

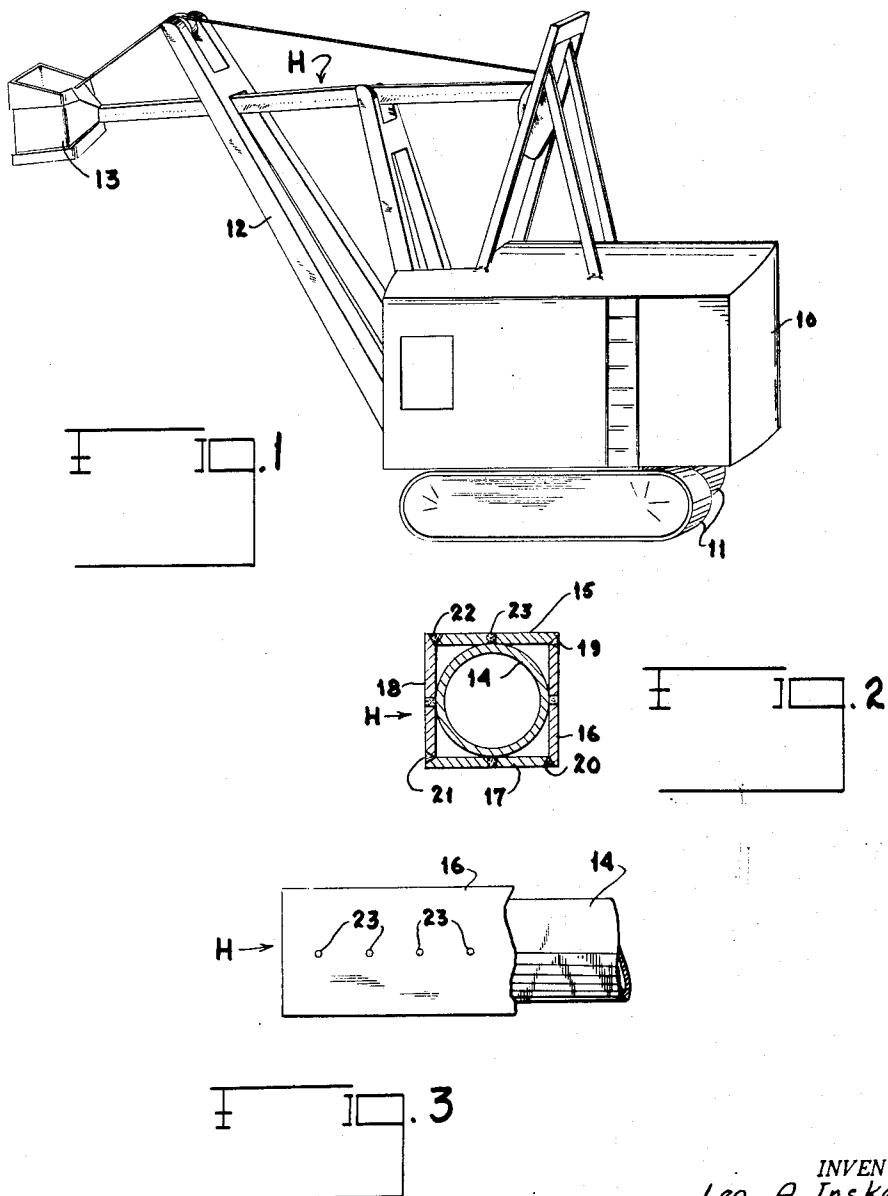
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L. A. INSKEEP
DIPPER HANDLE

