April 7, 1942. W. C. EWALDSON ET AL 2,279,114

MATERIAL SERVING APPARATUS

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FIG. 2

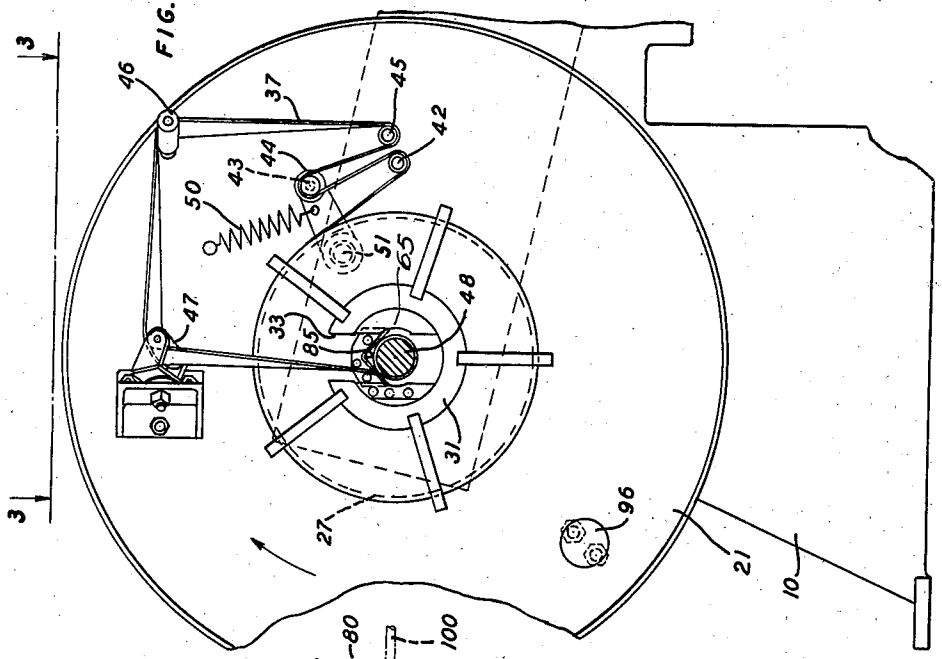
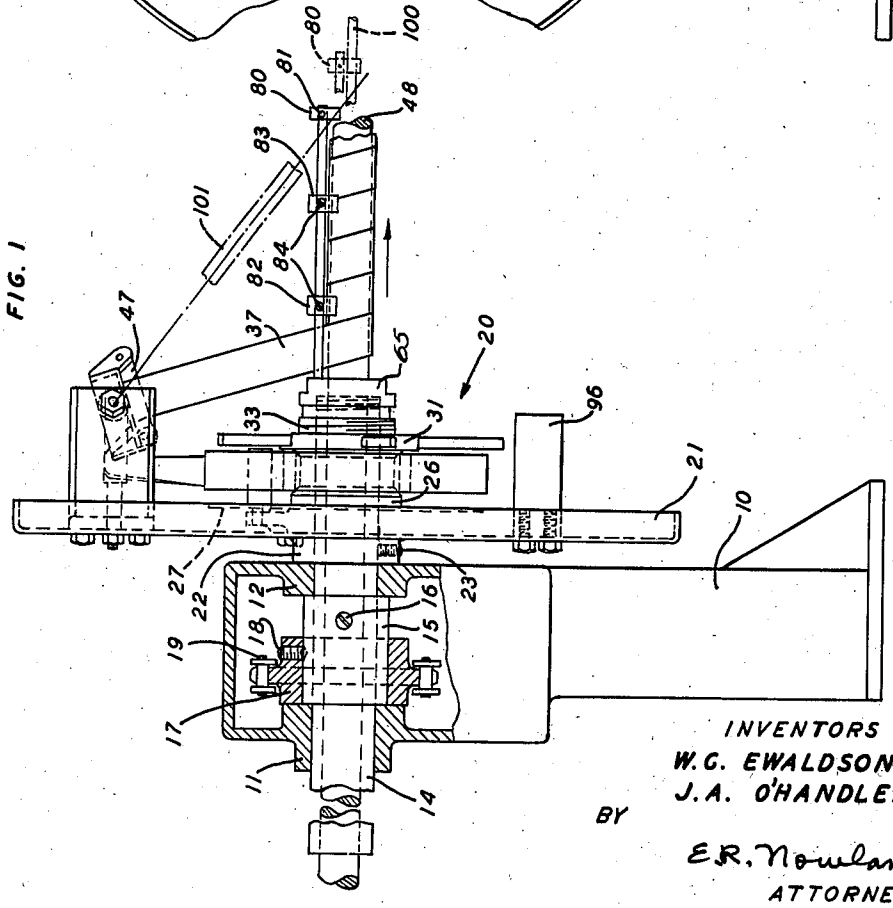


