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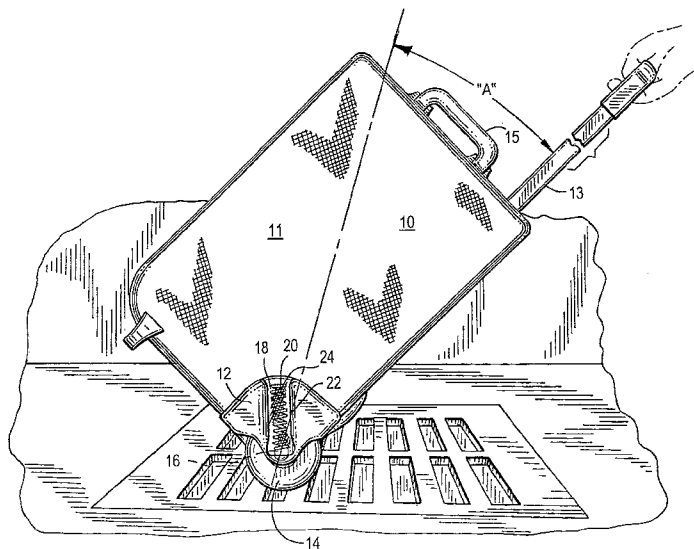
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(54) Title: SHOCK ABSORBING WHEEL HOUSING AND WHEEL FOR CARRY CASES SUCH AS COMPUTER CASES, LUGGAGE AND THE LIKE AND CARRY CASE INCORPORATING SAME



(57) Abstract: A device is disclosed for providing shock absorbing, reduced friction rolling movement of carry cases such as computer cases, luggage and the like to reduce shock when the carry case is rolled over an irregular surface. The device includes a wheel housing having means for attachment to at least a portion of the carry case and defining a wheel well for reception of a wheel, the wheel being supported on an axle shaft. A spring housing is positioned on each side of the wheel for reception of a spring, each such spring being supported on a respective spring mount which is in turn supported by the axle shaft. A carry case incorporating such device is also disclosed.

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**SHOCK ABSORBING WHEEL HOUSING AND WHEEL FOR CARRY CASES
SUCH AS COMPUTER CASES, LUGGAGE AND THE LIKE AND
CARRY CASE INCORPORATING SAME**

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to devices for providing shock absorbing rolling support for carry cases and the like. In particular, the invention relates to a shock absorbing wheel housing with visible shock spring, and wheel supported thereby, for carry cases such as computer cases, luggage and the like for protecting the contents of the carry case from shock while travelling over irregular surfaces.

2. Description of the Related Art

Carry cases such as computer cases, luggage and the like are generally provided with wheels mounted on axles for ease of transport from place to place. The wheels are generally made of a relatively hard material such as urethane or plastic, and are often similar or identical to the wheels used on roller blade devices and skateboards.

In other instances, the carry case is mounted on a wheeled luggage cart which may also incorporate relatively hard, non-shock absorbing wheels.

As a result of the relative hardness of such wheels, tilting the carry case to an angular position relative to the ground, and pulling or pushing it from place to place often subjects

the carry case and the contents to unwanted shock when the ground is of particularly hard material such as concrete or pavement, and when the ground is bumpy and uneven. Such shock is particularly unacceptable for delicate equipment such as personal computers or the like.

In the prior art, the issue of providing wheels with spring devices is generally known. However, none of the known systems provides a shock absorbing wheel housing for carry cases which facilitates relatively low friction, smooth rolling motion for the carry case, with significantly reduced shock so as to protect the items therein from shock forces.

We have invented a wheel housing and wheel combined with resilient spring members, one of which is visible through a transparent window, which provides optimum shock absorbency for carry cases, particularly computer cases, luggage and the like, while significantly reducing rolling function. The combination of the wheel housing and resilient spring members is particularly configured and arranged to optimize the absorption of shock, while minimizing rolling friction through the use of spring mounts.

SUMMARY OF THE INVENTION

A device for providing shock absorbing rolling movement for carry cases such as computer cases, luggage and the like is disclosed, which comprises a wheel housing having means for attachment to at least a portion of the carry case and defining a wheel well for reception of a wheel, an axle shaft for supporting a wheel in the wheel well with respect to the housing, a wheel rotatably supported by the axle shaft, an elongated spring housing positioned on each side of the wheel for reception of a resilient spring, and at least one elongated resilient spring positioned in each spring housing, at least one end of each spring being in engagement with a spring mount, each spring mount being supported by the wheel axle, such that when the wheel is subjected to forces, the forces are transmitted to the springs to reduce shock to the carry case.

Preferably the resilient springs are elongated coil springs. Furthermore, the wheel housing is preferably made of a moldable plastic material, such as polypropylene, polyurethane, nylon or the like.

The outside spring housing includes a transparent window which permits viewing of the coil spring supported by the spring housing. The transparent window is positioned on the outer side of the carry case when the wheel housing is mounted thereto, to permit viewing of the coil spring when viewing the carry case. The visible coil spring preferably has a distinctive color to identify either line of carry cases, the strength of the spring, or the particular carry case to which the wheel housing is attached. Furthermore, the transparent window is preferably molded polycarbonate. Preferably the spring housing is made of ABS (acrylonitrile butadiene styrene).

A cover for the wheel housing is configured and dimensioned for attachment to the rear side of the wheel housing and has complementary surface portions which correspond in

dimension and shape to surface portions of the wheel housing to facilitate positioning portions of material which form the carry case between the cover and the wheel housing for attachment of the wheel housing to the carry case.

At least portions of the complementary surface portions of at least one of the wheel housing and the cover preferably comprise raised portions which engage the portions of material of the carry case positioned therebetween to facilitate firm attachment of the wheel housing to the carry case by crimping the material therebetween.

The wheel housing further comprises a plurality of screw bosses to facilitate attachment of the cover thereto by screw-type fasteners. The wheel may be made of urethane, hard rubber, plastic or any known materials used in skateboard wheels.

Each spring mount has a support surface for supporting the lower end of a respective spring. Furthermore, each spring mount has a generally transverse aperture for reception of the wheel axle shaft to thereby reduce friction during transmission of forces from the wheel to the springs. Preferably each spring has a linear spring rate. The visible outer spring is preferably colored of a selected color such as red, for example. Each spring is made of spring metal.

Preferably the wheel is supported on the axle shaft by a pair of ball bearings. However one ball or roller bearing can be used.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will be described hereinbelow with reference to the drawings, wherein:

Fig. 1 is a side elevational view of a carry case incorporating a shock absorbing wheel housing and wheel constructed according to the present invention, the carry case traveling over a typical irregular surface such as a sewer grate;

Fig. 2 is a top, front and outside perspective view of a preferred embodiment of the wheel housing and wheel according to the invention, a resilient device such as a coil spring being enclosed in an outer spring housing having a transparent window, the spring housing being molded of ABS plastic and the transparent window being molded of a shock resistant plastic;

Fig. 3 is a top, rear and outside perspective view of the housing shown in Fig. 2;

Fig. 4 is a top perspective inside view from above, of an embodiment of the present invention, illustrating a resilient coil spring on each of the inboard and outboard sides of the wheel, each coil spring being individually housed and providing resilient force to the wheel axle shaft to provide shock absorption to the housing and to thereby carry the case on which it is mounted;

Fig. 5 is a top outside perspective view of the present invention, similar to Fig. 3, showing the resilient coil spring which is enclosed within a spring housing having a transparent window for easy viewing thereof, and extending between the upper wall of the spring housing and the spring mount and wheel axle shaft for shock absorption purposes, the transparent window removed for illustration purposes;

Fig. 6 is a top, front and inside perspective view, of an embodiment of the present invention, showing the wheel housing formed with a moldable polymeric material, and the

resilient device being in the form of a coil spring within the spring housing on the outboard side of the wheel housing and extending between the upper wall of the spring housing and the spring mount and wheel axle shaft;

Fig. 7 is a front and left outside exploded perspective view, with parts separated for illustration purposes, of an embodiment of the invention having a coil spring enclosed within a spring housing having a clear plastic window, and showing the inside housing cover which generally sandwiches the carry case material with the wheel housing for purposes of attachment to the carry case;

Fig. 8 is a right outside elevational view of the wheel housing and wheel according to the invention, illustrating an outer spring housing for enclosing a resilient coil spring and the transparent window which permits viewing of the coil spring as shown;

Fig. 9 is a front elevational view taken along lines 9-9 of Fig. 8;

Fig. 10 is a top perspective view of the wheel and axle shaft and the pair of coil springs in position on each of the respective inboard and the outboard sides of the wheel, the remaining structures being removed for illustration purposes;

Fig. 11 is a partial cross-sectional view taken along lines 11-11 in Fig. 9, and illustrating a portion of material which forms the carry case sandwiched between the wheel housing and cover, the material being crimped thereby;

Fig. 12 is a cross-sectional view taken along lines 12-12 of Fig. 11; and

Fig. 13 is an exploded perspective view, with parts separated for illustration purposes, of the molded plastic housing of the present invention, illustrating the respective positions of each coil spring on each side of the wheel, each spring being positioned in engagement with an appropriate supportive spring mount which is supported by, and in engagement with the axle shaft.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and in particular to Fig. 1, there is illustrated a carry case such as a computer or business case 10, made of a suitable fabric material 11, supported on a wheel housing 12 attached thereto and constructed according to the invention. The housing may be made of suitable polymeric material, preferably moldable, such as polypropylene. Other materials such as polyurethane, nylon or the like can be used. Still other materials such as acrylonitrile butadiene styrene (hereinafter ABS), polycarbonate, polyacetol can be used. Metal is also contemplated for the wheel housing.

