Oct. 10, 1944. J. A. MacLEAN, JR 2,360,004

FLOOR SECURING CLIP

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Fig. 1.

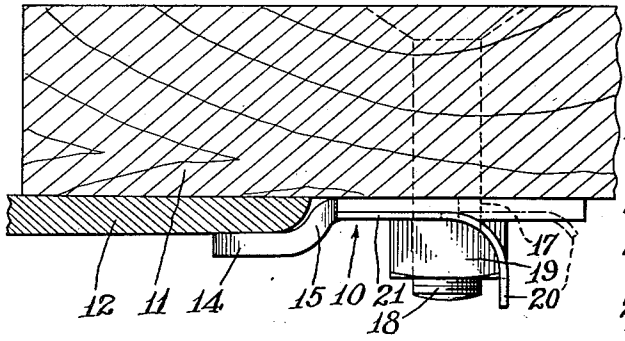


Fig. 4.

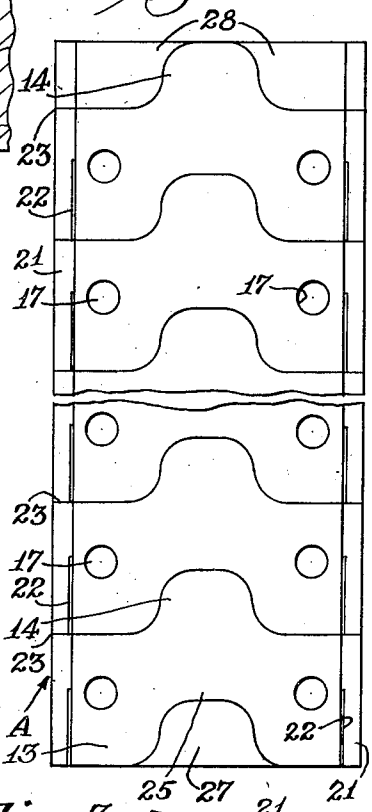


Fig. 2.

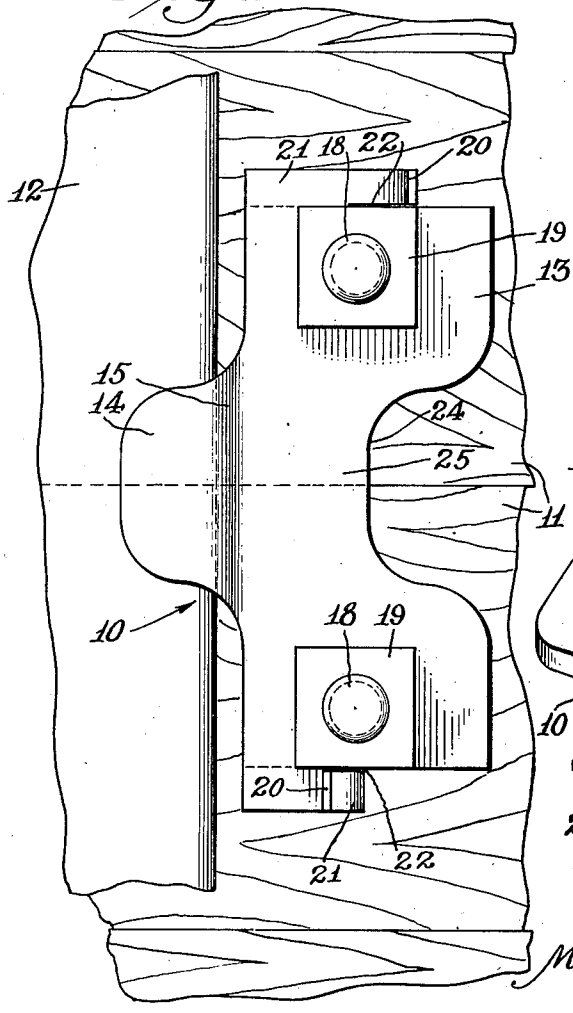
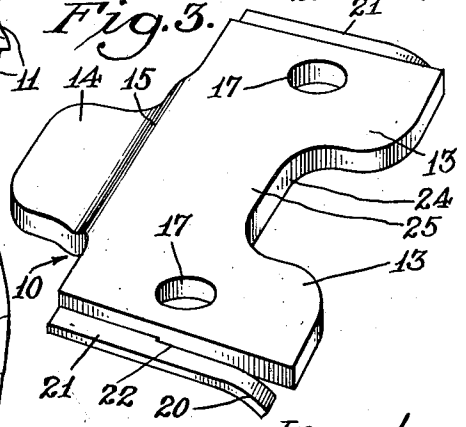


Fig. 3.



