



(12) **DEMANDE DE BREVET CANADIEN**
CANADIAN PATENT APPLICATION

(13) **A1**

(86) Date de dépôt PCT/PCT Filing Date: 2019/12/13
(87) Date publication PCT/PCT Publication Date: 2020/06/18
(85) Entrée phase nationale/National Entry: 2021/06/14
(86) N° demande PCT/PCT Application No.: CA 2019/051815
(87) N° publication PCT/PCT Publication No.: 2020/118454
(30) Priorités/Priorities: 2018/12/14 (US62/779,887);
2019/04/09 (US62/831,654); 2019/11/06 (US62/931,584)

(51) Cl.Int./Int.Cl. *E01D 1/00* (2006.01),
E01D 19/00 (2006.01), *E01D 19/12* (2006.01),
E01D 21/00 (2006.01), *E04G 1/15* (2006.01)
(71) Demandeur/Applicant:
MAADI GROUP, INC., CA
(72) Inventeur/Inventor:
DE LA CHEVROTIERE, ALEXANDRE, CA
(74) Agent: SMART & BIGGAR LLP

(54) Titre : SYSTEME ET PROCEDE DE FABRICATION D'UN TABLIER D'UN PONT OU D'UNE AUTRE
CONSTRUCTION
(54) Title: SYSTEM AND METHOD FOR MAKING A DECK OF A BRIDGE OR OTHER CONSTRUCTION

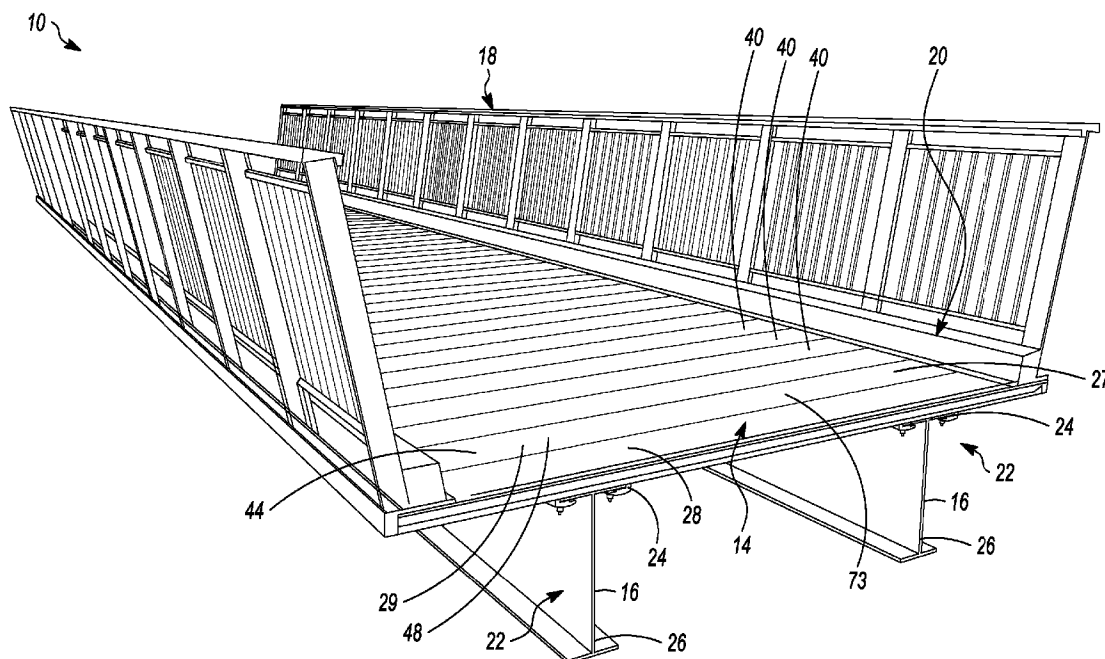


FIG. 1

(57) **Abrégé/Abstract:**

A bridge or other construction comprising a deck, in which the deck is designed to be lightweight and durable, such as by including aluminum, and readily installable on a main bearing structure of the bridge or other construction (e.g., without welding and/or without drilling or otherwise creating holes into the main bearing structure of the bridge or other construction), even if the main bearing structure of the bridge or other construction is based on different material (e.g., steel).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property

Organization

International Bureau

(43) International Publication Date

18 June 2020 (18.06.2020)



(10) International Publication Number

WO 2020/118454 A1

(51) International Patent Classification:

E01D 1/00 (2006.01) *E01D 21/00* (2006.01)*E01D 19/00* (2006.01) *E04G 1/15* (2006.01)*E01D 19/12* (2006.01)

(21) International Application Number:

PCT/CA2019/051815

(22) International Filing Date:

13 December 2019 (13.12.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/779,887 14 December 2018 (14.12.2018) US

62/831,654 09 April 2019 (09.04.2019) US

62/931,584 06 November 2019 (06.11.2019) US

(71) Applicant: **MAADI GROUP, INC.** [CA/CA]; 1445 Graham-Bell Street, Boucherville, Québec J4B 6A1 (CA).(72) Inventor: **DE LA CHEVROTIÈRE, Alexandre**; 2300 de la Salle Street, Suite B405, Montreal, Québec H1V 2L1 (CA).(74) Agent: **SMART & BIGGAR LLP**; 2300-1055 West Georgia, PO Box 11115, Vancouver, British Columbia V6E 3P3 (CA).(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) Title: SYSTEM AND METHOD FOR MAKING A DECK OF A BRIDGE OR OTHER CONSTRUCTION

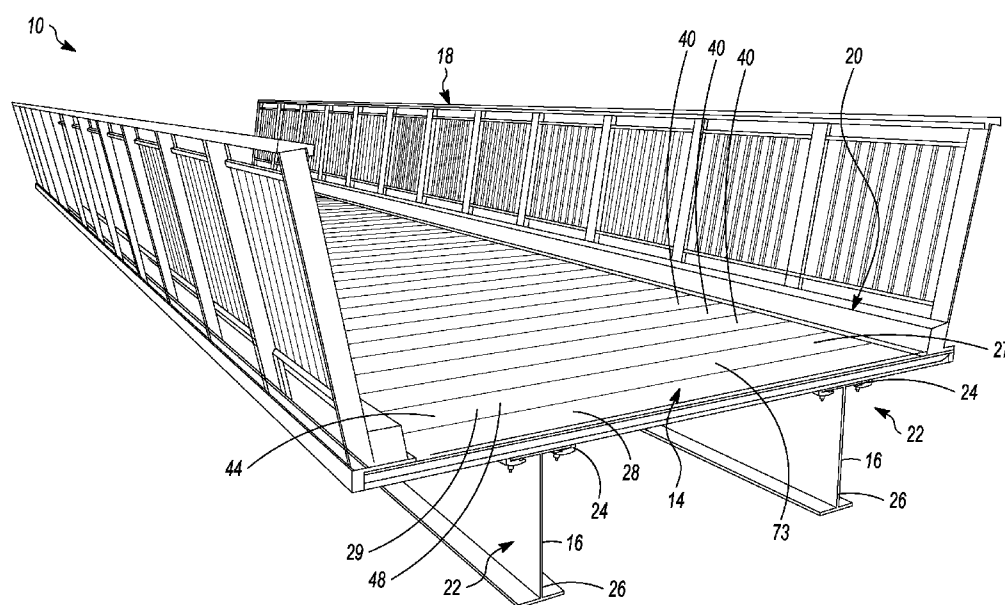


FIG. 1

(57) **Abstract:** A bridge or other construction comprising a deck, in which the deck is designed to be lightweight and durable, such as by including aluminum, and readily installable on a main bearing structure of the bridge or other construction (e.g., without welding and/or without drilling or otherwise creating holes into the main bearing structure of the bridge or other construction), even if the main bearing structure of the bridge or other construction is based on different material (e.g., steel).

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UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

SYSTEM AND METHOD FOR MAKING A DECK OF A BRIDGE OR OTHER CONSTRUCTION

5 CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from U.S. Provisional Patent Application 62/779,887 filed on December 14, 2018, U.S. Provisional Patent Application 62/831,654 filed on April 9, 2019, and U.S. Provisional Patent Application 62/931,584 filed on November 6, 2019,
10 which are incorporated by reference herein.

FIELD

This disclosure relates generally to bridges and other constructions and, more
15 particularly, to decks of bridges and other constructions.

BACKGROUND

Bridges and other constructions comprise a deck on which vehicles and/or people can
20 travel or otherwise be supported.

For example, a bridge's deck may allow vehicular traffic, pedestrian traffic, or both. The deck may be built from concrete (e.g., reinforced concrete), metal (e.g., steel), wood, and/or other materials, depending on the bridge's use.
25

Concrete bridge decks are common but present issues. They are heavy and this may cause problems in some situations, such as for older bridges (e.g., whose capacity to support modern vehicular loads may be challenged). Also, they may sometimes severely deteriorate due to traffic, use of road salt in colder climate, etc.
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While other materials such as aluminum have been contemplated for decks of some bridges, this may also present issues. For instance, this may involve welding, drilling or otherwise creating holes in main bearing structures of the bridges, and/or other operations that may be expensive, impractical and/or otherwise undesirable.

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Similar considerations may sometimes arise in respect of other constructions such as floors, landing pads, etc.

For these and/or other reasons, improvements in making decks for bridges and other constructions would be welcomed.

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SUMMARY

In accordance with various aspects, this disclosure relates to a bridge or other construction comprising a deck, in which the deck is designed to be lightweight and durable, such as by including aluminum, and readily installable on a main bearing structure of the bridge or other construction (e.g., without welding and/or without drilling or otherwise creating holes into the main bearing structure of the bridge or other construction), even if the main bearing structure of the bridge or other construction is based on different material (e.g., steel).

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For example, according with one aspect, this disclosure relates to a system for making a deck of a bridge. The system comprises: a plurality of aluminum deck members; and a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge such that the aluminum deck members are retained together weldlessly and the main bearing structure of the bridge is free of fastening holes to fasten the aluminum deck members to the main bearing structure of the bridge.

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According to another aspect, this disclosure relates to a system for making a deck of a bridge. The system comprises: a plurality of aluminum deck members; and a fastening assembly configured to fasten the aluminum deck members to a main bearing structure

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of the bridge such that the aluminum deck members and the main bearing structure of the bridge are free of fastening holes to fasten the aluminum deck members to the main bearing structure of the bridge.

5 According to another aspect, this disclosure relates to a system for making a deck of a bridge. The system comprising a plurality of aluminum deck members. Each aluminum deck member comprises: a body comprising an upper surface of the aluminum deck member; and a fastener-receiving channel integrally formed with the body of the aluminum deck member and configured to receive a fastener to fasten the aluminum
10 deck member to a main bearing structure of the bridge. The fastener-receiving channel of the aluminum deck member is open at a bottom of the aluminum deck member to allow the fastener to extend from the fastener-receiving channel of the aluminum deck member towards the main bearing structure of the bridge.

15 According to another aspect, this disclosure relates to a system for making a deck of a bridge. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge; and an anti-sliding intermediary configured to be disposed between the aluminum deck members and the main bearing structure of the bridge to protect against
20 sliding of the aluminum deck members relative to the main bearing structure of the bridge.

According to another aspect, this disclosure relates to a system for making a deck of a bridge. The system comprises: a plurality of aluminum deck members; a fastening
25 assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different from aluminum; and a dielectric intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the bridge to dielectrically isolate the aluminum deck members from the metal of the main bearing
30 structure of the bridge.

According to another aspect, this disclosure relates to a system for making a deck of a bridge. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different
5 from aluminum; and an anti-corrosion intermediary configured to protect against galvanic corrosion between the aluminum deck members and the metal of the main bearing structure of the bridge.

According to another aspect, this disclosure relates to a system for making a deck of a
10 bridge. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different from aluminum; and a dielectric anti-sliding intermediary configured to be disposed
15 between the aluminum deck members and the metal of the main bearing structure of the bridge to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the bridge and protect against sliding of the aluminum deck members relative to the metal of the main bearing structure of the bridge.

According to another aspect, this disclosure relates to a system for making a deck of a
20 bridge. The system comprises: a plurality of aluminum deck extrusions; a fastening assembly configured to fasten the aluminum deck extrusions to a steel beam of the bridge; and a coating applied onto at least one of (i) the aluminum deck extrusions and (ii) the fastening assembly.

