

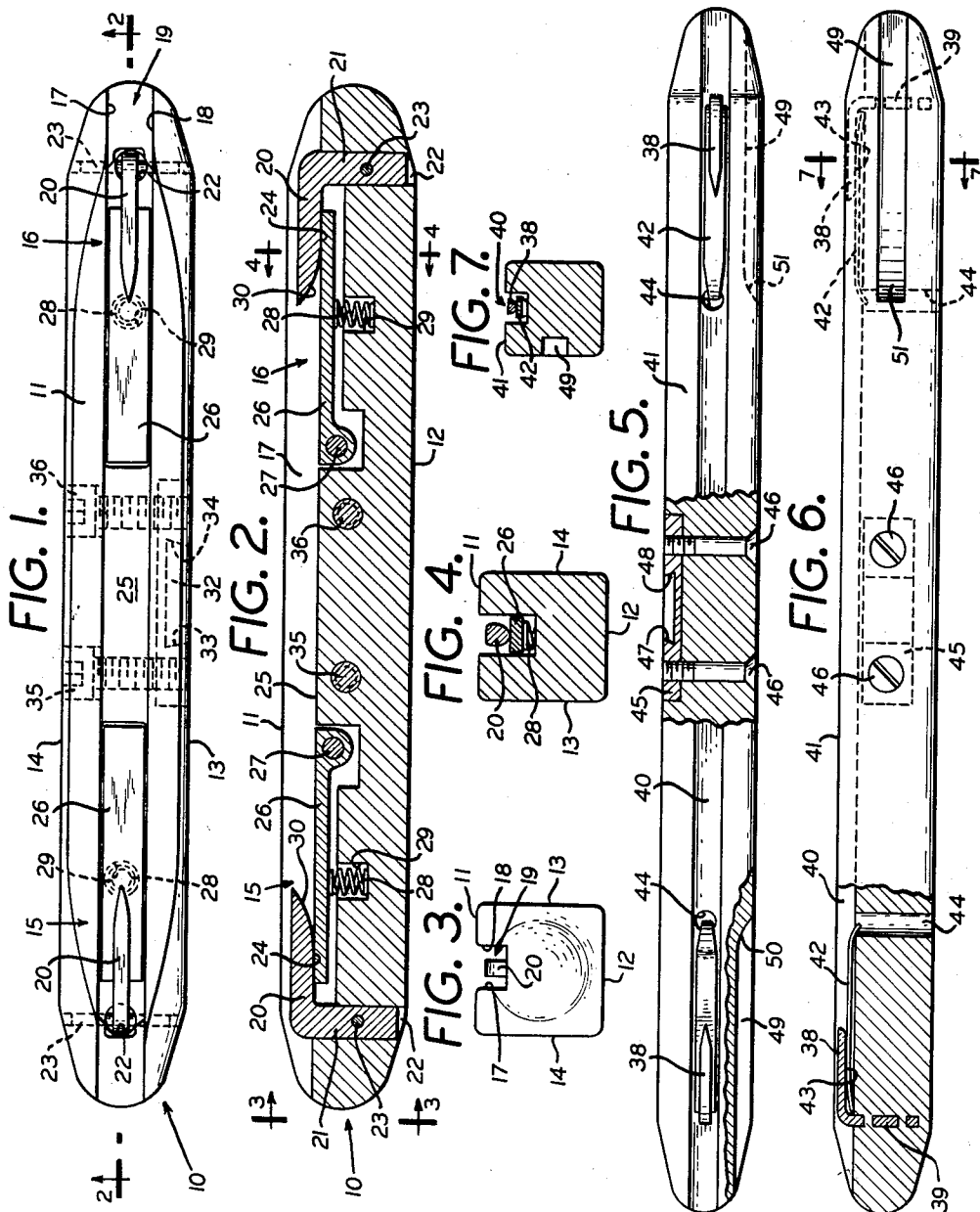
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PILOTS FOR FILLING THREADS

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PILOTS FOR FILLING THREADS

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This invention relates to filling thread carriers or pilots for use in looms of the type in which filling threads are woven into a fabric from separate supply sources located at opposite sides of a loom. A single pilot is alternately projected in opposite directions from similar projecting mechanisms at either end of a lay.

The pilot of the present invention is adapted to pick up the leading end of a filling thread and carry it across a loom to a projecting mechanism which receives and temporarily holds the pilot until it is readied for travel in the reverse direction. Before a pilot is projected from a projector the filling thread which is carried across the loom is released from one thread gripper on the pilot, the leading end of a new filling thread is positioned for engagement by a second thread gripper, and a latch by which the pilot is held stationary in the projector is released. The second thread gripper picks up the new filling thread as the pilot begins its return flight. Among the objects of the invention is to provide a rugged pilot of simple construction and capable of accomplishing the performances required with unerring dependability. It is sturdily built for enduring repeated percussions throughout an extensive period of operation.

