

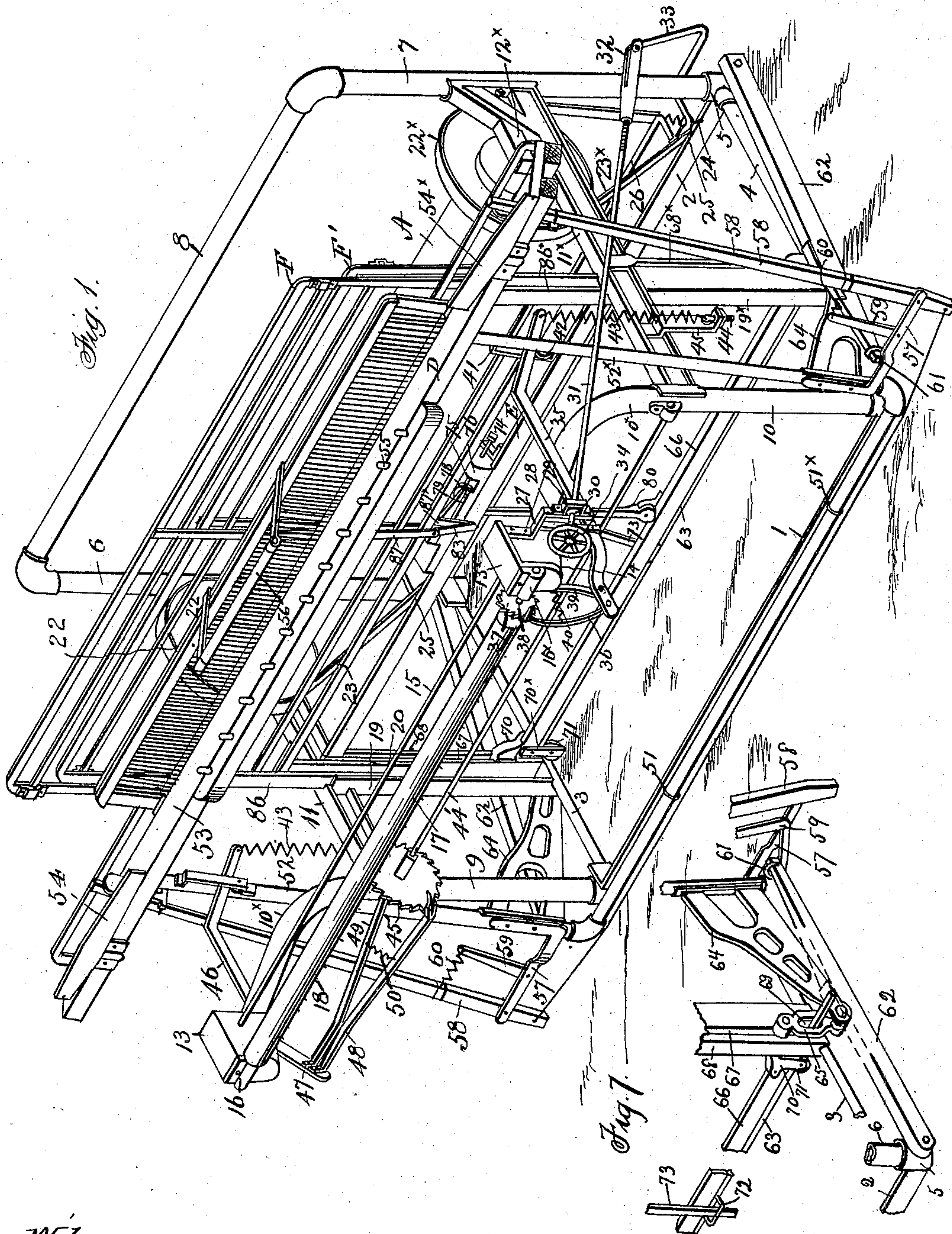
(No Model.)

4 Sheets—Sheet 1.

W. HARVEY.
HAND LOOM.

No. 568,138.

Patented Sept. 22, 1896.



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(No Model.)

