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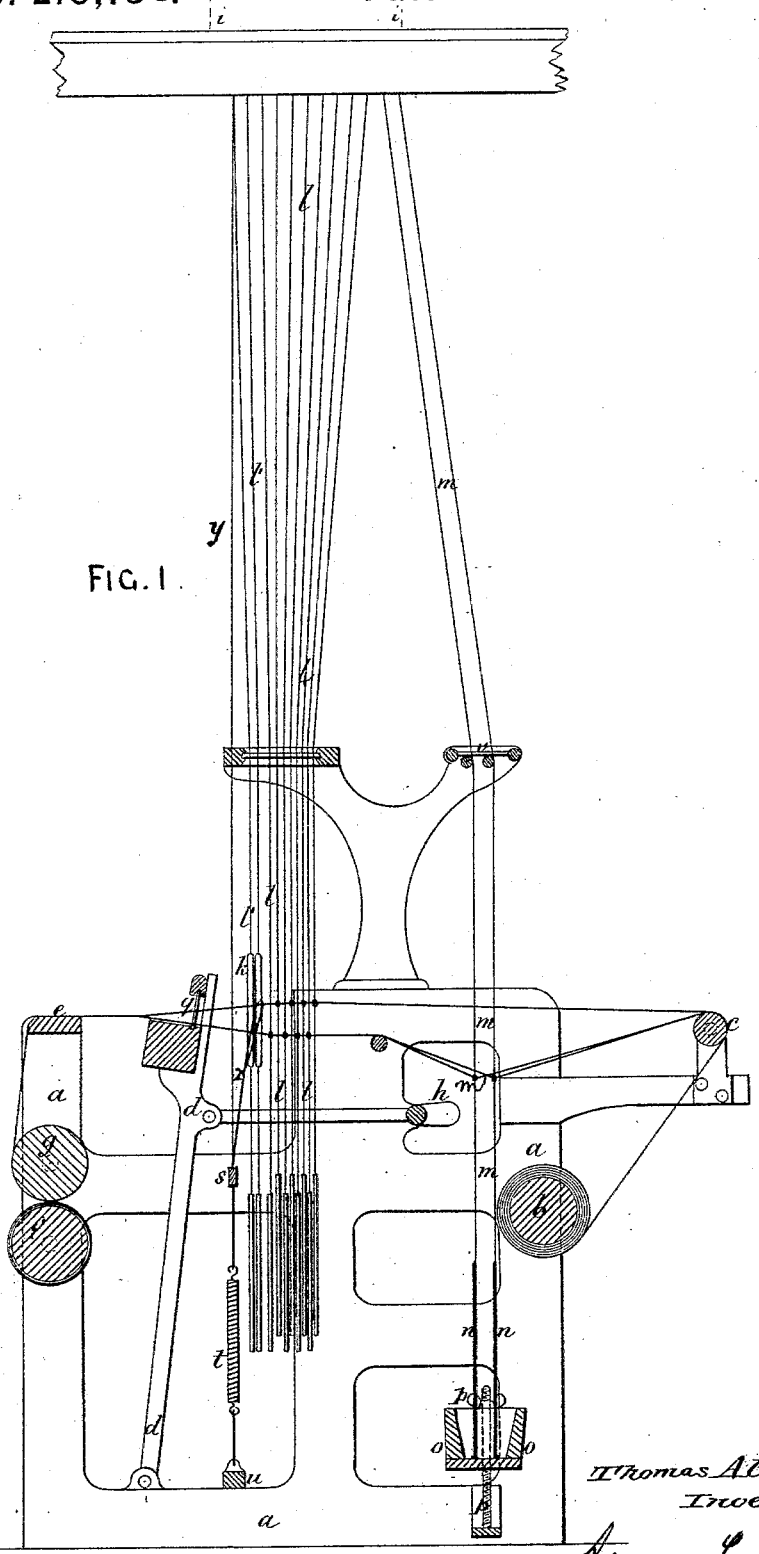
Loom for Weaving Leno, &c.

