July 25, 1944. G. E. UTTER 2,354,340

LOOM PICKER CHECK

Filed May 7, 1943

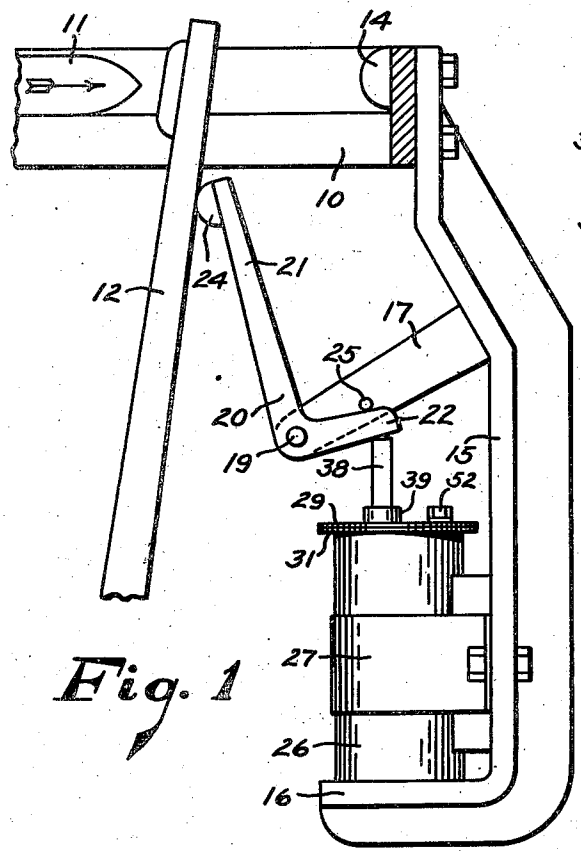


Fig. 1

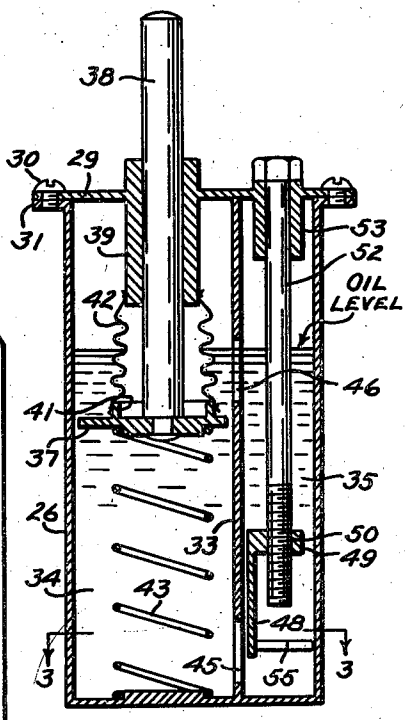


Fig. 2

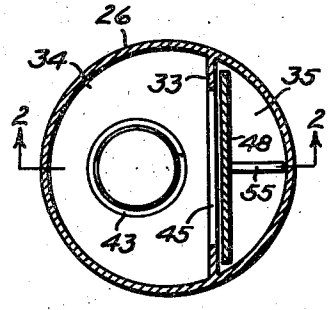


Fig. 3

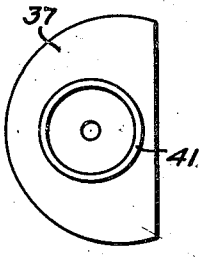


Fig. 4



Fig. 5

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Patented July 25, 1944 2,354,340

UNITED STATES PATENT OFFICE

2,354,340

LOOM PICKER CHECK

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Application May 7, 1943, Serial No. 486,053

11 Claims. (Cl. 139—161)

This invention relates to loom picker checks, and more particularly to the construction and arrangement of a picker check suitable for use with looms operating at unusually high speeds.

