United States Patent [19]

Oury

[11] 3,795,308

[45] Mar. 5, 1974

[54] **SCRAPER FOR CONCRETE CONVEYOR BELT**

[75] Inventor: **Robert F. Oury**, Elmhurst, Ill.

[73] Assignee: **Rotec Industries, Inc.**, Elmhurst, Ill.

[22] Filed: **Apr. 11, 1972**

[21] Appl. No.: **242,971**

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

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

[58] **Field of Search** 198/188, 230

[56] **References Cited**

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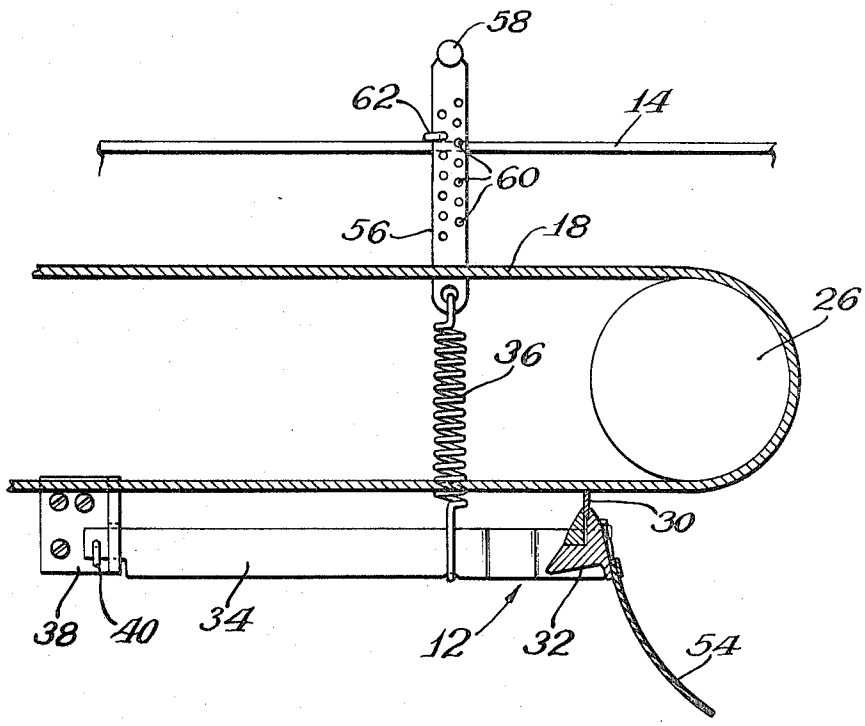
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Primary Examiner—Evon C. Blunk
Assistant Examiner—W. Scott Carson
Attorney, Agent, or Firm—Molinare, Allegretti, Newitt & Witcoff

[57] **ABSTRACT**

A scraper assembly used for removing residual concrete from a concrete conveyor belt, following removal of most of the concrete therefrom. A scraper blade is positioned against and substantially normal to the plane of the belt and substantially transverse thereto. The blade is constructed of a hard material such as carbide steel. A holder is provided for the scraper blade and the scraper blade is biased with pressure against the outer surface of the conveyor belt so as to substantially remove all the residual concrete therefrom.