No. 210,736. Patented Dec. 10, 1878.

FIG. 1.



Thomas Aldred.
Inventor.

Attest:
J. A. Rutherford
A. H. Norris.

By. James L. Norris.
Atty.

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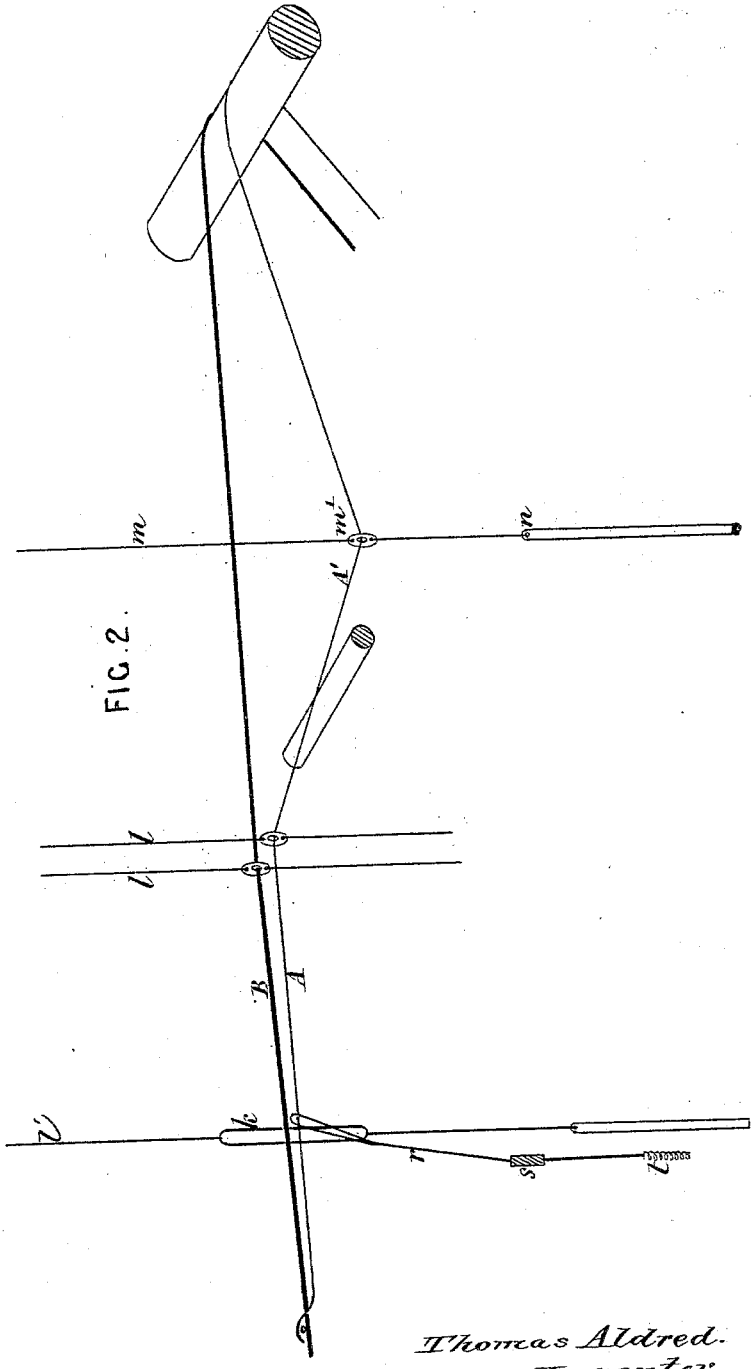

FIG. 2.

Attest:
J. A. Rutherford
A. L. Norris

Thomas Aldred.
Inventor:
By James L. Norris.
Atty.

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T. ALDRED.

