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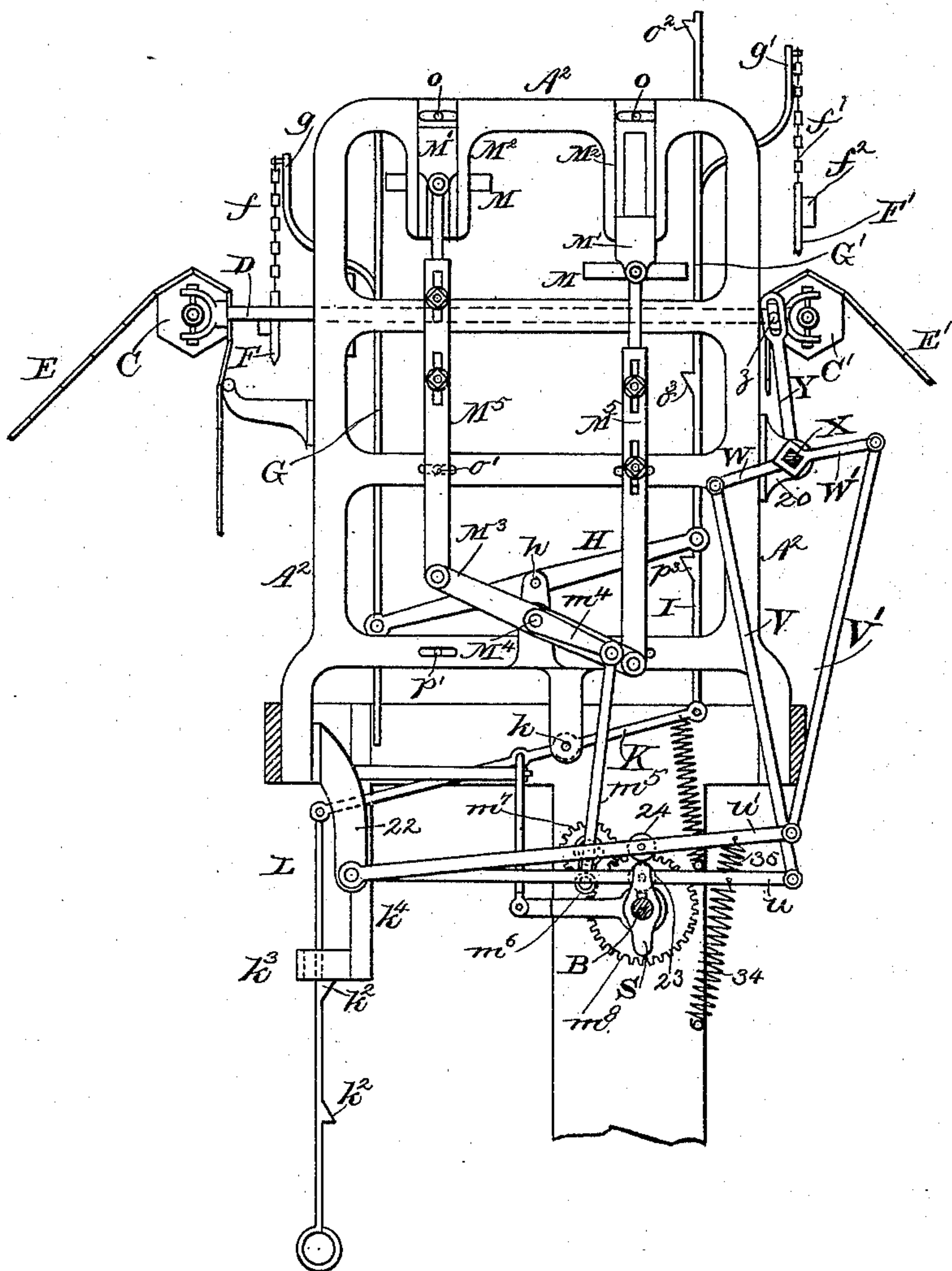
3 Sheets—Sheet 1.

A. TURKINGTON.  
JACQUARD MECHANISM FOR LOOMS.

No. 446,039.

Patented Feb. 10, 1891.

FIG. 1.



WITNESSES

Edgar A. Goddard  
Howard J. Eaton

INVENTOR

Alexander Turkington,  
by Leroy Gregory atty.

