(No Model.) 4 Sheets—Sheet 1.

A. L. SKINNER.

TAKE-UP DEVICE FOR LOOMS.

No. 549,400. Patented Nov. 5, 1895.

Fig 1

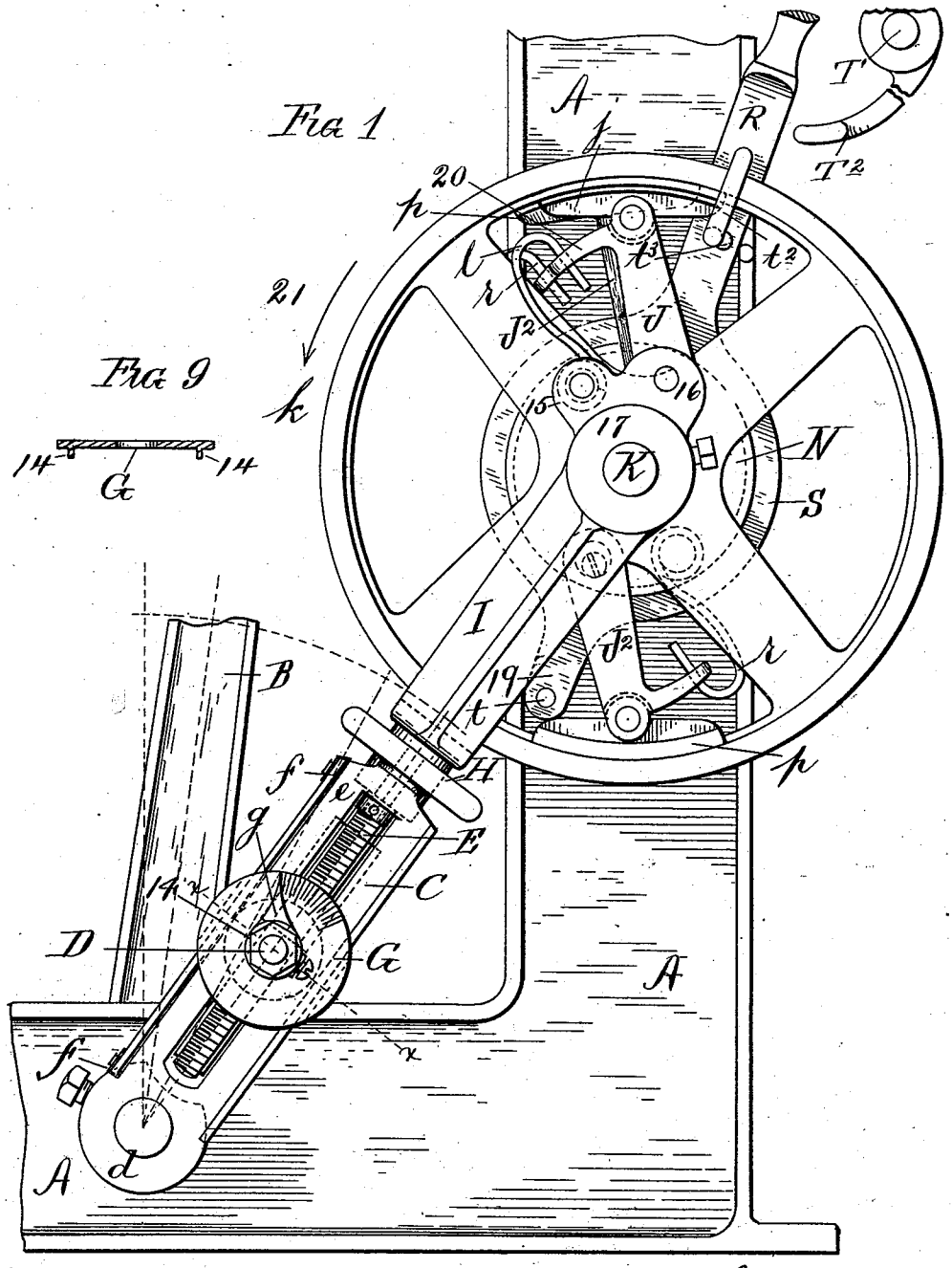


Fig 9

Witnesses
Upton Chapin
A. H. Gardner.

Inventor
Allen L. Skinner
By Chapin & Co
Attys.

