M. B. FERGUSON.

APPARATUS FOR SEALING WRAPPED ARTICLES.

APPLICATION FILED FEB. 5, 1909.

1,066,193.

Patented July 1, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

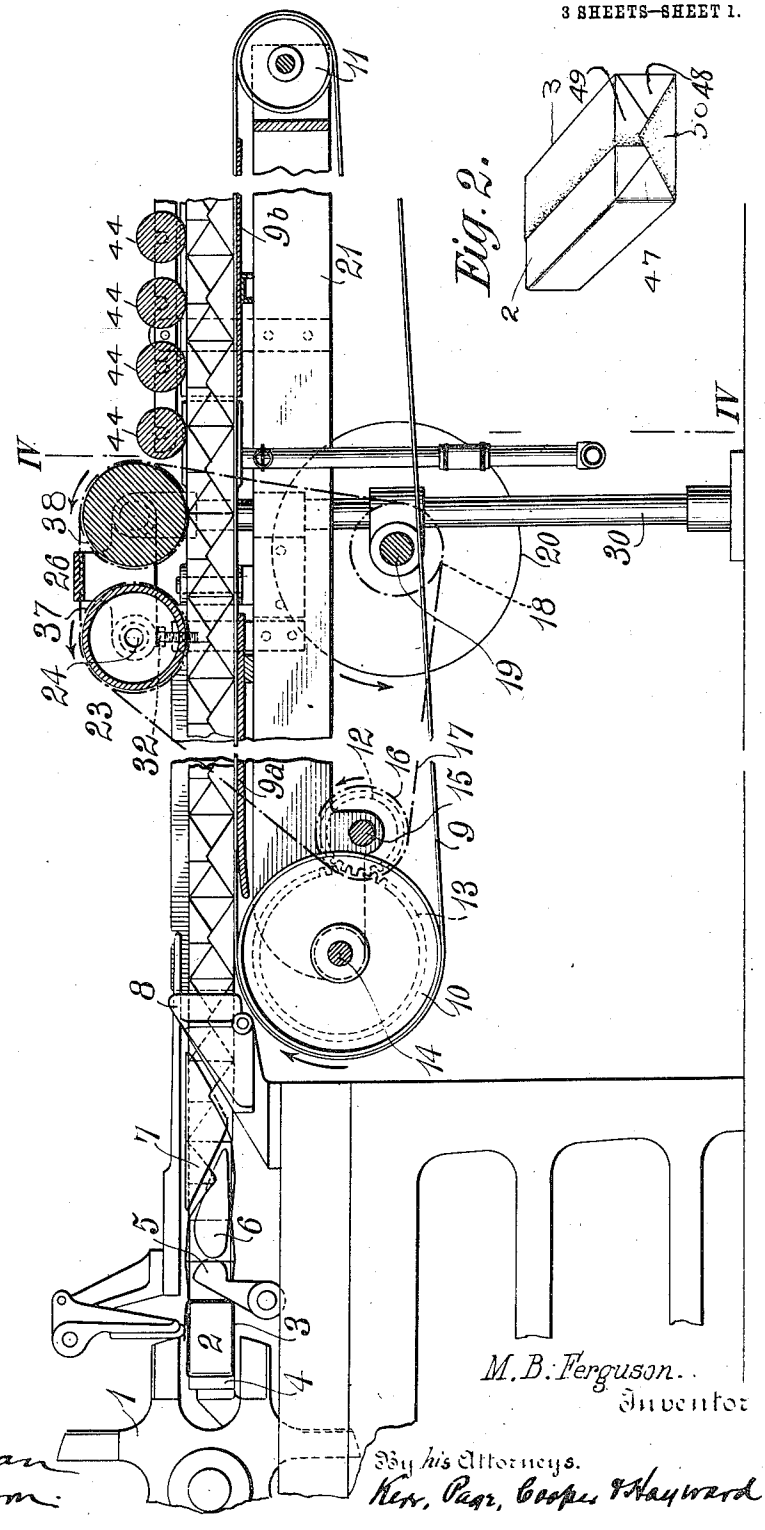


Fig. 2.

Witnesses:

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3 SHEETS—SHEET 2.

