No. 877,511. PATENTED JAN. 28, 1908.

C. H. MAXSTED.

NARROW WARE LOOM.

APPLICATION FILED AUG. 28, 1906.

5 SHEETS—SHEET 1.

Fig. 1.

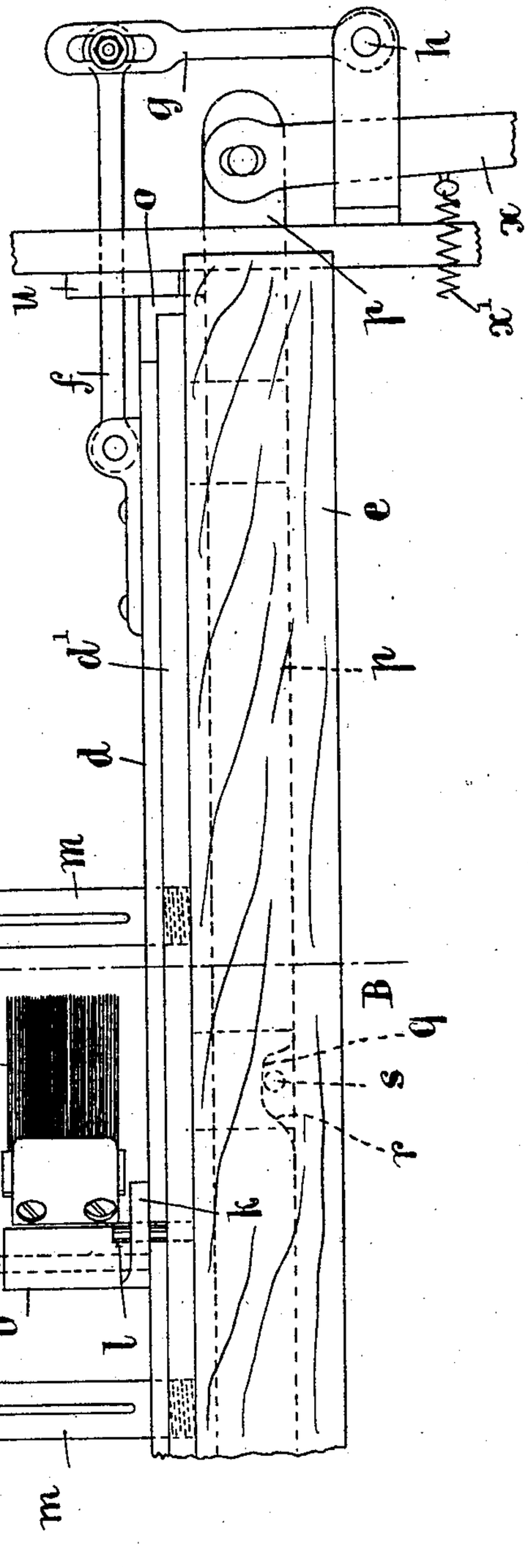
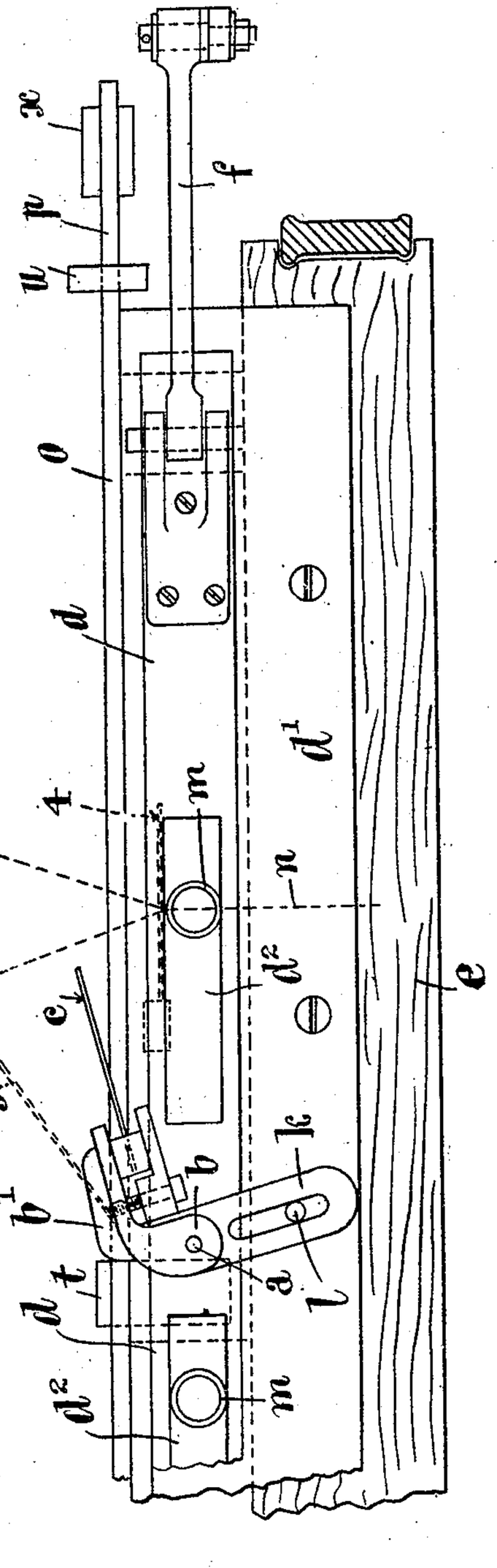


Fig. 2.



