Sept. 5, 1939. B. J. LEE ET AL 2,171,728

FLEXIBLE BEADING

Filed Sept. 10, 1936

Fig. 1.

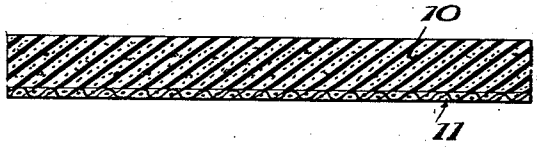


Fig. 2.

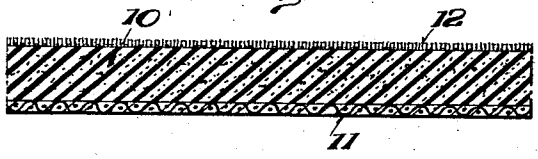


Fig. 3.

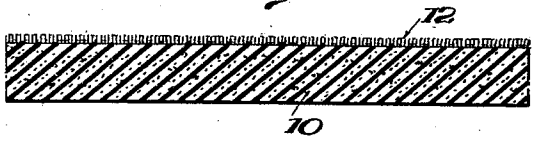


Fig. 4.

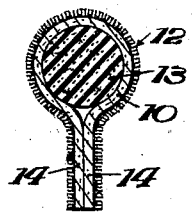


Fig. 5.

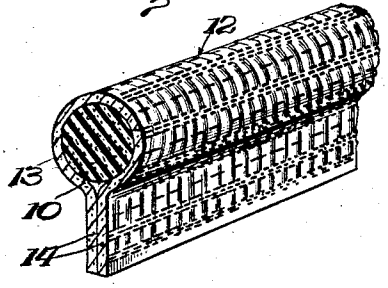
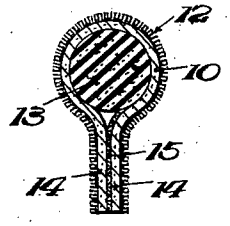


Fig. 6.



Inventors

Bernard J. Lee

Henry Gora

By Cameron, Kerkam & Sutton

Attorneys

Patented Sept. 5, 1939

2,171,728

UNITED STATES PATENT OFFICE

2,171,728

FLEXIBLE BEADING

Bernard J. Lee and Henry Gora, Bridgeport, Conn., assignors to Jenkins Bros., New York, N. Y., a corporation of New Jersey

Application September 10, 1936, Serial No. 100,196

12 Claims. (Cl. 20—69)

This invention relates to an article of manufacture of the character which may be employed for upholstering beading, weather-stripping, general trimming, and the like, and which for convenience will be hereinafter referred to as flexible beading, it being expressly understood, however, that the term as here employed is intended to be generic to articles of the character herein described whether used for general trimming, weather-stripping, or otherwise.

A common use for flexible beading is the trimming or weather-stripping of doors, wind shields and other openings in the body of an automobile, the primary function of the beading when used as weather-stripping being to assist in preventing the entrance of water and air into the car around the edges of the door or other member when the latter is in closed position. Since beading of this character is exposed to view, its appearance must also be such as to harmonize with the upholstery in the car.

The form of beading now generally used for this purpose consists of an inner core or body portion made of hollow rubber tubing of uniform diameter and an outer covering of suitable woven material which is loosely mounted on the core and provided with a flange by which it may be secured in place at the desired location. The covering is usually made from a piece of cloth of a width greater than the circumference of the core by an amount equal to twice the width desired for the flange and the cloth is simply wrapped around the core with the overlapping portions stitched together to constitute a flange.

In installing beading of this known form, the flange must be secured to the car body or other structure, as by tacks or nails, in such position as to hold the beading in its desired location. However, because of the fact that the flange is made of woven or like material and is hence entirely lacking in rigidity and ability to hold any particular shape, considerable difficulty has been experienced in the past in securing this kind of beading in inaccessible places, particularly when it is necessary to insert the flange into a crack or crevice, and in holding the body portion in its proper position after installation, especially where the flange must lie at an angle with respect to the body portion.

