

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 February 2009 (05.02.2009)

PCT

(10) International Publication Number
WO 2009/017752 A1

(51) International Patent Classification:
B62D 25/12 (2006.01) *E02F 9/08* (2006.01)
B60J 10/08 (2006.01)

(74) Agents: HANLEY, Steven, M. et al.; 100 N.E. Adams Street, Peoria, IL 61629-9510 (US).

(21) International Application Number:
PCT/US2008/009196

(22) International Filing Date: 30 July 2008 (30.07.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/935,203 31 July 2007 (31.07.2007) US

(71) Applicant (for all designated States except US): CATERPILLAR INC. [US/US]; 100 N.E. Adams Street, Peoria, IL 61629-9510 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): GIOVANNINI, Mario, R. [US/US]; 23722 W. Cotswald Drive, Plainfield, IL 60585 (US). SALIS, Francis, A. [US/US]; 46 S. Raddant Road, Batavia, IL 60510 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(54) Title: ENGINE ENCLOSURE

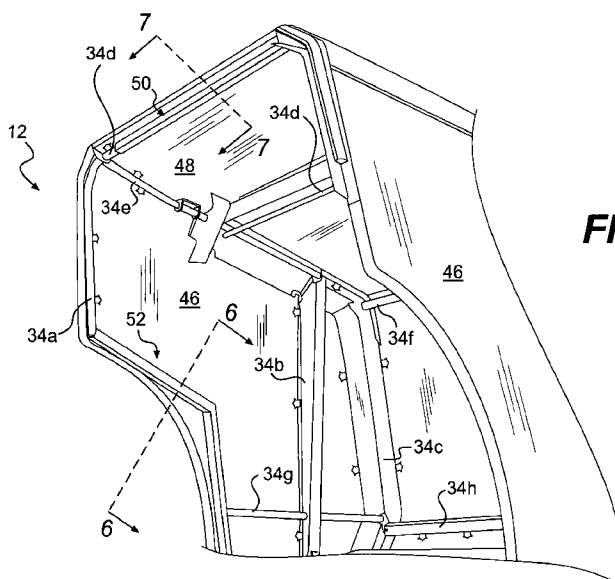


FIG. 4

(57) Abstract: An engine enclosure (22) is disclosed. The engine enclosure has a first wheel well assembly (24) and a hood assembly (12). The hood assembly has an upper panel (48) substantially aligned with a pivot axis (68) of the hood assembly. The hood assembly also has a first side panel (46) connected to the upper panel and configured to move in a plane substantially parallel to the first wheel well assembly. Additionally, the hood assembly has a first deflection element (52) connected to the first side panel. The engine enclosure also has a first sealing element (62) connected to the first wheel well assembly. The first sealing element extends from the first wheel well assembly toward the first side panel to engage the first deflection element.

-1-

DescriptionENGINE ENCLOSURETechnical Field

5 This disclosure is directed to an enclosure and, more particularly,
to an engine enclosure.

Background

Some large machines such as wheel loaders, off-highway trucks, excavators, and other earth-moving machines include an engine to power travel and other operations of the machines. Because the machines often operate within
10 dusty or debris-filled environments, the engines may be sealed from the environment to protect the engines from damage. Typically, the engine is located within an enclosure known as an engine compartment. Access to the engine compartment is generally provided by way of a pivoting hood.

Typical engine compartments consist of an open box-like
15 structure, with the hood acting as a lid to close off the box. To seal the engine from dust and debris, a sealing element such as a foam gasket or weather stripping is located along the open edges of the engine compartment and compressed by the hood when the hood is closed. This type of engagement is commonly referred to as a butt-joint, wherein the hood includes a generally
20 planar surface that moves into engagement against another generally planar surface at the edges of the engine compartment, in a direction substantially normal to both of the planar surfaces such that the sealing element is sandwiched between the two planar surfaces.

Unfortunately, this type of engagement can be problematic. That
25 is, if misalignment between the two surfaces is excessive, the sealing element may be insufficiently compressed to adequately seal the engine from the environment. This problem may be exacerbated when the surfaces of the hood

-2-

and edges of the engine enclosure are non-planar, such as when the side walls of the engine enclosure also function as wheel wells.

One system that attempts to improve the sealing of an engine compartment is disclosed in U.S. Patent No. 6,374,936 (the '936 patent) issued to
5 Smith on 23 April 2002. The '936 patent discloses a hood closure guide and seal arrangement. A hood is pivotally mounted to a supporting structure adjacent to a mast. The mast extends vertically upward from the supporting structure of a work vehicle. A work implement is operatively coupled to the mast. The mast is provided with left and right mast side walls. The interior of each of the side walls
10 is provided with a guide and a seal having a V-shaped cross section. The hood is provided with left and right side walls having left and right rear edges. The left and right rear edges are offset inwardly from the hood side walls. When the hood is closed, the left and right rear edges engage the left and right guides, wedging the edges into the V-shaped cross section. The base of each guide is provided
15 with a tapered block. The tapered blocks are designed to engage a Z-bracket. The Z-bracket is located on the bottom corners of the hood side walls.

Although misalignment between the hood side walls and the left and right mast side walls may be minimized through the use of the left and right guides, the hood of the '936 patent may still be problematic, expensive, and have
20 limited applicability. Specifically, the V-shaped guide and hood engagement still relies on a precise depth of the hood into the guide. If the hood side walls have a leading edge that is non-linear or at an angle non-parallel to a vertex of the V-shaped guide, the sealing may be inadequate. For this same reason, the hood/guide arrangement may have limited applicability to non-linear geometry
25 such as when the hood engages a wheel well. Further, the V-shaped guides, tapered blocks, and Z-brackets may substantially increase the cost of the arrangement.

The engine enclosure of the present disclosure solves one or more of the problems set forth above.

Summary of the Disclosure

In one exemplary aspect, the present disclosure may be directed to an engine enclosure. The engine enclosure may include a first wheel well assembly and a hood assembly. The hood assembly may include an upper panel substantially aligned with a pivot axis of the hood assembly. The hood assembly may also include a first side panel connected to the upper panel and configured to move in a plane substantially parallel to the first wheel well assembly. Additionally, the hood assembly may include a first deflection element connected to the first side panel. The engine enclosure may also include a first sealing element connected to the first wheel well assembly. The first sealing element may extend from the first wheel well assembly toward the first side panel to engage the first deflection element.

Brief Description of the Drawings

Fig. 1 is a pictorial illustration of an exemplary disclosed machine;
Fig. 2 is a pictorial illustration of an exemplary disclosed hood assembly frame for use with the machine of Fig. 1;
Fig. 3 is an exploded-view of exemplary disclosed hood assembly panels and deflection elements for use with the machine of Fig. 1;
Fig. 4 is a pictorial illustration of the panels and deflection elements of Fig. 3 assembled to the hood assembly frame of Fig. 2;
Fig. 5 is an exploded-view of an exemplary disclosed end wall assembly and exemplary disclosed wheel well assemblies for use with the machine of Fig. 1;
Fig. 6 is a cutaway-view illustration of an exemplary disclosed lap-joint connection for use between the hood assembly of Fig. 4 and one of the wheel well assemblies of Fig. 5;

Fig. 7 is a cutaway-view illustration of an exemplary disclosed lap-joint connection for use between the hood assembly of Fig. 4 and the end wall assembly of Fig. 5;

Fig. 8 is a cutaway-view illustration of an exemplary disclosed butt-joint connection for use between the hood assembly of Fig. 4 and the end wall assembly of Fig. 5; and

Fig. 9 is an enlarged cutaway-view illustration of the hood assembly of Fig. 4 connected to the machine of Fig. 1.