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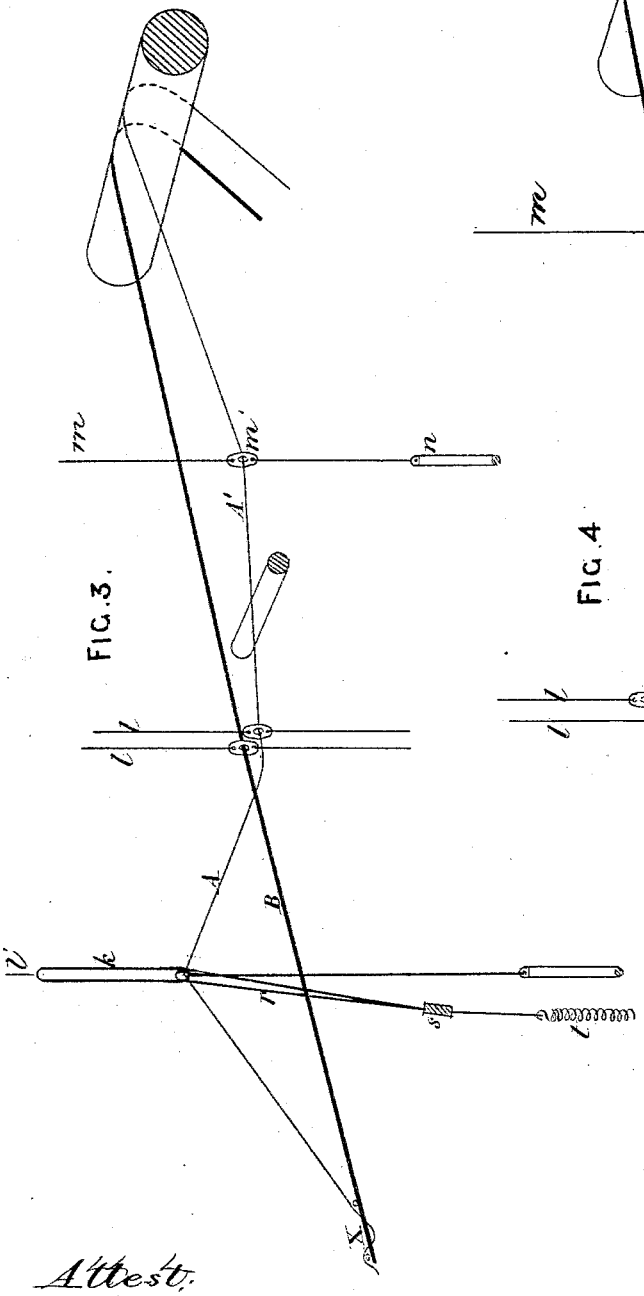

FIG. 3.

