March 6, 1951 O. V. PAYNE 2,544,434

TUBE FRAME FOR AXMINSTER LOOMS

Filed July 28, 1948

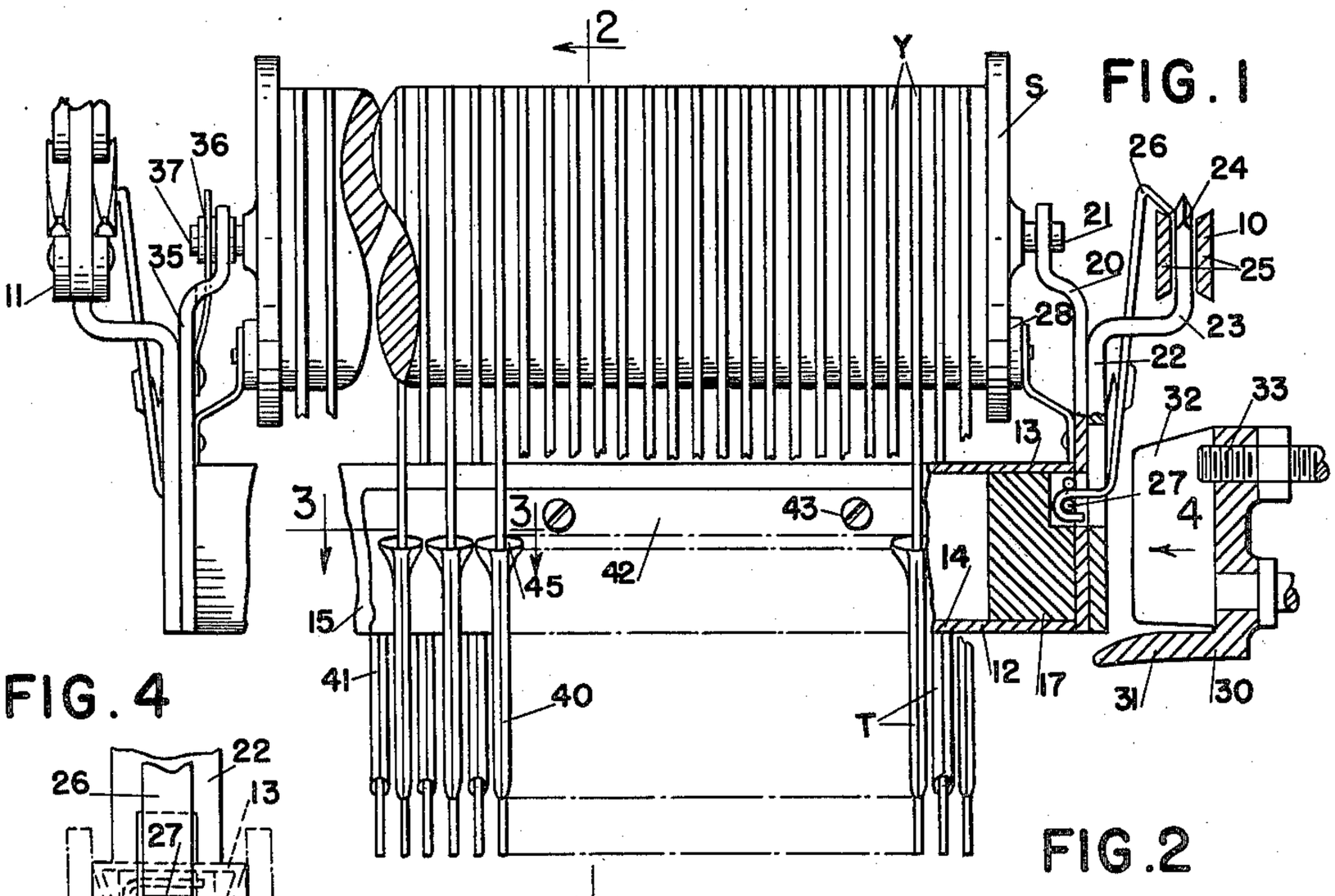

FIG. 1

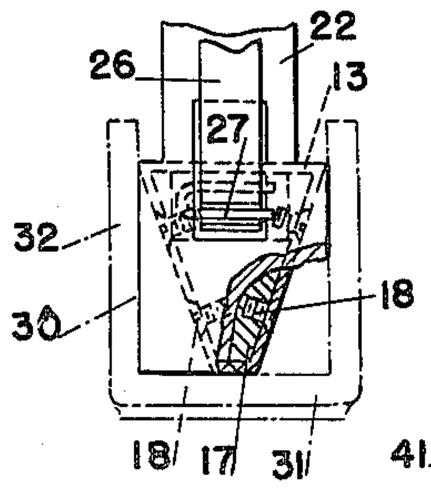

FIG. 4

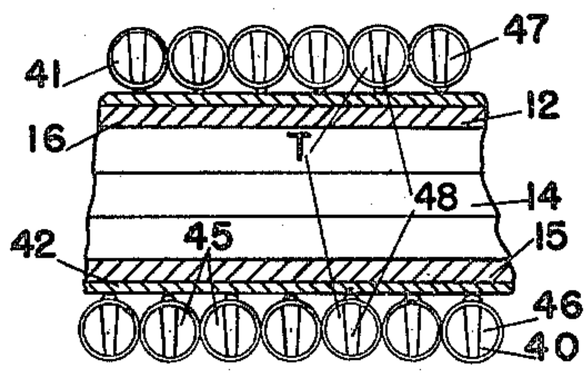

FIG. 3

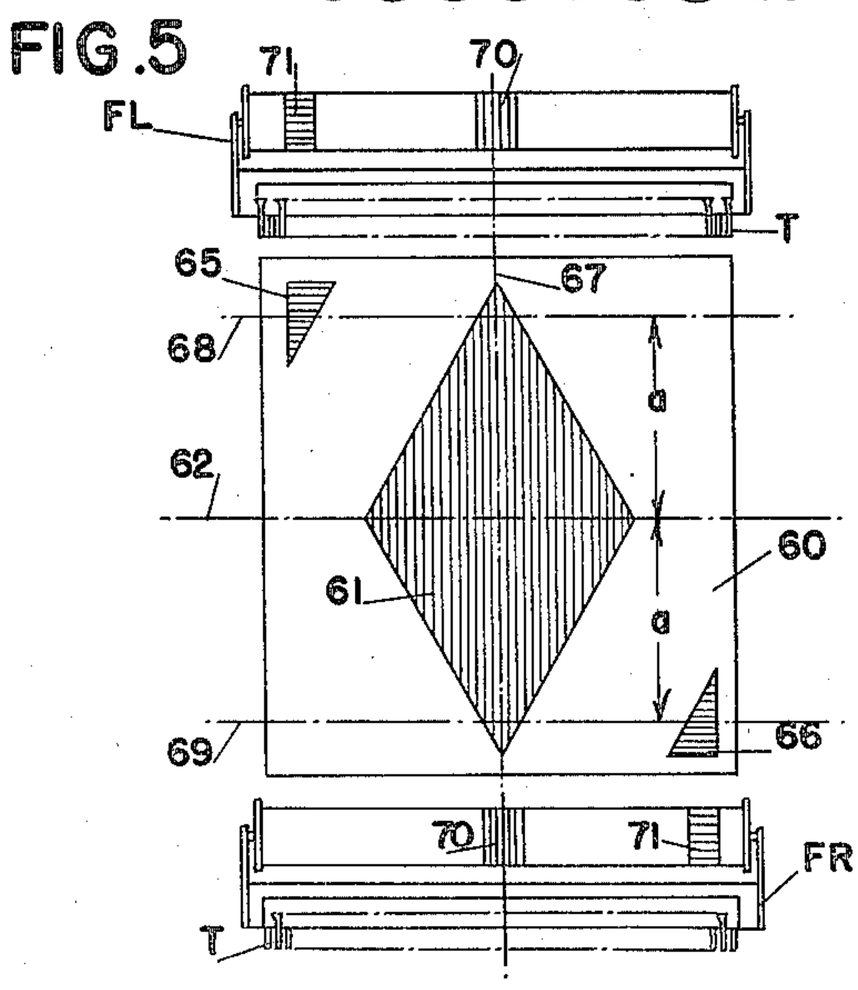

FIG. 5

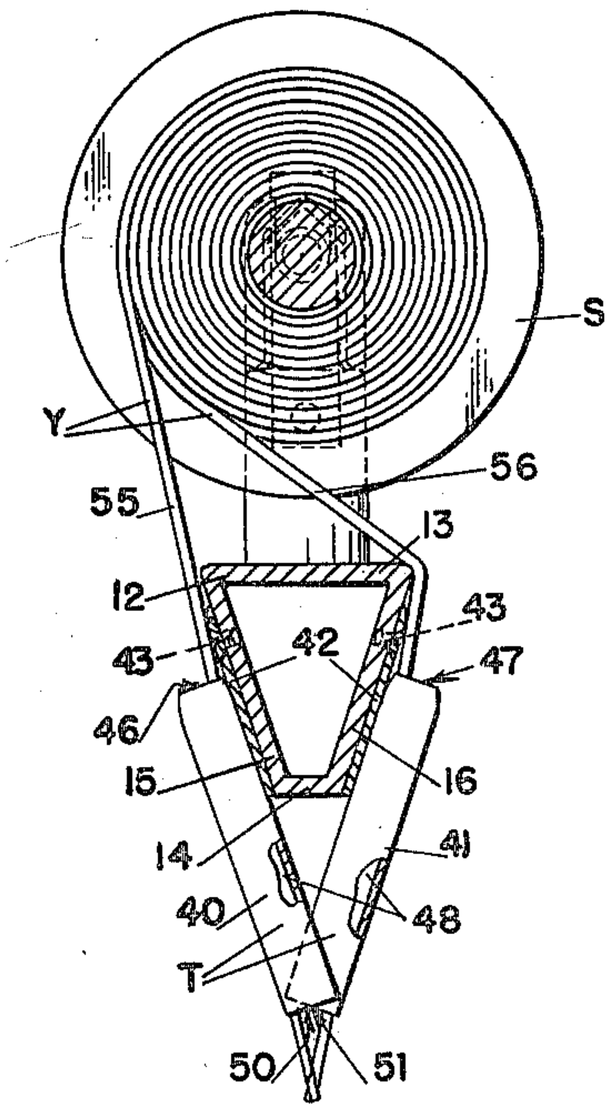

FIG. 2

INVENTOR
OSCAR V. PAYNE

Chas. T. Hawley
ATTORNEY

Patented Mar. 6, 1951 2,544,434

UNITED STATES PATENT OFFICE

2,544,434

TUBE FRAME FOR AXMINSTER LOOMS

Oscar V. Payne, Leicester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application July 28, 1948, Serial No. 41,003

10 Claims. (Cl. 139—10)

1

This invention relates to improvements in Axminster looms and it is the general object of the invention to provide an improved Axminster tube frame.

In Axminster looms the tuft yarns are wound on spools carried by tube frames which are ordinarily provided with a single row of yarn tubes having their receiving mouths in a single line parallel to the carrier bar of the tube frame. In such a construction the yarn receiving mouths are so narrow that they interfere with the entry into the yarn tubes of large sized yarns or knots in yarns. It is an important object of the present invention to provide a tube frame having two rows of yarn tubes, one on each side thereof, the rows being inclined toward each other so that their delivery mouths are arranged along a single line, or in a single row. When a tube frame is constructed in this manner the spacing between adjacent tubes in any one row can be double the spacing in the usual tube frame, thereby providing room for enlarged yarn receiving mouths, but the yarn delivery mouths will be arranged substantially as in the usual tube frame to permit use with ordinary loom parts.

