No. 789,168. PATENTED MAY 9, 1905.

C. J. NAUEN.

TAKE-UP MECHANISM FOR LOOMS.

APPLICATION FILED MAR. 9, 1904.

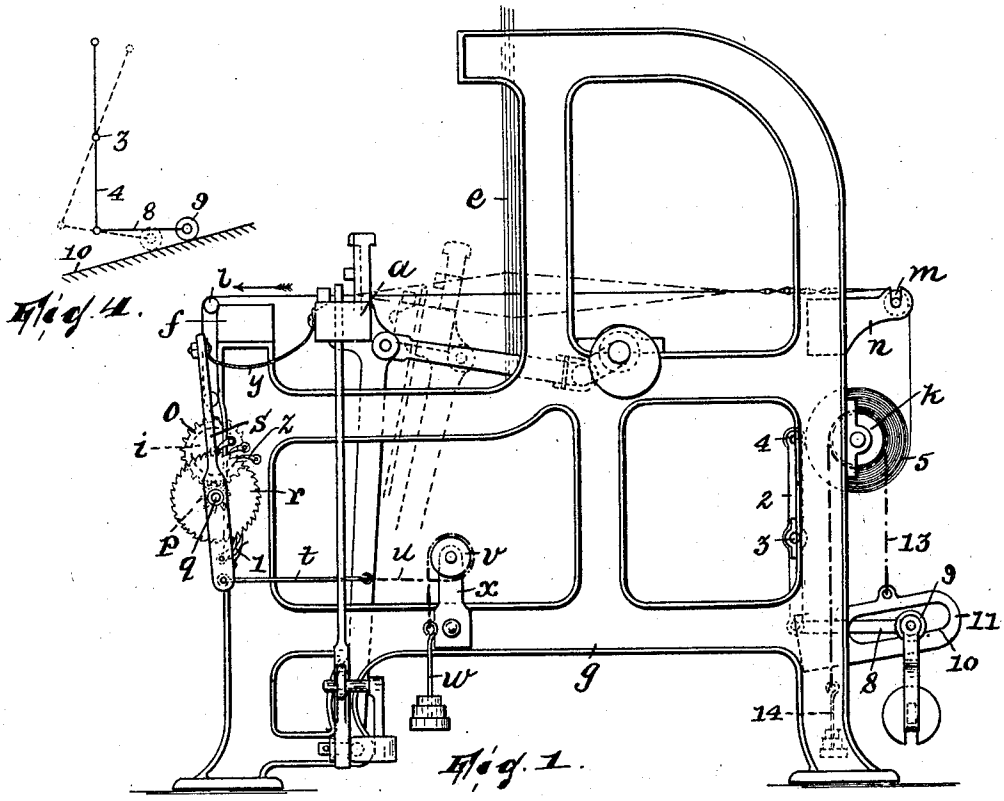

Fig. 4.

Fig. 1.

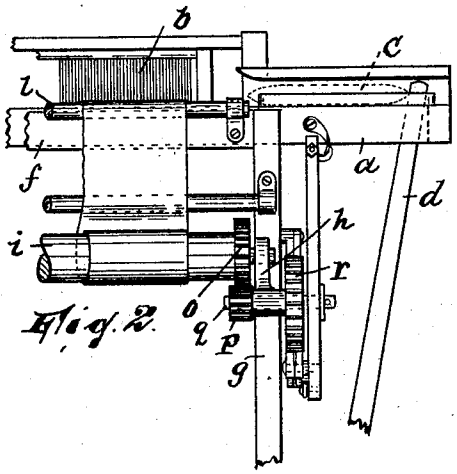

Fig. 2.

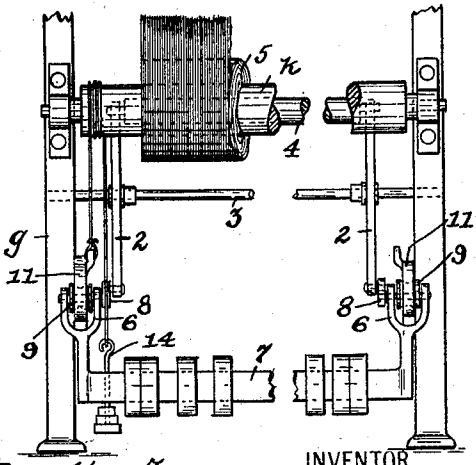

Fig. 3.

