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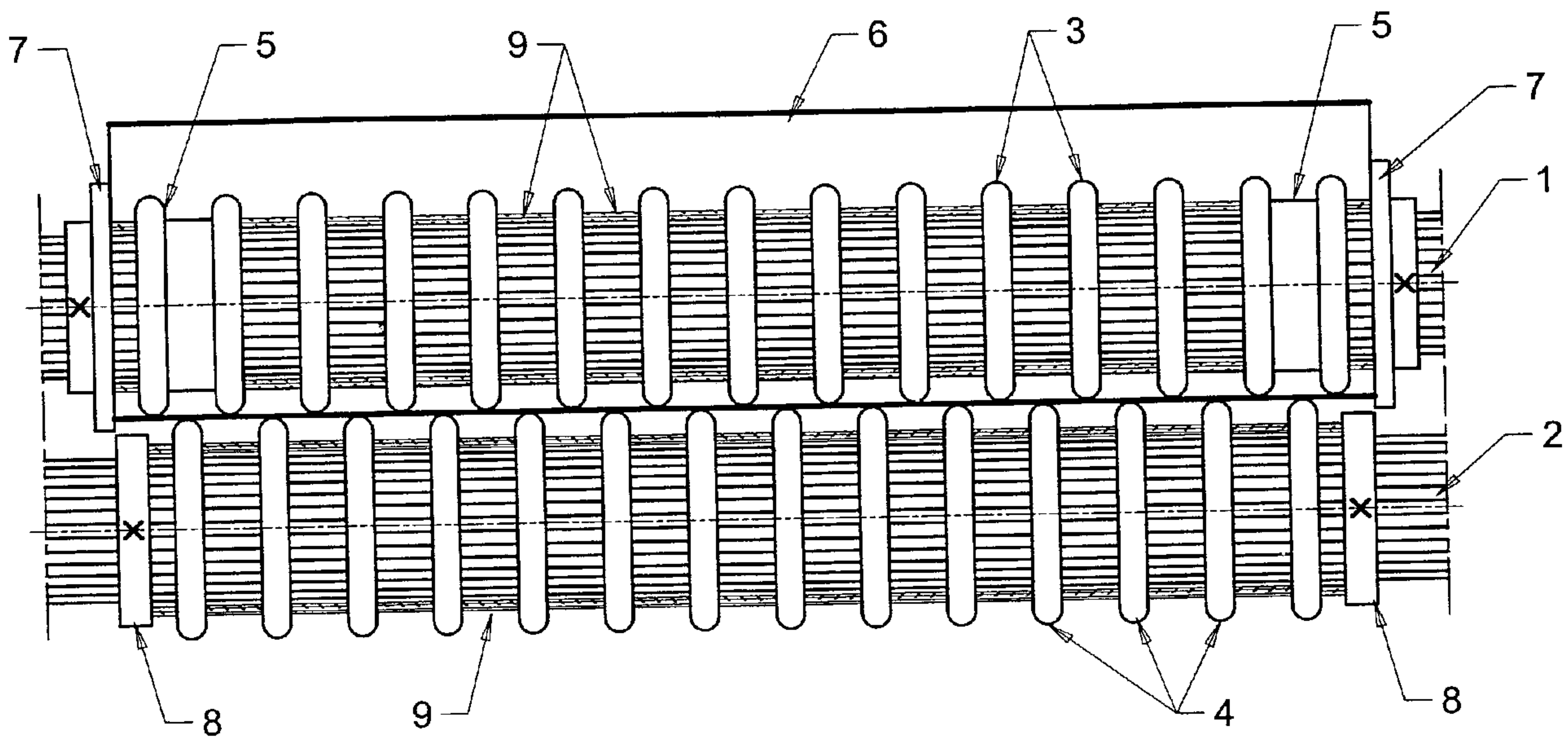
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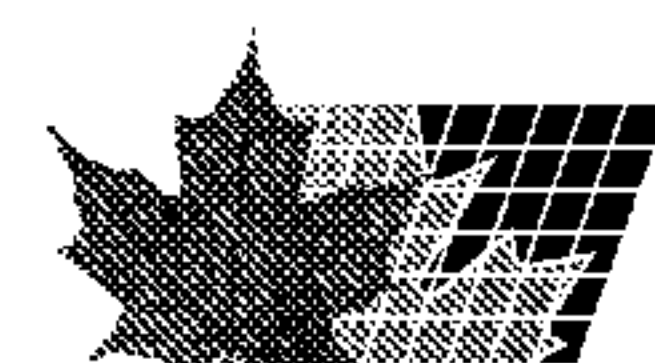
(54) Titre : DISPOSITIF ET METHODE DE FORMATION DE CANNELURES DANS DES MANCHONS OU
D'ONDULATION DE TOLES

