

Apparatus for winding on an object extending in a longitudinal direction like
a line or a cable

5 The invention concerns an apparatus for winding on an object
extending in a longitudinal direction like a line or a cable, wherein the
apparatus has a drum rotatable about an axis of rotation in a direction of
rotation and having a supporting surface extending over the periphery of the
drum for support of the object to wound on and raised portions which extend
10 radially away from the axis of rotation of the drum at the sides or in lateral
regions of the supporting surface and which laterally delimit a receiving space
disposed between them for the object to be wound on, and the apparatus
includes a device for preventing the windings of the object from piling up in
a narrow region of the transverse extent of the supporting surface.

Associated with the drum is a feed region for the object to be wound
15 on, in which the object is fed to the drum, in particular tangentially or
approximately tangentially, before it is brought into the state of being
supported on the drum.

Such apparatuses for winding on a cable or hose are known from the
state of the art, wherein the device for preventing the windings from being
20 piled up has a cable or hose guide between two rollers, which guide is
reciprocatingly moveable by a drive over the transverse extent of the
supporting surface of the drum for the cable or hose to be wound on. That
device is arranged in the feed region where it takes up space corresponding
to its size.

25 Such a device is structurally complicated and expensive and takes up
a relatively large amount of space outside the drum.

The object of the present invention is to provide an apparatus for
winding on an object which extends in a longitudinal direction like a line or a
cable, of the kind set forth in the opening part of this specification, having a
30 structurally simple and compact device for preventing the windings from
being piled up.

According to the invention that object is attained by the features of
claim 1, in accordance with which it is provided, in the apparatus described

in the opening part of this specification, that the device for preventing the windings of the object from piling up has a shaft which has an external thread and which extends transversely over the supporting surface at a small spacing over a narrow gap from the raised portions and is mounted about its
5 axis of rotation at a component arranged laterally of the drum.

The apparatus according to the invention makes it possible that a region of the object, that when the object is being wound on transitions from the feed region into a winding or is already disposed in a winding and while resting on lower windings comes into contact with the thread crests and
10 grooves of the shaft that are disposed thereabove, causes rotation of the shaft in the direction of rotation opposite to the direction of rotation of the shaft, by frictional engagement with the thread. In that situation the region of the object that comes into contact with the thread of the shaft moves by virtue of the positively locking or frictional engagement with the rotating
15 thread in the transverse direction relative to the peripheral direction of the supporting surface over the windings which are disposed beneath it. That measure according to the invention prevents windings of the turns from accumulating in a narrow region of the transverse extent of the supporting surface, while involving a low level of structural complication and expenditure
20 and saving space.

In a preferred embodiment of the invention the shaft is driven exclusively by the region of the object which is being wound on, which region is supported on respective lower windings and contacts the thread from below, this being caused by the rotation of the drum.

25 In a preferred embodiment of the invention the shaft is arranged non-displaceably along its longitudinal axis.

The shaft is preferably arranged at the location of the drum, at which the feed region for the object ends, in particular in the case of a tangential or approximately tangential feed at the location at which the feed region is
30 in tangential relationship with the drum. The shaft however can also be arranged in a region adjacent to that location in the direction of rotation of the drum.

In the case of a vertically arranged drum with a horizontal axis of rotation, the shaft is preferably arranged over the upper region of the drum.

In use of the apparatus according to the invention the direction of rotation of the drum, viewed from a given end of the drum, can be so selected
5 that the region of the object, that contacts the thread of the shaft, is moved by positively locking and/or frictional engagement with the thread from the end in question of the drum in the direction towards the opposite end of the drum. In that case the shaft is so arranged that, viewed in the direction of rotation of the drum at the location of the shaft and with a horizontal view of
10 the shaft, it has a left-hand thread portion when the shaft is contacted in its left-hand region by the object and/or a right-hand thread portion when it is contacted in its right-hand region by the object. In that case the thread crests and grooves in the left-hand thread portion extend from the left-hand end of the shaft towards the left, that is to say rotating in the anti-clockwise
15 direction, and in the right-hand thread portion away from the right-hand end, towards the right, that is to say rotating in the clockwise direction, in the direction towards the respectively opposite end of the shaft. The respective thread portion can extend over a part of the length or the entire length of the thread.

