Aug. 8, 1944. LE ROY LAYTON ET AL 2,355,540

PICKER MOTION FOR LOOMS

Filed June 4, 1942 2 Sheets-Sheet 1

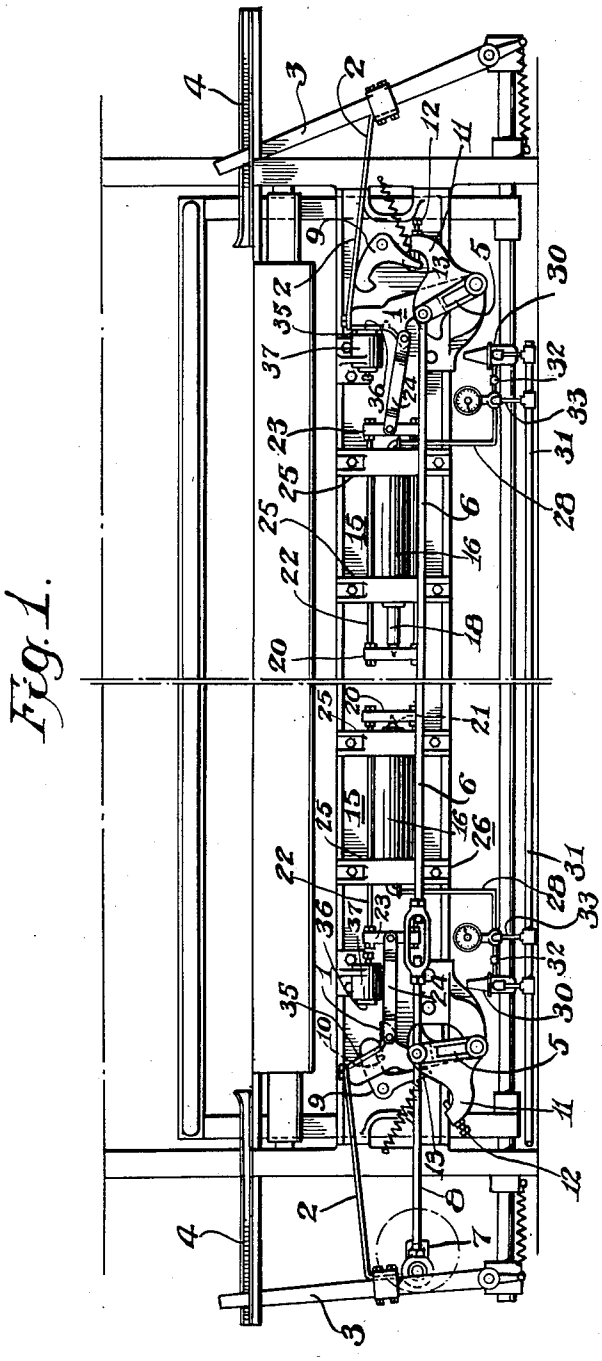


Fig. 1.

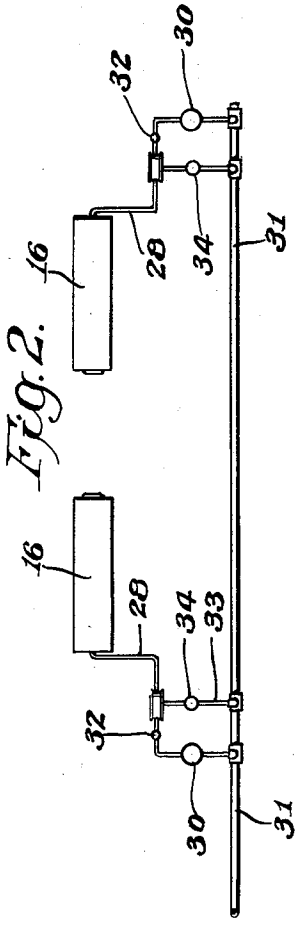


Fig. 2.

