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Foot protection system for a horse

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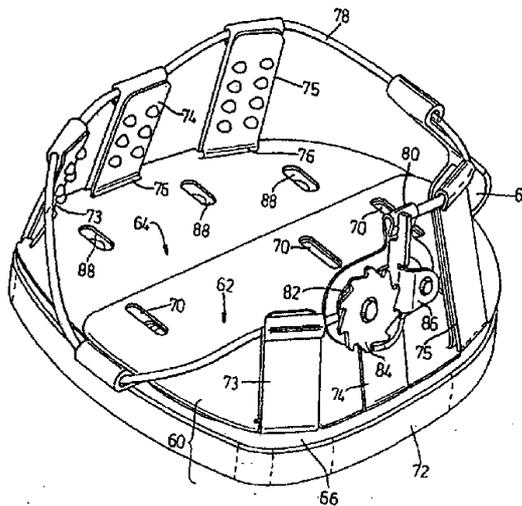
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(54) Title: FOOT PROTECTION SYSTEM FOR A HORSE



(57) Abstract

A removable foot protection system comprises a sole member which may be of multiple element construction comprising a tread (72), and movable overlapping plates (62, 64). Around the periphery of the sole member are support strips (68, 73) to (75), which can in use engage spaced peripheral portions of the horse's hoof. The support strips pivot or flex to conform to the profile of the shoe and a clamping force is exerted by an encircling cable (78).

FOOT PROTECTION SYSTEM FOR A HORSE

This invention relates to a foot protection system for the hoof of a horse or other hoofed animal such as a pony.

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Horses and ponies have been shod for centuries by nailing a forged metal shoe to the underside of the hoof. In more recent developments, rubber or synthetic plastics shoes have been bonded to the hoof of the horse by
10 adhesive.

It is also known to apply a slipper or boot to the horse's hoof for medical treatment such as a poultice or the like.

There are however several disadvantages associated
15 with the conventional horseshoe and its application. Because of the spread of the horse's hoof when bearing weight, the horseshoe is nailed to the horse's hoof only at the front portion and the horse can often lose or "throw" a shoe. The conventional horseshoe wears quite quickly and
20 needs to be replaced regularly. Repeated replacement of the horseshoes means that the horse's hoof is riddled with nail holes which discolour the hoof and degrade it. This is particularly so where the horse spends a significant amount of time on metalled roads, for example where the
25 horse is used in driving. In addition, in conventional nailed metal shoes or bonded synthetic shoes, these are permanently attached and prevent natural wearing down of

the hoof and so it needs to be trimmed regularly.

US patent No. 4,171,754 discloses a removable protection device in the form of a boot with a continuous wall enclosing the horse's foot, and secured by a cable. There are disadvantages with this arrangement because the enclosed nature of the boot means that there is inadequate ventilation and drainage for the horse's foot and sweat and/or water, mud, etc., may collect in the boot with deleterious effect on the horse's foot. Also the continuous encircling wall of the boot means that it is difficult to apply secure clamping pressure on the foot of the horse.



10 I have designed a removable foot protection system which obviates or at least mitigates at least some of the above disadvantages.



Accordingly, in one aspect, this invention provides a removable foot protection device for the hoof of a horse or hoofed animal, said device comprising a sole member adapted in use to cover at least a major part of the underside of the hoof, a plurality of spaced locating means upstanding from said sole piece and each defining a distinct clamping engagement adapted in use to engage the outer surface of the hoof to locate the device, and elongate tensioning member attached to said device and adapted in use to pass around the outside of said locating means to urge them towards engagement with said hoof, and a tensioning device for applying tension to the tensioning member in use to clamp the locating means into direct engagement with the hoof.



By this arrangement there are distinct clamping engagements between the device and the hoof, and the clamping force of the tensioning member is concentrated on these discrete clamping engagements. This provides a much more secure arrangement for a given tension compared to the boot arrangement in which the clamping force is distributed over the entire periphery of the boot and may be absorbed by local deformation of the side wall of the boot. Furthermore, the spaced nature of the locating means allows good ventilation and drainage of any sweat, water or mud.



The device may be fitted to the horse as required for road use and removed when the horse is returned to the paddock. The device is securely and removably attached to the hoof without requiring nailing or adhesive, thereby preserving the structure of the hoof. In addition, the device may be removed for periods so that
5 the hoof may wear down naturally and reducing or obviating the need for trimming.

The ground-contacting portion of the sole piece preferably comprises a material having at least one of the following properties: abrasion resistance, relatively high friction, vibration absorbing, and flexible. In one embodiment, the ground-contacting portion of the sole piece comprises a patch cut out of the road
10 surface of a tyre and this has the properties just described.



In some circumstance, however, this may provide excessive friction in which case the ground-contacting portion of the sole piece may have a lower coefficient of friction, eg. it may be of a resilient tough plastics

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material which provides shock absorption and a lesser frictional effect. In some circumstances it could be metal.

Preferably, the sole member comprises a hoof-
5 contacting element releasably secured to a ground-
contacting element, so that the ground-contacting portion
of the sole piece is a replaceable item.

