Dec. 21, 1954 H. F. TECHTMANN 2,697,473

ROTARY HEAT SEALER

Filed March 25, 1949 4 Sheets-Sheet 1

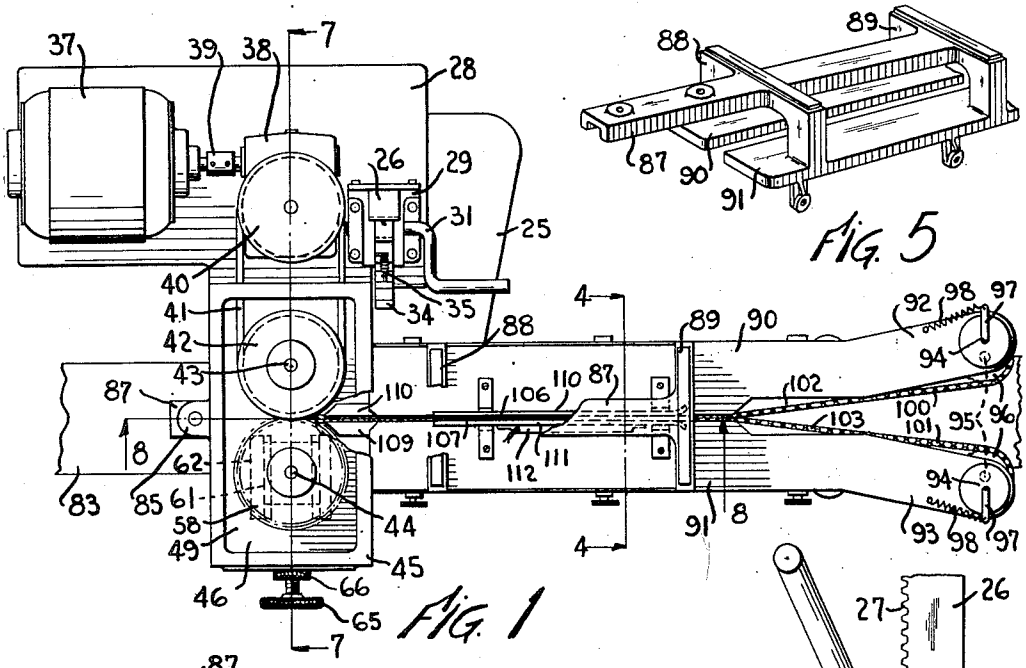


FIG. 1

FIG. 5

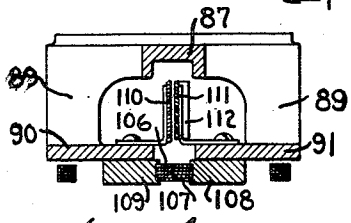


FIG. 4

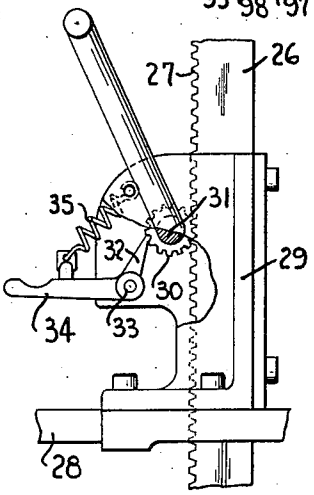


FIG. 3

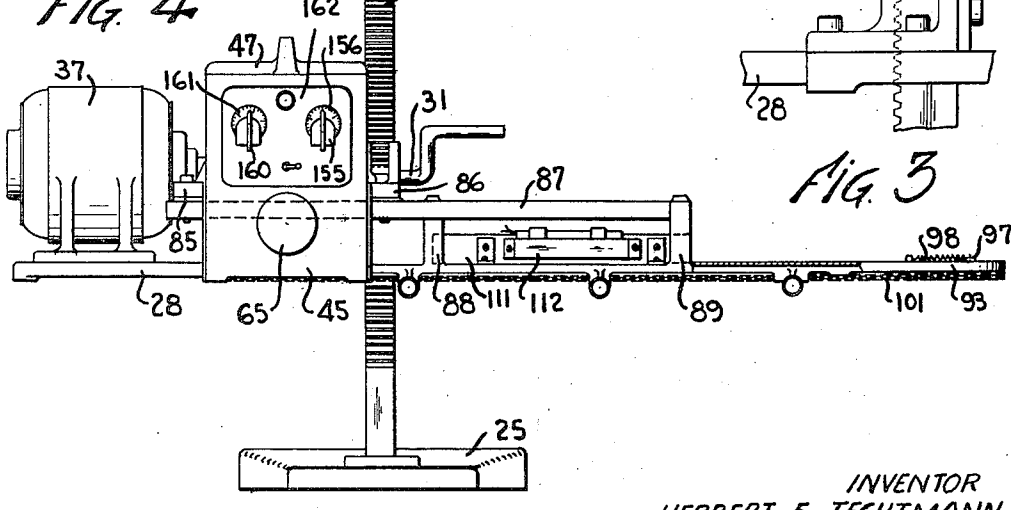


FIG. 2

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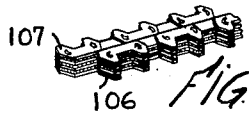