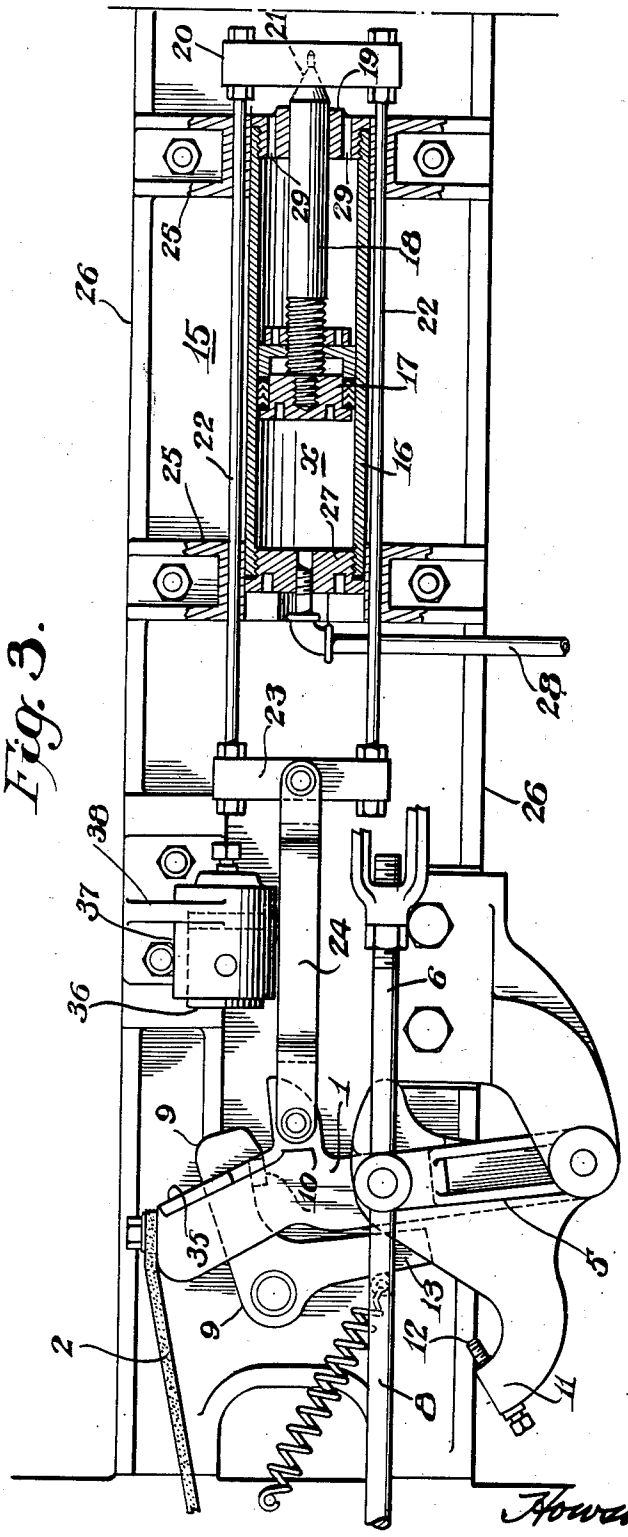
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Fig. 3.



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PICKER MOTION FOR LOOMS

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11 Claims. (Cl. 139—144)

This invention relates to the picker mechanism of looms, and more particularly to looms of the wider, heavier types used in the weaving of broad-loom carpets and wide rugs, etc.

More specifically, the present invention relates to a new, novel and improved motivating means for rapidly driving a weft-carrying shuttle from a shuttle-box at one side of the loom, through the open warp shed in the loom, and into the shuttle-box at the opposite side of the loom, which, prior to the present invention, has been accomplished, in most cases, by one or more heavy metal springs.

The heavy steel springs normally employed for actuating the picker sticks rapidly become crystallized and break. These springs are expensive and at the present time replacements are difficult, if not impossible, to obtain.

The present invention involves the use of pneumatic cylinders and complementary pistons, etc., operable by elastic fluid trapped in one end of the cylinder, between the cylinder head and the side of the piston facing said head, at all times during the reciprocation of the piston within the cylinder.

The trapped elastic fluid is maintained at a predetermined minimum pressure with the piston in its remotely situated position with respect to the cylinder head, attained as a result of the piston having snapped its associated picker stick into action to throw the shuttle across the loom.

