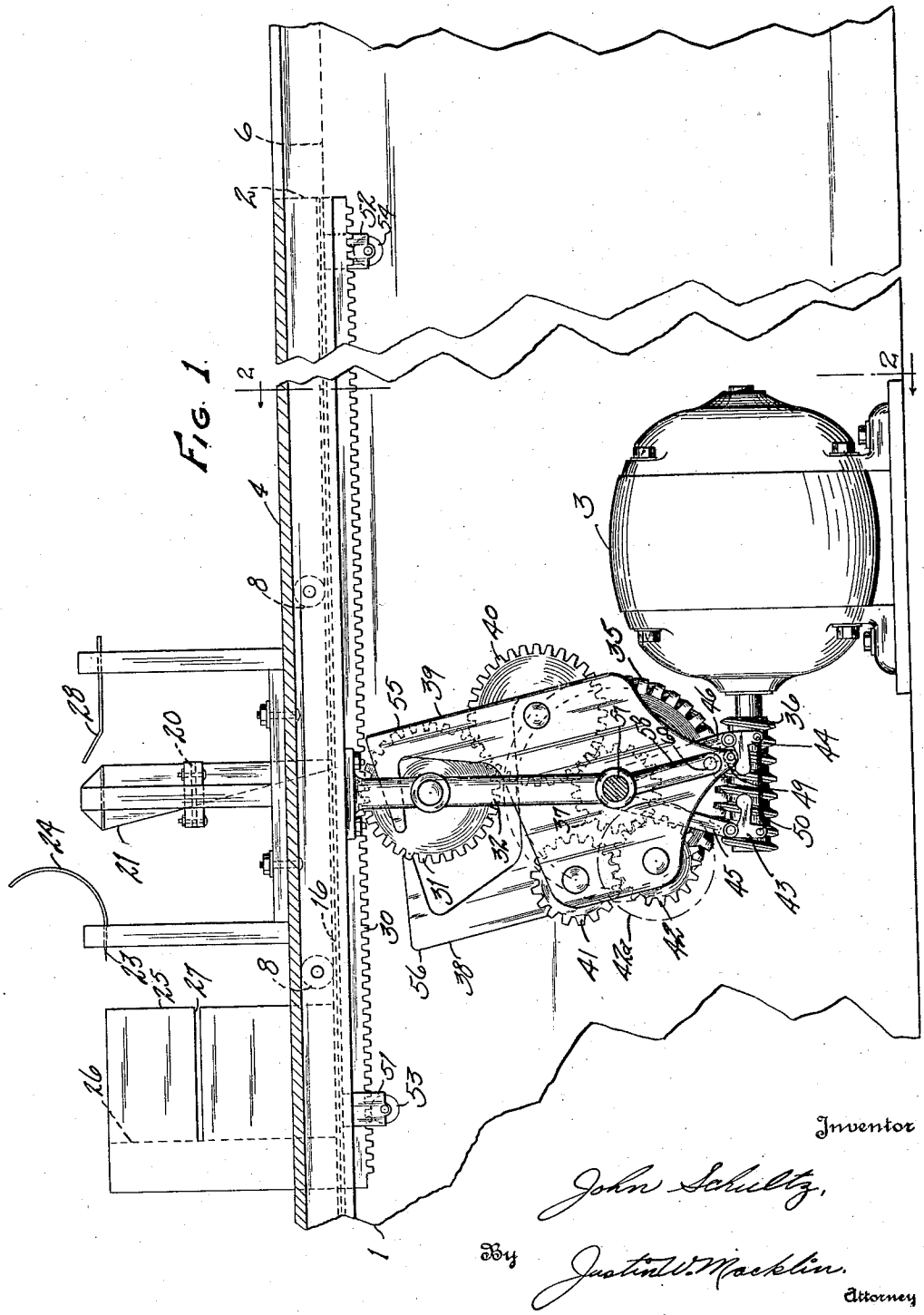
Nov. 24, 1931. J. SCHULTZ 1,833,266

ICE CREAM CUTTING MACHINE

Filed May 3, 1930 2 Sheets-Sheet 1

FIG. 1.



Inventor

John Schultz,

By Justin W. Macklin.

