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(54) Assembly for nesting tyres or the like and method therefor

(57) The present invention relates to an assembly for nesting tyres or the like, comprising:

- positioning means for positioning at least one first tyre;
- compressing means for compressing at least one second tyre; and
- placing means for placing the thus compressed second tyre in the positioned first tyre, so that the second tyre nests in the first tyre.

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Description

The present invention relates to an assembly for nesting tyres or the like and a method therefor.

Businesses have been built up wherein used tyres are collected and transported to other parts of the world, such as countries in South America and Africa, where these tyres are then fitted again on vehicles for further use. Often in these countries tyres do not have to comply with strict legal requirements, which means that it is not illegal to drive on these used tyres.

At present, these used tyres are collected and loaded in containers for transport. In order to increase the number of tyres which can be loaded in a container, tyres can be nested into each other, a process which at the moment is carried out manually. Problems associated herewith are that this is physically demanding, wasteful of energy, time-consuming and inefficient.

An object of the present invention is to obviate at least one of these problems.

According to a first aspect of the present invention an assembly is provided for nesting tyres or the like, comprising positioning means for positioning at least one first tyre, compressing means for compressing at least one second tyre and placing means for placing the thus compressed second tyre inside the positioned first tyre, so that the second tyre nests in the first tyre.

Since the assembly according to the present invention automatically places one tyre into the other, the problems of nesting tyres manually are thus obviated.

According to a second aspect of the present invention a method is provided for automatically nesting tyres or the like, which is performed by the above stated assembly, wherein the method comprises the steps of positioning at least one first tyre in a desired position; exerting compression force on at least one second tyre in order to compress same; and placing the thus compressed second tyre into the first tyre, so that the second tyre nests in the first tyre, whereafter this method can be repeated to nest further tyres inside the nested first and second tyre or for a further first and second tyre.

According to a third aspect of the present invention a device is provided for automatically positioning and pulling apart at least one tyre, comprising positioning means for positioning the tyre and pulling apart means for pulling apart the tyre.

According to a fourth aspect of the present invention an automatic method is provided for positioning and pulling apart at least one tyre which is performed by the above stated device, comprising the steps of positioning at least one tyre in a desired position, whereafter this tyre is pulled apart.

According to a fifth aspect of the present invention a device is provided for compressing at least one tyre, wherein this device comprises at least one pointed compressing element and at least one rounded compressing element.

According to a sixth aspect of the present invention an automatic method is provided for compressing at least one tyre, comprising the steps of compressing a tyre, wherein this process is performed by the above stated compressing device.

Further details, features and advantages of the present invention follow in the form of a non-limiting description in which reference is made to the annexed figures, in which:

figure 1 shows a perspective view of a preferred embodiment of the assembly according to the present invention;
figure 2 shows a partly broken away front view in perspective of the assembly of figure 1;
figures 3-10 show broken away exploded front views in perspective of parts of the assembly of figures 1 and 2, wherein the operation of the assembly is shown schematically.

An assembly 1 (figure 1) according to the present invention preferably has transport means, preferably in the form of a first conveyer belt 2 for transporting to the interior of the assembly tyres in which other tyres have to be nested, which assembly 1 preferably stands inside a housing 3.

A pneumatic press 4 is mounted on top of the assembly 1 (see figures 1-10). The assembly 1 preferably has an access 5 through which tyres which have to be compressed can be introduced into the assembly 1. This access 5 is preferably provided with a displaceable safety fence (not shown).

Access to the assembly 1 is preferably made possible through a door 6 arranged in the housing 3.

When a tyre A is placed on conveyer belt 2, tyre A is transported inside the assembly and up to the positioning means, which are preferably formed by a bench element 7 (see figures 2-10), at which position conveyer belt 2 receives a signal to stop.

Once the tyre A has been placed on bench element 7, the latter is automatically displaced upward, preferably via a pneumatic piston arm. During displacement this bench element 7 is preferably stabilized by rods 9 arranged in the assembly which are situated close to the corners of bench element 7. This combination of the pneumatic piston arm 8 and the rods 9 enables a smooth upward and downward movement of bench element 7.

