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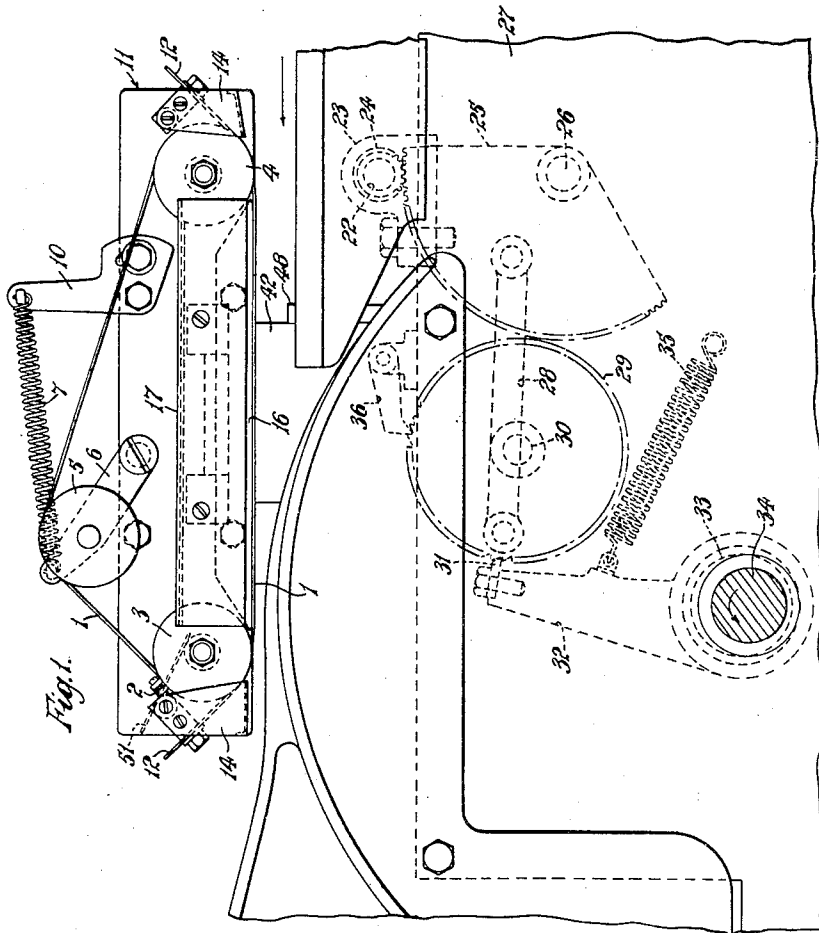
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2,360,703

CONTINUOUS CIGARETTE AND LIKE ROD FORMING APPARATUS

Filed May 8, 1940

4 Sheets-Sheet 1



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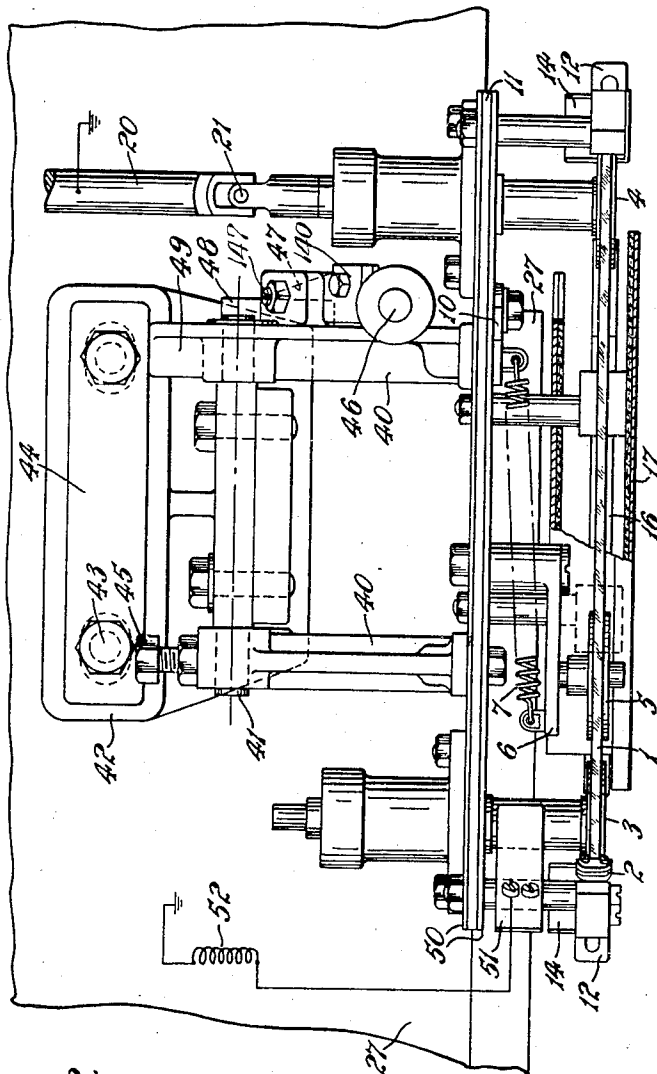


Fig. 2.