Detailed Description

Fig. 1 illustrates an exemplary machine 10 with a hood assembly 12 in an open position. Machine 10 may embody a mobile machine that may be used in a dusty or debris filled environment associated with an industry such as mining, construction, farming, or any other industry known in the art. For example, machine 10 may be a loader, motor grader, off-highway truck, excavator, or any other similar machine. Machine 10 may include a frame 14 and a pivot element 16 connecting hood assembly 12 to frame 14.

Frame 14 may include any structural unit that supports movement of machine 10. Frame 14 may be, for example, a stationary base frame connecting an engine 18 to a traction device 20, a movable frame member of a linkage system, or any other frame known in the art.

Engine 18 may be substantially surrounded by an engine enclosure 22, which may help protect engine 18 from dust and/or other debris. Engine enclosure 22 may have moveable and/or fixed sub-assemblies, each sub-assembly being attached to frame 14, and comprising one or more panels. The panels may be positioned to at least partially surround engine 18. The panels may be fabricated from a material capable of withstanding exposure to the work site of machine 10 and the temperature near engine 18. For example, the panels may be fabricated from aluminum, steel, titanium, fiberglass, plastic, or any other

material known in the art. The panels may be shaped by molding, stamping, bending, or other processes known in the art.

One fixed sub-assembly of engine enclosure 22 may be associated with traction device 20. In particular, engine enclosure 22 may include a wheel well assembly 24. Wheel well assembly 24 may include a side wall panel 26, which may be fixedly attached, directly or indirectly, to frame 14 via threaded fastening, riveting, welding, or in any other way known in the art. Side wall panel 26 may be positioned to form a wall between engine 18 and traction device 20, the wall being generally orthogonal to a ground surface and generally parallel to a longitudinal axis 32 of machine 10. Machine 10 may include two wheel well assemblies 24 located on opposite sides of engine 18, thereby forming two sides of engine enclosure 22.

Engine enclosure 22 may also include an end wall assembly 28. End wall assembly 28 may include an end wall panel 30, which may be fixedly attached, directly or indirectly, to frame 14 via threaded fastening, riveting, welding, or in any other way known in the art. End wall panel 30 may act as an end for engine enclosure 22, joining wheel well assemblies 24. End wall panel 30 may be positioned to form a wall generally orthogonal to both a ground surface and longitudinal axis 32 of machine 10. End wall panel 30 may be fixedly attached to both side wall panels 26 via threaded fastening, riveting, welding, or in any other way known in the art. Each of these connections, between end wall panel 30 and side wall panels 26, may include a seal such as, for example, foam, whether stripping, glue, calk, or any other type of mechanical sealing element known in the art. Machine 10 may include two end wall panels 30, located on opposite sides of engine 18 (i.e. fore and aft of engine 18), thereby forming two ends of engine enclosure 22 orthogonal to the two sides of engine enclosure 22 formed by side wall panels 26.

As described above, engine enclosure 22 may include a moveable sub-assembly. In particular, engine enclosure 22 may include hood assembly 12,

-6-

which is moveable to provide access to engine 18. Fig. 2 illustrates an exemplary embodiment of an internal frame 34 used to support and provide structure for hood assembly 12. Frame 34 may be fixedly attached, directly or indirectly, to pivot element 16 (referring to Fig. 1) via threaded fastening, riveting, welding, or
5 in any other way known in the art. Frame 34 may thereby support and stabilize, directly or indirectly, other components of hood assembly 12.

Frame 34 may have various members including upright support members 34a, 34b, and 34c; upper support members 34d, 34e, and 34f; lower support members 34g and 34h; and/or any other support members necessary to
10 support and stabilize hood assembly 12. Members of frame 34 may be, for example, formed or shaped beams having substantially hollow cross-sections. Formed or shaped beams may be single piece beams created by hot or cold methods, and may or may not, include a single longitudinal seam. Members of frame 34 may be connected to each other via threaded fastening, riveting,
15 welding, or in any other way known in the art.

The forward end of each upper support member 34e may be connected to the upper end of one upright support member 34a. Each of these connections may also include one end of one upper support member 34d. Thus, upper support member 34d may connect upright support members 34a to each
20 other, and upper support members 34e to each other. Alternatively, upright support members 34a and this upper support member 34d may be formed into a single integral component. Each end of another upper support member 34d may be connected to an inward facing side of each upper support member 34e, thereby connecting upper support members 34e to each other at a second location.
25 Additionally, the rearward end of each upper support member 34e may be connected to the upper end of one upright support member 34b. Each of these connections may also include the upper forward end of one upright support member 34c.

-7-

The upper rearward end of each upright support member 34c may be connected to one end of upper support member 34f. Thus, upper support member 34f may connect upright support members 34c to each other. Upright support members 34c may also be connected to each other by lower support member 34h. In particular, each end of lower support member 34h may be connected to the lower end of one upright support member 34c. Each of these connections may also include the rearward end of one lower support member 34g. Each lower support member 34g may extend forward through a hole in one upright support member 34b to connect each upright support member 34c to one upright support member 34a.

Members of frame 34 may have bends located along their length. Therefore, the longitudinal axis of each member may be located in more than one plane. For example, each upright support member 34a may have one bend 36 and another bend 38. Near bend 36, the longitudinal axis of upright support member 34a may be located in a plane 40 and a plane 42. And, near bend 38, the longitudinal axis of upright support member 34a may be located in plane 42 and a plane 44.

Fig. 3 illustrates a set of panels, which may be fixedly attached to frame 34 via threaded fastening, riveting, welding, or in any other way known in the art. In the illustration, the panels are oriented, relative to each other, approximately as they are when attached to frame 34. The set may have opposing side panels 46, which may act as partial sides for engine enclosure 22. Side panels 46 may be positioned to form spaced apart walls generally orthogonal to a ground surface and generally parallel to side wall panels 26 (referring to Fig. 1). Side panels 46 may be spaced outward of wheel well assemblies 24 (referring to Fig. 1). As illustrated in Fig. 4, each side panel 46 may be attached to several members of frame 34. In particular, each side panel 46 may be attached to one upright support member 34a, 34b, and 34c. Each side panel 46 may also be attached to one upper support member 34e.

The set illustrated in Fig. 3 may also have an upper panel 48, which may act as a top for engine enclosure 22. Upper panel 48 may be positioned to form a ceiling generally parallel to a ground surface when hood assembly 12 is in a closed position. As illustrated in Fig. 4, upper panel 48 may be attached to one upper support member 34d. Upper panel 48 may also be attached to upper support members 34e and upright support members 34c. Additionally, upper panel 48 may be fixedly attached to side panels 46 via threaded fastening, riveting, welding, or in any other way known in the art. Each of these connections between upper panel 48 and side panels 46 may include a seal such as, for example, foam, whether stripping, glue, calk, or any other type of mechanical sealing element known in the art. Alternatively, upper panel 48 and side panels 46 may be formed into a single integral panel, this panel having one or more bends allowing it to act as both a top and two partial sides of engine enclosure 22.

