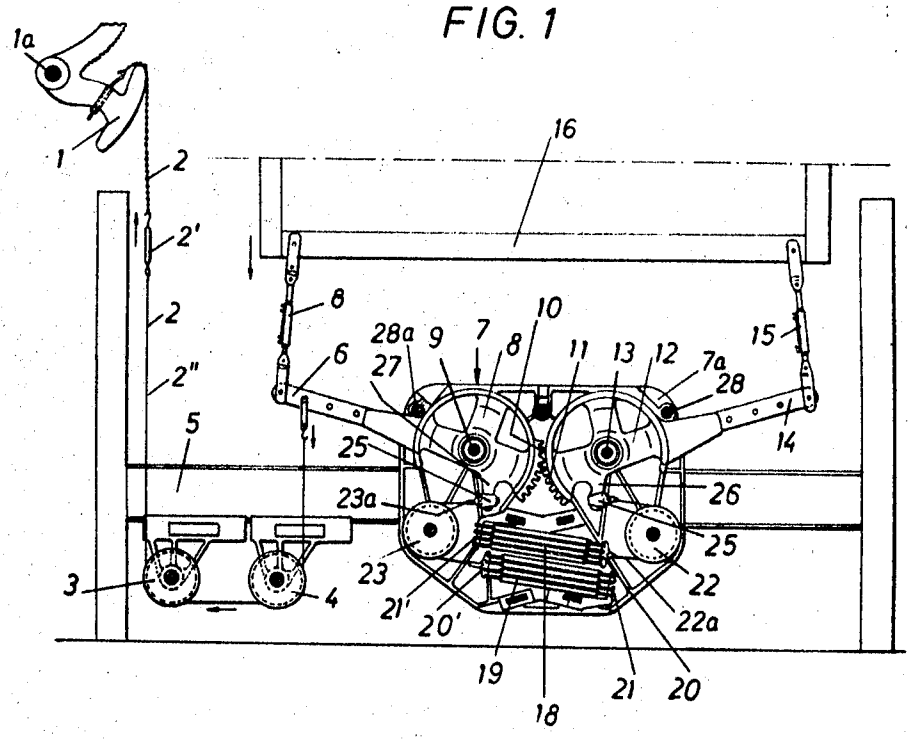
Aug. 5, 1969 D. S. S. XAUS 3,459,237

HEDDLES FOR TEXTILE LOOM

Filed April 13, 1966 4 Sheets-Sheet 1

