April 16, 1935. M. T. ZEIGLER 1,997,620

METHOD OF PRODUCING PACKAGED ICE

Filed April 10, 1933 2 Sheets-Sheet 1

Fig. 1.

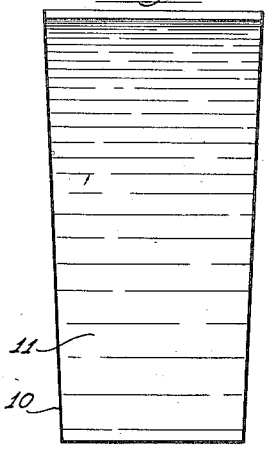


Fig. 2.

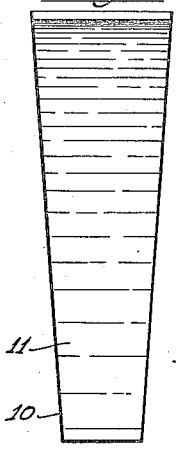


Fig. 3.

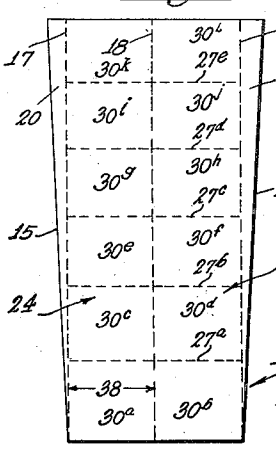


Fig. 4.

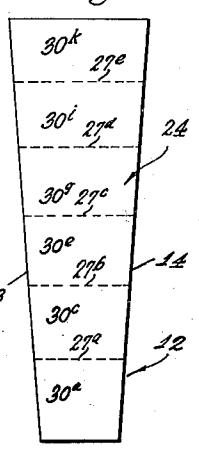


Fig. 8.

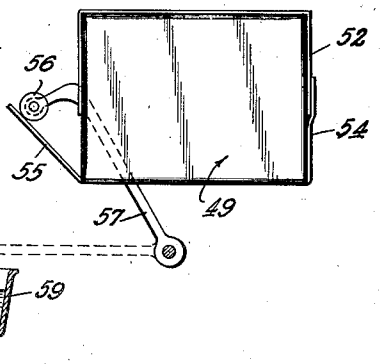


Fig. 5.

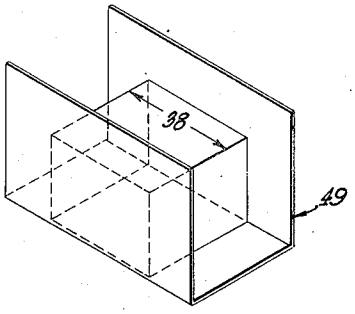


Fig. 6.

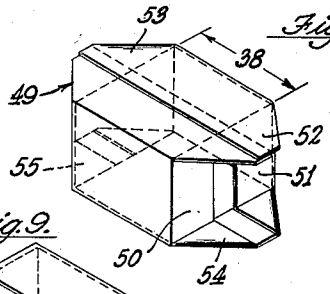


Fig. 7.

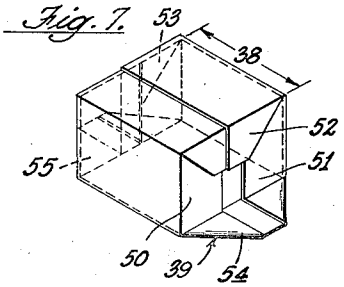
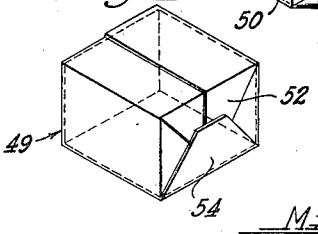


Fig. 9.



