US010641300B2

(12) **United States Patent**
Header

(10) **Patent No.: US 10,641,300 B2**
(45) **Date of Patent: *May 5, 2020**

(54) **FLANGED MATERIAL AND STANDING SEAM CLAMP**

(71) Applicant: **Gregory A. Header**, Richland, PA (US)

(72) Inventor: **Gregory A. Header**, Richland, PA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/456,679**

(22) Filed: **Mar. 13, 2017**

(65) **Prior Publication Data**

US 2017/0248161 A1 Aug. 31, 2017

Related U.S. Application Data

(63) Continuation of application No. 14/566,361, filed on Dec. 10, 2014, now Pat. No. 9,714,670, which is a (Continued)

(51) **Int. Cl.**
F16B 2/10 (2006.01)
F24S 25/615 (2018.01)
(Continued)

(52) **U.S. Cl.**
CPC ***F16B 2/065*** (2013.01); ***E04D 13/10*** (2013.01); ***F16M 13/022*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B25B 5/103; B25B 5/104; B25B 5/106; B25B 5/108; B42F 9/00; B42F 9/008;
(Continued)

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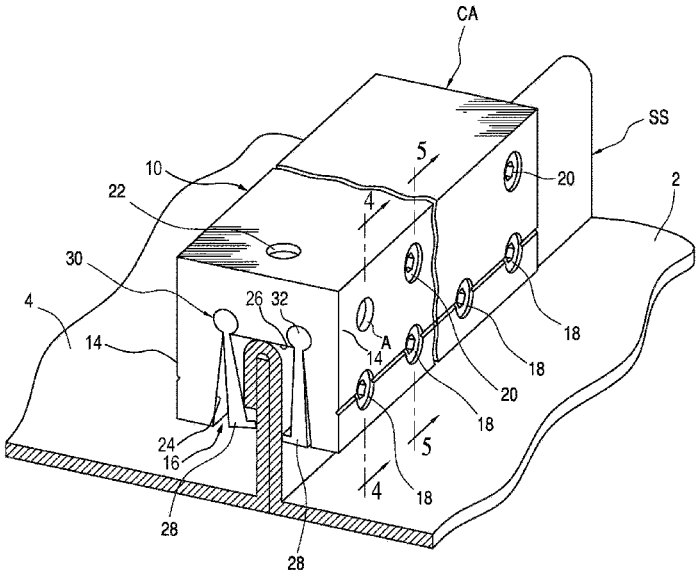
Primary Examiner — Joseph J Hail
Assistant Examiner — J Stephen Taylor
(74) *Attorney, Agent, or Firm* — Stone Creek Services LLC; Alan M Flum

(57) **ABSTRACT**

A clamping assembly for attaching loads to various kinds of flanged seams, the assembly comprising a generally U-shaped clamp body, at least one clamping hammer disposed interior of the clamp body, the clamping hammer is secured to the clamp body along the longitudinal axis of the clamp body, at least one adjustment screw extending through the clamp body and adapted to selectively impinge against the clamping hammer and cause it to pivot about its axis or otherwise move inwardly within the clamp body, the adjustment screw extending transverse to the longitudinal axis of the clamping hammer, at least one locking screw adapted to selectively impinge against the clamping hammer to prevent pivoting of the same may be optionally provided whereby a standing seam received within the clamp body may be tightly grasped between the clamp body and the clamping hammer under action of the adjustment screw.

18 Claims, 13 Drawing Sheets



Related U.S. Application Data

continuation of application No. 14/091,062, filed on Nov. 26, 2013, now Pat. No. 8,910,928, which is a continuation-in-part of application No. PCT/US2012/039283, filed on May 24, 2012, which is a continuation of application No. 13/118,308, filed on May 27, 2011, now Pat. No. 8,528,888.

(51) **Int. Cl.**

H02S 20/23	(2014.01)
E04D 13/00	(2006.01)
F16B 2/06	(2006.01)
E04D 13/10	(2006.01)
F16M 13/02	(2006.01)
E04D 3/30	(2006.01)
E04D 13/12	(2006.01)

(52) **U.S. Cl.**

CPC ***F24S 25/615*** (2018.05); *E04D 3/30* (2013.01); *E04D 13/00* (2013.01); *E04D 13/12* (2013.01); *H02S 20/23* (2014.12); *Y02B 10/20* (2013.01); *Y02E 10/47* (2013.01); *Y10T 403/7067* (2015.01)

(58) **Field of Classification Search**

CPC ... E04D 13/00; E04D 13/10; Y10T 403/7067; F24J 2/5249; Y02E 10/47

See application file for complete search history.

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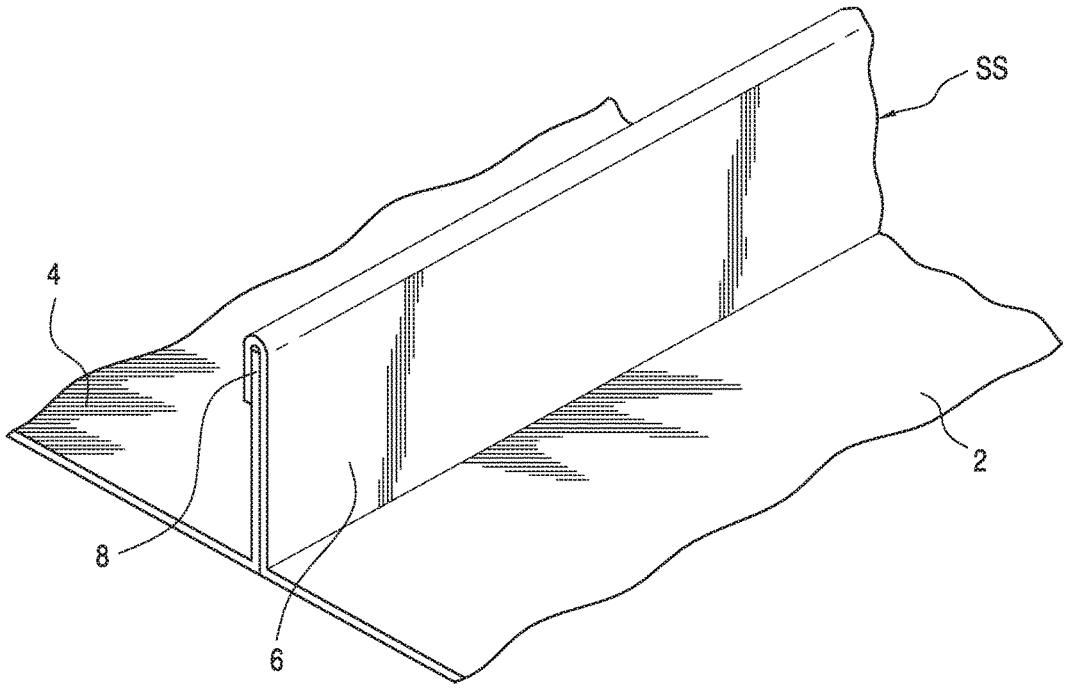


FIG. 1

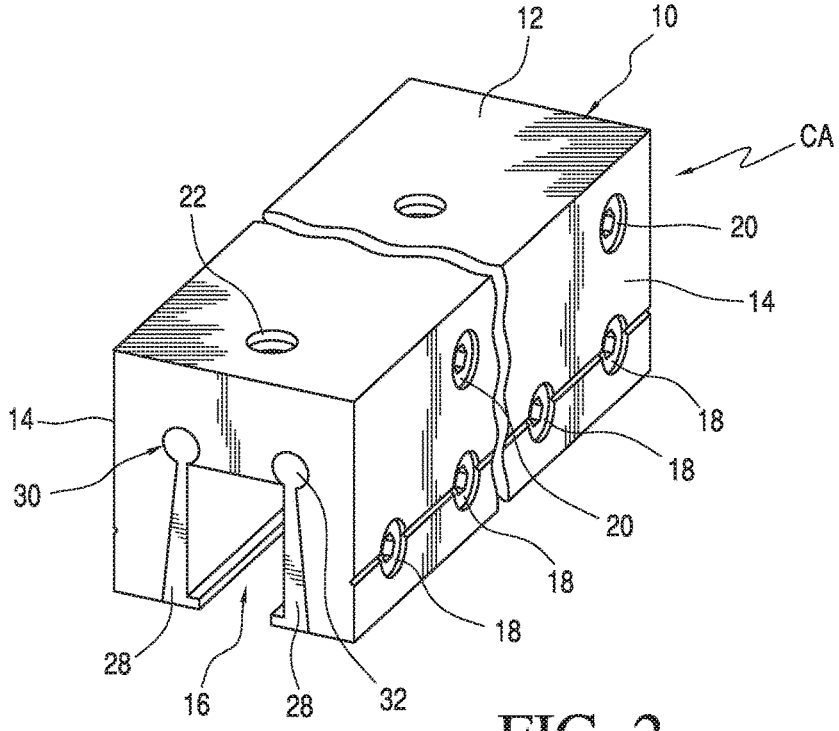
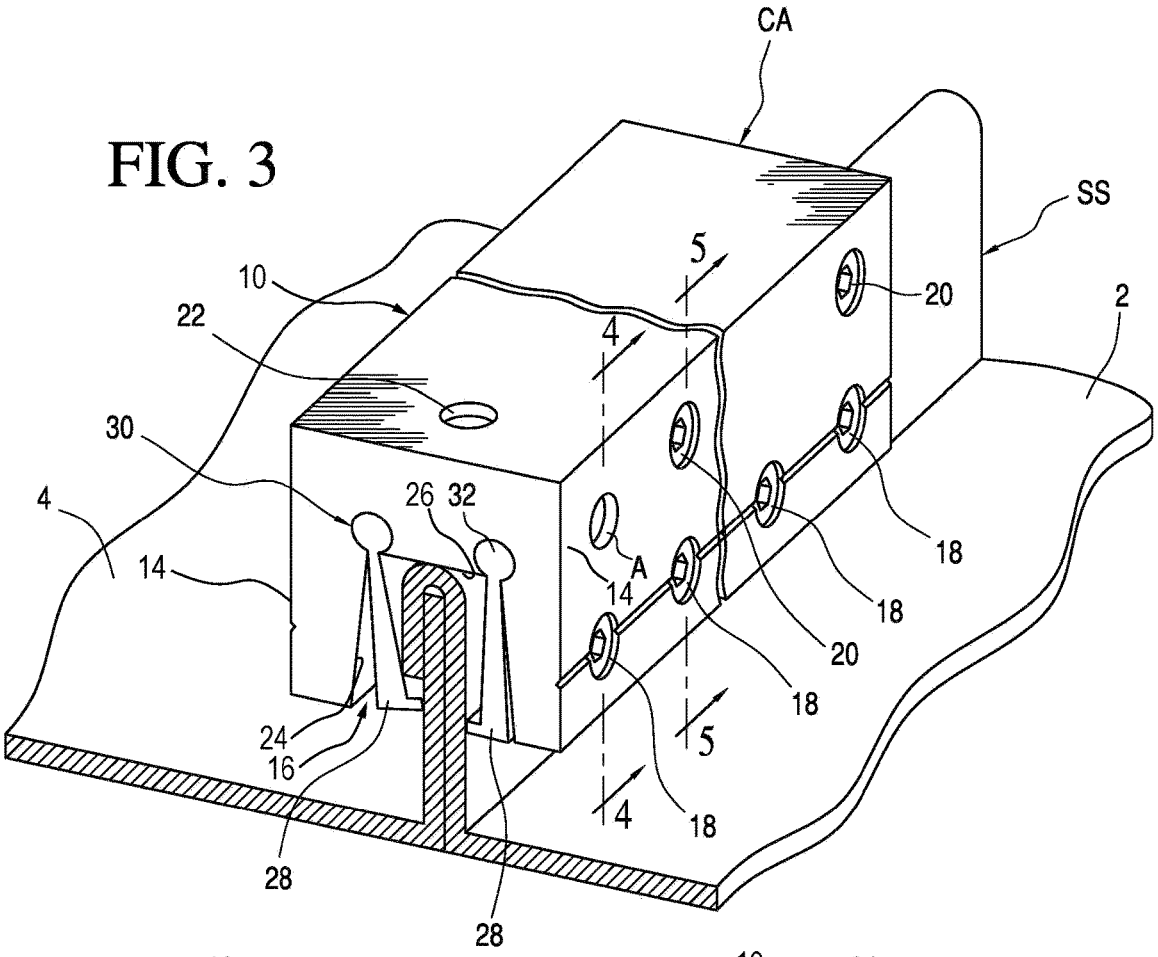


