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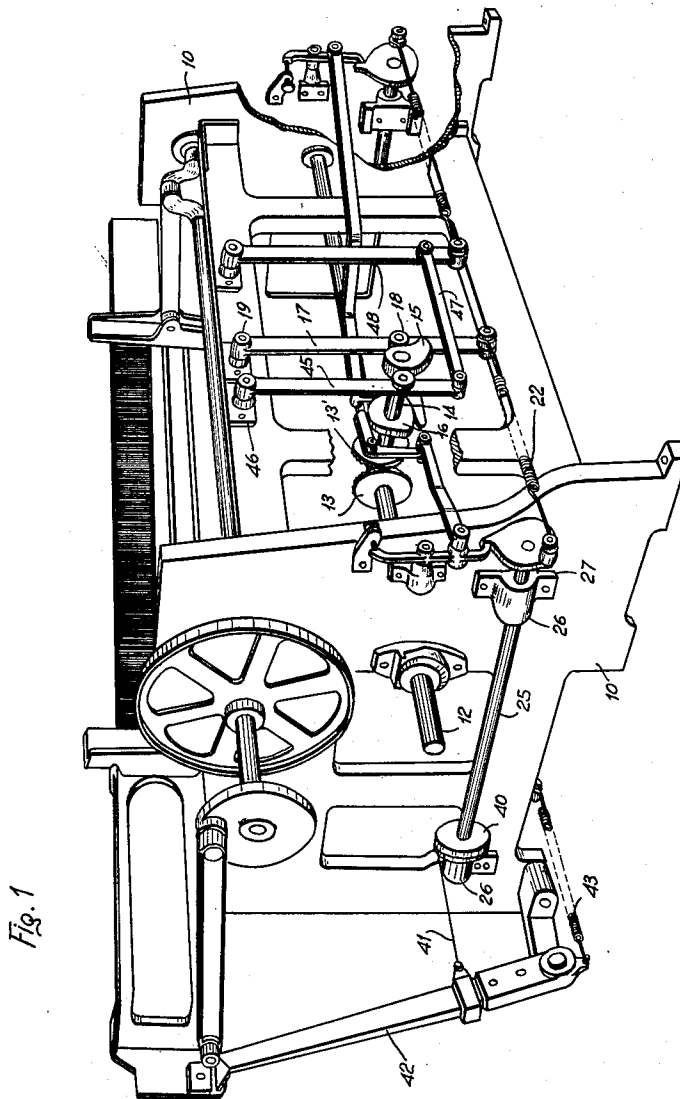
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SHUTTLE EJECTION MECHANISM FOR LOOMS

Filed Dec. 19, 1949

2 SHEETS—SHEET 1



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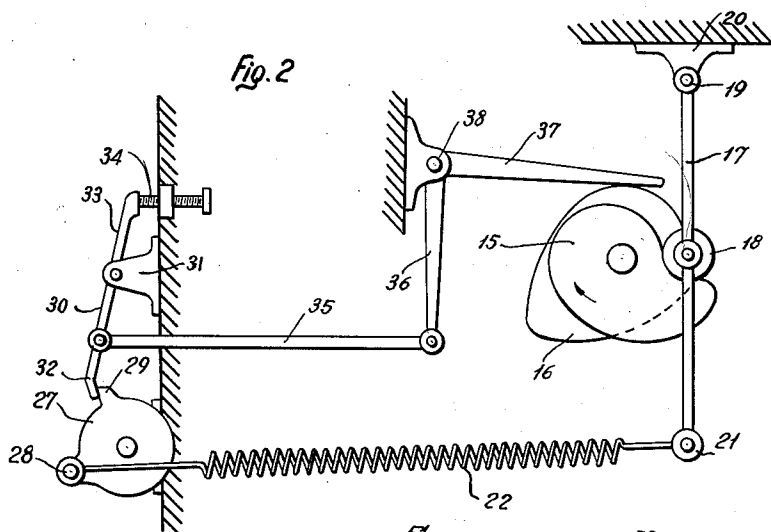
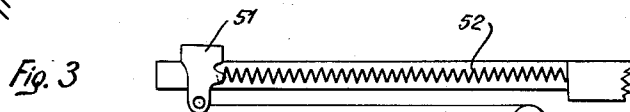
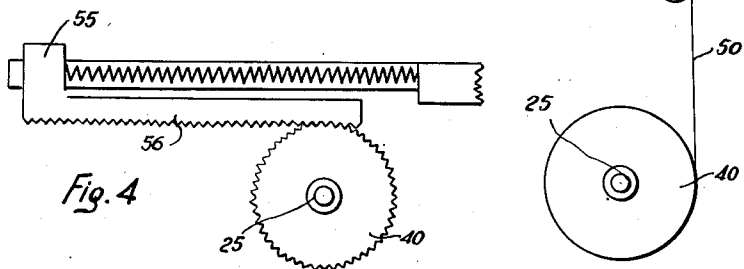
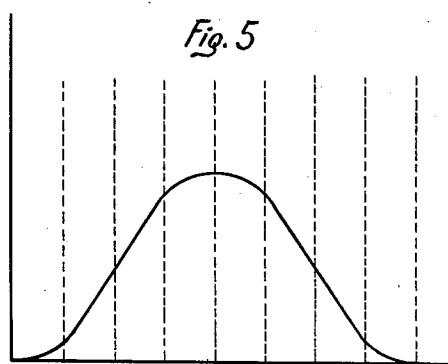
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SHUTTLE EJECTION MECHANISM FOR LOOMS

