

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

**0 447 738 A2**

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: 90830126.0

(51) Int. Cl.<sup>5</sup>: **A46D 1/08**

(22) Date of filing: 29.03.90

(30) Priority: 22.02.90 IT 1944290

(43) Date of publication of application:  
25.09.91 Bulletin 91/39

(84) Designated Contracting States:  
**BE CH DE ES FR GB LI NL SE**

(71) Applicant: **ARCE S.R.L.**  
**Via Corfù, 62**  
**I-25100 Brescia(IT)**

(72) Inventor: **Straziota, Pietro, Arce S.r.l.**  
**Via Corfù, 52**  
**I-25100 Brescia(IT)**

(74) Representative: **Cicogna, Franco**  
**Ufficio Internazionale Brevetti Dott.Prof.**  
**Franco Cicogna Via Visconti di Modrone,**  
**14/A**  
**I-20122 Milano(IT)**

(54) **Apparatus for making rotary-brush bristle assemblies.**

(57) The present invention relates to an apparatus for making rotary-brush bristle assemblies, which comprises, downstream of the bristle yarn extruding assembly, a drawing and guiding assembly, adapted to supply a given number of yarns to a yarn associating assembly, provided for associating the bristle

yarns by means of a thread which is wrapped thereon so as to form a bristle yarn bundle holding a given number of yarns.

Downstream of the yarn bundling assembly there being provided a reeling frame for forming a yarn hank.

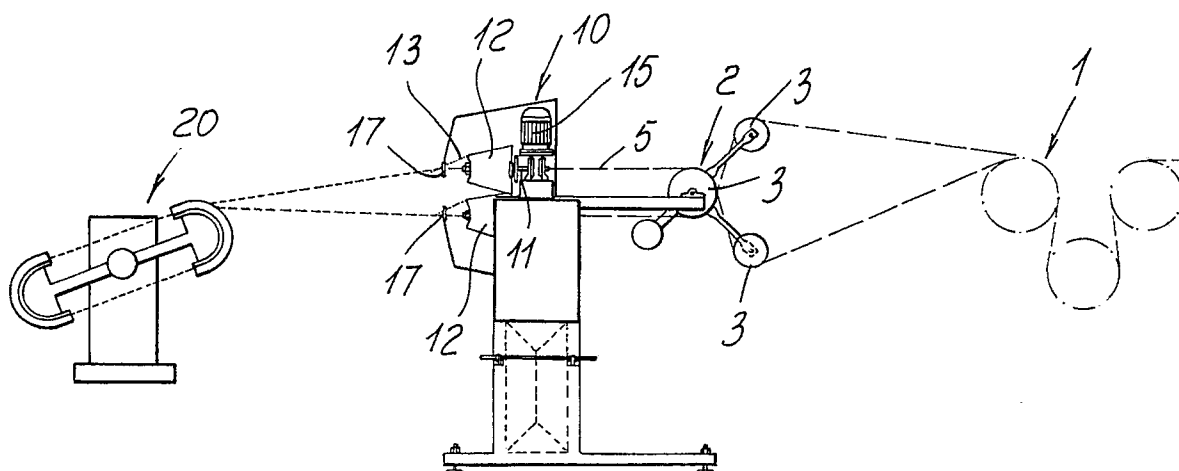


FIG. 1

EP 0 447 738 A2

The present invention relates to an apparatus for making rotary-brush bristle assemblies; according to another aspect thereof, the invention relates to a method for making the mentioned rotary-brush bristle assemblies.

As is known, for making rotary brushes, for example for automatic vehicle washing systems, there are conventionally used bristles which are made starting from plastic material yarns made by extruding methods.

Also known is the fact that during the bristle forming operations there is necessary to extrude elementary yarns which, after several processing steps, that is a drawing processing step, a hank forming processing step, a cutting step and an end portion trimming step, must be manually counted, so as to provide washing brushes having a preset even yarn count.

The requirement of making rotary brushes including bristles formed by a given preset number of bristle yarns is mainly due to the fact that the bristles must be evenly distributed on the brush surface in order to prevent said brush from vibrating as it is turned and in order to provide a perfectly balanced rotary brush.