FIG. 2

FIG. 3



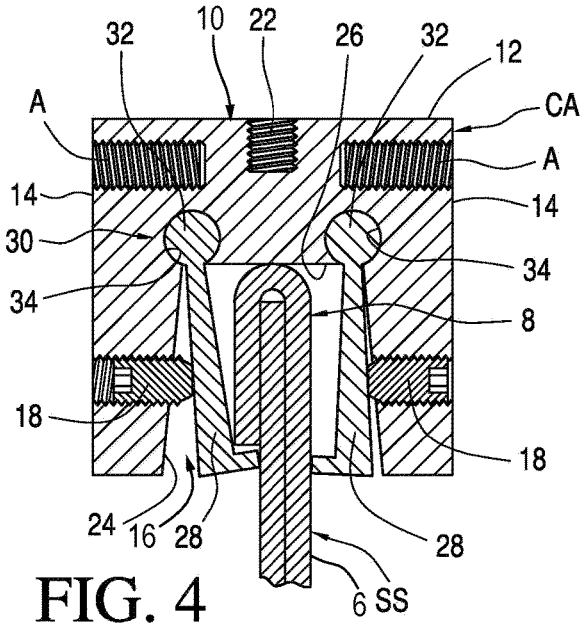


FIG. 4

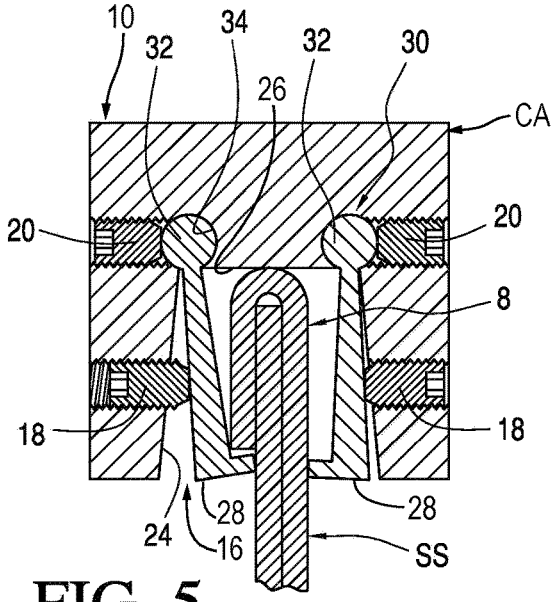


FIG. 5

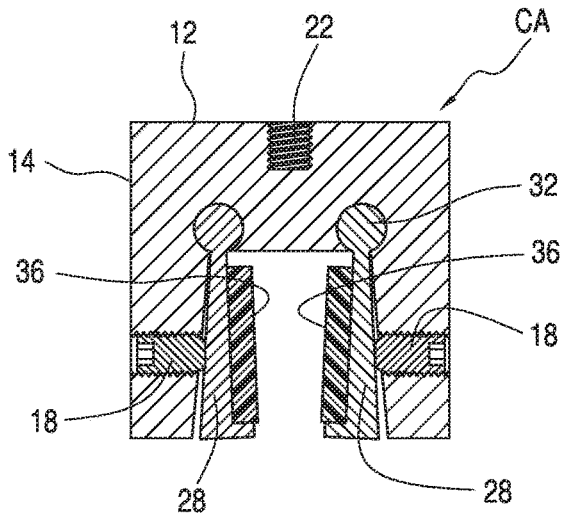


FIG. 6

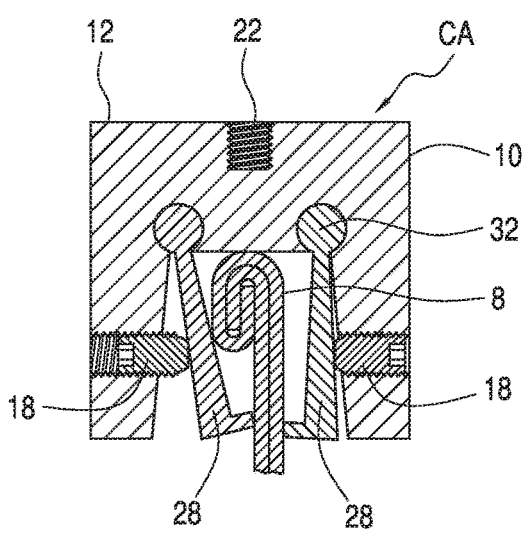


FIG. 7

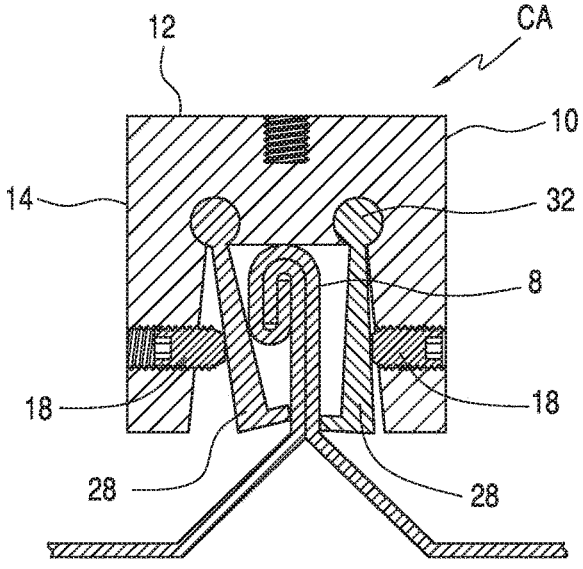


FIG. 8

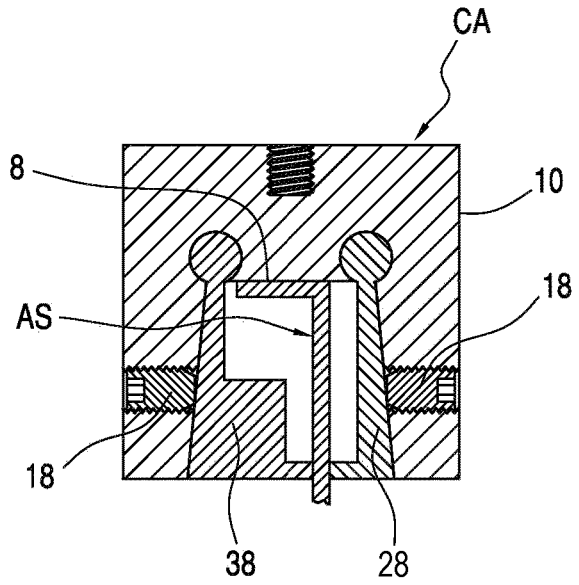


FIG. 9

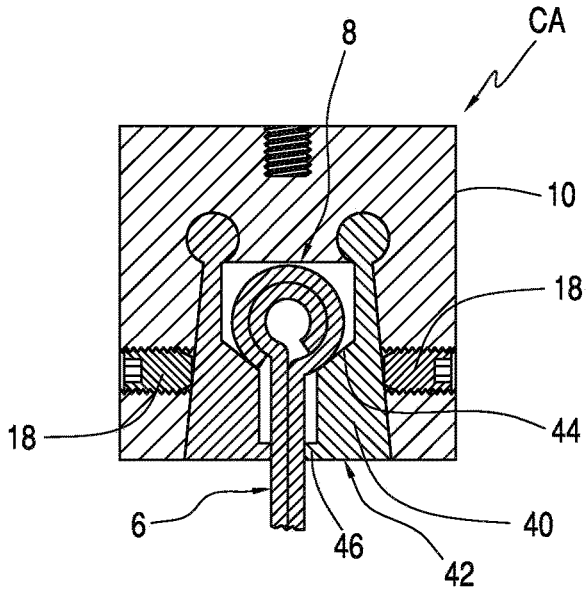


FIG. 10

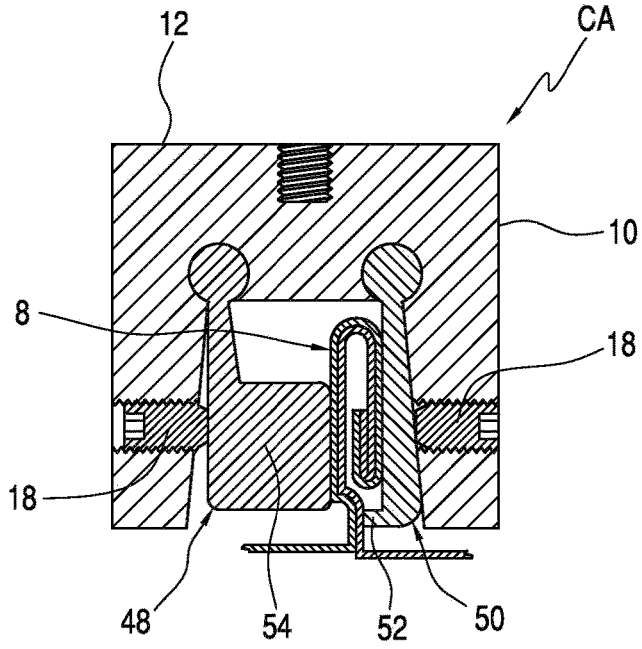


FIG. 11

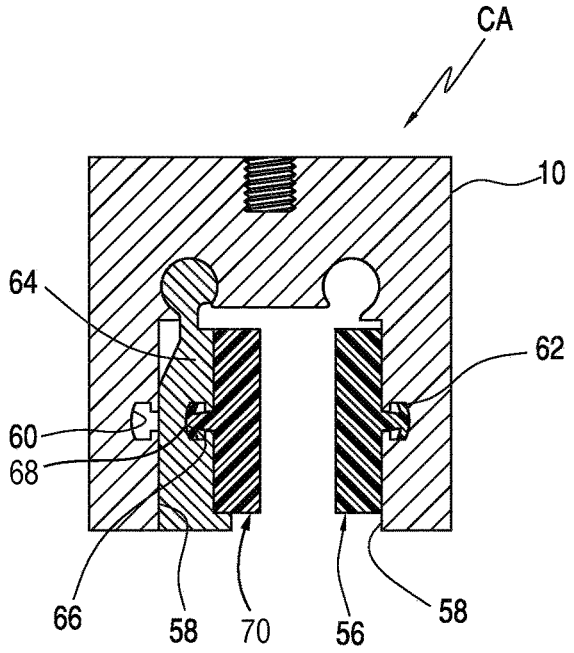


FIG. 12

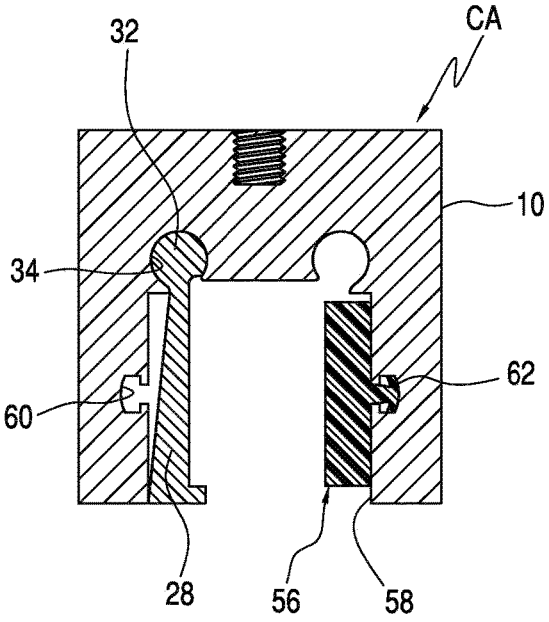


FIG. 13

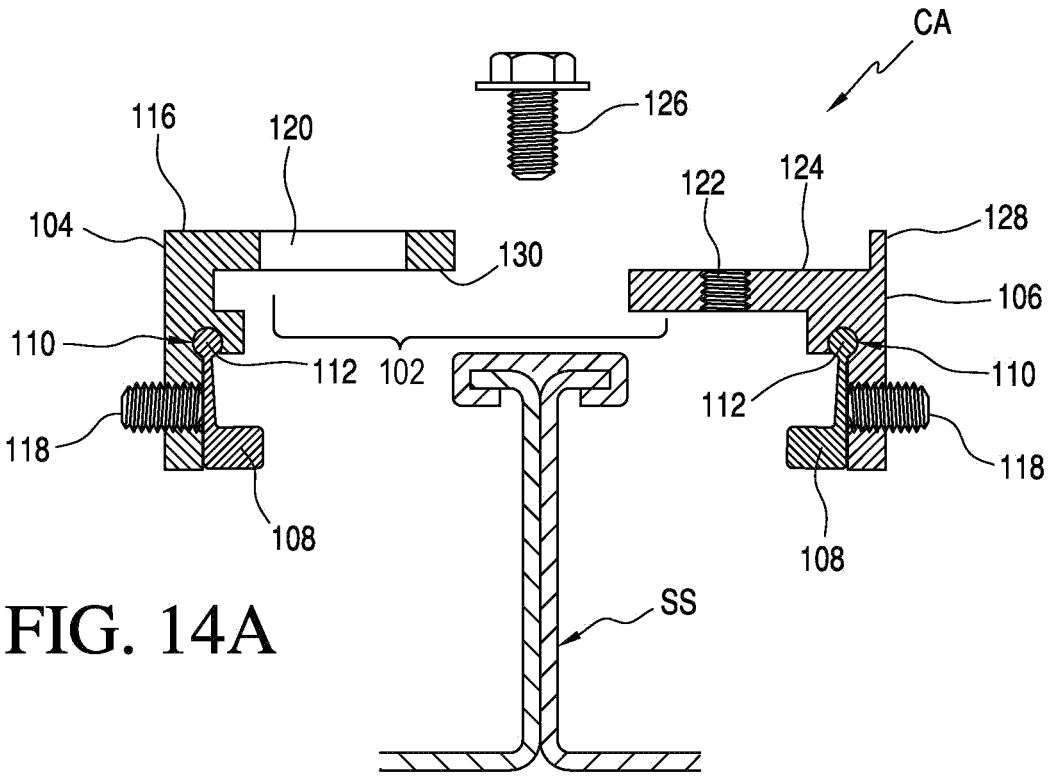


FIG. 14A

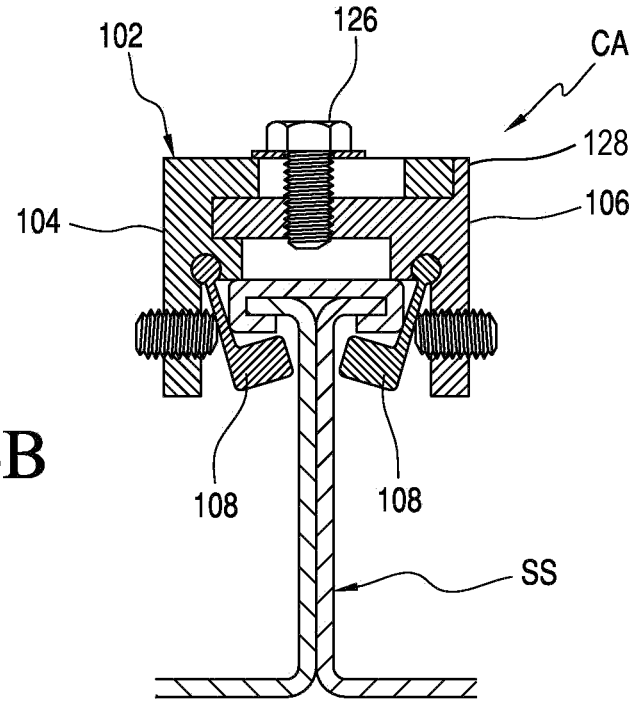


FIG. 14B

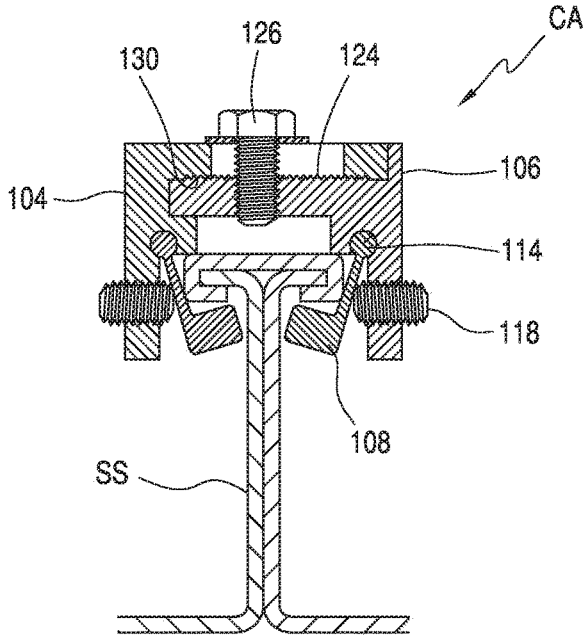


FIG. 15

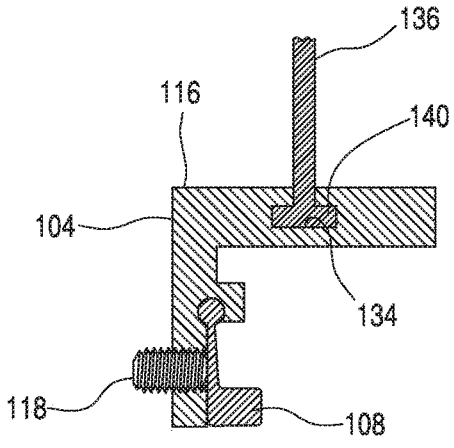


FIG. 16A

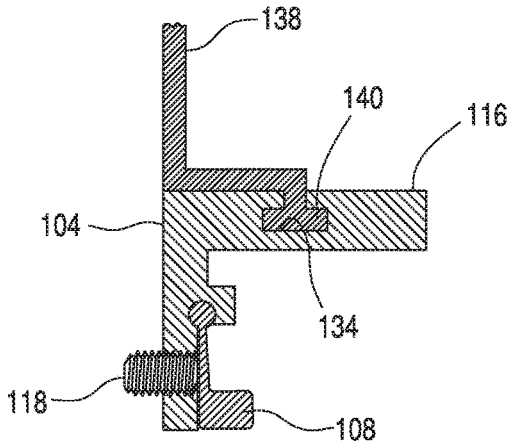


FIG. 16B

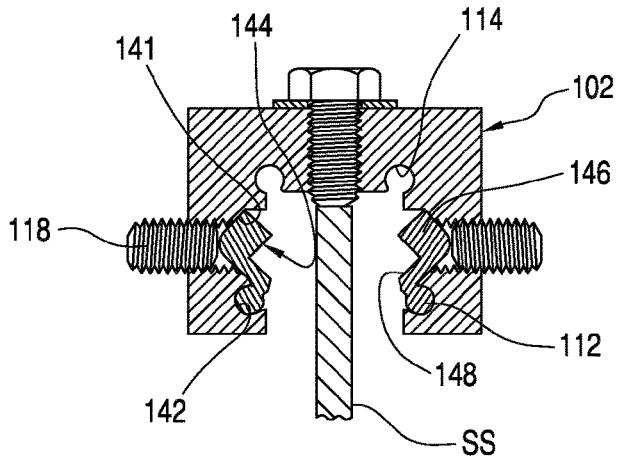


FIG. 17A

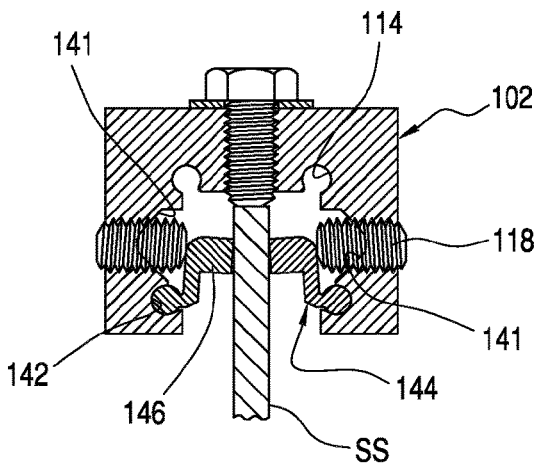


FIG. 17B

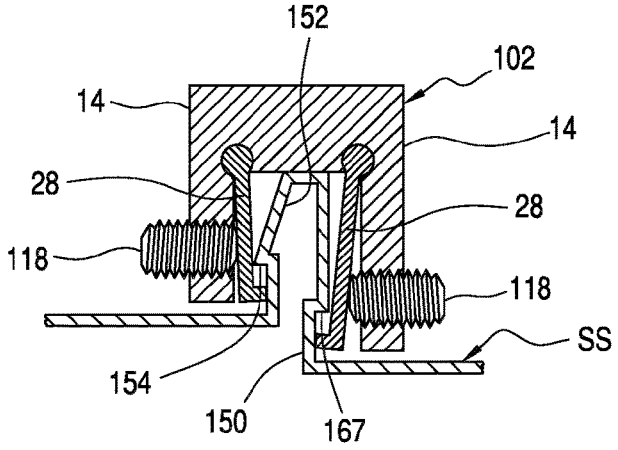


FIG. 18

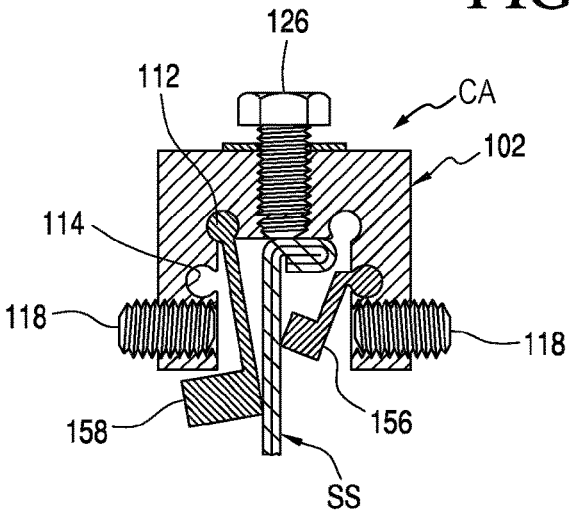


FIG. 19

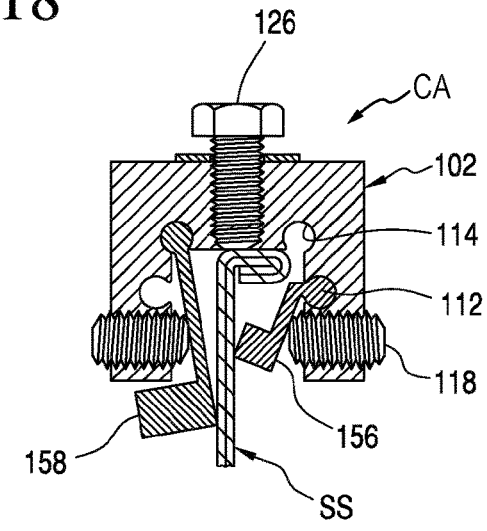


FIG. 20

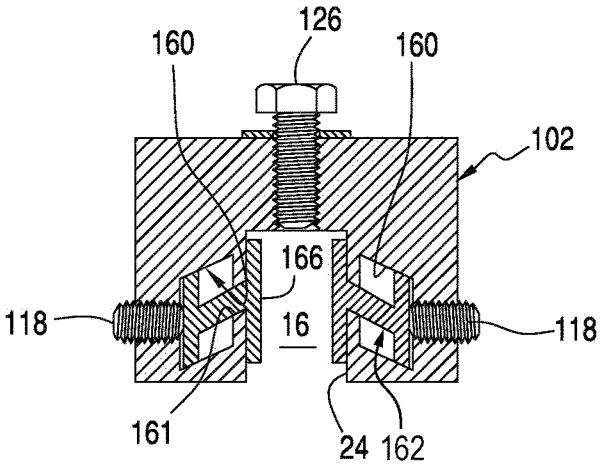


FIG. 21

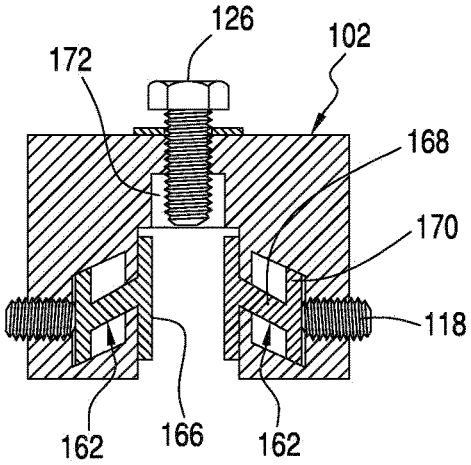


FIG. 22

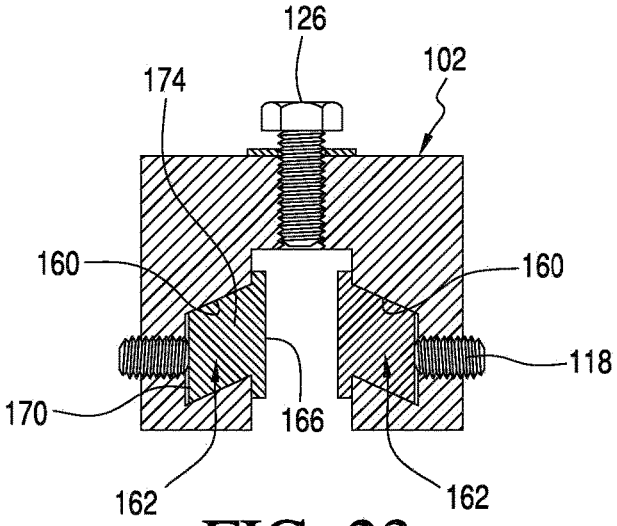


FIG. 23

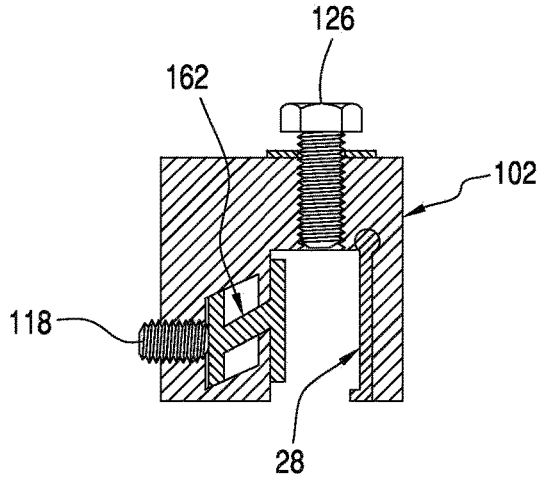


FIG. 24

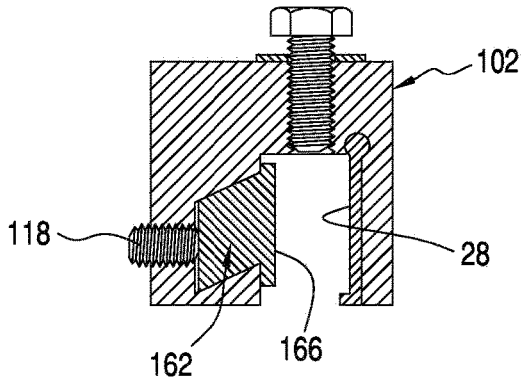


FIG. 25

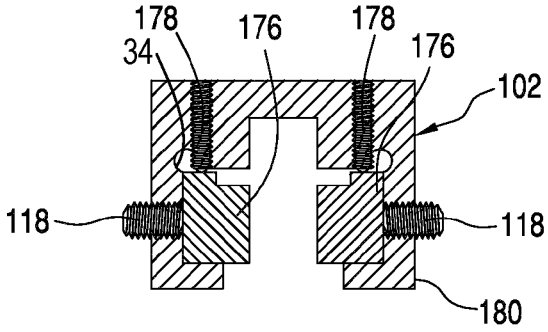


FIG. 26

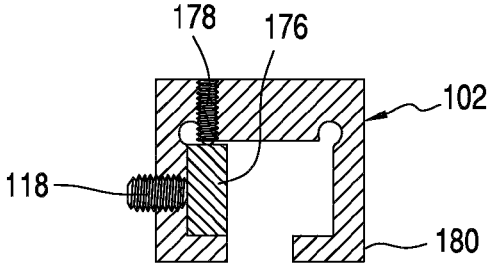


FIG. 27A

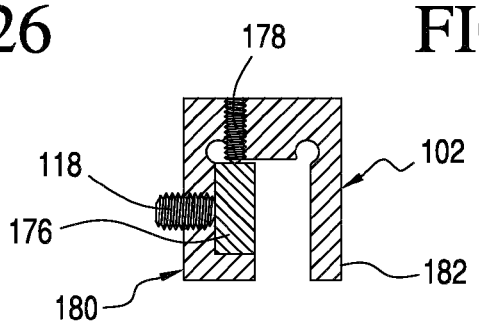


FIG. 27B

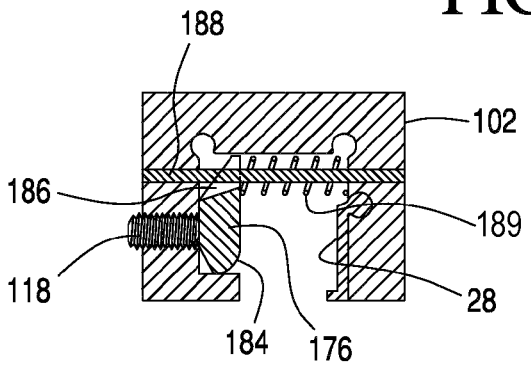


FIG. 28A

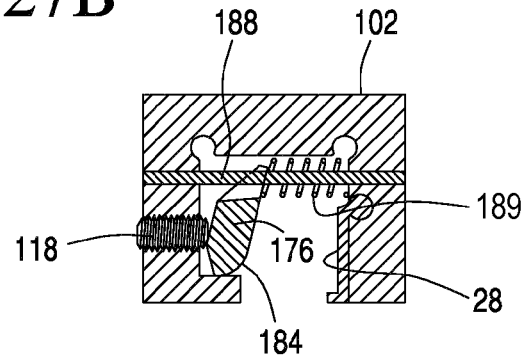


FIG. 28B

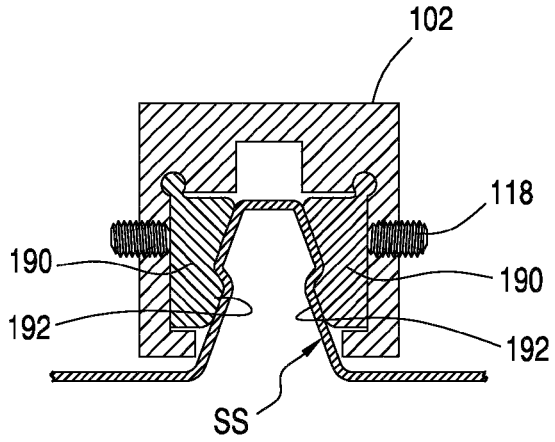


FIG. 29A

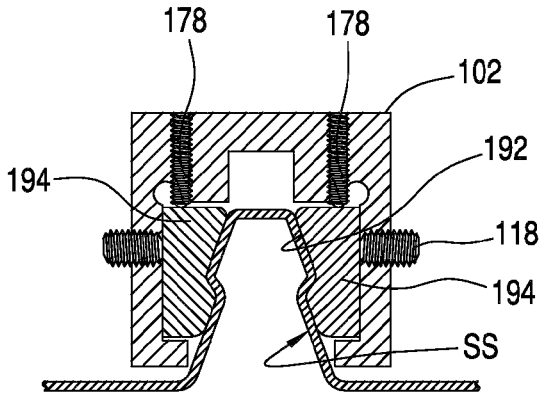


FIG. 29B

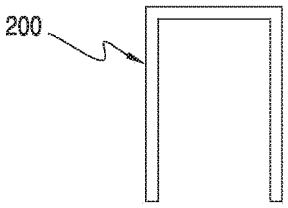


FIG. 30

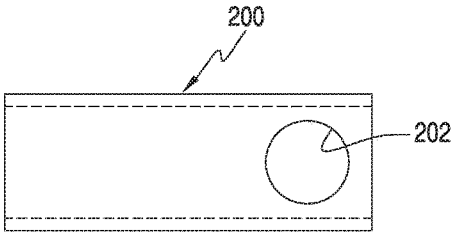


FIG. 31

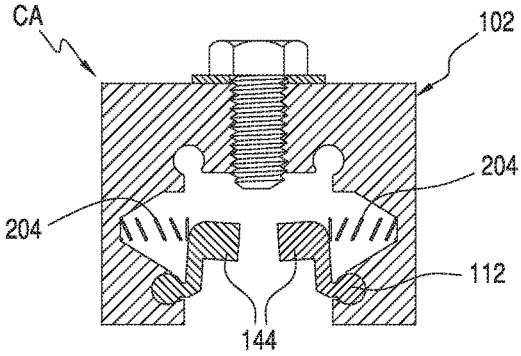


FIG. 32

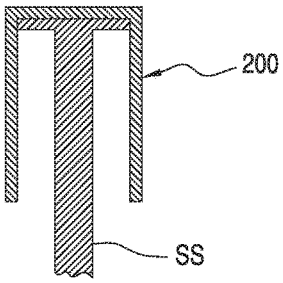


FIG. 33

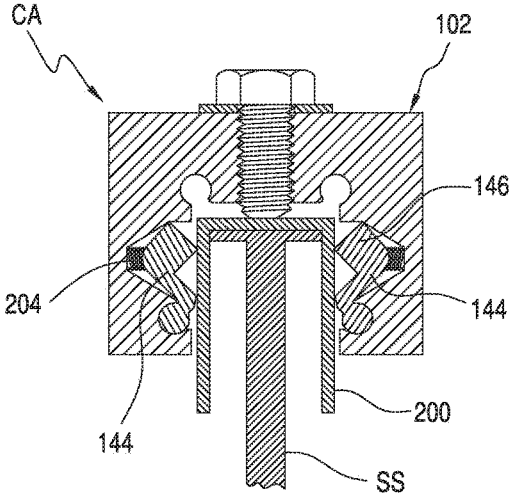


FIG. 34A

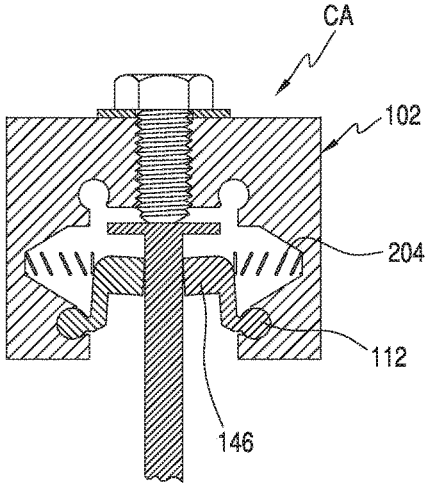


FIG. 34B

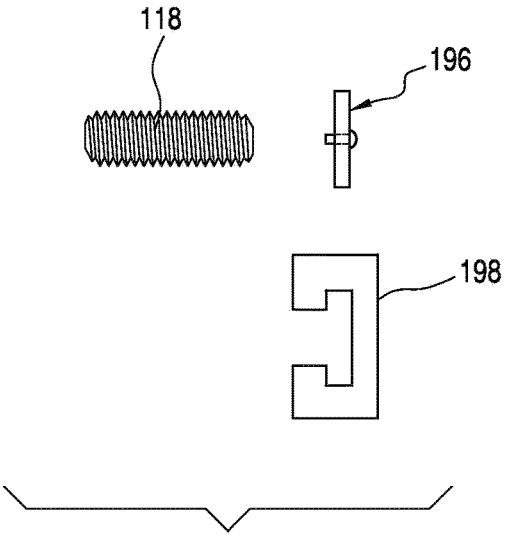


FIG. 35

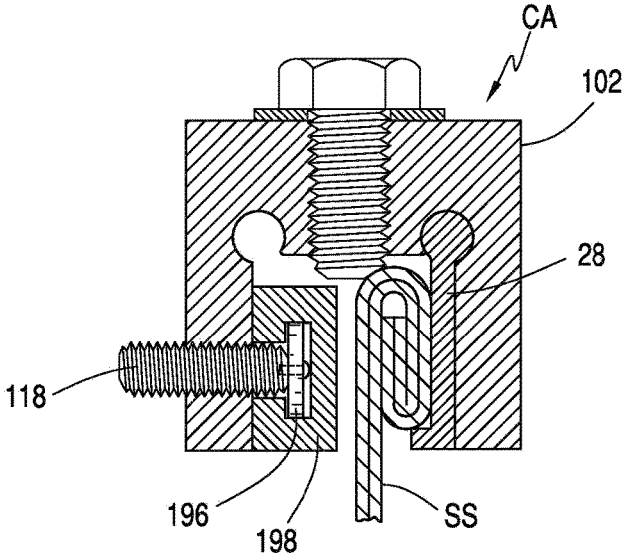


FIG. 36

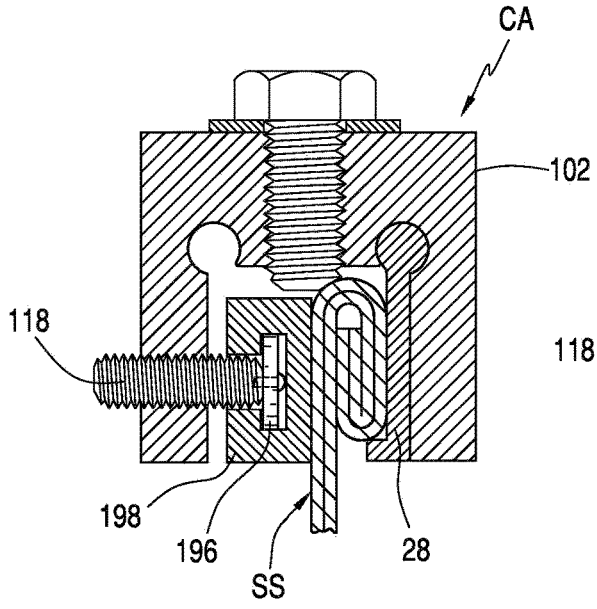


FIG. 37

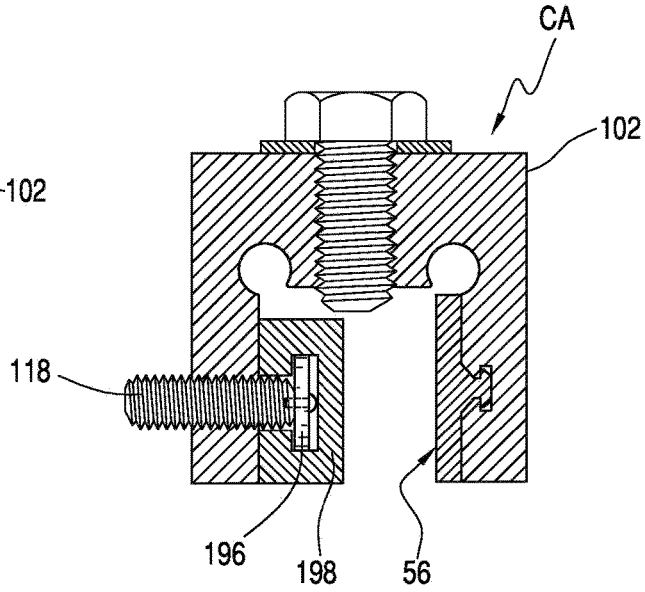


FIG. 38

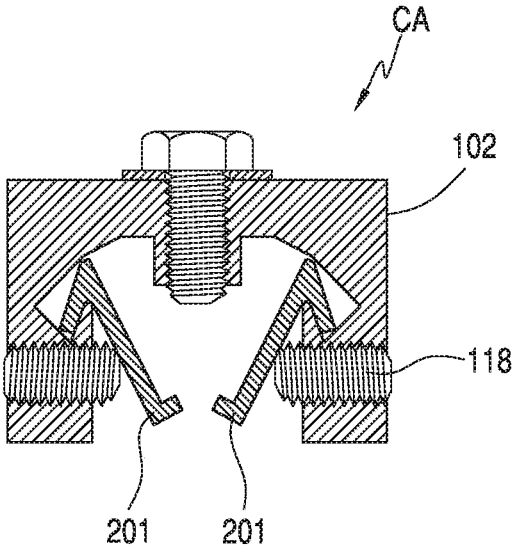


FIG. 39

FLANGED MATERIAL AND STANDING SEAM CLAMP

CROSS-REFERENCE TO RELATED APPLICATIONS

PCT International Application No. PCT/US2012/039283, filed on May 24, 2012, U.S. Pat. No. 8,528,888, issued Sep. 10, 2013, and U.S. Pat. No. 8,910,928, issued Dec. 16, 2014 are each incorporated herein by reference as if fully set forth.

FIELD OF THE INVENTION

This invention is a clamp assembly for attaching loads to various kinds of flanged seams including, but not limited to, standing seam roofing.

BACKGROUND OF THE INVENTION

Standing seams are often used to interconnect metal panels to form the roof of a building or other structure. The seam is created by bending and profiling together adjacent side edges of two metal sheets to form an upwardly extending portion that interlocks the sheets as it extends the width or length of the roof surface. The head or uppermost portion of the seam may be formed in a variety of shapes depending upon the manner in which the sheets are profiled together. For example, the head of a standing seam may be L-shaped, T-shaped, rounded, doubled over, or have some other profile correlating to the nature of end use.

It is desirable to attach a structure to a standing seam, especially in the case of roofing. Rooftops are obvious locations for mounting solar panel arrays, walkways, plumbing, wiring or other ancillary structures including but not limited to snow catchers, ice dams, etc.

When attaching a structure to a standing seam, drilling or penetration of the seam is avoided because doing so can affect the life of the roof. Clamp assemblies that do not penetrate a standing seam are known; however, these devices use bolts that are tightened directly against the seam, which can damage the seam and ultimately affect the integrity of the roof. Prior art clamping assemblies also produce an uneven clamping pressure that is not evenly distributed against the seam, eventually leading to clamp or roof failure. Many other roof clamps are known, but in each of these cases the device is complicated and difficult to install quickly.