Referring again to Fig. 1 in conjunction with Fig. 2, a wheel housing 12 is shown attached at the left rear corner of the carry case. Wheel 14 is supported within wheel well 13 on an axle shaft 16, best shown in Fig. 13, and partially enclosed by the housing 12 as shown. Wheel 14 may be made of polyurethane, sometimes commercially referred to as "urethane". Synthetic rubber such as neoprene or natural rubber, hard or soft, or hard plastic or the like may also be used for the wheels.

Referring again to Fig. 1 in conjunction with Fig. 2, wheel housing 12 includes a spring housing which includes a transparent window 18 through which coil spring 20 is visible, at least partially for esthetic, repair or replacement purposes. Coil springs 20 and 28 are enclosed in spring housings 22 and 30 which are preferably made of ABS because of its strength. Coil springs 20 and 28 extend between upper walls 24 at the upper end of spring housings 22 and 30, and a pair of spring mounts which are supported on the axle shaft 16, and which transmit resilient spring forces between the springs and the wheel with reduced friction, when the wheel 14 is subjected to shock by movement of the carry case 10 over irregular surfaces. In Fig. 1, only one corner is shown. Preferably a housing and wheel is provided at two opposed corners of the carry case, and in some instances, at each of the four

corners of a carry case. The wheel housing on the right rear corner of the carry case is substantially the mirror image of the wheel housing shown in the drawings, with the transparent window being exposed on the opposite side of the case. However, both (or all) wheel housings are functionally identical.

The visible spring 20 can be of a distinctive color, i.e., red, for aesthetic as well as functional purposes. In particular, the visible spring 20 can have a particular color to associate it with a particular line of luggage to thereby provide the user with a ready and quick means of identification of the line of luggage, as well as identifying a particular item of luggage when traveling, such as at an airport luggage retrieval area. The color of the spring can also be used to identify a particular strength of the spring for various size carry cases to individualize the spring to the carry case.

In Fig. 1, extendible handle 13 facilitates moving the carry case 10 from place to place, and pivotable lift handle 15 (shown in the lifting position) facilitates manually lifting the carrying case for manual transport. The handle 15 may also be oriented at 90° (i.e., degrees) from the orientation shown, depending on user preferences.

Referring to Fig. 2 there is shown a front and left side perspective view of the molded plastic wheel housing 12 shown in Fig. 1. In the wheel housing 12 shown in Fig. 2, the spring 20 is enclosed in spring housing 18 which includes a clear or transparent window 22 which permits viewing of the coil spring 20 supported therewithin. The coil spring 20 in Fig. 2 is positioned to engage the upper wall 24 of the spring housing 18 at the upper end, and a support surface 23 on spring mount 17 at the lower end, which in turn is supported on axle shaft 16 to provide resilient spring action against the axle shaft 16 of the housing 12 and to the carry case 10. The inner spring housing 30 and coil spring 28 are identical to the outer spring housing 18 and spring 20, except that the transparent window is replaced by an

opaque cover, since it is not visible to the user:

Spring mounts 17 facilitate smooth transmission of forces from the wheel to the springs, while ball bearings 34, 36 maintain smooth rolling motion for the wheel. Thus the combination of these features provides superior shock absorption and smooth rolling movement while rolling the carry case over irregular surfaces.

In Fig. 2, inner coil spring 28 is contained in inner spring housing 30, which is completely opaque and is preferably made of ABS, i.e., the same plastic material as that of the outer spring housing 18. While the transparent window 22 of the outer coil spring housing 18 shown in Fig. 2 is preferably made of a hard durable shock resistant polycarbonate material to withstand impact forces when transporting the case, the inner coil spring housing 30, and its opaque cover are made of ABS; however, the inner spring housing 30 and its opaque cover can optionally be made of such polycarbonate material. Further the outer housing may alternatively be provided with an opaque shock resistant window.

Fig. 3 is a top, rear and outside perspective view of the shock absorbing wheel housing 12 and wheel 14 shown in Fig. 2. As shown in Fig. 2, wheel 14 is rotatably supported on axle shaft 16 by dual ball bearings 34, 36 having respective inner races which can be press (i.e., interference) fit, or friction fit onto the shaft for providing smooth rotatability to the wheel 14 via the ball bearings. A single ball or roller bearing may optionally be used.

Fig. 4 is a top perspective inside view of the present invention showing the respective spring housings in further detail. Wheel housing 12 supports urethane (or hard rubber) wheel 14 supported by dual ball bearings 34, 36 on axle shaft 16 for rotation. Resilient coil springs 20, 28 are positioned on each side of the wheel 14 respectively, and are enclosed in respective spring housings 18, 26 as shown. Springs 20, 28 each extend between the upper

wall 44, 46 of its respective spring housing 18, 26 at the upper end thereof, and spring mounts 17, which are supported on, and engage axle shaft 16 at the lower end thereof to thereby provide resilient spring action to the axle shaft 16 when the carry case 10 is pulled by handle 13 over an irregular surface as shown in Fig. 1.

Wheel housing 12 includes appropriate internally threaded (or self threading) cylindrical bosses 48 for attachment of a cover 54 shown in Figs. 4, 5 and 7. Cover 54 which will be described in further detail, facilitates attachment of the wheel housing 12 to the material of the carry case 10, and provides protective coverage for the wheel housing and its components. Attachment to the carry case is facilitated by gripping the fabric 11 between the wheel housing 12 and the cover. The fabric 11 is pinched by pincers 50 (or other raised gripping members as shown for example in Fig. 13) to retain the relative position of the wheel housing 12 on the carry case 10. Since the case material is often a woven synthetic fiber such as nylon or polyester, which is laminated with a plastic coating, gripping the material between the wheel housing and the cover is thus easily facilitated by the structures provided in the wheel housing and the cover.

It should be understood that although linear coil springs are illustrated, other resilient devices such as leaf springs, spring washers (i.e., Belleville washers), or even a resilient compressible material may be incorporated into the spring housing without departing from the spirit of the invention.

Referring once again to Fig. 1, it can be seen that the line of resilient force provided by springs 20, 28 is oriented at an angle "A", which is preferably acute, and generally approximately 30° , so that when the carry case 10 is tilted for movement as shown, the direction of spring action is vertical so that the springs 20, 28 is subjected to the most severe forces along the direction of resilient action of the springs. In the case of a coil springs 20,

28 the spring force direction is along the length of the springs. This feature permits the springs 20, 28 to accept direct forces along their length, thus maximizing the life of the springs.

In contrast thereto, if the direction of the spring action were at an angle with respect to upward vertical component forces, by known force resolution techniques, the actual force to which the spring would be subjected would be greater than the actual upward vertical force component, thus reducing the capability of the spring and its life expectancy. This condition will necessarily alter the spring, which must be chosen by design, and will cause premature failure and premature replacement of the spring. As noted, this conclusion is based upon a well known analysis of force resolution which in the present embodiment minimizes the force to which the spring is subjected.

It should be noted and emphasized that it is generally accepted that the angle of tilt of such wheeled carry cases generally falls within a range of between 18 and 35 degrees, but for most users, it is about 30°. Variations in the angle are dependent upon various factors, such as the dimensions of the carry case, the length of the handle, the height of the user and the arm length of the user. Therefore it is important to orient the direction of the spring action of the resilient device in the present invention between 18 and 35°, preferably about 30°. For resilient devices other than linear coil springs, the preferred angle will apply to the actual direction of the resilient force of the resilient device.

