John C. Duckworth's Impt. in Fancy Looms.

109884

PATENTED DEC. 6, 1870.

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Fig. 1.

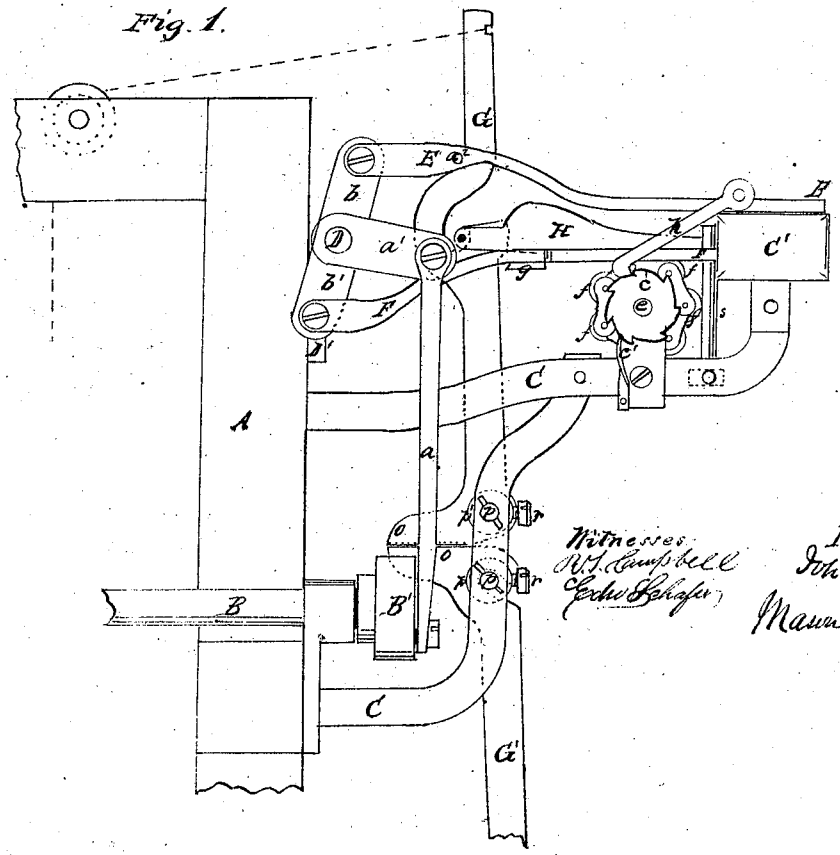

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Fig 2.

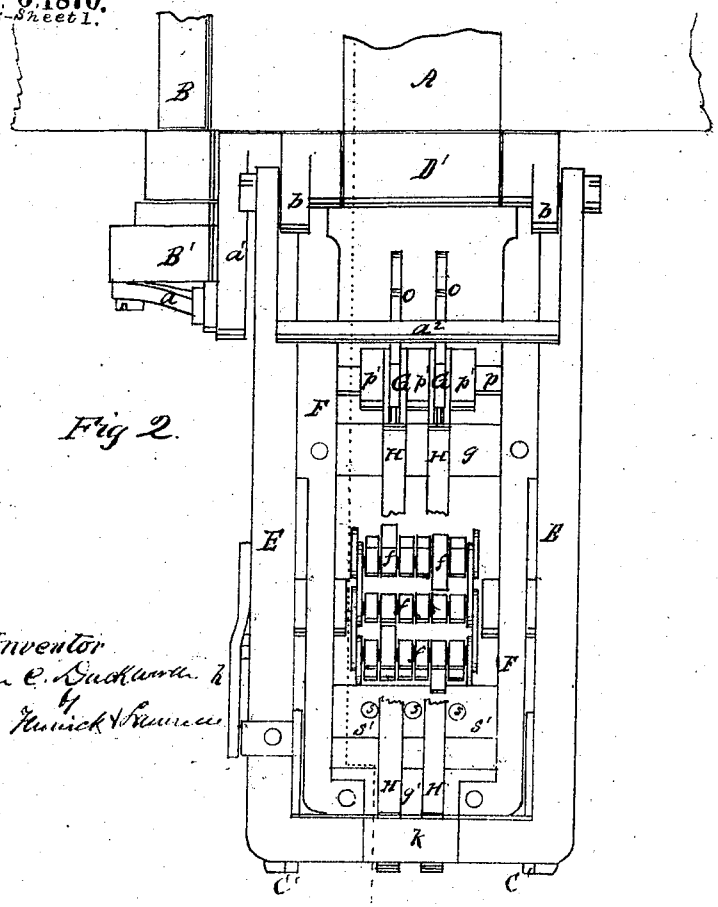

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Fig. 4.

