

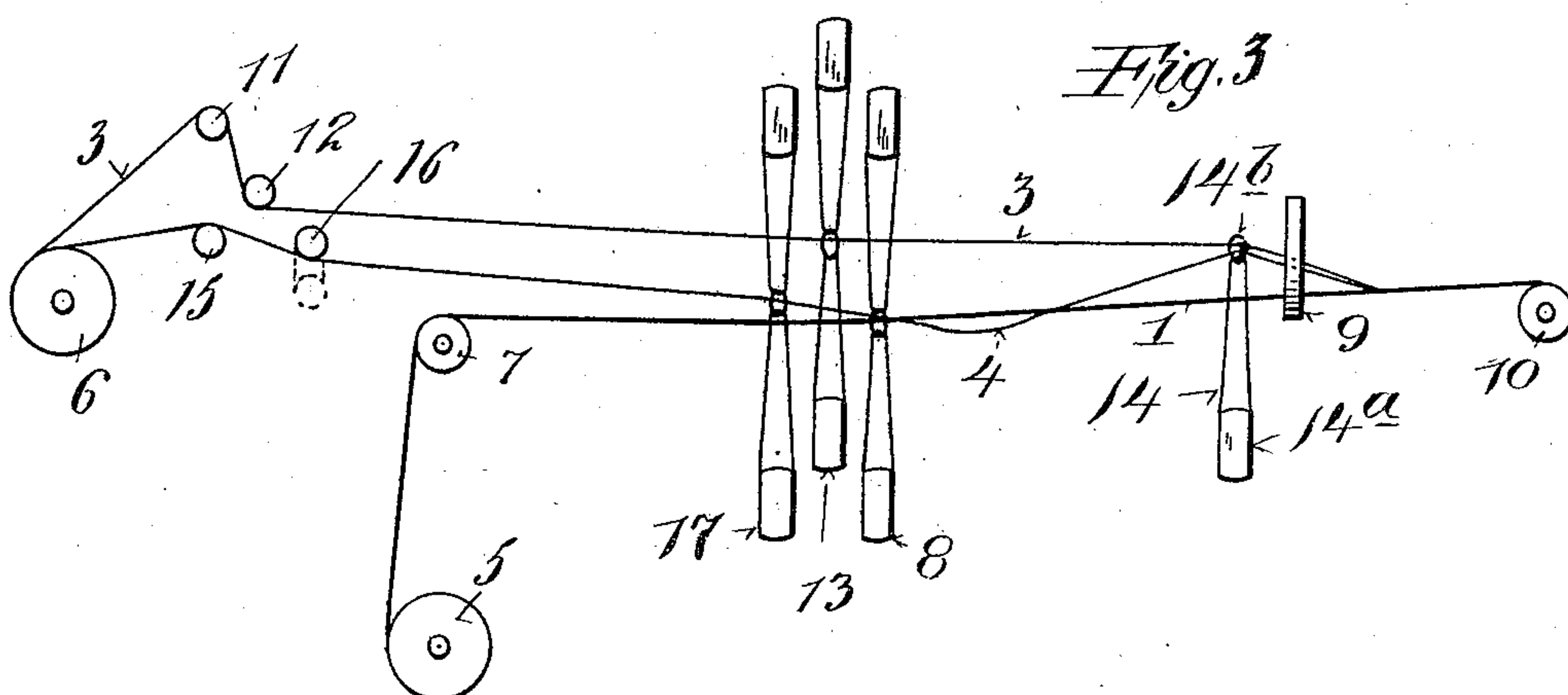
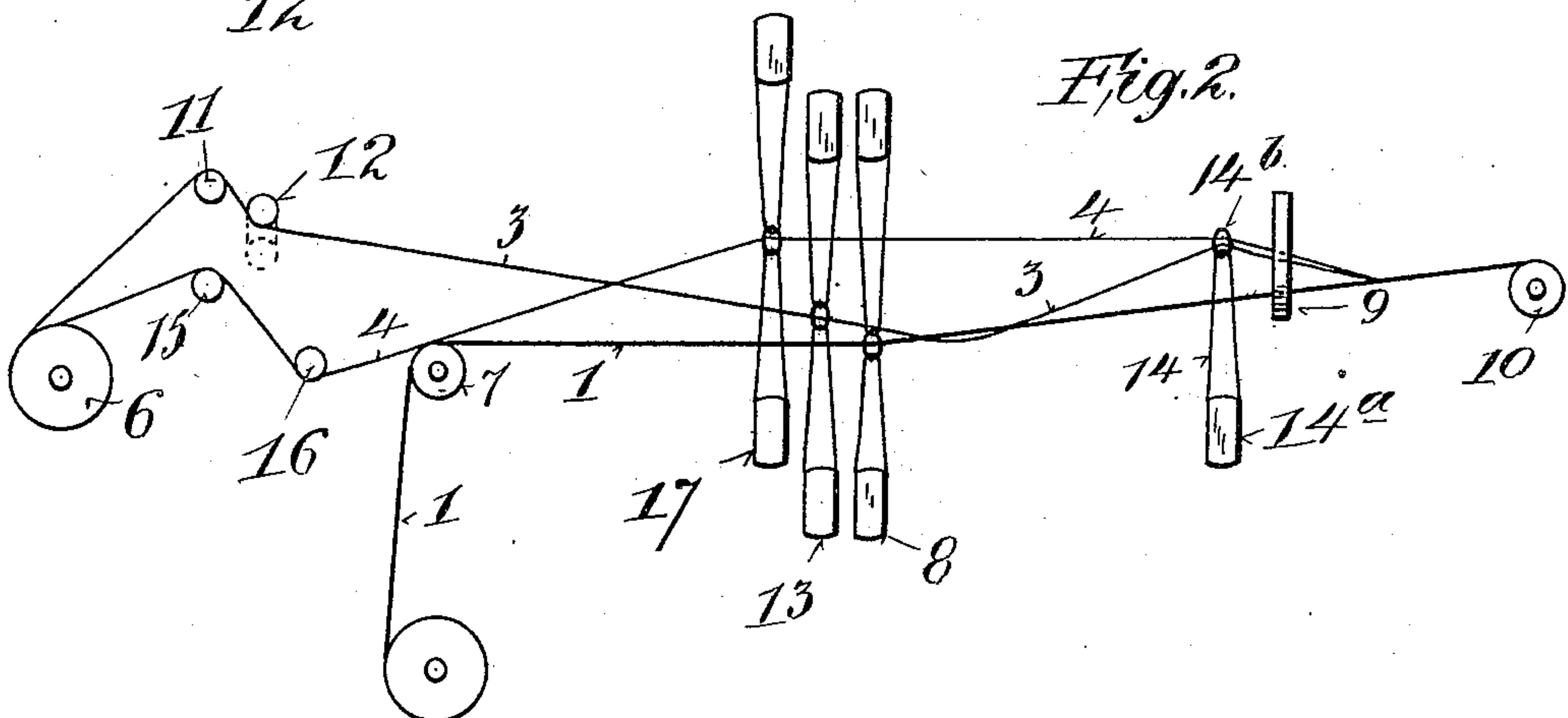
