

Jan. 12, 1971

R. K. STANLEY
STRAND CRIMPING

3,553,802

Filed April 4, 1968

2 Sheets-Sheet 1

Fig. 1.

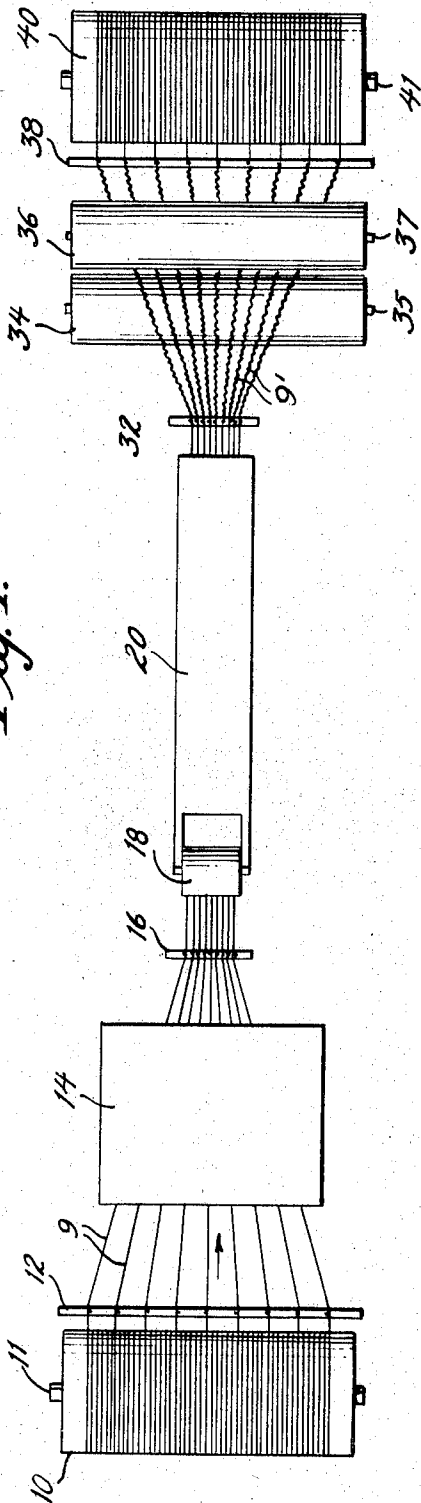
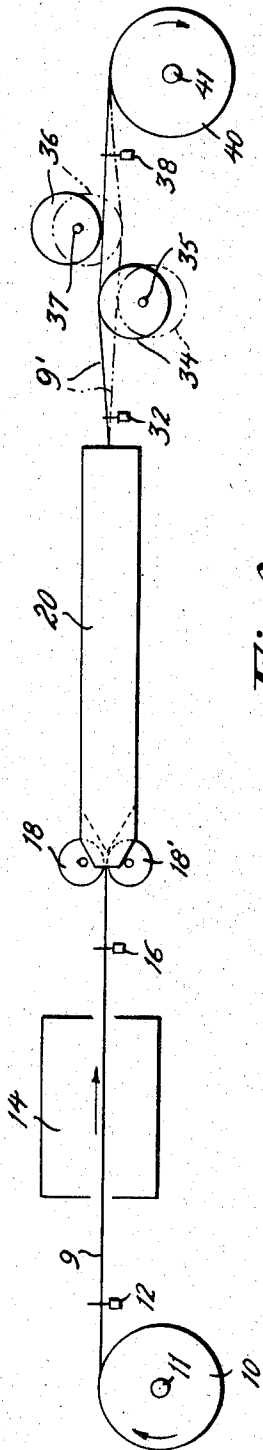


Fig. 2.



INVENTOR,
ROBERT K. STANLEY
BY *McClure & Weiser*
ATTORNEYS.

Jan. 12, 1971

R. K. STANLEY

3,553,802

Filed April 4, 1968

STRAND CRIMPING

2 Sheets-Sheet 2

Fig. 3.