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Fig. 2

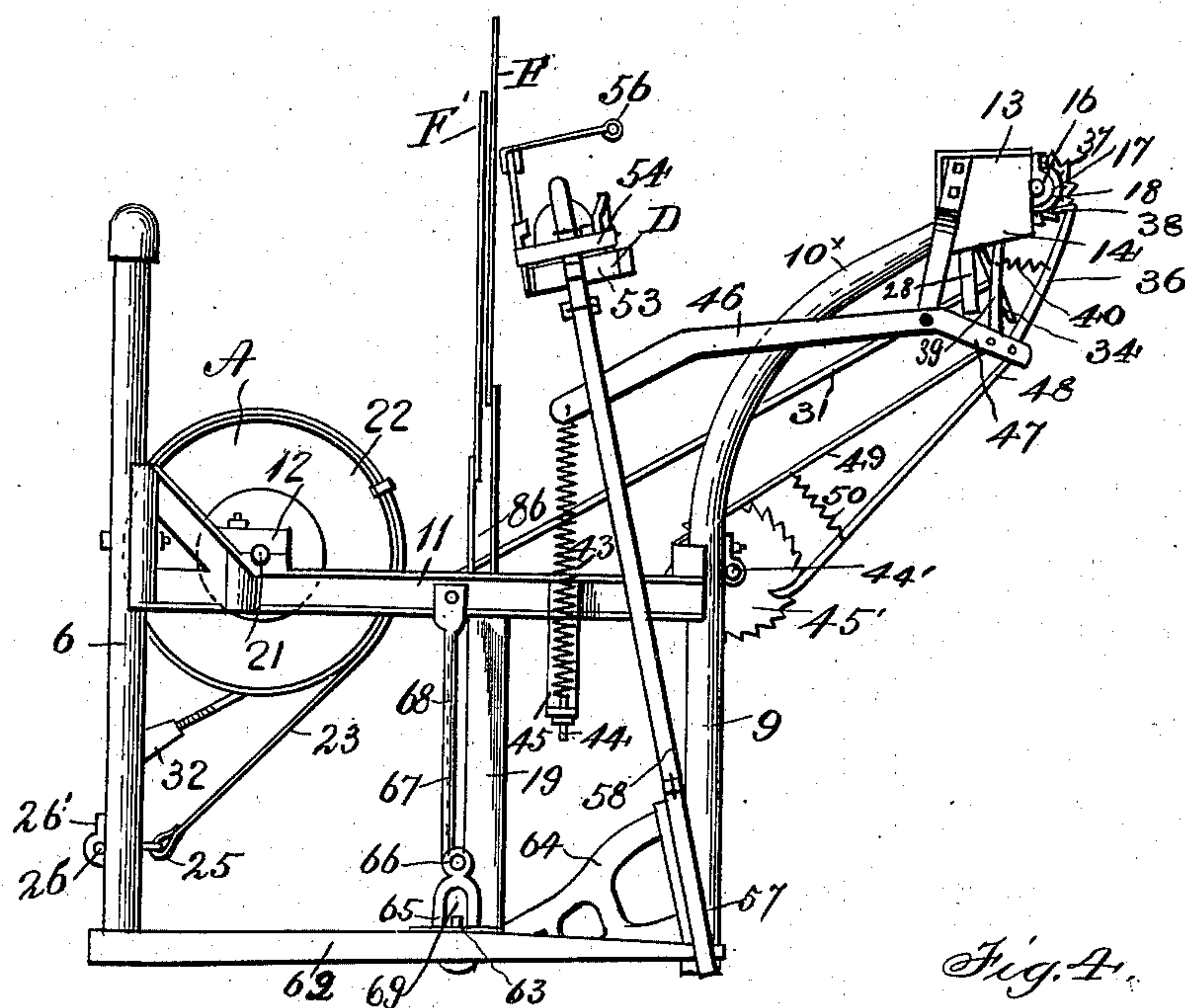
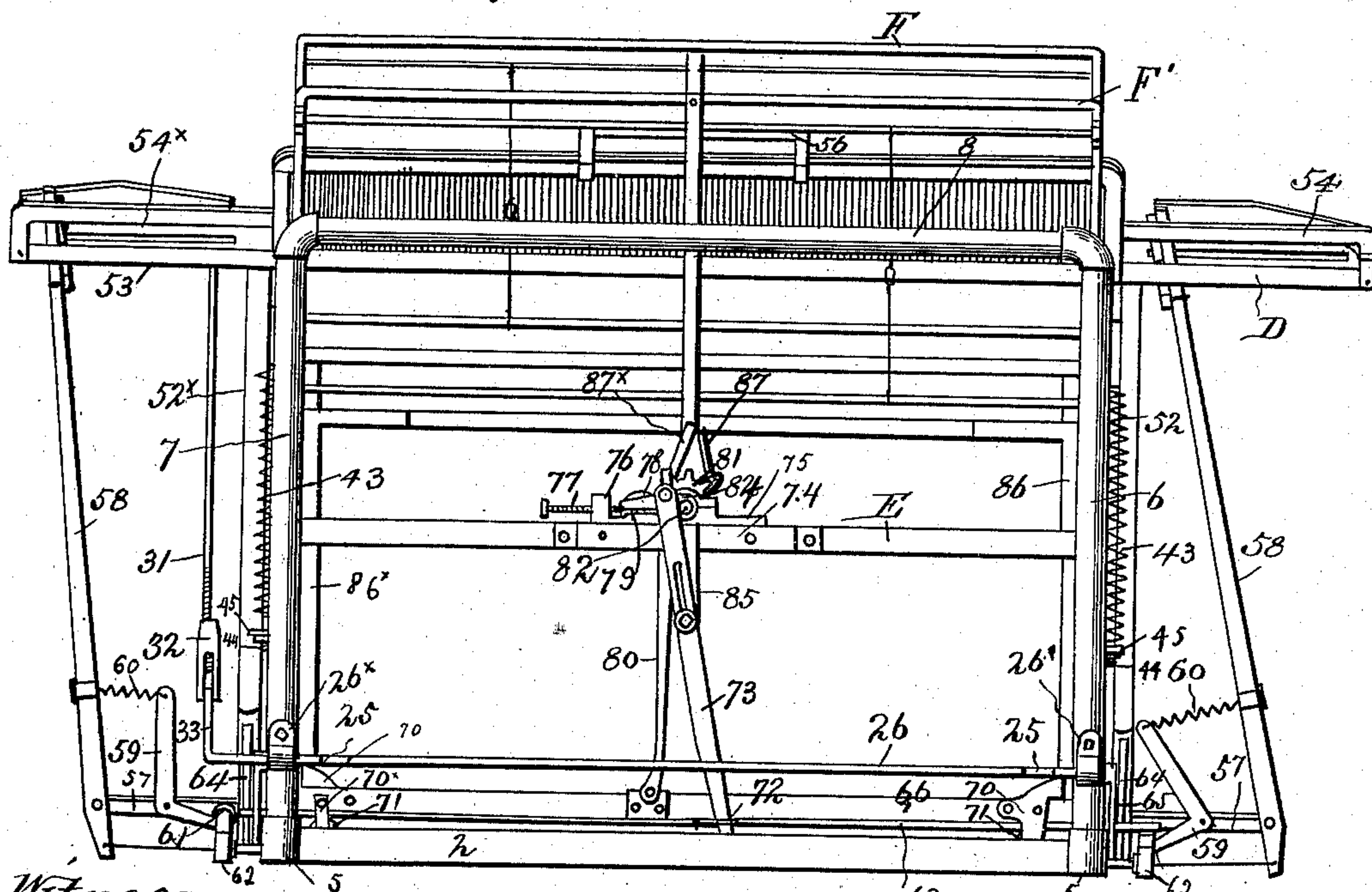


