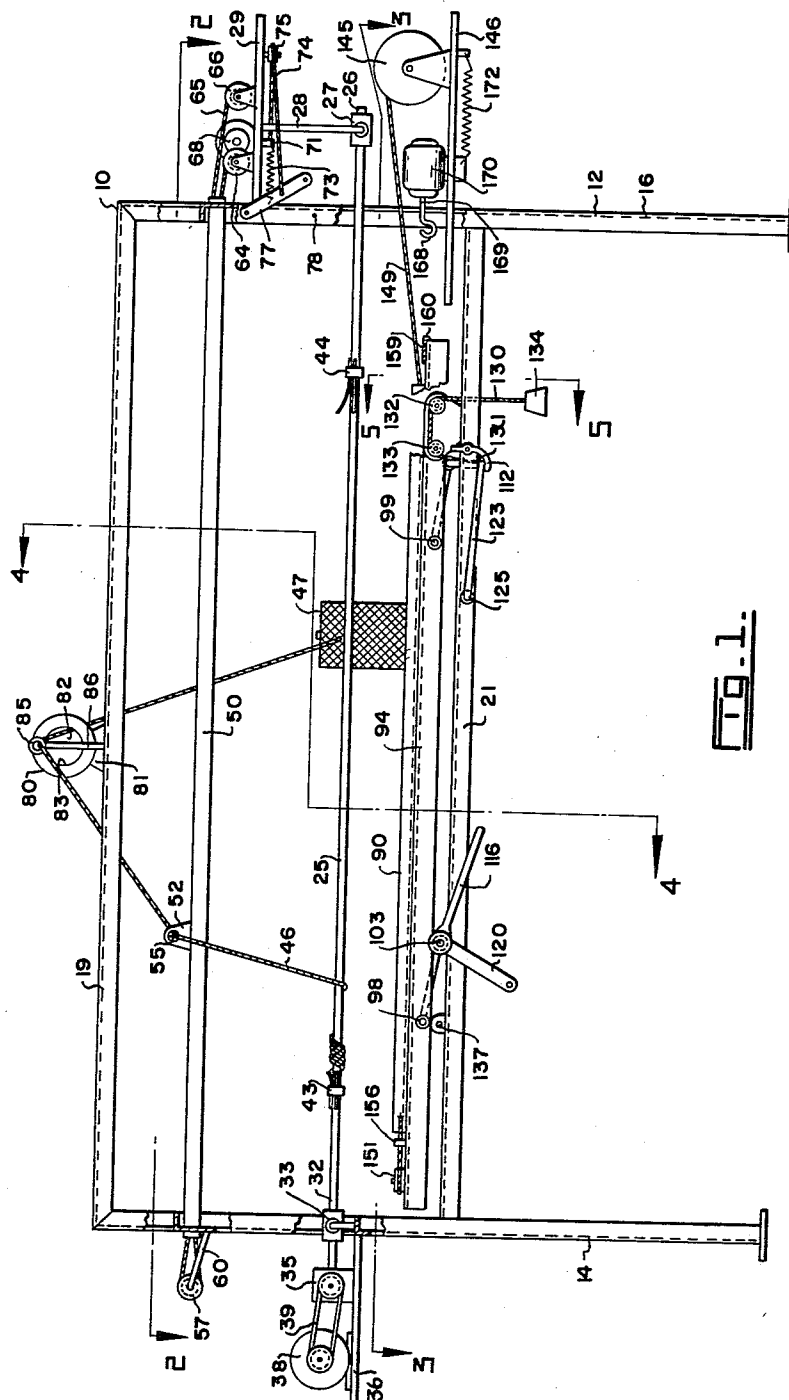


Filed Sept. 8, 1959

GARLAND MAKING APPARATUS

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Aug. 14, 1962

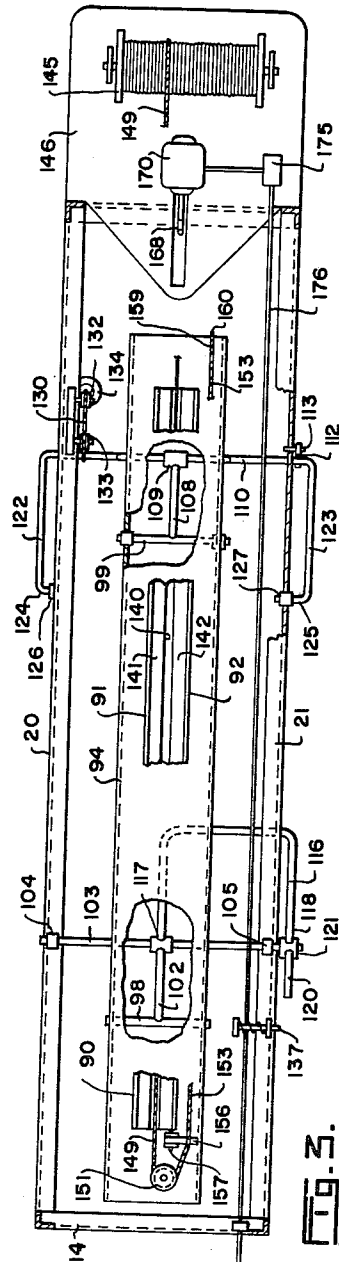
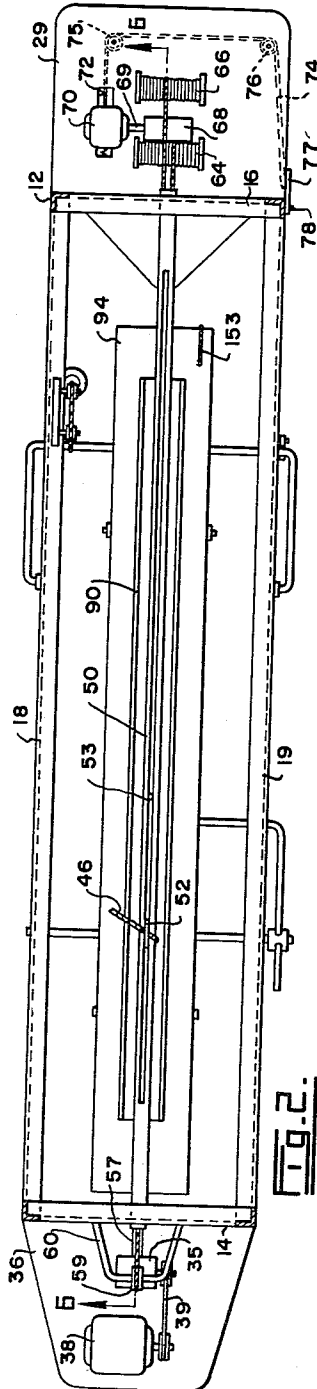
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3,049,157

GARLAND MAKING APPARATUS

