June 6, 1967 M. R. FLAMAND 3,323,555

WEFT INSERTING MECHANISM

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FIG. 1

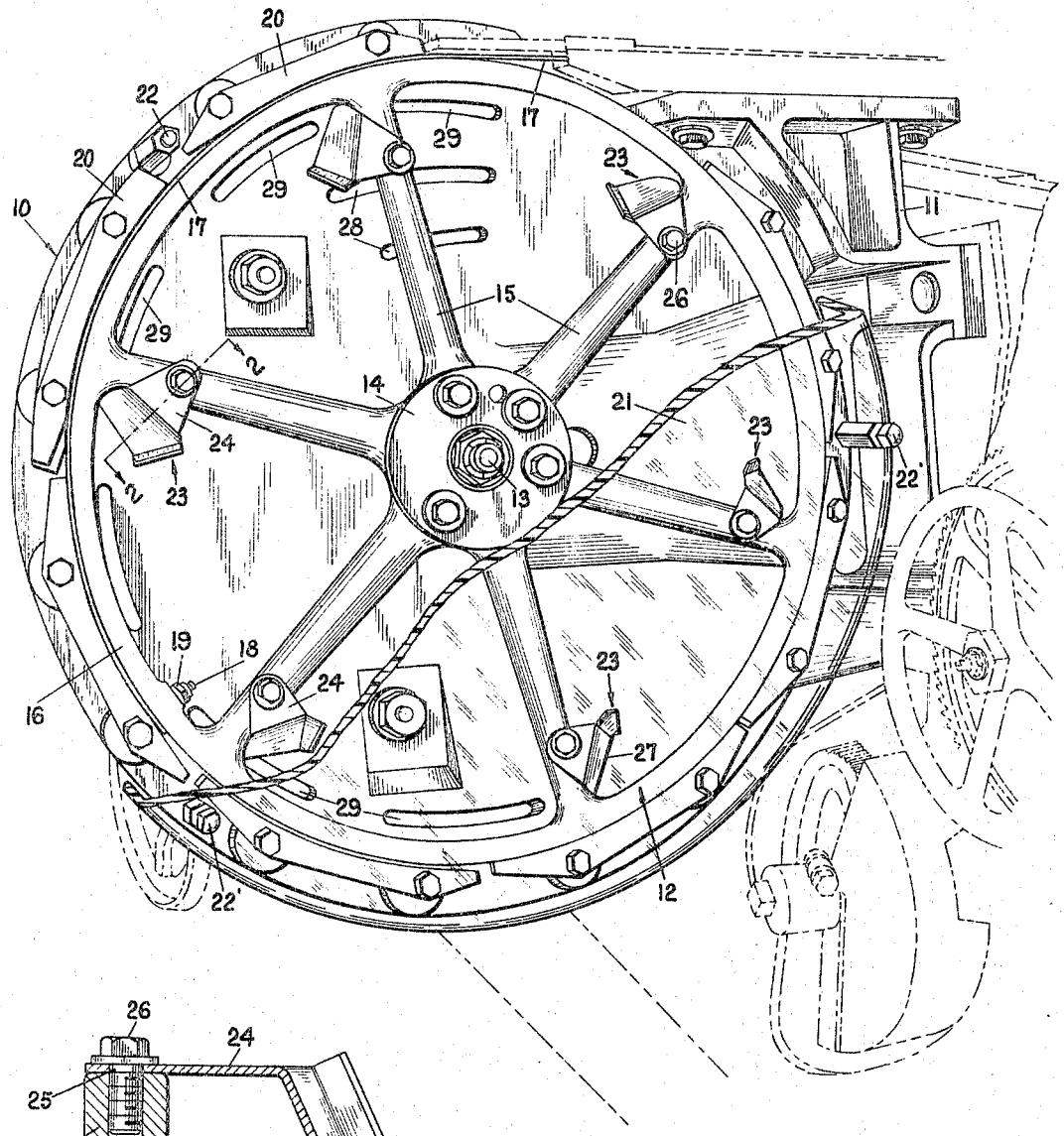

FIG. 2

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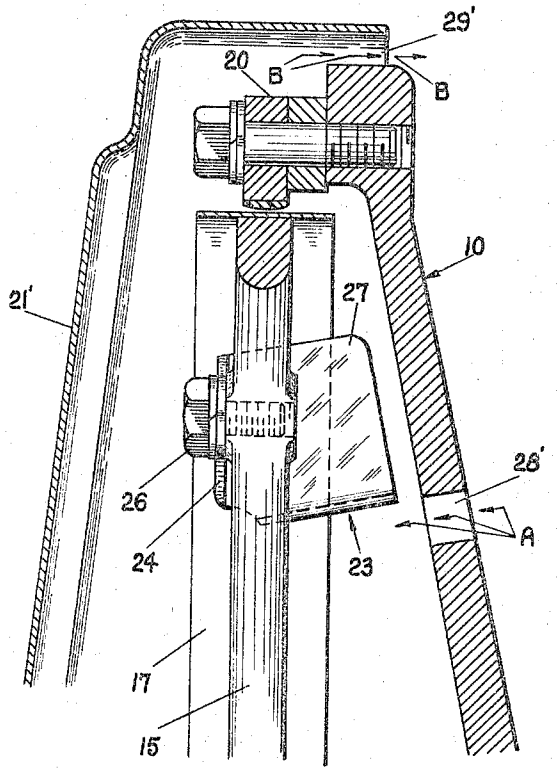

FIG. 3

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United States Patent Office 3,323,555 Patented June 6, 1967

3,323,555

WEFT INSERTING MECHANISM

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Filed Mar. 29, 1965, Ser. No. 443,475
1 Claim. (Cl. 139—122)

This invention pertains to an improvement in shuttleless looms of the type wherein filling is drawn from an outside source and placed in a warp shed by flexible inserting members such as tapes and, more particularly, to a means for cooling the tapes as they are wrapped about and extended from oscillating wheels by which they are driven.

It is a general object of the inevntion to provide a positive means for circulating the air within the substantially enclosed members that house the oscillating wheels to effect cooling of the tape members.

It is a further object of the invention to effect a cooling of the flexible tapes as they are wrapped about and extended from the rims of the oscillating wheels to permit a closer setting of the shoe members adapted to guide and maintain the tapes in close proximity with the rim of the wheel, thereby providing a smoother and more desirable running condition.

A further and more specific object of the invention is that of cooling the tape members to obtain an improved and more desirable weaving condition, as a reduction in the tape heat permits a truer and more accurate control of the tape settings at the filling transfer point within the shed formed by warp threads.

Further objects and advantages of the invention will become apparent from the following more detailed disclosure.

