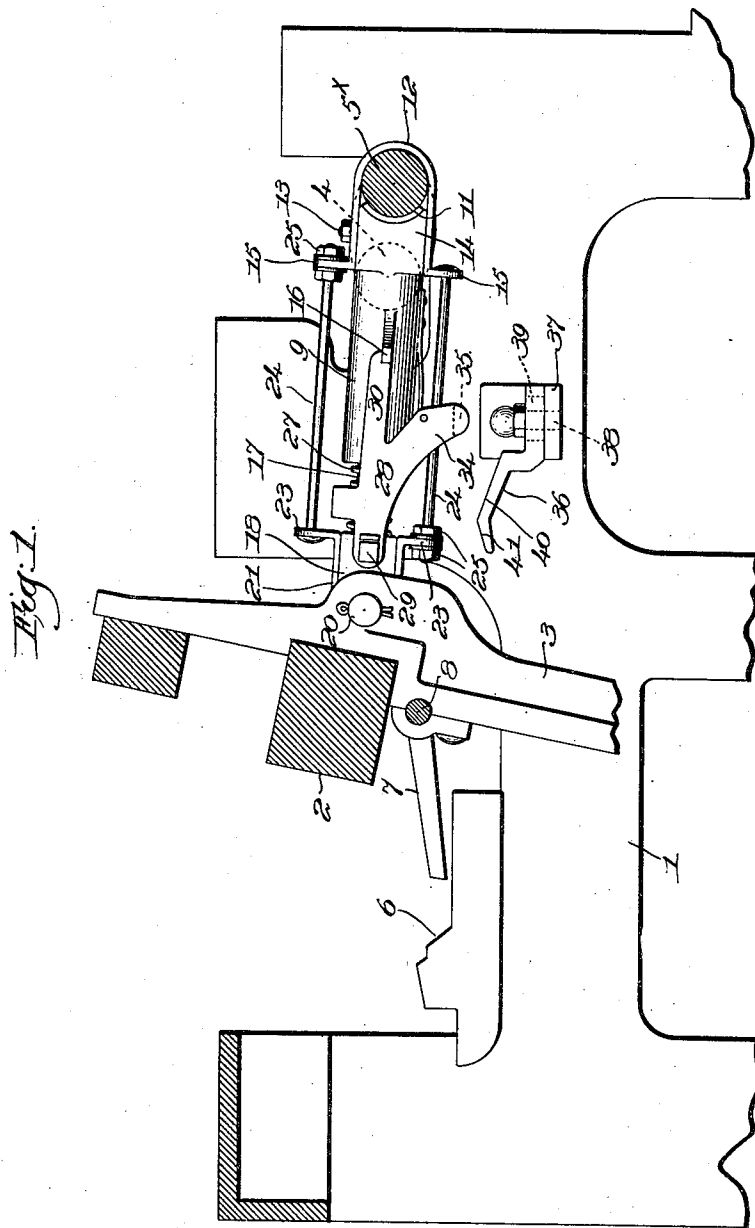


No. 873,606.

PATENTED DEC. 10, 1907.

A. E. RHOADES.
LAY MOTION FOR LOOMS.
APPLICATION FILED MAY 2, 1907.

2 SHEETS—SHEET 1.



Witnesses,
Edward H. Allen.
Joseph M. Ward.