Fig. 4



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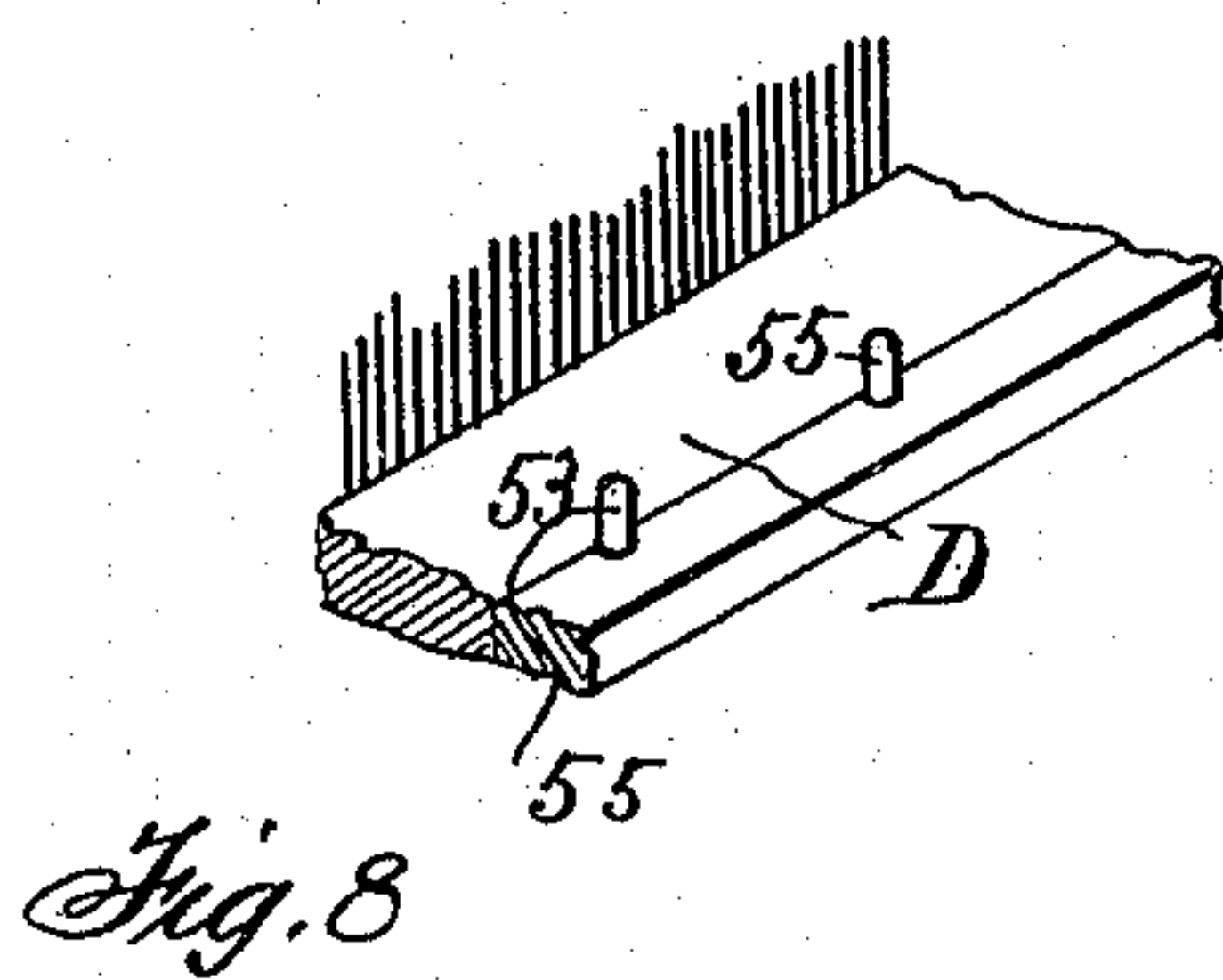
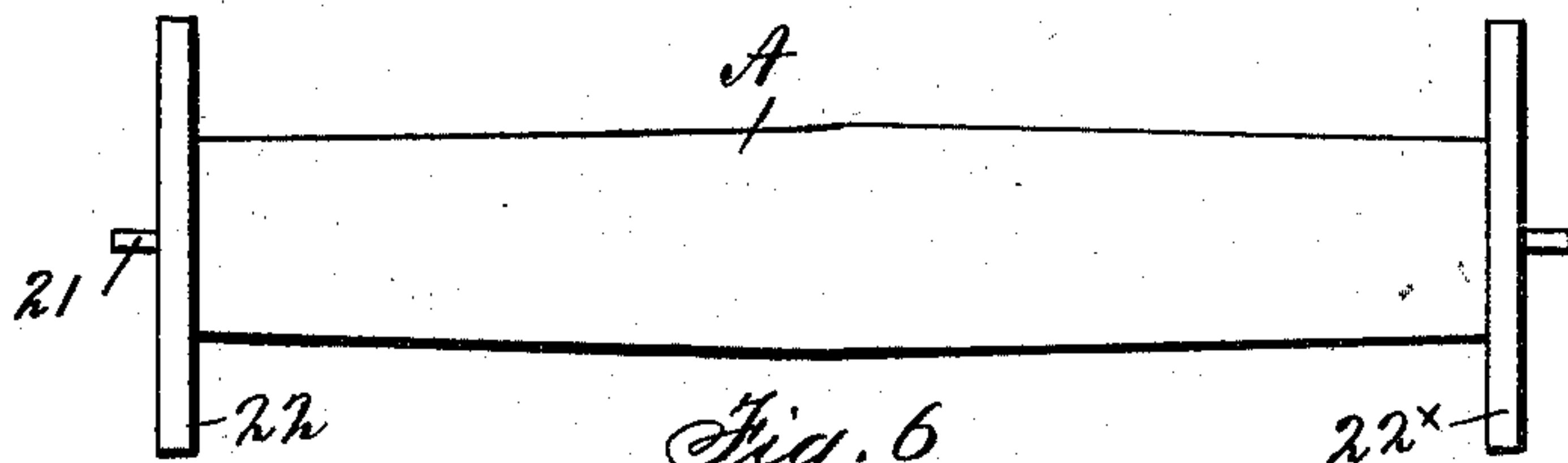