Referring to Fig. 5, there is shown a wheel housing 12 according to the present invention, which supports wheel 14 on axle shaft 16 as shown in the previous Figs. In this embodiment, linear coil spring 20 is supported within spring housing 18 having a transparent window 22 so as to be visible through the transparent enclosure. The transparent window 22 has been removed in Fig. 5 to facilitate a full view of the spring 20 and its housing 18.

As in the previous embodiments and descriptions, spring 20 extends between the upper wall 54 of spring housing 18 and the spring mounts 17 which is mounted on, and engages the axle shaft 16 as shown in Fig. 7.

Fig. 6 shows a top, front and inside perspective view of wheel housing 12 constructed according to the invention from the inner side of the carry case, showing the opaque inner spring housing 30 of Fig. 2 which houses the inside spring 28. In this view the wheel housing is attached to fabric 11 which forms the carry case 10 shown in Fig. 1. Fabric 11 is sandwiched between the respective surfaces of the wheel housing 12 and the housing cover 54 which is best shown in Fig. 7. Fabric 11 is firmly secured in position by pincers 50, several typical ones of which are clearly shown in Fig. 6, but which are additionally positioned along common surfaces of the wheel housing 12 and the cover 54, both of which come in face-to-face relation when they are assembled. All additional pincers and raised portions are not shown in the Figs.

As shown in Fig. 7, cover 54 is attached firmly to wheel housing 12 by screws (not shown) which extend through apertures 56 in the cover 54 and are threadedly received in threaded cylindrical bosses 48 shown in Figs. 4 and 5, while fabric 11 is sandwiched between the respective "face-to-face" positioned surfaces of the wheel housing 12 and cover 54.

Fig. 7 shows a front perspective view of the wheel housing shown in the previous Figs., including wheel housing 12, spring 20, spring housing 22 and upper wall 24. Wheel housing cover 54 is configured and dimensioned to be positioned in face-to-face relation with the rear (or inner) side of the wheel housing 12. Wheel housing cover 54 provides protection for the inner side of the wheel housing 12, and additionally, it provides a means to attach the wheel housing 12 to the carry case 10 by sandwiching the material 11 forming the carry case 10 between the respective face-to-face surfaces of the wheel housing 12 and the cover 54.

Figs. 8 and 9 are illustrative of this assembly, except the cover 54 is not shown in these Figs.

Most carry cases are made of woven fabrics which are coated either with PVC backing or laminated with EVA (i.e., ethylene-vinyl acetate) foam and polyurethane coating. The woven fabrics may be nylon or polyester or the like. The coating material assists to enhance the grip on the fabric provided by the clamping techniques between the surfaces of the wheel housing and the cover 54.

In order to provide better gripping of the fabric or other material which may form the carry case 10, the surfaces of both the wheel housing 12 and the cover 54 includes raised portions 59 or the like shown in Fig. 7. Such raised portions actually pinch or grip the fabric when it is sandwiched between the respective opposed surfaces of the housing 12 and the cover 54 when they are permanently attached by screws (not shown). Such screws generally extend through apertures 56 of cover 54 and are threadedly engaged by cylindrical bosses 48 in the wheel housing 12 as shown in Fig. 5. Bosses 48 can either be pre-threaded or self-threading. When thus assembled, the wheel housing 12 is permanently and fixedly attached to the carry case 10 as shown in Fig. 9. Fastening devices and techniques other than screws can be used.

Fig. 10 is a perspective view from above, of the wheel 14 and the action of dual coil springs 20 which engage spring mounts 17, which in turn receive and engage the axle shaft 16 of the wheel 14 in accordance with the present invention. The actual housing is removed in Fig. 10 for illustration purposes. As shown in Fig. 10, upwardly extending guide plates 56, 60 are positioned adjacent the coil springs 20 to guide the springs and prevent distortion thereof as they are alternately compressed and extended while the carry case 10 traverses an irregular surface.

Fig. 11 is an elevational view, partially in cross-section, taken along lines 11-11 of Fig. 9, showing the fabric 11 of the carry case 10 gripped by the raised portion 59 on cover 54, which raised portion additionally incorporates sharp pincers 60 to pierce the fabric 11 of carry case 10 as shown in Figs. 11 and 12.

Fig. 12 is a cross-sectional view taken along lines 12-12 of Fig. 11.

Referring now to Fig. 13, there is illustrated the various components and the assembly of the wheel housing 12 and its related components. In Fig. 13, there is shown an exploded view with parts separated for convenience of illustration, of the wheel housing 12 and wheel 14 of the present invention. As shown in the previous Figs., wheel housing 12 supports wheel 14 on axle shaft 16, which is fixed in position by screw 62, which is inserted into an aperture 15 in the spring mount 17 and then into threaded aperture 19 in axle shaft 16. This spring mount and axle arrangement provides independent transmission of forces without adversely affecting rolling movement of the carry case. Axle shaft 16 may be of any strong material, such as metal, plastic or the like. Inner and outer ball bearings 34, 36 are respectively press fit into wheel 14 on each side into opening 21, and the inner races of each bearing is either slidably or press fit onto axle shaft 16 to provide smooth rolling rotation to wheel 14 when the carry case is transported over a surface. While press fitting the inner races of bearings 34, 36 may be preferred, it has been found that with the forces encountered by most carry cases, a loose fitting inner race/axle shaft relationship is acceptable.

In Fig. 13, spring housings 22, 30 receive and support the springs 20, 28 as they are supported at the lower end by support surfaces 23 of spring mounts 17 and at the upper ends by upper walls 24 of the spring housings 22.

While dual coil springs 20 are preferred, one coil spring 20 may be incorporated into only one of the spring housings, preferably the outer spring housing. Alternatively, other

resilient devices may be used in place of the coil springs. The coil springs 20, 28 may be made of any conventional spring material and may or may not be linear, depending upon the particular application. A linear coil spring provides a linear spring rate, i.e., the relationship between the force and the direction.

The color of the spring can be used to identify either the strength of the spring (i.e., for various sizes of carry cases), or the line of carry cases associated with a particular color. In addition, the color of the spring can assist the user to retrieve the carry case at luggage terminals and the like.

While specific embodiments of the invention have been shown and described in detail to illustrate the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

CLAIMS

WE CLAIM:

1. A device for providing shock absorbing rolling movement for carry cases such as computer cases, luggage and the like, which comprises:
 - a) a wheel housing having means for attachment to at least a portion of the carry case and defining a wheel well for reception of a wheel;
 - b) an axle shaft for supporting a wheel in said wheel well with respect to said housing;
 - c) a wheel rotatably supported by said axle shaft;
 - d) an elongated spring housing positioned on each side of said wheel for reception of a resilient spring; and
 - e) at least one elongated resilient spring positioned in each said spring housing, at least one end of each said spring being in engagement with a spring mount, each said spring mount supported by said wheel axle shaft, such that when said wheel is subjected to forces, the forces are transmitted to said springs to reduce shock to the carry case.
2. The device according to Claim 1, wherein said resilient springs are elongated coil springs.
3. The device according to Claim 2, wherein said housing is made of a moldable plastic material.
4. The device according to Claim 3, wherein said moldable plastic material is at least one of polypropylene, polyurethane and nylon.
5. The device according to Claim 4, wherein at least one of said spring housings includes a transparent window which permits viewing of said coil spring supported by said spring housing.

6. The device according to Claim 5, wherein said spring housing having said transparent window is positioned on the outer side of said carry case when said wheel housing is mounted thereto, to permit viewing of said coil spring when viewing said carry case.

7. The device according to Claim 6, wherein said visible coil spring has a distinctive color to identify at least one of a line of carry cases, the strength of said spring, and the particular carry case to which the wheel housing is attached.

8. The device according to Claim 7, wherein said transparent window is molded polycarbonate.

9. The device according to Claim 8, where each said spring housing is made of ABS (acrylonitrile butadiene styrene).

10. The device according to Claim 9, further comprising a cover for said wheel housing, said cover being configured and dimensioned for attachment to the rear side of said wheel housing and having complementary surface positions which correspond in dimension and shape to surface portions of said wheel housing to facilitate positioning portions of material which form said carry case between said cover and said wheel housing for attachment of said wheel housing to said carry case.