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4 Sheets-Sheet 2



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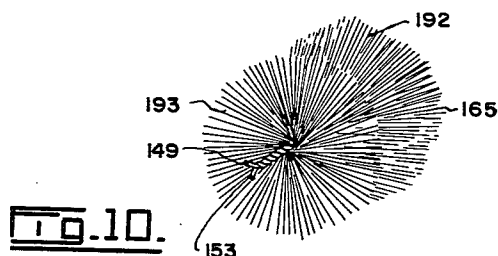
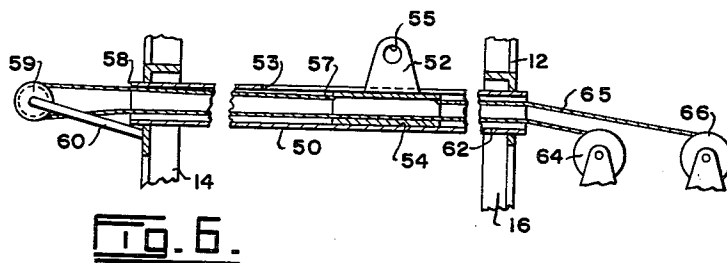
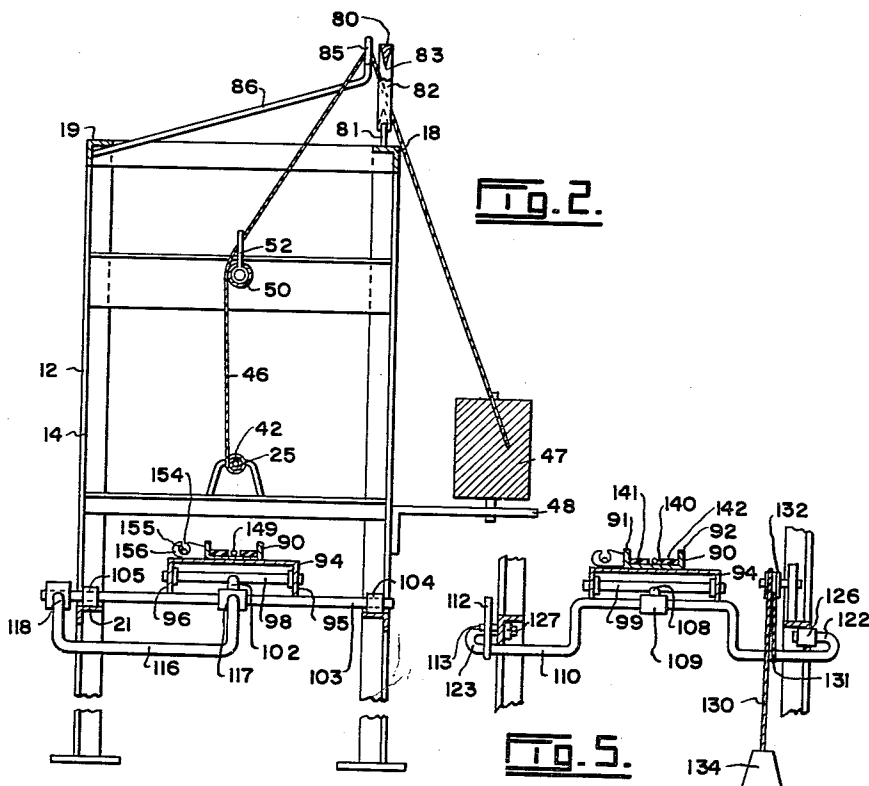
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GARLAND MAKING APPARATUS