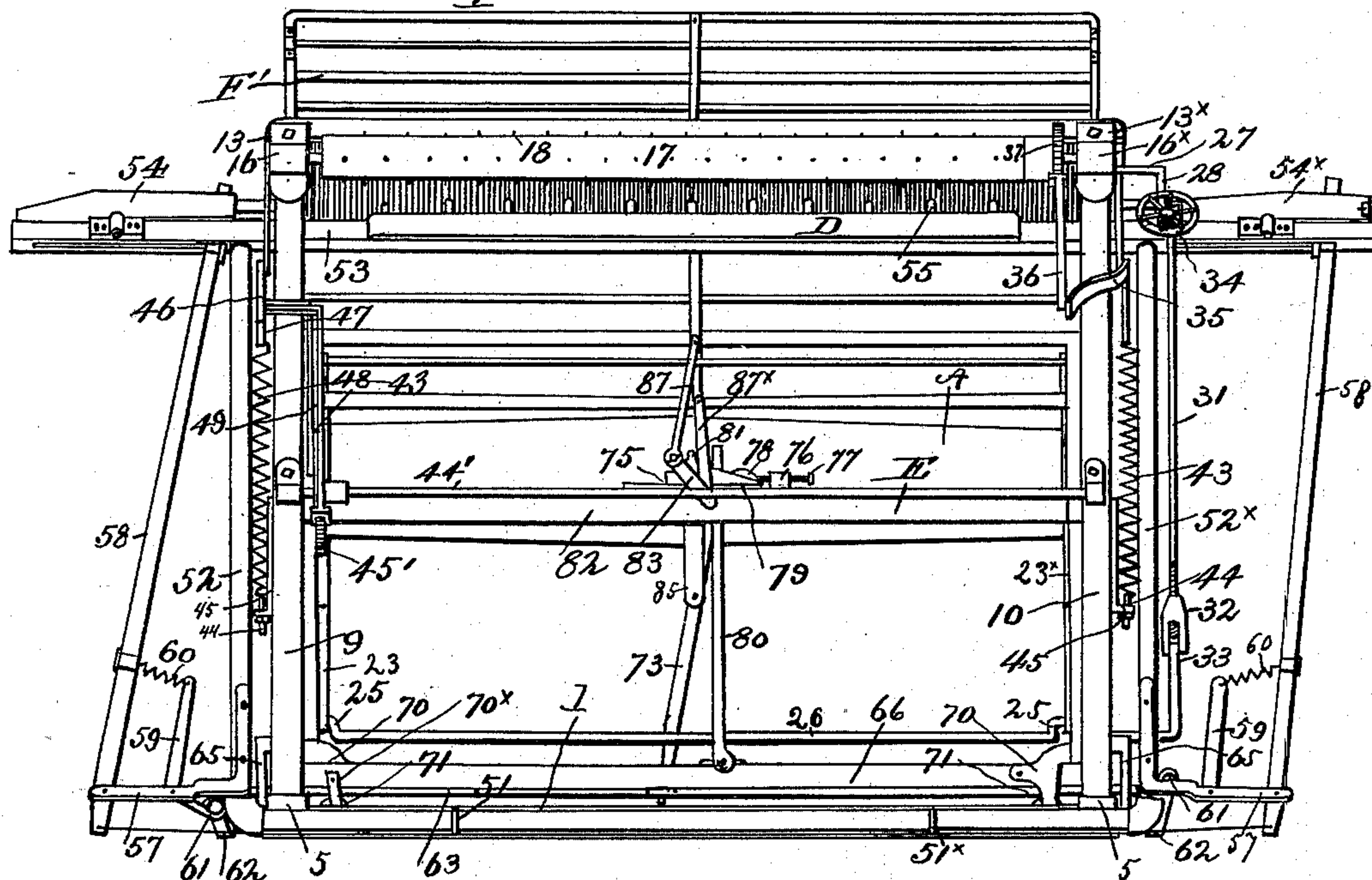
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Fig. 3.