FIG. 1



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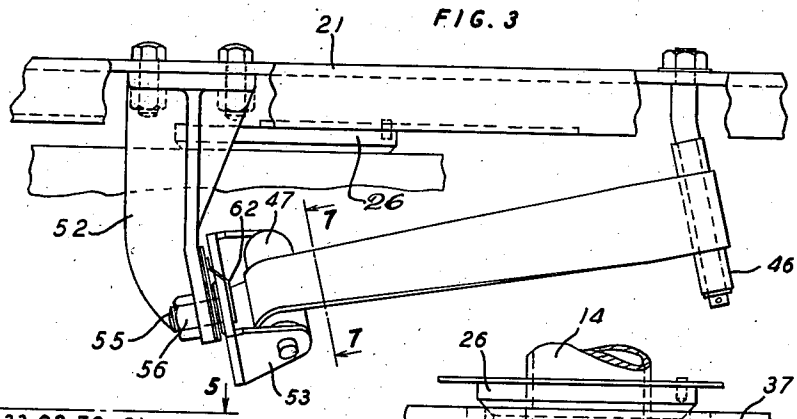
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MATERIAL SERVING APPARATUS

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FIG. 3



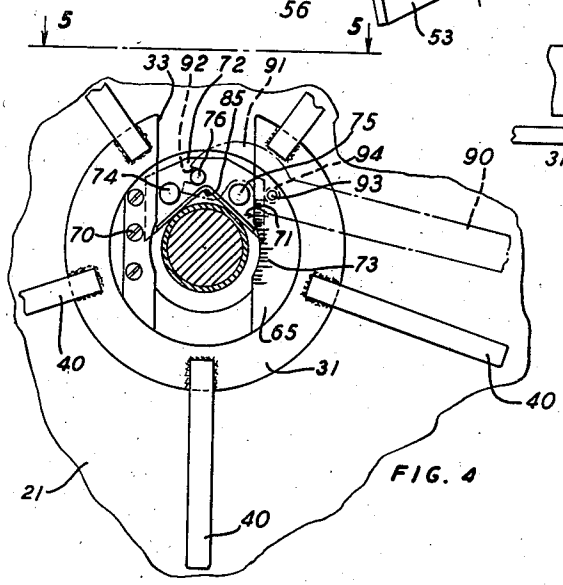


FIG. 4

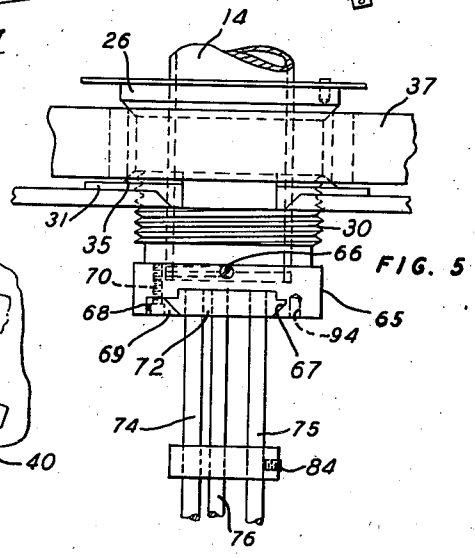


FIG. 5

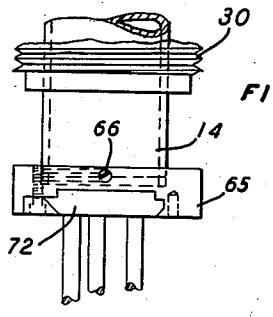
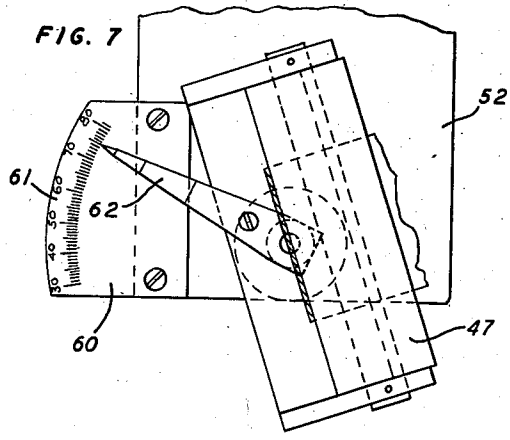


FIG. 6

FIG. 7



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UNITED STATES PATENT OFFICE

2,279,114

MATERIAL SERVING APPARATUS

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Application August 17, 1940, Serial No. 353,088

11 Claims. (Cl. 57—18)

This invention relates to material serving apparatus, and more particularly to apparatus for serving tape to advancing cores.

One of the steps frequently employed in the processes of manufacturing electrical cables is the serving of tape, for example, paper tape, thereto intermediate the electrical conductors and the final sheath. Such cables vary in size, that is, in diameter, and with the variations in size variations are necessary in the width of the tape and/or in the angle of application of the tape thereto. Such variations require numerous serving heads, and it has been determined advantageous to provide one serving head with variable features to accommodate many different sizes of cable and capable of serving tapes of different widths at different angles of application thereto.

An object of the invention is to provide a material serving apparatus which is simple in construction and accurately variable, to serve tape of various widths to cables of various sizes.

With this and other objects in view, the invention comprises a serving head having a support for pads of tape of various widths, guide rollers for directing the travel of the tape to an advancing core or cable including a roller variable to cause travel of the tape at a preferred angle relative to the core, and a guide for the core variable for cores of different sizes to support the core adjacent the point of application.

Other objects and advantages will be apparent from the following detailed description when taken in conjunction with the accompanying drawings, wherein—

Fig. 1 is a front elevational view of the apparatus, portions thereof being shown in section;

