Feb. 21, 1956 H. BUDDECKE 2,735,250

METHOD OF AND MEANS FOR THE MANUFACTURE OF THREAD PACKS

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FIG. 1

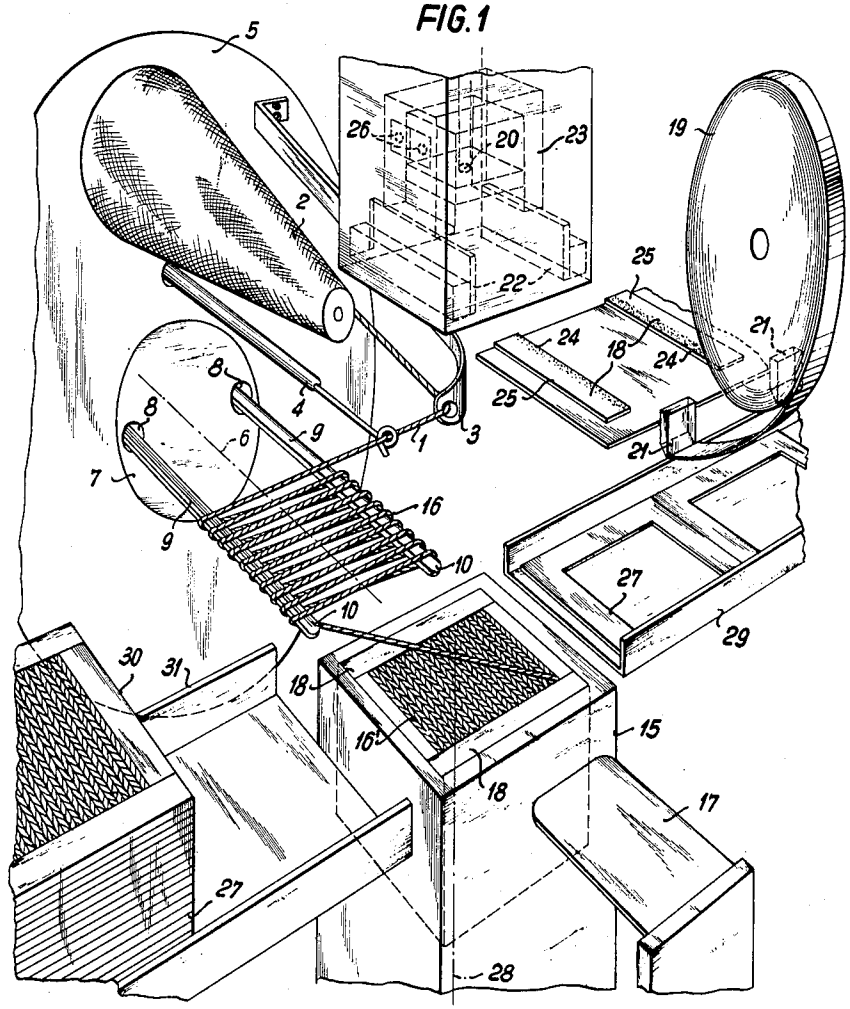


FIG. 3

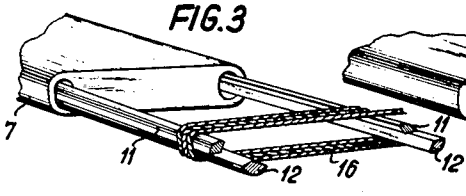


FIG. 2

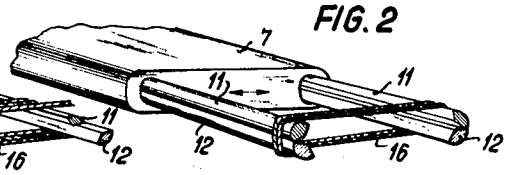


FIG. 4

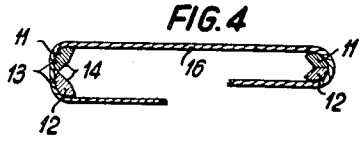


FIG. 5

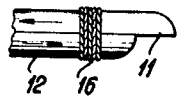


FIG. 6



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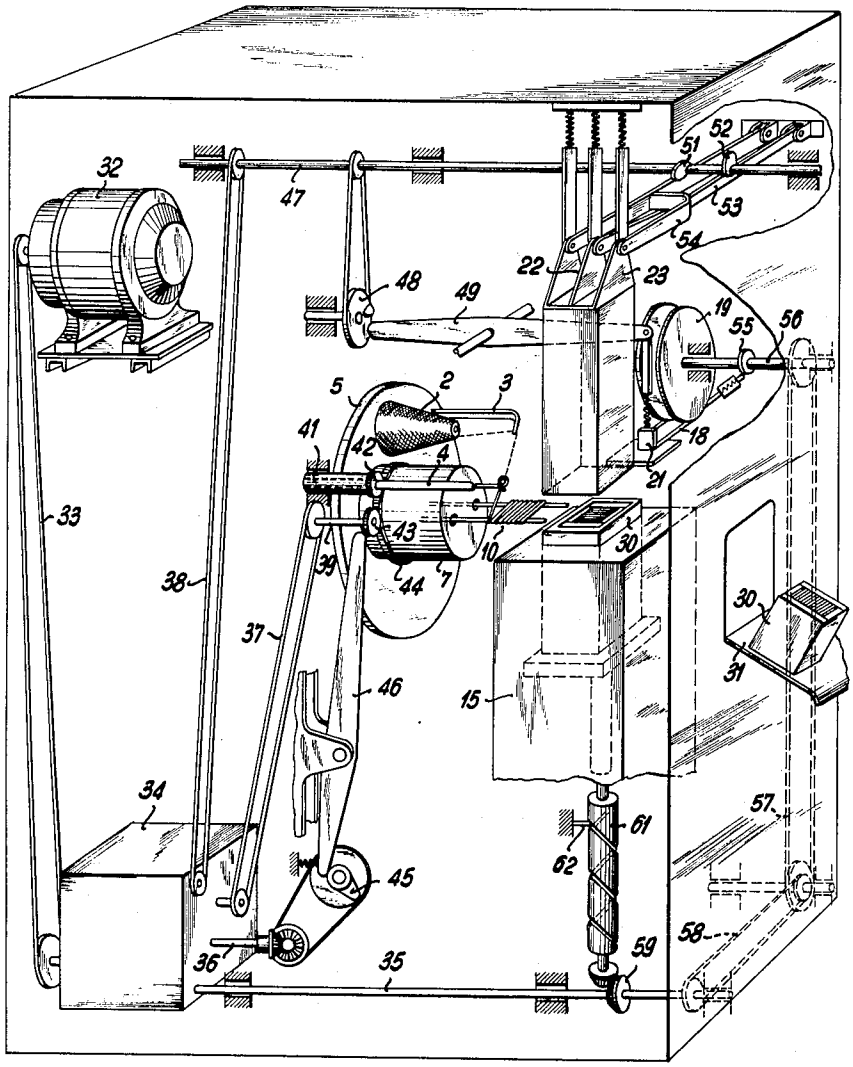
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METHOD OF AND MEANS FOR THE MANUFACTURE OF THREAD PACKS

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FIG. 7



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METHOD OF AND MEANS FOR THE MANUFACTURE OF THREAD PACKS

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Application January 22, 1952, Serial No. 267,683

15 Claims. (Cl. 53—7)

The present invention concerns a method of and means for the manufacture of thread packs with the thread disposed in layers in back and forth arrangement, with separating means provided between the end turns of the threads, forming the different layers as well as helicoidal coiling of the thread on a pin of rectangular section and stripping-off of the coiled layer, with scale-like arrangement of the individual thread coils one above the other.

