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Ekstam

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[54] **ARRANGEMENT IN AN OVERHEAD TRACK FOR CONTROLLED TURNING OF SUSPENDED CARCASSES**

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[51] **Int. Cl.** **A22b 5/00**, B65g 19/02, B65g 47/24

[58] **Field of Search** ..... 198/33 AB, 177, 174; 17/11, 17/24; 104/64, 74

[56] **References Cited**

UNITED STATES PATENTS

3,518,717 7/1970 Johnson ..... 198/33 AB X

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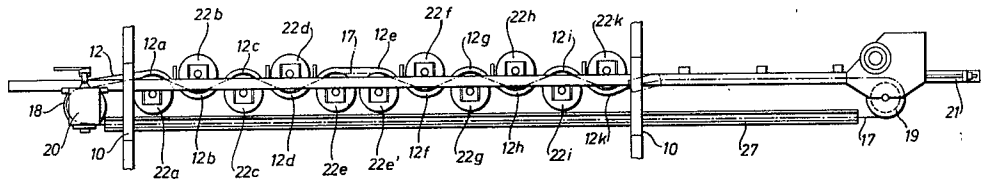
[57] **ABSTRACT**

An overhead track for controlled turning of suspended carcasses comprises a rail which forms a sinuous portion. Trolleys rotatably mounting hangers for suspending carcasses therefrom are positively advanceable along the rail, and stationary abutments are provided at one side of the sinuous portion of the rail opposite the concave bends thereof to engage the hangers at a distance from the rotational center thereof for rotating the hangers.

7 Claims, 4 Drawing Figures



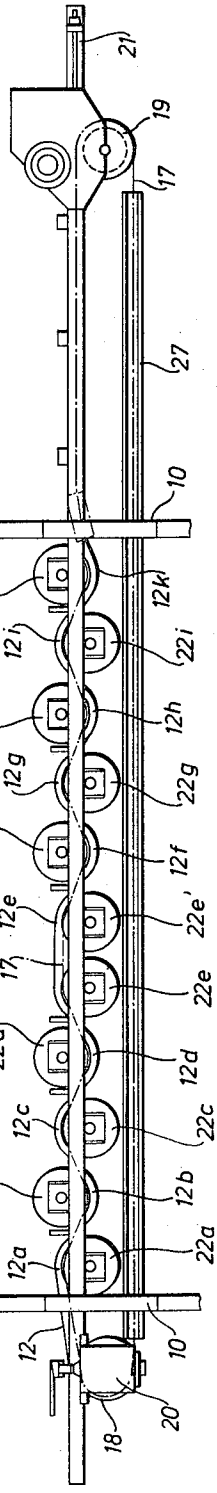

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Fig.1

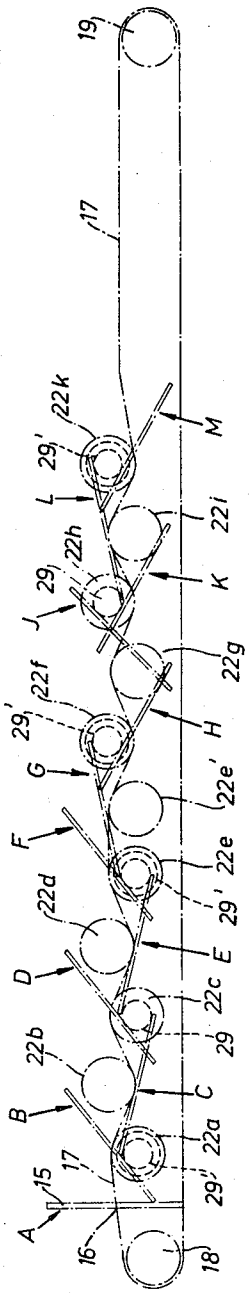
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Fig.2

