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RATCHET MECHANISM

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FIG. 1

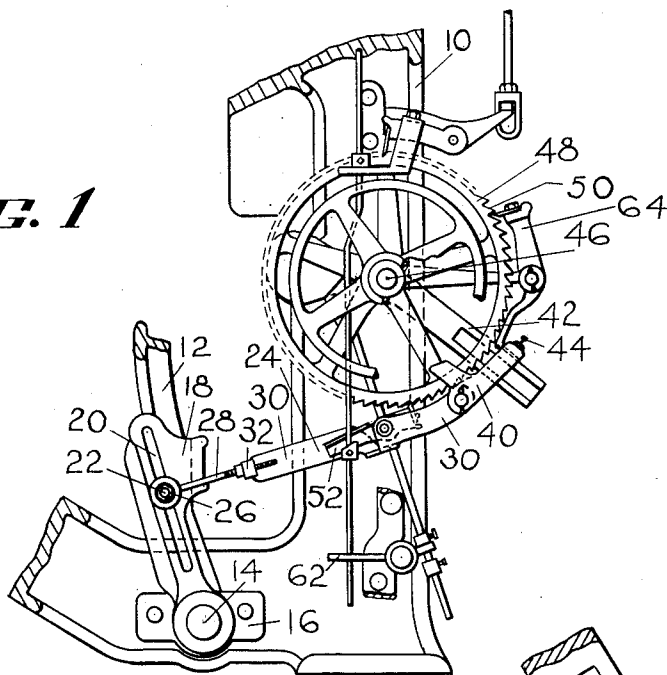


FIG. 2

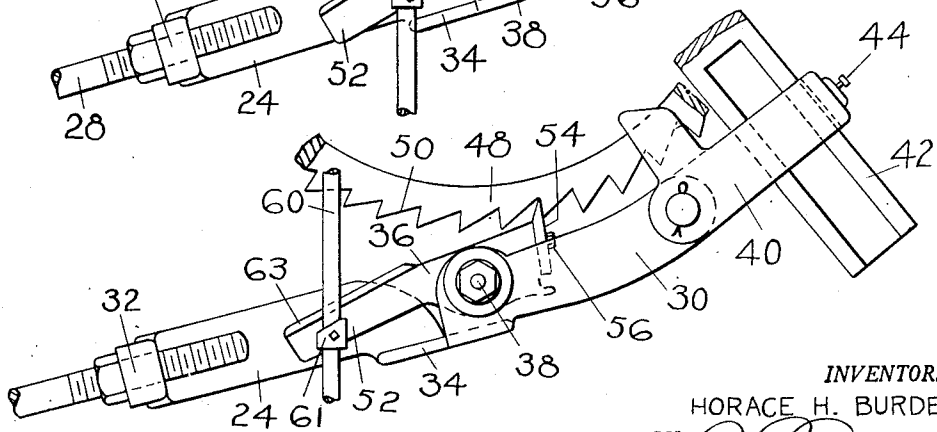
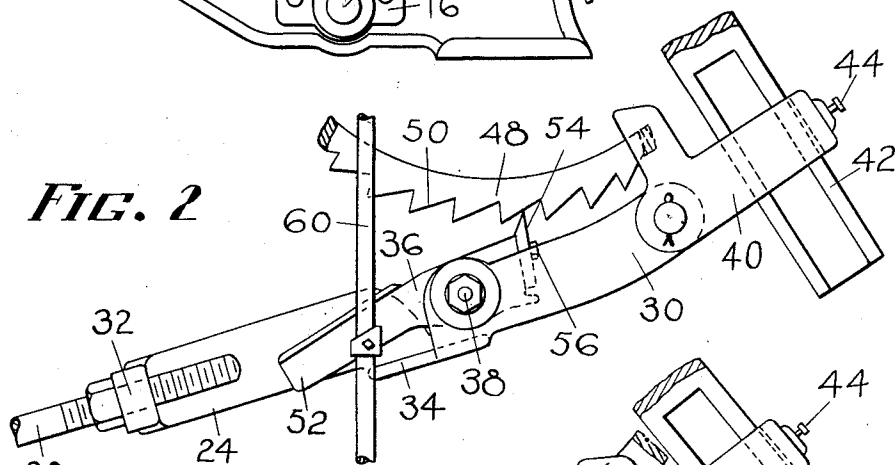


FIG. 3

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RATCHET MECHANISM

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6 Claims. (Cl. 74—144)

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The present invention relates generally to cloth take-up mechanisms for looms and, as illustrated herein, relates more particularly to an improved pawl and pawl carrier for use in such take-up mechanisms.

