No. 709,420.

Patented Sept. 16, 1902.

C. PAY.

DREDGING BUCKET.

(Application filed May 16, 1902.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 3.

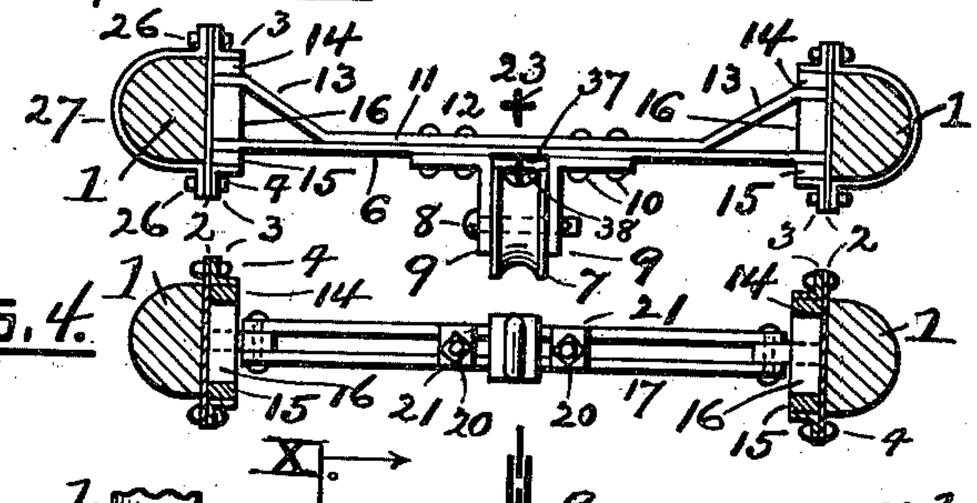

FIG. 4.

FIG. 1.

