The invention herein disclosed relates to a spangle slinging machine by means of which spangles coaxially arranged on a spangle thread are rearranged in flatwise, overlapping relation and secured on one or more filling cords.

An object of the invention is to provide a spangle slinging machine that is comparatively simple in construction and reliable in operation. Another object of the invention is to provide a spangle slinging machine that does not require a skilled operator. A further object of the invention is to provide such a machine on which a large number of spangles may be slung without refilling.

The foregoing objects and certain advantages that will hereinafter appear are realized in the embodiment of the invention illustrated in the accompanying drawing and described in detail below from which description a clearer understanding of the invention may be had.

The drawings include:

1. Fig. 1 which is a side elevation of a plurality of spangles disposed in coaxial relation on a spangle thread;
2. Fig. 2 which is a front elevation of spangles in overlapping, flatwise relation secured on two filling cords;
3. Fig. 3 which is a rear elevation of the same;
4. Fig. 4 which is a front elevation of a spangle slinging machine embodying this invention;
5. Fig. 5 which is a side elevation of the same;
6. Fig. 6 which is a partial, sectional plan taken on the line 6—6 of Fig. 5;
7. Fig. 7 which is an elevation, partly in section of a guide tube;
8. Fig. 8 which is an enlarged, fragmentary side elevation;
9. Fig. 9 which is an enlarged, fragmentary front elevation;
10. Fig. 10 which is an enlarged, fragmentary plan similar to Fig. 6;
11. Fig. 11 which is an enlarged front elevation of the end section of a guide tube; and
12. Fig. 12 which is an enlarged side elevation of the same.

In Fig. 1 of the drawing, spangles 1 are illustrated as coaxially arranged on a thread 2 which passes through the central apertures of the spangles 1. This is the manner in which spangles are supplied by the manufacturer. Commonly, each lot of spangles contains ten thousand spangles secured on a thread and coaxially arranged as shown in Fig. 1.

For the purpose of utilizing spangles on women's wear, such as hats, dresses, etc. it is necessary to rearrange the spangles in overlapping, flatwise relation and secure the spangles so arranged on a filling cord. This relation is illustrated in Figs. 2 and 3 of the drawings. Here the spangles 1 are rearranged in overlapping, flatwise relation. A spangle thread 3 (Fig. 3), different from the thread 2 on which the coaxially arranged spangles are supplied, passes through the apertures of the spangles. Filling cords 4 and 5 (Fig. 3) extend along the surfaces of the spangles, and wrapping threads 6 and 7 wound in opposite directions between successive spangles, about the spangle thread 3 and filling cords 4 and 5, secure the spangles in spaced relation to the filling cords. While two filling cords are shown, a single filling cord may be used.

The machine illustrated in Figs. 4 to 7 of the drawings, and which constitutes one specific embodiment of this invention, is for the purpose of rearranging coaxially arranged spangles as shown in Fig. 1 into overlapping, flatwise relation and securing the spangles so arranged on one or more filling cords as shown in Figs. 2 and 3. In general, the machine includes a spangle stripper plate for separating spangles individually and consecutively from coaxially arranged spangles; guide and feeding means for delivering coaxially arranged spangles to the stripper plate, guiding the separated spangles into the proper relation and feeding the filling cords; and mechanism for effecting the securing of the separated spangles to the filling cords by winding wrapping threads in opposite directions and between successive separated spangles about the spangle thread and filling cords.

The entire machine is desirably mounted upon a table 8. On the top of the table, there is secured to the table a frame which consists of a base 9 and an upstanding arm or standard 10.