(54) Title: APPARATUS AND METHOD FOR SLEEVE OR SHEET CORRUGATION



(57) **Abrégé/Abstract:**

An apparatus and method for the forming of corrugations in cylindrical objects or plain sheets, which include but not limited to two or more rotating spline or keyed shafts with internally grooved sliding wheels. Springs or collars with elastic properties are located between sliding wheels to allow them to keep predetermined distance which varies under axial forces.



ABSTRACT OF THE DISCLOSURE

An apparatus and method for the forming of corrugations in cylindrical objects or plain sheets, which include but not limited to two or more rotating spline or keyed shafts with internally grooved sliding wheels. Springs or collars with elastic properties are located between sliding wheels to allow them to keep predetermined distance which varies under axial forces.

APPARATUS AND METHOD FOR SLEEVE OR SHEET CORRUGATION

[0001] This is a provisional application as provided for in 35 USC §111(b).

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention relates to an apparatus for forming a tube or sheet with corrugations. Such sheets or tubes/sleeves can be made of metal or other materials suited for the method and apparatus described herein.

2. Description of Background and Relevant Information

[0003] The equipment used for corrugating of sheets is equipped with plural roll stands in their progressive line. This kind of progressive rollformers with different but fixed distance between wheels in each stand is represented, for example, in U.S. Patent No. 5,163,311.

[0004] There are different solutions to produce corrugated pipe. Almost all of them have intricate kinematics and need complicated adjustments to fit pipe diameter or to change pitch dimension. Moreover, most of these apparatus stretch corrugating workpiece, and thus create undesirable stresses in the material. See, for example, U.S. Patent Nos. 3,690,137; 4,619,131; 5,056,348; 6,073,473; 6,282,939; 6,550,300; 6,789,318.

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[0005] An apparatus such as the one disclosed in U.S. Patent No. 4,366,691 includes sliding wheels. However, displacement of these wheels needs very fine adjustment. Moreover, making more than two corrugated waves at the same time needs too intricate kinematics and operation complexity. Finally, the changing of pitch dimension is fully impossible.

SUMMARY OF THE INVENTION

[0006] An object of the invention is to provide an apparatus and method to fabricate corrugated sleeves and or sheets, which enables:

- Use one set of two or more rotating shafts with the needed quantity of sliding wheels to make plural quantity of corrugating waves;
- Easily change pitch of corrugations;
- Make different pitches and shapes of corrugation in the same workpiece;
- Easily change length and diameter of the corrugated sleeves;
- Easily change width and length of the corrugated sheets;
- Minimize material stretching because of automatically adjusted distance between sliding wheels.

