

May 24, 1932.

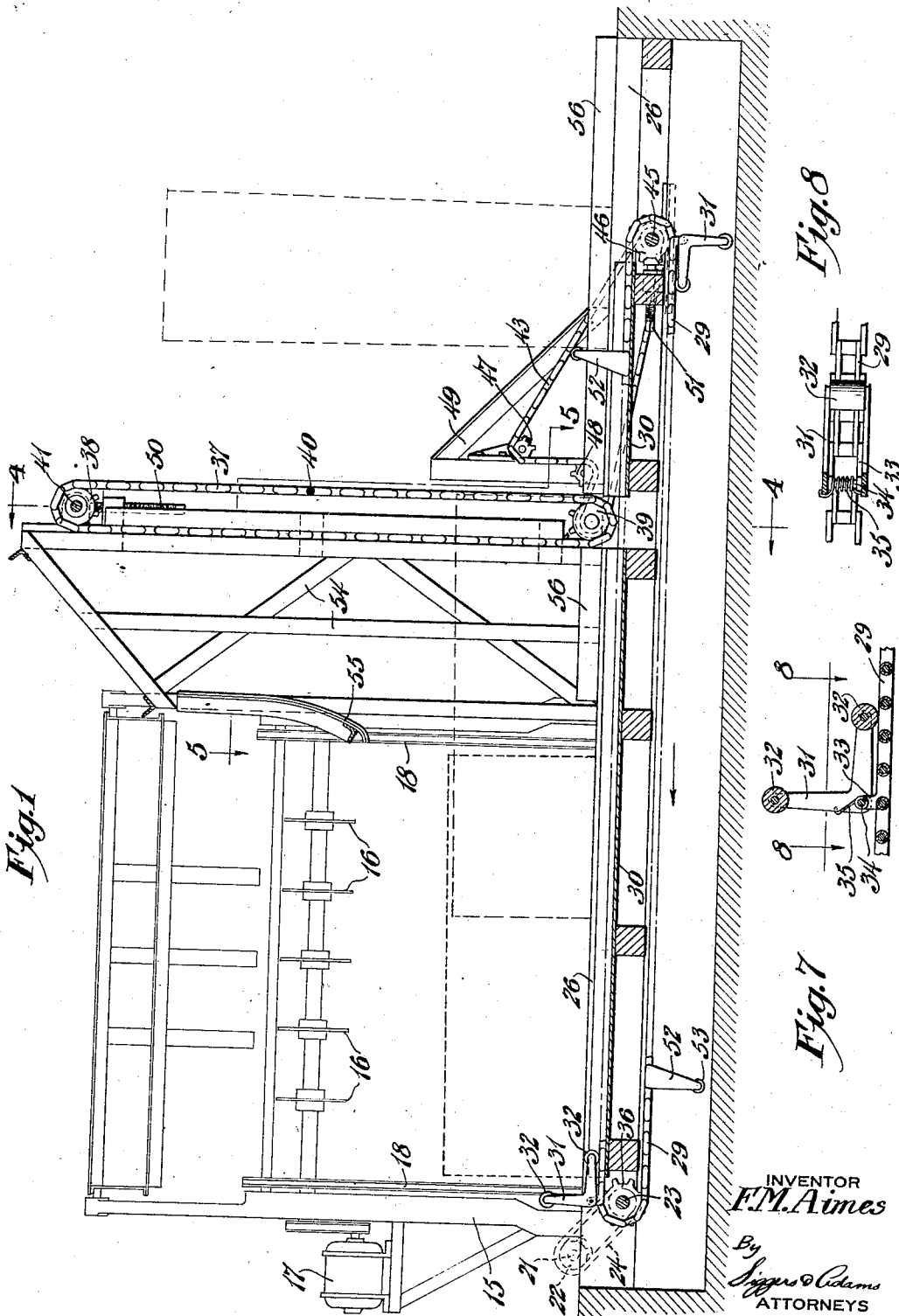
F. M. AIMES

1,859,486

ICE UP-ENDING MACHINE

Filed Aug. 19, 1930

3 Sheets-Sheet 1



