

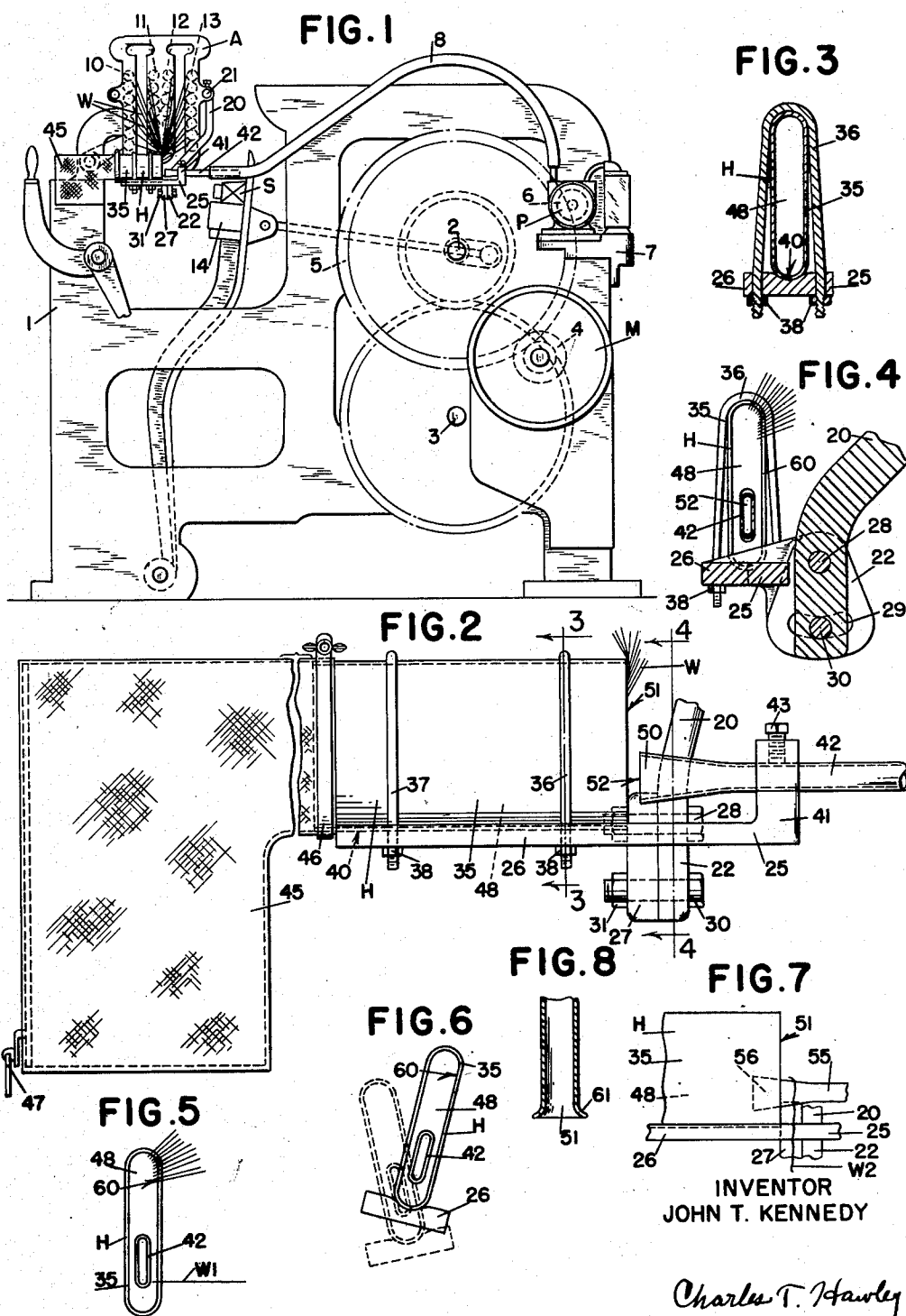
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PNEUMATIC THREAD HOLDER FOR WEFT THREADS

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PNEUMATIC THREAD HOLDER FOR WEFT
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1

This invention relates to improvements in pneumatic thread holders for and the method of controlling the weft threads extending from reserve bobbins of weft replenishing looms.

