

(22) Date de dépôt/Filing Date: 2009/12/21

(41) Mise à la disp. pub./Open to Public Insp.: 2011/06/21

(45) Date de délivrance/Issue Date: 2014/04/08

(51) Cl.Int./Int.Cl. *E01H 5/06* (2006.01)

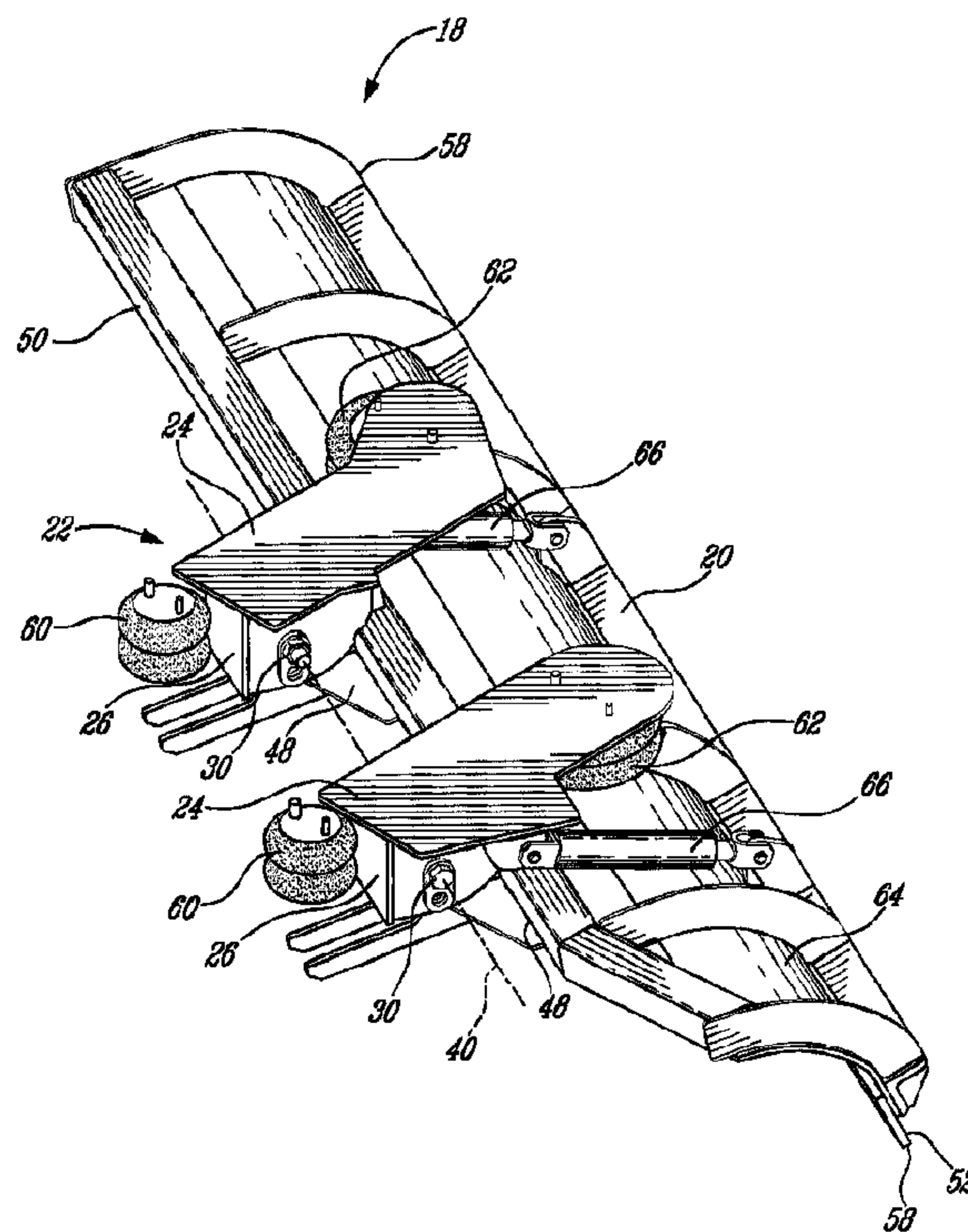
(72) Inventeur/Inventor:
DESCHENES, GUY, CA

(73) Propriétaire/Owner:
SERVICE D'EQUIPEMENT G.D. INC., CA

(74) **Agent:** ROBIC

(54) Titre : SYSTEME DE SUPPORT DE LAME BIAISE PLACEE SOUS LE CHASSIS D'UNE NIVELEUSE ET EN SON MILIEU

(54) Title: MID-CHASSIS AND UNDERBODY PLOW SUPPORT SYSTEM



(57) **Abrégé/Abstract:**

A vehicle having a chassis, front wheels, rear wheels, and a vehicle central axis, the vehicle includes: at least one pivoting member secured to the vehicle chassis between the front wheels and the rear wheels; and at least one blade support member engaged with the pivoting member through at least one resilient sleeve, the at least one resilient sleeve being concentric with the at least one pivoting member and the at least one blade support member pivoting about the pivoting member between a transport position and an operative position.

ABSTRACT

A vehicle having a chassis, front wheels, rear wheels, and a vehicle central axis, the vehicle includes: at least one pivoting member secured to the vehicle chassis between the front wheels and the rear wheels; and at least one blade support member engaged with the pivoting member through at least one resilient sleeve, the at least one resilient sleeve being concentric with the at least one pivoting member and the at least one blade support member pivoting about the pivoting member between a transport position and an operative position.

MID-CHASSIS AND UNDERBODY PLOW SUPPORT

SYSTEM

Field of the Invention

The technical field relates to plowing equipments and, more particularly, to a support
5 system for mounting an underbody plow or scraper to the chassis of a vehicle between
the front and the rear wheels, such as trucks. It also relates to a method for mounting
underbody plows to a vehicle chassis.

Description of the Prior Art

Underbody plows and scrapers mounted between the front wheels and the rear wheels
10 of a vehicle are well-known to remove snow, ice or other debris from a road surface.
When designing an underbody plow, it is desirable to provide adjustability to raise the
blade for storage and transport purposes or to lower the blade during operation. It is
also desirable to tilt the blade, i.e. to effect vertical displacement of the outer ends of the
blade, to overcome road obstacles. These features should be achieved while reducing
15 weight addition and reduce stress applied to the blade support assembly.

