United States Patent

[11] 3,581,814

[72] Inventor **Richard A. Jackson**
57 Fairview Lane, Mount Iron, Minn. 55768

[21] Appl. No. **823,441**
[22] Filed **May 9, 1969**
[45] Patented **June 1, 1971**

[54] **RADIATOR COMPRESSION STRAP**
4 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **165/134,** 165/148, 165/175, 220/73, 277/166, 285/368, 287/189.36
[51] **Int. Cl.** **F28d 7/00**
[50] **Field of Search** ..... 165/148, 134, 149, 175, 151; 220/73; 287/189.36 F; 285/368; 277/166

[56] **References Cited**

UNITED STATES PATENTS

Re24,133	3/1956	Bloedow	287/189.36
773,734	11/1904	Griffiths	285/368
1,434,724	11/1922	Tucker	165/149
2,178,095	10/1939	Bowser	165/149X
3,117,656	1/1964	Kinnear	287/189.36

FOREIGN PATENTS

537,170	6/1941	Great Britain	165/149
398,920	3/1966	Switzerland	287/189.36

Primary Examiner—Albert W. Davis, Jr.
Attorneys—Clarence A. O'Brien and Harvey B. Jacobson

ABSTRACT: An elongated rigid strap for backing abutted radiator end tank and core body flanges. The flanges are bolted together with bolts spaced longitudinally therealong and secured therethrough and the strap backs one of the flanges and has a longitudinal slot formed therein through which the bolts are also passed. A plurality of removable clips are spaced along the strap and embracingly receive the opposite side surfaces of the strap between spaced opposing portions thereof for preventing the portions of the strap on opposite sides of the slot from spreading apart, each clip having one of the aforementioned bolts secured therethrough.

