

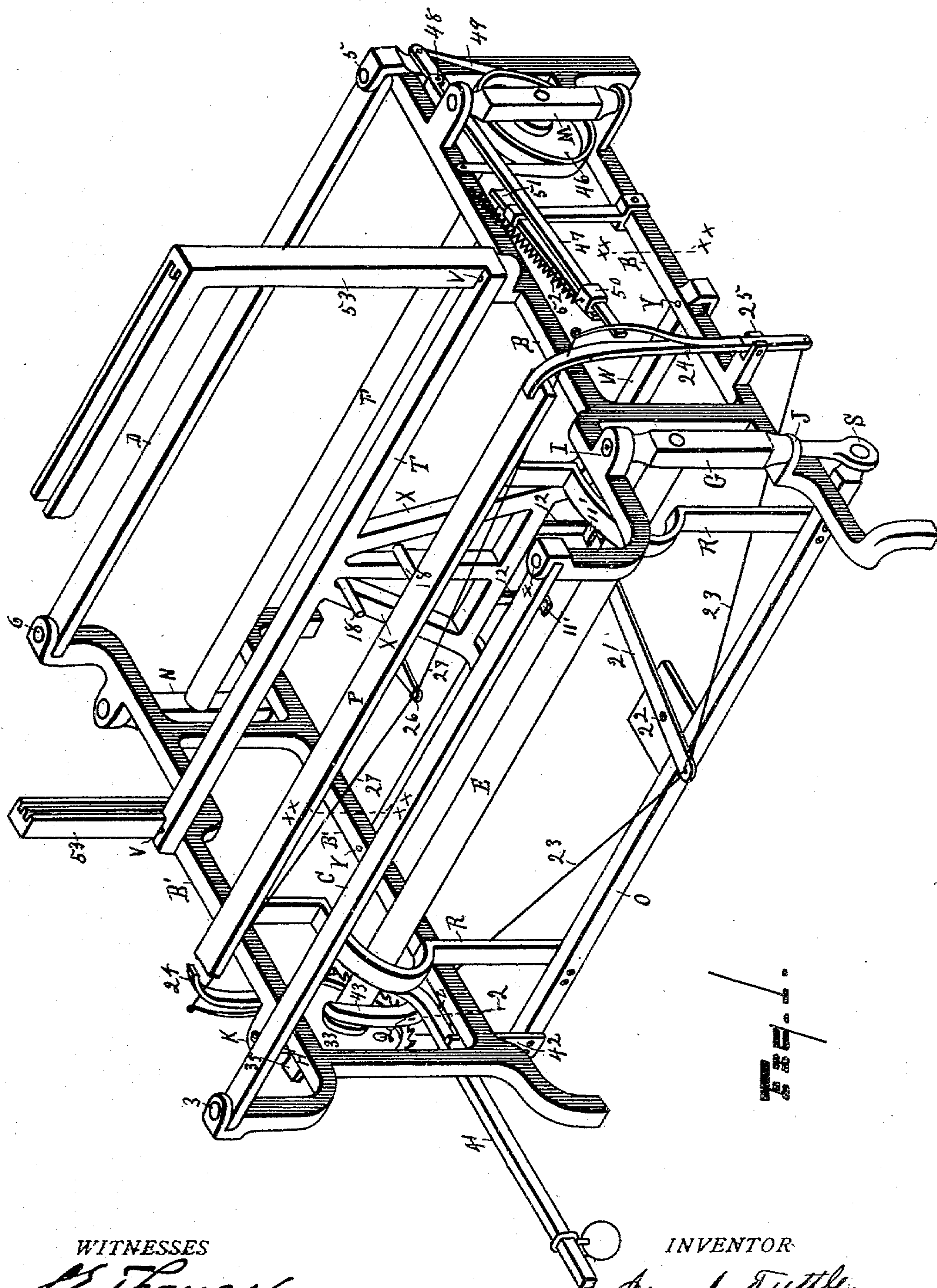
(No Model.)

4 Sheets—Sheet 1.

I. J. TUTTLE.
CARPET LOOM.

No. 545,318.

Patented Aug. 27, 1895.



WITNESSES

L. B. Thomas
H. H. Hager

INVENTOR

Ira J. Tuttle,
By Lucius C. West, atty.