11. The device according to Claim 10, wherein at least portions of said complementary surface portions of at least one of said wheel housing and said cover comprise raised portions which engage said portions of material of said carry case positioned therebetween to facilitate firm attachment of said wheel housing to said carry case by crimping said material therebetween.

12. The device according to Claim 11, wherein said wheel housing further comprises a plurality of screw bosses to facilitate attachment of said cover thereto by screw-

type fasteners.

13. The device according to Claim 12, wherein said wheel is made of at least one of urethane, hard rubber and plastic.

14. The device according to Claim 13, wherein each said spring mount has a surface for supporting the lower end of said respective spring.

15. The device according to Claim 14 wherein each said spring mount has a generally transverse aperture for reception of said wheel axle to thereby reduce friction during transmission of forces from said wheel to said springs.

16. The device according to Claim 15, wherein each said spring has a linear spring rate.

17. The device according to Claim 16, wherein said visible outer spring is colored.

18. The device according to Claim 17, wherein said color is red.

19. The device according to Claim 17, wherein each said spring is made of spring metal.

20. A carry case such as a computer case, luggage and the like, which comprises:

a) a case defining an interior space having a volume sufficient for storage of articles;

b) a wheel housing having means for attachment to at least a portion of said case and defining a wheel well for reception of a wheel;

c) an axle shaft for supporting a wheel in said wheel well with respect to said housing;

d) a wheel rotatably supported by said axle shaft;

e) an elongated spring housing positioned on each side of said wheel for reception of a resilient spring; and

f) at least one elongated resilient spring positioned in each said spring housing, at least one end of each said spring being in engagement with a support surface on said spring mount, each said spring mount having a generally transverse aperture for reception of said wheel axle shaft, such that when said wheel is subjected to forces, the forces are transmitted to said springs to reduce shock to said case.

21. A carry case such as a computer case, luggage and the like, which comprises:

- a) a case defining an interior space;
- b) a wheel housing having means for attachment to at least a portion of said case and defining a wheel well for reception of a wheel;
- c) an axle shaft for supporting a wheel in said wheel well with respect to said housing;
- d) a wheel rotatably supported by a pair of ball bearings on said axle shaft;
- e) an elongated spring housing positioned on each side of said wheel for reception of a resilient spring;
- f) at least one elongated resilient spring positioned in each said spring housing; and
- g) a pair of spring mounts each respectively having a support surface for supporting the lower end of each said spring, each said spring mount having a generally transverse aperture for reception of said wheel axle; such that when said wheel is subjected to forces, the forces are transmitted to said springs to reduce shock to said case.

