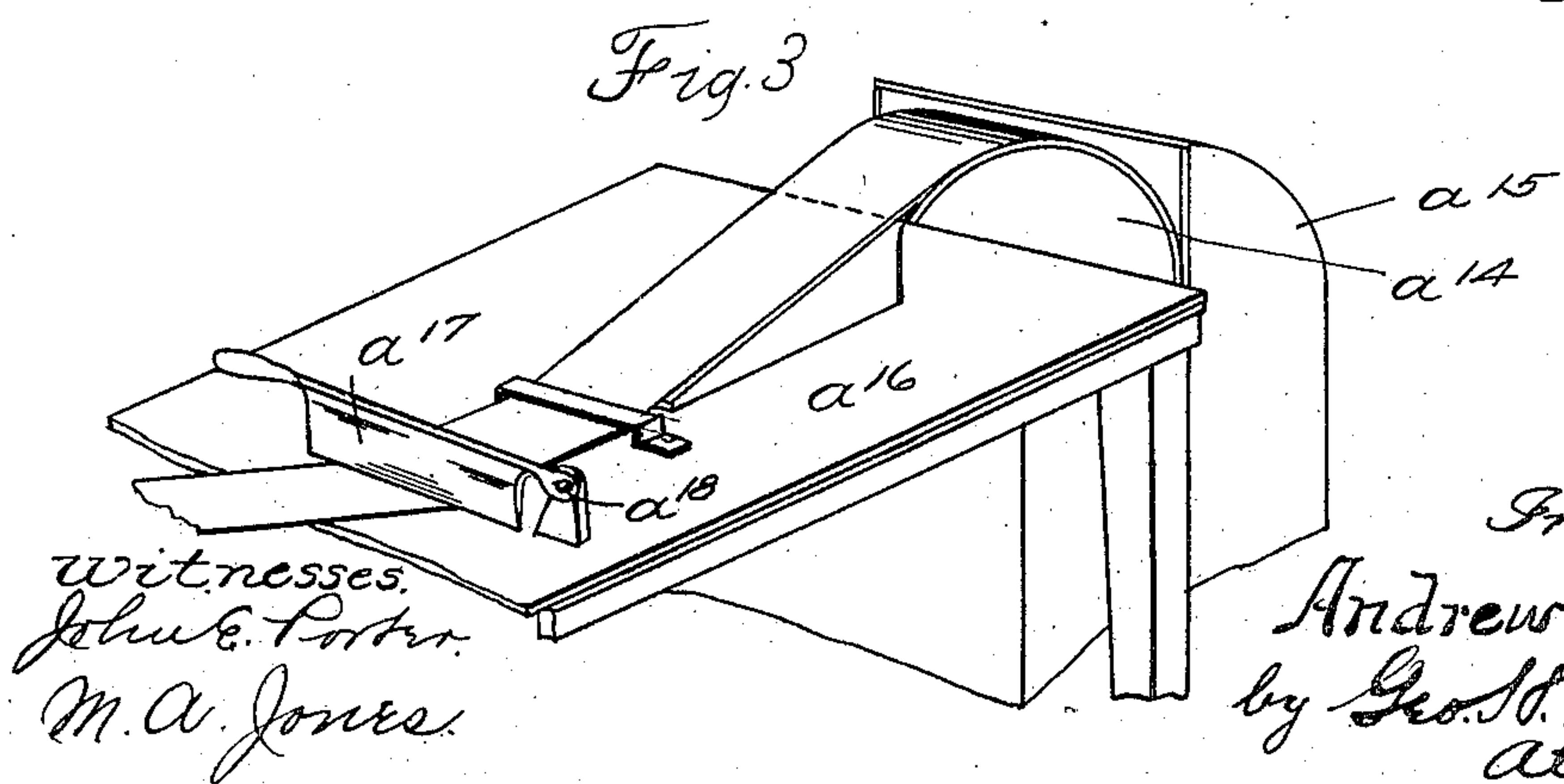
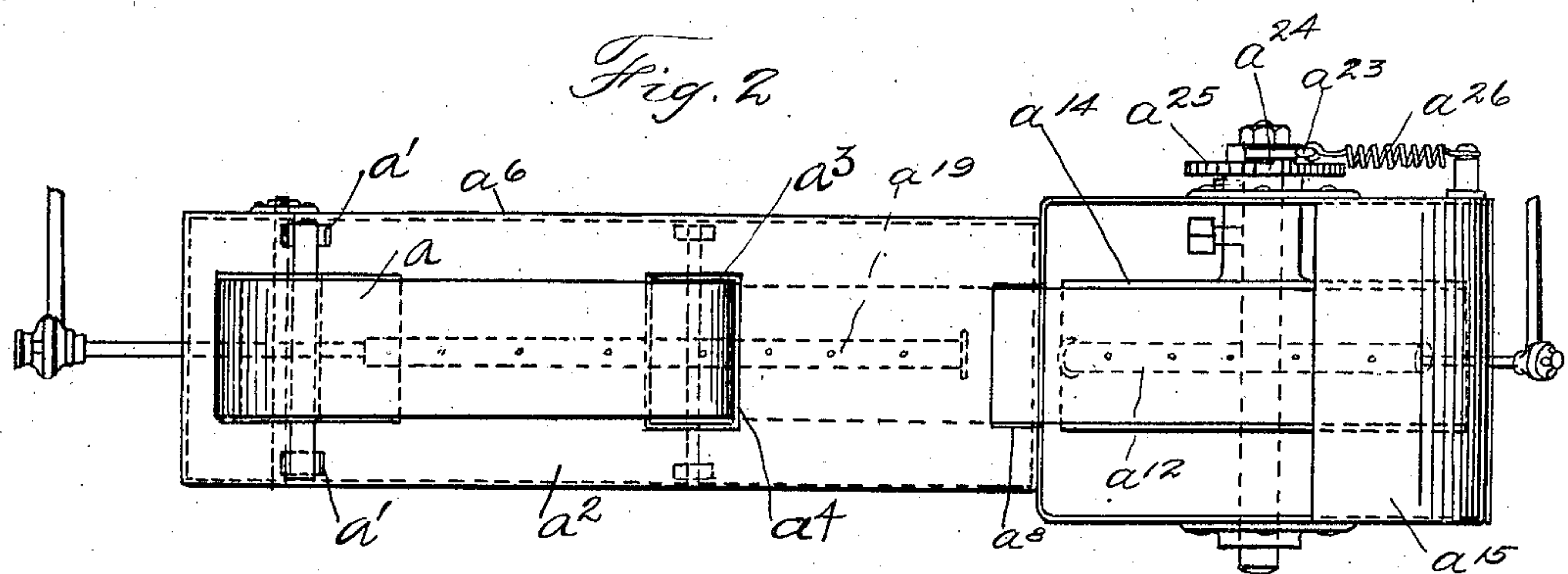