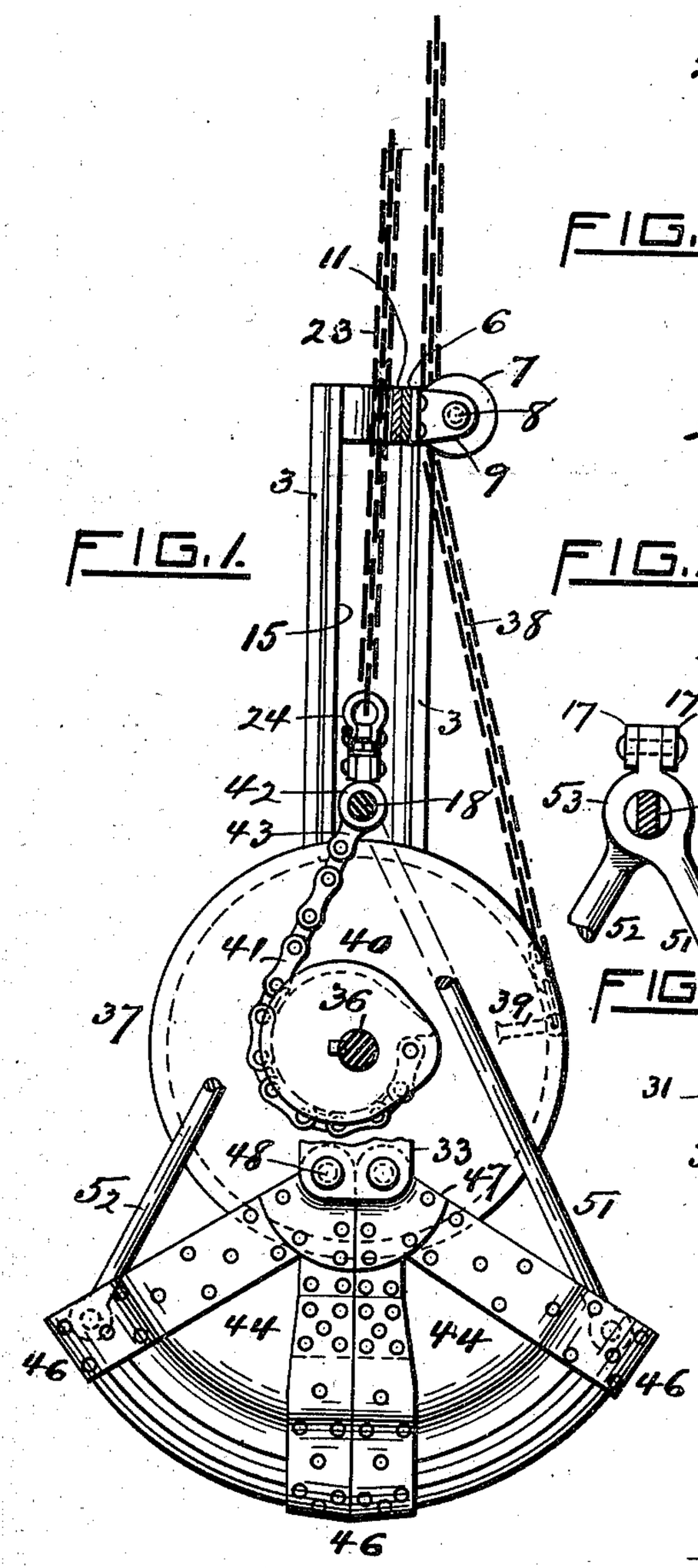

FIG. 2.

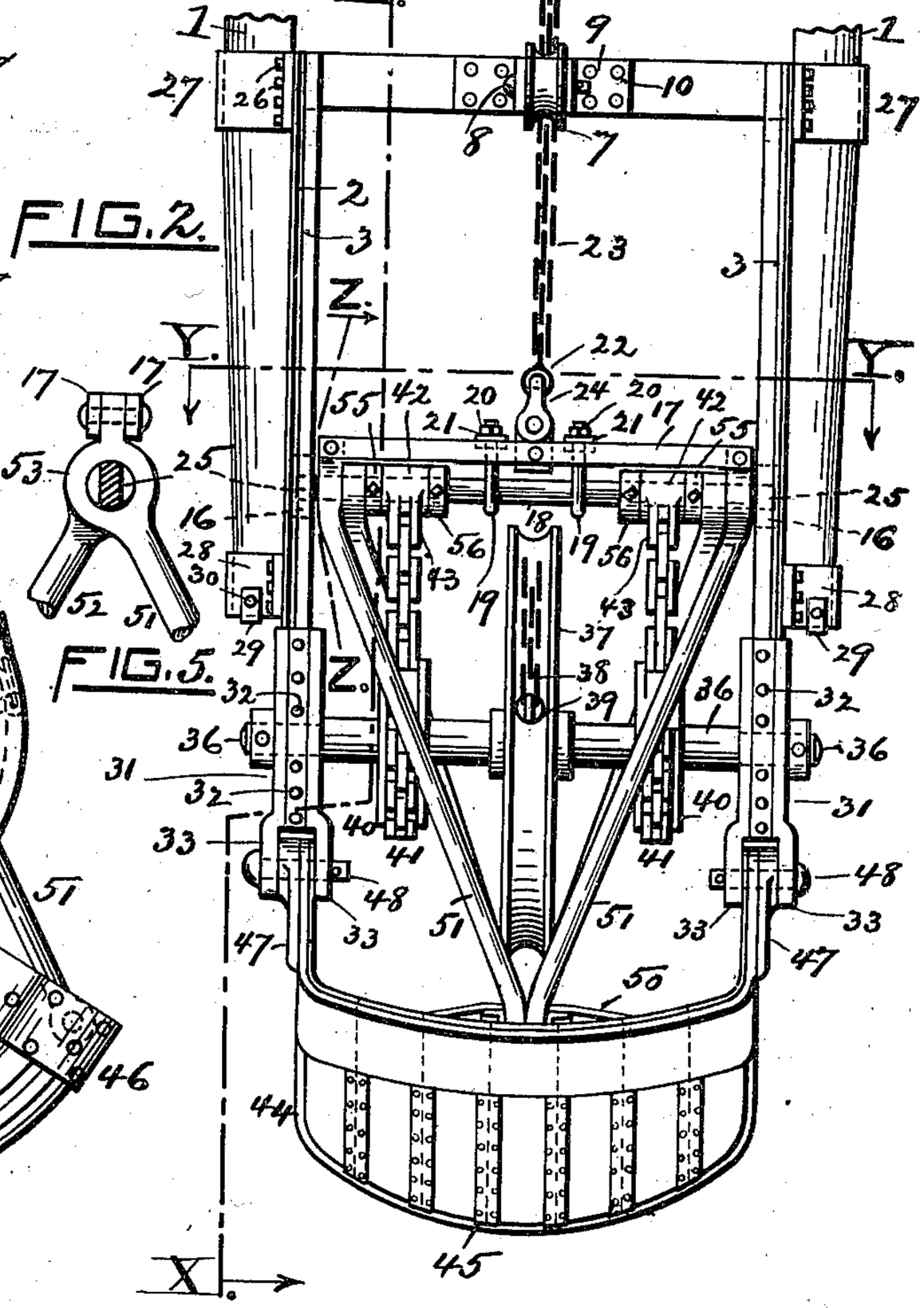

FIG. 5.

