Sept. 8, 1936. W. STONEMAN, JR 2,053,540

HEAT EXCHANGE UNIT FOR WRAPPING MACHINES

Filed Sept. 7, 1935

Fig. 1

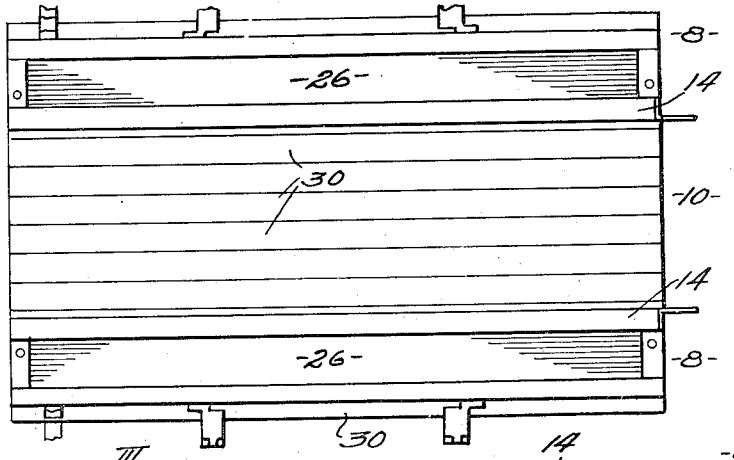

Fig. 2

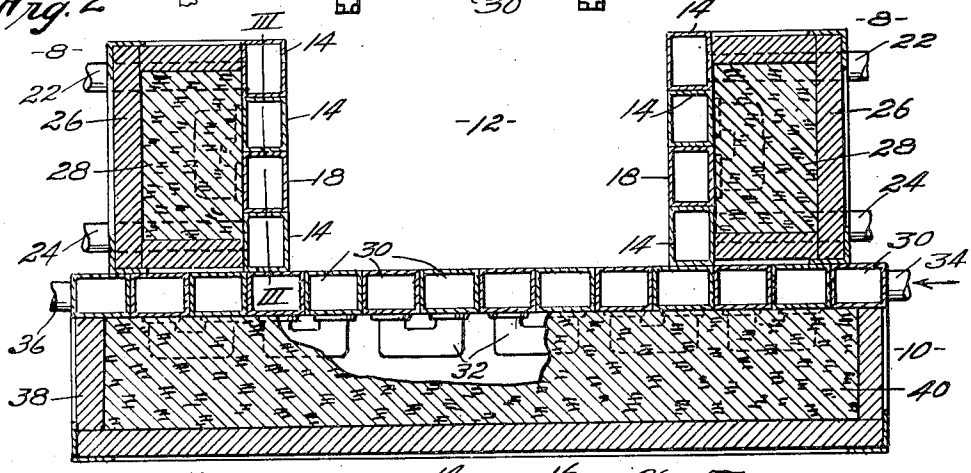

Fig. 3

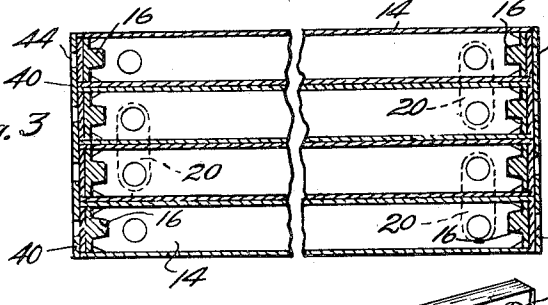

Fig. 5

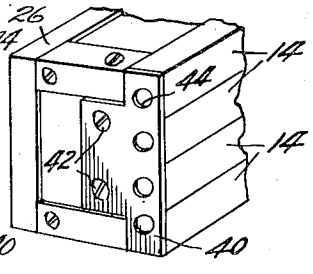

Fig. 4

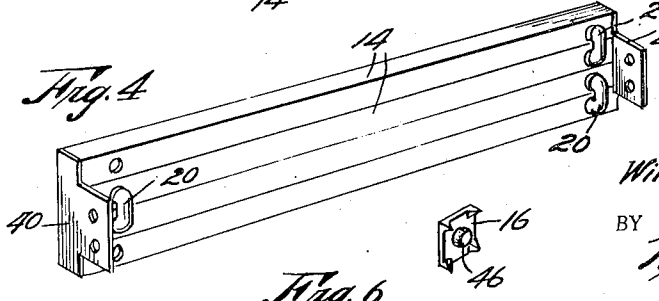

Fig. 6

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HEAT-EXCHANGE UNIT FOR WRAPPING MACHINES

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Application September 7, 1935, Serial No. 39,579

14 Claims. (Cl. 62—126)

This invention relates to package wrapping and sealing machines and particularly the heat-exchange unit thereof which is employed to congeal the hot seals of the package as it passes through the machine, and the primary object of this invention is the provision in such a unit of refinements of construction which will render the same more efficient, durable and generally desirable because of the advantages gained from its use.

One of the objects of the invention is to provide a heat-exchange unit for wrapping machines which has as a part thereof, a wall comprising a number of substantially straight, superimposed conduits for a refrigerant, disposed in such a way as to present and form a relatively smooth planar wall along which the packages are passed and through which heat units are passed from hot seal to refrigerant, whereby to quickly and positively congeal the seal.

Minor objects of the invention constitute important aims thereof and a large number of them will appear during the course of the following specification, referring to the accompanying drawing, wherein:

Figure 1 is a top plan view of an heat-exchange unit for wrapping machines embodying this invention.

Fig. 2 is a vertical cross section through the same.

Fig. 3 is a longitudinal, vertical, condensed, sectional view taken through the plurality of conduits of one of the side members and on line III—III of Fig. 2.

Fig. 4 is a perspective view of the plurality of conduits entirely removed from the remaining elements of the unit.

Fig. 5 is a perspective, fragmentary view of one end of one of the unit members illustrating the manner of attaching the plurality of conduits to the boxing, and,