The body of the pilot is constructed from one piece of a hard and durable material formed as an elongated member having a central portion of uniform cross-section and end portions tapering down to warp-parting ends. It is particularly useful in looms of the type described in my copending application Serial No. 588,152, filed May 29, 1956, of which this application is a continuation-in-part. The pilot has like thread grippers adjacent each end. The thread-engaging ends of the two grippers face towards each other and the grippers function independently of one another for carrying filling threads in opposite directions across the loom. The thread grippers are located within the girth of the body of the pilot in a groove in an outside face of the pilot. The groove preferably extends from end to end of the body of the pilot to accommodate the thread-engaging end of a device by which a thread is bent into the groove and presented to a gripper during initial movement of the pilot.

Each gripper includes a hook element opening in the direction of flight and a yieldable member biased for engagement with the underside of the hook element and forming therewith a wedge-shaped notch opening towards a filling thread which is to be picked up. A filling thread is bent into the groove in advance of the open end of a gripper by a thread-depressing element which is actuated by the loom and the thread is caught in the bite of the gripper between the hook element and the yieldable member as the flight of the pilot begins. The pressure of the yieldable member on the underside of the hook effects seizure of the thread and the thread is drawn from its source of supply as the pilot continues across the loom. A yieldable member and its associated hook are so proportioned with respect to each other and to the width of the groove in which they are disposed as to enable a thread-releasing device to enter the groove to displace the

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yieldable member of a gripper from thread-engaging position thereby to free a filling thread from the pilot after the thread has been carried across the loom.

The flight of the pilot ends when it arrives at the projector at the other side of the loom. Each projector has an impact absorbing device adapted to engage a tapered end of the pilot. A latch is provided by each projector to engage a shoulder on a plate which is recessed in a side face of the pilot. The latch is withdrawn before the pilot is projected in the reverse direction.

In the drawing, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Fig. 1 is a plan of a pilot embodying the principle of the present invention;

Fig. 2 is a longitudinal section on line 2—2 of Fig. 1;

Fig. 3 is an end view of the pilot shown in Fig. 1;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a top view of a modified form of pilot with parts broken away;

Fig. 6 is a side elevation of the pilot shown in Fig. 5 with one end broken away to show a thread-engaging gripper;

Fig. 7 is a section on line 7—7 of Fig. 6.

The body of the pilot has the general shape of a cigar with the configuration of its girth variable to provide a plurality of flat side faces corresponding to a like number of guiding surfaces of a raceway for a particular loom in which the pilot is to be used. For a loom having a raceway with rectangularly disposed guiding surfaces the pilot body 10 (Figs. 1 and 3) would have two parallel flat surfaces 11 and 12 and two parallel flat surfaces 13 and 14 which are disposed at right angles to the surfaces 11 and 12. These surfaces slide over similarly disposed guide surfaces at the interior of a raceway. The flat surfaces end in conic sections at their intersection with the conical end portions of the body of the pilot. The apex ends of the conical surfaces may be pointed, or more or less blunt, as desired.

The body member is composed of a hard, durable material. A molded plastic has proven satisfactory, although the body member may be made of any other suitable material, such as a light metal or alloy. It is sufficiently strong to withstand the impact of a hammer or plunger by which it is impelled.

The grippers 15 and 16 are similarly constructed. They are contained within the girth of the pilot between parallel side walls 17 and 18 of a groove 19. As shown in Figs. 1 and 2, each gripper includes a relatively stiff thread-catching element in the form of a hook having a finger 20 extending longitudinally along the groove 19 from a shank 21 which is press fitted or otherwise anchored in a bore 22. A rivet 23 holds the hook solidly in place.

The upper surface of the hook is located below the top surface 11 of the body member and the under surface 24 of the hook is substantially coincident with the plane at the bottom surface 25 of the groove 19. The hook is sufficiently narrow to provide clearance alongside for the passage of an actuator (not shown) which is operated by the loom for displacing the underlying second member 26 of a gripper to release an engaged thread.

The lowermost surface 24 of the hook is preferably a rounded edge, as best shown in Fig. 4, to provide an edge contact with the upper surface of the resiliently yieldable member 26 in order to localize the pressure of these two members on an engaged thread. Each of the yieldable members 26 is contained in a recess below the surface 25 of the groove 19. The upper surface of each member 26 is flat and is normally disposed in the same plane as the surface 25. Its width is slightly less

than the width of the space between the side walls 17 and 18 of the groove.