Witnesses
W. P. Burke
W. E. Perkins

Inventor
Charles Higgin Maxsted
By his attys Dickerson & Co

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APPLICATION FILED AUG. 28, 1906. 5 SHEETS—SHEET 2.

Fig. 3.

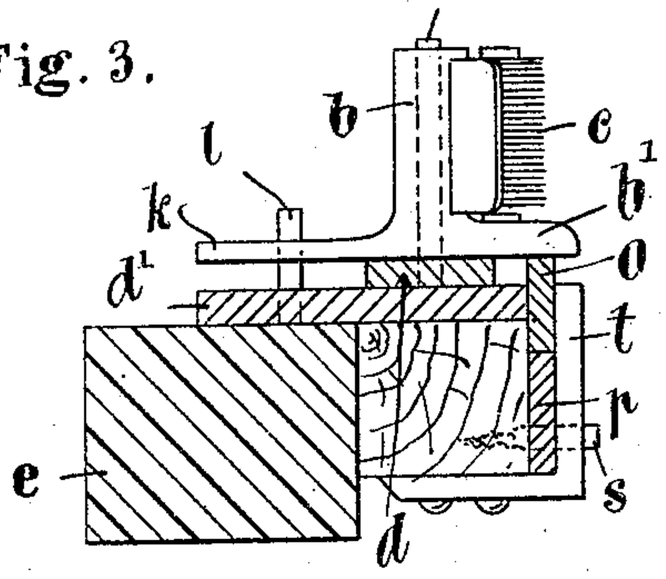


Fig. 4.

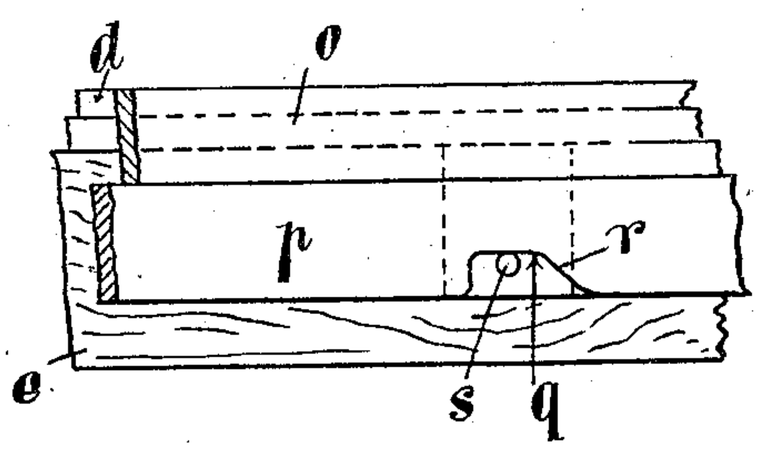


Fig. 5.

