W. HOLLAS, R. FARNWORTH & T. JACKSON.

BEATING-UP MECHANISM OF LOOMS FOR WEAVING.

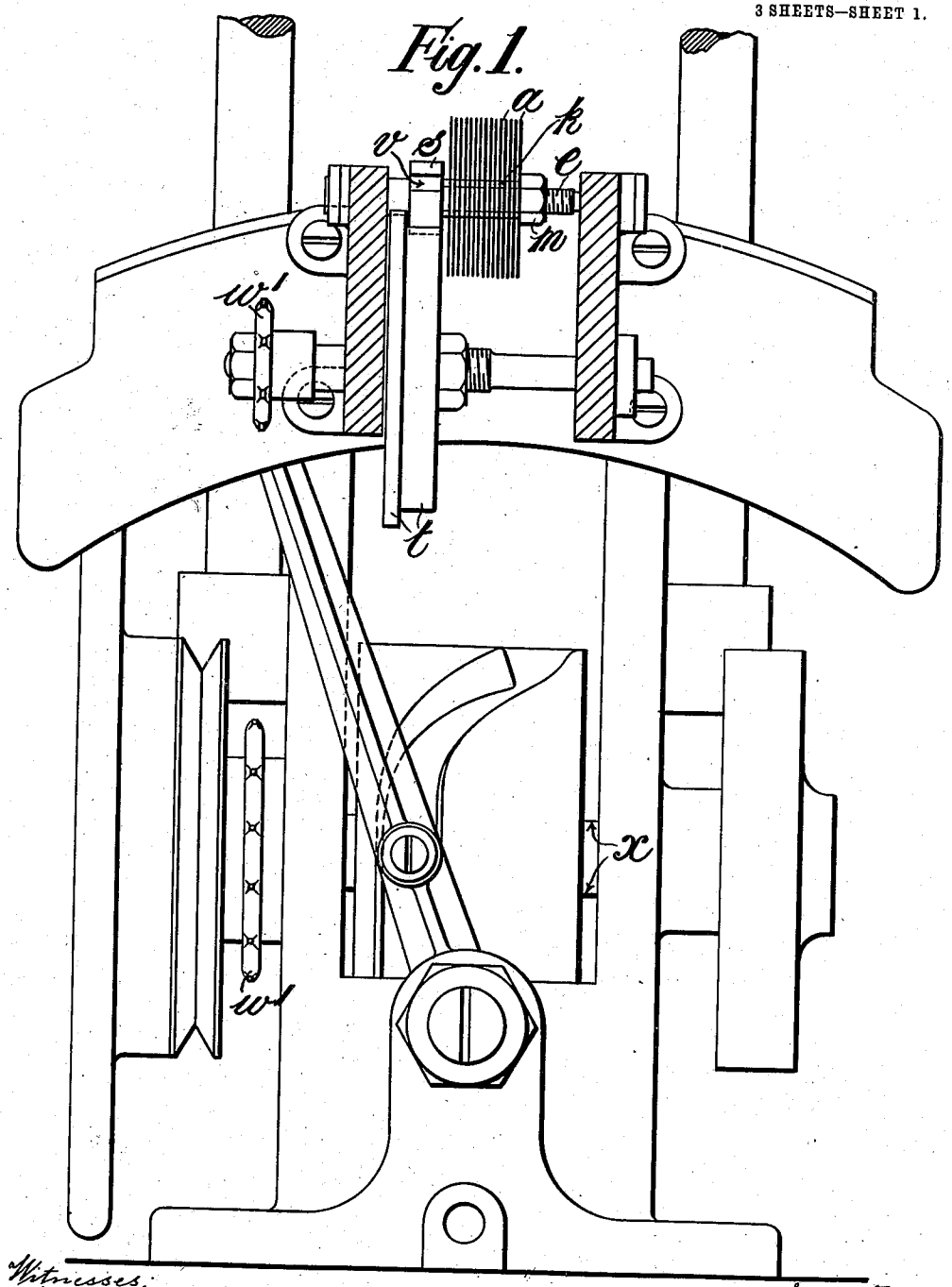
APPLICATION FILED JAN. 19, 1909.