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Fig. 5.

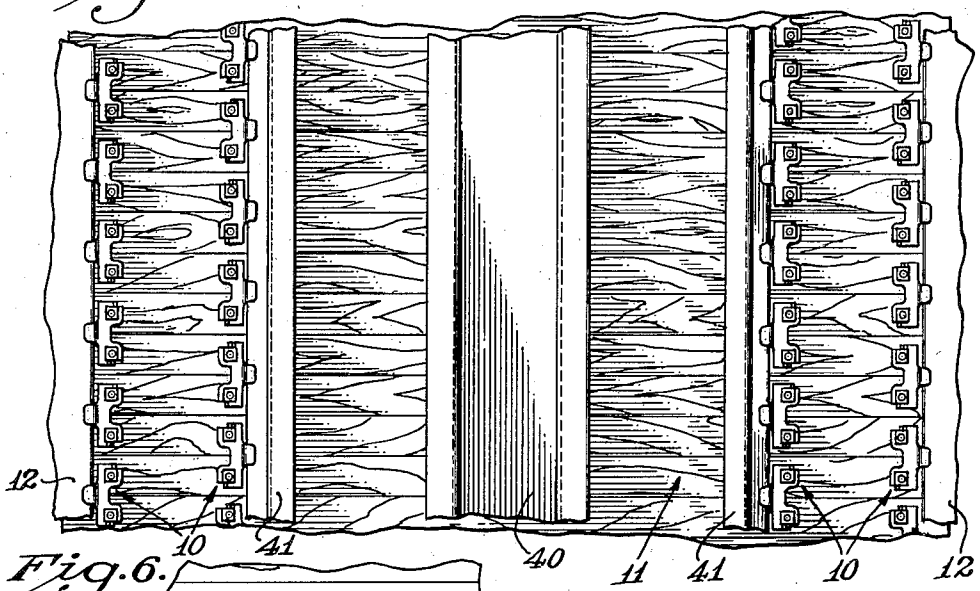


Fig. 6.

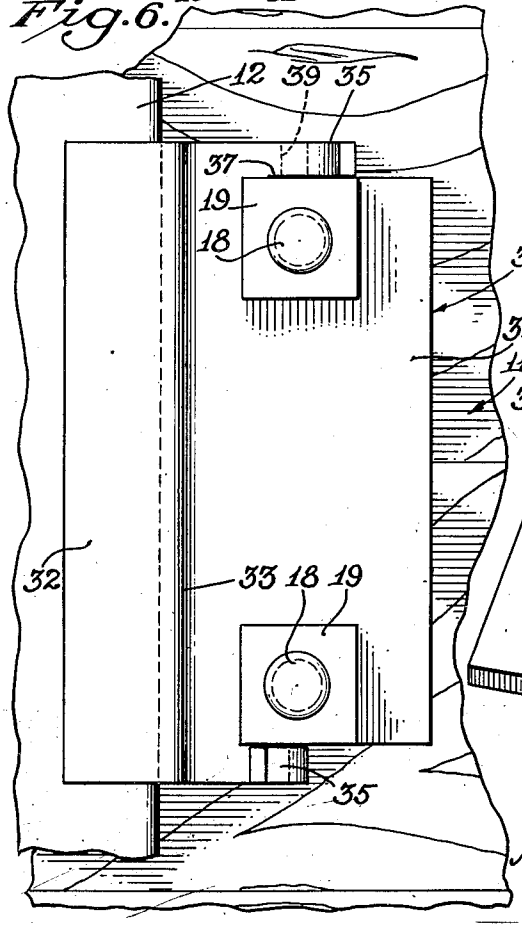
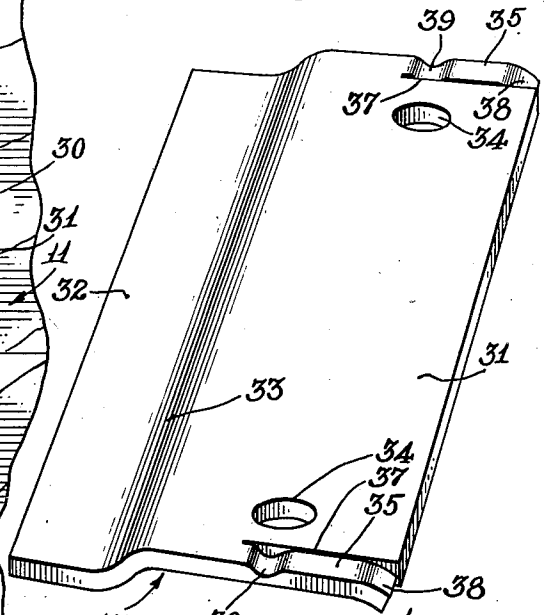