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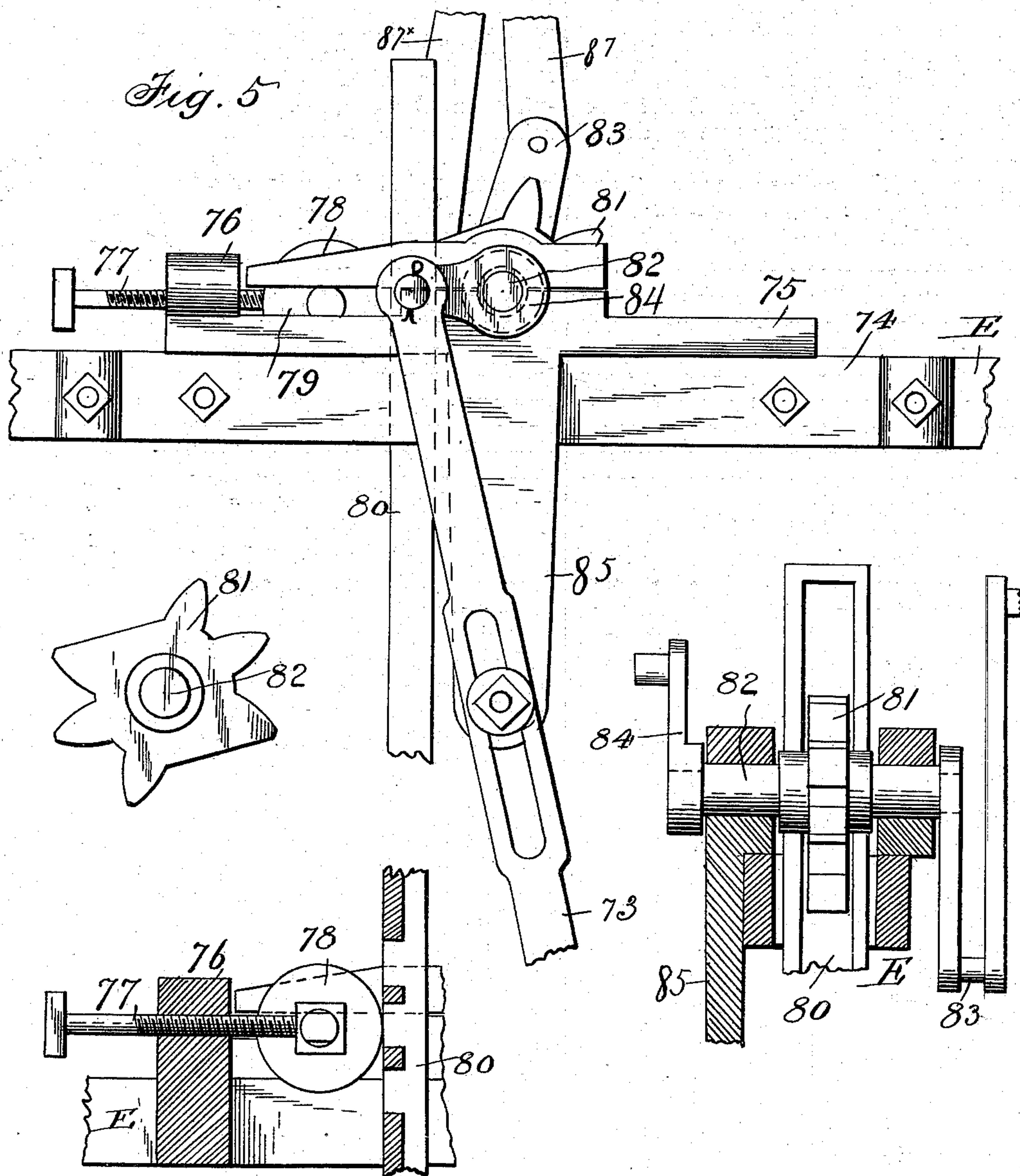
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UNITED STATES PATENT OFFICE.

