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G. S. ROBINSON

3,412,764

BINDER CONTROL MECHANISM

Filed Sept. 27, 1967

2 Sheets-Sheet 1

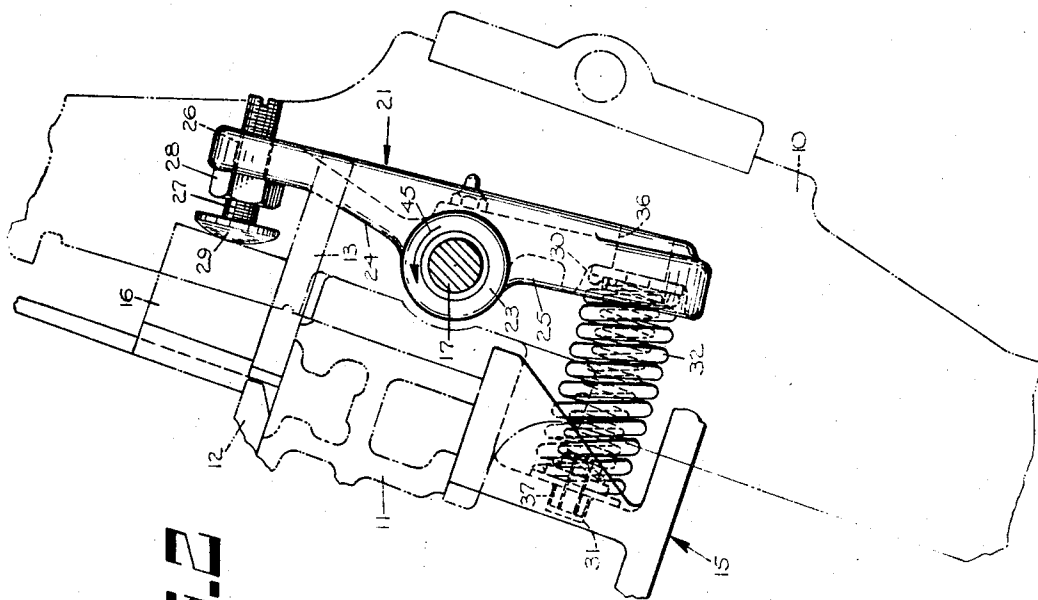


FIG. 2

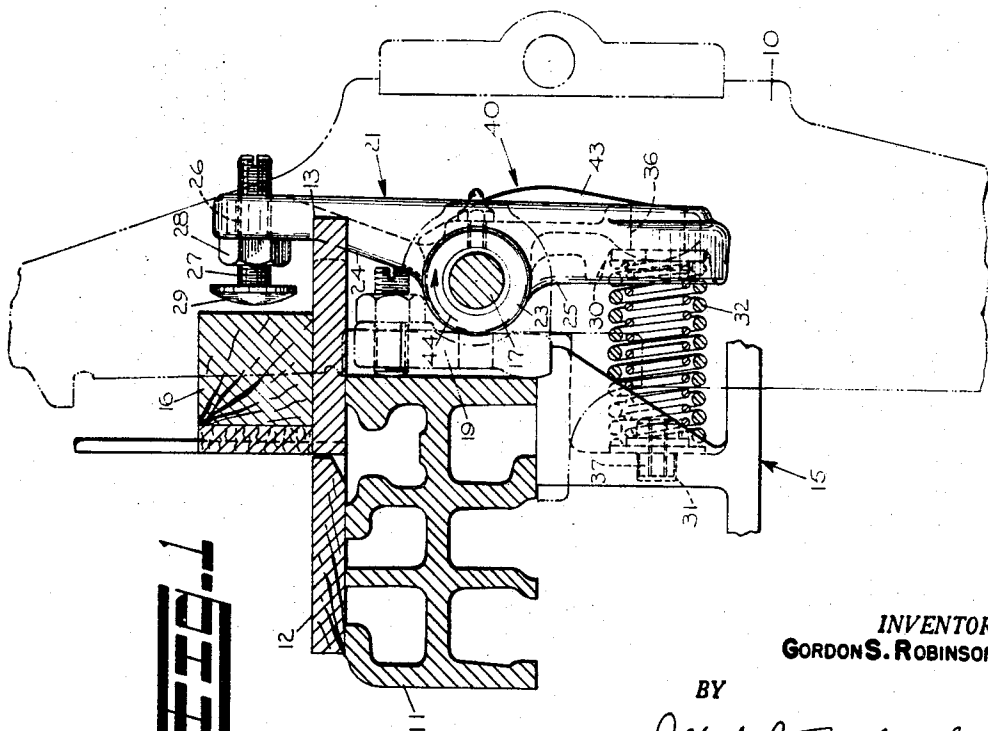


