Feb. 25, 1947. S. M. UDDEN 2,416,422

ROTARY ICE CHIPPER

Filed July 28, 1944 2 Sheets-Sheet 1

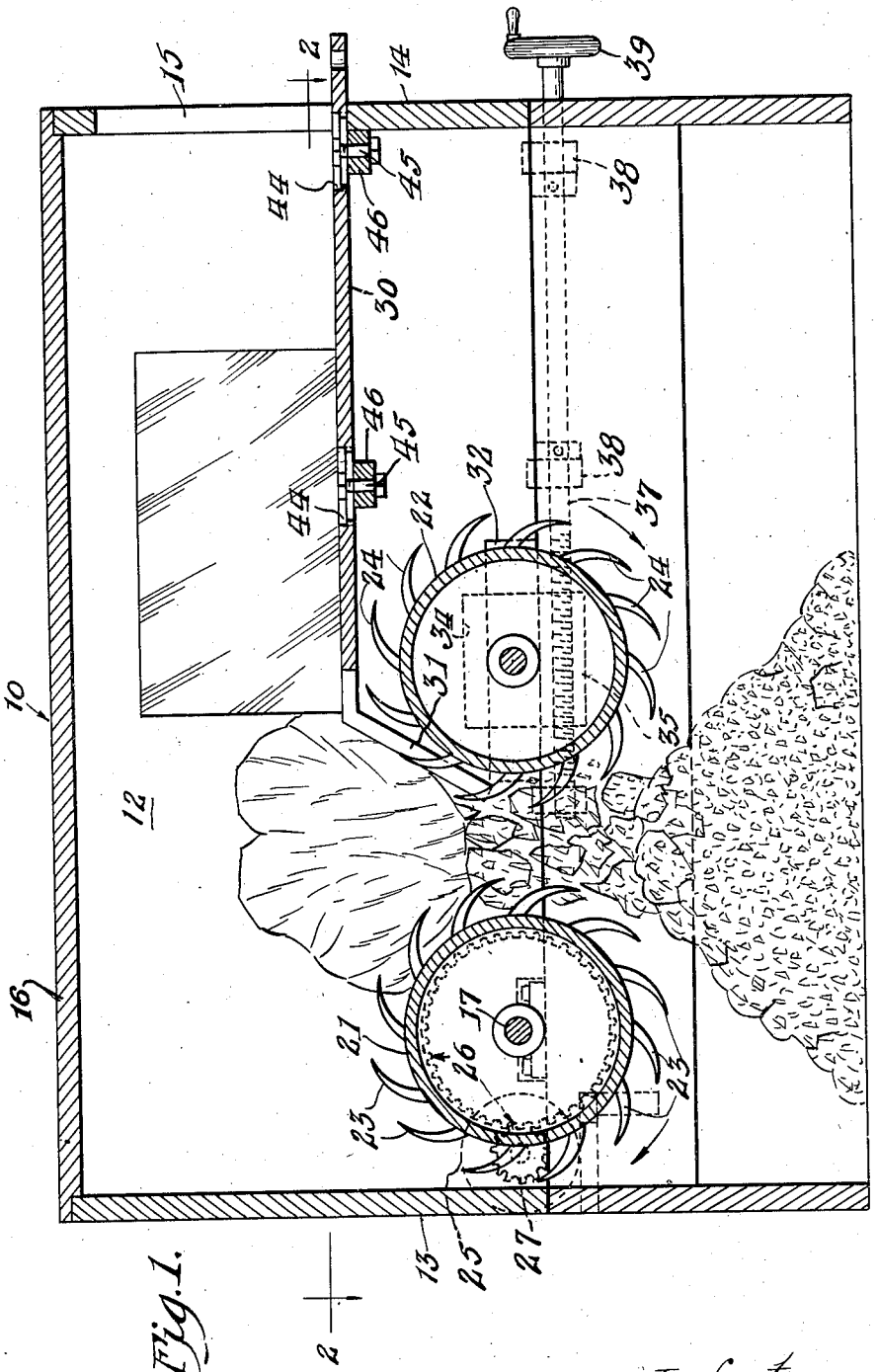


Fig. 1.

