April 27, 1965 E. W. GARTZ 3,180,007

QUICK CHANGE ROLLER COATING PLATE

Filed Dec. 13, 1963

FIG. 1.

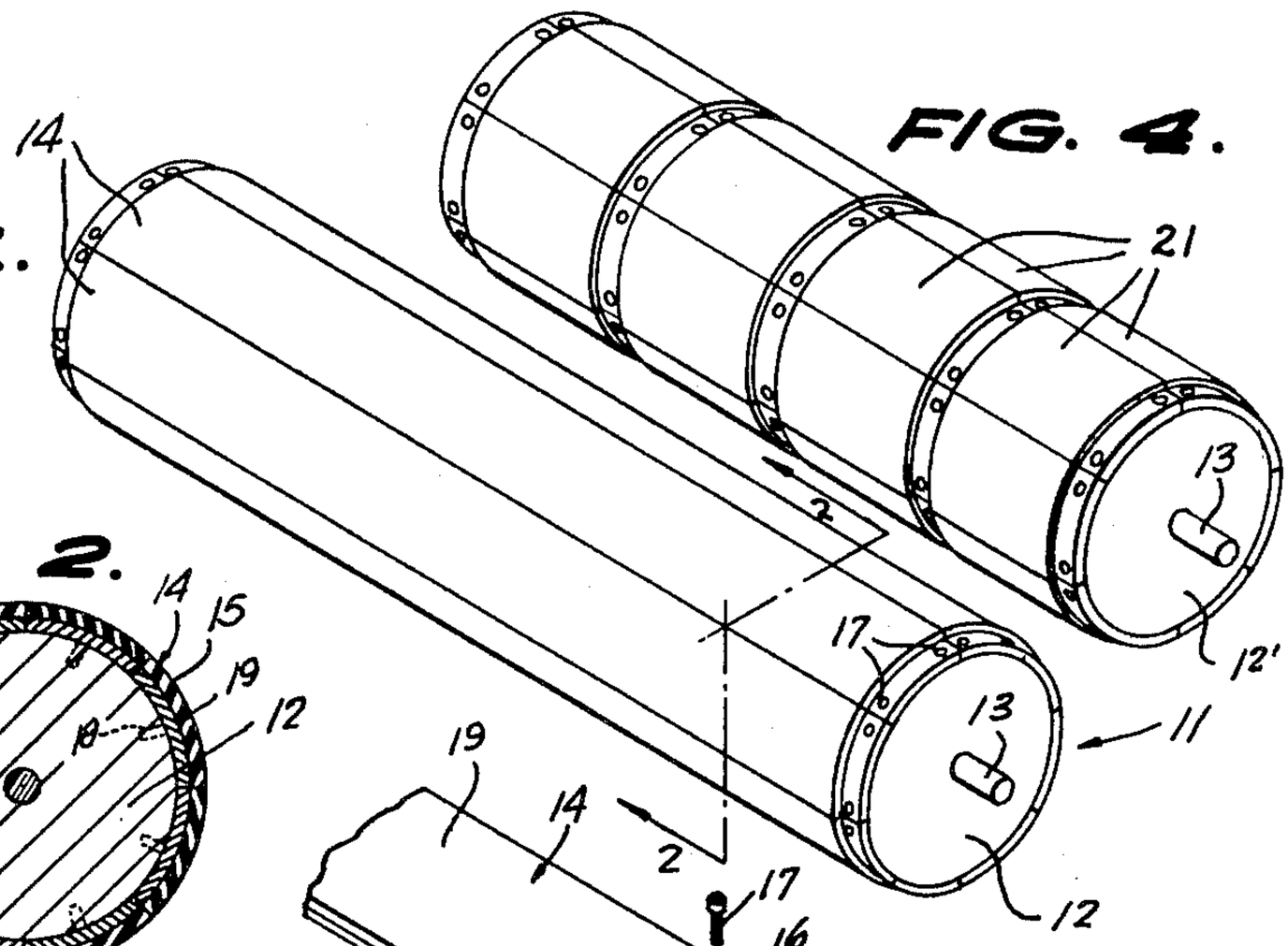


FIG. 4.

FIG. 2.