Shuttleless looms of the type to which the instant invention pertains have reciprocable filling carriers which are alternately wound upon and unwound from the rims of wheels mounted for oscillating movement within substantially enclosed housings disposed at the sides of the loom. This type of loom utilizes an outside source of filling, that is, the supply is not carried to and fro through the warp shed by a shuttle or the filling inserting member itself. The filling thread is measured and cut to the required length for extending across the width of the fabric being woven. A first carrier inserts the filling into the warp shed to a point adjacent the center thereof where it is then transferred to a second carrier member which extends it through the remaining portion of said shed to complete the insertion of a single pick.

A number of United States patents describe and clearly illustrate the looms and mechanism for actuating the filling carriers which are adapted to be cooled by the function of the instant invention and it is considered unnecessary at this point to insert herein a detailed description of these mechanisms. Attention is hereby drawn to United States Patents 2,604,123, 2,810,403 and 2,888,956.

The flexible tapes when being withdrawn from the shed are wrapped tightly against the rim or outer periphery of their respective tape wheel, but when they are being unwrapped from the wheel and inserted into the shed, a guide means is required to hold them radially inward and in close proximity with the rim.

Various types of tape restraining devices have been utilized which have included such elements as rollers, magnets and arcuate shoe members made of such materials as impregnated wood or plastic. The more common form of tape restraining means in use today is that of the arcuated shoe type. Each oscillating wheel is provided with a plurality of these shoes circumferentially disposed about and in close proximity with the outer periphery of the wheel. On the inner arcuated surface of each shoe

it is common practice to utilize a wear and friction resistant material for guiding the flexible tape members as they are unwound from their respective wheels and inserted into the warp shed.

