(No Model.)

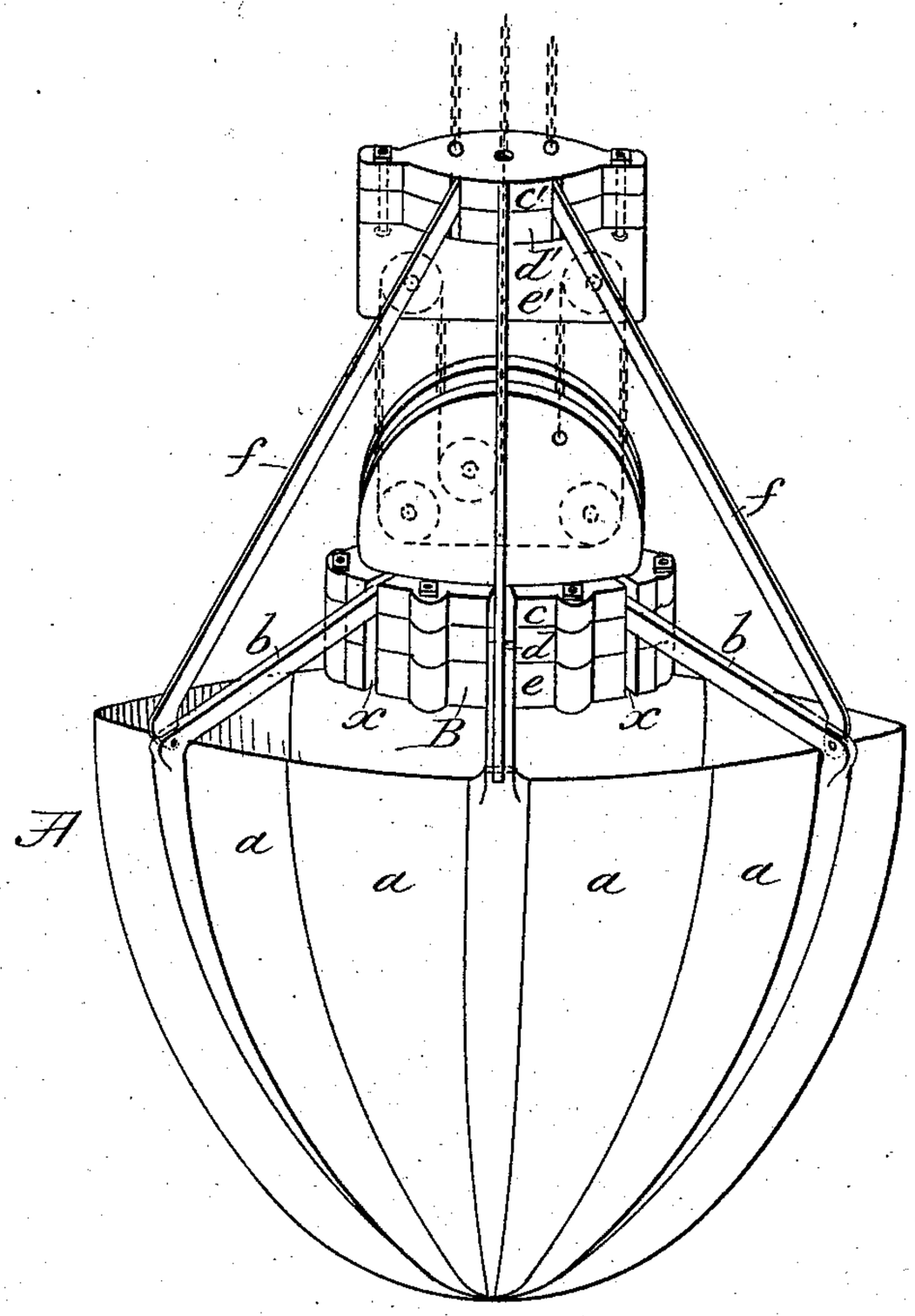
2 Sheets—Sheet 1

S. MEAD.

DREDGING MACHINE.