When a rug is unsymmetrical about a central transverse axis it is usually necessary to wind a different spool for each row of tufts in the fabric, each spool having its color yarns in a different order with respect to the direction of unwinding. This will be true even though the pattern of one-half of the rug be merely the opposite hand of the other half. It is another object of the present invention to make a tube frame symmetrical about a longitudinal plane passing through the axis of the spool bearings and the yarn delivery mouths, so that the tube frame will be reversible in the transporting chains. Under this arrangement two identical spools can be wound on the setting frame for each order of yarns drawn from the creel with no reversal of the setting frame. Each pair of spools thus wound is mounted on a pair of tube frames, and one of the tube frames of a pair is used for the first half of the rug and the other for the second half of the rug. Tube frames previously have had all the delivery mouths of their yarn tubes on one side only of a line passing through the axis of the spool bearings, and the carrier bar, and for this reason they could not be reversed when being put in the transporting chains.

It is a further object of the invention to provide an improved method of preparing and applying tube frames to transporting chains when the fabric has its two halves considered lengthwise thereof of opposite hand with reference to a central longitudinal axis. The method includes the steps of winding pairs of identical spools, mounting them on pairs of tube frames reversible in the chains, applying one tube frame of each pair taken in the order in which the pairs are wound to the chains for one half the pattern, and reversing the remaining tube frames end for end and applying them to the chains for the other half of the pattern in the reverse order of winding of the pairs of spools.

2

With these and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawings, wherein a convenient embodiment of the invention is set forth,

Fig. 1 is a side elevation, parts being broken away and parts being in section, of a tube frame made according to the present invention,

Fig. 2 is a vertical section on line 2—2, Fig. 1,

Fig. 3 is a detailed horizontal section on line 3—3, Fig. 1,

Fig. 4 is an end view looking in the direction of arrow 4, Fig. 1, showing the lower part of the tube frame, parts being in section, and indicating one of the transfer clutches in dot and dash lines, and

Fig. 5 is a diagrammatic view showing a pattern for an Axminster fabric setting forth the advantages of the reversibility of the tube frame set forth herein.

Referring particularly to Figs. 1 and 2, the right and left transporting chains 10 and 11, respectively, of the loom are fed intermittently in usual manner and are provided with a group of tube frames which move one by one to a transfer station in the loom. The tube frames, only one of which is shown, are removed from this station by transfer clutches, are dipped and then rolled-in, after which they are lifted and the lower ends of the tufts severed by knives. The tube frames are then returned to the chains. These parts of an Axminster loom are of common construction and are not set forth herein. It is thought sufficient to state that there will be a transporting chain at each side of the loom and the chains will be so formed that each can hold either end of the tube frame to be described. To accomplish this result the chains need not be different from those customarily employed.

The tube frame comprises a carrier bar 12 which may be tubular and of the inverted isosceles trapezoidal cross section shown in Fig. 2, that is, with a relatively broad top 13 and a narrow bottom 14, and equal inclined side walls 15

and 16. Fitted into the right end of the bar 12 as shown in Fig. 1 is a block 17 held in position by screws 18 tapped into the block and passing through walls 15 and 16.

The block 17 has secured thereto an upwardly extending spool bearing 20 to receive the gudgeon 21 of a yarn spool S. A chain engaging member 22 is offset as at 23 and has a tongue 24 to pass between the two links 25 of chain 10. A hook 26 pivoted at 27 with respect to the block 17 normally hangs over one of the chain links 25 to support the right end of the tube frame when the latter is in the chain. The block 17, spool bearing 20, and member 22 are all rigid with respect to each other and may be welded together or fastened to each other in any other approved manner. Any approved form of spool tension, such as that shown at 28, may be employed to retard rotation of spool S.

The loom will have two transfer clutches one of which is shown at 30 in Fig. 1. This clutch has a bottom lip 31 to pass under the adjacent end of the carrier bar 12 and has side wings 32 one of which is shown in Fig. 1. These side wings will be shaped to engage the lower ends of the spool bearing 20 and the member 22, as suggested in Fig. 4. A screw 33 in the upper end of the clutch is positioned to engage the lower end of hook 26 and move the latter away from the chain when the clutch moves to the left as viewed in Fig. 1 preparatory to a tuft forming operation of the loom.

The left end of the tube frame which is supported by chain 11 is similar to the right end already described with the exception that the spool bearing 35 is provided with a spring bearing member 36 which permits the spool gudgeon 37 to be pushed down into bearing relation with respect to the spool member 35. A clutch (not shown) similar to clutch 30 will be employed for the left end of the tube frame.