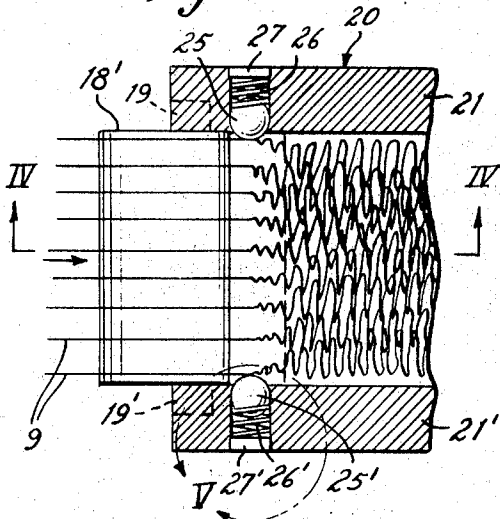
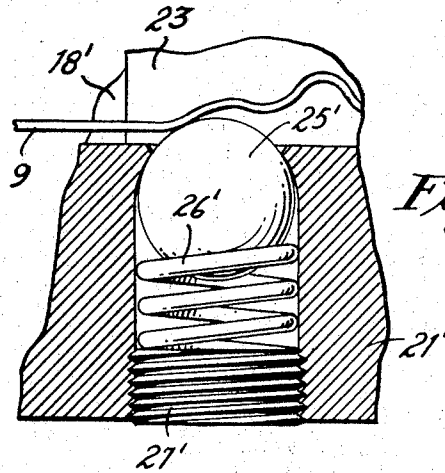


Fig. 5.

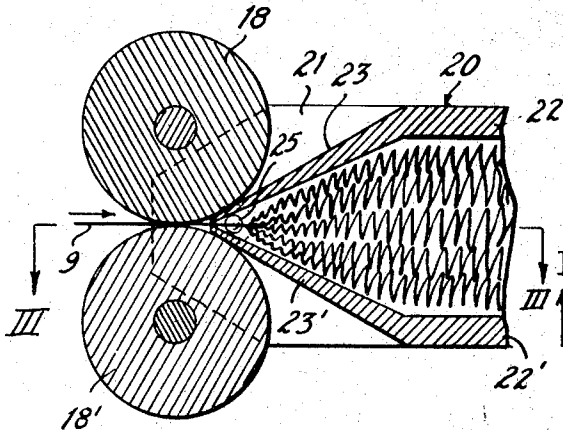


Fig. 4.

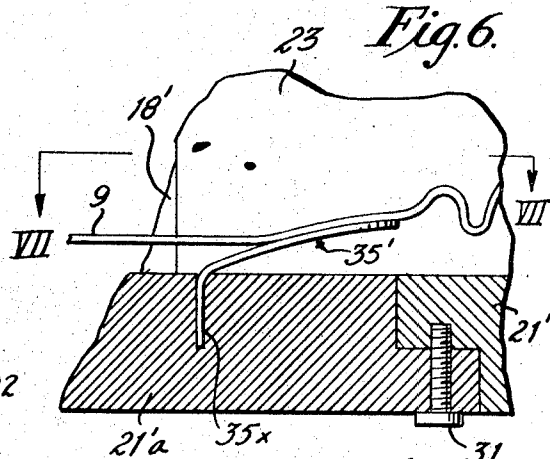
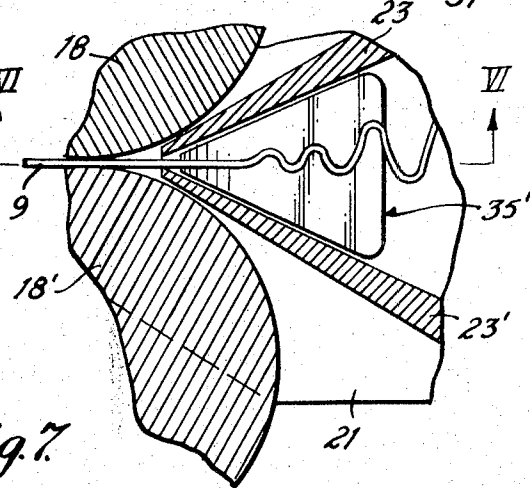


Fig. 7.