FIG. 1



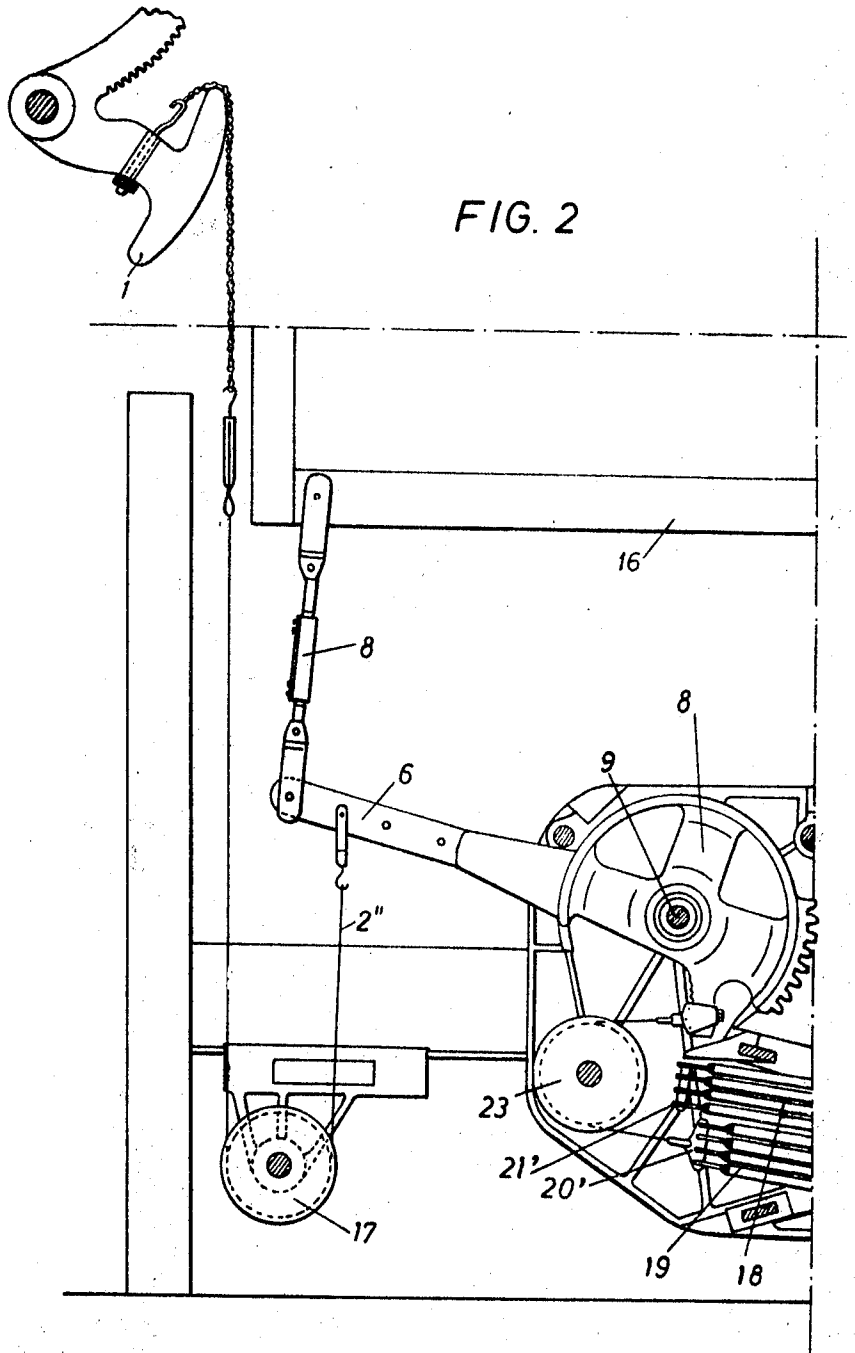
INVENTOR
D. SERGIO SERRA XAUS
By Linton and Linton
ATTORNEYS

