Sheet 1, 2 Sheets.

E. B. Bigelow.

Take-up Motion.

No. 2741 Patented Jul. 28, 1842.

Fig. 3

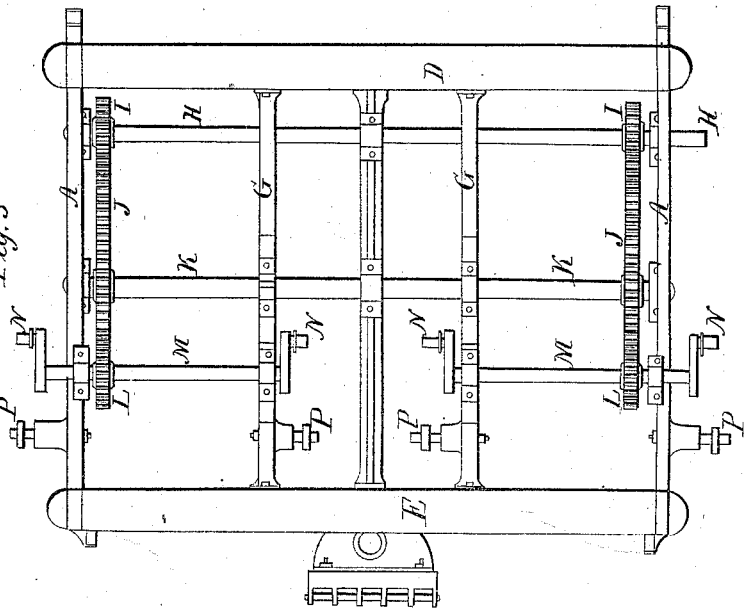


Fig. 2

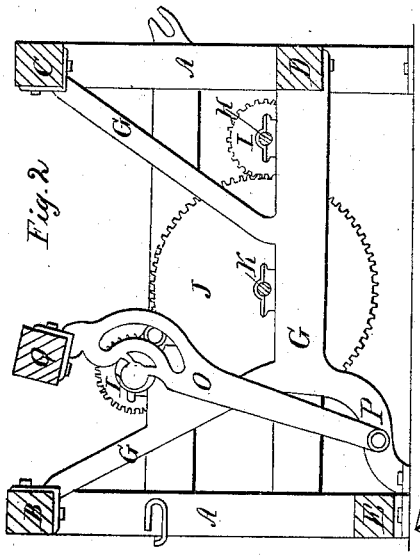
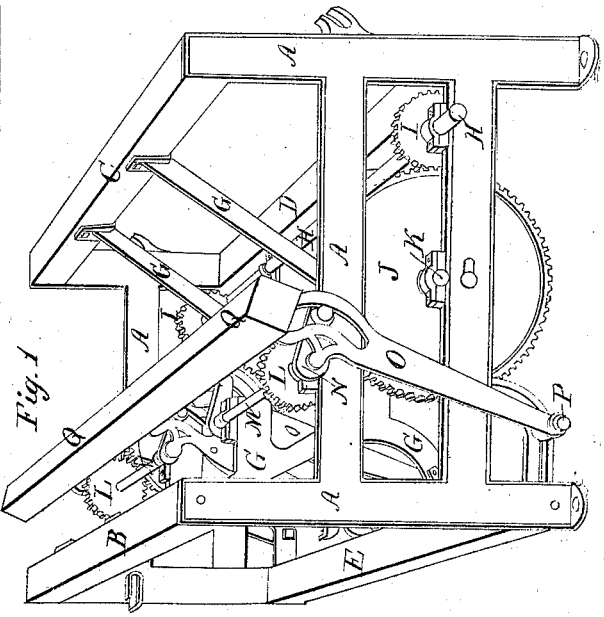


Fig. 1



Sheet 2, 2 Sheets.

E. B. Bigelow.

Take-up Motion.

No. 2,741 Patented Jul. 28, 1842.