FIG. 10

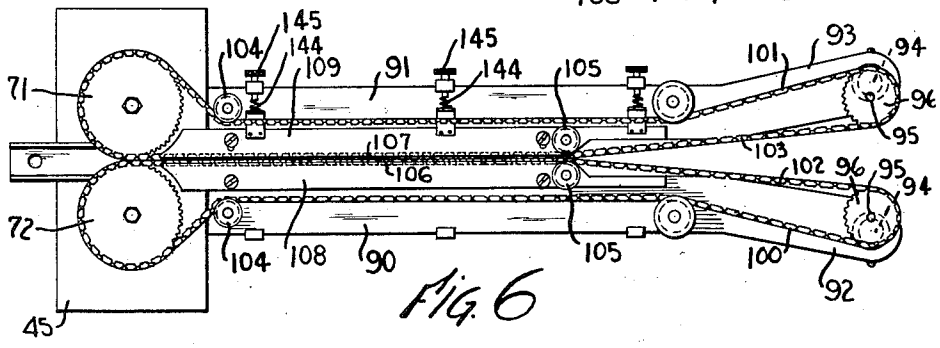


FIG. 6

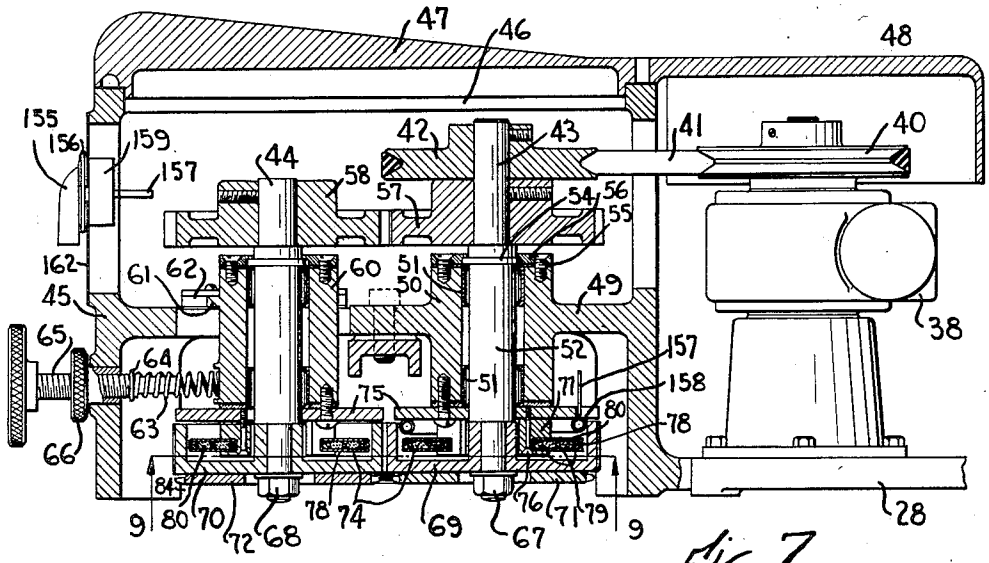


FIG. 7

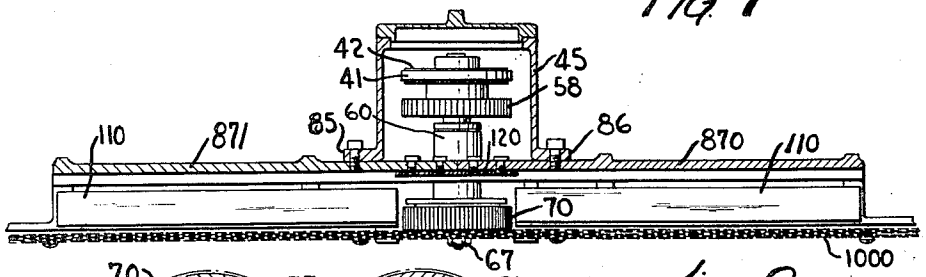


FIG. 8

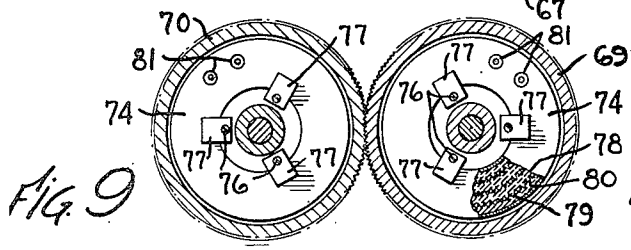


FIG. 9

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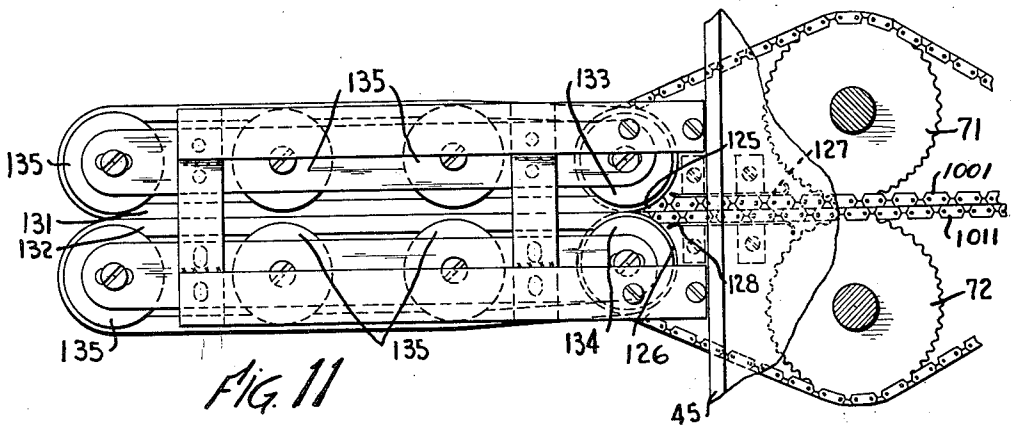


