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(71) Applicant: **AEC Service sp. z o.o.**
50-333 Wrocław (PL)

(72) Inventor: **Godlewski, Aleksander**
54-220 Wrocław (PL)

(74) Representative: **Trawinska, Urszula**
Abapat. Kancelaria Patentowa
ul. Tadeusza Kosciuszki 19/1
44-200 Rybnik (PL)

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(54) **PERFORATING ROLLER AND ALUMINUM FOIL WINDER COMPRISING THE SAME**

(57) Aluminum foil winder with a set of unwinding, tensioning, cutting and winding devices including a unwinder (2), a tension roller, guide rollers (5), a foil tension adjuster (6), a set of rotating tensioning and pressing rollers (7,8) mounted on a mounting frame (15) attached to a frame of the winder (1), a knife (9), a drum (11) with pins (12) and a pressing brush (10) and a gripper of the finished roll (13). The tensioning roller (7) in the set of pressure rollers (8,7) on the mounting frame (15) additionally includes a number of metal ring-shaped perforating knives (18) whose outer outline has the shape of

sharp-pointed teeth (21) fixedly fixed on a metal mandrel (17).), the knives (18) are separated by a plurality of spacer disks (19) and the ends of the perforation roller (7) are placed in bearings. The tensioning-perforation roller of the aluminum foil winder, containing the spindle (17) embedded in the bearing, includes a plurality of metal ring-shaped perforating knives (18) whose outer outline has the shape of sharp-pointed teeth (21) fixedly fixed on the metal spindle (17), the knives (18) are separated by many spacer discs (19).

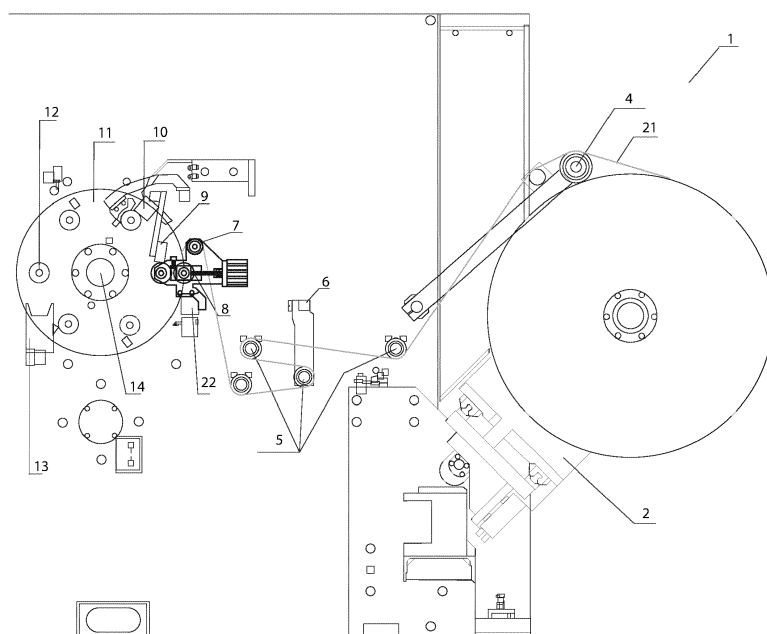


FIG. 1

Description

[0001] The subject of the invention is a device intended for continuous perforation of a sheet of aluminium foil unwound from a roll and for the production of rolls of perforated aluminium foil, the so-called winder. The invention also relates to the construction of a perforating roller.

[0002] In the prior art, devices for perforating plastic films are known which most often exhibit a certain flexibility and deformability.

[0003] The most frequently used system is a system of two rotating rollers through which the foil sheet moves, with one roller being a roller with perforating pins or needles on its surface, and the other being a counter pressure roller. Such a system is described, for example, in EP2117953A1, Fig. 2 and Fig. 4.

