

A. MARK & W. E. SANDFORD.
 APPARATUS FOR CORRUGATING TUBES.

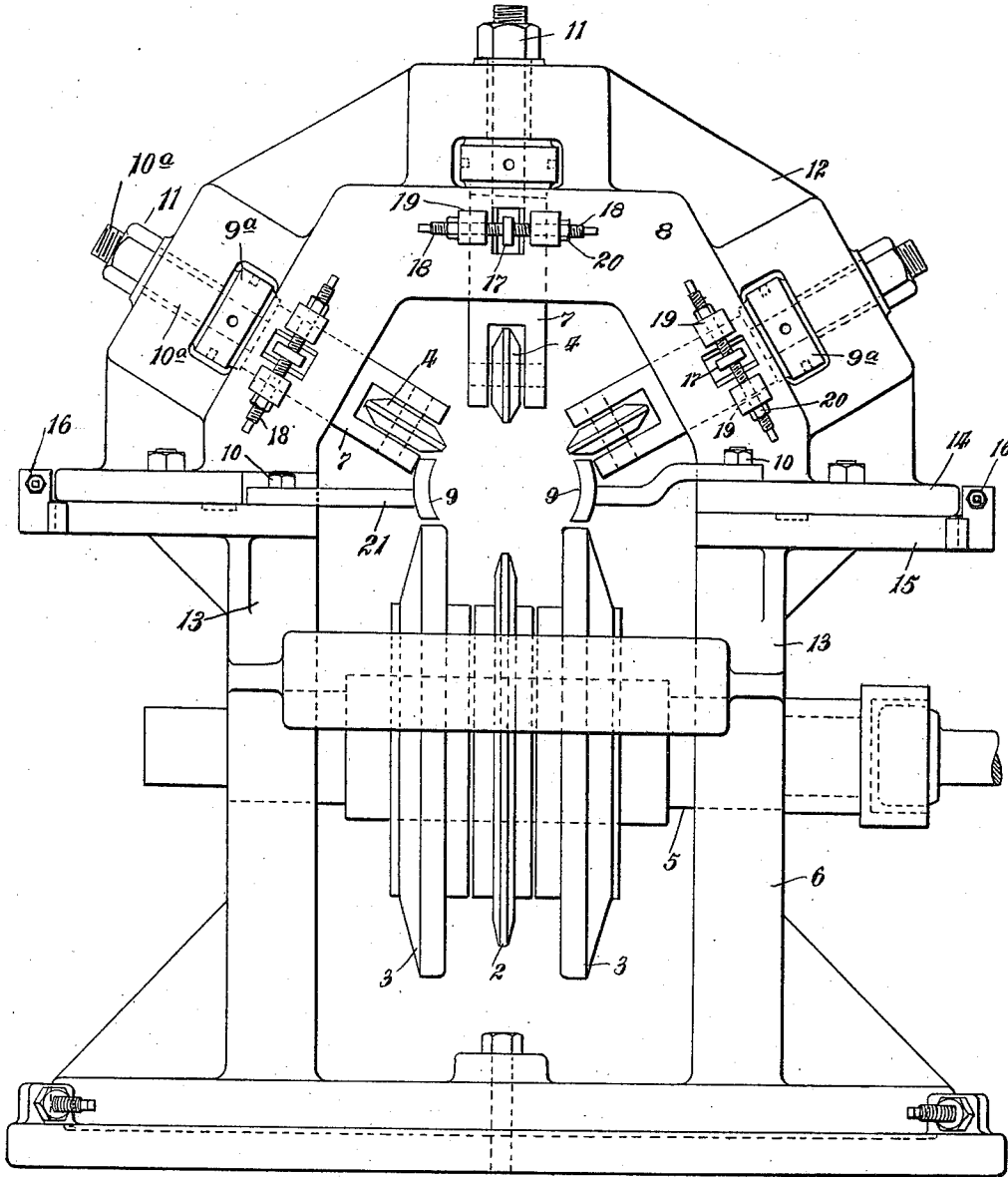
APPLICATION FILED AUG. 1, 1910. RENEWED APR. 27, 1912.