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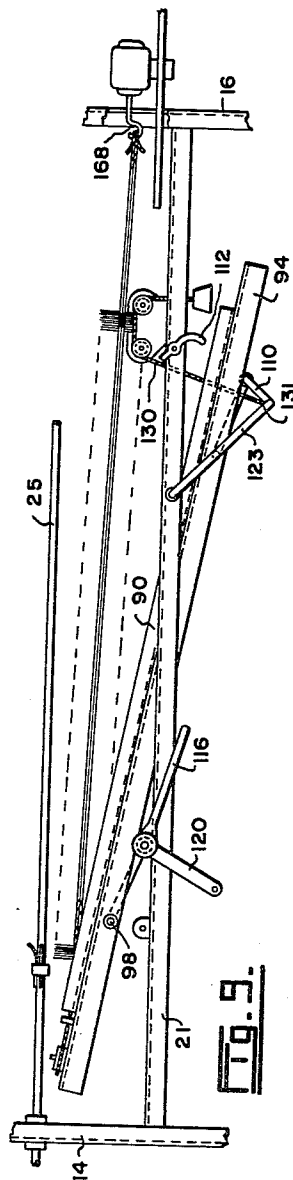
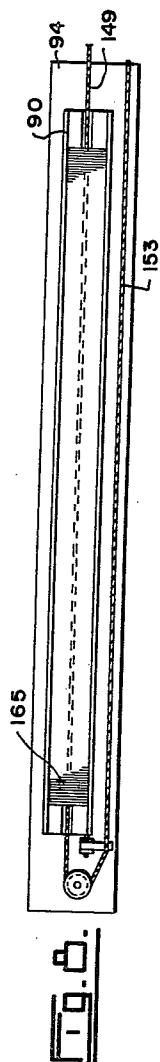
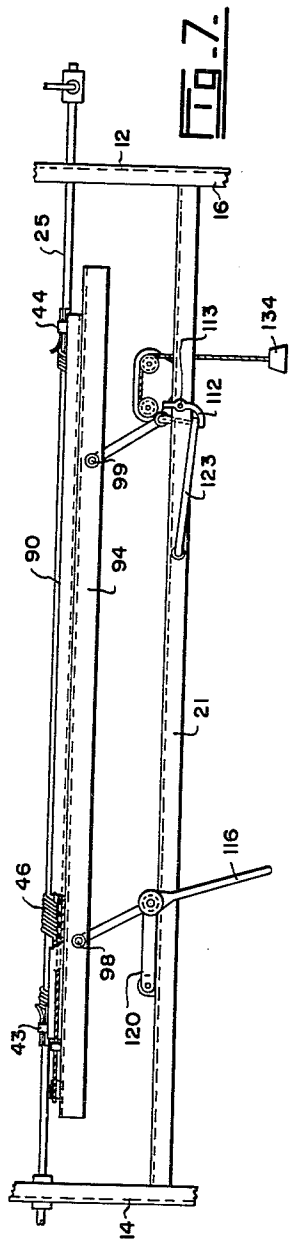
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GARLAND MAKING APPARATUS

