No. 729,102. PATENTED MAY 26, 1903.

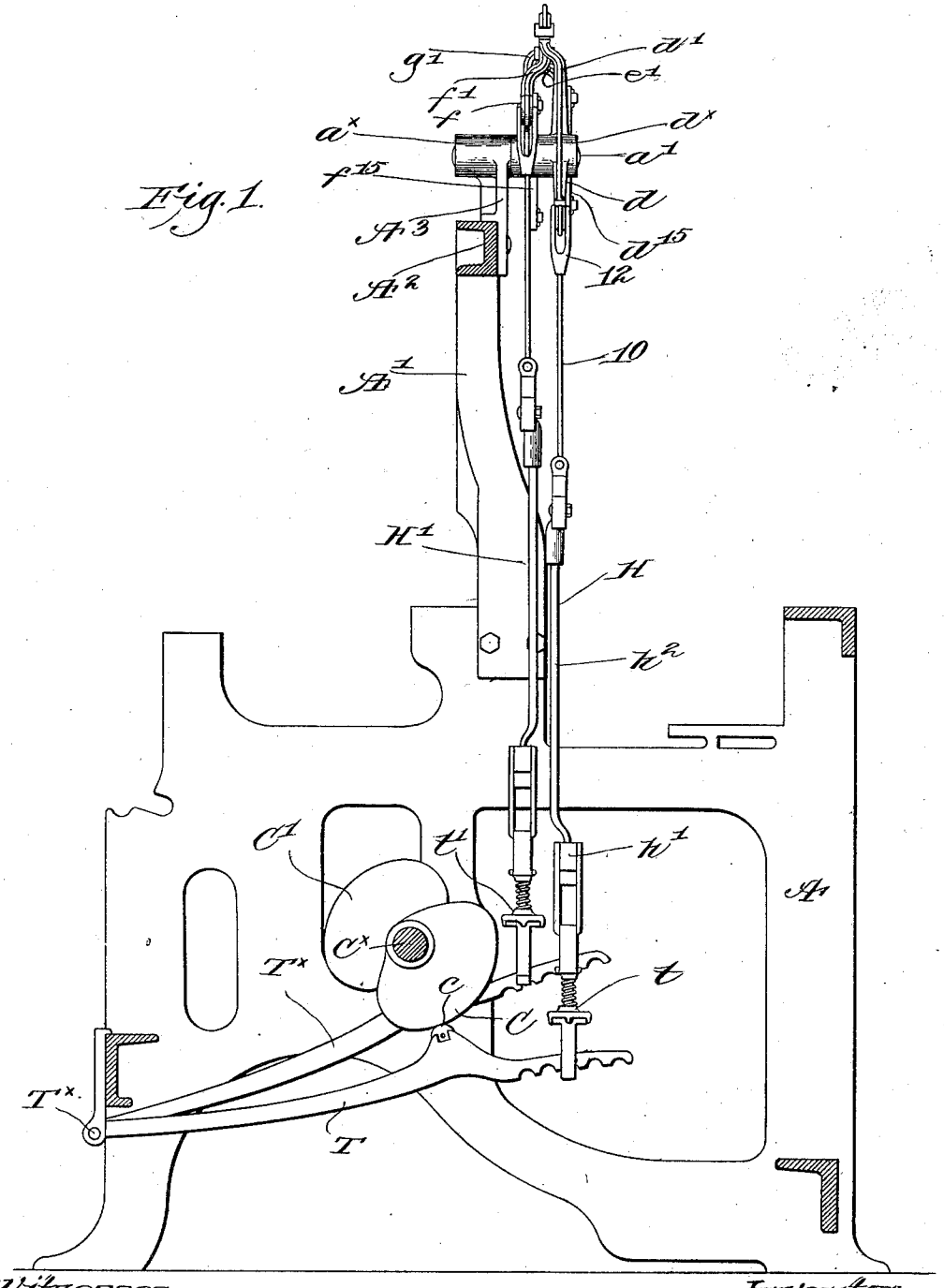
E. S. STIMPSON.

LOOM HARNESS MECHANISM.

APPLICATION FILED OCT. 18, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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S. W. Sutton.