Aug. 5, 1969 D. S. S. XAUS 3,459,237

HEDDLES FOR TEXTILE LOOM

Filed April 13, 1966 4 Sheets-Sheet 2

FIG. 2



INVENTOR
D. SERGIO SERRA XAUS
By Linton and Linton
ATTORNEYS

Aug. 5, 1969 D. S. S. XAUS 3,459,237

HEDDLES FOR TEXTILE LOOM

Filed April 13, 1966 4 Sheets-Sheet 3

FIG. 3

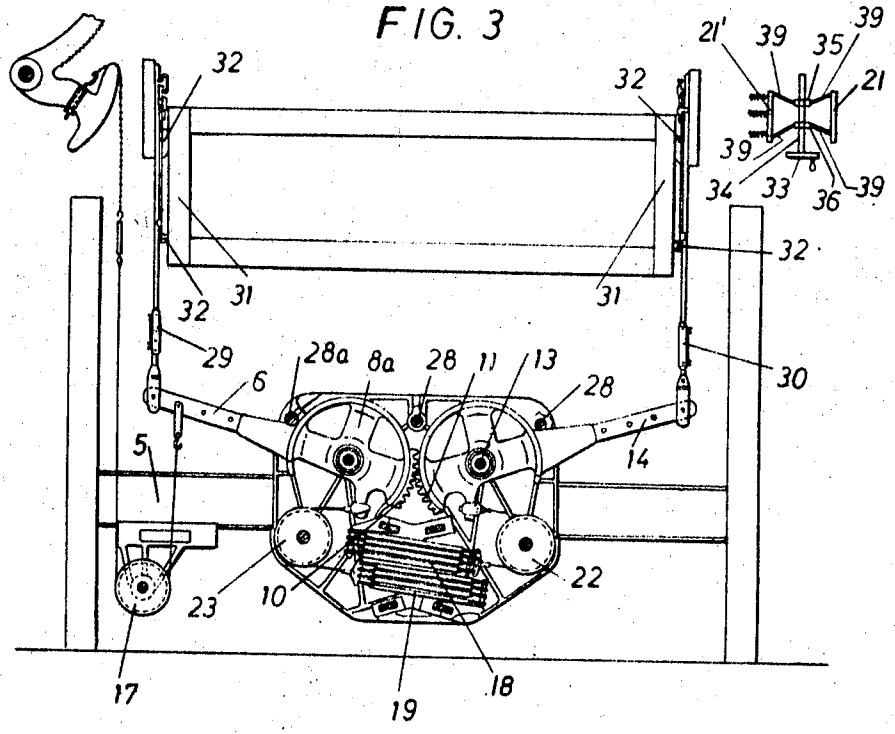


FIG. 4

INVENTOR

D. SERGIO SERRA XAUS

By Linton and Linton

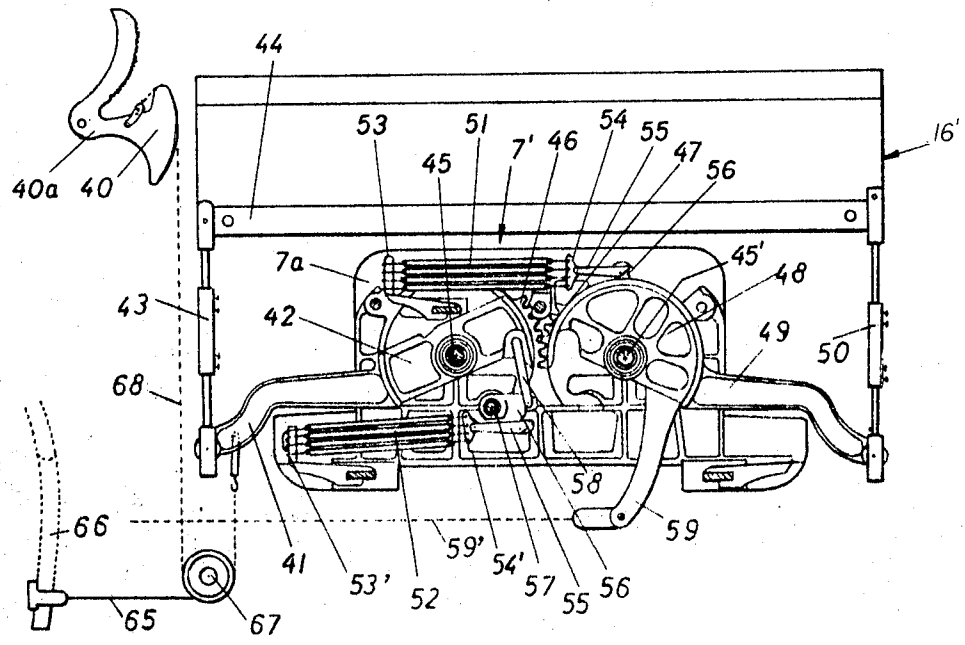
ATTORNEYS

Aug. 5, 1969 D. S. S. XAUS 3,459,237

HEDDLES FOR TEXTILE LOOM

Filed April 13, 1966 4 Sheets-Sheet 4

FIG. 5



INVENTOR
D. SERGIO SERRA XAUS
By Linton and Linton
ATTORNEYS

United States Patent Office 3,459,237
Patented Aug. 5, 1969

3,459,237

HEDDLES FOR TEXTILE LOOM

Sergio Serra Xaus, Legalidad 12, Barcelona, Spain

Filed Apr. 13, 1966, Ser. No. 542,329
Claims priority, application Spain, Aug. 30, 1965, 316,952
Int. Cl. D03c 9/06
U.S. Cl. 139—89 7 Claims

ABSTRACT OF THE DISCLOSURE

A shedding mechanism for a loom including a heald frame and a control member for lowering the heald frame. The shedding mechanism includes a return mechanism for raising the heald frame and cable means for connecting the control member to the return mechanism. The return mechanism is positioned below the heald frame and is connected to the heald frame so that, after the control member is operated to actuate the heald frame in a downward stroke, the return mechanism functions to raise the heald frame after same has completed its downward stroke.