25 According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; and a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction such that the aluminum deck members are retained together weldlessly and the main bearing structure of the construction is free of
30 fastening holes to fasten the aluminum deck members to the main bearing structure of the construction.

According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; and a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction such that the aluminum deck members and the main bearing structure of the construction are free of fastening holes to fasten the aluminum deck members to the main bearing structure of the construction.

According to another aspect, this disclosure relates to a system for making a deck of a construction, the system comprising a plurality of aluminum deck members. Each aluminum deck member comprises: a body comprising an upper surface of the aluminum deck member; and a fastener-receiving channel integrally formed with the body of the aluminum deck member and configured to receive a fastener to fasten the aluminum deck member to a main bearing structure of the construction. The fastener-receiving channel of the aluminum deck member is open at a bottom of the aluminum deck member to allow the fastener to extend from the fastener-receiving channel of the aluminum deck member towards the main bearing structure of the construction.

According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction; and an anti-sliding intermediary configured to be disposed between the aluminum deck members and the main bearing structure of the construction to protect against sliding of the aluminum deck members relative to the main bearing structure of the construction.

According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and a dielectric intermediary configured to be disposed

between the aluminum deck members and the metal of the main bearing structure of the construction to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the construction.

- 5 According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and an anti-corrosion intermediary configured to protect
10 against galvanic corrosion between the aluminum deck members and the metal of the main bearing structure of the construction.

- According to another aspect, this disclosure relates to a system for making a deck of a construction. The system comprises: a plurality of aluminum deck members; a fastening
15 assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and a dielectric anti-sliding intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the construction to dielectrically isolate the aluminum deck members from
20 the metal of the main bearing structure of the construction and protect against sliding of the aluminum deck members relative to the metal of the main bearing structure of the construction.

- According to another aspect, this disclosure relates to a system for making a deck of a
25 construction. The system comprises: a plurality of aluminum deck extrusions; a fastening assembly configured to fasten the aluminum deck extrusions to a steel beam of the construction; and a coating applied onto at least one of (i) the aluminum deck extrusions and (ii) the fastening assembly.

These and other aspects of this disclosure will now become apparent to those of ordinary skill upon review of a description of embodiments that follows in conjunction with accompanying drawings.

5

BRIEF DESCRIPTION OF DRAWINGS

A detailed description of embodiments is provided below, by way of example only, with reference to drawings accompanying this description, in which:

10 Figure 1 shows an embodiment of a bridge comprising a deck that comprises deck members and a fastening assembly;

Figure 2 shows a side perspective of a deck member fastened to a main bearing structure of the bridge;

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Figure 3 shows an assembled view of respective ones of the deck members fastened to the main bearing structure of the bridge;

Figure 4 shows a partially exploded view of the fastening assembly;

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Figure 5 shows an assembled view of the fastening assembly onto the main bearing structure of the bridge;

Figure 6 shows a connector extruded integrally with the deck member;

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Figure 7 shows an assembled view of a connection between a fastener and the connector of deck member;

Figure 8 shows interlocking portions of adjacent ones of the deck members;

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Figure 9 shows an assembled view of the deck fastened to the main bearing structure of the bridge;

Figure 10 shows a representation of an embodiment of an intermediary, such as an anti-sliding and/or anti-corrosion (e.g., dielectric) intermediary, comprising a coating disposed between the deck members and the main bearing structure of the bridge;

Figure 11 shows an example of possible application of the coating in some embodiments;

Figure 12 shows another exploded view of one of the deck members, part of the fastening assembly and part of the main bearing structure of the bridge;

Figure 13 shows an example of selected locations where the coating is applied in some embodiments; and

Figure 14 shows a variant of the intermediary in another embodiment.

It is to be expressly understood that the description and drawings are only for purposes of illustrating certain embodiments and are an aid for understanding. They are not intended to be and should not be limiting.

DETAILED DESCRIPTION OF EMBODIMENTS

Figures 1 to 9 show an embodiment of a construction 10 comprising a deck 14. In this embodiment, the construction 10 is a bridge. More particularly, in this example, the bridge 10 is a vehicular bridge allowing vehicles to cross it. The bridge 10 comprises a main bearing structure 16 supporting the deck 14. In this example, the bridge 10 also comprises guardrails 18 and curbs 20, as shown in Figures 1 and 3.

As further discussed below, in this embodiment, the deck 14 is designed to be lightweight and durable, such as by including aluminum, and readily installable on the main bearing structure 16 of the bridge 10 (e.g., without welding and/or without drilling or otherwise creating holes into the main bearing structure 16 of the bridge 10), even if
5 the main bearing structure 16 of the bridge 10 is based on different material (e.g., steel).

In this embodiment, the main bearing structure 16 of the bridge 10 comprises beams 22 that extend in a longitudinal direction of the bridge 10. In this example, each beam 22 comprises an upper flange 24 and a lower flange 26. More particularly, in this
10 embodiment, the beams 22 are I-beams. In this example, the beams 22 are metallic, i.e., comprise metallic material 30 that constitutes at least most (i.e., most or all) of each beam 22. Specifically, in this example, the metallic material 30 of each beam 22 is steel.

In some cases, the deck 14 may be installed on the main bearing structure 16 of the
15 bridge 10 when the bridge 10 is originally built. In other cases, the deck 14 may be installed on the main bearing structure 16 of the bridge 10 after the bridge 10 was originally built with an original deck that is removed and replaced by the deck 14, i.e., the deck 14 may be retrofit onto the bridge 10.

20 The deck 14 comprises a plurality of deck members 40 and a fastening assembly 42 configured to fasten the deck members 40 to the main bearing structure 16 of the bridge 10.

In this embodiment, the fastening assembly 42 is configured to fasten the deck
25 members 40 to the beams 22 such that the deck members 40 extend transversally to the longitudinal direction of the bridge 10. A longitudinal direction of each deck member 40 is thus transversal to the longitudinal direction of the bridge 10.

Also, in this embodiment, the fastening assembly 42 comprises: a plurality of fasteners
30 52; and a plurality of clamps 54 configured to clamp the aluminum deck extrusions 40 to the beams 22 of the main bearing structure 16 of the bridge 10.

In this embodiment, the deck 14 is metallic, i.e., comprises metallic material 44 that constitutes at least most (i.e., most or all) of the deck 14. In this example, the metallic material 44 of the deck 14 is different from the metallic material 30 of the beams 22 of the main bearing structure 16 of the bridge 10.

More specifically, in this example, the metallic material 44 of the deck 14 is aluminum. This makes the deck 14 lightweight and durable, notably as it is resistant to corrosion. Thus, in this embodiment, the deck members 40 are aluminum deck members and parts of the fastening assembly 42, notably the clamps 54, are aluminum parts.

In this embodiment, the aluminum deck members 40 are aluminum deck extrusions. That is, they are made by an extrusion process.

Each aluminum deck extrusion 40 comprises a body 46 comprising an upper surface 48 of the aluminum deck extrusion 40. In this embodiment, as shown in Figures 6 and 7, the aluminum deck extrusion 40 also comprises a connector 50 integrally formed with its body 46 and configured to connect the aluminum deck extrusions 40 to the beams 22 of the main bearing structure 16 of the bridge 10. Thus, in this example, the body 46 and the connector 50 of the aluminum deck extrusion 40 are extruded integrally together during the extrusion process.

In this example of implementation, the upper surface 48 of the aluminum deck extrusion 40 comprises a frictional texture 27 to increase friction with traffic on the aluminum deck extrusion 40. In this case, the frictional texture 27 of the upper surface 48 comprises a plurality of formations 28 extending in the longitudinal direction of the aluminum deck extrusion 40. More specifically, in this case, the formations 28 of the frictional texture 27 include ridges 29.

In some embodiments, at least part of the upper surface 48 of each of the aluminum deck extrusions 40 may be anodized. Alternatively or additionally, in some

embodiments, at least part of the upper surface 48 of each of the aluminum deck extrusions 40 may be painted and/or coated with an anti-slip coating 73.

5 In this embodiment, the aluminum deck extrusion 40 comprises a base 23 configured to rest upon the main bearing structure 16 of the bridge 10. More particularly, in this embodiment, the base 23 comprises a plurality of base portions 21 spaced from one another (as best shown in Figures 6 and 7) and extending in the longitudinal direction of the aluminum deck extrusion 40. In this example, the aluminum deck extrusion 40 comprises a plurality of structural channels 13 spaced from one another and extending
10 in the longitudinal direction of the aluminum deck extrusion 40. In this case, each of the structural channels 13 comprises a plurality of web portions 19 which provide an increased stiffness and shear resistance of the bridge 10, as shown in Figure 8.

15 In this example of implementation, each of the aluminum deck extrusions 40 is configured to interlock with an adjacent one of the aluminum deck extrusions 40. This is shown in Figure 8 in which an interlocking portion 17 of the aluminum deck extrusion 40 comprises an interlocking projection 12, while the interlocking portion 17 of the adjacent one of the aluminum deck extrusions 40 comprises an interlocking recess 11 in order to receive the interlocking projection 12 of the aluminum deck extrusion 40. This
20 interlocking portion 17 of each of the aluminum deck extrusions 40 may facilitate assembly and disassembly of the aluminum deck extrusions 40 and help to secure them together.

25 In this embodiment, the connector 50 comprises a plurality of connecting elements 51 spaced from one another in a widthwise direction of the aluminum deck extrusion 40. A first one of the connecting elements 51 of the connector 50 is configured to receive a first subset of the fasteners 52 to fasten the aluminum deck extrusion 40 to the main bearing structure 16 of the bridge 10. A second one of the connecting elements 51 of the connector 50 is configured to receive a second subset of the fasteners 52 to fasten
30 the aluminum deck extrusion 40 to the main bearing structure 16 of the bridge 10.

In this embodiment, each of the connecting elements 51 of the connector 50 comprises a fastener-receiving channel 15 extending in the longitudinal direction of the aluminum deck extrusion 40 and is configured to receive given ones of the fasteners 52 to fasten the aluminum deck extrusion 40 to the main bearing structure 16 of the bridge 10. More particularly, in this embodiment, the fastener-receiving channel 15 comprises an opening 82 at a bottom of the aluminum deck extrusion 40 to allow the given ones of the fasteners 52 to extend from the fastener-receiving channel 15 towards the main bearing structure 16 of the bridge 10.

The fastening assembly 42 is configured to fasten the aluminum deck extrusions 40 to the main bearing structure 16 of the bridge 10. In this embodiment, the aluminum deck extrusions 40 are retained together weldlessly (i.e., without welding) and the main bearing structure 16 of the bridge 10 is free of fastening holes (i.e., has no fastening holes) to fasten the aluminum deck extrusions 40 to the main bearing structure 16 of the bridge 10. In this case, the aluminum deck extrusions 40 and the main bearing structure 16 of the bridge 10 are free of fastening holes to fasten them to one another. This may enhance integrity of the deck 14 and facilitate its installation.

In this embodiment, the fastening assembly 42 comprises the clamps 54 to clamp the aluminum deck extrusions 40 to the main bearing structure 16 of the bridge 10 and the fasteners 52 to fasten the aluminum deck extrusions 40 to the main bearing structure 16 via the clamps 54. In this example, washers 83 are provided to distribute loading of the fasteners 52, nuts 84 are provided to retain respective ones of the fasteners 52 and the clamps 54 together with the washers 83, and lock nuts 85 are provided to resist loosening under vibration and torque before the aluminum deck extrusions 40 are fastened to the main bearing structure 16.

In this example of implementation, each fastener-receiving channel 15 of the aluminum deck extrusion 40 comprises a plurality of fastener-engaging portions 59 spaced from one another and configured to engage an enlarged portion of a given one of the fasteners 52. In this case, each of the fastener-engaging portions 59 of the fastener-

receiving channel 15 of the aluminum deck extrusion 40 tapers in the widthwise direction of the aluminum deck extrusion 40. In this example, the enlarged portion of the given one of the fasteners 52 comprises an inclined surface 63, whereas each of the fastener-engaging portions 59 of the fastener-receiving channel 15 comprises an inclined surface 64 configured to engage the inclined surface 63 of the enlarged portion of the given one of the fasteners 52. This may help to secure the aluminum deck extrusion 40.

