Oct. 18, 1932. C. S. ANDREWS 1,883,449

PACKING PROCESS FOR SILK YARN AND THE LIKE

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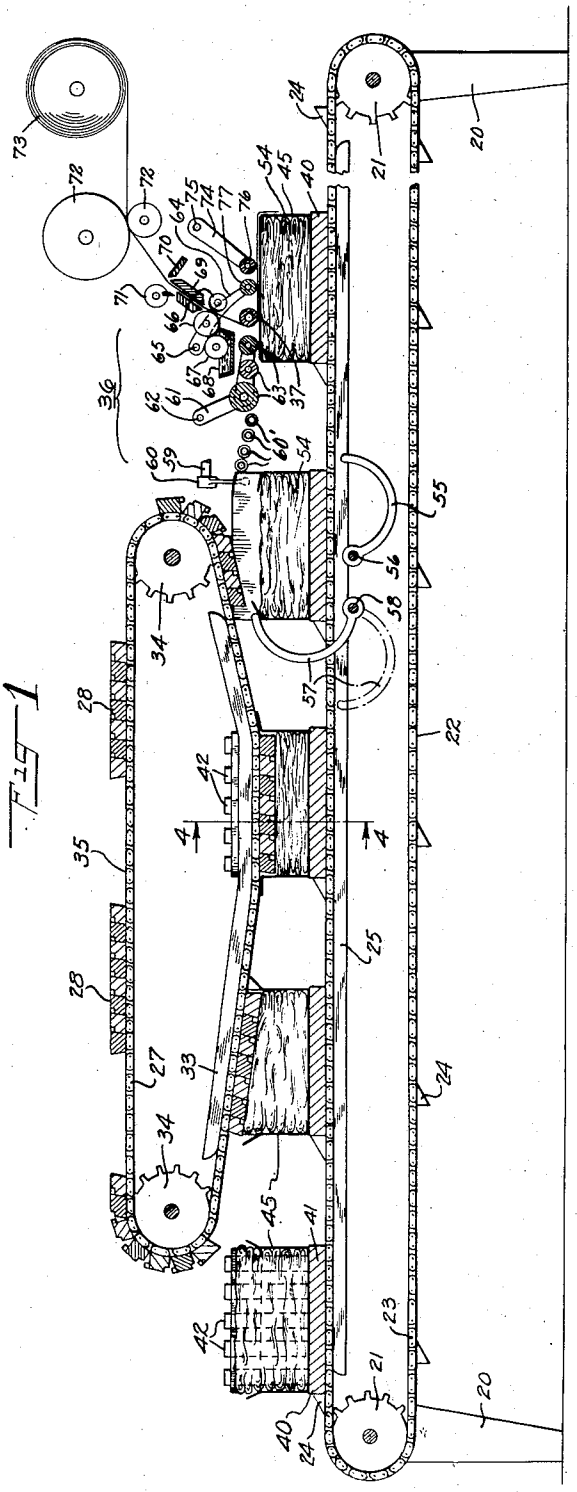


