104687

Wm. Aspinall's Improved Loom.

PLATE, I.

PATENTED JUN. 28 1870.

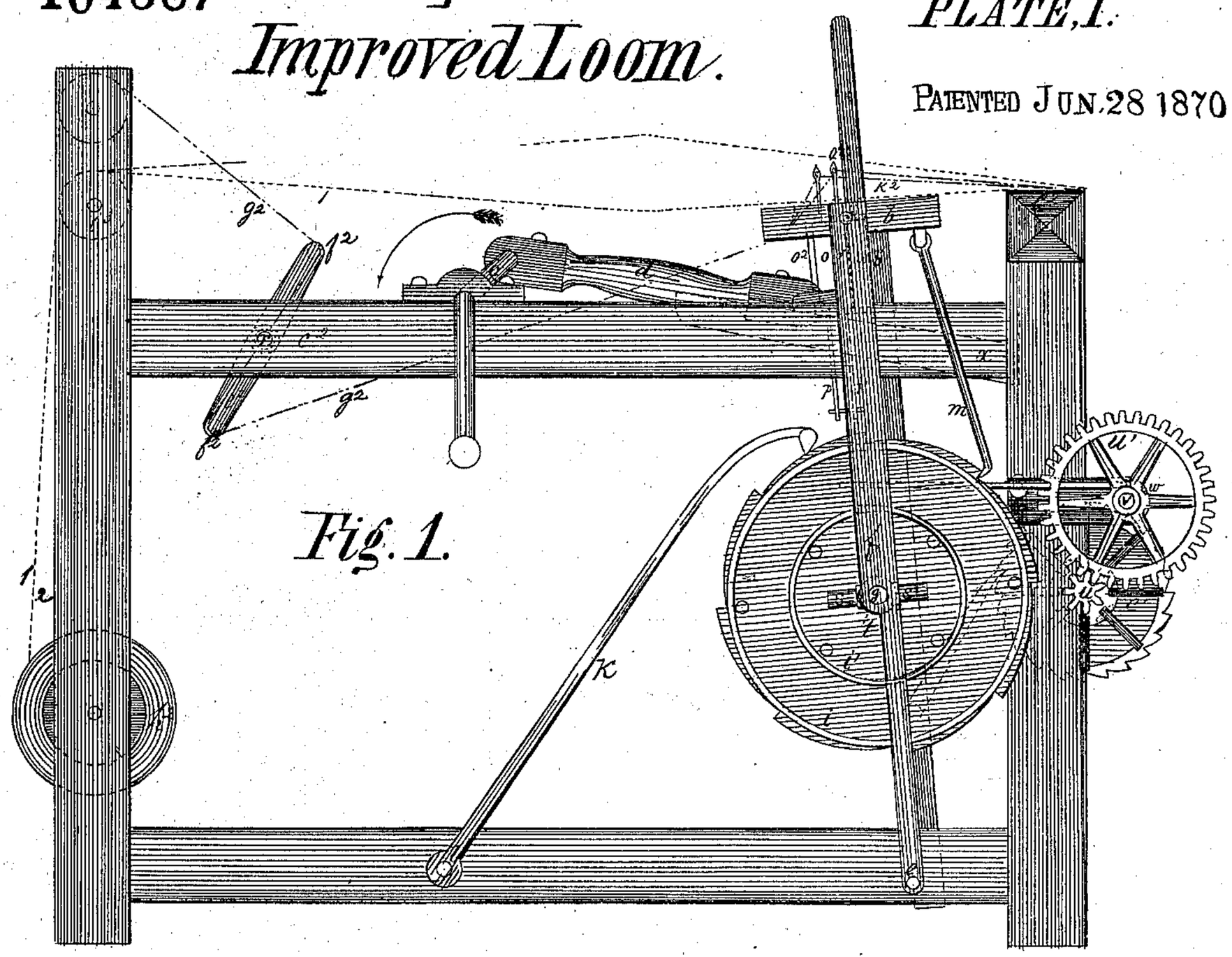


Fig. 1.