2,610,754

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2 SHEETS—SHEET 1



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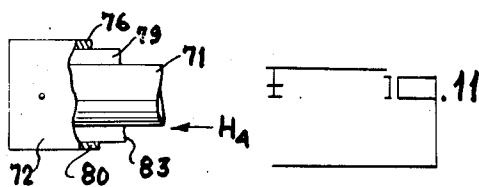
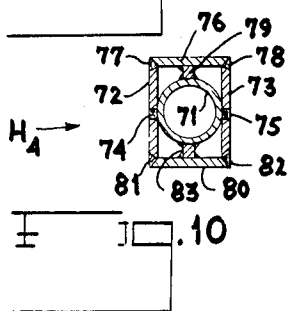
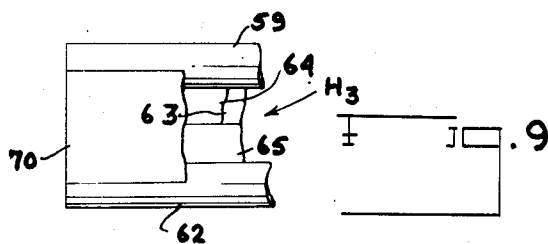
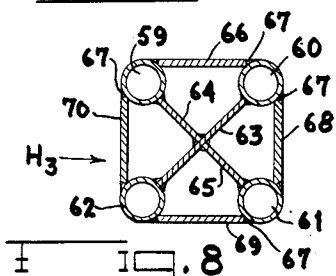
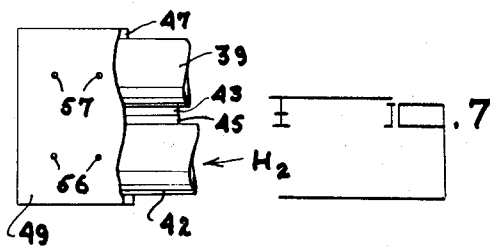
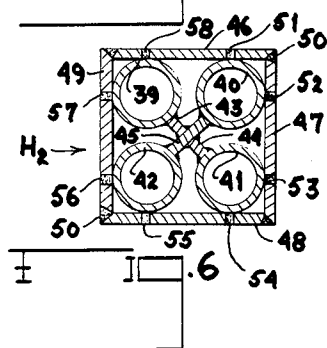
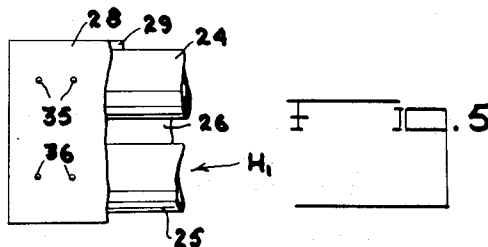
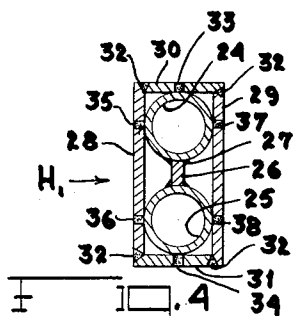
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2 SHEETS—SHEET 2



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DIPPER HANDLE

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2 Claims. (Cl. 214-145)

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The present invention relates to dipper handles of power excavators and is concerned primarily with a dipper handle of novel construction.

At the present time, power shovels and similar excavators, which include a dipper, mount the dipper on a handle. During the use of the excavator, this handle is subject to severe stresses and strains of a widely varying character. In performing such work as excavating in quarries, very often one edge of the dipper will be caught in a tight or hard spot with the result that severe torsional strains and twists are set up in the dipper handle.

The dipper handles now meeting with use in the art of power excavators consist essentially of an elongated box-like structure which is braced by bulkheads that are spaced along the box-like structure at appropriate intervals. It has been found that these dipper handles have not proven to be satisfactory under conditions of severe usage and they often become weakened and give away where the bulkheads are located.

With the foregoing conditions in mind, the present invention has in view, as its foremost objective, the provision of a dipper handle for power excavators which is peculiarly adapted to withstand the severe stresses and strains encountered during service use of the excavator.

More in detail, the invention has as an object, the provision in a power excavator of a dipper handle which consists essentially of a tubular core to which is welded a box-like structure. This box-like structure is defined by four sides with the meeting edges welded together with each side being effectively secured to the tubular core by plug welds which are spaced apart at appropriate intervals therealong.

Still another object of the invention is to provide dipper handles of the general character above indicated but which are constructed so as to adapt the handle to the size of an excavator with which it is used. A theme which is common to all of these handles is that they include a core made up of one or more tubular elements together with a box-like structure that is welded to the core and which is defined by four side plates each of which is plug welded to the core with the meeting edges of the side plates welded together.

