

June 14, 1955

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2,710,641

COOLING MEANS FOR PACKAGE SEALS

Filed May 29, 1953

3 Sheets-Sheet 1

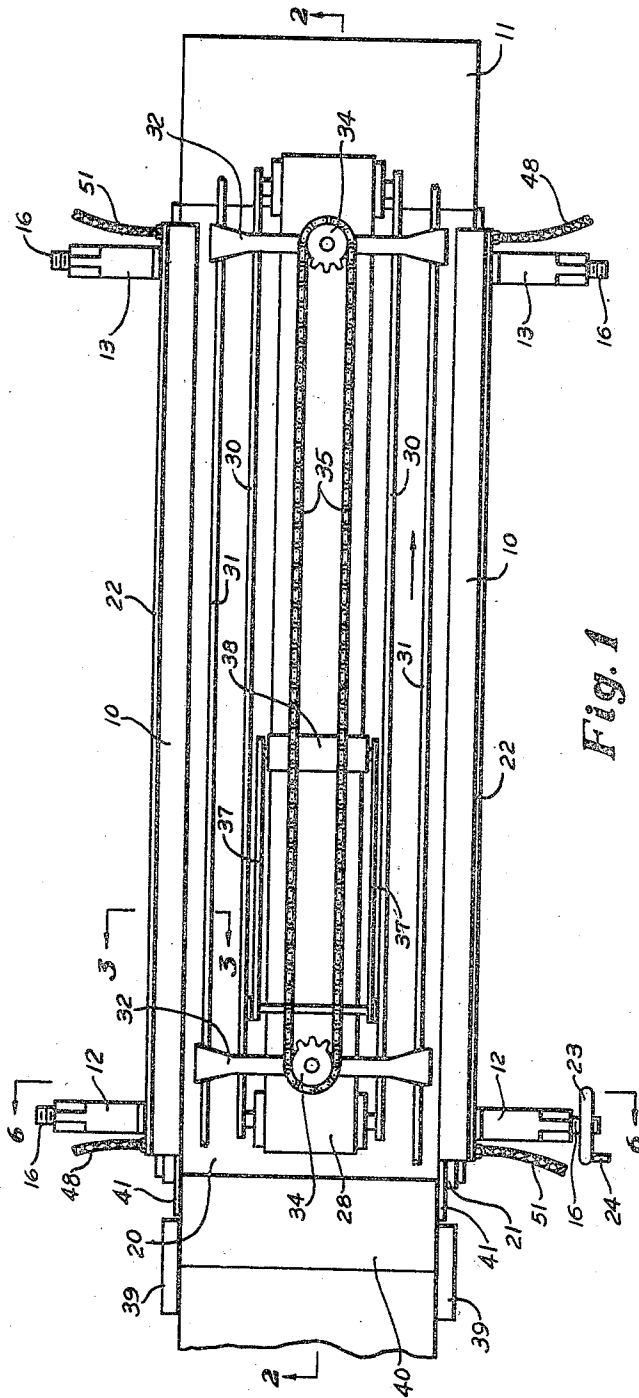


Fig. 1

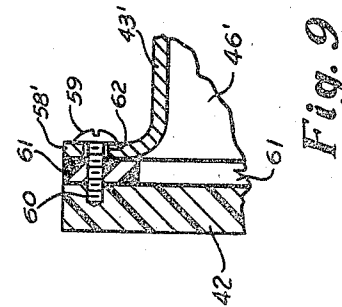


Fig. 9

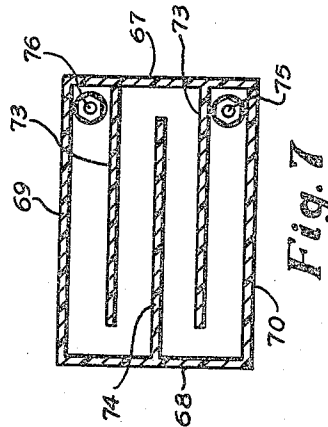


Fig. 7

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3 Sheets-Sheet 2

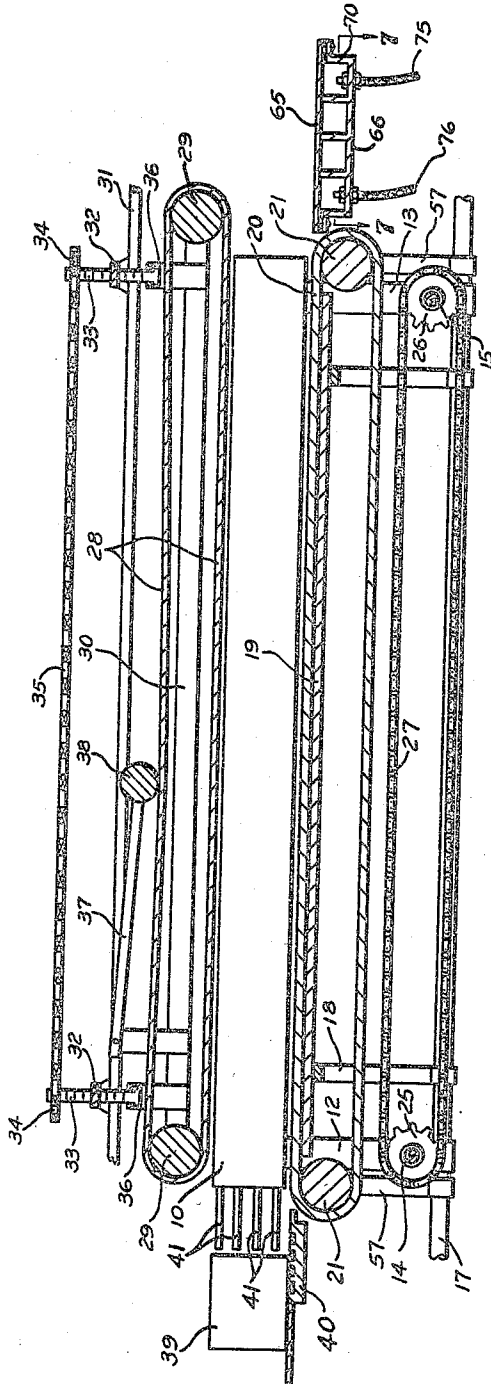


Fig. 2

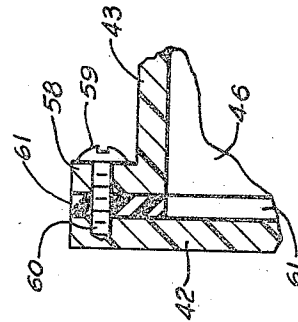


Fig. 4

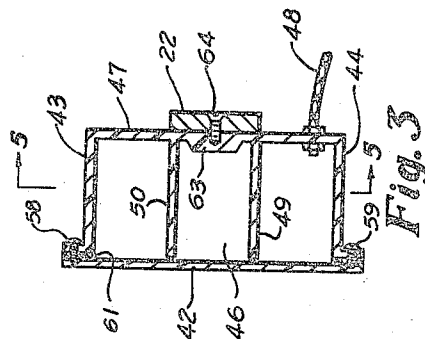


Fig. 3

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3 Sheets-Sheet 3

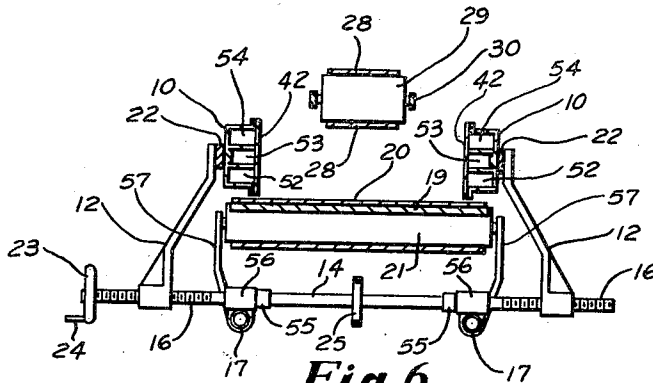


Fig. 6

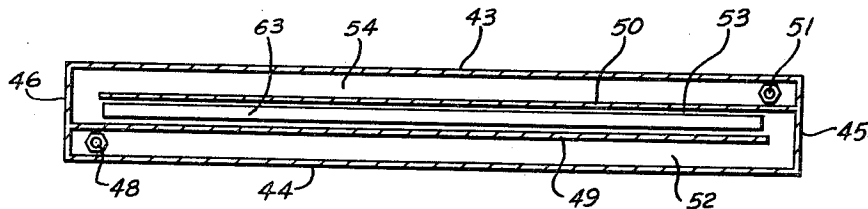


Fig. 5

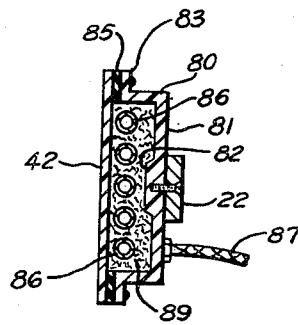


Fig. 10

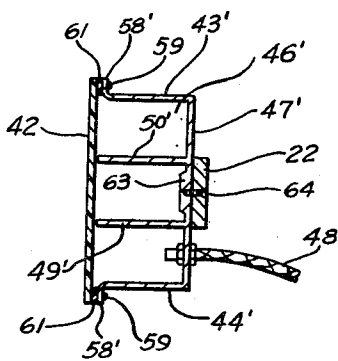


Fig. 8

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COOLING MEANS FOR PACKAGE SEALS

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4 Claims. (Cl. 154—42)

My invention relates to cooling means for package seals, and more particularly to cooling means for the seals of wrapped packages, such as wrapped bread, or similar products, that are sealed in a wrapper that is heated for sealing purposes, such as the ordinary wax paper used for bread.

As the room temperature in bakeries often exceeds that at which paraffin wax, or similar wax, used for bread wrappers will congeal, it has been found necessary to cool the seals of the packages. In wrapping the bread the wrapper is folded over on itself in such a way as to enclose the loaf completely in the wrapper and heat is applied to the folded wax paper wrapper so as to cause the wax coating thereon to be softened and substantially liquefied, so that upon cooling it will congeal and