Through an opening in the base a bushing 11 extends and makes a press fit therein so that it is stationary with respect to the base. This bushing 11 also extends through an opening 12 in the table 8. Within the lower portion of the bushing 11, there is a smaller bushing 13 which extends from the lower end of the bushing 11. This latter bushing 13 makes a press fit in the bushing 11 and is secured therein by a set screw 14. Within the bushing 13 and secured therein by a set screw 15 there is a guide tube 16 which extends vertically above the base 9. The mechanism for rearranging the spangles and winding the wrapping threads is rotatably mounted about the guide tube 16, the axis of which constitutes the axis of rotation of this mechanism. The up-
per end of the guide tube is inclined to the horizontal at an angle of seven degrees.

A hollow shaft 17 surrounds the tube 16, is rotatably mounted thereon, and extends into the upper portion of the stationary bushing 11 in which it is rotatably mounted. On the shaft 17, there is mounted, for rotation, a bevel gear 18. This gear meshes with a bevel gear 19 mounted on a shaft 20 that extends through and is journaled in the standard 10. On the shaft 20, there is also mounted a combined handwheel 21 and pulley 22. A belt 23 extends from the pulley 22 to an electric motor (not shown) by means of which the shaft 20 is driven in the direction of the arrow on the handwheel.

Also, meshing with the gear 18, there is a bevel gear 24 rotatably mounted on the shaft 17. The gear 24 has a hub thereon to which there is secured a table or spool carrier 25. A vertical post 26 extends from the table 25 and a spangle stripper plate 27 is secured to the post 26 and extends radially over the end of the guide tube 16. The stripper plate is for the purpose of separating the spangles individually and consecutively from coaxially arranged spangles. The plate has an opening 28 therethrough, the axis of which is aligned with the axis of the guide tube 16, and a stripper edge 29. The opening through the stripper plate is of such diameter as to permit a spangle to pass therethrough. The stripper edge 29 extends tangential to the opening 28, as shown in Fig. 6, and it is of a thickness equal to the thickness of a spangle.

Also mounted on the table 25, there is a spool holder 30 on which a spool 31 of wrapping thread is rotatably mounted. Wrapping thread 32 from the spool 31 passes through an adjustable thread tension 33 also mounted on the table 25. From the thread tension 33, the thread passes through a guide groove 34 and along a wrapping thread guide groove 35 formed in the upper surface of the stripper plate 27 and extending from the edge thereof to the opening therethrough.

On the shaft 17, below the gear 18, there is mounted another table 36 for rotation with the shaft 17. A spool carrier 37 rotatably supports another spool 38 of wrapping thread. From this spool, a wrapping thread 39 passes through a thread tension device 40, also mounted on the table 36, and a thread guide 41. After passing through the guide 41, the thread 39 passes through a guide tube 42 which extends along a groove in the shaft 17 to a point above the end of the tube 16.

Above the stripper plate 27, there is a vertical spangle guide tube 43 that is supported by an arm 44 extending from the standard 10 and through which arm the spangle guide tube extends. The upper end of the tube 43 is desirable flatly as at 45 and adjacent the lower end of the tube is cut away as at 46. The tube 43 is offset from the axis of the opening 28 through the stripper plate an amount such, as shown in Fig. 6, that the axis of the tube 43 is approximately at the edge of the opening 28.

The lower edge of the tube 43 is closely adjacent the stripper plate, being spaced therefrom the thickness of a spangle and just clearing the upper edge of the stripper plate. At one side of the tube 43, to the rear thereof, there is a filling cord guide tube 47 through which filling cords 48 are directed through the opening 28 of the stripper plate 27. These filling cords extend from spools (not shown) through thread tension devices 49 mounted on the standard 10 to the guide tube 47.

In an upright bushing 50 formed on the base 9, there is secured one end of a telescopic rod 51. Extending laterally from the upper end of the rod 51, there is an arm 52 well above the stripper plate 27. Mounted on the arm 52, a bevel gear 53 is guided on eye 55 which supports a spangle thread 54 coaxial with the tube 43. The spangle thread 54 extends from a spool (not shown) through a thread tension device 55 mounted on the rod 51.