When hood assembly 12 is in a closed position, the panels of hood assembly 12 may be sealed against the fixed sub-assemblies of engine enclosure 22 via lap-joints and/or butt-joints to partially enclose engine 18. Each of these joints may include a deflection element connected to hood assembly 12, and a sealing element attached to wheel well assembly 24 and/or end wall assembly 28. The sealing element may be deflected and/or compressed by the deflection element when hood assembly 12 is moved from an open position to a closed position.

Deflection elements may be fabricated from a rigid material not subject to bending or buckling under the weight of hood assembly 12. For example, deflection elements may be fabricated from a material such as aluminum, steel, titanium, plastic, carbon-fiber, or any other material known in the art. One deflection element 50 may be attached to each upper front support member 34d. As illustrated in Fig. 3, deflection elements may be generally L-shaped. Side a of the L may be attached fixedly and flushly to frame 34 via

threaded fastening, riveting, welding, or in any other way known in the art. And side b of the L may be positioned to deflect or compress a sealing element, thereby flushly connecting itself to the sealing element. Deflection element side 50a may be oriented in a plane generally orthogonal to a ground surface when hood assembly 12 is in a closed position (i.e. oriented vertically). An upper edge of deflection element side 50a may be connected to upper panel 48. This connection may include a seal such as, for example, foam, whether stripping, glue, calk, or any other type of mechanical sealing element known in the art. Deflection element side 50b may extend fore or aft relative to the travel of machine 10, thereby forming a surface oriented substantially parallel to a ground surface when hood assembly 12 is in a closed position (i.e. horizontally).

One deflection element 52 may be attached to each upright support member 34a (referring to Fig. 4). Deflection element sides 52a may be oriented in a plane generally parallel to side panels 46 (i.e. vertically). Deflection elements 52 may have bends located along their length. Therefore, the longitudinal axis of each deflection element 52 may be located in more than one plane. In particular, each deflection element 52 may have one bend 54. Near bend 54, the longitudinal axis of deflection element 52 may be located in plane 40 and plane 42. Below bend 54, deflection element side 52b may be oriented in a plane generally parallel to plane 40 (i.e. substantially vertically). Above bend 54, deflection element side 52b may be oriented in a plane generally parallel to plane 42, and inclined relative to plane 40. An outward edge of deflection element side 52b may be connected to side panel 46. This connection may include a seal such as, for example, foam, whether stripping, glue, calk, or any other type of mechanical sealing element known in the art. Alternatively, deflection element side 52b may be arced, planar or non-planar, and single or multi-faceted.

Fig. 5 illustrates seal support elements, which may connect sealing elements to engine enclosure 22. Seal support elements may be fabricated from a

-10-

rigid material not subject to bending or buckling under the weight of hood assembly 12. For example, seal support elements may be fabricated from a material such as aluminum, steel, titanium, plastic, carbon-fiber, or any other material known in the art. Seal support elements may be attached fixedly to
5 engine enclosure 22 panels via threaded fastening, riveting, welding, or in any other way known in the art.

One seal support element 56 may be assembled to each end wall panel 30. Seal support element 56 may extend fore or aft relative to the travel of machine 10, thereby forming a surface oriented substantially parallel to a ground
10 surface (i.e. horizontally). Alternatively, seal support element 56 and end wall panel 30 may be formed into a single integral component, end wall assembly 28.

One seal support element 58 may be assembled to each side wall panel 26. Seal support element 58 may extend outward toward traction device 20, thereby forming a surface partially surrounding the traction device 20. Seal
15 support elements 58 may have one or more bends located along their length. Therefore, the longitudinal axis of each seal support element 58 may be located in more than one plane. In particular, each seal support element 58 may have one bend 60. Near bend 60, the longitudinal axis of seal support element 58 may be located in plane 40 and plane 42. Below bend 60, seal support element 58 may
20 be oriented in a plane generally parallel to plane 40 (i.e. substantially vertically). Above bend 60, seal support element 58 may be oriented in a plane generally parallel to plane 42 (i.e. inclined relative to plane 40). Alternatively, seal support element 58 may be arced, planar or non-planar, and single or multi-faceted. In another alternative, seal support element 58 and side wall panel 26 may be
25 formed into a single integral component, wheel well assembly 24.

A sealing element may be attached fixedly and flushly to each seal support element with a retaining strip, threaded fastener, glue, or any other means known in the art. The sealing element may be deflected by deflection elements to form a lap-joint. A lap-joint sealing element may embody a mechanical sealing

-11-

element fabricated from an elastomeric material such as, for example, fluorocarbon elastomer (FKM), ethylene propylene (EPM, EPDM), neoprene (CR), or any other elastomeric material known in the art that is capable of bending without breaking.

5 One lap-joint sealing element may be used to connect hood assembly 12 to each wheel well assembly 24. In particular, as illustrated in Fig. 6, one sealing element 62 may be attached to each seal support element 58. Sealing element 62 may be curved or bent as necessary so that it remains generally flush with seal support element 58. Sealing element 62 may extend
10 past the edge of deflection element 52 so that it overlaps seal support element 58 and deflection element 52. This dual overlap may allow deflection element 52 to deflect sealing element 62, thereby forming a lap-joint connecting seal support element 58 to deflection element 52. This lap-joint may complete a chain of joints (side wall panel 26 to seal support element 58, seal support element 58 to
15 deflection element 52, and deflection element 52 to both frame 34 and side panel 46), thereby connecting wheel well assembly 24 (referring to Fig. 1) to hood assembly 12 (referring to Fig. 1).

 One lap-joint sealing element may be used to connect hood assembly 12 to each end wall assembly 28. In particular, as illustrated in Fig. 7,
20 one sealing element 64 may be attached to each seal support element 56. Sealing element 64 may be curved or bent as necessary so that it remains generally flush with seal support element 56. Sealing element 64 may extend past the edge of deflection element 50 so that it overlaps seal support element 56 and deflection element 50. This dual overlap may allow deflection element 50 to deflect sealing
25 element 64, thereby forming a lap-joint. Alternatively, as illustrated in Fig. 8, one butt-joint sealing element may be used to connect hood assembly 12 (referring to Fig. 1) to each end wall assembly 28 (referring to Fig. 1). In particular, one sealing element 66 may be attached to each seal support element 56. Sealing element 66 may embody a foam gasket, whether stripping, or any

-12-

other type of mechanical sealing element known in the art that is capable of being compressed. Sealing element 66 may be positioned atop seal support element 56 so that it may only be compressed against seal support element 56, and not deflected past seal support element 56. This positioning may allow deflection
5 element 50 to compress sealing element 64, thereby forming a butt-joint. At least one of the sealing element 64 lap-joint and the sealing element 66 butt-joint, may complete a chain of joints (end wall panel 30 to seal support element 56, seal support element 56 to deflection element 50, and deflection element 50 to both frame 34 and upper panel 48), thereby connecting end wall assembly 28
10 (referring to Fig. 1) to hood assembly 12 (referring to Fig. 1).

