

Aug. 7, 1951

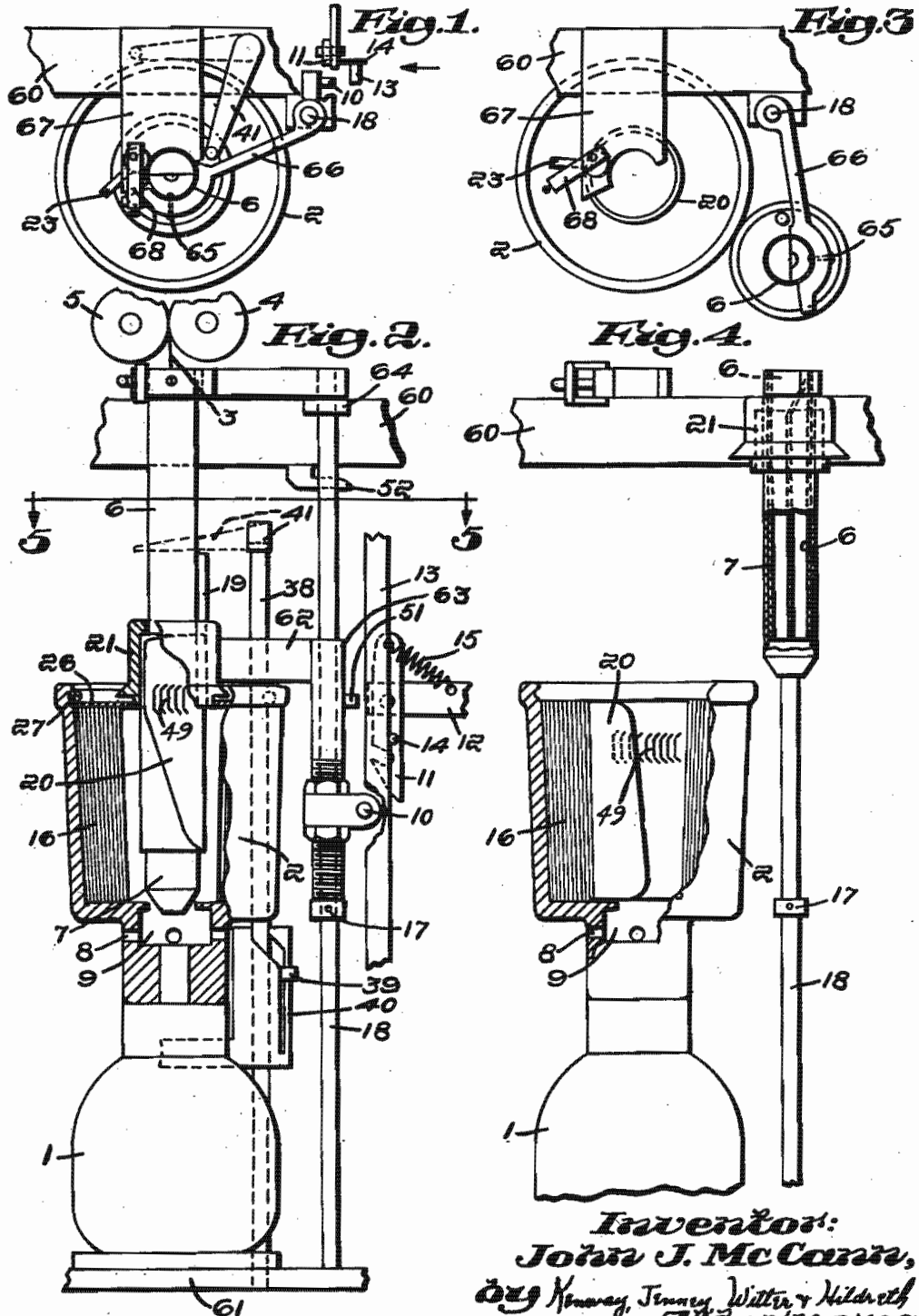
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2,563,053