Attorney

Nov. 24, 1931. J. SCHULTZ 1,833,266

ICE CREAM CUTTING MACHINE

Filed May 3, 1930 2 Sheets-Sheet 2

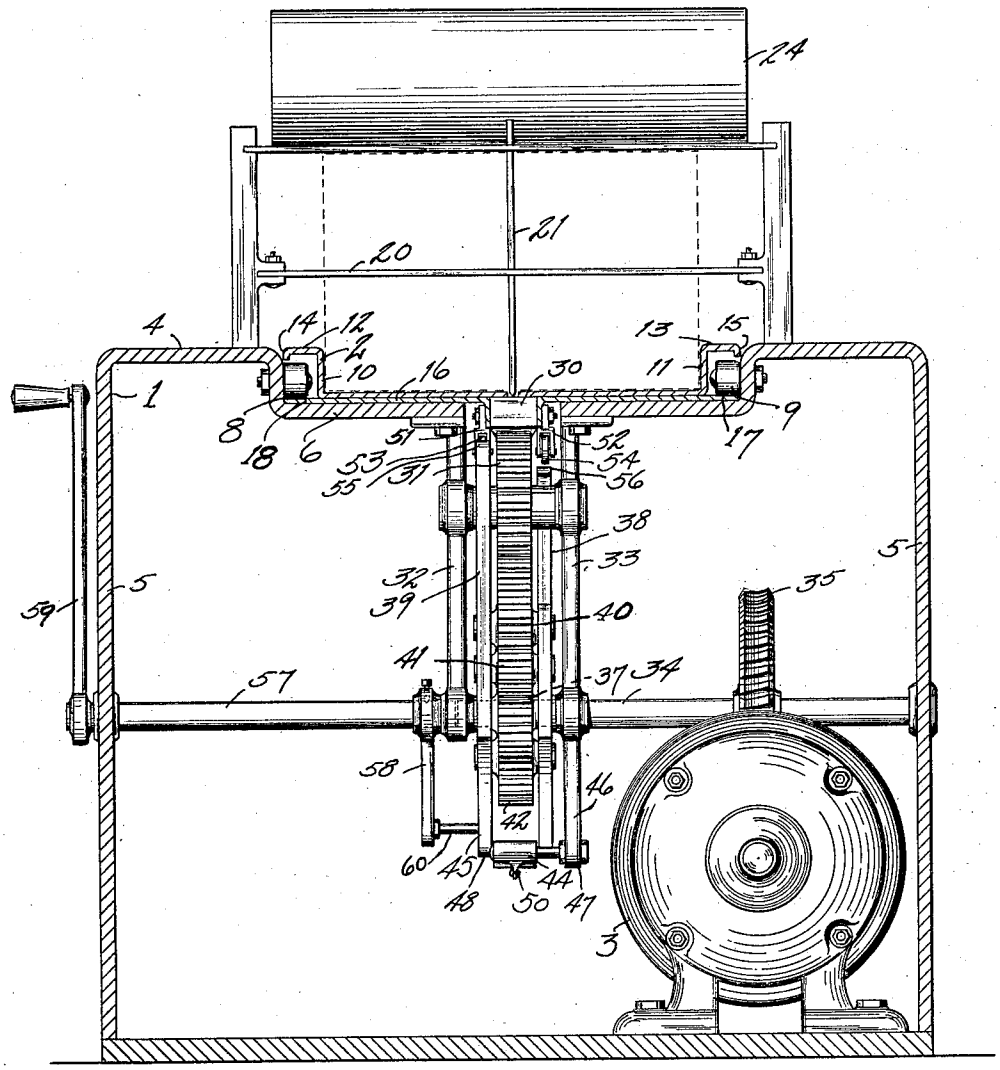


FIG. 2.

Inventor

John Schultz,

By Justin W. Macklin, Attorney

Patented Nov. 24, 1931 1,833,266

UNITED STATES PATENT OFFICE

JOHN SCHULTZ, OF CLEVELAND, OHIO

ICE CREAM CUTTING MACHINE

Application filed May 3, 1930. Serial No. 449,372.

This invention relates to icecream cutting machines. In the manufacture of icecream confections such as chocolate or candy covered icecream briquettes and the like, economical practice requires that the icecream first be frozen in very hard long slabs of comparatively large cross-sectional area. These blocks, while still very hard, must be cut into strips of proper dimensions for feeding into the cutting and coating machines, which in turn cut them transversely to form small briquettes of the desired size for coating. The strips thus prepared must be sized to within comparatively narrow limits for efficient operation of the cutting and coating machines. Further they should be kept hard and unbroken, or a great waste of material results.

The machines now used for cutting the large slabs into strips are designed to enclose the slab and embrace its flat surfaces against lateral distortion. As a result the slabs must be inserted by hand, an operation that is not only difficult but is undesirable from a hygienic standpoint.