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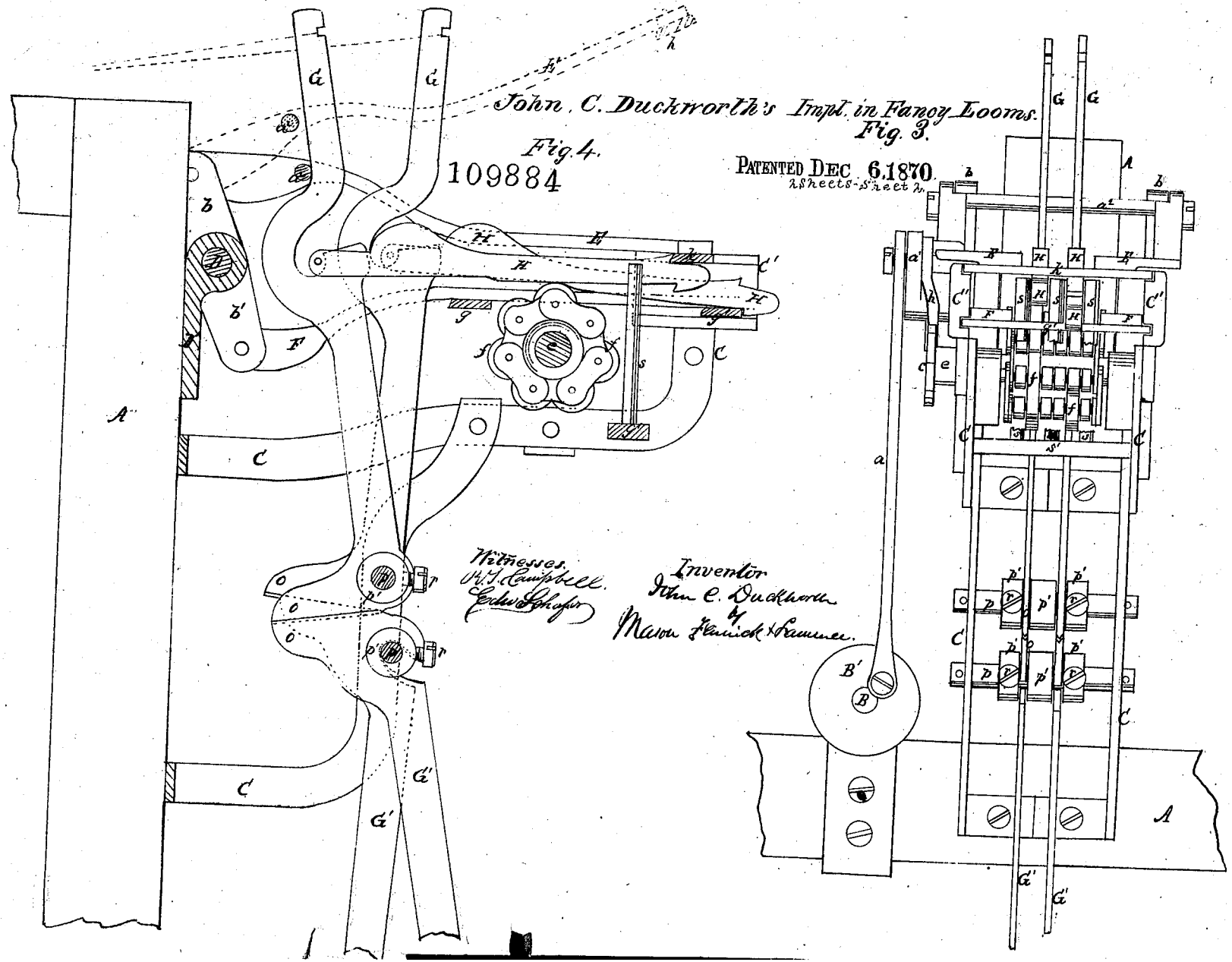
Fig. 3.

PATENTED DEC 6.1870

2 Sheets-Sheet 2.



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JOHN C. DUCKWORTH, OF PITTSFIELD, MASSACHUSETTS.

Letters Patent No. 109,884, dated December 6, 1870.

