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H. G. KÜSTER
FASTENING ASSEMBLIES

3,395,864

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2 Sheets-Sheet 1

FIG. 1

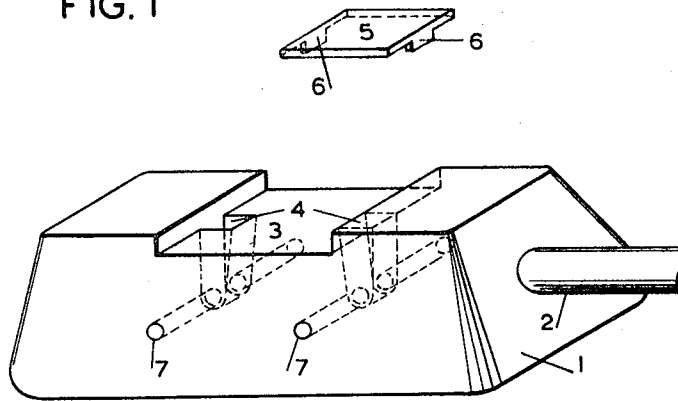
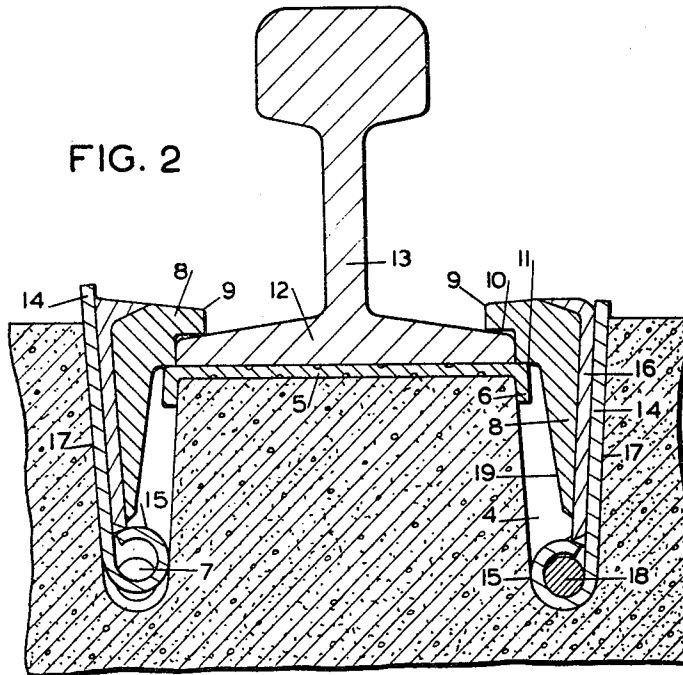


FIG. 2



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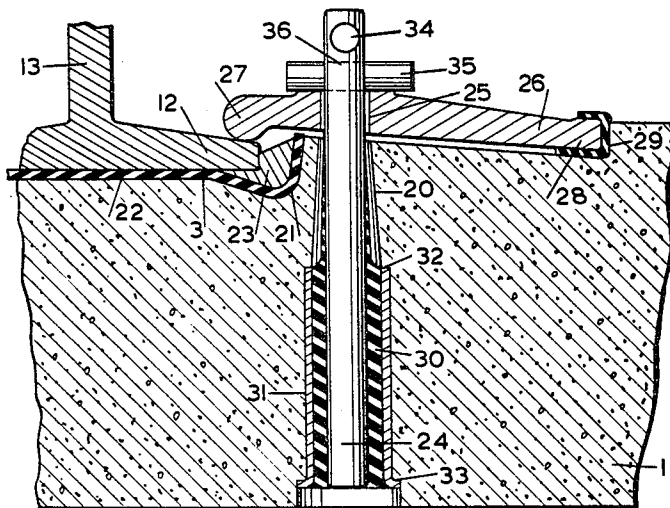


FIG. 3

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FASTENING ASSEMBLIES

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12 Claims. (Cl. 238—310)

This invention relates to fastening assemblies primarily designed for use as rail clips but which may be used in any other analogous applications in which an article is to be held in position against a base member.

