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PATENTED OCT. 29, 1907.

A. CALDWELL & G. F. DREW.

SHOE LACING.

APPLICATION FILED MAY 5, 1906.

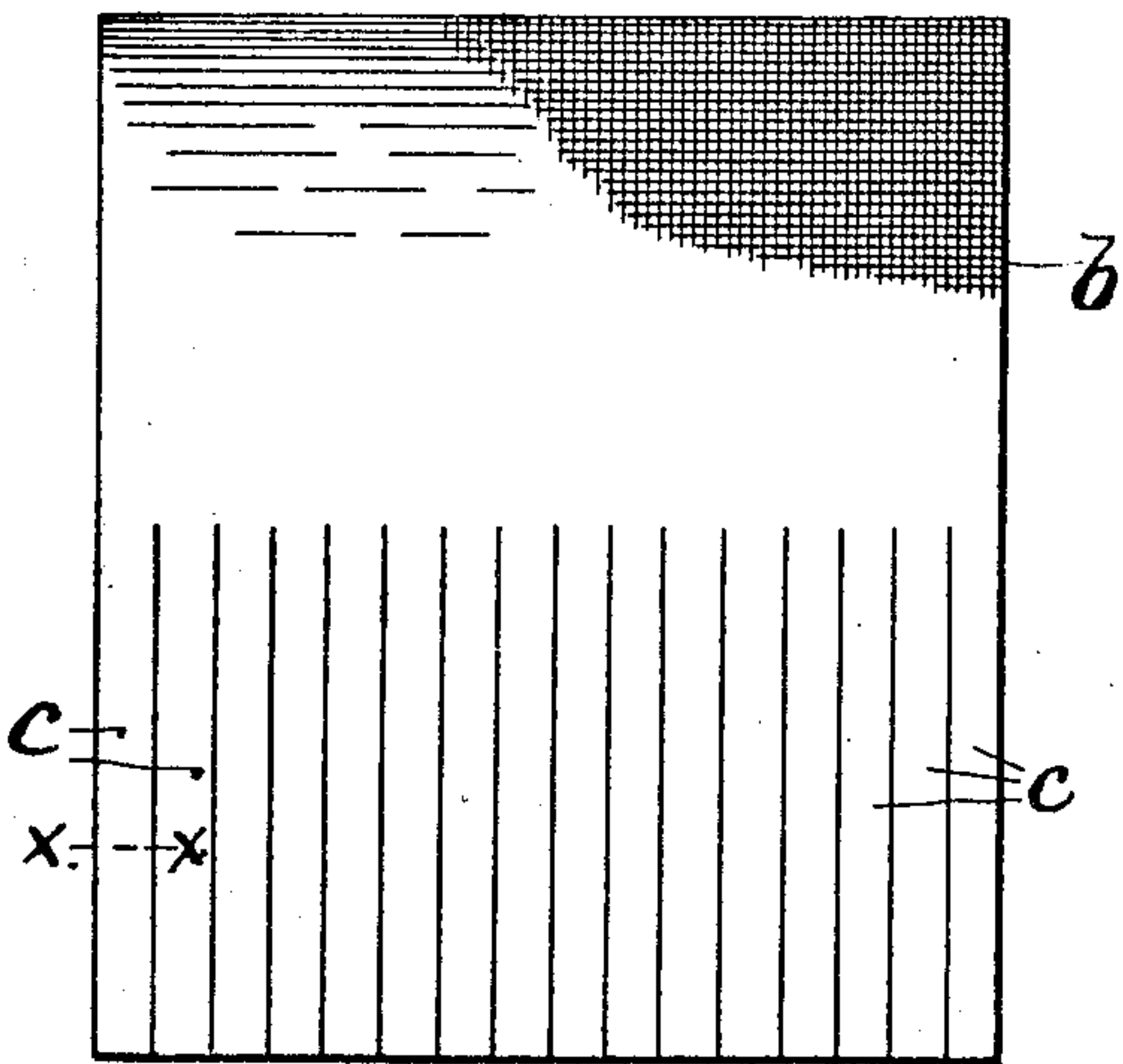
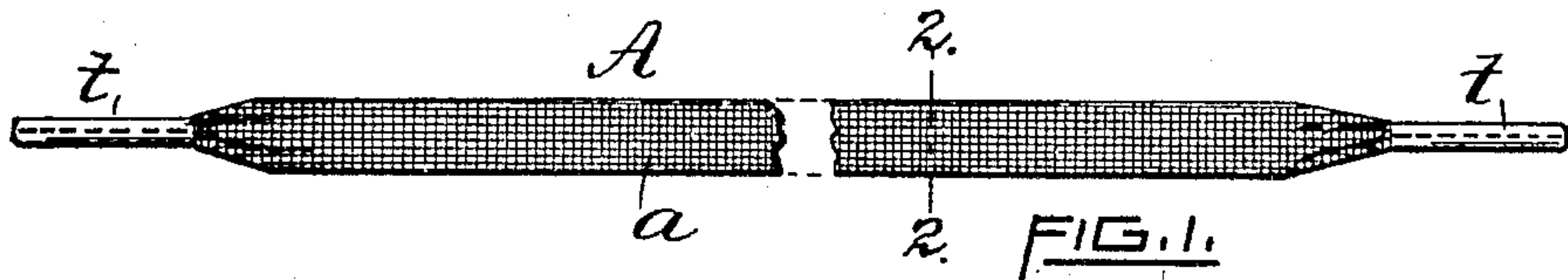