20 It is possible to provide a plurality of shafts distributed over the periphery of the drum.

The gap extending between the thread of the shaft and the lateral raised portions of the drum can be so small that there is just no contact between the shaft and the drum. It can be kept so small that the object to
25 be wound on cannot pass therethrough.

The shaft which extends over the supporting surface can be arranged parallel to the axis of rotation of the drum. The shaft which extends transversely over the supporting surface however can also extend at an inclined angle with respect to a plane which is arranged perpendicularly to
30 the axis of rotation of the drum, which angle is less than 45° . The thread or the thread portions of the shaft can be in the form of a screw or worm thread. By way of example a sharp, round or trapezoidal thread can be considered as the thread shape for the invention. The thread can have one or more

flights. A two-flight or multi-flight thread has the advantage that the region of the object, that comes into contact with the shaft, can be moved in the lateral direction more quickly than when using a single-flight thread with the same pitch.

5 The shaft, as viewed in the direction of rotation of the drum at the location of the shaft and with a horizontal view of the shaft, can have a left-hand thread portion in its left-hand region and a right-hand thread portion in its right-hand region, those portions adjoining each other at a connecting location.

10 In that case it can be provided that the right-hand end of the left-hand thread portion and the left-hand end of the right-hand thread portion are connected together directly.

 In particular the left-hand thread portion and the right-hand thread portion can be connected together in the central region, in particular in the
15 centre of the shaft.

 The connection of the left-hand thread portion and the right-hand thread portion together can be of such a nature that both thread portions are arranged in mirror-image relationship with each other with respect to the mirror plane which extends at the connecting location perpendicularly to the
20 axis of rotation of the shaft. In that case the mirror plane can extend through a thread crest and a thread groove of the mutually adjoining thread portions.

 In an alternative configuration the connection can be such that the left-hand thread portion and the right-hand thread portion are arranged displaced relative to each other through a given angle, in particular 180° , in
25 relation to a mirror-image arrangement with respect to the plane extending perpendicularly to the axis of rotation of the shaft. In that case the plane at the connecting location can extend through a thread crest of the one thread portion and a thread groove of the other thread portion. In relation to the mirror-image arrangement of the thread portions the arrangement displaced
30 for example through 180° has the advantage that windings passing between the two thread portions, of the object which is being wound on, are not so easily exposed to a jamming action as in the case of a mirror-symmetrical arrangement.

The above-described configuration of the shaft with a left-hand thread portion and a right-hand thread portion is advantageous in particular in the case of a vertically arranged drum, the axis of rotation of which extends horizontally, or in the case of a drum which is only slightly inclined with respect to the vertical, as in that case a region of the object which is being wound on, that region contacting the left-hand or right-hand thread insert portion, can be moved in a direction towards the centre of the shaft.

In an alternative configuration of the invention the shaft can have a continuous left-hand thread or a continuous right-hand thread.

This configuration is advantageous in particular in the case of a horizontally arranged drum with a vertically extending axis of rotation or in the case of a drum which is inclined with respect to the horizontal arrangement. In the case of a drum which is arranged in that way the force of gravity of the windings of the object which is being wound on acts with at least one component in a direction towards the respective lower end of the drum. To generate a force which acts against the force of gravity and which prevents the windings of the object which are wound on to the drum from accumulating in a region of the receiving space, that is adjacent to the lower end face of the drum, the shaft has a continuous left-hand thread when, viewing on to the lower end of the drum from below, it rotates in the anti-clockwise direction, and a right-hand thread when, viewing on to the lower end of the drum from below, it rotates in the clockwise direction. That prevents the windings of the object that is being wound on to the drum from accumulating in the lower region of the receiving space of a drum in a lying position.

At least in one of its end regions the shaft can be provided with a frustoconical enlargement which faces towards its end face and the largest diameter of which is larger than the outside diameter (nominal diameter) of the thread of the shaft. The frustoconical enlargement can be arranged laterally of the raised portion over the supporting surface of the drum for the object to be wound on and can engage into the receiving space for the object to be wound on to the drum.

In an alternative configuration the outside diameter (nominal diameter) of the thread of the shaft can increase at least in one of its end regions, in a direction towards the end face of the drum that adjoins the end region.

5 The shaft can be in the form of a hollow shaft mounted rotatably on a spindle held at or in the component arranged laterally of the drum.