The spool S is wound with tuft yarns Y which will be arranged with respect to their color according to the pattern requirements. The spool will be wound in the usual manner with the tuft yarns arranged side by side and drawn through yarn tubes to be described secured to the carrier bar 12. In usual tube frames these yarn tubes are in a single plane or row and are arranged side by side on one side only of the carrier bar and are spaced apart a distance determined by the gauge of the tube frame. Thus, if the tube frame is made to weave an Axminster rug having seven tufts to the inch measured across the fabric, the yarn tubes will be 1/7'' apart along the length of the carrier bar, and the yarn receiving mouths of the tubes will ordinarily be no wider than 1/7''.

In the present instance I arrange the yarn tubes T in two planes or rows and incline the planes of the rows to each other so that the upper ends of the tubes of one row are spaced transversely of the carrier bar with respect to the upper ends of tubes of the other row, but the lower ends of all the tubes of both rows will be aligned much in the same manner as are the lower ends of the yarn tubes of the ordinary tube frame.

Referring particularly to Fig. 2, the left hand row 40 of yarn tubes extends downwardly to the right from the inclined side wall 15, while the other row 41 of yarn tubes extends downwardly to the left from the inclined side wall 16. The yarn tubes are secured to carrier plates 42 which may be fastened to their respective sides of the carrier bar by screws 43. The yarn tubes of the group 40 will be staggered lengthwise of the carrier bar with respect to the yarn tubes of the group 41, so that alternate yarn tubes along the length of the carrier bar 12 will be in one row, while the intermediate tubes will be in the other row.

The result of this distribution or mounting of the yarn tubes will be to space the tubes in either row double the distance which has been possible with tube frames as heretofore made, as will be apparent in Fig. 1. Because of this double spacing the upper end of each yarn tube can be provided with a yarn receiving mouth 45 which has a width approximately double the gauge of the tube frame. These mouths are arranged in two rows, the rows 46 and 47 corresponding respectively to the yarn tube rows 40 and 41. The plates 42 are secured to the carrier bar 12 so that the yarn tubes of one row will be between the tubes of the other row.

The yarn mouths are substantially circular, see Fig. 3, although I do not wish to be limited to this particular shape, but when the mouth is round it provides a maximum area for the entry of a knot in a yarn for a given perimeter of the tube. It is to be understood that the tube will be formed of one piece of metal and may be either folded, as is common in prior practice, or may be made of a seamless tube cylindrical in original form and then rolled and shaped to provide the mouth and a yarn passage 48.

The lower end of each yarn tube has a yarn delivery mouth, the yarn tubes of row 40 having delivery mouths 50, while the tubes of row 41 have delivery mouths 51. The mouths 50 and 51 are aligned lengthwise of the carrier bar as shown in Fig. 2. These mouths are in a plane which passes through the axis of the spool bearings 22 and 35 and the central longitudinal axis of the carrier bar, and the tube frame is symmetrical about a vertical axis as viewed in Fig. 2. The yarns will be divided into two planes 55 and 56 leading respectively to the rows 40 and 41 of yarn tubes.

As a result of the symmetry of the tube frame about a vertical axis it is reversible so that either end thereof can be supported by either chain 10 or chain 11. The advantage of this reversibility will be understood with reference to Fig. 5, which shows a fabric 60 having a large central figure 61, shown here in the form of a diamond, symmetric about a central transverse axis indicated by line 62. In the upper left-hand corner of the fabric is a second figure 65, shown as a triangle, while in the lower right hand corner there is a third figure 66 similar to figure 65, but of the opposite hand and inverted. The upper right hand and lower left hand corners of the fabric are left plain and unfigured, so that the fabric 60 is not symmetrical about either the axis 62 or the central lengthwise axis indicated by line 67. The upper and lower halves of the fabric are of opposite hand with reference to the longitudinal axis 67.

