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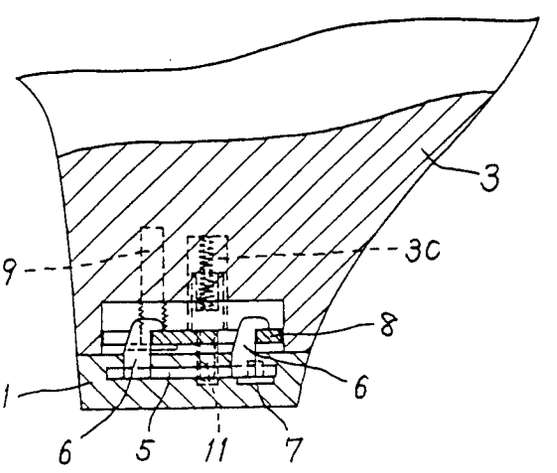
(54) **SHOE WITH REPLACEABLE LIFT.**

(57) This invention relates to a structure of the heel of a shoe and, in particular, to a shoe having a lift that can be replaced with another easily and simply. Hook-like engaging projections (6) are provided on the top of the lift, and, on the other hand, a catching plate (8) is fixed to the lower end surface of the heel and provided with engaging holes (13) to engage with said engaging projections (6) with the relative movement or relative turning of the lift with respect to the heel so that engagement between said engaging projections and catching plate (8) may constrain both the lift and the heel from moving vertically and, further, a locking pin (11) to be energized in the direction of approaching the lift is provided in a hole vertically passing through the heel and lift when the lift is fixed to the heel, thereby constraining the lift and heel from moving horizontally.

Fig. 1



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TECHNICAL FIELD

The present invention relates to the structure of a heel portion (hereinafter referred simply to as a heel) of a high heel shoe or the like of which lower end portion that is called a lift can be exchanged with a new one.

BACKGROUND ART

A conventional high heel shoe is also constructed such that its lift can be exchanged with a new one. For example, as shown in Fig. 2, the high heel shoe includes a lift 1 which is integrated with a connection shaft 2 having a substantially semicircular sectional shape, and the connection shaft 2 is slightly tapered in the upward direction such that its upper end has a slightly reduced sectional area.

On the other hand, a receiving hole 4 having the same sectional shape as that of the connection shaft 1 is formed through the bottom surface of a heel 3 of the high heel shoe so that the connection shaft 2 is fitted into the receiving hole 4. It should be noted that an inner diametrical dimension of the receiving hole 4 is determined to be slightly smaller than an outer diametrical dimension of the connection shaft 2. When the lift 1 is fixedly secured to the heel 3, the upper end part of the connection shaft 2 is first slightly inserted into the receiving hole 4, and thereafter, the connection shaft 2 is forcibly fitted into the receiving hole 4 from the bottom side by imparting a high magnitude of hammering force to the connecting shaft 2 by actuating a certain tool, e.g., a wood hammer with an operator's hand. Consequently, the lift 1 can firmly be secured to the heel 3 by virtue of the frictional engagement of the connection shaft 2 with the receiving hole 4.

As a user repeatedly wears the high heel shoe, the lift 1 wears increasingly, causing a necessity for exchanging the worn lift 1 with a new one. However, since the connection shaft 2 is tightly received in the receiving hole 4, it is practically impossible for an unskilled person to disconnect the connection shaft 2 from the receiving hole 4 irrespective of how a high intensity of pulling force is imparted to the connection shaft 2, because the frictional engagement of the connection shaft 2 with the receiving hole 4 is remarkably increased after she wears her high heel shoe for a long time. For this reason, she is unavoidably required to bring her worn high heel shoe to a well-skilled repairing shop in which the worn lift 1 is disconnected from the receiving hole 4 of the heel 3 by actuating a special tool.

In addition to the troublesome task that she brings her worn high heel shoe to the repairing shop for exchanging the worn lift with a new one, there is an inconvenience that a comparatively long time is required until an exchanging operation is achieved in the repairing shop because her high heel shoe should usually be reserved in the repairing shop for the time being, and thereafter, she goes to the repairing shop later again to receive her repaired high heel shoe.

Even in case that her high heel shoe can immediately be repaired at the repairing shop, the waiting time that elapses till completion of the repairing operation gives her a psychological burden.

In addition, another problem is that there is a possibility that the surface of the heel 3 is injured or scratched when the worn lift 1 is disconnected from the heel 3 with a high intensity of pulling force imparted to the lift 1 by actuating a certain tool.

The present invention has been made in consideration of the aforementioned background and its object resides in providing a shoe which assures that a worn heel can easily be exchanged with a new one by any unskilled person.

DISCLOSURE OF THE INVENTION

To accomplish the above object, according to one aspect of the present invention as defined by claim 1 of the claim clause, there is provided a shoe including an exchangeable lift, wherein the shoe is characterized in that an anchor plate having a plurality of hook-shaped engagement projections formed thereon is embedded in the upper part of the lift while extending substantially in parallel with the upper surface of the lift in such a manner as to allow the hook-shaped engagement projections to be projected upward of the upper surface of the lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of the lift while extending substantially in parallel with the upper surface of the lift, that a plurality of engagement holes are formed on the engagement plate corresponding to the hook-shaped engagement projections in such a manner that the upper ends of the hook-shaped engagement projections are first inserted through the engagement holes when the upper surface of the lift is located at the insertion/detachment position where the lift is permitted to move along the lower end surface of the heel in the horizontal direction, and thereafter, the horizontal portions of the hook-shaped engagement projections are displaced to the attachment position where the upper surface of the lift is brought in contact with the lower surface of the heel, that a part of the heel located above the engagement holes is recessed so as to avoid interference with the hook-shaped engagement projections, that a pin hole having the opposite ends thereof kept closed is vertically formed through the

lower end part of the heel, the engagement plate and the anchor plate at the position where the upper end surface of the lift is correctly aligned with the lower end surface of the heel, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on the anchor plate is received in the pin hole while it is normally biased in the downward direction.

When the lift is practically attached to or detached from the heel, the heel and the lift can freely be handled with an operator's hand. For this reason, the upper surface of the lift is turned upside down or the upper surface of the lift is inclined by a certain angle, and the lower surface of the heel is turned upside down or the lower surface of the heel is inclined by a certain angle. In spite of the foregoing fact, for the purpose of simplification, the summary of the invention has been described on the assumption that orientation of the upper surface of the lift and the lower surface of the heel is determined with the practical operative state as a reference.

Since the shoe is constructed in the above-described manner according to the invention as defined by claim 1 of the claim clause, while the lift is seized at the insertion/detachment position relative to the heel with an operator's hand, the upper surface of the lift is brought in contact with the lower end surface of the heel. At this time, the upper ends of the hook-shaped engagement projections projecting upward of the upper surface of the lift are inserted into the engagement holes formed on the engagement plate.

This causes the upper surface of the lift to approach toward the lower end surface of the heel while thrusting the locking pin projecting downward of the engagement plate against the resilient force given by a pin spring. When the upper surface of the lift is brought in contact with the lower surface of the heel, the hook-shaped engagement projections are fully inserted into one ends of the corresponding engagement holes on the engagement plate.

As the lift is displaced toward the attachment position relative to the heel while maintaining the foregoing state, the lift moves in the horizontal direction while the upper surface of the lift is brought in slidable contact with the lower surface of the heel. At the same time, the vertical portions of the hook-shaped projections are displaced toward the other ends of the respective engagement holes. When the lift reaches the attachment position, the horizontal portions of the hook-shaped engagement projections are engaged with the upper surface of the engagement plate, whereby the lift and the heel are firmly assembled together without any possibility that the lift is disconnected from the heel in the vertical direction.

At this time, the pin hole on the lift which is located at the position offset in the horizontal direction is aligned with the hole on the heel. This causes the locking pin to be quickly displaced in the downward direction by the resilient force given by the pin spring until the lower end part of the locking pin is fitted into the pin hole on the anchor plate of the lift.

Consequently, since the lift and the heel are assembled together without any possibility that the lift is displaced relative to the heel in the horizontal direction, the lift and the heel are firmly connected to each other. Accordingly, there is no possibility that the lift is separated from the heel.

As the bottom of the lift wears due to repeated usage of the shoe for a long time, the bottom surface of the lift intersects the bottom of the pin hole. In other words, a hole appears on the bottom surface of the lift. It is obvious that a quantity of wearing of the bottom surface of the lift varies depending on the depth of the pin hole in the lift.

When a certain hole appears on the bottom surface of the lift, it is recommendable that a pin having a small diameter is inserted through the foregoing hole from below so as to raise up the locking pin against the resilient force of the pin spring. This enables the lower end of the locking pin to be parted away from the pin hole on the lift side.

Since the lift is released relative to the heel from the immovably seized state that the lift and the heel are firmly assembled together in the horizontal direction till now, the lift can be displaced from the attachment position to the insertion/detachment position,

Once the lift is returned to the insertion/detachment position, the hook-shaped engagement projections are disengaged from the engagement plate so that the lift can be separated from the heel.

According to the invention as defined by claim 2 of the claim clause, in addition to the structure of the shoe constructed according to the invention as defined by claim 1 of the claim clause, a signal piece is fitted into the lower surface of the anchor plate so as to enable the present state of wearing of the lift to be visually recognized by a user.

When the lift wears in course of time and the lower end surface of the signal piece is exposed to the outside on the bottom surface of the lift, the user can visually detect the present state of wearing of the lift by way of exposure of the signal piece to the outside.

Usually, the signal piece is molded of the same synthetic resin as that of the lift, e.g., a polyurethane resin. For example, the lift is colored with black, while the signal piece is colored with a

different color, e.g., a red color. The reason why the signal piece is molded of the same synthetic resin as that of the lift in that way consists in that the signal piece is intended to wear at the same rate as that of the lift.

Although the present state of wearing of the lift can visually be recognized by detecting the exposure of the pin hole to the outside on the bottom surface of the lift, a characterizing feature of the signal piece additionally fitted to the lift according to the invention as defined by claim 2 of the claim clause consists in that excessive wearing of the lift can earlier be detected when the signal piece is disposed at the rear part of the lift (i.e., on the back side of the lift) where the lift wears at a higher rate.

