United States Patent

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[54] **MATERIAL HANDLING ELEVATOR**
5 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **198/141,** 198/207, 198/208
[51] **Int. Cl.** **B65g 17/12**
[50] **Field of Search** 198/207, 168, 141, 170, 200; 214/44A, 16, 17.6

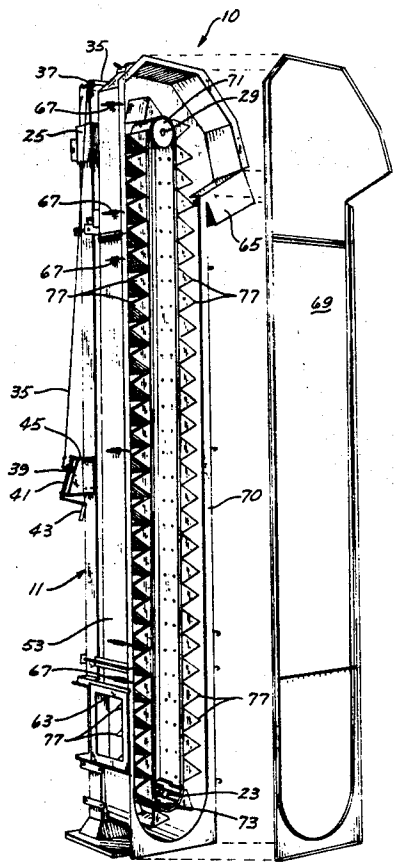
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ABSTRACT: A material handling elevator for food materials or the like including a vertical support post having a first bearing means rigidly secured thereto adjacent the lower end thereof and a second bearing means vertically slidably mounted thereon adjacent the upper end thereof. A driven shaft extends through the second bearing means laterally from the post and an idler shaft is mounted in the first bearing means and extends laterally therefrom. The shafts support a cup conveyor belt means movably mounted thereon and which is enclosed by a casing secured to the support post. One side of the casing is enclosed by a removable cover to facilitate the cleaning of the interior of the casing.



