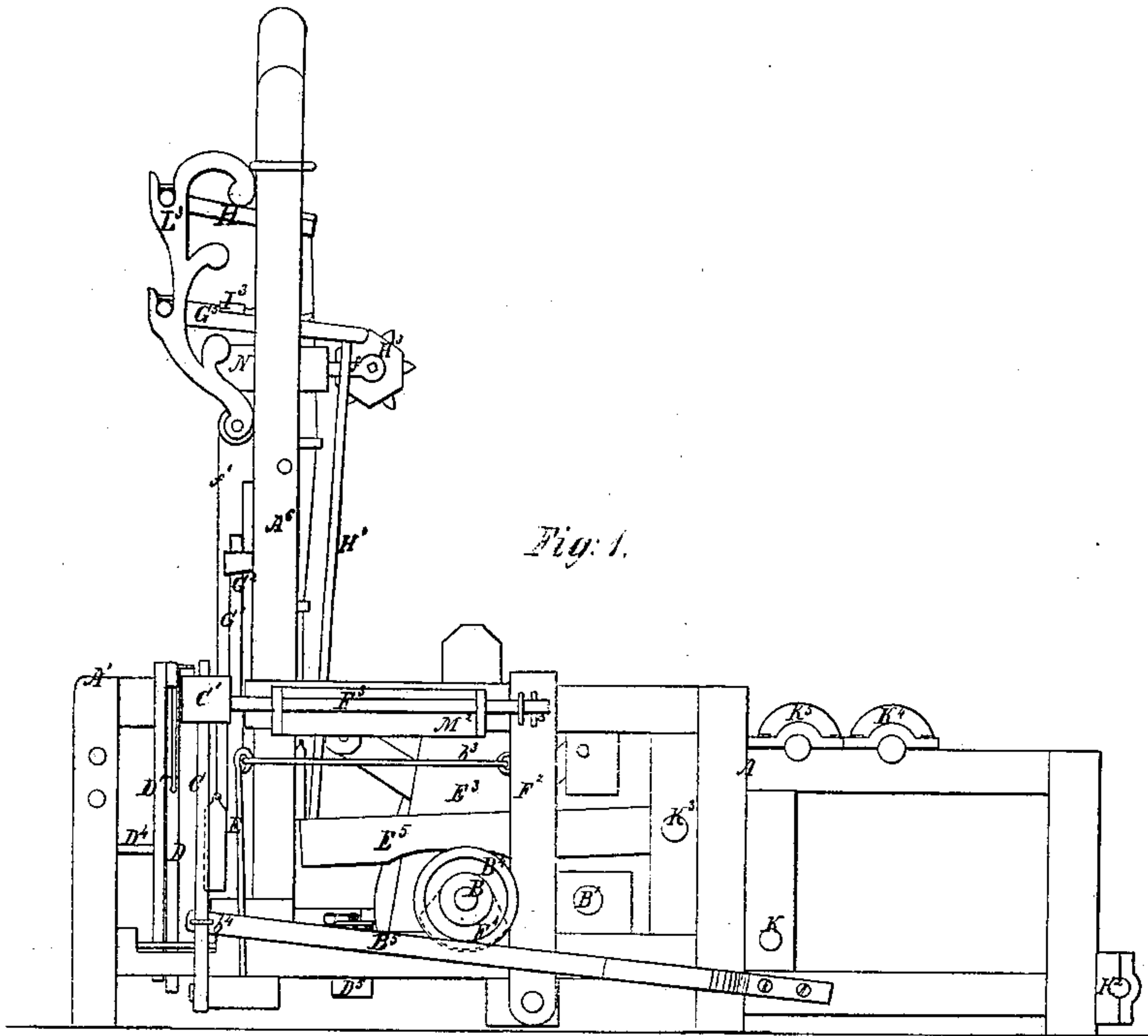


Sheet 1. 2 Sheets.

*J. Goulding.*  
*Weaving Pile Fabrics.*

*N<sup>o</sup> 2171.*

*Patented Aug. 3, 1852.*



J. Goulding.  
Weaving Pile Fabrics.

N<sup>o</sup> 9,171.

Patented Aug. 3, 1852.

Fig. 4.

