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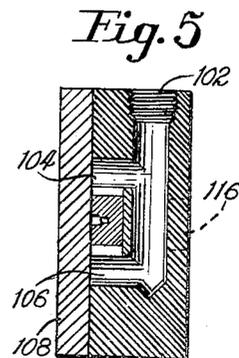
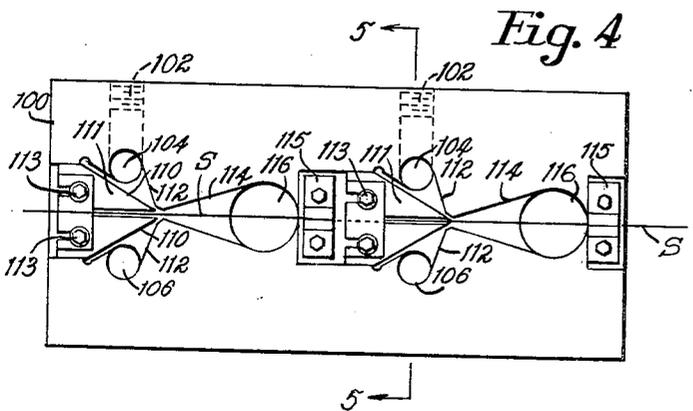
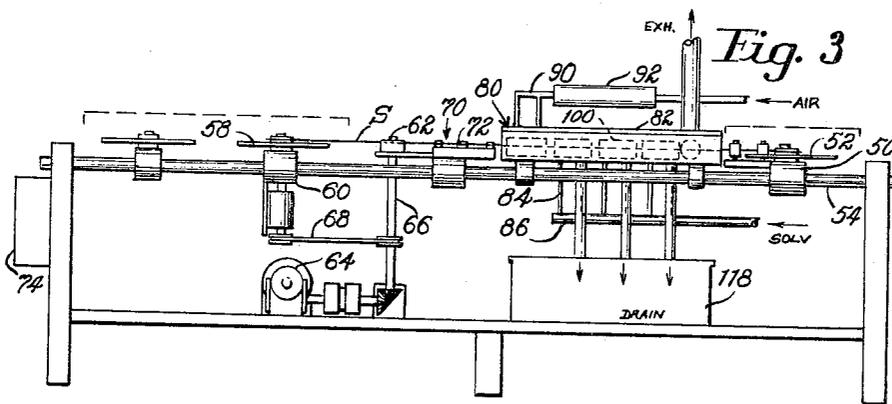
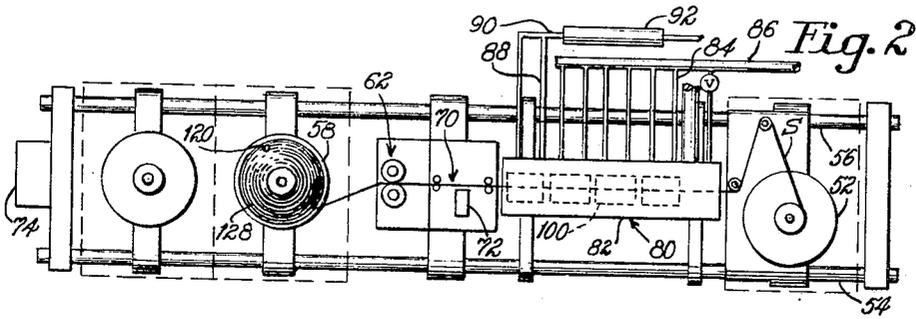
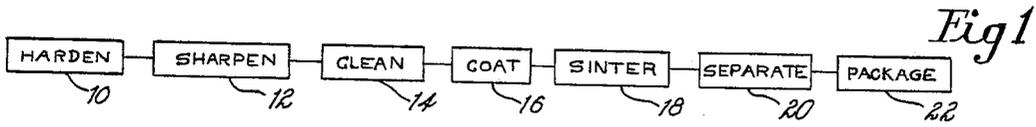
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RAZOR BLADE COATING METHOD AND APPARATUS