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Fig. 2

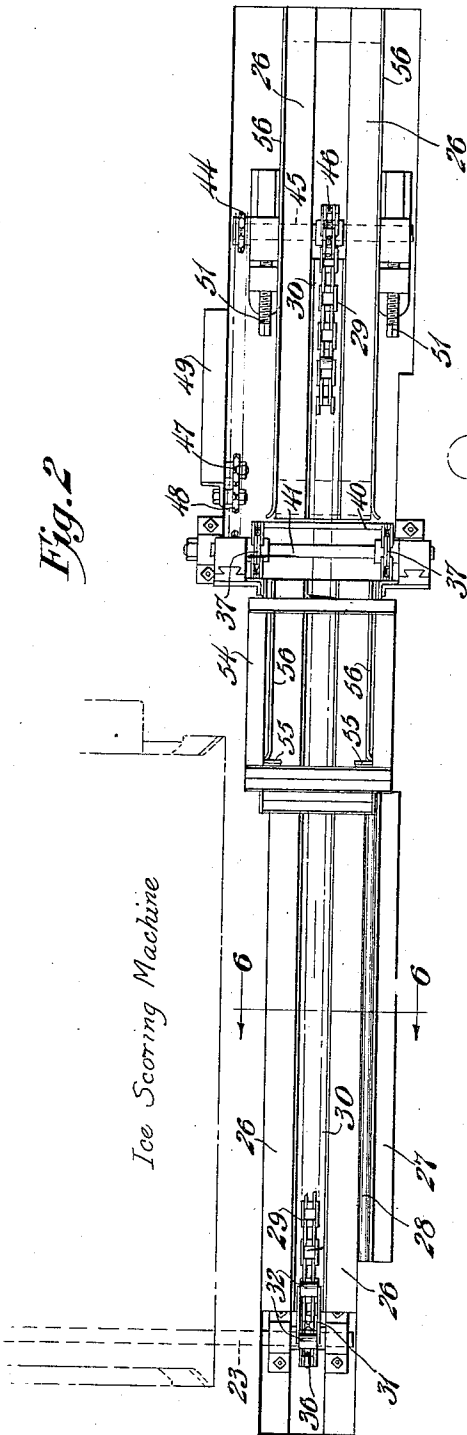
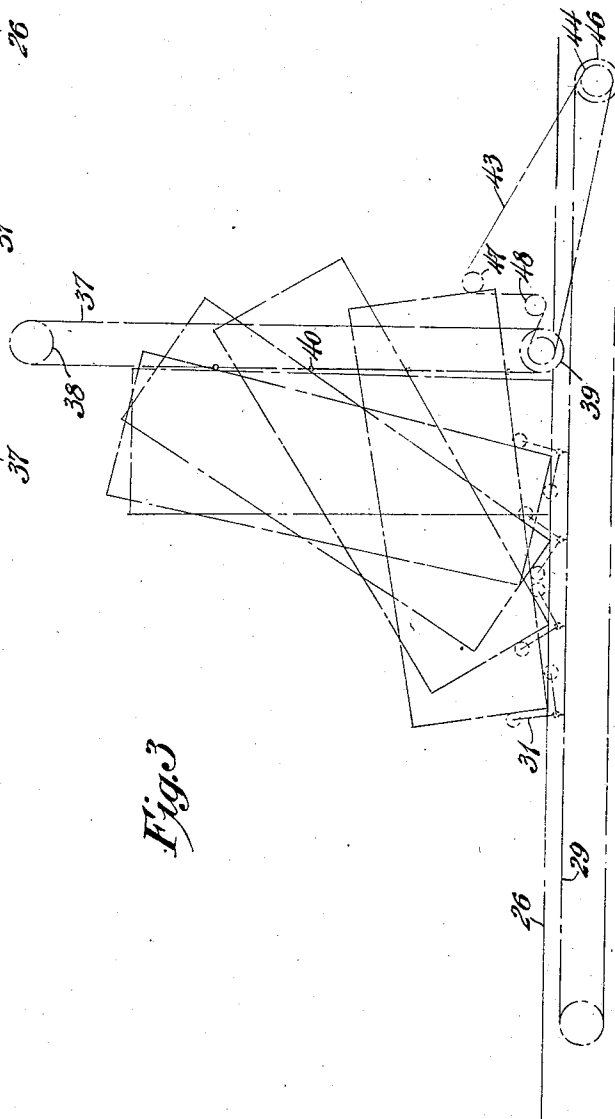


