No. 725,009. PATENTED APR. 7, 1903.

J. E. RANDALL.

BOOT OR SHOE.

APPLICATION FILED JAN. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1

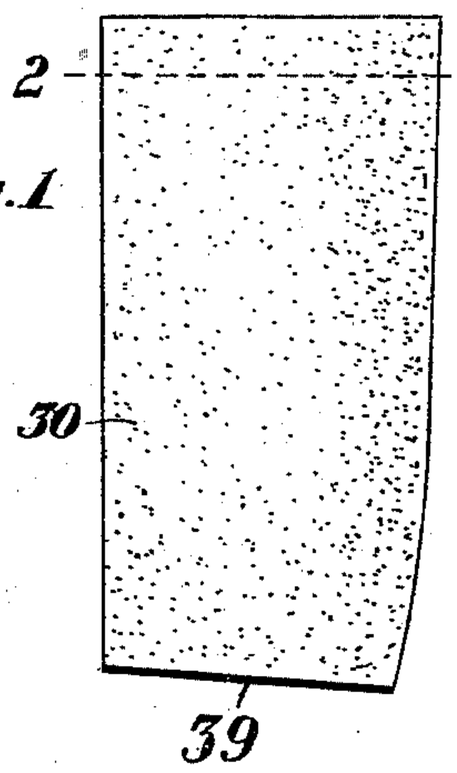


Fig. 3

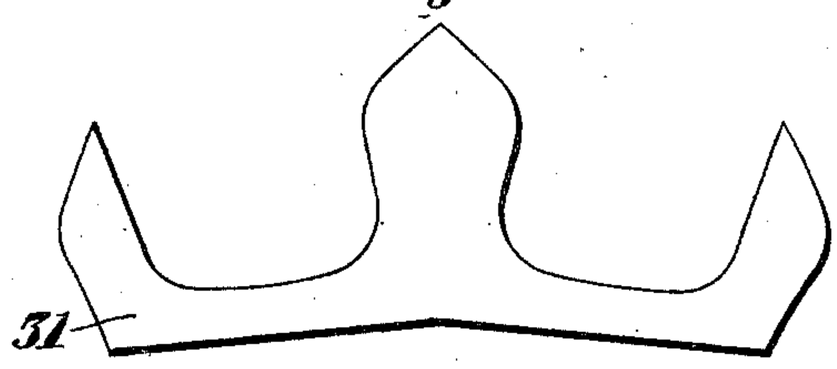


Fig. 2

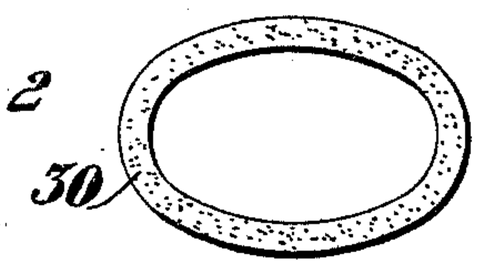


