

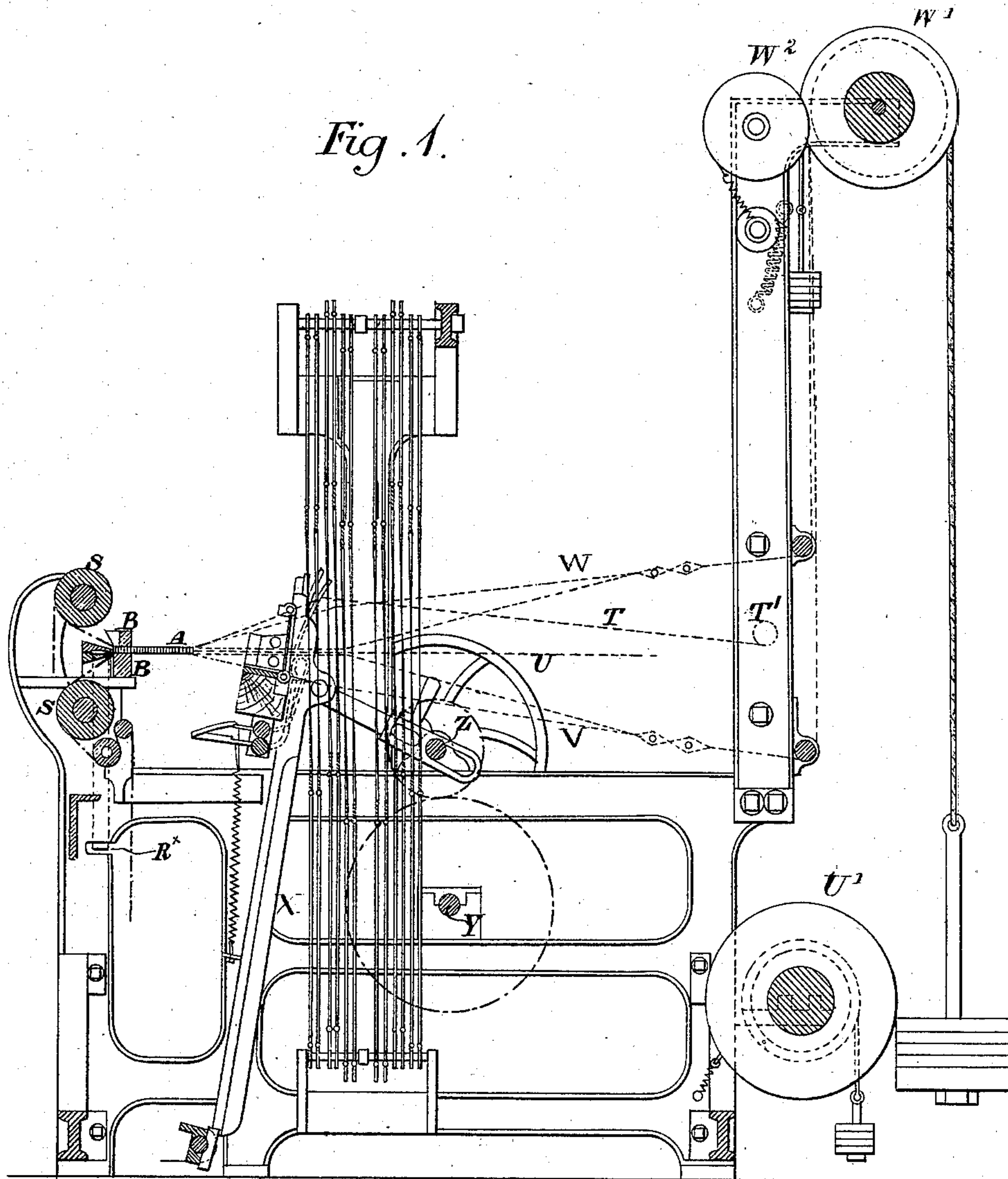
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5 Sheets—Sheet 1.

ART OF WEAVING DOUBLE PILE FABRICS AND LOOM FOR WEAVING
THE SAME.

No. 270,321.

Patented Jan. 9, 1883.



Witnesses
Lloyd B. Wight
James Young

Inventors:
S. C. Lister
Jose Reixach
By their attys Baldwin, Hopkins & Peyton

(No Model.)