Fig. 3



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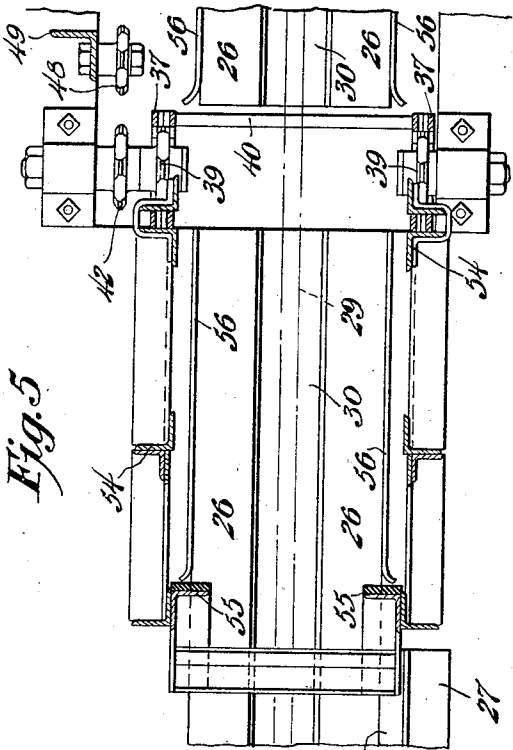


