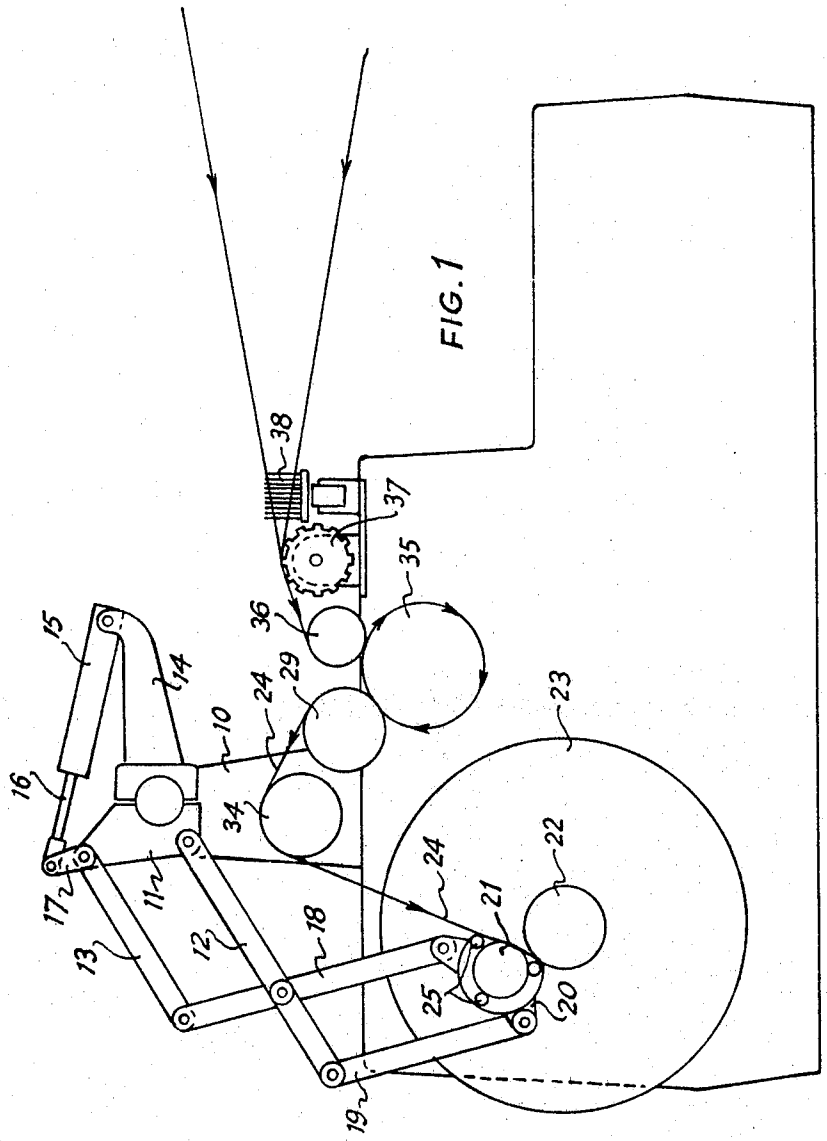
March 3, 1970 J. NORTON 3,497,927

METHOD AND APPARATUS FOR WINDING BEAMS

Filed Feb. 15, 1968 3 Sheets-Sheet 1

FIG. 1



INVENTOR:
JOHN NORTON
BY
Albert J. Davis
Burnett W. Norton
ATTORNEYS

March 3, 1970 J. NORTON 3,497,927

METHOD AND APPARATUS FOR WINDING BEAMS

Filed Feb. 15, 1968 3 Sheets-Sheet 2

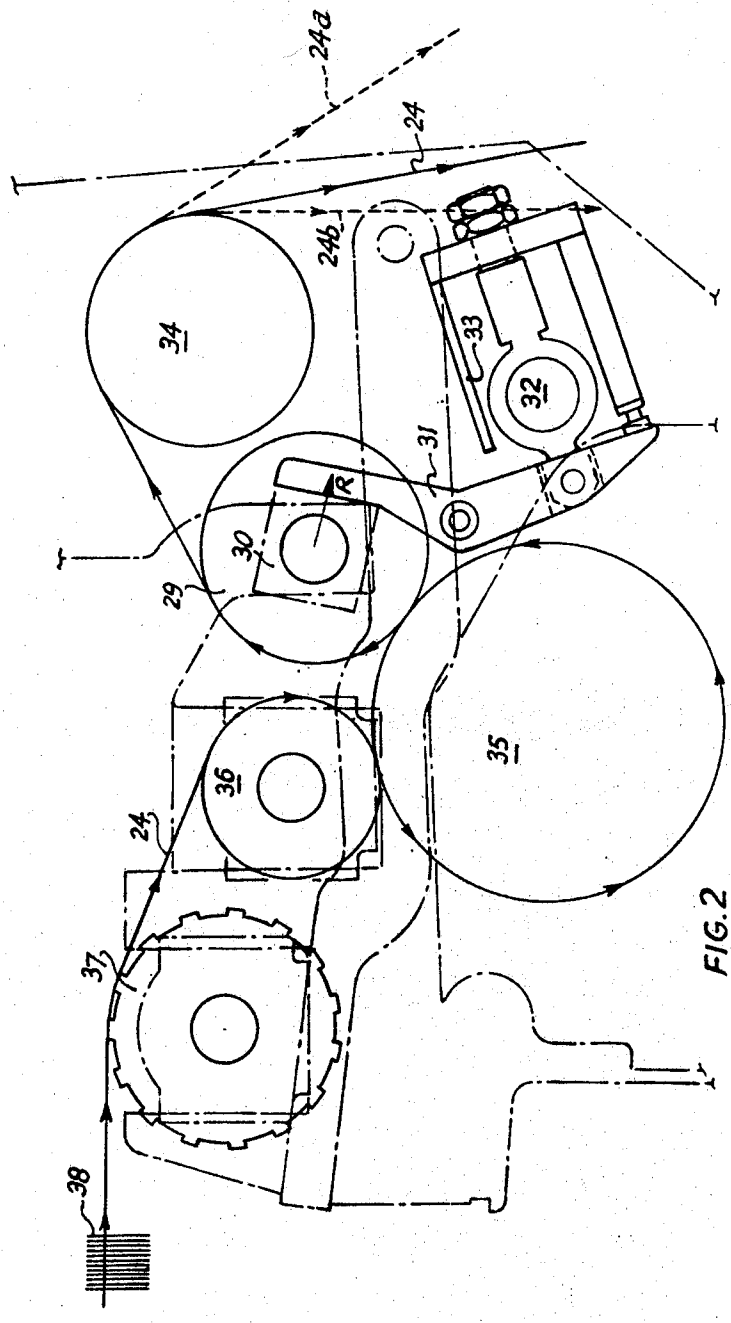


FIG. 2

INVENTOR:
JOHN NORTON
BY Albert P. Davis
Burnett W. Norton
ATTORNEYS

March 3, 1970 J. NORTON 3,497,927

METHOD AND APPARATUS FOR WINDING BEAMS

Filed Feb. 15, 1968 3 Sheets-Sheet 3

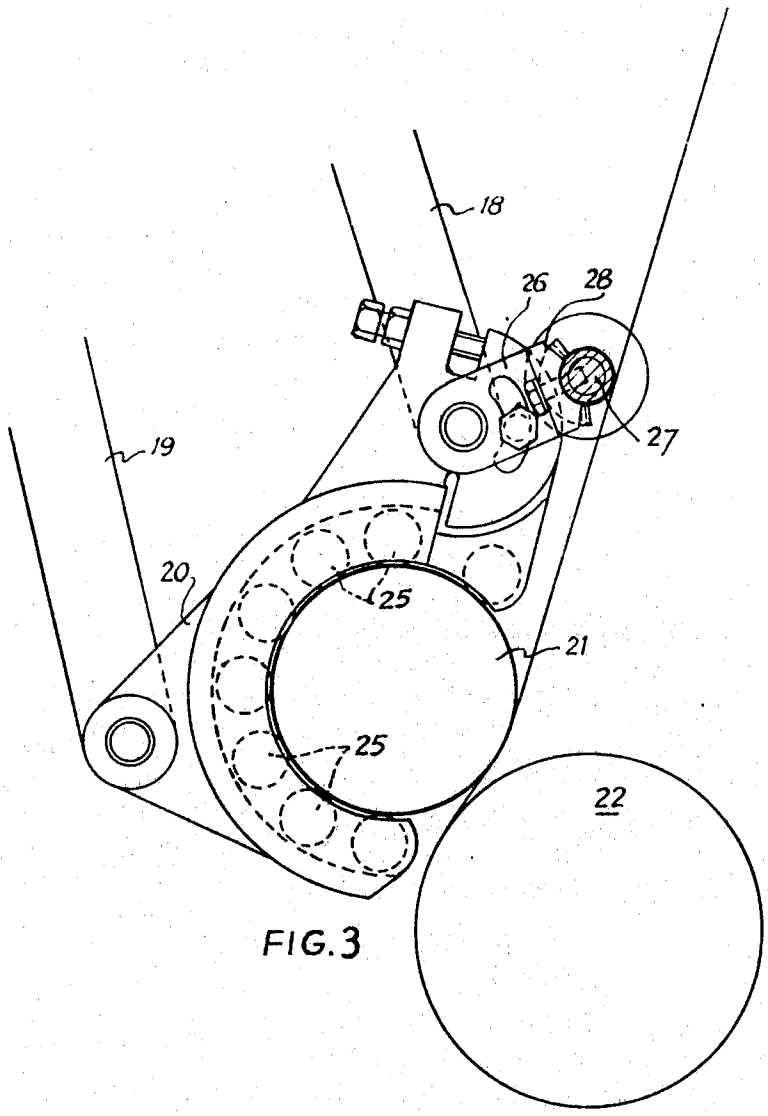


FIG. 3

INVENTOR:
JOHN NORTON
BY Albert P. Davis
Burnett W. Norton
ATTORNEYS

United States Patent Office 3,497,927
Patented Mar. 3, 1970

3,497,927

METHOD AND APPARATUS FOR WINDING BEAMS

Jack Norton, Darwen, England, assignor to Leesona Limited, a corporation of Great Britain, Northern Ireland and the Isle of Man

Filed Feb. 15, 1968, Ser. No. 705,813
Claims priority, application Great Britain, May 13, 1967, 22,286/67
Int. Cl. D02h 5/00
U.S. Cl. 28—32 10 Claims

ABSTRACT OF THE DISCLOSURE