Inwitness,
Alonzo E. Rhoades,
by Crosby & Gregory

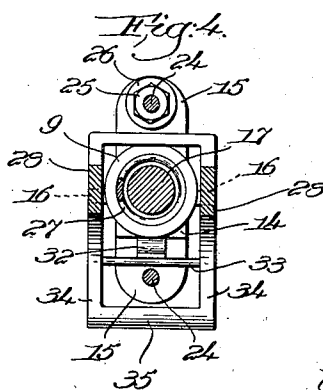
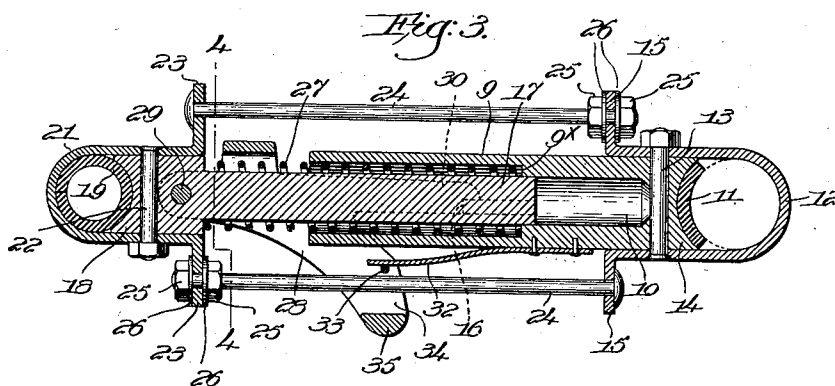
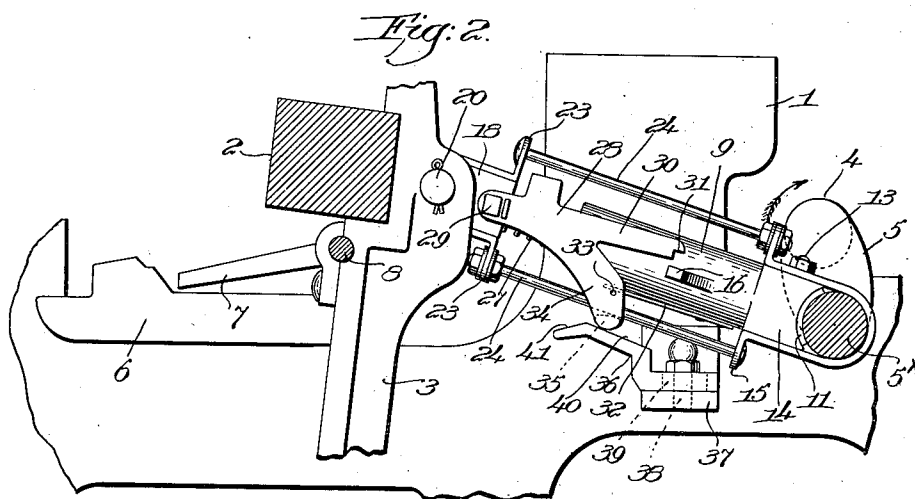
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Attys.

UNITED STATES PATENT OFFICE.

ALONZO E. RHOADES, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

LAY-MOTION FOR LOOMS.

No. 873,606.

Specification of Letters Patent.

Patented Dec. 10, 1907.

Application filed May 2, 1907. Serial No. 371,365.

To all whom it may concern:

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, residing in Hopedale, county of Worcester, and State of Massachusetts, have invented an Improvement in Lay-Motions for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has particular reference to the lay-motion of a loom, whereby the reciprocation of the lay is effected through a connection with the rotating crank-shaft of the loom, and it has for its object the production of novel connecting means between the lay and crank-shaft, whereby when the usual protection mechanism operates to stop the lay the connection will act to prevent straining or breakage of the lay-sword as the movement of the crank-shaft continues.

It is well known that the stoppage of the lay by the operation of the protection mechanism subjects the lay-swords to great strains, and frequently they are broken by such action, the movement of the crank-shaft continuing, by reason of the momentum of the parts, after the sudden stoppage of the lay.