Fig. 2.

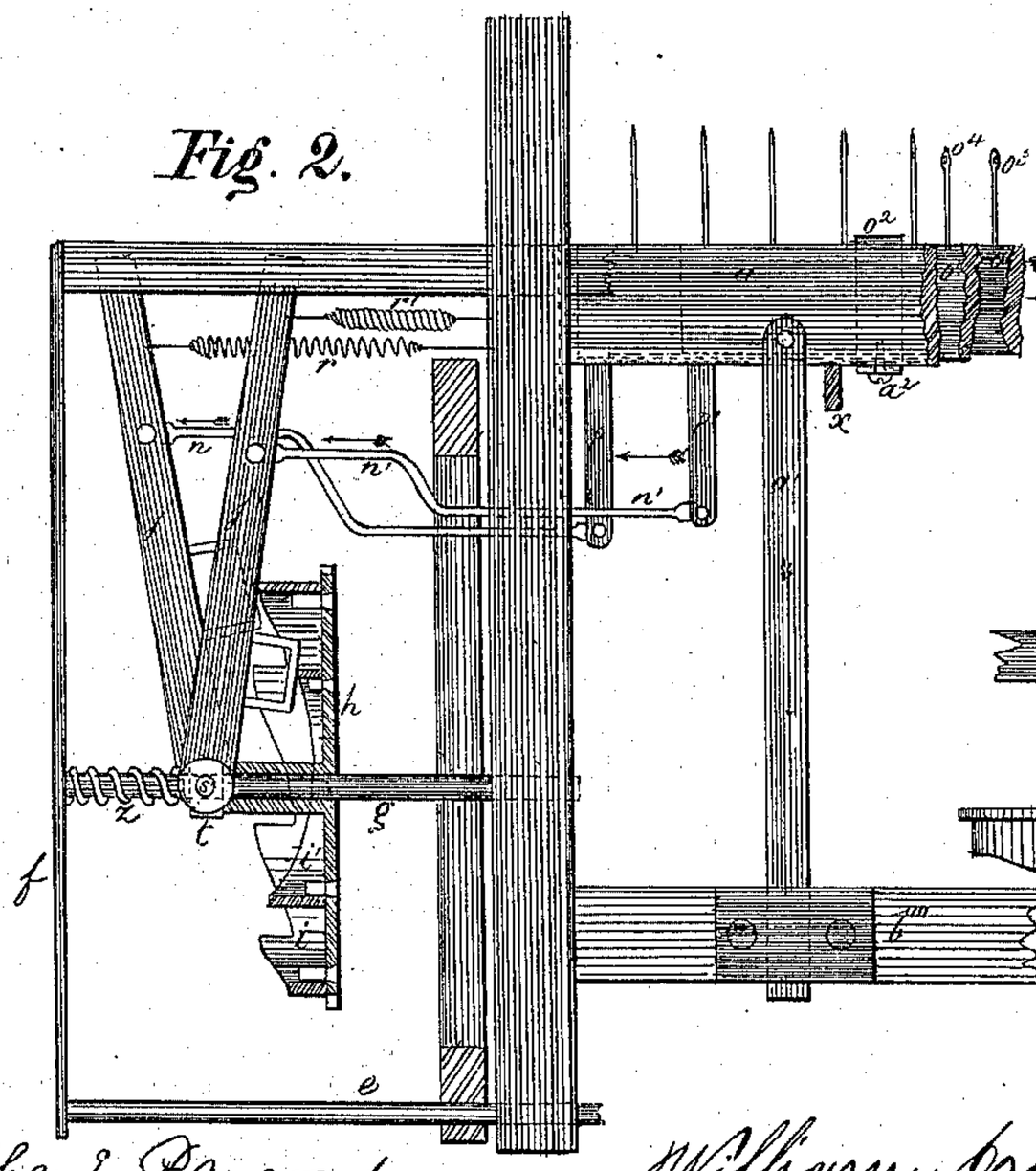
