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(54) **Loom provided with a cooling system**

(57) A Jacquard loom is provided with thread (14) guide means (12, 13) and with a cooling system (15) of the guide means (12, 13) and of the threads (14) near the guide means (12, 13). Said cooling system (15) comprises:

- at least one distribution pipe (21) of the cooling air

arranged along the guide means (12, 13) and near the threads (14), said at least one distribution pipe being provided with holes (22) on the side wall to deliver air to the threads (14) and the guide means (12, 13); and

- a fan for blowing (17) cooling air inside said distribution pipe (21).

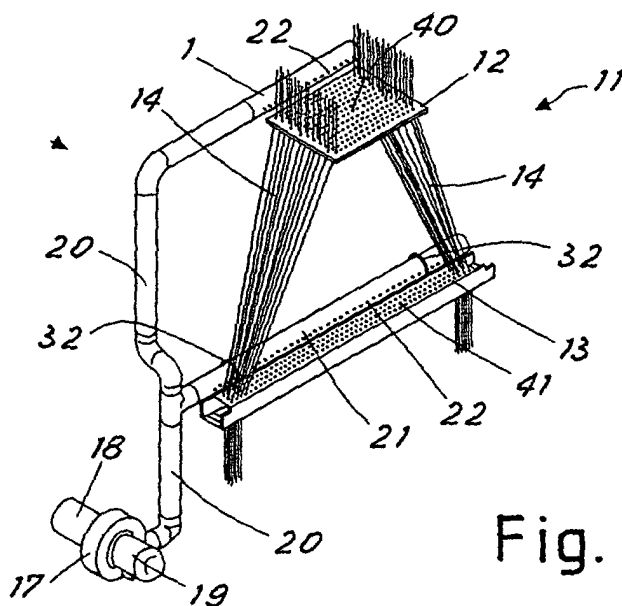


Fig. 1

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Description

[0001] The present invention relates to a loom, for example a Jacquard loom, provided with a cooling system of the threads and of the corresponding guide means.

[0002] Owing to the increasingly urgent need to improve the productivity of looms, it has recently become necessary to increasing the weaving speed of machines and therefore the speed of the harnesses or assembly threads inside the boards and the bottom of the Jacquard loom. This gives rise to numerous problems in Jacquard looms. In fact, the highspeed rubbing between threads and guide elements causes considerable and undesirable overheating that is due to friction. This phenomenon is typically negative in Jacquard looms, because it accelerates the process of wear of the guide boards and damages the harnesses as they move.

[0003] Cooling systems were proposed in the past to solve the above problems.

[0004] One of the prior-art solutions proposes simply using a cooling fan with an air flow directed to the guides zones of the harnesses in the loom. However, this system enables only a small quantity of heat to be removed in relation to energy consumption and the amount of flow of cooling air generated. In fact, this cooling flow is directed to the overheated zones in an approximate and non-selective manner, with significant waste of cooling air and considerable inefficiency in the overall cooling system.

[0005] A second prior-art solution suggests using a system of compressed air. Nevertheless, the latter are typically just as expensive as the fan systems. Furthermore, the use of compressors may lead to lubricant circulating in the cooling system, with a consequent risk of having undesirable traces of grease inside the assembly (or top). Again, the pressure rises that come into play in these systems could lead to local condensate on the guide boards, thus altering normal and good operation of the loom.

[0006] The general object of the present invention is to overcome the aforementioned drawbacks by providing a loom with an assembly provided with a cooling system that is able to remove a sufficiently high quantity of heat, whilst involving relatively low installation costs and limited energy consumption.

[0007] A further object of the present invention is to provide a loom with assembly provided with a cooling system that is easily adjustable and adaptable to the specific cooling requirements of different weaving conditions.

[0008] Another object of the present invention is to provide a cooling system that enables the guide boards of the threads, the threads themselves and also the bottoms of the loom or glass screens to be kept suitably clean.

[0009] In view of this object a Jacquard loom has been devised according to the invention provided with thread guide means and with a cooling system of the guide

means and of the threads near the guides means, said cooling system comprising:

- at least one distribution pipe of the cooling air arranged along the guide means and near the threads, said at least one distribution pipe being provided with holes on the side wall to deliver air to the threads to the guide means;
- a fan for blowing cooling air inside said distribution pipe.