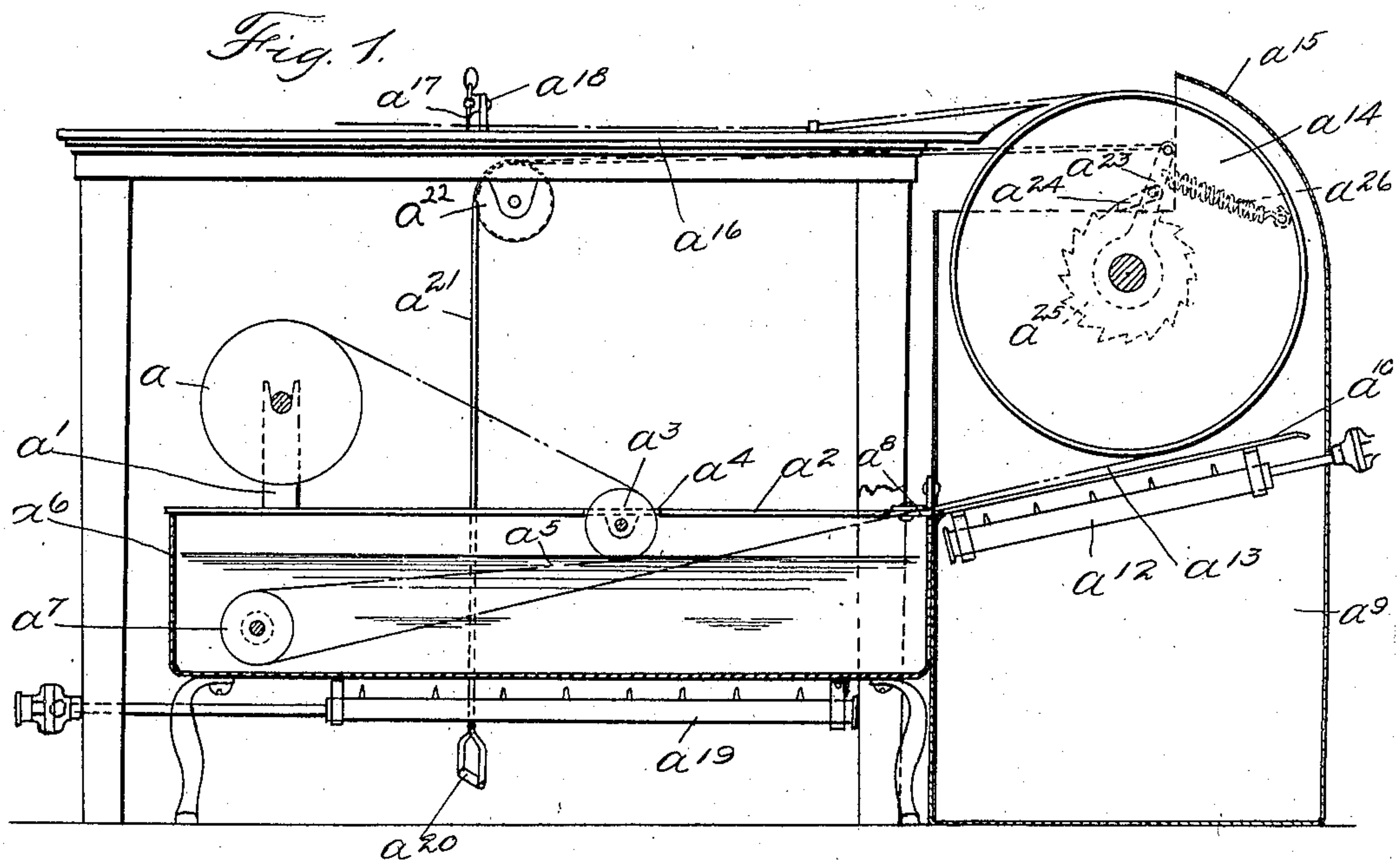


