Jan. 10, 1967 H. D. BUXTON 3,296,818

SYSTEM OF PRECOOLING PRODUCE ON TRUCKS

Filed Nov. 26, 1965 3 Sheets-Sheet 1

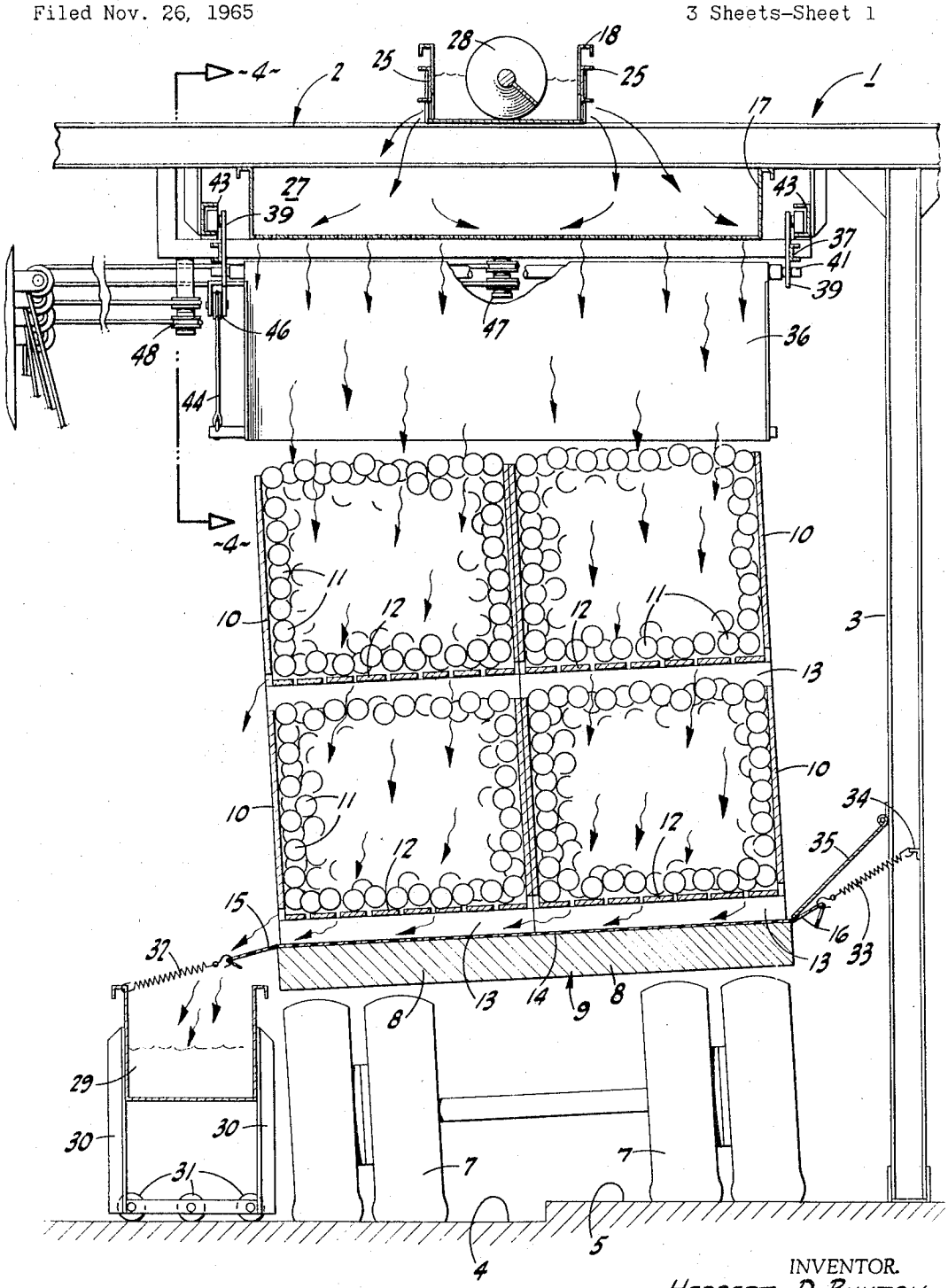


FIG-1

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Jan. 10, 1967 H. D. BUXTON 3,296,818

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Filed Nov. 26, 1965 3 Sheets-Sheet 2