The hoof contacting element is preferably adjustable
in at least one of length and width. The hoof-contacting
10 element preferably comprises a plurality of relatively
moveable portions and means for clamping or securing the
portions in a required disposition.

Preferably, said locating means comprise resilient
strip elements secured at their lower ends to said sole
15 piece. The strip elements are preferably made of a
resiliently deformable material such as metal. The strip
elements are preferably pivotally mounted on said sole
member.

Preferably, said plurality of locating means comprise
20 a forward locating means adapted in use to locate against
the front of the horse's hoof and one or more side locating
means adapted in use to engage the side of the hoof.
Preferably, said forward locating means includes an
extended base strip which extends across the major portion
25 of the length of the sole member.

Preferably at least said side locating means are
provided with friction enhancing means such as inwardly

directed tangs or roughened regions for engaging the side of the hoof in non-slip fashion.

Preferably said elongate tensioning member is retained adjacent the rear of the sole piece, passing around the 5 outside of each of the plurality of locating means. The device preferably includes a tensioning mechanism for applying tension to said tensioning member. The mechanism may comprise a ratchet pulley on which the elongate member may be wound, and a releasable pawl associated with said 10 ratchet. Alternatively an over-centre buckle arrangement may be used of a type similar to that used in ski-boot buckles, where initial slack is taken up by a linear ratchet prior to applying the clamping force by the over-centre buckle. In another embodiment the tensioning 15 mechanism may comprise an over-centre toggle arrangement, or the elongate member may be wholly or partially formed of a spring elastic material.

The path of the tensioning member is advantageously chosen to avoid contact with the sensitive "bulbs" at the 20 back of the hoof of the horse in use.

In one arrangement the elongate tension member comprises a tensioning member retained adjacent the upper surface of the rear of the sole member, thence passing on a generally upward path to the front of the hoof and 25 following a generally symmetric path back down to the rear of the sole member.

In another aspect, this invention provides a method of

applying protection to the foot of a hoofed animal which comprises applying to the hoof a removable device as described herein. Preferably, said removable device is made by initially taking a cast or measurement of the hoof and manufacturing a device to fit. The cast may be taken in a quick setting synthetic material such as a two-part filler or casting material.

Whilst the invention has been described above, it extends to any inventive combination of the features set out above or in the following description.

The invention may be performed in various ways, and two embodiments thereof will now be described by way of example only, reference being made to the accompanying drawings in which:-

Figure 1 is a top plan view of a first embodiment of equine foot protection device in accordance with this invention;

Figure 2 is a perspective view from above of the protection device of Figure 1;

Figure 3 is a side view of the protection device of Figures 1 and 2 fitted to the hoof of a horse;

Figure 4 is an isometric view of a second embodiment of a front left equine foot protection device in accordance with this invention;

Figure 5 is an exploded view of the foot protection device of Figure 4;

Figure 6 is a top plan view of the primary plates, the

secondary plate, and the centre tang of the foot protection device of Figures 4 and 5;

Figure 7 shows the components of Figure 6 in an exploded isometric view;

5 Figure 8 is a left side view on the equine foot protection device;

Figure 9 is a right hand side view on the equine foot protection device, and

10 Figure 10 is a detail of the tensioning arrangement used in the second embodiment of equine foot protection device.

The removable device of the first embodiment comprises a flexible sole piece 10 which may be conveniently formed by cutting out a suitably shaped section from the road 15 surface of an old tyre. As well as the beneficial effect of recycling, the road surface comprises a robust non-slip shock, absorbing-material which can securely receive a self-tapping screw. Along the fore and aft centre line of the base piece 10 runs the lower portion 12 of a locating 20 strip which terminates in an upwardly projecting, rearwardly inclined location portion 14 which in use engages the front sloping portion of the horse's hoof 16. The forward locating portion is secured to the base piece 10 by means of two screws or bolts 18 and a cross piece 20 25 also secured by bolts or screws to the base portion. The upper end of the locating portion is out-turned to provide a lip 22 for retaining the strap as to be described below.

Spaced generally about the side of the base portion are four lateral support strips 24, 26, 28, and 30, each of generally L-shaped form with their bases secured to the base piece 10 by means of bolts or screws 32. Each of the 5 lateral support strips is generally upwardly directed but inclined slightly towards the centre of the device, to match the typical profile of the outer surface of the horse's hoof. The lateral support strips are also intended to engage the outer surface of the hoof and are provided 10 with inwardly directed tangs 34 formed by slashing and bending the sides of the strips.

A removable strap arrangement 36 is associated with one of the forward lateral support strips, in this instance strip 24. One end of the strap 36 is anchored by a rivet 15 or similar arrangement 38 to the forward lateral strip 24 and then passes downwardly around the outside of strip 26 to twist flat to lie flat against the upper surface of the base portion 12 in the region 40. The strap is conveniently attached to the base portion 10 by means of 20 two screws or bolts 42. From region 40, the strap twists again to pass at an upwardly inclined angle around the strips 28 and 30 and then under the lip 22 of the forward location strip 14. The end of the strap 36 terminates in a hooked portion 44 which locates in an eye or recess 46 in a 25 catch element 47 which is pivotally located to an over-centre toggle lever 48 which is pivotally attached to the top end of location strip 24. This over-centre toggle

arrangement allows the strap 36 to be drawn tightly around the lateral and forward location strips to urge them into engagement with the hoof of the horse and thus fix the removable device securely to the hoof, with the toggle 5 lever in a stable closed position.