Although this means of restraining the flexible tapes has performed its function with satisfactory results, the frictional heat created by repeated oscillations of the wheel members and the outer surface of said tapes making contact with the wear and friction resistant material forming the inner surfaces of the shoe members, has created conditions whereby a cooler running tape would be advantageous with respect to the operating efficiency of a loom.

The inner arcuated surface of each restraining shoe member has a crowned cross-sectional configuration which provides line contact with the flexible tapes as they are unwound from their respective wheel. Should this line contact be closer to one edge of the tape than the other, the frictional contact will cause that side of the tape to absorb more heat than its opposite side. Such a condition has been known to create a bi-metallic condition whereby the warmer side of said tape will bow in a lateral direction. The bowing of flexible tapes under such conditions is considered quite serious for it alters the intended and desired position of the carrier members at the filling transfer point within the shed. An extreme condition, such as both tapes being caused to bow in opposite directions, will create a more serious condition whereby one carrier will fail to transfer the filling with a possible collision of the carriers resulting in breakage thereof and the tearing out of many warp threads.

Another problem with excessive frictional heat is that of the wear and friction resistant material on the inner surface of the shoe members which becomes soft to the extent of increasing the fritcional drag on the tape members as they are unwound from their wheels.

The device according to the instant invention provides a positive circulation of air within the housings in which the wheels are mounted for oscillating movement. The housing itself includes a plurality of air inlet and outlet ports or openings and the wheel mounted therein is provided with a plurality of spaced vane members. These vane members are fixedly attached to the spoke portions of the wheel adjacent the rim thereof and are so formed as to cause a positive circulation of air around said rim and the pathway of the tape as the wheel moves in that direction to unwind the tape therefrom. During the actual oscillation of the wheel members, air is drawn through intake ports disposed in the housing adjacent the hub of the wheel, and the warmer circulated air is expelled through the outlet ports disposed adjacent the outer edge of said housing.

The invention will hereinafter be described in detail by reference to specific embodiments thereof one of which is illustrated in the accompanying figures of drawing, wherein:

FIG. 1 is a perspective view of a portion of a shuttleless loom as seen looking from the front thereof showing the various components of the invention and their relationship to the flexible tape and tape wheel;

FIG. 2 is a view partially in section taken along line 2—2 in FIG. 1; and

FIG. 3 is a view partially in section of a portion of the tape wheel and housing showing a modification of the air circulating means.

Referring now to the figures of drawing, enough of a shuttleless loom is illustrated in FIG. 1 to serve as a basis for a detailed description of the invention as applied thereto. In this figure of drawing there is shown the tape wheel housing which assembles to the left-hand side of the loom as seen looking from the front thereof. This

housing is indicated generally by numeral **10** and although the right-hand housing is not illustrated it is to be understood that it is of similar construction and the cooling device to be more fully described subsequently also functions in a like manner at that end of the loom. The tape wheel housing **10** is provided with an integrally formed mounting bracket **11** which serves as a means for attaching it to the lefthand loomside (not shown).

A tape wheel generally indicated by numeral **12** is mounted for oscillating movement in the housing **10** and is supported by a centrally disposed stud **13** that is driven in a manner fully described in the aforementioned patents. This tape wheel includes a hub portion **14**, a plurality of integrally formed and radially directed spoke members **15** which extend from said hub and terminate with a rim **16**.

A carrier inserting member or flexible tape **17** has one end thereof fixedly attached to the rim or outer periphery of the tape wheel by means of a bolt **18** and a nut **19**.

A plurality of arcuated tape restraining shoes **20** are adjustably attached to the housing **10** adjacent its outer edge and in close proximity with the outer periphery of the tape wheel for substantially its circumferential extent. The clearance between the inner surface of the tape restraining shoes **20** and the rim of the tape wheel is of a distance sufficient to permit the flexible tape **17** to be wrapped about and extended from said rim as said wheel is caused to oscillate.