Fig. 5

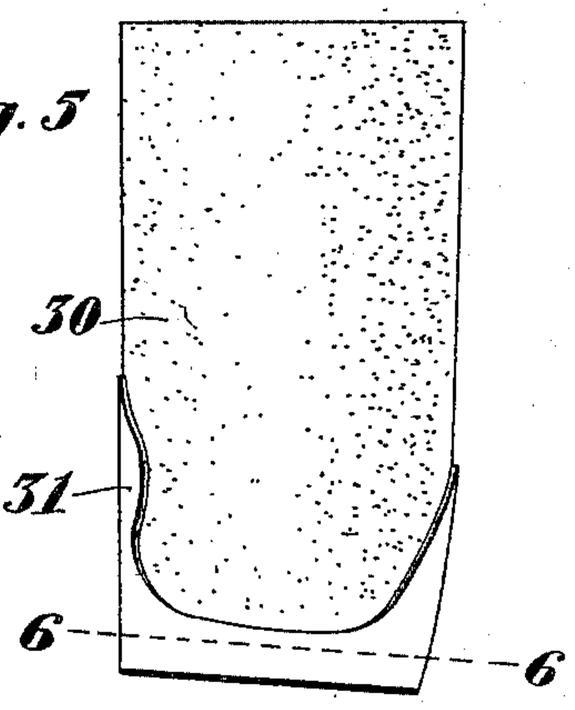


Fig. 4

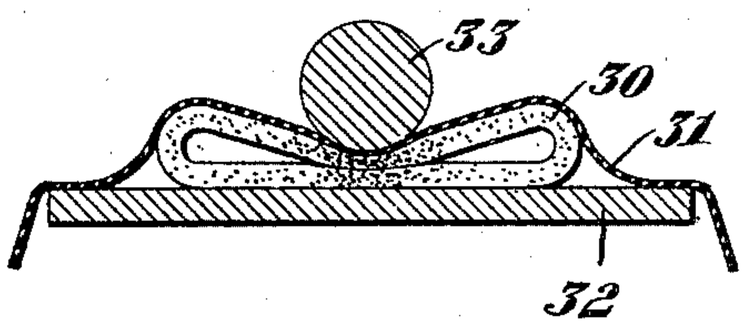


Fig. 6

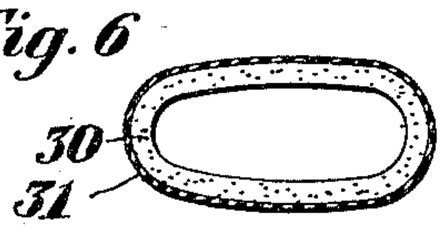


Fig. 7

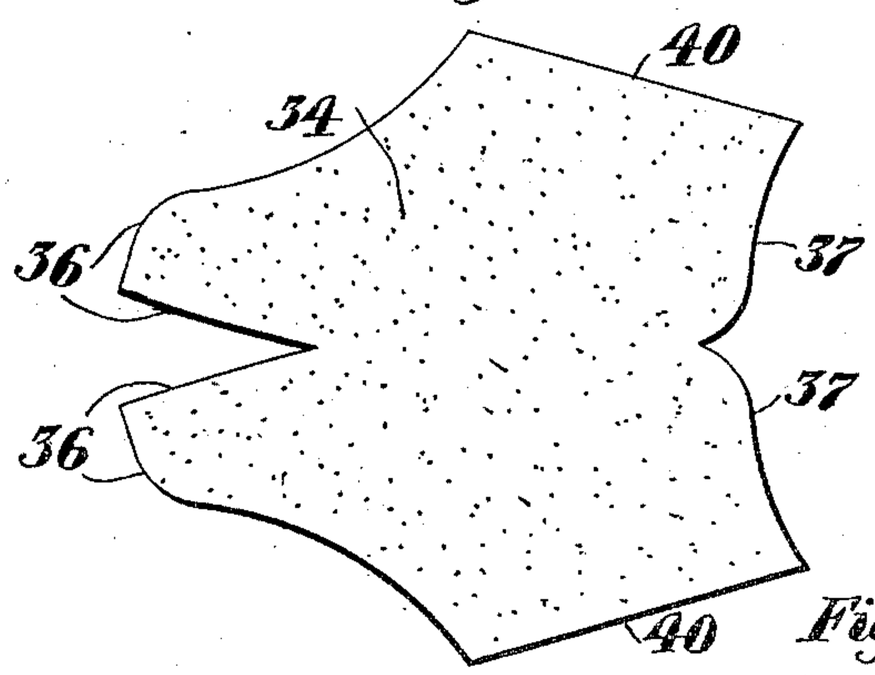


Fig. 8

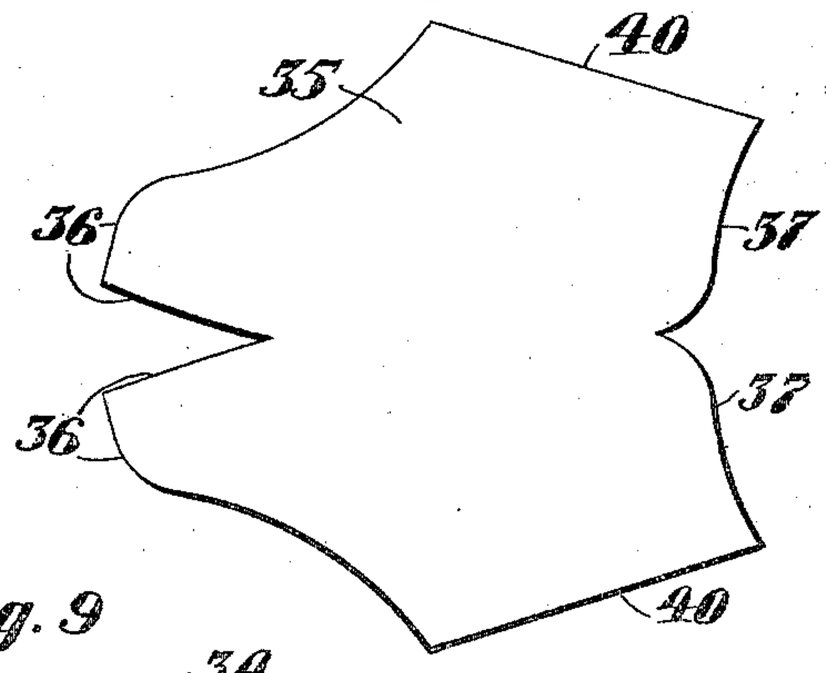
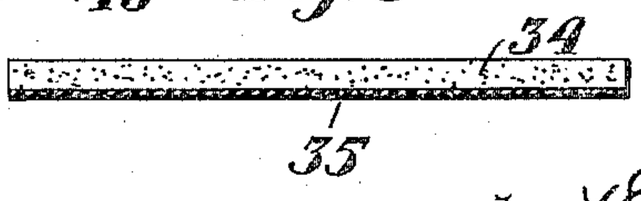


