May 10, 1932. M. J. ULINE 1,857,894

ICE SCORING MACHINE

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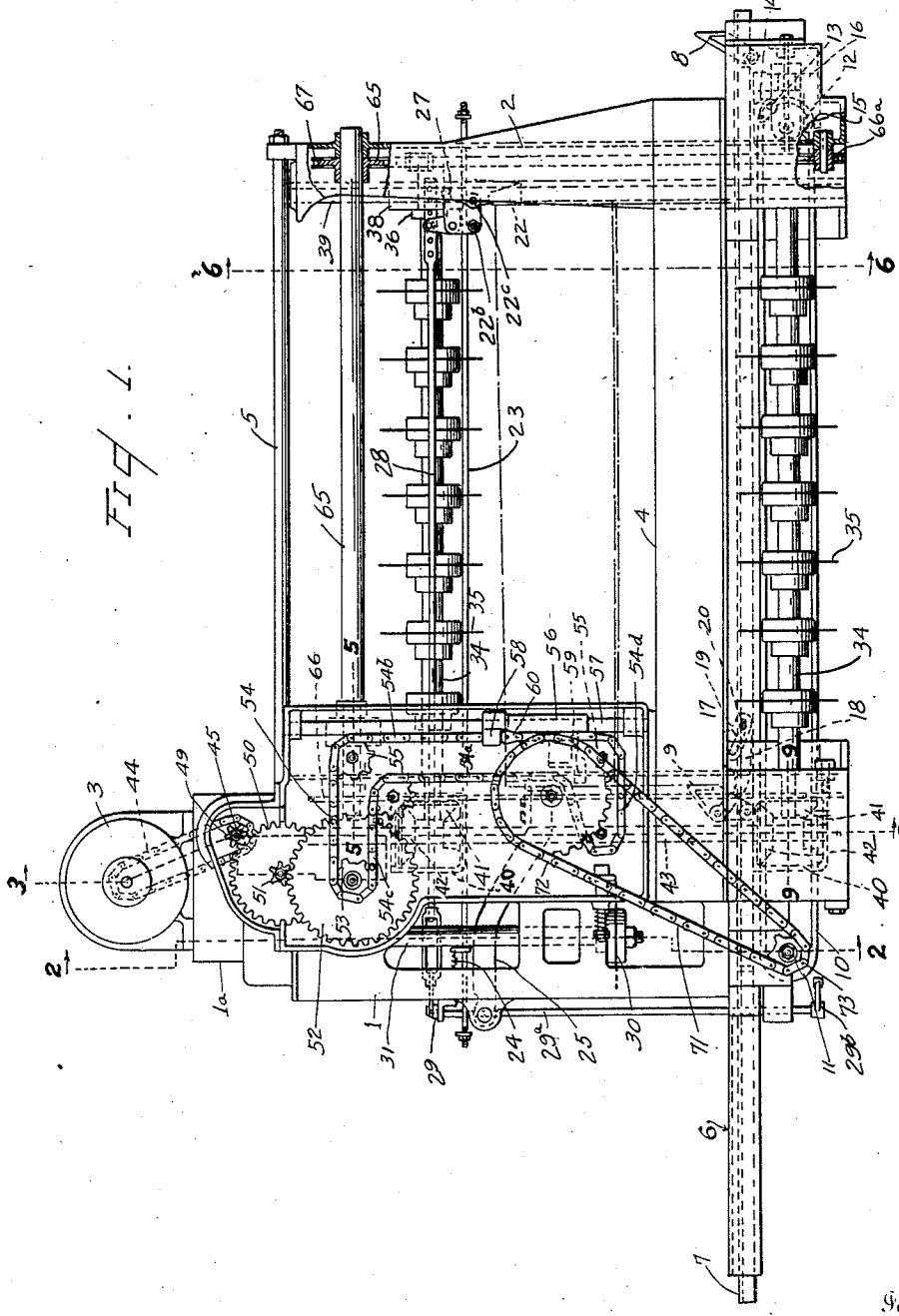


Fig. 1.

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Fig. 3.

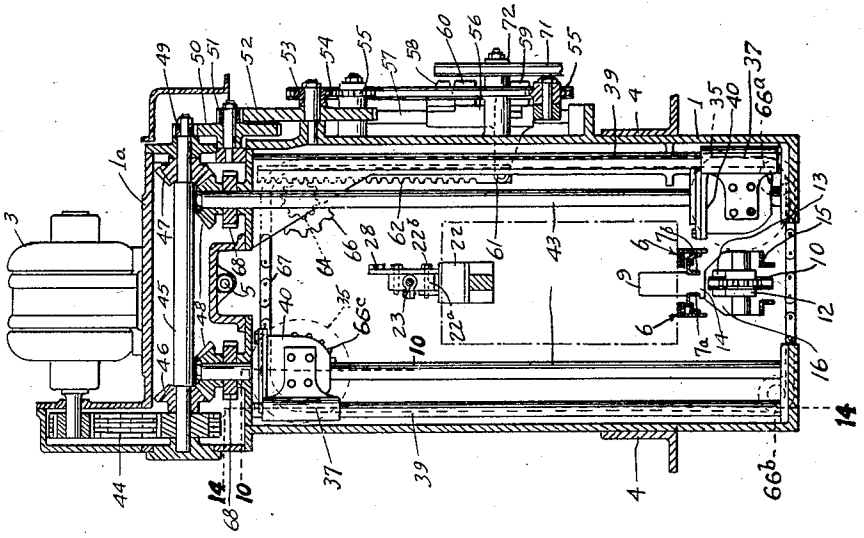
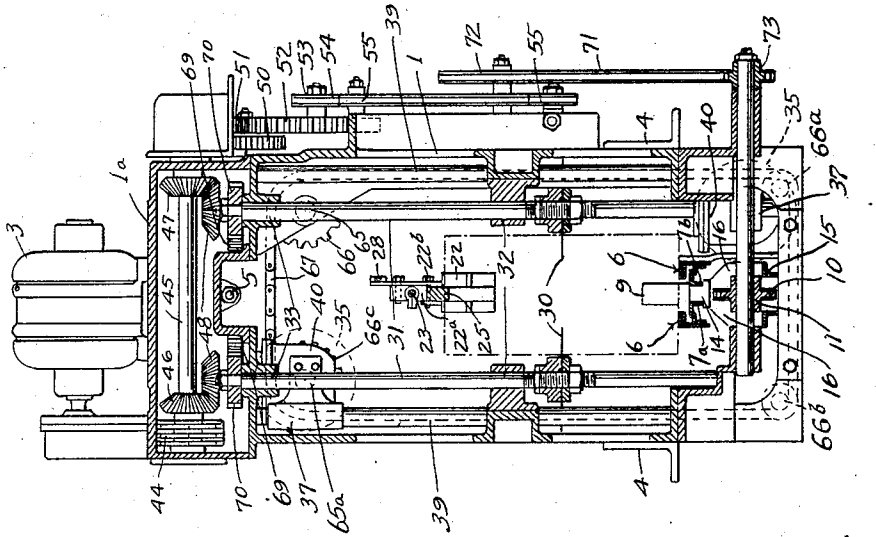


