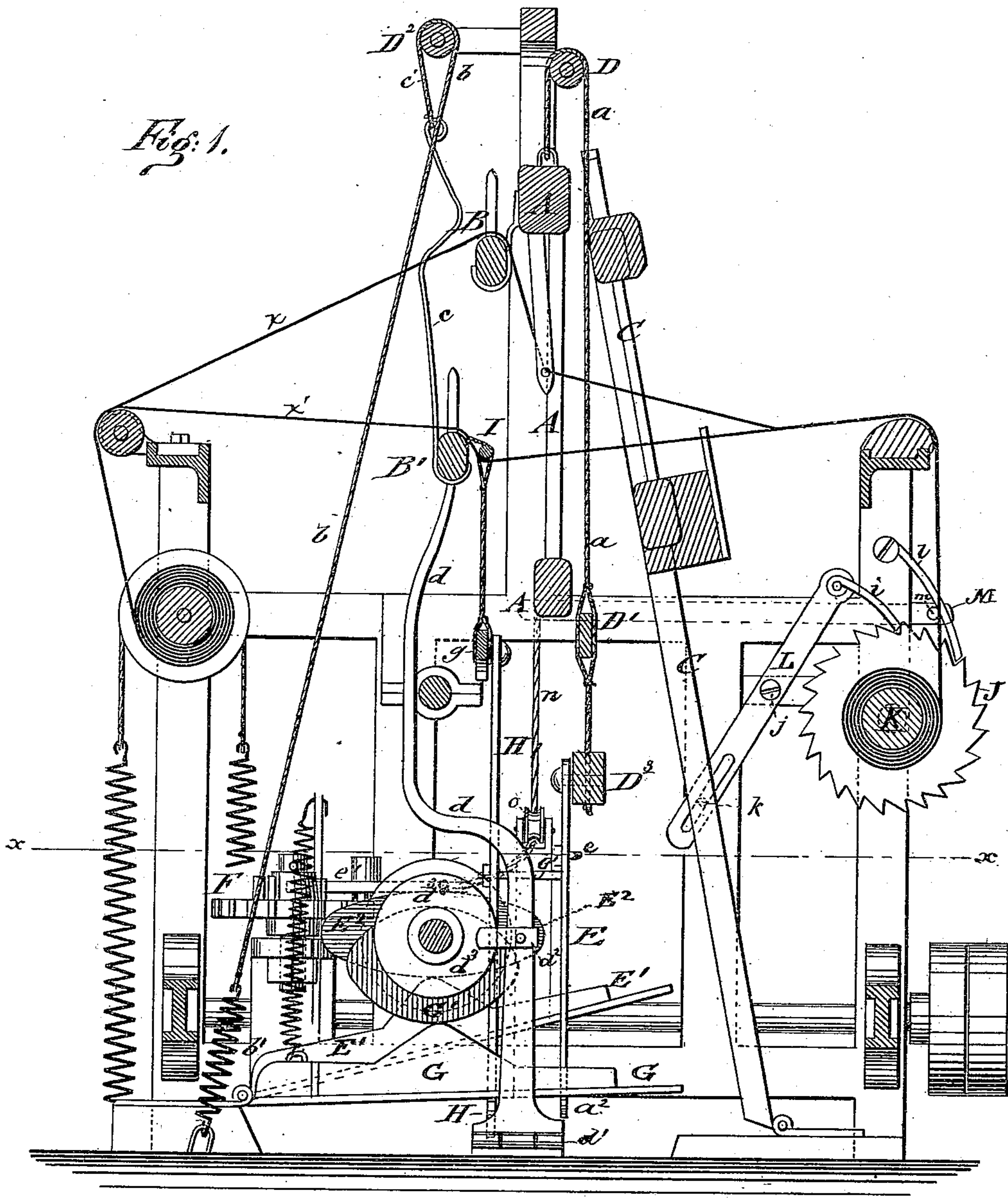


A. McLEAN. 3 Sheets—Sheet 1.  
 Loom for Weaving Gauze Fabrics.  
 No. 228,372. Patented June 1, 1880.



WITNESSES:

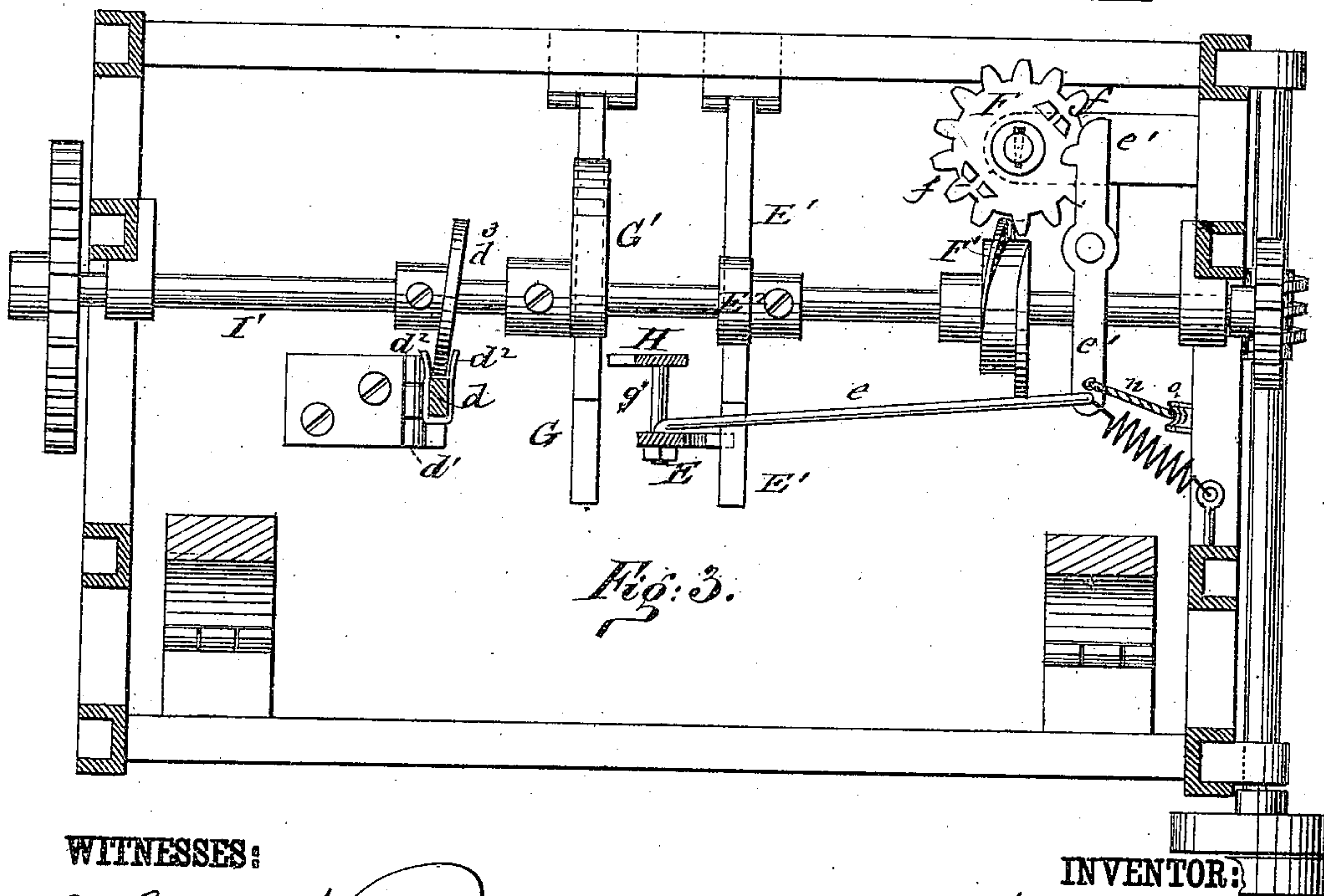
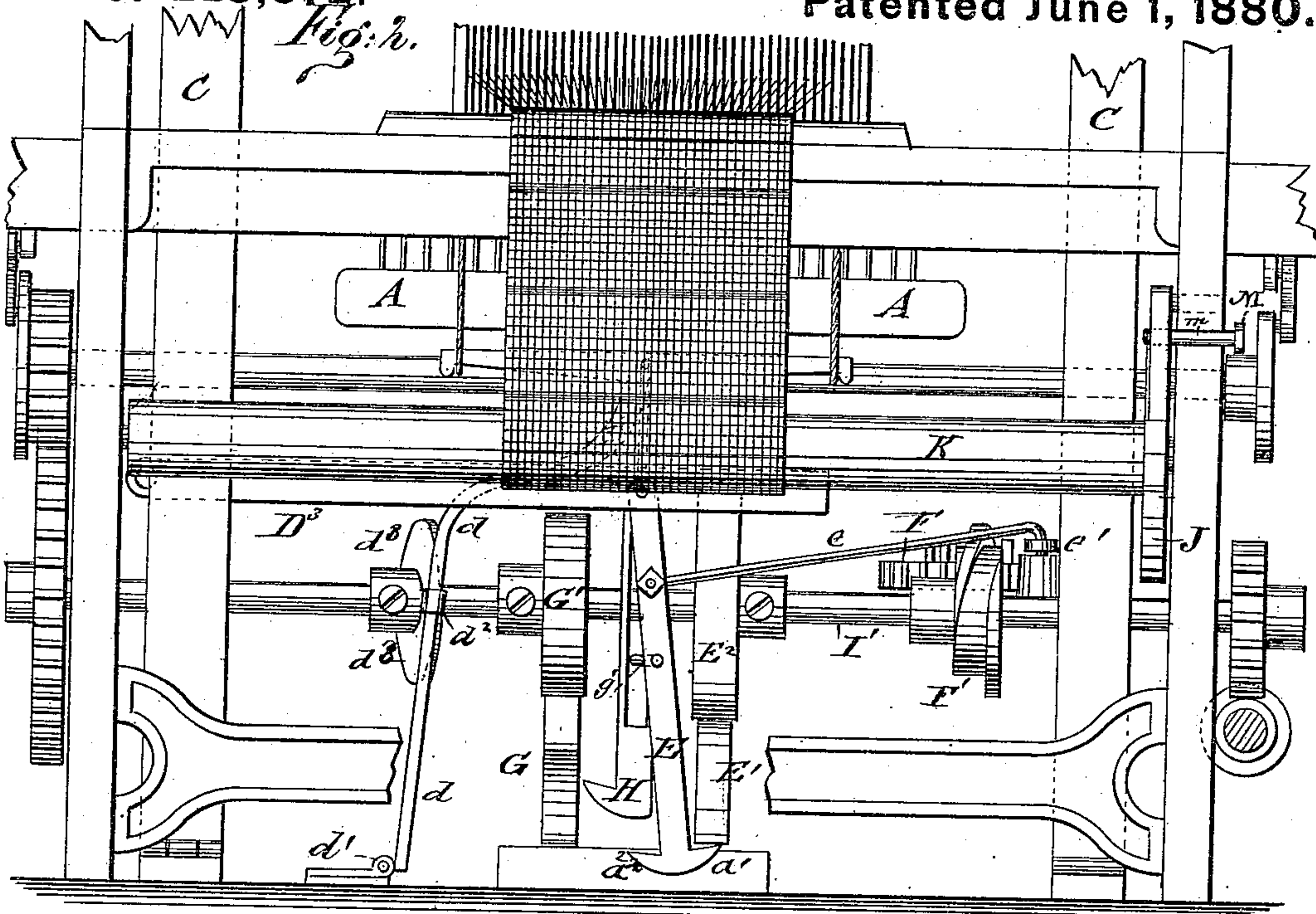
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Loom for Weaving Gauze Fabrics.  
No. 228,372. Patented June 1, 1880.