Other forms of beading have been suggested, but they have generally employed woven material for the sheath of the beading. A woven sheath places a very definite limitation on the use of the beading because the sheath possesses little extensibility and it is virtually impossible to make the beading follow curves of small radius of curvature or sharply changing contours without distortion or buckling, which seriously interferes both with the appearance and the function of the beading.

It is heretofore been proposed to provide flexible beading in the form of a hollow rubber tube having projecting radially therefrom an integral flange, and also to fill the core of said tube with sponge rubber and reenforce the beading with textile material, such as canvas, either covering the entire exterior surface of the beading or interposed between the sponge rubber core and the rubber of the exterior tube. However, a canvas sheath coextensive with the exterior surface of the beading or coextensive with the inner face of the exterior rubber tube substantially prevents extension of the beading and causes buckling or wrinkling of the beading when passing around curves of small radius or when bent at relatively sharp angles.

It is an object of this invention to provide a new and improved form of flexible beading which can be installed, even in relatively inaccessible places, with a minimum of effort and without injury to the material from which the beading is made and without buckling or wrinkling, even though the flange may have to be at a substantial angle to the body of the beading and even though the contour which the beading is following includes curves of small radius or relatively sharp angles.

Another object of this invention is to provide improved flexible beading of the character referred to which possesses great flexibility and at the same time ample rigidity.

Another object of this invention is to provide improved flexible beading of the character referred to which may be stretched longitudinally to a considerable extent.

Another object of this invention is to provide improved flexible beading of the character referred to which has a flange that tends to hold the body portion of the beading elastically against an opposing surface.

Another object of this invention is to provide improved flexible beading of the character referred to which has a flange that is sufficiently flexible to enable its adaptation to positions where the body portion of the beading must lie at an angle to the flange and which at the same time is strong enough to insure against rupture or tearing at the junction between the body and the flange or at points where nails or tacks pass through the flange.

Another object of this invention is to provide

improved flexible beading of the character referred to which includes a securing flange that permits ready insertion into openings of narrow compass that would materially hinder the installation of prior beadings employing flanges of woven or like material.

Another object of this invention is to provide improved flexible beading of the character referred to which is of simple construction so that it may be manufactured economically and produced on a quantity basis by a continuous and economical procedure.

Another object of this invention is to provide improved flexible beading of the character referred to which may be temporarily opened to permit removal of a section of the body when desirable to effect a neat joint but which will remain sealed after it is put in service.

Another object of this invention is to provide a new method of manufacturing flexible beading whereby the characteristics heretofore referred to may be obtained.

Another object of this invention is to provide a method of manufacturing flexible beading which facilitates giving the beading an exterior finish of desired character and attractive appearance whereby it may harmonize with the surroundings with which it is intended to be used.

Another object of this invention is to provide a method of manufacturing flexible beading which provides a flocked surface for the beading that may be readily embossed to give the same a superior finish that is attractive and artistic in character.

Other objects will appear as the description of the invention proceeds.

In our earlier application, Serial No. 40,500, filed September 13, 1935, for Upholstering beading, we have disclosed tubular rubber beading provided with an integral radial flange, which may be either tapered or rectangular in cross section, and which flange may be reenforced by fabric incorporated in or applied exteriorly to said flange, the exterior surface of said beading being provided with an adherent coating of flock of any desired character, color and decoration, and in our earlier application, Serial No. 52,390, filed November 30, 1935, for Upholstering beading, we have disclosed flexible beading as just characterized provided with a sponge rubber core or formed entirely of sponge rubber. Thereby, by eliminating the use of woven material, except as a reenforcement for the flange when desired, the beading is susceptible to considerable stretch, and it can therefore be bent at a relatively sharp angle and around curves of relatively small radius without distortion or buckling because, unlike a continuous woven sheath, the adherent flock does not interfere with the extensibility of the beading or the relative stretching of the elements thereof when bent, while the desired decorative effects can be obtained as readily as with woven material.

The present application is a continuation in part of our foregoing two applications and contains claims generic to the structures therein disclosed.

