

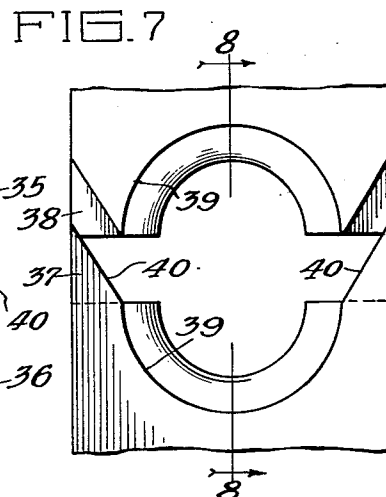
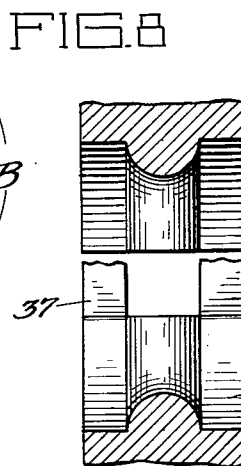
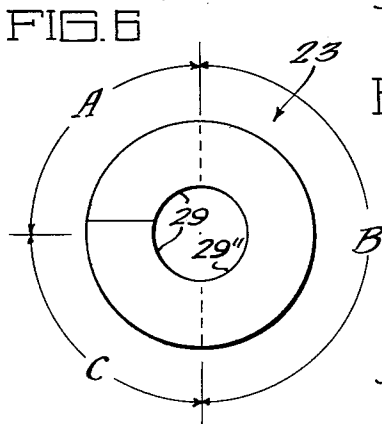
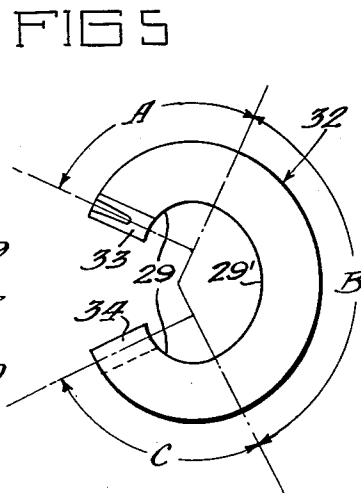
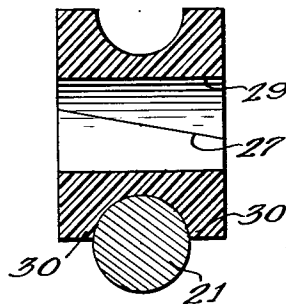
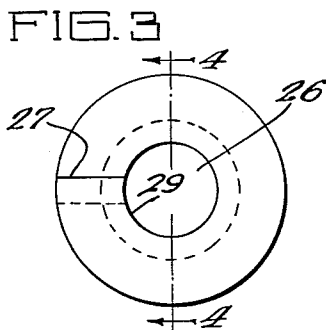
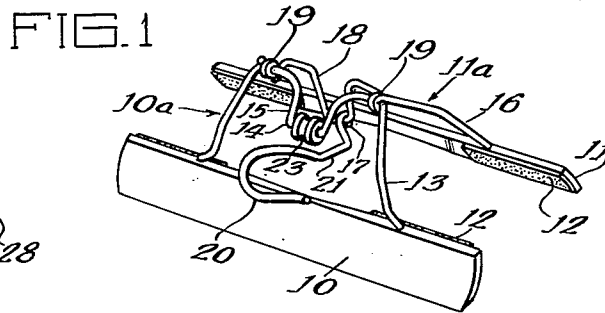
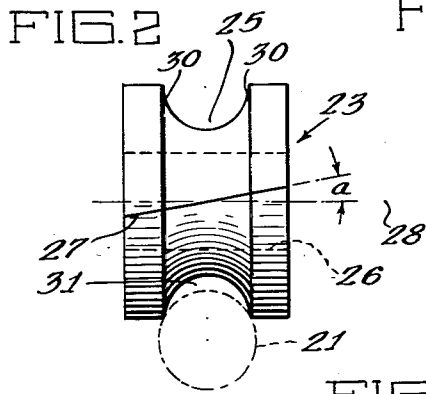
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3,010,626

GARMENT HANGER

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3,010,626

GARMENT HANGER

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This invention relates to an improved garment hanger of the clamping type, and in particular to an improved roller construction and to an improved method of making the roller and of applying it to the hanger structure. In describing my invention I have shown it as applied to a garment hanger of the type shown in Deknatel Patent No. 1,955,792, dated April 24, 1934 which shows the use of a metal roller on a garment hanger of the clamping type.