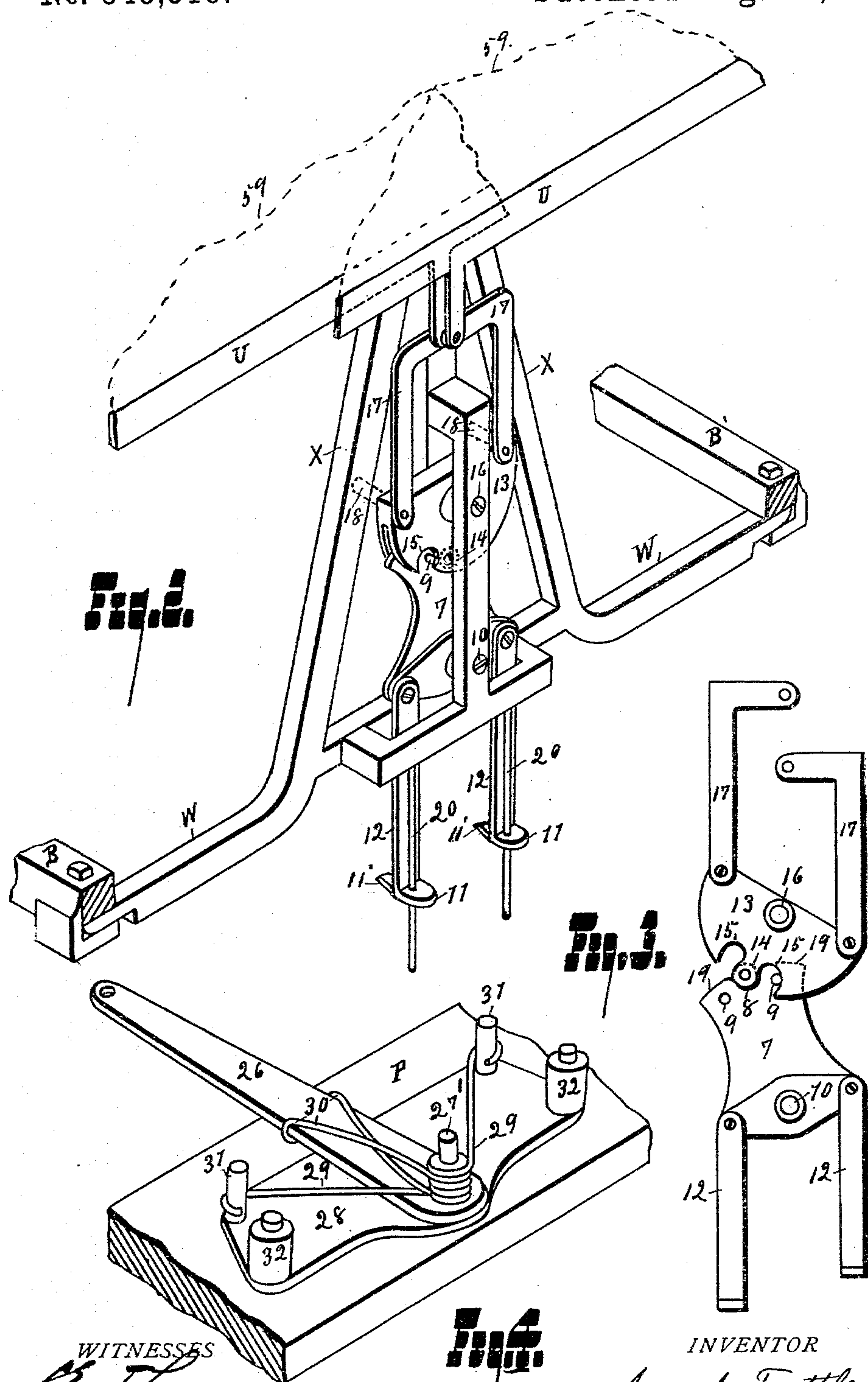
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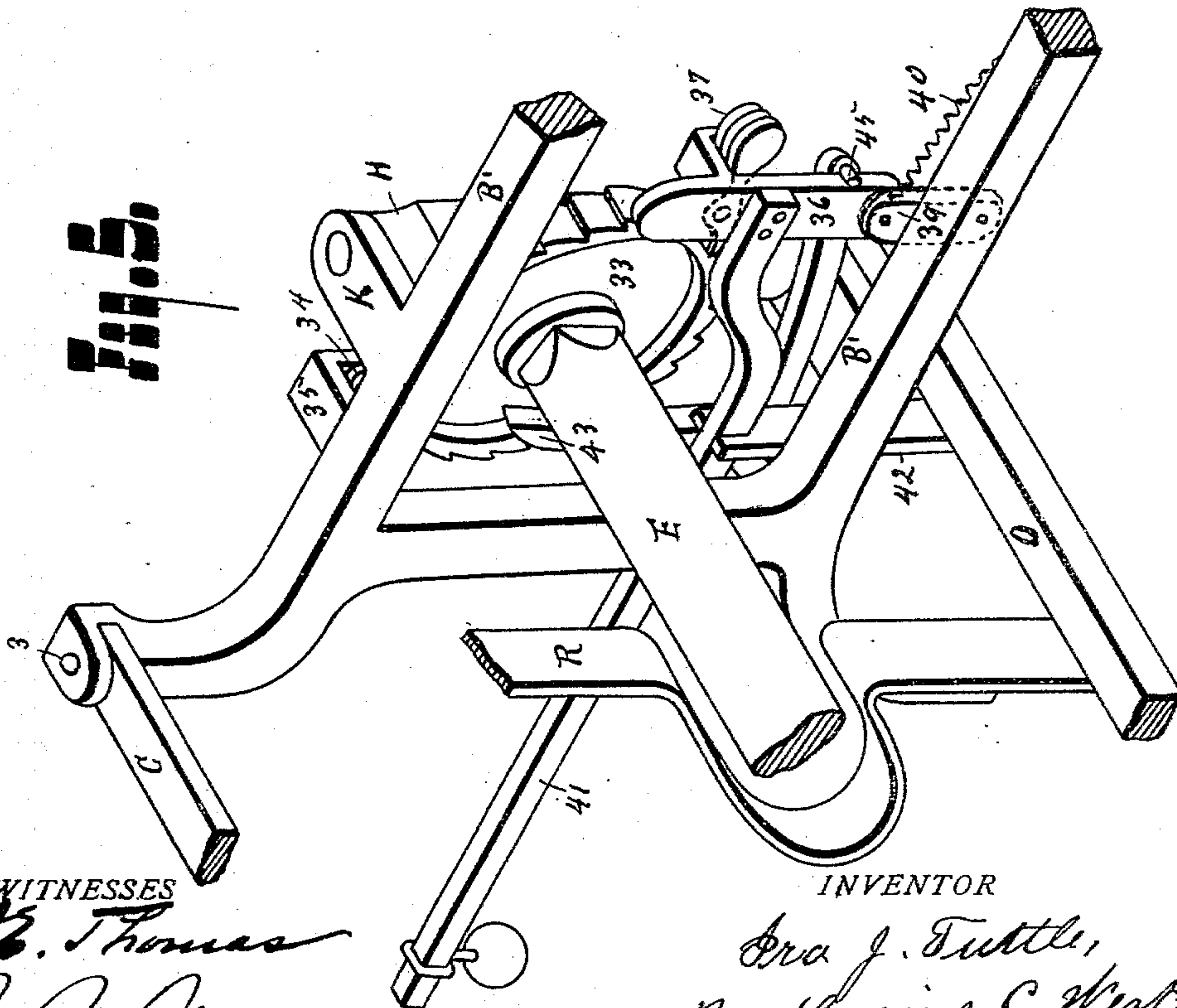