In this example, the fasteners 52 are threaded fasteners. More particularly, in this embodiment, the fasteners 52 comprise bolts 53. More specifically, in this case, the bolts are T-bolts. Thus, the fasteners 52 fit into the fastener-receiving channel 15 without need of a hole into the aluminum or steel allowing for a quick installation. The fasteners 52 may be made of stainless steel or any other suitable material.

In this embodiment, each of the clamps 54 comprises an opening 77 configured to receive a given one of the fasteners 52. In this example, each one of the clamps 54 is stepped. More particularly, in this example, each one of the clamps 54 comprises at least three horizontal surfaces 78 located at different heights, as best shown in Figure 4. The clamp 54 is configured to engage a lateral end 95 of the flange 66 of the beam 22 and an underside 67 of the aluminum deck extrusion 40.

In this embodiment, the upper flange 24 of the beam 22 comprises a first flanged portion 65 and a second flanged portion 66 that extend opposite one another. A given one of the clamps 54 is configured to engage an underside 75 of the first flanged portion 65 of the beam 22 and another one of the clamps 54 is configured to engage an underside 76 of the second flanged portion 66 of the beam 22. In this example, each clamp 54 is configured to leave an open gap 88 between the aluminum deck extrusion 40 and that clamp 54. The open gap 88 allows the clamp 54 to tilt in order to compensate for tolerances and variations of onsite alignment which provides facilitating means during installation. The tilt position of the clamp 54 is a factor in preventing the movement of the aluminum deck extrusion 40 relative to the beam 22. Additionally, the

open gap 88 also contributes to reduce the weight of the fastening system 42 while saving on material cost.

5 In this example, the underside 67 of the aluminum deck extrusion 40 comprises a frictional texture 68 to increase friction with given ones of the clamps 54. In this example, the frictional texture 68 comprises a plurality of formations 69 extending in the longitudinal direction of the aluminum deck extrusion 40. In this case, the formations 69 include ridges 89. Also, in this embodiment, each of the clamps 54 comprises a frictional texture 70 to increase friction with the underside 67 of the aluminum deck
10 extrusion 40. The frictional texture 70 of each of the clamps 54 may comprise a plurality of formations 96, which may comprise ridges 97.

In this embodiment, an intermediary 60 is configured to be disposed between the aluminum deck extrusion 40 and the main bearing structure 16 of the bridge 10.

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In this example, the intermediary 60 is an anti-sliding intermediary disposed between the aluminum deck extrusions 40 and the main bearing structure 16 of the bridge 10 to protect against sliding of the aluminum deck extrusions 40 relative to the beams 22 of the main bearing structure 16 of the bridge 10. This may be useful to counter a potential
20 tendency of the aluminum deck extrusions 40 to slide relative to the beams 22 that could otherwise exist as vehicles travel on the bridge 10 and apply loads onto the aluminum deck extrusions 40.

Also, in this example, the intermediary 60 is an anti-corrosion intermediary configured to
25 protect against galvanic corrosion between the aluminum deck extrusions 40 and the steel 30 of the beams 22 of the main bearing structure 16 of the bridge 10. This may help to prevent or at least impede galvanic corrosion of the aluminum 44 of the deck 14 that would otherwise be in contact with the steel 30 of the beams 22.

30 More particularly, in this example, the intermediary 60 is a dielectric intermediary disposed between the aluminum deck extrusions 40 and the steel 30 of the main

bearing structure 16 of the bridge 10 to dielectrically isolate the aluminum deck extrusions 40 from the steel 30 of the beams 22 of the main bearing structure 16 of the bridge 10.

- 5 In this embodiment, the dielectric anti-sliding intermediary 60 comprises a coating 62 applied onto at least one of (i) the aluminum deck extrusions 40 and (ii) the fastening assembly 42. More particularly, in this embodiment, the coating 62 is applied onto the aluminum deck extrusions 40 and the fastening assembly 42.
- 10 In this example, with additional reference to Figure 13, the coating 62 is applied only onto a limited part 90 of a periphery 80 of a given one of the aluminum deck extrusions 40 such that at least part of the periphery 80 of the given one of the aluminum deck extrusions 40 is free of the coating 62 (i.e., is not coated by the coating 62). More particularly, in this example, the limited part 90 of the periphery 80 of the given one of
- 15 the aluminum deck extrusions 40 on which the coating 62 is applied is configured to press towards the main bearing structure 16 of the bridge 10. Another part 91 of the periphery 80 of the given one of the aluminum deck extrusions 40 that is opposite to the part 90 of the periphery 80 of the given one of the aluminum deck extrusions 40 is free of the coating 62. In this case, at least a majority of the periphery 80 of the given one of
- 20 the aluminum deck extrusions 40 is free of the coating 62.

- In this embodiment, the coating 62 is also applied onto the fastening assembly 42. In this example, the coating 62 is applied onto the clamps 54. More specifically, the coating 62 is applied only onto a limited part 93 of a periphery 92 of a given one of the
- 25 clamps 54 such that at least part of the periphery 92 of the given one of the clamps 54 is free of the coating 62. In this example, the limited part 93 of the periphery 92 of the given one of the clamps 54 onto which the coating 62 is applied is configured to press towards the main bearing structure 16 of the bridge 10. Another part 94 of the periphery 92 of the given one of the clamps 54 that is opposite to the limited part 93 of the
- 30 periphery 92 of the given one of the clamps 54 is free of the coating 62. Thus, in this

embodiment, at least a majority of the periphery 92 of the given one of the clamps 54 is free of the coating 62.

In order to protect against sliding of the aluminum deck extrusions 40 relative to the beams 22 of the main bearing structure 16 of the bridge 10, in this embodiment, frictional engagement of the coating 62 between the aluminum deck extrusions 40, the clamps 54, and the main bearing structure 16 of the bridge 10 may be greater than that which would exist if the aluminum deck extrusions 40 and the clamps 54 were directly contacting the main bearing structure 16 of the bridge 10. Thus, in this embodiment, a coefficient of friction between the coating 62 and at least one of the aluminum deck extrusions 40, the clamps 54, and the beams 22 of the main bearing structure 16 of the bridge 10 (e.g., between the coating 62 and the beams 22) may be greater than a coefficient of friction between the metallic material 44 of the deck 14, which is aluminum in this case, and the metallic material 30 of the beams 22, which is steel in this case.

For example, in some embodiments, the coefficient of friction between the coating 62 and at least one of the aluminum deck extrusions 40, the clamps 54, and the beams 22 of the main bearing structure 16 of the bridge 10 (e.g., between the coating 62 and the beams 22) may be relatively high. For instance, in some embodiments, the coefficient of friction between the coating 62 and at least one of the aluminum deck extrusions 40, the clamps 54, and the beams 22 of the main bearing structure 16 of the bridge 10 (e.g., between the coating 62 and the beams 22) may be greater than that of a polymer (e.g., ultra-high-molecular-weight (UHMW) polyethylene or nylon) on steel. In some embodiments, the coefficient of friction between the coating 62 and at least one of the aluminum deck extrusions 40, the clamps 54, and the beams 22 of the main bearing structure 16 of the bridge 10 (e.g., between the coating 62 and the beams 22) may be at least 0.3, in some cases at least 0.4, in some cases at least 0.5, in some cases at least 0.6, and in some cases even more.

The coating 62 may be implemented in any suitable way and using any suitable substance in various embodiments.

In this embodiment, as shown in Figure 10, the coating 62 comprises a matrix 86 and particles 87 dispersed in the matrix 86. More particularly, in this embodiment, the matrix 86 is a polymeric matrix, and the particles 87 may include metallic elements. For example, in this embodiment, the matrix 86 is epoxy and the particles 87 are metal oxide particles. More specifically, in this example, the metal oxide particles 87 are aluminum oxide particles. For instance, in some embodiments, the particles 87 may be grit formed from slag. The matrix 86 may include any other suitable polymer or other material and/or the particles 87 may include any other suitable metal oxide or other material in other embodiments

For example, in some embodiments, as shown in Figure 11, the coating 62 may comprise a lower layer 79 (e.g., primer) of the polymeric matrix 86 applied onto the aluminum deck extrusions 40 and the clamps 54 at selected locations, the aluminum oxide particles 87 dispersed onto the lower layer 79 of the polymeric matrix 86, and an upper layer 81 of the polymeric matrix 86 applied onto the aluminum oxide particles 87 and the lower layer 79 of the polymeric matrix 86 so that the aluminum oxide particles 87 are sandwiched and encapsulated by the upper and lower layers 81, 79 of the polymeric matrix 86.

For instance, in some embodiments, the particles 87 may be provided such that a ratio of a quantity of the particles 87 over a surface area covered by the coating 62 is at least $0.9 \text{ kg} / \text{m}^2$, in some cases at least $0.95 \text{ kg} / \text{m}^2$, in some cases at least $1 \text{ kg} / \text{m}^2$, and in some cases even more.

In this embodiment, the guardrails 18 and the curbs 20 also include aluminum. The deck 14, the guardrails 18 and the curbs 20 therefore contribute to lightness.

The bridge 10, including the deck 14, may be implemented in any other suitable way in other embodiments.

For example, in other embodiments, the aluminum deck extrusions 40 may be shaped in any other desired manner (e.g., have different sizes, different number or arrangement of channels, their connector 50 differently shaped, different number of connecting elements like those of the connector 50, no connector that is integrally formed with its
5 body 46, etc.). In other embodiments, the aluminum deck members 40 may be made by any suitable process other than extruding (e.g., casting).

In other embodiments, the fastening assembly 42 may be implemented in various other ways. For example, in other embodiments, the fasteners 52 and/or the clamps 54 may
10 be shaped in various other manners, include various other materials, etc., and/or the fastening assembly 42 may include any other fastening devices (e.g., instead of or in addition to the clamps 54).

In other embodiments, the main bearing structure 16 of the bridge 10 may be
15 implemented in various other ways. For instance, in other embodiments, the beams 22 may be any other type of beam (e.g., have any other shape, number and/or arrangement of flanges, no flanges, etc.). Also, in other embodiments, one of the beams 22 may be different (e.g., differently shaped, composed of different material, etc.) than another one of the beams 22, and/or there may be any other number of beams (e.g., a
20 single beam or more than two beams).

In other embodiments, as shown in Figure 14, the intermediary 60 may comprise a plurality of intermediate members 61 that are thinner than the aluminum deck extrusions 40 in a thicknesswise direction of the aluminum deck extrusions 40 and are configured
25 to be mounted between the aluminum deck extrusions 40 and the main bearing structure 16 of the bridge 10. The intermediate members 61 may comprise at least one of composite material, metallic material, and concrete material.

In other embodiments, the deck 14 may be based on another metal that is not aluminum
30 and that is different from the metal of the main bearing structure 16 of the bridge 10.

Although in embodiments considered above the bridge 10 is a vehicular one allowing vehicles to travel over it, the bridge 10 may be a pedestrian bridge allowing pedestrians to cross it or any other type of bridge in other embodiments.

- 5 Also, while in embodiments considered above the construction 10 is a bridge, the construction 10, including its deck 14, may be any other suitable construction in other embodiments. For example, in some embodiments, the construction 10 may be a floor of a building, a landing pad (e.g., helicopter landing pad), skyscraper roof, mezzanines, various platforms, applications for replacing concrete slabs, etc.

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Certain additional elements that may be needed for operation of some embodiments have not been described or illustrated as they are assumed to be within the purview of those of ordinary skill in the art. Moreover, certain embodiments may be free of, may lack and/or may function without any element that is not specifically disclosed herein.

15

Any feature of any embodiment discussed herein may be combined with any feature of any other embodiment discussed herein in some examples of implementation.

- 20 Although various embodiments and examples have been presented, this was for purposes of describing, but should not be limiting. Various modifications and enhancements will become apparent to those of ordinary skill and are within a scope of this disclosure.