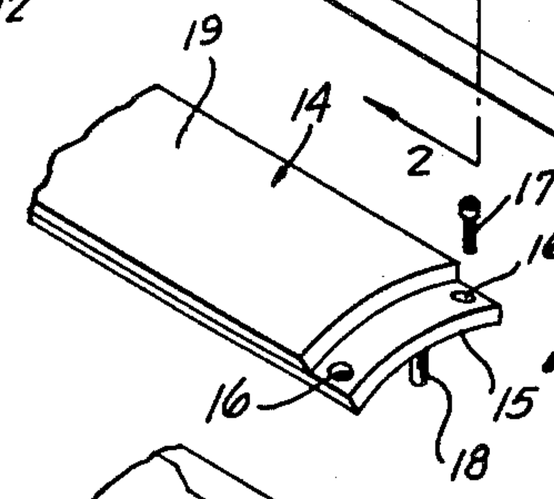


FIG. 3.

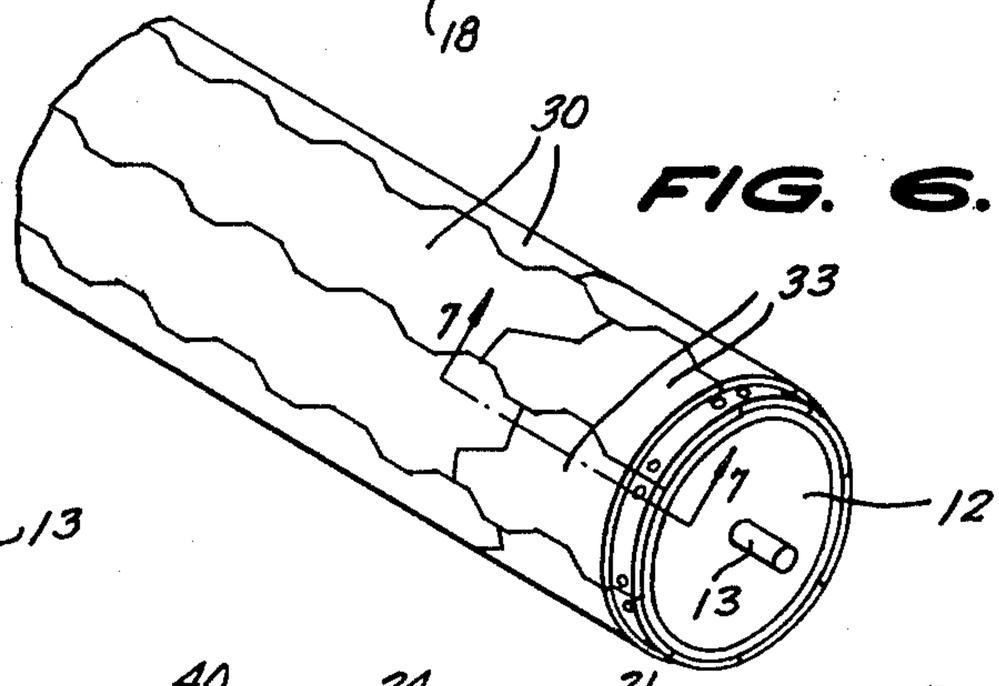


FIG. 6.

FIG. 7.

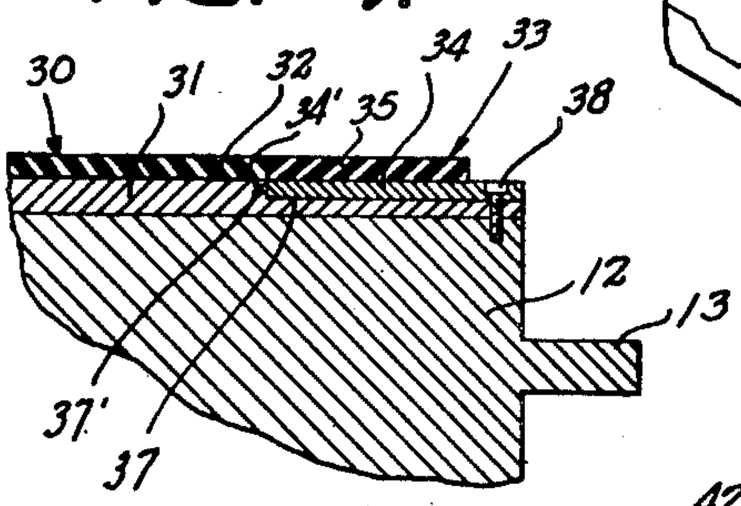


FIG. 8.