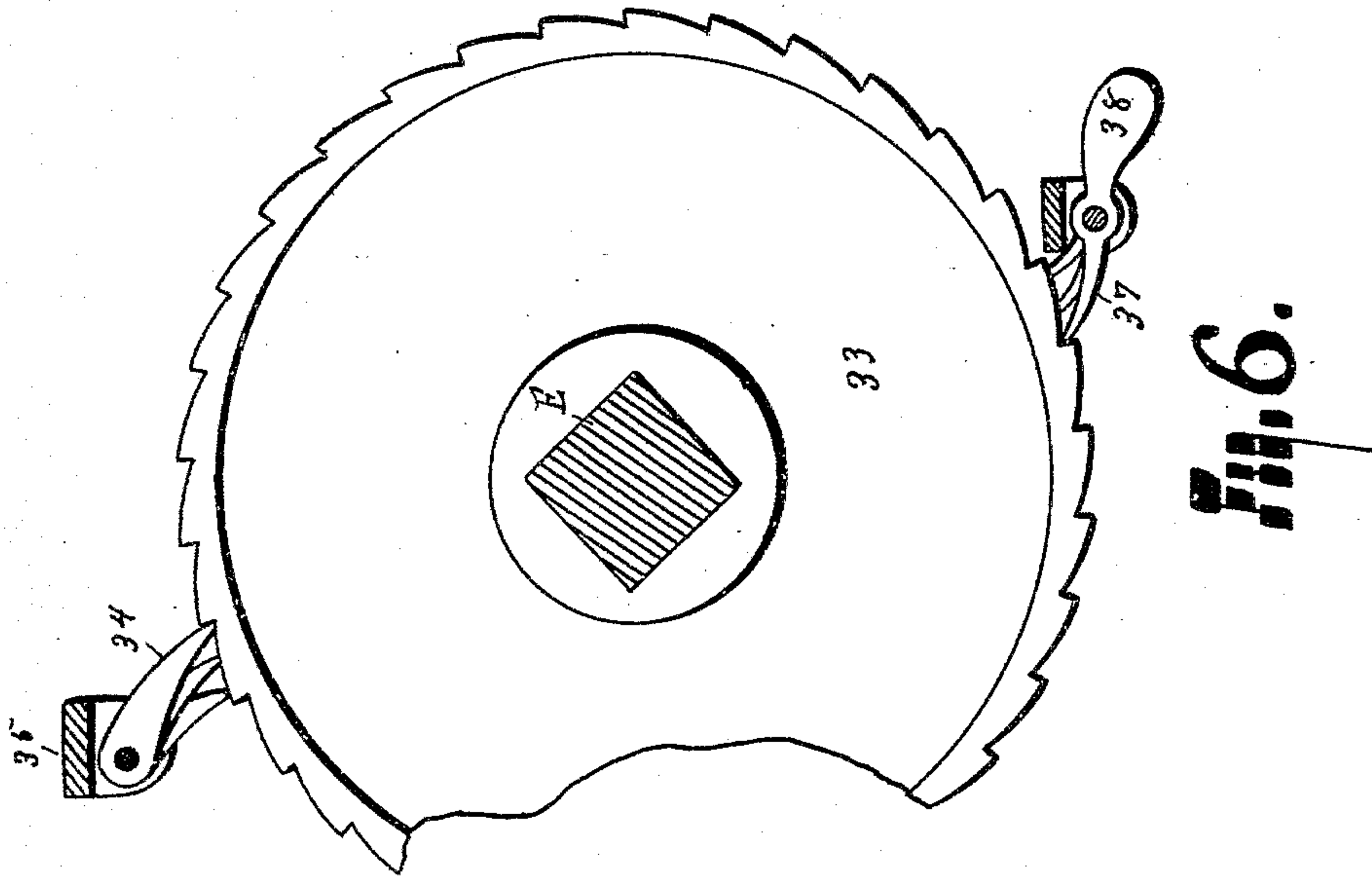
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I. J. TUTTLE.
CARPET LOOM.

