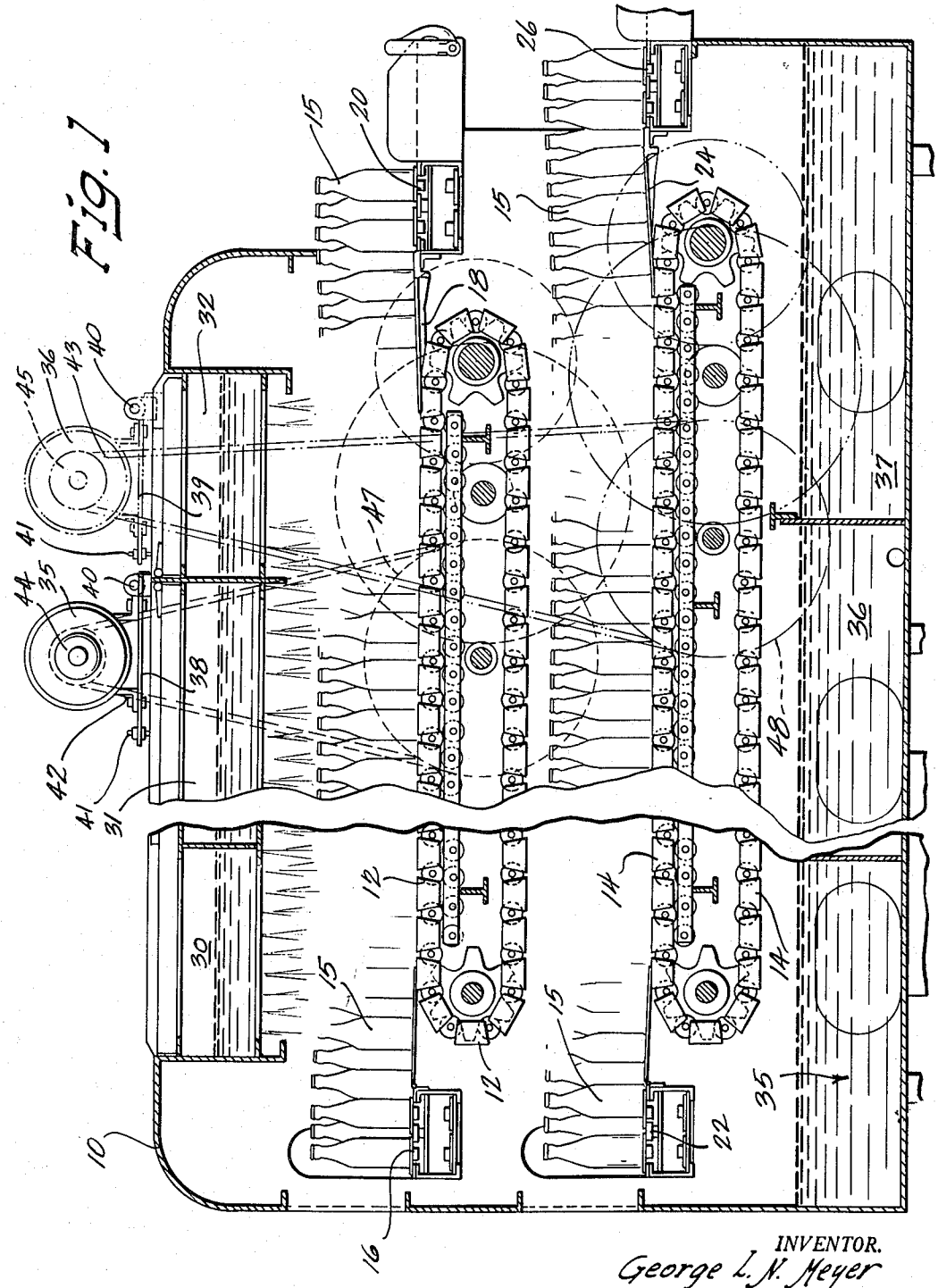
Jan. 31, 1956 G. L. N. MEYER 2,732,788

MULTITIER PASTEURIZER

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Fig. 1