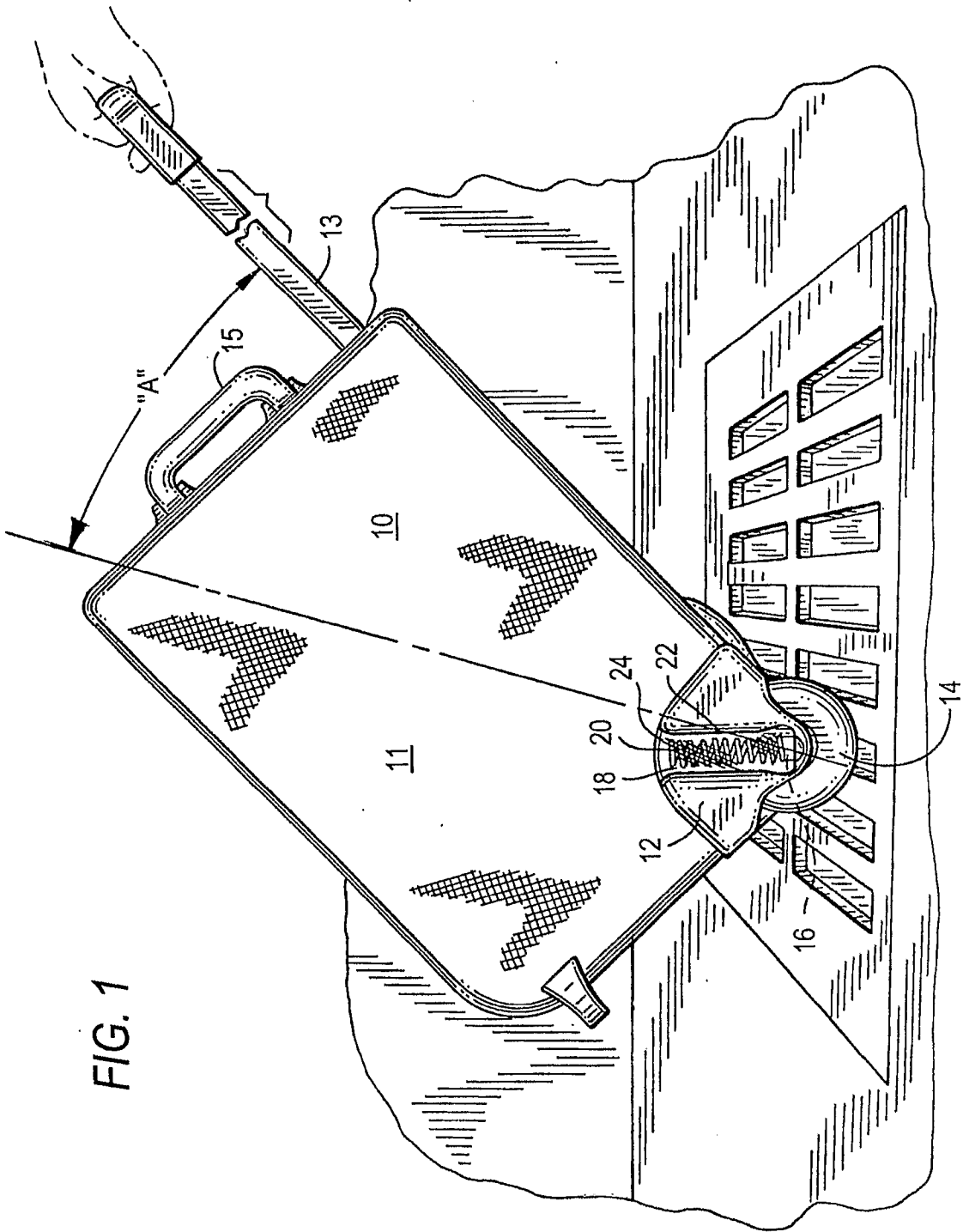


FIG. 1

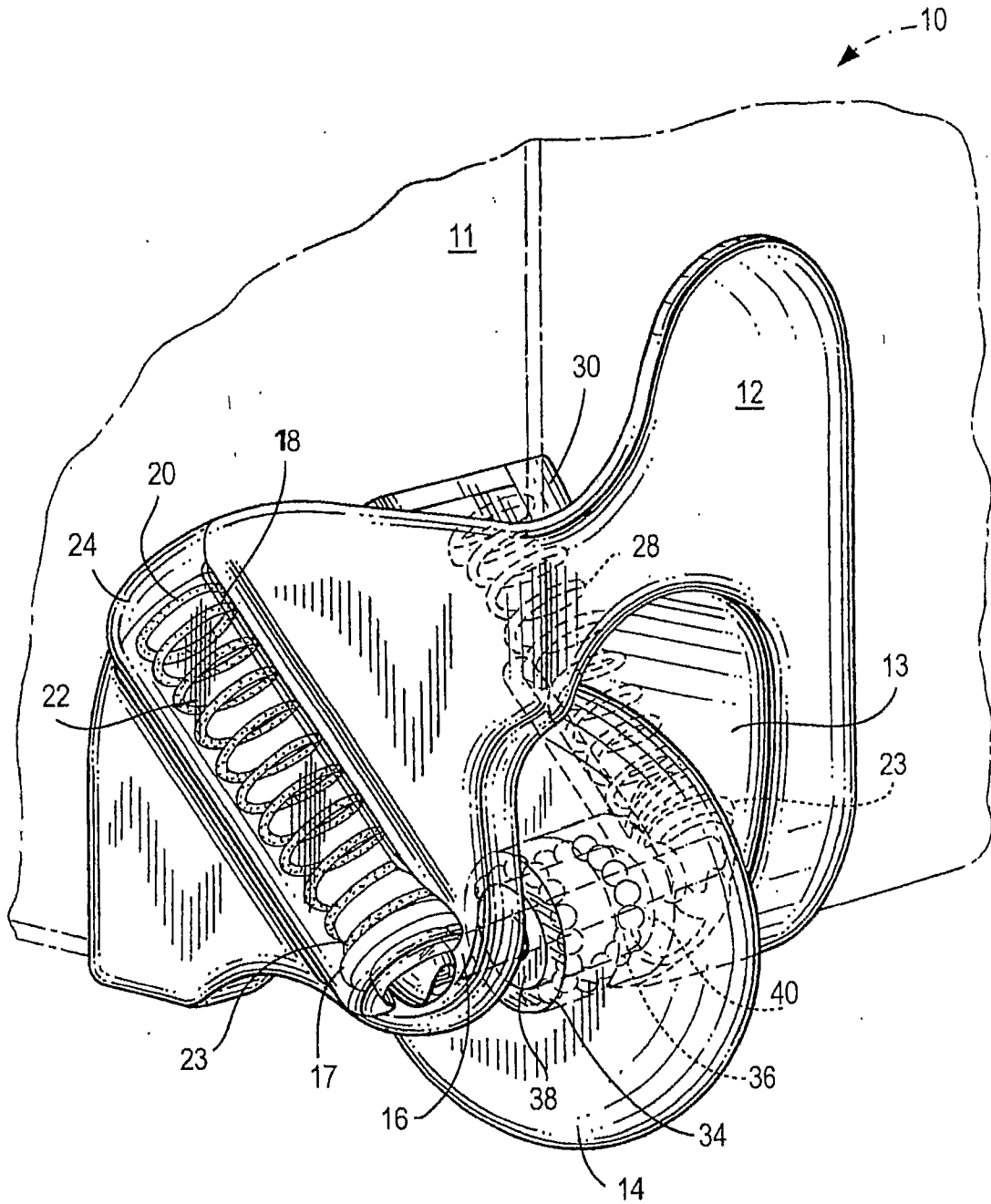


FIG. 2

