2 Sheets—Sheet 1.

T. SMITH.

ICE ELEVATOR.

No. 179,619. Patented July 4, 1876.

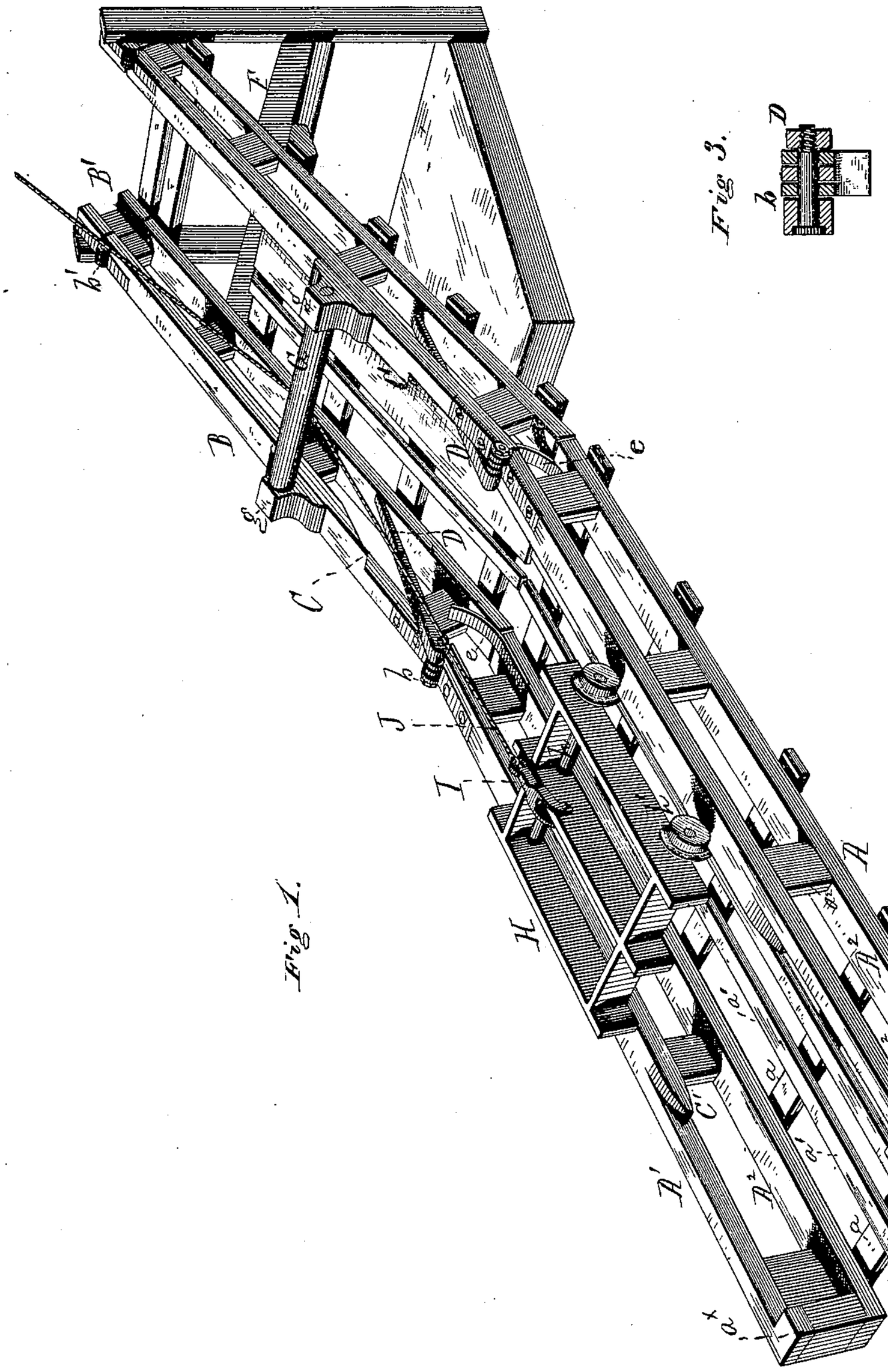

Fig. 1.

Fig. 3.