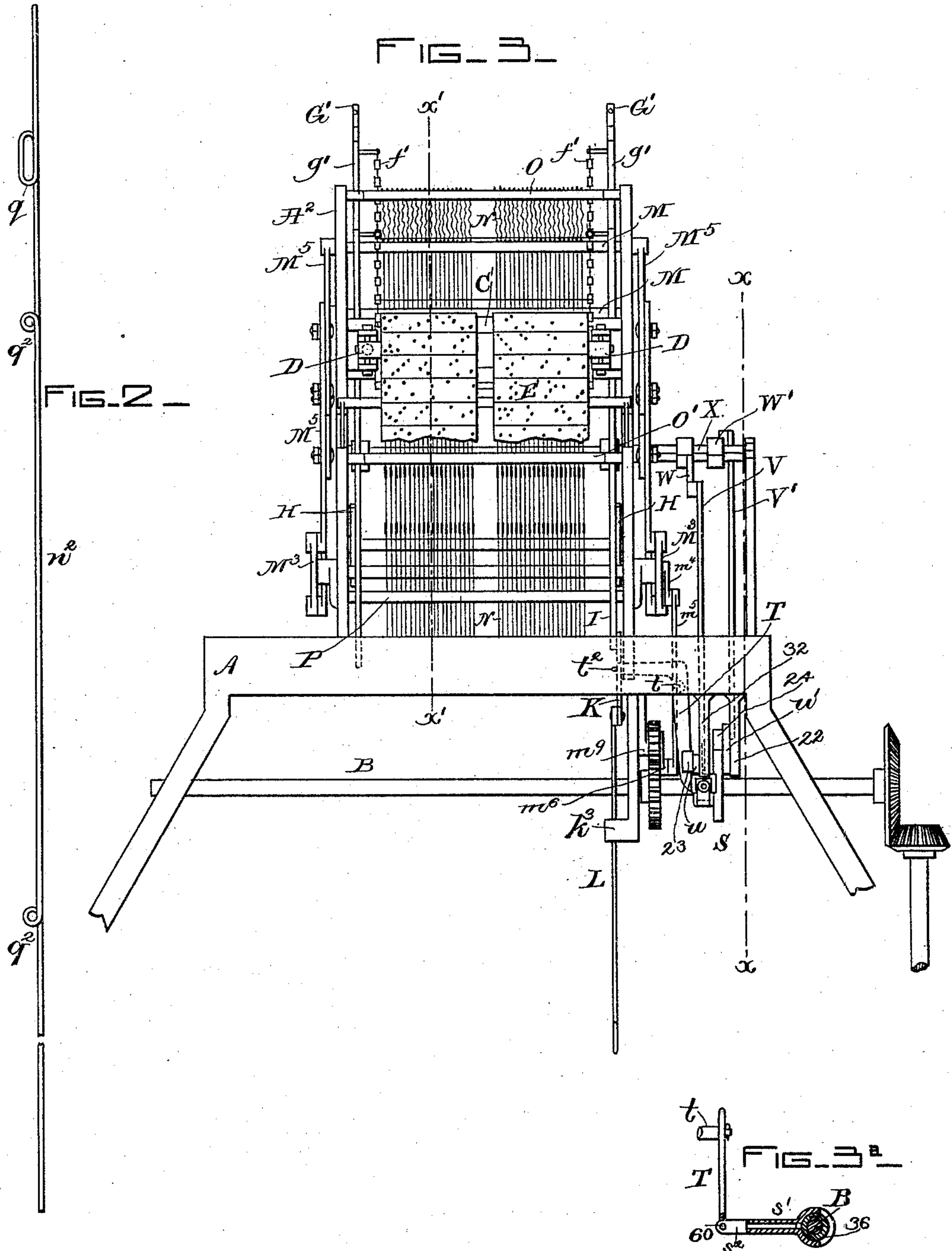
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Howard F. Eaton.

INVENTOR

Alexander Turkington,  
by Leroy & Gregory attys.