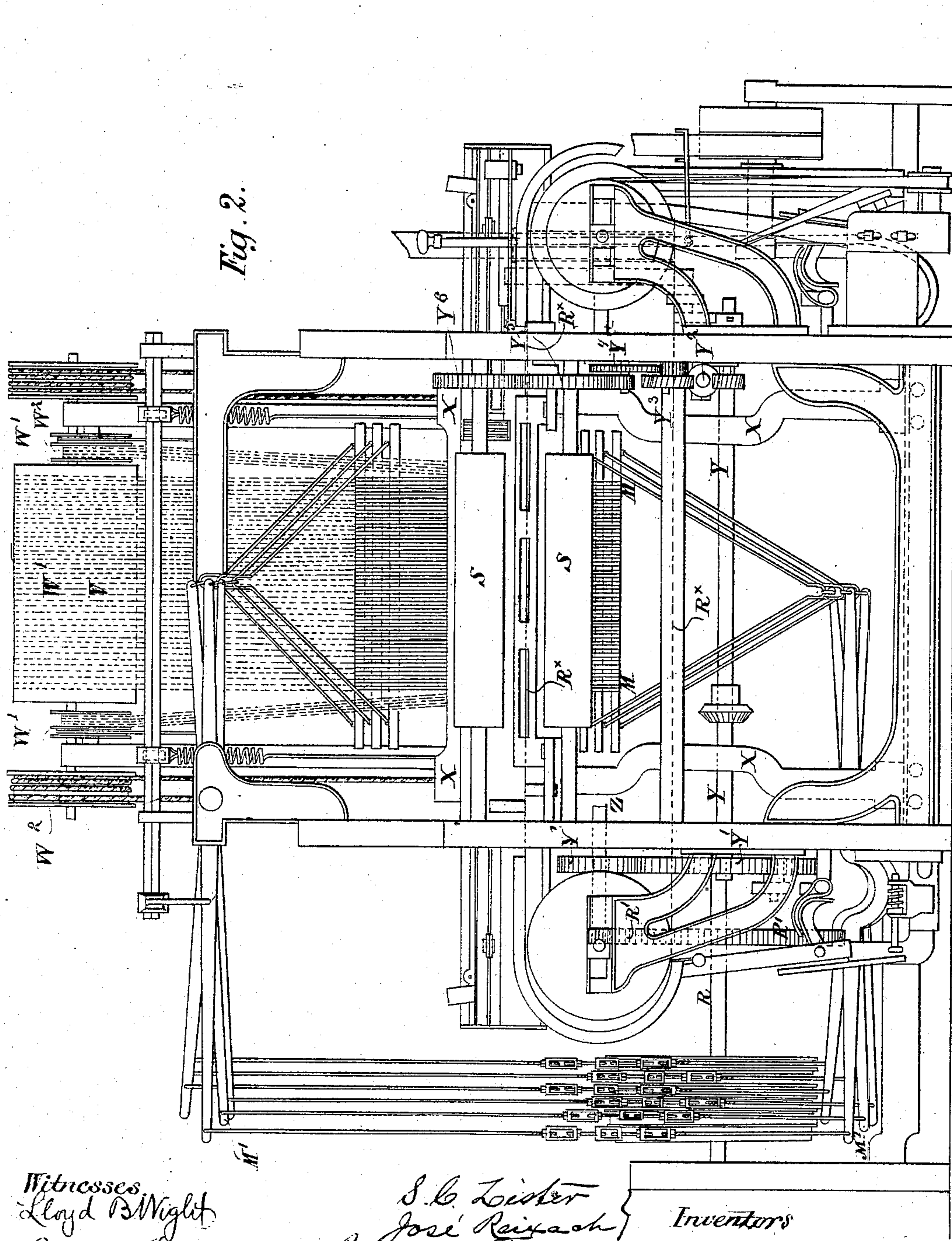
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S. C. LISTER & J. REIXACH.