POT SPINNING METHOD, APPARATUS, AND PRODUCT

Filed Nov. 30, 1948

3 Sheets-Sheet 1



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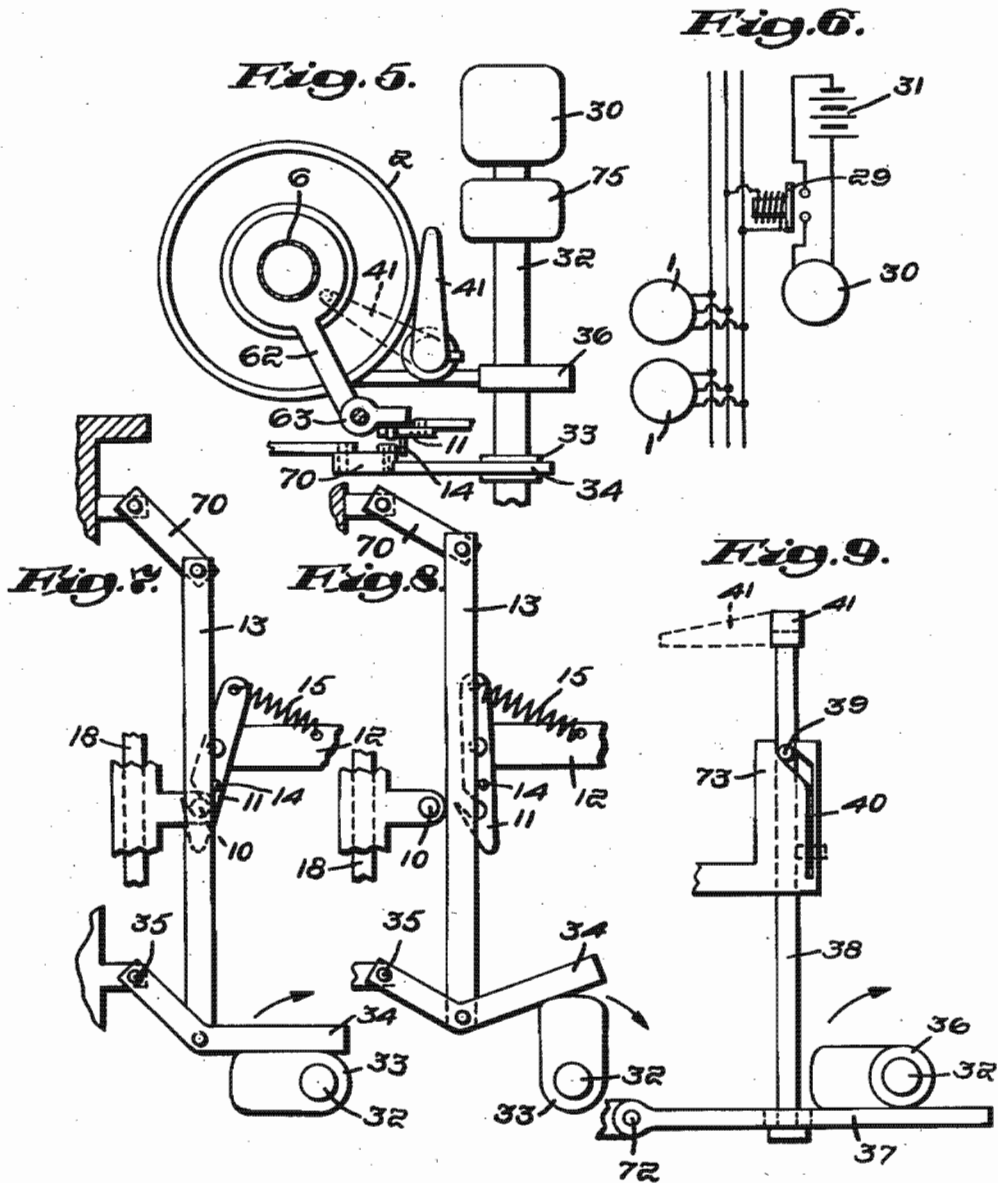
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POT SPINNING METHOD, APPARATUS, AND PRODUCT

