

No. 778,432.

PATENTED DEC. 27, 1904.

E. K. WARREN.  
STIFFENING MATERIAL.  
APPLICATION FILED DEC. 17, 1901.

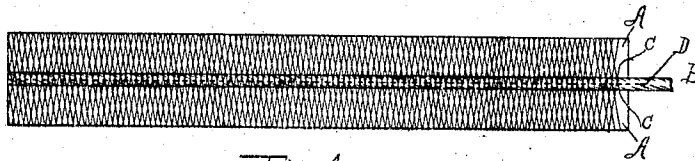


Fig. 1.

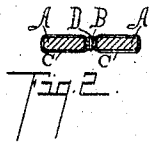


Fig. 2.

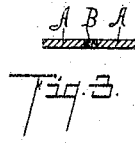


Fig. 3.

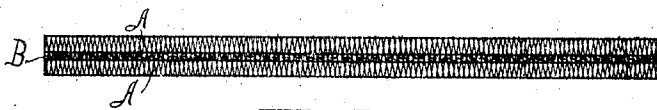


Fig. 4.

Witnesses:

Alice E. Houghton  
Chas. A. East

Inventor,

Edward K. Warren  
By Fred L. Chappell  
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# UNITED STATES PATENT OFFICE.

EDWARD K. WARREN, OF THREEOAKS, MICHIGAN.

## STIFFENING MATERIAL.

SPECIFICATION forming part of Letters Patent No. 778,432, dated December 27, 1904.

Application filed December 17, 1901. Serial No. 86,188.

*To all whom it may concern:*

Be it known that I, EDWARD K. WARREN, a citizen of the United States, residing at the village of Threeoaks, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Stiffening Material, of which the following is a specification.

This invention relates to a new and improved corset-stiffener or dress-stay manufactured from whalebone. Whalebone in its natural condition other than the highest grade is often quite porous and spongy, and in the higher grades it is quite likely to split when bended under tension. Again, it can be procured only in very short lengths, and there is consequently great waste in cutting it into proper lengths for use. Another objection to it is that in its natural condition it cannot be stitched through for attaching to garments.

This invention relates to an improved method of treating whalebone and to an improved product therefrom, the object being to provide a stiffener constructed of whalebone which can be made in continuous lengths, in which the tendency to split is overcome, and which is so prepared that it may be readily stitched through, and this is all accomplished without adding to the bulk of the whalebone or increasing its thickness, but the process rather results in the compacting of the same. This is especially true of the spongy whalebone, improving its quality and increasing its elasticity so that it approximates in quality the finest grades of whalebone, and its tendency to split under stress is entirely overcome. Minor objects of the invention will clearly appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in this specification.

The invention is clearly defined, and pointed out in the claim.

A structure embodying the features of my invention and illustrating the effect of the different steps of the process thereon is fully illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an enlarged detail view of a short section of my improved whalebone stiffener. Fig. 2 is a cross-section of the structure appearing in Fig. 1 before the same has been processed. Fig. 3 is such a cross-sectional view after the processing. Fig. 4 is a detail view of the stiffener in about the usual size after its completion.

In the drawings similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A A are strips of whalebone cut to about the size indicated, the ends of the strips being beveled and overlapped. Between these strips is a cord of soft material, and wrapped around strips and the central cord are wrapping-threads C C, preferably wound crosswise upon each other, although a single layer of the winding would be found to be quite effective. The double winding is preferred, however, as a finer thread can be utilized and a closer winding be secured in that way. When this winding is completed, a line of stitching D is made down through the soft central cord B, strong tension being put upon the sewing-thread, so that the winding-threads C C will be drawn down and onto the whalebone. This clearly appears in Fig. 2, and by this means a very close wrapping of the wrapping-thread C is secured. The structure is then subjected to a suitable sizing material by being immersed in a solution containing glue or other suitable adhesives. The blade then is heated to such an extent as to materially soften the texture of the strips of bone A A, when the blades are subjected to heavy pressure, either that of rolls or dies, and retained under pressure until the softened material is set again, when it will be found that the wrapping-threads C C adhere to the whalebone and are substantially embedded therein and that each of these threads is retained independently by the stitching D at the center, so that the breaking of a considerable number of these threads will not relax the tension on the others. The finished blade will be found to be as smooth as ordinary whalebone that has not been treated. Its toughness is greatly

enhanced, as the wrapping-threads prevent any tendency to split, and the soft portion at the center enables it to be attached to a garment without any tendency to split, because  
5 the needle does not penetrate the substance of the bone.

The treatment by wrapping the thread and treating the bone to a sizing, heat, and pressure in this way would be of advantage  
10 whether a central cord were inserted or not, as it overcomes entirely the tendency of the bone to split without increasing its bulk, but rather decreases the bulk of the spongy bone and makes it as effective and desirable as the  
15 shell-whalebone itself for any ordinary use.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In a stiffening material the combination of strips of whalebone with a textile cord between the same; wrapping-threads around the whole; a line of stitching through the central soft cord of the stiffener to retain the wrapping-threads in position, the wrapping-threads being embedded in the bone and adhering  
25 thereto.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

EDWARD K. WARREN. [L. S.]

Witnesses:

MORRIS G. MCGAWN,  
MARY A. DAVIDSON.