In weft replenishing looms more particularly of the multicolor type it is customary to restore reserve bobbins in vertical stacks in a magazine located at one end of the loom. The reserve bobbins have weft ends extending from them toward some form of thread holder and as the lowest bobbins of the stack are transferred the upper bobbins and their weft ends descend. When a bobbin is selected from one or another of the stacks it is released by a so-called cradle and moves to a common transfer position some distance below the bottoms of the stacks and when moving to this position the corresponding weft thread moves downwardly. On some subsequent beat of the loom the thread of the freshly replenished shuttle is cut at the selvage and should be removed to prevent it from being drawn into the warp shed to produce a fault in the cloth. It is desirable that sufficient tension be applied to the thread of the bobbin in transfer position to keep it above the path of the lay and also to withdraw it from the loom when it is cut at the selvage.

It is an important object of the present invention to provide a pneumatic thread holder comprising a hollow member preferably transversely disposed with respect to the weft threads and having a vertically elongated thread intake mouth coupled with an injector tube which projects compressed air into the lower part of the mouth. By this arrangement air around the injector tube is drawn into the intake mouth under considerable pressure, but the air in the upper part of the mouth is drawn into the latter under less pressure. The weft threads corresponding to the bobbins which are relatively high in the magazine are therefore subjected to only a light pressure which does not tend to abrade them as they turn to extend into the thread holder, but as the threads move downwardly they are subjected to increasing pressure and when a bobbin moves to transfer position its thread is in the zone of maximum pneumatic pressure so that it will be held taut to assist in the threading of the replenished shuttle and then be quickly withdrawn when cut at the selvage.

The thread intake mouth preferably has the side thereof adjacent to the magazine substantially straight so that the weft threads can be distributed along it to be individually responsive to a stream of air moving into the intake mouth. In this connection it is a further object of the

2

invention to mount the thread holder so that the angle of the mouth can be changed, this change preferably being effected by moving the top of the intake mouth either toward or away from the magazine.

The previously mentioned injector tube will draw air from a surrounding atmosphere into the intake mouth due to the compressed air issuing from the tube. The injector tube may be spaced somewhat from the intake mouth, in which event weft threads corresponding to bobbins freshly inserted into the magazine can pass downwardly between the intake mouth and injector tube, or the tube can project slightly into the mouth, in which event threads of fresh bobbins can rest on and be supported by the tube preparatory to being drawn pneumatically into the thread holder.

It is also an object of the invention to provide an improved method for controlling the weft threads wherein the latter are subjected to progressively increasing pneumatic forces as they descend in the bobbin magazine.

In order that the invention may be clearly understood reference is made to the accompanying drawings which illustrate by way of example three embodiments of the invention and in which:

Fig. 1 is a side elevation of part of a weft replenishing loom having the preferred form of the invention applied thereto,

Fig. 2 is an enlarged side elevation of the thread holder shown in Fig. 1,

Figs. 3 and 4 are detailed vertical sections on lines 3—3 and 4—4, respectively, Fig. 2,

Fig. 5 is a diagrammatic view showing the thread of a bobbin in transfer position located in the thread intake mouth at a point where it is subjected to maximum pneumatic tension,

Fig. 6 is a diagrammatic view showing the manner in which the angle of the intake mouth may be adjusted by tipping the upper end of the mouth either toward or away from the magazine,

Fig. 7 is a view similar to a part of Fig. 2 but showing the first modified form of the invention wherein the injector tube extends somewhat into the thread holder and through the thread intake mouth, and

Fig. 8 is a view showing the second modification in which the edges of the intake mouth may be curved to prevent chaffing of the weft threads which extend into the thread holder.