1,045,093.

Patented Nov. 19, 1912.

4 SHEETS-SHEET 1.

FIG. 1.



WITNESSES

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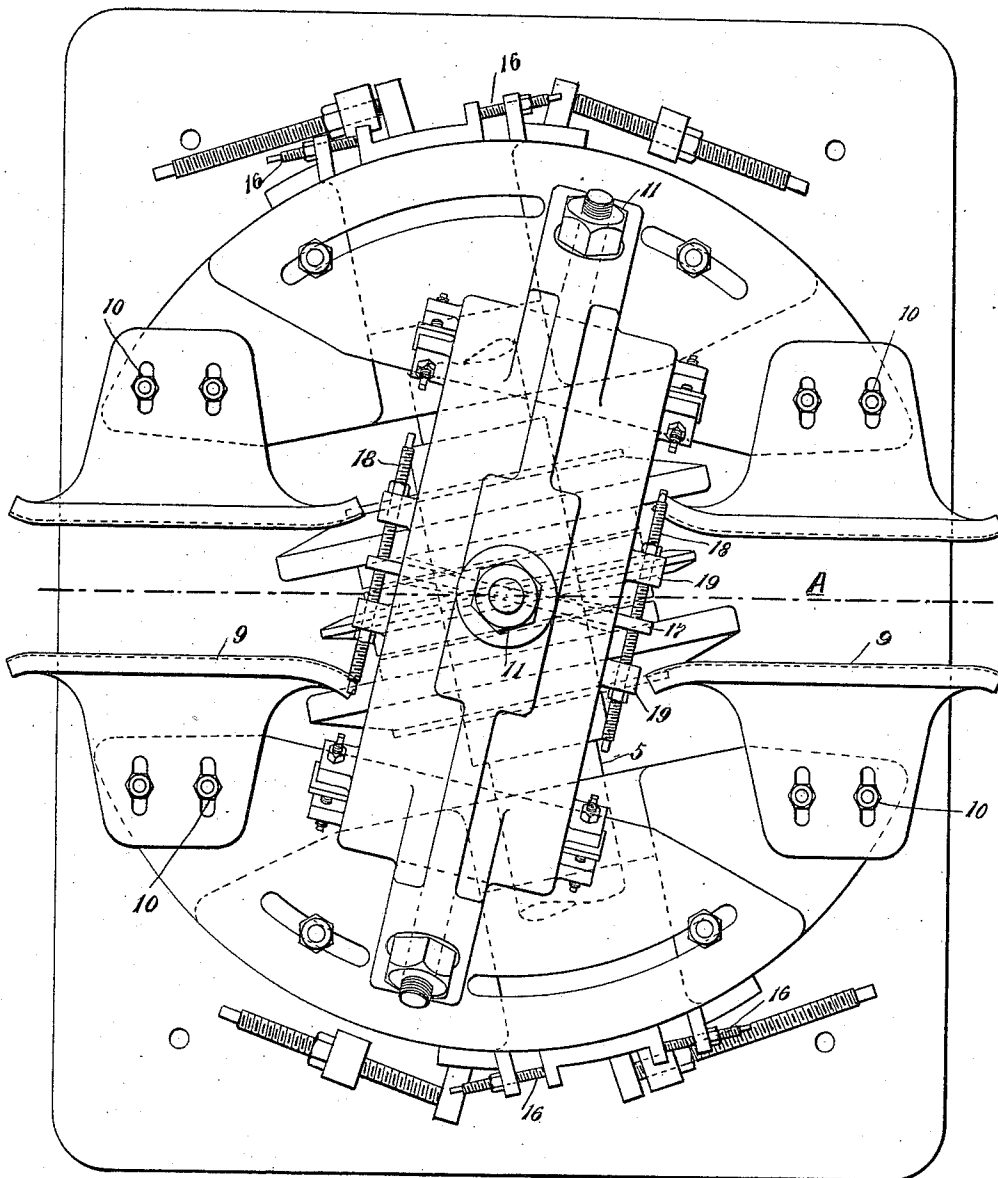
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4 SHEETS—SHEET 2.