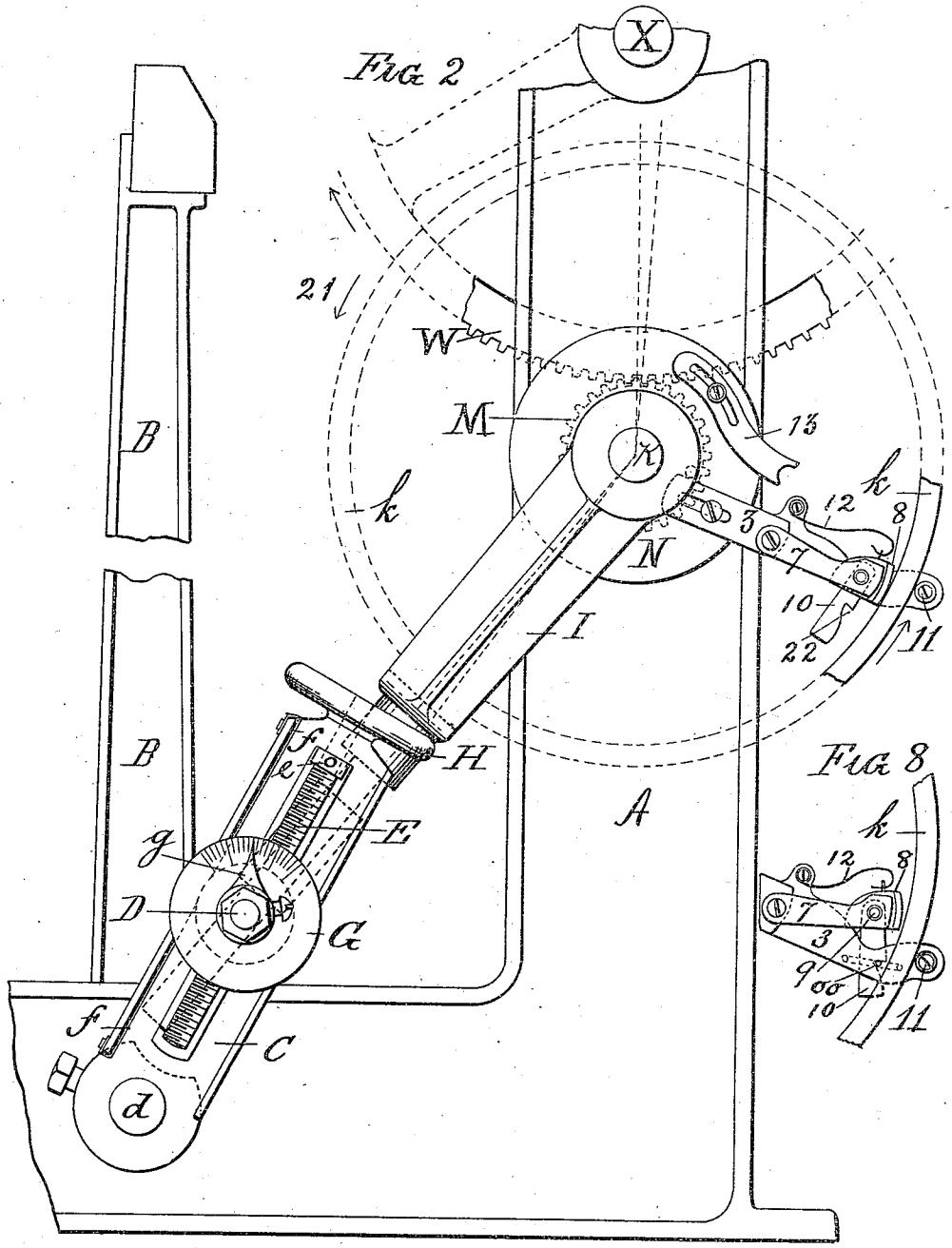
(No Model.)

4 Sheets—Sheet 2.

A. L. SKINNER.

TAKE-UP DEVICE FOR LOOMS.

No. 549,400. Patented Nov. 5, 1895.



Witnesses
Wm. H. Chapin
A. N. Gardner

Inventor
Allen L. Skinner
By Chapin & Co
Attys.

(No Model.)

4 Sheets—Sheet 3.

A. L. SKINNER.

TAKE-UP DEVICE FOR LOOMS.

No. 549,400. Patented Nov. 5, 1895.

