

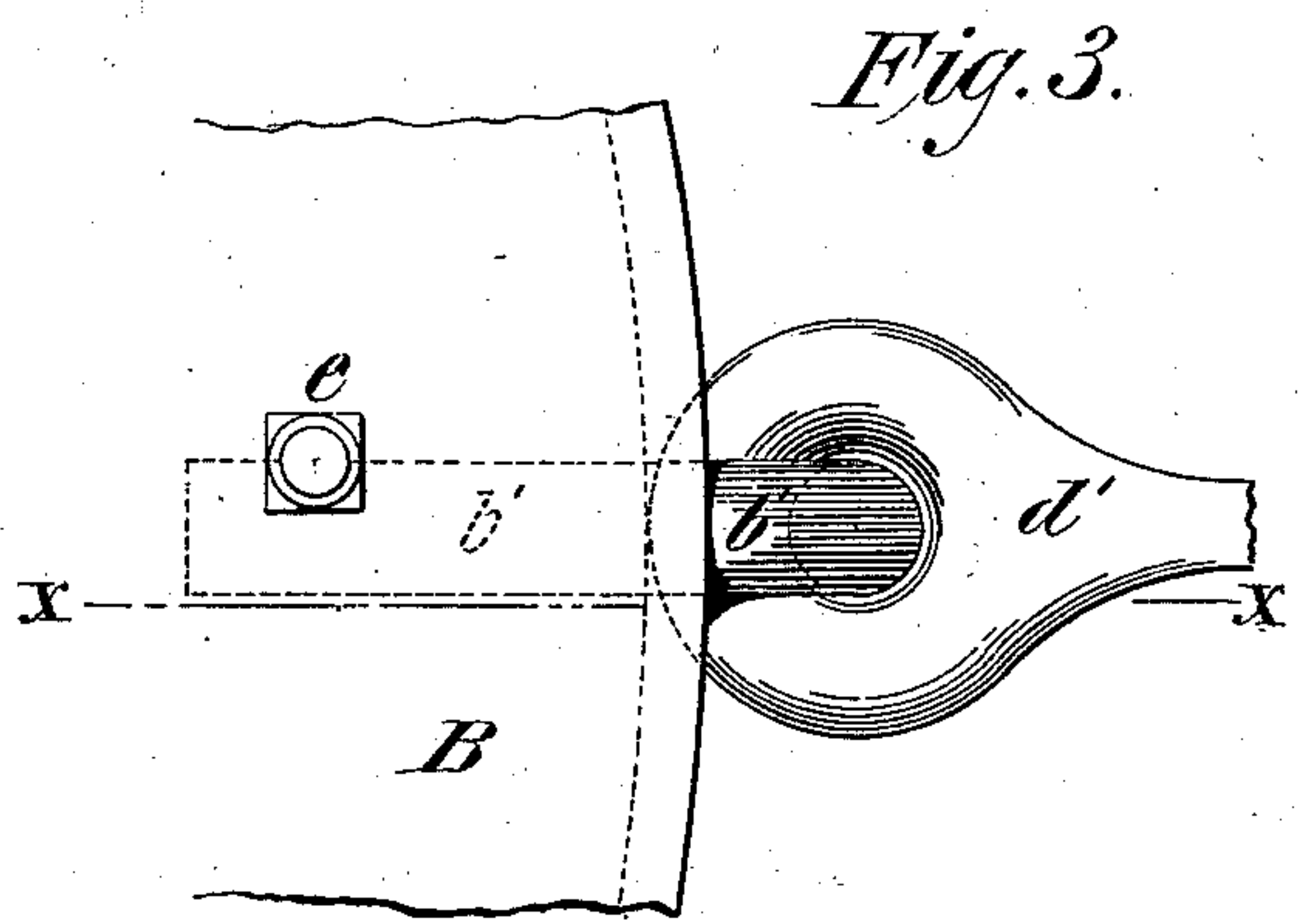
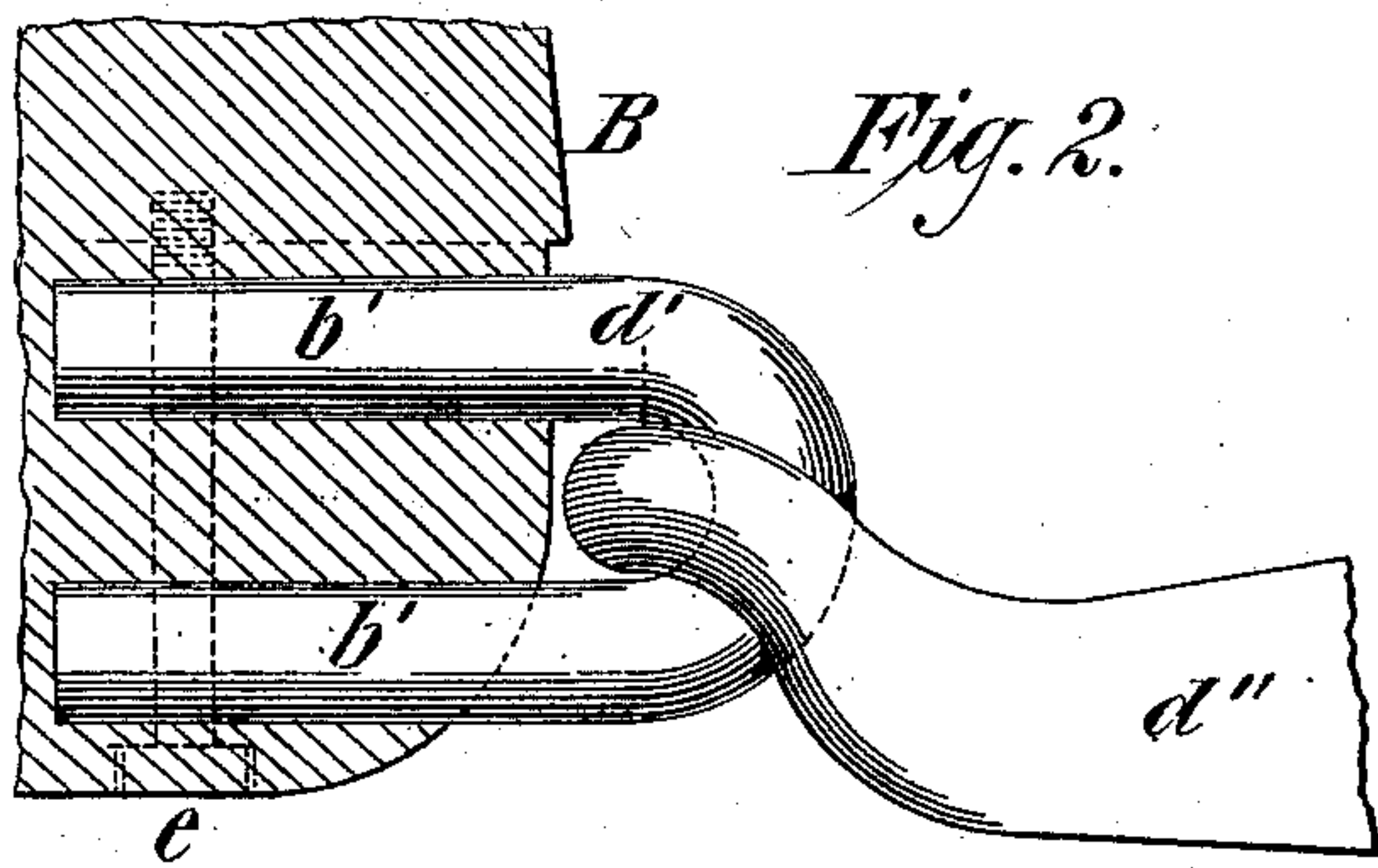
