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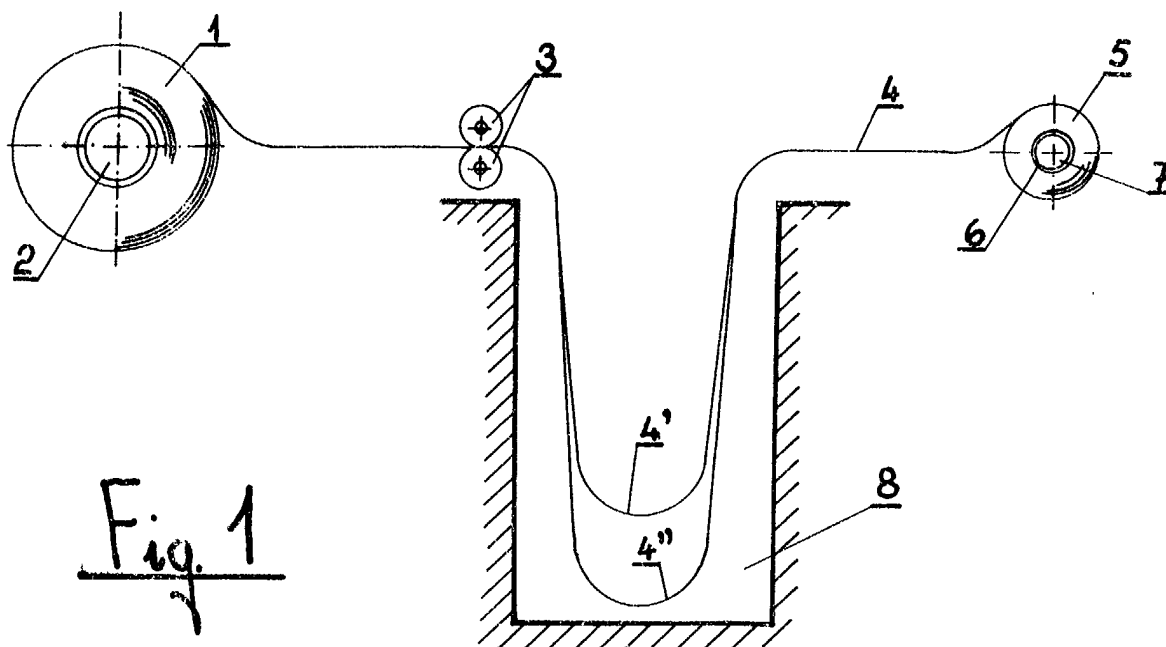
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(54) **Supporting core to coil up mill rerolled strips usually in metal materials**

(57) Supporting core to coil up rerolled and slit-sheared strips (1,4) of suitable width, the core (6') being obtained by cross-cutting a drawn tubular shape (11) in rigid plastic material, thus eliminating any irregularity

and deformation of the known cores while permitting the recovery and reutilisation of the cores with the elimination or at least reduction of the so called "looping pit" (8) receiving the various branches (4', 4'', etc.) of the slit and not uniformly coiled strips.



Description

[0001] In industry, supporting cores are used for winding up, storage and transport of rolled strips, especially of metal strips, to form the so-called "coils".

[0002] This invention particularly refers to the cores of metal strips that have been coiled up a second time, i.e. cores suitable to support rewinding of gauged thickness strips, cut or sheared to the width required by the user and forming coils of a prefixed weight.

[0003] It is well known that the metal strips produced by the steel mills have a rather relevant thickness and standard width, so that they need subsequent drawing to obtain the strip thickness required by the market. Furthermore, it is usually necessary to reduce the strip width to the size requested by the users.

[0004] Therefore, the originally rolled coils are once more drawn to the required thickness (to a minimum value ranging between 0,05 and 0,1 mm,) and are then positioned on a decoiler or uncoiler for subsequent slitting of the strip by multiple shears; the strips, cut to the required width, are rewound on several coiling cores that are usually mounted on one single motor driven shaft.