BRIEF SUMMARY OF THE INVENTION

The present invention is a clamping assembly comprising a generally U-shaped clamp body for receiving a standing seam, an I-beam or similar structure, either a pair of cooperating clamping hammers or a single clamping hammer are disposed interior of the clamp body, the clamping hammers are hingedly secured to the clamp body along a longitudinal axis of the body and each is provided with at least one adjustment screw adapted to movably extend through the clamp body and selectively impinge against the hammer and cause it to pivot about its axis to open and close the clamp, the adjustment screw being disposed transverse to the longitudinal axis of the clamping hammer, each clamping hammer is also provided with a typical or optional one locking screw that movably extends through the clamp body to selectively impinge against the hammer and prevent pivoting whereby a standing seam or other structure received within the clamp body may be tightly grasped between the pair of cooperating hammers (or single hammer) to clamp and lock it into place.

The present invention is also directed to a clamping assembly comprising a generally U-shaped clamp body comprising two interconnected body members for receiving a standing seam, an I-beam or similar structure, either a pair of cooperating clamping hammers or a single clamping hammer are disposed interior of the clamp body, the clamping hammers are hingedly secured to the clamp body along a longitudinal axis of the body and each is provided with at least one adjustment screw adapted to movably extend through the clamp body and selectively impinge against the hammer and cause it to pivot about its axis to open and close the clamp, the adjustment screw being disposed transverse to the longitudinal axis of the clamping hammer, each clamping hammer is also provided with at least one locking screw that movably extends through the clamp body to selectively impinge against the hammer and prevent pivoting whereby a standing seam or other structure received within the clamp body may be tightly grasped between the pair of cooperating hammers (or single hammer) to clamp and lock it into place.

The present invention is also directed to a clamping assembly comprising a generally U-shaped clamp body for receiving a standing seam, an I-beam or similar structure, either a pair of cooperating clamping hammers or a single clamping hammer are disposed interior of the clamp body, the clamping hammers are hingedly secured to bottom of the clamp body and each is provided with at least one adjustment screw adapted to movably extend through the clamp body and selectively impinge against the hammer and cause it to pivot upwardly about its axis to open and close the clamp, the adjustment screw being disposed transverse to the longitudinal axis of the clamping hammer, each clamping hammer may also be provided with at least one locking screw that movably extends through the clamp body to selectively impinge against the hammer and prevent pivoting whereby a standing seam or other structure received within the clamp body may be tightly grasped between the pair of cooperating hammers (or single hammer) to clamp and lock it into place.

The present invention is also directed to a clamping assembly comprising a generally U-shaped clamp body for receiving a standing seam, an I-beam or similar structure, either a pair of cooperating clamping hammers or a single clamping hammer that is generally I-shaped in cross section and disposed interior of the clamp body within a longitudinal slot, the clamping hammers are fitted within the clamp body along a longitudinal axis of the body and each is provided with at least one adjustment screw adapted to movably extend through the clamp body and selectively impinge against one side of the hammer to cause it to shift laterally to open and close the clamp, the adjustment screw being disposed transverse to the longitudinal axis of the clamping hammer, each clamping hammer is also provided with an increased clamping surface area to provide contact against a seam to be clamped whereby a standing seam or other structure received within the clamp body may be tightly grasped between the pair of cooperating hammers (or single hammer) to clamp and lock it into place.