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MULTITIER PASTEURIZER

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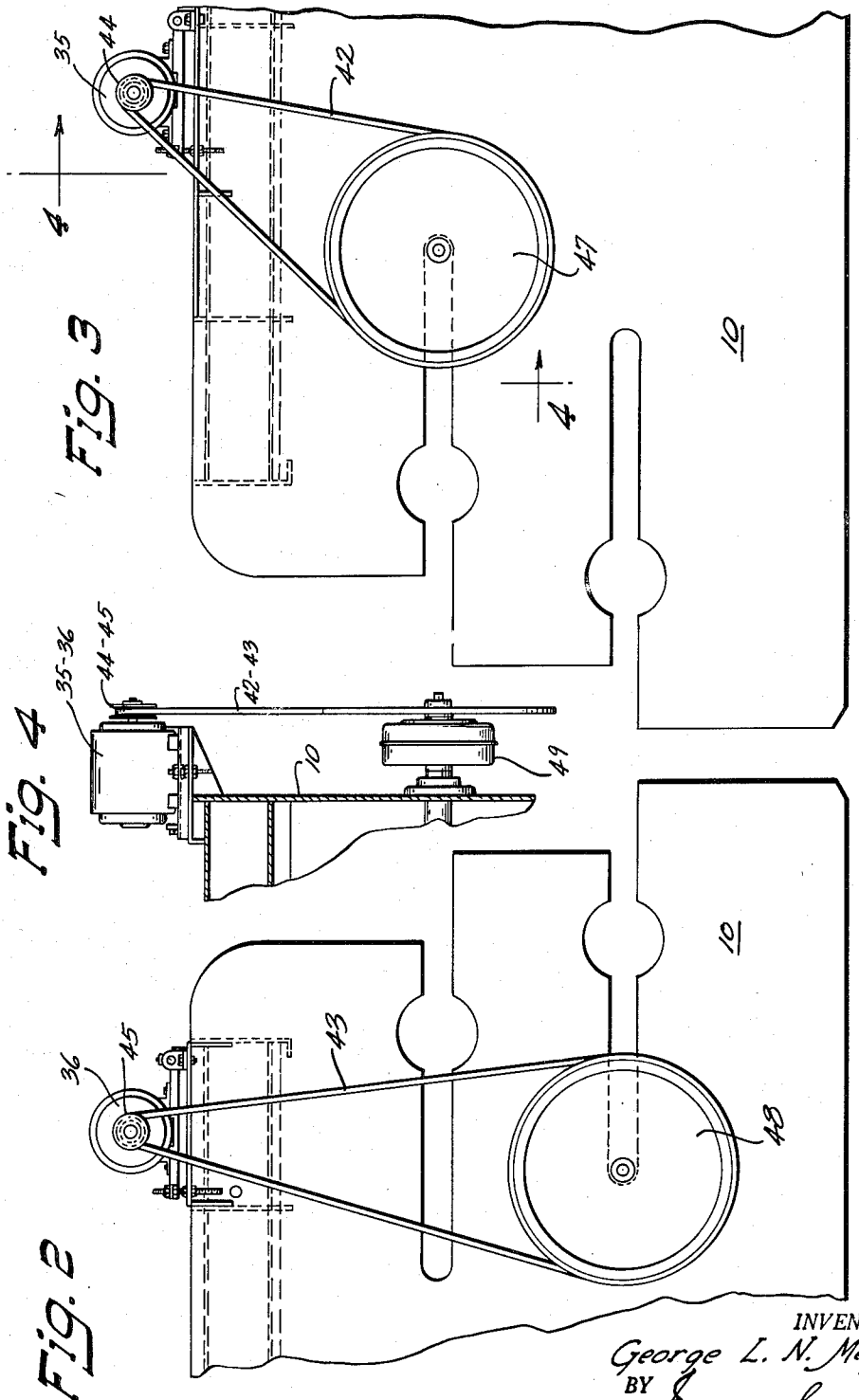