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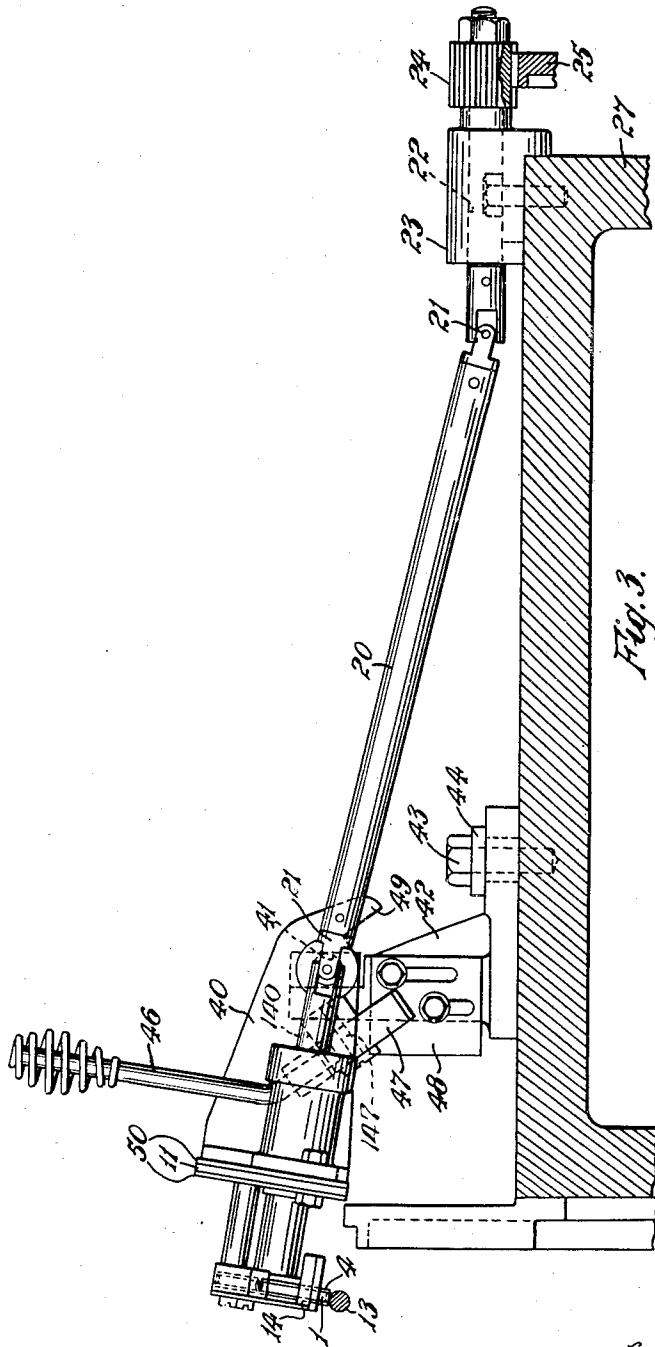


Fig. 3.