FIG. 2.



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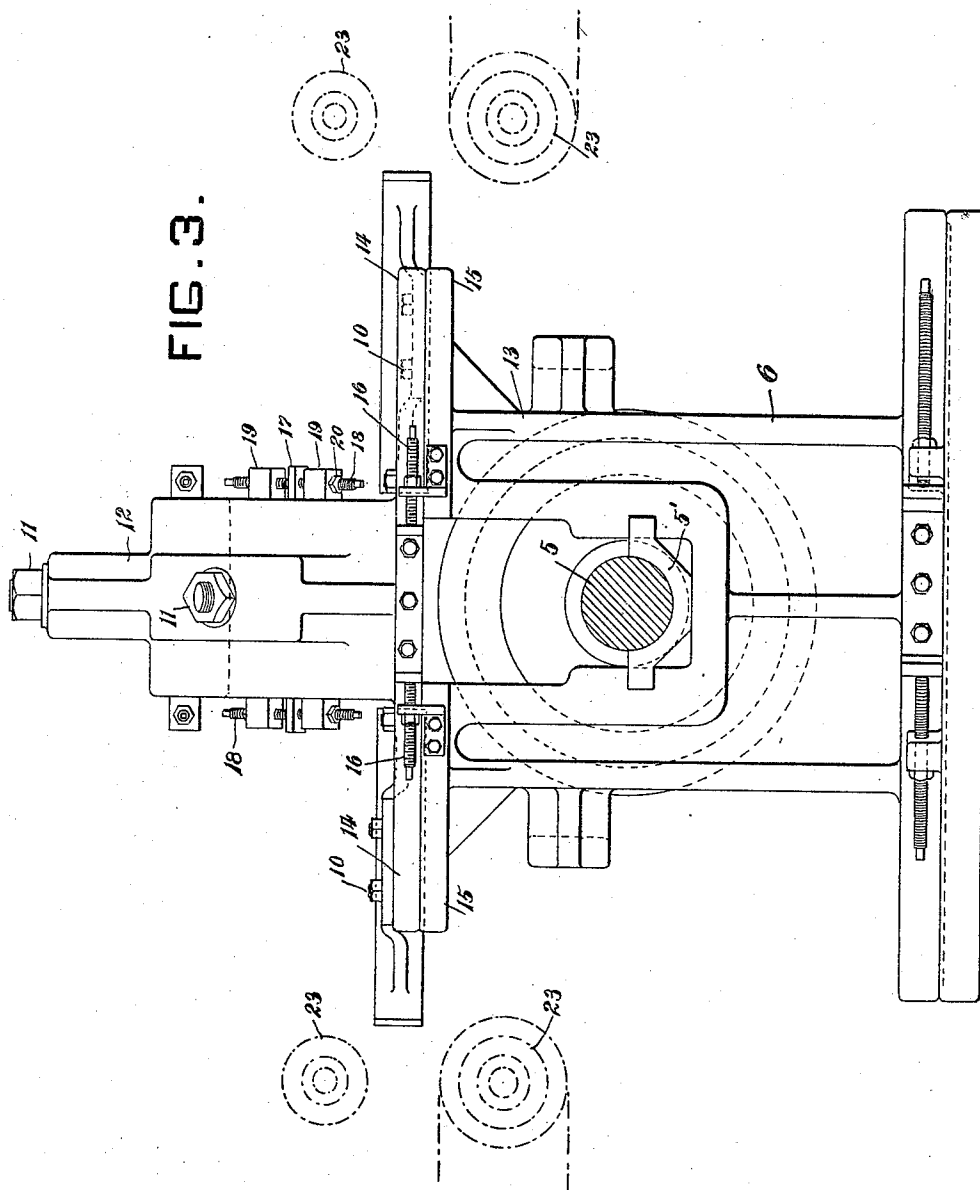
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4 SHEETS—SHEET 3.