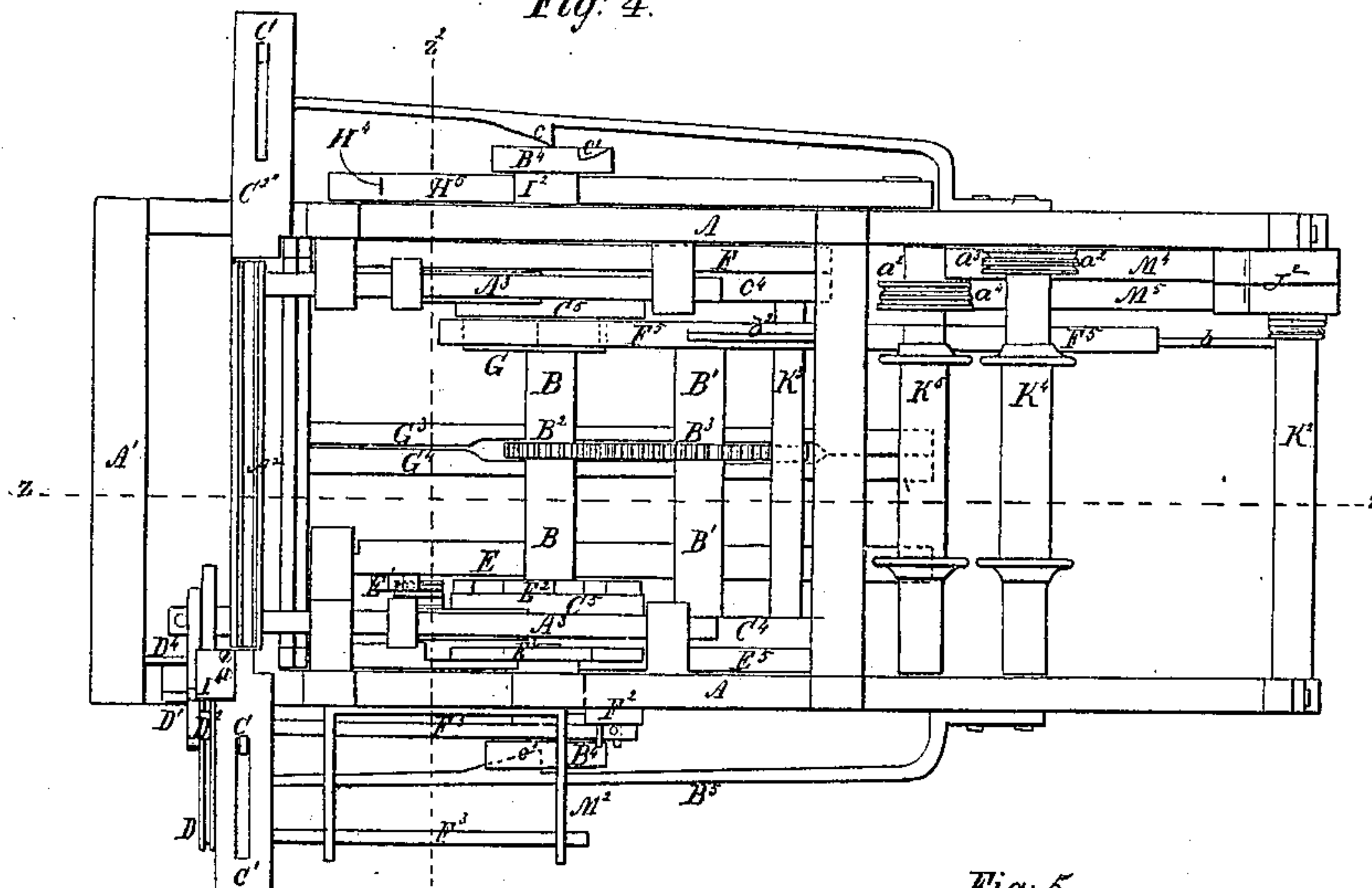


Fig. 5.