No. 294,400. Patented Mar. 4, 1884.

Fig. 1.



Attest:
F. H. Schott
Daniel S. Glenney Jr

Inventor:
Solomon Mead

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

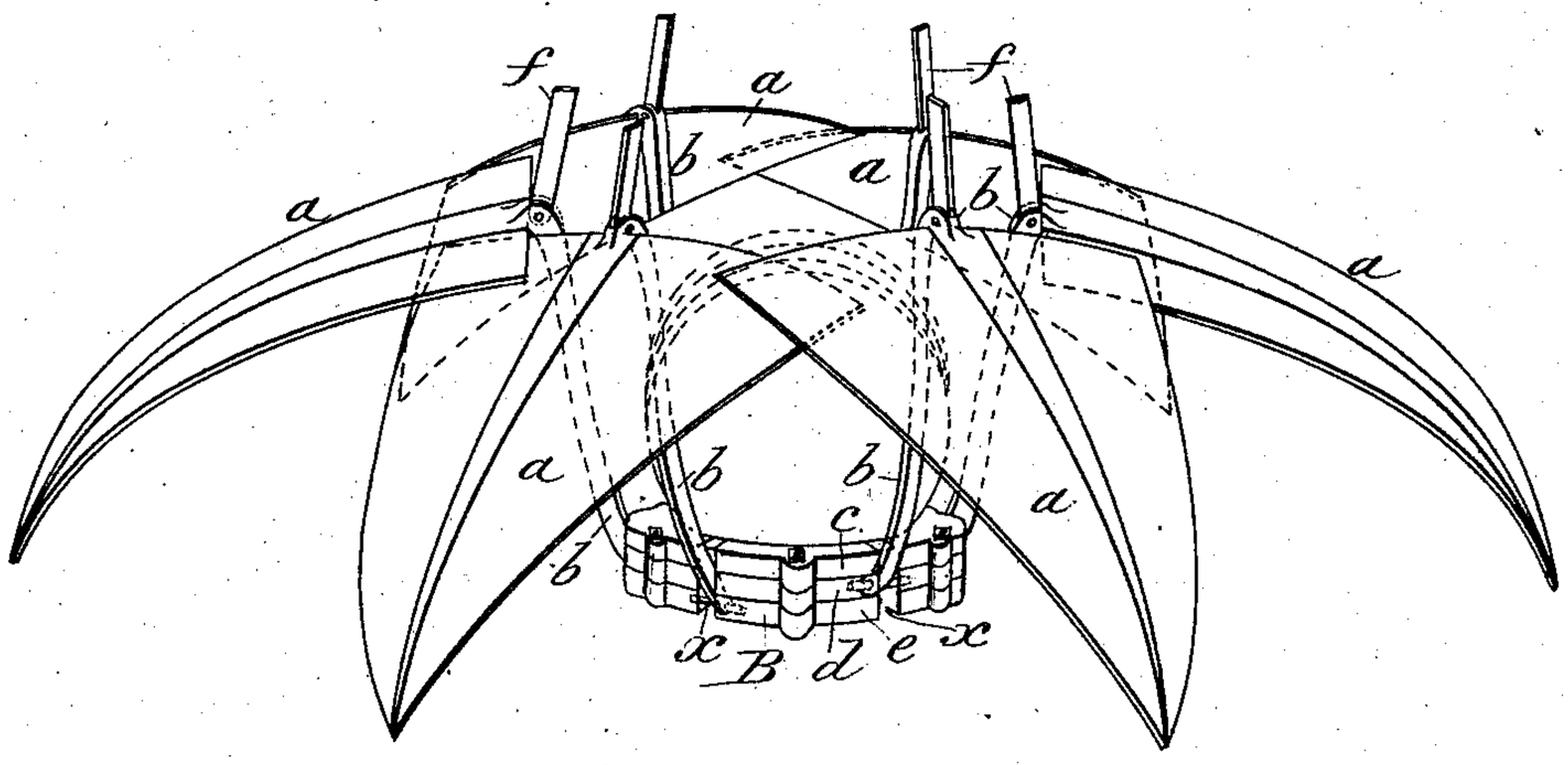

Fig. 3.