In further developing this fundamental idea, preparation is effected in such a way that, in accordance with the invention, the thread is wound, with the aid of a thread guide by the thread dispensing device rotating round a coiling mandrel of rectangular section, the stripping off of the coiled layer being effected by withdrawing the coiling mandrel while the central part is being held tight.

With a view to obtaining a scale-like overlapping arrangement of the thread windings, the upper portions of the layers are slid out of line with the lower ones in the direction of coiling before stripping off. This sliding is effected by the relative displacement of an upper and a lower member of the coiling mandrel in longitudinal direction, bringing them nearer one to the other simultaneously.

After stripping off, the separating means in form of separating strips on both sides are placed above the thread returns and on a protruding edge glued to the base frame or to the preceding separating strips. By preference, gluing is effected with the aid of a heated pressing member on the separating strips employing a gluing medium sensitive to heat. Each stripped-off layer of thread is swung by 90 degs in its plane relative to the coiling mandrel, whereupon the subsequent layer of thread is applied.

The mechanism employed for following this procedure is of corresponding design. The coiling mandrel is fork-shaped, and each prong of the mandrel consists of two sections, movable in relation to one another longitudinally and also transversely of the longitudinal direction in such a way, that the total circumference of the coiling mandrel is reduced measuring its vertical transverse plane, thereby facilitating the work of stripping off the coil.