CLAIMS

1. A system for making a deck of a bridge, the system comprising:
 - a plurality of aluminum deck members; and
 - 5 - a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge such that the aluminum deck members are retained together weldlessly and the main bearing structure of the bridge is free of fastening holes to fasten the aluminum deck members to the main bearing structure of the bridge.
- 10 2. The system of claim 1, wherein the aluminum deck members are aluminum deck extrusions.
3. The system of any one of claims 1 and 2, wherein the aluminum deck members and
15 the main bearing structure of the bridge are free of fastening holes to fasten them to one another.
4. The system of any one of claims 1 to 3, wherein each aluminum deck member comprises: a body comprising an upper surface of the aluminum deck member; and
20 a connector integrally formed with the body of the aluminum deck member and configured to connect the aluminum deck member to the main bearing structure of the bridge.
5. The system of claim 4, wherein: the fastening assembly comprises a plurality of
25 fasteners; and the connector of the aluminum deck member is configured to receive a given one of the fasteners to fasten the aluminum deck member to the main bearing structure of the bridge.
6. The system of claim 5, wherein the connector of the aluminum deck member
30 comprises a fastener-receiving channel extending in a longitudinal direction of the aluminum deck member and configured to receive the given one of the fasteners.

7. The system of claim 6, wherein the fastener-receiving channel of the connector of the aluminum deck member is open at a bottom of the aluminum deck member to allow the given one of the fasteners to extend from the fastener-receiving channel of the connector of the aluminum deck member towards the main bearing structure of the bridge.
8. The system of any one of claims 6 and 7, wherein: the given one of the fasteners is a first one of the fasteners; and the fastener-receiving channel of the connector of the aluminum deck member is configured to receive a second one of the fasteners.
9. The system of claim 8, wherein the fastener-receiving channel of the connector of the aluminum deck member is configured to receive a third one of the fasteners.
10. The system of claim 9, wherein the fastener-receiving channel of the connector of the aluminum deck member is configured to receive a fourth one of the fasteners.
11. The system of any one of claims 6 and 7, wherein: the given one of the fasteners is a first one of the fasteners; the connector of the aluminum deck member comprises a plurality of connecting elements spaced from one another in a widthwise direction of the aluminum deck member; a first one of the connecting elements of the connector is configured to receive the first one of the fasteners to fasten the aluminum deck member to the main bearing structure of the bridge; and a second one of the connecting elements of the connector is configured to receive a second one of the fasteners to fasten the aluminum deck member to the main bearing structure of the bridge.
12. The system of claim 11, wherein: the first one of the connecting elements of the connector of the aluminum deck member is configured to receive a third one of the fasteners; and the second one of the connecting elements of the connector of the aluminum deck member is configured to receive a fourth one of the fasteners.

13. The system of any one of claims 11 and 12, wherein the connecting elements of the connector of the aluminum deck member comprise fastener-receiving channels extending in a longitudinal direction of the aluminum deck member.

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14. The system of any one of claims 6 to 13, wherein the fastener-receiving channel of the aluminum deck member comprises a plurality of fastener-engaging portions spaced from one another and configured to engage an enlarged portion of the given one of the fasteners.

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15. The system of claim 14, wherein each of the fastener-engaging portions of the fastener-receiving channel of the aluminum deck member tapers in a widthwise direction of the aluminum deck member.

15 16. The system of claim 15, wherein: the enlarged portion of the given one of the fasteners comprises an inclined surface; and each of the fastener-engaging portions of the fastener-receiving channel of the aluminum deck member comprises an inclined surface configured to engage the inclined surface of the enlarged portion of the given one of the fasteners.

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17. The system of any one of claims 5 to 16, wherein the fasteners are threaded fasteners.

18. The system of any one of claims 5 to 16, wherein the fasteners comprise bolts.

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19. The system of claim 18, wherein the bolts are T-bolts.

20. The system of any one of claims 5 to 19, wherein the fasteners are steel fasteners.

30 21. The system of claim 20, wherein the fasteners are stainless steel fasteners.

22. The system of any one of claims 1 to 21, wherein the aluminum deck member comprises a base configured to rest upon the main bearing structure of the bridge.
- 5 23. The system of claim 22, wherein the base of the aluminum deck member comprises a plurality of base portions spaced from one another and extending in a longitudinal direction of the aluminum deck member.
- 10 24. The system of any one of claims 1 to 23, wherein the aluminum deck member comprises a structural channel extending in a longitudinal direction of the aluminum deck member.
25. The system of claim 24, wherein the structural channel of the aluminum deck member comprises a plurality of web portions.
- 15 26. The system of any one of claims 1 to 24, wherein the aluminum deck member comprises a plurality of structural channels extending in a longitudinal direction of the aluminum deck member and spaced from one another.
- 20 27. The system of claim 10, wherein each of the structural channels of the aluminum deck member comprises a plurality of web portions.
- 25 28. The system of any one of claims 1 to 27, wherein each of the aluminum deck members is configured to interlock with an adjacent one of the aluminum deck members.
29. The system of claim 28, wherein: each aluminum deck member comprises an interlocking portion configured to interlock with the interlocking portion of the adjacent one of the aluminum deck members.
- 30 30. The system of claim 29, wherein the interlocking portion of the aluminum deck member comprises an interlocking projection and the interlocking portion of the

adjacent one of the aluminum deck members comprises an interlocking recess to receive the interlocking projection of the aluminum deck member.

31. The system of any one of claims 1 to 30, wherein an upper surface of the aluminum deck member comprises a frictional texture to increase friction with traffic on the aluminum deck member.

32. The system of claim 31, wherein the frictional texture of the upper surface of the aluminum deck member comprises a plurality of formations extending in a longitudinal direction of the aluminum deck member.

33. The system of claim 32, wherein the formations of the frictional texture of the upper surface of the aluminum deck member include ridges.

34. The system of any one of claims 5 to 33, wherein the fastening assembly comprises a plurality of clamps configured to clamp the aluminum deck members to the main bearing structure of the bridge.

35. The system of claim 34, wherein: the main bearing structure of the bridge comprises a beam; the beam comprises a flange; and a given one of the clamps is configured to engage an underside of the flange of the beam.

36. The system of claim 35, wherein the given one of the clamps comprises an opening configured to receive the given one of the fasteners.

37. The system of any one of claims 35 and 36, wherein the given one of the clamps is configured to engage a lateral end of the flange of the beam.

38. The system of any one of claims 35 to 37, wherein the given one of the clamps is configured to engage an underside of the aluminum deck member.

39. The system of claim 38, wherein the underside of the aluminum deck member comprises a frictional texture to increase friction with the given one of the clamps.

40. The system of claim 39, wherein the frictional texture of the underside of the aluminum deck member comprises a plurality of formations extending in a longitudinal direction of the aluminum deck member.

41. The system of claim 40, wherein the formations of the frictional texture of the underside of the aluminum deck member include ridges.

42. The system of any one of claims 35 to 41, wherein the given one of the clamps comprises a frictional texture to increase friction with the underside of the aluminum deck member.

43. The system of claim 42, wherein the frictional texture of the given one of the clamps comprises a plurality of formations.

44. The system of claim 43, wherein the formations of the frictional texture of the given one of the clamps include ridges.

45. The system of any one of claims 35 to 44, wherein the given one of the clamps is configured to leave an open gap between the aluminum deck member and the given one of the clamps.

46. The system of any one of claims 35 to 45, wherein each clamp is stepped.

47. The system of any one of claims 35 to 46, wherein each clamp comprises at least three horizontal surfaces located at different heights.

48. The system of any one of claims 35 to 47, wherein: the flange of the beam comprises a first flanged portion and a second flanged portion that extend opposite

one another; the given one of the clamps is a first given one of the clamps and is configured to engage the underside of the first flanged portion of the flange of the beam; and a second given one of the clamps is configured to engage the underside of the second flanged portion of the flange of the beam.

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49. The system of any one of claims 35 to 48, wherein the beam is an I-beam.

50. The system of any one of claims 34 to 49, wherein the clamps are aluminum clamps.

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51. The system of any one of claims 1 to 50, comprising an intermediary configured to be disposed between the aluminum deck members and the main bearing structure of the bridge.

15 52. The system of claim 51, wherein the intermediary is an anti-sliding intermediary configured to protect against sliding of the aluminum deck members relative to the main bearing structure of the bridge.

20 53. The system of claim 51, wherein: the main bearing structure of the bridge comprises metal different from aluminum; and the intermediary is a dielectric intermediary configured to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the bridge.

25 54. The system of claim 51, wherein: the main bearing structure of the bridge comprises metal different from aluminum; and the intermediary is a dielectric anti-sliding intermediary configured to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the bridge and protect against sliding of the aluminum deck members relative to the main bearing structure of the bridge.

30 55. The system of claim 51, wherein: the main bearing structure of the bridge comprises metal different from aluminum; and the intermediary is an anti-corrosion

intermediary configured to protect against galvanic corrosion between the aluminum deck members and the metal of the main bearing structure of the bridge.

56. The system of any one of claims 51 to 55, wherein the intermediary comprises a coating applied onto at least one of (i) the aluminum deck members and (ii) the fastening assembly.

57. The system of claim 56, wherein the coating is applied onto the aluminum deck members.

58. The system of claim 57, wherein the coating is applied only onto a limited part of a periphery of a given one of the aluminum deck members such that at least part of the periphery of the given one of the aluminum deck members is free of the coating.

59. The system of claim 58, wherein at least a majority of the periphery of the given one of the aluminum deck members is free of the coating.

60. The system of claim 57, wherein the coating is applied onto a part of a periphery of a given one of the aluminum deck members that is configured to press towards the main bearing structure of the bridge.

61. The system of claim 60, wherein: the part of the periphery of the given one of the aluminum deck members that is configured to press towards the main bearing structure of the bridge is a first part of the periphery of the given one of the aluminum deck members; and a second part of the periphery of the given one of the aluminum deck members that is opposite to the first part of the periphery of the given one of the aluminum deck members is free of the coating.

62. The system of any one of claims 56 to 61, wherein the coating is applied onto the fastening assembly.

63. The system of claim 62, wherein: the fastening assembly comprises a plurality of fasteners and a plurality of clamps configured to clamp the aluminum deck members to the main bearing structure of the bridge; and the coating is applied onto the clamps.

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64. The system of claim 63, wherein the coating is applied only onto a limited part of a periphery of a given one of the clamps such that at least part of the periphery of the given one of the clamps is free of the coating.

10 65. The system of claim 64, wherein at least a majority of the periphery of the given one of the clamps is free of the coating.

15 66. The system of claim 63, wherein the coating is applied onto a part of a periphery of a given one of the clamps that is configured to press towards the main bearing structure of the bridge.

20 67. The system of claim 66, wherein: the part of the periphery of the given one of the clamps that is configured to press towards the main bearing structure of the bridge is a first part of the periphery of the given one of the clamps; and a second part of the periphery of the given one of the clamps that is opposite to the first part of the periphery of the given one of the clamps is free of the coating.

25 68. The system of any one of claims 56 to 67, wherein the coating comprises a matrix and particles dispersed in the matrix.

69. The system of claim 68, wherein the matrix is a polymeric matrix.

70. The system of any one of claims 68 and 69, wherein the particles are slag.

30 71. The system of any one of claims 68 and 69, wherein the particles include metallic elements.

72. The system of any one of claims 68 and 69, wherein the particles are metal oxide particles.
- 5 73. The system of claim 72, wherein the metal oxide particles are aluminum oxide particles.
74. The system of any one of claims 51 to 55, wherein the intermediary comprises a plurality of intermediate members thinner than the aluminum deck members in a thicknesswise direction of the aluminum deck members and configured to be
10 mounted between the aluminum deck members and the main bearing structure of the bridge.
75. The system of claim 74, wherein the intermediate members comprise at least one of
15 composite material, metallic material, and concrete material.
76. The system of any one of claims 1 and 75, wherein at least part of an upper surface of each of the aluminum deck members is anodized.
- 20 77. The system of any one of claims 1 to 76, wherein at least part of an upper surface of each of the aluminum deck members is painted.
78. The system of any one of claims 1 to 77, wherein at least part of an upper surface of each of the aluminum deck members is coated with an anti-slip coating.
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79. The system of any one of claims 1 to 78, wherein the bridge is a vehicular bridge.
80. The system of any one of claims 1 to 78, wherein the bridge is a pedestrian bridge.
- 30 81. A system for making a deck of a bridge, the system comprising:
- a plurality of aluminum deck members; and

- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge such that the aluminum deck members and the main bearing structure of the bridge are free of fastening holes to fasten the aluminum deck members to the main bearing structure of the bridge.

