

(No Model.)

2 Sheets—Sheet 1.

J. H. PLACE.

STOCKING.

No. 356,080.

Patented Jan. 11, 1887.

Fig. 1.

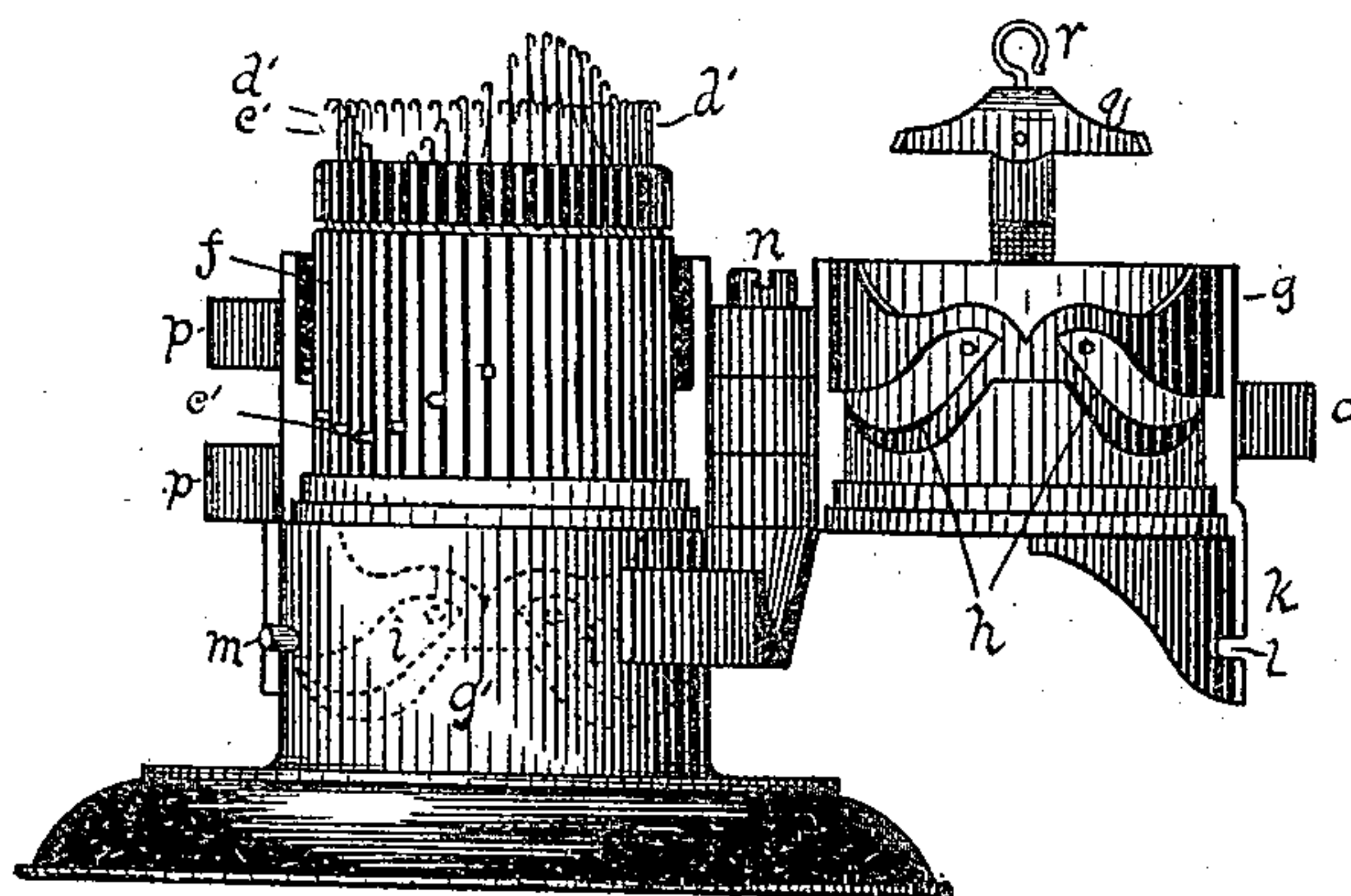


Fig. 2.

