Feb. 17, 1953 T. J. KIELY 2,628,639

THREAD HOLDER FOR LOOMS

Filed May 12, 1951 2 SHEETS—SHEET 1

FIG. 1

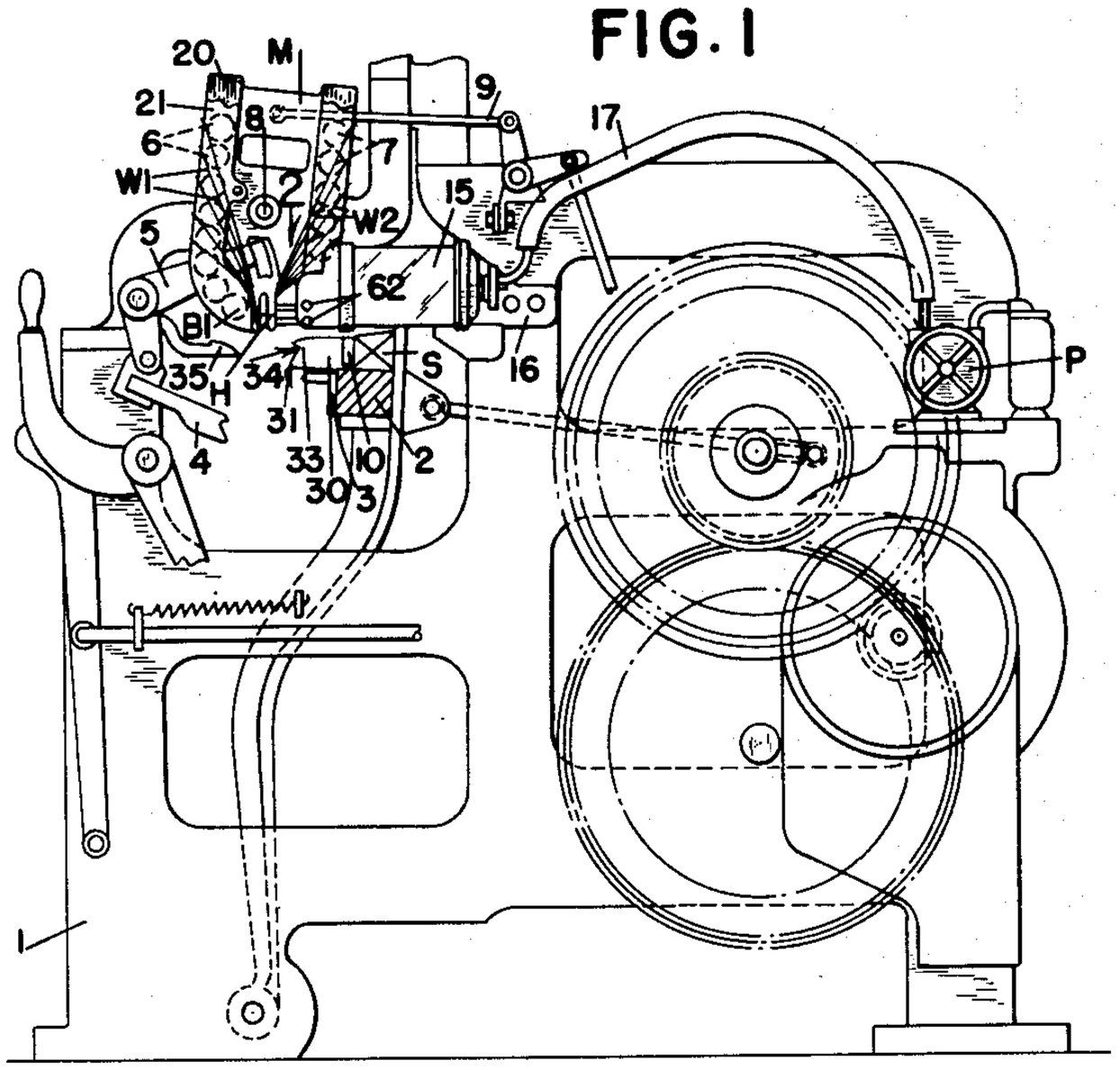

FIG. 3

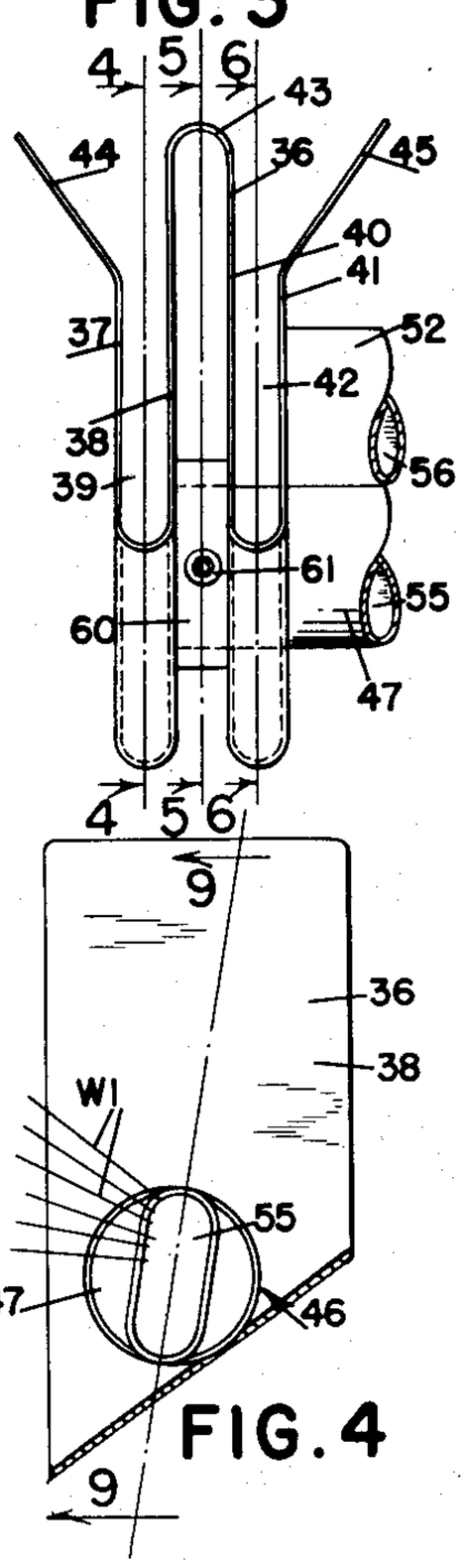

FIG. 2

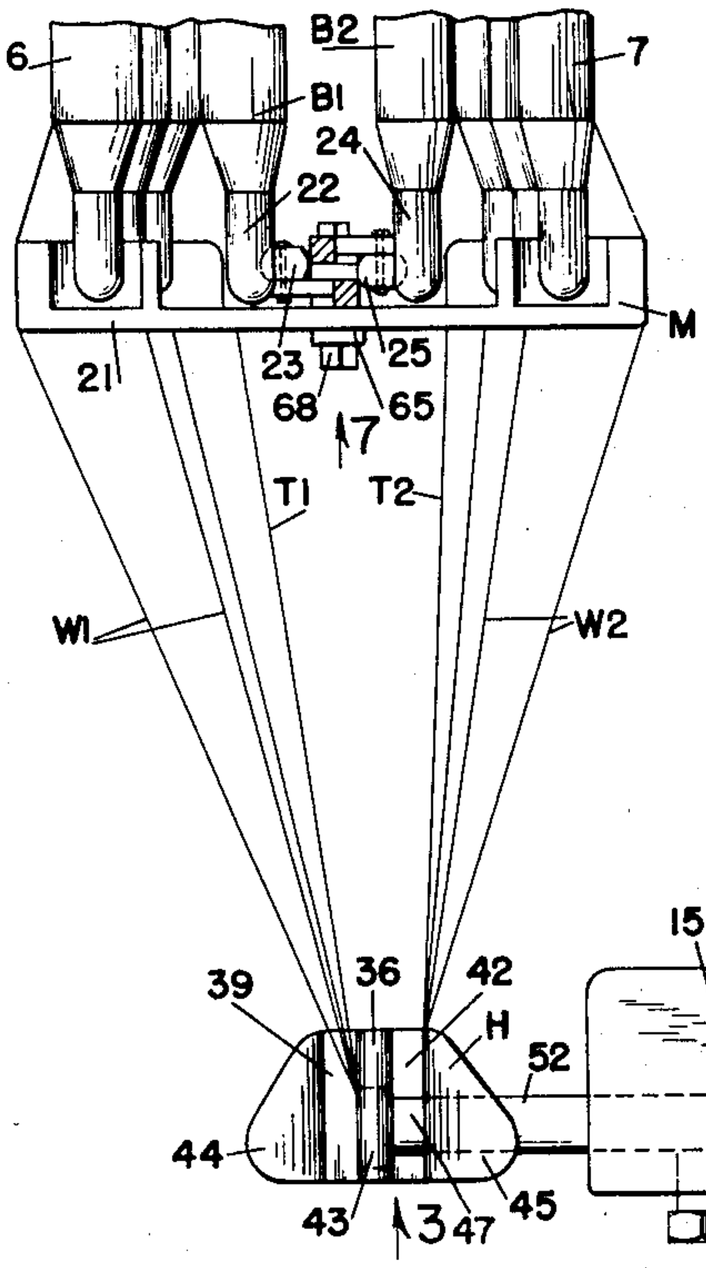

FIG. 5

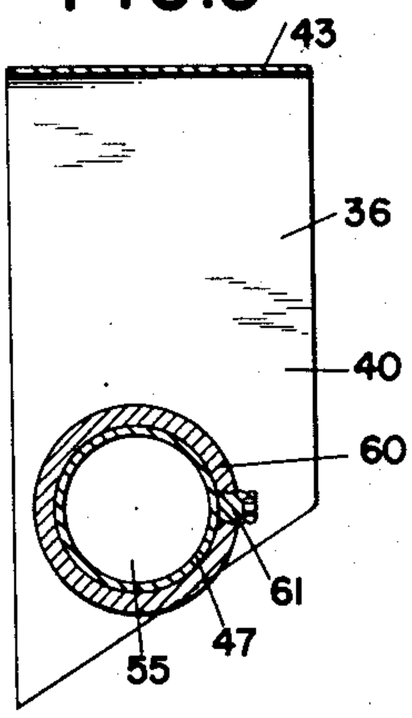