Fig. 5

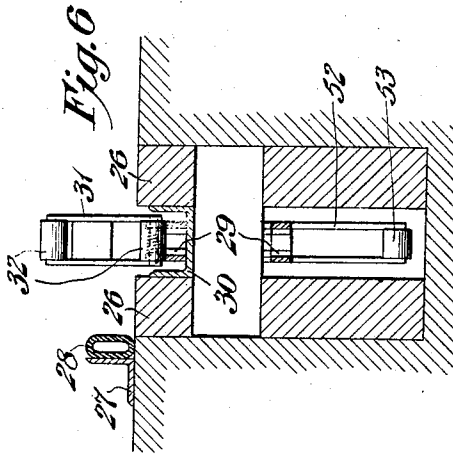


Fig. 6

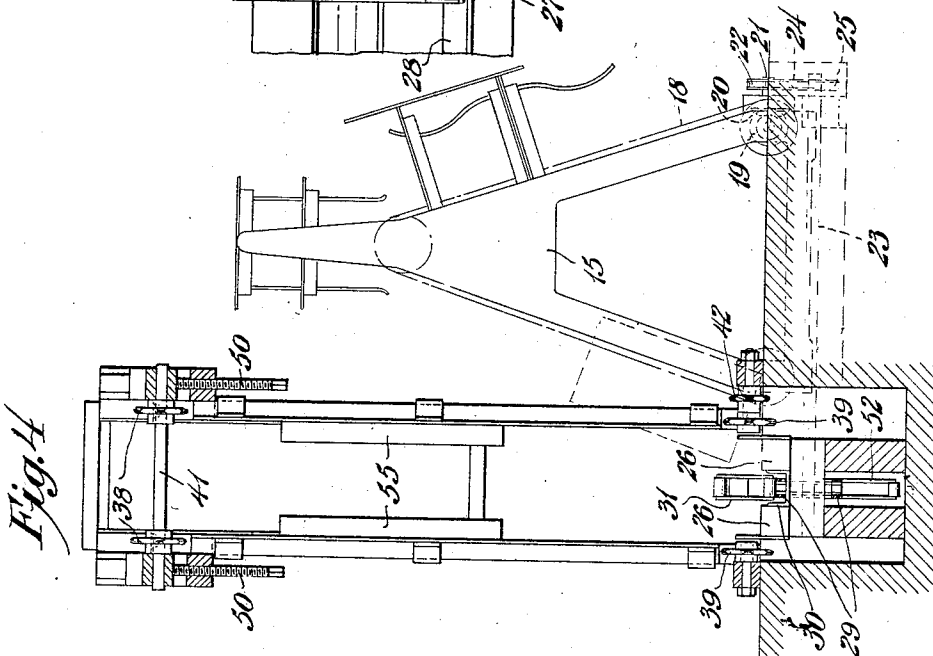


Fig. 4

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UNITED STATES PATENT OFFICE

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ICE UP-ENDING MACHINE

Application filed August 19, 1930. Serial No. 476,335.

This invention relates to machines for turning commercial ice cakes from an "on edge" to an "on end" position and, among other objects, aims to provide a machine of this character which is relatively inexpensive to build and operate, and which may be readily adapted to operate in conjunction with any ice scoring machine capable of delivering scored ice cakes on edge. The machine of the invention may also turn or up-end many objects besides ice cakes.

Referring to the accompanying drawings forming a part of this specification and showing a preferred embodiment of the invention,—

Fig. 1 is a vertical sectional elevation of the up-ending machine, showing in light lines one form of scoring machine adjacent thereto to deliver ice cakes to it and also to drive it, the ice cake being indicated in three different positions in dotted lines;

Fig. 2 is a top plan view of the up-ending machine, the scoring machine being partially indicated in dot and dash lines;

Fig. 3 is a diagram on a somewhat reduced scale corresponding generally to Fig. 1 and showing the way in which an ice cake is turned from on edge to on end;

Fig. 4 is a vertical transverse section on line 4—4 of Fig. 1;

Fig. 5 is a horizontal section on line 5—5 of Fig. 1;

Fig. 6 is a vertical transverse section through the conveyor, the section line being 6—6 of Fig. 2;

Fig. 7 is an enlarged sectional detail showing one of the right angle flights on the conveyor; and

Fig. 8 is a section on line 8—8 of Fig. 7.

Referring to Figs. 1 and 4, there is shown part of an ice scoring machine of the type disclosed in Patent No. 1,772,144 which issued August 5, 1930 to the Gifford-Wood Company of Hudson, New York. The parts shown comprise the frame 15, vertical scoring saws 16, driving motor 17 and conveyor chains 18. To drive the up-ending machine to be described synchronously with the ice scoring machine, the latter has one of its sprocket shafts provided with a bevel gear

19 driving a bevel gear 20 on a short shaft 21 on which a sprocket 22 is fixed. The sprocket 22 drives a countershaft 23 through a chain 24 and sprocket 25, the countershaft extending under the scoring machine to the up-ending machine and driving the conveyors thereof, as will be described.

The scoring machine delivers the cakes sidewise, on edge, as indicated in Figs. 4 and 1, the cakes being pushed off the scoring machine onto wooden slides 26 which are parts of the longitudinal conveyor of the up-ending machine. As shown in Figs. 2 and 6, there is a resilient stop provided alongside the outer slide 26, so positioned as to prevent lateral movement of the ice cakes delivered by the scoring machine beyond the outer slide 26. The resilient stop preferably comprises an angle 27 secured to the floor and a rubber tube 28 secured to the angle. The ice cakes strike only the rubber tube and hence are not injured by being abruptly stopped. The two wooden slides 26 are horizontal and preferably have their top surfaces on a level with the floor, as shown in Fig. 6, being spaced apart to give room for an endless conveyor chain 29 guided by a channel 30 set between the slides 26.