Fig. 2



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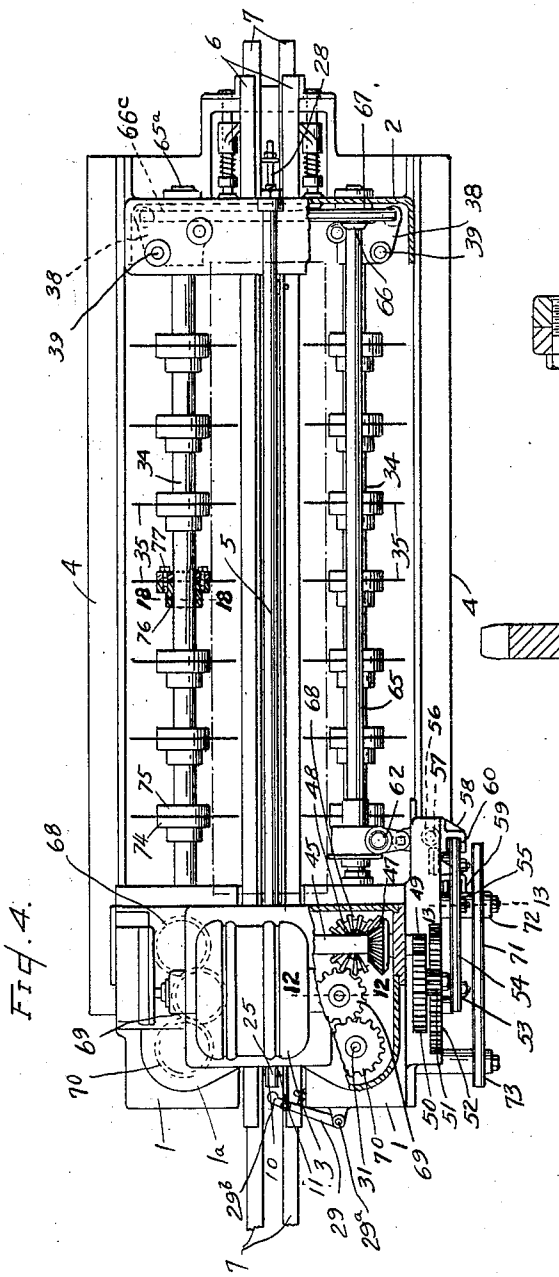


Fig. 4.

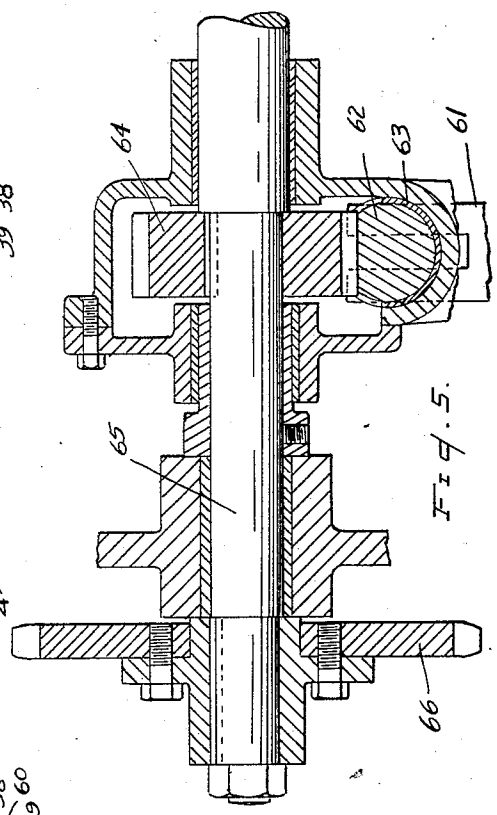


Fig. 5.

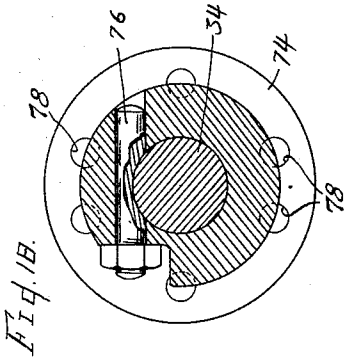


Fig. 1B.

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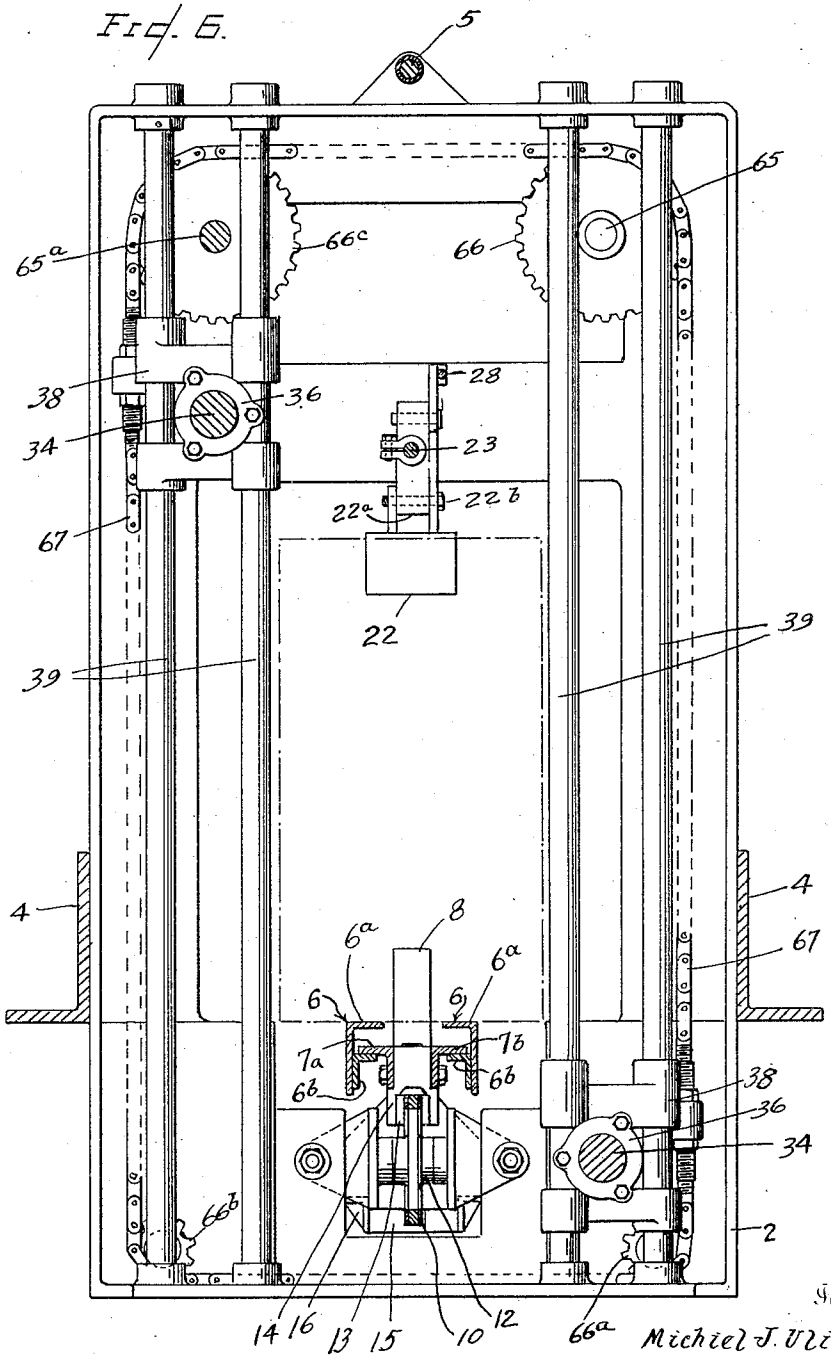
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Fig. 6.