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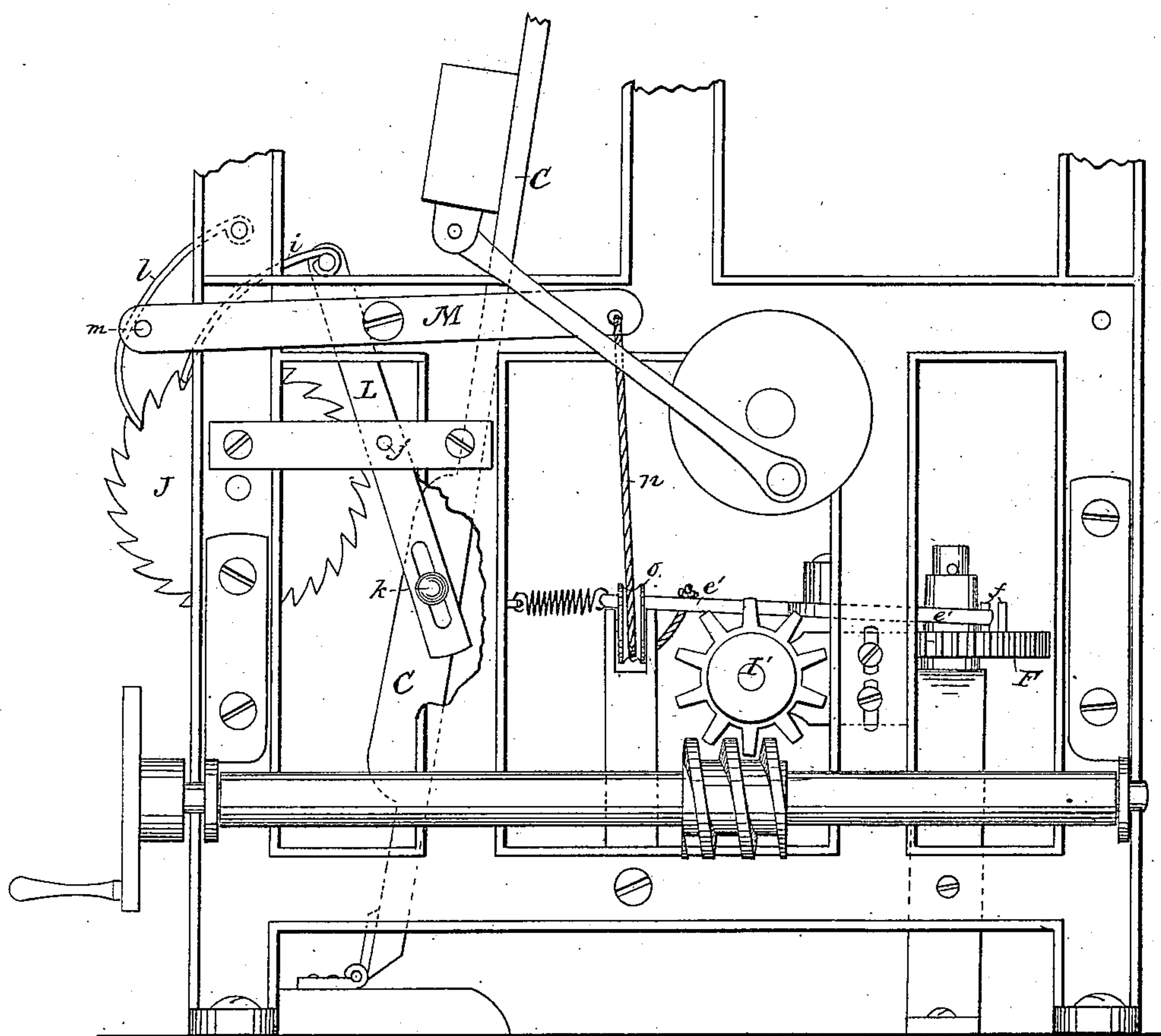
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Loom for Weaving Gauze Fabrics.  
No. 228,372. Patented June 1, 1880.

