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Hartwig

[11] **3,815,727**

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[54] **REPLACEABLE TIP FOR END STRIPPER OF TRAVELING GRATE CONVEYOR AND END STRIPPER HAVING SUCH REPLACEABLE TIP**

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[52] **U.S. Cl.** **198/230,** 198/45

[51] **Int. Cl.** **B65g 45/00**

[58] **Field of Search** ..... 198/26, 45, 230, 229; 74/242 R; 165/120; 37/142 R, DIG. 12

[56] **References Cited**

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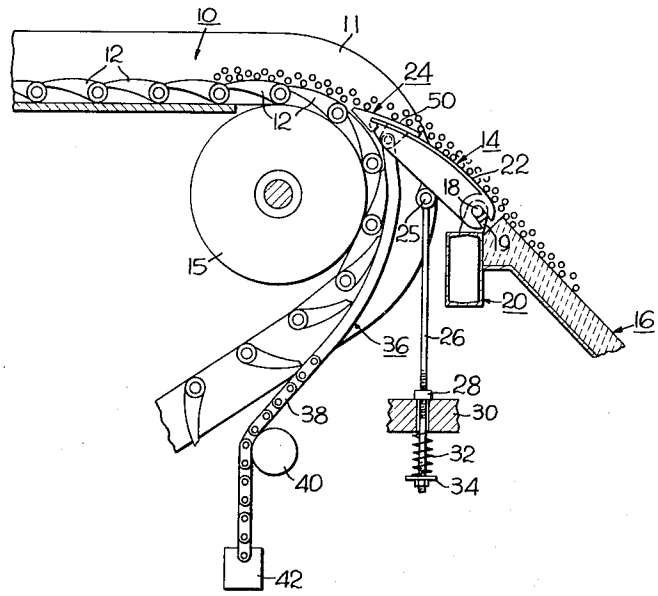
Primary Examiner—Richard E. Aegerter

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[57] **ABSTRACT**

A replaceable stripper tip for the end stripper which strips material such as hot pelletized ore from the discharge end of a traveling grate conveyor such as that used in a Grate-kiln system or the like, and a cooperating main body portion of the stripper which is adapted to receive the replaceable stripper tip. The stripper tip member is adapted for slip-on (or off) engagement with or disengagement from the main body member of the stripper by the use of clip-like lug means or the like on one of said members which interengage with cooperating surfaces on the other of said members. Additionally, the detachable stripper tip when in position is held firmly engaged with the main body of the stripper by a downward tension exerted by a "let-down" bar and associated chain and weight connected to the stripper tip, the "let-down" bar and associated chain and weight also performing the function of limiting the degree of pivotal opening of the empty conveyor grates as they move downwardly toward the lower run of the conveyor.