The article of the present invention is capable of receiving a variety of expressions and the method of the invention is capable of being carried out in a variety of ways. For purposes of illustration the preferred manner of procedure and two desirable embodiments of the resulting product are illustrated on the accompanying drawing and described hereinafter, but it is to be expressly understood that these embodiments have been selected for purposes of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring in detail to the drawing, wherein the same reference characters are employed to designate corresponding parts in the several figures, and wherein the thicknesses of the layers, particularly in Figs. 1, 2 and 3, have been exaggerated to facilitate a ready understanding thereof:

Fig. 1 is a fragmentary section illustrating the backed rubber sheet;

Fig. 2 is a fragmentary section illustrating the backed rubber sheet afer the flock has been applied thereto;

Fig. 3 is a fragmentary section illustrating the flocked sheet after the backing has been removed therefrom;

Fig. 4 is a transverse section illustrating the application of the flocked rubber sheet to the rubber core;

Fig. 5 is a perspective view of a fragment of the beading whose cross section is shown in Fig. 4; and

Fig. 6 is a transverse section corresponding to Fig. 4 but illustrating an embodiment of the invention which includes reenforcement of the flange.

Although the drawing shows only fragmentary pieces of beading and its component elements, it is to be understood that the beading is produced commercially in continuous strips of any desired length so that pieces of the proper size for installation in any desired location may be cut from the strip as required.

In the manufacture of flexible beading in conformity with the present invention rubber of any suitable character and quality is first milled in any suitable way and then run through rolls and applied as a layer 10 of any suitable thickness to a continuous strip-like backing 11 of fabric or sheet material of any suitable character that has been treated in any suitable way so that the rubber will not impregnate the same or adhere thereto but may be easily removed therefrom as hereinafter referred to. As the rubber is uncured at this stage, and as the thickness of rubber which it is desired to use is relatively thin, the rubber cannot be handled without distortion in the absence of a backing and therefore the backing sheet is supplied as a carrier for the rubber until such time as the rubber has been cured.

A suitable rubber cement or solvent for rubber is then applied to the exposed face of the rubber sheet 10 and, as shown in Fig. 2, flock 12 is applied to the cement-treated surface in any suitable way, as by a suitable flocking machine. During the flocking operation the sheet is constantly beaten from the rear or fabric side thereof, or the flock during application is subjected to the action of an air stream, to cause the flock to stand upright on the rubber surface. Thereby a flocked surface is formed which has a relatively deep but uniform nap. After being flocked the sheet may be left plain or it may be embossed, printed, or otherwise decorated in any suitable way as by passing the sheet through any suitable embossing rolls, if ornamentation is to be applied to the surface of the beading. It has been found that the upright condition of the flock assured by the vibration of the sheet or by air spray action, as heretofore referred to, enables the surface to receive embossing which is materially superior

to that which can be obtained from use of other types of flocked surfaces. By thus flocking the sheet, and also embossing it when such is to be done, while the rubber is in sheet form more uniform and satisfactory effects may be obtained, as well as the operation be carried out more simply and expeditiously, than if the flocking and embossing are carried out on the otherwise completed beading with its curved surfaces and irregular shape. Moreover, as the rubber is uncured at this stage and therefore is semi-plastic and inelastic the flock takes a deeper and better impression under the action of the embossing rolls.

The sheet with its flocked surface, with or without embossing depending upon the use to which the article is to be put, is then ready for curing, and the curing operation is carried out in any suitable oven, the length of time during which heat is applied thereto and the temperature to which the strip is subjected depending upon the character and quality of rubber being used as well understood in the art. After the rubber has been properly cured the backing sheet 11 is removed therefrom (see Fig. 3), and the sheet is ready for application as a sheath to a core of any suitable size, shape and material. If preferred the embossing or other decorating step may be carried out after the curing of the sheet 10 and removal of the backing sheet 11.

In conformity with the present invention the core 13 (see Fig. 4) is preferably formed as a continuous strip of sponge or other suitable soft rubber and is preferably solid in cross section although it may be made tubular in cross section. The rear or unflocked surface of the sheet 10 is then treated with rubber cement, and the sheet is wrapped around the core in any suitable way, as by forming rolls, to form the body portion, causing the rubber sheath to adhere substantially throughout the circumferential extent of the core 13, with the overlapping portions 14, united by the rubber cement at their inner contiguous faces, forming a flange which may be made of any suitable radial extent by suitably determining the width of the sheet 10.