FIG 3

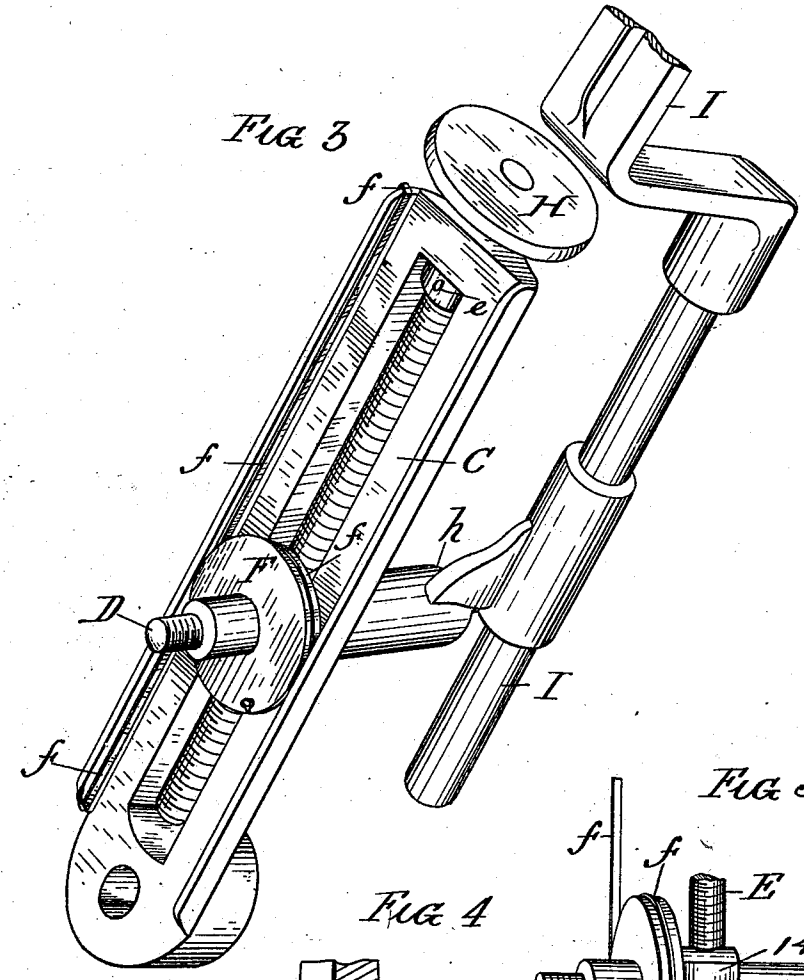


FIG 4

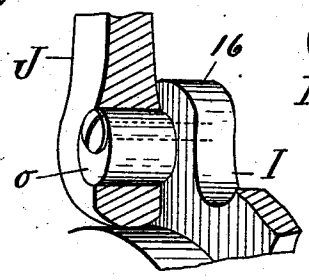
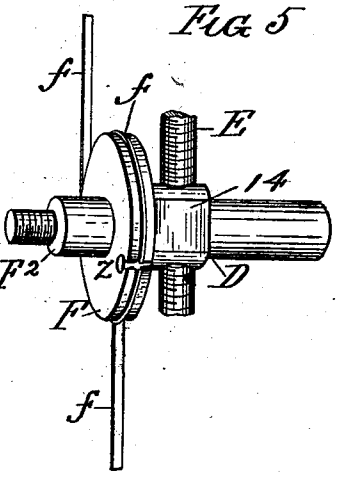


FIG 5



Witnesses
Wm. H. Chapin.
A. N. Gardner.

Inventor
Allen L. Skinner
By Chas. Pinto & Co
Atty.

(No Model.)

4 Sheets—Sheet 4.

A. L. SKINNER.

TAKE-UP DEVICE FOR LOOMS.

No. 549,400. Patented Nov. 5, 1895.