5 Claims, 3 Drawing Figures



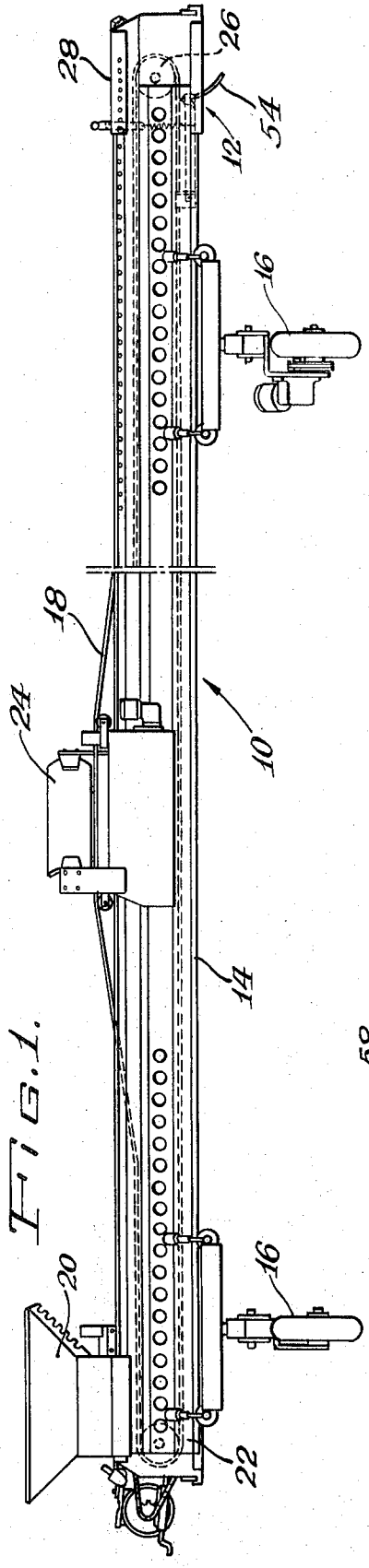


Fig. 1.

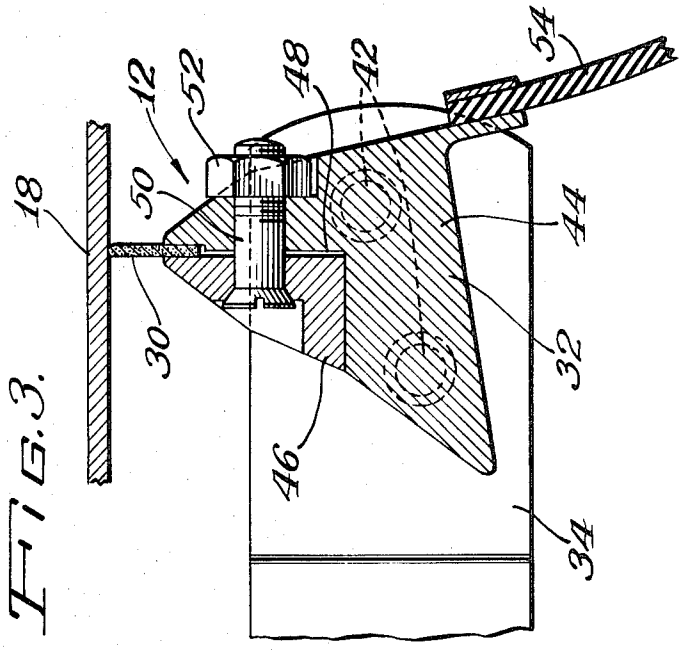


Fig. 3.

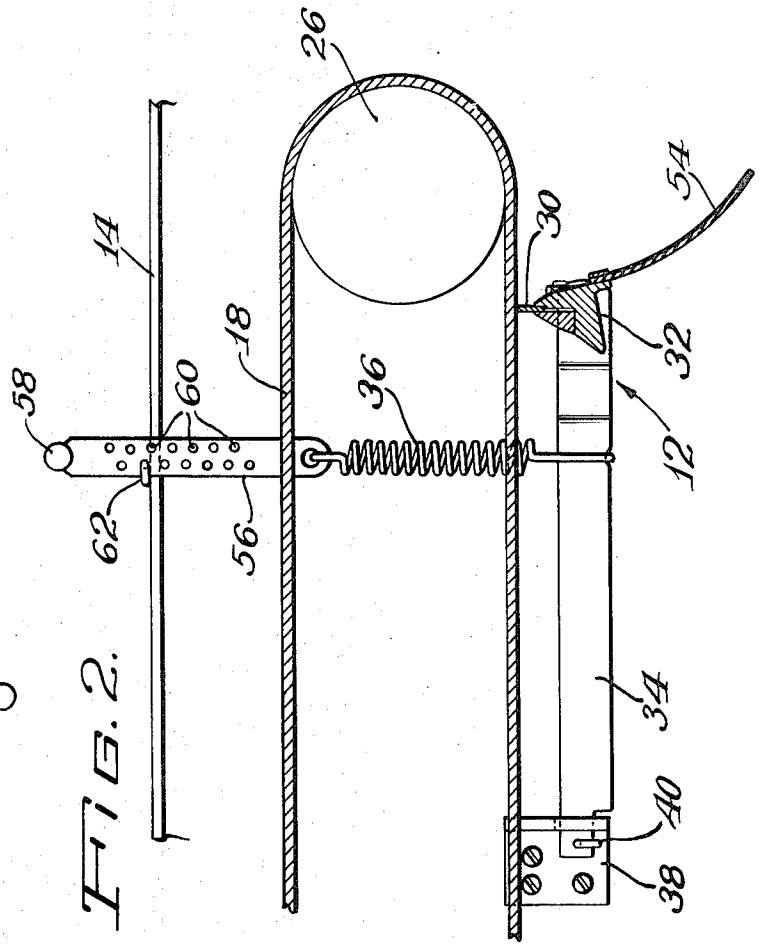


Fig. 2.

