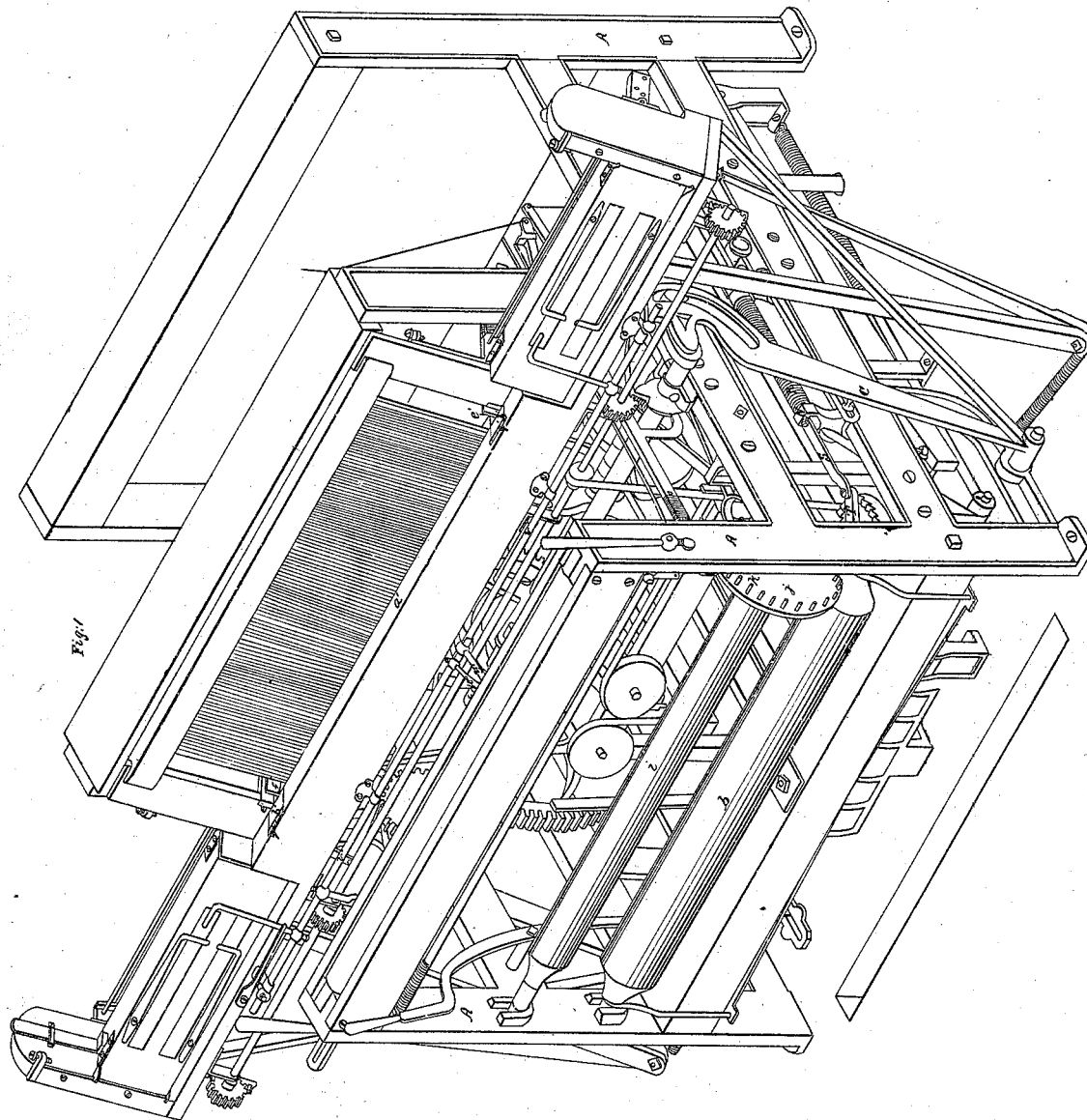


*E. B. Bigelow.*  
*Loom.*

*Sheet 1 of 2 Sheets.*

*N<sup>o</sup> 2,639.*