Two lower pulling apart members 10 are mounted on bench element 7. When the tyre A lies on bench element 7 the lips 11 of the lower pulling apart members 10 fit over the inner edge of the tyre A (see figures 2-4).

The tyre A is then carried upward via bench element 7 until the upper pulling apart members 12 pass into the tyre opposite the lower pulling apart members 10 (see figure 4).

The lower pulling apart members 10 are then moved apart from their rest position by pneumatically controllable rods 13 (figure 5) until the lips 11 of the

lower pulling apart members engage the inside of tyre A. At the same time the upper pulling apart members 12 are displaced pneumatically so that they come to lie in line with an opening 14 in an upper platform 15 of assembly 1. In this position the lips 16 of the upper pulling apart members 12 also push against the inside of the tyre A (see figure 5).

The bench element 7 is then carried slightly downward so that the lips 11 of lower pulling apart members 10 and the lips 16 of upper pulling apart members 12 push against the interior side of tyre A, whereby this is pulled apart and held fast (see figure 6).

A second tyre B which has been introduced into the assembly via the access 5 so as to lie above the opening 14 in upper platform 15 (see figure 7) is enclosed in this position by four pointed compressing elements 17 and four rounded compressing elements 18 (see figures 2 and 7). The pointed compressing elements 17 are pressed first into the tyre B (see figure 8). The rounded compressing elements 18 are subsequently pressed inward so that the tyre B assumes a form and size as shown in figure 9 which enables the tyre to pass through opening 14.

The compressing element 17 respectively 18 is preferably operated by pneumatic rods 20 respectively 21.

The shape of the compressing elements 17 respectively 18 and the sequence in which these are pressed together was developed after extensive research in order to ensure that the flipping out of position of a tyre during compression is minimized (see figure 8).

The compressed tyre B is subsequently placed in the tyre A which has been pulled apart by pushing tyre B with force through the opening 14, this being performed by the press 4. Since the compressing elements 17 respectively 18 moved toward each other and the upper pulling apart members 12 form a sort of passage, the compressed tyre B does not spring out of its compressed shape until it has been placed inside the tyre A, i.e. after tyre B has been pressed past the lips 16 of upper pulling apart members 12. In this position the tyre B springs out of its compressed shape, so that it nests inside the tyre A which has been pulled apart. The press 4 preferably remains in its lowered position (as shown in figure 10) for at least one second, so that the compressed tyre B can nest inside the pulled apart tyre A without the compressed tyre B springing in upward direction and thereby possibly causing complications in the nesting thereof.

Prior to the actual compressing of a tyre, the compressing elements 18 respectively 19 are preferably sprayed, preferably with water, in order to facilitate forcing of compressed tyres into the pulled apart tyres, for instance in unfavorable weather conditions.

The bench element 7 is thereafter moved upward to support the now nested tyres A and B, whereafter the pulling apart members 10 respectively 11 are retracted to their rest positions.

The bench element 7 is then carried downward, whereafter the nested tyres are transported out of the assembly 1, preferably by a second conveyer belt 19 (see figure 2).

The assembly according to the present invention is very suitable for placing smaller tyres of for instance thirteen inches inside larger tyres of for instance fourteen inches. Using the assembly according to the present invention approximately 300 tyres per hour can be placed inside other tyres, while it takes a single employee about five days to place 250 tyres inside other tyres. A container can thus be loaded more quickly with more tyres with use of an assembly according to the present invention than in the case of nested tyres which have to be nested manually beforehand.

It is also possible with an assembly according to the present invention to place a third tyre inside the now nested first and second tyre. In this case, after two tyres have been nested, the now "doubled tyres" are pulled apart and a compressed third tyre is placed therein.

The operation of the assembly according to the present invention is preferably controlled by a computer in order to facilitate the process of/for nesting tyres.

Claims

1. Assembly for nesting tyres or the like, comprising:

   - positioning means for positioning at least one first tyre;
   - compressing means for compressing at least one second tyre; and
   - placing means for placing the thus compressed second tyre in the positioned first tyre so that the second tyre nests in the first tyre.