Fig. 6 is a perspective view of one of the plugs for the conduit.

The manner of adjustably supporting the two opposed side members 8 and the base member 10 and the way of supplying a suitable refrigerant to the conduits of these members is well known in the art. The passageway 12 which is formed for the packages between side members 8 and base member 10 may be altered with respect to its width between side members 8 by merely moving said members toward and from each other.

The structure embodying the preferred form of this invention is designed to dispose the heat unit absorbing refrigerant as close to the hot seal as possible. It is further desired to have the refrigerant spread over the entire area of the contacting walls so that no voids along the contacting wall of members 8 and 10 will be presented to cause incomplete congealing and therefore a faulty seal. To this end, each of the members 8 of the selected embodiment of the invention illustrated comprises a plurality of conduits 14 that are rectangular in cross section and which have their ends closed by a plug 16 of special design.

Conduits 14 should be substantially straight from end to end and one face of each of the plurality of conduits 14 lies in a plane common with a face of the remaining conduits. The hollow wall thus formed by the plurality of conduits presents a substantially smooth surface 18, against which the seals of the package (not here shown) may be pressed and frictionally forced along as it traverses passageway 12.

Proximal conduits have their adjacent sides in abutting relation as illustrated in Figs. 2 and 3 and couplings are provided to interconnect the conduits 14 so that a serpentine path for the refrigerant is formed by conduits 14 and couplings 20. Connections to the coupled plurality of conduits 14 such as illustrated at 22 and 24 are provided for the purpose of introducing and removing the refrigerant. Each member 8 includes a boxing 26 that may be made of wood or metal and which has a filling of cork or other heat insulating material 28 therein to encase couplings 20 and which lies against the backs of the plurality of conduits 14 to the end that the action of the refrigerant is through the outer walls of the conduits which are in contact with package in passageway 12.