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3 Sheets-Sheet 2



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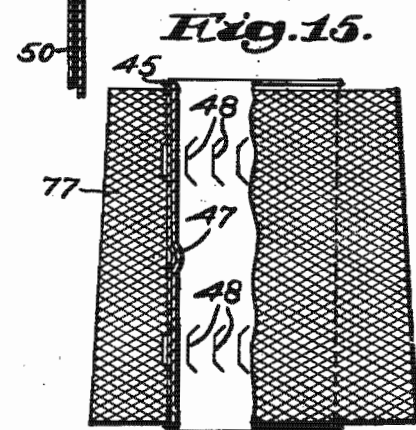
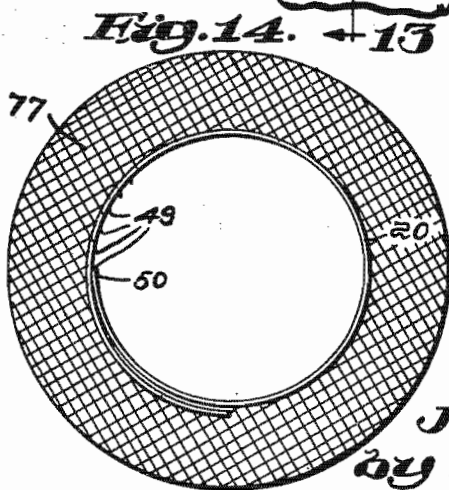
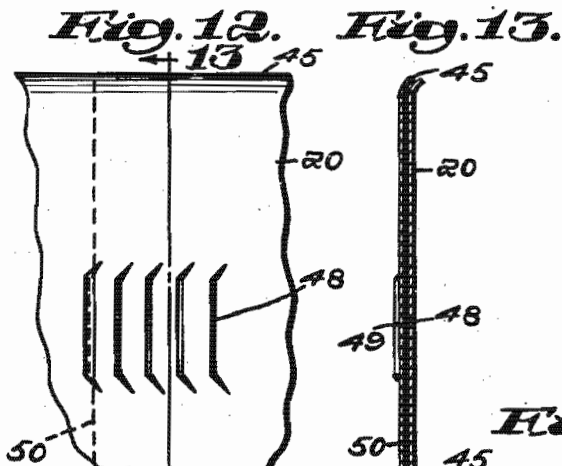
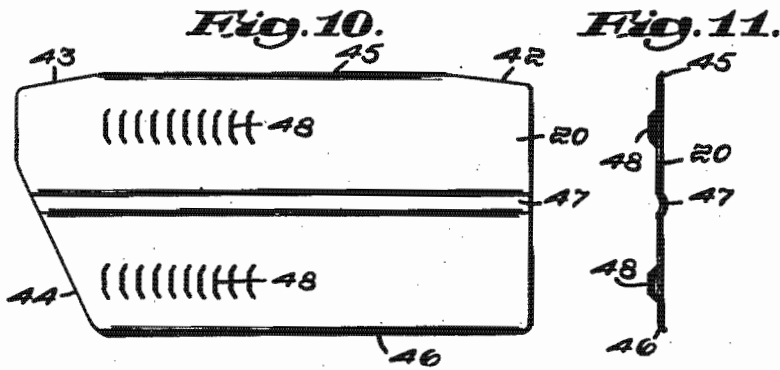
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POT SPINNING METHOD, APPARATUS, AND PRODUCT

Filed Nov. 30, 1948

3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

2,563,053

## POT SPINNING METHOD, APPARATUS, AND PRODUCT

John J. McCann, Lowell, Mass.

Application November 30, 1948, Serial No. 62,666

25 Claims. (Cl. 57—34)

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This invention relates to the art of spinning a continuous strand of fibrous material into a hollow package by centrifugal force within a rotary pot, as described in my Patent 2,291,819 and my Reissue Patent 23,232, dated May 23, 1950, and more particularly to a novel method and apparatus for preventing collapse of the package when the speed of pot rotation diminishes either intentionally for doffing or accidentally should the pot rotating power fail. The invention consists in expanding a yarn supporting core embodying a tubular yarn supporting surface into contact with the inner cylindrical wall of the package while the pot is rotating at a speed supporting the package in expanded relation by centrifugal force, such tubular surface thereupon serving as a support from which the yarn can be unwound without loss or damage. The invention furthermore contemplates mechanism for thus servicing a plurality of spinning pots simultaneously either singly manually or automatically collectively at the completion of the spinning of the package or in case of power failure.