In a device of this general type, jaws are provided to engage the garment to be supported and the jaws in turn are supported by arms or other means which are hingedly connected to each other. Means are provided for urging the jaws into clamping engagement with each other.

In the aforesaid patent, the hingedly connected arms are provided with crank portions. The clamping means in that patent comprises a clamping lever which is pivotally mounted on one crank portion and engages the crank portion of the other arm to actuate the jaws. In order to reduce the friction of this sliding engagement of the clamping lever over the last-mentioned crank portion, and for other reasons, a small roller is mounted on the last-mentioned crank portion which is engaged by the clamping lever.

The roller shown in the aforesaid patent comprises a strip of metal bent around to form a short cylinder. Whereas this type of metal roller is quite satisfactory if properly formed, I have found that greatly improved operation can be obtained by the use of the different type of roller which forms the subject matter of the present invention. Furthermore, it is rather difficult to provide a bent metal roller which is a true cylinder. The ordinary stamping or bending operation results in a roller of the shape shown in FIG. 2 of my prior Patent 2,607,517, dated August 19, 1952.

It is an object of my invention to provide a roller which more nearly approaches a true solid of revolution than the strip metal roller above referred to.

It is another object of my invention to provide an improved method of forming the same and of applying it to the hanger structure after the hanger structure has been formed.

In this connection, according to my invention, I provide, as an intermediate product of manufacture, a C-shaped plastic member which can be slipped over the crank portion and then can be closed by squeezing to provide the completed roller.

However, it has been found that a plastic roller of this type tends to open up in use. More particularly, if the plastic roller comes to rest in an angular position such that the line of contact between the crank and the roller directly overlies the joint between the abutting surfaces, the compressive stress to which the plastic is subjected at the joint will cause the joint to open up. This tendency is accentuated by the cold flow characteristics of the particular plastic used.

It is a further object of my invention to avoid this difficulty by providing a plastic roller having an improved joint construction.

A still further object of my invention is to provide an improved roller which is in the form of a grooved roller, the groove being so shaped as to provide a pinching effect which will provide good frictional contact between the

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roller and the clamping arm, and a frictional contact which is sufficient to overcome the forces which tend to resist rotation of the roller on the crank.

Still another object is to provide, as an intermediate product of manufacture, a C-shaped plastic member which is so shaped that by a simple squeezing operation it can be converted into a plastic roller of the desired trueness of round.

Still another object is to provide an improved method of applying a plastic roller to a pre-formed rod or wire portion of a garment hanger.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings, in which like reference numerals designate like parts:

FIG. 1 is a perspective view of a garment hanger embodying my invention, the jaws being shown in open position;

FIG. 2 is an end view of the roller, the initial position of the clamping bar being shown in broken lines;

FIG. 3 is a side view thereof;

FIG. 4 is a sectional view taken along line 4-4 of FIG. 3 but also showing an extreme position of clamping bar together with the resulting deformation of the roller;

FIG. 5 is a side view of the C-shaped intermediate product;

FIG. 6 is a diagram illustrating the relationship of the variations portions shown in FIG. 5 when in closed position;

FIG. 7 is a side view of a set of closing dies, and

FIG. 8 is a section taken along line 8-8 of FIG. 7.

The garment hanger shown in FIG. 1 comprises a pair of jaws 10 and 11 which are preferably made of strips of wood which are lined with felt pads 12. The jaws are formed with openings which are adapted to receive the end portion of two rods 10a and 11a respectively which support the jaws. The rod 10a is provided with jaw arm portion 13 at either end which are separated by an intermediate portion comprising a crank 14 and crank arms 15. The rod 11a comprises jaw arm portions 16 which are separated by an intermediate portion comprising a crank 17 and crank arms 18. The two portions between the crank arms 18 and the jaw arms 16 are formed into helices 19 which embrace correspondingly disposed pintle portions on the opposite rod 10a. Thus, the jaws 10 and 11 are hingedly mounted with respect to each other.

The roller 23 is mounted on the crank 14.