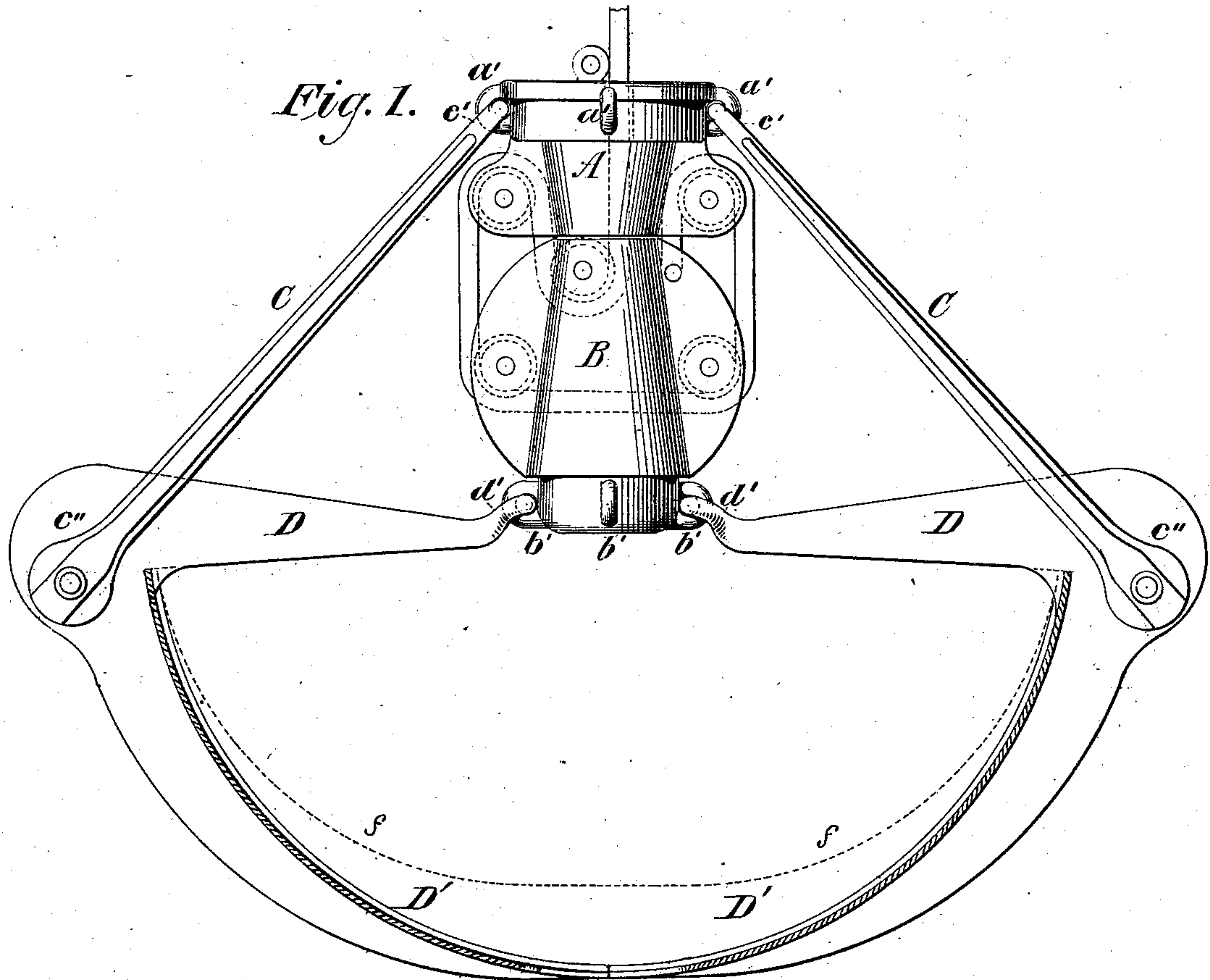
(No Model.)