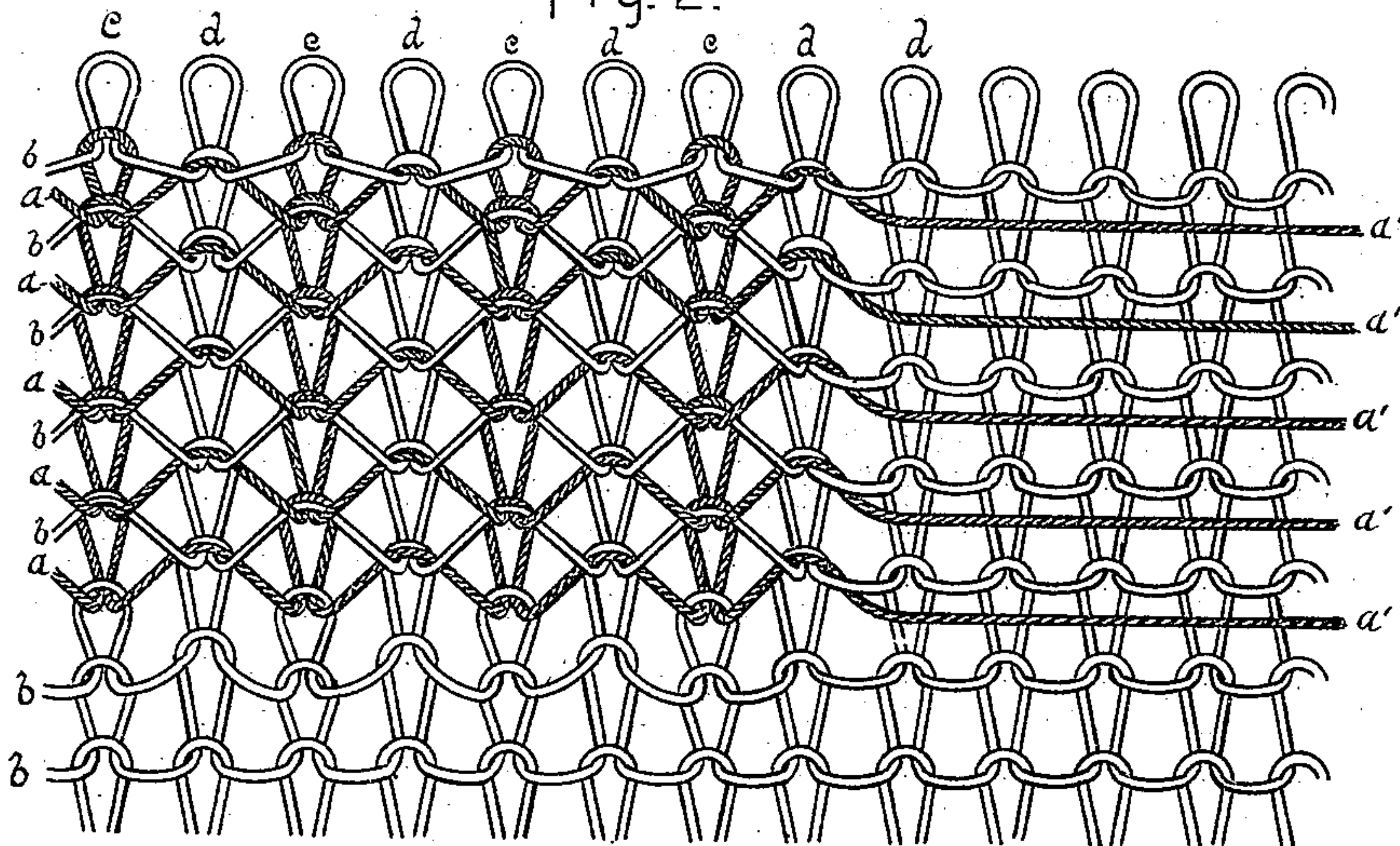


Fig. 3.