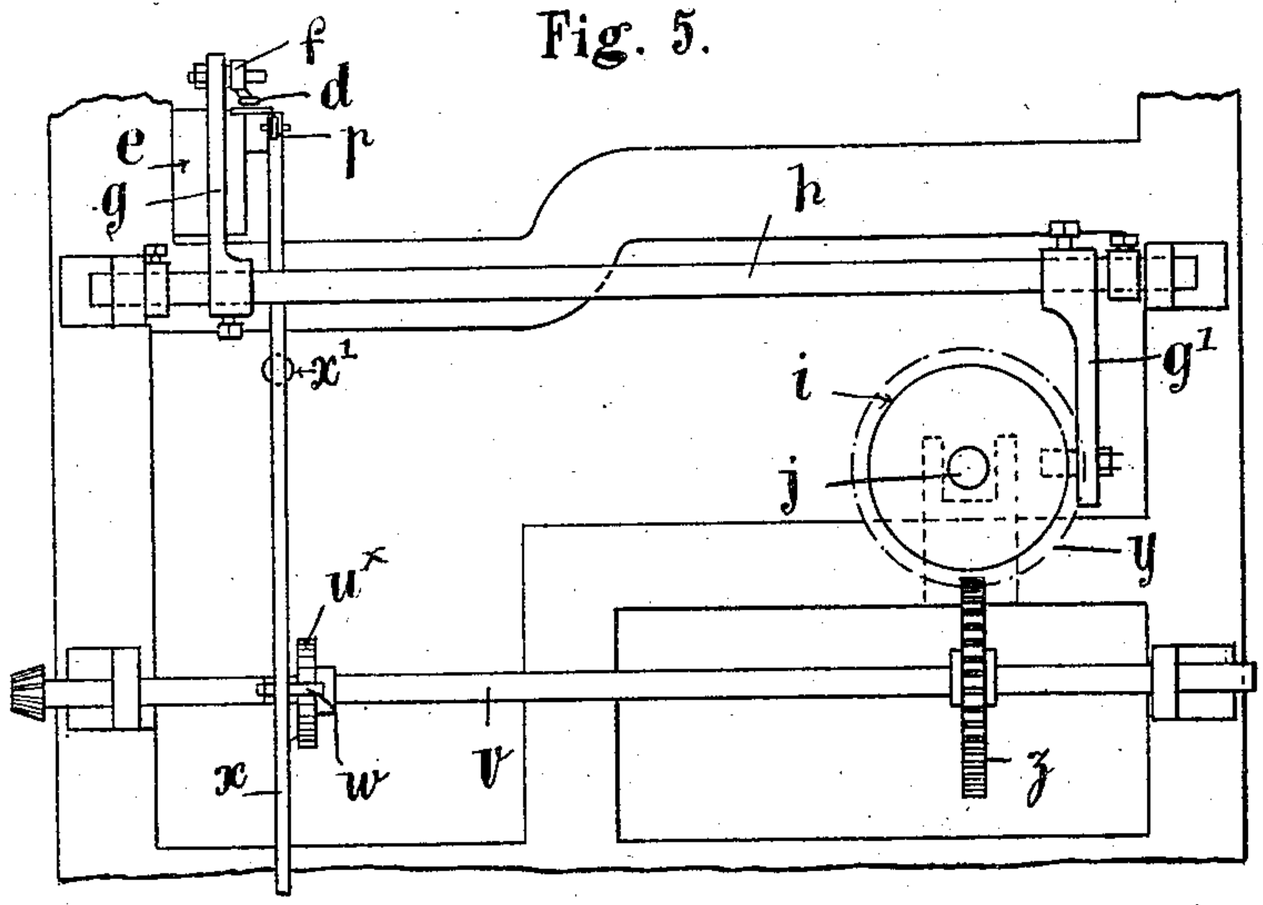


Fig. 6.

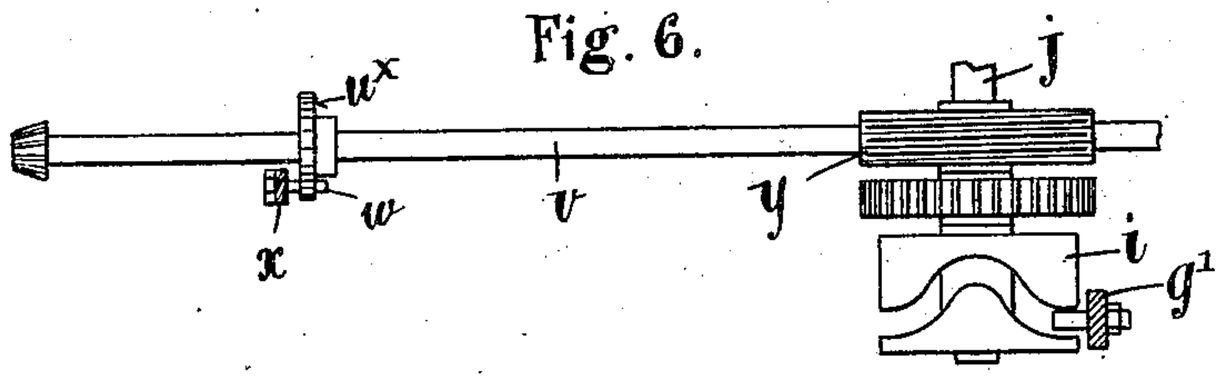
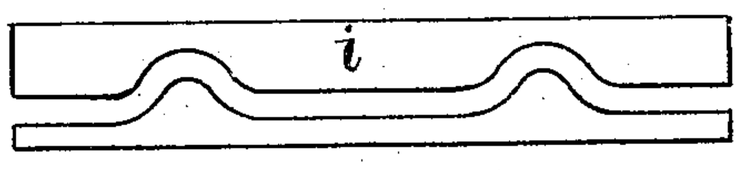


Fig. 7.



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5 SHEETS—SHEET 3.