IMPROVEMENT IN HARNESS-OPERATING MECHANISMS FOR LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN C. DUCKWORTH, of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain novel Improvements on the Harness-Motion of Looms for Weaving Fancy Fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a side elevation of a portion of a loom-frame having applied to it my improved harness-motion.

Figure 2 is a top view of the same parts.

Figure 3 is an end view.

Figure 4 is an enlarged vertical sectional view of the parts shown in fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The first part of my invention relates to the heddle-levers of fancy-looms. In fancy-looms each leaf of heddles is connected with and operated by a separate heddle-lever or levers, as the case may be, depending upon the construction of the loom, some looms having a double series of heddle-levers—one lever of each series for each leaf of heddles—and other looms having but a single series of heddle-levers—one lever for each leaf of heddles. The latter class of looms, those having a single series of upright heddle-levers arranged at the side of the loom, have the advantage of simplicity in construction; but, on account of the great length of the levers and the necessity of crowding as many as are required for the purpose of a fancy-loom into a space equal to the width of the heddles, they are slender and comparatively frail, especially when made of cast-iron, as is the practice in the construction of heddle-levers, and are, therefore, liable to breakage of either or both arms, and, when this occurs in either arm, the entire lever must be replaced by a new one. Moreover, these long slender side levers are difficult to cast in a sufficiently perfect manner, many of them being lost in the casting by reason of their being so long and slender. The other class of looms, those having a double series of heddle-levers, one lever of each series for each leaf of heddles, have the levers of each series arranged horizontally, one series above the loom and the other below it, each lever of each series being connected with its respective heddle, and with the corresponding lever of the other series, by suitable connections, in manner well known to loom-builders and manufacturers accustomed to the fancy-loom known as the "Crompton loom." These looms have the disadvantage of the vibration of their connections, which renders the operation of the jacks more or less uncertain, besides throwing the stress of the operation of the heddle-levers upon the top and bottom of the loom-frame.

The nature of this part of my invention consists in the combination and arrangement of a double series of upright angular heddle-levers, placed at the side of the loom on bearings, which are parallel to the side of the loom, one lever of each of the series being connected with a leaf of heddles by connections extending from the leaves of heddles to each of the long arms of the corresponding heddle-levers of both series, the two series of heddle-levers not being necessarily connected together, except through the leaves of heddles, and being made to move with each other by reason of the short arms or toes abutting each other, the whole arranged substantially as hereinafter described. By arranging a double series of upright or vertical angular levers at the side of the loom upon independent bearings and without long connections, I have avoided many of the disadvantages of the former mode of using a double series of heddle-levers in fancy-looms, and have also avoided the principal disadvantages attending the use and construction of the long, slender, single series of upright levers.

My invention further consists in an arrangement of the pattern-chain, horizontal hooked jacks, and vertical or upright heddle-levers, arranged at the side of the loom, so as to move toward and from the loom, and connected with the leaves of heddles, the gist of the arrangement consisting in bringing the pattern-chain directly in contact with the horizontal hooked jacks on their under edges or sides, each jack having a hook on its upper and a hook on its lower edge, at one end, and at its other end attached to the heddle-lever, or to a projection thereof, so as to lift the jacks, or allow them to be depressed, by reason of the protuberances and depressions of the pattern-chain, without intervention of hinged toes, as formerly practiced.

My invention further consists in an arrangement of the pattern-chain relatively to the reciprocating knives, (sometimes called lifters and depressers,) the horizontal hooked jacks hinged at one end to vertical or upright heddle-levers arranged at the side of the loom, so as to move toward and from the loom, and connected with the leaves of heddles and said upright heddle-levers, each jack at its other end having a hook on its upper and a hook on its lower edge, and the gist of the arrangement being that the pattern-chain is placed directly in contact with the lower side of the jacks, and between the point where the jacks are hinged to the side levers, or to a projection therefrom, and the hooks upon the jacks, which engage with the reciprocating knives, whereby the jacks are elevated or depressed, to engage with the knives, by a comparatively slight movement of the pattern-chain, by reason of

the hooks on the jacks being at a greater distance than the pattern-chain from the joint or point of attachment of the jacks to the side lever.