The expandable core and supporting surface which I preferably employ embodies a sheet of flexible material coiled to tubular form and normally expansible to engage and support the package internally. The sheet is held in constricted tubular relation within the package during the spinning operation and means is provided for releasing the sheet whereupon it expands into contact with the package. The sheet is furthermore provided with ratchet teeth which automatically come into engagement and support the sheet in expanded relation when associated with the package.

The production of these novel features for the purpose described, together with the new yarn package produced, comprises the primary object of the invention. These and other features will be best understood and appreciated from the following description of preferred embodiments of the invention selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a fragmentary plan view of a spinning pot and associated mechanism,

Fig. 2 is a side elevation, partially in section,

Fig. 3 is a plan view like Fig. 1 but showing the parts in another position,

Fig. 4 is a side elevation thereof,

Fig. 5 is a plan view taken on line 5—5 of Fig. 2,

Fig. 6 is a diagram of a wiring circuit employed,

Fig. 7 is a fragmentary elevation of mechanism shown in Fig. 2,

Fig. 8 is a like view with the parts in another position,

Fig. 9 is a fragmentary elevation of other mechanism shown in Fig. 2,

Fig. 10 is an elevation of the flexible sheet employed for supporting the package,

Fig. 11 is an end view of Fig. 10,

Fig. 12 is an enlarged fragmentary view of the coiled and overlapped sheet,

Fig. 13 is a sectional view taken on line 13—13 of Fig. 12,

Fig. 14 is an end view of the coiled sheet in supporting relation with a package of yarn, and

Fig. 15 is an elevation thereof, partially broken away.

As illustrated in my Patent 2,321,404, a pot spinning machine embodying my invention comprises an oblong frame on and along which is mounted a row of spinning pots. Since the pots and their cooperating mechanisms are duplicates along the frame, illustration and description of one pot together with the cooperating novel features comprising this invention will suffice.

In the drawings, 60 indicates a horizontal upper portion of the frame for mounting the strand guiding tubes. Each spinning pot 2 is driven by and mounted vertically above and on a motor 1 resting on a base 61. The pot is open at the top and is provided with a cover 26 secured by a gasket 27 and having a centrally disposed opening into the pot. The strand 3 of fibrous material to be spun is fed downwardly by rolls 4 and 5 into and through a guiding tube 6. A traversing tube 7 including a housing 21 is mounted to slide telescopically over the normally fixed tube 6, the tube 7 extending downwardly into the pot through the cover opening. The housing 21 is integral with an arm 62 and a sleeve 63 slidable on a vertical rod 18 supported at its bottom and top ends in the base 61 and bracket 64 on the frame 60.

The tube 6 is secured by a rivet 65 to an arm 66 mounted on the top end of the rod 18. Thus arm 66 supports the tube and also serves as the movable element of a clamp cooperating with a fixed element 67 extending forwardly from the frame 60. A yoke 68 pivoted to the element 67 is adapted to engage the arm and an eccentric having an operating finger 23 is provided for tightening the yoke and arm to the element and thus securing the tube 6 in operative position over the spinning pot. The leading end of the strand 3 is drawn downwardly into the pot by a current of air generated by holes 8 leading outwardly

from a chamber 9 in the bottom of the pot. The chamber 9 is adapted to receive the forward end of the traversing tube 7 when starting the spinning operation.