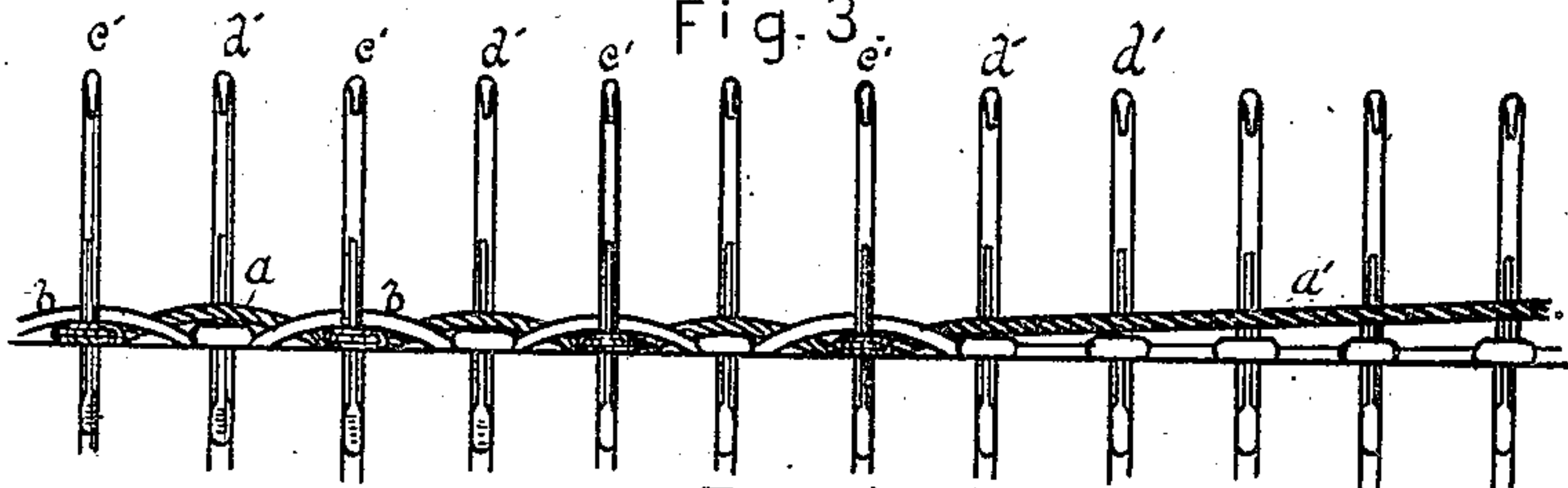
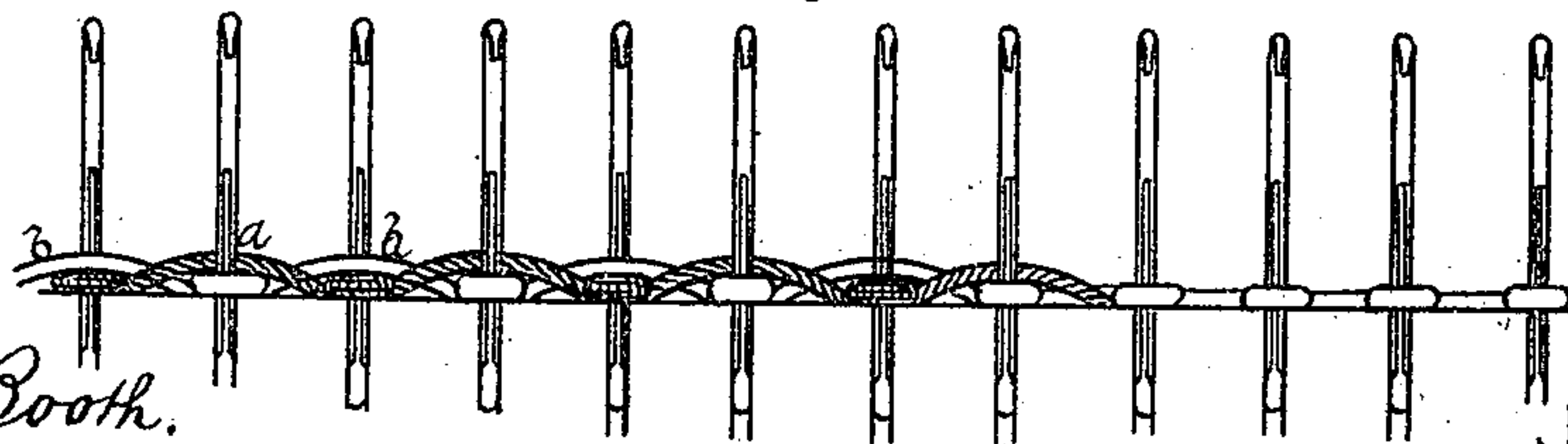