FIG. 11

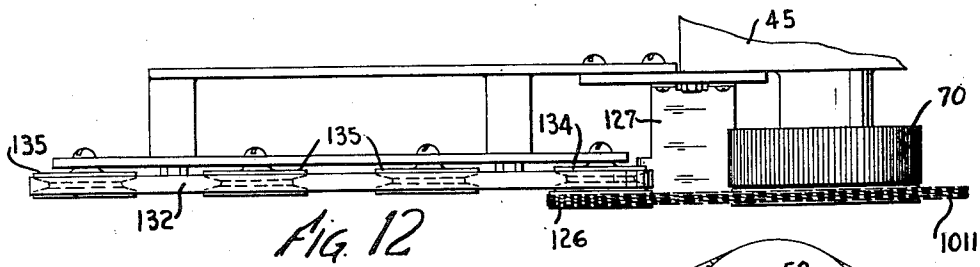


FIG. 12

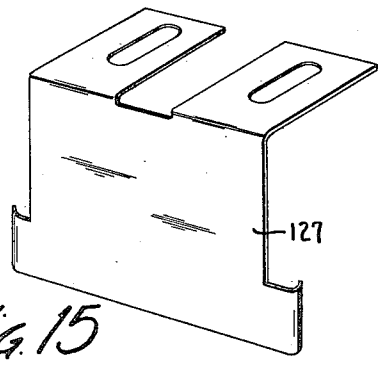


FIG. 15

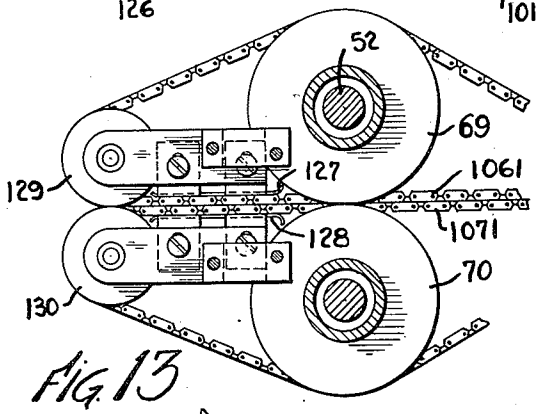


FIG. 13

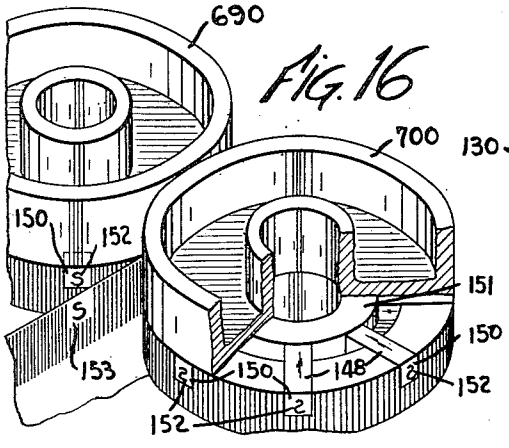


FIG. 16

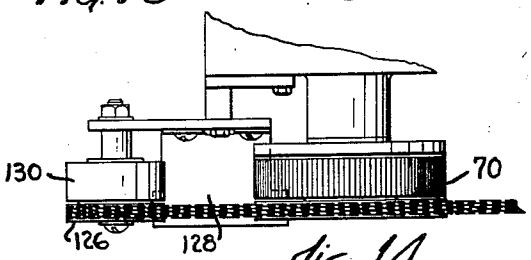


FIG. 14

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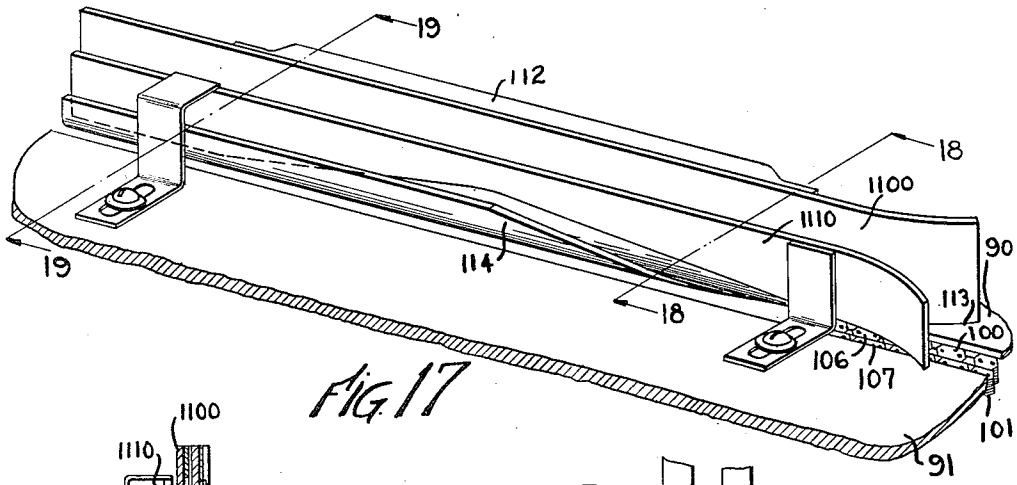