Inventor.
Edward S. Stimpson.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

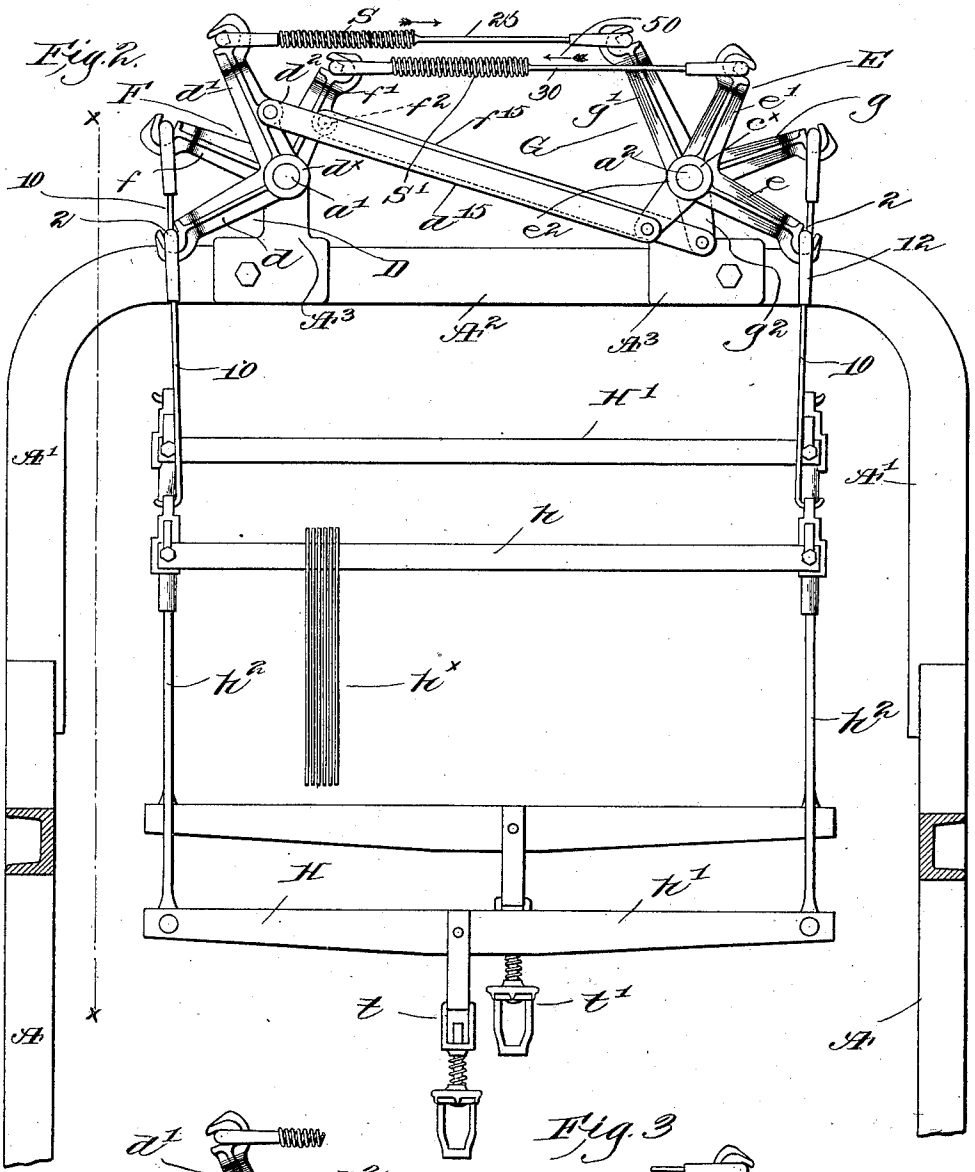


Fig. 2.

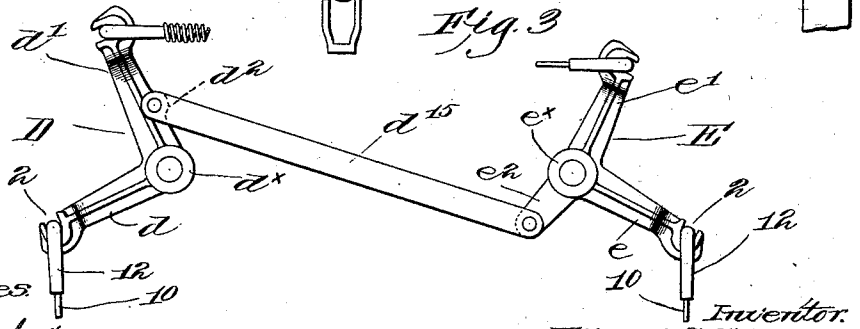


Fig. 3

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No. 729,102. Patented May 26, 1903.

UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

LOOM HARNESS MECHANISM.

SPECIFICATION forming part of Letters Patent No. 729,102, dated May 26, 1903.

Application filed October 18, 1902. Serial No. 127,796. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Loom Harness Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates particularly to the harness mechanism of a loom for weaving, and more especially to mechanism of the specified character wherein two harness-frames or a multiple of two frames will be employed.

One object of my invention is the production of novel and positive connecting means between the frames of a pair, whereby the movement of each frame is effected with uniformity and in a true path.

Another object of the invention is the provision of means for continuously maintaining the two frames of a pair under the instant control of their actuating-cams without any backlash or lost motion, the movement of each harness in both directions being effected by or through a cam-actuating device or equivalent positively-acting means.

Another object of the invention is the elimination of straps, bands, or other similar flexible connections between the frames of a pair, thereby obviating the results due to stretching and wear of such connections.

These and other 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 loom in part and showing in detail only the harness mechanism thereof embodying one form of my invention, the section being taken on the line $x\ x$, Fig. 2. Fig. 2 is a front elevation of the harness mechanism illustrated in Fig. 1, but omitting the harness-cams and their treadles; and Fig. 3 is a detached view, in front elevation, of the pair of rocking members operatively connected with a harness-frame shown in the position assumed when the frame is down.

The loom sides A, of usual construction, have erected thereupon an overhead arch A', with a flattened and substantially horizontal head A^2, on which are erected two symmetrically-located upright brackets A^3, each having a transverse hub-like portion $a^\times$, the latter supporting two parallel forwardly-projecting fulcrum-studs a' and a^2, Fig. 2, for a purpose to be described.

I have herein shown my invention as applied to and coöperating with two harness-frames which are reciprocated in parallel vertical paths, said frames being indicated, respectively, at H and H'. The cam-shaft $C^\times$ has two like and oppositely-set cams C and C' fast thereon to coöperate, respectively, with treadles T T', fulcrumed at $T^\times$ at the back of the loom, the treadles being provided with usual follower-rolls, one of which, as c, is shown in Fig. 1, the cams operating to depress the treadles one after another. Stirrups $t\ t'$ connect the free ends of the treadles with the bottom cross-bars of the harness-frames in substantially well-known manner, each frame being herein shown as comprising top and bottom cross-bars $h\ h'$, connected by upright side bars h^2, the heddles being hung between the cross-bars, and herein I have shown steel heddles consisting of thin flat sheet-metal detector-heddles $h^\times$, suspended from the top bar h and operating substantially as provided for in United States Patent No. 536,969, only the front frame H being lettered in detail and provided with some detector-heddles.

By or through my novel overhead connection and transmitting means between the two frames and which is now to be described the elevation of the back frame H' is effected positively by the cam C, which also depresses the front harness-frame H, and the cam C' positively elevates the front frame and depresses the back frame.

The overhead connecting and transmitting means is sustained on the two fulcrum-studs $a'\ a^2$, hereinbefore referred to, and includes a pair of oppositely-movable rocking members operatively connected with each harness-frame, each rocking member of a pair

being also connected with the rocking member of the other pair, which is mounted on the other fulcrum-stud. It thus follows that while the rocking members connected with a frame rock oppositely the connected members of the two pairs rock together in the same direction, one harness-frame rising when the other descends.

The rocking members (indicated generically at D and E) are mounted to rock on the studs a' and a^2, respectively, and are shown as bell-cranks, the member D having an outwardly-extended arm d and an upturned long arm d', secured to or integral with its hub $d^\times$, while the member E consists of a hub $e^\times$, outwardly-extended arm e, upturned arm e', and a short depending arm e^2. The arms d and e are equal in length and notched or hooked, as at 2, to receive loops 12 at the upper end of draft-links 10, connected with the harness-frame H at or near its sides.

