June 23, 1964 R. D. RESPESS 3,138,164

CIGAR SQUARING METHOD AND APPARATUS

Filed Aug. 21, 1962

2 Sheets-Sheet 1

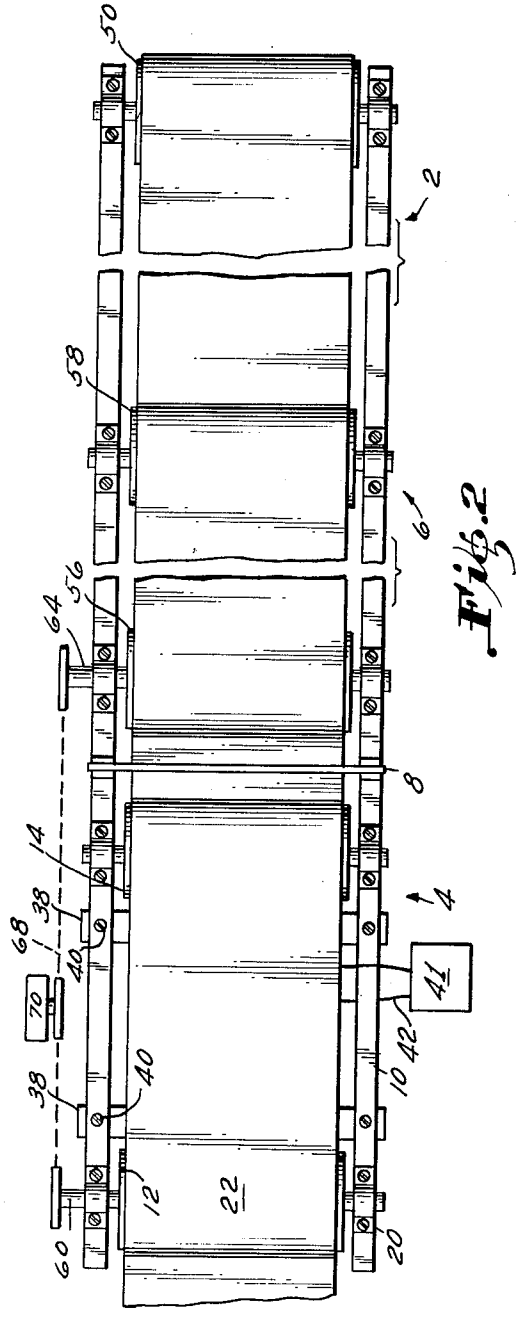


Fig. 2

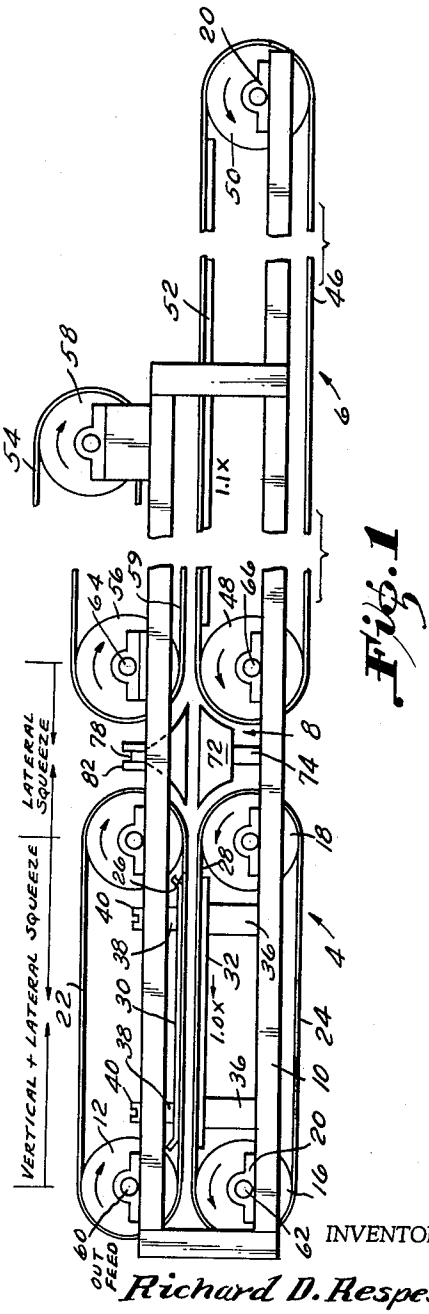


Fig. 1

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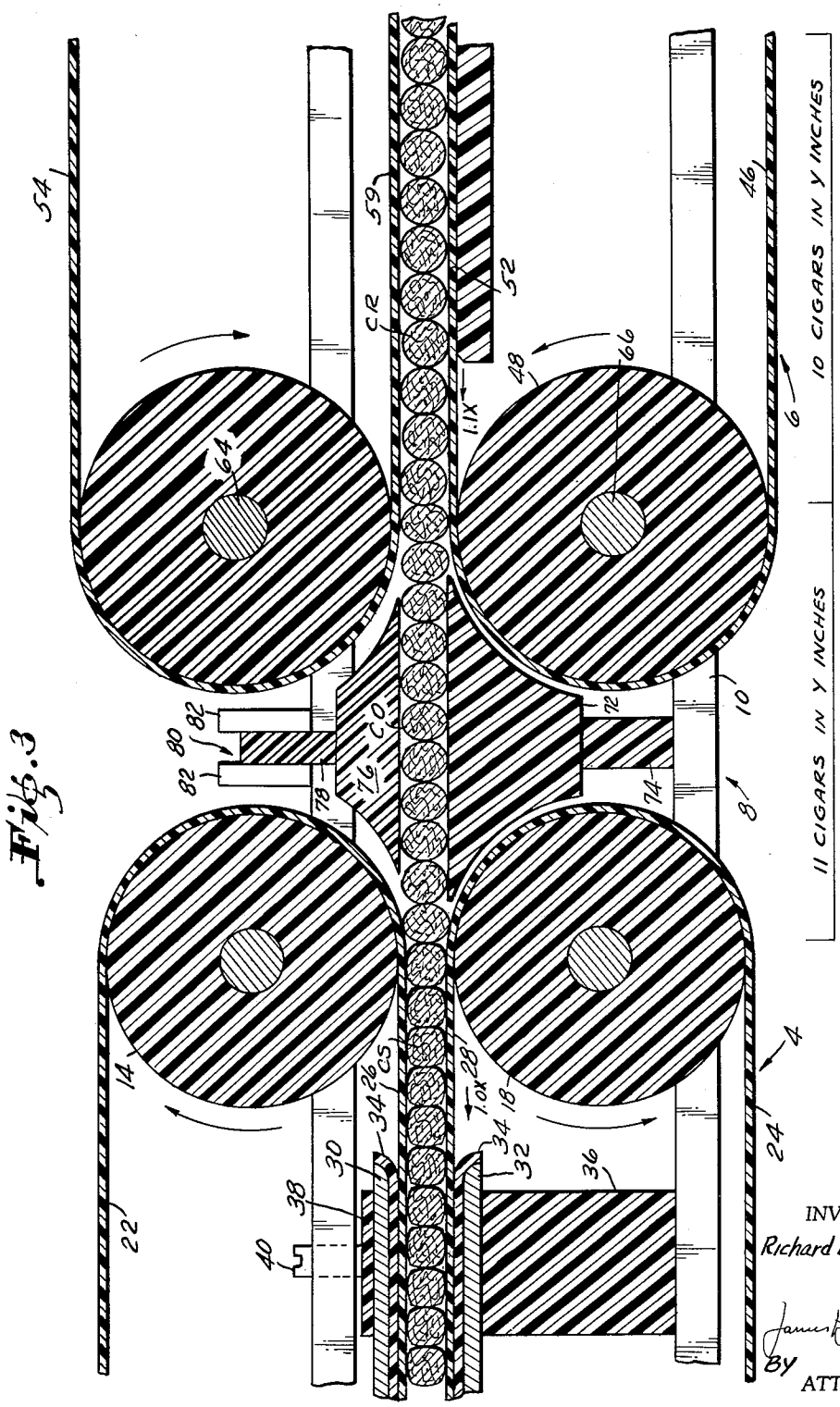


Fig. 3

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CIGAR SQUARING METHOD AND APPARATUS

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8 Claims. (Cl. 131—20)

This invention relates to a method and apparatus for shaping cigars and, more particularly, for imparting a so-called "square" shape to originally round cigars. This application is a continuation-in-part of co-pending application Serial No. 134,469, filed August 28, 1961, entitled Cigar Shaping Method and Apparatus, Patent No. 3,057,361 of October 9, 1962.

The primary object of this invention is to provide a belt-press machine wherein cigars are conveyed in a direction transverse to their lengths, side-by-side, between upper and lower runs of a pair of belts and, while being subjected to vertical pressure between the belt runs, the cigars are also heated by high frequency current so that they attain a flat set. According to the co-pending application, supra, the cigars enter the belt press in close side-by-side adjacency and remain clamped close to one another as they pass through the press, and while the upper and lower belt surfaces squeeze the cigars vertically. The vertically exerted forces cause the cigars to squash out laterally against one another so that not only are the upper and lower sides horizontally flattened by the belt surfaces, but so also flattened are the vertical sides, as the result of the "squash-out" of the cigars against one another. As used in the art, and in this application, the terms "flat" and "square" mean somewhat flat or somewhat square, it being understood that geometric perfection is neither achieved nor desired.