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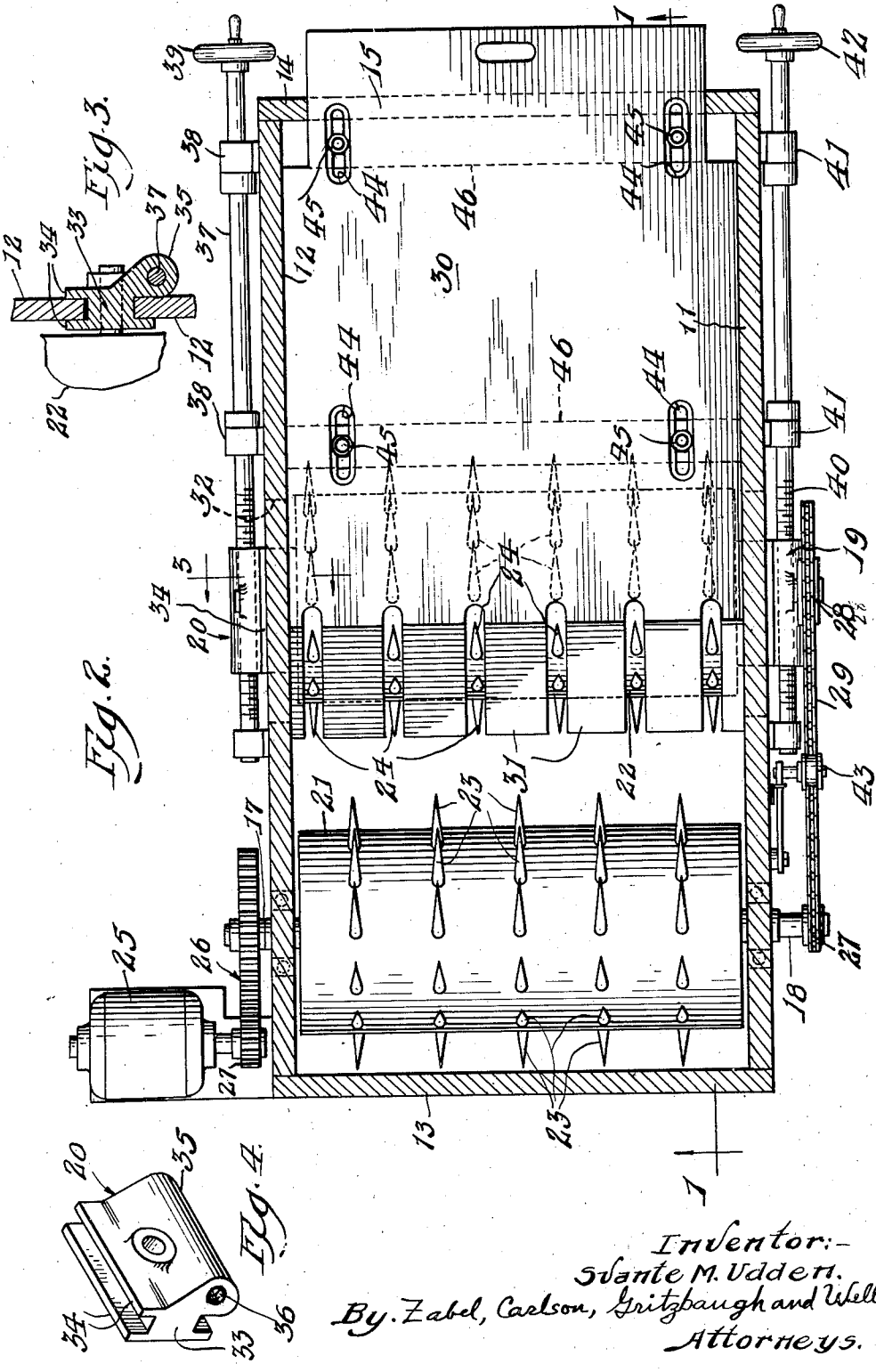


Fig. 2.

Fig. 3.

Fig. 4.

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ROTARY ICE CHIPPER

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3 Claims. (Cl. 241—235)

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This invention relates to an improved ice chipper and in particular to one in which the picks or chipping elements are mounted on two separate rolls rotating in the same direction, preferably at different speeds, and between which the ice is chipped.