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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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SHUTTLE EJECTION MECHANISM FOR
LOOMS

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6 Claims. (Cl. 139-145)

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My invention relates to an automatic mechanism for expelling the shuttle in looms, which allows to impart determined and constant impulse to the shuttle, whatever may be the speed at which the loom is working, and permits the power of this impulse to be easily graduated, thus avoiding frequent stops and breakdowns. Besides this the following advantages are obtained. The mechanism works with the minimum of friction, and there is no appreciable wear of the pieces the mechanism being of great duration. The power or force of impulsion is obtained at no one instant, but in a gradual manner, giving great regularity of strength and movement to the loom. This latter can be started in any position of the mechanism, thus greatly facilitating the work for the workman.

In the ordinary looms with flat or round picking sticks, worked directly by an excentric or cam any increase or decrease in the speed of the loom, produces a stoppage by the shuttle running back and striking the battens, in the first case, or by the shuttle not arriving at the shuttle-box with sufficient strength or force, in the second case.

The mechanism according to the invention, always maintains a certain determined impulse for the throwing of the shuttle, although the speed of the loom be increased or decreased.

Said mechanism is characterized by comprising on each side of the loom, for the working of the picking stick or the member for the impulsion of the shuttle, a crank, crank shaft or crank disc, to which is coupled the end of a spring of convenient strength, the other end of which is fixed to a lever articulated to any suitable part of the framework of the machine. Said spring is able to receive a tension produced by a rotating cam acting on said lever and the crank is retained in a certain determined position by means of a stop or buffer, which prevents it from turning. In its retained position the crank remains slightly below the line determined by the axle of the crank and the second end of the spring fixed to the lever.

The crank is also in combination with a releasing mechanism actuated by a second rotating cam, said mechanism being constituted by a displaceable member as a lever or similar, which applies on a projecting part of the crank device, said second cam being inter-related with the first one in such a way that, when the spring has attained the desired strength, and at a convenient moment, the second cam acts upon the releasing lever which pushes the projecting part of

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the crank device, producing a partial rotation of same until said crank passes to the other side of the precedently cited line, at which moment the spring acts producing a rapid turning of the crank, and imparting an impulse to the picking-stick or equivalent member of the loom, by any means of transmission, so that the rotation of the crank under the action of the spring may communicate the impulsion to the shuttle.

The releasing-lever and the buffer or stop-block, may be combined to form a single element that carries out both functions.

When the expulsion of the shuttle has taken place, the spring remains without any tension, and the picking-stick or other organs of expulsion, go back under the action of an auxiliary spring, a counter-weight, etc., which causes the inverse rotation of the crank until its projecting part again meets with the retaining-lever, when the spring begins to be again charged by the cam.

This mechanism or movement is placed on each side of the loom in order to work the expelling organs on each side. The expulsion of the shuttle with the mechanism described may be effected by means of the known systems of flat or round picking-stick, coupling these organs to an impulsion shaft or axle, but it also allows of the direct action of the picker that strikes or impels the shuttle, by means of a cable or strap, more or less directly coupled to the action-plate, or the direct action of the shuttle itself by means of a running or sliding piece provided with a rack, also coupled to the said plate by gearing.