FIG. 1

INVENTOR.
GORDON S. ROBINSON

BY

Albert A. Mahamel

ATTORNEY

Nov. 26, 1968

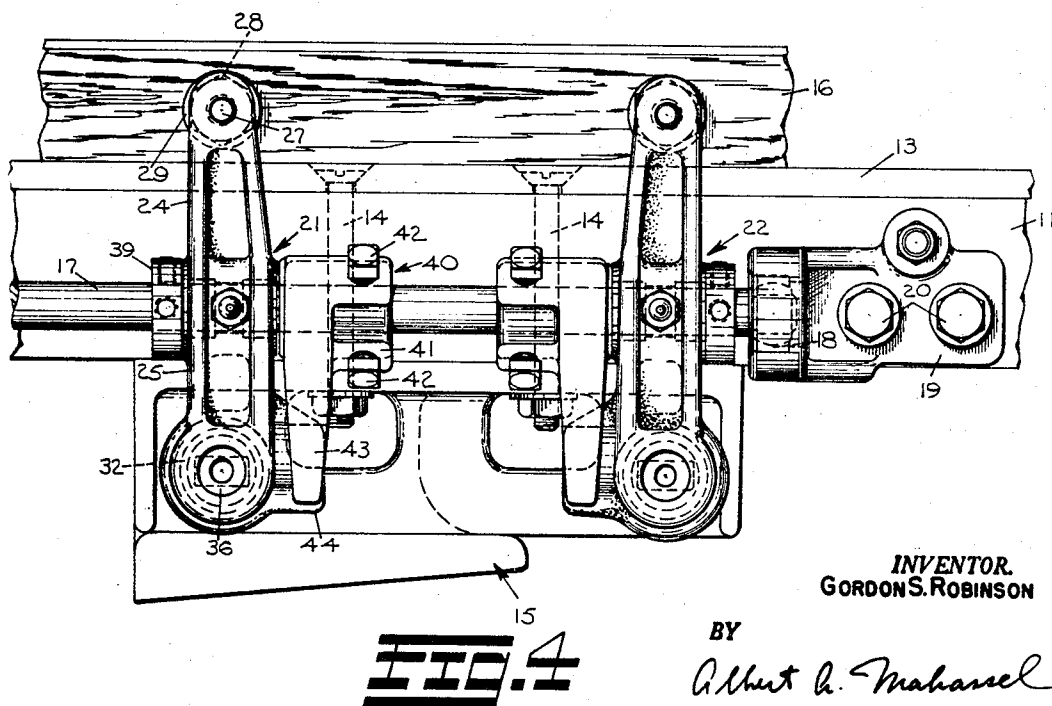
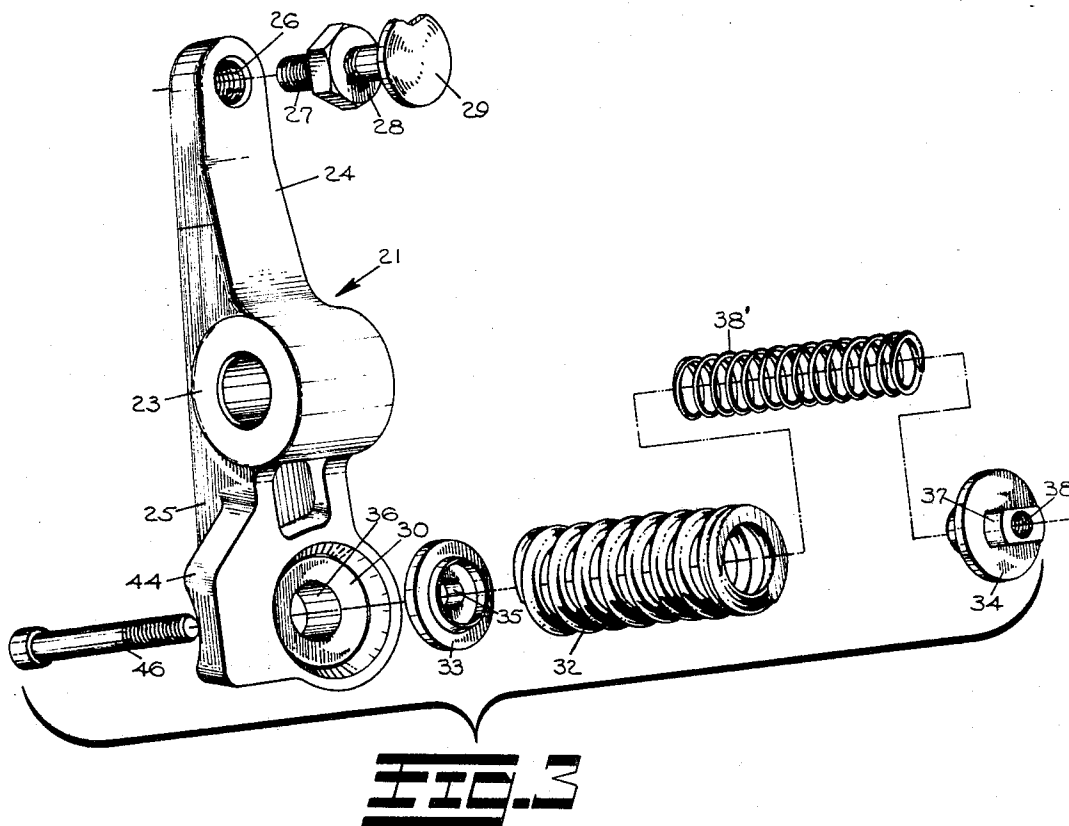
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2 Sheets-Sheet 2