The up-ending machine comprises in general, a horizontal conveyor (of which chain 29 and slides 26 are the principal parts), a vertical conveyor, means for synchronizing the two conveyors, and the necessary frame for supporting the conveyors and guiding the ice cakes. The machine takes the ice cakes on edge and in a space scarcely exceeding the length of two ice cakes, turns them on end and delivers them to any desired take-away conveyor, chute or skid (not shown). Thus the required floor space is small, and as for head room, very little more is needed than for the scoring machine.

In order to push the ice cakes along the slides 26, the chain 29 is provided at the proper intervals with an angle flight 31 (Figs. 1, 6, 7 and 8) preferably having rubber rollers 32 at the ends of its arms, the angle flight being centrally pivoted on a special link 33 of chain 29, as shown at 34. The angle link consists of two spaced right angle arms se-

cured together at their extremities by the axles for the rollers 32 and secured to the pivot member 34. A spring 35 is carried on pivot 34 and urges the flight into contact with chain 29 with one arm vertical, as shown in Fig. 7, but permits the flight to swing counter-clockwise at certain times during the operation of the machine.

The conveyor chain 29 is synchronized relative to the ice scoring machine by a sprocket 36 on shaft 23 so that a flight 31 engages the end of an ice cake immediately after the latter has been delivered to the slides 26. This will be understood from Fig. 1. The rubber rollers 32 prevent injury to the ice cakes. The weight of the cake holds the flight against turning, and accordingly its vertical arm pushes the cake along the slides 26, the horizontal distance traveled by the cake being a little more than half its length. It is now in position to be lifted up on end, and yet leave room for the next scored cake thrust sidewise out of the scoring machine.

Before describing the parts which effect the up-ending of the cakes, reference should be made to Fig. 3, which illustrates clearly the manner and the essential means for performing this operation. Immediately after the ice cake has been pushed to the right hand position illustrated in dotted lines in Fig. 1, it is engaged underneath by a flight of a vertical conveyor, and this flight, in conjunction with flight 31 on chain 29, lifts and turns the cake. Fig. 3 shows four positions of a cake during the up-ending, the fifth position being vertical or on end.

Referring to Figs. 1, 2 and 4, the vertical conveyor comprises two spaced chains 37 each running over upper and lower sprockets 38 and 39 respectively. The two chains are connected together by a flight 40 which may consist of a round bar rigidly secured to the links of the two chains and preferably covered with a rubber sheathing. The lower sprockets 39 are mounted on separate shafts, as clearly appears in Figs. 4 and 5, while the upper sprockets 38 are secured to a shaft 41 extending crosswise of the machine (Figs. 1 and 2) and thus causing the two chains 37 to be driven synchronously.

So as to synchronize the vertical and horizontal conveyors, the following mechanism is provided. Mounted on the same shaft as one of the sprockets 39 is a sprocket 42 about which a sprocket chain 43 is trained. The sprocket chain 43 is driven from a sprocket 44 mounted on a shaft 45, said shaft being driven from the chain 29 by a sprocket 46 (Fig. 1). The chain 43 also passes around idler sprockets 47, 48 both mounted on a triangular frame 49 at each side of the machine.

In order to tighten the chains 37, screw take-ups 50 (Fig. 4) are provided at the upper end of the vertical conveyor. The

chains 29 and 43 are tightened by means of take-up screws 51 (Figs. 1 and 2) which move the shaft 45 longitudinally of the machine.

After the ice cake is in the upright position shown in Fig. 3, it must be moved out of the machine and this is accomplished by another flight 52 rigidly secured on chain 29 at a proper distance back of the pivoted flight 31 so that the flight 52 engages the lower end of the up-ended cake immediately after it attains the vertical position, and carries the cake on end out of the machine, as clearly shown in Fig. 1. The final position of the cake will be at the extreme right-hand end of the machine as viewed in Fig. 1. At this point, the cake may be moved by hand or may be carried by another conveyor to some other part of the ice plant, as for instance the storage room. If desired, a take-away conveyor may be synchronized with the conveyor 29 or may even be driven by the shaft 45 so as to convey away the up-ended ice cakes. The flight 52 has a rubber roller 53 on its end so that the ice cake is not damaged by being suddenly pushed ahead by the flight.

