March 25, 1958 H. RUMSEY, JR 2,827,743

APPARATUS FOR USE IN THE WRAPPING OF PACKAGES

Filed April 13, 1954 4 Sheets-Sheet 1

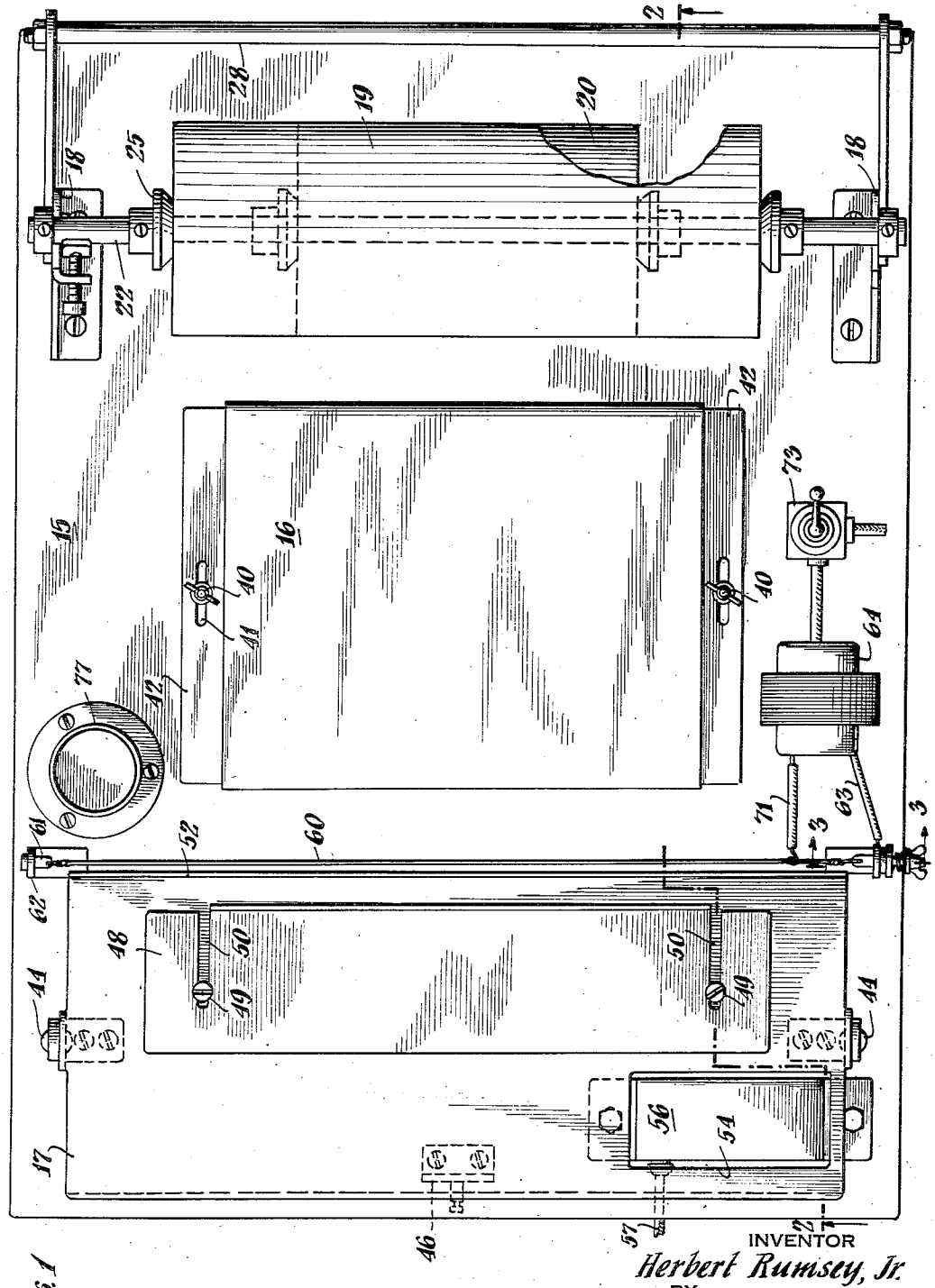


Fig. 1

