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ELEVATOR LINK AND WEAR PLATE HAVING MEANS AIDING IN ASSEMBLY THEREOF

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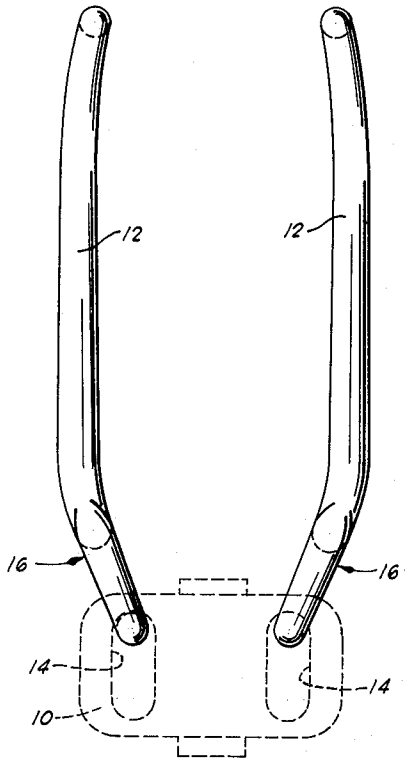


Fig. 1

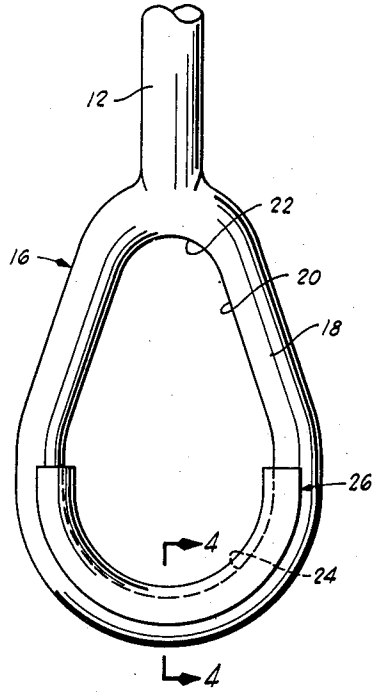


Fig. 2

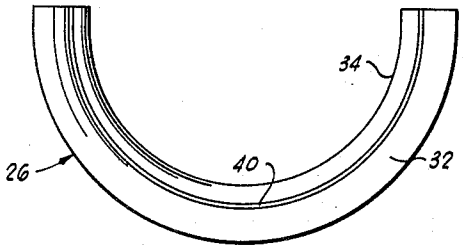


Fig. 3

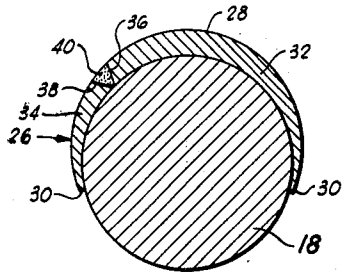


Fig. 4

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ELEVATOR LINK AND WEAR PLATE HAVING MEANS AIDING IN ASSEMBLY THEREOF

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This invention relates generally to improvements in elevator links used in oil well drilling and servicing operations, and more particularly, but not by way of limitation, to an improved device for increasing the service life of an eye-shaped connector, such as found on the lower end of an elevator link.

As it is well known in the oil industry, various types of elevators used for supporting articles such as drill pipe, tubing and rods in a well bore are normally suspended by a pair of links pivotally connected to opposite sides of the elevator for raising and lowering the elevator without interfering with the article supported by the elevator. Such elevator links are commonly formed of forged steel and have eye-shaped connectors on the opposite ends thereof. The eyes at the upper ends of the links are utilized to support the links from the traveling block and the lower eyes of the links are extended through eye-shaped connectors on the opposite sides of an elevator. Since the elevators are subjected to hard usage, the eyes at the lower ends of the elevator links normally tend to wear more quickly than the eyes at the upper ends of the links.

As indicated above, elevator links are ordinarily formed of forged steel and the link manufacturers ordinarily guarantee the links, providing the links are returned to the manufacturers for rebuilding by the addition of metal, particularly to the lower connectors of the links. However, these link manufacturers refuse to guarantee the links if the user attempts to add metal to the lower connectors of the links, since the application of welding heat to the links drastically reduces the expected service life of the links, unless such heat is scientifically applied. It may also be noted that these elevator links ordinarily weigh several hundred pounds and the transportation charges involved in returning a link to a manufacturer are excessive, let alone the problems involved in shipping the links.