[0004] From the Polish application P.411535 a perforation roller of the labeling machine is known, which includes bearing rollers rotatable mounted on the axis and at least one sleeve coaxially mounted between them with pins mounted on the outer circumference, protruding beyond the circumference of the rollers, the axis being detachably mounted on the holders attached the frame of the labeling machine and inside the sleeve there is a metal ring, tightly seated under the inner ends of the pins, with the sides of the sleeve tightly seated inside the rollers, and the bearings through which the axis passes along with the housing, closing the sides of the perforation roller. The description shows that the roller is intended for perforating the heat-shrinkable foil.

[0005] In the prior art, aluminium foil rewinders are known which consist of a set of devices for unwinding the aluminium foil from a large roll and then for wrapping the perforated foil into smaller rolls for sale. These devices, usually from a roll of aluminium foil wound through a unwinder, tensioning and guiding rollers, lead a continuous sheet of aluminium foil to a set of pressure rollers and a knife cutting a continuous sheet into shorter lengths, and then these shorter sheets are wound on cardboard rolls mounted on mandrels mounted on a rotating drum and removable with the ready roll gripper.

[0006] In households and in gastronomy, aluminium foil is commonly used, which is used to prepare dishes by heat treatment, as well as for packing and storing food products. Aluminium foil is usually sold in rolls.

[0007] Rolls of aluminium foil are also known having longitudinal perforations or weakening notches which facilitate the tearing of the foil sheets from the roll.

[0008] The known aluminium foils have the disadvantage that they are tight and that no gas exchange between the product and the environment is possible.

[0009] The object of the invention is to construct a perforation device containing a perforation roller, which would allow the rolled continuous sheets of aluminium foil to be perforated over all or at least a significant part of their surface, and then winding the perforated foil onto smaller rolls and cutting the foil. The purpose of the in-

vention is to construct a device that could be mounted on existing machines for winding a continuous sheet of aluminium foil onto rolls - the so-called aluminium foil rewinders. The purpose of the invention is also to construct a perforation roller that allows a continuous sheet of aluminium foil to be perforated with different densities and perforation structures.

[0010] According to the invention, an aluminium foil winder including a set of unwinding, tensioning, cutting and winding devices including a unwinder, a tensioning roller, guide rollers, a foil tension adjuster, a set of rotating tensioning and pressing rollers mounted on the mounting frame attached to the winder frame, a knife, a drum with pins and a brush clamp and gripper of the finished roll. The essence of the invention is that the tensioning roller in the set of pressure rollers on the mounting frame additionally comprises a plurality of metal ring-shaped perforation knives, the outer contours of which have the shape of sharp-pointed teeth fixed on a metal mandrel, the knives being separated by a number of spacer discs.

[0011] The essence of the invention is the above-described perforation roller and its location in the set of devices constituting the aluminium foil winder.

[0012] The tensioning-perforating roller is simple in design and manufacture. Its assembly is easy and it can be used in existing and implemented in production winders. The roller replaces the stretching roller and in its place performs the tensioning and perforating function.

[0013] The invention is shown in the figure where:

Fig. 1 shows an overview drawing of an aluminium foil winder with a tensioning-perforating roller,

Fig. 2 shows the roller assembly on the mounting frame,

Fig. 3 shows the structure of the tensioning-perforating roller.

Fig. 4 shows exemplary dimensions of the perforating roller.

[0014] In the winder 1 (Fig. 1) the roll 3 of aluminium foil is moved by a roll unwinder 2. The aluminium foil is guided through the tension roller 4, then through guide rollers 5, one of which is adjusted by adjusting the tension 6. Then the foil aluminium foil guided by the set of tensioning and pressing rollers 7 and 8. First, the aluminium foil is guided on the tensioning-perforating roller 7 and then between the pressure rollers 8. The tensioning-perforating roller 7 and rollers 8 are mounted on bearings on the mounting frame 15 (Fig 2). In a standard winder, in the place of the tensioning-perforating roller 7, there is a regular tensioning roller without perforating knives. Replacing the tension roller with the tensioning-perforating roller 7 enables the modification of the standard winder into a device that additionally performs perforation. Next, the aluminium foil is cut into shorter lengths with a

knife 9 and then wound on cardboard rolls placed on pins 12 mounted on a drum 11. The foil is pressed against the cardboard rolls with pressing brushes 10.