2. Assembly as claimed in claim 1, wherein the positioning means are formed by at least one displaceable bench element.

3. Assembly as claimed in claims 1 and 2, wherein the compressing means are formed by at least one pointed compressing element and at least one rounded compressing element.

4. Assembly as claimed in any of the foregoing claims, wherein the placing means are formed by at least one pneumatic press.

5. Method for automatically nesting tyres or the like, comprising the steps of positioning at least one first tyre in a desired position, exerting compression force on at least one second tyre in order to compress said tyre, and placing the thus compressed second tyre in the first tyre, so that the second tyre nests in the first tyre.

6. Method as claimed in claim 5, comprising the further steps of positioning the nested first and second

tyre, exerting compression force on at least one further tyre in order to compress said tyre, and placing the thus compressed further tyre in the nested first and second tyre, so that the further tyre nests in the nested first and second tyre.

7. Assembly as claimed in claims 1-4 for performing a method as according to claims 5 and 6.

8. Device for automatically positioning and pulling apart at least one tyre, comprising positioning means for positioning the tyre and pulling apart means for pulling apart the tyre.

9. Method for automatically positioning and pulling apart at least one tyre which is performed by the device as claimed in claim 8, wherein the method comprises the steps of positioning at least one tyre in a desired position, whereafter this tyre is pulled apart.

10. Device for compressing at least one tyre, comprising at least one pointed compressing element and at least one rounded compressing element.

11. Method for automatically compressing at least one tyre, wherein this process is performed by the device as claimed in claim 10.