15 Claims, 4 Drawing Figures



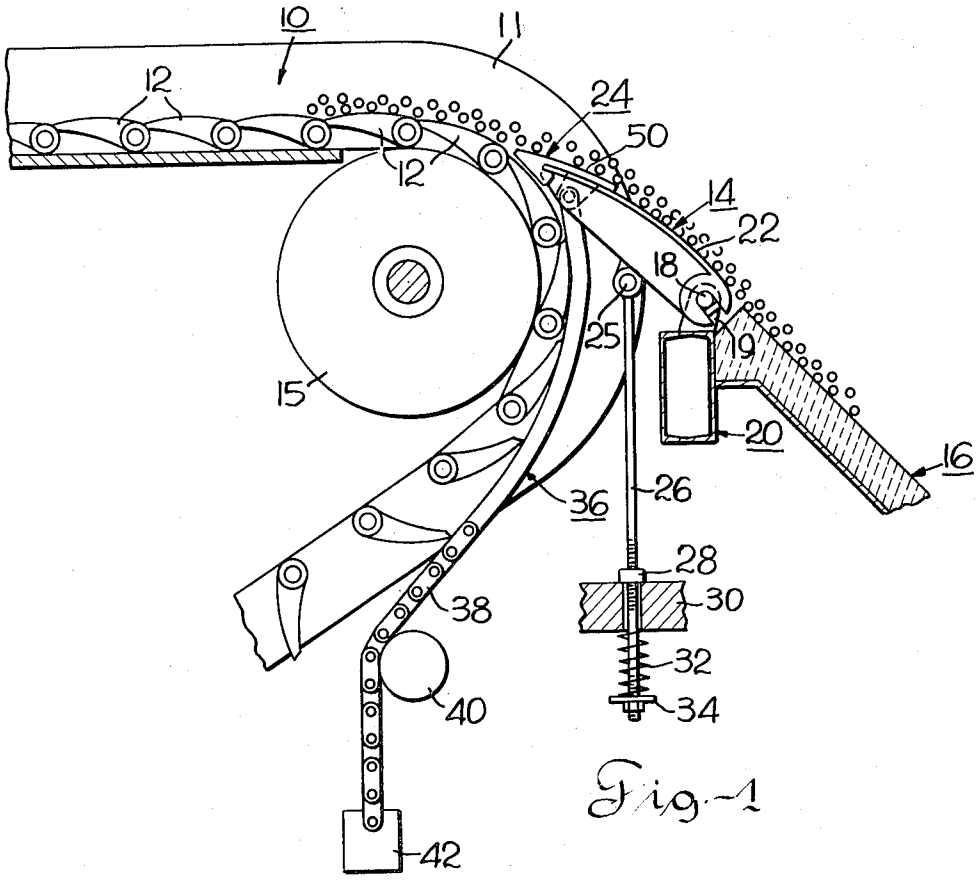

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Fig. 1

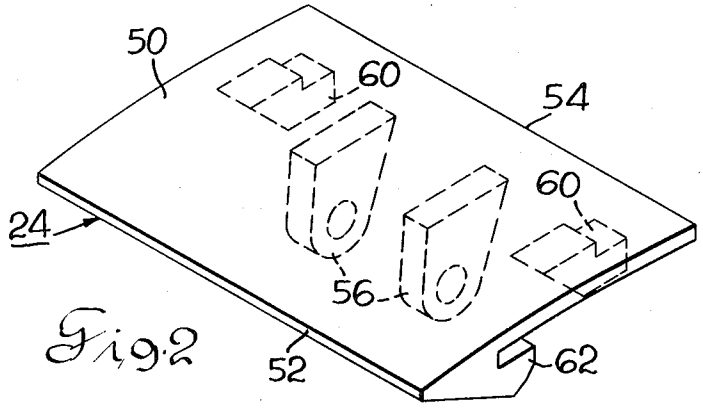

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Fig. 2

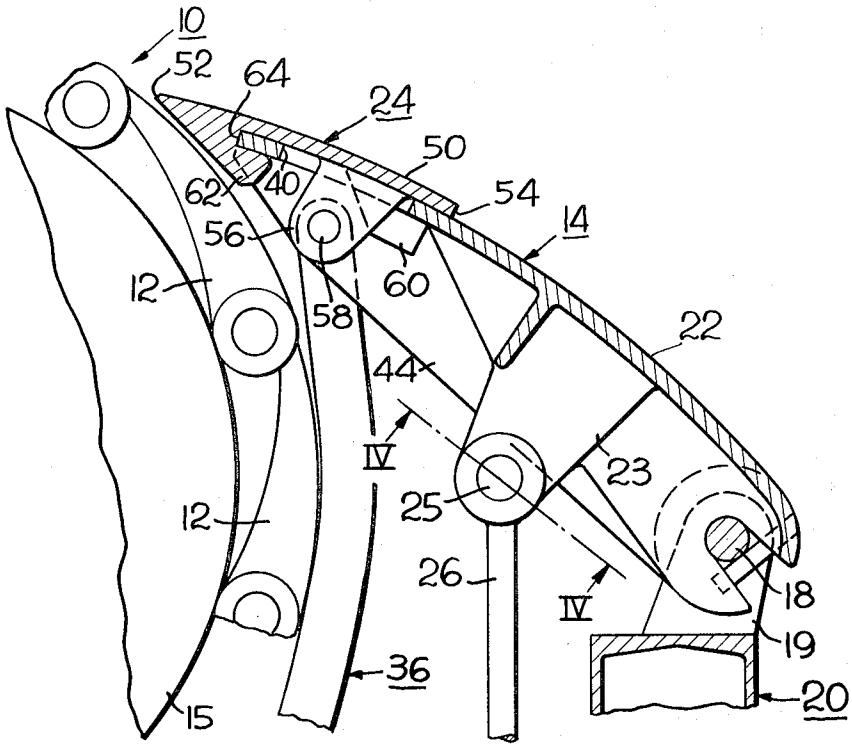

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Fig.3

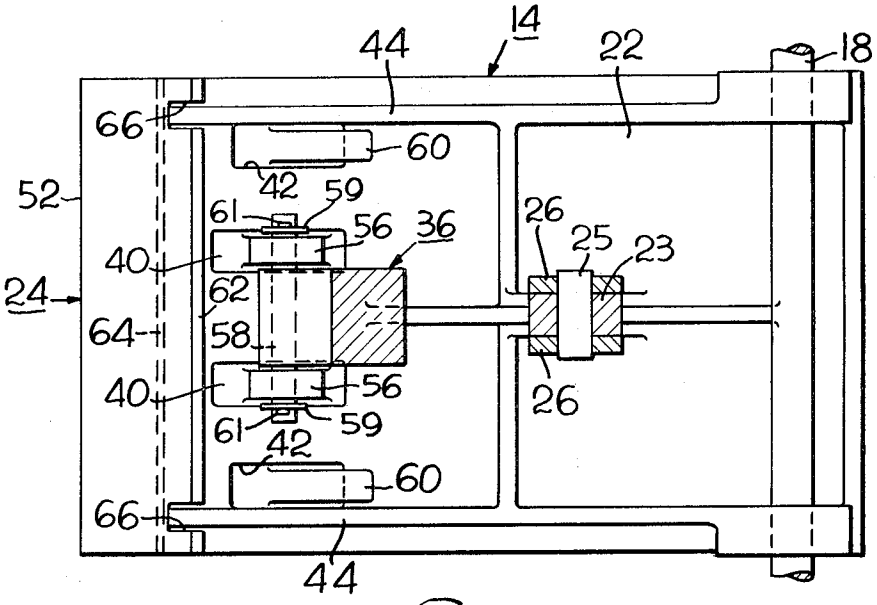

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Fig.4

REPLACEABLE TIP FOR END STRIPPER OF TRAVELING GRATE CONVEYOR AND END STRIPPER HAVING SUCH REPLACEABLE TIP

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to traveling grates of the type used to convey material through a dryer, a furnace, a cooler, or the like, and more particularly to a replaceable tip for the end stripper of such a grate conveyor, and to an end stripper having such a replaceable tip.

2. Description of the Prior Art

It is well known in the prior art to provide what is known as an end stripper (sometimes referred to as a horizontal stripper) which is positioned contiguous the discharge end of a traveling grate conveyor or the like and which strips the material such as hot ore pellets or the like from the discharge end of the grate conveyor for delivery to a rotary kiln where the ore pellets are further processed. An end stripper of the type just described is shown, for example, as element **14** in U.S. Pat No. 3,160,266, Edwards, and is also shown in my copending U.S. Pat. application Ser. No. 216,641 filed Jan. 10, 1972 now U.S. Pat. No. 3,760,872.

The end edge or stripping edge of the end stripper which bears against the grates of the traveling grate conveyor and which strips the material from the grates is subjected to very hard usage, and this stripping edge deteriorates at a much faster rate than the rest of the end stripper. In the prior art, after the stripping edge has become excessively worn, it has often been the practice to remove the entire stripper casting