No. 805,228.

PATENTED NOV. 21, 1905.

W. H. ONION.

EXCAVATOR.

APPLICATION FILED MAR. 28, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

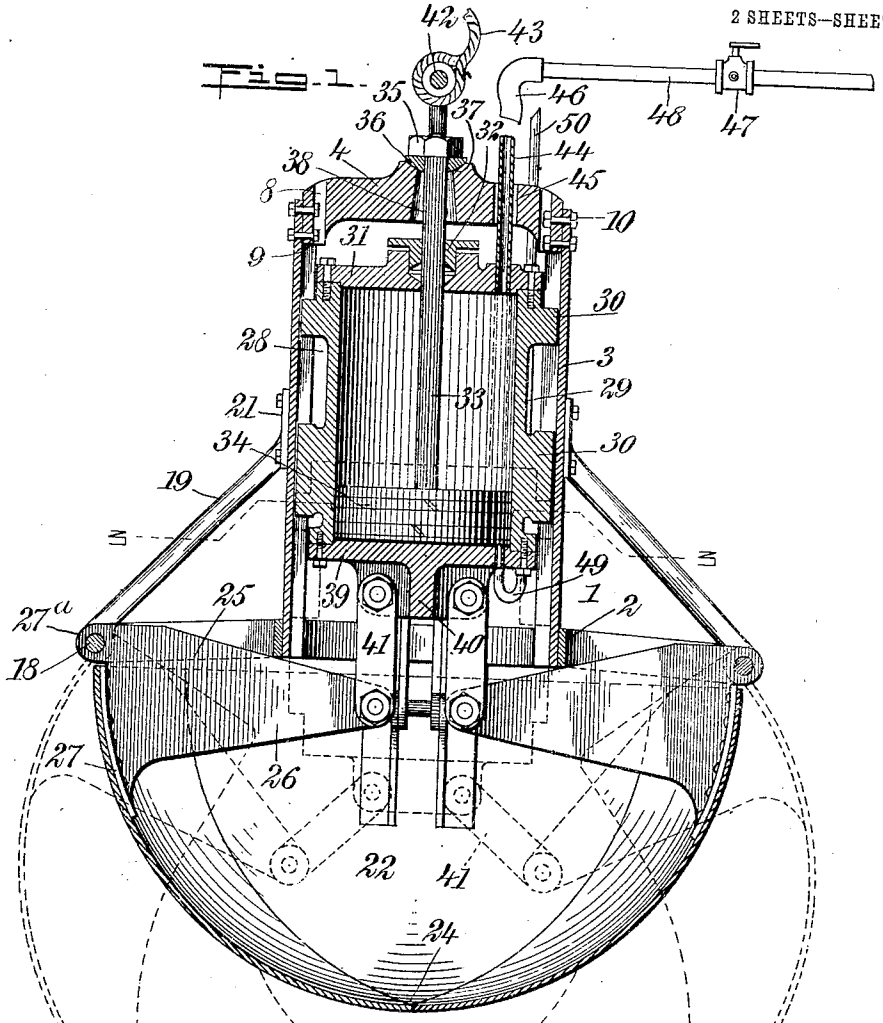
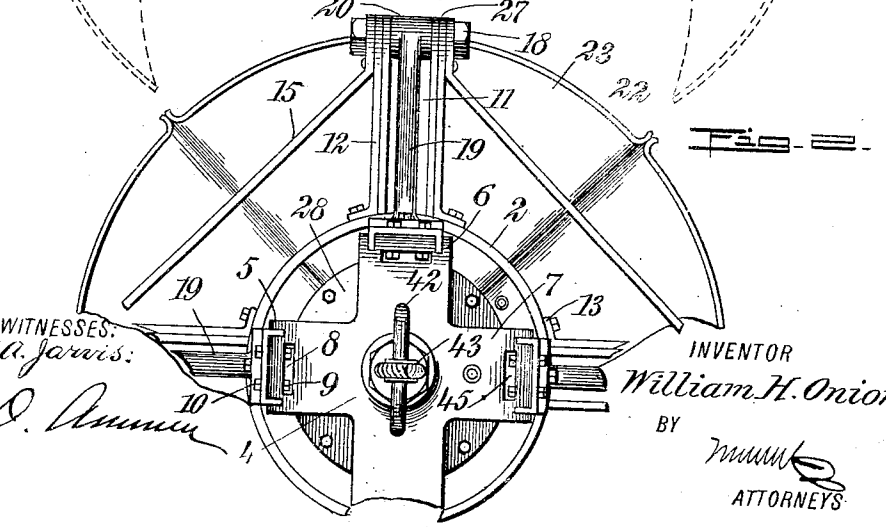


Fig. 2.