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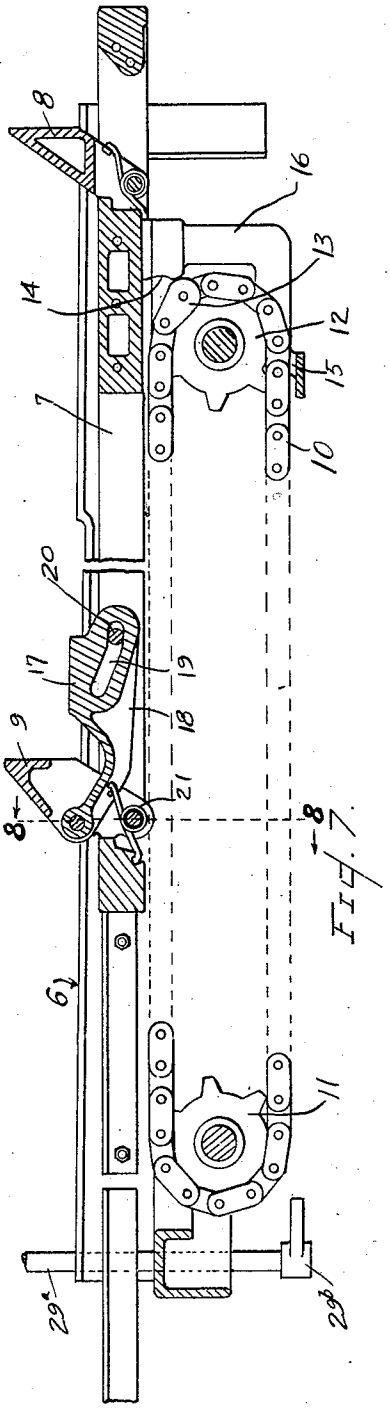


Fig. 7.

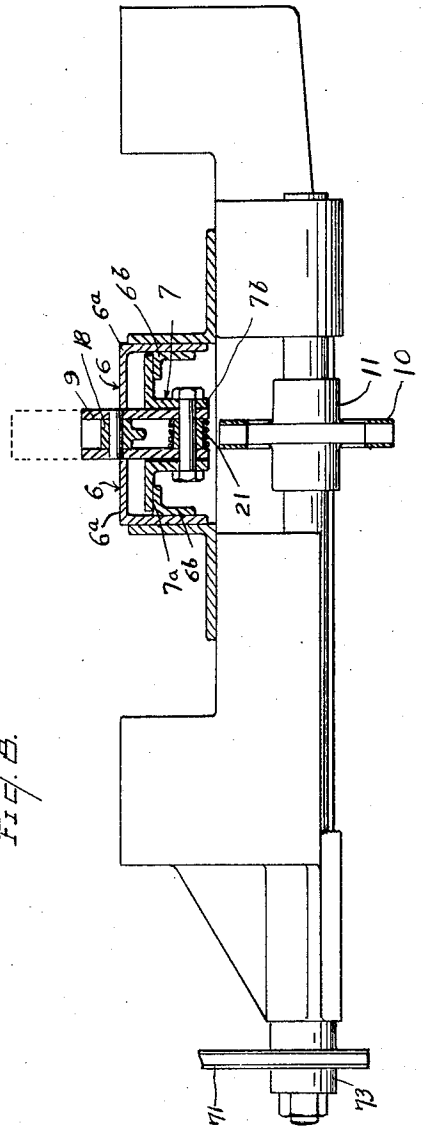


Fig. 8.

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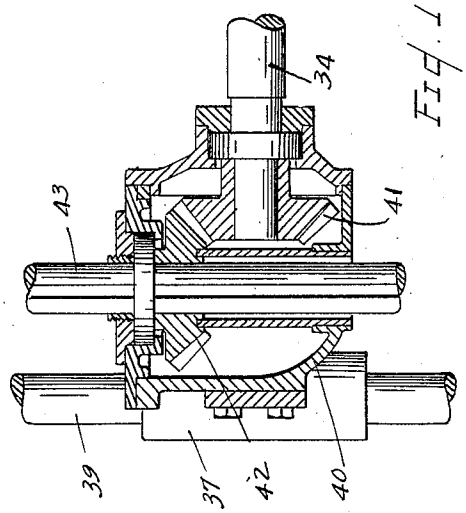


Fig. 10.

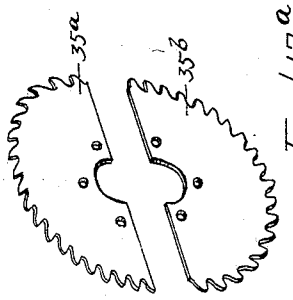


Fig. 17a

Fig. 17

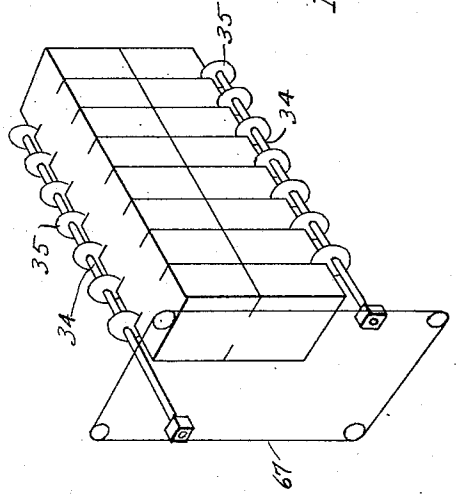


Fig. 11.

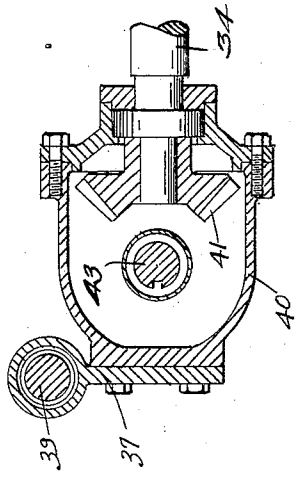


Fig. 9.

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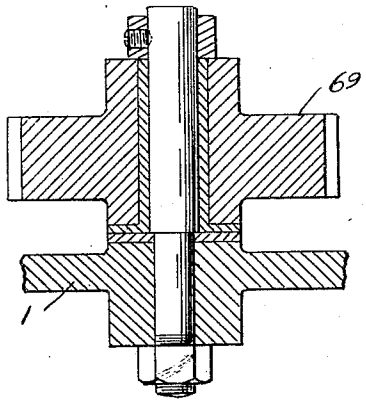


Fig. 12.