To illustrate the previously mentioned method when used to weave a pattern such as that shown at 60, two cross rows of tufts at equal distances from axis 62 will be selected for consideration. It is assumed that the upper frame FL shown in Fig. 2 is one of a pair of identical tube frames the other of which is designated at FR. Tube frame FL is in such position that its yarns are arranged to produce the cross row of tufts on line 68 which will be a given distance *a* from axis

62. At the bottom of Fig. 5 the similar tube frame FR is reversed and in its reversed position it will supply the yarns for the cross row 69 of tufts also at distance *a* from axis 62 Each of the spools for the particular sections shown at lines 68 and 69 in Fig. 5 will have a central group 70 of distinctive yarns corresponding to the diamond shaped figure 61, and near one end thereof will be another group 71 of distinctively colored yarns for the triangular figures 65 and 66. Tube frame FR may be considered to have its sections 70 and 71 arranged in right hand order, while the sections 70 and 71 of tube frame FL are in left hand order.

Only one pair of tube frames has been described in connection with Fig. 5, but it will be understood that similar relations will exist for all the other pairs of tube frames. The pair for the topmost and bottommost rows of tufts of pattern 60 will be at the ends of the series of tube frames in the transporting chains, while the pair of tube frames for the two rows of tufts at the center, one at each side of axis 62, will be side by side in the series. The members of the other pair of tube frames will be separated in the chains according to the distance between their respective rows of tufts in fabric 60.

When the series of spools is prepared for weaving the fabric 60 there will be half as many kinds of spools with respect to color or pattern distribution of yarns as that needed for weaving the fabric, but there will be a pair of each kind, and for each row of tufts of one hand in one half of the fabric one member of a pair will be used, and for the corresponding row of opposite hand in the other half of the fabric the other member will be used. The pairs of spools are arranged in the order in which they are wound on pairs of tube frames, and one or the first member of the first pair of frames is put in the transporting chain, then one or the first member of the next pair, etc., until the first member of all the pairs of tube frames for the first half of the fabric 60, the upper half in Fig. 5, for instance, are arranged on the transporting chains in the order of winding of the pairs of spools. Then the second or remaining tube frames of the pairs are turned end for end and put in the chain in reverse order of winding. One half of the tube frames, that is, the first members of the pairs, will be attached to the chains in positions corresponding for instance to the tube frame designated at FL, while the other half of the tube frames, the second members of the pairs, will be in positions suggested by the tube frame FR.

It will thus be seen that it will not be necessary to wind a different spool for each tuft of rows throughout the whole length of the fabric 60, and it will suffice if only half as many threadings of the setting frame are used as would be necessary if the tube frames were not reversible in the transporting chains.

From the foregoing it will be seen that the invention sets forth a tube frame having two rows of tuft yarn tubes arranged in such manner that each yarn tube can have an enlarged mouth for the passage of large yarns or knots in the yarns. This result is accomplished by having every other yarn tube on one side of the carrier bar 12, and the intermediate yarn tubes on the other side of the bar. While the yarn receiving mouths are in two different rows preferably parallel to the carrier bar, the yarn delivery mouths 50 and 51 are all aligned so that they

will be presented to the nose board of the loom and the cutting mechanism in the same manner as under previous practice. The distance between adjacent receiving mouths in either row is double the distance between adjacent delivery mouths. Furthermore, it will be seen that the tube frame is symmetrical about a vertical longitudinal plane passing through the axis of the spool bearings, the longitudinal central axis of the carrier bar 12, and the aligned delivery mouths 50 and 51, and for this reason the tube frame can be reversed in the transporting chains 10 and 11. Because of the reversibility of the tube frames in the chains a non-symmetrical pattern, such as that shown in Fig. 5, can be woven from tube frames the spools of which are wound with half as many threadings of the setting frame as would otherwise be necessary, and with no reversals of the setting frame, and this face simplifies the method of preparing tube frames for assembly in the chains.

Having thus described the invention it will be seen that changes and modifications of the foregoing specific disclosure may be made without departing from the spirit and scope of the invention.

What is claimed as new is:

1. In an Axminster tube frame, a carrier bar, spool bearings on the ends of the bar, the latter having a cross section in the form of an inverted isosceles trapezoid symmetrical about a plane passing through said bearings and the longitudinal axis of the bar, the sides of said bar being inclined downwardly and toward each other, and a row of yarn tubes on each of said sides, each yarn tube having a yarn receiving mouth and a yarn delivery mouth, said rows being inclined downwardly and toward each other and having the delivery mouths aligned and in said plane.

