Sept. 4, 1928. 1,683,324

W. H. BAKER

LAY MOTION FOR LOOMS

Filed Oct. 4, 1927 2 Sheets-Sheet 1

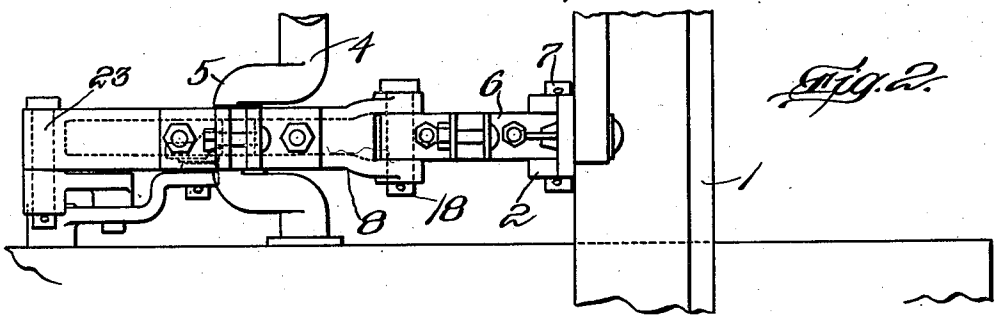

Fig. 2.

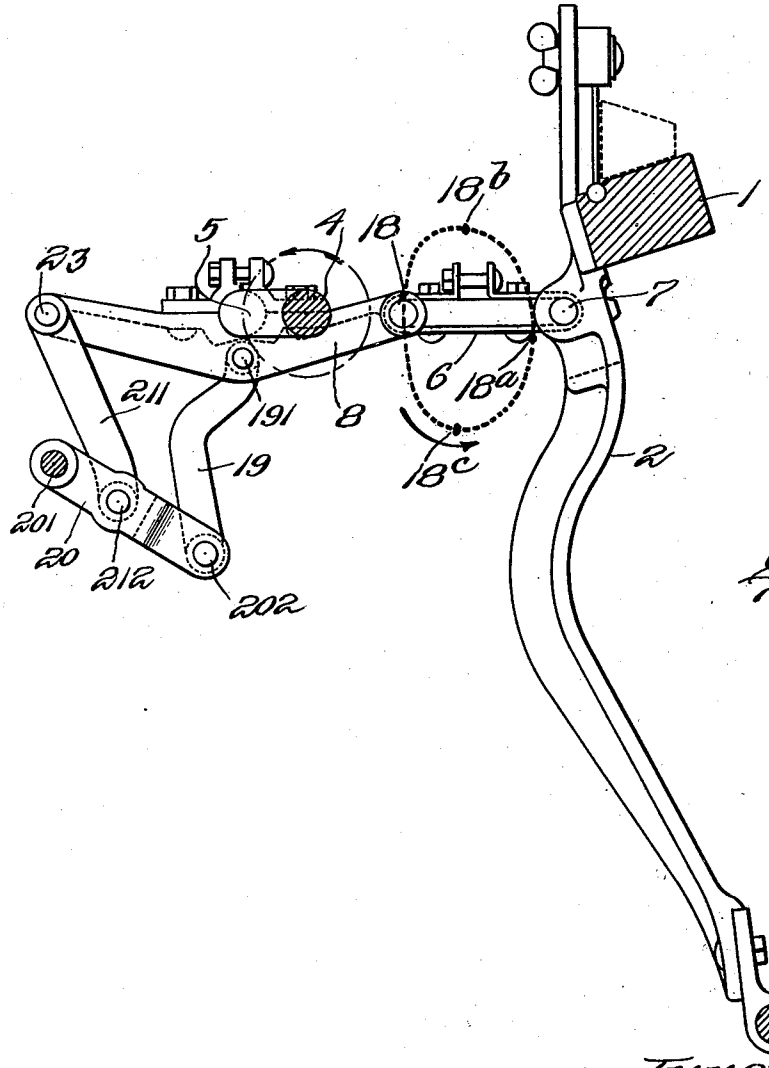

Fig. 1.

