June 22, 1954

G. L. HANSEN

2,681,715

CLAMP

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Fig. 1

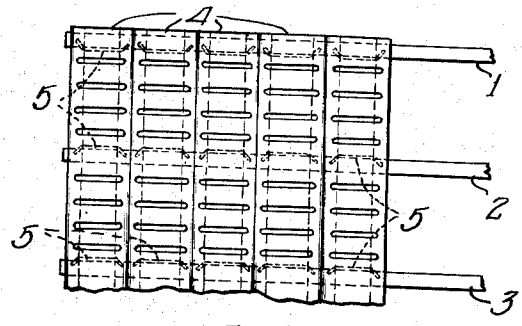


Fig. 2

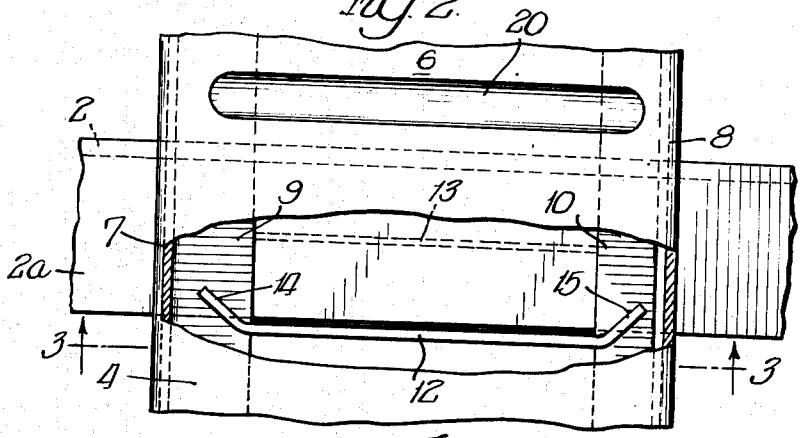


Fig. 3

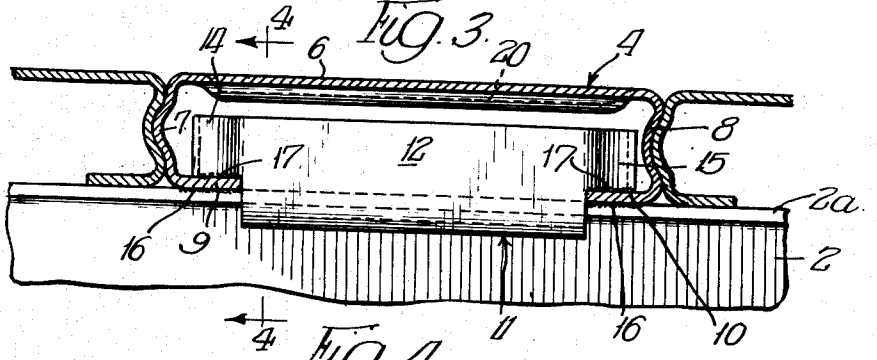
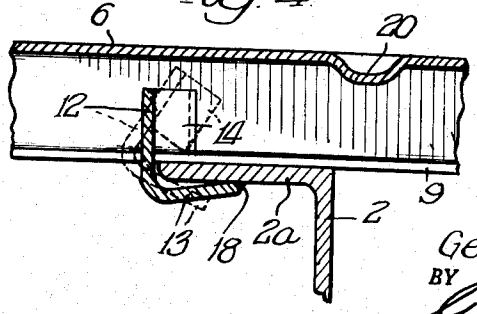


Fig. 4



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CLAMP

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4 Claims. (Cl. 189—35)

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This invention relates to steel floors and has for its principal object the provision of a new and improved floor of this type.

It is a main object of the invention to provide a clamping member adapted to engage the sub-flanges of a steel floor plank and the flange of the joists upon which the plank rests, to securely bind the two members together.

Another object of the invention is to provide a clamp for securing channel-shaped floor planks to flanged joists sufficiently securely so that a floor structure may be inverted and the entire floor welding required thereon done in a down-hand manner.