Fig. 4

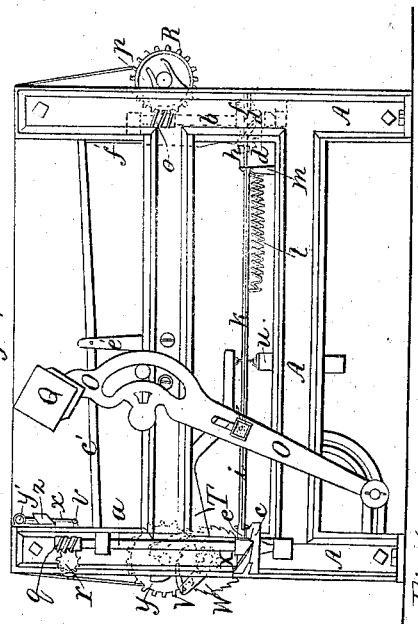


Fig. 6

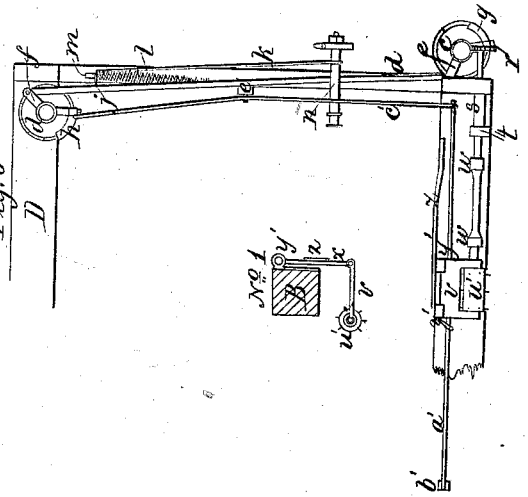
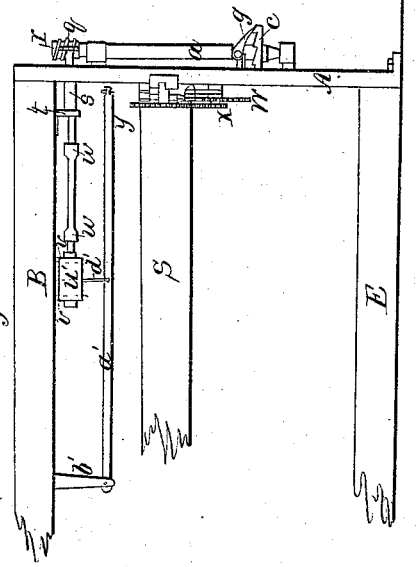


Fig. 5



UNITED STATES PATENT OFFICE.

ERASTUS B. BIGELOW, OF LANCASTER, MASSACHUSETTS.

IMPROVEMENT IN POWER-LOOMS FOR WEAVING COUNTERPANES, &c.

Specification forming part of Letters Patent No. **2,741**, dated July 28, 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 Power-Loom for Weaving Counterpanes and other Figured Goods; and I do hereby declare that the following is a full and exact description thereof.

These improvements in looms consist, first, in the manner of strengthening the lathe, the breast-beam, and the top back girth, in order to weave cloth of great width and thickness, and, secondly, in the manner of delivering out the chain or warp and of taking up the finished cloth, which is effected in such a manner as to cause a given number of threads of filling to form a given length of cloth.

Figure 1 is a perspective view of the parts employed and of the manner of using them to strengthen the lathe, the breast-beam, and the top back girth. Fig. 2 is an end view thereof. Fig. 3 is a plan giving a top view of the gearing and the lathe-cranks, the lathe being removed for the purpose of showing them the more distinctly. Fig. 4 is an end view of the loom, showing the apparatus employed to deliver out the chain or warp and to take up the finished cloth. Fig. 5 is a front view thereof. Fig. 6 is a plan of said apparatus with the breast-beam removed.

In each of these figures where the same parts are shown they are designated by the same letters of reference.

The first improvement to be described is the mode of strengthening the lathe, breast-beam, and top back girth. The breast-beam and top back girth are strengthened by means of cross-braces extending across the loom from the breast-beam to the top back girth at suitable distances from each other and from the ends of the loom. The lathe is strengthened by means of gearing it at both ends of the loom and by employing four swords and four lathe-cranks.

A A is the main frame-work of the loom; B, the breast-beam, and C the top back girth.

D and E are the back and front bottom girths.

G G are the cross-braces used to strengthen the breast-beam B and the back girth C and to support the shafts which operate the loom.

H H is the driving-shaft, which extends along the loom, and has the cog-wheels I I affixed to it, which wheels gear into and drive the cog-wheels J J, affixed to the cam-shaft K. When the cam-shaft K extends across the loom, as shown in Fig. 3, one of the cog-wheels I I may be dispensed with; but in some cases it is convenient to divide the cam-shaft K in the middle, in which case both the wheels I I are required. The cog-wheels J J take into and turn the cog-wheels L L, which are affixed to their respective lathe-shafts M M.