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APPARATUS FOR USE IN THE WRAPPING OF PACKAGES

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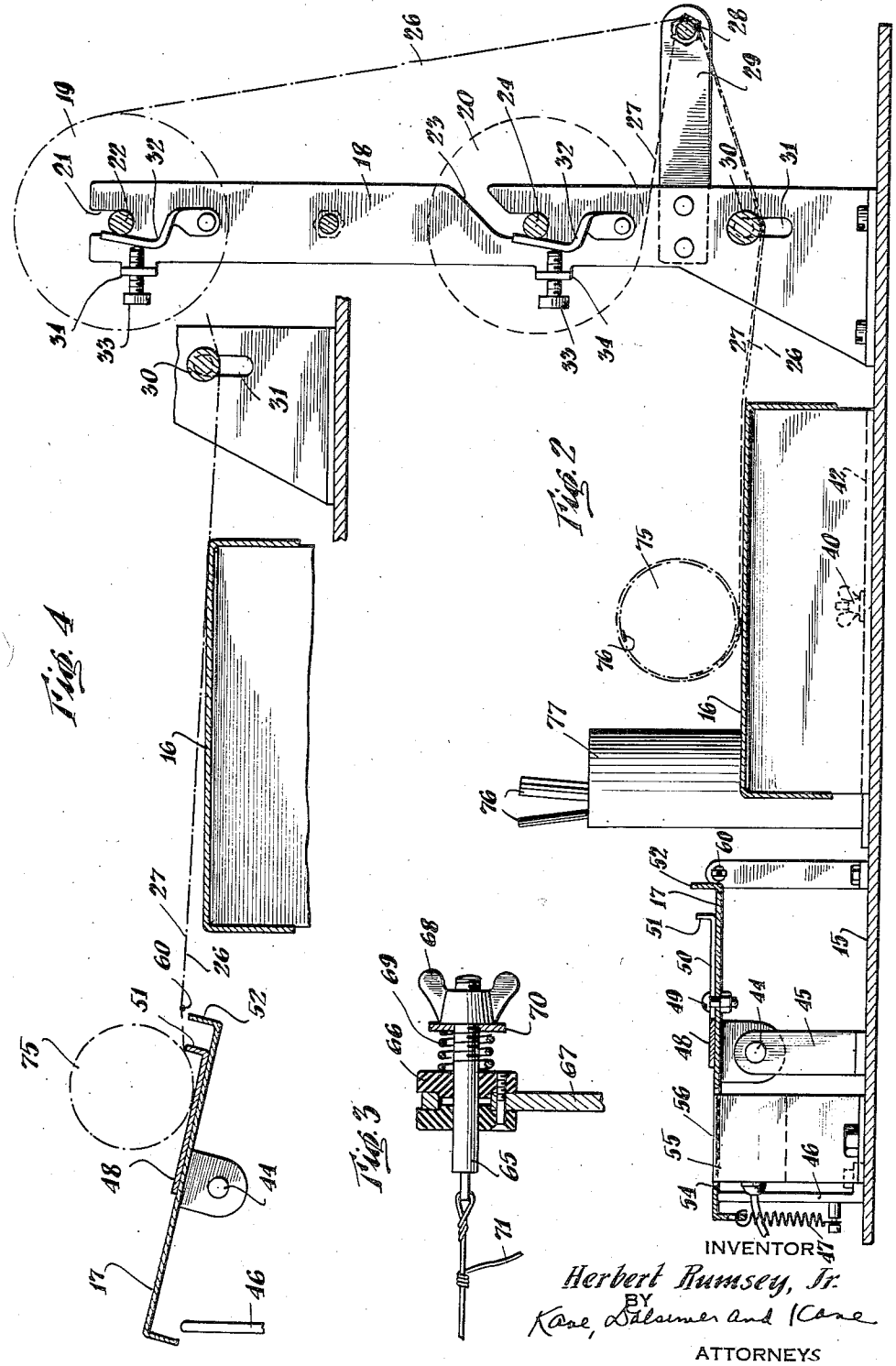