Fig. 9



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Inventor:
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by Wright, Brown & Quinby,
Attys.

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Fig. 10

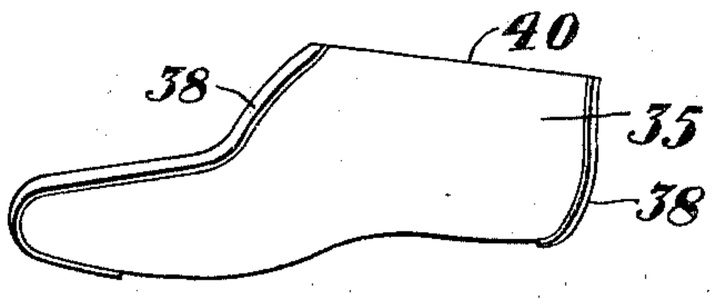


Fig. 12

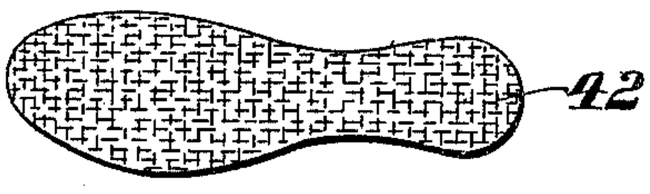


Fig. 13

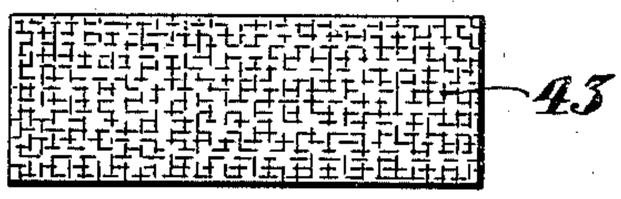


Fig. 11

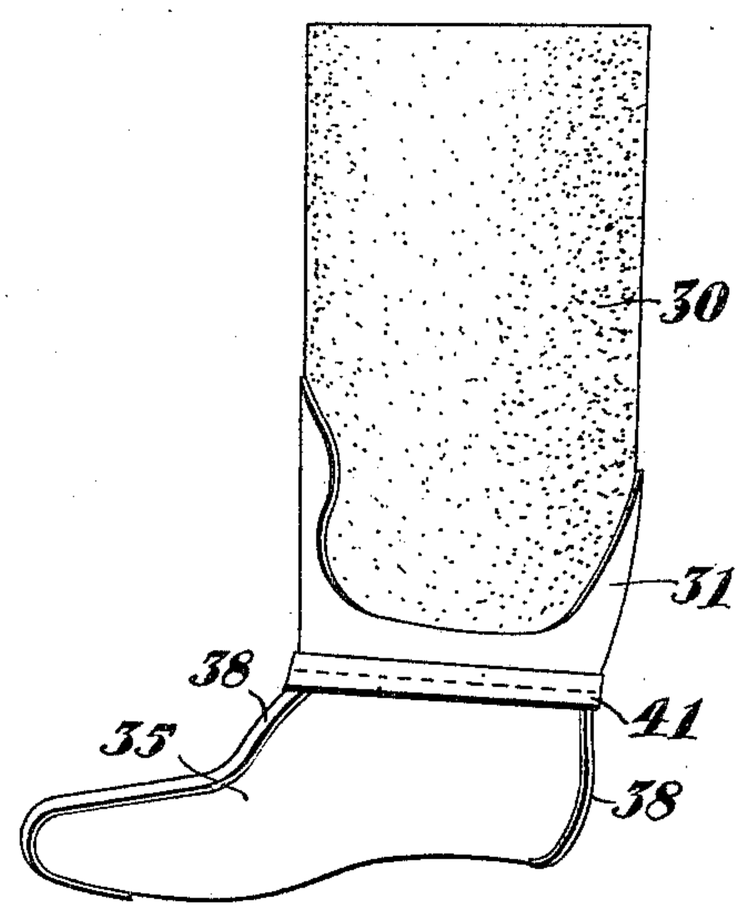


Fig. 14

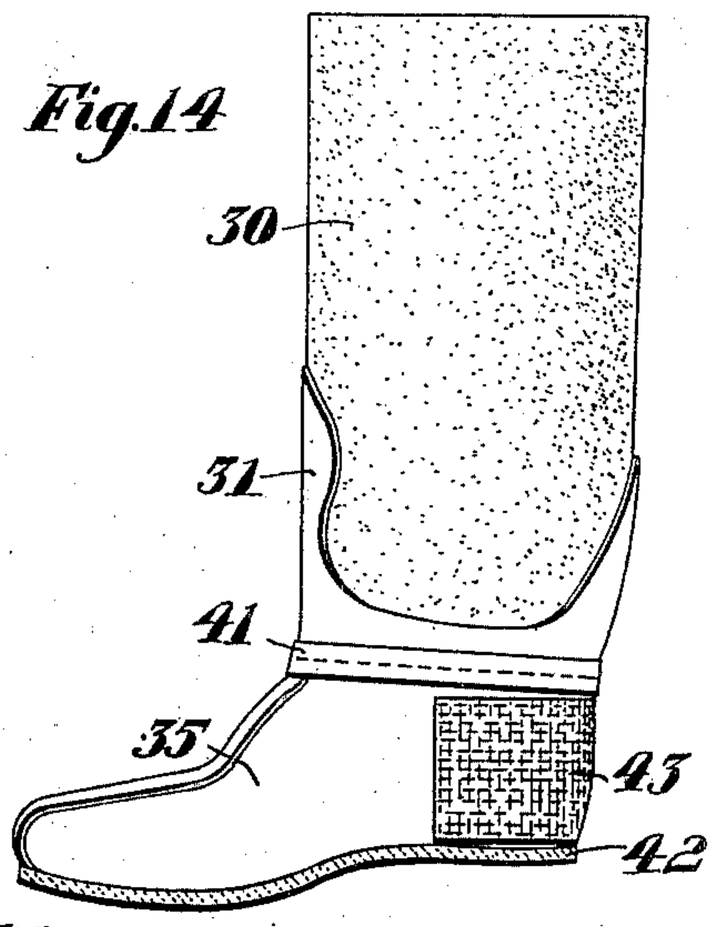
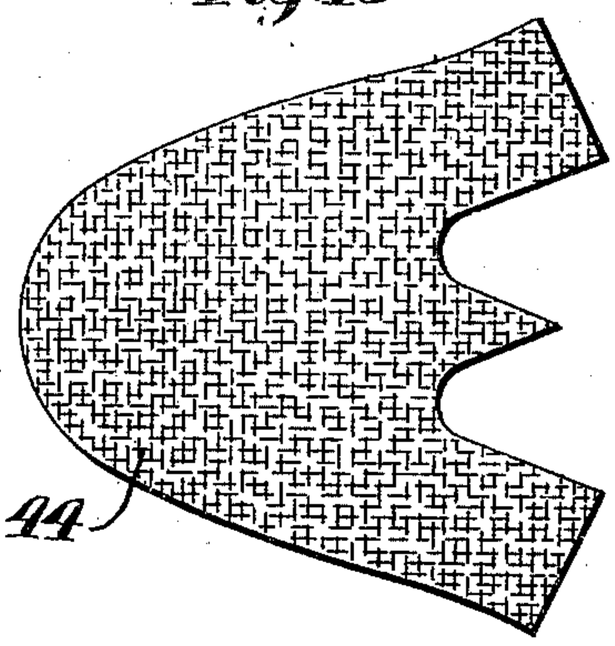


