

Oct. 25, 1955

J. HODKINSON ET AL
PACKAGING OF YARNS AND FILAMENTS

2,721,371

Filed Jan. 5, 1953

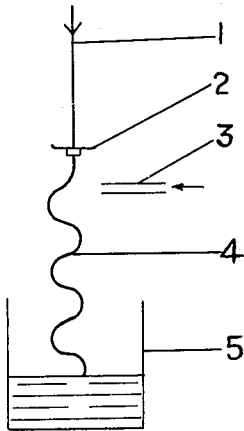


FIG. 1

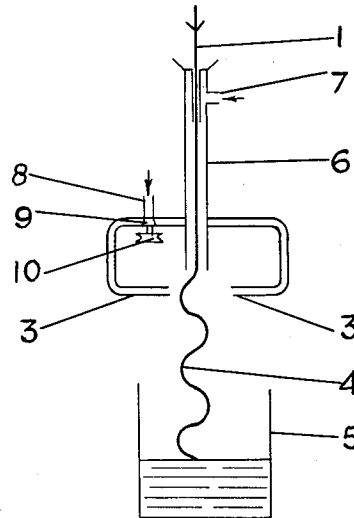


FIG. 2

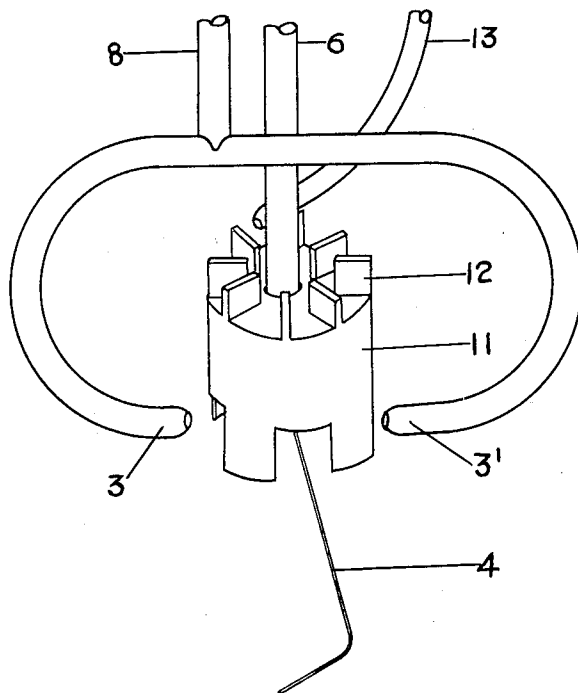


FIG. 3

INVENTORS:

John Hodgkinson,²
Robert Lipscomb,

BY *Cushman, Darby & Cushman*
ATTORNEYS.

1

2,721,371

PACKAGING OF YARNS AND FILAMENTS

John Hodkinson, Cleveleys, near Blackpool, and Robert Lipscomb, Little Eccleston, near Preston, England, assignors to Imperial Chemical Industries Limited, a corporation of Great Britain

Application January 5, 1953, Serial No. 329,702

Claims priority, application Great Britain February 1, 1952

7 Claims. (Cl. 28—21)

This invention relates to an improved process for packing yarns and filaments into containers.

In the manufacture of artificial yarns and filaments, difficulty is often experienced in packaging, particularly when a heavy yarn or bundle of filaments is fed to the collecting device at high speed, e. g. as it comes from a spinneret. The winding of such yarns for example onto reels involves the use of large and heavy reels which are not easy to handle quickly so that there is considerable waste when doffing. While it has been found possible to pack the yarn into an open container, difficulty has been experienced in the removal of the yarn from such a container.

We have found that it is possible to pack yarns and bundles of filaments (hereinafter referred to as tows) into containers at high speeds, e. g. by directing the yarn or tow into the container by means of a stream of gas or vapour, speeds greater than 1500 feet per minute can be attained; but if the yarn or tow follows a straight path it is projected into the container with such force that it often penetrates below the top layers already in the container. This causes tangles when the yarn or tows are drawn out of the container.

According to the present invention we provide a process for packaging yarns or tows which comprises projecting the yarn or tow into a container, via a guide, and subjecting the yarn or tow after it leaves the guide to one or more cross currents of gas or vapour which impinge upon the yarn or tow intermittently.

The effect of the intermittent cross currents of gas or vapour is to set up a wave movement in the yarn or tow which causes folding during packing. Such a package can be unwound without difficulty.

Our invention also includes an apparatus for use in the packaging of yarn or tow comprising a guide, a container, at least one gas or vapour jet positioned between the guide and the container, and means for controlling the gas or vapour stream coming from the jet to provide an intermittent flow across the line of travel of the yarn or tow, between the guide and container.

In a preferred embodiment of the invention the guide is a tube through which the yarn or tow is fed, entrained in a stream of gas or vapour.

Any number of jets may be used to supply the cross currents of gas or vapour. When there are more than one they may conveniently be arranged symmetrically around the line of feed of the yarn or filaments. Thus if two jets are used they may be diametrically opposed, three jets set at 120° intervals and 4 jets at 90° intervals.

Intermittent flow may be effected by any known means. For example, a valve may be incorporated in the feed line for the gas or vapour coming to the jets. If only one jet is used, this valve may cut off the flow completely at intervals; if however more than one jet is used, the valve may serve to direct the gas or vapour to each of the jets in turn, according to some pre-arranged cycle.

