No. 875,420. PATENTED DEC. 31, 1907.

C. A. FRAYER.

EXCAVATOR.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.

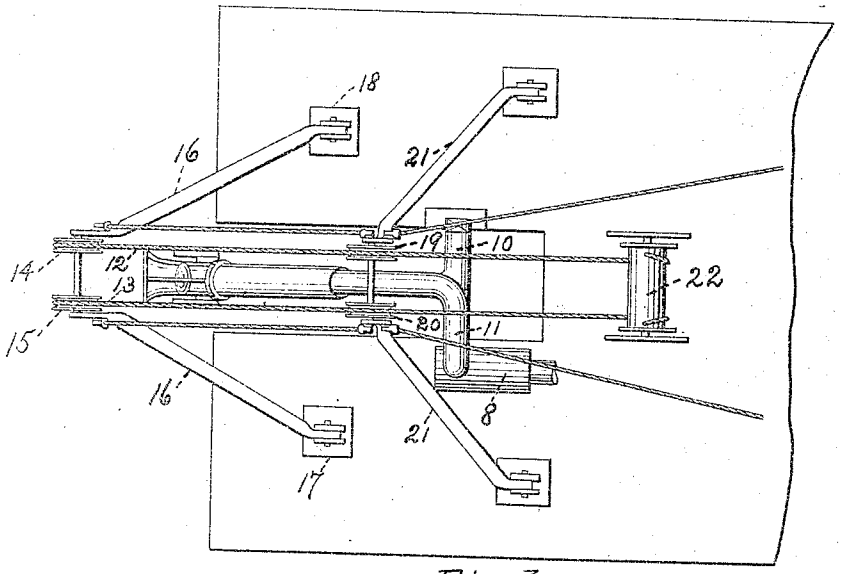


Fig. 3.

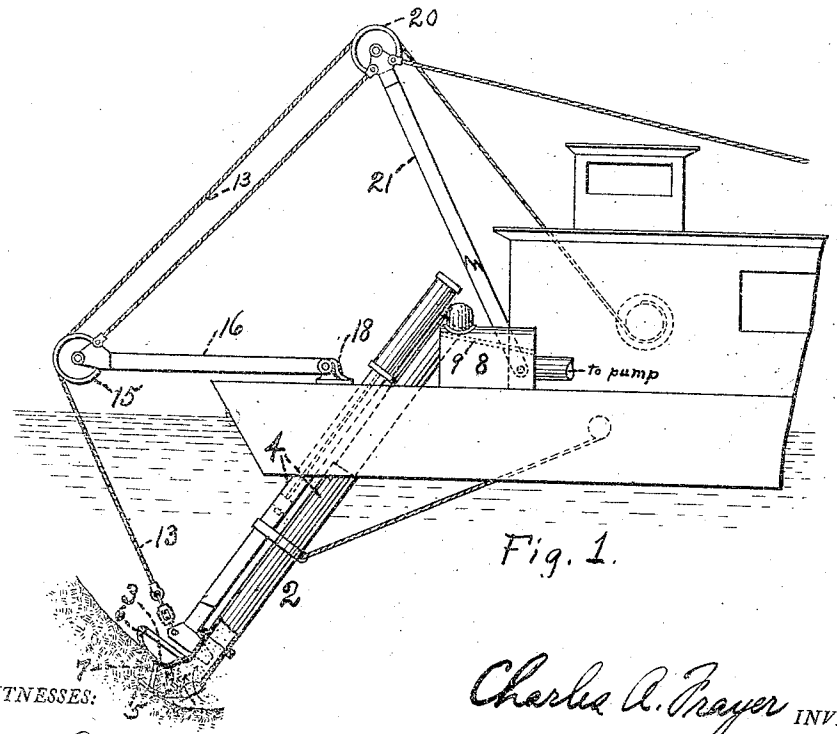


Fig. 1.

WITNESSES:

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2 SHEETS—SHEET 2.