FIG. 17

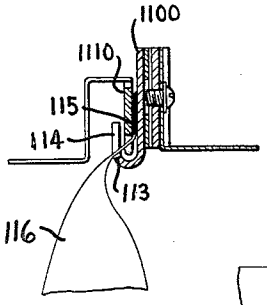


FIG. 18

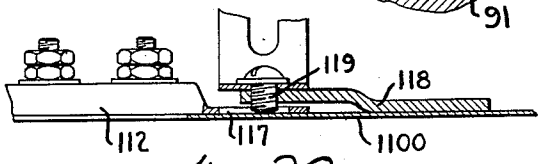


FIG. 20

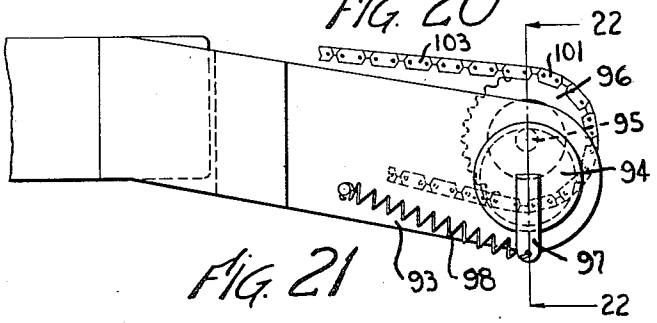


FIG. 21

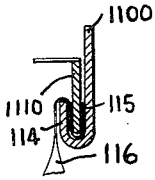


FIG. 19

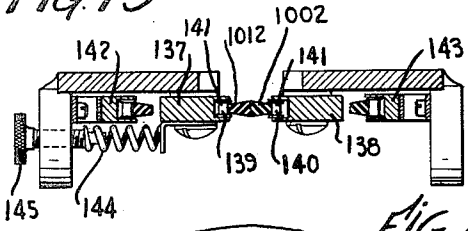


FIG. 23

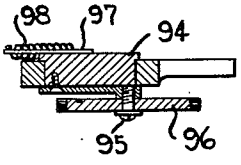


FIG. 22

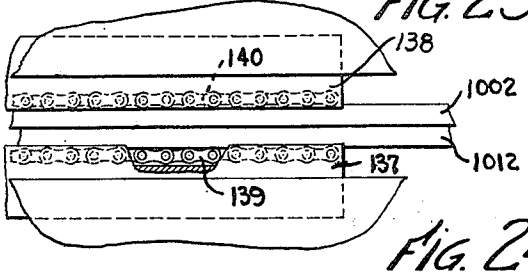


FIG. 24

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ROTARY HEAT SEALER

Herbert F. Techtmann, Milwaukee, Wis., assignor to Herbert F. Techtmann and Wilbur H. Techtmann, copartners, doing business as Techtmann Industries, Milwaukee, Wis.

Application March 25, 1949, Serial No. 83,487

13 Claims. (Cl. 154—42)

This invention relates to improvements in rotary heat sealers.

The invention has for its object the provision of many features of improvement including a novel and improved mounting for the bodily vertical adjustment of the rotary sealing rolls and associated input and output feeding parts; a novel mounting of, and driving connections to, the rotary sealing parts; an arrangement whereby the rotary sealing parts are heated by radiation to eliminate the usual rotating heating elements and brush connections thereto; the provision of die means preferably interchangeably mounted on one or both of the sealing rolls for the imprinting of any desired indicia in the sealed web in the course of the sealing thereof; the provision of novel and travelling vise means presenting substantially continuous clamping support for the work during its movement into and through the sealing rolls, the vise being desirably provided with automatic tensioning arrangements and with an elongated convergent approach run assuring the proper feed of the work into the vise; and the provision in a novel organization of optionally usable input and output feeding means with or without pre-heating and cooling devices.

The above and other objects will more specifically appear in connection with the following disclosure of my invention with reference to the accompanying drawings wherein:

Fig. 1 is a plan view of apparatus embodying my invention, portions thereof being broken away.

Fig. 2 is a front elevation of apparatus shown in Fig. 1.

Fig. 3 is a fragmentary detail view in side elevation of a portion of the apparatus of Fig. 1.

Fig. 4 is a detail view taken in transverse section in the plane indicated at 4—4 in Fig. 1.

Fig. 5 is a fragmentary detail view in perspective showing the supporting frame only of the input feeder.

Fig. 6 is a fragmentary view in inverted plan of the sealing rolls and associated infeed mechanism.

Fig. 7 is an enlarged fragmentary detail view taken in section on the line 7—7 of Fig. 1.

Fig. 8 shows a modified embodiment of my invention as it appears in section on the line 8—8 of Fig. 1.

Fig. 9 is a fragmentary detail view showing the heat sealing rolls and the mounting of the heating elements therein as viewed in section on the line 9—9 of Fig. 7, a portion of one of the heating elements being broken away to expose the embedded resistance wire therein.

Fig. 10 is an enlarged fragmentary detail view in perspective showing associated runs of the silent chain used as a travelling vise for the work in the preferred embodiments of my invention.

Fig. 11 is a fragmentary detail view partially in plan and partially in section through a modified embodiment of the invention.

Fig. 12 is a fragmentary detail view in front elevation of the parts shown in Fig. 10.

Fig. 13 is a fragmentary detail view partially in horizontal section and partially in plan showing a further modified embodiment of the invention.

Fig. 14 is a fragmentary detail view in side elevation of the parts shown in Fig. 13.

Fig. 15 is an enlarged detail view in perspective showing one of the guide plates used in the devices of Figs. 11 to 14, inclusive.

Fig. 16 is a fragmentary detail view in perspective showing further modified sealing rolls, a portion of one of them being broken away.

Fig. 17 is an enlarged fragmentary detail view in perspective showing a modified infeeding and preheating and folding arrangement.

Fig. 18 is a detail view taken in transverse section on the line 18—18 of Fig. 17.

Fig. 19 is a detail view taken in section on the line 19—19 of Fig. 17.

Fig. 20 is a fragmentary detail view partially in plan and partially in horizontal section showing a mounting for the heating element used in the devices of Figs. 17 to 19.

