VENTILATING SPACER AND METHOD

Samuel P. Crase, Great Neck, and Stephen D. Kent, New-
back, N.Y., assignors to Alpha Research Corp., New
ork, N.Y., a corporation of New York

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This invention relates to ventilating seat spacers and par-
ticularly to the structure and manufacturing of that type
in which upright coils are arranged in rows to form an
inner unit and the unit is covered with foraminous
material.

In our copending application Serial No. 744,830, now
Patent No. 2,954,076, is disclosed a spacer wherein the
“bearing area” at the surface against which the body of
the user is pressed, is enlarged by plastic extensions for
covering thereto, which is done by dipping the coils into a
viscous plastic to coat said parts with an excess of plastic
and to form a gob, and then flattening and spreading the
gob to form extensions of the coating, which extensions are
largely of haphazard or indeterminate outline. The edge
portions of the cover for the unit are usually enclosed in and stitched to binding tape.

Instead of merely flattening and spreading the excess
plastic of the coating or adding a preformed sheet to
flattened extensions of indeterminate outline as con-
templated by said application, the present invention is directed to
the control of the shapes, sizes, colors and arrange-
ments of those elements of the cover which become
coalesced with the coil coatings and with each other, the
invention being also directed to control of the shapes,
sizes and arrangement of the openings between the ele-
ments of the cover, so as to make it possible to dispense
completely with the usual separate foraminous cover for
the rows of coils, as well as with the usual edge binding,
thereby to form a new kind of plastic cover molded in
situ and optionally having imperforate bearing areas of
predetermined designs, sizes and colors integrally joined
to perforated areas or netting of any pattern in an almost
unlimited range and completely controlled as to the major
characteristics thereof.

The invention further contemplates the provision of a
ventilating spacer of pleasing appearance in which the
coiled inner unit is adhesively secured by the coating
formation thereon to an integral plastic top cover molded
with perforations therethrough of predetermined shapes,
sizes and arrangement to form a net-like decorative sheet
with or without imperforate areas also of predetermined
shapes, sizes and arrangement, the cover thereby main-
taining the coils of the unit against relative displace-
ment and increasing the bearing area of the spacer to any
desired extent at the places where the greater part of the
load is concentrated, while providing sufficient perfora-
tions for adequate ventilation where such ventilation is
most needed, and preferably having open side and end
edges for increased ventilation.

The invention further contemplates the provision of
a method for making the spacer including the steps of
partially coating the coils with plastic, inserting plastic
in a mold of the desired net-forming pattern and resting
the coil unit on the surface of the mold before the coated
plastic or the molded plastic has set so as to weld or
integraisly join or cause to coalesce the coating and the
molded plastic at the points where they come into con-
tact, whereby the molded cover is provided with inwardly
extending formations embracing the coils.

The various objects of the invention will be clear
from the description which follows and from the draw-
ings which:

FIG. 1 is a top plan view of a seat spacer to which the
invention has been applied, showing the plastic cover for
the inner unit molded in a net design having diamond
shaped openings, with decorative imperforate areas adja-
cent those portions subjected to the greatest stress or wear.

FIG. 2 is an enlarged fragmentary bottom plan view
of a corner of the spacer of FIG. 1, showing a form of
the unit employing a border wire and border coils and
having parallel spacing rows of coils.

FIG. 3 is a fragmentary elevational view, partly in
cross section, of a modified form of the inner unit in
which the border wire is omitted, the coils being shown
coated and arranged with the coating in contact with
and joined at random to a cover-forming molded plastic
member prior to the removal of the member from the
mold cavities.

FIG. 4 is a fragmentary perspective view of the spacer
in upside down position as it comes off the mold, show-
ing a modified form of the net-forming part of the cover
and showing the coated parts of the coils in each row
arranged in contact with a line element of the net-like
cover.

FIG. 5 is a top plan view of a modified form of the
molded cover showing various forms, sizes and spacing
of perforations in the cover combined with an imper-
forate decorative area in the form of a letter or initial,
the inner coil unit being omitted for clarity.

FIG. 6 is a fragmentary perspective view of a suggested
mold, illustrating some possible variations in the design
and arrangement of the mold cavities used to form the
cover preparatory to the attachment thereof to the plastic
formations on the inner unit.

FIG. 7 is a perspective view of a coated coil before
its attachment to the cover showing the sleeve-like coating
encasing the bottoms of the coils, the thickness of the
coating being exaggerated, and showing the increased
flattened bearing area at the tops of the coils opposite
the coating.

It should be noted that the invention may be effecti-
vely applied to any preferably preassembled unit made of
rows of coils, whether such unit includes a border wire
as 10 (FIG. 2) or merely a border coil 11 (FIG. 3) to
which the ends of the coiled rows as 12 are attached
in any suitable manner, or whether the unit includes both
border wire and border coil, or whether the individual
coils are generally circular or flattened, or made of wire
or plastic or other suitable material.