The present invention is also directed to a clamping assembly comprising a generally U-shaped clamp body for receiving a standing seam, an I-beam or similar structure, either a pair of cooperating clamping hammers or a single clamping hammer are disposed interior of the clamp body, the clamping hammers comprise a block fitted with a washer and a rivet secured to the clamp body along a longitudinal

axis of the body and each is provided with at least one adjustment screw fixed at one end thereof to the washer and the rivet and adapted to movably extend through the clamp body and selectively impinge against the block to cause it to travel inwardly within the clamp to clamp a standing seam, the adjustment screw being disposed transverse to the longitudinal axis of the clamping block. In the alternative, the washer and the rivet may be replaced with a free spinning washer and nut to move the clamping block.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. **1** is a perspective view showing a typical overlap type standing seam that may be clamped by the present invention;

FIG. **2** is a perspective view showing the clamp assembly according to the present invention with portions broken away;

FIG. **3** is a perspective view of the clamp shown in FIG. **2** when clamping standing seam with portions of the clamp shown in broken lines;

FIG. **4** is a cross-sectional view taken along lines **4-4** of FIG. **3**;

FIG. **5** is a cross-sectional view taken along lines **5-5** of FIG. **3**;

FIG. **6** is a cross-sectional view of an alternative embodiment of the clamp assembly shown in FIG. **4**;

FIG. **7** is cross sectional view of the clamp shown in FIG. **4** when clamping a double lock type standing seam;

FIG. **8** is cross-sectional view of the clamp shown in FIG. **4** when clamping a trapezoid double lock type standing seam;

FIG. **9** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **4** when clamping an angled seam;

FIG. **10** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **4** when clamping a seam having a round head;

FIG. **11** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **4** when clamping an off-set seam;

FIG. **12** is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention with a pair of protective gaskets;

FIG. **13** is a cross-sectional view showing an alternative embodiment of one clamp according to the present invention having an isolation gasket or membrane to protect a roof or other structure from vibration, sound, or the like or otherwise increase surface tension;

FIG. **14**A is an exploded cross-sectional view showing an alternative embodiment of the clamp according to the present invention.

FIG. **14**B is a cross-sectional view of the clamp shown in FIG. **14**A when assembled and secured to a standing seam;

FIG. **15** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIGS. **14**A and **14**B;

FIG. **16**A is a cross-sectional view showing an alternative embodiment of the clamp shown in FIGS. **14**A and **14**B;

FIG. **16**B is a cross-sectional view showing an alternative embodiment of the clamp shown in FIGS. **14**A and **14**B;

FIG. **17**A is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention and prior to securing to a standing seam;

FIG. **17**B is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention when securing to a standing seam;

FIG. **18** is a cross-sectional view showing another alternative embodiment of the clamp according to the present invention when securing to a standing seam;