During the up-ending operation, as illustrated in Fig. 3, the ice cake may have a tendency to fall to one side, but this is prevented by means of an upright frame 54 on each side of the ice cake, said frame carrying curved guides 55 which may be angle bars, as shown. The position of the curved guides 55 is such that a standard ice cake cannot move more than about an inch in any direction during the up-ending operation. The frame 54 may also provide means for supporting the shaft 41 which, in turn, supports the sprockets 38 and the chains 37.

When the ice has been up-ended, it is still supported by the slides 26 which are continued on the opposite side of the vertical conveyor and is guided by means of vertical plates 56. These plates may be continued along the floor, if desired, and instead of employing a conveyor, the successive cakes may push the ones in front along the slide formed by the floor and the plates 56 provided the power available for the machine is sufficient to take care of this extra load.

While the machine has been described in connection with one particular type of ice scoring machine, it is obvious that it can be adapted to handle ice cakes from any type of scoring machine delivering the cakes on edge. Specifically, the present machine may handle ice cakes from the machine illustrated in the Horner Patent 1,554,432 dated September 22, 1925 and the machine of the Uline application, Serial No. 649,138 filed July 2, 1923 and assigned to the assignee of this application. The horizontal conveyor may take the ice on edge whether delivered laterally as in the Horner machine or longi-

tudinally as in the Uline machine. Furthermore, the machine may be operated independently of an ice scoring machine, by means of an individual motor drive, as will be understood without illustration; and when so operated, the machine may be used in any part of an ice plant, whether or not scoring machines are used. Furthermore, the machine may be adapted to handle many objects of substantially uniform size and shape, such as boxes, turning the same from a horizontal to a vertical position and moving them away in that position.

Obviously the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and sub-combinations.

What I claim is:—

1. An ice up-ending machine comprising, in combination, a horizontal flight conveyor; a vertical flight conveyor; means for driving the two conveyors simultaneously at the same speed; a flight on the horizontal conveyor co-operating with a flight on the vertical conveyor to turn the ice cakes from an "on edge" to an "on end" position; and conveyor means to remove the up-ended ice cakes from the machine.

2. An ice up-ending machine comprising, in combination, a horizontal flight conveyor; a vertical flight conveyor; means for driving the two conveyors synchronously; the flights on the two conveyors being so arranged that after the horizontal conveyor flight pushes the ice cake at one end so that its opposite end is beyond the general plane of the vertical conveyor, the flight on the vertical conveyor engages underneath the cake near the opposite end and in conjunction with the horizontal conveyor flight, turns the cake to an "on end" position; and another flight on the horizontal conveyor engaging the up-ended cake after the turning operation and pushing it to make way for the succeeding cake.

3. An ice up-ending machine comprising, in combination, a horizontal pushing conveyor having means engaging the cakes, when on edge, at one end thereof; a vertical lifting conveyor having means engaging under the bottom edges of the cakes delivered thereto by the pushing conveyor; means for driving the two conveyors simultaneously at the same speed; the means on the conveyors being so located and co-ordinated and co-operating with each other so that the cakes are turned one at a time entirely by a simultaneous pushing and lifting action of the two conveyors.

4. An ice up-ending machine comprising, in combination, a horizontal pushing conveyor having means engaging the cakes,

when on edge, at one end thereof; a vertical lifting conveyor having means engaging under the bottom edges of the cakes delivered thereto by the pushing conveyor; means for driving the two conveyors simultaneously at the same speed; the conveyor means being so located and the speed of movement of said conveyors being so regulated that the cakes are turned one at a time entirely by a simultaneous pushing and lifting action of the two conveyors; means to guide the cakes during the turning operation; and means to carry the up-ended cakes away.