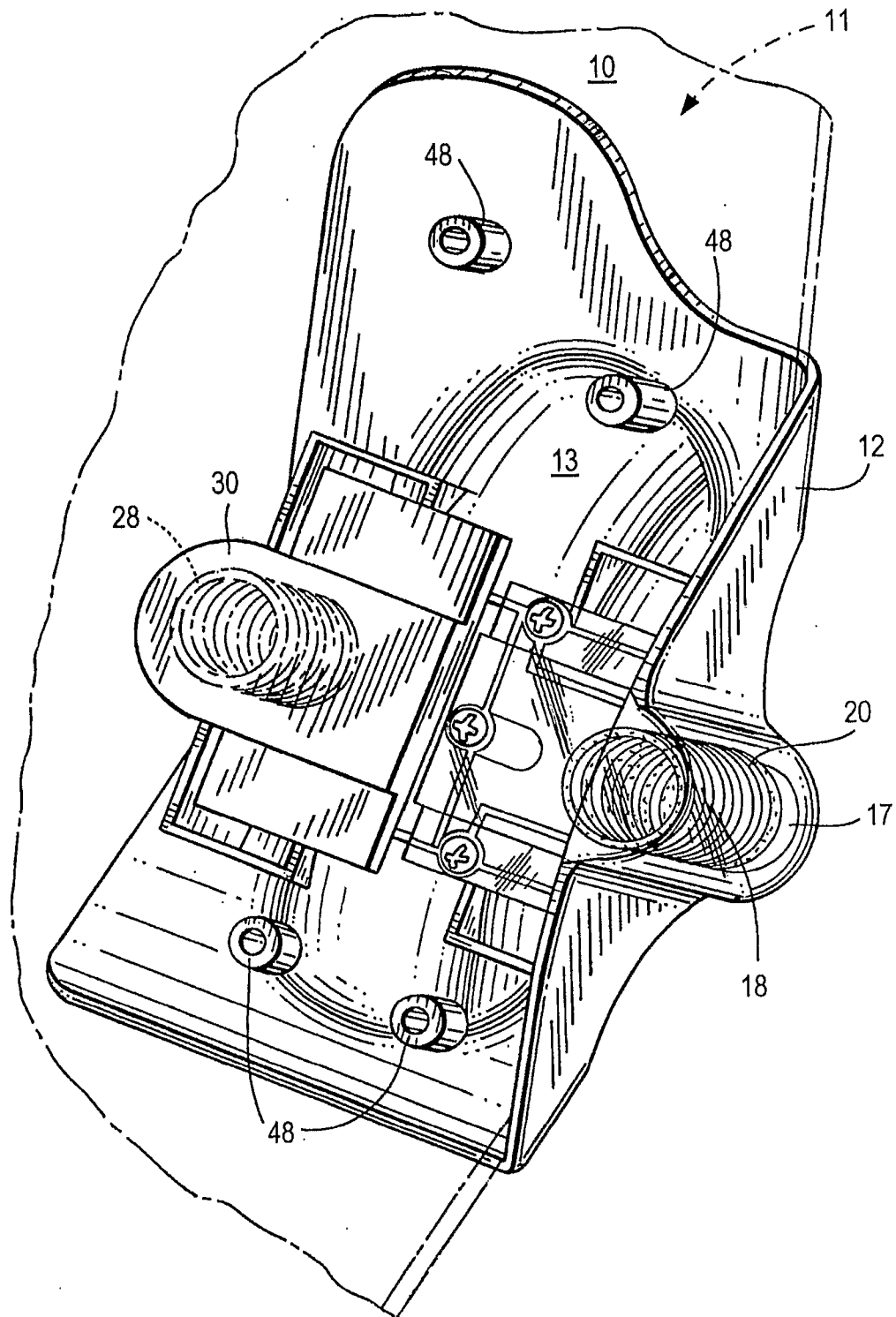


FIG. 3

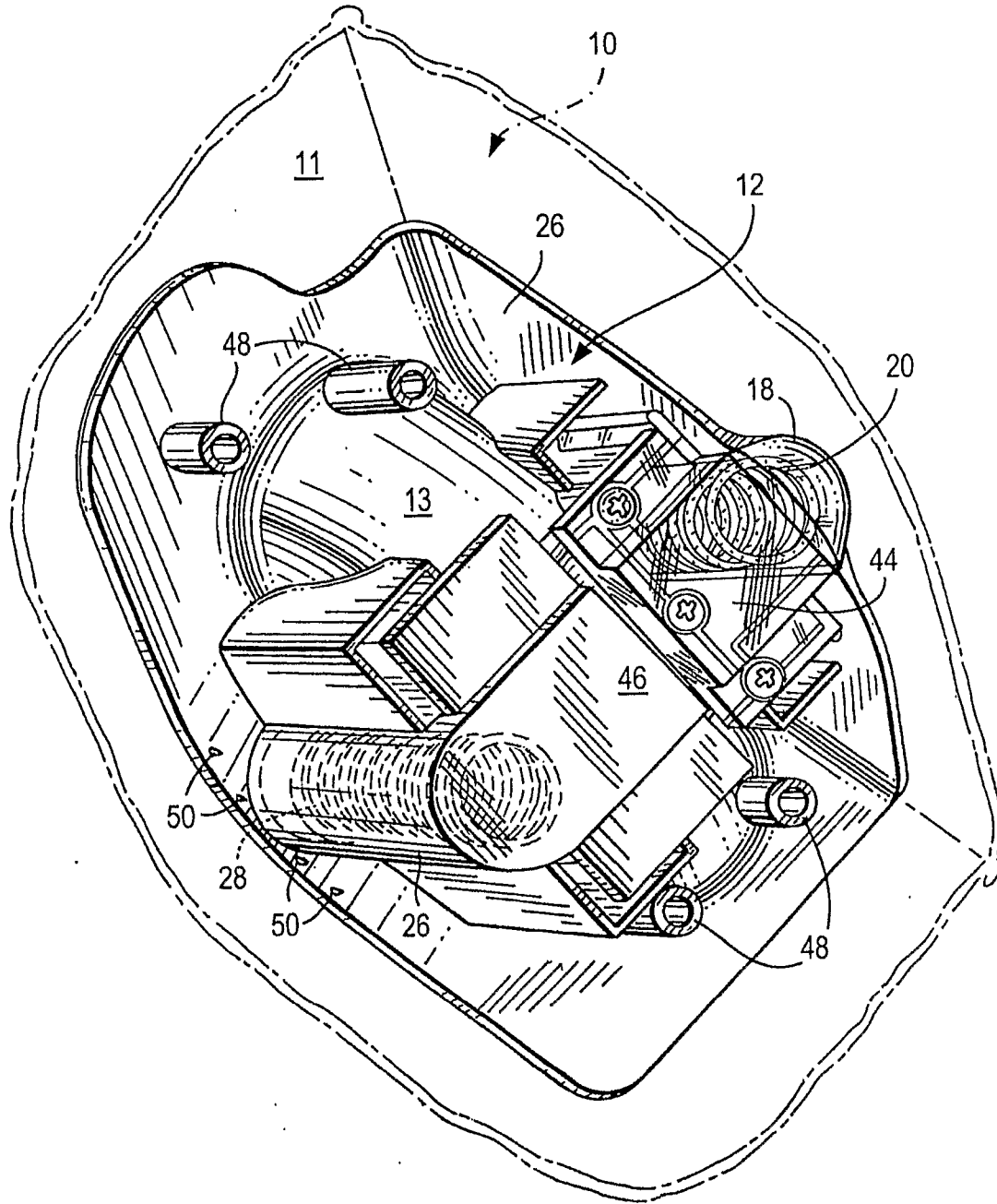
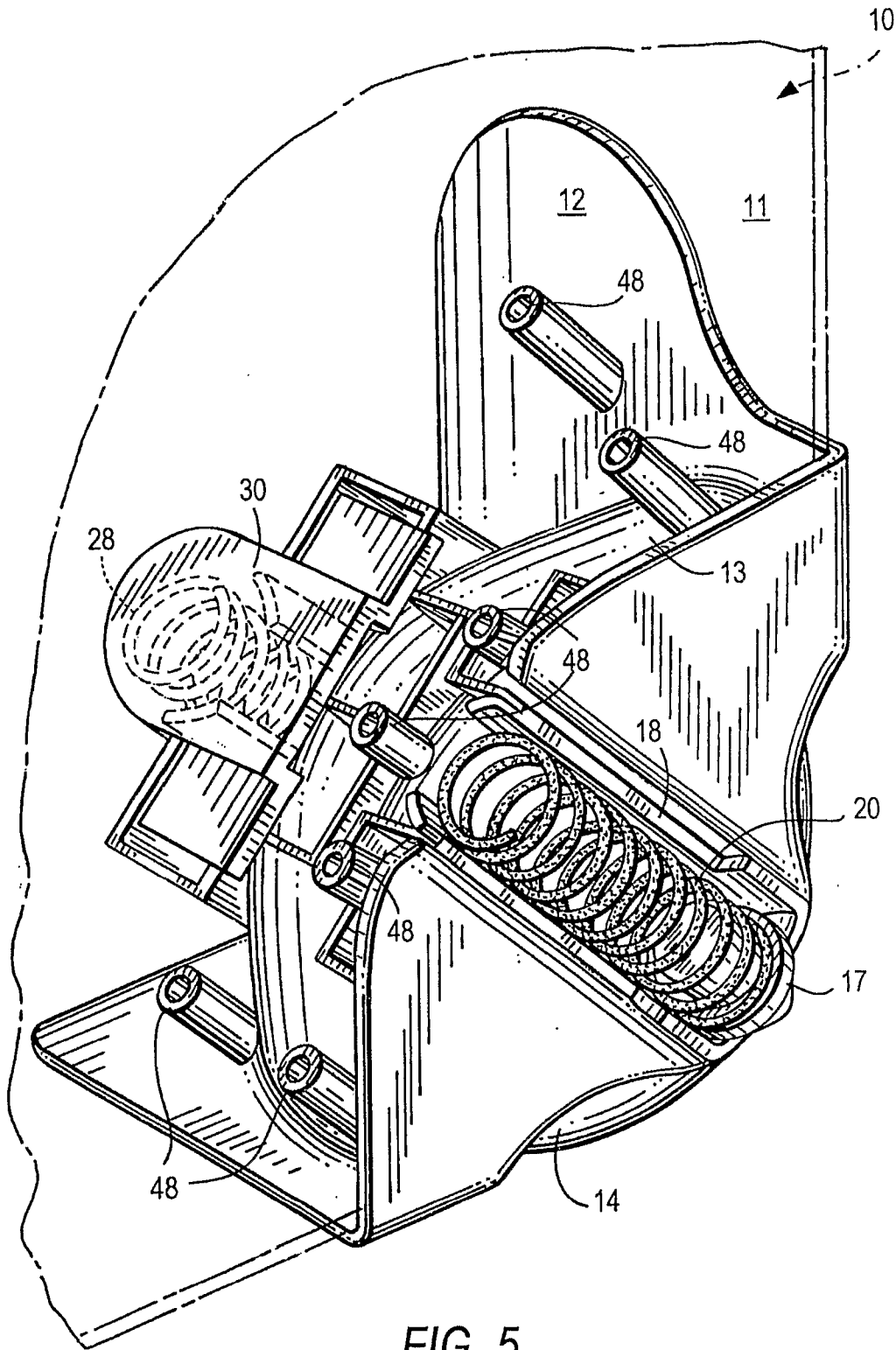