INVENTOR
ROBERT K. STANLEY

BY

McClure & Weiser

ATTORNEYS

1

3,553,802

STRAND CRIMPING

Robert K. Stanley, Media, Pa., assignor to Techniservice Corporation, Kennett Square, Pa., a corporation of Pennsylvania

Filed Apr. 4, 1968, Ser. No. 718,737

Int. Cl. D02g 1/12

U.S. Cl. 28—1.6

11 Claims

ABSTRACT OF THE DISCLOSURE

Multiple-end stuffer-crimping of textile strands is improved by deflecting the sidemost strands laterally away from the walls and toward the interior of the stuffing chamber inside the entrance thereof. The deflecting means are yieldable in nature and conveniently take the form of leaf springs or balls biased by coil springs.

Means and methods for stuffer-crimping textile strands are well-known. A confining or "stuffing" chamber having a strand entrance and exit has one or more strands fed therinto, forced into crimped configuration against a compact wad-like mass of strand previously accumulated therein and discharged subsequently therefrom. Strand-impeding means may be interposed to apply back pressure to the strand accumulation, as in List et al. Pat. 3,027,619, or may be omitted, as in my Pat. 3,279,025. Where at least several strands are to be stuffer-crimped simultaneously in the same chamber (usually referred to as "multiple-end" stuffer-crimping) they usually are fed therinto arranged side-by-side in a flat web or sheet, and the chamber usually has a rectangular cross-section with the long transverse dimension accommodating the web width, as in Rosenstein Pat. 3,283,387, for example.

Multiple-end operation has the apparent advantage over "single-ending" (i.e., treating only one strand at a time in the stuffing chamber) of great productivity or strand throughput per stuffing chamber. However, the treatment of a single strand is more consistent or uniform than can be attained with a multiplicity of strands in the same chamber simultaneously. In particular, the quality of the outermost of multiple-end stuffer-crimped strands is often, if not invariably, inferior to that of the other strands, as well as to that of single-end stuffer-crimped strands.

A primary object of the present invention is improvement in the consistency or uniformity of crimping and overall quality level in multiple-end stuffer-crimped textile strands.

Another object is improved winding of multiple-end stuffer-crimped textile strands.

A further object is provision of apparatus for accomplishing the foregoing objects.

Other objects of this invention, together with means and methods for attaining the various objects, will be apparent from the following description and the accompanying diagrams.

FIG. 1 is a plan view of apparatus useful according to the present invention;

FIG. 2 is a side elevation of the apparatus of FIG. 1;

FIG. 3 is a fragmentary sectional plan of components of the preceding views;

FIG. 4 is a sectional elevation taken as IV—IV on FIG. 3;

FIG. 5 is an enlarged detail view taken as indicated in FIG. 4;

FIG. 6 is a detail view similar to FIG. 5 but showing another embodiment of the invention; and

FIG. 7 is a fragmentary sectional elevation taken at VII—VII on FIG. 6.

2

Considered in more detail, FIGS. 1 and 2 show, in plan and side elevation, respectively, apparatus useful according to this invention, with the movement of certain components thereof and of strand treated thereby being indicated by arrows. Strands 9 are unwound side-by-side from beam 10 supported on axle 11 and rotated by conventional means (not shown). The unwound strands pass through comb or reed 12 through preheating enclosure 14, which may be heated in any conventional manner, and into the nip of feed rolls 18, 18' at the entrance to stuffing chamber 20. From the exit of the stuffing chamber, the crimped strands (now designated as 9' to indicate their altered condition) pass through comb or reed 32, then over and under reflecting rolls 34 and 36, respectively, through comb or reed 38, and finally onto beam 40 rotated on axle 41 by any suitable means (not shown). Deflecting rolls 34 and 36 are mounted essentially on axles 35 and 37, respectively, and phased appropriately so that as suggested by broken lines in FIG. 2 the rolls move up and down while being rotated by suitable drive means (not shown) on their axles and thereby deflect the sheet or web of crimped strands up and down substantially perpendicularly to the undeflected plane defined by the lateral and longitudinal extent of the strand web.