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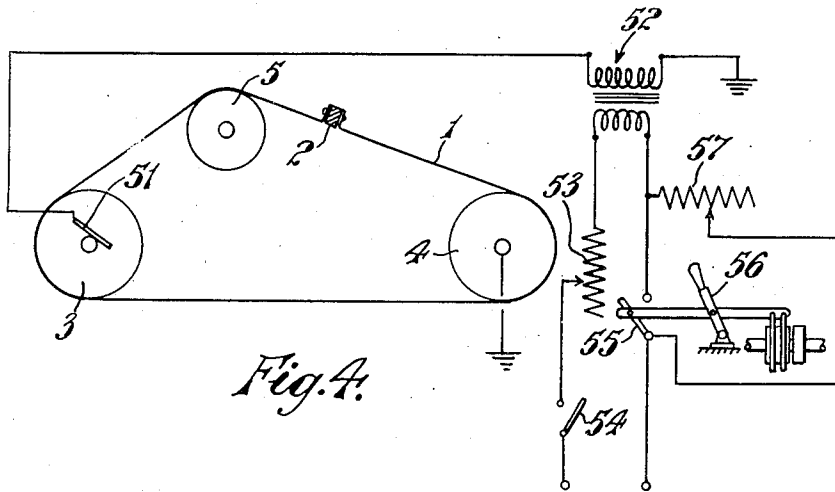
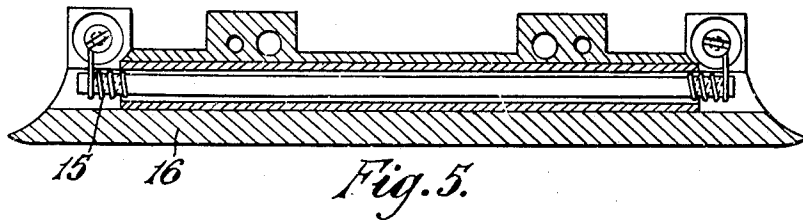
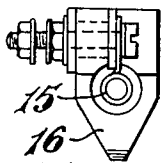
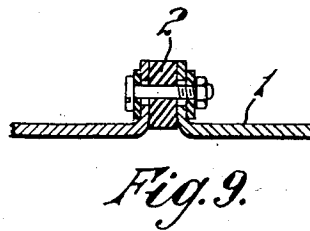
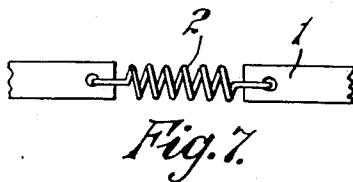
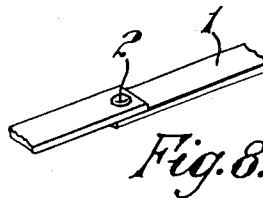
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CONTINUOUS CIGARETTE AND LIKE ROD FORMING APPARATUS

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4 Sheets-Sheet 4



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2,360,703

CONTINUOUS CIGARETTE AND LIKE ROD FORMING APPARATUS

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5 Claims. (Cl. 154—42)

This invention is for improvements in or relating to sealing devices for sealing longitudinal seams formed from overlapping portions of material caused to adhere together, such as the seams formed by continuous rod forming apparatus for making continuous cigarette rods or other continuous rods comprising a core (e. g., a tobacco core) enclosed in a continuous wrapper and having a longitudinal seam secured by adhesive or for making a continuous rod comprising alternate wrapped tobacco portions and stub portions which are united by a band or a strip of wrapping material while moving axially, for example, in the manner described in United States patent specification No. 2,156,600 in which case, it will be appreciated, the longitudinal seam is not a continuous seam, but is, for the purposes of the present invention considered in the same manner as the seam of other continuous rods. The term "rod forming apparatus" will for convenience be used to mean all such apparatus as aforesaid.

The invention is particularly concerned with a sealing device for sealing longitudinal moving seams such as those of the rod made in a rod forming apparatus, said device comprising a movably mounted heated metal band having a straight portion extending lengthwise of the seam to engage the latter. Such a sealing device will be referred to as "a sealing device of the kind specified."

It is customary in sealing devices of the kind specified to mount the band on a pair of pulleys so that the straight portion of the band runs lengthwise of the seam. The band is usually heated by a heating element which is arranged to come in contact with the said straight portion.

The bands in the known sealing devices have an endless smooth surface, the bands being formed by welding, brazing or the like of the ends of a metal strip from which the band is made so that the band has a smooth surface throughout its length. Such bands have utility in that as they are driven during the operation of the rod forming apparatus, any adhesive which may be deposited on the surface of the band may be removed by means of cleaning elements which are usually in the form of stationary scrapers.

These endless welded bands are, however, subject to the disadvantage of being liable to break near the welded joints, and it is an object of the present invention to provide an alternative form of sealing device of the type described in

which one obtains the advantages of a device which can be cleaned during the operation of the machine.

According to the present invention there is provided a sealing device of the kind specified wherein the sealing band comprises a metal strip having a smooth surface and having its ends interconnected by a mechanical coupling and wherein the band is reciprocated so that only the smooth surface of the strip engages the seam. The mechanical coupling may comprise a helical tension spring whereby the band is extensible.