According to another embodiment the shaft at its ends can have bearing journals which engage into bearing mountings at or in the component arranged laterally of the drum.

10 In a preferred configuration of the invention the drum is mounted rotatably at the component arranged laterally of the drum.

The component which is arranged laterally of the drum and at which the shaft is rotatably mounted can have a device with which the spacing of the axis of rotation of the shaft from the axis of rotation of the drum is adjustable. By means of that device, differences in the outside diameter of the drums and in the height of the raised portions laterally delimiting the supporting surface can be compensated.

15 The component arranged laterally of the drum can have a wall extending parallel to the adjoining end face of the drum, for mounting the shaft. The drum can also be mounted rotatably at or in the wall. In particular the component can have two walls extending parallel to the respectively adjoining end faces of the drum, for mounting the shaft and/or the drum. The end regions of the spindle for mounting the shaft which is in the form of the hollow shaft can be arranged at or in the walls of the component or the bearing journals arranged at the ends of the shaft can engage into the bearing mountings.

20 The raised portions arranged laterally of the supporting surface for the object to be wound on the drum, at at least one side of the supporting surface, can have a flange which extends radially outwardly over a height from the supporting surface. In that case the shaft can extend at a small spacing relative to the flange over same and the supporting surface.

30 If, in one of its end regions or in both of its end regions, the shaft has a frustoconical enlargement facing towards the respective end, then the

frustoconical enlargement can be arranged laterally of the flange over the supporting surface, in which case the spacing between the enlargement and the supporting surface is less than the height of the flange above the supporting surface.

5 In a preferred embodiment the flange which extends radially outwardly at least at one side of the supporting surface is in the form of a flange in the shape of a circular ring which extends over the entire periphery of the drum. At its outside that faces away from the supporting surface the flange can form an end region of the drum.

10 The foregoing description sets forth a corresponding method of winding on an object which extends in a longitudinal direction having the stated features as well as the use of the apparatus according to the invention for winding on an object extending in a longitudinal direction having the stated features, which are also embraced by the invention.

15 A number of embodiments by way of example of the present invention are described in greater detail hereinafter with reference to the drawing.

 In the drawing:

 Figure 1 shows a side view of an embodiment with a vertically arranged drum looking on to an end face of the drum,

20 Figure 2 shows a view of the embodiment viewing in the direction of rotation and perpendicularly to the axis of rotation of the drum at the location of the shaft,

 Figure 3 shows a portion of the upper region in Figure 2,

 Figure 4 shows a perspective view of the embodiment of Figure 1,

25 Figure 5 shows a portion from Figure 4,

 Figure 6 shows a side view of the embodiment of Figure 1 upon further rotation of the drum through about 20°,

 Figure 7 shows a view of the embodiment of Figure 2 upon further rotation of the drum through about 20°,

30 Figure 8 shows a portion of the upper region of Figure 7,

 Figure 9 shows a perspective view of the embodiment upon further rotation of the drum through about 20°,

 Figure 10 shows a portion from Figure 9,

Figure 11 shows a plan view of an embodiment with a drum in the lying position, viewing on to the upper end face of the drum,

Figure 12 shows a view of the embodiment of Figure 11 viewing in the direction of rotation and perpendicularly to the axis of rotation of the drum
5 at the location of the shaft,

Figure 13 shows a portion of the left-hand region of Figure 12,

Figure 14 shows a view of the embodiment, that is turned through 90° relative to the Figure 12 view,

Figure 15 shows a perspective view of the embodiment,
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Figure 16 shows a portion from Figure 15,

Figure 17 shows a side view of a first embodiment of the shaft perpendicularly to the axis of rotation of the shaft,

Figure 18 shows an end view of the shaft shown in Figure 17,

Figure 19 shows a perspective view of the shaft shown in Figure 17.