*Patented May 26, 1842*

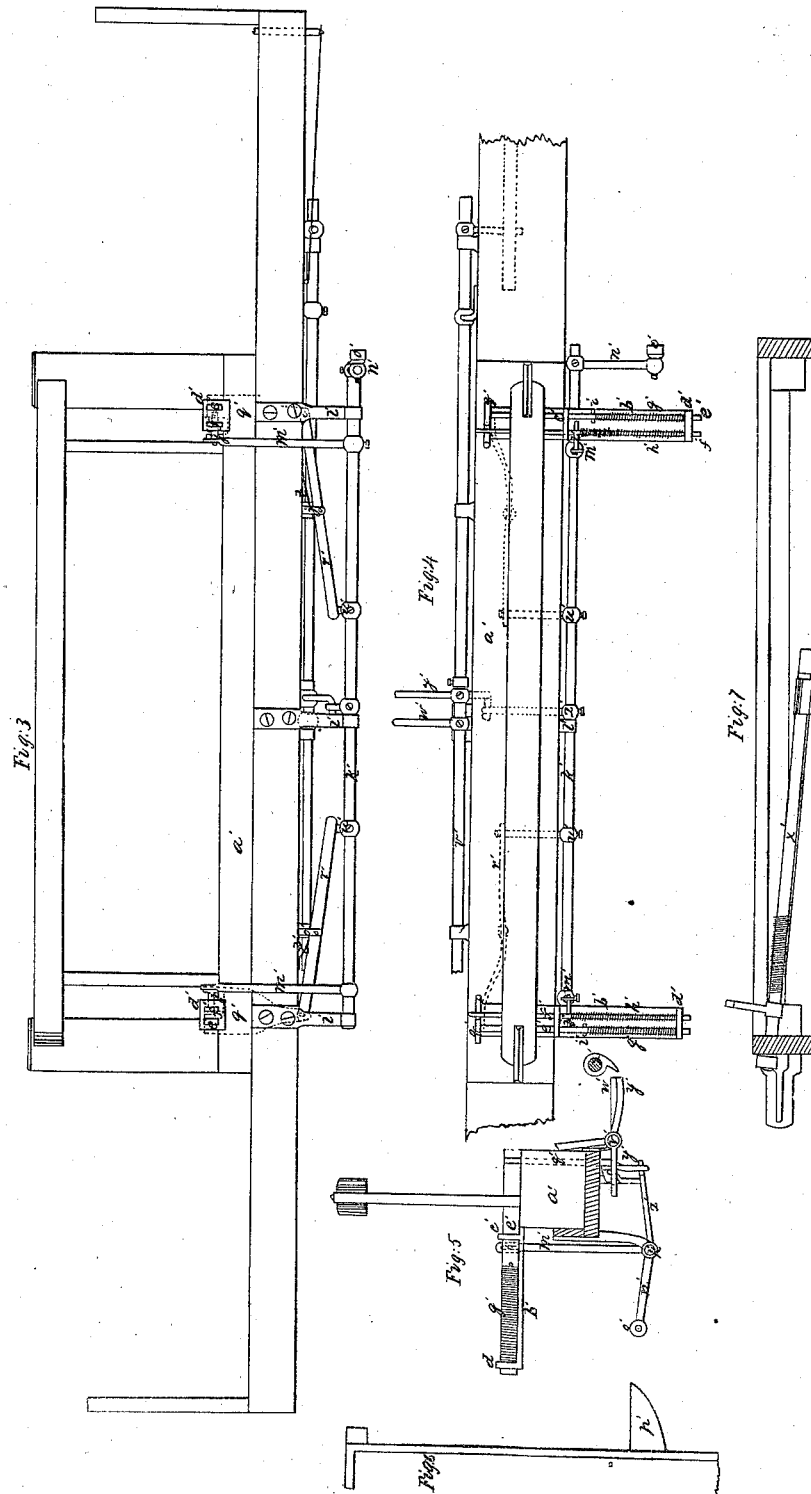


# E. B. Bigelow. Loom.

Sheet 2-2 Sheets.