FIG. **19** is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention prior to securing to an L-shaped standing seam;

FIG. **20** is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention when secured to an L-shaped standing seam;

FIG. **21** is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention;

FIG. **22** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **21**;

FIG. **23** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **21**;

FIG. **24** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **21**;

FIG. **25** is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **21**;

FIG. **26** is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention;

FIG. **27**A is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **26**;

FIG. **27**B is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **26**;

FIG. **28**A is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention prior to clamping;

FIG. **28**B is a cross-sectional view showing the clamp in FIG. **28**A when in a clamping position;

FIG. **29**A is a cross-sectional view showing an alternative embodiment of the clamp according to the present invention;

FIG. **29**B is a cross-sectional view showing an alternative embodiment of the clamp shown in FIG. **29**A;

FIG. **30** is an end view showing a tool according to the present invention for use when assembling a clamp to a standing seam;

FIG. **31** is a top view of FIG. **30**;

FIG. **32** is a cross-sectional view showing an alternative embodiment of a clamp according to the present invention;

FIG. **33** is a cross-sectional view showing the tool in FIGS. **30** and **31** fitted over a standing seam to be clamped;

FIG. **34**A is a cross-sectional view showing the tool shown in FIGS. **30** and **31** in use with the clamp shown in FIG. **32**;

FIG. **34**B is a cross-sectional view of FIG. **34**A after the tool has been removed and the clamp is secured against a standing seam;

FIG. **35** is an exploded cross-sectional view of an alternative embodiment according to the present invention;

FIG. **36** is a cross-sectional view of a clamp fitted with the clamping structure shown in FIG. **35** and prior to being secured to a standing seam;

FIG. **37** is a cross-sectional view of the clamp shown in FIG. **36** when clamped to a standing seam;

FIG. **38** is an alternative embodiment of the clamp shown in FIG. **36**; and

FIG. **39** is a cross sectional view showing another embodiment of the clamp according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** shows a standard overlap-type standing seam SS comprising metal sheets **2** and **4** interconnected at upstanding portion **6** and head portion **8**. The standing seam SS is formed by bending or profiling together adjacent edges of

sheets **2** and **4** to interlock the edges at head portion **8** in a known manner. The present invention is applicable for clamping other standing seams as will be explained further below. A perspective view of the standing seam SS and sheets **2**, **4** is illustarted in FIG. **3**.

Referring to FIGS. **2** through **5**, the clamp assembly CA of the present invention is shown in greater detail. As best seen in FIG. **2**, the clamp assembly CA comprises a generally U-shaped clamp body **10**, formed from metal such as extruded aluminum, or a high-density plastic, or other material, and having a top **12** and sides **14** that define an interior region **16** for receiving a standing seam. The clamp body **10** may be of variable length and thickness depending upon the end use of the clamp and the strength requirements necessary for that particular use.

Adjustment screws **18** are provided along both of the sides **14** of the clamp body **10**. The apertures for each of the adjustment screws **18** are disposed adjacent to the bottom edge of each side **14** and each extends through the sides **14** so that the adjustment screw **18** may be selectively moved into and out of the interior region **16** of the clamp body **10**.