No. 812,383.

PATENTED FEB. 13, 1906.

A. THOMA.
METHOD OF MAKING INNERSOLES AND THE LIKE.

APPLICATION FILED MAR. 13, 1905.



UNITED STATES PATENT OFFICE.

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METHOD OF MAKING INNERSOLES AND THE LIKE.

No. 812,383.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed March 13, 1905. Serial No. 249,688.

To all whom it may concern:

Be it known that I, ANDREW THOMA, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Methods of Making Innersoles and the Like, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to applying fabrics to leather or other materials, and is particularly intended for the manufacture of that class of innersoles in which a base or foundation of leather, leatherboard, composition, or the like is reinforced by a canvas backing which provides the sole with the required strength, especially at the stitch-receiving regions thereof. There is a wide variety of these innersoles; but taking one of them as a type—that shown in the patent of Cole, No. 575,460, of January 19, 1897—it will be seen that the base or innersole proper is provided with a lip or stitch receiving rib turned up substantially parallel to and slightly in from the edge, and over the corresponding side of the innersole a reinforcing covering of canvas or other fabric is secured in direct contact with the entire side of the innersole including its lips or ribs and thin edge or peripheral feather. The common practice is to apply rubber-cement separately to the entire surface of the canvas and likewise to the entire surface of the innersole which is to receive said canvas. Then after the two have stood long enough to dry (as is necessary with rubber-cement) the two are applied face to face and pressed and hammered together; but because of the curved shape of the lip, and especially its more or less cup-shaped bend about the toe, it is exceedingly difficult to apply the canvas firmly at all points. As it is being secured at one side of the toe, for instance, it will be pulled away from the opposite side, and in general the stretching and straining of the canvas at one point tends to pull it away and distort it from another point. Also the brushing or spreading on of quantities of cement is wasteful of this expensive article and cannot be accomplished rapidly in a cleanly and neat manner. Accordingly I have devised the present method with the object of doing away with all the above objectionable features, while at