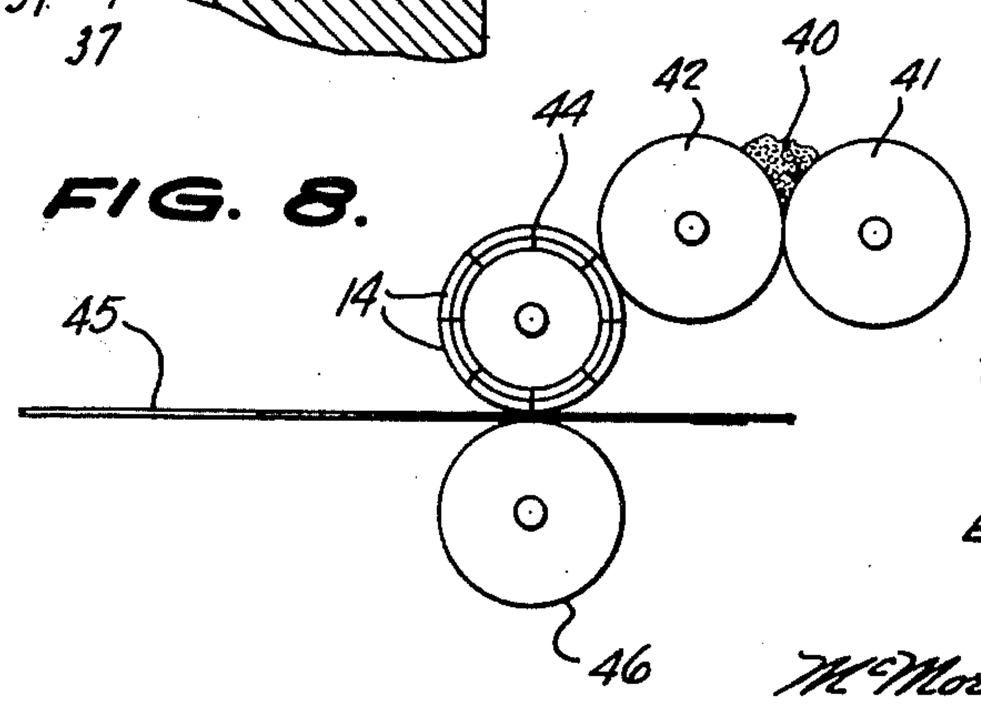
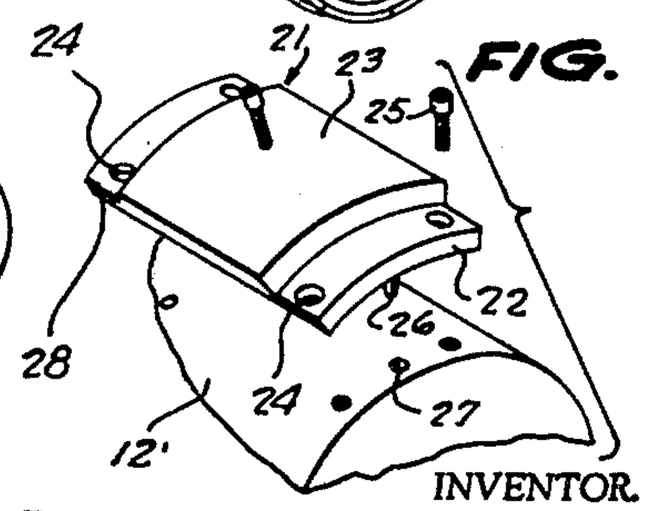


FIG. 5.



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QUICK CHANGE ROLLER COATING PLATE

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4 Claims. (Cl. 29—124)

This invention relates to rollers for applying coating material to sheets of tin plate, or the like, and more particularly to rollers having replaceable outer surface sections.