and to replace it with a new stripper casting. Replacement of the entire prior art stripper casting is very expensive not only in terms of the cost of the new casting, but also in terms of labor and lifting equipment required to replace an entire stripper casting, and also in terms of excessive conveyor shut-down time required.

Attempts have also been made to renovate the stripping edge of a worn stripper either by: (1) building a new tip by the deposition of weld metal; or (2) by bolting on or welding on a new stripper edge which replaces the worn stripper edge. The prior art attempts to renovate the stripper edge by welding on or by bolting on a separate metal replacement stripper tip (not the "built-up" weld tip) have proven unsatisfactory due principally to the fact that differentials in expansion between the newly added stripper tip and the rest or main body portion of the stripper have resulted in fracturing or other deterioration of the added stripper tip of the prior art. While prior art replacement stripper tips formed of built-up" weld metal are of reasonably good quality, such "build-up" tips require excessive time for their application.

STATEMENT OF THE INVENTION

Accordingly, it is an object of the present invention to provide an easily replaceable tip construction for the end stripper of a traveling grate conveyor or the like which is economical to manufacture and install (or remove) and which has good operating characteristics.

It is a further object of the invention to provide an easily installable and removable stripper tip for the end stripper of a traveling grate conveyor or the like, and which requires no rigid attaching bolts, welds or the like, which prior art arrangements may be subject to unequal thermal expansions resulting in the shearing of bolts or of welds, and which stripper tip does not require excessive time for its application as in the case of the prior art "built-up weld" type stripper tip.