Fig. 21 is a fragmentary detail view in plan showing on an enlarged scale the self-tensioning arrangement for the infeed conveyor vise used in the device of Fig. 1.

Fig. 22 is a view taken in transverse section on the line 22—22 of Fig. 21.

Fig. 23 is a detail view taken in transverse section through a modified input conveyor.

Fig. 24 is a fragmentary detail view partially in plan and partially broken away in horizontal section to illustrate the device shown in Fig. 23.

In the preferred organization of a device embodying my invention, I provide a base 25 upon which there is erected a post 26 having rack teeth 27 in its forward face. The platform 28 (Fig. 1, 2 and 3) has an aperture through which the post extends and carries a bearing guide 29 which is best shown in Fig. 3 and which is telescopically slidable upon the post 26 to provide rigid support for the platform.

Meshing with the rack teeth 27 is a pinion 30 mounted on a crank shaft 31 which is provided with bearings and disposed transversely in the bearing guide structure 29. Rotation of the crank turns the pinion 30 in mesh with the rack teeth 27 to feed the platform 28 upwardly or downwardly upon the post 26. In order to hold the platform in the position to which it may be adjusted in this manner, I provide a pawl 32 mounted on a rock shaft 33 and provided integrally with a manual control lever at 34 which is subject to the bias of spring 35. The pawl is so positioned that in the clockwise rotation of pinion 30 (as viewed in Fig. 3), the pawl ratchets over the pinion teeth for the raising of platform 28. When the platform is to be lowered, it is necessary for the pawl to be manually retracted from engagement with the teeth of pinion 30 against the bias of spring 35, the lever 34 being used for this purpose. The operator will hold the pawl disengaged with one hand while, with the other, he uses the crank 31 to lower the platform.

Mounted on the platform 28 is the motor 37 and the speed reducer 38 to which the motor armature shaft is connected by coupling 39. The power output of the speed reducer is transmitted from a pulley 40 by belt 41 to pulley 42 at the upper end of shaft 43.

The shaft 43, and the companion shaft 44, are mounted in a boxlike frame 45, the top opening 46 of which is capped by a closure 47 which is extended at 48 over the speed reducer 38 to enclose the pulley 40 and belt 41. Intermediate the top and bottom of the boxlike frame 45, there is a horizontal partition web 49 which integrally carries a bearing sleeve 50, within which there are needle bearings at 51 for the enlarged portion 52 of shaft 43. A collar 54 on the shaft is supported upon an anti-friction disk 55 mounted at the top of bearing sleeve 50 and the collar is confined against axial displacement by a retaining ring 56 which has an inner annular notch fitted to the collar as shown in Fig. 7.

At the shoulder formed by the upper end of the enlarged portion 52 of shaft 43, the shaft carries a driving gear 57 meshing with the gear 58 on the companion shaft 44. The companion shaft 44 has a mounting in sleeve 60 which corresponds in all respects with the mounting of shaft 43 in sleeve 50. However, the sleeve 60, instead of being integral with partition web 49, is mounted on a block 61 which is shown in dotted lines in Fig. 1 and is guided in ways 62 provided on the partition web 49 of the box frame 45 (Fig. 7). The entire assembly of the bearing sleeve 60, shaft 44 and driven gear 58 is slidable to and from shaft 52 and is urged toward such shaft by the compression spring 63 which is adjustable as to bias by reason of the fact that it seats against a shoulder 64

on screw **65**, the latter being locked in position by the lock nut **66**.

Connected to the lower ends of shafts **43** and **44** by the nuts **67** and **68**, respectively, are the cup-shaped crimping rolls **69**, **70** and the associated sprockets **71**, **72**, respectively. While it is broadly immaterial whether the sealing rolls are peripherally smooth or toothed, it is preferred that they be at least in part provided with crimping teeth, as shown in Fig. 9.

It is important to note that by reason of the mounting of bearing sleeve **60** on the slide block **61**, the shaft **44** is maintained at all times in parallelism with shaft **43** so that the crimping rolls **69**, **70** are parallel and their line of bite is uniform.

In the hollow interiors of the respective rolls are the annular heating elements **74** which, in accordance with the present invention, are non-rotatable and deliver their heat by radiation rather than conduction to the respective sealing rolls to avoid the necessity of using slip rings or the like to energize the heating elements. Another and very great advantage in having the heating element stationary consists in the fact that the rolls are uniformly heated throughout their peripheries. If the heating elements were fixed in the respective rolls, there would unavoidably be a space between the terminals of the heating element which would not be heated uniformly with the remainder of the periphery of the roll.

The heating elements are mounted on disks **75** (Fig. 7), each of which is bolted to the lower end of one of the bearing sleeves **50** or **60**. The disks **75** are not only relatively thin but are desirably made of aluminum, whereas the rolls are made of brass or bronze. Since the heating elements are thermostatically controlled, as will hereinafter be pointed out, and since the thermostatically responsive bulb is directly associated with the aluminum disk, heat radiation from the disck cools the disk slightly more rapidly than the rolls so that the disks, in effect, anticipate heat requirements of the rolls, thereby keeping the temperature more uniform than would be the case if the rolls themselves had to cool to the temperature at which the thermostat would respond before additional heat would be supplied.

Connected by cap screws **76** to the respective disks are the brackets **77**, which may be three in number, for each heating element, the brackets being notched in the manner clearly shown in Fig. 7, to engage the inner peripheries of the respective annular heating elements. The heating elements are of a well known type employing a metal sheath **78**. This is shown broken away at one point in Fig. 9, and in cross section in Fig. 7, to expose the resistance wire **79** and the refractory material at **80** in which such wire is embedded to insulate it from the metallic sheath. The electrical connections to the heating elements are made through the ceramic eyelets **81** (Fig. 9) and, being conventional, are not further illustrated.

