

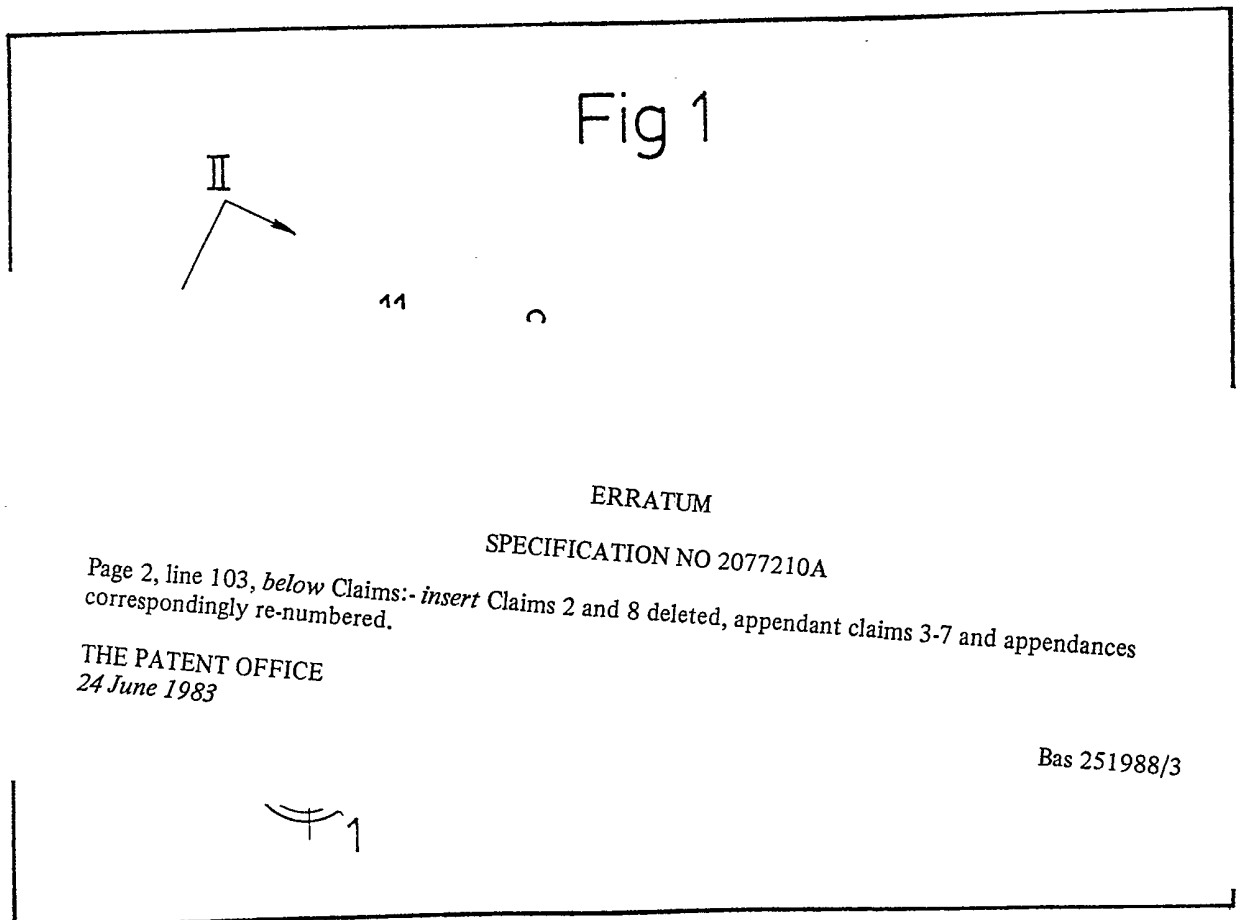
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(54) **Roller Support for a Reversible Belt**

(57) A roller support for a reversible belt conveyor comprises two edge rollers (8, 8') which are arranged to support respective edges of a belt (9) and which are freely rotatable on rigid shafts (7, 7'). The laterally outer ends of each shaft (7, 7') are positioned

further forward in the direction of movement of the belt (9) than the laterally inner ends of the shafts. The inner end of each edge roller shaft (7, 7') is pivotally mounted so that the shaft can swing to and fro between limited end positions in which the outer end of the shaft is respectively forward of or behind the inner end in the directions of movement of the belt (9). The outer end of each edge roller shaft (7, 7') is supported by a travelling roller (11) which runs on a path substantially parallel to the direction of movement of the belt (9).