ART OF WEAVING DOUBLE PILE FABRICS AND LOOM FOR WEAVING
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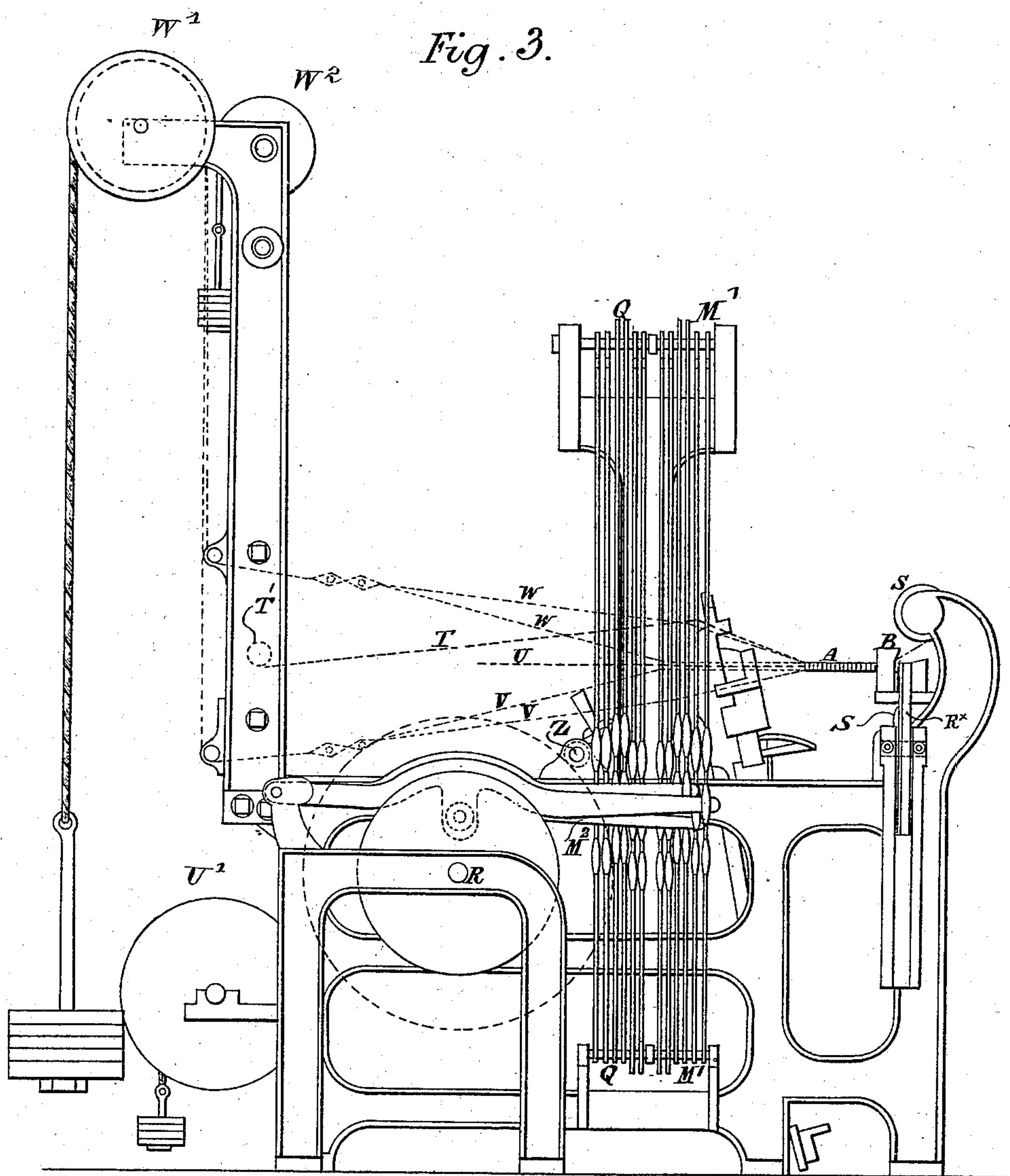
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S. C. LISTER & J. REIXACH.

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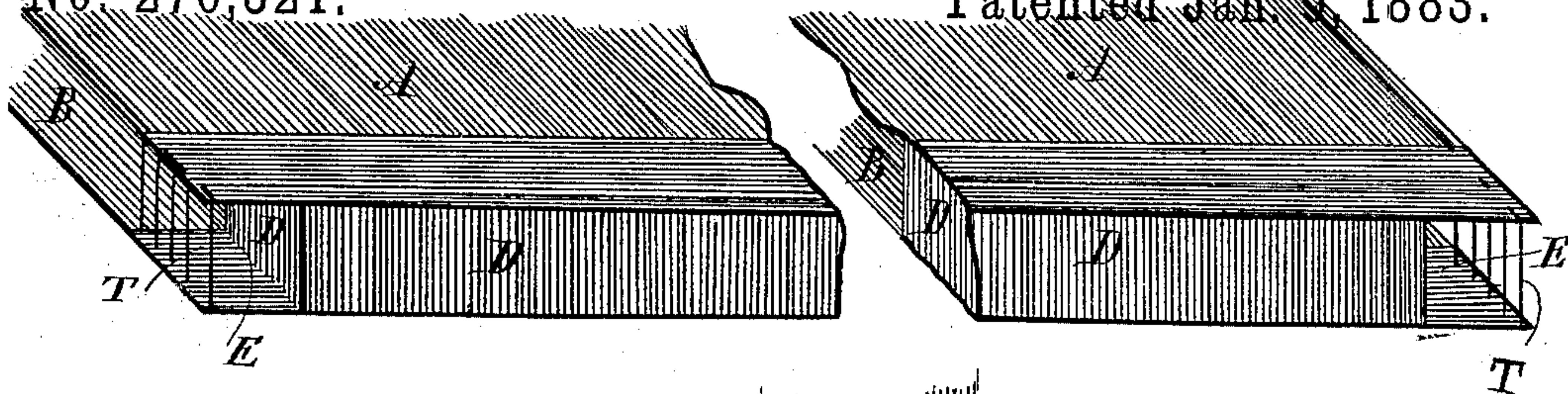


Fig. 4.