U.S. patent no. 6,123,156 describes a mid-chassis underbody plow wherein the blade is
located at the rear end of pivotable arms. The blade mounting system also includes a
rotatable coupling extending between the pivotable arms, close to the blade. Relatively
severe stresses are applied to the hinge mounts connecting the pivotable arms to the
20 vehicle chassis since the blade and the rotatable coupling are spaced apart from the
hinge mounts.

BRIEF SUMMARY OF THE INVENTION

It is therefore an aim of the present invention to address the above mentioned issues.

According to a general aspect, there is provided a plow assembly for mounting on a
25 vehicle, said vehicle having a chassis with front and rear wheels and a vehicle central

axis. The plow assembly comprises: a blade support engageable with the chassis between the front and rear wheels, pivotable about a pivoting axis, and including at least one resilient sleeve concentric with the pivoting axis and pivotable thereabout; and a blade connectable to the blade support and pivotable therewith about the pivoting axis.

According to another general aspect, there is provided a vehicle having a chassis, front wheels, rear wheels, and a vehicle central axis. The vehicle comprises: at least one pivoting member secured to the vehicle chassis between the front wheels and the rear wheels; and at least one blade support member engaged with the pivoting member through at least one resilient sleeve, the at least one resilient sleeve being concentric with the at least one pivoting member and the at least one blade support member pivoting about the pivoting member between a transport configuration and an operative configuration.

According to a further general aspect, there is provided a method for mounting a plow assembly to a chassis of a vehicle comprising: securing at least one blade support member to the vehicle chassis through at least one pivoting member and a rubber bushing extending between the at least one blade support member and the at least one pivoting member, the at least one blade support member being pivotable about the pivoting member.

According to another general aspect, there is provided a vehicle underbody scrapper blade support system for mounting on a vehicle having a chassis with front and rear wheels and a vehicle central axis, the support system comprising at least two blade supports, at least one of the blade supports being mounted on a left side of the vehicle central axis and at least one of the blade supports being mounted on a right side of the vehicle central axis, each of the blade supports including a resilient bushing and a rigid blade support member, the blade supports being pivotably mounted to the chassis through a respective pivoting member with at least one of the resilient bushings extending between the pivoting members and the rigid blade support members.

According to a further general aspect, there is provided a plow assembly for mounting on a vehicle having a chassis with front and rear wheels and a vehicle central axis. The plow assembly comprises : at least one pivoting member mounted to the chassis between the front and rear wheels and defining at least one pivoting axis; a right blade support and a left blade support, spaced-apart from one another, each one of the blade supports including a resilient sleeve engaged with the at least one pivoting member, the right blade support and the left blade support being pivotable about the at least one pivoting axis and engaged with the chassis on a respective side of the vehicle central axis; and a blade rigidly engaged with the right blade support and the left blade support and pivotable therewith about the pivoting axis, the blade being resiliently engaged with the chassis through the resilient members.

According to still another general aspect, there is provided a vehicle having a chassis, front wheels, rear wheels, and a vehicle central axis. The vehicle comprises: at least one pivoting member secured to the vehicle chassis between the front wheels and the rear wheels; a right blade support including a resilient sleeve, the right blade support being resiliently mounted to the chassis on a right side of the vehicle central axis with the at least one pivoting member being engaged with the resilient sleeve; a left blade support including a resilient sleeve, the right blade support being resiliently mounted to the chassis on a right side of the vehicle central axis with the at least one pivoting member being engaged with the resilient sleeve; and a blade rigidly engaged with the right and left blade supports and resiliently engaged with the chassis through the resilient sleeves, the blade and the right and left blade supports being pivotable about the at least one pivoting member between a transport configuration and an operative configuration.

According to another general aspect, there is provided a method for mounting a plow assembly to a chassis of a vehicle comprising: resiliently mounting at least two blade supports to the vehicle chassis through at least one pivoting member and rubber bushings extending between each one of the at least two blade supports and the at least one pivoting member engaged with the chassis, the at least two blade supports

being spaced-apart from one another and pivotable about the at least one pivoting member with the rubber bushings being independently deformable; and rigidly engaging a blade with the at least two blade supports.

According to still another general aspect, there is provided a vehicle underbody scrapper blade support system for mounting on a vehicle having a chassis with front and rear wheels and a vehicle central axis. The support system comprises at least two blade supports, at least one of the blade supports being mounted on a left side of the vehicle central axis and at least one of the blade supports being mounted on a right side of the vehicle central axis, each of the blade supports including a resilient bushing and a rigid blade support member, the blade supports being pivotably and resiliently mounted to the chassis through a respective pivoting member with at least one of the resilient bushings extending between the pivoting members and the rigid blade support members.

In this specification, the term "blade" is intended to encompass any form of scrapper, scrapper blade, plow, snowplow, plowing blade, including rake and chisel-like constructions, and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Fig. 1 is a side elevation view of a vehicle having an underbody plow mounted through a plow support assembly in accordance with an embodiment of the invention;

Fig. 2 is a perspective view of the underbody plow and the plow support assembly in accordance with an embodiment of the invention;

10 Fig. 3 is a perspective view of a blade support including a resilient sleeve member in accordance with an embodiment of the invention;

Fig. 4 is a side elevation view, sectioned, of the underbody plow and the plow support assembly mounted to the vehicle chassis and being configured in the transport configuration in accordance with an embodiment of the invention; and

15 Fig. 5 is a side elevation view, sectioned, of the underbody plow and the plow support assembly mounted to the vehicle chassis and being configured in the operative configuration in accordance with an embodiment of the invention.

It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

20 Referring to Fig. 1, there is shown a vehicle 10 having a chassis 12, front wheels 14, and rear wheels 16. An underbody plow 18 is mounted to the chassis 12 between the front and the rear wheels 14, 16.

Fig. 2 shows that the plow assembly 18 includes a blade 20 mounted to the chassis 12 through two plow support members 22, each being located on a respective side of a 25 vehicle central axis. Thus, the blade 22 is mounted through left and right plow support

members 20. Both plow support members 20 being similar, only one will be described in the following paragraphs.