In my present invention I have provided a novel and efficient direct connection between the crank-shaft and the lay-swords, with automatic means to permit a yielding of the said connection should the lay be suddenly stopped before it reaches front center, as by the operation of the protection mechanism. The connection is so constructed and arranged that any continued movement of the crank-shaft after such stoppage of the lay is taken up and absorbed by means within or forming a part of the connection, so that the lay-sword is relieved from forcible breaking strains.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a transverse sectional view of a portion of a loom, with one embodiment of my invention applied thereto, the lay being shown at back center and with the parts in normal operating condition; Fig. 2 is a view similar to Fig. 1, but showing the change in the novel part of the apparatus just at the beginning of the period during which the

protection mechanism operates if the shuttle is improperly boxed; Fig. 3 is an enlarged longitudinal section of my novel form of connection between the lay and the crank-shaft; Fig. 4 is a cross-sectional detail on the line 4—4, Fig. 3, looking toward the right.

Referring to Figs. 1 and 2 the loom-side 1, the lay 2 and its attached lay-sword 3, the crank-shaft 4 and crank 5, the frog 6 and the dagger 7 mounted on the lay and adapted to cooperate with the frog when the shuttle fails to box properly, may be and are all of usual construction and operate in well known manner, the frog 6, dagger 7 and rock-shaft 8 on which the dagger is mounted forming a portion of the protection mechanism of the loom, as is customary.

Inasmuch as the two connections between the lay-swords and the crank-shaft are the same only one of said connections is herein illustrated and described in detail. In the present embodiment of my invention said connection comprises two members slidably or telescopically connected, to have a relative longitudinal movement at times, one member being pivotally attached to the lay-sword and the other member to the crank-shaft. One of said members 9 is shown as tubular, and reduced in internal diameter at 10, Fig. 3, near its rear end, and having at such end a concave seat to receive a segmental bushing 11 adapted to partly embrace and take the thrust of the crank-pin 5^x on the forward beat of the lay, a metal strap 12 detachably secured in place by a bolt 13 surrounding the crank-pin, as shown in Figs. 1 and 2, to take up the pull on the backward beat. The rear end of the member 9 is rectangular in cross-section, at 14, the straight ends of the strap 12 lying on the upper and lower faces thereof and being bent outward to form apertured ears 15. On the outside of the tubular portion of the member 9 I form opposite locking lugs or projections 16, for a purpose to be described. The other member of the connection is shown as an elongated cylindrical body 17 slidable easily in the reduced bore 10 of the member 9, and having a preferably rectangular head 18 provided with a concave seat for an annular bearing lining or bushing 19, Fig. 3, through which is extended a pin or stud 20 by which the member is pivotally attached to the lay-sword.

A metal strap 21 holds the bushing in place

on the head and is secured to the upper and lower faces of the latter by a suitable bolt 22, the ends of the strap being outturned to form apertured ears 23 opposite and parallel to the ears 15.

Headed rods 24 are extended through the ears, as clearly shown, the head of one rod being at the front end of the connection and the head of the other rod at the rear end, the other ends of the rods being screw-threaded to receive check-nuts 25, a pair being set up on each rod at opposite sides of the adjacent ear 15 or 22, as the case may be.

Suitable washers 26 are interposed between the ears and the washers, as herein shown, and by means of the nuts the maximum distance between the front and rear pairs of ears is adjusted and regulated, and while the rods 24 are rigidly connected to one ear of each pair by the check-nuts they are freely slidable at their opposite ends through the other ear.

A spiral spring 27 surrounds the cylindrical body 17, of the one member of the connection and is interposed between its head 18 and the internal shoulder 9^x of the member 9, the spring tending to move the said members in opposite directions to extend them and elongate the connection. Such extending action is limited by the rods 24, which are tension members when subjected to any strain, as will appear hereafter; the spring having considerable power, but yielding to allow contraction of the two-part connection when the lay is stopped by the operation of the protection mechanism.

A metal frame 28 embraces the yielding or compressible connection and is fulcrumed on the head 18 of one member by a transverse pin 29, the sides of the frame being rearwardly extended to form latches 30 notched at 31 to at times cooperate with the projections 16 on the member 9, as shown in Fig. 1.