WILLIAM HARVEY, OF JERMYN, PENNSYLVANIA.

HAND-LOOM.

SPECIFICATION forming part of Letters Patent No. 568,138, dated September 22, 1896.

Application filed June 10, 1896. Serial No. 594,986. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARVEY, a citizen of the United States, residing at Jermyrn, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Hand-Looms; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to improvements in hand-loom, and the object is to produce a simple, cheap, and convenient loom of this class for general use; and to this end the novelty consists in the construction, combination, and arrangement of the same, as will be hereinafter more fully described, and particularly pointed out in the claims.

I have fully and clearly illustrated my improvements in the accompanying drawings, wherein—

Figure 1 is a perspective of the loom, taken from the front and right-hand end thereof. Fig. 2 is an end view taken from the left side of the loom. Fig. 3 is a front view in elevation. Fig. 4 is a rear view in elevation. Fig. 5 is a detail enlarged view of the heddle and trigger-operating mechanism. Fig. 6 is a detail view of the cloth-beam, showing the construction of the beam as tapering from the middle to the ends thereof. Fig. 7 is a detail of the mechanism for throwing the trigger-bar and moving the heddles. Fig. 8 is a detail of the shuttle-race, showing the guide-pins for the shuttles.

The loom-frame consists of a rectangular base-frame, the front and back bars 1 2 of which are made of flat bars of iron, having their ends turned at right angles and suitably secured to the bottom rails or bars of the end pieces of the frame. The end pieces 3 4 of the base are made of substantial pipe-iron, provided with threaded coupling-pieces 5 at their respective ends. To the rear couplings are connected standards 6 7, having their upper ends connected by the pipe-bar 8. At the front end of each end piece of the bases are connected standards 9 10, running vertically to the point where the upper cross-piece of the frame is connected and from thence extended upward and frontward, as

at 10^x, to such a height and for such a distance as to provide a suitable seat for bearings for the breast-roller, as hereinafter will be more fully specified.

Between the front and rear posts of the frame are suitably mounted and secured the substantial cross-pieces 11 11^x, provided adjacent to their rear ends with bearing-boxes 12 12^x, in which the journals of the warp-beam are mounted, substantially as shown. On the upper ends of the standards or supports 9 10 are brackets 13 13^x, consisting of substantial plates having sleeves 14 formed therein adapted to take in the ends of the standards, and the two brackets being connected by a cross-rod 15, which braces the frame at this part. To the brackets 13 13^x are detachably secured the bearings 16 16^x, in which the journals of the breast-roller 17 are mounted, substantially as shown. The breast-roller 17 is of the usual form and its uses are well known. It is here illustrated as being provided with a number of short studs 18, which engage the fabric and prevent it from slacking between the breast-roller and the warp-beam. Intermediate of the front and rear frames, between the base-pieces and the cross-pieces at the ends of the frame, are two substantial uprights 19 19^x, formed with vertically-arranged grooves 20 in their inner faces, which serve as guides in which the ends of the heddle-frames are seated and slide.

A designates the warp-beam, on which the warp-threads are wound and arranged in a well-known manner. To make good tight selvages I make the warp-beam slightly larger in the middle and tapering gradually and evenly from the middle line toward each end thereof, thus giving to the warps a tendency to maintain the original arrangement, completely covering the beam without shifting toward the middle. The warp-beam has the journals of its shaft 21 mounted in the bearings 12 12^x on the cross-pieces 11 11^x, and at the ends of the beam are large flanges 22 22^x, having flat band-faces on which are arranged friction-straps 23 23^x, of sheet metal or other suitable material, and one end of which is secured to the rear base rail of the frame, as at 24, and the other end secured to a crank 25, formed in a shaft 26, mounted in suitable bearings, as 26 26^x, adjacent to the rear posts of