[0005] At present, the cores of these coils are obtained from cross-cut tubular glued cardboard or bakelized paper shapes. The tubular glued cardboard cores are obtained from axial or spiral wound cardboard on a cylindrical matrix and this cardboard is impregnated with glue. After setting of the glue, the tubular shape is ready to be cross-cut so as to form the cores on which the strip is coiled.

[0006] These glued cardboard cores have various drawbacks. The first drawback is due to the fact that the outer core surface may have blisters caused by imperfect sizing and always features a tiny transverse step at the end of the cardboard winding. This non-uniformity of the outer core surface may cause, especially on thin strips, damage and deformation due to the so called "contraction" of the material. A further drawback is caused by the fact that cardboard is significantly affected by climatic conditions, especially by moisture which will cause swelling and contraction resulting in core detachment from the first coil wrap and a "loose core", which may cause trouble, especially during transportation and storage in the warehouse, also in view of the fact that the end section of the strip is simply secured to the core by adhesive tape. It follows that it is necessary to fabricate tubular cores with perfectly smooth and homogeneous outer surfaces, in material which is not affected by climatic conditions.

[0007] Another drawback is caused by the fact that the diameter of the various strip supporting cores depends on the thickness of the cardboard, the number of windings and the glue type, so that it is necessary to compensate the length of the various strips to be coiled by using a "looping pit" in which to receive the "loops" making up for the differences between the strips being coiled up. It would therefore be necessary to adopt cores

derived from perfectly uniform tubular shapes, all having the same outside diameter, on which to rewind the sheared strips.

[0008] Then, there is the drawback due to the fact that the cardboard cores, because of the poor stiffness of their components, may be subject to ovalization, so that the coils too will be "out-of-round".

[0009] Finally a drawback is due to the fact that the glued cardboard cores are fast deteriorating and can therefore normally not be re-used.

[0010] In addition to the above, bakelized paper cores are known which are obtained from tubular shapes consisting of superimposed resin (preferably bakelite) impregnated and oven dried paper wraps. These bakelized cores have substantially the same drawbacks as the above mentioned glued cardboard cores, although the bakelized cores are less subject to deformation caused by climatic conditions, have a more uniform outer surface and may be re-used. However, the preparation of the bakelite cores is much more expensive than that of the glued cardboard cores and cutting the bakelite produces much dust.

[0011] This invention has the aim to fabricate supporting cores, on which to coil up mill strips, usually in metal material, so as to obtain guaranteed uniform and stable dimensions of the outer core surface on which the strip is fastened and coiled, ready for storage and delivery. In this way it is possible to eliminate "contraction" of the material, loose or ovalized cores and differentiated up-coiling of the strips on the variously sized cores, also in order to eliminate or at least reduce the dimensions and especially the depth of the "looping pit".

[0012] These aims are achieved, according to this invention, by using a drawn tube in rigid material of proper thickness and having a perfectly smooth and cylindrical surface, to fabricate the various cores on which the strips, coming from the drawing mill and slitter, are once more wound; excellent results have been obtained by the preferential utilisation of a drawn tube in plastic material such as PVC, although this does not exclude any other drawn products or products that have been processed to obtain the same characteristics.

[0013] These cores manufactured in plastic sections can be re-used for further windings. Besides the drawn tube in rigid plastic and especially in rigid PVC, will generate very little dust during core - cutting but a rather high chip volume, whereas cutting of the tube in bakelised paper will cause a high volume of fine dust which requires the installation of dust suction and air cleaning equipment.

[0014] The invention in question is illustrated for exemplification purposes, in the following table in which:

Fig. 1 shows the exemplified unwinding of the re-rolled strip, its slitting and up-coiling of the strips on their cores;

Fig. 2 shows a cross section of a known core sample obtained from a tubular glued cardboard shape;

Fig.3 shows the central vertical section of the tubular element in fig.2;

Fig. 4 shows the cross section of the tubular shape obtained, according to this invention, by drawing plastic material like PVC, which permits to obtain, by crosscutting, various homogeneous cores on which to coil the slitted strips;

Fig. 5 shows a central vertical section of a core sample obtained from the tubular shape in fig.4.