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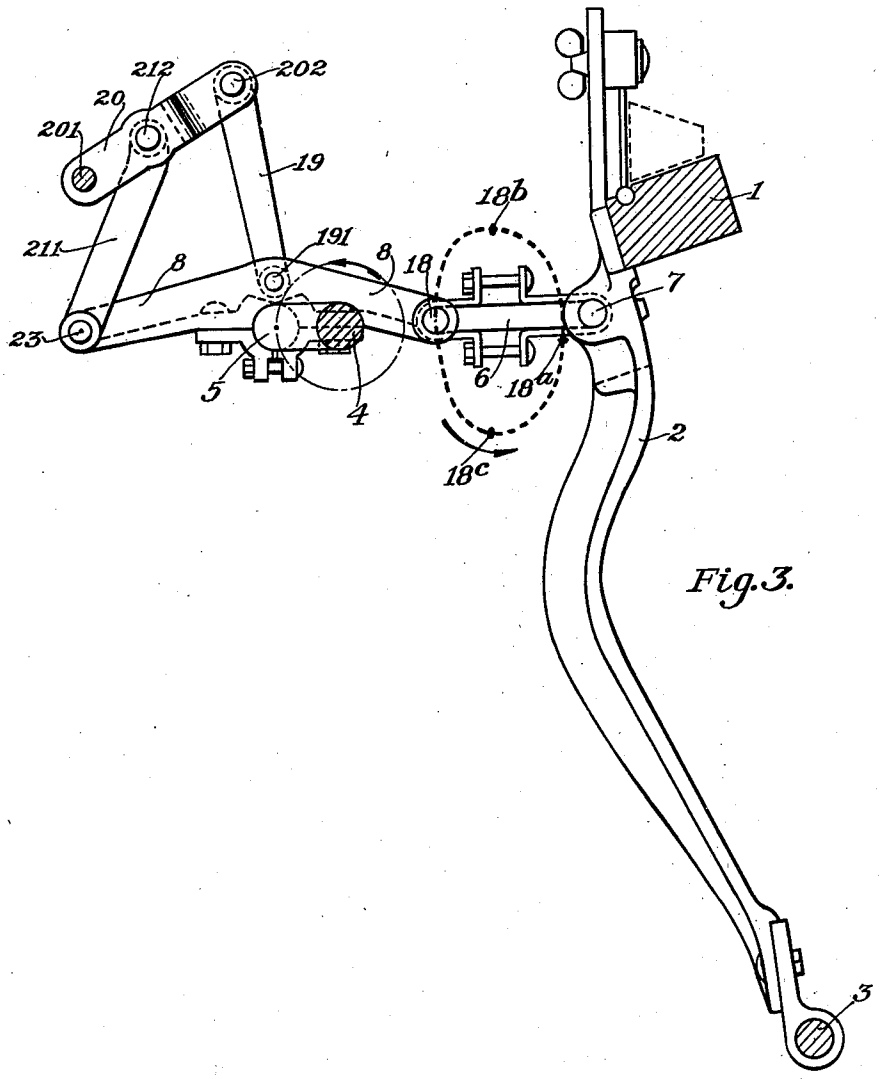

Fig. 3.

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UNITED STATES PATENT OFFICE.

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LAY MOTION FOR LOOMS.

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The invention has relation to the lay motions of looms, namely organizations of the class comprising, in a loom, the means combined with the lay of the latter for vibrating the lay rearward and forward, in order to provide for a passage of the shuttle across the loom and through a shed in the warp while the lay is rearward, so as to leave a pick of weft or filling in the said shed in front of the reed carried by the lay, and so that as the lay goes forward the reed shall push the said pick forward among the warp threads until it is beaten-up to the line at which cloth is formed.

The general object of the invention is to provide a simple, practical, and smoothly-working lay motion capable of actuating the lay with greater than usual retardation and dwell during its movement rearward, while rearward, and in the first portion of the ensuing movement forward.

It has been customary in practice so to proportion and relate the cranks of the crank-shaft of a loom, and the pitmen connecting such cranks with the lay, as to give more or less retardation and dwell, to afford more time for the passage of a shuttle through a shed in the warp. My invention is designed as an improvement upon what has been used or proposed heretofore in this line, my aims being to secure a more advantageous extent of properly timed retardation and dwell, and thereby to render feasible the employment of a shuttle of much larger size than heretofore found practicable to be used, and possessing greatly increased containing capacity.