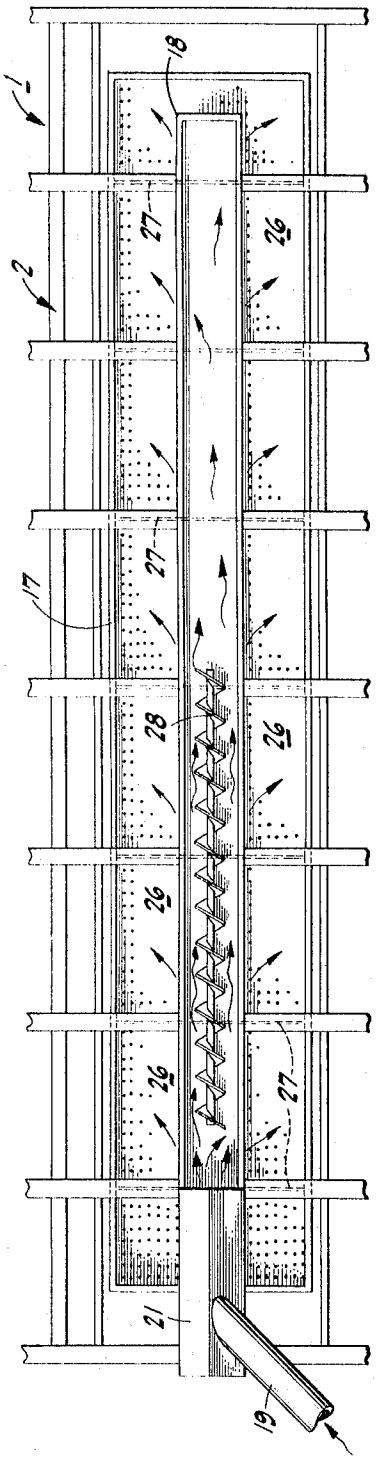


FIG-3

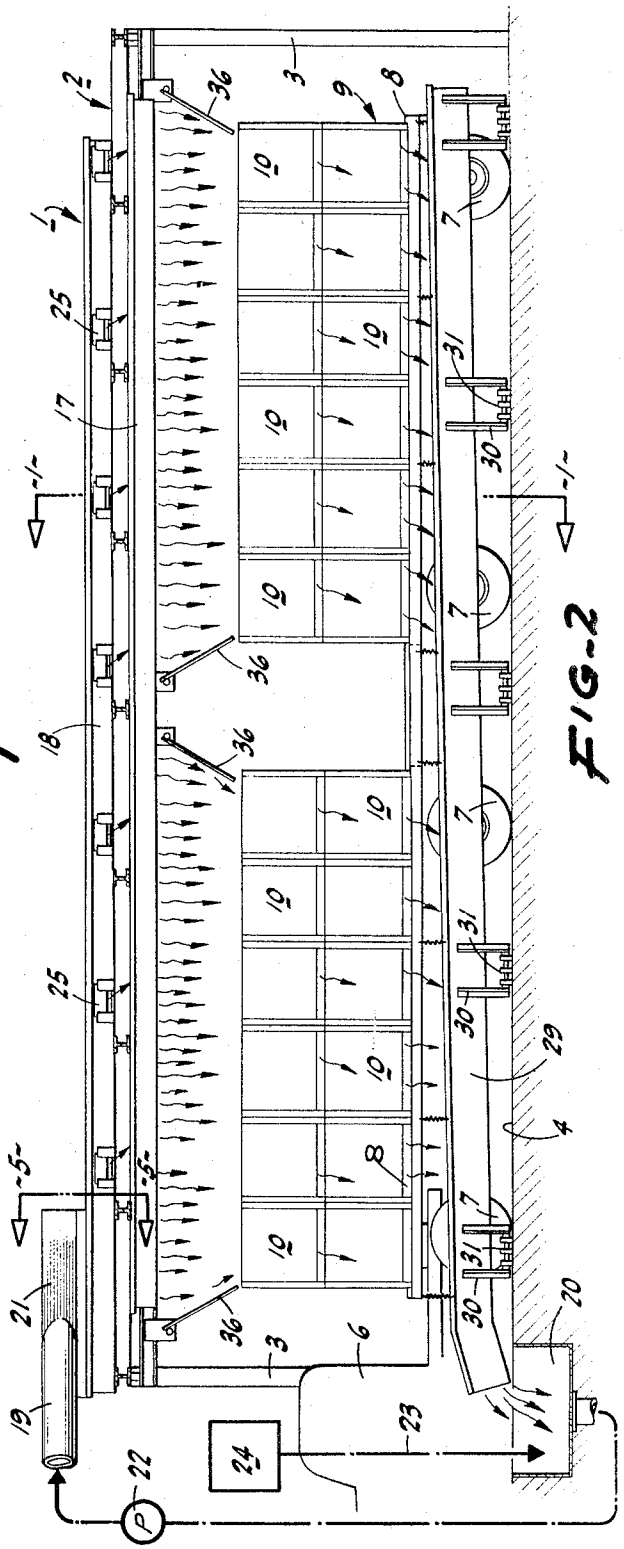


FIG-2

Jan. 10, 1967 H. D. BUXTON 3,296,818

SYSTEM OF PRECOOLING PRODUCE ON TRUCKS

Filed Nov. 26, 1965 3 Sheets-Sheet 3

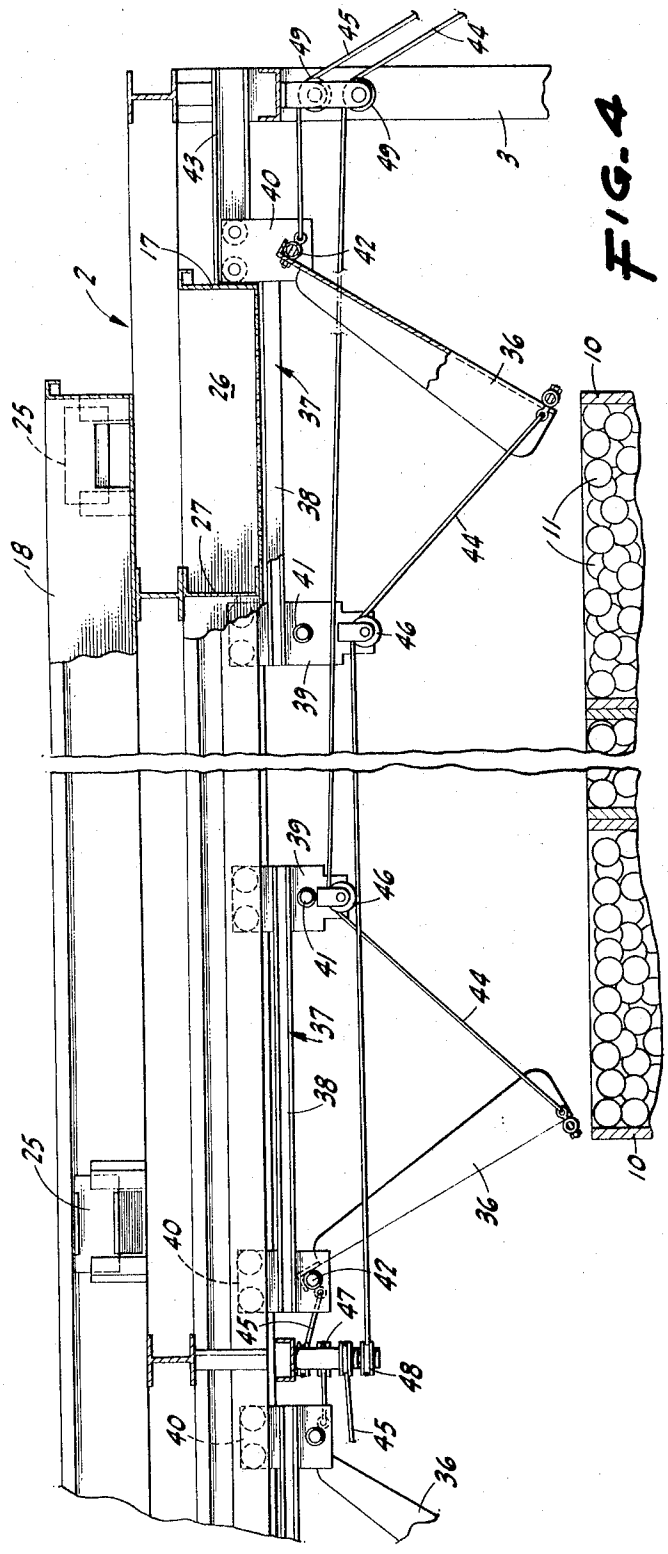


FIG. 4

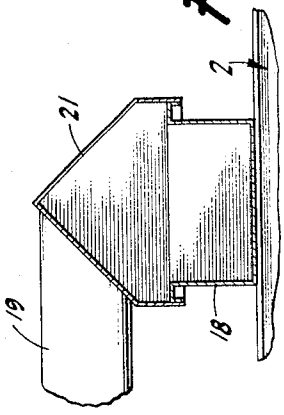


FIG. 5

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SYSTEM OF PRECOOLING PRODUCE ON TRUCKS

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10 Claims. (Cl. 62—259)

This invention relates in general to the precooling—for transport—of bulk produce (such as peaches or tomatoes) whereby to reduce deterioration of such produce.