My invention further consists in an arrangement of pattern-chain, horizontal hooked jacks, and upright heddle-levers, the gist of the arrangement consisting in the heddle-levers being arranged at the side of the loom, so as to move toward and from the loom, the jacks being hinged at one end to the heddle-levers above their fulcrums, and at its other having a hook on its upper and a hook on its lower edge, and arranged horizontally outside of the heddle-levers, the pattern-chain being placed directly in contact with the lower side of the jack, outside of the heddle-levers, and the drum which carries the pattern-chain being located beneath the jacks and above the fulcrums of the heddle-levers, whereby convenient access to the jacks and pattern-mechanism is obtained, and also room for a considerable length of chain to be suspended vertically from the drum without obstruction, and, at the same time, the pattern-chain acts directly upon the jacks.

But, in order to more particularly describe my invention, I will refer to the drawings, which illustrate the construction and operation of the double series of levers, and the arrangement of the jacks, reciprocating knives, and pattern mechanism.

To avoid confusion, the drawings only show two levers of each series of upright heddle-levers, with their jacks and other accompanying mechanism, it being understood that as many levers of each series are to be used as there are leaves of heddles in the loom.

Letter A represents a portion of the main side frame of the loom.

Letter B represents a portion of the main driving-shaft, which gives motion to the lay and other parts of the loom, and carries a disk, B′, on the end, to which is attached a crank-pin, which operates a rock-shaft, D, through a pitman, *a*, and a rocking-arm, *a′*, fast to the rock-shaft D, to give motion to the reciprocating knives *k* and *g′*, which move in opposite directions, the knife *k* being connected with a reciprocating frame, E, and the knife *g′* being connected with the reciprocating frame F, both frames being moved horizontally and in opposite directions by the arms *b* and *b′*, fast to the horizontal rock-shaft D.

The additional side frame C, attached to and projecting from the side of the loom, supports two fixed horizontal shafts, *p p*, which are placed, one above the other, near together, and parallel with each other and with the side of the loom.

These two shafts form the bearings or fulcrums of the double series of vertical or upright angular heddle-levers, the upper series G G being pivoted upon the upper shaft *p*, and the lower series G′ G′ being pivoted upon the lower shaft *p*.

The levers of each series vibrate freely upon their bearings, and are kept in place by collars *p′* on the shafts *p*, the outside collars being secured to the shaft by screws *r*.

The upright arms of the upper series of heddle-levers G G are connected, each with its leaf of heddles, by a cord running horizontally, or nearly so, to a pulley over the leaf of heddles, thence vertically to the leaf of heddles, as is usual in looms which have upright side-heddle levers moving toward and from the loom. The lower series of heddle-levers are shown broken off in the drawings, but are to be connected at the ends of their vertical arms with their respective leaves of heddles, in the same manner as the upper series of heddle-levers. There being an equal number of heddle-levers in each series, and as many heddle-levers in each series as there are leaves of heddles, each leaf of heddles is connected above with one of the upper series, and below with one of the lower series of heddle-levers. And there being no link or connection between the two series of heddle-levers, whenever a lever of the upper series is moved outward from the loom to lift a leaf of heddles, one of the lower series moves toward the loom by gravity, or by the pull of the connecting cord from below the leaf of heddles to the lower end of its vertical arm, thus avoiding danger of breakage of the lower series of levers by obstructions, when moving toward the loom, the strain at that time bearing upon the harness-cords, instead of upon the lever, as would be the case if it were a part of a single long upright lever, pivoted in the middle.

When the upper series of levers are moved toward the loom, for the purpose of depressing the heddles, the lower series of levers are forced to move away from the loom by reason of the action of their angular toes O O of both series of levers upon each other.

The acting surface of the opposite toes are grooved and rounded to fit each other, as shown in the drawings, for the purpose of guides, to keep the levers more accurately in their planes of motion than would be the case if the toes had plane surfaces.

The lower series of levers, G′, are arranged to hook on the shafts *p*, in the manner shown in the drawings, for convenience in removal.

The upper series of heddle-levers, G, are bent, as shown in the drawings, and provided with a projecting tenon, to which the horizontal jacks H are jointed, either by a mortise, as shown in the drawings, or in any convenient manner,

The object of jointing the jacks to a projection from the heddle-levers is to preserve the strength of the heddle-levers, which would be very much impaired by making the joint in the drum of the heddle-lever.

The horizontal jacks H are each provided with a hook upon their upper edges, and a hook upon their lower edges, as shown in the drawings, which engage with the knives K and *g′*, for the purpose of moving the heddles. These knives, being attached to reciprocating frames, as before described, reciprocate in opposite directions, in recesses in the guides C′, attached to the framing C, the upper knife and its frame being free to lift up, and thus avoid breakage in case of obstructions.

