

No. 687,077.

Patented Nov. 19, 1901.

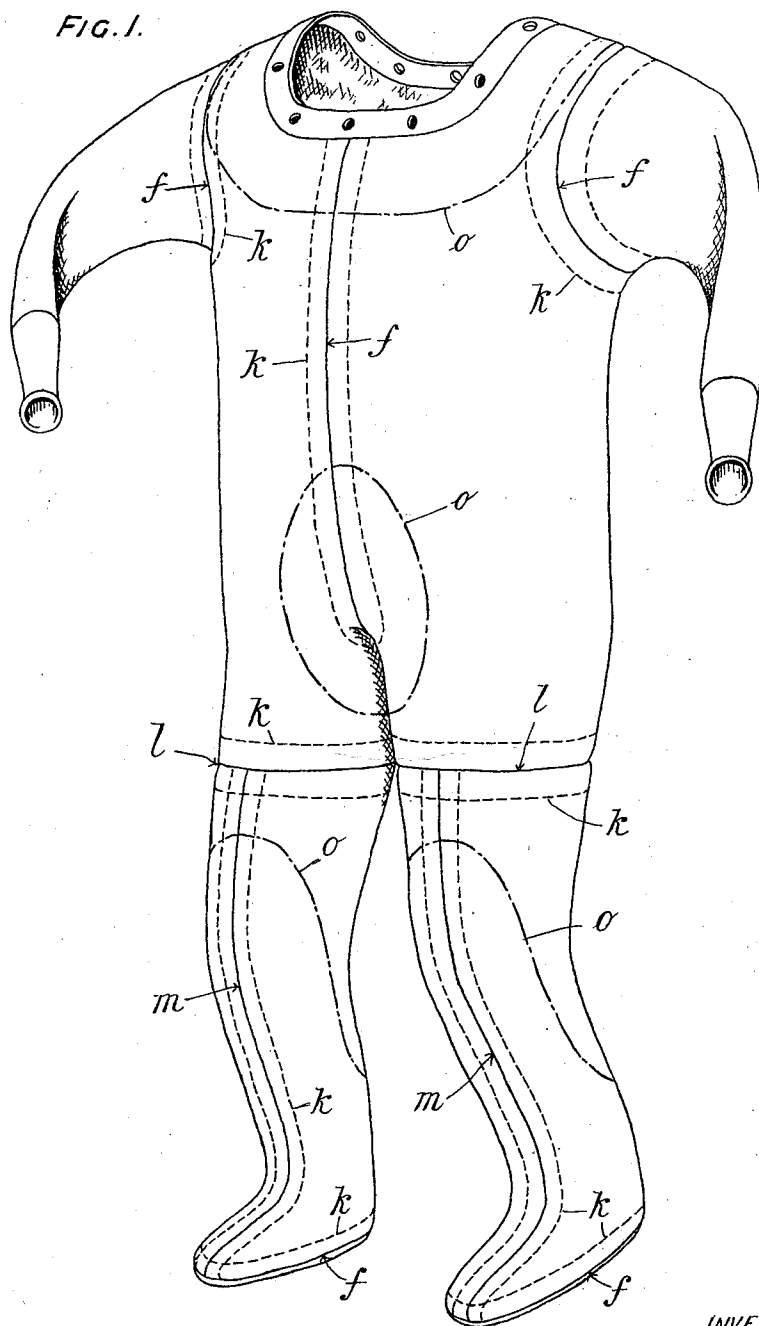
F. H. SPRANG.
DIVING DRESS.

(Application filed July 23, 1901.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.



