Abstract: A kit for correcting nail plate deformations of fingernails and toenails comprising a stabilizer plate, a device with a base on which are mounted in brackets means for immobilizing a toenail or a fingernail relative to the base, means for pressing the middle portion of the nail towards the base, slidable and pivotable manipulating elements for manipulating at the lateral edge of the nail and slidable and pivotable manipulating elements for manipulating at the front portion of the nail, is characterized in that it comprises a foot or hand stabilizer (SSD), an arch-shaped front bracket (WP) and an arch-shaped rear bracket (WT), in which, symmetrically to the longitudinal axis of the device, in two rows, are located sockets for receiving the manipulating elements.
Published:

- with international search report (Art. 21(3))
A kit for correcting nail plate deformations of fingernails and toenails

The subject-matter of the invention is a kit for correcting nail plate deformations of fingernails and toenails destined in particular for clinics and podology salons.

The problem of deformations, chronic diseases and defects of the nail plate is a phenomenon found more and more often in today's world. According to the statistics, more than 15% of the world population suffers from such and related conditions. Said diseases and deformations include in particular: onychogryphosis (nail plate hypertrophy), onycholysis, nail fold hypertrophy, koilonychia (spoon nails), nail clubbing (mainly fingernails), pincer nails (curled nails and trumpet nails), the yellow nail syndrome (fingernails and toenails), ingrown nails, a number of mechanical traumas, and all other defects of the nail plate, caused e.g. by incorrect micro-circulation or the diabetic foot syndrome.

Document US 1 772 130 discloses a device for curing ingrowing toe nails comprising a body plate having a pair of arms disposed in opposite directions and terminating in curved jaws to engage under the sides of the nail. The body plate also includes an arm to engage the nail plate under the body plate. A threaded shank is engaged through the center of
the body plate to bear against the nail plate. A lock nut is engaged on the threaded shank. The jaws are engaged over the sides of the nail and a spring extending through the arm is engaged about the toe.

Document EP 2 025 309 discloses a device for painless correction of ingrown nails within a very short time (30 minutes to 1 hour) with very simple operations. The device comprises an upstanding push-down member having at its lower end a push-down head; a laterally extending, lifting angle maintenance means secured at its middle portion to the push-down member; and lifting members having anchors at their lower ends. When the lifting members are placed under tension, the anchors secured to side portions of a nail are lifted to exert a lifting force on the side portions while causing the push-down member to push the middle portion of the nail in its thicknesswise direction.

Document WO 2013/053933 discloses a device for correcting ingrowing foot nails. It comprises a base, on which there are mounted means for immobilizing the toe with respect to the base, means pressing the middle portion of the nail towards the base, slidable and pivotable means for manipulating at the lateral edge of the nail and slidable and pivotable means for manipulating at the front portion of the nail.

The prior art devices for nail correction did not provide the possibility of correction in the case of diverse nail abnormalities, of both fingernails and toenails, whereas more and more patients suffer from such type of conditions. Further, the prior art devices were not equipped with stabilizers of the heel and hand. The absence of a stabilizer
creates a risk of an unpredictable movement of the patient during the operation, which may lead to an irreversible damage to the nail matrix and the nail bed, and an injury to the finger or toe.

The purpose of this invention is to improve on the prior art devices by way of eliminating the above-listed disadvantages.

A kit for correcting nail plate deformations of fingernails and toenails comprising a stabilizer plate, a device with a base, on which are mounted in brackets means for immobilizing a toenail or a fingernail relative to the base, means for pressing the middle portion of the nail towards the base, slidable and pivotable manipulating elements for manipulating at the lateral edge of the nail and slidable and pivotable manipulating elements for manipulating at the front portion of the nail, is characterized in that it comprises a foot or hand stabilizer, an arch-shaped front bracket and an arch-shaped rear bracket, in which, symmetrically to the longitudinal axis of the device, in two rows, are located sockets for receiving the manipulating elements.

Preferably, the front bracket includes five sockets for receiving the manipulating elements, wherein two sockets are located in a top row and three sockets are located in a bottom row, and the rear bracket includes six sockets for receiving the manipulating elements, wherein four sockets are located in a top row and two sockets are located in a bottom row.