*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

ANDREW McLEAN, OF JERSEY CITY, NEW JERSEY.

## LOOM FOR WEAVING GAUZE FABRICS.

SPECIFICATION forming part of Letters Patent No. 228,372, dated June 1, 1880.

Application filed December 6, 1877.

*To all whom it may concern:*

Be it known that I, ANDREW McLEAN, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Looms for Weaving Gauze Fabrics; and I 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 represents a vertical transverse section of my improved loom for weaving gauze fabrics with bars or checks therein; Fig. 2, a front elevation of the same with the upper portion broken off; Fig. 3, a horizontal section of the loom on line  $x\ x$ , Fig. 1, and Fig. 4, an end view with the upper portion broken off.

The invention consists in the combination, with the gauze-reed double-hooked rod connected to the gauze-reed in a suitable manner, duplex cam, and cam-shaft, of the vibrating comb, hinged lever provided with jaws, its operating-cam, heddle-roller, suspension-rod and cords and spring; in the combination of the gauze-reed, heddle-roller, suspension-cord, jack, lamb, cam-shaft, and vibrating comb, the duplex cam, duplex-cam treadle, hinged lever, its operating-cam, and double-hooked rod; in the combination of the gauze-reed, heddle-roller, suspension-cord, jack, lamb, loom-cam, worm, and cam-shaft, the loom-cam treadle, double-hooked rod, connecting-rod, spring-lever, and pattern-wheel; in the combination of the gauze-reed, heddle-roller, suspension-cord, jack, lamb, cam-shaft, worm, loom-cam, loom-cam treadle, double-hooked rod, connecting-rod, spring-lever, and pattern-wheel, the slotted hooked bar, vibrating comb, and shed-rod, and in the combination of the cam-shaft, worm, pattern-wheel, spring-lever, ratchet-wheel, cloth-beam, the right-angle armed lever, cord, and pawl, as will be hereinafter fully described.

Referring to the drawings, A represents a gauze-reed, such as is sometimes used in looms for weaving gauze fabrics without bars, said reed being composed of short splits with eyes at the points or ends for the passage of one lease,  $x$ , of the warp-threads, alternating with longer splits, through which the other lease,  $x'$ , passes.

To the gauze-reed A is attached a stationary comb, B, through which are passed the warp-threads of the lease  $x$ , which are passed through the eyes of the short splits of reed A. Gauze-reed A is suspended by cords or straps  $a$ , which pass over a heddle-roller, D, at the top of the loom-frame, and thence down to a jack, D', which is connected by cords with a lamb, D<sup>3</sup>, pivoted horizontally to one side of the loom-frame.

From the lamb D<sup>3</sup> depends a rod, E, provided at its lower end with hooks  $a'$   $a^2$  on opposite sides like barbs. The hooks  $a'$   $a^2$  hang below two spring-treadles, E' G, and the rod E is adapted to be shifted laterally by mechanism that will be fully described hereinafter, so as to carry barb  $a'$  under treadle E' and barb  $a^2$  under treadle G, for a purpose that will be described farther on.

The treadles are held up by either springs, as shown, or weights, as may be preferred. Treadle E' is immediately under a duplex cam, E<sup>2</sup>, on the main shaft I' of the loom, and by means of the spring with which it is connected it is held in contact with the face of said cam, so that as shaft I' rotates the cam E<sup>2</sup> operates treadle E' twice up and down to every revolution of said shaft I'.

Treadle G is under the ordinary loom-cam G', fixed to shaft I', and is held in contact with the face of said cam G', so that when rotated by shaft I' cam G' operates treadle G once up for one pick and once down for alternate picks to every revolution of shaft I'.

B' is a comb, having at each pick a laterally-shifting motion, and when the bar is being woven having also a downward and return motion. Through said comb are passed the threads of the lease  $x'$ . Comb B' is suspended by rods  $c$  and cords  $c'$  from heddle-roller D<sup>2</sup>, at the top of the loom-frame, said heddle-roller D<sup>2</sup> being connected by a cord,  $b$ , with a spring,  $b'$ , or weights, as may be preferred. The cords  $c'$  are wrapped around roller D<sup>2</sup>, so that the comb B' can descend when the shed-rod I draws on the lease  $x'$ , for a purpose that will be presently described, while the cord  $b$ , which is also wrapped around roller D<sup>2</sup>, being connected with the spring  $b'$ , yields readily to the downward pressure on comb B'; but the spring through the cords and roller draws the comb back to its position and holds it there as soon



as the strain is removed from the lease  $x'$  and comb B' by the lease-rod I being released by the cam G'.