Fig. 1

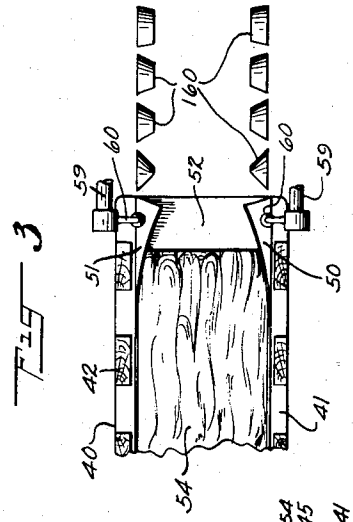


Fig. 3

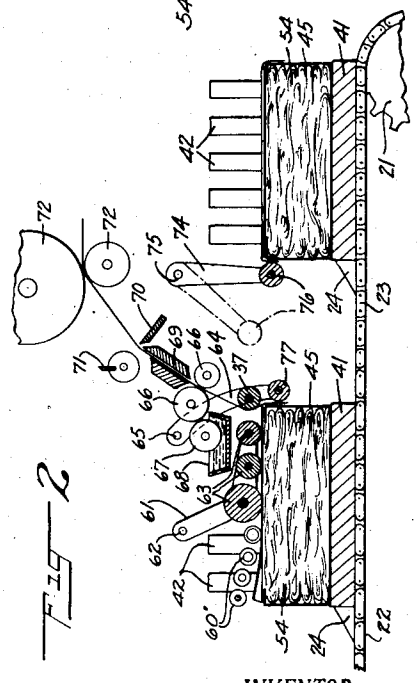


Fig. 2

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Fig 4

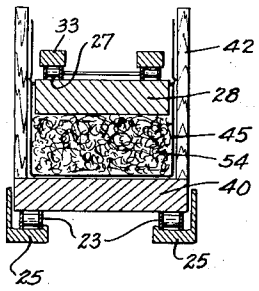


Fig 5

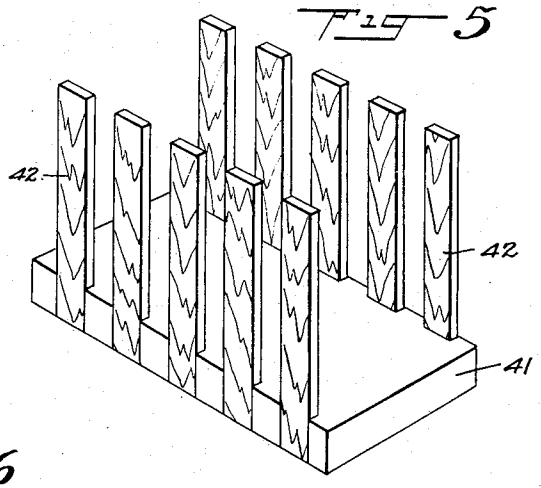


Fig 6

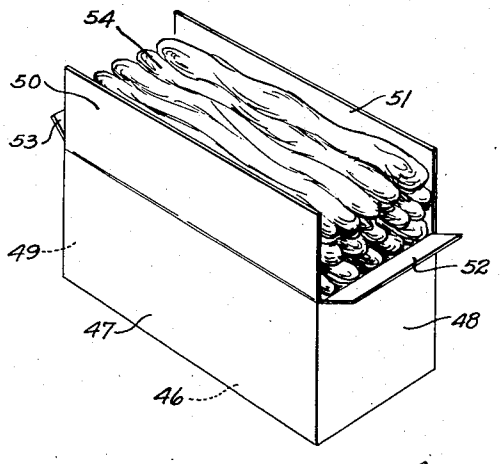
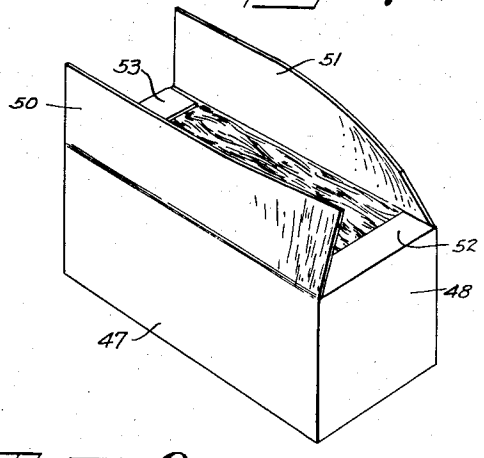


Fig 7



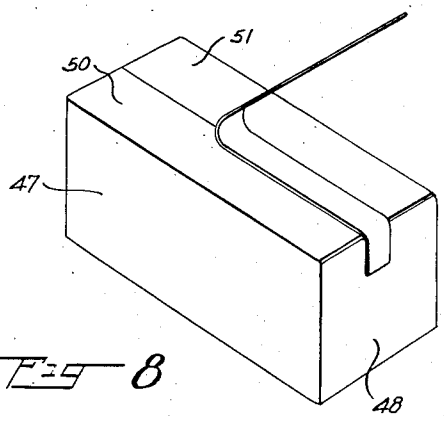
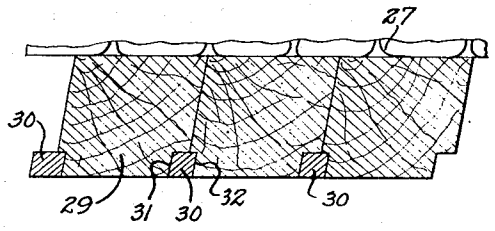


Fig 8

Fig 9



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Patented Oct. 18, 1932 1,883,449

UNITED STATES PATENT OFFICE

CHAMPE S. ANDREWS, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO BOX BLANK CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

PACKING PROCESS FOR SILK YARN AND THE LIKE

Application filed August 10, 1929. Serial No. 384,966.

The invention relates in general to the art of packing, and more particularly to a method of packing skeins or hanks of thread in a box.

According to a preferred method of practicing the invention the skeins or hanks of compressible thread such as silk are packed in boxes of paper board by applying pressure to the protruding thread progressively as the box moves along a predetermined path. The box is suitably supported as it travels along the path to withstand the packing pressure and at proper times the top flaps of the box are folded in and the box is sealed.