With a depositing table which is given a turn of 90 degrees at the end of every coiling process, a detaining tongue co-operates which holds firmly the center portion of the thread layer upon stripping off; furthermore, a double stamp, of which one portion presses the laterally fed separating strips against the end turns of the thread while the other, heated portion of the stamp acts upon those parts of the separating strips having glue thereon.

Further features of the invention will become evident from the claims in conjunction with the following description.

In the drawings, one manner of applying the invention is illustrated by way of example,

Fig. 1 being a diagrammatical view of the principal elements of the device in perspective;

Fig. 2 is a perspective view of the coiling mandrel in position for coiling;

Fig. 3 is a perspective view of the coiling mandrel in stripping-off position;

Fig. 4 is a vertical section through the coiling mandrel in various operating positions of the prongs;

Figs. 5 and 6 show a lateral view each of the front part of the prongs of the coiling mandrel in various operating positions, and

Fig. 7 shows in diagrammatical presentation the principal elements of the machine with their driving mechanism in which for the sake of clearness some parts being arranged in somewhat other relative positions from those shown as in Fig. 1.

The thread to be coiled **1** (Fig. 1) comes from a bobbin **2** and is guided over a thread tensioner with eye **3** to the thread guide **4**. The thread dispensing device consisting of bobbin **2**, the thread tensioner **3** and thread-guide **4** is arranged upon a disc **5** or its equivalent which is rotatably supported on a horizontal shaft **6**, by preference upon a fixed bolt **7**. Through apertures **8** in bolt **7** two prongs **9** of a coiling mandrel **10** project, said mandrel being disposed in a horizontal plane, forming in section a rectangle with rounded narrow sides. Round this coiling mandrel the thread is wound helicoidally when turning disc **5**, that the thread guide **4** is shifted in longitudinal direction in accordance with the rotative movement. Instead of shifting the thread guide **4**, a corresponding shifting of the coiling mandrel **10** in its horizontal plane may take place.

Each prong of the coiling mandrel, as may be seen from Fig. 2, consists of an upper portion **11** and a lower portion **12**. These two portions may be adjusted in relation to one another longitudinally by suitable intermediate members, in such a way, that coiled windings according to Fig. 5 coiled in vertical planes, are brought into a slanting position according to Fig. 6.

In order to bring about the inclined position of the windings without the thread being pinched, the two prong elements are simultaneously brought nearer to one another during their relative longitudinal adjustment. Approach may be effected on one of the prongs or on both, and that in such a way, that the length of a circumference of the coiling mandrel covered by a winding remains approximately unchanged.

Preferably, each prong element is given a sector-like section (Fig. 4). By hinges, guides and the like, two outer edges **13** each of the prong elements are made to maintain contact between them, while their relative approach or going apart transversely is produced by movement of the edges **14**, which rest in the circle centers of the sector-shaped sections. After the windings have been brought into inclined position, a depositing table **15** (Fig. 1) located below the coiling mandrel is moved from below upwards up to thread layer **16** while from the front a retaining tongue **17** is moved above the thread layer and lowered upon the same, in such a way, that the latter will be situated under soft pressure between depositing table **15** and retaining tongue **17**, whilst the individual windings are held firmly against thread derangement in the manner illustrated in Fig. 6 in scale-like superposition.

Thereupon, the tension exerted on the thread layer by the coiling mandrel is relieved by suitable additional approach in transverse direction of the two members of one of the prongs **11**, or both, and the coiling mandrel is withdrawn on its level, and the coiled layer stripped off in doing so, which is retained by the retaining tongue.

Now the separating strips **18** are brought above the end turns of the thread of the individual thread windings. These are wound in the form of strips on rollers **19** and are cut off to suitable length by blades **21**.

Above the depositing table a pressing member has been provided, formed by an interior pressing member **22** and an exterior pressing member **23**, both of which may be moved independently of one another up and down. The interior pressing member **22** is operative within the range of the end turns of the thread, and in going down it presses upon the inner portions of the separating strips which is provided with roughenings **24**, pressing it down upon the end turns of the thread after it has sucked the separating strips by way of suction holes of a sucking mechanism **20** disposed within the pressing member, in such a way that the thread turns are clamped in proper order, whereupon retaining tongue **17** is withdrawn.

