Oct. 17, 1967 E. LÜTHY 3,347,731

DEVICE FOR MANUFACTURING PILE PRODUCTS

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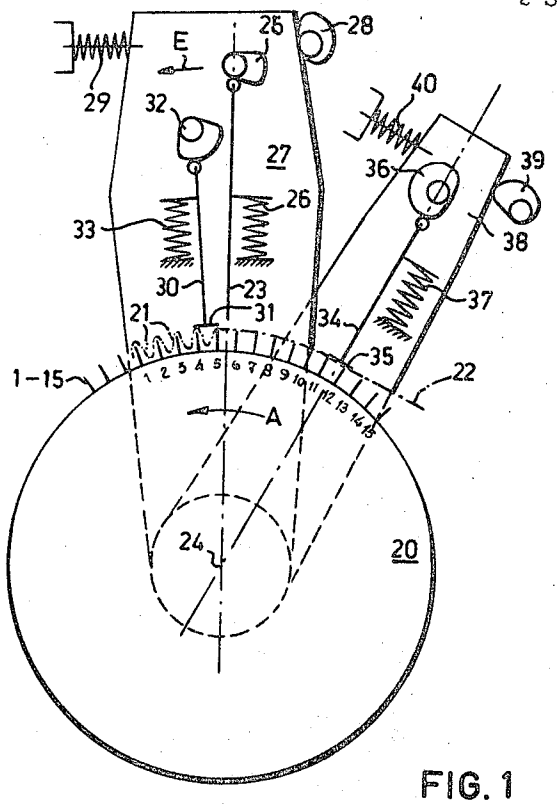

FIG. 1

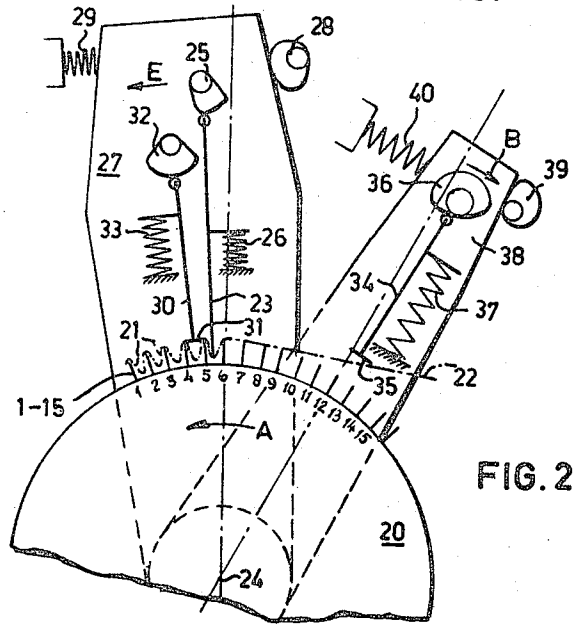

FIG. 2

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DEVICE FOR MANUFACTURING PILE PRODUCTS

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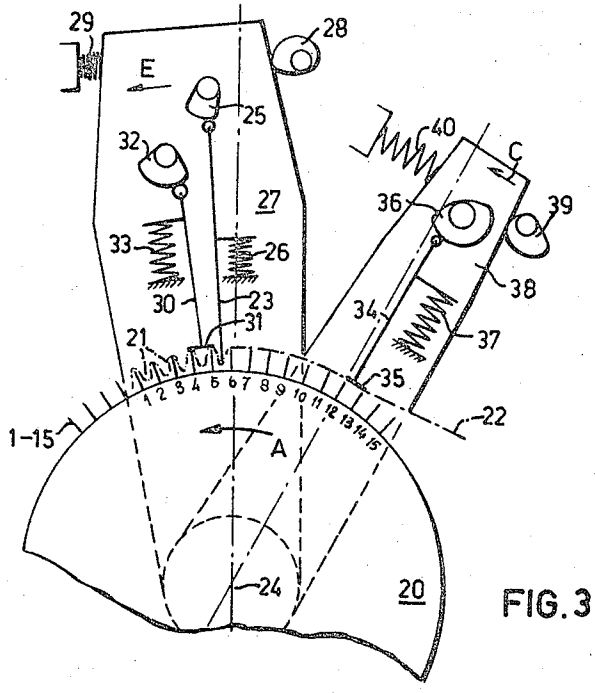