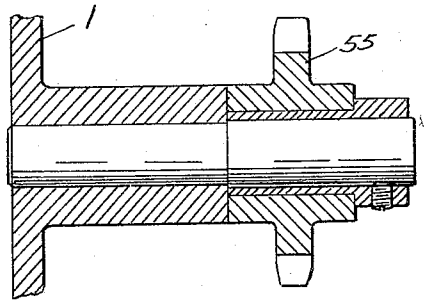


Fig. 13.

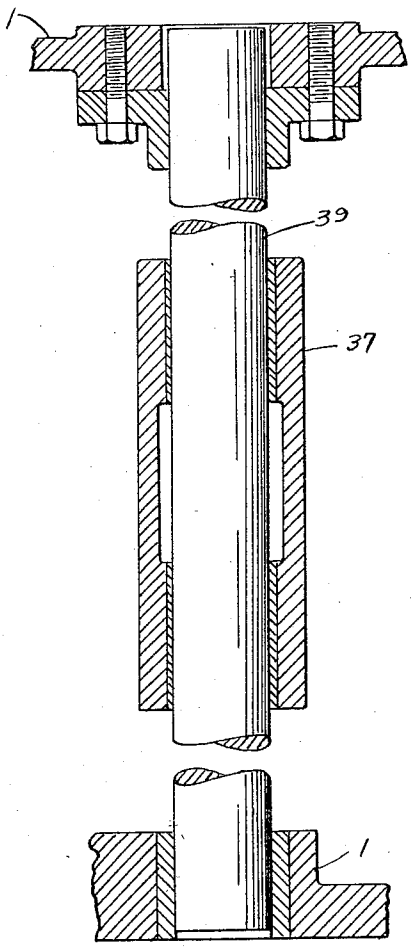


Fig. 14.

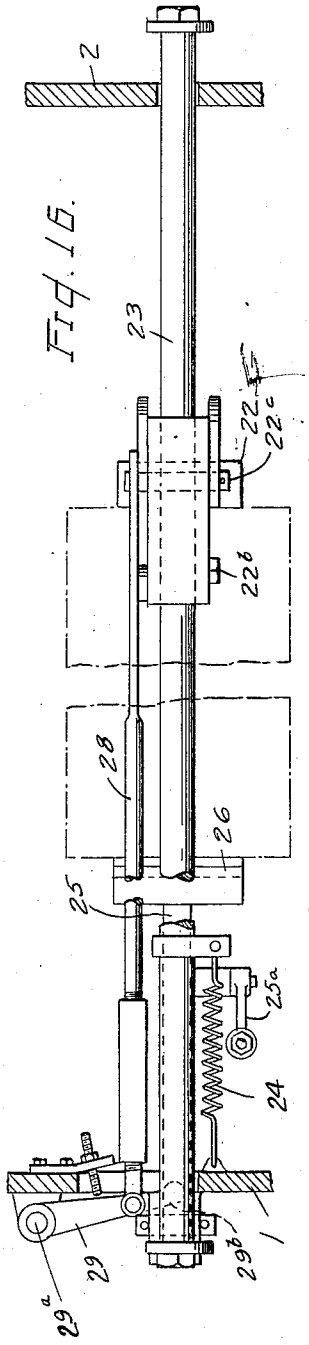
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Michiel J. Uline

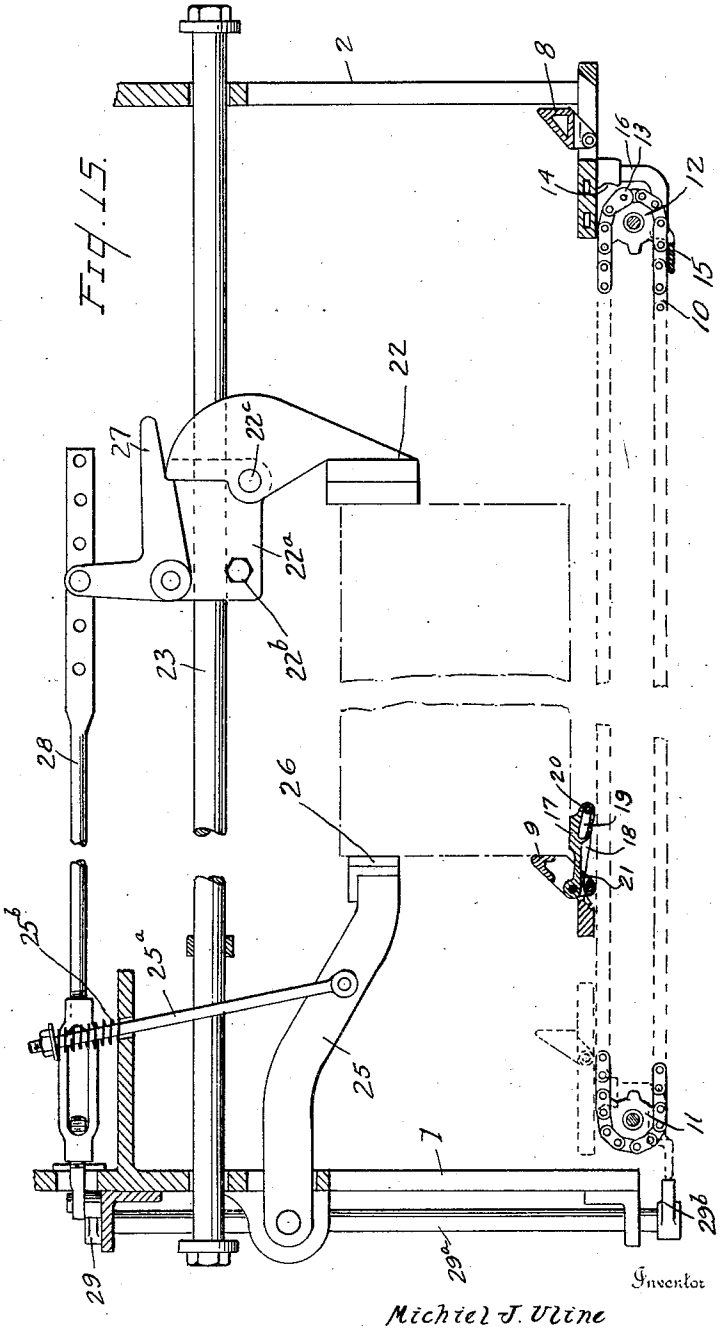
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ICE SCORING MACHINE

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Patented May 10, 1932 1,857,894

UNITED STATES PATENT OFFICE

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ICE SCORING MACHINE

Application filed July 2, 1923, Serial No. 649,138. Renewed April 3, 1928.

The invention relates to machines for scoring ice cakes such as are delivered from the freezing cans in an artificial ice plant so as to permit of subsequently dividing the cakes into sections of exactly predetermined size and weight.

In the present state of the art various machines and methods have been devised for accomplishing the scoring of the cake, but all have involved more or less complexity, which has interfered with the convenient handling of the ice and has increased the labor thereof. It is therefore the object of the present invention to obtain a construction of machine which may be conveniently installed in an ordinary ice plant through which the cakes can be successively fed in a rectilinear path and scored both longitudinally and transversely.