Now the exterior pressing member **23** is lowered. It operates within the range of the outer portions **25** of the separating strips which on its lower side is provided with an adhesive. Such adhesive may be of the current type which is moistened before pressing on or applied in the liquid state, respectively. By preference, an adhesive effective under heat is employed. In the latter case, pressing member **23** is equipped with suitable electric heating means **26**, in such a way, that in pressing the pressing member **23** upon strip portions **25**, the gluing of the separating strips upon the separating strips placed below of the previous thread layer **16'** or with the base frame **27** disposed on the lowermost end of the thread body is effected. To prevent the heat of the pressing member **23** from passing onto the interior pressing member **22**, the latter may be provided with circular refrigeration or the like.

Now the depositing table **15** is given a partial turn by 90 degrees round its vertical axis **28**, whereby the freshly applied and glued separating strips **18** are brought to transverse position in relation to coiling mandrel **10**, and that on the same level the previous thread layer had occupied after the latter had moved downward within the table by the thickness of one layer. During this, the thread runs in diagonal direction toward one of the prongs of the coiling mandrel which, like the thread guide **4** has been moved forward again. Now the coiling process for the next following layer of thread may be enacted, the procedure as previously described being repeated in doing so.

The base frame **27** is led towards the depositing table **15** over a guide **29** by suitable drive connections, while the finished, coiled and glued thread pack **30** thrown out of the table, is passed along guiding means **31**.

By a modification of the mechanism described, instead of a single coiling mandrel, a number of coiling mandrels corresponding to the number of thread layers in the finished thread pack may be employed. In this case the coiled thread layers may be composed to form a thread pack in one operation, the separating strips being interposed simultaneously.

The drive of the part mechanisms described is effected by an electric motor **32** (Fig. 7) with belt connection **33** over a gear box **34** in which the motor energy with a suitable ratio of transmission is transferred to shafts **35**, **36** and belt-drives **37**, **38**.

Belt drive **37**, by way of a shaft **39**, drives the thread releasing device **2** to **4** carried on disc **5**. The thread guide **4** is axially shifted corresponding to the winding progress of the thread **1** being wound, in doing so, its thread engaging within a bushing **41** revolving in unity with disc **5**. Bushing **41** is made to revolve independently with regard to the thread guide slidable but not revolvable on disc **5**, by way of the gears **42**, **43** and gear teeth **44** on the rigid bolt **7**, whereby the sliding of the thread guide is effected. Back and forth sliding of coiling mandrel **10** is effected through drive shaft **36** which, at the proper moment, will swing out, through a cam **45**, a lever **46** which at its upper end is connected with coiling mandrel **10**.

A shaft **47** is revolved by the belt-drive **38**, said shaft

by way of a cam disc **48** and a lever **49** actuating the cutting-off mechanism **21** for the separating strips **18**. On shaft **47**, cams **51**, **52** are provided taking effect on a lever **53** and a stirrup **54** which, at the proper moment, will move up and down the interior pressing member **22** and the exterior pressing member **23**. The feeding of the separating strip **18** is effected by a cam **55** of a shaft **56** which is revolved through shaft **35** by way of a belt drive **57**, **58** and moves to and fro a suitable feeding member engaging the strip. This same shaft also causes the upward movement of the depositing table **15** by way of a bevel gear pair **59**, said table having connected to it for that purpose a cylinder **61** revolved by the bevel gear pair **59**, said cylinder being screwed upward with the aid of a spindle groove on a fixed projection **62**.

Guide **31** for the carrying-away of the finished thread packs **30** may be disposed also in the direction of coiling mandrel **10**, as may be seen from Figure 7.

What is claimed as new, is:

1. A method for preparing thread packs consisting of layers being composed of flat pressed, longitudinal helicoidal thread windings the end turns of which are separated by separating strips, each layer being formed by coiling the thread on a coiling mandrel of oblong rectangular section upon moving it relatively round said mandrel in helicoidal fashion, holding stationary the central portion of the windings, withdrawing the coiling mandrel out of the windings and pressing flat the stripped off coil, thereby placing the individual windings in such a way that they are superimposed in scale like fashion to one another.

2. A method according to claim 1, in which the upper parts of the thread-coils being shifted with relation to the lower parts in the direction of coiling before stripping off in order to produce a scale-like overlapping of the thread coils.

3. A method according to claim 1, in which two separating strips, after stripping off, are placed over the end turns of the thread, and have projecting edges glued to the separating strips of the preceding thread layer.