secure the folded and overlapped plies of paper of the wrapper together so as to seal the package. In order to obtain a good seal and to assure that the packages will not become unwrapped after supposedly having become sealed, by contact with the surrounding atmosphere, which, prior to cooling the seals, was depended upon for congealing the wax coating on the paper, it has been found necessary to cool the seals of the packages materially in order that such congealing of the wax will take place. Not only is such cooling necessary and desirable for wax paper wrapped sealed packages, but also for packages that are sealed in other wrappers, such as cellophane, which requires heat for bringing the material to such a temperature that the layers thereof can be sealed together.

In order to accomplish the cooling of the seals, cooling units or plates have been provided with which the seals of the packages move into sliding contact, and it has been found that due to the fact that the wax of the wrapper has a tendency to adhere to the metal surfaces of the cooling units or plates, it has been found necessary, in order to accomplish successful cooling of the seals without disarranging the wrappers of the packages and possibly causing the same to become opened by sticking to the cooling plates while being moved relative to the same, that a coating of frost or ice has to be created on the cooling units or plates so that this sticking will not occur. This necessitates the use of direct expansion refrigeration in the cooling plates or units, which requires considerable equipment, as the temperature of the seal contacting surfaces of said units has to be kept considerably below the freezing point of water in order to maintain the ice or frost on the surfaces thereof that engage the seals.

It is the principal purpose of my invention to provide cooling means for package seals that does not require the use of direct expansion refrigeration for cooling the same, as my improved cooling means is of such a character that wax will not adhere thereto at any temperature and accordingly it is unnecessary to maintain a coating of ice or frost thereon. While it is desirable to cool the seals to a temperature considerably below the room temperatures that are ordinarily encountered in bakeries, and particularly in bakeries during the hot summer

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months, with my improved cooling means it is unnecessary to use any refrigeration in connection with the cooling of said cooling units or plates. The temperature that may be desired to accomplish the purpose of congealing the wax of the seals need only be below the temperature at which the wax will congeal. If the cooling units are made of sufficient size that the seals will be in engagement therewith for a considerable period of time in their passage through the cooling apparatus, the temperature of ordinary tap water is sufficient for accomplishing the congealing of the wax so as to obtain a perfect seal of the packages before leaving the cooling means, but if a shorter period of contact with the cooling units is desired, these can be made of less length and a temperature of the cooling medium maintained that is considerably below the temperature of ordinary tap water, as long as it is above the freezing point of water, it being desirable to utilize ordinary water as a cooling medium in my improved cooling units instead of an expansible cooling medium or a brine cooling medium.

