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MECHANISM FOR STARTING AND STOPPING WEAVING LOOMS

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FIG. 1

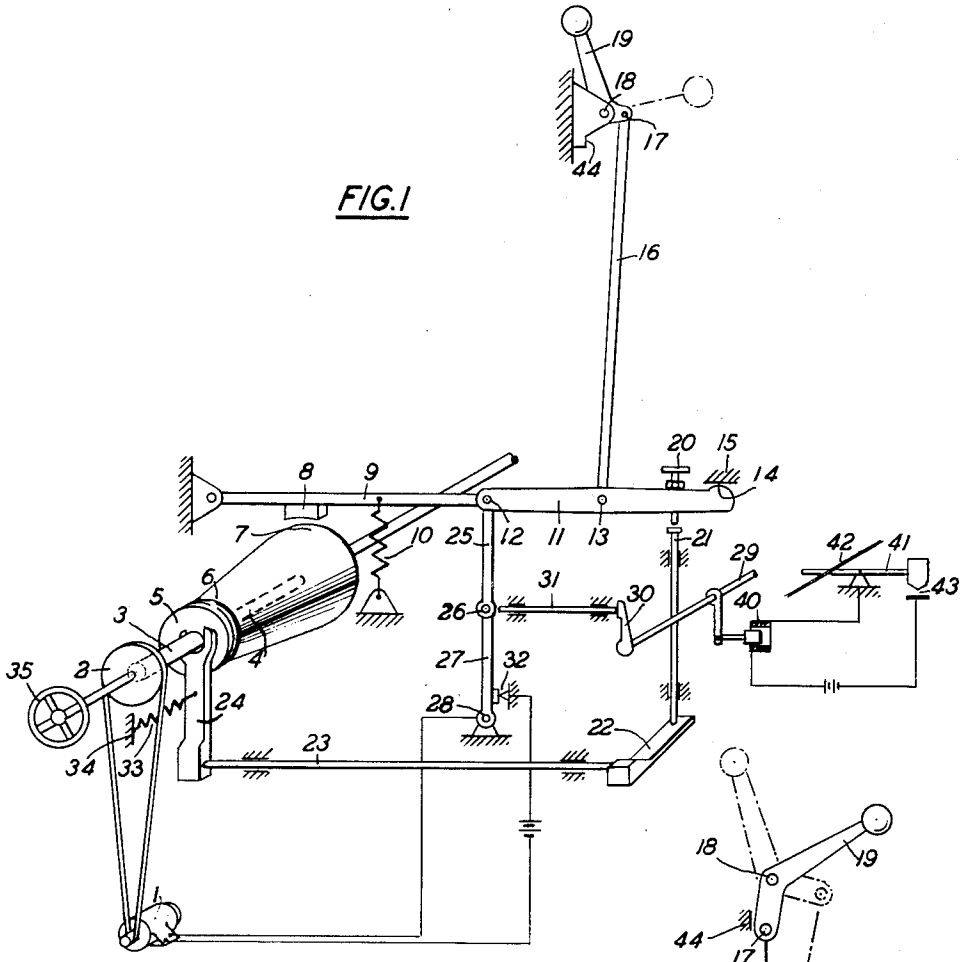
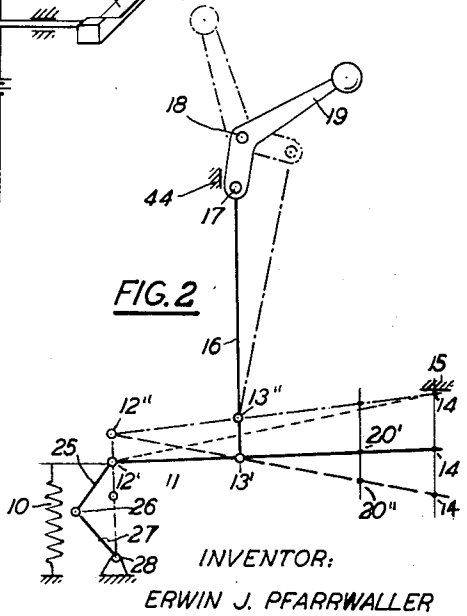


FIG. 2



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MECHANISM FOR STARTING AND STOPPING WEAVING LOOMS

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9 Claims. (Cl. 139—336)

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The present invention relates to a method and means for stopping and starting looms for weaving of the type having a single motor and a main drive shaft connected with said motor by means of a clutch and being equipped with a brake for quickly stopping said shaft and the loom when said clutch is disconnected.