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BINDER CONTROL MECHANISM

Gordon S. Robinson, North Smithfield, R.I., assignors, by
mesne assignments, to John Donald Marshall and
Horace L. Bomar, as trustees of the Carolina Patent
Development Trust

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6 Claims. (Cl. 139—187)

ABSTRACT OF THE DISCLOSURE

A binder control mechanism for looms of the fly shuttle type having control arms biased by coil springs for exerting pressure on the binder and which include means for compressing said springs and releasing the tension applied thereto for facilitating the assembly and removal thereof.

Background of the invention

The invention relates to looms of the fly shuttle type which utilize binders as elements of the shuttle boxes at each end of the lay for checking the flight of a shuttle as it is caused to enter and be picked from said boxes during the performance of its intended function.

Numerous methods have been employed for exerting a biasing force to the binder which in a known manner is timed to press against the shuttle as it enters the box and to greatly reduce this biasing force just prior to the picking of said shuttle.

Leaf springs, torsion springs and coil springs are a few of the known devices that are currently utilized for providing the required pressure to a loom binder.

Numerous arrangements of compression or coil springs have been tried and are in use which have proven to be a very desirable method of being able to obtain a wide range of binder pressures that can be set up to meet the requirements of practically all weaving conditions.

The use of such springs has, until the introduction of the present invention, met with certain difficulties and drawbacks which have not made them completely satisfactory.