Fig. 4

Fig. 2

Fig. 3

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Fig. 5

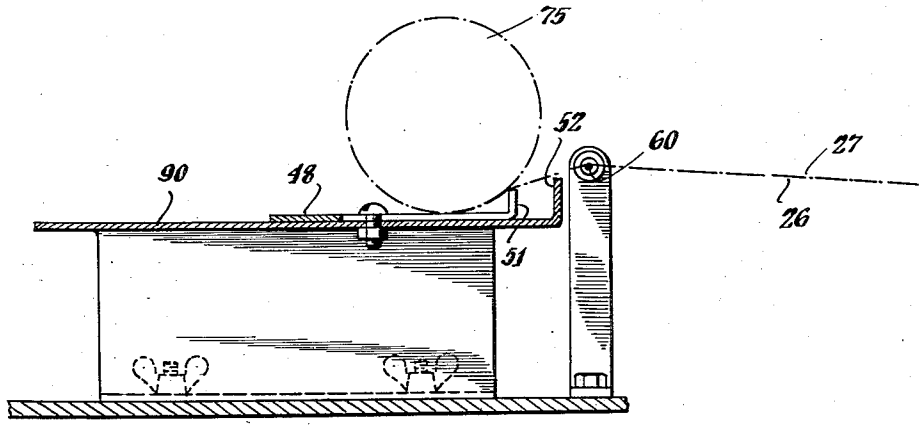


Fig. 6

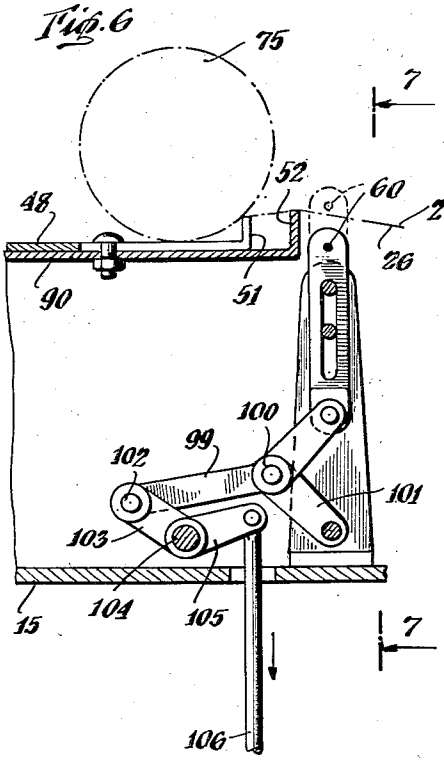
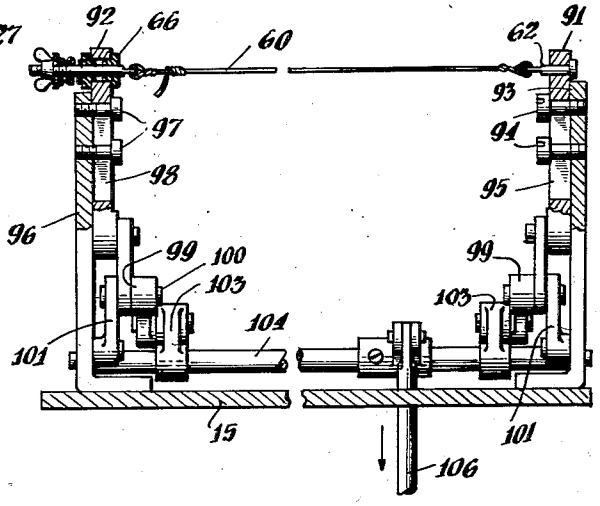


Fig. 7



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Fig. 8

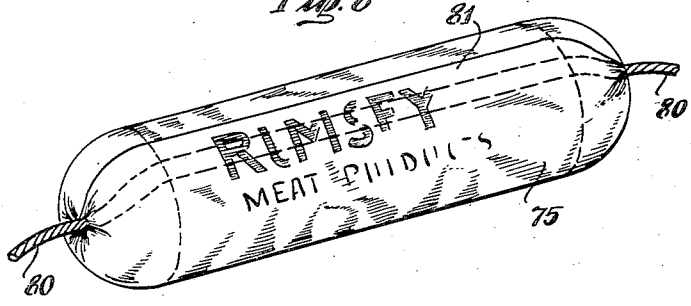


Fig. 9

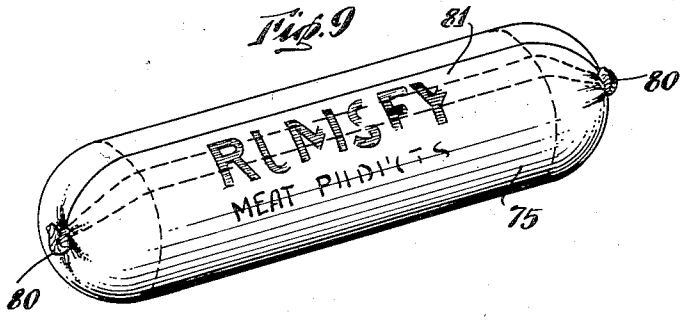


Fig. 10



Fig. 11

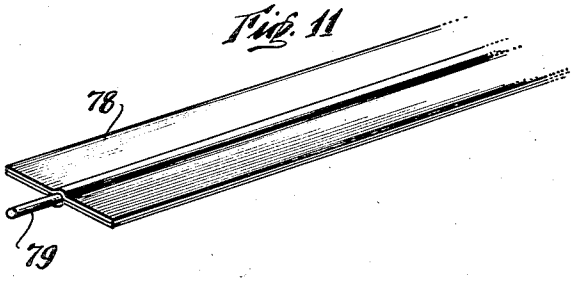
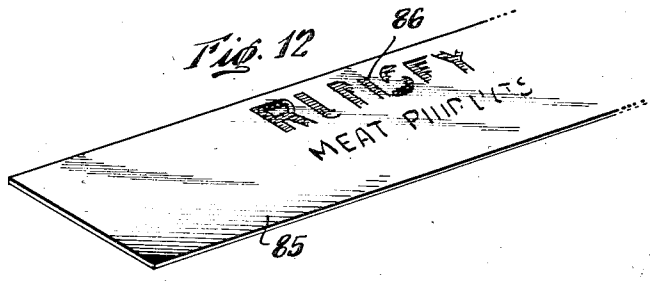


Fig. 12



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2,827,743

APPARATUS FOR USE IN THE WRAPPING OF PACKAGES

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Application April 13, 1954, Serial No. 422,953

7 Claims. (Cl. 53—219)

This invention relates to improved apparatus to be used in the wrapping of packages for heat sealing and severing thermoplastic wrapping materials. The present apparatus embodies certain improvements over the apparatus disclosed in my Patent No. 2,635,672, granted April 21, 1953, and in my copending application Serial No. 258,193, filed November 26, 1951, now Patent No. 2,725,699, granted December 6, 1955.