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INVENTOR

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2 SHEETS—SHEET 2.

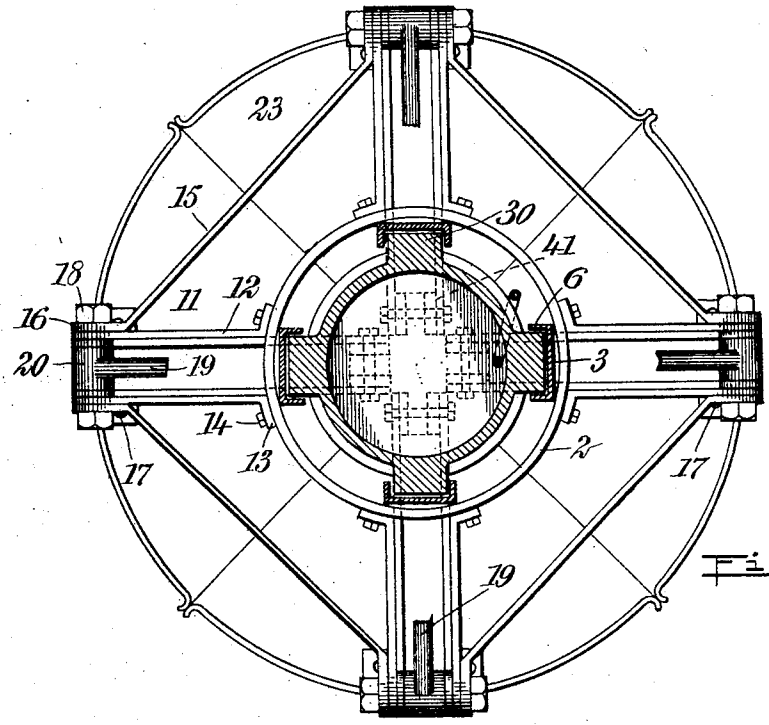


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM HOWELL ONION, OF NEW ORLEANS, LOUISIANA.

EXCAVATOR.

No. 805,228. Specification of Letters Patent. Patented Nov. 21, 1905.

Application filed March 28, 1905. Serial No. 252,479.

To all whom it may concern:

Be it known that I, WILLIAM HOWELL ONION, a citizen of the United States, and a resident of New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and Improved Excavator, of which the following is a full, clear, and exact description.

My invention relates to excavating machinery, and especially to dredges employing sectional buckets which open and close in the dredging or excavating operation.

More particularly the invention relates to buckets operated by a cylinder attached to the same, and concerns itself with improvements in the construction of the cylinder and the means for connecting the same.

The object of the invention is to provide a bucket which shall be of simple construction and provided with improved means for efficiently operating it, the invention being characterized by the absence of chains or similar devices for operating the bucket.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and definitely set forth in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical central section through a bucket and its operating-cylinder constructed according to my invention. Fig. 2 is a plan, a portion of this view being broken away, as will appear; and Fig. 3 is a horizontal section taken substantially on the line 3 3 of Fig. 1.

Referring more particularly to the parts, 1 represents the frame of the excavator or bucket, the said frame comprising an annular member or ring 2, disposed at the lower portion thereof. To the inner face of this ring 2 a plurality of vertically-disposed channels or guides 3 are attached, the same being preferably four in number, as shown, and attaching at their upper extremities to a cross-head or spider 4. As shown most clearly in Fig. 3, the channels or guides 3 present inwardly-disposed flanges 5 at their edges, and these flanges are received in vertical recesses 6 corresponding thereto, which recesses are formed at the extremities of arms 7, four in number, which constitute the cross-head 4. Near their extremities these arms 7 are provided with openings 8 therethrough, in which openings are received nuts 9, carried by bolts 10, which attach the cross-head to the channels, as shown.