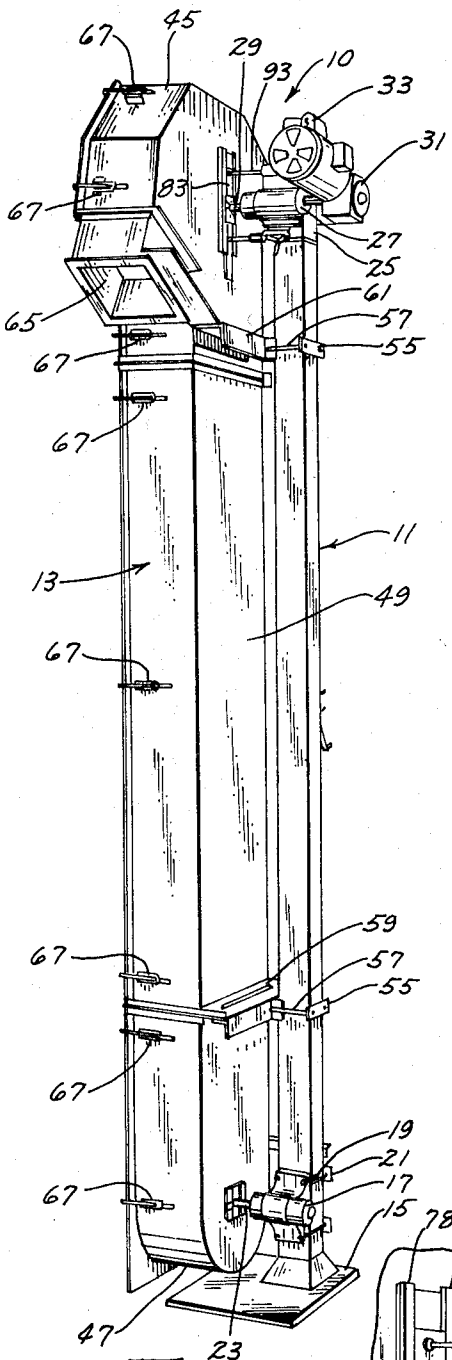


Fig. 1

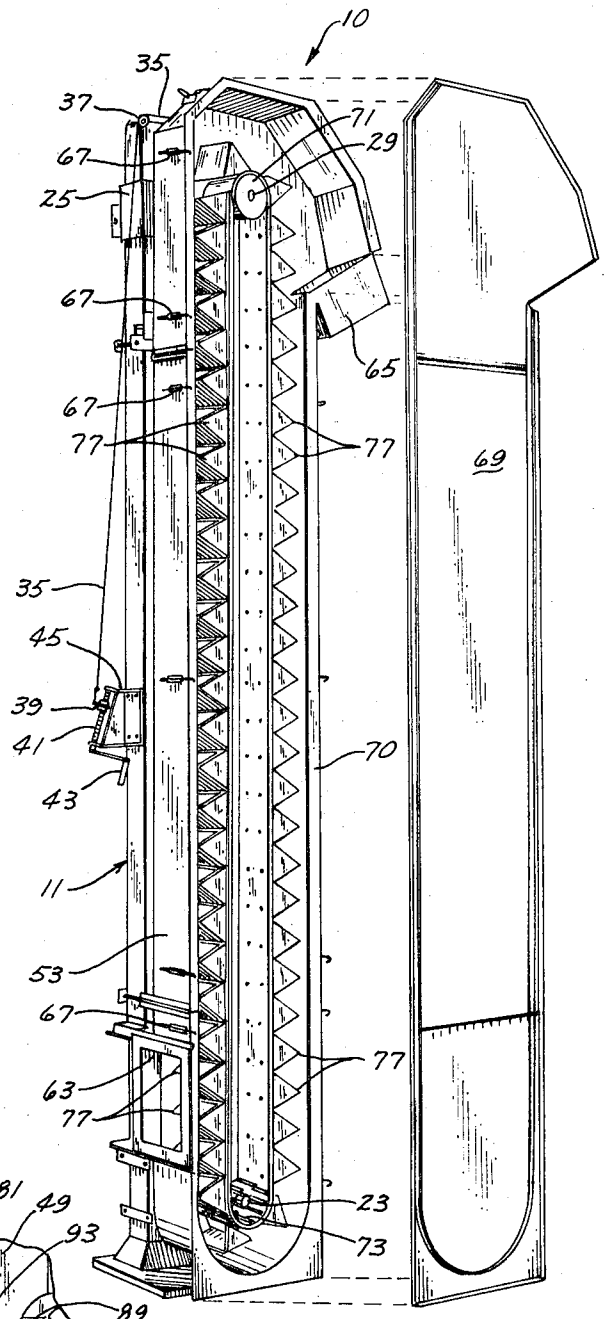


Fig. 2

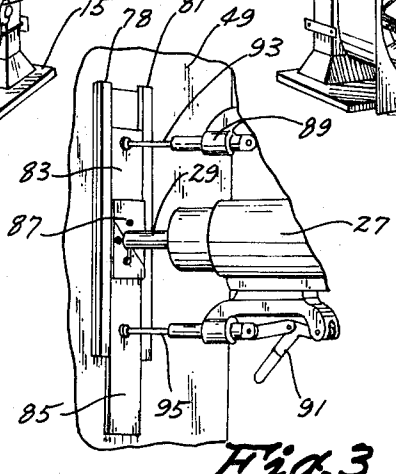


Fig. 3

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MATERIAL HANDLING ELEVATOR

Conventional material handling elevators rely upon the inherent strength of the casing to support themselves. Thus, if the elevator is constructed of a stainless steel material so as to permit its usage in a food handling environment, the cost of constructing the elevator would be prohibitive due to the fact that the casing of the elevator would have to be made strong enough to support the entire weight of the elevator. Additionally, the conventional elevators do not provide a means whereby the interior of the elevators can be conveniently cleaned which is necessary in the food industry.

Therefore, it is a principal object of this invention to provide a material handling elevator for use in the food industry.

A further object of this invention is to provide a material handling elevator including a vertical support post which supports the elevator casing.

A further object of this invention is to provide a material handling elevator having means thereon to adjust the tension in the conveyor belt.

A further object of this invention is to provide a material handling elevator including an elevator casing having one side thereof removably closed by a cover means.

A further object of this invention is to provide a material handling elevator which may easily be cleaned.

A further object of this invention is to provide a material handling elevator including a support post and bearing means associated therewith which will be common to various types of elevators regardless of the material of the casing.

A further object of this invention is to provide a material handling elevator which is freestanding.

A further object of this invention is to provide a material handling elevator which includes a stainless steel casing.

A further object of this invention is to provide a material handling elevator which is economical of manufacture, durable in use and refined in appearance.

These and other objects will be apparent to those skilled in the art.