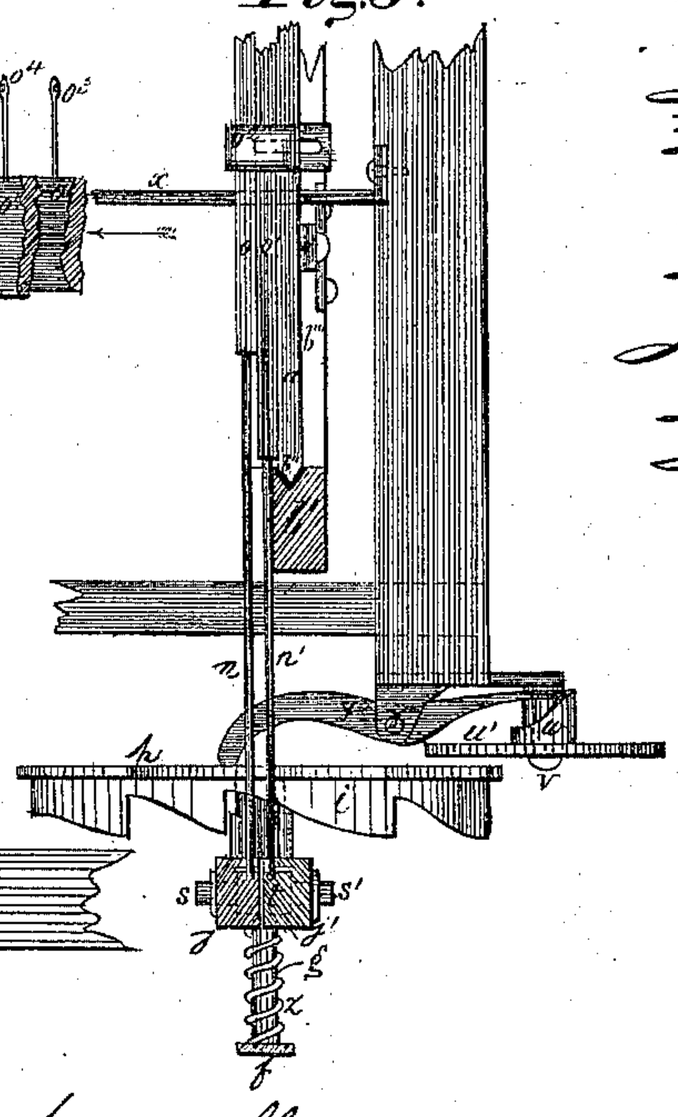