In order that the frame shall move squarely and evenly, it is necessary that the members D and E shall rock oppositely in unison through equal angles, and this result is attained by an equalizer, shown as a bar or link d^{15}, pivotally connected at one end to an ear d^2 on the arm d' above the fulcrum a' and at its other end pivotally connected to the depending arm e^2 below the fulcrum a^2 of the member E.

The points of connection of the equalizer with the two members are equidistant from the fulcra of said members, the link or bar d^{15} being longitudinally rigid.

Referring to Fig. 2, a rocking member or bell-crank F, having arms ff', is mounted on the stud a' behind the member D, the arm f being connected by a draft-link 10 with the back harness-frame H', and on the stud a^2 back of the rocking member E a second rocking member G is mounted, comprising an outwardly-extended arm g, connected with the frame H', an upturned longer arm g', and a short arm g^2. An equalizer f^{15}, similar to the link or bar d^{15}, is connected at f^2 with the upturned arm f' of one back member, and at its other end the equalizer is pivotally connected with the short arm g^2, the members F and G being thereby caused to rock oppositely in unison through equal angles.

Viewed from the side of the loom the hubs of the rocking members D and E are substantially directly above the harness-frame H and the hubs of members F and G are above the back frame H', as shown in Fig. 1.

The upturned long arm d' is bent rearwardly at its upper end into substantial alinement with the forwardly-bent upper end of the upturned arm g', to which it is connected, the connection being shown as a rod 25 and attached strong spring S. Likewise the arm f' of member F is bent forward and connected by a rod 30 and attached spring S' to the rearwardly-bent upper end of the arm e' of the rocking member E, the greater length of the arms d' g' elevating the connection therebetween above and out of the way of the connection between the arms f' and e'.

Viewing Fig. 2, as the front harness-frame is down and its fellow up the descent of the latter will move the connection 30 S' in the direction of arrow 50 and connection 25 S in the opposite direction, and therethrough the members D and E will be rocked toward each other to raise positively the front harness-frame. When the latter is depressed by its cam, the longitudinal movement of the two connections just referred to will be reversed, so that the rocking members F and G will be turned toward each other to lift the back harness-frame, the equalizers compelling rocking movement of each pair of members in unison through equal angles.

I have shown a spring in each connection merely for the purpose of preventing any lost motion or backlash and to take up wear which may occur; but the connection might be a longitudinally rigid or unyielding rod or link. By employing the springs, however, the cam-followers are at all times kept in proper and accurate coöperative engagement with their cams, so that the movements of the harness-frames are quickly responsive thereto, and the springs obviate the necessity for setting up the various parts from time to time.

Each connection is a tension member, as will be manifest, and the springs are made stiff enough to transmit the pull without any material stretching.

All pulleys, sheaves, or the like, as well as bands, belts, or other flexible connections, are eliminated by the present invention, which is very direct acting, strong, and durable, the construction and arrangement being such that the harness-frames will move squarely and uniformly in their proper paths.

The connection between the treadle and its frame is usually offset from the center of the latter, as shown in Fig. 2, and where a number of frames are employed this offset may be quite large, tending to cant the frames; but any such tendency is overcome by the mechanism herein shown for the overhead connection.

One or more pairs of frames may be operated, as hereinbefore set forth; but it will be manifest that there must be an even number of frames, and combinations of movements will be limited in scope.

The construction and arrangement herein shown and described may be varied or modified in different particulars by those skilled in the art without departing from the spirit and scope of my invention, one practical embodiment of which is herein illustrated and explained.

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

1. In loom harness mechanism, two oppositely-movable harness-frames, a positive ac-

tuating device for each, a pair of oppositely-movable rocking members operatively connected with each frame and mounted on two fixed fulcrums, each member having a rigid, upturned arm, and a separate and direct transmitting connection between the said arm of each rocking member of a pair and the similar arm of that rocking member of the other pair which is mounted on the opposite fulcrum, the descent of either frame acting through its own rocking members and the transmitting connections to swing positively and oppositely the rocking members connected with the other frame, to lift the latter.