The clamping lever 20 at one end is pivotally mounted on crank 17. The clamping lever includes a camming portion or shank 21 which is adapted to ride over the roller 23 and bring the jaws into clamping engagement.

As shown in FIGS. 2-4, the roller 23 is provided with a groove 25 in its periphery, and a central opening or bore 26. The crank 14 extends through the bore, the diameter of which is slightly greater than the diameter of the rod stock from which the crank 14 is formed to provide for easy rotation of the roller on its crank. The shank 21 of the clamp lever 20 rides in the groove 25.

The roller 23 is in the form of a split ring as indicated by the joint 27 formed by the abutting surfaces. The joint 27 is disposed in a plane which is inclined with respect to the axis 28 of the roller. As shown in FIG. 2, the angle of inclination is indicated by the angle "a." Thus, if the roller stops in a position in which the joint 27 is disposed between the crank 14 and the shank 21, the line of contact between the crank 14 and the surface 29 of the bore 26 will not be parallel to the joint 27. Thus, the pressure exerted at the line of contact bears on the joint proper at only one point and not along the entire length of the joint. This arrangement of the parts

prevents the joint from opening up due to the continued application of pressure.

It is desirable to design the roller so that the angle "a" is as large as possible. However, if the angle is too large, difficulty is encountered in making the die due to problems of helical projection. I have found a value of 10 degrees is satisfactory from both viewpoints.

Since there is a certain amount of friction between the crank 14 and the surface 29, there is a tendency for the shank 21 to slide or skid in the groove 25 without causing that rotation of the roller 23 which is desirable in order to provide smooth operation of the clamping mechanism. This tendency will be aggravated if the abutting surfaces are not exactly aligned at the joint 27.

To overcome this tendency, the groove 25 is made somewhat smaller than the diameter of the shank 21, as illustrated in FIG. 2. More specifically, in the event that groove 25 is of semi-circular shape, the radius of the groove is smaller than the radius of the stock from which the shank 21 is formed.

Thus, the shank 21 rides on the walls, or corners 30 of the groove, and leaves a clearance 31 at the bottom of groove 25. However, it is understood that the particular shape shown is illustrative only, and the same pinching effect may be obtained by the use of a V-shaped groove.

The groove construction thus provides a pinching effect which increases the frictional contact between the shank 21 and the roller to an extent that rotation of the roller 23 is assured. Furthermore, since the point of engagement between the shank 21 and the roller at points 30 is located near the periphery of the roller, a greater lever arm is provided than if the point of engagement were at the bottom of groove 25.

One advantage of a plastic roller is that it possesses a certain amount of resilience with the result that the plastic will be deformed at points 30 in order to provide a substantial area of contact under the forces involved. The limiting position of the roller 23 and shank 21 is shown in FIG. 4 in which the clamping force is sufficient as to deform the groove to such an extent that the shank entirely fills the groove. However, this limiting position is not necessary to satisfactory operation; it is shown merely to illustrate the fact that the walls of the groove 25 do in fact yield to a varying extent in order to provide the desired frictional contact.

FIGS. 5-8 illustrate the method of making the roller and of applying it to the hanger structure. According to my invention I provide as an intermediate product of manufacture a C-shaped plastic member 32 of generally elliptical outline, the end surfaces being designated by the reference numerals 33 and 34. The cross section of the C-shaped member 32 is substantially identical in shape and area to the cross section of the finished roller, as illustrated in FIG. 4. The distance or opening between the end surfaces 33 and 34 is large enough so that the C-shaped member can be slipped onto the crank 14. At this time, the C-shaped member 32 is heated to a point somewhat below its softening point so that when inserted between dies 35 and 36 the C-shaped member 32 can be closed to form the completed roller 23.

The design of the C-shaped member 32 can be best described by assuming that the same is divided into three portions, A, B, and C. The portions A and C are preformed to the radius of the finished roller 23, and each portion is of a length approximating 90 degrees of arc. The intermediate portion B can be formed to a somewhat greater radius and can be of a length approximating 130 degrees of arc. More specifically, the radius of the inner surface 29' can be approximately one and a half to two times the radius of the inner surface 29 of portion A with the result that the length of surface 29' in FIG. 5 will be slightly greater than the length of the

180 degree surface 29' in FIG. 6, in order to compensate for shrinkage when the part is being formed.

