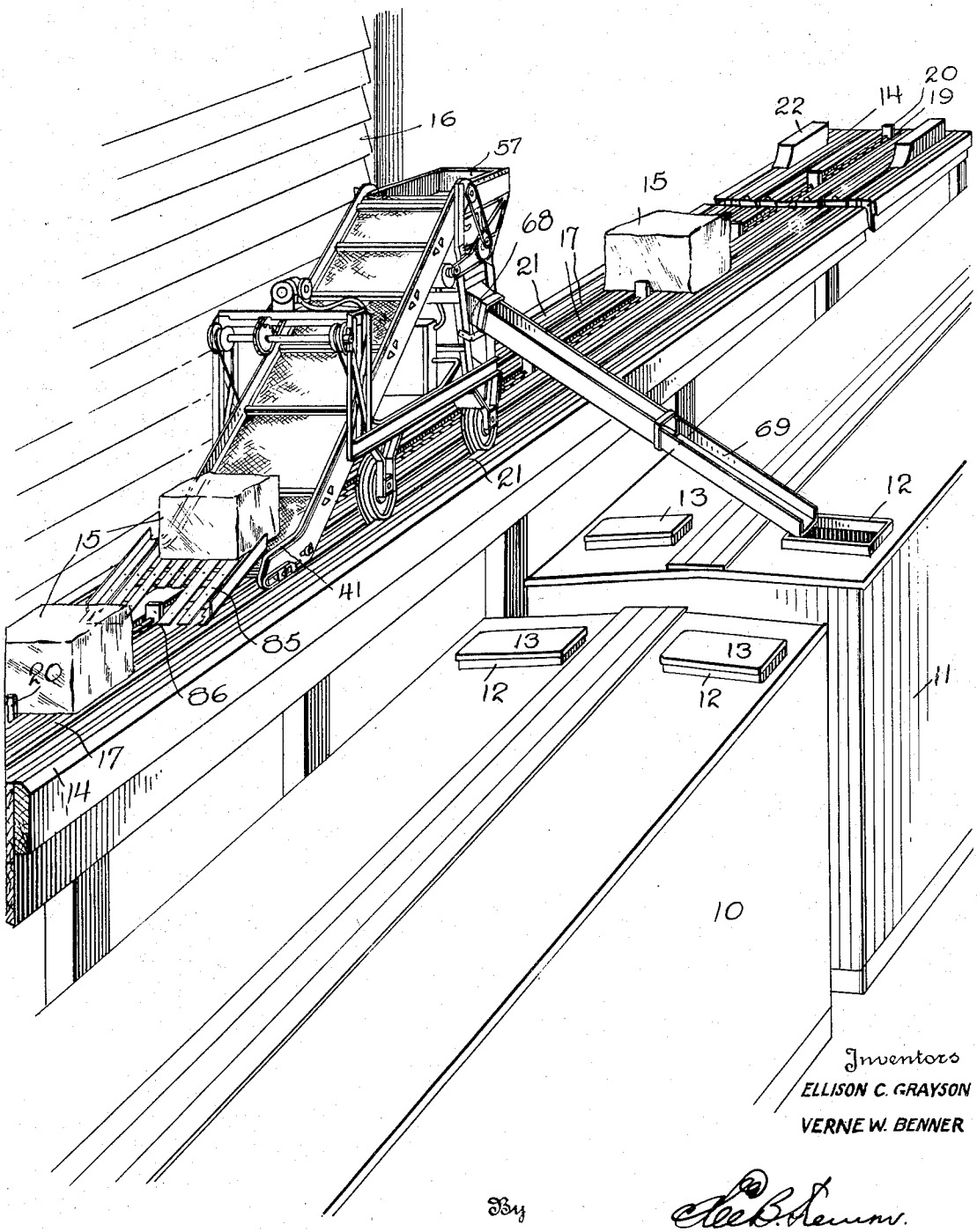
Dec. 8, 1936. E. C. GRAYSON ET AL 2,063,431