WITNESSES

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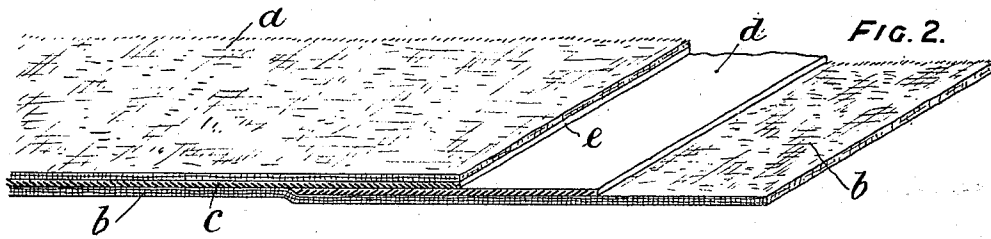
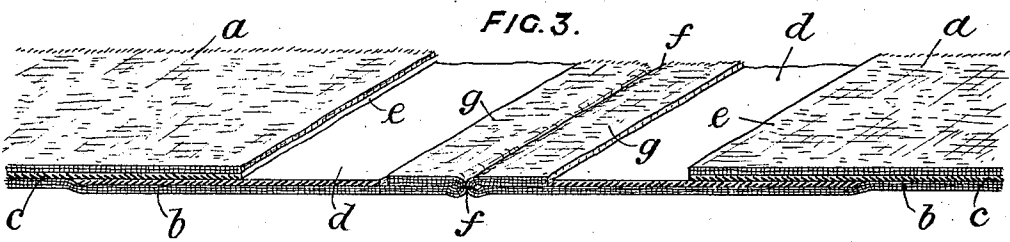
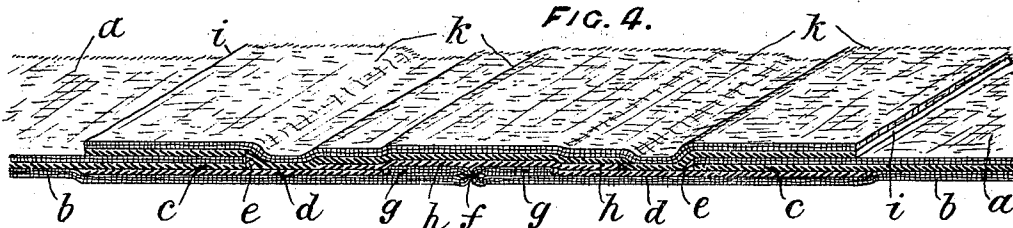
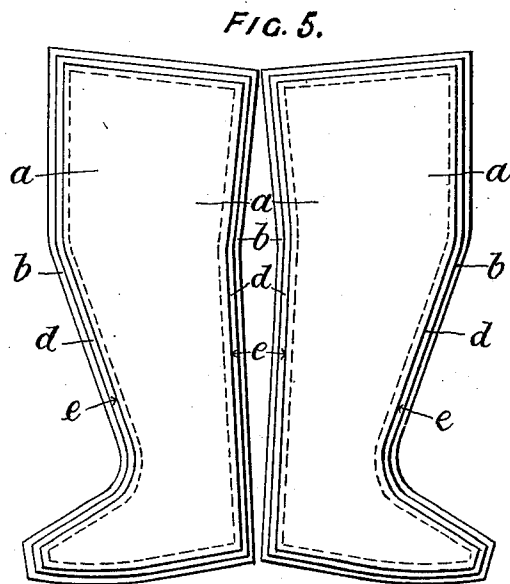
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2 Sheets—Sheet 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK HENRY SPRANG, OF LONDON, ENGLAND.

DIVING-DRESS.

SPECIFICATION forming part of Letters Patent No. 687,077, dated November 19, 1901.

Application filed July 23, 1901. Serial No. 69,372. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK HENRY SPRANG, india-rubber manufacturer, a subject of the King of Great Britain, and a resident of 86 Grange road, Bermondsey, London, England, have invented certain new and useful Improvements in the Manufacture of Diving-Dresses, of which the following is a specification.

Heretofore diving-dresses have usually been waterproofed with unvulcanized rubber, the proof-coating of rubber being carried on the inner face of an outer fabric and inclosed between the latter and a lining fabric cemented to the rubber. Among other disadvantages such dresses have been subject to rapid deterioration consequent on the liability of the unvulcanized rubber to be absorbed by the porous fabric in hot climates, with the result that the proofing becomes defective and inward weeping or infiltration of water and outward leakage of air through the dress occur.

My invention has primarily for its object to enable rubber-coated fabric vulcanized in the piece to be used, which has not heretofore been found possible in consequence of the difficulty of making the seams by which the parts whereof the dress is made up are united; and my invention consists, essentially, in the structure of the dress, as hereinafter described.

Reference is to be had to the accompanying drawings, wherein—

Figure 1 is a general view of the dress. Fig. 2 is a cross-sectional perspective view of the marginal portion of one of the constituent pieces of the dress before seaming together. Fig. 3 is a cross-sectional perspective view of one of the seams (the front seam, for example) before the seam is proofed; and Fig. 4 is a similar view of the finished seam. Figs. 2, 3, and 4 are drawn to an exaggerated scale. Fig. 5 shows the shape of the pieces forming the leg and foot portion of the dress developed in the flat.

According to my invention the vulcanized-rubber-coated fabric *a*, which constitutes the waterproof fabric of the dress, occupies the position of the lining of the dress, (instead of being the outer fabric, as usual,) the pieces thereof to form the dress being cut smaller than would otherwise be required to form a

dress of given dimensions and not being stitched together, so as to leave the waterproof fabric free from needle punctures. The outer fabric *b* is unproofed, and it is cut into pieces corresponding in shape to those of the proofed fabric *a*, but larger to allow for the intumed margins at the seams and for making and proofing the seams, as hereinafter described. Insulating marginal strips of unvulcanized rubber *d* are applied to the rubber face *c* of the portions *a*, so as to project for about half their width beyond the edges *e* thereof, after which the pieces of the outer fabric *b* are cemented to the rubber face *c* of the pieces of the fabric *a*.