Figure 3 shows the removable device when attached to a horse's hoof 16. It should be noted that the strap 36 passes underneath the soft tender "bulbs" 50 but at the same time provides an encircling strap which encircles the 10 horse's hoof and pulls the location strips into engagement with the surface to secure the device in position.

Once the horse is used to the device, it may be applied and removed as part of the harnessing and bridling routine so that the horse wears the device when out on the 15 road but can go bare-hoofed elsewhere.

In most cases, the removable device will be custom made for each hoof, as the size of horses' hooves vary considerably. I have designed a method whereby the farrier or device fitter initially takes an impression of the 20 horse's hoof using a quick setting material. This impression is then used as a mould to cast a replica of the horse's hoof. The removable device may then be constructed by cutting the sole piece 10 to match the hoof and then securing the locating strips and attaching the strap to the 25 sole piece, taking care to ensure that it will not contact the bulbs 50 during use.

When a sole piece 20 has worn down below a certain

limit the device can be resoled by cutting out a further sole piece and securing it to the underside of the original sole piece 10 by driving four self tapping screws through the original sole.

5 Referring now to Figures 4 to 10 inclusive, there is shown a second embodiment of an equine foot protection device in accordance with this invention, which has been developed from the first embodiment. The main principles of attachment are generally similar although in this
10 embodiment the device has been designed to be adjustable in length and width to suit the size of the horse's hoof. The Figures show the device for the front right hoof of the horse. The left hand device will be a mirror image of the illustrated device.

15 In this second embodiment, the sole piece 60 is of multiple element construction made up of a number of plates secured to a tread. The construction comprises a right or top plate 62 which overlies the right hand edge of a left or bottom plate 64. Beneath the top and bottom plates 62,
20 64, there is a secondary plate 66. An extended centre tang 68 runs underneath the overlapping portions of the plates 62, 64 and is sandwiched between the overlapping region of the plates and the central region of the secondary plate 66. The plates 62, 64 and the centre tang 68 are provided
25 with co-operating slots 70 to allow the effective width or transverse extent of the plates to be adjusted to suit the width of the horse's hoof and also to allow the effective

length, as defined by the centre tang 68, to be adjusted to match the length of the horse's hoof, as shown by the arrows in Figure 7. Underneath the secondary plate 66 is stacked a tread 72 of suitable material. As described
5 herein the material is hardwearing and resilient with shock-absorbing and frictional characteristics selected in accordance with the animal's requirements and the expected ground surface. In some applications the tread may be of rubber whereas in other applications it may be a tough
10 plastics material with a lower coefficient of friction or indeed a metal material.

Down each side of the left hand and right hand plates are provided three support strips 73, 74, 75. Each of the support strips is of a folded metal construction and
15 pivoted by looping through a slot 76 in the respective plate 62,64. On the right hand side, one of the support strips 74 includes a cable anchoring and ratchet mechanism to be described below. The height of the support strips generally increases from the rearmost 73 to the foremost
20 75, although the support strip 74 with the ratchet mechanism does have a higher projecting portion.

A cable 78 is anchored in an anchorage portion 80 in the middle strip and then passes through the folded over portion of the support strip 75, and the folded over
25 portion of the centre tang 68 to pass through the folded over portions of the strips 75, 74, 73 down the left hand side and through a folded over portion in the rearmost

portion of the tang 68 to pass via the rear support strip 73 74 to a pulley 82 with ratchet 84 secured thereto, with the two rotatably mounted on the central support strip 75.

A pivotable pawl arm 86 is mounted on the support strip 5 74, the arrangement being such that the pulley 82 may be rotated clockwise to tension the cable member 78 under the effect of the ratchet 84. To allow release of the cable tension, the pawl arm 86 is disengaged from the ratchet 84.

The detailed construction of the support strip 74 and 10 ratchet pulley is shown in Figure 10.

The interior facing surfaces of the support strips 73, 74 and 75 are provided with inwardly directed tangs directed to grip securely the outer surface of the horse's hoof when the device is applied to the horse's foot and the 15 cable tensioned.

As with the previous embodiment, it is important to note that the cable passes under the bulbs on the horse's foot and so provides a secure tensioned effect without applying pressures to regions which could cause pain to the 20 horse.

In use, the components will be assembled to the configuration shown in Figure 1 with screws (not shown) passing through the overlapping slots 70 as well as the peripheral slots 88, to apply light pressure. The device 25 may then be adjusted by sliding plates 62 and 64 to provide the required effective width of the device and likewise the centre tang 68 may be slid back and forth to place it in

the required orientation with the remaining components. Once the configuration of the plates and the central tang is as required, the screws may be tightened.

