

Drum-shaped scanning unit for a recording and/or reproducing apparatus and method for mounting a transformer disc of two-part ring transformer. 

The invention relates to a drum-shaped scanning unit for a recording and/or reproducing apparatus, around whose circumferential surface a record-carrier in the form of a tape can be wrapped over a predetermined angle and which comprises at least one stationary drum section, a coaxial rotatable drum section, and a two-part rotary transformer comprising two transformer discs which are made of a ferrite material, which carry at least one transformer winding, and which are arranged coaxially on the rotatable drum section and on the facing stationary drum section respectively with a clearance between their major disc surfaces, at least one of the two drum sections being formed with at least three angularly spaced axially parallel bores, in each of which a supporting element for the relevant transformer disc, to which said element is connected, is mounted.

Such a scanning unit is used in apparatuses for recording and/or reproducing video signals, which are commercially available under the type number VR 2220. In such scanning units the manner in which the transformer discs are arranged on the drum sections poses a special problem, because the spacing between the facing major disc surfaces of the two transformer discs should be very small, of the order of magnitude of 0.05 mm, in order to ensure an optimum signal-transfer efficiency. Moreover, care must be taken to avoid impermissible changes in the spacing between the two transformer discs as a result of varying operating conditions and aging. Tolerances also play an essential part, because the transformer discs are made of a ferrite material which, as is known, may exhibit comparatively large tolerances when formed into a component. Until now the transformer discs were mounted onto the drum sections by means of an adhesive, but this is a rather intricate method, which also gives rise to stability problems. For mounting a transformer disc on a drum section of the afore-mentioned known scanning unit the supporting elements are constructed as cylindrical pins which are cemented to the transformer disc with one of their ends and which are inserted into bores in the drum section with their free ends, after

which they are cemented inside the bores with their circumferential surfaces, which demands several cementing operations.

It is the object of the invention to construct a scanning unit of the type specified in the opening paragraph in such a way that
5 the rotary transformer can be mounted very accurately and simply on the drum sections of the scanning unit and the resulting connection is also stable. In accordance with the invention this object is achieved in that the supporting elements are constructed as pot-shaped sleeves of a weldable material, which are open at one of their ends and which are
10 closed at their other ends with which they project from the drum section, the transformer disc is provided with mounting surfaces which correspond to the closed ends of the sleeves on the drum section and which are constituted by at least one mounting element of a weldable material arranged on the transformer disc, and the closed ends of the
15 sleeves are welded to the corresponding mounting surfaces. In this way a transformer disc can first be positioned correctly relative to a drum section, after which it is welded to said drum section, so that tolerances can be eliminated and a high accuracy is attainable. Further the process of making such a connection is easy to control during
20 manufacture and the resulting connection is not affected by varying operating conditions and aging. Welding may be effected by means of any known welding technique.

It is found to be very simple if the mounting surfaces are formed by an annular mounting element arranged on the transformer
25 disc. In this way only one part has to be secured to the transformer disc, for example by means of an adhesive.

However, it is also found to be advantageous if each mounting surface is formed by a separate disc-shaped mounting element arranged on the transformer disc. This enables the positions of the
30 individual mounting elements to be chosen in conformity with the desired arrangement of the sleeves on the drum section.

The sleeves may be arranged on the drum section in several manners. For example, the sleeves may be pressed into or cemented in the bores in the drum section or they may be soldered or
35 welded to the drum section. However, it is found to be very advantageous if the sleeves comprise collars at their open ends and are inserted loosely into the bores in the drum section, so that the collars rest on

one side of the drum section, and at the locations where the sleeves project from the drum section the sleeves are provided with circumferential ridges, which bear against the other side of the drum section to secure the sleeves to the drum section. In this way the sleeves are mounted on the drum section in a very stable manner without the use of additional means. Further, as the circumferential ridges are formed, it is possible to compensate for differences in height by means of the sleeves which project from the drum section, so that an even more accurate mounting of a transformer disc on a drum section is possible.

The circumferential ridge may be formed in various manners. For example, the entire portion of the sleeve which projects from the drum section may be deformed to become mushroom-shaped, so that it is urged against the radial drum surface. This is possible if the sleeve has a uniformly and comparatively thin wall and its closed end portion is semispherical. However, it is found to be particularly advantageous if in comparison with the other wall portions the circumferential walls of the portions of the sleeves which project from the drum section are thickened towards the interior. This ensures that the circumferential ridge is formed only on that portion of the sleeve which directly adjoins the drum section and that the deformed material fits tightly against the radial surface of the drum section and thus firmly secures the sleeve to the drum section. Such a deformation can readily be carried out and is well reproducible during manufacture.