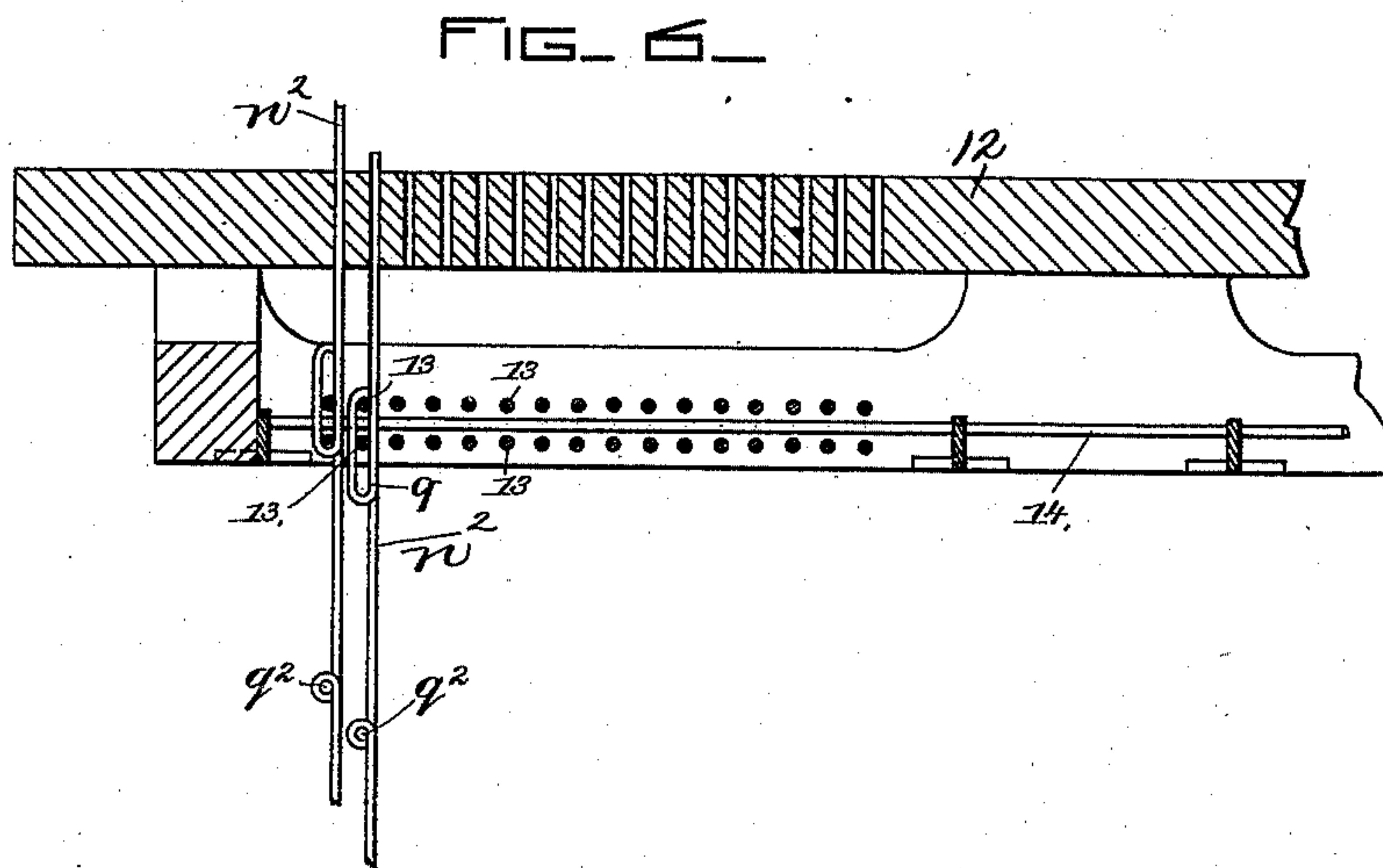
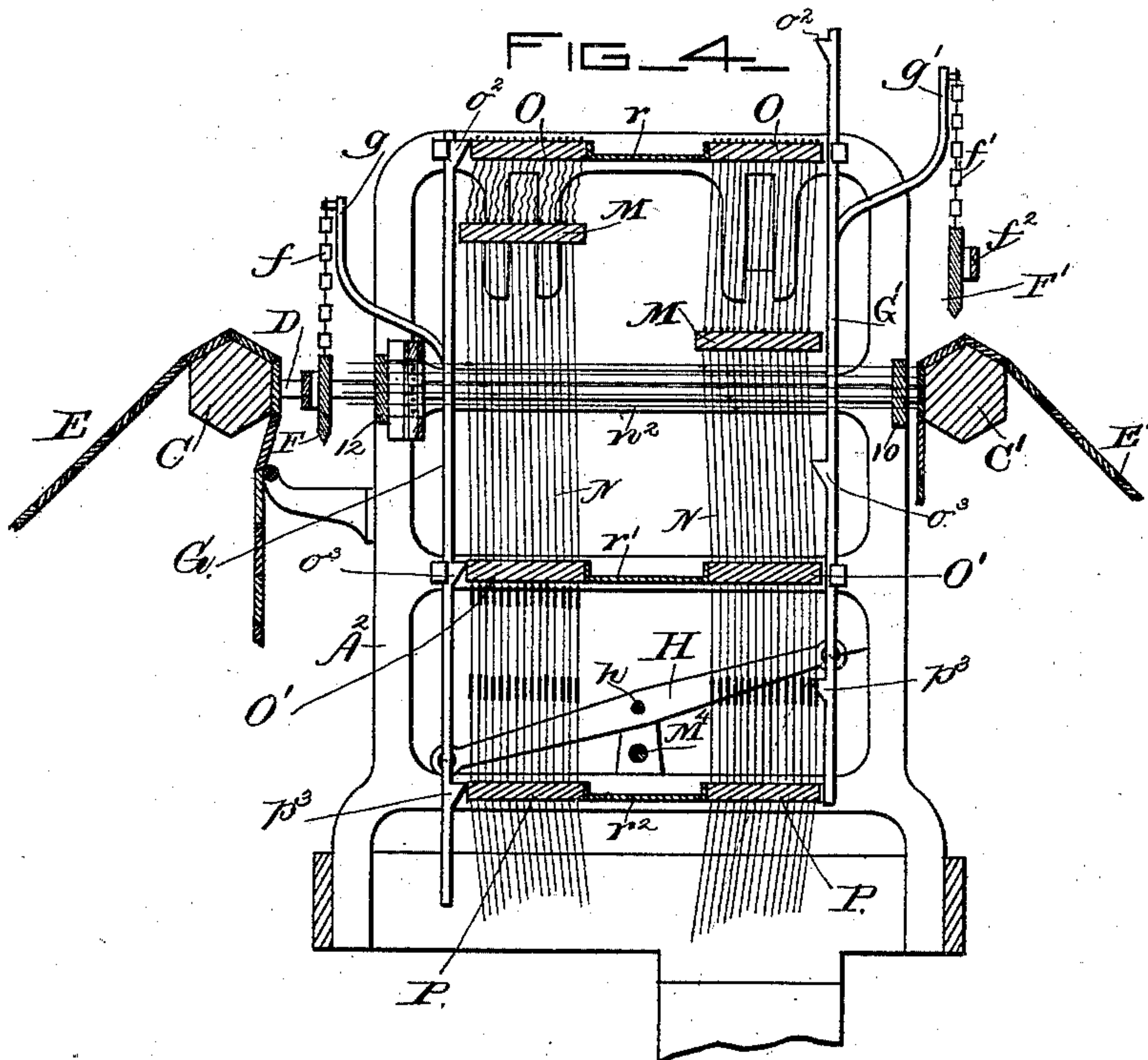
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WITNESSES

