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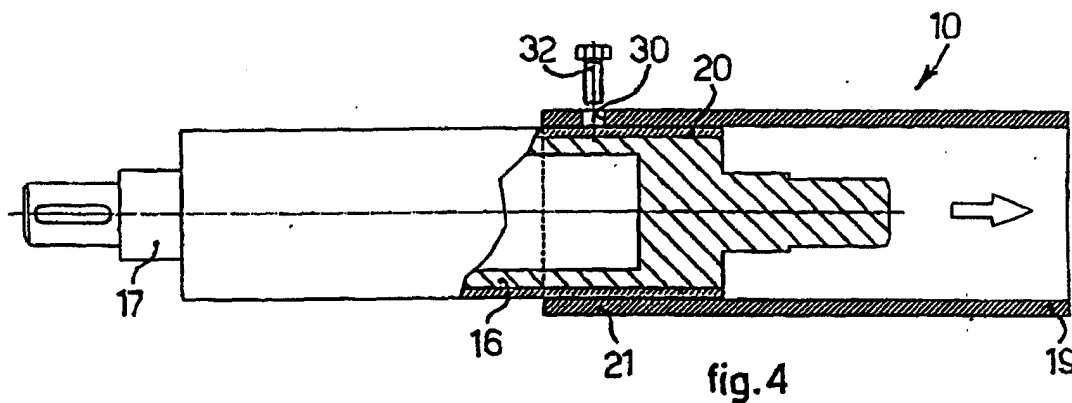
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(54) **Roller for textile finishing machines**

(57) Roller for textile machines (20, 200) suitable to perform grinding operations on fabrics (13). The roller comprises a supporting inner core (16) and an outer covering including abrasive or filamentary material (22).

The outer covering comprises a jacket (19) consisting of a tubular body on whose outer surface (21) the abrasive or filamentary material (22) is present, the cylindrical tubular body being a separate element able to be inserted/removed axially on/from the inner core (16).



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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a roller that can be used in textile machines to perform a finishing treatment on a fabric, to be more exact a grinding treatment with the removal of fibrous surface material.

[0002] The roller is provided on its outer surface with finishing means, such as for example an abrasive and/or filamentary material, abrasive brushes or similar, able to achieve a desired treatment to break the surface and remove the fiber from the surface of a fabric in transit.

[0003] According to the present invention, the roller comprises an inner core and a removable covering jacket which has the abrasive material on the outside; the jacket can be mounted/dismantled easily and rapidly on/from the inner core to be changed in the event of wear, or replaced in order to change the finishing material being treated.

BACKGROUND OF THE INVENTION

[0004] In the field of textile finishing, grinding machines are known comprising a plurality of rollers, in contact with which a fabric to be treated is made to pass.

[0005] The rollers comprise a cylindrical body, normally made of stainless steel, covered with an abrasive or filamentary material, suitable to generate a desired treatment to partly remove the surface fiber of the fabric passing through.

[0006] The abrasive material is normally applied by means of gluing, spot welding, nailing or other similar means, of one or more strips that are arranged in bands, so as to cover substantially the whole surface of the roller.

[0007] Such rollers can be driven or idle so as to rotate around their own shaft, and can be arranged in line or mounted circumferentially on a rotary drum around which the fabric to be treated is made to pass. Examples of machines of this type can be seen in EP-A-0.620.307, WO-A-99/01602 and EP-A-1.072.713, the last two in the name of the present Applicant.

[0008] To be more exact, the cylindrical body is turned and gauged precisely, so that it is able to rotate at high speed around its axis without any risk that any irregularities of movement occur, or any lack of homogeneity in the processing of the fabric in transit.

[0009] A first disadvantage of known rollers is the fact that, especially in the case of rollers with a small diameter, for example in the range of about 8-10 cm, they are complex to achieve and require long working times; moreover, when they are made of stainless steel with a small diameter, they do not guarantee over time that the requirements of shape are maintained, as required to rotate at very high speeds without creating problems of stability and homogeneity in treatment.