APPARATUS FOR ICING RAILWAY REFRIGERATOR CARS OR OTHER VEHICLES

Filed May 28, 1935 3 Sheets-Sheet 1

Fig. 1



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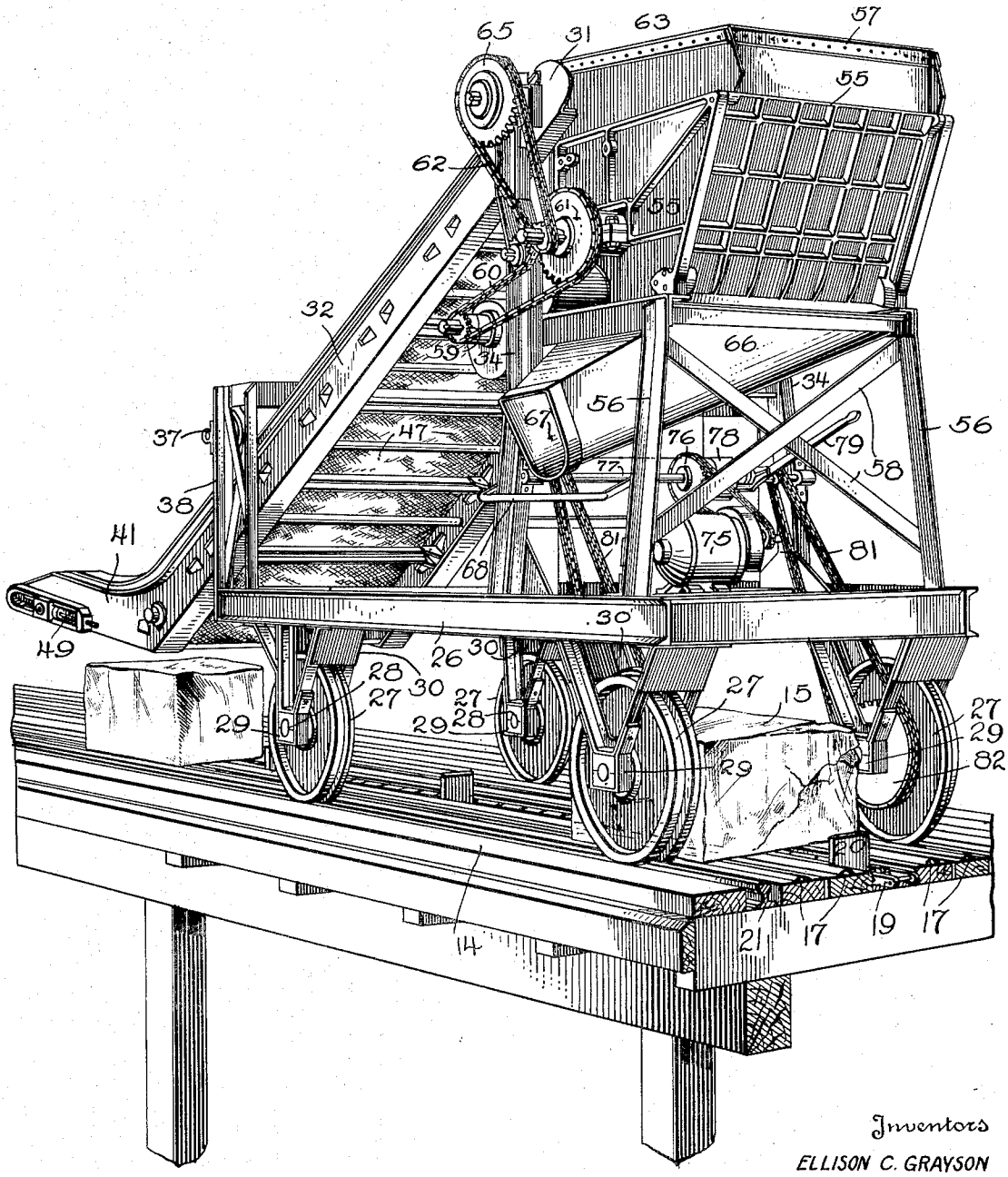
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Filed May 28, 1935 3 Sheets-Sheet 2