In accordance with this invention there is provided a fastening assembly for holding an article in position comprising a base and clip, the latter embodying a clamping head shaped to bear on the article to be held, an elastomeric element interposed between the base and clip and adapted to be stressed by displacement of the clip relative to the base, and means for locking the base in such a displaced position relative to the clip.

A further feature of the invention provides for the base and clip each to include a body portion in the form of a metal strip each strip bonded or similarly secured to an intermediate elastomeric strip.

The invention further provides a sleeper, rail, and fastening assembly comprising a sleeper and rail supported thereon, a downwardly extending opening in the top surface of the sleeper on each side of the rail flange, a fastening assembly accommodated partly in each opening, each fastening assembly comprising a clip and base with an elastomeric element interposed between them and a clamping head projecting laterally relative to the clip and bearing on the adjacent flange of the rail, the base being displaced relative to the clip to maintain the elastomeric element under stress, and the base being locked to the sleeper in this displaced position, thereby transmitting downward pressure to the head via the clip to hold the rail on the sleeper.

As indicated above, the invention is particularly applicable to rail fastening assemblies. This preferred application will accordingly be described below and various embodiments of this application are illustrated in the accompanying drawings in which:

FIG. 1 is an isometric view of portion of a rail sleeper and a rail pad adapted to be fitted on said sleeper;

FIG. 2 is a section on a larger scale through part of a sleeper and fastening assembly, and

FIG. 3 is a section on the same scale as FIG. 2 through portions of rail sleepers, and showing alternative forms of fastening assemblies.

As shown in FIG. 1 there is provided a concrete sleeper of generally normal type consisting of two reinforced concrete blocks 1 (only one being illustrated), the blocks being joined by a bar 2.

The top surface of block 1 has a rectangular recess 3 and at each side of the recess is a downwardly extending and preferably downwardly tapered hole 4 conveniently of mainly rectangular horizontal cross section. The rail pad 5 which rests on the top surface of the recess 4 has at each side a downwardly flanged portion 6 which when placed in the recess 3 extends a small distance into the top of each hole 4.

Two laterally extending holes 7 extend inwardly from the side of the block 1 one of each of the holes 7 intersecting the bottom portion of each corresponding downwardly extending hole 4.

As shown in FIG. 2, into each hole 4 is fitted a rail clip assembly which overall is of downwardly tapered shape. The clip assembly comprises a clip 8 in the form of a metal strip or bar having an inwardly projecting

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head 9 the undersurface of which has two steps 10, 11, the upper step 10 bearing on the corresponding portion of the flange 12 of the rail 13 which rests on pad 5, and the lower step bearing on the edge of the said rail pad 5.

Forming a backing for the rail clip is a base member 14 also in the form of a metal strip with the lower end shaped as a hook or eyelet 15. The base member is separated from the clip by a strip 16 of rubber or equivalent elastomeric and preferably electrically insulating material which is bonded to both the base 14 and clip 8.

The outer side of each base 14 or at least a very substantial part of the outer side thereof bears flat against the corresponding wall 17 of the holes 4 so that any lateral thrust applied to the base 14 will be resisted over a substantial area of the block 1.

As shown in the left hand side of FIG. 2 when the clip assembly is placed in the hole 4 the top of the base 14 projects slightly above the top of the clip 8. To secure the assembly in position the projecting top portion of the base 14 is pressed downwardly and the lower end engaged by a metal pin 18 inserted through the lateral hole 7 in the sleeper 1 as shown in the right hand side of FIG. 2. The parts are so dimensioned that when this is done the rubber strip 16 will be under a shear stress thereby pressing the head 9 of the clip onto the rail flange 12 with the required pressure.

The inner face 19 of the clip is spaced from the inner face of the hole 4. In addition to the rubber strip 16 in combination with the rail pad 5 insulating the clip and accordingly the rail from the sleeper, the assembly provides a resilient fastening which not only resists vertically directed loads but also side thrust.

To prevent loss of insulation through ingress of water into the downwardly extending holes 4 the latter may have drainage openings (not shown) if the laterally extending holes 7 do not fully serve this purpose and/or any exposed metal portions of the clip assembly may be insulated by a skin of rubber moulded or otherwise formed thereon.