Fig. 3.



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Wm. Aspinall's Improved Loom.

PLATE II.

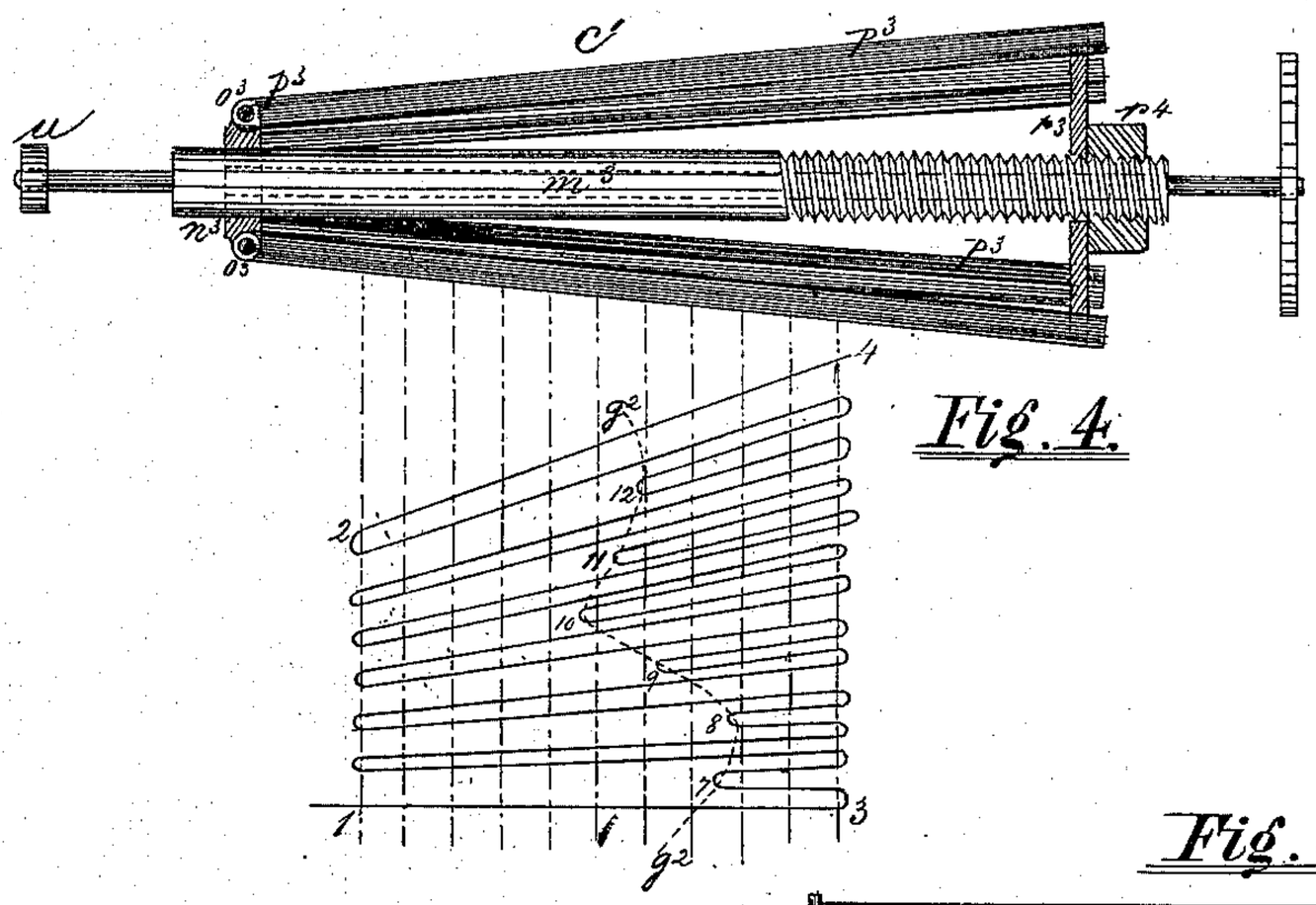


Fig. 4.

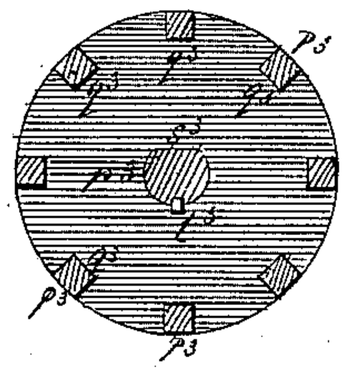
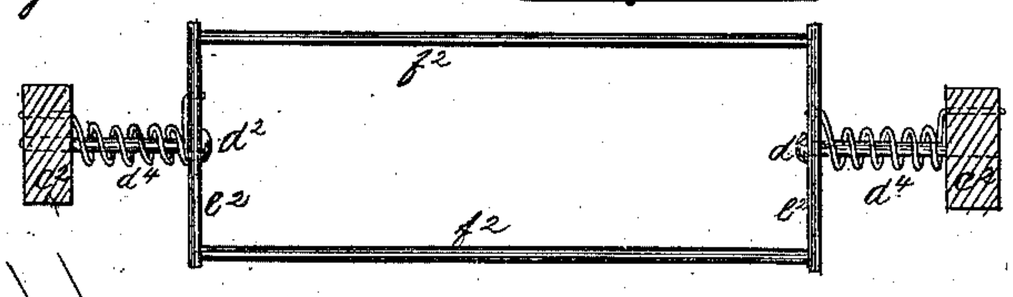


Fig. 5.

Fig. 6.