In the drawings:—

Fig. 1 is a partly sectional view of certain portions of a loom with an illustrative embodiment of the invention applied thereto.

Fig. 2 shows in plan the parts which are represented in Fig. 1.

Fig. 3 is a view similar to Fig. 1, showing certain of the parts in an inverted position.

Having reference to the drawings:—

The lay of a loom is represented in the different views by the lay-beam 1 and one of the lay-swords 2, the latter mounted at its lower end upon a lay-rockshaft 3. At 4 in the respective views is the loom-crankshaft, formed with a crank 5, and at 6 is a pitman having its forward end in pivotal engagement at 7 with the lay-sword 2. I utilize the crank 5 as an actuator-crank for the lay, and utilize the pitman 6 in transmitting to the lay movement occasioned through the action of such crank, but instead of engaging the pitman 6 directly with the crank 5, I interpose between the said crank 5 and the pitman a lever 8 which is combined operatively with the crank 5 so as to be actuated thereby, such lever 8 having pivotal or crank-pin connection with the rear portion of the pitman. With the lever 8 I operatively combine governing means whereby the crank-pin 18 of the said lever is caused to travel in a predetermined controlled path or orbit, to secure thereby the desired modification of the lay-movement.

In the illustrative embodiment of the invention that is shown in the drawings, the lever 8 has at its front end crank-connection with the rear portion of the pitman 6, as by a crank-pin 18, the said lever 8 being engaged farther rearward with the actuator-crank 5. The governing means aforesaid, by means of which the transmitter crank-pin 18 is caused to travel in the orbit required for the attainment of the desired retardation and dwell, is combined with this lever 8.

In this illustrative embodiment of the invention, the controlling or governing means comprises a radius-arm or link, 211, a swinging arm 20, and a link 19. Radius-arm or link 211 has at its upper end a pivotal connection at 23 with the rear portion of lever 8. Its lower portion has a pivotal connection at 212 with swinging arm 20, at a point intermediate the pivotal support at 201 of the said swinging arm and the point 202 of pivotal connection between the forward portion of such swinging arm and the lower portion of link 19. The upper portion of link 19 has pivotal connection at 191 with lever 8 at an intermediate point in the length of the latter. The orbit of transmitter crank-pin 18 is as indicated by the dotted line in Fig. 1.

As will of course be understood, the crank and pitman devices are duplicated at the side of a loom opposite that indicated in such views. The pivotal support at 201, for the swinging arm 20 may be a simple pivot located at one side, only, of a loom, and duplicated for the devices at the opposite side of the loom, or a rockshaft may be employed, extending across the loom from one side of the latter to the other, mounted in suitable bearings, and having fixed thereon both of the levers 20 which are located at the two sides of the loom.

The capacity of radius-arm or link 211 to

swing rearward and forward around pivotal support 212 permits lever 8 to have bodily movement rearward and forward, or fore-and-aft-wise as it may be termed, in unison with the rearward and forward components of the revolving movement of the actuator-crank 5. The pivotal connection at 23 between the rear portion of the lever 8 and the radius-arm or link 211 serves as a pivotal support for such lever. The said pivotal connection restrains such portion of lever 8 from moving up or down, except as point 23 itself is moved up and down through the connections between lever 8 and such point, with the addition of movement to a negligible extent due to the vertical curvature of the horizontal arc in which such pivotal connection travels rearward and forward, but such pivotal connection leaves the lever free to swing vertically in unison with the ascending and descending components of the revolving movement of the actuator-crank. The up-and-down movement transmitted to pivotal point 23 through the described connections 19, 20, 211, is of less amplitude than the throw of the crank 5. In virtue of such fact, and of the transmitter crank-pin 18 being located at a greater distance from pivotal connection 23 than the point at which the lever is engaged with actuator-crank 5, the extent of the ascending and descending components of the movement of the transmitter crank-pin is multiplied more or less as compared with the vertical components of the rotary movement of actuator-crank 5. One result of this is vertical elongation of the orbit of the transmitter crank-pin. In virtue of the connection between lever 8 and arm 20 by means of link 19, the arm 20 is swung upward and downward in unison with lever 8, and in virtue of the connection of the lower end of the radius-arm or link 211 with arm 20 at 212 simultaneous rise and fall of pivotal support 23 for lever 8 is occasioned. The conjoint effect of the working of the combined parts is to cause the transmitter crank-pin 18 to travel in an orbit corresponding substantially with that indicated by the dotted line in Fig. 1. This orbit is ellipsiform, and its major axis is upright, as referred to also. The posterior arc of the said orbit is relatively flattened, as indicated in Fig. 1. As regards the results perceptible in the movement of the lay, the conjoint effect of the combined parts is to occasion a rapid rearward movement of the lay from front center 18^a of the transmitter crank-pin 18 to about top-center 18^b thereof, followed by retardation beginning at about top-center 18^b and merging into a more or less perfect dwell until the transmitter crank-pin passes the back-center position in which it is shown in Fig. 1, these in turn being succeeded by comparatively slow forward movement of the lay until the transmitter crank-pin arrives at its bottom center 18^c, following which the continued forward movement of the lay is accelerated rapidly until the transmitter crank-pin reaches its front center position, completing the cycle.