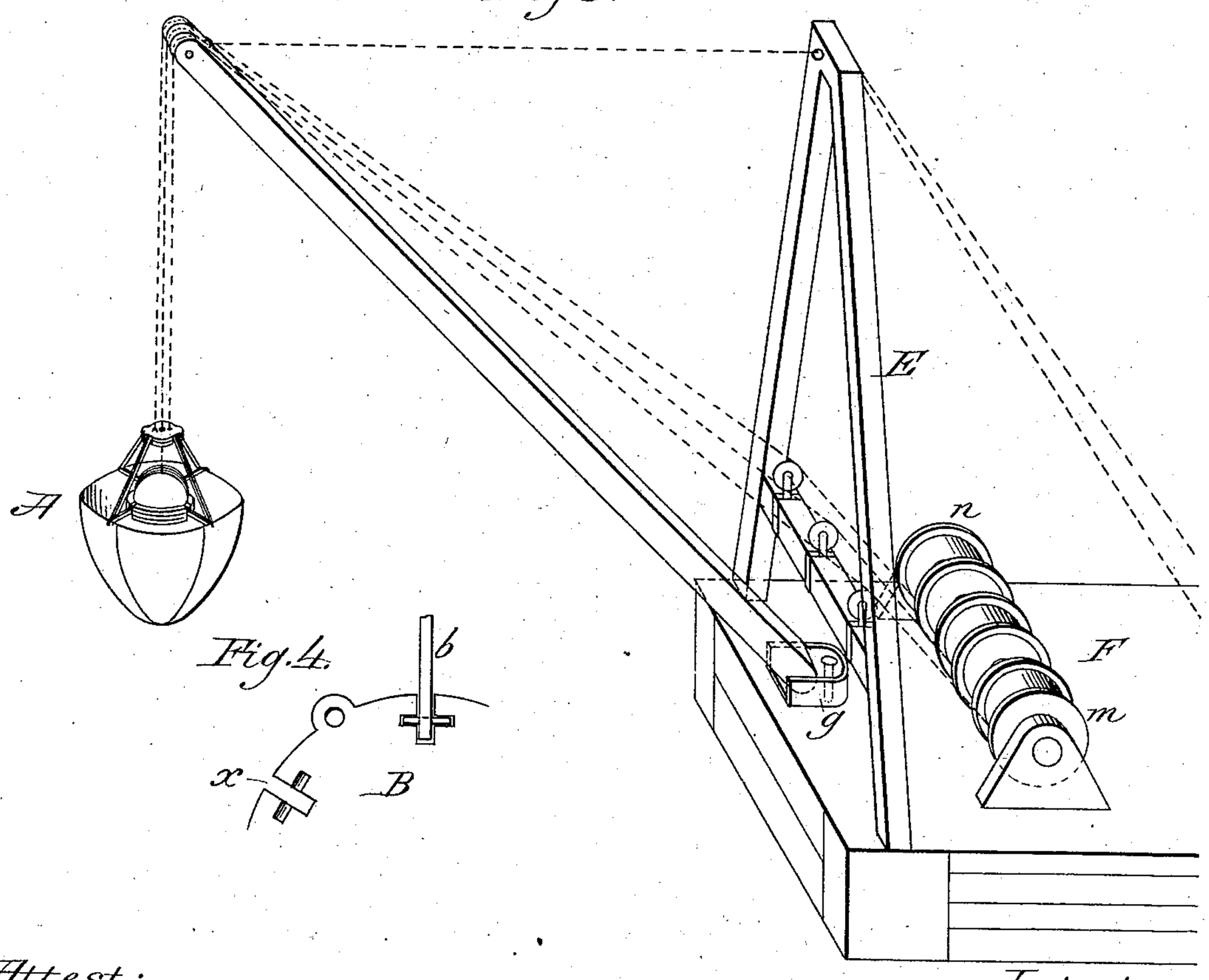

Fig. 4.