Fig. 15



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 16

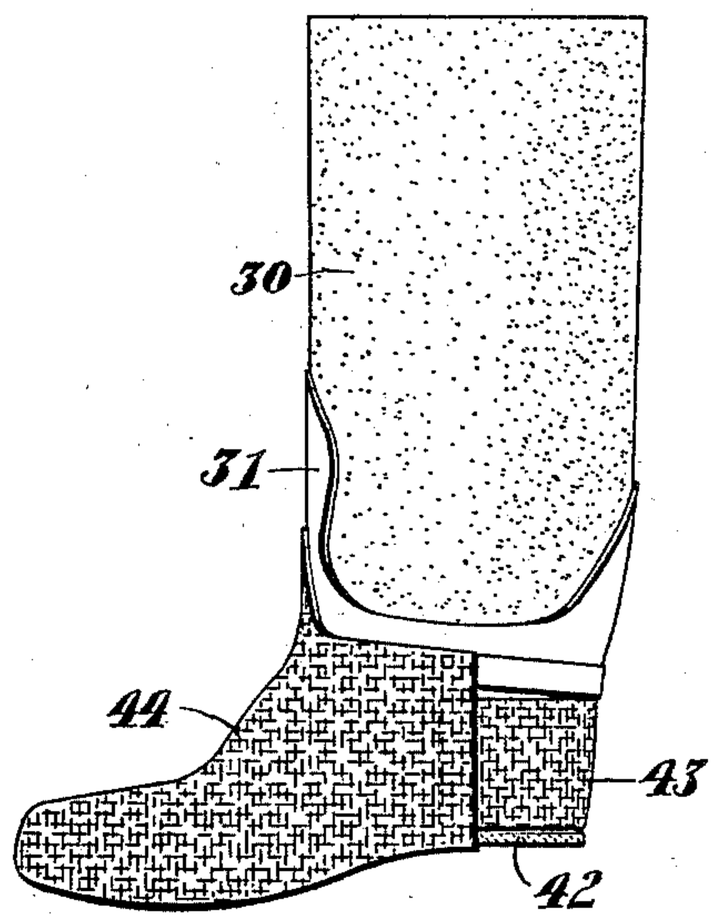


Fig. 17

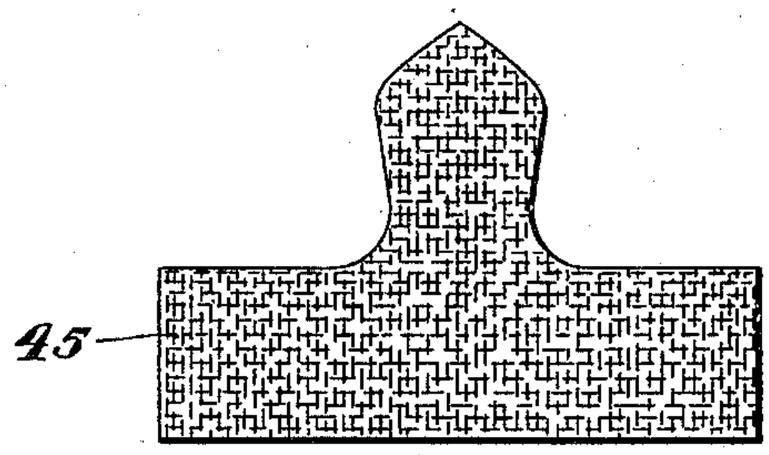


Fig. 18.