The device is applied to the horse's foot by first
5 releasing the tension by releasing the ratchet arm so that the support strips 73, 74, 75 can be pivoted outwardly to the allow the horse's hoof to be received in the device. The device is then held in place on the hoof and this is applied by tightening the pulley 82 using a hexagonal key
10 or the like. The fit is then checked and the process is repeated for the other feet of the horse.

To prevent damage due to clipping, the inner rear corner of the secondary plate 65 may carry an extension 90 as shown in dotted lines on Figure 5 (only), on the devices
15 for the front feet.

Claims

1. A removable foot protection device for the hoof of a hoofed animal, said device comprising:
- 5 a sole piece (60) adapted in use to cover at least major part of the underside of the hoof;
- a plurality of spaced locating means (73, 74, 75) upstanding from said sole piece (60) and each defining a distinct clamping engagement (34) adapted in use to engage
- 10 the outer surface of the hoof to locate the device;
- an elongate tensioning member (78) attached to said device and arranged in use to pass around the outside of said locating means (73, 74, 75);
- a tensioning device (82-86) for applying tension to
- 15 said tensioning member (78) in use to clamp the locating means (73, 74, 75) into direct engagement with said hoof; whereby the clamping force of the tensioning member is concentrated on said clamping engagements (34).
2. A device according to Claim 1, wherein the ground
- 20 contacting portion of the sole piece (60) comprises a patch (72) cut out of the road surface of a tyre.
3. A device according to Claim 1, wherein the ground-contacting portion (72) of the sole piece (60) comprises a robust plastics material.
- 25 4. A device according to Claim 1, wherein the ground-contacting portion (72) of the sole piece (60) comprises a metal material.



5. A device according to Claim 1, wherein the sole piece (60) comprises a hoof-contacting element (62, 64) releasably secured to a ground-contacting element (72).
6. A device according to Claim 5, wherein the hoof contacting element (62, 64) is adjustable in length and preferably said sole piece (60) includes two discrete elements (62, 64) relatively movable to allow the width of the sole piece (60) to be adjusted.
7. A device according to any of the preceding Claims, wherein the locating means comprise resilient strip elements (73, 74, 75) secured at their lower ends to said sole piece (60).
8. A device according to Claim 7 wherein the strip means are made of a resiliently deformable material such as metal.
9. A device according to any of the preceding Claims, wherein said locating means (73, 74, 75) are pivotally mounted on said sole member.
10. A device according to any of the preceding Claims, wherein said plurality of locating means comprise a forward locating means (68) adapted in use to locate against the front of the horse's hoof and one or more side locating means (73, 74, 75) adapted in use to engage the side of the hoof.
11. A device according to Claim 10 wherein said forward locating means (68) includes an extended base strip which extends across a major portion of the length of the sole



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piece (60).

12. A device according to Claim 10 or 11, wherein at least said side locating means (73,74, 75) are provided with friction-enhancing means for engaging the side of the hoof.
- 5 13. A device according to any of the preceding Claims, wherein said elongate tensioning member (78) is located adjacent the rear of the sole piece, (60) passing around the outside of each of the plurality of locating means (68, 73, 74, 75).
- 10 14. A device according to any of the preceding claims wherein said tensioning device includes a ratchet pulley (84), and a releasable pawl (86).
- 15 15. A device according to any of the Claims, wherein said tensioning mechanism includes an over-centre toggle arrangement (44-48).
16. A device according to Claim 15, wherein said tensioning mechanism additionally includes a ratchet device for taking up slack in the tensioning member before operation of said tensioning means.
- 20 17. A method of applying protection to the foot of a hoofed animal which comprises applying to the hoof a removable device as claimed in any of the preceding Claims.



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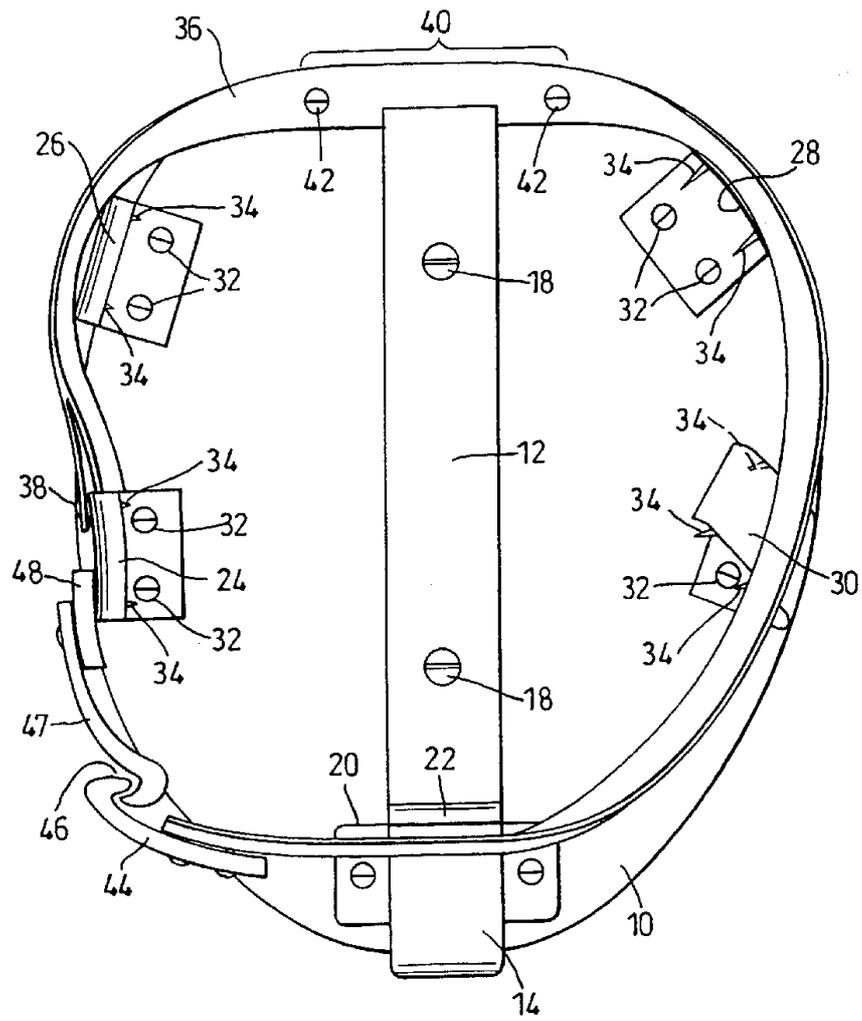