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METHOD OF PRODUCING PACKAGED ICE

Filed April 10, 1933 2 Sheets-Sheet 2

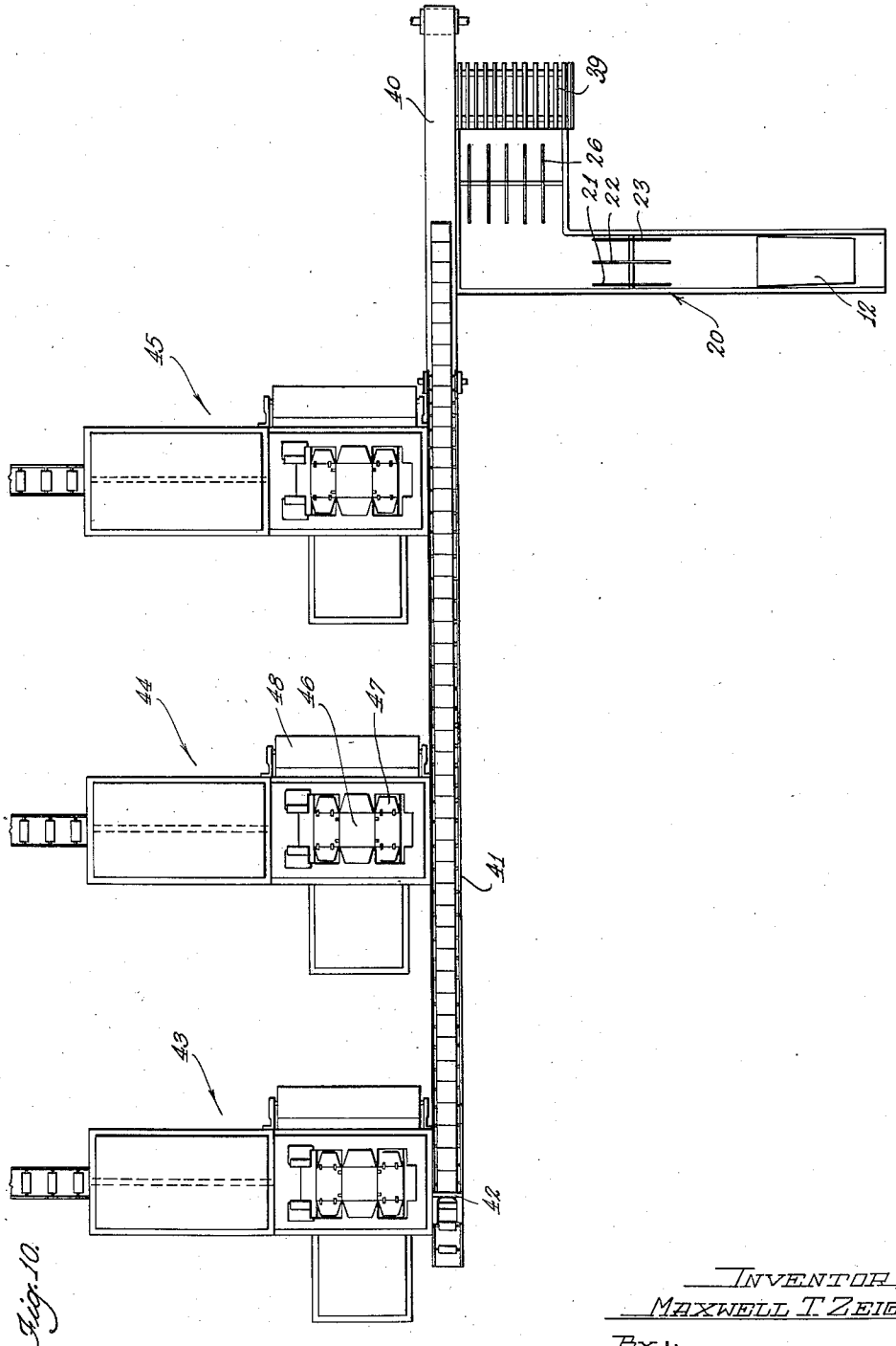


Fig. 10.