FIG. 3.

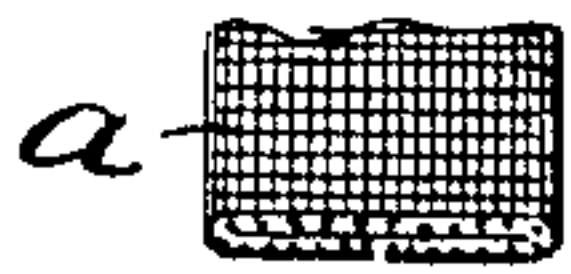


FIG. 8.



FIG. 2.

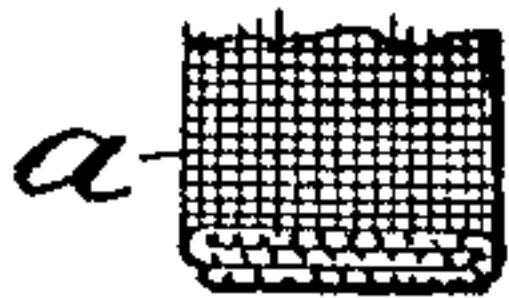


FIG. 9.



FIG. 4.

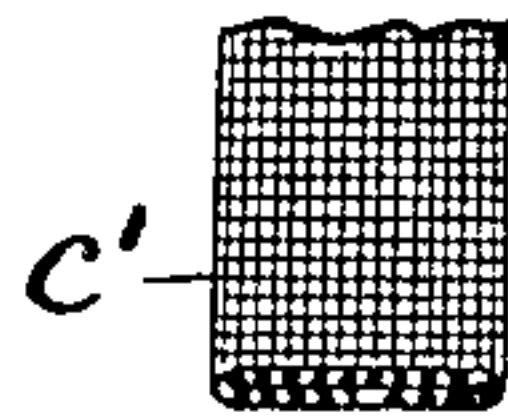


FIG. 5.

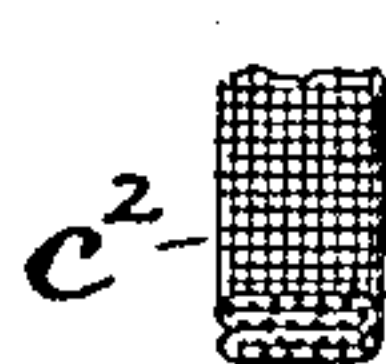


FIG. 6.

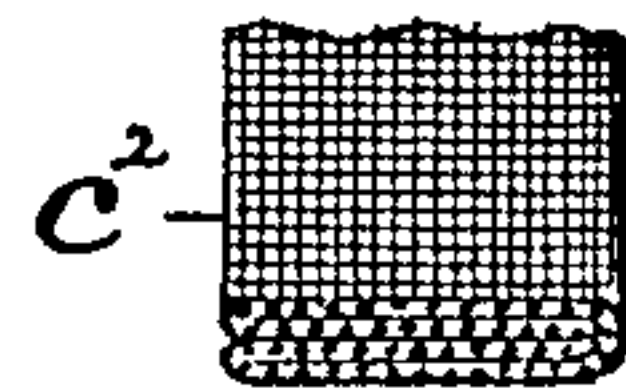


FIG. 7.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## SHOE-LACING.

No. 869,346.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed May 5, 1906. Serial No. 315,455.

*To all whom it may concern:*

Be it known that we, ALFRED CALDWELL and GEORGE F. DREW, citizens of the United States of America, and residents, respectively, of Providence, in the county of Providence and State of Rhode Island, and of Brunswick, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Shoe-Lacings, of which the following is a specification.