WITNESSES.

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C. PAY.

DREDGING BUCKET.

(Application filed May 16, 1902.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 9.

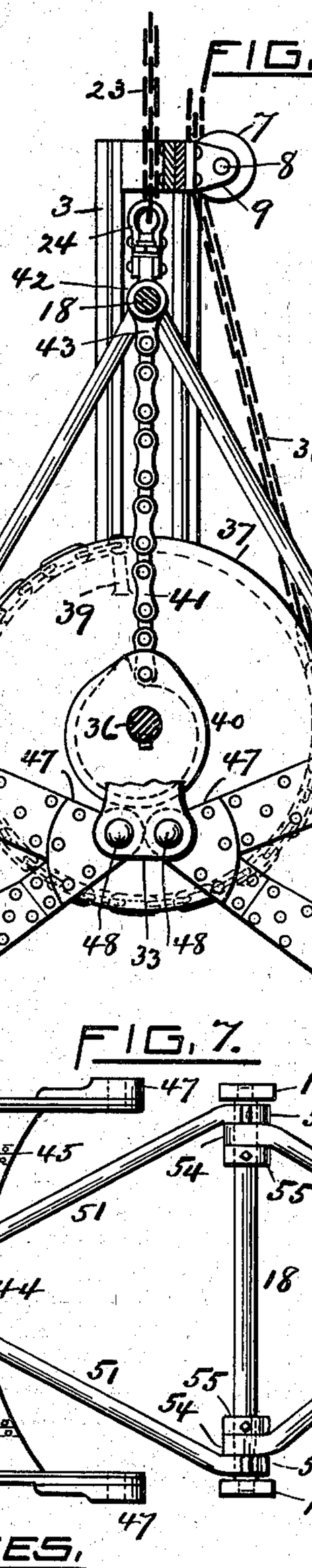

FIG. 6.

FIG. 7.

FIG. 10.

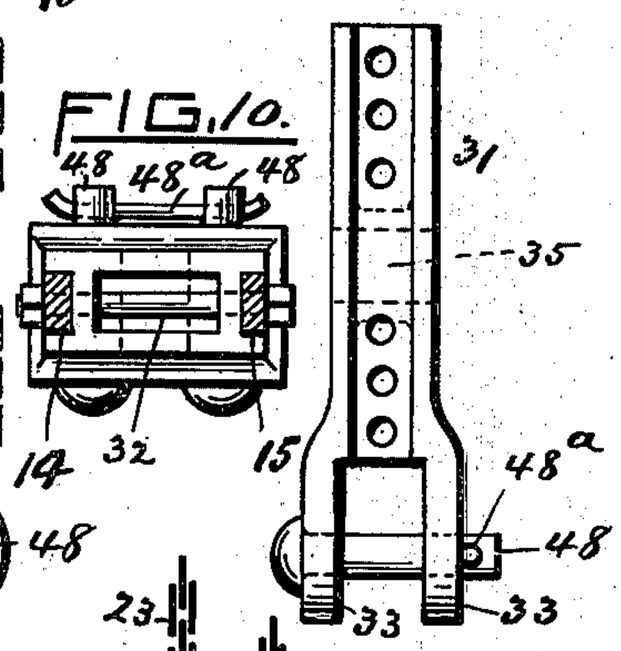

FIG. 11.