A main object of the invention is to provide a novel and improved roller for use with machines for coating sheets of tin plate with various types of material, for example, for coating sheets of tin plate which are to be used for making cans, the roller being provided with removable rubber surface sections so that damaged portions of the roller surface may be readily replaced, making it unnecessary to replace a complete roller when only a small portion of its outside surface is damaged.

A further object of the invention is to provide an improved rubber surfaced coating roller which is provided with replaceable rubber coating outer surface sections, which provides greater economy in the utilization of existing rollers, which eliminates lost time in repairing and replacing rollers when surface portions thereof become damaged, and eliminating the need for keeping a large stock of roller cores on hand, such as spare rollers for use when other rollers are being repaired.

A still further object of the invention is to provide an improved roller for coating sheets of tin plate with various materials, as required in the manufacture of tin cans, the roller having replaceable outer segments in various shapes and sizes and which can be easily removed or replaced, as required, the improved roller being low in cost, providing economical utilization of the major portions of the roller by enabling surface segments thereof to be readily replaced when they become damaged, and reducing inventory requiremnets with respect to the need for keeping a large stock of roller cores on hand for various roller styles.

A still further object of the invention is to provide an improved coating roller for use on a machine for coating sheets of tin plate with various materials, for example, in the manufacture of tin cans, the improved roller having replaceable rubber coating surface segments which can be easily replaced whenever they become damaged thereby minimizing the loss of operating time for the associated machine, since a damaged section of the coating surface of the roller can be replaced in a very short time and without the necessity of cutting the roller to a required dimension or for resetting the machine for operation.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an improved coating roller constructed in accordance with the present invention.

FIGURE 2 is an enlarged transverse vertical cross sectional view taken substantially on the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged fragmentary perspective view showing the end portion of one of the replaceable roller outer surface segments employed in the roller of FIGURES 1 and 2.

FIGURE 4 is a perspective view of a roller according to the present invention but showing a modified form thereof.

FIGURE 5 is a fragmentary perspective view showing a portion of the roller of FIGURE 4 with an associated replaceable outer surface segment and a pair of fastening screws for attaching the segment to the roller core, the parts being shown in separated positions.

FIGURE 6 is a fragmentary perspective view of a still further modified form of rubber-surfaced coating roller constructed in accordance with the present invention.

FIGURE 7 is a fragmentary enlarged cross sectional view taken substantially on the line 7—7 of FIGURE 6.

FIGURE 8 is a schematic side elevational view showing a system for applying coating material to a sheet of tin plate, employing a coating roller according to the present invention.

Referring to the drawings, and more particularly to FIGURES 1, 2 and 3, **11** generally designates an assembled coating roller for use in a conventional machine for coating sheets of tin plate with various materials, the roller being constructed in accordance with the present invention. The roller **11** comprises a generally cylindrical, elongated main steel core **12** provided at its opposite ends with the outwardly projecting axial shaft elements **13**. Secured on the cylindrical outer surface of the core **12** are a plurality of longitudinally extending coating segments **14**, each coating segment comprising a metal base strip **15** which is arcuately curved to conform with the curvature of the cylindrical core **12** and which is provided at its opposite ends with a pair of apertures **16, 16** which are countersunk and which are adapted to receive fastening screws **17**. The fastening screws **17** are threadedly engaged in the opposite end portions of the steel core **12** and fasten the strips **15** thereto. The strips **15** are further provided between the apertures **16, 16** with inwardly projecting aligning pins **18** which are located so as to enter corresponding recesses provided in the steel core **12** so as to properly position the base strips **15** on the steel core in longitudinally extending positions on the core. Bonded onto the convex surfaces of the strips **15** are layers of rubber, shown at **19**, or of plastic material having suitable resiliency, as required for properly coating tin plate with the intended coating materials. As shown in FIGURES 1 and 3, the resilient outer layers **19** of the segments **14** terminate just short of the apertures **16, 16** at the opposite ends of the base strips **15**, allowing free access to the fastening screws **17**, for easy removal and replacement of the sections **14**, whenever required.