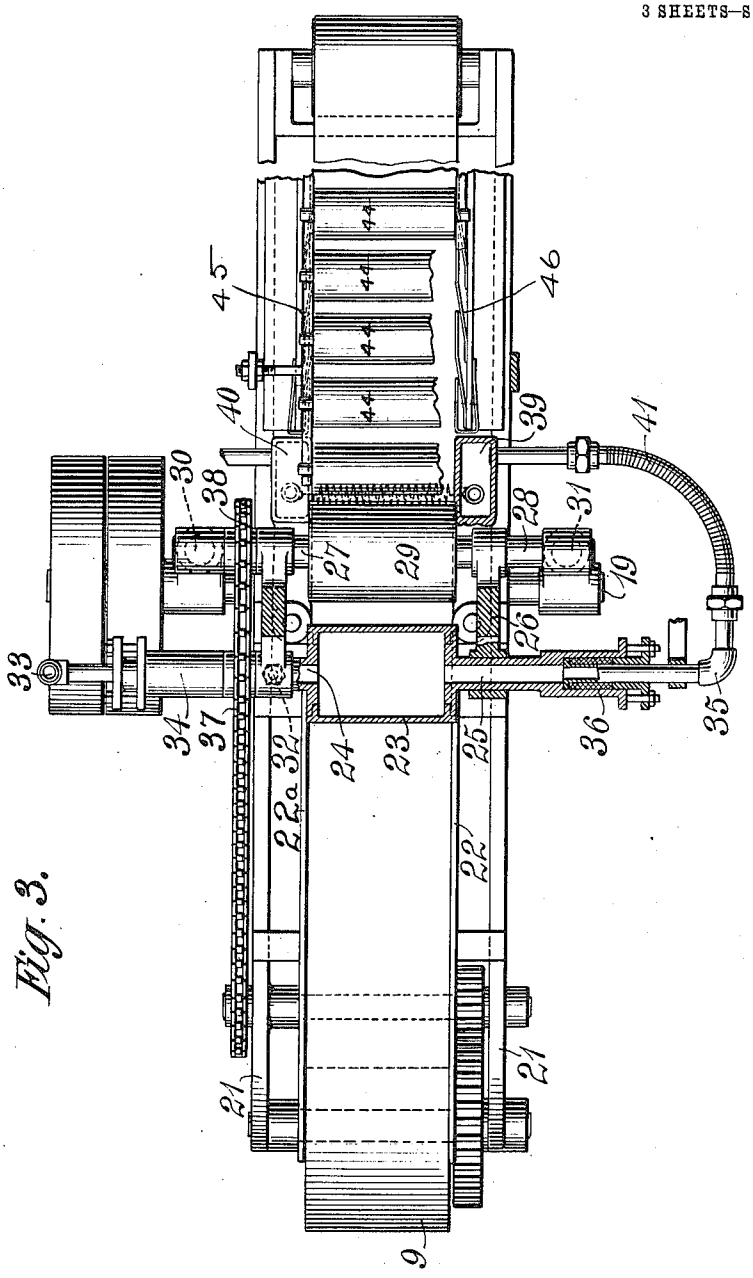


Fig. 3.

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3 SHEETS—SHEET 3.