Should there be any tendency for fatigue of the rubber strip 16 leading to loss of pressure on the flange 12, the base 14 may be initially secured in position with an undersized pin 18 which may later be replaced with pins of larger diameter to restore the required tension in the clip. In any case it will be appreciated that the clip assemblies may be easily removed and replaced.

It will be appreciated that the assembly may be varied in many ways, two of which are illustrated in FIGS. 3 and 4 of the accompanying drawings, each of which only show one clip in position though it will be appreciated that two clips are used to secure each rail 13 on each block 1.

As shown in FIG. 3 the rectangular hole 4 is replaced by a hole 20 of circular section which is spaced inwardly from the recess 3 and extends the full height of the block 1. The edge portions 21 of the recess 3 are curved and extend below the centre portion of the bottom of said recess, the pad 22 being correspondingly shaped. Rigid bearing pads 23 which may be of any suitable material such as metal or resin bonded glass fibre, are interposed between the ends of the rail flange 12 and the adjacent upwardly curved edges of the pad 22. The bearing pads 23 extend an appreciable distance on each side of the hole 20 and are for the purpose of resisting lateral thrust.

The clip assembly consists of two metal parts, namely, a clip portion in the form of a rod 24 fitting loosely through a hole 25 in a lever 26. The inner end of the lever is shaped to form a clamping head 27 bearing on the rail flange 12 and the outer end 28 bears on a pad

29 located in a recess in the top surface of the block 1. The lower portion of the rod 24 has a rubber sheath 30 to which it is bonded, the sheath 30 also being bonded to a base member in the form of a metal sleeve 31. The top of the metal sleeve 31 bears against a shoulder 32 in the centre portion of the length of the hole 20 and if desired the bottom of the sleeve 31 may be outwardly flanged to bear against a further shoulder 33 in the hole 20.

The clip is assembled and operatively positioned by inserting the rod 24 upwardly through the bottom of hole 20 and through hole 25 in the lever 26. The upper end of rod 24 is then lifted by hole 34 and a pin 35 inserted through a lower hole 36 to project on each side of hole 36 and bear downwardly on the top of lever 26. It will be seen that the upward movement of rod 24 places the rubber sheath 30 under a shear stress which through the pin 35 presses lever 26 onto rail flange 12 to hold the rail 13 in position.

The sheath 30 may be extended upwardly above the sleeve as a skin to ensure that the rod 24 and accordingly the rail are insulated from the sleeper.

It will be apparent that by suitably shaping the parts making up the clip and the parts making up the base the pressure applied to the clip by the elastomer element or elements of the assembly may be maintained almost wholly by compressive stress in the elastomer.

What I claim as new and desire to secure by Letters Patent is:

1. A fastening assembly comprising a base and a clip, a clamping head extending laterally from the clip, a bearing face on said clamping head, an elastomeric element interposed between and bonded to the base and clip, said elastomeric element extending in a direction at approximately right angles to the surface of said bearing face and being deformable under shear stress to allow limited and parallel displacement of the clip relative to the base, and anchoring means embodied in the base to hold the latter in a displaced position relative to the clip.

2. A fastening assembly in accordance with claim 1 in which the base and clip comprise spaced metal plates, the clamping head is integral with one end of the clip, and the anchoring means is embodied in the base plate at the end thereof opposite the clamping head.

3. A clamping assembly in accordance with claim 1 in which the clip and base comprise respectively a metal rod and concentric metal sleeve with the one end of the rod projecting from the sleeve, and the clamping head comprises part of a lever detachably engaged by the projecting end of the clip.

4. A sleeper, rail and fastening assembly comprising a sleeper, a rail, flanges to the rail supported on the sleeper, downwardly extending openings in the top surface of the sleeper and outwardly spaced from each rail flange, a fastening assembly accommodated partly in each opening, each fastening assembly comprising a base and a clip, a clamping head extending laterally from the clip, a bearing face on said clamping head bearing on the adjacent rail flange, an elastomeric element interposed between and bonded to the base and clip, said elastomeric element extending in a direction at approximately right angles to the surface of said bearing face, the base being displaced in a parallel direction relative to the clip thereby deforming the elastomeric element and maintaining it under shear stress, and means anchoring the base to the sleeper in this displaced position thereby transmitting downward pressure to the clamping head via the clip to hold the rail on the sleeper.