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Filed Sept. 8, 1959, Ser. No. 838,693

12 Claims. (Cl. 140-149)

This invention relates to apparatus for making garlands and the like of fine filament which are usually difficult to handle.

The term "garlands" is used herein for want of a better name for the articles produced by this apparatus. The so called garlands comprises a stiffly flexible stem and a mass of fine filaments arranged completely around and radiating from the stem throughout all or any desired portion thereof. This article may be used as produced or it may be bent into different shapes for decorative purposes, it may be used as a branch in a structure simulating a tree, as set out in a co-pending application, and it may be used as a soft brush, such as a bottle brush.

The stem of the garland is made up of two or more spirally wound wires which may be formed of metal, coated or uncoated, suitable plastic material, or the like. The filaments are formed of any desired fine material, but they are preferably made of glass rovings, but they may be made from any plastic material, such as sold under the trademark "nylon", or wool or other rovings.

The present apparatus is particularly designed for handling fine filaments which are of a somewhat fluffy or light nature so that they are difficult to control and to move about in a free state. The short filaments may be produced in any convenient manner for this apparatus, but it is preferable to include in the apparatus means for producing such filaments. In the preferred form of the invention, the filaments are formed by winding a filament yarn around a tube having a longitudinal slot therein, and running a knife along this slot to cut the convolutions of the yarn into short filaments. The apparatus includes means for receiving the cut filaments across a wire laid therein. Another wire is moved across the tops of the filaments, and then the wires are twisted spirally around said films. The twisting action forms the spiralled wires into a stem with the filaments gripped in pockets formed therein, and causes the filaments to radiate in all directions from this stem.

An advantage of this apparatus is that the filaments do not need to be handled or transported after they have been formed in order to be inserted in the garland-producing section of the apparatus.

Examples of this invention are illustrated in the accompanying drawings, in which

FIGURE 1 is a front elevation of apparatus for making garlands, said apparatus being in one operational position,

FIGURE 2 is a horizontal section taken on the line 2-2 of FIGURE 1,

FIGURE 3 is another horizontal section taken on the line 3-3 of FIGURE 1,

FIGURE 4 is a vertical section taken on the line 4-4 of FIGURE 1,

FIGURE 5 is a fragmentary vertical section taken on the line 5-5 of FIGURE 1,

FIGURE 6 is an enlarged section taken substantially on the line 6-6 of FIGURE 2,

FIGURE 7 is a fragmentary elevation similar to FIGURE 1, but with the apparatus in another operational position,

FIGURE 8 is a horizontal section taken on the line 8-8 of FIGURE 7,

FIGURE 9 is another view similar to FIGURE 1, but with the apparatus in still another operational position,

FIGURE 10 is a perspective view of a garland made by this apparatus.

2

Referring to the drawings, 10 is apparatus for making garlands of the type referred to above. This apparatus includes a supporting frame 12 of any desired construction. The illustrated frame includes end supports 14 and 16, upper beams 18 and 19, and lower beams 20 and 21.

A relatively long tube 25 extends longitudinally of frame 12 and is rotatably supported thereby in any convenient manner. In this example, the end 26 of the tube is journaled in a swivelled bushing 27 which is carried by arms 28 depending from a platform 29 which is mounted on and projects outwardly from end support 16 above said tube. The opposite end 32 of tube 25 may extend through a bushing 33 mounted on the end support 14, and into a reduction gear unit diagrammatically illustrated at 35 which is mounted on a platform 36 carried by and projecting outwardly from end support 14. A suitable source of power, such as an electric motor 38, is mounted on platform 36 and is operatively connected to the reduction unit 35 by a belt or chain 39. This motor rotates tube 25 slowly around its longitudinal axes through reduction unit 35.

