(Specimens.)

L. H. MARSDEN & J. H. FROST.

WOVEN FABRIC.

No. 484,537. Patented Oct. 18, 1892.

Fig. 1.

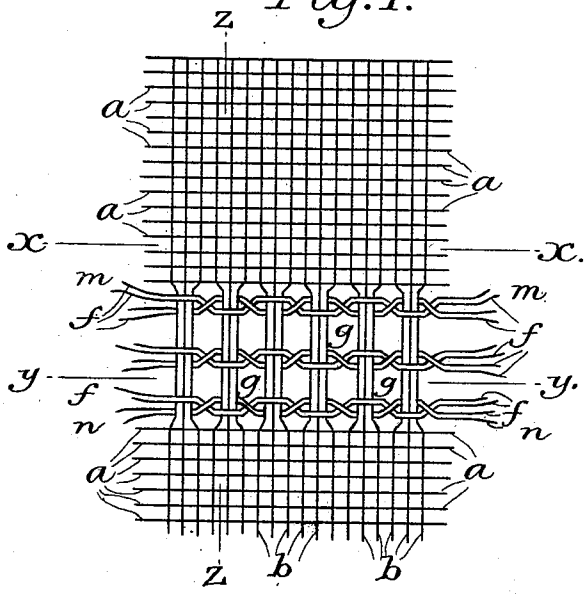


Fig. 2.

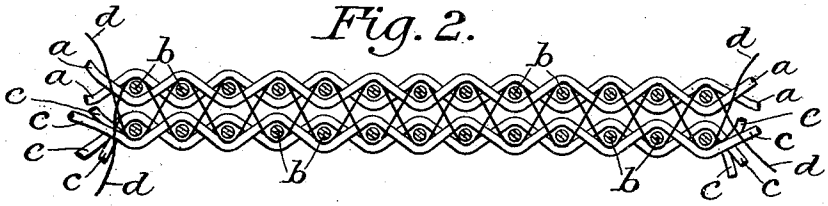


Fig. 3.

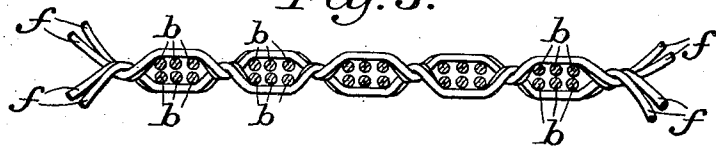
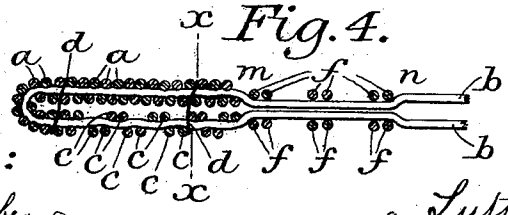


Fig. 4.



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UNITED STATES PATENT OFFICE.

LUTHER HARDCASTLE MARSDEN, OF DROYLSDEN, AND JAMES HILL FROST, OF ECCLES, ENGLAND.

WOVEN FABRIC.

SPECIFICATION forming part of Letters Patent No. 484,537, dated October 18, 1892.

Application filed November 9, 1891. Serial No. 411,264. (Specimens.) Patented in England November 22, 1889, No. 18,734.

To all whom it may concern:

Be it known that we, LUTHER HARDCASTLE MARSDEN, of Droylsden, and JAMES HILL FROST, of Eccles, in the county of Lancaster, England, have invented a new and useful Improvement in Woven Fabrics for Braces, Waist-Belts, &c., (for which Letters Patent were granted to us in Great Britain November 22, 1889, No. 18,734;) and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The object of our invention is to produce an improved fabric for belts, suspenders, or braces and the like, formed in the weaving with open spaces or holes for the purpose of ventilation. The strength and body required for the uses referred to are of necessity secured by making the fabric double—that is, composed, essentially, of a face fabric and a backing fabric united by binders—and this fact renders the ventilation of the fabric by making open spaces therein still more important to the wearer. The fabric may in general be formed in any of the usual modes of weaving a double fabric, the chief modification necessary to produce the novel and very desirable result being the omission of certain of the warp-threads in both face and backing webs from their respective dents of the reed in the lines where it has been determined that the open spaces or holes shall appear.

In the drawings, wherein we have illustrated a fabric embodying our invention and formed in a mode which has proved to be a convenient one, Figure 1 is an exaggerated plan view of a portion of such a fabric. Fig. 2 is a longitudinal section thereof on the line *x x* of Fig. 1. Fig. 3 is a longitudinal section on the line *y y* of Fig. 1, and Fig. 4 is a section on the line *z z* of Fig. 1.

Like letters of reference indicate like parts in the several figures.

The face-web of the double fabric is made up of the usual warp-threads *a* and weft-threads *b*, interwoven in the usual manner, and the backing-web is similarly made up of warp-threads *c* and weft-threads *b*, also interwoven as usual. Simultaneously with the formation of the two webs they are united in the loom by binder-threads *d*, which pass from one web to the other.

At intervals, and in the lines where it is desired that the ventilating-openings shall occur in the fabric, the ordinary warp-threads *a a* are omitted, as from *m* to *n*, and the weft-threads are loosely interwoven in groups between the strips of double fabric thus formed by leno threads or warps *f*. Preferably these leno threads are made to embrace and unite an equal number of the weft-threads of both webs into a single group, as indicated, thereby forming the unobstructed openings *g g*.

We have shown in the drawings a portion only of the width of a fabric embodying our improvement, with one selvage and one series of ventilating-openings; but it will be understood that such portion is substantially a unit, which may be repeated as many times as required to produce a fabric of the desired width.

We are well aware that belts have been woven in one piece as a double fabric, continuous or closely woven from edge to edge, and that belts and other articles have been formed as single fabrics with closely-woven strips alternating with strips of cross-weaving or leno. Furthermore, the several processes of weaving which we employ, considered separately, are well known; but we combine these old processes in a novel manner and produce a fabric which consists, in effect, of strips of double fabric, closely woven, alternating with strips of practically-single open-work fabric, which has never been produced heretofore to our knowledge, and which combines great strength and durability with lightness and the qualities of a ventilating fabric.

We claim as our invention—

A ventilating fabric for belts and the like, the same being composed of a series of face-warps, a series of backing-warps, the warps of both series being omitted at intervals, weft-threads closely interwoven with the face-warps, weft-threads closely interwoven with the backing-warps, both sets of weft-threads extending across the intervals between the groups of warps, binder-warps uniting the two webs thus formed to form strips of double fabric, and warp-threads in the intervals be-

tween the strips of double fabric loosely uniting the weft-threads into groups, each of which group contains the corresponding weft-threads of both the upper and lower webs and constituting thereby strips of loosely-woven single fabric alternating with the strips of closely-woven double fabric, substantially as shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

LUTHER HARDCASTLE MARSDEN.
JAMES HILL FROST.

Witnesses:
ARTHUR E. HALL,
ARTHUR F. POPE.