WITNESSES

Harry King

Alex Mahon

By his Attorney

INVENTOR

Thomas Smith,

A. M. Smith.

2 Sheets—Sheet 2.

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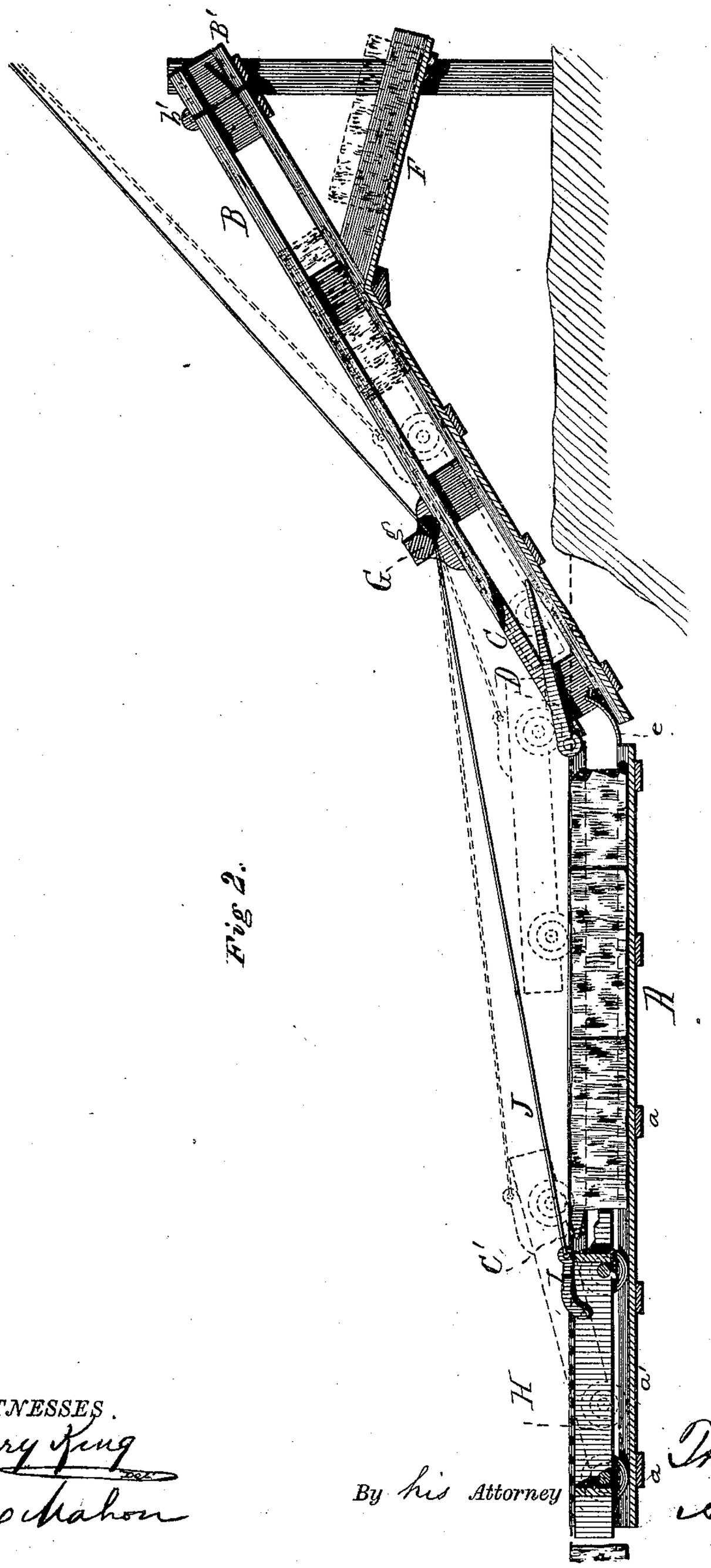

Fig 2.

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UNITED STATES PATENT OFFICE.

THOMAS SMITH, OF GREEN ISLAND, NEW YORK.

IMPROVEMENT IN ICE-ELEVATORS.

Specification forming part of Letters Patent No. **179,619**, dated July 4, 1876; application filed May 26, 1876.