To the outer face of the ring 2 arms 11 attach, the same consisting of oppositely-disposed members 12, having outwardly-turned feet 13, attached by bolts 14, as indicated. These arms 11, as shown, are disposed, respectively, opposite the channels or guides 3. They are braced at their outer extremities by diagonal braces or diagonals 15, which connect adjacent individuals of the members 12 of the arms 11. These diagonals have laterally-bent feet 16, as shown, which lie against the outer faces of the members 12 and are attached thereto by rivets 17, as will be readily understood. At their extremities the arms 11 are provided with through-bolts 18, which pass completely through the same from the outer faces of the feet 16. Centrally upon these bolts 18 main braces 19 are attached, the same having enlarged heads 20, provided with a bore for this purpose, and inclining upwardly, as shown, toward the channels or guides 3. These main braces 19 are provided above with feet 21 to facilitate their attachment to the outer faces of the channels, as indicated.

The body 22 of the bucket is of substantially hemispherical form, as shown, and is composed of segments 23, which are four in number, as shown, to correspond with the number of arms 11. These segments 23 have the form of spherical triangles with a common vertex 24 disposed centrally or at the "pole" of the hemisphere. To these segments or shells 23 gussets 25 attach, the same consisting of inwardly-extending plates 26, having curved flanges 27, riveted to the inner sides of the shells near the upper edges thereof, as indicated most clearly in Fig. 1. These gussets are of substantially triangular form, as shown, and their inner extremities are substantially beneath the central portion of the bucket-frame. As indicated, there are two of these gussets 25 in connection with each of the segments 23, and they are provided with ears 27^a, which are received upon the bolts 18 in such a manner as to enable the shells or segments to rotate upon the bolts, as will be readily understood.

A cylinder 28 is provided with a body 29, which has laterally-disposed lugs 30, which are received in the channels or guides 3, as shown, in order that the body of the cylinder may be guided vertically therein, as will be readily understood. The cylinder comprises

an upper head 31, having a suitable stuffing-box 32, through which passes a piston-rod 33, carrying a piston 34, mounted within the cylinder-body, as indicated. At the upper end of the piston-rod 33 a suitable nut 35 is attached, the same being disposed above a washer 36, having a convex lower face, as shown, which face is received in a cupped recess 37, which recess constitutes a counterbore for an upwardly-tapering opening 38, formed centrally in the cross-head 4. As shown, the opening 38 is of enlarged diameter with respect to the piston 33, from which arrangement and by reason of the convex washer it should be understood that considerable freedom of movement or lateral play is allowed the piston 34. The cylinder 28 also comprises a lower head or main head 39, the lower face whereof is provided with radially-disposed wings 40, which are four in number, as shown. On the opposite sides of these wings 40 links 41 attach, there being two in connection with each wing, as shown, and the lower extremities of the links attach to the inner extremities of the aforesaid gussets 25. It should be understood that the connection of the links is pivotal, permitting a free movement.

To the upper side of the cross-head 4 a bail 42 is attached, the same enabling the entire construction to be supported by a suitable cable or line 43.

In order to enable the cylinder to be actuated by an operating fluid—such as compressed air, steam, or water—the upper head 31 is provided with an inlet-pipe 44, which passes vertically upward through the same and through an enlarged opening 45, provided in the cross-head 4, as indicated. To the upper extremity of the pipe 44 a suitable hose 46 may be attached, if desired. The flow of the fluid will be controlled by a suitable valve 47, supposed to be located in the handling-house and connected by a suitable pipe 48 with the hose 46, as shown.

Through the lower head 39 a vent-pipe 49 passes, the body 50 whereof passes vertically, as shown, at the side of the bucket. This vent-pipe is for the purpose of allowing a flow of air into the cylinder below the piston 34, and at this point it should be stated that where the device is to be used for dredging under water a suitable hose will be attached to the pipe 50, leading to a point above the water-line.

The operation of the bucket will now be described. It should be understood that when the bucket is lying inert the cylinder 28 would descend by gravity to its extreme low position, or until the head 31 thereof would be supported upon the piston-head 34. When in this position, the links 41 would of course be depressed and forced outwardly, so as to maintain the segments or shells 23 in an open position, such as that indicated by the dotted lines in Fig. 1. When in this position, if the valve 47 is opened the operating fluid will flow into the cylinder-body 29 above the head 34, producing an upward pressure upon the cylinder, which would operate to force the same upwardly in the guides 3, as will be readily understood. Eventually the cylinder would arrive in substantially the position in which it is shown in Fig. 1, at which time the shells or segments 23 would have rotated sufficiently upon their pivot-bolts 18 so as to bring the body of the bucket to a closed position, as will be readily understood. The partial vacuum forming beneath the piston 34 would be constantly broken by the influx of air passing through the vent-pipe 50. It should be understood also that as the cylinder moves in the guides 3 the piston 34 will readily accommodate itself to the bore of the same and there will be little or no tendency to bind at any time by reason of the free connection at the washer 36. This feature is considered highly desirable, as it obviates the necessity for accuracy in the guiding mechanism of the cylinder, accurately-fitting parts of all kinds being out of place on a dredging-bucket, for the reason that they are subjected to very rough treatment when in use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an excavator, in combination, a frame, a piston supported thereupon, a bucket formed of separable segments, a cylinder receiving said piston, and connections between said cylinder and said segments for operating the same.