Thus, by pre-forming the end portions A and C to the finished shape, parallelism of the end surfaces 33 and 34, after closing, is assured. I prefer to chill the dies 35 and 36 so that any shrinkage that may occur due to cooling, will occur while the parts are confined and under compressive stress, to the end that the surfaces 33 and 34 will remain in abutting relationship to provide a good joint 27.

The lower die 36, shown in FIGS. 7 and 8, may be provided with wings 37 which receive a web portion 38 of the upper die 35 for purposes of alignment. The die surfaces 39 correspond to the radius of the finished roller.

Although the C-shaped member 32 may be inserted in the dies either in the upright position shown in FIG. 5, or in a horizontal position, I have found that preferred results are obtained by inserting the C-shaped member in the dies in a horizontal position with the opening facing downwardly. In this instance, then the surfaces 40 of the wings 37 engage the outer surface of the C-shaped member and serve as cam surfaces to bring the same into closed position.

However, it will be understood that the dies shown herein are illustrative only since considerable modification may be made therein and still secure a proper closing action.

To summarize the operation which has been pointed out in connection with the description of the various parts, the C-shaped member 32 is first brought up to the proper temperature, then slipped onto the crank 14 and the assembly is placed between the closing dies 35 and 36. Operation of the dies closes the C-shaped member and forms the finished roller 23 on the crank 14. The end surfaces 33 and 34 of the C-shaped member 32 when brought into abutting engagement with each other determine the diameter of the bore 26, and this diameter is somewhat greater than the diameter of the rod 10a to permit easy rotation of the roller upon its crank. In other words, if the C-shaped member 32 be considered as a pre-formed length of grooved stock, its effective length is such that a clearance between the bore 26 and the crank 14 is automatically provided.

The dies 35 and 36 are preferably chilled dies so that the roller 23 is brought down to room temperature before removal. After the assembly has been removed from the closing dies, it is then ready for use.

Referring now to FIG. 1 as the clamping lever 20 is swung upwardly, the shank 21 will engage the roller 23, and thus bring the jaws 10 and 11 together into clamping relationship. The shank 21 is so disposed that an over-center action is provided which will maintain their parts in their clamped relationship against the resilience of rods 10a and 11a.

The plastic roller herein described provides a smooth and easy action, as compared with metal rollers of the prior art. By virtue of the pinching effect provided by the groove 25, the roller will always rotate on its crank 14, and will not skid with respect to the shank 21. Furthermore, the inclination of the abutting surfaces 33 and 34, or joint 27, materially reduces any tendency of the roller 23 to open up.

The roller 23 may be formed from any suitable plastic having good dimensional stability at room temperatures, and which has a softening point which is not so abrupt so as to impede the closing operation. As an example of a suitable plastic material I have found that a butyrate plastic grade H-2 is satisfactory.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes may be made in the construction shown without departing from the spirit of my invention as pointed out in the appended claims.

I claim:

1. In a garment hanger of the clamping type including two hingedly connected jaw supporting members each having correspondingly disposed crank portions, and a clamping member pivotally mounted on one of said crank portions and having a portion of circular cross section, the combination of a roller mounted on the other of said crank portions for engagement by said clamping member, the periphery of said roller being provided with a groove having outwardly diverging walls and portions of said walls above the bottom of said groove being spaced from each other by a distance less than the diameter of said circular cross section portion of said clamping member to provide a clearance between the bottom of said groove and the surface of said clamping member between the points of engagement with said roller whereby said clamping member will initially engage only the walls of said groove, said roller being made of a plastic material such that said walls will yield slightly under the clamping stress to increase the area of contact between the clamping member and the roller in order to provide good frictional contact between the surface of said clamping member and the walls of said groove.

2. In a garment hanger of the clamping type including two hingedly connected jaw supporting members each having correspondingly disposed crank portions, and a clamping member pivotally mounted on one of said crank portions, the combination of a grooved roller mounted on the other of said crank portions for engagement by said clamping member, said roller comprising a split ring of plastic material providing a cylindrical central opening through which said other crank portion extends, the abutting end surfaces of said split ring lying in a plane which is inclined to the axis of said roller in order to provide a helically disposed joint whereby the line of contact between said last-mentioned crank portion and the inner surface of said roller will be out of parallelism with said joint.