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UNITED STATES PATENT OFFICE

1,997,620

METHOD OF PRODUCING PACKAGED ICE

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Application April 10, 1933, Serial No. 665,348

9 Claims. (Cl. 62—172)

This invention relates to a method of producing packaged ice, and may be considered a continuation in part of my pending application Serial No. 554,141, filed July 30, 1931, entitled Method of packaging ice. I have proposed marketing ice in packaged form, that is, manufactured ice is to be cut up into pieces of suitable weight and wrapped in a sheet of wrapping material. In this way it is possible for me to vend ice in ice vending machines and the consumer may purchase a package of ice at the vending machine and on transporting it to his residence will be amply protected from the melting on the surface by the surrounding paper wrapper. Also the paper wrapper affords a suitable friction surface by which the package may be picked up, which friction surface is not afforded by the bare ice. The wrapping paper also acts somewhat as a heat insulator and prevents sunlight from entering the ice which, if permitted for a considerable period of time, causes the interior of the ice as well as the surface to melt.

Most ice as now manufactured is produced by freezing water in tapered ice cans or receptacles and on defrosting obtaining from these tapered ice cans tapered blocks of ice. I have designed an ice wrapping machine, as disclosed in my copending application Serial No. 554,142, filed July 30, 1931; and an ice vending machine, as disclosed in my copending application Serial No. 529,105, filed April 10, 1931. In wrapping the ice by means of the ice wrapping machine it is highly important that the small marketable pieces all have one common dimension. This uniformity in this common dimension is also highly important in vending ice in an ice vending machine such as is disclosed in my application above mentioned.

It is an object of this invention to provide a novel method of producing packaged ice which consists primarily of manufacturing the ice in the conventional tapered ice cans, thus obtaining tapered blocks, and then dividing these blocks with a minimum wastage into smaller pieces of uniform weight having one common dimension, and then wrapping these individual pieces, producing packages which can be easily vended in my ice vending machine. It is important that the small pieces be of uniform weight so that a purchaser may rely on receiving a given number of pounds of ice for his purchase price.

The invention more specifically concerns the dividing of the tapered block of ice in such a manner that there will be very little waste and that the taper of the block will be compensated for in producing the pieces of uniform weight having their common dimension which will enable them to be packaged by machine and vended by machine.

Another object of the invention is to provide a method of wrapping blocks of ice, which blocks have one common dimension but which have two other dimensions which may vary. The improved method of wrapping is such as to render it suitable to being performed by machine yet regardless of the two variable dimensions neatly and closely wrapped packages of ice will be produced.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Fig. 1 is a front view in section illustrating the manufacturing of the ice.

Fig. 2 is a side view in section illustrating the manufacturing of the ice.

Figs. 3 and 4 are front and side views, respectively, of the block of ice obtained and illustrating in dotted lines the manner in which the block is divided.

Figs. 5, 6, 7, 8 and 9, illustrate steps in the wrapping operation which finally produces the package.

Fig. 10 is a plan view illustrating the assembly of preferred machines employed in carrying out the method of producing packaged ice.

Referring to the accompanying drawings, wherein similar reference characters designate similar parts throughout, 10 designates a conventional ice freezing can, the front and back walls as well as the side walls being tapered as is conventional. The taper in these figures is illustrated slightly exaggerated in order to clearly show that the conventional freezing can has a decided taper which is necessary in removing the frozen block of ice after the water 11 has been frozen therein. From the can 10 there is obtained the block 12 which, as is shown slightly exaggerated in Figs. 3 and 4, has a downward taper. For purposes of clarity the front and back sides 13 and 14 will hereinafter be designated as the faces of the block, while the narrow sides 15 and 16 will be designated as merely the sides as distinguished therefrom, and the top and bottom surfaces constituting the ends of the block. As will be noted from an inspection of Figure 4, the faces 13 and 14 converge downwardly as well as the sides 15 and 16. The problem is to divide this block in such a manner

as to produce smaller blocks or pieces of uniform weight and having one common dimension so that it can be wrapped and vended by machinery. To accomplish this, the block 12 is first cut into elongated strips. This may be accomplished by means of the ice cutting machine disclosed in my pending application Serial No. 572,966, filed November 4, 1931. If performed by such machine, the block is first ripped on dotted lines 17, 18 and 19.