The latches and cooperating projections constitute a species of locking device, and when the latches 30 are in operative position, as in Fig. 1, it will be manifest that the two members 9 and 17 cannot be moved longitudinally toward each other, or telescoped, nor can they be moved outward or extended, because of the rods 24. At such time the connection between the crank-shaft and the lay-sword is perfectly rigid and unyielding.

A leaf-spring 32 fastened on the member 9 bears on a cross-bar 33 of the latch-frame and serves to reset the latter with the latches in engagement with the projections 16 after the locking device has been rendered inoperative.

The sides of the latch-frame depend at 34 and are connected by a bridge 35 below the lower rod 24, the bridge being convexed on its under surface, see Fig. 3, and a releasing device is arranged to intermittently cooperate

with said bridge and render the locking device inoperative at predetermined intervals. Said releasing device consists of a casting 36 resting on a bracket 37 bolted to the loom-side, the casting being adjustably secured to the bracket by a bolt 38 extended through a slot 39 in the casting, Figs. 1 and 2.

The casting has a forwardly and upwardly inclined cam-face 40, and then a downwardly inclined cam-face 41 at its front end, the releasing device being so located that as the lay is moving forward the bridge 35 will engage and ride up on the face 40. The rise of the bridge swings the latch-frame up and releases the latches 30 from the lugs or projections 16, see Fig. 2, just before the protection period begins, and the locking means is held inoperative as the lay continues its forward movement until the dagger 7 is either lifted above the frog 6, the shuttle boxing properly, or engages such frog if the shuttle is improperly boxed. In the former case the resetting spring 32 operates to effect engagement of the latches and projections just as soon as the bridge 35 passes over the high point of the cam-face of the releasing device and down the face 41 thereof, so that the two-part connection again resumes its rigidity prior to the beating in of the filling. Should the protection mechanism operate, however, the cooperation of the dagger and frog brings the lay to a sudden stop before it reaches front center and while the locking device is inoperative, so that any continued movement of the crank-shaft will telescope the two members 9 and 17 of the connection, compressing the spring 27. The spring thus takes up and absorbs such movement of the crank-shaft, relieving the lay-sword of the strain and shock to which it would otherwise be subjected and obviating the breaking tendency due to sudden stoppage of the lay.

Referring to Fig. 1, where the lay is at back center, it will be seen that the connection is rigid at the time the forward stroke or beat of the lay is begun, so that the full power of the crank-shaft is then transmitted through the direct connection to the lay. At the time the locking means is rendered inoperative the momentum of the lay is sufficient to continue its forward movement without any compression of the spring 27, so that if the shuttle is properly boxed the locking device will be restored to operative condition, making the connection rigid, while the filling is beaten in. After the lay passes front center the pull of the crank-shaft is transmitted to the lay through the rods 24, which are thus under tension, as hereinbefore stated, the locking device remaining operative until again released at the predetermined point on the next forward beat of the lay. When the protection mechanism operates and the two-part connection yields or is compressed the

rods 24 slide through the loosely connected ears, the upper rod through the ear 23 and the lower rod through the ear 15.

My invention is not restricted to the precise construction and arrangement herein shown and described, as various changes or modifications in different details may be made by those skilled in the art without departing from the spirit and scope of my invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a loom, in combination, the lay, the crank-shaft, spring-controlled, longitudinally compressible connections between them, a locking device to prevent compression of said connection, and means to release automatically the locking device at a predetermined point on each forward beat of the lay.

2. In a loom, in combination, the lay, the crank-shaft, a yielding connection between them, a device to normally prevent yielding of said connection, and means to render said device inoperative for a predetermined portion of each forward beat of the lay.

3. In a loom, in combination, the lay, the crank-shaft, a two-part connection between them, the members being relatively movable longitudinally, a spring to cushion such movement and normally acting to extend the members, a latch to positively lock said members from relative movement, and means to automatically release the latch at a predetermined point on the forward beat of the lay.