Base member 10 is constructed generally the same as side members 8 in that it has a plurality of superimposed edge-to-edge conduits 30 that are substantially rectangular in cross section and interconnected by couplings 32 so that a continuous serpentine path for the refrigerant is created from intake connection 34 to outlet connection 36. One of the flat faces of each conduit 30 is in a common horizontal plane with the flat faces of the remaining conduits, thereby to create a floor for the passageway.

A boxing 38 of wood or metal has a filling 40 of suitable insulated material so as to confine, as far as possible, the action of the refrigerant to the opposite sides of conduits 30.

The longitudinal abutting edges of conduits 14 and 30 are not interconnected other than by mere frictional engagement and the plurality of conduits 14 on each side member 8 are secured

to boxing 26 by a plate 40 which is rigidly affixed by screws or otherwise 42 to boxing 26 and which is soldered to the ends of conduits 14 in such a manner as to leave a layer of solder between the face of plate 40 and the ends of conduits 14. This solder is relatively pliable and plate 40 is flexible enough to permit expansion and contraction of conduits 14 while they are in place and without injury thereto. Plugs 16 are secured inwardly from the ends of conduits 14 and plate 40 is provided with a series of holes 44 through which may be poured ordinary soft solder for the purpose of filling the interstices between plug 16 and plate 40 to further present the desired cushioning aforementioned. Couplings 20 secure together conduits 14 at points spaced inwardly from the ends thereof and when the conduits 14 lengthen and shorten by expansion and contraction respectively, the structure just set down will be effective in preventing self-destruction to the members.

Conduits 30 or base member 10 may be similarly attached to boxing 38 and the conduits 30 plugged and connected in a specific manner as described with respect to conduits 14.

An advantageous way of casting plugs 16 is shown in Fig. 6 and since these plugs must be secured in place by welding or silver soldering, boss 46 serves to absorb and cause an even distribution of heat from the flame of the welding torch as assembly takes place. The surfaces of all conduits 14 and 30 which contact the package should be smooth and the refrigerant supplied to said conduits should be of sufficiently low temperature to quickly absorb heat units from the hot seal of the packages and in most instances the refrigerant should be of such a temperature as to create and maintain a thin layer of frost or ice on the surfaces being engaged by the hot seals.

The temperature that is sufficiently low to quickly absorb the heat units from the hot seals of the package is appreciably below the freezing point of water and therefore the refrigerant employed could not be ordinary circulating water, especially in view of the length of the unit which is appreciably shorter than those now employed in wrapping machines to attain the same end.

Only the preferred embodiment of the invention has been illustrated and described and it is understood that many modifications with respect to specific form might be made by one skilled in the art without departing from the spirit of the invention or scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a package wrapping machine of the kind described, a heat-exchange unit for congealing the hot seals of the packages comprising a plurality of straight conduits interconnected to form a wall and to have a refrigerant of sufficiently low temperature circulated therethrough to quickly absorb heat units from the hot seals of the packages as they contact the said wall, each of said conduits having a planar side, the planar sides of all of the conduits forming said wall being in a common plane whereby to present a substantially smooth surface to contact the seals of the packages.

2. In a package wrapping machine of the kind described, a heat-exchange unit for congealing the hot seals of the packages comprising a plurality of straight conduits interconnected to form a wall and to have a refrigerant of sufficiently low temperature circulated therethrough to quickly absorb heat units from the hot seals of the packages as they contact the said wall, proximal conduits of said plurality of conduits having their adjacent longitudinal sides in abutting relation.

3. In a package wrapping machine of the kind described, a heat-exchange unit for congealing the hot seals of the packages comprising a plurality of straight conduits interconnected to form a wall and to have a refrigerant of sufficiently low temperature circulated therethrough to quickly absorb heat units from the hot seals of the packages as they contact the said wall, each conduit of the said plurality of conduits having a planar side, the planar sides of the adjacent conduits being in abutting relation.

