July 9, 1957 E. PFARRWALLER 2,798,513

MECHANICALLY DRIVEN LOOM OF GREAT WIDTH

Filed May 21, 1953 2 Sheets-Sheet 1

Fig. 1

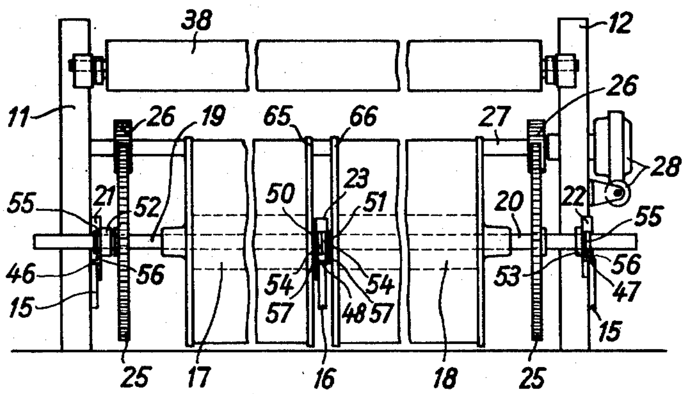


Fig. 2

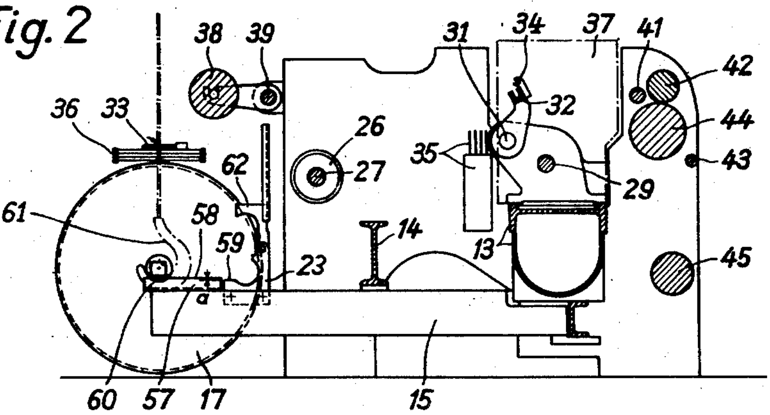
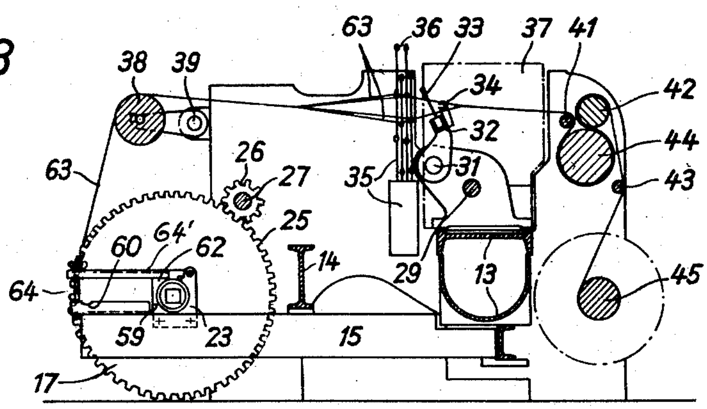


Fig. 3



INVENTOR.
ERWIN PFARRWALLER.
BY
K. A. Mayr
ATTORNEY.