5. An assembly as claimed in claim 4 in which the clamping head is integral with the clip and the bearing face is stepped.

6. An assembly as claimed in claim 4 in which the clamping head is integral with the clip and the bearing face is stepped, the base and clip being in the form of plates and each opening has an outer wall against which

a substantial area of the corresponding base plate bears.

7. A sleeper, rail and fastening assembly comprising a sleeper, a rail, flanges to the rail supported on the sleeper, downwardly extending openings in the top surface of the sleeper and outwardly spaced from each rail flange, a fastening assembly accommodated partly in each opening, each fastening assembly comprising a base plate and a clip plate with an elastomeric layer bonded to and interposed between said plates, and a clamping head integral with the clip plate projecting laterally from the latter, a bearing face on the clamping head and bearing on the adjacent rail flange, the said elastomeric element extending in a direction at approximately right angles to the surface of said bearing face, an outer wall to each of said openings and a correspondingly shaped outer surface to each base plate bearing against a substantial area of the corresponding wall, the base plate being displaced in a parallel direction relative to the clip plate thereby deforming and maintaining the elastomeric layer under shear stress, an anchoring member forming part of the bottom of each base plate, holes extending laterally through the sleeper and intersecting the downwardly extending openings therein, and pins located in said laterally extending holes and engaging said anchoring members to hold the base plates in the said displaced positions thereby transmitting downward pressure to the clamping heads via the clips to hold the rail on the sleeper.

8. An assembly in accordance with claim 7 including a rail pad interposed between the rail flange and sleeper and downwardly flanged portions of said rail pad extending into the downwardly extending openings in the sleeper.

9. A sleeper, rail and fastening assembly comprising a sleeper, a rail, flanges to the rail supported on the sleeper, downwardly extending openings in the top surface of the sleeper and outwardly spaced from each rail flange, a fastening assembly accommodated partly in each opening, each fastening assembly comprising a rod, sleeve, elastomer layer, lever and clamping head, the sleeve being rigid and encircling one end of the rod, the layer of elastomer interposed between and bonded to the rod and sleeve, the lever detachably engaged by the end of the rod opposite the sleeve, and the clamping head forming an integral part of one end of the lever, shoulders in the openings against which the sleeve bears and means locking the rod in an upwardly displaced position relative to the sleeve thereby maintaining the elastomeric layer under shear stress.

10. A sleeper, rail and fastening assembly comprising a sleeper, a rail, flanges to the rail supported on the sleeper, downwardly extending openings in the top surface of the sleeper and outwardly spaced from each rail flange, a fastening assembly accommodated partly in each opening, each fastening assembly comprising a base and clip with an elastomer bonded to and interposed between them, the clip being in the form of a rod and the base in the form of a sleeve encircling one end of the rod, a lever detachably engaged by the end of the clip opposite the sleeve the one end of the lever being in the form of a clamping head extending laterally from the clip, a bearing face on said end of the lever bearing on the adjacent rail flange and the other end of the lever supported by the sleeper, said elastomeric element extending in a direction at approximate right angles to the surface of said bearing face, the clip being displaced upwardly in an axial direction relative to the base thereby deforming the elastomeric element and maintaining it under shear stress, shoulders in the openings against which the base bears and means anchoring the clip in said displaced position.

11. A fastening assembly in accordance with claim 10 including a recess in the top surface of the sleeper located between and inwardly of the downwardly extending openings therein, a pad in said recess and under the rail flanges, side walls to the recess and a rigid bearing pad located between each flange and adjacent recess side wall.

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12. A fastener assembly comprising a base and a clip, a clamping head extending laterally from the clip, a bearing face on said clamping head, an elastomeric element interposed between and bonded to the base and clip, said elastomeric element extending in a direction at approximately right angles to the surface of said bearing face and being deformable under shear stress to allow limited and parallel displacement of the clip relative to the base, and means for anchoring the base in a displaced position relative to the clip.

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