Edgar A. Goddard  
Howard A. Eaton

INVENTOR  
A. TURKINGTON.  
by Leroy Gregory attys.



# UNITED STATES PATENT OFFICE.

ALEXANDER TURKINGTON, OF PHILADELPHIA, PENNSYLVANIA.

## JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 446,039, dated February 10, 1891.

Application filed November 16, 1887. Serial No. 255,345. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER TURKINGTON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Jacquard Mechanism for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

This invention has for its object to improve the construction of jacquards, whereby the production of different patterns, as borders or cross-stripes, may be facilitated.

In the practice of my invention I propose to employ two drums located at opposite sides of the frame of the Jacquard machine, each drum receiving part of the cards to be used in the production of the pattern, mechanism being provided whereby either of said drums, with its cards, may be made to act in place of the other drum and card, as when it is desired to change from one to the other pattern of the article being woven.

My invention consists in the combination, in a jacquard, of harness-supporting knot-cords or tails, top boards from which they are supported, lifters for the knot-cords or tails, double-ended needles to move the knot-cords or tails to be engaged by the lifters, drums having cards and located at opposite ends of the said needles, and means for bringing either of said drums and cards thereon into action at pleasure, according to the requirements of the pattern; also, in the combination, with harness-supporting cords or tails and the needles, of a laterally-movable board co-operating with the said cords or tails.