[0010] Moreover, they have the disadvantage that, in

the event that the abrasive material is ruined, for example due to an excessive overheating of the abrasive grains or of the supporting material, the entire roller has to be eliminated, which wastes a lot of material.

[0011] Another disadvantage is that, in the event that different treatments have to be done on one finishing machine which require an alternation of rollers with different abrasive characteristics, the fitting of the machine takes a long time and entails complex operations and stoppages. It should be considered that machines of this type have up to 24, 32 or more rollers, so that, if they have to be replaced, in the event of wear or a change of process, this operation takes a very long time with the machine stopped, and considerable work for the operators.

[0012] A further disadvantage is caused by the overheating and high vibrations to which the inner metal core is subjected during processing, particularly during prolonged processing.

[0013] US-A-5,050,280 describes a roller for an emerizing machine, which is a different machine from a grinding machine. In an emerizing machine, in fact, emery rollers are used consisting of an inner metal core, a plurality of wooden beating blades attached by means of bolts to the inner core and an external covering made of abrasive material applied in the form of a continuous strip. The beating blades are configured to define a discontinuous surface for the abrasive material, achieving a beating effect on the fabric being worked during the rotation of the roller. Apart from being intended for uses and on machines that are different from those of the present invention, this roller does not resolve any of the disadvantages mentioned above, particularly because it does not provide the possibility to remove the abrasive covering from the core of the roller easily and rapidly, nor does it resolve the problem of overheating and the vibrations of the inner core, but on the contrary it accentuates these problems.

[0014] US-A-6,122,807, on which the preamble to the independent claim 1 is based, describes a roller for textile finishing methods, comprising an inner metal tubular core on whose outer surface a laminated sheet is deposited, so as to constitute a single body therewith. An abrasive layer, continuous or discontinuous, consisting of diamond granules or dust, is then applied by means of electro-plating on the outer surface of the laminated sheet.

[0015] This document does not solve the disadvantages mentioned above either, since it does not allow the abrasive material to be replaced easily and quickly, it does not prevent overheating of the inner core, it does not provide cushioning and stabilizing elements between the inner core and the outer abrasive material.

[0016] Applicant has devised and embodied the present invention to overcome all these shortcomings and to obtain other advantages as shown hereafter.

SUMMARY OF THE INVENTION

[0017] The present invention is set forth and characterized in the main claim, while the dependent claims describe other innovative characteristics of the invention.

[0018] The purpose of the invention is to achieve a roller for grinding machines intended for surface finishing treatments of a fabric with a partial removal of the fibrous surface material, which has great regularity and perfect shape in order to be able to rotate even at high speeds, without any irregularities of movement and lack of homogeneity in finishing the fabric developing in the short term.

[0019] Another purpose of the present invention is to achieve a roller for textile finishing machines wherein the abrasive covering can easily be replaced without changing or replacing the entire roller, and wherein this replacement can be carried out even leaving the inner core of the roller on the machine in which the roller is applied.

[0020] Another purpose is to achieve a roller wherein the overheating of the inner metal core is avoided and a stable positioning of the outer abrasive covering is guaranteed.

[0021] In accordance with these purposes, a roller for textile finishing machines comprises a supporting inner nucleus or core, advantageously made of metal material, and a covering jacket. The jacket is provided, on its outer surface, with finishing means, such as for example an abrasive or filamentary material, or abrasive brushes for grinding.

[0022] According to the present invention, the jacket consists of a tubular body, with an inner diameter mating with the outer diameter of the inner core, which is able to be separated and inserted/removed axially onto/from the inner core so as to be replaced by a jacket equipped with finishing material of a different type, or changed for a new one in the event of wear or damage.

[0023] With a roller configured in this way it is therefore also possible to keep the inner core assembled on the relative finishing machine, and remove only the jacket with the abrasive/filamentary material, thus reducing the time needed for the replacement and, at the same time, considerably reducing costs.

[0024] In one embodiment of the invention, the inner core comprises a rod made of turned iron, rectified and balanced, suitable to rotate at high speeds and able to be associated with a mating jacket of any suitable material.