Fig. 7.



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UNITED STATES PATENT OFFICE

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FLOOR SECURING CLIP

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Application February 2, 1942, Serial No. 429,169

8 Claims. (Cl. 189—35)

This invention relates to floor securing clips and more particularly to clips which are adapted for securing the floor boards to the supporting sills in railway cars, or the like.

One of the objects of the invention is to provide for the securing of a pair of floor boards to a supporting sill by means of a single clip.

Another object of the invention is to provide a clip for this purpose which has substantially equal bearing engagement with both of the secured floor boards but requires only a relatively small area of engagement with the supporting sill.

Another object is to provide a clip of this character which is designed to permit the sill-engaging flange of one clip to be severed from the board-engaging flange of the next adjacent clip when the clips are manufactured.

Another object of the invention is to provide a double floor clip which is adapted to be separately bolted to both of a pair of adjoining floor boards and is equipped with means for locking the nuts of both of the fastening bolts against unintentional loosening.

Still another object of the invention resides in the method of making the double floor clips simply and economically from strips of sheet metal only as wide as the greatest dimension of the clips.

A further object is the method of severing each clip from a strip of material by a single shearing action along a line designed to cut away an intermediate portion of its board-engaging flange to form the sill-engaging flange of the next adjacent clip.

The present method permits the use of stock strips of flat sheet metal or of a specially rolled flat section having narrow, integrally formed nut lock ribs along the longitudinal edges of the strips which in the finished clips will comprise the opposite ends of the board-engaging flanges. The portions of such ribs at the opposite ends of the board-engaging flange of each clip are partially severed from the flange so as to form tongues that can be bent into locking engagement with the nuts of the respective fastening bolts.

Another object is the construction of a floor in which the floor boards are thoroughly tied together as well as to the supporting sill structure.

Other objects and advantages of the invention will be apparent from the following description of a specific embodiment of the invention and the accompanying drawings showing the same, in which similar characters of reference indicate similar parts throughout the several views. In the drawings:

Fig. 1 is a fragmentary vertical sectional view taken through one of a pair of floor boards and their supporting sill and showing one of my clips in end elevation;

Fig. 2 is a bottom plan view of the clip and the associated sill and floor boards;

Fig. 3 is a top perspective view of the clip;

Fig. 4 is a fragmental schematic view showing how the clip blanks are cut from a strip of sheet metal stock;

Fig. 5 is a fragmentary bottom plan view of a railway car floor utilizing the clips in a novel manner;

Fig. 6 is a bottom plan view of a modified form of the clip, and associated portions of the floor structure; and

Fig. 7 is a top perspective view of the modified form of clip.

Referring first to Figs. 1 and 2 of the drawings, a clip 10 embodying the features of my invention is shown in securing relation to a pair of floor boards 11 and a supporting sill 12 which may comprise part of the floor structure of a railway car or the like. From the nature of their relationship, the floor boards and the sill have their lower faces offset by the thickness of the sill.

The clip 10 comprises a board-engaging flange 13 and a sill-engaging flange 14. The flanges are connected together by a bend 15 in offset relation substantially proportionate to the offset of the lower face of the sill 12 from the lower faces of the floor boards 11. Both of the flanges 13 and 14 preferably have substantially flat engagement faces adapted to make full contact with the lower faces of the respective secured floor members.