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UNITED STATES PATENT OFFICE.

SOLOMON MEAD, OF NEW HAVEN, CONNECTICUT.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 294,400, dated March 4, 1884.

Application filed October 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON MEAD, a citizen of the United States of America, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Dredging-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention consists in making a dredging-bucket of sections of an ellipsoid, and pivoting the arms to which the sections are attached in different planes; also, in improved means for operating a bucket, as hereinafter described.

To enable others to understand these improvements, the following descriptions and explanations are made.

Figure 1 is a view of the bucket closed. Fig. 2 is a view of the bucket opened. Fig. 3 is a view of the derrick or means for operating a bucket. Fig. 4 is a view of the recesses and pivots by which the arms and connecting-bars are pivoted.

The bucket A, Fig. 1, is made of six equal sections, *a*, and of the form of a hollow ellipsoid, so far as it extends, and the sections of which it is made have their meeting-point at the axis of the ellipsoid. Each section of the bucket is fastened to an arm, *b*, for support and to keep it in position, which arm also extends to the lower sheave-block, B, to which it is pivoted. The arms *b* are pivoted alternately to the lower sheave-block in two different and parallel planes, as hereinafter described.

The lower sheave-block is made of three pieces, *c d e*, and is furnished with sheaves, as indicated by the broken lines. The three pieces *c d e* are bolted together, as shown in the drawings. Between these pieces recesses are formed, in which pivots are placed, as shown in Fig. 4, on which the arms *b* are pivoted. The arms are pivoted alternately between the pieces *c* and *d* and the pieces *d* and *e*, the upper surfaces of which are the two parallel planes, having the piece *d* as the separation of the planes.

The upper sheave-block is made of three pieces, *c′ d′ e′*, bolted together. The lower piece, *e′*, incloses the sheaves shown by the broken lines. Between the pieces *c′* and *d′* are pivoted the upper ends of the connecting-bars *f* in manner as shown in Fig. 4. The connecting-bars *f* are pivoted at their lower ends in slots in the arms near the intersection of the arms with the sections of the bucket.

The bucket, when in operation, is opened by the weight of the lower sheave-block, B, and as the bucket opens the upper portions of the sections overlap each other, as shown in Fig. 2. To provide for this overlapping, so that alternate sections shall pass over and under each other without interference, the arms of the bucket are pivoted alternately in different planes, as heretofore described, so that the sections of those arms that are pivoted in the upper plane will, when open, rise higher and occupy a larger space than those sections the arms of which are pivoted in the lower plane, and thus all interference in overlapping be prevented.

In Fig. 2 the bucket is shown open, which gives another view of the form of the sections of the bucket, and also a view of the overlapping of the sections when the bucket is opened. The spread of the bucket is also shown in this figure.

In Fig. 3 the derrick is shown, and consists in the usual upright frame, E, which is fastened to the platform F, and is supported by the usual stays. The boom G has its lower end resting in a seat, which is pivoted to the platform F, and its upper end is held by chains or rods extending from the upper part of the frame. At the outer end of the boom three pulleys are supported, over which the chains pass for operating the bucket. On the frame E are three guiding-sheaves for the chains, and back of the frame are three winding or friction drums, to which the chains are attached and the power applied. The two outside or hoisting chains are fastened to the upper sheave-block of the bucket, and pass up and over the outer pulleys at the end of the boom, and also over the guiding-sheaves on the frame E, to the outer winding or friction drums, *m* and *n*, to which they are fastened, and on which they are wound and unwound to operate the bucket. The closing or center chain is fastened to the lower sheave-block, B, passing upward and over a sheave in the upper sheave-block, downward and around the two lower sheaves in the lower

sheave-block, thence upward and over a sheave in the upper sheave-block, and downward and around the upper sheave in the lower sheave-block, and up through an opening in the upper sheave-block, up over the central pulley at the end of the boom, to the guiding-sheave and the central drum, to which it is attached, as shown in Figs. 1 and 3.