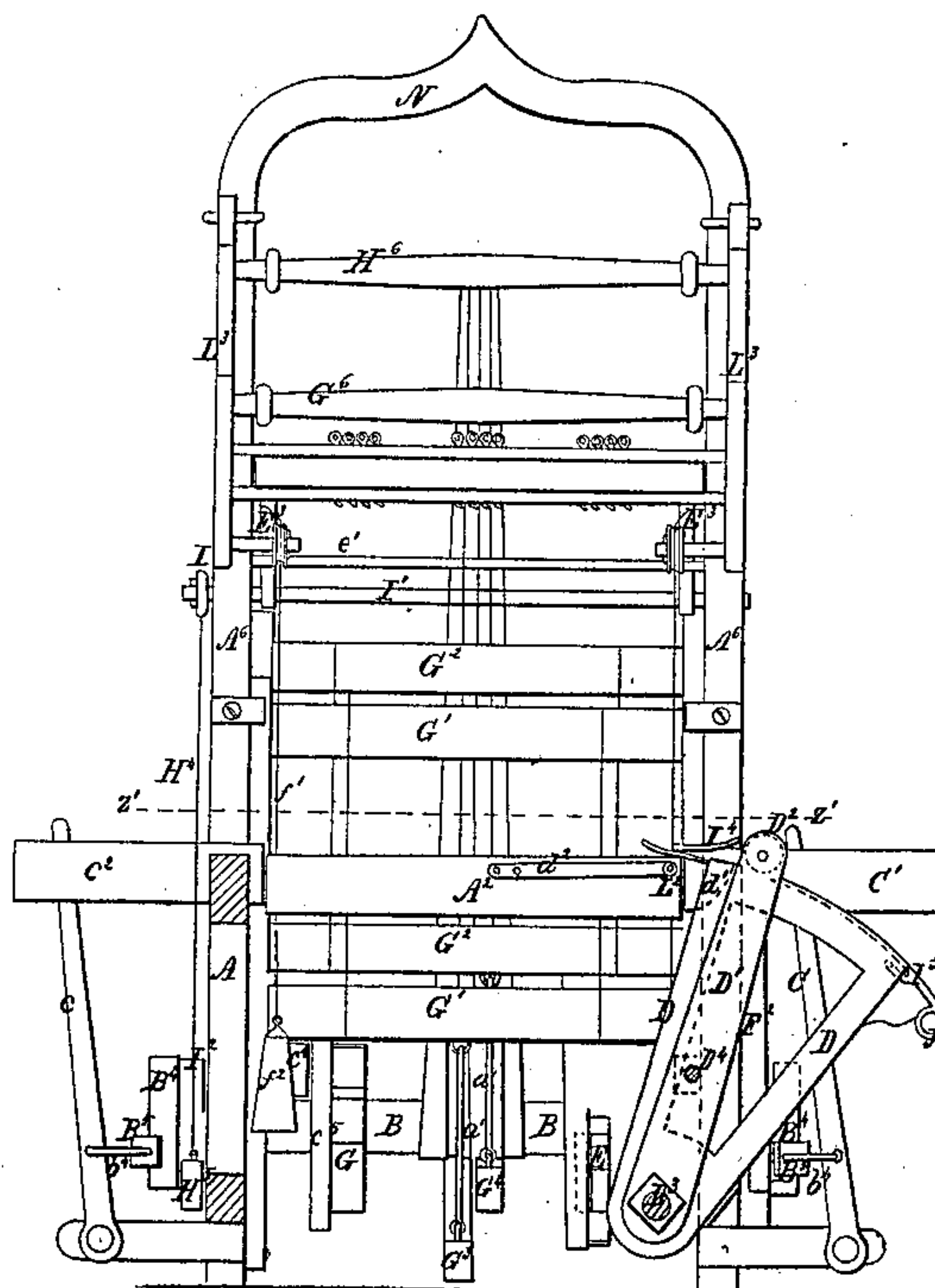


Fig. 7.

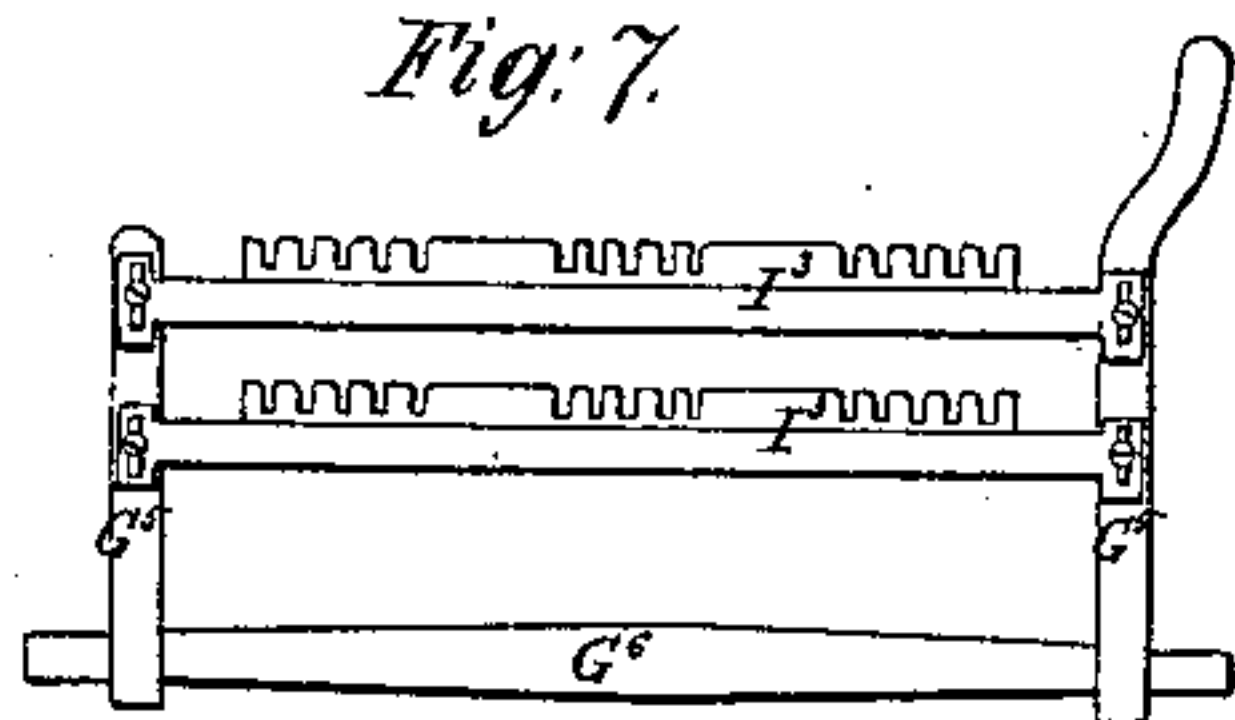


Fig. 6.