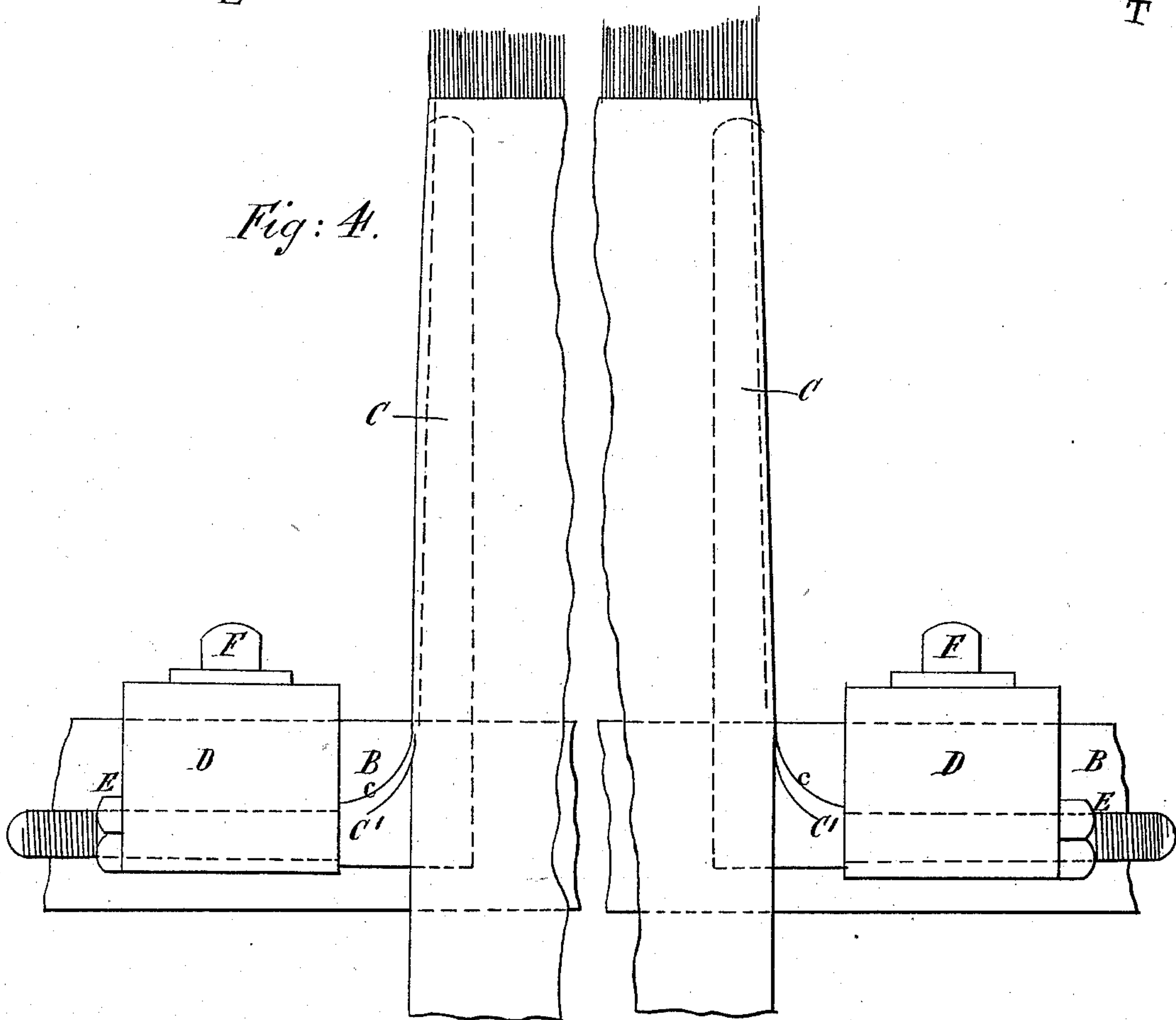