N<sup>o</sup> 2,639.

Patented May 26, 1842.



# UNITED STATES PATENT OFFICE.

ERASTUS B. BIGELOW, OF LANCASTER, MASSACHUSETTS.

## MANNER OF CONSTRUCTING LOOMS FOR WEAVING CARPETS AND OTHER SIMILARLY WROUGHT FABRICS.

Specification of Letters Patent No. 2,639, dated May 26, 1842; Antedated May 1, 1842.

*To all whom it may concern:*

Be it known that I, ERASTUS B. BIGELOW, of Lancaster, in the county of Worcester and State of Massachusetts, have invented certain improvements in the manner of constructing looms for the weaving of carpets, and of other similarly wrought fabrics; and I do hereby declare that the following is a full and exact description thereof.

10 These improvements consist mainly in the following particulars: First, in the mode of, or apparatus for, delivering out the chain or warp, and of taking up the finished cloth, which are effected in such a manner as to cause a given number of threads of the woof or filling to form a given length of cloth, and insure the accurate matching of the figure or pattern; secondly, in a new and improved apparatus for giving a uniform tension to each thread of filling or woof, for the purpose of producing a smooth face on the cloth, and a distinct outline to the figure; thirdly, in a new mode of arranging and applying the apparatus for throwing the loom out of gear when the filling or woof breaks or is exhausted on the bobbin in the shuttle.

In the accompanying drawings, Figure 1, is a perspective view of the loom. Fig. 2, is an end view thereof, with certain parts detached to show more clearly the apparatus for delivering out the chain or warp and of taking up the finished cloth. Fig. 3, is a front view of the race beam of the lathe, and the apparatus used to give tension to the woof or filling. Fig. 4, is a top view thereof. Fig. 5, is an end view of the same, shown in the relative position it sustains in the loom to that part of the main frame, which is shown in Fig. 6. Fig. 7, is a view of the rotating shaft, on which the bayonet of the protecting rod acts to throw the loom out of gear.

These improvements may be applied, and I intend to apply them to various kinds of looms in which the mode of gearing, mounting, and throwing the shuttles may be varied according to the kind of goods to be wrought. They are represented in the accompanying drawings as applied to looms in which the mode of gearing and of stopping the loom are similar to those described in the specification of my patents for an improved mode of gearing, and of stopping the loom, &c., dated on the 1st day of May

1842; and the mode of mounting the loom the same as that described in the specification of my patent for improvements in looms for weaving carpets and other similarly wrought fabrics, dated also the 1st day of May 1842; and the mode of working the shuttle boxes and shuttles, the same as that described in the specification of my patent for improvements in looms for weaving counterpanes, &c., dated April 24, 1840.

By a reference to the specifications of the several patents referred to the respective parts of the loom aforesaid will be found described in detail. Therefore it is not necessary to repeat a description of them in this specification.

I will now proceed to describe the improvements, which are, first, the apparatus for delivering out the chain or warp, and of taking up the finished cloth, which are effected in such a manner as to cause a given number of threads of woof or filling, to form a given length of cloth, and insure the accurate matching of the figure or pattern.

A, A, see Fig. 2, is the end frame of the loom; B, the floor of the mill upon which it rests. C, is one of the swords to the lathe which is made to give motion to the machinery employed to deliver out the chain or warp, and take up the cloth. D, is the yarn beam, the axis of which turn in the hangers E, which are bolted to the floor B. F, is a cogged wheel affixed to the yarn beam D, and actuated by the endless screw or worm G. The worm G, is affixed to a vertical shaft H, which turns in suitable bearings, and has the contrate ratchet wheel I, affixed to its upper end. J, is a vibrating lever, which vibrates on the upper end of the vertical shaft H, as its fulcrum. On one end of the vibrating lever J the pawl or click K plies, which pawl actuates the contrate ratchet wheel I; to the other end of said vibrating lever a bar L, is attached, which connects it with the sliding bar M. The sliding bar M, slides in the stands N, N, which are bolted to the frame A. O, is a stud or arm affixed to the sliding bar M; and to the end of O, which projects outward from the loom, one end of the rod P, is attached, the other end of said rod being made hooked and playing in a groove in the stud Q, projecting from the sword C. The sliding bar M, is encircled by the