Filed Oct. 14, 1966

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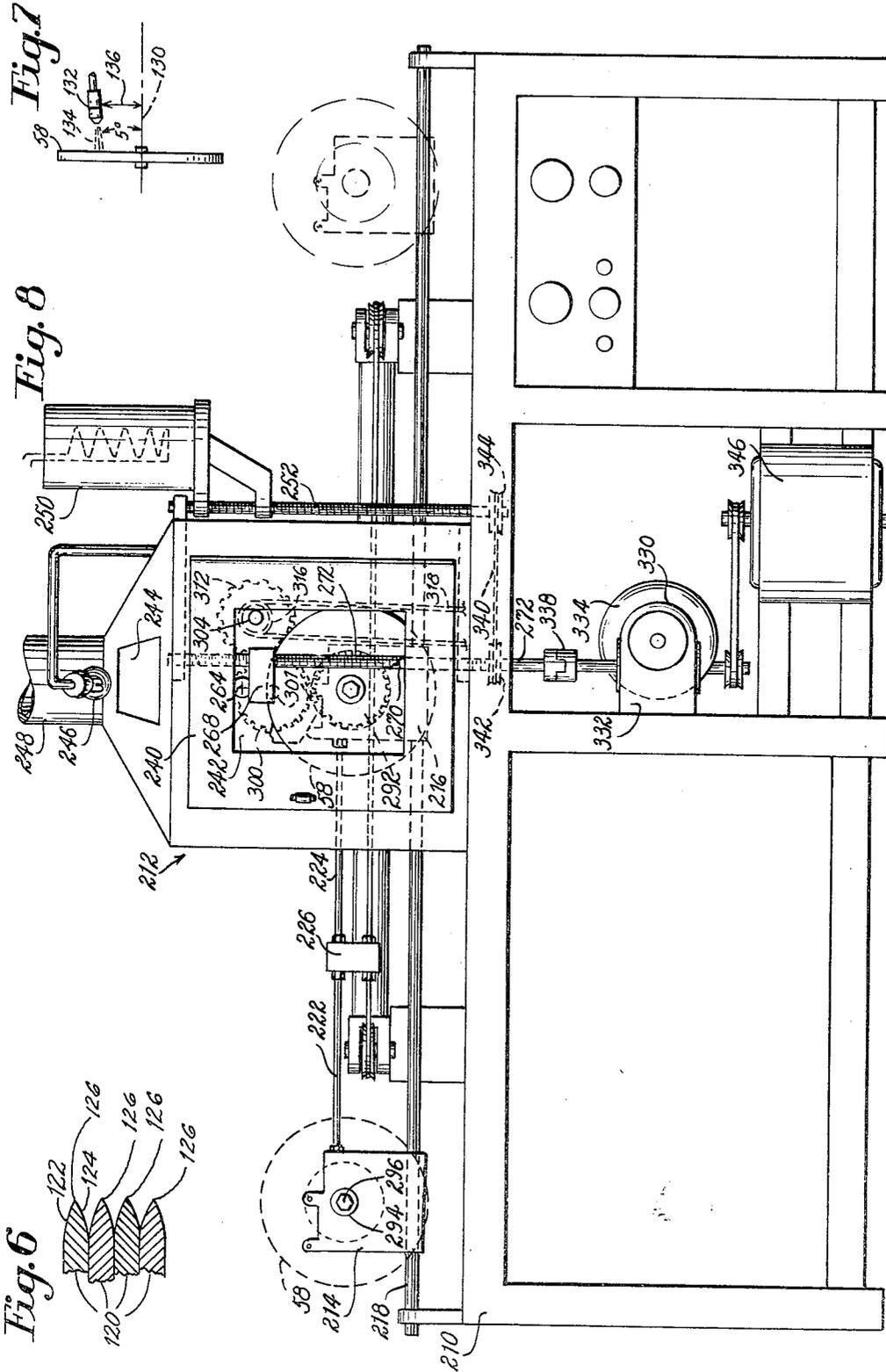
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RAZOR BLADE COATING METHOD AND APPARATUS

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RAZOR BLADE COATING METHOD AND APPARATUS

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Fig. 10

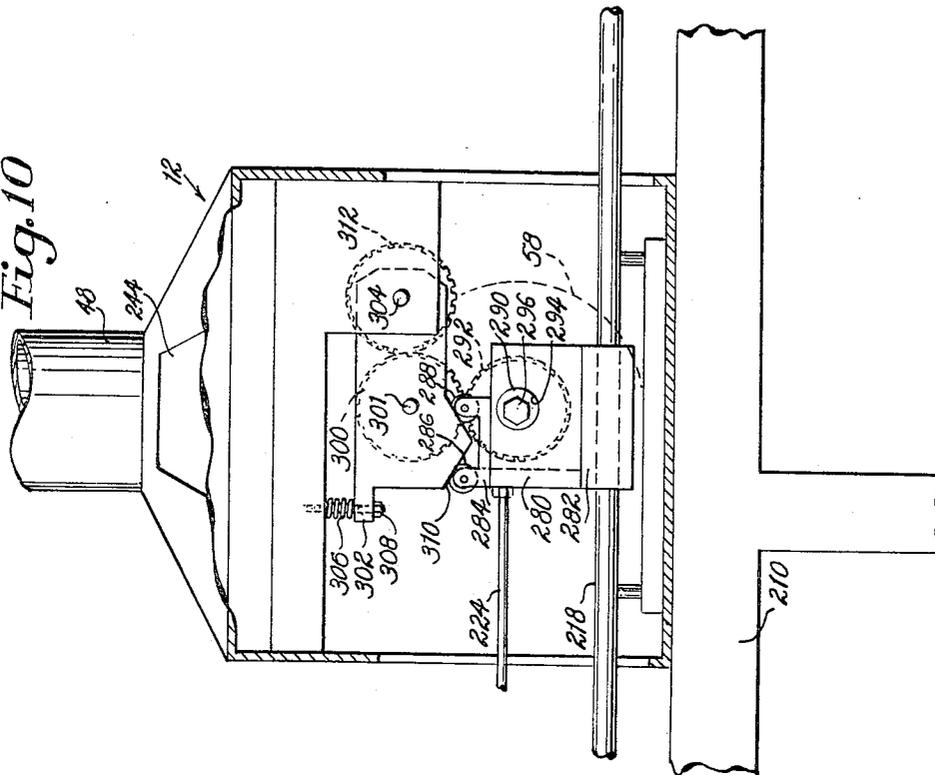
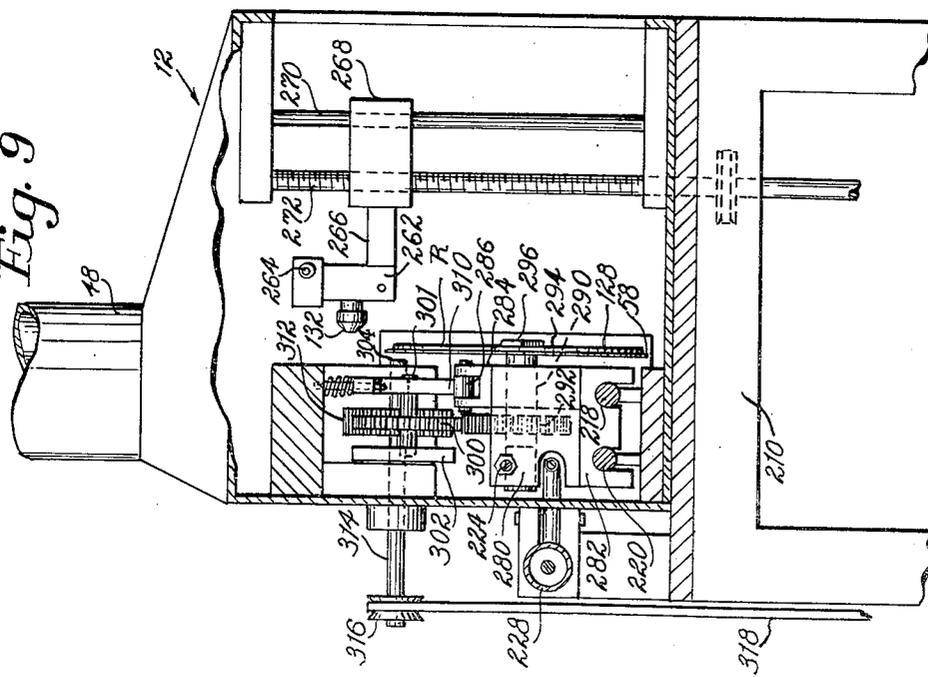


