

(No Model.)

2 Sheets—Sheet 1.

J. ROBINSON.
METHOD OF UTILIZING PARTIALLY WORN FIBROUS HARNESS.
No. 570,683. Patented Nov. 3, 1896.

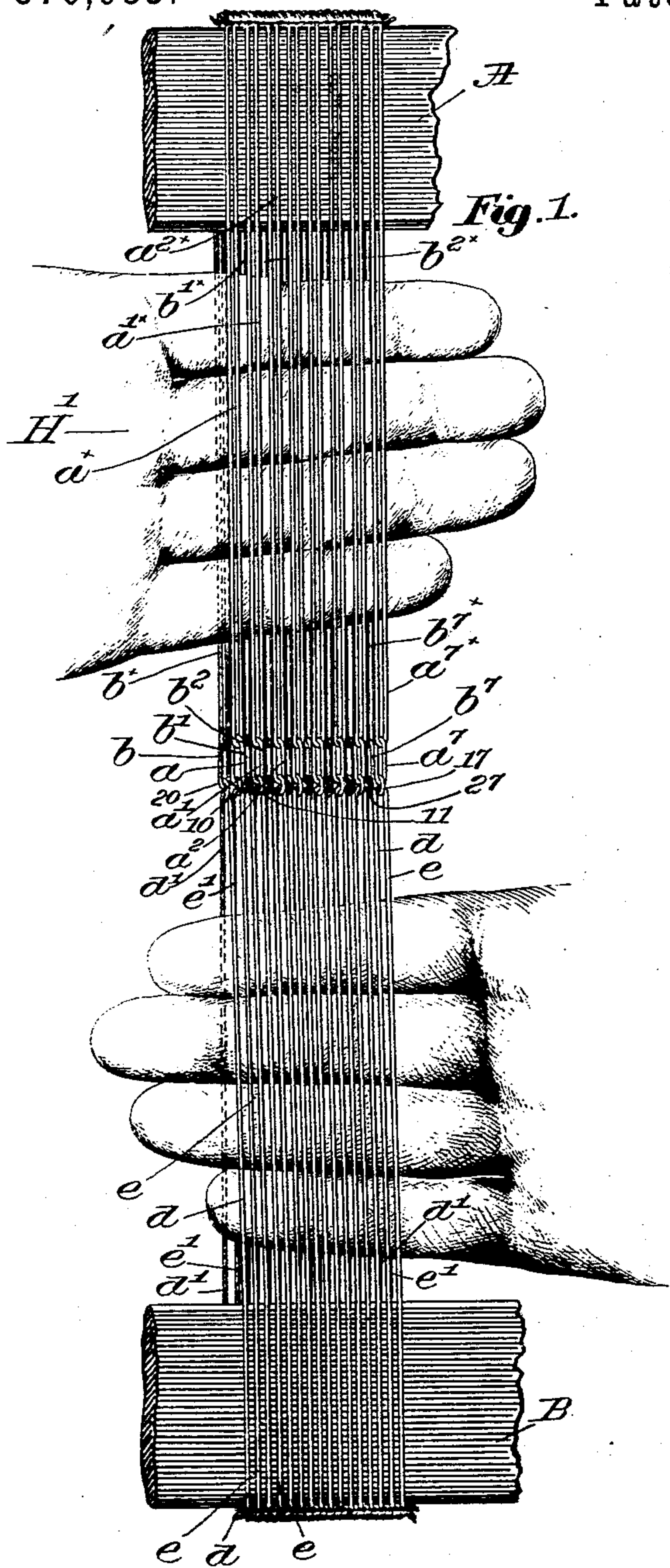
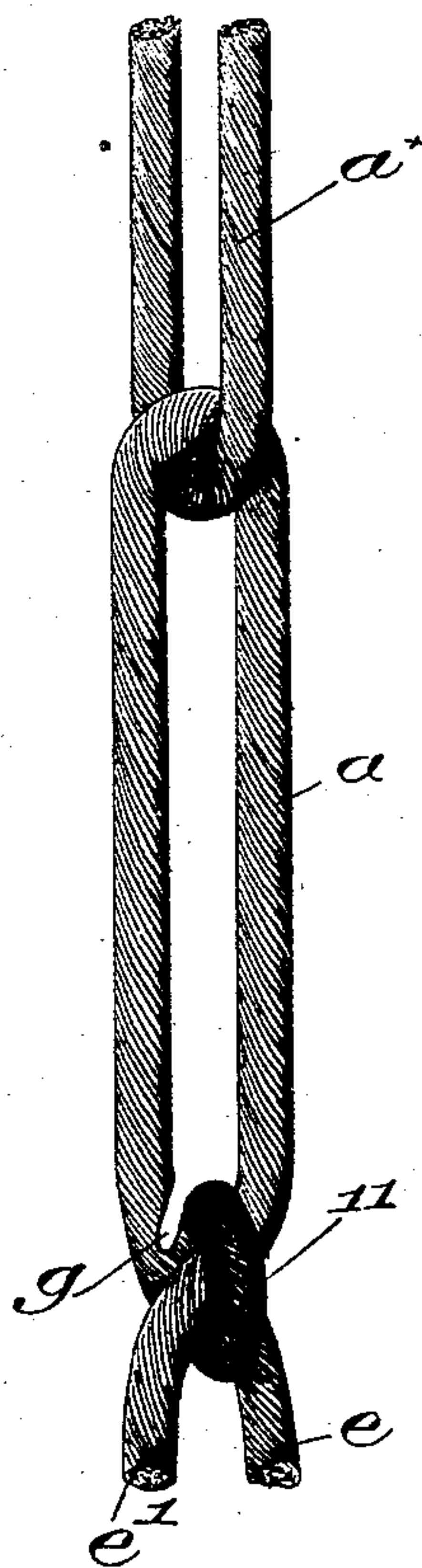