The present invention relates to looms and, in particular, to a shedding mechanism for a loom.

The invention specifically includes a shedding mechanism in a loom which includes a heald frame and a control member for lowering the heald frame. The shedding mechanism includes a return mechanism for raising the heald frame and cable means for connecting the control member to the return mechanism. The return mechanism is positioned below and is connected to the heald frame so that, after the control member is operated to move the heald frame downwardly, the return mechanism functions to raise the heald frame upwardly after same has completed its downward stroke.

Embodiments of the apparatus according to the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

FIGURE 1 is an end view of one embodiment of the present invention, same being shown partly in section.

FIGURE 2 is a partial end view, partially in section, of another embodiment of the invention.

FIGURE 3 is an end view of still a further embodiment of the invention, same being shown partly in section.

FIGURE 4 is a schematic view of a device for adjusting the tension of a spring set utilized in the present invention.

FIGURE 5 is an end view of still a further embodiment of the present invention, same being shown partly in section.

As shown in FIGURE 1, a control member or dobby **1** rotatably mounted on a pivot **1***a* is connected to an arm **6** of a return means mechanism **7** through a chain **2**, tension means **2'** and a cable **2''**, the cable **2''** being arranged to pass around pulleys **3** and **4** mounted on a beam **5**, which beam comprises a portion of the frame of the loom. A link **8** is pivotally connected to the bottom of a heald frame **16** and to the outer end of the arm **6**.

The return mechanism **7** includes a pair of oscillatory members **8***a*, **12** rotatably mounted on pivots **9**, **13**, respectively, and each having a toothed sector **10**, **11**, respectively, the teeth of the two sectors being in engagement with each other. The pivots **9**, **13** are rotatably mounted on the housing **7***a* of the return mechanism **7**. The arm **6** is secured to and extends radially from the oscillatory member **8***a* and a similar arm **14** is secured to and extends radially from the oscillatory member **12**.

Pivotally mounted on the free end of the arm **14** is a link **15** similar to the link **8** and similarly connected to the bottom of the heald frame **16**, although spaced along the bottom of the frame **16** from the link **8**.

Associated with each oscillatory member **8***a*, **12** is a set of parallel helical springs **18**, **19**, respectively, and each of the springs in each set **18**, **19** are connected at one end to a common plate **20**, **20'**, respectively, and at the other end to a common tensioning arm **21**, **21'**. One end of a cable **22***a* is connected to the plate **20** of the set of springs **18** and the other end of the cable **22***a* is secured in a clamp **24** mounted on an extension **26** of the oscillatory member **12**, the cable **22***a* passing around a pulley **22**. Similarly, a cable **23***a* passing around a pulley **23** is secured at one end to the plate **20'** of the set of springs **19** and at the other end to a clamp **25** mounted on an extension **27** of the oscillatory member **8***a*. Stops **28** and **28***a* are provided to limit rotation in a counterclockwise direction of the oscillatory member **12** and rotation in a clockwise direction of the oscillatory member **8***a* due to the biasing action of the spring sets **18** and **19** respectively.

In FIGURE 2, the apparatus, which is otherwise the same as that of the embodiment of FIGURE 1, has a single pulley **17** instead of two pulleys **3** and **4** as in the previous embodiment.

The arrangement shown in FIGURE 3 is similar to that shown in FIGURE 2 except that the links **8** and **15** have been replaced by links **29** and **30** which are each secured at one end to a side **31** of the heald frame **16** by connection means **32**.