The invention further consists in the new and novel features of operation and the new and original arrangements and combinations of steps in the process hereinafter described and more particularly set forth in the claims.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a side elevation illustrating diagrammatically a preferred process;

Fig. 2 is a detail illustrating steps in the process;

Fig. 3 is a plan view illustrating one of the operating steps;

Fig. 4 is a transverse section on the line 4—4 of Fig. 1;

Fig. 5 is a perspective illustrating the carrier;

Fig. 6 illustrates the position of the box filled with thread at the beginning of the process;

Fig. 7 illustrates the appearance of the box at a step along the process;

Fig. 8 illustrates the appearance of the box with the thread packed therein near the end of the packing process; and

Fig. 9 is a detail illustrating the construction of a pressure pad.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

Referring now to the drawings, the apparatus illustrated diagrammatically for performing the process will be first described. The apparatus comprises, in general, a conveyor 22, a pressure belt 35 and a series of carriers 40 for supporting the boxes 45, and suitable box closing and sealing apparatus denoted by 36.

The conveyor 22 comprises a pair of chains 23 running on sprockets 21 suitably journalled in a frame supported on legs 20. A pair of guides 25 support the chains at points where pressure is applied to the carriers 40. Mounted upon the chains 23 at points spaced along the length thereof are stops 24 against which the carriers 40 are positioned.

The pressure belt 35 comprises a pair of endless chains 27 mounted upon sprockets 34 suitably journalled in the frame of the machine. Extending from one chain 27 to the other are a plurality of pressure pads 28 spaced from each other at predetermined distances corresponding to the spacing of the carriers 40 on the conveyor 22. A pair of guides 33 are provided for reenforcing the endless pressure belt at points where pressure is applied to the thread in the boxes 45.

Each pressure pad 28 comprises a series of pressure elements 29 (Fig. 9), each element having a shallow notch 32 and a deeper notch 31 in its edges. Suitably secured in each shallow notch 32 is a strip or block of soft rubber or similar material which can be compressed to the position shown in Fig. 9 and which will expand when the elements 29 separate slightly, to keep the joint between elements tight under such conditions.

Each carrier or basket 40 comprises a relatively heavy base 41 adapted to bridge the conveyor 22 from one chain 23 to the other. Secured to the base 41 are a plurality of upstanding side slats 42 for imparting lateral support to the cardboard boxes 45.

The boxes in which the skeins or hanks of

thread 54 are to be packed, may be of any desired construction which will lend itself to practicing the invention. In the form illustrated the box is preferably made from a single blank of paper board suitably scored and folded to form a rectangular box having a bottom 46, side walls 47, front wall 48, rear wall 49, side flaps 50 and 51, front flap 52 and rear flap 53.

For folding in the front flap 52 after the thread 54 is compressed a front folding arm 55 pivoted on shaft 56 is provided. Similarly a rear folding arm 57 pivoted on a shaft 58 is provided for folding in the rear flap 53. For folding in the side flaps 50 and 51, side arms 60 pivoted on shafts 59 are provided.

For further folding down side flaps 50 and 51 over the top of flaps 52 and 53 a plurality of conical rollers 160 are provided. These rollers are arranged on either side and on an incline, their shape approaching that of the cylinder to conform with the surface of the flaps 50 and 51 as they are folded down.

For applying sealing tape to the box a storage roller 73 of suitable sealing tape which may be either adhesive paper tape or adhesive cloth tape is provided. This tape passes between rollers 72 and between guides 69. Before it reached guides 69 it passes between a stationary knife 70 and a rotary knife 71 for cutting the tape at proper intervals.

A front sealing arm 64 pivoted on a shaft 65 has a roller 77 which presses on the tape as illustrated in Fig. 2 at the front side of the box, and presses on the tape as the box 45 moves along under the arm. Mounted on a stationary part of the frame of the machine is a pair of rollers 66 between which the tape passes and also a roller 37 over which the tape passes. A container 68 of water and a transfer roll 67 are provided for wetting one of the rolls 66 to moisten the tape so that it will stick to the box.

For holding the flaps 50 and 51 down until the tape can be applied, an arm 61 is provided which is pivoted to shaft 62. This arm carries a plurality of rolls 63.

For folding the boxes and pressing the adhesive tape over the rear end 49 a rear sealing arm 74 is provided. This arm is pivoted on shaft 75 and carries a roller 76.

The operation of the apparatus for carrying out the different steps of the invention is as follows.

Empty box 45 is placed on a carrier 40 with its side flaps 50 and 51, front flap 52 and rear flap 53 in the position shown in Figs. 1 and 6, and is filled to the proper height with the skeins of yarn 54 which may be silk yarn. As the conveyor 22 moves, the box is carried along and comes directly under pressure pad 28. This pad progressively compresses the yarn starting at the front of the box and presses it below the top of the box as illustrated in Fig. 1. As the pressure pad 28 is removed from the box the front folding arm 55 pivots upwardly and presses the front flap 52 inwardly.