In the form of the invention shown in FIGS. 1 and 2,
the border wire or frame 19 carries the border coil 11.
A series of rows 12 of preferably continuous coils, are
arranged to span the space between opposite sides of the
border frame and may be wound around said frame or
otherwise attached thereto and to intersecting similar rows
in a known manner. The preassembled unit including
the coils and border can be readily manipulated for fur-
ther processing and the flattened plastic extensions 14
optionally formed on those parts of the individual coils
which later become arranged at the bottom of the spacer
shown upside down in FIGS. 3 and 7. The extensions
have been omitted from FIG. 2 for clarity of illus-
tration, but they may optionally be formed on the coils
by coating the coils with excess material and flattening
the excess as disclosed in said Patent No. 2,954,076.

In case such extensions 14 are employed on what are
later to be the bottom parts of the coils as shown in
FIGS. 3 and 7, the coating and the extensions thereof are
followed to set or are set by heat before the associated
plastic cover 15 or 28 on the opposite or top parts of the
coils and soon to be described, is set, to avoid inter-
ference with the formation of the spacer.

The cover as 15 (FIGS. 1—3) is preferably molded in
the form of a one piece net having ventilating perfora-
tions 16 therein of any desired size, shape and arrange-
ment, and the line elements or intersecting bands or
strips of the net may even have different colors at different parts hereof. As shown, the perforations are diamond shaped and the line elements or bands, 17, 18, of the net are straight and integrally joined at the respective intersections thereof. At the edges of the cover, 5 said line elements merge into a relatively wide strip-like imperforate annular border 19 forming a frame-like edging. The border is preferably thickened at its outer periphery to form the reinforcing edge bead 20 which is sufficiently thick, wide and strong to withstand the stresses put upon the spacer. The cover is formed, if desired, with decorative areas so shaped and proportioned as to strengthen the net where wear is concentrated, without materially affecting the ventilating properties of the cover. In FIG. 1 is shown an imperforate molded annular strip 21 surrounding the central part of the spacer. Such strip may be superimposed, if desired, on and integrally joined to the net elements or bands, 17, 18, to close certain perforations, or the net elements may be omitted at the strip and at similar imperforate areas. In the space enclosed by the strip 21 are shown decorative strengthening areas 22 where the greatest pressure is applied to the spacer. As will later be explained, differently colored plastic may be used for the strip 21, for the areas 22 and for any or all of the net elements, 17, 18, to obtain the decorative color effect desired. The design elements or patterns or repetitive motif of such areas as well as of the net elements may also be controlled varied in a wide range.

In FIG. 5, the imperforate area 25 is shown in the form of the letter A, the perforations 26 are relatively small and rectangular within the A and larger and circular outside of the A merely to indicate some of the variations possible. The line elements or bands are shown wider in some places than in others.

As has been previously mentioned, the net cover is integral with the relatively thin plastic coating 27 on the tops of the coils of the net and welded thereto or allowed to coalesce therewith while the coating and the cover are in a relatively thick viscous state to provide inwardly extending formation on the cover. In FIG. 4, the pattern selected for the net 28 and the spacing and arrangement of the rows 12 are such that the plastic coating or formations 27 on each coil of each row is tangent to one of the parallel net lines or elements 29 to attain the maximum number of spaced points of contact between the coating formations on the coils and the net. The net elements 30 are shown perpendicular to the main surface substantially square perforations 31. In FIG. 2, however, the various coating formations make contact at random with the net lines, there being no predetermined relation between the controlled molded pattern of the net elements and the arrangement of the rows or pitch of the coils thereof. However, it should now be clearly that by determining and employing such definite relation and pitch, the coils may be concealed more or less and minimum areas of adhesion of the coils to the cover attained as well as the greatest number of coil-embracing formation projecting inwardly from the cover.

While it is possible to preform a complete cover 15 in various ways as by injection molding, die forming, casting or other known methods and later to attach the thus formed and set cover to the coils, it is preferred to mold the cover in a suitable mold as 35 (FIG. 3) or 36 (FIG. 6) or the like and to utilize the coating 27 to secure and hold the rows and the cover against relative or displacing movement.

The coating 27 is formed by dipping the outermost parts of the rows 12 of coils or of the unit into a viscous plastic of the flexible type such as vinyl plastisol, in which the plasticizer controls the consistency or viscosity and setting time. Hot melts or relatively quick setting organics or rigidizers of the proper consistency may be employed if desired for the coating and the cover, 75 it being desirable that the setting time be relatively short and controllable, that the material be liquid or semi-liquid at reasonable coating temperatures, and that the plastic be not brittle were set.