[0015] The fastening frame 15 of the set of tightening-tensioning and perforating rollers 7, 8 is bolted to the frame 22 of the winder 1. The fastening frame 15 together with the rollers 7, 8 can be dismantled, which enables the rollers to be replaced. Therefore, placing the perforating roller 7 at this point does not require any other additional modifications to the device in order to perforate the aluminium foil. Also attached to the frame 15 is a pneumatic cylinder 16.

[0016] The tensioning-perforating roller 7 comprises a plurality of metal perforating knives 18 fixedly mounted on a metal mandrel 17 (Fig. 3). The perforating knives 17 are separated by spacer discs 19 made of plastic. The perforation roller 7 may have one, several, a dozen or several dozen perforation knives 18. The outer ends of the roller are closed with spacer rings 19. The perforation knives 18 have the shape of rings, the outer contours of which are conical teeth 21. The number and size of teeth 21 may be shaped depending on the needs and on the required target sizes and layout of the holes in the aluminium foil. Only the tips of the teeth 21 protrude beyond the outline of the spacer discs 19.

[0017] The teeth 21 may also have other shapes, for example trapezoidal, however the most preferred shape is triangular.

[0018] The knives 19 may be mounted on a mandrel 17 symmetrically, or in such a way that every second or every knife is mounted symmetrically to each other. The effect of the asymmetric mounting of the knives 19 is a shift between the transverse rows of holes in the aluminium foil.

[0019] The spacer discs 19 may be of the same or different width. This width is dictated by the required layout of the holes in the aluminium foil and the required number of longitudinal rows.

[0020] In addition to the spacer discs 19, on one or both sides of the roller there are smaller spacer sleeves 20, which press the knives 18 and spacer disks 19 against each other. The spacer sleeves are secured against movement by a round cotter pin, not shown in the drawing.

[0021] Exemplary dimensions of the tensioning-perforating roller are shown in Fig. 4. The teeth 21 of the knives 18 are 3 mm high and also 3 mm wide at the base. The metal knives 18 are 0.5 mm thick. The spacers 19 are 10 mm wide. The teeth 21 project above the outer surface of the spacers 19 by approx. 1.5 mm. The roller contains 27 perforating knives 18.

[0022] The invention finds application in the food product packaging industry.

tensioning, cutting and winding devices including a unwinder (2), a tension roller, guide rollers (5), a foil tension regulator (6), a set of rotating tensioning and pressing rollers (7, 8) mounted on a fastening frame (15) attached to a winder frame (1), knife (9), a drum (11) with pins (12) and a pressing brush (10) and a gripper of a finished roll (13), **characterized in that** the tensioning roller (7) in the set of pressure - tensioning rollers (8,7) on the mounting frame (15), additionally comprises a plurality of metal ring-shaped perforating knives (18), an outer outline of which has a shape of sharp-pointed teeth (21) fixedly fixed on a metal mandrel (17), the knives (18) are separated by plurality of spacer disks (19), and the ends of the perforation roller (7) are placed in bearings.

2. A tensioning-perforation roller of an aluminium foil winder comprising a mandrel (17) embedded in a bearing, characterized that it includes a plurality of metal ring-shaped perforation knives (18) whose outer outline has a shape of sharp-pointed teeth (21) fixedly mounted on a metal mandrel (17), the knives (18) being separated by a plurality of spacer disks (19).