Fig. 2



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Fig. 3

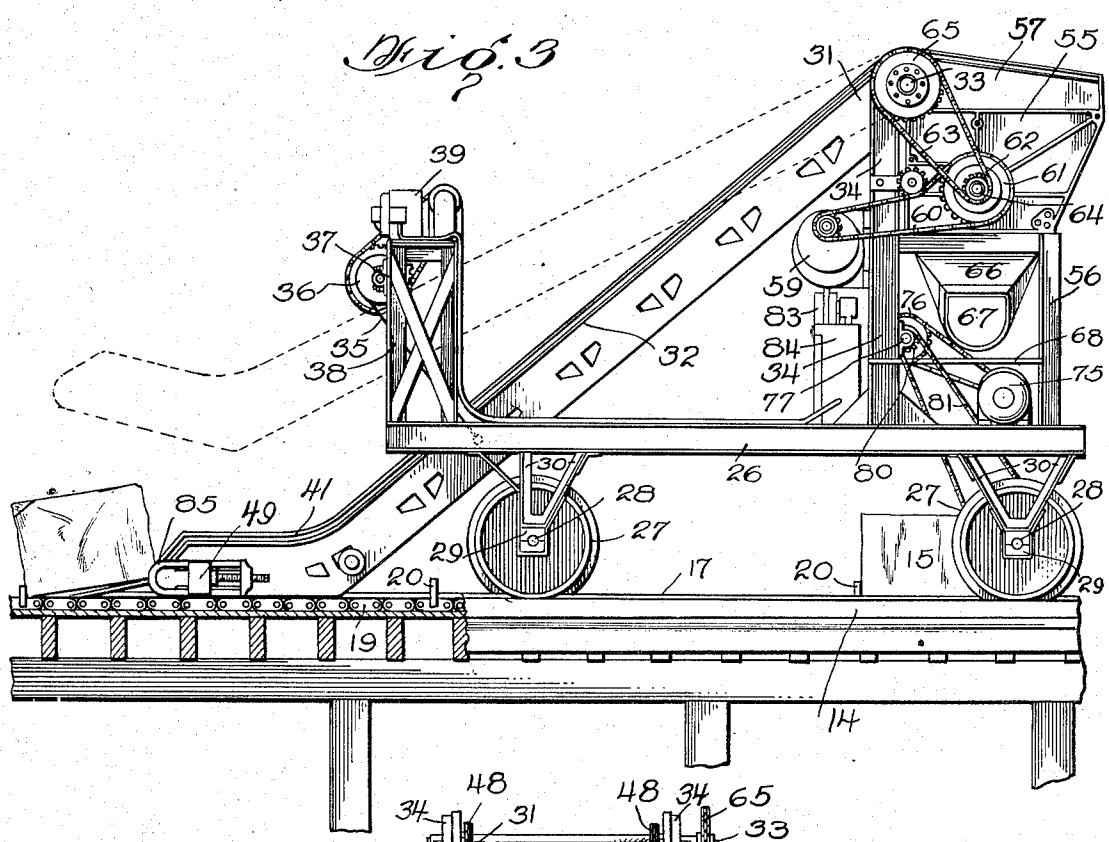
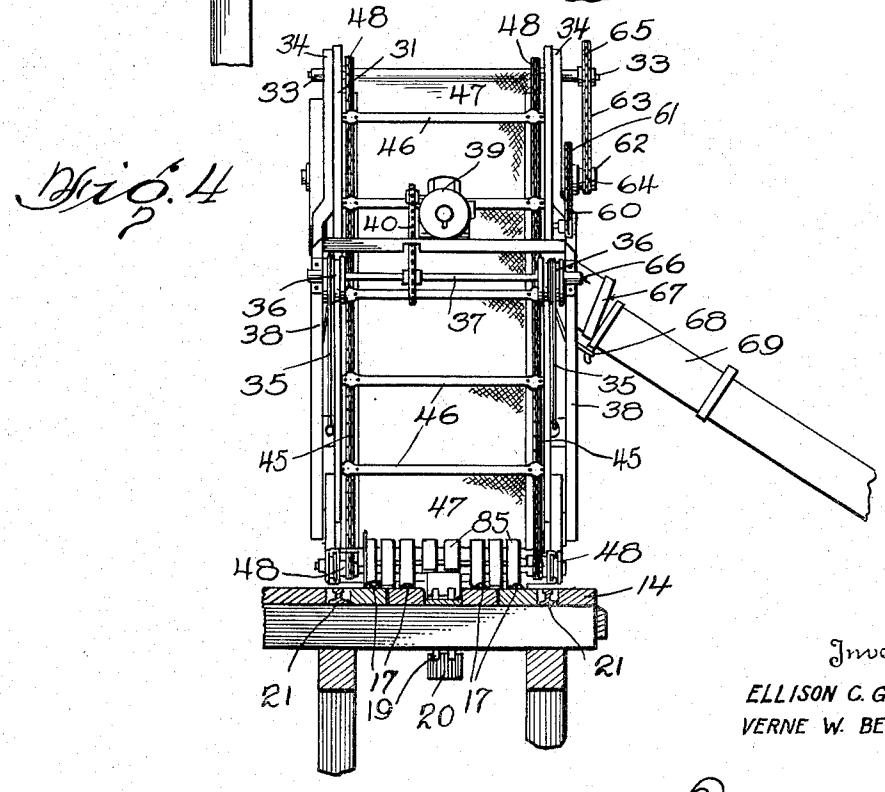