The pressure of the trapped elastic fluid is progressively increased as the piston is reversed in the cylinder and approaches the cylinder head, during the return movement of the picker stick and the piston to "cocked" position, ready for the next shuttle-throwing movement of the picker stick, at which time the pressure of the trapped elastic fluid is a maximum.

The construction and operation of the improved picker mechanism will be fully disclosed, in detail, hereinafter, reference being had to the accompanying drawings, of which:

Fig. 1 is a front elevation of sufficient of a loom to illustrate the application of the present invention thereto;

Fig. 2 is a piping diagram; and

Fig. 3 is an enlarged face view of part of the mechanism of Fig. 1, with one of the elastic fluid cylinders shown in longitudinal section.

As previously noted, the invention resides broadly in supplanting the heavy springs commonly used for operating the picker sticks which throw the shuttles across the warps of wide carpet looms, i. e., looms making carpet or rugs up to 18 feet in width.

These picker springs are usually of the tension type, made of round spring steel stock about ½ to ⅝" in diameter, with the coils about 4" in outside diameter and frequently from six to eight feet in length.

The springs are normally stretched between two picker strap levers 1, 1, to which the picker straps 2,2 are respectively connected at the upper end of each, while the second end of each picker strap is secured to a picker stick 3, which, through the usual picker carried thereby, strikes and drives the shuttle out of the shuttle box 4 at one side of the loom, across the loom through the open warp shed, into the shuttlebox at the opposite side of the loom.

The levers, 1, 1 are normally rocked, alternately, in one direction by the springs, supra, and in the opposite direction by setting levers 5, 5 respectively which engage the strap levers 1, 1, and normally place the picker spring or springs under tension or compression, as the case may be, depending upon the picker mechanism of the particular loom involved.

The setting levers 5, 5 are connected to each other by a link 6, and to a crank 7 by a link 8, through which said levers receive their rocking motion. As each setting lever, in turn, completes its oscillatory motion in one direction and moves the associated strap lever 1 therewith, a trigger 9 engages a lug 10 on the strap lever 1 and holds it "cocked" against the tension of the picker spring. As each setting lever 5 rocks in the opposite direction and leaves the associated strap lever 1, an arm 11 on the setting lever 5, having an abutment screw 12, engages the tail 13 of the trigger 9 and releases the strap lever 1. The spring then rocks the strap lever 1 and jerks the strap 2 which causes the picker stick 3 to hit the shuttle with a sudden hammer blow of sufficient force to drive the shuttle across the loom.

In the present instance, the heavy picker spring is supplanted by a pair of pneumatic units 15, 15, each of which includes an air cylinder 16 with a piston 17 therein. The piston is connected to one end of a rod 18 which slides through a head 19 in the inner end of the cylinder 16. The piston rod 18 is connected to a rear cross head 20, by a tapered point and socket joint 21. The rear cross head 20 is connected, by rods 22, 22 to a front cross head 23 which is connected by a link 24 to the strap lever 1.

There is one unit 15 for each picker stick at each side of the loom.

The rods 22, 22 are slidably mounted in a pair of brackets 25, 25, which are secured to a cross beam 26 of the frame of the loom and which also support the opposite ends of the cylinder 16.

The outer end of each cylinder 16 is closed by a head 27 to which is connected a pipe 28 for building up a predetermined pressure in the space x between the head 27 and piston 17. The inner head 19 of the cylinder 16 is provided with breather ports 29, 29 for obvious reasons.

An initial pressure of 140 pounds per square inch, for example, is built up in the space x by an extraneous compressor through the pipe 28.

As each strap lever 1 is rocked into cocked position, by rocking of the setting lever 5 in one direction to its maximum extent, the piston 17, moving in the cylinder 16 toward the head 27, progressively increases the pressure in the progressively decreasing space x to about 190 pounds.

As the setting lever 5 rocks in the opposite direction to its maximum extent, the abutment screw 12 in the arm 11 of said lever, engages the tail 13 of the latch or trigger 9 and releases said trigger from the lug 10 of the strap lever 1. This releases and permits the piston 17 to move rapidly toward the head 19, thereby operating the strap lever 1 to throw the shuttle in the manner noted above.