Fig. 4.



ATTEST

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L. A. Mills.

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J. H. PLACE

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att'y.

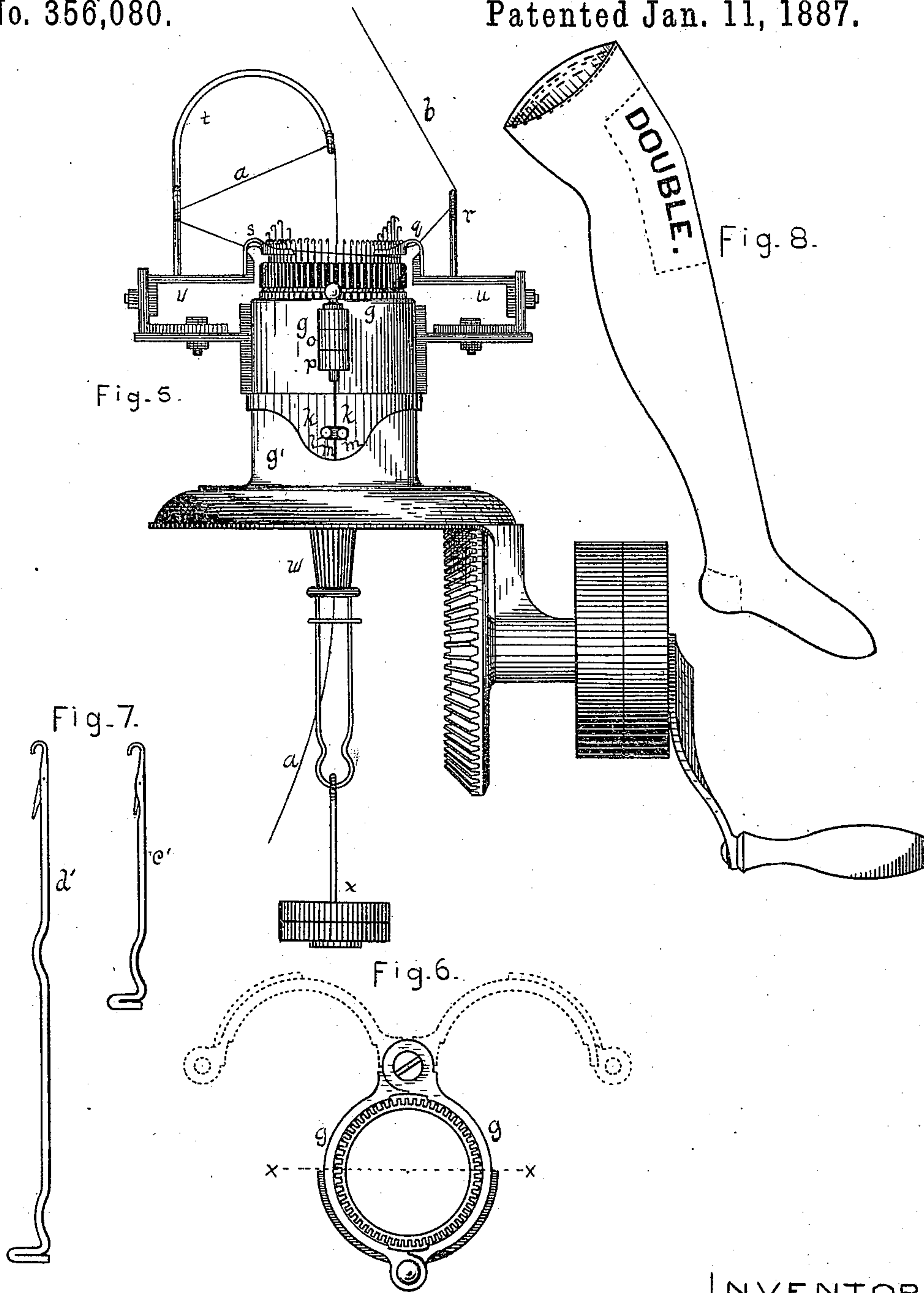
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN H. PLACE, OF DECATUR, ILL., ASSIGNOR OF TWO-THIRDS TO DAVID R. ALEXANDER AND THOMAS P. MATTHEWS, BOTH OF SAME PLACE.