In loom take-ups of the type to which the present invention is applied, the take-up roll is positively rotated at a uniform speed to feed the cloth forwardly in the loom by a pawl and ratchet mechanism. In order to insure that the cloth will be even and uniform in appearance, the take-up roll must be rotated a uniform amount each pick; otherwise the cloth will have thick and thin places which materially detract from its appearance and value. In modern high speed looms, the usual pawl tooth may under some conditions fail to engage the proper tooth of the ratchet wheel with the result that the ratchet wheel fails to rotate a sufficient distance to properly rotate the take-up roll. Thus the cloth is not taken up a sufficient amount and a thick place is produced in the cloth.

One object of the present invention, accordingly, is to provide a pawl and pawl carrier so arranged that engagement of the pawl with the proper tooth of the ratchet wheel will be insured at each pick of the loom. To this end, the pawl is pivotally mounted on a pawl carrier which moves, on its return stroke, away from the teeth of the ratchet wheel, in a fashion or manner which permits the pawl tooth to rotate on its pivot toward the ratchet wheel relative to the pawl carrier. By the use of such a construction, the pawl moves in the proper direction to engage the correct tooth of the ratchet wheel when the pawl carrier reverses its direction of movement to commence a working stroke to drive the ratchet wheel. As illustrated, the pawl carrier is pivotally secured at one end to an adjustably fixed bracket on an arm which is pivoted on the ratchet wheel shaft and at its other end is pivoted to an arm fast on the rocker shaft supporting the lay sword. The pivots are so related in space relative to the ratchet wheel and the length of the carrier is so adjusted that the carrier, on its return movement, moves downwardly and away from the ratchet wheel thus permitting the pawl to pivot toward the ratchet wheel.

With the above and other objects in view as will hereinafter more fully appear, the invention will now be described with particular reference to the accompanying drawings which illustrate a preferred embodiment of the invention and in which:

Fig. 1 is a view in side elevation of parts of the left hand forward portion of a loom with portions

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removed for the sake of clarity of illustration and having the present invention applied thereto;

Fig. 2 is a detail view on an enlarged scale showing the pawl carrier at the end of its return stroke; and

Fig. 3 is a view similar to Fig. 2 but showing the pawl carrier at the end of its operative or working stroke and at the beginning of the return stroke.

The drawings illustrate only such portions of a loom as is necessary to a full understanding of the invention. The parts not shown are of usual construction and form no part of the present invention. Certain of the conventional parts are only fragmentarily shown, for the sake of clarity and conciseness of illustration.

The drawings show a portion of the left hand side frame 10 of a loom. A lay sword 12 is fixed to a shaft 14 which is rotatably mounted in a bearing 16 fixed to the lower portion of the side frame 10. The shaft 14 also has fixed thereto a take-up pawl actuator arm 18 having a slot 20 for receiving a shoulder bolt 22 which is secured in adjusted position in slot 20 in any suitable manner.

A pawl carrier 24 comprising a part 30 and a rod 28 is pivotally connected to the arm 18 by the bolt 22 and is held in position thereon for pivotal movement by nut means 26. The parts forming carrier 24 are adjustably secured together. The left hand end is in the form of a rod 28 having a threaded end which is received in a threaded opening formed in the part 30. The part 30 is preferably formed as a casting and is provided at one end with a laterally extending shoulder 32 having the threaded hole in which the threaded end of the rod 28 is received. The left hand and right hand ends of the part 30 are offset laterally from each other a sufficient distance to provide a ledge 34 which acts as a stop for a pawl 36. The pawl 36 is pivotally mounted on the part 30 by bolt and nut means 38 which permits the pawl to pivot freely. The right hand end of the pawl carrier 24 is pivotally connected to an arm 40.

Arm 40 is formed with an aperture adjacent one end thereof through which an arm 42 is passed. Arm 40 is secured in adjusted position to arm 42 by a set screw 44 passing through a threaded hole in the end of arm 40. Arm 42 is pivotally mounted on a shaft 46 mounted in a bearing (not shown) fixed to the side frame 10 of the loom.

