

Holcroft & Smith. Loom.

N^o 43,583.

Patented Jul. 19, 1864.

Fig. 1

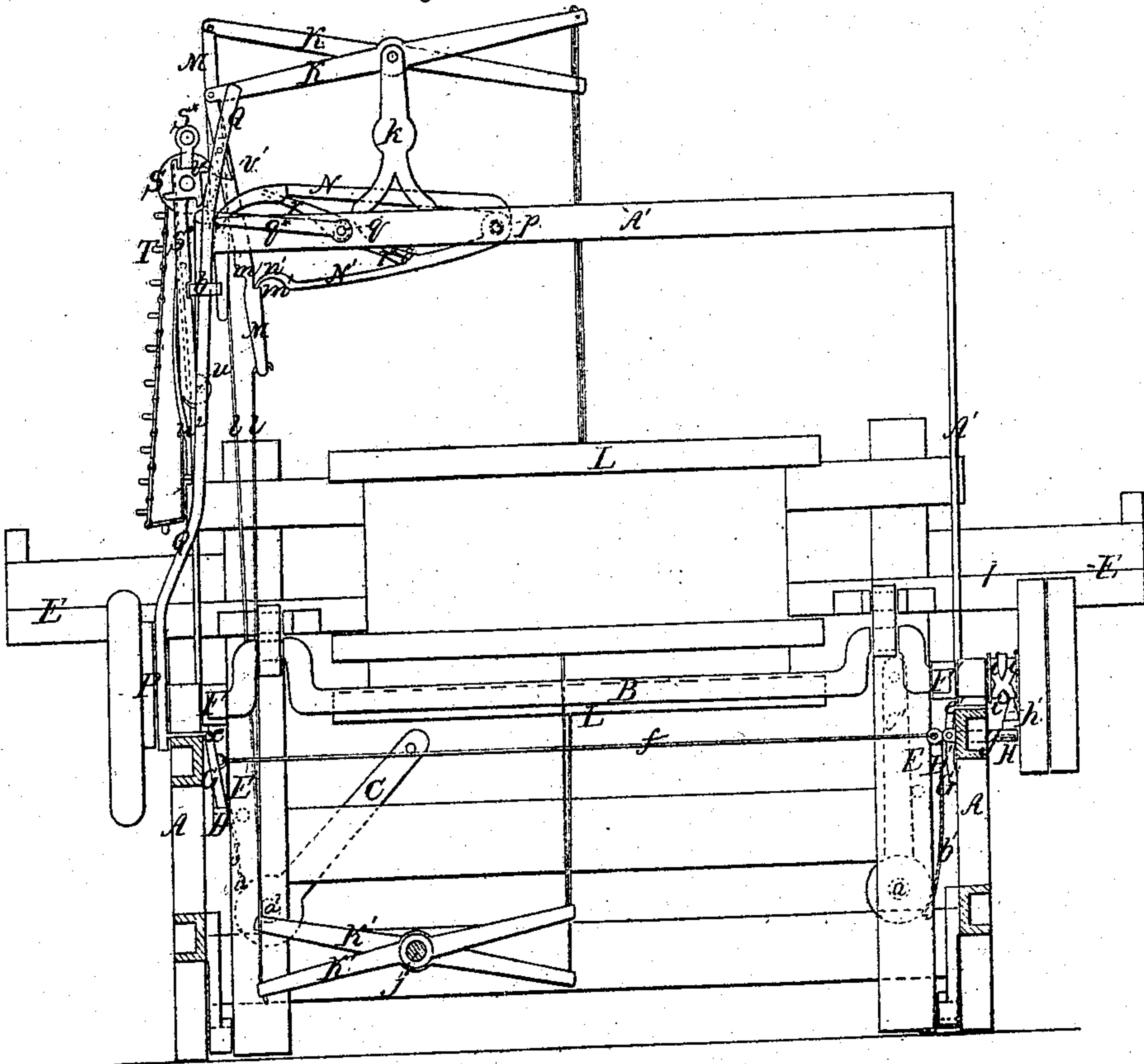
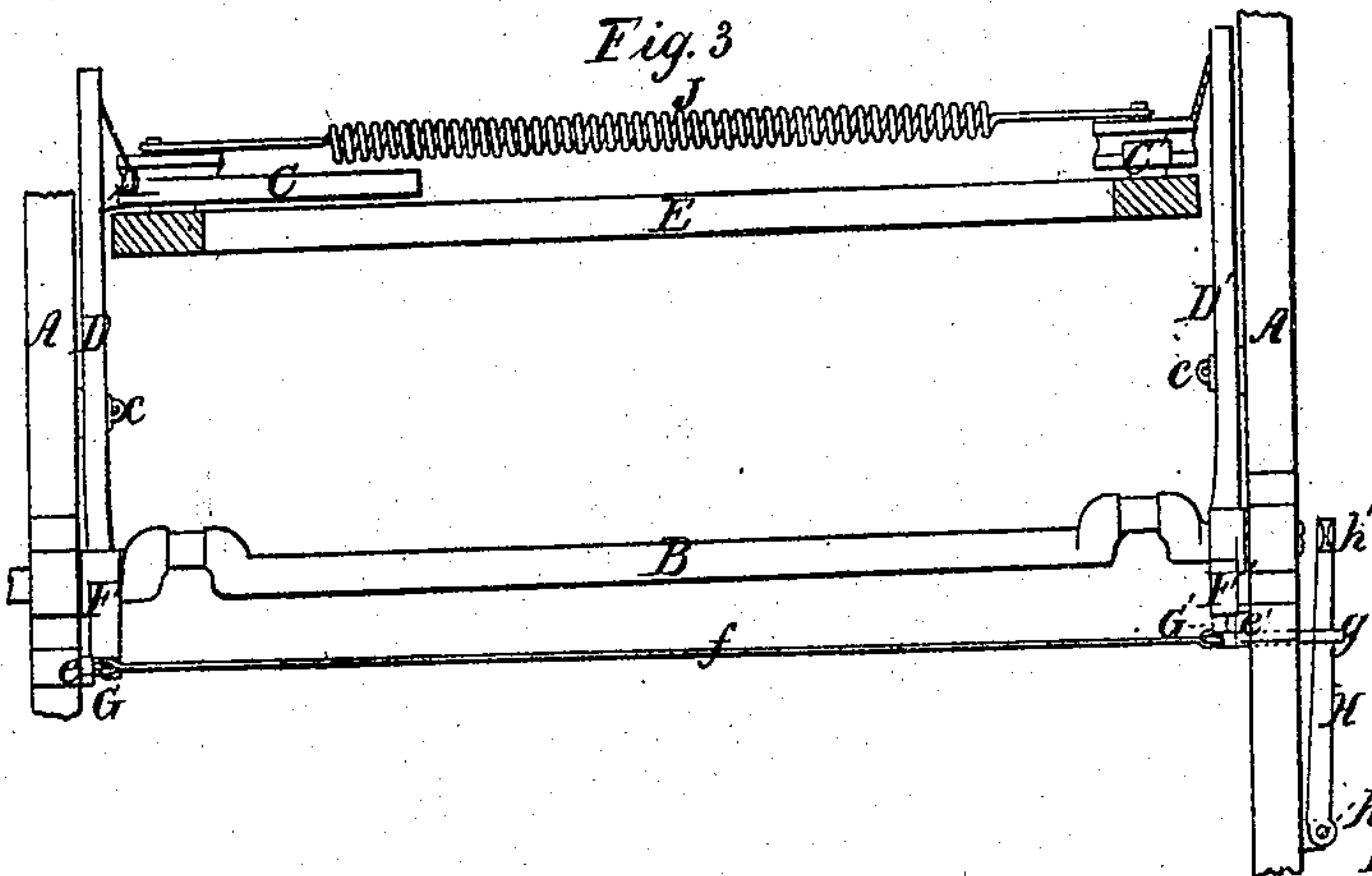