After the strand feeding operation is started the traversing mechanism is connected to the sleeve 63 to reciprocate the tube 7 vertically within the pot. It will be understood that the traversing motion reciprocates the bottom end of the tube 7 within the spinning pot whereupon the traveling strand is spun into a hollow package 16 by centrifugal force. This traversing mechanism (not shown) embodies an arm 12 having a hook 11 pivoted to its free end in position to engage a pin 10 carried by the sleeve 63. A spring 15 attached to the hook normally holds the hook engaged with the pin 10. The first step in doffing can be effected by releasing the hook from the pin whereupon the traversing tube 7 drops downwardly into the chamber 9 to a point permitted by a stop 17 on the rod 18.

Should the pot speed be stopped or substantially reduced the package would collapse and the primary object of the invention resides in the employment of an expansible tubular surface for supporting the internal cylindrical wall of the package and preventing such collapse, such tubular surface thereupon serving as a support for the package from which the yarn or strand can be unwound without loss or damage.

In the drawings I have illustrated a flexible sheet 20 of any suitable material, such as aluminum, a plastic composition or the like, which can be coiled to cylindrical form from which it tends to expand radially due to the resiliency of the sheet. This sheet is of a size to fit within the pot between the bottom and cover 26 and it is mounted in coiled position on the tube 7 with its top end confined within the housing 21. The sheet is slotted at 48 to provide ratchet lips 49 projecting outwardly at one surface. These lips are adapted to cooperate with a shoulder on the sheet, as the shoulder provided by the straight end 50 of the sheet, to prevent collapsing of the tube after it has expanded into supporting engagement with the package.

When a package is to be doffed, the strand delivery is stopped, the hook 11 is released whereupon the tube 7 drops into the chamber 9, and the coiled sheet 20 is forced downwardly from the housing 21 by downward pressure on a pin 19 mounted in the housing. The sheet thereupon expands into supporting contact with the internal wall of the package and the end 50 engages the lips 49 (Fig. 14) to prevent collapsing of the sheet and package when the pot rotation is stopped.

The package is then doffed by removing the cover 26 and raising the sleeve 63 and its connected elements upwardly and swinging them outwardly to the position shown in Figs. 3 and 4. In such position a pin 51 carried by the sleeve 63 is engaged with a hook 52 on the frame thereby holding the mechanism upwardly in such elevated position. The package together with the supported sheet 20 is thereupon removed from the pot 2.

The following described mechanism is provided for simultaneously inserting the coiled sheets 20 in all the pots automatically either intentionally or upon failure of power to the pot spinning motors 1. This mechanism is illustrated as operated by an electric motor 30 from a battery 31, although it will be understood that any other suitable source of power, such as a spring or gravity loaded motor, may be provided for this purpose. The

circuit to the motor 30 is normally open at a solenoid operated switch 29. The coil of the solenoid is normally energized from the circuit to the motors 1 but should this latter circuit fail to energize the solenoid the solenoid switch would automatically close and cause the motor 30 to function.

A shaft 32 driven from the motor 30 through reduction gearing at 75 is provided with two cams 33 and 36 at each spinning pot. The cams 33 are adapted to release the hooks 11 and the cams 36 are adapted to force the expansible coiled sheets 20 into the spinning pots from their housings 21. Suitable mechanism (not shown) is provided for automatically stopping the rotation of the shaft 32 after it has made one complete revolution.

A lever 34 pivoted to the frame at 35 rests on each cam 33. The bottom end of a link 13 is pivotally connected to the lever and its top end is pivotally connected to the frame through a short link 70. The link 13 is disposed forwardly of a pin 14 carried by the hook 11. Rotation of the cam 33 (Fig. 8) lifts the arm and link and causes the arm to move outwardly and into contact with the pin 14 to an extent releasing the hook from its pin 10. The traversing mechanism thereupon drops to the position permitted by the stop 17.

A lever 37 pivoted to the frame at 72 is connected to the bottom end of a rod 38 carrying an arm 41 on its top end. A pin 39 carried by the rod is disposed within a slot 40 in a fixed bracket 73.

Following the above described action by the cam 33, the cam 36 depresses the lever 37 and draws the rod 38 downwardly. The slot 40 thereupon rotates the rod to bring the arm 41 over and in alignment with the pin 19 (Fig. 5). Further downward travel of the rod then serves to push the pin 19 downwardly and force the expansible member 20 from its housing 21 and into the spinning pot 2 where it expands into contact with the package.