Another difficulty encountered in the use of such machines results from the increase in cross sectional area of the block, due to slight variations in temperature. Quite often such an increase in size makes it impossible to insert the slab in the machine. If the slab becomes somewhat soft, this operation is increasingly difficult and breakage or other distortion of the slab results.

When a slab of icecream is so enclosed it strikes the confining walls of the container of the cutting machine and tends to adhere thereto and develops a very high coefficient of friction opposing longitudinal movement of the slab through the machine. The power required to overcome these frictional forces is extremely great and tends to break down the crystalline formation of the frozen slab and extrude it as a semiplastic mass rather than as a firm hard strip.

Further, since the slab does not compress evenly, it tends to swell after it leaves the confining box and has passed the knives. This swelling is uneven and the strips so cut vary in size and are unsuitable for manufacture of the final product, which must be kept very accurately to the proper amount.

It is one of the objects of my invention to eliminate these difficulties and to cut the large slab of icecream into properly sized strips under varying temperature conditions.

Another object of my invention is to eliminate the necessity of touching the strip with the hands, by providing a machine into which the slab can easily be dropped directly from the mold.

Another object of my invention is to eliminate buckling or breaking of the slab during the cutting operation and to cut it into strips without disturbing the crystalline formation.

A more specific object of my invention is to accomplish these results by a machine which may readily be constructed from easily obtainable material, and which is extremely simple in operation, whereby the workman handling the icecream does not have to touch his hands to the machine itself.

Another object of my invention is to build such a machine in a form in which the working parts are protected from the melting icecream, and in which those parts which come in contact with the icecream may be easily removed and cleaned or sterilized.

Other objects and advantages will become apparent from the following description in which reference numerals are used to denote the same parts in different views.

In the drawings—

Fig. 1 represents a front elevation of a cutting machine embodying my invention, part of the casing being removed for clearness of illustration.

Fig. 2 is a cross sectional view taken on the plane indicated on the line 2—2 of Fig. 1.

My invention includes a frame 1, upon

which is mounted a reciprocating table 2, driven from a suitable source, such as a motor 3 through a selective power transmission later to be described. The frame 1 preferably comprises a metal top 4, having integral side walls 5 to protect the driving mechanism. The top 4 is indented longitudinally along its central portion to form a slideway 6, in which the table 2 may reciprocate. Along the walls of the slideway are rollers, such as 8 and 9, to slidably support the table 2.

The table 2, as illustrated, may be formed of a channel shaped strip of metal having longitudinal side flanges 10 and 11, portions 12 and 13 near the top of which are bent outward and the outermost edge turned down as at 14 and 15. These portions act as spacers to align the table in the slideway and as a track to support it on the rollers. Further, they protect the rollers from the melted material. To retain the table in contact with the driving mechanism, a strip 16 is provided on the bottom face thereof and extends beyond the depressed portion so as to form a track under the rollers, as at 17 and 18.

Supported on the top 4 of the frame 1 across the path of movement of the table 2 are a plurality of cutting knives. Since the usual practice is to cut the slabs into four strips, I have used, for illustration, a horizontal knife 20 and a vertical knife 21, intersecting centrally. In order to obtain a slicing action, the cutting edge of each section of the horizontal knife slopes toward the intersection, away from the direction of movement of the table 2 on its cutting stroke. The cutting edge of the vertical knife slopes similarly from top to bottom.

Thus the lateral thrusts of the horizontal knives balance each other and that of the vertical knife tends to hold the slab against the table. This arrangement of knives tends to retain the slab centrally of the table 2. The lower edge of the vertical knife extends into a longitudinal slot 22 in the reciprocating table 2. It should be noted that this slot does not extend through the table, so that any melted material is retained in the table 2 and the driving mechanism shielded.

To properly size the slabs passing through the knives, a sizing knife 23 having an apron 24, is secured to the table top 4 in front of the cutting knives and adjusted to the desired height. Excess material cut off from the slab is pushed onto the apron 24 and can be collected for subsequent use. At one end of the table 2 is secured a pushing block 25 of substantially the same width as the channel of the table 2, and slotted vertically and horizontally as at 26 and 27 so that its pushing surface may pass a substantial distance beyond the cutting knives. A guide 28 is provided behind the knives to retain the cut strips in position.