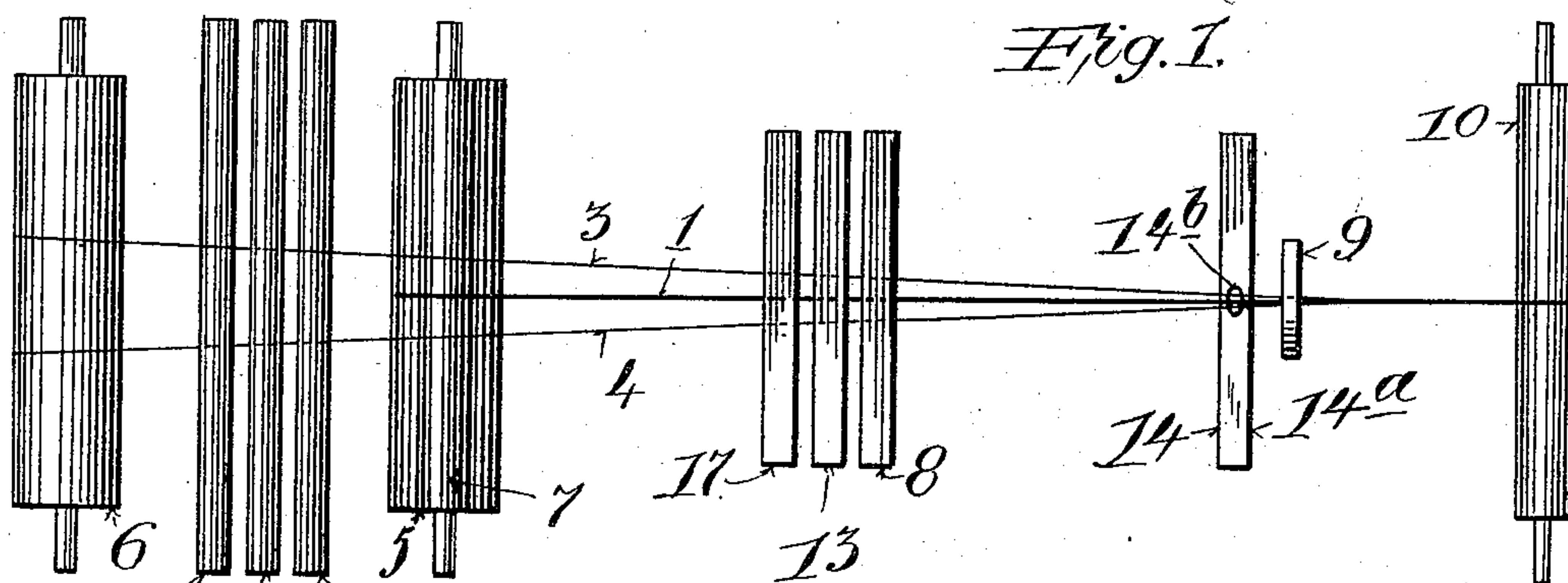
No. 841,087.

