

Manufacture of top plate for an elastomeric rail fastening assembly

Field of the Invention

THIS INVENTION relates to castings and is more specifically, although not exclusively, concerned with the construction of a metal casting used to provide a top
5 plate of an elastomeric rail fastening assembly used to secure rails to the underlying bed of a railway track.

State of the Art

Elastomeric rail fastening assemblies are being used increasingly in situations where, for example, track noise and vibration caused by train wheels travelling along the
10 rails, are to be lessened. Such an assembly comprises a top plate attached by clips to the under-flanges of the rail, a bottom plate which is securely attached to the track bed to hold the assembly in place, and a layer of an elastomeric material such as rubber usually sandwiched between frusto-conical and spaced opposed surfaces of the top plate and the bottom plate.

15 The top plate is conventionally formed by an iron casting having a central well formed in its undersurface to assist retention of the casting in a mould in which it is formed, and sockets formed in the upper surface of the casting to receive the ends of respective clips which loop over bottom flanges of the rail and hold it securely in position. Each rail is supported by parallel lines of spaced top plates. The layer of
20 elastomeric material is vulcanised to the top and bottom plates and suppresses the transmission of vibration and noise from the top plate to the bottom plate, and thus to the bed of the railway track. Such top plates are also useable in other devices in which a layer of elastomeric material is used to suppress the transmission of sound and vibration between two parts of the device.

25 The casting of a top plate involves a moulding process in which separate cores are used to define the positions of the sockets, such cores being attached to separate seats in the mould in which the casting is formed.

Manufacturing a top plate by the method described above results in undesirable flashing and positional variations of the sockets, and those imperfections have to be removed by dressing the casting. For example, the cores used to produce the sockets may move slightly with respect to one another during the moulding process. Also flashing can occur at the ends of the sockets where the core seating extends to the mould and this must be removed to ensure that there is a clean surface free of flashing for the elastomeric layer to bond onto it and thus make an effective seal. Also the sides of the well must diverge to allow the casting to be removed from the mould. This results in a considerable thickness of the metal backing of the frusto-conical surface of the top plate. This substantially increases the weight and cost of the top plate unnecessarily.

Object of the Invention

An object of this invention is to provide an improved top plate for an elastomeric rail fastening assembly, or similar device.

The Invention

In accordance with one aspect of the invention a manufacture of a top plate for an elastomeric rail fastening assembly or similar device comprises a casting process using a single core to define a well formed in the underside of the top plate and also sockets of the casting which are to receive rail-holding clips, the core being attached to the interior wall of a mould in which the top plate is cast, by way of the mouth of the well prior to passing molten metal into the mould.

In accordance with a second aspect of the invention a top plate for an elastomeric rail fastening assembly or similar device is formed by a casting process and has a well formed in the underside of the top plate communicating with sockets on the upper surface of the top plate for the reception of rail-holding clips.

Advantages of the Invention

The advantage of the invention is that the use of a single core to define the sockets and the well results in the positioning of the sockets in relation to one another and to the well, being precisely defined. Also flashing on the top face of the plate is avoided so that previous problems with the bonding of the elastomeric layer to the top face of the plate are avoided without the need for subsequent dressing. As a single core is used, it can be attached securely to the interior of the mould cavity prior to moulding, and, as the core material is readily removed after moulding the wall thickness of the casting backing the frusto-conical surface of the top plate can be made much thinner than hitherto. In consequence, a thinner wall thickness can be utilised without a loss in performance and with a consequential saving in the weight of the casting. In practice, the weight of the casting determines its price and the combination of the reduction in the weight of the top plate together with the reduced requirement for dressing to remove flash, results in a superior top plate which can be marketed at a cheaper price than hitherto.

Introduction to the Drawings

The invention will now be described in more detail, by way of example, with reference to the accompanying informal and partially diagrammatic drawings, in which:-

20 In the Drawings

FIGURE 1 is a perspective view of an elastomeric rail fastening assembly;

FIGURE 2 is a top plan view of a top plate of the assembly;

FIGURE 3 is a vertical-section through figure 2 taken on the line and in the direction indicated by the arrows III-III in figure 2;

FIGURE 4 is a vertical-section taken on the line and in the direction indicated by the arrows IV-IV in figure 2;

FIGURE 5 is a horizontal cross-section of part of the top plate and taken on the line and in the direction indicated by the arrows V-V in figure 3;