spiral spring R, one end of which rests against one of the stands N, N', and the other end against the stud or arm O. When the sword of the lathe C, moves forward to beat up the cloth, the rod P, draws the sliding bar M forward and when the lathe recedes from the face of the cloth, the spring R, forces the sliding bar M back until the arm O strikes against the stand N', which determines the degree of motion given to the sliding bar M. The bar S connects the sliding bar M, to one end of the vibrating lever T, which turns on the upper end of the vertical shaft U, as its fulcrum. On the other end of said vibrating lever T, the click V plies, which actuates a contrate ratchet wheel W, affixed to the shaft U. To the lower end of the shaft U, the endless screw or worm X, is affixed, which actuates the cogged wheel Y affixed to the axis of the cloth roller Z. The cloth roller Z, is supported by the hangers a, which are bolted to the floor of the mill B.

A vibrating or tension roller b, is allowed to vibrate up and down in suitable guides on the inside of the frame A. c, is a hook hanging on a groove in the end of the vibrating or tension roller b, there being a similar hook at its opposite end. The lower ends of the hooks c, c, are connected to a spring d, and adjusted by the means of nuts and screws to increase or diminish the action of the spring d, on the vibrating or tension roller b, according to the tension required to be given to the warp. The lever e, which is represented in the drawings by dotted lines, is a regulating lever, and it turns on a fulcrum f. One end of the regulating lever e, is connected to the click K by the cord or wire g, and the other end is connected to the vibrating or tension roller b, by the bar, h. When the vibrating or tension roller b, is depressed to a certain position, it raises the click K, through the intermedium of the bar L, the regulating lever e, and the cord g, and cuts off its action on the contrate ratchet wheel I; and when said vibrating or tension roller is raised, the click K is depressed to renew its action on the ratchet I. The roller i, which is shown in part by the dotted lines in the drawing, is called the measuring roller; it extends across the loom and turns in suitable bearings in the frame A, A. To the axis of the measuring roller i, the wheel j, is affixed, which has wire pins k, k, rising perpendicularly from its face. The wire pins k, k, are about  $\frac{1}{4}$  of an inch in length, and are placed at a greater or less distance apart, according to the greater or less diameter of the measuring roller i, or the number of threads of woof or filling required to be put in an inch of the cloth. A second regulating level l, l, which is shown in part by dotted lines in the drawings, has a slot through it in which a stud plies, which projects in-

ward from the stand m, said stud supporting the lower end of said second regulating lever in such a manner as to allow it to vibrate thereon, and at the same time have a reciprocating motion endwise. The long arm of the regulating lever l, is guided by the stand n, shown in the drawings by dotted lines, and is connected to the click V by the cord o; p, is a spiral spring encircling the lever l, one end of which spring rests against the stud projecting from the stand m, and the other end against a pin in the lever l. q, is a stud extending from the cam r, on the main shaft s, of the loom. And as said shaft s, revolves, the stud q acts on the beveled part of the lower end of the regulating lever l, and forces it back; and when said stud relieves its action on said lever, the spiral spring p, forces it forward again until the end of the slot strikes against the stud projecting from the stand m, which limits its motion.

The yarn passes from the yarn beam D, up over the top back girth, through the harness and reed, over the roller t, thence down under the vibrating or tension roller b, up over the regulating roller i, thence down, and is wound up on the cloth roller z, shown by the red lines. The operation of this apparatus is such as to cause the cloth roller z, to wind up a given length of cloth, every given number of threads of woof or filling introduced, and to cause the yarn beam D to deliver out a sufficient length of warp to form the cloth taken up by said cloth roller z.