Claims

1. Aluminium foil winder with a set of unwinding, ten-

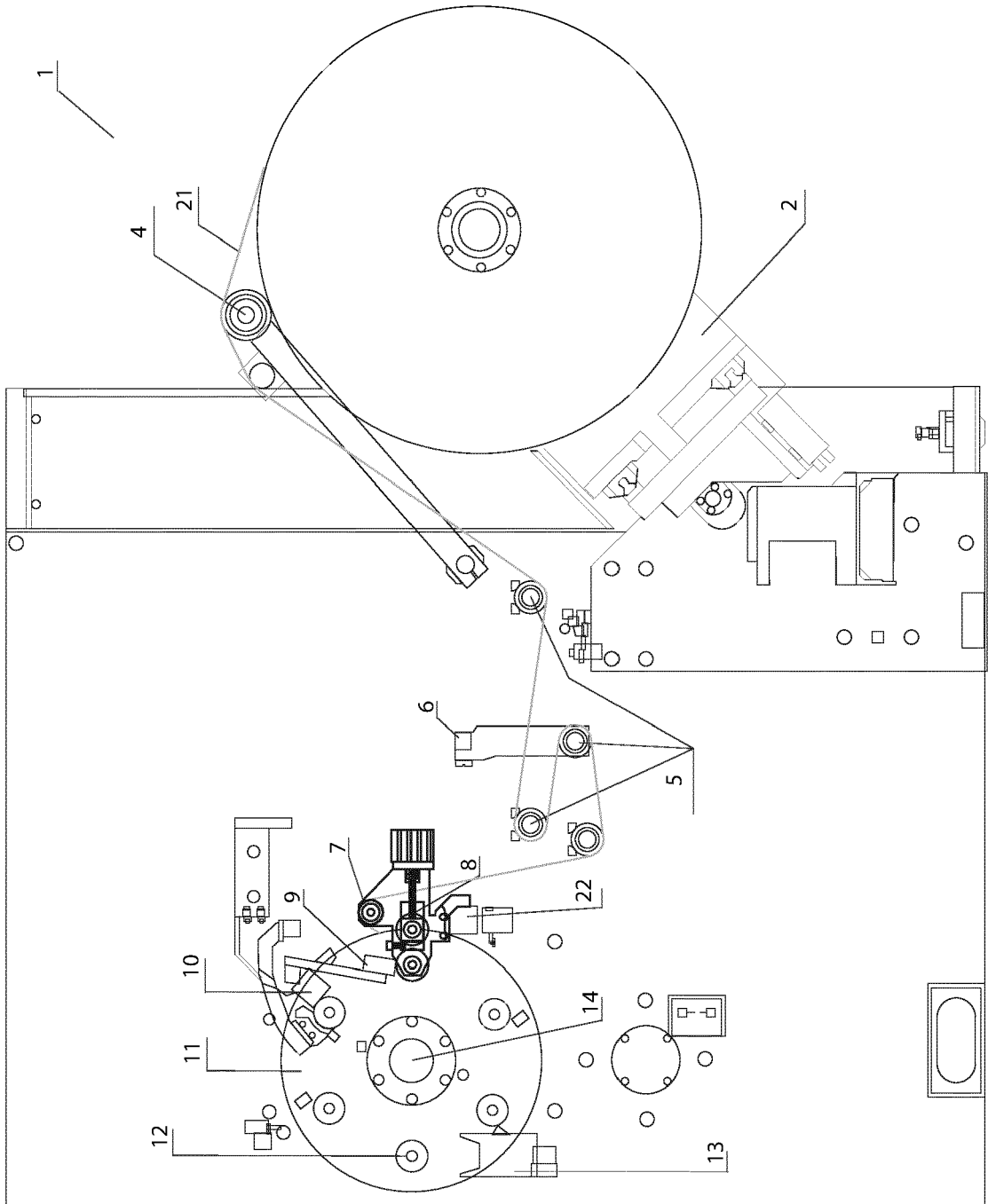