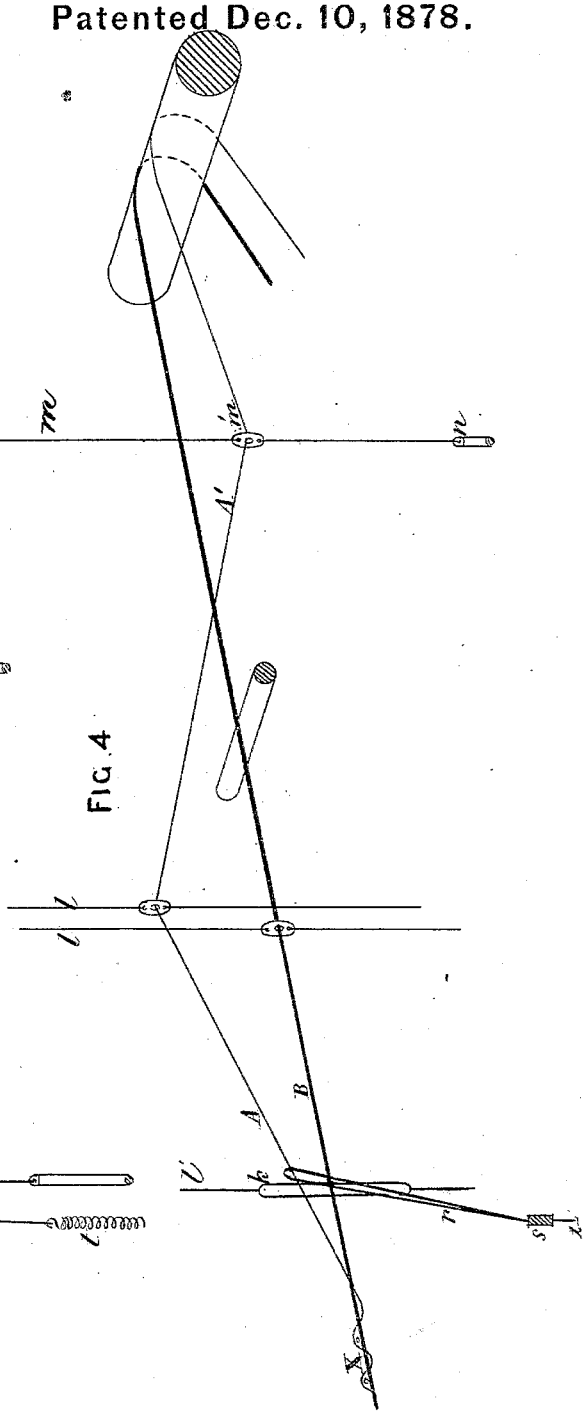

FIG. 4.

Attest.
J. A. Rutherford
A. H. Norris.

Thomas Aldred.
Inventor.
By James L. Norris.
Atty.

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T. ALDRED.