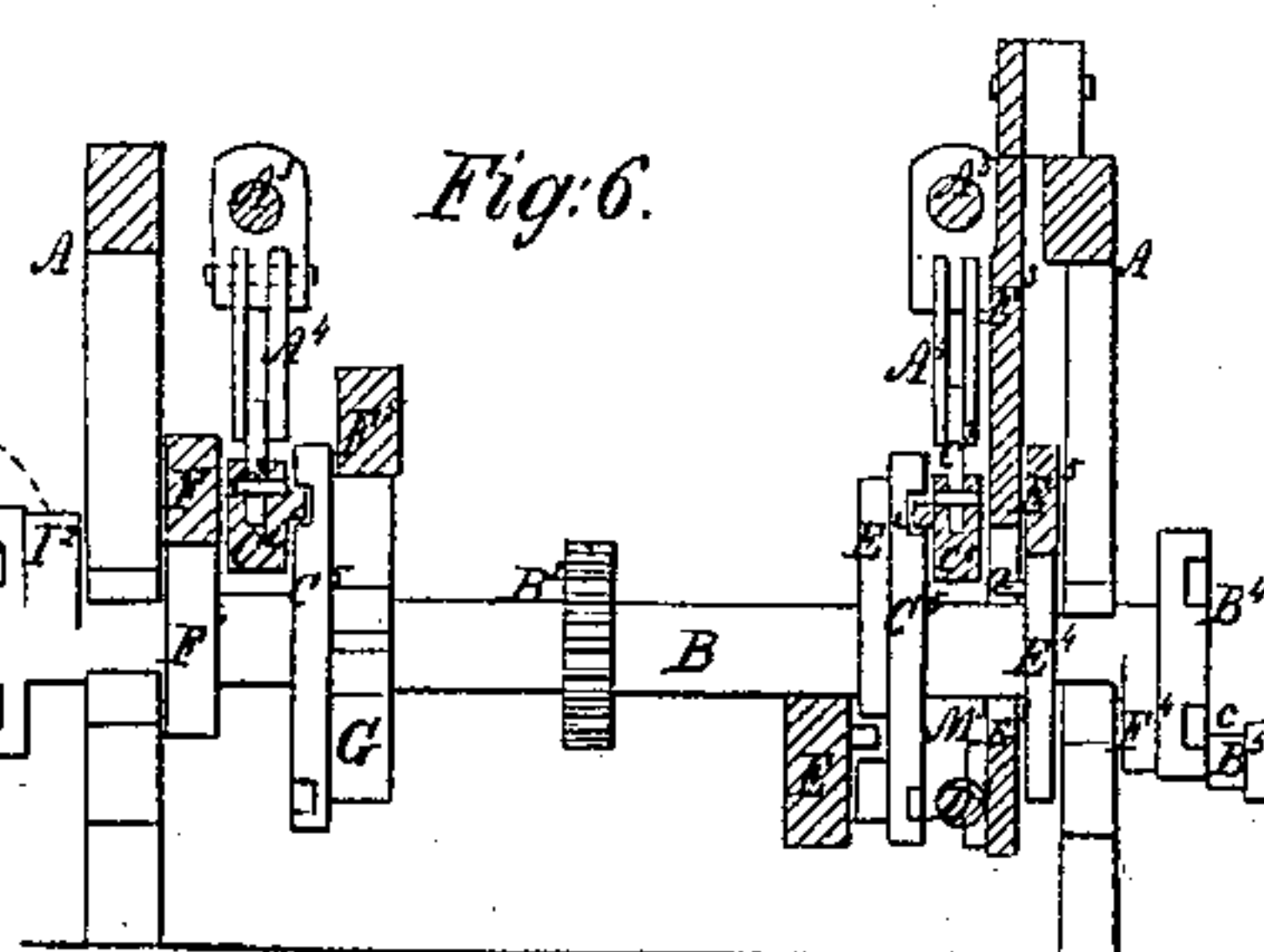


Fig. 11.