[0025] The finishing material and the type of application on the surface of the jacket are not restrictive for the field of the present invention.

[0026] In one embodiment of the invention, the tubular body of the jacket is made of stainless steel, which is particularly suitable to attach in a stable manner, directly on its outer surface - for example by means of electroplating with nickel - granules or powder of abrasive ma-

terial, for example diamond, corundum, in the form of ruby or sapphire, or otherwise.

[0027] According to a variant, the tubular body of the jacket is made of plastic material with high mechanical resistance.

[0028] Advantageously, the jacket has a cylindrical shape.

[0029] In a preferential form of embodiment of the invention, between the jacket and the inner core there are positioning means able to allow an easy coupling of the two elements to a stable constraint.

[0030] In one embodiment of the invention, the positioning means comprise a sleeve made of elastically deformable material attached to the outer surface of the inner core and able to facilitate the insertion and adaptation of the jacket.

[0031] In a first embodiment, the sleeve has a cylindrical shape, mating with that of the inner core and of the jacket.

[0032] According to a variant, the sleeve is formed by longitudinal, transverse, diagonal or mixed strips that partly occupy the outer surface of the inner core.

[0033] According to another variant, the sleeve is formed by blocks made of elastic material distributed on the outer surface of the inner core.

[0034] The presence of the intermediate sleeve creates a condition of stable coupling, extended over time, which ensures that the machine can be used for a long time in efficient conditions. The sleeve is made for example of vulcanized rubber, bakelite, ebonite, etc. and is also able to absorb knocks during the transit of the fabric, so as to obtain a more homogeneous finishing action.

[0035] The intermediate sleeve also has the function of reducing both the possibility of overheating of the inner core and also the vibrations during processing.

[0036] In one embodiment of the invention, there are also clamping means provided, such as screws, bolts or suchlike, to attach the jacket to the inner core with even greater stability.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- figs. 1 and 2 show two possible examples of grinding machines with rollers or abrasive brushes wherein the roller according to the present invention is applied;
- fig. 3 is a view of a roller according to the present invention in a first operating position;
- fig. 4 is a view of the roller shown in fig. 3 in a second operating position;
- fig. 5 shows a section of the roller in fig. 4, along the

line from III to III.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0038] In the attached figures, fig. 1 shows schematically an example of a grinding machine 20 of the type with a rotary drum 11 on whose periphery a plurality of grinding rollers 10 are mounted, also rotary.

[0039] At inlet to and outlet from the drum 11 there are drawing rollers, respectively 12 and 14, the function of which is to feed a fabric 13 to be worked to the grinding machine 20, keeping a desired winding tension.

[0040] The machine 200 shown in fig. 2, on the contrary, has a plurality of grinding rollers 10 arranged substantially aligned on one plane, on which a fabric 13 is made to pass, intermediate tensioning rollers 15 being present able to create a desired contact pressure between the fabric 13 and the rollers 10.

[0041] These examples of machines 20 and 200 must not be considered as restrictive, as the roller 10 according to the invention can be applied substantially to any type of machine suitable to perform finishing operations on fabrics 13.

[0042] A roller 10 according to the invention (figs. 3, 4 and 5), usable in the machines 20 and 200 or other similar or comparable machines, comprises an inner core 16 of a hollow cylindrical shape, able to be coupled with a driven shaft 17 for the purposes of rotation, and a covering jacket 19, in this case tubular in shape and with a thickness of about 1.5 cm.

[0043] The inner core 16 preferably consists of a metal rod, advantageously made of turned, rectified and balanced iron able to be made to rotate at high speeds.

[0044] The jacket 19 is provided on its outer surface 21 with an abrasive material 22 suitable to achieve the desired surface treatment on the fabric 13.

[0045] In this case the jacket 19 consists of a stainless steel cylindrical tubular body on which the abrasive material 22 is attached, for example by means of electroplating. The abrasive material 22, in this case, comprises mineral granules having a high level of hardness, for example from 8 to 10 on the Mohs scale.