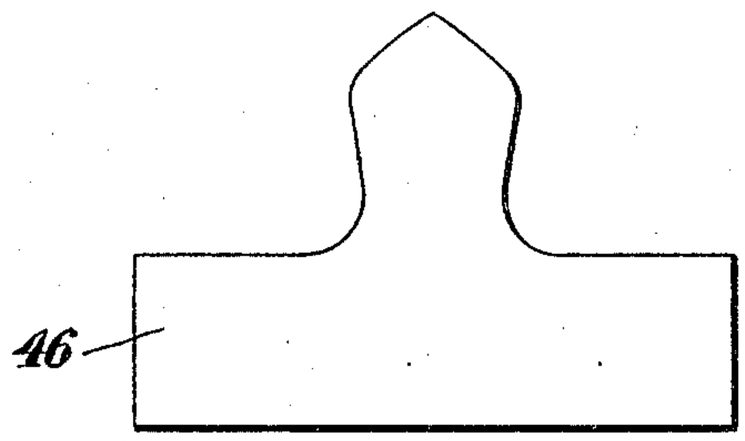


Fig. 20

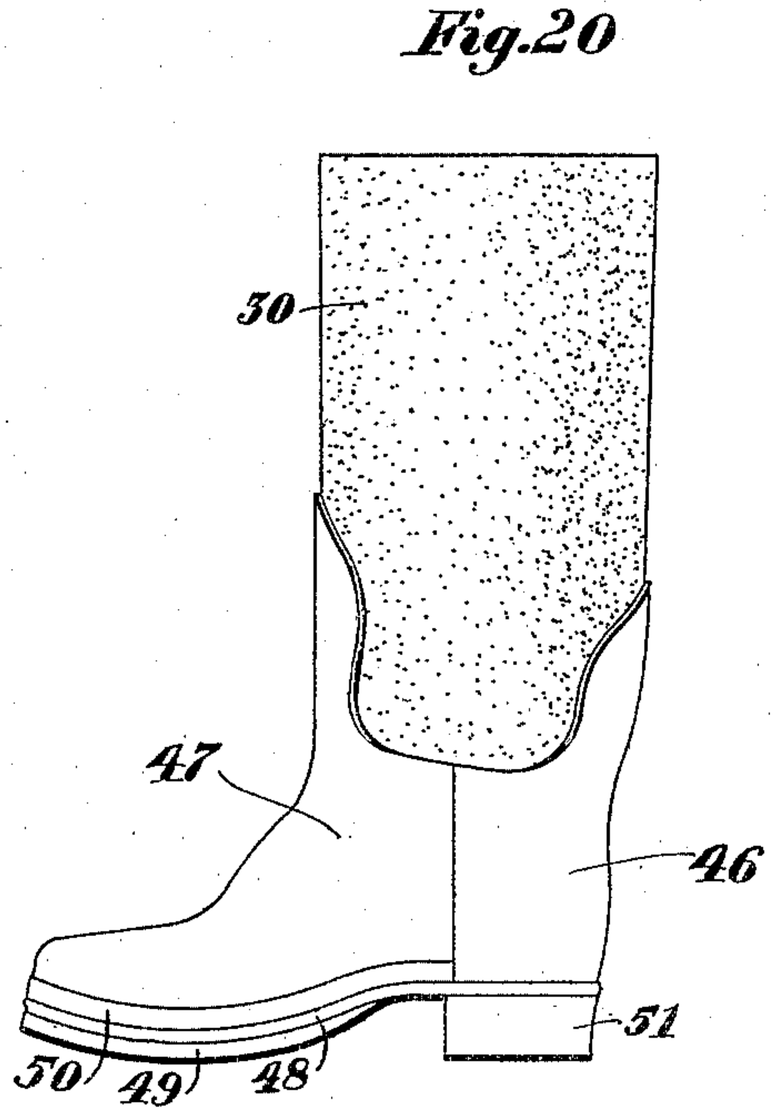
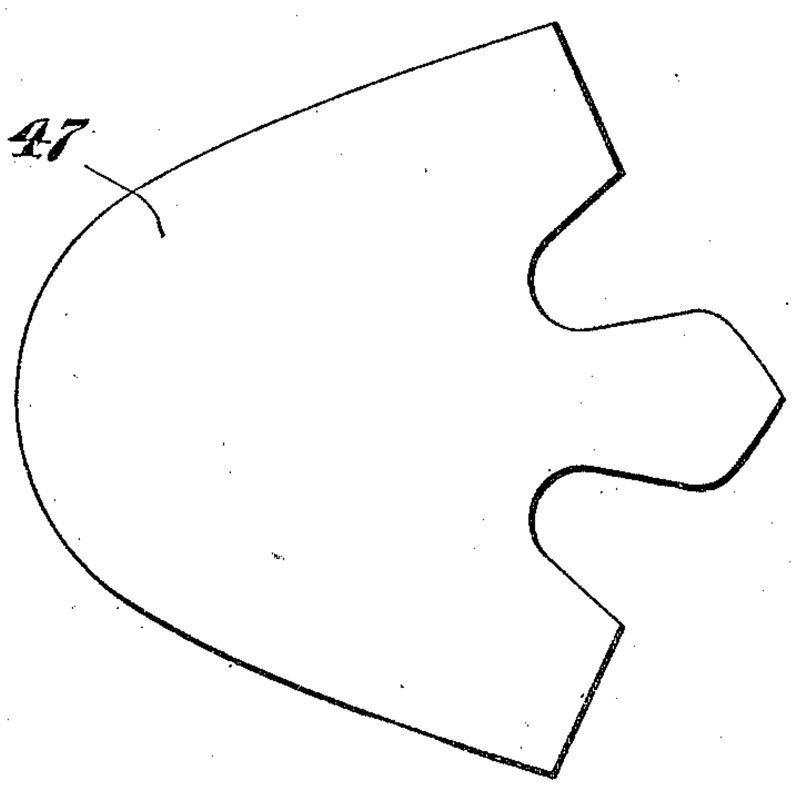


Fig. 19



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN E. RANDALL, OF MALDEN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO THEODORE S. VERY, TRUSTEE, OF BOSTON, MASSACHUSETTS.