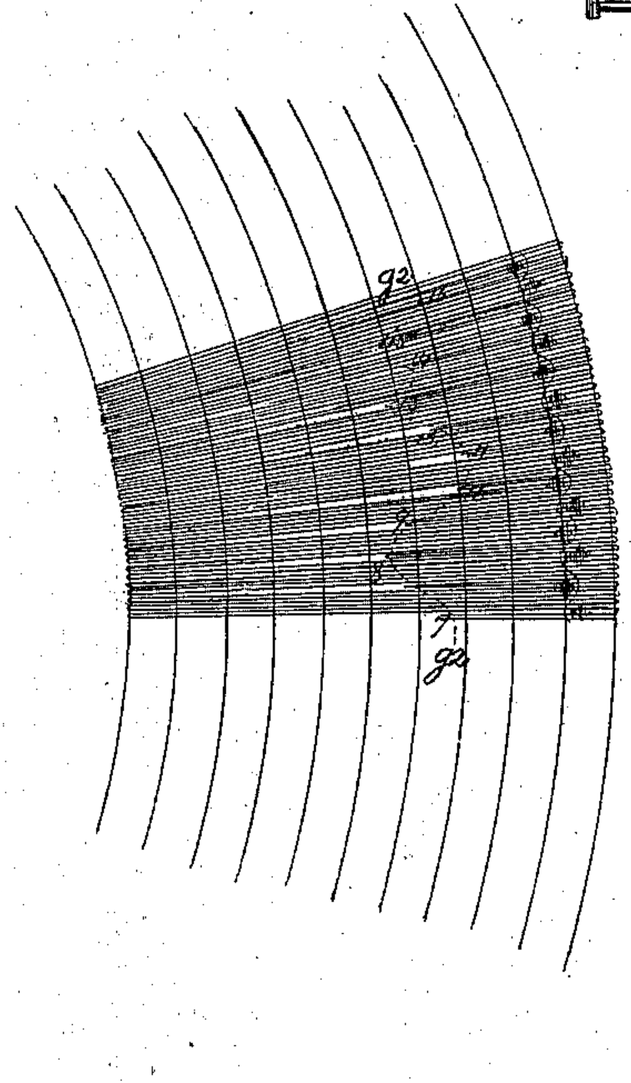


Fig. 7.

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Letters Patent No. 104,687, *dated June* 28, 1870.

IMPROVEMENT IN LAPPET LOOM.

The Schedule referred to in these Letters Patent and making part of the same.

I, WILLIAM ASPINALL, of Philadelphia, county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Looms, of which the following is a specification.

Nature and Object of the Invention.

The first part of my invention relates to an improved device for giving motion to the needle-bars and pin-bars of looms used for producing fancy or stitched fabrics.

The second part relates to an improved tension device.

Description of the Accompanying Drawing.

Figure 1, Plate I, represents a side view of the loom.

Figure 2, a front view of those parts which produce the motion of the needle and pin-bar.

Figure 3, a plan of the same.

Figure 4, Plate II, shows the conical yarn or cloth beam, with variable taper, and the manner of producing circular cloth.

Figure 5, an end view of the same.

Figure 6 is a front view of the improved tension device.

Figure 7 is a diagram exhibiting the form of the cloth when it is taken off the conical roller, and the manner in which its even density or texture is preserved.

General Description.

The pin-bar *a*, figs. 1, 2, and 3, slides vertically between the slide *b'* of the lay *b*, in V-guides *b''*, fig. 3, provided for that purpose. This vertical motion is produced by the inclined planes *x*, figs. 1, 2, and 3.

As the cranks *c*, connected with the lay *b*, by connecting-rods *d*, cause said lay to oscillate on the pin *e*, and as the left end of the incline *x* is further from the center of oscillation than the right end, it follows that the pin-bar, resting upon said incline, must move away from said center when the lay moves toward the left, and toward that center, when the lay rocks to the right.

To give the vertical motion of the pin-bar greater steadiness when the loom works at a high speed, the guides a^1 have been provided, which slide in recesses in the brace *b'''*.