To the shafts M M the cranks N N are affixed.

O O O are the swords of the lathe, which vibrate on their respective studs P P P. In the upper ends of the swords O O O circular slots are formed, in which the rollers on the cranks N N N work in the ordinary way.

Q is the lathe to which the swords O O O are bolted at their upper ends. By this arrangement it is evident that cloths of great width and thickness may be wrought without bending the breast-beam, the top back girth, or the lathe.

The second improvement to be described is the mode of delivering out the chain or warp and of taking up the finished cloth, which is effected in such a manner as to cause a given number of threads of filling to form a given length of cloth. The apparatus by which this is effected is shown in Figs. 4, 5, and 6.

R is the yarn-beam which contains the warp and turns in bearings in the frame A. The warp passes from the yarn-beam R over the top back girth through the harness and reed, thence over the breast-beam B down to and is wound onto the cloth-roller S. The cloth-roller S is turned to wind up the cloth by means of a lever, click, ratchet, and pinion operating in the common way.

T is the lever, which is actuated by a stud extending from one of the swords of the lathe O O, and has the weight U suspended from one end to give tension to the cloth, and to the other end of said lever the click V is attached, which acts on the ratchet-wheel W.

X is a pinion affixed to the ratchet-wheel W, and takes into and turns the cogged wheel Y on the axis of the cloth-roller S.

This apparatus being in common use, its operation is well understood by machinists.

The mode of delivering the chain or warp from the yarn-beam and of regulating its de-

livery therefrom so as to cause a given number of threads of filling to form a given length of cloth is described as follows:

a and *b* are vertical shafts which turn in suitable standards bolted to the frame A. To the lower ends of these shafts the contrate ratchet-wheels *c* and *d* are affixed.

e and *f* are vibrating levers placed above their respective ratchet-wheels *c* and *d* and turning on their respective shafts *a* and *b* as their fulcra.

g and *h* are clicks which vibrate on the arms of their respective vibrating levers *e* and *f*, and act on and turn their respective ratchet-wheels *c* and *d*, as shown most distinctly in Fig. 6. The other arms of the vibrating levers *e* and *f* are connected together by the rod *i*.

j is a stud which projects from the outer side of the rod *i*.

k is a connecting-rod, one end of which is jointed to the outer end of the stud *j*, and the other end is bent in a hooked form and works in a groove in the stud *n*.

l is a spiral spring, one end of which is attached to the rod *i* and the other end to the stand *m*, which is bolted to the frame A. When the lathe moves forward to beat up the cloth, the rod *k* draws the rod *i* forward, which, through the medium of the vibrating levers *e* and *f*, causes the click *g* and *h* to turn their respective ratchet-wheels *c* and *d* to a certain distance. Then when the lathe recedes from the face of the cloth the spiral spring *l* draws back the rod *i* until the stud *j* strikes the stand *m*, which limits its motion. By this arrangement the click *g* is made to turn the ratchet-wheel *c* one tooth every thread of filling introduced, while the click *h* is made to turn the ratchet-wheel *d* one or more teeth, according to the length of warp required to be delivered out. There is a worm or endless screw *o*, affixed to the upper end of the vertical shaft *b*, which takes into and turns the cog-wheel *p* on the axis of the yarn-beam R.

The mode of regulating the action of the click *h* on the ratchet-wheel *d* so as to cause the yarn-beam R to give out the required length of warp is described as follows: A worm or endless screw *q* is affixed to the upper end of the vertical shaft *a* and takes into and turns the cog-wheel *r* on the outer end of the shaft *s*. One end of the shaft *s* turns in the frame A and the other end thereof in the stand *t*, which is screwed to the under side of the breast-beam B. *u'* is a measuring-roller, the axes of which turn in the frame *v*. The periphery of the measuring-roller *u'* is armed with sharp metallic points to prevent its slipping on the cloth. The measuring-roller *u'* is connected to the shaft *s* by means of coupling-joints *w w*, which are so adjusted as to cause the shafts *s* to turn the measuring-roller *u'* and at the same time to allow the said measuring-roller *u'* to vibrate vertically or horizontally. The frame *v* is connected by means of a joint-pin to the vertical frame *x*, which vibrates in the stands *y' y'* and is suspended therefrom, as shown distinctly in No. 1, Fig. 6. *r* is a spring which acts on the vertical frame *x* and forces the measuring-roller *u'* against the cloth. *a'* is a lever, one end of which vibrates in the stud *b'* and the other end thereof is connected to the regulating-lever *c'*. The lever *a'* is connected to the frame *v* by the rod *d'*, so that when the frame *v* is raised it raises the lever *a'*. The regulating-lever *c'* vibrates on the fulcrum *e'*, and the arm at the back side of the loom is connected to the click *h* by the cord or wire *f'*.

