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(54) **Improvements in or relating to cutting wound coils.**

(57) A wound coil (2) which is rotating about its axis is cut and severed against a support (4) by moving a rotatable cutting blade (6) incorporating an arcuate cutting edge towards the rotating coil and the support such that the cutting blade rotates about the axis of the arcuate cutting edge against the wound coil, becomes inserted between adjacent turns of the wound coil and cuts the wire forming the coil against the support. Once the coil has been cut, the cutting blade is moved away from the coil.

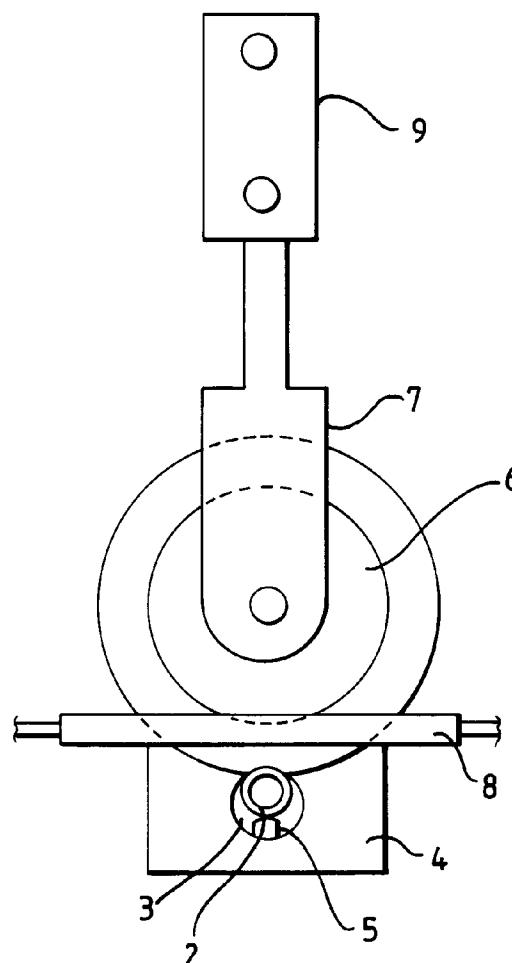


FIG 2

The present invention relates to a method and an apparatus for cutting wound coils, and more particularly is concerned with a method and an apparatus for cutting the wire of a wound coil against a support.

It is known to cut the wire of a wound coil against a support through which the coil passes, for example so as to cut the coil into predetermined lengths. This is accomplished by means of a cutting blade, the cutting blade being movable towards and away from the support such that, as the cutting blade moves towards the support, the blade is inserted between adjacent turns of the coil, and cuts the wire as the coil rotates. The disadvantage of this known method is that the blade does not reliably become inserted between adjacent turns of the coil, particularly when the coil is rotating at high speed, and this can lead to deformation of the ends of the coils. There is therefore a need to improve the method of cutting the wire so as to minimise any deformation of the ends of the coils, particularly when the coil is rotating at high speed.

It is an object of the present invention to provide a method and apparatus for cutting wound coils in which the wire is cut in a manner which reduces the likelihood of the ends of the coils being deformed.

According to one aspect of the present invention there is provided a method for cutting wound coils, including the steps of providing a wound coil which is rotating about its axis, providing a support against which the coil is to be cut, and moving a cutting blade towards and away from the rotating coil so as to cut the wire forming the coil against the support and to sever the wire, wherein the cutting blade incorporates an arcuate cutting edge and is rotatable about the axis of the arcuate cutting edge such that as the cutting blade is moved towards the rotating coil the cutting blade rotates against the wound coil, becomes inserted between adjacent turns of the wound coil and cuts and severs the wire forming the coil.

The cutting blade may be freely rotatable. The cutting edge may be circular.

The method may include the step of limiting movement of the rotating coil in a direction perpendicular to the axis thereof during the cutting of the wire.

According to another aspect of the present invention there is provided apparatus for cutting wound coils comprising a support for supporting wire in the form of a wound coil which is rotating about its axis, and a cutting blade movable towards and away from the support so as to cut and sever the wire comprising the wound coil, wherein the cutting blade includes an arcuate cutting edge and is rotatably mounted in a support member so as to be rotatable about the axis of the arcuate cutting edge and to be rotatable with the wound coil.

The cutting blade may be circular and may be provided with a circular cutting edge around the periphery thereof.

The support may comprise a coil retaining member for limiting movement of the coil as a result of movement of the cutting blade towards and away from the coil.

The apparatus may include a lifting pin movable within the coil retaining member towards and away from the coil for limiting movement of the coil relative to the coil retaining member.

The cutting blade may be freely rotatable in the support member.

The apparatus may include a roller for limiting movement of the cutting edge of the cutting blade in the axial direction of the coil.

For a better understanding of the present invention and to show more clearly how it may be carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 is a longitudinal partial cross-sectional view of one embodiment of an apparatus according to the present invention for cutting wound coils; and

Figure 2 is an end elevational view of the apparatus shown in Figure 1 looking in the direction of the arrow II in Figure 1.