In place of employing rubber cement throughout the width of the sheet 10 the cement may be applied only to one or both marginal portions thereof for substantially the width that is to constitute the flange, so that when the sheet is wrapped around the core the overlapping portions 14 will be caused to adhere to constitute the flange but the core will be unattached to the inner surface of the sheet 10.

Whether the sheet is to be attached to the core or not, the cement used may be a suitable slow vulcanizing cement that will not cause permanent adhesion until the lapse of a predetermined number of days sufficient to include the time of installation of the beading. This enables a workman to separate the layers of the flange and gain access to the core for the purpose of removing a section of the core when such is desirable to effect a neat joint or meet other difficulties of installation. The layers of the flange may then be pressed together again to cause them to adhere, and with lapse of time the cement will set and cause permanent adhesion between the flange layers, and also with the core if the cement is coextensive with the inner face of the sheet.

If the sheet 10 is to be vulcanized to the core 13 or only the layers 14 of the flange are to be vulcanized together, the final heat treatment for completing the curing or vulcanizing of either the core or the sheet or both can be left to take place simultaneously with the vulcanizing of the sheet to the core or the flange layers together.

In order to reenforce the flange so formed it is sometimes desirable to employ a sheet of suitable fabric between the layers 14 of the flange. When this is desired a sheet of fabric 15 (see Fig. 6) may be previously or simultaneously applied along one or both edges of the rear face of the sheet so that when the sheet is wrapped around the core said fabric will lie between the layers 14 of the flange. The reenforcing strip or strips may be of the same width as the flange or somewhat less or somewhat greater, but is substantially confined to said flange though preferably projecting somewhat beyond the junction of the flange and body portion as shown. Thereby the flange is reenforced so as to minimize the likelihood of its being torn during attachment by tacks or the like.

Whether or not the flange is reenforced, stitching or other means of attachment may be applied to the flange if for any reason such is preferred as a substitute for or as an addition to the cementing together of the overlapping flange portions.

It will therefore be perceived that the present invention provides a flexible beading composed of a body portion, which may be solid or tubular in cross section and which may be composed entirely of sponge rubber or entirely of cured rubber or of sponge rubber encased in cured rubber, and a flange, which is integral with the body portion whether formed as an integral projection from the core as in our earlier applications above referred to or formed by overlapping portions of a rubber sheath wrapped around a core, which is extensible and elastic or resilient throughout the body portion, avoiding all woven material in the body portion and therefore capable of being easily stretched and bent without buckling or wrinkling, and which also provides a relatively stiff resilient flange that holds the body portion elastically in position and yet is readily deformable to permit installation under the most exacting conditions.

Experience has demonstrated that an all rubber flexible beading including a cured rubber sheath and a soft rubber core as herein disclosed provides a flexible beading which is highly flexible, and yet it is possessed of proper stiffness and wearing qualities because of the relative toughness of the outer cured-rubber layer. The beading as a whole may be stretched longitudinally to a much greater extent than has been the case with flexible beadings employing layers of woven material because the flock cured to the rubber does not oppose extension or bending of the rubber beading, and therefore the beading may be made to follow irregular contours and bend around relatively sharp curves and angles without buckling or wrinkling. The flange, being of rubber and integral with the body portion, affords sufficient stiffness to facilitate installation and yet it can be readily flexed as required by the exigencies of installation, and additionally reacts on the body portion to urge the latter resiliently against an opposing surface to assist in sealing against wind, rain, etc.

The manner of production assures a surface which is attractive in appearance and which can be made of any suitable color to harmonize with the surroundings in which it is to be placed, and where surface ornamentation is desired the man-

ner of production as herein described enables the embossing or other decoration of the surface so as to provide sharply cut figures in the surface material owing to the manner in which the flock is made to adhere to the surface of the rubber in a relatively upright position and embossed while the backing is still in a soft and impressionable condition. The production of the flexible beading can be carried out expeditiously and economically because the operations are simple in character, and hence the method of the present invention lends itself readily to quantity production without requiring unusual or highly expensive equipment, highly skilled labor, etc.