the same time producing a superior and less expensive innersole. I do away with the cementing of each separate innersole, save the heavy cement bill, eliminate the loss of time due to drying the cemented parts, and to the subsequent cleaning of those parts of the soles which were daubed and soiled while being cemented, and I so treat the canvas that instead of being stiff and hard to manipulate it is rendered exceedingly pliable and is secured in place immediately, so that the finished innersoles are produced rapidly and at once on the spot, (not requiring the intermediate step of cement-drying which has heretofore consumed so much time and space and caused so many accidents and losses.) I first prepare a strip of canvas having a special coating, which is normally not sticky, and therefore permits the canvas to be rolled, in which condition it can remain indefinitely without deterioration. Next, having provided the usual leather base or other cut innersole, I pass the specially-prepared strip of canvas through a bath of hot water, and when it is properly soaked and rendered pliable the coated side thereof is passed over a dry heat. This treatment renders the strip exceedingly sticky, and thereupon the softened pliable fabric is pressed or molded onto the leather, adhering thereto at every point and readily following all the curves, depressions, and elevations of the stitch-receiving rib and other portions of the innersole.

Further steps of my method will be pointed out and the entire method rendered more readily intelligible, in connection with the accompanying drawings in which I have illustrated my method in connection with apparatus for carrying it out.

In the drawings, Figure 1 is a longitudinal sectional view of said apparatus. Fig. 2 is a top plan view thereof, and Fig. 3 is a perspective detail.

As already stated, my invention, although applicable to various other uses, is particularly intended for the manufacture of innersoles, and therefore I will describe it in connection therewith. Having stripped the fabric, usually canvas, into widths of, say, four and one-half inches and of convenient lengths for handling—say fifty or one hundred or more yards in length—I apply to one side thereof a thin layer of very sticky com-

pound having the property of adhering strongly to cotton, and on this as a base I apply one or more coatings of a somewhat different nature, so that the final result is that the coating is not sticky except under heat, but when heated will become sticky and capable of adhering strongly to cotton and to leather. Various well-known compounds may be employed within the spirit and scope of my invention; but I prefer to employ for the first or basic coating compound consisting of twenty per cent. of resinous residuum of petroleum and eighty per cent. of gum-chickle or pontianac or tuno or almeidina, or any vegetable gum of a similar nature, and for the second and subsequent coatings a compound consisting of five per cent. of said resinous residuum of petroleum, twenty per cent. of said gum-chickle or other enumerated gums, and seventy-five per cent. of resinous gutta-percha. The point to be observed in respect to the compounds is that the base shall be tacky or sticky and capable of adhering strongly to the cotton or other material upon which it is placed and also of adhering strongly to the next layer or coating, while said next layer or coating is not normally sticky, but is capable of becoming exceedingly so upon proper treatment, as the application of dry heat. I prefer the use of resinous residuum of petroleum, because, not being readily oxidizable, it prevents the finished coated fabric from deteriorating when exposed to the air and yet it is very tacky. For the latter reason I employ a larger proportion of this ingredient in the base or first coating and only barely enough of it in the second coating to properly join the two coatings. I rely mainly upon the gutta-percha for the normally non-sticky character of the finished surface of the coated fabric. These strips of prepared canvas may then be rolled up in quantity and kept for a long time, if desired. I next provide the desired number of innersoles which are to be covered, and I might point out that, with the fabric prepared as above stated, it is feasible to use other materials than leather—such as paper, cork, or, in fact, any substance not appreciably oily and on which the coated canvas can be pressed or pounded—the nature of the adhesion being such that the coated fabric will thoroughly adhere to either a smooth or rough surface.

While my method is not dependent upon any particular apparatus, it is convenient to employ an apparatus of the general character which I will now describe in connection with the remaining steps of my method invention.