5. An ice up-ending machine comprising, in combination, a horizontal chain conveyor having an angle flight pivoted thereon and shaped to engage the bottom corner of an ice cake when on edge and bear against both the edge and the end; a vertical chain conveyor comprising two chains with a flight bar fast thereto and extending between them; means for driving the conveyors synchronously at the same speed; the angle flight and the flight bar being so arranged that the cakes are turned upwardly on end entirely by a simultaneous pushing action by the angle flight and a lifting action by the flight bar; the angle flight passing out from under the end of the cake when up-ended without interference.

6. An ice up-ending machine comprising, in combination, a horizontal chain conveyor having an angle flight pivoted thereon and shaped to engage the bottom corner of an ice cake when on edge and bear against both the edge and the end; a vertical chain conveyor comprising two chains with a flight bar fast thereto and extending between them; means for driving the conveyors synchronously; the angle flight and the flight bar being so arranged that the cakes are turned upwardly on end by a simultaneous pushing action by the angle flight and a lifting action by the flight bar; the angle flight passing out from under the end of the cake when up-ended without interference; and another flight fixed to and projecting above the horizontal conveyor to move the cakes, after up-ending, out of the way of succeeding cakes.

7. An ice up-ending machine comprising, in combination, a horizontal chain conveyor having an angle flight pivoted thereon and shaped to engage the bottom corner of an ice cake when on edge and bear against both the edge and the end; a vertical chain conveyor comprising two chains with a flight bar fast thereto and extending between them; means for driving the conveyors synchronously at the same speed; the angle flight and the flight bar being so arranged that the cakes are turned upwardly on end by a simultaneous pushing action by the angle flight and a lifting action by the flight bar; the angle flight passing out from under the end of the cake when up-ended without interference; the

angle flight having resilient rollers on its ends for contact with the ice cake.

8. In combination, a conveyor for ice cakes; means to turn each ice cake to a position where it rests on end directly above the conveyor; said ice turning means comprising a pivoted angle flight on said conveyor, and another vertical conveyor synchronously driven by the first conveyor and having means for lifting the ice as it is pushed by the pivoted angle flight; and fixed means co-operating with the ice cake turning means to guide the cakes and prevent slipping while being turned; the first conveyor being synchronized with the ice cake turning means so that the ice cakes are handled without injury.

9. An ice up-ending machine comprising, in combination, a horizontal flight conveyor; a vertical flight conveyor; means for driving the two conveyors simultaneously at the same speed; the flights on the two conveyors being so arranged that after the horizontal conveyor flight pushes the ice cake at one end so that its opposite end is beyond the general plane of the vertical conveyor, the flight on the vertical conveyor engages underneath the cake near the opposite end and in conjunction with the horizontal conveyor flight, turns the cake to an "on end" position.

10. A machine for up-ending ice cakes and other solid bodies comprising, in combination, a horizontal flight conveyor; a vertical flight conveyor located intermediate the ends of the horizontal flight conveyor; means to drive both conveyors; the flights being so located that each flight of the horizontal conveyor co-operates with a flight of the vertical conveyor to turn a cake or other body by a simultaneous pushing and lifting action; the horizontal conveyor having other flights which push each cake or other body out of the machine after it has been turned on end.

11. A machine for up-ending ice cakes and other solid bodies comprising, in combination, a horizontal flight conveyor; a vertical flight conveyor located intermediate the ends of the horizontal flight conveyor; means to drive both conveyors; the flights being so located that each flight of the horizontal conveyor co-operates with a flight of the vertical conveyor to turn a cake or other body by a simultaneous pushing and lifting action; a fixed guide adjacent the vertical conveyor and so positioned that it prevents the cakes, when up-ended, from falling backward and may assist in guiding the cakes during up-ending; the horizontal conveyor having other flights which push each cake or other body out of the machine after it has been turned on end.

12. A machine of the character described comprising, in combination, a pair of flight conveyors at right angles to each other and driven simultaneously at the same speed, the flights of which are equally spaced and so ar-

ranged that each flight on one conveyor co-operates with a flight on the other conveyor to turn an article at right angles; one of the conveyors having other flights to move the turned article out of the machine.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

FRANCIS M. AIMES.