Oct. 31, 1950

E. VON BOLHAR

2,528,195

DREDGE DIGGING STRUCTURE

Filed Oct. 25, 1946

3 Sheets-Sheet 1

FIG. 1.

INVENTOR.
Edgar Von Bolhar
BY Mason Fenton

Oct. 31, 1950

E. VON BOLHAR

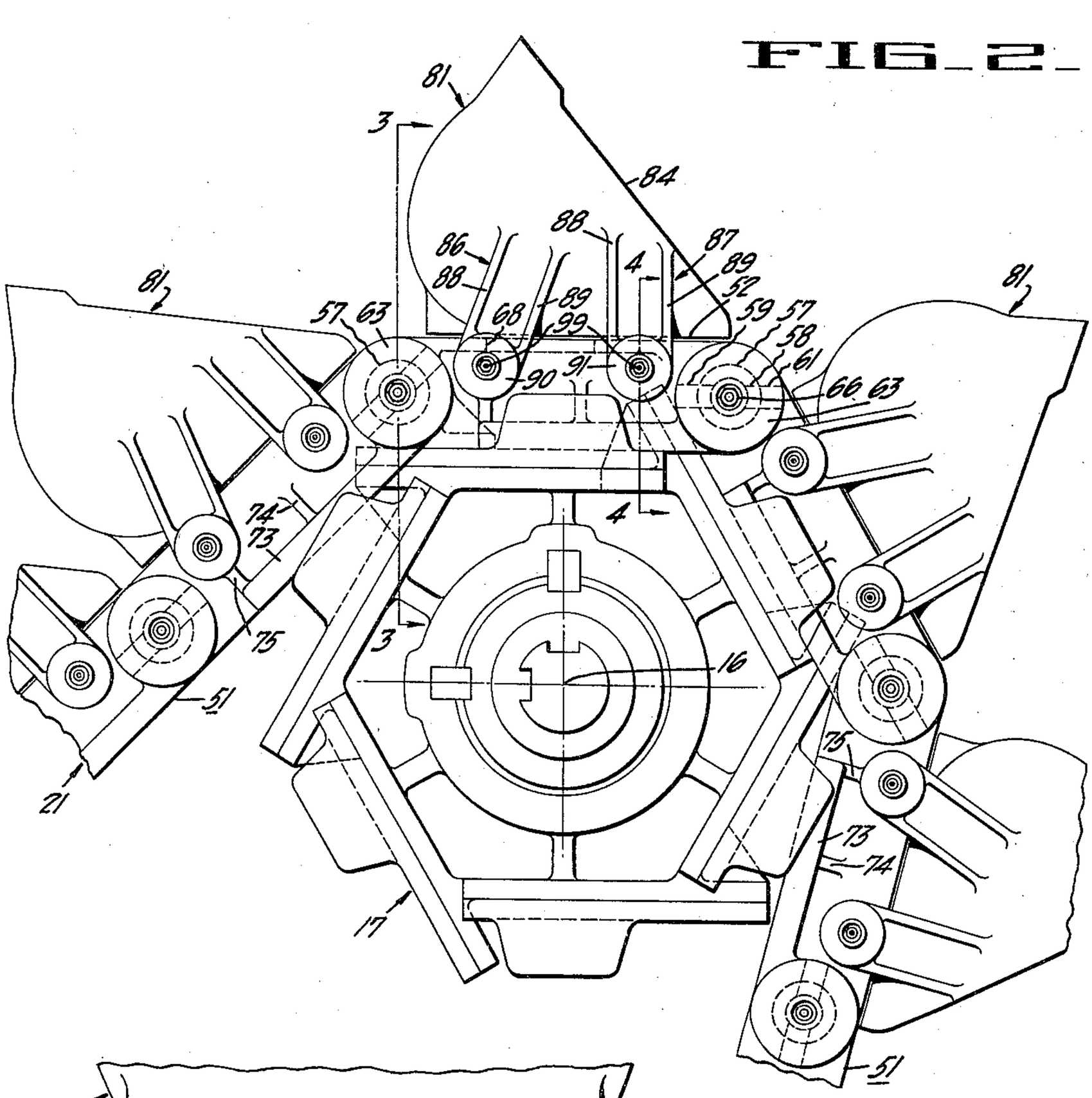
2,528,195

DREDGE DIGGING STRUCTURE

Filed Oct. 25, 1946

3 Sheets-Sheet 2

FIG_2_



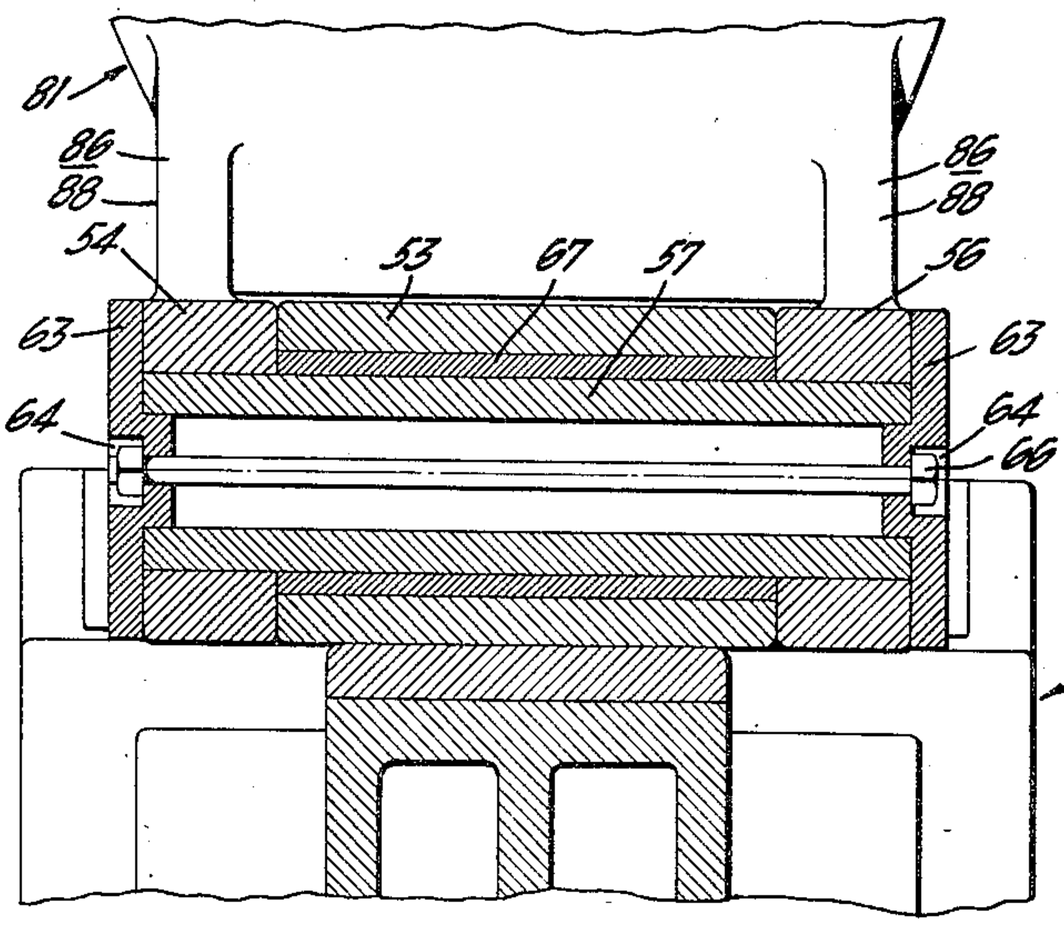


FIG_3_

INVENTOR.
Edgar Von Bolhar
BY Marcus Southerland