On the back of the pin-bar are the needle-bars *o* o^1, which, in addition to the vertical motion imparted to them by the pin-bar, have also a horizontal sliding motion, which is produced by the following means:

The pin *e*, on which the lay rocks, is elongated to support on its extremity the bar *f*, the latter being also fastened to the lay above.

The spindle *g*, fastened to the bar *f* on one end, and to the side *b'* on the lay on the other, carries the ratchet wheel *h*, to which the detachable pattern-rings *i* i^1 are fastened.

The spindle *g* and wheel *h* partake of the motion of the lay *b*, and, as the latter oscillates, the pawl *k*, whose center stud *l* is fastened into the loom frame, drops at every alternate stroke of the lay behind a tooth of the ratchet-wheel, and, on its return stroke, *h* is moved through the angular distance equal to its pitch.

The pawl *m* prevents the wheel *h* from moving in the wrong direction.

The levers *j j'*, connected with the needle-bars *o o'* by links *n* n^1 and ears *p* p^1, bear against the serrated or curved edges of the pattern-rings *i* i^1, and are kept tightly against them by means of springs *r* r^1.

It will now be noticed that, as the wheel *h*, and with it the pattern-rings, revolve, the levers *j j'* will oscillate on their studs *s* s^1, according to the shape of the edge of the pattern-rings, and will communicate said motion to the needle-bars.

The motion of the levers is very limited, owing to the deviation from a vertical line, in their oscillation, which, when very great, impairs the accuracy of their movement. To obviate this, and at the same time to obtain a loom capable of producing a more elaborate pattern of needle-work, I have devised the following arrangement:

The studs *s* s^1 are connected with each other by an eye, *t*, which latter is capable of sliding freely on the spindle *g*.

The cloth-beam is provided on one end with a pinion, *u*, figs. 1 and 4, gearing into a gear-wheel, *u'*, figs. 1 and 3, which latter revolves loosely on a stud, *v*.

On the hub of the wheel *u'* is fastened a cam, *w*, which gives motion to the lever *y*, figs. 1 and 3. This lever has its fulcrum stud at *y'*, between its extremities, one of which bears against the back of the wheel *h*, as shown in fig. 3, so that any motion communicated by the beam *c'* and wheels *u* and *u'* to the lever *y*, will be transferred to the wheel *h*, studs *s* s^1, and levers *j j'*.

As the lever is only capable of moving the wheel *h*, studs *s* s^1, &c., outward, a spring, *z*, is provided to bring them back to their original position, as the lever *y* moves back.

It will be evident that this motion is entirely independent of that given to the levers by the edge of the pattern-rings, and is dependent upon the difference in the size of the gears *u u'*, the speed of the cloth-beam, and the shape of the cam on the hub of *u'*; hence, by these, the motion can be regulated to obtain the result desired.

The "U-shaped" guides o^2, for the needle-bars, are fastened to the lower edge of the pin-bar by a screw, a^2, and are provided with a slot, through which said

screw passes, as shown in fig. 3, so that they can be moved from or toward the pin-bar, to accommodate different numbers of needle-bars.

The tension device, figs. 1 and 6, consists of two studs, d^2 d^2, figs. 1 and 6, fastened to supports c^2 c^2, and carrying spiral springs d^4 d^4. One end of each of these springs is fastened to the studs d^2 d^2, or to the supports c^2 c^2, and the other to the levers e^2 e^2, which can revolve freely on said studs.

The extremities of these levers are connected by wires f^2 f^2, over which the taut threads g^2 g^2 pass.

The springs, by their tendency to uncoil, would partly revolve the levers on their studs, but the threads prevent this motion, and, by the strain brought upon them, are kept at the proper tension. This tension can be regulated by turning the levers around on their studs more or less, or by fastening the ends of the spiral springs at different points around the studs.