Fig. 2 is a fragmentary side elevational view of the apparatus;

Fig. 3 is a fragmentary top plan view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary front elevational view of the core guide;

Fig. 5 is a fragmentary top plan view of the core guide taken substantially along the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary detailed view of a portion of the structure shown in Fig. 5 illustrating an adjustment of the apparatus, and

Fig. 7 is a fragmentary sectional view taken along the line 7—7 of Fig. 3.

Referring now to the drawings, attention is first directed to Figs. 1 and 2, which illustrate a supporting housing 10 having aligned bearings 11 and 12 to rotatably receive a hollow or tubular shaft 14. A sleeve 15 is slidably disposed on the shaft 14 between the bearings 11 and 12 in the housing 10 and normally held for rotation with the shaft by suitable means, such as a set screw 16. A sprocket wheel 17 mounted upon the sleeve 15 and fixed thereto, by a set screw 18, for rotation with the sleeve and the shaft, is operatively connected to a suitable power means (not shown) by the aid of a chain 19.

A serving head, indicated generally at 20, includes a disk-like member 21 with its peripheral edge bent at right angles to serve as a reenforcing means. The member 21 is apertured at its center for receiving the tubular shaft 14 and has suitable means, such as a collar 22, fixed thereto to removably secure the member to the shaft through the aid of a set screw 23. A cone head 26 (Figs. 1 and 3) is disposed concentric with the shaft 14 and fixed to a circular plate 27 mounted for rotation on the shaft 14. The cone head 26 has a cylindrical externally threaded portion 30 extending to the right (Figs. 1, 5 and 6) to receive a retaining element 31 of the general contour illustrated in Figs. 1, 2, 4 and 5. The element 31 is in the form of a nut split, or having a portion removed between the surfaces, indicated at 33 (Fig. 4), and provided with a cone portion 35 of similar incomplete circular contour which will cooperate with the cone head 26 to grip a pad of tape 37 therebetween. Radially projecting handles 40 have their inner ends fixed to the nut portion of the element to assist in manually moving the nut on the threaded portion 30 in securing a pad in place or freeing the remaining core of an empty pad.