It is a further object of the invention to provide a repair part (i.e. a replaceable tip) for the end stripper of a traveling grate conveyor or the like which is less expensive and/or more satisfactory in operation than prior art arrangements used in industry when a stripper tip became excessively worn.

It is a still further object of the invention to provide a replaceable tip for the end stripper of a grate conveyor or the like which weighs substantially less than the total stripper weight, and which may be removed or installed with substantially reduced labor time and substantially reduced expensive shut-down time and lifting equipment requirements as compared to removing or replacing a conventional entire stripper casting not having the replaceable tip of the present invention.

It is a further object of the invention to provide a replaceable tip for the end stripper of a traveling grate conveyor or the like, which end tip, while being easily secured in position on the stripper or removed from the stripper as desired, is held securely in place when in position on the stripper not only by the interengagement of the stripper tip with the main body portion of the stripper, but also by the tension exerted on the stripper tip by the "let-down" bar (sometimes popularly known in the art as a "banana bar") together with any chains or weights which may be secured to the "let-down" bar.

In achievement of these objectives there is provided in accordance with an embodiment of the invention a replaceable stripper tip for the end stripper which strips material such as hot pelletized ore from the discharge end of a traveling grate conveyor such as that used in a Grate-Kiln system or the like, and a cooperating main body portion of the stripper which is adapted to receive the replaceable stripper tip. The stripper tip member is adapted for slip-on (or off) engagement with or disengagement from the main body member of the stripper by the use of clip-like lug means or the like on one of said members which interengage with cooperating surfaces on the other of said members. Additionally, the detachable stripper tip when in position is held firmly engaged with the main body of the stripper by a downward tension exerted by a "let-down" bar and associated chain and weight connected to the stripper tip, the "let-down" bar and associated chain and weight also performing the function of limiting the degree of pivotal opening of the empty conveyor grates as they move downwardly toward the lower run of the conveyor.

Further objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view in vertical elevation of the discharge end of a traveling grate conveyor showing an assembled stripper including a replaceable tip in accordance with the invention;

FIG. **2** is a perspective view of the replaceable stripper tip;

FIG. 3 is an enlarged view partially in vertical section of an assembled stripper having a replaceable tip in accordance with the invention; and

FIG. 4 is a bottom plan view of an assembled stripper including the replaceable stripper tip, taken along line IV—IV of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1**, there is diagramatically shown a traveling grate conveyor generally indicated at **10** of the type used for conveying heated pelletized ore or the like to a rotary kiln. The conveyor **10** includes a plurality of pivotally mounted grate members **12** and a conveyor side wall schematically indicated at **11** which pass around end shaft **15** at the discharge end of the conveyor. Heated pelletized ore or the like which reaches the end of the upper run of grate conveyor **10** at the discharge end of the conveyor is stripped from the grate conveyor by an end stripper member (sometimes referred to as a "horizontal" stripper member) generally indicated at **14**, the stripper member **14** delivering the stripped ore to an inclined chute generally indicated at **16** over which the ore passes to a rotary kiln or the like (not shown) for further processing. Stripper member **14** is pivotally supported at **18** by a suitable pivotal support means **19** mounted on the upper surface of the steel support beam generally indicated at **20**.

The stripper member **14** includes what might be termed a "main body portion" **22** which extends from the pivotal connection **18** to a point contiguous the path of the conveyor **10** where the conveyor passes around the end shaft **15**. The replacement tip generally indicated at **24** of the stripper **14** is suitably detachably secured to the end of the main body portion **22** of the stripper **14** in a manner which will be described hereinafter more fully.

The main body portion **22** of the stripper **14** is pivotally connected intermediate its length (its left-to-right dimension relative to the view of FIG. **1**) by means of projection **23** and pivot pin **25** to the upper end of a vertical rod **26** which is used for adjusting the angular position and clearance of stripper **14** relative to the discharge end of the grate conveyor. Rod **26** is externally threaded at least in the portion thereof in the region of the nut member **28**. The rod **26** passes through a suitable passage in a stationary stop member or structure **30**. A spring **32** bears against an abutment **34** carried by the lower end of rod **26** beneath the stationary stop member **30** in such manner as to bias rod **26** downwardly to a position in which nut member **28** on rod **26** abuts against the upper surface of the stop **30** or against a stop plate bearing against the upper surface of the stop **30**. By suitably adjusting the nut **28** to a predetermined position on the threaded portion of rod **26**, the angular position and clearance of stripper **14** relative to the discharge end of the grate conveyor **10** can be suitably adjusted. At the same time, the spring bias arrangement provided by spring **32** and the rest of the structure just described permits stripper **14** to swing in a clockwise direction with respect to the view shown in FIG. **1** if necessary to permit passage of an otherwise obstructing pellet or the like attempting to pass between the discharge end of the grate conveyor **10** and the stripping edge of stripper **14**. In a typical installation there may be a clearance of 1/16 inch, for example, between the under surface of the stripper tip **24** of stripper member **14** and the facing surface of the grates **12** on moving grate conveyor **10**.