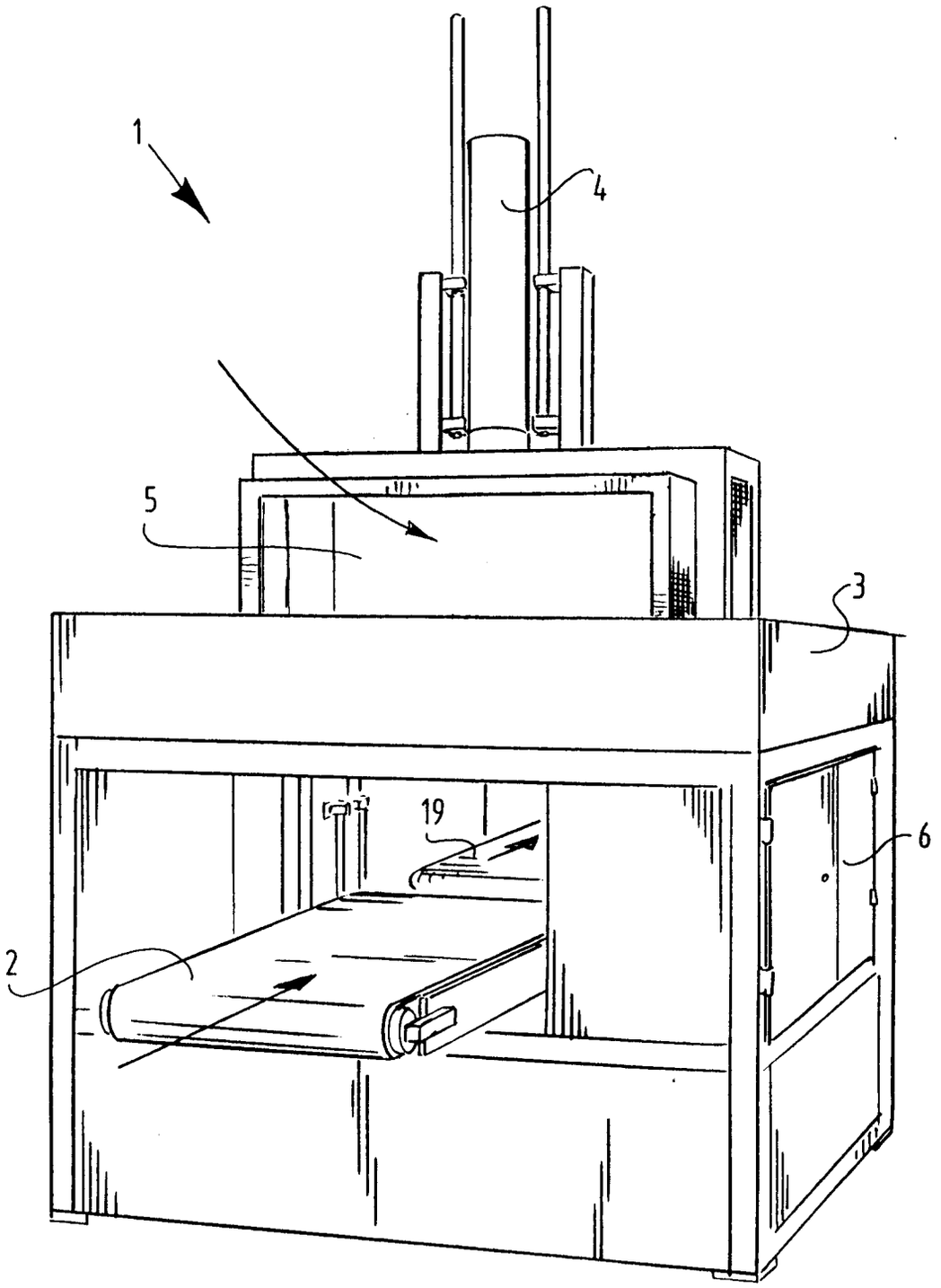

FIG.1

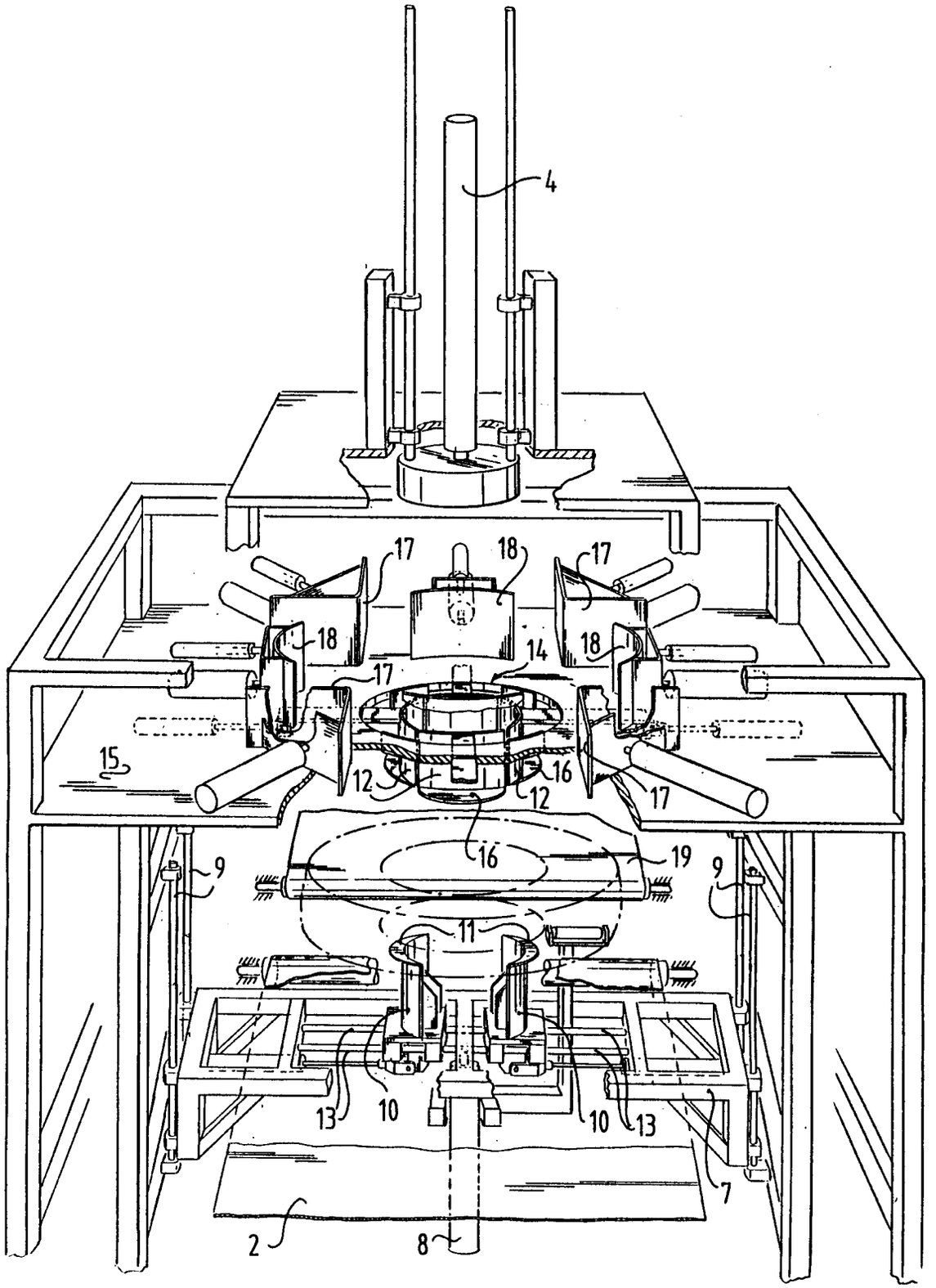

FIG.2

