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PATENTS ACT 1990

PATENT REQUEST: STANDARD PATENT

I/We, the Applicant(s)/Nominated Person(s) specified below, request I/We be granted a patent for the invention disclosed in the accompanying standard complete specification.

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[54] Invention Title:

Wheeled Luggage Tipper

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By:



Registered Patent Attorney

IRN: 314244

INSTR CODE: 53409

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NOTICE OF ENTITLEMENT

I, John Gordon Hinde, of Spruson & Ferguson, St Martins Tower, 31 Market Street, Sydney, New South Wales 2000, Australia, being the patent attorney for the Applicant(s)/Nominated Person(s) in respect of Application No 32984/95 state the following:-

The Applicant(s)/Nominated Person(s) has/have entitlement from the actual inventor(s) as follows:-

The Applicant(s)/Nominated Person(s) is/are the assignee(s) of the actual inventor(s).

The Applicant(s)/Nominated Person(s) is/are the applicant(s) of the basic application(s) listed on the Patent Request. The basic application(s) listed on the Patent Request is/are the first application(s) made in a Convention Country in respect of the invention.

DATED this FIRST day of NOVEMBER 1995



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- (57) Claim

1. A conveyor for transporting an item comprising:
a belt;
a frame having first and second end portions and an intermediate section located at a lower elevation than at least one of said first and second end portions and comprising a V-shaped support structure for said belt, said support structure comprising at least one pair of idler rollers mounted to said frame for supporting said belt in a V-shaped configuration; and,
means for driving said belt about said frame.

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AUSTRALIA
PATENTS ACT 1990

COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

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Invention Title:

Wheeled Luggage Tipper

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

WHEELED LUGGAGE TIPPER**Background of the Invention****I. Field of the Invention**

The present invention relates generally to a conveyor. More particularly, the present invention relates to a conveyor for tipping items, such as wheeled luggage, to a prone position onto a conveyor.

II. Description of the Relevant Art

Conveyors having a continuous belt for transporting items from a receiving point to a dispensing point are well known. Previous continuous belt conveyors disclose a continuous belt conveyor for transporting cement and other fine-grained particles. Edges of the belt are joined together to form a tubular conveyor to support the cement during transport to a discharge station.

A troughing type conveyor may be used to transport granular material, such as coal. For instance, a belt conveyor having a U-shaped trough may be equipped with vibrating troughing idler rollers to impart a steady vibration to the conveyor belt causing the coal to migrate toward the center of the belt during conveyance. These types of conveyors are not well suited for many types of items, such as boxes and luggage.

Also known are belt conveyor systems for use in airport terminals to deliver luggage to and from passengers. In such systems, the luggage is frequently carried sequentially by a number of belts. The luggage is placed on the conveyor system in an upright position by a baggage handler. However, luggage, particularly wheeled luggage, has a tendency to move out of alignment as it is being transferred from belt to belt or fall off the belt while it is being transported through the belt conveyor system. Thus, it would advantageous to have a conveyor system which would prevent the misalignment or movement of the luggage off the belt.

Summary of the Present Invention

It is the object of the present invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a conveyor for transporting an item comprising:
a belt;

a frame having first and second end portions and an intermediate section located at a lower elevation than at least one of said first and second end portions and comprising a V-shaped support structure for said belt, said support structure comprising



at least one pair of idler rollers mounted to said frame for supporting said belt in a V-shaped configuration; and,

means for driving said belt about said frame.

Preferably, the rollers in each of said at least one pair of idler rollers are angled with respect to each other.

Preferably, said frame first end portion is generally horizontal.

Preferably, said frame second end portion is generally horizontal.

Preferably, said idler rollers are mounted to said frame at an angle of about 20 degrees to the horizontal.

Preferably, the rollers of said at least one pair of rollers are offset from one another in the direction of travel of said belt.

Preferably, said at least one pair of idler rollers comprises a first set of rollers forming a first side of said V-shaped support structure and a second set of rollers forming a second side of said V-shaped support structure, and wherein at least some of said rollers in said first set of rollers are offset from said rollers in said second set of rollers in the direction of travel of said belt.

