UNITED STATES PATENT OFFICE.

JOHN E. JOHNSON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SURGICAL SPLINTS.

Specification forming part of Letters Patent No. **216,680**, dated June 17, 1879; application filed February 27, 1879.

To all whom it may concern:

Be it known that I, JOHN E. JOHNSON, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Surgical Splints, of which the following is a specification.

My invention relates to that class of splints which are constructed of a pliable material, stiffened with gums, and molded to the desired form while temporarily softened by heat at the time of the application of the splint to the part to be treated.

It is especially an improvement upon the inventions described and claimed in Letters Patent No. 23,996, dated May 17, 1859, and Letters Patent No. 33,470, dated October 15, 1861, granted to David Ahl.

In carrying out my invention I employ substantially the same gum solutions for stiffening the material of which my splints are made as those mentioned in the said patents of David Ahl, omitting, however, the acid bath referred to in Patent No. 23,996.

My improvement over the Ahl splints consists in the particular construction of the fabric, and in the manipulation thereof at the time of the application of the stiffening solution, whereby signal advantage is gained over the Ahl splint in that there are secured a greater degree of porosity and cleaner exterior surfaces, whereby they are made comparatively free from the stiffening-gums, and, consequently, much softer to the touch than are the surfaces of splints made according to the modes described by David Ahl in his said Letters Patent.

My method of making my improved splints is as follows: I form the fabric of alternate layers (three or more) of live or long-staple wool, and of short stock, composed of wool, cotton, or a mixture of wool and cotton, or other suitable materials.

I have found in practice that five layers produce the best results; but whatever number may be used they should be so disposed that the outer layers shall be of the long-staple fiber.

The whole must be well felted together in the usual way. The felted cloth is then stiffened by the application of a solution of shellac or other substance adapted for the purpose, as mentioned in Ahl's said patents; but instead of smoothing the material with a hot iron "for the purpose of concentrating the gum," as is done by Ahl, as stated in his Letters Patent No. 33,470, I run the felted sheet between calender-rollers, or equivalent mechanical devices, under pressure, in order to equalize the distribution of the stiffening-solution and to simultaneously force the latter through the exterior layers in toward the medial part of the fabric. The result is that when the latter, as it passes from between the rollers and is thereupon relieved from compression, expands, it draws the solution to the fibers, thus breaking up the continuity of the gummy liquid and rendering the fabric perfectly porous after being dried. This porosity it retains indefinitely.

The stuff may afterward be molded into the specific conformations desired by heat, steam or radiated heat being preferable.

The lack of external softness, combined with internal rigidity, and, more especially, the practical absence of porosity, are the striking objectional features of splints manufactured according to the specifications of David Ahl's said patents.

Ahl's method of "concentrating" the gums by means of a hot iron causes the scattered particles thereof to coalesce and fill up the interstices which would otherwise, to some extent, exist between the fibers of the felted fabric. This defect is recognized and attempted to be remedied by Ahl in the specification of his Letters Patent of October 15, 1861, No. 33,470, wherein he states that "the splints may be perforated to render them porous."

Besides those hereinbefore mentioned, my improved surgical splints retain all the advantages of the Ahl splint, as set forth at length in his said patents, to which reference may be had.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. A felted fabric for surgical splints, composed of alternate layers of long staple and of

short stock, and treated with a stiffening-solution, substantially as and for the purposes described.

2. The method or process of preparing such fabric, as hereinbefore described, by passing the same when saturated with a stiffening-solution between rollers under pressure, whereby porosity and external softness of the fabric are retained, as set forth.

3. As a new article of manufacture, surgical splints constructed of the fabric made and treated as described.

In witness whereof I have hereunto set my hand this 26th day of February, A. D. 1879.

JOHN E. JOHNSON.

In presence of—

JOHN RUSSELL,

GEORGE RUSSELL.