Fig. 2.



Witnesses:

Walter E. Lombard.
Thomas J. Spummond.

Inventor:
Joshua Robinson,
by Crosby & Sugan
Attorneys.

(No Model.)

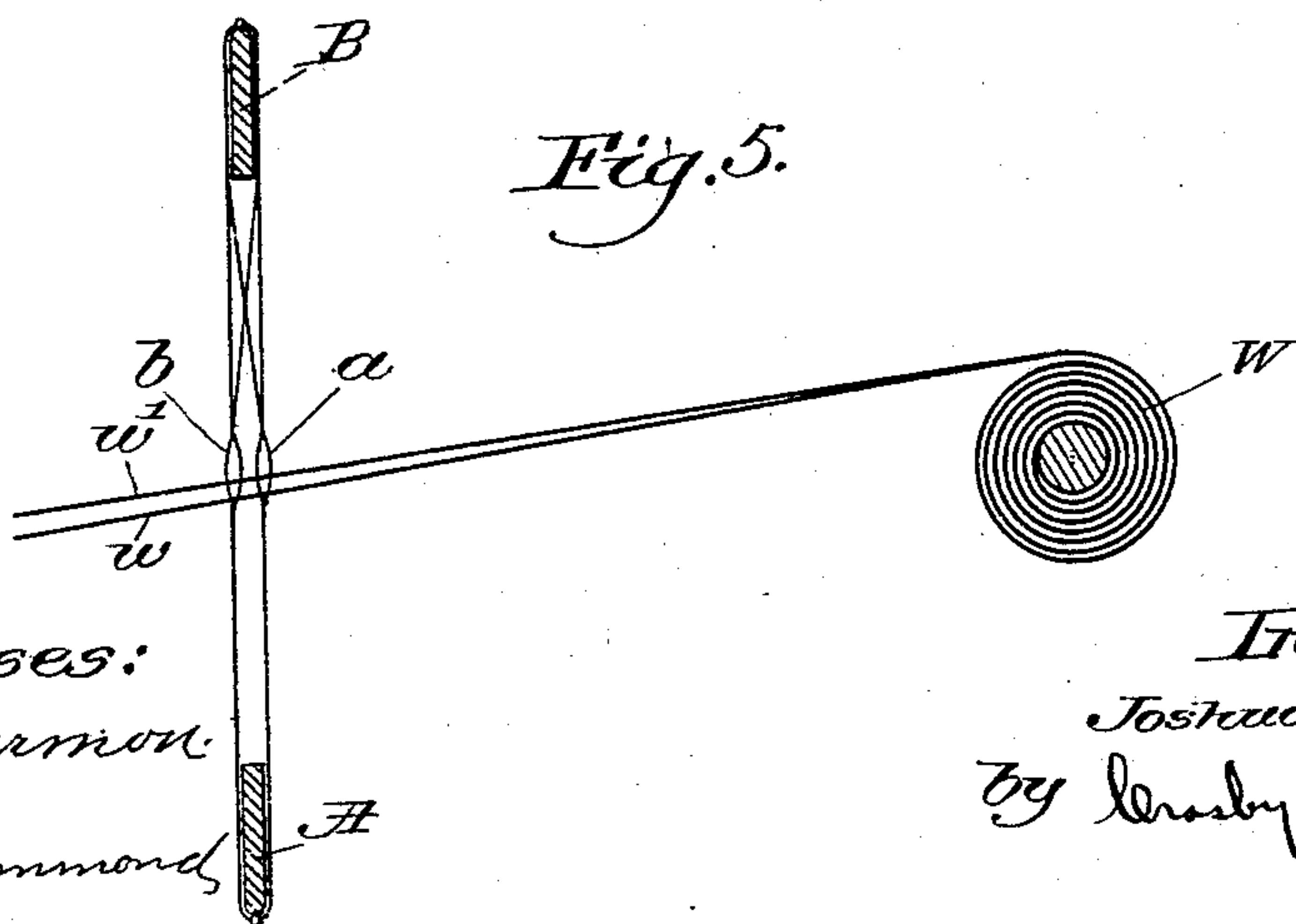
