Feb. 9, 1971 L. KUCHECK 3,562,067

LABEL CENTERING APPARATUS

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FIG. 1

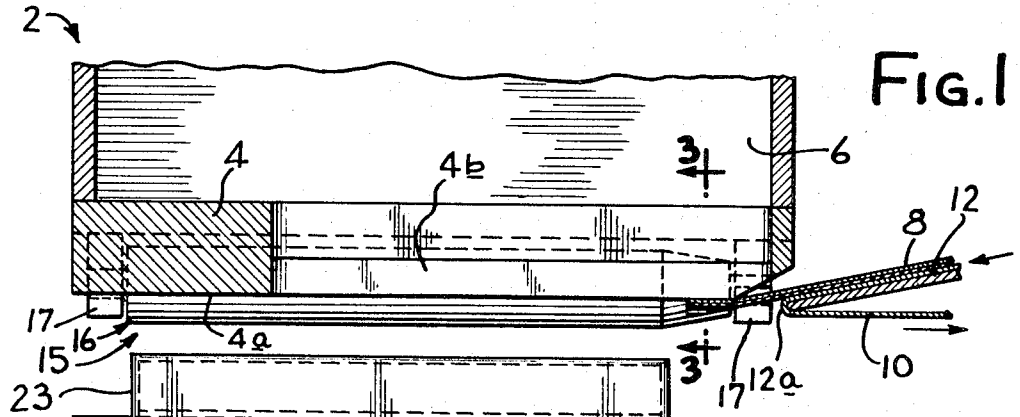


FIG. 2

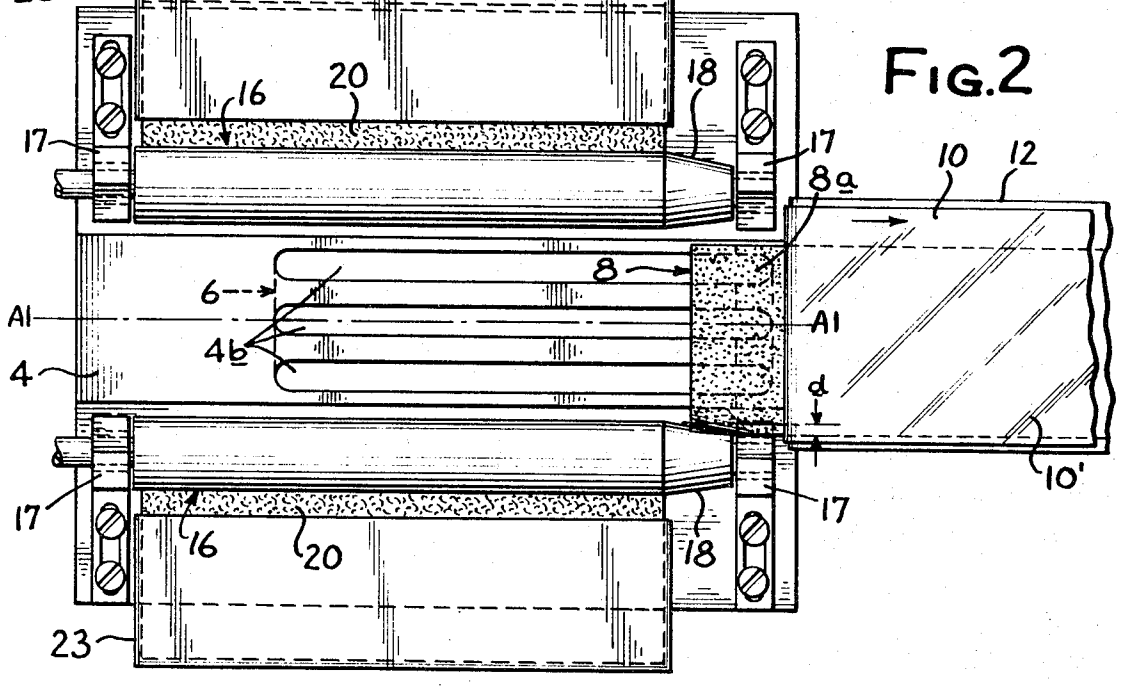


FIG. 3

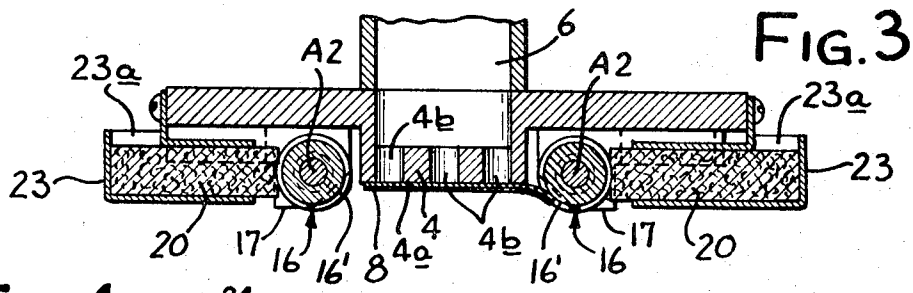
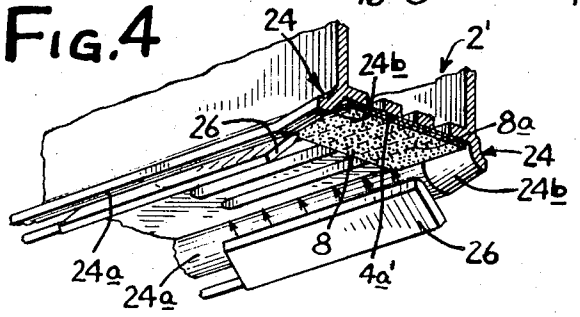