The plow support member 20 includes a chassis support plate 24, secured to the vehicle chassis 12, and having a frame bracket 26 mounted thereon. In an embodiment,
 5 the frame bracket 26 is welded to the chassis support plate 24. A blade-to-chassis pivotal attachment 28 is mounted inside an internal space defined in the frame bracket 26 and includes a pivoting member 30, a rigid inner sleeve 32, a resilient sleeve member 34 covering the inner sleeve 32, and a rigid outer sleeve 36 covering the resilient sleeve member 34 and the inner sleeve 32.

10 In the embodiment shown, the assembly including the inner sleeve 32, the resilient sleeve member 34, and the outer sleeve 36 defines a bushing assembly 37, as shown in Fig. 3. The resilient sleeve member 34 can include an elastomeric bushing. The elastomeric bushing is molded around and adhesively attached to the inner sleeve 32 and, in turn, is press fit into the outer sleeve 36. Thus, the resilient sleeve member 34 is
 15 an encapsulated resilient cushion such as a rubber cushion. For example and without being limitative, the inner and outer sleeves 32, 36 can be made of metal such as steel.

A blade support member 38 is attached to the rigid outer sleeve 36 and pivots therewith about a pivoting axis 40. In an embodiment, the blade support member 38 is welded to the rigid outer sleeve 36. The blade support member 38 includes a front portion 42 and
 20 a rear portion 44. In the embodiment shown, the front portion 42 includes two spaced-apart arms 46 and is located forwardly of the bushing assembly 37. The rear portion 44 includes a blade support plate 48 to which an upper end 50 of the blade 20 is secured, as it will be described in more details below. The blade 20 is secured to the blade support member 38, rearwardly of the bushing assembly 37. In the embodiment shown,
 25 the upper end 50 of the blade 20 is welded to a blade support plate 48 and is therefore rigidly attached to the rear portion 44 of the blade support member 38. It is appreciated that in an alternative embodiment, the upper end 50 of the blade 20, or any portion thereof, can be attached directly to the blade support member 38.

In the embodiment, the upper end 50 of the blade 20 is located close to the bushing assembly 37. More particularly, along a horizontal plane, the distance between the pivoting axis 40 of the blade-to-chassis pivotal attachment 28 and the upper end 50 of the blade 20 is smaller than the distance between the upper end 50 of the blade 20 and an opposed scraping edge 52 of the blade 20. In an embodiment, the distance between the pivoting axis 40 of the blade-to-chassis pivotal attachment 28 and the upper end 50 of the blade 20 is approximately between three to six inches and, in an alternative embodiment, it is approximately between four to five inches. In an embodiment, the distance between the upper end 50 of the blade 20 and an opposed scraping edge 52 of the blade 20 is approximately between fifteen to twenty-five inches and, in an alternative embodiment, it is approximately between eighteen to twenty-two inches.

The bushing assembly 37 is pivotally attached to the frame bracket 26 through the pivoting member 30, which is coaxial with the pivoting axis 40. More particularly, in the embodiment shown, the inner sleeve 32 has a continuous passage 54 formed therethrough. The pivoting member 30 extends through openings defined in the frame bracket 26 and through the continuous passage 54 defined in the inner sleeve 32 of bushing assembly 37. The pivoting member 30 substantially does not pivot about the frame bracket 26. The bushing assembly 37 pivots about the pivoting member 30, inside the frame bracket 26. Conventional fasteners such as bolts can be used as pivoting members 30 to pivotally attach the bushing assembly 37 to the frame bracket 26. However, it is appreciated that, in alternative embodiments, other appropriately designed fasteners can be used.

In the embodiment shown, the bushing assembly 37 is a Tri-functional® bushing wherein the resilient sleeve member 34 includes cavities 56 defined in solid rubber, molded around the inner sleeve 32. The resilient sleeve member 34 absorbs vertical and horizontal forces resulting from braking, acceleration, and uneven road surfaces. Moreover, it also allows independent vertical movements, i.e. tilting, of the outer ends 58 of the scraping edge 52 of the blade 20. In an embodiment, the elastomeric bushing can be engineered to deflect a greater amount in the vertical direction than in the fore-

aft direction. In an embodiment, the bushing can compress and allows vertical movements of approximately 0.75 inch to 1.75 inches in both directions, in an alternative embodiment, the bushing can compress of approximately 1 inch to 1.5 inches in both directions, and, in another alternative embodiment, the bushing can
 5 compress of approximately 1.25 inches in both directions, i.e. 2.5 inches total.

The bushing assemblies 37 and, more particularly, the resilient sleeve members 34 allow the blade 20 to adjust to the road surface R. Moreover, if one side of the blade 20 encounters an obstacle, the respective side can lift above the obstacle. The resilient sleeve members 34 deform to displace up and down the outer ends 58 of the blade
 10 scraping edge 54.

In the operative configuration, when the blade scraping edge 54 abuts the road surface R, if a dislocating force is applied to one side of the blade 20, the resilient cushions 34 of the bushing assemblies 37 can deform to permit rotation of the blade 20 about a horizontal axis aligned with the travel direction of the vehicle 10 (or the vehicle central
 15 axis).

The blade 20 can be raised and lowered by pivoting the bushing assemblies 37 about the pivoting members 30. In an embodiment, the pivoting movement about the pivoting members 30 can be as large as about 35° (thirty-five degrees) and in an alternative embodiment, about 25° (twenty-five degrees)

20 Referring to Figs. 4 and 5, there is shown that, to raise and lower the blade 20, the underbody plow 18 further includes front and rear pneumatic actuators 60, 62 such as pneumatic bellows. There are two front actuators 60 and two rear actuators 62, respectively mounted on opposite sides of the vehicle central axis. The front actuators 60 are mounted to the vehicle chassis 12, in front of the bushing assemblies 37 and the
 25 pivoting axis 40. On the opposite, the rear actuators 62 are mounted to the vehicle chassis 12, rearwardly of the bushing assemblies 37 and the pivoting axis 40. They are movable between a contracted configuration and an expanded configuration.

To raise the blade 20, the pressure in the front actuators 60 is increased while the pressure in the rear actuators 62 is decreased. Thus, the front actuators 60, configured in the expanded configuration, abut the front portion 42 of the blade support members 38 and, more particularly, the arms 46 while the rear actuators 62 are configured in the contracted configuration and are spaced-apart from the blade 20. Simultaneously, the arms 46 lower, the bushing assemblies 37 and the blade support members 38 pivot about the pivoting axes 30, and the blade 20 raises above the road surface R. Figure 4 shows the underbody plow 18 in the raised or transport configuration.

