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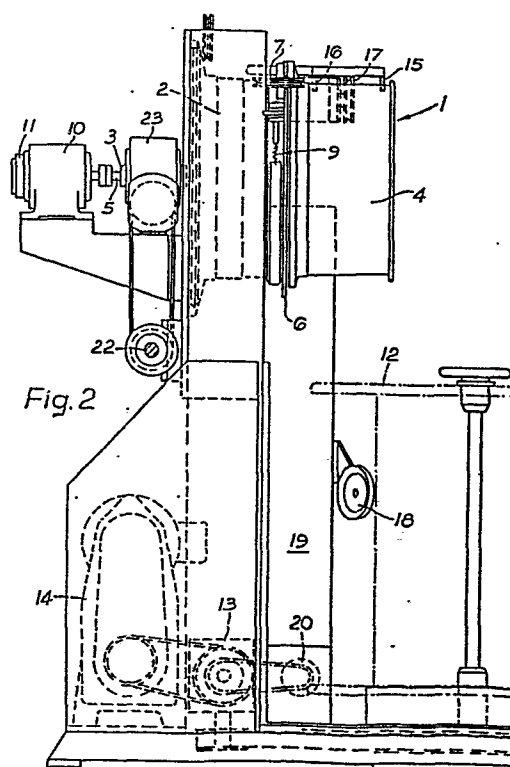
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(54) **Double block wire accumulator.**

(57) A double block wire accumulator (1) having a draw block (2) on an outer shaft (3), an accumulator block (4) on an inner shaft (5), and a take-off ring (6) with a turn-back pulley (7) between the blocks (2, 4), has a motor (10) for overdriving the accumulator block (4) for a period and a brake (11) for stopping rotation of the accumulator block and holding it stationary for a period, whereby a defective portion of wire can be transferred to the accumulator block (4), then the latter can be held stationary while the defective portion of wire is cut out and the ends of the remaining good wire welded together, without stopping the draw block (2), whereafter the accumulator block can be released, and - if need be - overdriven briefly, to restore normal running.



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This invention relates to a double block wire accumulator as is used in a wire processing line, such as wire drawing or wire galvanising, and in which a draw block is
5 secured to a hollow outer shaft, an accumulator block is journalled on an inner shaft for free rotation in one direction only, a take-off ring is freely rotatable on the inner shaft between the draw block and the
10 accumulator block and carries a turn-back pulley, a motor is provided for driving the hollow outer shaft and draw block at the processing line speed in the opposite direction to that in which the accumulator
15 block is freely rotatable on the inner shaft, and means is provided for applying torque to the take-off ring in the direction of draw block rotation. Wire wound in one direction on the draw block passes round the turn-back
20 pulley and is wound in the opposite direction on the accumulator block. When desired wire tension is maintained, torque applied to the take-off ring is counter-balanced by tension in the wire and causes the take-off ring and
25 turn-back pulley to remain in a substantially

fixed position. The take-off ring responds to an increase or decrease in wire tension by rotating in one direction or the other, as required, to restore desired tension, and the
5 accumulator block responds to differences between the processing line speed and speed of take-off from the accumulator block, e.g., by a driven reel, by speeding up or slowing down, as required, to release more or less wire
10 until the speeds are again equal.

Thus, in the normal course, there will usually be an equal number of turns of wire on the draw block and the accumulator block, and for each turn of wire taken off the
15 accumulator block there will be one turn transferred from the draw block to the accumulator block and a fresh turn is wound on to the draw block.

In the event that a portion of wire is
20 defective, e.g., incorrectly galvanised, it is necessary to stop the processing line while the defective portion is cut out and the ends of the remaining good wire connected together by welding. This is particularly
25 disadvantageous when, as is frequently the case, the processing line is one of a

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plurality arranged side-by-side, e.g., in a wire galvanising plant where stoppage of the processing line causes defective material to be produced.

5 The object of the invention is to provide a double block wire accumulator which allows of cutting out of a substantial length of defective wire without having to stop the processing line.

10 According to the present invention, a double block wire accumulator as described above is provided with means for overdriving the accumulator block for a period, means for stopping rotation of the accumulator block,
15 and means for holding the accumulator block stationary for a period.