Our invention relates to a new and novel type of shoe-lacing, the same being produced from comparatively narrow strips of woven fabric or cloth, as distinguished from lacings in which the several threads thereof are interlaced or braided together by means of braiding-machines.

The object of our invention is to produce a flexible shoe-lace, or other analogous article, possessing greater strength and durability and in which the cost of manufacture is reduced, as compared with flat or hollow braided shoe-lacings such as are usually employed. Our improved shoe-lace when in service also possesses the following additional advantages: It lies more smoothly and closely to the shoe-upper, therefore it is less conspicuous; it is less liable to become crimped or upwardly curled along its longitudinal edges; it does not materially contract in width nor elongate in length; it is not liable to get caught on the edge of the lacing-hooks and is water-proof.

In the production of our improved shoe-lacing we preferably take a bolt or "cut" of black or other suitably-dyed comparatively strong and thin woven cloth having say the quality and width of ordinary sheetings or print goods. The said web of cloth is subjected to a suitable machine which unwinds and cuts or slits the same into a number of comparatively narrow strips having say uniform width, each being about one inch wide, or as determined by the style of lacing desired. The said strips of fabric are next passed through a combined folding, cementing and compressing device whereby the outer edge portions of each strip are first intumed and folded inwardly or backwardly upon itself to produce a plurality of superimposed plies, the then outer or exposed edges of the thus-folded, and correspondingly narrower, strip being non-ravelable. At substantially the same time, too, the strips of fabric are coated or treated with any suitable absorbent thin cementing medium, followed by feeding the thus-folded and prepared stock between the faces of revolving compressing rolls. The thus produced long

lengths of stock are subsequently severed transversely into shorter pieces having the desired length and suitably tipped, thus completing the operation.

In the accompanying sheet of drawings, Figure 1 is a perspective view of a shoe-lacing embodying our improvement. Fig. 2 is a transverse sectional view taken on line 2 2 of Fig. 1. Fig. 3 is a plan view, in reduced scale, of a piece of woven cloth, showing a manner of slitting or dividing the same into parallel strips. Fig. 4 is a cross-sectional view of one of the strips taken on line *aa* of Fig. 3, enlarged, and corresponding with the scale of Fig. 1. Fig. 5 represents said strip having its longitudinal edges infolded, or two-ply. Fig. 6 is a similar view, showing the same strip folded into a four-ply member and being uncompressed, the scale corresponding with Fig. 2. Fig. 7 is a sectional view, similar to Fig. 6, greatly enlarged, and Figs. 8 and 9 represent enlarged cross-sectional views, corresponding with Fig. 7, except that the stock is folded to form two and three plies, respectively.

Again referring to the drawings, A, Fig. 1, designates a shoe-lace embodying our improvement. The body portion *a*, comprising a plurality of plies, is produced or formed by suitably folding an integral strip *c* of woven fabric, the ends being reduced and stiffened by the employment of metal tips *t* in a well-known manner. The said strips are cut from a web of cloth *b*, substantially as indicated in Fig. 3.

We would state that for the sake of clearness in the drawings the thickness of the stock and lacing as represented is materially exaggerated, the actual thickness of the finished lacing not exceeding say two to three one-hundredths of an inch. The strip *c* (Figs. 3 and 4) is first folded by suitable means to about one-half its width thus making it two-ply as indicated at *c*<sup>1</sup> Fig. 5, and then re-folded, or four-ply, as represented at *c*<sup>2</sup> Fig. 6.

During the transformation of the normal stock *c* to the form *c*<sup>2</sup>, which comprises a plurality of superimposed plies, the strip is subjected to any suitable liquid cement or water-proofing preparation whereby the several plies are secured or bonded together; the thus-treated and folded strip is then suitably compressed, as between revolving rolls, and subsequently severed into the proper lengths and tipped, the body or flexible portion of the finished lacing being indicated by *a*.

The lacing *a* may consist of two or three thicknesses or plies *c*, as indicated in enlarged scale in Figs. 8 and 9. In any event, however, we prefer to so fold the stock

that the rough or normally ravelable longitudinal edges thereof will be concealed or at least protected and rendered non-ravelable. The preparation above referred  
5 to may consist of a thin solution of rubber cement.

We claim as our invention and desire to secure by United States Letters Patent:—

10 A flat shoe lacing consisting of a length of woven material folded longitudinally upon itself a plurality of times throughout its entire extent, said lacing having its plies

bonded together and both longitudinal edges formed by said folds.

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