MECHANICALLY DRIVEN LOOM OF GREAT WIDTH

Filed May 21, 1953 2 Sheets-Sheet 2

Fig. 4

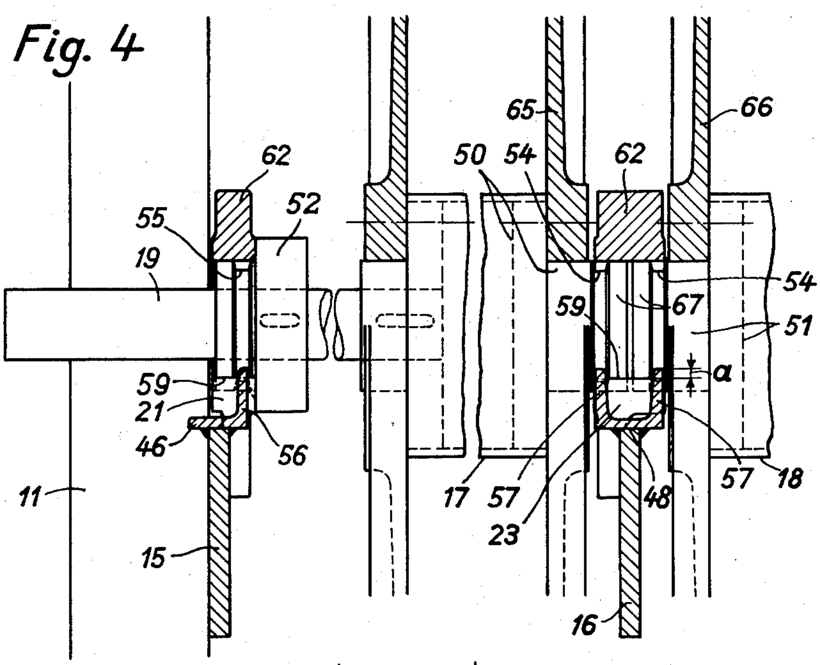
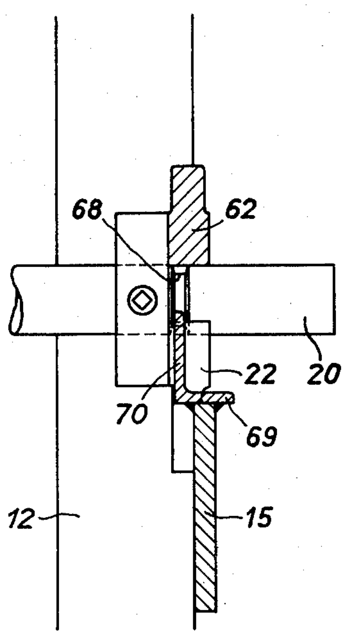


Fig. 5



INVENTOR.
ERWIN PFARRWALLER.
BY K. A. Mayr.
ATTORNEY.

United States Patent Office

2,798,513

Patented July 9, 1957

2,798,513

MECHANICALLY DRIVEN LOOM OF GREAT WIDTH

Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Gebruder Sulzer, Aktiengesellschaft, Winterthur, Switzerland, a corporation of Switzerland

Application May 21, 1953, Serial No. 356,495

Claims priority, application Switzerland May 31, 1952

8 Claims. (Cl. 139—101)

The present invention relates to a mechanically driven loom having great width and at least two coaxially arranged warp beams.

The object of the invention resides in the provision of guide means, for example grooves, at least in the neighboring shafts or bearing pins extending from two adjacent warp beams, and of guide means engaging the first mentioned guide means for guiding the warp beams at least against axial movement of the beams when the latter are moved towards and from support bearings for the warp beams.

The guide means for the shafts or pins of the warp beams are preferably made to also serve as a support for the warp beams. The aforesaid guide means are arranged horizontally and include vertical portions extending into the grooves in the shafts or pins, the upper edges of the vertical portions extending by the depth of the grooves beyond a horizontal support surface extending from the lower part of the warp beam support bearing toward the guide means.

The novel features which I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, and additional objects and advantages thereof will best be understood from the following description of an embodiment thereof when read in connection with the accompanying drawing in which:

Fig. 1 diagrammatically shows an elevation of the warp beam side of the loom;

Fig. 2 is a diagrammatic cross section of the loom shown in Fig. 1 with a warp beam in position prior to being moved into the warp beam support bearings;

Fig. 3 is a diagrammatic cross section of the loom with the warp beam in normal operating position;

Fig. 4 illustrates, partly in section and on a larger scale, a detail of the invention;

Fig. 5 is a part sectional large scale illustration of a modified detail of the invention.