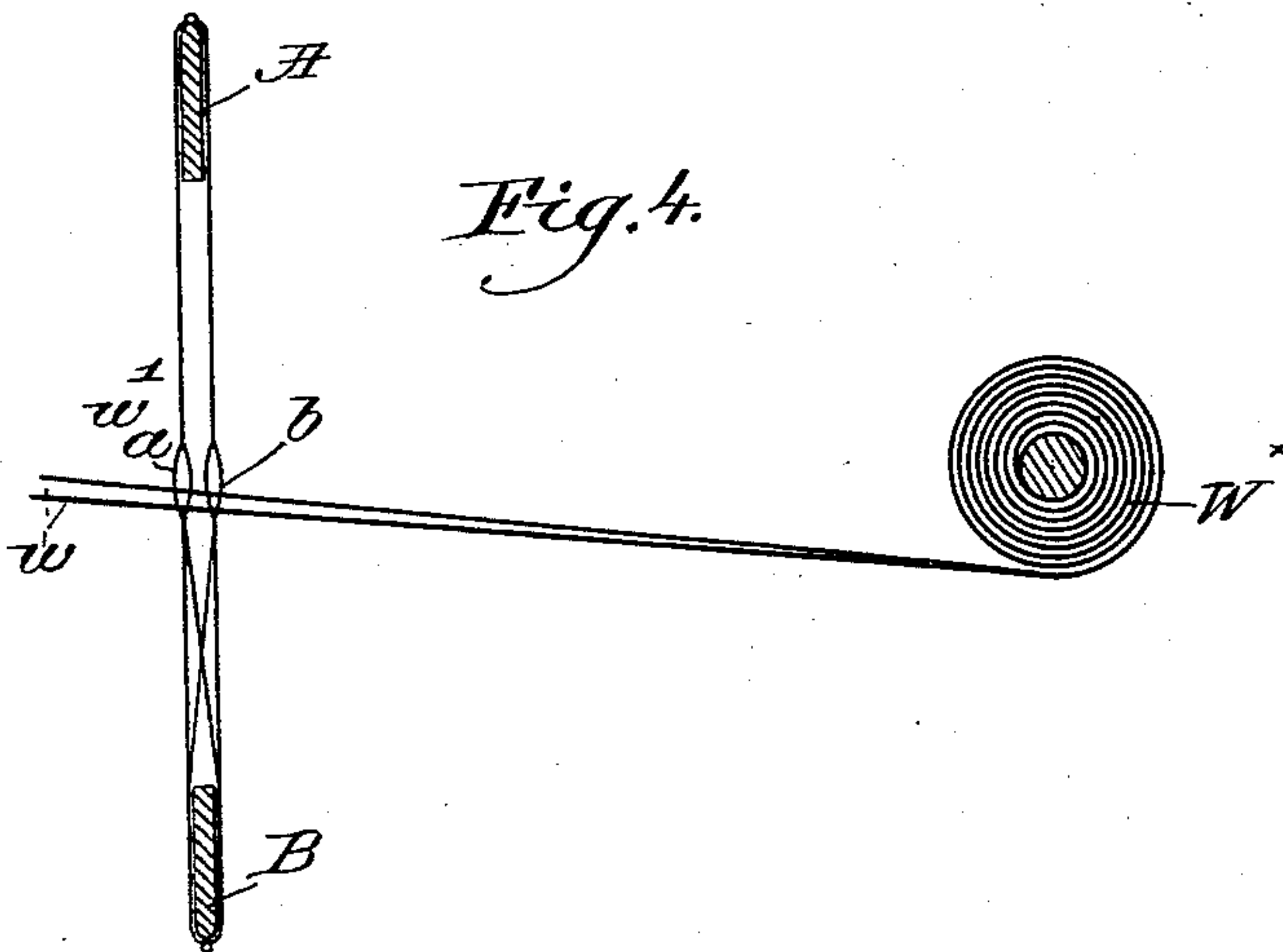
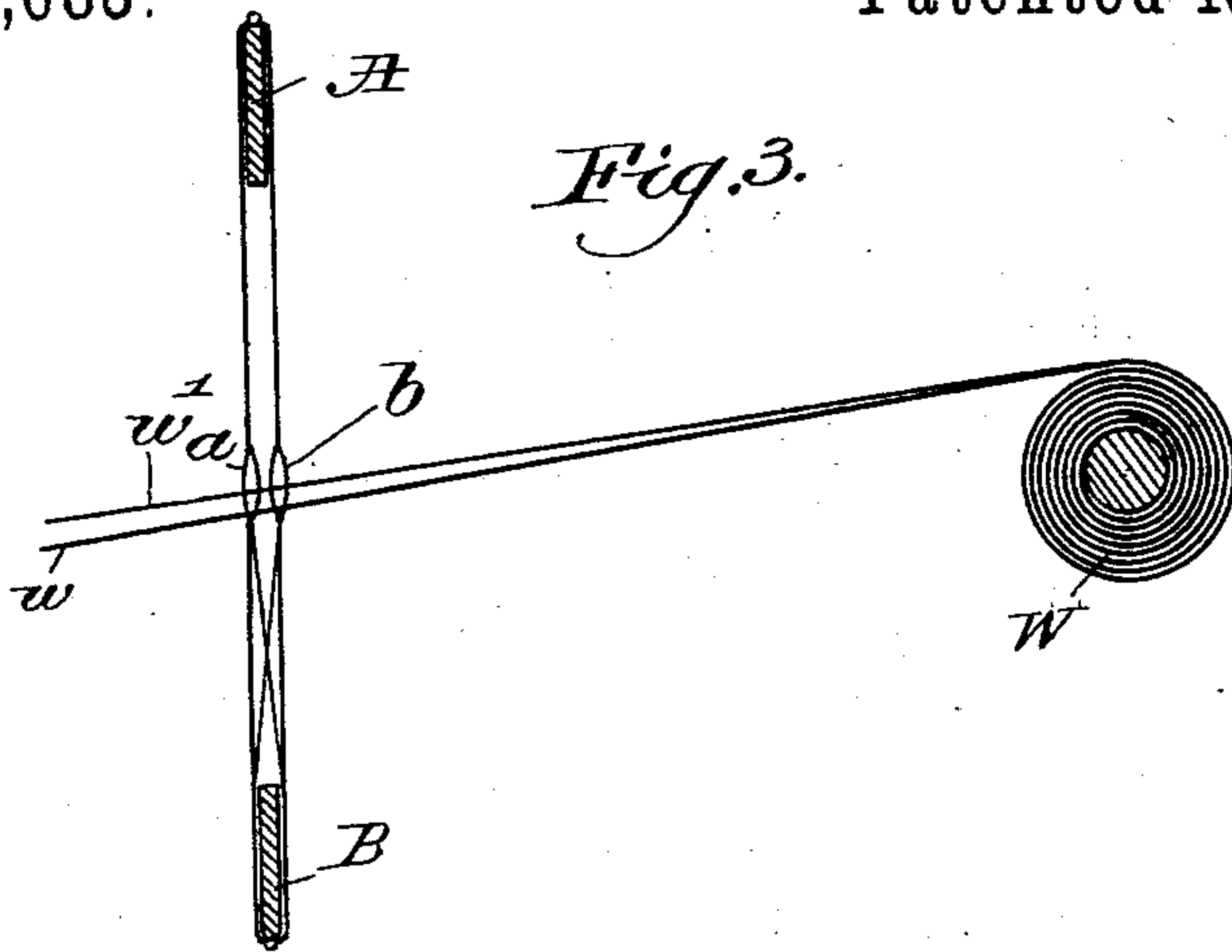
2 Sheets—Sheet 2.

