Sept. 1, 1931. E. W. STONE 1,821,409

MACHINE FOR TRIMMING THE TUFT YARNS OF TUBE FRAMES

Filed Dec. 18, 1929 3 Sheets-Sheet 1

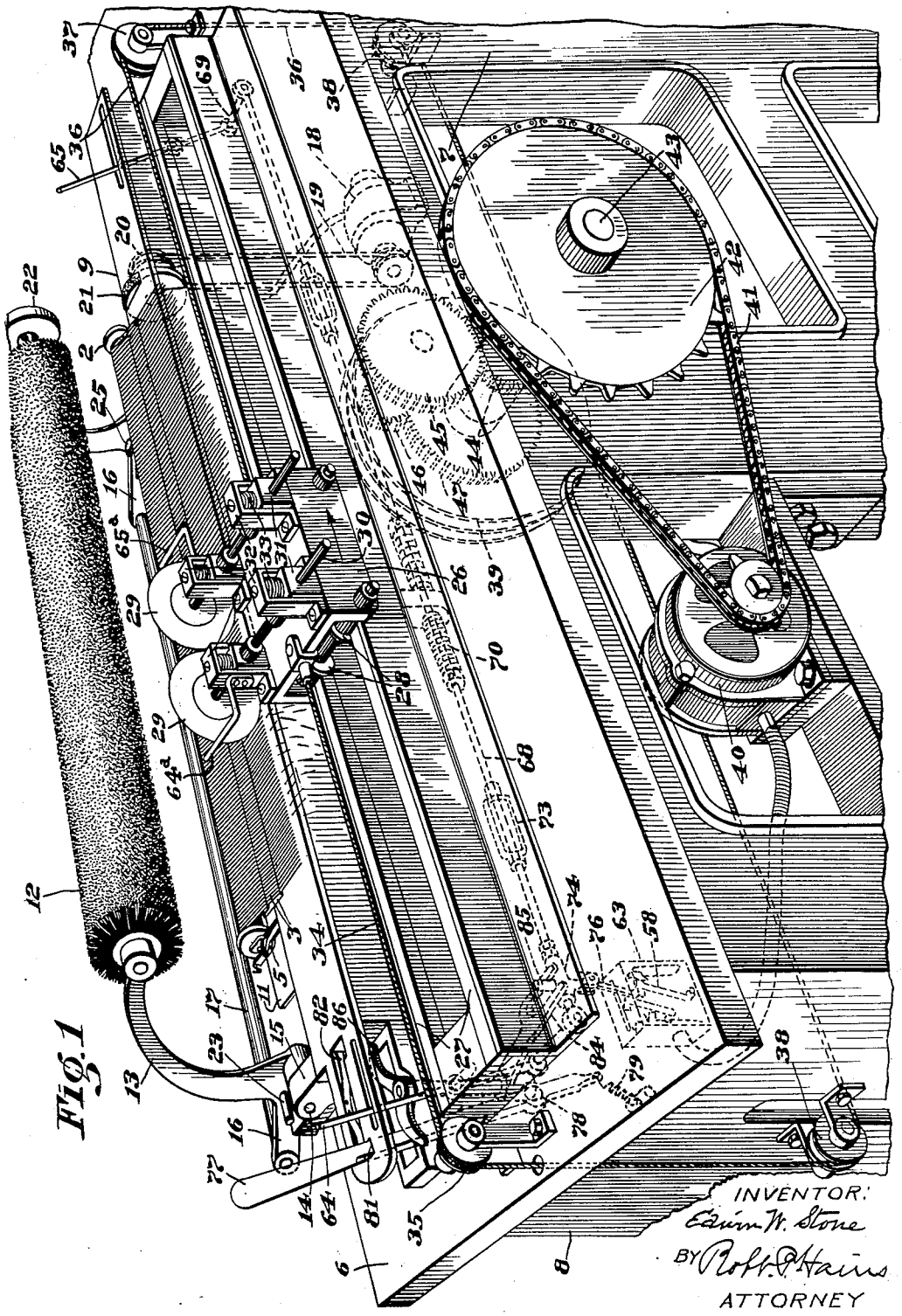


Fig. 1

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Filed Dec. 18, 1929 3 Sheets-Sheet 2