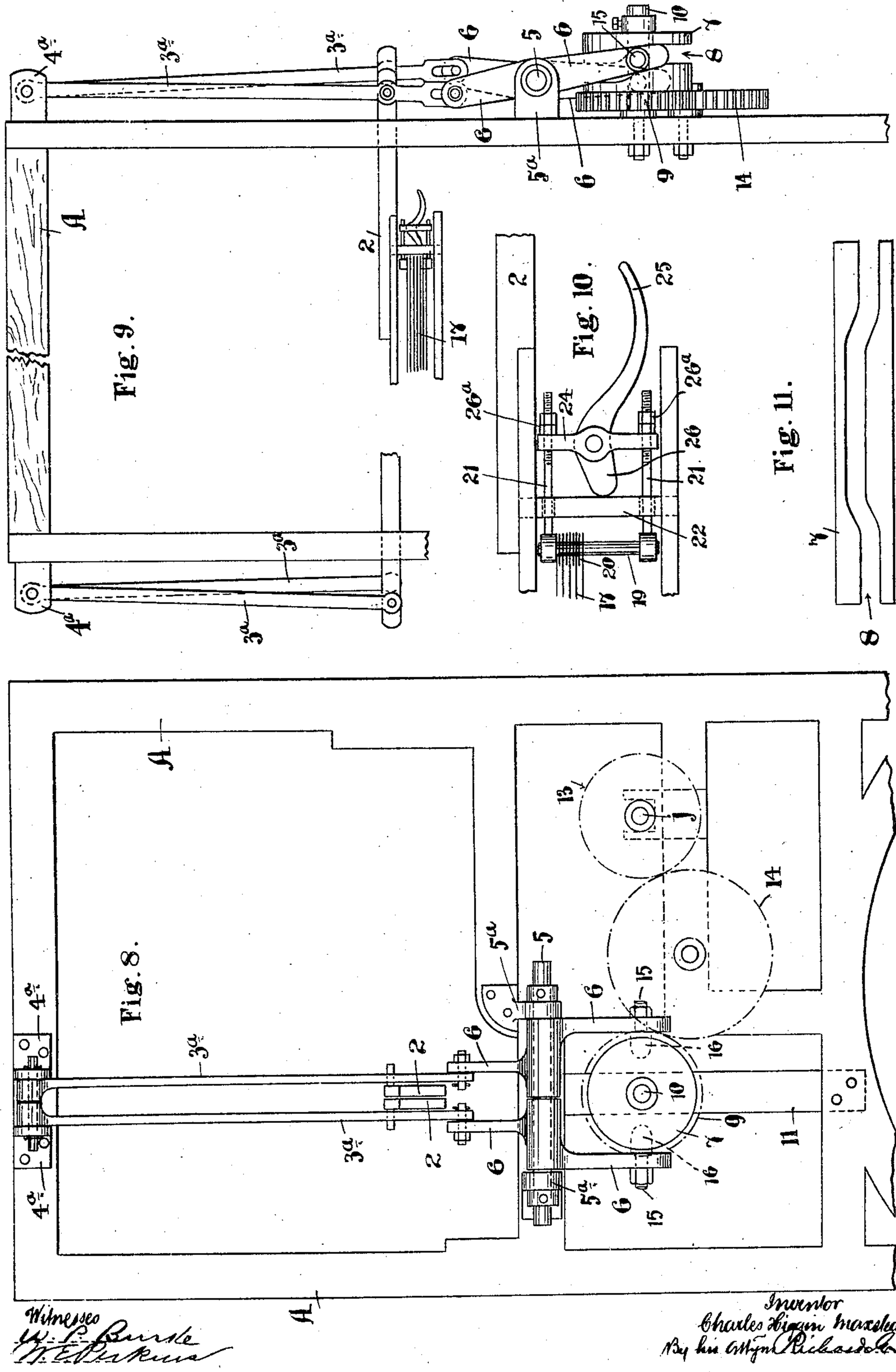

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 8.

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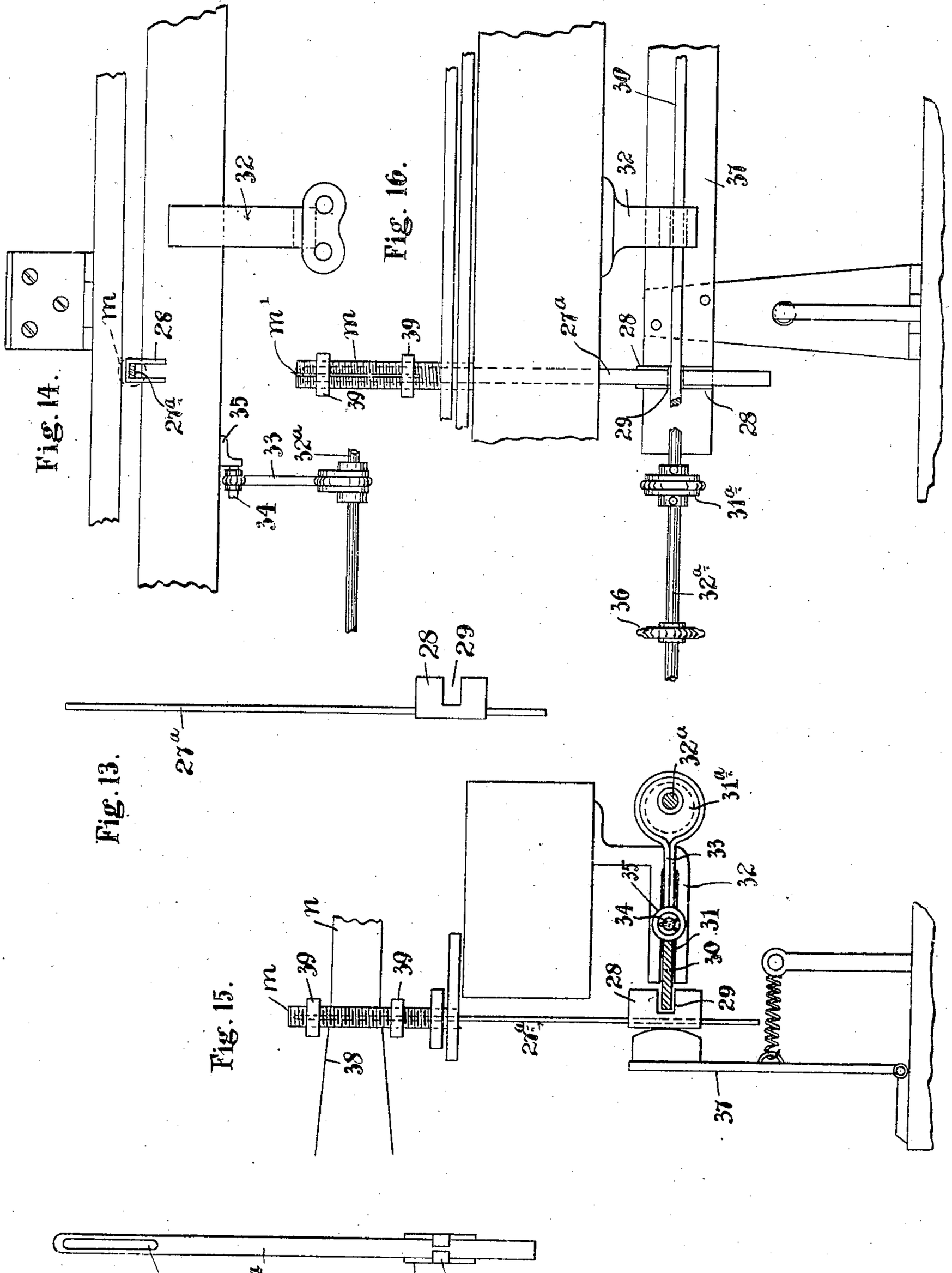
5 SHEETS—SHEET 4.



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No. 877,511. PATENTED JAN. 28, 1908.