Fig. 1

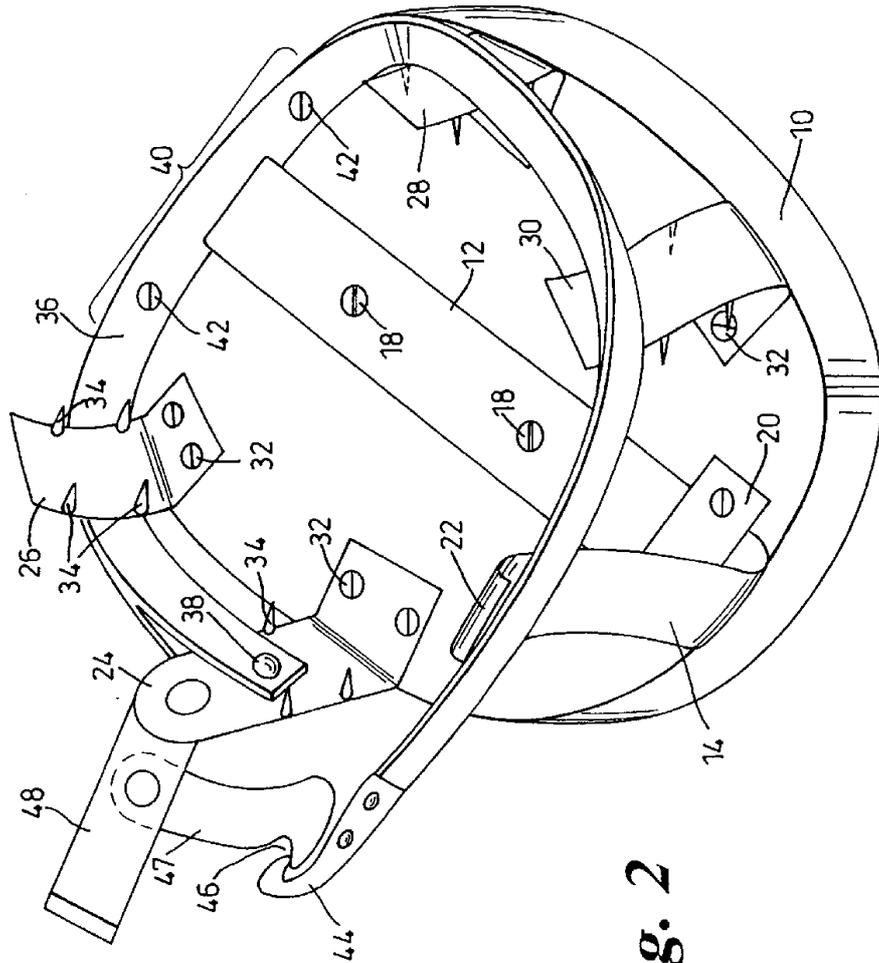


Fig. 2

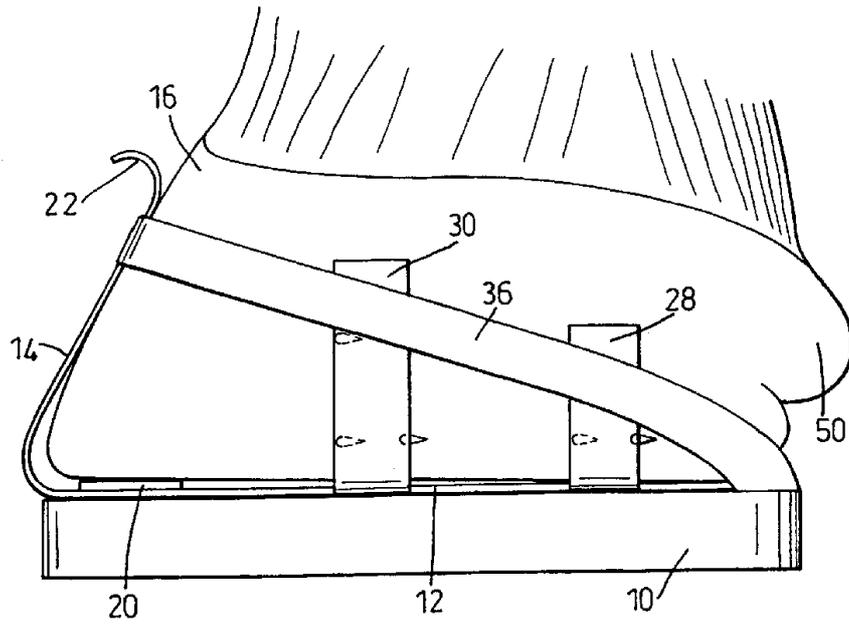


Fig. 3