Other features of my invention will be hereinafter described, and specified in the claims.

I have herein shown my improvements as applied to a jacquard adapted more especially for weaving two-ply ingrain carpets, the jacquard having two trap or lifting boards working alternately to lift the harnesses for the picks, the knot or tail cords attached to the top boards and extended through the needles being provided with knots adapted

to be engaged and lifted in usual manner by the trap-board, they having usual eyes contracted at one end. Attached to these knot or tail cords are the harness-cords, the lower ends of which carry the eyes or mails, through which the warp-threads are passed, and below which are the links or weights which act to carry the warp into the lower shed when required; but it will be obvious that I may apply my invention to any well-known form of jacquard wherein knot or tail cords are employed—as, for instance, those having a single trap-board which lifts at every pick.

Figure 1 is a partial sectional elevation to the left of the dotted line  $x$ , Fig. 3, it showing a sufficient portion of a jacquard containing my improvements to enable the same to be understood. Fig. 2 shows one of the needles removed and enlarged. Fig. 3 is an elevation of the machine shown in Fig. 1, viewing it from the left. Fig. 3<sup>a</sup> is a detail to be referred to. Fig. 4 is a vertical section in the line  $x'$ , Fig. 3. Fig. 5 is a detail showing an edge view of part of one of the spring-boards to be described; and Fig. 6 is an enlarged detail, to be referred to, of a part of the needles and the frame in which they are adapted to slide, the said figure showing means for preventing overturning of the needles.

Referring to the drawings, A designates the top part of a loom-frame, and A<sup>2</sup> the frame of the Jacquard mechanism, the frame A having journaled in it a shaft B, receiving motion through a train of gear-wheels (shown only in Fig. 3) driven from any suitable part of the loom proper. (Not shown.)

The shaft B carries a cam S, through which motion is communicated to the card-drums C C'. These drums are journaled upon the opposite ends of two sliding rods D D, commonly called "piston-rods," which are adapted to be reciprocated in the frame A<sup>2</sup>.

Each drum C C' is furnished with its appropriate set of cards E E', so that in their rotation the cards are brought successively into action.

The drums C C' may be rotated at the desired times by any well-known mechanism—such, for instance, as shown in United States Patent No. 146,544, dated January 20, 1874.



F F' designate spring-boards which are adapted to be alternately interposed between the ends of the needles  $n^2$  and the drums C C'. These spring-boards are suspended by chains  $f f'$  from arms  $g g'$ , shown as projected laterally from suitable carriers G G', the said spring-boards being represented as composed of flat strips of wood of substantially the length of the card-drums, each bar having, as represented, yielding buffers  $f^2$ , such buffers being represented as composed of leather secured to the boards in the form of loops, as best represented in Fig. 5. Either spring-board F F' may be lowered into position between the ends of the needles and the drums C or C' next to it, according as the card on that drum is to be thrown out of action, the inoperative card-drum in its reciprocations acting on the said spring-board and serving to push back into normal position such of the needles  $n^2$  as have been driven out at one side of the jacquard by the card upon the drum at the other side thereof; or, in case any of the said needles, owing to their having been bent or caught, or owing to other defects, should not be carried over properly, the said spring-boards, lowered between the needles and the card-drum then out of action, will act to push the said needles over into proper position.

The carriers G G', serving to carry certain cams or inclines to be described, are shown as pivoted at their lower ends (see Figs. 1 and 4) to the ends of like rock-arms H H, secured to the opposite ends of a rock-shaft  $h$ .

The lever K, attached at one end to an extension I of the carrier or rod G', is extended toward the front of the loom, where it is provided with a rod L, having a suitable handle within reach of the loom-operator, and by means of which the end of the said lever may be pulled down to lift the spring-board F' through the medium of said rod I, rock-arms H, and vertical carriers G', the spring-board F being simultaneously lowered, the reverse movement of the spring-boards being obtained by lifting the rod L, it being provided with locking devices or lugs  $k^2$ , adapted to engage with the socket  $k^3$  on the stationary arm  $k^4$  when it is desired to sustain the said rod in its elevated or depressed position.