[0015] With reference to the above figures and especially to fig. 1, the coil 1 obtained from a coil originally produced in the steel mill and rerolled according to need, is placed on a downcoiler 2, from which it is unwound and conveyed to a multi-blade splitter 3 by which the initial strip 1 is lengthwise slit into numerous strips of the required length.

[0016] After slitting, the strips 4 are rewound into coils 5, each having its own core 6 and usually keyed onto one single shaft or motor driven coiler 7.

[0017] Because of the dimensions of the coiler cores 6, the strips are now featuring different loops 4', 4" etc. hanging in a looping pit 8 and the latter involves a high cost for plant preparation and set-up, also because this pit has an average depth of about 15 m.

[0018] As already explained before, the cores 6 obtained from tubular, glued cardboard 9 or bakelized paper elements, have a non uniform outer surface, caused by blisters and by the small step 10 at the end of the tubular glued or bakelized wrapping and this defect is exemplified in Fig. 2. Glued cardboard cores are most prone to ovalization and deformation caused by the variation of climatic conditions. As already mentioned, these defects of the cores now being used are favouring "contraction" of the "loose" and "ovalised" core.

[0019] Similar problems are encountered when using bakelized paper cores 6, although with less surface deformation and less influence of climatic conditions, but with higher cost for preparation, set-up and installation of a dust suction system to recover the dust caused by cutting to size the various cores from the original tubular shape.

[0020] According to this invention, the cores 6' of the rewound coils 5 derived by slitting the single strip drawn to size as required by the market, are obtained from one single drawn tube 11 in rigid plastic material, preferably rigid PVC, so that these cylinders, when cut into variously sized cores, will provide perfectly smooth and cylindrical coil cores 6', virtually indeformable and easily recyclable, while cross cutting of these original drawn tubes 11 will not produce dust, according to the aims of this invention.

[0021] Obviously, the drawn tube 11 from which the various cores 6' are obtained, may also be obtained from other drawn plastic material or from properly processed materials so as to achieve cores 6' with a perfectly smooth and homogeneous outer surface on which the strips 4 are coiled, as mentioned above.

[0022] When the various strips 4 are wound on these virtually identical cores 6', the winding process of the coils 5 is improved and the utilisation of a "looping pit" 8 to absorb the different loops 4', 4" etc. of the strips may be eliminated or at least reduced.

[0023] As already explained, the possibility to reutilise the various cores for the production of later coils, permits to cut the processing as well as the disposal costs, which are rather high for glued cardboard or bakelized cardboard cores, also in view of the fact that PVC is 100% recyclable.

[0024] This invention refers to rewound metal coils and in particular to stainless steel strips. Nevertheless, cores obtained from drawn tubes may also be used for coiling metal strips of other nature.

Claims

1. Supporting core to coil up rerolled mill strips (1) slit into narrower strips (4) of appropriate width, this core being obtained by cross cutting tubular shapes (9) in glued cardboard or bakelized paper, **characterized in that** the core (6') is obtained by cross cutting a drawn tubular shape (11) in rigid plastic material so as to eliminate any irregularity and deformation of known cores, to allow for recovery and reutilization of the cores and to eliminate or at least reduce the so called "looping pit" (8) receiving the various loops (4', 4", etc.) of the slit and non uniformly rewound strips.
2. Core as described in claim 1, **characterized in that** the drawn tubular shape (11) is in rigid PVC and that the various cores (6') of the rewound coils (5) of the slit strips (4) are obtained by crosscutting without producing any dust.
3. Core as described in claim 1, **characterized in that** the tubular shape (11) is obtained from material, the outer surface of which has been machined to obtain a perfect cylindrical surface.
4. Core as described in claim 1, **characterized in that** these cores are particularly used for drawn metal strips (4) such as for instance stainless steel strips.