The shaft 46 has fixed, adjacent to its outer end, a ratchet wheel 48 having ratchet teeth 50 thereon which are engaged by the pawl 36 to rotate the ratchet wheel. The inner end of the shaft

46 is provided with a gear connection (not shown) to a take-up roll (not shown) as is usual in constructions of this type.

Pawl 36 is provided with a tail 52 which is substantially heavier than the part of the pawl on the opposite side of the pivot 38 so that pawl 36 normally tends to rotate in a counter-clockwise direction as viewed in the drawings, tail 52 tending to move toward the ledge or stop 34. The pawl 36 is provided with an adjustable ratchet wheel engaging tooth member 54 which is fixed in adjusted position by a set screw 56 threaded into a tapped hole in the pawl. The tooth member 54 is so adjusted that the tail 52 does not engage the stop 34 at any time during normal loom operation. Thus the pawl 36 is free to rotate in a counter-clockwise direction under the influence of gravitational forces to permit tooth member 54 to move into engagement with the teeth 50 of the ratchet wheel 48. The effective length of rod 28 is by adjustment at its threaded end so fixed that movement of arm 40 about shaft 46 as a center and movement of bolt 22 about shaft 14 as a center will cause bolt 38 to travel along a path or line whose angle with respect to a horizontal plane is always greater than is that of the back surface of the tooth 50 being traversed by member 54 on its non-operating or return stroke. Thus, on its non-working or return stroke pawl carrier 24 moves bolt 38 downwardly away from the ratchet wheel 48 a distance which is greater than the depth of the engaged tooth 50 but which distance is not sufficiently great to cause the tooth engaging member 54 to become disengaged from the sloping surface of the tooth 50.

The result of the above described action is that pawl 36 is allowed to rotate in a counter-clockwise direction about bolt 38 during the entire return stroke of the pawl. Hence, when the carrier reverses its direction of movement to commence a working stroke, the pawl is already rotating or has completed rotation in a direction which will bring tooth member 54 into engagement with the next or a succeeding tooth of ratchet wheel 48. Thus the pawl will with certainty engage the desired tooth of the ratchet wheel and will advance the ratchet wheel the proper distance. It is clear; therefore, that the present construction effectively insures proper rotation of the ratchet wheel each pick and consequently formation of thick spots in the cloth is obviated.

It will be noted that it is immaterial whether the non-working or return stroke is great enough to cover one, or several, ratchet-wheel teeth, since the pawl 36 is permitted to rotate counter clockwise during the entire return stroke of carrier 24. Only tail 52 contacting ledge 34, or member 54 contacting the ratchet wheel at the end of a return stroke, can cause cessation of the counter-clockwise movement of the pawl. The number of teeth in the ratchet wheel, and the length of stroke of carrier 24 may be varied to accommodate the requirements of the desired design of loom.

A conventional lift rod 60 with an adjustable lug 61 having an extension underlying a ledge 63 on the tail 52 of pawl 36, and guided by a bracket 62 affixed to the loom frame, is arranged to raise tail 52 of the pawl to disengage the pawl from the ratchet wheel when desired. Likewise a conventional holding pawl 64 may be employed in the usual fashion in conjunction with the ratchet wheel to hold the same in advanced position.

Having fully disclosed a preferred embodiment of the invention, what I claim and desire to secure by Letters Patent of the United States is:

1. A loom cloth take-up mechanism comprising, in combination, a shaft to be intermittently rotated, a ratchet wheel fixed on said shaft, a pawl carrier having a pivot thereon, a driving pawl mounted on said pivot and having a tooth and a weighted tail piece arranged on opposite sides of the pivot, and means supporting and imparting to said carrier alternating working and return strokes, the supporting means for said carrier being so guided that on working strokes the said pivot approaches said ratchet wheel throughout substantially the entire stroke and said tooth rotates toward said carrier and on return strokes, said pivot recedes from said ratchet wheel for substantially the entire stroke and said tooth rotates away from said carrier and toward the ratchet wheel, whereby certainty of engagement of said tooth and said wheel during return strokes is assured.