A roll *a* of coated fabric is mounted in bearings *a'* on a cover *a''*, which also carries a guide-roll *a'''*, in front of which is a slit *a''''*, through which the fabric passes, as indicated at *a'''''*, into a tank *a''''''*, containing a heated liq-

uid, preferably water. The strip of fabric is passed through this hot water for a sufficient distance and time to enable it to become properly soaked or softened, one deflector-roll *a'''''''* being herein shown for the purpose, although it will be understood that more than one such roll may be provided, if desired. Thence the fabric passes through an outlet-slit *a''''''''* to a second chamber *a'''''''''*, provided with a dry-heat applicer *a''''''''''*, heated by flames from a gas-pipe *a'''''''''''*, and thence the roll passes, as indicated at *a''''''''''''*, about a large drum *a'''''''''''*, beneath a hood *a''''''''''''*, to a table *a'''''''''''*, where the operator cuts it into innersole lengths by suitable cutting means, a knife *a''''''''''''''* being indicated for the purpose pivoted at *a'''''''''''''* to the table. The tank *a''''''''* is maintained at the desired temperature by any suitable heating device, as a gas-heater *a''''''''''*. The strip of fabric may be pulled along by hand or fed in any other manner, a stirrup or foot-lever *a''''''''''''* being shown for this purpose connected by a cord *a'''''''''''''*, passing over a pulley *a''''''''''''''*, to a lever *a'''''''''''''*, carrying a pawl *a''''''''''''''*, engaging a ratchet *a'''''''''''''* and normally held back by a spring *a''''''''''''''*, so that every depression of the foot will feed forward the desired length of innersole to be cut off.

The temperature of the liquid bath will depend mainly upon the quality and weave of fabric, it being desirable to employ actually boiling water with closely woven and heavy duck, while with flimsy duck the water may be merely warm to hot.

The fabric is wound with the coated side inwardly, so that as the roll *a* is unwound the coated side becomes eventually the under side of the web or strip of canvas as the latter emerges from the tank. As the fabric passes from the roll *a* into the tank *a''* the special coating is softened and the fabric itself is not only soaked with water, but is rendered exceedingly pliable. It passes thence in this wet condition over the dry heat of the shielded gas-flame, which dries up the moisture on the coated side only and imparts a stickiness to the already-softened coating, which the latter will retain for a sufficient length of time to enable it to be applied deliberately and properly to the innersole, and likewise the fabric remains pliable for a long time, as I avoid as much as possible drying the fabric. As soon as this sticky coating comes in contact with the leather of the innersole it is cooled by said contact unless already previously cold by standing; but, as above stated, the stickiness previously developed by the heat is retained for a considerable time, so that when the sole is carried to the pounding or hammering machine and subjected to the pressing and pounding operation a perfect adhesion at all points takes place, notwithstanding the cold condition which all the parts will have usually attained by that time.

The coating is not only waterproof, but its

nature is such that it withstands the action of the hot or boiling water, so that the strip of canvas may be subjected to the latter sufficiently to eliminate all stiffness therefrom, due to sizing or the natural stiffness of a close strong weave, so that it becomes soft and limp and can be made to follow the curves, indentations, and configuration of the inner-sole far more readily than a refractory stiffer material. The effect of the boiling water is equally beneficial to the coating which it prepares for the flame. The soft wet condition of the canvas and coating enables the strip to pass unharmed before a live gas-flame or intense dry heat. The wet condition of the canvas also keeps the knife clean and greatly facilitates the handling of the cut pieces, and the moistening of the fingers thereby prevents them from sticking to the gummed surface. It is necessary to keep the coating moist in order to maintain the fabric workably sticky for any considerable length of time, and therefore the liquid bath of wet steam or hot water should be applied long enough to soften the strip and coating.

The fabric is coated sufficiently to provide a considerable body of coating, and when this has been softened in the bath and has been subsequently rendered tacky by the dry heat it becomes very workable, so that in connection with the pliable canvas it can be shifted and molded to conform to the exact requirements of the innersole without losing its adhesion thereto. This also produces under normal conditions of temperature in connection with the subsequent drying of the canvas a firm and stiff reinforcing of the innersole, which provides a material additional body of strength and stiffness to the latter, so that thin weak foundations of innersoles may be employed with good results.