It is the further object of the invention to overcome certain difficulties that have been encountered in the past, such for instance as the factor of inertia. An ice cake as delivered from the freezing can may weigh from 300 to 400 pounds, and, consequently, when such a cake is in motion, it is difficult to stop the same without either overcarrying the mark or causing a rebound. The cake must necessarily be accurately positioned with relation to the scoring saws, which, on account of the inertia factor, is difficult. In my improved construction provision is made for allowing the ice cake to move beyond its position of registration under the yielding resistance of a buffer and for then returning the cake to a fixed stop, which accurately positions the same.

Still another object of the invention is to simplify the mechanism and structure of the machine and to economize space occupied thereby.

In the drawings:

Figure 1 is a side elevation of the machine partly in section;

Figures 2 and 3 are cross sections respectively on lines 2—2 and 3—3 of Figure 1;

Figure 4 is a plan view partly in section;

Figure 5 is a horizontal section on line 5—5 of Figure 1;

Figure 6 is a cross section on line 6—6 of Fig. 1;

Figure 7 is a sectional elevation showing the feed mechanism;

Figure 8 is a cross section on line 8—8 of Fig. 7;

Figure 9 is a cross section on line 9—9 of Fig. 1;

Figure 10 is a sectional front elevation of a portion of the mechanism;

Figure 11 is a diagram illustrating the operation of the device;

Figures 12, 13 and 14 are sectional elevations illustrating a number of details of the construction;

Figure 15 is an elevation of the buffer mechanism;

Figure 16 is a plan view thereof;

Figures 17 and 17ª are perspective views showing the means for mounting the circular saw upon its arbor;

Figure 18 is a cross section on line 18—18 of Fig. 4.

Generally described, my improved machine comprises intermittently actuated means for successively advancing the ice cakes through a rectilinear course, a frame through which the cakes pass and in which they dwell for an interval, and scoring devices operated during the interval of rest of the cake within the frame and transversely traversing the same on opposite sides and in opposite directions. This avoids the necessity of returning the scoring devices after the completion of a transverse cut, as successive cakes may be scored by movements in opposite directions. The longitudinal scoring of the cake is effected during the movement into the frame and the completely scored cake is delivered from the frame by a movement in the same direction. Thus the elements of the preferred structure are—the frame, an intermittent feed mechanism, scoring devices in fixed position on said frame for operating on the cake while advancing, and scoring devices on opposite sides of the frame intermittently transversely movable thereon in opposite directions.

Frame

The frame of the machine comprises front and rear upright frame members 1 and 2 each

having spaced sides for the passage of the ice cake therebetween. See Figs. 1, 2 and 4. At the top of the front frame is a transverse frame member 1^a on which is mounted a motor 3 for driving the operating mechanism. The frames 1 and 2 are connected to each other by longitudinally extending tie members 4 near the base and a tie rod 5 at the top, thereby forming a substantially rectangular structure of a length somewhat greater than the length of the ice cake to be scored.

Feed mechanism

Centrally of the frame and at the base thereof are arranged spaced parallel guides 6 for receiving a reciprocating slide bar 7. See Figs. 1, 7 and 8. As shown, the slide bar 7 is formed of a pair of angle bars 7^a, 7^b, spaced from each other and having outwardly extending flanges. These flanges engage grooves in the guides 6, preferably by forming said guides of pairs of connected angle bars 6^a and 6^b having spaced horizontal flanges. See Figs. 6 and 8. The bars 7^a and 7^b are spaced from each other so as to receive therebetween the forward and rear flights 8 and 9, each of which is collapsible during the return stroke of the bar to permit of passing beneath the ice cake. Beneath the bar 7 there is arranged an endless feed chain 10 which passes about sprockets 11 and 12 journaled respectively near the front and rear of the main frame. The chain 10 has connected thereto the dog 13 adapted to alternatively engage with bearings 14 and 15 on an arm 16 depending from the forward end of the bar 7. The arrangement is such that the dog 13 while travelling along the upper course of the chain will engage the bearing 14 and feed the bar 7 forward until such bearing passes beyond the sprocket 12. The dog then disengages from the bearing 14 but engages with the lower bearing 15 which feeds the bar rearward until said bearing 15 passes beyond the sprocket 11. See Figs. 7 and 15. Thus a reciprocatory movement is imparted to the bar 7, which, as hereinafter set forth, will feed an ice cake from a position in front of the frame into the space within the frame and will simultaneously feed the scored ice cake which is within the frame outward from the rear end thereof.

Ice cans for the manufacture of artificial ice usually taper slightly from top to bottom to facilitate the withdrawal of the frozen cake. This forms a cake with non-parallel sides, and consequently, a line parallel to either side will not divide the cake into equal and similar sections. I have therefore provided means for elevating the small end of the cake so that the central longitudinal axis of the cake will be in a horizontal plane. This elevating means is automatically operated by the feed dog 9 and is preferably constructed as follows:

17 is a supporting bearing upon a link 18 which is pivotally connected at one end to the flight 9 and at its opposite end is provided with a cam slot 19 through which a transverse pin 20 passes. See Figs. 7 and 15. The pin 20 passes through the angle bars 7^a, 7^b, and forms a bearing over which the cam rides so that the swinging of the flight 9 from horizontal to vertical position will cause the upward travel of the bearing 17 until it is elevated the proper amount for supporting the small end of the ice cake. A spring 21 yieldingly actuates the flight 9 towards upright position, but permits of the depression of said flight in the rear movement of the bar 7 so that it may pass beneath an ice cake. The ice cake is supported upon any suitable platform in front of the frame of the machine, which platform is slotted for the passage of the bar 7 and is provided with extensions of the guides 6 for supporting said bar. The forward flight 8 is similar in construction to the flight 9 with the omission of the link 18 and operates to feed the scored ice cake away from the frame in advance of the incoming ice cake fed by the flight 9.

Buffer

As has been stated, the momentum acquired by the ice cake during its feeding movement into the frame is such as to require some special provision for arresting the cake. This I have provided for by a yieldable stop 22 (Figs. 2, 6, 15 and 16), which is located centrally of the rear frame 2 and near the top thereof and is connected to a draft rod 23 having a spring 24 (Fig. 16) for resisting movement thereof. Pivotally secured to the front frame 1 is the gravity dog 25 which is yieldably supported by the link 25^a having the spring 25^b sleeved thereon and engaging an abutment on the frame. The dog 25 has an inclined portion (Fig. 15) which is in the path of the upper portion of the ice cake and by which it is lifted. At the forward end of this dog is a stop 26 which, after the passage of the cake, will drop in rear thereof and limit the return movement of the cake. Thus when the cake strikes the yieldable stop 22, said stop will be carried forward until the momentum is absorbed by the spring 24. The spring will then draw the stop 22 and ice cake backward until the stop 26 prevents further movement. In this position the ice cake is properly registered for the transverse scoring operation. Inasmuch, however, as ice cakes are not all of the same dimensions, further provision is made for adjusting the normal position of the stop 22, which consists in a clamp 22^a adjustably secured by the clamping bolt 22^b upon the rod 23. As the stop 22 would interfere with the outward feeding of the ice cake by the dog 8 after the scoring

operation, provision is made for temporarily releasing said stop. To his end the stop 22 is pivotally connected at 22c to the member 22a and is normally held in position by a latch member 27. This latch member is in the form of a bell crank lever having its actuating arm connected to a rod 28, which at its opposite end is connected to a rock arm 29 on a vertical rock shaft 29a having a rock arm 29b at its base. The rock arm 29b extends into the path of a lug 15a on the bearing 15 which is so positioned that in the final rearward movement of said lug, it will actuate the rock arm 29b (as indicated in dotted lines in Fig. 15) and through the intermediate mechanism lift the latch 27 and release the stop 22 just in advance of the forward movement of the feed bar 7. This will permit the flight 8 to feed out the ice cake without interference from the stop 22 and as soon as the rear end of the cake has passed the stop 22, the latter will fall and automatically re-engage with the latch 27.