Although it does not necessarily need be, tube 25 is preferably formed of flexible spring metal, such as an aluminum alloy. It has a slot 42 therein extending longitudinally thereof substantially between the end support 14 and 16. Suitable grippers 43 and 44 are provided near the ends of the tube just inside supports 14 and 16, respectively.

It is desired to wind a filament yarn around tube 25 and extending longitudinally thereof. For example, a filament yarn 46 may be drawn for this purpose from a yarn spool 47 mounted in any convenient position, such as on a platform 48 carried by lower beam 20 of the supporting frame work. One end of the yarn 46 is fixed to tube 25 by gripper 43, and the tube is rotated by motor 38 while the yarn is fed thereto longitudinally of the tube substantially up to gripper 44. Alternatively, the end of yarn 46 may be secured to the tube by gripper 44 and the yarn fed to the tube in the opposite direction.

Although the yarn may be fed to the tube and along the latter manually, it is preferable to provide means for automatically accomplishing this. One way of doing this is to provide a guide tube 50 extending longitudinally of supporting frame 12 near but spaced from the winding tube 25. In this example, the guide tube is supported by end supports 14 and 16 above the winding tube. A guide 52 is mounted on and movable back and forth longitudinally of tube 50 in any convenient manner. In this example, the tube is formed with a slot 53 extending longitudinally thereof and through which guide 52 projects. The guide is secured at its inner end to a tubular slide 54 which is slidably mounted in tube 50, see FIGURE 6. Guide 52 has a loop 55 on its outer end.

Guide 52 is moved back and forth longitudinally of tube 50 in any desired manner such as by worm gear or cable. In this example, a wire cable 57 is connected at one end to slide 54, and extends through tube 50 and out of the end 58 thereof around a pulley 59 carried by supports 60 projecting from the end of support 14. Cable 57 extends back through the guide tube and out through its opposite end 62 where it is wound around a drum 64 rotatably mounted on platform 29. Another light wire cable 65 is connected to slide 54, and extends in a direction opposite to that of cable 57 through tube 50, out through the end thereof and is wound around another drum 66 rotatably mounted on platform 29, said latter cable being wound in the same direction as the winding of cable 57 around drum 54. A power drum 68 is mounted in any desired manner between drums 64 and 66 for selective movement into engagement with either drum. This may be accomplished by mounting drum 68 on a shaft 69 projecting from a suitable source of power, such as a small electric

motor 70, which, in turn, is slidably mounted on platform 29. In this example, a finger 71 projects from motor 70 downwardly through a slot 72 in platform 29, said finger being connected by a spring 73 to the adjacent end support 16. This spring loads the motor towards the support and, consequently, drum 68 against drum 64. A cable 74 extends from finger 71 around pulleys 75 and 76 carried by the platform to an operating lever 77 swingably mounted on support 16. This lever may be swung into engagement with a pin 78 projecting from support 15 to draw drum 68 away from drum 64 and against drum 66, where it is retained until lever 77 is disengaged from pin 78.

When power drum 68 is shifted into engagement with drum 64, cable 57 draws the guide 52 towards the end 58 of guide tube 50, drum 66 being free at this time to allow cable 65 to be drawn therefrom. When the power drum 68 is shifted into frictional engagement with drum 66, cable 65 moves guide 52 in the opposite direction towards the end 62 of the guide tube, drum 64 being free at this time. It will be noted that there is no positive connection between power drum 68 and either of the drums 64 or 66 so that there may be slippage therebetween.

Yarn 46 is threaded through loop 55 of guide 52 before it reaches the winding tube 25. The yarn may extend directly to the guide from spool 47, but it is preferable to provide suitable cutting means in case anything stops the feeding of the yarn from the ball. One way of accomplishing this is to provide a knife ring 80 which is carried by a base 81 mounted on upper beam 18 of the supporting frame. Ring 80 has an opening 82 therethrough around which an annular cutting edge 83 extends. A loop 85 is provided near knife ring 80, said loop being carried by a spring arm 86 mounted on upper beam 19 and extending generally towards the knife ring. Yarn 46 extends from spool 47 through the opening 82 of knife ring 80, and then through loop 85 before reaching the loop 55 of guide 52.

