No. 769,921. PATENTED SEPT. 13, 1904.

C. F. ROPER.

SELVAGE MOTION FOR LOOMS.

APPLICATION FILED JUNE 23, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

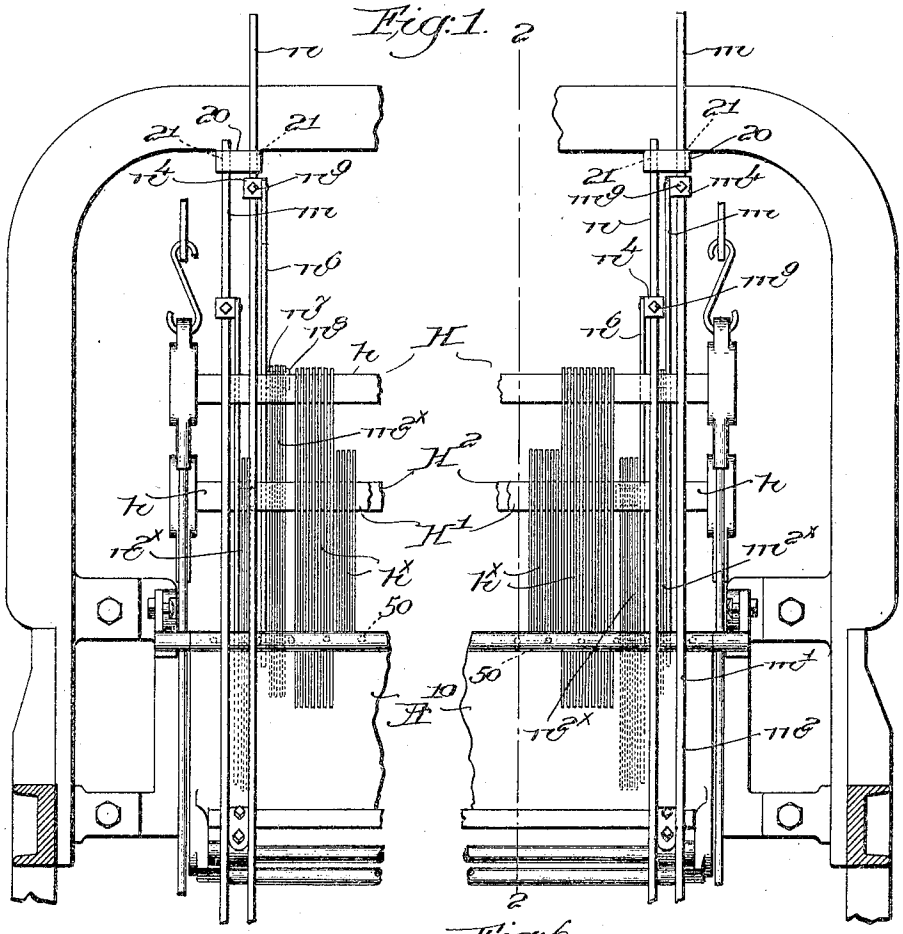


Fig. 6.

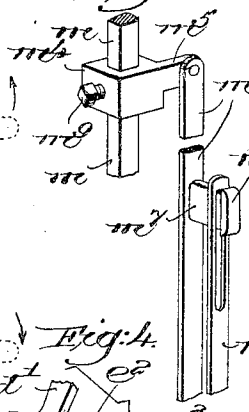


Fig. 3.

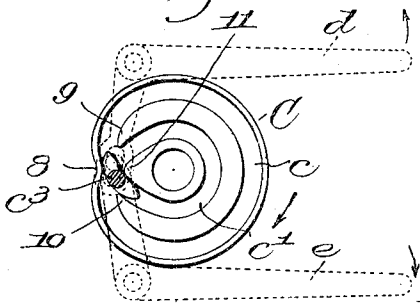


Fig. 4.

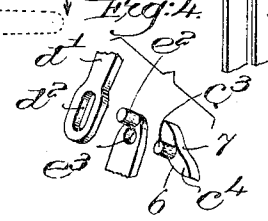
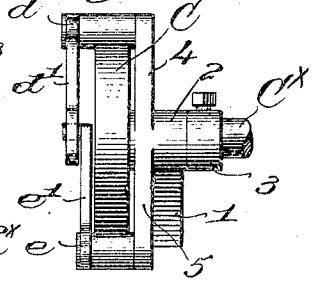


Fig. 5.