More specifically my invention comprises cooling means for seals of wrapped packages having a wall that the seals thereof engage, that is of a material other than metal, to which the wax used in bread wrappers and similar package wrappers will not adhere, and particularly a wall which said seals engage that is of a synthetic resin that has an inherent greasiness and a negligible adhesive factor with respect to wax. Certain synthetic resins have the characteristic that, while they are substantially inert and do not transfer any of their greasy characteristics to materials coming in contact therewith, they have a greasy feel to the surface thereof and are inadhesive to wax and many other materials. The specific materials that have these characteristics particularly are polytetrafluoroethylene and polyethylene. Neither of these materials are adversely affected by being cooled to the temperatures that are desirable in a device for cooling seals of wrapped packages and can be subjected to the temperatures now utilized in devices of this character that utilize direct expansion refrigeration without any harmful effects to the material. Also both of these materials are substantially inert within the temperature range to which the same would be subjected in use in such a cooling apparatus and conduct heat satisfactorily for the purpose of cooling package seals.

While it is preferred to use a cooling liquid, such as cold water, or merely tap water, for cooling the walls that contact the seals of the packages, my improved cooling units having the seal contacting surfaces thereof made of the synthetic resin materials above referred to, can also be used satisfactorily, and have the advantage that there is no necessity of maintaining frost or ice thereon, if direct expansion refrigeration or a cooling brine is utilized for cooling those walls with which the seals come in contact.

Other objects and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described except as defined in the claims.

In the drawings:

Fig. 1 is a top plan view of a sealing apparatus, partly broken away, to which my improved cooling means for the seals is applied.

Fig. 2 is a vertical section thereof, partly broken away, taken on the line 2—2 of Fig. 1.

Fig. 3 is a section on an enlarged scale, taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary detail section of an end seal cooling member on a greatly enlarged scale.

Fig. 5 is a section taken on the line 5—5 of Fig. 3.

Fig. 6 is a section taken on the line 6—6 of Fig. 1.

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Fig. 7 is a section taken on the line 7—7 of Fig. 2.

Fig. 8 is a view similar to Fig. 3 of a modification.

Fig. 9 is a fragmentary detail sectional view on an enlarged scale of the form of the invention shown in Fig. 7, and

Fig. 10 is a view similar to Fig. 3 of a further modification.

Referring in detail to the drawings, my improved cooling means is shown as comprising a pair of cooling units 10 that engage the end seals of wrapped packages, such as loaves of wrapped bread, and a cooling unit 11 that engages the bottom seals of said packages. The units 10 are mounted for adjustment toward and away from each other so that the cooling apparatus can be adjusted for acting on the end seals of packages, such as wrapped loaves of bread, of various lengths. Such adjustable mounting may be of any desired character, but preferably consists of pairs of brackets 12 and 13 that are mounted on transversely extending shafts 14 and 15, which shafts are provided with screw-threaded portions 16 that are of opposite pitch, as is common in devices of this character, so that rotation of the shafts 14 and 15 in one direction will move the brackets 12 and the brackets 13 toward each other while rotation of said shafts in the opposite direction will move said brackets 12 and 13 away from each other. Said shafts 14 and 15 are each mounted for rotation in a pair of brackets 56 mounted on a pair of longitudinally extending frame members 17, which are shown as being tubular, collars 55 being mounted on said shafts to hold the same against endwise movement.