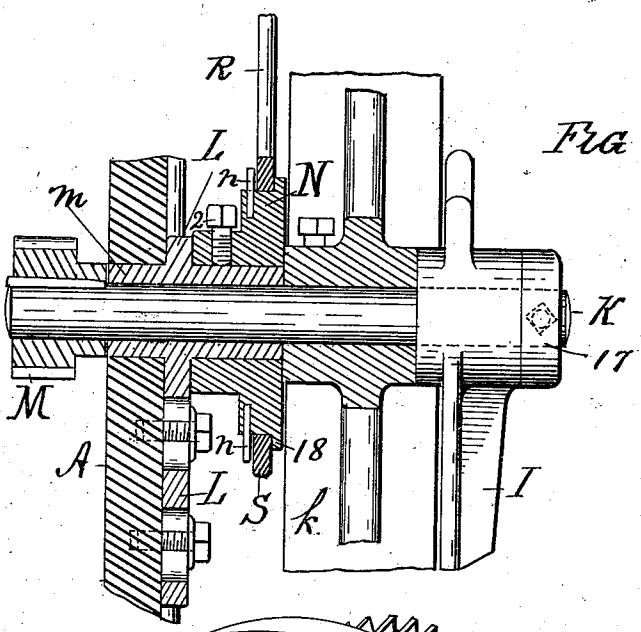


Fig 6

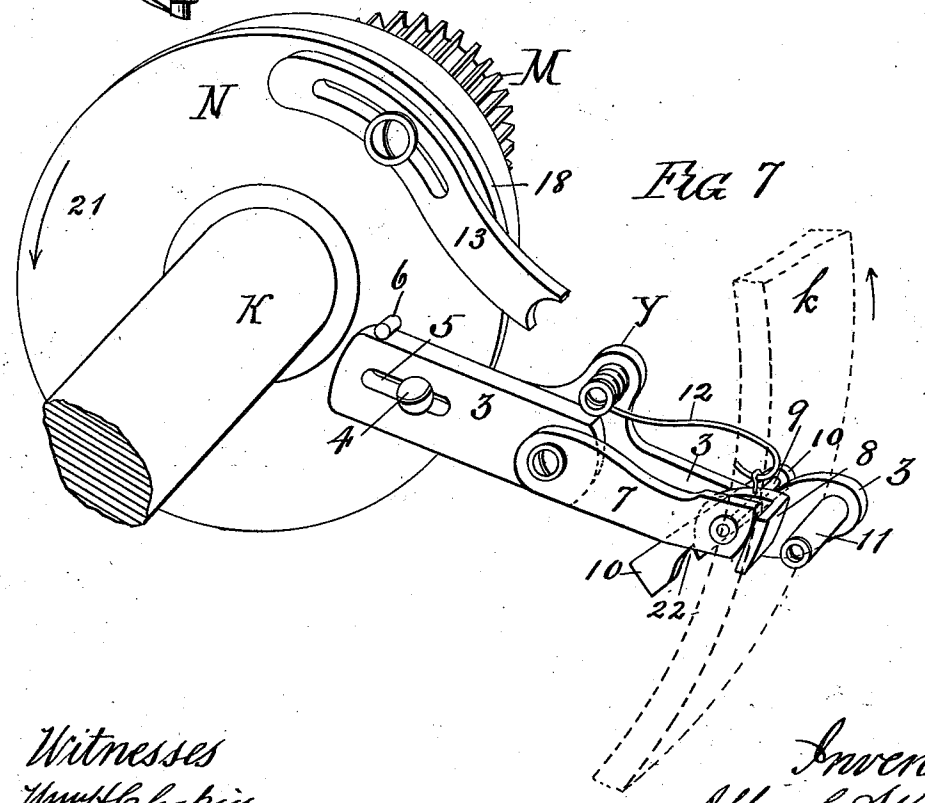


Fig 7

Witnesses
Wm. H. Chapin.
A. N. Gardner.

Inventor.
Allen L. Skinner.
By Chapin & Co
Attys.

UNITED STATES PATENT OFFICE.

ALLEN L. SKINNER, OF SPRINGFIELD, MASSACHUSETTS.

TAKE-UP DEVICE FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 549,400, dated November 5, 1895.

Application filed August 13, 1894. Renewed September 12, 1895. Serial No. 562,338. (No model.)

To all whom it may concern:

Be it known that I, ALLEN L. SKINNER, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Take-Up Devices for Looms, of which the following is a specification.

This invention relates to improvements in take-up mechanism for looms, one object thereof being to provide improved mechanism intervening between the lay-frame and the take-up or cloth-beam whereby the rotary movement of the cloth-beam is caused to be exactly coincident with the movement of the woven fabric, whatever may be the number of picks therein per inch, a second object being to provide for setting the cloth-beam-operating mechanism when the warp is put into the loom to correspond with the number of picks to be woven therein and indicating devices in sight of an inspector, showing plainly what number of picks the take-up mechanism is set to. A third object is to provide mechanism for limiting back-turn of the cloth-beam caused by the warp-strain when the loom is stopped and determining the degree of said back-turn, according to the requirements of cloth being woven, to the end that upon starting up the loom again the first pick made shall be in proper position relative to the preceding pick, all as hereinafter fully described, and more particularly pointed out in the claims.

Reference is had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of a portion of the end of a loom having my improvements applied thereto, this figure illustrating a lever on the end of the stop-motion rock-shaft of the loom in proximity to beam-rotating mechanism, the purpose of which is below described. Fig. 2 is similar view of the end of a loom to that shown in Fig. 1, illustrating in connection therewith features of the improvements not shown in Fig. 1, and showing portions of the latter in dotted lines, and a part of the gear on the end of the cloth-beam shaft. Figs. 3 to 9, inclusive, illustrate detail parts, which are fully described below.