The sections **14** fit closely together on the core **12**, the edges of the longitudinally extending segments **14** being substantially in abutment with each other, whereby the adjacent resilient layers **19** define a substantially continuous resilient surface covering the major portion of the associated core **12**.

Whenever one or more of the resilient exterior layers **19** becomes damaged, the associated sections **14** may be readily replaced by unfastening the screws **17** holding their ends attached to the core **12** and replacing the worn or damaged segments **14** with new segments.

In the modification illustrated in FIGURES 4 and 5, the core shown at **12′** is provided with a plurality of spaced coating assemblies, each coating assembly comprising a circumferentially continuous series of replaceable surface segments **21**, each segment **21** comprising a metal base portion **22**, arcuately curved to conform with the exterior contour of the core **12′**. Bonded onto the convex surface of the segment base element **22** is the exterior pad of resilient deformable material, shown at **23**, comprising rubber or plastic material. The end portions of the arcuately curved base member **22** are exposed and are provided with countersunk apertures **24** to receive fastening screws **25** which are threadedly secured in the core **12′**. The base members **22** are likewise provided with inwardly projecting positioning pins **26** which are engageable in positioning recesses **27** provided in the core **12′**. The exposed ends of members **22** inwardly of the ends of the core **12′** overlap, the inner end portions of the members **22** being offset or formed with recesses **28** at their bottom margins to receive the arcuate ends of the

base portions **22** of the adjacent segments. The apertures **24** of the overlapped margins of the longitudinally adjacent elements **22** are in registry and receive common fastening screws **25**. The resultant assembly, shown in FIGURE 4, provides four coating units on a single roller, adapted to distribute coating material on four parallel sheets of tin plate. As in the previously described embodiment of the invention, whenever one of the resilient deformable outer portions **23** becomes damaged or worn it can be readily replaced by unfastening its holding screws **24**, allowing the damaged section to be removed and to be replaced by a new section.

The rubber strips **15** of FIGURE 1 may be formed to define spaced pad sections similar to the spaced surface segments **21** in FIGURE 4.

Referring now to the form of the invention shown in FIGURES 6 and 7, the core, shown at **12**, is provided with a plurality of substantially longitudinally extending main coating segments **30**, each coating segment **30** comprising a longitudinally extending base strip **31** (see FIGURE 7) which is arcuately curved to conform with the contour of the external surface of the core **12**, each base strip **31** having bonded thereon a longitudinally extending resilient deformable exterior coating section **32** of rubber or plastic. The end portions of the sections **30** are arranged for replacement by the provision of detachable end segments **33**, each end segment **33** comprising a metal supporting base portion **34** on which is bonded a resilient deformable external section **35** of rubber or plastic material, of the same thickness as the resilient deformable external layer **32** of the associated strip **30**. The end portions of the base member **31** of each main strip **30** are recessed, as shown at **37**, to receive the relatively thin metal base portions **34** of the replaceable end sections **33**. The recesses **37** are further formed with grooves **37'** beneath the end margins of the resilient deformable pads **32**, as shown in FIGURE 7, said grooves **37'** receiving locking tongues or ribs **34'** formed on the edges of the base members **34**. The base members **34** are formed with securing apertures which register with the securing apertures of the main base strips **31** and which receive the fastening screws **38** for securing the strip assemblies to the core **12**. The arrangement of FIGURES 6 and 7 is for conditions where the end portions of the rollers receive maximum wear so that ordinarily only the end portions of the resilient deformable coating surfaces of the rollers are worn or damaged. With the arrangement shown in FIGURES 6 and 7 it is not necessary to replace entire longitudinal strip assemblies **30**, but merely the end portions of said assemblies, namely, the sub-assemblies **33**. Thus, whenever the resilient deformable elements **35** of the sub-assemblie **33** become damaged, they may be readily replaced by unfastening the associated screws **38**, allowing the sub-assemblies to be easily removed and replaced by new sub-assemblies **33**.

The longitudinal strip assemblies **30** may be made with or without the detachable end segments **33**, as desired, and member **31** may therefore be of uniform thickness for the full length thereof instead of being recessed at **37**.

