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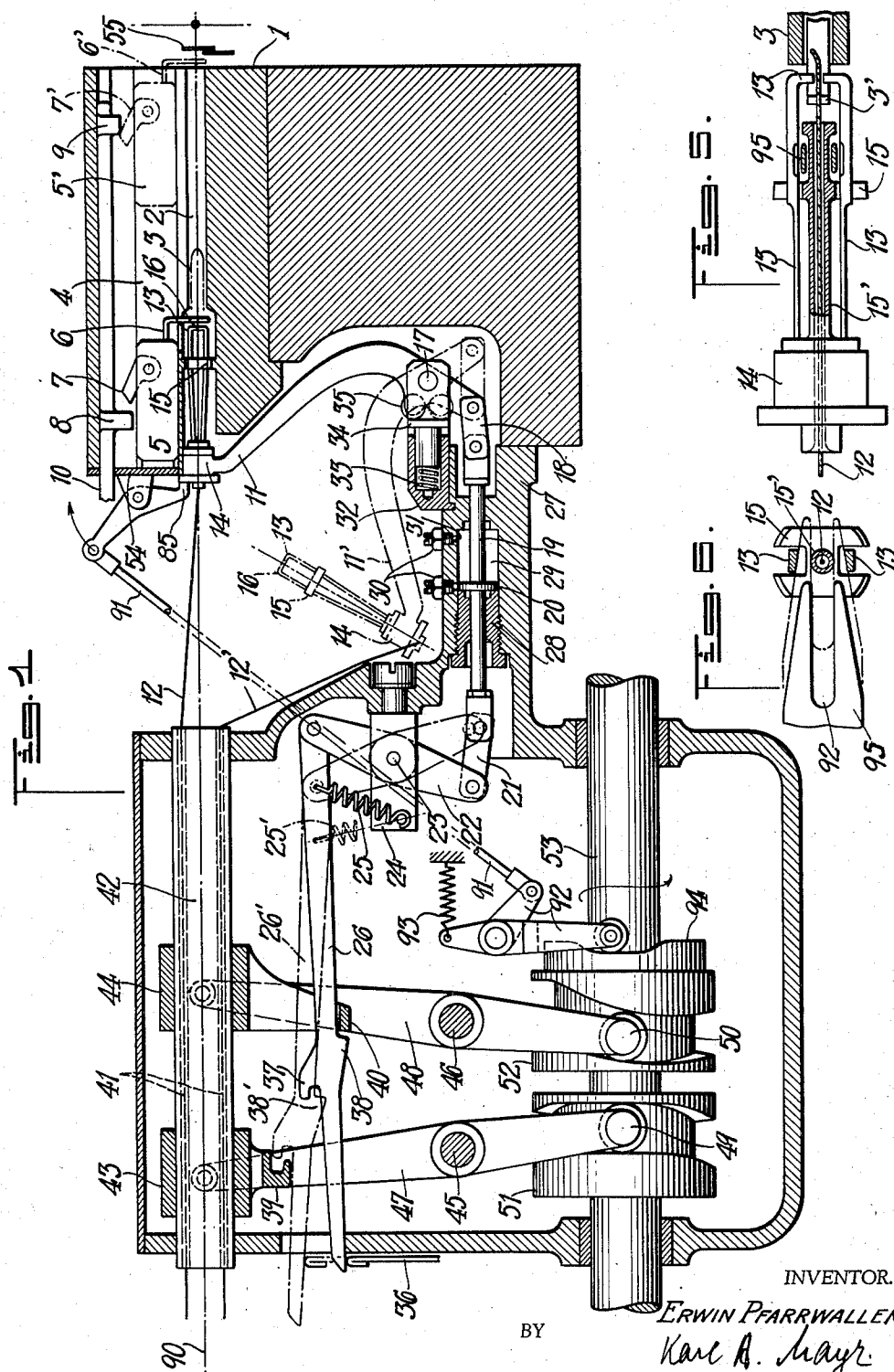
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2,221,384

WEFT THREAD FEED MECHANISM

Filed June 28, 1939

2 Sheets-Sheet 1



Nov. 12, 1940.