BOOT OR SHOE.

SPECIFICATION forming part of Letters Patent No. 725,009, dated April 7, 1903.

Application filed January 3, 1902. Serial No. 88,316. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. RANDALL, of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boots or Shoes, of which the following is a specification.

This invention relates to the manufacture of waterproof rubber boots and shoes; and it consists in the novel process of manufacture, substantially as hereinafter described and claimed.

Of the accompanying drawings, Figure 1 represents a side elevation of the felt leg. Fig. 2 represents a section thereof on the line 2 2 of Fig. 1. Fig. 3 represents a plan of the covering-sheet of rubber tissue. Fig. 4 represents a sectional view illustrating the process of applying said sheet to the leg. Fig. 5 represents a side elevation of the felt leg with rubber tissue applied. Fig. 6 represents a section thereof on line 6 6 of Fig. 5. Figs. 7 and 8 represent plan views of the felt foot-blank and its rubber-tissue covering, respectively. Fig. 9 represents a sectional view of the two layers joined together. Fig. 10 represents a side elevation of the formed foot. Fig. 11 represents a side elevation of the leg and foot joined together. Figs. 12 and 13 represent plan views of the rag sole and rag counter, respectively. Fig. 14 represents a side elevation of the boot with said parts applied. Fig. 15 represents a plan of the inner-vamp lining. Fig. 16 represents a side elevation of the boot with the vamp-lining applied. Figs. 17 and 18 represent plan views of the counter-form and rubber counter, respectively. Fig. 19 represents a plan of the vamp. Fig. 20 represents a side elevation of the completed boot.

The same reference characters indicate the same parts in all the figures.

In the usual method of manufacture of rubber boots and shoes a lining of felt, woven, knitted, or other textile fabric is placed upon the last in suitably-shaped sections which meet or overlap, said sections having been cut to pattern from a larger body of the lining material which has been given a "skim" coat of rubber in a calender, this coated side of the lining being placed on the outside when the lining is on the last, so as to give a rubber surface to which the outer layers can adhere. The skim coat is not waterproof. Subsequently the waterproofing layer, which is usually the outer layer of the boot or shoe, consisting of suitable sections of green or unvulcanized rubber tissue or rubber compound cut to pattern, is placed upon the lining already on the last and caused to adhere to the inner layers and conform to the contour of the last by rolling or rubbing. In heavy footwear, such as boots, there are usually interposed between the lining and the outer layer suitable strips or sheets of friction-cloth to give body and stiffness to the walls. The layers of the sole having been applied at a suitable stage, the boot or shoe is then vulcanized.

In the drawings I have selected for the purpose of illustrating my invention a waterproof boot, the steps in the manufacture of which are as follows: 30 is a tube, which may be of felt, as shown, or of woven or knitted fabric constituting the upper or leg portion of the boot and to which before the tube is placed on the last and while it can be flattened, as shown in Fig. 4, I apply a sheet or layer 31 of unvulcanized or green rubber tissue or rubber compound of sufficient thickness to be permanently waterproof, said sheet being applied directly to the felt tube 30 without cement and united thereto by heavy pressure furnished between two surfaces, such as the platen 32 and roller 33. The apparatus should be such as to give simultaneous pressure over a large extent of surface and any other suitable device than the exact one herein shown may be employed to obtain the desired result. The sheet of green rubber is of sufficient plasticity or adhesiveness to cause the nap or surface fibers of the felt or other fabric to become slightly embedded in the rubber by reason of the pressure, but not being in a viscous or semifluid condition similar to that of cement there is no substantial penetration of the rubber into the body of the fabric. When the boot is subsequently vulcanized, the permanent set then acquired by the rubber causes the surface fibers of the fabric to be so held as to secure a practically inseparable connection between the fabric and the rubber. The union of the rubber sheet 31