There is further disclosed herein a conveyor for transporting an item in a direction comprising:

a belt;

a frame for supporting said belt, said frame including first and second generally horizontal end portions for supporting said belt in a generally horizontal orientation and a V-shaped trough portion comprising a plurality of idler rollers angled with respect to the horizontal located between said end portions and lower than at least one of said end portions; and,

drive means for driving said belt along said frame.

Preferably, said frame comprises first and second generally parallel side supports and a central trough support located between, below and parallel to said side supports, and wherein said trough portion comprises a first roller connected between said first side support and said trough support and a second roller connected between said second side support and said trough support.

Preferably, said first roller is connected to said trough support at a first location and said second roller is connected to said trough support at a second location, said first location being offset from said second location in said direction.

There is still further disclosed herein a method for tipping a discrete object from an unstable orientation into a stable orientation comprising the steps of:

providing a conveyor including a belt and a frame, said frame having a first section and a second section;



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providing a V-shaped trough in said second section at a lower elevation than
said first section;

providing belt support means in said first and second sections;

placing said objects onto said belt upstream from said trough; and,

5 operating said conveyor to move said belt and said objects through said trough.

Brief Description of the Drawing

A preferred form of the present invention will now be described by way of
example with reference to the accompanying drawings, wherein:

10 FIG. 1 is plan view of the conveyor system according to a preferred
embodiment of the present invention;

FIG. 2 is a fragmentary plan view showing the area of the conveyor system
according to a preferred embodiment of the present invention that forces the orientation
of material in a prone position onto a main conveyor system;



FIG. 3 is a side of a preferred embodiment of the present invention; and

FIG. 4 is a sectional view of the embodiment of Fig. 3.

Detailed Description of a Preferred Embodiment of the Present Invention

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With reference to Fig. 1, a conveyor 10 particularly suited for tipping an item 40, such as a piece of luggage, is thereshown. The conveyor system 10 includes a main frame 14 having a pair of longitudinally extending parallel spaced rails 16. The conveyor system 10 further includes a continuous belt 18 extending between the parallel spaced rail 16. A power driving assembly is provided within the main frame 14 for moving the belt 18 horizontally about the main frame 14. Although the system shown is particularly suited for luggage, the system may be used for any item which has a relatively high center of gravity in one alignment and a lower, more stable, center of gravity in a second alignment.

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The power driving assembly includes a motor (not shown) for driving a drive wheel 20. The drive wheel 20 fictionally engages belt 18 to move the belt about the main frame 14. The belt 18 is supported along a path of conveyance 48 by idler rollers 28 and drums 50. The drums 50 rotate freely to guide belt 18 as it is being driven by drive wheel 20. A take-up assembly is provided opposite the drive wheel 20 along the conveyor path 48. The take-up assembly includes three drums 52, 54, 56, each freely rotatable. The take-up assembly provides tension to belt 18. If the belt 18 becomes stretched through use and does not fictionally engage drive wheel 20, take-up assembly drum 52 is moved inwardly toward drive wheel 20 to tighten the slack in belt 18. Take-up assembly drum 52 may also be moved outward away from drive wheel 20 to increase the slack in belt 18, thereby increasing the frictional engagement of belt 18 along the idler rolls 28. Increasing the slack of belt 18 may be necessary to create the V-shaped profile desired to allow material 40 to fall into a prone position.

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As shown in Fig. 1, the conveyor includes an in-feed conveyor section 22 extending from one end of the frame 14 for

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receiving an item 40. Preferably, the in-feed conveyor section 22 extends along a horizontal plane 34 parallel to spaced rail 16.

5 The conveyor also includes a discharge conveyor section 24 extending from an opposite end of the main frame 14 for delivering luggage 40 onto a main conveyor system 12 after the luggage has been tipped to a more stable configuration. The discharge conveyor section 24 also extends along a horizontal plane 36 parallel to the spaced rails 16.

10 An intermediate conveyor section 26 extends between the in-feed conveyor section 22 and the discharge conveyor section 24. As best shown in Figs. 2 and 4, the intermediate conveyor section 26 operates to ensure the item 40 is transferred from the belt conveyor system 10 to the main conveyor system 12 in a prone position by providing a V-shaped section of the belt 18. The V-shaped section has two longitudinal portions which are angled at approximately 140° to each other. The longitudinal portions are supported on a series of troughing roller idler assemblies 28 as shown in Fig. 3.