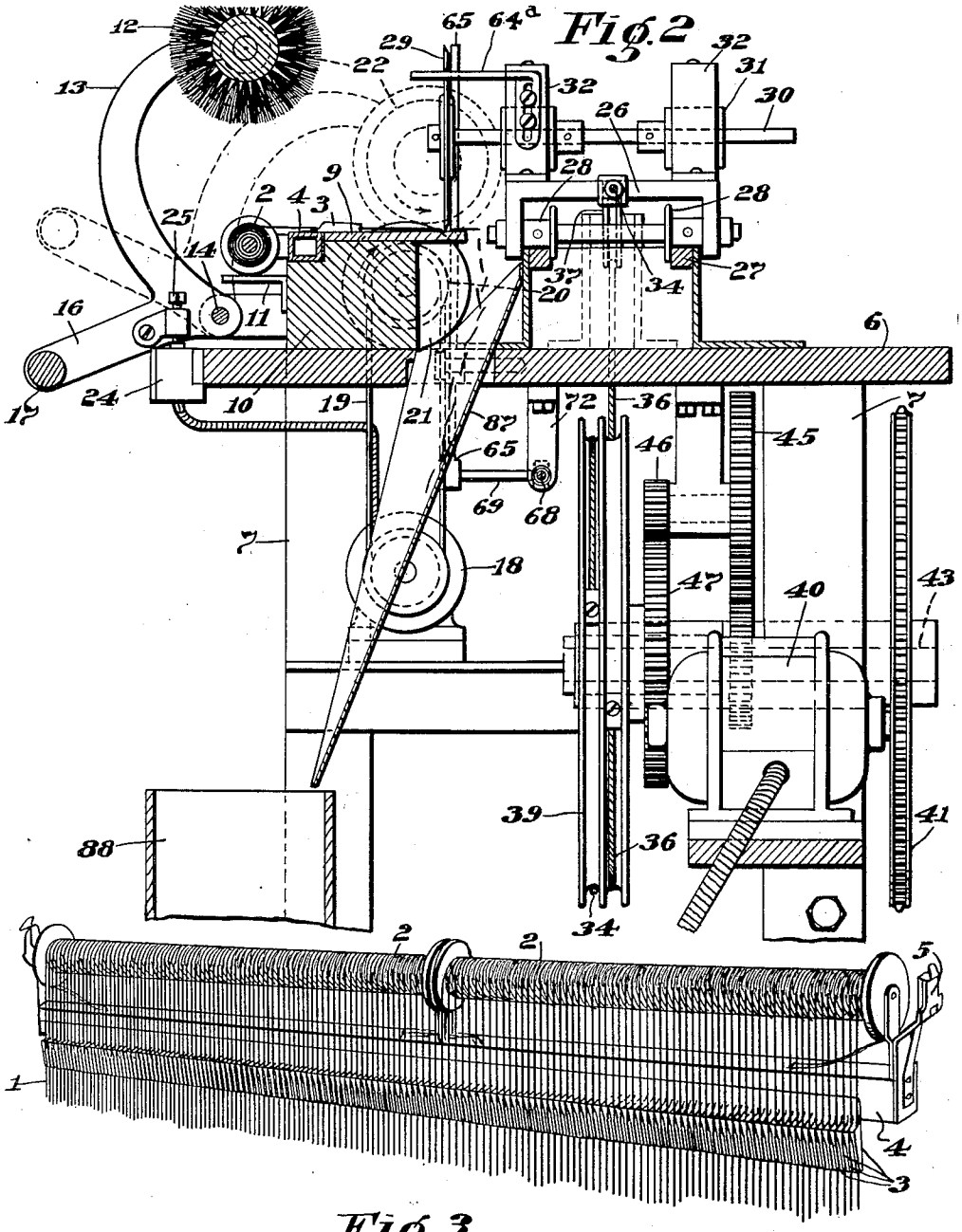


Fig. 2

Fig. 3

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MACHINE FOR TRIMMING THE TUFT YARNS OF TUBE FRAMES

Filed Dec. 18, 1929 3 Sheets-Sheet 3

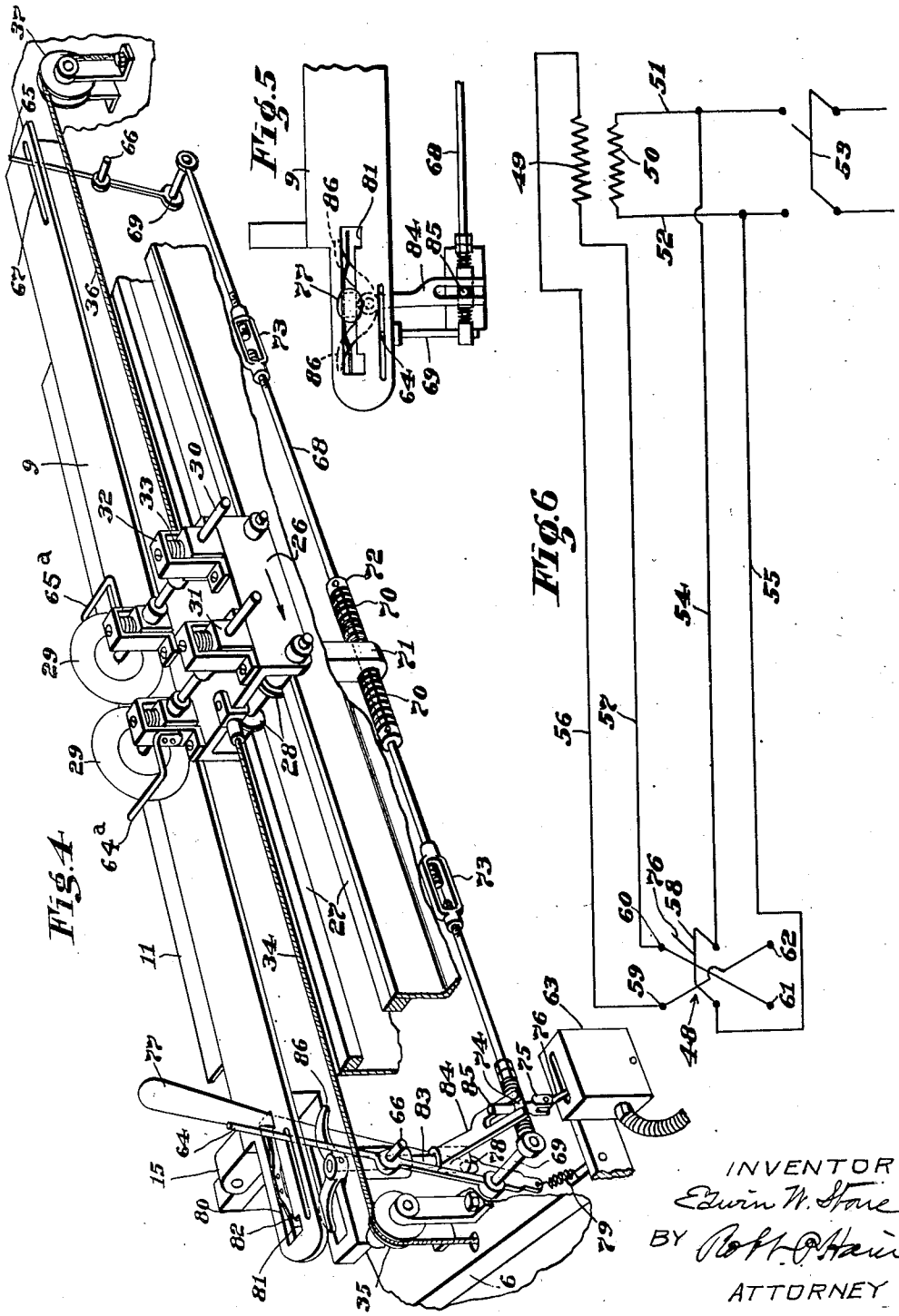


Fig. 4

Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE

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MACHINE FOR TRIMMING THE TUFT YARNS OF TUBE FRAMES

Application filed December 18, 1929. Serial No. 414,889.

This invention relates to the trimming of the tuft yarns of tube frames preparatory to using the tube frames in weaving Axminster carpets and other similar pile fabrics, and more particularly to machines for trimming the tuft yarns at a uniform distance from the tube frame.

In weaving Axminster and Moquette carpets or rugs, tuft tube frames are employed to form the pile loops that are bound to the body fabric, and the different colored yarns for forming the pile are drawn into the individual tubes of a tuft tube frame in accordance with a predetermined design.

After the tuft forming yarns have been drawn through the tubes of a tube frame it is necessary or desirable to trim the tuft yarns so that they will all extend a uniform distance from the tube frame. This trimming operation has been performed heretofore by hand but it is difficult to trim the tuft yarns evenly by hand.