The depth of the dip is shallow and just beyond the diameter of the coil material so that the lowermost parts of the coils, which are latter reversed, and the uppermost parts, are just covered and little or no excess plastic adheres to the coils. As shown in FIG. 3, the thus coated rows of coils are then placed on the top surface of a mold as 35, the cavities of which have been previously filled with plastic, preferably of the same type as the coating 27, which plastic has not set, the uppermost surface 37 of the mold having been cleared and freed of plastic. Wherever the coating comes into contact with the plastic in a mold cavity, that is, wherever the coating and cover are tangent to each other, the coating merges, welds or coalesces with the plastic in the mold and becomes integrally therewith. Consequently, when the coating and molded cover become set, the spacer is finished. By moving the unit from the mold, the adhered cover 15 is also removed with the coils. To make such removal easy, the surfaces of the mold including those of the cavities, may be coated with a material to which the plastic does not adhere well, such as wax, oil, grease or a silicone or other film.

The coating 27 may be of any desired color, but a color not in contrast with those selected for the cover 15 is preferred in order to render the coils as inconspicuous as possible. However, the plastic applied to the mold to form the cover may be of different colors at different places for decorative purposes. Each colored plastic is applied to the appropriate part of the mold in a layer thick enough to fill the selected cavities, as by means of rollers, brushes or other suitable applying tools. The uppermost surface of the mold inevitably becomes coated with some plastic during such operation. For example, the edge bead-forming cavity 41 may be filled with plastic colored red, the border strip cavity 42 with blue plastic, the net element cavity 43 with plastic of a third color, the perpendicular net element cavities 44 with a fourth colored plastic and the imperforate strip forming cavity 45 with a plastic of a fifth color. Any undesired plastic deposited on the mold surfaces 40, regardless of its color, is removed as by a suitable scraping tool such as a doctor blade or squeegee moved across the mold to leave only plastic of the cavity colors in the bottom parts of the mold. Such bottom plastic becomes the outer visible surface of the cover when the thus molded cover is removed together with the coated unit, from the mold.

It will now be understood that by molding the plastic cover, it can be made in various decorative designing perforated ventilating parts with imperforate parts to attain added strength where such strength is needed, to eliminate studding and edge binding, to create inwardly extending integral formations thereon embracing the coils and thereby maintaining the rows in place, and adequately to attain the objects of the invention.

While certain specific embodiments of the invention have herein been shown and described, various obvious changes may be made therein without departing from the spirit of the invention defined by the appended claims.

We claim:

1. A decorative ventilating spacer comprising an inner spacing unit having rows of coils arranged with the axes of the coils in a plane substantially parallel to the general plane of a face of the spacer, decorative molded plastic cover and coil connecting material for the tops of said coils, molded in a predetermined pattern, the pattern comprising spaced apart strip-like band elements, each element have smooth side edges and a flat under surface substantially coplanar with the tops of the coils,
plastic means for securing the elements tangentially to arcuate lengths of the top portions of the coils only at each of those points where an element meets a top of a coil,
the remaining parts of the elements being free of the coils,
said means comprising a sleeve-like plastic coating on each of said arcuate lengths,
the bearing area of the spacer comprising said elements together with auxiliary bearing points at the places where the coated coil tops are free of the elements and are arranged at the spaces between elements and below the upper surface of the elements.

2. The decorative spacer of claim 1, the pattern further comprising areas of controlled predetermined decorative configuration.

3. The decorative spacer of claim 1, at least one of the elements of the pattern being in generally annular form.

4. A decorative ventilating spacer comprising an inner spacing unit having rows of coils arranged with the axes of the coils in a plane substantially parallel to the general plane of a face of the spacer, a decorative plastic cover for and secured to the tops of said coils and having and being adapted to be molded with a predetermined inherent net-like mesh pattern therein, the pattern comprising spaced apart perforations, each having a regular perimeter of predetermined shape and size, and two sets of strip-like band elements, the elements of one set intersecting the elements of the other set and bounding the perforations, the cover having a substantially flat under surface substantially coplanar with the tops of the coils and having an irregular top bearing surface spaced laterally from the under flat surface different distances at different selected areas thereof to provide different thicknesses in the cover at the respective selected areas, and plastic means for securing the molded plastic cover tangentially to arcuate lengths of the top portions of the coils, said means comprising a sleeve-like plastic coating on each of said arcuate lengths having substantially line contact with said elements, said coating and cover being of material adapted to coalesce while in a plastic state and when brought into tangential contact with each other, the unit having auxiliary bearing points where the coated tops of the coils are arranged under the perforations.

5. The method of making a decorative ventilating spacer comprising inserting a first plastic material in a plastic state into a mold having continuous channel-like cavities therein between raised portions, wiping from off the raised portions of the mold any surplus plastic material thereon, bringing into contact with the first plastic material coils with second plastic material thereon while at least one of said first and second plastic materials is in a soft moldable adhesive condition, and maintaining said first and second plastic materials in contact for a sufficient time to fuse together and set said materials.

References Cited in the file of this patent
UNITED STATES PATENTS