[0046] According to a variant, the tubular body of the jacket 19 is made of plastic material with a high mechanical resistance, for example based on epoxy resin or other.

[0047] In a further variant, the tubular body of the jacket 19 is made of hard rubber, for example vulcanized.

[0048] The jacket 19 can be mounted/dismantled and removed axially from the inner core 16, so as to be removed easily when it is worn or damaged, or when it has to be exchanged for another jacket of a different type, without having to dismantle, change or even eliminate the inner core 16.

[0049] In this way, on the same machine 20, 200 the same roller 10 can be used, to perform different types of treatments, changing the jacket 19 simply and quickly

for another jacket having different abrasive characteristics in terms of material, grain, density, distribution, etc.

[0050] Between the jacket 19 and the inner core 16 there is an intermediate sleeve 25 made of elastic material, for example rubber, able both to thermally insulate the inner core 16 in order to limit the overheating thereof, due to the friction between the abrasive material 22 and the fabric 13 passing through, and also to facilitate the insertion and adaptation of the jacket 19.

[0051] The use of the intermediate sleeve 25 also allows to deaden the vibrations during the rotation of the roller 10.

[0052] To further ensure the attachment of the two elements there is an attachment screw 32, which is inserted into a through aperture 30 made in the jacket 19 to clamp it in the assembled condition to the inner core 16.

[0053] It is clear, however, that modifications and/or additions of parts may be made to the roller 10 for finishing grinding machines as described heretofore, without departing from the field and scope of the present invention.

Claims

1. Roller for textile machines (20, 200) suitable to perform grinding operations on fabrics (13), comprising a supporting inner core (16) and an outer covering including abrasive or filamentary material (22), **characterized in that** said outer covering comprises a jacket (19) consisting of a tubular body on whose outer surface (21) said abrasive or filamentary material (22) is present, said tubular body being a separate element able to be inserted/removed axially on/from said inner core (16).
2. Roller as in claim 1, **characterized in that** said jacket (19) is cylindrical.
3. Roller as in claim 1 or 2, **characterized in that** the tubular body of said jacket (19) is made of stainless steel.
4. Roller as in claim 1 or 2, **characterized in that** the tubular body of said jacket (19) is made of plastic or rubber material having high mechanical resistance.
5. Roller as in any claim hereinbefore, **characterized in that** said abrasive/filamentary material (22) is attached directly on the outer surface (21) of the tubular body of said jacket (19).
6. Roller as in any claim hereinbefore, **characterized in that** said abrasive/filamentary material (22) comprises granules or powder of abrasive material.
7. Roller as in claim 6, **characterized in that** said

abrasive material is corundum, in the form of ruby or sapphire or diamond.

8. Roller as in any claim from 1 to 5 inclusive, **characterized in that** said abrasive/filamentary material (22) comprises abrasive brushes. 5
9. Roller as in any claim hereinbefore, **characterized in that** said inner core (16) comprises a turned, rectified and balanced metal rod able to rotate at high speeds. 10
10. Roller as in any claim hereinbefore, **characterized in that** between said jacket (19) and said inner core (16) positioning means (25) are arranged able to allow and facilitate the adaptation between said jacket (19) and said inner core (16). 15
11. Roller as in claim 10, **characterized in that** said positioning means comprise a sleeve (25) made of elastically deformable material attached to the outer surface of said inner core (16). 20
12. Roller as in claim 11, **characterized in that** said sleeve (25) is made of vulcanised rubber, bakelite, ebonite, etc. 25
13. Roller as in claim 11 or 12, **characterized in that** said sleeve (25) covers the whole surface of said inner core (16). 30
14. Roller as in claim 11 or 12, **characterized in that** said sleeve (25) partly covers the surface of said inner core (16) and comprises strips or blocks of elastic material. 35