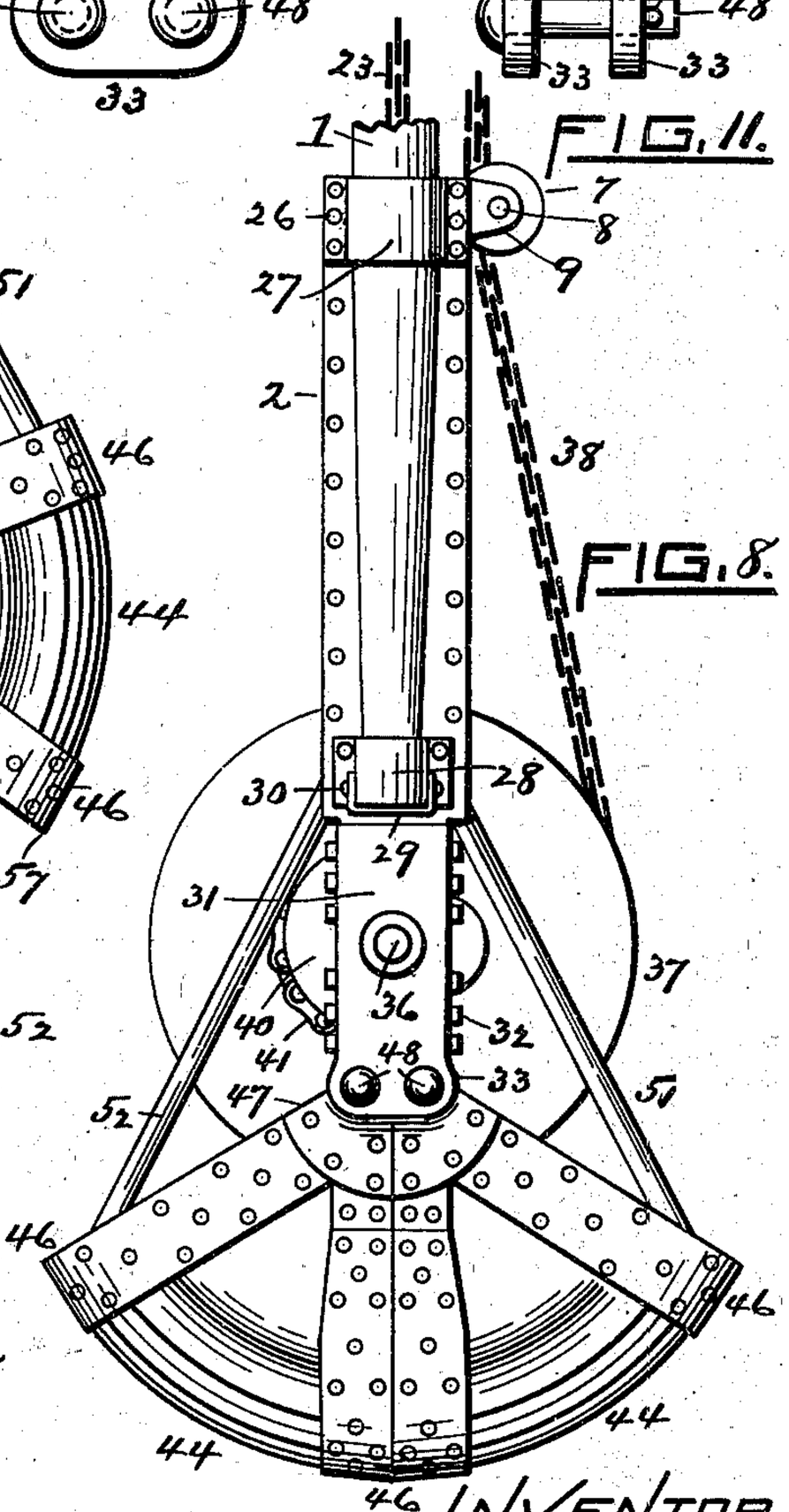

FIG. 8.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES PAY, OF PROVIDENCE, RHODE ISLAND.

DREDGING-BUCKET.

SPECIFICATION forming part of Letters Patent No. 709,420, dated September 16, 1902.

Application filed May 16, 1902. Serial No. 107,630. (No model.)

To all whom it may concern:

Be it known that I, CHARLES PAY, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Dredging-Buckets, of which the following is a specification.

Like numerals indicate like parts.

Figure 1 is a side elevation of my invention as seen on line X X of Fig. 2. Fig. 2 is a front elevation of the same. Fig. 3 is a top plan view of the upper portion of the device illustrated in Fig. 2. Fig. 4 is a top plan view as seen on section-line Y Y of Fig. 2. Fig. 5 is an enlarged detail view as seen on line Z Z of Fig. 2. Fig. 6 is a side elevation of my improved machine as seen when the bucket is open. Fig. 7 is a top plan view of one-half of the bucket when open. Fig. 8 is side elevation of said machine as seen when the bucket is closed. Figs. 9, 10, and 11 are detail views of the cam-shaft box, Fig. 9 being a side elevation thereof, Fig. 10 a top plan, and Fig. 11 a front elevation, of the same.

My invention relates to dredging-machines, and more particularly to the bucket thereof and means for its operation; and it consists of the novel construction and combination of the several parts, as hereinafter described, and specifically set forth in the claims.