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82. A system for making a deck of a bridge, the system comprising a plurality of aluminum deck members, each aluminum deck member comprising:

- a body comprising an upper surface of the aluminum deck member; and
- a fastener-receiving channel integrally formed with the body of the aluminum deck member and configured to receive a fastener to fasten the aluminum deck member to a main bearing structure of the bridge, the fastener-receiving channel of the aluminum deck member being open at a bottom of the aluminum deck member to allow the fastener to extend from the fastener-receiving channel of the aluminum deck member towards the main bearing structure of the bridge.

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83. A system for making a deck of a bridge, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge; and
- an anti-sliding intermediary configured to be disposed between the aluminum deck members and the main bearing structure of the bridge to protect against sliding of the aluminum deck members relative to the main bearing structure of the bridge.

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84. A system for making a deck of a bridge, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different from aluminum; and
- a dielectric intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the bridge to

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dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the bridge.

85. A system for making a deck of a bridge, the system comprising:

- 5 - a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different from aluminum; and
- 10 - an anti-corrosion intermediary configured to protect against galvanic corrosion between the aluminum deck members and the metal of the main bearing structure of the bridge.

86. A system for making a deck of a bridge, the system comprising:

- a plurality of aluminum deck members;
- 15 - a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the bridge, the main bearing structure of the bridge including metal that is different from aluminum; and
- a dielectric anti-sliding intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the
- 20 bridge to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the bridge and protect against sliding of the aluminum deck members relative to the metal of the main bearing structure of the bridge.

87. A system for making a deck of a bridge, the system comprising:

- 25 - a plurality of aluminum deck extrusions;
- a fastening assembly configured to fasten the aluminum deck extrusions to a steel beam of the bridge; and
- a coating applied onto at least one of (i) the aluminum deck extrusions and (ii) the fastening assembly.

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88. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members; and
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction such that the aluminum deck members are retained together weldlessly and the main bearing structure of the construction is free of fastening holes to fasten the aluminum deck members to the main bearing structure of the construction.

89. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members; and
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction such that the aluminum deck members and the main bearing structure of the construction are free of fastening holes to fasten the aluminum deck members to the main bearing structure of the construction.

90. A system for making a deck of a construction, the system comprising a plurality of aluminum deck members, each aluminum deck member comprising:

- a body comprising an upper surface of the aluminum deck member; and
- a fastener-receiving channel integrally formed with the body of the aluminum deck member and configured to receive a fastener to fasten the aluminum deck member to a main bearing structure of the construction, the fastener-receiving channel of the aluminum deck member being open at a bottom of the aluminum deck member to allow the fastener to extend from the fastener-receiving channel of the aluminum deck member towards the main bearing structure of the construction.

91. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction; and

- an anti-sliding intermediary configured to be disposed between the aluminum deck members and the main bearing structure of the construction to protect against sliding of the aluminum deck members relative to the main bearing structure of the construction.

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92. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and
- a dielectric intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the construction to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the construction.

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93. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and
- an anti-corrosion intermediary configured to protect against galvanic corrosion between the aluminum deck members and the metal of the main bearing structure of the construction.

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25 94. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck members;
- a fastening assembly configured to fasten the aluminum deck members to a main bearing structure of the construction, the main bearing structure of the construction including metal that is different from aluminum; and
- a dielectric anti-sliding intermediary configured to be disposed between the aluminum deck members and the metal of the main bearing structure of the

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construction to dielectrically isolate the aluminum deck members from the metal of the main bearing structure of the construction and protect against sliding of the aluminum deck members relative to the metal of the main bearing structure of the construction.

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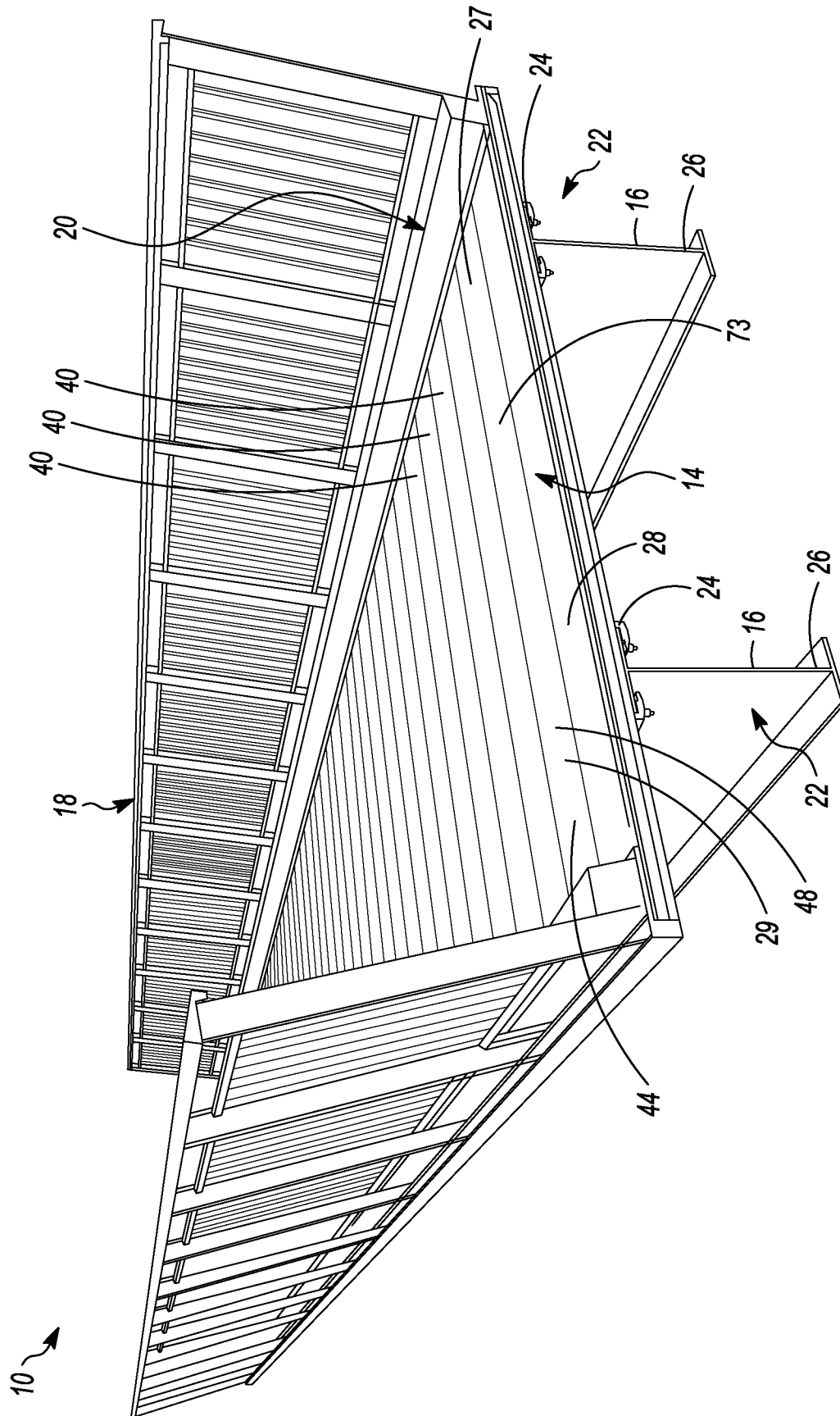
95. A system for making a deck of a construction, the system comprising:

- a plurality of aluminum deck extrusions;
- a fastening assembly configured to fasten the aluminum deck extrusions to a steel beam of the construction; and
- a coating applied onto at least one of (i) the aluminum deck extrusions and (ii) the fastening assembly.

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**FIG. 1**

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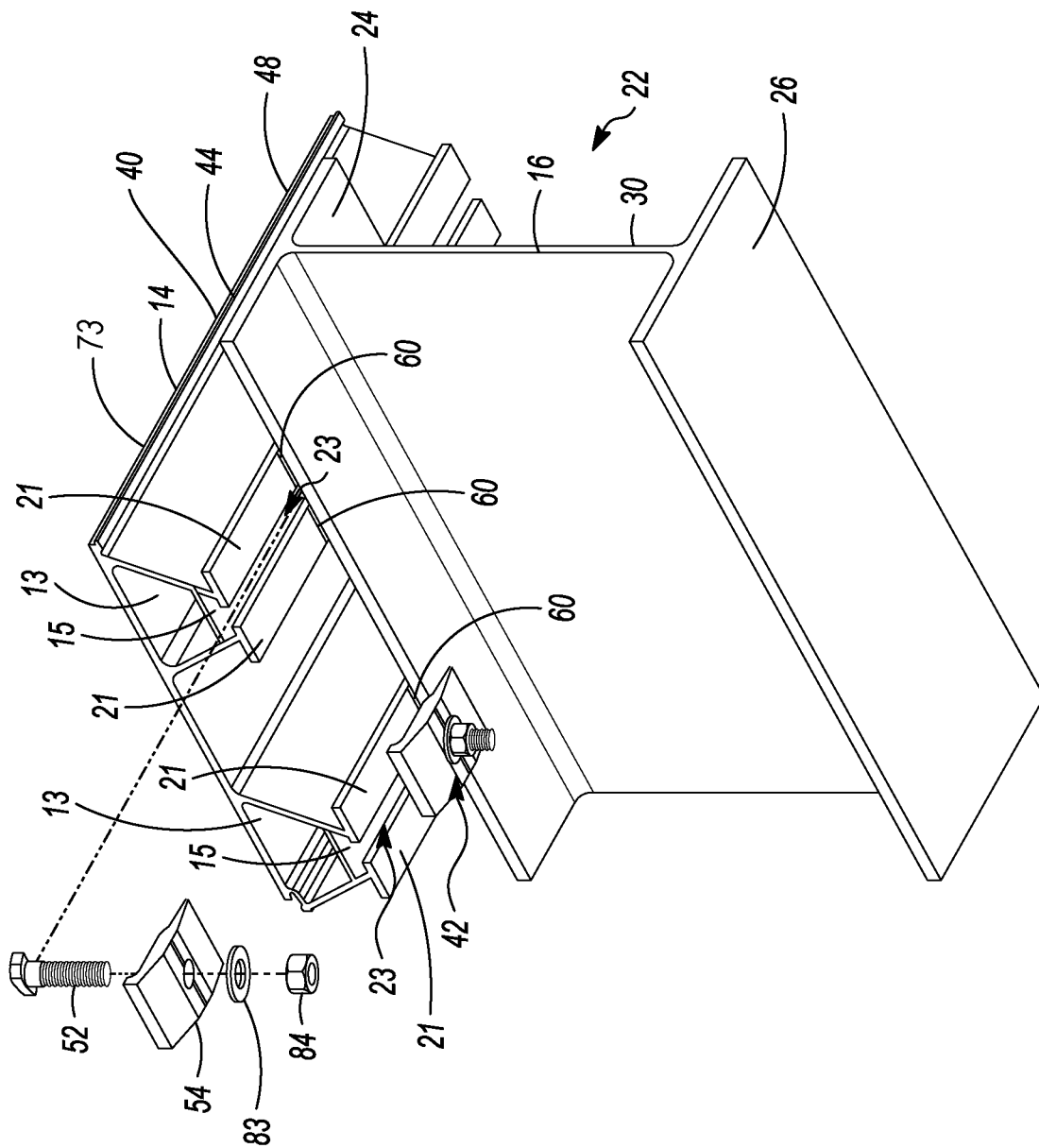


