

No. 698,777.

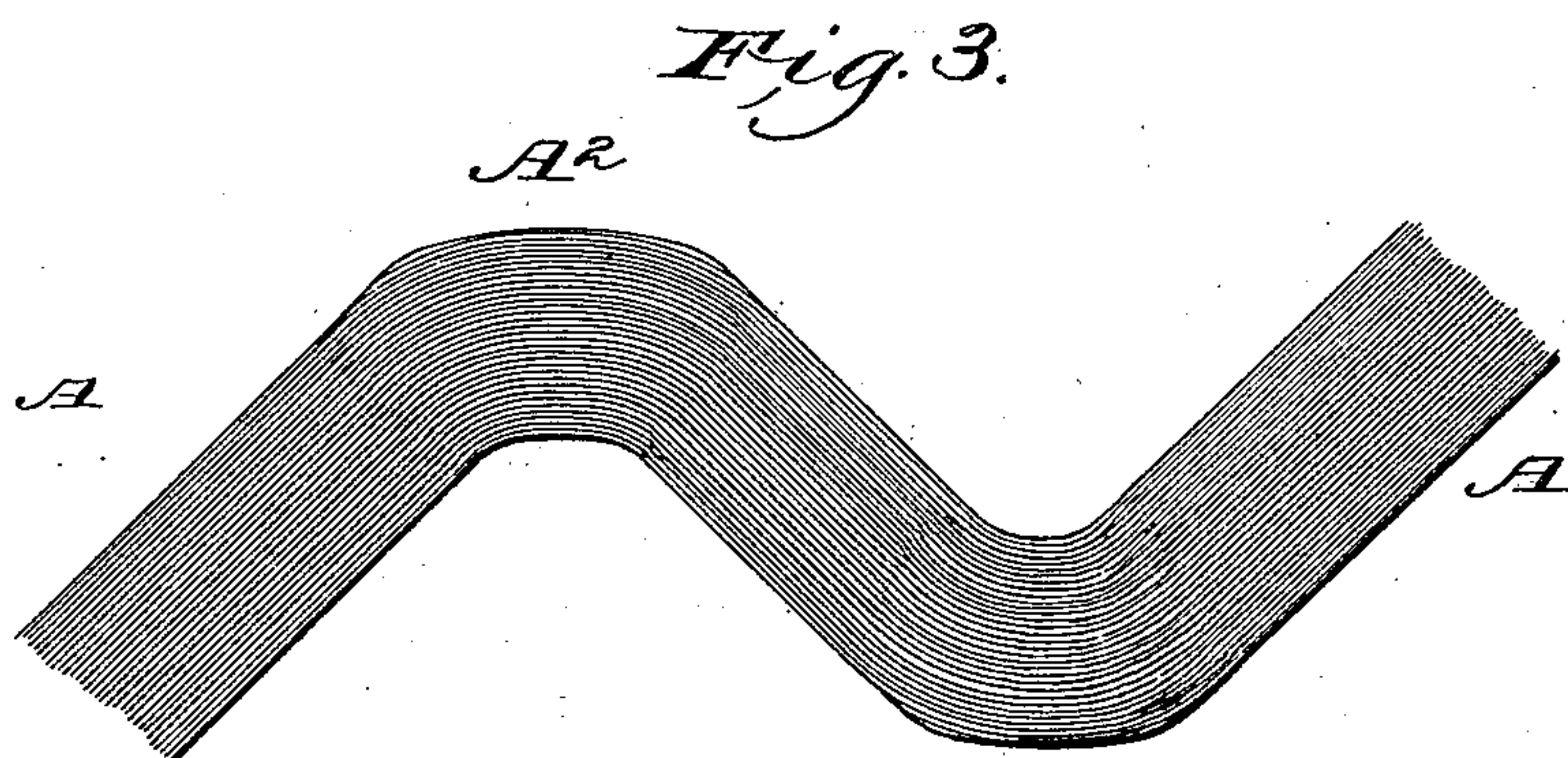