5 FIGURE 6 is a perspective under-view of the top plate of figure 1; and,

FIGURE 7 is a cross-section through the perspective underview of the top plate shown in figure 6 and taken on the line and in the direction of the arrows VII-VII in figure 3;

Description of Preferred Embodiment

10 The assembly 1 shown in figure 1 is attached to a track foundation by screw spikes (not shown) driven downwardly through apertures 2 in four anchor lugs 3 arranged in pairs at each side of a bottom plate 4 of the assembly. The plate 4 is made from cast iron. A cast iron top plate 5 is mounted centrally in an opening in the upper surface of the bottom plate 4 and is held
15 in place by a thick layer 6 of an elastomeric material such as rubber, sandwiched between opposed and spaced frusto-conical surfaces provided respectively on the two plates 4 and 5. The frusto-conical surface 5 tapers downwardly. The layer 6 is vulcanised to both plates 4 and 5.

A track rail 7, shown diagrammatically in broken outline, has a bottom
20 flange 8 that locates between two spaced clip mounts 10 projecting upwards from the top plate 5 and cast integrally with it. Each mount 10 is formed with a horizontal and open-ended socket 11 for the reception of one end-portion of a resilient steel rail holding clip 12 shown in broken outline. The other end portion of the clip 12 loops around behind and then
25 over the mount 10, and is formed with a straight horizontal terminal portion which forces the rail flange 8 downwardly against an

inclined face 13 extending between the mounts 10. The inclination of the face 13 provides the required cant to the rail 7.

Figures 2, 3 and 4 shows the top plate 5 in more detail. It is formed with a downwardly convergent hollow body 20 shown more clearly in figure 4 and which provides externally one of the opposed frusto-conical surfaces referred to earlier, and referenced 22.

The interior of the top plate 1 contains a well 24 which extends to within twenty millimetres of the external and downwardly-tapering frusto-conical surface 22. As shown in figure 3, the cavity of the well 24 extends upwardly onto the interiors of the mounts 10 and into their open-ended sockets 11.

It will be noted from figures 3 and 4 that the wall of the top plate 5 surrounding the sides of the well 24 is of a minimum thickness to provide the required strength without using excess metal. This reduces the cost and weight of the top plate 5. Also, the lower part of the wall provides a re-entrant lip 25 beneath the well 24 and this assists the strengthening of the wall and the location of a core used during the casting process to provide the well 24 and the sockets 11. An opening in the underside of the top plate 5 and defined by the inner edge of the lip 25, allows the core to be attached to the inside of the mould cavity during casting of the top plate 5. The mould in which the top plate is cast is prepared with just a single core (not shown) mounted in one face of the mould cavity by way of an opening 26 in the underside providing a mouth to the well 24. The core is made from a sandy material which disintegrates after casting so that it can be readily removed as a powder from the well 24 of the top plate after casting. Portions of the core project upwardly to provide the interior surfaces and sockets 11 and the mounts 10.

As a result of using a single core to make the interior of the top plate 5, the positions of the sockets 11 with respect to one another and to the well 24 are precisely defined as also is the wall thickness surrounding the well 24 and the location of the core in

the mould during casting. As a result, the amount of metal used in the top plate is reduced without compromising its strength, and, the cost of the top plate and its weight are reduced as also is the need for extensive dressing of the casting. The upper surface of the top plate reflects the high finish of the
5 wall of the mould cavity ~~and is thus~~ flat and smooth and can readily be vulcanised to the layer of elastomeric material located between the top and bottom plates in a manner which greatly lessens the risks of imperfections in the sealing of the elastomeric layer to the surfaces of the top and bottom plates to which it is vulcanised.

Claims:

1. The manufacture of a top plate for an elastomeric rail fastening assembly or similar device, formed by a casting process using a single core to define a well formed in the underside of the top plate and also sockets of the plate which are to receive rail-holding clips, the core being attached to the interior wall of a mould in which the top plate is cast by way of the mouth of the well prior to passing molten metal into the mould.
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2. A top plate for an elastomeric rail fastening assembly or similar device, formed by a casting process and having a well formed in the underside of the top plate communicating with sockets on the upper surface of the top plate for the reception of rail-holding clips.
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3. A top plate as set forth in claim 2 above, in which the well has a larger horizontal cross-section inside the top plate than the mouth of the well.
4. A top plate as set forth in any one of claims 2 or 3, in which the underside of the top plate is provided with a lip extending inwardly beneath the well and defining a, or the mouth of the well.
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