FIG. 4

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FIG. 6

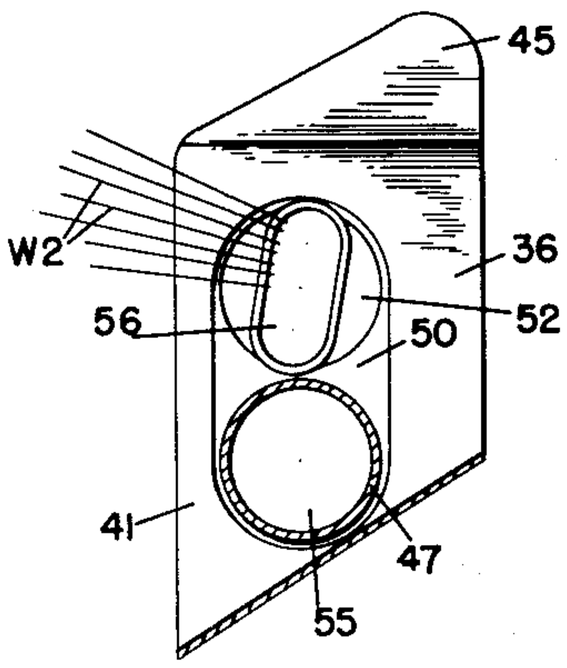


FIG. 7

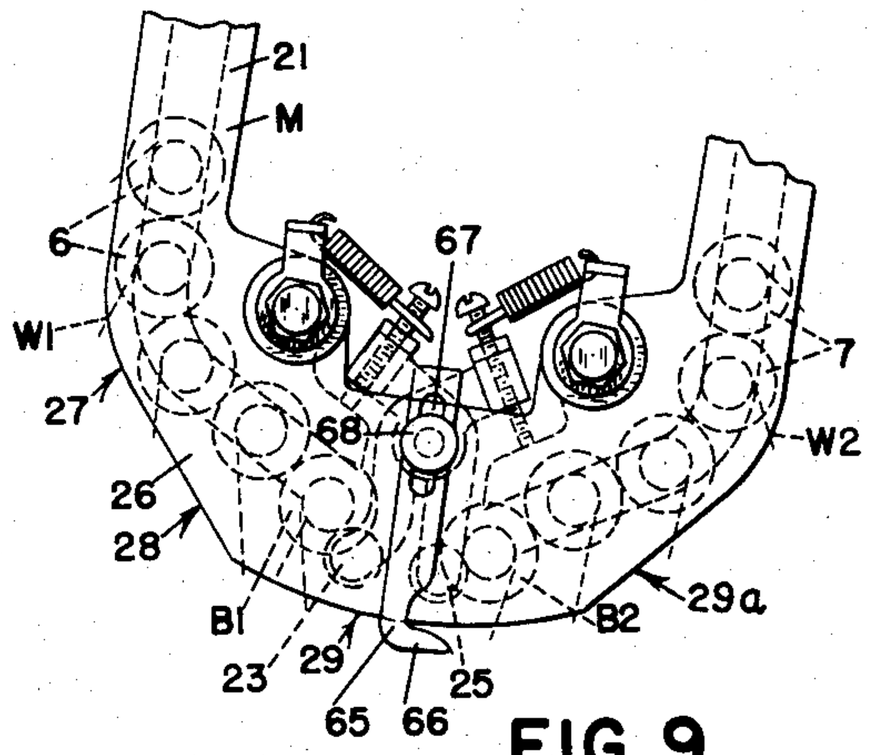


FIG. 8

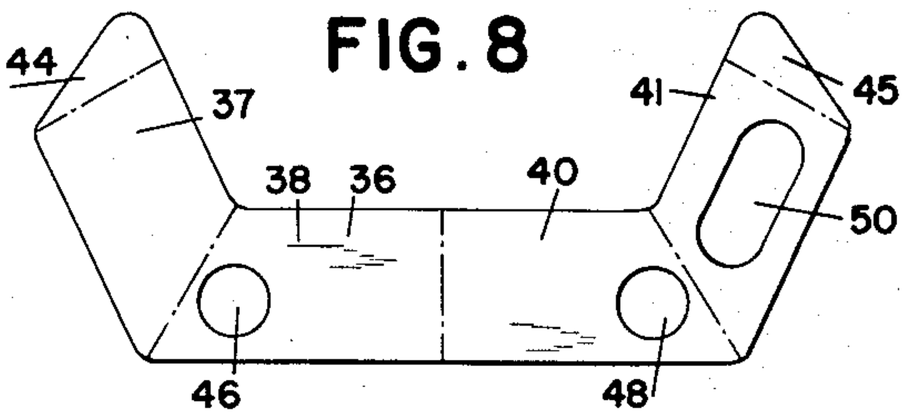


FIG. 9

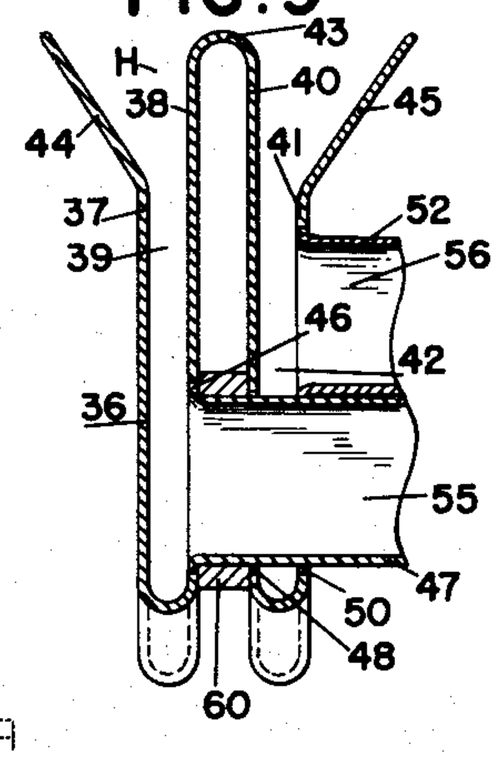


FIG. 10

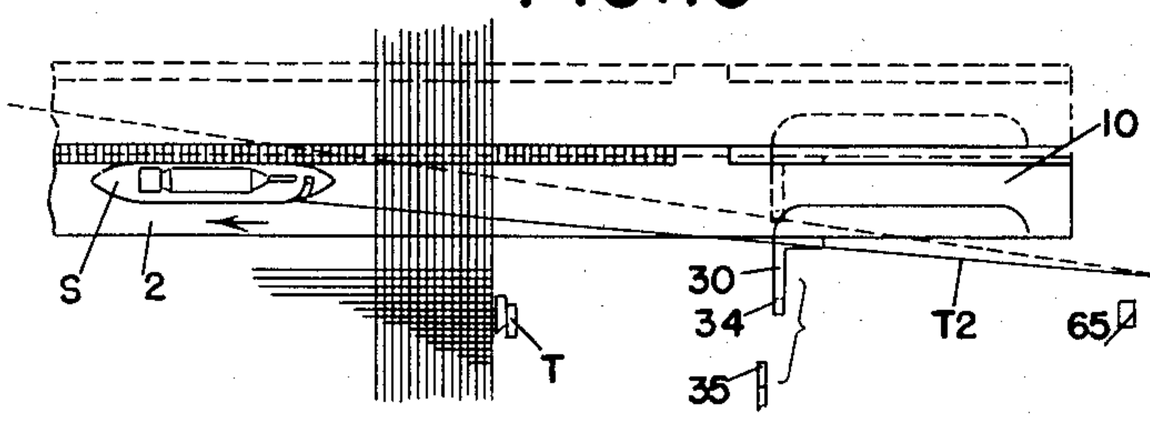
