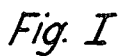
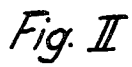


3,047,030

2 Sheets-Sheet 1



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3,047,030

DEVICE FOR INSTANTANEOUS STOPPING OF POWER LOOMS

Filed Oct. 12, 1959

2 Sheets-Sheet 2

Fig. III

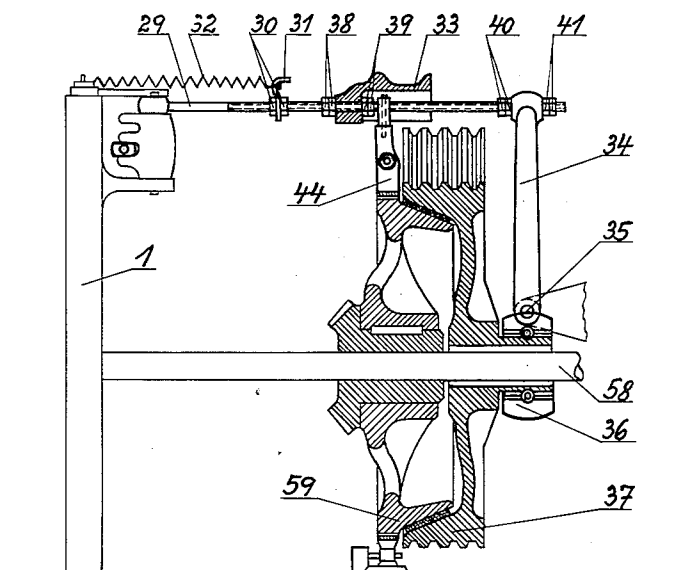


Fig. V

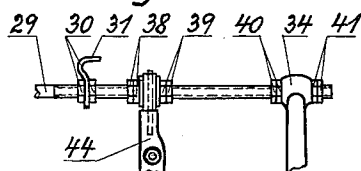


Fig. IV

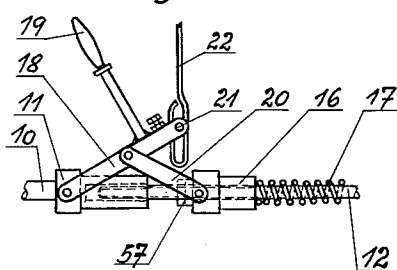
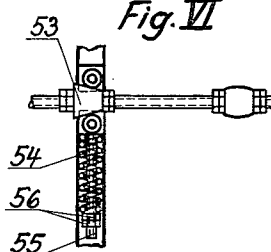


Fig. VI



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3,047,030

DEVICE FOR INSTANTANEOUS STOPPING
OF POWER LOOMSKurt Metzler, Duwockskamp 15, Hamburg-
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Filed Oct. 12, 1959, Ser. No. 845,984

Claims priority, application Germany Oct. 15, 1958
10 Claims. (Cl. 139—336)

Power looms must be equipped with a device that allows the loom to stop within the shortest possible time if some safety apparatus is actuated or if some action within the machine is not done in the prescribed manner, particularly if a picked shuttle does not arrive at the empty shuttle box at the opposite side of the lathe. If this happens, the slay is just moving forward at its nearly maximum speed, and it must then be stopped completely and instantly, for otherwise at further forward movement of the slay the shuttle trapped in the shed would tear up entire groups of warp threads.

It is known to stop the loom rapidly, in such a case, by means of so-called knocking-off devices which in general are constructed in such a way that the loom slay carries along its full width a so-called protector rod on which are fitted one or more bunters or knocking-off fingers. At both ends of the protector rod are fitted feeler levers whose fingers feel the position of the swells of those shuttle boxes which are on race board level. If a shuttle enters the felt shuttle box, the swell of the latter moves forward, thus pressing forward the feeler lever concerned whereby some swinging movement is given to the protector rod. This means that the bunters (or knocking-off fingers) are lowered so that they pass below the buffers. If, however, a shuttle does not fully enter the box, the aforementioned forward movement of the box swell, the movement of the feeler lever, the swinging movement of the protector rod and the downward movement of the knocking-off fingers fail to take place, and when the slay is moving forward, the loom driving means is disengaged or uncoupled, the bunters or knocking-off fingers push against the buffers, and the further forward movement of the slay is thus stopped.