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

Fig. 1 of the drawing illustrates only those elements which are needed for explaining the invention. Two warp beams **17** and **18** are supported by lateral shields **11** and **12** which, in combination with longitudinal and transverse structural elements **13** to **16**, form the frame of the loom. The shafts of the warp beams are supported by end bearings **21** and **22** and by a central bearing **23** which bearings are mounted on transverse beams **15** and **16**. Each shaft **19** and **20** of the warp beams **17** and **18**, respectively, carries a tooth gear wheel **25** which is driven in the conventional manner by the main loom shaft **29** through a pinion **26** on a shaft **27** of a warp let-off mechanism **28**. The main shaft **29** also drives the actuating mechanism **31** for the lay **32** comprising a reed **33** and a shuttle guide **34** (Fig. 3), and drives the mechanism **35** for actuating the heddles **36**; the shaft **29** which is disconnectably connected with the loom motor also drives a shuttle picking mechanism in box **37** and other mechanisms which are not related to the present invention and are not illustrated. A tensioning beam **38** which is swingable about a shaft **39** and forced against the warp by means of a spring or a weight, not shown, serves for tensioning the warp threads. The fabric passes around guide rollers **41** to **44** and is wound on a cloth beam **45**.

Modern weaving machines of the gripper shuttle type can produce a cloth which is 11′ 6″ wide. The warp beams, even if several are provided, are therefore very long. In order to reduce cost, the diameter of a fully wound warp beam of a modern loom is much greater, say 28 and more inches, than it used to be. The weight of a warp beam with the warp wound on it is at least 660 pounds and a crane or other lifting device is needed for moving the warp beam onto the loom. If the operating position of the warp beams is underneath the warp tensioning mechanism, the tension beam obstructs direct setting of the warp beams into their bearings from above by means of a crane.

The mechanism according to the invention for mounting the warp beams **17**, **18** on the loom comprises guide elements in the form of rails **46**, **47**, and **48** which are made of rods having and L- or U-shaped cross sectional configuration and are mounted on the transverse carriers **15**, **16**. The pins **50**, **51** facing one another as well as the bearing bushings **52**, **53** of the shafts **19** and **20** are provided with annular grooves **54**, **55** receiving the vertical portions **57** and **56** of the guide rails **48** and **46**, respectively. The left end portions of the vertical rail portions **56** and **57**, as seen in Figs. 2 and 3 have recesses **60** curved to conform with the bottoms of the grooves **54**, **55**. The guide elements **46** to **48** are placed horizontally at such elevation relatively to the support bearings **21** to **23** that the upper edges **58** of the vertical rail portions **56**, **57** project by the measure *a*, which is substantially equal to the depths of the grooves **54**, **55**, above a horizontal support surface portion **59** extending from the lower parts of the bearings **21** to **23** towards the rails **46** to **48**.

Fig. 2 illustrates the parts of the device according to the invention in the position which they occupy when a new loaded warp beam is mounted on the loom. The warp beam **17** is first placed on the recessed portions **60** of the rails **46**, **48** whereupon the crane hooks **61** are removed from the beam shaft. The support bearings **21**, **23** are open, the upper bearing part **62** which is hinged to the lower bearing part having been swung upwards. Thereupon the warp **63**, whose threads have already been pulled through the eyes of the heddles **36** and through the reed **33**, is unwound by revolving the beam **17** in the recesses **60** and laid over the tension beam **38**. Thereupon the heddles **36** are mounted on the shedding mechanism **35**, the reed **33** is mounted on the lay **32**, and the warp threads are connected with those of the cloth which has been laid around the rollers **41** to **44** and connected with the cloth beam **45**. When both warp beams **17** and **18** have been prepared in the aforedescribed manner, they are pushed out of the recesses **60** and toward the loom, the warp **63** remaining tensioned, until the pins **50**, **51** and the bushings **52**, **53** rest in the lower parts of the support bearings **21** to **23**. The upper parts **62** of the support bearings can now be swung down and held in closed position by means of bolts **64** connecting an arm **64′** extending from part **62** with one of the rails **47** and **48**.