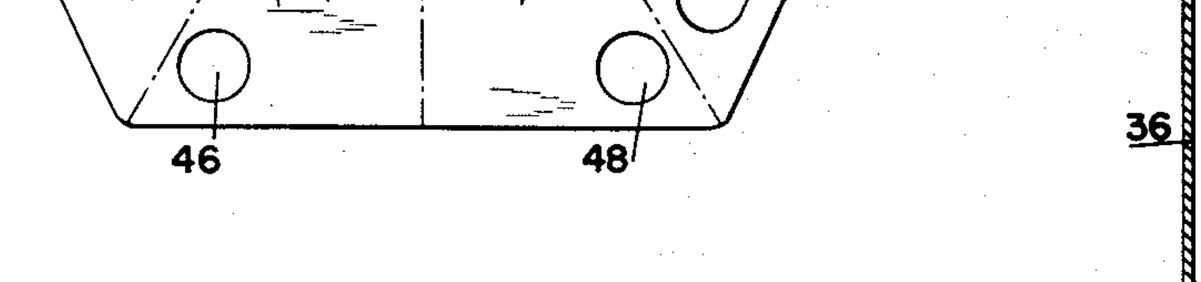


FIG. 12

FIG. 11



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THREAD HOLDER FOR LOOMS

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Application May 12, 1951, Serial No. 225,991

16 Claims. (Cl. 139—247)

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This invention relates to improvements in thread holder mechanisms for weft replenishing looms and it is the general object of the invention to provide a thread holder of the pneumatic type adaptable more particularly to looms operating with more than one shuttle.