In the drawings, 1 1 are the poles or supports upon which the working parts are held in position. On each pole 1 is a rectangular plate 2, having a width exceeding the diameter of said pole, as seen in Fig. 4.

3 3 are angle-irons, and bolts 4 4 connect said angle-irons to the plate 2.

A cross-bar 6 extends from one pole 1 to the other, and centrally mounted thereon is a pulley 7, whose axle 8 is supported in brackets 9, the latter being fastened to the cross-bar 6 by bolts 10. A supplemental cross-bar 11 is bolted at 12 to the cross-bar 6 and has its two ends bent, as seen at 13. Between the side of the bent end of the bar 11 and the inner side of the angle-iron 3 is inserted the strip 14, and between the side of the cross-bar 6 and the other angle-iron 3 is inserted the strip 15. These strips 14 and 15 extend the whole length of the plate 2. In the space between the vertical strips 14 and 15 is loosely mounted on each side of the machine a sliding block 16, made of cast-steel or other suitable material.

A lifting-yoke 17 consists of two parallel bars, as shown in Fig. 4, and a cylindrical shaft 18 is held thereto by the eyebolts 19, which pass up between the said two parallel bars, as seen in Fig. 4, and are secured in place by the nuts 20 and plates 21, as seen in Figs. 2 and 4. A ring 22 of a chain 23 is secured in a ring-bolt or swivel 24. The shaft 18 is kept from turning by having its ends made flat where they enter the blocks 16 16, as illustrated at 25 in Fig. 5.

On the plate 2 is bolted at 26 a yoke or U-shaped band 27, through which the pole 1 passes. At or near the bottom of the plate 2 is a similar yoke 28, in which the lower end of the pole 1 is seated. A bent strip 29, bolted at 30 to the yoke 28, closes the bottom of the yoke 28, as shown in Figs. 2 and 8.

There are two cam-shaft boxes 31, (shown in detail in Figs. 9, 10, and 11,) and each of these boxes is made in one piece of cast-steel to withstand the greatest strain at that point of the frame where the cam-shaft 36 is mounted, and these boxes are grooved at each end to receive the strips 14 and 15, which are secured to the boxes by the bolts 32. A hole 35 is made in each of the boxes 31, through which the cam-shaft 36 passes rotatably, and the lower portions of each of the boxes have ears 33 33, through which project bolts 48 48, which are held stationary by the pin 48^a, which passes through them, as seen in top plan of Fig. 10. The cam-shaft 36 has the pulley 37 fastened thereon. A chain 38 is fastened at its lower end by a bolt 39 to the grooved periphery of the pulley 37, and said chain 38 passes up behind the pulley 7, as seen in Figs. 1, 2, 3, 6, and 8. On the shaft 36 are also secured two cams 40. A chain 41 is fastened at its lower end to each cam 40. A collar 42 is mounted on the shaft 36 and is provided with ears 43, between which the upper end of the chain is pivotally mounted. Said cams 40 have parallel flanges on their peripheries, as illustrated in Figs. 1, 2, and 6.

The dredging-bucket consists of two shells or scoops 44, and each of these scoops has straight parallel sides and also has a spher-

ically-shaped bottom. It is strengthened by the riveted ribs 45, as shown in Figs. 2 and 7, and by the metallic straps or bands 46, as shown in Figs. 1, 6, and 8. Earpieces 47 are provided on each scoop 44, and bolts 48, passing through said earpieces 47, pivotally connect them with the earpieces 33 of the cam-shaft box. Each scoop 44 has brackets 49, which are strengthened by braces 50, and two bail-arms 51 and two other bail-arms 52 are pivotally mounted at their lower ends, respectively, to the brackets 49, contiguous thereto, by bolts 53ª. At their upper ends said bail-arms 51 52 have rings or collars 53 54 integral therewith and through which collars the shaft 18 passes. On the sides of each collar 42 are collars 55 56, abutting it and held to the shaft 36′ by set-screws.