Referring to Fig. 1, a loom frame 1 supports the usual top and bottom shafts 2 and 3, respectively, which may be geared together so that the bottom shaft turns once for every second rotation of the top shaft. A driving motor M is provided

with a pinion 4 meshing with a gear 5 which is connected to the crank shaft 2 when the loom is in operation. The gear 5 is also shown herein as meshing with a pinion 6 of an air pump P supported on a stand 7 secured to the loom frame. The pump P is connected to a hose or pipe 8 extending forwardly to deliver compressed air from the pump. The pump P is shown as one means for providing compressed air, but the invention is not necessarily limited to such a pump and any convenient supply of compressed air may be used.

The magazine A is shown in the present instance as being of the multicolor type and is provided with four vertical stacks of reserve bobbins 10, 11, 12 and 13, arranged respectively front to back in the loom, the left end of the loom as viewed in Fig. 1 being the front. These bobbins have extending from them weft ends designated generally at W which lead to a thread holder mechanism H to be described in more detail hereinafter.

Whenever a replenishing operation is to occur the bottom bobbin of one or another of the stacks 10-13 will move downwardly to a common transfer position and be supported by the magazine so that as the lay 14 moves forwardly a shuttle S on it can be replenished with the previously released bobbin. When a bobbin is released from a stack to move to transfer position all the superposed bobbins of the corresponding stack and their weft threads move downwardly by gravity. When it is necessary to place fresh bobbins in the magazine they are inserted from the top and their weft ends are led toward the holder H. It will thus be apparent that the weft threads W move downwardly progressively and that a bobbin which is originally in top position in the magazine will eventually reach low position in its stack, and will ultimately descend to a low transfer position.

The matter thus far described is of common construction and may operate and be constructed in the usual manner. While the specific form of reserve bobbin magazine has been shown some features of the invention are not necessarily dependent upon the type of magazine set forth herein.

In carrying the preferred form of the present invention into effect the magazine is provided with a support arm 20 secured to a tie rod 21 forming part of the magazine. This arm extends downwardly and outwardly away from the magazine and has a lower end 22, see Fig. 4. A stand 25 has an elongated backwardly and forwardly extending shelf or platform 26 provided with a laterally extending flange or wing 27 which is pivoted on a bolt 28 carried by the lower end 22 of arm 20. The flange or wing 27 is provided with an adjusting slot 29 concentric with the bolt 28 and receives a second bolt 30 extending through the lower end 22 of the support arm and the slot. The slot and bolts permit the angle of the platform 26 to be changed and the desired adjustment is held by nut 31 on the bolt 30, see Fig. 2.

The thread holder in the present instance comprises a hollow member 35 which may be generally of tubular form having a vertically elongated cross section such as shown in Fig. 3. Inverted U-shaped tie bolts 36 and 37 extend upwardly over the tubular member 35 and project downwardly through the shelf 26 and are held in position by nuts 38. The upper part of the shelf is preferably provided with a longitudinal upwardly facing groove 40 which receives the

lower rounded end of the hollow member 35. The latter extends back and forth in the loom and is transverse of the weft threads W.

The right end of the shelf 26 as shown in Fig. 2 has an upstanding bearing 41 thereon which supports an injector tube 42. The latter is in alignment with the lower part of the hollow member 35 and is movable longitudinally in the bearing 41 and held fixed in adjusted position by a set screw 43. The rear end of the tube 42 is connected to the previously mentioned hose or pipe 8.

A mesh or gauze bag 45 may be held by clamp 46 to the left end of the tube 35, Fig. 2, and has a slide fastener 47 at the left side thereof. The interior of bag 45 communicates with the thread and air compartment 48 within the hollow member 35 so that threads passing through the member 35 may be collected within the bag. The slide fastener affords means for periodically emptying the bag of accumulated threads.