with the leg-tube 30 may be accomplished in three stages around the leg. It is not essential to have a complete tube in the first instance, as the rubber may be applied to the lining in an opened-out state and the united layers afterward formed into a tube. The foot part of the lining may be made from a single piece of felt 34 or other textile fabric, to which a sheet 35 of green or unvulcanized rubber tissue or compound of corresponding shape and size is applied by pressure, as described in connection with the layers 30 31, while the said parts 34 35 are in a flat state. The united blanks 34 35 are then formed into a slipper with the felt on the inside, the blanks being shaped with complemental meeting edges 36 37 at front and back, which edges are preferably beveled and cemented and united by strips of adhesive tape 38 38. The completed slipper has the form represented in Fig. 10. Preferably before the back edges of the slipper are united the foot part of the boot-tree or last is inserted in the slipper and the tubular leg 30 31 is placed on the leg part of the tree. The complemental edges 39 40 of the leg and foot are then brought together and the joint covered by a strip of adhesive tape 41. The boot as thus formed and when subsequently vulcanized is perfectly waterproof without the addition of subsequent parts which I shall presently describe and which are added for the sake of giving body and stiffness to the boot and providing a suitable surface to withstand wear and also to firmly unite the leg part of the boot to the foot part and prevent their being pulled apart. After the boot has reached the stage of Fig. 11 the rag sole 42 and rag counter 43 are applied by cementing them in place, after which is applied the inner-vamp lining 44, made of friction-cloth or other suitable material, then the inner-sole filler, (not shown,) and then the counter-form 45, of the same material as the vamp-lining, and the counter 46, of rubber or other material suitable for a wearing-surface, the latter two being cemented together before being applied. The outer vamp 47, of rubber, knitted or woven fabric, or other material, is then put in place and the construction of the boot is completed by applying the outer-sole layers and the heel in the usual manner, these being shown in Fig. 20, 48 being the plain sole, 49 the tap-sole, 50 a foxing, and 51 the heel. The whole boot is then vulcanized by heat in the ordinary manner.

The steps and materials succeeding the stage represented in Fig. 11 may be variously modified as desired. The steps preceding and including this stage may also be subjected to modification without departing from the spirit of the invention. For instance, the rubber layer 31 may be extended to cover the whole of the leg portion of the lining. It is also unessential to make the foot portion of the lining and its rubber layer 35 each in a single piece or of the exact shape of a complete slipper.

It will be noted that my invention distinguishes from the old method of making rubber boots or shoes hereinbefore alluded to in the fact that the waterproofing layer is applied to the lining before the lining is lasted and while it is in a substantially flat state, as shown in Figs. 4 and 9, and also in the method of uniting the waterproofing layer to the lining layer, which I believe to be new with me. Several advantages arise from this method of manufacture, among which are the fact that I dispense with the skim coat of rubber heretofore applied to the lining in a calender and with the waste of material incident to cutting out this rubber-coated lining to pattern, the valuable rubber in which cannot be recovered except by "reclaiming" it—that is, separating the rubber from the fabric by chemical process. In my process there are no waste pieces or strips of combined fabric and rubber requiring to be reclaimed to save the rubber, for by pursuing the method which I have described of uniting the rubber to the fabric I can cut both the rubber and the fabric to their proper pattern before uniting them. This process also provides for covering a part only of the lining with rubber, if desired, as illustrated by the parts 30 31. It is not practicable nor economical to do this by the calender method, and if done by cementing the rubber to the lining the latter is made stiff and liable to crack and loses its porosity and evaporative qualities, owing to the permeation of the lining by the cement. It is evident that in those portions of my improved foot-covering which are protected by an outer wearing layer the cracking, puncturing, or wearing through of this outer layer will not destroy the waterproof quality of the foot-covering, as it will in an ordinary rubber boot or shoe.

I am aware that it has heretofore been proposed to unite a previously-formed sheet of green rubber and a previously-formed sheet of fabric by continuously passing them together between rollers, thus securing a rubber coat on the fabric of greater thickness than that secured in a calender, and I do not claim such process as my invention.

I claim—

1. The herein-described process of making a foot-covering which consists in taking a lining sheet or layer of fibrous fabric, and a sheet or layer of unvulcanized green rubber which has been previously cut to the desired pattern and is of a waterproof thickness, directly uniting the two by pressure while in an unlasted extended condition but avoiding substantial penetration of the rubber into the fabric, then forming the united layers into a foot-covering, and vulcanizing the rubber.

2. The herein-described process of making a boot which consists in separately producing

leg and foot portions, each by taking a lining sheet or layer of fibrous fabric, and a sheet or layer of unvulcanized green rubber which has been previously cut to the desired pattern and is of a waterproof thickness, directly uniting the two by pressure while in an unlasted extended condition but avoiding substantial penetration of the rubber into the fabric, then forming said leg and foot portions into a boot, uniting said portions by an outside upper-shaped wearing layer, and vulcanizing the rubber.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN E. RANDALL.

Witnesses:

R. M. PIERSON,

P. W. PEZZETTI.