The operation of this apparatus is as follows: I have already said that the cloth is wound on the cloth-roller S by means of the lever T, the click V, the ratchet-wheel W, and the pinion X, which co-operate in such a manner as to wind up the cloth as fast as the delivery of the warps from the yarn-beam R allow it to pass from the loom. Now, suppose that the click *h* were allowed to act on the ratchet-wheel *d* every vibration of the vibrating lever *f*, it is evident that the length of the warp delivered from the yarn-beam R during the introduction of a given number of picks of filling would vary in proportion to the variation in the diameter of the yarn-beam, which is continually diminishing as the warps are delivered out. To obviate this difficulty and regulate the action of the click *h* on the ratchet-wheel *d*, the measuring-roller *u'* is employed, which is made to turn on its axis in such a degree as to cause the periphery thereof to pass through a given space every thread of filling introduced—that is to say, the periphery of said measuring-roller *u'* is made to pass over as much space every thread of filling introduced as said thread of filling is to occupy in the cloth. Now it will be evident that when the measuring-roller *u'* is turned on its axis, as aforesaid, the metallic points on its periphery will cause it to climb up on the cloth and raise the frame *v*, which, by means of the rod *d'*, the lever *a'*, the regulating-lever *c'*, and the cord or wire *f'*, will depress the click *h* and allow it to act on the ratchet-wheel *d* and turn the yarn-beam R. Then in case too much warp is being delivered out, the measuring-roller *u'* descends with the cloth as it is wound on the cloth-roller S, raises the click *h*, and cuts off its action on the ratchet-wheel *d*. Thus it is evident that a given number of threads of filling will form a length of cloth equal to the space passed over by the periphery of the measuring-roller *u'*. Therefore the number of picks of filling to an inch in the cloth may be varied at pleasure either by varying the diameter of the measuring-roller *u'* or the number of teeth in the cog-wheel *r* or in the ratchet-wheel *c*.

The following modifications may be made in the manner of constructing this apparatus: First, instead of a single measuring-roller with metallic points on its periphery, two roll-

ers may be used, which may be so arranged in a vibrating frame as to press toward each other with the cloth between them, and these may climb up on said cloth when turned in the same manner and accomplish the same end as the single roller above described; secondly, the measuring roller or rollers may be applied to act on the yarn or warp instead of on the cloth; thirdly, the measuring roller or rollers may be so arranged as to operate by forming a suitable connection therewith to regulate the action of the machinery employed to wind up the finished cloth, as well as to regulate the action of the machinery employed to deliver out the warp. These, together with similar modifications of the machine, may be made without changing the principle on which it operates, the action being substantially the same with that herein described.

Having thus fully described the improvements in the power-loom, it is to be understood that I do not claim the employment of a measuring-roller or of measuring-rollers operating upon the principle or in the manner of that herein described and marked *u'*, for the purpose of regulating the action of the machinery used to deliver out the chain or warp, or to regulate the operation of that employed to take up the finished cloth; but

I do claim—

1. The manner herein described of constructing and arranging the apparatus by which the measuring-roller is connected with such machinery, whether employed to deliver out the chain or warp or to take up the finished cloth, and these I claim whether the apparatus used for attaining the end in view be made precisely in the form and manner herein set forth or in any form which is substantially the same in its construction and operation.

2. The herein-described improvements in the manner of strengthening the lathe, the breast-beam, and the top back girth in order to weave cloth of great width and thickness, the manner in which I have constructed and arranged the parts for effecting this object being the introduction of one, two, or more intermediate cross-frames and one, two, or more intermediate and additional swords, which are, as I believe, altogether new and essential in the weaving of broad and heavy goods.

ERASTUS B. BIGELOW.

Witnesses:
EBENEZER RHOADES,
BENJN. H. RHOADES.