2. In loom harness mechanism, two oppositely-movable harness-frames, a positive actuating device for each, a pair of oppositely-movable rocking members operatively connected with each frame and mounted on two fixed fulcrums, an equalizing device for each pair, to cause the rocking members thereof to rock in unison through equal angles, and a separate and direct, longitudinally-extensible transmitting connection between each rocking member of a pair and that rocking member of the other pair which is mounted on the opposite fulcrum, the descent of either frame acting through its own rocking members and the transmitting connections to swing positively and oppositely the rocking members connected with the other frame, to lift the latter.

3. In loom harness mechanism, two oppositely-movable harness-frames, a positive actuating device for each, a pair of bell-cranks operatively connected with each frame and mounted to rock on two parallel, fixed fulcrums, each bell-crank having an upturned arm, an equalizing device connecting the bell-cranks of each pair, to cause them to rock oppositely in unison through equal angles, and a separate and direct transmitting connection between the upturned arm of each bell-crank of a pair and the upturned arm of that bell-crank of the other pair which is mounted on the opposite fulcrum, the descent of either frame acting through its own bell-cranks and the transmitting connections to move the latter in opposite directions and swing positively and oppositely the bell-cranks connected with the other frame, to lift the latter.

4. In loom harness mechanism, two oppositely-movable harness-frames, a cam operatively connected with each, to directly depress it, and to lift indirectly the other frame, a pair of oppositely and equally movable rocking members operatively connected with each frame and mounted on two fixed fulcrums, and a separate and direct transmitting connection between each rocking member of a pair and that rocking member of the other pair which is mounted on the opposite fulcrum, said connections being attached to the rocking members above their fulcra and being supported wholly by said members, the descent of either frame acting through its own rocking members and the transmitting connections to swing positively and oppositely the rocking members connected with the other frame, to lift the latter.

5. In loom harness mechanism, two oppositely-movable harness-frames, a cam operatively connected with each, to directly depress it, and to lift indirectly the other frame, a pair of bell-cranks operatively connected with each frame, and mounted above it to rock on two parallel fixed fulcrums, an equalizing device connecting the bell-cranks of each pair, said device being attached to one bell-crank above, and to the other bell-crank below, the fulcrum thereof, to cause them to rock oppositely and equally in unison, and a separate tension member directly connecting each bell-crank of a pair and that bell-crank of the other pair which is mounted on the opposite fulcrum, the descent of either frame acting through its own bell-cranks and the tension members to swing oppositely and positively the bell-cranks connected with the other frame, to lift the latter.

6. In loom harness mechanism, two oppositely-movable harness-frames, a cam operatively connected with each, to directly depress it and to lift indirectly the other frame, a pair of bell-cranks operatively connected with each frame and mounted above it to rock on two parallel fixed fulcrums, an equalizing device connecting the bell-cranks of each pair to cause them to rock oppositely and equally in unison, and a separate transmitting tension connection, including a spring, between each bell-crank of a pair and that bell-crank of the other pair which is mounted on the opposite fulcrum, such connection being directly attached to and supported wholly by the two bell-cranks, the descent of either frame acting through its own bell-crank and the two transmitting connections to move the latter longitudinally in opposite directions and swing positively and oppositely the bell-cranks connected with the other frame, to lift the latter, the springs in the transmitting connections preventing lost motion, and causing each harness-frame to be quickly responsive to cam control.

7. In loom harness mechanism, two oppositely-movable harness-frames, a cam operatively connected with each to directly depress it and to lift indirectly the other frame, two pairs of bell-cranks mounted to rock on two parallel fixed fulcrums above the harness-frames, each bell-crank having an outwardly-extended and an upturned arm, the outwardly-extended arms of each pair being operatively connected with a frame, an equalizing-link connected with the bell-cranks of each pair on opposite sides of their fulcrums, to cause them to rock oppositely in unison through equal angles, and a transmitting tension member connecting the upturned arm of each bell-crank of a pair with the corresponding arm of that bell-crank of the other

pair which is mounted on the opposite fulcrum, the descent of either frame acting through its own bell-crank and the two transmitting tension members to swing backwardly and oppositely the bell-cranks connected with the other frame to thereby lift the latter.

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

EDWARD S. STIMPSON.

Witnesses:

GEORGE OTIS DRAPER,

ERNEST WARREN WOOD.