Should any of the fluid in the space x leak around the piston and cause the pressure in the space x to drop below the initial 140 pounds per square inch, an automatic pressure regulating valve 30 in the line 28 will open the line 28 to the supply line 31, whereby the compressor which feeds the line 31 will build up the pressure again to 140 p. s. i. in the cylinder 16. A check valve 32 in the line 28, between the regulating valve 30 and the cylinder 16 holds the fluid in the space x against backing up in the line 31 under the high pressure developed in the space x when the lever 1 is cocked.

Assuming that the line 31 carries a pressure greater than the initial 140 p. s. i. and less than the developed pressure of 190 p. s. i., it is sometimes desirable to develop an initial pressure of greater than 140 p. s. i. in starting up the loom at the begining of a working day. This is done by a by-pass 33 under a manually operated control valve to shunt the higher pressure around the automatic regulating valve 30 which is normally set to deliver the lower pressure only to the cylinder 16.

The power stroke of the piston 17, in each instance, is arrested, before the piston reaches the rear head 19 of the cylinder 16 by a flat face 35 on the strap lever 1 engaging a resilient impact dissipator 36, in the form of a rubber plug, housed in a cup 37 carried by a bracket 38 which is secured to the loom beam 26.

The power applied to the picker sticks by the piston 17 may be varied, if desired, by changing the operating positions of pistons in the cylinders 15 with respect to the heads 27 of said cylinders. It will be obvious that the closer the piston approaches the head 27, the higher the compression of the fluid trapped between the piston and the head, and consequently the greater the power applied to the picker stick when the latch 9 is released. Conversely, the further the piston is carried away from the head 27, the lower becomes the compression of the trapped fluid and the lesser is the power applied when the latch is released. With the stroke of the piston being constant and the limits of reciprocation thereof changed within the cylinder 15, it will be seen that varying degrees of power may be transmitted to the picker sticks, and the speed and manner of operation may be changed accordingly.

Any suitable means may be provided for changing the operating locality of the piston within the cylinder 15, such, for example, as interchange of piston rods 18 of greater or lesser lengths or by threading a long piston rod and employing locking nuts at opposite sides respectively of the cross head 20, through which such long threaded rod would pass.

We claim:

1. A picker motion for looms, comprising a closed fluidic system including a cylinder, a piston reciprocable in said cylinder, means for trapping elastic fluid in one end of said cylinder, means for moving said piston toward said end of the cylinder to compress said fluid therein, means for retaining said piston in its fluid compressing position, and means for releasing said piston to effect driving of a shuttle across said loom under impetus of said compressed fluid.

2. A picker motion for looms, comprising a closed fluidic system including a cylinder, a piston reciprocable in said cylinder, means for trapping elastic fluid in one end of said cylinder, an axial extension on said piston projecting outwardly beyond the opposite end of said cylinder, means engaging the outer end of said extension for moving said piston toward the first said end of the cylinder to compress said fluid therein, means for retaining said piston in its fluid compressing position, and means for releasing said piston to effect driving of a shuttle across said loom under impetus of said compressed fluid.

3. A picker motion for looms, comprising a cylinder, a piston reciprocable in said cylinder, means for trapping elastic fluid in one end of said cylinder, an axial extension on the piston projecting through and out the opposite end of the cylinder, a cross-head engaged by the outer end of said extension, a second cross-head beyond the first said end of the cylinder, rods connecting said cross heads, means connected to said second cross-head for moving said piston toward the first said end of the cylinder to compress said fluid therein, means for retaining said piston in its fluid compressing position, and means for releasing said piston to effect driving of a shuttle across said loom under impetus of said compressed fluid.

4. A picker motion for looms, comprising a cylinder, a piston reciprocable in said cylinder, means for trapping elastic fluid in one end of said cylinder, an axial extension on the piston projecting through and beyond the opposite end of the cylinder, a picker lever operably connected to the outer end of said extension, means for moving said piston toward the first said end of the cylinder to compress said fluid therein, means engageable with said lever for retaining said piston in its fluid compressing position, and means for relasing said lever to permit said piston to effect driving of a shuttle across said loom under impetus of said compressed fluid.