With one popular known arrangement, considerable difficulty is had when assembling such springs, that is to say, there is no safe or positive means of compressing them to enable easy and unrestricted placement thereof in operating position. With this arrangement the springs are pried into operating position with the assistance of a screw driver or the like and aside from being considered a tedious and time consuming method of spring assembly, it is also considered dangerous due to the likely possibility of slippage.

Other arrangements are quite complex and due to the multiplicity of parts they require considerable time and skill to assemble or replace such springs as well as to obtain the desired setting for a particular weaving condition.

The binder control mechanism according to the instant invention utilizes coil springs as a means for obtaining a biasing force for the loom binders. These springs are provided with an uncomplicated and positive means of compressing said springs to a length which permits their assembly without the disassembly of cooperating components or making any changes in the timing or critical settings of a loom. The compressed spring is simply held in the position at which it will operate and then the tension to which it was subjected is removed. As the tension is relieved from a spring the tendency for it to return to its free length causes said spring to become seated between the elements with which it functions. The springs are not

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completely relieved of their tension and the amount that remains firmly holds them in operating position.

U.S. Patent 2,351,189 discloses one form of a binder control mechanism in which a spring of the helicoidal type is utilized.

Summary of the invention

The coil springs which provide the biasing force in the present binder mechanism are interposed between a support bracket carried on the underside of the loom lay and the lower end of control arms which are pivotably supported intermediate their ends adjacent to the loom's shuttle boxes.

Each spring includes cap members fitted to each end thereof with one cap being threaded for reception of a bolt which is adapted to extend through the center of the spring.

The opposite cap member is provided with a centrally disposed aperture through which the bolt extends with the head portion of the latter bearing against the outer surface of this cap member.

Prior to assembly of a spring, the bolt is simply rotated in a direction to draw the threaded cap closer to the opposed cap member which in turn compresses said spring. The compressed spring is then held in operating position and the bolt rotated in a direction to release the tension applied thereto. As the tension of the compressed spring is relieved, it tends to expand toward its free length and becomes seated in opposed and integrally formed pockets provided in the control arm and support bracket. Under actual running conditions the bolt is completely removed from the spring and drawn outwardly through a centrally disposed aperture provided in the integrally formed pocket of the control lever. To remove the spring, the bolt is simply replaced and turned into the threaded cap member a sufficient distance to again compress said spring.

Brief description of the drawing

FIG. 1 is a view in side elevation and partially in section of a loom sword showing a section of the loom lay and shuttle box with the binder control mechanism according to the invention applied thereto;

FIG. 2 is a view similar to that of FIG. 1 but showing the manner in which pressure is applied to the loom binder;

FIG. 3 is a perspective view in exploded form showing a control arm along with a coil spring and the means for compressing said spring; and

FIG. 4 is a view in side elevation showing the position of the control arms relative to the binder and the support bracket carried on the underside of the lay.

Description of the preferred embodiment

Now referring to the figures of drawing enough of a binder control mechanism is shown in FIG. 1 to serve as a basis for a detailed description of the invention applied thereto.

In FIGS. 1 and 2 a portion of the left-hand sword 10 is shown as seen looking from a point intermediate the ends of the lay beam 11.

Since the various components at the right-hand side of the loom are basically the same in shape and intended function as those on the left, they have for purpose of brevity been omitted and a detailed description of the left-hand elements only is considered adequate for a complete understanding of the invention.

The lay beam 11 is supported for swinging movement in a known manner by the swords and includes a shuttle raceway 12 and a lay end 13 contiguous therewith that forms a part of the shuttle box disposed at each end of

said lay. The lay end 13 is attached to the upper surface of the lay beam 11 by means of a plurality of bolts, two of which are shown and identified in FIG. 4 by numeral 14. These bolts also serve as a means for attaching a support bracket generally indicated by numeral 15 to the underside of the lay which will be further described hereinafter as a cooperating component of the binder control mechanism according to the invention.