Referring now to the plan view of the machines preferably employed in carrying out the improved method as shown in Figure 10, the ice cutting machine is diagrammatically indicated by the reference character 20. This machine has a gang of ripping saws indicated at 21, 22 and 23. The block 12 is positioned on a conveyor not shown on this figure, with its large end foremost. As it is pushed through the saws by the longitudinally running conveyor, saws 21 and 23 remove the side tapers and cut the block upon the lines 17 and 19. The center saw 22 rips the block upon the line 18. These side tapers, which are removed by ripping the block on lines 17 and 19, are the only portions of the block that are wasted and inasmuch as these tapers are on the narrow sides of the block as distinguished from its faces, it will be appreciated that this amount of wastage is quite small. Dotted line 18 is equidistant from lines 17 and 19 so that the two strips 24 and 25 have equal widths. After the block has thus been divided into the two strips, the longitudinally running conveyor carries these strips onto a transversely running conveyor, which is not shown on Figure 10, which serves to convey the strips through a gang of cross cut saws indicated at 26. These saws as well as the ripping saws cut entirely through the block and divide the block upon transverse lines 27^a, 27^b, 27^c, 27^d and 27^e. These cross cut saws are not equidistant from each other and consequently the various transverse lines are not equidistant. They are so spaced as to divide the strips into small pieces of equal weight. Due to the taper emphasized in Figure 4, pieces 30^a and 30^b will have the greatest height and pieces 30^c and 30^d will be slightly shorter. Likewise pieces 30^e and 30^f are shorter than 30^c and 30^d. Pieces 30^g and 30^h are shorter than 30^e and 30^f but slightly taller than 30^i and 30^j. Pieces 30^k and 30^l are the shortest. This slight decrease in height from bottom to top compensates for the slight increase in width due to the taper shown in Figure 4 so that the pieces are of uniform weight. Inasmuch as the saws cut entirely through the block, finished flat cut surfaces are formed on four of the six sides of each small piece. In this way the small pieces produced will all have a uniform weight and will have one common dimension indicated at two places upon Figure 3 by the reference character 38. This common dimension will be in a direction parallel to saws 26 as the blocks are cut thereby. They are discharged onto a longitudinally running conveyor 39 with the common dimension at right angles to the direction of movement of conveyor 39. The heights of the blocks will vary and their thicknesses through will vary depending upon the location from which the individual pieces have been cut from the large block 12.

The blocks or pieces thus obtained from the ice cutting machine may be wrapped or packaged in the ice wrapping machine disclosed in my copending application Serial No. 554.142. To this end there is provided an ultimate conveyor 40 running in a transverse direction adjacent the end of conveyor 39. Preferably a suitable turning mechanism, not disclosed herein, is interposed between conveyor 39 and the ultimate conveyor 40 so that as the blocks pass from conveyor 39 onto conveyor 40 each block will be turned so as to dispose the block on the conveyor 40 in such a manner as to cause it to rest on a freshly cut side. The uniform dimension will remain parallel to the direction of movement of conveyor 40. The purpose of turning these blocks in passing from conveyor 39 to ultimate conveyor 40 is due to the fact that the faces of the block may not be perfectly formed. Sometimes these faces are perfectly flat but usually they are slightly concave. If the blocks were merely allowed to be transferred from conveyor 39 to ultimate conveyor 40 without turning, the concave faces on certain blocks which are more noticeable than on others would prevent the formation of an even line of blocks on the conveyor 40. Turning the blocks, however, so as to cause them to rest on a freshly cut side, causes the blocks to rest evenly on the conveyor and to line up properly thereon.

Conveyor 40 is a divided conveyor, the right-hand-most portion of which is power driven. The left-hand-most portion 41 need not be power driven and is provided with a stop 42. The power driven portion carries the blocks in longitudinal alignment against the stop so that the blocks are crowded together in end to end relation. The uniform dimension being parallel to the length of ultimate conveyor 40, each block will occupy a space of predetermined and uniform length on the conveyor.