In a preferable embodiment, the kit for correcting nail plate deformations of fingernails and toenails also comprises
an illuminating lamp or an illuminating lamp with a magnifying glass, and the stabilizer plate includes a right groove and a left groove for mounting an illuminating lamp or an illuminating lamp with a magnifying glass.

In another preferable embodiment, the stabilizer plate includes rods for mounting the foot or hand stabilizer, fastened with a screw.

Preferably, the kit for correcting nail plate deformations of fingernails and toenails comprises a left and/or right manipulating element with a tip having trough-shaped lateral edges, or with a tip having the crescent moon shape, or with a horseshoe-shaped tip, or with a cuboid tip for pressing the nail down, or with a tip shaped like a truncated sickle.

The prior art devices only provided for the correction of ingrown nails. The kit according to the invention provides far broader possibilities of correction in the case of diverse nail abnormalities, of both fingernails and toenails. All the conditions and defects described earlier, including defects caused by the diabetic foot syndrome, can be corrected with the help of the device according to the present invention. This effect has been obtained by means of increasing the number of sockets for receiving the elements for manipulating at the front portion of the nail up to five and by an appropriate construction of the front bracket of the device, as well as by means of increasing the number of sockets for receiving the elements for manipulating at the lateral edges of the nail up to six and by an appropriate construction of the rear bracket of the device, as well as by providing new designs of the manipulating elements.
Moreover, with the help of the kit according to the invention, the safety of the treatment has been increased, by means of adding to the kit for correcting fingernails and toenails a stabilizer for the heel or hand, mounted to the stabilizer plate.

The kit according to the invention provides for an appropriately shaped stabilizer plate, (a place on both the right side and the left side of the stabilizer plate for mounting a lamp or a lamp with a magnifying glass), thanks to which the place of operation is optimally illuminated.

The subject-matter of the invention on the example of a preferred embodiment has been presented in the drawing, in which:

Fig. 1 presents a top view of the kit for correcting nail plate deformations of fingernails and toenails,

Fig. 2 presents a view of the kit for correcting nail plate deformations of fingernails and toenails from the direction of the foot/hand stabilizer,

Fig. 3 presents a view of the kit for correcting nail plate deformations of fingernails and toenails from the direction of the front bracket,

Fig. 4 presents the manipulating elements which are utilized in the kit according to the invention:

Fig. 4.1 presents a manipulating element with a cuboid tip,

Fig. 4.2 presents a manipulating element with a tip shaped like a truncated sickle,

Fig. 4.3 presents a manipulating element with a tip having the crescent moon shape,

Fig. 4.4 presents a manipulating element with a horseshoe-shaped tip,
Fig. 4.5, presents a manipulating element with a tip having a trough-shaped lateral edge, left, Fig. 4.6 presents a manipulating element with a tip having a trough-shaped lateral edge, right.

The kit for correcting nail plate deformations of fingernails and toenails comprises a stabilizer plate PS, in which there is a recess for receiving a device U with a base P, as well as grooves ZM1L and ZM1P for an illuminating lamp or an illuminating lamp with a magnifying glass. Moreover, the kit for correcting nail plate deformations of fingernails and toenails includes a foot/hand stabilizer SSD.

The device U with the base P comprises two brackets located opposite each other, a front bracket WP and a rear bracket WT, which are arch-shaped. In the brackets, symmetrically to the longitudinal axis of the device, in two rows, are located sockets for receiving manipulating elements. Such form of the brackets provides for the optimal (from the point of view of access to the treated nail) arrangement of the manipulating elements and for the optimal manipulation with them.

The front brackets includes five sockets G1, G2, G3, G4, G5 for receiving manipulating elements for manipulating at the front portion of the nail, two sockets in a top row and three sockets in a bottom row. The manipulating elements are pivotable and slidable within the sockets and are secured in the openings by fastening screws SD.