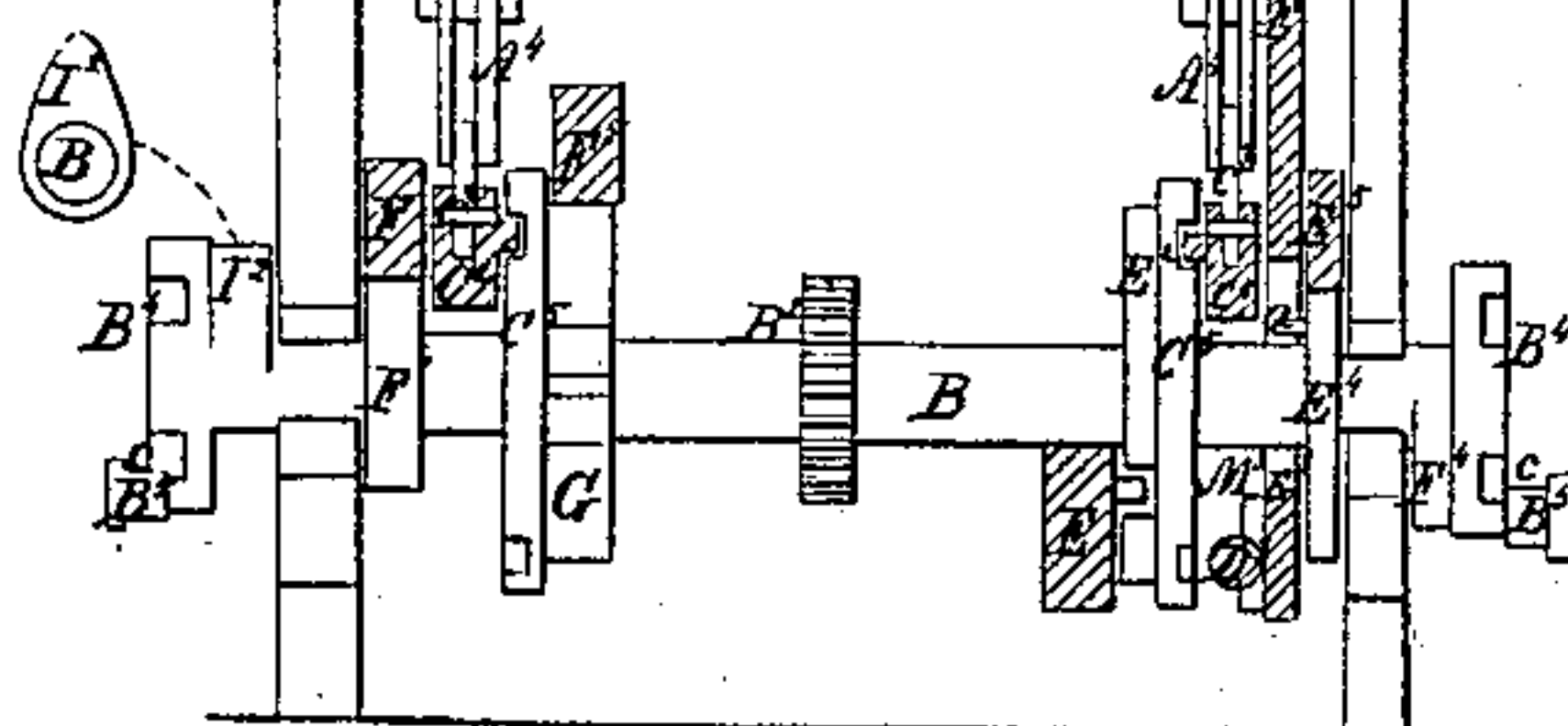


Fig. 10.

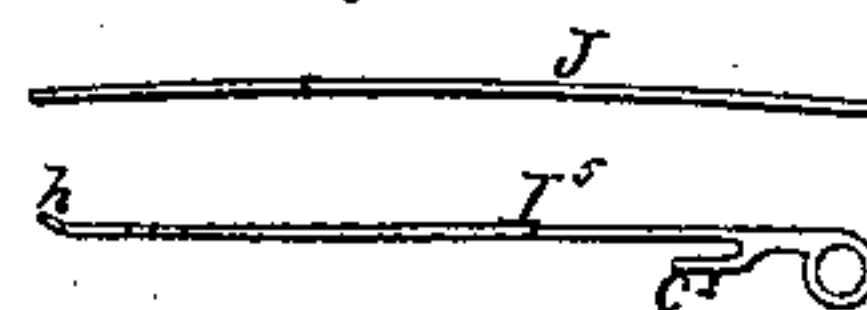


Fig. 8.

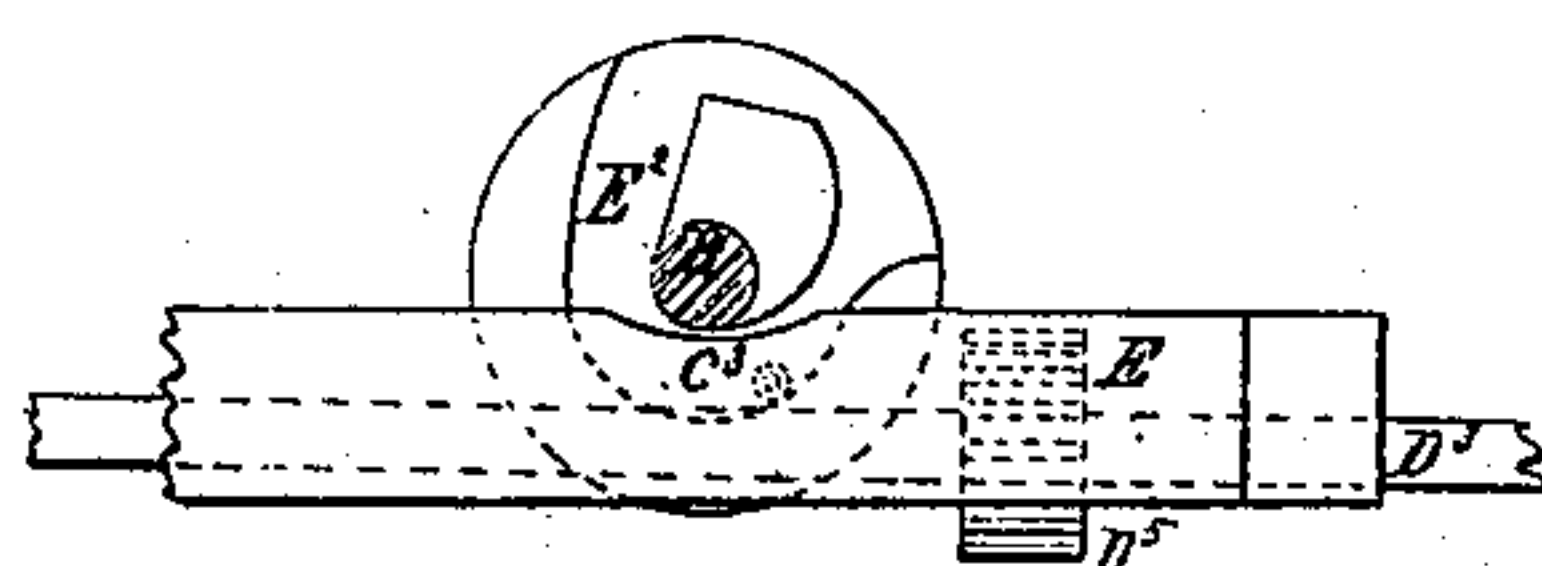
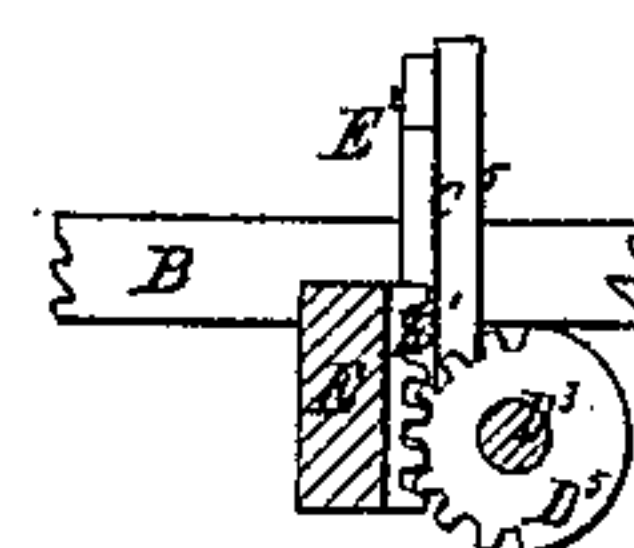


Fig. 9.