A "let-down" bar (or "banana bar") generally indicated at **36** is connected to the under surface of the stripper tip **24** in a manner which will be more fully described hereinafter. A roller-type chain **38** is connected to the lower end of the "let-down" bar **36** and the chain passes over a sprocket, roller, or the like **40**. A suitable biasing weight (typically **350** pounds) indicated at **42** is connected to the lower end of chain **38** at a level below that of the sprocket **40**.

One function of the "let-down" bar **36** and the connected chain **38** and weight **42**, as already known per se in the prior art, is for let-down bar **36** and chain **38** to bear against the grate members **12** under the influence of the biasing force of weight **42** as grate members **12** are moving downwardly about the end shaft **15** after having passed the stripper tip **24**. The bearing effect and weight of the "banana" bar **36** and the chain **38** together with the biasing effect of weight **42** are such as to prevent an extreme pivotal opening movement of the grates **12** as they move around shaft **15** toward the lower run of the conveyor. An extreme pivotal opening movement of the grates **12** in this region might cause the grates to become undesirably interlocked with each other, and "let-down" bar **36**, chain **38**, and weight **42** cooperate to permit a gradual opening of grates **12** as they approach the lower or return run of the grate conveyor.

A grate conveyor of the type used to convey pelletized ore or the like typically may extend for a length of about 150 to 200 feet from the head shaft sprocket to the tail shaft sprocket thereof. Such a conveyor typically may have a lateral width of about 15 to 18 feet. The temperature of the stripper **14** during operation of the conveyor typically may be in the range 1700°–1900° Fahrenheit.

The stripper assembly herein described typically may extend a lateral distance of approximately 1½ to 2 feet of the total lateral width of the conveyor at the discharge end of the conveyor, and a plurality of similar stripper assemblies are positioned in side-by-side relation to complete the entire lateral width at the discharge end of the conveyor. Thus, assuming the lateral width of the conveyor to be 16 feet, for example, and the lateral width of one of the stripper assemblies described in this application to be approximately 2 feet, for example, then eight stripper assemblies would be required to cover the entire lateral width of the discharge end of the conveyor to strip ore from across the entire lateral width of the discharge end of the conveyor. Each of the stripper assemblies would be similar to that described herein and a separate hold-down bar such as **26** would be provided for each such assembly and a separate "let-down" bar **36** and connected chain **38** and weight **42** would also be provided for each separate stripper assembly.

The two stripper assemblies located at the opposite lateral ends of the discharge end of the conveyor are each additionally provided with a vertical end or side wall at the laterally outer edge of the respective stripper assembly to prevent material passing over the stripper from discharging laterally of the stripper assembly. See stripper end wall 20 in my copending United States patent application Ser. No. 345,231, *Side Stripper For Traveling Grate Conveyor*, filed Mar. 26, 1973. Also,

see wall 15 in U.S. Pat. No. 3,160,266, Edwards. Such a vertical end or side wall could be suitably attached, as by bolts, for example, to the main body portion **22** of stripper **14,** but would also extend in bounding relation to the detachable stripper tip **24** of the respective stripper. The stripper tip **24** would be the same and would engage the main body portion **22** of the stripper **14** in the same manner for the laterally end stripper assemblies as for stripper assemblies intermediate the lateral ends.

All of the stripper assemblies are supported by a common support beam **20** which extends the entire lateral width of the conveyor.