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WITNESSES

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(No Model.)

4 Sheets—Sheet 4.

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CARPET LOOM.

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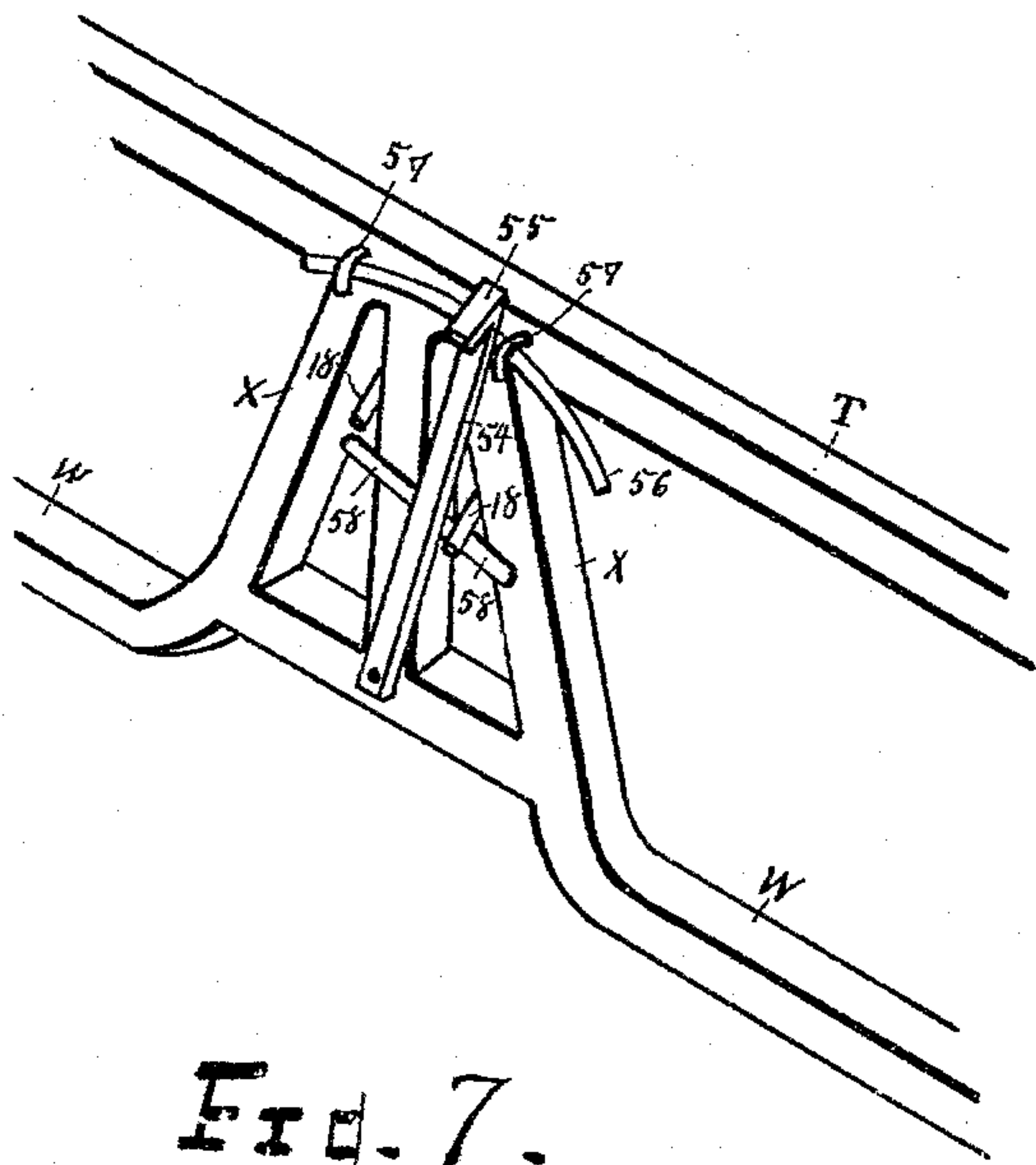


Fig. 7.