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NARROW WARE LOOM.

APPLICATION FILED AUG. 28, 1906.

5 SHEETS—SHEET 5.

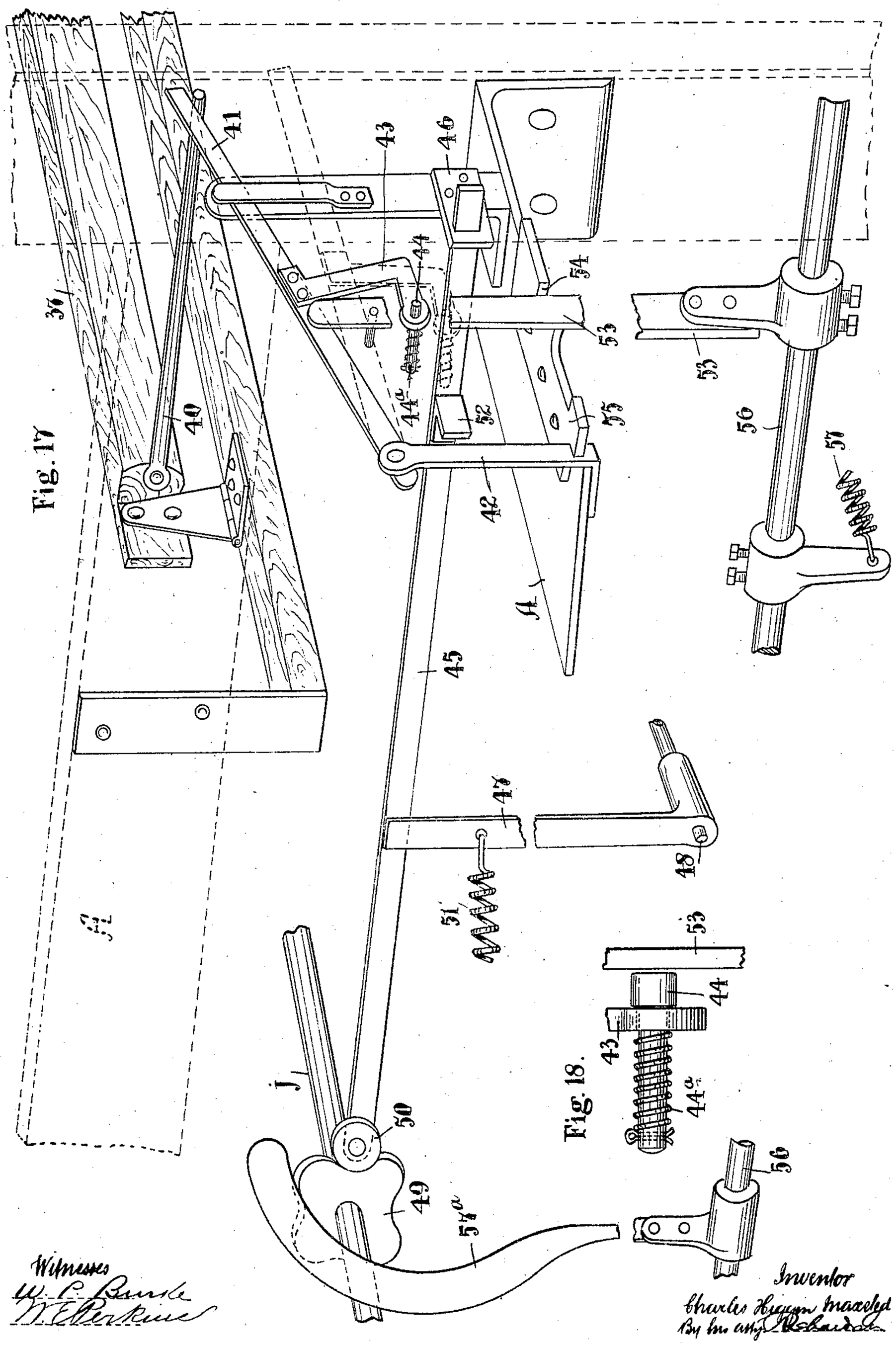

Fig. 17

Fig. 18.

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UNITED STATES PATENT OFFICE.

CHARLES HIGGIN MAXSTED, OF OAKLAND, WINDERMERE, ENGLAND.

NARROW-WARE LOOM.

No. 877,511. Specification of Letters Patent. Patented Jan. 28, 1908.

Application filed August 28, 1906. Serial No. 332,354.

To all whom it may concern:

Be it known that I, CHARLES HIGGIN MAXSTED, a subject of Great Britain, residing at Oakland, Windermere, in the county of Westmoreland, England, gentleman, have invented new and useful Improvements in Narrow-Ware Looms, of which the following is a specification.

My invention relates to looms for weaving tapes, ribbons and other small wares, of the type having vertically actuated shuttles for which I have obtained Letters Patent No. 785625 of 1905.

My present invention has reference to improvements in the "beat up" mechanism, the means for actuating the harness, and in the stop motion of such looms and is illustrated in the accompanying drawings.

Figure 1 is a front elevation of the beat up mechanism. Fig. 2 is a plan thereof. Fig. 3 is a cross section on the line A—B Fig. 1. Fig. 4 is a back view of a part of Fig. 1. Fig. 5 is an end view of part of the loom on a smaller scale. Fig. 6 a plan thereof. Fig. 7 a detail view. Fig. 8 represents an end view of the loom frame showing the shedding or harness mechanism. Fig. 9 is a front view of a portion of the loom frame and shedding mechanism. Fig. 10 is a detail view on a larger scale. Fig. 11 is also a detail view. Figs. 12 to 18 illustrate the improved stop motion.