As it should be apparent, the manually counting operation carried out on the bristle yarns is very expensive since it requires a very long time and a very great amount of labour.

## SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing an apparatus which is adapted to automatically accurately count the bristle yarns.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such an apparatus which can be quickly and easily fitted downstream of the bristle yarn extruding assembly, without the need of performing substantial modifications to this extruding assembly.

Another object of the present invention is to provide such an apparatus which is very reliably and safe in operation and can be easily constructed starting from easily available elements and materials and which, moreover, is very competitive from a mere economic standpoint.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a bristle yarn counting apparatus, for accurately counting the bristle yarn to be used for making rotary-brush bristle assemblies, characterized in that said apparatus comprises, downstream of a bristle yarn extruding assembly, a bristle yarn drawing and guiding assembly adapted to supply with a set

number of bristle yarns a bristle yarn bundling assembly, adapted to associate the bristle yarns with one another by means of an outer wrapped thread so as to form a bristle yarn bundle holding a set number of bristle yarns, downstream of said bristle yarn bundling assembly there being moreover provided a reeling frame adapted to form a bristle yarn hank.

## BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become more apparent from the following detailed description of a preferred, though not exclusive, embodiment of a counting apparatus for making rotary brush bristle assemblies, which is illustrated, by way of an indicative but not limitative example, in the accompanying drawings, where:

Figure 1 is a schematic elevation view illustrating the apparatus according to the invention;

Figure 2 is a top plan view of the apparatus according to the invention;

and

Figure 3 is a schematic view illustrating the bristle yarn bundling assembly.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings, the apparatus for making rotary-brush bristle assemblies according to the invention, comprises, downstream of an extruding assembly, of a substantially known type and which is not shown in the drawings, a conventional bristle yarn drawing assembly, indicated overall at the reference number 1, which supplies with extruded and drawn bristle yarns a guide assembly 2, including a plurality of guiding pulleys 3 which are so arranged as to properly drive a set number of bristle yarns which have been subdivided after the bristle yarn drawing step.

The bristle yarns, indicated at the reference number 5, are then supplied to a bristle yarn bundling assembly, indicated overall at the reference number 10, comprising a guide tube 11 there-through the yarn material is caused to pass, and supporting a binding-thread bobbin 12 of an assembling yarn 13.

The thread bobbin 12 is coupled to an electric motor 15 which, by means of worm screw transmission elements 16 causes said thread bobbin 12 to turn about its axis so that the assembling or binding thread 13 is wrapped about the yarns 5 to provide a yarn bundle containing a set number of yarns.

The assembling thread 13, supplied from the thread bobbin 12, is driven inside an yarn guiding

element 17, into which there is introduced the yarn 5 assembly coaxially supplied to the assembling thread 13 bobbin 12.

Downstream of the bunding assembly, the thus made yarn bundles are wound on a reeling frame, 5 overallly indicated at the reference number 20, which is operated to provide a yarn assembly hank holding a set number of yarn bundles which, in turn, hold a set number of individual yarns.

This hank, which is made with an easily con- 10 trollable turn numbers, is then cut so as to provide a bundle of yarn assemblies which is wrapped in by a tape material so as to provide a stable bundle.

The thus made bundle is then properly cut to 15 given desired lengths.

In this connection it is to be pointed out that, at the end of the yarn trimming operation, the number of yarns included in each yarn assembly will be 20 precisely determined, thereby obviating any needs of manually counting the yarns.

Thus, the invention provides a method in which, by counting the yarns immediately down- 25 stream of the drawing step, it is possible to obtain an end product including an already known yarn count, thereby the bristles can be made according to a pre-set yarn number, so as to provide perfectly balanced rotary brushes.

In this connection, very important is for the inventive method the yarn bundling step which 30 affords the possibility of making yarn assemblies holding a set number of yarns.

From the above disclosure it should be appar- 35 ent that the invention fully achieves the intended aim and objects.

While the invention has been disclosed and 40 illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modifications and variations all of which will come within the scope and spirit of the appended claims.