STOCKING.

SPECIFICATION forming part of Letters Patent No. 356,080, dated January 11, 1887.

Application filed April 15, 1886. Serial No. 199,005. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. PLACE, of the city of Decatur, county of Macon, and State of Illinois, have invented certain new and useful Improvements in Stockings, of which the following is a specification.

My invention relates more particularly to children's stockings, and is intended to increase the durability of the same by re-enforcing that portion of their surface most unduly exposed to wear.

Children's stockings knit of a uniform thickness throughout are almost invariably worn through at the knee, while remaining in comparatively good condition elsewhere, and as a consequence the stockings, if worn at all, must carry unsightly patches in a most conspicuous position.

In order to practically obviate the above-mentioned imperfection, by re-enforcing the knee of the stocking, it becomes necessary to provide means whereby the re-enforced portion may be readily and firmly knitted in a manner that will leave the external surface thereof identical in appearance with the contiguous portions of the stocking-leg. Should the external surface of the re-enforced portion differ in appearance from the contiguous portions of the stocking-leg, the effect will be much the same as if the knee were patched. Should it be a difficult matter to construct the re-enforced portion in conjunction with the other portions of the stocking, the expense of manufacture would possibly equal the benefits derived, and should the re-enforcing thread not be thoroughly incorporated with the stocking raveling might at any time occur.

In the drawings accompanying and forming a part of this specification, Figure 1 represents a knitting-machine cylinder provided with the cams and needles necessary to produce my improved stocking, one part of the cam-cylinder being thrown open to show its internal construction. Fig. 2 is an enlarged and distended representation of the inner surface of a portion of my stocking as it appears just before the final step is taken in its manufacture. Fig. 3 is a representation of a series of needles arranged on a right plane and provided with two threads in the relative posi-

tion that the same threads would occupy in the machine immediately after the re-enforcing thread had been knitted. Fig. 4 is a representation of a series of needles arranged on a right plane and provided with two threads in the relative position that the same threads would occupy in the machine immediately after the principal thread had been knitted. Fig. 5 represents a knitting-machine fully equipped for knitting my stocking, the cams and lower terminations of the needles being concealed from view by the cam-cylinder. Fig. 6 represents the machine-cylinders as seen from above, the upper portion of the cam-cylinder being indicated as opened by dotted lines. Fig. 7 is a representation of the two kinds of needles used in knitting my stocking. Fig. 8 represents a stocking, showing by dotted lines the approximate relative position of the re-enforced portion.