PATENTED JAN. 8, 1907.

W. HANNAH.  
LOOM.

APPLICATION FILED APR. 11, 1906.

3 SHEETS—SHEET 1.



Witnesses  
C. M. Benjamin  
G. H. Shaw

Inventor  
William Hannah  
By his Attorney  
Joseph L. Levy

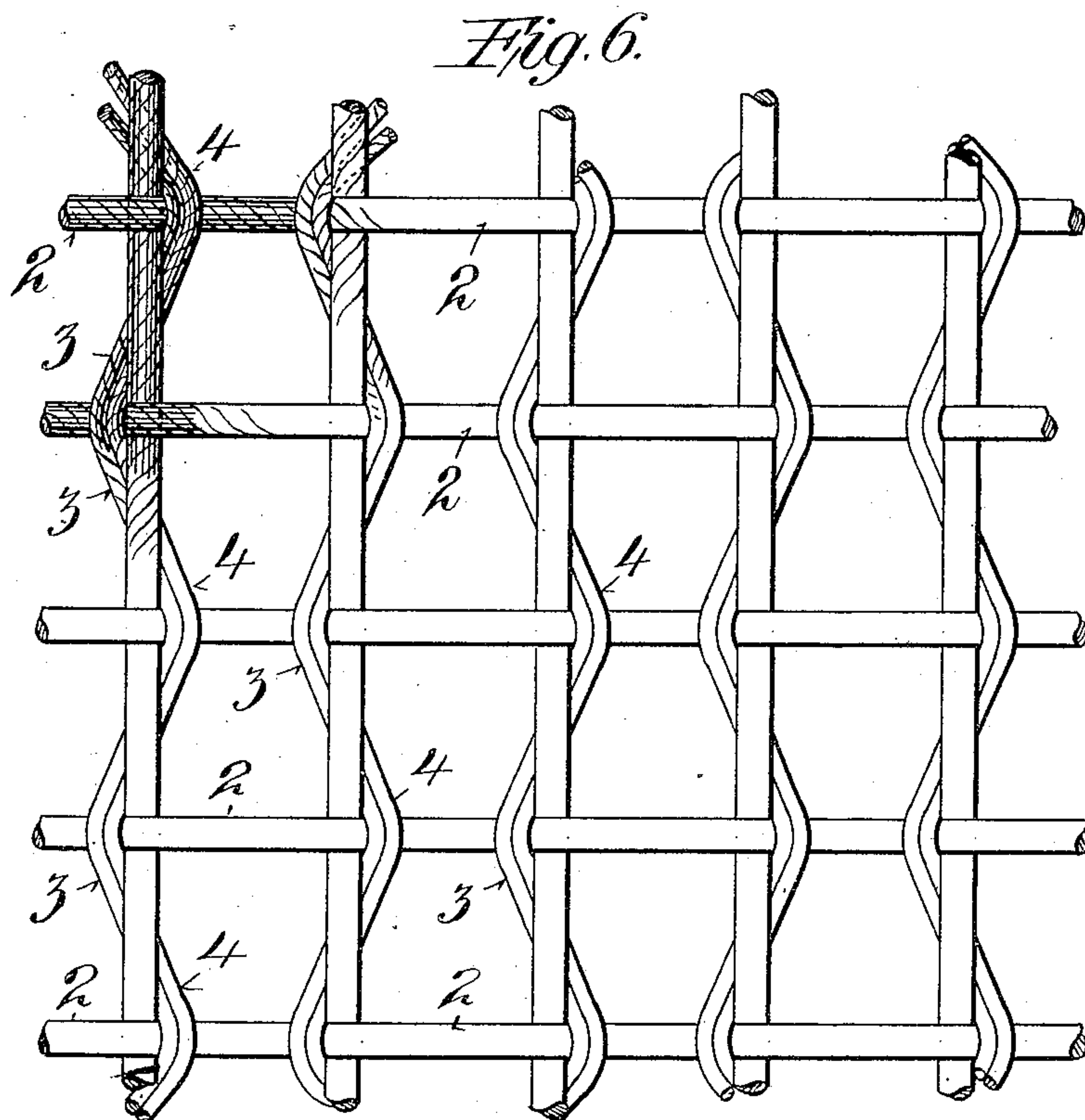