Referring now to FIG. **4,** it will be seen that main body portion **22** of stripper **14** is provided contiguous the end disposed toward the conveyor **10** with two slots or openings each respectively indicated at **40** and laterally spaced from each other but each lying contiguous the central portion of the lateral width of main body portion **22.** The main body portion **22** of the stripper is also provided with two slots each designated at **42** which lie contiguous the oppositely disposed vertical rib members **44,** which rib members depend downwardly (relative to the views of FIGS. **1** and **3**) from the under surface of main body portion **22** of the stripper contiguous the respective opposite lateral edges of main body portion **22.**

The replaceable stripper tip generally indicated at **24** includes an upper body portion **50** which is adapted to overlie the forward part of the upper surface of main body portion **22** of the stripper. The upper body portion **50** of the stripper tip extends from the stripper tip edge **52** which serves as the stripping edge of the stripper tip to the edge **54** which in the view of FIG. **3** with the stripper tip **24** assembled relative to the main body portion **22** of the stripper, lies in overlapped relation to the right, relative to FIG. **3,** of the ends of the respective slots **42** of the main body portion **22.**

Stripper tip **24** is provided with a pair of laterally spaced lug members each indicated at **56** which depend downwardly from the under surface of upper body portion **50** of stripper tip **24,** and are adapted to be received in and project downwardly through the slots **40** of main body portion **22** of the stripper and to project, in the assembled view of FIGS. **3** and **4,** below slots **40** where the spaced lugs **56** are loosely pivotally connected to the upper end of "let-down" bar **36.** A pivot pin member **58** passes through a passage in the upper end of "let-down" bar **36** and through apertures in the spaced lugs **56** of the stripper tip. A washer **59** and a cotter pin **61** are positioned on each of the opposite ends of the pin **58** whereby to retain the pin **58** in position. By the means just described, the "let-down" bar or "banana bar" **36** is pivotally connected to the downwardly projecting lugs **56** of stripper tip **24,** with the "banana bar" **36** being free to pivotally move relative to the stripper tip **24** if required.

A pair of spaced lug-like clip members **60** project downwardly and rearwardly (relative to FIGS. **3** and **4**) from the under surface of upper body **50** of stripper tip **24** and are adapted to be received in and pass through the apertures or slots **42** of main body portion **22** of stripper **14.** Lug-like members **60** are so contoured that when the stripper tip is pushed into position to assemble stripper tip **24** relative to main body portion **22** as will be described hereinafter (and as seen in FIGS. **3** and **4**) lugs **60** are adapted to overlap the ends of slots **42** and to underlie the under surface of main body portion **22** contiguous slots **42.**

The end of stripper tip **24** contiguous stripper edge **52** is provided with a lug-like underhung edge indicated at **62** which extends substantially the entire lateral width of main body portion **22** and is adapted to be received in underlying relation to forward edge **64** of main body portion **22** of stripper **14.** The underhung or underlying edge **62** of stripper tip **24** is provided contiguous the opposite lateral ends thereof with slots **66** which are adapted to receive and interlock with the ends of ribs **44** which underlie main body portion **22** of stripper **14.**

It can be seen that stripper tip **24** is easily installed or removed as desired. Before removal of the stripper tip **24,** the stripper **14** must be swung upwardly or "jacked-up" about its pivot point **18** to raise the tip end of the stripper sufficiently clear of the conveyor grates to permit working on the tip end during removal and subsequent reassembly of the stripper tip. After the stripper tip **24** has been replaced, stripper **14** is returned to its normal position as shown in FIGS. **1** and **3.**

To remove stripper tip **24** from the installed position shown in the drawings, cotter pins **61** are removed from pivot pin **58** which connects stripper tip **24** to the upper end of "let-down" bar **36.** Pin **58** may then be removed from its engagement with the lug-like projections **56** of stripper tip **24** and from its engagement with "let-down" bar **36** to thereby disconnect stripper tip **24** from "let-down" bar **36.** The stripper tip **24** may then be slid forwardly to the left relative to the view of FIGS. **1** and **3** so that the lugs **60** and the underhung edge **62** of stripper tip **24** are moved out from underlying relation with respect to main body portion **22** of the stripper. Stripper tip **24** may then be raised clear of main body portion **22,** lugs **60** and **56** moving out through the respective slots **42** and **40** until stripper tip **24** is clear of main body portion **22** of the stripper.