Tension of the springs in the sets **18**, **19** is adjusted by the apparatus shown in FIGURE 4. Each tensioning arm **21**, **21'** has a pair of links **39** pivotally connected to it, one at each end of the lever **21**. The other end of each link is pivotally connected to a nut, there being two nuts **35**, **36** each having a link **39** of the two tensioning levers connected to it. A screw threaded spindle **34** having a handwheel **33** receives the nuts **35**, **36** and is arranged such that, on rotation of the handwheel **33** and the spindle **34**, the nuts **35**, **36** move toward or away from each other to thus displace the levers **21** relatively to one another and thereby vary the tension in the springs of the sets **18**, **19**. The movement may be effected by dividing the spindle **34** into two sections of opposite threads with a unt **35**, **36** received on each section. The spindle **34** may be rotatably supported (not shown) on the frame **5** of the loom.

In operation, the control member **1** of the apparatus shown in FIGURES 1–3 is rotated in a counterclockwise direction about the pivot **1***a* to lift the chain and cable arrangement (**2**, **2''**, **2''** etc.), thereby rocking the arm **6** of the return means **7** in a counterclockwise direction about the pivot **9**. Since the oscillating member **8***a* is geared to the oscillating member **12** through the toothed sectors **10** and **11**, the member **12** rocks in a clockwise direction. Movement of the arms **6** and **14** due to counterclockwise rotation (FIGURES 1–3) of the control member **1** results in a downward displacement of the heald frame **16** through the connection of the links **8**, **15** and the springs of the sets **18**, **19** are tensioned. When the heald frame has reached its lowermost position, the control member **1** has completed its pivotal movement and the springs of the sets **18**, **19** retract so as to rotate the oscillating members **8***a* and **12** and thus the arms **6** and **14** in a clockwise and counterclockwise direction respectively, thereby lifting the links **8** and **15** and raising the heald frame **16**. Upward movement of the frame **16** is arrested when the arms **6**, **14** abut the stop members **28***a*, **28**, respectively. The cycle is then repeated.

In the arrangement shown in FIGURE 5, a control

member or dobby **40** is connected by a cable **68** to an arm **41** of return mechanism **7'**. The arm **41** is connected to an oscillatory member **42** having a toothed sector **46** the teeth of which are in engagement with the teeth of a similar toothed sector **47** of a second oscillatory member **48** also having an arm **49**. The arms **41** and **49** are connected to the bottom **44** of a heald frame **16'** by means of links **43** and **50** respectively. Thus, when the control member **40** rotates in a counterclockwise direction about a pivot **40***a* (FIGURE 5), the arm **41** also moves in a counterclockwise direction due to the pull of the cable **68**, and the oscillatory members **42**, **48** counter rotate on their supporting shafts **45**, **45'** so that the arm **49** rotates in a clockwise direction with a result that the links **43**, **50** move downwardly (FIGURE 5), thus lowering the heald frame **16'**.

The heald frame **16'** is raised due to the action of two sets of parallel helical springs **51**, **52** which are tensioned when the oscillating members **42**, **48** are rotated during the downward movement of the heald frame. Each of the springs of each set **51**, **52** is connected at one end to a tensioning arm **53**, **53'**, respectively, common to each set and mounted on the frame of the loom and at the other end to a plate **54**, **54'**, respectively, common to each set. The plates **54**, **54'** are each pivotally connected to one end of a lever **55**, the other end of which is pivotally connected to a portion of a cam **56** pivotally mounted on a shaft **57**. A lever **58** connects the cam **56** to the oscillatory member **42**. A similar arrangement (not shown) is provided for the oscillatory member **48**.

The tensioning arm of each set of springs may be adjusted to vary the tension of the springs of the set. Depending on the kind of cloth to be woven, two, three or four springs may be used for each set of springs. As shown in FIGURE 5, the oscillating member **48** has a second lever **59** which may be operated by means of a cable **59'** so that the arrangement may be connected with a dobby or control member rather than through arm **41**. The arrangement shown in FIGURE 5 also has a single return pulley **67** and a single cable **68**. The pulley **67** is connected to a lever **66** by means of a cable **65**.

The apparatus of the present invention thus provides for a tension return mechanism for controlling the movement of a heald frame without requiring any superstructure. It will be recognized that the apparatus of the present invention can be modified in form, or the assembly and dimensions.