My invention has for its object the provision of a chipper which will chip ice into either large or small pieces and in which there is produced a minimum of finely divided ice or snow. This is accomplished in part by rotating the aforesaid rolls in the same direction so as to eliminate the crushing action which results from the prior art devices in which the rolls are rotated in opposite directions or in which only one roll is used. Oppositely rotating rolls have the effect of crushing a chunk of ice as it is caught by the downward moving picks on the opposite side and forced through the constricted opening between the two rolls. A single roll crusher with picks attacking the ice held against a plate and comb has the effect of cutting or crushing a chunk of ice as it is caught by the downwardly moving picks and forced through the constricted opening between the teeth of the comb.

In my invention, the picks of one roll tend to force one side of a chunk of ice upwardly while the picks of the other roll force the opposite side downwardly. This results in the rotation of the chunk of ice, thereby exposing new surfaces of the chunk to the downwardly moving picks.

It is also an object of my invention to provide an improved feeding arrangement whereby the action of the upwardly moving picks will be limited in extent so as not to remove the chunk of ice from engagement with the downwardly moving picks.

It is a further object of this invention to provide, in an ice chipper, an improved arrangement of the elements whereby the picks are forced into the ice in a substantially straight direction, thereby exerting a splitting or chipping action on the ice.

Other objects, features and advantages of my invention will become apparent as this description proceeds.

With reference now to the drawings, in which like reference numerals indicate like parts—

Fig. 1 is a sectional elevation of a preferred embodiment of my invention, the section being taken along the line 1—1 of Fig. 2;

Fig. 2 is a section taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional detail taken along line 3—3 of Fig. 2; and

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Fig. 4 is a detail view of the sliding journal shown in Fig. 3.

In the drawings, the reference numeral 10 designates generally a housing which comprises side walls 11 and 12, and end walls 13 and 14. The end walls are extended downwardly beyond the side walls and serve as legs for supporting the ice chipper. The end wall 14 is provided with an opening 15 into which chunks of ice may be fed. A top 16 is also provided which is preferably secured to the side and end walls to resist any manual feeding pressure applied to the ice, although it may also be made removable for inspection or repair of the mechanism.

Journals 17 and 18 are set in side walls 11 and 12 respectively, and a roll 21 is journaled therein. A second roll 22 is journaled in sliding journals 19 and 20 so that the roll may be moved toward or away from roll 21. Each of the side walls 11 and 12 are provided with horizontally disposed slots, as indicated by reference numeral 32 with respect to the side wall 12. The journals 19 and 20 are slidably disposed in these slots.

Journal 20 comprises a central body portion 33 fitting in the slot 32 and having flanges 34 to maintain it in the slot. The outer and lower flange is enlarged, as indicated by reference numeral 35, and is provided with a tapped bore 36. The configuration of the journal 20 is best shown in Fig. 4.

A worm 37 is mounted on the exterior of the side wall 12 in bearings 38. One end of the worm is provided with a hand wheel 39 by means of which the worm may be rotated to cause the journal 20 to slide in the slot 32. It will be seen from the drawings that the worm extends through the sliding journal 20, and cooperates with the tapped bore 36.

Journal 19 is similar in construction to journal 20, and a cooperating worm 40 is similarly mounted in bearings 41 on the exterior of side wall 11. A hand wheel 42 is also provided for rotation of the worm.

It will be seen that hand wheels 39 and 42 may be rotated to adjust the lateral position of roll 22 whereby the average size of the chipped ice pieces may be varied.

A motor 25 drives the roll 21 through suitable gearing 26 in a clockwise direction, as shown in Fig. 1. The roll 22 is driven in the same direction by means of a chain 29 which engages gears 27 and 28 associated with the rolls 21 and 22 respectively.

It will be seen that at the point where the picks 23 are substantially opposite to the picks 24, the

picks 23 will be moved downwardly and the picks 24 will be moved upwardly. The roll 22 is preferably driven from roll 21 at a lower speed.

A horizontally disposed feeding shelf 30 is suitably mounted within the housing and is aligned with the opening 15. The feeding shelf terminates in a downwardly extending comb 31, the separate elements of which feed between the picks 24. The comb is spaced sufficiently close to the surface of the roll 22 so that the picks 24 extend beyond the surface of the comb 31. Thus it will be seen that a chunk of ice resting on the comb will be engaged by the upwardly moving picks 24 in such a manner that the ice will tend to be rotated.