FIG. 3

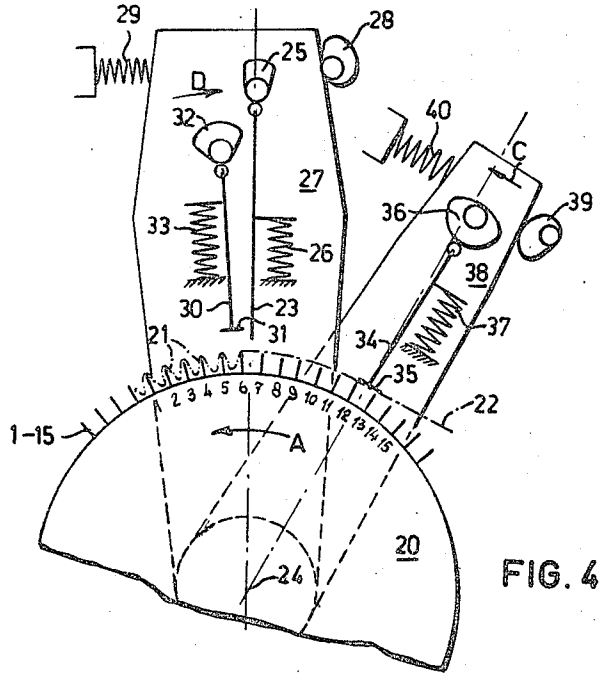

FIG. 4

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DEVICE FOR MANUFACTURING PILE PRODUCTS

Erich Lüthy, Naarden, Netherlands, assignor to Tapijtfabriek Noordster N.V., Loosdrecht, Netherlands, a limited-liability company of the Netherlands

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6 Claims. (Cl. 156—435)

The present invention relates to a device for manufacturing pile products, in which the pile forming material, such as a series of mutually parallel threads are folded in a zig-zag fashion by insertion between blades which are provided on the circumference of a continuously rotating drum, after which at least the folds are fixed in or onto a continuous backing.

Such an arrangement is known and when the insertion means has left the blades, the drum continues rotating, and the inserted material remains in the shape of a loop and is unprotected against a non-controlled pulling force of the material supplied. There is therefore a great danger that the loops of said material are pulled completely or partially out of the space between two blades thereby creating a great irregularity in the pile material. The pulling away tendency can be the consequence of tension differences which may be caused, for example, by variation in the sizes of the yarn cops, badly filled cross-wound bobbins, knobs or knots in the threads etc.

It is an object of the present invention to provide a device in which the loops of the pile material, after they have been inserted between two blades by the inserting means, are carried to the position of fixing free from relief means, such as pile wires and without tension between said blades.

In the known device the inserting means moves with the continuously rotating drum, this however, takes place in such a way that the inserted loops are chafed on the edges of the blades because during the rotation the angular position of said inserting means relative to the blades varies.

In order to overcome this objection in the device according to the invention, there are provided means for causing oscillating angular movement of the inserting means coaxially of the drum over the pitch of the blades, means for clamping coaxially to the drum by means of a first clamping means, two adjacent folds of the pile material onto the edges of the blades adjacent to, and as seen in the direction of the movement of the drum, behind the inserting means during the movement thereof, and means for clamping coaxially of the drum by means of a second clamping means of the pile material supplied onto the edges of the blades which are present, as seen in the direction of movement of the drum, in front of the inserting means, after the inserting means has reached its extreme inserting position and until said first clamping means has taken its new operating position on the two following blade edges over which the pile material are placed. In the attached drawings an embodiment of a portion of the device according to the invention is illustrated by way of example.

FIG. 1 shows diagrammatically and in side view a first position of the device according to the invention.

FIG. 2 shows the device in a position that follows the position of FIG. 1.

FIG. 3 shows the device in view a position that follows the position of FIG. 2.

FIG. 4 shows the device in a position that follows the position of FIG. 3 and that precedes the position of FIG. 1.

In the drawing, the drum 20 is provided with radial

blades 1–15, between which the loops 21 of the pile forming material 22 are positioned. The pile forming material is supplied, from a reel (not shown) and from which said material is drawn with a predetermined tension.

Said tension is highly dependent on the kind of winding, the quantity of yarns on the cops or bobbins, the type of yarn etc. The drum 20 continuously rotates in the direction of the arrow A. Inserting means in the form of a blade 23 has the same width as the blades 1–15 on the circumference of the drum 20. Blades 23 moves up and down radially from axis 24 of the drum 20. The up and down movement of the blade 23 is effected by means of a cam 25 and a spring 26. The assembly of blade 23, cam 25, and spring 26 is supported in a first supporting means 27 which can oscillate about the axis 24 of the drum 20. The oscillating motion of means 27 is effected by a cam 28 and a spring 29 acting on said support 27. Hereby it is possible that the inserting means 23 can cause accurate insertion of the pile forming material 22 between the two blades 5 and 6 in the shape of loops 21.

When the inserting means 23 is inserted into the space between two adjacent blades (blades 5 and 6 as shown in FIGS. 2 and 3) there is the danger that the previously inserted loop 22 is completely or partially withdrawn from the foregoing space. In order to prevent this, there is provided a first clamping means 30 having a foot member 31 spanning the space between two adjacent blades (blades 4 and 5 in FIGS. 1 and 2) and resting on the top edges of two blades on which lie the two adjacent folds of the pile material.

