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LOOM SHEDDING MECHANISM

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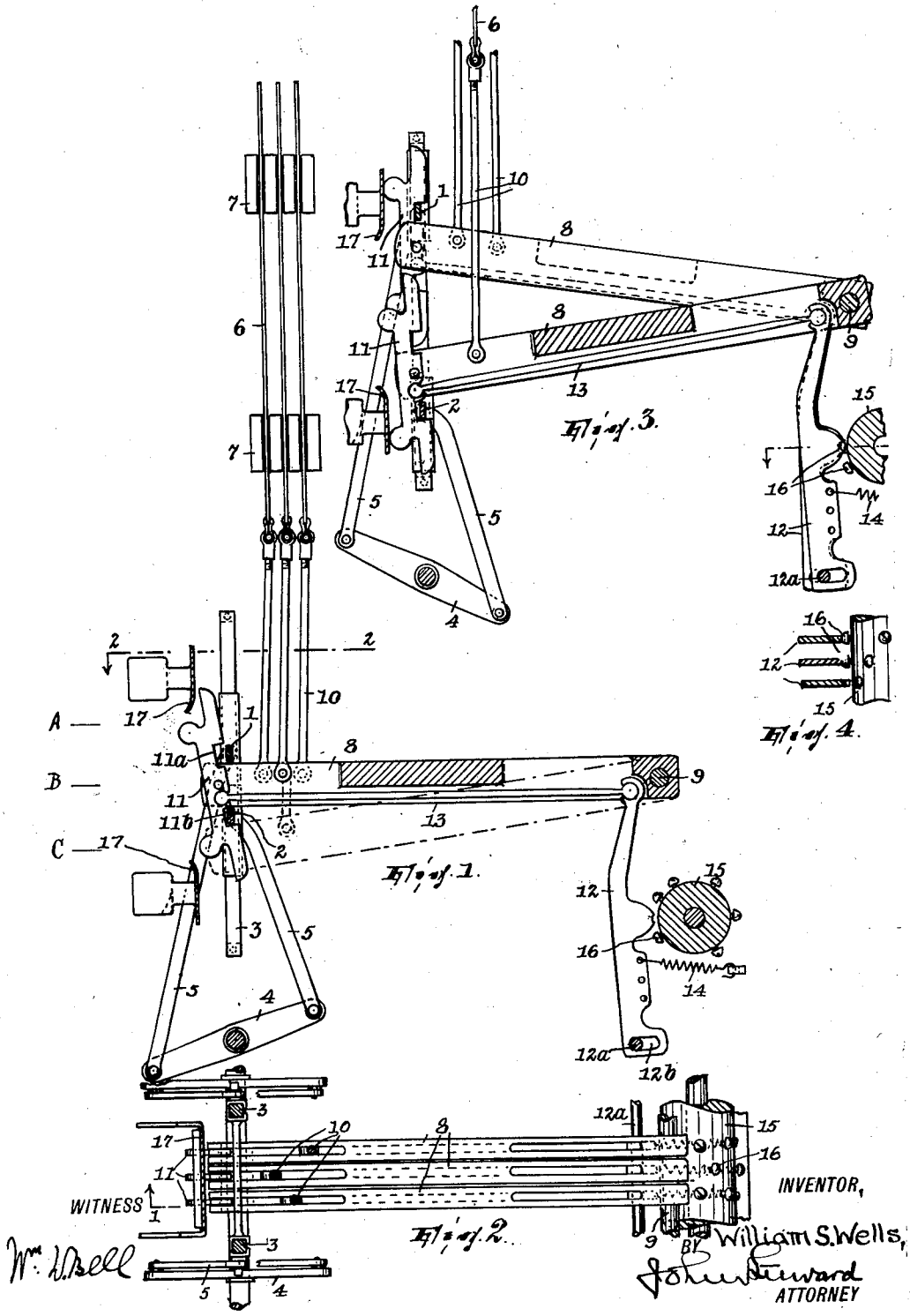


Fig. 3.

Fig. 4.

Fig. 1.

Fig. 2.