939,503.

Patented Nov. 9, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Walter Allen
L. B. Middleton.

Inventors:
William Hollas,
Robert Farnworth, &
Thomas Jackson.
by Herbert W. Jenner. attorney.

W. HOLLAS, R. FARNWORTH & T. JACKSON.

BEATING-UP MECHANISM OF LOOMS FOR WEAVING.

APPLICATION FILED JAN. 19, 1909.

939,503. Patented Nov. 9, 1909.

3 SHEETS—SHEET 2.

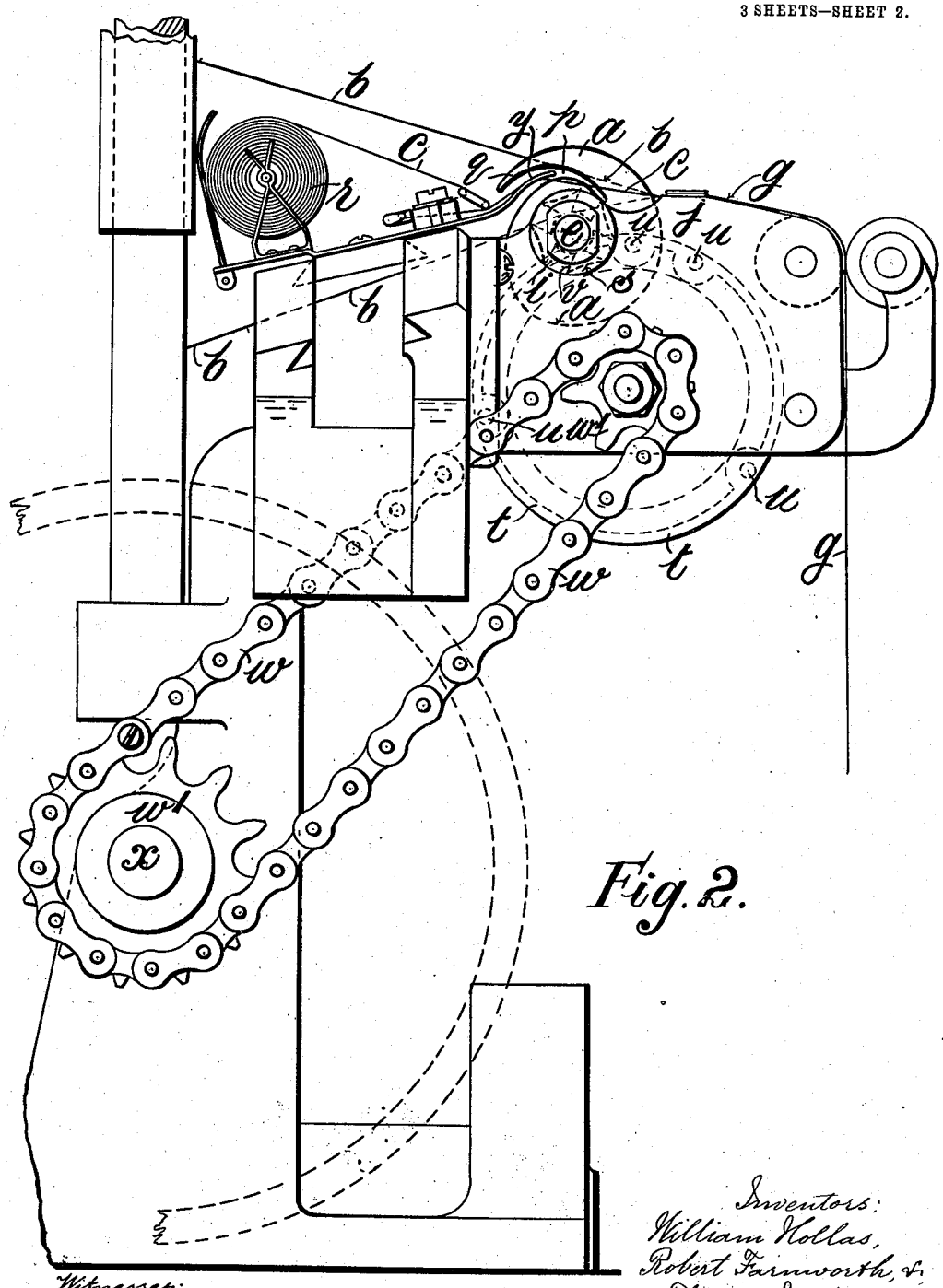


Fig. 2.

Witnesses:
Walter Allen
S. B. Middleton

Inventors:
William Hollas,
Robert Farnworth, &
Thomas Jackson.
by Hubert W. Penner, Attorney.

W. HOLLAS, R. FARNWORTH & T. JACKSON.

BEATING-UP MECHANISM OF LOOMS FOR WEAVING.

APPLICATION FILED JAN. 19, 1909.

939,503. Patented Nov. 9, 1909.