The devices for obtaining a draft or pull upon the double-ended needles  $n^2$  which are employed in connection with my improved jacquard are as follows: M M designate the trap or lifting boards, and M' M' blocks or carriages in which the ends of the said trap-boards are secured, said blocks sliding in ways M<sup>2</sup> at the sides of the frame A<sup>2</sup> and receiving motion from rock-arms M<sup>3</sup>, secured centrally to opposite ends of a rock-shaft M<sup>4</sup> through vertical rods M<sup>5</sup>, pivoted to the said rock-arms and to the said slides. The rock-shaft M<sup>4</sup>, as herein shown, derives its motion from a toothed gear  $m^8$  on the shaft B, it engaging a pinion  $m^7$ , loose on a stud  $m^9$ , the

said pinion having a connected crank  $m^6$  and having attached to it a rod  $m^5$ , jointed to an arm  $m^4$ , secured to the said rock-shaft M<sup>4</sup>.

N N designate the knot or tail cords suspended from the top boards O O and passing through the usual holes, narrow at one end, in the trap-boards M M and through the eyes  $q^2$  of the needles  $n^2$ , so that as the trap-boards are lifted at the proper time they will lift such of the knot or tail cords as have by a longitudinal movement of the needles  $n^2$  in usual manner been placed in position to have their knots caught in usual manner by the said trap or lifting boards, they lifting with them the said cords and the connected harness-supporting cords attached to them, thus forming the shed.

The middle boards are marked O' O', and the bottom boards P P. These boards O' P have usual holes for the passage of the cords N; but, instead of being stationary upon or with relation to the frame A<sup>2</sup>, as heretofore customary, they, together with the top boards O O, are so arranged or supported as to be capable of receiving lateral motion in either direction, the said boards O O O' O' P P being connected in pairs by means of slides  $r r'$ , (shown as trough-shaped metal bars,) to the longitudinal edges of which are connected the edges of the said boards, the ends of the said boards being provided, respectively, with lugs  $o o' o' p p'$ , which enter and slide in horizontal slots in the frame A<sup>2</sup>, the said slots being shown in Fig. 1. The boards referred to, connected, as described, in pairs, may be moved, each pair in unison, by one of the cams  $o^2$ ,  $o^3$ , or  $p^3$  on the carriers or rods G G'. Lateral movement of either set of boards O O' to one side exerts strain on the cords N in one or the other direction, causing the needles  $n^2$  to be moved in the same direction, thus placing one or the other end of each needle  $n^2$  in position to be acted upon by the set of cards toward which the said needles  $n^2$  are carried by the draft or pull of the said cords N thereon. Should the projection  $o^3$  or  $p^3$  be omitted, then only the top board O would be moved laterally, the desired result being in either case obtained. Should the cam projection  $o^2$  or  $p^3$  be omitted, then only the connected boards O' would be moved laterally.

The needles  $n^2$ , having their opposite ends shaped and adapted to be acted upon by the card-surfaces E and E', have like eyes  $q^2$  for the two sets of cords N and a steadying-eye  $q$  to prevent the needles turning over. These needles  $n^2$  are in practice supported near their opposite ends by usual hole-boards 10 12, the said needles, near the board 12, receiving through their oblong eyes  $q$  vertical wires 13, which wires act to restrict the longitudinal movement of the needles, the needles, where the eyes  $q$  are formed in them, resting upon horizontal wires 14, separated just far enough apart to allow the needles and their eyes free longitudinal movement for a little distance, the wires 14 preventing any possible rotation



or overturning of the needles and thereby avoiding any cramping of the tail-cords in the eyes  $q^2$ .

The rods D are reciprocated to carry the drums toward and from the ends of the needles by the cam S, splined on the shaft B by a spline s, so that the said cam may be moved laterally on the said shaft when desired. Each rod D in practice has a pin z, embraced by the slotted upper end of like arms Y at opposite ends of the rock-shaft X, journaled in suitable bearings 20 on the frame A<sup>2</sup>. This rock-shaft X has fast to it two other arms W W', having attached to them, respectively, the rods V V', jointed, respectively, to like levers u u', having their fulcrums on suitable hangers 22 32, and provided, respectively, with rolls 23 24 to be acted upon by the cam S, the said cam being movable along on the said shaft, so as to be brought under either of the said rolls 23 or 24, according as it is desired that the cam S move the lever u or u'. Each lever u u' is acted upon by a suitable spring 34 or 36 to normally keep it down toward the cam S. To enable the cam S to be moved laterally on the shaft B, to thus enable either set of cards to be used at will, the hub 36 of the said cam has been provided with an annular groove to receive the forked end of a shipper-fork s'. This shipper-fork may be moved by or through an elbow-lever T, pivoted at t on the frame A, a reduced end of the said lever entering loosely a hole in the lever K. The lower end of the lever T is shown as forked and as embracing a loose pin s<sup>2</sup> of the fork s', the pin s<sup>2</sup> and lever being connected by a pin 60. (See Fig. 3<sup>a</sup>.)