Figure 20 shows a side view of a second embodiment of the shaft
15 perpendicularly to the axis of rotation of the shaft,

Figure 21 shows an end view of the shaft shown in Figure 20,

Figure 22 shows a perspective view of the shaft shown in Figure 20,

Figure 23 shows a side view of a third embodiment of the shaft
20 perpendicularly to the axis of rotation of the shaft,

Figure 24 shows an end view of the shaft shown in Figure 23,

Figure 25 shows a perspective view of the shaft shown in Figure 23,

Figure 26 shows a side view of a fourth embodiment of the shaft perpendicularly to the axis of rotation of the shaft,

Figure 27 shows an end view of the shaft shown in Figure 26,
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Figure 28 shows a perspective view of the shaft shown in Figure 26,

Figure 29 shows a side view of a fifth embodiment of the shaft perpendicularly to the axis of rotation of the shaft,

Figure 30 shows an end view of the shaft shown in Figure 29,

Figure 31 shows a perspective view of the shaft shown in Figure 29,
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Figure 32 shows a side view of a sixth embodiment of the shaft perpendicularly to the axis of rotation of the shaft,

Figure 33 shows an end view of the shaft shown in Figure 32,

Figure 34 shows a perspective view of the shaft shown in Figure 32,
Figure 35 shows a side view of a seventh embodiment of the shaft
perpendicularly to the axis of rotation of the shaft,

Figure 36 shows an end view of the shaft shown in Figure 35,

5 Figure 37 shows a perspective view of the shaft shown in Figure 35,

Figure 38 shows a side view of an eighth embodiment of the shaft
perpendicularly to the axis of rotation of the shaft,

Figure 39 shows an end view of the shaft shown in Figure 38, and

Figure 40 shows a perspective view of the shaft shown in Figure 38.

10 The apparatus shown in Figures 1 to 10 for winding on an object 1
extending in a longitudinal direction like a line or a cable has a drum which
is rotatable about an axis of rotation d1 in a direction of rotation r1 and
having a supporting surface 3 extending over the periphery of the drum 2
for support of the object 1 to be wound on. Provided at the sides of the
15 supporting surface 3 are raised portions 4 which extend radially away from
the axis of rotation d1 of the drum and which laterally delimit a receiving
space 5 disposed between them, for receiving the object 1 to be wound on.
The raised portions 4 are in the form of ring-shaped flanges 8 which extend
at both sides of the supporting surface 3 over a height radially outwardly and
20 which, at their side facing away from the supporting surface 3, form an end
region of the drum 2.

In addition the apparatus includes a device 6 for preventing the
windings 7 of the object 1 from piling up in a narrow region of the transverse
extent of the supporting surface 3. The device 6 for preventing the windings
25 7 from piling up has a shaft 9 which has an external thread 10 which extends
transversely over the supporting surface 3 and the flange 8 at a small spacing
over a narrow gap 11 from the flanges 8 of the drum 2 and is mounted
rotatably about its axis of rotation d2 at a component 12 arranged laterally
of the drum 2.

30 The embodiment shown in Figures 1 to 10 illustrates a configuration
of the apparatus for winding on the object 1 extending in a longitudinal
direction, in which the drum 2 is arranged vertically. In the side views shown
in Figures 1 and 6 and axis of rotation r1 of the drum extends in the clockwise

direction so that the object 1 to be wound on to the drum is moved in the direction of the arrow a by way of the tangential feed region 13 shown in particular in Figures 1 and 6. The shaft 9 with its thread 10 is arranged in the peripheral region of the drum 2, adjoining the feed region 13.

5 Figures 1 to 5 show the drum in a first rotational position. The region of the object 1, that extends along the feed region 13, is shown cut-away at a given location in Figures 1 to 10.

 As can be seen in particular from Figures 3 and 5 the region 14 of the object 1 to be wound on, which region 14 is fed to the drum 2 from the feed region 13 and is disposed on one or more lower windings 7, engages in the left-hand region of the receiving space 5 into a thread groove in the thread 10 of the shaft 9 and by frictional engagement with the thread 10 causes rotation of the shaft 9 in a direction of rotation r_2 opposite to the direction of rotation r_1 of the drum 2.

15 Figures 6 to 10 show the embodiment illustrated in Figures 1 to 5, in a second rotational position of the drum 2, that is rotated (in the clockwise direction) through about 20° in the direction of rotation r_1 with respect to the first rotational position, and corresponding rotation of the shaft 9 in its direction of rotation r_2 (in the anti-clockwise direction) in a plan view as shown in Figure 6. In that case, as can be seen from the cut-away end of the object 1 that is to be wound on in the feed region 13, the object 1 has been further wound on to a corresponding length. By virtue of the positively locking and frictional engagement of the region 14 of the object 1, which region is fed to the drum 2 from the feed region 13 and is resting on one or more lower windings 7, with the thread 10 of the shaft 9 and the further rotation caused thereby of the shaft 9 through about 20° from the first rotational position shown in Figures 1 to 5 into the second rotational position, the region 14 of the object 1 to be wound on has been moved away from the subjacent windings 7 in the transverse direction of the supporting surface 3 towards the centre thereof so as to avoid windings from piling up in the region of the windings 7.