3 SHEETS—SHEET 3.

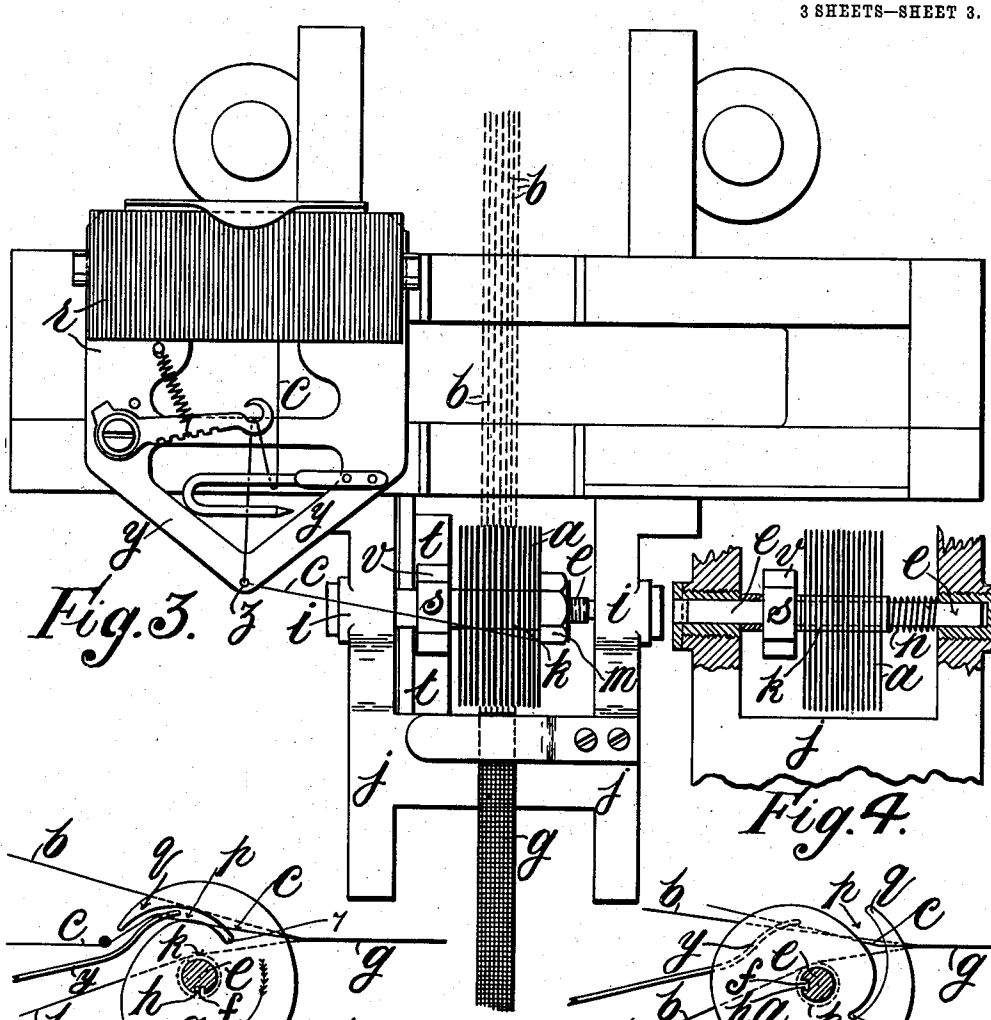


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

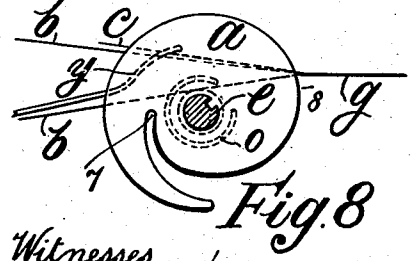


Fig. 8

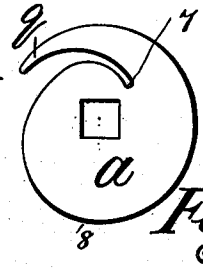


Fig. 9.

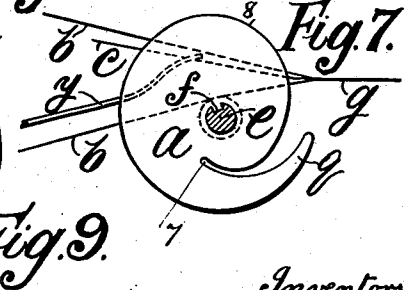


Fig. 7.

Witnesses

Walter Allen

L. B. Middleton

Inventors

William Hollas,

Robert Farnworth, &

Thomas Jackson.

by Hubert W. Jenner. Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM HOLLAS, ROBERT FARNWORTH, AND THOMAS JACKSON, OF BOLTON, ENGLAND.

BEATING-UP MECHANISM OF LOOMS FOR WEAVING.

939,503. Specification of Letters Patent. Patented Nov. 9, 1909.

Application filed January 19, 1909. Serial No. 473,172.

To all whom it may concern:

Be it known that we, WILLIAM HOLLAS, cotton manufacturer, ROBERT FARNWORTH, cotton manufacturer, and THOMAS JACKSON, mechanic, subjects of the King of Great Britain and Ireland, and residents of Bolton, in the county of Lancaster, England, have invented certain new and useful Improvements in the Beating-Up Mechanism of Looms for Weaving, of which the following is a specification.

This invention relates to improvements in looms for weaving and while particularly relating to narrow looms for weaving tape and like goods, such as in the "Poyser" loom, is nevertheless applicable to looms for weaving fabrics of any width, the principal object being to provide improved arrangements to take the place of the ordinary lathe mechanism for beating-up the weft and for supporting the warp thread.

Prior to the date of our invention it has been the general practice to employ lathe mechanism consisting of a frame pivoted on a shaft or studs near the base of the loom, such frame being comprised of lathe swords supporting a lathe beam, shuttle boxes, reed and hand rail, the lathe being operated to effect the beating-up of the weft by connections with the crank shaft of the loom. In such an arrangement the reed dents or reed wires are usually arranged each in one piece of wire transversely of the rods supporting them, though in the Poyser tape loom to which we have referred the reed wires are adapted to form a joint about the middle of their length, one half of the wires being fixed to and supported by a longitudinal rod while the other half are fixed to and supported by a second rod. The divided wires are arranged to be opened at their central joint at certain times to enable the weft carried by the shuttle to be traversed across the warp as will be well understood by those who are acquainted with the tape loom to which we have referred. Further these old arrangements are particularly referred to in order to enable the features of our invention to be thoroughly understood.