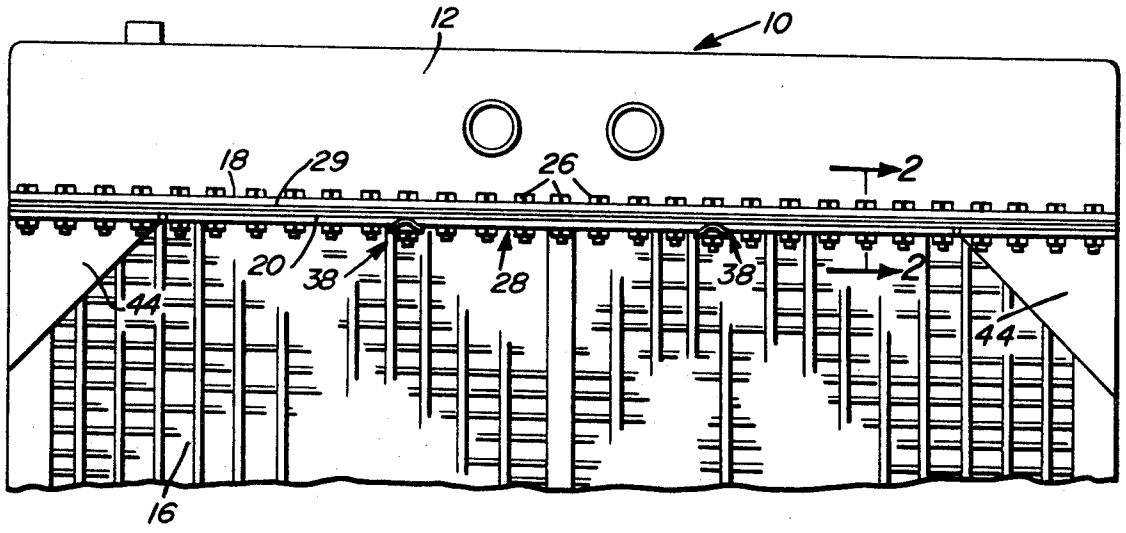


Fig. 1

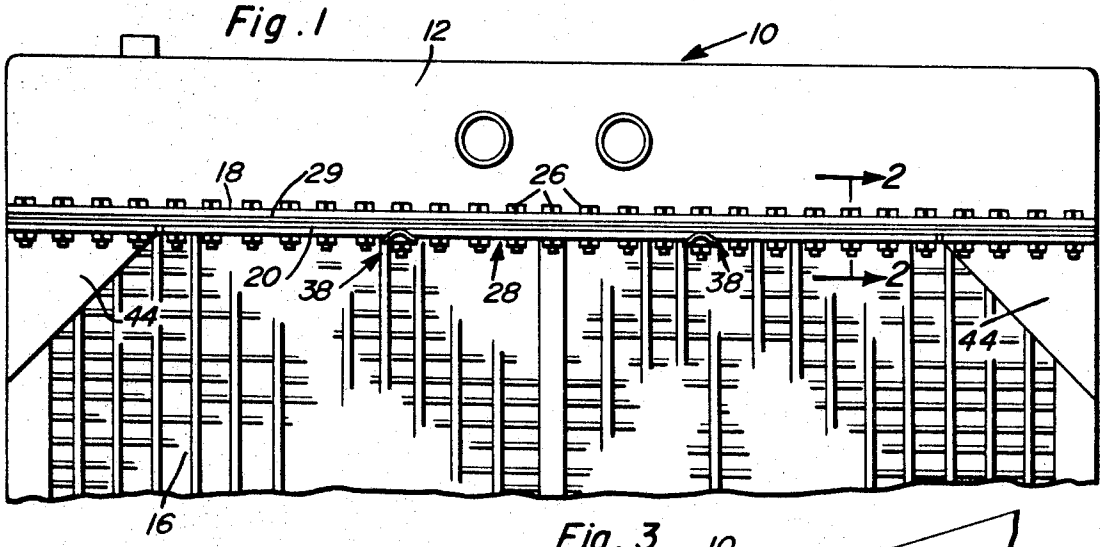


Fig. 2

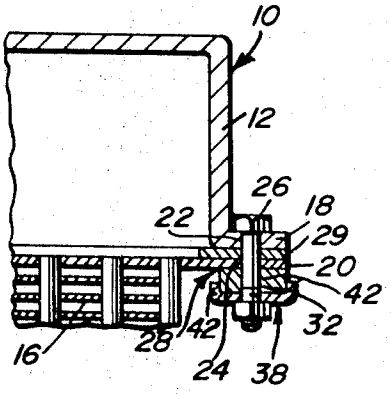


Fig. 3

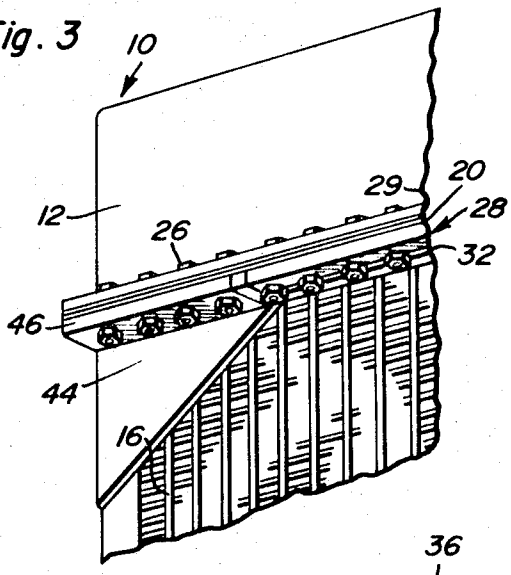
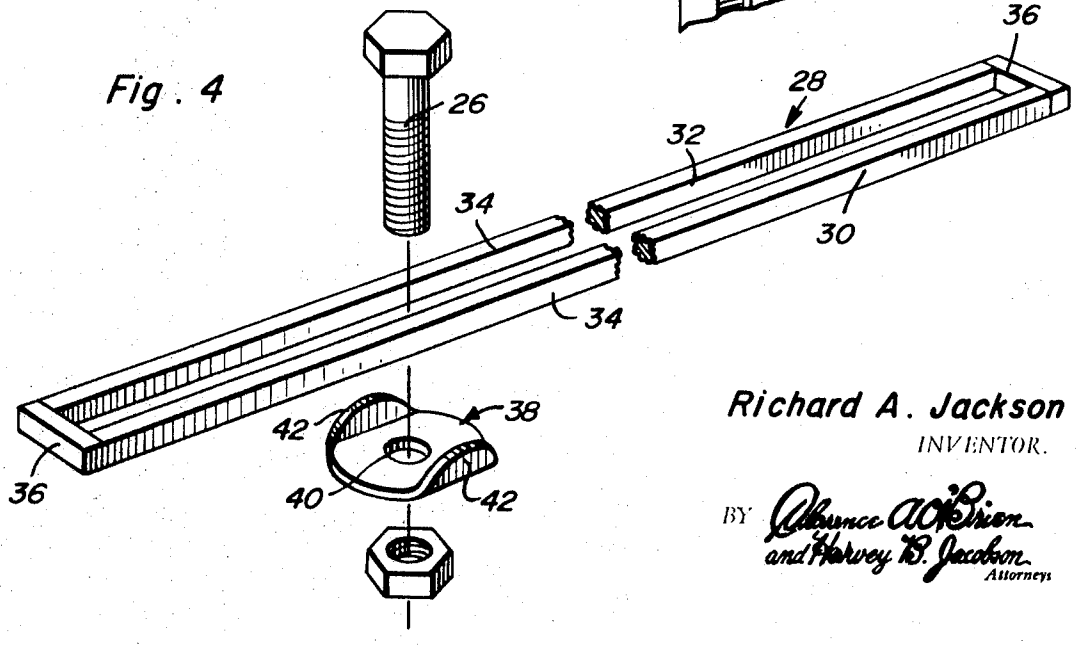