Said first clamping means 30 with its foot member 31 is moved up and down by means of a cam 32 and a spring 33. The arrangement of elements 30, 31, 32, 33 also is supported by the first supporting means 27.

In order to insure that after the removal of the inserting means 23 from the space between two blades, the formed loops are not withdrawn again by the tension in the threads supplied from the supply means, a second clamping means 34 having a foot member 35 is provided. Said second clamping means 34 can be moved up and down by means of a cam 36 and a spring 37. Said foot member 35 spans the space between two adjacent blades (blades 11, 12 in FIG. 1) and can rest on the top edges of said two blades on which the pile material lies. The assembly of elements 34, 35, 36, 37 is supported in a second supporting means 38 that can oscillate about the axis 24 of the drum 20. This oscillating movement is effected by means of a cam 39 and a spring 40.

The clamping means 30 as well as the clamping means 34 are always directed towards the axis 24 of the drum 20 during operation.

The above described device operates as follows:

The clamping means 30, the inserting means 23 and the clamping means 34, are driven in the direction of movement of the drum 20 so that no chafing or shifting or tension creating forces are applied to the threads 21.

Furthermore the clamping means 30 and 34 move in their operative positions during advance of the drum 20 over a pitch distance of the blades with the exception of the period in which the inserting means 23 carries out its insertion action, because at that moment the second clamping means 34 is not operative and therefore the threads 22, from which the loops 21 are formed are withdrawn from the supply.

In FIG. 1 the clamping means 30 presses the loops already made between the blades 4 and 5 and then as shown in FIG. 2, the inserting means 23 enters between blades 5, 6, the clamping means 30 still holding the loops made between the blades 4 and 5 in order to prevent removal therefrom. All the means above mentioned move in the direction of the arrow A with the drum 20.

The formation of loops between the blades 5 and 6 can take place freely, however, because the clamping means 34 releases the supply of the threads 22. This clamping means 34 moves in the direction of arrow B over the distance between two adjacent blades 11 and 12 and then returns to a position between the next two adjacent blades 12 and 13. After the loops between the blades 5 and 6 are formed (FIG. 3) the inserting means 23 withdraws and the clamping means 30 moves out of contact with the threads (FIG. 4) and retracts in the direction of the arrow D. The clamping means 34, however, clamps the threads 22 against the blades 11, 12 so that the pulling action on the threads 22 by the supply will not withdraw the loops just made from between the blades 5 and 6. The clamping means 34 moves with the drum 20 in the direction of the arrow C. The loops 21 made by the inserting means 23 are therefore, formed accurately between the blades, and are not subjected to any tension. The loops are fixed subsequently by a device known per se and not drawn with their folds at the edges of the blades into or on a continuous backing.

What is claimed is:

1. A device for the manufacture of a pile product comprising a rotatable drum, uniformly spaced radial blades mounted on the drum at the periphery thereof, for receiving pile material in the form of tensioned mutually parallel threads which are fed circumferentially over the blades, inserting means mounted outside said drum for reciprocal radial movement for entering the spaces between adjacent blades to form loops in the threads extending thereon and draw the material from a supply thereof, first clamping means for acting on the blades bounding the space ahead of the space in which the inserting means is inserted to clamp the threads against such blades and prevent disturbance of the loops formed therein, and second clamping means for acting on a pair of blades behind the inserting means to clamp the threads against such blades after each formation of loops in a space and when the insertion means has been removed from between the blades to prevent windback of the material to the supply thereof, and means supporting the inserting means for oscillating circumferential movement about an axis coincident with the axis of the drum over a distance equal to the spacing between adjacent blades in synchronism with the rotation

of the drum to enable operation of the inserting means while the drum is rotating.

2. A device as claimed in claim 1 wherein said means supporting the inserting means comprises a support member mounted for pivotal movement about the axis of the drum, said inserting means and first clamping means being mounted on said support member for respective reciprocal movement.

3. A device as claimed in claim 2 comprising drive means mounted on the support member for radially reciprocating the inserting means and drive means for radially reciprocating the first clamping means also mounted on the support member.

4. A device as claimed in claim 3 comprising a second support member mounted for pivotal movement about the axis of the drum, said second clamping means being mounted on said second support member and drive means mounted on the second support member for radially reciprocating the second clamping means.

5. A device as claimed in claim 2 comprising means engaging the first support member to oscillate the same over a distance equal to the spacing between adjacent blades.

6. A device as claimed in claim 4 comprising means engaging the second support member to oscillate the same over a distance equal to the spacing between adjacent blades.

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EARL M. BERGERT, *Primary Examiner.*

ALEXANDER WYMAN, *Examiner.*

R. H. CRISS, J. P. MELOCHE, *Assistant Examiners.*