Having thus described the parts of said machine, I will now explain its operation. When the dredging-bucket descends and rests upon the river mud bottom which is to be scooped up, the parts are in the position shown in Fig. 6. The scoops 44 are here shown as open to their widest extent and the sharp digging edges thereof (designated in said figure as 57) are in contact with the soil which is to be excavated. When the scoops 44 are in this position, the bolt 39, by which the end of the chain 38 is fastened to the periphery of the pulley 37, is at the part of the pulley 37 then uppermost. The chain 23 is let down and the chain 38 is pulled up at the same time. The pull on the chain 38 turns the pulley 37 and the shaft 36, to which said pulley is fastened. The rotation of the shaft 36, so caused, turns the cams 40 40, secured thereto. This turning of the cams 40 40 winds up the chains 41 41 and so draws down the shaft 18 and the sliding blocks 16 16, on which the ends of said shaft 18 are mounted, the blocks 16 sliding between the guides or strips 14 15. The result of this pull upon the chain 38 therefore results in the closing of the scoops 44 44, and the parts are then in the position shown in Figs. 1 and 8. This downward movement of the shaft 18 pushes the bail-arms 51 52 and brings together the edges 57 57 of the scoops 44 44, thus biting into the soil and filling the scoop-bucket. When the bucket has been elevated and swung into discharging position by the well-known means, (not shown,) the chain 23 is pulled and the chain 38 is let out. At the beginning of this upward movement the parts are in the position shown in Fig. 8. The pull of the chain 23 raises the shaft 18 from the position shown in Fig. 1 to the position shown in Fig. 6. This rise of the shaft 18 unwinds the chains 41 41 from the cams 40 40, thus rotating the shaft 36, winding the chain 38 on the pulley 37, and pulling the bail-arms 51 52, so opening the scoops 44 44. By the construction and arrangement shown and described the power exerted to close the scoops is applied to the cams 40 40 on their shortest radii, and consequently with greater degree and at the same time with a less tendency to lift the bucket out of the soil. As the scoops are closing the chains 41 are wound on the cams 40 on increasing radii, and when the scoops are entirely closed together the chains 41 are pulling on the cams 40 on their longest radii. When the bucket has been lifted and is ready to be emptied by the opening of the scoops, the tension is changed from the chain 38 to the chain 23 in the usual and well-known manner and the leverage upon the cams proceeds in the reverse order, thus facilitating a quick discharge of the bucket-load. The spherical form of the bottoms of the scoops adapts them more easily to excavate the wet soil, and the application of the power of the arms 51 52 to said scoops at the centers of their digging edges 57 gives to the scoops the best penetrating ability. By this construction the maximum of closing and opening power is given to the scoops at the times and intervals when they respectively are most needed.

It is obvious that this device is applicable for general excavating purposes, for wet or dry soils, or for hoisting or elevating coal, grain, or other substances.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a dredging-machine, the combination of a bucket consisting of two sections or scoops, each of which has straight parallel sides and also a segmental-shaped bottom, said scoops pivotally mounted on a proper support, bail-arms connected with said scoops respectively at the digging edge of each, and means adapted to operate said arms for the purpose of opening and closing said scoops, substantially as shown and described.

2. In a dredging-machine, the combination of a bucket comprising two scoops pivotally mounted on a proper support, a properly-mounted cam-shaft, a pulley fixed on said shaft, two cams fixed on said shaft and each having a volute periphery, a lifting-bar, bail-arms mounted on said bar and connected with said scoops respectively, a chain adapted to raise and lower said bar, a chain adapted to rotate said pulley, and two chains mounted on said bar and adapted to operate said cams respectively, substantially as specified.

3. In a dredging-machine having a suitable frame provided with guideways, and two cast-steel blocks each of which is rigidly secured at the lower portion of said frame, in combination therewith, of a bucket comprising two scoops pivotally mounted on said blocks, a shaft rotatably mounted on said blocks, two cams rigidly secured on said shaft and each having a volute periphery, a lifting-bar movable in the guideways of said frame, bail-arms mounted on said bar and connected to said scoops respectively at the centers of the digging edge of each and means adapted to operate said arms in opening and closing said scoops, substantially as shown and described.

4. In a dredging-machine having suitable guideways, the combination therewith, of cast-steel blocks movable in said guideways, the lifting-bar, the shaft attached to said bar and having its ends mounted in said blocks, the bucket comprising two pivotally-mounted scoops, and arms extending from said shaft to said scoops, respectively, substantially as specified.

5. In a dredging-machine having suitable guideways, the combination therewith, of cast-steel blocks each of which is made in one piece and secured to said guideways between the lower portion thereof, a cam-shaft mounted rotatably in said blocks, and a bucket comprising two scoops pivotally mounted on said blocks and suspended beneath the said cam-shaft, substantially as shown and described.

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

CHARLES PAY.

Witnesses:
THOMAS LOCKE,
ELMER WALKER.