On the opposite, to lower the blade 20, the pressure in the front actuators 60 is released while the pressure in the rear actuators 62 is increased. Thus, the rear actuators 62, configured in the expanded configuration, abut an outer side 64 of the blade 20 and the front actuators 60 are configured in the contracted configuration and are spaced-apart from the front portion 42 of the blade support members 38. Simultaneously, the blade 20 lowers and contacts the road surface R, the bushing assemblies 37 pivot about the pivoting axes 30, and the front portion 42 of the blade support members 38 raises. Figure 5 shows the underbody plow 18 in the lowered or operative configuration.

It is appreciated that the pressure applied by the pressure actuators located on both sides of the vehicle central axis can be different. Thus, the pressure applied to the outer ends 58 of the blade scraping edge 52 can be similar or different. Moreover, it is appreciated that the blade 20 can be configured in a plurality of intermediate configurations, i.e. between the expanded and contracted configurations.

The front and rear pneumatic actuators 60, 62 can be mounted in alternative ways to the chassis 12 or to the plow support assembly 22. For instance and without being limitative, the front actuators 60 can be mounted to the front portions 42 of the blade support members 38 and the rear actuators 62 can be mounted to either the rear portions 44 of the blade support members 38 or to the outer side 64 of the blade 20. If mounted to the vehicle chassis 12, the rear actuators 62 can abut the rear portions 44 of the blade support members 38 instead of the outer side 64 of the blade 20.

The plow support assembly 22 further includes two hydraulic actuators 66, respectively mounted on opposite sides of the vehicle central axis. The hydraulic cylinders have a first end attached to the vehicle chassis 12 or the frame bracket 26 and an opposed second end attached to the outer side 64 of the blade 20. The hydraulic actuators 66
 5 are configurable in an expanded configuration wherein the blade 20 abuts the road surface R (operative configuration) and a contracted configuration wherein the blade 20 is raised above the road surface R (transport configuration). It is appreciated that, in an alternative embodiment, the plow support assembly 22 can include either the pneumatic actuators 60, 62 or the hydraulic actuators 66.

10 As for the pneumatic actuators 60, 62, it is appreciated that the hydraulic actuators 66 located on both sides of the vehicle central axis are configurable independently. Moreover, it is appreciated that the blade 20 can be configured in a plurality of intermediate configurations, i.e. between the expanded and contracted configurations.

The pneumatic actuators 60, 62 and the hydraulic actuators 66 are controlled by a
 15 control system (not shown).

In the embodiment shown and described above, the plow support assembly 22 includes two spaced-apart sections, each being located on a respective side of the vehicle central axis. However, in an alternative embodiment, at least one portion of the plow support assembly 22 can be common for both sections. For instance and without being
 20 limitative, the pivoting member 30 can be common to both bushing assemblies 37.

In an embodiment, the blade 20 can be aligned substantially perpendicular to the vehicle central axis. Thus, the pivoting members 30 located on respective sides of the vehicle central axis can be mounted to the chassis 12 at the same position between the front and the rear wheels 14, 16. In an alternative embodiment, the blade 20 can be
 25 angled respectively to the vehicle central axis. Thus, the pivoting members 30 located on respective sides of the vehicle central axis can be spaced apart from one another along the vehicle central axis or the blade support connections on both sides of the

vehicle central axis can be spaced-apart along the vehicle central axis. The angling feature of the blade 20 allows debris to be transferred to one side of the vehicle 10.

The embodiments of the invention described above are intended to be exemplary only. For instance, it is appreciated that the shape and the design of the components of the
5 plow support assembly can differ from the one shown in the above described embodiments. The scope of the invention is therefore intended to be limited solely by the scope of the appended claims.

CLAIMS :

1. A plow assembly for mounting on a vehicle having a chassis with front and rear wheels and a vehicle central axis, the plow assembly comprising :
 at least one pivoting member mounted to the chassis between the front and rear wheels and defining at least one pivoting axis;
 a right blade support and a left blade support, spaced-apart from one another, each one of the blade supports including a resilient sleeve engaged with the at least one pivoting member, the right blade support and the left blade support being pivotable about the at least one pivoting axis and engaged with the chassis on a respective side of the vehicle central axis; and
 a blade rigidly engaged with the right blade support and the left blade support and pivotable therewith about the pivoting axis, the blade being resiliently engaged with the chassis through the resilient members.
2. The plow assembly as claimed in claim 1, wherein the at least one resilient sleeve of the right blade support is compressible independently of the at least one resilient sleeve of the left blade support.
3. The plow assembly as claimed in one of claims 1 and 2, wherein the resilient sleeves of the right and left blade supports comprise a central channel and internal cavities defined peripherally of the central channel, the at least one pivoting member being engaged with the central channel.
4. The plow assembly as claimed in any one of claims 1 to 3, wherein each one of the blade supports comprises an outer sleeve engaged over the respective one of the at least one resilient member and being concentric therewith, the outer sleeve of the right and left blade supports being rigidly engaged with the blade and being spaced-apart from one another, the right

and left blade supports being resiliently engaged with the chassis through the respective one of the resilient members.

5. The plow assembly as claimed in claim 4, wherein each one of the blade supports further comprises an inner sleeve concentric with the respective one of the outer sleeves, the respective one of the at least one resilient sleeve being inserted between the inner sleeve and the outer sleeve.
6. The plow assembly as claimed in any one of claims 1 to 5, wherein the blade has an upper end rigidly connected to the blade supports.
7. The plow assembly as claimed in any one of claims 1 to 6, wherein the blade is secured rearwardly of the pivoting axis.
8. The plow assembly as claimed in claim 6, wherein the upper edge of the blade is located rearwardly of the at least one pivoting member and a distance between the upper edge and the at least one pivoting member is smaller than a distance between the upper edge and a scraping edge of the blade along a horizontal plane.
9. The plow assembly as claimed in any one of claims 1 to 8, comprising at least one front pneumatic actuator mounted to at least one of the chassis and a front portion of the blade support, forwardly of the pivoting axis, being movable between a contracted state and an expanded state, and abutting the other one of the chassis and the front portion of the blade support in the expanded state for raising the blade above a road surface.
10. The plow assembly as claimed in any one of claims 1 to 9, comprising at least one rear pneumatic actuator mounted to at least one of the chassis, a rear portion of the blade support, and the blade, rearwardly of the pivoting axis, being movable between a contracted state and an expanded state, and abutting at least another one of the chassis, the rear portion of the

blade support, and the blade in the expanded state for lowering the blade to be in contact with a road surface.