To all whom it may concern:

Be it known that I, THOMAS SMITH, of Green Island, county of Albany, and State of New York, have invented certain new and useful Improvements in Ice-Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of the improved elevator. Fig. 2 represents a vertical longitudinal section through the same, and Fig. 3 represents a section through the hinge or joint between the lower inclined land-section and the float or water-section of the elevator.

Similar letters of reference denote corresponding parts wherever used.

The invention consists, first, in the combination, with the hinged lower land-section of an inclined elevator way or track, of a hinged water-section or float, which adapts itself to the height of the surface of the water relative to the bank or surface on which the elevator is located; second, in providing the hinged water-section or float with a double track, one above the plane of the floating ice, for carrying the truck out over and beyond the ice in the float, and the other submerged, as hereinafter explained; third, in combining the switch, which causes the truck or carriage to follow the upper track of the water-section or float of the elevator in its outward movement, with the pivot of the hinge connecting the float with the inclined elevator, whereby the relation of the switch to both of said sections is preserved under all the variations of the angle of relation of said parts to each other; fourth, in the employment, in combination with the inclined elevator and the hinged float, having the upper and lower tracks, as described, of a four-wheeled truck or carriage, adapted to maintain itself upon the ways or tracks, and to be carried by its own gravity down the incline and outward to the outer end of the float, as hereinafter described; fifth, in a novel manner of bridging the joints in the track of the elevator by means of thin elastic straps, as hereinafter described; sixth, in the employment of a friction-roller at or near the joint between the lower land-section and the float or water-section, for deflecting the elevating-rope to conform to the angle of relation of said sections, and thereby giving a direct, or nearly direct, pull upon the truck in the line of its path through its entire operative movement; and, lastly, in certain details hereinafter fully described.

In the accompanying drawings, A represents the water-section or float, consisting of two upright parallel frames, united upon their lower sides by transverse bars *a a*, upon which, between the side frames, are laid longitudinal strips or boards a^1, forming a flooring to the float. The top and bottom rails A^1 A^2 of the float project inward beyond the uprights a^2, and form tracks for a truck, hereinafter described, these tracks, in practice, being covered by iron rails or band-iron, for the protection of the timbers on which the rails are laid. The float thus constructed has its upper rails A^1 hinged at their inner ends, at *b*, to the lower adjacent ends of the upper rails of an inclined way or frame, B, constructed similarly to the float-frame A, and which, at its upper end, is in turn hinged at *b'*, in a similar manner, to an upper or second inclined frame or way, B', (only a short section of which is shown.) The upper and lower longitudinal side rails of these inclined elevator frames or ways B and B' project inward, and form tracks similar to those in the float, the lower ones serving as tracks for the truck, while the upper ones hold the truck down to its work. The projecting portions of the upper rails of the frame B are cut away at their lower ends, as shown at C, to allow the truck to pass out upon the upper rails A^1 of the float, switch bars or rails D D vibrating upon the pivot of the hinges which connect the float with the lower inclined section of the elevator, and resting at their inner or swinging ends upon the lower rails of said frame or section B, serving to effect the transfer. The projecting upper rails A^1 of the float are also cut away at their outer ends at C', to permit the truck to drop down upon the lower tracks A^2 outside of or behind the ice in the float. The hinge-connection between the sections of the elevator being made through the upper bars, as explained, in some positions or angles of the sections relative to each other, openings of considerable size will be formed

in the lower track, which might interfere with the free working of the truck. To remedy this elastic straps or rails *e*, connected with one of the sections, overlap and cover the joint or opening, thereby serving to make the track continuous without interfering with the required freedom of vibration of the sections on their hinge-connections.

By the employment of the two hinged sections A and B, as described, it will be seen that the water-section is adapted to float freely on the surface of the water, while the hinge at *b'*, between the sections B B', permits the angle or degree of inclination of the section B to vary, to adapt itself to the height of the water, and of the float resting thereon. The upper end of the elevator B B' is connected with uprights, which may either be connected with the sections for upholding them, as shown, or they may be the door or window frame posts of the ice-house or building in which the ice is to be stored, and at or near the upper end of the elevator an opening is made in the flooring, and a chute or slide, F, is connected with the frame of the elevator, for conveying the ice to and discharging it at the desired point. This will serve the purpose of discharging the ice into wagons for conveying it away or directly into the ice-house. In the latter case it may be made adjustable, so that as the ice rises in the house the chute may be correspondingly raised relatively to the elevator.