To do away with the necessity of cutting goods into tapering pieces for skirts, &c., for example, I weave the cloth "circular." By the word "circular" I mean cloth, the selvages of which represent concentric arcs or circles, or, in other words, cloth which represents the developed surface of a cone, as shown in fig. 7. To produce this kind of cloth the warp is wound upon a conical beam, h^2, which may be either rigid or adjustable, as shown in fig. 4. From this beam the warp-threads 1 2 pass over the "whip-roller" i^3, over the race-board k^2, and breast beam l^2, as usual; but, instead of the cloth passing over, and being wound upon, a cylindrical roller, it is rolled on a conical one, c^1, fig. 4.

It will be evident that the warp and the cloth which passes around the large ends of the cones moves with a greater velocity than that toward the small end, as will be made plain by reference to fig. 4, where the right side of the cloth has moved from 3 to 4, while the left side has only moved from 1 to 2; hence, the distance between the weft or filling-threads is greater on one side of the cloth than on the other, and, the length of all the weft-threads being the same, it follows that they must be parts of radii of circles, of which the warp-threads are the circumference, as in fig. 7.

It is difficult in this kind of weaving to make the texture or density of the cloth uniform, in consequence of the varying distance between the weft-threads. It has been attempted to obviate this difficulty by putting the warp-threads gradually closer together toward the "long" side of the cloth in the same proportion as the weft or filling-threads are further apart; but this makes the cloth appear entirely different toward the one side to what it does toward the other.

In my invention the result is obtained by causing, as often as is found expedient, a weft-thread to be woven in the fabric on the long side only, by not crossing the warp-threads, or, technically, by not forming a "shed" through the whole width, so that there will be more weft-threads on the "long" side of the cloth than on the short side, as shown in figs. 4 and 7.

I need not describe the method by which this non-forming of the shed through part of the width of the cloth is accomplished, as that is well known to every practical weaver.

In my invention this difficulty is obviated by passing the thread which is intended to catch the weft-threads on the long side of the cloth through the needle o^4, on the needle-bar o^1, and not through the regular heddles. Now, as this needle reciprocates transversely across the cloth, moving the thread with it, it follows that the ridge above referred to is diffused more through the cloth, and cannot be detected. This traversing-thread is shown in figs. 4 and 7 by the lines g^2 g^2, and the points where the warp is caught is indicated by 7 8 9 10, &c.

The conical roller shown in fig. 4 is made so that its taper can be varied.

On the cylinder m^3 is fastened the head n^3. This head is provided with jaws o^3, into which slats p^3 p^3 are hinged. The other end of the cylinder is provided with a screw-threw, over which the plate r^3 can slide freely.

By screwing the nut r^4 against this plate, the latter is forced toward the head n^3, and, thus forcing the slats outward, enlarges the large end of the cone.

The plate is provided with recesses q^3 q^3, to receive the slats, and is kept from revolving on the screw by means of a flat, as at s^3, or a key or feather, as at t^3.

The lever j j' and the connecting-links n n' have been purposely omitted from fig. 1, in order to avoid confusion. The studs s s^1 and the ears p p^1, between which the levers j j' and links n n^1 form the connection, will be easily recognized in the drawing, fig. 1.

I do not claim anything as my invention which is not mentioned in the following clauses, although the same be described in the foregoing specification.

I claim as my invention—

1. The revolving and sliding wheel h, attached to and moving with the lay b, substantially as and for the purpose herein set forth.

2. The levers j j' on the movable studs s s^1, in combination with the revolving and sliding wheel h, substantially as and for the purpose set forth.

3. The combination of the spiral spring z with the studs s and s^1 and revolving and sliding wheel h, substantially as and for the purpose specified.

4. The pattern-rings i i, with the revolving and sliding wheel h^1, when constructed and arranged as described.

5. The combination of the levers j j, spiral springs r r^1, links n n^1, and needle-slides o o^1, with the revolving and sliding wheel h, substantially as and for the purpose specified.

6. The construction and arrangement of the gears u u', cam w, and lever y, in combination with the revolving and sliding wheel h, all constructed and arranged substantially as and for the purpose specified.

7. The tension device, constructed and operating substantially as herein described.

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