Multi-shuttle bobbin changing looms ordinarily employ a magazine which holds a group of reserve bobbins for each shuttle. After a bobbin is transferred from any group its weft end will extend from the selvage to the thread holder on the next beat-up of the lay, and may extend over a retaining hook. At a later time the thread is cut at the selvage and is then drawn pneumatically into the thread holder.

In a loom operating with two shuttles it is possible for weft replenishing operations involving bobbins drawn from different groups to occur in close succession, the second transfer leaving a thread before the thread left by the first transfer has been cut at the selvage, and in this event there is likelihood that the two threads will become entangled with each other so that they may not be properly removed by pneumatic action.

In order to prevent entanglement of the two threads remaining after two bobbin changing operations involving bobbins from different groups it is an important object of the present invention to provide a pneumatic thread holder of a type having two thread and air intake mouths, one mouth for one group of weft ends and the other mouth for the other group of weft ends, and locate the mouths at different elevations so that although two threads drawn from different groups may be engaged over the aforesaid hook they will nevertheless traverse different paths to their respective mouths.

It is a further object of the invention to provide a pneumatic thread holder having two intake mouths at different elevations, the lower mouth being forward of the upper mouth, and provide an air and thread tube for the forward mouth passing below the rear upper mouth in such position as to locate the weft ends of new bobbins corresponding to the upper mouth in correct position to be drawn into the latter.

In a form of two-color weft replenishing looms which has gone into general use there is employed a rocking magazine having two groups of bobbins the weft ends of which extend under the outer plate of the magazine toward a thread holder. The weft ends of the front group pass under the forward part of said plate while the weft ends of the rear group extend under the

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rear part of the plate. It is a further object of the invention to provide a stop or guide, which may conveniently be in the form of a hook, which will prevent the thread of a bobbin transferred from one group from moving into a position where it may become entangled with the thread of a bobbin transferred from the other group. The stop or hook may be used in conjunction with the previously described thread holder having two mouths at different elevations, the thread remaining after transfer of a bobbin from the rear stack being held in high position by the guide and leading to the upper rear intake, and the thread remaining after transfer of a bobbin from the front stack extending to the lower front intake mouth at a level below the guide so as not to become entangled with the thread corresponding to the rear stack.

It is another object of the invention to provide a simple form of pneumatic thread holder made preferably of sheet material and having two thread slots one of which receives the front group of threads and has a lateral opening for the previously mentioned rearwardly extending tube and the other slot of which has a lateral opening located above the tube for the reception of a tube for the rear group of threads.

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

Fig. 1 is a side elevation partly in section of a weft replenishing loom of the multicolor type having the invention applied thereto,

Fig. 2 is an enlarged plan view looking in the direction of arrow **2**, Fig. 1,

Fig. 3 is an enlarged side elevation looking in the direction of arrow **3**, Fig. 2,

Figs. 4, 5 and 6 are vertical sections on lines **4—4**, **5—5** and **6—6**, respectively, of Fig. 3,

Fig. 7 is a fragmentary side elevation looking in the direction of arrow **7**, Fig. 2, showing the lower part of the outer plate of the magazine and the thread stop or guide hook thereon,

Fig. 8 is a plan view of the blank from which the thread holder is made,

Fig. 9 is a vertical section on line **9—9**, Fig. 4, showing the relation between the upper and lower intake mouths, the thread slots, and the tube of the lower mouth passing below the upper mouth, and

Figs. 10, 11 and 12 are diagrammatic views illustrating the operation of the invention.

Referring to Fig. 1, the loom frame **1** supports a lay **2** which reciprocates backwardly and for-

wardly in usual manner and has a bunter 3 for cooperation with a latch 4 when it is desired to give the transferrer arm 5 a bobbin changing operation. The loom is provided with a magazine M which in the present instance is shown as being provided with front and back stacks 6 and 7, respectively, of reserve bobbins which await transfer. Leading from the front stack of bobbins is a group of weft ends W1, while a second group of weft ends W2 leads from the bobbins of the rear stack 7. The magazine is mounted for rocking about an axis 8 by means of a rod 9 leading to well-known mechanism. The lay has a shuttle box 10 to receive either of two shuttles only one of which is shown herein at S.

Under normal conditions the magazine will be stationary with the lowest bobbin in the rear stack 7 in position for transfer. If the shuttle corresponding to this bobbin requires replenishment the magazine will remain stationary and the transferrer arm will descend to effect replenishment, but if the other shuttle requires replenishment the magazine M will first be rocked in a counter-clockwise direction as viewed in Fig. 1 to place the lowest bobbin in the front stack 6 under the transferrer arm.