[0007] In accomplishing the above object, the invention relates to an apparatus for the forming of corrugations in sleeves or sheets, which includes the following: a mechanism for shafts rotating, two or more rotating shafts with longitudinal grooves or keys, sliding in axial direction wheels with internal grooves located on the said shaft, springs or collars with elastic properties placed between sliding wheels.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other objects, features and advantages of the present invention will become apparent from the detailed description of exemplary embodiments of the invention, which follows, when considered in the light of the accompanying drawings, in which:

- FIG. 1 is a longitudinal view illustrating rotating shafts with sliding wheels and elastic collars at the start position in accordance with the present invention;
- FIG. 2 is a longitudinal view illustrating rotating shafts with sliding wheels and elastic collars at the finish position;
- FIG. 3 is a cross-sectional view illustrating the possible third shafts and its location.
- FIGS. 4a, 4b, and 4c are cross-sectional views illustrating corrugated sleeves with different pitches (4a) or (4b)/and (4c) different depth of corrugations.

DETAILED DESCRIPTION OF THE INVENTION

[0009] Shown in FIGS. 1 and 2 is an embodiment in accordance with this invention. Apparatus for the fabrication corrugated sleeves or sheets comprises of spline shafts 1 and 2 mounted on a rotating mechanism (not shown) with possibility to rotate said shafts in an opposite direction in relation to each other. In addition, said rotating mechanism has the possibility to displace said shafts toward and away from each other. Further, said spline shafts are provided with needed quantity of sliding wheels 3 and 4, double wheels 5 to keep sleeve/sheet 6 edges in fixed position relatively to said wheels 5, and fixed to the shaft 1 or 2 restricting wheels 7 and 8. Elastic collars (or springs) 9 are located between said wheels 3 and 4.

[0010] FIG. 3 shows another embodiment of this invention, where said rotating mechanism is provided with a third shaft 10 similar to shafts 1 and 2 with possibility

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to shift manually said shaft 10 in accordance with said sleeve/sheet diameter (plain sheet has infinite diameter). Said shaft 10 serves as guide for moving/rotating workpiece 6, especially when the middle wheel from set of wheels 3 or 4 is fixed to the shaft 1 or 2 and respective middle wheel 11 on the shaft 10 is fixed to said shaft

[0011] The aforementioned apparatus operates in the manner described below.

[0012] First, the apparatus for the forming corrugations in sleeves or sheets is provided with the certain quantity of sliding wheels 3 and 4 and with certain length of elastic collars 9. Double wheels 5 flanks in position depend on initial width of the workpiece 6. Restricting wheels 7 and 8 are fixed on the shaft 1 and 2. The distance between said wheels 8 slightly bigger than the initial width of the workpiece 6. At the same time, said wheels 7 and 8 compress respective set of the collars 9 with the small initial force.

[0013] In the case (see FIG. 4a) when, for instance, a smaller pitch is needed in the middle of said workpiece 6 in order to withstand higher load in this area, just shorter collars 9 should be placed in this middle area. To create deeper grooves in some part of said workpiece (4b), just sliding wheels with bigger diameter should be placed in this area.

[0014] Now, workpiece 6 is placed between shafts 1 and 2, and rotation of the shafts 1 and 2 is started. At the same time, said shafts start to displace toward each other, and said wheels 3 and 4 start to corrugate workpiece 6 by mostly collecting material of said workpiece along said shafts.

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CLAIMS

Claim 1. An apparatus for corrugating sleeves and/or sheets, said apparatus comprising:

at least two rotatable shafts having longitudinal grooves or keys to transfer rotational movement

a mechanism to rotate said two shafts;

a plurality of wheels adapted to slide in an axial direction with internal grooves or keys located on said shafts; and

elastic collars placed between said sliding wheels.

Claim 2. An apparatus according to claim 1, wherein:

said at least two rotatable shafts comprise more than two rotatable shafts.

Claim 3. An apparatus according to claim 1, wherein:

some of said sliding wheels comprise at least one annular groove.

Claim 4. An apparatus according to either of claims 1 and 3, wherein:

said sliding wheels have different thicknesses and diameters.

Claim 5. An apparatus according to any of claims 1, 3, and 4, wherein:

some of said sliding wheels are provided with a variable width of said annular groove.