Fig. 4



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Patented Dec. 8, 1936 2,063,431

UNITED STATES PATENT OFFICE

2,063,431

APPARATUS FOR ICING RAILWAY REFRIGERATOR CARS OR OTHER VEHICLES

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Application May 28, 1935, Serial No. 23,934

8 Claims. (Cl. 83—63)

This invention relates to improvements in mobile equipment for icing refrigerator cars and other vehicles, and particularly to a portable, or automotive machine by which block ice on an icing platform is elevated onto the machine and crushed to a suitable size for delivery directly into the bunkers or ice chambers of refrigerator cars or vehicles.

While the embodiment of the invention herein illustrated is intended primarily for icing railway refrigerator cars, it is, of course, intended to disclose that the invention is also applicable to the icing of motor trucks, trailers or the like, for use in refrigerated transport service generally.

Heretofore, refrigerator cars have been supplied with ice from ice storage houses to which each refrigerator car is moved, stopped, iced, and then moved on. It has also been proposed to use ice handling apparatus mounted for movement on the same tracks or siding on which the refrigerator cars are located. It has also been known to provide ice handling equipment mounted on a road vehicle which is moved to the side of a refrigerator car, and operated to transfer ice from another vehicle to the ice bunkers of the refrigerator car.

It is the object of this invention to provide an ice handling device which may be operated on and along a platform located adjacent to a track or siding on which a number of refrigerator cars to be iced are positioned.

It is another object of the invention to provide a device adapted to receive cake or block ice from the platform, elevate the blocks in the device for discharge into an overhead crusher, crush the ice, and deliver the crushed ice into the ice bunkers of refrigerator cars.

It is the further object of this invention to provide a mobile ice elevator and crusher adapted to be moved along an elevated car icing platform for receiving ice from the platform, and constructed with respect to its running gear to straddle and pass ice cakes which are to be conveyed to other ice handling equipment at different positions along the platform.

The further object of this invention is to provide an economical and efficient device for quickly transferring ice from a conveyor to an ice crusher, and to deliver the crushed ice directly to the hatch of a refrigerator car ice bunker.

Another object of the invention is to provide ice handling apparatus that is preferably automotive, and which is adapted to move along a platform to successive operating positions for delivering crushed ice successively to each of a number of refrigerator cars.

Other objects and advantages of the invention will be apparent from the following detailed description of an embodiment of the invention as shown in the accompanying drawings, wherein

Figure 1 is a perspective view of a preferred form of the complete ice handling equipment for icing refrigerator cars;

Figure 2 is a perspective view of the mobile apparatus shown in Figure 1, with its ice receiving end raised to a position which allows block ice to pass beneath the machine, or the machine to move along the platform without interference with block ice that may be moving or distributed therealong;

Figure 3 is a side elevation of the apparatus shown in Figure 1; and

Figure 4 is an end view of the machine showing the elevating conveyor and apron extension in position to receive ice from the platform.

Referring to Figure 1 of the drawings, a number of refrigerator cars in position to be iced are indicated generally at 10 and 11. The cars shown are intended to represent a train or portion of a train of refrigerator cars standing on a main track or on a siding for icing. Refrigerator cars usually are provided with ice bunkers located within and at both ends of the car. These bunkers are supplied with ice through the hatches 12 in the roof of the car. The hatches are provided with suitable insulated closures 13 for covering the hatches 12 after the cars have been iced.