Various other more detailed objects and advantages of the invention, such as arise in connection with carrying out the above noted ideas in a practical embodiment, will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

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The invention therefore comprises a dipper handle for power excavators which consists essentially of a tubular core which is enclosed by a box-like structure defined by side plates, the meeting edges of which are welded together with the plates plug welded to the core at spaced intervals.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing, wherein:

Figure 1 is a perspective view illustrating a power excavator which includes a dipper handle that is constructed in accordance with the precepts of this invention;

Figure 2 is a transverse vertical section through the dipper handle per se;

Figure 3 is a view in side elevation, with parts broken away, of a portion of the handle shown in Figure 2;

Figure 4 is a transverse section through a modified form of the dipper handle;

Figure 5 is a view in side elevation, with parts broken away, of the dipper handle shown in Figure 4;

Figure 6 is a transverse section through another modification;

Figure 7 is a view in side elevation of the dipper handle shown in Figure 6;

Figure 8 is a transverse section through still another modification;

Figure 9 is a view in side elevation, with parts broken away, of a portion of the dipper handle shown in Figure 8;

Figure 10 is a transverse section through still another modification; and

Figure 11 is a view in side elevation, with parts broken away, of a portion of the dipper handle shown in Figure 10.

Referring now to the drawings wherein like reference characters denote corresponding parts, and first more particularly to Figure 1, a power excavator is therein illustrated. This excavator comprises a cab or body 10 mounted on traction elements 11, and which cab houses the power plant. Extending outwardly from the cab 10 in a well known manner is a boom 12. As illustrated in the drawing, this boom is of a bifurcated or two part construction, and a dipper handle H is mounted for operation between the two parts of the boom 12. At one end of the handle H there is a dipper 13 which is illustrative of one type of dipper which is used in power excavators.

The present invention is concerned primarily with the construction of the dipper handle H.

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The environment in which this dipper handle is located is not a part of the invention other than essentially being a power excavator. There are many types of such power excavators and the one illustrated in Figure 1 is not in any sense intended to be a limitation on the invention.

Referring now more particularly to Figure 2, the dipper handle H is shown as comprising a tubular core 14 which may be made from an appropriate metal such as steel so that it will have required properties of strength and rigidity. The size of the core 14, as well as the thickness of the wall thereof, depends on the size and type of excavator with which it is used.

Enclosing the tubular core 14 is a box-like structure made up of four walls 15, 16, 17 and 18. In the form of the invention illustrated in Figure 2, the box-like structure of the handle H has a square cross section, hence each of the sides 15, 16, 17 and 18, is substantially a duplicate of each of the other sides.

Where one edge of the side 15 is in meeting engagement with one edge of the side 16, the two edges are welded together as represented at 19. Similarly, where one edge of the side 16 meets one edge of the side 17, the meeting edges are joined by the weld represented at 20. In the same manner where the other edge of the side 17 meets an edge of the side 18, the meeting edges are joined by the weld represented at 21, and where the remaining edge of the side 18 meets the remaining edge of the side 15, the meeting edges are joined by a weld 22.

Each of the sides 15, 16, 17 and 18 consists of an appropriate metallic plate having required properties of strength and rigidity such as a steel plate. Each of the plates making up the sides 15, 16, 17 and 18 is anchored to the core 14 by a series of spaced apart plug welds 23. In forming the plug welds 23, a series of holes is first drilled along the median of each of the side plates. These holes will assume a position exactly opposite to the line of contact between each of the plates and the core 14. A plug weld is then formed at each of the holes.

From the foregoing, it is apparent that the construction of the handle H is such as to provide a comparatively light structure having structural effects and properties which are necessary to withstand the stresses and strains encountered in the service life of a dipper handle for power excavators.

First modification

Referring now more particularly to Figure 4 a modified form of a dipper handle is therein illustrated. This dipper handle is referred to in its entirety by H₁ and comprises a pair of tubular core members 24 and 25 which are maintained in spaced relation by a rib 26. The edges of this rib 26 are welded to the core members 24 and 25 by the welds represented at 27.

Enclosing the core members 24 and 25 is a box-like structure of oblong cross section defined by large side walls 28 and 29 and smaller side walls 30 and 31. Where the edges of the side walls meet, they are joined by welds 32, the latter being comparable to the welds 19, 20, 21 and 22 of Figure 2. The plate 30 is anchored to the core member 24 by a series of plug welds 33, while the plate 31 is similarly secured to the core member 25 by a series of plug welds 34. The side plate 28 is secured to both the core members 24 and 25 by two series of plug welds 35 and 36. Similarly, the side plate 29 is anchored to both of the tubu-

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lar core members 24 and 25 by two series of plug welds 37 and 38.