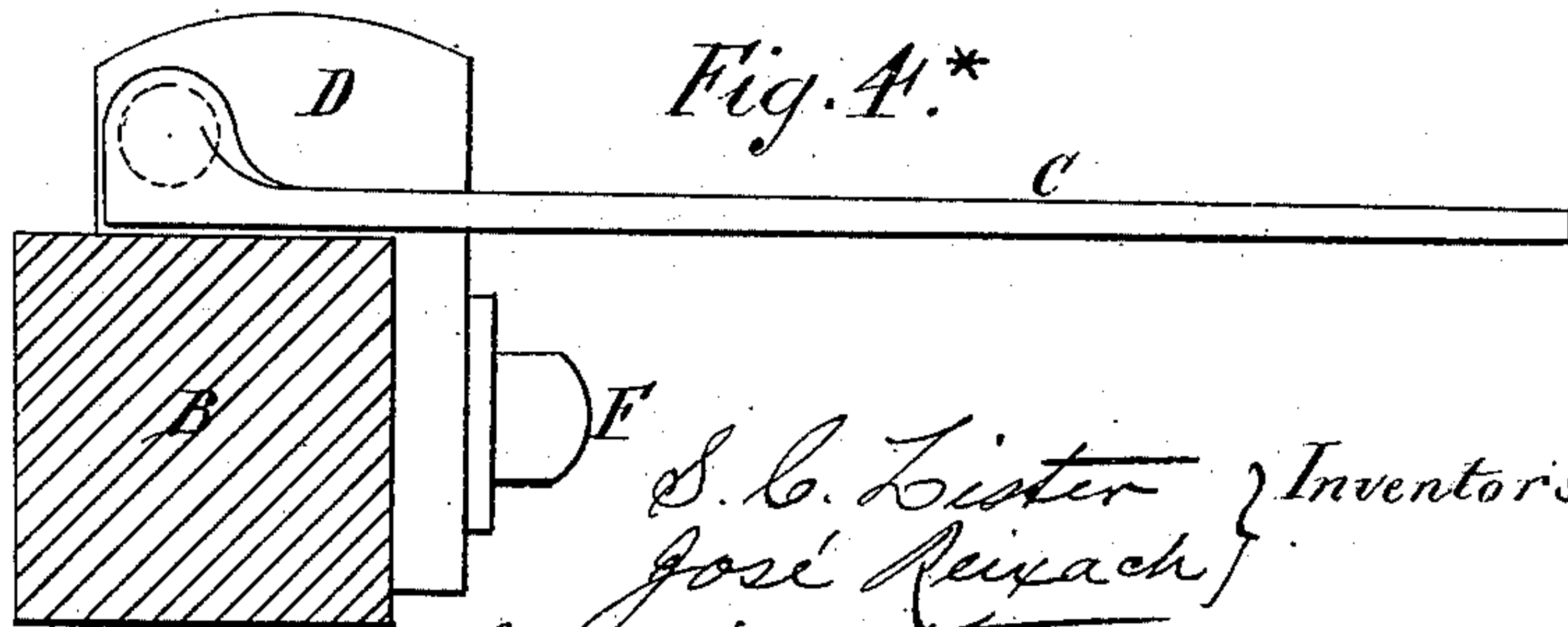