The invention also relates to a method of mounting a transformer disc of a two-part rotary transformer on a drum section of a drum-shaped scanning unit. As stated in the foregoing, the known method employs adhesives for this purpose, but this is found to be laborious and difficult during manufacture. Adhesive joints are often subject to changes due to ageing and varying operating conditions.

In order to preclude these problems the following steps are provided in a method in accordance with the invention characterized in that

- a) at least three pot-shaped sleeves of a weldable material which are open at one end are mounted in angularly spaced axially parallel bores in the drum section, in such a way that the closed ends of the sleeves project from that side of the drum section which should adjoin the transformer disc,

- b) the transformer disc is provided with at least one mounting element made of a weldable material to form mounting surfaces corresponding to the closed ends of the sleeves on the drum section,
- c) the drum section and the transformer disc are placed in a device, in which the closed ends of the sleeves are situated opposite and are spaced with a clearance from the corresponding mounting surfaces on the transformer disc, and
- d) the closed ends of the sleeves are welded to the mounting surfaces by means of laser beams which are projected into the sleeves through their open ends. This results in a simple process, which is particularly suitable for the series manufacture of large quantities. Moreover, the laser-welding process provides reliable and stable welds in a simple manner, and owing to the use of the narrow laser beams no problems occur even if the sleeves have relatively small dimensions.
- Moreover, central welds are formed, which have a particularly low shrinkage, which is very important in view of the desired high accuracy with which a transformer disc should be mounted on a drum section.

It is found to be very advantageous if after steps a) and b) of the method have been carried out the transformer disc is placed in a measuring device to measure the heights, relative to a reference plane, of the individual mounting surfaces corresponding to the closed ends of the sleeves, and the drum section is placed in a device in which the heights of the individual sleeves projecting from said drum section, in a manner corresponding to the measured heights of the individual mounting surfaces on the transformer disc, are reduced to a nominal dimension relative to a reference plane, which nominal dimension has been adapted arithmetically to said measured height of each corresponding mounting surface, after which steps c) and d) are carried out. In this way a transformer disc can be mounted very accurately on a drum section, so that the two transformer discs of a rotary transformer can be arranged at a very small distance opposite each other with their major disc surfaces, which ensures a very good signal transfer. Moreover, this ensures that the distances between the closed ends of the sleeves and the associated mounting surfaces on the transformer disc are always equal, so that by welding the closed ends to the mounting surfaces very stable and reproducible joints are obtained. Moreover, the individual steps of such a method can be fully automated.

An embodiment of the invention and a preferred method in accordance with the invention will now be described in more detail, by way of example, with reference to the accompanying drawings.

Figure 1 is a partly sectional view of a scanning unit for a recording and/or reproducing apparatus in which the two transformer discs of a rotary transformer are mounted on the two drum sections of the scanning unit by means of sleeves.

Figure 2 is an enlarged-scale sectional view showing one of the points where a transformer disc is secured to a drum section of the embodiment shown in Figure 1.

Figure 3 shows a transformer disc and a drum section placed in a device in which they are positioned relative to each other and in which they are secured to each other by laser-beam welding.

Figure 4 shows schematically how the heights of the mounting surfaces on a transformer disc are measured and the sleeves on a drum section are deformed to a nominal dimension which has been adapted to these measured heights by computation.

Figure 1 shows a drum-shaped scanning unit for an apparatus for recording and/or reproducing video signals on/from a record-carrier tape, which unit comprises a stationary drum section 1 and a rotatable drum section 2 which is coaxial with this stationary drum section. These drum sections 1 and 2 comprise a central disc-shaped portion 3 and 4 respectively, which adjoins a circumferential cylindrical portion 5 and 6 respectively, the circumferential surfaces of the two drum sections together constituting the circumferential surface of the scanning unit around which a record carrier tape can be wrapped along a helical path over a predetermined angle. The record carrier runs partly over the circumferential surface of the stationary drum section 1 and partly over that of the rotatable drum section 2, a stepped portion 7 on the drum section 1 ensuring that both edges of the record carrier are guided exactly. In Figure 1 a part of such a record carrier 8 is shown schematically in dotted lines.