It will be seen, therefore, that a band according to the present invention has not an endless smooth surface such as is found in bands in known machines by reason of the fact that the ends of the metal strip are connected together by a mechanical coupling. By reciprocating the band according to the present invention it is possible to ensure that only the smooth portion of the metal strip will engage the seam of the rod, and the mechanical coupling can be arranged at all times to be out of engagement with the seam.

By providing a mechanical coupling according to the present invention the metal strip from which the bands are made can be made extremely thin, which also provides an added advantage in cost of the band, and the ease with which it can be heated to the desired temperature. Further, where the band is to be heated by a separate heating element, the thinner the band the less will be the heat loss from the heating element to the seam.

Sealing devices made in accordance with the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a front elevation of part of a continuous rod cigarette making machine embodying the invention.

Figure 2 is a plan of Figure 1.

Figure 3 is a side elevation of the upper part of Figure 1 partly in section, some parts being omitted.

Figure 4 is a diagram showing electrical connections to the heating device for the sealing device.

Figure 5 is a sectional elevation of a heating element for the sealing device.

Figure 6 is an end elevation of Figure 5.

Figures 7 to 9 show different kinds of mechanical couplings.

Referring to the drawings the general arrangement of the band may be best seen in

Figure 4 where a thin metal strip 1 connected by a mechanical coupling at 2 is shown supported on pulleys 3 and 4 and passing over an idler 5. The pulleys are grooved to accommodate the strip so that it is flush with the pulley rims. The idler 5 is carried on a pivoted arm 6 which is controlled by a spring 7 to adjust the tension on the strip. The spring 7 is anchored to an adjustable arm 10. The pulleys 3 and 4 and the arms 6 and 10 are all fixed on a support plate 11 which is constructed as described later. The arrangement described enables the strip to expand and contract readily on changes of temperature, thus maintaining proper tension in the strip and contact between the band and the pulleys.

A scraping element 12 is arranged near each end of the lower run of the strip 1 to engage the smooth surface of the strip which comes into contact with the seam of the cigarette rod, shown in section at 13, Figure 3. The rod and the supports and conveying means therefor are omitted from Figure 1 to render the drawings clear, but the rod travels in the direction of the arrow. These scraping elements are arranged to engage the surface of the strip as it passes over the peripheries of the pulleys 3 and 4. Since the strip is reciprocated, by mechanism to be described, the whole of the surface of the strip which engages the seam will be kept clean by the scraping elements. Adhesive or dirt scraped off the strip is collected by guards 14 when it falls off the scrapers, thus preventing it from contaminating the rod 13.

The strip 1 may be heated by an electric heater 15, Figures 5 and 6, contained in a shoe 16 mounted above the seam of the cigarette rod so that the strip mounted on the pulleys lies between the heating element and the seam and in contact with both the shoe 16 and the seam of the rod 13. In such a case the shoe is made of metal and the strip may be of thin spring steel.

As shown in Figures 1 to 4, however, the strip 1 itself comprises the heating element, in which case it is made of resistance metal strip, such as the material sold under the registered trademark "Nichrome," while the shoe 16 is made of refractory material such as unglazed china. In either case a cover 17 lined with asbestos is provided to conserve the heat.

Various kinds of mechanical couplings are shown in Figures 7, 8 and 9, those in Figures 7 and 8 being chiefly suitable for use with a heating element such as 15, while that shown in Figure 9 is preferred for use in cases where the strip itself constitutes the heating element. In the case of couplings as shown in Figures 8 and 9, a jockey pulley such as the pulley 5, or an equivalent arrangement is necessary, but with the coupling shown in Figure 7 the spring will permit the strip to expand and contract as necessary.

The strip is intermittently moved first in one direction and then in the other by gearing about to be described which is operatively connected to the pulley 4 by a shaft 20 provided with universal joints 21. The lower end of the shaft 20 is connected by one joint to a spindle 22, Figure 3, supported in a bearing 23. The free end of the spindle 22 has fixed thereto a gear 24 which engages with a toothed quadrant 25 rotatable on a spindle 26 fixed in the frame 27 of the cigarette making machine. The quadrant is oscillated on its spindle by a connecting rod 28, the other end of which is connected to a ratchet wheel 29

rotatable on a spindle 30 also fixed to the machine frame. The ratchet wheel is rotated by a pawl 31 on an eccentric rod 32 which is mounted on an eccentric 33. The eccentric is fixed to a continuously rotating shaft 34 which is the tape drum shaft of the cigarette making machine, and a spring 35 holds the pawl in engagement with the ratchet teeth. A loosely pivoted pawl 36 prevents the ratchet wheel from moving backwards.