Locking screws **20** may be provided along both of the sides **14** of the clamp body. The apertures for each of the locking screws **20** are disposed adjacent to the top edge of each side **14** and each extends through the sides **14** so that it can be selectively moved into and out of the interior region **16** of the clamp body **10** to lock the clamp onto a seam as will be further explained below. The number of locking screws **20** and adjustment screws **18** provided on the clamp is variable. In general, the clamp body **10** will have a pair of adjustment screws **18** on each of side of the clamp, the pairs aligned as mirror images and at least one locking screw **20** per side.

A threaded aperture **22** is provided within the top **12** of the clamp body **10** to receive a threaded bolt (not shown) that may be used to attach a solar panel, wiring, or other structure to the clamp body **10**. Similarly, and as best shown in FIGS. **3** and **4**, a threaded aperture A may be provided in either or both of the sides **14** of the clamp body **10** to receive a threaded bolt (not shown) to attach a solar panel, wiring, or some other structure to the clamp body **10**. The adjustment screws **18** are also illustrated in FIGS. **3** through **5**. The locking screw **20** is illustrated in FIGS. **3** and **5**, and the threaded aperture **22** is also illustrated in FIGS. **3** and **4**. In FIG. **4**, the threaded aperture is shown extending into the top **12**.

Turning to FIGS. **3** through **5**, additional features of the clamp assembly CA are shown together with operation of the clamp. The interior region **16** comprises side walls **24** and top wall **26**. The width and height of interior region **16** may be varied depending upon the size of the standing seam to be clamped.

A pair of movable clamping jaws or hammers **28** are provided within interior region **16** of the clamp body **10** for clamping against a seam. As best shown in FIGS. **4** and **5**, the clamping hammers **28** are disposed as mirror images of each other, and in one embodiment, are generally L-shaped to accommodate the head portion of a conventional folded seam as will be further explained below. The hammers **28** extend the length of the clamp body **10** from a first end to a second end and are pivotally secured within the clamp body **10** at hinge member **30**. The hammers may be constructed from metal, such as extruded aluminum, or from a high-density plastic or other material suitable to the use of the clamp.

Referring to FIGS. **3** through **5**, hinge member **30** comprises a cylindrical member **32**, provided at the top of the clamping hammer **28** and extending the length of the clamping hammer **28**, and a cooperating groove **34** (FIGS. **4** and **5**) provided within the clamp body **10**, the groove **34** sized to receive the cylindrical member **32** such that hammer **28** is adapted to freely pivot about the longitudinal axis of hinge member **30**. During assembly of the clamp, a series of inwardly extending detents (not shown) may be provided at each end of the groove **34** to retain the clamping hammer **28** within the groove **34**. The hinge member **30**, cylindrical member **32**, and clamping hammers **28** are also illustrated in FIG. **2**.

As best shown in FIG. **4**, the adjustment screws **18** are aligned transverse to the longitudinal axis of the clamping hammers **28**. Selectively turning the adjustment screw **18** will cause it to move inwardly or outwardly and consequently, into and out of engagement with a respective clamping hammer **28**. When a standing seam SS is disposed interior of clamp body **10**, and the adjustment screws **18** associated with the clamping hammers **28** are turned inwardly, the hammers are likewise caused to pivot inwardly about hinge **30** and engage against the upstanding portion **6** of a seam SS. The L-shape of the clamping hammers **28** allow the head portion **8** of the seam SS to be received between the hammers without damaging the head. The present invention generates a clamping pressure against the seam SS that is continuous and evenly distributed along the entire length of the clamp assembly CA. By spreading the load along the length of the clamp, damage to the seam SS is avoided and failure of the clamp is greatly reduced. The head portion **8** is also shown in FIG. **5**.

As best shown in FIG. **5**, after the seam SS is engaged by the clamping hammers **28**, the locking screws **20** associated with each of the clamping hammers **28** are tightened which causes the screw to contact cylindrical member **32** and prevent pivoting of hinge **30** which is then in a locked position. As is apparent, to remove the assembly from a seam SS, the adjustment screw **18** and locking screws **20** are loosened which causes the clamping hammers **28** to pivot out of engagement thereby allowing the clamp to be separated from the seam SS.

FIG. **6** illustrates an alternative embodiment of the present invention whereby the inwardly facing surfaces of the clamping hammers **28** have secured to the surfaces an elastomeric coating (or a sheet) of material to provide an isolation gasket, membrane or filler material **36** for purposes of, for example, increased friction, dampening vibration or providing insulation to the clamped seam or otherwise function as a spacer. Each of the clamping hammers **28** includes a cylindrical member **32**. The clamping assembly CA also includes adjustment screws **18** that engage the clamping hammers **28** through the sides **14**. A threaded aperture **22** is provided within the top **12**.

FIG. **7** illustrates the clamp assembly CA of the present invention when clamped to a double lock standing seam with one of the clamping hammers **28** engaging the head portion **8** of the seam. In this embodiment, the clamping hammers are angled inwardly to a greater degree than would be the case with an overlap type standing seam. The invention is adapted to accommodate different kinds of seams having varying shapes and head sizes. A threaded aperture **22** is provided within the top **12** of the clamp body **10**. Each of the clamping hammers **28** include a cylindrical member **32**. The adjustment screws **18** engage the clamping hammers **28** and cause them to pivot about cylindrical members **32**.

FIG. **8** illustrates the clamp CA assembly of the present invention when clamping to a trapezoid double lock type standing seam with one of the clamping hammers **28** engag-

ing the head portion **8** of the seam. The clamp assembly CA includes a clamp body **10**, adjustment screws **18**, and clamping hammers **28**. The clamp body **10** includes a top **12** and sides **14**. Each of the clamping hammers **28** includes a cylindrical member **32**. The adjustment screws **18** engage the clamping hammers **28** and cause them to pivot about cylindrical members **32**.

FIG. **9** illustrates an alternative embodiment of the present invention. The clamping hammer **28** noted earlier are interchanged in this embodiment to adapt the clamp assembly CA to clamp an angled seam AS. In this embodiment, one of the two clamping hammers **28** in FIGS. **2** through **5** is replaced with an angled seam clamping hammer **38**. The angled seam clamping hammer **38** is shown to have a stepped configuration to accommodate the head portion **8** of the angled seam AS which extends transverse to the longitudinal axis of the seam. One of the adjustment screws **18** engages the angled seam clamping hammer **38** through the clamp body **10**. The other of the adjustment screws **18** engages the clamping hammer **28**.

FIG. **10** illustrates a further embodiment of the present invention. Both clamping hammers in this embodiment are changed from that shown in the previous embodiments so as to adapt the clamp assembly CA for clamping a seam having a round head **8**. The round head clamping hammers **42** include an abutment region **40** that extends inwardly and includes a downwardly sloping surface **44** for engaging the lower regions of the rounded head **8** and jaw portions **46** for engaging the upstanding portion **6** of the seam. The adjustment screws **18** engage the round head clamping hammers **42** through the clamp body **10**.

FIG. **11** illustrates another embodiment of the present invention. Both clamping hammers in this embodiment are changed from that shown in the previous embodiments so as to adapt the clamp assembly CA for clamping a seam having an offset head **8**. The offset head clamping hammers **48** and **50** have different thicknesses and heights. Offset head clamping hammer **50** has a greater height than offset head clamping hammer **48** and further includes a jaw portion **52**. Offset head clamping hammer **48** includes a thickened region or abutment **54** so that when the hammers are urged against the offset head **8**, it is held securely between both hammers and the top **12** of the clamp body is maintained parallel to the surface from which the seam extends. The adjustment screws **18** engage the offset head clamping hammers **48** and **50** through the clamp body **10**.

FIG. **12** illustrates another embodiment of the present invention. In this embodiment, the interior wall surfaces **58** of the clamp body **10** are provided with parallel keyway tracks **60** extending the length of the clamp for selectively receiving a gasket or membrane **56** having a male keyway portion **62** adapted to interfit and interlock the keyway track **60**. A modified clamping hammer **64** is provided at the opposite side of the gasket or membrane **56**. The modified clamping hammer **64** is shown to include a keyway track **66** for receiving a male keyway portion **68** of gasket or membrane **70**. An adjustment screw **18** (not shown) is provided to cause the modified clamping hammer **64** to move inwardly and clamp and insulate (sound, vibration, etc.) a seam between the resilient gasket or membrane **56** and **70**.

FIG. **13** is an alternative embodiment of the clamp assembly CA of FIG. **12** wherein a clamping hammer **28** as shown in FIGS. **2** through **5** is used in place of the modified clamping hammer **64** of FIG. **12** to clamp the seam (not shown) between a gasket or membrane **56** and the clamping hammer **28** by way of adjustment screws (not shown) and locking screws (not shown). As can be seen, the gasket or membrane **56** is provided with a key member **62** that interlocks with the interior wall **58** of U-shaped member **10** at female keyway **60**. The clamping hammer **28** includes a cylindrical member **32** that resides within a hinge groove **34** that is within the clamp body **10** of the clamp assembly CA.

Turning to FIG. **14**A, a clamp assembly CA provided with a two-piece clamp body is shown. This embodiment is well adapted for attachment to relatively larger standing seams where the clamping hammers are sized or otherwise shaped such that a one-piece clamp body is impractical or otherwise not well suited for the application. The clamp assembly CA is shown for attachment to a standing seam SS that is T-shaped. As is apparent, this embodiment is adapted to be connected to a standing seam other than a T-shaped seam or to some other upstanding member such as a joist, beam, etc. The clamp body **102** comprises a first portion **104** and second portion **106**. Each of the first portion **104** and the second portion **106** may be of variable width depending upon the dimension of the standing seam SS to be clamped.

Referring to FIGS. **14**A and **14**B, each of the first portion **104** and the second portion **106** is provided with a separate one of a pair of movable jaws or hammers **108** that are shown to be generally L-shaped. As is apparent, the shape of the hammer **108** is variable depending upon the specific application for the clamp. In the present embodiment, the lower portion of the hammer **108** is increased in size so that it will effectively clamp against the underside of the T-shaped standing seam SS as best shown in FIG. **14**B. Referring to FIG. **14**A, the hammers **108** extend the length of the clamp portions **104** and **106** and are pivotally secured within the respective clamp portions **104** and **106** at hinge member **110**. As in the embodiments described earlier, hinge members **110** comprises a cylindrical member **112** provided on each hammer that is adapted to axially rotate within a cooperating groove that extends within each of clamp portions **104** and **106** and as shown in the figure. Adjustment screws **118** and locking screws (not shown) as set forth in the earlier noted embodiments are provided.

The top surface **116** of the first clamp portion **104** is provided with an aperture **120** having variable size that cooperates with a threaded aperture **122** provided in the top contact surface **124** of second clamp portion **106**. A bottom contact surface **130** is provided on first clamp portion **104**. Top and bottom contact surfaces will engage against each other when the clamp is in an assembled position as will be further explained below. An abutment **128** shown in FIGS. **14**A and **14**B, extends upwardly from second clamp portion **106** and functions as a stop member for limiting the width of the clamp when assembled and as best shown in FIG. **14**B. It is within the scope of the present invention to not provide an abutment. A connecting member **126** shown in the FIGS. **14**A and **14**B to be a screw is provided and adapted to be received within apertures **120** and **122** (FIG. **14**A) to interconnect the two clamp portions of the clamp assembly CA of FIGS. **14**A and **14**B and secure it to a standing seam as best shown in FIG. **14**B. As is apparent, a washer of varying diameter may be provided to accommodate interconnection of the two clamp portions when a clamp having a relatively greater width is required.

The embodiment shown in FIGS. **14**A and **14**B reduce the width of the clamp body **102** from that which would otherwise be necessary if the clamp body **102** were constructed from a single unitary piece. Accordingly, the clamp body **102** in this embodiment is adapted to interconnect T-shaped standing seams of variable width without the need to provide several clamp bodies of varying widths. The first and second clamp portions may be machined or cut to any

desired length. The clamp portions and the hammers **108** may be constructed of any suitable material adapted to be shaped via, extrusion, casting or injection molding.

Turning to FIG. **15**, an alternative embodiment of the clamp shown in FIGS. **14**A and **14**B is shown. In this embodiment, the top contact surface **124** and the bottom contact surface **130** are shown to be serrated or otherwise scoured or rendered not smooth. When the clamp is assembled, friction between the first clamp portion **104** and the second clamp portion **106** is increased and any lateral movement of the clamp portions relative to each other is prevented. Other means to enhance connection between the surfaces are within the scope of the present invention. For example, the top and bottom contact surface may be provided with a cooperating set of teeth of varying width and depth depending upon the application of use. The cooperating set of teeth are adapted to mesh together or otherwise interconnect so as to allow indexing of the clamp width. The clamp assembly CA further includes a connecting member **126**. The connecting member **126** is shown engaging the first clamp portion **104** and the second clamp portion **106**. A hammer **108** extends downward from the upper longitudinal groove **114**. An adjustment screw **118** is shown engaging the hammer **108**. The hammer **108** is shown engaging the seam SS.