Said members 17 are mounted in any suitable manner on a suitable support and may be mounted on the frame (not shown) of a wrapping machine and of the conveying apparatus usually associated with such a machine, if desired. Mounted on said frame members 17 are the brackets 18, which support the table or plate-like member 19 over which the upper run of the conveyor belt 20 extends, said conveyor belt being mounted on a pair of rollers 21, which are mounted in any suitable manner on the cooling apparatus, as on the brackets 57 mounted on the members 17, and are driven in any suitable manner so as to move the upper run of the belt 20 in the direction indicated by the arrow in Figs. 1 and 2, the particular mounting and drive of said conveying means not being part of this invention, it being only of importance that means be provided for moving the wrapped packages, the seals of which are to be cooled, along the cooling units 10 in sliding engagement therewith.

The brackets 12 and 13 are connected together by means of a pair of longitudinally extending bars 22 and the cooling units 10 are mounted on said bars 22. The shaft 14 is provided with a hand wheel 23 that has a handle 24 thereon for rotating said shaft and the rotation of said shaft simultaneously rotates the shaft 15 through the sprockets 25 and 26 keyed on said shafts 14 and 15 and the sprocket chain 27 so that both pairs of brackets 12 and 13 are adjusted toward or away from each other simultaneously and equally.

Preferably, the conveying means in the form of a belt 28 is also provided for engagement with the upper sides of the wrapped packages, being mounted on rollers 29 that are mounted for rotation in any suitable manner on the longitudinal frame members 30, and one of said rollers 29 is driven in any suitable manner. Preferably the driven rollers 21 and 29 for the conveyor belts 20 and 28 are driven in any suitable manner from some rotating part of the wrapping machine with which the cooling device is associated. The conveyor belt 28 is adjustable by adjustment of the frame members 30 relative to a pair of longitudinally extending bars 31 that are mounted in any suitable manner, as on the frame of the wrapping machine and the frame of a conveyor usually provided for conveying the wrapped packages away from the cooling means.

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Mounted on said longitudinally extending members 31 are a pair of transversely extending brackets 32 that have screw-threadedly engaged therewith the adjusting screws 33, said adjusting screws having means thereon for adjusting the same equally simultaneously, comprising a pair of sprockets 34 and the sprocket chain 35 operating over said sprockets. The lower ends of said adjusting screws are provided with heads thereon that engage the under sides of brackets 36 and are rotatably mounted in openings in said brackets, said brackets 36 supporting the longitudinally extending members 30. Thus the entire upper conveying means comprising the belt 28, the rollers 29 and the longitudinally extending members 30, are adjustable vertically by means of said adjusting screws 33. Suitable belt tensioning means comprising pivoted arms 37 and a roller 38 may be provided for the belt 28.

A fragmentary portion of the wrapping machine is shown in Figs. 1 and 2, showing the heating devices for the wrappers of the packages, these being shown somewhat diagrammatically in said figures as comprising the heating units 39 for the end seals of the packages and the heating unit 40 for the bottom seals. Any suitable means for conveying the wrapped loaves of bread into engagement with the heating means may be provided. Suitable flexible guide members 41 are provided between the heating units 39 and the cooling units 10. No means is provided for conveying the wrapped packages into engagement with the cooling unit 11 other than the conveying means 20 and 28, as this is unnecessary, the packages that are being moved along by the conveying means 20 and 28 in the direction of the arrow indicated in Figs. 1 and 2 pushing the packages ahead of them across the bottom sealing unit 11.

The sealing units 10 are provided with flat faced inner walls 42 and are otherwise shown as being rectangular, although this is not absolutely necessary, being shown as being provided with the top and bottom walls 43 and 44, the end walls 45 and 46 and the outer walls 47 extending parallel to the walls 42. An inlet connection is shown at 48 leading into the lower portion of the cooling unit adjacent one end thereof and a baffle member 49 is shown as extending from the end wall 46 to a point in spaced relation to the end wall 45. Another baffle member 50 is shown as extending from the end wall 45 to a point in spaced relation to the end wall 46, and an outlet connection is provided at the opposite upper end of the unit at 51. A circuitous passage is thus provided for the cooling medium extending from the inlet connection 48 to the outlet connection 51 comprising the parallel passages 52, 53 and 54 connected together by the openings between the ends of the baffle members 49 and 50 and the end walls 45 and 46. The number of baffle members and thus the number of substantially parallel liquid passages within the cooling unit may be varied as may be found desirable, it being only important to provide some form of baffle means within the unit to prevent direct passage of the cooling medium from the inlet 48 to the outlet 51 to thus assure uniform cooling of the inner walls 42 of said units, which engage the end seals of the packages.