Claim 6. An apparatus according to claim 1, further comprising:

restricting wheels fixed on said shafts.

Claim 7. An apparatus according to claim 1, wherein:

said elastic collars are provided with different axial lengths.

Claim 8. An apparatus according to either of claims 1 and 7, wherein:

said elastic collars are made from different elastic materials.

Claim 9. A method of corrugating a sleeve and/or a sheet using the apparatus of claim 1.

FIG. 1

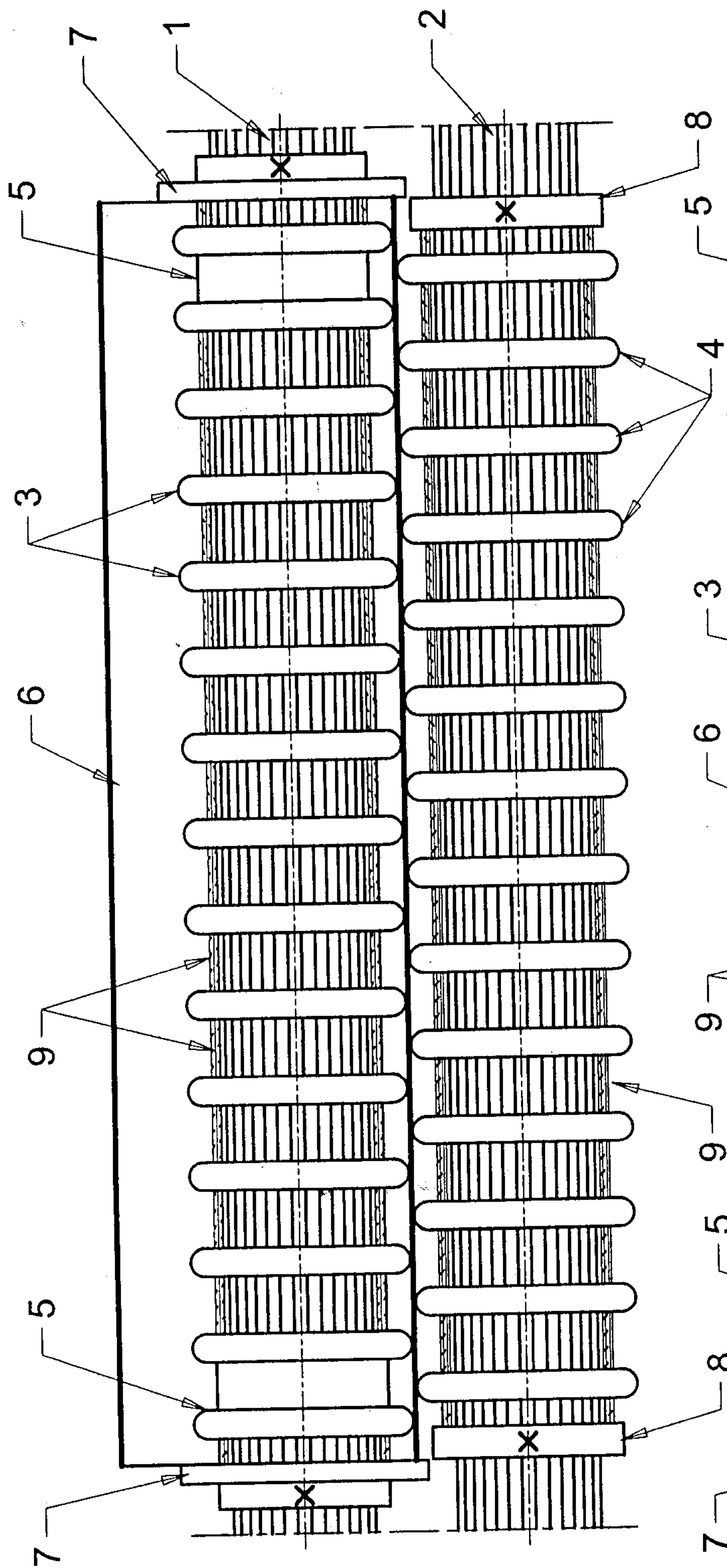
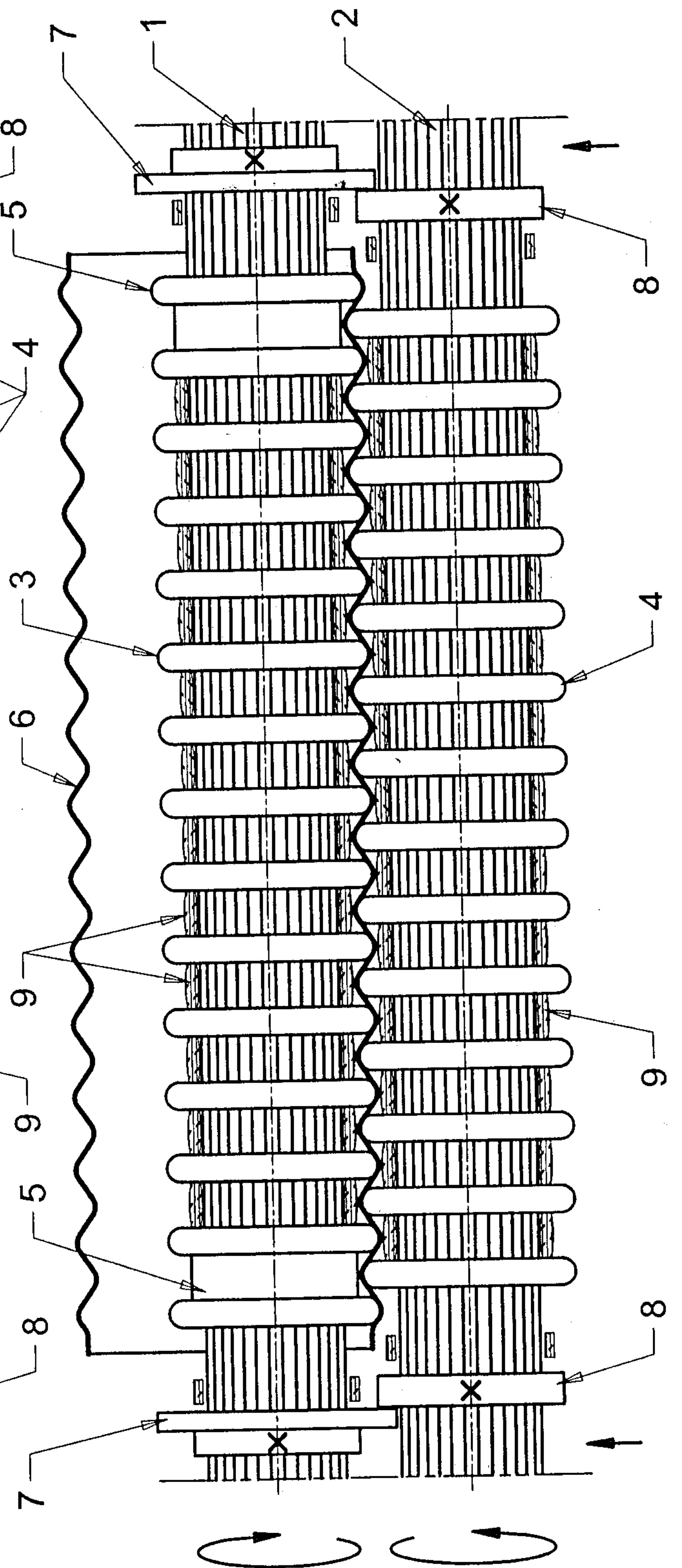