I claim:

1. An apparatus for a loom, comprising:

a housing and a heald frame mounted for reciprocating movement relative to said housing;

first and second oscillatable members rotatably mounted on said housing, each of said oscillatable members having toothed peripheries in mutual meshing engagement with each other for causing simultaneous rotation of said oscillatable members;

first and second arms fixed to and extending outwardly from said first and second oscillatable members, respectively;

first and second pulleys rotatably mounted on said housing substantially adjacent said first and second oscillatable members, respectively;

first spring means interconnected between said first oscillatable member and said housing for urging said first oscillatable member in a first rotational direction;

second spring means interconnected between said second oscillatable member and said housing for urging said second oscillatable member in one rotational direction;

first cable means passing over said first pulley and having the opposite ends thereof interconnected to said first oscillatable member and said first spring means;

second cable means passing over said second pulley and having the opposite ends thereof interconnected to said second oscillatable member and said second spring means;

first and second connecting means respectively connecting the ends of said first and second arms to said heald frame substantially adjacent the opposite ends thereof; and

means for causing movement of said heald frame and rotational movement of said oscillatable members in a rotational direction in opposition to said first and second spring means.

2. An apparatus according to claim **1**, wherein said first and second spring means each include a plurality of springs connected in parallel relationship with each other, and further including means for adjusting the tension of each of said first and second spring means.

3. An apparatus according to claim **1**, wherein said means for causing movement of said heald frame in opposition to the urging of said first and second spring means includes a control lever pivotally mounted on said housing and third cable means connected between said control lever and an end portion of one of said arms, and a third pulley rotatably mounted on said housing with said third cable means passing over said third pulley.

4. An apparatus for controlling the position of a heald frame of a loom, comprising:

frame means;

a heald frame mounted on said frame means for reciprocating vertical movement;

first and second arm means pivotally mounted on said frame means, each of said arm means having a toothed peripheral portion in mutual meshing engagement with one another;

first connecting means extending from an end portion of said first arm means to a first point on said heald frame;

second connecting means extending from an end portion of said second arm means to a second point on said heald frame, said second point being spaced from said first point;

first spring means interconnected to said first arm means for urging same in a first rotational direction whereby the end portion of said arm means is moved upwardly to cause an upward movement of said heald frame, said first spring means including a plurality of parallel springs and means interconnecting one end of said plurality of springs to said first arm means;

second spring means interconnected to said second arm means for urging same in a second rotational direction whereby the end portion of said second arm means is moved upwardly to cause an upward movement of said heald frame, said second spring means including a plurality of parallel springs and means interconnecting one end of said plurality of springs to said second arm means; and

means for causing downward movement of said heald frame in opposition to the urging of said first and second spring means, said means including a movable control member and cable means connected between said control member and said first arm means for causing rotational movement of said first arm means in a rotational direction opposite said first direction for causing downward movement of said heald frame.

5. An apparatus according to claim **4**, wherein said means for causing downward movement of said heald frame includes a pulley rotatably mounted on said frame means, an intermediate portion of said cable means passing over said pulley.

6. An apparatus according to claim **4**, wherein said means interconnecting the one end of said first spring means to said first arm means includes a pulley and cable means passing over said pulley, and wherein said means interconnecting the one end of said second spring means to said second arm means also includes a pulley and a cable passing over said pulley.

7. An apparatus according to claim 4, further including adjusting means interconnected to the other ends of the plurality of springs of said first and second spring means for permitting adjustment of the tension of said first and second spring means.

References Cited

UNITED STATES PATENTS

2,674,272	4/1954	Werner et al.	139—57
654,077	7/1900	Stafford	139—89

FOREIGN PATENTS

838,136	11/1938	France.
998,333	10/1949	France.
505,161	5/1939	Great Britain.
451,054	3/1949	Italy.
246,963	11/1947	Switzerland.
1,207,242	8/1959	France.
1,405,446	5/1964	France.
857,629		Germany.

HENRY S. JAUDON, Primary Examiner