In the drawings, A is a part of the frame of the loom at one end thereof.

B indicates the lay-frame, carried upon a horizontal shaft *d* in the usual manner. C is a radial arm, also secured on shaft *d*, and said arm is formed with a longitudinal slot therein centrally between its edges. Thus the arm C moves in consonance with the lay-frame. A bolt-like arm D, (see Fig. 5,) having a nut 14 formed therein, whose sides are flattened, as shown, is inserted through said arm C in a position to have a sliding motion within said slot, the said flattened side of nut 14 bearing against the borders of said slot. A screw-rod E is passed through the upper extremity of said radial arm C and through the said nut 14. A collar *e* is fixed on said screw-rod at the upper end of said slot, and thus while said rod may have a free rotary motion it is prevented from endwise movement. The said bolt-like arm extends somewhat beyond the front face of said arm C and extends rearwardly beyond said arm.

On the outer end of the bolt-like arm D is a loose pulley F, having a hub F^2 thereon, said pulley having a free rotary motion on said bolt. On the said hub F^2 is secured a pointer or hand *g*, (see Figs. 1 and 2,) which rotates with said pulley. Between said pointer and pulley is placed a dial G, having ribs 14 on its rear side, (see Fig. 9, which is a sectional view of said dial about on line *x x* on said Fig. 1,) by which it has such engagement with the edges of the arm C as prevents it from rotating, but permits it to slide up and down on the face of said arm, carried by the bolt-like arm D, when the latter is actuated to move up and down by turning the said screw-bolt E. Two metal strips or ribbons *f* are secured each by one end at *z*, Fig. 5, on the periphery of the said pulley F, each strip being wound thereon in opposite directions, one extending as shown and being secured to the upper end and one to near the lower end of said arm C, as shown in Figs. 1 and 2, to the end that when said pulley is carried up or down on said bolt D the said pulley and the hand *g* are rotated, thereby causing said hand to indicate by the position of the said bolt D within the slot in said arm a certain number of vibratory movements of the lay-frame or the number of picks woven in a given length of fabric. Graduation-

marks are shown on said dial in Figs. 1 and 2 to a certain extent on its face to indicate the movement of said hand *g* and the number of picks, as aforesaid. The said screw-rod E has fixed on its upper end a hand-wheel H, whereby said screw-rod is turned. The said bolt-like arm D extends beyond the rear side of the vibrating arm C and its rear end enters the horizontal arm of a tubular elbow *h*.

A lever I, having a cylindrical lower end which enters the vertical arm of said elbow *h* and has a free sliding movement therein, has on its upper end a hub, as shown, projecting upwardly from which are two flat bosses 15 and 16. (Said bosses are not shown in Fig. 2.) A shaft K is supported in a bearing in the frame A, (see Fig. 6,) and said lever I is hung on the end of said shaft and swinging thereon, actuated by the said vibratory movement of the arm C. A collar 17 retains the hub of said lever on shaft K. A pulley *k* is secured on shaft K and has an intermittent rotary movement. The inner surface of the rim of said pulley, on each side of the arms thereof, is finished to a true circle. A bracket L, (see Fig. 6,) having a long journal-box *m* on its upper end, is secured to frame A. The said shaft K passes through said journal-box *m* and has a pinion M secured to its rear end. The said pinion M (see Fig. 2) engages with a gear W, which is fixed on the end of the shaft X of the cloth-beam of the loom. Directly back of said pulley *k* is a disk N, which is secured on said long journal-box *m* by a set-screw 2 or other suitable means, said disk having a circular rib 18 at one edge of its periphery. (See Figs. 6 and 7.) At the opposite edge of its periphery said disk N has several pins *n* inserted therein, which, together with said rib, serve to retain a ring S thereon, said ring being adapted to have reciprocating rotary movement on said disk. A lever R extends from the upper edge of the ring S, and on the opposite edge thereof is an arm 19, in which is fixed a forwardly-projecting pin *t*, and on the rear side of lever R, just above said ring, is a second pin t^3. (See Fig. 16.) Said lever R also has thereon a hook t^2 extending over the face of pulley K and having its extremity bent inwardly toward said lever. On said lever I, on the boss 16 thereon, is hung the arm J, on the extremity of which is pivotally hung a friction driving-shoe *j*. Said arm J constitutes a toggle connection between said lever I and shoe *j*. A spring *l*, one end of which is fixed to the inner side of the boss 15 on lever I and coiled around a stud on said arm, has its free end hooked into a hole in an arm 20 on said arm J, and said spring acts to hold the friction-shoe *j* normally in contact with the surface of pulley *k*, on which it bears. The relation of said arm J and shoe *j* to the lever I is such, as clearly shown in Fig. 1, that when arm C swings from the position shown in Fig. 2 to that shown in Fig. 1 said shoe, by its said toggle connection with lever I through arm J, as described, is forced against the rim of pulley *k* and the latter is caused to turn more or less. Said shoe *j* is retracted from said pulley, when arm C returns to the position shown in Fig. 2. On said disk N are pivotally hung two other arms J^2 to the rear side of the arms of pulley *k*, and on the extremities of said arms are pivoted two other shoes *p p*, similar to said shoe *j*, but normally constantly acting through their connection with the fixed disk N by the said arms J^2 J^2 and the springs *r r* (the latter connected to said arms and disk in a manner similar to that above described relative to arm J and spring *l*) to constitute friction-brakes to prevent the rotation of the pulley *k* in a direction opposite to that indicated by the arrow 21, Fig. *l*. The said arms J^2 J^2 constitute toggle connections between said disk N and the said shoes *p p*.