The top edges of the sheet 20 are cut away at 42 and 43 so that when the sheet is supporting a package of yarn with an inside taper these edges will not protrude. The free end of the sheet is cut away at 44 so that it will not project outwardly when coiled on the tube 7 as shown in Fig. 2. The top and bottom edges 45 and 46 are slightly bent outwardly to hold the yarn package from sliding off the ends of the tubular coil and also to increase the resiliency of the sheet. A rib 47 is also formed longitudinally through the sheet to interengage and hold the ends of the sheet in straight superposed relation.

Having thus disclosed my invention what I claim as new and desire to secure by Letters Patent is:

1. In the art of spinning a continuous strand of fibrous material into a hollow package by centrifugal force within a rotary pot, the method of preventing collapse of the package when the speed of pot rotation diminishes which consists in expanding a tubular supporting surface into contact with the interior cylindrical wall of the package while the pot is rotating at a speed supporting the package in expanded relation by centrifugal force.

2. Yarn spinning mechanism comprising a spinning pot mounted for rotation about a strand spinning axis, means for feeding a strand along said axis into the pot, means for rotating the pot to spin the strand centrifugally into a package, a flexible sheet coiled to tubular form, means for holding the sheet in constricted tubular rela-

tion at said axis during the spinning operation, and means for releasing said sheet within the pot whereupon it expands into contact with the package.

3. The spinning mechanism defined in claim 2 plus a strand guiding tube disposed about said axis leading into the spinning pot, said sheet holding means being mounted on the tube.

4. Yarn spinning mechanism comprising a spinning pot mounted for rotation about a strand spinning axis, means for feeding a strand along said axis into the pot, means for rotating the pot to spin the strand centrifugally into a package, traversing mechanism at the pot including a strand guiding tube positioned to extend downwardly into the pot, and a disengageable connection for supporting the tube, the tube being adapted to drop downwardly into the pot when said connection is disengaged.

5. Yarn spinning mechanism comprising a plurality of spinning pots each mounted for rotation about a strand spinning axis, means for feeding a strand along each said axis into its pot, means for rotating the pots to spin each strand into a package, traversing mechanism for guiding each strand in its pot, a flexible sheet coiled to tubular form about each strand, means carried by each traversing mechanism for holding its said coiled sheet, and means for releasing all the coiled sheets within the pots simultaneously.

6. The mechanism defined in claim 5 in which the pot rotating means is driven electrically and in which said releasing means is operated automatically to release the sheets when the electric power to the pot rotating means is interrupted.

7. The mechanism defined in claim 5 in which said traversing mechanism at each pot includes a strand guiding tube positioned to extend downwardly into the pot and a disengageable connection for supporting the tube, and means for automatically disengaging all of said connections simultaneously.

8. The mechanism defined in claim 7 in which the pot rotating means is driven electrically and in which the disengaging means automatically disengages said connections when the electric power to the pot rotating means is interrupted.

9. Yarn spinning mechanism comprising a spinning pot mounted for rotation about a strand spinning axis, means for feeding a strand along said axis into the pot, means for rotating the pot to spin the strand centrifugally into a package, traversing mechanism at the pot including a strand guiding tube positioned to extend downwardly into the pot, and means supporting the tube for pivotal movement about an axis disposed laterally of the pot and parallel with its axis of rotation.

10. The mechanism defined in claim 9 plus a strand guiding tube extending telescopically into the first named tube, means for supporting the second named tube for pivotal movement about an axis disposed laterally of the spinning axis, and means for detachably anchoring said second named tube in spinning position at and parallel with said spinning axis.

11. A sheet of flexible material for use in pot spinning mechanism as an expandable yarn core and adapted to be coiled to tubular form, a shoulder on the sheet and a plurality of ratchet teeth disposed on and along the sheet in position to be engaged by said shoulder and prevent inward collapsing of the coiled sheet.

12. The sheet defined in claim 11 in which

said teeth are cut from and form an integral part of the sheet.