 The manner of operation of the means of the invention, and preferred features thereof will now be described with reference
20 to the accompanying drawings in which:-

 Figure 1 is a front elevation of a double block wire accumulator in accordance with the invention;

 Figure 2 is an elevation from the left
25 hand side of Figure 1;

 Figure 3 is a plan, on a smaller scale

than Figures 1 and 2, showing how the draw blocks of a plurality of double block wire accumulators as in Figures 1 and 2 are driven by a common electric motor; and

5 Figures 4 to 7 are diagrammatic plan views showing how the double block wire accumulator in accordance with the invention is operated to enable a defective portion of wire to be cut out.

10 In Figures 1 and 2 a double block wire accumulator 1 for wire W in a processing line comprises in known manner, a draw block 2 secured to a hollow outer shaft 3, an accumulator block 4 journalled on an inner
15 shaft 5 for free rotation in one direction only, a take-off ring 6 freely rotatable on the inner shaft 5 between the draw block 2 and the accumulator block 4 and carrying a turn-back pulley 7, a motor 8 (see Figure 3) for
20 driving the hollow outer shaft 3 and draw block 2 at the processing line speed in the opposite direction to that in which the accumulator block 4 is freely rotatable on the inner shaft 5, and means 9 for applying torque
25 to the take-off ring 6 in the direction of draw block rotation.

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Wire W wound in one direction on the draw block 2 passes round the turn-back pulley 7 and is wound in the opposite direction on the accumulator block 4, from which the wire is taken off, as by a take-off to be described presently. When desired wire tension is maintained, torque applied to the take-off ring 6 (by the means 9) is counter-balanced by tension in the wire and causes the take-off ring and turn-back pulley 7 to remain in a substantially fixed position. The take-off ring 6 responds to an increase or decrease in wire tension by rotating in one direction or the other, as required, to restore desired tension, and the accumulator block 4 responds to differences between the processing line speed and speed of take-off from the accumulator block by speeding up or slowing down, as required, to release more or less wire until the speeds are again equal.

Thus, in the normal course, there will usually be an equal number of turns of wire W on the draw block 2 and the accumulator block 4 (as in Figure 4), and for each turn of wire taken off the accumulator block there will be one turn transferred from the draw block to

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the accumulator block and a fresh turn is wound on to the draw block.

In the past it has been necessary to stop the processing line while any defective
5 portion of wire was cut out and the ends of the remaining good wire connected together by welding. The means in accordance with the invention that are about to be described allow cutting out of a substantial length of
10 defective wire without having to stop the processing line.

An independent electric motor 10 for overdriving the accumulator block 4 for a period is coupled to the inner shaft 5, and
15 the motor 10 incorporates a brake 11 for stopping rotation of the accumulator block and for holding it stationary for a period.

Thus, when a defective portion of wire DW (indicated by thinner lines) is detected on
20 (or approaching) the draw block 2, the accumulator block 4 is overdriven until the defective portion is transferred from the draw block to the accumulator block (i.e., increasing the number of turns of wire on the
25 accumulator block and decreasing the number of turns on the draw block, as in Figure 5), the

accumulator block is stopped and held stationary while the defective portion DW of wire W is cut out and removed (with, meanwhile, the number of turns of wire on the
5 draw block building up again, as in Figure 6) and the ends E of the remaining good wire connected together by welding (see Figure 7), and then the accumulator block is released to allow it to resume free rotation again on the
10 inner shaft 5.

It is obviously necessary to stop the take-off from the accumulator block 4 (by means to be described presently) while the accumulator block is held stationary, and it
15 may be necessary to overdrive the accumulator block again briefly if by the time the cut ends E of good wire have been connected to the draw block 2 has "accumulated" more turns of wire than it normally carries (compare Figure
20 7 with Figure 4), this overdriving of the accumulator block being effected until there is again an equal number of turns of wire W on the draw block and the accumulator block (i.e., again as in Figure 4).

25 The take-off from the accumulator block, being in the illustrated embodiment a

driven reel 12, is driven by its own independent electric motor 13 through a variable speed gearbox 14, control of the speed ratio of which is effected in accordance with the number of turns of wire W on the accumulator block 4 as sensed by maximum and minimum micro-switches 15, 16 respectively. The wire W is led from the accumulator block 4 to the reel 12 via a swivelling guide pulley 17 and a swivelling traversing pulley 18 with a traversing drive 19 (not detailed beyond its input pulley 20) derived from the reel drive 13, 14, and a releasable wire clamp 21 is preferably provided between the two pulleys 17, 18.