According to other aspect of the present invention as defined by claim 3 of the claim clause, there is provided a shoe including an exchangeable lift, wherein the shoe is characterized in that an anchor plate having at least one hook-shaped engagement projection formed along a part of a cylindrical cup-shaped plane thereof is embedded in the upper part of the lift in such a manner as to allow the hook-shaped engagement projection to be projected upward of the upper surface of the lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of the lift while extending substantially in parallel with the upper surface of the lift, that an engagement hole is formed along a part of the outer peripheral edge of the engagement plate corresponding to the hook-shaped engagement projection so as to allow the upper end of the hook-shaped engagement projection to be inserted through the engagement hole, that a part of the heel located above the engagement hole is recessed so as to avoid interference with the hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of the heel, the engagement plate and the anchor plate at the attachment position where the horizontal portion of the hook-shaped engagement projection is engaged with the upper surface of the engagement plate, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to enable it to be inserted into a hole on the anchor plate is received in the pin hole while it is normally biased in the downward direction.

With the shoe constructed according to the invention as defined by claim 3 of the claim clause, the anchor plate and the hook-shaped engagement projection are arranged one above another in the coaxial relationship, and the lift is arranged at the angular insertion/detachment position relative to the heel so that the hook-shaped engagement projection is aligned with the engagement hole. While the foregoing state is maintained, the upper surface of the lift is raises up to come near to the lower end surface of the heel. Subsequently, the upper end of the hook-shaped engagement projection projected upward of the upper surface of the lift is inserted into the engagement hole of the engagement plate.

This causes the upper surface of the lift to approach toward the lower end surface of the heel while thrusting the locking pin projecting downward of the engagement plate against the resilient force of a pin spring. When the upper surface of the lift is brought in contact with the lower surface of the heel, the hook-shaped engagement projection is fully inserted into the engagement hole of the engagement plate.

When the lift is turned relative to the heel to assume an angular attachment position, it performs turning movement while the upper surface of the lift is brought in slidable contact with the lower end surface of the heel. When it reaches the angular attachment position, the horizontal portion of the hook-shaped engagement portion is completely engaged with the upper surface of the engagement plate, whereby the lift and the heel are firmly assembled together without any possibility that the lift is disconnected from the heel in the vertical direction.

At the same time, the pin hole on the lift, which is located at the position offset from the center line of the anchor plate and the engagement plate, is aligned with the hole on the heel. This causes the locking pin to be displaced in the downward direction by the resilient force given by a pin spring until the lower end of the locking pin is fitted into the pin hole on the anchor plate of the lift.

Consequently, since the lift and the heel are assembled together without any possibility that the lift is displaced relative to the heel in the horizontal direction, the lift and the heel are firmly connected to each other. Therefore, there is no possibility that the lift is separated from the heel.

As the bottom of the lift wears due to repeated usage of the shoe for a long time, the bottom surface of the lift intersects the bottom of the pin hole. In other words, a hole appears on the bottom surface of the lift. When it is found that a certain hole appears on the bottom surface of the lift, it is recommendable that a pin having a small diameter is inserted through the foregoing hole from below so as to raise up the locking pin against the resilient force of the pin spring. Thus, the lift can easily be separated from the heel, whereby the worn lift can reliably and simply be exchanged with a new one in the same manner as the shoe constructed according to the invention as defined by claim 1 of the claim clause.

According to the invention as defined by claim 3 of the claim clause, since the lift is turned when it is attached to and detached from the heel, it is

desirable that this invention is applied especially to a high heel shoe for a lady including a lift having a very small width.

According to the invention as defined by claim 4 of the claim clause, in addition to the structure of the shoe constructed according to the invention as defined by claim 3 of the claim clause, a signal piece is fitted into the lower surface of the anchor plate so as to enable the present state of wearing of the lift to be visually recognized by a user.

Since advantageous effects obtainable from the additional arrangement of the signal piece are same as those of the shoe constructed according to the invention as defined by claim 2 of the claim clause, repeated detailed description on the advantageous effects will not be required.

In addition, according to another aspect of the present invention, there is provided a shoe including an exchangeable lift, wherein the shoe is characterized in that an anchor plate of which both sides are bent in the U-shaped sectional contour to form a pair of first parallel rails and which has at least one hook-shaped engagement projection formed at the central part thereof by bending so as to allow it to stand upright between both the bent side parts thereof is embedded in the upper part of the lift while extending substantially in parallel with the upper surface of the lift in such a manner as to allow the first parallel rails and the hook-shaped engagement projection to be projected upward of the upper surface of the lift, that a pair of second parallel rails exhibiting the U-shaped sectional contour by bending and engageable with the first parallel rails are attached to the lower end part of the heel located opposite to the upper surface of the lift, that an engagement plate is secured to the second parallel rails while extending substantially in parallel with the upper surface of the lift, that an engagement hole is formed on the engagement plate corresponding to the hook-shaped engagement projection on the upper surface of the lift in such a manner that the upper end of the hook-shaped engagement projection is inserted through the engagement hole when the upper surface of the lift is located at the insertion/detachment position where the lift is permitted to move along the lower end surface of the heel in the horizontal direction, and thereafter, the horizontal portion of the hook-shaped engagement projection is displaced to the attachment position where the upper surface of the lift is brought in contact with the lower surface of the heel, that a part of the heel located above the engagement hole is recessed so as to avoid interference with the hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of the heel, the engagement plate and the anchor plate at the position where the upper end surface of the lift is correctly aligned with the lower end surfaces of the heel, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on the anchor plate is received in the pin hole while it is normally biased in the downward direction.

With the shoe constructed according to the invention as defined by claim 5 of the claim clause, the lift is first placed at the insertion/detachment position offset from the heel in the horizontal direction, and thereafter, while the foregoing state is maintained, the upper surface of the lift is raised up to come near to the lower end surface of the heel. Subsequently, the upper end of the hook-shaped engagement projection is inserted into one end of the engagement hole on the engagement plate.

This causes one of the first parallel rails and the second parallel rails to be received within the other one in the clamped state. At the same time, the upper surface of the lift approaches toward the lower end surface of the heel while thrusting the locking pin projecting downward of the engagement plate against the resilient force given by a pin spring. When the upper surface of the lift is brought in contact with the lower end surface of the heel, the hook-shaped engagement projection is completely inserted into one end of the engagement hole of the engagement plate.

When the lift is displaced to the attachment position relative to the heel while maintaining the foregoing state, the upper surface of the lift moves in the horizontal direction while the upper surface of the lift is brought in slidable contact with the lower surface of the heel and the side surfaces of the first parallel rails are brought in slidable contact with the side surfaces of the second parallel rails. At the same time, the vertical portion of the hook-shaped engagement projection is displaced toward the other end of the engagement hole of the engagement plate. When the lift reaches the attachment position, the horizontal portion of the hook-shaped engagement projection is engaged with the upper surface of the engagement plate, whereby the lift and the heel are firmly assembled together without any possibility that the lift is disconnected from the heel in the horizontal direction.

At this time, the pin hole on the lift which is located at the position offset in the horizontal direction is aligned with the hole on the heel. This causes the locking pin to be displaced in the downward direction by the resilient force given by the pin spring until the lower end part of the locking pin is fitted into the pin hole on the anchor plate of the lift.

Consequently, since the hook-shaped engagement projection is engaged with the engagement plate in the longitudinal direction of the parallel rails

and the locking pin is engaged with the anchor plate in the vertical direction while the first parallel rails are engaged with the second parallel rails, the lift and the heel are assembled together without any possibility that the lift is disconnected from the heel in the vertical direction. In other words, the lift and the heel are firmly connected to each other. Accordingly, there is no possibility that the lift is separated from the heel.

As the bottom of the lift wears due to repeated usage of the shoe for a long time, a hole appears on the bottom surface of the lift. At this time, a pin having a small diameter is inserted through the foregoing hole from below so as to raise up the locking pin. This enables the worn lift to be separated from the heel in the same manner as the shoe constructed according to the invention as defined in claim 1 to claim 4 of the claim clause. Thus, repeated detailed description on the separation of the worn lift will not be required.

According to the invention as defined by claim 6 of the claim clause, in addition to the structure of the shoe constructed according to the invention defined by claim 5 of the claim clause, a signal piece is fitted into the lower surface of the anchor plate so as to enable the present state of wearing of the lift to be visually recognized by a user.

Since advantageous effects obtainable from the additional arrangement of the signal piece are same as those of the shoe constructed according to the invention as defined by claim 2 of the claim clause, repeated detailed description on the advantageous effects will not be required.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a heel portion of a high heel shoe constructed according to an embodiment of the present invention as defined by claim 2 of the claim clause, Fig. 2 is a perspective view which shows by way of example the structure of a conventional high heel shoe, Fig. 3 is a perspective view which shows the structure of an anchor plate for the high heel shoe, Fig. 4 is a perspective view which shows the high heel shoe constructed to the embodiment of the present invention as defined by claim 2 of the claim clause, Fig. 5 is a perspective view which shows, in the disassembled state, essential components constituting the heel portion of the high heel shoe constructed according to the embodiment of the present invention as defined by claim 2 of the claim clause, Fig. 6 is an exploded plan view of the heel portion of the high heel shoe constructed according to the embodiment of the present invention as defined by claim 2 of the claim clause, Fig. 7 is a fragmentary sectional view of a heel portion of a high heel shoe constructed according to an embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 8 is a perspective view of an anchor plate for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 9 is a perspective view of a lift for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 10 is a perspective view of the lower end part of a heel for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 11 is a perspective view which shows, in the disassembled state, essential components constituting a heel portion for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 12 is a sectional view which shows the structure of a pin-shaped sleeve for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, Fig. 13 is a partially exploded sectional view of the pin-shaped sleeve constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, particularly showing a process of preventing a locking pin from being disconnected from the pin-shaped sleeve, Fig. 14 is a sectional view of the pin-shaped sleeve for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, particularly showing that the pin-shaped sleeve is subjected to press working for the purpose of preventing the locking pin from being disconnected from the pin-shaped sleeve, Fig. 15 is a bottom view of a heel and a lift for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, particularly showing the angular positional relationship between the heel and the lift located at the insertion/detachment position before hook-shaped engagement projections on the lift are engaged with an engagement plate on the lower end surface of the heel, Fig. 16 is a bottom view of the heel and the lift for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, particularly showing the angular positional relationship between the heel and the lift at the attachment position where the hook-shaped engagement projections have been engaged with the engagement plate, Fig. 17 is a sectional view of a heel portion for the high heel shoe similar to Fig. 7 which is constructed according to the embodiment of the present invention as defined by claim 4 of the claim clause, particularly showing a process of exchanging a worn lift with a new one, Fig. 18 is a perspective view of an anchor plate for a high heel

shoe constructed according to an embodiment of the present invention as defined by claim 6 of the claim clause, Fig. 19 is a side view of a lift for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 6 of the claim clause, Fig. 20 is a perspective view of a heel for the high heel shoe constructed according to the embodiment of the present invention, particularly showing, in the disassembled state, essential components constituting the heel portion, Fig. 21 is a side view of the high heel shoe constructed according to the embodiment of the present invention as defined by claim 6 of the claim clause, particularly showing the positional relationship between the heel and the lift, Fig. 22 is a side view of a heel portion for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 6 of the claim clause, Fig. 23 is a rear view of the heel portion for the high heel shoe constructed according to the embodiment of the present invention as defined by claim 6 of the claim clause, and Fig. 24 is an illustrative view which shows the relationship between a hook-shaped engagement projection and an engagement hole for a high heel shoe constructed according to a modified embodiment of the present invention as defined by claim 1, claim 2, claim 5 and claim 6 of the claim clause.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will be described in detail hereinafter with reference to the accompanying drawings which illustrates a few preferred embodiments thereof. Incidentally, description will be made only with respect to the invention as defined by claim 2 of the claim clause for the purpose of simplification. This is because the invention as defined by claim 2 is substantially identical with the invention as defined by claim 1 of the claim clause with the exception of a signal piece.