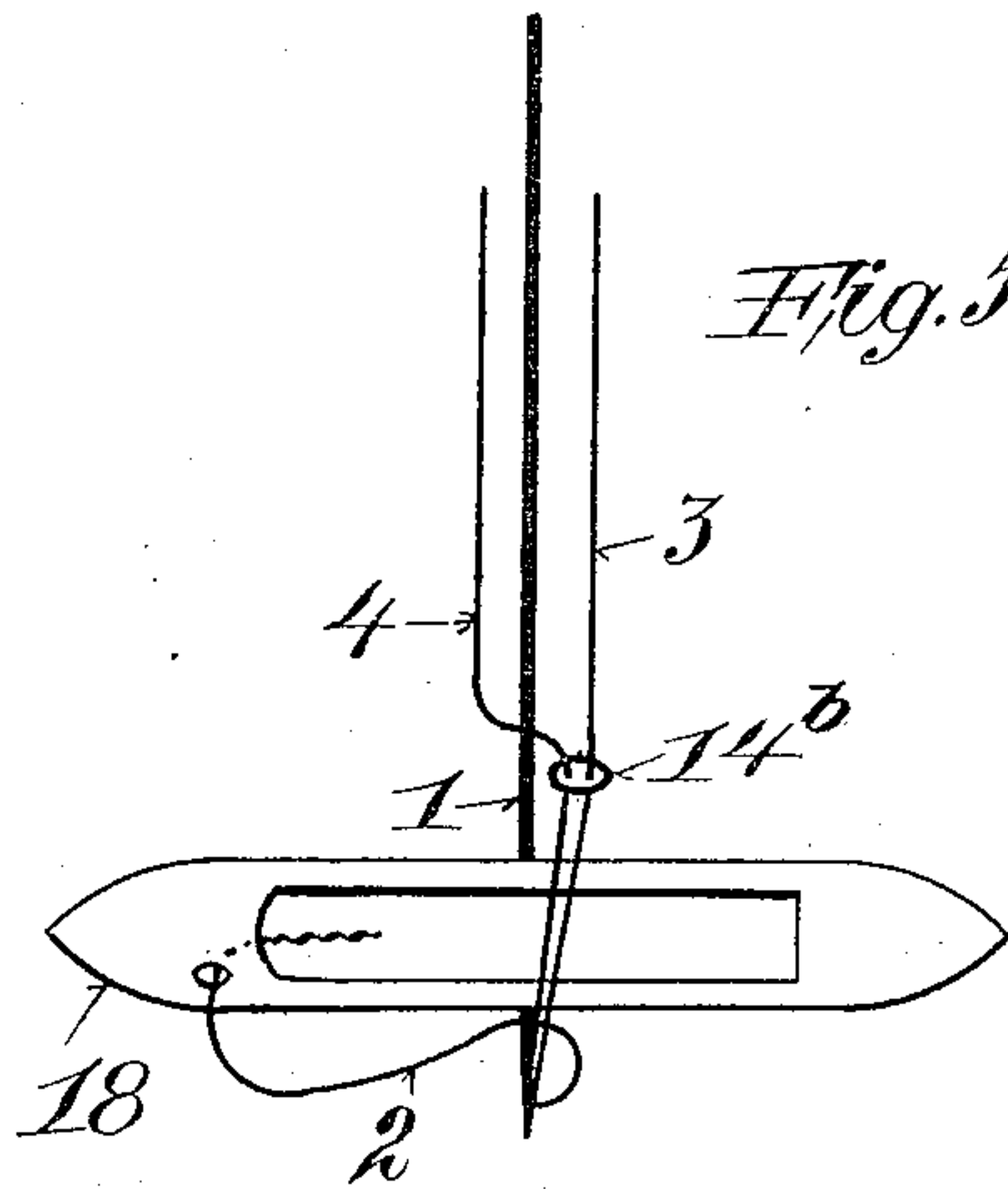
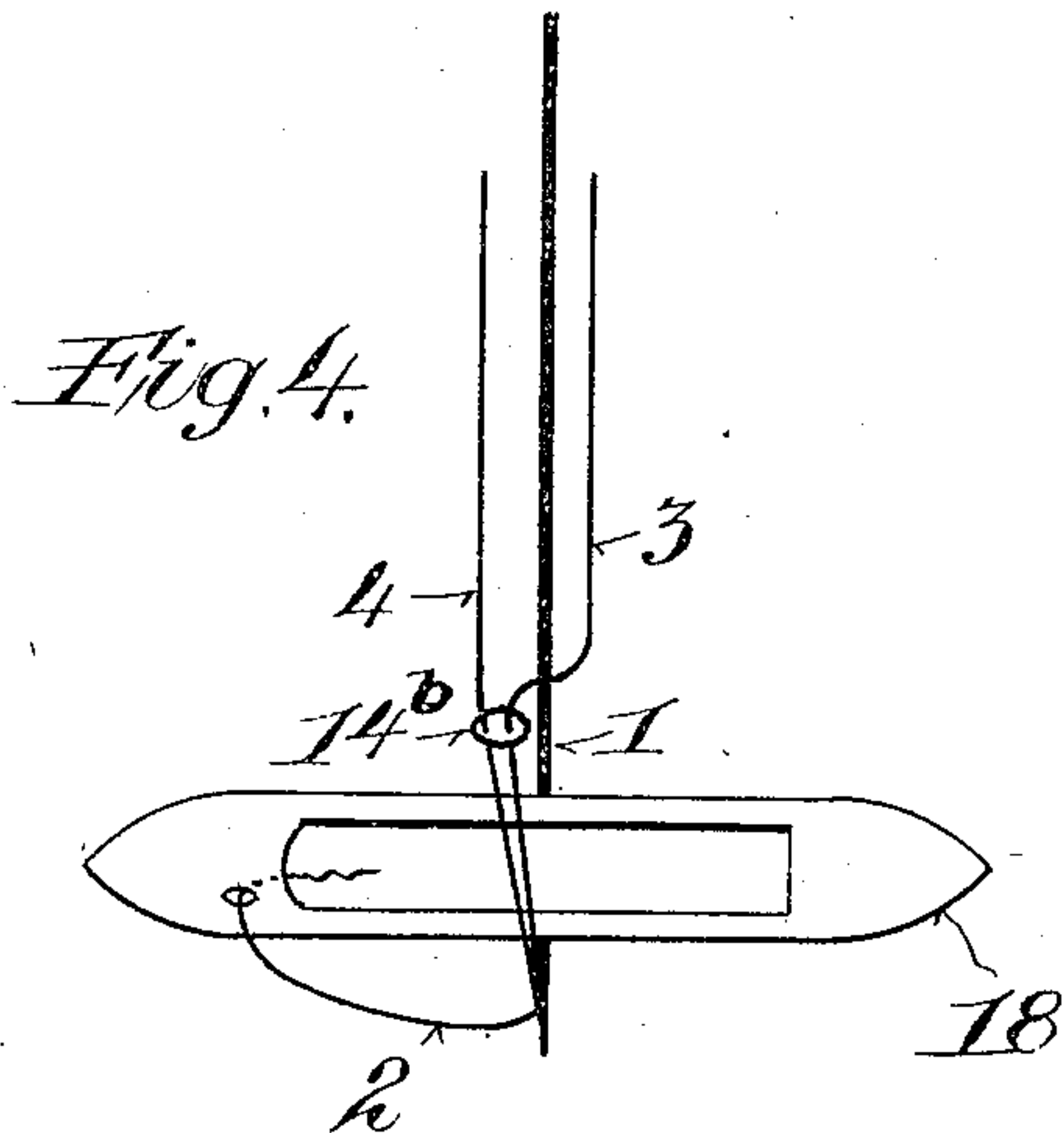
No. 841,087.