Fig. 3

Fig. 4

Fig. 2

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MULTITIER PASTEURIZER

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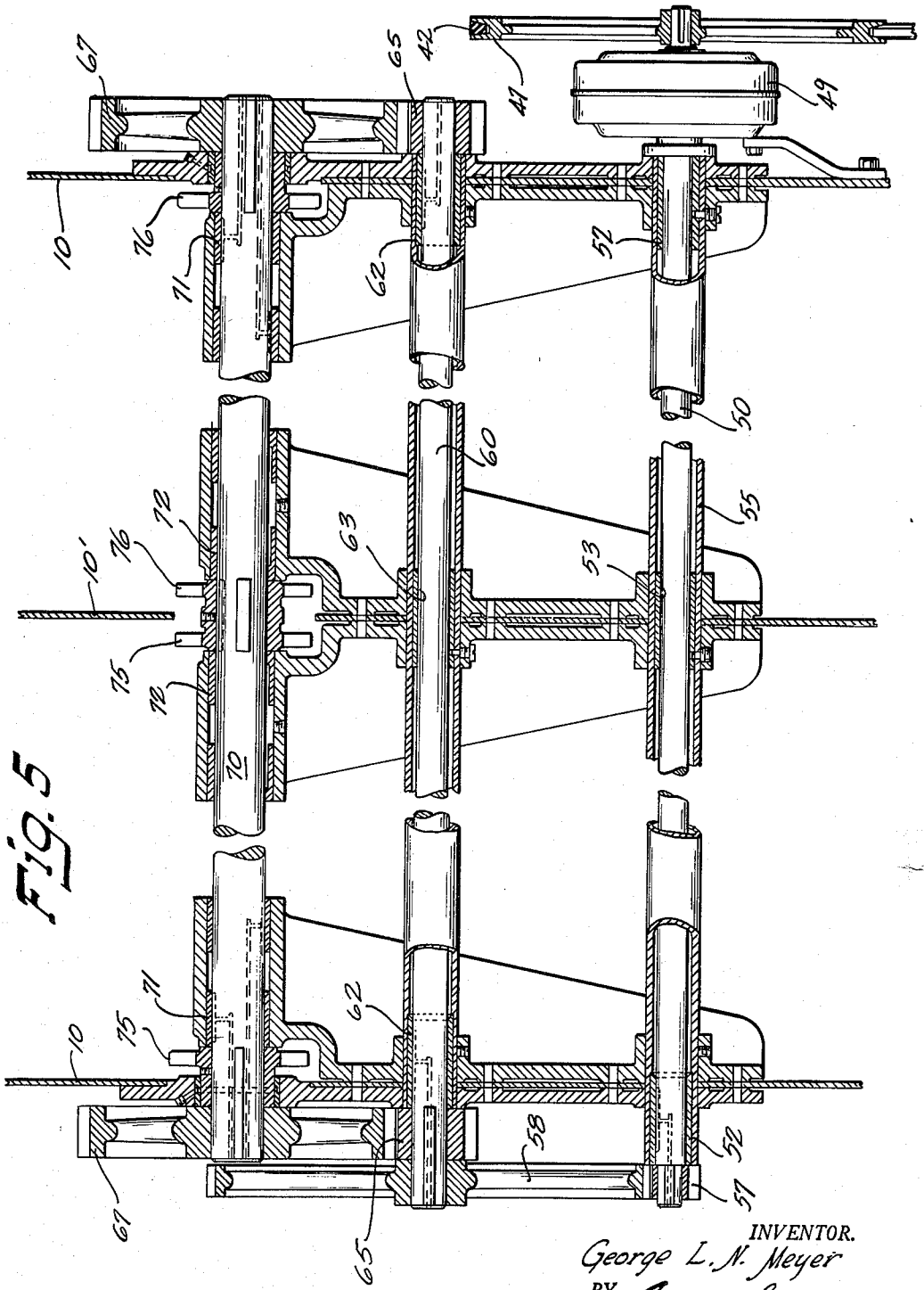


Fig. 5

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2,732,788

MULTITIER PASTEURIZER

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Application January 21, 1953, Serial No. 332,152

5 Claims. (Cl. 99—360)

This invention relates to a multi-tier pasteurizer of the spray type and to the operation thereof.