FIG. 2

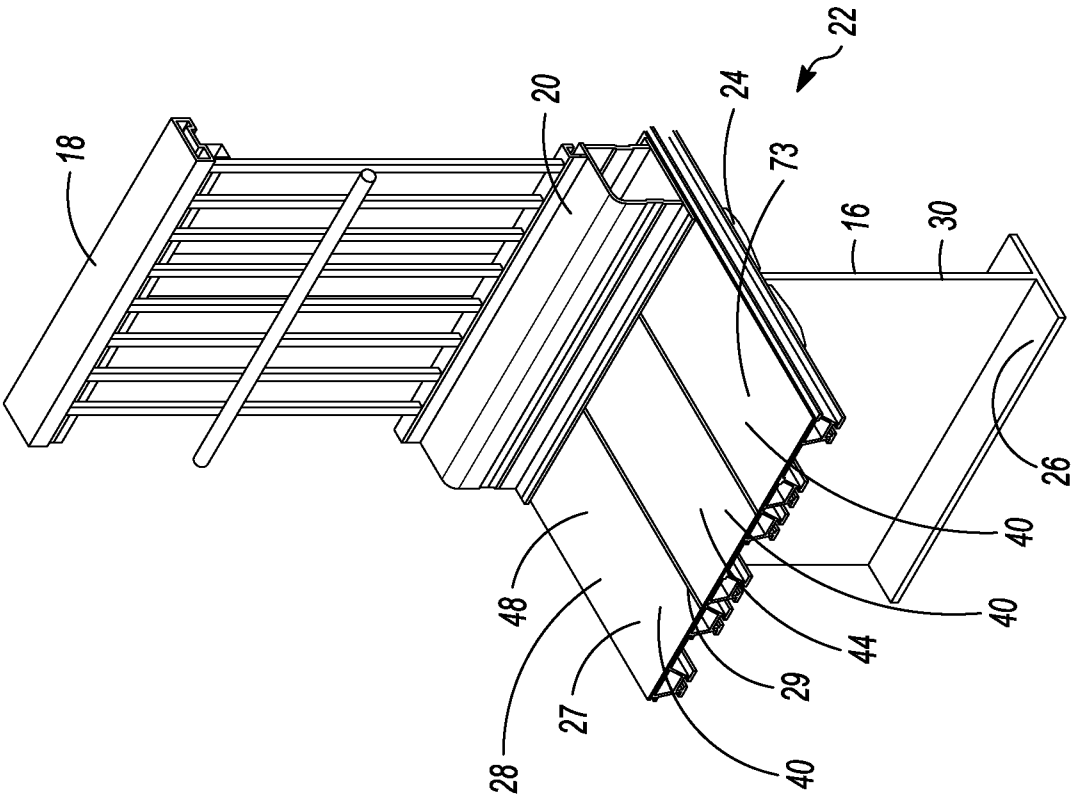


FIG. 3

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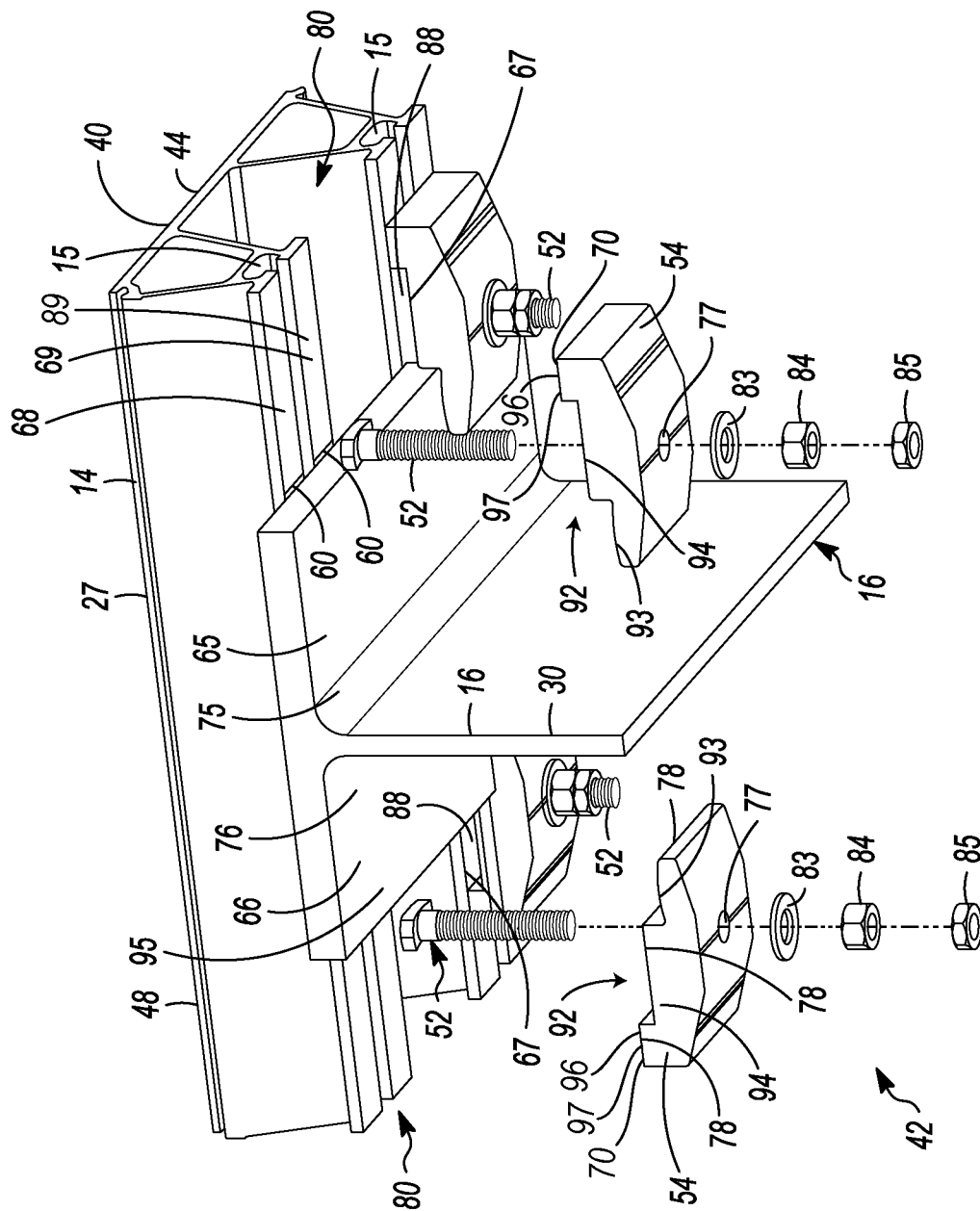


FIG. 4

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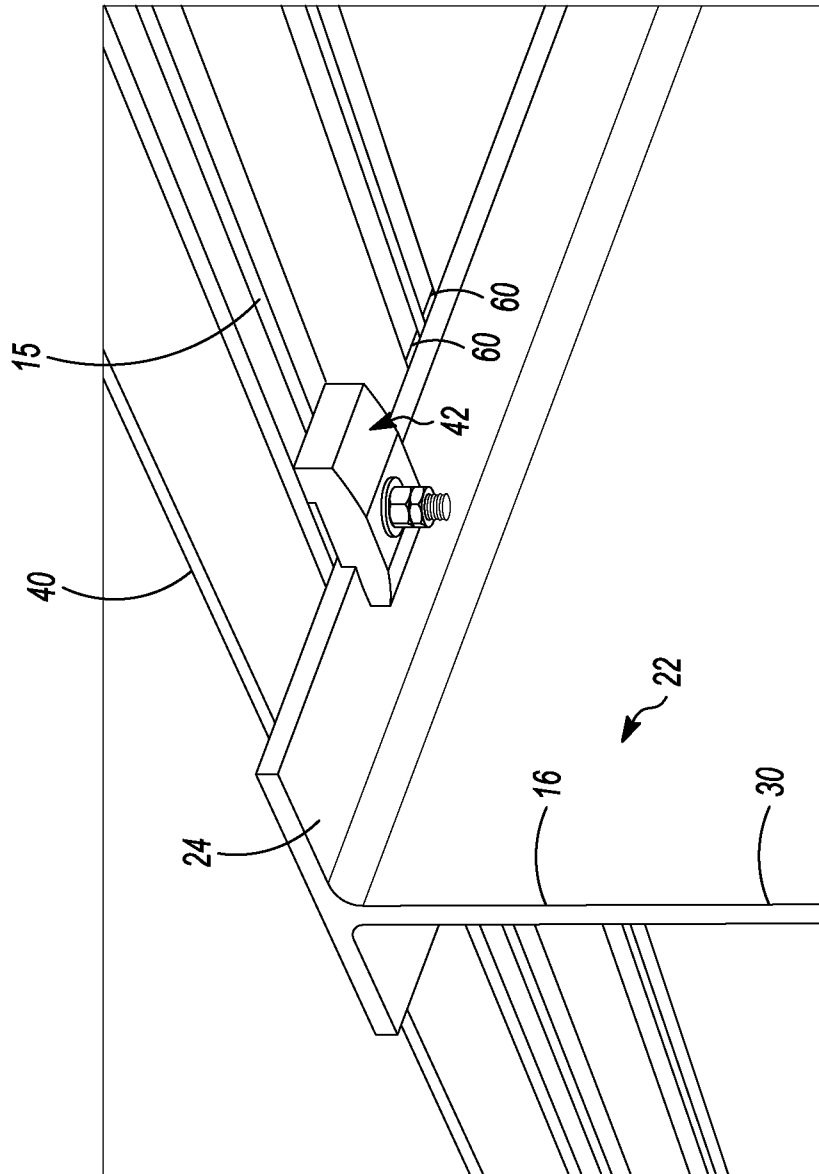