Second modification

Another modified form of dipper handle is shown in Figures 6 and 7. This handle is referred to in its entirety by the reference character H₂ and comprises four tubular core members 39, 40, 41 and 42. These core members 39, 40, 41 and 42 are maintained in a desired spaced relation by a crossed rib arrangement. The latter comprises a pair of small ribs 43 and 44 and a large rib 45. One edge of the rib 45 is welded to the core member 40 while the opposite edge is welded to the core member 42. One edge of the rib 43 is welded to the core member 39, while the opposite edge is welded to the rib 45. In a similar manner, one edge of the rib 44 is welded to the tubular core member 41 while the other edge is welded to the rib 45.

The core assembly comprising the core members 39, 40, 41 and 42, together with the crossed rib arrangement, is enclosed by a box-like structure of square cross section. This box-like structure is defined by four side plates 46, 47, 48 and 49, which are substantially the same size and shape. Where the edges of the sides 46, 47, 48 and 49 meet, they are joined by welds 50.

The side plates 46 and 47 are welded to the tubular core member 40 by the two series of plug welds 51 and 52. The plates 47 and 48 are secured to the core member 41 by the two series of plug welds 53 and 54. The side plates 48 and 49 are anchored to the core member 42 by the two series of plug welds 55 and 56, while the side plates 49 and 46 are joined to the core member 39 by the two series of plug welds 57 and 58.

Third modification

A third modification is illustrated in Figures 8 and 9 wherein the dipper handle is designated H₃. The handle H₃ comprises four tubular core members 59, 60, 61 and 62. These core members are maintained in a desired spaced relation by a crossed rib arrangement made up of a side rib 63 and short ribs 64 and 65. One edge of the rib 63 is welded to the core member 60 and the opposite edge to the core member 62. One edge of the rib 64 is welded to the core member 65 while the other edge is welded to the rib 63. One edge of the rib 65 is welded to the core member 61 and the opposite edges to the rib 63.

A side plate 66 is arranged substantially tangentially to the core members 60 and 62 and the edges of the plate 66 are welded to the respective core members by the welds 67. Likewise, another side plate 68 is arranged tangentially between the core members 60 and 61 with its side edges welded to the respective cores by welds 67. In the same manner, another side plate 69 is arranged tangentially between the core members 61 and 62 with its side edges welded to these core members by welds 67. Another side plate 70 is arranged tangentially between the core members 59 and 62 and has its side edges welded to the respective core members by welds 67.

It is evident that the dipper handle H₃ has a cross section that is substantially square. This means that the side walls 66, 68, 69 and 70 are substantially the same size and shape.

Fourth modification

A fourth modification of the dipper handle is illustrated in Figures 10 and 11, and is designated H₄. The dipper handle H₄ comprises a central

core member 71 to which wide side plates 72 and 73 are anchored by the series of plug welds shown at 74 and 75. A small side plate 76 has its opposite edges welded to the side plates 72 and 73 by the welds shown at 77 and 78. A rib 79 spans the distance between the plate 76 and the tubular core member 71. The opposite edges of this rib are welded to the plate 76 and to the core 71, respectively.

Another smaller side plate 80 has its opposite side edges welded to the side plates 72 and 73 by welds 81 and 82. A rib 83 spans the gap between the plate 80 and the core member 71 and has its opposite edges welded to these parts. It is evident that the box-like structure defined by the plates 72, 73, 76 and 80 has a cross section that is oblong. Thus, the dipper handle H₄ is quite similar to the dipper handle H with the exception that it is of oblong cross section rather than of square cross section.

While preferred specific embodiments of the invention are hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a power excavator, a dipper handle comprising a tubular core structure and a box-like structure enclosing said tubular core structure, said tubular core structure consisting of a pair of tubular core members arranged in spaced relation, a rib spanning the gap between said core members and having its opposite edges welded to the respective core members, said box-like

structure comprising a pair of oppositely disposed large plates and a pair of oppositely disposed small plates, said plates having edges in meeting engagement, welded connections at said meeting edges, a welded connection between each of said small plates and one of said core members, and welded connections between each of said large plates and each of said core members.

2. In a power excavator, a dipper handle comprising a tubular core structure and a box-like structure enclosing said tubular core structure, said tubular core structure consisting of a pair of tubular core members arranged in spaced relation, a rib spanning the gap between said core members and having its opposite edges welded to the respective core members, said box-like structure comprising a pair of oppositely disposed large plates and a pair of oppositely disposed small plates, said plates having edges in meeting engagement, welded connections at said meeting edges, a series of plug welds arranged along the median of each of said small plates and anchoring that plate to one of said core members, and two series of plug welds along each of said large plates with each series anchoring that plate to one of said core members.

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