Figures 1 and 2 show a wound coil 1 of wire 2, the coil 1 passing through an aperture 3 in a coil retaining member in the form of a coil retaining block 4. The wire 2 may be a resistance heating wire comprising, for example, an iron-chromium-aluminium alloy. Also provided within the coil retaining block 4 is a coil lifting pin 5 for intermittently raising the coil 1 against the upper surface of the aperture 3 so as to limit movement of the coil relative to the coil retaining block and to move the coil towards a cutting blade 6 which is positioned at that side of the coil retaining block 4 from which the wound coil emerges so as to facilitate indexing the turns of the coil with the cutting blade 6.

Cutting blade 6 is circular in shape with an arcuate cutting edge in the form of a circular cutting edge around the periphery thereof and is provided with a central aperture by means of which the blade 6 is rotatably mounted in a cutting blade support member 7 so as to be rotatable about the axis of the circular cutting edge. The cutting blade may have a diameter of about 60 mm. The support member 7 is movable towards and away from the coil 1 by means of a pneumatic cylinder 9, although other means such as hydraulic means or an electrical relay can be used, so as to cut and sever the wire 2 against the base of the aperture 3. A roller 8 serves to restrain movement of the cutting blade 6 in the axial direction of the coil 1.

In use of the apparatus, the required length of the coils is determined, for example in dependence on the number of turns required and thus the number of revolutions of the coil 1. Each time the required length of coil has been wound and passed through the aperture in the coil retaining block 4, the coil lifting pin 5 is raised by means not shown, for example

by pneumatic or hydraulic means or by an electrical relay, so as to raise the coil against the upper surface of the aperture 3 in the coil retaining block 4 and to facilitate indexing the cutting blade 6 with the turns of the coil 1. The cutting blade 6, because it is freely rotatable, rotates with the coil. This mutual rotation reduces relative movement between the cutting blade 6 and the coil 1 and facilitates the cutting blade becoming inserted between adjacent turns of the coil as the support member 7 is moved by the pneumatic cylinder 9 towards the base of the aperture 3 so as to cut the wire.

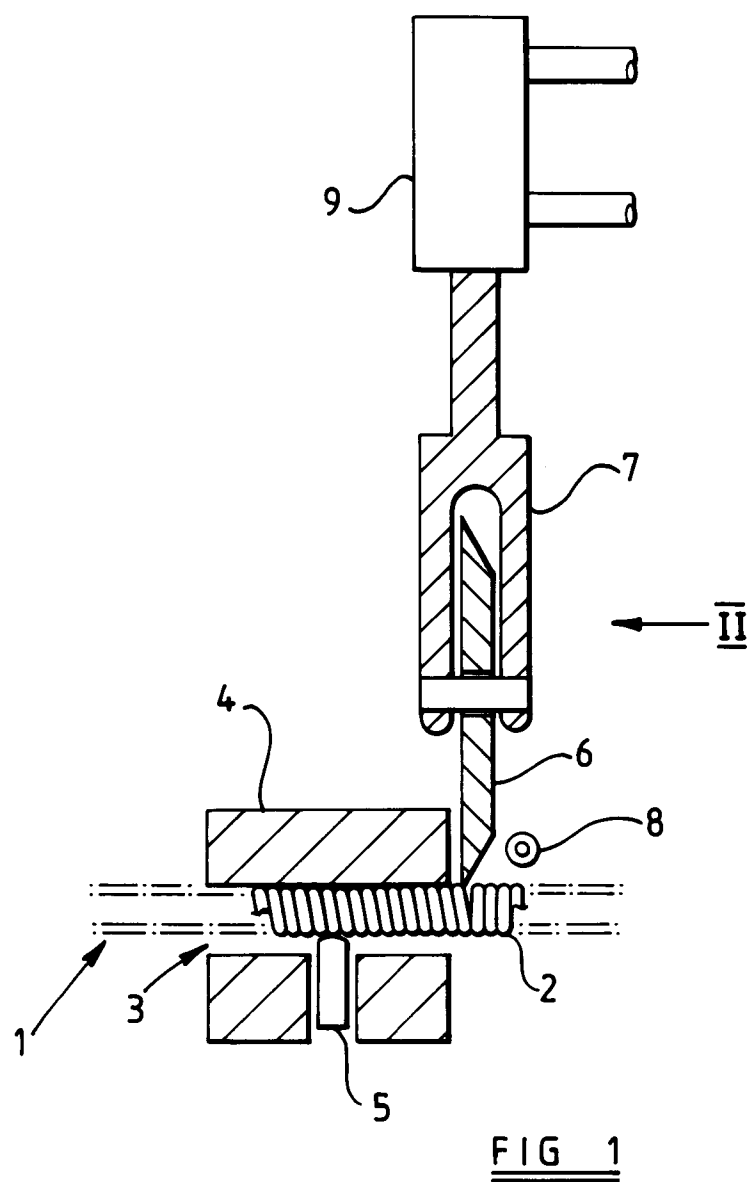
We have found that the use of a rotatable cutting blade in place of a conventional non-rotatable cutting blade considerably reduces the likelihood of the ends of the coils being deformed, results in reduced wear of the cutting blade, and also facilitates increased rotational speeds of the coil, up to 10,000 r.p.m. or more, and thus increased productivity, compared with the usual rotational speeds of approximately 2,000 to 4,000 r.p.m.