The actual sealing is done by simply passing the work between the heated sealing rolls **69** and **70**. The resiliently yieldable sliding mounting for the assembly carried by driven shaft **44** accommodates any slight variations in the thickness of the work, the spring **63** maintaining the requisite pressure to effect sealing. The variation in work thickness is so minute as to involve no material change in mesh of driven gear **58** with driving gear **57**, despite the fact that relative movement between these gears occurs in the course of reciprocation of bearing **60** and slide **61** and shaft **44** with respect to the shaft **43** and bearing **50**.

For propelling the work in its movement respecting the sealing rolls, it is common to use a supporting table conveyor **83** (Fig. 1). This, however, merely sustains the weight of the packages or other work to be sealed and does not guide the work to and from the sealing rolls. I prefer at least to guide the work into such rolls and, desirably, to guide it from such rolls and I may combine with propelling and guiding means a pre-heater or cooler or both of these features, the arrangement being such that the machine may be interchangeably equipped either with an input conveyor or an output conveyor or a pre-heater or a cooler, or all of these devices.

At its sides, the box frame **45** has lateral openings, one of which is shown at **84** in Fig. 7. Immediately above these openings there are laterally projecting ears **85**, **86** (Fig. 1 and Fig. 8). According to whether one or more guiding conveyors are to be associated with the machine, I attach one or more sub-frames to the ears **85**, **86**.

Where a single sub-frame is to be used, the sub-frame is desirably made as shown in Fig. 5. A channeled arm **87** bolted to both ears (see also Fig. 1 and Fig. 2) projects at the input side of the machine and by means of integral fingers at **88** and **89** supports a pair of conveyor guide plates **90**, **91**. These plates have widely divergent work-receiving portions at **92**, **93** respectively, near the extremities of which are the rock shafts **94** (see Fig. 21) which carry eccentrically mounted pins **95** for the bearing support of the sprockets **96**. Connected with the rock shafts **94** are the levers **97** biased by springs **98** which extend to oscillate the respective shafts in directions to tighten the respective conveyor chains **100** and **101** whereby the work is clamped and propelled and guided.

The conveyor chains **101** are of the multi-ply link type commonly used for other purposes and known as silent chains **100**, **101**. These chains comprise links made up of multiple plies of sheet material toothed at the inside of the chain and externally finished to a common plane to provide a substantially flat surface which, in the instant use of the chain, is used to clamp the work. As the chains pass about the sprockets **96** at the ends of the divergent portions **92**, **93** of the guide plates, the converging runs **102** and **103** of the chains gradually guide the work to enter the jaws of the parallel runs **106**, **107** which constitute, in effect, a moving vise. The idlers **104**, **105** (Fig. 6) bring the runs **106**, **107** of the chains into substantial contact and throughout the extent of runs **106**, **107**, such contact may be yieldably maintained by the thrust bars **108**, **109** upon which the chains slidably bear as shown in Fig. 4 and Fig. 6. The work is thus securely held and positioned and advanced, its advance being positive whether or not the underlying supporting belt **83** is employed.

While the engagement of the work has been described as positive, I desirably make at least one of the thrust bars **109** yieldable on the plate **91** upon which it is mounted, this being done by backing the yieldable plate with compression springs **144** provided with adjustable screw threaded spring seats **145** which are generally illustrated in Fig. 6 and more specifically shown in Fig. 23.

The runs **106**, **107** of the chains continue to clamp the work until the chains separate in passing about the sprockets **71**, **72** which are connected with the sealing rolls and the driving and driven shafts **43** and **44** already described. At this point those portions of the work projecting above the chains are sealed by heat and pressure applied by the rolls **69** and **70** and, if the machine is a single arm machine, the work is thereupon discharged.

As the work approaches the sealing rolls, the portions thereof which project above the vise runs of the chains and are subsequently to be sealed may conveniently be supported and guided by means of the parallel plates **110** and **111** shown in Figs. 1 and 4. To one or both of these plates a pre-heating element **112** may be applied, if desired.

The plates in question may also be constructed to do folding as the work advances. This is sometimes required where, as in the case of a sack, the projecting end portion of the sack is unnecessarily long and it may be desirable to place a fold therein in order that the seal may encompass all of the end material.

In such a case, the plates may be made as shown at **1100** and **1110** in Figs. 17, 18 and 19. The lower margin **113** of plate **1100** is gradually carried beneath plate **1110** and developed into the form of a channel having a wall **114** of progressively increasing height, and into which channel the lower margin of plate **1110** extends, whereby the terminal end portions **115** of the sack **116** representing the work are gradually folded upon themselves as shown in Fig. 18 and Fig. 19 so that the work is folded when it ultimately reaches the sealing rolls. In this and other constructions using the pre-heater **112**, one end of the pre-heater is preferably left free to expand, being slotted at **117** (Fig. 20) and held by a retaining clip **118** which carries a screw at **119** that enters the slot to hold the pre-heating element **112** without fixedly anchoring its end.

Where it is desired that the machine operate as a double arm rather than a single arm machine to hold the sealed work under pressure until the sealed portions thereof are permitted to cool, the construction shown in Fig. 8 may be used. The arm **870** is slightly shorter

than the arm 87 shown in Fig. 5, terminating in the middle of the box frame 45. A like arm 871 is used at the delivery side of the machine, the respective arms being bolted to the ears 86 and 85. Where the ends of the arms abut intermediate the sides of the box housing 45, a plate 120 is used to splice the joint and both arms are secured thereto as shown in Fig. 8.