FIG. 5

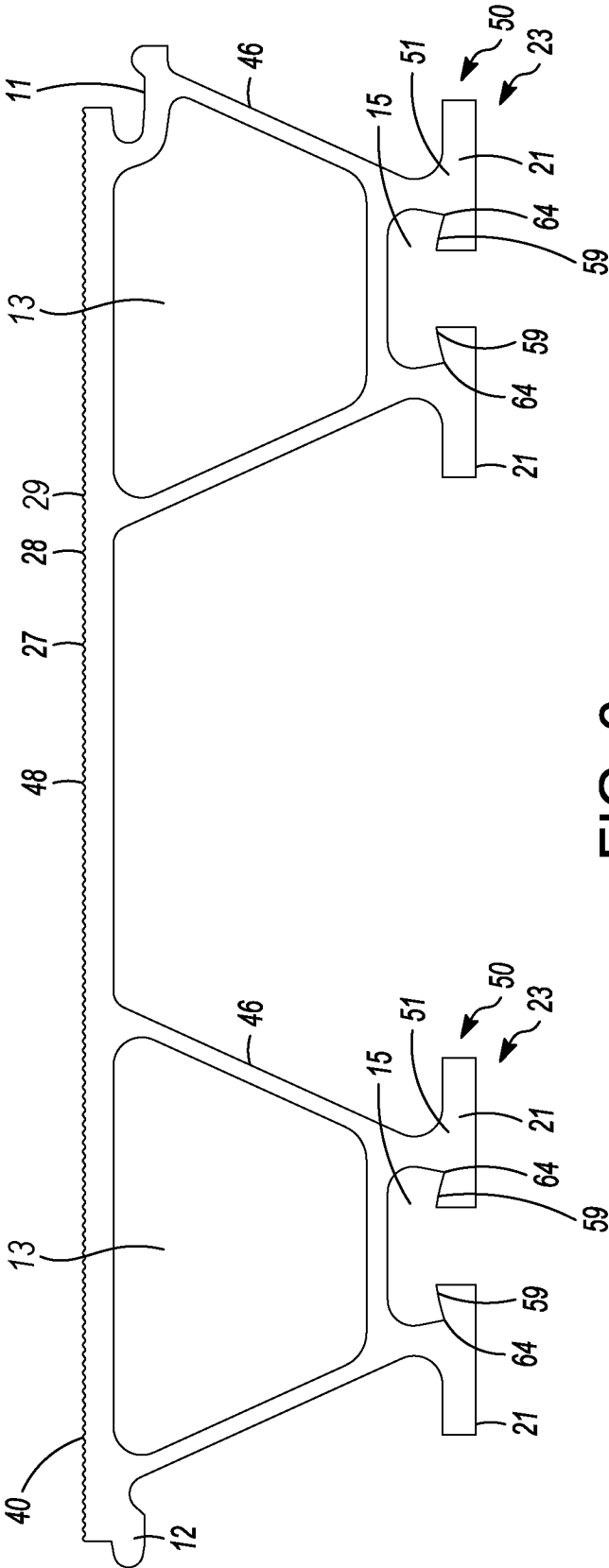


FIG. 6

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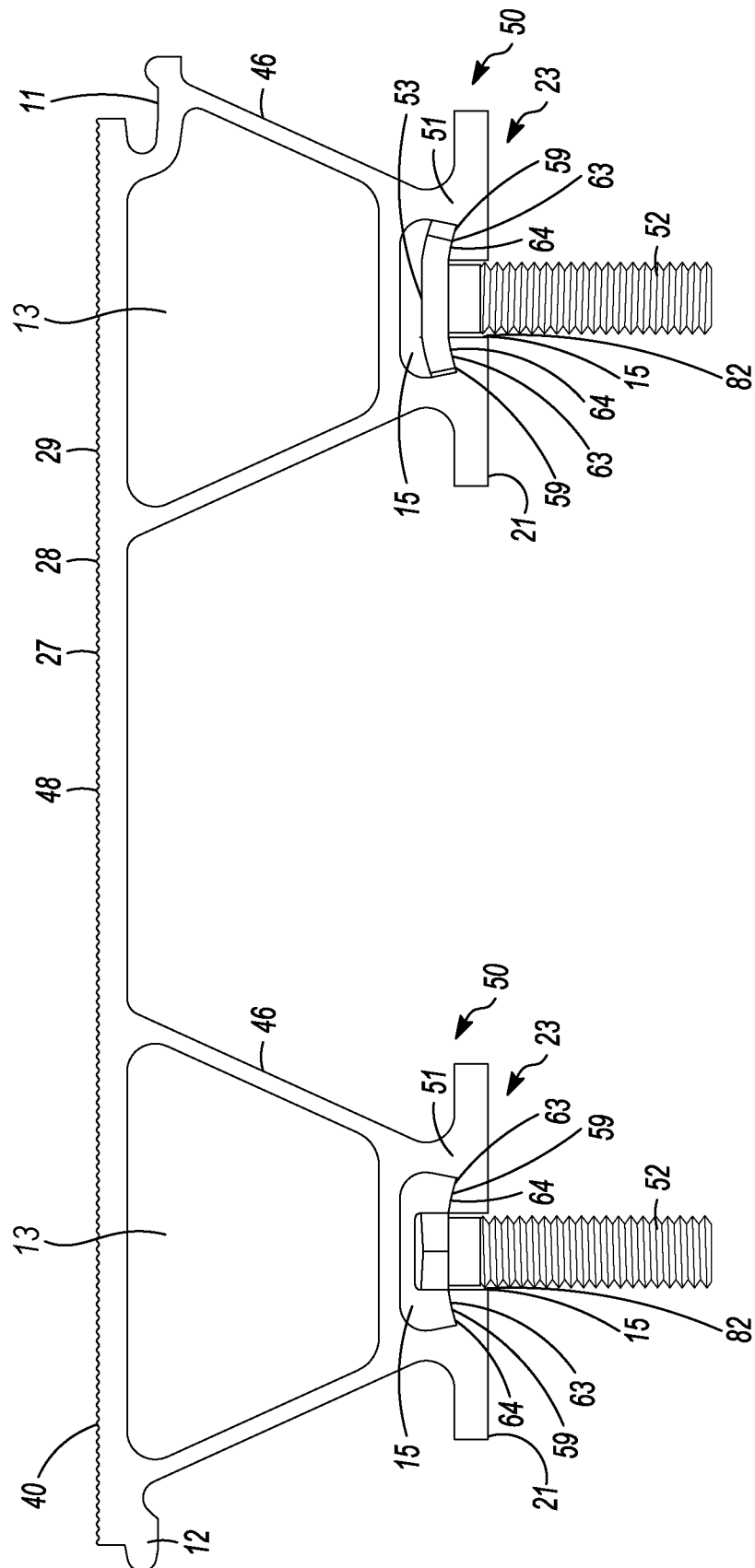
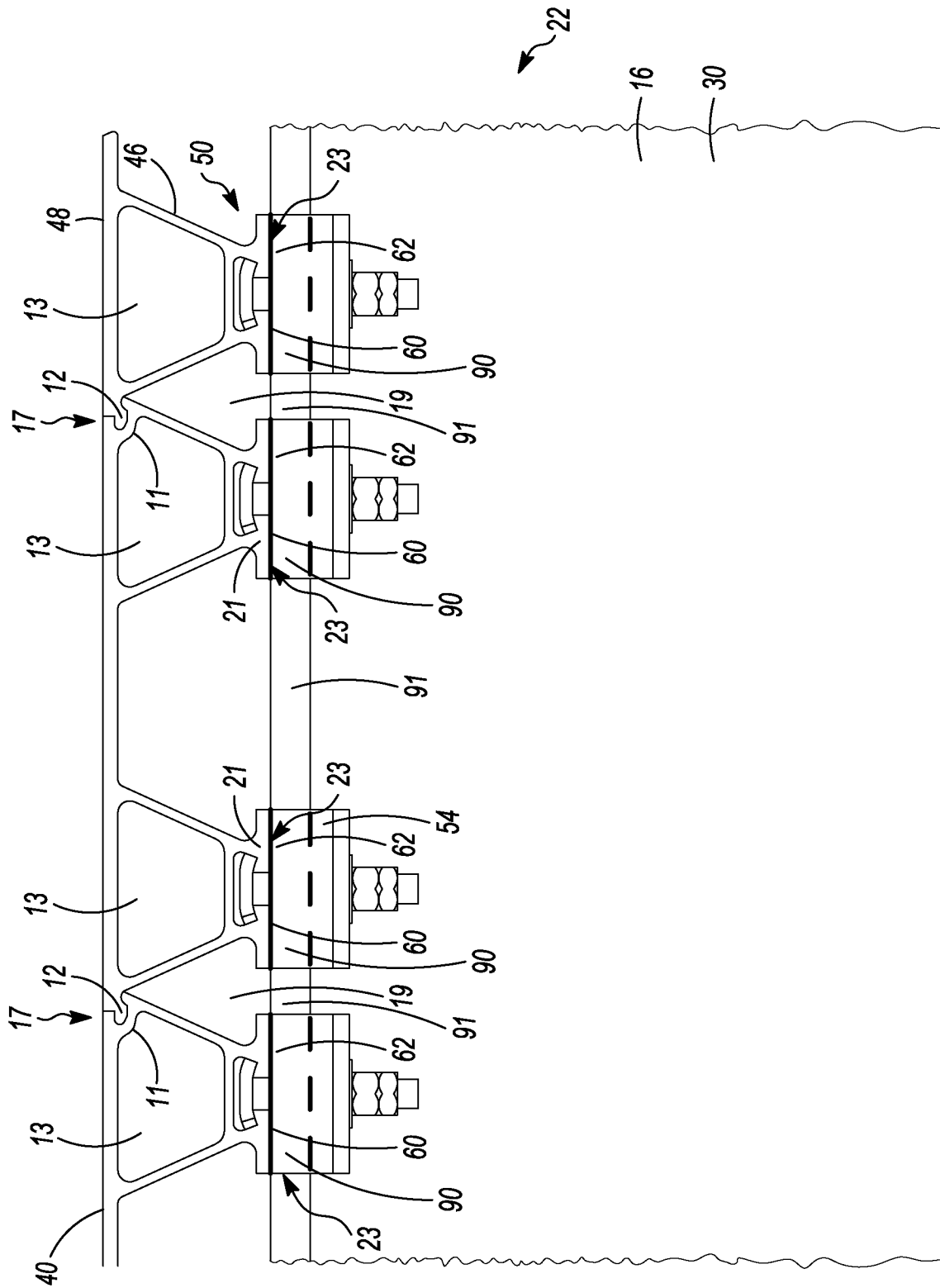


FIG. 7

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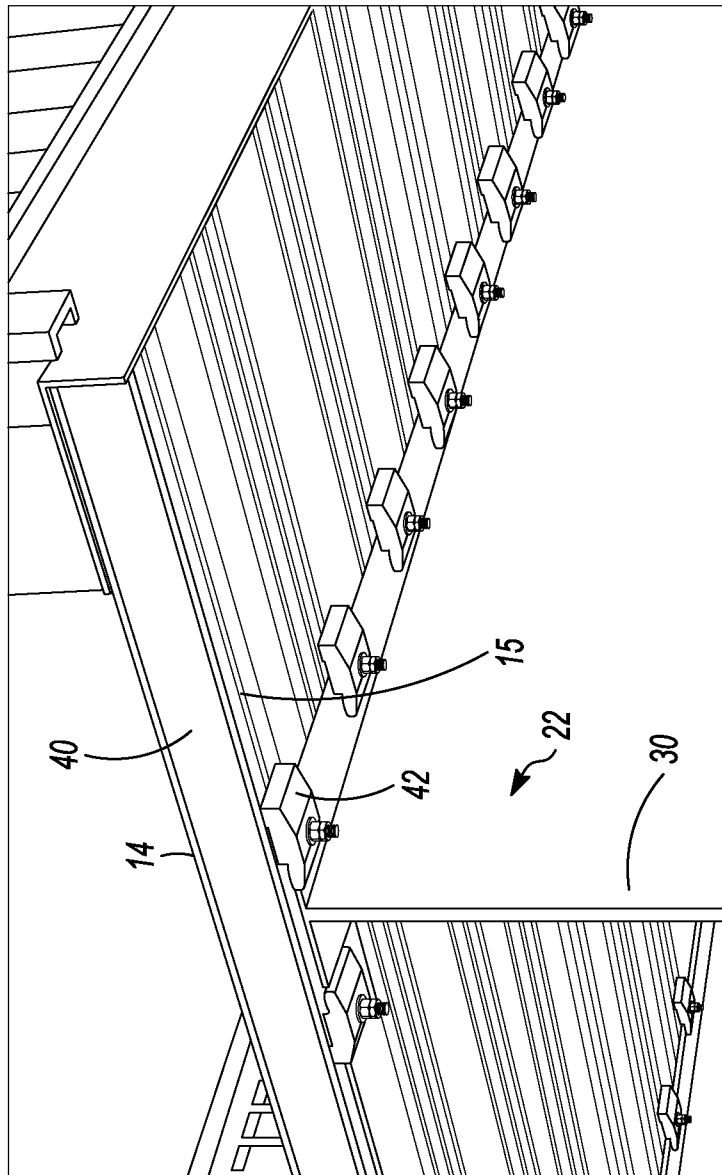


FIG. 9

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FIG. 10

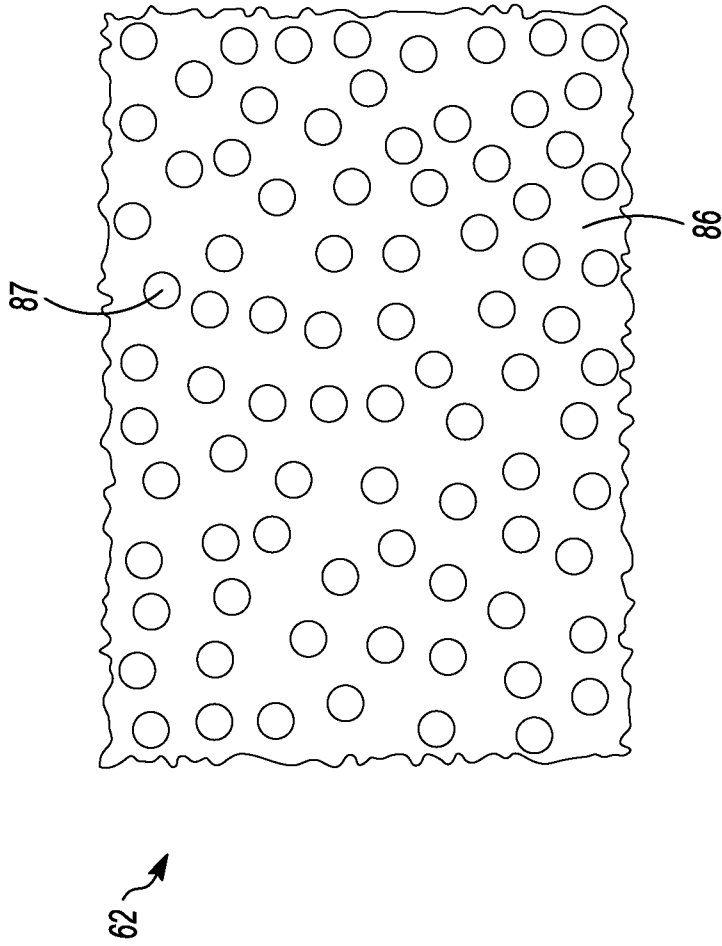
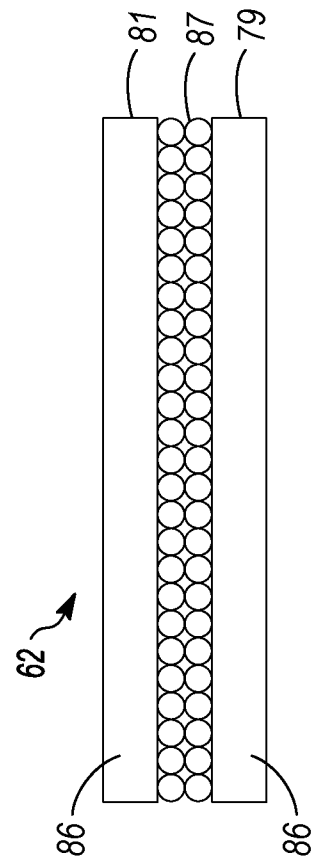