FIG. 2



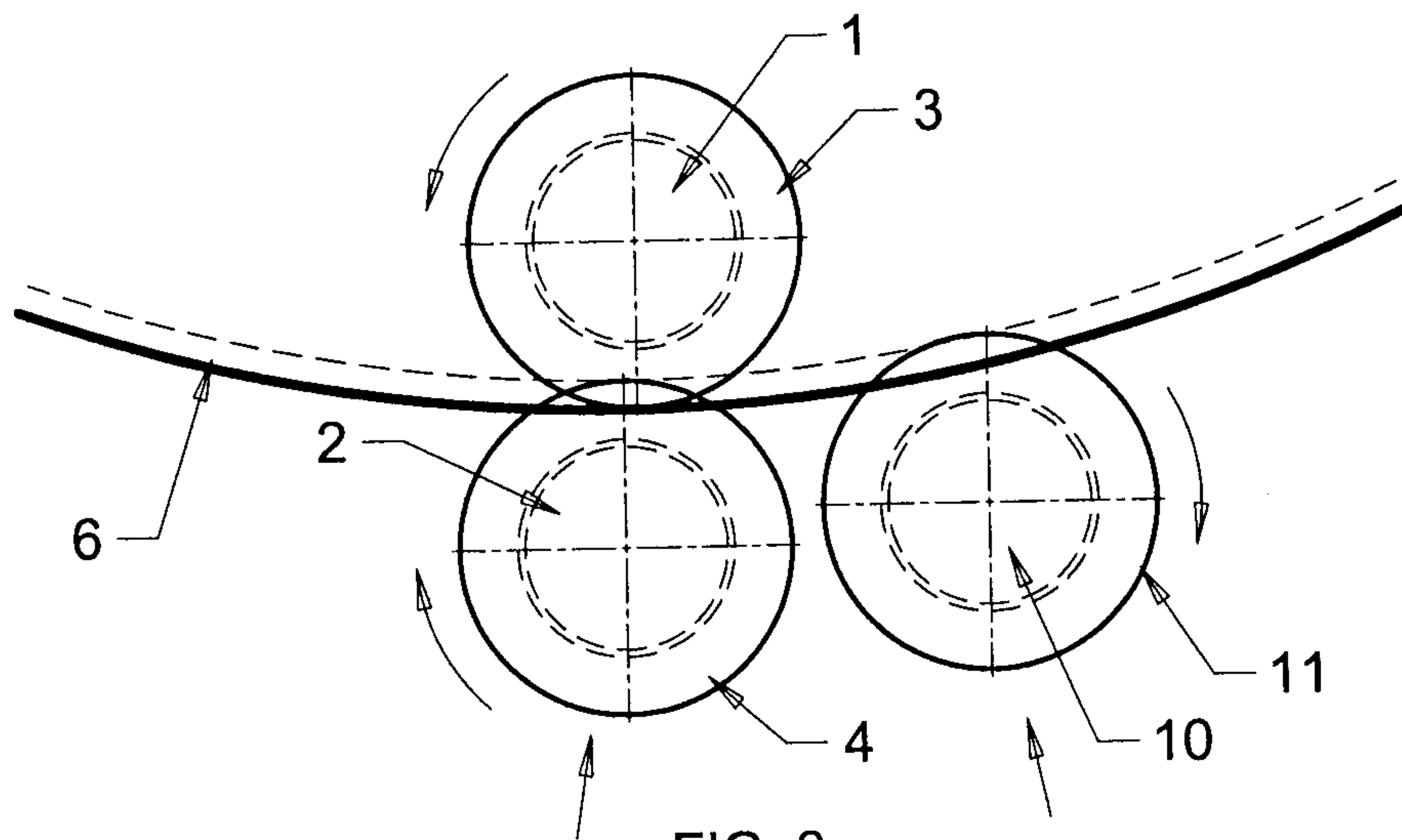


FIG. 3