The reference to "independent" electric motors (10 and 13) for overdriving the accumulator block 4 and the take-off or reel 12 is not only because these drives are independent of the drive for the draw block 2 (which is matched for speed to the feed of the processing line) but also because, as shown in Figure 3, the draw blocks 2 of a plurality of double block wire accumulators 1 arranged side-by-side (e.g., in a wire galvanising plant) can be driven by a common electric

motor 8 through cardan shafts 22 and worm
reducers 23, and there may be reduction gear
24 between the motor 8 and the first of the
cardan shafts 22. A control console 25 for
5 the row of double block wire accumulators 1 is
also indicated in Figure 3.

CLAIMS

1. A double block wire accumulator (1) for use in a wire processing line and in which a draw block (2) is secured to a hollow outer shaft (3), an accumulator block (4) is
5 journalled on an inner shaft (5) for free rotation in one direction only, a take-off ring (6) is freely rotatable on the inner shaft (5) between the draw block (2) and the accumulator block (4) and carries a turn-back
10 pulley (7), a motor (8) is provided for driving the hollow outer shaft (3) and draw block (2) at the processing line speed in the opposite direction to that in which the accumulator block (4) is freely rotatable on
15 the inner shaft (5), and means (9) is provided for applying torque to the take-off (6) ring in the direction of draw block rotation, characterised in that there is also provided means (10) for overdriving the accumulator
20 block (4) for a period, means (11) for stopping rotation of the accumulator block (4), and means (11) for holding the accumulator block (4) stationary for a period.

2. A double block wire accumulator
25 as in Claim 1, characterised in that the means

(10) for overdriving the accumulator block (4) for a period is an independent electric motor coupled to the inner shaft (5).

3. A double block wire accumulator
5 as in Claim 2, characterised in that the independent electric motor (10) incorporates a brake (11) for stopping rotation of the accumulator block (4) and for holding the accumulator block (4) stationary for a period.

10 4. A double block wire accumulator as in any of Claims 1 to 3, characterised in that a take-off (12) from the accumulator block is driven by its own independent electric motor (13) through a variable speed
15 gearbox (14), control of the speed ratio of which is effected in accordance with the number of turns of wire (W) on the accumulator block (4) as sensed by maximum and minimum micro-switches (15, 16).

