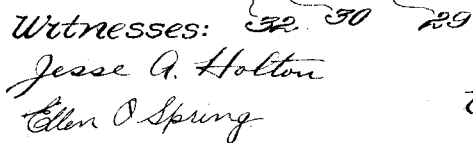


1,064,494.

3 SHEETS—SHEET 1.



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SHEDDING MECHANISM FOR LOOMS.
APPLICATION FILED AUG. 7, 1911.

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3 SHEETS—SHEET 3.

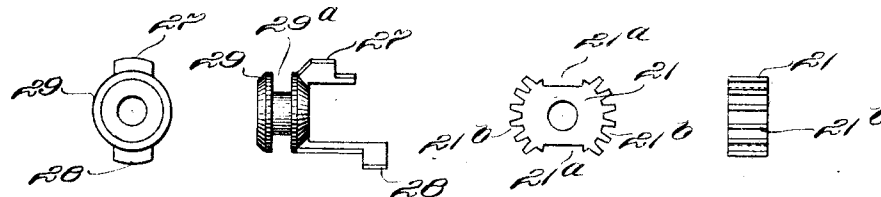
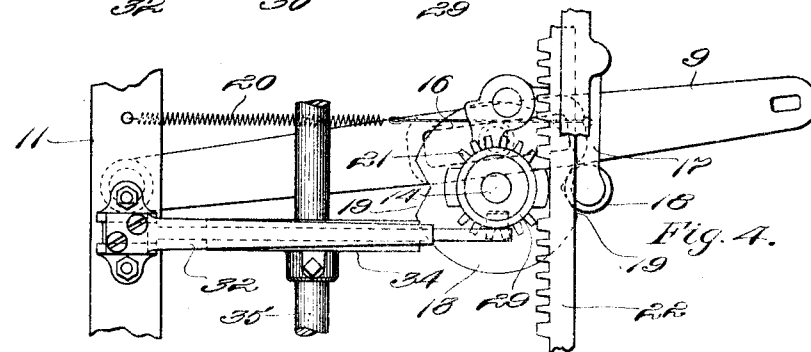
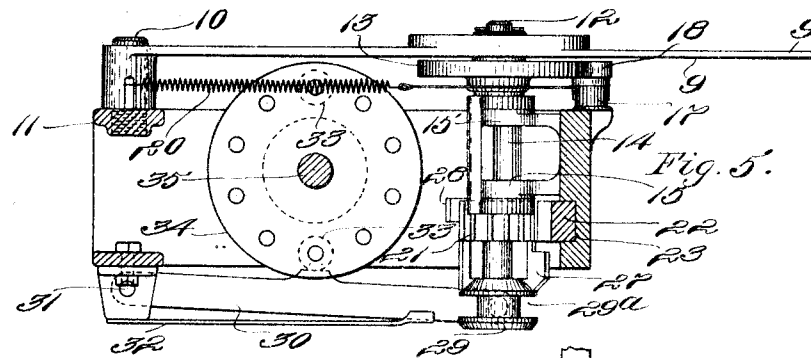


Fig. 8. Fig. 9. Fig. 6. Fig. 7.

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UNITED STATES PATENT OFFICE.

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SHEDDING MECHANISM FOR LOOMS.

1,064,494.

Specification of Letters Patent.

Patented June 10, 1913.

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To all whom it may concern:

Be it known that I, FRED LACEY, a citizen of the United States, residing at Lowell, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Shedding Mechanism for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to pattern-controlled harness-operating mechanism for looms, and provides for the actuation of the harness-frames of a loom by devices having important advantages over those heretofore employed to form sheds in the warp in a loom.

The invention presents a novel construction, combination, and arrangement of parts, constituting a novel and improved shedding mechanism of the open-shed type, and which is less subject to wear and tear, and more durable, than the dobbies and other forms of pattern-controlled shedding mechanisms at present in general use.