The arm 870 is otherwise identical with the arm 87 shown in Fig. 4 and Fig. 5 and it carries the pressure plates 110 and 111 just as above described for guiding to the sealing rolls the portions of the work which are to be acted on thereby. Similar plates are used at the delivery side of the machine where they not only maintain the work under pressure until it cools, but also assist in absorbing the heat from the work and rejecting it into the atmosphere. In the dual construction, the vise chains used may be continuous throughout the extent of both arms as indicated at 1000 in Fig. 8, the chains passing between the sprockets 71 and 72 of Figs. 6 and 7 in mesh therewith, but without passing about such sprockets as shown in Fig. 6.

A somewhat comparable arrangement is shown in the modification illustrated in Figs. 11 to 13 where the chains 1001 and 1011 pass between the sprockets 71 and 72 and about the idler sprockets 125 and 126, thence returning about the outside of sprockets 71 and 72. The clamping runs 1061 and 1071 hold the work tightly engaged, while the sealing rolls 69 and 70 exert heat and pressure on the portions of the workpieces which require sealing. The clamping of the runs 1061 and 1071 continues while the sealed portions of the workpieces pass between the plates 127, 128 which are suspended from above in the manner clearly shown in Figs. 11 to 15.

At this point, the work may be cooled by passing through the clamping engagement of the cooling rolls 129 and 130 as in Fig. 13 or it may be held in continued clamping pressure between the parallel and contiguous runs of V-belts 131, 132 which are driven by pulleys 133 and 134 fixed to sprockets 125 and 126, the V-belts thence passing over a series of idlers 135 as clearly shown in Fig. 11.

Although the laminated link or socalled silent chain has been found greatly preferred to any other means of providing travelling vise pressure for advancing the work, it is possible, if desired, to substitute rubber V-belts wherever chains have heretofore been described. A means of doing this is shown in Figs. 23 and 24 where the conveyor runs 1002 and 1012 comprise V-belts. Throughout the clamping portion of the machine, I have used channeled guides at 137, 138 in which there are permanently fixed lengths of roller chain at 139 and 140, respectively, the rollers 141 of such chain lengths constituting idlers on closely adjacent centers, which provide backing for the runs of V-belt to hold these in pressure engagement with the work. Similar channeled guides at 142 and 143 may be similarly lined with lengths of roller chain to guide the return runs of the V-belts.

As in all of the constructions herein disclosed, adjustable pressure may be provided by yieldably mounting one or both guides subject to the bias of compression springs such as that shown at 144, the springs desirably being adjustable as to pressure by engaging them with the screws 145 which serve as spring seats.

Reference has been made heretofore to the fact that the sealing rolls 69, 70 are desirably at least partially fluted or toothed peripherally. Fig. 16 shows a construction in which the sealing rolls 690, 700 (alternatively useable in any of the devices previously discussed) have peripheral or wall portions which are partially cylindrical and partially fluted in upper and lower planes, respectively. In addition, these rolls are provided with sockets at 148 to receive interchangeable marking dies 150 which project into the sockets to receive support from the roll hub 151 and which, at their outer ends, have insignia at 152 to imprint any desired symbol or other matter on the sealed and crimped work as indicated at 153.

It will be apparent from the foregoing that I have provided a novel mounting upon which novel sealing mechanism is vertically adjustable bodily. The sealing rolls are positively intergeared and yet are yieldable respecting each other. They are conveniently heated without the use of slip rings by means of non-rotatable radiant heating elements. The sealing rolls may be cylindrically surfaced or fluted or may be provided with dies for imprinting insignia of any desired sort upon the work.

The machine is of universal character since it is adapted interchangeably for manual feed or for the use of an input conveyor only or an output conveyor only or a combination of both such conveyors. The output system may include not only conveyors but cooling means, if desired, and a single pair of endless travelling vise means may serve both the input and the output conveyor systems.

The silent or laminated link chains preferably used perform a new function in the instant device by providing substantially continuous and planiform clamping surfaces represented by the aligned edges of the laminations used in making up the links. I have shown means whereby such chains will be engaged under pressure with the work, or other endless conveyors such as V-belts may be substituted, or used in addition to the chains.

I have shown how the means which guides to the sealing rolls the portions of the work to be acted on thereby may be used to perform additional functions in the way of pre-heating and even folding the portions of the work to be acted on.

Since different workpieces require different sealing and pre-heating temperatures, I prefer to incorporate means for controlling these. The thermostats used are not shown in detail, being conventional, except for the manner of installation. The knob 155 (Fig. 2) coacting with dial 156 sets the temperature at which the sealing rolls operate, this thermostat being connected by means of tube 157 (Fig. 7) with an annular thermostatically responsive bulb 158 associated with heating element 74 within the cup-shaped sealing roll 69 (Fig. 7). A similar thermostat 159 having a connection from the pre-heater is controlled by knob 160 associated with dial 161 on the front panel 162.

I claim:

1. In a heat sealer, the combination with a pair of sealing rolls provided with heating elements, of shafts upon which the respective rolls are mounted, a bearing for one of said shafts, a bearing for the other shaft provided with a slide, a frame providing a way in which said slide is movable to and from the bearing first mentioned, whereby said shafts are relatively movable to and from each other, a driving connection to one of the shafts and meshing gears carried by the respective shafts for transmitting motion from one to the other notwithstanding the relative movement of said shafts in the respective bearings.