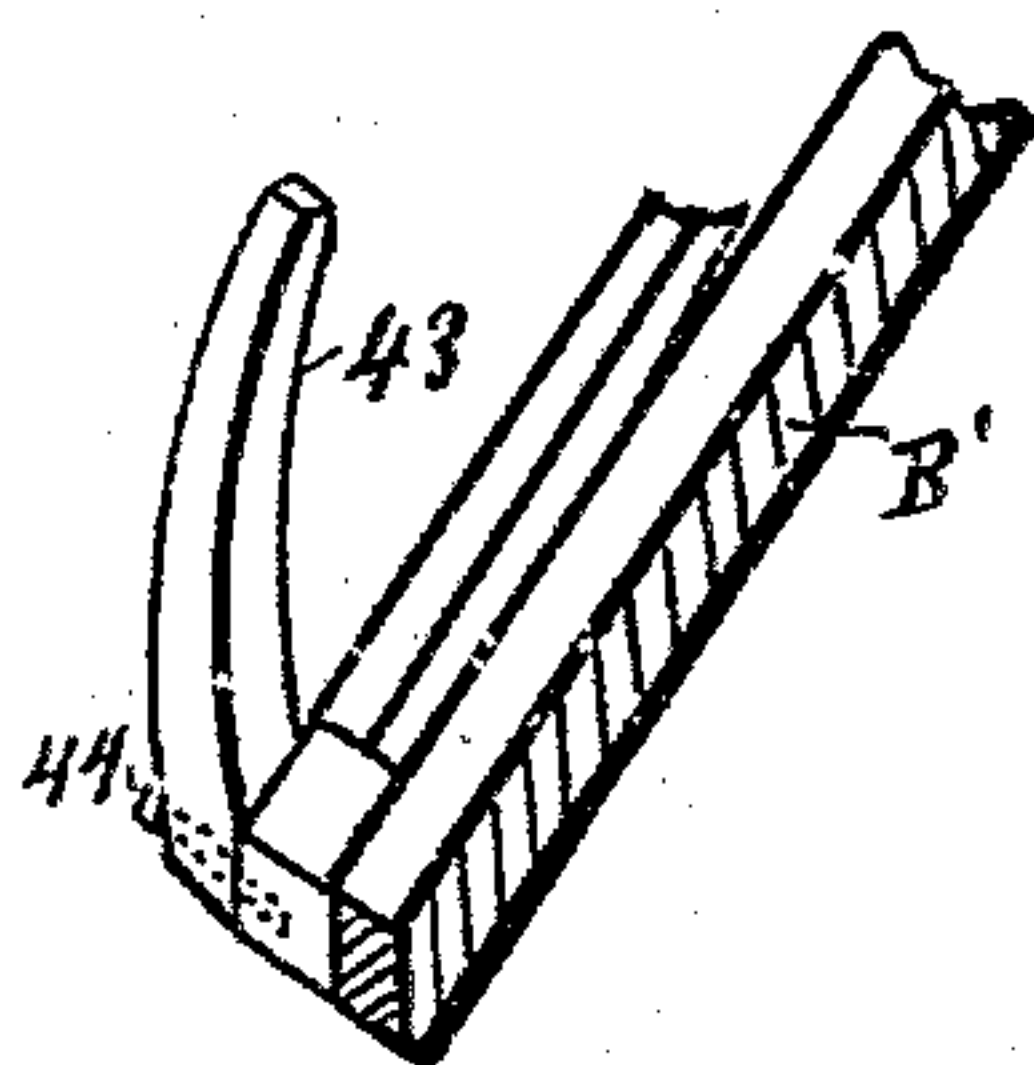


Fig. 8.

Witnesses

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UNITED STATES PATENT OFFICE.

IRA J. TUTTLE, OF MORRICE, MICHIGAN, ASSIGNOR TO WILLIAM H. KYNETT,
OF SAME PLACE.

CARPET-LOOM.

SPECIFICATION forming part of Letters Patent No. 545,318, dated August 27, 1895.

Application filed March 20, 1895. Serial No. 542,504. (No model.)

To all whom it may concern:

Be it known that I, IRA J. TUTTLE, a citizen of the United States, residing at Morrice, in the county of Shiawassee, State of Michigan, have invented a new and useful Carpet-Loom, of which the following is a specification.

One object of this invention is to construct a folding loom in a manner that it can be folded or closed up, something on the principle of a double toggle, from its used condition into an elongated narrow form, so as to be carried through a narrow door or passage, and then at once set in its used condition by adjustment without necessitating the detachment of parts from each other. Much advantage is found from this feature of my invention from the fact that the loom can be shipped in its folded condition, and then all the user has to do is to set it in its opened or unfolded condition and it is ready for use, thus not requiring an expert to put the several parts together, since they are already connected.

Another object consists in an improved construction for operating the picker-sticks in throwing the shuttle across the batten to insure a more easy and positive action with less jar and noise.

Another object is to shift the harness to cross the warp by a mechanism in which two cam-plates are employed which are adapted to lock at each alternate action and hold the harness in its shifted condition until desiring to shift it again.

Another object is to shift the harness to cross the warp by the action of the batten in closing the woof, and to have a portion of the mechanism for this purpose contribute to the action of the mechanism which operates the picker-sticks in throwing the shuttle across the batten, so that both actions alternately take place by the action of the batten.

A further object is to automatically wind the carpet as fast as it is woven by means of a construction which is operated by the action of the batten when closing the woof, which revolves the carpet-beam a less distance as the roll of carpet grows larger.

Another object is to vary the brake-tension on the warp-beam by a mechanism which

automatically decreases the brake-tension as the roll of warp on the warp-beam grows smaller.

Other objects will appear in the following description and claims.