Fig. 3

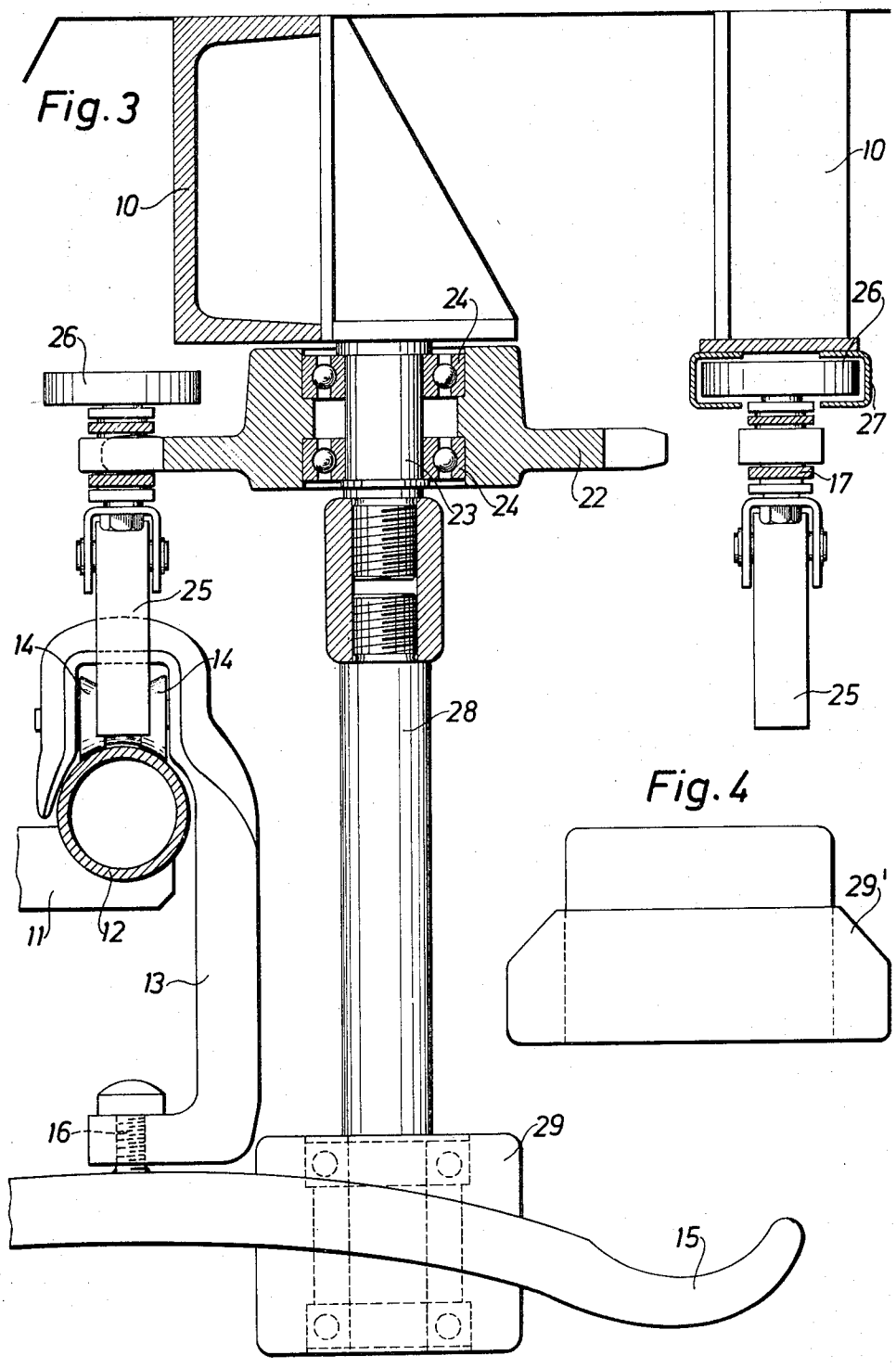

Fig. 4

ARRANGEMENT IN AN OVERHEAD TRACK FOR CONTROLLED TURNING OF SUSPENDED CARCASSES

The invention relates to an overhead track for controlled turning of suspended carcasses comprising a rail, trolleys advancable thereon and rotatably mounting hangers for suspending carcasses therefrom, means for positively advancing the trolleys along the rail, and stationary abutments disposed laterally of the rail to be engaged by the hangers passing along the track, at a location on the hanger spaced from the rotational center thereof for rotating the hangers, so that the suspended carcasses when being carried along the track are turned continuously for instance to be exposed at all sides thereof to processing members provided along the track at opposite sides thereof.