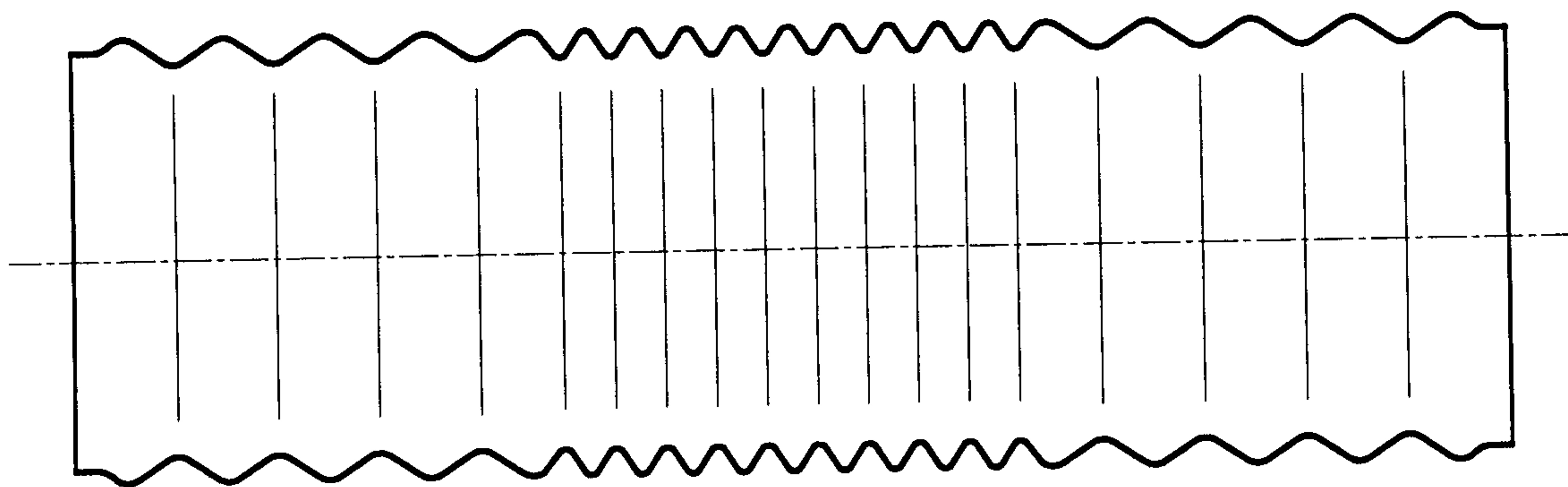


FIG. 4,a

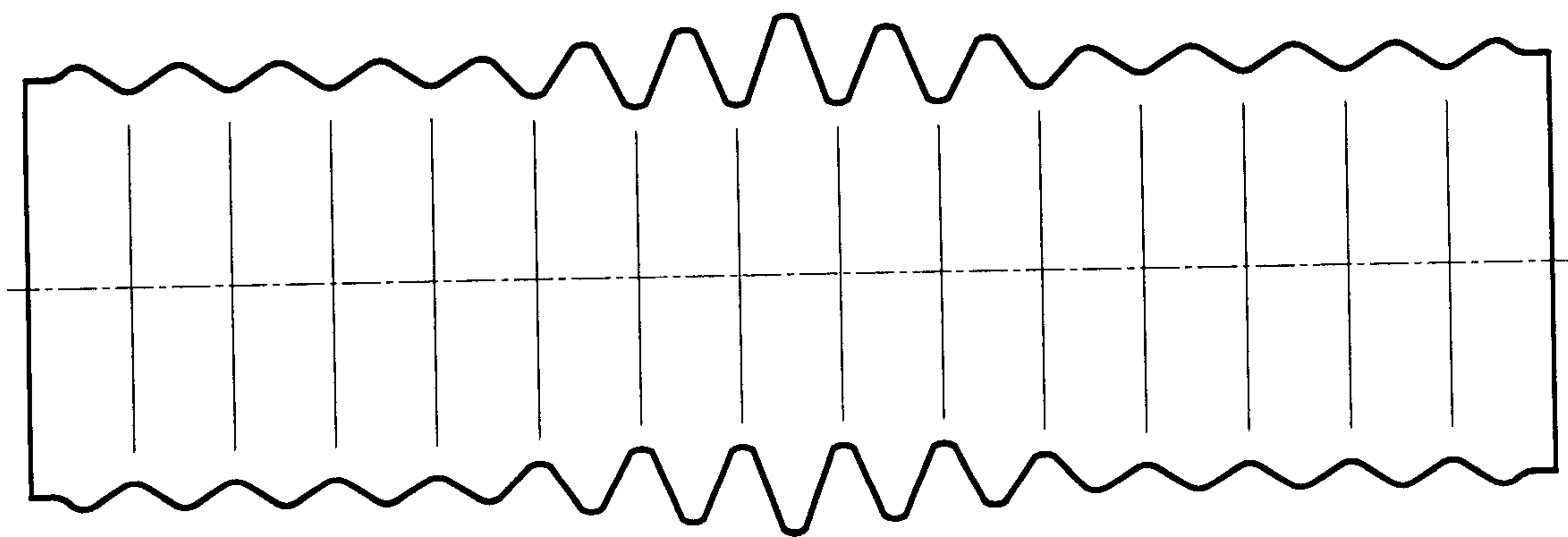