The operation of the machinery for taking up the cloth is as follows: When the lathe vibrates to beat up the cloth, the click V, acts on the contrate ratchet wheel W, and turns the cloth roller z. But as the cloth roller z, is increased in diameter by every layer of cloth wound on it, it is evident that there will be no regularity in the quantity of cloth taken up without regulating the action of the click V, on the ratchet wheel W. This is effected as follows: The cloth, as it is taken up by the cloth roller z, turns the measuring roller i, and causes one of the pins k, k, to raise the long arm of the regulating lever l, which by means of the cord or wire o raises the click V, and cuts off its action on the ratchet wheel W, and leaves the cloth roller z, at rest until the stud q draws back the lever l, from its action on the pins k, k, and allows the long arm of said lever l, to fall down until it is arrested by the guide n, in a position to enter the next space between the pins k, k, and cause the click V, to renew its action on the ratchet W.

Suppose it be required to weave cloth with twenty four picks to the inch, and that the stud q, acts on the lever l, every fourth thread of woof or filling introduced; and suppose the circumference of the measuring

roller *i*, to be four inches, the number of the pins *k*, *k*, in the wheel *j*, should be thirty. The relative proportion of the cloth roller *z*, cogged wheel *y*, and contrate ratchet wheel *W*, should be such as to take up about one fourth more cloth than is produced by the operation of the loom, provided the click *V*, acted on the ratchet *W*, continually.

The mode of regulating the delivery of the warps from the yarn beam *D*, is as follows: Suppose the vibrating or tension roller *b*, depressed to the position to raise the click *K*, and cut off its action on the contrate ratchet wheel *I*, so as to leave the yarn beam *D*, at rest. Now as the cloth is taken up by the cloth roller *z*, the vibrating or tension roller *b*, will be raised and thereby bring the click *K* to renew its action on the ratchet *I*, and deliver out a new portion of warp, and in case too much warp is being delivered out, the tension roller *b*, sinks and raises the click *K* as before.

Although in the above description of the measuring roller *i*, and its appendages, it has been spoken of, and represented in the drawings, as employed to regulate the action of the machinery employed to take up the cloth, it is not intended to confine the use of it to this purpose alone, as it will answer equally well, and I intend to apply it, to regulate the action of the machinery employed to turn the yarn beam, and to deliver out the chain of warp.

The second improvement to be described is, the mode of giving a uniform tension to each thread of woof or filling for the purpose of producing a smooth face to the cloth and a distinct outline to the figure. This, and the third improvements are principally represented in the perspective view Fig. 1, and in those of the details, from Figs. 3 to 7, the same letters of reference designating corresponding parts in each of these figures.

*a'* is the race beam to the lathe. *b'*, *b'*, are standards, one end of each of which is embedded into and screwed to the top side of the race beam *a'*, and the other ends project backward from the race beam *a'*, as seen in Figs. 4 and 5. From the upper side of the standard *b'*, *b'*, the projections *c'*, and *d'*, extend; *e'* and *f'* are bars which slide horizontally through the projections *c'* and *d'*, the under sides of the front ends of which are made to run close to the top sides of the standards *b'*, *b'*. *g'* and *h'* are spiral springs which encircle the bars *e'* and *f'*, one end of each of which springs rests against the projections *d'*, *d'*, and the other ends against the studs or pins *i'* and *j'*. *k'*, is a shaft which has a vibrating motion in the standards *l'*, *l'*, which are screwed to the back side of the race beam *a'*. *m'* *m'* are arms which extend from the upper side of the shaft *k'*, and have slots in their upper ends which ply on the inner ends of the studs

*j'*, *j'*. *n'*, is in arm which extends backward from the shaft *k'*, and has a stud projecting from its outer end on which the roller *o'* revolves. *p'* is standard or cam bolted to the end frame of the loom, as shown in Fig. 6. When the lathe falls backward to allow the shuttle to pass, the roller *o'* strikes against the under side of the cam *p'*, and turns the shaft *k'* a short distance on its axis, and the shaft *k'* through the medium of the arms *m'*, *m'*, acting on their respective studs *j'*, *j'*, forces back the bars *f'*, *f'*. When the bars *f'*, *f'*, are moved as aforesaid, the studs *j'*, *j'*, strike against their respective studs *i'*, *i'*, and force back the bars *e'* *e'* at the same time. Now when the lathe is moved forward to beat up the cloth, and the roller *o'*, leaves the standard or cam *p'*, the spiral springs *g'*, *g'* and *h'* *h'* again force their respective bars *e'* and *f'* forward.