5. A picker motion for looms, comprising a cylinder, a piston reciprocable in said cylinder, means for trapping elastic fluid in one end of said cylinder, an axial extension on said piston projecting through and beyond the opposite end of said cylinder, a picker lever operatively connected to the outer end of said extension, means

engageable with said lever for moving said piston toward the first said end of the cylinder to compress said fluid therein, means engageable with said lever for retaining said piston in its fluid compressing position, and means for releasing said lever to permit said piston to effect driving of a shuttle across said loom under impetus of said compressed fluid.

6. A picker motion for looms, comprising a picker stick, a cylinder, a piston reciprocable in said cylinder and operably connected to said picker stick, means for trapping elastic fluid in one end of said cylinder, means for moving the piston toward said end of said cylinder to compress said fluid, means for retaining said piston in said fluid compressing position, and means for releasing said piston to permit the compressed fluid to effect driving of the piston toward the opposite end of said cylinder and actuate said picker stick.

7. A picker motion for looms, comprising a picker stick, a picker lever connected to said picker stick, a cylinder, a piston reciprocable in said cylinder and operably connected to said picker lever, means for trappng elastic fluid in one end of said cylinder, means engageable with said lever for moving the piston toward said end of said cylinder to compress said fluid, means engageable with said lever for retaining said piston in said fluid compressing position, and means for releasing said lever to permit the compressed fluid to effect driving of the piston toward the opposite end of said cylinder and actuate said picker stick.

8. A picker motion for looms, comprising a picker stick, a picker lever connected to said picker stick, a cylinder, a piston reciprocable in said cylinder and operably connected to said picker lever, means for trapping elastic fluid in one end of said cylinder, means engageable with said lever for moving the piston toward said end of said cylinder to compress said fluid, means engageable with said lever for retaining said piston in said fluid compressing position, and means carried by said lever engageable means for releasing said lever to permit the compressed fluid to effect driving of the piston toward the opposite end of said cylinder and actuate said picker stick.

9. A picker motion for looms, comprising a picker stick, a picker lever connected to said stick, a cylinder, a piston reciprocable in said cylinder and operably connected to said picker lever, means for trapping elastic fluid in one end of said cylinder, a constantly oscillating lever engageable with said picker lever for moving the piston toward said end of said cylinder to compress said fluid, a latch engageable with said picker lever for retaining said piston in said fluid compressing position, and an arm on said osclating lever engageable with said latch for releasing said piston to permit the compressed fluid to effect driving of the piston toward the opposite end of said cylinder and actuate said picker stick.

10. A picker motion for looms, comprising a picker stick, a picker lever connected to said picker stick, a cylinder, a piston reciprocable in said cylinder, a piston rod connected to said piston and extending beyond one end of said cylinder, a cross-head on the outer end of said piston rod, a second cross-head beyond the opposite end of said cylinder, tie rods connecting said cross-heads, a link connecting said picker lever to the second said cross-head, means for trapping elastic fluid in the second said end of said cylinder between said end and said piston, an oscillating lever engagable with said picker lever for moving the piston toward said second end of said cylinder to compress said fluid, a latch engageable with said picker lever for retaining said piston in said fluid compressing position, and an arm on said oscillating lever engageable with said latch for releasing said piston to permit the compressed fluid to effect driving of the piston toward the first said end of said cylinder and actuate said picker stick.

11. A picker motion for looms, comprising a picker stick, a cylinder, a supporting bracket for the cylinder at each end thereof, a head closing each end of the cylinder, a piston reciprocable in said cylinder, a piston rod extending axially from one side of the piston through and beyond the head at one end of the cylinder, breathing ports in said cylinder at said one end of the cylinder, means for admitting elastic fluid to said cylinder between the head at the opposite end thereof and said piston, a cross head beyond each of said brackets, a pair of tie rods slidably mounted in said brackets and rigidly connecting said cross-heads, means connecting one of said cross-heads, means connecting one of said cross-heads to the outer end of said piston rod, means connected to the other of said cross-heads for moving the piston toward said opposite end of said cylinder, to compress said fluid, means for retaining said piston in said fluid compressing position, and means for releasing said piston to permit the compressed fluid to effect driving of the piston toward the opposite end of said cylinder and actuate said picker stick.

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