While I have described and shown all of the boards O O, O' O', and P P as being movable laterally to give draft to the needles, it will be found sufficient in some cases to move but one of the three sets of boards—that is, to move the top boards or the middle boards. I prefer, however, to move only the middle boards.

The several parts, being constructed and arranged as shown and described, operate as follows: As shown in the drawings, the end of lever K has been pulled down and is held there by the upper lug  $k^2$  on rod L engaging with the bottom of the socket  $k^3$ . Carrier G at the left-hand side of the frame A<sup>2</sup> has descended, and the lugs  $o^2$ ,  $o^3$ , and  $p^3$  on said rod have pushed the boards O O' P toward the right, thereby giving a draft in that direction on the harness-supporting cords or tails N. The spring-board F has been lowered in front of drum C, and the spring-board F' has been lifted from in front of drum C'. The movement of lever K has shifted the cam S into position beneath lever u', and as the cam revolves said lever is raised, and the drum C' is thereby moved positively from right to left, the return movement of the said lever being effected by spring 35. When it is desired to bring the cards on drum C into action, it is only necessary to raise lever K by pushing up

rod L until the lower lug  $k^2$  engages with the top of socket  $k^3$ . This movement raises the carrier G and spring-board F and lowers the carrier G' and spring-board F', causing the carrier G' by its cam projections to push against the boards O O' P from right to left, and at the same time the cam S is shifted from its position beneath lever u' into position beneath lever u, thereby insuring a direct and positive motion of the drums C C' from left to right.

I claim—

1. The top board, the connected harness-supporting knot-cords and double-ended needles, the trap-board and the bottom board, through which the said cords are extended, two card-drums arranged one at each end of the said needles, and means for bringing either of the said drums into action at pleasure, combined with means to shift either the top or bottom boards laterally to co-operate with one or the other of the said drums, substantially as described.

2. The combination, with the double-ended needles and two card-drums, one at each end of the said needles, of two spring-boards and means for placing one or the other of the said spring-boards at will at one or the other end of the said needles, to operate substantially as described.

3. The combination, with the piston-rods D and drums C C', of the rock-shaft X, arm Y, connecting said rock-shaft to one of said piston-rods, and means, substantially as described, for giving said rock-shaft a positive motion in either direction, as set forth.

4. The combination, with the harness-supporting cords or tails and Jacquard needles, of a laterally-movable board through which said cords or tails pass and means for moving said board, substantially as described.

5. The combination, with the harness-supporting cords or tails and Jacquard needles and trap-board, of a top and a bottom board and means to move either of said boards laterally, to operate substantially as described.

6. The combination, with the two drums C C', the piston-rods upon which said drums are carried, and the rock-shaft X, connected to said piston-rods, of the levers u u', connected to said rock-shaft, the shaft B, the cam S, adapted to move either of said levers alternately, and means for shifting said cam upon its shaft, substantially as described.

7. The combination, with lever K, rocking lever H, connected thereto, carriers G G', attached to said rocking lever, a series of needles, and the spring-boards F F', of the drums C C', the piston-rods carrying said drums, the rock-shaft X, connected to the piston-rods, and means for giving said rock-shaft a positive movement in either direction, accordingly as said lever K is in an elevated or depressed position.

8. The two drums and the double-ended Jacquard needles, each having an elongated



eye between its ends, which ends are acted upon by cards carried by the said drums, and guides, as described, for both ends of said needles, combined with wires 13 and 14 to co-  
5 operate with the said eyes, as and for the purposes set forth.

9. The top boards O O, the harness-supporting cords or tails suspended therefrom, and a trap or lifting board, combined with  
10 double-ended Jacquard needles, two card-drums arranged one at each end of the said

needles, means for bringing either of the said drums into action at pleasure, and spring-boards to co-operate with one or the other of said drums, substantially as described. 15

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of November, 1887.

ALEXANDER TURKINGTON.

Witnesses:

JOS. B. CONNOLLY,

R. DALE SPARHAWK.