15 With reference to Figs. 2 and 4, each idler assembly includes a pair of idler rollers 30. One end of the roll is rotatably mounted in bracket 42 mounted to a side portion of the main frame and an other end is mounted in a lower bracket 44 which is supported on a crosspiece 46 extending perpendicularly between the spaced rails 16. The rollers are mounted on an inclined axis 25 38 of approximately 20 degrees from the horizontal plane. For items such as luggage the 20 degree angle from horizontal ensures that the troughing roller idler assembly 28 will support the continuous belt 18 in a V-shaped contour 32.

30 With reference to Fig. 1, the preferred embodiment of the conveyor 10 of the present invention is shown in use. The item 40, such as wheeled luggage, is set upon the conveyor 10 at the in-feed section. The wheeled luggage 40 has been set upon the conveyor 10 in an upright position or relatively unstable position.

35 As the item approaches the intermediate section 26 of the conveyor 10, the continuous belt 18 forms a V-shaped contour 32 defined by the troughing roller idler assemblies 28 due to gravity

and the weight of the wheeled luggage 40. Luggage which is unstable because of a high center of gravity will fall to either side of the V of the belt and thus travel in a prone position to the discharge section 24.

5 As the luggage 40 approaches the discharge section 24 of the conveyor, the luggage 40 has a tendency to stay in the prone position as it enters the horizontal plane 36 defined by the discharge section 24. As such, luggage 40 is fed onto a main conveyor system 12 in a prone position.

10 Having described my invention, however, many modifications, such as use of driven rollers rather than a belt to move the luggage through a V-shaped section, will become apparent to those skilled in the art. These and other changes are within the spirit of the invention as defined by the scope of the appended
15 claims.

The claims defining the invention are as follows:

1. A conveyor for transporting an item comprising:
a belt;

a frame having first and second end portions and an intermediate section
5 located at a lower elevation than at least one of said first and second end portions and
comprising a V-shaped support structure for said belt, said support structure comprising
at least one pair of idler rollers mounted to said frame for supporting said belt in a
V-shaped configuration; and,

means for driving said belt about said frame.

10 2. A conveyor according to claim 1 wherein the rollers in each of said at
least one pair of idler rollers are angled with respect to each other.

3. A conveyor according to claim 2 wherein said frame first end portion
is generally horizontal.

15 4. A conveyor according to claim 3 wherein said frame second end
portion is generally horizontal.

5. A conveyor according to claim 1 wherein said idler rollers are
mounted to said frame at an angle of about 20 degrees to the horizontal.

20 6. The conveyor as set forth in claim 1 wherein the rollers of said at least
one pair of rollers are offset from one another in the direction of travel of said belt.

7. The conveyor as set forth in claim 1 wherein said at least one pair of
idler rollers comprises a first set of rollers forming a first side of said V-shaped support
structure and a second set of rollers forming a second side of said V-shaped support
structure, and wherein at least some of said rollers in said first set of rollers are offset
from said rollers in said second set of rollers in the direction of travel of said belt.

25 8. A conveyor for transporting an item in a direction comprising:
a belt;

a frame for supporting said belt, said frame including first and second
generally horizontal end portions for supporting said belt in a generally horizontal
orientation and a V-shaped trough portion comprising a plurality of idler rollers angled
30 with respect to the horizontal located between said end portions and lower than at least
one of said end portions; and,

drive means for driving said belt along said frame.

35 9. A conveyor according to claim 8 wherein said frame comprises first
and second generally parallel side supports and a central trough support located
between, below and parallel to said side supports, and wherein said trough portion
comprises a first roller connected between said first side support and said trough
support and a second roller connected between said second side support and said trough
support.



10. A conveyor according to claim 9 wherein said first roller is connected to said trough support at a first location and said second roller is connected to said trough support at a second location, said first location being offset from said second location in said direction.

5 11. A method for tipping a discrete object from an unstable orientation into a stable orientation comprising the steps of:

providing a conveyor including a belt and a frame, said frame having a first section and a second section;

10 providing a V-shaped trough in said second section at a lower elevation than said first section;

providing belt support means in said first and second sections;

placing said objects onto said belt upstream from said trough; and,

operating said conveyor to move said belt and said objects through said trough.