In the weaving art there is a constant demand for looms operable at higher and higher speeds, and these speeds have been definitely limited by the inherent weaknesses of picker checks as heretofore constructed. Unless the shuttle and picker can be brought to rest smoothly and dependably in a definite predetermined position throughout long periods of operation, it will not be possible to increase the speed of the loom. It has been a common practice to check the pickers by means of an arrangement of leather straps or the like, but such constructions wear out rapidly unless the shuttle speed is relatively low, and their operation varies considerably with changes in atmospheric conditions, particularly the humidity. Several attempts have been made to solve the problem by employing pneumatic devices which utilize the energy of the high-velocity shuttle to compress a confined body of air, this air escaping gradually through an orifice. None of these pneumatic checks has proven satisfactory in commercial practice. The orifice has to be made very small, and it frequently becomes obstructed by dust, dirt or lint. Variations in atmospheric conditions have a pronounced effect on the operation. Furthermore, there is a decided tendency for the compressed air to re-expand as the shuttle comes to rest, causing a considerable rebound which is highly undesirable. These difficulties become much more serious as the speed of the loom is increased.

It is accordingly one object of the invention to provide a loom picker check capable of uniform and dependable operation at relatively high speeds.

It is a further object of the invention to provide a loom picker check of comparatively simple and inexpensive construction capable of stopping a high speed shuttle smoothly and quickly, and bringing the shuttle to rest in a definite predetermined position without appreciable rebound.

It is a further object of the invention to provide a loom picker check which will operate in a uniform and accurate manner regardless of variations in atmospheric conditions.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawing illustrating one embodiment of the invention and in which like reference numerals indicate like parts,

Fig. 1 is a fragmentary elevation of a loom lay and an associated picker check;

Fig. 2 is a vertical section through a part of the mechanism, the section being taken on the line 2—2 of Fig. 3;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a detail of a piston; and

Fig. 5 is a detail of a valve.

The embodiment illustrated comprises a loom lay 10 of any usual and well-known construction, with an associated shuttle 11 and picker stick 12. It will be understood that the same construction is employed at the two opposite ends of the lay, and that the picker sticks will be oscillated in known manner to throw the shuttle back and forth between them. Each time as the shuttle returns it will strike the picker and carry it toward the end of the lay, where a suitable bumper 14 is mounted to limit the motion of the picker. The present invention provides a mechanism which serves to check the motion of these parts quickly and smoothly, and bring the picker to rest against the bumper 14 without appreciable shock.

As shown in Fig. 1, there is secured to the end of the lay 10 a depending bracket 15 having an inwardly extending shelf 16 at its lower end and an arm 17 which projects inwardly above the shelf and beneath the lay. The inner end of this arm 17 supports a pin 19 which forms a fulcrum for a bell crank lever 20 having an upwardly extending arm 21 and a comparatively short outwardly extending arm 22. The arm 21 is provided at its upper end with a bumper 24 which is located in the path of the picker stick 12 and in position to engage the outer surface thereof. The bracket arm 17 carries a stop pin 25 which overlies the short arm 22 of the bell crank lever to limit its upward movement. The shelf 16 supports a receptacle in the form of a hollow upright circular cylinder 26 which is securely fastened to the bracket 15 by means of a U-strap 27.

Referring now to Fig. 2, it will be seen that the receptacle 26 is closed at its upper end by a flat cover plate 29 which is held in place by means of screws 30 threaded into an outwardly extending annular flange 31 formed on the top of the receptacle. Within the receptacle, and somewhat offset from the center thereof, there is provided a vertical partition 33 which divides the interior of the receptacle into a large main compartment 34 and a small auxiliary compartment 35. Within the large compartment 34 there is