WITNESSES

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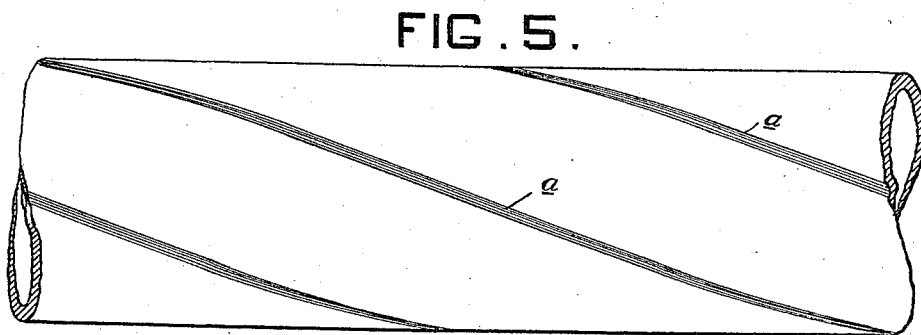
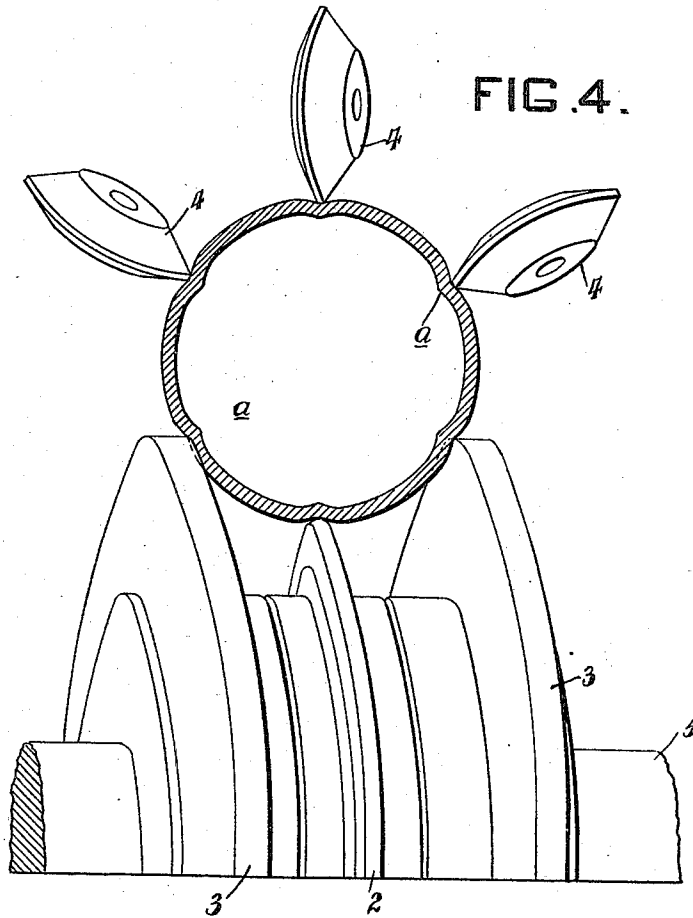
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ANSON MARK AND WILLIAM E. SANDFORD, OF ZANESVILLE, OHIO.

APPARATUS FOR CORRUGATING TUBES.

1,045,093.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed August 1, 1910, Serial No. 574,912. Renewed April 27, 1912. Serial No. 693,690.

To all whom it may concern:

Be it known that we, ANSON MARK and WILLIAM E. SANDFORD, of Zanesville, Muskingum county, State of Ohio, have invented certain new and useful Improvements in Apparatus for Corrugating Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification.

The object of our invention is to provide simple and efficient apparatus for indenting or corrugating pipe and the like; and it is particularly adapted for imparting spiral indentations or corrugations to such articles.

Our invention consists, generally stated, in providing a plurality of wheels or disks arranged in sets or series, the different sets being so disposed as to receive and impinge upon and indent or corrugate the wall of the pipe or tube, as will be hereinafter more fully described.