To assemble stripper tip **24** relative to main body portion **22** of stripper **14** and also relative to the upper end of "let-down" bar **36,** steps which are substantially just the reverse of those just described for the disassembly operation are performed. That is, stripper tip **24** is positioned above main body portion **22** of the stripper with lugs **56** being positioned above slots **40** and with the lugs **60** being positioned above slots **42.** The stripper tip is then moved downwardly toward the main body portion **22** until the respective lugs **56** and **60** have been received in their corresponding slots **40** and **42.** The stripper tip **24** is then slid telescopically to the right relative to FIGS. **1** and **3** toward the main body portion **22** to cause lugs **60** to move into underlying relation to main body portion **22** in overlapped relation to the ends of slots **42,** and to cause underhung edge **62** at the forward end of stripper tip **24** to move into underlying relation to forward edge **64** of main body portion **22** of the stripper. The parts are so dimensioned and the various clearances are such that the engagement of lugs **60** and of underhung edge **62** of the replaceable tip **24** with main body portion **22** will cause replaceable tip **24** to snuggly engage main body portion **22** of the stripper. The downwardly projecting lugs **56** of the stripper tip may then be suitably pivotally connected by means of pivot pin **58,** washers **59** and cotter pins **61** to the upper end of "let-down" bar **36.** In the final assembled relation of stripper tip **24** relative to main body portion **22** of the stripper, the assembly will

then be as shown in FIGS. **1**, **3** and **4** of the drawings.

It should be noted that the engagement of slots **66** in underhung edge **62** of stripper tip **24** with the forward end of ribs **44** serves to positively and centrally locate stripper tip **24** relative to main body portion **22** of the stripper.

It should also be noted that with the parts assembled as shown in the drawing that the connection of the "let-down" bar **36** and the connected chain **38** and weight **42** to the stripper tip **24** by way of the pivotal connection between the "let-down" bar **36** and the projections **56** which extend from the under surface of the stripper tip, performs an important function in helping to maintain stripper tip **24** tightly assembled relative to main body portion **22** of the stripper. Thus the stripper tip is secured in position not only by the interengagement of lugs **60** and of underhung edge **62** of stripper tip **24** with main body portion **22** of the stripper as previously described, but also is additionally secured tightly in assembled relation relative to main body portion **22** by the tension exerted by the weight of the "let-down" bar **36,** chain **38** and weight **42.** For example, the total weight of "let-down" bar **36,** chain **38** and weight **42** may be of the order of magnitude of 500 pounds.

The stripper assembly **14,** including both the main body portion **22** and the stripper tip **24** may be heat resistant steel alloy castings such as Alloy Casting Institute Designation HH, Alloy Type 25Cr-12Ni, American Society of Testing Materials Specification A297, having 11–14 percent nickel content and 24–28 percent chromium content. (See the publication "Stainless Steel and High Alloy Heat Resistant Castings – Corrosion Resistant Castings —Their Engineering Properties and Applications", Copyright (c) 1960 by The International Nickel Company, Inc., One New York Plaza, New York, New York 10004, 4th Edition, August 1968.

As an indication of the economic saving resulting from use of the replaceable stripper tip of the invention, it might be pointed out that if the prior art type one-piece stripper were to be removed and replaced, it is estimated that a four-man crew working 12 hours (48 man-hours) would be required to do the job; whereas to remove and replace a replaceable stripper tip of the type shown and described in this application, it is estimated that a crew of 2 men working 2 hours (4 man-hours) could do the job. It will also be appreciated that the expensive conveyor shut-down time required for removing and replacing the prior art one-piece stripper would be correspondingly greater than the shut-down time required for removing and replacing a replaceable stripper tip in accordance with the invention. The examples just given are for replacing one one-piece stripper or alternatively one replaceable stripper tip either of which, as previously explained, only extends part of the total lateral width of the discharge end of the conveyor since a plurality of strippers are required for the lateral width of the discharge end. The time required per unit decreases if more than one unit (either the prior art one-piece stripper or the replaceable stripper tip of the invention) is replaced. It might also be pointed out that in a typical pelletized ore processing plant in which the end strippers for the grate conveyor are used, plant shut-down for repairs such as those hereinbefore described may result in a loss of the order of magnitude of $5,000 per hour in production.

From the foregoing detailed description of the present invention, it has been shown how the objects of the invention have been obtained in a preferred manner. However, modifications and equivalents of the disclosed concepts such as readily occur to those skilled in the art are intended to be included within the scope of this invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An end stripper adapted to strip material being processed from the discharge end of a grate conveyor, said end stripper comprising a main body member adapted to be supported by stationary support structure at a location in spaced relation from the stripping end of said stripper, and a replaceable stripper tip member adapted to be detachably mounted on said main body member at the stripping end of said stripper, lug-like means on one of said members adapted to detachably interengage with cooperating surfaces on the other of said members, and means on one of said members adapted to be connected to a normally downwardly acting tension means whereby the tension means when connected to said last-mentioned one member acts to engage said stripper tip member and said main body member in firmly assembled relation with each other.