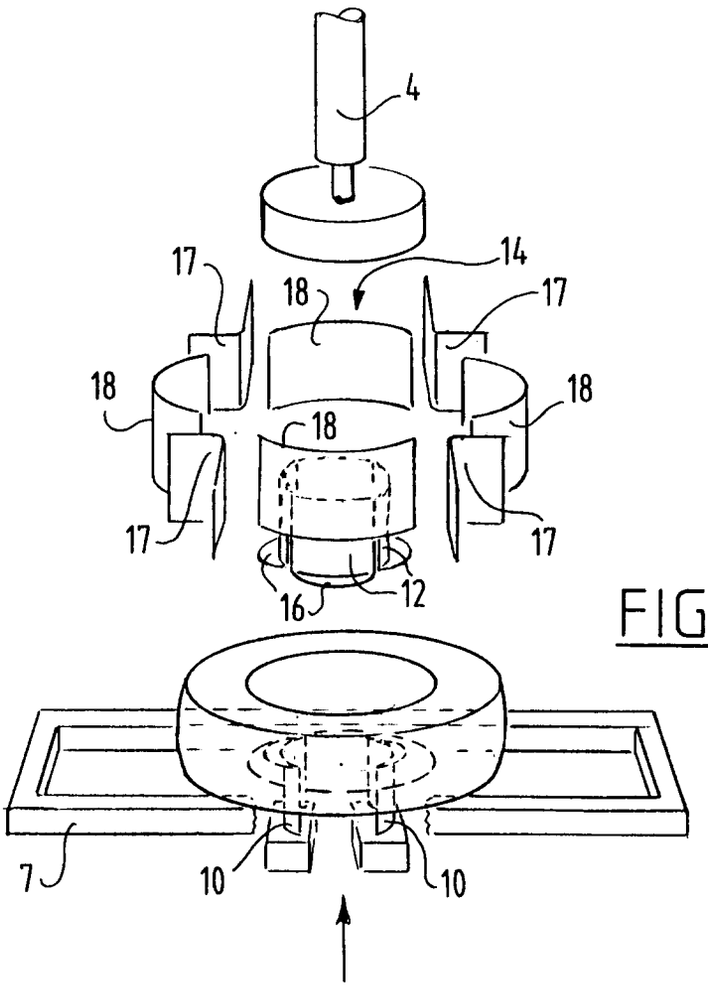
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FIG.3