It is an object of the present invention to provide improved apparatus of the above character which can be used in wrapping packages such as food packages of various sizes and shapes, particularly irregularly shaped packages, for example, packaged smoked butts, meat loaves, picinc hams, etc.

Further objects are the provision of improved apparatus for wrapping packages in which thermoplastic wrapping material can be readily heat severed with a neat, clean cut; in which overlapping edges of the wrapping material can be readily heat sealed; and which conveniently provides for wrapping the package with either one layer or a plurality of superimposed layers which may be of the same width or of varying widths as, for instance, where it is desired to provide printed display, advertising or instructional material on an inner layer to be displayed through a transparent outer layer.

Another object is the provision of improved heat severing means in apparatus of the above type in the form of a stretched ligament having an improved mounting so as to maintain its taut condition regardless of variations in temperature but which, nevertheless, will not be over stressed with danger of breakage.

In the accompanying drawings—

Fig. 1 is a plan view of apparatus for the wrapping of packages embodying my invention with upper portions broken away to show the construction of the lower portion thereof;

Fig. 2 is a longitudinal, sectional view in the direction of the arrows on the line 2—2 of Fig. 1;

Fig. 3 is a detailed view partially in section in the direction of the arrows on the line 3—3 of Fig. 1 showing an improved mounting for one end of the stretched ligament forming part of my heat severing apparatus;

Fig. 4 is a partially sectional, partially diagrammatic view in side elevation showing my apparatus in heat severing position;

Fig. 5 is a sectional side elevational view of a modified form of heat severing platform;

Fig. 6 is a similar view showing a modified type of heat severing device which can be elevated to sever the thermoplastic wrapping material;

Fig. 7 is a cross-sectional view in the direction of the arrows on the line 7—7 of Fig. 6;

Fig. 8 is a perspective view of a package wrapped in accordance with my invention prior to shrinking of the wrapping material;

Fig. 9 is a perspective view of the completed package with the wrapping material tightly wrapped around the package after shrinking;

Fig. 10 is a cross-sectional view of one of the twisted ends of the completed package;

Fig. 11 is a fragmentary, perspective partially in section of one form of retaining strip that may be employed to retain the twisted ends of my package; and

Fig. 12 shows another form of retaining strip to retain the twisted ends.

As shown most clearly in Figs. 1 and 2, my apparatus comprises generally a base plate 15 on which is mounted the initial wrapping platform 16, the secondary wrapping platform 17 and the standards or supports 18 for supporting one or more rolls of wrapping material 19 and 20. The standards 18 may have slots 21 at the upper end in which the shaft 22 of supply roll 19 is mounted. Adjacent the central portion thereof the standards 18 are provided with slots 23 having an angular entrance portion in which the shaft 24 of supply roll 20 may be mounted. Adjustable collars 25 may be provided in the usual manner on the shafts 22 and 24 to properly position the supply rolls on the respective shafts. The supply rolls are free to rotate and the webs of wrapping material from the supply rolls are fed from the rolls as indicated at 26 and 27 around the horizontal guide bar 28 mounted in brackets 29 and thence downwardly at an angle beneath the weighted guide bar and retractor 30, mounted for vertical movement in the slots 31 formed near the lower end of the standards 18. The superimposed webs 26 and 27 are then fed to the initial wrapping platform 16 where the initial wrapping may take place as shown in Fig. 2.

I also provide improved braking mechanism operating in connection with the two supply rolls. In this connection the braking mechanism is coordinated with the weight of the guide bar and retractor 30 so that when the webs are drawn from the rolls to the primary wrapping platform, the retractor 30 will be shifted upwardly to its uppermost position in slots 31, as shown in Fig. 2, due to the drag imposed by the brakes on the supply rolls. In this connection, guide bar and retractor 30, when in its lower position, is in a plane beneath platform and beneath guide bar 28. This facilitates elevation of the retractor when tension is applied to the webs.