With reference to the mechanism for "beating up" the pick of weft inserted by the vertically actuated shuttle as described in the said United States specification, under my present invention, and as illustrated in Figs. 1 to 7, the pivots *a* for the carriers *b* to which are secured the open combs *c* effecting the "beat up", consists of spindles fixed vertically in a bar *d*, which bar is reciprocated laterally across the width of the loom on a fixed breast beam *e*. The bar *d* is reciprocated to and fro at the required times by a rod *f* which is pivoted to a lever *g* mounted on a side shaft *h*. This side shaft *h* receives a rocking motion through the medium of a cam *i* mounted on the driving shaft *j* of the loom, or by other suitable gearing through the medium of the driving shaft of the loom. The cam *i* is shown in plan view in Fig. 6, and as it would appear if rolled out flat in Fig. 7. This cam provides for two reciprocations to and fro of the bar *d* for each revolution of the driving shaft, so that the comb *c* will beat up the two picks which are inserted for each revolution of the driving shaft. A lever *g'* mounted on the shaft *h* is provided with a pin engaging with the groove in the cam *i*. To oscillate the open comb *c* through the requisite path the comb carrier *b* is formed with a slotted foot *k*, a pin *l* fixed on a plate *d'* attached to the breast beam *e* entering the slot. Thus as the bar is reciprocated to and fro the comb is vibrated through a wide arc away from the warp threads as the shed is opened for the passage of the shuttle, giving plenty of time for the changing of the shed, and then towards and through the warp threads when the shuttle has passed through the shed, to beat up the inserted pick. The limit of movement of the open comb *c* is indicated in dotted lines 3, 4, in the plan view Fig. 2. The dotted line 3 represents the position of the comb *c* when the bowl on the lever *g'* is in the straight portion of the cam groove as shown in Fig. 6.

As shown in dotted lines 4 in Fig. 2 the comb is beating up the inserted pick. The bar *d* is suitably guided on the plate *d'* secured to the fixed breast beam *e* of the loom. For instance, as shown in the drawings, the bar *d* is cut with slots d^2 to enable tubes *m* to be secured to the fixed plate *d'*. The tubes *m* are slotted to pass the woven tape *n*, and in addition to serving the purpose indicated hereafter, also guide the bar *d* laterally across the fixed breast beam *e*. The open comb is made long enough to enter the warp threads well behind the fell so as to insure its always entering the warps behind the inserted pick of weft should the pick not be close up to the fell.

I have ascertained by experiment that much more perfect work results by imparting a vertical traverse or reciprocatory movement to the beat up comb *c* so that the teeth of the comb do not always enter the warp threads in the same horizontal plane. I have effected this movement by providing the comb carrier *b* with a foot *b'* (see Figs. 2 and 3) to rest upon a bar *o*. This bar *o* is supported by another bar *p* formed with gaps *q* at intervals and inclined or cam surfaces *r*. Pins or studs *s* carry the bar *p* and a reciprocatory movement is imparted to the bar *p*, and as the bar *p* is reciprocated it slowly raises and lowers to a slight degree the superimposed bar *o* which in turn imparts this movement to the comb carrier *b*. Brackets *t* guide the bars *o p* and brackets *u* at each end

of the loom serve to confine the upper bar *o* and prevent horizontal movement thereof. The reciprocatory movement of the bar *p* may be obtained in any convenient manner but I find it can be effected by a star or suitable toothed wheel $u^{\times}$ mounted on the slowly rotated shaft *v* which is used in the loom to actuate the "take up" motion, the star wheel $u^{\times}$ being in contact with a pin or bowl *w* carried by a lever *x* which is pivoted at its lower end to the floor, and at its upper end is connected to the bar *p* bearing underneath bar *o*. As the pivoted lever *x* is slowly oscillated by the star wheel $u^{\times}$ the requisite motion is imparted to the bar *p* and through it to the comb carrier *b*. A spring *x'* is employed to constantly maintain the pin or bowl *w* in contact with the star wheel $u^{\times}$. The shaft *v* is slowly rotated by a worm *y* on the driving shaft *j* which form *y* shown in Fig. 5 gears with a worm wheel *z* on the shaft *v* in the usual manner.

With reference to the harness or shedding mechanism of such looms illustrated in Figs. 8 to 11, to reduce friction the harness frames 2 are held suspended by rods 3^a at each end, the rods being pivoted to brackets 4^a secured to the upper frame work A of the loom, instead of sliding in bearings. The means for suspending the harness frames may be varied. Means are provided to effect the necessary reciprocation of the harness frames 2 for changing the shed. For this purpose I provide one end of the loom frame A with a short shaft 5 fixed in brackets 5^a, on which shaft are loosely mounted two levers 6 6 pivoted centrally or thereabouts, such levers being secured at one end to the harness frames 2 and the other ends of the levers engaging with each side of a cam 7 cut with a cam groove 8 and driven in any suitable manner. The cam 7 with its groove 8 is shown in Fig. 11 as it would appear if rolled out flat. The driving of the cam 7 I conveniently effect as follows. Formed integral with or secured to the cam 7 is a spur wheel 9 the cam and spur wheel being mounted on a stud 10 secured to a bar 11 attached to the frame of the loom. On the driving shaft *j* of the loom I mount a spur wheel 13 which communicates motion to the spur wheel 9 by means of an intermediate gear wheel 14. The rotation of the cam 7 effects the oscillation of the levers 6 and the harness therewith. This method of actuating the suspended harness may be varied in point of mere mechanical detail.