To access engine 18, the connections between hood assembly 12 and wheel well assembly 24, and between hood assembly 12 and end wall assembly 28, may be broken by pivoting hood assembly 12 to an open position. Hood assembly 12 may be pivoted to an open position, as illustrated in Fig. 9, by
15 rotating hood assembly 12 about pivot axis 68 through an angle α , thereby causing the deflection elements to disengage the sealing elements and expose engine 18. To close engine enclosure 22, hood assembly 12 may be pivoted from an open position to a closed position by rotating hood assembly 12 about pivot axis 68 through an angle β , thereby causing the deflection elements to reengage
20 the sealing elements and partially enclose engine 18.

Industrial Applicability

The disclosed engine enclosure may be applicable to any machine having a power source sensitive to contamination. The enclosure may be particularly beneficial when applied to a machine operating within dusty or
25 debris-filled environments. The disclosed engine enclosure may protect the power source from contamination by providing an inexpensive, easily manufactured compartment that is reliably sealed.

The enclosure may reduce the complexity and cost of machine 10. In particular, the lap-joint connections of the enclosure may reliably seal the

-13-

engine compartment without guides or brackets. Lap joint connections may not require guides and brackets because lap-joint sealing elements may be deflected. Deflection of a sealing element may allow each lap-joint connection to form at various locations along the sealing element's surface. These locations may
5 increase the connection's tolerance for misalignment. Therefore, various deflection elements that are non-linear, or otherwise difficult to align precisely to seal support elements, may be used. Without guides or brackets, these deflection elements may minimize the complexity and total part count of the enclosure, the manufacturing and material costs associated with the required parts, and the
10 assembly costs associated with joining the individual parts.

The lap-joint connection may increase the number of non-metallic materials that are suitable for use in the fabrication of hood assembly 12. This is because the lap-joint connection may reliably seal the engine compartment without being compressed by heavy metallic materials. Lessening the weight of
15 parts near engine 18 may allow for more efficient ballasting of machine 10. Efficient ballasting of machine 10 may reduce the total weight of machine 10, and thereby increase the fuel efficiency of machine 10. In addition, non-metallic materials may be easily molded to include complex features. These complex features may be functional, and for example, increase the efficiency of air
20 movement in the vicinity of engine 18. Or, the features may be aesthetic, and increase the salability of machine 10.

It will be apparent to those skilled in the art that various modifications and variations can be made in the engine enclosure embodiments without departing from the scope of the disclosure. Other embodiments of the
25 disclosed engine enclosure will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope being indicated by the following claims and their equivalents.

-14-

Claims

1. An engine enclosure (22), comprising:
a first wheel well assembly (24);
5 a hood assembly (12) having:
an upper panel (48) substantially aligned with a pivot axis
(68) of the hood assembly;
a first side panel (46) connected to the upper panel and
configured to move in a plane substantially parallel to the first wheel well
10 assembly; and
a first deflection element (52) connected to the first side
panel; and
a first sealing element (62) connected to the first wheel well
assembly and extending from the first wheel well assembly toward the first side
15 panel to engage the first deflection element.
2. The engine enclosure of claim 1, wherein the first sealing
element extends from the first wheel well assembly past an edge of the first
deflection element when the hood assembly is in an open position, and is
20 deflected by the first deflection element when the hood assembly is pivoted from
the open position to a closed position.
3. The engine enclosure of claim 1 or 2, wherein the first
wheel well assembly includes:
25 a first side wall panel (26); and
a first seal support element (58) connecting the first sealing
element to the first side wall panel.

-15-

4. The engine enclosure of claim 3, wherein the first seal support element has a first substantially planar surface oriented generally vertical relative to a ground surface when assembled to the first wheel well assembly, and a second substantially planar surface connected to and inclined relative to the first substantially planar surface.

5. The engine enclosure of claim 4, wherein the first deflection element has a first substantially planar surface generally parallel to the first substantially planar surface of the first seal support element when the hood assembly is in a closed position, and a second substantially planar surface connected to the first substantially planar surface and generally parallel to the second substantially planar surface of the first seal support element when the hood assembly is in the closed position.

6. The engine enclosure of claim 5, wherein the first substantially planar surface of the first deflection element overlaps a portion of the first sealing element connected to the first substantially planar surface of the first seal support element, and the second substantially planar surface of the first deflection element overlaps a portion of the first sealing element connected to the second substantially planar surface of the first seal support element.

7. The engine enclosure of any one of claims 3-6, wherein the first seal support element and the first side wall panel are formed into a single integral component.

8. The engine enclosure of any one of claims 1-7, wherein:
the hood assembly further includes a second deflection element
(50) connected to the upper panel; and
the engine enclosure further includes:

-16-

a second sealing element (64, 66); and
a first end wall assembly (28) connected, and oriented generally orthogonal, to the first wheel well assembly, the first end wall assembly including:

- 5 a first end wall panel (30); and
 a second seal support element (56) connecting the second sealing element to the first end wall panel.

9. The engine enclosure of claim 8, wherein the second
10 sealing element extends from the first end wall panel past an edge of the second deflection element when the hood assembly is in an open position, and is deflected by the second deflection element when the hood assembly is pivoted from the open position to a closed position.

15 10. A machine (10), comprising:
 a power source (18);
 a first traction device (20) driven by the power source; and
 the engine enclosure according to any one of claims 1-9
configured to at least partially seal the power source from an environment.