4. In a package wrapping machine of the kind described, a heat-exchange unit for congealing the hot seals of the packages comprising a plurality of straight conduits interconnected to form a wall and to have a refrigerant of sufficiently low temperature circulated therethrough to quickly absorb heat units from the hot seals of the packages as they contact the said wall, each conduit of said plurality of conduits having at least two planar longitudinal sides, proximal conduits having their adjacent planar sides in abutting relation and the other planar sides thereof disposed in a common plane for the purpose specified.

5. In a heat-exchange unit of the character described, a plurality of conduits, each rectangular in cross section and all having one side thereof in a common plane to present a smooth surface; and insulation overlying the other sides of all of said conduits.

6. In a heat-exchange unit of the character described, a plurality of closed-end, straight conduits, each rectangular in cross section and all having one side thereof in a common plane; insulation overlying the other sides of all of said conduits; and laterally projecting couplings joining adjacent conduits at points spaced inwardly from the ends thereof said couplings being embedded in said insulation.

7. In a heat-exchange unit of the character described, a plurality of closed-end, straight conduits, each rectangular in cross section and all having one side thereof in a common plane, proximal conduits having their adjacent edges in abutting relation; a boxing covering the other sides of said conduits; a filling of insulating material in said boxing and couplings joining adjacent conduits at points spaced inwardly from the ends thereof projecting into said boxing.

8. In a heat-exchange unit of the character described, a plurality of straight conduits, each rectangular in cross section and all having one side in a common plane; couplings joining the conduits at points spaced inwardly from the ends thereof to create a serpentine path for the passage of a refrigerant; and a plug for each end respectively of said conduits.

9. In a heat-exchange unit of the character described, a plurality of straight conduits, each rectangular in cross section and all having one side in a common plane; couplings joining the conduits to create a serpentine path for the passage of a refrigerant; and a plug for each end respectively of said conduits, each of said plugs being spaced inwardly from the end of the conduit which it closes.

10. In a heat-exchange unit of the character described, a plurality of straight conduits, all having one side in a common plane; couplings joining the conduits to create therewith a serpentine path for the passage of a refrigerant; a

support for the conduits; and a flexible bracket joining together the conduits and support adapted to permit expansion and contraction of the conduits with respect to the support.

11. In a heat-exchange unit of the character described, a plurality of conduits all having one side in a common plane; couplings joining the conduits to create therewith a serpentine path for the passage of a refrigerant; a boxing along the other sides of said conduits; and a flexible plate joining together all of said conduits at each end respectively of the plurality thereof and secured to said boxing whereby to permit expansion and contraction of the conduits with respect to the boxing.

12. In a heat-exchange unit of the character described, a plurality of conduits all having one side in a common plane; couplings joining the conduits at points spaced inwardly from the ends thereof to create therewith a serpentine path for the passage of a refrigerant; a plug closing each end of the conduits; a boxing along the other sides of said conduits; a flexible plate joining together all of said conduits at each end respectively of the plurality thereof and secured to said boxing; and a filling of pliable material between and serving to join together said conduits and plate.

13. In a heat-exchange unit of the character described, a plurality of conduits all having one side in a common plane; couplings joining the conduits at points spaced inwardly from the ends thereof to create therewith a serpentine path for the passage of a refrigerant; a plug closing each end of the conduits; a boxing along the other sides of said conduits; a flexible plate joining together all of said conduits at each end respectively of the plurality thereof and secured to said boxing; and a filling of pliable material between and serving to join together said conduits and plate, said plugs being spaced inwardly from the ends of the conduits to provide a space for the reception of said pliable material.

14. In a heat-exchange unit of the character described, a plurality of conduits all having one side in a common plane; couplings joining the conduits at points spaced inwardly from the ends thereof to create therewith a serpentine path for the passage of a refrigerant; a plug closing each end of the conduits; a boxing along the other sides of said conduits; a flexible plate joining together all of said conduits at each end respectively of the plurality thereof and secured to said boxing; and a filling of pliable material between and serving to join together said conduits and plate, said plugs being spaced inwardly from the ends of the conduits to provide a space for the reception of said pliable material, said boxing having a filling of heat insulating material therein encasing said couplings and in contact with the sides of said conduit.

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