While the preferred procedure and certain preferred embodiments of the article of the present invention have been described with considerable particularity, it is to be expressly understood that the invention is not to be restricted thereto, as other procedures and structures embodying the invention will now readily suggest themselves to those skilled in the art, and it is therefore to be understood that changes may be made in the details of structure and procedure without departing from the spirit of this invention. It is also to be understood that the beading may be made of any desired size, diameter, width of flange, etc., and the body may be given other shapes than circular in cross section, depending upon the use to which the flexible beading is to be put. Reference is therefore to be had to the appended claims for a definition of the invention.

What is claimed is:

1. A flexible beading comprising a body portion having a flange formed integrally therewith and extending radially outwardly therefrom, both said body portion and flange being made of rubber, said flange having a strip of penetrable reinforcing material centrally disposed and substantially confined therewithin for increasing the resistance thereof to rupture and tearing.

2. A flexible beading comprising a body portion having a flange formed integrally therewith and extending radially outwardly therefrom, both said body portion and flange being made of rubber and having a permanently adhering coating of fibrous material, said flange having a reinforcing strip of fabric material substantially confined therein.

3. A flexible beading comprising a body portion having a flange formed integrally therewith and extending longitudinally thereof and radially outwardly therefrom, both said body portion and flange being made of rubber, and a reinforcing core of fabric material centrally disposed within said flange and substantially confined therein but extending beyond the junction between the body portion and said flange.

4. A flexible beading comprising a strip of flexible material having a tube-like body portion and a flange formed integrally therewith and extending radially outwardly therefrom, both said body portion and said flange being made of rubber, and penetrable reinforcing means associated only with said flange for increasing the resistance thereof to tearing.

5. A flexible beading comprising a strip of flexible material having a tube-like body portion and a flange connected thereto and extending radially outwardly therefrom, and a core of penetrable reinforcing material substantially limited to said flange.

6. A flexible beading including a hollow rubber body portion which is extensible by reason of the absence of a woven fabric surrounding the same, said body portion having formed integrally therewith an outwardly projecting flange also of rubber, and said flange only having a reinforcement of fabric associated therewith.

7. A flexible beading comprising a cylindrical rubber body member which is solid in cross section and which is extensible by reason of the absence of woven fabric surrounding said body member, an integral rubber flange extending radially therefrom and adapted to be inserted into small crevices, and a covering of flock directly and permanently adherent to said body member and flange, said flange being of such rigidity as to yieldingly resist distortion out of its normal radial position.

8. A flexible beading comprising a cylindrical rubber body member which is solid in cross section and which is extensible by reason of the absence of woven fabric surrounding said body member, a rubber flange extending radially therefrom and adapted to be inserted into small crevices, said flange being of such rigidity as to yieldingly resist distortion out of its normal radial position, and reinforcing means associated only with said flange.

9. A flexible beading strip whose extensibility is unrestrained by woven fabric about the body thereof, said strip including a soft rubber core, a sheath of harder rubber enclosing the same and having its edge portions secured together to provide a flange, and reenforcing means extending only between the portions of said flange.

10. A flexible beading strip whose extensibility is unrestrained by woven fabric about the body thereof, said strip including a longitudinally extensible and elastic body portion and a resilient longitudinal flange portion extending radially from the body portion and operative to urge said body portion elastically against an opposed surface, said flange having reenforcing means extending longitudinally thereof and substantially confined thereto.

11. A flexible beading strip including a soft rubber core, a sheath of harder rubber enclosing said body portion and having its edge portions secured together to provide a flange, and fabric interposed between the layers of said flange but not surrounding said core and constituting a reenforcement for the flange.

12. A flexible beading strip whose extensibility is unrestrained by woven fabric about the body thereof, said strip including a body portion composed only of a soft rubber core and a sheath of rubber having flock material directly adherent to the outer face thereof, said sheath having at least one edge portion reenforced with fabric and said edge portions secured together to provide a longitudinal flange for said beading.

BERNARD J. LEE.
HENRY GORA.