 In the plan view on to the end of the shaft 9, arranged at the left in Figures 3 and 8, the shaft 9 in its left-hand region has a left-hand thread

portion 15 (upon rotation of that thread portion, in a plan view on to the left-hand end of the shaft 9, in the clockwise direction, a region 14 which engages into the thread region of the object 1 moves towards the right towards the centre of the shaft 9) and in the right-hand region it has a right-hand thread portion 16 (upon rotation of that thread region, in a plan view on to the left-hand end of the shaft 9, in the clockwise direction, a region engaging into that thread region of the object 1 that is being wound on, moves towards the left towards the centre of the shaft 9).

In the embodiment shown in Figures 11 to 16 the drum 2 is arranged horizontally with a vertically extending axis of rotation d1. The axis of rotation d2 of the shaft 9 is also oriented vertically, with the drum 2 and the shaft 9 being so arranged relative to each other as described hereinbefore in relation to the first embodiment shown in Figures 1 to 10.

With a horizontally arranged drum 2 with a horizontal winding action the force of gravity of the windings of the object 1 which is being wound on acts in a direction towards the lower end of the drum 2. To create a force which acts against the force of gravity and which prevents the windings of the object 1 that are being wound on to the drum 2 from accumulating in a region of the receiving space 5, that is adjacent to the downward end face of the drum 2, the shaft 9, in the lower plan view on to its downward end, has a continuous left-hand thread as can be seen in particular from Figure 13. In that way a region 14, that is fed to the drum 2 from the feed region 13, of the object 1 which by virtue of its force of gravity therein tends to be deposited in the lower region of the receiving space 5 and comes into contact with the left-hand thread of the shaft 9, experiences an upward movement which lifts it up above the lower windings 7.

As can be seen from Figures 1 to 16 of the above-described embodiments, the component 12 which is arranged laterally of the drum 2 and which is stationary in relation to the rotational movement of the drum 2 has a wall 17 extending parallel to the adjoining end face of the drum 2, to mount the shaft 9. The drum 2 is also mounted rotatably to the wall 17.

The embodiment of the shaft 9, shown in Figures 17 to 19, has a left-hand thread portion 15 in its left-hand region in the horizontal view shown

in Figure 17, and a right-hand thread portion 16 in its right-hand region. In that respect it is assumed that, in a plan view on to its left-hand end face as shown in Figure 18, the shaft 2 rotates in the clockwise direction. The two thread portions are respectively single-flight threads and are connected
5 together in the centre of the shaft in such a way that they are arranged in mirror-image relationship with respect to each other with respect to the mirror plane extending at the connecting location perpendicularly to the axis of rotation d2 of the shaft 9. As can be seen in particular from Figure 17 the mirror plane extends through a thread crest and a thread groove of the
10 mutually adjoining thread portions.

The embodiment of the shaft 9 shown in Figures 20 to 22 differs from that shown in Figures 17 to 19 in that the two thread portions are arranged displaced relative to each other through an angle of 180° with respect to the mirror-image arrangement shown in Figures 17 to 19. The plane at the
15 connecting location, that is arranged perpendicularly to the axis of rotation of the shaft 9 at the centre thereof, extends through a thread crest of the one thread portion and a thread groove of the other thread portion.

The embodiment of the shaft 9 shown in Figures 23 to 25 differs from the embodiment shown in Figures 17 to 19 in that the shaft 9 has a double-
20 flight thread in each thread portion.

The embodiment of the shaft 9 shown in Figures 26 to 28 also differs from the embodiment shown in Figures 20 to 22 in that the two thread portions are of a double-flight configuration.

This embodiment corresponds to the configuration of the shaft 9 used
25 in the embodiment shown in Figures 1 to 10.