FIG. 4



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FIG. 5

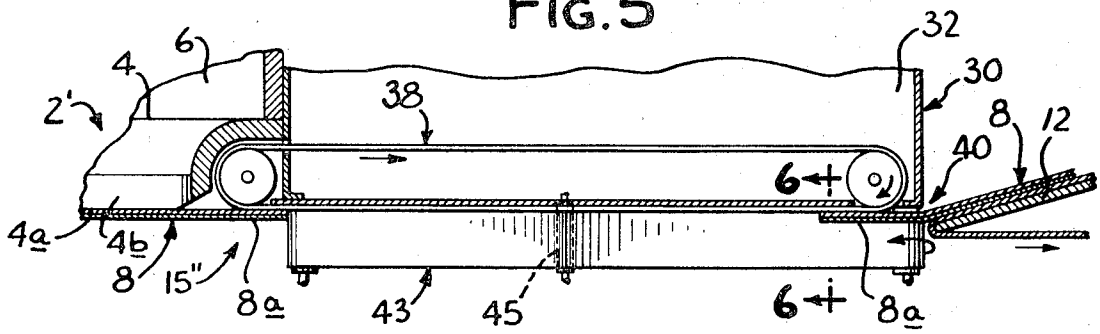


FIG. 6

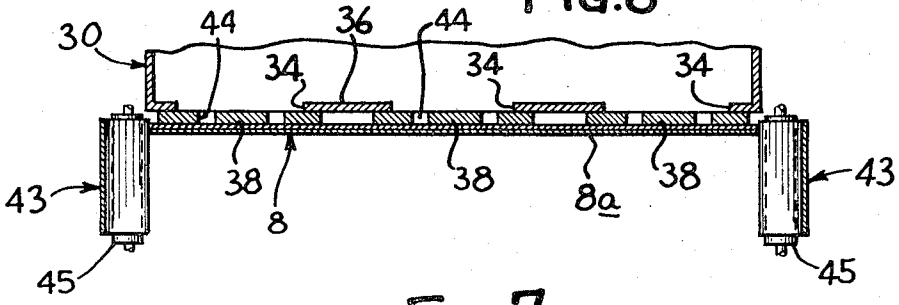
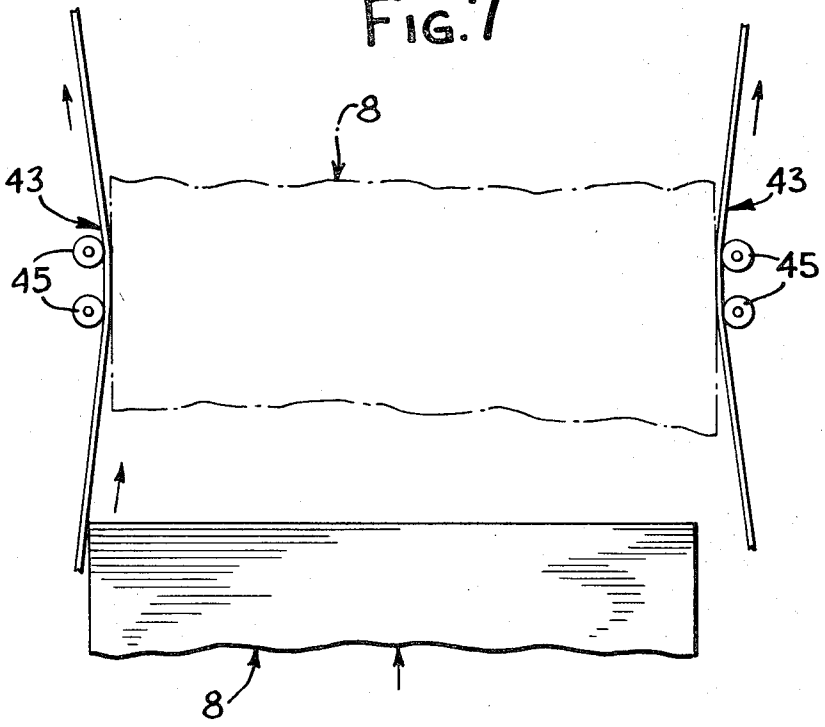


FIG. 7



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LABEL CENTERING APPARATUS

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Int. Cl. B65h 17/22, 9/16
U.S. Cl. 156—542 11 Claims

ABSTRACT OF THE DISCLOSURE

Label centering apparatus usable with a label applying machine having a label receiving surface thereon, the label centering apparatus including roller means mounted for rotation on opposite sides of the label receiving surface about axes of rotation which are in a plane which is flush with or located inwardly of said label receiving surface so the confronting roller surfaces converge toward and up to the same, the closest portions of the confronting roller surfaces at the point where they are flush with the label receiving surface being equally spaced from a label centering axis on said label receiving surface and spaced apart a distance equal to the corresponding dimension of the labels to be delivered thereto. The roller means are rotated in opposite directions so they approach the label receiving surface from a position outwardly thereof.

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for centering labels fed to a label applying station of a label applying machine.

Labels delivered to a label applying head of a label applying machine of the type disclosed in U.S. Pat. No. 3,093,528, granted June 11, 1963, are carried thereto on a backing strip upon which the labels are held in longitudinally spaced relation by a pressure sensitive adhesive coated on the inner surface of the labels. In this machine, the backing strip with the labels attached thereto is fed around the edge of a label peeling plate located immediately contiguous to a downwardly facing label receiving surface of the label applying head so that the labels peel from the backing strip as the path of the strip reverses in direction around the edge of the label peeling plate and come to rest against said label receiving surface with the adhesive coated side thereof facing away therefrom. The labels may be held on the label applying head by suction applied through apertures in the label receiving surface thereof. The labels may be delivered to an article from the label applying head in any suitable way, preferably by application of air pressure through said apertures in the label receiving surface thereof. A photocell or label position sensing switch may control the feeding of the labels to the label applying head so that, when a label is delivered to an article, movement is automatically imparted to the backing strip until another label peels from the backing strip.

In many applications, it is important that the labels be precisely positioned upon the article involved. The longitudinal position of each label is precisely fixed on the label applying head because the label comes to rest thereon as it leaves engagement with the backing strip. However, the particular lateral position of each label on the label applying head is determined by the lateral position of each label as it leaves the backing strip. Unfortunately, the labels are frequently inaccurately laterally positioned on the backing strip so the lateral positions thereof vary somewhat as they are fed to the label applying head. The present invention provides a relatively simple and reliable means for accurately centering the labels on the

label applying head independently of the particular lateral position thereof on the backing strip.