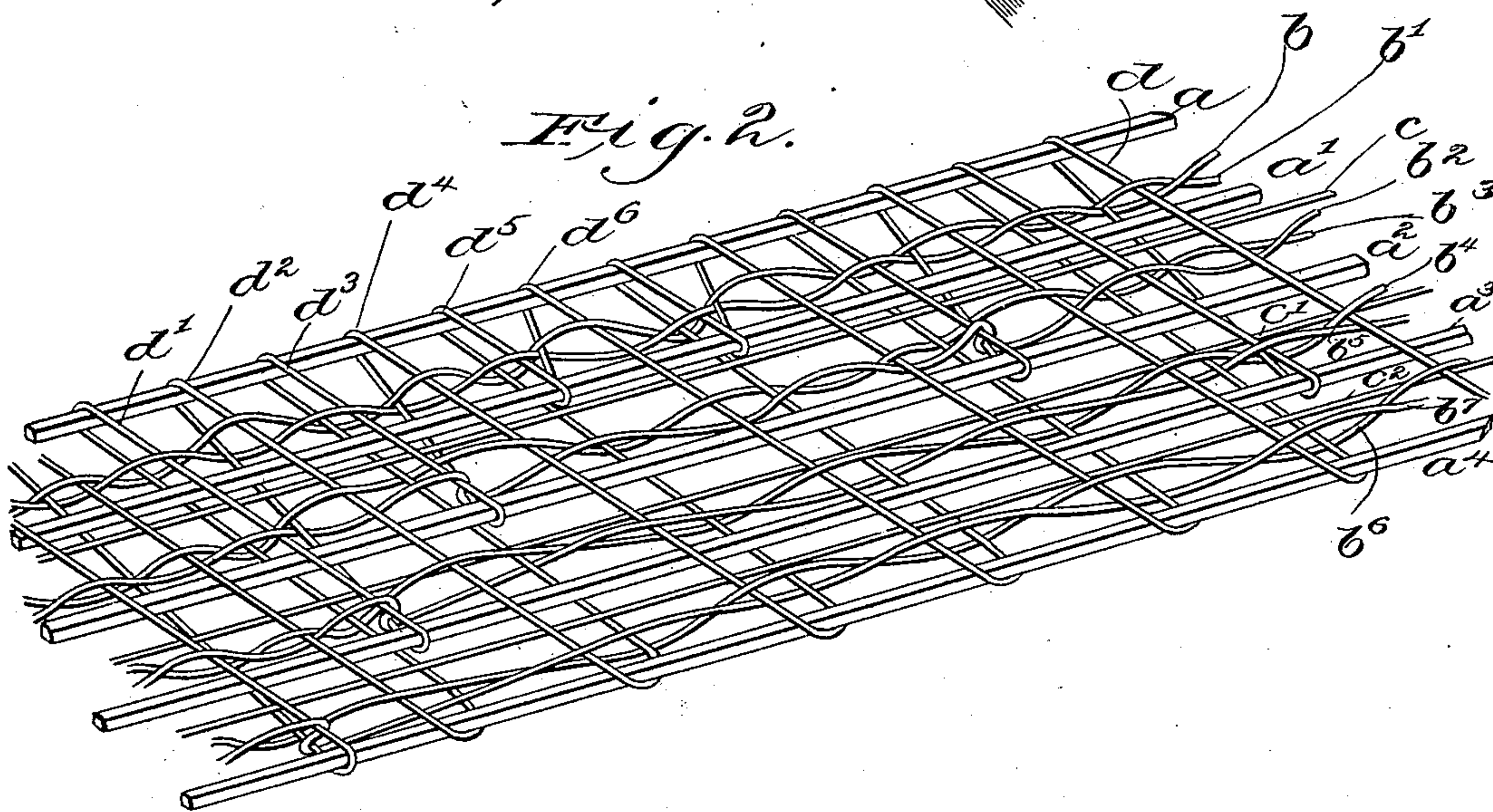
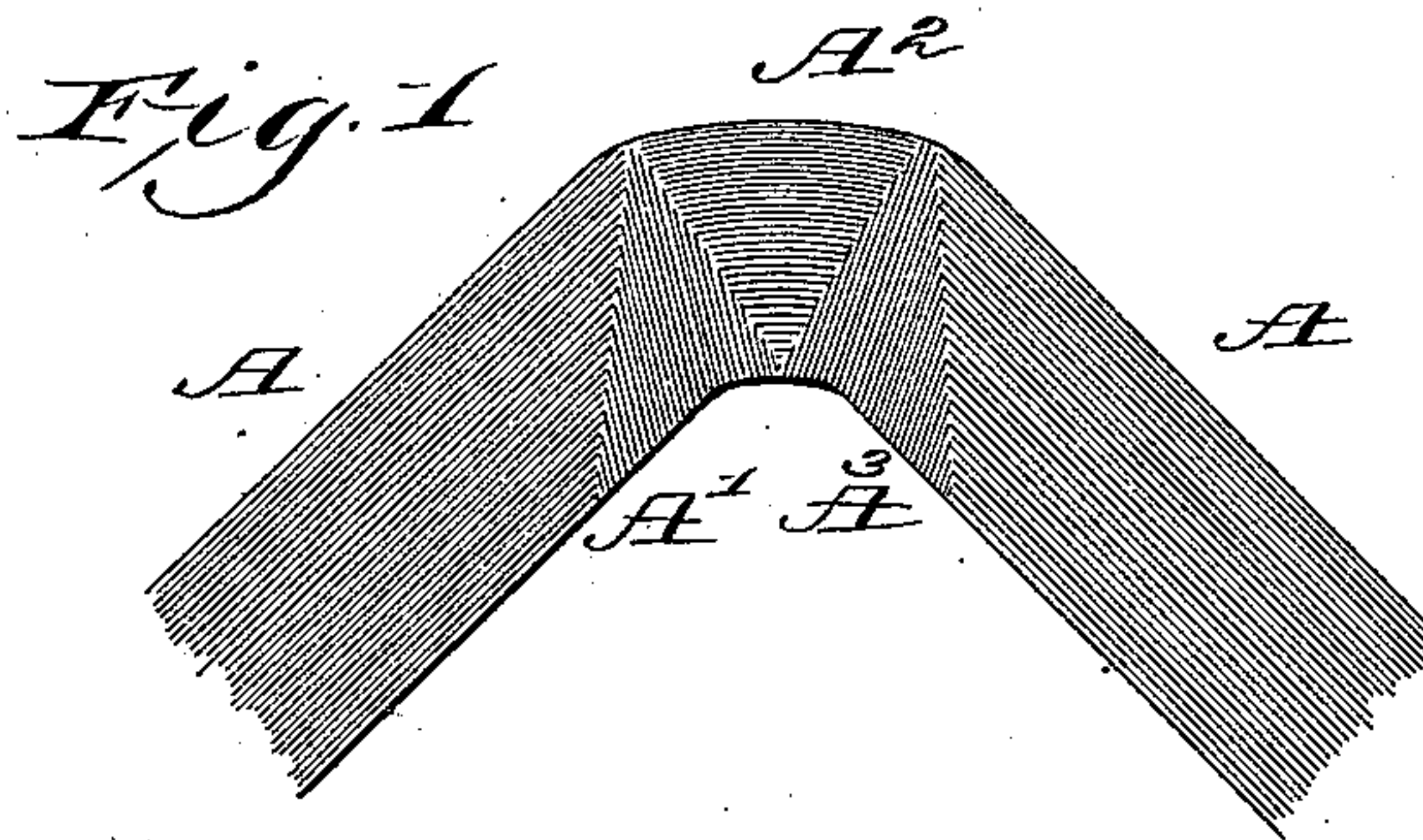
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A. M. ZIEGLER.