A method and apparatus for winding beams with yarn having a flat configuration to ensure that the yarns all lie with their longer cross-sectional dimension parallel to the beam and in an untwisted state, which requires the yarn to be turned positively before being presented to the beam so that it will lie flat and untwisted. The apparatus consists essentially of a roller which lies on the yarn as it is being wound and guides it onto the beam, the roller being mounted on a pantograph link system so that it can maintain the same relative position throughout winding, the means for turning the yarn consisting of off-setting the wraith or comb relative to the direction of movement of the yarn so that each individual yarn of the sheet is turned in the same direction. Tension control being provided by passing the yarn over a roller mounted in strain gauges which control electronically the winding speed of the yarn.

This invention concerns a method and apparatus for winding beams and is particularly concerned with the method and apparatus for winding yarn of elongated cross-section. Examples of such yarns are the so-called tape yarns made from polypropylene and polythene which may have dimensions of 0.1 inch by 0.002 inch.

Yarns of the kind referred to are particularly difficult to wind due to their tendency to twist and thus it is extremely difficult to produce flat, uniform beams.

It is an object of the present invention to provide an apparatus for and method of winding beams with yarns of the kind referred to.

According to the present invention the method of winding beams with yarn of the kind referred to includes the steps of presenting a sheet of yarn of controlled width immediately prior to winding on a beam to means for ensuring that individual yarns lie with their longer dimension parallel to the periphery of a beam and winding the beam with the yarns so held.

Preferably the method includes the further step of causing all of the individual yarns to be turned in the same direction prior to being caused to lie parallel to the beam periphery whereby twisting of the yarns is prevented.

According to a further feature of the invention apparatus for carrying out the method referred to includes the provision of a roller located upstream of the beam and carried by a pantograph link system, said roller being arranged, in use, to lie on the yarn and immediately before the yarn is wound on the beam cause it to lie with its longer dimension parallel to the beam periphery, means being provided to control the width of the yarn sheet.