Further objects of the invention not specifically mentioned here will be apparent from the detailed description and claims which follow, reference being had to the accompanying drawings in which a preferred embodiment of the invention is shown by way of example and in which:

Fig. 1 is a plan view of a fragment of floor section, showing the invention;

Fig. 2 is a fragmentary plan view of one of the floor planks with parts cut away to show the clamp of the present invention secured thereto;

Fig. 3 is a fragmentary cross sectional view taken substantially along the line 3—3 of Fig. 2, looking in the direction of the arrows; and

Fig. 4 is a fragmentary cross sectional view taken substantially along the line 4—4 of Fig. 3, looking in the direction of the arrows.

In the construction of railway refrigerator cars, box cars and gondolas, trucks, loading platforms and the like, steel floors are frequently used. In such construction, floor planks composed of steel are formed in channel section with sub-flanges projecting inwardly from the free edges of the side flanges and disposed substantially parallel to the web of the plank. The planks are usually laid web uppermost upon substantially parallel metal sills or joists which may be channels, I-beams, or Z-bars, as desired. It has been the practice heretofore to secure the panels to the joists by welding the sub-flanges to the edges of the joist flanges along the lines of engagement of these members. While such construction results in a sturdy floor, all welding must be done from the bottom side of the floor and in positions which are oftentimes very awkward.

So-called "nailable steel floors" employ the same type of planks, the side flanges of which are shaped so that a serpentine path is formed between adjacent planks. Nails driven into this

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path hold securely. This invention is applicable also to floors of this type.

The present invention provides a clamp having a generally L-shaped body portion adapted to fit between the free edges of the sub-flanges on the floor plank and alongside the flanges on the joist, with one of the legs of the clamp engaging the underface of the joist flange. Projecting from the ends of the leg of the clamp that is disposed alongside of the edge of the joist flange are generally rectangular ear sections which overlie the sub-flanges and are spaced with respect to the joist-engaging leg of the clamp so as to draw the sub-flange tightly down upon the joist. Preferably the ears are bent out of the plane of the leg of the clamp from which they project and in the same direction as the joist engaging leg of the clamp so that the points of engagement of the ears with the sub-flanges will be directly over the flange on the joist.

With the clamps forced into place, the floor planks are securely fixed on the joists and the floor structure may be inverted or stood on edge so that welding of the planks to the joists can be done in a down-hand manner and under conditions far more favorable than has been possible heretofore.

If desired, the leg of the clamp engaging the flange on the joist can be welded thereto and the ears of the clamp welded to the free faces of the sub-flanges of the floor planks, thereby strengthening the floor to such an extent that oftentimes the number of joists required in the floor can be reduced.

Should occasion arise necessitating removal of one or more of the planks from the floor, the welds between the clamps and the joist and planks can be severed without material damage to the joist or plank.

Referring now to the drawings in more detail, Fig. 1 shows a section of a floor, such as for example the floor of a railway box car, having joists 1, 2 and 3 extending longitudinally of the floor and to which steel flooring planks 4 are attached by clamps 5, in accordance with the teachings of the invention. As will be seen better in Figs. 2, 3, and 4, the floor plank 4 illustrated consists of a web 6 from the edges of which flanges 7 and 8 project downwardly with sub-flanges 9 and 10 projecting from the free edges thereof and disposed substantially parallel to the web 6. The plank is laid web uppermost upon the joist, such as 2, and secured thereto by the clamp having a main body portion 11 consisting of an upright leg 12 and a substantially horizontal arm 13. The

two portions are disposed with respect to each other at an angle slightly less than 90°.

Projecting from the ends of leg 12 are generally rectangular ears 14 and 15 which, as will be seen best in Figs. 2 and 4, overlie the sub-flanges 9 and 10 respectively of the plank. As will be seen in Fig. 2, the projections are bent out of the plane of the leg 12 and overlie the sub-flanges along areas overlying the flange 2a of the joist 2, near the edge thereof.