A motor 9 is mounted on the stationary drum section 1 and has a drive shaft 10 on which the drum section 2 is mounted with a hub 11, so that it can be rotated by the motor 9. The position of the drum section 2 on the shaft 10 is such that the bounding surface 12 of the drum wall 6 which faces the drum section 1 is situated at a distance a

from the bounding surface 13 of the drum wall 5 of the drum section 1, so that between the two drum sections 1 and 2 a gap is formed which has a width, for example, of the order of magnitude of 0.1 mm. This gap allows scanning elements, for example magnetic heads, not shown, which are arranged on the rotatable drum section 2, to cooperate with a record carrier 8, thereby scanning the record carrier along contiguous oblique tracks in order to record or reproduce signals.

For applying the signals to be recorded to the scanning elements which rotate with the drum section 2 and for taking off the signals reproduced by the scanning elements during reproduction, and also for transferring other control signals to the rotating drum section 2, there is provided, as is customary, a two-part rotary transformer 14 comprising two transformer discs 15 and 16 of a ferrite material. The transformer disc 15 is connected to the drum section 1 and the transformer disc 16 to the drum section 2, the drive shaft 10 of the motor 9 extending through central openings in the two transformer discs 15 and 16. The two transformer discs 15 and 16 are each arranged in such a way that two of their major disc surfaces 17 and 18 are situated at a distance b opposite each other. The two transformer discs 15 and 16 have annular grooves in their facing surfaces to accommodate transformer windings, the facing transformer windings cooperating with each other for the transfer of signals; in the present example it is assumed that, for example, two signals should be transferred. In order to ensure that the signals are transferred with a high efficiency by means of such a rotary transformer 14 the distance b between the two major disc surfaces 17 and 18 of the two drum sections 15 and 16 should be minimal, for example of the order of magnitude of 0.05 mm, or preferably even smaller. However, this means that the transformer discs should be mounted on the drum sections with a maximal accuracy in order to ensure that the desired small distance between the two major disc surfaces 17 and 18 of the two drum sections 15 and 16 is obtained after the two drum sections have been assembled to form the scanning unit, which must also be effected with a maximal accuracy. The transformer discs should be mounted on the drum sections in a very stable manner in order to ensure that during operation the position of the two transformer discs relative to each other is maintained and, consequently, the small distance between the major disc surfaces 17 and 18 cannot change to an

impermissible extent.

How a transformer disc is mounted on a drum section in accordance with the invention will be described hereinafter for the transformer disc 16 and the drum section 2. The transformer disc 15 can be mounted on the drum section 1 in a similar way, but it is not strictly necessary to mount the two transformer discs on the associated drum sections in the same way. The transformer disc 16 is mounted on the drum section 2 by means of four supporting elements, of which one element is shown in Figure 1, which elements are angularly spaced on the drum section 2. Each element, see also Figure 2, is constructed as an initially externally cylindrical sleeve 21 of a weldable material, which is open at one end and closed at the other end. At its open end each sleeve 21 has a collar 22. The sleeves are inserted into angularly spaced axially parallel bores 23 in the drum section 2 in such a way that their collars 22 rest on one side of the drum section and their closed ends 24 project from that side of the drum section 2 where the transformer disc 16 is to be mounted. The sleeves 21 thus mounted in the drum section are formed with a circumferential ridge 25 at the location where they project from the drum section, which ridge bears against that side of the drum section which is remote from the collar 22. When the collar 22 is in the correct position such a ridge is formed by exerting pressure on the sleeve from the closed end 24. In this way each of the sleeves 21 is clamped in the drum section 2 by the cooperation of its collar 22 and its ridge 25 with this drum section. At the location of the portion 26 which projects from the drum section the circumferential wall of each sleeve 21 is thickened at the inside in comparison with the remainder of this wall, which ensures that the ridge 25 is formed only at the location where the sleeve directly adjoins the drum section and that the deformed material fits tightly against the radial surface of the drum section and thereby firmly secures the sleeve to the drum section. The cooperation with the ridges 25 can be improved further by bevelling the relevant edges of the bores 23.

The transformer disc 16 is provided with mounting surfaces 27, which correspond to the closed ends 24 of the sleeves 21 and which in the present embodiment are each formed by a mounting element 28 of a weldable material arranged on the transformer disc; in the present example the mounting elements 28 are disc-shaped but they

may, for example, also be cup-shaped. These mounting elements may be secured to the transformer disc by means of an adhesive or in another manner, for example by embedding them in the ferrite material of the transformer disc during sintering.