The loom is provided with a hollow thread collector 15 held in fixed position on the loom in any approved manner, as by a stand 16 secured to the loom frame. Leading rearwardly from the right end of the thread collector is a tube or pipe 17 connected to an air pump P which operates to create subatmospheric pressures within the hollow collector 15. The pump may be either of the intermittent or continuously running type and need not necessarily be of the specific form indicated in Fig. 1.

The magazine has inner and outer bobbin guiding plates 20 and 21 respectively adapted in usual manner to guide the butts and tips of the reserve bobbins and direct the latter toward their transfer positions. In Fig. 2 the lowest bobbin in the front stack 6 is indicated at B1 and has a tip 22 supported on a yielding support 23, while the lowest bobbin in the rear stack is indicated at B2 and has its tip 24 supported by another yielding support 25. The supports are mounted in known manner on the lower part of wall 26 of the outer plate 21. This wall has on the under side thereof a preferably continuous thread guiding surface 27 which extends downwardly and rearwardly as at 28 and then under the bobbin tip supports as at 29 and then upwardly and rearwardly as at 29a. The bobbins which are adjacent to transfer positions have their weft ends extending under the wall 26 toward a pneumatic thread holder designated generally at H. The holder H is forward of and connected pneumatically to the thread collector 15, as will be set forth hereinafter, to hold the weft ends taut and enable them when cut at the selvage by thread cutter T, see Fig. 10, to be drawn into the collector 15.

The lay has secured thereto a forwardly extending thread placer 30 having an upwardly and rearwardly extending surface 31 leading to a thread hook 33 overhanging surface 31 and forming with the latter a thread notch 34. The loom has secured thereto a stationary hook 35 over which the threads left by the incoming bobbins are moved by the placer 30 as the lay moves forwardly on the next beat of the loom following a bobbin changing operation.

Except for the thread collector 15 and the thread holder H the matter thus far described

may be constructed and operate in the usual manner.

The thread holder H, shown more specifically in Figs. 3, 8 and 9, is made preferably of a strip 36 of sheet material, such as steel, which in blank form may have the shape shown in Fig. 8. The strip has a front pair of walls 37 and 38 which define a front thread slot 39 when the strip is folded as shown in Fig. 9. A back pair of walls including a front wall 40 and a rear wall 41 when folded form a second thread slot 42 rearward of the slot 39. The walls 38 and 40 are joined at their upper ends by a curved part 43 and the upper ends of the walls 37 and 41 may be deflected forwardly as at 44 and rearwardly as at 45, respectively. The thread slots 39 and 42 open upwardly to receive the groups W1 and W2, respectively, of weft ends.

Wall 38 is provided with a hole 46 receiving the front end of a lower pneumatic tube 47 extending rearwardly, or to the right as viewed in Fig. 9, to the thread collector 15. The wall 40 has a hole 48 through which the tube 47 extends. The rear wall 41 is provided with an elongated vertical opening or slot 50 the lower end of which is horizontally aligned with holes 46 and 48 and through which the tube 47 extends. Into the upper part of opening 50 extends an upper tube or pipe 52 similar to tube 47 and connected to the thread collector 15. The tubes 47 and 52 have air and thread intake mouths 55 and 56, respectively, for the front and back groups of weft ends W1 and W2, opening into slots 39 and 42, respectively. Both of the tubes 47 and 52 extend into the thread collector 15 so that the pump acting through the collector and the tubes can create subatmospheric pressures in the intake mouths. It will be noted from Fig. 9 that the forward intake mouth 55 is in relatively low position and that the other intake mouth 56 is at a higher elevation and rearward of the mouth 55.

The holder H is supported on the tubes and is positioned along tube 47 by a collar 60 fitting between walls 38 and 40 and held on tube 47 by a set screw 61. The holder is held against substantial angular motion around tube 47 by engagement of the upper tube 52, with the rearmost wall 41, as will be apparent from Fig. 6. The tubes 47 and 52 are held to the thread collector 15 and with respect to each other by set screws 62, see Fig. 1, which permit relative adjustment of the tubes and mouths 55 and 56 with respect to the slots 39 and 42, respectively. The bottoms of the slots 39 and 42 may be inclined downwardly and toward the magazine, as shown for instance in Fig. 5.

When new bobbins are placed in the magazine their weft ends will be drawn toward the thread holder H and will be dropped into one or the other of the slots 39 or 41, the front weft ends W1 preferably being dropped into the slot 39 and thence being drawn through the lower mouth 55 into tube 47, and the weft ends W2 being dropped into the slot 42 and thence being drawn into the tube 52. When the weft ends W2 are dropped into the slot 40 they will fall on the tube 47 the upper part of which is closely adjacent to the bottom part of the intake mouth 56 and these weft ends will be supported by the lower tube 47 until they can be drawn into the upper tube.