In those instances which require bulk produce to be transported by truck from a harvest area to a processing plant many miles distant and in a warm climate, it is desirable that the produce be precooled at or soon after the start of such transport.

It is, therefore, the major object of this invention to provide a novel system (preferably located reasonably near—in trucking time—to the harvest areas) which is operative to precool bulk produce carried in bins on a transport truck; the bins remaining on the truck during the precooling operation. This is a most advantageous feature as substantial saving in time and expense is effected in comparison to prior practices wherein produce was unloaded for precooling and then reloaded on the truck.

Another important object of the invention is to provide a precooling system, as above, in which the produce in the bins is subjected to a high volume shower of low temperature water; such water shower reducing the temperature of the produce as well as cleaning the same.

An additional important object of the invention is to provide a novel arrangement for recovery and recirculation of the low temperature water after passing through the produce bins; such arrangement including a truck-receiving station having a floor which causes the truck bed to assume an incline to one side thereof, a flexible waterproof sheet on the truck bed beneath the produce bins, and a trough extending alongside the truck in a position to receive the low temperature water after it passes through the bins and sheds from said waterproof sheet at the low side of the inclined bed.

A further object of the invention is to provide a produce precooling system designed for convenience and economy of operation.

A still further object of the invention is to provide a practical and reliable produce precooling system and one which is exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

FIG. 1 is an enlarged transverse sectional elevation taken on line 1—1 of FIG. 2; the view showing the system as in operation.

FIG. 2 is a longitudinal elevation of the system as in operation; the view being somewhat diagrammatic.

FIG. 3 is a fragmentary plan view showing mainly the shower-producing water pans.

FIG. 4 is a fragmentary sectional elevation taken on line 4—4 of FIG. 1; the view being foreshortened and showing mainly one pair of the water deflecting aprons and the carriages therefor.

FIG. 5 is an enlarged fragmentary cross section on line 5—5 of FIG. 2; the view showing the anti-splash hood between the water supply pipe and the receiving trough.

Referring now more particularly to the drawings and to the characters of reference marked thereon, the system comprises a truck port, indicated generally at 1; such truck port—which is open at both ends—including a top

or elevated open frame structure 2 supported on one side by posts 3. The other side of the frame structure 2 is also suitably supported.

The floor 4 of the truck port 1 is of a length extending completely therethrough, and on one side thereof such floor includes a raised longitudinal portion 5.

The floor 4 is adapted to receive a truck 6 having wheels 7 and a bed 8. As the illustrated truck is shown with a trailer 9, all reference herein to the truck shall be deemed to include such trailer, and the wheels and bed of the latter are thus likewise indicated at 7 and 8, respectively.

The truck 6 normally carries on each bed 8 thereof a load of stacked bins 10, and which bins contain the produce 11; such bins being open at the top as shown and having a slotted bottom 12. Additionally, the bins are each fitted at the bottom and at opposite sides with transversely extending, supporting cleats 13. Thus, with respect to the bottommost bins 10, a substantial space exists between the slotted bottoms 12 and the truck bed 8; such space providing a water flow area as will hereinafter appear.

Further, the truck 6 is provided on each bed 8 and beneath the related stacked bins 10 with a flexible waterproof sheet 14 preferably of heavy duty plastic such as polyethylene. Each waterproof sheet 14 extends the full length of the related bed 8 and is of somewhat greater width than the latter whereby to provide skirts 15 and 16 at opposite sides of such bed 8.

When the truck 6 is driven into the truck port 1 and stands on the floor 4, the wheels 7 at one side rest on the floor 4, whereas the wheels on the other side rest on the raised portion 5 of said floor. As a consequence, the truck is tilted laterally somewhat toward one side and which imparts a corresponding incline to the beds 8.

The frame structure 2 is fitted on the underside thereof with an elongated shower-producing water pan 17 which is of a length and width to substantially vertically register with both beds 8 and the stacked bins thereon when a truck 6 stands in the truck port 1.

The water pan 17 is, as shown, provided in the bottom thereof with a multiplicity of perforations; such perforations producing a shower of water beneath the pan 17 when water in substantial volume is supplied thereto.