# UNITED STATES PATENT OFFICE.

JOHN GOULDING, OF WORCESTER, MASSACHUSETTS.

## JACQUARD LOOM.

Specification of Letters Patent No. 9,171, dated August 3, 1852.

*To all whom it may concern:*

Be it known that I, JOHN GOULDING, of the city and county of Worcester, in the State of Massachusetts, have made certain  
5 new and useful Improvements in Looms for Weaving Piled and other Fabrics; and I do hereby declare that the same is described and represented in the following specification and accompanying drawings.  
10 The nature of my invention consists in devices which operate the trap and knot boards in such a manner that the second row of heddles or harness rises and falls so much farther than the first, and the third  
15 than the second, and so on through the entire series of heddles or harness that as the warp is sprung the threads in the same shed from each row of heddles, whether front, middle or back, and whether sprung in the top or  
20 bottom shed, will all lie in the same plane; also in, inserting and drawing the pile wires by a vibrating quadrant with a groove in it into which the wire is pressed by a roller as it is inserted and drawn; which quadrant  
25 moves forward after it inserts a wire to the wire that is to be drawn, draws the wire and moves back again and inserts it; also in locking the beams which contain the warp just before the lay strikes the cloth so as to  
30 hold the warp firmly to insure a uniform quantity of weft from end to end of the fabric; and releasing the beams just after the lay leaves the cloth so that the heddles may spring the warps freely, and then locking  
35 the beams again before the lay strikes the cloth.

To enable others skilled in the art of weaving to make and use my improvements I will proceed to describe the construction  
40 and operation of a loom with my improvements, referring to the above mentioned drawings in which the same letters indicate like parts in all the figures.

Figure 1, is an elevation of the right side.  
45 Fig. 2, is a sectional view showing the parts at the left of the line Z, Z Fig. 4. Fig. 3, is a section of the lathe motion and wire drawing apparatus. Fig. 4, is a top view of the loom omitting the parts represented above  
50 the line Z', Z' Fig. 5. Fig. 5, is a front elevation. Fig. 6, is a section through the line Z<sup>2</sup>, Z<sup>2</sup> in Fig. 4; except the cams on the end of the main shaft which are cut through the center. Fig. 7, is a top view of lower trap-

board, arms and shaft. Fig. 8, is a side 55 elevation of a section of the cam, lever and segment that draw the wires. Fig. 9, is a front elevation of a section of the same. Fig. 10, is a representation of the wires over which the pile is formed. 60

A is the frame, constructed in some respects like those in common use, with a breast beam A' and with top and bottom girts, to the latter of which the boxes for the main shaft B are fastened in which it turns being 65 operated by a gear to be applied to some part of the shaft. The lay A<sup>2</sup> is fastened to two traverse rods A<sup>3</sup> which support it and traverse in stands fastened to the top girts and is vibrated by the toggle joints consisting of the arms A<sup>4</sup> and A<sup>5</sup>, the former of which is connected to one of the stands above mentioned, and the latter is connected to the traverse rod and to the treadle or lever C<sup>4</sup> by the link C<sup>3</sup>. This lever C<sup>4</sup> has a pin 75 in it projecting into the grooved cam C<sup>5</sup> on the main shaft B which cam vibrates the lever operating the toggles which traverse the lay. The gear B<sup>2</sup> fastened to the shaft B drives the gear B<sup>3</sup> fastened to a second 80 shaft B' which shaft turns in boxes fastened to the bottom girts. There is a groove in each side of the gear B<sup>3</sup> which forms the cams that vibrate the treadles G<sup>3</sup> and G<sup>4</sup>, there being a stud from each treadle projecting into the groove with a friction roller 85  $\alpha$  upon it which is acted upon by the groove so as to give the treadles G<sup>3</sup> and G<sup>4</sup> a positive motion in each direction which they communicate to the heddle frames G' G<sup>2</sup> for 90 the ground warp by stiff links  $\alpha'$  connected to said frames and treadles, the back end of the treadles being supported by the shaft K which rests in boxes fastened to the middle posts of the side frame. 95