The lower edges of the ears 14 and 15 are spaced from a plane through the free edge of the joist engaging arm 13 a distance slightly less than the thickness of the sub-flanges 9 and 10 and the flange 2a of the joist, so that when the clamp is forced into place it will be placed under tension tending to move arm 13 into position at right angles to the leg 12, and thereby securely bind the sub-flanges of the plank 2 to the flange 2a.

The clamps are installed by registering them with the sub-flanges and joist flange in the manner shown in dotted lines in Fig. 4 and then driving them into the position shown in full lines in this figure. This operation draws the sub-flanges tightly onto the joist flanges and tends to bend arm 13 into position at right angles to leg 12 thereby tensioning the clamp to maintain the flanges tightly together. The clamps are composed of relatively thick stock, preferably steel, and are slightly resilient. When driven into the position shown in full lines in Fig. 4, the clamp is distorted somewhat but not to exceed the elastic limit of the material, and it has been found that the clamps can be used several times before reshaping thereof becomes necessary.

With all of the planks constituting a floor thus secured to the joists, the floor structure can be inverted or stood on edge so that if desired the sub-flanges can be welded to the flange of the joists along lines 16, the ears 14 and 15 can be welded to the sub-flanges along lines 17, and the arms 13 can be welded to the joist flange 2a along lines 18, all of these welds being made in a downhand position which is convenient.

As shown in the drawings, the planks contain depressed bosses 20 at regular intervals, which bosses serve to stiffen the web and consequently stiffen the entire floor. Such bosses form no part of the present invention and flooring planks are available both with indented webs and with plain webs.

Should it be desired to remove a plank that has been welded into place as above, welds 16, 17 and 18 can be severed with a minimum of damage to the plank and joist.

Floors constructed in accordance with the teachings of the present invention are stronger than similar floors built in accordance with the practice heretofore employed and are no more expensive, inasmuch as the cost of the clamping member is offset by a reduction in the welding cost. In certain instances, fewer floor joists may be employed and further reduction in the cost of the floor thus achieved.

While I have chosen to illustrate my invention by showing and describing a preferred embodiment of it, I have done so by way of example only, as there are many modifications and adaptations which can be made by one skilled in the art within the teachings of the invention.

Having thus complied with the statutes and shown and described what I consider the preferred embodiment of the invention, what I consider new and desire to have protected by Letters Patent is pointed out in the appended claims.

What I claim is:

1. A clamp for securing together two flanged metallic structural members, comprising: a rigid elongated metallic body of L section, the first and second planar legs of which have a slight amount of resilience therebetween and are disposed slightly less than 90° apart; generally rectangular ears on the ends of the first leg, bent out of the plane of that leg at an acute angle and extending from the first leg in the same direction as the second leg, said ears having edges adjacent the second leg disposed in a second plane that is normal to the plane of the first leg and lies closer to the free edge of the second leg than to the junction of the two legs, said second plane being spaced from the free edge of said second leg a distance slightly less than the thickness of the members to be secured together to form jaws that when driven onto those members will be tensioned to hold the members together.

2. A clamp comprising: a rigid elongated metallic member of L section, the first and second planar legs of which are disposed slightly less than 90° apart and have a slight amount of resilience therebetween; ears extending from the ends of the first leg and forming obtuse angles therewith and projecting therefrom in the same direction as the second leg; edges on said ears adjacent the second leg disposed in a plane that is normal to the first leg and spaced away from the free edge of the second leg, the edges of said ears and the edge of the second leg defining between them an opening adapted to receive the work to be gripped by the clamp.

3. A clamp as claimed in claim 2, in which the ears are rectangular and in which the outer corners thereof nearest the second leg form fulcrums around which the clamp rotates on being forced into gripping engagement with the work.

4. A clamp as claimed in claim 2, in which the plane through the edges of the ears adjacent the second leg is spaced from the free edge of the second leg a distance slightly less than the thickness of the work the clamp is adapted to grip.

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