My improved brake mechanism is shown in Figs. 1 and 2. At least one brake mechanism is provided for each of the shafts 22 and 24 and may be mounted on one of the standards 18. Each of the brake mechanisms consists of a shoe 32 preferably made of resilient metal and riveted or otherwise secured at its lower end to the standard 18 a short distance beneath the slots 21 and 23. The brake shoes are engageable at their upper ends with the respective shafts 22 and 24. The amount of friction exerted by the brake shoes against the shafts can be controlled and adjusted by the adjusting screws 33 which are threaded to the lugs 34 struck from the standard 18 and are engageable with the brake shoes at an intermediate portion thereof. The amount of friction or force exerted by the brake shoes against the shafts can be increased by tightening the screws and can be decreased by loosening them. In this fashion the brakes can be adjusted to prevent continued unwinding of the supply rolls after a force exerted on the webs to withdraw a length of the wrapping material has been discontinued, and also the force exerted by the brakes can be regulated relative to the weight of the guide bar and retractor 30 to cause the retractor to shift upwardly in its slot when tension is exerted on the web to withdraw a supply length thereof for wrapping purposes.

Referring now to the initial wrapping platform 16, it will be seen that it is disposed in parallel alignment with the supply rolls. It is mounted on the supporting plate 15 for limited longitudinal adjustment by means of the threaded studs 40, having wingnuts applied thereto, ex-

tending through slots 41 formed in the supporting flanges 42.

The preferred form of secondary wrapping platform 17, as shown in Figs. 1, 2 and 4, is pivotally mounted at 44 adjacent the central portion thereof on the brackets 45 carried by base plate 15. Thus, the secondary platform 17 may shift from the normal horizontal position shown in Fig. 2 to the heat severing tilted position shown in Fig. 4. It is normally maintained in horizontal position by means of the stop or abutment 46 mounted on the base plate 15 and engageable with the undersurface of platform 17 near the trailing end thereof when it is in horizontal position and helical spring 47 connected between the trailing end of platform 17 and the lower portion of abutment 46. Spring 47 is of such a length as normally to exert force upon the platform to hold it in horizontal position in engagement with the abutment.

A guide plate 48 is adjustably mounted on the platform 17 by means of screws 49 extending through slots 50, whereby the guide plate may be shifted towards or away from the leading end of the platform and then firmly secured in adjusted position. The leading end of the guide plate has an upturned flange 51 as shown which is engageable with the package 75 to be wrapped thereon, as shown in Fig. 4. This flange serves as a guide to the operator in positioning the package on the platform.

In the case of larger, irregularly shaped packages the guide plate is shifted away from the leading edge of the platform so as to prevent engagement between the upper portion of the package and the heat severing blade when the platform is tilted. In the case of smaller packages or packages of lower heighth, the guide plate may be shifted closer to the edge.

The leading edge of the platform 17 is also formed with an upturned flange 52 which, as will be later explained, is arranged so that the upper edge thereof when the platform is in horizontal position, projects upwardly to a height above the heat severing blade. This flange serves as a guide for the web or webs of wrapping material so as to hold them out of engagement with the heat severing device until the wrapping has proceeded to the stage where the operator is ready to sever the web.

The secondary wrapping platform 17 preferably has associated therewith heat sealing apparatus in the form of a heat sealing pad to be used in heat sealing overlapping layers of the wrapping material during the wrapping operation. For this purpose the platform 17 may be provided with an opening or aperture 54, near the trailing edge thereof, of sufficient size to accommodate the upper end of the heat sealing device 55. The heat sealing device is of conventional construction and has an electrical heating element with a thermostatic control (not shown) for maintaining the temperature of the heat sealing pad 56 at the upper end thereof at such a level that it will plasticize and heat seal overlapping layers of thermoplastic wrapping material when applied thereto without destroying or volatilizing it.

My apparatus also includes an improved, elongated heat severing device or blade and this preferably takes the form of a stretched ligament or wire 60 made of chrome-nickel, or other high resistance alloys. At one end, the wire 60 is mounted in a stud 61 carried by bracket 62 which, in turn, is mounted on supporting plate 50. Stud 61, bracket 62 and plate 15 are all made of electrical conducting material, with the result that the electrical circuit is grounded or completed from wire 60 through plate 15 which, in turn, is connected by lead 63 to one terminus of the voltage regulator 64.

The opposite end of the wire 60 is insulated from the ground connection and is provided with a resilient mounting exerting a force in tension serving to maintain the wire in taut or stretched condition and serving further to accommodate the incidental variations in length resulting from thermal expansion and retraction. Thus, as shown in Figs. 1 and 3 the opposite end of wire 60 is connected to stud 65 which is slidably mounted in the insulator bushings 66 carried by the upright 67 mounted on base plate 15. Stud 65 extends through the center of bushings 66 and is provided with a threaded end having an enlarged head in the form of wingnut 68 engaged therewith. A helical spring 69 is disposed around the stud and extends between the bushings 66 and a washer 70 disposed immediately inside the wingnut. In practice, the wingnut is adjusted so as to partially compress the helical spring with the result that the spring exerts a force against the washer 70 and wingnut 68 tending to shift them to the right as viewed in Fig. 3. This, in turn, exerts a force in tension on wire 60 and maintains it in tightly stretched condition. Thus, regardless of thermal expansion and contraction, the wire is maintained in taut condition and it will not be over stressed.