A housing cover **21** (FIG. 1) attaches to the outer and forward edge of the housing **10** by means of forwardly extending stud member **22** and nuts **22'** and to illustrate clearly the various components within the housing, a large portion of said cover is broken away and is shown as being made from a transparent material. This cover encloses the oscillating tape wheel and tape restraining shoes within the housing **10** and serves to prevent the accumulation of dust and lint from interfering with the parts therein as well as a safety feature for preventing any possible interference with said oscillating tape wheel.

The flexible tape cooling device according to the invention includes a plurality of air circulating vane members which are depicted generally in FIG. 1 by numeral **23**. These vane members are angularly formed having a first surface **24** which includes an aperture **25** (FIG. 2) through which a cap screw **26** is adapted to pass for mounting said members on the spokes **15** immediately adjacent to the rim **16** of the wheel. A second surface **27** in continuation of surface **24** and extending obliquely from the latter is so disposed as to cause a positive circulation of air in the direction of the restraining shoes **20**, the rim **16** of the wheel and around the tape itself attached to said rim as said wheel moves in that direction to unwind said tape.

To provide a continuous change of air during loom operation, the housing **10** is provided with a plurality of openings or ports which are so positioned that the positive air circulation by the vane members causes air to be drawn into the housing through certain ports and the warmer air to be expelled through others. Numeral **28** depicts those openings which serve as intake ports and numeral **29** identifies those ports through which the warmer air is expelled.

FIG. 3 shows a modified means of circulating the air within the tape wheel housing **10** and includes air intake ports **28'** which by means of the vanes **23** on the oscillating tape wheel **12** draw air into said housing as shown by the indicating arrows A. The vanes are disposed on the spokes **15** of the wheel so as to direct the air outwardly toward the rim thereof to effect cooling of the tape **17** and the tape restraining shoes **20**. A housing cover **21'** attaches to the housing **10** in the same manner as the cover shown in FIG. 1; however, the outside diameter of cover **21'** is somewhat larger than cover **21** and defines a circumferential opening **29'** between the outer periphery of the housing **10** and said cover **21'**. This circumferential opening **29'** serves as an air outlet port and permits the air being circulated by the vane members to escape as illustrated by the indicating arrows B.

In operation, the flexible tapes are alternately wound upon and unwound from the rims of the tape wheels which are caused to oscillate throughout slightly less than a full revolution. These flexible tapes are in pressing contact with the wheel's rim when being wound on the latter as it is withdrawn from the shed and when being unwound or inserted into the shed, the arcuated shoe members **20** serve to hold said tape radially inwardly in close proximity with said rim.

During the unwinding of the tape, the pitch of the vane members which move with the wheel is such that they influence the air within the housing and direct it in a positive manner toward the restraining shoes, the wheel's rim and the flexible tape to effect a substantial cooling of these elements.

A significant advantage derived from this means of reducing the accumulation of frictional heat is that of being able to maintain closer tolerances between the inner surfaces of the tape restraining shoes and the rim of the wheel thereby providing further control of said tape and a smoother operating condition.

While the vane members are shown to be of a specific configuration and as being attached to the spokes of the tape wheel, they may, of course, be varied as to their form and shape so long as the desired circulation of air is brought about, and they may further be formed integrally with the spokes, if desired.

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 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 claim.

I claim:

In a shuttleless loom of the type having means for inserting filling from a stationary supply which includes a wheel having a tape-supporting rim, said wheel being rotatably supported for oscillation of less than one full revolution, a flexible tape attached to and adapted to be wrapped about and extended from said rim, a plurality of arcuated shoes members disposed in spaced relation and in close proximity with said rim, a housing within which said wheel is mounted for oscillating movement, said housing having a plurality of air-ventilating intake ports radially disposed relative to the hub of said wheel, a housing cover removably fixed to overlie the outer periphery of said housing defining a circumferential opening therebetween, and a plurality of circumferentially arranged vane members fixedly attached to said wheel inwardly of said rim, each one of said vanes being angularly disposed for directing intermittent circulating streams of air about said tape and toward said circumferential opening with each oscillating movement of said wheel.

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