Some of the components of the apparatus first mentioned with reference to FIGS. 1 and 2 are illustrated on enlarged scale and partly in section in succeeding views. Thus, FIGS. 3, 4 and 5 show portions of the apparatus in the vicinity of the entrance to stuffing chamber 20 in one embodiment and FIGS. 6 and 7 show an alternative embodiment thereof.

FIGS. 3, 4 and 5 show in the vicinity of the entrance to stuffing chamber 20 entering strands 9, which deviate from their original rectilinear condition into a modified sawtooth or zigzag crimped configuration (shown stylized) shortly after leaving contact with feed rolls 18, 18', which are rotated on their axles 19, 19' to force the strands into the chamber and against the wadlike mass of crimped strand (also stylized) already therein. The crimping chamber 12 composed of left and right sidewalls 21 and 21' and interconnecting top and bottom sidewalls 22 and 22', each of the latter terminating near the nip of the feed rolls in tapering portions 23 and 23'. The left and right sidewalls extend past the entrance and, chamfered to pass between the roll axles, along the ends of the rolls to a location past the roll nip. Sidewalls 21 and 21' are bored through on their centerlines at a location just inside the chamber entrance designated by the closest approach of sidewalls 23 and 23' to one another, and the bores at the left and right, respectively, receive balls 25, 25' supported against biasing compression springs 26, 26', the balls and springs being retained therein by plugs 27, 27' threaded into the other portion of the respective bores. Each ball protrudes partway into the chamber interior at the inner end of the bore through an opening too small to admit the entire ball.

As strands 9 leave the contact with the surface of feed rolls 18, 18' and enter the chamber, they are enabled to move out of the previous straight line and, in fact, are forced to do so and to buckle into crimped configuration by contact with the strand accumulation already therein as more of each strand is fed in continuously. The sidemost strands in the entering web come into contact with balls 25, 25' and are deflected thereby away from sidewalls 21, 21' and toward the interior therebetween as they assume crimped configuration. The resulting treatment of those sidemost strands is more nearly like that of the intermediate strands than if the sidemost strands had continued along the sidewalls as they would have done in the absence of such deflection. It will be understood that the representation of the form and distribution

of the resulting crimped strand configuration is diagrammatic and stylized rather than photographic.

FIGS. 6 and 7 show an alternative embodiment in which the deflecting balls of FIGS. 3 to 5 are replaced by leaf springs (only one shown). A portion of the sidewall is formed separate from and is retained removably in place aligned with the main part thereof. As shown, part 21'a of wall 21' is secured in place by screw 31. Retained in a slot in the inside wall of portion 21'a is leaf spring 35'. The spring is generally triangular in outline, with extension 35x at one apex, where it is retained in the wall slot. The flanking sides of the leaf spring fit along but spaced from tapering sidewall portions 23, 23' over a considerably longer distance than did part of the deflecting balls in the previous embodiment.

It will be understood that in both the spring-biased ball and leaf spring embodiments the deflecting means can yield in position if and when the pressure of the strand accumulation rises sufficiently, thus relieving such pressure at least locally. The action in that regard somewhat resembles the yielding of adjacent yarns under similar pressure, an ability not possessed by unmodified stuffing chamber sidewalls, of course.

Under the compression to which they are subjected in the stuffing chamber, the crimped strands tend to lose their individuality, especially when the individual ends comprise more than one filament. That is another disadvantage of multiple-end treatment as compared with single-end treatment. The previously mentioned intermittent deflection of the existing web of crimped strands perpendicularly to the plane thereof aids in restoration of the individual strands to their original identity notwithstanding their crimped configuration. Preferably the web is deflected periodically up and down (in effect, vibrated) without exceeding the comb or reed limits. Such separation of the crimped strands ends aids in maintaining the uniformity of crimps imparted to the strands in the practice of this invention.

Although preferred embodiments have been illustrated and described, modifications may be made therein, as by adding, combining, or sub-dividing parts or steps, while retaining some, if not all, of the advantages and benefits of this invention, which is defined in the following claims.