Longitudinal scoring means

The longitudinal scoring of the opposite sides of the ice cake is effected by a pair of horizontally arranged saws which are positioned in the front frame 1 upon opposite sides of the path of the ice cake. These scoring saws 30 (Fig. 2) are mounted upon vertically extending arbors 31 which are journaled in bearings 32 and 33 in the frame 1. The arbors are constantly driven by a gear hereinafter described, and therefore, while the ice cake is being fed into the frame by the flight 9, it will be centrally longitudinally scored on opposite sides thereof by the saws 30.

Transverse scoring means

On opposite sides of the frame are arranged horizontally extending arbors 34, on each of which are adjustably mounted a plurality of saws 35. See Figs. 1, 4 and 11. The arbors 34 are journaled at their opposite ends in bearings 36 in vertically movable slides 37 and 38, which latter are mounted on vertical guide rods 39 (Fig. 6) fixedly positioned in the frame. Each of the slides 37 has attached thereto a gear box 40 (Fig. 2, 3, 9 and 10) containing intermeshing bevel gears 41 and 42 respectively on the arbor 34 and the associated vertical drive shaft 43. The bevel gears 42 are splined to the shafts 43 so as to be freely slidable thereon while receiving rotary motion therefrom. This permits the arbors 34 to move vertically so that the saws thereon will transversely score the ice cake while it is stationary within the frame.

The arbors 34 on opposite sides of the machine are normally located one at the top and the other at the bottom, as shown in Fig. 6, so that all of the saws are out of the path of the ice cake while it is being fed into the frame. During the interval when the cake is stationary and the feeding bar 7 is being returned to engage another cake, the upper arbor 34 is moved downward and the lower arbor 34 upward so as to reverse their positions vertically of the frame. This is accomplished by shifting mechanism of the following construction:

Saw shift mechanism

The motor 3 is connected by a chain drive 44 (Figs. 2 and 3) with a transverse shaft 45 having the bevel gear wheels 46 and 47 adjacent to the opposite ends thereof and meshing with bevel gear wheels 48 upon the vertically extending shafts 43, thereby transmitting the rotary drive to the arbors 34. The shaft 45 is also connected by a step-down gear train including the gears 49, 50, 51 and 52 (Figs. 1, 2 and 3) to a sprocket 53 which drives a chain 54. This chain passes around idler sprockets 55 (Fig. 1) which are so positioned as to form two parallel vertical portions of the chain 54a and and 54b with laterally extending portions 54c and 54d at opposite ends thereof. 56 is a slide engaging a vertically extending guide rod 57 and having the laterally extending bifurcated lugs 58 and 59 for respectively embracing the strands 54b and 54a of the chain. The chain carries a dog 60 adapted to alternatively engage the lugs 58 and 59 to respectively move the slide 56 upward and downward upon the guide 57. After each of said movements the dog automatically disengages from the lug and the interval in which said dog is passing around the lateral portions 54c and 54d of the chain is equal to the interval during which the feeding of the ice cake into the frame is accomplished.

The slide 56 is connected by a laterally extending arm 61 with a vertically extending rack bar 62 (Figs. 3 and 5) which slides in a tubular guideway 63 and engages a pinion 64 on the horizontally extending shaft 65 journaled in bearings in the upper part of the frame. Sprockets 66 are mounted upon opposite ends of the shaft 65 and actuate chains 67 (Figs. 6 and 11) which pass around idler sprockets 66a, 66b and 66c to form an endless circuit. The latter sprocket is mounted on a shaft 65a parallel to the shaft 65 and upon the opposite side of the frame. The chains 67 are attached to the slides 37, 38, and the arrangement is such that whenever the slide 56 is actuated, one of the arbors 34 is moved upward and the other one downward and in alternative movements of the slide 56, said arbors are moved in reverse directions.

The arbors 31 are driven through gear trains including the gears 68 at the upper ends of the shafts 43, intermediate gears 69 and the gears 70 on the arbors 31. The

sprocket 11, which actuates the reciprocating slide 7, is driven by a connection, which as shown includes a sprocket chain 71, a sprocket 72 attached to one of the idler sprockets 55, and a sprocket 73 in the shaft of the sprocket 11. See Figs. 1, 2 and 4.

Complete operation

The machine is so positioned in the ice plant as to be in a convenient location for receiving the ice cakes to be scored and the cakes discharged from the machine are preferably loaded directly into the delivery vehicles. When the mechanism is in operation, motion is communicated from the motor through the chain 44, shaft 45, gear train 49, 50, 51, 52, sprocket 53, chain 54, sprockets 55 and 72, chain 71, sprockets 73 and 11, to the chain 10. This will communicate a continuous movement to said chain 10, which, through the dog 13 and bearings 14 and 15, will impart a reciprocatory movement to the slide 7. This reciprocation of the slide alternately projects the same outward beyond the frame and beneath an ice cake on the platform and then returns it to a position within the frame. In the outward movement the dog 9 collapses by the yielding of the spring 21 so as to pass beneath the ice cake and this collapsing movement also lowers the bearing 17 to be beneath the ice. When the dog passes beyond the ice cake on the platform, the spring 21 will restore it to vertical position and the same movement raises the bearing 17 and lifts the small end of the ice cake so that its central axis is horizontally arranged. Thus when the slide 7 is moved inward, the ice cake is fed past the saws 30 which score the opposite sides of the cake centrally and longitudinally during its movement into the frame. During this inward movement the stop 26 is lifted until the ice cake clears the same and then drops into the path of the cake. The forward end of the cake strikes the stop 22, which yields by the movement of the rod 23 and the spring 24. As soon as the momentum is overcome the spring 24 will return the cake while the stop 26 limits its return movement so as to accurately position it within the frame.