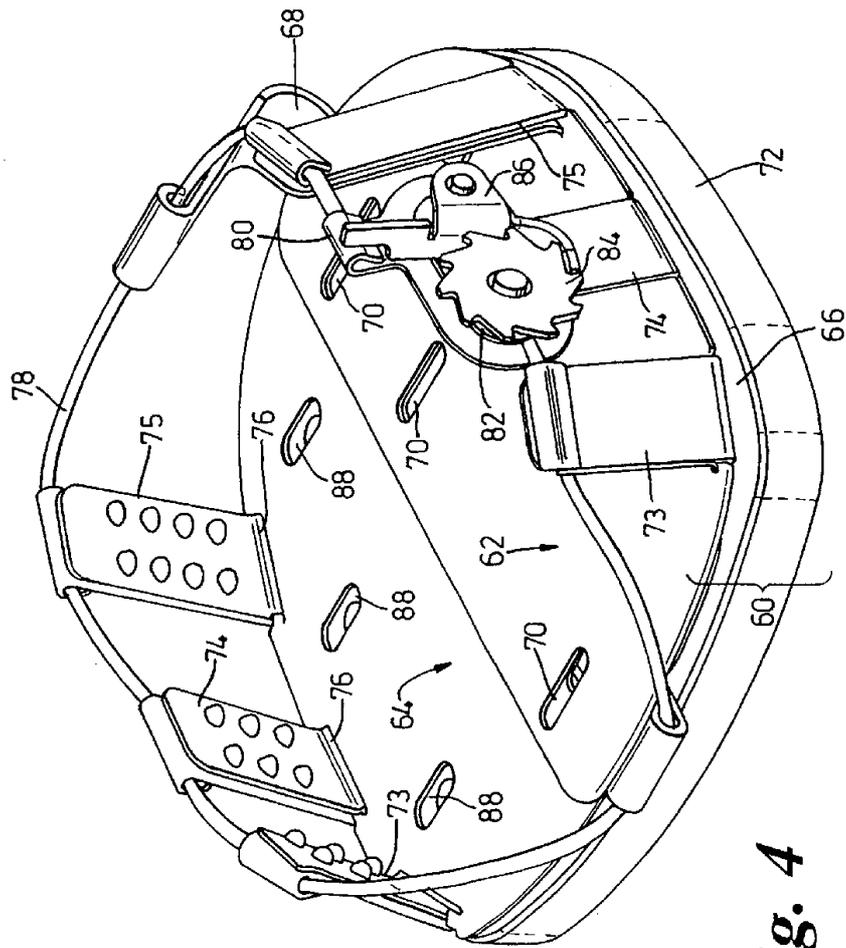


Fig. 4

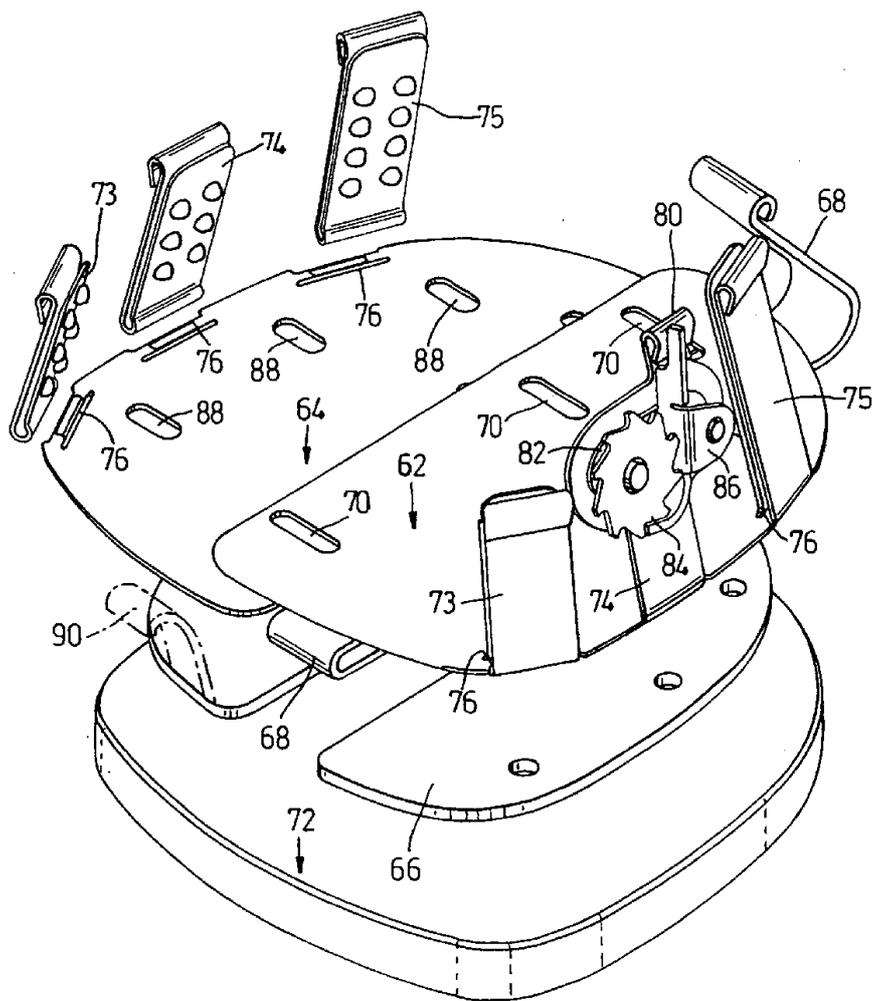


Fig. 5

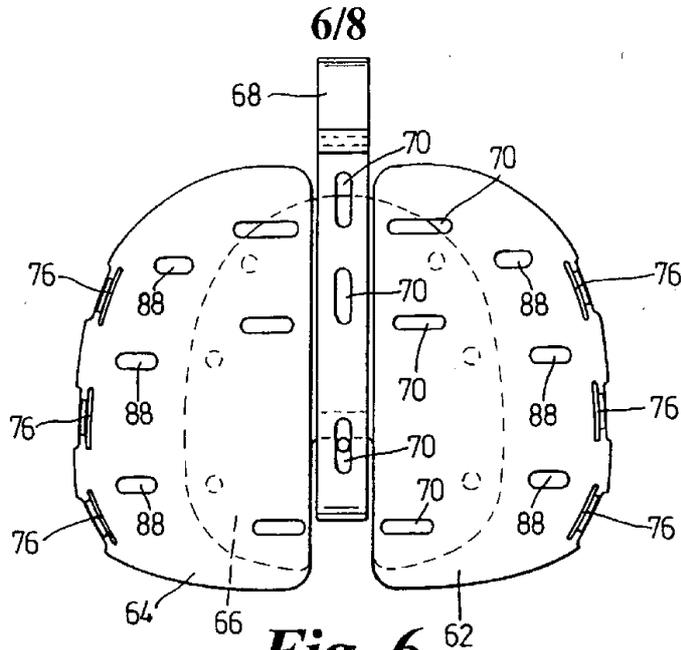