The invention resides in a pattern-controlled loom shedding mechanism wherein the series of harness-frames of a loom is combined operatively with a series of cranks or their equivalents which are supported by bearings mounted in fixed or stationary positions in the loom, and which are operated, to raise some of the harness-frames and lower others as required to form a shed in the warp-threads, by means of a driven gear for each crank or its equivalent, and a driver constituted by a moving toothed surface, the actuation of a crank or its equivalent through the agency of the said toothed driver and the driven gear pertaining to such crank being caused by starting devices in connection with such parts, controlled by pattern mechanism.

The invention admits of being embodied in different specific constructions, all involving the same general principles. I have herein, by way of illustration, chosen an embodiment in which the toothed surface constituting the driver moves normally without moving the driven gear, which remains at rest, and in which movable starting teeth for initiating engagement of the

driver and driven gear with each other, to bring about a partial rotation of the gear and crank each time a change is required in the position of the corresponding harness-frame, are moved into acting position under control of the pattern-surface.

The embodiment just referred to is shown in the drawings, in which,—

Figure 1 shows in side-elevation the frame of a loom, and a harness-operating mechanism containing the said embodiment of the invention. Fig. 2 is a top view of the parts shown in Fig. 1. Fig. 3 is a front elevation of the said parts, including also the harness-frames and the connections therewith. Fig. 4 is a view in side elevation showing a harness-lever and the parts which are concerned more immediately in the actuation thereof. Fig. 5 is a plan view of the parts shown in Fig. 4. Fig. 6 is a side-view, and Fig. 7 an edge view, of one of the mutilated gears. Fig. 8 is an end view, and Fig. 9 a front elevation, of the starting teeth for the mutilated gear of Figs. 6 and 7.

Having reference to the drawings,—the side of the loom-frame which is partly shown in the drawings is marked 1, in Figs. 1, 2 and 3, and 2 is the arch thereof. The harness-frames shown in Fig. 3 are marked 3, 3. The harness-connections are marked 4, 4, those connected with the tops of the harness-frames passing upward to and partly around sheaves 5 mounted upon the arch 2, and then outward to and partly around other sheaves 6, from which they extend down to and are connected with the harness-operating levers. Those which are connected with the bottoms of the harness-frames pass downward to and partly around sheaves 7 mounted in the lower part of the loom, and then outward to and partly around other sheaves 8, from which they extend up to and are connected with the harness-operating levers. The said levers, termed hereinafter simply harness-levers, are marked 9, 9, etc. They are mounted pivotally by their rear ends upon studs 10, 10, etc., Figs. 2, 3 and 5, carried by the frame of the shedding mechanism attachment, such frame being supported in convenient

manner at that side of the loom which is represented in the drawings.

The actuating devices for the harness-levers, and the pattern-mechanism by which the action of such devices is controlled, are mounted in the frame 11.

The actuating crank for each harness-lever comprises a crank-pin 12 projecting from the face of a carrier-disk 13, the said disk being fixed on a short shaft 14 mounted in bearings 15, 15', which are provided in connection with frame 11. The said crank-pin is engaged with the harness-lever by being entered into a slot 16, Fig. 4, in such lever. While at rest, the crank stands either in its upper position represented in Fig. 4, with the harness-lever 9 raised, which corresponds with the depressed position of the connected harness-frame, or in the opposite position shown in the case of the lowest crank in Fig. 3, with the harness-lever depressed and the connected harness-frame elevated. The crank is arrested and held in either one or the other of the said positions, after a half-revolution thereof, by means of a check-lever 17 carrying a roll 18 which bears upon the edge of the crank-disk and enters opposite notches 19, 19, Fig. 4, therein, as they successively are presented to the roll by successive half-revolutions of the crank, the said arm being actuated by means of a contracting spiral spring 20 which holds the roll firmly seated in one of said notches while the crank is motionless, or in contact with said edge as the crank turns.