FIG. 4



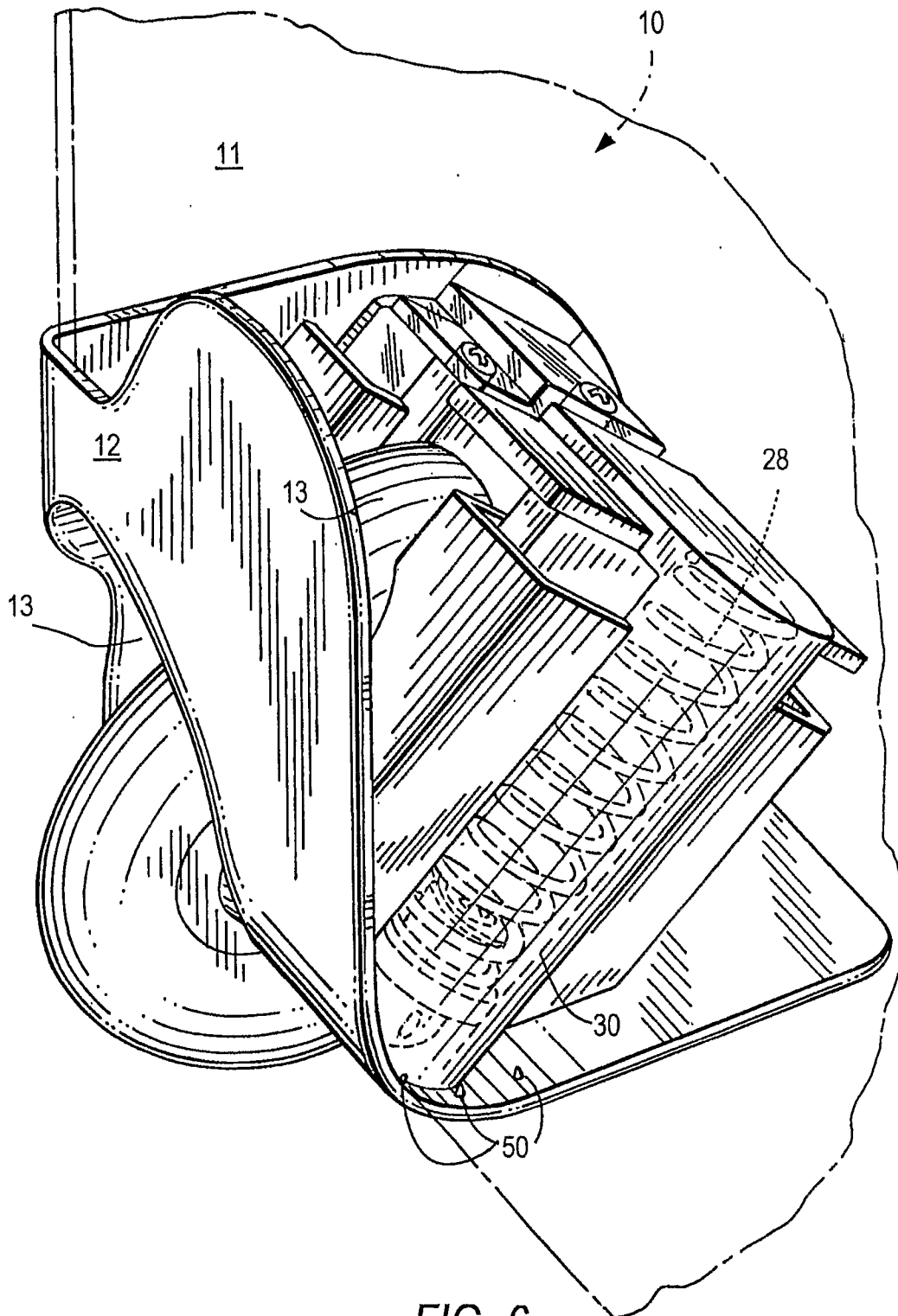


FIG. 6

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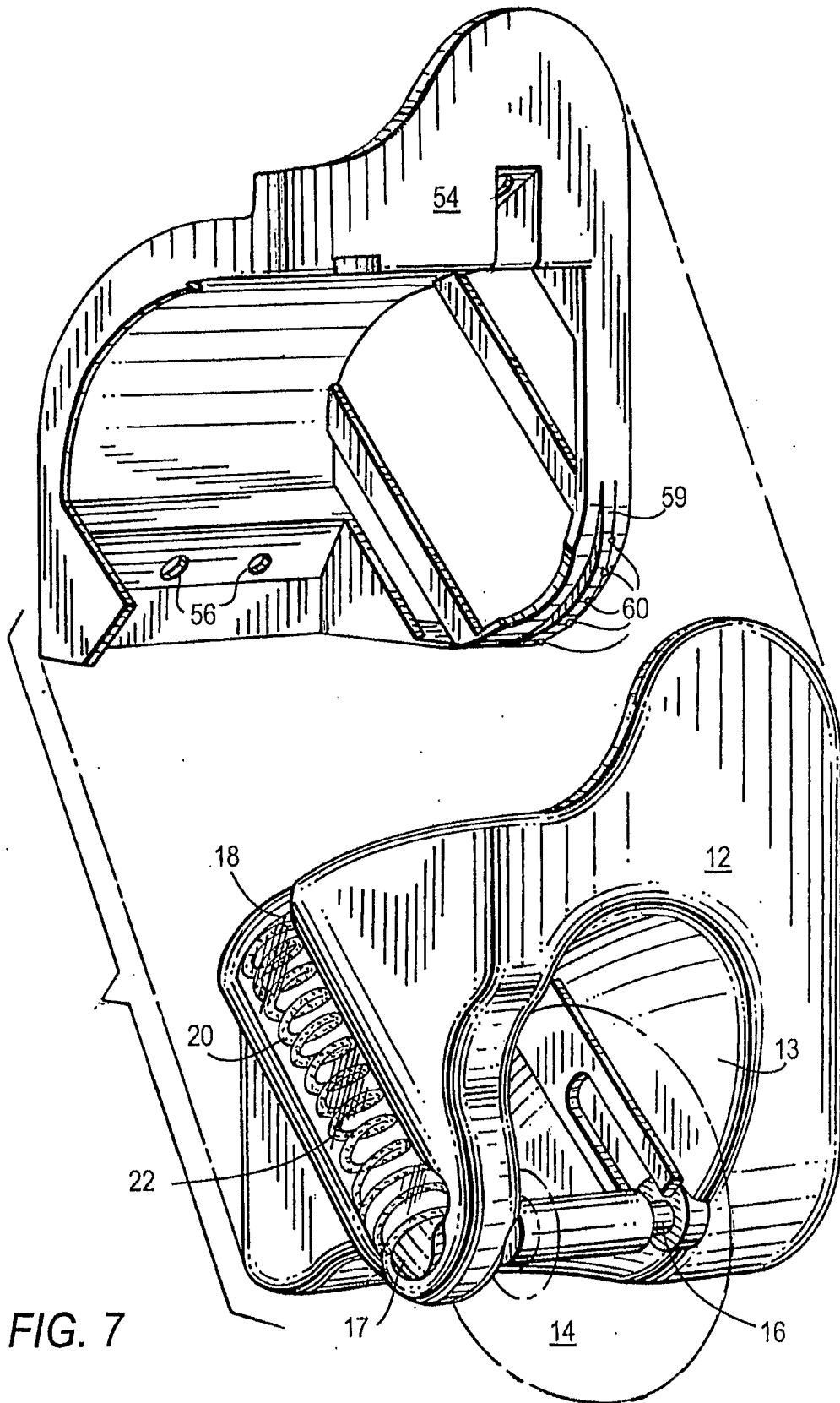