Knocking-off motions of this kind, as described in the German Patents No. 306,821 and No. 803,104, offer a great disadvantage in that owing to the relatively high speed of the slay, when moving forward, a very high inertia force is exercised on the buffers if the knocking-off fingers jolt them, and this heavy stroke will, of course, exercise a heavy stress on the stop motion and on the whole loom frame.

Other stop motions are further known which stop the loom if for instance, a weft or warp thread breaks, the position of the shuttle box in the aforementioned manner has not been attained or there is some trouble in the picking motion of the loom. All these devices have the common feature that they are slow in action so that the prompt stopping of the loom is not guaranteed.

A characteristic feature of the present invention is that the stopping motion is accelerated by the electromagnetic reaction and intermediate linkage members, such as the front parts of the shipper lever mechanism, in particular the shipper handle, remain in their on position whereby the prompt stopping of the loom in the required position, especially in the nearly open shed when shuttle is trapped in the shed, is performed by means of the rapid action of the block brake.

To achieve this aim, the shipper lever assembly has an articulated joint or toggle. By lifting a point of the joint lever, the joint is swung outwardly thus producing the shortening of the acting length of the back shipper shaft, whereby the loom is instantly stopped. The said

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lifting of a point of the joint lever is done by means of an electric lifting magnet and a connecting wire; the magnet is actuated by a contactor when a safety or control device of the loom is actuated. The shipper lever assembly further has a pre-loaded pressure spring which serves to accelerate the lifting of the articulated joint for the shortening of the effective acting length of the shipper shaft.

After the stopping of the loom by these means the lifted articulated joint of the shipper lever assembly drops automatically into its normal or operating position as soon as the shipper handle is brought by hand into its disengaged or off position. Further, one of the levers of the articulated joint is fitted with a handle which permits the joint to be brought into its normal position if the joint should not fall automatically into its normal position after the shipper handle has been brought by hand into its disengaged position.

The shipper lever assembly controls, by means of an angle-lever, a connecting rod which operates the loom brake and the friction pulley, whereby the loom brake and the friction pulley are adjustable independently of each other by means of double nuts so that both parts can be synchronized. The loom brake is a circumferential shoe-brake of instantaneous effect and needing very low forces for operation; the brake shoes are pivoted in adjustable bearings, the setting-on of the loom brake can be made positively by means of a brake link, whereas the brake is released in non positive way by means of a pressure spring. It is, however, also possible to set on the brake non positively, whereas the brake is released positively, i.e. by means of a spreader wedge.

The accompanying drawings (FIGS. I—VI) are an example of construction and disclose the present invention: FIG. I is the side view of a loom, drive side, showing the joint of the stopping device in normal or operating position.

FIG. II is a plan view of FIG. I, partially in section.

FIG. III is the cross section to FIG. I, along the inter-section line A—B,

FIG. IV is a side view of a detail of FIG. I, but with lifted articulated joint after the reaction of the lifting magnet,

FIG. V is a fragmentary side view and FIG. VI is a fragmentary top view of an alternative construction possible for the operation of the instantaneous shoe brake.

In the FIGURES I—III the machine frame 1 is shown in dot and dash manner. The movement of the well-known shipper handle 2 for starting and stopping of the loom is transmitted in well-known manner by means of the stopping crank 3, to the front stopping-crank shaft 4, and from there by the lever 5 to the front stop rod 6.

The further transmission of movement is made from the rearwardly disposed eyelet of the connecting rod 6 by means of the lever 7, the stopping-crank shaft 8 and the lever 9, to the collapsible rod or stop rod 10—12. This stop rod is composed, according to the invention, of a front part 10 with guidance piece 11 and of a back part 12, the front end of the rod 12 gliding in the pipe-shaped guiding piece 11 of the rod 10, and the back part of the rod 12 sliding in a frog 13 which is fitted on the arm 26 of the angle lever 27 between the double nuts 14 and 15. The rod 12 is further fitted with the double nut 57 and the bush 16, which is in contact with the pressure spring 17. The guide piece 11 as well as the bush 16 are fitted with a bolt, and between these bolts or toggle joint is arranged which consists of the lever 18, the operating lever 19, and the lever 20 (FIGS. I and IV).

From the point 21 of the lever 18 (FIG. IV) the connecting wire 22 extends upwards and is linked to the core 23 of the lifting magnet 24.