In operation, the end of the spangle thread 54 is tied to one end of the thread 2 and the spangles are pushed on to the spangle thread. A weight 56 is first placed on the spangle thread so as to rest upon the spangles and urge the spangles down the thread during the operation of the machine. This weight has an extension 57 thereon that is received in the spangle tube 43 and so maintains contact of the lowermost spangle on the spangle thread with the stripper plate until the last spangle is acted upon by the stripper plate.

When the spangles are on the spangle thread, the end of the spangle thread is guided through the tube 43, through the opening in the stripper plate and into the tube 16. The filling cords are also entered in the tube 16 through the guide tube 47 and the opening 28 of the stripper plate 27. The upper wrapping thread 31 is positioned in the groove 35 and extends across the opening and the lower wrapping thread extends across the end of the tube 16. The machine is then started and the wrapping threads wind about the spangle thread and the filling cords. The spangles are then passed through the cover 23 until the lowermost spangle engages the stripper plate. As the stripper plate 27 rotates in the direction of the arrow, the stripper edge engages the lowermost spangle in contact with the stripper plate and moves it into the opening 28 into which it passes in contact with and substantially parallel to the filling cords. The upper wrapping thread is carried around the filling cord and spangle thread above the separated spangle. At the same time the lower wrapping thread is wound around the filling cords and spangle thread in the opposite direction.

The spangle thread and filling cords with the spangles secured thereon in flatwise, overlapping relation by the wrapping thread passes through the lower end of the tube 16, below the table 36. They are then passed through tension feed rollers 58 and 59 to a spool 60 on which they are wound.

The roller 58 is mounted upon the end of a shaft 61 that is journaled in the spaced arms 62 and 63 of a bearing bracket 64 secured to the under surface of the table 1. This shaft 61 is driven through a worm wheel 65 mounted therein and meshing with a worm 66 mounted on a vertical shaft 67. The shaft 67 extends through the table 8, and on the upper end thereof, there is a pulley 69. A belt 68 connects the pulley 68 with a pulley 70 secured on the shaft 17. The pulley 70 is an idler and is mounted on a shaft 71 secured in a link 74 pivotally connected to a bracket 72 pivotally mounted on the arm 62 of the bracket 64. Both the rollers 58 and 59 are rubber covered rollers and desirably the roller 59 is spring pressed against the rollers.

The spool 50 makes a frictional engagement on the end of a shaft 73 extending from a bearing bracket 74. A pulley 75 mounted on the shaft 73 is driven by a belt 76 from a pulley 71 mounted
on the shaft 61. The finished product is thus wound upon the spool.

From the foregoing description of the embodiment of the invention illustrated in the drawings and described above, it will be seen by those skilled in the art that by this invention there is provided a spangle slinging machine that is simple in construction, that is capable of continuous operation for each filling, and that does not require a skilled operator.

It will be obvious that various changes may be made by those skilled in the art in the details of the machine illustrated in the drawings and described above within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A spangle slinging machine for arranging spangles in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, which machine comprises in combination a spangle stripper plate for separating spangles individually and consecutively from coaxially arranged spangles, means for guiding the spangles separated by the stripper plate at substantially right angles to the coaxially arranged spangles, means for guiding the filling cord adjacent the spangles separated by the stripper plate, and means for winding a wrapping thread about the filling cord on each side of each separated spangle.

2. A spangle slinging machine for arranging spangles in overlapping, flatwise relation and securing the spangles on a filling cord, which machine comprises in combination a rotatably mounted spangle stripper plate for separating spangles individually and consecutively from coaxially arranged spangles, means for rotating the stripper plate, means for guiding spangles separated by the stripper plate substantially parallel to the axis of rotation of the stripper plate, means for guiding a filling cord substantially parallel to the axis of rotation of the stripper plate, and means for winding wrapping threads in opposite directions about the filling cord between separated spangles.