My method as above explained makes it possible to apply stiff canvas neatly and accurately even to the thin weak upstanding lip of such a style of innersole as that shown in the aforesaid patent, and yet when once applied and finally dried the resulting innersole will have the requisite stiffness and strength. As already pointed out, there is an entire elimination of the usual naphtha-rubber cement, with its accumulation of dirt and dust and its great expense, consumption of time, and imperfect results. The rubber-cement method renders the fabric, before application to the irregularly-shaped innersole, even stiffer than its normal condition, whereas my method not only does away with this extra stiffness, but introduces an element of extreme pliability of canvas and workable quality of the attaching coating.

I regard not only the method herein set forth as new, but also the article and the mechanism, but claim only the method herein and reserve the rest for other applications.

Having described my invention, what I

claim as new, and desire to secure by Letters Patent of the United States, is—

1. The herein-described method of making innersoles, consisting of providing an inner-sole foundation of leather or other suitable material, and a fabric strip of cementitious coated reinforce material, softening and rendering pliable said strip in a liquid bath, rendering the coating sticky by heat and applying the same to said innersole foundation while still moist.

2. The herein-described method of making innersoles, consisting of providing an inner-sole foundation of leather or other innersole-foundation material, and a fabric strip of reinforce material, applying to one side of said strip a coating of cement capable of adhering to said foundation material, permitting said coating to dry, rendering pliable said strip by soaking it in a liquid bath until the liquid has permeated and softened the entire body of the fabric, and cementing the same to said innersole foundation while still in said pliable, softened condition.

3. The herein-described method of making innersoles, consisting of providing an inner-sole foundation of leather or other suitable material, and a fabric strip of reinforce material, applying to said strip a coating of cementing material which is unaffected by water, softening and rendering pliable said strip in a liquid bath, subjecting said coating to an intense dry heat, and cementing the same to said innersole foundation while still moist.

4. The herein-described method, consisting of applying to a strip of fabric a base of sticky compound, adhesive to the fabric, then applying to said base a normally non-sticky compound which is capable of becoming sticky under heat, permitting the same to dry and set, and then subjecting the coated side only of said fabric strip to an intense dry heat, and applying it under pressure to the article to be reinforced.

5. The herein-described method, consisting of applying to a strip of fabric a base of sticky compound, adhesive to the fabric, then applying to said base a normally non-sticky compound which is capable of becoming sticky under heat, permitting the same to dry and set, then passing said coated strip through a hot liquid bath, then subjecting the same to an intense dry heat, and applying the same while still moist to the article to be reinforced.

6. The herein-described method of forming a reinforcing-strip, consisting of applying to one side of a strip of fabric a base of sticky compound adhesive to the fabric, then applying to said base a normally non-sticky non-oxidizing compound unaffected by water, and capable of becoming sticky under dry heat, and then drying the same.

7. The herein-described method, consisting in providing a strip of reinforcing mate-

rial with a cementitious coating whose cementitious character is not injured by water, then immersing said strip in hot water a sufficient time to soften and render the same pliable, then subjecting the coated side of the strip momentarily to a dry heat, and applying the same under pressure to the article to be reinforced.

8. The herein-described method, consisting of coating a strip of fabric with a base of sticky compound adhesive to the fabric, coating said base with a normally non-sticky compound, permitting the same to dry and set, rendering said coating sticky by the application of heat, and forcibly pressing together, when cold, said coated fabric and the article to be reinforced.

9. The herein-described method, consisting of providing a strip of fabric with a coat-

ing having a base adhesive to the fabric and a normally non-sticky outer surface capable of being rendered sticky by heat and of remaining sticky for a considerable time thereafter when cold, permitting said coating to dry and set, applying an intense heat to said coated fabric for developing the said stickiness of said coating, permitting the same to cool, and then forcibly pressing the cold, sticky fabric in place on the article being reinforced.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANDREW THOMA.

Witnesses:

GEO. H. MAXWELL,
M. A. JONES.