FIGS. **16**A and **16**B illustrate a further modification of the clamp shown in FIGS. **14**A and **14**B. In this embodiment, a T-shaped groove **134** is provided within the top surface **116** of the first portion **104** and extends longitudinally along the length of the clamp portion. The connecting member **126** and aperture **120** shown in the earlier embodiments are also provided, but are not shown in these figures. A straight extension member **136** (FIG. **16**A) or an angled extension member **138** (FIG. **16**B) are shown to extend upwardly from the top surface **116** of the first clamp portion **104**. Each of the extension members **136** and **138** are provided with a T-shaped end portion **140** adapted or otherwise shaped to be received within the T-shaped groove **134** as shown. The extension members **136** and **138** may be used as supports for securing supplementary structures to the clamp after it has been secured to a standing seam. For example, a conduit or other object that needs to be run along the length of a roof. As is apparent, it is within the scope of the invention to vary the size and shape of the extension member depending upon the application required and to include one or more features of the embodiments noted above. It is also within the scope of the present invention to provide the T-shaped slot within a separate block as opposed to within the clamp body portion **104**. The block is then secured to the top of the clamp portion by screws or other connection means. This enables the T-shaped slot to be varied relative to the clamp body. For example, it could be aligned transverse to the longitudinal axis of the clamp body. FIGS. **16**A and **16**B also illustrate the adjustment screws **118** engaging the hammers **108**.

FIGS. **17**A and **17**B illustrate another embodiment of the present invention where the location of the hinge members is reversed from that as shown in the previous embodiments together with an alteration of the hammer configuration. This embodiment expands the number of applications for which the clamp may be adapted and/or improves the ease-ability of clamping to certain standing seams.

Turning to FIGS. **17**A and **17**B, the clamp body **102** is shown to include an upper longitudinal groove **114** as depicted in the earlier described embodiments and a pair of lower longitudinal grooves **142** including a pair of recess portions **141** that are mirror images of each other. As is apparent, it is within the scope of the present invention to provide only lower longitudinal grooves if desired. Also, the clamp body **102** may be modified to increase its width or height or otherwise be provided with a greater mass so as to accommodate standing seams having a increased height or greater load requirements. The reverse hammer **144** is shown to have a generally S-shaped configuration as opposed to the generally L-shaped configuration of the above noted embodiments. Each reverse hammer **144** is provided with a horizontally extending cylindrical member **112** (FIG. **17**A) similar to that described above with respect to the earlier embodiments and in addition, a head portion **146** for contacting against a standing seam to be clamped. A leg portion **148** (FIG. **17**A) extends between and interconnects the cylindrical member **112** (FIG. **17**A) to the head portion **146**. As is apparent, it is within the scope of the present invention to provide the reverse hammer with a shape other than an S-shape depending upon the application of use.

As best shown in FIG. **17**A, the recess portions **141** of the clamp body **102** are adapted to receive the head portion **146** of each of the hammers **142** so that a standing seam SS may be received within the interior of the clamp body **102** prior to clamping. Turning to FIG. **17**B, the device is shown clamping a standing seam SS whereby the adjustment screws **118** are turned inwardly to cause the head portion of each hammer **142** to move inwardly and engage against a standing seam SS. Once the seam has been properly engaged, the locking screws (not shown) are sufficiently turned so that the hinge member for each hammer **142** is fixed in its position.

FIG. **18** discloses an embodiment where the clamping hammers **28** adapted to be secured to a standing seam SS and where the sides of the seam are of unequal height. In this embodiment, a standing seam SS has a first side **150** of a first height and a second side **152** having a height greater than that of the first side **150**. Seam lips **154** and **167** are provided and cooperate to form a seam head. The sides **14** of the clamp body **102** provided with a height that corresponds to the respective sides of the standing seam SS. In addition, each of the clamping hammers **28** are provided with a height that corresponds to the height of either the first side **150** or the second side **152** of the clamp. As can be seen, the adjustment screws **118** are positioned at different clamp heights to correspond with the height of the respective clamping hammer **28**.

FIGS. **19** and **20** disclose a further embodiment where the clamping hammers have an unequal height. In this embodiment the standing seam SS is L-shaped and the hammers are adapted to provide a uniform clamping force against the standing seam SS. The shorter clamping hammer **156** is shown in the figures to engage the standing seam SS just under the seam lip whereas the clamping hammer **158** having a greater length is shown to engage the standing seam SS a distance below that of clamping hammer **156**. Clamping hammer **158** provides more clearance when the clamping assembly is placed onto a seam to be clamped. This embodiment also allows for a more uniform clamping force to be provided against the seam than would otherwise be the case if the hammers were the same length. In addition, two sets of grooves **114** are provided within the clamp body **102**. In this way, the clamp assembly CA is adapted to engage an L-shaped standing seam SS including a seam lip that is oriented transverse to either side of the standing seam SS. Referring to FIG. **19**, the clamping hammer **158** includes a cylindrical member **112**. Refering to FIG. **20**, the clamping hammer **156** includes a cylindrical member **112**. Referring to FIGS. **19** and **20**, adjustment screws **118** engage the

clamping hammers **156** and **158**. The connecting member **126** engages the head of the standing seam SS through the clamp body **102**.

Turning to FIGS. **21** and **22** a gravity clamping hammer adapted to slide perpendicular toward a standing seam under action of the set screws and lock the clamp to a standing seam. When the set screws are loosened, clamping hammer will recede away from the seam due to gravitational forces. Referring to FIG. **21**, the clamp body **102** is provided with a pair of cooperating recesses **160** that extend the longitudinal axis of the clamp body **102** and have a general configuration in cross-section of a parallelogram. A slot **161** is provided within each of the side walls **24** of the interior region **16** to provide an opening between the clamp interior region **16** and the recesses **160**. A clamping hammer **162** is disposed within each recess **160**. Referring to FIG. **22**, the clamping hammer **162** comprises a head portion **166** (also see FIG. **21**), neck **168** and end portion **170**. The opposite ends of the clamp body may be staked or pinned to prevent the clamping hammer **162** from sliding out of the clamp body **102**.

In operation, when the adjustment screws **118** (also in FIG. **21**) are turned clockwise, it moves inwardly and impinges upon the end portion **170** of the clamping hammer **162**. This causes the clamping hammer to slide perpendicular toward the standing seam to clamp the same. To loosen the clamp, the adjustment screws **118** are turned counterclockwise whereby the clamps slide away from the standing seam under the force of gravity. FIG. **21** illustrates an embodiment whereby the clamp body **102** may be machined to provide an upper recess so as to accommodate a standing seam having a greater height. Clamp body **102** may be manufactured by extrusion, casting or injection molding, and the gravity-type clamping hammers **162** may be manufactured in a variety of sizes and lengths and from a number of materials, including, but not limited to, metal, elastomeric rubber, DELRIN or other thermoplastics having high stiffness, high or low friction and excellent dimensional stability. FIGS. **21** and **22** also illustrates connecting members **126** extending into the clamp body **102**.

FIG. **23** illustrates an alternative embodiment of the invention shown in FIGS. **21** and **22**. In this embodiment, the slot associated with the recesses **160** is removed and the entire inward face of the recess **160** is opened to receive a clamping hammer **162** having an expanded neck portion **174** that generally occupies the entire recess **160**. A head portion **166** is also provided to engage against a standing seam. The adjustment screw **118** extends through the clamp body **102** and engages the end portion **170** of clamping hammer **162**. A connecting member **126** extends downward into the clamp body **102**.

FIGS. **24** and **25** disclose alternative embodiments of the invention shown in FIGS. **21** through **23**. FIG. **24** discloses a clamp body **102** that combines a gravity type clamping hammer **162** as set forth in FIG. **22** in combination with a clamping hammer **28** as disclosed in FIG. **2**. An adjustment screw **118** engages the gravity type clamping hammer **162**. A second adjustment screw is not provided for hammer **28**. A connecting member **126** engages the clamp body **102**. FIG. **25** discloses a clamp body **102** that combines a gravity type clamping hammer **162** as set forth in FIG. **23** in combination with a clamping hammer **28** as set forth in FIG. **2**. As illustrated, the gravity type clamping hammer **162** includes a head portion **166**. An adjustment screw **118** engages the gravity type clamping hammer **162**. A second adjustment screw (not shown) may be provided for hammer **28**.

FIG. **26** discloses another embodiment of the present invention that includes detent type hammers or blocks instead of pivoting or gravity hammers. A cooperating pair of hammers or blocks **176** is shown retained within a generally C-shaped recess or cavity forming the interior region of the clamp body **102**. The detent type hammer or block **176** may be manufactured by extrusion, casting or injection molding and in a variety of sizes and lengths and from a number of materials, including, but not limited to, metal, elastomeric rubber, DELRIN or other thermoplastics having high stiffness, higher or low friction and excellent dimensional stability. Adjustment screws **118** extending transverse to the longitudinal axis of the block **176**, and through the I-shaped leg member **180**, are rotated and contact the block **176** to urge it inwardly against a standing seam clamp (not shown). Once both of the blocks **176** have adjusted against a standing seam clamp, pair of locking members **178** shown to be screws or detents are engaged to force a downward pressure against the aligned block thereby locking it into place. It is within the present invention to provide a groove in the block **176** that is aligned perpendicular to the longitudinal axis of the hinge groove **34** for receiving the locking member **178**. This assists in retaining the block within the clamp body and preventing it from falling out until clamped against the seam.

FIG. **27**A discloses a further embodiment whereby a single elongated shaped block **176** is provided to engage against an L-shaped standing seam (not shown). FIG. **27**B discloses another embodiment whereby a single elongated shaped block **176** is provided to engage against a vertical standing seam having no head portion (not shown). The clamp body **102** is not provided with a single L-shaped leg member **180** with the opposite leg member **182** shown to be generally planar. FIG. **27**A illustrates a part of the L-shaped leg member **180**. Referring to FIGS. **27**A and **27**B, an adjustment screw **118** is illustrated as extending through the L-shaped leg member **180** of the clamp body **102** and engaging the elongated shaped block **176**. A locking member **178** is illustrated extending through the top of the clamp body and engaging the elongated shaped block **176**.

FIGS. **28**A and **28**B are directed to a further embodiment of the present invention whereby the clamp body is spring-loaded to retain a detent block **176** within the interior region of the clamp body. FIG. **28**A discloses a detent block **176** that has been shaped at the top and bottom regions to allow it to pivot inwardly when engaged by an adjustment screw **118**. Referring to FIGS. **28**A and **28**B, as can be seen, the bottom edges **184** of detent block **176** is tapered inwardly to provide a pivot point at the bottom of the block. The upper portion of the detent block **176** is provided with a through-hole **186** through which a retaining rod **188** is inserted, the retaining rod **188** being secured at both ends to the sides of the clamp body **102**. The through-hole **186** is illustrated in FIG. **28**A. The retaining rod **188** is threaded through a spring member **189** and is sized within the interior of the clamp body **102** such that it will urge the detent block **176** into an open position as shown in FIG. **28**A. The spring member **189** is also illustrated in FIG. **28**B. Referring to FIGS. **28**A and **28**B, a clamping hammer **28** is provided opposite the detent block **176**. As best shown in FIG. **28**B, when the adjustment screw **118** is rotated clockwise, it is caused to impinge against the detent block **176** and causes it to pivot inwardly against the force of the spring to engage a standing seam (not shown). The spring ensures the block will always return to a open position away from the standing seam when the adjustment screws **118** are unscrewed and be prevented from falling out of the clamp body **102**. A locking screw as

shown in FIG. **26** may be provided to lock the clamp into place after engaging a standing seam.

FIG. **29**A is another embodiment of the present invention and discloses hinged pivoting hammers **190** that operate in the manner as disclosed earlier but the hammers slide in the ends of the clamp. The head portion **192** of each hammer is custom shaped to match and engage the contours of the standing seam SS. FIG. **29**B is an alternative embodiment that provides a non-hinged detent block **194** the interior surface of which is custom shaped to match and engage the contours of the standing seam SS; for example, the head portion **192**. A pair of locking screws **178** is also provided. FIGS. **29**A and **29**B both illustrate the adjustment screws **118** extending through the clamp body **102** and engaging a corresponding one of the hinged pivoting hammers **190**.