F. G. JOHNSON.

AUTOMATIC GRAPPLING BUCKET.

No. 255,172.

Patented Mar. 21, 1882.



WITNESSES:

*Gustave Dietrich*  
*Geo. W. Hayward*

INVENTOR:

*Frank G. Johnson*



# UNITED STATES PATENT OFFICE.

FRANK G. JOHNSON, OF BROOKLYN, NEW YORK.

## AUTOMATIC GRAPPLING-BUCKET.

SPECIFICATION forming part of Letters Patent No. 255,172, dated March 21, 1882.

Application filed August 15, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK G. JOHNSON, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Automatic Grappling-Buckets, of which the following is a specification, reference being had to the accompanying drawings.

My improvements relate more particularly to semi-globular grappling-buckets for which Letters Patent were granted to me on the 1st day of March, 1881, numbered 238,293, and on the 2d day of August, 1881, numbered 245,073.

The improvements herein described consist, first, in the method of constructing the joints so as to allow horizontal movement of the blades, which, by experience, it is found are more practical and useful than other joints heretofore employed; second, in the method of providing opening power of the bucket for overhauling the heavy closing and hoisting chain; third, in the method of providing the closing stop or bumpers of the bucket to prevent a straining action on the carrying-arms.

Referring to the accompanying drawings, Figure 1 represents a general view of these improvements; Fig. 2, a vertical section in the direction of the line *x* in Fig. 3 to show the construction of the joints; Fig. 3, a horizontal section to further illustrate the construction of the joints.