The rear bracket WT includes sockets for a pressing screw D1, for a manipulating element for pressing the middle portion of the nail, disclosed in Fig. 4.1, and six sockets for receiving manipulating elements for manipulating at the
lateral edges of the nail. Four out of the six sockets for the manipulating elements for manipulating at the lateral edge of the nail are located in a top row, and two in a bottom row. The sockets include openings in which are placed spheroidal joints with the manipulating elements. The manipulating elements are pivotable and slidable within the sockets and are secured in the openings by fastening screws SD.

During the operation the patient's foot or hand is on the stabilizer plate PS. If the operation concerns a foot, the toe is placed in the space WO and the heel stabilizer is adjusted so that the foot is immobilized during the operation. The toe is then additionally immobilized by means of tightening the pressing screw D1. The end of the pressing screw D1 has a replaceable rubber pad N1, N2, which protects the toe from being overly pressed upon by the pressing screw. Prior to the tightening, a strip of a thermostetting material is placed on the nail. The width of the strip depends on the size of the nail. On the strip a small depression is made for stabilizing the manipulating element configured to press down on the middle portion of the nail, disclosed in Fig. 4.1, in a suitable position depending on the size of the nail and the type of its deformation. Next, the middle portion of the nail is pressed down by the manipulating element disclosed in Fig. 4.1 mounted in the socket DPZ.

Depending on the type of deformation, different manipulating elements mounted in appropriate sockets are used.

Example 1
Deformation: koilonychia affecting toenails
After the foot is correctly placed on the stabilizer plate PS, the toe subject to the operation is placed in the space W0, and the heel stabilizer SSD is tightened. The toe is then pressed down by means of the pressing screw Dl. Before immobilizing, a strip of a thermosetting material is placed on the nail. On the middle portion of the thermosetting strip, subjected to thermal pretreatment, a small depression is made with the manipulating element disclosed in Fig. 4.1 for the purpose of stabilizing it, which as a result provides for the immobilizing of the nail. Next, in the socket GL3 is mounted the manipulating element with a tip shaped like a truncated sickle, disclosed in Fig. 4.2, thanks to which the nail fold is pushed aside to reveal the entire edge of the nail. The same step is performed on the other side of the nail, with the manipulating element being mounted in the socket GP3. For the purpose of pressing down on the nail plate abnormally curved upwards the manipulating element with a horseshoe-shaped tip, disclosed in Fig. 4.4, is used, which is mounted, depending on the specific case, in the socket GL1 or GL2 (if the manipulation is carried out on the left side), in the socket DPZ (if centrally), or in the socket GP1 or GP2 (if the manipulation is carried out on the right side). In the socket GL is mounted, depending on the side of the manipulation, a right or a left manipulator with a tip having a trough-shaped \(^\text{\#}0\) lateral edge, disclosed in Fig. 4.5 or Fig. 4.6, which is slid under the nail plate in the direction of the nail matrix to lift the damaged nail edge, which is visible only after the nail fold is pushed aside by means of the manipulating element mounted in the socket GP3 or GL3.
Next, the thermosetting material is applied, and thanks to the upwardly curled edge of the manipulating element with a tip having a trough-shaped lateral edge the material is prevented from reaching undesirable areas. Due to the use of the described manipulating elements set in appropriate sockets, which did not exist in prior art devices for correcting nails, the newly-formed nail has a continuous and smooth edge. Next, the fastening screw of the socket G1 is tightened. The same step is repeated on the other side of the nail, with use of the manipulating element with a tip having a trough-shaped lateral edge mounted in the socket G2. After this step is performed, the entire surface of the nail is covered with the thermosetting material of an appropriate thickness, and then thermal curing is performed until completely set. After the curing the foot is released from the device by means of loosening the fastening screws which secure the manipulating elements in the sockets GP1, GP2, GP3 (on the right-hand side), DPZ (centrally), and GL1, GL2, GL3 (on the left-hand side), after which the fastening screws which secure the manipulating elements in the sockets G1 and G2 are loosened, and the manipulating elements with a tip having a trough-shaped lateral edge are removed. Finally, the nail is polished and given an aesthetic look.