It is an object of the present invention to provide a method for stopping a fast operating loom of the type set forth, by substantially simultaneously disengaging the clutch and engaging the brake in response to a failure such as breakage of a thread.

It is an object of the present invention to provide a method for stopping a fast operating loom of the type set forth, by simultaneously disengaging the clutch and engaging the brake and locking it in braking position, in response to a failure such as breakage of a thread.

A further object of the invention is a method of stopping a fast operating loom by simultaneously stopping the loom drive, disconnecting the drive from the rest of the loom and absorbing and destroying the kinetic energy of all moving parts of the loom, and initiating the three aforestated steps in dependence on an operating condition of the loom.

An object of the invention is the provision of a method for starting a loom of the type set forth in which the brake is disengaged prior to engagement of the clutch by means of two consecutive manipulations.

A further object of the invention is the provision of a mechanism in looms of the type set forth, said mechanism comprising means responsive to an operating condition of the loom, for example weft tension, which means actuate the clutch and the brake simultaneously and which mechanism comprises means affording consecutive release of the brake and engagement of the clutch.

A further object of the invention is the provision of a mechanism in looms of the type set forth, said mechanism comprising means responsive to an operating condition of the loom, for example weft tension, which means actuate the clutch and the brake simultaneously and lock the latter in braking condition.

Another object of the present invention is the provision of a mechanism in looms for weaving

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of the type set forth, which mechanism comprises means responsive to an operating condition of the loom which actuate the clutch and the brake and hand operable means which when manipulated in one direction release the brake and when manipulated in the other direction engage the clutch.

It is an object of the invention to provide, in a loom of the type set forth, a mechanism comprising a handle connected with a two arm lever one end of which is adapted to engage an abutment and the other end of which is connected with the free end of a toggle lever joint whereby said abutment is engaged and said joint is stretched upon pulling on said handle. Thereupon the brake is disengaged. By returning said handle into its initial position said abutment is disengaged and said joint remains in stretched position and said lever causes engagement of the clutch. Said handle is held in one of its two operating positions, for example by an abutment, and if then said toggle joint is collapsed, for example by a power applied in response to an undesired operating condition of the loom, a tensioned spring is released and engages the brake and disengages the clutch.

A further object of the invention is the provision of a switch controlling power supply to the motor operating the loom which switch is connected with the mechanism set forth above and is opened when said mechanism is operated for applying the brake and disconnecting the clutch. The hand operable means for starting the loom are so constructed that the clutch operating mechanism cannot act back on said handle means during normal operation and correct position of said means is assured at times when the toggle joint is collapsed for stopping the loom.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be a preferred embodiment of my invention.

In the drawings:

Fig. 1 is a diagrammatic perspective illustration of a mechanism according to the invention;

Fig. 2 is a diagram showing the kinematics of a portion of the mechanism shown in Fig. 1.

Like parts are designated by like numerals in both figures of the drawing.

Numeral 1 designates an electric motor which drives the pulley 2 mounted on shaft 3. The latter can be connected with the main shaft 4 of the loom by means of the clutch 5, 6. Clutch disk 6 is rigidly connected with shaft 4 and disk 5 can be axially displaced on shaft 3, but is not rotatable thereon. Shaft 3 is hollow and rotatable on shaft 4.

A brake disk 7 is rigidly connected with shaft 4 and may be made of one piece with disk 6. In the drawing two separate disks 6 and 7 are shown to make the illustration more clear. A brake shoe 8 is mounted on a lever 9 and adapted to be pressed on disk 7 by means of a spring 10. The free end of lever 9 is connected with one end of a two-arm lever 11 by means of a pin 12. The two-arm lever 11 has a fulcrum 13 to which one end of a rod 16 is connected swingably. The other end of rod 16 is connected to pin 17 at the end of the short arm of a bell crank lever which swings about a stationary fulcrum 18 and has a long arm 19 which is provided with a handle for manual operation.

The free end of lever 11 is provided with a nose portion 14 which cooperates with a stationary abutment 15. Inside of nose 14 a set screw 20 is provided on lever 11 which screw is adapted to engage one end of an axially reciprocatingly movable rod 21. The other end of rod 21 rests on arm 22 attached to shaft 23. The latter carries a forked arm 24 which engages the axially movable clutch disk 5. A spring 33 which is supported by a stationary part 34 and connected to arm 24 tends to disengage the clutch 5, 6 and maintains engagement of arm 22 and rod 21.

Fulcrum 12 which swingably interconnects one end of lever 9 and one end of lever 11 holds also one end of a link member 25, the other end of which is fulcrumed at 26 to one end of a lever 27. The other end of lever 27 swings about a stationary pivot 28. The system 25 to 28 constitutes a toggle joint. If the system 25, 27 forms one straight line, the brake shoe 8 is removed from the disk 7 and locked in this position.