Fig. 9



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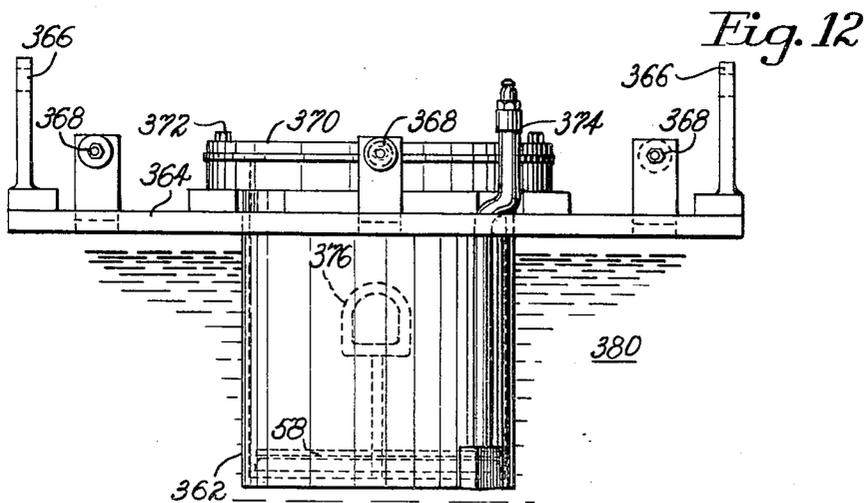
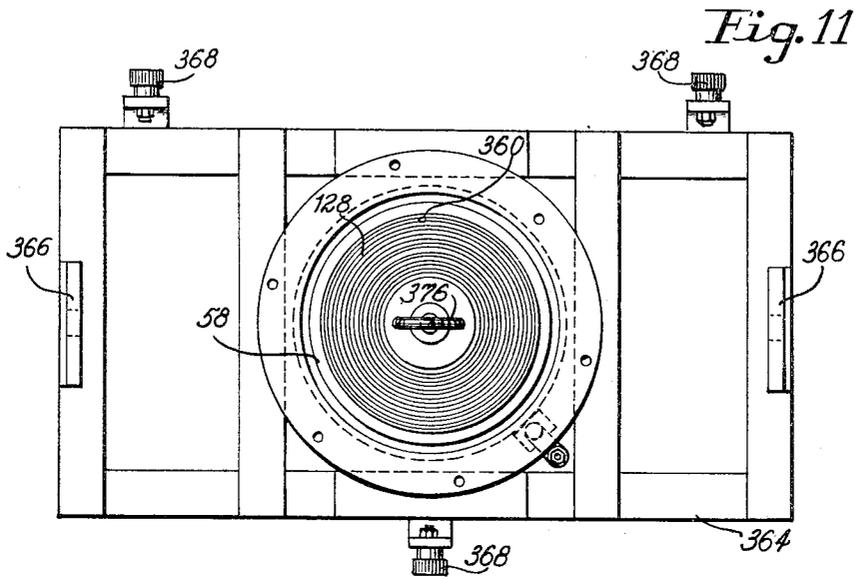
W. I. NISSEN

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RAZOR BLADE COATING METHOD AND APPARATUS