The outer magazine plate 21 has adjustably mounted thereon a thread stop or positioning member 65 having a depending rearwardly fac-

ing hook **66** and having a slot **67** in the upper end thereof to receive an attaching means, such as a screw **68** mounted on the wall **26**. The screw **68** is ordinarily tight to hold the member **65** in fixed position with respect to the wall **26**, but when loosened permits both vertical and angular adjustment of member **65** with respect to wall **26**.

The hook **66** will normally be forward of the thread T2 of bobbin B2 and behind thread T1 of bobbin B1, see Figs. 2 and 7. If bobbin B2 is transferred its thread T2 will descend as the bobbin is transferred into its shuttle and may become disengaged from the edge **29**. The replenished shuttle is then picked as the lay moves rearwardly, see Fig. 10, and the thread T2 will be raised from the position it occupied when the shuttle was in box **10** into reengagement with edge or surface **29***a*, or the rear part of edge **29**, due to motion of the shuttle and to the fact that the thread T2 extends from the upper mouth **56**. As the lay thereafter moves forwardly thread T2 remains up against the bottom of wall **26** and eventually enters hook **66**. If the thread placer **30** is used it will place thread T2 over hook **35**, see Fig. 11, as the lay beats up. If thread placer **30** is not used thread T2 will extend to holder H from the selvage. In either event thread T2 will be kept at a relatively high level because of hook **66** and mouth **56**. After the bobbin transfer has been completed as described the other bobbins in the rear stack will fall by gravity toward transfer position. Eventually this thread T2 will be cut by a temple cutter T, see Fig. 10, and be drawn through mouth **56** into the collector **15**.

If the other shuttle should require replenishment before thread T2 is cut the lowest bobbin B1 in the front stack will be pushed into the second shuttle and on the next beat-up of the loom its thread T1 will extend from either the selvage or hook **35** to holder H, but since this second thread leads to the lower mouth **55** it will lie along a path below the magazine and hook **66**, and also thread T2 and there will be no opportunity for these two threads to become entangled as will be apparent from Fig. 12. The two threads extend under the magazine, and if eventually they are cut by the temple cutter T at the same time thread T2 will pass along hook **66** into the upper mouth **56** and thread T1 will be drawn directly into the lower mouth **55**, and both threads will be sucked into the collector **15**.

It will be understood that during replenishment of the second shuttle as already described the magazine M will rock in a counter-clockwise direction as viewed in Fig. 7 and if thread T2 is present and engaged over the hooks **35** and **66** the latter hook will move this thread rearwardly so that it will be clear of the path of the thread T1, see Fig. 12.

From the foregoing it will be seen that the invention sets forth an improved form of pneumatic thread holder having two intake mouths for two groups of threads, the mouths being at different elevations so that the path traversed by any thread extending into mouth **56** will be above a path traversed by a thread entering mouth **55**. It will also be seen that the thread holder is so constructed that the weft ends W2 which are dropped into slot **42** fall on tube **47** and will be supported by it in favorable position for being drawn into the mouth **56**. Also, the outer plate **21** of the magazine is provided with a thread stop or positioning member **65** which effectively separates the thread corresponding

to a bobbin transferred from the front stack. Furthermore, the thread holder H includes a single piece of sheet material bent to provide two thread slots and has the tube **47** opening into slot **39** and passing through slot **42** and walls **40** and **41**. Both tubes **47** and **52** pass through slot **50** and prevent the holder H from moving angularly around tube **47**. If threads T1 and T2 are both present at the same time thread T2 will be held up against the bottom of wall **26** by the higher intake mouth and thread T1 will be at a lower level spaced below wall **26** due to the lower position of intake mouth **55**.

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 thread holder mechanism for two groups of weft ends extending from a reserve bobbin magazine, a hollow thread collector in which subatmospheric pressures exist, a tube extending forwardly from said collector and formed with an air and thread intake mouth for one of said groups of weft ends, and a second tube extending forwardly from said collector and having an air and thread intake mouth for the other group of threads located above and intermediate the first mouth and said thread collector.

2. In thread holder mechanism for a loom having front and back groups of weft ends extending from reserve bobbins, a thread collector in which subatmospheric pressures exist, an upper tube extending forwardly from the collector and having an air and intake mouth for the back group of threads, a second tube extending forwardly from the collector beyond said mouth and having an intake mouth for the front groups of threads, said second tube extending below the first mouth in position to support weft ends of the rear group in position adjacent to the first named mouth.

3. In thread holder means for front and back groups of weft ends extending from reserve bobbins, a pneumatic thread holder having an air and intake mouth for the front group and having a second intake mouth for the back group located above and rearward of the first mouth, a source of subatmospheric pressures pneumatically communicating with the second mouth, and means pneumatically connecting said source to the first mouth extending below the second mouth in position to support threads of the back group adjacent to the second mouth.