a in Figs. 2, 3, and 4 represents interknitted portions of the re-enforcing threads, and *a'* represents floating portions of the same.

b represents the principal thread used in the construction of my stocking.

c, Fig. 2, represents the wales formed on needles *c'*,

d represents the wales formed on needles *d'*.

f, Fig. 1, shows the needle-cylinder used in the construction of my stocking, its only distinguishing feature being its unusual length.

g represents the upper portion of the cam-cylinder, which is composed of two semi-cumferential parts hinged together and to the lower portion of the cylinder, each part being provided with a recess capable of admitting operating-cams.

g' represents the lower portion of the cam-cylinder, which has one set of cams only, as indicated by dotted lines in Fig. 1.

h represents a pair of removable cams, which may be used on either side of the upper portion of the cylinder.

i in Fig. 1 represents by dotted lines the permanent location of the only cams in the lower portion of the cylinder.

k k represent downward extensions of the upper portion of the cam-cylinder, sufficiently enlarged to encompass the lower portion of the cam-cylinder, and provided with recesses

7, that engage pins *m* when the cylinder is closed, and prevent vertical disarrangement therein.

o represents a perforated lug on one part of casing *g*, and *p p* represent perforated lugs on the other part of the same, said lugs *p p* being arranged to pass on opposite sides of lug *o* and carry their perforations on a vertical line with the perforations in said lug *o* when the cylinder is closed, in order that a securing-pin may be passed through all the lugs, as indicated in Fig. 5.

q represents the guide for the principal thread used in the construction of the stocking, and *r* is an auxiliary for the same.

s represents the guide for the re-enforcing thread, and *t* is an auxiliary for the same.

u is the frame that carries guides *q* and *r*.

v is the frame that carries guides *s* and *t*.

w represents a comb of ordinary construction, and *x* is the weight for the same.

The needles *d'* are arranged continuously on one side of cylinder *f*, and alternately with needles *c'* on the other side of the cylinder. This will be more readily understood by referring to Fig. 6, in which dots *x* indicate a line on one side of which are needles *d'* only, and on the other side of which are needles *d'* and *c'* alternately arranged. The position of the division indicated by dotted line *x* is, however, only a matter of choice, and may be varied according as it is desired to re-enforce a greater or less part of the circumference of the stocking-leg.

The needles *d'* are operated by cams *i* only. The needles *c'* are operated by the cams *h* only. The position of cams *i* is permanent. Cams *h* may be moved from one side of the upper portion of the cam-cylinder to the opposite side of the same, their pivot-pins being fitted loosely in the cylinder to facilitate this result.

In beginning my stocking the cams *h* are placed directly over cams *i*, thread *b* is fed from above through guides *r* and *q*, and the stocking is set up in any well-known manner. As the knitting progresses all of the needles are operated in regular succession, precisely the same as if all were of one length and operated by one set of cams. The reason for the successive action of all the needles, as above stated, lies in the vertical coincidence of the two sets of cams and their consequent simultaneous action on their respective needles. Fig. 1 illustrates the relative position of the two sets of needles when subjected to the simultaneous action of the two sets of cams.

The process of knitting, as above set forth, is continued until the knee portion is approached, when the upper portion of the cam-cylinder is opened, the cams *h* changed to the opposite side of the cylinder, and said cylinder again closed. Guides *s* and *t* are then placed in position, and an extra thread, *a*, is fed upward through the comb and cylinder and carried to the needles by guides *t* and *s*. Then as the knitting is resumed the original