The retardation and dwell in the movement of the lay taking effect while the shuttle-boxes and shuttle-race of the lay are nearing and at the widest portion of the V-shaped opening of a shed in the warp, not only afford time for movement of the shuttle through the shed from one side of the loom to the other without being trapped in the shed, but render possible the employment of a shuttle much larger than otherwise it would be practicable to employ with a shed of usual depth of opening, and consequently capable of carrying a much greater amount of weft or filling. Such greater amount of shuttle-contained weft or filling enables much more cloth to be woven before exhaustion of the shuttle-contents renders it necessary to place a fresh supply therein.

The parts may be differently disposed in practice. Thus, the arrangement may be inverted, as in Fig. 3, namely with the swinging arm 20, radius-arm or link 211, and link 19 above the lever 8. In the case of a broad loom, parts arranged as shown in the drawings may be employed at opposite sides of the loom, in connection with the opposite ends of the crankshaft 4, and intermediately of the width of the loom one or more inverted sets of the parts may be employed.

What is claimed as the invention is:—

1. An improved lay-motion for looms, comprising in combination with an actuator-crank, a loom-lay, and a pitman having its front end connected with the lay, a lever having its front portion in pivotal connection with the rear end of said pitman, its intermediate portion operatively engaged with the actuator-crank, and its rear portion controlled by a fulcrum movable forward and rearward as said lever is moved by the actuator-crank, and means for raising and lowering the said fulcrum during each cycle of the actuator crank, through a less amplitude than the throw of the said actuator-crank, the parts coacting to cause the said point of pivotal connection between the lever and the pitman to travel in a vertically elongated orbit.

2. An improved lay-motion for looms, comprising, in combination with an actuator-crank, a loom-lay, and a pitman having its front end connected with the lay, a lever having its front portion in pivotal connection with the rear end of said pitman, and its intermediate portion operatively engaged with the actuator-crank, a radius-arm or link on which the rear portion of said lever is fulcrumed, a swing-member with which said link is engaged, and a link connecting the swing-member with the lever to swing said swing-member and transmit movement by

means of the first link to the fulcrum to raise and lower the latter through a less amplitude than the throw of the said actuator-crank, the parts coacting to cause the said point of pivotal connection between the lever and the pitman to travel in a vertically elongated orbit.

3. An improved lay-motion for looms, comprising, in combination with an actuator-crank, a loom-lay, and a pitman having its front end connected with the lay, a lever having its front portion in pivotal connection with the rear end of said pitman and its intermediate portion operatively engaged with the actuator-crank, a radius-arm or link on which the rear portion of said lever is fulcrumed, a swing-member extending forward from a fulcrum at the rear and having said link engaged therewith in advance of the fulcrum, and a link connecting the lever to the swing-member to swing said swing-member and transmit movement by means of the first link to the fulcrum to raise and lower the latter, through a less amplitude than the throw of the said actuator-crank, the parts coacting to cause the said point of pivotal connection between the lever and the pitman to travel in a vertically elongated orbit.

In testimony whereof I affix my signature.

WILLIAM H. BAKER.