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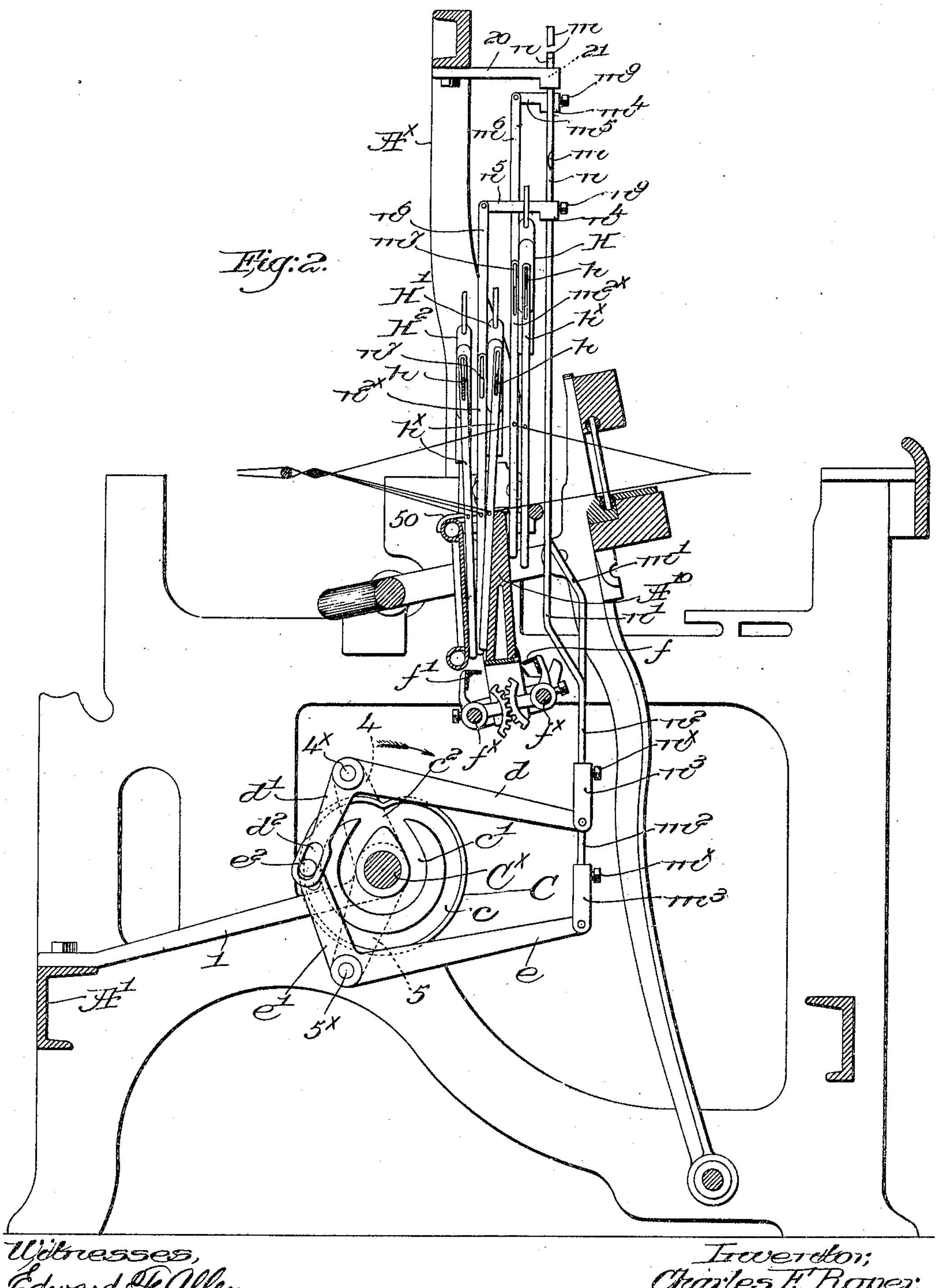
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SELVAGE MOTION FOR LOOMS.

APPLICATION FILED JUNE 23, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



Witnesses,
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No. 769,921. Patented September 13, 1904.

UNITED STATES PATENT OFFICE.

CHARLES F. ROPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

SELVAGE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 769,921, dated September 13, 1904.

Application filed June 23, 1904. Serial No. 213,804. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Selvage-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the production of a novel selvage-motion for looms, whereby the planes of the selvage-shed are caused to be substantially in alinement with the planes of the main shed, so that throwing out or catching of the shuttle is obviated and any diversion of the shuttle from its proper path is prevented.