We will now describe our invention, referring to the accompanying drawings, so that others skilled in the art to which it appertains may understand and construct the same.

Figure 1 is a front elevation of an apparatus embodying our invention; Fig. 2 is a top plan view, showing the corrugating wheels or disks angularly disposed or skewed with reference to one another and to the line of feed of the pipe or tube; Fig. 3 is a side elevation, showing the spindle of the lower disks in section; Fig. 4 is an enlarged fragmentary elevational view showing the wheels or disks in skewed relation and in operative engagement with a pipe or tube; the latter being shown in section; and Fig. 5 is a fragmentary elevation of a tube as spirally-corrugated by our apparatus.

In describing our invention, the reference numerals 2, 3 and 4 indicate the corrugating wheels or disks which are arranged in two sets or series, mounted one above the other in coöperative association; the disks being adapted to impinge upon and indent or corrugate the tube as it is caused to be fed thereto longitudinally between the series. The wheels or disks 2 and 3 forming the lower set or series, are commonly carried by the shaft or spindle 5, mounted in suitable bearings 5' in the housing or framework 6. The disposition of these disks 2 and 3 on the shaft 5 is preferably such as to

cause the central corrugating wheel or disk 2 to bear radially on the pipe or tube being corrugated, the outer disks 3, symmetrically disposed on each side of the central disk 2, engaging with the pipe at substantially a tangent, as shown in Fig. 4. The disks 4, forming the upper or top series, are so disposed as to bear radially on the pipe or tube being corrugated; being loosely journaled in suitable individual supports 7, carried by the cross-frame or yoke 8 of the housing 6.

As above described, the pipe or tube to be corrugated is adapted to be fed longitudinally between the two sets or series of corrugating disks, the edge of each disk impinging upon and indenting or corrugating the wall of the tube or pipe, (as indicated by the letter *a*), in such passage between the disks. If it is desired to impart straight or longitudinal corrugations to the tube, the tube is fed to the disks on a line perpendicular to the axes of rotation of the disks. And where it is desired to spirally indent or corrugate the tube, the disks are angularly disposed or skewed with reference to one another and to the line *A* of feed of the tube or pipe, as shown in Fig. 2. Such angular disposition of the disks will cause the disks to engage with the tube or pipe at an angle to the longitudinal axis thereof, setting up a spiral movement of the tube as it is caused to be fed between the disks, with a consequent spiral corrugating of the tube.

Disposed at each side of the apparatus, adjacent to the outer corrugating disks of each series are the suitable guides 9, which are adjustably secured at 10 to the framework or housing 6. By means of these lateral guides the pipe or tube is held in a true central position or alinement with respect to the points of impingement of the corrugating disks in its passage through the machine, insuring thereby the placing of the indentations or corrugations in the tube in an even or uniform manner. In other words, the pipe or tube is prevented, by means of these guides, from shifting laterally in its passage between the disks.

The depth of the indentations or corrugations *a* is dependent upon the degree of association of the two series of corrugating disks, to readily bring about variations in which the supports 7 carrying the upper

series of disks 4 are so mounted in the yoke as to be capable of radial adjustment with respect to the axial center of the pipe or tube. In the construction shown, this adjustment is accomplished by means of a suitable nut 9^a, which is carried by the threaded shank 10^a of the support 7, and which co-acts with the yoke 8 to bring about such radial shifting of the support in the yoke; the stem or shank 10^a also being provided with a suitable lock-nut 11 by means of which the support may be locked in its desired adjusted position.

Feeding of the pipe or tube between the series of corrugating disks is effected by a positive rotation of one or more of the lower series of disks 2 and 3, through a driving of the shaft or spindle 5; the purchase of such revolving disks on the pipe or tube propelling the latter along. If desired, suitable driven rolls 23, as shown in Fig. 3, may be employed to assist in feeding the pipe between the series of disks.