4. In a loom, in combination, a frog, a lay having a dagger to cooperate with the frog and stop the lay when the shuttle is improperly boxed, a crank-shaft; a direct connection between it and the lay, and automatic means operated independently of cooperation of the dagger and frog to permit said connection to yield when the movement of the lay is stopped by cooperation of the dagger and frog.

5. The combination in a loom of a lay, a crank-shaft, protection mechanism to stop the lay when the shuttle is improperly boxed, a compressible connection between the lay and the crank-shaft, a device to prevent compression of said connection, and means to automatically render said device inoperative just prior to the time for the protection mechanism to operate if the shuttle is improperly boxed.

6. The combination in a loom of a lay, a crank-shaft, protection mechanism to stop the lay when the shuttle is improperly boxed, a yielding connection between the lay and the crank-shaft, a latch to maintain said connection unyielding, and means to render said latch inoperative during the protection period on each forward stroke of the lay,

whereby stoppage of the lay by operation of the protection mechanism will cause the said connection to yield.

7. The combination in a loom of a lay, a crank-shaft, protection mechanism to stop the lay when the shuttle is improperly boxed, a two-part, spring-extended connection between the lay and the crank-shaft, means to limit extension of said connection, a latch to positively hold the connection extended, means to render the latch inoperative during the protection period on the forward stroke of the lay, and a device to reset the latch automatically.

8. In a loom, a lay and lay-sword, a crank-shaft, a connection including two telescopically movable members pivoted respectively to the lay-sword and the crank-shaft, a spring to extend said members, a lug on one of said members and a cooperating latch on the other member, to positively maintain said members extended, and means to disengage the latch from the lug for a predetermined period on each forward beat of the lay, whereby if the lay is stopped during such period the connecting members may telescope, compressing the spring during continued movement of the crank-shaft.

9. In a loom, in combination, a lay and a crank-shaft, a connection between them including two longitudinally rigid members one of which is slidable upon the other, an extending spring, tension rods to limit the extending action of the spring, a spring-latch to prevent relative movement of the sliding members to shorten the connection, and a fixed cam to engage and release the latch during a predetermined part of the forward beat of the lay.

10. In a loom, in combination, a lay and a crank-shaft, a compressible connection between them, including two relatively slidable members pivotally connected with the lay and crank-shaft respectively, means to positively limit extension of said members, a spring to extend them, a device to lock said members in extended position, protection devices, to stop the lay on its forward beat and means to render inoperative the locking device on each beat of the lay during the protection period, whereby if the protection devices operate to stop the lay, the connection between it and the lay may be compressed against the action of the extending spring.

11. In a loom, in combination, a lay and lay-sword, protection mechanism to stop the lay, a crank-shaft, a direct connection between it and the lay-sword, automatic means operated independently of the protection mechanism to permit shortening of said connection during the protection period, and a shock-absorber forming a part of the connection, to relieve the lay-sword from strain when the protection mechanism operates.

12. A connection for loom-lays, comprising two slidably connected, longitudinally rigid members adapted to be pivotally attached to the lay-sword and crank-shaft, respectively, a spring to extend said members, tension rods to limit such action of the spring, a lug fixedly mounted on one member, and a spring-set latch on the other member, to normally coöperate with the lug and maintain said members locked in extended position.

13. In a loom, in combination, a lay and its lay-sword, a crank-shaft, a yieldable connection between the latter and the lay-sword, and means to maintain said connection rigid and unyieldingly as the forward beat of the lay is begun, and to thereafter operate on each forward beat to permit the

connection to yield if the lay is stopped during a predetermined portion of its forward beat.

14. In a loom, in combination, a lay and its lay-sword, a crank-shaft, a direct connection between it and the lay-sword, and means to render said connection longitudinally yieldable during a predetermined portion of each forward beat of the lay after its movement has been initiated and prior to beating in the filling.

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

ALONZO E. RHOADES.

Witnesses:

CLARE HILL DRAPER,
EUGENE BEAUDRY.