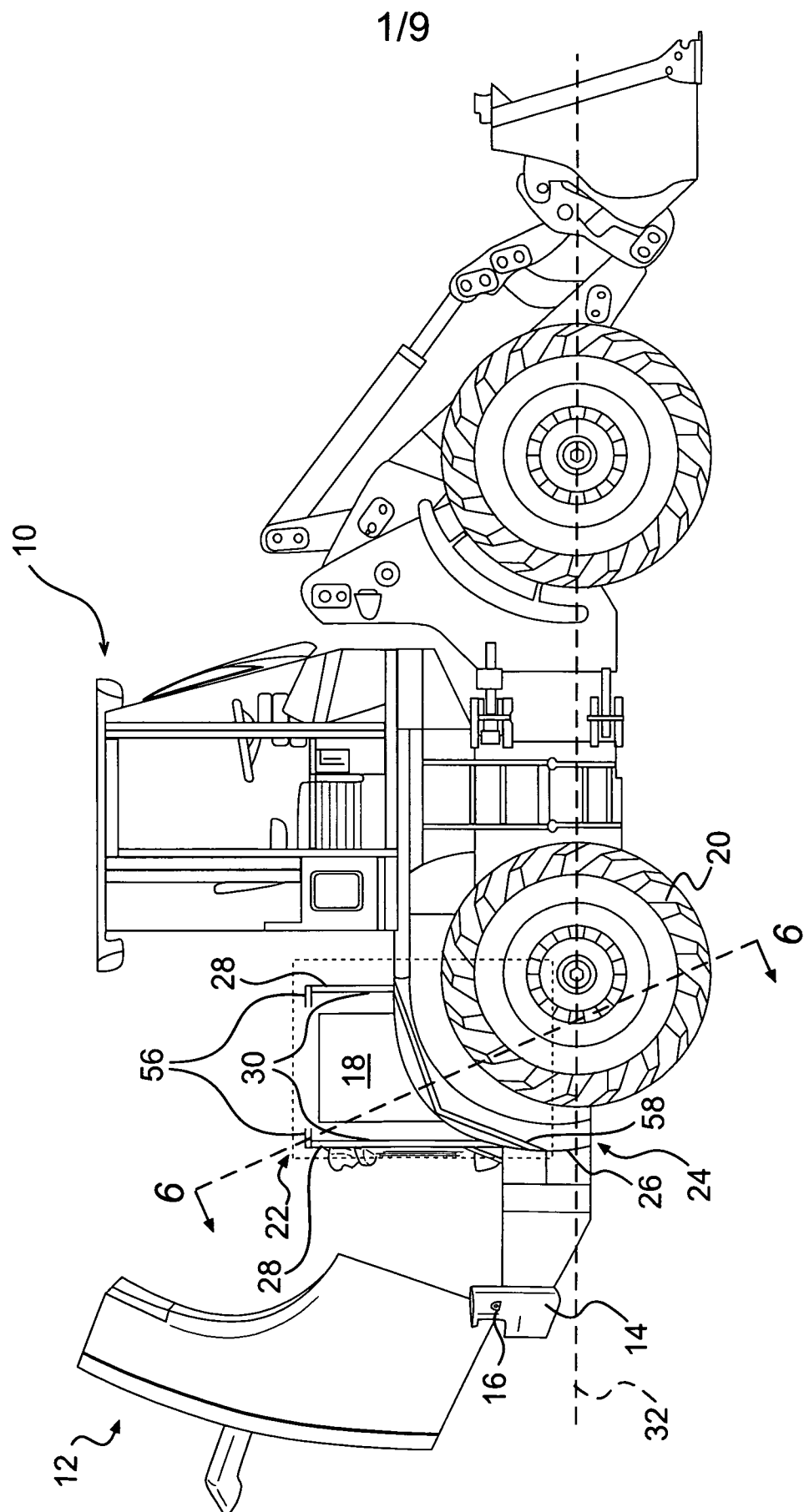
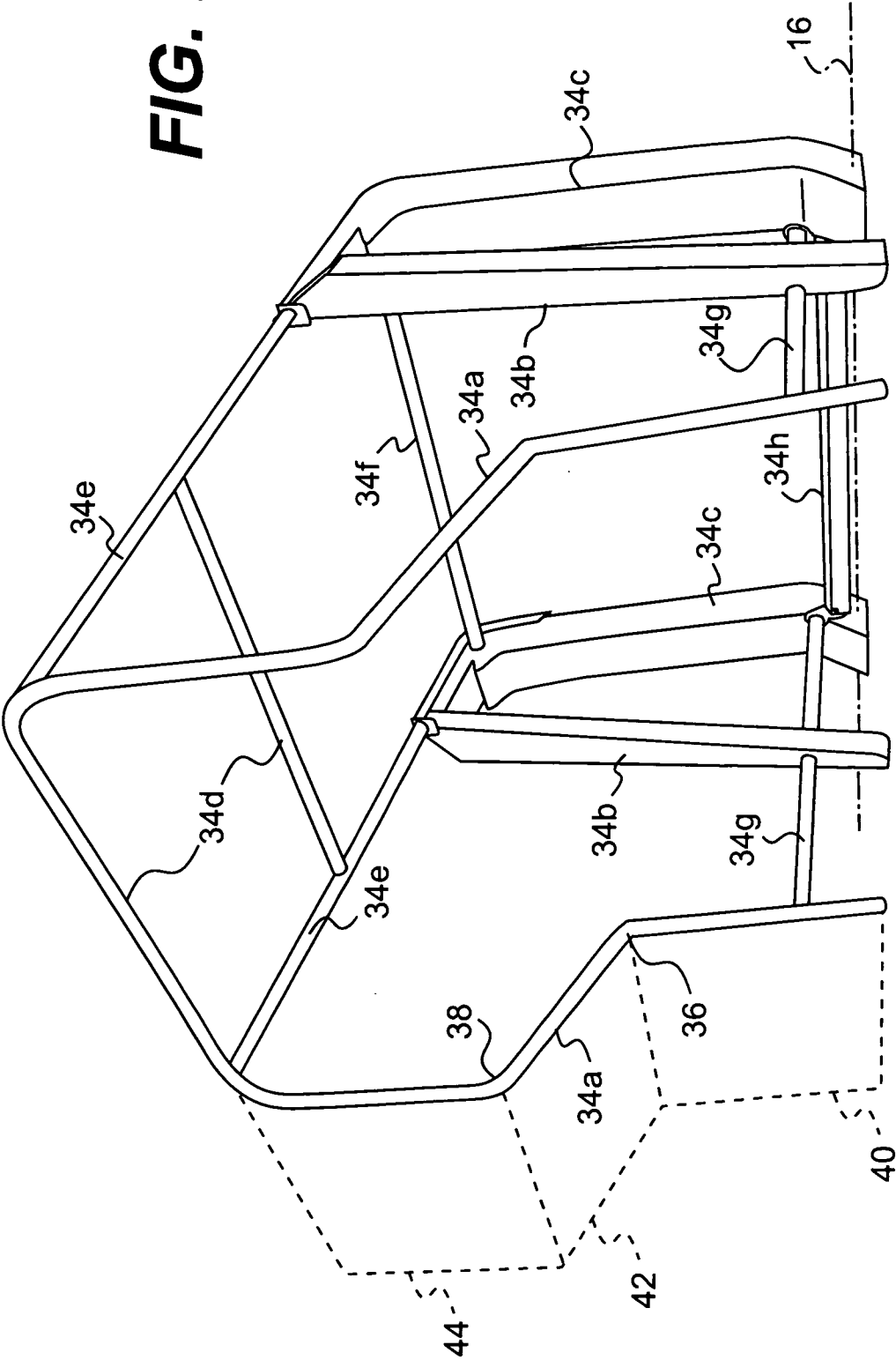


