(No Model.)

T. THOMPSON & F. CROOK.

SMASH PROTECTOR MECHANISM FOR LOOMS.

No. 428,292. Patented May 20, 1890.

Fig. 2.

Fig. 3.

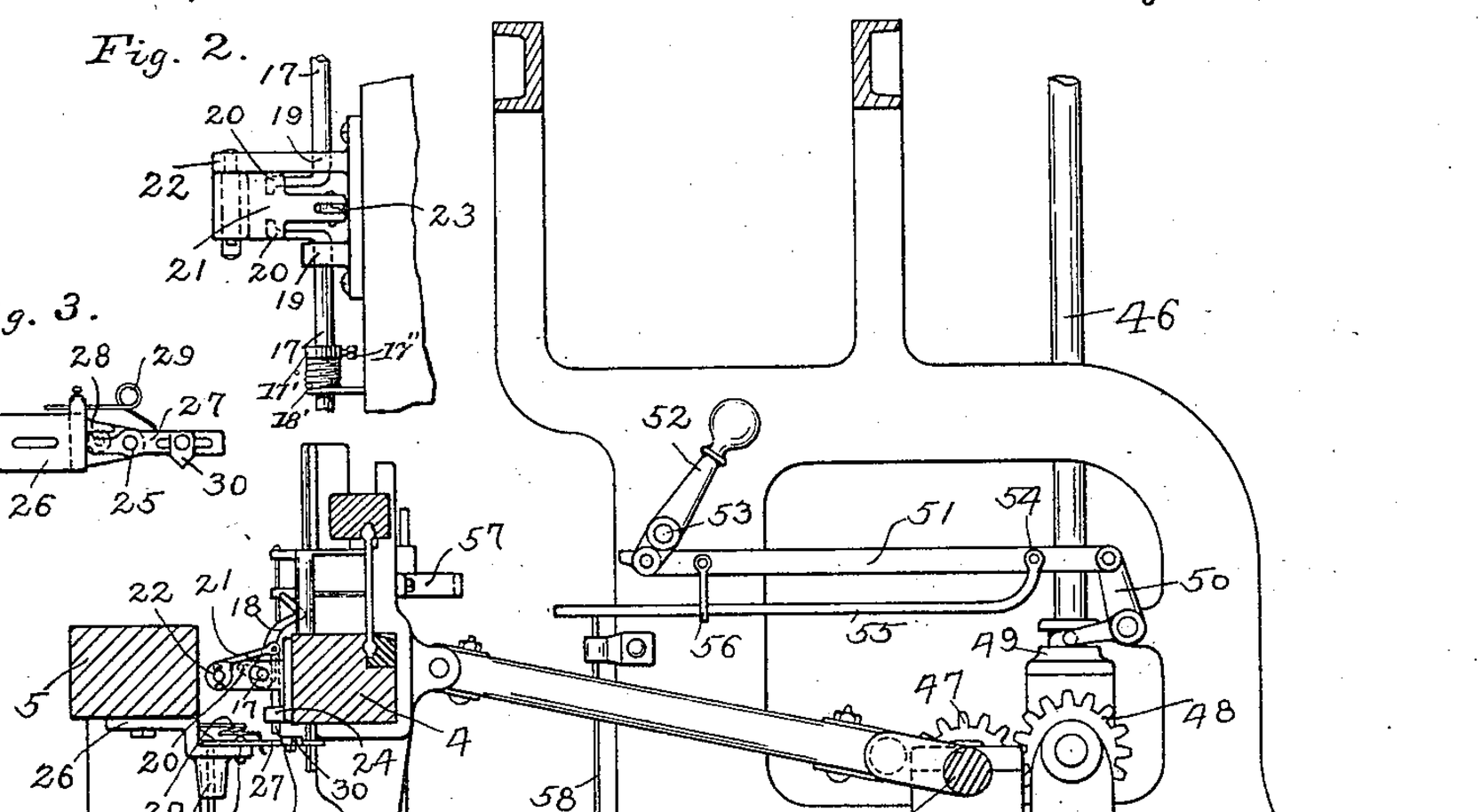
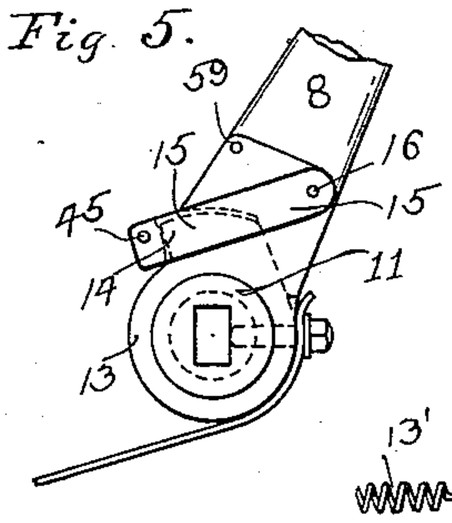


Fig. 1.