In the most preferred form of the invention, label centering apparatus is provided which can be readily built into or installed upon the label applying head of existing types of label applying machines. In such case, the label centering apparatus of the invention receives each label as it peels from the associated backing strip and automatically centers the same in a lateral direction on the label receiving surface of the label applying head. In another form of the invention, the label centering apparatus is physically separate and is spaced from the label applying head and, in such case, the label peeling plate referred to above delivers the labels to the inlet end of the label centering apparatus which both centers and conveys the labels, one at a time, to an outlet end thereof adjacent to the label applying head.

The specific features of the invention will become apparent upon making reference to the specifications to follow, the claims and the drawings wherein:

FIG. 1 is a vertical sectional view through a label head of a well-known form of label applying machine to which head label centering rollers of one form of the invention have been applied;

FIG. 2 is a bottom plan view of the apparatus shown in FIG. 1;

FIG. 3 is a vertical section through the apparatus of FIG. 2, taken along section line 3—3 thereof;

FIG. 4 is a perspective view of a modified form of the invention which uses fixed walls instead of rollers on the label applying head of the label applying machine involved;

FIG. 5 is a vertical longitudinal section through a still further modified form of the invention where the label centering apparatus includes conveyor and centering belts which are physically separate from the label applying head of the label applying machine involved;

FIG. 6 is a greatly enlarged transverse section through the label centering apparatus of FIG. 5, taken along section line 6—6 thereof; and

FIG. 7 is a bottom plan view of the apparatus of FIGS. 6 and 7.

In the embodiment of the invention shown in FIGS. 1 through 3, there is shown a label applying head 2 of a label applying machine similar to that shown in said U.S. Pat. No. 3,093,528. The label applying head 2 has a bottom, downwardly facing label receiving surface 4*a* provided by an apertured wall 4. The wall 4 has apertures 4*b* opening onto a chamber 6 which communicates in any suitable way with a suction fan or other source of low pressure (not shown) which creates a suction at the apertures 4*b* which will hold a label 8 on the surface 4*a* when the same is delivered thereto. The chamber 6 also communicates with a source of air pressure (not shown) which becomes effective to deliver air under pressure to the chamber 6 to blow the label 8 downwardly from the bottom of the label applying head 2 when an article to be labeled is moved into position below the same.

The labels 8 are delivered to the label receiving surface 4*a* in the illustrated embodiment of the invention by a backing strip 10 which carries the labels 8 in longitudinally spaced position thereon. The backing strip 10 may have a suitable release coating 10 thereon, and each of the labels 8 has a coating 8*a* of a suitable pressure sensitive which adheres each label to the release coating 10′ of the backing strip 10. At a point immediately contiguous to the inlet end of the label receiving surface 4*a* of the label applying head 2, there is positioned a label peeling plate 12 around which bends the backing strip 10 carrying the labels 8. Because the labels 8 are relatively loosely held upon the release coating 10′ of the

backing strip **10**, as a portion of the backing strip **10** bends sharply around the edge **12***a* of the peeling plate **12** the rigidity of the label **8** carried thereby will cause the labels to continue to move forwardly and to peel from the backing strip **10**. The label peeling from the backing strip **10** is directed beneath the label receiving surface **4***a* onto label centering apparatus **15** built into the label applying head **2** and comes to rest when the trailing edge of the label leaves contact with the backing strip **10**.

As in the case of the apparatus disclosed in said U.S. Pat. No. 3,093,528, the movement of the backing strip **10** is controlled in such a way that movement is automatically imparted to the backing strip as long as a label is not fully mounted upon the label receiving surface **4***a* of the label applying head **2**. Once a label is fully positioned on the label receiving surface **4***a*, the feeding of the backing strip **10** ceases until the label is removed from the label applying surface **4***a*. The backing strip **10** will then again be fed around the peeling plate **12** until a new label is fully in position upon the label receiving surface **4***a*. The means for controlling the intermittent movement of the backing strip **10** may be a label sensing switch as disclosed in said U.S. Pat. No. 3,093,528 or a photocell system well-known in the art.

FIG. 2 shows a label **8** on a backing strip **10** which is displaced laterally by a distance *d* from its desired position where it would be centered on a reference axis A1—A1 centered with respect to the label receiving surface **4***a* of the label applying head **2**. The label centering apparatus **15** will, in a manner to be explained, shift the position of the label **8** so that it is centered with respect to the reference axis A1—A1 when the label is finally moved completely upon the label receiving surface **4***a*.