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FIG. 5

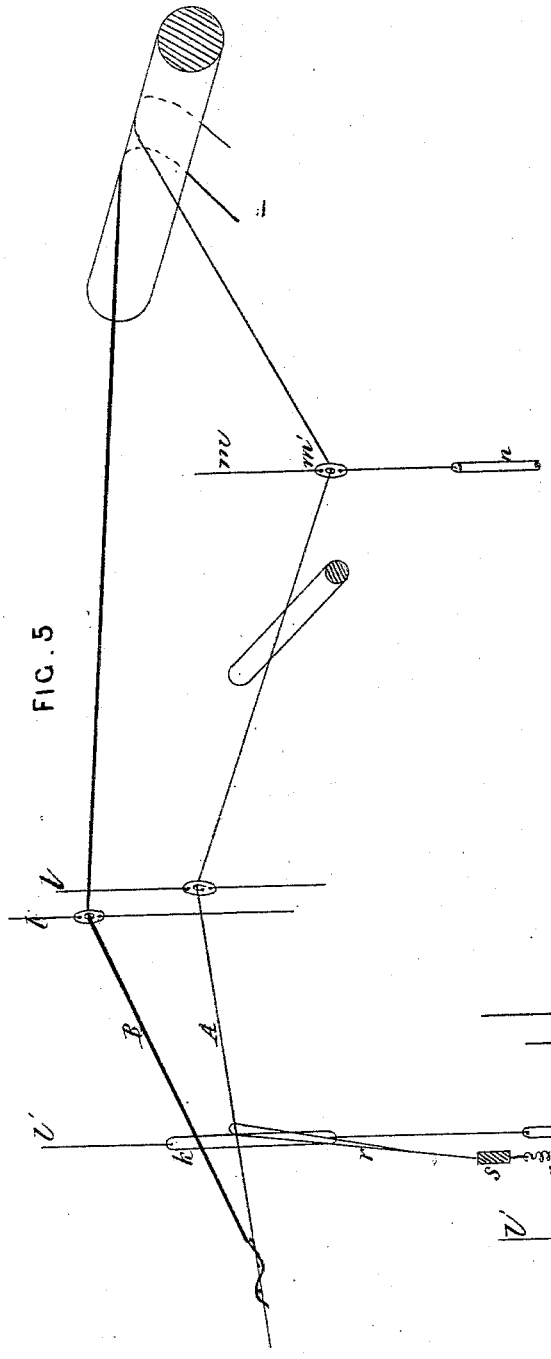
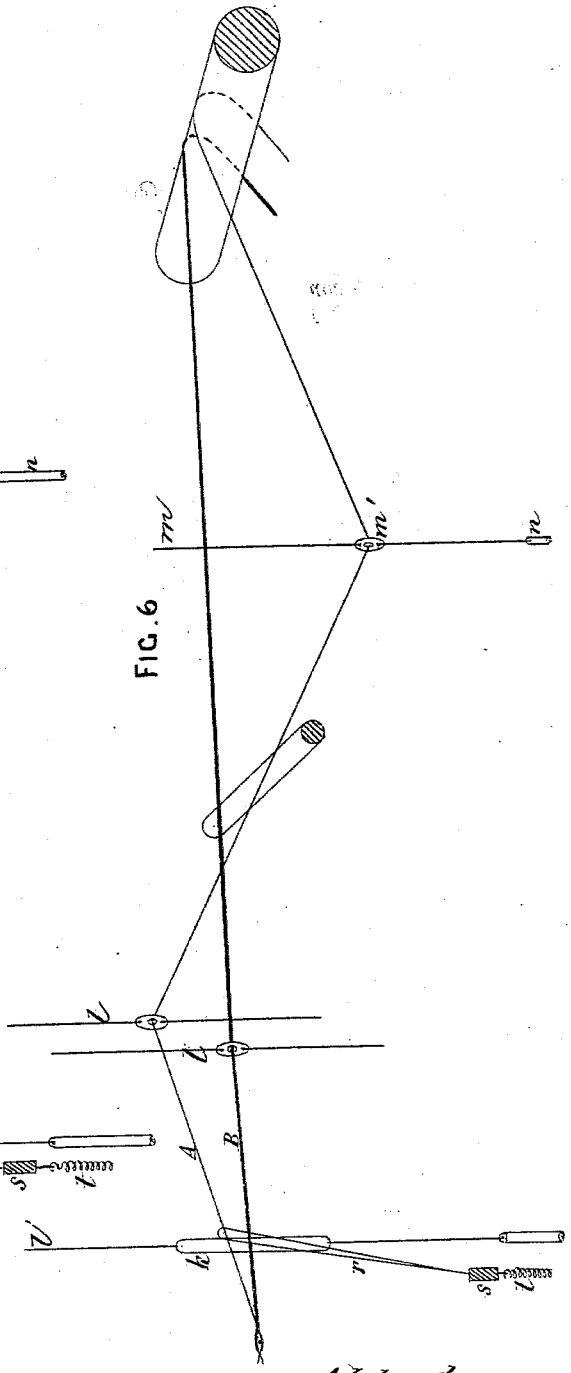


FIG. 6



Attest:
J. A. Rutherford
A. H. Norris.

Thomas Aldred.
Inventor.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

THOMAS ALDRED, OF MACCLESFIELD, ASSIGNOR TO JOHN DENDY AND JOHN RUSSELL BEARD, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN LOOMS FOR WEAVING LENO, &c.

Specification forming part of Letters Patent No. **210,736**, dated December 10, 1878; application filed January 11, 1878; patented in England, December 30, 1876.

To all whom it may concern:

Be it known that I, THOMAS ALDRED, of Macclesfield, county of Chester, England, weaving manager, have invented an Improvement in Looms for Fancy Weaving; and do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvement, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to secure by Letters Patent—that is to say:

My invention relates to looms for fancy weaving, wherein the fabric known as "leno" is produced, and more particularly where this style of weaving is produced in combination with "plain float" or twill in patterns or figures by jacquard apparatus.