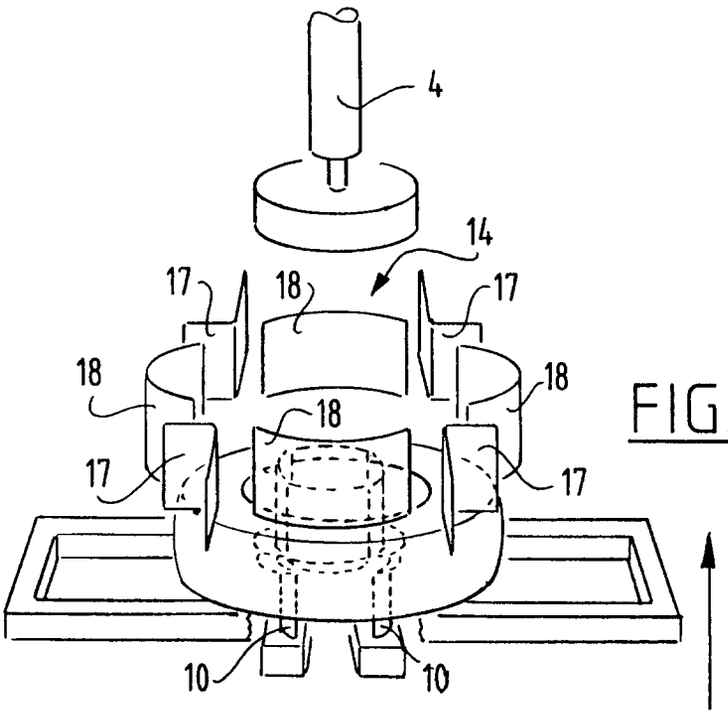
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FIG.4

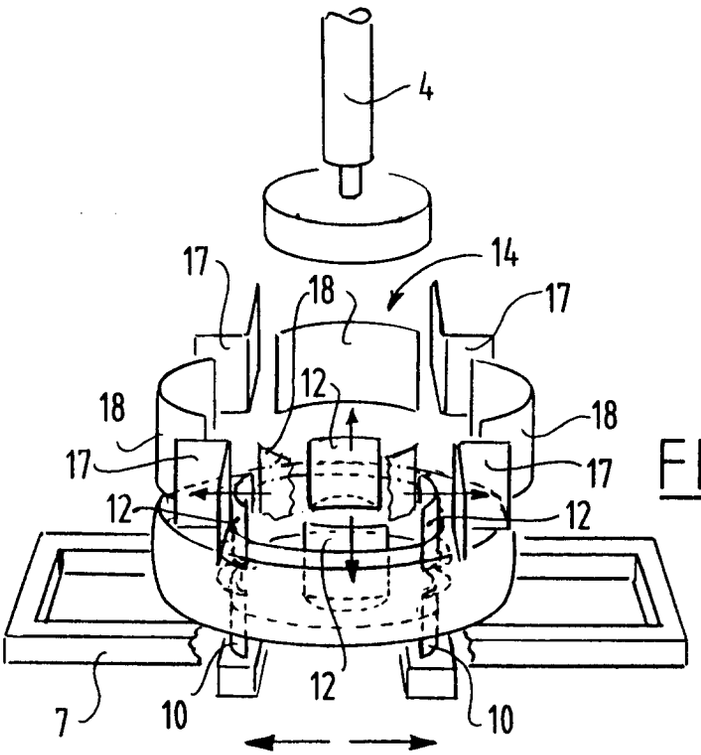
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FIG.5

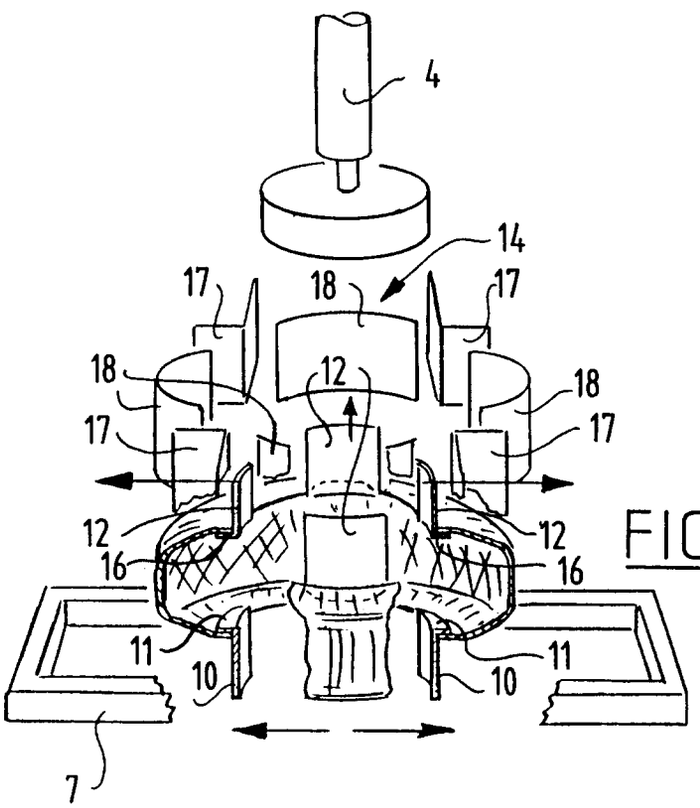
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FIG.6