In spray type pasteurizers, the material to be pasteurized is carried on a conveyor under sprays of water at various temperatures, including one at pasteurizing temperature. The speed of the conveyor and/or the length of the spray tank is made such that the material is heated to and retained at the correct pasteurizing temperature for the proper length of time after which it is cooled.

For any given material the length of time at which the material must be held at pasteurizing temperature, in order to destroy bacteria, is constant no matter what size container is used. However, the total time, which is known as the "processing time," that a container remains in the pasteurizer varies with both the size of the container or package and with the material used for packaging. For example, a large bottle of beverage, in general, will require a longer processing time than a small bottle of the same beverage due to the fact that it requires a greater length of time to raise the temperature of the beverage in the larger bottle to pasteurizing temperature and a greater length of time to cool the beverage at the conclusion of the pasteurizing. However, the time the beverage is held at pasteurizing temperature or "holding" time is identical for both bottles.

Similarly, a twelve ounce bottle of beverage will require a longer processing time than a twelve ounce can of the same beverage due to the fact that the can is a better conductor of heat than the bottle and hence the beverage in the can reaches pasteurizing temperature faster than beverage in the bottle and also loses heat faster at the conclusion of the pasteurization.

It is an object of the present invention to provide a pasteurizer of the spray type in which the spray is utilized to maintain a pasteurizing temperature in similar containers in a plurality of tiers, in which the processing conditions in the containers in each of the tiers is substantially identical.

Another object is to provide a spray type multitier pasteurizer adapted to maintain pasteurizing temperature in containers for identical holding times with variable processing times.

A further object is to provide a spray type pasteurizer adapted to maintain a pasteurizing temperature in a plurality of groups of containers, simultaneously, where each group requires a different holding period.

A further object is to provide a spray type pasteurizer with a plurality of conveyors, which is adapted to maintain different holding times for the containers on the various conveyors.

A still further object is to provide a multi-tier pasteurizer adapted to maintain identical pasteurizing conditions in the material carried on the various tiers where the processing time for the various materials varies.

A still further object is to provide a multi-tier pasteurizer adapted to maintain identical pasteurizing conditions on the several tiers where the various tiers require different processing times due to different sizes of containers.

Still further objects will become apparent from the following specification, which, when taken in conjunction with the accompanying drawings illustrates a preferred embodiment of the invention.

In the drawings:

Fig. 1 is a longitudinal vertical cross-section through a spray type pasteurizer embodying the present invention;

Fig. 2 is an elevation view of one end of the pasteurizer shown in Fig. 1, and showing the drive member for the lower conveyor;

Fig. 3 is an elevational view of one end of the pasteurizer shown in Fig. 1 and showing the drive member for the upper conveyor;

Fig. 4 is a partial transverse section through the drive members shown in either Figs. 2 or 3; and

Fig. 5 is a horizontal cross-section through the drive gears for either upper or lower conveyor showing the driving means therefor.

In the drawings, the machine is enclosed in a casing **10**, the pasteurizer comprising an upper longitudinal conveyor **12** and a lower longitudinal conveyor **14**, the conveyors **12** and **14** defining two distinct tiers at which pasteurization is effected.

Containers **15** are loaded onto the upper longitudinal conveyor **12** by a transverse intake conveyor **16** and are transported by the conveyor **12** through the pasteurizer and are discharged onto a take off plate **18** from whence they are pushed by subsequent containers onto a transverse conveyor **20** for delivery to a labeler.