It is previously known to effect the turning of the hangers by a mechanism comprising on each hanger a disk fixedly connected with the hanger coaxially with the turning axis thereof and having peripheral edge notches which are successively engaged by the abutments when the hangers are passing along the overhead track the disk and thus the hanger being turned part of a revolution each time a notch in the disk is engaged by an abutment. In order to operate in a proper way this turning mechanism has to be constructed with great accuracy which is not satisfactory. Another mechanism previously known comprises stationary guide rails engaging the carcass proper and completing a turning movement initiated by the engagement between hanger and abutment. Also this mechanism is not satisfactory since it will not provide a uniform turning movement due to the fact that the engagement between the guide rails and the carcasses takes place on the soft parts of the carcasses and, thus, fluctuations as to size and form of the carcasses will cause variations in the turning movement thereof obtained by the mechanism.

The present invention has for its object to provide reliable and simple means for effecting a positive uniform turning of the hangers and the carcasses suspended therefrom, and for this purpose there is provided an arrangement in an overhead track of the kind referred to above wherein the rail has a sinuous portion and the abutments are disposed at one side of the rail opposite the concave bends thereof.

According to the invention there is provided an overhead track for controlled turning of suspended carcasses comprising:

- a rail forming a sinuous portion;
- trolleys advancable along the rail;
- hangers rotatably mounted on the trolleys for suspending carcasses therefrom;
- means for positively advancing the trolleys along the rail; and
- stationary abutments disposed laterally of the rail at one side thereof each opposite one of the concave bends of the rail to engage the hangers passing along the rail, at a location spaced from the rotational center of the hanger to rotate the hangers so that the carcasses suspended from the hangers will be turned continuously when carried along the sinuous portion of the rail.

The invention is illustrated in the accompanying drawings wherein

FIG. 1 is a plan view of an overhead track incorporating the turning arrangement according to the invention;

FIG. 2 is a diagrammatic plan view of the overhead track illustrating the turning process;

FIG. 3 is an enlarged vertical sectional view, partly an elevation, of the overhead track; and

FIG. 4 is a side elevation of a roller of another embodiment than that disclosed in FIG. 3.

In a beam structure **10** suspended from the sealing for instance in a slaughter-house, a processing compartment or the like, there is mounted by means of brackets **11** an overhead track comprising a tubular rail **12**. On this rail are supported overhead trolleys **13** having support rollers **14** running on the rail, and these trolleys are movable along the rail and are provided at the lower end thereof with a hanger **15** which is centrally connected with the trolley by means of a pivot **16** to be rotatable about a vertical axis and provides two opposite arms each forming a hook end. The overhead track may be extended over an arbitrary distance and may comprise straight and curved portions as well as switches. The trolleys **13** may be moved along the rail by manually pushing or pulling the carcasses suspended from the hangers or the overhead track may be provided with mechanical means for advancing the trolleys along the rail.