Efficient cutting of the slabs can be accomplished when the table 2 is driven at a steady, even speed, and to obtain the result, I prefer to use mechanical power. On the underside of the table 2 is a longitudinal rack 30, driven by a pinion 31, rotatably mounted in brackets 32 and 33 suspended from the underside of the table top 4. Rotatably mounted at one end in one of the side walls 5 and at the other end in the brackets 32 and 33 is a main driving shaft 34. Rigid with the shaft 34 is a gear 35 which engages a worm gear 36 for drivingly connecting the shaft 34 and motor 3. Rigidly mounted on the shaft 34, intermediate the brackets 32 and 33, is a spur gear 37. Carried on the shaft 34 between each of the brackets and the spur gear 37 are plates 38 and 39. These plates are rockably mounted in fixed axial position on the shaft 34 and are in fixed spaced relation to each other.

Mounted in and between the plates 38 and 39 are a plurality of complementary spur gears 40, 41 and 42. The gears 40 and 42 are in constant mesh with the gear 37 and gears 41 and 42 are likewise in constant mesh with each other. These gears are positioned so as to be selectively engageable with the pinion 31 as the plates 38 and 39 are moved from the extreme right to the extreme left position. As the plates 38 and 39 are placed in position intermediate these extreme positions, both the gears 41 and 40 are out of mesh with the pinion 31 and the driving mechanism is in neutral. If desired, the plates 38 and 39 may be separated a greater distance and a gear 42*a* larger than gear 42 and rotatable with gear 42 on the same shaft may be provided for causing the table to move faster on the return stroke. In such case, the gear 41 could be widened and reduced so as to properly engage the pinion 31 and gear 42*a*, which would thus be offset axially from the pinion.

In order to retain the plates 38 and 39 at any one of the three given positions snap locks 43 and 44 carried on suitable arms 45 and 46 on the brackets 32 and 33 are provided. These snap locks are adapted to engage a pin rigid in the lower projections 47 and 48 of the plates 38 and 39 respectively.

To render the action of the locks more easily operable, a roller 49 may be mounted on the pin between the lower projections of the plates 38 and 39. The snap locks 43 and 44 are provided with a spring 50 which holds them normally in a horizontal position but allows them to resiliently engage the roller 49. To render the machine semiautomatic, lugs 51 and 52 carrying suitable roller contacts 53 and 54, are mounted on the lower side of the table 2. Upwardly projecting arms 55 and 56 are provided on the plates 39 and 38 respectively and are of the proper shape and size that the projection 55 is engaged by the roller 53 as the table moves on

the cutting stroke and the upwardly projecting arm 56 is engaged by the roller 54 on the return stroke.

The engagement between these rollers and the projecting arms tilts the plate to neutral position at the end of the cutting stroke and at the end of the return stroke. Mounted in one of the walls 5 and in the bracket 32 is a shaft 57 provided with a crank 59 outside of the frame of the machine. This shaft carries a lever arm 58 having a pin 60 engaging the plate 39. The gearing mechanism may be selectively shifted so as to be driven in either direction by throwing the plates from neutral position by means of a crank 59 on the shaft 57. Since this shift is accomplished by merely swinging the crank in a single plane, the operator can start or stop the machine by merely pushing against the crank and is not required to grasp it in his hands.

In the operation of this machine, the molded slab is dropped directly from the mold, without handling, onto the reciprocating table 2. Since the side walls 10 and 11 of the table 2 are of very limited height, the slab will slip easily into place between them. Power is then applied and the cable carries the slab through the cutting knives, the block 25 retaining it in longitudinal position on the table. The side walls 10 and 11 are of just sufficient height to keep the block aligned on the table, yet allow it to spread freely laterally as the strips cut therefrom are forced apart by the knife blades. Frictional resistance to the movement of the slab due to confining its flat surfaces is eliminated. The excess material due to swelling or irregularities in the slab are removed by the sizing knife before the slab engages the cutting knives. Since the surface of the table is smooth and the longitudinal slot is closed at the bottom a small amount of melted ice cream is necessarily held on the table. This prevents air from reaching the underside of the slab and as a result, the slab is held by suction firmly against the table and thereby prevented from buckling. At the same time it is free to spread laterally of the table so that the tendency of the strips to separate, due to the wedging action of the knives, is not impeded.

To further reduce the frictional forces, the cutting edge of the horizontal knife should slope upwardly from the botom side of the knife. In this manner the lower half of the strip is not compressed as it passes the knife, and upper half is free to move upwardly from the knife.

By proper adjustment of the height of the sizing knife relative to that of the horizontal cutting knife, slabs may be cut into strips of the same cross sectional dimensions.