In Fig. 3, reference numeral 5 designates an anchor plate. The anchor plate 5 includes plural pairs of hook-shaped projections 6 (four hook-shaped projections in the shown embodiment) each of which is integrated with the anchor plate 5 in the bent state while standing upright along the longitudinally extending opposite side edges of the anchor plate 5 to serve as an engagement projection. It is preferable that the anchor plate 5 is made of a metallic material plate, e.g., a stainless steel plate.

A stepped pin-shaped signal piece 7 is secured to the lower surface of the anchor plate 5 at the rear end of the same. The signal piece 7 is molded of a synthetic resin, e.g., a polyurethane resin which is the same material as that of a heel 3 but has a color different from that of the lift 1.

When the signal piece 7 is secured to the anchor plate 5, it is recommendable that a fitting hole which is not designated by reference numeral in the drawing is drilled through the anchor plate 5 at the rear end part of the latter (at the right-hand end as seen in Fig. 3) and a smaller diameter portion of the signal piece 7 is press-fitted through the fitting hole.

After the anchor plate 5 is prepared in the above-described manner, it is embedded in the upper part of the lift 1 while extending substantially in parallel with the upper surface of the anchor plate 5, as shown in Fig. 1.

On the other hand, as shown in Fig. 1, Fig. 5 and Fig. 6, an engagement plate 8 extending substantially in parallel with the upper surface of the lift 1 is secured to the lower end surface of the heel 3 (the upper end surface of the same as seen in Fig. 5 and Fig. 6) located opposite to the upper surface of the lift 1.

In this embodiment, as is best seen in Fig. 5, the engagement plate 8 is made of a rectangular metallic material plate having two longitudinally extending cutouts formed along each side edge thereof.

Each of the cutouts serves as a kind of engagement hole as mentioned above.

A stopper hole 8a through which the lower end part of a locking pin 11 to be described later is inserted as well as a fixing shaft hole 8b through which a fixing shaft 9 is inserted are drilled through the central part of the engagement plate 8. It is obvious that the stopper hole 8a is located at the intersection where a locking pin 11 to be described later intersects the engagement plate 8.

The lower surface of the heel 3 (the upper surface of the same as seen in Fig. 5) has a recess formed therein, and a part of the recess having a smallest depth is contoured in the form of an elongated rectangular mounting platform 3a.

A fixing shaft hole 3b and a pin hole 3c are formed in the mounting platform 3a, and they are located in alignment with each other in the longitudinal direction.

When the engagement plate 8 is secured to the lower end surface of the heel 3, it is first placed on the mounting platform 3a while the fixing shaft hole 8b is correctly aligned with the fixing shaft hole 3b. Subsequently, a fixing shaft 19 having a number of slantwise knurled portions 19a formed therearound is press-fitted through the fixing shaft hole 8a into the fixing shaft hole 3b by actuating a certain tool, e.g., a wood hammer with an operator's hand so as to impart a high intensity of striking force to the flange-shaped head portion of the fixing shaft 19.

Since the heel 3 is usually molded of a synthetic resin such as acrylonitrile-butadiene-styrene

copolymer, when the fixing shaft 19 passes through the fixing shaft hole 3b, the inner diameter of the fixing shaft hole 3b is temporarily enlarged due to elastic deformation of the heel 3. However, after completion of the passing of the fixing shaft 19 through the fixing shaft hole 3b, the inner cylindrical portion of the fixing shaft hole 3b restores the original inner diameter, whereby the fixing shaft 9 is immovably held by the frictional engagement of the slantwise knurled portions 9a with the fixing shaft hole 3b.

It should be noted that the locking pin 11 and a pin spring 12 serving as a compression spring for biasing the locking pin 11 in the downward direction are preliminarily received in the pin hole 3c before the engagement plate 8 is fixedly secured to the heel 3 with the aid of the fixing shaft 19.

In the embodiment shown in Fig. 5, the locking pin 11 is designed in the form of a stepped pin of which larger diameter portion has a cylindrical hollow space in which the pin spring 12 is received.

At this time, the small diameter portion of the locking pin 11 is projected downward of the stopper hole 8a, but since the stepped part of the locking pin 11 comes in contact with the engagement plate 8, a quantity of downward projection of the smaller diameter portion of the locking pin 11 is restrictively kept constant (see Fig. 1).

To avoid interference with the upper end of each of the hook-shaped engagement projections 6, it is required that the peripheral edge located outside of the mounting platform 3a of the heel 3 is recessed to be deeper than the surface of the mounting platform 3a (i.e., downward of the surface of the mounting platform 3a as seen in Fig. 5).

It is not an essential structural requirement of the present invention that the engagement plate 8 is fixedly secured to the heel 3 at the position above the lower end surface of the heel 3. In the embodiment shown in Fig. 5, since the flange-shaped head portion of the fixing shaft 19 interferes with the upper surface of the lift 1, the engagement plate 8 is fixedly secured to the heel 3 at the position dislocated upward of the lower surface of the heel 3 so as to avoid the aforementioned interference. In addition, it is recommendable that the engagement plate 8 is fixedly secured to the heel 3 using flat head screws (not shown) so as to enable the lower surface of the engagement plate 8 to be flush with the lower surface of the heel 3.

As shown in Fig. 4, the pin hole 1a on the lift 1 side is formed on the upper surface of the lift 1 at the insertion/detachment position where it is correctly aligned with the pin hole 3c when the lift 1 is fixedly secured to the heel 3 as shown in Fig. 1. A depth of the pin hole 1a on the lift 1 side is dimensioned such that it extends in the downward direction at least through the anchor plate 5 (see Fig. 1).

With the high heel shoe as constructed in the above-described manner in accordance with the embodiment of the present invention, when the lift 1 is fixedly secured to the heel 3, the upper ends of the hook-shaped engagement projections 6 projecting upward of the upper surface of the lift 1 (see Fig. 4) are first fitted into the left-hand ends of engagement holes 13 as seen in Fig. 6. Subsequently, while the lift 1 is brought in close contact with the lower end surface of the heel 3, it is displaced in the rightward direction, causing the upper horizontal portions of the hook-shaped engagement projections 6 to be engaged with the upper surface of the engagement plate 8. At this time, the locking pin 11 is caused to enter the pin hole 1a on the lift 1 side. As a result, the lift 1 can immovably be secured to the heel 3 without any possibility that the lift 1 is disconnected from the heel 3.

Incidentally, the fact that there is no possibility that the lift 1 is disconnected from the heel 3 represents that the lift 1 can not be disconnected from the heel 3 for a certain period of time after completion of the fitting operation. However, when the lower end of the pin hole 1a is exposed to the outside (not shown) as the lift 1 increasingly wears in course of time, it is recommendable that a rod having a small diameter is inserted into the pin hole 1a through the exposed end of the lift 1 so as to raise up the locking pin 11 until the locking pin 11 is released from the engaged state relative to the lift 1. Now, the worn lift 1 is ready to be easily disconnected or removed from the heel 3.

In Fig. 8, reference numeral 5 designates an anchor plate which is constructed according to the invention as defined by claim 4 of the claim clause. In this embodiment, the anchor plate 5 is shown in the form of a bottom plate for a cylindrical cup, and two hook-shaped engagement projections 6 each standing upright along a part of the outer peripheral surface of the cylindrical cup are integrated with the anchor plate 5. It is recommendable that the anchor plate 5 is made of a metallic material plate, e.g., a stainless steel plate.

In Fig. 8, reference numeral 7 designates a signal piece which is coincident with the signal piece constructed according to the invention as defined by claim 2 of the claim clause. Thus, repeated description on the signal piece 7 will not be required.

In operation, as shown in Fig. 7, the anchor plate 5 constructed in the above-described manner is embedded in the upper part of the lift 1 while extending substantially in parallel with the upper surface of the lift 1, whereby at least one hook-shaped engagement projection 6 (two hook-shaped engagement projections in the shown embodiment)

is projected upward of the upper surface of the lift 1 as shown in Fig. 9.

On the other hand, as shown in Fig. 7, Fig. 10 and Fig. 11, an engagement plate 8 is secured to the lower end of the heel 3 while extending substantially in parallel with the upper surface of the lift 1.

In this embodiment, as is best seen in Fig. 11, the engagement plate 8 is designed in the form of a circular metallic plate having two arc-shaped cutouts 13 symmetrically formed along the outer periphery thereof. The arc-shaped cutouts 13 correspond to the engagement holes in the preceding embodiment.

To assure that the engagement plate 8 is secured to the heel 3, the lower end surface of the heel 3 is recessed in the form of a circular cavity so that the engagement plate 8 is mounted on a mounting surface 3a corresponding to the bottom of the circular cavity so as to allow it to be secured to the heel 3 with the aid of a pin-shaped sleeve 9 to be described later.

To avoid interference with the hook-shaped engagement projections 6 when the engagement plate 8 is secured to the heel 3, a part of the mounting surface 3a is recessed to be deeper than the level of the mounting surface 3a at the positions exactly corresponding to the cutouts 13 of the engagement plate 8 in the same manner as the preceding embodiment.

A pin-shaped sleeve hole 3b is formed on the mounting surface 3a of the heel 3 at the position offset from the center line of the heel 3, and a chamfered sleeve hole 8b is formed on the engagement plate 8 at the position located in alignment with the pin-shaped sleeve hole 3b.

The pin-shaped sleeve 9, of which upper end is kept closed and of which lower end is slantwise expanded to form a truncated-conical flange, is caused to pass through the chamfered sleeve hole 8b of the engagement plate 8, and thereafter, the upper end part of the pin-shaped sleeve 9 is press-fitted into the pin-shaped sleeve hole 3b, whereby the engagement plate 8 is fixedly secured to the lower end part of a heel 3 (see Fig. 10).