During normal operation, the yarn feeds off spool 47 more or less freely through loops 85 and 55 as it is wound on tube 25. However, should anything prevent the arm from feeding off the spool, the winding action of tube 25 tightens yarn 46. As this takes place, owing to the fact that spool 47 and guide 52 are located beneath loop 85, said loop is drawn downwardly by the increasing tension of the yarn against the spring action of arm 86 until said yarn is cut by the knife edge 83 of ring 80. The flexibility of winding tube 25 is another safety factor in the apparatus 10. Should the tension on yarn 46 unduly increase, tube 25 will bend rather than break, the swivelled bushing 27 aiding this action. This protects the winding tube until the taut yarn is cut in the knife ring 80.

The end of yarn 46 is connected to winding tube 25 by gripper 43, and with the tube rotating, drum 68 is moved into engagement with drum 66 to cause guide 52 to move along the winding tube. When the winding yarn approaches gripper 44, this action is stopped and the yarn cut near the winding tube. Later after the wound yarn has been removed from tube 55, the end of yarn 46 is connected to the tube by gripper 44, after which drum 68 is shifted into engagement with drum 64 to move guide 52 in the opposite direction to repeat the process.

A tray or trough 90 is mounted in the supporting frame 12 beneath and extending longitudinally of the winding tube 25. In this example, tray 90 is formed with side walls 91 and 92, and is mounted on a table 94 which also extends longitudinally of frame 12. For convenience, this table is formed with depending side flanges 95 and 96. The table is preferably movable towards and away from winding tube 25, and suitable means is provided for maintaining it in a parallel position during this action.

For this purpose, horizontal and parallel pins 98 and 99 are journaled in table flanges 95 and 96 near the ends of table 94. An arm 102 is fixedly connected at one end to pin 98 and at its opposite end to a transverse shaft 103 which is journaled in bearings 104 and 105 carried by

frame beams 20 and 21. Another arm 108 is fixedly secured at one end to pin 99 and at its opposite end to a sleeve 109 rotatably mounted on a transverse shaft 110 which extends below beams 20 and 21, said shaft being removably held against the undersurfaces of these beams by a hook 112 which is pivotally mounted at 113 on beam 21. It will be noted that arms 102 and 108 extend in the same direction away from their respective pins 98 and 99 beneath table 94. A U-shaped arm 116 is fixedly connected at one end 117 to transverse shaft 103 near arm 102, and at its opposite end 118 to said shaft outside beam 21. Arm 116 lies in substantially the same plane as arm 102, and an operating handle 120 is fixedly secured to arm end 118 and shaft 103 at 121, see FIGURE 3.

Arms 122 and 123 are connected to the ends of transverse shaft 110 outside beams 20 and 21, and are inclined upwardly from said ends to ends 124 and 125 which are bent inwardly and journaled in bearings 126 and 127 carried by said frame beams. As stated above, shaft 110 is normally retained against the undersurfaces of beams 20 and 21 by hook 112. When said hook is moved to disengage the shaft, the latter may be swung downwardly to permit table 94 to move downwardly, the flanges 95 and 96 of said table resting on shaft 110. In order to keep this shaft and the table from dropping downwardly when the shaft is released by hook 112, a cable 130 is connected at 131 to the shaft and extends upwardly over pulleys 132 and 133 carried by beam 20 and downwardly to a weight 134. This weight is sufficient to lift shaft 110 and the adjacent end of table 94 upwardly until said shaft engages beams 20 and 21.

With the arrangement just described, when handle 120 is swung upwardly and arm 116 is depressed, arm 102 through its connection to pin 98 lifts table 94 upwardly. This causes arm 108 to swing upwardly around shaft 110 which is held in position by hook 112 at this time, so that table 94 moves upwardly while remaining in a horizontal position. A spring-loaded pin 137 is provided on beam 21 near handle 120 to retain the latter in an elevated position when desired, at which time table 94 is in its elevated position, see FIGURE 7. Pin 137 is normally spring loaded clear of handle 120, but after the latter is swung upwardly, the pin is moved outwardly of beam 21 into a position beneath the handle, after which the handle is allowed to rest on the pin, thus retaining the table in its elevated position. When it is desired to depress the table, pin 137 is withdrawn from handle 120, and the table moves downwardly under its own weight until the U-shaped arm 116 engages the underside of beam 21. This maintains table 94 in its normal lower horizontal position.

If it is desired to depress the end of table 94 near shaft 110, hook 112 is disengaged from said shaft, after which the table end may be pressed downwardly against the action of weight 134, arms 122 and 123 swinging around bearings 126 and 127 at this time. When the table is released, weight 134 returns it to its normal position.