The board-engaging flange 13 is of elongated form transversely of the floor boards 11 so that its opposite end portions will extend under substantial longitudinal center areas of the respective floor boards. An aperture in each of the end portions receives the shank of a fastening bolt 18 extending down from the associated floor board center area. Attaching nuts 19 are threaded onto the downwardly projecting ends of the fastening bolts 18 and are driven tightly up against the board-engaging flange 13 to fasten the clip in place.

The spacing of the end edges of the flange 13 from the adjacent respective bolt holes 17 is preferably correlated with the width of the nuts 19 to enable substantial registration of a lateral or

side face of each nut with the associated edge. This arrangement makes it possible to lock the nuts 19 against rotating loose by means of integral nut-locking tongues 20 on said end edges of the flange 13. These locking tongues 20 consist of bendable portions of integral narrow ribs 21 which extend lengthwise of the respective end edges of the flange 13. The ribs may be substantially thinner than the flange 13 so as to have a substantially reduced cross-section and thus facilitate bending of the locking tongues.

In the formation of the locking tongues, the ribs 21 are severed from the edges of the flange 13 along lines 22. These lines of severance 22 preferably extend inwardly from the side of the flange 13 which is remote from the edge of the sill 12 to a point near or beyond the vertical center of the respective nut faces. Thus, the locking tongues 20 have their ends at that side of the clip where engagement by a bending tool is most convenient.

The small cross-section and length of the tongues 20 permits them to be bent and re-bent easily and without breaking, even where the bending is practically a doubling back as shown at the lower end of Fig. 2 in order to project the tongue effectively into the loosening-rotative path of the rear corner portion of the adjacent nut face. On the other hand, the locking tongues are amply resistant to rotative force exerted by the locked nuts 19 because of the edgewise engagement of the tongues with the respective faces of the nuts (Figs. 1 and 2). To facilitate bending engagement of the locking tongues, they may initially be curved downwardly as seen in full lines in Fig. 3 and in dot-dash outline in Fig. 1.

Although the board-engaging flange 13 must be of substantial length in order to make adequate bearing engagement with the two floor boards 11, sufficient engagement with the sill 12 is obtained where the sill-engaging flange 14 is much smaller longitudinally of the clip. An average length of about one-third as great as the length of the flange 13 is ample, while the width of the flange 14 need be only about half that of the flange 13. This effects substantial savings in clip material and effectively reduces the weight of the clip.

A balanced relationship of the flanges is attained by having the flange 14 centered on the sill-opposing side of the flange 13. It will be seen, by reference to Fig. 2, that the flange 14 will thus engage that portion of the sill 12 which underlies and extends to each side of the joint between the floor boards 11 secured by the clip. By this arrangement, also, there is a free nut-driving tool clearance between the respective nuts 19 and the edge of the sill, unhampered by the offsetting bend 15.

Inasmuch as the clip 10 is fastened by two bolts located at spaced points, accidental turning of the clip out of proper floor-securing position is entirely prevented.

A series of the clips 10 may be economically cut from a rolled section of sheet metal stock A (Fig. 4) of any length that may conveniently be handled merely by severing the strips along transverse lines 23 which follow the shape of the flanges 14. By this method the flange 14 of one clip is cut from the intermediate portion of the flange 13 of an adjoining clip in the series. The space 24 in the outer side edge of each of the flanges 13, left by the cutting away of the relatively small flange 14, will have no appreciable weakening effect upon the flange 13 because of the rather substantial body portion 25 which remains between the end portions of the flange 13 and carries the flange 14.

Weakening of the flange 13 is further avoided by the elimination of any sharp corners in the lines of severance 23. The evidence of this is in the rounded corners both at the outer edges and at the bases of the flanges 14, and the complementary rounded contours defining the cut-out spaces 24.

An advantage of severing the clips along the transverse lines 23 is that it permits the nut-lock ribs 21 to be provided along both longitudinal edges of the stock strip A. As a result, both of the nut-locking tongues 20 may be severed along the lines 22 simultaneously at each end of each clip as a part of the operation of cutting the clips from the stock strip. After each severing action along one of the transverse lines 23, the newly formed flange 14 may be bent into offset relation to its associated flange 13 as a continuous operation of the clip-forming machine. The method outlined permits the clips to be made at low cost.