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The other arm 28 of the angle lever 27 is connected with the rod 29 which has a hook 31 fixed by the two nuts 30 (FIG. III). This hook holds one end of the tension spring 32; the other end of this spring is fixed to the loom side 1. As part of a first linkage the rod 29 operates, by means of the brake connecting link 33, the loom brake 42-52 (FIGS. I and III) and also, by means of the lever 34 with fulcrum at point 35, and the sliding piece 36, to displace the friction pulley 37, the effects of the loom brake and of the friction plate being adjustable independently from each other by means of the double nuts 38-41; in such a manner both parts can be synchronized. The sliding piece 36 can be displaced on the shaft 58.

The instantaneous shoe-brake 42-52 consists of the two sliding pieces 42 with rollers 43 which can slide on the inner surface of the brake connecting link 33 and which are controlled by the latter, and also of the two brake shoes 44 and 45 with brake linings 46 and 47, in which, at the top part, the rollers 43 of the sliding pieces 42 engage (FIG. II). The brake shoes are adjustable in their brackets 48 and 49. The brake further has the pressure spring 50, held by the screw 51 with double nuts 52.

The FIGURES V and VI disclose that the control of the loom brake can also be accomplished by means of the spreader wedge 53 which releases the brake, the setting on of the brake being made by means of the pressure spring 54 fitted outside the brake shoes and held by the screw 55 with the double nuts 56.

During weaving the articulated joint or releasable means 18-20 remains in its normal operating position as per FIG. I whereby the loom brake 42-52 and the friction pulley 37 are operated by the displacement of the shipper handle 2.

If, however, some safety device of the loom has been actuated, the control circuits closed so that the lifting magnet 24 (FIG. I) is energized across a contactor whereby the lifting core 23 is drawn in and point 21 of the lever 18 of the articulated joint 18-22 is lifted by means of the connecting wire 22.

The lifting of the articulated joint 18-20 is further accelerated by the pressure of the pressure spring 17. The spring 17 (FIG. II) first exerts pressure on the bush 16 until the double nut 57 and then the rod 29 is pulled by means of the spring 32 (FIG. III) until the arm 28 of the angle lever 27 engages the adjustable stop screw 25, whereby the friction clutch is released and the loom brake put on. Such a releasing is made by the first linkage in such a manner that, by means of the rod 29, the two-armed lever 34 (FIG. III) is pulled, on its fulcrum 35, to the left; the bottom part of the lever 34 then moves to the right, taking with it the guiding piece 36 and with the latter the friction or drive pulley 37, whereupon the clutch constituting the connection of the drive pulley 37 with the counter pulley 59 on the drive shaft is interrupted. The front end of the rod 12, linked by means of the frog 13 to the other arm 26 of the angle lever 27, is with this pushed into the guiding piece 11 of the rod 10, which elements comprise a second linkage.

The loom is thus stopped without moving the parts of the shipper lever mechanism 2-11; this means that all these parts have remained in their on position.

After removing the cause of the loom stoppage, the loom can be brought by hand, by means of the shipper handle 2, into the off position shown in FIG. II in dot and dash manner, whereby the articulated joint falls back in its position as shown in FIG. I. The handle 19 is for safety only and is operated only when the articulated joint 18-20 does not return automatically to its stretched position as soon as the shipper handle 2 is brought by hand to the off position as shown by FIG. II in dash and dot manner.

Thus, applicant's invention includes a first linkage having the elements 26-31 and 33-43 connected to the brake-

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and-clutch means for moving the latter between operative and inoperative positions; shipper lever means comprising elements 2-11; and a second linkage interconnecting the shipper lever means with the first linkage and including elements 18-21 of the releasable means or toggle joint as well as the collapsible rod means 12.

The details in construction as shown by the figures only give one possibility of construction with a view to the desired aim. As a matter of fact it is possible to design several machine parts in different ways. For instance, the arms of the brake connecting link 33 or of the spreader wedge 53 respectively could be made adjustable with a view toward varying the effect of the loom brake; or the handle 19 of the lever 18 could be eliminated.

By the co-operation of all machine parts in the arrangement as per the figures, the stopping of the loom in the shortest possible time is obtained. That is due first to the fact that the lifting of the articulated joint 18-20 is accelerated by the spring 17 and also due to the fact that the front parts 3-11 of the starting and stopping or shipper lever mechanism, including the shipper handle 2, are not moved when the instantaneous stopping becomes active; further to the fact that the moment shoe brake is of quickest action.