The tape 37 upon leaving the pad, is threaded over a roller 42, a roller 43 of a tension arm 44, around rollers 45 and 46, and around an adjustable roller 47 to the core 48 being covered, which in the present instance is an electrical cable. The rollers 42 and 45 are supported for rotation by the member 21 and extend at right angles with respect thereto. The tension arm 44 is normally urged upwardly by any suitable means, such as a spring 50, and is pivoted, at 51, to the member 21. Suitable means (not shown) may be associated with the tension arm to create a braking force between the member 21 and plate 27. Such means may be essential in the complete operation of the apparatus to create a definite tension on the tape, but as it is not considered a necessary feature of the invention, such structure is not shown.

The roller 46 is supported at an angle, illustrated in Figs. 2 and 3, with respect to the member 21 to direct the tape to the roller 47 which is

supported in general by a bracket 52 fixed to the member 21. Specifically, the roller 47 is rotatably supported by a cradle 53, that is, a member substantially U-shaped in general contour, with the legs supporting the roller and the central portion fixed to a stud or other suitable threaded portion 55. The stud 55 extends through the outer portion of the bracket 52 and through the aid of a nut 56 provides means to secure the cradle and the roller at any desired angle with respect to the vertical plane of the member 21 and center line of the core 48. Suitable means, such as integral bosses on the cradle 55 and the bracket 52, serve to space the cradle a suitable distance from the bracket, as illustrated in Fig. 3. This allows for adjustment of the cradle relative to a dial plate 60 mounted upon the bracket and having graduations or indications, shown at 61, disposed in arcuate arrangement about the center of the stud 55, so that through the cooperation of a pointer 62 fixed to and movable with the cradle the operator may readily determine the angular position of the roller 47.

Attention is now directed to Figs. 1, 2, 4 and 5, which illustrate the core guiding means consisting of an annular head portion 65 threadedly mounted upon the adjacent end of the shaft 14 and secured against displacement by a set screw 66. The outer end of the head 65 farthest from the shaft 14 is machined to form a vertical dovetail or angular slot 67 at one side thereof, and curved at the other side, as indicated at 68, for receiving a retaining clamp 69, the latter being removably secured in place by screws 70 and cooperating with the adjacent structure of the head to form a dovetail or angular slot similar in contour to the slot 67. A supporting member 72, of the general contour illustrated in Figs. 4 and 5 and conditioned to fit within the cutaway portion of the head 65, is disposed therein and conditioned for vertical adjustment in the head when the clamp 69 is loosened and to be held at any desired position by the clamp. By the aid of a pointer 71 on the supporting member 72 and graduations 73 on the adjacent surface of the head 65, the graduations representing measurements in diameters of cores, the operator may readily adjust the support for any desired core. The support 72 has rods 74, 75 and 76 extending outwardly in spaced parallel planes parallel also with the center line of the shaft 14 and the general path of travel of the core 48. The adjacent ends of the rods are embedded in the support 72, while the outer ends of the rods have an auxiliary supporting element 80, similar in general contour to the support 72 excepting the outer edges thereof, which may be flat and not provided with the dovetail contour. The element 80 is fixed to the rods by suitable means, such as pins 81. Adjustable auxiliary supporting elements 82 and 83 are slidably disposed on the rods and may be secured in any desired adjustable positions by set screw 84. The under surfaces of the support 72 and the auxiliary supporting elements 80, 82 and 83 are V-shaped in general contour, as indicated at 85 (Figs. 2 and 4), and these surfaces are rounded slightly to remove sharp edges which might damage the surfaces for the core. The rods 74, 75 and 76 serve mainly as rigid supporting portions of the unit to hold the supporting elements 80, 82 and 83 against movement, to guide the core in a definite path. The rod 76 may serve as an additional means to guide the tape to the core and to function with a suitable tool, indicated at 90, which may be used in adjusting the support 72 with its other associated parts relative to the head 65. The tool 90, as will be observed by viewing Fig. 4, has a semicircular end 91, notched at 92 to receive the rod 76 and curved to straddle the rod 75. A pin 93 carried by the tool 90, is receivable in an aperture 94 (Figs. 4 and 5) in the head 65 to serve as a fulcrum about which the tool may be moved, to force the support 72 upwardly or downwardly, as the case may be. A weight 96 is secured to the member 21 substantially diametrically opposite the rollers 42, 43, 45, 46 and 47 and the associated structures, to serve to counterbalance the entire serving head.