FIG. 1

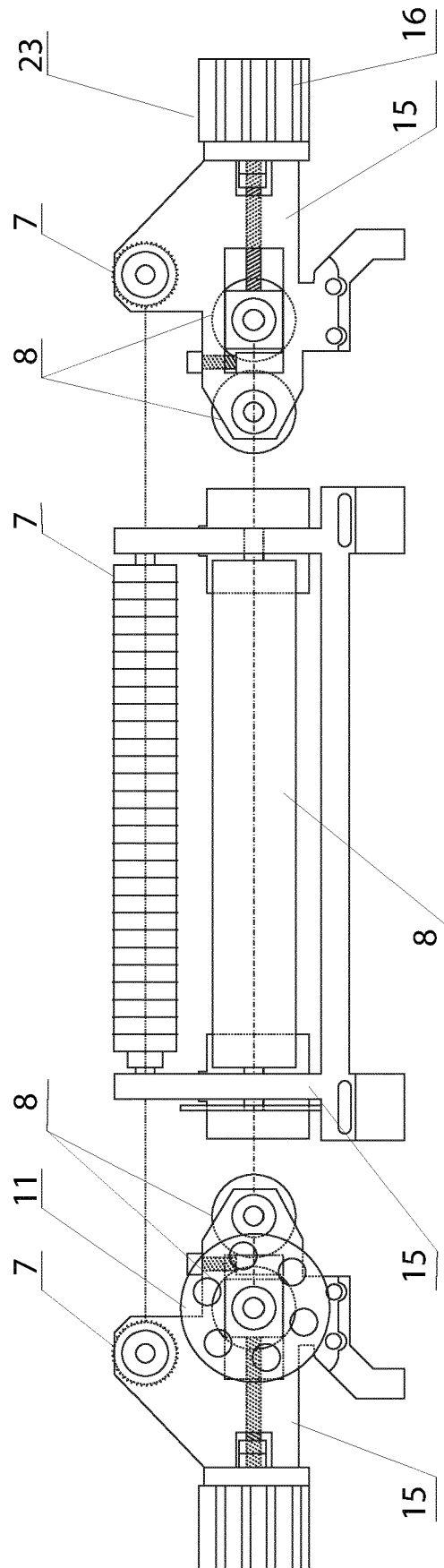
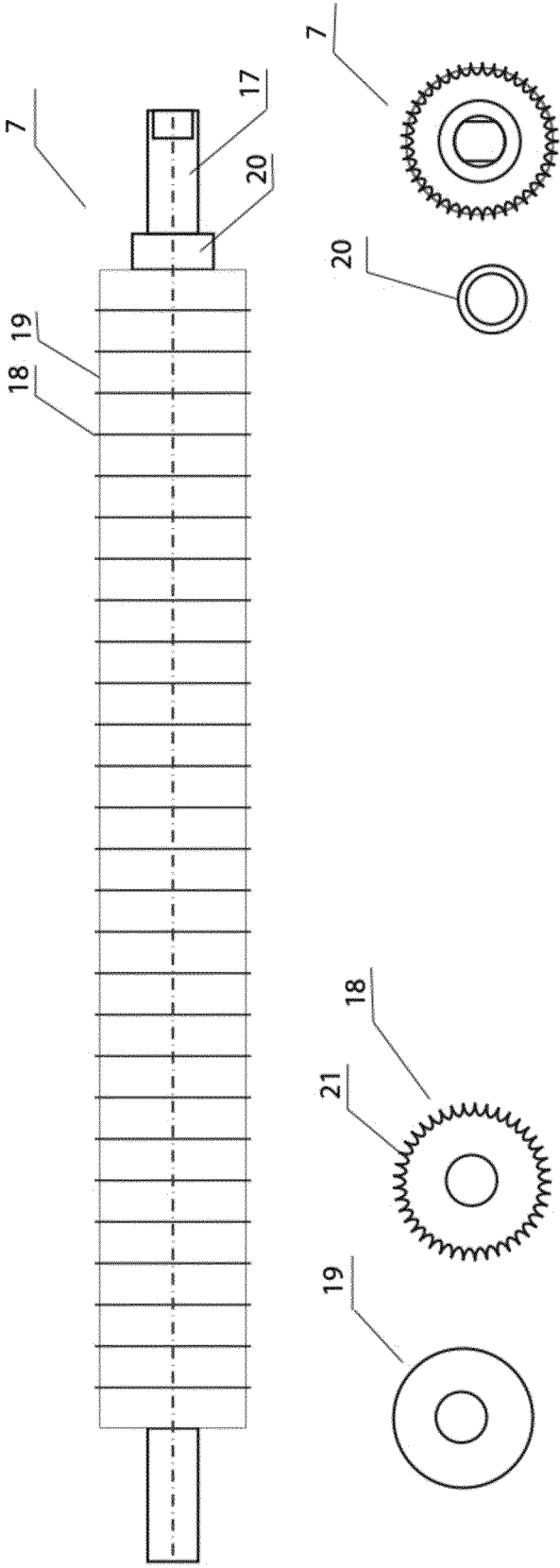