Oct. 31, 1950 E. VON BOLHAR 2,528,195

DREDGE DIGGING STRUCTURE

Filed Oct. 25, 1946 3 Sheets-Sheet 3

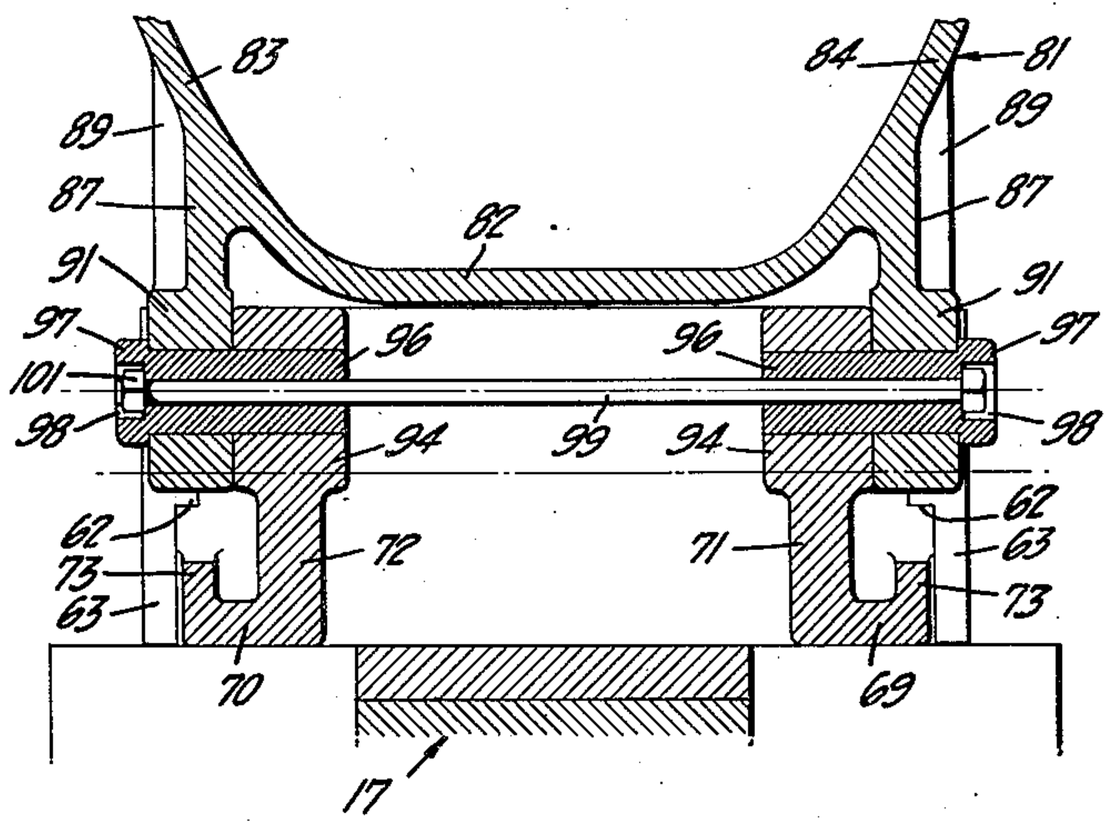


FIG_4_

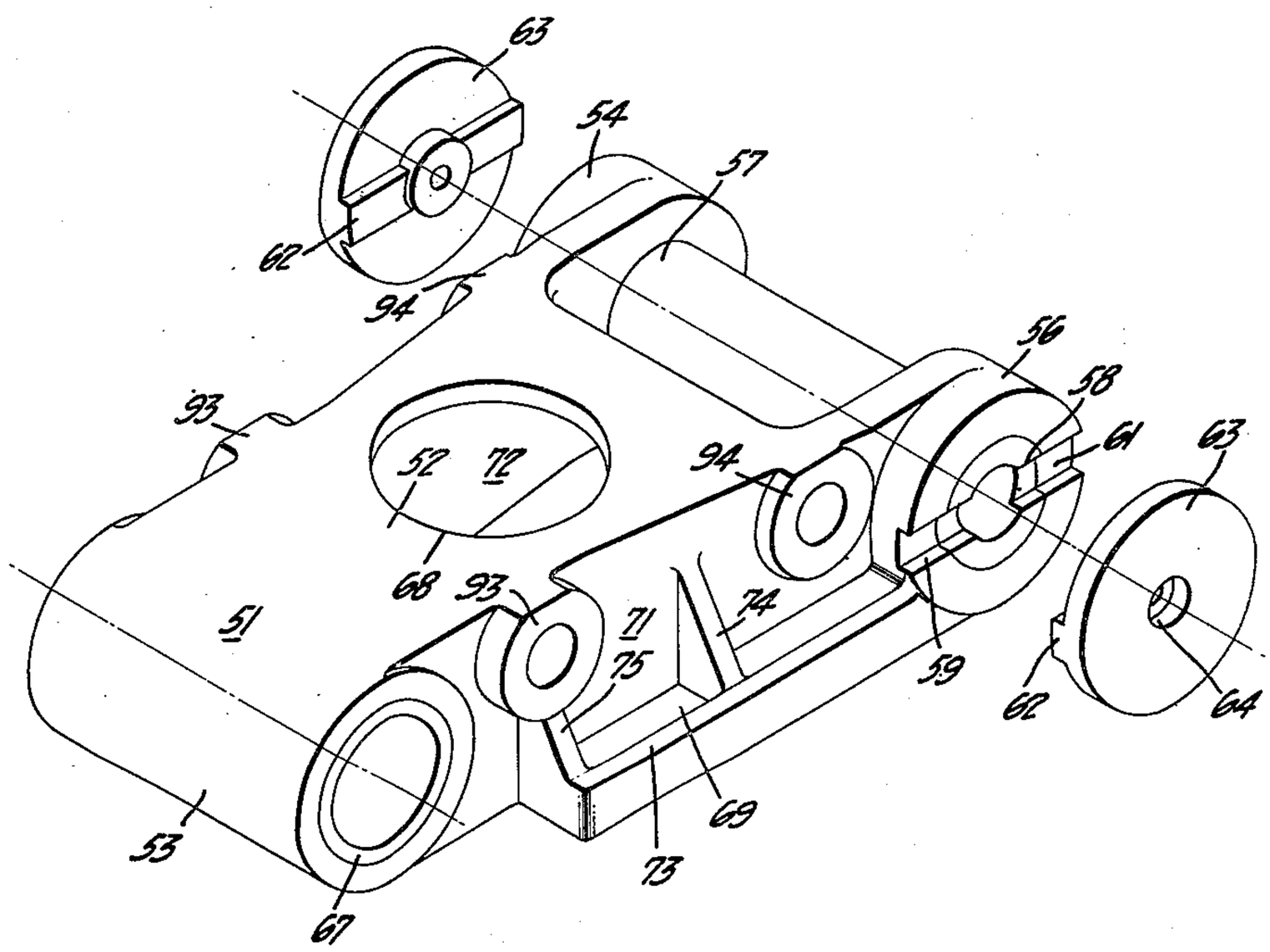


FIG_5_

INVENTOR.
Edgar Von Bolhar
BY Marcus Southcott

Patented Oct. 31, 1950

2,528,195

UNITED STATES PATENT OFFICE

2,528,195

DREDGE DIGGING STRUCTURE

Edgar von Bolhar, Sausalito, Calif., assignor to Yuba Manufacturing Company, San Francisco, Calif., a corporation of California

Application October 25, 1946, Serial No. 705,730

4 Claims. (Cl. 37—191)

1

My invention relates to alluvial dredges and more particularly to the digging units and associated structures of alluvial dredges.

In the type of alluvial dredge referred to there is provided a main hull on which the digging ladder is mounted. The ladder extends between an upper tumbler and a lower tumbler around which is trained a digging chain incorporating digging buckets. As dredging structures of this type have been developed they have increased greatly in size so that the digging mechanism has become increasingly bulky and of greatly increased weight. The problems of manufacture and of handling the larger structures have become more complex.