SCRAPER FOR CONCRETE CONVEYOR BELT

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION AND DESCRIPTION OF THE PRIOR ART

This invention relates to a scraper blade assembly for removing substantially all of the residual concrete from a concrete conveyor belt after the bulk of the concrete has been directed from the belt to a place of use.

Belt type conveyors for carrying materials such as concrete, gravel, sand and like materials have been known and used for several years, in the construction business. Typical of such concrete conveyors are those found in Oury et al. U. S. Pat. No. 3,151,732, Oury U. S. Pat. No. 3,171,534, and Oury U. S. Pat. No. 3,203,538. Another specific example of such a belt type concrete conveyor is that shown in my U. S. Pat. No. 3,590,983.

Referring specifically to my U. S. Pat. No. 3,590,983, a diagonally mounted blade bears against the upper surface of the belt conveyor at the desired position for discharging the concrete from the conveyor to a place of use. Although the assembly substantially removes or wipes the great majority of the concrete from the belt, the belt wears quickly so that within a short period of time streaks of unremoved or residual concrete begin to show on the carrying surface of the belt after the belt passes the normal concrete discharge position. Although, in my concrete conveyor the frame for the apparatus has been specifically designed to prevent concrete from building up on it, it is nevertheless highly desirable to substantially reduce the amount of residual concrete from collecting on the frame, adding to the weight of the equipment, creating an unsightly condition, and even possibly adversely affecting the operation of the equipment. It has therefore been found to be desirable to remove substantially all the residual concrete from the belt, following discharge of the bulk of the concrete from the belt.

Although the concrete conveyor in my U. S. Pat. No. 3,590,983 does not show a scraper assembly for removing residual concrete from the belt, belt scraping or cleaning blades for removing residual concrete from conveyor belts are known. One such scraper blade was constructed with a scraper blade made from a relatively soft material, such as ordinary steel, in order to avoid gouging and the forming of grooves in the belt. However, when such a soft scraper blade was used, it was found that the material being scraped, such as the aggregate in the concrete, wore the soft blade so that it had to be replaced rather frequently. Also, with such a soft scraper blade, the wearing of the blade was uneven and caused grooves to start forming in the concrete conveyor belt. Thus, adverse effects were created not only on the scraper blade, but also on the conveyor belt. Furthermore, with such a soft scraper blade, it was found that a relatively high force or pressure was needed for the blade to bear against the belt in order to properly clean the conveyor belt of the residual concrete.

SUMMARY OF THE INVENTION

It is therefore an important object of this invention to provide an improved scraper assembly for substantially removing residual concrete from a belt type concrete conveyor wherein the disadvantages of prior art scraper assemblies are substantially avoided.

It is also an object of this invention to provide an improved scraper assembly for removing residual concrete from a concrete conveyor belt where the scraper blade is constructed of a material which is harder not only than the belt, but also harder than the material being scraped therefrom, such as concrete containing aggregate.

It is a further object of this invention to provide an improved scraper assembly for removing residual concrete from a concrete conveyor belt wherein the scraper blade is constructed of a carbide steel.

It is still another object of this invention to provide an improved assembly for scraping concrete from a conveyor belt wherein both the scraper blade and the concrete conveyor belt have an extended life by the use of a scraper blade which is harder than the aggregate in the concrete.

It is still a further object of this invention to provide a scraper blade assembly used for cleaning residual concrete from a conveyor belt wherein the scraper blade assembly is characterized by its simplicity and economy of construction and effectiveness in use.

Further purposes and objects of this invention will appear as the specification proceeds.

The foregoing objects are accomplished by providing a scraper assembly, useful for substantially removing residual concrete or like material, from a conveyor belt wherein the assembly includes a scraper blade which extends transversely across the outer surface of the conveyor belt, the blade being constructed of a material which is harder than the material being scraped from the belt, a holder for mounting the blade, and means for biasing the holder and thereby for pressing the blade against the outer surface of the belt for substantially removing residual concrete therefrom.