Preferably the pantograph link system is provided with link members of such length that whatever the distance of the roller, due to yarn buildup on a beam, from the beam spindle axis the roller remains in the same position relative to the beam periphery.

The invention will be described further by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a somewhat diagrammatic side elevation of the headstock of a sizing machine, showing the relative positions of the parts of the apparatus forming the subject of the invention;

FIG. 2 is a more detailed side elevation of part of the apparatus of FIG. 1; and

FIG. 3 is a detail view of another part of the apparatus of FIG. 1.

Although reference will be made to a sizing machine this will not be described in detail since sizing machines are known per se.

The apparatus for winding beams with yarn of the kind referred to is associated with the headstock of a sizing machine of any known type and consists of a framework **10** extending upwardly from the headstock frame upon which is mounted, at each side of the headstock, a carrier plate **11** to which are pivotally attached the first two limbs **12** and **13** of a pantograph link system. Conveniently the carrier plates each carry an arm **14** to the free end of which is pivotally attached the cylinder **15** of a hydraulic ram **16**, which ram **16** is pivotally secured to a link **17** rigid with pantograph arm **13**. The ram **16**, in use serves to lift and lower the pantograph link system for the purpose of allowing removing of a full beam and its replacement with an empty beam to be wound.

The free ends of the other two links **18** and **19** of the pantograph linkage at each side of the headstock are pivotally attached to a carrier plate **20** for a roller **21** arranged to extend across the headstock and be located, in relation to the spindle **22** of an empty beam **23**, just upstream of the position at which yarn (indicated by the line **24**) commences to be wound on the beam **23**. The link lengths of the pantograph, and the position at which it is mounted on the headstock are so chosen that whatever the condition of winding from an empty to a full beam the roller **21** will maintain the same relative position in relation to the point at which yarn commences to be wound. The roller **21** is conveniently mounted in roller bearings **25** (see FIG. 3) in the carrier plates **20**. Also mounted on the carrier plates **20** (and shown in FIG. 3 in particular) are adjustable brackets **26** each of which serves to carry one end of a round bar **27** arranged just to contact the yarn sheet. The bar **27** carries adjustable flanges **28** which serve to control the width of the yarn sheet and conveniently the width of the sheet is arranged to be just less than the overall beam spindle width in order that jute selvedge yarns (not shown) can be wound onto the beam **23** to prevent damage to the yarns adjacent the beam flanges.

Referring now particularly to FIG. 2 it will be seen that in the headstock being referred to there is provided a yarn tension control roller **29** carried in bearings **30** mounted on pivotally mounted levers **31** each of which is secured, at its end opposite to the bearings **30**, to a strain gauge **32** carried in a bracket **33** rigidly mounted on the headstock. In order that the angle of wrap of the yarns around this roller **29** does not vary and thus affect the accuracy of the tension control achieved an additional roller **34** is placed in the headstock between the beam (not shown in FIG. 2) and the strain gauge carried roller **29** so that the resultant force indicated by the arrow R on the strain gauges **32** is always achieved for the same angle of wraps of yarn **24** around the roller **29**. An indication of the variation of the yarn line between an empty and a full beam is given by the broken lines **24***b* and *d* of FIG. 2.

In addition to the rollers **29** and **34** the headstock carries a draw roller **35** between which and the roller **29** the yarn are carried after passing around draw roller **35** from the nip between it and a guide roller **36**. The rollers **29**, **35** and **36** have in effect a capstan-like action due to the amount of wrap of the yarns around these rollers,

and in particular roller **35**. The headstock also carries the usual fluted roller **37** and a wraith or comb **38** through which the yarns are passed to the fluted roller **37**.

It is preferable to offset the headstock from the remainder of the machine so that the yarn as they are drawn onto the beam **23** are caused, at the wraith or comb **38** to be turned through an angle to ensure that all the yarns lie in the same attitude and have been turned in the same direction. The yarns after passing the wraith or comb **38** pass over the fluted roller **37** and then to the beam **23** via the strain gauge mounted roller **29**, the additional roller **34**, the width control bar **27** and pantograph mounted roller **21**.