Fig. 2



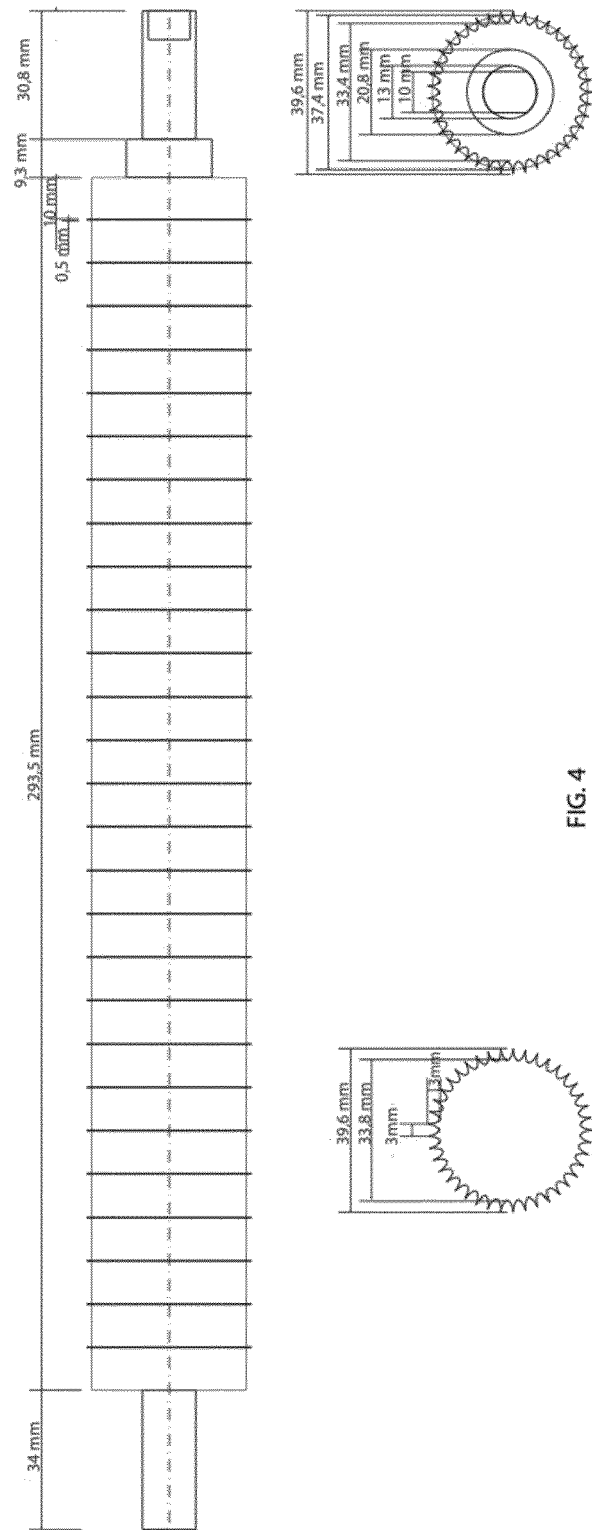


FIG. 4



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 Application Number
 EP 20 18 5387

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Place of search Munich		Date of completion of the search 21 December 2020	Examiner Maier, Michael
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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