FIG. 4,b

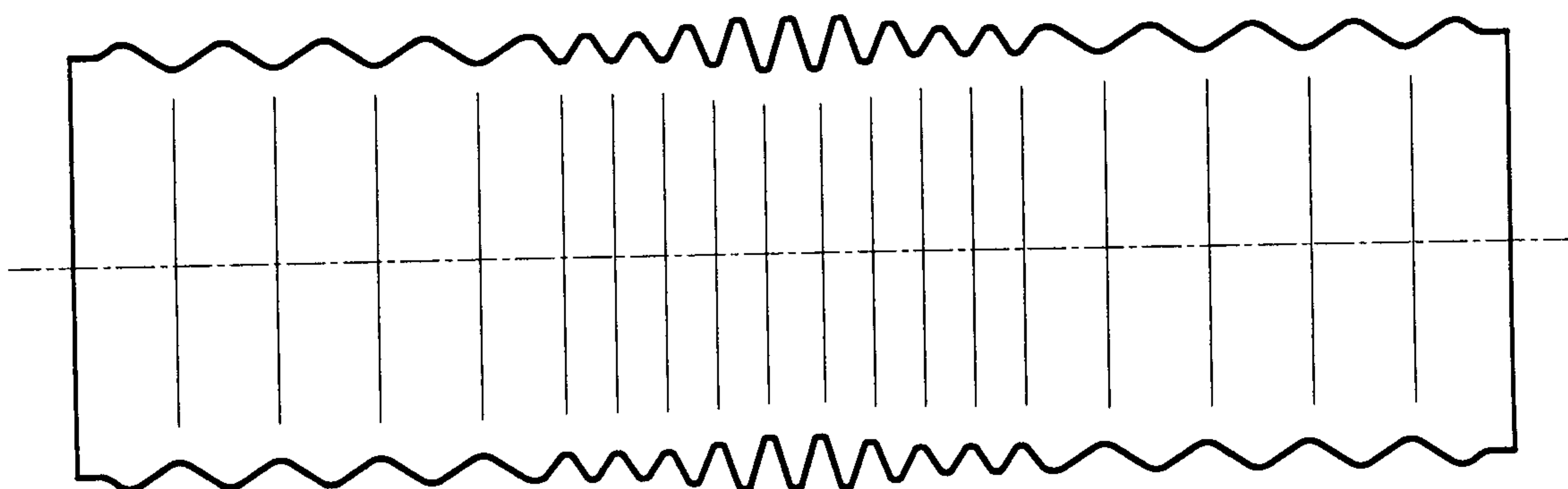


FIG. 4,c

