

March 18, 1952

L. B. GALHOUSE ET AL

2,589,241

PROCESS FOR CORRECTING FOOT DEFORMITIES

Filed Sept. 16, 1946

2 SHEETS—SHEET 1

Fig. 1.

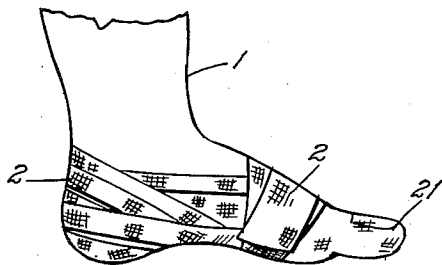


Fig. 2.

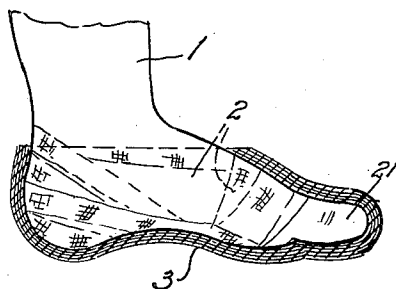


Fig. 3.

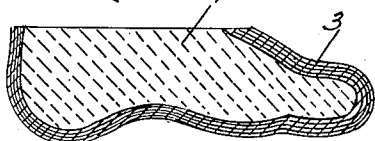


Fig. 4.

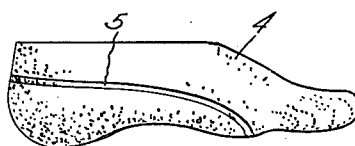


Fig. 5.

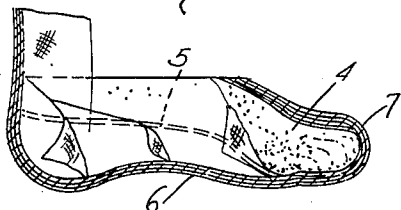


Fig. 6.

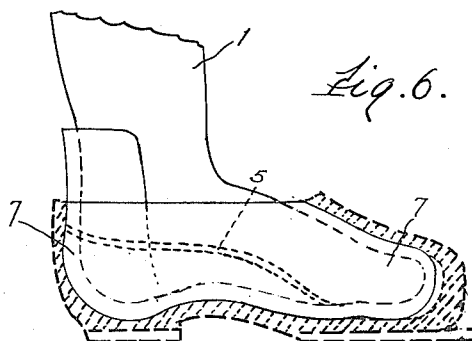


Fig. 7.



Inventors:
Leonard B. Galhouse.
and Hillis N. Lurie.
By H. J. Sanders
Attorney.

March 18, 1952

L. B. GALHOUSE ET AL

2,589,241

PROCESS FOR CORRECTING FOOT DEFORMITIES

Filed Sept. 16, 1946

2 SHEETS—SHEET 2

Fig. 8.

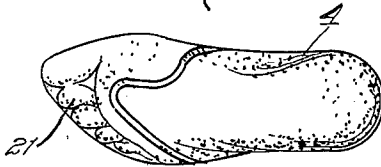


Fig. 9.

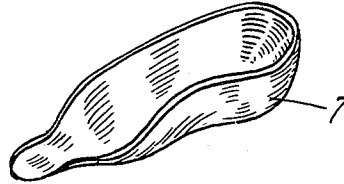


Fig. 10.

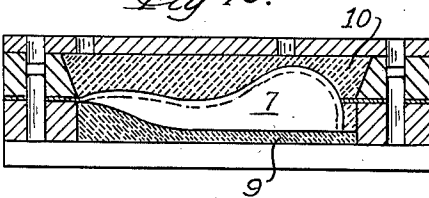


Fig. 11.

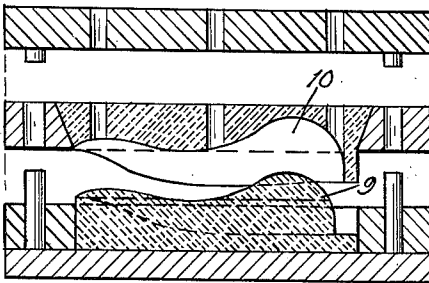


Fig. 13.