In the accompanying drawing is shown, only as an example, a preferable form of construction of the mechanism according to this invention.

Fig. 1 represents the whole of the loom seen from the back, showing the general disposition of the mechanism.

Fig. 2 shows with greater detail the group of organs for working the rotary plate crank on each side of the loom.

Fig. 3 represents in diagram an arrangement for directly working the picker that throws or impels the shuttle.

Fig. 4 shows, also in diagram, another arrangement for directly working the shuttle by means of a rack and pinion.

Fig. 5 is a graph which represents the value or amount of the impulsion received by the shuttle.

The general view of Fig. 1 shows a loom formed by the lateral framework 10 and the posts or

central frames 11. This loom is provided with a general axle 12 for working the machine and this axle transmits its movement by means of the conical pinions 13—13' or other suitable means, to the axle 14 provided with the two cams or excentrics 15 and 16 of suitable profiles.

The cam or excentric 15 (Fig. 2), acts on the central part of the lever 17, provided with the roller 18 and jointed or articulated by one end to the axle 19, held up by the support 20 of the frame, while the other end of the said lever is connected by the point 21 to one end of the spring 22 which extends from the said lever to the plate crank 27. On this lever being moved or displaced by the action of the excentric, or cam, the tension of the spring is increased until it reaches the maximum and the value or amount of this tension may be varied by placing on the end 21 of the lever, several points or links of connection, as well as by moving or displacing the upper end 19 of the said lever in a preceptibly vertical direction.

Parallely to the lateral framework of the loom, is the axle 25, of suitable length, sustained by bearings 26 and this axle carries, solidly fixed on to it, the plate crank 27 which has a lateral pivot or button 28 to which is fixed the other end of the spring 22. The said plate or crank also has a projecting part or stop 29 which acts in combination with the combined retention and release lever 30, which is jointed or articulated on the support 31 fixed to the frame, this lever having an end 32 which applies against the stop 29, while, the other end 33 is held against the regulating-screw 34 fixed to the frame, by means of which may be determined the extreme limit position of the said retention lever.

The retention lever 30 is connected by means of the tie-rod 35 the end of an elbow-lever 36—37 jointed or articulated on to the axle 38 fixed to the frame, and the arm 37 of the said lever rests on the second cam or excentric 16, constituting the releasing movement or mechanism of the spring.

Moreover, the axle 25 is also solidly fixed to the pulley or drum 40 which carries a cable belt, band or strap rolled round it which is connected to a picking stick 42 of the loom (Fig. 1).

This axle is retained by the retention lever in about the position represented in Fig. 2, that is with the button of the plate slightly below the line determined by the center of the axle and the point where the spring is fixed to the lever.

On charging or augmenting the tension of the spring, by means of the excentric or cam which pushes the said lever, the plate 27 has a tendency to turn in counterclockwise direction, said movement being prevented by the retention lever 30.

On reaching the maximum charging point, the second cam or excentric 16 acts on the elbow-lever, by which the end 32 of the retention lever 30, pushes the projecting part 29 and makes the plate turn slightly, until the button 28 passes to the other side of the said line, by which the spring 22 acts freely, causing the rapid rotation of the axle 25, which gives a strong jerk to the picking stick making it throw or expel the shuttle.

The picking stick returns to its starting position by means of the auxiliary spring 43, and so, the axle of the impulsion plate turns in the reverse direction, returning also all the organs to the position shown, ready to begin a new cycle,

helped if needed by the action of some kind of spring or counter-weight, etc.

The rotation of the impulsion-plate attains a variable angle, preferably of about 180° and this rotation gives the picker an accelerated movement at the beginning, up to the maximum, and a retarded motion at the finish, as may be seen in the graph of Fig. 5 and by this means rough effects and the resulting impacts or collisions are avoided. All this produces great regularity in the working of the loom, the impelling effort of the shuttle being constant and independent of the variations in speed that may occur. Besides this, the releasing motion or mechanism requires only a minimum of effort and there are no organs or parts that suffer from friction or that experience excessive wear, for which reason the mechanism is extremely durable and has a long working life.

The mechanism, corresponding to one of the sides of the loom, has now been described, and for the working of the picking stick on the other side, a similar mechanism may be provided worked symmetrically by another set of cams or excentrics, or else by the same set.