In the preferred form of the invention set forth more particularly in Fig. 2 the injector tube 42 is set so that its end 50 from which compressed air issues is in front of and spaced slightly away from the intake mouth 51 at the adjacent end of the member 35. This setting can be attained by the set screw 43 and permits the threads of reserve bobbins freshly inserted into the magazine to pass down between the thread mouth 51 and the preferably vertically elongated discharge mouth 52 at the end 50 of tube 42. In this preferred form of the invention the threads of freshly added bobbins may rest on the shelf 26 when released by the operator and will then be drawn into the mouth 51. Such threads however will not always fall to the bottom of the intake mouth but may be drawn into the latter if released by the operator while they are near the upper part of the mouth.

In the modified form of the invention shown in Fig. 7 a tube 55 similar to tube 42 is in front of the thread intake mouth and has the end 56 thereof projected slightly inside of the intake mouth 51. When the injector tube is in the position shown in Fig. 7 it can support the weft threads of bobbins freshly added to the magazine.

Compressed air issuing from the injector tube will enter the lower part of the mouth 51 and draw the surrounding air into the mouth. The air drawn into the upper part of the thread mouth 51 will move more slowly than air drawn into the lower part of the mouth nearer the injector tube. Therefore, the threads which correspond to the bobbins in the upper part of the magazine are subjected to only a moderate amount of pneumatic tension just sufficient to take up excess slack, and as the threads move downwardly in the mouth 51 due to descent of their bobbins they will be subjected to progressively increasing pneumatic pressures, so that the thread corresponding to the lowest bobbins in the stacks are subjected to relatively high pneumatic tension to hold them above the path of the lay 14. When a bobbin is released from one or another of the stacks to move down to transfer position the associated weft thread will move to the position W1, Fig. 5, where it will be subjected to the maximum pneumatic force as the freshly replenished shuttle is picked, thus assisting the self-threading of the shuttle.

On some later pick of the loom the thread of the freshly replenished shuttle will be cut at the selvage by mechanism not shown herein

5

but well understood, whereupon the thread, still entering the intake mouth 51 at a point adjacent the injector tube, will be subjected to maximum pneumatic forces and will be drawn promptly into the tubular member 35 and be blown into the bag 45.

The member 35 is so formed that it provides a comparatively straight edge 60 for the mouth 51 adjacent to the magazine and the weft threads will be distributed along this straight edge from the upper part thereof downwardly toward the injector tube. Depending upon the character of weft with which the bobbins are wound it may be desirable to change the angle of edge 60 of the intake mouth 51 to a position most favorable for the particular weft. When this adjustment is desired the bolt 30 can be slackened and the wing 27 swung around the pivot bolt 28 to move the upper part of the intake mouth 51 either toward the magazine as suggested in Fig. 6 in full lines, or away from the magazine, as indicated in dotted lines.

In the second modification of the invention shown in Fig. 8 the mouth 51 may have the perimeter thereof curved or bell shaped as indicated at 61.

From the foregoing it will be seen that the invention sets forth a simple form of pneumatic thread holder having no moving parts and wherein an injector tube 42 is located in front of and near the lower end of a vertically elongated thread intake mouth 51 so that the threads corresponding to the upper bobbins in the magazine are subjected to only slight pneumatic forces while the threads in the lower part of the magazine are subjected to higher pneumatic forces to keep them above the lay 14. The jet of air from the injector tube is directed into the mouth into which the weft threads extend. When a bobbin moves to transfer position its thread W1 will move down to a zone of maximum pneumatic force existing around the injector tube, this maximum force assisting not only in effecting self-threading of the shuttle, but also in withdrawal of the thread when it is cut at the selvage. Also, the injector tube when in the position shown in Fig. 2 permits the threads of freshly added bobbins to pass downwardly between the mouth 51 and the injector tube, whereas the latter tube when in the position shown in Fig. 7 acts as a support for the thread freshly added to the magazine, such as indicated at W2. Furthermore, the angle of the mouth 51 can be adjusted with respect to the magazine to adapt the holder for cooperation with wefts of various types. There is also set forth an improved method for controlling the weft threads wherein the latter are subjected to progressively increasing pneumatic forces as they descend.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In pneumatic thread holder mechanism for a loom having a stack of reserve bobbins which move downwardly during loom operation and from which weft threads extend, a hollow thread holder member formed with a vertically elongated thread intake mouth for reception of the weft threads, and an injector tube in front of the mouth effective to introduce compressed air into the lower part of said mouth to cause a column of air to move into the mouth from the surrounding atmosphere in such manner that the lower part of the column entering the mouth moves faster than

6

the upper part thereof to exert a progressively increasing pneumatic tension on the weft threads as the latter move downwardly with their bobbins.