WITNESSES:

Wm. D. Bell.

Robert J. Pollitt

INVENTOR,

Charles J. Nauen,

BY

Gartner & Stewart,

ATTORNEYS.

No. 789,168. Patented May 9, 1905.

UNITED STATES PATENT OFFICE.

CHARLES J. NAUEN, OF PATERSON, NEW JERSEY.

TAKE-UP MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 789,168, dated May 9, 1905.

Application filed March 9, 1904. Serial No. 197,277.

To all whom it may concern:

Be it known that I, CHARLES J. NAUEN, a subject of the Emperor of Germany, residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Take-up Mechanisms for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

In the ordinary type of loom the warp is advanced as the cloth is woven by means which is arbitrarily adjusted to effect the advance according as the size of filler used, the closeness of weave desired, and other conditions can be ascertained to require. This means, in other words, is one which when once set is positive in its action not being adapted to adjust itself to possible changing conditions in the material going to make up the goods. The consequence is that the finished goods embodies irregularities in the form, particularly of too much packing or crowding together of the weft-threads in some parts and undue spacing thereof in others. If the weft thread or filler for a time runs relatively thick or coarse, there will occur the crowding together referred to; if thin, then the goods will show openings or shyers of more or less magnitude. I propose in the present instance to effect the advance of the warp as the weaving progresses from the reed, with the object of making each advancing impulse imparted to the warp commensurate, more or less, with the thickness of the fell, so as to make the goods more uniform in texture. In order to accomplish this, that portion of the warp-controlling means which comprises the take-up and let-off mechanisms is so constructed that said mechanisms will keep in approximate balance with each other throughout the operation of the loom, so that if the least pull is exerted to advance the warp, such as the reed acting against the already-woven goods, the pull of the take-up mechanism will be augmented and the resistance of the let-off mechanism overcome sufficiently to effect the advance of the warp.

My invention therefore consists in a loom constructed substantially as above indicated, so that the advance of the warp will be effected from the reed.

My invention will be found fully illustrated in the accompanying drawings, wherein I have shown it applied to a broad silk-loom, and wherein—

Figure 1 is a view in side elevation of the loom. Fig. 2 is a view in front elevation of the portion of the loom comprising the take-up mechanism. Fig. 3 is a rear view of the loom, showing the let-off mechanism; and Fig. 4 is a diagrammatic view illustrating the action of the let-off mechanism.

The batten structure *a*, the reed *b* carried therein, the shuttle *c*, the picker-stick *d*, the harness *e*, the breast-beam *f*, and the other essential parts of the loom are or may be substantially the same as in ordinary looms.

At the front of the loom-frame *g* is arranged in bearing-brackets *h* the cloth-beam *i*, constituting a part of the take-up mechanism hereinafter described. In the back of the loom is arranged in bearings *j* the warp-beam *k* of the let-off mechanism hereinafter described. Between the cloth-beam and the warp-beam the warp is held under tension by the take-up and let-off mechanism, being extended over a glass bar *l* on the front of the breast-beam and over a roller *m*, journaled in brackets *n* at the back of the loom.

Describing first the take-up mechanism, the end of the warp-beam *i* carries a gear *o*, which is in mesh with a pinion *p*, fixed to a shaft *q*, journaled in one of the brackets *h*, and carrying also, fixed thereto, a ratchet-wheel *r*. This shaft forms the fulcrum for a lever *s*, whose lower end carries a hook *t*, to the free end of which is affixed a strap *u*, passing over a pulley *v* and carrying at its free end a weight-support *w*, said pulley being journaled in a bracket *x* on the loom-frame. The upper end of the lever *s* is connected with the batten structure by a flexible connection *y*. The ratchet-wheel is engaged by a series of pawls *z*, pivoted on the frame and set closer together than the distance between the adjoining teeth