In the drawings forming a part of this specification, Figure 1 is a perspective view of the loom; Fig. 2, a vertical section on line XX XX in Fig. 1, looking from a point at the right, said figure being enlarged. Fig. 3 is a rear view showing details from Fig. 2, illustrating parts in different positions; Fig. 4, an enlarged inverted broken portion of the batten in Fig. 1, showing parts attached thereto on the under side; Fig. 5, an enlarged perspective of parts at front left-hand corner in Fig. 1, looking from the rear right-hand corner of said figure; Fig. 6, an enlarged section on a line near the inner face of the ratchet-wheel in Fig. 5; Fig. 7, broken portion of Fig. 1, showing parts not shown in said figure for operating the lever in Fig. 4; and Fig. 8 shows details from Fig. 1 in section on dotted line 2 2, looking from a point at the left.

Referring to the lettered parts of the drawings, B B' are the side frames of the loom-frame proper, to which the transverse bars C in front and D at the rear are pivotally attached at the ends, the former at 3 4 and the latter at 5 6.

The carpet-beam E has bearings at the ends in upright posts G H. These posts are pivoted in lugs I J, projecting from the frame at the right side, at K L at the left side, so as to turn in said lugs in a swiveled manner when the sides B B' are thrown at oblique angles in folding or closing the loom. The warp-beam F has bearings at each end in like swiveled posts M N and for a like reason. The lower rocking shaft O, to which the batten P is attached by standards R R, has bearings in a vertical extension of posts G H, so that the batten is in effect pivoted or swiveled to the loom-frame in a manner to fold with the frame like the carpet-beam and warp-beam. The transverse central beam T, Figs. 1 and 8, which supports the guide-frame in which guide-frame the harness-frames U move up and down in shifting, is pivoted at the ends at V V to the side frames B B', so as to fold with the frame in like manner,

as stated above, in relation to the pivoting of other parts.

At W is a transverse beam below beam T, and these two beams are connected by a vertical frame X X for supporting the harness-shifting mechanism. This in effect makes the beams T W and the connecting-frame X X all one; but this is a matter of choice. The beam W is pivoted at Y Y to the side frames B B' of the loom-frame. Thus the side frames and all transverse parts connecting therewith or supported thereby are pivotally attached in a manner that all of said parts will fold or close up parallel with each other into a narrow compass or condition, as stated.

In Fig. 1 the loom is shown in its used condition or form. In folding or closing it into a smaller condition for shipping or moving from one room into another, or otherwise, two of its opposite corners diagonally across are carried toward each other, which of course throws its other two diagonally-opposite corners farther apart, and thus the loom is closed or folded together in the manner of a double-toggle joint.

Referring especially to Figs. 2 and 3, a cam-plate is shown at 7, which is provided with a cam serration 8 centrally in its upper edge, and with a cam projection 9 9 at each side thereof. This cam-plate 7 is pivoted to the supporting-frame X X near its lower edge at 10 in a manner to oscillate on its pivot during the operation of shifting the harness-frames U U. Pivotally attached to the lower corners of the cam-plate 7 are reciprocating bars 12, Figs. 1, 2, and 3, which bars are acted upon by means described farther on. Above the cam-plate 7 is a cam-plate 13, which is provided with a central cam-roller 14, normally resting in the cam serration 8 of the cam-plate 7, and is further provided with cam serrations 15 each side of said cam-roller 14 and in which the cam projections 9 9 work. This cam-plate 13 is pivoted at 16 to the supporting-frame X X in a manner to oscillate on its pivot during the operation. Pivotally attached to the upper corners of the cam-plate 13 are connecting-rods 17, and their upper elbow-ends are pivotally attached to the harness-frames U U. The cam-plate 13 is also provided with two forwardly-projecting pins 18, Figs. 1, 2, and 8, the office of which is explained farther on.

The operation of the harness-shifting mechanism is as follows: It should perhaps be first stated that the harness-frames in the perfected loom are rectangular in form, but are here shown broken, only the lower bars appearing in Fig. 2, and that in use the ordinary cords or strands are attached to the upper and lower bars occupying the space indicated by dotted lines 59, which persons skilled in the use of looms will understand. In use one harness is shifted above the other; but in Fig. 2 the cam-plates 7 and 13 are in position as when the harness-frames U U are not shifted. In Fig. 3 the right-hand reciprocating bar 12 has been raised, which action oscillated the cam-plate 7 over toward the left hand and oscillated the cam-plate 13 in a manner to raise its left-hand corner and to lower its right-hand corner, which action, through the medium of the connecting-rods 17, would raise on one of the harness-frames U and lower the other, thus shearing them by each other in the ordinary manner, so far as shifting is concerned. The action in Fig. 3 is only partly completed. Continuing to oscillate the cam-plate 7 toward the left hand would bring the cam-roller 14 onto the right-hand cam-surface 19 of said cam-plate 7, at which time the shifting of the harness in that instance would be completed, and the engagement of the cam-roller 14 with the cam-surface 19 upon which it then rests would lock or hold the harness in its shifted condition until it was shifted by design in the other direction, which would, of course, be done by raising on the left-hand reciprocating bar 12, and thus reverse the prior operation. At 20 are guide-rods projecting downward from the supporting-frame X X and passing through holes in the right-angled steps 11 at the lower end of the reciprocating bars 12, thus forming guides to said bars. On the rocking shaft O of the batten P is a lifting-lever 21, pivoted between its two ends at 22, Fig. 1. When the batten is swung forward to beat up the woof, the end of the lifting-lever 21 is tilted upward, and the arrangement is such that at this time the end of said lifting-lever will catch under step 11' of one of the reciprocating bars 12, and thus be operated upon to shift the harness, as explained, during each stroke of the batten P to close the woof. These steps 11', as here shown, extend in opposite direction to the steps 11; but one set of steps can be made to serve both purposes. This lifting-lever 21 is alternately shifted from beneath one step 11' of the bars 12 to the other step by means of cords 23, attached to the outer end of said lever and to the lower end of the picker-sticks 24. Thus when said picker-sticks are alternately tilted to throw the shuttle (not shown) across the batten in the ordinary manner, alternating with the swing of said batten, the lifting-lever 21 is shifted through the medium of the cords 23, as stated. The picker-sticks 24 are of the ordinary construction and arrangement. They are pivoted at 25 and are operated by a laterally-swinging lever 26, which lever is pivoted to the batten P on the under side, (see Fig. 4, showing inverted view,) and by cords 27, attached to said lever 26 and to the picker-sticks 24, Fig. 1. The construction and arrangement of other parts, as herein explained, are such that when the batten P is swung toward the harness after beating up the woof the lever 26 will be swung laterally, and through the medium of cords 27 will pull on one of the picker-sticks, causing it to strike against the end of the shuttle and throw it across the batten P, all in a similar