FIG. 11



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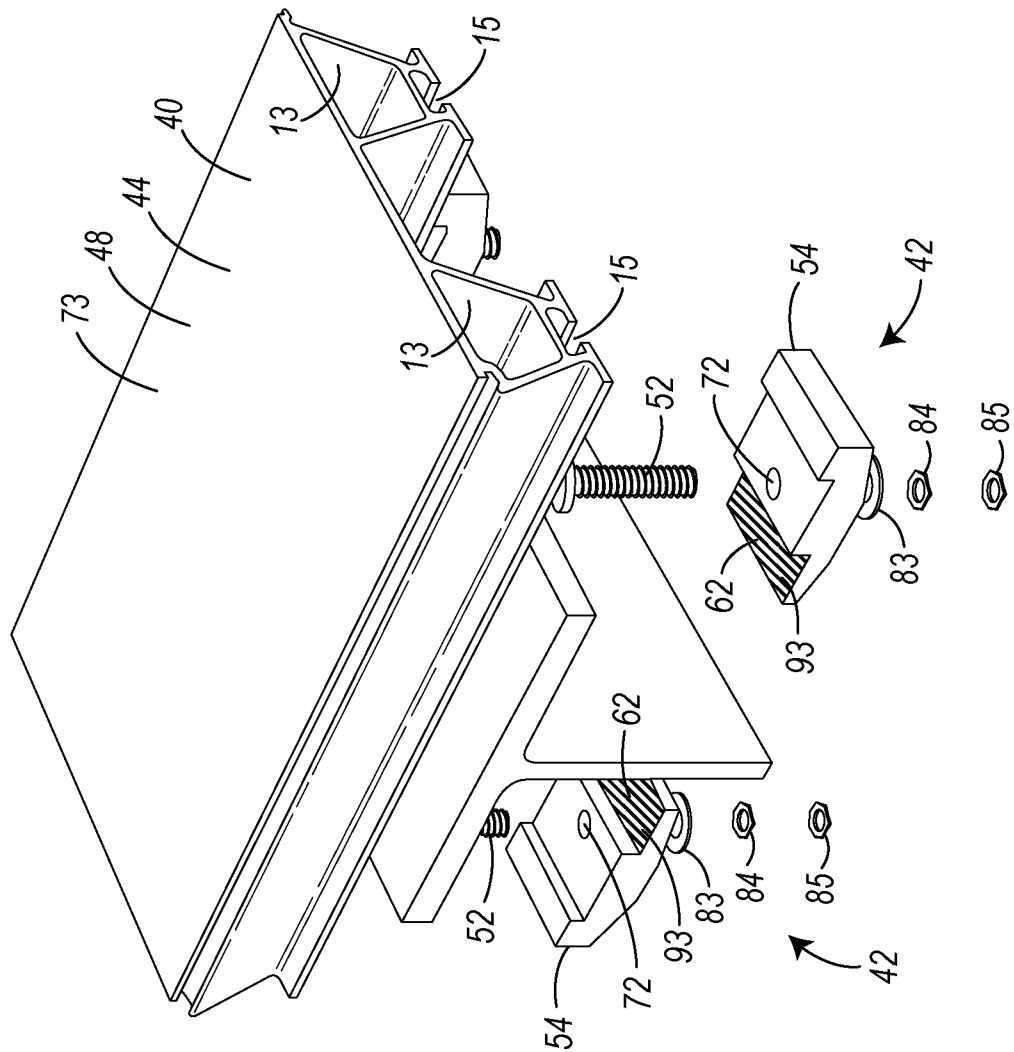


FIG. 12

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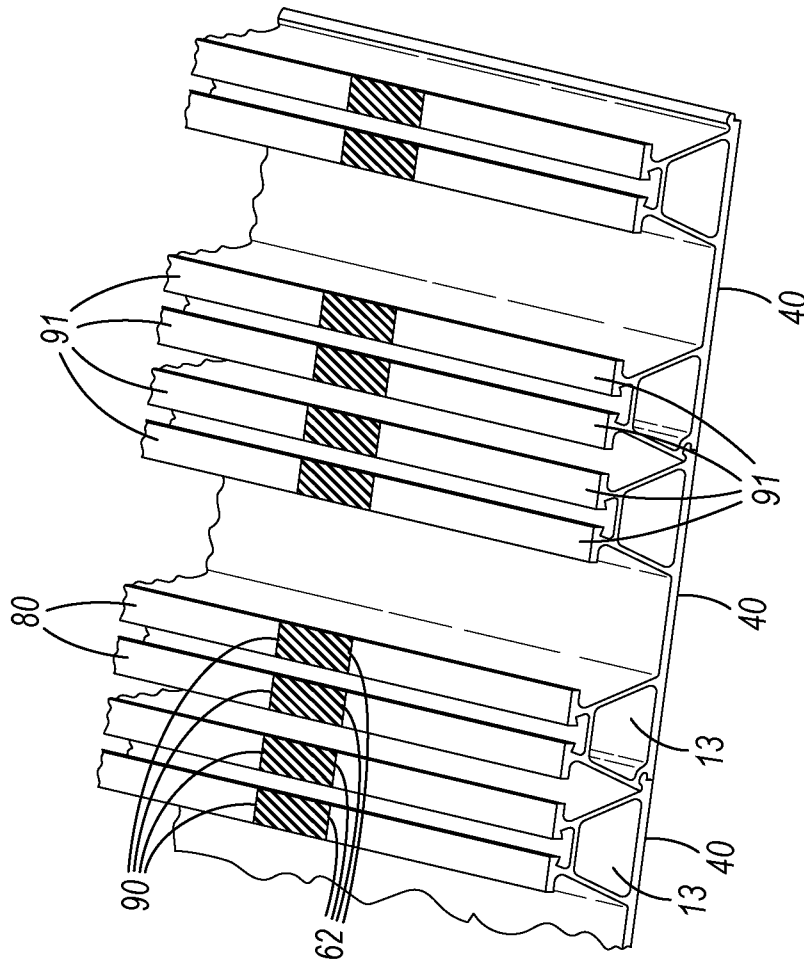


FIG. 13

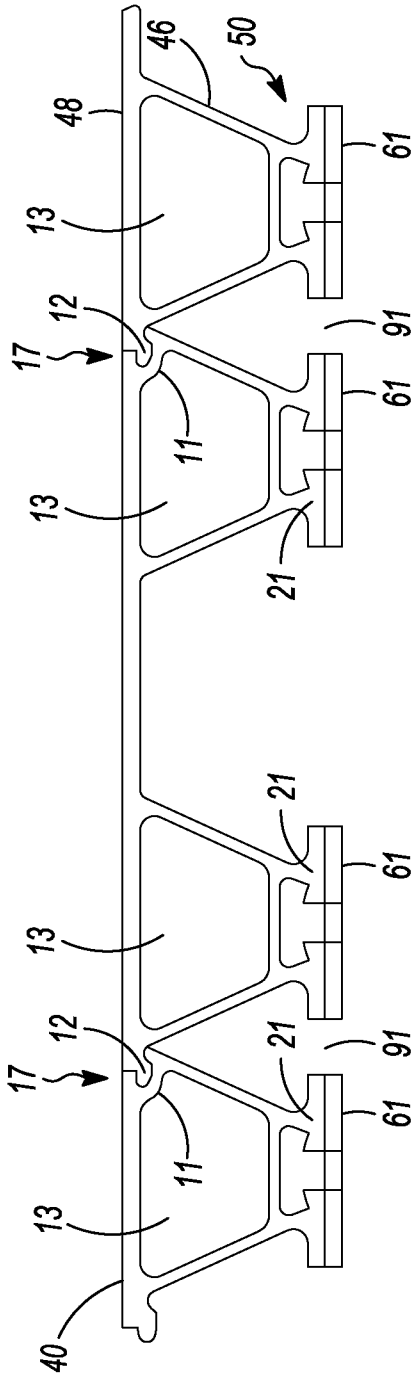


FIG. 14

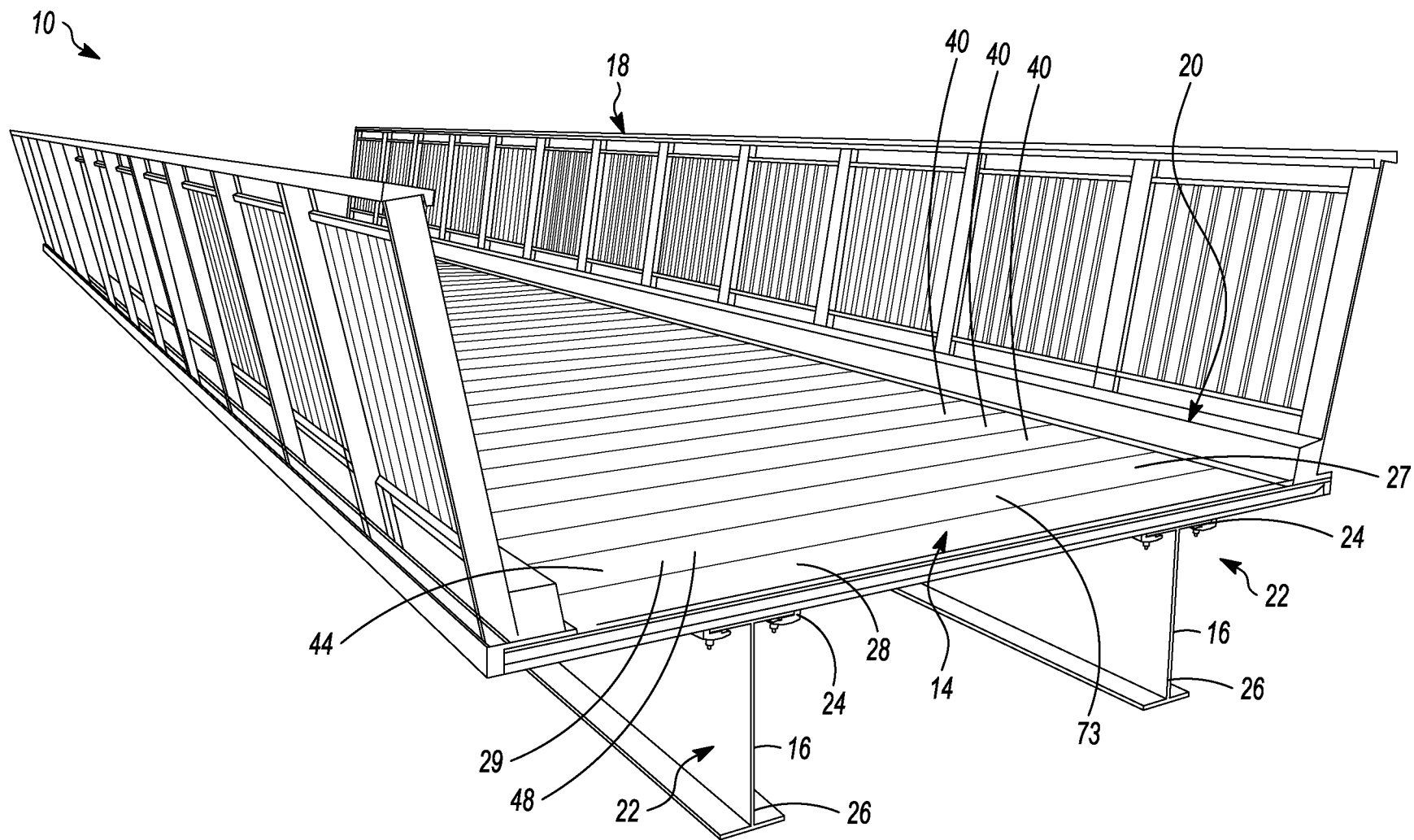


FIG. 1