Adjacent and parallel to the track on which the cars 10 and 11 are located is an icing platform 14 which may extend the length of several refrigerator cars, or the entire length of a train of cars. The platform 14 is elevated and preferably is slightly higher than the roofs of the cars, as shown in Figure 1. Ice in cake or block form 15 is supplied to the platform 14 in any desired manner, and may be supplied from an adjacent ice manufacturing or storage plant 16, indicated in Figure 1, or it may be delivered to the icing platform from a distant plant by any suitable vehicles or conveyors.

The surface of the platform 14 is preferably provided with projecting runners 17, usually of metal, on which the cakes, or blocks of ice 15 are supported. The runners 17, if of metal, tend to form grooves in the underside of each ice cake and thereby effectively guide the ice during its movement along the platform. A power driven conveyor is preferably used to positively move the ice cakes along the platform, and such a

conveyor may consist of an endless chain 19, suitably supported in a groove or slot in the platform between the runners 17. The chain 19 is provided with upstanding lugs 20 spaced along its length at suitable intervals to engage and propel the blocks of ice 15 along the platform.

To guide the movements of the mobile elevator and crusher along the platform 14, the latter is also provided with a longitudinal pair of parallel rails 21 which may be of railroad type and which are supported in the platform structure, so that the upper surface of the rails is approximately flush with the upper surface of the platform. Suitable stops or bumpers 22 may be provided at the end of each rail 21.

Referring now to Figures 2, 3, and 4, showing in detail the preferred embodiment of portable elevator and ice crusher of this invention, the supporting frame of the machine is indicated by the numeral 26. It is generally rectangular in shape, and may, e. g., be fabricated from structural steel members rigidly secured together by bolts, welding, or the like. The frame 26 is supported for movement along the platform on wheels 27, each wheel having a short or stub axle 28, journaled in suitable bearings 29, secured with reference to the frame 26 by braces or pedestals 30. The bearings 28 are arranged on both sides of and relatively close to each wheel so that the frame 26 may be supported on these wheels without the use of transverse axles extending from one side of the device to the other. A relatively large clearance is thereby provided beneath the frame 26, so that the device may easily straddle or pass blocks of ice on the platform. The wheels 27 are provided with a peripheral flange to maintain the wheels on the rails 21 during longitudinal movement of the device along the platform to any desired location. Obviously, rails 21 may be omitted and plain unflanged wheels be used for operation of the device along the surface of the platform, if desired.

The upper ends 31 of an inclined elevator or conveyor 32 are pivotally supported above the frame 26 on a horizontal shaft 33 journaled in the upper ends of the vertical frame members 34. The lower portion 41 of the elevator 32 is supported by the tension cables 35 which are adapted to be wound on the drums 36 suitably secured to a jack shaft 37 journaled in upright frame members 38. Rotation of the shaft 37, for instance, by the use of a geared electric motor 39 and a chain drive 40, causes the cables 35 to be wound or unwound on the drums 36 for lifting or lowering the lower portion 41 of the elevator 32. The lifted position of the elevator is shown by dotted lines in Figure 3.

The elevator 32 is preferably of the endless chain type, having a chain 45 at each side thereof (see Figure 4), and provided with a plurality of transverse bars 46 connecting the chains. The bars 46 may be of angle iron or may be tubular in shape. The elevator is provided with a sheet metal or wooden floor 47, along which the ice cakes 15 slide as they are conveyed up the incline by the bars 46. Suitable sprockets 48 are provided for the conveyor chains 45 at the upper and lower ends of the incline. An adjustment 49 is provided for the bearings of the chain sprockets at the lower end of the elevator for enabling slack in the chains to be eliminated. Suitable guide grooves of wood or metal may be provided on the upper and under sides of the incline surface 47 to guide the movement of the chains 45 as is conventional in the conveyor art.