The groove 8 in the cam 7 is cut or arranged to provide for the necessary dwell for the passage of the shuttle through the shed as well as to effect the oscillation of the levers and harness as will be understood and to reduce friction the pins 15 attached to the ends of the levers 6 acted on by the cam 7 are preferably provided with anti-friction bowls 16. I also provide means for slackening the metallic tapes 17 of the harness to facilitate the "entering" of the warp threads, which means are indicated on a larger scale in Fig. 10. To effect this the tapes 17 are mounted at one end in a frame which consists of a spindle 19 on which the tapes are threaded with spacing washers 20 between them, and screwed spindles 21, 21, passing loosely through a cross bar 22 attached to the harness frame 2. Pivoted to a cross-head 24 on the screwed spindles 21 is a handle 25 with a cam or head 26. By bringing the head or cam 26 to bear with more or less pressure against the cross bar 22 the frame 19 21 can be actuated to put the tapes 17 of the harness under any desired tension, or release them from such tension according to the direction of movement of the handle 25 as will be apparent from the drawing. The amount of tension which can be brought to bear upon the tapes by the handle 25 can be regulated by the nuts 26^a on the screwed spindles 21. In connection with the loom I have also invented an improved stop motion shown in Figs. 12 to 18, to promptly effect the stoppage of the loom in case the shuttle meets any obstruction in the shed, and thus prevent breakage of the warps by the shuttle. In carrying this part of my invention into effect each of the tapes *n* being woven is threaded through a slot 27, in a vertically movable detector 27^a, the detector being arranged in the tube *m* close up to the fell of the tape, the tube having a slot *m'* to pass the tape. The lower part of the detector 27^a is formed with a trough or other shaped plate or part 28 having a gap 29 therein. A feeler bar 30 is reciprocated towards and from the dropper.

The feeler bar 30 is slidable in slots 31 cut in brackets 32 attached to the frame of the loom. To reciprocate the feeler bar 30 towards and from the detector 27^a I employ one or more eccentrics 31^a mounted on a shaft 32^a supported in suitable bearings in the frame of the loom the eccentric rods 33 being mounted on pins 34 attached to brackets 35 secured to the feeler bar 30. The shaft 32^a is suitably rotated which may be effected by chain gearing, a chain wheel being mounted on the driving shaft of the loom communicating motion by a chain to a chain wheel 36 on the shaft 32^a. Normally the feeler bar reciprocates within the gap 29 in the trough 28 in the detector 27^a as shown in Figs. 14 to 16 and the detector 27^a is unaffected by the movement of the feeler bar 30. A hinged bar 37 is arranged immediately behind the series of detectors 27^a. In case the shuttle meets any obstruction to its free passage up and down through the shed 38, the tape *n* is raised, or lowered, as the case may be, in the slotted tube *m* thereby lifting or lowering the detector 27^a, so that the feeler bar 30 misses the gap 29 and comes

into contact with the projecting trough 28 or other shaped part of the detector, oscillating the detector and with it the hinged bar 37 disposed immediately behind the detector 27[a]. The slotted tube *m* is screw threaded and provided with stops or nuts 39 for different widths of tape and to limit the movement of the tape *n* in the slot.

The movement of the hinged bar 37 is utilized to bring into action the usual or any convenient stop motion. The stop motion I am at present using is illustrated in Fig. 17 of the drawings. The hinged bar 17 is provided with a rod 40 which, when the bar 37 is unaffected by the detector 27[a] is arranged to support a lever 41 pivoted to a bracket 42 secured to the loom frame A. A cranked arm 43 attached to the lever 41 is provided with pin 44 slidable in the arm 43 against the action of a spring 44[a] as shown separately in Fig. 18. The loom is provided with a bar 45 slidable in a bracket 46 and supported by a lever 47 pivoted at 48 to the loom frame and this bar 45 is reciprocated by means of a cam 49 on the driving shaft *j* of the loom, the cam engaging with a bowl 50 on the bar. The cam 49 and bowl 50 are maintained in contact by a spring 51 attached at one end to the frame A of the loom and at the other to the lever 47. When the hinged bar 37 is actuated as described the rod 40 is lowered as the bar 37 is turned on its hinges thus allowing the lever 41 to drop and with it the arm 43 so as to bring the pin 44 in the path of a projection 52 carried on the reciprocating bar 45 as shown in dotted lines in Fig. 17. The pin 44 is then disposed immediately behind a flexible lever 53 and the projection 52 acting on the pin 44 pushes the lever 53 out of a retaining notch 54 in a bracket 55. The shaft 56 is then rotated by the pull of the spring 57 and this movement of the shaft 56 actuates the belt fork 57[a] so as to remove the driving strap from the fast to the loose pulley of the loom as will be understood.

I declare that what I claim is.—

1. In looms for weaving tapes, ribbons and other small wares having vertically actuated shuttles, the improved beat up mechanism consisting of a fixed breast beam for the loom, a bar mounted on such breast beam, means for reciprocating such bar laterally across the breast beam, spindles carried on the bar, an open comb, carriers for such combs mounted on the spindles, a slotted foot formed on the comb carrier, a spindle on the fixed breast beam of the loom engaging with the slotted foot substantially as described.