In Fig. 1, at the right of the upper end of lever R, is indicated the end of the usual stop-motion shaft of a loom, and on said shaft is shown a curved lever T^2. Lever R in practice is supported in a position normally in contact, or nearly so, with the end of said curved lever T^2 when the take-up devices are operating, but is shown in Fig. 1 slightly separated from said lever to avoid confusion of parts. A pin in the frame of the machine, (see Fig. 1,) against which said lever R is shown to be resting, constitutes a stop for arresting the further movement of said lever toward the shaft T.

The broken drawing of the arm T^2 signifies, as usual, that its length may be what in practice shall be found necessary within the judgment of one skilled in the art to which this specification pertains, whereby its action with other described parts shall be as set forth.

When for any reason the usual stop-motion devices operate to stop the loom, the arm T^2 swings against lever R and swings it to the left, thereby carrying pins *t*, t^2, and t^3 against the arms J^2 and J, thereby freeing all three of the said shoes from frictional contact with the rim of pulley *k*, thereby stopping the take-up action and consequently slacking up the warp. Said arm T^2, after acting against lever R as described, is immediately retracted, thereby letting the take-up mechanism and brakes actuated by springs *l r r* return to their normal operative position, as shown in Fig. 1.

The hook on lever R extends over face of pulley *k* and turns under to engage arm J to disengage shoe *j* from said pulley when said lever is swung to the left. This is the first result of the swing of the lever R by the stop-motion shaft or when operated by hand, after which the lever disengages the friction-shoes *p p* by striking the arms J^2 J^2, thereby temporarily disconnecting the devices which intermittently rotate pulley *k* therefrom.

In order, when desired, to limit the back-

ward movement given to pulley *k* by the tension of the warp when the brake-shoes are by the action of stop-motion devices suddenly disengaged from said pulley *k*, the devices illustrated in Figs. 7 and 8 are employed, and they consist of an arm 3, (on which are other devices, below described,) pivotally attached to the front face of said fixed disk N by a screw 4, passing through a slot 5 therein, whereby said arm may be free for more or less endwise movement, so that the grip of said other devices carried thereby upon the pulley *k* may be facilitated. A stop-pin 6 is placed in the face of said disk to limit the downward movement of arm 3. Said Fig. 7 illustrates in perspective said arm 3 and its connected mechanism in engagement with the rim of the pulley *k*, there indicated in dotted lines. Fig. 8 shows a section of said pulley and illustrates the devices in a position of disengagement from said pulley-rim. Fig. 7 further illustrates a stop-bar 13, adjustably secured on said disk N, which provides means for limiting the rotary movement of the pulley *k* in the direction of the take-up, (see arrows 21, Figs. 1 and 2,) so that said pulley when the lay-frame is moving very rapidly (in weaving a great number of picks per minute) shall not be unduly turned by its take-up-actuating devices. Said arm 3 has pivoted thereon a latch 7, and on the free end of said latch a brake-shoe 8 is pivotally connected to it by a shaft 9, which extends through said latch and shoe and over the upper edge of the arm 3 and beyond the farther side thereof. An arm 10 is fixed on the end of shaft 9, as shown, having a notch 22 therein for engagement with a pin *o o* on arm 3 when said latch 7 is moved up to the position shown in Fig. 8. The disengagement of the brake-shoe 8 from the pulley-rim, as shown in Fig. 8, permits the pulley to be turned in a direction opposite to the take up motion. A spring 12 acts to press the brake-shoe 8 against the pulley-rim. The bar 11 on arm 3 constitutes an abutment, between which and the shoe 8 the said rim is clamped.