The only scrap resulting from the present method of making the clips, aside from the slugs of material removed from the bolt holes 17, will be a slug 27 corresponding in shape to the sill flange 14 at the starting end of the strip A and a pair of slugs 28 at the opposite sides of the flanges 14 of the endmost clip blank severed from the strip. This insignificant percentage of scrap further reduces the manufacturing cost of the clips.

A modified form 30 of the clip (Figs. 6 and 7) is adapted to be made from relatively thin, flat sheet steel stock, without the special rolled section, as shown in connection with the clip 10.

The length of the modified clip 30, similarly as the clip 10, is such as to engage with equal effect a pair of adjoining floor boards. However, the modified clip has substantially coextensive board-engaging and sill-engaging flanges 31 and 32, respectively. An integral offsetting bend 33 joins the flanges.

The board-engaging flange 31 may be on the order of twice as wide as the sill-engaging flange 32, and has holes 34 adjacent its opposite ends for receiving the fastening bolts 18.

Nut-locking tongues 35 may be formed integrally on the clip by the severance of narrow strips of the end margins of the board-engaging flange 31, along lines 37 extending inwardly from the outer side edge of this flange to points preferably substantially alined with the rearmost tangents of the bolt-hole peripheries. The ends of the nut-locking tongues 35 may be bent down slightly as shown at 38 in order to facilitate engagement thereof by a bending tool. Bending of the tongues 35 is facilitated by forming them with substantially reduced respective cross-sectional areas adjacent their bases as by means of grooves or notches 39.

It should be understood, of course, that the clip 30 may, if preferred, be formed from a specially rolled section having nut-lock ribs of reduced thickness, such as the ribs 21 of the clip 10. On the other hand, the clip 10 may be made from flat sheet metal and be provided with integral nut-locking tongues cut directly from the body of the board-engaging flange similarly as are the tongues 35 of the clip 30.

The clip of the present invention is particularly well adapted for tying the floor boards into a unitary structure which substantially prevents

floor board shrinkage from accumulating, and which distributes up or down loads and other strains, instead of leaving each floor board more or less to itself in these respects, as where the boards are only individually fastened. These factors are particularly noteworthy in a railway car floor which must withstand many stresses and strains in the course of switching, or traveling over uneven road beds, or loading or unloading of the car.

The supporting frame structure of the car floor may include, in addition to the side sills 12, a center supporting beam 40, and intermediate sills 41 respectively located in spaced relation between the side sills and the sides of the center beam (Fig. 5).

By using my double clip, all of the floor boards 11 can be connected together into a unit at the same time that the boards are secured to the supporting frame structure. By way of example, a separate series of clips of the form of the clip 10 is shown in Fig. 5 connecting the floor boards 11 to each of the side sills 12 and to each of the intermediate sills 41. These series of clips are so arranged that every board is connected to the two adjoining boards by two clips respectively located adjacent the opposite ends of the boards. Thus, any selected pair of the boards 11 is secured together by one of the clips 10 at one of the side sills and by another of the clips 10 at the intermediate sill farthest removed from such side sill. In addition, such pair of floor boards is secured to the adjoining boards at each side by additional clips extending across the board joints at the remaining side sill and intermediate sill. This results in a staggered relationship of the series of clips at each side sill and the adjacent intermediate sill. Through this arrangement it will be readily apparent that every board is held in a relatively fixed position in the assembly, so that as shrinkage occurs, no large gaps will form in the joints between any of the boards by crowding together of certain boards under the influence of jarring or motion of the car floor. In addition, the strain of substantial weight imposed upon only a selected few of the boards, as for example by the wheels of vehicles or machinery loaded in a car, will be distributed to the entire floor or at least to a large number of floor boards near the points where weight is imposed. Similar distribution also occurs with respect to upward force on the floor boards, as for example, where one or more articles in the load are fastened down to the floor to prevent shifting and then in stopping, starting or swaying of the car, the inertia of the articles causes the securing devices to pull upwardly on the floor boards to which they are fastened.