Fig. 4.*



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(No Model.)

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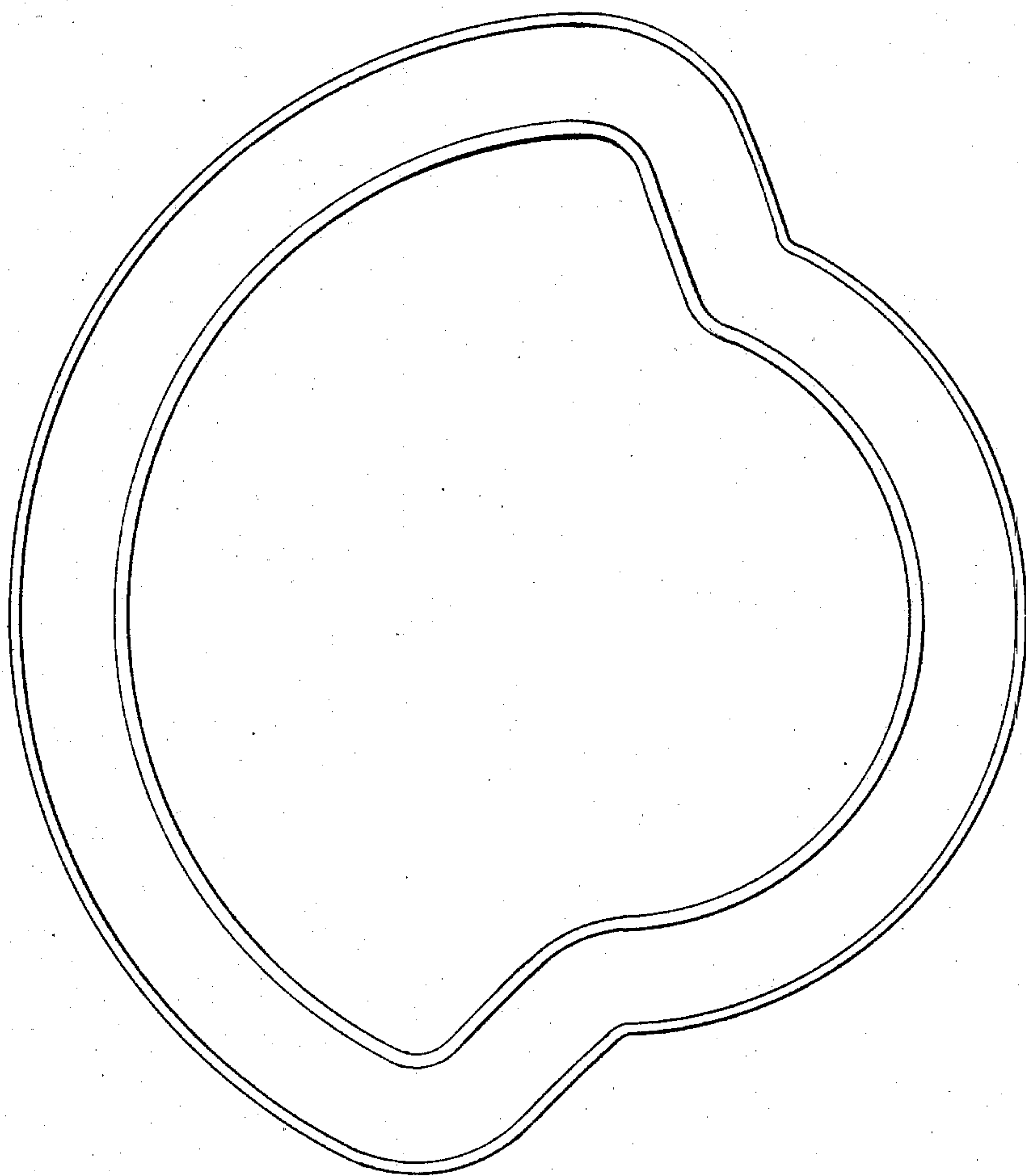
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Fig: 6.



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UNITED STATES PATENT OFFICE.

SAMUEL C. LISTER AND JOSÉ REIXACH, OF MANNINGHAM, NEAR BRADFORD, COUNTY OF YORK, ENGLAND.

ART OF WEAVING DOUBLE-PILE FABRICS AND LOOMS FOR WEAVING THE SAME.

SPECIFICATION forming part of Letters Patent No. 270,321, dated January 9, 1883.

Application filed November 28, 1881. (No model.) Patented in England August 23, 1878, No. 3,327; in France March 13, 1879, No. 129,564, and in Germany March 25, 1879, No. 10,163.

To all whom it may concern:

Be it known that we, SAMUEL CUNLIFFE LISTER and JOSÉ REIXACH, subjects of the Queen of Great Britain, residing at Manningham, near Bradford, in the county of York, England, have invented certain new and useful Improvements in the Art of Weaving Double-Pile Fabrics and in Looms for Weaving the Same, (for which we have received Letters Patent in England, No. 3,327, dated August 23, 1878; in France, No. 129,564, dated March 13, 1879, and in Germany, No. 10,163, dated March 25, 1879,) of which the following is a specification.

This invention relates to improvements in the manufacture of pile fabrics woven double—that is, composed of two distinct cloths connected by pile-threads—which have to be severed to produce two pile fabrics. Heretofore and prior to our invention for the most part such fabrics have been woven in single-shuttle looms, and the shuttle has passed from one cloth to another. The shuttle-threads so passing from one cloth to the other at the selvages have allowed of the fabrics being held distended to the proper width by means of temples formed of fixed bars, which project forward from the velvet-rail, one at each selvage, and enter between the two cloths. The outer edges of these bars have borne against the shuttle-thread where it passed from cloth to cloth, and have so held the fabric distended to the proper width until the severing of the shuttle-thread by the temples. When pile fabrics are woven double in the above manner in two-shuttle power-looms—that is, in looms in which a separate shuttle is used for each cloth—there is no connection of the one cloth to the other along the selvages by the passing of the shuttle from one cloth to the other. Now, in accordance with our invention, and in order to allow of the old form of temple being used, it being very efficient for the purpose, we employ on each side of the double fabric being woven a binding warp-thread worked in by a heald, so as to connect the edge of the selvage of the top cloth with the edge of the selvage of the bottom cloth, and form a succession of loops

for the outer edge of the temples to bear against and hold the cloths distended to the proper width.