The operation of the above-described parts shown in Figs. 7 and 8, which are connected to disk N, whereby the slacking up of the fabric and warp when the take-up mechanism is released is controlled, and whereby the backward movement of pulley *k*, caused by the tension of the warp, is limited, as above set forth, and whereby the said overthrow of pulley *k* is prevented, is as follows: The normal position of the arm 3 and the devices carried thereby is that shown in Fig. 7. Pulley *k* is turned in taking-up in the direction of the arrow in said last-named figure. When the loom is in operation, the power exerted on shaft K and in the take-up devices is in the direction of the arrow 21. If by reason of the breaking of a thread the stop-motion devices on the loom are brought in action, there always intervenes a short space of time between such break in the thread and the operation of the stop-motion through its shaft T and its arm T^2 to disengage the arm having the friction-shoe thereon and thus by the release of pulley *k* on shaft K relieve the strain on the fabric, which is maintained by the said take-up devices. At times enough movement in the fabric takes place during such interval to show, when the loom is next started up, a space more or less wide, which looks as if one or more of the shuttle-threads had been left out, whereas it is caused only by reason of the slight excessive take-up of the warp after the stop-motion devices have been set in operation and before such devices have released the take-up mechanism, as described. The devices shown principally in Fig. 7 obviate this difficulty, as follows: As has been said, the power applied to shaft K is during the operation of the loom in direction of the arrow 21. Now should the stop-motion devices be set in operation by the breaking of the thread as soon as the friction-shoes on arms J J^2 have been released the tension under which the cloth has been taken up on the cloth-beam immediately operates through gear W on the cloth-beam and the pinion M on shaft K to reverse said shaft K and slack up the cloth and warp to such a degree as may have been determined upon by the adjustment of the stop-arm 13 and the projection *y* on arm 3, which when said reversed movement of shaft K in a direction opposite to arrow 21 takes place come into contact, and the engagement of the clutch device on arm 3 with the rim of the pulley arrests the said reversed movement of shaft K. The fabric and warp may be slacked up to a greater or less degree, as desired, by the suitable adjustment of the stop-arm 13 on the disk N relative to said projection *y* on arm 3. If the pulley *k* tends to throw too far around in rapid weaving, the adjustable stop-bar 13 is set with its extremity so near the projection *y* on arm 3 that any excess of movement of pulley *k* will swing arm 3 against the end of said stop-bar 13, and stop the movement of the pulley. The said stop-bar 13 is made in practice of the form and proportions shown in Fig. 7 and is secured adjustably on disk N by a single screw-bolt through its slot; but if found desirable the bar and the screw-bolt may be made proportionately heavier. By seizing the arm 10 on latch 7 and lifting it and securing it in the position shown in Fig. 8 the devices on arm 3 are rendered inactive.

Fig. 4 shows in perspective the upper end of the lever I, the boss 16 thereon, and a section of the arm J of Fig. 1, and illustrates the preferred manner of jointing said arm to said lever. All of the arms carrying the frictional shoes are provided with this adjustment, which is as follows: A bushing O is eccentrically pivoted on said boss and the arm J is hung on said eccentric bushing. It is desirable that suitable means be provided for carefully adjusting the arms J and J^2 endwise in order to insure suitable frictional en-

gagement of the shoes *j* and *p p* with the pulley-rim, and such adjustment is effected by turning said eccentric and then securing the latter rigidly to the boss 16 by the screw passing through it.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In take-up devices for looms, an arm having a longitudinal slot therein, secured to the lay-frame shaft and having a vibratory movement in consonance therewith, a bolt-like arm extending through said slot and adjustable longitudinally therein, a pulley having a hub thereon for rotary movement on said bolt-like arm, a dial carried on said hub and engaging with said arm whereby it is prevented from rotating, a hand secured on said hub and rotating over the face of said dial, mechanism connecting said pulley with said vibrating arm whereby said pulley is caused to rotate when said bolt-like arm is moved longitudinally in the slot of said vibratory arm, combined with said lay-frame shaft and with a shaft, K, having a rotating engagement with the cloth-beam of the loom, a pulley rigidly secured on said shaft, K, a lever hung on said last-named shaft near said pulley, a connection between said lever and said slotted vibrating arm, one or more shoes bearing frictionally against the rim of said pulley, toggle connections uniting said lever and shoes, and means for longitudinally adjusting said bolt-like arm and disk whereby said lever is given a vibratory movement of variable extent, and said hand is caused to be rotated before said dial, substantially as set forth.