FIG. 1

FIG. 2



3/9

FIG. 3

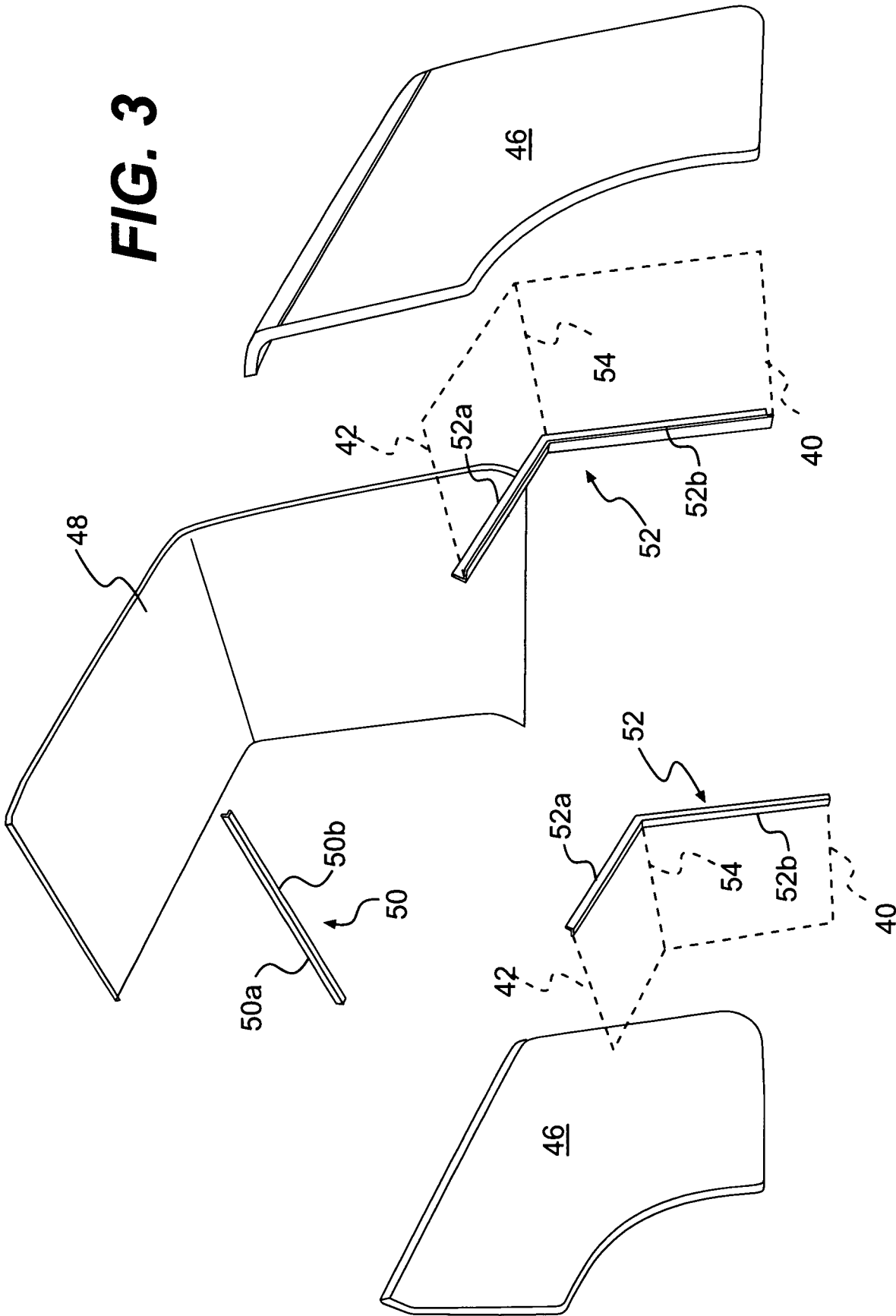
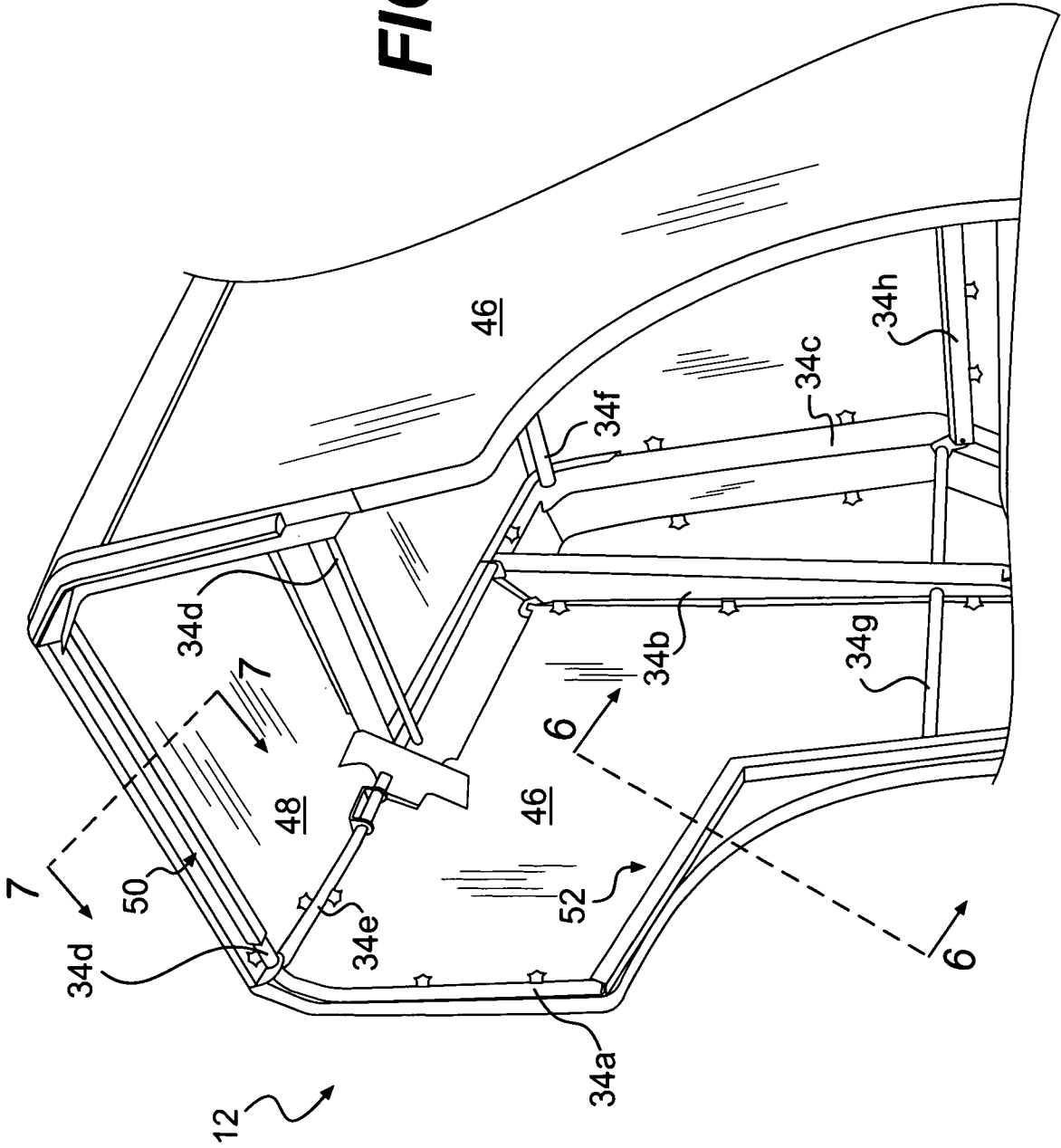