A, Fig. 1, is the upper sheave-block, to which are attached the working-arms C C. B, Fig. 1, is the lower sheave-block, to which are attached the carrying-arms D D. These two sheave-blocks A and B are differently constructed from those employed in either of the above-mentioned patents or in my pending application for Letters Patent for an improvement in automatic grappling-buckets, filed August 1, 1881. These sheave-blocks A and B are each made in a single piece and so formed as to attain four specific objects besides that of carrying the sheaves, viz: first, to afford suitable attachments for the working-arms C C and the carrying-arms D D; second, to furnish additional weight to the bucket, especially in that part, B, which acts as the chief opening power or force of the bucket, always

needed to overhaul the heavy closing and hoisting chain; third, to provide a suitable closing stop or bumper, by which an undue strain on the carrying-arms D D is avoided after the bucket is closed and filled; and, fourth, to provide a powerfully-resistant bottom to the lower sheave-block, B, which, when the bucket is dropped on its work, is always liable to come into violent contact with stones, rocks, &c. As shown by Fig. 1, each of these two sheave-blocks A and B is made essentially in the form of a frustum of a cone, the upper one, A, being inverted and enlarged at the base to facilitate the attachment of the carrying-arms D D. Passing through the center of these conical sheave-blocks, save at the top of one and the bottom of the other, is a vertical opening to receive the sheaves, adjacent to and on either side of which opening, and attached to the cone, is extended a suitable flange to increase the lateral dimensions of these sheave-blocks. The relative length of these conical sheave-blocks, the working-arms C C, and carrying-arms D D is such that when the bucket is closed, as shown in Fig. 1, these cones A and B will come into contact and form a closing stop or bumper, thus relieving the carrying-arms D D from all strain save that of the weight of the contents of the bucket. These frustums of cones, as is evident, can be and are made sufficiently large, either in length or diameter, or both, to give any needed weight to the bucket for hand-digging or for increasing its opening power to overhaul the necessarily heavy closing and hoisting chain.

The bottom end of the sheave-block B is rounded, and presents a solid heavy body of iron to resist the oftentimes powerful concussion between itself and unyielding substances, as stones, rocks, &c.

It is found by experience that in a semi-globular grappling-bucket, where it is employed for handling resistant objects—as stones, &c.—it becomes necessary to allow each of the several sections of such buckets unlimited freedom to move horizontally around its points of attachment to the sheave-blocks A and B. Therefore the chief feature of my improvements relates to the construction of the joints between these sheave-blocks A and B, and the working-



arms C C and carrying-arms D D, which construction is described thus:

$b' b'$  are staples, of suitable size and material, which, after passing through the eyes  $d'$  5  $d'$  of the carrying-arms D D, are inserted in the bottom of the sheave-block B, Figs. 2 and 3, which are securely held in place by means of suitable screw key-bolts,  $e e$ , which pass up from the lower surface of the sheave-block B and rest 10 in a slot made on one side of the two arms of the staple, as shown in Figs. 2 and 3. The heads of the key-bolts  $e e$  are countersunk to prevent them from becoming battered by stones, rocks, &c. The carrying-arms D D, at and near to 15 their attachment to the staples  $b' b' b'$ , are somewhat goose-necked from  $d'$  to  $d''$ , Fig. 2, to prevent the arms D D from striking the sheave-block B when the bucket is fully opened, and to prevent the eye of the arms D D from cramp- 20 ing on the staples  $b' b' b'$  when the bucket is being closed and the blades are moved horizontally around their points of attachment. This goose-neck shape to the arms D D is found to be indispensable to perfect freedom of the 25 needed horizontal motion of the several sections of the bucket.

The joints between the upper sheave-block, A, and the working-arms C C are made in exactly the same manner as those between the 30 sheave-block B and the carrying-arms D D, save that the working-arms C C terminate in a straight line instead of having the goose-neck bend, as shown at  $c c'$ , Fig. 1.

The center of vertical curvature and motion

of the several sections of the bucket is at the 35 common center of the bucket instead of at the points of contact between the arms D D and the sheave-block B, as shown by  $D' D'$ .

The vertical curvature and motion of the several blades are shown by the dotted curved 40 line  $f f$ , Fig. 1, when centered from the points of contact between the arms D D and the sheave-block B.

The horizontal shape of the bucket is that of a circle, so that the bucket, when closed, is 45 in form semi-globular.

What I claim as new, and desire to secure by Letters Patent, is—

1. In connection with the semi-globular bucket, Fig. 1, the sheave-blocks A and B, con- 50 sisting of single pieces and having the form of a frustum of a cone, substantially in the manner and for the purposes set forth.

2. In connection with the semi-globular bucket, Fig. 1, the staple and eye joints, con- 55 sisting of the staples  $b' b' b'$  and the eyes  $d' d' d'$  and key-bolts  $e e$ , substantially in the manner and for the purposes described.

3. In connection with the semi-globular bucket, Fig. 1, the staple and eye joints  $b' b' 60 b'$  and  $d' d' d'$ , as described, in combination with the conical sheave-blocks A and B and carrying-arms D D, substantially as and for the purpose set forth.

FRANK G. JOHNSON.

Witnesses:

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FRANK R. JOHNSON.