From comb B' a lever,  $d$ , depends, the lower end being hinged at  $d'$ . The lever  $d$  is provided with two jaws,  $d^2$ , which clasp a cam,  $d^3$ , fixed to the main shaft I'. As shaft I' revolves cam  $d^3$  vibrates lever  $d$ , and said lever vibrates comb B' laterally. The purpose of giving this lateral shifting motion to comb B' is to form the twist in the warp-threads after every pick in forming the open part of the gauze fabric between the bars, and the mode of operation is as follows: When the loom is in operation the duplex cam is rotated by shaft I', and actuates treadle E', as before mentioned. When the shuttle has passed through the shed and the lay C advances to make the pick, the cam E<sup>2</sup> actuates the treadle E', and this treadle, engaging hook  $a'$  of rod E, which, during the weaving of the gauze between the bars, is under treadle E', raises the reed A, and at the same time cam  $d^3$  vibrates lever  $d$  and comb B', so that when the points of the short splits get above lease  $x'$ , the threads whereof have been on one side of said short splits, between them and the long splits, the comb B', shifting laterally, transfers the threads of lease  $x'$  to the opposite side of the short splits, and as the cam at this point ceases to operate the lever, the weight of reed A causes it to gravitate, and thus carry lease  $x$  below lease  $x'$ , and form the shed for the next pick. Thus, by the cam E<sup>2</sup> raising, through lever E' and hook  $a'$ , the reed A, the shifting movement of comb B', and the gravitation of reed A, the twist in the warp-threads between the weft-threads of the gauze parts of the fabric is produced.

I will now proceed to describe the mode of forming the bars in the fabric.

Hook-rod E is connected, by means of a rod,  $e$ , with a spring-lever,  $e'$ . The power end of said lever, or the end opposite its connection with rod  $e$ , lies over a pattern-wheel, F, which meshes with a worm, F', on main shaft I'. As the pattern-wheel revolves the pins or cams  $f$  on its face come in contact with the adjacent end of the lever  $e'$ , and move or turn said lever on its fulcrum, and through connecting-rod  $e$  this motion of lever  $e'$  throws hook-rod to the left, or away from treadle E', and carries hook  $a^2$  under treadle G, as shown in Fig. 1, which said treadle is actuated by the ordinary loom-cam G'. This movement of hook-rod E carries hook  $a'$  from under treadle E', and thus throws the duplex cam E<sup>2</sup> out of connection with the gauze-reed A, and the said reed, through rod E, hook  $a^2$ , and treadle G, in connection with cam G', and thus from receiving two motions up and down at every revolution of shaft I', said reed now receives but one motion up for one pick, and down for the next, and so on alternately, whereby the short splits, which carry the lease  $x$ , will be held alternately above and below the lease  $x'$  during the time the lateral movement of the comb B and lease  $x$  in both directions is effected, so as to prevent the lease

$x'$  from being transferred to opposite sides of the said short splits by the said lateral movement of the comb, and thereby prevent the warp-threads from being twisted.

I is a shed-rod, placed on lease  $x'$  between reed A and comb B'. It is connected by cords with comb B', and also with a jack,  $g$ , from which depends a slotted rod, H, carrying a hook on its lower end. The rod H is connected by a bar,  $g'$ , with rod E, or, if preferred, directly with the pattern-wheel, so that when said rod is moved toward treadle G it carries rod H with it, and the hook on the end of rod H passes under treadle G simultaneously with the hook  $a^2$  on rod E.

The hook  $a^2$  of the double-hooked rod E and the hook of the slotted rod H both being under the treadle G, the loom is in condition for weaving in the bars between the weft-threads, of which the warp-threads are not twisted, but woven plain.

The operation is as follows: The loom-cam G on the revolving shaft I' coming in contact with the treadle G, depresses it, and consequently the double-hooked rod E and the slotted rod or bar H will be drawn downward, and thus, in connection with their connecting mechanism, the reed A and the lease  $x$  will be elevated and held up for the duration of one pick of the lay C, and the shed-rod I and the lease  $x'$  will be lowered and held down for the duration of the same pick, and thereby form the shed, as shown in Fig. 1. While the warp-threads are in this position the comb B will be reciprocated in both directions laterally of the warp by its cam on the shaft I', and the lease  $x$  being held up and the lease  $x'$  down during these lateral movements of the comb, the lease  $x'$  cannot be transferred to the opposite sides of the short splits to form the twist in the warp-threads. The shuttle having now been passed through the shed and the lay C having made a pick, the cam G' ceases to bear the treadle G down, and consequently the reed A gravitates, and the shed-rod I, being released from strain, allows the lease  $x'$  to rise, while the lease  $x$  is carried below the lease  $x'$  by the descent of the reed A, which remains down during the lateral movement of the comb B', whereby another shed is formed and the lease  $x'$  again prevented from being transferred to the opposite sides of the short splits to give the twist to the warp-threads. This is repeated until enough picks are woven to form the check or bar in the fabric, which is controlled by the pattern-wheel, for as soon as the cam or projection of the said pattern-wheel releases the connecting-lever mechanism of the double-hooked rod and the slotted hooked bar the same is changed back to the duplex cam-treadle, and the loom continues then to weave the gauze portion, as before.