As pointed out above, the resiliently mounted end of wire 60 is insulated from the electrical ground and is connected by lead 71 to the other terminal of voltage regulator 64. When voltage is impressed upon the high resistance wire 60 by turning on switch 73, it is caused to elevate in temperature and the temperature is controlled so as to be maintained at a level to immediately fuse and sever the thermoplastic wrapping material brought in contact therewith. The temperature can be controlled by a rheostat (not shown) or by shifting lead wire 71 towards and away from bracket 62 to increase or decrease the temperature.

My improved apparatus is particularly applicable to wrapping various types of food products such as meat products including smoked butts, meat loaves, picnic hams, bologna or the like. In using my apparatus the rolls of thermoplastic wrapping material 19 and 20 are assembled on the shafts 22 and 24. The wrapping material should be made of a suitable thermoplastic film which can be shrunk after it has been applied to the package, by subjecting it to heat lower than the melting or plasticizing temperature thereof. For this purpose I may use tensilized polyvinyl films such as tensilized polyvinylidene chloride available commercially as tensilized Saran, or tensilized rubber hydrochloride film available commercially as tensilized Pliofilm. The inner layer of wrapping material may be narrower than the outer layer. Thus, the web of roll 20 is shown as somewhat narrower than the web of roll 19. The web from roll 19 forms the outer layer of the package and it may be of a thinner gauge than the web of roll 20. The web of roll 20 is preferably of sufficient thickness so that it is practical to print thereon and suitable labelling, advertising or instructional material may be printed on the outer surface thereof so that the printed matter rests against the inner surface of the web from roll 19 when wrapped about the package and is displayed through the outer web. The web from roll 19 should be wide enough to extend completely across the package and project beyond the two ends thereof while the web from roll 20 need not extend the entire width of the package. It should be understood of course that either the wider or narrower roll may be mounted in the higher position on standards 18 and the threading of the webs over the guide bars is rearranged accordingly.

In wrapping the package on my improved apparatus, I may follow the general method and procedure disclosed in my copending application Serial No. 368,991, filed July 20, 1953, now Patent No. 2,801,180, issued July 30, 1957, for Commercial Package and Method of Making the Same. Thus, the two webs of material are drawn outwardly around the guide bar 28 and beneath the guide bar and retractor 30 thence onto the initial wrapping platform 16. The pork butt, meat loaf or other product to be wrapped, indicated diagrammatically at 75, is then placed upon the superimposed webs on the wrapping platform and a retaining strip 76 conveniently disposed in holder 77 is inserted between the wrapping material and the product being wrapped parallel to the edge of the

wrapping material. The retaining strip is in the form of an elongated flat strip including a metal which will readily take a permanent set. One type of retaining strip, as shown most clearly in Fig. 11, is in flat, ribbon form and consists of two laminated layers of paper 78 having a wire 79 of the type which will readily take a permanent set interposed therebetween.

Another type of retaining strip is shown in Fig. 12, and consists of a thin foil strip made of a metal which will readily take a permanent set, such as tin, lead or aluminum foil. Aluminum foil .0003" or more thick may be employed and I prefer to use aluminum foil approximately .001" in thickness. The intermediate portion of the retaining strip may have printed advertising or instructional material printed thereon as indicated at 86 and this will be displayed through the transparent wrapping material of the completed package.

The length of the retaining strips should be substantially equal to the width of the web of material from roll 19. The superimposed layers of wrapping material are wrapped around the product 75 for slightly more than one complete turn so that longitudinal portions of the wrapping material will overlap adjacent the edges of the material. When thus wrapped around the product, web 26 from roll 19 projects in open fashion from the two ends of the product.

At this stage the partially wrapped package is transferred to the secondary platform 17 where the guide plate 48 has been preadjusted to properly position the package on the platform. As previously indicated, when the web is withdrawn the brakes cause sufficient force to be exerted thereon to shift the guide bar and retractor 30 upwardly in slots 31 to the position shown in Figs. 2 and 4. When the partially wrapped package is transferred to platform 17, flange 52 serves to hold the superimposed webs of wrapping material out of engagement with the heat severing wire 60. The operator can then manually tilt the leading end of secondary platform 17 downwardly to the position shown in Fig. 4 so that the superimposed webs engage the wire 60 which is maintained at a sufficient temperature to immediately fuse and sever the webs. The severing of the web releases the tension or force exerted thereon, with the result that retractor and guide bar 30 shifts downwardly in its slots 31. This causes an immediate retraction of the webs giving a clean, sharp, severed edge.