The cross-rod *d*, on the reciprocating frame E, and the cross-bar *g*, on the reciprocating frame F, act as eveners, to restore the heddle-levers to their normal positions.

The jacks H are held in place, laterally, by means of vertical pins *s s*, which are secured to a horizontal plate, S′, attached to the frame C, and they are raised and depressed at the proper time to be acted upon by the reciprocating knives, by means of the pattern-chain *f*, which is carried by a chain-drum, constructed in the usual manner, secured to the horizontal shaft S.

The pattern-chain is moved, link by link, at each beat of the lay, by means of a pawl, *h*, connected with the reciprocating frame E, which acts upon a ratchet-wheel, *c*, attached to the shaft of the chain-drum.

The pattern-chain is of the ordinary construction used in fancy looms, and does not need further description.

It will be observed that the pattern-chain acts directly upon the jacks without intermediate toes, and that, by reason of its being placed between the hooks of the jacks and the point of attachment of the jacks to the levers, the jacks are moved sufficiently to engage and disengage their hooks with the reciprocating knives, by means of comparatively small rollers upon the chain. It will also be observed that those parts of my invention above referred to after the statement of the first part of my invention, which relate to the arrangement of the pattern-mechanism, jacks,

and reciprocating knives, with the vertical heddle-levers, do not depend upon having the heddle-levers arranged in two series, but is equally applicable to a single series of long upright heddle-levers, pivoted in the middle at the side of the loom, and moving toward and from the loom; the jacks, reciprocating knives, and pattern mechanism being arranged in the same manner with relation to the upper arms of such long upright heddle-levers, as they are with respect to the vertical arms of the upper series of angular heddle-levers herein shown and described.

Claim.

1. The arrangement, in combination with the leaves of heddles, of a double series of vertical angular heddle-levers, placed at the side of the loom on bearings which are parallel to each other and to the side of the loom, and moving toward and from the side of the loom, the vertical arm of each lever of each series of heddle-levers being connected with a leaf of heddles, and the horizontal arms or toes of such lever of each series acting upon the corresponding horizontal arms or toes of the opposite series, substantially in the manner and for the purposes hereinbefore described.

2. The arrangement of the pattern-chain, horizontal hooked jacks, and vertical or upright heddle-levers, pivoted at the side of the loom, so as to move toward and from the loom, and connected with the leaves of heddles, substantially as described, the gist of the arrangement consisting in bringing the pattern-chain directly in contact with the horizontal hooked jacks in said combination beneath the same, each jack having a hook on its upper and a hook on its lower edge, at one end, and at its other end attached to the heddle-lever, or to a projection thereof, so as to lift the jacks or allow them to be depressed by the action of the protuberances, and depressions of the pattern-chain without intervention of hinged toes, as formerly practiced.

3. The arrangement of the pattern-chain relatively to the reciprocating knives, or lifters and depressers, the horizontal hooked jacks, hinged at one end to vertical or upright heddle-levers, each jack at its other end having a hook on its upper and a hook on its lower edge, such heddle-levers arranged at the side of the loom, so as to move toward and from the loom, and connected with the leaves of heddles, and said upright heddle-levers, the gist of the arrangement being that the pattern-chain is placed directly in contact with the lower side of the jacks, and between the hooks of jacks, which engage with the reciprocating knives and the point where the jacks are hinged to the side levers, or a projection therefrom, whereby the jacks are elevated or depressed to engage with the knives, by comparatively small rings or protuberances upon the pattern-chain.

4. The arrangement of pattern mechanism, horizontal hooked jacks, and upright heddle-levers, the gist of the arrangement consisting in such heddle-levers being arranged at the side of the loom, so as to move toward and from the loom, the jacks being hinged to such heddle-levers above their fulcrums, and arranged horizontally outside of such heddle-levers perpendicularly to the side of the loom, or nearly so, each jack at its other end having a hook on its upper and a hook on its lower edge, the pattern-chain being placed directly in contact with the lower side of the jacks, and outside of such heddle-levers, and the drum which carries the pattern-chain being located beneath the jacks and above the fulcrums of such heddle-levers, whereby convenient access to the jacks and pattern-mechanism is obtained, and also room for a considerable length of pattern-chain to be suspended vertically from the drum, without obstruction, and, at the same time, direct action of the pattern-chain upon the jacks is secured, substantially as described.

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Witnesses:

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