The present invention therefore relates to tuft yarn trimming machines for trimming the tuft yarns of a tuft tube frame so that the projecting yarns will all extend a uniform distance from the tube frame.

One important feature of the present invention resides in a tube frame support and means associated therewith for trimming the tuft yarns at a uniform distance from the tube frame.

Another important feature of the invention resides in a brush for straightening out the tuft yarns preparatory for the trimming operation.

Another feature of the invention resides in a cutter supporting carriage mounted for moving longitudinally of the trimming table and provided with a yarn engaging cutter and means for advancing the carriage along the table to trim the tuft yarns.

Another feature of the invention resides in means for supporting the brush for movement to and from the yarn brushing position and in means for driving the brush while it is in the yarn engaging position.

A further feature of the invention resides in a reversing motor for advancing the cutter carriage in either direction longitudinally of the trimming table.

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form of the invention.

In the drawings:

Fig. 1 is a perspective view of a yarn trimming machine constructed in accordance with the present invention;

Fig. 2 is a transverse sectional view through the machine of Fig. 1;

Fig. 3 is a perspective view of a tuft tube frame of well known construction;

Fig. 4 is a perspective view having the upper frame structure broken away to disclose the carriage control mechanism;

Fig. 5 is a top plan view of the power control lever and associate parts; and

Fig. 6 is a diagrammatic view of the electrical connection for the carriage advancing motor.

The trimming machine of the present invention is designed for use to trim the tuft yarns of the tube frame shown in Fig. 3 of the drawings or any other type of tuft tube frame.

In preparing tuft tube frames for use in a loom to supply the tuft yarns, the yarns 1 supplied by one or more spools 2 mounted upon the tube frame are drawn through the individual tubes 3 secured to the carrier bar 4 of the tube frame. These yarns after being drawn through the tubes will present the uneven appearance shown in Fig. 3. It is therefore desirable to trim these yarns to a uniform length before the tube frames are attached by their hooks 5 to the tube frame advancing chains supported adjacent a loom and operable in a well-known manner to advance the successive tube frames towards the tuft inserting position.

The tuft yarn trimming machine of the present invention may be variously constructed and in the embodiment of the invention shown has a raised surface or platform 6 which is supported the desired distance

from the floor by the side frames 7 and end frames 8 of the machine.

Upon the platform 6 is mounted the trimming table 9 that extends longitudinally of the machine and this table in the present case is supported in spaced relation to the platform 6 by a block or bracket 10. The block 10 in the construction shown has a portion cut away to form a seat for the carrier bar 4 of the tuft tube frame, and the spool or spools 2 of the bar may rest upon the shelf 11 attached to the block 10. The arrangement is such that the tube frame may be readily placed in the position in which it is shown in Figs. 1 and 2 with the individual tubes 3 resting upon and extending over the trimming table 9 while the inner face of the carrier bar 4 abuts against a portion of the block 10 to thereby align the tube frame with the yarn trimming mechanism.

In carrying out the present invention it is important that the tuft yarns 1 to be trimmed be placed upon the trimming table 9 in a straightened condition transversely of the table so that they will be trimmed evenly by the cutter. This is accomplished in the embodiment of the invention shown by providing the rotating brush 12 which is supported by the arms 13 for movement towards and from the trimming table 9. The arms 13 are pivotally secured at 14 to brackets 15 extending laterally from the block 10.

It is desirable that the brush 12 be so supported that it may be readily moved by hand to and from the yarn engaging position and to this end the rocking arms 13 which support the rotating brush are provided with the laterally projecting arms 16 and these arms 16 are secured to an operating bar 17 which extends longitudinally of the trimming machine as will be apparent from Fig. 1. The arrangement is such that the weight of the bar 17 will normally hold the brush 12 in the elevated position in which it is shown in Fig. 1, but the brush may be readily engaged with the tuft yarns 1 upon the table 9 by raising the operating bar 17 to shift the brush 12 from the position in which it is shown in full lines in Fig. 2 to the position to which it is shown in dotted lines in this figure.

It is necessary that the brush 12 be rotated while in engagement with the table 9 to thereby straighten out the yarns 1 but it is unnecessary that the brush be rotated while it is in its inactive position of Fig. 1.