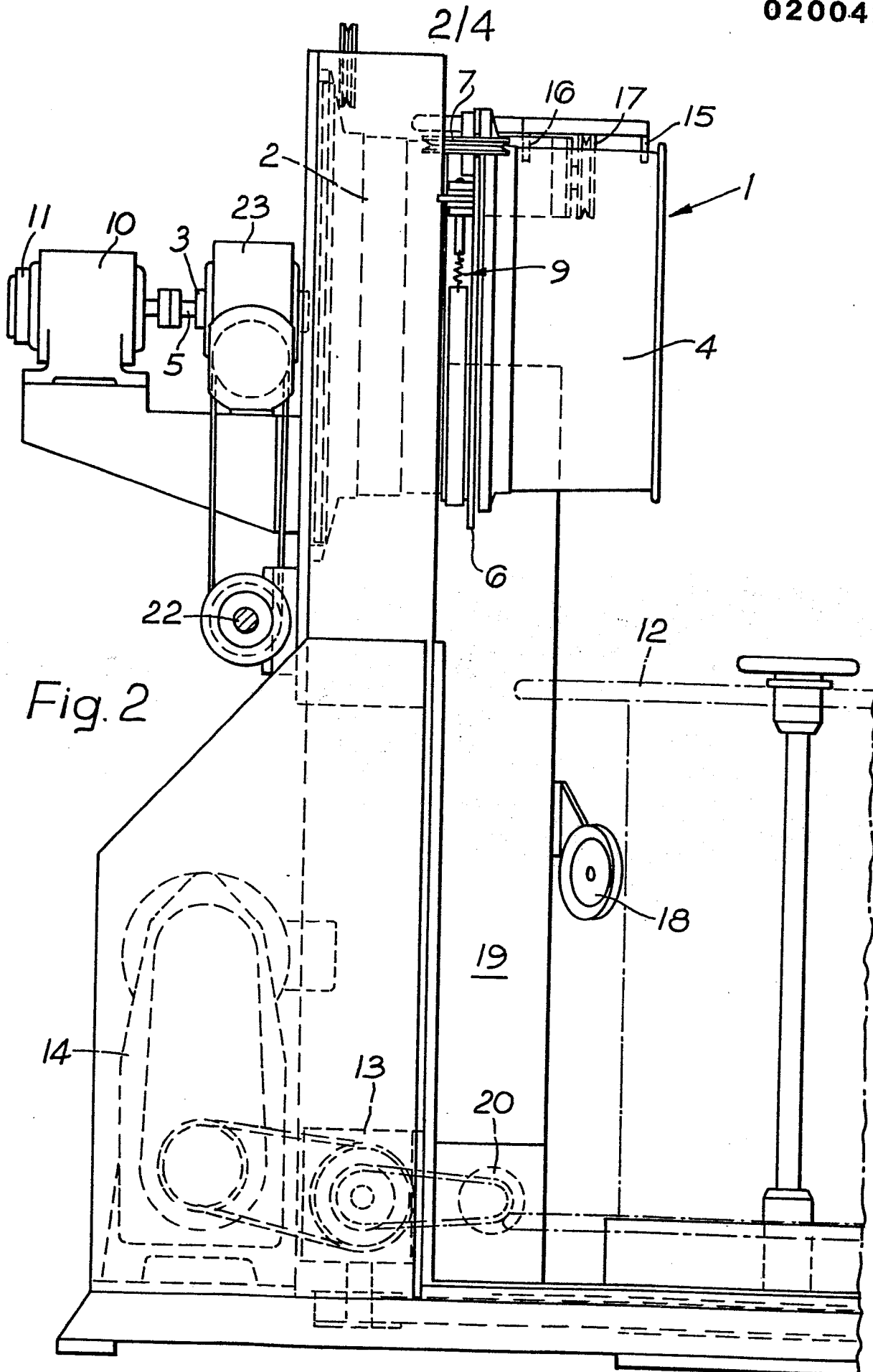
20 5. A double block wire accumulator as in Claim 4, characterised in that the take-off is a driven reel (12) and the wire (W) is led from the accumulator block (4) to the reel via a swivelling guide pulley (17) adjacent
25 the accumulator block and a swivelling traversing pulley (18) with a traversing drive