J. ROBINSON.

METHOD OF UTILIZING PARTIALLY WORN FIBROUS HARNESS.

No. 570,683.

Patented Nov. 3, 1896.



Witnesses:
A. C. Harmon
Thomas Drummond

Inventor:
Joshua Robinson
by Lewis Gregory
attys.

UNITED STATES PATENT OFFICE.

JOSHUA ROBINSON, OF LAWRENCE, MASSACHUSETTS.

METHOD OF UTILIZING PARTIALLY-WORN FIBROUS HARNESS.

SPECIFICATION forming part of Letters Patent No. 570,683, dated November 3, 1896.

Application filed November 18, 1895. Serial No. 569,271. (No specimens.)

To all whom it may concern:

Be it known that I, JOSHUA ROBINSON, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Methods of Utilizing Partially-Worn Fibrous Harnesses, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of a method of drawing in warp ends, whereby the life of fibrous harnesses may be greatly increased and the cost of production decreased, owing to the less frequent renewal of harnesses made possible thereby.

It is well known that the lifting of the warps causes considerable and constant friction at the lower ends of the harness-eyes, the friction causing the material of the eyes to be cut or worn into grooves or notches, into which the warps are drawn and through which they pass. The friction on the warp-yarns is thus increased to such an extent that the chafing causes frequent breakages, and when a number of the eyes of a harness become thus grooved or impaired the entire harness is rendered worthless and must be discarded, even though the other eyes are in good condition and the remainder of the harness practically as good as new. If it were possible to reverse the harness in the loom, so as to bring the unused ends of the eyes into the position occupied before by the worn ends, the life of the harness would be practically doubled, or at least very greatly extended. So far as I am aware, however, such reversal of the harness has never been attempted heretofore, and, ordinarily, such reversal would be impractical, owing to the somewhat peculiar but well-known construction of fibrous harnesses desired to assist in the drawing in of the warp ends through the harness-eyes.

The peculiar construction of harnesses referred to consists in making them with the lease at the lower portion or below the eyes, that is, the eyes are suspended by their upper ends from the top harness-shaft from its front and rear sides alternately, and the lower end of each eye is connected to opposite sides of the bottom harness-shaft, so that in drawing in the operator gathers a number of the eye-supporting strands in the hand, inserting one

finger through the lease of one harness, another finger through the lease of the second harness, and so on, if more than two harnesses be in the set. This brings the eyes of any one harness into the same plane, and they can be picked off in regular order from the bunch held in the hand and the warp ends threaded through them.

With two harnesses, the simplest form, the warp ends are drawn in in one and one order, first a warp end through an eye of one harness, the next warp end through an eye of the other harness, the next end through the second eye of the first harness, and so on until all the warp ends have been drawn in. If the harnesses are turned upside down for the drawing in, the lease would be at the top, and when the fingers of the operator were inserted between the series of eye-supports the eyes of each harness would be divided into two sets in parallel planes, and it would be almost impossible to draw in the warp ends properly. The eyes in each harness would have to be picked out, one from the set in front of the finger and then one from the set back of the finger, and the operation would be so slow as to be prohibitive.

By my invention I am enabled to utilize partially-worn harnesses by reversing them in the loom, yet without changing the essential characters of the work of the operator in drawing in.

Figure 1 in front elevation represents a portion of a cotton harness, the fingers of two hands being inserted above and below the eyes merely to show more clearly the formation of the lease. Fig. 2 is a greatly-enlarged view of a single-knot harness-eye, showing the manner in which the lower end is worn into a groove by the warp end passing there-through. Fig. 3 is a sectional view of a harness upright, as in the loom, with the warp-beam in relative position. Fig. 4 is a similar view representing the relative arrangement of the harness and warp-beam when drawing in for a reversal of the harness in the loom, and Fig. 5 represents the reversed harness as it would appear in the loom with the warp-beam in proper position.