Our invention consists essentially in the substitution for all forms of reeds in looms, of a revolving reed adapted to have the weft laid into it in such a way that its revoluble motion will carry the weft forward, force it up to the fell of the cloth, release itself from the weft and then rotate into position again to receive the next pick.

Our invention will be fully described with reference to the accompanying drawings in which,

Figure 1 is a front elevation, partly in section, of a Poyser tape loom showing our invention applied thereto, Fig. 2 partial side elevation of the loom, Fig. 3 partial plan, Fig. 4 partial plan, partly in section, showing a modified arrangement of the reed while, Figs. 5, 6, 7, and 8 show end elevations of one of the reed plates in different positions and Fig. 9 end elevation of a modified form of reed plate.

In accordance with our invention we entirely dispense with the reeds as at present used and also with the present form of beat-up mechanism and for narrow looms or looms for weaving narrow fabrics we do not employ any lathe mechanism whatever, but to effect the separation of the warp threads and to enable the weft to be beaten up we employ reed dents consisting of revoluble plates *a* which not only act for the separation of the warp threads *b* but also as a means for beating-up or forcing the weft *c* toward the fell of the cloth or fabric *g* being woven. The plates forming these reed dents are mounted upon a shaft *e* of any suitable cross section. In Figs. 1 to 8 the shaft is of circular cross section but has a longitudinal groove *f* into which enter the projections *h* formed on the reed plates, while in Fig. 9 the reed plates are shown with a square hole adapted to fit a square shaft. The shaft is supported in bearings *i* adjacent to the breast beam *j* of the loom, the plates being of any suitable thickness and made of any suitable material for their purpose. We have experimented with various materials including iron and steel plates, celluloid and vulcanite. The thickness of the plates, as in the case of ordinary reed dents, depends upon the character of the fabric to be woven, and the distance of their separation from each other is also dependent upon the same factor. Usually they are separated by washers *k* of the required thickness placed between them though they may be formed with a boss on one or both sides. In Figs. 1 to 3 the plates and washers are cramped or bound together axially by a nut *m* fitting on a screwed portion of the shaft *e*. It will thus be seen that by these means the plates are tightly bound at the center though their

thinness admits of a little lateral resiliency near to the periphery of each plate so that any knots or thick places in the warp threads *b* may readily pass between them. We may provide for additional resiliency by dispensing with the nut and screw and adopting the arrangement shown in Fig. 4 in which the plates and washers are pressed together axially by a spring *n* inserted between them and one of the bearings of the shaft *e* on which they are mounted. This arrangement admits of freedom of movement in almost every direction for each plate. In Fig. 8 the plates would be cramped together as in Figs. 1 to 3 but lateral resiliency is obtained by stamping out from each plate an almost complete circular slot *o* though other simple means of obtaining resiliency may be employed. On the other hand we find in employing reed plates made of celluloid and cramped together as in Figs. 1 to 3, that this material is sufficiently flexible to allow of the required lateral resiliency for the purposes referred to. Sometimes we employ a combination of celluloid and steel plates arranged alternately.

In side elevation each reed dent or plate is, roughly speaking, similar to *a* Fig. 6, that is to say, somewhat cam-shaped with a space *p* between the main portion of the plate and the arm or point *q* which forms the upper portion of the figure. In other words the space referred to forms a curved slot, the outer and open end of this slot being away from the breast beam *j*. The shaft *e* carrying the reed plates has given to it an intermittent rotary motion so that at one time the slot or space *p* is presented and remains momentarily stationary in the position indicated in Figs. 2 and 5, to enable the weft *c* to be passed into it by the shuttle *r* as it is shot across the warp by the ordinary mechanism of the loom, while at another time the dents are rotated so as to convey the weft so placed toward the fell of the cloth, the position indicated in Fig. 6 being midway between Figs. 5 and 7 though the reed does not actually stop in that position. The view, however, shows the weft being pulled around the pointed end of the reed plate by the shuttle. The next point of momentary stoppage, however, is at position Fig. 7 where the pointed end of the reed plate has descended below the warp, the weft now lying across the warp threads on the breast beam side of the reed plate ready for being beaten-up. This is effected by the further rotation of the reed plates to the position shown in Fig. 8 in which the weft is completely forced up to the fell of the cloth by the edges of the plate. While the reed plates are being rotated from the position shown in Fig. 8 to the initial position shown in Fig. 5 the shed has been changed in the ordinary way to tie-in the weft when the cycle of operations referred to is repeated.