Thus as the ratchet wheel is rotated the quadrant is moved in one direction for half of the revolution of the ratchet wheel, and then in the reverse direction for the other half revolution of the ratchet wheel. In this way the strip 1 moves in one direction for a certain time and then in the other direction, the joint 2 being so located as to avoid contact with a scraper 12 during either movement.

The support plate 11 which carries the strip 1 and its associated parts is itself supported by brackets 40 which are pivoted at 41 to a base bracket 42. The parts are adjustable to raise or lower the pivot point 41 to alter the location of the strip 1 with respect to the seam in the rod and the base 42 itself may be moved with respect to the frame 27 for similar purposes, the fixing of the base being by bolts 43 which clamp the base down on the frame by means of a spring plate 44. Finer adjustment is provided by a screw 45 by means of which the brackets 40 and plate 11 may be slightly rotated on the pivots 41. A handle 46 is provided by means of which the whole arrangement may be swung upwards and around on the pivot 41 for inspection and other purposes. The handle 46 is attached to the arrangement by a pivot pin 47 passing through a lug 48 formed on the right hand bracket 40 as viewed in Figure 2. The handle 46 has a projection 47 at its end which may be turned inwards by rotation of the handle and its projection about the pivot 47 to engage on the top of an adjustable plate 48 and support the whole device in the inoperative position. A tailpiece 49 on one bracket 40 prevents the device from being swung too far back.

In constructions employing a heating device of the kind shown in Figures 5 and 6 the plate 11 consists merely of a single piece of metal, but where it is desired to use the metal strip 1 itself as the heating unit, a metal plate clamped between two sheets 50, Figure 2, of insulating material is employed. The various parts fixed to the support plate are insulated from the metal by making the bolt holes therein larger than those in the insulating material.

The electric current is fed to the strip 1 by a brush 51 bearing on the hub of the pulley 3, while the other connection may be by a similar brush on the hub of pulley 4, but as shown in Figure 4, is an earth connection to the frame via the universal shaft 20.

Low voltage current is suitable for the heating of the strip 1 and the electric connections are shown in Figure 4 where the brush 51 is connected to the secondary or a transformer 52, the other end thereof being earthed. The primary is connected through an adjustable resistance 53 and main switch 54 to one terminal of the main supply. The other end of the primary is connected, when the machine is operating, through a switch 55 to the other terminal of the mains. The switch 55 is operated by the starting lever 56 of the driving pulleys or the like of the machine in the manner indicated diagrammatically in the figure. When the machine is stopped the switch 55 is opened, but the heater is still in

circuit through an adjustable resistance 57, the current passing being sufficient to keep the band hot enough during the idle period to ensure that satisfactory sealing will take place immediately the machine is started. Where the strip 1 itself constitutes the heating element the coupling 2 preferably comprises insulating material as indicated in Figure 9, and thus the current path is from pulley 3 along the lower or operative part of the strip 1 to pulley 4 and thence to the frame 27.

What we claim as our invention and desire to secure by Letters Patent is:

1. A sealing device of the kind specified, comprising a smooth surfaced metal strip, a mechanical coupling to interconnect the ends of the strip, and means to effect reciprocation of the strip lengthwise of the strip, said coupling being reciprocated with the strip.

2. A sealing device of the kind specified, comprising a smooth surfaced metal strip, a mechanical coupling comprising a helical tension spring to interconnect the ends of the strip, and means to effect reciprocation of the strip lengthwise of the strip, said coupling being reciprocated with the strip.

3. A sealing device of the kind specified, comprising a smooth surfaced metal strip, means to apply an electrical current to said strip, and insulated mechanical coupling to interconnect the ends of the strip, and means to effect reciprocation of the strip lengthwise of the strip, said coupling being reciprocated with the strip.

4. A sealing device of the kind specified, comprising a smooth surfaced metal strip, a mechanical coupling to interconnect the ends of the strip, means to effect reciprocation of the strip lengthwise of the strip, said coupling being reciprocated with the strip, and an adjustable pulley over which the strip passes, said pulley being arranged to maintain the desired tension in the strip.

5. A sealing device of the kind specified, comprising a smooth surfaced metal strip, means to apply an electrical current to said strip, a mechanical coupling to interconnect the ends of the strip, an adjustable pulley over which the strip passes, said pulley being arranged to maintain the desired tension in said strip, and means to effect lengthwise reciprocation of the strip.

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