The operation of the apparatus is as follows. The core 48 is advanced at a definite speed in the direction of the arrow (Fig. 1). From the size of the core, that is, the diameter thereof, the operator determines the size, that is, the width, of the tape to be served thereto. The purpose of the tape is to completely cover the core with but slight overlapping edges. The size of the tape to be served to the core is determined before the core is threaded through the shaft 14. The selected pad of tape is disposed over the ends of the supporting elements 80, 82 and 83 and the rods 74, 75 and 76 and moved rearwardly, that is, to the left (Fig. 1) until the pad is disposed adjacent the cone head 26, the element 31 having been removed. The cutaway portion 33 of the element 31 permits removal thereof adjacent the head 65 without the necessity of moving it to the ends of the rods 74, 75 and 76. With the selected pad disposed in place, the element 31 may be rotated upon the threaded portion until it causes a firm gripping of the pad beteween the cone head 26 and the cone portion 35. The tape may then be threaded about the rollers 42, 43, 45, 46 and 47, respectively, and to the core 48. The operator then determines the angle at which the tape should be fed to the core and adjusts the roller 47 accordingly by loosening the nut 56 and moving the cradle 53 with the roller 47 until the desired adjustment, through the aid of the pointer 62 and the graduations 61, has been made. The nut 56 may then be tightened to hold the roller 47 against accidental displacement. The supporting elements 82 and 83 may then be adjusted on the rods to support the core adjacent the point of application of the tape. The apparatus may then be set in motion, which in the present instance causes clockwise rotation of the serving head 20 to spirally wrap the tape about the core during the advancement thereof. During the rotation of the serving head the spiral wrapping of the tape will cause the tape to be drawn over the respective rollers to rotate the pad as the tape is pulled therefrom. The tension in the tape has a tendency to pull the core out of its general path of travel, but this is avoided by the supporting member 72 and its associated supporting elements 80, 82 and 83 which are located with their angular or V-shaped engaging surfaces 85 in planes tangent to the core, to cause the core to travel in its definite path, resulting in a uniform laying of the tape on the core and eliminating irregular laying of the tape should the core be allowed to be bent out of its preferred path of travel.

The V-shaped engaging surfaces of the support 72 and the supporting elements 80, 82 and 83 will accommodate cores of various sizes, for example, cores larger than the core 48 capable of passing through the shaft 14 or other cores smaller in size to the smallest core which might be

equal to the curvature of the arcuate surfaces 85 joining the legs of the angular portions thereof. When cables of different sizes are to be served, the support 72 and its associated parts are adjusted so that the surfaces will be tangent with the selected cable when the cable is positioned with its center at the axis of the shaft 14. This adjustment is made possible by loosening the screw 70 of the clamp 69 and through the aid of the tool 90, moving the support 72 with its associated parts to locate the pointer 71 adjacent the graduation 73 representing the diameter of the cable to be covered.

This apparatus may be used in conjunction with other units necessary in the formation of electrical cable and when the space between such units and this apparatus is restricted it may be desirable to condition the shaft 14 as illustrated, so that it may be moved to the right after loosening the set screws 16 and 23, to move the head 65 with the support 72 and its associated parts forwardly or to the right (Fig. 1) so as to position the fixed supporting element 80 a greater distance from the pad of tape to allow for the desired angle of application of the tape to a smaller core, as indicated in dotted lines at 100 in Fig. 1. This adjusted position of the shaft 14 is further illustrated in Fig. 6, which shows the head 65 spaced from the threaded portion 30. The rods 74, 75 and 76 may also be of greater length to allow for this angular application of the tape to the smaller cores. In almost each instance the roller 47 must be adjusted so that the tape will travel smoothly from the roller 46 to the core with an equal strain caused by the tension of the tape throughout the withdrawal of the tape in passing over the roller 47 and eliminating tearing or breaking of the tape which would occur if the roller 47 were not adjustable with the variations in the angles of application of the tape to the core. It will readily be observed that when the roller 47 is in the proper position, shown in Fig. 1, for the travel of the wide tape 37 along the desired angle to the core 48 it would not be located properly for a narrow tape, indicated at 101, in travelling through a different angle of application to the smaller core 100. If such an attempt were made to apply the narrow tape 101 to the core 100 without adjustment of the roller 47, there would be a definite unbalance of force throughout the width of the narrow tape in passing over the roller 47, tending to tear the tape at point of greatest force, which would be at the left (Fig. 1). Furthermore, as the angle of application varies the distance of the point of application from the pad varies, necessitating adjustment of the supporting elements 82 and 83 so that a support will be positioned upon each side of the tape. For example, with the wider tape 37 the support 72 is disposed at the left thereof (Fig. 1), while the supporting element 82 is disposed at the right thereof. Should the tape travel nearer the center of the rods the supporting elements 82 and 83 will be adjusted on the rods so as to be located one upon each side of the tape. However, if the tape should extend outwardly its greatest distance from the pad, the supporting element 83 will be disposed at the left of the tape while the supporting element 80 will serve to support the core at the right of the tape.