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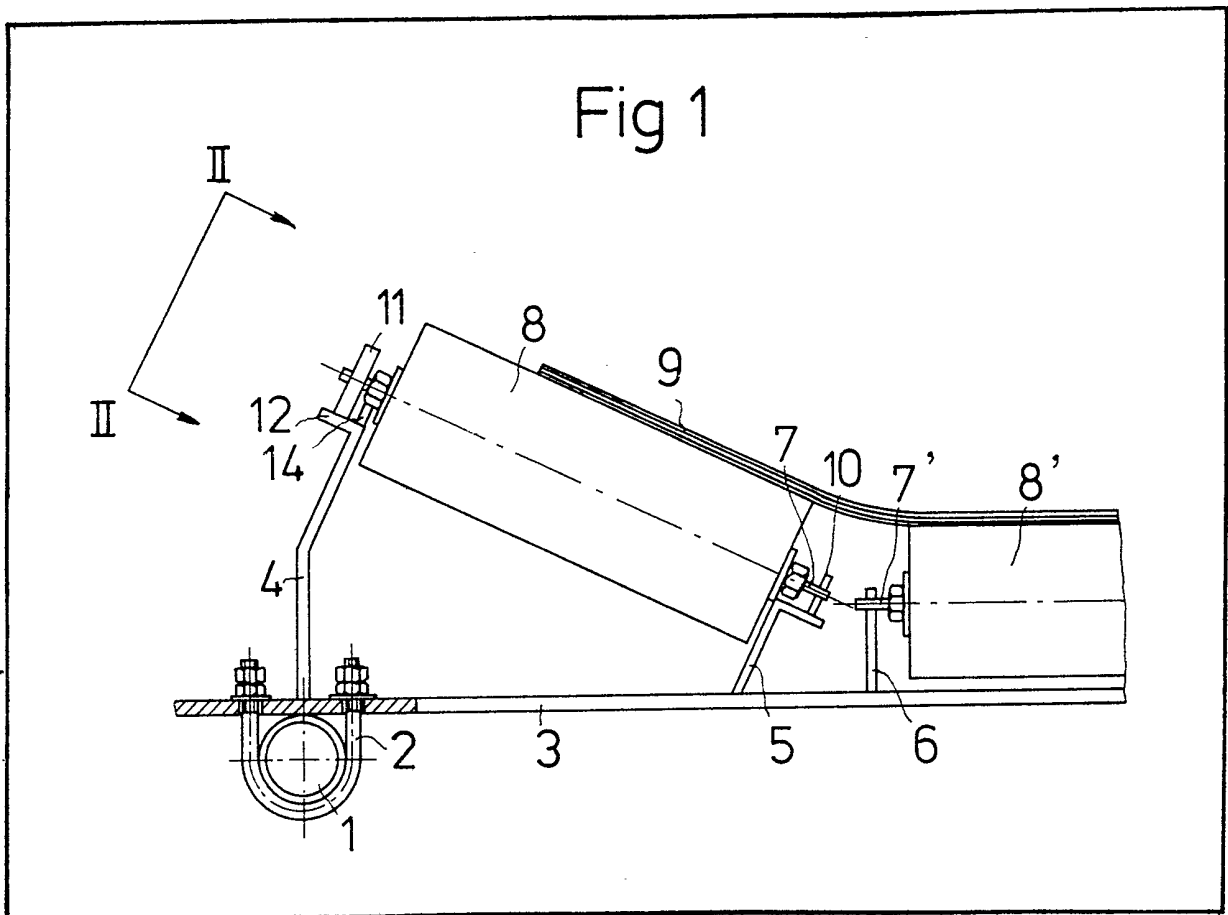
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Fig 1