This invention consists in the construction, arrangements, and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in the claims, and illustrated in the accompanying drawings in which:

FIG. 1 is a side perspective view of the elevator;

FIG. 2 is a perspective view of the elevator illustrating the casing cover removed therefrom; and

FIG. 3 is a fragmentary perspective view of the top bearing means and the removable slot and shaft seal associated therewith.

The elevator of this invention is generally designated by the reference numeral **10** and includes a support post **11** and a casing **13** secured thereto at one side thereof. A base plate **15** is secured to the lower end of post **11** by welding or the like and would normally be secured to a supporting surface such as a floor or the like. A conventional double bearing means **17** of the ball bearing type is detachably secured to post **11** adjacent the lower end thereof by any convenient means such as by bolts **19** and clamps **21**. An idler shaft **23** preferably constructed of a stainless steel material is mounted in bearing means **17** and extends laterally therefrom as seen in FIG. 1,

A square tube **25** is slidably mounted on the upper end of post **11** and has a conventional bearings **27** of the ball-bearing double-pillow block type secured thereto by any convenient means. A shaft **29** preferably constructed of a stainless steel material is mounted in bearing means **27** and is operatively secured to and driven by a gear reducer means **31** which is driven by a conventional motor **33**. Gear reducer means **31** is supported by shaft **29** and supports motor **33**. A torque arm (not shown) is connected to gear reducer means **31** and is connected to tube **25** to prevent counterrotation of gear reducer means **31** and motor **33**. A cable **35** is secured to tube **25** and passes over a pulley **37** which is rotatably secured to the upper end of post **11** as viewed in FIG. 2. The lower end of cable **35** is secured to a threaded member **39** which is threadably mounted on a bolt member **41** having a crank handle **43** secured to one end thereof as seen as in FIG. 2. Bolt member **41** is rotatably mounted on a bracket means **45** which is secured to one side of post **11** by bolts or the like. The rotation of crank handle **43** causes bolt member **41** to be rotated which causes threaded member **39** to longitudinally move along the length of bolt member **41** thereby raising or lowering square tube **25** on post **11**.

Casing **13** includes an upper end **45**, lower end **47**, back wall **49**, and opposite sidewalls **51** and **53**. Casing **13** is secured to post **11** by means of clamp assemblies **55** and **57** secured to post **11** and being connected to braces **59** and **51** which are secured to casing **13** as illustrated in FIG. **1**.

Casing **13** is provided with an inlet opening **63** formed in side **53** adjacent the lower end thereof which is adapted to receive the material from any convenient means such as a hopper, adapter, etc. Casing **13** is provided with a discharge spout means **65** at its upper end as illustrated in FIGS. **1** and **2**. A plurality of pivotal locking levers **67** are pivotally secured to casing **13** as illustrated in FIGS. **1** and **2** and are adapted to lock the cover **69** on casing **13** at the open side **70** thereof. Pulley **71** is mounted on shaft **29** in casing **13** and a pulley **73** is mounted on shaft **23** in casing **13**. The numeral **75** designates a belt which extends around the pulleys **71** and **73** as illustrated in FIG. **2** and has a plurality of cups **77** mounted thereon adapted to convey the material from inlet opening **63** to discharge chute means **65**.

FIG. **3** illustrates the relationship of the shaft **29** and the casing **13** which form an important part of this invention due to the fact that shaft **29** is vertically movable so that the tension of the belt **75** can be adjusted. Shaft **29** extends through an elongated vertical slot formed in wall **49** and a pair of guide members **78** and **81** are secured to wall **49** adjacent opposite sides of the elongated vertical slot. Seals **83** and **85** are slidably received between guide members **78** and **81** above and below shaft **29** as illustrated in FIG. **3**. A split seal means **87** embraces shaft **29** as illustrated in FIG. **3** and is secured to seals **83** and **85** by bolts or screws. A pair of locking means **89** and **91** are operatively secured to the tube **25** and are provided with plungers **93** and **95** respectively which are adapted to be moved into engagement with the outer surface of the seals **83** or **85** upon movement of the handle means associated with the locking means to maintain the seals **83** or **85** against the casing. Thus, when it is desired to increase the tension on the belt **75** it is simply necessary to rotate crank **43** in one direction so that threaded element **39** moves downwardly on bolt member **41** thereby causing cable **35** to pull the square tube **25**, motor **33**, gear box **31**, bearing means **27** and shaft **29** upwardly with respect to post **11** and casing **13**. The seals **83**, **85** and **87** vertically move with shaft **29**. It is only necessary to loosen locking means **89** and **91** when it is desired to clean between the casing and the seals.