The ice wrapping machines, as disclosed in my copending application No. 554,142, may be either used singly or in a bank. A bank of three machines is shown on Figure 10, the machines being indicated by the reference characters 43, 44 and 45. Briefly, each machine consists of a suitable platform 46 surrounded by pivoted or hingedly connected folding plates 47. Paper from a supply roll 48 is drawn across the platform and a suitable length is cut off by a mechanism not shown on Figure 10. A withdrawing mechanism, not shown, withdraws a block from ultimate conveyor 40 onto platform 46 over the piece of paper positioned thereon, after which the side folding plates 47 proceed to fold the paper up about the block as shown in Figures 5 to 9. By having the blocks of uniform dimension positioned on ultimate conveyor 40 with the uniform dimension parallel to the length of movement of ultimate conveyor 40 and crowding these blocks against stop 42, it will be noted that as the blocks all have equal dimensions that the block which is before a wrapping machine will be in a predetermined position so as to be capable of being engaged properly by the withdrawing mechanism and drawn onto platform 46. Also on being positioned on platform 46 each block will be perfectly centered with respect to the platform and with respect to the sheet of wrapping paper positioned thereon. The uniform dimension will be running from right to left as viewed in Figure 10 and as the paper is withdrawn from the roll 48 across platform 46 from right to left, each piece of paper can be cut to uniform dimension.

The first steps in wrapping the block are to fold up the sides of the paper, which is indicated at 49, as shown in Figure 5. These sides

are folded against the block parallel to the uniform dimension **38**. The tops of the sides are then folded over onto the top of the block and during this folding operation a suitable adhesive is applied between the overlapped edges of the paper by a mechanism not shown herein but disclosed in my copending application. This forms a type of rectangular tube enclosing the block and the projecting portions of the sides of the tube are then folded inwardly against the ends of the block which define the uniform dimension **35**. These inwardly folded projecting portions of the sides are indicated at **50** and **51** on Figure 6, thus forming projecting top flaps **52** and **53** and projecting bottom flaps **54** and **55**. The projecting top flaps **52** and **53** are then folded downwardly against the ends of the block and the bottom flaps **54** and **55** are folded upwardly thereover. During this upward folding of the bottom flaps adhesive is applied such as by rollers on the machine, one of which is indicated at **56**, mounted on levers **57**. These rollers are dipped into an adhesive **58** and kept in reservoirs **59**. After the adhesive is applied by these rollers and the bottom flaps **54** and **55** are folded upwardly suitable pressing mechanism, not shown, and which are preferably heated press the bottom flaps against the folded ends of the package. When heated these pressing mechanisms cause adhesive to permeate the fibers of the paper and to set quickly. The paper employed need not be waxed paper nor any paper which is rendered waterproof and preferably the ice cutting and ice wrapping machines are all located in a room maintained at a temperature below freezing so that all operations are conducted in an atmosphere which will not cause the ice to melt. It will be noted that in preserving a uniform dimension on all blocks that the blocks can be suitably handled on conveyors and properly positioned thereby before each wrapping machine of a bank of wrapping machines. Also this uniform dimension enables the cutting of a uniform piece of paper for the wrapping operation and inasmuch as all folding operations take place against the ends of the block which define the uniform dimension, the various folds or end flaps will be of substantially uniform size and shape enabling the formation by machine of a tightly and neatly wrapped package regardless of the fact that the two other dimensions besides the uniform dimension **38** may vary slightly.

The uniform dimension is important in other respects. If the packages are to be dispensed through vending machines, the construction of the vending machine is greatly simplified by having these uniform dimensions of the blocks present. Blocks having non-uniform dimensions either require the construction of a complicated vending machine to take care of their various sizes, or there is a tendency for the blocks to jam therein so that they will not feed properly from the vending machine.

The uniform dimensions at **38** are also important in stacking these blocks for storage purposes. Inasmuch as four of the six sides of each of the small blocks are freshly cut sides, which are flat, stacking is facilitated by the presence of the uniform dimension which is very important in being able to build a stack of stored blocks to any considerable height.