This single apparatus is capable, through variations in its different members and elements, to singly serve materials of various sizes in various angular directions to cores of various sizes and support the cores against deflection adjacent the variable points of application of the materials to the cores. The term "angular direction" is intended to be understood as the angular position of the material relative to the core during its travel from the roller 47 to the core. It should also be understood that the apparatus although shown serving the material spirally clockwise on the cable or core is capable of serving the material spirally counter-clockwise. It is often desirable to provide a core with two servings, one clockwise and the other counter-clockwise, and in such a case two apparatus identical in structure and varying only in the direction of rotation may be used to accomplish such a result.

The embodiment of the invention herein disclosed is merely illustrative and may be widely modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited solely by the appended claims.

What is claimed is:

1. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, and means variable with the variations in the size of the cables to cause the cables to advance in a definite path.

2. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, and elements with substantially V-shaped surfaces each to singly engage spaced points of surfaces of cores varying in size to hold the core against deflection.

3. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, elements with substantially V-shaped surfaces each to singly engage spaced points of surfaces of cores varying in size to hold the core against deflection, and means to support the element at positions variable with variations in the size of the core.

4. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, an element of a contour to singly support cores varying in size, and means to vary the positions of the element to support cores varying in size.

5. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, an element of a contour to singly support cores varying in size, and means to indicate the location for the support for the various sizes of cores.

6. A material serving apparatus comprising rotatable means to support a pad of material, means to serve the material singly to advancing cores varying in size, elements of contours to singly support the cores, means to support the elements distances from the center of the cores varying with variations in the diameters of the cores and distances from the pad to support the cores on both sides of the material.

7. A material serving apparatus comprising a hollow rotatable shaft through which cores of various sizes may be singly advanced, rotatable means supported by the shaft to support a pad of material, means to secure the material singly to cores at points distances from the pads variable with variations in the sizes of the cores, an

element carried by the shaft to support the cores at the serving points, and means to move the shaft relative to the pad to locate the element adjacent the serving point.

8. A material serving apparatus comprising rotatable means to support a pad of material and serve the material spirally about an advancing core at a point variable relative to the pad, an elongate member extending parallel with the core, and elements adjustable on the member to positions on each side of the said point to hold the core against deflection.

9. A material serving apparatus comprising rotatable means to support a pad of material and serve the material spirally about an advancing core at a point variable relative to the pad, an elongate member extending parallel with the core, elements adjustable on the member to positions on each side of the said point to hold the core against deflection, and separate means to secure the elements in adjusted positions.

10. A material serving apparatus comprising rotatable means to support a pad of material and serve the material spirally about an advancing core at a point variable relative to the pad, an elongate member extending parallel with the core, elements adjustable on the member to positions on each side of the said point to hold the core against deflection, and means to vary the position of the elongate member and the elements relative to the path of the core for variations in the size of the core.

11. A material serving apparatus comprising rotatable means to support a pad of material and serve the material spirally about an advancing core at a point variable relative to the pad, an elongate member extending parallel with the core, elements adjustable on the member to positions on each side of the said point to hold the core against deflection, and means to move the elongate member with the elements longitudinally of the core to locate the elements variable distances from the pad.

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