In order to rotate the hangers **15** and effect a positive turning of the carcasses suspended therefrom the overhead track has two sinuous portions as shown in FIG. **1**. As used in this description and in the appended claims, the term "sinuous" includes not only a form which follows a mathematic sinuous curve but also other forms more or less resembling the mathematic sinuous curve. Thus, the rail forms bends **12***a* to **12***d* in a first sinuous portion and bends **12***f* to **12***k* in a second sinuous portion a straight portion **12***e* being provided between the sinuous portions. An endless conveyor chain **17** (indicated by a dot and dash line in FIGS. **1** and **2**) for driving the trolleys along the sinuous portions and along the straight portion of the rail is guided for movement above the rail along said portions thereof. The conveyor chain **17** passes over two reversing sprockets **18** and **19**, rotatably mounted in the beam structure, sprocket **18** being operatively connected with an electric drive motor **21** for the conveyor chain. Between these sprockets the chain is guided by guiding sprockets **22***a* to **22***d* provided alternately at one side and the other of the rail each opposite one of the bends **12***a* to **12***d* at the concave side thereof, guiding sprockets **22***f* to **22***k*, provided alternately at one side and the other of the rail each opposite one of the bends **12***f* to **12***k* at the concave side thereof, guiding sprockets **22***e* and **22***e'* provided at the straight portion **12***e* of the rail opposite the transition between the bend **12***d* and the straight portion **12***e* and opposite the transition between the bend **12***f* and the straight portion **12***e*, respectively. Each guiding sprocket is an idling sprocket and is rotatably mounted on a vertically depending stub shaft **23** supported by the beam structure **10**, by means of ball bearings **24** as will be seen in FIG. **3**. The chain has projecting driving dogs **25** for engagement with the overhead trolleys **13**. Means for guiding the chain when returning between sprockets **18** and **19**, spaced laterally from the rail **12**, comprise a

circular plate 26 rotatably mounted on the chain at each driving dog, and a straight channelled guide rail 27 supported by the beam structure and slidably receiving the plates.

In the sinuous portion of the rail 12 comprising the bends 12*a* to 12*d* the stub shaft 23 for the guiding sprockets 22*a* to 22*c* is provided with an extension 28 fixedly connected therewith to form an abutment for the hangers. The same arrangement is provided for the stub shafts 23 of the sprockets 22*e*, 22*f*, 22*h*, and 22*k*. On the extension 28 there is rotatably mounted a roller 29 as shown in FIG. 3, or a roller 29' having a portion of greater diameter than that of the roller 29 as shown in FIG. 4. Thus, two types of rollers, 29 and 29', respectively, are provided and the reason therefor will be explained below.

In order to explain the operation of the turning arrangement according to the invention reference is made to the diagrammatic view in FIG. 2. A hanger 15 is positioned in position A transversely of the rail 12 when the advancement thereof is started by means of the conveyor chain 17 which advances the trolley along the rail 12 with the hanger in said position to the bend 12*a* where the hanger engages the roller 29' on the extension 28 coaxial with the sprocket 22*a* the hanger being rotated clockwise, as seen in FIG. 2, through position B to position C which is attained when the trolley is substantially opposite the bend 12*b*. Now, the hanger will engage the roller 29 on the extension 28 coaxial with the sprocket 22*c* and, thereby, will continue to rotate clockwise through position D to position E when the trolley is passing along the bend 12*c* and reaches the center of the bend 12*d*. The hanger now engages the roller 29' on the extension 28 coaxial with the sprocket 12*e* and attains position F and then position G. When carried along the straight portion 12*e* the hanger then will engage the roller 29' on the extension 28 coaxial with the sprocket 22*f* at the other side of the rail 12. During the continued movement along the rail 12 through the bend 12*f* the hanger will reach position H due to said engagement but now the hanger will be rotated in the opposite direction, that is in a counterclockwise direction as seen in FIG. 2. When passing through the bend 12*g* the hanger will be rotated to position J due to the engagement with the roller 29' on the extension 28 coaxial with the sprocket 22*f* and now will engage the roller 29 on the extension 28 coaxial with the sprocket 22*h* in order to pass through position K during the continued rotation in the counterclockwise direction and reach position L substantially centrally of the bend 12*i*. Then, the hanger engages the roller 29' on the extension 28 coaxial with the sprocket 22*h* so that the hanger will arrive at position M and then will be further rotated in the counterclockwise direction to leave the second sinuous portion of the rail substantially in a position wherein the hanger is disposed longitudinally of the straight portion of the rail connected to said sinuous portion.