The driven gear in connection with each crank is shown at 21, it being connected with the crank to turn in unison therewith, as by being fixed upon shaft 14. It is what is known as a mutilated gear, it being formed with opposite toothless spaces or gaps 21^a, 21^b, Fig. 6, and two segmental series of teeth, marked 21^b, 21^b. The moving toothed driver is shown at 22. It is in the form of a straight rack which moves lengthwise in a guideway 23, Fig. 5, in the frame 11, and is reciprocated in such guideway by actuating connections comprising a connecting link 24, Figs. 1 and 2, and a crank 25 on the cam-shaft 26 of the loom. To enable the entire series of driven gears to be operated by means of one driver, the shafts 14, 14, are disposed in a vertical series in the frame 11, one mounted vertically above another, and the different driven gears are all located in the same vertical plane with one another. The rack is mounted in position for engaging with all of the said gears, as just indicated.

To enable the cranks to remain at rest while the driver 22 reciprocates up and down, the toothless spaces or gaps 21^a, 21^a, of each driven gear are so located on the

said gear that one or the other of them will be presented next to the driver while the connected crank is in its positions of rest, and such gaps are of such size as to permit the driver to reciprocate without touching the teeth of segments 21^b, 21^b.

Referring to Figs. 4 to 9, the movable starting teeth for a given driven gear are shown at 27, 28. They are provided upon arms carried by a hub 29 which fits upon the shaft 14 of such gear. The arms occupy notches in the driven gear at the gaps 21^a, 21^a, and are adapted to slide therein lengthwise of shaft 14. The two starting teeth 27, 28, are in different transverse vertical planes, at different distances from the hub, so that when one thereof is in line with a tooth or projection on the toothed driver designed to engage therewith the other is out of line with the tooth or projection on the driver that is designed for engagement therewith, and a movement of the hub and teeth lengthwise of shaft 14 that shifts the latter tooth into line with its cooperating tooth or projection on the driver shifts the first tooth out of line with its cooperating tooth or projection on the driver, and vice versa. The shifting movements of the starting teeth 27, 28, are timed to occur during the dwell of the driver at the end of its stroke in either direction. To permit one of said teeth to be moved into position in readiness to be engaged by the coacting tooth or projection as the driver makes its stroke, gaps shown in Figs. 1 and 4 are left among the teeth of the driver at those places which are presented to the respective driven gears at the ends of the strokes of the driver.

For the purpose of shifting the starting teeth lengthwise of a shaft 14, each hub 29 is grooved circumferentially at 29^a, Figs. 5 and 9, and receives a pin carried by a lever 30 which is pivoted at 31, Figs. 2 and 5, upon frame 11. When the lever swings horizontally around the said pivot, it carries the hub and starting teeth with it. The lever is acted upon by a leaf-spring 32, which holds it normally in its inner position, and returns it to such position after having been swung outward therefrom, when permitted to do so. The position of the starting teeth is controlled automatically by means of a pattern-surface which coacts with the said lever and spring. The said pattern-surface is constituted by a series of rolls 33, 33, Figs. 2 and 5, mounted between the disks or flanges of a horizontal pattern-wheel 34, such disks or flanges also receiving between them a portion of the lever 30 so as to retain the latter in register with the rolls 33, 33.

The pattern-wheels for all the driven gears pertaining to the cranks are fixed upon an upright shaft 35 which is mounted in bearings in frame 11, and intermittingly

rotated from the cam-shaft 26 of the loom by means of a worm-wheel 36 fixed upon the lower end of shaft 35, a worm 37 engaging with said worm-wheel, a miter-gear 38 with which said worm is fixedly connected, and a miter-gear 39 fixed on the said cam-shaft and with which the miter-gear 38 meshes.