Fig. 4



Richard A. Jackson
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

RADIATOR COMPRESSION STRAP

The radiator compression strap of the instant invention has been designed to provide a means for rigidly backing one of the abutting flanges of the radiator end tank and a radiator core body which are secured together by bolts passed therethrough. In addition, while the compression strap is usually utilized to back the radiator core body flange inasmuch as the opposing end tank flange is of heavier gauge material, should it be deemed advisable to also back the radiator end tank flange a second compression strap may be utilized for this purpose. Still further, if a large radiator composed of adjacent radiator core bodies is being constructed and the core bodies include opposing flange portions, a pair of the compression straps of the instant invention may be utilized to back both of the radiator core body flanges.

Conventionally, heavy duty industrial radiators include core bodies and end tanks provided with opposing outwardly projecting mounting flanges which are secured together by bolts passed therethrough with a sealing strip of suitable seal material disposed between the opposing flanges. However, the radiator core body flanges are not constructed of heavy gauge material and there is a tendency for the lighter gauge core body flanges to become slightly dimpled in the areas thereof surrounding the bolts secured through the end tank and core body flanges. This dimpling of the core body flanges tends to promote leakage between the opposing end tank and core body flanges in the areas thereof disposed between adjacent bolts by which the flanges are secured together.

Accordingly, it is the main object of this invention to provide a compression strap for backing at least the radiator core body flanges whereby the latter will not be subject to dimpling and the compressive forces applied by the bolts utilized to secure a radiator core body flange to an associated end tank flange will be more evenly distributed along the opposing flanges.

Another object of this invention, in accordance with the immediately preceding object, is to provide a radiator compression strap constructed in a manner whereby it will be adapted for use in conjunction with radiators including bolts that are used to secure the end tank and core body flanges together and which are spaced varied distances apart.

Yet another object this invention is to provide a radiator compression strap in accordance with the immediately preceding object and including a longitudinal slot formed therethrough whereby the strap may receive bolts therethrough at points spaced varied distances therealong.

It is a further object of this invention to provide the compression strap with suitable clips preventing the opposite side portions thereof defined by the slot formed in the strap from spreading apart.

A final object of this invention to be specifically enumerated herein is to provide a radiator compression strap which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a fragmentary elevational view of the upper portion of a conventional form of industrial radiator;

FIG. 2 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 2–2 of FIG. 1;

FIG. 3 is a fragmentary perspective view of one upper corner portion of the radiator illustrated in FIG. 1; and

FIG. 4 is an exploded perspective view illustrating the radiator compression strap with parts thereof being broken away and illustrated in transverse section, one of the retaining clips for the compression strap, and one of the nut and bolt assemblies utilized in conjunction with the compression strap.

Referring now more specifically to the drawings, the numeral **10** generally designates a conventional form of heavy duty or industrial radiator including an upper tank **12** and a core body **16**. The tank **12** includes a horizontally outwardly projecting flange **18** and the core body **16** includes a horizontally outwardly projecting flange **20** which opposes the flange **18**. The flanges **18** and **20** have aligned bores **22** and **24** formed therethrough and a plurality of bolts **26** are utilized to secure the flanges **18** and **20** together with a suitable sealing strip **29** disposed therebetween.