The present invention contemplates a novel elevator link construction including a wear plate in the nature of an insert in the lower eye-shaped connector of the link which is held in the connector by its configuration. The wear plate provides an increase in metal for the lower connector of an elevator link which is the equivalent of building up the metal thickness of the connector, but without the application of welding heat to the connector. The wear plate is formed in segments which are positioned in the link connector and are then welded together in an assembled relation, whereby the wear plate will remain in the connector without the use of fastening devices which would interfere with the operation of the elevator link.

Broadly stated, the present invention may be defined as a device for increasing the service life of an eye-shaped connector deleteriously affected by welding heat, comprising a segmental wear plate positioned in the wear-receiving portion of the connector, said wear plate being curved lengthwise and transversely to mate with the inner peripheral surfaces of the wear-receiving portion of the connector and extend sufficiently around the connector to prevent removal thereof from the connector in an assembled form, and welding material fused to adjacent segments of said plate to retain said segments assembled in the connector.

An important object of this invention is to economically and efficiently increase the service life of an elevator link or the like.

Another object of this invention is to effectively increase the metal thickness of the wear-receiving portion of an eye-shaped connector, without the application of welding heat to the connector.

A further object of this invention is to provide a novel wear plate for an eye-shaped connector which may be readily secured in the connector, and without the use of fastening devices protruding from the connector.

Another object of this invention is to increase the economy of well drilling and servicing equipment.

A still further object of this invention is to provide a welded wear plate for an eye-shaped connector, wherein the weld will not be subjected to forces during a normal use of the connector.

Other objects and advantages of the invention will be evident from the following detailed description, when read in conjunction with the accompmanying drawings which illustrate my invention.

In the drawings:

FIGURE 1 is an elevational view of an elevator link assembly illustrating the positions of a pair of links supporting an elevator.

FIGURE 2 is an enlarged elevational view of the lower portion of an elevator link having my novel wear plate assembled therein.

FIGURE 3 is a side elevational view of the wear plate taken at the opposite side from the view shown in FIG. 2.

FIGURE 4 is an enlarged sectional view as taken along line 4—4 of FIG. 2.

Referring to the drawings in detail, and particularly FIG. 1, reference character **10** designates a typical elevator of the type used in a rotary drilling operation and which is supported by a pair of elevator links **12** from the traveling block (not shown) of the drilling rig. A typical elevator **10** has a pair of eyes **14** arranged in diametrically opposite sides thereof which are linked with eye-shaped connectors, generally designated by reference characters **16**, formed on the lower ends of the elevator links **12**. It will thus be apparent that the eye-shaped connectors **16** of the elevator links **12** are connected to the eyes **14** in the nature of the links of a chain to support the elevator **10** in a horizontal plane in such a manner that various articles may be handled by the elevator **10** without interference by the elevator links **12**. It should also be noted in FIG. 1 that the eye-shaped connectors **16** of the links **12** are curved lengthwise to extend upwardly and outwardly from the elevator **10**.

The construction of a typical eye-shaped connector **16** of an elevator link **12** is illustrated most clearly in FIGS. 2 and 4 where it will be observed that the eye-shaped connector comprises a substantially round bar **18** formed integrally with the main body portion of the link **12** and shaped to provide an opening **20** which receives a portion of the elevator **10** as previously described. The opening **20** is oblong, with the upper end portion **22** thereof being smaller than the lower end portion **24**, and, as previously noted in connection with FIG. 1, the connector **16** is curved lengthwise. It should also be noted that the bar **18** around the lower portion **24** of the opening **20** is the wear-receiving portion of the connector **16**. A novel wear plate, generally designated by reference character **26**, is inserted in the lower end portion **24** of the opening **20**.

As shown most clearly in FIGS. 3 and 4, the wear plate **26** is curved lengthwise to conform with the shape of the lower portion **24** of the connector opening **20** and is of sufficient length to extend upwardly along the sides of the opening **20** a distance equal to about one-fourth of the length of the opening **20**. This not only assures that the wear plate **26** covers that portion of the connector **16** subject to wear, but also facilitates the retention of the wear plate in the opening **20** during use of the link **12**.