An ice crusher 55, of any known construction, is supported above the frame 26 on the upright structural members 56 and 34. The crusher preferably has an open hopper 57 on its upper side to which the ice is directed, and into which it moves, by gravity, after reaching the top 31 of the inclined elevator 32. The crusher supporting members 34 and 56 may be suitably braced by cross members 58 to provide a rigid supporting structure. The crusher 55 (the details of which are not a part of this invention) may be of conventional construction having a plurality of picks angularly secured to a rotating drum (not shown). A geared electric motor 59 (see Figure 3) is secured to the frame members 34 and connected by a chain or belt drive 60 to the drive sprocket 61 of the crusher shaft 62 for rotating the latter. Another chain or belt drive 63 is provided between a second sprocket 64 on the crusher shaft 62 and a sprocket 65 secured to the conveyor shaft 33. The conveyor chains 45 engage sprockets secured to the pivot shaft 33 and are driven by the rotation of said shaft. Thus the motor 59 is operatively connected to simultaneously drive the crusher 55 and to operate the elevator 32.

The outlet of the ice crusher 55 is provided with a hopper 66 having a side spout 67. A horizontal rod 68 or the like is provided below and adjacent to the outlet 67 and securely fastened to the frame uprights 34 and 56. As shown in Figures 1 and 4, a removable telescoping, metal chute 69 is supported at its upper end to the horizontal hanger 68, and its lower end is supported by resting on or projecting into the hatch 12 of the refrigerator car ice bunker. By shortening or extending the length of the chute 69, it is possible to reach the various hatches 12 of the cars 10 and 11, or to reach the hatches of cars (not shown) that may be located on one or more tracks, removed from the platform 14.

The ice elevator and crusher may be provided with an electric motor 75 for propelling the same along the track 21. The motor 75 is shown connected by chain drive to a sprocket 76 on jack shaft 77, the latter being journaled in bearings secured to the frame uprights 34. A suitable clutch 78 operated by a hand lever 79 (see Figure 2) is provided to mechanically connect the sprocket 76 to the shaft 77 for driving the latter. The shaft 77 is also provided with one or more sprockets 80, suitably secured or keyed thereto for driving the rail engaging wheels 27 through chains or belts 81 extending between the sprockets 80 and 82 carried by the wheels 27.

Suitable control switches, e. g., push-button control switches 83, and a terminal box 84 are secured to the frame 26 (see Figure 3) to permit centralized control of the electric motors 39, 59, and 75. Also, suitable outlet sockets may be provided at intervals along the platform 14, and a flexible connector cable (not shown) used between one of such sockets and the terminal box 84 to furnish electrical power for operation of the machine, and to propel it along the icing platform, as its position with respect to standing cars requires. Any suitable overhead trolley system or other means for supply of current to the mobile machine may be used in place of the described connector cable as will be readily apparent to one skilled in the art.

The foot or forward end 41 of the inclined elevator 32 is provided with a removable ramp or apron 85 extending between the elevator and the surface of the platform 14. The apron 85 may

be of metal or wood and is provided at the center with a slot or opening **86** in its leading edge to permit conveyor lugs **20** to pass through the apron. Suitable hooks or hinges are used to secure the upper edge of the apron to the lower end **41** of the elevator.

When using the preferred form of the above-described ice elevator and crusher, the refrigerator car or train of cars to be iced is positioned or "spotted" on a track parallel and adjacent the elevated platform **14**. Ice in the form of cakes or blocks is supplied to the platform **14** either from the adjacent ice house **16** or from a distant plant. Large ice blocks may be cut into smaller units either before or after reaching the platform. Preferably ice blocks weighing about 300 pounds each are received on the platform and conveyed to positions therealong convenient to the elevating and crushing apparatus where they are cut into units of 50 to 100 pounds each prior to being directed onto the elevator **41**. During movement along the platform, the ice blocks slide on the longitudinal runners **17** which melt or cut grooves in the under surface of each block, such grooves serving effectively to guide the blocks along the platform.

The ice elevator and crusher may be moved along the platform **14** manually or by the described electric motor drive, to a location conveniently adjacent the hatches **12** of ice bunkers to be filled. It will be noted that the elevator and crusher device is so constructed that when the lower end **41** of the elevator is raised, the device has ample underside clearance to straddle ice on the platform so that ice for other delivery points along the platform may pass beneath one machine, or an elevating and crushing machine may be moved along the platform without interfering with ice that is being distributed by a conveyor or is positioned at any point in or along the path of the moving machine.