4. In pneumatic thread holder mechanism for front and back groups of weft ends extending from reserve bobbins, a thread holder having front and back upwardly opening thread receiving slots, the front slot for the front group of weft ends and the back slot for the back group of weft ends, a relatively low tube extending through the back slot and opening into the front slot and having an intake mouth for the front group of weft ends, and a relatively high tube opening into the back slot above the relatively low tube and having an intake mouth for the back group of weft ends.

5. The pneumatic thread holder mechanism set forth in claim 4 wherein the relatively low tube is located to support weft ends in the back slot adjacent to the intake mouth corresponding to the back slot.

6. In pneumatic thread holder mechanism for a loom having front and back groups of weft ends extending from reserve bobbins, thread holder means comprising a pair of spaced walls

defining an upwardly opening front slot for the front group of weft ends and having another pair of spaced walls defining a back upwardly opening slot for the back group of weft ends, a tube extending through the back pair of walls and opening into the front slot to define an air and thread intake mouth for the front group of weft ends, and a second tube above the first tube opening into the back slot to define an air and thread intake for the back group of weft ends.

7. The pneumatic thread holder mechanism set forth in claim 6 wherein both tubes pass through one of the walls defining the back slot and prevent substantial angular motion of the thread holder around the first named tube.

8. In pneumatic thread holder mechanism for front and back groups of weft ends extending from reserve bobbins, a thread holder including a front pair of walls and a back pair of walls, each pair having a front and a rear wall, the front pair of walls defining an upwardly opening front thread slot for the front group of weft ends and the rear pair of walls defining an upwardly opening back thread slot rearward of the front thread slot for the back group of weft ends, the rear wall of the back pair of walls having an elongated vertical opening therein and the rear wall of the front pair of walls and the front wall of the back pair of walls having holes therethrough in horizontal register with the lower part of said elongated opening, a tube extending through the lower part of said elongated opening and through said holes and opening into the front slot to define an air and thread intake mouth for the front group of weft ends, and a second tube entering the upper part of said elongated opening into said back slot to provide an air and intake mouth for the back group of weft ends.

9. The pneumatic thread holder set forth in claim 8 wherein the second tube engages the rear wall of said back pair of walls and prevents angular motion of the thread holder with respect to the first named tube.

10. In a pneumatic thread holder means for front and back groups of weft ends extending from reserve bobbins, a piece of sheet material bent on itself to form a front pair of horizontally spaced walls comprising a front and a rear wall defining between them an upwardly opening thread slot for the front group of weft ends, and said sheet material being bent on itself to form a back pair of horizontally spaced walls comprising a front and a rear wall defining a back upwardly opening thread slot for the back group of weft ends, and two tubes fixed with respect to each other in which subatmospheric pressures can be created supporting said holder, one tube extending through the back pair of walls and opening into the front thread slot to provide an intake mouth for the front group of weft ends and the other tube being above the first tube and opening into the back thread slot to provide a thread intake mouth for the back group of weft ends.

11. The pneumatic thread holder means set forth in claim 10 wherein a collar adjustably positioned on the first tube beween said pairs of walls is effective to locate the thread holder longitudinally of said tubes.

12. The pneumatic thread holder set forth in claim 10 including a thread collector in which subatmospheric pressures can be created and into which said tubes extend, means holding the thread holder on said one tube, and means to effect relative adjustment of said tubes with respect to said collector to permit adjustment of said other tube relative to the rear wall of said back pair of walls.

13. In pneumatic thread holder mechanism for a loom having a front thread and a back thread extending from a cloth selvage under an outer wall forming part of a reserve bobbin magazine, a pneumatic thread holder having two thread and air intake mouths one of which is below and forward of the other, said one intake mouth being for the front thread and the other intake mouth being for the back thread, said one intake mouth being so located that the front thread can extend directly thereinto along a path below said wall and the other intake mouth being so located that the back thread engages the under side of said wall and then leads upwardly into said other mouth.

14. The thread holder mechanism set forth in claim 13 wherein a thread positioner secured to said wall extends downwardly between said threads and prevents the back thread from moving into engagement with the front thread.

15. The thread holder mechanism set forth in claim 13 wherein a rearwardly facing hook depends from said wall in position to engage the back thread at a point above said one mouth, said hook and other mouth being effective to hold the part of the back thread extending from the hook to said other mouth at an elevation above the front thread.

16. In pneumatic thread holder mechanism for a loom having two groups of weft ends extending from a reserve bobbin magazine, a hollow thread collector in which subatmospheric pressures can be created, means providing a thread and air intake mouth for one of said groups of weft ends pneumatically communicating with the collector, and other means providing a second thread and air intake mouth for the other group of weft ends above the first intake mouth and pneumatically communicating with said thread collector, the weft ends of the said one group because of the lower location of said first intake mouth being below the weft ends of the other group.

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