The guide 28 is provided with an apron having an upturned end which resiliently engages the cut strips and urges them lightly together after they have been spread apart vertically by the cutting knives, thus retaining the strips in alignment with a negligible amount of frictional resistance.

Experience has proven that a machine constructed in accordance with this invention will cut slabs of varying degrees of rigidity without buckling or fracturing of the crystalline structure, and operates on a very small amount of power, and subsequent swelling or breaking of the cut strips is eliminated.

Furthermore, the working parts are well protected from the melted material and the material itself does not have to be touched by human hands. Again, as a result of using mechanical power the slab is carried evenly through the knives and will not tend to freeze or adhere thereto as would be the case were its progress there across temporarily stopped or slowed down, as when manually operated.

While I have described a form of my invention which has proved very satisfactory, I do not intend to limit the specific arrangement herein described, but intend to include all reasonable modifications embodying the principles set forth.

I claim:

1. A machine for cutting icecream slabs into strips including a frame, a reciprocating table carried by said frame, cutting knives in the path of movement of said table, a horizontal trimming knife in spaced relation to said table in front of said cutting knives, a guide behind and in spaced relation to said cutting knives, means to drive said table, said means including a source of power and a gear train, a lever for selectively engaging predetermined gears of said train to move said table in opposite directions, means carried by said table to shift said gears into idling position to stop the movement of said table.

2. A machine for cutting icecream slabs into strips, including a reciprocating table, a plurality of cutting knives in spaced relation to said table across the path of movement thereof, a supporting frame for said table, a rack carried by said table, a pinion carried by said frame engageable therewith, a rotatable shaft carried by said frame, a gear on said shaft rigid therewith, a tiltable plate on said shaft, a plurality of gears rotatably mounted on said plate and engageable with said gear and adapted for engagement and disengagement with said pinion as said plate is tilted about said axis, lugs engageable with said plate consequent upon the movement of said table for rendering said gears idle, and locks carried by said frame to retain said gears in predetermined positions.

3. A machine for cutting icecream slabs into strips, comprising a frame, a reciprocating table carried on said frame, a plurality of knives carried by said frame, said knives

extending transversely to the direction of movement of said table, a rack carried by said table and a pinion operably engaging said rack, a rotatable shaft mounted in said frame, a driving gear on said shaft, a plurality of gears intermediate said driving gear and pinion, the axes of said intermediate gears being revoluble about said shaft, a lever adapted to revolve said intermediate gears about said shaft for selectively interengaging certain of said gears and said pinion whereby the direction of movement of said table may be reversed selectively by swinging said lever in a single plane.

4. An icecream slab cutting machine, comprising a frame, a reciprocating table carried by said frame, cutting knives in the path of movement of said table, guides to retain the slab in fixed position on said table, resilient means engaging the top surface of said slab in the front of and rear of said cutting knives and urging said slab normal to the top surface of said table.

5. A machine for cutting icecream slabs into strips, including a frame, a longitudinal guideway in said frame, a table reciprocable in said guideway, said table comprising a flat supporting surface and side walls normal to said surface, said side walls being in height a very small proportion of the height of the slab to be cut, a plurality of cutting knives carried by said frame in the path of movement of said table, a sizing knife carried by said frame and positioned in front of said cutting knives, an apron on said sizing knife extending therefrom toward the cutting knives and terminating a substantial distance in front of the cutting knives, a guide carried by said frame and positioned behind said cutting knives and yieldably engaging the top of said slab, and power means for driving said table, said power means including a source of power and a plurality of selectively engageable gears, and means carried by said table to shift said gears into idling position.

6. A machine for cutting icecream slabs into strips, including a frame, a reciprocating table carried by said frame, cutting knives in the path of movement of said table and means to drive said table in reverse directions, said means including a source of power and a gear train connected therewith, a lever for selectively engaging predetermined gears of said train to move said table in opposite directions, means operable consequent upon movement of said table to predetermined positions to shift said gears into idling position to stop the movement of said table.

7. A machine for cutting icecream slabs into strips including a frame, a reciprocating table carried by said frame, cutting knives in the path of movement of said table and power means to drive said table selectively in reverse directions, said means including a driving gear and driven means carried by said table and intermediate gears selectively engageable with said driving gear and driven means consequent upon movement of the axes of said intermediate gears about the axis of said driving gear, part of said intermediate gears driving said table in one direction and the remainder driving said table in the opposite direction.

In testimony whereof, I hereunto affix my signature.

JOHN SCHULTZ.