2. An end stripper as defined in claim **1** in which said stripper tip member is adapted to be connected to said tension means.

3. An end stripper as defined in claim **2** in which said replaceable stripper tip member is adapted to be connected to a "let-down" bar which applies downward tension to said stripper tip member whereby to engage said stripper tip member and said main body member in firmly assembled relation with each other.

4. An end stripper as defined in claim **3** in which a chain is connected to said "let-down" bar contiguous an end of said "let-down" bar in spaced relation to the connection of said "let-down" bar to said stripper tip, and a weight is connected to said chain contiguous an end of said chain in spaced relation to the connection of said chain to said "let-down" bar.

5. An end stripper as defined in claim **1** in which said stripper tip member includes first lug-like means in spaced relation from the stripping edge of said tip member and adapted to be received through first aperture means in said main body member in detachably interengaged relation with said main body member, said stripper tip member additionally including second lug-like means contiguous the stripping edge of said tip member and adapted to underlie the forward edge of said main body member contiguous the stripping region and in detachably interengaged relation with said forward edge, and projection means carried by and extending downwardly from said stripping tip member in its assembled position and adapted to be pivotally connected to said tension means.

6. An end stripper as defined in claim **5** in which said main body member is provided with additional aperture means for receiving said projection means of said stripper tip and said projection means extends through said additional aperture means for connection to said tension means.

7. An end stripper as defined in claim **5** in which said second lug-like means of said stripper tip member is an underhung edge which is adapted to extend in underly-

ing relation to said forward edge of said main body member for substantially the entire length of said forward edge in a direction laterally of the grate conveyor.

8. An end stripper as defined in claim **7** in which said main body member of said end stripper is provided with laterally space oppositely disposed rib members projecting in a normally downward direction from the under surface of said main body member, said rib members extending in a direction lengthwise of said main body member substantially to said forward edge, and slot means in said underhung edge of said stripper tip adapted to interegage with the ends of each said rib members contiguous said forward edge.

9. A replaceable stripper tip for the end stripper of a grate conveyor or the like in which said end stripper comprises a main body portion adapted to be supported by stationary support structure at a location in spaced relation from the stripping end of said stripper, said stripper tip being adapted to detachably engage said main body portion of the stripper and including lug-like means adapted to detachably interengage with cooperating surfaces on said main body portion, and additional means projecting downwardly from the normally under surface of said stripper tip and adapted to be connected to a normally downwardly acting tension means whereby the tension means when connected to said stripper tip acts to engage said stripper tip and said main body portion in firmly assembled relation with each other.

10. A replaceable stripper tip as defined in claim **9** in which said downwardly acting tension means comprises a "let-down" bar, and said additional means is pivotally connected to said "let-down" bar whereby said "let-down" bar applies downward tension to said stripper tip to engage said stripper tip and said main body portion in firmly assembled relation to each other.

11. A replaceable stripper tip as defined in claim **10** in which a chain is connected to said "let-down" bar contiguous an end of said "let-down" bar in spaced relation to the connection of said "let-down" bar to said stripper tip, and a weight is connected to said chain contiguous an end of said chain in spaced relation to the connection of said chain to said "let-down" bar.

12. A replaceable stripper tip as defined in claim **9** in which said main body portion includes first and second aperture means and said stripper tip includes first lug-like means in spaced relation from the stripping edge of said tip and adapted to be received through said first aperture means in said main body portion of said stripper in detachably interengaged relation with said main body portion, said stripper tip additionally including second lug-like means contiguous the stripping edge of said tip and adapted to underlie the forward edge of said main body portion contiguous the stripping region in detachably interengaged relation with said forward edge, said additional means being adapted to be pivotally connected to said tension means.

13. A replaceable stripper tip as defined in claim **12** in which said additional means is adapted to extend through said second aperture means carried by said main body portion of said end stripper.

14. A replaceable stripper tip as defined in claim **12** in which said second lug-like means of said stripper tip is an underhung edge which is adapted to extend in underlying relation to said forward edge of said main body portion for substantially the entire length of said forward edge in a direction laterally of the grate conveyor.

15. A replaceable stripper tip as defined in claim **14** in which said main body portion is provided with two laterally spaced rib members which project in a normally downward direction from the under surface of said main body portion, said rib members extending in a direction lengthwise of said main body portion substantially to said forward edge, and said underlying edge of said stripper tip is provided with slot means adapted to interengage with the forward ends of said laterally spaced rib members.

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