The take-up consists of a ratchet, J, on cloth-beam K, operated by a pawl,  $i$ , pivoted to a lever, L, fulcrumed at  $j$ , and pivoted to the lay at  $k$ , so that at every pick the lay operates the lever and causes the pawl to move the ratchet-



wheel and cloth-beam, while another pawl, *l*, pivoted to the frame of the loom, engages the ratchet and holds it when pawl *i* is drawn back by the lay.

5 When the bar is formed in the gauze it is necessary that the take-up shall wholly or be partially arrested. For this purpose a lever, *M*, is fulcrumed to the frame of the loom, and one end is provided with an arm, *m*, which  
10 projects under pawl *l*, while the opposite end is attached to a cord, *n*, which runs under a friction-wheel, *o*, and is fastened to the lever *e'*, so that when said lever is moved by the pattern-wheel *F* (when the bar is being formed)  
15 it operates lever *M* and raises pawl *l* from the ratchet, thus allowing the ratchet and cloth-beam to turn backward and forward slightly, and avoid being turned by pawl *i* while the bar is being woven in.  
20 From this description it will be readily seen that by means of the duplex cam *E*<sup>2</sup> two sheds are formed for the shuttle at every revolution of the main shaft *I'* while weaving the gauze portion of the fabric, and that by means of the  
25 shifting arrangement of the double-hooked rod *E* the duplex cam is thrown out of gear, and the twisting of the warp-threads and the weaving of the gauze are thereby interrupted, and at the same movement the single cam *G'* is  
30 brought into action and the two leases of warp, by the action of reed *A* and shed-rod *I*, are operated to produce plain weaving, and thus form the bar in the fabric, and during the weaving of said bar the take-up is arrested, so  
35 that the picks can be laid close together.

What I claim is—

1. The combination, with the gauze-reed *A* double-hooked rod *E*, connected to the gauze-reed in the manner described, the duplex cam *E*<sup>2</sup>, and shaft *I'*, of the comb *B'*, hinged lever *d*, provided with jaws *d*<sup>2</sup>, cam *d*<sup>3</sup>, rod *c*, roller *D*<sup>2</sup>, cords *b c'*, and spring *b'*, substantially as and for the purpose set forth.

2. The combination of the gauze-reed *A*, the roller *D*, cord *a*, jack *D'*, lamb *D*<sup>3</sup>, shaft *I'*, and comb *B'*, the duplex cam *E*<sup>2</sup>, cam *d*<sup>3</sup>, lever *d*, treadle *E'*, and double-hooked rod *E*, substantially as and for the purpose set forth.

3. The combination of the gauze-reed *A*, roller *D*, cord *a*, jack *D'*, lamb *D*<sup>3</sup>, loom-cam *G'*, worm *F'*, and shaft *I'*, the treadle *G*, double-hooked rod *E*, connecting-rod *e*, spring-lever *e'*, and pattern-wheel *F*, substantially as and for the purpose set forth.

4. The combination of the gauze-reed *A*, roller *D*, cord *a*, jack *D'*, lamb *D*<sup>3</sup>, shaft *I'*, worm *F'*, loom-cam *G'*, treadle *G*, double-hooked rod *E*, connecting-rod *e*, spring-lever *e'*, and pattern-wheel *F*, the slotted hooked bar *H*, comb *B'*, and shed-rod *I*, substantially as and for the purpose set forth.

5. The combination of the shaft *I'*, worm *F'*, pattern-wheel *F*, spring-lever *e'*, ratchet-wheel *J*, and the cloth-beam *K*, the lever *M*, provided with the arm *m*, the cord *n*, and the pawl *l*, substantially as and for the purpose set forth.

ANDREW McLEAN.

Witnesses:

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C. SEDGWICK.