Fig. 5.



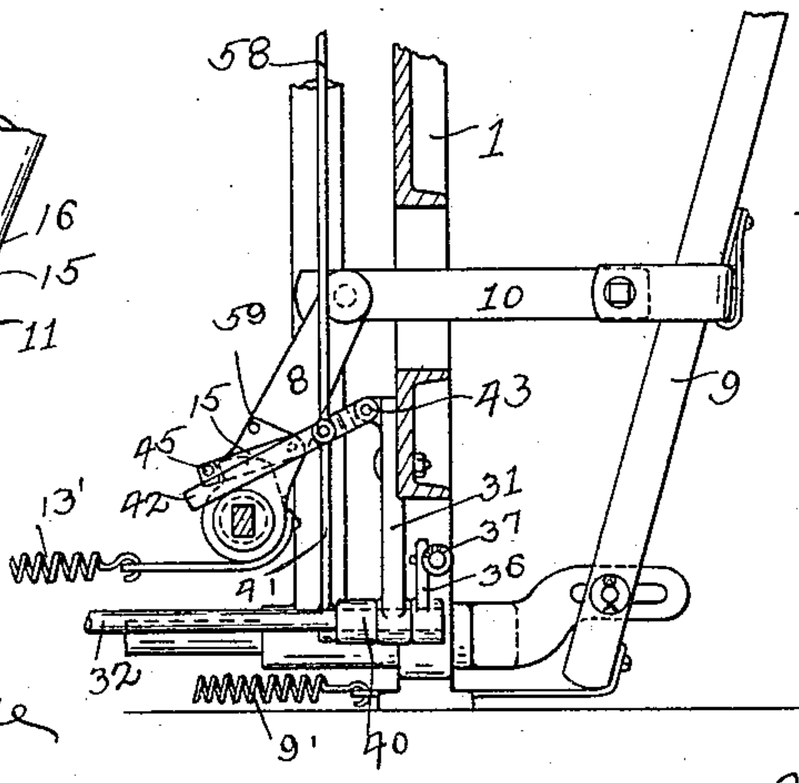


Fig. 4.

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SMASH-PROTECTOR MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 428,292, dated May 20, 1890.

Application filed August 15, 1889. Serial No. 320,879. (No model.)

To all whom it may concern:

Be it known that we, THOMAS THOMPSON, of Daysville, in the county of Windham and State of Connecticut, and FREDRICK CROOK, of Providence, in the county of Providence and State of Rhode Island, both citizens of the United States, have jointly invented certain new and useful Improvements in Smash-Protector Mechanisms for Looms; and we do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which our invention belongs to make and use the same.

Our invention relates to looms, and more particularly to a smash-protector mechanism for looms; and the object of our invention is to provide a positive and convenient mechanism which will automatically stop the loom from picking and prevent a smash in the shed when two shuttles are presented simultaneously by the box motion at opposite ends of the shuttle-race, and which will at the same time throw out the harness and box motions, and thus prevent losing the pick.

Our invention consists in certain novel features of construction, combination, and operation of mechanisms for carrying out the object above mentioned, as will be hereinafter fully described, and the nature thereof indicated by the claims.

Referring to the drawings, Figure 1 represents in a transverse sectional view our invention applied to the well-known Knowles loom, as shown and described in United States Patent No. 134,992, of January 21, 1873. Figs. 2 and 3 are detail plan views of the indicator and release mechanism. Fig. 4 is a detail of the picking motion, in section, on line *x x*, Fig. 1, looking in the direction of the arrow, same figure; and Fig. 5 is an enlarged detail of the picking-arm and latch.