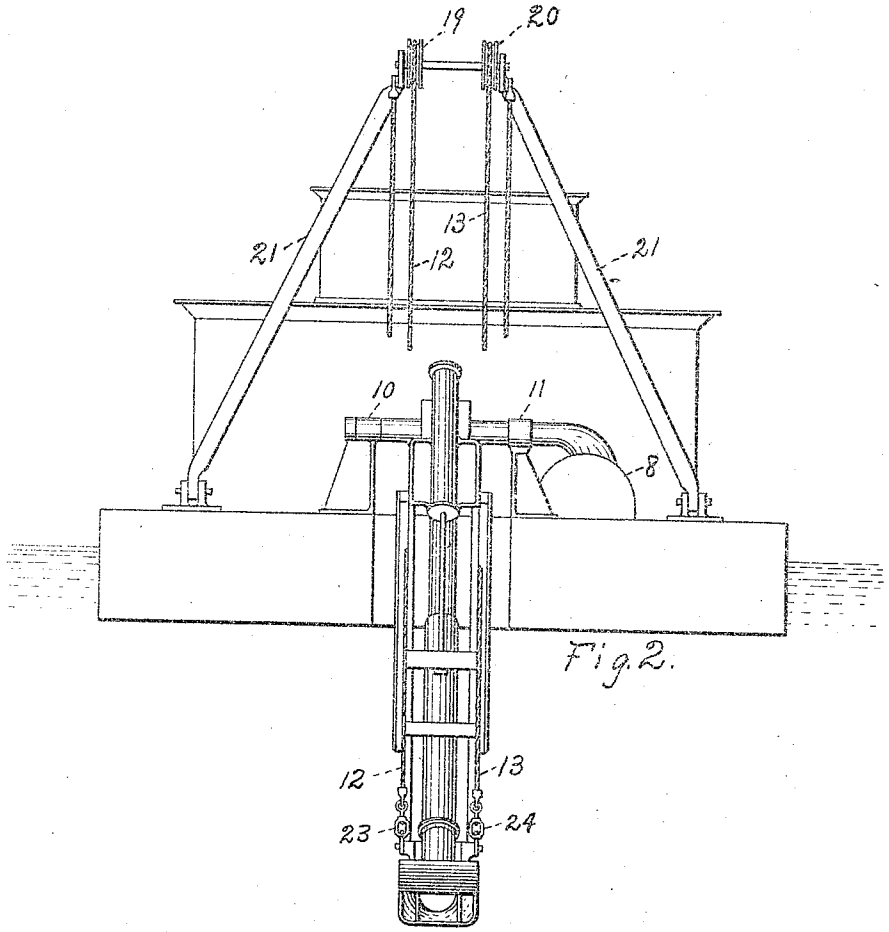


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES A. FRAYER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW JERSEY.

EXCAVATOR.

No. 875,420. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed September 11, 1905. Serial No. 277,876.

To all whom it may concern:

Be it known that I, CHARLES A. FRAYER, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Excavators, of which the following is a specification.

This invention relates to an Excavator, and in using the term "excavator," any mechanism is meant which is capable of excavating or digging earth, sand, gravel, etc. The term "excavator" is therefore intended to include either a dredge or a power shovel.

The object of the invention is to so arrange the operating cables that they will relieve the dipper or operating part of the dredge or shovel of all twisting strains due to material being caught at either side of the cutting edge of the dipper bucket.

In disclosing the invention the same has been applied to a hydraulic dipper dredge, that is, a suction dredge in which the material is drawn up through the dipper by means of a stream of water drawn up by a centrifugal pump mounted upon the barge.

In the drawings: Figure 1 shows a vertical section of the forward part of the barge upon which is located a hydraulic dipper dredge to which my invention is applied. Fig. 2 is a transverse vertical section of the same. Fig. 3 is a plan view.

Referring to the drawings, Fig. 1 shows the dredge in the act of digging. The suction pipe of a pump ends in a form of dipper 2, comprising a bucket 3 and a handle 4. The handle may be extensible as shown. The bucket is formed with a cutting edge 5 at the bottom and a guard or runner 6 at the top. This allows the dipper to slice off the material as a dipper dredge would, but as it can only enter the earth as the guard or runner 6 strikes the surface, it is prevented from burying itself beyond the point desired. Across the mouth of the dipper, cutter bars 7 are vertically placed so as to cut the material into slices and partially prepare it for the action of the water. These cutters are necessary when clay is handled, but can be dispensed with in sand or gravel work.