Figures 29 to 31 show a shaft 9 whose thread, like the embodiment shown in Figures 17 to 19, has a left-hand thread portion 15 and a right-hand thread portion 16 which are of mirror-symmetrical relationship with respect to the central plane that is perpendicular to the axis of rotation d2 of the shaft 9. At its ends facing towards the two end faces the shaft 9 is
30 respectively provided with a frustoconical enlargement 18 which directly adjoins the thread portion in question and whose largest diameter is larger than the outside diameter (nominal diameter) of the two thread portions.

When using this shaft in the embodiment illustrated in Figures 1 to 10 of the apparatus for winding on an object which extends in the longitudinal direction, the frustoconical enlargements 18 can be arranged laterally of the raised portions 4 over the supporting surface 3 of the drum 2 for the object to be wound on and can engage into the receiving space 5 for the object 1.

As the frustoconical enlargements 18 on the shaft 9 shown in Figures 29 to 31 project at the insides of the raised portions 4 into the receiving space 5 of the drum 2 this avoids contact between the enlargements 18 with the component 12 by virtue of spacer rings 20 arranged concentrically with respect to the axis of rotation d2 of the shaft 9.

The enlargements 18 provide that regions 14 of the object 1 which is being wound on, that come into contact with the enlargements 18, are diverted towards the thread region of the shaft 9 in order to prevent windings from piling up in the receiving space 5 of the drum 2, adjoining the raised portions 4.

An embodiment of the shaft 9, as an alternative thereto, is shown in Figures 32 to 34. Here the outside diameter (nominal diameter) of the respective thread portion of the shaft 9 increases in the two end regions thereof in the direction towards the end face of the shaft 9, adjoining the respective end region. That measure provides for a specifically targetted arrangement of the windings of the object 1 which is being wound on, with an increase in the height thereof, towards the centre of the receiving space 5 of the drum 2.

In the embodiment shown in Figures 17 to 34 the shaft 9 is in each case in the form of a hollow shaft mounted rotatably on a spindle (not shown in the drawing) which is rotatably mounted at or in the component 12 which is stationary with respect to the rotatable drum 2.

Instead of a hollow shaft the component 12 can also mount a shaft 9 with bearing journals 19 projecting outwardly at the ends thereof, as shown by way of example in Figures 35 to 37. In this example the shaft 9 is provided with a left-hand thread portion 15 and a right-hand thread portion 16 in accordance with the embodiment shown in Figures 26 to 28. The

connection between the two thread portions is also provided as shown in Figures 26 to 28.

5 To mount the shaft 9 shown in Figures 35 to 37, like also in the other embodiments described by way of example herein, there are preferably provided two walls 17 of the component 12, which walls 17 extend laterally of the drum 2 and at or in which the shafts 9 can be mounted. In particular the two end bearing journals 19 on the shaft 9 can engage into the bearing receiving means (not shown in the drawing).

10 In the embodiment shown in Figures 38 to 40 the shaft 9 is provided with a continuous double-flight thread. The shaft 9 is once again in the form of a hollow shaft.

When using that shaft in the embodiment shown in Figures 11 to 16 of an apparatus for winding on an object extending in a longitudinal direction, the shaft 9 shown in Figures 38 to 40 can be installed with a left-hand thread configuration, as shown in particular in Figure 13 and described in greater detail hereinbefore.

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List of references

	1	object
	2	drum
5	3	supporting surface
	4	raised portion
	5	receiving space
	6	device
	7	winding
10	8	flange
	9	shaft
	10	thread
	11	gap
	12	component
15	13	feed region
	14	region
	15	left-hand thread portion
	16	right-hand thread portion
	17	wall
20	18	raised portion
	19	bearing journal
	d1	axis of rotation
	d2	axis of rotation
	r1	direction of rotation
25	r2	direction of rotation
	a	arrow

CLAIMS

1. Apparatus for winding on an object (1) extending in a longitudinal direction like a line or a cable, wherein the apparatus has a drum (2) rotatable about an axis of rotation (d1) in a direction of rotation (r1) and
5 having a supporting surface (3) extending over the periphery of the drum (2) for support of the object (1) to wound on and raised portions (4) which extend radially away from the axis of rotation (d1) of the drum (2) at the sides or in lateral regions of the supporting surface (3) and which laterally delimit a receiving space (5) disposed between them for the object (1) to be
10 wound on, and the apparatus includes a device (6) for preventing the windings of the object (1) from piling up in a narrow region of the transverse extent of the supporting surface (3), characterised in that the device (6) for preventing the windings of the object (1) from piling up has a shaft (9) which has an external thread (10) and which extends transversely over the
15 supporting surface (3) at a small spacing over a narrow gap (11) from the raised portions (4) and is mounted about its axis of rotation (d2) at a component (12) arranged laterally of the drum (2).