While the "squash out"' effect referred to above is useful, and is utilized to some extent in the subject method and apparatus, considerable squeeze pressure is necessary to produce the lateral expansion of the cigars sufficient to cause the desired flattening of the vertical sides of adjacent cigars against one another, particularly if the adjacent cigares are not very close to each other as they enter the press. The object now is to provide for the lateral squeezing of the adjacent cigars against one another as they enter the press. Also, according to this invention, the cigars, prior to being pressed vertically, are squeezed laterally and made somewhat oval, with the longer axis of the oval vertical, and then squeezed vertically to produce the final generally square shape.

These and other objects will be apparent from the following specification and drawings, in which:

FIG. 1 is a diagrammatic side elevation illustrating the apparatus utilized for performing the method;

FIG. 2 is a top plan diagrammatic view of the apparatus of FIG. 1; and,

FIG. 3 is a greatly enlarged diagrammatic and fragmentary cross-section illustrating the method and apparatus.

Referring now to the drawings, in which like reference numerals denote similar elements, the apparatus generally denoted 2 consists essentially of three cooperative sections, i.e., a belt press 4, a feeder 6, and a bridge 8 between the press and feeder. In the present example, all three sections have a common frame 10, preferably of insulating material.

In the belt press section 4, upper and lower spaced pairs of rollers 12, 14 and 16, 18, preferably of insulating material, are rotatably mounted on suitable bearings, such as pillow blocks 20, for supporting a pair of endless belts 22, 24, of insulating material, such as Koroseal. The lower run 26 of belt 22 is spaced above the upper run 28 of belt 24; upper and lower metal electrode plates

30, 32 are disposed against the non-working faces of the belts, and a sheet of anti-friction material 34, such as Teflon, mounted on the belt-sides of the electrodes. The electrodes serve as back-up members for the belts, the lower electrode 32 being supported on frame 10 by blocks 36 of insulating material, and the upper electrode 30 being supported on cross members 38 which may be adjusted upwardly and downwardly by leg screws 40 whose ends, not shown, are rotatably captive in cross-members 38 and whose shanks are threadedly engaged through members of frame 10. The distance between belt runs 26 and 28 may thus be adjusted so as to regulate the amount of squeeze-pressure exerted vertically on the cigars passing through the press. Opposite sides of a high frequency current generator 41 are connected by leads 42 to the respective electrodes and tuning stubs, not shown, are also used to match the operating characteristics of the electrodes with the output of the generator.

Feeder 6 comprises an endless belt 46, preferably also of Koroseal or the like material having reasonably good insulating properties, mounted on insulating rollers 48, 50 rotatably supported on frame 10 by bearings 20. The purpose in utilizing insulating material for all possible structural members, particularly those near the electrodes, is to protect the operating personnel from stray pick-up of, or accidental contact with, the high-frequency currents.

Feed section 6 also includes a helper belt 54 running over rollers 56, 58 whose lower run 59 preferably angles downwardly so as to engage the tops of the in-feeding cigars shortly before passing under roller 56. The nip between the upper surface of belt run 52 and the lower surface of helper belt run 59, at the points where they intersect a straight line passing through belt shafts 64, 66, is tight enough to compress the then still-round cigars slightly so as to drive them firmly forwardly, towards belt press 4. The shafts 60, 62, 64 and 66 of rollers 12, 16, 56 and 48, respectively, are driven by a suitable drive 68 from a torque source 70. The linear speed of the belts in feed section 6 is faster than those of belt press 4 for reasons explained below.

Bridge section 8 is designed to support and confine the cigars as they pass from feed section 6 to press section 4, and includes a fixed floor 72 extending from near the start of the down-turn of feed belt 52 to near the end of upturn of belt 24, floor 72 preferably being formed of insulating material supported on frame 10 by an insulating block 74. Spaced above floor 72 is a floating cap 76 constrained against movement lengthwise of the direction of cigar feed. In this example, cap 76 has rigid therewith a cross-strip 78 which slides in a vertical slideway 80 between spaced blocks 82 on frame 10. Cap 76 is free to move upwardly and downwardly; it rests on, and imposes upon the cigars fed beneath it a gravity load sufficient to prevent the cigars from buckling or riding up on one another.