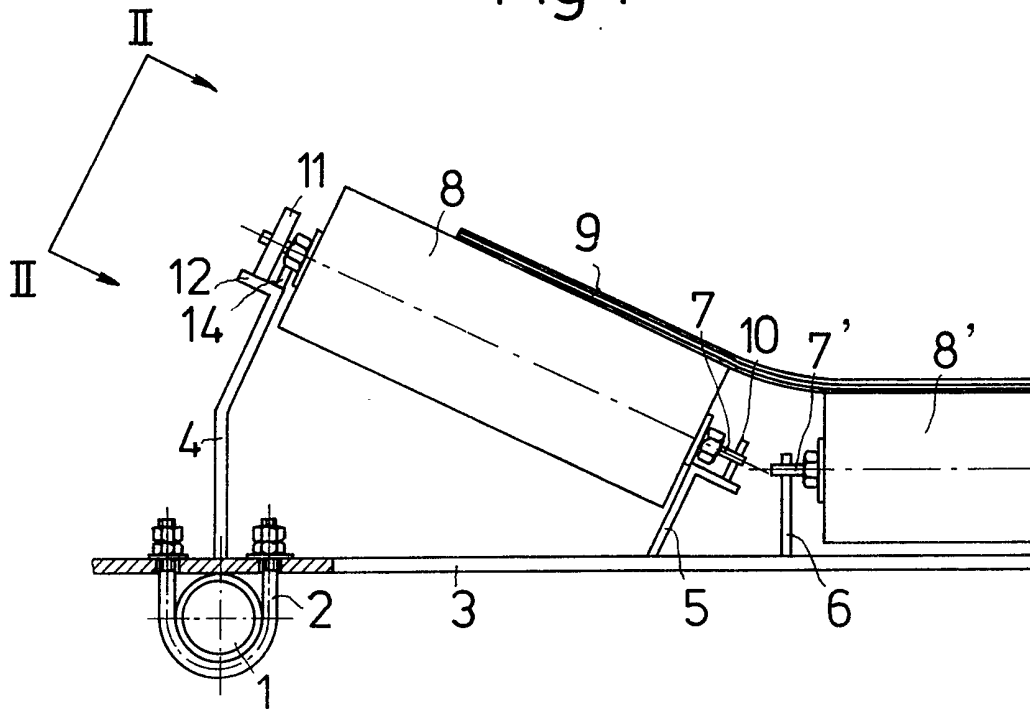


Fig 2

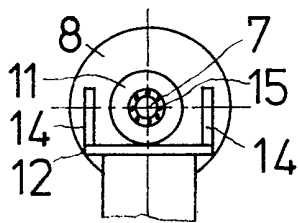
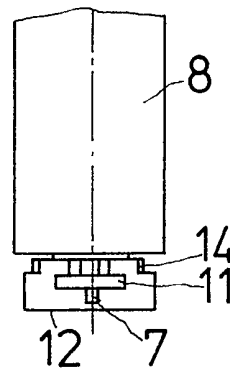


Fig 3



## SPECIFICATION

**Roller Support for a Reversible Belt**

The invention relates to a roller support for a reversible belt conveyor, the support comprising two edge rollers which are arranged to support respective edges of a belt and which are freely rotatable on rigid shafts the laterally outer ends of which are positioned further forward in the direction of movement of the belt than the laterally inner ends of the shafts. Such a support is hereinafter referred to as of the kind described.

Normally, the belts are carried by supports having at least two of the rollers positioned next to each other across the belt, with at least the edge rollers inclined upwards in such a way that the conveyor belt forms a trough for containing the material to be conveyed. To ensure that the conveyor belt is centred, the edge rollers are, as seen from above, inclined laterally outwardly of the belt and forwardly in the direction of movement of the belt. When the belt runs over a roller it will tend to move tangentially to the roller and perpendicularly to the generatrix where the belt touches the roller. The edge rollers will thus guide the belt back towards the centre of the support. If the belt runs askew and travels towards one side of the support, it is primarily influenced by the roller positioned on that side and consequently it is guided back towards the centre until it is supported equally by the rollers on either side. As this adjustment of how the belt runs requires that the belt not only rolls but also slides on the edge rollers, the angle by which the shafts of these rollers deviate from the plane perpendicular to the direction of movement of the belt, must be as acute as possible, in order not to cause undesirable wear on the belt.