FIG. 4



5/9

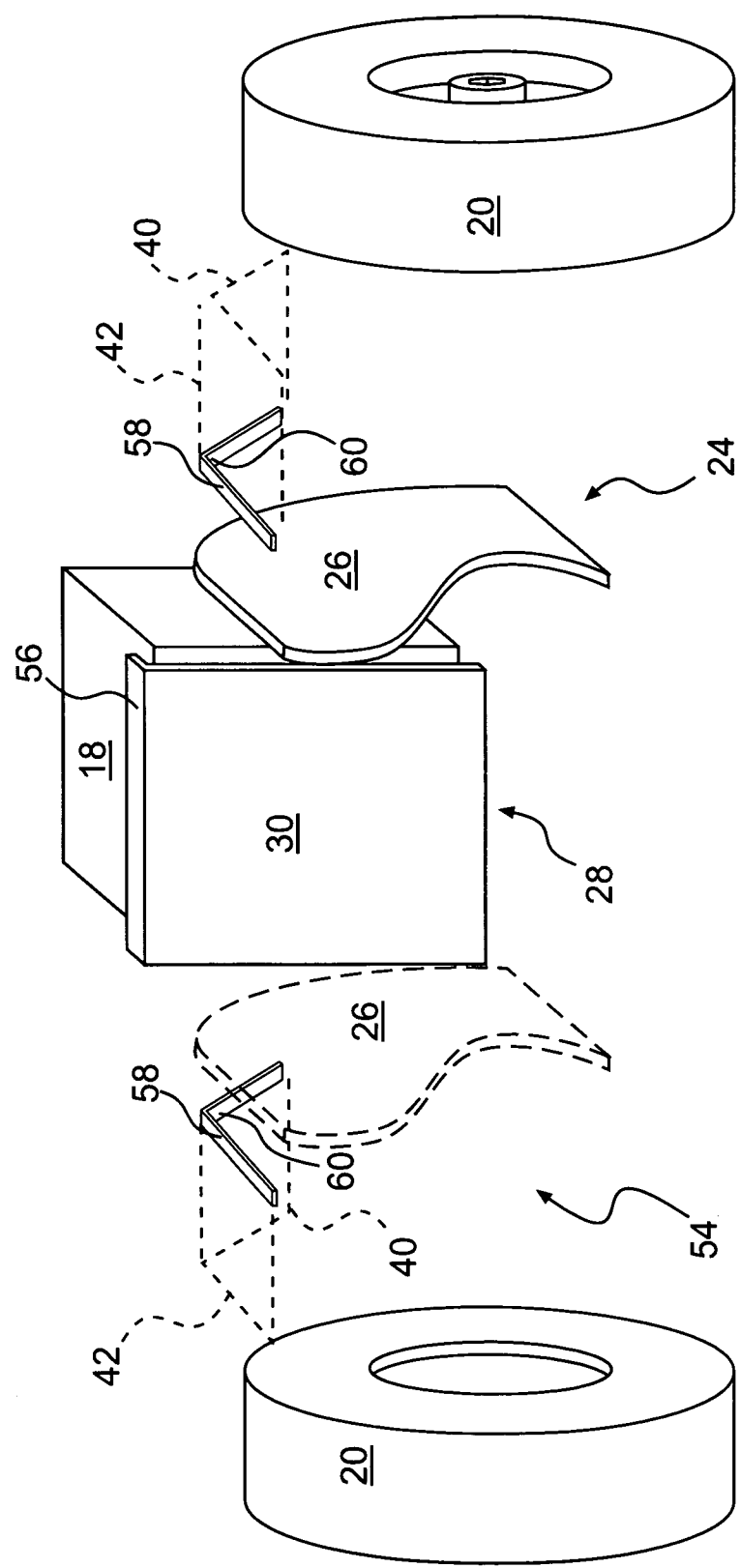


FIG. 5

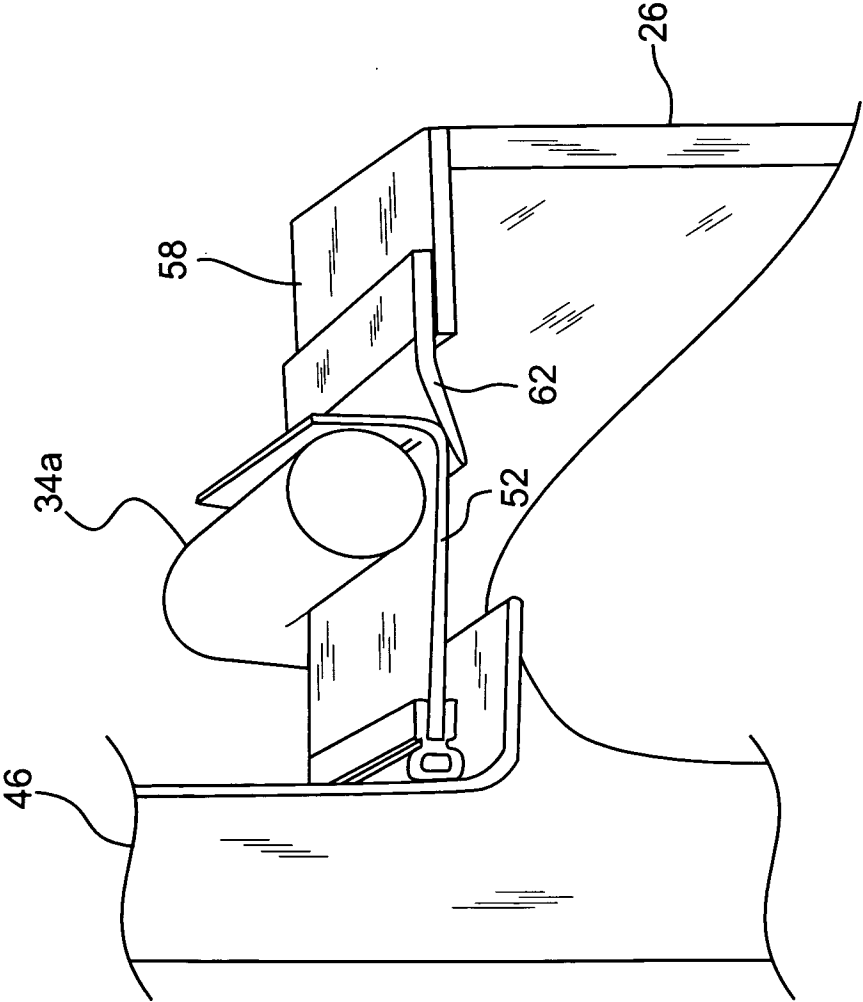


FIG. 6

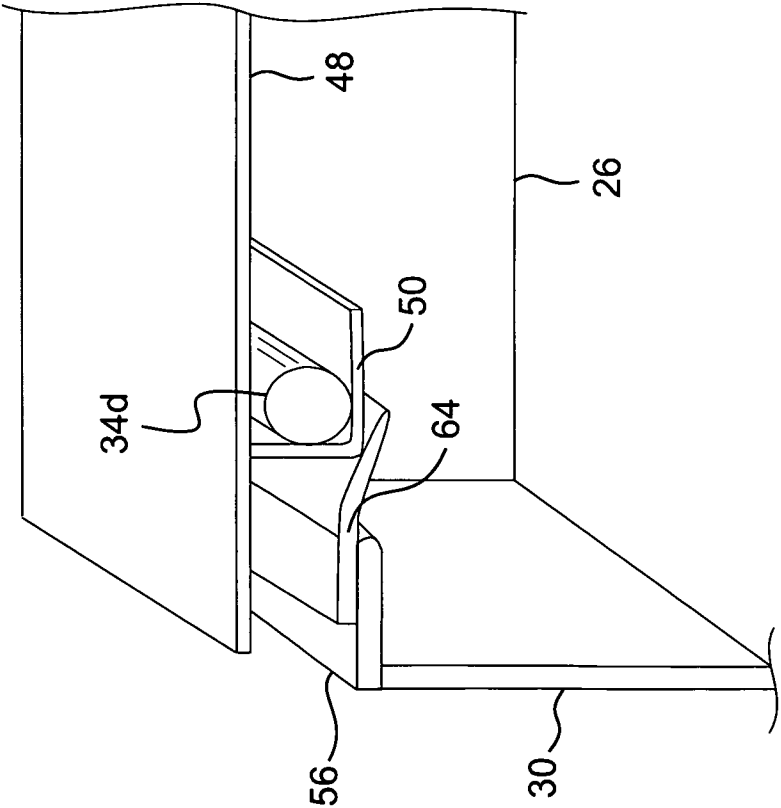


FIG. 7

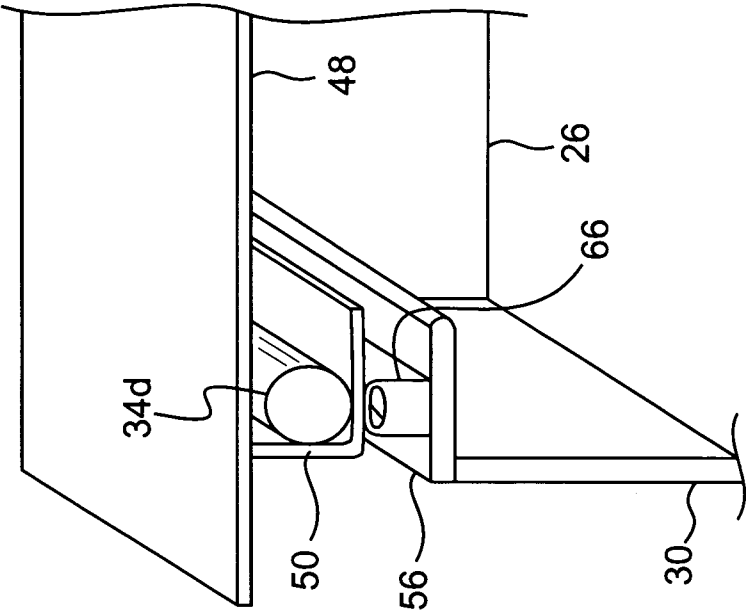
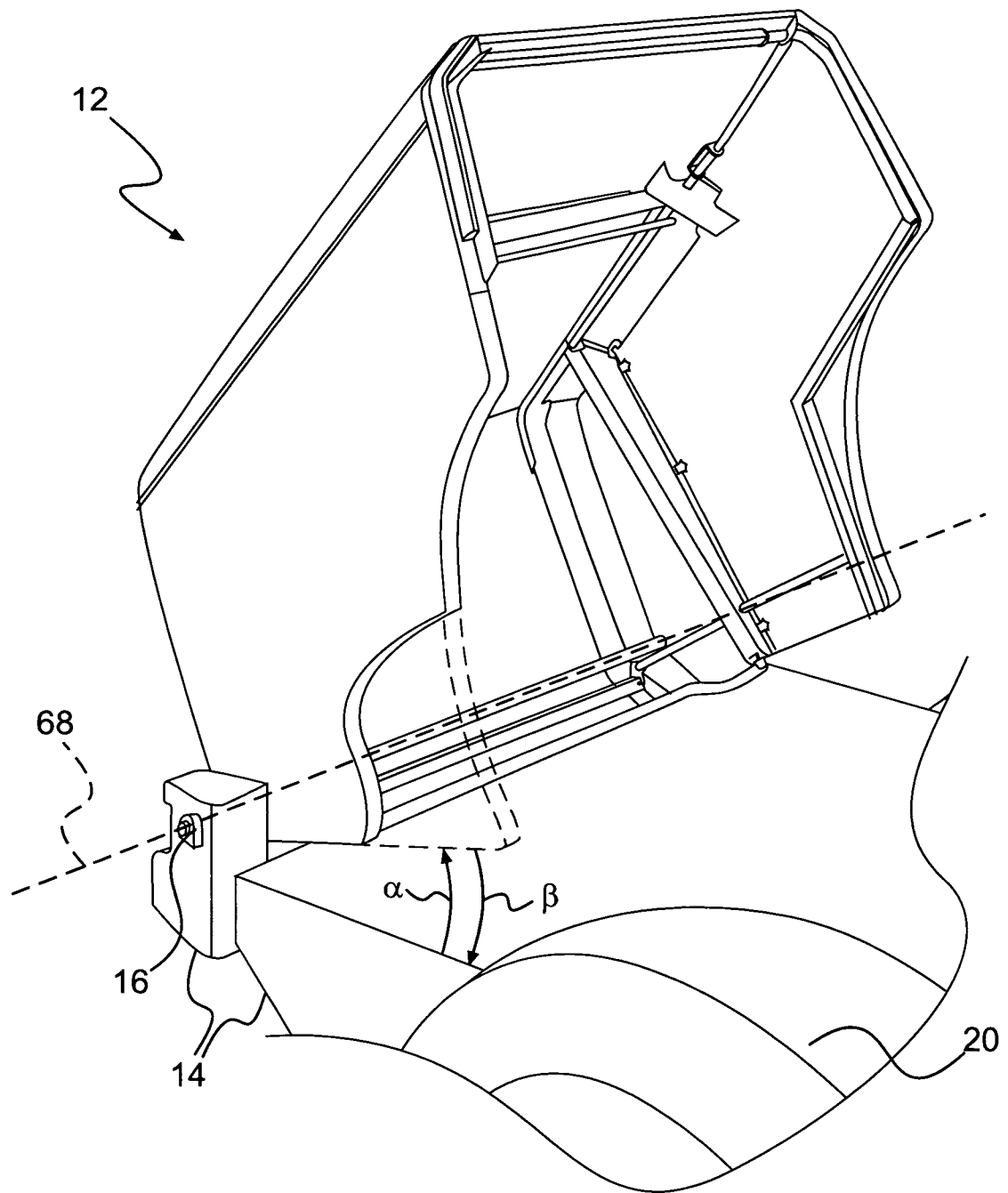


FIG. 8

9/9

**FIG. 9**

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/009196

A. CLASSIFICATION OF SUBJECT MATTER

INV. B62D25/12 B60J10/08 E02F9/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B62D B60J E02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 91 11 759 U1 (O & K ORENSTEIN & KOPPEL AG, 1000 BERLIN, DE) 2 January 1992 (1992-01-02) claims 1,14; figures page 5, line 21 - line 29	1
A	WO 2006/098079 A (YANMAR CO LTD [JP]; AYABE HIROAKI) 21 September 2006 (2006-09-21) abstract; figures 1-3,14,15	1
A	EP 1 741 618 A (CATERPILLAR MITSUBISHI LTD [JP]) 10 January 2007 (2007-01-10) figures 1,2,8,9 paragraph [0021] - paragraph [0025]	1
	-/--	

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

30 October 2008

Date of mailing of the international search report

06/11/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Westland, Paul

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/009196

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 374 936 B1 (SMITH RICHARD JON [US]) 23 April 2002 (2002-04-23) cited in the application figures 4,5 column 2, line 38 - column 3, line 15	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/009196

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 9111759	U1	02-01-1992	NONE	
WO 2006098079	A	21-09-2006	EP 1867560 A1 JP 2006248491 A US 2008185873 A1	19-12-2007 21-09-2006 07-08-2008
EP 1741618	A	10-01-2007	JP 2005313818 A WO 2005105553 A1 US 2007035155 A1	10-11-2005 10-11-2005 15-02-2007
US 6374936	B1	23-04-2002	BR 0102938 A EP 1174545 A1	05-03-2002 23-01-2002