The dress is made up by stitching together, as at *f*, the pieces of the outer fabric *b* only, care being taken that the edges of the intumed margins *g* do not meet the edges *e* of the fabric *a*, but are separated therefrom by the projecting margins of the insulating-strips *d*. The proofing of the seams and adjacent portions of the outer fabric *b* is then effected by solutioning on over the margins *g* first a strip of unvulcanized rubber *h*, whose edges overlap and are united to the insulating-strips *d*, and then a cover-strip *k*, of vulcanized-rubber-coated canvas, which is cemented over the strip *h* and the insulating marginal strips *d* and whose edges *i* overlap and are cemented to the inner surface of the lining *a*. By means of the insulating-strips *d* and the proofing-strip *h* all possibility of a porous channel of communication being formed between the edges or body portion of the outer fabric *b* and the raw edges of the fibrous fabric *a* is avoided. All the seams of the dress are similarly proofed.

Heretofore the legs of such dresses have been cut in one with the body, which has necessitated the insertion of gusset-pieces to form the vamps for the foot portions, and consequently the formation of seams over the insteps, where the greatest amount of flexure occurs and where the wear due to chafing by the straps of the diver's boots is greatest. According to my invention the leg and foot portions are cut separate from the body and are united thereto by circumferential seams, as at *l*, above the knees, these seams being formed as above described, whereby such combined leg and vamp portion can be made with lon-

itudinal seams *m* at front and back only without the introduction of any gussets. This mode of making the leg portions also enables them to be formed with a sweep or bagginess at the knees, as indicated in Fig. 5, whereby the flexure of the knees of the diver is more readily accommodated. These seams, by which the leg portions are united to the body of the dress, instead of extending circumferentially, as shown, may be diagonal, so as, for example, to follow the direction of the groin. The usual protective covering-pieces for the legs and other parts of the dress are indicated by the dotted lines at *o*, Fig. 1.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A diving-dress made of an inner fabric coated with vulcanized rubber on its outer face, and an outer fabric cemented thereto, the pieces of the outer fabric being larger than the corresponding pieces of the inner fabric and alone being stitched together, each seam with the adjacent inturned margins of the outer fabric being proofed by a cover-strip of vulcanized-rubber-coated fabric cemented both to the inner fabric and to the intervening portions of the outer fabric.

2. In a diving-dress whereof the component parts are formed of an inner fabric coated with vulcanized rubber on its outer face and an outer fabric cemented thereto, the pieces of outer fabric alone being stitched together and the margins thereof turned back toward the edges of the inner fabric, the combination with the inner and outer fabrics of an insulating-strip of unvulcanized rubber interposed between the outer fabric and the edges of the inner fabric and projecting beyond the latter, so as to completely isolate the edges of the fibrous portion of the inner fabric both from the body of the outer fabric and from the inturned margins thereof.

3. In a diving-dress whereof the component parts are formed of an inner fabric coated with vulcanized rubber on its outer face and an outer fabric cemented thereto, the pieces of outer fabric alone being stitched together, and the margins thereof turned back toward the edges of the inner fabric, the com-

bination with the inner and outer fabrics of an insulating-strip of unvulcanized rubber interposed between the outer fabric and the edges of the inner fabric and projecting beyond the latter, so as to completely isolate the edges of the fibrous portion of the inner fabric both from the body of the outer fabric and from the inturned margins thereof, and of a proofing-strip of unvulcanized rubber applied over the seam and inturned margins of the outer fabric and united at opposite edges to the adjacent insulating-strips.

4. In a diving-dress whereof the component parts are formed of an inner fabric coated with vulcanized rubber on its outer face and an outer fabric cemented thereto, the pieces of outer fabric alone being stitched together, and the margins thereof turned back toward the edges of the inner fabric, the combination with the inner and outer fabrics of an insulating-strip of unvulcanized rubber interposed between the outer fabric and the edges of the inner fabric and projecting beyond the latter so as to completely isolate the edges of the fibrous portion of the inner fabric both from the body of the outer fabric and from the inturned margins thereof, a proofing-strip of unvulcanized rubber applied over the inturned margins and united at opposite sides to the adjacent insulating-strips, and a cover-strip of vulcanized-rubber-coated fabric applied over all and cemented to the rubber proofing and insulating-strips and to the adjacent margins of the inner fabric.

5. A diving-dress having the leg portions made separate from the body portion, and united thereto by circumferentially-extending seams proofed as described, each said leg portion having longitudinal seams down the front and back thereof so as to enable a sweep or bagginess at the knee to be obtained and avoid the insertion of gussets to form the vamp.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

FREDERICK HENRY SPRANG.

Witnesses:

W. M. HARRIS,
FRED. C. HARRIS.