5 By means of a device, in which the transformer disc 16 provided with the mounting elements 28 and the drum section 2 provided with the sleeves 21 are placed, the transformer disc and the drum section are brought into the desired position relative to each other, in which the mounting surfaces 27 of the elements 28 are disposed correctly
10 opposite the closed ends 24 of the sleeves 21. In this position of the transformer disc 16 relative to the drum section 2 the closed ends 24 of the sleeves 21 are welded to the mounting surfaces 27 of the mounting elements 28, as is indicated by the weld 29 in Figure 2. Such a welding operation, for which any known welding method may be employed, for
15 example electrical resistance welding, results in reliable and stable welds between the closed ends 24 of the sleeves 21 and the mounting elements 28, so that the transformer disc 16 is secured to the drum section 2 exactly in the correct position.

It is found to be very advantageous if the transformer
20 disc 16 with the mounting elements 28 and the drum section 2 with the sleeves 21 are placed in a device which is constructed in such a way that the closed ends 24 of the sleeves 21 are situated opposite and are spaced from the corresponding mounting surfaces 27 of the mounting elements 28 on the transformer disc 16, after which the closed ends 24
25 of the sleeves 21 are welded to the mounting surfaces 27 of the elements 28 by means of laser beams which are projected into the sleeves through their open ends. Figure 3 schematically shows such a device 30. The device is disc-shaped and comprises a first step 32 for positioning the transformer disc 2, the transformer disc and the drum section being
30 positioned in the device in such a way that the mounting surfaces 27 of elements 28 on the transformer disc are positioned opposite the closed ends 24 of the sleeves 21 on the drum section. In the device 30, which also defines the correct coaxial position of the transformer disc relative to the drum section, the steps 31 and 32 are situated at such
35 a level relative to each other that the mounting surfaces 27 and the closed ends 24 are spaced from each other. As a result of this, the position of the transformer disc and the drum section relative to each

other can be defined very accurately, because this eliminates possible axial tolerances. The schematically shown laser-beam sources 33 then project laser beams into the sleeves through their open ends, which beams impinge on the bottoms 24 of the sleeves and thereby weld the closed ends 24 to the mounting faces 27 of the mounting elements 28, so that the gaps between them are bridged, as is shown in Figure 2. Suitably, the closed ends 24 of all the sleeves 21 are welded to the associated mounting surfaces 27 of the elements 28 at the same time, so that the desired position of the transformer disc 16 relative to the drum section 2 is maintained accurately and no stresses are produced. The clearances between the closed ends 24 of the sleeves 21 and the mounting surfaces 27 of the elements 28 depend inter alia on the materials to be welded to each other and the thickness of the end walls 24 of the sleeves 21 and may range between some thousandths and some tenths of millimetres. Suitable materials for the sleeves 21 and the mounting elements 28 are copper-nickel alloys, but the two parts need not necessarily be made of the same material. It is found that the welds formed by means of laser beams are particularly reliable and stable, the shrinkage during welding being minimal because the welds are situated in the centres of the closed ends of the sleeves, which is also important in order to obtain the required high accuracy. Thus, the manner in which the welds are made ensures a very accurate position of the transformer disc 16 relative to the drum section 2.

Such a method of mounting a transformer disc on a drum section can be improved even further with respect to the attainable accuracy of the position of the two parts relative to each other, as will be described with reference to Figure 4. For this purpose the transformer disc 16 with the mounting elements 28 is placed in a measuring device 34 in which the height of each of the mounting surfaces 27 of the four elements 28 relative to a reference plane is measured. Similarly, the drum section 2 with the sleeves 21 is placed in a device 35 in which the portion of each of the sleeves 21 which project from said drum section is deformed to a nominal height relative to a reference plane, which nominal height has been adapted to the measured height of the corresponding mounting surfaces 27 on the transformer disc 16. In this way the heights of the individual sleeves are adapted to the heights of the associated mounting surfaces on the transformer disc. If

the transformer disc 16 and the drum section 2 are now placed in a device 30 as shown in Figure 3, in which each mounting surface 28 is situated opposite a sleeve 21 whose height has been adapted to this mounting surface 27, it is guaranteed that the distances between the closed ends 24 of the individual sleeves 21 and the associated mounting surfaces 27 of the elements 28 are always equal, so that the subsequent welding operations by means of laser beams can proceed without any problems and the position of the transformer disc relative to the drum section is very accurate.