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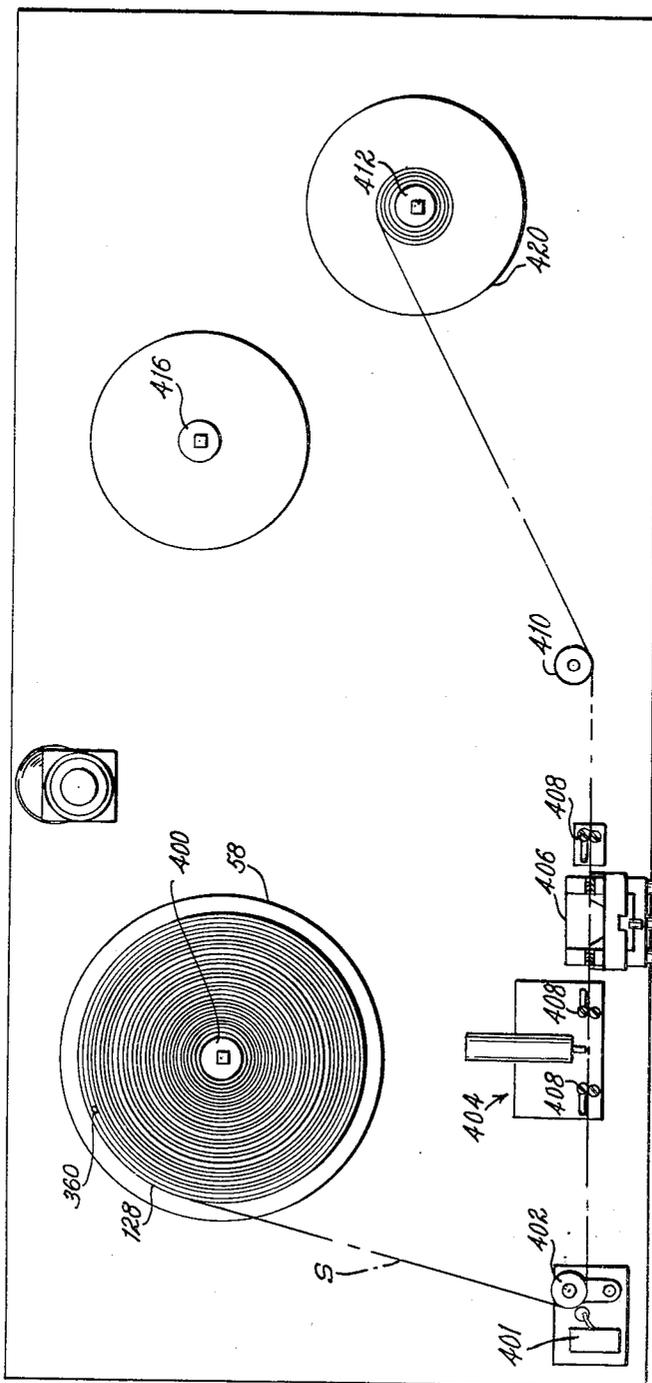
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RAZOR BLADE COATING METHOD AND APPARATUS

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Fig. 13



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3,489,589

**RAZOR BLADE COATING METHOD AND APPARATUS**

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Filed Oct. 14, 1966, Ser. No. 586,872

Int. Cl. B05b 13/04

U.S. Cl. 117-43

19 Claims

**ABSTRACT OF THE DISCLOSURE**

After the edge of a blade strip has been sharpened, the strip is coiled compactly so that only the sharpened edge of the razor blade strip is exposed at the face of the coil. The coil is driven in rotation about its coil axis and a coating material is sprayed on the exposed surface of the sharpened edge of the blade strip by moving a spray head along a path generally perpendicular to and intersecting the axis of the coil. The coating material is cured to form a firmly adherent shave facilitating coating on the sharpened edge of the blade strip and then the coil is unwound for further processing and separation of the blade strip into individual blade elements.

This invention relates to methods and apparatus for treating razor blades and more particularly to methods and apparatus for placing, on the cutting edge of the razor blades during the manufacturing operation a shave facilitating coating.

In present razor blade technology, it has been found that certain materials, when applied to the shaving edge of the blade, significantly improve the shaveability characteristics of the razor blade such types of coatings and such a material and methods of its application to razor blade edges are described in copending patent application Ser. No. 384,805, filed July 23, 1964, now abandoned, in the name of I. W. Fischbein. In the processing of razor blades, the blade strip is subjected to a sequence of operations, a typical sequence including a metallurgical modification process to harden the blade strip, a physical modification process involving the sharpening an edge of the blade strip, a process involving the adhering of a coating to the sharpened edge to improve its shaveability characteristics, a process of separating the blade strip into elements of predetermined length and finally a process of packaging of those blade elements. The duration of the processing time of the steps differs, for example, the length of time necessary to adhere the coating material to the blade edge typically is substantially greater than the process time required for separating an individual blade element from a blade strip.

It is an object of this invention to provide novel and improved methods and apparatus for manufacturing razor blades which facilitates the efficient accommodation of different processing times for various steps of the overall process.

Another object of the invention is to provide novel and improved methods and apparatus for adhering a shave facilitating coating to the sharpened edges of razor blade elements in high volume production operations.

Another object of the invention is to provide novel and improved apparatus for applying coating material to the sharpened edges of razor blade elements economically and at a rate consistent with present day mass production requirements, which apparatus is capable of operating automatically with a minimum amount of supervision and maintenance while assuring a product of high quality and uniformity.

Still another object of the invention is to provide

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novel and improved methods and apparatus for manufacturing coated razor blades which are compatible with high volume production techniques and which permit ready control of the quality and uniformity of the product.

A further object of the invention is to provide novel and improved methods and apparatus for applying a heat treatable coating to the sharpened edges of a razor blade strip in a manner such that a coating of uniform shaveability characteristics is obtained.

In accordance with the invention, in the processing of razor blades, after one edge of the blade strip has been sharpened, that strip is coiled compactly so that only the sharpened edge of the razor blade strip is exposed at the face of the coil. This coil of razor blade strip is then driven in rotation about its coil axis and a coating material is sprayed on the exposed sharpened edge of the blade strip by moving a spray head along a path generally perpendicular to and intersecting the axis of the coil. The coating material thus applied to the sharpened edge of the blade strip is then appropriately treated to form a firmly adherent shave facilitating coating on the sharpened edge of the blade strip and then that coil is unwound for further processing, if necessary, and separation of the blade strip into individual blade elements.