In accordance with the most preferred form of the invention, the label centering apparatus **15** provided on the label applying head **2** includes at least one pair of rollers **16—16** mounted on opposite sides of the label receiving surface **4***a* by adjustable brackets **17—17**. The rollers **16—16** are mounted for rotation about axes A2—A2 (FIG. 3) which are in a plane preferably located inwardly (upwardly) of the label receiving surface **4***a*, so that the confronting roller surfaces **16'—16'** outside of (below) the surface **4***a* converge toward and up to the surface. The roller axes of rotation A2—A2 are preferably parallel to the reference axes A1—A1 and equally spaced therefrom. The rollers **16—16** are preferably of the same size and are cylindrical for most of their lengths. The ends of the rollers **16—16** nearest the peeling plate **12** are tapered at **18—18** so that any off-centered label **8** delivered from the peeling plate **12** will not abut the end face of one of the rollers **16**, but, instead, engages the tapered outer end surface thereof as the suction applied through the openings **4***b* in the label applying head **2** draws the label upwardly. The confronting roller surfaces **16'—16'** at the points where they are adjacent the label receiving surface **4***a* are spaced apart a distance equal to the corresponding lateral dimension of the labels **8** to be delivered thereto. The rollers **16—16** are rotated in opposite directions so that the converging roller surfaces **16'—16'** approach the label receiving surface **4***a* from outside (below) the surface.

It can thus be seen that, as the backing strip **10** moves a label **8** peeling therefrom onto one of the rollers **16**, the upwardly directed force caused by the suction drawing the label toward the label-receiving surface **4***a* and the upwardly and laterally directed force of the roller **16** engaged by the label involved will cause the label to move into a properly centered position between the confronting surfaces of the rollers **16—16**. The lateral component of the force of the rotating roller **16** engaging an off-centered label must be great enough to overcome the upward force of the suction applied to the label **8**, so that the roller involved can move the label laterally into a properly centered position.

A roller **16** wiping against the longitudinal edge of an

off-centered label **8** delivered to the label applying head **2** comes into contact with the adhesive **8***a* at the edges of the label, and there is a danger that some of the adhesive **8***a* will be transferred to the rollers **16—16**. The transfer of this adhesive to the rollers **16—16** can cause sticking of a label to the rollers which will prevent the proper centering and transferring of the labels to the label applying head **2**. To alleviate this problem, the rollers are coated with a material to which the adhesive will not readily adhere. Such materials are often referred to as release coating materials. A suitable release coating material which may be utilized is a liquid silicone containing material manufactured by a number of companies including the Dow Chemical Company which sells the same under the trademark Slipicone.

When the rollers **16—16** are made of metal, means are preferably provided for continuously applying such a release coating material to the various surfaces of the rollers **16—16**. This means most advantageously comprise a pair of porous, absorbent wicks **20—20** which are initially saturated with a release coating material upon the roller surfaces, thereby preventing the ready transfer of adhesive material from the edges of the labels **8** to the roller surfaces. Each wick is held in an enclosure **23** having an upwardly facing opening **23***a* into which the liquid release coating material may be poured to saturate the wick. If the rollers **16—16** are made of a synthetic plastic material, the outer surface of the rollers can be made of a solid material to which the adhesive **8***a* will not readily adhere.

Refer now to FIG. 4 which shows a modified form of the invention wherein the converging surfaces of the rollers **16—16** are replaced by stationary converging surfaces **24***a—24a* formed by walls **24—24**. The converging surfaces **24***a—24a* have placing portions **24***b—24b* at the inlet ends thereof corresponding to the confronting margins of the tapered ends **18—18** of the roller **10—10** in FIGS. 1 and 2. Air blower heads **26—26** deliver streams of air to the converging surfaces **24***a—24a* to create an upward force on a label **8** which pushes the same into a position between the closest portions of the converging surface **24***a—24a*.

Reference should now be made to FIGS. 5 through 7 which show a still further modified form of the invention wherein label centering apparatus **15''** is provided which is physically separate from the label applying head **2'**. In FIGS. 5 through 7, the label centering apparatus **15''** is located between the label peeling plate **12** and the label applying head **2'**. The label peeling plate **12** feeds labels **8** one at a time to the inlet end **40** of the label centering apparatus **15''** in the same manner as the peeler plate **12** in FIG. 1. The label centering apparatus **15''** centers the labels and conveys the same to the inlet side of the label receiving surface **4***a* of the label applying head **2**.