In this style of weaving for producing "leno" it is necessary that one portion of the warp should cross the threads of the other portion alternately in reversed directions for forming each successive shed, while, when changing to plain or brocade weaving, it is necessary that both the leno and the other warp-threads should be raised and lowered in the ordinary manner for forming the shed without crossing. Now, according to my invention, I effect this description of weaving with a much simpler construction of loom than heretofore employed, whereby the friction and wear are greatly reduced, and the irregular tension on the warp caused by the unsteady working of the present appliances is obviated. For this purpose, instead of the appliances now used in leno-weaving for effecting the crossing of the warp, I effect this by means of a device known as a "slip-heald," used in some descriptions of weaving, and instead of using the ordinary worsted coupling for such healds I employ couplings of fine wire, which are not liable to wear like the worsted couplings, and occasion little or no friction to the warp-threads that pass them, and also entirely prevent such threads from sticking, as they frequently do on the top of the mails of the healds ordinarily employed for such weaving. Furthermore, in place of keeping the warp-threads that are used for crossing in the leno-weaving stretched by the ordinary heavy lingoes and weights, and slacking them when required for crossing by the cumbersome vibrators, compensating-shafts, and levers, I substitute for the former elastic cords or "tensors," which are attached to the lower ends of the healds, through the mails of which the leno-threads pass, and hold these down in the stretched position, the healds being passed up through a horizontal reed to the back rows of hooks of the ordinary single or double jacquard-machine, which, owing to the light strain put upon the healds by the said elastic cords, is enabled to effect the slacking of the leno-threads without the use of the ordinary vibrators, compensating-shafts, and levers.

My said invention will be readily understood on reference to the accompanying drawings, in which Figure 1 shows a longitudinal section of a loom for fancy weaving with my invention applied thereto, while Figs. 2 to 6 show diagrammatically the action of the several parts in leno-weaving.

In Fig. 1, *a* is the framing; *b*, the warp-beam; *c*, the back-bearer; *d*, the lay; *e*, the breast-beam; *f*, the cloth-beam; *g*, the sand or friction roller, and *h* the crank-shaft.

The single or double lift jacquard-machine of the kinds in common use is placed at *i*, and has the ordinary sets of hooks, the front rows of which are attached to and work the cords *l'*, having the inserted wire couplings *k* constructed according to my invention and actuating the leno-warps by means of the slip-healds *r*. The wire couplings consist, as shown, of long loops of thin wire, through which the loops of the slip-healds *r* are passed, and which have weights at the lower end like the ordinary harness. When the jacquard lifts the cords *l'* it draws up with it the loop of the slip-heald, through which the leno-warp is passed, and these slip-healds are drawn back by the operation of the spring *t* on bar *s*. The middle rows of the jacquard-hooks are

attached to the cords *l*, working the ordinary brocade portion of the harness, and the back rows are attached to and work the cords *m*, connected to the mails *m'*, through which the leno-warps pass, such mails being attached to the elastic cords or tensors *n* according to my invention, which are fastened at their lower ends to a frame, *o*, which can be adjusted at will by thumb-nuts on screws *p*, so as to put the exact tension that may be required on the tensors, and consequently on the leno-warps which are stretched by the tensors. The cords *m* pass through the dents of a horizontal reed, *v*, corresponding in count to the fabric to be woven. The slip-healds *r* are connected to a bottom bar, *s*, which is drawn downward by the springs *t*, fixed to the bar *u*, and raised at every pick of the loom by the cords *y*, which are connected to bar *s*, and are also connected to and operated by the jacquard in the ordinary manner, this raising of said slip-healds being for the purpose of easing the leno-warps. The warp is drawn through the reed *q* two or more ends in a dent in the ordinary way, and the entire warp is also drawn singly through the mails of the ordinary jacquard-harness; but the leno-warp is in addition passed through the slip-healds *r* one or more ends in a group, the other portion of the warp passing freely between the slip-healds and wire couplings *k*. This portion of the warp passes direct from the jacquard-harness over the bearer *c* to the warp-beam *b*, while the leno-warp is first passed singly through the mails *m'*, so as to be stretched downward by the elastic cords or tensors *n*, as shown.