In the present embodiment of my invention I have shown a warp stop-motion in connection with the selvage-motion, so that the loom may be stopped automatically upon breakage or failure of a selvage-warp, though such arrangement is not herein claimed, as it of itself is not of my invention.

The selvage-motion comprises two oppositely-movable vertically-reciprocating harness members for the selvage-warps and arranged at the sides of the main shed-forming mechanism, and herein I reciprocate each selvage-harness member of a pair positively, there being no overhead connection between the two harness members constituting a pair.

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 front elevation, centrally broken out, of a portion of a loom comprising principally the shed-forming mechanism, with one practical embodiment of my present invention applied thereto. Fig. 2 is a transverse sectional view of the loom on the line 2 2, Fig. 1, looking toward the right, three main harness members being shown, and other parts of the loom are shown which are omitted in Fig. 1. Fig. 3 is a detail in side elevation of one of the selvage-harness-actuating cams shown in a different position from that illustrated in Fig. 2. Fig. 4 is a perspective detail, with the coöperating parts separated, of the connection between the cam-follower and the rocking transmitters, whose movement is controlled by the cam. Fig. 5 is a detail in front elevation of the mechanism shown in Fig. 3; and Fig. 6 is a perspective detail, enlarged, of one of the front harness members of the selvage-motion.

My invention is herein shown in connection with a loom wherein the heddles also serve as warp-stop-motion-controlling detectors of the type shown in United States Patent No. 536,969; but my invention is not restricted to such form of apparatus, as will be apparent hereinafter.

The main harness-frames H H′ H² may be suspended from the arch $A^{\times}$ and reciprocated in any suitable manner, each frame having a cross-bar *h*, upon which are mounted heddle-detectors $k^{\times}$ of well-known construction, a transverse separator A^{10} dividing the front series of heddle-detectors from the two back series. Vibratable feelers *f f′*, mounted on rock-shafts $f^{\times}$, geared together, operate in well-known manner to effect automatic stoppage of the loom when a released detector engages and arrests a feeler.

The front harness-frame H is shown up and the middle and back frames H′ and H² down, the frame H having in practice a shorter stroke, as usual, in order that the shed-opening may be the same whether the front harness is up or down.

The cam-shaft $C^{\times}$ of the loom has fast upon it near each side of the loom a selvage-cam C, provided on its inner face with an outer cam path or groove *c* and an inner path or groove *c′*, the two meeting and crossing at c^2, Figs. 2 and 3.

A bracket 1, rigidly bolted to and near each end of a cross-girth A′ at the back of the loom-frame, is extended forward and provided with a hub 2, Fig. 5, which loosely embraces the cam-shaft $C^{\times}$ between the outer face of one of the selvage-cams C and a collar 3, secured to the shaft.

Divergent and rearwardly-extended arms 4 5 project from the top and bottom of each hub and are provided with lateral fulcrum-studs $4^{\times}$ $5^{\times}$, respectively, a bell-crank or rocker d d' being fulcrumed on the stud $4^{\times}$, and a somewhat similar but reversely-arranged rocker e e' is fulcrumed on the stud $5^{\times}$, said rockers serving as "transmitters" between the cam and the selvage-harness members and being so termed in some of the claims.

The downturned arm d' has an elongated slot d^2 in its free end, loosely entered by a pin e^2 on the free end of the upturned arm e', which latter is shown as somewhat longer than the arm d', the arms overlapping, as shown clearly in Fig. 5.

A hole e^3 in the arm e' adjacent the pin e^2 loosely receives a pin or stud c^3 on a cam-follower c^4 of a peculiar shape, it being elongated and pointed at its ends and having one long side 6 convex and its opposite side 7 concave. (See Fig. 4.) This follower travels in the grooves c c' of the adjacent selvage-cam C, and it is of such length that when it reaches the crossing portion c^2 of the grooves c c' it will pass from one to the other groove.