13. The sheet defined in claim 11 in which said shoulder is an integral part of the sheet and said teeth are cut from and form an integral part of the sheet.

14. The sheet defined in claim 11 in which the margins of the sheet at the ends of the tube formed by the coiled sheet are flared outwardly of the coiled sheet.

15. The sheet defined in claim 11 in which the end of the sheet forming the outer lap of the coiled sheet extends angularly from a point intermediately of the ends of the tube toward the other end of the sheet.

16. The sheet defined in claim 11 in which a rib is formed in and extending longitudinally of the sheet in position to interengage when the sheet is coiled to tubular form.

17. An oblong hollow package of yarn comprising a strand wrapped about an opening disposed axially through the package and supported in contracted relation on a coiled sheet of flexible material disposed in said opening and expanded outwardly into supporting contact with the package, said sheet including a plurality of ratchet-like teeth engaged by the overlapping end of the sheet and supporting the coiled sheet against inward collapse.

18. Yarn spinning mechanism comprising a spinning pot mounted for rotation about a strand spinning axis, means for feeding a strand along said axis into the pot, means for rotating the pot to spin the strand into a package, traversing mechanism for guiding the strand in the pot, support means carried by the traversing mechanism for holding in contracted condition and in a position adjacent the pot an expandable yarn package core in said contracted condition, and means for ejecting the core from the traversing mechanism into the pot.

19. In spinning mechanism including a spinning pot for spinning a hollow yarn package in its interior and means to feed a strand into said pot, an expandable yarn package core, means to support the core in contracted condition during spinning, and operating means to place it in expanded condition in supporting contact with the interior of the yarn package while the pot is still rotating.

20. In spinning mechanism including a spinning pot for spinning a hollow yarn package in its interior, a hollow guide tube extending into said pot and means to feed a strand through said guide tube into said pot, an expandable yarn package core, support means on the guide tube holding the core in contracted condition during spinning, and means moving said core axially into said pot, releasing it from said support and expanding it into contact with the package upon the completion of spinning and while the pot is still rotating.

21. In spinning mechanism including a spinning pot for spinning a hollow yarn package in its interior and means to feed a strand into said pot, a flexible resilient sheet coiled to expandable tubular form, support means holding the sheet in contracted tubular condition in a first position during spinning and then introducing said sheet into said pot, and means releasing said sheet from said support means within said pot whereupon it expands into contact with the package.

22. In spinning mechanism including a spinning pot for spinning a hollow yarn package in

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its interior and means to feed a strand into said pot, a flexible resilient sheet coiled to expandable tubular form, support means holding the sheet in contracted tubular condition during spinning, and operating means to release said sheet from said support means within said pot while the pot is still rotating whereupon it expands into contact with the package.

23. In spinning mechanism including a spinning pot for spinning a hollow yarn package in its interior, means to feed a strand into said pot and a strand guide tube extending into said pot, a flexible resilient sheet coiled to expandable tubular form, support means on said guide tube holding the sheet in contracted tubular condition about said guide tube during spinning, and operating means to release said sheet from said support means within said pot while the pot is still rotating whereupon it expands into contact with the package.

24. In spinning mechanism including a spinning pot for spinning a hollow yarn package in its interior, means to feed a strand into said pot and a traversing strand guide tube extending into said pot, a flexible resilient sheet coiled to

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expandable tubular form, support means on said traversing tube holding the sheet in contracted tubular condition about said tube during spinning, and means moving said sheet into said pot and releasing it from said support on the completion of spinning whereupon the coiled sheet expands into contact with the package.

25. In spinning mechanism including a spinning pot for forming a hollow package of spun yarn in its interior, means to feed a strand into said pot and a traversing strand guide tube extending into said pot, a flexible resilient sheet coiled to expandable tubular form, support means on said traversing tube comprising a housing enclosing one end of said tubular form and thereby holding it in contracted tubular condition about said guide tube during spinning, operating means moving said tube further into said pot and presenting said sheet within said package, and means operating to eject said sheet from said housing whereupon it expands into contact with said package.

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No references cited.