Various means may be provided for rotating the brush only while it is in engagement with a trimming table and this is accomplished in the construction shown by providing an electric driving motor 18 mounted upon the machine supporting frame and this motor is provided with a driving belt or chain 19 adapted to drive the pulley or sprocket 20 which rotates the friction driving disk 21 that is mounted below the trimming table 9 but so arranged that a small portion of this driving disk extends upwardly through a slot formed in the table 9 as will be apparent from Figs. 1 and 2. The brush 12 is provided at one end with a driving disk 22, the arrangement being such that when the brush 12 is moved to the yarn engaging position the friction disk 22 will be brought into engagement with the power driven disk 21 to rotate the brush 12. The rocking arms 13 are preferably provided with stops such as 23 for limiting the rocking movement of these arms towards the trimming table.

It may be desirable to cut off the driving current for the motor 18 while the brush 12 is in its elevated position and this is readily accomplished by providing the motor 18 with a controlling switch 24 which is so positioned that when the brush 12 is moved to its elevated position in which it is shown in full lines of Fig. 2 an adjustable stop 25 mounted upon an arm 16 will engage and actuate the electric switch 24 to cut off the supply of current to the motor 18, and as soon as the brush supporting means is moved towards the table 9 the stop 25 will be disengaged from the switch to permit the same to automatically start the motor 18.

It will be seen from the foregoing that when the tuft yarns of a tube frame are to be trimmed the tube frame may readily be placed in the position in which it is shown in Figs. 1 and 2 so that the yarns 1 will extend over the trimming table 9 and that these yarns may be readily straightened out for engagement by the trimmer by momentarily engaging the rotating brush 12 with the yarns 1.

The means for trimming the yarns 1 may be variously constructed but in the embodiment of the invention shown the trimming means consist of a carriage 26 mounted for movement lengthwise of the trimming machine upon the tracks or runways 27, the carriage being provided with the flanged rollers 28 adapted to travel along the tracks 27.

The cutter or trimmer provided upon the travelling carriage 26, in the construction shown consists of a pair of cutter disks 29, each of which is provided with a supporting shaft 30, that is journaled in the spaced bearing blocks 31. These blocks in the construction shown are mounted for vertical sliding movement of the brackets 32 secured to the traveling carriage but the blocks are continuously urged in a downward direction by the springs 33. The construction is such that each cutter disk 29 is supported by its shaft 30 in yielding engagement with the surface of the trimming

table 9, which surface is preferably made of relatively soft metal so as not to injure the cutting edge of the disks cooperating therewith.

It will be seen from the trimming mechanism just described that the engagement of the cutter disks with the table 9 serves to rotate these disks as they are rolled along the table by the travel of the carriage 26. In some cases a single cutter disk will be sufficient but two cutter disks are provided in the construction shown to insure the severing of all tuft yarns.

Various forms of operating mechanism may be provided for advancing the carriage 26 back and forth along the tracks 27, and it is preferable that the construction be such that the trimming mechanism will trim the yarns as the carriage travels lengthwise of the machine in either direction.

In the embodiment of the invention illustrated a rope or cable 34 connected to the carriage 26 and extending therefrom to a grooved pulley 35 supported at one end of the platform 6 serves to pull the carriage in a left-hand direction viewing Fig. 1. A similar rope or cable 36 connected to the carriage 26 and passing around a grooved pulley 37 disposed at the opposite end of the machine serves to pull the carriage in a right-hand direction.

The operating cables 34 and 36 extend downwardly from the pulleys 35 and 37 to the pulleys 38 and then inwardly to an operating drum 39 having two grooves, one for receiving the cable 34 and the other for receiving the cable 36. It will be apparent from the construction just described that the carriage 26 may be moved lengthwise of the machine in either direction by rotating the grooved drum 39 in one direction or the other.

The means shown for driving the grooved drum 39 comprises a reversing motor 40 having a driving chain 41 for driving the large sprocket 42 that is rigidly secured to the operating shaft 43. The shaft 43 is provided with a pinion 44 adapted to drive the reducing gears 45, 46, and the gear 46 meshes with a gear 47 that drives the grooved drum 39 at the desired speed. The carriage operating mechanism just described is such that the carriage will be advanced lengthwise of its tracks in one direction or the other depending upon the direction in which the reversing motor 40 is driven.