W. HANNAH.  
LOOM.

PATENTED JAN. 8, 1907.

APPLICATION FILED APR. 11, 1906.

3 SHEETS—SHEET 2.



Witnesses  
*C. W. Neufuss*  
*G. D. Brown*

Inventor  
*William Hannah.*  
By his Attorney  
*Joseph L. Levy*

No. 841,087.

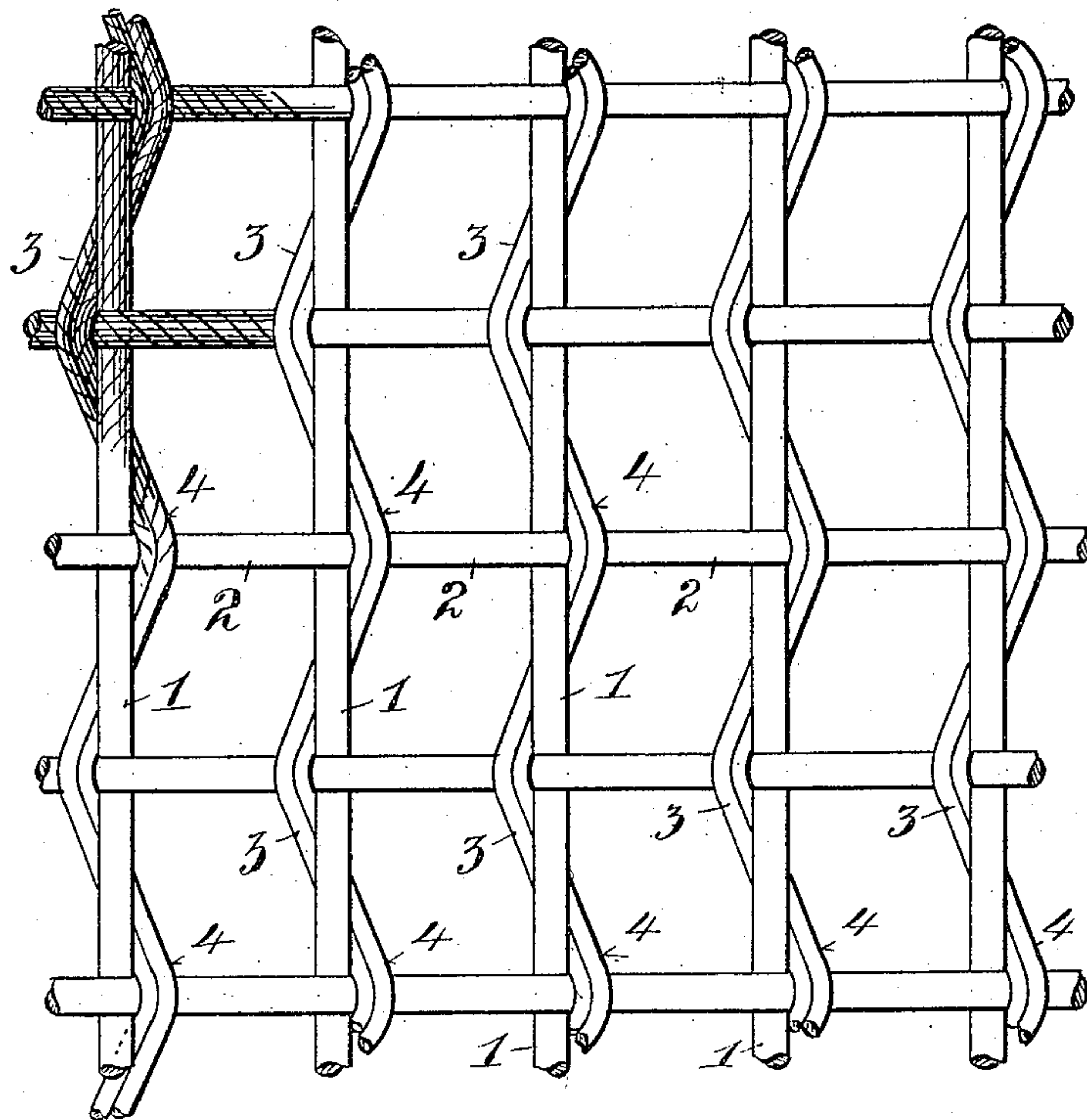
PATENTED JAN. 8, 1907.