To assure that the pin-shaped sleeve 9 is stably fixed to the heel 3 for a long time, it is recommendable that the pin-shaped sleeve 9 and the pin-shaped sleeve hole 3b are coated with an adhesive.

As shown in Fig. 11 and Fig. 12, a pin spring 12 serving as a compression spring and a stepped locking pin 11 are received in the pin-shaped sleeve 9.

In this embodiment, to prevent a locking pin 11 from flying to the outside by the action of the resilient force given by the pin spring 12, an annular projection 9b having a truncated conical sectional shape is formed around the opening edge of the pin-shaped sleeve 9 as shown in Fig. 12. After the pin spring 12 and the locking pin 11 are received in the pin-shaped sleeve 9, the annular projection 9b is forcibly press-deformed by actuating a press jig 10 so as to form an annular inner projection along the opening edge of the pin-shaped sleeve 9, as shown in Fig. 13.

Consequently, the annular projection 9b is deformed in the inward direction to form an annular inner projection along the opening edge of the pin-shaped sleeve 9 so that the stepped part of the locking pin 11 is engaged with the annular inner projection so as to prevent the locking pin 11 from being disconnected from the pin-shaped sleeve 9, as shown in Fig. 14. It is obvious that the press working to be performed using the press jig 10 is achieved before the pin-shaped sleeve 9 is press-fitted into the pin-shaped sleeve hole 3b (see Fig. 11).

In this embodiment, the pin-shaped sleeve hole 3b on the heel 3 side serves as an inner cylindrical portion for the pin-shaped sleeve 9.

As shown in Fig. 9, a pin hole 1a is formed on the upper surface of a lift 1 at the position which is located in alignment with the locking pin 11 when the lift 1 is secured to the heel 3. In this connection, it is required that the pin hole 1a has a large depth enough to allow the locking pin 11 to pass through the anchor plate 5 (see Fig. 8).

With the high heel shoe constructed according to the invention as defined by claim 4 of the claim clause, when the lift 1 is secured to the heel 3, the lift 1 is first placed at the insertion/detachment position relative to the heel 3.

At this time, the engagement projections 16 are located in alignment with the engagement holes 13 on the engagement plate 8 but the pin hole 1a on the lift 1 side is not located in alignment with the locking pin 11 adapted to be projected downward of the lower end surface of the heel 3. Thus, the hook-shaped engagement projections 6 on the anchor plate 5 can be inserted into the engagement holes 13 on the engagement plate 8 while the locking pin 11 is retracted in the heel 3 by the upper surface of the lift 1.

When the lift 1 is turned toward the attachment position in the arrow-marked direction as seen in Fig. 15 while the foregoing state is maintained, the horizontal portions of the hook-shaped engagement projections 6 are brought in engagement with the upper surface of the engagement plate 8, and at the same time, the locking pin 11 is located in alignment with the pin insert hole 1a on the lift 1 side. Thus, the lift 1 can fixedly be secured to the heel 3 without any possibility that the lift 1 is disconnected from the heel 3 in the same manner as the preceding embodiment.

The foregoing fact that there is no possibility that the lift 1 is disconnected from the heel 3 represents that the lift 1 can not be disconnected from the heel 3 for a certain period of time after completion of the fitting operation. When the lower end of the pin hole 1a is exposed to the outside as the lift 1 wears in course of time, it is obvious that the worn lift can easily be removed from the heel 3 by inserting a rod having a small diameter through the exposed part of the pin hole 1a so as to raise up the locking pin 11 until the locking pin 11 is released from the locked state relative to the lift 1, as shown in Fig. 17.

Fig. 18 to Fig. 23 show an embodiment of the present invention as defined by claim 6 of the claim clause. Among these drawings, Fig. 18 shows by way of perspective view the structure of an anchor plate.

Referring to Fig. 18, the anchor plate 5 is constructed such that a substantially rectangular metallic plate is bent along the opposite side edges in the U-shaped sectional contour to form a pair of first rail portions 14 extending in parallel with each other on the upper surface (the lower surface as seen in Fig. 18) of the anchor plate 5, and the central part of the anchor plate 5 is bent toward the first rail portions 14 to form a hook-shaped engagement projection 6. It is desirable that the anchor plate 5 is made of a metallic material plate, e.g., a stainless steel plate.

A fitting hole is formed at the rear end (the right-hand end as seen in Fig. 18) of the anchor plate 5, and a signal piece 7 is press-fitted through the fitting hole from below in the same manner as the anchor plate shown in Fig. 8.

As shown in Fig. 19, the anchor plate 5 constructed in the above-described manner is embedded in a lift 1 while extending substantially in parallel with the upper surface of the lift 1, wherein a pair of first rail portions 14 and a hook-shaped engagement projection 6 are projected upward of the upper surface of the lift 1.

In addition, a pin hole 1a is formed through the anchor plate 5 on the upper surface side of the lift 1. The pin hole 1a is dimensioned to have a large depth enough to enable a locking pin 11 to pass through the anchor plate 5.

As shown in Fig. 20 and Fig. 21, an engagement plate 8 is secured to the lower end surface (the upper end surface as seen in Fig. 20 and Fig. 21) of the heel 3 while extending substantially in parallel with the upper surface of the lift 1.

In this embodiment, as is best seen in Fig. 20, the engagement plate 8 is made of a metallic material plate such that the opposite edges of the metallic material plate are bent in the U-shaped sectional contour to form a pair of second rail portions 15.

A rectangular engagement hole 13, a stopper hole 8a through which the lower end of the locking pin 11 is caused to pass, and a fixing shaft hole 8b through which a fixing shaft 19 is caused to pass are formed along the central part of the engagement plate 8 in accordance with the order as seen from the rear side (the right-hand side as seen in Fig. 20). It is obvious that the stopper hole 8a serves as an intersection where the pin hole 1a intersects the engagement plate 8.

The lower surface (the upper surface as seen in Fig. 20) of the heel 3 is recessed in the rectangular contour to form a mounting surface 3a at the bottom of the rectangular cavity.

To avoid interference with the hook-shaped engagement projection 6, a part of the mounting platform 3a corresponding to a rectangular engagement hole 13 on the engagement plate 8 is recessed to have a large depth, while a pin hole 3c and a fixing shaft hole 3b are formed on the mounting platform 3a at the positions located in alignment with the stopper hole 8a and the fixing shaft hole 8b on the engagement plate 8.

When the engagement plate 8 is secured to the lower end surface of the heel 3, a fixing shaft 9 having a number of slantwise knurled portions 19a formed therearound is used in the same manner as the embodiment of the present invention as defined by claim 2 of the claim clause.

Obviously, it is required that a locking pin 11 and a pin spring 12 serving as a compression spring for biasing the locking pin 11 in the downward direction are preliminarily received in the pin hole 3c on the heel 3 side before the engagement pin 8 is fixed to the heel 3 with the aid of the fixing shaft 9.

In the embodiment shown in Fig. 20, the locking pin 11 is designed in the form of a stepped pin including a cylindrical larger diameter sleeve portion in which a pin spring 12 is received.

In this case, a smaller diameter portion of the locking pin 11 is caused to project downward of the stopper hole 8a of the engagement plate 8. However, since the stepped part of the locking pin 11 comes in contact with the engagement plate 8, a quantity of downward projection of the locking pin 11 is restrictively determined to be constant (see Fig. 21).

The distance between the pair of first rail portions 14, the distance between the pair of second rail portions 15 and the relative positional relationship between the first rail portions 14 and the second rail portions 15 are determined in such a manner that when the lift 1 is secured to the heel 3 as shown in Fig. 23, the first rail portions 14 are held in the second rail portions 14 in the clamped state while maintaining a gap of, e.g., about 0.03 mm therebetween.

According to the invention as defined by claim 6 of the claim clause, when the lift 1 is secured to the heel 3, the lift 1 is first held above the heel 3 at the insertion/detachment position horizontally offset from the attachment position as shown in Fig. 21, and thereafter, the engagement projection 8 is inserted into an engagement hole 13 of the engagement plate 8.

When the lift 1 is displaced in the rightward direction as seen in Fig. 21 while the foregoing state is maintained, the hook-shaped engagement projection 6 is engaged with the engagement plate 8 and the locking pin 11 is caused to enter the pin hole 1a on the lift 1 side, whereby the lift 1 is firmly secured to the heel 3.

Since the first rail portions 14 are received in the second rail portions 15 as if they are engaged with each other, the reliable secured state of the lift 1 relative to the heel 3 is assured only with a single engagement projection 6 on the lift 1 side.

It should of course be understood that the present invention should not be limited only to the shown embodiments but various change or modification may be made in a suitable manner. For example, in the aforementioned embodiment, the engagement projection 6 is displaced in the horizontal direction. Alternatively, the hook-shaped engagement projections 6 may be displaced in the transverse direction as shown in Fig. 24. In this case, a quantity of displacement required by the hook-shaped engagement projection 6 can be reduced but there arises a necessity for modifying the contour of the engagement hole 13 to a L-shaped one.

INDUSTRIAL APPLICABILITY

As is apparent from the above description, according to the present invention, a worn lift can easily and simply be exchanged with a new one by an unskilled operator. In addition, the present invention can equally be applied to all the kinds of shoes with advantageous effects.

Claims

1. A shoe including an exchangeable lift, characterized in that an anchor plate having a plurality of hook-shaped engagement projections formed thereon is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said hook-shaped engagement projections to be projected upward of the upper surface of said lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of said lift while extending substantially in parallel with the upper surface of said lift, that a plurality of engagement holes are formed on said engagement plate corresponding to said hook-shaped engagement projections in such a manner that the upper ends of said hook-shaped engagement projections are first inserted through said engagement holes when the upper surface of said lift is located at the insertion/detachment position where said lift is permitted to move along the lower end surface of said heel in the horizontal direction, and thereafter, the horizontal portions of said hook-shaped engagement projections are displaced to the attachment position where the upper surface of said lift is brought in contact with the lower surface of said heel, that a part of said heel located above said engagement holes is recessed so as to avoid interference with said hook-shaped engagement projections, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of said heel, said engagement plate and said anchor plate at the position where the upper end surface of said lift is correctly aligned with the lower end surface of said heel, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction.