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manner thus far as heretofore; but I have devised a new cushioning effect on the lever 26 and means coacting with the projecting pins 18 of the mechanism for operating the harness-frames U U, so that the picker-sticks 24, the lifting-lever 21, and the harness-frames U U are operated at the proper times by and in keeping with the swing of the batten P. In Fig. 4 the lever 26 is pivoted on a pin 27', which pin is attached to the under side of the batten P and is connected with a cross-bar 28, which really constitutes a T-head to the lever 26, by springs 29, coiled around the pin 27, one end of each spring resting against the lever 26 at 30 and the other end of said springs being caught around posts 31. This T-head 28 is pivoted on the same pin 27 beneath the lever 26, and is provided with projections at the outer corners and at right angles to its face, said projections bearing rollers 32. To the front side of lower cross-beam of the supporting-frame X X, which is really a continuation of beam W, is pivoted the lower end of an oscillating lever 54, Fig. 7, the upper end of said lever 54 being provided with a forward projection 55, with a guide-bar 56, which is loosely confined by loops 57, and is also provided with lateral projections 58 between its two ends. When the batten P is swung toward the harness, one of the rollers 32 of the T-head comes suddenly and forcibly in contact with the projection 55 of the oscillating lever 54, Fig. 7, which action throws the lever 26 laterally and operates one of the picker-sticks 24. When the batten is swung in like direction again, (which it would be after making a forward swing to heal up the woof,) the projection 55 will have been swung to a proper position to be hit by the other roller 32, which, of course, would throw the lever 26 in the other direction and operate the other picker-stick. During this action the lifting-lever 21 was shifted to operate the cam-disks 7 and 13 alternately with the throw of the batten P, as before explained, and this action alternately lowered the projecting pins 18 in proper time to contact with the respective projection 58 of lever 54 to oscillate said lever from side to side, thus bringing the projection 55 into the proper position and at the right time to contact with the respective roller 32. When this roller 32 first strikes the projection 55, the spring 29 receives the shock first and imparts its force to the lever 26 with what is termed a "cushioned effect." In the complete loom this oscillating lever 54 (shown in Fig. 7) would, of course, be in the construction shown in Fig. 1 in the same relation to other parts as in said Fig. 7, as would also the constructions shown in Figs. 2, 3, and 4 appear in Fig. 1 in their same relation of parts. The lever 54 would be seen in Fig. 1 looking from a point at the left of said figure, and the cam-plates in Figs. 2 and 3 would be seen in Fig. 1 looking from a point at the right.