The end discs **65**, **66** of the warp beams **17**, **18**, respectively, should be arranged as close as possible so that the warp threads run nearly parallel into the heddle frames **36** and into the reed **33**. If, for example, three cloth lengths are woven from two warp beams, the warp thread of the central cloth length coming from the extreme right side of beam 17 must be adjacent to the extreme left warp thread coming from the beam 18 to avoid formation of a gap in the fabric. The two aforedescribed warp threads form an isosceles triangle between the reed 33 or the heddles 36 and the tension beam 38, the base of the triangle being determined by the distance between the inner surfaces of the end discs 65, 66.

The greater the base of the triangle, the greater is the angle formed by the warp threads. This angle determines the friction between the warp threads and the heddles and the reed. The friction is greater if the angle is greater and there is a possibility of warp thread breaks. This is the reason why the neighboring end discs 65, 66 of the warp beams must be as close together as possible. The pins 50, 51 are supported in the same central bearing 23 (Fig. 4). Because of the aforementioned condition, there is only space for the bearing 23 between the end discs 65, 66 which are fast on pins 50, 51. Since the bearing 23 must be short, the pins 50, 51 are short. Their length is determined by the width of the grooves 54 and of the bearing surface 67 (Fig. 4). At a given diameter of the pins, the minimum size of the surface 67 depends on the weight of the warp beam, considering lubrication and rotation conditions.

Due to the shortness of the pins 50, 51, they could easily slide from a support without lateral guidance when the warp beams are moved from the position shown in Fig. 2 into the position shown in Fig. 3, if there is a slight lateral movement or if displacement of one end of the beam exceeds that of the other end. This is prevented by forming at least the central supports as a guide rail 48 having upright portions 57 which are received in the annular grooves 54 of the pins 50, 51. This effects exact lateral guidance of the warp beams 17, 18 which prevents any undesired axial movement of the beams.

In the embodiment illustrated in Fig. 5, the annular groove is cut into the shaft 20′ of the warp beam. This, however, cannot be done if the shaft has an angular cross section. The upright portion 70 of the guide rail 69 extends into the groove 68, effecting lateral guidance.

If flat rods are used as supports for the running surfaces 67, the guide rails may be arranged above the pins or shafts and may be provided with downwardly extending portions received in the annular grooves. Such guide rails may be hinged to the loom frame so that they can be upwardly folded like the upper support bearing parts 62.

The advantage obtained by the invention is the reliable prevention of a sliding off of the warp beams from their supports which would not only cause tearing of the warp 63 but also damage to the beams themselves. A further advantage is that, due to the provision of the annular grooves and of guide rails having portions extending into the grooves, the length of neighboring bearings of axially adjacent warp beams and therefor the distance between neighboring warp threads at the extreme ends of the two warp beams is reduced to a minimum.

If the groove is arranged between the end disc and the bearing surface of the pin or of the shaft, the length of the bearing or of one bearing pin must be increased only by the width of the groove. The bottom of the groove coincides with the smallest diameter of the bearing pin or of the shaft end. This diameter is determined by the strength requirements and the diameter of the bearing surface is greater than the smallest diameter only by the duplicate depth of the groove. The width of the running surface may be made somewhat smaller and the pin somewhat shorter than it would be if the groove were arranged at the extreme end of the bearing pin or of the shaft.

While I have shown and described specific embodiments of my invention, it will be apparent to those skilled

in the art that various changes, modifications, substitutions, additions and omissions may be made therein without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim:

1. A mechanically driven loom for weaving comprising at least two coaxially disposed warp beams, axle means axially projecting from said warp beams, bearing means for said axle means, at least one of said axle means of each warp beam being provided with an annular groove, longitudinal horizontal support means extending at a right angle from the longitudinal axis of said bearing means for supporting said axle means and said warp beams when the latter are moved towards and from said bearing means, said support means having vertical portions disposed longitudinally of and being integral with said support means and being received in said annular grooves, said bearing means having a lower portion comprising a horizontal support surface extending towards said support means, the top edge of said vertical portions being disposed substantially so much higher than said support surface as said grooves are deep.