What is claimed is:

1. In multiple-end stuffer-crimping of textile strands, wherein at least several strands arranged side-by-side are fed into a temporarily confining chamber having an entrance and an exit, the improvement comprising deflecting the two sidemost strands laterally toward the strands adjacent thereto upon entrance into the confining chamber and before deformation of the strands into a crimped mass.

2. The process of claim 1, including the step of closely spacing the strands laterally from one another to be fed into the temporarily confining chamber.

3. Multiple-end crimping of textile strands, comprising the steps of arranging at least several strands side-by-side, feeding them into a temporarily confining chamber having an entrance and an exit, deflecting the two side-most strands before crimping thereof laterally toward strands adjacent thereto upon entrance into the confining chamber, continued feeding of strands thereinto forcing the strands downstream from the entrance and into contact with an accumulation of strand lengths previously fed thereinto and crimped therein and thereby forming the more recently fed strand lengths into crimped configuration, withdrawing the crimped strands from the leading edge of the accumulation thereof, and out the exit of the chamber, and winding them spaced from one another.

4. In apparatus for stuffer-crimped textile strands, including a stuffing chamber having an inside wall and an entrance for strands to be fed thereinto arranged in laterally coplanar configuration and an exit for the crimped strands to be discharged therefrom, the improvement comprising yieldable deflecting means inside the chamber entrance and extending essentially the internal transverse dimension of the chamber thereat perpendicular to the plane of the strand configuration, for deflecting incoming strand away from the inside wall of the chamber.

5. In apparatus for stuffer-crimping textile strands, including a stuffing chamber having an entrance for strands to be fed thereinto and an exit for the crimped strands to be discharged therefrom, the improvement comprising deflecting means inside the chamber entrance and spring-biased substantially laterally toward the chamber interior for deflecting incoming strand away from the inside wall of the chamber.

6. The apparatus of claim 5, wherein the deflecting means comprises a spring-pressed ball protruding into the chamber interior through an aperture in the chamber wall.

7. The apparatus of claim 5, wherein the deflecting means comprises a leaf spring attached at one end to the inside wall of the chamber and adjacent the entrance thereof, the other end of the leaf extending inwardly therefrom toward the chamber interior and from the entrance toward the exit thereof.

8. The apparatus of claim 7, wherein the leaf spring has a generally triangular configuration with an apex thereof at the locus of attachment to the chamber wall.

9. Multiple-end stuffer-crimping apparatus for textile strands, comprising a stuffing chamber having an entrance for strands to be fed thereinto and an exit for the crimped strands to be discharged therefrom, the chamber having a generally rectangular transverse cross-section with the lesser lateral dimension thereof narrowing over a portion of the length thereof toward the entrance yieldable deflecting means located at opposite sides, with respect to the greater lateral dimension, inside the chamber entrance for deflecting the sidemost strands away from the inside narrow sidewalls and toward the interior of the chamber.

10. Multiple-end stuffer-crimping apparatus for textile strands, comprising a stuffing chamber having an entrance for strands to be fed thereinto and an exit for the crimped strands to be discharged therefrom, the chamber having a generally rectangular transverse cross-section with the lesser lateral dimension thereof narrowing over a portion of the length thereof toward the entrance, deflecting means located at opposite sides, with respect to the greater lateral dimension, inside the chamber entrance and flaring outward adjacent the narrowed sidewalls in a direction from the chamber entrance toward the exit deflecting the sidemost strands away from the inside narrow sidewall and toward the interior of the chamber.

11. The apparatus of claim 10, wherein each deflecting means is spring-biased away from adjacent sidewall bounded by the narrow sidewalls and toward the chamber interior.

References Cited

UNITED STATES PATENTS

3,078,542	2/1963	McFarren et al.	28—72.11
3,096,587	7/1963	Rainard et al.	28—72.14X
3,110,076	11/1963	Trifunovic et al.	28—1.6

FOREIGN PATENTS

1,455,491	9/1966	France	28—16
-----------	--------	--------	-------

DORSEY NEWTON, Primary Examiner