Preferably one of the walls of the cooling units 10 is detachably mounted to facilitate the molding of the cooling units. Inasmuch as the materials from which the cooling units are made can not be readily secured to each other by any adhesives to provide a liquid-tight joint, preferably the closing wall of each unit is detachably mounted on the body portion there. In the structure illustrated the inner walls 42 are detachably mounted on the body portion and the walls 43, 44, 45 and 46 are provided with outwardly directed flanges 58, through which screw-threaded headed fastening elements 59 extend, said fastening elements engaging in screw-threaded openings 60 in the inner wall 42, compressible gasket means 61 being provided between the flanges 58 and the wall 42 of

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each of said units to provide a liquid tight joint between the wall 42 and the body portion of each of said cooling units. The openings in the flanges 58 for receiving the headed threaded fastening elements 59 are not threaded, as will be obvious from Fig. 4.

Instead of making the cooling units entirely of the synthetic materials to which wax will not adhere, such as polytetrafluoroethylene and polyethylene, either with or without metallic filler materials, such as particles of aluminum therein, the cooling units 10 can be provided with a metallic body portion and a detachable wall made of the synthetic resin materials of the above referred to character. Such a structure is shown in Figs. 8 and 9, in which the body portion is provided with the walls 43', 44', 46' and 47', corresponding to the walls 43, 44, 46 and 47 of the cooling unit shown in Figs. 3 and 4, the unit, of course, being also provided with an end wall corresponding to the end wall 45', which is made of metal. Said metallic body portion is provided with a flange 58', corresponding to the flange 58, on the top and bottom walls and the end walls thereof. The synthetic resin inner wall 42, which is the same as the wall 42 previously described, is secured in the same manner as previously described by means of screw-threaded headed fastening elements 59, which engage in the screw-threaded openings 60, and the compressible gasket means 61 is provided in the same manner as previously described. However, preferably the openings 62 in the flanges 58' are made considerably larger than the shank portions of the screw-threaded headed fastening elements 59 so as to allow for the difference in the co-efficient of thermal expansion of the synthetic resin material and the metallic body portion of the cooling unit, said synthetic resin material having a much greater co-efficient of expansion than the metal of the body portion of the cooling unit.

The walls 47 and 47' of said cooling units are provided with thickened portions 63, in which the screw-threaded headed fastening elements 64 engage to secure the cooling units to the longitudinally extending bars 22. The cooling units shown in Figs. 8 and 9 are provided with baffle members 49' and 50' corresponding to the baffle members 49 and 50 and being similarly related to the end walls of said units as said baffle members 49 and 50.

The cooling unit 11 is made in a similar manner to the cooling units 10, having a flat top wall 65 with which the bottom seals of the packages engage, said wall being made of the same synthetic resin materials as the wall 42 of each of the cooling units 10. The body portions are preferably also made of said synthetic resin material, but may be made of metal if desired, and have the bottom wall 66, the end walls 67 and 68 and the side walls 69 and 70. The walls 67, 68, 69 and 70 are provided with flanges 71 through which the securing elements 72 extend in a similar manner to the securing elements 59 previously described, to secure the top wall or plate 65 to the body portion of the cooling unit.

Said cooling unit is provided with baffle members 73 extending from the end wall 67 and a baffle member 74 extending from the end wall 68 to thus provide a circuitous passage extending from the inlet connection 75 to the outlet connection 76 for the cooling medium, which preferably, is a liquid such as cold water or tap water. The baffle 74 is spaced from the wall 67 and the baffles 73 are spaced from the wall 68 to provide connections between the parallel liquid passages between the walls 69 and 70 and baffles 73 and between the baffles 73 and the baffle 74.