It is therefore an object of my invention to provide a dredge digging structure in which the bucket and related parts are of an improved design more readily manufactured and operated and more especially adapted to massive units.

Another object of the invention is to provide a dredge digging structure in which the stresses and resulting strains in the several parts are more readily met or resisted by especially adapted materials.

Another object of the invention is to provide a generally improved dredge digging structure.

These objects and others are attained in the embodiment of the invention disclosed in the accompanying drawings in which

Figure 1 is a partially diagrammatic view in cross section on a vertical plane through a dredge pond showing an alluvial dredge in operation, portions of the figure being broken away.

Figure 2 is a side elevation of an upper tumbler of the dredge with the digging structure encompassing the tumbler, some parts being broken away.

Figure 3 is a fragmentary view, for the most part being a cross section the plane of which is indicated by the line 3—3 of Figure 2.

Figure 4 is a fragmentary view in cross section the plane of which is indicated by the line 4—4 of Figure 2.

Figure 5 is an isometric perspective of a link body constructed in accordance with the invention together with some associated parts displaced for clarity of illustration from their normal positions.

In its preferred form, the dredge digging structure of my invention comprises a link body including a central plate having a central boss at one end thereof and a pair of lateral bosses at the other end thereof joined by side flanges depending from the central plate and each incorporating a pair of apertured side bosses therein. The central boss and lateral bosses are designed to interfit on adjacent structures and are held for articulated relationship by bucket pins piercing the various bosses and turning in bushings. The pins are retained by caps which engage suitably formed recesses in them and in the lateral bosses. Adapted to cooperate with the link body is a bucket body including a hood for retaining material and having a bottom wall and a pair of side walls. Projecting from each of the side walls is a pair of apertured lugs depending below the bottom wall to straddle the side bosses on the link body. To secure the bucket body and the link body together, pins pierce the apertured lugs and side bosses and are suitably held in place.

2

While there are many environments in which my dredge digging structure can be satisfactorily and successfully operated, it is especially adapted for use on an alluvial dredge including a hull 6 floating in a dredge pond 7 adjacent a bank 8. On the dredge hull are disposed a superstructure 9 and a bow gantry 11 together serving as supports for a digging ladder 12 operating in a reentrant well 13 between forwardly projecting portions of the hull 6. A suitable rigging 14 is effective when operated to lift and lower the digging ladder 12 about a transverse axis 16 in the superstructure. An upper tumbler 17 is revolved about the same axis 16 in a clockwise direction, as seen in Figure 1, by appropriate driving machinery, not shown.

Mounted on the digging ladder 12 at the lower or outboard end thereof is a lower tumbler 18 mounted for free rotation. The tumblers 17 and 18 receive a continuous chain digging mechanism 21 engaging the upper tumbler for driving energy and the lower tumbler for support in a position adjacent the actual digging site. The upper run 22 of the digging mechanism is supported at intervals on the ladder 12 by a spaced roller idlers 23 whereas the lower run 24 preferably hangs by gravity in a catenary curve or in some instances where the weight is very great, the lower run 24 is supported on an idler pulley, not shown herein.

The entire digging chain is advanced uniformly over the tumblers and over the supporting idlers 23 and is effective to dislodge material 26 from the bank 8, to carry it on the upper run 22 and then to discharge it into appropriate handling and value-saving machinery, not shown, on the dredge hull 6.

The dredge digging chain is comprised of a

plurality of individual units joined together for relative pivotal motion about transverse axes and since the numerous units are all identical, a description of one of them applies equally to the others. Each unit or digging structure includes a link body 51 fabricated in any of various different ways from suitable material preferably a metal capable of withstanding rather high tensile stresses. Each of the link bodies 51 is subjected to the load of a large part of the assemblage and hence is especially constructed to withstand the resulting severe forces.