## Claims

1. A bristle yarn counting apparatus, for accu- 45 rately counting the bristle yarns to be used for making rotary-brush bristle assemblies, characterized in that said apparatus comprises, downstream of a bristle yarn extruding assembly, a bristle yarn drawing and guiding assembly adapted to supply with a set number of 50 bristle yarns a bristle yarn bundling assembly, adapted to associate the bristle yarn with one another by means of an outer wrapped thread so as to form a bristle yarn bundle holding a set number of bristle yarns, downstream of 55 said bristle yarn bundling assembly there being moreover provided a reeling frame adapted to form a bristle yarn hank.
2. An apparatus according to claim 1, characterized in that said bristle yarn bundling assembly comprises a hollow tube into which there are introduced yarn assemblies including a set number of yarns, an assembling thread bobbin adapted to supply an assembling thread being provided coaxially of said hollow tube.
3. An apparatus according to the preceding 10 claims, characterized in that said thread bobbin is rotatively driven on its axis so as to coil-wind said assembling thread about said yarn assemblies.
4. An apparatus according to one or more of the 15 preceding claims, characterized in that said thread bobbin is rotatively driven by an electric motor adapted to rotatively drive an hollow shaft supporting said bobbin.
5. An apparatus according to one or more of the 20 preceding claims, characterized in that said apparatus further comprises a yarn guiding element into which there are introduced said yarn assemblies and assembling thread.
6. A method for making yarn bristles for rotary brushes and the like, characterized in that said 25 method comprises the steps of extruding yarns, drawing said extruded yarns, dividing the drawn extruded yarns so as to provide yarn assemblies holding a set number of yarns, winding about said yarn assemblies an assembling thread, providing a hank from said 30 yarn assemblies, cutting said hank so as to provide a yarn assembly bundle, winding about said cut hank a tape member, cutting to a desired length the yarn assembly bundle and trimming the end portions of said yarns.