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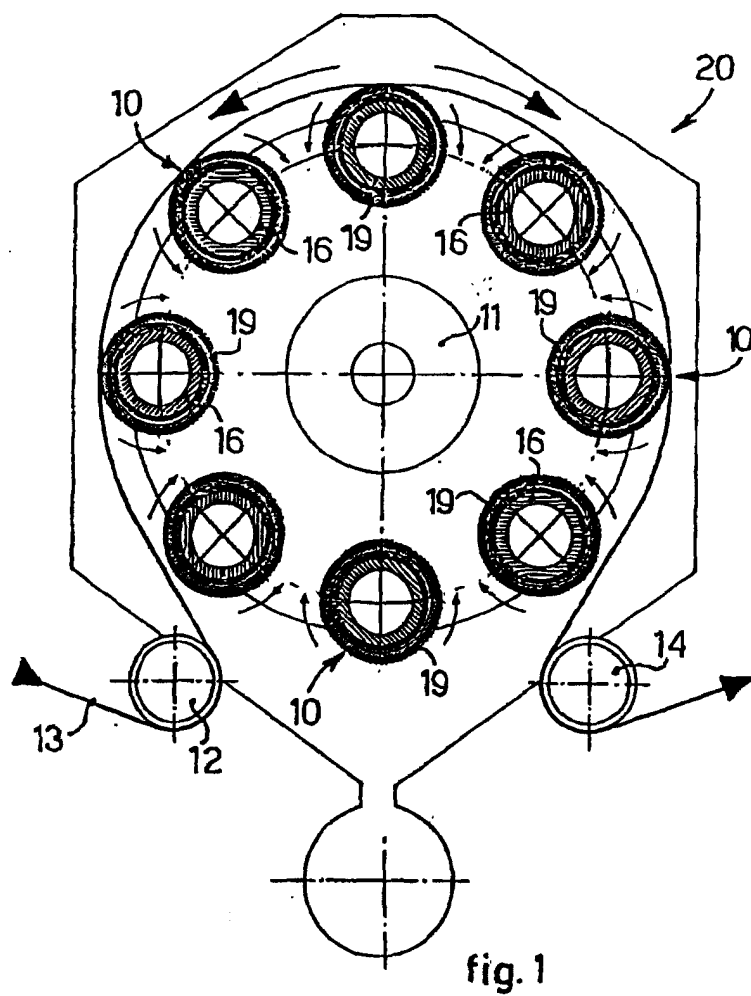