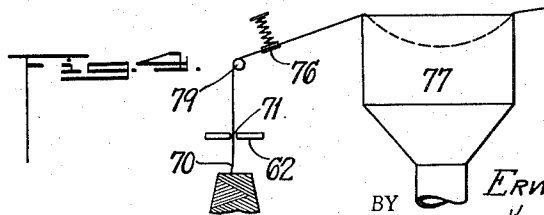
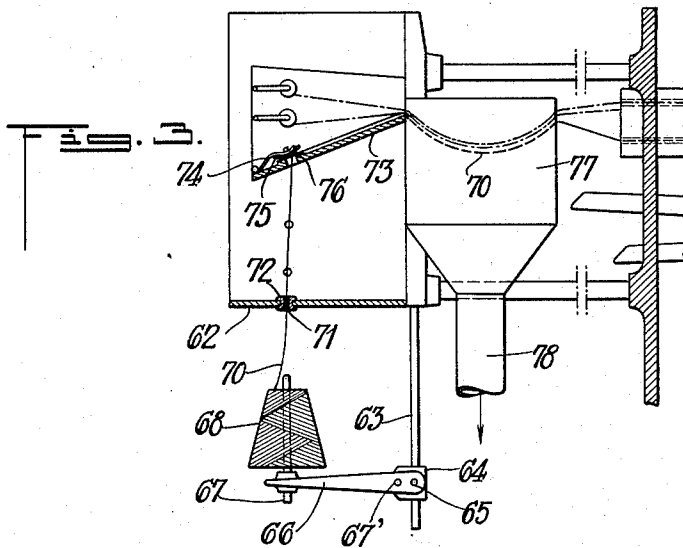
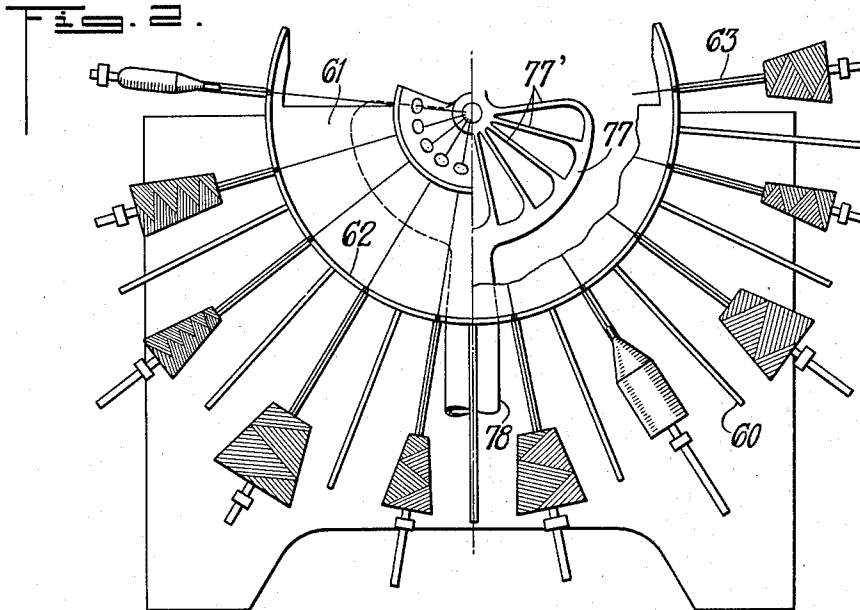
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WEFT THREAD FEED MECHANISM

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2 Sheets-Sheet 2



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2,221,384

WEFT THREAD FEED MECHANISM

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Application June 28, 1939, Serial No. 281,515
In Switzerland July 1, 1938

17 Claims. (Cl. 139—122)

The present invention relates to a weft thread feed mechanism for looms for weaving having weft thread feed means of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, more particularly to a mechanism of the type set forth in which said feed levers individually make feed swings towards a thread feeding position and return swings to a rest position and in which mechanism separate drive or actuating means are provided for producing the feed swings or for producing the return swings.