The feeding movements just described occur during the interval when the dog 60 is out of engagement with both of the bifurcated lugs 58 and 59 so that the slide 56 remains stationary. As soon, however, as the ice cake is positioned within the frame, the dog 60 engages with one of said bifurcated lugs 58 and 59 (according to the position of the arbors 34) and actuates the slide 56 either upward or downward upon the guide 57. This movement of the slide is imparted to the rack bar 62 which actuates the pinion 64, shaft 65, sprocket wheels 66 and chain 67. The latter move the slides 37 and 38 upon the vertical guides 39, thereby moving one of the arbors from an upper position downward and the other from a lower postion upward. At the same time both arbors are continuously driven through the mechanism including the shaft 45 and bevel gear wheels 46, 47 and 48, shafts 43 and bevel gear wheels 42 and 41, thereby causing the saws to score the opposite sides of the ice cake during the vertical movement of the arbors. By the time this movement is completed the slide 7 has again been moved outward to engage another unscored ice cake and begins its inward movement. During this inward movement the dog 8 first engages the scored ice cake and pushes the same outward through the opening in the frame 2, the stop 22 having previously been released by the latch 27, while the dog 9 engages the unscored cake and feeds it into the frame.

The operation above described is exceedingly simple, as the ice cakes are not lifted but are merely pushed along a horizontal way, which may be accomplished with expenditure of but little energy. Also, the direction of movement is rectilinear, which avoids a great deal of complication. The transverse scoring means is of relatively small mass only including the arbors 34 with their saws, which are arranged the one to counterbalance the other. This also reduces the inertia factor and the energy required for driving the machine. Thus a small powered motor is all that is necessary for the continuous and rapid operation of the machine.

To divide the large tapering cake into sections of equal volume the saws 35 must be spaced differentially upon the arbors 34; also where large cakes of different weight are operated upon, a change of the spacing of the saws is necessary. Still further, it is desirable to easily remove the saws when necessary for sharpening or in case of breakage. All of these results may be accomplished in the construction shown in detail in Figures 17, 17ª and 18, in which 74 and 75 are clamping collars arranged on opposite sides of each saw. The collar 74 is adjustably secured upon the arbor 34 by means of the clamping key 76. See also Fig. 4. The saws 35 are formed of semi-circular segments 35ª and 35ᵇ which may be engaged with the arbor from opposite sides thereof without the necessity of removing the arbor from its bearings. The sections are then secured by tap bolts 77 (Fig. 4) which pass through registering apertures in the collar 75 and segments 35ª and 35ᵇ and engage threaded apertures 78 in the collar 74.

What I claim as my invention is:

1. In an ice scoring machine the combination with means for intermittently advancing ice cakes, of stationary means for longitudinally scoring each ice cake during the advancement thereof, reciprocating means for transversely scoring each ice cake in a position of rest thereof, and means for timing

successive phases of the reciprocation with the intervals of rest of successively advanced ice cakes.

2. In an ice scoring machine, the combination with means for intermittently advancing a series of ice cakes, of stationary means for longitudinally scoring each successive ice cake during the advancement thereof, transverse scoring means for said ice cakes while stationary, and means for moving said transverse scoring means across said ice cake in opposite directions upon opposite sides thereof.

3. In an ice scoring machine, the combination with means for intermittently advancing a series of ice cakes, of stationary means for longitudinally scoring each successive ice cake during the advancement thereof, transverse scoring means for said ice cakes while stationary, means for reciprocating said transverse scoring means across said ice cake in opposite directions on opposite sides thereof, and means for timing successive phases of the reciprocation with successive intervals of rest of the ice cake.

4. In an ice scoring machine, the combination with means for intermittently advancing ice cakes, of scoring means and means for reciprocating said scoring means across the path of said ice cake timed to score successive cakes by alternate phases of the reciprocation and during the intervals of rest between successive advancements.

5. In an ice scoring machine, the combination with means for intermittently advancing ice cakes, of ice scoring means, means for reciprocating said scoring means transversely of the direction of advancement with an interval of rest between each phase of the reciprocation, and means for timing the successive advancement of the ice cakes with said intervals of rest.

6. In an ice scoring machine, the combination with a hollow frame, of means for intermittently advancing the ice cakes into and out from said frame, scoring means upon opposite sides of said frame, and means for reciprocating said scoring means oppositely on said opposite sides and with successive phases of the reciprocation alternating with the successive advancements of the ice cakes.

7. In an ice scoring machine, the combination with a hollow frame, of means for intermittently feeding ice cakes into and out from said frame with an interval of rest for the cake within said frame, revoluble arbors on opposite sides of said frame, gangs of scoring saws upon said arbors, an oscillatory carrier for said arbors movable in opposite directions on opposite sides of the frame, and means for timing the oscillation of said carrier with the intervals of rest of successive ice cakes within the frame.

8. In an ice scoring machine, the combination with a hollow frame, of a reciprocatory feeder for successively feeding ice cakes into and out from said frame with an interval of rest of said cakes within the frame, revoluble arbors upon opposite sides of said frame, an oscillatory endless chain carrier for said arbors adapted to simultaneously move the same in opposite directions on opposite sides of the frame across the path of the ice cake therein, and means for alternating the oscillations of said carrier with the feeding of the ice cakes by said reciprocatory feeder.

9. In an ice scoring machine, the combination with a hollow frame, of means for intermittently feeding ice cakes into and out from said frame with an interval of rest for each cake within the frame, vertically reciprocatory scoring means on opposite sides of said frame connected in counterbalancing relation, each scoring device being adapted to move from a position above to a position below the ice cake and vice versa, and mechanism for actuating said ice feeding means, and scoring means timed to effect the scoring of the ice cakes between successive phases of the reciprocation.

10. In an ice scoring machine, the combination with a frame, of scoring means transversely movable across said frame, means for feeding an ice cake into the path of said scoring means, a resilient buffer for said ice cake to absorb the inertial force thereof, and a back stop against which said ice cake is pressed by said resilient buffer to register said cake in predetermined relation to said scoring means.

11. In an ice scoring machine, the combination with a hollow frame, of a reciprocatory feeder for successively feeding ice cakes within said frame, rotary scoring means movable transversely across said frame, intermittently operated means for reciprocating said scoring means, and means for transmitting rotary motion to said scoring means during the reciprocation thereof.

12. In an ice scoring machine, the combination with a frame and ice scoring mechanism located thereon, of a reciprocatory feed mechanism for successively advancing tapering ice cakes into said frame, and means automatically operated by said reciprocatory mechanism for raising the small end of said ice cake to arrange the longitudinal axis thereof parallel to the direction of movement.

13. In an ice scoring machine, the combination with a frame, an ice scoring mechanism mounted thereon, of a reciprocatory feeder for intermittently advancing tapering ice cakes into said frame, a collapsible dog on said reciprocatory feeder adapted to pass beneath said ice cake in one phase of the reciprocation and to engage said ice cake for the feeding of the same in the opposite phase of said reciprocation, and means automatically actuated by said collapsible dog for raising the small end of the ice cake to arrange the axis

thereof parallel to the direction of feeding movement.

14. In an ice scoring machine, the combination with a frame, of rotary scoring means mounted on said frame for transverse movement thereacross, a reciprocatory feeder for successively advancing ice cakes into the path of said scoring means, a continuous drive mechanism, means for transmitting rotary movement from said continuous drive mechanism to said transversely movable rotary scoring means, and mechanism for transmitting alternate intermittent movement to said feeder and movable scoring means.

15. In an ice scoring machine, the combination with a frame, of a pair of rotary arbors transversely movable across said frame at opposite sides thereof, drive shafts for said arbors extending parallel to the direction of transverse movement, rotary transmissions between said drive shafts and arbors permitting the relative movement thereof, and an intermittent transmission between said drive shafts and said rotary arbors for simultaneously reciprocating the latter in opposite directions.