[0010] To make clearer the explanation of the innovative principles of the present invention and its advantages in relation to the prior art a possible embodiment applying such principles will be illustrated below with the help of attached drawings by way of example. In the drawings:

- figure 1 shows a general view of an embodiment of the cooling system acting on two thread-guide boards in a loom; and
- figure 2 shows a detail of the cooling system in figure 1.

[0011] With reference to the figures, figure 1 shows an assembly 11 of a Jacquard loom, that is in itself known and is not therefore shown or disclosed in detail. The assembly 11 comprises a threading board 13 and a loom bottom board 12 for guiding the harnesses or threads 14 in the assembly, according to what is well known in the weaving field. The boards 12, 13 are provided with a plurality of guide holes 40, 41 suitable for guiding the threads 14 of the loom according to the prior art. The figure also shows a cooling system 15 set up in the frame to maintain the guide boards 12, 13 and the threads 14 near the guides at a sufficiently low temperature. The cooling system 15 comprises a blowing fan 17 (for example of the tangential type) actuated by an electric motor 19. The fan 17 is advantageously provided with an inlet filter 18 to purify the cooling air intended to be blown onto the threads 14 and onto the guide boards 12, 13. At the outlet of the air from the blowing fan 17 there is connected a supply conduit 20. Advantageously, this conduit 20 is an at least partially flexible pipe, in order to enable regulation of and adjustments to the configuration of the cooling system as a whole. To the supply conduit 20, two distribution pipes 21 are in fact connected by means of prior-art joint elements; these two distribution pipes 21 are suitable for respectively blowing cooling air onto the threading board 13 and onto the loom bottom board 12. The pipes 21 are rectilinear cylinders and are advantageously placed along the longest side of the guide boards 12, 13 (see figure 1). They are fixed to the support structure of the guide boards 12, 13 by fixing means 31, 32. In figure 2 there is shown the distribution pipe 21 fixed to the support structure 30 of the threading board 13 by means of a shelf 31 and of a pair of U bolts 32 (in figure 2 only

one is shown). It should be noted that the fixture of the distribution pipe 21 to the shelf 31 is achieved in such a way as to enable axial rotation of the pipe for regulation of the flow direction of the cooling air. Said regulation is achieved by loosening the U-bolts 32 on the distribution pipe to enable rotation of the pipe around its axis.

[0012] The ends of the distribution pipes 21 that are further from the supply conduit 20 are shut. Furthermore, on their side wall, the pipes 21 are provided with a sequence of delivery holes 22, through which the cooling air is blown. The delivery holes 22 are aligned parallel to the pipe axis 21 and point in the direction of the threads 14 so as to generate an air flow that is virtually parallel and touches a face of the guide boards 12, 13. The flow of cooling air that is thereby generated affects the portions of threads 14 that are nearest the boards and boards themselves 12, 13 (see figure 2). In one embodiment of the present invention the delivery holes 22 are equidistant from one another and they all have the same diameter.

[0013] Advantageously, the distribution pipes 21 are formed of modular segments that can be assembled in series. In this way it is possible to obtain cooling flows of different amounts and such as to adapt as well as possible to the dimensions of the guide boards, thereby preventing waste of cooling air or ineffective cooling of the peripheral zones of the loom.

[0014] It should be noted that the step of positioning the distribution pipes along the longest side of the guide boards enables the cooling action of the system to be optimised. In fact, in this way the threads 14 are on average nearer the delivery holes 22, in a zone in which the air flow is more intense and therefore characterised by greater cooling capacity.

[0015] The cooling system that has just been disclosed enables great operating flexibility to be obtained. In fact, part of the delivery holes 22 can be closed during use of the loom in such a way as to create a greater cooling flow in those guide zones in which thermal stress is higher and less cooling flow where this stress is less. In this way, the air flow is always used to best effect, preventing part thereof flowing where it is not necessary. This enables a very efficient cooling system to be obtained so as to remove a satisfactorily high level of heat with relatively moderate energy consumption. Furthermore, the disclosed system is also economical in terms of installation costs compared for example with compressed-air systems, costly compression devices not being used. In addition to this a cooling system has been devised that also enables the thread guide zones and the threads themselves to be kept clean. In fact, the blowing air prevents the depositing of foreign bodies or dusts on the guide boards and on the threads. Furthermore, the absence of compressors in the system excludes the possibility of formation of patches of lubricant inside the loom.