Each member 26 is pivotally mounted on a rivet 27 which is driven into a hole in the body member. The pivoted member is continually pressed against the underside of the hook by a spring 28 disposed in a socket 29.

The pointed ends of the hooks of the two grippers are directed towards each other or towards the central transverse plane of the pilot, and it will be understood that the gripper 15 picks up and carries a filling thread as the pilot moves in one direction, i.e. from left to right, as viewed in Fig. 1, and that the gripper 16 picks up a filling thread when the pilot travels in the opposite direction. Each hook 20 has a sloping convex surface 30 which intersects the straight under surface 24 of the hook in a manner to form an angular opening or open wedge.

One side surface of the body member is recessed to receive a metal insert 32 which provides a pair of shoulders 33 and 34 facing each other from opposite ends of the insert. The insert is fixed in position by screws 35 and 36. The shoulder 33 is engaged by a spring-pressed latch when the pilot has been received in a left-hand projector, and the shoulder 34 is engaged by a similar latch in a right-hand projector when the pilot has been received therein. Each latch is withdrawn from the pilot before the pilot is projected.

The cross-section of the pilot illustrated in Figs. 5, 6 and 7 is such as to provide four flat sides for guidance within a raceway having similarly disposed guiding surfaces. Each of the hooks 38 has a right angle portion 39 extending into the body of the pilot for permanently attaching the hook to the pilot. The hooks extend parallel to and within a longitudinal groove 40 in the top surface 41 of the pilot. A spring member 42 is disposed beneath each hook 38 whereby a yieldable thread-gripping device is provided. The spring member 42 is supported by engagement of its ends with the bottom of the groove 40 and with its top surface pressing against the underside 43 of the hook so that a filling thread extending across the groove may be picked up by engagement between the hook and the spring as the pilot is projected. The spring member 42 is so shaped below the loop end of the hook as to provide a free space which eliminates the collection of lint under the hook. The other end of the spring is bent downwardly into an opening 44 through which a tool may be inserted to raise the end of the spring member from the bottom of the groove whenever it is desired to replace the spring member.

A metal plate 45 is located in a recess in one side of the pilot midway between the ends of the pilot and is held in place by screws 46. The plate is recessed to provide shoulders 47 and 48 which are alternately engaged by a latch at the respective projectors, as previously explained.

The side of the pilot opposite from the recessed locking plate 45 has two longitudinally disposed slots 49 which terminate in cam surfaces 50 and 51 adjacent each end of the pilot. The slot and cam at one end functions with one projector and the slot and cam at the other end functions with the projector at the other end of the lay. The cam surfaces respectively actuate a pin of a safety switch at the respective projectors.

As in the case of the pilot first described, after a thread has been carried across the loom and before the pilot is projected in the reverse direction, the spring member 42 of the gripper which carried the thread across the loom is depressed to release the thread.

It is desired it be understood that the devices which have been described are illustrative of the best embodiments of the invention and that the invention is capable of incorporation in other forms of devices designed to use the various features and elements in the combinations and relationships disclosed and within the scope of the claims which follow.

What is claimed is:

1. A pilot for carrying a filling thread through a shed of warps formed in a loom, said pilot comprising a multi-sided elongated body having tapering ends adapted to receive propulsive force for propelling the pilot and a groove extending lengthwise in one side of the body from end to end of said body, a thread gripper located adjacent each of the ends of said groove below the plane of said one side of said body, each of said grippers comprising a hooking element and a resiliently yieldable member, each hooking element having an open end portion extending along said groove and pointing towards the other hooking element, said resiliently yieldable members disposed below said hooking elements and normally pressing against the undersides of the open end portions of their respective hooking elements for engaging a filling thread hooked onto one or the other of said hooking elements, said hooking element and said yieldable member of each gripper providing an angular opening for the entry of a filling thread and its seizure between the hooking element and the yieldable member of one or the other of said grippers depending on the direction of travel of the pilot longitudinally of said body.

2. The combination set forth in claim 1 wherein the underside of the hooking element and the upper surface of the yieldable member of each of said grippers normally lie in a common plane coincident with the bottom of said groove.

3. The combination set forth in claim 1 wherein a side of said elongated body other than the side containing the open-end groove is provided with an insert having an exterior face substantially flush with said other side of the elongated body and inwardly extending shoulders adapted to be engaged by a latching device.