2. In an excavator, in combination, a frame, a piston depending therefrom, a cylinder receiving said piston, means for guiding said cylinder upon said frame, a bucket composed of separable segments, and connections between said cylinder and said segments.

3. In an excavator, in combination, a frame, comprising an upwardly-disposed cross-head, a piston having a rod passing freely through said cross-head and depending therefrom, a cylinder receiving said piston, means for guiding said cylinder upon said frame, a plurality of bucket-segments, and means for connecting the said bucket-segments with said cylinder.

4. In an excavator, in combination, a frame, comprising an elevated cross-head having an enlarged opening therethrough, a piston having a rod passing through said enlarged opening and having a collar attached thereto with a convex lower face, said cross-head having a cupped recess seating said collar, a cylinder receiving said piston, means for guiding said cylinder upon said frame, a sectional bucket, and means for actuating said bucket and mechanism connecting said bucket with said cylinder.

5. In an excavator, in combination, a frame comprising a ring in the lower portion thereof, vertically-disposed guides attaching to

said ring and extending upwardly thereof, a cross-head attached to the upper extremity of said guides, a piston depending from said cross-head, a cylinder receiving said piston and having projections moving in said guides, arms carried by said ring, bucket-segments attaching at the extremities of said arms, and links attached to said cylinder and connecting with said bucket-segments.

6. In an excavator, in combination, a frame comprising a lower ring, channel members attaching to the inner face thereof and constituting guides, a cross-head attaching to the upper extremity of said channel members, a piston depending from said cross-head, a cylinder receiving said piston and having lugs on the body thereof receiving said channels, radially-disposed arms attaching to the outer face of said ring, braces connecting the extremities of said arms, bucket-segments pivotally attaching at the extremities of said arms, and links connecting said cylinder with said bucket-segments.

7. In an excavator, in combination, a frame, comprising a ring, vertically-disposed guide members attaching to the inner face thereof, a cross-head attaching to said guide members at the upper extremities thereof, radially-disposed arms attaching at the outer face of said ring, transverse bolts carried at the extremities of said arms, braces carried upon said bolts, and attaching to said guides, gusset-plates also carried by said bolts, a cylinder receiving said piston and moving between said guides, links connecting said cylinder with said gusset-plates, and segment-shells attaching to said gusset-plates.

8. In an excavator, in combination, a frame comprising a lower ring, vertically-disposed channel-guides attached to the inner face thereof, a cross-head attaching to the upper extremities of said channel-guides, a piston depending from the said cross-head, a cylinder receiving said piston and having lugs projecting into the channels of said channel-guides, radially-disposed arms attaching to the outer face of said ring, diagonal braces connecting the extremities of said arms, transversely-disposed bolts at the extremities of said arms and constituting pivots, main braces having heads attaching at said bolts and attaching at their upper extremities to said channel-guides, bucket-segments, gusset-plates attaching thereto and having ears mounted upon said bolts, and links connecting said cylinder with said gusset-plates.

9. In an excavator, in combination, a frame comprising a vertical guide, a cylinder movably mounted in said guide, bucket-segments carried by said frame, members connecting with said bucket-segments and projecting inwardly in the direction of said cylinder, said cylinder having a lower head with wings formed on the outer face thereof, and links attaching to said wings and connected to said members.

10. In an excavator, in combination, a frame, comprising a vertical guide, a cylinder adapted to reciprocate in said guide, radially-projecting arms attaching to said guide, a plurality of bucket-segments pivotally attaching at the extremities of said arms, the said cylinder having a lower head with a plurality of radially-disposed wings, gusset-plates projecting inwardly from said bucket-segments to points adjacent to said wings, and links connecting said gusset-plates with said wings.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM HOWELL ONION.

Witnesses:
J. K. BURRISS,
H. C. ROGERS.