Referring now to the diagrams Figs. 2 to 6, Fig. 2 shows, in perspective, a leno-warp, A, passed through the slip-heald *r*, the jacquard-harness *l*, the mail *m'* of the tensor *n*, and thence to the warp-beam. B is an ordinary warp-thread at the side of the leno-warp, and passing between the wire couplings *k* of the latter and through the harness *l'*, and thence to the warp-beam. The wire coupling *k*, being situated on the side of the warp B opposite to that on which the leno-warp A is itself situated, it follows that when for the purpose of weaving leno the wire coupling is raised from the position at Fig. 2 into that shown at Fig. 3, so as by means of the slip-heald to raise the warp A for forming a shed with the warp B, the warp A will be drawn over to the side of B opposite to that which it occupies in Fig. 2, whereby the required crossing of the warp at X is effected. To allow of such raising of the warp A while B remains stationary, and consequently no warp is given off from the beam, the portion A' of the warp A, which is drawn down by the tensors *n*, is caused by the cords *m*, acted on by the jacquard-hooks, to rise from the position at Fig. 2 into that shown at Fig. 3, thus giving out a corresponding amount of slack. The shoot having been thrown at X, the coupling *k* and slip-heald are lowered to allow the warp A to descend, while at the same time the heald *l* of the jacquard-harness is raised into the position shown at Fig. 4, thus causing the warp to cross back again to its own side and to form a shed on the side of B opposite to that at Fig. 3, the wire coupling *k* allowing the slip-heald to rise with the warp.

While in the above operation the slip-heald and coupling, together with the warp, descend to pass to the other side of B, the cord *m* allows the tensor *n*, which had before been stretched by the upward motion of A, to contract again and to take in the slack of A, while on this again ascending to form the next shed, *m* is again raised, and so on. Assuming now that it is required to pass from leno-weaving to plain or brocade weaving, then the coupling remains in its lowered position, while the warps A and B are alternately raised and lowered in the ordinary way by their respective healds *l l'* for forming the shed, as shown at Figs. 5 and 6, the leno-warp A being during this time kept stretched downward by the tensors, as shown, as both the leno and other warps are now delivered simultaneously from the warp-beam.

Owing to the light pull of the tensors I am enabled to operate them directly from the hooks of the common jacquard-machine, thus dispensing with the ordinary vibrators, compensating-shafts, and levers heretofore in use. By obtaining a uniform adjustable tension on the yarn I am enabled to weave silk, cotton, linen, or woolen with the least amount of labor and wear and tear, as the pressure or tension can readily be increased or diminished to accord with the class of yarn used.

By using the fine wire couplings I give more freedom to the warps, as they only rest on one transverse bar after leaving the back-rest or bearers, thus allowing finer yarns to be woven.

By my invention all cramping of yarn is done away with, and I am enabled to use less links, cranks, and tackles.

Having thus described the nature of my in-tion and in what manner the same is to be performed, I claim—

1. In a loom for weaving leno or fancy goods, the combination of the elongated wire couplings *k* with the slip-healds *r*, passing through said couplings, cords *l'*, attached to the front hooks of a jacquard-bar, *s*, and suitable springs for drawing said bar downward, substantially as described, and for the purpose set forth.

2. The adjustable frame *o*, having the screws *p*, in combination with the cords *m*, attached directly to the jacquard-hooks, and having the mails *m'* for the leno-threads, the tensor-springs *n*, reed *v*, and the leno-harness, substantially as described.

3. The elongated wire couplings *k* and slip-healds *r*, in combination with the tensors *t*,

cords l', attached to the front jacquard-hooks, cords m, attached to the rear jacquard-hooks, and having mails m', and the adjustable tensor n, for keeping the leno-warp stretched, substantially as described.

4. The adjustable frame o and screws p, having adjusting-nuts, in combination with the mail-cords m and tensors n, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 7th day of December, 1877.

THOMAS ALDRED.

Witnesses:
SAMUEL SEDGLEY,
ROBERT WILLIAM WHITE.