mounted a flat piston 37 in the form of a circle with a segment removed therefrom, this piston conforming to the shape of the compartment but with an appreciable clearance between the periphery of the piston and the surrounding walls. The piston is mounted on the lower end of a vertical rod 38 which is slidably supported in a guide boss 39 formed on the cover plate 29, the upper end of this rod engaging the short arm 22 of the bell crank lever 20. On the upper surface of the piston 37 there is provided an annular flange 41 which is connected to the lower end of the boss 39 by a loose sleeve 42 of a suitable light, flexible and impervious material, such as oiled silk, this sleeve being wired to the connected parts to form a seal. Beneath the piston there is provided a light coiled compression spring 43. The partition 33 is provided with an opening 45 therethrough near the bottom of the receptacle, and an opening 46 therethrough above the upper limit of travel of the piston. Both of these openings are of considerable area, and they are preferably elongated horizontally. The receptacle is filled with a suitable liquid, such as oil, to a level above the upper position of the piston.

It will now be apparent that as the shuttle 11 strikes the picker stick 12 and carries it outwardly toward the bumper 14, the picker stick will turn the bell crank lever 20 in a clockwise direction and slide the rod 38 downwardly through the boss 39, thus lowering the piston 37. This will cause some of the oil to flow from the compartment 34 through the lower opening 45 to the compartment 35, and at the same time some oil will flow from the compartment 35 through the upper opening 46 to the space above the piston. Because of its inertia and viscosity, the oil will impose a resistance to the piston movement and thereby decelerate the picker and shuttle, causing the picker to come to rest gently against the bumper 14.

Means is preferably provided to adjust the checking action, and for this purpose I employ an adjustable valve to control the lower opening 45. As illustrated this valve is in the form of a vertically slidable gate 48 mounted in the compartment 35 adjacent the partition 33, with the lower edge of the gate extending across the opening 45. On the top of this gate there is provided a lug 49 having a threaded opening 50 therethrough to receive the lower end of a vertical screw 52. This screw is rotatably supported at its upper end by a boss 53 formed on the cover plate 29. A pin 55 projects horizontally from the lower portion of the gate 48, beneath the screw 52, to engage the wall of the receptacle 26 and thereby brace the gate against the flow of the liquid through the opening 45.

The operation of the invention will now be apparent from the above disclosure. As the picker stick 12 moves rapidly to the left in Fig. 1 it will throw the shuttle 11 across to the left-hand side of the loom, whereupon the picker stick will swing back until it reaches the position illustrated, with the outer side of the stick engaging the bumper 24 on the bell crank. When the shuttle returns it will strike the picker and swing it still further to the right. During this movement the bell crank 20 will force the rod 38 and piston 37 downwardly. To some extent the piston will pass downwardly through the oil, because of the clearance space around the outside of the piston. Also the piston will cause the oil in the compartment 34 to move downwardly, some of the oil flowing through the opening 45, while oil in the compartment 35 will flow upwardly and through the opening 46. In thus moving downwardly through the body of oil and in starting the oil into motion, the piston will encounter resistance which will check the speed of the shuttle. Furthermore this resistance will be at a maximum at the start of the checking action when the velocity of the piston is the greatest and the body of oil is stationary. The resistance will gradually decrease as the velocity of the piston decreases and the downward velocity of the oil in the compartment 34 increases, and if the valve 48 has been correctly adjusted the resistance will practically cease at the instant the picker stick 12 reaches the bumper 14, the parts having by now lost nearly all their velocity. This provides an ideal checking action, causing the picker stick to come up against the stop 14 gently and without appreciable shock. There will be no tendency for the piston to rebound, since the oil is not compressible. Furthermore the downward movement of the oil in the main compartment 34 will tend to continue for an instant after the piston has reached the bottom of its stroke, since the oil has appreciable inertia, and this fact will tend to hold the piston down during the very brief interval while the shuttle is stationary. All this is in direct contrast to the action of a pneumatic check, which by compressing air creates a maximum of resistance when the velocity of the shuttle is the lowest and thereby results in serious problems because of the tendency of the parts to rebound instead of coming to rest in a desired position.