In the accompanying drawings, 1 is the loom-side, 2 the crank-shaft, 3 the bottom shaft, 4 the lay, 5 the breast-beam, 6 the picking rock-shaft, and 7 the picking-shoe, all as ordinarily constructed and arranged. The picking-arm 8, connected to the picker-stick 9 in the usual way by connector 10, is forked on the lower end, and instead of being fast on the picker-shaft, as is usually the case, is pivoted on two collars 11, which are fast on the shaft. Fast on the picker-shaft 6, between the two sides of the picking-arm fork 12, is a plate 13, provided with a projection 14, (see Fig. 5,) which is normally in engagement with a latch 15, pivoted on the outside of the forked picking-arm at 16 in such a position that it may be lifted to clear the projection 14, when the picking-shaft may be picked over without moving the arm and stick. The picker stick and arm are returned to the positions shown in the drawings after a pick by the usual spring 9′, attached to the bottom of the picker-stick, (see Fig. 4,) while the picker plate and shaft are returned when the latch is lifted by the auxiliary spring 13′, attached to the plate 13. (See Fig. 4.)

Hung in suitable boxes on the front of the lay are two rods 17, one extending to each end of the lay, and meeting at a convenient point, preferably near the center. (See Fig. 2.) Fast on the outer ends of the rods are feelers 18, Fig. 1, which bear on the box-binders in the same manner as the usual protector-feelers. (Not here shown.) Feelers 18 are actuated by coil-springs 18′, only one of which is shown, (see Fig. 2,) confined on rod 17 by set-collar 17′. One end of the spring 18′ is hooked into collar 17′, and the other end extends out and strikes against the lay, preventing the spring 18′ from turning on the rod 17, when the tension is adjusted by turning set-collar 17′ on the rod 17. Collar 17′ is fastened by set-screw 17″ on the rod 17 in the requisite position to give the spring 18′ the proper tension, all in the ordinary way. Just inside the bearings 19 on the inner ends the rods 17 are bent outward, forming arms 20, which bear under a plate 21, pivoted at 22 on the extremity of one of the feeler-rod bearings. (See Fig. 2.) Pivoted to the plate 21 on the inner end, toward the lay, is a plunger 23, the lower end of which is fitted to slide freely in a guide 24, cast to the same foot with the feeler-rod bearings. (See Fig. 1.) The motion of the box-binders, from a shuttle entering or leaving the boxes, causes the plunger 23 to be raised or lowered in its guide.

Pivoted at 25 on a stand 26, bolted to the breast-beam, is a lever 27, the inner end of which, toward the breast-beam, rests against a lug 28 on the stand 26, in which position it is held lightly by the spring 29. (See Figs. 1 and 3.) Bolted adjustably to the outer end of lever 27 is a cam-plate 30, the projecting point of which (see Fig. 3) is made to come when the lay beats directly in the path of the plunger 23 when at the lower extremity of its travel. Pivoted below the picking-shaft in stands 31, bolted to the loom-side, is a shaft 32, (see Figs. 1 and 4,) which extends across the loom. Fast on shaft 32 is an arm 33, so placed that bent check-rod 34, which is pivoted to its extremity, comes in line with the center of stand 26, Figs. 1 and 3, on the breast-beam. The upper end of check-rod 34 enters a socket 35 on stand 26, in which it can move freely. Fast on the end of shaft 32 is an arm 36, to which is attached a coil-spring 37, the outer end of which is fastened to the loom-side at 38 by link 39. (See Fig. 1.) Fast on shaft 32 is an arm 40, pivoted to the end of which is a connector 41, which is also pivoted to an arm 42, which is itself pivoted at 43 to the stand 31, bolted to the loom-side. Arm 42 extends out over the picking-shaft 6, and rests normally just under a pin 45, fast in the latch 15, in such position that it does not obstruct the action of the picking-arm. Arm 42 is retained in this position against the action of spring 37, which would tend to lift it, and with it the latch 15, by the check-rod 34, resting against the end of lever 27 on stand 26 on the breast-beam, which covers the end of socket 35. The shaft 46, which drives the harness and box mechanism on the Knowles loom, above referred to, is itself driven from the crank-shaft by gears 47 and 48 through the clutch 49. The harness and box mechanism is disconnected from the rest of the loom by lifting the top part of the clutch 49 by means of bell-crank 50, connector 51, and hand-lever 52, pivoted on a stud 53, fast on the loom-side, all of which is as usually constructed and operated on the Knowles loom, above referred to. Pivoted to connector 51 at 54 is a rod 55, which rests in a loop 56, attached to rod 51 at such a height that an angle-plate 57, bolted to the back of the lay, just clears the end of the rod as the lay beats. (See Fig. 1.) Extending upward from connector 41 of the picker mechanism is a rod 58, the top of which is bent over at right angles to the rod, and which terminates just underneath rod 55 when it rests in its loop 56. The proportions between the arms 20 on feeler-rods 17, length of plate 21, and the movement of the shuttle-box binders is such that when the box on one end of the loom is empty and the binder is in the corresponding arm 20, through plate 21, will hold the plunger 23 up to clear cam 30 as the lay beats, and that when the boxes on both ends of the loom contain shuttles and both binders are out the arms 20, through plate 21, will allow the plunger 23 to drop into range with the cam 30. The cam 30 is so adjusted on its lever 27, with reference to the time of completion of the box-shift and the beat of the lay, that when the shift is completed the plunger will have time to drop into range with the cam 30 on the side next the breast-beam, so that the movement of the lay backward will cause the plunger, acting on cam 30, to push aside the lever 27 against the action of the spring 29, thus uncovering the end of socket 35 and releasing bent check-rod 34. The proportions between arm 40 on shaft 32, arm 42, pivoted to stand 31, and the arms of latch 15 on the picking-arm 8, are such that when the check-rod 34 is released the action of the spring 37 in rotating shaft 32 causes arm 42 to lift the latch 15 clear of the picking-plate 13 and against the stop-pin 59, fast in the arm 8. (See Fig. 4.) The position of the end of rod 55, resting in its loop 56, is such that the movement of arm 42, which lifts the latch 15, also lifts the end of rod 55 through rod 58 into range with angle-plate 57. The relative lengths of rod 55 and plate 57 are such that plate 57 on the backward swing of the lay engages the end of the rod 55, so as to throw out the clutch 49 as the crank approaches the back center.