11. A vehicle having a chassis, front wheels, rear wheels, and a vehicle central axis, the vehicle comprising:
 - at least one pivoting member secured to the vehicle chassis between the front wheels and the rear wheels;
 - a right blade support including a resilient sleeve, the right blade support being resiliently mounted to the chassis on a right side of the vehicle central axis with the at least one pivoting member being engaged with the resilient sleeve;
 - a left blade support including a resilient sleeve, the right blade support being resiliently mounted to the chassis on a right side of the vehicle central axis with the at least one pivoting member being engaged with the resilient sleeve; and
 - a blade rigidly engaged with the right and left blade supports and resiliently engaged with the chassis through the resilient sleeves, the blade and the right and left blade supports being pivotable about the at least one pivoting member between a transport configuration and an operative configuration.
12. The vehicle as claimed in claim 11, wherein the at least one pivoting member comprises two spaced-apart pivoting members, each being mounted to the chassis on a respective side of the vehicle central axis.
13. The vehicle as claimed in one of claims 11 and 12, wherein each one of the blade supports comprises an outer sleeve surrounding the at least one resilient sleeve and rigidly engaged with the blade, with the at least one resilient sleeve having a central channel defined therein through which the at least one pivoting member is engaged.

14. The vehicle as claimed in claim 13, wherein each one of the blade supports further comprises an inner sleeve inserted through the central channel of the at least one resilient sleeve.
15. The vehicle as claimed in any one of claims 11 to 14, wherein the at least one resilient sleeve of the right blade support is compressible independently of the at least one resilient sleeve of the left blade support.
16. The vehicle as claimed in any one of claims 11 to 15, wherein the resilient sleeves of the right and left blade supports comprise internal cavities defined peripherally of a central channel.
17. The vehicle as claimed in any one of claims 11 to 16, wherein an upper edge of the blade is rigidly secured to the right and left blade supports.
18. The vehicle as claimed in claim 17, wherein the upper edge of the blade is located rearwardly of the at least one pivoting member and a distance between the upper edge and the at least one pivoting member is smaller than a distance between the upper edge and a scraping edge of the blade along a horizontal plane.
19. The vehicle as claimed in any one of claims 11 to 18, wherein the at least one resilient sleeve comprises compressible rubber.
20. A method for mounting a plow assembly to a chassis of a vehicle comprising:

resiliently mounting at least two blade supports to the vehicle chassis through at least one pivoting member and rubber bushings extending between each one of the at least two blade supports and the at least one pivoting member engaged with the chassis, the at least two blade supports being spaced-apart from one another and pivotable about the at least one

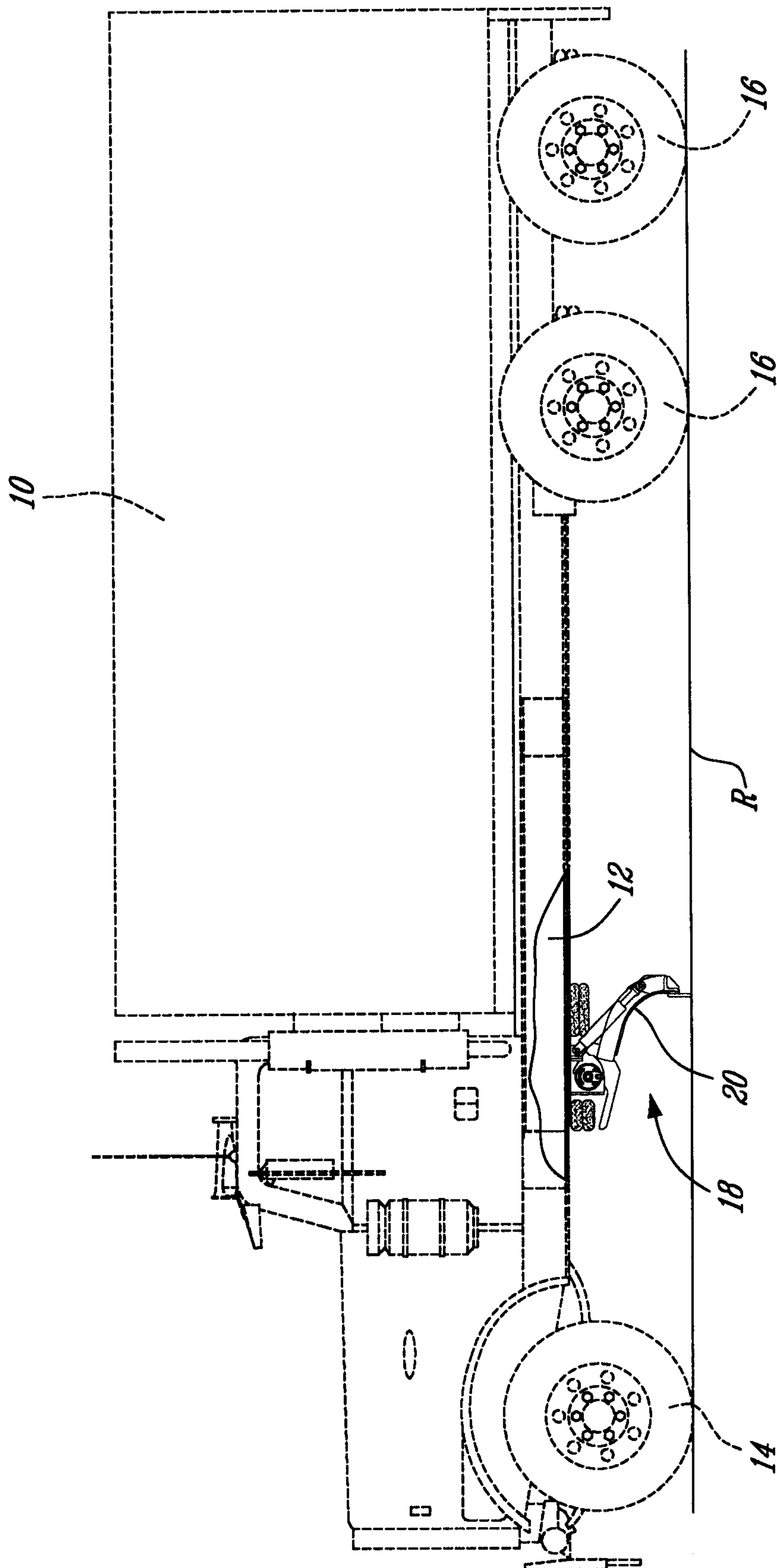
pivoting member with the rubber bushings being independently deformable; and

rigidly engaging a blade with the at least two blade supports.