The fulcrum 26 of the toggle joint system may be displaced by one end of a rod 31. The other end of rod 31 abuts arm 30 connected with a shaft 29 which may be rotated, for example, by actuation of a solenoid 40 which is energized if, for example, a thread feeler 41 which is normally held in the position shown in Fig. 1 by the tension of a thread 42, revolves clockwise when said thread breaks. In this case a switch 43 is closed.

If rod 31 moves to the left the toggle joint system collapses and brake lever 9 swings clockwise under the influence of spring 10, whereby the brake shoe 8 is pressed to the disk 7.

Lever 27 actuates a switch 32 which controls the current supply to motor 1. This switch is closed only when the lever system 25—27 is stretched.

The following describes the operation of the mechanism with the aid of the diagram, Fig. 2. It is assumed that the lever system 25—27 has been bent by means of the rod 31. Fulcrum 12 is thereby moved under the influence of the spring 10 from position 12'' to position 12' and the brake has been applied. Fulcrum 13 remained in its original position 13' because hand lever 19 remained in the position shown in full lines. The set screw 20 has moved from position 20'' to position 20' and the clutch disk 5 has been permitted to remove itself from disk 6 under the influence of spring 33. If hand lever 19 is moved counterclockwise toward the position shown by dash-dot lines, rod 16 is pulled up and pulls two-armed lever 11 with it, whereby the nose 14 engages abutment 15 and becomes a fulcrum. Lever 11 is now in the thin dotted line position with fulcrum 12 remaining in position 12'. Upon further lifting of rod 16 fulcrum 13 reaches position 13'' and fulcrum 12 position 12'', whereby the lever system 25—27 is stretched. Lever 11 is now in the position shown by a dash-dot line. In this condition of the mechanism the brake is disengaged and the loom shaft 4 is still disconnected from the motor 1. Shaft 4 extends through the hollow shaft 3 and is provided with a hand wheel 35. By manipulating the latter the moving parts of the loom can be brought into any desired position. Stretching of system 25—27 causes closing of switch 32 whereby the motor 1 is started.

If it is now desired to drive the loom by means of the motor 1 hand lever 19 is returned from the dash-dot line position to the solid line position and lever 11, revolving about fulcrum 12 which is in position 12'', is pressed down into the position indicated by a heavy dotted line. This brings the set screw 20 into position 20'' and depresses rod 21 whereby clutch 5, 6 is engaged. The brake remains in disengaged position because of the locking effect of the lever system 25—27. The mechanism cannot act back on hand lever 19 because its short arm 17 is slightly beyond its lower dead center position and abuts the stationary abutment 44. In case of any irregularity in the operation of the loom the fulcrum 26 of the toggle joint system 25 to 27 is displaced by the rod 31 and lever 11, under the influence of spring 10, moved from the heavy dotted line position in Fig. 2 into the position indicated by a solid line. This causes disengagement of the clutch and application of the brake. Suitable adjustment of the set screw 20 assures that clutch 5, 6 is disengaged first and brake 7, 8 applied subsequently which is the desired form of operation.

While I believe the above described embodiment of my invention to be a preferred embodiment, I wish it to be understood that I do not desire to be limited to the exact details of design and construction shown and described, for obvious modications will occur to a person skilled in the art.

I claim:

1. A mechanism for controlling the operation of looms for weaving having a motor, a drive shaft, a clutch interposed between said shaft and said motor, and brake means for braking said shaft, said mechanism comprising a single handle movable in two different directions, actuating means interconnecting said handle and said brake means, and clutch operating means engageable by said actuating means and connected with said clutch, said actuating means being adapted to release said brake means upon movement of said handle in one direction and to engage said clutch operating means upon movement of the same handle in the other direction.

2. A mechanism for controlling the operation of looms for weaving having a motor, a drive shaft, a clutch for connecting and disconnecting said shaft to and from said motor, a brake for braking said shaft, said mechanism comprising a handle movable in two substantially opposite directions, motion transmitting means interconnecting said handle and said brake, and releasing said brake upon movement of said handle in

one direction, and other motion transmitting means engageable by said first transmitting means and engaging said clutch upon movement of the same handle in the opposite direction.

3. A mechanism for controlling the operation of looms for weaving having a motor, a drive shaft, a clutch disconnectably connecting said shaft and said motor, and brake means for braking said shaft, said mechanism comprising a single handle movable in two different directions, a train of motion transmitting members connected with said handle and with said brake means for operation of the latter in dependence on the position of said handle, and other motion transmitting means engageable by said first transmitting means and connected with said clutch.