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LOOM SHEDDING MECHANISM

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The object of this invention is to provide a simple, reliable and efficient means for effecting in any predetermined order the movements of warps in the forming of warp-sheds in weaving. In that form of the invention herein shown, given a pair of actuators reciprocating in opposite directions together toward and together from an intermediate plane and the system to shift the warps to form the sheds, a transfer-coupling means is employed which is operative at will to couple said system and either actuator and discontinue the coupling of said system and the other actuator when they are in the portions of their ranges of movement approximating said plane; thus, according to a pattern which may be used to control the coupling means, the shaft and hence the warps connected therewith may have imparted thereto a movement through the space from one extreme to the other of the combined ranges of movements of the actuators or a movement through a space from either such extreme to an intermediate position (where the coupling operation takes place) and back, and, depending on the pattern, the movement of either kind may continue as reciprocation for any selected time-period. This will serve to concisely describe the invention in the example herein shown and to be more fully described hereinafter.

In the drawing,

Fig. 1 shows the mechanism partly in side elevation and partly in vertical section on line 1—1, Fig. 2;

Fig. 2 is a horizontal section on line 2—2, Fig. 1;

Fig. 3 is a view similar to Fig. 1 showing the parts in the positions in which two harness shafts are fully up and another fully down; and

Fig. 4 is a section on line 4—4, Fig. 3.

The mentioned "actuators" are shown as two cross-heads 1 and 2 having end sleeves arranged to slide up and down on two vertical guides 3. They are given motion (whereby they always move together toward and together from an intermediate plane) from any source, as a rocking lever 4 connected with them on opposite sides of its fulcrum by pitmen 5. The means 1, 2, 4 and 5 in the present case is continuously oscillated.

The mentioned "system" here includes a harness shaft 6 sliding vertically in guides 7, and having of course heddles or other provision (not shown) for receiving and imparting shed-forming movements to warps; a lever 8 fulcrumed at 9 to move up and down; and means 10 to link the shaft to the lever.

The mentioned "coupling-means" here includes the coupling proper or coupler 11 having notches 11^a and 11^b to receive and catch the respective actuators 1 and 2 and pivoted therebetween to lever 8; a lever 12 fulcrumed on a shaft or other fulcrum-member 12^a; a link 13 pivotally connecting this lever and the coupler and a spring 14 connecting the lever with some fixed point.

Finally, let 15 represent a suitable cylinder having a peg or pegs or other means 16 to cause shifting of the lever 12 when such cylinder (here serving as the "pattern" means) is rotated by any means or in any way.

Assume the actuators to be reciprocating. The coupler is always coupling the mentioned system with one or the other actuator (in Fig. 1 it happens to be with the actuator 2). The transfer from one to the other actuator occurs when the actuators are in the proximating portions of their ranges of movement, as when a peg 16 of the pattern means has then caused displacement of lever 12 to the left or permits it to move to the right. Therefore the system may be reciprocated between the positions A—B, B—C or A—C, in each case continuing for any period of time according to control from the pattern; treating positions A and C as "open-shed" positions and position B as the "closed shed" position, subject to the control of the pattern the system will in other words either be reciprocated from one open- to the closed-shed position and back, one such reciprocation in that case corresponding to each complete reciprocation or cycle of the actuators, or reciprocated from one to the other "open-shed" position, the movement in each direction in that case involving a transfer from one actuator to the other at closed-shed position B and corresponding to two complete reciprocations of

the actuator. Otherwise viewed, the shaft 6 thus proceeds from the closed-shed position to either open-shed position (depending on the pattern) and back on each cycle of lever 4 and hence of the actuators.

Now if the systems and couplings are multiplied various arrangements of the warps to form sheds according to the pattern to be woven will manifestly be possible. Thus, in Fig. 3, two of the shafts shown are up and one down and so long as their couplers retain the positions shown the warps for the two shafts will in a sequence of shed-formations remain up and for the one shaft down; but if on one of the approaches of the actuators toward each other a transfer occurs, the shaft 6 affected will continue in the direction in which it was last moving and begin to reciprocate on the opposite side of position B, so that if its warp was up it will now be down, or vice versa.