A problem arises in the case of reversible conveyor belts. As mentioned, the laterally outer ends of the edge roller shafts are positioned further forward in the direction of belt movement than the laterally inner ends of these shafts, and the problem is that when the direction of movement of the conveyor belt is changed, the laterally outer ends of the shafts must be shifted so that they are positioned forwardly of the laterally inner ends of the shafts in the new belt direction.

From French patent specification No. 70.26602 it is known to mount the laterally outer ends of the edge roller shafts in holders which, by a hydraulically operated system of levers, are movable in the direction of movement of the belt, thus changing the angle of the rollers in relation to the vertical plane perpendicular to the direction of movement of the belt. In the case of comparatively long conveyor belts such a system is, however, too complicated and costly.

According to the invention, in a support of the kind described, the inner end of each edge roller shaft is pivotally mounted so that the shaft can swing to and fro between limited end positions in which the outer end of the shaft is respectively forward of or behind the inner end in the

directions of movement of the belt, and the outer end of each edge roller shaft is supported by means enabling a belt conveyor to drag the shaft in the direction of motion of the belt, in use, from one limited end position to the other.

With this arrangement, the drag of the belt on the edge rollers ensures that, irrespective of the direction of running of the belt, the outer ends of the edge rollers and their shafts will automatically adopt the desired position forward of their inner ends.

Stops for limiting swinging movement of the edge roller shafts may be provided which acts directly on the edge roller shaft.

Preferably, the outer end of each roller shaft is supported by a travelling roller which runs on a path substantially parallel to the direction of movement of the belt. In this case, the paths on which the travelling rollers run may be provided with stops for limiting the swinging movement of the edge rollers and their shafts. When the conveyor belt is started, each of the edge rollers will be drawn in the direction of movement of the belt, the travelling roller rolling along the supporting path in such a way that the shaft rotates about its pivot mounting until it reaches a position in which the stop is encountered, after which it will remain in that position.

It is particularly advantageous if the edge rollers rotate very smoothly on the shafts, and thus the force with which they are drawn in the direction of movement of the belt will be very small. Consequently, in the case where travelling rollers are employed, each travelling roller must also be extremely smooth running both as regard its mounting on the shaft and as regard its rolling over the supporting path. To achieve smooth running, the travelling roller may be provided with a roller bearing, and in one construction the outer race of the roller bearing can constitute the travelling roller. As the belt conveyor often operates in dust-laden surroundings, use may be made of a dust-proof sealed roller bearing.

In accordance with another aspect to the present invention, a method of automatically adjusting edge rollers of a roller support for a reversible belt conveyor comprises the steps of pivotally mounting the edge rollers at their laterally inner ends; and causing the conveyor belt to drag the edge rollers for a limited amount in the direction of motion of the belt to a position where their laterally outer ends lie further forward in the direction of movement of the belt than the laterally inner ends of the shafts.

An example of a roller support in accordance with the present invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a part sectional view showing part of one side of a support;

Figure 2 shows diagrammatically a detail of the support seen on the line II—II in Figure 1; and,

Figure 3 is a plan view of the detail shown in Figure 2.

Figure 1 shows one side of a roller support having self-adjusting edge rollers 8. As is partly

shown such a support may have, as well as the edge rollers 8 on its sides, one or more rollers 8' between the adjustable edge rollers 8, depending upon the width of the conveyor belt to be carried.

5 Often the support is only provided with two adjusting edge rollers 8, which will impart a V-shaped cross-section to the belt. The drawing only shows one side of the support, as the opposite side is symmetrical to the one shown.