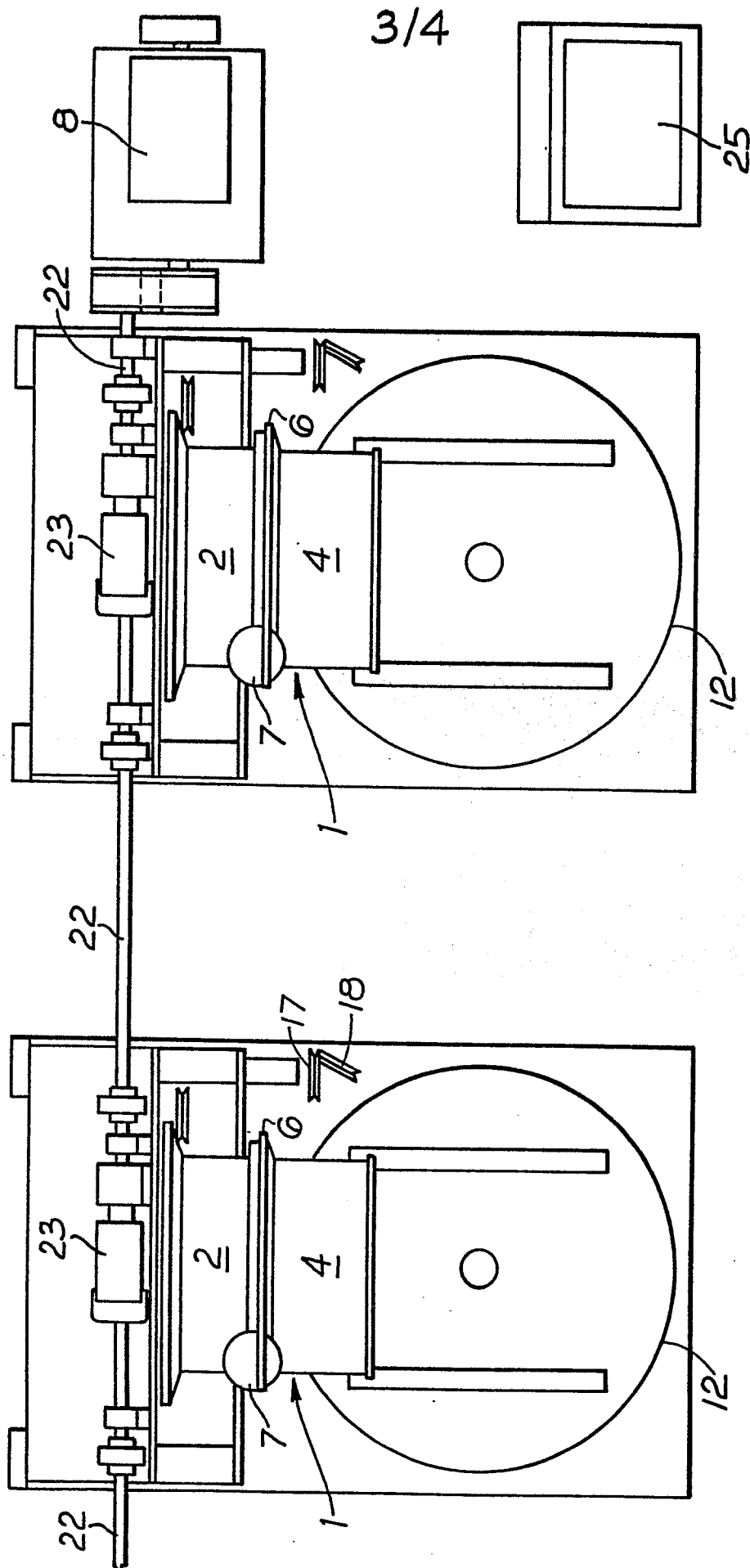
(19) derived from the reel drive (13, 14).

6. A double block wire accumulator as in Claim 5, characterised in that a releasable wire clamp (21) is provided between
5 the two pulleys (17, 18).

7. A plurality of double block wire accumulators (1) as in any one of Claims 1 to 6 arranged side-by-side and characterised in that the draw blocks (2) are driven by a
10 common electric motor (8) through cardan shafts (22) and worm reducers (23).

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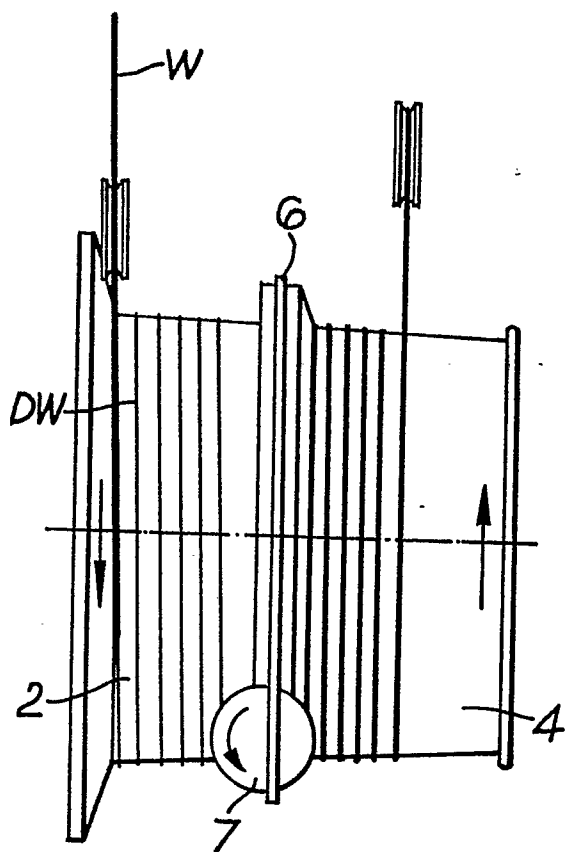