2. In combination in looms of the indicated nature, a driving shaft, a rock shaft and means for rocking such shaft from the driving shaft, a fixed breast beam, a bar mounted on such breast beam, a connecting rod attached to the bar, and to a lever on the rock shaft to reciprocate the bar laterally across the fixed breast beam, means for guiding the bar, vertical spindles attached to the bar, an open comb, carriers for such combs mounted on the vertical spindles, a slotted foot formed on the comb carrier, a spindle on the fixed breast beam entering the slot in the foot, a bar *o* disposed beneath the comb carriers and means for raising and lowering such bar to impart a vertical reciprocatory motion to the comb carriers substantially as described.

3. The means for slackening or putting under tension the metallic tapes of the harness consisting of a slidable frame to which the ends of the tapes are secured, a cross head adjustably carried by the frame and a cam lever pivoted to each cross head adapted to set upon a fixed rail of the harness frame providing a bearing for the slidable frame, substantially as described.

4. In combination the harness 17, frames for such harness, links connected to the ends of the harness frames and to the upper sides of the loom, pivoted levers connected to such links, a grooved cam engaging with such pivoted levers, means for slackening or putting under tension the metallic tapes of the harness consisting of a slidable frame to which the ends of the tapes are secured, a cross head adjustably carried by the frame and a cam lever pivoted to such cross head adapted to set upon a fixed rail of the harness frame providing a bearing for the slidable frame, substantially as described.

5. In combination in looms of the indicated nature, a driving shaft, a rock shaft and means for rocking such shaft from the driving shaft, a fixed breast beam, a bar mounted on such breast beam, a connecting rod attached to the bar and to a lever on the rock shaft to reciprocate the bar laterally across the fixed breast beam, means for guiding the bar, vertical spindles attached to the bar, an open comb, carriers for such combs mounted on the vertical spindles, a slotted foot formed on the comb carrier, a spindle on the fixed breast beam entering the slot in the foot, a bar *o* disposed beneath the comb carriers and means for raising and lowering such bar to impart a vertical reciprocatory motion to the comb carriers, the harness 17, frames for such harness, means for suspending such harness frames, pivoted levers connected to the harness frames, means for oscillating such levers and connected harness frames, from the driving shaft and means for slackening or putting under tension the metallic tapes of the harness substantially as described.

6. The combination in looms of the indicated nature of a slotted tube, a detector arranged within the tube and slotted to carry the tape or ribbon, projections on such detector to form a trough or gap, a feeler bar

with means to reciprocate such bar towards and from the detector, and a pivoted bar arranged behind the detector said bar feeler being adapted to push the detector against the pivoted bar when the tape is raised or lowered substantially as described.

7. The combination in looms of the indicated nature of a slotted tube, a detector arranged within the tube and slotted to carry the tape or ribbon, projections on such detector to form a trough or gap, a feeler bar with means to reciprocate such bar towards and from the detector and a pivoted bar arranged behind the detector, and means actuated by the pivoted bar for effecting the stoppage of the loom substantially as described.

8. In combination in looms of the indicated nature, a driving shaft, a rock shaft and means for rocking such shaft from the driving shaft, a fixed breast beam, a bar mounted on such breast beam, a connecting rod attached to the bar and to a lever on the rock shaft to reciprocate the bar laterally across the fixed breast beam, means for guiding the bar, vertical spindles attached to the bar, an open comb, carriers for such combs mounted on the vertical spindles, a slotted foot formed on the comb carrier, a spindle on the fixed breast beam entering the slot in the foot, a bar *o* disposed beneath the comb carriers and means for raising and lowering such bar to impart a vertical reciprocatory motion to the comb carriers, a slotted tube, a detector arranged within the tube and slotted to carry the tape or ribbon, projections on such detector to form a trough or gap, a feeler bar with means to reciprocate such bar towards and from the detector and a pivoted bar arranged behind the detector and means actuated by the pivoted bar for effecting the stoppage of the loom substantially as described.

9. In combination the harness 17, frames for such harness, means for suspending such harness frames, pivoted levers connected to the harness frames, means for oscillating such levers and connected harness frames from the driving shaft and means for slackening or putting under tension the metallic tapes of the harness, a slotted tube, a detector arranged within the tube and slotted to carry the tape or ribbon, projections on such detector to form a trough or gap, a feeler bar with means to reciprocate such bar towards and from the detector, a pivoted bar arranged behind the detector and means actuated by the pivoted bar for effecting the stoppage of the loom substantially as described.

10. In combination in looms of the indicated nature, a driving shaft, a rock shaft and means for rocking such shaft from the driving shaft, a fixed breast beam a bar mounted on such breast beam, a connecting rod attached to the bar and to a lever on the rock shaft to reciprocate the bar laterally across the fixed breast beam, means for guiding the bar, vertical spindles attached to the bar, an open comb, carriers for such combs mounted on the vertical spindles, a slotted foot formed on the comb carrier, a spindle on the fixed breast beam entering the slot in the foot, a bar *o* disposed beneath the comb carriers and means for raising and lowering such bar to impart a vertical reciprocatory motion to the comb carriers, the harness 17 frames for such harness, means for suspending such harness frames, pivoted levers connected to the harness frames, means for oscillating such levers and connected harness frames from the driving shaft and means for slackening or putting under tension the metallic tapes of the harness, a slotted tube, a detector arranged within the tube and slotted to carry the tape or ribbon, projections on such detector to form a trough or gap, a feeler bar with means to reciprocate such bar towards and from the detector, and a pivoted bar arranged behind the detector and means actuated by the pivoted bar for effecting the stoppage of the loom substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES HIGGIN MAXSTED.

Witnesses:

JOSHUA ENTWISLE,

ALFRED YATES.