The picks 23 slant forwardly and are curved in such a manner that they tend to bite into a chunk of ice in a substantially straight direction as the ice is rotated by the combined action of the picks 23 and 24. The provision of the comb 31 and the shelf 30 also prevents the picks 24 from carrying the ice downwardly on the outside of the roll 22.

The feeding shelf 30 serves to support a second chunk of ice in the position wherein it is ready to be fed into the bite between the two rolls when the first chunk of ice has been broken up into smaller pieces. These smaller pieces drop down between the two rolls and can be withdrawn from the side of the housing 10.

I have found that satisfactory results are obtained by causing the roll 21 to rotate at sixteen revolutions per minute whereas the roll 22 is rotated at about four revolutions per minute. The average size of the chipped ice pieces may be varied by varying the distance between the centers of the two rolls.

As indicated above, this distance is varied by turning the hand wheels 39 and 42. The chain 29 has a certain amount of slack which will permit a certain amount of variation. An idler 43 may be provided for the chain to take up this slack.

If it be desired to vary the distance between the centers of the two rolls by an amount greater than that permitted by the slack of the chain, it is contemplated that additional chains may be provided which are of different length. By providing a series of three or four chains of progressively greater length, it will be seen that any desired distance between the roll centers may be obtained, and hence any desired average ice size.

Means are also provided to shift the position of the feeding shelf and comb 31 in accordance with the shifting of the roll 22. To accomplish this, the feeding shelf is disposed on transverse supports 46 and is secured thereto by bolts 45 which extend through longitudinally disposed slots 44 in the feeding shelf. By loosening the bolts, the shelf and comb can be shifted to any desired position, and then the bolts may be tightened up to secure the shelf and comb in that adjusted position.

It will be seen that the device herein disclosed provides a minimum amount of crushing action due to the fact that the ice is caught and suspended between the two series of oppositely moving picks. This also results in causing the ice to be rotated, thereby exposing new surfaces to the picks and eliminating a cutting or crushing action.

Although I have disclosed only a preferred embodiment of my invention, it will be understood that various changes and modifications may be made therein without departing from the spirit thereof. The foregoing description and the drawings are intended to be illustrative only and the invention is to be limited only by the appended claims.

I claim:

1. An ice chipper having a primary chipping roll which includes picks projecting from the surface thereof, and a secondary chipping roll, which includes picks projecting from the surface thereof, said rolls being mounted on substantially parallel axes, means to drive said rolls so that the picks of said primary chipping roll, at the bite of said rolls, will be moved downwardly and so that the picks of said secondary chipping roll, at the bite of said rolls, will be moved upwardly at a lesser speed, and a comb overlying said secondary chipping roll so as to limit the extent of contact of said upwardly moving picks with a piece of ice disposed at the bite of said rolls.

2. An ice chipper having a primary chipping roll including picks projecting from the surface thereof, and a secondary chipping roll including picks projecting from the surface thereof, said rolls being mounted on substantially parallel axes, means to drive said rolls so that the picks of said primary chipping roll, at the bite of said rolls, will be moved downwardly and so that the picks of said secondary chipping roll, at the bite of said rolls, will be moved upwardly at a lesser speed, and a shelf disposed above said secondary chipping roll and terminating in a comb portion extending downwardly toward said bite and spaced sufficiently close to said secondary chipping roll that said upwardly moving picks extend therethrough.

3. An ice chipper comprising a housing having an opening at one end thereof, spaced primary and secondary chipping rolls mounted for cooperation with each other at the other end of said housing, means to rotate said rolls in the same direction and at different peripheral speeds so as to cause a differential chipping action, and a shelf disposed within said housing which extends from said opening to a point above said secondary chipping roll and provided with a downwardly extending slotted portion which terminates in the bite between said rolls, the axis of said secondary chipping roll being disposed in substantially the same horizontal plane as and closer to said opening than said primary chipping roll, said chipping rolls being provided with chipping elements which at the bite of the rolls, move in opposite directions, the chipping elements of said secondary chipping roll moving upwardly and extending through said slotted portion.

SVANTE M. UDDEN.

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