In Fig. 1 is shown the whole set of a single group of cams for working the mechanisms on both sides. In this case the same cams, besides acting in the form described, also act on the other side upon an auxiliary lever 45 sustained or held by the support 46, this lever being connected, by means of the connecting rod 47, with the charging lever 48 of the cam, placed in a similar symmetrical relationship to that already described before. The object on this auxiliary lever in the mechanism described is only to facilitate the crossing and passing of the pieces. The release is arranged and fitted in a similar way to that described above.

This system is very useful for working the picking sticks or other usual expelling organs, but, besides this, it also allows of very much simplifying the construction of a usual loom, acting directly upon the picker or the shuttle.

In Fig. 3 is shown the arrangement of the pulley 40 fixed on the revolving axle 25 which is connected by means of a cable, strap or band 50 with the picker 51, which being suitably guided, may run along the shuttle-box, thus throwing or impelling the shuttle, completing it by the addition of an auxiliary spring 52 which pushes the picker back to its starting position.

Another very simplified arrangement is to fit the shuttle-box with a sliding or running piece 55 which constitutes or forms the picker or organ for striking the shuttle and which at the same time carries a bar provided with a rack 56 which is geared to a cog-wheel 40' fixed to the said axle 25, so that the rapid turning of the said axle causes a rapid displacement or movement of the shuttle, and in consequence, its forcible expulsion from the shuttle-box.

The foregoing description only refers to a preferable form of construction of the mechanism according to the invention, and it is understood that it may be introduced any variations of details such as means for varying and regulating the lengths of levers or connecting rods, connecting points or links, and other, without limitation of the scope of the invention.

I claim:

1. Shuttle ejection mechanism comprising on each side of the loom, a rotatably mounted crank device having a crank axle, a spring coupled by one end to said crank, a pivotally mounted lever,

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the other end of said spring being connected to said lever, a general axle for said loom, a cam movable by said general axle, said lever imparting tension to said spring, retaining means to maintain the crank against the spring action in a point located at one side of a line determined by the crank axle and the end of the tension imparting lever and normally resting the crank near said line, releasing means adapted for producing a partial rotation of the crank against the spring action until the crank passes to the other side of said line, said crank in said last position being allowed to receive the full action of the spring which imparts a rapid rotating movement to the crank axle, said axle in turn acting on the shuttle ejection member of the loom.

2. Shuttle ejection mechanism according to claim 1, and having retaining and releasing means combined in one and the same device and consisting of a lever oscillatably mounted on the machine, a stop on said crank, an end of said lever bearing against said stop and acting as a buffer to prevent said crank from turning when the spring is loaded, a stop fixed to the framework of the loom, said lever by another point resting against said stop fixed to the framework which limits the movement of the lever in one sense, a second cam, a member actuatable by said second cam, said lever being coupled to said member actuatable by the action of said second cam, which at a suitable moment, acts on the retaining and releasing lever in a direction that imparts a partial rotation to the crank leaving it free to be moved by the spring action.

3. A mechanism according to claim 1, and including a drum coupled to the crank axle, a cable wound around said drum, said cable being connected to a picking stick of said loom used for expelling the shuttle, on rapid turning of the crank

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axle, this movement being transmitted to the picker by said cable and the ejection of the shuttle taking place with an accelerated movement at the start, up to the maximum, and retarded at the finish all dependent on the tension of the spring, and independent of the variations of speed of the loom.

4. A mechanism according to claim 1, and wherein two groups of shuttle ejecting means are placed one on each side of the loom, for impelling the shuttle in both shuttle-boxes, and a single axle and a single pair of cams for actuating both said means, and a symmetrical coupling and levers interconnecting said cams and said single axle.

5. A mechanism according to claim 1, and including a sliding picker in a shuttle-box of said loom, a cable connecting said crank to said sliding picker and communicating directly to the said picker the impulsion for expelling the shuttle, and a spring to return the picker to its starting point.

6. A mechanism according to claim 1, and including a sliding member in the shuttle-box acting as a picker and having an arm with a toothed-rack, a gear coacting with said toothed-rack coupled to the crank, so that the turning of said crank causes the displacing of the shuttle, and a spring for pushing back the said sliding member to its starting point.

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