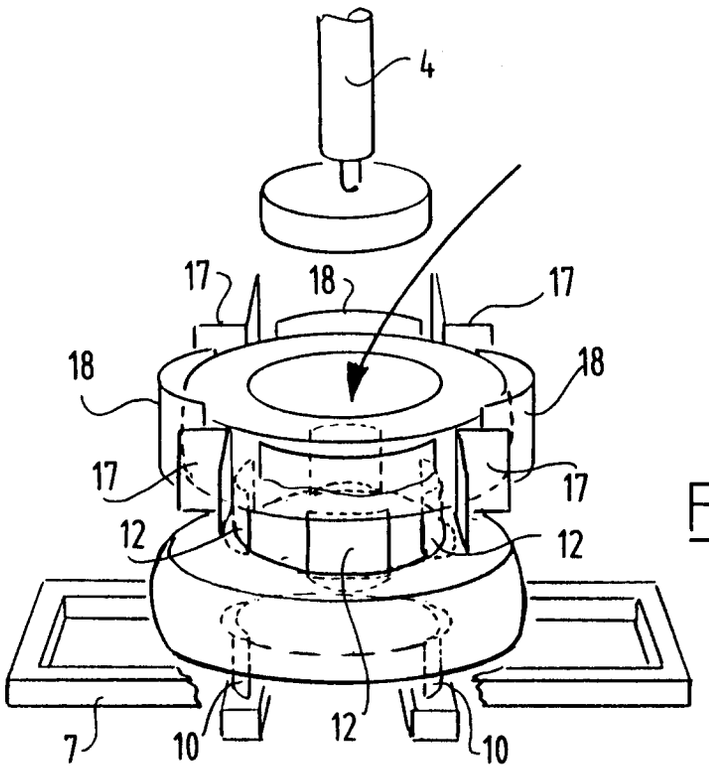
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FIG.7

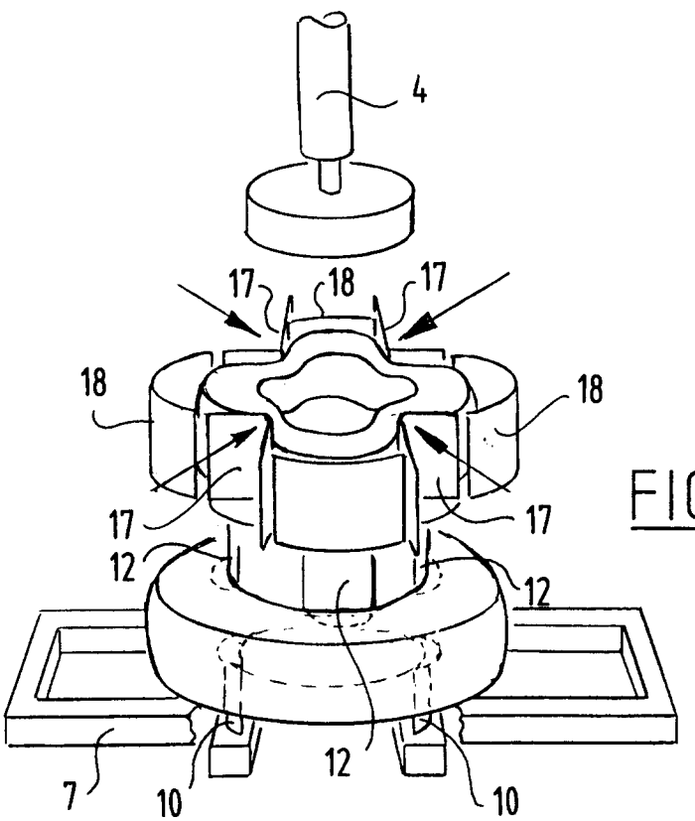
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FIG.8