Looms for weaving having gripper shuttles are known in the art in which looms different weft threads are individually inserted in a predetermined sequence. The desired sequence of weft insertion is obtained by means of a feeler cooperating with a perforated step-wise progressing pattern. The swingable weft feed levers are disposed in a circle and are provided with controlled weft clamps and are operated by means of platens which are hooked in reciprocating knives according to the pattern to be produced. With these known mechanisms the platen of the next operating feed lever cannot be hooked into the actuating knife until a feed and return swing is completed. This operation calls for a standstill of the actuating knife in its extreme position.

Conventional mechanisms of the type set forth require comparatively much time between two picks whereby the number of picks per minute is considerably reduced.

An object of the present invention is the provision of a weft supply mechanism of the weft gripping type in looms for weaving having radially disposed pattern controlled and swingable weft supply levers in which mechanism the feed swings of the levers are produced by an actuating mechanism and the return swings of the levers to rest position is produced by another actuating mechanism.

It is a further object of the present invention to provide a mechanism of the type set forth in which the radial projection of the total stroke of the thread supply or feed lever is greater than the projection necessary to make room for the adjacent lever and in which mechanism the feed swing produced by one of two actuating mechanisms is started before the return swing produced by the other actuating mechanism is completed.

Another object of the present invention is to provide a mechanism of the type set forth in which the platens of the feed levers which may

be in rest or in feed position, are in such a position that the actuating mechanism locks the feed levers in their rest and/or operating position at least during a fraction of the time available between two picks. This type of mechanism assures that without providing special means the feed lever which must deliver several times consecutively the same thread coming from the same bobbin to the shuttle remains in operating or feeding position without returning to rest position.

According to the present invention the feed levers may be held in their rest and in their operating or feed position by means of a resilient member. This method of arresting which is sufficient for the rest position may be, according to the present invention, improved for the operating or thread feeding position by means of a controlled lever at least during the time of transfer of the weft thread end to the shuttle.

The clamp points of the shuttles and of the thread feeder are usually very small. In order to absolutely assure weft transfer it is necessary to hold the clamps of the shuttle and the clamps of the thread feeder in exact position with respect to one another. According to the present invention the exact position of the feed lever or rather the weft clamp thereof is assured by the provision of centering means which are preferably positioned adjacent to the clamp jaws and which means may be used for guiding the clamps. The fulcrums of the thread feed levers are preferably disposed in a plane which is perpendicular to the direction of the pick and in which plane also the aforesaid centering means are located.

A further object of the present invention is the provision of only one clamp control means provided in the shuttle box for operating the resilient clamp jaws from outside. This is particularly important when there is a great number of thread feed levers. The clamp control means preferably comprise a wedge shaped bifurcated member which is periodically inserted between the jaw members of the clamp. The weft thread passes inbetween the prongs of said bifurcated member and the wedge acts between the centering means and the gripping ends of the jaws.

The stationary weft thread spools are preferably arranged radially as are the feed levers and their axes are directed towards the line of direction of the shuttle pick. A thread brake is provided between the thread spools and the feed levers in such a manner that there are as few and as small bends of the thread as possible

between the brake and the thread holding head of the feed levers. The main part of the diversion of the thread from the radial direction of the thread spool to the direction of the pick is arranged ahead of the thread brake with respect to the movement of the thread.

Further and other objects and advantages of the present invention will be apparent from the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be preferred embodiments of my invention.

In the drawings:

Figure 1 is a part sectional side view of a weft thread feed mechanism according to the present invention.

Figure 2 is a part sectional rear view of the weft thread feed mechanism taken in the direction of the shuttle pick.

Figure 3 is a part sectional diagrammatic showing of the path of the weft thread in a thread feed mechanism according to the present invention.

Figure 4 is a diagrammatic showing of a modified path of the weft thread according to the present invention.

Figure 5 is a longitudinal sectional view of the thread holding head of a weft thread feeder according to the present invention.