the loom-frame. On the bracket 13^x is secured an arm 27, having a downward extension 28, to which is secured a box-plate 29, formed with a recess, as shown, in which is seated a bearing 30, through which the stem of the tension-rod 31 is arranged to turn, and which is held therein against longitudinal displacement by any suitable means. The other or inner end of the tension-rod is screw-threaded for a distance, and engages in a screw-threaded socket in the socket-piece 32, jointed to the arm 33 on the crank-shaft 26. On the outer end of the tension-rod 31 is secured a hand-wheel 34 by which the rod is turned. It will be perceived from the foregoing description of the parts involved that screwing the tension-rod in or out of the threaded socket the crank-shaft is correspondingly turned and the cranks to which the ends of the tension or friction straps on the flange-pulleys of the warp-beam are connected will be affected to loosen or tighten the straps on the pulleys, thereby making less or more friction between the straps and pulleys and decreasing or increasing the tension of the warp.

To turn the breast-roller 17 synchronously with the cloth-beam and to "take up" the fabric regularly with progressing production thereof, a lever 35 has a bearing in the projecting upper part of one of the front standards of the frame, and on the front arm of the lever is pivotally mounted a pawl 36, which engages in the teeth 37 of a ratchet-disk 38, fixed on the end of the breast-roller. The pawl 36 is held in engagement with the ratchet by means of an arm 39, mounted on the same bearing as the pawl and arranged to bear with its free end on the perimeter of the ratchet, the pawl and the arm being drawn toward each other by means of a spring 40, having its respective ends fastened to the arm and the pawl, substantially as shown. The long arm of the lever 35 is bent down at an incline and arranged through a keeper or guide 41, secured to the post of the batten or lay, in which guide is journaled a roller 42, on which the arm of the lever bears. To the inner end of the lever 35 is connected one end of a pull-spring 43, the other end of the spring being fastened to some stationary part of the frame, or preferably to an eye in the end of an adjusting-screw 44, let through a bracket 45, secured to the upper cross-piece of the frame at that end of the frame, jam-nuts being arranged on the adjusting-screw to hold it fixed in any set position. It will now be perceived that when the lay is drawn forward the lever 35 will be drawn down by the force of the pull-spring 43 and the short arm of the lever moved upward, carrying the nose of the pawl over the teeth of the ratchet, so that when the lay is thrown back again the long arm of the lever will be raised slightly and thus pull the pawl downward and turn the breast-roller to take up the slack.

In order that the same movement of the lay which actuates the breast-roller to take up

the fabric shall also operate in like manner to take up the fabric, I have devised the following described mechanism: The cloth-beam (not shown) is mounted on a shaft 44', journaled in bearings fixed to the front standards of the frame, and this shaft has a ratchet disk or wheel 45' fixedly mounted at the left-hand end, substantially as shown. To the left-hand bracket of the breast-collar is secured a fulcrum-piece 46, the long arm of which is arranged through a guide-keeper provided with a roller, in all respects like the keeper and roller on the opposite frame-post, through which the actuating-lever of the breast-roller projects and slides, and having connected to the inner end a pull-spring made adjustable, as heretofore specified and as shown in Fig. 2 of the drawings. To the front end or arm of the lever 47 is pivotally secured a pawl 48, the end of which engages with the ratchet 45' on the cloth-beam, the pawl being held in engagement with the ratchet by means of a rod 49, hung to the lever and bearing with its free inner end on the perimeter of the ratchet-wheel 45', a spring 50 connecting the pawl and rod and by its resilient force holding them in relative arrangement and the pawl in engagement, substantially as shown in the drawings.

It will be observed that the throw of the lay forward permits the action of the pull-spring to depress the lever and move the pawl a distance over the ratchet, and that its back stroke raises the lever and actuates the pawl to turn the cloth-beam a determined distance, the movement being simultaneous and synchronously with the movement of the breast-roller.

D designates the lay-frame, consisting of a substantial piece of pipe-iron for the bottom rail thereof, suitably held in bearings fixed to or on the front bottom rail of the frame, as 51 51^x, and having two vertical side standards 52 52^x, on the upper ends of which is secured and mounted the lay or batten rail 53, which, in general, is of the well-known construction, excepting that the ends of the rail are extended beyond the sides of the loom to afford supports for the shuttle-boxes 54 54^x, substantially as shown. To guide the shuttle across the batten and prevent it from flying out of its direct and guided course, a series of hard-rubber pins 55 are inserted in the edge of the batten, against which the shuttle slides as it passes back and forth. The pins I have found suit the purposes completely and do not wear the shuttle at all. To the head of the batten is secured a suitable handle 56, projecting forward so as to be conveniently reached by the operator standing or sitting at the front of the loom.

The mechanism associated with and intended to operate the respective pickers is identical in construction and arrangement, and therefore the description of the picker mechanism applies to both constructions and elements.