2. In a loom cloth take-up mechanism comprising, in combination, a shaft to be rotated intermittently, a ratchet wheel fixed on said shaft, a pawl carrier having a pivot and a pawl rotatable about said pivot on said carrier and having engagement with teeth on said ratchet wheel, said pawl having a weight at the opposite side of the pivot from its tooth engaging end and being so disposed that the weight tends to maintain the tooth engaging end of the pawl in contact with the ratchet wheel, means for supporting said pawl carrier and for guiding it in a path-way so related to the ratchet wheel that on return strokes of the carrier and pawl, the pivot for the pawl is moved away from the ratchet wheel throughout substantially the entire stroke and for a total distance equal to the depth of the ratchet wheel teeth, so that the tooth engaging end of the pawl is moved only in a direction away from the carrier and toward the ratchet wheel and toward the next succeeding tooth to be engaged.

3. In a loom cloth take-up mechanism comprising, in combination, a shaft to be rotated intermittently, a ratchet wheel fixed on said shaft, a pawl carrier having a pivot and a pawl rotatable about said pivot on said carrier and having engagement with teeth on said ratchet wheel, said pawl having a weight at the opposite side of the pivot from its tooth engaging end and being so disposed that the weight tends to maintain the tooth engaging end of the pawl in contact with the ratchet wheel, means upon which said pawl carrier is pivoted at spaced points, said means itself being pivoted for swinging movement to impart a reciprocatory movement to the carrier such that on its return strokes, the pivot for the pawl is moved away from the ratchet wheel for a total distance equal to the depth of the ratchet wheel teeth, at a rate sufficient to cause the tooth engaging end of the pawl in following along the back of a tooth next to be engaged, to move toward the ratchet wheel and toward a next succeeding tooth to be engaged.

4. In a loom cloth take-up mechanism comprising, in combination, a shaft to be rotated intermittently, a ratchet wheel fixed on said shaft, a pawl carrier having a pivot and a pawl rotatable about said pivot on said carrier and having engagement with teeth on said ratchet wheel, said pawl having a weight at the opposite side of the pivot from its tooth engaging end and being so disposed that the weight tends to

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maintain the tooth engaging end of the pawl in contact with the ratchet wheel, arms upon which said pawl carrier is pivoted at spaced points, other pivot means for said arms, said carrier being reciprocable upon swinging of said arms, said arm pivots and the connecting pivots between the arms and carrier being so positioned relatively to said ratchet wheel that upon return strokes of the carrier the pivot for the pawl is caused to follow a pathway which recedes from the ratchet wheel for a total distance equal to the depth of the ratchet wheel teeth, at a rate sufficient to cause the tooth engaging end of the pawl in following along the back of a tooth, to move toward the ratchet wheel and toward a next succeeding tooth to be engaged.

5. In a loom cloth take-up mechanism comprising, in combination, a shaft to be rotated, a ratchet wheel fixed on said shaft and having teeth with faces to be engaged by a pawl for advancing the ratchet wheel and inclined back portions upon which a pawl may ride in moving to engage a next succeeding tooth, a pawl carrier having a pivot and a pawl rotatable about said pivot and urged into engagement with said ratchet wheel teeth, said pawl having a weight at the opposite side of the pivot from its tooth engaging end and being so disposed that the weight tends to maintain the tooth engaging end of the pawl in contact with the ratchet wheel, means comprising a plurality of arms and pivots about which said arms are positively oscillated for supporting said pawl carrier and for confining it to a pathway such that the pivot for the pawl, on return strokes of the carrier and pawl, is constrained to follow a pathway substantially parallel to the extension of the back portion of that tooth over which the pawl is at that time moving, so that the pawl in moving to engage succeeding teeth is not rotated about its pivot away from the ratchet wheel.

6. A pawl and ratchet mechanism comprising

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a ratchet wheel having teeth with faces to be engaged by a pawl for advancing the ratchet wheel and inclined back portions upon which a pawl may ride in moving to engage a next succeeding tooth, a pawl carrier having a pivot and a pawl rotatable about said pivot and urged into engagement with said ratchet wheel teeth, said pawl having a weight at the opposite side of the pivot from its tooth engaging end and being so disposed that the weight tends to maintain the tooth engaging end of the pawl in contact with the ratchet wheel, means comprising a plurality of arms and pivots about which said arms are positively oscillated for supporting said pawl carrier and for confining it to a pathway such that the pivot for the pawl, on return strokes of the carrier and pawl, is constrained to follow a pathway substantially parallel to the extension of the back portion of that tooth over which the pawl is at that time moving, so that the pawl in moving to engage succeeding teeth is not rotated about its pivot away from the ratchet wheel.

HORACE H. BURDETT.

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