10 Such roller supports may by means of clamps 2 be spaced apart on two longitudinal side bars 1, onto which the supports are also secured. In addition to a transverse rail 3 stretching between the two side bars 1, the support also comprises a number of stanchions 4, 5, and 6, which support shafts 7. The rollers 8, 8' support a belt 9, and are rotatably mounted on the non-rotatable shafts 7, 7' respectively.

20 Considering one edge roller 8, the possibility of the edge roller 8 adjusting in accordance with the direction of movement of the belt has been obtained by mounting the shaft 7 of the edge roller 8 at its laterally inner end closest to the centre of the belt 9 on a pivot 10 supported by the stanchion 5 and passing through the shaft perpendicular to the shaft axis. The opposite end of the shaft 7 remote from the pivot 10 is supported on a travelling roller 11, mounted to rotate smoothly on the shaft 7 and being capable of rolling along a path 12 at the top of the stanchion 4. The construction of the other edge roller 8 is exactly similar to the one described.

25 When the belt 9 is set to move it draws the edge rollers 8 with it, in such a way that the shaft 7 of each roller pivots about the pivot 10, each travelling roller 11 rolling along its respective path 12 until the slewing movement of the shaft 7 is stopped when the shaft encounters a stop 14 mounted perpendicularly to the path 12.

30 Figures 2 and 3 show in more detail how the travelling roller 11 is capable of rolling along the path 12 until it is stopped because the shaft 7 encounters a stop 14 on one side or the other of the centre plane of the support. Furthermore the travelling roller 11 is mounted in a roller bearing 15 in order to obtain sufficiently smooth rotation on the shaft 7. In practice the travelling roller 11 may be constituted by the outer ring of the roller bearing 15.

#### 50 Claims

1. A roller support for a reversible belt conveyor, the support comprising two edge rollers which are arranged to support respective edges of a belt and which are freely rotatable on rigid shafts the laterally outer ends of which are positioned further forward in the direction of movement of the belt than the laterally inner ends of the shafts, the laterally inner end of each roller shaft being pivotally mounted so that the shaft can swing to and fro between limited end positions in which the outer end of the shaft is respectively forward of or behind the inner end in

the directions of movement of the belt, and the outer end of each roller shaft being supported by means enabling a belt conveyor to drag the shaft in the direction of motion of the belt, in use, from one limited end position to the other.

2. A roller support according to claim 1, wherein the outer end of each roller shaft is supported by a travelling roller which runs on a path substantially parallel to the direction of movement of the belt.

3. A roller support according to claim 2, wherein each travelling roller is mounted with a roller bearing on the respective edge roller shaft.

4. A roller support according to claim 3, wherein the outer race of the roller bearing constitutes the travelling roller.

5. A roller support according to any of claims 2 to 4, wherein the paths on which the travelling rollers run are provided with stops for limiting the swinging movement of the edge rollers and their shafts.

6. A roller support according to any of claims 1 to 4, wherein stops act directly on the edge roller shafts to limit the swinging movement.

7. A roller support according to claim 1, substantially as described with reference to the accompanying drawings.

8. A method of automatically adjusting edge rollers of a roller support for a reversible belt conveyor, the method comprising the steps of pivotally mounting the edge rollers at their laterally inner ends; and causing the conveyor belt to drag the edge rollers for a limited amount in the direction of motion of the belt to a position where their laterally outer ends lie further forward in the direction of movement of the belt than the laterally inner ends of the shafts.

100 New Claims or Amendments to Claims Filed on 12.8.81.  
Superseded Claims 1

#### New or Amended Claims:—

1. A roller support for a reversible belt conveyor, the support comprising two edge rollers which are arranged to support respective edges of a belt and which are freely rotatable on rigid shafts the laterally outer ends of which are positioned further forward in the direction of movement of the belt than the laterally inner ends of the shafts, the laterally inner end of each roller shaft being pivotally mounted so that the shaft can swing to and fro between limited end positions in which the outer end of the shaft is respectively forward of or behind the inner end in the directions of movement of the belt, and the outer end of each roller shaft being supported by a travelling roller which runs on a path substantially parallel to the direction of movement of the belt to enable a belt conveyor to drag the shaft in the direction of motion of the belt, in use, from one limited end position to the other.