16. In an ice scoring machine, the combination with a frame, of a rotary arbor transversely reciprocable across said frame, scoring means carried by said arbor, means for feeding an ice cake longitudinally of said frame into position where the side face thereof is in the path of reciprocation of said scoring means, a drive shaft for said arbor extending parallel to the direction of transverse reciprocation, a rotary transmission between said drive shaft and arbor permitting the relative movement thereof, and means for reciprocating said rotary arbor across the face of said ice cake.

17. In an ice scoring machine, the combination with a frame, of a rotary arbor extending longitudinally of said frame, bearings for said arbor movable transversely of said frame, scoring means carried by said rotary arbor, means for feeding an ice cake longitudinally of said frame into a position where the side face thereof is in the path of reciprocation of said scoring means, a drive shaft extending in the direction of movement of said bearings, a rotary transmission between said drive shaft and arbor permitting the relative movement thereof, and an intermittent transmission between said drive shaft and said bearings for reciprocating the latter across the side face of said ice cake.

18. In an ice scoring machine, the combination with a frame, of ice scoring means transversely movable across said frame, means for successively feeding ice cakes into the path of said scoring means, a buffer arranged in the path of said ice cake and slidable in the direction of movement thereof, resilient means for urging said buffer rearwardly opposite to the direction of movement of said ice cake, and a stop for opposing the rearward movement of said buffer.

19. In an ice scoring machine, means for feeding the ice cake longitudinally, means for transversely scoring the ice cake, a resilient buffer for intercepting said cake during its longitudinal movement, and a back stop against which said ice cake is pressed by said resilient buffer to register said ice cake in predetermined relation to said scoring means.

20. In an ice scoring machine, a series of laterally spaced scoring saws for the sides of the ice cake, means for feeding the ice cake longitudinally into approximate alignment with said scoring saws, a resilient buffer in the path of said longitudinal movement adapted to engage the end of the ice cake, and a stop against which said ice cake is pressed by said resilient buffer to register said ice cake in exact relation to said scoring means.

21. In an ice scoring machine, means for positively advancing an ice cake in a longitudinal direction, means for longitudinally scoring said ice cake during said advancement, means for discontinuing the positive advancement after said longitudinal scoring, resilient means for engaging said ice cake and urging the same in the direction opposite to said advancement, a fixed stop against which said cake is urged by said resilient means, and ice scoring means arranged in predetermined relation to said fixed stop for transversely scoring said ice cake.

22. In an ice scoring machine, a frame, means for moving an ice cake relative to said frame, a resilient buffer in the path of movement of said ice cake arranged to engage the end of said cake and to longitudinally adjust the position of the same relative to said frame, a stop against which the opposite end of said cake is pressed by said buffer, and a series of ice scoring saws arranged in predetermined relation to said stop for transversely scoring the sides of the ice cake.

23. In an ice scoring machine, a frame, means for moving an ice cake relative to said frame, a resilient buffer in the path of movement of said ice cake arranged to engage the end of said cake and to longitudinally adjust the position of the same relative to said frame, a stop against which the opposite end of said cake is pressed by said buffer, a series of ice scoring saws in predetermined relation to said stop, and means for reciprocating said saws transversely across said ice cake while the latter engages said stop.

24. In an ice scoring machine, means for feeding said ice cake longitudinally, means for longitudinally scoring the sides thereof during said movement, means for transversely scoring said ice cake, a stop engaging the end of said cake during said transverse scoring, and resilient means engaging the opposite end of said cake for urging the same towards said stop.

25. In an ice scoring machine, the combination of means for supporting an ice cake, scoring means on opposite sides of said ice cake, and means for moving said scoring means transversely across said ice cake in opposite directions upon the opposite sides thereof.

26. In an ice scoring machine, the combination of a frame, means for supporting an ice cake therein, revoluble arbors on opposite sides of said frame, scoring saws upon said arbors, and means for moving said arbors in opposite directions on opposite sides of said frame.

27. In an ice scoring machine, the combination of a hollow frame, revoluble arbors on opposite sides of said frame, scoring saws upon said arbors, means for moving said arbors in opposite directions on opposite sides of said frame, and means for feeding an ice cake into said frame while said arbors are separated by more than the width of the ice cake.

28. In an ice scoring machine, a pair of scoring devices spaced apart substantially the width of a block of ice, and means for moving said scoring devices vertically in opposite directions for simultaneously scoring opposite sides of an ice block.

29. In an ice scoring machine, a pair of motor operated rotating saws spaced apart substantially the width of a block of ice, and means for moving said scoring devices vertically in opposite directions for simultaneously scoring opposite sides of an ice block.

30. In an ice scoring machine, a pair of scoring devices spaced apart substantially the width of a block of ice, actuating means for moving said scoring devices vertically in opposite directions for simultaneously scoring opposite sides of an ice block, and means for automatically cutting off said actuating means when the scoring is completed.

31. The method of scoring an ice cake which comprises simultaneously moving ice scoring devices in opposite directions on opposite sides of the cake so that two opposite faces of the cake are simultaneously scored.

32. The method of scoring an ice cake while it stands upright on one of its four edge faces which comprises simultaneously moving two vertical ice scoring saws vertically in opposite directions on opposite sides of the cake so that two scores are made in the opposite sides of the cake.

33. The method of scoring an ice cake while it stands upright on one of its four edge faces which comprises simultaneously moving two vertical ice scoring saws vertically in opposite directions on opposite sides of the cake so that two scores are made in the opposite sides of the cake; and moving the ice cake between and past a pair of horizontal scoring saws on opposite sides of the cake, so that a pair of score lines are formed in the opposite sides of the cake substantially at right angles to the score lines formed by the vertical saws.

34. In an ice scoring machine, the combination of means for supporting an ice cake; scoring means on opposite sides of said ice cake; and means for moving said scoring means across said ice cake in opposite directions upon the opposite sides thereof.

35. In an ice scoring machine, the combination with a hollow frame, of means for intermittently feeding ice cakes through said frame with an interval of rest for each cake within the frame; vertically reciprocating scoring means on opposite sides of said frame; means connecting said reciprocatory scoring means so that they substantially counterbalance each other; each scoring device being adapted to move from a position above to a position below an ice cake within the frame, and vice versa; and power-driven mechanisms for actuating said feeding means and said scoring means.

36. In an ice scoring machine, the combination with a hollow frame, of means for intermittently feeding ice cakes through said frame with an interval of rest for each cake within the frame; vertically reciprocatory scoring means on opposite sides of said frame; means connecting said reciprocatory scoring means so that they substantially counterbalance each other; each scoring device being adapted to move from a position above to a position below an ice cake within the frame, and vice versa; substantially horizontal scoring means on opposite sides of frame between which the ice cake passes when moved by said feeding means, and which score the ice cake on opposite sides substantially at right angles to the scores made by the vertically reciprocatory scoring means; and power-driven mechanisms for actuating said feeding means and said scoring means.

In testimony whereof I affix my signature.

MICHIEL J. ULINE.