Thereafter, the protruding ends of web 26 from roll 19 together with the protruding ends of the retaining strip may be twisted as shown at 80 in Fig. 8, and either before or after the twisting, the overlapped longitudinal edges 81 of the thermoplastic material may be heat sealed together by contacting the overlapped edges with the sealing pad 56 at one or more places. As previously indicated, the temperature of the sealing pad 56 is sufficient to render the wrapping material plastic so that the superimposed layers seal together. However, it should not be so high as to destroy or volatilize the material on short contact.

The sealed longitudinal seams of the package and the twisted ends serve to retain the wrapping in closed position. When the protruding ends of the wrapping material, having the retaining strip 76 or 85 disposed therein, are twisted the two sides of the strip interlock with the wrapping material as shown in the cross-sectional view of Fig. 10. The metal remains set in the twisted position and the interlocking between the strip and the wrapping material prevent the untwisting or release of the wrapping material with the result that the twisted ends are held in closed or sealed relationship.

The package, when wrapped in the manner shown in Fig. 8, is completely encased in the wrapping material and can be used in this fashion if desired. However, the wrapping material remains relatively loose and wrinkled. In order to provide a package which will display the product to best advantage, I thereafter preferably shrink the wrapping material uniformly around the package so that it presents the neat, attractive, tightly wrapped appearance as shown in Fig. 9. I accomplish this result by applying heat uniformly to all portions of the wrapping material, preferably by applying a heated liquid such as hot water thereto and this can be conveniently accomplished by spraying the wrapping or by immersing the loosely wrapped package in hot water, as taught in my above identified patent application Serial No. 368,991. Where the wrapping material consists of polyvinylidene chloride or rubber hydrochloride, I have found that the water should be of a temperature of 190° F. or a little higher.

The package is immersed in the heated liquid a sufficient length of time to cause the heat to shrink the material. As the thermoplastic material shrinks simultaneously therewith the heat causes expansion of the entrapped air inside the package. This combined action forces the air outwardly between the overlapped edges of the wrapping material between the sealed areas thereof. This, of course, provides a neater, tighter package with a minimum of air therein, and in addition the escaping air prevents any water from entering the overlapped edges 81. The package should be removed from the heated liquid when practically all of the free air has been removed from the package and either prior to or at the time that the shrinking stops. The escaping air prevents water from entering the package and the package should be removed from the water before any water enters therein.

The shrinking operation not only causes the wrapping material to shrink and fit smoothly over the package contents, but also causes it to shrink in conformation with the shape and configuration of the package, with the result that it is shaped, molded or fitted to the contours of the package contents.

As indicated in Figs. 8 and 9 labelling or instructional material printed on the narrower inner web 27 or on the retaining strip is displayed through the outer transparent web 26. During the heating operation the thermoplastic wrapping material in the twisted end portions shrinks and the stressing of the material in this fashion serves further to hold the twisted ends in tightly closed relationship. While the retaining strip retains the ends in twisted relationship, they may nevertheless be readily untwisted when desired so as to open the package and expose the contents.

In Fig. 5, I have shown a modified type of secondary wrapping platform 90 which is rigidly mounted and cannot tilt or pivot. The heat severing wire 60 is mounted in the same manner a short distance in front of the leading edge of the secondary platform. In this particular case, however, the flange 52 at the leading edge of the platform is disposed slightly below the level of the wire 60 with the result that when the partially wrapped package is placed on platform 90 in contact with the guide plate 48, the superimposed webs 26 and 27 of wrapping material engage the heat severing wire 60 and are immediately severed at this point. As previously explained, the severed edges will be retracted at once by the action of retractor and guide bar 30. The remainder of the wrapping operation with the apparatus shown in Fig. 5 will be the same as with the first form of my apparatus. It will be appreciated that instead of moving the partially wrapped package from the initial platform to platform 90, the superimposed webs 26 and 27 of wrapping material may be grasped by the operator along their side edges and drawn in taut relation over the heat severing wire 60 and a suitable length then severed and the entire wrapping operation performed on platform 90.

In Figs. 6 and 7, I have shown a rigid platform 90 similar to that shown in Fig. 5. However, the heat severing wire 60 is provided with a reciprocating mounting whereby the wire can be elevated and lowered in a vertical plane by action of a foot treadle, manual lever or

the like. In this case, the stud **62** and the bushings **66** are mounted respectively in vertically shiftable supports **91** and **92**. The support **91** is mounted for vertical shift movement on the standard **93** by means of screws **94** extending through slot **95**. The support **92** is mounted on standard **96** by means of screws **97** extending through slot **98**. The lower ends of the shiftable supports **91** and **92** are pivotally connected to toggles **99** which have floating pivotal connection at **100** with links **101** and are pivotally connected at their opposite ends **102** to the arms **103** keyed to shaft **104**. Arm or lever **105** also is keyed or fixedly connected to shaft **104** and has pivotal connection at its outer end with a rod or link **106** which may be connected at its lower end to a foot treadle (not shown).