Also, the wear plate **26** is curved transversely, as shown in FIG. 4, into a substantially U-shape to partially encircle the bar **18** throughout the length of the wear plate. In a preferred construction, the wear plate **26** extends around slightly more than one-half the transverse circumference of the bar **18** to rigidly secure the wear plate in the connector **16**. Furthermore, since the central portion **28** of the wear plate **26** is the portion of the plate subject to wear by movement of the elevator **10**, the wear plate is increased in thickness from its opposite edges **30** toward the central portion **28** of the plate. This variation in thickness of the wear plate **26** positions the maximum amount of metal where the maximum wear occurs, yet permits the use of a minimum total amount of metal for each wear plate.

The wear plate **26** comprises a pair of elongated segments **32** and **34** having their mating edges **36** and **38**, respectively, beveled to be connected together by welding material **40**. The beveled edges **36** and **38** of the segments **32** and **34** are extended outwardly in a diverging manner from the inner periphery of the wear plate **26**, such that the welding material **40** never comes in contact with the bar **18**. It should also be observed in FIG. 4 that one of the segments **32** is substantially wider than the other segment **34** to position the welding material **40** at one side of the opening **20** of the connector **16**, such that the weight of the elevator **10** will not be imposed on the welding material **40**.

When assembling a wear plate **26** in the opening **20** of a connector **16**, the segments **32** and **34** are individually placed around the lower portion **24** of the opening **20** in the positions shown in FIGS. 2 and 4. Since each of the segments **32** and **34** extends less than one-half way around the transverse circumference of the bar **18**, these segments may be easily placed in the desired positions around the opening **20**. The beveled edges **36** and **38** of the segments are placed in abutting relation as shown in FIG. 4, and then the welding material **40** is fused to the beveled edges **36** and **38** to rigidly interconnect the segments **32** and **34**; whereupon the wear plate **26** is rigidly secured in the connector **16** and will not interfere with the operation of the elevator **10** in any respect. It should also be noted that since the welding material **40** is not brought into contact with, or fused with, the bar **18** of the connector **16**, welding heat is not applied to the connector **16** and the strength of the connector **16** will not be reduced by the assembly of the wear plate **26** therein.

It will be apparent to those skilled in the art that the wear plates **26** may be assembled in the connectors **16**, either when the elevator links **12** are new, or after the elevator links have been used and then rebuilt to about their original shapes. In either event, the wear plates **26** will effectively increase the metal thickness of the connectors **16** in the wear-receiving portions of the connectors, and any further wear encountered will merely decrease the thicknesses of the wear plates **26**. When the wear plates **26** have become worn to be of no further use in the connectors **16**, the wear plates may be easily

cut off of the connectors **16** and new wear plates inserted; whereupon the elevator links **12** will be ready for further service.

From the foregoing it will be apparent that the present invention will increase the economy of well drilling and servicing installations by materially increasing the service lives of the elevator links. The wear plates are rigidly secured in the eye-shaped connectors without the use of fastening devices, and the wear plates will not interfere with the normal operation of elevators or the like supported by the eye-shaped connectors. It will also be apparent that the wear plates provide the maximum metal thickness where wear occurs, with a minimum total volume of metal being required. By forming the wear plates in elongated segments, the segments may be easily welded in assembly with the wear plate positioned in an eye-shaped connector, without applying welding heat to the connector, and without subjecting the welding material to the weight of an elevator or the like supported by the respective connector.

Changes may be made in the combination and arrangement of parts or elements as heretofore set forth in the specification and shown in the drawings, it being understood that changes may be made in the configuration, combination and arrangement of parts or elements disclosed as a preferred embodiment herein, without departing from the spirit or scope of the invention as defined in the following claim.

I claim:

In combination with an eye-shaped connector of an elevator link or the like formed by a substantially round bar having an oblong opening therethrough larger at one end than at its other end and being curved along its length, a wear attachment comprising a segmented, elongated plate curved lengthwise and transversely to conform with the configuration of the portion of said bar defining the larger end portion of said opening, said wear plate having a width sufficient to extend around more than one half the transverse circumference of said bar and comprising two elongated, transversely adjacent segments of different transverse widths, said segments having contiguous abutting edges beveled divergingly outward from the mating inner surface of said wear plate and defining a substantially V-shaped groove between said segments; and welding material fused between said segments in said groove, said welding material being positioned at one side of said opening and in spaced relation to said bar.

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