A substantial volume of low temperature water is continuously supplied to the pan 17—when the system is in operation—in the following manner:

The frame structure 2 supports on top thereof, and centrally of the sides of the water pan 17, an elongated water supply trough 18 which extends substantially the full distance of the water pan but terminates short of the ends thereof. A water supply pipe 19 leads from a sump 20 upwardly to and discharges into the trough 18 at one end thereof; the point of discharge of the water from the pipe 19 being embraced by an anti-splash hood 21. A pump 22 is interposed in the pipe 19 and serves to draw water from the sump 20 and feed such water through pipe 19 into trough 18. The sump 20 is located near one end of the truck port 1, and the water in such sump is maintained at low temperature by crushed ice fed through a line 23 from a block ice crusher indicated diagrammatically at 24.

As the low temperature water delivers in substantial volume from pipe 19 into the trough 18, such water flows through gates 25 into corresponding compartments 26 of such pan; the latter being separated into a longitudinal row of compartments by means of transverse partitions 27. The gates 25 are of a slide type which can be manually opened or closed. The purpose of this arrangement is so that the water flow to certain of the compartments 26 may be shut off if such compartments do not occupy a position over a portion of the load on a truck in the truck port. For example, if a truck without a trailer

is in the truck port, then only a portion of the length of the water pan **17** will be required for the precooling operation.

As the low temperature water from the pipe **19** delivers into the trough **18** at relatively high velocity, it is necessary to decelerate the flow in such trough. This is accomplished by the expedient of mounting in the trough **18** a helical water velocity decelerator **28**.

Upon a truck **6** being positioned in the truck port **1** beneath the water pan **17**, an elongated water catch trough **29** is moved into position alongside the truck adjacent the low side of each bed **8** and the waterproof sheet **14** thereon; such trough sloping from one end to the other, and at the lower end discharging into the sump **20**.

The water catch trough **29** is supported by standards **30** provided with rollers **31** whereby the trough can be moved from a laterally spaced position to another position close to the truck, as shown in FIG. 1.

After the water catch trough **29** has been so positioned, the skirt **15** of the waterproof sheet **14** is connected to such trough in a manner to hold the skirt outstretched and overhanging said trough; this being accomplished by spring-hook units **32** which connect between the skirt and the outside top lip of the trough.

With the truck in place in the truck port, and with the water catch trough **29** and skirt **15** in the relationship described above, the pump **22** is started. This delivers low temperature water in substantial volume from the sump **20** to the trough **18** and thence to the water pan **17**. From the perforate pan **17**, the water descends as a cold shower upon the produce **11** in the bins **10**; this operation being carried out over a period of fifteen to twenty minutes. During such period, the water as it flows downwardly in the bins **10** materially reduces the temperature of the produce **11** and thus effectively cools such produce for subsequent transport—often in hot weather—to a processing plant and which may be located many miles distant. As a result, the produce **11** (which may be covered with a layer of crushed ice immediately after the precooling operation) arrives at the processing plant in much better condition than would otherwise be the case.

Further, by virtue of the low temperature water flowing downwardly in the bins **10** over the produce **11**, the latter is cleaned; this being a further advantage with respect to subsequent processing of such produce.

After the water passes completely through the stack of bins **10** on each bed **8**, the water escapes onto the waterproof sheet **14** and thence flows laterally—in the spaces between the bin cleats **13**—to the low side of such sheet; hence the water delivers down the outstretched skirt **15** and into the catch trough **29**. As such catch trough **29** delivers to the sump **20**, there is a constant recirculation of the water used in the precooling operation. Also, as hereinbefore indicated, the water in the sump **20** is supplemented by crushed ice from the crusher **24**. As a result, the recirculating water is maintained—at all times during the operation—at a low temperature.

In order to prevent the shower of water from escaping in part on the side of the truck opposite the catch trough **29**, the skirt **16** is—during the precooling operation—maintained in an outstretched position by means of spring-hook units (one of which is indicated at **33**), and which units attach to a post-supported bar **34**. Additionally, a hinged longitudinal deflector plate **35** extends at a downward and inward incline to a point above the outstretched skirt **16**; such deflector plate **35** being mounted in connection with the posts **3**.

It is also desirable to prevent any appreciable amount of the shower of water to fall beyond the ends of the stack of bins **10** on each bed **8**. This is accomplished—for each such stack of bins—by means of a longitudinally spaced pair of depending, transversely extending water deflecting aprons **36** disposed at a downward incline in the direction of each other and positioned so that their lower edges are above and in a position to discharge into the top and endmost bins of said stack.