2. In take-up devices for looms, a longitudinally slotted arm secured to the lay-frame shaft and vibrating therewith, a bolt-like arm extending through said slotted vibrating arm and projecting on opposite sides thereof, means for holding, and for adjusting said bolt-like arm in the slot of said arm to positions at different distances from the axis of said lay-frame shaft, a pulley having a hub thereon turning on said bolt-like arm, a non-rotating dial engaging said pulley hub and having a longitudinal movement on said slotted arm coincident with said bolt-like arm, a hand secured on the outer end of said hub and rotating over the face of said dial, two metallic strips, each secured by one end to said pulley and wound thereon, having their extremities secured near the upper and lower ends of said slotted arm, combined with said lay-frame shaft and with a shaft, K, having a rotating engagement with the cloth-beam of the loom, a pulley rigidly secured on said last-named shaft, a lever hung on said shaft, K, near said pulley, a connection between said lever and said slotted vibrating arm, one or more shoes bearing frictionally against the rim of said pulley, and toggle connections uniting said lever and shoes, substantially as set forth.

3. Take-up devices for looms consisting of a cloth-beam driving-shaft, a pulley rigidly secured on said shaft, a lever hung thereon near said pulley, one or more shoes bearing frictionally against the rim thereof, toggle connections uniting said lever and shoes, a spring holding said shoes against said pulley, combined with the lay-frame shaft, an arm secured to said shaft and vibrating in consonance therewith, a connection between said arm and lever whereby said lever is given a vibratory movement, a disk fixed on the journal-box of said driving-shaft near said pulley, an arm 3 having an adjustable pivotal connection with one face of said disk, automatically acting clamp devices carried on said last-named arm for engagement with the rim of said pulley, and an adjustable stop-bar attached to said disk whereby the swinging movement of said arm, carrying said clamp-devices, is limited, substantially as set forth.

4. Take-up devices for looms consisting of a cloth-beam driving-shaft, a pulley rigidly secured on said shaft, a lever hung on said shaft near said pulley, one or more shoes bearing frictionally against the rim thereof, toggle connections uniting said lever and shoes, a spring holding said shoes against said pulley, combined with the lay-frame shaft, an arm secured to said lay-frame shaft and vibrating in consonance therewith, a connection between said arm and lever whereby said lever is given a vibratory movement, a disk fixed on the journal-box of said shaft near said pulley, an arm 3 having an adjustable pivotal connection with one face of said disk, and having the bar, 11, thereon which engages with the outer surface of the rim of said pulley, a latch pivoted on the side of said last named arm, a brake-shoe pivoted on said latch opposite said bar, a spring carrying said brake-shoe against the inner face of the rim of said pulley and a latch-lifting arm pivoted near the end of said latch, whereby said brake-shoe is lifted out of connection with said pulley, substantially as set forth.

5. The shaft, K, the pulley, *k*, freely turning on said shaft, the lever, I, hung on shaft, K, near said pulley and having a vibratory movement, the arm, J, pivotally connected with said lever, the shoe, *j*, pivoted to the extremity of said arm, J, and frictionally bearing against the inner face of the said pulley, a spring, *r*, attached by one end to said lever, I, and having its opposite end engaging with said arm, J, whereby said shoe is held against said pulley, combined with the shaft, *d*, of the lay-frame, the arm, C, fixed on the end of said shaft, *d*, and having a longitudinal slot centrally arranged therein, a screw-rod, E, turning in the extremity of said arm, C, and extending into said slot, a bolt-like arm, D, having a nut, 14, therein, located in said slot, said screw-rod engaging with said nut, a tubular elbow receiving in one arm thereof the end of said arm, D, and in its other arm the

lower end of said lever, I, substantially as set forth.

6. Means for indicating the degree of take-up in a loom consisting of the arm, C, fixed on the lay-frame shaft and having a longitudinal slot therein, a screw-rod, E, on said arm extending into said slot, the bolt-arm, D, having a nut therein located in said arm-slot with the nut of which said screw-rod engages, the pulley, F, free to turn on said shaft, having a hub, F^2, two metallic strips, *f*, *f*, attached to said pulley, F, and wound thereon, and having their opposite ends secured to the upper and lower ends of arm, C, whereby the movement of bolt, D, in said slot will cause the rotation of said pulley, F, a graduated dial, G, engaging with hub, F^2, of said pulley, and sliding on arm, C, and a hand, *g*, secured on said hub and rotating over said dial, combined with the lever, I, a tubular elbow engaging said bolt, D, and lever, I, the lay-frame shaft and take-up devices, substantially as described, actuated by said last-named lever, substantially as set forth.

ALLEN L. SKINNER.

Witnesses:
H. A. CHAPIN,
A. N. GARDNER.