WOVEN ELASTIC FABRIC AND METHOD OF MAKING SAME.

(Application filed July 1, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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WOVEN ELASTIC FABRIC AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 698,777, dated April 29, 1902.

Application filed July 1, 1901. Serial No. 66,665. (No model.)

To all whom it may concern:

Be it known that I, ALFRED M. ZIEGLER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Woven Elastic Fabrics and Methods of Making the Same, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

I have chosen to illustrate my invention in fabric in connection with what is known as an "elastic" fabric or web.

By my invention I am able to produce a crooked fabric—that is, a fabric presenting at times horizontal or straight line selvages parallel one with the other and at other times curved selvages.

My improved fabric is applicable for use in connection with wearing-apparel, and especially for stocking-supporters and for other use.

In the production of my improved fabric as herein provided for I stretch in the loom in usual manner the elastic warp and place between the stretched warp usual binder warp-threads each mounted in its own harness-frame, and sheds are formed in the binder-warp above and below the stretched elastic warp, and in such sheds, made alternately above and below the elastic warp, I insert a weft or filling to thereby make a fabric with pockets, leaving the elastic warp in the pockets. This is a usual way of weaving elastic fabric, and so long as the filling is inserted in each shed from one to the other selvage the fabric produced will present straight and parallel selvages throughout its length. In my invention, however, I desire to produce a crooked fabric or a fabric presenting at desired intervals curved selvages, and to effect this I lift or drop into an abnormal position at the desired times, say, one of the elastic warp-threads and associated binders and make a shed in the remaining warp-threads occupying their normal position and insert in such shed filling, the filling as it returns being arrested by the binder warp-threads and the elastic warp-threads used in that shed

and occupying their operative position. At the next shed I may return into operative position the elastic warp-thread and the binders which were put into their abnormal position to insert a shorter pick of filling and again form a shed in the entire binder-warp. At a succeeding shed I may put into abnormal position two india-rubber warp-threads and two pairs of binders and form a shed in the remaining binder warp-threads then in their operative position for shedding, and at the next pick I may again return into their operative position before making a shed all the binder warp-threads and the rubber warp-threads. In this way it will be understood that the fabric presented will contain a series of picks of filling which extend from one selvage only partially through to the other selvage, and consequently when the woven fabric is removed from the loom and the elastic warp is permitted to resume its normal unstretched condition that edge of the fabric to which some of the picks of filling do not extend will be shortened, thus presenting a concaved edge, while the opposite edge of the fabric will be convexed.

Figure 1 shows a piece of woven elastic fabric embodying my invention and removed from the loom, the fabric showing a crook in a portion thereof. Fig. 2 shows separated a series of elastic and binder warp-threads and a filling, the figure illustrating the crossing of the threads; and Fig. 3 shows my improved fabric with reverse crooks.

In the production of a fabric I select in usual manner any desired number of elastic warp-threads $a a' a^2 a^3 a^4$, &c., preferably quadrilateral in cross-section, and stretch the same in usual manner in the loom and in the dents of the reed. I then insert in said dents and into the eyes of usual harnesses two or more binder warp-threads, as $b b' b^2 b^3 b^4 b^5 b^6 b^7$, two, or it may be more, for each elastic warp-thread, and, if desired, which is customary, I may insert parallel with each elastic warp-thread a fibrous warp-thread, as $c c' c^2$. Usually the elastic warp occupies a stationary position and the binder warp-threads are moved by the harness to make

sheds above and below the elastic warp, and into such sheds the filling d is inserted, each pick of filling crossing alternately above and then below the elastic warp.

5 A fabric woven in the manner so far described is common in the art, and the fabric produced will present straight and parallel selvages.

10 The sheds in the binder-warp may be made in any usual way common to weaving elastic fabric.

I will now describe wherein my invention differs from the ordinary plan or practice in weaving elastic fabrics.