The dipper handle 4 is hollow and leads to a stone box 8, provided with grizzly bars 9 which are placed on a slant and divide the stone box into upper and power compartments. The purpose of the grizzly bars is to separate large stones and boulders from the incoming stream of material, these accumulating in the upper compartment of the stone box and being periodically removed through a manhole provided for that purpose. The lower compartment of the stone box has an outlet extending to the suction of the centrifugal pump.

The dipper 2 is mounted upon trunnions 10, 11, see Fig. 2, so as to be swung in a vertical plane. The operating means for swinging the dipper in its working stroke consist of cables 12, 13, attached to the lower end of the dipper near or directly to the bucket 3. The points of attachment are spaced apart transversely of the operating plane. The cables 12, 13, extend from the lower end of dipper handle 3 to and around sheaves 14, 15, Figs. 1 and 3, upon a swinging frame 16 which is mounted upon the forward end of the barge deck in supports 17, 18. From the sheaves 14, 15, cables 12, 13, extend upwardly, over sheaves 19, 20, Figs. 1 and 2, mounted at the top of the A-frame 21, Figs. 1 and 2. From the sheaves 19, 20, the cables 12, 13, extend downwardly to the winding drum 22. Turnbuckles 23, 24, Fig. 2, are conveniently placed somewhere in the length of cables 12, 13, so as to provide for equal tensioning of these cables.

In operation the dipper 2 is swung up on trunnions 10, 11, by the winding up of cables 12, 13, upon the drum 22 by engine mechanism not described. Should the bucket 3 strike an obstruction in the bank being excavated, and such obstruction be caught by the side cutting edge of the bucket, there will be a tendency to twist the dipper handle 4. This tendency is avoided by the connection of cables 12, 13 to the dipper at points spaced apart, as plainly indicated in Fig. 2. All the strain caused by the obstruction as above, will, in the present invention, come directly upon one of the two cables 12, 13, and prevent any twisting of the dipper handle 4.

In the present disclosure of the invention, the dipper is shown as telescopic, but this has no direct relation to the present invention.

In accordance with the provisions of the patent statutes, the principle of operation of the invention has been described, together

with the apparatus which is now considered to represent the best embodiment thereof; but it is desired to be understood that the apparatus shown is merely illustrative and that the invention can be carried out by other means.

What is claimed is:—

1. In an excavator, a dipper comprising a bucket having a cutting edge and a handle, and simultaneous operating means for the dipper including a plurality of ropes spaced apart having spaced attachment to the dipper near its cutting edge.

2. In an excavator, a dipper comprising a bucket having a cutting edge and a handle, operating means for the dipper for the working stroke including a plurality of ropes spaced apart transversely of the operating plane and having attachment to the dipper spaced apart transversely of the operating plane and near the cutting edge of the dipper.

3. In an excavator, a dipper comprising a bucket having an entering edge and a handle, and elevating means for the dipper including a plurality of ropes spaced apart and having spaced attachment to the dipper near the entering edge of the bucket.

4. In an excavator, a dipper comprising a bucket having an entering edge and a handle and elevating means for the dipper including a plurality of ropes spaced apart and having horizontally spaced attachment to the dipper and directed towards the entering edge of the dipper.

5. In an excavator, a dipper comprising a bucket having an entering edge and a handle and means for elevating the dipper in a vertical plane including a plurality of ropes spaced apart transversely of the elevating plane and having attachment to the dipper transversely spaced as to the elevating plane and directed towards the entering edge of the dipper.

6. In an excavator, a dipper having a cutting or entering edge and a handle, and flexible means for operating the dipper having attachment to the dipper at points spaced apart but near the cutting or entering edge of the dipper.

7. In an excavator, a dipper having a cutting or entering edge and a handle, and flexible means for operating the dipper having attachment to the dipper at points spaced apart, the said flexible means extending towards the cutting or entering edge of the dipper.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES A. FRAYER.

Witnesses:

JOHN DAY, Jr.,

R. M. STONE.