The label centering apparatus **15''** includes a vacuum box **30** having a chamber **32** therein communicating with a source of low pressure (not shown) which draws air through openings **34** in a bottom wall **36** of the box. One or more perforated belts **38** move over the openings **34**, the belts **38** forming a conveyor for carrying the labels **8** from the inlet end **40** of the label centering apparatus **15''** to label applying head **2'**. The one or more belts **38** have perforations **44** therein through which the low pressure within the vacuum box **30** is applied to hold the labels by suction upon the moving section of the belt or belts **38**. As the labels are moved from one end to the other of the vacuum box **30**, means in the form of a pair of vertically oriented belts **43—43** positioned on opposite sides of the vacuum box **30** are operative to engage the edge of an off-centered label and guide the same into a centered position. To this end, the belts **43—43** extend immediately contiguous to the longitudinal margins of the belt or belts **38** moving under the vacuum box **30**, and, at the inlet end **40** of the label

centering apparatus, the belts **43—43** are spaced apart a distance substantially greater than the corresponding dimension or width of the labels **8** to be carried on the belts **38**, so that any off-centered label delivered to the inlet end of the vacuum box **30** will be engaged by one of the belts **43**. The belts **43—43** converge towards a central portion of the vacuum box **30** where they are spaced apart a distance substantially equal to the corresponding dimension or width of the labels **8**, so that the belts **43—43** will progressively center an off-centered label. The belts **43—43** pass around guide rollers **45—45** at their closest points, and the belts **43—43** diverge from the roller **45—45** so that, once the labels are properly centered on the belts **38**, they remain in this position until they are delivered to the label applying head **2'**.

It should be understood that numerous modifications may be made in the most preferred forms of the invention described above without deviating from the broader aspects of the present invention.

I claim:

1. In a label applying machine having a label receiving surface from which labels are to be dispensed in a centered position about a given reference axis on said surface, and means for delivering labels to said surface, the improvement comprising label centering apparatus for centering labels along said reference axis as they are delivered to said surface, said label centering apparatus comprising: roller means mounted for rotation on opposite side of said label receiving surface about axes of rotation which extend generally parallel to said reference axes and label receiving surface and are in a plane which is flush with or located inwardly of said label receiving surface so the confronting roller surfaces viewed in a plane transverse to said reference axis and label receiving surface converge towards and up to the same, the closest portions of said confronting roller surfaces at the point when they are flush with said label receiving surface being equally spaced from said reference axis and spaced apart a distance equal to the corresponding dimension of the labels to be delivered thereto, and means for rotating said roller means in opposite directions so the confronting surfaces of the roller means located outwardly of said label receiving surface move towards the same to move an off-centered label delivered thereto into a position centered with respect to said reference axis.

2. The label centering apparatus of claim **1** wherein the axes of rotation of said roller means are located inwardly of said label receiving surface a distance which is much less than the radii of the rollers, so the confronting roller surfaces converge to and beyond said label receiving surface at a small acute angle.

3. The label centering apparatus of claim **1** wherein said roller axes of rotation are parallel to said reference axis and said roller surfaces at the widest points of the rollers are cylindrical surfaces.

4. The label centering apparatus of claim **1** where the labels to be delivered thereto have an outwardly facing exposed layer of pressure sensitive adhesive material, and there is provided a supply of release coating material to which said pressure sensitive material does not readily adhere, and there is provided means for automatically transferring said release coating material to said rollers to inhibit transfer of adhesive material from the edges of a label to said roller means as the rollers engage the edges of the label.

5. The label centering apparatus of claim **1** wherein the label receiving surface with which the apparatus is, associated faces in a direction other than upward, and the labels are held against said surface by suction producing means acting on said surface, the suction force being sufficiently light that the centering force of said roller means on the labels is greater than the suction force.