15 Fig. 1 shows at A a portion of a fabric presenting straight and parallel selvages, and A² shows a crook in the fabric which it is the aim of this invention to produce. In the fabric shown at A the filling extends in picks of
20 uniform length across the fabric, as shown at the left, Fig. 2. To provide for making the crook, I put into inoperative position (see Fig. 2) the elastic warp-thread a^4 and the pair of binder warp-threads $b^6 b^7$, and I form sheds
25 in the binder warp-threads $b b' b^2 b^3 b^4 b^5$, &c., and insert the filling, it crossing the elastic warp-threads at the upper side, as shown, by the filling-crossing lettered d' at the left, said filling in its return stopping on the elastic
30 warp-thread a^3 and crossing the under side of the remaining elastic warp-threads. Before inserting the next pick of filling I restore the elastic warp-thread a^4 and the binder warp-threads b^6 and b^7 into their normal or operative
35 position and insert the pick d^2 , it in its return embracing the entire elastic warp. At the next pick I may put into abnormal position the elastic warp-threads a^4 and a^3 , together with the binder warp-threads $b^6 b^7$ and $b^4 b^5$,
40 and insert a pick of filling, as d^3 , in the shed formed above the elastic warp-threads, returning said pick about the elastic warp-thread a^2 in a shed formed below said elastic warp-threads. Before making the next pick I
45 again restore the elastic warp-threads and the binder warp-thread which occupied their abnormal positions when the pick d^3 was inserted and form a shed in the entire binder-warp, enabling the pick to embrace the entire elastic warp, and prior to making the
50 next shed I may lift the elastic warp-threads a^4 , a^3 , and a^2 , together with the binder warp-threads $b^6 b^7 b^4 b^5 b^3 b^2$, and insert a pick d^5 , it passing through a shed in the binder warp-threads above the elastic warp-threads,
55 and turning back about the elastic warp-thread a' said pick passes below said elastic warp-threads through a shed formed in the binder warp-threads. Preparatory to making the next pick I again restore all the warp-threads which occupied their abnormal position when the pick d^5 was inserted and again insert a pick, as d^6 , extending throughout the entire width of the fabric. In this way it will

65 be noticed that I insert at proper times what I may designate "part picks" or picks extending but partially into the fabric with relation to its width. Any number of these part picks may be inserted in succession or alternately with full-length picks, according to the abruptness of the bends desired in the finished fabric. When the fabric is removed from the loom, that edge thereof which contains the greatest number of picks will be longer than the edge thereof to which all the picks inserted
70 do not extend. 75

In the production of my improved fabric I may insert picks of filling entirely across all the warps for any desired distance, thus leaving the selvage edges of the woven fabric
80 straight and parallel, and when it is desired that the fabric present a crook I may insert a pick or picks but partially through the shed from one side of the fabric, gradually decreasing the length of alternate picks until
85 the shortest pick is inserted and then gradually increasing the length of alternate picks in the reverse order, as shown in Fig. 2. This operation repeated twice will produce a fabric such as shown, Fig. 1, it presenting gores,
90 as A' A³, and thereafter I may again resume weaving and insert the picks entirely across all the warps for any desired number of picks, again producing a fabric such as represented at A. 95

The fabric shown in Fig. 1 presents a convex portion, as at a' , the opposite edge being concave; but it will be obvious that a fabric may be woven, if desired, to present crooks in opposite directions or present convex portions, as $a^2 a^4$, at both edges of the fabric. This will be done by putting into abnormal position at suitable points in the weaving, first at one and then at the other edge of the fabric, certain elastic and binder warp-threads, as provided for, and thus the fabric may be made to present at any desired point in its length a crook. 100 105

Having described my invention, what I claim, and desire to secure by Letters Patent, is— 110

1. An elastic fabric presenting at intervals straight parallel selvages, and at intervals convex and concave selvages, to thereby present crooks in the fabric. 115

2. An elastic fabric composed of elastic warp, a binder-warp, and filling, the filling at predetermined points in the weaving extending but partially through the fabric in the direction of its width to thereby provide for a
120 crook in the fabric when the elastic warp is released from tension.

3. The herein-described method of weaving crooked elastic fabric which consists in stretching the elastic warp, forming sheds in
125 the binder-warp between said elastic warp, and inserting the filling at intervals through the sheds of a portion only of the binder

5 warp-thread, returning the filling about elastic warp-threads intermediate the warp-threads constituting the selvages of the fabric, the contraction of the elastic warp causing that edge of the fabric through which the filling does not extend to the selvage-warp, to present a concaved appearance.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED M. ZIEGLER.

Witnesses:

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