The direction of rotation of the motor 40 may be readily controlled by providing a reversing switch 48 of well konwn construction, see Fig. 6. This switch will serve to reverse the direction of current passing through the field 49 of the motor 40 without reversing the current passing through the armature 50 of this motor. One practical form of wiring for the reversing motor 40 is shown in Fig. 6 wherein current is supplied to the armature 50 through the conductor wires 51 and 52 upon closing the hand operated switch 53 leading from any suitable source of current supply as shown in Fig. 6.

The closing of the switch 53 will serve also to supply current through the conductors 54 and 55 to the reversing switch 48, which switch is connected to the field coil 49 by the conductors 56 and 57. The arrangement is such that when the movable element 58 of the reversing switch 48 is moved into engagement with the contacts 59 and 60 current will be supplied to the field coil 49 in one direction, and when the movable element 58 of the switch is engaged with the contacts 61 and 62 current will pass through the coil 49 in the opposite direction, thus reversing the direction in which the motor 40 rotates. The reversing switch 48 is preferably housed in the box or casing 63 mounted upon the machine frame in position to have the switch element 58 shifted into and out of engagement with the contacts 59, 60, 61 and 62 by the operating mechanism to be described.

It is desirable that the travel of the carriage 26 be at all times under the control of the machine attendant and that the construction be such that the carriage will automatically come to rest upon approaching either end of the desired path of travel. While various means may be provided to this end one good practical construction is illustrated in the drawings and will now be described.

The means disclosed in the drawings for arresting the travel of the carriage 26 as it approaches either end of the trimming machine consists of the rocking levers 64 and 65 which are pivotally mounted at 66 near the opposite ends of the machine and the upper ends of these levers extend upwardly through slots 67 formed in the table 9. The arrangement is such that as the carriage 26 approaches the end of its path of travel in one direction a stop 64^a disposed at one side of the carriage will engage and shift the lever 64 and as the carriage approaches the end of its travel in the opposite direction a stop 65^a upon the carriage will engage and shift the lever 65.

Each of these levers 64 and 65 is provided with a downwardly extending portion that is connected to the longitudinally extending rod 68 by a pin 69. The arrangement is such that movement is imparted from one lever 64, 65 to the other by the connecting rod 68. It is desirable that these two levers shall be normally held in their intermediate position, that is midway between the ends of the slots 67. This is accomplished by providing the coiled springs 70 disposed at

the opposite sides of the fixed rod supporting bracket 71 and each of these springs is confined between a face of the bracket 71 and a collar 72 secured to the rod 68. The rod 68 may also be provided with the turn buckles 73 for varying the effective length of the connection between each lever 64 and 65 and the centering springs 70.

The longitudinally extending rod 68 is connected to the movable portion 58 of the reversing switch by providing the rod 68 with the sleeve 74 slidably mounted upon the rod 68 and confined between coiled springs. This sleeve 74 is provided with the downwardly extending portion 75 connected to an operating lever 76 of the reversing switch. The arrangement just described is such that the reversing switch will be normally held in its intermediate or switch open position by the centering springs 70, but the reversing switch may be closed to drive the motor 40 in one direction or the other depending upon the direction in which the connecting rod 68 is shifted from its normal or intermediate position.

The stop 64ª and 65ª upon the traveling carriage 26 as above pointed out, will serve to automatically stop the travel of the carriage as it approaches either end of the trimming machine, and means will now be described for manually effecting the travel of the carriage 26 in either direction lengthwise of the machine. This is accomplished in the construction shown by providing the hand operated lever 77 which is pivotally mounted at 78 and this lever is normally held in its central or intermediate position by any suitable means such as a spring 79 having one end anchored and its other end secured to the downwardly extending end of the lever 77. This lever may be shifted back and forth within the slot 80 formed in the table 9 and may be retained at either end of this slot by engaging the lever with a notch 81 provided at each end of the slot 80, and if desired a blade spring 82 may be provided for yieldingly holding the lever 77 in engagement with either notch 81.

The function of the lever 77 is to shift the connecting rod 68 in either direction to bring the movable element 58 into engagement with either set of the reversing contacts. This is accomplished in the construction shown by providing the upright rocking shaft 83, the lower end of which is provided with a laterally extending arm 84, the outer end of which is provided with a slot adapted to receive a pin 85 extending upwardly from the sleeve 74. The upper end of the rocking shaft 82 is provided with a head having the curved oppositely extending arms or horns 86, the arrangement being such that when the hand operated lever is shifted in one direction from its normal or central position it will engage one horn 86 and rock the shaft 83 and arm 84 to thereby bring the movable element 58 of the reversing switch into engagement with one side of the contacts and when the lever 77 is shifted to the opposite end of the slot it will engage the other horn 86 to bring the movable element 58 of the reversing switch into engagement with the other set of contacts. It will be noted that the hand operated lever 77 is shown at one end of its stroke in Fig. 1 and at the other end of this stroke in Fig. 4, while in Fig. 5 it is shown in its central or switch open position.