21. The method as claimed in claim 20, further comprising rigidly connecting an upper end of a blade to the at least two blade supports.
22. The method as claimed in claim 20, wherein the securing step comprises securing at least two frame brackets defining an internal space to the chassis; engaging the at least one pivoting member to the at least two frame brackets; and engaging the rubber bushings over the at least one pivoting member with each one of the rubber bushings being located in a respective one of the internal space defined by the at least two frame brackets.
23. The method as claimed in claim 22, wherein the at least two blade supports are rotatably mounted to the at least two frame brackets.
24. A vehicle underbody scrapper blade support system for mounting on a vehicle having a chassis with front and rear wheels and a vehicle central axis, the support system comprising at least two blade supports, at least one of the blade supports being mounted on a left side of the vehicle central axis and at least one of the blade supports being mounted on a right side of the vehicle central axis, each of the blade supports including a resilient bushing and a rigid blade support member, the blade supports being pivotably and resiliently mounted to the chassis through a respective pivoting member with at least one of the resilient bushings extending between the pivoting members and the rigid blade support members.

25. The vehicle underbody scrapper blade support system as claimed in claim 24, wherein the rigid blade support members comprise a blade upper end support portion located rearwardly of the pivoting member.
26. The vehicle underbody scrapper blade support system as claimed in claim 24, wherein the resilient bushings comprise an outer sleeve rigidly engaged with a blade upper end support portion located rearwardly of the pivoting member and a resilient sleeve with at least one internal cavity.
27. The vehicle underbody scrapper blade support system as claimed in any one of claims 24 to 26, comprising at least one front pneumatic actuator mounted to at least one of the chassis and a front portion of a respective one of the blade supports, forwardly of the pivoting member, being movable between a contracted state and an expanded state, and abutting the other one of the chassis and the front portion of the respective one of the blade supports in the expanded state for raising a blade above a road surface.
28. The vehicle underbody scrapper blade support system as claimed in one of claims 26 and 27, comprising at least one rear pneumatic actuator mounted to at least one of the chassis, a rear portion of a respective one of the blade supports, and a blade, rearwardly of the pivoting member, being movable between a contracted state and an expanded state, and abutting at least another one of the chassis, the rear portion of the respective one of blade supports, and the blade in the expanded state for lowering the blade to be in contact with a road surface.