The spring 43 is purposely made very light so that it will have no appreciable checking action during the downward stroke of the piston and it will be incapable of raising the piston during such time as the shuttle is stationary. As soon however as the picker starts on its working stroke to the left and thus releases the bell crank lever, the spring will raise the piston and return the lever to the position shown in Fig. 1, this movement being completed before the picker stick returns to rest against the bumper 24 on the lever in readiness to receive the returning shuttle.

It will be noted that the construction is simple and inexpensive. A minimum of machine work is requested, and many of the parts can be produced from drawn or stamped sheet metal. For example, the receptacle 26 can be drawn from a single piece, and the partition 33 subsequently inserted and welded in place. There are no small orifices subject to plugging by dust or dirt. Changes in atmospheric conditions will have no appreciable effect on the operation, which will continue in a uniform and dependable manner even at very high speeds.

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

1. In combination with the shuttle of a loom and a picker arranged to drive the shuttle in one direction and to receive the impact of the returning shuttle, a receptacle, a body of liquid in the receptacle, a piston mounted for substantially vertical reciprocation in the receptacle in contact with the liquid, a pivotally mounted bell crank lever having an upright arm arranged to be engaged by the picker as it moves outwardly under the said shuttle impact, the lever also having a laterally extending arm arranged to swing downwardly when the upright arm swings

outwardly, and connections between the laterally extending arm and the piston to force the piston downwardly against the resistance of the liquid as the said laterally extending arm swings downwardly, whereby the motion of the shuttle and picker will be checked.

2. In combination with a loom lay, a horizontally reciprocable shuttle, and a picker arranged to drive the shuttle in one direction and to receive the impact of the returning shuttle, a bracket on the lay, a receptacle carried by the bracket, a body of liquid in the receptacle, a piston mounted for substantially vertical reciprocation in the receptacle in contact with the liquid, a bell crank lever pivotally mounted on the bracket and having an upwardly extending arm arranged to be engaged by the picker as it moves outwardly under the said shuttle impact, the lever also having an outwardly extending arm arranged to swing downwardly when the upright arm swings outwardly, and connections between the outwardly extending arm and the piston to force the piston downwardly against the resistance of the liquid as the said outwardly extending arm swings downwardly, whereby the motion of the shuttle and the picker will be checked.

3. In combination with a loom lay, a horizontally reciprocable shuttle, and a picker arranged to drive the shuttle in one direction and to receive the impact of the returning shuttle, a bracket depending from the lay end and having an inwardly extending shelf, a receptacle mounted on the shelf, a body of liquid in the receptacle, a piston mounted for substantially vertical reciprocation in the receptacle in contact with the liquid, a bell crank lever pivotally mounted on the bracket above the receptacle and having an upwardly extending arm arranged to be engaged by the picker as it moves outwardly under the said shuttle impact, the lever also having an outwardly extending arm arranged to swing downwardly when the upright arm swings outwardly, and connections between the outwardly extending arm and the piston to force the piston downwardly against the resistance of the liquid as the said outwardly extending arm swings downwardly, whereby the motion of the shuttle and the picker will be checked.

4. In combination with the picker of a loom, a receptacle, a partition dividing the interior of the receptacle into a main compartment and an auxiliary compartment connected by an opening through the partition, a body of liquid in the receptacle, a piston mounted for reciprocation within the main compartment, and connections from the picker to the piston to drive the piston in a direction such as to force liquid from the main compartment through the opening into the auxiliary compartment, whereby the motion of the picker will be checked.

5. In combination with the picker of a loom, a receptacle, an upright partition dividing the interior of the receptacle into a main compartment and an auxiliary compartment connected by an opening through the partition near the bottom thereof, a body of liquid in the receptacle, a piston mounted for substantially vertical reciprocation within the main compartment, and connections from the picker to the piston to drive the piston downwardly and force liquid from the main compartment through the opening into the auxiliary compartment, whereby the motion of the picker will be checked.