I claim:

1. In a power loom in combination, brake-and-clutch means having an operating position where a brake thereof is disengaged while a clutch thereof is engaged and having an inoperative position where the brake is engaged and the clutch is disengaged; a first linkage operatively connected with said brake-and-clutch means for moving the latter between said positions thereof; spring means operatively connected with said first linkage for urging the latter to place said brake-and-clutch means in said inoperative position thereof; shipper lever means; a second linkage interconnecting said shipper lever means with said first linkage for transmitting movement of said shipper lever means to said first linkage for manual operation of said brake-and-clutch means, said second linkage including a collapsible rod means and releasable means releasably maintaining said collapsible rod means in an expanded condition during normal operation of the loom, said rod means, when collapsed, preventing transmission of motion between said shipper lever means and said first linkage and releasing the latter to said spring means for placing said brake-and-clutch means in said inoperative position thereof.

2. In a power loom in combination, brake-and-clutch means having an operating position where a brake thereof is disengaged while a clutch thereof is engaged and having an inoperative position where the brake is engaged and the clutch is disengaged; a first linkage operatively connected with said brake-and-clutch means for moving the latter between said positions thereof; spring means operatively connected with said first linkage for urging the latter to place said brake-and-clutch means in said inoperative position thereof; shipper lever means; a second linkage interconnecting said shipper lever means with said first linkage for transmitting movement of said shipper lever means to said first linkage for manual operation of said brake-and-clutch means, said second linkage including a collapsible rod means and releasable means releasably maintaining said collapsible rod means in an expanded condition during normal operation of the loom, said rod means, when collapsed, preventing transmission of motion between said shipper lever means and said first linkage and releasing the latter to said spring means for placing said brake-and-clutch means in said inoperative position thereof; and means operatively connected with said releasable means for automatically actuating the latter to release said rod means for movement to a collapsed condition when faulty loom operation occurs.

3. In a power loom as recited in claim 1, second spring means cooperating with said collapsible rod means

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for urging the latter from said expanded condition to a collapsed condition when said releasable means releases said collapsible rod means, so that the action of said first-mentioned spring means on said first linkage will be substantially instantaneous.

4. In a power loom as recited in claim 1, said rod means including a pair of coaxial rod portions axially movable one with respect to the other, and said releasable means being in the form of a toggle joint having an active position maintaining said rod portions with respect to each other in a position placing said rod means in said expanded condition thereof, said toggle joint having an inactive position releasing said rod portions for movement one with respect to the other to place said rod means in said collapsed condition thereof.

5. In a power loom as recited in claim 4, second spring means cooperating with said rod portions for urging the same to move in opposition to said toggle joint to a position where said rod means is collapsed, whereby said second spring means provides substantially instantaneous action of said first-mentioned spring means on said first linkage when the toggle joint is moved from said active toward said inactive position thereof.

6. In a power loom as recited in claim 4, electromagnetic means cooperating with said toggle joint for moving the same from said active toward said inactive position thereof when faulty loom operation occurs.

7. In a power loom as recited in claim 1, said shipper lever means being movable by the operator to a position for manually placing said brake-and-clutch means in said inoperative position thereof and during movement of said shipper lever means to said latter position thereof said shipper lever means automatically placing said rod means, if it is in a collapsed condition, back into its expanded condition and automatically setting said releasable means in a position where the latter again releasably maintains said rod means in said expanded condition thereof.

8. In a power loom as recited in claim 1, said brake-

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and-clutch means including a pair of brake shoes, means actuated by said first linkage and cooperating with said shoes for placing the latter in a braking position when said spring means acts on said first linkage, and a second spring means cooperating with said brake shoes for urging the latter to a position releasing the brake.

9. In a power loom as recited in claim 1, said brake-and-clutch means including a pair of brake shoes, spring means cooperating therewith for urging the latter to a braking position, and spreader wedge means operatively connected to said first linkage to be actuated thereby and cooperating with said brake shoes for moving the latter to a disengaged position in opposition to the spring means which acts on said brake shoes.

10. In a power loom as recited in claim 1, said brake-and-clutch means including a rotary member forming part of said clutch means and braking elements cooperating with said rotary member to stop the rotation thereof when the brake is in an engaged position, said clutch means including a second member forming part of a driving pulley and engaging the first member of the clutch means when the clutch is engaged, said first linkage including a rod and means operatively connected therewith and with the second clutch member and braking elements for placing the latter in their engaged position when said second member is moved away from said first member and vice versa.

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