Fig. 3



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UNITED STATES PATENT OFFICE.

HENRY HOLCROFT, OF MEDIA, AND CANBY S. SMITH, OF CHESTER VALLEY,
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IMPROVEMENT IN POWER-LOOMS.

Specification forming part of Letters Patent No. 43,583, dated July 19, 1864.

To all whom it may concern:

Be it known that we, HENRY HOLCROFT, of Media, in the county of Delaware and State of Pennsylvania, and CANBY S. SMITH, of Chester Valley, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Power-Looms; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which --

Figure 1 is a transverse vertical section of a loom, taken behind the crank-shaft and showing all the principal parts but the yarn-beam, whip roll, and let-off apparatus. Fig. 2 is a longitudinal vertical section of the same, taken just within one of the side frames. Fig. 3 is a plan of the shuttle-motion. Fig. 4 is a sectional view of the principal parts of the harness-motion in a plane parallel with Fig. 1.

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

This invention consists in certain improved means of driving the shuttle from the main shaft of the loom without the intervention of any other shaft, thereby obviating the necessity for more than one shaft in a power-loom and greatly simplifying it.

It also consists in certain improvements in the harness-motion for fancy weaving, whereby it is much simplified.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A is the main framing of the loom.

B is the main or crank shaft, which drives the lay E, arranged in the usual position in suitable bearings on the framing A.

C C' are the picker-staves, arranged to vibrate on pins *a a'*, which attach them to the front of the lay E, and having their rounded lower parts connected by straps or cords *b b'* with the front ends of two similar levers, D D', which are similarly arranged parallel with the warp and inside of the framing on fixed fulcrum-pins *c c'*, secured in the framing. On the top of the rear part of each of these levers there is formed an inclined plane, *d*, which is situated under the shaft P, as shown in Fig. 2.

F F' are two similar cams for producing the shuttle motion, secured upon the shaft B di-

rectly over the two levers D D', and operating upon the inclined surfaces *d* of the said levers to produce their depression, and thereby produce the movement of the picker-staves toward the center of the loom, by which the shuttle is thrown. The said cams are arranged in line with each other, so that if the two levers always occupied corresponding positions the said cams would act upon them simultaneously; but as only one picker is required to operate during each revolution of the shaft, and the two are required to alternate with each other in their operation, it is necessary that one or the other should be kept out of the range of its respective cam during each revolution of the shaft, leaving one only in position to be acted upon. This is done by means of two vibrating stops, G and G', hinged at *e e'* to the two side frames of the loom, as shown in Figs. 1, 2, and 3, and connected together by a rod, *f*, (shown in Fig. 1,) in such manner that both may move together to the right or left, but that neither can so move without the other, and that when the point of one is brought to a position over the rear end of its respective lever, in which it stops or prevents that end of the said lever from rising, as shown at the left side of Fig. 1, the other lies snugly against the side of the loom-framing, as shown at the right side of Fig. 1, in such a position that it does not interfere with the movement of its respective lever. The stop *g'* is connected by a short rod, *g*, with a horizontally-moving lever, H, which works on a fixed fulcrum, *h*, secured outside of the framing of the loom. This lever is furnished with a swivel-tooth *h'*, which works in the two grooves *i i* of a cam I on the shaft B, the said grooves being parallel with each other and with the planes of revolution of the cam upon the greater portion of the circumference of the latter, but united with each other by two oblique-crossing connections, as shown in Fig. 1, so that once in every revolution of the cam the swivel-tooth *h'* may be caused to cross from one groove to the other, remaining in one groove during one revolution of the shaft B, and in the other groove in the next revolution. This action of the cam upon the tooth *h'* produces a quick movement of the lever H and the stops G G' to the right and left, alternately drawing the successive revo-

lutions of the shaft, the said movement taking place quickly and being completed at the same moment that the cams $F F'$ would have completed the depression of their respective levers $D D'$. The effect of this movement is to bring one or other of the stops $G G'$ over the rear end of its respective lever D or D' after the said lever has been depressed by its respective cam, and thereby prevent the said lever from rising again, at the same time removing the other stop from above the other lever D' or D , which has been held down during the previous revolution of the shaft, and allowing the latter lever to rise to a position in which it may be acted upon by its respective cam in the next revolution of the shaft. By this means only one lever is allowed to be acted upon during each revolution of the shaft and one picker-staff is actuated to drive the shuttle during one revolution and the other during the next revolution. The picker-staves are drawn back and the levers raised, as soon as the latter are liberated, by means of a spring, J , which connects the two picker-staves together below the pivots $a a'$.