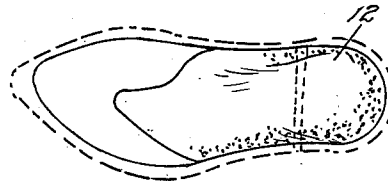


Fig. 12.

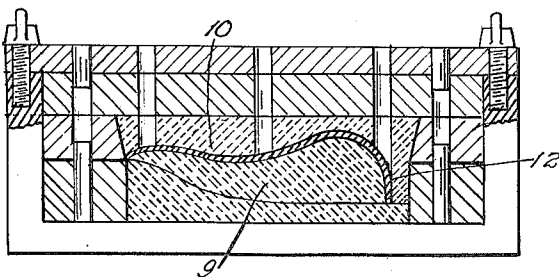
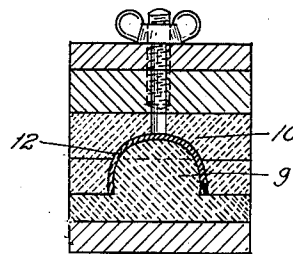


Fig. 14.



Inventors:
Leonard B. Galhouse
and Hillis N. Lure.
by H. J. Sanders
Attorney.

UNITED STATES PATENT OFFICE

2,589,241

PROCESS FOR CORRECTING FOOT DEFORMITIES

Leonard B. Galhouse and Hillis N. Lurie,
Chicago, Ill.

Application September 16, 1946, Serial No. 697,282

2 Claims. (Cl. 12-146)

1

This invention relates to a process for correcting foot deformities such as corns, bunions, callouses, fallen arches or dislocation of bones both chronic and acute. It is well known that the feet of any two persons are not exactly alike and, as well, the feet of any person are not alike, there being distinctions and differences aside from the fact that one is right and the other left. It is, therefore, essential in correcting foot deformities that the exact foot anatomy be known and taken into consideration in the case of each foot in order to apply proper corrective measures. Such abnormalities as are apparent are corrected by filling in or deleting the impression material used in making a vehicle to be worn by the patient. Should any discomfort attend wearing same it can be removed, inspected and further corrected until it can be worn without uncomfortable results.

It is an object of the invention to provide a simple method of procuring and forming a vehicle, slipper or matrix that under body weight will accurately and clearly show the dimensions and contours of the foot to be treated.

A further object is to provide means for obtaining an exact cast of the foot and of the inside of the shoe which may be used as a pattern to make an arch member, which member may be attached to a shoe last from which a shoe may be made which shoe when worn will provide a corrective and preventive for and of deformities of the individual.

In the drawings:

Fig. 1 is a view in side elevation of a foot bound or taped preparatory to making a plaster of Paris form as shown in Figs. 2 and 3.

Fig. 2 is a sectional view of the foot wrapped with a plurality of layers of wet plaster of Paris or cloth material as the next step toward completion of the plaster of Paris form from which a model of the foot is to be obtained.

Fig. 3 is a sectional view of the plaster of Paris form removed from the foot and filled with plaster of Paris material.

Fig. 4 is a side view of the model or set material removed from the form and marked in a predetermined manner.

Fig. 5 is a sectional view of the model which has now been encased in layers of dental wax and gauze forming a shell, the gauze extending outward to serve as a shoe removal tab.

Fig. 6 is a view of the wax shell now inserted in the shoe for the first shaping, the protruding tab being left to facilitate removal, the foot being also shown.

2

Fig. 7 is a view of the reverse side of the model shown in Fig. 4.

Fig. 8 is a bottom plan view of the model of Figs. 4 and 7.

Fig. 9 is a view in elevational perspective of the wax shell.

Fig. 10 is a sectional view of the wax shell in the mold box or flask.

Fig. 11 is a sectional view of the flask now separated for removal of the shell.

Fig. 12 is a sectional view of the flask with slipper in final stage of completion.

Fig. 13 is a view of the bottom of the shoe with finished slipper therein ready for use, and

Fig. 14 is a vertical cross sectional view through Fig. 12.