When the apparatus has been located conveniently adjacent a car to be iced, the telescoping chute **69** is positioned with its upper end supported on the hanger **68** beneath delivery spout **67** of the ice crusher. The lower end of the chute **69** is then placed for discharge into one of the hatches **12** of an ice bunker. The lower end **41** of the ice elevator **32** is next lowered from the position shown in Figure 2, to the position indicated in Figures 1 and 3 by operation of the geared motor **39** and the cable drums **36** connected thereto. The apron **85** is secured to the lower end **41** of the elevator, preferably by hinge connection thereto, and inclined downwardly to contact the surface of the platform **14** at a small angle. An ice block, propelled along the platform manually, or by the conveyor **20**, arrives at the apron **85**, and is upwardly directed thereby into a position to be received on the elevating conveyor **41**. In case the platform is not provided with a longitudinal ice conveyor, the ice blocks may be manually distributed along the platform and similarly pushed up the apron **85** onto the elevator **41**.

The elevator and crusher, driven by the geared motor **59**, are now in operation, and as ice reaches the lower end **41** of the elevator, a cross bar **46** of the elevator engages a block of ice and positively moves it up the inclined surface **47**. At the top of the elevator, the ice falls into the hopper **57** of the power-driven ice crusher **55**. In the latter, the ice is broken into small pieces of desired size and discharged by gravity into the hopper **66** beneath the crusher. The crusher, as previously stated, may be of known construction and preferably is of a type that is provided with adjustable crushing elements so that crushed ice of desired size range can be produced. The crushed ice collecting in the hopper **66**, falls from the hopper spout **67** into the chute **69** and it slides to the ice bunker hatch **12**. The spout **67** may, if desired, be provided with a gate valve to control the rate of delivery of crushed ice into the ice chute. A motor operated crushed ice slinger or blower (not shown) may be substituted for the ice chute **69**. In such case, crushed ice from the hopper **66** slides into such a slinger which forces the crushed ice through a flexible hose for the top icing of commodities in the adjacent vehicle requiring direct refrigeration.

After an ice bunker has been filled with crushed ice, to the desired degree, the elevator and crusher apparatus may be moved in either direction, along the platform to the other end of the car, or to any other of the cars that is required to be iced. When the apparatus is moved along the platform, the removable ramp **85** should be removed or swung up and onto the end **41** of the elevator, and the telescoping chute **69** removed from the hanger **68**. If there is no ice on the platform to be passed, the elevator need not be raised to the position shown in Figure 2; but if there are blocks of ice standing on the platform or being moved therealong, to other icing points, then the lower end **41** of the elevator should be raised to the position shown in Figure 2, in which position the apparatus straddles and clears ice in its movement along the platform.

It will be observed that by the use of the above described equipment, the icing of refrigerator cars may be rapidly and efficiently accomplished. Thus, a train of refrigerator cars may be completely iced without the necessity of "spotting" each car at a definite position for individual icing. By simultaneously using several of the described portable ice elevator and crusher devices, all operating on the same platform, long trains may be iced in a very short time, and with a minimum of shifting or spotting. The equipment permits the ice to reach the bunkers immediately after crushing, and thereby losses due to melting are minimized.

Although the apparatus shown and described is illustrated as operated by electric motors, other sources of power, such as an internal combustion engine, may be used instead. Also, various obvious changes in the size, shape, proportion and minor details of construction may be resorted to without sacrificing any of the advantages of, or departing from the herein disclosed invention.

What is claimed is:

1. In apparatus for supplying crushed ice to railway cars and/or road vehicles, the combination comprising, an ice handling and distributing platform paralleling and adjacent to a track or roadway on which vehicles to be iced may be positioned, a mobile ice crushing machine movable along said platform and over block ice distributed thereon to any point conveniently located with respect to the vehicle to be iced, means mounted on said machine for transferring block ice from said platform to the crushing mechanism of said machine, means for shifting said transferring means to a position clear of block ice on said platform, and means for delivering crushed ice from the crushing mechanism directly to a vehicle adjacent said platform.