FIG. 7

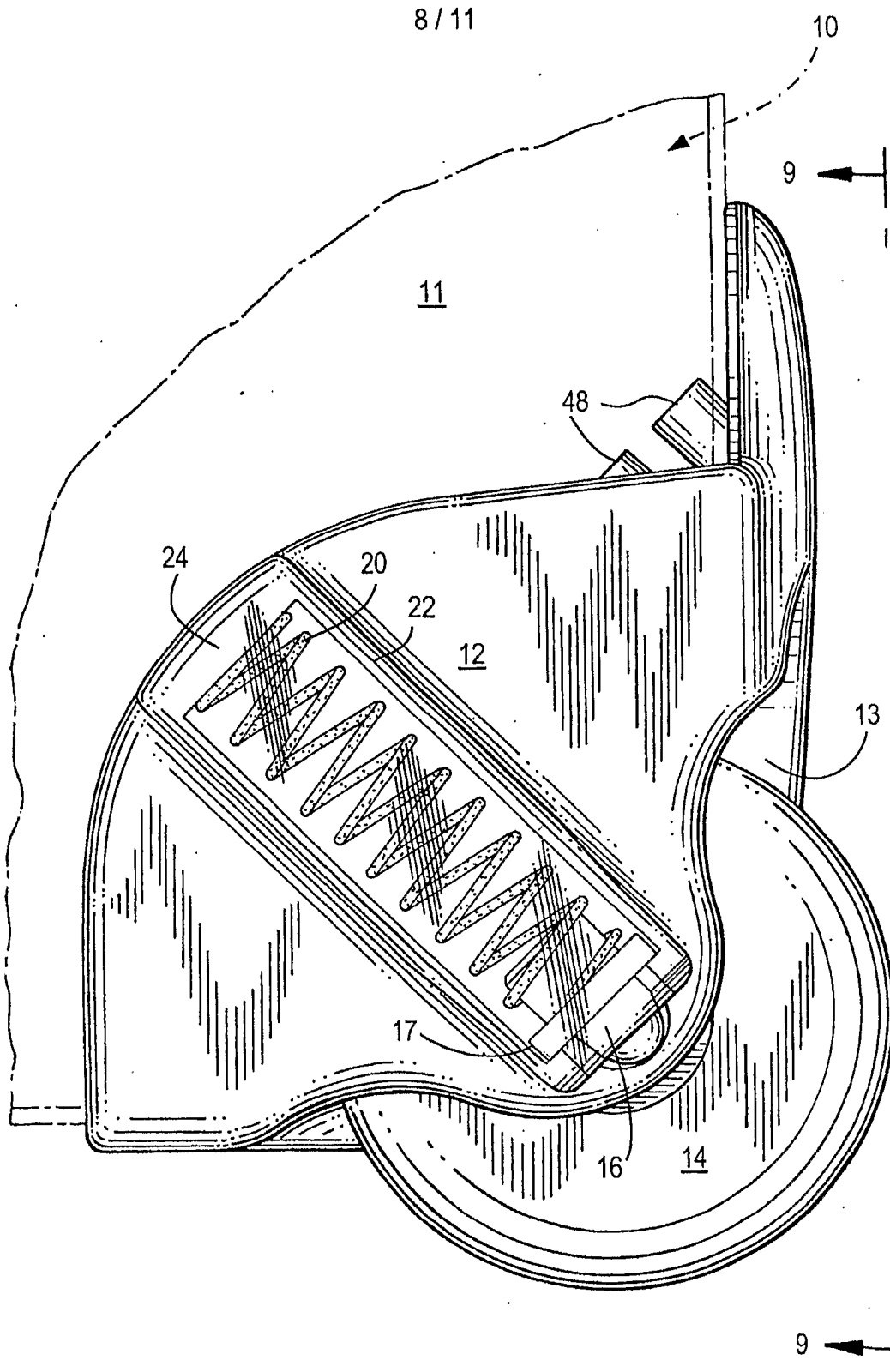


FIG. 8

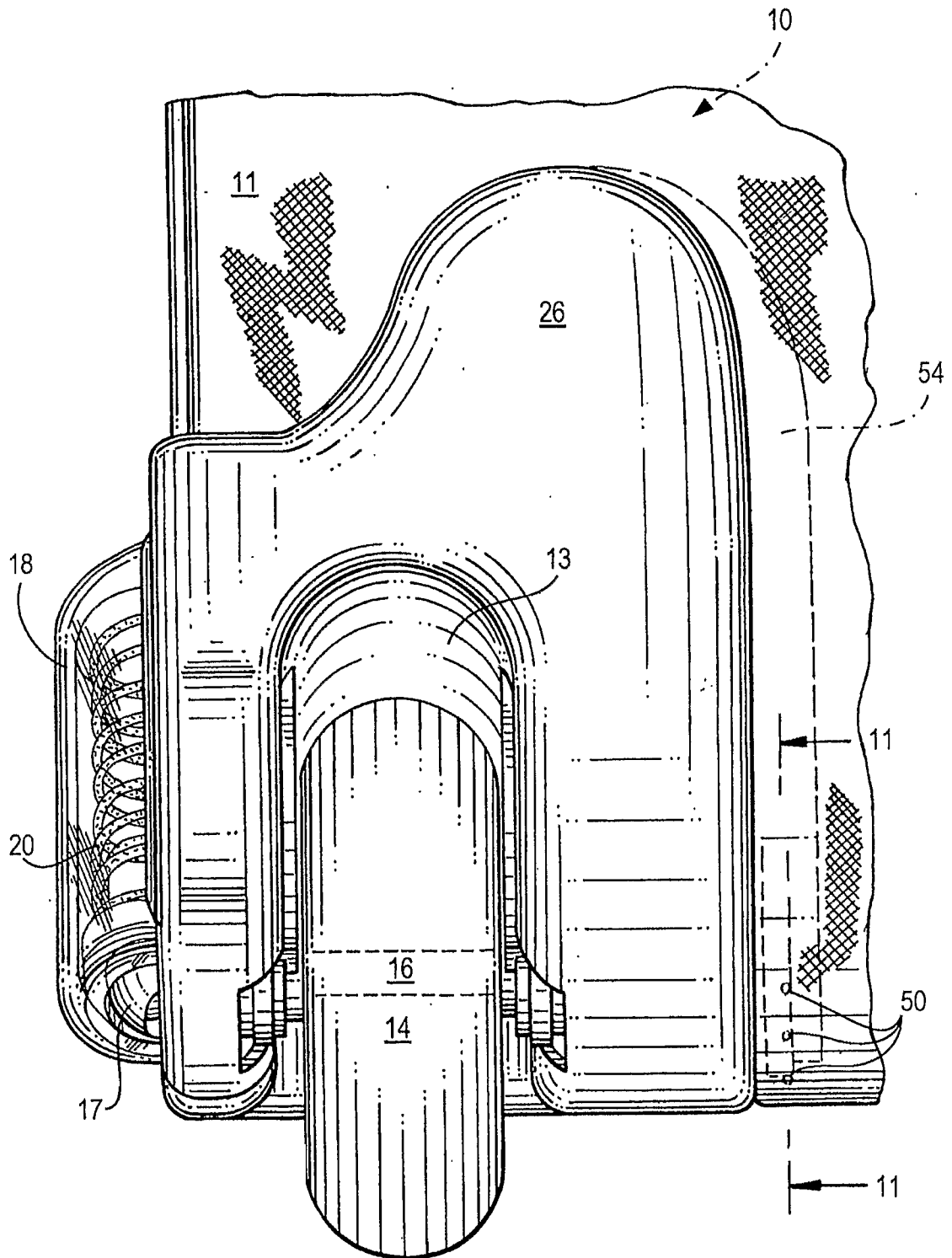


FIG. 9

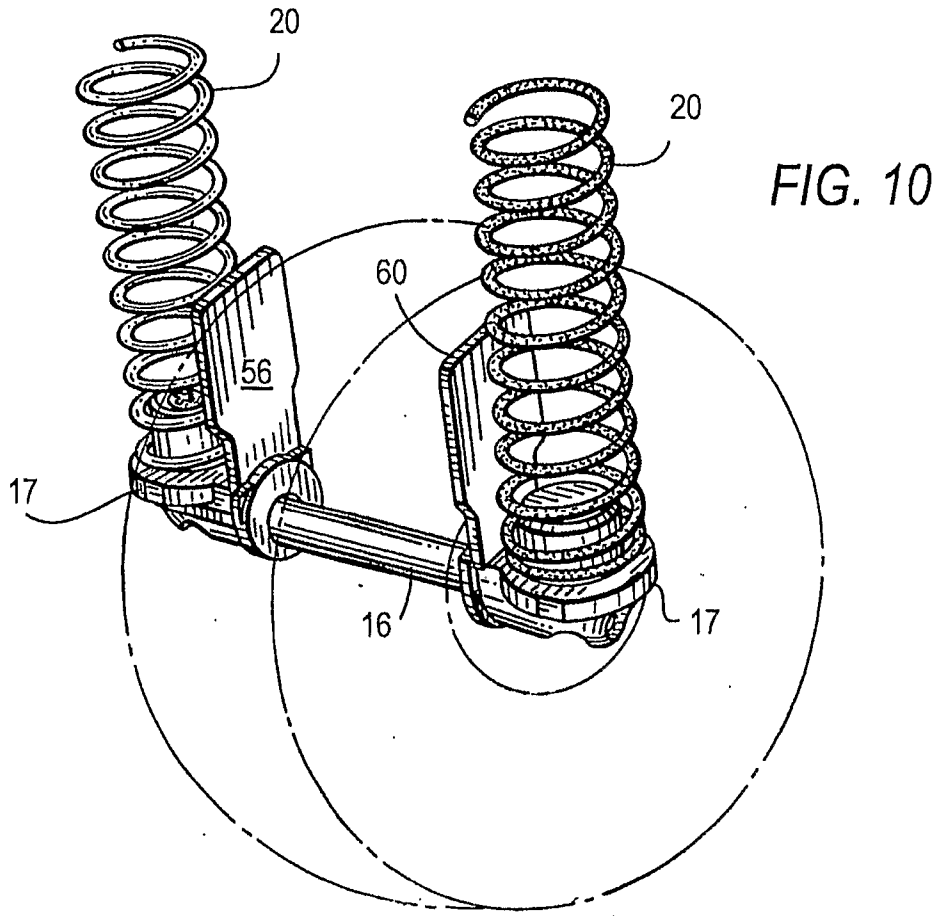


FIG. 10

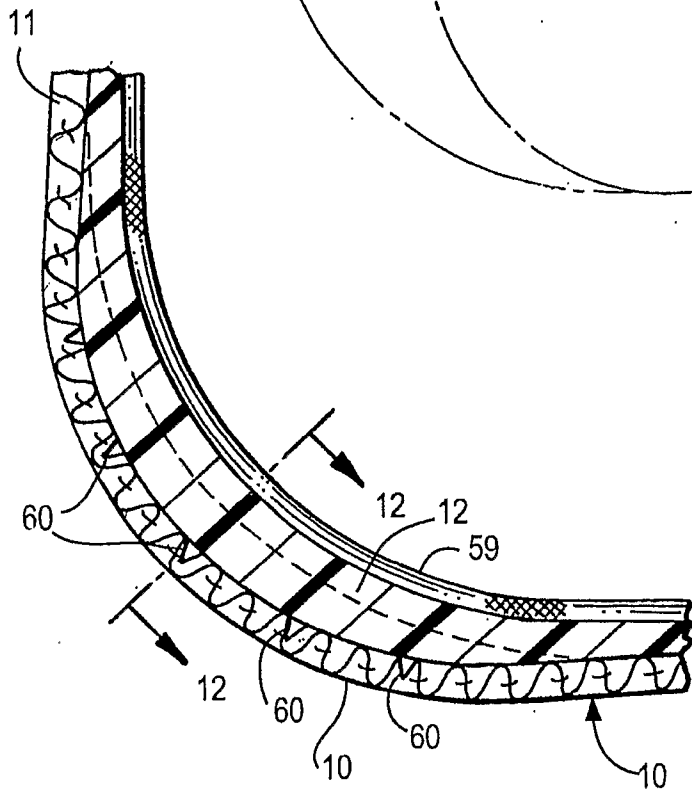


FIG. 11

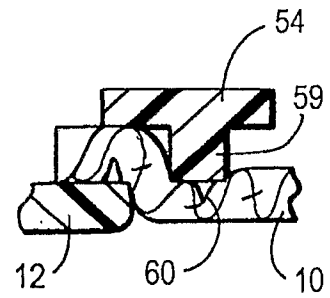


FIG. 12

FIG. 13