4. A method according to claim 1, in which two separating strips, after stripping off, are placed over the end turns of the thread and have projecting edges glued to the separating strips of the preceding thread layer, said glueing being effected with the aid of a heated pressing member and the use of an adhesive sensitive to heat.

5. A method according to claim 1, in which each stripped off layer of threads is turned in its plane by 90 degrees relative to the coiling mandrel previous to initiating the next following thread layer.

6. In an apparatus for preparing thread packs composed of separate layers of flat pressed, longitudinal helicoidal thread-windings the end turns of which are separated by separating strips, a coiling mandrel of rectangular section, means adapted to slidably arrange said coiling mandrel in a horizontal plane, a thread dispensing mechanism, including a bobbin and a thread guide, means adapted to rotate said thread dispensing mechanism round said coiling mandrel upon coiling the thread on the mandrel in a helicoidal fashion, means adapted to strip off the coiled thread layer from the mandrel, and means adapted to hold stationary the said layer in its center during stripping off.

7. In an apparatus according to claim 6, said means for holding stationary the coiled thread layer consisting of a depositing table arranged below said coiling mandrel, and a retaining tongue usually arranged out of the way of the mandrel, means adapted to raise and lower said depositing table, and means to place said retaining tongue above said mandrel and to lower it upon the center of the coiled layer, in order to softly clamp the layer on said depositing table.

8. In an apparatus according to claim 6, said coiling mandrel being fork-shaped each fork prong consisting of two parts, means adapted to shift said two parts relatively to one another in longitudinal direction, and means adapted

to move them one to the other crosswise to their longitudinal direction, in such a way, that the circumference of the coiling mandrel, regarded in a transverse plane is being reduced.

9. In an apparatus according to claim 6, said coiling mandrel being fork-shaped each fork prong consisting of two parts, embodying two rods of circle-segmental shape in section having outer partially cylindrical surfaces for guiding the end turns of the coiled thread, means adapted to dispose them hingelike relative to one another and to shift them one to another, inner edges of said two parts of said prongs resting in the circle centers of the sector shaped sections, and means to move said inner edges in a direction transverse to their longitudinal direction in order to change the cross sectional area of the coiling mandrel.

10. In an apparatus according to claim 6, said means for holding stationary the coiled thread layer consisting of a depositing table arranged below said coiling mandrel, and a retaining tongue usually arranged out of the way of the mandrel, means adapted to raise and lower said depositing table, and means adapted to place said retaining tongue above said mandrel and to lower it towards the center of the coiled layer, in order to softly clamp the layer on said depositing table, consisting of two prongs, said mandrel each being composed of an upper and lower part, means adapted to reduce the cross sectional area of the mandrel by approaching said upper to said lower parts and to shift the upper parts in relation to the lower parts in longitudinal direction, and means adapted to withdraw said coiling mandrel out of the clamped layer.

11. In an apparatus according to claim 6, a depositing table receiving the stripped off layers one above the other, and means adapted to turn said table together with the deposited layers by 90 degrees to or fro before depositing the following layer.

12. In an apparatus according to claim 6, said means for holding stationary the layer of threads including a deposit table, a pressing member for upward and downward movement provided above said deposit table and designed to connect the separating strips between the layers with one another.

13. In an apparatus according to claim 6, said means for holding stationary the layer of threads including a deposit table, a pressing member for upward and downward movement provided above said deposit table and designed to connect the separating strips between the layers with one another, said separating strips having the form of two separating strips, means adapted to introduce said strips between said pressing member and the uppermost layer, said pressing member having an inner part designed to operate within the range of the end turns of the thread layers, and equipped with means to suck the introduced strips and to press them onto the end turns, and an exterior part of said pressing member, designed to operate within the outer portions of said separating strips provided with glue, and adapted to glue same to the previously located separating strips.

14. In an apparatus according to claim 6, said means for holding stationary the coiled thread layer containing a deposit table and a retaining tongue, a pressing member adapted to connect the separating strips with each other said separating strips having the form of two strips, means for feeding and cutting off said strips, said table, tongue, pressing member and strip feeding and cutting means, being arranged symmetrically with the vertical center plane of the coiling mandrel, a feeding mechanism for the base frames of the thread packs, and a discharge for the finished thread packs both being situated in a vertical plane transverse to the center plane of the coiling mandrel.

15. In an apparatus according to claim 6, said means for holding stationary the coiled thread layer including a deposit table designed to receive the finished layers stacked on its top layer by layer, and means for ejecting the finished thread packs from the table.

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