2. In apparatus for supplying crushed ice to railway cars and/or road vehicles, the combination comprising an elevated ice handling and distributing platform paralleling and adjacent to a track or roadway on which vehicles to be iced may be positioned, the working surface of said platform being at approximately the level of the roofs of the vehicles, a mobile ice crushing machine movable along said platform and over block ice distributed thereon to any point conveniently located with respect to the vehicle to be iced, means mounted on said machine for transferring block ice from said platform to the crushing mechanism of said machine, means for shifting said transferring means to a position above and clear of block ice on said platform, and means for delivering crushed ice from the crushing mechanism directly to a vehicle adjacent said platform.

3. In apparatus for supplying crushed ice to railway cars and/or road vehicles, the combination comprising, an ice handling and distributing platform paralleling and adjacent to a track or roadway on which vehicles to be iced may be positioned, a mobile ice crushing machine movable along said platform and over block ice distributed thereon to any point conveniently located with respect to the vehicle to be iced, apron means extending between said platform and said machine for guiding block ice from said platform onto said machine, elevator means mounted on said machine for transferring block ice to the crushing mechanism of said machine, means to raise said apron and elevator means clear of block ice on said platform, and means for delivering crushed ice from the crushing mechanism directly to a vehicle adjacent the said platform.

4. In apparatus for supplying crushed ice to railway cars and/or road vehicles, the combination comprising, an ice handling and distributing platform paralleling and adjacent to a track or roadway on which vehicles to be iced may be positioned, runner means projecting above the surface of said platform and extending longitudinally thereof, conveyor means on said platform for distributing block ice along said runner means, said conveyor means being located parallel and adjacent to said runner means, rails on said platform extending longitudinally thereof, a mobile ice crushing machine movable along said platform on said rails and over block ice distributed along said runner means, said machine being movable to any point on said rails conveniently located with respect to the vehicle to be iced, means mounted on said machine for elevating block ice from said runner means to the crushing mechanism of said machine, and means for delivering crushed ice from the crushing mechanism directly to a vehicle adjacent the said platform.

5. In an ice crushing machine operative along an icing platform to receive and crush block ice and to deliver crushed ice to refrigerator vehicles located adjacent to said platform, the combination comprising, a running gear for said machine having clearance thereunder for allowing block ice to pass beneath the machine, ice crushing mechanism supported on said machine, means supported on said machine for transferring block ice from said platform to said crushing mechanism, means on said machine for raising said first-mentioned means to a position of sufficient elevation to avoid contact with block ice on said platform, and conducting means for discharging crushed ice from said crushing mechanism into said refrigerator vehicles.

6. In an ice crushing machine operative along an icing platform to receive and crush block ice and to deliver crushed ice to refrigerator vehicles located adjacent to said platform, the combination comprising, a running gear for said machine having clearance thereunder for allowing block ice to pass beneath the machine, ice crushing mechanism supported in the upper part of said machine, means pivotally supported on said machine for elevating block ice from said platform and discharging said ice into said crushing mechanism, means on said machine for raising said first-mentioned means to a position of sufficient elevation to avoid contact with block ice on said platform, and inclined means for guiding the crushed ice discharged from said crushing mechanism directly into said refrigerator vehicles.

7. In an ice crushing machine operative on rails along an icing platform to receive and crush block ice and to deliver crushed ice to refrigerator vehicles located adjacent to said platform, the combination comprising, a running gear for said machine including flanged wheels operating on said rails and a separate stub axle for each of said wheels, said running gear being constructed to provide clearance thereunder for allowing block ice to pass beneath the machine, ice crushing mechanism carried by said machine, elevating means carried by said machine for transferring block ice from said platform to said crushing mechanism, driving means carried on said machine for operating both said crushing mechanism and said elevating means, and means for raising said elevating means clear of block ice on said platform.

8. In an ice crushing machine operative along an icing platform to receive and crush block ice and to deliver crushed ice to refrigerator vehicles located adjacent to said platform, the combination comprising, a running gear for said machine including wheels operating on said platform and a separate stub axle for each of said wheels, said machine being supported sufficiently above said wheels to avoid contact with block ice on said platform beneath said machine and between said wheels, ice crushing mechanism carried by said machine, ice elevating mechanism supported on said machine for transferring block ice from said platform to said crushing mechanism, means for raising said elevating means to a position of sufficient elevation to avoid contact with block ice on said platform, and means carried on said machine for operating said mechanisms and driving said machine along said platform.

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