Having described the movement of the bars *e'* *e'* and *f'* *f'*, I will now proceed to describe the apparatus which coöperates with them, and the manner in which they act on the woof or filling to produce the desired effect.

*q'* *q'* are flat bars or pieces of iron having a notch or slot in their upper ends, and otherwise shaped as shown in Fig. 3. These bars *q'* *q'* are made to slide up and down freely in mortises made in the race beam *a'*, as represented in Fig. 4. *r'*, *r'*, are levers which vibrate in the fulcrum stands *s'*, *s'*, which are screwed to the under side of the race beam *a'*. The outer ends of the levers *r'* *r'* are jointed to the lower ends of their respective bars *q'* *q'*, so that, when said levers are vibrated, they cause the bars *q'* *q'* to move up and down. *t'* *t'* are springs, one end of each of which is screwed to the under side of the race beam *a'* and the other acts on the inner arms of its respective lever *r'*, in such a manner as to raise the bar *q'* *q'*. *u'* *u'* are arms which extend forward from the shaft *k'*, and when the shaft *k'* is turned by the action of the roller *o'* on the cam *p'*, as aforesaid, the arms *u'* *u'* act on the inner arms of their respective levers *r'* *r'*, and depress the bars *q'* *q'*.

The operation of this apparatus, and its action on the filling or woof are as follows: Suppose the loom to be in that stage of its operation in which the lathe is receding from the face of the cloth, and the shuttle about to be thrown; the roller *o'* strikes against the under side of the cam *p'*, and through the medium of the arm *n'* causes the shaft *k'* to turn a suitable distance, which shaft *k'*, through the agency of the arms *m'* *m'* force back the bars *f'* *f'*, which bars by means of the studs *j'*, *j'*, striking against their respective studs *i'* *i'* carry back with them their respective bars *e'* *e'* until the front ends of both the bars *f'* *f'* and *e'* *e'* are fully back to the face of the reed.

The motion of the shaft  $k'$  simultaneously with the action on the bars  $e' e'$  and  $f' f'$  as aforesaid, also acts, through the medium of the arms  $u', u'$ , and levers  $r' r'$  on their respective bars  $q' q'$ , and depresses them until their upper ends are on, or below, a level with the top side of the race beam  $a'$ . This position of the apparatus allows the shuttle to pass unobstructed, and while the apparatus is in this position the shuttle is thrown across the loom, and the thread of filling or woof which said shuttle carries, lies between the reed and the bars  $q' q'$ . Now as the lathe moves forward to beat up the cloth, the roller  $o'$  leaves the cam  $p'$  which allows the spring  $t' t'$  to raise the bars  $q' q'$ , and the spiral springs  $g' g'$  and  $h' h'$  to force forward their respective bars  $e' e'$  and  $f' f'$ ; and as the bars  $e' e'$  and  $f' f'$  move forward, the forward ends thereof carry the thread of filling or woof along with them until the bars  $e' e'$  strike against the side of their respective bars  $q' q'$ , and hold the filling as between the jaws of a pair of pliers, and while the thread is thus secured and prevented from drawing out from the shuttle, the bars  $f' f'$  enter the notches or slots in the upper ends of the bars  $q' q'$ , as shown in Fig. 4, and give a tension to the filling in proportion to the force of the springs  $h' h'$ , which may be adjusted so as to give the proper tension required. Then as the lathe recedes from the face of the cloth, the roller  $o'$  acts on the cam  $p'$ , and puts the apparatus in the position to allow the shuttles to pass as before.

The third improvement to be described is, the mode of applying the apparatus for throwing the loom out of gear when the filling or woof breaks or is exhausted on the bobbin in the shuttle.