4. A pilot for carrying a filling thread through a shed of warps formed in a loom, said pilot comprising an elongated body having tapering ends adapted to receive propulsive force for propelling the pilot, a pair of thread grippers mounted thereon, one of said grippers adjacent an end of said body and the other of said grippers adjacent the other end of said body, each of said grippers comprising a hooking element fixed in said body and having an open end portion pointing towards the hooking element of the other gripper, and a resiliently yieldable plate member supported on a pivot located beyond the free end of its associated hooking element, said plate member being wider than said hooking element to enable an actuator to move past said hooking element to displace said plate member from engagement with said hooking element, the upper surfaces of said resiliently yieldable members being pressed into engagement with the under edges of said hooking elements by springs mounted in said body.

5. A pilot for carrying a filling thread through a shed of warps, said pilot comprising an elongated member having ends adapted to receive propulsive force for propelling the pilot, a longitudinal groove in one side of the member, said groove intersecting said ends of said member, thread-gripping means disposed within said groove adjacent each end of said member, each of said thread-gripping means comprising a hooking element secured to said member and having an open end portion extending in the lengthwise direction of the groove above the bottom of the groove and a strip of resilient material disposed at the bottom of said groove and having a portion intermediate its ends normally contacting the underside of said open end portion of the hooking element, whereby a thread extending across said pilot and bending into said groove may be seized between said strip and said open end portion of said hooking element.

6. A pilot for carrying a filling thread through a shed of warps, said pilot comprising an elongated member having ends adapted to receive propulsive force for propelling the pilot and a groove extending lengthwise in one side of the member from end to end of said member,

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thread-gripping means adjacent each end of said pilot, each of said thread-gripping means comprising a hooking element secured to said member and having an open end portion extending within said groove in the longitudinal direction of said groove above the bottom of the groove, and a resilient strip disposed in said groove and extending from beneath said open end portion of said hooking element to beyond said open end portion with the ends of said strip resting on the bottom of the groove and an intermediate portion of said strip pressing against the underside of the open end portion of said hooking element, said member having an opening communicating with said groove adjacent the end of said resilient strip extending from beneath said open end portion of said hooking element whereby the underside of said strip is accessible for enabling the removal of said strip from beneath said hooking element.

7. A pilot adapted to receive propulsive force against its ends for propelling the pilot through sheds of warps in opposite directions, said pilot comprising an elongated body member having a mid-length portion with a substantially uniform transverse section bounded by planar surfaces extending lengthwise parallel to the longitudinal axis of said body member and intersecting exterior surfaces of tapering end portions of the body member, a pair of thread grippers mounted on said body member, one of said grippers adjacent an end of said body member and the other of said grippers adjacent the other end of said body member, each of said grippers comprising a stationary hooking element and a yieldable plate member, each of said hooking elements having a shank secured in said body member and an open-end portion extending from said shank and pointing towards the hooking element of the other gripper, said open-end portion having a thread-engaging edge disposed adjacent the plane of one of said planar surfaces of said body member and substantially parallel thereto, each of said yieldable plate members disposed below said one planar surface in a recess in said body member with the outside face of said plate member providing a surface normally contacting with said thread-engaging edge of the open-end portion of its associated hooking element, each of said yieldable plate members pivotally supported on an axis extending crosswise of said body member in said recess in which the plate member is disposed, and resilient

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means contained in said recesses and engaging the undersides of said plate members for normally urging said plate members into engagement with said thread-engaging edges of said hooking elements, whereby a thread positioned transversely and in advance of a gripper is caused to be wedged and seized between one of said hooking elements and its associated plate member when the pilot is projected.

8. In a weaving loom, a pilot for carrying filling threads through sheds of warps in opposite directions, said pilot comprising an elongated body member having an open-ended longitudinal groove in one side of said body member and thread-gripping means adjacent each end of said pilot, each of said thread-gripping means comprising a hook having a shank extending laterally from the bottom wall of said groove and a hooking element extending from said shank along said groove midway between the side walls of said groove, said hooking element wholly disposed within said groove below said side of said body member and having an under edge substantially coincident with the plane of the bottom wall of said groove, a yieldable plate disposed in a slot in said body member below the bottom wall of said groove, said plate extending from a movable end adjacent said shank to a pivoted end beyond the free end of said hooking element, a pin pivotally supporting said end of said plate remote from the shank of said hooking element, and a spring disposed in said slot in said body member and tensioned between said body member and the under surface of said plate whereby the upper surface of said plate normally presses against said under edge of said hooking element and forms a substantially continuous length of the bottom wall of said groove.

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