The operation of my machine is as follows: When the bucket is held or raised by the hoisting-chains, with the closing-chain slackened, the bucket is opened by the weight of the lower sheave-block, B. In this opened condition the bucket is lowered to the material to be dug. The power now applied to the closing-chain closes the bucket. It is then raised by the three chains operating together. The bucket is then swung to the right or left by loosening one and tightening the other of the hoisting-chains. The closing-chain is then slackened and the bucket is opened and emptied, and may again be returned to the place of filling while open.

The improved means for operating a bucket as here described consist in the use of three chains for such operation, two of the chains being used as hoisting-chains and one of the chains for the closing of the bucket. The object of having three chains is to have a better control over the bucket in its use.

As ordinarily constructed, dredging-machines of this kind have been made with two chains only—a hoisting-chain and a closing-chain. As one of the results of the ordinary way of construction, the swinging of the bucket has been confined chiefly to one direction. Another result is that the bucket, when empty, cannot be returned and refilled without being first closed, then swung to its position, and then opened again before it is lowered to the place to be dug. A third result is found in the difficulty of placing the bucket just where it is desired to have the digging done, on account of the slackening required in the closing-chain, to allow the bucket to open, and then, being held only by the hoisting-chain, it is liable to be drawn to one side while the bucket is opened. A fourth result is found in a tendency of the chains to wind or twist around each other by the turning of the bucket, as the weight of the bucket is held by one chain, which is not centrally attached to the bucket.

With these improved means of operating a bucket by the use of three chains, two of the chains being used as hoisting-chains and one as an opening and closing chain, the following advantages are found: First, the bucket may be swung, with its load, to the right or left at pleasure—a very practical and important advantage in the use of a bucket; and, secondly, the bucket, when empty, may be returned to its place of refilling without the delay of closing and opening again, and thereby make a great saving in time, power, and wear in the use of the bucket; and, thirdly, with this better control over the bucket it may be returned to be filled just where it is desired to have the digging done; and, fourthly, the twisting of the chains by the turning of the bucket is by this means entirely prevented.

I am aware that dredging-buckets as heretofore constructed have been made in two parts, and also in "sections of a hollow half-globe." One of the results of this globular form of construction is that the ends of the sections of the bucket, when open, occupy a space not exceeding the diameter of the bucket when closed. Another result is that when the full diameter of the bucket is dug the bottom of the place dug is studded with ridges or points, which is the material left undug between the different cuts of the bucket. Another result is found in the direction given to the points of the bucket when closing, which is rather inward than downward, thus giving less penetrating-power in hard digging.

One of the advantages arising from the ellipsoidal form of bucket, as shown open in Fig. 2, where it is obvious that the space embraced within its points when open largely exceeds its own diameter when closed, is that it thereby enables this bucket to gather its filling material from a much larger surface, and more certainly insures its filling when it is closed. Another advantage arising from the larger space embraced within the points of the ellipsoidal form of bucket over its own diameter is that it serves to gather within its scope any points or ridges that may be left undug between the different cuts of the bucket, and thus leaves a more even surface at the bottom of the place dug. Another advantage in the ellipsoidal form of bucket is that its points in the early part of its closing tend more downward than inward, and thus give a greater penetrating-power in digging to this form of bucket, which is of great value when the material to be dug is hard to penetrate.

With the foregoing description of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A dredging-bucket consisting of like sections of a hollow ellipsoid, provided with arms which are pivoted to the lower sheave-block, B.

2. A dredging-bucket consisting of like sections of a hollow ellipsoid, provided with arms which are pivoted alternately in different planes to the sheave-block, to prevent any interference of the overlapping sections in opening the bucket.

3. In a dredging-machine, three chains—two hoisting-chains and a closing-chain—in combination with an ellipsoidal form of bucket, as described, and with the winding-drums and the derrick, all the said parts constructed and combined substantially as set forth.

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

SOLOMON MEAD.

Witnesses:

DANIEL S. GLENNEY, Jr.,

GEORGE TERRY.