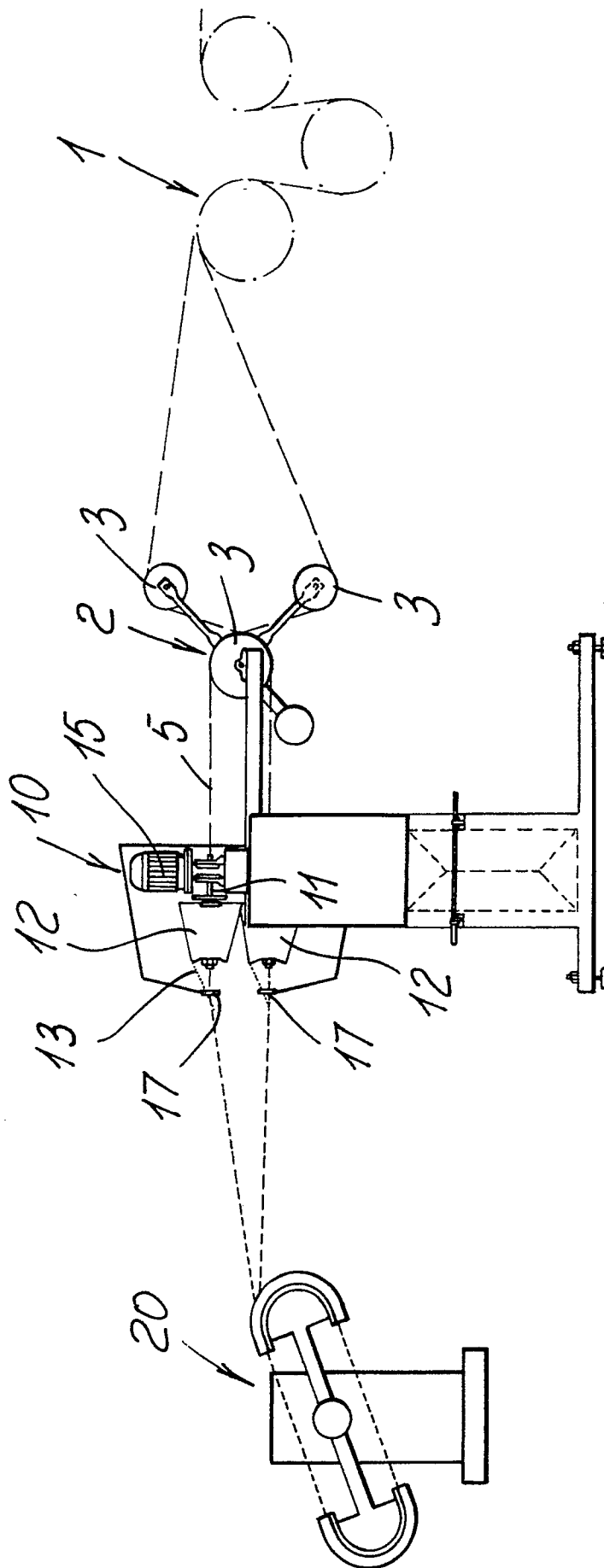


FIG. 1

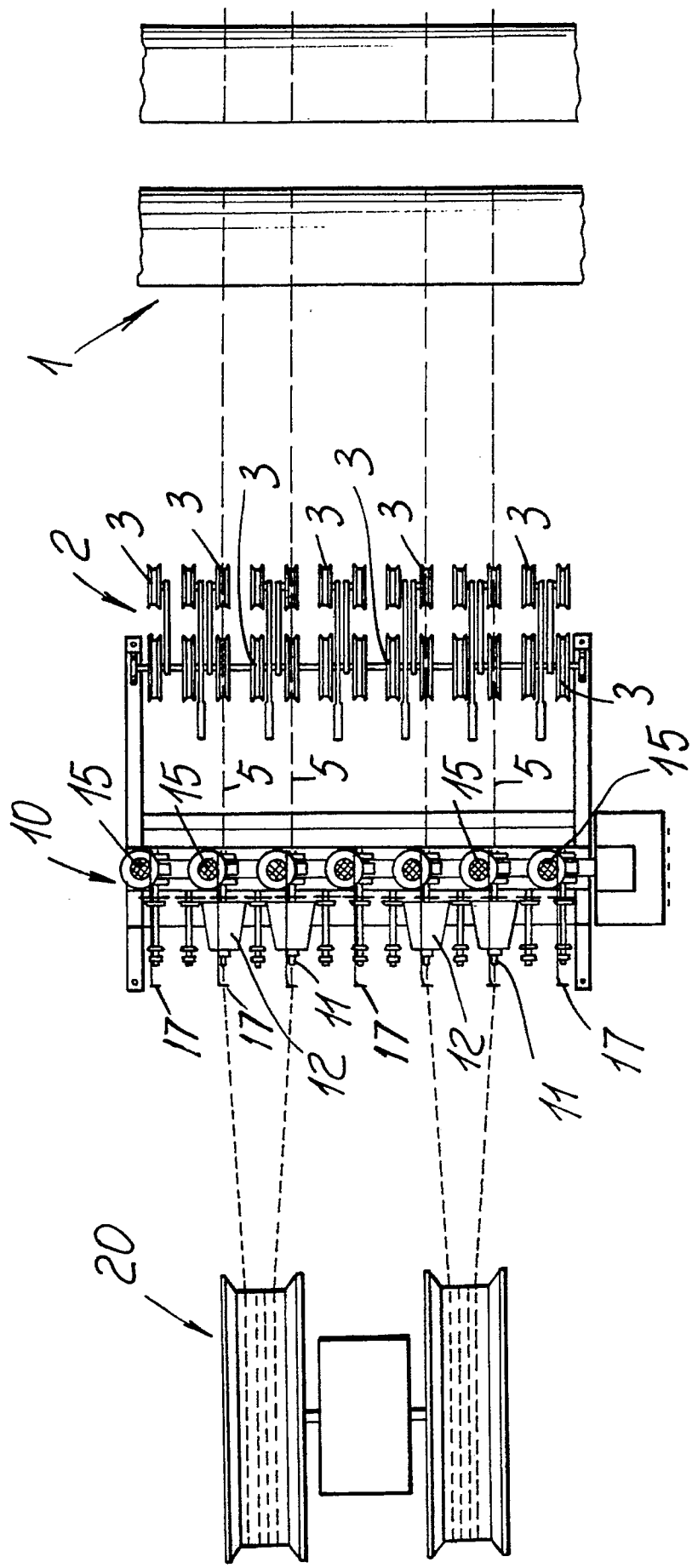


FIG. 2