Fig. 4

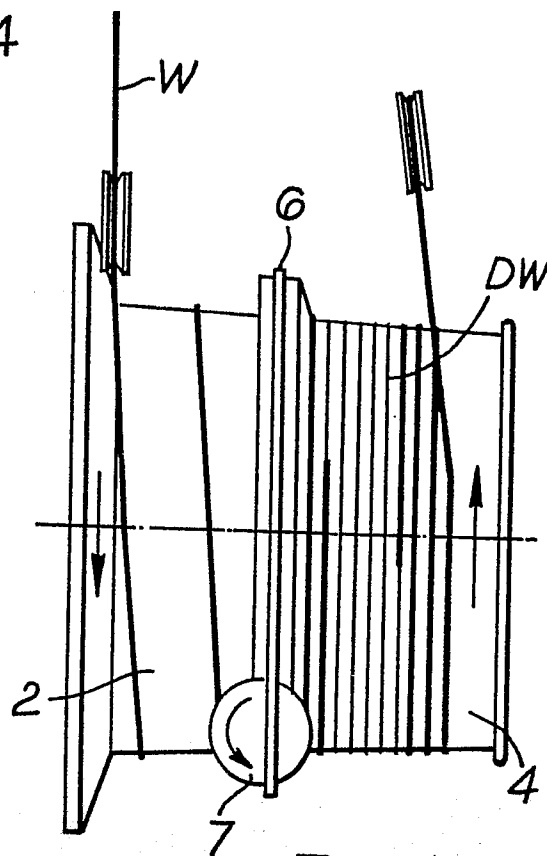


Fig. 5

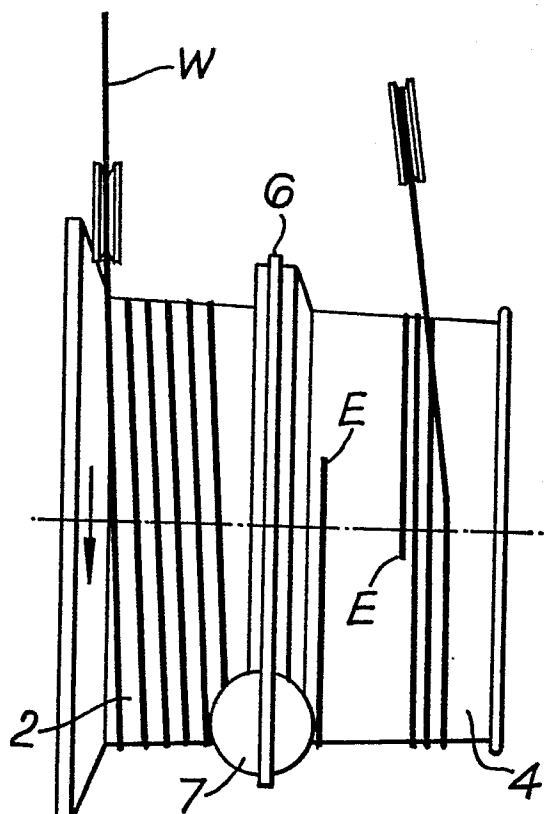


Fig. 6

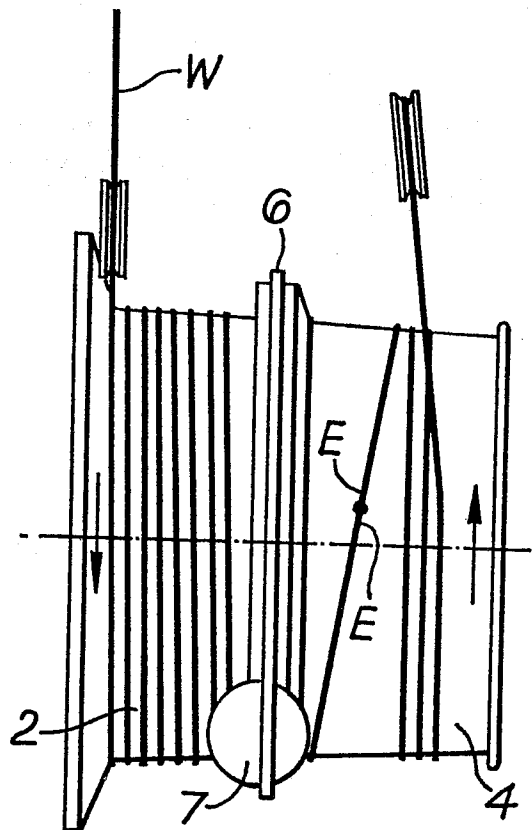


Fig. 7