Fig. 5 shows a roll 33 engaged with an arm 30, and the latter held thereby in its outward position, with starting tooth 27 drawn outward beyond the driven gear 21 and starting tooth 28 occupying one of the gaps of such gear, but at the side of the latter farthest from the toothed driver 22. Consequently, the latter moves without actuating the driven gear. Turning movement of shaft 35 will carry said roll 33 out of engagement with arm 30, so as to permit spring 32 to move arm 30 inward and thereby cause the starting teeth to be shifted so as to move the starting tooth 28 into a position inward of the driven gear, and starting tooth 27 in the gap of the driven gear and also in the gap which the driver presents opposite said gear at such moment. As the toothed driver now moves in one direction, the leading tooth of a series of the teeth thereof will encounter starting tooth 27 and turn the driven gear far enough around for the following teeth of such series to mesh with those of one of the segments of the driven gear. Thereby the driven gear will be turned half-way around, whereupon the two sets of teeth will run out of mesh with each other, at the other gap, and the driven gear will stand at rest, with starting tooth 27 at the side farthest from the toothed driver, and starting tooth 28 inward out of line with the teeth of the driver. When next in the turning movement of the shaft 35, a roll 33 is caused to engage arm 30 so as to move it outward and shift the starting teeth into their outward position, the starting tooth 28, it being now at the side next the toothed driver, will be moved into line with teeth of the latter, while starting tooth 27, it being at the side of the driven gear farthest from the driver, will be moved outward out of line with such teeth. In the ensuing movement of the toothed driver, the tooth thereof which leads will engage starting tooth 28 and turn the driven gear far enough for the succeeding teeth on the driver to mesh with those of one of the segments of the driven gear and turn the driven gear half-way around, until the two sets of teeth run out of mesh with each other at the gap occupied by the arm carrying starting tooth 27.

The number of cranks 12, and accessory mechanisms for actuating the same and controlling the action thereof, with which a loom is equipped may be varied in practice.

The harness-levers 9, 9, being mounted

one above another, upon separate pivots, are all brought within narrow width, and the entire shedding mechanism projects only to a small extent from the loom side. By thus mounting the harness-levers I am enabled to provide bearings of any approved length in connection with the said levers, and also am enabled to make the walls of the slots in the harness-levers of any approved width. As shown in Fig. 5, this permits the harness-levers to be formed with long bearings fitting the supporting studs 10 whereby the mountings for the pattern-levers are rendered more substantial, and also permits the said harness-levers to be formed of increased thickness around the said slots, which obviates rapid wear and cutting away of the walls of the slots. The harness-levers are all readily accessible, and any one thereof may be removed or replaced without disturbing any of the others.

The cranks 12 are in practice of different throw, in order that the respective harness-levers and harness-frames may be moved thereby to the proper extents for the production of uniform V-sheds.

The pattern-wheels preferably are located one above another between the harness-levers 9, 9, and the pattern-levers 30, 30, thereby giving great compactness.

What is claimed as the invention is:—

1. In loom shedding mechanism, the combination with a series of harness-frames in a loom, of a series of cranks supported by bearings occupying fixed or stationary positions one above another in the loom and respectively connecting operatively with the respective harness-frames, a driven gear for each crank, a moving toothed driver, starting devices for causing the actuation of a crank and its rotation through a half-revolution through the agency of said driver and the driven gear pertaining to such crank, and pattern-mechanism having lines of pattern-indicators one above another controlling said starting devices.

2. In loom shedding mechanism, the combination with a series of harness-frames in a loom, of a series of cranks mounted one above another and respectively connected operatively with the respective harness-frames, a mutilated gear for each crank, starting teeth in connection with said mutilated gear, a toothed driver which coacts with said starting teeth and the mutilated gears in giving half-revolutions to the said cranks and thereby raising and lowering the respective harness-frames, and pattern-mechanism having lines of pattern-indicators one above another in control of the said starting teeth.

3. In loom shedding mechanism, the combination with a series of harness-frames of a series of harness-levers with which the

said harness-frames are connected, the said harness-levers being mounted one above another, a series of cranks for actuating said harness-levers, and pattern-controlled mechanism for giving half-revolutions to said cranks to actuate the harness-levers to raise and lower the harness-frames.

In testimony whereof I affix my signature in presence of two witnesses.

FRED LACEY.

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