Referring to Fig. 3, the follower has just left the groove c and is entering the inner groove c', the reëntrant portion 8 of the outer groove having acted to throw the leading end of the follower inward, (assisted by the action of the horn 9 on the concave side 7 of the follower,) so that the follower is turned or deflected into the groove c' between the horn 10 and the point 11 of the latter groove. When the follower is about to leave the groove c', the horn 9 and point 11 act upon it to direct its leading end over the crossing c^2 and against the reëntrant portion 8, the convex side 6 of the follower being directed thereby into the groove c, assisted by the action of the horn 10 on the concave side 7 of the follower. As the follower traverses the groove c' it approaches and recedes from the shaft $C^{\times}$, and consequently the rocker-arms d and e are moved away from and toward each other, the movement toward each other being continued when the follower enters the groove c until the circular or dwell portion is reached, as shown in Fig. 2. When the follower leaves the dwell portion of the groove c, it is gradually moved toward the shaft $C^{\times}$, rocking the arms d and e away from each other, such movement being continued when the follower enters the groove c' until its circular or dwell portion is reached. As the arm e' is longer than arm d', the arm e of one rocker will be rocked through a smaller arc than the arm d of the other rocker, the differential movement so obtained for the two rockers being utilized to cause the planes of the selvage-shed to be in substantial alinement with the planes of the main shed. As the follower moves inward or toward the center of the cam the pin e^2 travels in the slot d^2 toward the fulcrum $4^{\times}$, shortening the effective length of the lever-arm d', so that the arm d will swing through a greater arc than does the arm e of the other rocker, thus increasing the differential movement of the rockers.

The selvage-cams $C^{\times}$ make one revolution for every two picks, so that the follower traverses the two grooves c c' of each cam while the loom is making four picks, and the cams are set oppositely, so that the front selvage-harness member at one side will be up when the corresponding member at the other side of the loom is down, and vice versa. The selvage thus made is termed a "tape selvage;" but a plain selvage can be readily made by substituting for the cam shown herein an ordinary single-groove elliptical cam.

It will be understood that the dwell portions of the cam-grooves are to maintain the selvage-shed open, while the change of shed is effected by the other portions of the grooves.

The bell-cranks rocked by each selvage-cam are directly connected with the selvage-harness members, each member of a pair being positively reciprocated and controlled, and the use of any overhead connection between such members is entirely obviated.

A bracket 20 is secured to the loom-arch at each side, each bracket having parallel upright guide-bearings 21 21 (see dotted lines, Fig. 1) for the reception of the selvage-harness members. The front member of each pair consists of an upright elongated longitudinally-rigid metal bar m, slidably supported and guided in one of the bearings 21 and bent outward at m^2 and then downward to form a straight extension m^2, which enters a socket member m^3, pivotally connected with the free end of the rocker-arm e, a set-screw $m^{\times}$ adjustably retaining the extension in the socket. (See Fig. 2.) A block m^4, having a rearwardly-extended lug m^5, is adjustably secured to the bar m near its upper end by a set-screw m^9, and a hanger m^6 is suspended from the lug and provided with a lateral support m^7, (clearly shown in Fig. 6,) having a slightly-enlarged head m^8.

The desired number of selvage-heddles $m^{2\times}$ are strung on the support m^7 and are shown as longitudinally slotted to enable them to serve also as warp-stop-motion-controlling detectors.

As shown in Fig. 1, the selvage-heddles are long enough to depend below the top of the separator A^{10} when the harness member is raised, and when it is lowered a released heddle can move down into position to coöperate with a feeler.

The hanger m^6 is long enough to extend even when elevated below the top of the separator and between transverse pins 50, which when used serve to divide or separate the lower ends of the heddles into relatively small groups or sections.

As shown in Fig. 2, the front selvage-harness member m m^2 is in front of the main harness H and the extension m^6 and the selvage-heddles $m^{2\times}$ are behind it. The back selvage-harness member is also shown as an elongated bar n, bent at n' and having a depending prolongation n^2 connected by a pivoted socket-piece n^3 on the rocker-arm d, the upper part or bar n sliding in one of the bearings 21, and as said rocker-arm d has the greater throw, as has been explained, the back harness member will have a longer stroke than the front harness member.

The back selvage-heddles $n^{2\times}$ are hung on a support n^7, laterally projecting from a hanger n^6, which is suspended from a rearward extension n^5 of a block n^4, clamped by a set-screw n^9 to the bar n, the front and back harness members being substantially alike in construction, save that the extension n^5 is long enough to cause the hanger n^6 and the heddles $n^{2\times}$ to reciprocate back of the main harness H', as clearly shown in Fig. 2.

In Fig. 1 the front selvage-harness member is shown raised at the right, and at the left the corresponding member is shown down, while the back member is down at the right and raised at the left.

When a front harness member of the selvage-motion is up, its selvage-warps will be in the upper plane of the main shed, and when it is down its warps will be in the lower plane of the main shed. This is easily accomplished by giving the front harness member of the selvage-motion substantially the same stroke as the front main harness, as the selvage-heddles $m^{2\times}$ are immediately adjacent the main heddles $h^\times$ of the front main harness H.