Figure 6 is a cross sectional view of the weft thread holding head of a weft thread feed lever according to the present invention.

Like parts are designated by like numerals in all figures of the drawings.

Referring more particularly to Figure 1 of the drawings a thread picking channel 2 is provided in the shuttle box 1; a picker shuttle 3 is inserted in channel 2 and is picked into the shed after it has gripped a weft thread. A guide 4 is provided on top of the picking channel 2, in which guide the return member 5 which is provided with clamps 6 is reciprocated. The return member is provided with special control means 7 which serve for opening and closing the clamps 6 and which may in addition move the clamps 6 to the sides or upward outside of the shuttle box. The control means 7 is driven by a member 10 provided with projections 8 and 9.

The thread feed lever 11 is shown in the shuttle box and either takes the weft thread 12 from the thread return means 5 or transfers it to the shuttle 3. A feed lever 11' is shown in rest position in dash and dotted lines. The feed levers 11 are provided with clamps 13. These clamps are held in the head 14 of the feed levers 11 and are guided adjacent to the clamping point 16 by means of a slotted guide member 15. The guide or centering member 15 is preferably of a conical outside configuration to facilitate centering. The weft thread 12 may be guided within said guide member 15, for example, in a tube 15', as shown in Figures 5 and 6. The part of guide member 15 at which the weft thread 12 enters said guide member is well rounded or conical so that the entrance of the thread is facilitated.

The axles 17 which form the fulcrums of the feed levers 11 are disposed in a circle. The feed levers are of the two arm type and have a long arm at the end of which the head 14 is provided and a short arm, the end of which is connected with the feed lever drive. This drive comprises connecting links 18 and 21 in between which a rod 19 provided with a piston 20 is arranged; to the free end of link member 21 one end of a two arm lever 22 is connected, which two arm lever

swings about a fulcrum 23 arranged in the stationary part of the loom. The fulcrums 23 are disposed in a circle. To the other end of the two arm lever 22 the platens 26 are individually connected. The platens 26 are pulled outward, away from the axis of the pick, by means of springs 25. The rod 19 is guided in a bush 28 and also in the part 27 of the stationary housing which forms a cylinder 29. The piston 20 reciprocates in the latter. Throttle openings 31 are provided in said cylinder which are adjustably closed by means of screws 30 for adjusting the brake action of the air brake formed by piston 20 and cylinder 29.

The axles 17 which are disposed in the circle are held by means of supports 32 having a segment configuration and being mounted to the housing portion 27. The supports 32 are provided with cylinders and coil springs 33 inserted therein, which springs act on pistons carrying plates 34 which plates are individually pressed onto the surface 35 provided on a projection of levers 11. The devices composed of members 32, 33, 34 and 35 tend to resiliently hold the levers 11 in their extreme end positions, i. e., the feed or operating position shown in solid lines and the rest position shown in dash and dotted lines even against the action of the lever actuating means 18, 19, 21, 22, 25 and 26.

The platens 26 are normally pulled away from the center line 30 of the pick by means of springs 25. Whenever the finger 36 moves from the position shown in solid lines to the position shown in dash and dotted lines due to the action of a perforated pattern, the platen 26 is moved from the position shown in solid lines to the position shown in dash and dotted lines and the lever 11 may be brought into operating position and its head into the shuttle box 1.

The platens 26 are provided with projections 37 and 38 which are engaged, respectively depending on the position of finger 36, either by the circular knife 39 or 40. Knives 39 and 40 are connected to bushes 43 and 44 respectively which bushes are slidable on guide rod 42. The latter is provided with bores through which the weft threads 12 pass. Bushes 43 and 44 are individually connected to one end of two arm levers 47 and 48 which are rotatably supported by means of pins 45 and 46 and the other ends 49 and 50 of which cooperate with clamps 51 and 52 respectively, which clamps are mounted on a shaft 53 which is connected to and driven by a main drive of the loom.