4. A mechanism for controlling the operation of looms for weaving having motor means, a drive shaft, a clutch disconnectably connecting said shaft and said motor means, and a brake for braking said shaft, said mechanism comprising a handle movable toward two extreme and opposite operating positions, a set of motion transmitting means connected with said brake and with said handle and comprising locking means adapted to lock said brake in disengaged position, another set of motion transmitting means engageable by said first transmitting means and connected with said clutch and holding it in engaged position when said locking means are in locking condition and said handle is in one extreme position, said first transmitting means affording engagement of said brake and actuation of said other transmitting means for disengagement of said clutch when said locking means are unlocked and said handle is in the same extreme position.

5. A mechanism for controlling the operation of looms for weaving having a motor, a drive shaft, a clutch disconnectably connecting said shaft and said motor, and a brake for braking said shaft, said mechanism comprising a handle movable toward two extreme substantially opposite operating positions, a train of motion transmitting means connected with said brake and with said handle and comprising locking means adapted to lock said brake in disengaged position, other motion transmitting means engageable by said first transmitting means and holding said clutch in engaged position when said locking means are in locking condition and said handle is in one extreme position, said first transmitting means affording engagement of said brake and actuation of said other transmitting means for disengagement of said clutch when said locking means are unlocked and said handle is in the same extreme position, and affording disengagement of said clutch and releasing of said brake and locking of said locking means and retaining of said other transmitting means in clutch disengaging position when said same handle is moved to the other extreme position.

6. A mechanism for controlling the operation of looms for weaving having a motor, a drive shaft, a clutch disconnectably connecting said shaft and said motor and a brake for braking said shaft, said mechanism comprising a handle movable to two extreme operating positions, a train of motion transmitting means connected with said brake and with said handle and comprising locking means adapted to lock said brake in disengaged position, other motion transmitting means engageable by said first transmitting means and holding said clutch in engaged position when said locking means are locked and said handle is in one extreme position, said first transmitting means affording engagement of said brake and actuation of said other transmitting means for disengagement of said clutch when said locking means are unlocked and said handle remains in the same extreme position, and affording disengagement of said brake and locking of said locking means and retaining of said other transmitting means in clutch disengaging position when said handle is moved to the other extreme position, and affording actuation of said other transmitting means for engagement of said clutch when said handle is moved back to its first extreme position.

7. A mechanism for controlling the operation of looms for weaving having motor means, a drive shaft, a clutch disconnectably connecting said shaft and said motor means having resilient means for moving the clutch to the disengaged position and brake means for braking said shaft having a movable member and resilient means for moving the movable brake member to braking position, said mechanism comprising a toggle joint connected to said movable brake member and adapted to be cocked for holding the brake means out of the braking position, a tripping device adapted to release said toggle joint for shutting down the loom, a lever pivoted at one end to the movable brake member, a fixed abutment at one side of the said lever, the lever being so oriented with respect to said movable member that lateral movement of said lever toward the said side thereof disengages said brake means, a movable member at the other side of the other end of said lever adapted to be engaged by said lever and connected to said clutch means for engaging the latter upon movement of said movable member away from said fixed abutment, and an operating rod pivoted to said lever at a point intermediate the ends thereof, whereby movement of said rod in the direction of said abutment serves to cock the toggle joint and release the brake means, and return movement of said rod serves to engage the clutch leaving the toggle cocked and the brake means released to cause operation of the loom.

8. A mechanism for controlling the operation of a loom for weaving having an electric motor, a drive shaft, a clutch interposed between said shaft and said motor, and a brake for braking said shaft, said mechanism comprising actuating means for engaging and disengaging said brake, means engageable by said actuating means for operating said clutch, and switch means so connected with said actuating means as to interrupt the current supply to the motor when said brake is engaged and to close the current supply when said brake is disengaged, independently of the position of said clutch.

9. A mechanism for controlling the operation of a loom for weaving having an electric motor, a drive shaft, a clutch interposed between said shaft and said motor, and a brake for braking said shaft, said mechanism comprising actuating means for engaging and disengaging said brake, locking means adapted to lock said brake in disengaged position, means engageable by said actuating means for operating said clutch independently of said brake, and switch means so connected with said locking means as to interrupt the current supply to the motor when said locking means are unlocked and the brake is engaged and to close the current supply when said locking means are locked and the brake is disengaged, independently of the position of said clutch.

ERWIN J. PFARRWALLER.

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