of the ratchet-wheel, being thus adapted to catch on a tooth of the ratchet-wheel and stop back action thereof upon each slight forward movement thereof. The lever carries a series of spring-actuated pawls 1, also set closer together than the distance between any two teeth of the ratchet-wheel, so that upon the back motion of the lever amounting to a fraction of the distance between teeth the ratchet-wheel will be effectively engaged by one of the pawls, so as to be advanced thereby. In view of the foregoing it will be seen that when the batten moves back it will, through the flexible connection *y*, pull the upper end of the lever *s* rearwardly, thus setting the pawls 1 at a new position on the periphery of the ratchet-wheel and lifting the weight-support *w*. When the batten moves forward again, the weight-support *w* will tend to fall and throw the upper end of the lever to the left, and consequently turn the ratchet-wheel. During the forward movement, therefore, of the batten the weight-support is exerting a pull on the warp, and if the weights on the weight-support are properly adjusted this pull can be made to just about balance the resistance offered by the let-off mechanism, so that if the slightest additional pull by other means is applied to the warp the warp will advance. It will be understood, therefore, that the weights on the weight-support *w* are adjusted with this end in view whereupon, when the batten moves forward to beat up the weft the reed upon bringing the weft-thread into position as the fell of the cloth will act to advance the warp. Any advance thus effected is of course maintained by the pawls *z*, which prevent the ratchet-wheel from back action.

Describing the let-off mechanism, 2 designates levers fulcrumed in the back portion of the loom on a fixed shaft 3. The upper ends of these levers carry a roller 4, which bears against the mass of warp 5 on the warp-beam *k*. The lower ends of these levers are connected with the forked ends 6 of a traveling weight-support 7 by links 8. The forked portions 6 of the traveling weight-support 7 carry rollers 9, running in inclined guideways 10 in brackets 11. In this arrangement the weight-support tends to move down the guideway 10 in the bracket 11 and in doing so acts, through links 8, to force the roller 4 against the warp-beam. The mechanism thus acts to retard the turning of the warp-beam, which thus resists the pull on the warp exerted by the take-up mechanism and coacts with the take-up mechanism to maintain the proper tension. In view of the foregoing, therefore, it will be seen, upon reference to Fig. 4 especially, that the maintaining of the tension constant notwithstanding the continual change in diameter of the mass on the warp-beam is the result of putting in practice the principle that where a pivoted or fulcrumed part is moved by another part having a direction of movement which is rectilinear or otherwise, so long as it is non-coincident and non-parallel with that of the fulcrumed part, the power exerted by the latter part is increased as the parts approach that relative arrangement where the actuating part applies its force to the actuated part in a direction at right angles to a line connecting the fulcrum of the latter and the point where the two parts engage each other and diminishes as they recede from this arrangement. As an auxiliary means for adjusting the tension a band or strap 13 may be wrapped two or more times around the warp-beam, carrying a weight-support 14 at one end and secured at its other end to the bracket 10.

In the ordinary positive-motion take-up mechanisms the number of picks to a given length of goods could not be regulated except by changing one of the series of gears comprised in the take-up mechanism for another of different size. In the present instance the number of picks may be varied with no other disarrangement of the parts than is involved in simply adding to or taking from the weight on the weight-support *w*.

Another advantage resulting from the present invention is that the take-up mechanism never operates except after each discharge of the shuttle and the consequent laying of the weft in the shed. Hence if the action of the shuttle is stopped the take-up mechanism ceases to work, although the batten and other parts of the loom may continue in action.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a loom, the combination of the frame, a going part, the cloth-beam, a rotary driven part operatively connected with the cloth-beam, an oscillatory driving part, means for securing the driven part against movement in one direction, means for operatively connecting the driving and the driven parts whereby to rotate the latter from the former in its other direction of rotation, said oscillatory part being adapted to be moved in one direction from the going part, means normally acting to move the oscillatory part in the other direction, a warp-beam, and means for braking the same, said braking means and the means whereby said oscillatory part is normally moved in one direction comprising means whereby the pulling action of the one and the resistance of the other may be kept uniformly in approximate balance with each other, so that the reed will advance the warp, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of February, 1904.

CHARLES J. NAUEN

Witnesses:
JOHN W. STEWARD,
ROBERT J. POLLITT.