As the pressure pad 28 is further removed from the box, the rear folding arm 57 swings up and folds in the rear flap 53. The side arms 60 then swing toward each other to start the side flaps 50 and 51 to bend inwardly as illustrated in Figs. 3 and 7. The carrier 40 then carries the box under rollers 160 which further press down the side flaps 50 and 51 over the front and rear flaps.

The box now slides under the holding down rolls 63 as illustrated in Fig. 2 and the front sealing arm 64 is in a position to apply the tape to the front 48 of the box, as also illustrated in Fig. 2. As the box moves along, the arm 64 swings up and applies the tape to the top of the box to seal the flaps 50 and 51 together. The rear sealing arm 74 is swung upwardly to the position shown in dotted lines in Fig. 2 to engage the top of the box as it passes under it. As the box moves along and it passes beyond the arm 64, the rear sealing arm 74 is given a forward movement faster than the speed of the box, which applies the tape to the rear wall 49 of the box, as indicated in Fig. 2. The sealed box then passes off of the conveyor and is received by any suitable device. The box is now sealed with a given predetermined amount of compressed skeins or hanks of yarn or thread therein.

Thus a process has been disclosed which effectively compresses material into a cardboard box without breaking the box, at the same time folding in the covers and sealing the box. The yarn is compressed without damaging it in any way so that it occupies considerably less space, making a much more compact bundle for shipping purposes. At the same time the yarn is completely sealed within a dirt-proof container which insures cleanliness of the yarn. Furthermore the process is relatively inexpensive to practice and is simple and efficient in operation.

Although certain novel features of the invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the several steps of the process and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A method of packing compressible thread-like material which comprises placing the desired amount of loose, thread-like material into and protruding from the open top of a container whose cover is in open position, reinforcing the sides of the container, holding the cover in open position, holding the protruding material over the container, applying pressure to the top of the

thread-like material to compress it to substantially the size of the closed container, closing the cover of the container over the compressed material and sealing said cover in closed position.

2. A method of packing compressible thread-like material which comprises placing the desired amount of loose thread-like material into and protruding from a container whose cover is in removed position, reinforcing the sides of the container, holding the overflowing material over the container, applying pressure to the thread-like material to compress it to substantially the size of the closed container, closing the cover of the container over the compressed material and fixing said cover in closed position.

3. The method of packing compressible hanks of thread-like material comprising placing the desired amount of material into and protruding from a rectangular paper board box having a cover formed of end and side flaps, moving said box along a predetermined path while subjecting it to the following operations: reinforcing the side and end walls of said box and holding said flaps in upstanding position, pressing the top of the protruding material progressively downward beginning at the front of the box, compressing said material below the top of the box, progressively removing pressure from the top of said material beginning at the front of the box, folding in the front end flap over the compressed material, folding in the back end flap over the compressed material, folding in the side flaps over said end flaps, applying sealing tape to the front wall of said box and along the meeting side flaps and down the back wall.

4. The method of packing compressible hanks of thread-like material comprising placing the desired amount of material into and protruding from a rectangular paper board box having a cover formed of flaps, moving said box along a predetermined path while subjecting it to the following operations: reinforcing the side and end walls of said box and holding said flaps in upstanding position, pressing the top of the protruding material progressively downward beginning at the front of the box, compressing said material below the top of the box, progressively removing pressure from the top of said material beginning at the front of the box, folding in the flaps over the compressed material, and applying sealing tape to the meeting flaps to seal the material within the box.

5. The method of packing compressible hanks of thread-like material comprising placing the desired amount of material into and protruding from a rectangular paper board box having a cover formed of end and side flaps, moving said box along a predetermined path while subjecting it to the following operations: reinforcing the side and end walls of said box and holding said flaps in upstanding position, pressing the top of the protruding material progressively downward, compressing said material below the top of the box, progressively removing pressure from the top of said material, folding in the front end flap over the compressed material, folding in the back end flap over the compressed material, folding in the side flaps over said end flaps, and applying sealing tape along the meeting side flaps.

6. The method of packing compressible thread-like material comprising placing the desired amount of material into and protruding from a rectangular paper board box having a cover, moving said box along a predetermined path while subjecting it to the following operations: reinforcing the side and end walls of said box and holding said cover in removed position, pressing the top of the protruding material progressively downward, compressing said material below the top of the box, progressively removing pressure from the top of said material, applying the cover over the compressed material, and sealing the box.

In testimony whereof I have hereunto set my hand.

CHAMPE S. ANDREWS.