Fig. 6

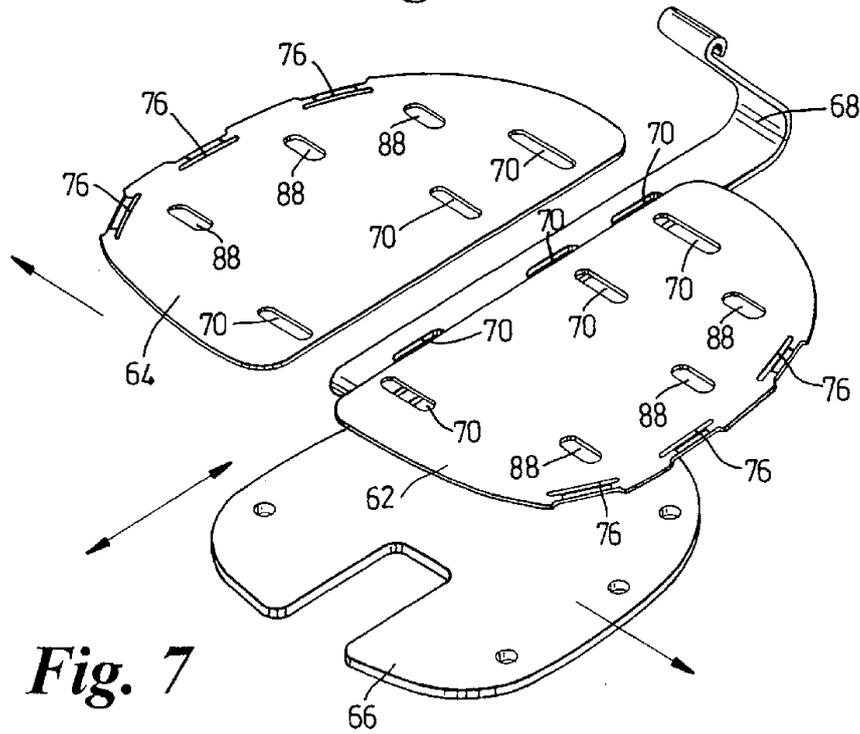


Fig. 7

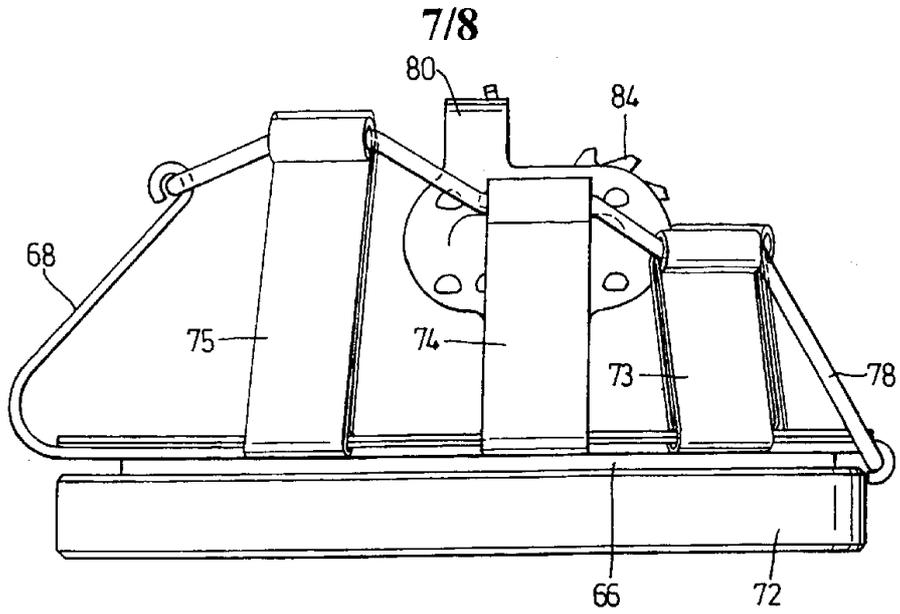