In order that the reed plates may operate as set forth, the slot *p* of each plate is wedge-shaped and is curved so that it approaches the shaft gradually from the point *q* at its wide end to its narrow end 7. The periphery of each plate is eccentric of the shaft *e* and is largest on a radial line at the point 8 which is diametrically opposite to the narrowest end 7 of the slot. From the point 8 the periphery approaches the shaft gradually in one direction until the point *q* is reached, and in the other direction the periphery gradually approaches the shaft until the narrow end 7 of the slot is reached.

Intermittent rotation of the reed plates may be effected by any suitable means so long as the objects referred to are accomplished. At present we prefer to employ a Geneva stop motion consisting of a star wheel *s* fixed on or formed integral with the shaft *e* and a disk *t* provided with pins *u* arranged at suitable distances apart and adapted to engage with the slots *v* of the star wheel so as to rotate the latter substantially in the manner described. The disk *t* may be operated by gearing in the form of wheels or by a chain *w* and sprocket wheels w^1 from a suitable revolving part of the loom, preferably the driving shaft *x*.

The reed plates at all times project both above and below the warp threads, that is to say, both when the shed is open and closed so that there is no possibility of the warp threads becoming disengaged or getting between the wrong plates. Not only so but the reed plates are perfectly open at the top so that whenever the warp threads become broken it is quite easy to place them between the dents after piecing up.

In order to pass the weft thread into slots of the reed plates the shuttle is provided with an extending arm *y*, the extension being in the direction of the breast beam. The weft is passed through a hole *z* in its forward end. The arm *y* is sufficiently thin to pass through the slots but the shuttle itself, in other respects, is of substantially the same character as that in the Poyser loom and it is also propelled in a similar manner.

Apart from the features of our invention hereinbefore described the other mechanism of the loom, where the improvements are applied to tape and like narrow looms, may be arranged as in such looms. We would, however, have it understood that instead of causing the shuttle to traverse across the warp in the arc of a circle struck from a horizontal center below the breast beam we may traverse it across the warp in the arc of a circle struck from a vertical center toward the front of the loom so that there would always be a tendency to lay the weft near the selvages of the fabric being woven. On the

other hand in broad looms the shuttle would travel in a straight path as at present.

From the foregoing description it will be seen that our invention entirely dispenses with ordinary beat-up and reed mechanism and substitutes therefor a most simple, effective and novel device capable of being applied to ordinary looms for weaving either narrow or wide fabrics.

What we claim as our invention and desire to secure by Letters Patent is:—

1. A reed and beating-up device for a loom, comprising an actuating shaft, a series of reed plates mounted to revolve with the said shaft but free to slide longitudinally on it, each reed plate being cam-shaped and provided with a curved slot, and a spring encircling the said shaft and permitting the said reed plates to be moved apart to a limited extent.

2. A reed and beating-up device for looms comprising a plurality of cam-shaped plates having slits or passages in alinement with each other to receive the weft, means for separating the plates from each other, a shaft for supporting the plates, bearings for the shaft, means for holding the plates together in an axial direction, a slotted disk on the shaft, a disk mounted on a second shaft having pins for engaging with the slots of the slotted disk, a sprocket wheel on the second shaft, a third shaft carrying a sprocket wheel and a chain for communicating motion between the two sprocket wheels substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

WILLIAM HOLLAS.
ROBERT FARNWORTH.
THOMAS JACKSON.

Witnesses:
WILLIAM HENRY TAYLOR,
DOROTHY I. DAVIES.