In describing the operation of the method and apparatus, certain arbitrary dimensional values will be assigned to the cigars. Let it be assumed that the cigars, or cigarillos, are initially round, or substantially so, with an original diameter averaging about 11/20ths of an inch; and that it is desired to "square" them so that they have four generally flat faces, the opposite faces being about 10/20ths or ½ inch apart, the "corner" surfaces between adjacent faces being somewhat rounded. Under these circumstances, the ratio of the linear speed of the feed and helper belts 46 and 54 with respect to the linear speed of pressing belts 22, 24 would be approximately 1.1/1.0. This would apply a lateral force to the cigars crossing bridge section 8 sufficient to squeeze eleven cigars into the same space occupied along the feed section 6 by ten uncom-

pressed, round cigars. The length of the bridge section is the lateral distance between the entrance nip of upper and lower belt runs **26, 28**, at the point where a cigar is firmly clamped between them, and the point where a cigar exits from the nip between the feeder and helper belts **46, 54**. In FIG. 3, the bridge has been designated as "Y" inches and, with the present exemplary dimensions, $Y=5.5''$. The linear speeds of the belts can be obtained in various ways as, for example, by driving the roller shafts at the same speed and by making the driving rollers **48, 56** of the feed section larger than the driving rollers **12, 16** of the press section.

When the apparatus is started, initially round cigars, designated CR, are fed, side by side, onto feed belt **52**. The cigars are fed across bridge section **8** until they reach the nip between belt runs **26, 28** where the latter pass directly under and over the shafts of rollers **14, 18** respectively. At this stage of the start-up only ten cigars are on the bridge, and those are round, because there has not, as yet, been any appreciable lateral compressive forces exerted upon them. The first few cigars entering the nip between the belts passing over rollers **14, 18** slip backwardly a trifle so that their net forward speed is note quite that of belt runs **26, 28**. Meanwhile, feed and helper belts **46, 54** feed succeeding cigars onto bridge section **8** so that the cigars crossing the bridge are compressed into somewhat oval shape, these being designated CO. As soon as a total of eleven cigars has built up across the bridge, no more back-slippage of the cigars entering the press section occurs, and a condition of equilibrium is reached so that eleven cigars are always cross the bridge. The apparent discrepency between the feed speeds of the press and feed sections is compensated for by the lateral compression of the cigars cross the bridge.

When the in-fed cigars are firmly clamped between belt runs **26, 28**, they can no longer slip laterally so that, as they are squeezed vertically, the newly made cigars, which are then still moist and pliable, squash out laterally as far as they can against adjacent cigars so that the sides become flat along the areas of contact, and the corners fill out slightly. The cigars being squared in the press section are designated CS. The pliability of the tobacco is enhanced by the internal heat developed by the high frequency currents passing between electrodes **30, 32**. The cigars, having been simultaneously squared and heated, obtain a square set after they have cooled.

The invention is not limited to the details illustrated and described herein, but is intended to cover all substitutions, modifications and equivalents within the scope of the following claims.

I claim:

1. The method of squaring cigars which comprises: passing said cigars sidewise in close side-by-side relationship successively through a belt feeder and a belt press by running the feeder at a greater linear speed than the press, whereby adjacent sides of the cigars are forced against one another as they enter the press.

2. The method of squaring cigars which comprises: passing said cigars sidewise in close side-by-side relationship successively through a belt feeder, along a flat surface, and through a belt press by running the feeder at a greater linear speed than the press, whereby adjacent sides of said cigars are forced against one another as they pass along said flat surface and as they enter the press.

3. The method of squaring cigars which comprises: applying sidewise driving forces to a continuous row of cigars in close side-by-side relationship by a belt feeder utilizing the driving forces of the belt feeder to slide the cigars sidewise across a surface and thence sidewise into a belt press while running the feeder at a greater linear speed than the press so as to force adjacent sides of said cigars against one another as they slide along said surface and enter the press.

4. The method defined in claim 3, and imposing a floating load on said cigars as they slide along said surface so as to hold said cigars against the surface and thereby prevent the cigars from over-riding one another.

5. A cigar squaring machine comprising a belt feeder having belt means with an output end, a belt press having belt means including upper and lower substantially parallel belt runs with an input end spaced from the output end of the feeder, said press and feeder belt means having a width to support cigars in side-by-side relationship with the axes of the cigars disposed transversely to the direction of feed, means providing a bridging surface between said output and input ends whereby cigars issuing from the output end of the feeder slide across said bridging surface into the input end of the belt press, and drive means for the belt means of said feeder and press, said drive means providing greater linear speed for the belt means of the feeder than the belt means of the press, whereby said cigars are compressed in the direction of movement thereof as they slide across said bridging surface.

6. The combination claimed in claim 5, said bridging surface facing upwardly, and a cap having a downwardly facing surface adapted to ride on said cigars as they slide along the bridging surface, whereby to hold said cigars against the bridging surface.

7. The combination claimed in claim 6, and means for constraining said cap against appreciable movement laterally with respect to the bridging surface, the constraining means providing freedom for upward and downward floating movement of the cap.

8. The combination claimed in claim 5, said belt press having dielectric heater electrodes respectively disposed adjacent the upper and lower belt runs thereof.

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