6. In a label applying machine having a label receiving surface from which labels are to be dispensed in a position centered about a given reference axis on said surface, and means for delivering labels to one end of said surface and then moving the same generally parallel to and along said surface until fully positioned thereon, the improvement comprising label centering apparatus for centering labels along said reference axis as they are delivered to said surface, said label centering apparatus comprising: a pair of cylindrical rollers mounted for rotation on opposite sides of said label receiving surface about axes of rotation which are generally parallel to said reference axis and label receiving surface and in a plane which is flush with or located inwardly of said label receiving surface so the confronting roller surfaces viewed in a plane transverse to said reference axis and label receiving surface converge towards and up to the same, said confronting roller surfaces at the points where they are flush with said label receiving surface being equally spaced from said reference axis and spaced apart a distance equal to the corresponding dimension of the labels to be delivered thereto, said cylindrical rollers being tapered at the ends thereof facing said one end of said surface to which the labels are initially delivered, the tapered ends of the rollers receiving and guiding the labels to the cylindrical portions of the rollers, and means for rotating said rollers in opposite directions so the confronting surfaces of the rollers located outwardly of said label receiving surface move towards the same to move an off-centered label delivered thereto into a position centered with respect to said reference axis.

7. In a label applying machine having a label receiving surface from which labels are to be dispensed centered about a given reference axis on said surface, and means for delivering labels to said surface, the improvement comprising label centering apparatus for centering labels along said reference axis as they are delivered to said surface, said label centering apparatus comprising: a pair of confronting label guiding surfaces extending outwardly of and located on opposite sides of said label receiving surface, said label guiding surfaces viewed in a plane transverse to said reference axis and label receiving surface converging towards said label receiving surface and, at the points where they are flush with said label receiving surface, being equally spaced from said reference axis and spaced apart a distance equal to the corresponding dimension of the labels to be delivered thereto, and label forcing means for forcing a label moved in an off-centered position upon one of said label guiding surfaces towards said label receiving surfaces, whereby the label guiding surface involved will guide the same into a centered position.

8. The label centering apparatus of claim **7** wherein said label forcing means includes means for causing a stream of air to move against an off-centered label engaging one of said label guiding surfaces.

9. In a label applying machine having a label receiving and applying station from which labels are to be dispensed centered about a given reference axis, the improvement in label conveying and centering apparatus for delivering labels to said station in a centered position comprising: a perforated conveyors belt means extending to said station and having a belt surface with a width no greater than a given dimension of said labels; means for moving said conveyor belt means to carrying labels thereon to said label receiving and applying station; a means for delivering labels to a surface of said conveyor belt means which faces in a downward direction and in a manner so the labels are conveyed by the belt means in a flat condition and so said given dimension of said labels extends transversely of the length of said belt surface; a suction box over which said conveyor belt means passes; and a pair of label centering means on opposite

sides of said conveyor belt means, which means have confronting label engaging surfaces extending adjacent to the longitudinal margin of said conveyor belt means so one of them will engage an off-centered label projecting beyond said belt surface, said label centering means having portions converging in the direction of movement of said labels on said conveyor belt means, said label engaging surfaces of said converging portions of the label centering means being spaced apart at their points of maximum spacing a much greater distance than said given dimension of the labels and being spaced apart at their points of minimum spacing a distance equal to said given dimension of said labels, said label engaging surfaces of said label centering means being spaced the same distance from a reference axis on said belt surface which establishes a label position which ensures centering of the label at said label receiving and holding station when delivered thereto by said conveyor belt means; and said suction box holding the labels by suction applied through the perforated conveyor belt means with a sufficiently light force that said label centering means can push the labels into a centered position against said suction force.

10. The label conveying and centering apparatus of claim **9**, wherein said label centering means on opposite sides of said conveyor belt means are belts and there is provided means for moving the label engaging surfaces

of said belts at the same speed and in the same direction as the adjacent surface of said conveyor belt means carrying said labels.

11. The label conveying and centering apparatus of claim **9** wherein the labels are delivered to a surface of said conveyor belt means which does not face upwardly, the portion of said conveyor belt means carrying said labels extending along a suction box which holds the labels by suction on said conveyor belt means with a sufficiently light force that said label centering means can push the labels into a centered position against said suction force.

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U.S Cl. X.R.

156—285; 271—52; 226—182