It is a fact that satisfactory results can follow corrective foot treatment only when the exact contour of the foot is known at the time treatment is started. To obtain this knowledge a replica of the foot contour is had by first wrapping the foot 1 with adhesive tape 2 while the foot muscles are relaxed and with stocking or sock on or off as may be preferred. This tape is wrapped substantially as shown in Fig. 1 completely about the foot at points spaced inwardly from the toes 21 beneath the sole of the foot and about the heel and thereabove and about the region of the ankle. The purpose is, of course, to bring the wrapped foot as near to normal shape as possible. Distortions from different causes may dictate wrappings differing in certain details but, nevertheless, the feet are brought as near to normal as the pathology of the case will permit.

When the wrapping is correct the wrapped foot is placed in a shoe of the size worn by the patient, the shoe having been supplied with a plastic material such as sheet dental wax of putty-like consistency or the like, a gauze sock being drawn over the foot when ready to receive the shoe. The shoe is now laced up completely or in part and the patient stands or walks about wearing the shoe for a short period of time thereby making an impression of the foot in said material. This impression or wax shell is now taken out of the shoe and examined for defects of any kind which may be corrected by cutting away surplus material or filling in for deficiencies with dental wax; such as an over or under supply of wax which is denoted by a too thick or too thin amount of wax to receive a proper impression; or a too long or too short shell. The wax shell should be sufficiently long to extend from the tendo Achillis at the heel to the planar surface of the foot beyond the metatarsal head and on the sides

3

both medial and lateral to the hair line of the foot. The proper thickness is determined by noting that the foot has made an overall imprint of itself upon the wax. If the imprint is imperfect the wax must either be cut away at the point of imperfection or more wax added at this point. It is to be understood that the impression is the wax shell 7, and this shell is placed in the shoe worn by the patient. This causes the shell 7 to take the exact shape or contour of the shoe upon one shell face and the contour of the foot upon the opposite shell face. The patient can tell, while standing and/or walking with the shell in his shoe whether the shell is too long, too short, too thick or too thin, and the doctor can likewise obtain this information by observing the shape of the shell. This determines the necessity for cutting from or adding to the shell. After any necessary alteration of the shell it is replaced in the shoe, and if in again wearing same it feels satisfactory to the patient the shoe is removed and plaster of Paris poured upon the shell while it is still in the shoe. The shell is then removed from the shoe and after being allowed to cool or harden it is invested in a flask for completion as hereinafter set forth. This is a negative impression or cast of the foot imprinted upon the inner wall of the shell, Fig. 9, the outer wall of the said shell bearing a negative impression of the sole and side portions of the shoe. Positive impressions may now be made therefrom by pouring plaster of Paris into the shell to fill same while the shell is held in the hand and this plaster of Paris allowed to harden. The shell is now inverted and placed in the bottom section of the mold box, Fig. 10, which box contains plaster of Paris of creamy consistency and allowed to harden to retain the shell in position. A separator of hot dental wax or the like is now applied, by brush or the like, upon the plaster of Paris immediately about but not upon the shell and the upper half of the mold box placed in position, as shown in Fig. 11, and the box now filled with plaster of Paris directly upon the shell and the box cover is applied. Sufficient time is now permitted to elapse to harden the plaster. The mold box is now opened and the shell removed whereupon it will be found to bear positive impressions in the plaster.

After an exact cast or wax shell is made of the foot under body weight, and of the inside of the shoe, the cast can be used as a pattern to make a slipper. This slipper may be attached to a shoe last and the combined last and added slipper may be used to make upon it a shoe to suit the individual. In cases involving broken bones of the foot or ankle a cast of this type may be made as by using sheets of dental wax with one layer of gauze interposed between the sheets. These wax sheets are placed about the foot as though making a plaster of Paris cast for broken bones. This wax, real warm, is placed with the foot into the shoe and gently hand massaged to make it fit the contour of the foot. The foot is now removed from the shoe, the wax remaining in the shoe until cool and hard and then removed. This wax serves as a shell that can be used to make a slipper that can be attached to a last in lieu of a plaster of Paris cast and a shoe made therefrom will enable the individual to walk while the bones are knitting. The shoe so made will correct foot deformities while being worn with slight or no inconvenience to the wearer and, moreover, will serve as a prophylaxis toward maintaining the feet in healthy condition and

4

normal shape which will provide proper body balance at all times and avoid foot strain and contortion.