2. In an Axminster tube frame, an elongated carrier bar, aligned spool bearings on said bar, two rows of yarn tubes, each tube having a yarn receiving mouth and a yarn delivery mouth, and means mounting said rows of tubes on the bar with all the delivery mouths aligned and with the receiving mouths of the tubes of one row spaced transversely of the bar from the receiving mouths of the tubes of the other row, said delivery mouths lying in a plane passing through the axis of said bearings and the central longitudinal axis of the carrier bar.

3. In an Axminster tube frame, an elongated carrier bar, aligned spool bearings at the ends of said bar, two rows of yarn tubes, each tube having a yarn receiving mouth and a yarn delivery mouth, and means mounting said rows of tubes on the bar obliquely with respect to each other and with all the delivery mouths aligned and in a plane passing through said bearings and the longitudinal axis of the bar and with the receiving mouths of the tubes of the two rows symmetrically placed on opposite sides of said plane.

4. In an Axminster tube frame for a loom having clutches to support the tube frame, an elongated carrier bar, and yarn tubes secured to opposite sides of the bar and having aligned yarn delivery mouths under the axis of said bar when the clutches hold said tube frame in upright position the delivery mouths being located in a vertical plane passing through the axis of said bar and said clutches.

5. In an Axminster tube frame for a loom having clutches to support the tube frame, an elongated carrier bar, and yarn tubes secured in two

rows on opposite sides of the bar and having aligned yarn delivery mouths, said rows of yarn tubes being symmetrical about a plane passing through the clutches and axis of the bar so that said delivery mouths will bear the same relation transversely of the bar if the tube frame is turned end for end and placed in the clutches.

6. In an Axminster tube frame for a loom having clutches to support the tube frame, an elongated carrier bar, and yarn tubes secured in two rows on opposite sides of the bar and having aligned yarn delivery mouths, said yarn tubes being symmetrical about a plane passing through the clutches and axis of the bar so that when the tube frame is in one position in said clutches the delivery mouths will occupy one position relatively to a given plane passing through the clutches and mouths and when the tube frame is turned end for end and reversed in said clutches said delivery mouths will occupy the same position relatively to said given plane.

7. In an Axminster tube frame for a loom having clutches to support the tube frame, the tube frame having aligned yarn delivery mouths at the lower ends of yarn tubes on a carrier bar when the tube frame is supported in upright position by said clutches, the tube frame being symmetrical about a plane passing through said aligned mouths and the central longitudinal axis of the carrier bar to be reversible end for end in the clutches without changing the position of said mouths with respect to said plane.

8. In an Axminster tube frame, a carrier bar, aligned spool bearings on the ends of the bar, the latter having side walls oblique relatively to each other and symmetrically placed with respect to a plane passing through said bearings and the central longitudinal axis of the bar, and two rows of yarn tubes, one for each of said side walls, the yarn tubes having yarn delivery mouths all of which are aligned and arranged in said plane.

9. In an Axminster tube frame, a carrier bar having a central longitudinal axis, aligned spool bearings on said bar, the axis of said bearings being parallel to said axis of the bar, and two rows of yarn tubes on opposite sides of the bar symmetrically placed with respect to a plane passing through said axes and having yarn delivery mouths all of which are aligned and in said plane.

10. In an Axminster tube frame, a carrier bar having side walls inclined downwardly and toward each other and symmetrically placed with respect to the central longitudinal axis of the bar, aligned spool bearings on said bar, the axis of said bearings being parallel to said axis of the bar, and two rows of yarn tubes, one for each of said side walls, said rows being inclined downwardly and toward each other, the yarn tubes having yarn delivery mouths all of which are aligned and in a plane passing through said axes.

OSCAR V. PAYNE.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,089,822	Clapperton	Mar. 10, 1914

FOREIGN PATENTS

Number	Country	Date
1,283	Great Britain	of 1908
317,193	Great Britain	Aug. 15, 1929