1 / 5

*Fig. 1*

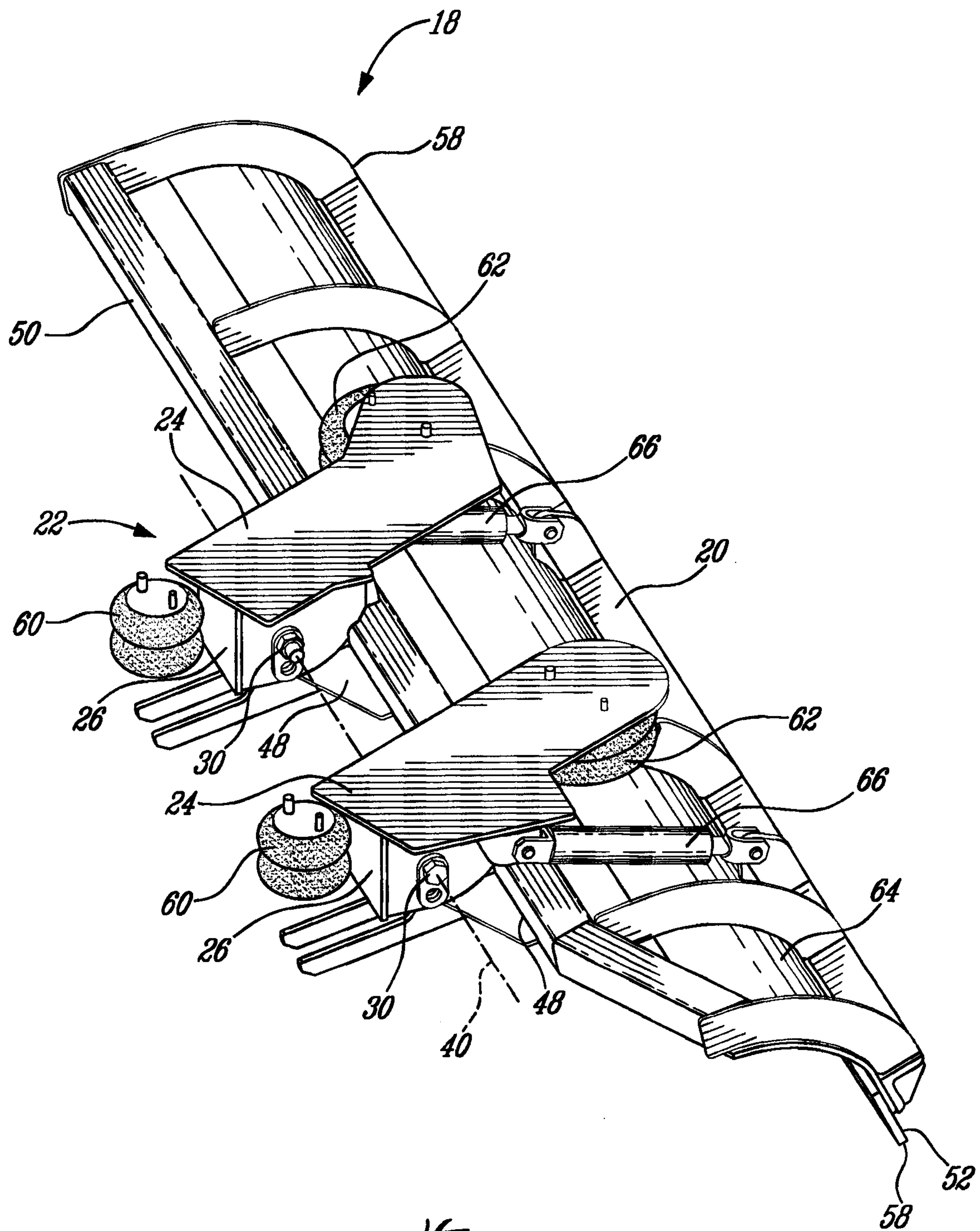
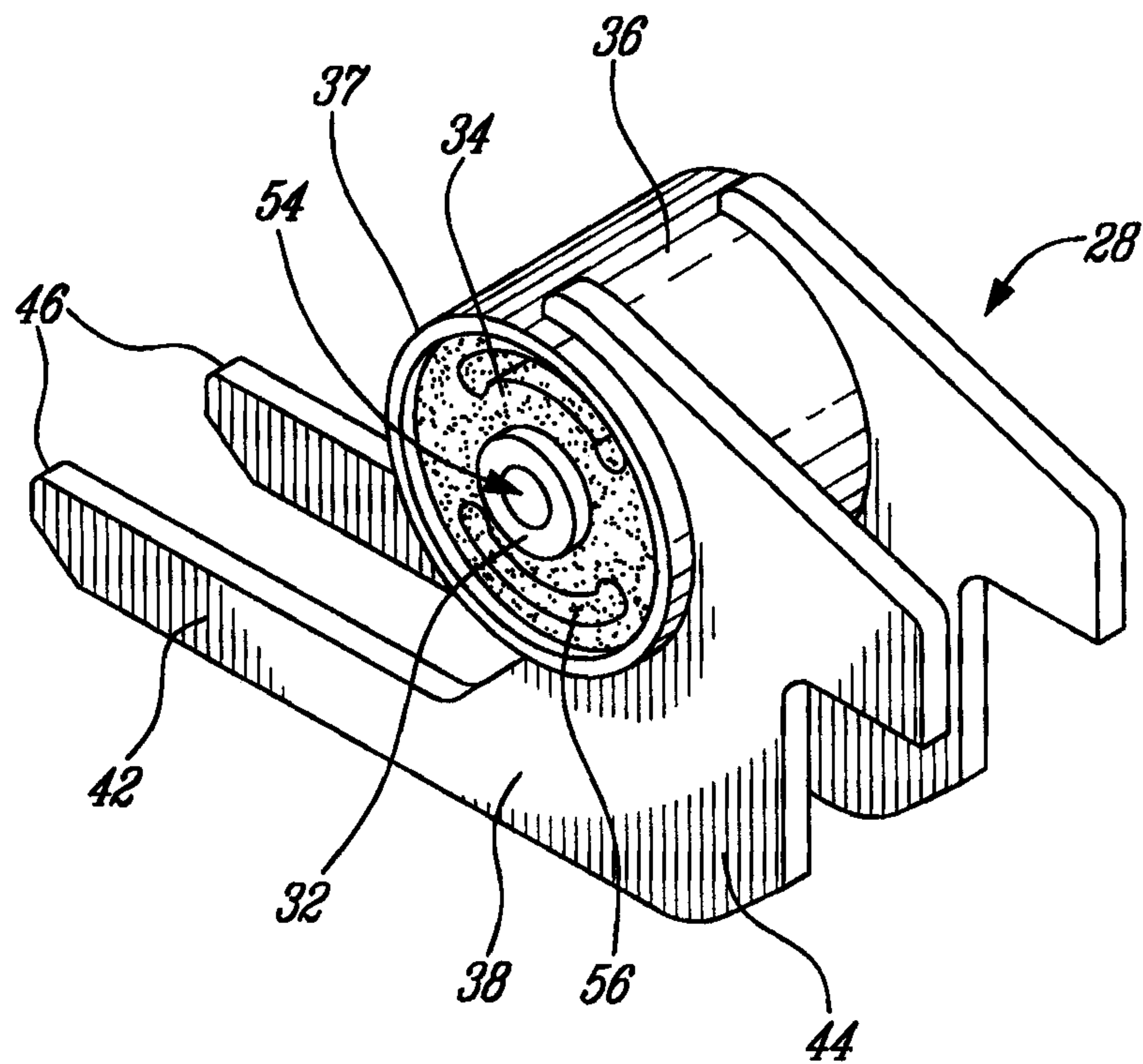