3. In a garment hanger of the clamping type including two hingedly connected jaw supporting members each having correspondingly disposed crank portions, and a clamping member pivotally mounted on one of said crank portions, the combination of a roller mounted on the other of said crank portions for engagement by said clamping member, said roller comprising a split ring of plastic material providing a cylindrical central opening through which said other crank portion extends, the abutting end surfaces of said split ring lying in a plane which is inclined substantially 10° to the axis of said roller in order to provide a helically disposed joint whereby the line of contact between said last-mentioned crank portion and the inner surface of said roller will be out of parallelism with said joint, said roller having a peripheral groove to receive said clamping member.

4. A garment hanger of the clamping type including two hingedly connected jaw supporting members each having correspondingly disposed crank portions, and a clamping member of circular cross-section pivotally mounted on one of said crank portions, the combination of a roller mounted on the other of said crank portions, said roller comprising a body member having a cylindrical bore to receive said last mentioned crank portion, the periphery of said body member being provided with a groove having an effective bottom radius less than the radius of the cross-section of said clamping member, whereby said clamping member will ride on the walls of said groove in order to provide good frictional contact between the surface of said clamping member and the walls of said groove, said body member being provided with a joint, the abutting surfaces of said joint lying in a plane which is disposed at substantially 10° to the axis of said crank.

5. A garment hanger of the clamping type comprising two hingedly connected jaw supporting members each having correspondingly disposed crank portions, a clamp-

ing member pivotally mounted on one of said crank portions and having a portion of circular cross section, and a grooved split roller mounted on the other one of said crank portions for engagement by said clamping member and being formed from a C-shaped member formed of a thermoplastic material and having two oppositely disposed 90° portions of equal given radius, and an intermediate portion having a greater radius, such that when said C-shaped member is closed to provide a split ring type of roller, said 90° portions will retain their original given radius, and said intermediate portion will be reduced in radius to provide approximately 180° of the finished split ring roller, and end surfaces formed on said 90° portions whereby the end portions of said C-shaped member are preformed to substantially the shape of the finished roller.

6. A garment hanger of the clamping type comprising two hingedly connected jaw supporting members each having correspondingly disposed crank portions, a clamping member pivotally mounted on one of said crank portions and having a portion of circular cross section, and a grooved split roller mounted on the other one of said crank portions for engagement by said clamping member and comprising a strip of material capable of plastic deformation and having a substantially channel shaped cross section which has been closed upon itself to form a solid of revolution, said strip having two end portions and a central portion, each of said end portions occupying substantially 90° of arc and said intermediate portion occupying substantially 180° arc, said end portions terminating in substantially plane end surfaces each of which are inclined at substantially 10° from the median plane of said roller taken through said groove, said strip being initially in the form of a C-shaped strip of which the end portions are preformed so as to have the same radius as the end portions of said roller and so as to extend through substantially 90° of arc, and the intermediate portion of said C-shaped strip occupying substantially less than 180° of arc and having a radius correspondingly greater than the radius of said end portions, whereby said roller is applied to said second mentioned crank portion by slipping said C-shaped strip over said crank portion and closing the same by the application of pressure in order to close the gap between said end surfaces, the preforming of said end portions serving to avoid the introduction of such stress as would tend to warp said end surfaces during the closing operation.

7. A garment hanger of the clamping type comprising two hingedly connected jaw supporting members each having correspondingly disposed crank portions, a clamping member pivotally mounted on one of said crank portions and having a portion of circular cross section, and a grooved split roller mounted on the other one of said crank portions for engagement by said clamping member and comprising a strip of material capable of plastic deformation and having a substantially channel shaped cross section which has been closed upon itself to form a solid of revolution, said strip having two end portions and a central portion, each of said end portions occupying substantially 90° of arc and said intermediate portion occupying substantially 180° of arc, said end portions terminating in substantially plane surfaces, said strip being initially in the form of a C-shaped strip of which the end portions are preformed so as to have the same radius as the end portions of said roller and so as to extend through substantially 90° of arc, and the intermediate portion of said C-shaped strip extending through substantially 130° of arc and having a radius correspondingly greater than the radius of said end portions, whereby said roller is applied to said second mentioned crank portion by slipping said C-shaped strip over said crank portion and closing the same by the application of pressure in order to close the gap between said end surfaces,

the preforming of said end portions serving to avoid the introduction of such stress as would tend to warp said end surfaces during the closing operation.

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