Similarly, containers **15** are loaded onto the lower longitudinal conveyor **14** by a transverse intake conveyor **22** similar and parallel to the conveyor **16**, are transported longitudinally through the pasteurizer on the lower longitudinal conveyor **14** and are delivered onto a take off plate **24**, from whence they are moved onto a transverse conveyor **26** by pressure from subsequent containers.

As the containers travel longitudinally through the machine on the conveyors **12** and **14**, water from tanks **30**, **31**, **32** is sprayed over the containers in the upper tier and passes over those containers and through apertures in the conveyor **12**.

The water passing through the conveyor **12** then falls on the containers in the lower tier and passes through apertures in the conveyor **14** and is caught in tanks **35**, **36** and **37**.

The water in the tanks **30**, **31**, **32** is maintained at temperatures suitable so that as the containers **15** pass beneath the tanks **30**, **31**, **32** they are heated to pasteurizing temperature, maintained at pasteurizing temperature for the required length of time and subsequently cooled.

When one size bottle is being run on the upper conveyor **12** and a different size bottle is being run on the lower conveyor **14**, different pasteurizing and/or processing times are required for each size bottle, the same being true where two different products are run.

Generally, variations in pasteurizing time may be accomplished either by variations in conveyor speed or by maintaining the speed of the conveyor constant and varying the length of the pasteurizer.

In the present invention, as seen in Figs. 2, 3 and 4, a motor **35** is used to actuate the conveyor **12** and a separate motor **36** is used to actuate the conveyor **14**. The motors **35** and **36** are mounted on plates **38—39**, respectively, which plates are pivoted to the casing **10** by hinges **40—40**.

The plates **38—39** are angularly adjustable through screws **41—41** to vary the position of drive belts **42—43** in adjustable drive pulleys **44—45** carried by the motors **35—36**, respectively. The belts **42—43**, which are of the V-belt type drive pulleys **47—48**, respectively.

The pulley **47**, which constitutes the main drive member for the upper conveyor **12**, drives the intake shaft of

a planetary reduction gear 49. The output shaft of the planetary reduction gear drives a shaft 50 which is mounted between the forward and return flights of the conveyor 12 and extends between the side walls of the outer casing 10 of the machine. Bearings 52—52 in the side walls 10 of the machine and a bearing 53 in the center dividing wall 10' support the shaft 50. The entire shaft 50 is carried in a tubular casing 55 to keep it from contact with water.

The shaft 50 carries a pinion 57 on the opposite end thereof from the gearing 49, the gear 57 meshing with a gear 58 carried by a shaft 60. The shaft 60 extends between the two side walls 10 of the pasteurizer, and is mounted in bearings 62—62 with a central bearing 63 in the center wall 10' supporting the center of the shaft.

The shaft 60 carries gears 65—65 mounted adjacent the ends of the shaft and keyed thereto. The gears 65—65 mesh with gears 67—67 carried on the opposite ends of a shaft 70, the gears 67—67 being keyed to the ends of the shaft 70 to drive it.

The shaft 70 is mounted in bearings 71—71 carried by the side walls 10 of the casing and by a bearing 72 carried by the central dividing wall 10'. Sprockets 75—75 and 76—76 are mounted to be driven by the shaft 70, the sprockets being mounted on the forward end of the forward or work flight of the conveyors 12 and form the drive means for the conveyors 12.

The drive for the conveyors 14 is identical to that of the conveyors 12 and hence will not be described in detail.

The conveyors 12 and 14 form the subject of a copending application Serial No. 332,151, filed January 21, 1953, by the same inventor and are described in detail therein.