BRIEF DESCRIPTION OF THE DRAWINGS

A particular embodiment of the present invention is illustrated in the accompanying drawings wherein:

FIG. 1 is a side elevational view of a conveyor assembly using my improved assembly for substantially removing the residual concrete from the belt conveyor;

FIG. 2 is an enlarged detailed side elevational view of my improved scraper assembly as used in the embodiment of FIG. 1; and

FIG. 3 is a further enlargement of the embodiment of FIG. 2 showing the scraper blade and the holder therefor in greater detail.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a concrete conveyor assembly 10 is shown wherein my improved scraper assembly, generally 12, is used. It is to be understood that the scraper assembly 12 may be used with other types of conveyors useful for conveying materials such as concrete, sand and gravel.

The concrete conveyor 10 shown in FIG. 1 includes a horizontally elongated support frame 14, with a pair of wheel support assemblies 16 mounted at the opposite ends of the frame 14 for movably supporting the conveyor 10. The elongated frame 14 carries a driven conveyor belt 18 which carries concrete from an inlet position to a discharge position and is the belt which is cleaned by the scraper assembly 12. A hopper 20 is

mounted at the inlet end 22 of the conveyor assembly 10. The hopper 20 receives concrete from a concrete supply and the concrete is discharged onto the moving belt 18. The belt 18 is generally supported in a U-shaped position until it reaches the moving plow 24, where the plow discharges the concrete laterally from the conveyor 10 to a place of use. Although the plow assembly 24 cleans substantially all of the concrete from the belt 18, a residual amount of concrete will commonly remain on the outer surface of the belt 18. The belt passes around a pulley 26 at the outer end 28 of the frame 14 for returning to the hopper 20. Without having the scraper assembly 12, any residual concrete on the belt 18 could drip from the belt in returning to the hopper 20. This concrete could harden on the frame 14 adding to its weight and creating an unsightly appearance. Hardened residual concrete on any part of the conveyor 10 could also cause mechanical problems. Although the conveyor 10 shown is designed to significantly reduce such concrete build-up, it is nevertheless highly desirable to position the scraper assembly 12 at the outer end 28 of the frame 14 for removing substantially all of the residual concrete from the carrying surface of the belt 18.

Referring to FIGS. 2 and 3, the scraper assembly 12 is shown in greater detail. The scraper assembly 12 is positioed in close proximity to the pulley 26 and the blade 30 bears against the outer or carrying surface of the belt 18 in its return path of travel on the frame 14. The particular location of the scraper assembly 12 is preferred because the belt 14 is supported by the pulley 26 and thereby provides resistance to the force or pressure of the blade 30 bearing against the outer surface of the belt 18 so as to provide a thorough cleaning of the belt.

In addition to the blade 30, the scraper assembly 12 includes a holder 32 for the scraper blade 30, a pair of support arms 34 for the holder, and a spring member 36 for biasing the holder 32 and thereby the blade 30 with pressure against the outer surface of the belt 18 to accomplish the desired cleaning thereof.

The support arms 34 are spaced from each other on opposite sides of the belt 18 and are pivotally mounted on each of a pair of brackets 38 which are rigidly secured to spaced parts of the frame 14 of the conveyor assembly 10. The inner or pivoted ends of the arms 34 are pivotally supported on a pivot plate 40 while the outer ends of the arms are rigidly secured to the opposite lateral ends of the holder 32. As shown in FIG. 3, suitable fasteners, as screws, 42 are used to secure the outer or free ends of the support arms 34 to the opposite ends of the holder 32.

The holder assembly 32 includes two interengaging extruded aluminum members 44 and 46. The larger or main extruded member 44 has a step portion 48 which receives or engages the smaller extruded member 46. The scraper blade 30 is rigidly held or captured between the extruded members 44 and 46 which function as jaws to hold the blade 30 securely in place. Suitable bolts 50 and nuts 52 hold the two members 44 and 46 together to mount the blade 30 in place in the holder 32. Normally, the blade 30 bears substantially perpendicularly against the outer surface of the belt 18. Desirably, an apron 54, made of a suitable flexible material, such as rubber, is rigidly secured to a lower elongated lip of the extruded member 44 for catching residual concrete scraped from the belt 18 and for directing the same to a location away from the apparatus 10. The holder section 44 and 46 are sloped downwardly and outwardly, relative to the position of the blade, so as to shed any residual concrete particles that happen to bypass the scraper 30 and fall from the belt 18.