15 12. A conveyor substantially as hereinbefore described with reference to the accompanying drawings.

13. A method for tipping a discrete object substantially as hereinbefore described with reference to the accompanying drawings.

Dated 21 May, 1998

Jervis B. Webb International Company

20 **Patent Attorneys for the Applicant/Nominated Person**

SPRUSON & FERGUSON



Wheeled Luggage Tipper

ABSTRACT

The invention relates to a conveyor (10) that ensures the orientation of an item (40) in a prone position when the item is fed onto a main conveyor (12). By ensuring the orientation of an item in a prone position, the invention can be used to transport luggage or equipment, such as wheeled luggage or golf bags, to an end distribution area. The conveyor (10) provides for an in-feed section (22), an intermediate section (26) and a discharge section (36) of a conveyor. The in-feed and 10 discharge sections both run parallel to the main support frame of the conveyor and provide a flat area to receive and discharge the material to be transported. The intermediate section (26) extends between the receiving and delivery section and discharge section of the conveyor and has a V-shaped contour so as to tip the item (40) being transported into a prone position.

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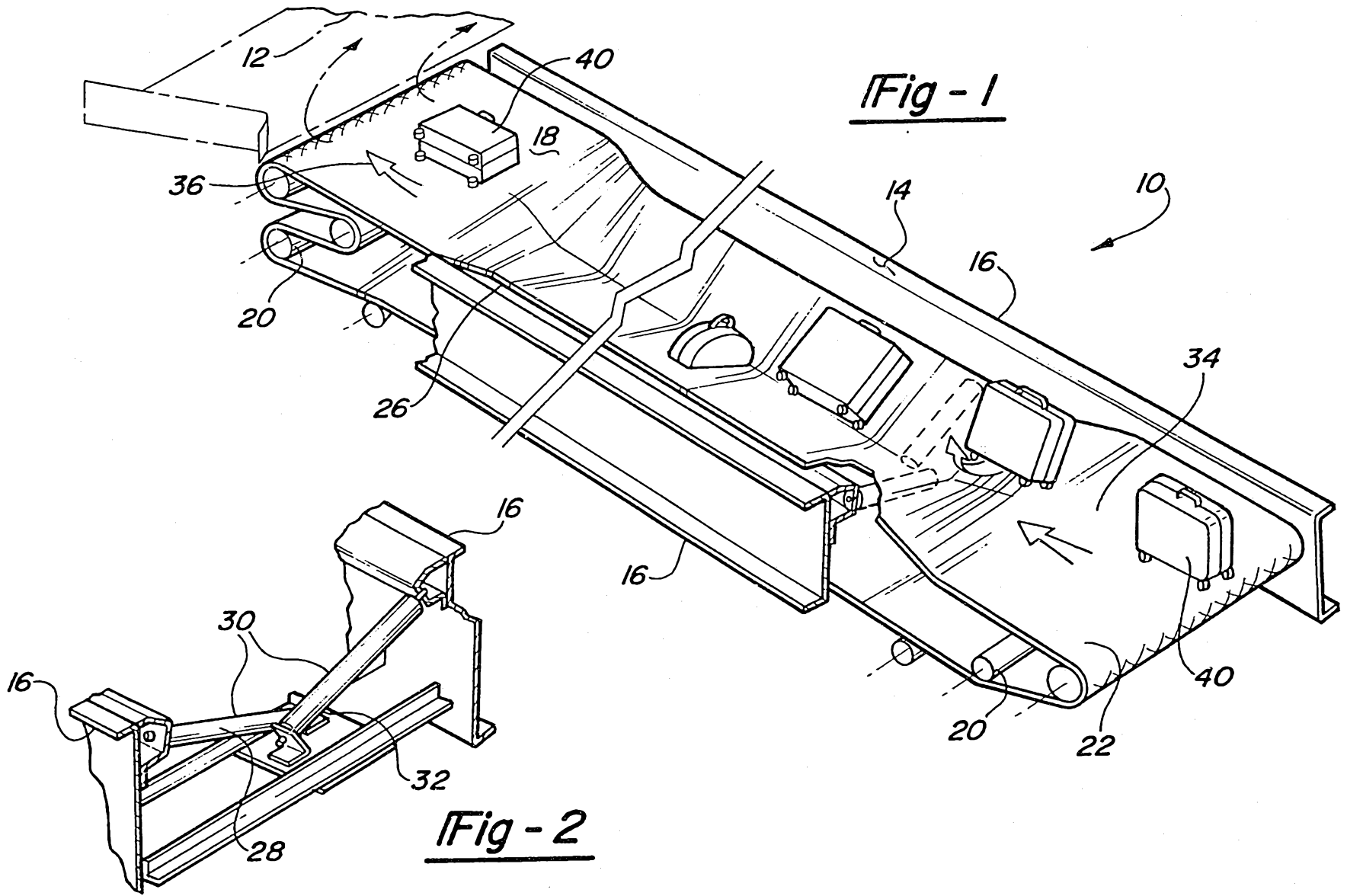