The parts 12, 13 and 14 constitute means to apply elastic pressure to the coupler 11, to shift it in either direction, i. e., into coupling engagement with either actuator, thus: In the position of these parts shown by Fig. 1, where no peg of the pattern means is acting, said parts have applied elastic pressure to shift the coupler into coupling engagement with the actuator 2, lever 12 then having its fulcrum at 12^a; but in the position to which said parts will be moved on presence of a peg engaged with lever 12, said parts will have applied elastic pressure to shift the coupler into coupling engagement with actuator 1, the fulcrum of lever 12 being then where it bears on the peg. Lever 12 is free to oscillate in response to the rectilinear motion of the coupler when the latter is engaged with the actuator 2 because then no peg is opposed thereto; to offer the lever such freedom when a peg is opposed thereto a slot 12^b receives the fulcrum member 12^a. The elastic pressure is of course desirable as avoiding looseness of the parts and insuring the maintenance of the coupling between changes, and on the whole it is an element contributing largely to the simplicity and efficiency of the mechanism.

As a safeguard against any possibility of any of the couplers 12 becoming uncoupled when out of the transfer position there may be any retainer as a fixed guide plate 17.

Having thus fully described my invention, what I claim is:

1. Means to effect shedding of warps in weaving including a pair of actuators reciprocating in opposite directions together toward and together from an intermediate plane, a shiftable warp-shifting system, a transfer coupler shiftable with said system and also oscillatory with respect thereto into coupling engagement with either and out of coupling engagement with the other actuator, and means to oscillate the coupler including a back-and-forth movable member with respect to which the coupler is oscillatory, and a link to transmit oscillations from said member to the coupler and pivoted to each of them and shiftable with the latter and with respect to the former of them.

2. Means to effect shedding of warps in weaving including a pair of actuators reciprocating in opposite directions together toward and together from an intermediate plane, a shiftable warp-shifting system including a fulcrumed element, a transfer coupler movable with said element and also oscillatory with respect thereto into coupling engagement with either and out of coupling engagement with the other actuator, a back-and-forth-movable member from which to oscillate the coupler arranged near the pivot of said element, and a link pivotally connecting said coupler and member and having separate coupling-engagement portions for the respective actuators.

3. In combination, a reciprocating actuator, a shiftable warp-shifting system, a coupling means movable with and also back and forth with respect to said system into and out of said position on the one hand to bear against said actuator and couple the same and said system and on the other to clear said system and discontinue the coupling and yieldingly held in said position and including a lever shiftable across its fulcrum, and pattern means engageable with the lever to shift said means out of said position.

4. Means to effect shedding of warps in weaving including a pair of actuators reciprocating in opposite directions together toward and together from an intermediate plane, a shiftable warp-shifting system, a transfer coupler movable with said system and also oscillatory with respect thereto in one direction into coupling engagement with either and in the other direction out of coupling engagement with the other actuator and means to apply elastic pressure to the coupler to shift the same in either direction.

5. Means to effect shedding of warps in weaving including a pair of actuators reciprocating in opposite directions together toward and together from an intermediate plane, a shiftable warp-shifting system, a transfer coupler movable with said system and also oscillatory with respect thereto in one direction into coupling engagement with either and in the other direction out of coupling engagement with the other actuator, and means to shift the coupler in either direction in which it is thus oscillatory including a lever operatively connected to the coupler, a fulcrum member against which the lever bears, and a spring normally holding the lever against said member and urging said lever in the direction to urge the coupler in one direction of its movement, said lever being movable reversely from said member

to urge the coupler in the other direction of its movement.

6. Means to effect shedding in weaving including a back-and-forth-moving actuator, a shiftable warp-shifting system including a lever member, a coupling means shiftable with and also back and forth with respect to said member into and out of position on the one hand to bear against said actuator and couple the same and said member and on the other to discontinue the coupling, and means, including a pattern means, to shift the coupling means back and forth.

7. Means to effect shedding in weaving including a back-and-forth-moving actuator, a shiftable warp-shifting system including a lever, a coupler shiftable on the lever into and out of coupling engagement with the actuator, another lever, a link connecting the coupling with the second lever, and means, including a pattern means active on the second lever, for moving the latter back and forth on its fulcrum and operative through the link to shift the coupler into and out of coupling engagement with the actuator.

8. Means to effect shedding in weaving including a back-and-forth-moving actuator, a shiftable warp-shifting system including a lever, a coupler shiftable on the lever into and out of coupling engagement with the actuator, another lever extending near the fulcrum of the first lever, a link connecting the coupling with a point of the second lever near said fulcrum, and means, including a pattern means active on the second lever, for moving the latter back and forth on its fulcrum and operative through the link to shift the coupler into and out of coupling engagement with the actuator.

In testimony whereof I affix my signature.

WILLIAM S. WELLS.