3. A spangle slinging machine for arranging coaxial spangles on a spangle thread passing therethrough in overlapping, flatwise relation and securing the spangles on a filling cord, which machine comprises in combination a rotatably mounted spangle stripper plate for separating spangles individually and consecutively from coaxially arranged spangles, means for maintaining a spangle thread having coaxially arranged spangles thereon parallel with the axis of rotation of the stripper plate, means for effecting a feeding of the spangles to the stripper plate, means for guiding spangles separated by the stripper plate substantially parallel to the spangle thread, means for guiding a filling cord substantially parallel to the plane of separated spangles, and means for winding wrapping threads in opposite directions about the spangle thread and filling cord between separated spangles.

4. A spangle slinging machine for arranging coaxial spangles on a spangle thread passing therethrough in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, which machine comprises in combination a spangle stripper plate having an opening therethrough and mounted for rotation about the axis of the opening for separating spangles individually and consecutively from coaxially arranged spangles, means for maintaining a spangle thread having coaxially arranged spangles thereon parallel with the axis of rotation of the stripper plate, means for effecting a feeding of the spangles to the stripper plate, means for guiding spangles separated by the stripper plate substantially parallel to the spangle thread, means for guiding a filling cord through the opening in the stripper plate and parallel to the spangle thread, and means for winding wrapping threads in opposite directions about the spangle thread and filling cord and between successive separated spangles.

5. A spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, which machine comprises in combination a spangle stripper plate mounted for rotation about a vertical axis for separating spangles individually and consecutively from horizontally arranged coaxial spangles, means for maintaining a spangle thread having coaxial spangles thereon in a vertical relation parallel with the axis of rotation of the stripper plate, means for guiding spangles separated by the stripper plate substantially parallel to the spangle thread, means for guiding a filling cord vertically and adjacent the spangle thread, and means for winding wrapping threads in opposite directions about the spangle thread and filling cord and between successive separated spangles.

6. A spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, which machine comprises in combination a spangle stripper plate mounted for rotation about a vertical axis for separating spangles individually and consecutively from horizontally arranged coaxial spangles, means for maintaining a spangle thread having coaxial spangles thereon in a vertical relation parallel with the axis of rotation of the stripper plate, means for guiding spangles separated by the stripper plate substantially parallel to the spangle thread, means for guiding a filling cord vertically and adjacent the spangle thread, and means for winding wrapping threads in opposite directions about the spangle thread and filling cord and between successive separated spangles.

7. In a spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, the combination comprising a rotatably mounted stripper plate having an opening therethrough of a diameter to pass a spangle, guide means eccentric to the opening through the stripper plate for guiding coaxially arranged spangles against the stripper plate, and a spangle stripper edge on said plate arranged to strip a spangle from the coaxially arranged spangles and move the spangle to the opening in the stripper plate.

8. In a spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, the combination comprising a horizontally arranged stripper plate having an opening therethrough and mounted for rotation about a vertical axis through the opening, the opening through the stripper plate being of a diameter to pass a spangle, vertical guide means for guiding coaxially
arranged spangles into contact with the stripper plate, the axis of the said guide means being spaced from and parallel to the axis of the opening through the stripper plate, and a spangle stripper edge on said stripper plate extending tangential to the opening therethrough, the stripper edge having a thickness substantially equal to the thickness of a spangle.

9. In a spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, the combination comprising a support, a stationary tube secured on the support, spaced elements rotatably mounted on the tube, means for rotating the said elements in opposite directions, a stripper plate mounted on one of said rotatable elements and extending over the end of the tube, and wrapping thread spool supports on said rotatable elements.

10. In a spangle slinging machine for arranging coaxial spangles on a spangle thread in overlapping, flatwise relation and securing the spangles so arranged on a filling cord, the combination comprising a horizontal stripper plate mounted for rotation about a vertical axis, a wrapping thread guide slot in said stripper plate, a vertical guide tube below the stripper plate and having an end edge inclined to the horizontal, and means for guiding a wrapping thread over the edge of the guide tube.

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