thread *b* is knitted by all the needles on one side of the cylinder and each alternate needle on the other side of the cylinder, while the re-enforcing thread is knitted by each alternate needle on one side of the cylinder only. The wales *d* are formed of the original thread on needles *d'*, the wales *c* are formed of the re-enforcing thread on needles *c'*, and the connecting-threads of each set of wales are interknitted with the intervening wales, as indicated in Fig. 2. Both sets of needles are so adjusted that when not in operation their upper ends will project above the cylinder, as indicated in Figs. 1 and 5, and the thread that is knitted by one set of needles is at the same time laid against the other set of needles, as indicated in Fig. 5. Were the needles not so adjusted the connecting-threads of the different sets of wales would pass to the inside of the stocking, where they would float loosely, instead of being interknitted, as shown. The floating portion of the re-enforcing thread passes over the needles to the inner surface of the stocking, where it occupies the position indicated in Fig. 2, and to facilitate this result the long needles *d'* are formed as shown in Fig. 7, the customary depression under the latches being dispensed with, in order that the latches may have a greater lateral projection when at rest and more surely trip on the floating thread, which does not lie so close to the needles as do the ordinary loops. When the knee portion of the stocking has been knitted with the two threads in the manner specified, the upper cams are again placed vertically coincident with the lower cams, the re-enforcing thread is dispensed with, the stocking is finished with one thread, after the manner in which it was begun, or in any suitable manner, and, as a final step, the floating threads *a'* are cut away.

The stocking knitted in the manner above described may be in no way different from stockings as ordinarily produced, with the exception of the knee portion; but the knee portion will be permanently re-enforced without becoming conspicuous by a difference in the appearance of its texture.

The greater density of the re-enforced portion of the stocking is indeed apparent on a very close examination; but the very slight difference in appearance is made still slighter by the stocking being drawn over the knee of the wearer, and is practically indistinguishable. The contrast so plainly seen in Fig. 2 is caused in part by the darkening of the re-enforcing thread, in part by the inner surface of the fabric being presented to view, and in part by the disproportionately large interstices; but such contrast does not exist to any perceptible degree in the outer surface of a stocking closely knitted with threads of one color.

The re-enforced portion of the stocking is of uniform thickness and texture throughout, each wale-loop carrying just two threads, no more and no less; and as each thread is knitted on separate and independently-operated

sets of needles, it will be readily understood that one thread will not interfere with the rapid and effective knitting of the other thread.

Were it otherwise—that is, if the thickness or the texture of the re-enforced portion varied in any way, as if one loop carried three threads and the next adjacent loop carried but one thread—the variation would make the said re-enforced portion conspicuous as an apparent make-shift, and if two threads were knitted together as one thread, in the customary manner, needles small enough to effectively knit a single thread would be overtasked by the introduction of a second thread and perform their work in an unsatisfactory manner, if at all, the result in one case being to produce an unsaleable article, and in the other case to produce an article under such circumstances as to make its ready sale at profitable prices an impossibility.

The singly alternate arrangement of the wales formed of different threads (shown in Fig. 2) is considered preferable, as furnishing a more compact and uniform texture; but it may be seen that by a suitable disposition of the needles the wales can be knitted in alternate pairs, or a wale of one thread can be interposed between two pairs of wales of the other thread.

In the use of the word “thread” throughout the specification and claim, I do not wish to be

considered as confining myself to a single strand without regard to thickness, but rather to include by such word the quantity of yarn in any form that may be readily knitted by the needles of the machine, and that is in fact so knitted.

I make no claim herein to the machine which forms the subject-matter of my application Serial No. 199,002, filed April 15, 1886, nor to the re-enforcing fabric as distinct from the stocking, which forms the subject-matter of my application Serial No. 158,974, filed March 16, 1885.

I claim—

A stocking knitted throughout, the knee portion excepted, with a single thread in any well-known manner, and having the knee portion knitted with two threads, each forming independent wales arranged alternately with the wales of the other thread, the connecting-threads of each set of wales being interknitted with the intervening wales in the uniform manner herein set forth, a single connecting-thread being held by each and every wale-loop, substantially as described.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

JOHN H. PLACE.

Attest:

C. C. CLARK,
J. L. BOOTH.