2. In a heat sealer, the combination with a frame provided with a web and a fixed bearing mounted therein, said web being provided with a way and a slide reciprocable in the way toward and from said fixed bearing, a second bearing mounted on the slide, a spring acting upon said slide and second bearing in the direction of the fixed bearing, whereby to bias said second bearing toward the fixed bearing, a second shaft rotatably mounted in the second bearing, cooperating heat sealing rolls carried by the respective shafts and having their peripheral portions in operative proximity, gears carried by the respective shafts and in operative mesh notwithstanding the yielding of the second bearing and second shaft respecting the fixed bearing, and a driving connection to the first shaft and adapted through said gears to actuate the second shaft in positively timed relationship to the first shaft.

3. The combination set forth in claim 2 in which said frame comprises a box frame having side wall portions in which said gears are housed and other wall portions at least partially enclosing said rolls, the said web comprising a partition across said box frame.

4. The combination set forth in claim 3 in further combination with the conveyor supporting subframe comprising an arm in detachable connection with the box frame and projecting laterally therefrom, conveyor guides carried upon said arm and disposed in pairs, conveyor driving rotors mounted on the respective shafts, and conveyors engaged with said rotors and extending above said guides and having complementary runs constituting travelling vise means in opposite position for work engagement and for the guidance and advance of work toward said rolls.

5. In a heat sealer, the combination with supporting shafts, of a pair of coacting sealing drums mounted on the respective shafts and radiant heating elements provided with radiant surfaces and fixed adjacent the respective drums whereby to be stationary within the drums

and to heat said drums without rotating therewith, said shafts being provided with bearings and the respective heating elements being fixed to the respective bearings, a frame with which one of said bearings has a fixed connection and the other of said bearings has a movable connection, the last mentioned bearing having a slide for which said frame is provided with a guideway in which the slide is reciprocable in a direction to and from the bearing fixed in the frame.

6. The device of claim 5 in which the respective drums are hollow and the respective elements are provided with brackets supporting them from their respective bearings within the hollow drums.

7. In a heat sealer, the combination with a frame and a tubular bearing fixed thereon, of a first shaft rotatable in the bearing, a heat sealing drum mounted on said first shaft, a bearing sleeve provided with a slide upon which it is mounted for movement to and from the first bearing, the frame being provided with a guideway on which said slide is reciprocable, a second shaft journaled in said sleeve, a second drum carried by the second shaft in operative proximity to the drum first mentioned and electrical heating elements respectively connected with the first mentioned bearing and with said sleeve to partake of relative non-rotatable reciprocation.

8. In a device of the character described, the combination with generally cylindrical sealing members mounted for rotation and provided with coaxial sprockets, of endless conveyor chains engaged with the sprockets and including parallel and substantially contiguous clamping runs leading toward the respective sprockets and members and constituting a travelling work-propelling vise means for advancing workpieces to said members, each such chain comprising laminar links having laminations interleaved with and pivotally connected with and spaced only by the laminations of contiguous links, all such laminations having corresponding edges finished substantially to a common plane for effectively engaging workpieces over an area thereof nearly coextensive with the width of said chain, idlers remote from the sprockets aforesaid and about which the respective chains are guided to said runs, and tightening idlers more remote than the first mentioned idlers from said sprockets and widely separated to provide convergent runs of said chains from said remote idlers to the idlers first mentioned.

9. In a device of the character described, the combination with a pair of rotary and mutually cooperating heat sealing drums and associated chain guide members, of delivery sprockets at one side of the said members first mentioned and in substantially the same plane, idler sprockets at the other side of the said members first mentioned and in substantially the same plane, and conveyor chains engaged with the respective delivery and idler sprockets and having work clamping runs extending from the idler sprockets between said members toward said delivery sprockets, said chains comprising laminar links of the silent chain type formed interiorly with teeth and having exterior faces in which said link laminations are substantially in a common plane, said links comprising interleaved laminations in substantial face contact and having pivotal connection at their interleaved portions, whereby said chains present substantially continuous clamping surfaces.

10. A detachable conveyor arm for use with a heat sealer comprising a frame and heat sealing rolls mounted thereon and provided with sprockets, the said arm extending laterally from said frame and being provided with conveyor chains adapted to be engaged with said sprockets, idlers rotatably mounted on said arm at points remote from the sprockets for guiding said runs in their advance thereto, and widely separated idlers beyond the idlers first mentioned and over which said chains are guided in converging runs toward the idlers first mentioned, the second mentioned idlers being provided with eccentrically rotatable mountings for chain tightening, and springs acting on said mountings for the rotation thereof in chain tightening directions.

11. In a device of the character described, a work feeding device comprising a pair of conveyors having cooperating substantially parallel work clamping runs, spaced parallel guide plates disposed in work clamping positions offset from said runs and between which portions of work engaged by said runs are slidable, a heating element directly associated with one of said plates for pre-heating work engaged thereby, one of said plates having its lower margin formed about and lapping the lower margin of the other of said plates whereby work passing between the plates will be folded in the course of its movement.

12. A device of the character described comprising the combination with a frame and a pair of heat sealing rolls rotatably mounted thereon, of arms carried by the frame and projecting in opposite directions therefrom, flexible conveyors having flat clamping faces and clamping runs extending tangentially past the respective rolls, guide means for said chains connected with the respective arms, supplemental guide means for said conveyors disposed adjacent the point of tangency of the conveyors with said rolls and engaged with the conveyors for the support thereof as they pass the rolls, a pre-heating element on one of the arms extending longitudinally of the clamping run of the conveyors in a position to preheat workpieces clamped by said conveyors and advancing therewith to said rolls, one of the arms projecting from said frame beyond said rolls being provided with cooling means, the other of the arms beyond said rolls having pressure means opposed to said cooling means for urging to contact with said cooling means workpieces advanced from said rolls by said conveyor, whereby said workpieces are cooled under pressure by said cooling means.

13. The device of claim 12 in further combination with a folding device associated with said pre-heater.

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