2. The pneumatic thread holder set forth in claim 1 wherein the end of the injector tube is outside the mouth so that weft threads of bobbins freshly inserted in the magazine can pass downwardly between the mouth and the end of the injector tube.

3. The pneumatic thread holder set forth in claim 1 wherein the injector tube projects inside the thread intake mouth so that weft threads of bobbins freshly inserted in the magazine can fall on and be temporarily supported by the injector tube preparatory to being drawn pneumatically into said mouth.

4. The pneumatic thread holder set forth in claim 1 wherein a stand is provided to which the hollow member is secured, and means are provided to adjust said stand so that the upper part of said mouth may be moved either toward or away from the magazine.

5. The pneumatic thread holder set forth in claim 4 wherein the side of said hollow member adjacent to the magazine is so formed as to provide said mouth with a substantially straight edge around which the weft ends extend as they pass into the hollow member.

6. The pneumatic thread holder set forth in claim 1 wherein means spaced from the mouth is provided to support the jet tube so that said tube and support means are entirely outside of said hollow member.

7. In pneumatic thread holder mechanism for a loom having a stack of reserve bobbins which move downwardly during loom operation and from which weft threads extend, a hollow thread holder member formed with a vertically elongated thread intake mouth for reception of the weft threads, and an injector tube in front of the mouth effective to direct a jet of air into the lower part of said mouth so that both the weft threads and the jet enter said mouth and the jet causes a faster rate of flow of air from the surrounding atmosphere into the lower part of said mouth than into the upper part thereof to subject the weft threads to progressively increasing pneumatic tension as their bobbins descend in the loom.

8. In pneumatic thread holder mechanism for a loom having a stack of reserve bobbins which move downwardly during loom operation and from which weft threads extend, a hollow thread holder member formed with a vertically elongated thread intake mouth for reception of the weft threads, and means in front of the mouth causing a column of air to flow into said mouth and through said hollow member in such manner that the lower part of the column entering the mouth moves at a faster rate than does the part of the column entering the upper part of the mouth so that the weft threads are subjected to a progressively increasing pneumatic force tending to move them into the hollow member as they descend with their bobbins.

9. In pneumatic thread holder mechanism for a loom having a stack of reserve bobbins which move downwardly during loom operation and from which weft threads extend, a hollow thread holder member formed with a vertically elongated thread intake mouth for reception of the weft threads, and means in front of the mouth causing a column of air to flow into said mouth and through said hollow member in such man-

7

ner that the lower part of the column entering said mouth moves at a relatively fast rate to exert enough pneumatic tension on the lower weft threads to assist in self threading of a shuttle replenished with a bobbin corresponding to one of the lower threads and wherein the part of the column which enters the upper part of the mouth moves at a slower rate which exerts sufficient pneumatic attraction to draw into said mouth a thread released in the vicinity of the upper part of said mouth and extending from a bobbin freshly added to the top of said stack.

10. The method of pneumatically controlling the weft ends extending from a stack of vertically arranged bobbins in a weft replenishing loom into the intake mouth of a thread holder compartment consisting in the following steps: causing a column of air to enter said intake mouth in such manner that the lower part of

8

the column moves faster than the upper part thereof, introducing the weft threads into the upper part of said column of air, and transferring the bobbins one by one from the bottom of said stack to cause the weft threads to move progressively downwardly in said column.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,703,898	Payne	Mar. 5, 1929
2,207,105	Payne	July 9, 1940
2,360,807	Whitin	Oct. 17, 1944
2,482,691	Peterson	Sept. 20, 1949