Another method of treatment somewhat varied from that described is followed in certain cases such as a flaccid foot. After wrapping the foot with adhesive tape an impression is taken by applying approximately nine layers of wet plaster of Paris cloth about the sides and sole of the foot and upon each other, as in Fig. 2, three layers to each side of the foot and three upon the sole of the foot or about the foot inwardly from the toes, the purpose being to hold the foot in a position as close to normal as possible. This wrapper promptly sets as a splint in the form of a shell 3 which is then removed and plaster of Paris of creamy consistency poured into the shell 3, filling it and providing a model 4 of the foot, Fig. 3. This pouring promptly sets and in about thirty minutes the set form is removed, the shell 3 being pried off if necessary, and a model is thereby provided, Fig. 4. A line 5, extending from the tendo Achillis at the heel along the hair line to the extremity of the fifth metatarsal on the lateral side and to the extremity of the first metatarsal on the medial side, is now drawn with a scraper or the like upon the model denoting the upper edge of the slipper and a gauze covering or sock is now slipped completely about the model, Fig. 5. Hot dental wax 6 is now applied to the mold upon the gauze and promptly thereafter a sheet of warm pliable dental wax is applied upon this first wax covering, both wax coverings extending to the slipper peripheral line 5 upon the mold or model.

A second sock or gauze covering is now applied upon the second layer of wax and a third layer of dental wax, a hot layer, is applied. A wax slipper 7 is thus formed which is removed from the form 4, the surplus wax is trimmed and a correct foot impression is had as shown in Fig. 9. This wax slipper is placed in the shoe and walked upon for about thirty minutes. Body temperature warms the wax and the slipper conforms to the foot and shoe, receiving impressions therefrom. The slipper is now removed from the shoe and imbedded in plaster of Paris of putty-like consistency in a metal mold box or flask, the slipper 7 being in inverted position as shown in Fig. 10, and allowed to set, a separator material is then applied to the plaster about but not upon the slipper. Plaster of Paris is now applied to the inverted slipper and allowed to set and thereafter the flask portions separated, the wax slipper removed with heat or boiling water and we have a die and counter die, or male 9 and female cavity 10 of the wax slipper. The die cavity 10 is now filled with a plastic in putty-like state and packed in by hand. Cellophane is now placed upon the plastic. The flask sections are now closed, placed in a press for trial packing, any excess removed and corrections made and then completed, clamps 11 applied and the flask immersed in warm water which is then heated to the boiling point. After curing time has elapsed the flask is removed from the water and allowed to cool whereupon the plastic slipper 12 is removed to be worn by the patient in his shoe to correct the foot deformity.

What is claimed is:

1. The method of forming a foot corrector to be worn in a shoe which consists in taping the foot, forming a plaster of Paris form upon the foot of quick setting impressionable material, removing said form from the foot and filling same

5

with a plastic material which promptly sets to a non-plastic form retaining its shape and forming a model, forming a shell by applying a moldable impressionable quick setting material to said model, removing said shell and inserting same in a shoe and walking thereon, removing the foot and pouring quick-setting plaster of Paris of putty-like consistency into the shell to fill same, removing said shell and imbedding same in a plastic material in a sectional flask and allowing same to set, separating the flask sections and removing the shell only, filling the cavity impression in the mold with plastic material, re-assembling the flask and immersing same in warm water and then bringing same to the boiling point and cooling the resulting plastic slipper.

2. The method of forming a foot corrector to be worn in a shoe which consists in taping the foot to normal, forming a plaster of Paris form thereupon of quick setting impressionable material, removing same from the foot and filling with a plastic moldable mass setting to a non-plastic form retaining its shape and forming a model, forming a shell by applying moldable im-

6

pressionable quick setting material to said model, removing said shell and inserting same in the shoe and walking thereon, removing the foot and pouring quick-setting plaster of Paris of putty-like consistency into the shell to fill same, removing said shell and imbedding same inverted in a sectional flask containing plastic material to set; separating the flask sections and removing said shell only, filling the shell cavity with plastic, re-assembling the flask and immersing same in cold water and then heating same to approximately 212° F. and drawing off same and cooling the slipper so formed.

LEONARD B. GALHOUSE.
HILLIS N. LURIE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,992,439	Milner	Feb. 26, 1935
2,136,815	Forster	Nov. 15, 1938
2,409,594	Sherman	Oct. 15, 1946