2. A shoe including an exchangeable lift, characterized in that an anchor plate having a plurality of hook-shaped engagement projections formed thereon is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said hook-shaped engagement projections to be projected upward of the upper surface of said lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of said lift while extending substantially in parallel with the upper surface of said lift, that a plurality of engagement holes are formed on said engagement plate corresponding to said hook-shaped engagement projections in such a manner that the upper ends of said hook-shaped engagement projections are first inserted through said engagement holes when the upper surface of said lift is located at the insertion/detachment position where said lift is permitted to move along the lower end surface of said heel in the horizontal direction, and thereafter, the horizontal portions of said hook-shaped engagement projections are displaced to the attachment position where

the upper surface of said lift is brought in contact with the lower surface of said heel, that a part of said heel located above said engagement holes is recessed so as to avoid interference with said hook-shaped engagement projections, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end surface of said heel, said engagement plate and said anchor plate at the position where the upper end surface of said lift is correctly aligned with the lower end surface of said heel, that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction, and that a signal piece is fixedly fitted into the lower surface of said anchor plate so as to enable the present state of wearing of said lift to be visually recognized by a user.

3. A shoe including an exchangeable lift, characterized in that an anchor plate having at least one hook-shaped engagement projection formed along a part of a cylindrical cup-shaped plane thereof is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said hook-shaped engagement projection to be projected upward of the upper surface of said lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of said lift while extending substantially in parallel with the upper surface of said lift, that an engagement hole is formed along a part of the outer peripheral edge of said engagement plate corresponding to said hook-shaped engagement projection so as to allow the upper end of said hook-shaped engagement projection to be inserted through said engagement hole, that a part of said heel located above said engagement hole is recessed so as to avoid interference with said hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of said heel, said engagement plate and said anchor plate at the attachment position where the horizontal portion of said hook-shaped engagement projection is engaged with the upper surface of said engagement plate, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to enable it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction.

4. A shoe including an exchangeable lift, characterized in that an anchor plate having at least one hook-shaped engagement projection projected along a part of a cylindrical cup-shaped plane thereof is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said hook-shaped engagement projection to be projected upward of the upper surface of said lift, that an engagement plate is fixedly secured to the lower end surface of a heel located opposite to the upper surface of said lift while extending substantially in parallel with the upper surface of said lift, that an engagement hole is formed along a part of the outer peripheral edge of said engagement plate corresponding to said hook-shaped engagement projection so as to allow the upper end part of said hook-shaped engagement projection to be inserted through said engagement hole, that a part of said heel located above said engagement hole is recessed so as to avoid interference with said hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of said heel, said engagement plate and said anchor plate at the attachment position where the horizontal portion of said hook-shaped engagement projection is engaged with the upper surface of said engagement plate, that a locking pin of which lower end part has a small outer diameter so as to enable it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction, and that a signal piece is fixedly fitted into the lower surface of said anchor plate so as to enable the present state of wearing of said lift to be visually recognized by a user.

5. A shoe including an exchangeable lift, characterized in that an anchor plate of which both sides are bent in the U-shaped sectional contour to form a pair of first parallel rails and which has at least one hook-shaped engagement projection formed at the central part thereof by bending so as to allow it to stand upright between both the bent side parts thereof is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said first parallel rails and said hook-shaped engagement projection to be projected upward of the upper surface of said lift, that a pair of second parallel rails exhibiting the U-shaped sectional contour by bending and engageable with said first parallel rails are

attached to the lower end part of said heel located opposite to the upper surface of said lift, that an engagement plate is secured to said second parallel rails while extending substantially in parallel with the upper surface of said lift, that an engagement hole is formed on said engagement plate corresponding to said hook-shaped engagement projection on the upper surface of said lift in such a manner that the upper end of said hook-shaped engagement projection is inserted through said engagement hole when the upper surface of said lift is located at the insertion/detachment position where said lift is permitted to move along the lower end surface of said heel in the horizontal direction, and thereafter, the horizontal portion of said hook-shaped engagement projection is displaced to the attachment position where the upper surface of said lift is brought in contact with the lower surface of said heel, that a part of said heel located above said engagement hole is recessed so as to avoid interference with said hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of said heel, said engagement plate and said anchor plate at the position where the upper end surface of said lift is correctly aligned with the lower end surface of said heel, and that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction.

6. A shoe including an exchangeable lift, characterized in that an anchor plate of which both sides are bent in the U-shaped sectional contour to form a pair of first parallel rails and which has at least one hook-shaped engagement projection formed at the central part thereof by bending so as to allow it to stand upright between both the bend side parts thereof is embedded in the upper part of said lift while extending substantially in parallel with the upper surface of said lift in such a manner as to allow said first parallel rails and said hook-shaped engagement projection to be projected upward of the upper surface of said lift, that a pair of second parallel rails exhibiting the U-shaped sectional contour by bending and engageable with said first parallel rails are attached to the lower end part of said heel located opposite to the upper surface of said lift, that an engagement plate is secured to said second parallel rails while extending substantially in parallel with the upper surface of said lift, that an engagement hole is formed on said engagement plate corresponding to said hook-shaped engagement projection on the upper surface of said lift in such a manner that the upper end of said hook-shaped engagement projection is inserted through said engagement hole when the upper surface of said lift is located at the insertion/detachment position where said lift is permitted to move along the lower end surface of said heel in the horizontal direction, and thereafter, the horizontal portion of said hook-shaped engagement projection is displaced to the attachment position where the upper surface of said lift is brought in contact with the lower surface of said heel, that a part of said heel located above said engagement hole is recessed so as to avoid interference with said hook-shaped engagement projection, that a pin hole having the opposite ends thereof kept closed is vertically formed through the lower end part of said heel, said engagement plate and said anchor plate at the position where the upper end surface of said lift is correctly aligned with the lower end surface of said heel, that a locking pin of which lower end part has a small outer diameter dimensioned so as to allow it to be inserted into a hole on said anchor plate is received in said pin hole while it is normally biased in the downward direction, and that a signal piece is fixedly fitted into the lower surface of said anchor plate so as to enable the present state of wearing of said lift to be visually recognized by a user.