W. HANNAH.  
LOOM.

APPLICATION FILED APR. 11, 1906.

3 SHEETS—SHEET 3.

*Fig. 7.*



Witnesses  
*Chas. Benjamin*  
*J. D. Brown*

Inventor  
*William Hannah.*  
By his Attorney  
*Joseph L. Day*



# UNITED STATES PATENT OFFICE.

WILLIAM HANNAH, OF PATERSON, NEW JERSEY.

## LOOM.

No. 841,087.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Original application filed July 25, 1905, Serial No. 271,133. Divided and this application filed April 11, 1906. Serial No. 311,029.

*To all whom it may concern:*

Be it known that I, WILLIAM HANNAH, a citizen of the United States, and a resident of the city of Paterson, county of Passaic, and State of New Jersey, have invented a new and useful Improvement in Looms, of which the following is a specification.

This is a division of my application filed July 25, 1905, Serial No. 271,133.

The object of my invention is to produce a gauze of silk or other material of an improved quality and at a reduced cost, the machine and process for producing the gauze being cheaper and simpler than any heretofore known to me. This object is attained by my invention, one embodiment of which is hereinafter set forth.

For a more particular description of my invention reference is to be had to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a diagrammatic plan view of a loom provided with my improvement. Figs. 2 and 3 are side elevations of the same, showing the parts in different positions. Figs. 4 and 5 are similar plan views showing the relative positions of the threads and shuttle in different positions. Figs. 6 and 7 are enlarged views of the fabric, parts being exaggerated to make the weave clear.

Throughout the various views of the drawings similar reference characters designate similar parts.

The well-known details of the loom are not shown, because they would confuse the drawings. Only such parts are indicated as are necessary to make clear the exact nature of my invention, it being understood that my improvements may be added to any suitable loom for weaving gauzes.

As the nature of my improvement is best explained by considering the fabric, reference is to be had to Figs. 6 and 7 of the accompanying drawings. In these figures the warp-threads 1 rest entirely under the woof-threads 2. These warp and woof threads 1 and 2 are bound together by the warp binding-threads (hereinafter called "binding-threads") 3 and 4. Ordinarily the threads 3 and 4 are the same size and half the size of the threads 1 and 2 and may be made of intervested or unthrown silk. These proportions may be varied as desired. Threads pass over the woof-threads and under the

warp-threads substantially in the manner shown, the binding-threads always remaining with the same warp-thread throughout the fabric.

By reference to the other figures in the case the manner in which the fabric is woven will be readily understood.