The preceding comprises a description of a conventional form of heavy duty or industrial-type radiator with which the compression strap of the instant invention is adapted to be used.

The compression strap of the instant invention is referred to in general by the reference numeral **28** and includes an elongated rigid body **30** having a longitudinal slot **32** formed therethrough. The body **30** includes a pair of opposite side laterally spaced longitudinal bars **34** including pairs of corresponding ends interconnected by means of transversely extending end bars **36** secured to the bars **34** in any convenient manner such as by welding or brazing. The slot **32** is defined between the longitudinal bars **34** and it is to be noted that the strap **28** could be formed of a single piece of material having the longitudinal slot **32** formed therein. However, inasmuch as the bars **34** and **36** may be readily obtained and secured together without wastage of material which would be experienced if the compression strap **28** was formed of a single piece of material having the slot **32** cut therein, that form of compression strap **28** formed by the securement of the opposite side bars **34** together at their adjacent ends by means of the bars **36** is preferred.

The compression strap **28** is utilized in conjunction with a plurality of clips referred to in general by the reference numerals **38** and which may comprise washers centrally apertured as at **40** and having diametrically opposite portions turned upwardly as at **42** to define abutment ears. The spacing between the abutment ears **42** is equal to the spacing between the opposing side surfaces of the bars **34** and **36** and accordingly, the clips **38** may be engaged with the compression strap **28** in the manner illustrated in FIG. **2** of the drawings so as to provide the adjacent portions of the bars **34** from spreading apart as the bolts **26** are tightened. In operation, the compression strap **28** is made to a length so as to be adapted to span the distance between the adjacent portions of the corner brackets **44** of the radiator **10**. The corner brackets **44** include heavy gauge flange portions **46** which serve to back the opposite ends of the core body flange **20** and he compression strap **28** is placed between the adjacent portions of the corner brackets **44** underlying the flange **20**. Then, with the sealing strip **28** disposed between the flanges **18** and **20**, the bolts **26** are inserted through the bores **22** and **24** as well as the slot **32** and tightened. In this manner, the relatively thin radiator core body flange **20** is backed throughout its entire length and is not dimpled in the areas thereof adjacent the bolts **26**. Thus, inasmuch as the flange **20** is clamped against the flange **18** with substantially equal force throughout its entire length, leakage between the flanges **18** and **20** and the sealing strip **29** in the areas of the sealing strip **29** spaced intermediate the bolts **26** is eliminated.

In addition, the clips **38** are not used on every bolt **26** but are spaced along the compression strap **28** in the manner illustrated in FIG. **1** of the drawings so as to prevent the adjacent portions of the bars **34** of the strap **28** from spreading apart as the bolts **26** are tightened. Of course, as previously herein before set forth, the slot **32** enables the compression strap **28** to be readily utilized in conjunction with radiators whose bolts corresponding to bolts **26** are spaced varied distances apart.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What I claim as new is as follows:

1. In combination with opposing radiator core body and end tank flanges having a strip of sealing material disposed therebetween and secured together by means of threaded tension bolts secured through said flanges and strip and thus comprising said strip between said flanges, a joint stiffener comprising an elongated rigid strap having a longitudinal slot formed therein, said stiffener being disposed over the side of said core body flange remote from said end tank flange, said threaded bolts also being secured through said slot, some of said bolts having a plurality of clips spaced along said stiffener and said clips including rigidly interconnected opposing surface portions tightly, embracingly receiving the remote side surfaces of said stiffener therebetween whereby longitudinal areas of said core body flange extending therealong on opposite sides of said bolts are backed by the opposing opposite side portions of said strap extending along the opposite sides of said slot.

2. The combination of claim 1 wherein said stiffener comprises a pair of laterally spaced parallel bars defining said slot therebetween and rigidly interconnected at their opposite ends.

3. The combination of claim 1 wherein each clip includes a panellike portion extending between said opposing surface portions opposing the surface of said stiffener remote from said core body.

4. The combination of claim 3 wherein each panellike portion has an aperture formed therethrough through which one of said bolts is secured.