$v'$ , is the protecting rod, to which the bayonet  $w'$  is affixed. The protecting rod  $v'$  is attached to the lathe, and the bayonet  $w'$  acts on the rotating shaft  $x'$  (see Fig. 7,) and throws the loom out of gear in the same manner as described in the specification of my patents for an improved mode of gearing and of stopping the loom, &c., dated on the first day of May in the year one thousand eight hundred and forty two.  $y'$  is a vibrating lever which vibrates loosely on the protecting rod  $v'$ . The straight arm of the vibrating lever  $y'$  is made a little heavier than the bent arm, so that when left to itself, the straight arm descends until the bent arm strikes against the under side of the race beam  $a'$  which arrests it in a position to pass freely by the rotating shaft  $x'$  without acting upon it. But when the bent arm of the vibrating lever  $y'$  is depressed, it raises the straight arm to a position to act on the rotating shaft  $x'$  and throw the loom out of gear, in the same manner as the bayonet  $w'$  does when the shuttle fails to enter the

box.  $z'$  is an arm which extends forward from the shaft  $k'$  and passes over the bent end of the vibrating lever  $y'$ , and acts thereon when the woof or filling breaks or is exhausted on the bobbin.

The operation of this apparatus is as follows: When the bars  $e' e'$  grasp the thread of woof or filling and the bars  $f' f'$  enter the slots in the bars  $q' q'$  to give tension to the woof or filling, as above described, the bars  $f' f'$  are prevented from moving forward beyond a certain distance by the woof or filling. When said woof or filling is working in a proper manner, and no action is produced by the arm  $z'$  on the lever  $y'$ ; but when the filling breaks, or is exhausted on the bobbin, or is too slack, the bars  $f' f'$ , by the action of the spiral springs  $h' h'$ , pass unobstructed through the slots in the bars  $q' q'$ , and thereby turn the shaft  $k'$  a sufficient distance to cause the arm  $z'$  to raise the straight arm of the vibrating lever  $y'$  to the proper position to act on the rotating shaft  $x'$  and throw the loom out of gear.

*Modifications.*—First, the measuring roller  $i$ , is represented in the drawings, and is described, as being applied to the cloth on the front side of the loom; but it may also be applied to the chain or warp on the back side of the loom, and regulate the action of the apparatus employed to deliver out the chain or warp. Second, instead of grasping the filling or woof between the bars  $e' e'$  and the bars  $q' q'$  and straining or giving tension to it, by the bars  $f' f'$ , as above described, an instrument similar to a pair of pliers may be substituted, which shall grasp the filling between its jaws, and by a lateral movement outward from the selvage of the cloth give the required tension. The lateral movement outward of said pliers should be given by a spring or weight, which spring or weight should exert a force equal to the tension required to be given to the woof or filling. There are various other modes of arranging the apparatus to grasp the woof or filling between the selvage of the cloth and the shuttle, and to give to it the required tension, by means similar, or equivalent to those above described, producing the same effect by means substantially the same.

Having thus fully described my improvements in the manner of constructing the loom for weaving carpets, and other fabrics of a similar character, what I claim as new therein, and desire to secure by Letters Patent is as follows:

1. I claim the application of the measuring roller  $i$ , to the cloth or yarn, for the purpose of regulating the action of the machinery employed to deliver out the chain or warp, or to take up the finished cloth in the manner above described, or under such modifications thereof, as shall produce the same end by similar means.

2. I claim the combination formed by the tension roller *b*, and the measuring roller *i*, coöperating together in the manner and for the purpose herein set forth.

5 3. I claim the mode of giving an uniform tension to each thread of woof or filling as above described; that is to say, I claim the grasping of the thread of woof or filling, at a point between the shuttle and selvage of  
10 the cloth, by the bars *e' e'* and *q' q'*, or by a pair of pliers operating in a similar manner as set forth, together with the mode of giving tension to the filling as above set forth,

or in any other manner, which is substantially the same.

15 4. I claim the manner in which I have connected the shipper and the rotating shaft *x'* with the apparatus employed to give tension to the woof or filling, for the purpose of throwing the loom out of gear when the  
20 woof or filling breaks, or is exhausted on the bobbin.

ERASTUS B. BIGELOW.

Witnesses:

EBENEZER RHOADES,  
BENJN. H. RHOADES.