A binder 16 is positioned on the upper surface of the lay end to form one side of the shuttle box and may be of the floating or pivoting type. The means for exerting a biasing force to the binder 16 shown in the various figures of drawing is provided by dual sets of elements to be described and is of the floating type.

A binder control shaft 17 (FIG. 1, 2 and 4) is supported for oscillating movement on the rear side of the lay intermediate the binder 16 and the support bracket 15. The outer end of this shaft is journaled in a bearing 18 (FIG. 4) which is assembled within a support housing 19 the latter of which is fixed to the side of the lay by means of cap screws 20.

The opposite end of the binder control shaft 17 (not shown) is provided with the means for oscillating said shaft in timed relation with the swinging movement of the lay and includes the gear segment and linkage arrangement such as shown and described in U.S. Patent 3,012, 586.

As shown in FIG. 4, a pair of binder control levers generally indicated by numerals 21 and 22 are pivotably assembled in spaced relation on the binder control shaft 17. Both binder control levers perform a like function and being substantially alike with regards to configuration and their cooperating components, it is considered necessary here to give a detailed description of only one of these members and the elements cooperating therewith. Attention is therefore drawn to the lever identified generally by numeral 21.

In FIG. 3 this lever is shown removed from the loom and includes a centrally disposed hub portion 23, an upwardly extending arm 24 and an opposed downwardly extending arm 25. Arm 24 adjacent its upper end is provided with a tapped hole 26 which is adapted to receive the threaded portion of an adjusting bolt 27. This bolt is longitudinally adjustable in hole 26 and by means of a lock nut 28 the desired position of said bolt can be maintained.

The head of bolt 27 is shown at 29 and as illustrated in FIGS. 1 and 2 is pivotable with the binder control lever 21 from a position which provides clearance between it and the binder to a position where it is pressing against the binder.

The lower end of the downwardly extending arm 25 is provided with an integrally formed pocket 30 which is disposed in opposed relation to a rectangular pocket 31 provided in the support bracket 15.

As shown in FIGS. 1 and 2 a coil spring 32 is assembled between the support bracket 15 and the binder control lever 21. End cap members 33 and 34 are fitted on the ends of the coil spring 32 and provide a means for positioning said spring in operating position. End cap 33 includes a centrally disposed aperture 35 and is adapted to seat in the pocket 30 of the binder control lever which also includes a centrally disposed aperture 36 (FIG. 3) in alignment with said aperture 35.

The end cap 34 at the opposite end of the coil spring 32 is provided with a centrally located and integrally formed boss 37 (FIG. 3) having a threaded hole 38 in axial alignment with apertures 35 and 36 in end cap 33 and binder control lever 21, respectively. This boss 37 is adapted to seat in the rectangular pocket 31 which is provided in the support bracket 15 and in combination with pocket 30 in the binder control lever 21, a positive means of positioning the coil spring 32 is provided.

In operating position spring 32 is under a sufficient amount of tension to provide the required checking pres-

sure on the binder at the time the shuttle is being received into the shuttle box. Should binder pressure greater than that provided by spring 32 be required, a second coil spring 38' (FIG. 3) may be used in combination with said spring 32.

Coil spring 38' is smaller in diameter than spring 32 and is adapted to assembly within the latter and to be held centrally thereof by means of the end caps 33 and 34. To prevent movement of the binder control lever along the length of the shaft, a collar 39 is fixed on said shaft immediately adjacent to the hub portion 23 of said lever and on the opposite side thereof there is provided a lever control member generally indicated by numeral 40 (FIG. 4).

This lever control member includes a hub portion 41 which is fixed to the binder control shaft 17 by means of set screws 42. Integral with the hub portion 41 the lever control member further includes a downwardly extending finger 43, the lower portion of which is adapted to engage an integrally formed and laterally extending ear 44 provided on the lower side of the binder control lever's downwardly extending arm 25.