10 The measuring device 34 comprises a disc-shaped support 36 on which the transformer disc 16 is arranged with its major disc surface which is remote from the mounting elements 28. Four measuring sensors 37 are each arranged on one of the mounting surfaces 27 of the four elements 28. A further measuring sensor 38 is placed on the support 15 36 through the central opening in the transformer disc 16. The support 36 and hence the major disc surface define the reference level which is determined by means of the sensor 38 and relative to which the heights of the individual mounting surfaces 27 are determined by the other four sensors 37. The sensors, which drive, for example, inductive 20 transducers, produce electrical output signals which are applied to a computer 39, which computes the individual heights and stores the relevant values.

 The device 35 comprises a support 40 which is provided with supporting elements, not shown, which correspond to the sleeves 21 25 on the drum section 2 and on which the drum section 2 is placed in such a way that the collars of the sleeves 21 are positioned on them and supported by them. In this position of the drum section 2 the closed ends 24 of the sleeves 21 and the surface 12 of the drum wall 6 are freely accessible. The surface 12 of the drum wall 6 is used as the 30 reference plane relative to which the sleeves 21 are shortened. This reference plane is determined by means of three measuring sensors 41, which are angularly spaced on the surface 12 of the drum wall 6. The measuring sensors 37 again supply electrical output signals via transducers and are also applied to the computer 39. The sleeves 21 are 35 shortened by means of a plunger 42 which has an axial cylindrical bore in which one of the sleeves 21 is engageable, which plunger can be driven by a motor 44 via a lead-screw 43 in such a way that its height

position relative to the drum section 2 changes to deform the relevant sleeve 21 accordingly. Inside the plunger 42 a further measuring sensor 45 is arranged, which cooperates with the end surface 24 of the relevant sleeve 21 and via a transducer supplies an electrical signal, which is again applied to the computer 39. By combining the signals from the sensor 41 and the sensor 45 the computer 39 determines the instantaneous height of the end surface 24 of the sleeve 21, with which the plunger 42 engages, relative to the reference plane defined by the surface 12 of the drum wall 6. The computer 39 relates this value to the stored height of the mounting surface 27 on the transformer disc 16 associated with this sleeve 21 to compute the length over which the sleeve 21 should be deformed to obtain the desired nominal dimension. The computer 39 transfers the result of this computation to a control circuit 46, which energizes the motor 44 accordingly, so that the plunger 42 is driven accordingly via the lead-screw. In this way a control loop is formed between the sensor 45 and the motor 44, which loop ensures that the sleeve is shortened accurately to the nominal dimension determined by the computer. This nominal dimension is the distance c , indicated in Figure 1, between the major disc surface 18 of the transformer disc 16 and the surface 12 of the drum wall 6 of the drum section 2, taking into account the instantaneous height of the relevant mounting surface 27 relative to the major disc surface 18 of the transformer disc 16 and the desired clearance between the mounting surface 27 and the end surface 24 of the sleeve 21 on the drum section 2, which clearance should be equal for all the four mounting surfaces 27 and sleeves 21. The procedure is the same for the other sleeves. By means of the computer 39 these steps can be carried out fully automatically.

The method described above guarantees that the transformer disc 16 is mounted on the drum section 2 in such a way that its major disc surface 18 has exactly a predetermined clearance c relative to the surface 12 of the drum wall 6 of the drum section 2. The transformer disc 15 can be mounted on the drum section 1 in a similar manner, the sleeves on this drum section being shortened relative to a reference plane which is defined by the bounding surface 13 of the drum wall 5 of the drum section 1, which guarantees that the major disc surface 17 of the transformer disc 15 has exactly a clearance d , indicated in Figure 1, relative to the surface 13 of the drum wall 5 of

the drum section 1. This ensures that during mounting of the drum section 2 on the drive shaft 10 a gap a is formed between the two surfaces 12 and 13 of the two drum sections 2 and 1, so that exactly a clearance b is obtained between the two major disc surfaces 17 and 18 of the two transformer discs 15 and 16 of the rotary transformer 14. Owing to the high accuracies attainable by means of the above method clearances b of the order of magnitude of 0.015 mm are attainable between the two major disc surfaces, which provides a highly efficient signal transfer by means of the rotary transformer.