While at least two harnesses are required to form a set, I have shown only one in Figs. 3 to 5, inclusive, to avoid confusion.

Referring to Fig. 1, the eyes $a a' a^2$, &c., are shown as suspended from the front side of the top harness-shaft A by loops $a^x a'^x a^{2x}$, &c., the alternate eyes $b b' b^2$ &c., being suspended by loops $b^x b'^x b^{2x}$, &c., from the rear side of the top shaft A, the latter set of eyes and their suspending-loops being shown by shaded lines. The eye a is knotted at its lower end at 10, and the ends e and e' are passed over the front and rear sides, respectively, of the bottom harness-shaft B, the eye a' knotted at 11, and its ends e and e' similarly attached to the bottom shaft B, and so on. The eyes $b b'$, &c., are similarly knotted at their lower ends at 20, &c., the free ends d and d' of the knot passing at the front and back of the shaft B and being attached thereto. Now, it will be seen that the fingers of the hand H, below the eyes, are behind the series of knot ends $e d e d$, &c., and in front of the series $e' d' e' d'$, &c., so that by moving the hand up to the eyes they will all be brought into one plane, and by picking off first an end e , then end d , and so on, one eye after another will be picked off in succession to be threaded with a warp end. Should the hand H', however, above the eyes be moved toward them they would be separated into two sets, the eyes $a a'$, &c., in front and the eyes $b b'$, &c., at the back, such being the result if it were attempted to draw in the warp ends with a reversal of the harness.

In Fig. 2 one of the eyes, as a , is shown enlarged as it would appear after usage, the friction of the warp end passing therethrough having worn a groove g therein at the lower end of the eye. The upper end of the eye gets little wear either in single or double knot harnesses, and by reversing the harness the upper end of the eye would be brought down into position to take up the wear, thus increasing the life of the harness. As has been said, however, it is not possible to draw in with the harness reversed, for then the lease will be at the top and the eyes cannot be properly separated and picked off to be threaded.

In Fig. 3 the harness is shown in usual position in the loom, with the warp end w drawn in through eye a and warp end w' drawn in through eye b , all the warp-yarns leading off from the top of the warp-beam W. Supposing now it is desired to draw in for a harness in which the lower ends of a number of eyes have been worn, so that the harness can be reversed in the loom to change the eyes end for end. The harness is mounted as usual in the drawing-in frame, (not shown,) but the warp-beam

W^x is reversed, as shown in Fig. 4, exactly opposite the position it must occupy in the loom, so that the warp-yarns lead from the under side of the beam to the harness. As the harness is right side up with the lease at the bottom the warp ends can be drawn in readily, as usual. When all are drawn in, the set of harnesses are temporarily attached to the beam, as usual, and beam and harnesses are ready to be sent to the weave-room to be placed in the loom. The beam is placed in the loom in the usual manner, with the warp-yarns leading from its upper side, and the harnesses are attached to the shedding mechanism, but in placing the beam properly in the loom the harnesses have been reversed, and they will be set up in the loom as shown in Fig. 5. The harness being upside down, it follows that the worn ends of the eyes will be uppermost and their unworn ends down, and weaving may then be begun as with a new harness to all intents and purposes.

My invention is applicable to either single or double knot harnesses, known as "cotton" harnesses, as distinguished from metallic heddles or harnesses.

In drawing in for twills, when the harnesses are to be reversed in the loom, it will be necessary to reverse the order of drawing in, *i. e.*, if the regular order be 1, 2, 3, 4, referring to the number of harnesses, when drawing in for a reversal of the harnesses, the order would be 4, 3, 2, 1. This reversal of the order of drawing in obviates resetting or reversing the harness-cams in the loom, for when the reverse order warps are placed in the loom they come in their proper order.

I claim—

The herein-described method of utilizing partially-worn fibrous harnesses for looms, whereby both ends of the eyes may be used, which consists in reversing the warp-beam, drawing in the warp ends from the under side of the beam, with the harness-leases down and mounting the drawn-in beam and harnesses in the loom with the warp-yarns leading from the top of the beam and the harness-leases up, whereby the previously upper ends of the harness-eyes are reversed in position, substantially as described.

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

JOSHUA ROBINSON.

Witnesses:

GEO. W. GREGORY,
LAURA T. MANIX.