The rollers shown in FIGURES 6 and 7 are particularly intended for use in coating sheets of tin plate which are to be subsequently used for stamping out circular can ends, and therefore the edges of the strip assemblies **30** and **33** are given a suitable configuration to assure continuous coating surfaces at the areas which will contain the circular shapes to be stamped out of the coated tin plate sheets. Experience has indicated that the end portions of the resilient deformable external layers of the rollers tend to wear more rapidly than the inner portions, whereby the arrangement of FIGURES 6 and 7 allows much more economical utilization of the main segments **30** by making it possible to replace the end portions **33** of the longitudinal strip assemblies of the roller.

FIGURE 8 diagrammatically illustrates the manner in which rollers according to the present invention are employed in a conventional tin plate coating machine. The coating material, shown at **40** is deposited between a pair of distributing rollers **41** and **42**, the roller **42** being located longitudinally adjacent to a coating roller, designated generally at **44**, constructed in accordance with any of the forms of the present invention above described. Thus, the roller **44** is provided with the replaceable longitudinal external segments, for example, the segments **14** illustrated in FIGURES 1, 2 and 3. The sheet of tin plate to be coated, shown at **45**, is received between the coating roller **44** and a subjacent supporting roller **46**. The material **40** is distributed by way of roller **42** to the coating roller **44**, which in turn distributes the coating material onto the top surface of the sheet of tin plate **45**.

Because of the provision, in the embodiment of FIGURES 4 and 5, of the generally serrated interfitting arrangement of the strip members **30** and of the replaceable end strip segments **33**, the strip members provide a mutually interlocking effect on each other, minimizing relative movements of the strip segments with respect to the core **12** and providing smoothly balanced rolling action. Because of the serrated configuration of the abutting strip edges, any tendency for the resilient deformable material to deform or bulge at said edges is minimized.

It will be apparent that within the spirit of the present invention, replaceable quick-change outer surface sections as above described may be employed on types of roller cores used in tin plate coating machinery other than those specifically described and illustrated herein.

While certain specific embodiments of improved coating rollers for applying coatings to tin plate have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. A coating roller comprising a rigid cylindrical main body, a plurality of longitudinally extending, arcuately shaped metal strips detachably secured on said main body in side-by-side contiguous relation and having convex outer surfaces, respective outside layers of resilient deformable material bonded on the convex outer surfaces of said metal strips, additional relatively short, metal strip members detachably secured on the end portions of said first-named metal strips, and respective additional outside layers of resilient deformable material bonded on the outer surfaces of said additional metal strip members and being substantially flush with the first-named outside layers.

2. A coating roller comprising a rigid cylindrical main body, a plurality of longitudinally extending, arcuately shaped metal strips detachably secured on said main body in side-by-side contiguous relation and having convex outer surfaces, respective outside layers of resilient deformable material bonded on the convex outer surfaces of said metal strips, said longitudinally extending metal strips being formed at their ends with recesses, additional metal strip members detachably secured in said recesses, and respective additional outside layers of resilient deformable material bonded on said additional strip members and being substantially flush with the first-named outside layers.

3. A coating roller comprising a rigid cylindrical main body, a plurality of longitudinally extending, arcuately shaped metal strips detachably secured on said main body in side-by-side contiguous relation and having convex outer surfaces, respective outside layers of resilient deformable material bonded on the convex outer surfaces of said metal strips, said longitudinally extending metal strips being formed at their ends with recesses, additional metal strip members detachably secured in said recesses, and respective additional outside layers of resilient deformable material bonded on said additional strip members and being substantially flush with the first-named outside layers,

said first-named outside layers overlying the inner end margins of said additional strip members.

4. A coating roller comprising a rigid cylindrical main body, a plurality of longitudinally extending, arcuately shaped metal strips detachably secured on said main body in side-by-side contiguous relation and having convex outer surfaces, respective outside layers of resilient deformable material bonded on the convex outer surfaces of said metal strips, said longitudinally extending metal strips being formed at their ends with recesses, additional metal strip members detachably secured in said recesses, and respective additional outside layers of resilient deformable material bonded on said additional strip members and being substantially flush with the first-named outside layers, said metal strips and additional metal strip members and the resilient deformable outer layers having interfitting, generally serrated edges.

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