What is claimed is:

1. The method of winding beams with a sheet of yarns of elongated cross-section including the steps of controlling the width of said yarn sheet, presenting said sheet immediately prior to winding on a beam to means for ensuring that individual yarns of said sheet lie with their longer dimension parallel to a beam periphery, and winding said yarns onto said beam.

2. The method of winding beams as set forth in claim **1** including the step of turning all the yarns of the said sheet in the same direction prior to winding said sheet on said beam.

3. Apparatus for winding beams with a sheet of yarns of elongated cross-section comprising, a roller under which said sheet of yarns pass, a pantograph link system carrying said roller, and said roller being adapted to lie on said yarns immediately before said yarns are wound on said beams to ensure that the individual yarns of said sheet lie with their longer dimension parallel to said beam periphery, and means for controlling the width of said sheet of said yarns.

4. Apparatus for winding beams with a sheet of yarns of elongated cross-section comprising, a roller under which said sheet of said yarns pass, means for turning all of said yarns in said sheet in the same direction, a pantograph link system carrying said roller, said pantograph link system including links operable to maintain said roller remains in the same position relative to the periphery of said beam during winding of the yarns onto the beam, said links being operable to initially position said roller to lie on said beam and thereafter on said yarns wound on said beam, and means for controlling the width of said sheet of yarns.

5. Apparatus for winding yarn of the kind referred to as set forth in claim **4** in which said means for controlling the width of said sheet includes a bar mounted adjacent said roller and movable therewith and adjustable flanges on said bar to prevent spread of yarns in said sheet.

6. Apparatus for winding yarn of the kind referred to as set forth in claim **4** in which said means for controlling the width of said sheet includes brackets mounted on said pantograph link system, a bar mounted in said brackets adjacent said roller, and adjustable flanges on said bar to prevent spread of yarns in said sheet.

7. Apparatus for winding yarn of the kind referred to as set forth in claim **4** in which brackets are mounted on said pantograph link system, said roller being carried in roller bearings in the brackets, and means for controlling the width of said sheet is mounted in said brackets, said means for controlling sheet width including a bar, and adjustable flanges on said bar to prevent spread of yarns in said sheet.

8. Apparatus for winding beams with a sheet of yarns of elongated cross-section in a sizing machine comprising, a pantograph link system, a headstock on said sizing machine carrying said pantograph link system, a roller on said pantograph link system under which said sheet of yarns pass, means for turning all of said yarns in said sheet in the same direction, links in said pantograph link system being of such length that, during winding, said roller remains in the same position relative to said beam periphery, said roller being arranged initially to lie on said beam and thereafter on said yarns wound on said beam, and means for controlling the width of said sheet of yarns.

9. Apparatus for winding beams with a sheet of yarns of elongated cross-section in a sizing machine comprising, means for controlling tension in said yarns, a pantograph link system, a headstock on said sizing machine carrying said pantograph link system, a roller on said pantograph link system under which said yarns pass, means for turning all of said yarns in said sheet in the same direction, links in said pantograph link system including links operable to maintain said roller initially on the periphery of said beam and thereafter on said yarns wound on said beam, and means for controlling the width of said sheet.

10. Apparatus for winding beams with a sheet of yarns of elongated cross-section in a sizing machine comprising, means for controlling tension in said yarns, a pantograph link system, a headstock on said sizing machine carrying said pantograph link system, brackets on said pantograph link system, a roller mounted in bearings in said brackets, and under which said yarns pass, means in the form of a comb in said headstock adapted to turn all of the yarns in said sheet in the same direction, links in said pantograph link system being of such length that, during winding, said roller remains in the same position relative to said beam periphery, said roller being arranged initially to lie on said yarns immediately before said yarns are wound on said beam, means for controlling the width of the said sheet mounted in said brackets, means for adjusting the position of said means for controlling the width of said sheet relative to said roller, said means for controlling the width of said sheet including a bar mounted on said brackets, adjacent said roller and adjustable flanges on said bar to prevent spread of yarns in said sheet.

References Cited

UNITED STATES PATENTS

2,169,886	8/1939	Shaw.	
2,635,321	4/1953	Bauer et al.	28—38

LOUIS K. RIMRODT, Primary Examiner

U.S. Cl. X.R.

28—72.5