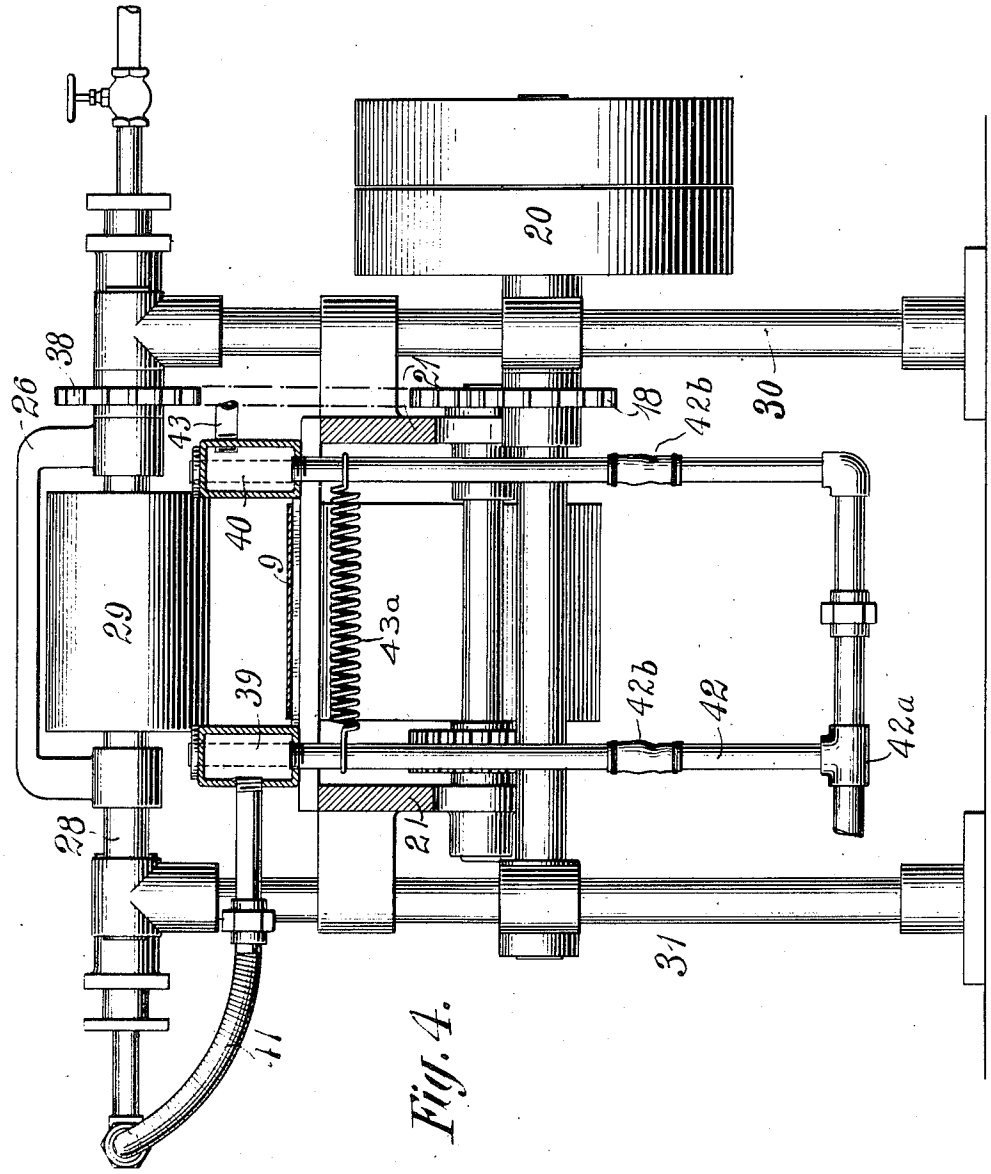


Fig. 4.

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UNITED STATES PATENT OFFICE.

MILFORD B. FERGUSON, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO PACKAGE MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

APPARATUS FOR SEALING WRAPPED ARTICLES.

1,066,193. Specification of Letters Patent. Patented July 1, 1913.

Application filed February 5, 1909. Serial No. 476,249.

To all whom it may concern:

Be it known that I, MILFORD B. FERGUSON, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Apparatus for Sealing Wrapped Articles, of which the following is a full, clear, and exact description.

This invention relates to wrapper-sealing machines, for sealing articles to exclude moisture, dust, etc. For such purpose articles are wrapped in paper or similar fabric impregnated with a readily fusible substance which is impervious to moisture, such as paraffin, and the flaps or overlapping parts of the wrapper are then sealed together by the application of heat and pressure. This operation melts the wax and causes the overlapping parts to adhere, so that the wrapper is effectually sealed and the contents thereof thereby protected from dampness.

The object of the invention is to provide a simple and effective apparatus for applying the necessary heat and pressure to the wrapped article.

To this and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described and more particularly set forth in the claims.

In carrying out the invention in the preferred manner I provide a suitable conveyer on which the wrapped articles are received from the wrapping apparatus. Above the conveyer is a roller, heated in any convenient manner as by passing a current of steam through it, which engages the tops of the articles as they are carried past on the conveyer and melts the wax with which the wrapper is impregnated. Beyond the melting roller is a pressing and cooling roller, serving to press the overlapping top-edges of the wrapper into close contact and to cool the same quickly, whereby the melted wax is congealed and the said edges are caused to adhere. On opposite sides of the conveyer are two heated devices which engage the ends of the article and melt the wax of the end-flaps of the wrapper, and beyond the said devices are smooth plates which serve to hold the end-flaps in close contact while the melted wax is hardening again. In this way the article is hermetically sealed in a moisture-proof wrapper, effectually excluding dampness, dust, and other impurities and preserving the contents in a clean and sanitary condition.