Example 2

The yellow nail syndrome (Fingernails - the ring finger)

It is a common phenomenon accompanying the yellow nail syndrome that the fingertip (or the tip of a toe) grows above the level of the deformed nail. To correct the said deformation of the nail plate the ring finger has to be placed in the device U in the space WO. The hand stabilizer
(SSD) works by means of pressing on the elbow while the forearm and the hand are placed in the starting position suitable for performing the operation. Next, the finger is pressed down by means of the pressing screw D1 equipped with the pad N2 (milder pressure on the finger). A strip of a thermosetting material is applied to the nail from the nail matrix to the distal edge of the nail. On the middle portion of the thermosetting strip a small depression is made with the manipulating element disclosed in Fig. 4.1 for the purpose of stabilizing it and, consequently, immobilizing the nail. Next, the manipulating element with a tip having the crescent moon shape, disclosed in Fig. 4.3, is mounted in the socket G3, G4 or G5, depending on which side the fingertip needs to be pulled down to reveal the free edge of the nail. This enables performing the operation with use of the manipulating elements mounted in the remaining sockets of the front body. The operation is continued as the element with a tip having the crescent moon shape is being secured in a position which enables pulling the fingertip down. Next, when the fingertip is being pressed down, thanks to which the free edge of the nail is revealed, the manipulating elements disclosed in Fig. 4.5 or 4.6 or any other suitable elements known in the prior art are mounted in the front bracket. Such possibilities were not provided by earlier devices for nail correction.

Example 3

Pincer nails (curled nails)

Once the foot is correctly set on the stabilizer plate PS, the toe subjected to the operation is placed in the space WO and the heel stabilizer is tightened. The toe is then
pressed down by the pressing screw Dl. Before immobilizing, a strip of a thermosetting material is applied to the nail from the nail matrix to the distal edge of the nail. On the middle portion of the thermosetting strip, subjected to thermal pretreatment, a small depression is made with the manipulating element disclosed in Fig. 4.1 for the purpose of stabilizing it, which as a result provides for the immobilizing of the nail.

Correction of pincer nails is carried out with use of the element with a cuboid tip disclosed in Fig. 4.1 of length equal to the length of the nail, which provides for a better pressure over the entire length of the nail. The nail fold is pushed aside by means of the manipulating element with a tip shaped like a truncated sickle, disclosed in Fig. 4.2, mounted in the sockets GP3 and GL3. Next, in the sockets GP1, GP2 and GL1, GL2, are mounted hook-shaped manipulating elements known in the prior art. Four hook-shaped manipulating elements are used simultaneously, which makes it possible to reverse almost any deformation of the nail plate characterized by curling. The hook-shaped manipulating elements, after being mounted in the sockets and engaged under the edges of the nail, are pulled upwards to form the correct shape of the nail. Next, the fastening screws SD are tightened to secure the hook-shaped manipulating elements in the correct position during the application of the thermosetting material and its curing (5-7 minutes). Finally, the nail is given an aesthetic look and polished.

Since the nail folds are pushed aside on both sides, it is possible to engage at the same time four manipulating elements with hook-shaped tips. The devices for nail
correction known in the prior art did not provide for such a possibility.

Previously, it has not been possible to carry out the corrections as described above due to an insufficient number of sockets in the brackets and the lack of suitably shaped manipulating elements.

Only the kit according to the present invention enables to carry out such operations.
List of reference symbols

WO  space for placing a finger/toe
Dl  means for pressing down on a finger/toe
DPZ socket for the manipulating element configured to press down on the middle portion of the nail, disclosed in Fig. 4.1
GL, G2, G3, G4, G5 sockets for mounting the elements for manipulating at the front portion of the nail
GL1, GL2, GL3 left sockets for mounting the elements for manipulating at the lateral edges of the nail
GP1, GP2, GP3 right sockets for mounting the elements for manipulating at the lateral edges of the nail
N1, N2 replaceable rubber pads for padding the end of the means for pressing down on a finger/toe
ZM1L, ZM1P left and right grooves for an illuminating lamp
SSD  foot or hand stabilizer
SR. regulating screw
PS  stabilizer plate
WP  front bracket
WT  rear bracket
SD  fastening screw
P  base
U  device
Patent claims