The stroke of the back harness members of the selvage-motion is made considerably longer, however, as has been explained, as it is well back, and the selvage-warps are brought into substantial alinement with the upper or lower plane of the main shed, as the case may be.

Adjustment of the selvage-harness members can be effected by the set-screws $m^\times$ $n^\times$ and m^9 n^9, as may be required.

Upon failure of a warp, either main or selvage, its heddle acting as a detector drops and arrests the movement of the proper feeler, effecting in well-known manner the stoppage of the loom automatically.

My invention is not restricted to the particular type of heddle herein shown, for the selvage-motion can be employed with equal facility with other forms of heddles and with or without the warp stop-motion feature.

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

1. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable harness members for the selvage-warps, a common actuator, and separate connections between it and each of said harness members to reciprocate the same positively.

2. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable harness members for the selvage-warps, a common actuator, a separate and direct connection between it and each harness member to reciprocate the same positively, and a fixed guide for and in which said members slide.

3. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable harness members for the selvage-warps, a common actuator, two rocking members directly connecting it with the harness members, to reciprocate the same positively and separately, and means to impart to the back harness member a longer stroke.

4. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable harness members for the selvage-warps, an actuating-cam, two rocking members vibrated thereby and operatively connected with said harness members, to reciprocate the same positively, and means to impart a longer stroke to the rocking member connected with the back harness member.

5. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable harness members for the selvage-warps, each member comprising a rigid, elongated bar having a lateral heddle-support, a fixed guide in which the upper ends of the bars slide, a common actuating-cam, and rocking transmitters intermediate the cam and the lower ends of the harness members and pivotally connected therewith, to effect positive reciprocation of the harness members.

6. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable, longitudinally-rigid harness members, a fixed guide in which their upper ends slide, an actuating-cam, two oppositely-movable transmitters mounted to rock on fixed fulcra and connected with the lower ends of the harness members, a cam-follower directly connected with one of said transmitters, and means, including a shifting connection between the two transmitters, whereby a differential vibration of the same is effected.

7. In a selvage-motion for looms, two vertically-reciprocating and oppositely-movable, longitudinally-rigid harness members, a fixed guide in which their upper ends slide, an actuating-cam having a double, crossed groove or path, a follower coöperating therewith, connections between the follower and the lower ends of the harness members, to reciprocate the same, and means to cause said connections to impart a differential reciprocating movement to the harness members.

8. In a loom, main shed-forming mechanism, independent shed-forming mechanism for each selvage, including oppositely-movable harness members for the selvage-warps, a common actuating-cam for each pair of said

harness members, a directly-connected rocking transmitter between each of the latter and the cam, and means to impart through one of said transmitters a greater stroke to the back harness, to thereby bring the planes of the selvage and main sheds into substantial alinement.

9. In a loom, main shed-forming mechanism, independent shed-forming mechanism for each selvage, including oppositely-movable harness members for the selvage-warps, a main cam-shaft, an actuating-cam thereon for each pair of selvage-harness members, two oppositely-movable, rocking transmitters pivotally connected with the lower ends of the selvage-harness members, a cam-follower, a direct connection between it and one of the transmitters, and an indirect, variable connection between said follower and the other transmitter, to impart a differential stroke to said transmitters and therethrough to the connected harness members.

10. In a selvage-motion for looms, two reciprocating, oppositely-movable and longitudinally-rigid harness members, an inturned arm adjustably mounted on each, a hanger suspended from each arm and having a lateral support for the selvage-heddles, a fixed guide in which the unconnected upper ends of the harness members slide, and means to positively and separately reciprocate said harness members, said means including rocking transmitters connected with the lower ends of the harness members.

11. In a selvage-motion for looms, two reciprocating, oppositely-movable and longitudinally-rigid harness members, each having a support for the selvage-heddles, a fixed guide in which the unconnected upper ends of said harness members slide, two rocking transmitters mounted on fixed fulcra and pivotally connected with the lower ends of the harness members, each transmitter having one of its arms overlapping a similar arm of the other, one arm having a slot and the other arm a pin to enter the slot, an actuating-cam, and a follower coöperating therewith and pivotally mounted on the transmitter-arm having the pin.

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

CHARLES F. ROPER.

Witnesses:

GEORGE OTIS DRAPER,

ERNEST W. WOOD.