Operation

In operation the machine is started by starting the motor drives (not shown) of the conveyors 16, 20, 22 and 26 together with the motors 35 and 36 to drive the conveyors 12 and 14. The speed of the conveyors 12 and 14 may be varied by changing the angle of the mounting plates 38—39, since raising the plates 38—39 causes the belts 42—43 to ride deeper in the pulleys 44—45 to reduce the speed of the conveyors 12 and 14.

Before operation begins, the pumps (not shown) are started pumping water at the proper temperatures from the tanks 35—36—37 into the tanks 30—31—32 from where the water is sprayed over the conveyors 12 and 14 and over the containers 15 carried thereby.

It will be noted that the provision of independent motors 35 and 36 to operate the conveyors 12 and 14, respectively, permits the machine to pasteurize two separate materials requiring different pasteurizing and/or processing times, simultaneously, or to pasteurize two different sizes of containers of the same material requiring different pasteurizing and/or processing times, simultaneously.

It will be realized that the hereinbefore described form of the invention is to be taken merely as a preferred embodiment thereof and that various changes in size, shape and arrangement of parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. A pasteurizer of the character described comprising, a casing, a spray tank positioned in said casing adjacent the top thereof and adapted to spray hot liquid through the bottom thereof, a first longitudinal conveyor adapted to support and transport material to be pasteurized through said machine, said conveyor being positioned beneath said tank and in the path of the liquid from the spray, a second longitudinal conveyor positioned beneath the first named conveyor and receiving liquid from the spray passing through said first conveyor, said second conveyor being adapted to support and transport material to be pasteurized through the machine, and means beneath the second conveyor to collect the sprayed liquid from said tank.

2. A pasteurizer of the character described comprising, a casing, a spray tank positioned in said casing adjacent the top thereof and adapted to spray hot liquid through the bottom thereof, a first longitudinal conveyor adapted to support and transport material to be pasteurized through said machine, said conveyor being positioned beneath said tank and in the path of the liquid from the spray, a second longitudinal conveyor positioned beneath the first named conveyor and receiving liquid from the spray passing through said first conveyor, said second conveyor being adapted to support and transport material to be pasteurized through the machine, means beneath the second conveyor to collect the sprayed liquid from said tank, and means to vary the speed of the first named conveyor.

3. A pasteurizer of the character described comprising, a casing, a spray tank positioned in said casing adjacent the top thereof and adapted to spray hot liquid through the bottom thereof, a first longitudinal conveyor adapted to support and transport material to be pasteurized through said machine, said conveyor being positioned beneath said tank and in the path of the liquid from the spray, a second longitudinal conveyor positioned beneath the first named conveyor and receiving liquid from the spray passing through said first conveyor, said second conveyor being adapted to support and transport material to be pasteurized through the machine, means beneath the second conveyor to collect the sprayed liquid from said tank, and means to vary the speed of the second named conveyor.

4. A pasteurizer of the character described comprising, a casing, a spray tank positioned in said casing adjacent the top thereof and adapted to spray hot liquid through the bottom thereof, a first longitudinal conveyor adapted to support and transport material to be pasteurized through said machine, said conveyor being positioned beneath said tank and in the path of the liquid from the spray, a second longitudinal conveyor positioned beneath the first named conveyor and receiving liquid from the spray passing through said first conveyor, said second conveyor being adapted to support and transport material to be pasteurized through the machine, means beneath the second conveyor to collect the sprayed liquid from said tank, and means to vary the speed of one of said conveyors relative to the other said conveyor.

5. A pasteurizer of the character described comprising, a casing, a spray tank positioned in said casing adjacent the top thereof and adapted to spray hot liquid through the bottom thereof, a first longitudinal conveyor adapted to support and transport material to be pasteurized through said machine, said conveyor being positioned beneath said tank and in the path of the liquid from the spray, a second longitudinal conveyor positioned beneath the first named conveyor and receiving liquid from the spray passing through said first conveyor, said second conveyor being adapted to support and transport material to be pasteurized through the machine, means beneath the second conveyor to collect the sprayed liquid from said tank, and means to vary the speed of both said conveyors.

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