The beams K<sup>4</sup> and K<sup>5</sup> are to contain the ground warp, one shed on each beam, the pivots of said beams turning in boxes upon the top girts just back of the middle posts as shown in the drawing. There is a friction pulley  $\alpha^2$  fastened to each beam surrounded by the chains  $\alpha^3$  and  $\alpha^4$ , one end of each chain being fastened to the levers M<sup>4</sup> and M<sup>5</sup> respectively, vibrating on the shaft K, and each having a weight on the other 105 end. These levers may be weighted in the usual manner sufficiently to hold the warps at a proper tension and they are locked by



the rack  $J^2$  formed of catches and fastened to the rock shaft  $K^2$  which rests in boxes fastened to the back posts and is operated by the arm  $b$  fastened into it and connected by a link  $b'$  to the lever  $F^5$  which vibrates on the cross shaft  $K^3$  when acted upon by the three-leaved cam  $G$  which is fastened to the cam  $C^5$  so as to throw the rack  $J^2$  forward to catch the levers just before the lay strikes the cloth so as to hold the warps firmly until the weft is driven home; and as the lay leaves the cloth the spring  $b^2$ , fastened to the middle cross girt, vibrates the lever  $L$  and throws back the rack  $J^2$  releasing the lever  $F^5$  so as to allow the heddles to spring the sheds and draw the warp from the beams. When the warp is drawn from the beam  $K^4$  by the springing of the shed it raises the lever  $M^4$  and lowers the weight  $M^6$  until the lever and weight come together and the lever lifts the weight loosening the chain  $a^2$  so as to let the pulley slip and allow the beam to turn and deliver the warp and as the sheds close and slacks the warp a weight upon the outer end of the lever  $M^4$  depresses it so that the weight  $M^6$  swings clear and the rack  $J^2$  comes up and catches the lever and locks the beam while the lay strikes up a wire or the weft as before mentioned, the chain passing around the pulley a sufficient number of times and the weight attached to it being heavy enough to retain the beam unless the lever is raised so as to lift the weight and loosens the chain allowing the pulley to be turned as described.

There are two posts  $A^6$  fastened into the top girts which extend up a proper height to support the card cylinder, needle frame, trap and knot-boards etc. which posts are connected at the top by a bracket  $N$  and have the stands  $L^3$  fastened to them, these stands supporting the trap and knot boards; lever-shafts  $H^6$  and  $G^6$  directly over that edge of the woven fabric (or nearly so) where the warp joins the cloth.

The upper or knot-board  $M$  is fastened to the arms  $H$  from the shaft  $H^6$  and is supported by the rod  $H^2$  placed between the arm or lever  $H$  and the lever  $F$  which vibrates upon the shaft  $K^3$  being operated by the cam  $F'$  (shown in dotted lines Fig. 2) upon the shaft  $B$  so as to raise the knot-board with the heddles and all the pile warp. The twine is tied to the heddles and taken up through two guide boards  $e$  and  $e'$  and the eye of the needle  $e^2$  and a knot tied in it to catch upon the teeth of the comb  $I^3$ ,  $I^3$  of the trap board; then through the holes in the knot board where a knot is tied to retain the eye of the heddle at a proper height. The trap board is formed of combs or their equivalents fastened to the arms or lever  $G^5$  of the shaft  $G^6$  and are supported by the rod  $H'$  placed between one of the arms and the lever  $E^5$ , which lever vibrates

upon the shaft  $K^3$  and is operated by the cam  $E^4$  on the shaft  $B$ , so as to raise the trapboard as required and take up the heddles of the figuring warp when the twine is carried in between the teeth of the combs by the needles  $e^2$  operated by a card cylinder  $H^3$  or by such other device as will answer the purpose. This card cylinder (which is represented in the drawing) may be constructed and operated in the usual manner or in such other manner as will effect the purpose intended. The cam  $I^2$  on the shaft  $B$  outside of the frame vibrates the lever  $H^5$  upon the end of the shaft  $K$  which lever draws down the lever  $I$  by the chain  $H^4$  which connects them. The lever  $I$  is fastened to the end of the rock shaft  $I'$  which has the arms  $e^3$  fastened to it which vibrate the traverse rods  $f$  supporting the card cylinder  $H^3$ , so as to force the cylinder out by the action of the cam  $I^2$  upon the lever  $H^5$ , the cylinder being drawn forward by the cords  $f'$  fastened to the arms, which cords pass over pulleys and are fastened to the weights  $f^2$ . The needles  $e^2$  are in the common form and are operated by the cards upon the cylinder  $H^3$  and traverse in the needle frame  $N'$  constructed in the usual manner.

It will be obvious that as the trap and knot-boards are fastened to and vibrate with the levers  $H$  and  $G^5$ , which levers have their fulcrum over the edge of the cloth in order that the second row of heddles or harness will rise and fall so much farther than the first, and the third than the second, and so on through the entire series of heddles or harness, so that as the warp is sprung, the threads in the same shed, from each row of heddles, whether front, middle or back, or whether they are sprung in the top or bottom shed, will all lie in the same plane. If the heddle cords are spread in the trap-board and contracted in the harness board, the trap board levers must be lengthened and the fulcrum must be moved forward over the cloth proportionally as they are lengthened so as to adjust the same properly.

The weights are hung to the heddles in the usual manner and may be made of No. 2 wire and about fifteen inches long for weaving Brussels carpet.

I make my shuttle boxes  $C'$ ,  $C^2$  in the usual form (or in such other form as will answer the purpose) and fasten the left hand box  $C^2$  to the top girt as the lay vibrates independently of the shuttle boxes: the right hand shuttle box  $C'$ , is supported by two rods  $F^3$ ,  $F^3$  which traverse in the stand  $M^2$  fastened to the top girt. This shuttle box is moved back by the lever  $F^2$  connected to one of the rods which lever vibrates on a stud in a stand fastened to the bottom girt and is operated by a wiper  $F^4$  (shown in dotted lines) fastened to the back



side of the shuttle cam  $B^4$  upon the end of the shaft B, so as to move the shuttle box back at the proper time to allow the apparatus that inserts the wires to take its place and insert a wire and then move out of the way to allow the spring  $L'$  (which is fastened to the stand of the picker shaft and connected to the lever  $F^2$  by the link  $b^3$ ) to move the shuttle box forward to its place again.