Fig. 1

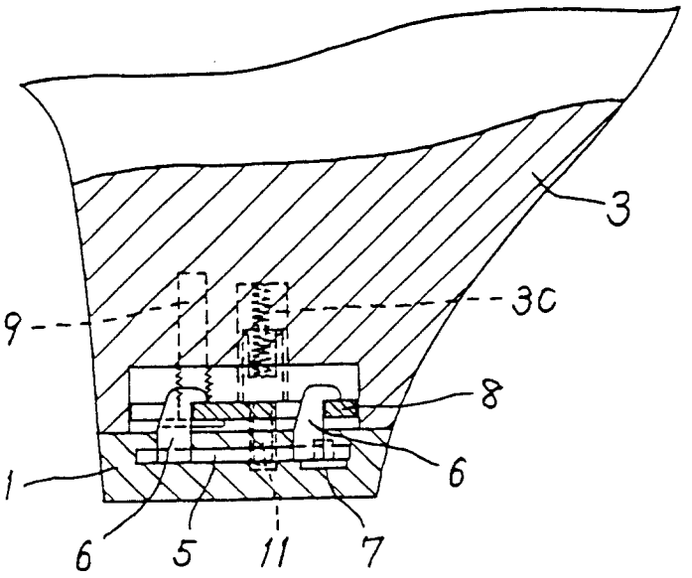


Fig. 2

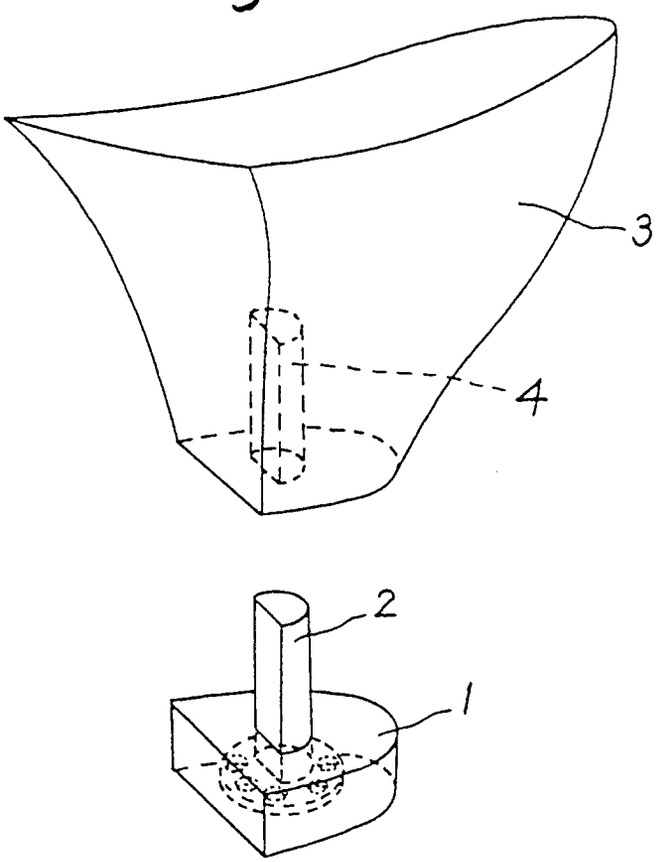


Fig.3

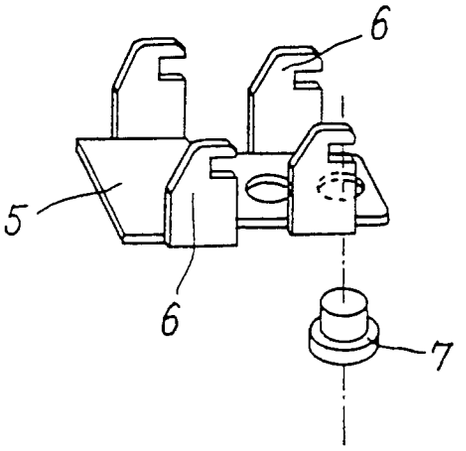


Fig.4

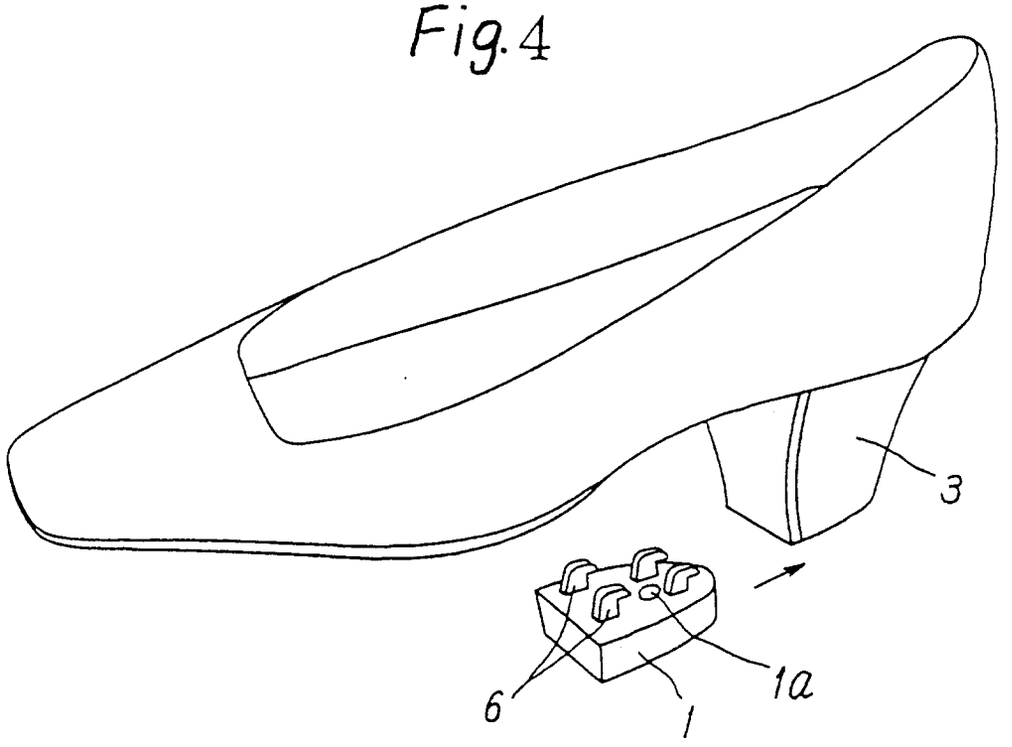


Fig.5

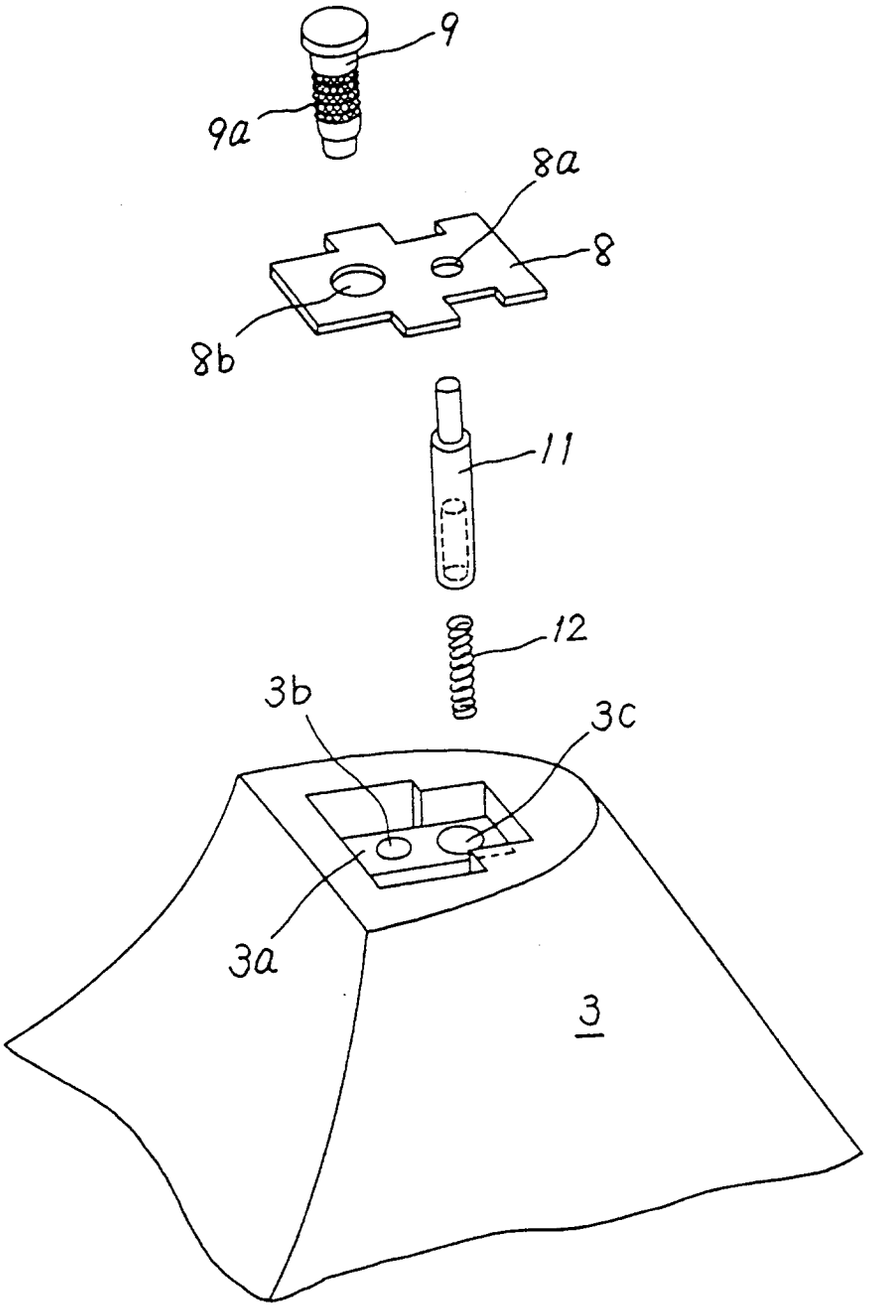


Fig. 6

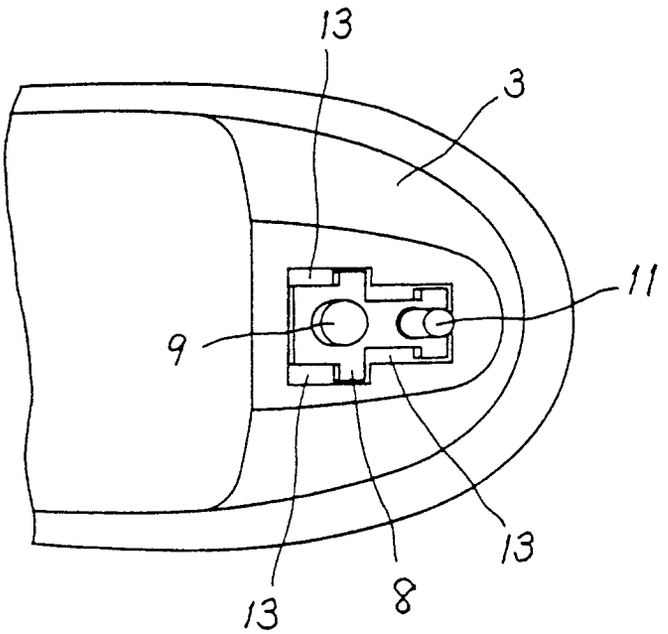


Fig. 7

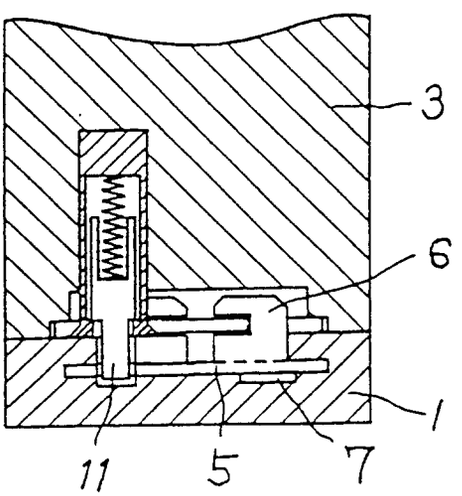


Fig. 8

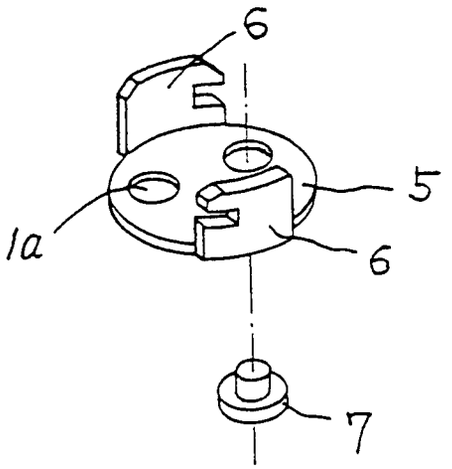


Fig. 9

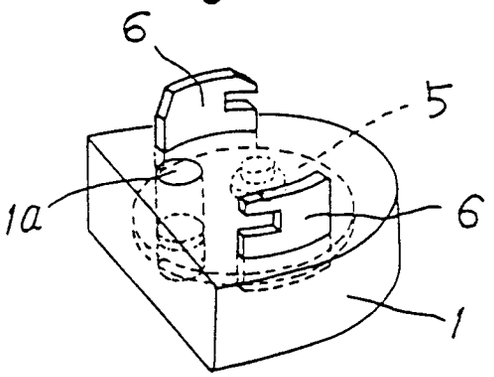


Fig. 10

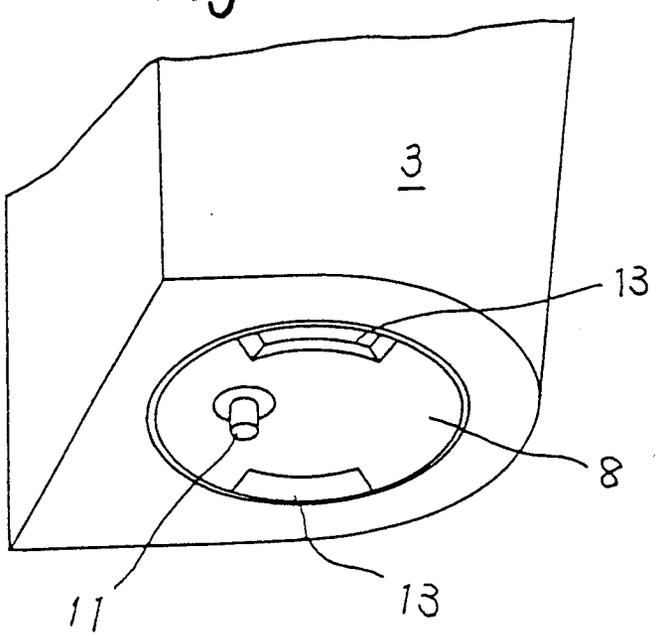


Fig.11

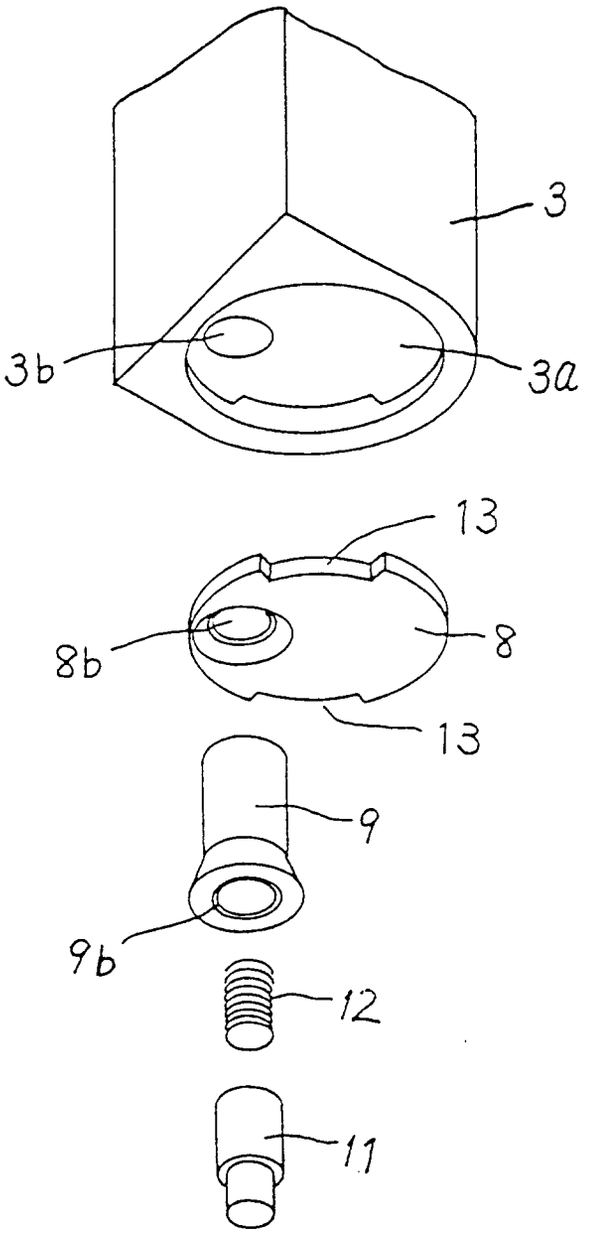


Fig.12

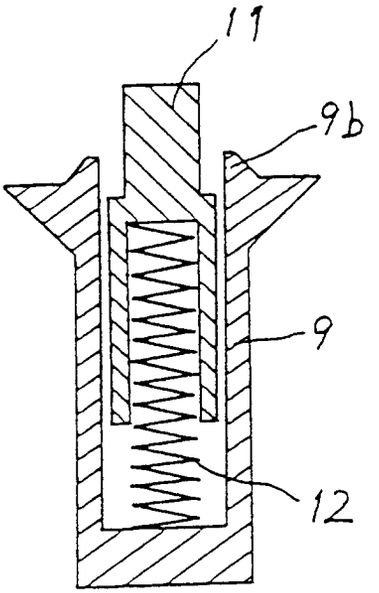


Fig.13

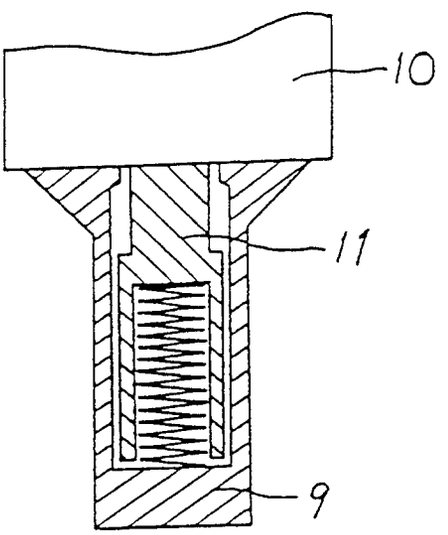


Fig. 14

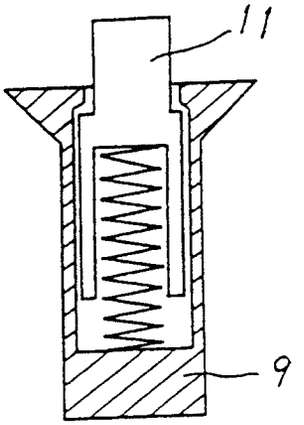


Fig. 15

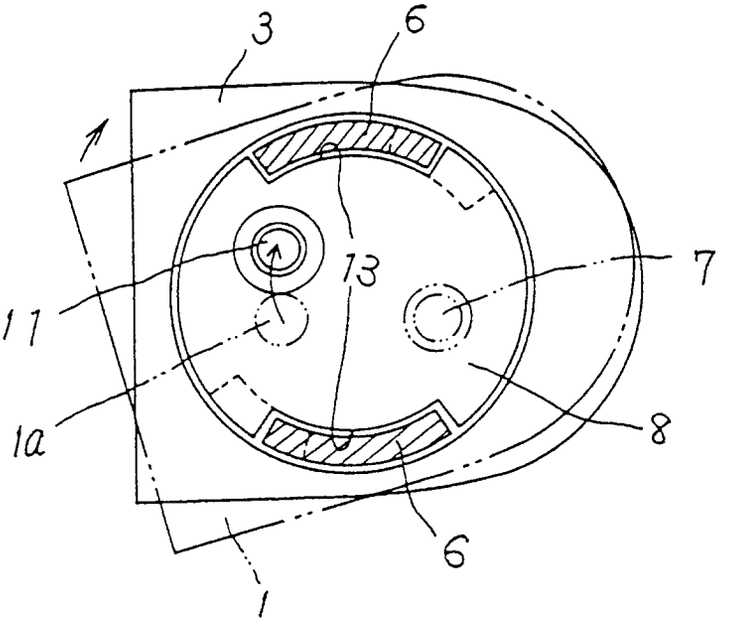


Fig. 16

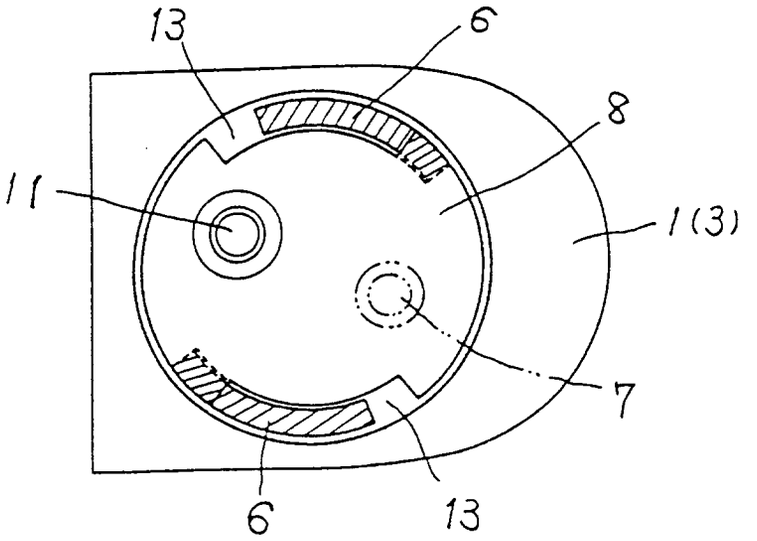


Fig.17

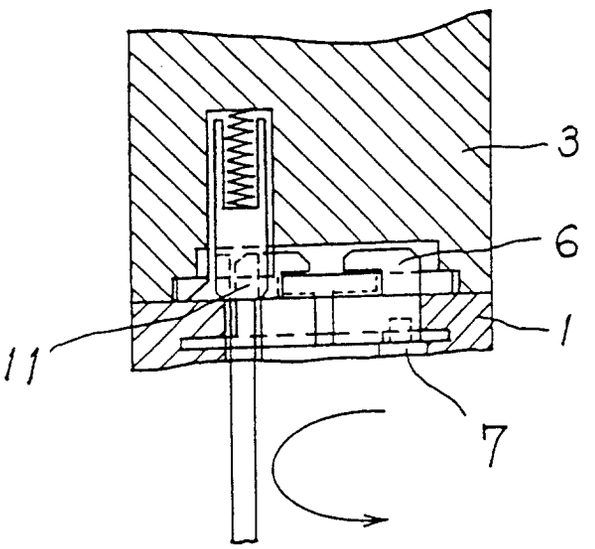


Fig.18

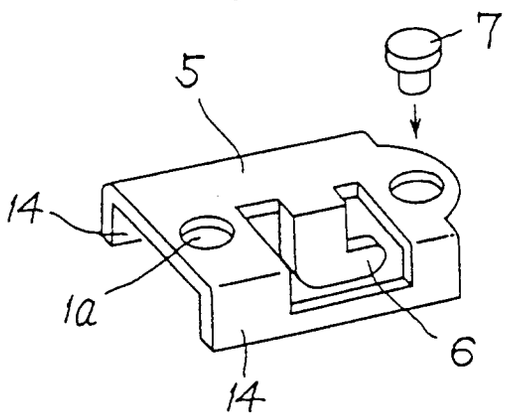


Fig.19