6. In combination with the picker of a loom, a receptacle, an upright partition dividing the interior of the receptacle into two compartments, a piston mounted for substantially vertical reciprocation within one compartment, the two compartments being connected both above and below the piston, a body of liquid filling the compartments to a level above the piston, and connections from the picker to the piston to drive the piston downwardly and thus cause liquid to flow from each compartment into the other, whereby the motion of the picker will be checked.

7. In combination with the picker of a loom, a receptacle, an upright partition dividing the interior of the receptacle into a main compartment and an auxiliary compartment connected by an opening through the partition near the bottom thereof, a body of liquid in the receptacle, a piston mounted for substantially vertical reciprocation within the main compartment, a manually adjustable valve to control the said opening, and connections from the picker to the piston to drive the piston downwardly and force liquid from the main compartment through the opening into the auxiliary compartment, whereby the motion of the picker will be checked.

8. In combination with the picker of a loom, a receptacle having a top plate, a body of liquid in the receptacle, a vertical rod extending through the top plate and slidably supported thereby, a piston mounted on the lower end of the rod and in contact with the liquid so that the liquid will resist downward movement of the piston, a sleeve of light, flexible and impervious material surrounding the lower portion of the rod, the upper end of the sleeve being connected to the top plate and the lower end thereof being connected to the piston, and connections from the picker to the upper end of the rod to drive the rod downwardly, whereby the motion of the picker will be checked.

9. In combination with the picker of a loom, a receptacle in the form of an upright circular cylinder, an upright partition within the cylinder and offset from the center thereof to provide a large compartment and a small compartment, the partition having an opening therethrough near the bottom of the receptacle, a body of liquid in the receptacle, a top plate for the receptacle, a vertical rod extending through the top plate and slidably supported thereby, a piston mounted on the lower end of the rod and immersed in the liquid in the large compartment, the piston being shaped as a circle with a segment removed therefrom, there being an appreciable clearance between the periphery of the piston and the surrounding wall of the large compartment, and connections from the picker to the upper end of the rod to drive the rod downwardly, the liquid resisting the downward movement of the piston and thereby checking the motion of the picker.

10. In combination with the picker of a loom, a receptacle in the form of an upright circular cylinder, an upright partition within the cylinder and offset from the center thereof to provide a large compartment and a small compartment, the partition having an opening therethrough near the bottom of the receptacle, a body of liquid in the receptacle, a top plate for the receptacle, a vertical rod extending through the top plate and slidably supported thereby, a piston mounted on the lower end of the rod and immersed in the liquid in the large compartment, the piston being shaped as a circle with a segment removed therefrom, there being an appreciable clearance between the periphery of the piston and the surrounding wall of the large compartment, a vertically slidable gate located within the

small compartment adjacent the said opening to control the effective size thereof, a vertical rotatable screw extending downwardly through the top plate and connected at its lower end to the gate to raise and lower the same, and connections from the picker to the upper end of the rod to drive the rod downwardly, the liquid resisting the downward movement of the piston and thereby checking the motion of the picker.

11. In combination with the shuttle of a loom and a picker arranged to drive the shuttle in one direction and to receive the impact of the returning shuttle, a receptacle, a piston reciprocally mounted in the receptacle with an appreciable clearance between the periphery of the piston and the surrounding wall of the receptacle, a body of liquid in the receptacle with the surface of the liquid above the piston, the liquid serving to resist movements of the piston, and operating means for the piston arranged to be actuated by the picker as it moves outwardly under the said shuttle impact, whereby the motion of the shuttle and picker will be checked.

GUSTAF E. UTTER.

DISCLAIMER

2,354,340.—*Gustaf E. Utter*, Worcester, Mass. LOOM PICKER CHECK. Patent dated July 25, 1944. Disclaimer filed Dec. 19, 1945, by the assignee, *William D. Dodenhoff*.

Hereby enters this disclaimer to claim 4 in said specification.

[*Official Gazette February 26, 1946.*]