The elevator of this invention is ideally suited for use in the food handling industry due to the fact that the cover **69** may be easily removed from the casing **13** to facilitate the cleaning of the interior of casing **13** with water, steam, etc. When the elevator is used to handle food materials, casing **13**, cover **69**, shafts **23** and **29**, pulleys **71** and **73** and cup **77** should be constructed of a suitable stainless steel material. The casing **13** and cover **69** may also be constructed of carbon steel, plastic or fibre glass materials. Belt **77** is constructed of a suitable material which will withstand wear and cleaning and be compatible with the material being handled.

Post **11** permits the casing **13** and cover **69** to be constructed of relatively light material since the casing will not have to have the inherent strength to support itself with the drive and belt assembly. Additionally, the elevator of this invention permits a manufacturer to reduce the necessary inventory since post **11**, bearing means **17** and **27**, shafts **23** and **29**, motor **33** and gear box **31** will be common to all manufactured elevators regardless of the particular design of the casing **13**. For example, a particular purchaser may want casing **13** to be constructed of a light sheet metal which would mean that the casing **13** could be manufactured to the desired specifications

and simply mounted on the post 11 and the structure associated therewith which would be the only parts which the manufacturer would be required to maintain on hand. The overall effect of the manufacturing procedure just outlined is that a manufacturer will be able to fill special orders very rapidly due to the fact that the entire elevator will not have to be manufactured upon receipt of the special order.

Thus it can be seen that the device accomplishes at least all of its stated objectives.

I claim:

1. A material handling elevator, comprising:
a vertical support post having upper and lower ends;
an elongated elevator casing secured in a spaced parallel relationship to said support post, said casing having a discharge opening adjacent its upper end and on intake opening adjacent its lower end;
a conveyor means completely housed in said casing;
a power means driving said conveyor means;
said casing having one side thereof closed by a removable cover means;
first and second bearing means secured to said support post;
a first shaft mounted in said first bearing means and having one end extending into said casing;
a second shaft mounted in said second bearing means and having one end extending into said casing;
said power means being operatively connected to said second shaft;
said conveyor means being mounted on said first and second shafts;
said second bearing means being secured to a tube slidably mounted on said support post; and
adjustment means connected to said tube whereby said tube can be moved upwardly on said support post to increase the tension in said conveyor means.

2. The elevator of claim 1 wherein said power means is operatively secured to said tube.

3. A material handling elevator, comprising:
a vertical support post having upper and lower ends;
an elongated elevator casing secured in a spaced parallel relationship to said support post, said casing having a discharge opening adjacent its upper end and on intake opening adjacent its lower end;
a conveyor means completely housed in said casing;
a power means driving said conveyor means;
said casing having one side thereof closed by a removable cover means;
first and second bearing means secured to said support post;
a first shaft mounted in said first bearing means and having one end extending into said casing;
a second shaft mounted in said second bearing means and having one end extending into said casing;
said power means being operatively connected to said second shaft;
a conveyor means being mounted on said first and second shafts; and
said second shaft extending through a vertical slot formed in said casing, said slot being selectively closed by a seal means positioned above and below said second shaft.

4. The elevator of claim 3 wherein said seal means is maintained in position by a pivotal locking means.

5. A material handling elevator, comprising:
a single vertical support post having upper and lower ends;
an elongated elevator casing secured in a spaced parallel relationship to said support post at one side thereof, said casing having a vertically disposed back wall positioned adjacent said support post in a spaced relationship thereto;
said casing having sidewalls extending from said backwall defining a casing interior;
said casing having an access opening having substantially the same configuration as said backwall;
said casing including a cover means removably mounted thereon which closes said access opening;
said casing having a discharge opening adjacent its upper end and an intake opening adjacent its lower end;
a conveyor means completely housed in said casing interior;
a power means driving said conveyor means; and
a plurality of brackets secured to said post between its upper and lower ends and which are secured to said casing for supporting the same said post having a first shaft rotatably secured thereto adjacent its lower end which extends transversely therefrom through said backwall into said casing, said post having a second shaft rotatably secured thereto adjacent its upper end which extends transversely therefrom through said backwall into said casing, said conveyor means being supported on said first and second shafts, said power means being connected to one of said first and second shafts for powering the same.