Near the lower end of the frame B are uprights *g g*, in which is mounted a transverse roller, G, underneath which the rope or chain actuating the truck H works, said roller serving to deflect the rope at the junction of the water and lower land section, for giving it a direct, or nearly direct, pull upon the truck while moving over the deflected or float portion of its track, thereby avoiding the lifting of the truck up over the ice in front of it. This difficulty is further guarded against by the overhanging upper rails of the frames, which hold the wheels of the truck down upon the lower track in the operative movement of the truck, the switches D D in this movement forming a continuation of the upper rails of frame B, and closing the opening C when the truck is passing up under said switches.

The truck H consists of a strong rectangular frame, made, by preference, of metal, as giving the required weight and strength without making the truck large and cumbrous; but it may be made of any suitable material, and is supported upon two transverse axles, *h h*, to the outer ends of which flanged car-wheels *h' h'* are connected, the flanges of said wheels overhanging the inner sides of the tracks described. By the arrangement of the two pairs of wheels, as shown and described, the relation of the truck to the track is preserved, and the truck is consequently adapted to run freely and steadily over the tracks without liability of accidental displacement. The truck-frame has a clevis or draft-link, I, pivoted to it centrally of its width, near its forward end, to which the rope J is connected, for propelling the truck up the inclined way or elevator.

The operation is as follows: Supposing the elevator to be in position, and the water-section A to have been filled inside of the dropway at C' with cakes of ice, cut in any usual manner, and floated in over the submerged lower track, as shown in Fig. 2, the windlass operating the rope J is released from its propelling-shaft through any suitable unshipping mechanism, leaving the windlass free to rotate and to pay out the rope actuated by the gravity of the truck H, which is thus allowed to descend rapidly over the inclined ways, and is caused, by the momentum acquired, to rise over the switch D D to the upper track A^1 of the float, and run out over the same to the dropway C', where it falls down upon the lower way A^2, behind or outside of the ice in the float, as indicated by the full lines in Fig. 2. Power is now applied to the rope, either by coupling the windlass referred to to its shaft, or in any preferred way, and the truck is pulled inward, pushing the cakes of ice in front of it, the wheels of the truck passing under the switch-bars D D, which rise to permit their passage up the incline, dropping back to place after the truck has passed, and the movement of the truck being continued, the ice is carried up the inclined elevator until it reaches and escapes over the chute F to the desired point of delivery, the truck continuing its movement up the inclined ways. In the meantime the float has been again filled with ice, and the truck being again released, the operation is repeated and continued as before. The outer standards $a^{\times}$ of the float-frame serve as stops to the truck, and prevent its escape from the track. Any suitable power may be employed for actuating the truck—either horse-power applied directly to the rope, or a windlass connected with a shaft operated by steam-power, and adapted to be released therefrom, as above explained; and any desired number of elevators, either independent and arranged side by side, or embraced in a single extended frame-work, may be employed where the work requires it, and where thus arranged all the trucks may be operated by a single shaft provided with a number of independent rollers or windlasses, corresponding to the number of tracks to the elevator.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The float A, hinged to, and in combination with, the hinged vibrating lower section B of the inclined elevator, substantially as and for the purpose described.

2. The hinged water-section or float A, provided with the upper and lower tracks A^1 A^2, in combination with the elevating-truck, operating substantially as described.

3. The switch-bars D D, mounted and vibrating on the pivots of the hinges which con-

nect the water-section or float A of the elevator with the lower inclined elevator, as described.

4. The combination, with the elevator and the float, having the double track, as described, of the four-wheeled truck H, adapted to be moved outward by its own gravity, and to maintain itself in position on the tracks, as explained.

5. The combination, with the sections of the jointed elevator, of the elastic tracks or ways *e*, for bridging the joints of the elevator, as described.

6. The friction-roller G, arranged at or near the joint between the float and the lower land-section, for deflecting the elevating-rope and giving a direct, or nearly direct, pull of the same upon the truck, as described.

THOMAS SMITH.

Witnesses:

JAS. REMINGTON,

PHEBE E. REMINGTON.