From the foregoing it will be apparent that the present invention provides a novel clip for connecting a pair of adjoining floor boards together and to their supporting sill. The novel construction of the clip provides for the convenient location of readily bendable integral nut-locking tongues at the opposite ends of the clip. The efficient method by which the sill-engaging flange may be cut directly from the board-engaging flange, reduces the amount of material required for each clip. The clip can also be made in a form which permits the use of unusually light gauge material when considering the work it must do. Another important advantage is the unique manner in which the elements of a floor can be tied into a unitary structure with my clips.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and have herein described in detail certain preferred embodiments, but it is to be understood that I do not thereby intend to limit the invention to the specific forms disclosed, but intend to cover all modifications and alternative constructions embraced within the spirit and scope of the invention as expressed in the appended claims.

I claim as my invention:

1. In combination in a securing clip for railway cars or the like, an elongated flange for engaging a pair of adjoining floor boards and having apertures in its opposite end portions for receiving fastening bolts carried by the floor boards, and an integral flange substantially shorter than said board-engaging flange extending laterally in offset relation to an intermediate portion of said board-engaging flange and being adapted to engage a sill upon which the floor boards are supported.

2. In combination in a securing clip for railway cars or the like, an elongated flange for engaging a pair of adjoining floor boards and having apertures in its opposite end portions for receiving fastening bolts carried by the floor boards, and an integral sill-engaging flange extending laterally in offset relation to said board-engaging flange, said sill-engaging flange being dimensioned to be cut from an intermediate portion of the board-engaging flange of an immediately adjacent clip formed from the same piece of clip material.

3. A floor securing clip of the character described comprising, in combination, a central body having three portions extending therefrom, two of said portions being at the opposite ends of said body and adapted to engage respective adjoining floor boards, and the third portion extending laterally from the body intermediate said end portions and being adapted to engage a supporting sill for said floor boards.

4. A securing clip of the character described comprising, in combination, an elongated flange for engaging a pair of floor boards, the opposite end portions of said flange being of relatively large area to receive means for fastening the flange to said floor boards, and an integral sill-engaging flange extending laterally from one side of said board-engaging flange at a point intermediate said end portions, said sill-engaging flange being of approximately the same average dimension as said portions longitudinally of the clip and about half as wide as said portions, whereby the sill-engaging flange may be derived from the material between the end portions of the board-engaging flange of another clip and the sill-flange of still another clip may be formed from the material between said first-mentioned end portions without appreciably weakening the body of the clip where the sill-engaging flange and the end portions are joined.

5. A clip of the character described for securing together the floor boards and a supporting sill in a railway car or the like, an elongated body including opposite end portions for engaging the respective lower faces of a pair of adjoining floor boards, and a laterally projecting integral portion offset relative to said board-engaging portion for engaging the lower face of the supporting sill, said sill-engaging portion being adapted to engage the sill in an area under and at each side of the joint between the floor boards, and being substantially smaller than said body to save clip material.

6. In combination in a floor of the character described including a series of individual floor boards adjoining at their longitudinal edges to provide a substantially continuous floor surface, a supporting frame structure carrying the floor boards, and clips each constructed for removably securing a pair only of floor boards together and to said frame structure, said clips being arranged in a systematic order wherein every floor board is secured to each adjoining floor board by a plurality of clips so disposed as to render the boards mutually co-operative in resisting floor strains.

7. In combination in a railway car floor including side sills and intermediate sills and floor boards supported by the sills in edgewise adjoining relation, clips securing the floor boards to the side sills and each fastened to a pair only of adjoining boards across every alternate board joint along each side sill, and additional clips securing the floor boards by pairs only to said intermediate sills and extending across the joints skipped by the clips at the adjacent side sills.

8. In combination with a railway car floor or the like including a plurality of spaced supporting frame members and a plurality of adjoining floor boards lying across said frame members, a plurality of series of securing clips fastened to said floor boards and said frame members for securing the floor boards in place, each of said clips engaging and connecting a pair only of adjoining floor boards together, and the clips of each series being staggered with respect to the clips of an adjacent series so that all of the floor boards are tied together into a unit for mutual distribution of the strains to which the floor may be subjected.

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