Instead of circulating a cooling medium within the housing having baffles therein, which is made up of a body portion and a seal engaging plate, conduits for circulating a cooling medium within the housing may be provided, as shown in Fig. 10, in which the plate-like seal engaging member 42 of the synthetic resin material is shown as being mounted on a housing 80 which has an outer wall 81 which is secured to the bar 22 by fastening

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elements extending into a thickened wall portion 82. The seal engaging wall 42 is secured to a peripheral flange 83 on the body portion by means of fastening elements 84 to compress the sealing gasket 85 between the flange 83 and the wall 42 in the same manner as previously described.

Within the housing is a cooling coil 86 through which suitable cooling medium is circulated, the flexible conduits such as the conduit 87 shown in Fig. 10 being connected with the opposite ends thereof. Said cooling coil may be part of a direct expansion refrigerating means, or brine or cold water may be circulated therethrough, as may be desired. The housing is filled with a jelly-like or viscous heat transfer medium 89 which remains in a mobile state at the temperatures to which it is subjected, or with a suitable anti-freeze solution serving as heat transfer means between the wall 42 and the coil 86 and maintaining a close contact with the wall 42 to cool it uniformly over its entire surface. The top wall 65 of the cooling unit 11 may be cooled in a similar manner.

It will be obvious that in the operation of my improved sealing apparatus the wrapped articles, such as loaves of bread, are moved by suitable conveying means into engagement with the heating elements 39 and 40 to heat the wrapping material to cause the wax coating in the case of wax paper wrappers for the packages, to be heated to an extent that the same is liquefied and caused to adhere the plies of the folded and overlapped wax paper to each other and to seal the packages upon cooling the same. After the said packages have been engaged with the heating element 40 the said packages are received upon the conveyor belt 20 and are carried thereby, in cooperation with the conveyor belt 22 into sliding engagement with the cooling units 10 and thus into engagement with the synthetic resin inner walls or plates 42 thereof, to which the wax will not adhere even though it may be in a somewhat liquid condition when it first engages with said plate-like members. The engagement of the end seals of the packages with the cooling elements 10 slidingly, cools the seals and seals the ends of the packages, these being carried along by the conveying means in sliding engagement with the cooling elements 10 until the same reach the cooling element 11 for the bottom seals of the packages over which the packages are slid by engagement of succeeding packages therewith to cool said bottom seals and seal said packages on the bottom thereof in a similar manner to that in which the cooling elements 10 accomplish the cooling and sealing of the end seals. The sliding engagement of the packages over the top wall or plate 65 of the cooling element 11 is not in any manner interfered with because none of the wax, which may be in a fluid or soft state when reaching the cooling element 11, will adhere to the material of the top plate 65. The cooling need only be sufficient to set or solidify the wax of the wax paper wrapper of the packages and accordingly ordinary tap water may be used for the circulation through the cooling elements. If more rapid cooling is desired cooled water or other cooling liquid can be utilized in the cooling elements, or, if desired, direct expansion refrigeration can be used to cool the cooling elements, but there is no necessity of forming any frost or ice on said cooling elements in order to obtain the desired sliding contact between the seals of the packages and said cooling elements without disarranging the seals, and accordingly if direct expansion refrigeration is utilized for cooling, then the controlling means of the refrigerating apparatus has to be so adjusted that the temperature of the walls 42 and 65 will not be such as to be below the freezing point of water, which would cause frost and ice to form thereon.

What I claim is:

1. Cooling means for seals of wrapped packages, comprising a stationary wall principally of polytetrafluoroethylene resin, means for moving seals of wrapped pack-

ages into sliding engagement with said wall, and means for cooling said wall.

2. Cooling means for seals of wrapped packages, comprising a stationary wall principally of polyethylene, means for moving seals of wrapped packages into sliding engagement with said wall, and means for cooling said wall.

3. Cooling means for seals of wrapped packages, comprising a cooling element having a body portion providing a chamber for a cooling medium, said body portion having a flat stationary seal engaging face principally of polytetrafluoroethylene resin.

4. Cooling means for seals of wrapped packages, com-

prising a cooling element having a body portion providing a chamber for a cooling medium, said body portion having a flat stationary seal engaging face principally of polyethylene resin.

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