The slides **91** and **92** are normally positioned in their lowermost position as shown in Fig. 7 and in full lines in Fig. 6 with the result that heat severing wire **60** is normally positioned beneath the upper edge of flange **52**. When the rod or link **106** is pulled downwardly in the direction of the arrows by means of a foot pedal or otherwise, it causes arm **103** to rotate in a clockwise direction shifting toggle **99** to the right as viewed in Fig. 6, with the result that slides **91** and **92** and heat severing wire **60** are shifted upwardly to the position shown in dotted lines in Fig. 6 above the upper end of the flange **52**. When a partially wrapped package is disposed on platform **90**, with the webs **26, 37** extending over flange **52**, this action will cause wire **60** to immediately sever the webs as indicated in dotted lines in Fig. 6. The remaining operations in connection with the form of apparatus shown in Figs. 6 and 7 are the same as in the first form of my invention.

It will thus be seen that I have provided improved apparatus for use in the wrapping of packages, particularly food packages such as packaged smoked butts, meat loaves, picnic hams, bologna, etc. It will be appreciated that my apparatus may be used with only one web of wrapping material or with two or more webs if desired. It will also be seen that the apparatus may be readily adapted to packages of different sizes and shapes. Furthermore, it will be appreciated that I have provided improved heat severing mechanism whereby sharp, smooth edges can be readily obtained. The apparatus can be readily used by relatively unskilled operators and the resultant package is retained in tightly wrapped condition and presents a smooth finished appearance.

Modifications may, of course, be made in the illustrated and described embodiments of my invention without departing from the invention as set forth in the accompanying claims.

I claim:

1. Apparatus to be used in the wrapping of packages comprising: a supporting structure having a wrapping platform; means for rotatably supporting a roll of sheet wrapping material so that the web of wrapping material may be drawn over the wrapping platform; brake means associated with said last named means for frictionally resisting the rotation of the roll of sheet wrapping material; severing means for severing the web of sheet wrapping material positioned adjacent the wrapping platform; and a guide bar and retractor mounted on said supporting structure for limited vertical shift movement at a point intermediate the severing means and the support for the roll of wrapping material and at a position whereby the web of wrapping material may be passed beneath the guide bar and retractor and over the wrapping platform so that a pulling force exerted on the web of wrapping material to pull it over the wrapping platform causes said guide bar and retractor to shift to an elevated position and upon release of said pulling force when the web is severed the guide bar and retractor shifts downwardly, said apparatus being free of web-gripping means intermediate the severing means and the guide bar and retractor whereby the guide bar and retractor serves to retract the web from the severing means when it shifts downwardly.

2. Apparatus to be used in the wrapping of packages as set forth in claim 1 in which said guide bar and retractor when in its lowermost position is positioned in a plane beneath the plane of the leading edge of the wrapping platform.

3. Apparatus to be used in the wrapping of packages as set forth in claim 1 in which the guide bar and retractor when in its lowermost position is positioned in a plane beneath the plane of the leading edge of the wrapping platform and additional guide means are positioned intermediate the guide bar and retractor and the said means for supporting the roll of sheet wrapping material in a plane positioned above the said guide bar and retractor.

4. Apparatus for use in wrapping packages as set forth in claim 1 in which the brake means comprises a brake shoe engageable with a shaft for supporting the roll of sheet wrapping material and a threaded member engageable with the brake shoe for varying the force which the shoe exerts against the shaft.

5. Apparatus to be used in the wrapping of packages as set forth in claim 4 in which the brake shoe is a resilient member.

6. Apparatus to be used in the wrapping of packages as set forth in claim 1 in which the severing means comprises an elongated heat severing member.

7. Apparatus to be used in the wrapping of packages comprising: a supporting structure having a first platform on which the package may be at least partially wrapped; a second platform spaced longitudinally from the first platform; means for rotatably supporting a roll of sheet wrapping material adjacent the first platform so that the web of wrapping material may be drawn over the platforms; elongated heat severing means for severing the web of sheet wrapping material mounted between the two wrapping platforms and cooperable to sever the web of wrapping material after the package is transferred from the first platform to the second platform; a guide bar and retractor mounted on said supporting structure for limited vertical shift movement at a point intermediate the first platform and the support for the roll of wrapping material and at a position whereby the web of wrapping material may be passed beneath the guide bar and retractor and over the platforms so that a pulling force exerted on the web of wrapping material to pull it over the platforms causes said guide bar and retractor to shift to an elevated position and upon release of said pulling force when the web is severed the guide bar and retractor shifts downwardly; and brake means associated with the supporting means for frictionally resisting the rotation of the roll of sheet wrapping material so that when the web of wrapping material is severed by the heat severing means the roll of sheet wrapping material is frictionally retained against rotation, said apparatus being free of web-gripping means intermediate the severing means and the guide bar and retractor whereby the guide bar and retractor serves to retract the web from the severing means when it shifts downwardly.

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