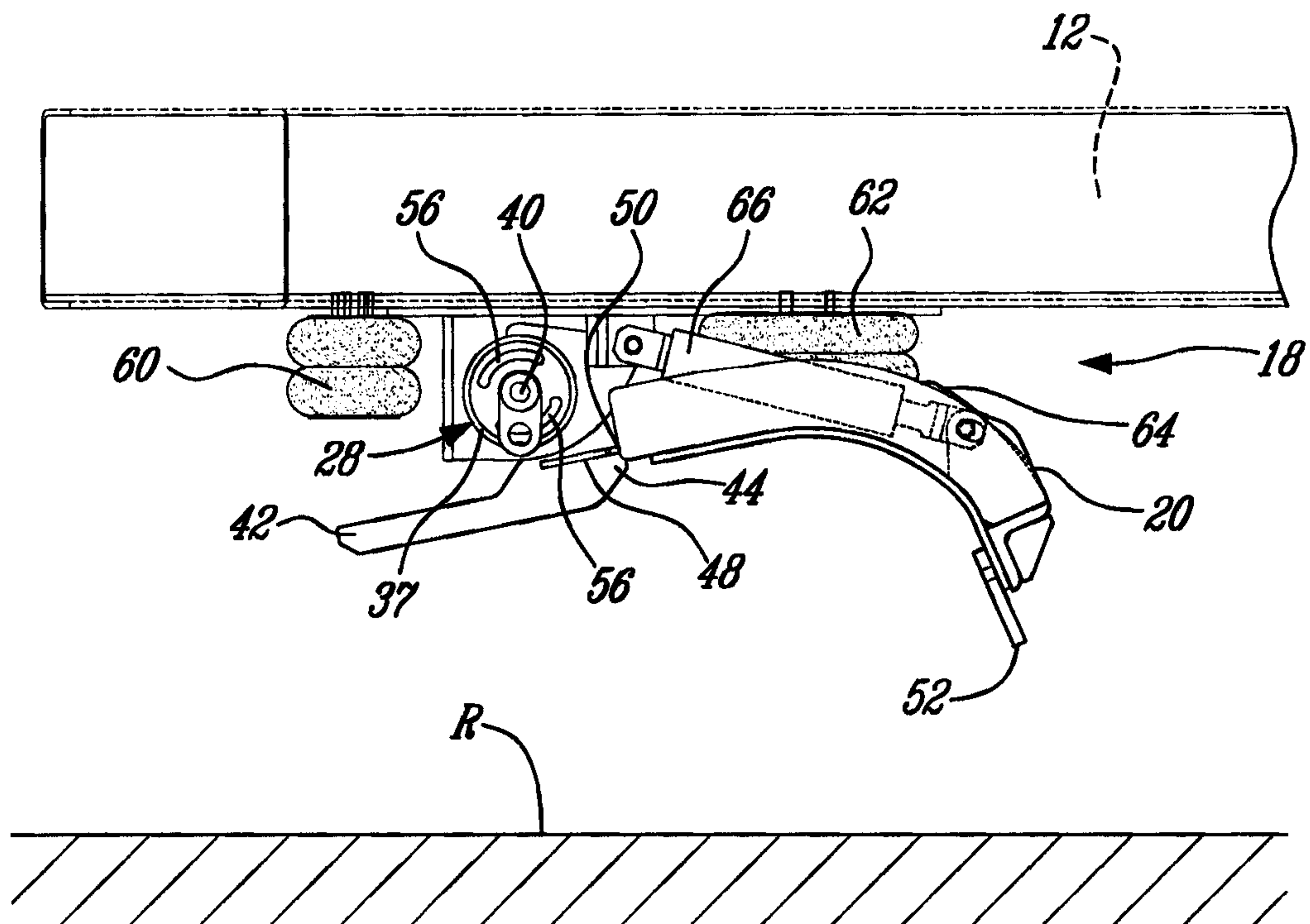
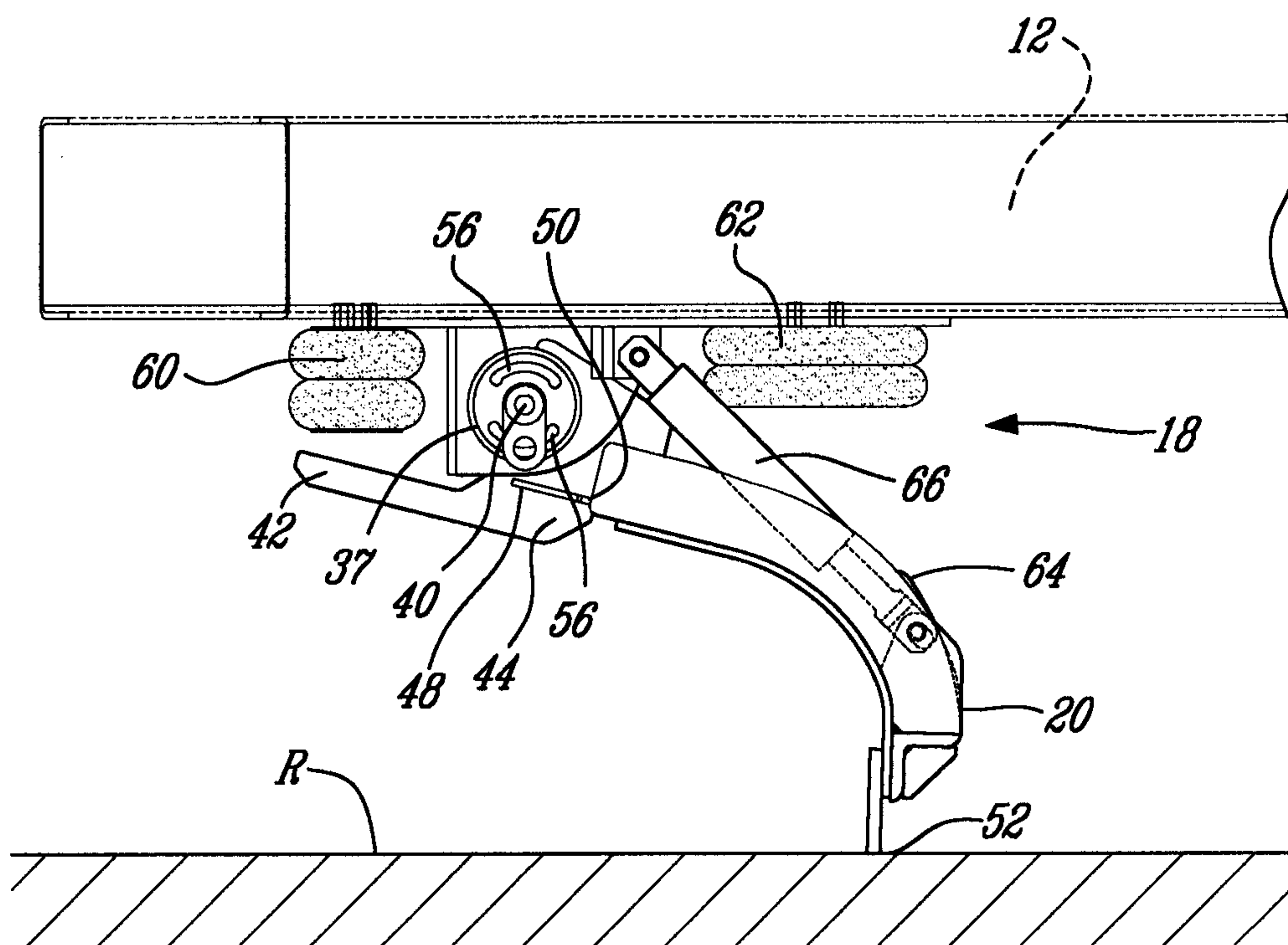


Fig. 2

*Fig. 3*

*Fig. 4*

*Fig. 5*