The picker staves C, C vibrate on studs in stands fastened to the bottom girts and are operated by the picker springs  $B^5$  fastened to the bottom girt and connected by the strap  $b^4$  to the staves. These springs  $B^5$ , are pressed out by the cams  $B^4$  on the end of the shaft B which cams act against the inclined planes  $c$  fastened to the springs so as to force the springs out and hold them until the notches  $c'$  in the cams pass the ends of the inclined planes  $c$  and allow the springs to draw the picker staves suddenly in to throw the shuttle.

The quadrant D inserts and draws the pile wires (one of which is represented upon it at  $I^5$ ) the end of the wire being bent as represented and brazed so as to form an eye  $J'$  and a hook  $c^2$  on it and the end  $h$  being turned up to prevent its catching under the threads in the lower shed;  $J$  is a top view and  $I^5$  an elevation. The quadrant D is fastened to the shaft  $D^3$  which turns and traverses in stands fastened to the bottom girt. The shaft  $D^3$  is turned to vibrate the quadrant and operate the wires by the segment gear  $D^5$  fastened to said shaft and acted upon by the rack  $E'$  upon the lever E which vibrates upon the shaft  $k$  being operated by the roller  $c^3$  on a pin which projects from said lever into the grooved cam  $E^2$  fastened to the shaft B. The shaft  $D^3$  is traversed by the lever  $E^3$  which has an oblong hole in it through which the shaft B passes and vibrates upon a stud in a stand fastened to the top girt, being operated by the pin  $a^5$  which projects from the cam  $E^4$  on the shaft B into the oblong hole acting against its sides so as to traverse the shaft  $D^3$  by the rib  $M^3$  upon the lever, which rib projects into a score  $d$  in the shaft so as to move it forward to draw a wire by the hook catching in the hole in the quadrant as shown by the dotted line: the quadrant is then moved by the rack on the lever acting on the segment so as to draw the wire which is held in the groove of the quadrant by the roller  $D^2$  turning on a stud in the lever  $D'$ : this lever is supported by the end of the shaft  $D^3$  (turning freely in it but being carried with it when it traverses) and is held in the required position by the stud  $D^4$  which projects from it so as to pass the side of the front post being held against it by a bracket. The wire having been

drawn by the quadrant D, the rib  $M^3$  upon the lever  $E^3$  moves the shaft and quadrant back (the shuttle box  $C'$  having been moved out of the way as already described) so that as the quadrant is moved or turned the other way by the lever, rack, and segment it pushes the wire forward, the wire being guided into the shed or opening between the pile and ground warps by the guide  $I^4$  fastened to the shuttle box: when the wire has been carried in, a proper distance, the projection  $L^2$  on the spring  $d^2$ , in the lay, which has been held in by the quadrant, is forced out into the eye  $J'$  of the wire so as to stop it and draw the hook out of the quadrant as it is carried over. The quadrant is now carried forward by the same fixtures that carried it back so as to be ready to draw the wire nearest to the breast beam at the proper time; there being about twenty wires in the pile at the same time. The quadrant having moved forward the lay drives up the wire (as I dispense with the race board in weaving piled fabrics, the front of the lay being nearly even with the face of the reed) the projection  $L^2$  on the spring  $d^2$  remaining in the eye of the wire to prevent it from turning until it is held by the warp in a proper position for the quadrant to catch and draw it: the shuttle box now returns to its place and the sheds are sprung and a proper number of threads of weft is woven to bind the pile: the quadrant then draws another wire and moves back and inserts it under the pile warp as has been described, the edge of the quadrant being beveled at  $d'$  so as to press in the projection  $L^2$  on the spring and hold it until the eye of the wire comes over it when it springs out into the eye and stops it as above described. The fabric woven (represented in dotted line at  $d^3$ ) is drawn over the breast beam by passing under the cloth roller  $J^3$  and around the same and around and over the roller upon the top of  $J^3$ , then falls down upon the floor as it is allowed to do in many carpet looms in common use. The roller  $J^3$  may be operated by some of the devices in common use for such purposes so as to give it a positive motion to take up the woven fabric as required. These rollers should be geared together and the top one pressed against the other by weights or springs.

The knot and trap boards may be suitably counterbalanced.

What I claim as my invention and desire to secure by Letters Patent is—

1. Connecting the knot and trap boards with, and operating them by levers arranged substantially as herein described so that the second row of heddles or harness shall fall and rise so much farther than the first and the third than the second and so on through the entire series of heddles or harness, that



as the warp is sprung the thread, in the same shed from each row of heddles, whether front, middle or back, and whether sprung in the top or bottom shall all lie substantially in the same plane.

2. The apparatus which inserts and draws the wires to form the pile, constructed and operated substantially as described.

3. The devices for locking and unlocking

the beam or beams containing the warp 10 substantially as described.

In testimony whereof, I have hereunto signed my name before two subscribing witnesses.

JOHN GOULDING.

Witnesses:

WM. DENNIS,

I. DENNIS, Jr.