In Figs. 1, 5, 6, and 8 is shown a means of

winding up the carpet on the carpet-beam E automatically by the stroke or swing of the batten P as fast as the carpet is woven. On the end of the carpet-beam E is a ratchet-wheel 33, and the beam is held from turning back by pawls 34, attached to a projection 35 of the loom-frame or to any other suitable point of attachment. At 36 is a block to which a series of pawls 37 are pivoted. These pawls are graduated as to length, one being longer than the others, one being shorter, and one being between the two, and all resting on the peripheral surface of one of the teeth of the ratchet-wheel, as in Fig. 6. Thus when the carpet-beam is to be revolved the distance of the length of one of the ratchet-teeth the longest pawl 37 will drop behind the shoulder of the tooth, when a less distance the next shorter, and when a still less distance then the shortest pawl will catch the tooth. These pawls are held in contact with the ratchet-wheel 33 by the gravity of their weighted ends 38. The block 36 is pivotally attached to a link 39, and this link is pivoted to the side frame B'. A spring 40 is attached at one end to said link and at the other end to the frame. A weighted lever 41 is attached to the block 36 between the two ends of said block. To the rocking shaft O of the batten P is attached an arm 42, projecting upward therefrom and contacting with and adapted to raise up on the weighted lever 41 at each swing of the batten P toward the harness. An elbow-lever 43 is pivoted to the side frame B' at 44 and is provided with a right-angled fulcrum-pin 45, contacting with the back of the block 36 and forming a changeable fulcrum therefor. The other end of the elbow-lever 43 extends up by the side of the carpet-beam E and rests against the roll of carpet forming thereon. When the roll of carpet is small, the fulcrum-pin 45 will be lower on the block 36. Hence when the weighted lever 41 is raised by the arm 42 the weighted pawls 38 will be carried back such a distance, we will say, to illustrate, that the longest pawl will catch behind a ratchet-tooth. Then when the batten P is swung back to beat up the woof the weighted lever 41 will lower and the carpet-beam E will be revolved the distance of the length of one ratchet-tooth; but as the carpet-roll gets larger the beam should not be revolved so far, and as the increasing size of the roll raises the fulcrum-pin 45 the leverage is thus lessened and the pawls 37 will not be carried back so far—perhaps a distance for the second pawl to catch the tooth. Then as the batten P is swung to again beat up the woof the carpet-beam E will not be revolved so far, and so on. This serves to illustrate the idea. In practice the number of pawls, the degree of adjustments of weight on lever 41, and the proportion and arrangement of parts may be fixed according to the desired effect. The link 39 and spring 40 hold the block 36 and yet make a yielding attachment for it. When the warp-beam F is full of warp, it unwinds easier, and said beam should not re-

involve so far as when the roll of warp is smaller. I have arranged to govern this automatically by the following means: The end of the warp-beam F is provided with a belt brake-wheel 46. At 47 is a lever fulcrumed at 48. A brake-belt is shown at 49, one end of the same being attached to the end of the lever 47, passed around the brake-wheel 46, and attached at the other end to the side frame B. On the lever 47 is a weight 50, adapted to slide thereon. Attached to this weight is an endwise-moving bar 51, the end of said bar abutting against the periphery of the warp-roll on beam F. No warp is here shown. A spring 52 is attached at one end to the sliding weight 50 and the other end is attached to the side frame B. The action of this spring is to draw on the weight, and thus keep the end of the bar 51 always abutting against the decreasing roll of warp. When the warp-beam F has no warp thereon, the bar and its weight 50 will be in the position shown in Fig. 1, and when full of warp the bar and weight will be moved nearer to the free end of lever 47. At this time the weight has the greatest leverage on the lever 47, and hence the belt 49 is held the tightest at this time when the brake-tension should be greatest. As the roll of warp grows smaller, the weight and its bar 51 approach the roll, thus lessening the leverage and slackening the brake-belt.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A folding loom, comprising side-frames, transverse-bars pivotally attached at the ends to the side-frames, supports attached to said side-frames in a swiveled manner, a carpet-beam, warp-beam, and a batten having pivotal bearings in said swiveled supports, and a guide-frame for the harness-frames of a loom pivoted at the ends to said side-frames, substantially as set forth.

2. The combination, of the cam-plates, one of them being provided with the cam-serration and a cam-projection each side thereof, and the other being provided with the cam-roller and a cam-serration each side thereof, and one of said cam-plates being also provided with the forwardly projecting pins, means for operating said cam-plates; a batten, a spring cushioned lever pivoted to said batten and provided with the projection at each of the two outer corners, an oscillating-lever provided with the forward projection for operating said spring cushioned lever by contacting with the projections at its outer cor-

ners, said oscillating lever being also provided with the lateral projections with which the forwardly projecting pins of the cam-plate contact to oscillate said lever, the picker-sticks, and cords attached thereto and to the spring cushioned lever, substantially as set forth.

3. The combination, of the cam-plates, one provided with the cam-serration and cam-surfaces and cam-projections each side thereof, the other provided with the cam-roller and cam-serrations each side thereof, harness-frames, connecting-rods pivotally attached to said harness-frames and to one of the cam-plates, and reciprocating-bars pivotally attached to the other cam-plate, and suitable means for operating them, substantially as set forth.

4. The combination, of the cam-plates, one being provided with the cam-serration and cam-projections and cam-surfaces each side thereof, the other provided with the cam-roller and cam-serrations each side thereof, harness-frames, connecting-rods pivotally attached to said harness-frames and to one of the cam-plates, reciprocating-bars pivotally attached to the other cam-plate, a rocking-shaft, a batten attached thereto, and a lifting-lever attached to the rocking-shaft and adapted to be tilted upward thereby to raise on the reciprocating-rods, substantially as set forth.

5. The combination of a loom-frame, a carpet-beam provided with the end ratchet-wheel, a batten, a rocking-shaft to which said batten is attached, a block, a link attaching said block to the loom-frame, a weighted lever attached at one end to said block, pawls of different lengths pivoted to the block in position to engage the teeth of the ratchet-wheel, a pivoted elbow-lever having a fulcrum-pin at one end adjustably resting against the block, the other end of said lever being adapted to rest against the roll of carpet forming on the carpet-beam, and an arm attached to the rocking-shaft of the batten and adapted to raise on the weighted-lever when the batten swings back after beating up a strand of woof, substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in the presence of two witnesses.

IRA J. TUTTLE.

Witnesses:

B. H. WELCH,
B. G. SPENCER.