$K K$ and $K' K'$ are two sets of jacks, between which the heddle-frames $L L$ are arranged, and with which they are connected in the usual manner, the upper set of jacks being arranged to vibrate on a short shaft, j , supported in standards k on the top frame, A' , of the loom, and the lower set being arranged to vibrate upon a stationary shaft, j' . From the outer ends of the upper jacks there are suspended the hooks $M M$, which are also connected by wires $l l$ with the outer ends of the lower jacks.

The hooks $M M$ have each a notch, m , in its outer edge and a notch, m' , in its inner edge, the latter notch being arranged to receive the edge of the knife n' , by which the said hooks are depressed and the former notch being arranged to receive the edge of the knife n , by which the said hooks are lifted, the said knives being extended across the whole series of hooks and being attached each to one of two levers, $N N'$, which work on the same fixed fulcrum-pin p , secured in the top framing, A' . Between these levers there is arranged in suitable bearings in the frame A' a rock-shaft, q , on which is secured a two-armed rocker, $r r'$, one arm, r , of which acts upon the upper lever, N , for the purpose of raising the knife n , lifting the jacks, and depressing the harness, and the other, r' , acts upon the lower lever, N' , for the purpose of depressing the knife n' and the jacks and raising the harness. The lever N always rests upon the rocker, descending by gravitation as the rocker returns to a horizontal position after having effected the opening of the shed, and the lever N' is raised again as the rocker returns by the action of the rocker under a projection, s , provided on the said lever for the purpose. The rock-shaft q derives the motion necessary to effect the opening of the shed from a cam, P , on the shaft B , the said cam operating upon a sliding

yoke-rod, Q , which works in a nearly vertical direction on a stationary guide, b , provided on the framing A' , and the upper part of which is slotted to receive the end of an arm, q^* , which is secured rigidly on the rear end of the rock-shaft q .

S is the cylinder which carries the pattern-chain T . This cylinder and chain are of the usual construction, but the cylinder is somewhat differently applied—that is to say, it is arranged in bearings in the upper part of a vibrating frame, S^* , the lower end of which is pivoted at u to the frame A' . The said frame has applied to it a spring, u^2 , which presses it toward the hooks $M M$.

On the rear end of the cylinder S there is a ratchet-wheel, v , which is operated upon to produce the revolution of the cylinder by means of a hooked pawl, v' , attached to the upper part of the sliding yoke-rod Q , hereinbefore mentioned. This pawl is so hung that it operates upon the ratchet-wheel during the upward movement of the rod Q , but passes freely over the teeth of the ratchet-wheel in its downward movement.

During the operation of the pawl the teeth of the ratchet wheel rest against the sliding-rod Q , which, being unyielding and having an inclination as shown in Fig. 1, causes the ratchet-wheel, cylinder, and frame S^* to swing back away from the hooks $M M$, thereby greatly easing the movement of the chain by preventing its pins from dragging continually against the hooks $M M$. As the pattern-chain revolves, those hooks $M M$ which have the pins of the chain presented opposite to them by the movement of the chain are pressed inward toward the knife n' , and caused to be caught by that knife which in its descent pulls down those hooks and thereby raises the attached leaves of harness, while the hooks which have no pins presented opposite to them are caught by the knife, n , which in its ascent raises those hooks, and thereby produces the depression of the attached leaves of harness.

What claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of two cams, $F F'$, on the main or crank shaft of the loom, two levers, $D D'$, interposed between the said cams and the picker-staves, and two movable stops, $G G'$, or their equivalents, the whole operating, substantially as herein described, to obtain the shuttle-motion from the main shaft.

2. Placing the pattern-cylinder S in a vibrating frame, S^* , when the cylinder is operated by a notched rod, Q , eccentrically attached to the main shaft of the loom.

3. The rock-shaft q , the rocker $r r'$, and the levers $N N'$, which carry the knives $n n'$, the whole arranged in combination with each other and with the jacks and hooks to operate substantially as herein specified.

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