With respect to the skewed or angular relationship of the corrugating disks, the disks may be fixedly or adjustably carried by the framework or housing 6. To provide for such angular adjustment of the disks, such framework or housing is preferably divided or swiveled at a point intermediate the two series of disks or wheels, forming the upper and lower portions or housings 12 and 13, which carry the upper and lower series of disks respectively. These housings are provided with the abutting bolting plates 14, and 15 by means of which the housings may be rigidly locked to one another in their adjusted position; the numeral 16 indicating suitable screws coöperatively carried by the bolting plates, for effecting minute adjustment of the housings. The supports 7 carrying the disks 4 may also be rotatively shiftably mounted in their seats in the yoke 8 and by means of which the range of angular adjustment of the disks may be extended. To provide for such adjustment, the supports 7 fixedly carry the radial arms or fingers 17 which are adapted to so coöperate with the adjusting screws 18, which are carried by the lugs 19, as to effect the shifting of the supports. The screws 18 are provided with lock nuts 20, by means of which they may be held in adjusted position.

It will be apparent that material variations in the pitch of the spiral corrugations in a given size of pipe or tubing may be made through such angular adjusting as mentioned above, for with each change in the angular relationship of the two series of disks, the points of operative contact of the disks with the pipe or tube will readjust themselves. Where changes in the size of tubing and spiral corrugation are radical, the apparatus, with respect to the lower

disks 3 which engage with the wall of the pipe substantially at a tangent, may be readily adapted thereto by so mounting these disks 3 on the shaft or spindle 5 as to be interchangeable with like disks of different diameter; it being apparent that the upper series of disks 4, bearing radially on the pipe, may, by reason of their radial and angular adjustability, spoken of above, be readily accommodated to such radical changes.

While we have shown a certain number of corrugating wheels or disks, we do not desire to limit ourselves thereto, as the number may be varied; being dependent on the number of indentations or corrugations it is desired to give the tube or pipe. And it will be apparent that many changes may be made therein without departing from our invention, especially in the matter of the framework or housing for operatively mounting the corrugating disks, as this is a matter well understood in the art and may be varied as desired without departing from our invention.

The advantages of our invention will be found to reside in a positive drive corrugating apparatus of the disk type having great facility and range of adjustment.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of disks arranged to bear radially on the tube each disk forming a corrugation in the finished product.

2. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of disks arranged to bear radially on the tube each disk forming a corrugation in the finished product, and means for preventing lateral displacement of the tube.

3. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other series.

4. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other series, and means for preventing lateral displacement of the tube.

5. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of corrugating disks arranged to bear radially on the tube, and means for ad-

justably supporting the disks; each disk forming a corrugation in the finished product.

6. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of corrugating disks arranged to bear radially on the tube, means for preventing lateral displacement of the tube, and means for adjustably supporting the disks; each disk forming a corrugation in the finished product.

7. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other series, and means for adjustably mounting the disks.

8. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other series, means for adjustably mounting the disks, and means for preventing lateral displacement of the tube.

9. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other series, and means for varying the angular relationship of the disks.

10. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, the disks of one series being skewed with reference to those of the other

series, means for adjustably mounting the disks, and means for varying their angular relationship.

11. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of corrugating disks arranged to bear radially on the tube, and supports for individually mounting the disks of the last named series; each disk forming a corrugation in the finished product.

12. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of corrugating disks arranged to bear radially on the tube, supports for individually mounting the disks of the last named series, and means for adjustably mounting the supports; each disk forming a corrugation in the finished product.

13. In an apparatus of the character described, a plurality of corrugating disks having alining axes, in combination with a plurality of corrugating disks arranged to bear radially on the tube, and means for adjustably mounting the disks, one set with respect to the other, comprising a swiveled housing.

14. In an apparatus of the character described, a series of corrugating disks having alining axes, in combination with a series of corrugating disks arranged to bear radially on the tube, and means for adjustably mounting the disks, comprising a housing swiveled at a point intermediate the different series of disks.

In testimony whereof, we have hereunto set our hands.

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WILLIAM E. SANDFORD.

Witnesses:

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L. G. MEREDITH.