Prior to the shuttle being picked from the shuttle box, the binder control shaft 17 is rotated a short distance in the direction of the indicating arrow 44 shown in FIG. 1. This movement rotates the lever control member 40

causing its downwardly extending finger 43 to press against ear 44 and rotate the binder control lever 21 a sufficient distance to compress the coil spring 32 and move the adjusting bolt 27 out of contact with the binder 16.

Prior to the shuttle being received into the shutter box, the binder control shaft is rotated a short distance in the direction of the indicating arrow 45 shown in FIG. 2. The movement of the lever control member 40 with shaft 17 relieves the forces being exerted by finger 43 on the ear 44 and the tendency of the coil spring 32 to return to its free length rotates the binder control lever 21 to a position where bolt 27 is pressing against the binder 16 to provide the required checking pressure for receiving the shuttle into the shuttle box.

The coil spring 32 or the combination of said spring 32 and 38 are quickly and easily assembled or removed from operating position by means of a bolt 46 shown in FIG. 3.

Bolt 46 is of the hex socket type and prior to assembly of spring 32, said bolt is simply inserted through the aperture 35 of end cap 33. The shank portion of the bolt extends through the spring centrally of its coils and the threaded portion thereof is adapted to be received by the threaded hole 38 provided in the end cap 37.

By advancing the threads of the bolt in the threaded hole 38 spring 32 can be compressed to a length which will permit unrestricted positioning of said spring into operating position. While the spring is being manually held in this position, a wrench proper for the hex socket type of bolt is inserted through the aperture 36 of the binder control lever 21. While withdrawing the bolt, the tendency for it to return to its free length causes it to seat in operating position and after complete removal of said bolt sufficient tension is retained by the spring to provide the necessary biasing force for the binder to check the flight of the shuttle when received into the shuttle box.

To remove the spring, the procedure is reversed by insertion of the bolt through aperture 36, end cap 33 and the spring to permit assembly of said bolts threaded portion in the threaded hole 38 of the end cap 34.

The rectangular configuration of the pocket 31 provided in the support bracket 15 into which the boss 37 of the end cap 34 is adapted to seat, serves as a means for preventing rotation of said cap as the bolt 46 is being assembled and withdrawn therefrom.

While one embodiment and a modification of the invention have been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited

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to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. A binder control mechanism for looms having a lay beam rockable by supporting swords, and a shuttle box including a binder forming the end of said lay for receiving a shuttle and picking the same therefrom in timed relation with the rocking of said lay, said binder control mechanism comprising:

- (a) at least one control arm pivotably mounted adjacent said shuttle box,
- (b) a support bracket carried by said lay in vertical alignment with said binder,
- (c) a coil spring member interposed between said support bracket and one end of said control arm for applying pressure to said binder,
- (d) means for compressing said coil spring member and releasing the tension applied thereto for assembly and disassembly intermediate said control arm and support bracket.

2. The binder control mechanism according to claim 1 wherein the opposed surfaces of said control arm and support bracket include integrally formed pockets for positioning the ends of said coil spring.

3. The binder control mechanism according to claim 2 wherein said coil spring includes cap members positioned on each end thereof with one of said cap being threaded for reception of the means for compressing the spring.

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4. The binder control mechanism according to claim 3 wherein said means for compressing said coil spring includes a bolt member extending through the spring with the head thereof being retained by one of said cap members and the opposite end rotatable within said threaded cap.

5. The binder control mechanism according to claim 4 wherein said threaded cap includes an integrally formed boss receivable into the integrally formed pocket of conforming configuration in said support bracket to prevent rotation thereof, whereby rotation of said bolt in one direction will compress said spring and in the other release the tension applied thereto.

6. The binder control mechanism according to claim 3 wherein a further spring is positioned within said coil spring and supported centrally thereof by said cap members.

References Cited

UNITED STATES PATENTS

1,232,262	7/1917	Field	139—186
2,417,295	3/1947	Darwin	139—185
3,012,586	12/1961	Budzyna	139—187

FOREIGN PATENTS

515,386 11/1952 Belgium.

HENRY S. JAUDON, *Primary Examiner.*