The operation of the mechanism above described is as follows: As long as one empty box is presented to the race-level by the box-shift the plunger 23 is kept clear of the cam and the releasing mechanism does not act. When on any pick the box-shift presents two shuttles level with the race, the plunger 23 drops into range with cam 30, the movement of the lay backward releases the check-rod 34, and spring 37 lifts the latch 15, so that, when the loom picks, the picking-arms, connectors, sticks, and shuttles do not move, and as the crank nears the back center the harness and box mechanism is thrown out by the action of the lay through angle-plate 57 on the clutch 49, so that these parts are always stopped on the mispick in case of any inattention or confusion on the part of the weaver. By the failure of the shuttles to leave the boxes all danger from the shuttles flying off the race or meeting and staying in the shed, resulting in a smash in the warp, is avoided. The filling is not put in, and the loom is stopped on the return beat of the lay by the ordinary filling stop-motion. (Not shown.) When the loom is ready to start after a mispick, the weaver, when he throws in the harness and box-motion clutch, pushes downward on rod 58 till the check-rod 34 catches under its retaining-lever 27, the socket 35 being made long enough to obviate any danger of the check-rod being pushed out of the socket 35 in setting.

We have shown and described our invention applied to the Knowles loom, above referred to; but it will be understood that it can be adapted and applied to co-operate with the harness and box mechanism of any

other loom without material modification and without departing from the principle of our invention. In some looms, and also in some forms of the Knowles loom, the harness and box-motion shaft is sometimes driven from the bottom shaft instead of the crank-shaft; but this difference of construction would not affect the application of our invention to such looms.

Having thus described our invention in looms, what we claim as new, and desire to secure by Letters Patent, is—

1. In a loom, the indicator mechanism consisting of binder-feelers, rods, actuating-springs, plunger-plate, and plunger, check mechanism consisting of a socket-stand, a cam-lever, a cam, and retaining-spring, the picking mechanism having a picking rock-shaft and a forked picking-arm pivoted on the picking-shaft, a picking-plate fast on said shaft, and a latch pivoted on said picking-arm, and the latch-lifting mechanism consisting of a shaft, a spring-actuated arm, check-rod and arm, latch-lifting arms, and link, in combination with the crank-shaft, bottom shaft, lay, breast-beam, and picking-tappet, all combined and operated substantially as shown, and for the purpose stated.

2. In a loom, the indicator mechanism consisting of binder-feelers, rods, actuating-springs, plunger-plate, and a plunger, check mechanism consisting of a socket-stand, a cam-lever, a cam, and retaining-spring, picking mechanism having a picking rock-shaft and a forked picking-arm pivoted on the picking-shaft, a picking-plate fast on said shaft, and a latch pivoted on said picking-arm, and latch-lifting mechanism consisting of a shaft, a spring-actuated arm, a check-rod and arm, latch-lifting arms, and link, and the clutch-operating mechanism consisting of a lifting-rod, bunter-plate, and rod, a clutch-link, lever, and clutch, in combination with the crank-shaft, bottom shaft, harness and box motion shaft, lay and breast-beam, and picking-tappet, substantially as shown and described.

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