The aprons **36** of each pair are adjustably mounted in the following manner:

Disposed to occupy a position generally above each bed **8** is a pair of longitudinally spaced carriages **37**; each such carriage including transversely spaced side bars **38** spanning between front and rear roller or trolley brackets **39** and **40** connected by front and rear cross rods **41** and **42**, respectively.

The roller or trolley brackets **39** and **40** are suspended from longitudinal rails **43** whereby the carriages **37** are longitudinally adjustable in their positions relative to each other and to the related stack of bins **10**.

At their upper edges, the aprons **36** are turnably secured on and depend from the related cross rod **41** or **42**.

Adjustment of each carriage **37** in a longitudinal direction is accomplished by opposed pull ropes **44** and **45**. Each pull rope **44** leads from adjacent one lower corner of the related apron **36** up to and over a pulley **46** on the opposed roller or trolley bracket on the same side of the carriage, while each pull rope **45** is connected to an intermediate point on the cross rod from which the related apron depends. Beyond each carriage **37** the opposed pull ropes **44** and **45** lead to direction-changing pulley units **47**, **48**, and **49** as the case may be. Beyond the direction-changing pulley units **47**, **48**, and **49**, the ropes **44** and **45** are suitably guided as necessary to lead to the ground for manipulation and selective anchoring.

By manipulating each pair of opposed pull ropes **44** and **45**, the corresponding carriage can be moved to properly position its apron **36** relative to the stack of bins **10**, and to set the apron at the proper incline.

From the foregoing description, it will be readily seen that there has been provided a produce precooling system as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth the present and preferred details of the produce precooling system still in practice such deviations from such details may be resorted to as do not form a departure from the spirit of the invention as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

1. A system of precooling a load of bulk produce on a truck, comprising a precooling station having a floor on which the truck stands, the truck having a waterproof sheet under the load, said floor being arranged to tilt the truck to impart a lateral incline to the waterproof sheet, and means to deliver a shower of low temperature water into the load from above the same, the water upon passing through the load being received on the waterproof sheet and then shedding from the low side thereof.

2. A system, as in claim **1**, including means to recover and recirculate the water thus shedding from such waterproof sheet.

3. A system, as in claim **2**, in which said water recovery and recirculating means includes an elongated catch trough alongside the truck in a position adjacent said low side of the waterproof sheet.

4. A system, as in claim **3**, in which the truck includes a bed on which the waterproof sheet is disposed; the low side of said waterproof sheet including a longitudinal skirt extending laterally beyond the adjacent side of the bed, and means between the trough and skirt holding the latter in an outstretched position overhanging said trough.

5. A system, as in claim **1**, in which the truck includes a bed and the produce being in bed-supported bins open at the top and foraminous at the bottom; the waterproof sheet being disposed on the bed beneath said bins.

6. A system, as in claim **1**, in which said shower means includes an elongated water pan supported in an elevated position above the load on a truck at said station, such

pan having a multiplicity of shower-producing preforations in the bottom thereof, and means to supply low temperature water in substantial volume to the pan.

7. A system, as in claim 6 in which said water supply means includes a trough above and extending lengthwise of the pan, the latter being transversely partitioned into separate compartments, gates on the trough to selectively control the flow of water from said trough into such separate compartments, and a pipe to feed the low temperature water to the trough.

8. A system of precooling a load of bulk produce in bins on the bed of a truck, the bins being open at the top and foraminous at the bottom; said system comprising a precooling station having a floor on which the truck stands and a frame structure above the truck, the truck having a waterproof sheet on the bed beneath the bins, said floor being arranged to tilt the truck to impart a lateral incline to the bed and said waterproof sheet, an elongated water pan on the frame structure above the bins on a truck at said station, such pan having a multiplicity of shower-producing perforations in the bottom thereof, means to supply lower temperature water in substantial volume to said pan, the water shower from the latter falling on the produce and upon passing through the bins being received on the waterproof sheet and then shedding from the low side thereof, and means to recover and recirculate to the pan the water thus shedding from such waterproof sheet.

9. A system, as in claim 8, in which said water recovery and recirculating means includes an elongated catch trough alongside the truck adjacent the low side of the waterproof sheet; such catch trough sloping toward one end, and means supporting the catch trough for movement in a direction toward or away from the truck.

10. A system, as in claim 8, including longitudinally spaced, transversely extending water-deflecting aprons beneath the water pan, and means mounting said aprons on the frame structure for adjustment lengthwise of the pan and relative to the bins on the truck bed; adjacent aprons inclining downwardly in the direction of each other.

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