A simple and convenient embodiment of the scheme thus briefly outlined is illustrated in the annexed drawings, and referring now thereto,

Figure 1 shows the apparatus in longitudinal section, arranged to receive the wrapped articles from a wrapping machine. Fig. 2 is a perspective view showing a wrapped and sealed package. Fig. 3 is a plan view of the sealing apparatus. Fig. 4 is a cross-section on line IV—IV of Fig. 1.

The sealing apparatus can be used in conjunction with a wrapping machine, or the wrapped articles can be delivered to it by hand, as desired. In the former case the sealing apparatus is arranged to receive the articles directly from the wrapping machine, which may be of any kind or construction. As merely indicative of such use of the apparatus the same is illustrated in Fig. 1 associated with a wrapping machine of well known form. Therein, 1 designates a rotating carrier, in the arms of which the partially wrapped articles are carried to the tucking and folding devices by which the end flaps are tucked and folded. The article, 2, partially inclosed by a wrapper 3, the ends of which project, is ejected from the carrier by a reciprocating member 4, whereupon horizontally-acting blades at opposite ends of the article, one of said blades being shown at 5, tuck in the part 47 of the wrapper from the rear. The article then moves on to engagement with stationary blades, one of which is shown at 6, which tuck in the part 48 of the wrapper from the front, after which the upper and lower flaps 49 and 50 respectively are folded against the end by stationary blades or members two of which are shown at 7 and 8 respectively. At this point the wrapped articles are delivered to the sealing apparatus, now to be described in its preferred form.

The articles are received on the upper reach of a belt conveyer 9 running over two drums 10, 11, the former of which is rotated by a pinion 12 meshing with a gear 13 on the shaft 14 which carries the said drum 10. On the shaft 15, which carries the pinion, is a sprocket wheel 16, driven by a chain 17 running over a sprocket 18 on a shaft 19, the latter being provided with fixed and

loose pulleys 20 for connection with a suitable source of power.

The parts just described are conveniently mounted in a frame 21 adapted to be arranged in such manner with respect to the wrapping machine as to receive the articles therefrom directly upon the conveyer, as clearly shown in Fig. 1.

The conveyer 9 is of substantially the same width as the articles, and parallel and close to the edges of the conveyer are two upstanding plates or guides 22, 22ª, against which the articles bear as they are carried along by the conveyer. These plates or guides serve to keep the end-flaps of the wrapper folded and thus decrease the tendency thereof to open or unfold. Below the upper reach of the conveyer are two plates 9ª, 9ᵇ, which serve to support the said reach and thereby prevent sagging thereof, so as to keep the articles in a horizontal plane.

At a convenient point and above the conveyer is a hollow roller 23, having tubular trunnions or journals 24, 25, rotatably mounted in the rear portion of a frame or yoke 26, which latter is pivotally supported by its forward end on the trunnions or journals 27, 28 of a solid roller 29, the trunnions or journals just mentioned being themselves rotatably mounted in the upper ends of the standards 30, 31, which serve as supports for the frame 21. This method of supporting the hollow roller 23 enables the same to be raised and lowered with respect to the conveyer, about the axis of the roller 29 as the center of movement, so as to regulate the closeness of contact, or degree of pressure, between said hollow roller and the articles carried under the same by the conveyer. The frame or yoke, and the hollow roller, are adjusted by adjusting screws, one of which is shown at 32, working in suitable members carried by or forming part of the frame 21. The bearings of the hollow trunnions rest on the tops of said screws, being thereby supported in a position determined by the adjustment of the screws, as will be readily understood.

The rollers 23 and 29 are rotated by the chain 17, which, besides driving the sprocket wheel 16, also passes over sprockets 37, 38, on the trunnions or journals 24, 27, respectively; the proportions of the parts being preferably such that the peripheral speed of the rollers 23, 29, will be the same as the lineal speed of the conveyer.

The purpose and function of the hollow roller 23 is to heat the wrapper on the top of the article, and thereby melt the wax or other substance with which said wrapper is impregnated, at the same time pressing the overlapping upper parts of the wrapper together. The roller is heated by a current of steam delivered from a steam-supply pipe 33, leading from any convenient source of steam, not shown. This supply-pipe is connected to the tubular trunnion 24 by a coupling 34 of any suitable construction such as to permit rotation of the trunnion and at the same time afford a steam-tight joint with the stationary supply pipe. Flowing through the hollow roller the steam passes out through the trunnion 25 to a pipe 35 connected to said trunnion by a coupling 36 of the same character as that referred to above.