It will be appreciated that the improved method not only causes a minimum of waste to be made in reducing the tapered blocks to smaller pieces but it also enables the invention to be practiced wherever ice is manufactured in tapered ice cans, which is now the conventional practice. No alteration whatsoever in the ice freezing equipment is required. In marketing the packaged ice, it is preferably taken from the room of subfreezing atmosphere in which all operations take place and placed in a truck which is kept at freezing temperature, or having a subfreezing atmosphere in its interior. The packages are transported by the truck in this condition to the vending machine and placed therein and the vending machine has its interior kept at a subfreezing atmosphere. The blocks delivered by the vending machine are delivered at a temperature below that of the freezing point of water. Consequently colder ice is delivered to the customer which is in dry packaged form. There is no opportunity for the blocks to melt and soak up the wrapper prior to delivery and the consumer in transporting the ice to his home is protected by the dry paper wrapper, which also acts slightly as a heat insulator, and prevents light from entering the block, which light tends to warm up the interior of the block. When the consumer deposits the block in his refrigerator, it is intended that the paper wrapper be removed.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. The method of dividing a tapered block of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice, into smaller blocks suitable for wrapping which consists of longitudinally and transversely dividing the block upon parallel lines so as to remove the tapers from two opposite sides and produce smaller blocks of substantially equal weight having at least two opposite sides parallel and of uniform distance apart.

2. The method of dividing a tapered block of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice, into smaller blocks suitable for wrapping which consists of rendering the two opposite sides parallel, longitudinally dividing each block into strips of uniform and equal width, and transversely dividing a block so as to produce smaller blocks each having at least two opposite faces parallel and of uniform distance apart.

3. The method of dividing a tapered block of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice, into smaller blocks suitable for wrapping which consists of rendering the two opposite sides parallel, longitudinally dividing each block into strips of uniform and equal width and transversely dividing the block upon unequally spaced parallel lines so as to produce smaller blocks of substantially equal weight having at least two opposite faces parallel and of uniform distance apart.

4. The method of producing packaged ice from tapered blocks of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice which consists of longitudinally and transversely dividing the block on parallel lines so as to remove the tapers from two opposite sides and to produce smaller blocks of substantially equal weight having at least two opposite sides parallel and of uniform distance apart, wrapping each smaller block individually and in so doing causing the final folding oper-

ations to take place against the parallel sides which are of uniform distance apart.

5. The method of producing packaged ice from a tapered block of ice obtained from freezing water in a tapered ice can in the artificial manufacture of ice, which consists of rendering the two opposite sides of the block parallel, longitudinally dividing each block into strips of uniform and equal width, transversely dividing the block so as to produce smaller blocks each having at least two opposite faces parallel and of uniform distance apart and wrapping each small block individually and in so doing causing the final folding operations to take place against the parallel sides which are of uniform distance apart.

6. The method of producing packaged ice from a tapered block of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice which consists of rendering the two opposite sides of the block parallel, longitudinally dividing each block into strips of uniform and equal width, transversely dividing the block upon unequally spaced lines so as to produce smaller blocks of substantially equal weight each having at least two opposite faces parallel and of uniform distance apart, wrapping each small block individually and in so doing causing the final folding operations to take place against the parallel sides which are of uniform distance apart.

7. The method of producing packaged ice from tapered blocks of ice obtained from freezing water in tapered ice cans, in the artificial manufacture of ice which consists of longitudinally and transversely dividing the block on parallel lines so as to remove the tapers from two opposite sides and to produce smaller blocks of substantially equal weight having at least two opposite sides parallel and of uniform distance apart, wrapping each smaller block individually and sealing the wrapper and in so doing causing the final folding and sealing operations to take place against the parallel sides which are of uniform distance apart.

8. The method of producing packaged ice from tapered blocks of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice which consists of rendering two opposite sides of the block parallel longitudinally dividing each block into strips of uniform and equal width, transversely dividing the block so as to produce smaller blocks each having at least two opposite faces parallel and of uniform distance apart, wrapping each smaller block individually and sealing the wrapper therefor and in so doing causing the final folding and sealing operations to take place against the parallel sides which are of uniform distance apart.

9. The method of producing packaged ice from tapered blocks of ice obtained from freezing water in tapered ice cans in the artificial manufacture of ice which consists of rendering the two opposite sides of the block parallel longitudinally dividing each block into strips of uniform and equal width, transversely dividing the block so as to produce smaller blocks of substantially equal weight each having at least two opposite faces parallel and of uniform distance apart, wrapping each smaller block individually and sealing the wrapper therefor and in so doing causing the final folding operations to take place against the parallel sides which are of uniform distance apart.

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