The scraper blade 30 itself is an important part of the invention. The blade generally constitutes a flat, elongated piece of carbide steel having ground radius at its outer edge which bears against the belt 18, such radius being preferably ground to provide a parabolic edge. The carbide steel used is preferably a tungsten carbide blade having a hardness of at least 90 – 92 Rockwell A. The type of steel used for the scraper blade may be the same type and grade of steel that is used for tire studs, snow plow scrapers, and the like. Although the specific material used for making the blade can be varied, it is important that the material used to make the blade is harder than the component parts of the concrete, primarily, the aggregate. With the carbide blade, it has been found, contrary to previous beliefs, that the blade does not become worn from contact with the aggregate, and neither the blade nor the belt have been found to develop grooves therein from excessive wearing of the blade. Thus, it is believed that any wearing occurs on the aggregate and not on the blade.

Referring to FIG. 2, the tension of the spring member 36 may be adjusted by use of an adjusting bar 56. Each spring member 36 is held between a support arm 34 and the top of the frame 14 of the conveyor assembly 10. The lower end of the spring 36 is detachably received on the underside of the arm 34 at a point intermediate the pivot point of the arm 34 and the holder 32 at the outer end of the arm 34. The upper end of the spring 36 is received in an aperture in the vertically elongated adjusting bar 36. The upper ends of the adjusting bars 56 are interconnected by a rigid cross bar 58. A plurality of vertically spaced apertures 60 are provided in the adjusting bar 56 and these apertures 60 receive a hair pin 62 which engages the top side of a section of the frame 14. By varying the location of the hair pin 62 in the vertically spaced apertures 60, the tension of the spring 36 may be varied between desired limits. It has been found that a tension of 25–50 pounds on each side of the holder provides advantageous results. The springs 36 act to bias the arms 34 upwardly so that the scraper blade 30 bears with suitable pressure against the belt 18 to accomplish substantial removal of residual concrete from the belt. The scraped concrete is thereby diverted as, by the apron 54, to a location away from the conveyor assembly.

The described scraper blade does not significantly wear and any wear which does occur is believed to be with the material being scraped, that is, the concrete, as opposed to the blade itself. Such reduction or elimination of blade wear results in the avoidance of grooves developing in the scraper blade and the conveyor belt is not damaged or gouged. Furthermore, by avoiding grooves developing in the scraper blade, the amount of pressure required to clean and wipe the conveyor belt is reduced.

While in the foregoing there has been provided a detailed description of a particular embodiment of the present invention, it is to be understood that all equivalents obvious to those having skill in the art are to be included within the scope of the invention as claimed.

What I claim and desire to secure by Letters Patent is:

1. A scraper assembly for substantially removing residual concrete from a moving concrete conveyor belt, said assembly comprising, in combination, a single blade only positioned substantially normal to said belt and at substantially right angles to the longitudinal axis of the direction of movement of said belt, said blade being fixed both longitudinally and transversely of said longitudinal axis of said belt, and being movable substantially only in a direction normal to the surface of said belt, said blade being constructed of tungsten carbide steel of at least 90 Rockwell A hardness, a pulley around which said belt passes, said blade bearing against the outer undersurface of said belt and being located longitudinally from but in close proximity to the location of said pulley, means for holding said blade, means for biasing said blade against said belt with sufficient pressure for accomplishing the desired removal of residual concrete therefrom, said pulley providing resistance to said biasing pressure, and means on said blade holding means having downwardly and outwardly inclined portions for directing scraped residual concrete to a location remote from said assembly.

2. The apparatus of claim 1 wherein said holding means includes first and second interengaging elements for holding said blade therebetween, said downwardly and outwardly inclined portions being defined on said elements.

3. The assembly of claim 1 including a frame, a pair of spaced arms pivotally mounted on said frame, said spaced arms having free ends and said holding means are connected to said free ends, and said biasing means comprises spring means interconnected between said arms and said frame for biasing said blade against said belt.

4. The apparatus of claim 3 including means for adjusting the tension of said spring means to attain the desired pressure sufficient for accomplishing removal of said residual concrete from said belt.

5. The apparatus of claim 1 wherein said blade includes an edge bearing against said belt, said edge having a substantially parabolic shape in cross section.

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