It will be understood from the carriage operating mechanism above described that the hand operated lever 77 is shifted to one end of its stroke to advance the carriage in one direction to trim the yarn 1, and the lever 77 is shifted to the opposite end of its stroke to cause the carriage to travel in its opposite direction. As the carriage 26 approaches the end of its travel in either direction the engagement of the stop 64ª or 65ª with a lever 64 or 65 will serve to shift the connecting rod 68. This will rock the shaft 83 to move one of the horns 86 in a direction to release the lever 77 from the holding notch 81 whereupon the lever will move to its intermediate position of Fig. 5 under the influence of the spring 79, and thus bring the motor 40 to rest and stop the travel of the carriage. Should it be desired to provide means whereby the motor 40 may be controlled from either side of the machine, this may be readily accomplished by simply providing the manually controlled lever 77 with a connecting rod (not shown) extending lengthwise of the machine so that the lever 70 may be shifted from any desired position along the trimming machine.

The rotating brush 12 will serve not only to straighten out the yarns 1 but also to keep the trimming table 9 clean by brushing off the severed ends of the yarns so that they may pass down the guide apron or trough 77 adapted to guide the trimmings into the hopper 88.

As a result of the present invention the tuft yarns of tube frames may be quickly and accurately trimmed at a uniform distance from the tube frame, by placing each tube frame upon the tube frame support in aligned relation with the trimming mechanism so that the tuft yarns extending from the tubes will rest upon the trimming table 9. The brush 12 is then moved into engagement with the tuft yarns 1 to straighten them out, whereupon the hand lever 77 may be shifted to advance the trimmer carriage along its path of travel to cause the cutters 29 to trim the yarns. The tube frames with the tuft yarns evenly trimmed may then be connected to the tube frame advancing mech-

anism of the loom in which they are to be used.

What is claimed is:

1. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a rotating brush for straightening the tuft yarns on said table in position for trimming, and a tuft yarn trimmer movable along said table to trim the tuft yarns at a uniform distance from the tube frame.

2. In a tuft yarn trimming machine, the combination of a tube frame support having means for aligning a tube frame on said support, a trimming table on which the tuft yarns extending from said frame rest and provided with a rigid surface for supporting the yarns at each side of the shearing point, a brush for brushing the tuft yarns transversely of said table to straighten the tuft yarns extending from said frame, a tuft yarn trimmer comprising a cutter, and means for moving the tuft yarn trimmer longitudinally of the table in a path parallel to the aligned tube frame to trim the tuft yarns at a uniform distance from the tube frame that the tuft yarns extending from the tube frame may be of uniform lengths.

3. In a tuft yarn trimming machine, the combination of a tube frame support having means for aligning a tube frame on said support, a trimming table on which the tuft yarns extending from said frame rest, a brush for brushing the tuft yarns transversely of said table to straighten the tuft yarns extending from said frame, means for rotating the brush, a tuft yarn trimmer comprising a cutter, and means for moving the tuft yarn trimmer longitudinally of the table in a path parallel to the aligned tube frame to trim the tuft yarns at a uniform distance from the tube frame that the tuft yarns extending from the tube frame may be of uniform length.

4. In a tuft yarn trimming machine, the combination of a tube frame carrying a spool having tuft yarns wound thereon and a series of tubes through which the tuft yarns extend, a support for the tube frame, a table on which the tuft yarns rest when the tube frame is in supported position, a brush, means for rotating the brush to extend the tuft yarn over the table, a cutter carriage having a tuft yarn trimming cutter, means for moving the carriage lengthwise of the table that the trimming cutter may trim the end portions of the tuft yarns at a uniform distance from the series of tuft yarn tubes.