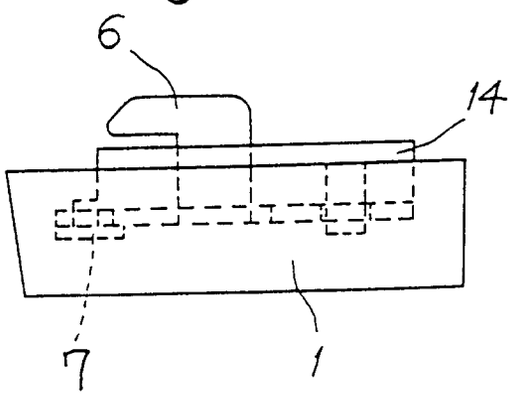


Fig. 20

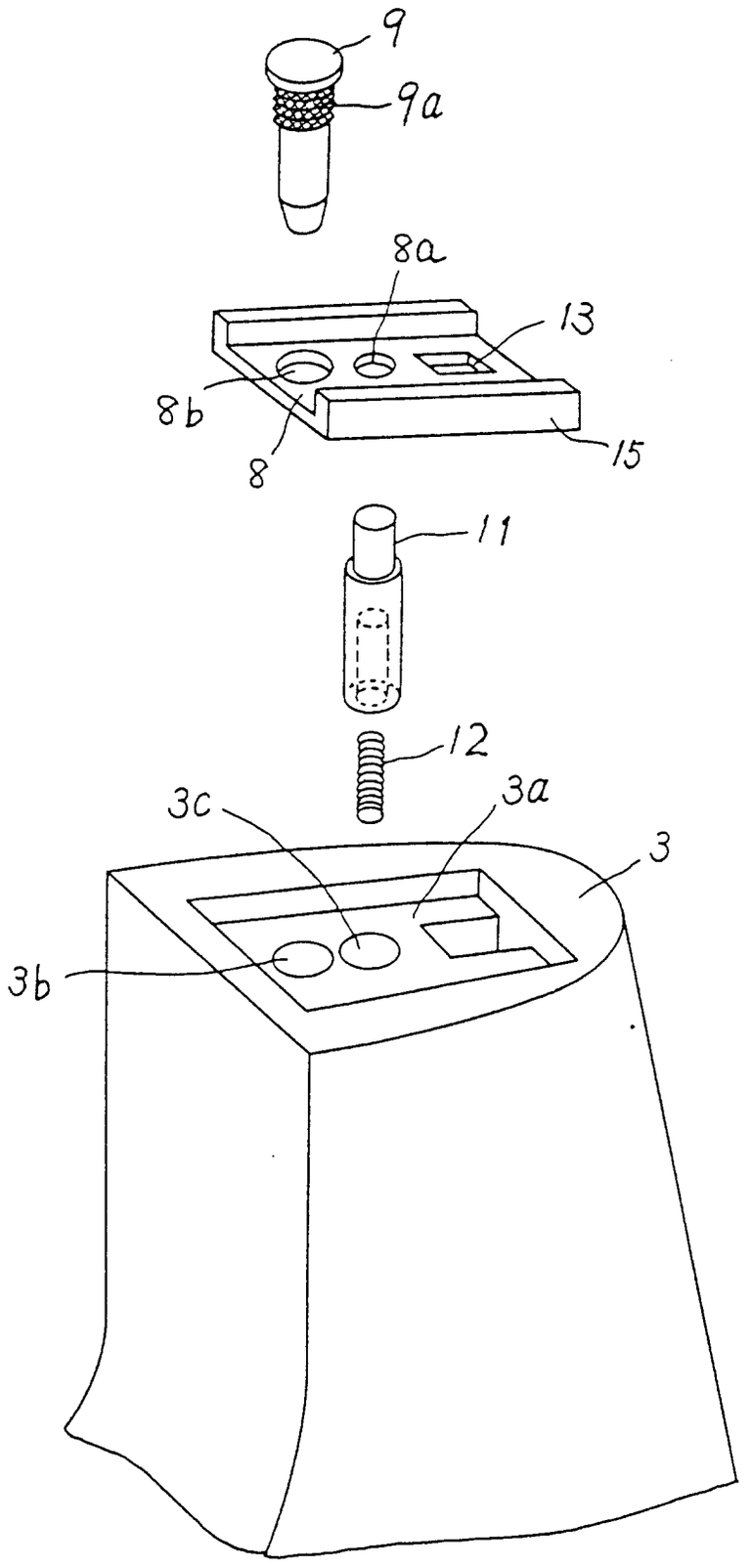


Fig.21

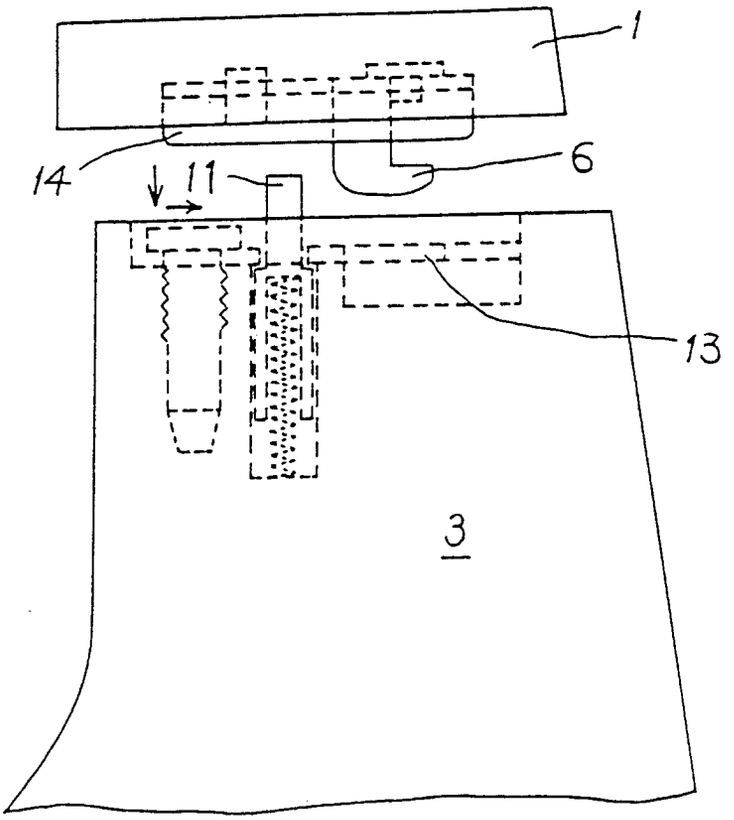


Fig.22

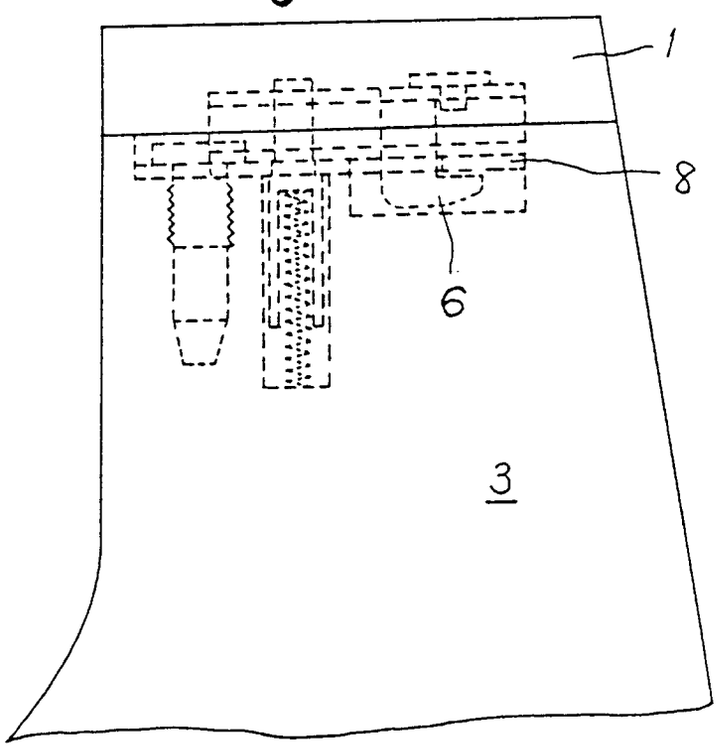


Fig. 23

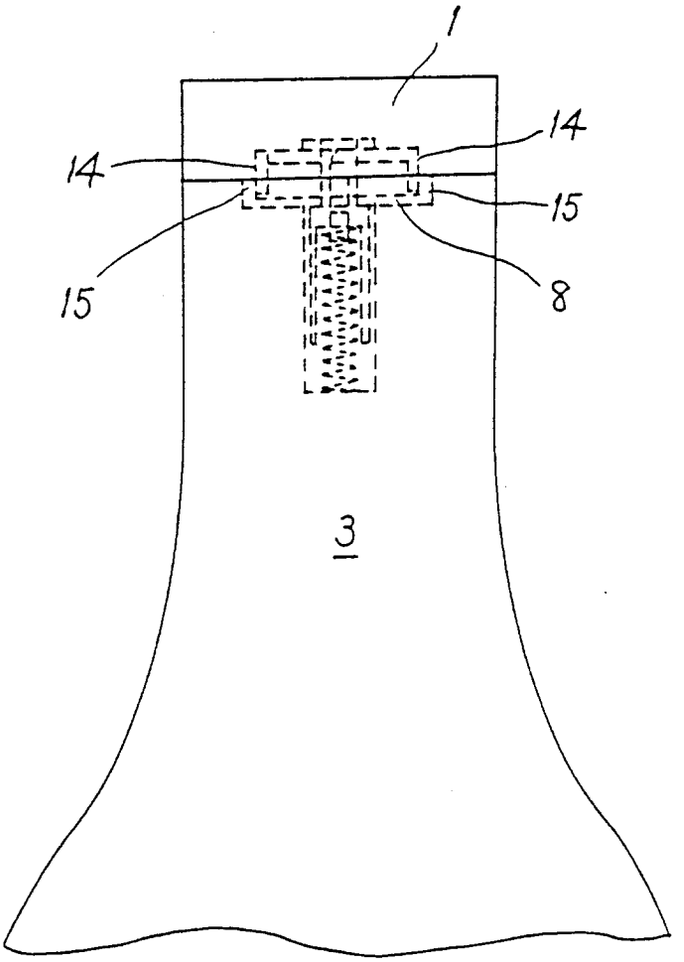
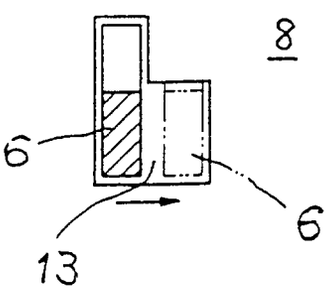


Fig. 24



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP92/01019

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[5] A43B21/40, 21/44, 21/47, 21/52

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC	A43B21/40, 21/44, 21/47, 21/52

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

Jitsuyo Shinan Koho	1926 - 1991
Kokai Jitsuyo Shinan Koho	1971 - 1991

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	JP, U, 49-24447 (Teruaki Takai), March 1, 1974 (01. 03. 74), (Family: none)	1, 2
Y	JP, Y2, 63-26007 (Giichi Hirai), July 15, 1988 (15. 07. 88), Lines 1 to 18, column 1, line 9, column 2 to line 1, column 3, and drawings (Family: none)	3, 4
Y	JP, U, 58-196604 (Toshikazu Fujiwara), December 27, 1983 (27. 12. 83), Microfilm of the specification of line 6, page 4 to line 4, page 5 annexed to the written application of Utility Model Application No. 94975/1982, December 27, 1983 (27. 12. 83), Japanese Patent Office, (Family: none)	1-6
Y	JP, Y2, 62-27128 (Yamada K.K.), July 11, 1987 (11. 07. 87),	2, 4, 6

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
October 20, 1992 (20. 10. 92)	November 10, 1992 (10. 11. 92)
International Searching Authority	**Signature of Authorized Officer**
Japanese Patent Office	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

Lines 1 to 11, column 1,
line 20, column 1 to line 6, column 2,
and drawings (Family: none)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers . because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers , because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.