The warp 1 is wound on the warp-beam 5, which is suitably mounted in the usual manner. The binding-threads 3 and 4 are wound on the beam 6, as is also common. The thread 1 passes over the guide-roll 7, through the harness or heddle 8 and reed 9 to the beam 10, where the finished fabric is wound. The binding-thread 3 passes from the beam 6 over a fixed horizontal rod 11, under a vertically-movable rod 12, through the heddle 13, dupe 14, reed 9, and finally onto the roll 10. The other binding-thread 4 passes similarly from the beam 6, over the fixed rod 15, under the vertically-movable rod 16, through the heddle, dupe 14, reed 9, and onto the roll 10. The threads 1, 3, and 4 all pass through the same space in the reed. The threads 3 and 4 are normally in a plane slightly below the horizontal plane of the threads 1 and are located on opposite sides of this thread 1, as indicated in Fig. 1. Only one warp and two binding threads are shown in Figs. 1 to 5, because the other warp and binding threads are identical with the set shown and described. Therefore a description of one set answers for all. The shuttle 18 passes between the reed 9 and roll 10, leaving the woof 2 in its path. The dupe 14 consists of a shaft or bar 14<sup>a</sup>, which has flexible connection with a small glass ring 14<sup>b</sup>.

As the shuttle-carrying actuating mechanisms are old, as well as those for the heddles, reed, rods, and rolls, a description of them is unnecessary, as they may be of any of the usual forms. It will be assumed that they actuate their respective mechanisms so that they will operate as herein set forth. The dupe may be operated by the harness or heddles.

Assuming the parts as above described, the thread 1 is never raised by its heddle 8 above horizontal plane of its normal position, although it may be slightly depressed, if desired. The rod 12 on the binding-thread 3 is shown not depressed, but raised from the position shown in dotted lines. (See Fig. 2.) The heddle 13, through which it passes, is in



its inoperative position, and the thread is a little slack. On the other hand, the thread 4 is tightened by the rod 16, which is in its lowest position and passes through its heddle 17, which is raised to its limit, whereby the thread is tight, and thereby controls the dupe 14, which causes the thread 3 to pass under the warp 1 and to be raised sufficiently with the dupe 14 and thread 4 to allow the shuttle 18 to pass over the thread 1 and under the threads 3 and 4, as indicated in Fig 4. After the shuttle 18 passes, the reed 9 forces the woof 2 into its proper place in the fabric. Upon the return movement of the shuttle the movements of the binding-threads 3 and 4 are reversed, the thread 3 being drawn tight by the rod 12 and heddle 13, the thread 4, being loose, the dupe 14 is brought up on the other side of the thread 1, over which and under the threads 3 and 4 the shuttle 18 passes, but in the opposite direction, and the reed 9 then forces the woof 2 into its position as before. By so operating the loom either form of fabric shown in Fig. 6 or Fig. 7 may be woven. The preferred fabric is shown in Fig. 7. Both forms show the two binding-threads, which must always be placed together. The fabric could not be woven in accordance with my invention if one binding-thread were used for each warp.

I have equipped several old-fashioned looms with my improvements and find that their capacity is increased from twenty-eight to forty-five yards per day, because the machine is simplified so that its speed may be increased. I also find that the life of the harness is greatly prolonged, because the warps and binding-threads pass through metal or glass pieces in the heddles and dupes instead of through a mass of twisted cotton strings, as heretofore.

It is obvious that the substance of my invention may be embodied in many other forms than the one herein described, so that

it is not to be understood as limited thereto, but as broad enough to cover all forms that come within the scope of the annexed claims.

Having thus described my invention, what I claim is—

1. In a loom, a dupe having two binding-threads passed therethrough, means for holding said binding-threads so that they converge in said dupe and under a warp-thread, and means for tightening one of said binding-threads and loosening the other in alternation whereby the dupe is first raised on one side of said work-thread and then on the other.

2. In a loom of the class described, means for stretching a series of warp-threads, means for stretching a converging series of binding-threads so that each warp-thread has a binding-thread on each side, a single dupe for converging the binding-threads under their warp-threads, a pair of heddles for said binding-threads, means for stretching and loosening said binding-threads and raising the heddles alternately, whereby the dupe may be drawn at either side of the warp-thread and above the same, and means for passing a woof-thread between the binding-threads and warp-threads.

3. In a loom of the class described, means for stretching and holding warp and binding threads, the binding-threads being arranged in pairs, one on each side of each warp-thread, rods for tightening or loosening said binding-threads, heddles for raising or lowering the binding-threads alternately, a single dupe for receiving each pair of binding-threads, a reed and a shuttle.

Signed at the city of New York, county of New York, State of New York, this 9th day of April, 1906.

WILLIAM HANNAH.

Witnesses:

O. E. EDWARDS, Jun.,  
EMIL BROWN.