[0016] Advantageously, the distribution pipe and the supply conduit will have a section that is suitable for min-

imising load losses of the cooling air flow. It has been found to be favourable to use pipes with a section of more than 110 cm², preferably comprised between 200 cm² and 700 cm². Furthermore, in order to create a "pressurised reservoir" effect and to ensure uniform discharge of air from all holes, it has been found to be appropriate to give the delivery holes sections between 0.75 cm² and 7 cm².

[0017] Naturally, the above disclosure of an embodiment applying the innovative principles of the present invention is given by way of exemplification of these innovative principles and must not therefore be taken as a limitation of the scope claimed herein. For example, the delivery holes of the cooling air need not be equidistant to one another and may have different diameters according to their distance from the blowing fan. Furthermore, the distribution pipes could be provided with two open ends and therefore be bilaterally supplied with cooling air rather than unilaterally as disclosed above. Alternatively, the distribution pipes could be provided with two closed ends and be supplied by means of an inlet port arranged halfway along their longitudinal extent.

Claims

1. Jacquard loom provided with thread (14) guide means (12, 13) and with a cooling system (15) of the guide means (12, 13) and of the threads near the guides means, said cooling system (15) comprising:
 - at least one distribution pipe (21) of the cooling air arranged along the guide means (12, 13) and near the threads (14), said at least one distribution pipe being provided with holes (22) on the side wall to deliver air to the threads (14) and to the guide means (12, 13); and
 - a fan for blowing (17) cooling air inside said distribution pipe (21).
2. Loom according to claim 1, **characterised in that** said guide means (12, 13) comprises a threading guide board (12) and a loom bottom guide board (13), each one of which is provided with its own air distribution pipe (21) the two distribution pipes extending laterally from a supply conduit (20) originating from the fan (17) and being closed at the opposite end.
3. Loom according to claim 2, **characterised in that** each of said two distribution pipes (21) is brought up to a longer corner of the corresponding board (12, 13) with the holes (22) turned towards the threads on the board (12, 13), to cover the threads with an air flow that is substantially parallel to a face of the board (12, 13).

4. Loom according to claim 1, **characterised in that**
the fan (17) is a tangential centrifugal fan.
5. Loom according to claim 1, **characterised in that**
the fan (17) is provided with an inlet filter (18) for
the purification of the cooling air. 5
6. Loom according to claim 2, **characterised in that**
said supply conduit (20) is an at least partially flex-
ible pipe. 10
7. Loom according to claim 1, **characterised in that**
at least one distribution pipe (21) is rectilinear and
that said holes (22) are arranged aligned parallel to
an axis of the distribution pipe (21). 15
8. Loom according to claim 7, **characterised in that**
the holes (22) of a distribution pipe (21) are equi-
distant to one another to form a sequence of holes
(22) open for a length of the pipe such as to cover 20
the entire extent of the guide means (12, 13).
9. Loom according to claim 1, **characterised in that**
the distribution pipe (21) is formed of modular seg-
ments. 25
10. Loom according to claim 1, **characterised in that**
the distribution pipe (21) is fixed to a support in such
a way as to be axially rotatable for the regulation of
the direction of the delivery air. 30
11. Loom according to claim 10, **characterised in that**
the support comprises shelves (31) with which the
distribution pipe (21) is connected by means of U-
bolts (32) that grasp its circumference to enable 35
said rotation to loosen the U-bolts.
12. Loom according to claim 1, **characterised in that**
the sections of the distribution pipe and of the sup-
ply conduit are greater than 110 cm², preferably 40
comprised between 200 and 700 cm².
13. Loom according to claim 12, **characterised in that**
the holes (22) have a section comprised between 45
0.75 cm² and 7 cm².

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