Fig. 8

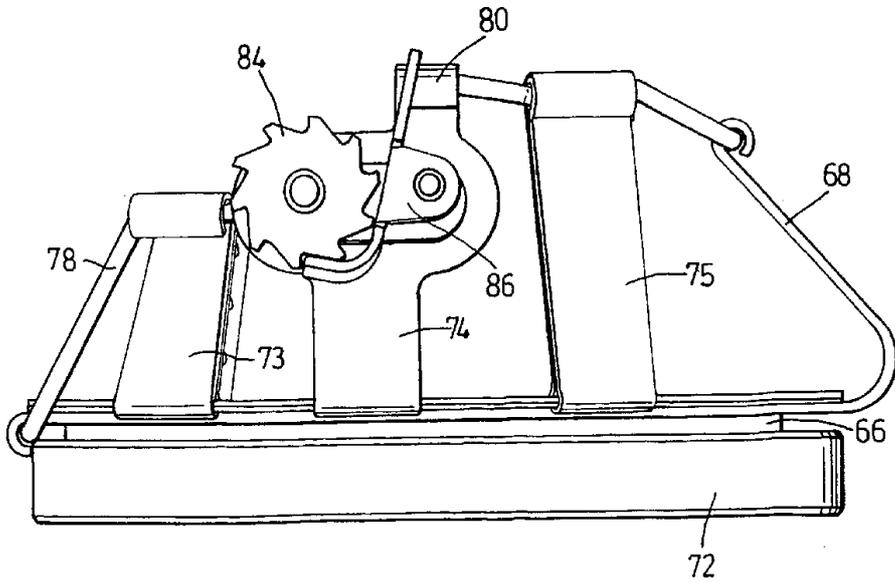


Fig. 9

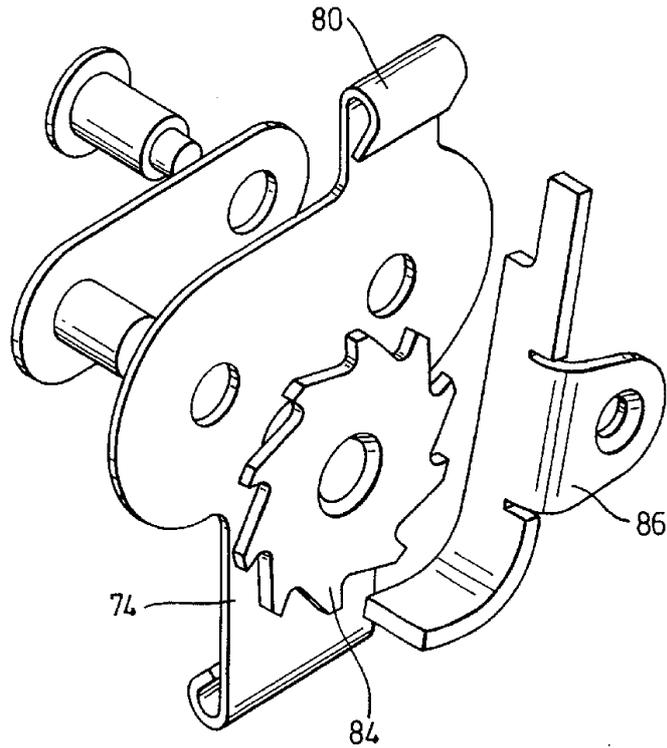


Fig. 10