Tray 90 is preferably formed with a longitudinal groove 140 in the bottom thereof. This may be formed by providing spaced-apart resilient pads 141 and 142 on the bottom of the tray.

A wire spool 145 is mounted on a platform 146 projecting outwardly from end support 16. A first wire 149 is drawn from spool 145 and led through groove 140 in the bottom of tray or trough 90. This wire passes around a pulley 151 at the opposite end of the tray and extends along the top of table 94 beside the tray as wire 153. Wire 153 is passed through the narrow entrance 154 of an opening 155 formed in a bar 156 which is pivotally mounted at 157 on table 94 near the end of wall 92 of tray 90. Bar 156 is swung outwardly relative to the tray at this time, see FIGURE 3. The end 159 of wire 154 is held at the end of table 94 in any convenient manner. For example, end 159 may be bent at 160

5

round the adjacent end of the table for this purpose. Wire 149 may then be cut away from the wire on reel 145 and for the time being it may be bent around the end of the table in the same as wire 153. Handle 120 is swung downwardly to raise table 94 towards winding tube 25 until said tube is positioned in or just above tray or trough 90, see FIGURE 7. The tray now is immediately beneath the winding tube. A knife is inserted in slot 42 of the winding tube and drawn therealong through the spiralled winding of yarn 46 thereon. This cuts the yarn into a plurality of short filaments 165, see FIGURE 8, and said filaments lie across wire 149 which extends along the groove 140 in the bottom of the tray.

Handle 120 is released to allow table 94 to return to its normal lower position, as shown in FIGURES 1, 2 and 3. Bar 156 is then swung over to shift wire 153, which is extending through opening 155 of said bar, into tray 90 over the filaments 130. As bar 156 is swung over, wire 149 enters opening 155 through channel 154. The ends of wires 149 and 153 are connected to a hook 168 on the outer end of the shaft 169 of a variable speed electric motor 170 slidably mounted on platform 146 for movement towards and away from tray 90. A spring 172 is connected to motor 170 to spring-load it away from the tray. Motor 170 is controlled by a rheostat 175 which, in turn, is operated by a bar 176 extending longitudinally of frame 12 near table 94 and is shiftable longitudinally of said frame.

When it is desired to wind wires 144 and 153, hook 112 is swung away from shaft 110, to free the latter and motor 170 set into operation to turn hook 168 and, consequently, the ends of wires 149 and 153 connected thereto. As the wires are turned, they are wound spirally around each other during which time they grip the filaments 165 which extend therebetween. Pulley 151 prevents the adjacent ends of the wires from twisting during this operation. It is preferable to depress the end of table 94 near hook 168 to move tray 90 downwardly as the winding progressively grips the filaments towards the pulley 151 end of the table. As this action progresses, the filaments are gripped in pockets formed between the wires and said wires form a stem with the filaments radiating in all directions therefrom. As the winding action continues, the stem shortens, and spring 172 allows motor 170 to move towards tray 90 to allow this to take place. The wires can be wound as tightly as desired. As soon as the garland is formed, the wires are cut away from pulley 151 and the garland removed from the apparatus.

When released, table 94 is moved by weight 134 back to its normal horizontal position, at which time hook 112 is swung back to grip shaft 110. During this winding operation, another length of filament yarn 46 has been wound on tube 25 from the end at which gripper 44 is located so that the apparatus is now ready to repeat the cutting and winding operation.

FIGURE 10 illustrates a garland 192 formed by this apparatus and with some of the filaments omitted. The garland has a stem 193 formed by the twisted wires 149 and 153 and the filaments 165 radiated in all directions from this stem substantially from end to end thereof. If desired, the filaments may be provided only along a part or parts of the stem. This is accomplished by providing filaments 165 in tray 90 only where they are required in the finished stem.

While guide 52 has been provided for feeding the filament yarn along winding tube 25, it is obvious that spool 47 may be mounted on a platform that is movable back and forth longitudinally of the supporting frame. In this case, the platform and spool would be moved back and forth in any convenient manner, such as by means of mechanism similar to that for moving guide 52.