fig. 1

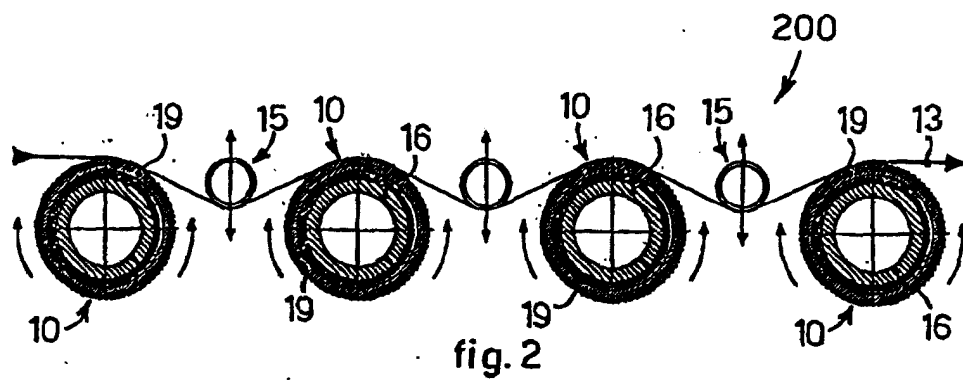
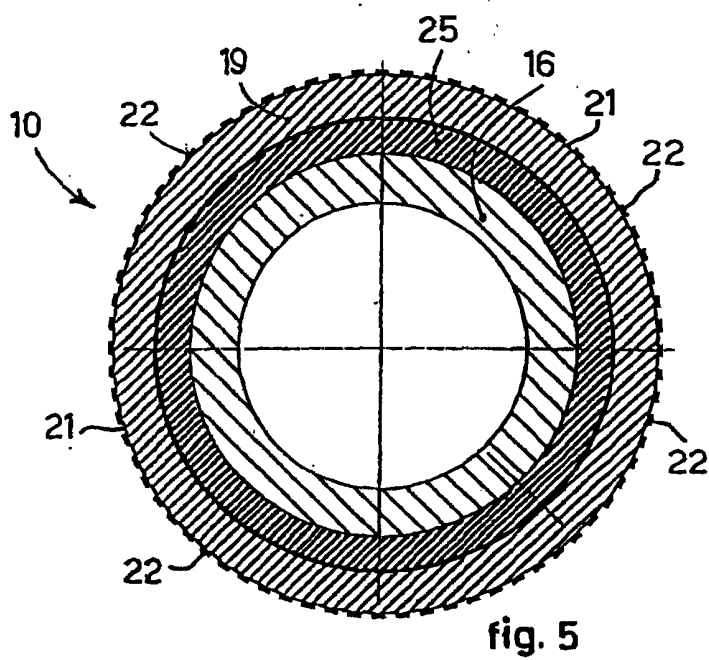
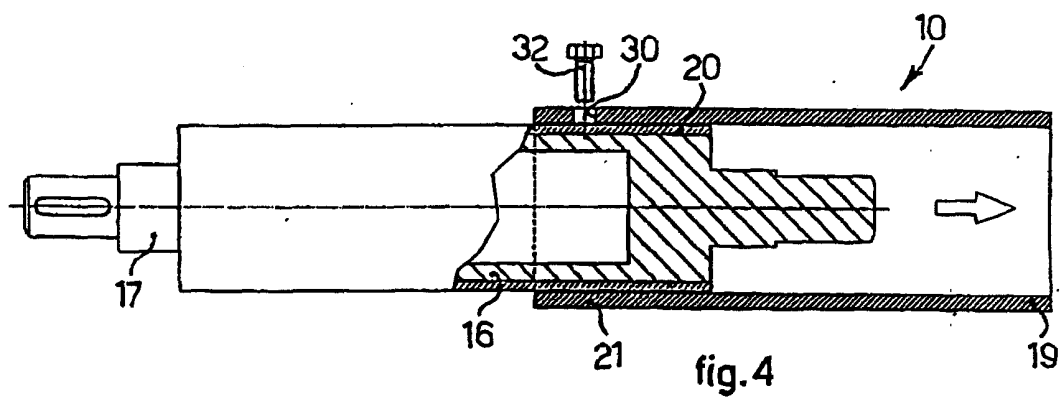
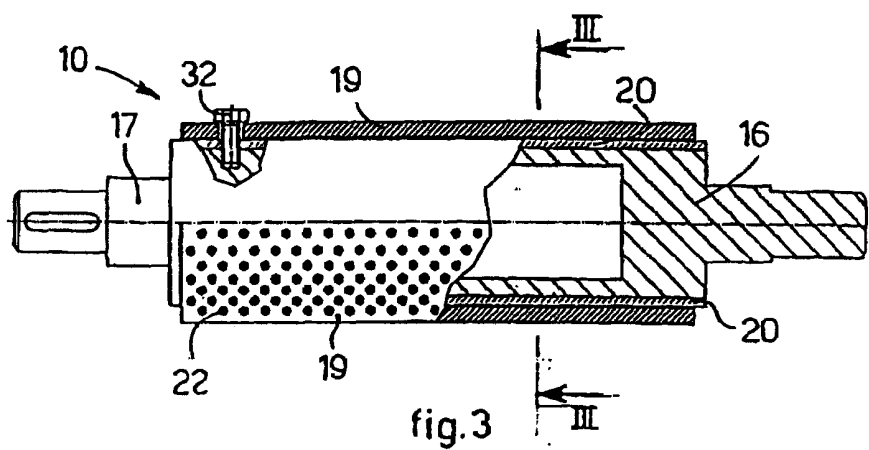


fig. 2





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Application Number
EP 03 10 3916

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			D06C D02J D06B F16C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 January 2004	Examiner D'Souza, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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