2. Apparatus according to claim 1 characterised in that the shaft (9)
20 is arranged in a peripheral region of the drum (2), that adjoins the feed of the object (1) to the drum (2).

3. Apparatus according to claim 1 or claim 2 characterised in that the shaft (9) is arranged parallel to the axis of rotation (d1) of the drum (2).

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4. Apparatus according to one of claims 1 to 3 characterised in that the shaft (9), viewed in the direction of rotation (r1) of the drum (2) at the location of the shaft (9) and with a horizontal view of the shaft (9), has a left-hand thread portion (15) in its left-hand region and a right-hand thread
30 portion (16) in its right-hand region.

5. Apparatus according to claim 4 characterised in that the right end of the left-hand thread portion (15) and the left end of the right-hand thread portion (16) are connected directly together.

5 6. Apparatus according to claim 5 characterised in that the left-hand thread portion (15) and the right-hand thread portion (16) are connected together in the centre of the shaft (9).

10 7. Apparatus according to claim 5 or claim 6 characterised in that the left-hand thread portion (15) and the right-hand thread portion (16) are arranged in mirror-image relative to each other with respect to a plane extending at the connecting location perpendicularly to the axis of rotation (d2) of the shaft (9).

15 8. Apparatus according to claim 5 or claim 6 characterised in that the left-hand thread portion (15) and the right-hand thread portion (16) are arranged displaced relative to each other through 180° about the axis of rotation (d2) with respect to a mirror-image arrangement with respect to the plane extending perpendicularly to the axis of rotation (d2), wherein in
20 particular the plane extends at the connecting location through a thread crest of the one thread portion and a thread groove of the other thread portion.

 9. Apparatus according to one of claims 1 to 3 characterised in that the shaft (9) has a continuous left-hand thread or a continuous right-hand
25 thread viewed in the direction of rotation (d1) of the drum (2) at the location of the shaft (9).

 10. Apparatus according to one of claims 1 to 9 characterised in that the shaft (9) is in the form of a hollow shaft and is mounted rotatably on a
30 spindle held at or in the component (12) arranged laterally of the drum (2).

11. Apparatus according to one of claims 1 to 9 characterised in that at its ends the shaft (9) has bearing journals (19) which engage into bearing mountings at or in the component arranged laterally of the drum (2).

5 12. Apparatus according to one of claims 1 to 11 characterised in that at at least one its end regions the shaft (9) is provided with a frustoconical enlargement (18) which faces towards the end in question and the largest diameter of which is larger than the outside diameter of the thread (10) of the shaft (9), wherein the spacing between the enlargement (18) and the
10 supporting surface (3) is less than the height of the flange (8) above the supporting surface (3).

 13. Apparatus according to one of claims 1 to 11 characterised in that the outside diameter of the thread (10) of the shaft (9) increases at least in
15 one of its end regions in a direction towards the end face of the shaft (9), that adjoins the end region.

 14. Apparatus according to one of claims 1 to 13 characterised in that the component (12) arranged laterally of the drum (2) has a wall (17) for
20 mounting the shaft (9), said wall extending parallel to the adjoining end face of the drum (2).

 15. Apparatus according to claim 14 characterised in that the drum
25 (2) is mounted rotatably to the wall (17).

 16. Apparatus according to one of claims 1 to 15 characterised in that at least one of the raised portions (4) arranged laterally of the supporting surface (3) for the object (1) to be wound on the drum (2) is in the form of a flange (8) which extends radially outwardly from the supporting surface
30 (3) over a height, wherein the shaft (9) extends at a small spacing relative to the flange (8) over same and the supporting surface (3).

17. Apparatus according to claim 16 characterised in that the flange (8) extending radially outwardly at least at one side of the supporting surface (3) is in the form of a flange in the shape of a circular ring which extends over the entire periphery of the drum (2) and which at its outside remote
5 from the supporting surface (3) forms an end region of the drum (2).