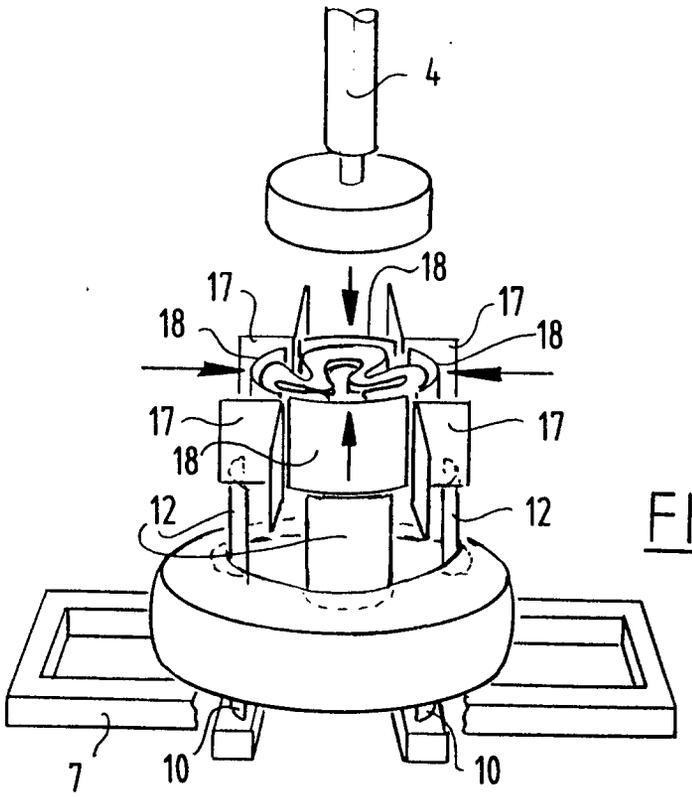
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FIG.9

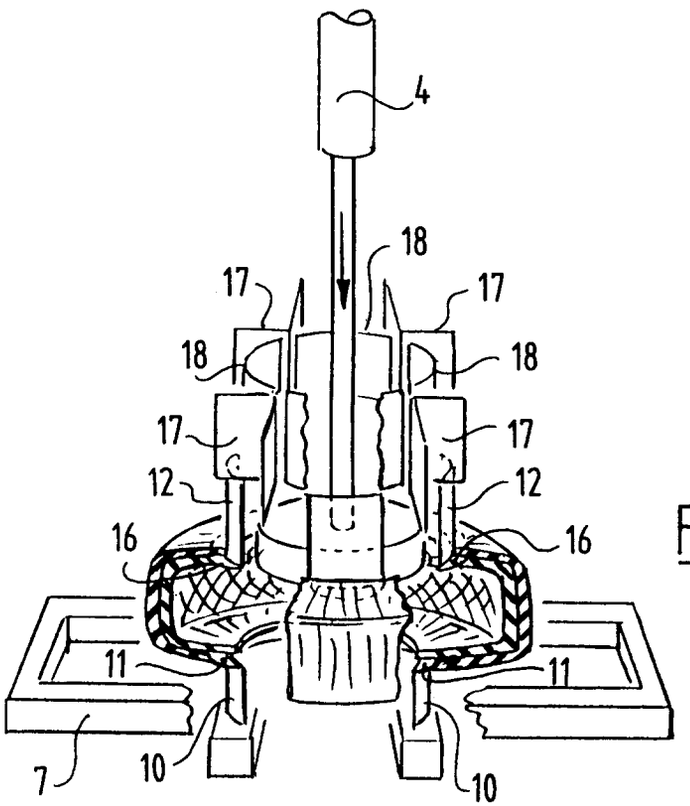
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FIG.10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 20 0185

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB-A-299 376 (DUNLOP) 24 October 1928 * claim 1; figure 1 * ---	1,5,8,10	B65B25/24
A	US-A-3 606 725 (DUGAN) 11 May 1971 * the whole document * -----	1,5,8	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B
B30B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 April 1996	Claeys, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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