5. In a tuft yarn trimming machine, the combination of a tube frame carrying a spool having tuft yarns wound thereon and a series of tubes through which the tuft yarns extend, a support for the tube frame, means for aligning the tube frame on the support, a table on which the tuft yarns rest when the tube frame is in supported position, a brush, means for rotating the brush to extend the tuft yarn over the table, a cutter carriage having a tuft yarn trimming cutter, means for moving the carriage lengthwise of the table that the trimming cutter may trim the end portions of the tuft yarns at a uniform distance from the series of tuft yarn tubes.

6. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, and provided with a rigid surface for non-yieldingly supporting the yarns while in the shearing position, a brush for straightening the tuft yarns on said table and supported for movement to and from the yarn engaging position, and a tuft yarn trimmer mounted adjacent the table to trim the tuft yarns at a uniform distance from the tube frame.

7. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a brush for straightening the tuft yarns on said table and supported for movement to and from the yarn engaging position, driving means for rotating the brush and controlled by the movement of the brush to and from the yarn engaging position, and a tuft yarn trimmer mounted adjacent the table to trim the tuft yarns at a uniform distance from the tube frame.

8. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a brush for straightening the tuft yarns on said table and supported for movement to and from the yarn engaging position, means for normally supporting the brush out of engagement with the tuft yarns, means for driving the brush while it is in the yarn engaging position but not while it is in its normal withdrawn position, and a tuft yarn trimmer mounted adjacent the table to trim the tuft yarns at a uniform distance from the tube frame.

9. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a brush for straightening the tuft yarns on said table and supported for movement to and from the yarn engaging position, driving means for said brush controlled by the position of the brush to rotate the brush only when it is advanced toward the tuft yarns, and a tuft yarn trimmer movable along the table

to trim the tuft yarns at a uniform distance from the tube frame.

10. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a cutter carriage mounted for movement back and forth longitudinally of the table, a tuft yarn trimmer operable to cut the tuft yarns as the carriage is advanced in either direction, cables for pulling the carriage along its path of travel, power means for operating the cables to move the carriage longitudinally of the table in either direction to trim the tuft yarns at a uniform distance from the tube frame, and means positioned to be shifted by the carriage movement to bring the carriage to rest as it approaches either end of its path of travel.

11. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a cutter carriage mounted for movement back and forth longitudinally of the table, a tuft yarn trimmer operable as the carriage is advanced to trim the tuft yarns at a uniform distance from the tube frame, power means under the control of the machine operative for advancing the carriage in either direction, and stops positioned to be shifted by the travel of the carriage to arrest its movement.

12. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a cutter carriage mounted for movement back and forth longitudinally of the table, a tuft yarn trimmer operable as the carriage is advanced to trim the tuft yarns at a uniform distance from the tube frame, a reversing motor for advancing the carriage longitudinally of the table in either direction, and switch operating mechanism adjacent each end of the carriage runway and adapted to be shifted by the travel of the carriage to stop its movement.

13. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a cutter carriage mounted for movement back and forth longitudinally of the table, a tuft yarn trimmer, a reversing motor for moving the carriage back and forth longitudinally of the table to trim the tuft yarns at a uniform distance from the tube frame, a manually operable lever for reversing the direction of rotation of the motor, and stops adapted to be shifted by the lever movement into position to be actuated by the travel of the carriage to stop the motor.

14. In a tuft yarn trimming machine, the combination of a tube frame support having means for aligning the tube frame on said support, a trimming table on which the tuft yarns extending from said tube frame rest and provided with a rigid surface for non-yieldingly supporting the yarns while in the shearing position, a brush for straightening the tuft yarns on said table in position to be trimmed, a tuft yarn trimmer mounted upon said table, and means for actuating the trimmer to trim the tuft yarns at a uniform distance from the tube frame.

15. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a rotating brush for straightening the tuft yarns on said table and supported for movement to and from the yarn engaging position, and a tuft yarn trimmer mounted adjacent the table to trim the tuft yarns at a uniform distance from the tube frame.

16. In a tuft yarn trimming machine, the combination of a tube frame support having a trimming table on which the tuft yarns extending from the tube frame rest, a cutter carriage mounted for movement longitudinally of the table and provided with a cutter, power means for moving the carriage back and forth along the table, a manually operable lever movable to the right to advance the carriage in one direction and movable to the left to advance the carriage in the opposite direction, and stops adapted to be shifted by the lever movement into position to be actuated by the travel of the carriage to stop its movement.

In testimony whereof, I have signed my name to this specification.

EDWIN W. STONE.