, *x*, and a central opening, *g*, which latter is in line with a passage, *h*, in an upright or post, C, resting at its lower end upon the partition, as shown. The hollow upright C is braced at its lower end against side-pressure, in any convenient manner, as by cleats or strips *i* bolted to the upper side of the partition B.

Within the chamber *e*, below the partition B, is arranged a horizontal power-wheel, D, the shaft E of which revolves at its lower end in a bearing, *j*, upon the bottom of the flume, while the opposite end of the shaft extends up through the central opening in the partition and through the passage in the upright C, and revolves in a bearing, *k*, carried by stays *l* supported at or near the upper end of said upright. The shaft E carries at its upper end a driving-pulley or other suitable device by which power may be transmitted in any well-known manner to the machinery to be driven. The upper edge of the body portion A of the flume is extended laterally at the rear side and ends to form a ledge, *t*, and supported upon the flume above said ledge is a rectangular frame, H, consisting of posts *m*, carrying at their upper ends longitudinal beams *n n'*, connected by cross-beams n^2 n^3. The beams *n n'*, as also the beams n^2 n^3, are slightly separated, as shown, and the outer edge of each beam *n'* and n^3 is in line with the edge of the ledge *t*, and said beams and ledge are connected by vertical strips *o*, arranged side by side a short distance apart, so as to constitute a grating, which, while permitting the ready flow of water to the interior of the flume, at the same time prevents the passage thereto of floating bodies.

In suitable guide-grooves in the posts *m* are arranged gates M, which may be adjusted by any convenient means and serve to control the passage of water through the flume.

To render the chamber *e*, within which the power-wheel revolves, perfectly free from obstructions, and at the same time prevent sagging of the partition B under the weight of the inflowing water, I provide the upper side of said partition at or near its ends with trusses P, preferably constructed as shown. By this arrangement it will be seen that the usual braces and stays within the chamber *e* to sustain the partition in place are dispensed with, and that the chamber may be made comparatively small and yet afford sufficient space for the free movements of the wheel and the ready passage of the water.

In practice the body portion of the flume or casing A is let down into the bed of a river or other stream of water, so that the lower edge of the grating is on a level with the bottom of the stream, while the upper edge thereof is at high-water mark. Thus it will be evident that by properly adjusting the gates the volume of water admitted to the flume may be readily controlled, and as it flows through the feed-opening in the partition B it strikes the blades or floats of the power-wheel and rapidly re-

volves the latter. As the water passes from the wheel it escapes through the passage *c*, which is provided with an escape tube or chute, *c'*, and the water is thereby again conducted to the body of the stream. This tube or chute *c'* is of any suitable length depending upon the grade of the river bottom, and is arranged in such a position that the onward flow of the stream over the mouth of the chute tends to suck or draw the water through it, and thus materially assists in facilitating the rapid passage of water through the flume.

By the use of my invention I overcome the expense and many objections incident to the construction of a dam, and at the same time avoid the danger of having the structure carried away by unusual tides, as the water may readily pass over the top of the flume through the frame-work above when the gates are all adjusted to an elevated position, as in such case there is comparatively little resistance offered to the onward movement of the stream. It will therefore be observed that the mill or machinery to be driven by the water may be placed directly above the upper frame-work of the flume out of reach of high water without the usual liability of being swept away.

I do not limit my invention to the exact construction and arrangement of parts set forth, nor to any particular kind of power-wheel, as any suitable wheel may be employed, and the construction of the flume itself may be slightly varied without departing from the essential features of the invention.

I claim—

1. The combination, with the casing adapted to be sunk in a stream, as described, and provided with an escape-chute, of a removable partition having a feed-opening and resting upon brackets within the casing, and provided on its upper side with trusses, as described, a power-wheel below the partition and adjustable gates above the casing, substantially as set forth.

2. The combination, with the casing provided with an escape-chute, of a removable partition having a feed-opening and supported within the casing and provided on its upper side with trusses, of a power-wheel below the partition, a frame-work above the casing provided with adjustable gates and grating, substantially as set forth.

3. The combination, with the rectangular casing provided at its rear with an escape-chute, and inclined sides leading thereto, of a horizontal removable partition having a feed-opening, a power-wheel arranged below said partition with its shaft projecting up through the same, a tubular upright above the partition and inclosing said shaft, a frame-work carried by the casing, independently adjustable gates within the frame-work on all four sides thereof, and grating supported by the frame-work and inclosing said gates, substantially as and for the purpose set forth.

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

PETER F. HELTZEL.

Witnesses:

W. A. ELDREDGE,

JOHN KELROY.