What I claim as my invention is:

1. Apparatus for making garlands of fine filaments, comprising a tray adapted to receive a first flexible wire

6

extending longitudinally along the bottom thereof, means above the tray for forming short substantially parallel filaments and depositing a layer of said filaments over the bottom of the tray and across the wire thereon, after which a second flexible wire is laid over the filaments in the tray, means connected to ends of the wires at one end of the tray for subjecting said wires to a twisting action to twist the wires spirally around the filaments, and means connected to the opposite ends of the wires to prevent the latter ends from turning in the direction of said twisting action, said twisting action forming the spiralled wires into a stem with the filaments gripped in pockets formed therein and causing the filaments to radiate in all directions from said stem.

2. Apparatus for making gariands as claimed in claim 1 in which the tray is formed with a longitudinally-extending groove in the bottom thereof through which the first wire extends.

3. Apparatus for making garlands as claimed in claim 1 in which the wire twisting means is adapted to maintain a yieldable pull on the wires during twisting thereof.

4. Apparatus for making garlands of fine filaments comprising a depressible tray adapted to receive a first flexible wire extending longitudinally along the bottom thereof, means above the tray for forming short filaments and depositing a layer of said filaments over the bottom of the tray and across the wire thereon, after which a second flexible wire is laid over the filaments in the tray, means connected to ends of the wires at one end of the tray for subjecting said wires to a twisting action to twist the wires spirally around the filaments while the tray is being depressed away from the wires, and means connected to the opposite ends of the wires to prevent the latter ends from turning in the direction of said twisting action, said twisting action forming the spiralled wires into a stem with the filaments gripped in pockets formed therein and causing the filaments to radiate in all directions from said stem.

5. Apparatus for making garlands of fine filaments, comprising a tube having a slot therein extending longitudinally thereof, means for winding a filament yarn around the tube longitudinally thereof, a tray beneath and extending longitudinally of the tube adapted to receive a first flexible wire extending longitudinally along the bottom thereof, said wound yarn being cut into short filaments by a knife in and moved along the tube slot and said filaments falling over the bottom of the tray and across the wire thereon, after which a second flexible wire is laid over the filaments in the tray, means connected to ends of the wires at one end of the tray for subjecting said wires to a twisting action to twist the wires spirally around the filaments, and means connected to the opposite ends of the wires to prevent the latter ends from turning in the direction of said twisting action, said twisting action forming the spiralled wires into a stem with the filaments gripped in pockets formed therein and causing the filaments to radiate in all directions from said stem.

6. Apparatus for making garlands of fine filaments, comprising a tube therein extending longitudinally thereof, means connected to the tube for rotating it around the longitudinal axis thereof, means for feeding a filament yarn to the tube along its length and during rotation thereof, said yarn being spirally wound around the tube as it is fed thereto, a tray beneath and extending longitudinally of the tube adapted to receive a first flexible wire extending longitudinally along the bottom thereof, said wound yarn being cut into short filaments by a knife in and moved along the tube slot and said filaments falling over the bottom of the tray and across the wire thereon, after which a second flexible wire is laid over the filaments in the tray, means connected to ends of the wires at one end of the tray for subjecting said wires to a twisting action to twist the wires spirally around the filaments, and means connected to the opposite ends of the wires to prevent the latter ends from turning in the direction of said

7

twisting action, said twisting action forming the spiralled wires into a stem with the filaments gripped in pockets formed therein and causing the filaments to radiate in all directions from said stem.

7. Apparatus for making garlands as claimed in claim 6 5 including gripping means near each end of the tube by means of which an end of the filament yarn may be secured to the tube, and means for moving the yarn feeding means back and forth along substantially the length of said tube.

8. Apparatus for making garlands as claimed in claim 7 including cutting means through which the filament yarn extends before reaching the tube, said yarn when subjected to above ordinary pull being severed by said cutting means.

9. Apparatus for making garlands as claimed in claim 5 15 in which the tray is normally spaced below the tube, and including means connected to the tray for shifting it upwardly to a position immediately beneath the tube to receive the cut filaments and back again to its normal position. 20

8

10. Apparatus for making garlands as claimed in claim 5 in which the end of the tray adjacent the wire twisting means is depressibly mounted in order that said tray end may be depressed while the wires are being twisted.

11. Apparatus for making garlands as claimed in claim 5 including means connected to the wires for maintaining a yieldable pull thereon during twisting thereof.

12. Apparatus for making garlands as claimed in claim 5 in which the tube is long and flexible.

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