It is essential to obtain a uniform coating configuration on both facet surfaces of the sharpened blade edge and in the preferred embodiment, the axis of the coil is disposed horizontally and the coating material is applied by spraying along an axis that is inclined downwardly slightly with respect to the axis of the coil.

In apparatus constructed in accordance with the preferred embodiment, a blade strip of substantial length is cleaned by spraying a cleaning solution on the blade surfaces in a series of opposed planar jets ejected in a generally horizontal direction at a sharp angle to the direction of movement of the blade strip which solution is then removed by drying with hot air. The cleaned blade strip is then coiled compactly on a treatment reel and mounted on a support structure that is rotatable about a horizontal axis and positioned in a spray booth. A spray gun having a symmetrical spray pattern inclined downwardly towards the reel face is mounted for traversing movement along the line that intersects the reel axis. A coating material supply container is mounted for traversing movement with the spray head so that a constant head of coating material is supplied to the spray head. Control is provided to vary the rate of travel of the spray head as a function of the radius of the coil currently being sprayed so that the duration of exposure of all edge portion of the coil is substantially equal. After spraying, the coil of blade strip is subjected to a heat treatment to modify the coating material so that it is firmly adhered to the sharpened shaving edge. The blade strip is then unwound for separation into blade elements or other processing as desired.

This method and apparatus for applying a shave facilitating coating to blade edge permits the relatively long-treatment times involved in applying the shave facilitating coating to the blade edge to be accommodated in an efficient manner and on a high volume production basis with other production operations such as the sharpening of the blade edge and the separation of the blade strip into a multiplicity of blade elements.

Other objects, features, and advantages of the invention will be seen as the following description of a particular embodiment thereof progresses, in conjunction with the drawings, in which:

FIG. 1 is a block diagram indicating a sequence of processing operations employed in the manufacture of a ribbon-type razor blade element;

FIG. 2 is a diagrammatic top view of apparatus for cleaning a sharpened razor blade strip;

FIG. 3 is a side elevational diagrammatic view of the apparatus shown in FIG. 2;

FIG. 4 is a top plan view of one of the sets of inlet orifice structures employed in the cleaning apparatus shown in FIGS. 2 and 3;

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4 with the further indication of a cover element;

FIG. 6 is a diagram indicating the configuration of the exposed blade edges as exposed in the compact coil formed after the cleaning operation;

FIG. 7 is a diagram indicating the geometrical relationship of the blade strip coil and spray head employed to apply a shave facilitating coating material to the exposed sharpened edge of the blade strip;

FIG. 8 is a side elevational view showing details of a spray booth structure employed for applying the shave facilitating coating material to the sharpened blade edge;

FIG. 9 is an end elevational view, with parts broken away showing details of the spray booth;

FIG. 10 is a front elevational view of the spray booth with the front wall thereof and the spray gun drive structure removed;

FIG. 11 is a top plan view of a cassette structure (with the cover removed) showing a coil of razor blade strip disposed in the cassette;

FIG. 12 is a side elevational view of the cassette structure shown in FIG. 11 with the cover in place; and

FIG. 13 is a diagrammatic view of a rewind and strip inspection table employed in the processing system.

There is shown in FIG. 1 a block diagram indicating a sequence of processing operations employed in the manufacture of a razor blade element. In this embodiment the razor blade element is a strip of stainless steel 0.0015 inch thick and 0.190 inch in width having one edge sharpened. The razor blade is intended for use in a razor structure of the type shown in Patent No. 3,262,198. In the processing of this razor blade strip, the strip is first subjected to a hardening operation indicated by block 10, then to a sharpening operation indicated by block 12, a cleaning operation indicated by block 14, application of a shave facilitating coating indicated by block 16, a sintering process at which the coating is cured to form an adherent coating indicated by block 18, separation of blade elements from the blade strip indicated by block 20 and finally loading of the blade elements into appropriate packages indicated by block 22, in this case each blade element being loaded into a magazine has a length sufficient to provide several shaving sections for use in a ribbon-type razor. In this processing operation the blade strip S is handled in a five thousand foot length, the blade strip being coiled after being passed through the hardening process unit 10, coiled again after being passed through sharpening process unit 12, coiled again after being passed through cleaning process unit 14, coating material is applied to the blade strip while it is in coil form at process unit 16 and the coated blade is heated in coil form in the heating process unit 18. The blade strip is again treated sequentially in the separating process unit 20 (in contrast of the bulk or batch processing operations 16 and 18) and the resulting blade elements are packaged sequentially in process unit 22. While the disclosed apparatus is particularly designed for processing a particular form of ribbon-type razor blade element it will be obvious that the principles of the invention are equally applicable to the processing of other configurations of razor blade elements.

With reference to FIGS. 2 and 3, there is shown plan and side views respectively of cleaning apparatus employed in the cleaning process 14. That apparatus includes a support 50 on which an aluminum reel 52 having a coil of sharpened razor blade strip S thereon is positioned. The reel support 50 is mounted on a pair of rails 54, 56 adjacent one end of the rails, and a stainless steel take-up reel 58 is mounted adjacent the

other end of the rails 54, 56 on a take-up drive-unit generally indicated at 60. Positioned adjacent take-up reel 58 is a pull-out roll unit 62 which is powered by drive unit 64 and output shaft 66. Belt 68 couples output shaft 66 to the take-up reel support drive unit 60. A magnetic mark sensing unit 70 is mounted in front of pull-out roll 62 and includes a gaussmeter probe 72 which senses magnetic information recorded on the stainless steel strip S and applies indication of detected magnetic marks to the recorder 74 mounted on the end of the support rails. A second reel mounting 76 is provided should it be desired to rewind the coil formed on reel 58 for any reason.