Claims

1. A method for cutting wound coils, including the steps of providing a wound coil (2) which is rotating about its axis, providing a support (4) against which the coil is to be cut, and moving a cutting blade (6) towards and away from the rotating coil (2) so as to cut the wire forming the coil against the support and to sever the wire characterised in that the cutting blade (6) incorporates an arcuate cutting edge and is rotatable about the axis of the arcuate cutting edge such that as the cutting blade (6) is moved towards the rotating coil (2) the cutting blade rotates against the wound coil, becomes inserted between adjacent turns of the wound coil and cuts and severs the wire forming the coil.
2. A method according to claim 1, characterised in that the cutting blade (6) is freely rotatable.
3. A method according to claim 1 or 2, characterised in that the cutting edge is circular.
4. A method according to any preceding claim, characterised by the step of limiting movement of the rotating coil (2) in a direction perpendicular to the axis thereof during the cutting of the wire.
5. Apparatus for cutting wound coils comprising a support (4) for supporting wire in the form of a wound coil (2) which is rotating about its axis, and a cutting blade (6) movable towards and away from the support so as to cut and sever the wire comprising the wound coil, characterised in that

the cutting blade includes an arcuate cutting edge and is rotatably mounted in a support member (7) so as to be rotatable about the axis of the arcuate cutting edge and to be rotatable with the wound coil.

6. Apparatus as claimed in claim 5, characterised in that the cutting blade (6) is circular and is provided with a circular cutting edge around the periphery thereof.
7. Apparatus as claimed in claim 5 or 6, characterised in that the support (4) comprises a coil retaining member for limiting movement of the coil (2) as a result of movement of the cutting blade (6) towards and away from the coil.
8. Apparatus as claimed in claim 7, characterised in that a lifting pin (5) is movable within the coil retaining member (4) towards and away from the coil (2) for limiting movement of the coil relative to the coil retaining member.
9. Apparatus as claimed in any one of claims 5 to 8, characterised in that the cutting blade (6) is freely rotatable in the support member (4).
10. Apparatus as claimed in any one of claims 5 to 9, characterised in that a roller (8) limits movement of the cutting edge of the cutting blade (6) in the axial direction of the coil (2).



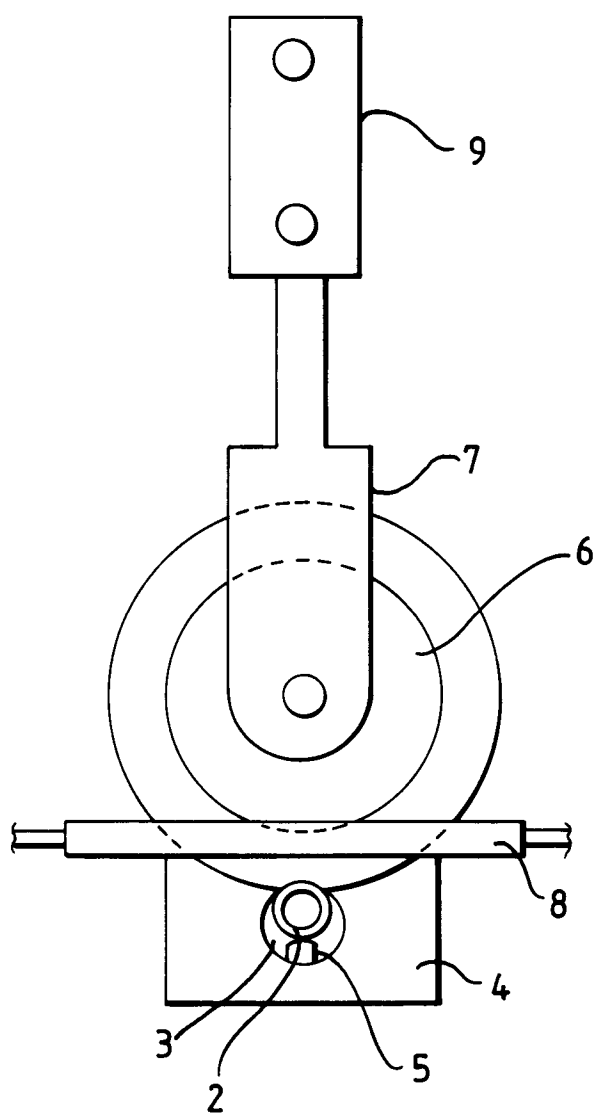


FIG 2