Carcasses are suspended from the hangers 15 by hooking the hind legs onto the ends of the hangers and are carried along the rail, through different processing stations in the slaughter-house the back side of the carcass usually being the leading side of the transported carcass. It is therefore presumed that the carcasses arrive at the first sinuous portion of the overhead track according to FIGS. 1 and 2 in this position. For instance, it may be assumed that the carcasses when carried along the sinuous portions of the overhead track will pass through a dehairing apparatus wherein the carcasses are to be turned continuously in order to be treated by scrapers or other tools at all sides, or through an apparatus for hot water treatment of the carcasses such as the apparatus described in U.S. Pat. No. 3,343,477 of Sept. 26, 1967. When a hanger initially engages the roller on the extension 28 such engagement takes place at the outer end of one arm of the hanger. However, as the hanger is moved along the roller the hind leg of the carcass hooked onto this arm of the hanger will contact the roller. Provided that the back side of the carcass forms the leading side thereof, then the contact will take place at a thin tendon in the leg, but if the chest side of the carcass is the leading side thereof the contact will take place at the hoof on the hind leg. This is the reason for the arrangement to have rollers of alternately one embodiment and the other, 29 and 29', respectively, according to FIG. 3 and FIG. 4, respectively. Since the carcass is continuously turned the thinner portion of the hind legs of the carcass and the thicker portion of the hind legs will alternately contact the roller. In case the thicker portion will contact the roller there is provided a roller of the form disclosed in FIG. 3, and when the thinner portion contacts the roller, there is provided a roller according to FIG. 4. By this arrangement the turning of the carcasses will be effective uniformly.

The arrangement shown and described herein may be included into an overhead track system for turning the carcasses carried thereon over distances of an arbitrary length in the desired direction in order to provide a processing or treatment of the carcasses at each side thereof when the carcasses are carried through different processing stations. However, the arrangement may also be used for turning the carcasses when they are passing a veterinary inspector to enable him to examine the carcass from all sides thereof without having to manually turn the carcass. The conveyor chain may be arranged above the rail and may be guided along the sinuous portions thereof by means of sprockets as shown and described but it is also possible to guide the conveyor chain in the tube forming the rail, the chain in that case having driving dogs projecting through a longitudinal slot in the tube to drivingly engaging the trolleys. Thus, it will be seen that modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. An overhead track for controlled turning of suspended carcasses comprising:

a rail forming a sinuous portion;

trolleys advancable along the rail;

hangers rotatably mounted on the trolleys for suspending carcasses therefrom;

means for positively advancing the trolleys along the rail; and

stationary abutments disposed laterally of the rail at one side thereof each opposite one of the concave bends of the rail to engage the hangers passing along the rail, at a location spaced from the rotational center of the hanger to rotate the hangers so that the carcasses suspended from the hangers will

be turned continuously when carried along the sinuous portion of the rail.

2. An overhead track as claimed in claim 1, wherein the driving means comprises an endless chain having driving dogs for engagement with the trolleys and wherein the chain is guided by sprockets disposed at opposite sides of the rail, to substantially follow the sinuous portion thereof.

3. An overhead track as claimed in claim 2, wherein each abutment comprises a stub shaft, the stub shafts being arranged coaxially with the rotational axes of the sprockets on said one side of the rail.

4. An overhead track as claimed in claim 3, wherein the stub shafts each are provided with a roller rotatably mounted thereon.

5. An overhead track as claimed in claim 4, wherein alternate rollers each have a portion of greater diameter than that of the rest of the rollers.

6. An overhead track as claimed in claim 1, wherein there is provided after a row of abutments at one side of a first sinuous portion of the rail a row of abutments at the other side of a second sinuous portion of the rail.

7. An overhead track as claimed in claim 6, wherein a straight portion of the rail is provided between said first and second sinuous portions of the rail.

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