Fig - 1

Fig - 2

1/2

32984/95

212 2/12

Fig - 3

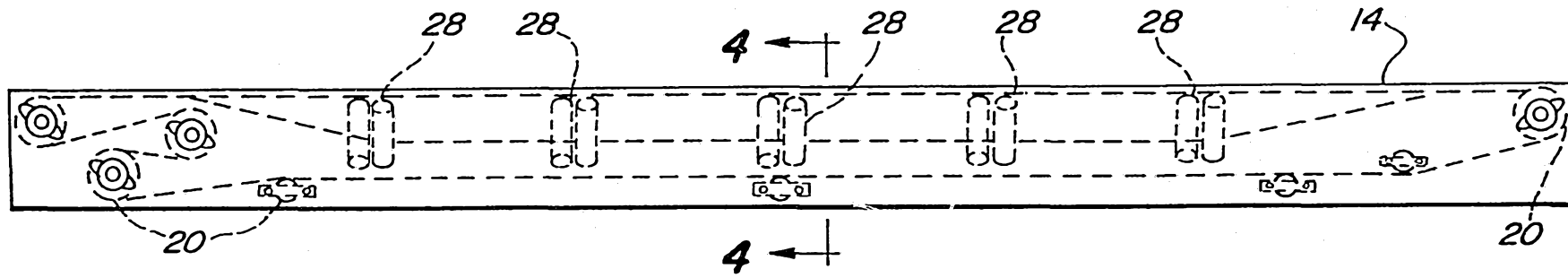
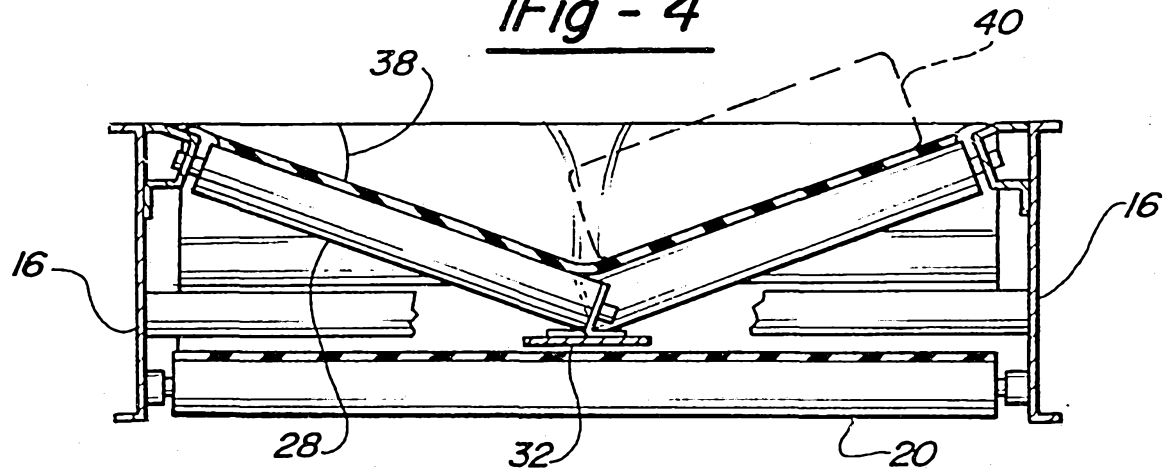


Fig - 4



2/12

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