10 As will be apparent from the foregoing, several modifications of the embodiments described in the foregoing are possible within the scope of the invention. This applies in particular to the construction of the sleeves and the manner in which they are mounted on a drum section and to the construction of the mounting surfaces on a transformer disc, the welding process used, and the manner in which the mounting process is carried out. It is obvious that the steps in accordance with the invention may also be applied to other scanning units, for example those comprising two stationary drum sections between which a flat rotatable disc carrying the scanning elements is
20 interposed.

CLAIMS:

1. A drum-shaped scanning unit for a recording and/or reproducing apparatus, around whose circumferential surface a record-carrier (8) in the form of a tape can be wrapped over a predetermined angle and which comprises at least one stationary drum section (1), a
5 coaxial rotatable drum section (2), and a two-part rotary transformer (14) comprising two transformer discs (15,16) which are made of a ferrite material, which carry at least one transformer winding, and which are arranged coaxially on the rotatable drum section (2) and on the facing stationary drum section (1) respectively with a clearance
10 (b) between their major disc surfaces, at least one of the two drum sections (1,2) being formed with at least three angularly spaced axially parallel bores (23), in each of which a supporting element for the relevant transformer disc (15,16), to which said element is connected, is mounted, characterized in that the supporting elements are
15 constructed as pot-shaped sleeves (21) of a weldable material, which are open at one of their ends and which are closed at their other ends (24) with which they project from the drum section (2), the transformer disc (16) is provided with mounting surfaces (27) which correspond to the closed ends (24) of the sleeves (21) on the drum section (2) and which
20 are constituted by at least one mounting element (28) of a weldable material, arranged on the transformer disc (16), and the closed ends (24) of the sleeves (21) are welded to the corresponding mounting surfaces (27).
2. A scanning unit as claimed in Claim 1, characterized in
25 that the mounting surfaces (27) are formed by an annular mounting element (28) arranged on the transformer disc (16).
3. A scanning unit as claimed in Claim 1, characterized in that each mounting surface (27) is formed by a separate disc-shaped mounting element (28) arranged on the transformer disc (16).
- 30 4. A scanning unit as claimed in any one of the preceding Claims, characterized in that the sleeves (21) comprise collars (22) at their open ends and are inserted loosely into the bores (23) in the drum



section (2), so that the collars (22) rest on one side of the drum section (2) and, at the location (26) where the sleeves (21) project from the drum section (2), the sleeves are provided with circumferential ridges (25), which bear against the other side of the drum section (2).

5 to secure the sleeves (21) to the drum section (2).

5. A scanning unit as claimed in Claim 4, characterized in that, in comparison with the other wall portions the circumferential walls of the portions (26) of the sleeves (21) which project from the drum section (2) are thickened towards the interior.

10 6. A method of mounting a transformer disc (16) of a two-part rotary transformer (14) on a drum section (2) of a drum-shaped scanning unit as claimed in any one of the preceding Claims, characterized in that

- 15 a) at least three pot-shaped sleeves (21) of a weldable material which are open at one end are mounted in angularly spaced axially parallel bores (23) in the drum section (2), in such a way that the closed ends (24) of the sleeves (21) project from that side of the drum section (2) which should adjoin the transformer disc (16),
- 20 b) the transformer disc (16) is provided with at least one mounting element (28) made of a weldable material to form mounting surfaces (27) corresponding to the closed ends (24) of the sleeves (21) on the drum section (2),
- 25 c) the drum section (2) and the transformer disc (16) are placed in a device, in which the closed ends (24) of the sleeves (21) are situated opposite and are spaced with a clearance (b) from the corresponding mounting surfaces (27) on the transformer disc (16), and
- d) the closed ends (24) of the sleeves (21) are welded to the mounting surfaces (27) by means of laser beams (33) which are projected into the sleeves (21) through their open ends.

30 7. A method as claimed in Claim 5, characterized in that after steps a) and b) of the method have been carried out the transformer disc (16) is placed in a measuring device (30) to measure the height, relative to a reference plane, of the individual mounting surfaces (27) corresponding to the closed ends (24) of the sleeves (21)
35 and the drum section (2) is placed in a device in which the heights of the individual sleeves (21) projecting from said drum section, in a manner corresponding to the measured heights of the individual mounting



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surfaces (27) on the transformer disc (16), are reduced to a nominal dimension relative to a reference plane, which nominal dimension has been adapted arithmetically to said measured height of each corresponding mounting surface (27), after which steps c) and d) of the 5 method are carried out.