Positioned between the supply reel 52 and the sensing station 70 is a cleaning unit 80, in which is mounted a series of four nozzle plate units 100, details of which are better indicated in FIG. 4. The cleaning unit includes housing 82 to which a series of six solvent inlets 84 are connected from header 86. Two additional inlets 88 are connected to line 90 (disposed at the output end of the cleaning unit after the solvent inlets 84) which in turn is connected through heater 92.

In the cleaner housing 82 are mounted a series of nozzles formed in four units 100. Each plate unit 100 has two sets of nozzles of substantially the same configuration as indicated in FIG. 4. Formed in each plate are two inlet passages 102, each of which is connected to two inlet ports 104, 106 that are disposed in opposite sides of the path of strip S through the plate unit 100. Solvent or heated air is directed from inlet passage 102 for upward impingement against closure plate 108 (FIG. 5) which deflects the agent into the tapered nozzle passage defined by surfaces 110 of insert 111 and surfaces, 112 of the plate body and ejection from these nozzles in a planar jet of width greater than the width of blade S for impingement on the blade S in a substantially horizontal direction counter-current to the direction of movement of the blade S through the cleaning unit. (Nozzle inserts 111 and guide inserts 115 are secured in place by bolts 113.) The jet of material impinges on blades with substantial force and flows directly into the enlarged cavity 114 through which the blade passes and then to exit passage 116 for return to the suitable sump 118. A suitable cleaning fluid such as trichloroethylene, mineral spirits or carbon tetrachloride is introduced from header 86 through the six sequential inlets 84 for impingement in a generally horizontal direction at an angle of about 150° to the direction of strip motion. In a preferred process trichloroethylene, maintained at a temperature of 100±15° F. is applied to the blade stock at a rate of five cubic feet per minute under a pressure of twenty psi. The blade, after passing the solvent inlets is subjected to heated air applied at a rate of twelve cubic feet per minute under a pressure of twenty psi through inlet nozzles in the last plate 100 that are of the same configuration as those of the solvent inlets. The blade is pulled through the washer unit by a pull-out rolls at constant speed of one hundred feet per minute. During the winding of the blade stock on the stainless steel treatment reel 58 a pin 120 is inserted about one quarter inch from the outer periphery of the coil is provided a space for attachment of a thermocouple for use in later processing of the blade strip.

The compact coil of razor strip mounted on reel 58 is then transported to coating unit 16. The exposed edges of the blade in this coil have a configuration as indicated in FIGURE 6. The surfaces of the body 120 of the blade are in contact with one another while the blade facets 122, 124, formed during the sharpening operation are spaced at distances from one another that gradually increase to the ultimate tip 126 of the sharpened edge. The sharpened tips 126 define a plane face of the coil which is perpendicular to the axis 130 as indicated in FIG. 7. The blade coil 128 in the coating unit is mounted for rotation about its axis 130 which is disposed horizontally. A spray head 132 is mounted so that it discharges mate-

rial in a conical spray pattern about cone axis 134 that is inclined downwardly angle of 5° with respect to axis 130. Spray head 132 is mounted for traversing movement in a direction perpendicular to axis 130 along path 136.

With reference to FIGS. 8-10 the spraying apparatus includes a support 210 on which is mounted a spray booth structure 212, two reel support structures 214, 216 which are movable into and out of the spray booth 212 on support rails 218, 220. The structures 214, 216 are connected by tie rods, 222, 224 to a drive link 226 which is driven by drive 228 for moving the reel supports along the rails 218, 220 into spray booth 212 to the illustrated position of reel support 216.

The spray booth 212 includes a front door 240, side doors (not shown) on either side of the booth for admitting the reel support structures with reels on them, inspection window 242 in front door 240, a second window 244 in the roof through which light from lamp 246 may pass to illuminate the spraying operation within the booth 212, and an exhaust vent 248 which extends out to the roof. A spray material supply chamber 250 which is mounted for vertical movement along rod 252 includes a heater and a magnetic stirrer to maintain the desired condition of the material and the air.

Details of the structure inside the spray booth 212 will be better understood with reference to FIGURES 9 and 10. Mounted within the spray booth 212 on support bracket 262 is a spray gun 132 (Spraco Model 125M) which has a circular spray cone pattern. Mounted above the spray nozzle on bracket 262 is a vibrator 264 (Martin Engineering "Vibrolator" No. BD-13). This spray head structure is mounted on support arms 266 which extend out from bearing block 268 which includes a bearing structure received on guide rod 270 and a threaded aperture that cooperates with screw 272.

With reference to FIGS. 9 and 10, each reel support structure 214, 216 includes a body 280 mounted on support member 282 which cooperates with rails 218, 220 and supports body 280 for movement in the horizontal direction. Secured to the upper surface of the body 280 is a bracket member 284 having two upstanding ears on which rollers 286, 288 are mounted. The body supports a shaft 290 which carries a gear 292 on its rear end. On its forward end, there is provided a seat 294 for reel 58 which is secured on seat 294 by nut 296.