Operation

Whenever a predetermined weft thread, for example, thread 12 must be picked into the shed, the finger 36 is moved from the position shown in solid lines into the position shown in dash and dotted lines and the platen 26 is pushed forward by means of knife 39 which engages nose 37. Upon clockwise movement of two arm lever 47 the feed lever 11 is moved from its rest position 11' into its operating position 11 and its head inserted into the picking box 1. An acceleration of the lever and actuating means is required at first and afterwards a retarding. In order to prevent the accelerated lever 11 and the actuating means 18 to 22 from running away from the knife 39, a retarding means in the form of a dash-pot or air brake 20, 29, 30, 31 is provided. This air brake also causes the head 14 to arrive at its abutment 54 at a much reduced speed whereby knocks are eliminated. Such knocks

would cause vibration of the clamps 13 and disengagement of the weft thread.

When changing over to another weft thread the weft thread which was last inserted in the shed is gripped by the clamps 6 of the thread return means 5 which are controlled by the projection 9. The means 5, at this operation, are in the position shown in dash and dotted lines and designated by numerals 5' and 6'. The thread return means 5 are moved to their outermost position shown in solid lines after the weft thread has been cut by means of scissors 55 and the weft thread will be gripped near its cut end by the clamping point 16 behind the return member clamp 6. Room must be made for a feed swing of a feed lever 11 which carries the next to be inserted weft thread. For this purpose the platen 26 of the last operated feed lever 11 is caused to drop down by means of the pattern controlled finger 36 and the nose 38 of platen 26 is brought into a position where it can be engaged by the knife 40. The return movement of feed lever 11 to rest position which is produced by the knife 40 is retarded by means of the double acting air brake 20, 29, 30, 31. According to the present invention the return movement of the feed lever 11 is actuated by means of a knife 40 which is definitely separated from the knife 39 which causes movement of the feed lever into feed or operating position. Before the actuating stroke of knife 40 is completed and lever 11 reaches rest position, the actuating stroke of knife 39 is started and the movement of knives 39 and 40 is so timed that there is just sufficient clearance between the feed levers to pass one another.

The position of fulcrum 17 is such that the free length of the weft thread between its stationary guide 41 and the head 14 of the feed lever is of equal length or somewhat longer when the feed lever is in operating position than when said lever is in rest position. The guide member 15 may preferably be made tapered so that it has some play when it enters its guide.

Figures 2 to 4 show an arrangement of the stationary weft thread spools and weft thread brake.

A ring member 62 is mounted on the stationary parts 60 of the loom by means of a support 61. Radially disposed rods 63 are also mounted to the support 61, which rods slideably support the blocks 64. Blocks 64 revolvably carry levers 66 which may be resiliently held in position by means of a well known point arresting device 67'. The levers 66 carry the spindle 67 for supporting the weft thread spools 68 which are composed of thread of different color, different gauge or other different quality. The thread 70 which is pulled from bobbin 68 is conducted from an eye 71 of eyelet 72 which is mounted to the annular sheet 62. Within the ring 62 a brake holder 73 of preferably conical configuration is provided, on which brake holder the brake devices 75 which are actuated by brake springs 74 are disposed. The weft thread makes very few and very slight bends from the braking point 76 until it is brought into the direction of the pick. The conicity of the brake holder 73 is just great enough to provide sufficient space for the brakes. In the embodiment shown all brakes are in one row; they may also be arranged in several rows.

After the thread has passed the brake it runs on the inside surface of the brake holder 73 and then into a device 77 where it is under the in-

fluence of an air current or into a device which maintains tension on the weft thread 70 when the thread feeder is returned from its foremost or operating position into its rearmost or rest position. It is advantageous to guide the weft thread before it enters and after it leaves the air current or vacuum 77 in order to prevent entanglement of adjacent different threads. The suction device 77 which is connected by means of a tube 78 to a ventilator or other source of suction is preferably subdivided so that an individual suction slot 77' is provided for each individual weft thread. This is shown in the right part of Figure 2. The individual suction slots are disposed radially and are connected by means of a streamlined channel with the suction tube 78.