Figure 1 of the drawings annexed shows, partly in side elevation and partly in vertical section, the main parts of a two-shuttle power-loom for weaving pile fabrics face to face; Fig. 2 a front view, and Fig. 3 a left-hand side view, of the same; Fig. 4, a plan view of the two end portions of the lower velvet-rail which have the temples standing out from them, the top rail being removed; and Fig. 4*, a cross-section of the lower velvet-rail, showing one of the temples; Fig. 5, a diagram of a portion of uncut fabric, especially designed to illustrate the way in which the binding-threads get tied to the edges of the two cloths; Fig. 6, a view of one of the cams for actuating the heald for working the separate warp-threads which bind together the edges of the cloths.

In order that our invention may be fully understood, we will first describe the way in which double-pile fabrics are woven in two-shuttle power-looms.

As the drawings show, there is one set of ground-warps for forming the top cloth and another set of ground-warps for forming the bottom cloth. Any desired number of these warps are made to serve only for forming selvages along the two sides of the two cloths. The set of pile-warps does not extend to the selvages, and therefore the selvages are formed without any pile. The two sets of ground-warps are by heddles simultaneously divided into sheds, and a shuttle is thrown through each shed. The two shuttles are thrown simultaneously. The pile-warps are also by a heddle alternately lifted up, so that the shoot of weft passed through the upper shed is below them, and afterward the pile-warps are lowered, so that a subsequent shoot of weft passed through the bottom shed shall be above them, and so the pile-warps get caught into the top and bottom fabrics, respectively. The batten beats up each time after a shoot of weft has simultaneously been passed through the two sheds.

In order that a shoot or weft may be passed simultaneously through the two sheds, the

batten has at each end of it two shuttle-boxes, one above the other, as shown at Fig. 2—one on a level with the upper shed, the other on a level with the lower shed. One picker-staff is used for throwing the shuttles from both boxes. The fabric woven is led away between two fixed horizontal bars, which are called the “velvet-rail.” The pile-threads connecting the top cloth to the bottom cloth are then cut by a continuously-revolving endless knife, as described in our United States Letters Patent No. 263,417, of August 29, 1882; or they might be cut by a knife having a reciprocating to-and-fro motion given to it or by other known cutting mechanism. The top cloth and the bottom cloth are then led away over take-up rollers, which have a continuously-revolving motion given to them from one of the continuously-revolving shafts of the loom.

In the drawings the warp for that part of the body or ground of both top and bottom cloths which are to have a pile-surface are shown as drawn off from a beam or roller, W' , and the warps for the selvages as drawn off from beams or rollers W^2 . Friction is applied to all these rollers to prevent them from turning too easily. This is done in the ordinary way by two or three turns of a cord led around the end of each roller, one end of the cord being attached to a spring and the other end having a weight hung onto it. The pile-warp is drawn off from the beam or roller U' , which is also prevented from turning too easily in the same way. We prefer also to continuously draw off the pile-warp from the beam or roller U' in the way fully described in our United States Letters Patent for looms for weaving double-pile fabrics, No. 268,250, dated November 28, 1882; but it might be drawn off from this roller in other ways.

Any ordinary mechanism may be used for raising and lowering the heddles at the required times. In the drawings the heddles are shown to be raised and lowered by the action of cams carried by a continuously-revolving cam-shaft, R , as is fully described in our application No. 46,762 for United States Letters Patent for improvement in the manufacture of pile fabrics, filed simultaneously herewith.

Referring to those features shown by the drawings of the loom in connection with which our invention is represented as employed, Z is the crank or driving shaft. Y is the picking-shaft, driven therefrom by toothed wheels Y' . X is the batten, moved to and fro by a crank on the crank-shaft in the ordinary manner. $W W$ are the ground-warps for the top fabric; $V V$, the ground-warps for the bottom fabric; U , the pile-warp; $T T$, the warp-binder threads for the temples. They come from bobbins T' . These bobbins turn upon pins carried by the side frames of the loom—one at each side of the loom—as shown at Fig. 1. Each bobbin is prevented from turning too easily by a weighted cord wound around it, just in the same way that the beams which carry the ground-warps

and the selvage-warps are prevented from turning too easily.

A is the double-pile fabric.

B is the velvet-rail.