Within the spray booth a gear 300 is mounted on shaft 301 that is secured on arm structure 302 which in turn is supported for pivoting movement about axis 304. Spring 306 normally biases arm structure 302 down to the position shown in FIGURE 10 as controlled by stop nut 308. Follower structure 310, secured to arm 302, engages rollers 286 and 288 as their reel support is moved into the spray chamber and arm 302 and gear 300 are lifted slightly so that the teeth of that gear may mesh easily with the teeth of gear 292. Also mounted for rotation about axis 304 is main drive gear 312 which is mounted and secured to shaft 314 for rotation therewith as driven by sprocket 316 and chain 318 from main drive motor (not shown).

With reference to FIG. 8, the tank 250 and spray gun are moved vertically as a unit through drive motor 330, and gear reducer 332, the gear reduction of which is controlled by speed control unit 334. The output of gear reducer 332 is applied via coupling 338 to threaded shaft 272 and via roller chain 340 and sprockets 342, 344 to the drive screw 252 for the supply tank 250.

In operation, a telomer material of the type described in the copending application Ser. No. 384,805, filed July 23, 1964, in the name of I. W. Fischbein and assigned to the same assignee, is stored in container 250 and magnetically stirred continuously while being maintained at a temperature of 40° C. The telomer material is applied to spray head 132 from tank 250 at a flow rate of three to five cubic centimeters per minute while atomizing air

is applied to the spray head 132 at a pressure of five p.s.i. and at a flow rate of twenty-five cubic feet per hour.

As indicated in FIG. 7, spray head 132 is mounted on support arm 266 so that its axis is inclined downwardly at an angle of approximately 5° from the horizontal (the axis of rotation of reel 58).

With the reel 58 mounted vertically, its drive motor 346 is energized to rotate that reel at a rate of sixty r.p.m. Spraying is performed continuously and the spray head 132 is moved inwardly from the outer periphery of the reel to the hub of the reel and then returned, the rate of travel of the spray head being varied as a function of the radius, and in this embodiment an initial travel speed of 1.818 inches per minute, a speed at the middle of the reel of 3.57 inches per minute, and a speed at the hub (axis 130 of rotation of reel 58) of 5.55 inches per minute are employed. Throughout the spraying operation vibrator 264 is energized to insure a nozzle of the spray gun 132 is clear so that a uniform spray pattern is achieved.

After spraying operation is completed, shuttle drive 228 is energized to move one reel out of the spray booth and the other reel into the spray booth so that the application of the telomer coating material to the sharpened edge of the next blade coil may be promptly initiated.

After spraying, a thermocouple 360 is inserted in the blade coil on reel 58 in place of pin 120 and the reel is placed in a cylindrical stainless steel cassette 362 shown in FIGS. 11 and 12. The cassette is secured to a transport frame 364 having two lifting ears 366 and three rollers 368 mounted on it. A cover 370 secured by bolts 372 permits the cassette to be sealed and a controlled atmosphere is introduced through conduit 374.

A handle 376 is secured to reel 58 and the reel is inserted in cassette 362. The thermocouple 360 is connected to leads (not shown) extending through cover 370 and the cover is then secured in place by bolts 372. The reel 58 is positioned in the bottom of cassette 362 so that the reel may be located at a depth of one foot in a salt bath when the frame rollers 368 are supported on cooperating rails above the salt bath. A suitable atmosphere is placed in the cassette and the cassette is inserted into a salt bath diagrammatically indicated at 380 and the sprayed material is subjected to heat treatment in accordance with the description in the above-mentioned Fischbein patent application to above the melting point of the telomer material so that an adherent coating is formed on the cutting edges of the blade strip. The cassette is then removed from salt bath 380 and cooled, and the coil of blade strip removed from the cassette 362.

Apparatus for processing the strip after it is removed from the cassette is shown in FIG. 13. In that figure a reel 58 with the coil of a sintered blade stock S is mounted on reel drive 400. The blade stock is passed by micro-switch unit 401 over roller 402, past magnetic mark detection station 404 and cutter apparatus 406, through hold down and guide roll units 408 and over intermediate guide roller 410 to either a good take-up reel 412 or to a discard reel mounted on drive 416. This rewinding operation transfers the treated coated blade stock from the stainless steel reel 58 to another stainless steel reel 420 mounted on drive 412 for further processing, permits visual inspection for the quality of the coating that has been applied to the blade edge, and permits removal of the long lengths of defective blade stock as indicated by that inspection or by recorder 74. Cutter 406 is actuated to cut the strip and a welder (not shown) is used to connect good lengths of strip together after a detected defective length has been removed.

What is claimed is:

1. A method of processing razor blades comprising, forming an elongated razor blade strip in a compact coil so that only the sharpened edge of the razor blade strip is exposed at the face of the coil,

driving said coil of razor blade strip in rotation about the axis of said coil,  
 driving a spray head along a path parallel to the face of said coil,  
 varying the speed of at least one of the coil and spray head drives so that the duration of exposure of all edge portions of the coil to the spray head is substantially equal,  
 and spraying a coating material on the exposed sharpened edge of the razor blade strip as said spray head is moved along said path.

2. The method as claimed in claim 1 wherein the axis of said coil is disposed horizontally and the coating material is sprayed in a direction that is inclined downwardly with respect to said coil axis.

3. The method as claimed in claim 2 wherein the path of movement of said spray path is generally perpendicular to and intersects the axis of said coil.

4. The method as claimed in claim 1 wherein said step of varying the relative drive speeds of said spray head and said coil involves varying the drive speed of said spray head as a function of the angular velocity of a particular portion of said coil then being sprayed.

5. The method as claimed in claim 1 and further including the step of heating said coil of blade strip to cure the coating material sprayed on the sharpened edge of said blade strip to form a firmly adherent coating thereon.