The link body includes a relatively planar plate 52 extending substantially parallel to the general direction of the chain run. It is provided adjacent one end with an integral, circular cylindrical, central boss 53 approximately tangent to the top of the central plate 52 and extending transversely for something less than the full width of the plate. At its other end the central plate is divided to merge with a pair of lateral bosses 54 and 56 formed integrally with the central plate and having a circular cylindrical contour substantially the same as that of the central boss 53 of the next adjacent link and to form substantial continuations thereof.

In order that the central boss 53 and the cooperating lateral bosses 54 and 56 can be suitably jointed with respect to each other, there is provided a through pin 57 extending from the outer extremity of the boss 54 to the outer extremity of the boss 56. The pin in this instance because of its relatively large diameter is tubular and is of a generally symmetrical configuration thus distinguishing markedly from most previous dredge bucket pins which are formed with turned heads thereon. The pin 57 is held in position both axially and against rotation by being formed at each end with a diametral cross slot 58 in alignment with or merging with a similar pair of notches 59 and 61 in the lateral bosses 54 and 56. When the pin 57 is in position and properly rotated, the slot 58 and notches 59 and 61 align to provide a continuous groove.

Seated in the groove is a diametral key 62 projecting from the inner face of a cap disc 63 overlying the outer edge of one of the lateral bosses 54 and 56. This disc is provided with a recess 64 to receive the enlarged head of a through bolt and nut assembly 66 effective to secure the adjacent members in assembled relationship. When the bolt 66 is disassembled by removal of its nut and is withdrawn from its assembled position, the cap 63 can be removed, the pin 57 can be withdrawn and then the adjacent link bodies can be separated.

To improve the articulated joint, the interior of the central boss 53 is provided with a bushing 67 bearing upon the pin 57 and removed when worn and replaced to prolong the effective life of the structure. With the arrangement as so far described, there is afforded a compact, strong, relatively light link body in itself capable of withstanding the various stresses to which it is subjected in its working environment. While the link body illustrated herein is shown as cast in one piece, it can as readily be fabricated of a number of separate pieces permanently welded together. Both of these types of construction are referred to herein as integral link body structures.

In either case the link body is preferably provided with a central aperture 68 to reduce its weight and to afford access to the under side of the plate 52 and is further extended laterally by ledges 69 and 70 projecting from the lower portion of a pair of side flanges 71 and 72 which are downturned from the plate 52 and extend between the bosses 53, 54, and 56. The ledges are edged with reenforcing walls 73 and are further braced by brackets 74 and 75 so that weight upon the central plate is well distributed to the bearing ledges 69 and 70. The depending side flanges 71 and 72 acts as stiffeners for the plate 52 and also assist in maintaining the various bosses against distortion and relative displacement.

In accordance with the invention there is likewise provided a bucket body 81 adapted to cooperate with the link body 51. The body 81 must be capable primarily of withstanding a good deal of abrasion and rough contact with rocks in the soil and is not in this design called upon to withstand any large amount of tensile stress so that it preferably is cast as an integral structure of manganese steel. The bucket body 81 includes a bottom wall 82 smoothly merging with a pair of side walls 83 and 84 having a somewhat hemispherical contour of the type customary in dredge buckets. Preferably the bottom or back 82 terminates in a generally planar portion disposed parallel to but spaced from the central plate 52.

In order to mount and secure the dredge bucket body, the side walls 83 and 84 are each provided with a pair of projecting lugs 86 and 87. These are spaced apart in a fore and aft direction on the bucket body and also are laterally spaced apart enough to straddle the central plate 52. The lugs 86 and 87 are provided with reenforcing flanges 88 and 89 and terminate in bosses 90 and 91 of an extent and position to overlie and register with comparable bosses 93 and 94 projecting from the flanges 71 of the link body. In assembled relationship of the link body and bucket body the various bosses are in alignment.