2. A mechanically driven loom for weaving comprising at least two coaxially disposed warp beams, axle means axially projecting from said warp beams, bearing means for said axle means, an annular groove in at least one of said axle means of each warp beam, longitudinal horizontal support means extending at a right angle from the longitudinal axis of said bearing means for supporting said axle means and said warp beams when the latter are moved towards and from said bearing means, said support means having vertical portions disposed longitudinally of and being integral with said support means and being received in said annular grooves, said vertical portions having a top surface portion, the latter being provided with a recess in and proximal to the end of said support means which is distant from said bearing means, for temporarily receiving said axle means and impeding movement of said warp beams on said support means.

3. A mechanically driven loom for weaving comprising at least two coaxially disposed warp beams, axle means axially projecting from said warp beams, bearing means for said axle means, at least one of said axle means of each warp beam being provided with a bushing supported by said bearing means and being provided with an annular groove, longitudinal horizontal support means extending from said bearing means and at a right angle from the longitudinal axis of said bearing means for supporting said axle means and said warp beams when the latter are moved towards and from said bearing means, said support means having vertical portions integral with and being disposed longitudinally of said support means and being received in said annular grooves.

4. A mechanically driven loom for weaving comprising at least two coaxially disposed warp beams, discs at the ends of said warp beams, axle means extending outwardly from said discs, bearing means for said axle means, said axle means having portions resting on said bearing means and at least one of said axle means of each warp beam having an annular groove disposed between said discs and said portions, longitudinal horizontal support means disposed in transverse relation to said bearing means for supporting said axle means and said warp beams when the latter are moved towards and from said bearing means, at least one of said support means of each warp beam having a vertical portion disposed longitudinally of the support means and being received in the annular groove of one of said axle means.

5. A mechanically driven loom comprising at least two coaxially disposed warp beams, axle means axially projecting from said warp beams, bearing means for said axle means, each of the neighboring axle means of different warp beams being provided with an annular groove, a horizontal support rail having a U-shaped cross sectional configuration and being disposed in transverse relation to

the longitudinal axis of said bearing means for supporting said neighboring axle means and said warp beams when the latter are moved towards and from said bearing means, the vertical parts of the said rail being individually received in the grooves of said neighboring axle means.

6. A mechanically driven loom comprising at least two coaxially disposed warp beams, axle means axially projecting from said warp beams, bearing means for said axle means, at least one of said axle means of each warp beam being provided with an annular groove, horizontal support rails having an L-shaped cross sectional configuration and being disposed in transverse relation to the longitudinal axis of and extending from said bearing means for supporting said warp beams when the latter are moved towards and from said bearing means, the vertical parts of said rails being individually received in the grooves of said axle means.

7. A mechanically driven loom for weaving comprising at least two coaxial individual warp beams, a shaft axially projecting from each of said warp beams, a bearing for each of said shafts, each of said shafts having a surface portion adapted to rest on said bearing, a guide and support element extending from said bearing transversely to the longitudinal axis of said shafts for supporting the respective shaft when the respective warp beam is moved towards and from the respective bearing, a guide groove in said surface portion, said guide and support element extending into said groove for preventing axial movement and slanting of the respective warp beam when the latter is moved towards and from said bearing.

8. A mechanically driven loom for weaving comprising at least two coaxial individual warp beams, two of said warp beams having ends facing each other, a pin axially projecting from each of said ends, a bearing for said pins, a guide and support element extending from said bearing transversely to the longitudinal axis of said pins for individually supporting said pins when the respective warp beams are moved towards and from said bearing, a guide integral with each of said pins and engaging said guide and support element for preventing axial movement and slanting of the respective warp beam when the latter is moved towards and from said bearing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,242,506	Wood	Oct. 9, 1917
1,603,394	McPhee	Oct. 19, 1926
1,648,998	Sherman	Nov. 15, 1927
1,817,894	Davis	Aug. 4, 1931
2,299,301	Britt et al.	Oct. 20, 1942