6. Apparatus for coating the shaving edges of razor blade elements comprising a support for positioning a coil of razor blade strip in a compact coil with the sharpened edge of the strip disposed in a plane and the surfaces of the body of the blade strip in successive turns of the coil in contact with one another, a coater for applying curable material on the exposed blade edges,

a first drive for rotating said coil about its axis,  
 a second drive for moving said coater and said coil relative to one another along a path perpendicular to and intersecting said coil axis,

and control for operating said first and second drives concurrently during the application of said curable material to said blade edges and varying the speed of at least one of said first and second drives so that the duration of exposure of all portions of the sharpened edge of the coiled strip to the coater is substantially equal.

7. The apparatus as claimed in claim 6 wherein said coil support positions said coil axis horizontally and said coater is a spray device having a spray pattern tilted downwardly to coat both facets of each blade edge equally with said curable material.

8. The apparatus as claimed in claim 6 and further including a supply tank for said curable material and a third drive for said tank, and wherein said control operates said second and third drives concurrently to move said tank at the same rate as said coater and maintain a substantially constant head of material for feeding said coater.

9. The apparatus as claimed in claim 6 wherein said control varies the speed of said first and second drives to maintain a substantially constant relation between the angular velocity of the portion of the coil currently being coated and the effective transverse speed of said coater.

10. The apparatus as claimed in claim 9 and further including a housing defining a coating station, a transport for moving a first coil support into said housing, a second coil support coupled to said first coil support for movement by said transport out of said housing as said first coil support is moved into said housing, and means for coupling each coil support to said first drive when the coil support is positioned in said housing.

11. The apparatus as claimed in claim 10 wherein said coil support positions said coil axis horizontally and said coater is a spray device having a spray pattern tilted downwardly to coat both facets of each blade edge equally with said curable material.

12. The apparatus as claimed in claim 11 wherein said spray pattern is inclined downwardly at an angle of about 5°.

13. The apparatus as claimed in claim 9 wherein said second drive moves said spray device along a vertical path and said control maintains a constant speed of said first drive and varies the speed of said second drive as a function of the position of said spray device with respect to the radius of said coil then being sprayed.

14. A razor blade treatment system for applying a shave facilitating coating to the sharpened edge of a razor blade strip comprising blade cleaning means including a first set of nozzles for emitting forceful planar jets of cleaning fluid on each side of said strip, a second set of nozzles for emitting forceful planar jets of gaseous fluid on each side of said strip, and a drive to move a blade strip through said cleaning means to expose said strip on each side thereof to impingement on either side of said planar jets of cleaning fluid and then to said planar jets of gaseous fluid to dry the blade strip,

means to coil said dried blade strip in a compact coil so that the sharpened edge of the strip lies in a plane with the body of the blade strip in each turn in firm engagement with the blade strip bodies in the immediately adjacent turns of said coil,  
 a coil rotating drive,

apparatus including a spray head for spraying coating material on said sharpened edge of said blade strip as said coil is being rotated and a spray head drive to move said spray head along a path generally perpendicular to the axis of rotation of said coil,

control for modifying the speed of movement of said spray head as a function of the angular velocity of the portion of said coil then being sprayed so that the duration of exposure of all portions of the sharpened edge of the strip in the coil to the spray head is substantially equal, and

a curing unit for receiving said coil with coating material deposited thereon and converting said coating material to a firmly adherent shave facilitating coating material.

15. The system as claimed in claim 14 wherein said coil rotating drive rotates said coil about the coil axis while said coil axis is horizontal and said spray head has a spray pattern inclined downwardly at an angle of about 5°.

16. The system as claimed in claim 15 wherein said coating material is a telomer and further including a supply tank for said telomer, a coupling connecting said supply tank to said spray head so that said spray head drive moves said supply tank with said spray head to maintain a substantially constant head of telomer material to said spray head throughout its movement relative to said coil axis.

17. The system as claimed in claim 16 and further including stirring and heating devices in said supply tank for maintaining uniform condition of said telomer material and a vibrator mounted on said spray head to continuously minimize clogging during the spraying operation.

18. The system as claimed in claim 17 wherein said curing unit includes a salt bath for receiving a cassette holding said coil of razor blade strip to heat said telomer material in a controlled atmosphere to convert said telomer material to said firmly adherent shave facilitating coating material.

19. The system as claimed in claim 18 and further including an inspection station for said razor blade strip after said telomer material has been cured, said inspection station including a magnetic sensor, strip segmenting apparatus and two take-up devices, a first device for satisfactory strip and second device for reject strip.

## 9

## References Cited

## UNITED STATES PATENTS

3,399,649	9/1968	Kidgell et al. -----	118—321
3,283,117	11/1966	Holmes et al. -----	117—105.1
3,243,321	3/1966	Rowland -----	117—49
3,006,316	10/1961	Wullenwaber -----	118—322
1,962,053	6/1934	Calnan -----	117—44

## 10

## FOREIGN PATENTS

939,879 5/1948 France.

ALFRED L. LEAVITT, Primary Examiner

M. F. ESPOSITO, Assistant Examiner

U.S. Cl. X.R.

117—49, 105.4, 132; 118—9, 40, 68, 73, 321, 612

PO-1050  
(5/69)

UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,489,589

Dated January 13, 1970

Inventor(s) Warren I. Nissen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 39, change "now abandoned" to  
--now Patent No. 3,518,110--.

SIGNED AND  
SEALED  
FEB 9 1971

(SEAL)

Attest:

Edward M. Fletcher, Jr.  
Attesting Officer

WILLIAM E. SCHUYLER, JR.  
Commissioner of Patents