To the lower end of each post or bar of the batten-frame is strongly secured an L-shaped bracket or iron 57, the arm of which projects a suitable distance outward parallel with the journal of the batten, as shown, and to the end of the arm the lower end of the picker-stick 58 is fulcrumed or jointed, the upper end being arranged in a slot on the shuttle-box. On the arm of the L-iron support of the picker-stick is fulcrumed an elbow-lever 59, one arm of which is connected to a coiled spring 60, the other end of the spring being fastened to the picker-stick. The other arm of the elbow-lever is formed with an eye or ring 61, which fits over the end of the trigger 62, which has its other end pivotally connected to the rear post or part of the frame, substantially as shown in the drawings. The depression of the triggers 62 is attained by means of a slide-bar 63, which has a vertical and also a longitudinal reciprocating movement, as will be hereinafter more fully specified.

To the lower portion of each post of the batten-frame is strongly secured a substantial bracket or arm 64, pivotally connected at its outer end with the lower end of a link 65, the upper end of the links being hung on the ends of a cross head or bar 66, having a vertical reciprocation in slots 67, formed between vertical bars 68 68^x and the middle standards of the frame. The links 65 are provided with vertically-elongated slots 69, as shown, to permit the slide-bar 63 to move up and down therein and also to slide lengthwise for a distance therethrough far enough to engage over the triggers. To the cross-bar 66, adjacent to the inner lines of the end frames, are secured two hangers 70 70^x, carrying small rollers 71 in the ends thereof, and through these hangers the slide-bar 63 is arranged, resting on the rollers, substantially as shown. In the middle of the slide-bar is fixed an eye 72, in which the end of a lever 73 loosely engages to throw the bar back and forth longitudinally, so that its ends will pass on and over the triggers alternately and depress them to fly the pickers.

E designates a strong metal cross-bar extending lengthwise of the loom and having its ends firmly secured to the end cross-pieces by any suitable means. On the middle of this cross-bar E is mounted and secured a bracket and housing consisting of a frame-bar 74, having its ends struck inward and then at right angles to provide means for securing it to the bar, thus leaving a slot between the parallel side faces of the bar E and the bar 74, substantially as shown. On the support thus made is mounted a housing 75, having an opening therein arranged lengthwise and having a vertical flange 76 at one end provided with a threaded hole, in which an adjusting-screw 77 is fitted to regulate the position of a pulley 78, mounted in slot-bearings 79 in the housing to push the rack-bar hereinafter mentioned in engagement. To

the vertically-reciprocable cross-bar 66 is jointed the lower end of a rack-bar 80, the upper end of which projects up through the housing and engages with a mutilated gear 81, cast on a shaft 82, and having formed on its front end a double crank-arm 83, provided with crank-pins in the ends thereof, and on the other end of the shaft 82 is formed a single crank-arm 84, having its end connected to the upper end of the lever 73. The lever 73 is slidingly fulcrumed on an arm 85, projecting downward from the housing, and has its lower end loosely arranged in the eye 72 on the slide-bar.

F F' designate the heddles, consisting of iron frames of the usual construction and provided with the usual thread-rods, substantially as shown. To each heddle-frame, at the ends, are secured metal guide-rods 86 86^x, which are arranged in the grooves 20 20^x in the uprights 19 19^x. To each heddle is jointed an operating-rod 87 87^x, the lower ends of which are connected to the respective ends of the double crank head or arm 83.

It will now be perceived that when the batten is pulled forward the lever-brackets connected to the links and cross-bar will raise the cross-bar, thereby moving the vertically-arranged rack-bar into engagement with the mutilated gear, which will move the double crank to raise one heddle and lower the other and at the same time turn the single crank-arm to throw the lever connected to the slide-bar and slide that element over one of the triggers, so that when the batten is moved back the reverse movement of the associated mechanism will depress the trigger and reverse the portions of the heddles.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is--

1. The combination with the batten, of bracket-levers secured to the lower ends of the frame thereof, links on the ends of the levers, a vertically-movable cross-bar having its ends connected to the upper ends of the links, a vertically-arranged rack-bar on the cross-bar, a mutilated gear to engage with the rack-bar, a double crank-arm on the shaft of the gear-wheel, the heddles, and rods connecting each heddle to the respective ends of the double crank-arm, substantially as described.

2. The combination with the batten, of levers secured thereto, a cross-bar connected to the free ends of the levers to be reciprocated vertically thereby, a vertically-arranged rack-bar on the cross-bar, a mutilated gear engaged by the rack-bar, a double crank on the shaft of the gear, the heddles, connections between the heddles and the double crank, a second crank on the shaft of the mutilated gear, a lever hung to the latter crank, a sliding bar reciprocated by the last-named lever, and the triggers of the pickers, substantially as and for the purpose specified.

3. In a loom, the combination with the bat-

ten and a cross-bar raised and lowered by the
action of the batten, of a lever rocked on its
fulcrum by the movements of the cross-bar,
a sliding bar reciprocated by the lever, and
5 the triggers arranged to be engaged alter-
nately by the ends of the slide-bar, substan-
tially as and for the purpose specified.

In testimony whereof I hereunto affix my
signature in presence of two witnesses.

WILLIAM HARVEY.

Witnesses:

J. W. GRANT,
JOHN JAY.