The sharpest bend of the thread is preferably arranged in advance of the brake 76. Figure 4 clearly shows this arrangement. The thread is bent around the pin 79 and passes, after it has passed said pin, through the brake 76.

Instead of conducting the weft threads through individual bores 41 of rod 42 as shown in Figure 1, they may also be conducted through a central bore in said rod.

The axes of the stationary spools 68 need not be all in the same plane but may be arranged staggered and/or in different planes. They may also be in inclined position whereby the inclination of individual spindles may be different.

Figures 5 and 6 show the control of the feed clamps 13 by means of a wedge shaped member 95 which is connected with the shuttle box 1. The clamps 13 themselves carry no control means. They only are under the influence of the control means 95 after they are inserted into the shuttle box. Figure 5 shows the rear end of the shuttle 3 carrying the projecting shuttle clamp 3'. The gripping ends of the jaws 13 act inbetween the rear end of the shuttle 3 and the clamp 3'. The wedge member 95 is adapted to open the clamp 13 and give free passageway for the clamp 3' of the shuttle 3. As shown in Figure 6 the member 95 is bifurcated having two prongs for accommodating the weft thread 12 inbetween the prongs.

A locking lever 85 is provided on the shuttle box 1 which holds or locks the feed lever head 14 in operating or feed position while the thread is transferred to the shuttle. This lever 85 is operated by means of link member 91, lever 92, spring 93 and cam 94. The feed lever 11 can be locked in its working position and rest position as follows:

The platen 26 shown in full lines is connected to a lever 11 which is in the working position. The platen 26 is, however, controlled in such a way that during the next stage of the operation this lever is turned into the rest position; this is effected by the knife 40. Should this lever 11 remain in the working position during the next stage in the operation, its platen 26 would be pressed upwards by the finger 36. In this case the lever 11 would be locked in its working position by the knife 39 and the nose 37.

In the rest position the locking is effected in a similar manner: should the lever 11' shown in chain-dotted lines remain in its rest position, its platen 26' is to be pressed downwards by spring 25'. In this case the locking in the rest position would be effected by knife 40 and nose 38'.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not

desire to be limited to the exact details of design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

8 I claim:

1. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers being adapted to make thread feed swings and return swings, said mechanism comprising lever actuating means adapted to be intermittently operatively connected with said feed levers for producing the feed swings, and other lever actuating means independent from said first mentioned actuating means and adapted to be intermittently operatively connected with said feed levers for producing the return swings of said levers.
2. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers being adapted to make thread feed swings and return swings, said mechanism comprising lever actuating means adapted to be intermittently operatively connected with said feed levers and being adapted to produce the feed swings, other lever actuating means independent from said first mentioned actuating means and adapted to be intermittently operatively connected with said feed levers and being adapted to produce the return swings of said levers, and a drive means common to both said actuating means.
3. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings and return swings, said mechanism comprising a lever actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means individually operatively connectable with said feed levers and producing the return swings thereof, said first mentioned actuating means starting a feed swing of the feed lever connected therewith while the return swing of the lever connected with the other of said actuating means is not yet completed.
4. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings and return swings, said mechanism comprising a lever actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means individually operatively connectable with said feed levers and producing the return swings thereof, the extent of the swings of said levers being greater than is necessary to provide space for the movement of the adjacent levers and said first mentioned actuating means starting a feed swing of the feed lever connected therewith while the return swing of the lever connected with the other of said actuating means is not yet completed.
5. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings

and return swings, said mechanism comprising a lever actuating means individually intermittently operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means independent from said first mentioned actuating means and individually intermittently operatively connectable with said feed levers and producing the return swings thereof, the extent of the swings of said levers being greater than is necessary to provide space for the movement of the next adjacent levers.

6. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings and return swings, said mechanism comprising a lever actuating means individually intermittently operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means independent from said first mentioned actuating means and individually intermittently operatively connectable with said feed levers and producing the return swings thereof, said other actuating means being so constructed as to lock said levers in returned or rest position during a fraction of the time between two picks.

7. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings and return swings, said mechanism comprising a lever actuating means individually intermittently operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means independent from said first mentioned actuating means and individually intermittently operatively connectable with said feed levers and producing the return swings thereof, said first mentioned actuating means being so constructed as to lock said levers in feed position at least during a fraction of the time between two picks.

8. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers making feed swings and return swings, said mechanism comprising lever actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other lever actuating means individually operatively connectable with said feed levers and producing the return swings thereof, said other actuating means remaining disconnected from said levers and inoperative and said levers remaining in feeding position at consecutive picks at which the same thread is inserted.

9. A weft thread feed mechanism for looms for weaving having picker shuttles, said mechanism comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other actuating means individually operatively connectable with said feed levers and causing the return swings thereof, said levers having thread feeding end portions, and lock means movable substantially in the direction of the weft movement and adapted to follow and to engage said end portions when said levers ap-

proach feeding position and to hold said levers in feeding position during the transfer of the weft thread to the shuttle.

5 10. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other actuating means individually operatively connectable with said feed levers and causing the return swings thereof, said levers having a thread feeding head a stationary thread feeding channel means having a thread feeding head receiving portion for receiving said head, and centering means connected with said head and with said receiving portion and assuring correct feed position of said heads at the end of a feed swing of said levers.

20 11. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other actuating means individually operatively connectable with said feed levers and causing the return swings thereof, said levers having a thread feeding head comprising a thread holding clamp, and a centering and clamp guiding member connected with said head adjacent to said clamp and adapted to definitely guide the movement of said clamp, a stationary thread feeding channel means having a thread feeding head receiving portion comprising centering means corresponding to said centering and clamp guiding member and assuring correct feed position of said head and said clamp.

40 12. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, actuating means individually operatively connectable with said feed levers and producing the feed swings thereof, and other actuating means individually operatively connectable with said feed levers and causing the return swings thereof, said levers individually having a thread feeding head and a centering member connected therewith for affording correct feed position of said heads at the end of a feed swing of said levers, said levers having fulcrums disposed in a plane perpendicular to the direction of the shuttle pick, and said centering members being so constructed as to be positioned substantially in the plane of said fulcrums when said lever is in feed position.

55 13. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, actuating means individually operatively connectable with

said feed levers and producing the feed swings thereof, and other actuating means individually operatively connectable with said feed levers and causing the return swings thereof, said levers having a thread holding and feeding head including a thread holding clamp comprising resilient jaw members, and bifurcated jaw member operating means associated with said loom and having prongs and temporarily engaging said jaw members and operating said clamp and accommodating the thread between said prongs.

14. A weft thread feed mechanism for looms for weaving having weft thread feed members of the thread gripping type and individually pattern controlled radially disposed and swingable weft thread feed levers, said levers being adapted to make thread feed swings and return swings, said mechanism comprising lever actuating means operatively connected with said feed levers and being adapted to produce the feed swings, other lever actuating means operatively connected with said feed levers and being adapted to produce the return swings of said levers, and a drive means common to both said actuating means and comprising a shaft, cam members mounted on said shaft, and a two arm lever for each actuating means, one arm of each of said two arm levers individually engaging one of said cam members.

15. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers adapted to make thread feed and return swings, a drive mechanism connected with each of said levers and comprising a brake which brakes the feed as well as the return movement of said levers, actuating means individually operatively connectable with said drive mechanism and producing the feed swings of said levers, and other actuating means individually operatively connectable with said drive mechanism and causing the return swings thereof.

16. A weft thread feed mechanism for looms for weaving comprising, in combination, individually pattern controlled radially disposed and swingable weft thread feed levers, drive mechanisms individually connected with said levers and comprising an air brake braking the ends of the swings of said levers, actuating means individually operatively connectable with said drive mechanism and producing the feed swings of said levers, and other actuating means individually operatively connectable with said drive mechanism and causing the return swings thereof.

17. A weft thread feed mechanism for looms for weaving as claimed in claim 16 in which said air brake is provided with adjustable air throttle openings for adjusting the brake action of said brake.

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