At the edges of the conveyer 9, beyond the rollers 23, 29, are two devices 39, 40, preferably hollow boxes or chambers as shown, having flat inwardly disposed faces arranged to be engaged by the ends of the wrapped article as the same is carried past by the conveyer. One of these chambers, as 39, is connected by a pipe 41 to the steam outlet pipe 35, which, it will be remembered, carries the current of steam flowing out of the tubular trunnion 25 of the hollow steam-roller 23. This chamber 39 is connected to the other chamber, 40, by a U-shaped pipe 42 passing under the lower reach of the conveyer, and steam is delivered to the latter chamber by a pipe 43 from a suitable source. Steam is thus conducted to the chambers 39, 40, and issues by way of a T-fitting 42ª in the pipe 42, which may be connected to a suitable pipe discharging into the atmosphere at a convenient distance from the machine or into a suitable condenser, not shown. The upwardly extending members or arms of the U-shaped connecting pipe 42 are made long enough (if necessary, longer than merely sufficient to permit the horizontal member to lie under the conveyer) to give the said members some flexibility or spring, and advantage is taken of this feature to make the steam chambers bear yieldingly on the ends of the wrapped article as it passes between the chambers. For this purpose a coil spring 43ª is provided, connected at its ends to the upwardly extending portions of the pipe 42, just below the upper reach of the conveyer; the effect of the spring being to draw the steam chambers yieldingly inward, as will be readily understood. If necessary or desirable the resiliency of the said arms may be increased by providing a short resilient section 42ᵇ in each. It will now be seen that as the articles pass between the chambers 39, 40, the folded ends of the wrapper will bear on the chambers, with resultant melting of the wax of said folded ends. Beyond the end-heating steam-chambers 39, 40, the article passes under a series of cold pressure rollers 44, journaled in side members carried by the frame 21 on opposite sides of the conveyer, which rollers serve to keep the overlapping edges of the wrapper, on the top of the article, in close contact with each other and to cool the melted wax, thereby causing the

said overlapping portions to adhere. The article also passes along two opposite series of blade springs 45, 46, at the sides of the conveyer, which serve to keep said flaps in close contact with each other while the wax is solidifying. The article finally issues from under the pressure rollers and from between the series of lateral pressure devices, or blade springs, with its wrapper hermetically sealed around it, and is taken off the conveyer by the operator or delivered by the conveyer to a suitable receptacle, not shown.

The operation of the various parts and mechanisms having already been explained, it seems unnecessary to describe the operation of the machine further. Suffice it to say that practical use of the invention, as embodied in the apparatus illustrated herein, has demonstrated its effectiveness for the purpose in hand. The invention is particularly useful for sealing articles which are to be protected from bacterial contamination, for example toilet and surgical soap, and packages or cartons containing cereal foods which depend largely upon a condition of crispness for their palatability, though the invention is of course in no way limited to the purposes just mentioned. Nor is the invention limited to the precise form and arrangement of parts herein specifically described, being capable of embodiment in various forms without departure from its proper scope as defined by the appended claims.

What I claim is:

1. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of a conveyer on which the articles are carried and adapted to continually advance the packages, sealing devices arranged to operate on the articles in their travel on the conveyer, means for heating said devices, and a cooling and pressing means arranged to bear on the heated portions of the articles after the same have been acted on by the heated devices, as set forth.

2. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of means on which the articles are carried, a sealing means adapted to operate on one surface of the article in its travel on the said means, sealing means at the side of said carrying means to operate on an adjacent surface of the article, and pressing and cooling means beyond the sealing devices to cause the overlapping portions of the wrapper to adhere.

3. In an apparatus for sealing articles having wrappers containing overlapping portions and impregnated with a readily fusible substance, the combination of means on which the articles are carried, heating means arranged to bear against and seal a plurality of said overlapping portions thereof, and means arranged to bear on the said wrappers after the same have been acted upon by the heat sealing means to cause the adherence of the overlapping portions of the wrapper.

4. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of a conveyer, on which the articles are carried, a heat-sealing roller, a pressure roller adjacent to the former and having journals, a frame pivotally mounted on the journals of the pressure roller and carrying the heat-sealing roller, and means for adjusting said frame, as set forth.

5. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of a conveyer on which the articles are carried, a hollow sealing roller arranged to operate on the articles in their travel on the conveyer, hollow sealing devices at the sides of the conveyer to operate on the adjacent portions of the articles as the same are carried past on the conveyer, and cold pressure rollers beyond the sealing devices to cause the overlapping portions of the wrappers to adhere.

6. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of hollow sealing devices arranged to operate on opposite portions of an article, means for carrying the article between the said devices, means for conveying steam into the sealing devices, a U-shaped pipe having flexible arms supporting the sealing devices, and serving to convey steam from the said devices, and yielding means arranged to urge the arms of the U-shaped pipes toward each other, whereby the said sealing devices will be caused to bear yieldingly on the articles carried between them, as set forth.

7. In an apparatus for sealing articles wrapped in fabric impregnated with a readily fusible substance, the combination of a conveyer for carrying the articles, heat-sealing devices at the sides of the conveyer to operate on the adjacent portions of the articles as the same are carried past on the conveyer, and blade or leaf springs arranged at the sides of the conveyer adapted to bear yieldingly on the portions which have been heated by the said heat-sealing devices, as set forth.

8. In an apparatus for sealing articles, wrapped in fabric impregnated with a readily fusible substance, the combination of a horizontal conveyer on which the articles are carried, guides at the sides of the conveyer to aline the articles thereon, a heated roller above the conveyer to operate on the

tops of the articles in their travel, a series of pressing and cooling rollers arranged to bear on the tops of the articles after the same have passed the heated roller, heated devices at the sides of the conveyer to bear on the adjacent portions of the articles in their travel, and pressure devices at the sides of the conveyer to bear on the portions of the articles acted on by the said heated devices, as set forth.

9. In a machine of the character described, the combination of a package conveyer adapted to continuously advance the packages, means to engage and heat the overlapped portions of the waxed wrappers of the packages transported by said conveyer whereby to soften the wax of said wrappers, and means of less temperature than said heating means adapted to bear against said heated overlapped portions to cause their adherence together.

10. In a machine of the character described, the combination of a package conveyer adapted to continuously advance the packages, means to engage and heat the overlapped portions and folded ends of the waxed wrappers of packages transported by said conveyer, whereby to soften the wax of said wrappers, and means of less temperature than said heating means and adapted to bear against said heated overlapped portions and folded ends of the wrapper whereby to seal the packages substantially airtight.

11. In a machine of the character described, the combination of a package conveyer, one or more steam heated compartments or chambers adapted to heat the overlapped portions and folded ends of the wrappers of the packages as they are transported along by said conveyer, a weight to apply pressure to the top surfaces of the packages and upon the heated overlapped portions of their wrappers to cause their adherence together, and bars extended longitudinally of the conveyer and adapted to force together the parts of the heated, folded ends of the wrappers to seal the same.

12. In a machine of the character described, the combination of a belt conveyer adapted to continuously advance the packages, stationary guides at the sides of the conveyer to position and aline the articles on the same, means arranged directly above the conveyer to engage and heat overlapped portions of the waxed wrappers of the packages transported by the conveyer, and a series of cooling and pressing rollers arranged above the conveyer beyond the said heating means to bear against the heated overlapped portions of the waxed wrappers to cause such portions to adhere together.

13. In a machine of the character described, the combination of a conveyer arranged to continuously advance the packages, heating devices at opposite sides of the conveyer to engage and heat the folded ends of the waxed wrappers of the packages, means for causing the said devices to bear yieldingly against the ends of the packages, and spring pressing and cooling means beyond said heating devices to cool and press said folded ends.

14. In an apparatus for sealing articles having wrappers impregnated with a readily fusible substance, the combination of means on which the articles are carried, heat sealing devices yieldingly mounted and arranged to bear against the wrappers of said articles in their movement on said means, and yielding means arranged to bear on said wrappers after the same have been acted upon by the heat sealing devices to cause their adherence together.

15. In an apparatus for sealing articles having wrappers containing overlapping portions and impregnated with a readily fusible substance, the combination with heating means and a cooling means, of a means for moving said articles into contact with said heating means and from the heating means in contact with the cooling means, so arranged that the overlapping portions of said wrapper are in direct contact with said heating and cooling means, said heating means and said cooling means movable toward and away from the path of movement of said article, substantially as described.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

MILFORD B. FERGUSON.

Witnesses:
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S. S. DUNHAM.