Each of the bosses is pierced to accommodate a fastening pin 96 seated in the bosses but not extending across the central portion of the bucket and link assembly. Each of the pins 96 has an enlarged head 97 formed with a central depression 98 to receive either the head of a through bolt 99 or a nut 101 at the extremity thereof and effective to hold a pair of the pins 96 in position. With this arrangement the principal loads are transmitted between the bucket body and the link body by shearing stresses on the pins 96 although some of the lateral forces are directly transmitted in compression between the bosses 90 and 91 and the bosses 93 and 94. In any case the severe tensile stresses on the link 51 are not transmitted to the bucket body 81.

With this arrangement, upon the removal of the nut 101 and the through bolt 99 and upon the withdrawal of the pins 96, the bucket body 81 can readily be lifted from the link body 51 and an entirely new bucket can take its place being quickly locked into position by reinstallation of pins 96 and the through bolts 99 and the nuts 101. In this fashion different buckets effective under different soil conditions can be utilized with the same chain structure and without necessitating the interruption of the continuity of the chain structure. In fact buckets of varying different shapes and functions can be incorporated readily in the same chain device. Under certain circumstances it is more feasible to restore or replace entire bucket body as-

semblies than it is simply to relip or to replace detachable lips on the buckets as is now often the practice. By following the present invention there is afforded a considerably improved dredge digging structure, one especially capable of use in large size devices and one in which advantage can be taken of various different materials of engineering in resisting most advantageously the various stresses to which the device is subject in operation.

I claim:

1. A dredge digging structure comprising an integral link body having a central plate, downturned side flanges on said central plate and transversely apertured side bosses on said side flanges, an integral bucket body having a material holding hood and transversely apertured side lugs projecting downwardly from said hood, and transverse fasteners engaging said side lugs and said side bosses for holding said link and said body together.

2. A dredge digging structure comprising an integral link body including a central plate, a substantially circular cylindrical central boss at one end of said central plate, a pair of substantially circular cylindrical lateral bosses at the other end of said central plate, side flanges depending from said central plate and extending between said central boss and respective ones of said lateral bosses, the margins of said side flanges being substantially tangent to the respective bosses and apertured side bosses on said side flanges below said central plate.

3. A dredge digging structure comprising an integral link body including a central plate, a central boss at one end of said central plate, a pair of lateral bosses at the other end of said central plate, side flanges depending from said central plate and extending between said central boss and respective ones of said lateral bosses, a pair of apertured side bosses on each of said side flanges; an integral bucket body including a hood having a pair of side walls, a bottom wall, a pair of apertured lugs depending from each of said side walls below said bottom wall to straddle said side bosses; and means for securing said link body and said bucket body together including pins engaging said side bosses and said lugs.

4. A dredge digging structure comprising an integral link body including a central plate, a central transverse boss depending from said central plate at one end thereof, a pair of transverse lateral bosses depending from said central plate at the other end thereof, side flanges depending from said central plate and extending between said central boss and respective ones of said lateral bosses, a pair of side bosses incorporated in each one of said side flanges, said side bosses having transverse apertures therethrough below said central plate; an integral bucket body including a hood having a pair of side walls and a bottom wall, a pair of lugs depending from each of said side walls below said bottom wall to straddle said side bosses, said lugs having transverse apertures therein disposed to align with said apertures in said side bosses when said bucket bottom wall is located just above said central plate; and fastening pins disposed in said aligned apertures.

EDGAR VON BOLHAR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
207,202	Orran	Aug. 20, 1878
622,637	Russell	Apr. 4, 1899
994,487	Vaichis	June 6, 1911
1,084,662	Porter	Jan. 20, 1914
1,560,370	Bennett	Nov. 3, 1925
1,638,099	Rorabeck	Aug. 9, 1927
1,838,362	Clark	Dec. 29, 1931
2,319,979	Collins	May 25, 1943

FOREIGN PATENTS

Number	Country	Date
146,813	Great Britain	Nov. 7, 1921
559,458	France	June 15, 1923