FIGS. **35** through **38** disclose an alternative embodiment of the present invention. Turning to FIG. **35**, a washer and rivet **196** is provided to retain a fastener **198** in place and prior to actuation of the adjustment screw **118**. The fastener **198** is provided with a T-shaped recess adapted to receive the washer and rivet **196**. Fastener **198** is made with enough tolerance within the T-shaped recess so as to allow it to pivot about the washer. This enable the fastener **198** to adapt to seams that may be out of plane or otherwise be slightly angled along the longitudinal axis. The range of pivot of fastener **198** compensates for slight variations in the plane of the seam by matching the slight angular differences. It is further noted that a gasket or other type of device may be applied to the fastener **198** to create a better contact surface having higher shear. FIG. **36** illustrates the entire clamp assembly for this embodiment. All of the adjustment screws **118** are rotated inwardly to align the washer and rivet **196** so that the fastener **198** can be slid over each of the washers to align it within the interior of the clamp body **102**. As best seen in FIG. **37**, the adjustment screws **118** are further rotated to urge the fastener **198** against the head of a standing seam SS to clamp the same. In the alternative, the washer and rivet **196** may be replaced with a freely spinning nut member to secure the washer to the end of the screw member **118**. Referring to FIGS. **36** and **37**, the clamping assembly CA is also illustrated with a clamping hammer **28** positioned on the opposite side of the clamp body **102** from the rivet **196** and fastener **198**. The clamp hammer **28** is positioned against the standing seam SS. FIG. **38** illustrates a further embodiment where the clamping hammer is replaced with a gasket **56** which is received within a keyway track for receiving a male keyway portion of the gasket. The clamping assembly CA of FIG. **38** also includes the rivet **196**, fastener **198** and adjustment screw **118**. The adjustment screw **118** extends through the clamp body **102** and into the fastener **198**. Clamp body **102** may be manufactured by extrusion, casting or injection molding and the fastener **198** may be manufactured in a variety of sizes and lengths and from a number of materials, including, but not limited to metal, elastomeric rubber, DELRIN or other thermoplastics having high stiffness, high or low friction and excellent dimensional stability and as noted earlier.

FIGS. **30** through **34**B disclose another embodiment of the present invention and in particular a tool application for a spring loading the clamp member. FIGS. **30** and **31** illustrate the tool member **200** shown to comprise a generally U-shaped member provided with a finger hole **202**, the finger hole **202** being shown in FIG **31**. As best shown in FIG. **33**, the tool **200** is adapted to be slid over a standing seam SS to be clamped. FIG. **32** illustrates the clamp embodiment shown in FIGS. **17**A and **17**B but having the clamping hammers **144** loaded using a pair of spring members **204** with the use of adjustment screw **118** (not shown) to tightly clamp the hammers **144** against a seam. As illustrated in FIG. **32**, the hammers **144** can include a cylindrical member **112**. The clamping assembly CA also includes the clamp body **102**. It is within the scope of the present invention to not employ adjustment screws if the specific application does not require them. After the standing seam is covered by the tool **200**, the user slides the clamp assembly CA over the top of the tool **200** and as best shown in FIG. **34**A, which in turn causes the spring-loaded hammers to be pushed out of the way and into an open position so that the standing seam can be received within the interior region of the clamp. The spring members **204** are illustrated as being compressed between the head portion **146** of the clamping hammers **144** and the clamp body **102**. Once the clamp is in place, the user will pull the tool **200** from the interior of the clamp by grasping the finger hole **202** of FIG. **31**. As shown in FIG. **34**B, the spring-loaded hammers are urged into engagement against the sides of the standing seam to clamp the same. The spring members **204** are extended away from the clamp body **102** of the clamp assembly CA, and the cylindrical member **112** pivots as compared with FIG. **34**A, rotating the head portion **146** toward the standing seam.

FIG. **39** illustrates another embodiment of the present invention wherein the body **102** of the clamping assembly CA is provided with a pair of notches that extend along the longitudinal axis of the clamp body so as to receive a clamping hammer **201** that is provided with a hook member at one end which is received within a notch and is adapted to pivot inwardly or outwardly under action of the adjustment screw **118**.

It is within the scope of the present invention to vary the use of adjustment and locking screws depending upon the end use of the clamp. In some situations, a locking screw may not be necessary and the force of the adjustment screw is sufficient to lock the clamp onto the seam. The use of multiple locking screws has been seen to reduce any vibration of the clamp due to conditions during use. As is apparent, in all embodiments the clamp body **102** and all components of the assembly may be manufactured by extrusion, casting or injection molding and the various clamp components may be manufactured in a variety of sizes and lengths and from a number of materials, including, but not limited to metal, elastomeric rubber, DELRIN or other thermoplastics having high stiffness, high or low friction and excellent dimensional stability and as noted earlier. The clamp body and all components forming the clamp assembly may be machined and milled as required in order to adapt it to its specific end use. The embodiments employing gaskets can be provided with hinges and without employing adjustment screws. It is also within the scope of the present invention to interconnect two or more clamps that are aligned parallel to each other with a bridge member secured at each end to a separate clamp. The bridge member may be constructed from any suitable material including, but not limited to, aluminum, stainless steel, etc. The bridge member would allow for the optional attachment of rooftop assembly devices such as fall protection structure, gutters, etc.

While this invention has been described as having a preferred design, it is understood that it is capable of further modifications, uses and adaptations, both in whole and in part, while following the general principle of the invention and including such departures from the present disclosure as

is known or customary practice in the art to which this invention pertains, and as may be applied to the central features of this invention.

I claim:

1. A clamping assembly comprising:

a) a clamp body being generally U-shaped, the clamp body including a top wall having a top surface and a first end and a second end opposite the first end;

the clamp body including a first side wall extending downwardly from the first end, a second side wall extending downwardly from the second end;

the top wall, the first side wall and the second side wall defining an interior region for receiving a structure to be clamped;

b) a first clamping hammer disposed within the interior region of the clamp body, the first clamping hammer being hingedly secured to the clamp body at a first intersection between the top wall and the first side wall;

c) a second clamping hammer disposed within the interior region of the clamp body, the second clamping hammer being hingedly secured to the clamp body at a second intersection between the top wall; and

d) an adjustment screw extending through the first side wall and adapted to selectively impinge against the first clamping hammer, wherein continual impingement by the adjustment screw causes at least a portion of the first clamping hammer to pivot toward the second side wall;

e) the first clamping hammer includes a first bottom end positioned away from the top wall and a first hammer head portion that extends from the first bottom end toward the interior region of the clamp body, and the second clamping hammer includes a second bottom end positioned away from the top wall and a the second hammer head portion that extends from the second bottom end toward the interior region of the clamp body.

2. The clamping assembly as in claim **1**, wherein the first side wall and the second side wall are aligned as mirror images.

3. The clamping assembly as in claim **2**, wherein the first clamping hammer and the second clamping hammer are aligned as mirror images of each other.

4. The clamping assembly as in claim **3**, further comprising:

a) a first cylindrically shaped recess positioned between the top wall and the first side wall; and

b) the first clamping hammer including a first cylindrically shaped hinge member that is received within the first cylindrically shaped recess such that the first clamping hammer is hingedly movable between the first side wall and the second side wall.

5. The clamping assembly as in claim **4**, further comprising:

a) a second cylindrically shaped recess positioned between the top wall and the second side wall; and

b) the second clamping hammer including a second cylindrically shaped hinge member that is received within the second cylindrically shaped recess such that the second clamping hammer is hingedly movable between the first side wall and the second side wall.

6. The clamping assembly as in claim **1**, wherein the first clamping hammer and the second clamping hammer are generally L-shaped in cross-section.

7. The clamping assembly as in claim **1**, further comprising an elastomeric material secured to one of the first clamping hammer and the second clamping hammer.

8. The clamping assembly as in claim **1**, further comprising a second adjustment screw extending through the second side wall and into the interior region of the clamp body.

9. The clamping assembly as in claim **1**, further comprising a threaded aperture, the threaded aperture extending through into the first side wall.

10. A clamping assembly comprising:

a) a one-piece clamp body, the one-piece clamp body includes a top wall, a first side wall and a second side wall each extending downwardly from the top wall, and an interior region therebetween;

b) a first clamping hammer and a second hammer disposed within the interior region;

the first clamping hammer being hingedly secured to the one-piece clamp body at a first intersection between the top wall and the first side wall and the second clamping hammer being hingedly secured to the one-piece clamp body at a second intersection between the top wall and the second side wall to restrict pivoting to within the interior region; and

c) a first adjustment screw extending through the first side wall to selectively engage against the first clamping hammer and causing the first clamping hammer to pivot toward the second clamping hammer, a second adjustment screw extending through the second side wall to selectively engage against the second clamping hammer and causing the second clamping hammer to pivot toward the first clamping hammer.

11. The clamping assembly as in claim **10**, wherein the first clamping hammer and the second clamping hammer are each generally L-shaped in cross-section and align within the interior region of the one-piece clamp body as a mirror image of each other.

12. The clamping assembly as in claim **10**, wherein:

the one-piece clamp body includes a first cylindrical recess extending within the one-piece clamp body between the top wall and the first side wall and a second cylindrical recess extending within the one-piece clamp body between the top wall and the second side wall;

the first clamping hammer includes at a first end thereof a first cylindrical hinge member adapted to pivotally engage the first cylindrical recess; and

the second clamping hammer includes at a second end thereof a second cylindrical hinge member adapted to pivotally engage the second cylindrical recess.

13. The clamping assembly of claim **10**, wherein:

the first clamping jaw includes a first lower end that is distal from the top wall and a first abutment that extends from the first lower end toward the second clamping jaw; and

the second clamping jaw includes a second lower end that is distal from the top wall and a second abutment that extends from the second lower end toward the second clamping jaw.

14. A clamping assembly comprising:

a) a clamp body being generally U-shaped, the clamp body including a top wall having a top surface, a bottom surface, a first end and a second end opposite the first end, a first side wall extending downwardly from the bottom surface and the first end of the top wall, and a second side wall extending downwardly from the bottom surface and the second end of the top wall;

the top wall and the first side wall and the second side wall defining an interior region for receiving a structure to be clamped, the top wall including a first hinge recess extending into the bottom surface of the top wall

proximate to the first side wall and a second hinge recess extending into the bottom surface of the top wall proximate to the second side wall;

b) a first clamping hammer disposed within the interior region of the clamp body, the first clamping hammer having a first top portion and a first bottom portion, the first top portion being housed in the first hinge recess such that the first clamping hammer is hingedly movable between the first side wall and the second side wall, the first bottom portion extending downwardly from the first top portion and including a first bottom end, an first inner surface extending between the first bottom end and the first top portion, and an first outer surface extending between the first bottom end and the first top portion, the first outer surface of the first bottom portion facing the first side wall and the first inner surface facing the second side wall;

c) a second clamping hammer disposed within the interior region of the clamp body, the second clamping hammer having a second top portion and a second bottom portion, the second top portion being housed in the second hinge recess such that the second clamping hammer is hingedly movable between the second side wall and the first side wall, the second bottom portion extending downwardly from the second top portion and including a second bottom end, an second inner surface extending between the second bottom end and the second top portion, and an second outer surface extending between the second bottom end and the second top portion, the second outer surface of the second bottom portion facing the second side wall and the second inner surface facing the first side wall;

wherein the first side wall has an inner surface facing the first outer surface of the first clamping hammer, the inner surface of the first side wall and the first outer surface of the first clamping hammer are planar, the first side wall provides a rotational stop for the first clamping hammer in one direction, and the first hinge recess is positioned such that the first outer surface of the first clamping hammer can lay flat against the inner surface of the first side wall.

15. A clamping assembly comprising:

a) a clamp body being generally U-shaped, the clamp body includes a top wall, a first side wall and a second side wall each extending downwardly from the top wall, and an interior region therebetween;

b) a first clamping jaw and a second clamping jaw disposed within the interior region;

the first clamping jaw being hingedly secured to the clamp body at a first intersection between the top wall and the first side wall and the second clamping jaw being hingedly secured to the clamp body at a second intersection between the top wall and the second side wall to restrict pivoting to within the interior region; and

c) a first adjustment screw extending through the first side wall to selectively engage against the first clamping jaw and causing the first clamping jaw to pivot toward the second clamping jaw, a second adjustment screw extending through the second side wall to selectively engage against the second clamping jaw and causing the second clamping jaw to pivot toward the first clamping jaw.

16. The clamping assembly of claim **15**, wherein:

the first clamping jaw includes a first lower end that is distal from the top wall and a first abutment that extends from the first lower end toward the second clamping jaw; and

the second clamping jaw includes a second lower end that is distal from the top wall and a second abutment that extends from the second lower end toward the second clamping jaw.

17. The clamping assembly as in claim **15**, wherein the first clamping jaw and the second clamping jaw are each generally L-shaped in cross-section and align within the interior region of the clamp body as a mirror image of each other.

18. The clamping assembly as in claim **15**, wherein:

the clamp body includes a first cylindrical recess extending within the clamp body between the top wall and the first side wall and a second cylindrical recess extending within the clamp body between the top wall and the second side wall;

the first clamping jaw includes at a first end thereof a first cylindrical hinge member adapted to pivotally engage the first cylindrical recess; and

the second clamping jaw includes at a second end thereof a second cylindrical hinge member adapted to pivotally engage the second cylindrical recess.

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