1. A kit for correcting nail plate deformations of fingernails and toenails comprising a stabilizer plate, a device with a base on which are mounted in brackets means for immobilizing a toenail or a fingernail relative to the base, means for pressing the middle portion of the nail towards the base, slidable and pivotable manipulating elements for manipulating at the lateral edges of the nail and slidable and pivotable manipulating elements for manipulating at the front portion of the nail, characterized in that - it includes a foot or hand stabilizer (SSD) - it includes an arch-shaped front bracket (WP) and an arch-shaped rear bracket (WT), in which, symmetrically to the longitudinal axis of the device, in two rows, are located sockets for receiving the manipulating elements.

2. A kit according to claim 1, characterized in that the front bracket (WP) includes five sockets for receiving the manipulating elements, wherein two sockets are located in a top row and three sockets are located in a bottom row.

3. A kit according to claim 1, characterized in that the rear bracket includes six sockets for receiving the manipulating elements, wherein four sockets are located in a top row and two sockets are located in a bottom row.

4. A kit according to claim 1, characterized in that it moreover includes an illuminating lamp or an illuminating lamp with a magnifying glass.
5. A kit according to claim 1, **characterized in that** the stabilizer plate (PS) includes a groove (ZM1L) and (ZM1P) for mounting an illuminating lamp or an illuminating lamp with a magnifying glass.

6. A kit according to claim 1, **characterized in that** the stabilizer plate (PS) includes rods for mounting the foot or hand stabilizer (SSD) to the base PS, fastened with a screw SR.

7. A kit according to claim 1, **characterized in that** it comprises a left and/or a right manipulating element with a tip having a trough-shaped lateral edge.

8. A kit according to claim 1, **characterized in that** it comprises a manipulating element with a tip shaped like a truncated sickle.

9. A kit according to claim 1, **characterized in that** it comprises a manipulating element with a horseshoe-shaped tip.

10. A kit according to claim 1, **characterized in that** it comprises a manipulating element with a cuboid tip for pressing the nail down.

11. A kit according to claim 1, **characterized in that** it comprises a manipulating element with a tip having the crescent moon shape.
**INTERNATIONAL SEARCH REPORT**

**INVENTION** A61F5/11

**ADD.**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>wo 2013/053933 AI (ARKADA ADRIAN STYL WEDLUG MEZCZYZNY [PL]; ARKADA ADRIAN [PL]) 18 April 2013 (2013-04-18) cited in the application on the whole document</td>
</tr>
<tr>
<td>A</td>
<td>EP 2 025 309 AI (HARADA MASANORI [JP]) 18 February 2009 (2009-02-18) cited in the application on abstract; figures</td>
</tr>
</tbody>
</table>

- A: 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
- E: Earlier application or patent but published on or after the international filing date
- L: Document which may throw doubts on priority claims in which one claims 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

Further documents are listed in the continuation of Box C. 

See patent family annex.

<table>
<thead>
<tr>
<th>Date of the actual completion of the international search</th>
<th>Date of mailing of the international search report</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 February 2016</td>
<td>25/02/2016</td>
</tr>
</tbody>
</table>

Name and mailing address of the ISA:

European Patent Office P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer:

Moers, Roel
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CA 2850578 A1</td>
<td>18-04-2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 201490668 A1</td>
<td>30-09-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 2765961 A1</td>
<td>20-08-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2542682 T3</td>
<td>10-08-2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR P20150763 TI</td>
<td>09-10-2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2014531950 A</td>
<td>04-12-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR 20140078709 A</td>
<td>25-06-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MD 20140043 A2</td>
<td>31-10-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2014350448 A</td>
<td>27-11-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2013053933 A1</td>
<td>18-04-2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 4324638 B2</td>
<td>02-09-2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR 20090122498 A</td>
<td>30-11-2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2010137771 A</td>
<td>03-06-2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2008142880 A</td>
<td>27-11-2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FR 2639219 A3</td>
<td>25-05-1990</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GB 2226249 A</td>
<td>27-06-1990</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT 219136 Z2</td>
<td>10-12-1992</td>
</tr>
</tbody>
</table>