$S S$ are the take-up rollers, driven continuously from the shaft Y , in the manner fully described in our above-mentioned Patent No. 263,417, which is as follows: The shaft Y , by skew-gear wheels, drives a shaft, Y^2 , the skew-gear wheel upon which drives a skew-gear wheel, Y^3 , fast with which is a pinion, which drives a toothed wheel, Y^4 . Fast with the wheel Y^4 is a pinion, which gears into a toothed wheel, Y^5 , on the lower take-up roller. This wheel Y^5 gears with a corresponding toothed wheel, Y^6 , on the upper take-up roller, and so both take-up rollers are driven continuously at the same speed.

R^* is an endless band of steel, forming the cutting-knife for severing the pile of the double-pile fabric, as set forth in our said Patent No. 263,417. One fabric is led away by the upper take-up rollers, S , and the other by the lower take-up roller.

The fabric A as it is woven by suitable mechanism—such as are above pointed out and as described in our said application No. 46,762—and before the pile is severed, passes between two fixed horizontal bars, B , which form, as usual, what is called the “velvet-rail.” The upper bar is fixed at its ends to the top of the lower bar. To the lower bar are secured the temples C , in the manner shown at Figs. 4 and 4*. The bar C , which forms the temple, has an arm, C' , extending at a right angle from it. This arm passes through a block, D , and is locked in it by a screw-nut, E . The block itself is secured to the lower velvet-rail by a bolt and nut, F . The front edge of the arm C' , where it unites with the bar C , is a cutting-edge, so that it may cut the loops of binding-thread (soon to be described) which come up to it. This form of temple has, as already stated, been before used. It is described in English Patent No. 2,429, in the year 1858, and we do not make any claim to it, *per se*, or otherwise than in combination with heald apparatus for laying in a warp-thread at each edge of the fabric to loop the two fabrics together, as herein described. The warp-threads to be used for this purpose are marked T in Figs. 1 and 3. They are placed the one near to the outer edge of the side selvage on one side of the fabric, the other near to the outer edge of the side selvage on the other side of the fabric. They are raised and lowered by a heald, M , and levers M' , linked to a lever, M^2 , which is acted on by a cam of the form shown at Fig. 6. The cam is fixed on the cam-shaft R , which carries the series of cams for working all the other healds. This cam-shaft has a toothed wheel, R' , upon it, which gears with a pinion on the crank or driving shaft of the loom, as described in our before-mentioned application, No. 46,762. The wheel and pinion are so proportioned that the crank-shaft makes

twelve revolutions for every revolution of the cam-shaft. Thus, with the cam shown at Fig. 6, the binding-threads will for every six shoots of weft be held up so that the shuttle forming the top cloth passes below it, and then for the next six shoots be held down so that the shuttle forming the bottom cloth passes above it. In this way the binding-thread gets tied to the edges of the two cloths, as shown by the enlarged diagram, Fig. 5, in which the lines A B represent the top and bottom cloths; T, the binding-threads for the temples to act against, and D the uncut pile.

It will be seen that the threads alternately lie for a short distance over the top of the top fabric, near to the side edges, and then for a short distance below the bottom of the bottom fabric. The temples enter the spaces E, which are between the uncut pile and the warp-binding threads T, so that the selvage or edge of the top fabric passes over the top of the temple, and the selvage or edge of the bottom fabric passes below the temple.

The healds and heald-levers for working the selvage-warps are marked Q. They are actuated by cams on the shaft which carries the cams for working all the other healds.

From the foregoing description it will be seen that our invention chiefly consists, first, in the method of temporarily binding the edges of the selvages of the two cloths together by warp-threads, in order that the double fabric, as formed, may be held properly distended until, as it is drawn along by the take-up mechanism, the binding-threads are severed by the curved knife-like portions or cutting-edges *c c* of the temples; and, second, in combining the mechanism for laying in a warp-thread at each

edge of the selvage of the double fabric with the mechanism for weaving the double-pile fabric.

We claim as of our own invention—

1. The hereinbefore-described improvement in the art of weaving double-pile fabrics, whereby provision is made for holding the same distended, which consists in weaving the two ground cloths or fabrics with common or connecting pile-threads and tying together by additional binding-warp threads the edges of the selvages of the two cloths at distances from the pile to admit the temples in the spaces at the selvages between the said binding-warp threads and pile.

2. The combination of mechanism for weaving two cloths connected by pile-threads with mechanism for binding together the edges of the selvages of the two cloths by the warp-threads T, and the temples adapted to enter the spaces between the said binding-warp threads and the pile, substantially as and for the purpose hereinbefore set forth.

3. The combination of the velvet-rail and the temples with the take-up mechanism, by which the several fabrics are drawn along, and the heald apparatus for laying in the binding-warp threads at the edges of the selvages of the fabrics, substantially as and for the purpose hereinbefore set forth.

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