In a preferred and simple method of operation, con-

2

trol of the air jets is effected by a shutter which passes intermittently between the jet and the yarn or filaments. This method of control is preferred because it provides an instantaneous cut-off. The shutter may be in the form of a rotating cylinder surrounding the yarn or filaments, and having slots in the cylinder wall. As the cylinder rotates, the blank spaces between the slots cut off a stream of gas or vapour directed across the line of travel of the yarn or filaments. The rotary shutter can be designed to operate with any number of jets. For example, using two jets each operating continually and diametrically opposed, the yarn or filaments can be subjected to alternating blasts in opposite directions by using a cylinder which has an odd number of symmetrically positioned slots.

Methods by which the rotary shutter may be driven are many and various. A drive may be taken from any convenient moving part of the machinery or a small individual electric motor may be used. As a stream of gas or vapour is already available near the apparatus, a system of vanes on which a blast of gas or vapour impinges provides a cheap and simple method of rotation. These vanes may be so designed as to allow one stream of gas or vapour to provide the cross currents and to cause rotation.

In another modification of the present invention the direction from which the intermittent currents of air are directed may be varied by mounting the jets so that they can move round the line of travel of the yarn or filaments. Such a modification permits of a great degree of variety in the manner in which the yarn or filaments are laid in the container.

The gas or vapour used in this invention will usually be air since supplies of air under pressure are easily and cheaply obtained.

The attached drawings illustrate but do not limit the scope of our invention.

Figure 1 is a diagrammatic sketch showing the general idea of the invention.

Figure 2 is a similar drawing showing the preferred embodiment wherein the yarn or tow is fed down a tube.

Figure 3 is a drawing of a preferred method of obtaining intermittent transverse jets of gas or vapour.

In Fig. 1 the tow 1 passes through a guide 2 and is then subjected to an intermittent air blast from the jet 3 causing it to follow a sinuous path 4 before it enters the collecting can 5.

In Fig. 2 the tow 1 passes down the tube 6 in a stream of air entering at 7. The jets 3 are fed with air from the inlet tube 8 via a two-way cock 9. The cock 9 is turned by a driven pulley 10 to provide alternate streams of gas to the jets 3. After passing through the jets the tow follows a sinuous path 4 into the can 5.

Fig. 3 shows in more detail a tow leaving a feed tube 6 in sinuous form as a result of traverse cross currents of air issuing alternatively from the jets 3 and 3¹ fed by the inlet pipe 8. The jets are made to impinge upon the tow alternatively by means of the cylindrical shutter 11 rotated by means of vanes 12 against which a stream of air is blown down the pipe 13. The slots in the shutter are so arranged that the jets of 3 are blocked while the jet 3¹ is open and vice versa. The shutter 11 rotates on a bearing mounted on the tube 6, not shown in the drawing.

It will be appreciated that the shutter may be rotated by means other than that illustrated. For example a small electric motor may be used.

In the packing of a yarn or tow into a container it is usual to cause guiding means bringing the yarn or tow to the container to follow a simple repetitive pattern, such as a clover leaf, to prevent uneven build up in the container. The present invention may be operated successfully in conjunction with such a movement. For example when the yarn or tow is fed in an air stream down

3

a moving tube the apparatus of this invention may be easily mounted on the end of the tube so that it moves with the tube. One simple means of moving the tube is a pantograph mechanism. Alternatively the container itself may be moved during filling to prevent build up and also, if desired, vibrated to assist the settling of the yarn or tow.

The present invention is particularly applicable to the packaging of heavy tows made up of filament forming material, for example, nylon or highly polymeric polymethylene terephthalates such as polyethylene terephthalate. Tows of these materials are used in the manufacture of staple fibre. Prior to this invention the packaging of these heavy tows, sometimes of 100,000 denier, has provided great difficulty.

What we claim is:

1. Apparatus for packing elongated yarn-like material comprising a container, a guide for said material directed toward said container, a jet disposed between said guide and said container and directed across the material path, means for conducting pressure gas to said jet, and a shutter arranged to pass intermittently between said jet and the material path.
2. Apparatus according to claim 1, wherein said shutter is a slotted cylinder rotatably mounted with its axis coincident with the material path.
3. Apparatus according to claim 2, including air blast means for effecting rotation of said shutter.
4. Apparatus according to claim 1, wherein said material guide is tubular, and said shutter is rotatably mounted on said tubular guide.
5. Apparatus according to claim 1, wherein said material guide is tubular and includes means for entraining the material passing therethrough in a gas stream.
6. Apparatus for packing elongated yarn-like material

4

comprising a container, a guide for said material directed toward said container, a plurality of angularly spaced jets disposed between said guide and said container and directed across the material path, means for conducting pressure gas to said jets, and a shutter arranged to pass intermittently between said jets and the material path.

7. Apparatus for packing elongated yarn-like material comprising a container, a guide for said material directed toward said container, a plurality of symmetrical-ly arranged jets disposed between said guide and said container and directed across the material path, means for conducting pressure gas to said jets, and a shutter arranged to pass intermittently between said jets and the material path.

References Cited in the file of this patent

UNITED STATES PATENTS

1,353,613	Renton	Sept. 21, 1920
1,653,311	Rice et al.	Dec. 20, 1927
1,710,817	Flidner	Apr. 30, 1929
1,858,945	Thierfelder	May 17, 1932
1,915,451	Schur	June 27, 1933
2,115,423	Korver	Apr. 26, 1938
2,190,597	Dritz	Feb. 13, 1940
2,242,988	Averns	May 20, 1941
2,304,260	Keller	Dec. 8, 1942
2,333,267	Modigliani	Nov. 2, 1943
2,347,046	Geiger	Apr. 18, 1944
2,393,243	Franz	Jan. 22, 1946
2,447,982	Koster	Aug. 24, 1948

FOREIGN PATENTS

525,283	Great Britain	Aug. 26, 1940
830,773	France	May 23, 1938