

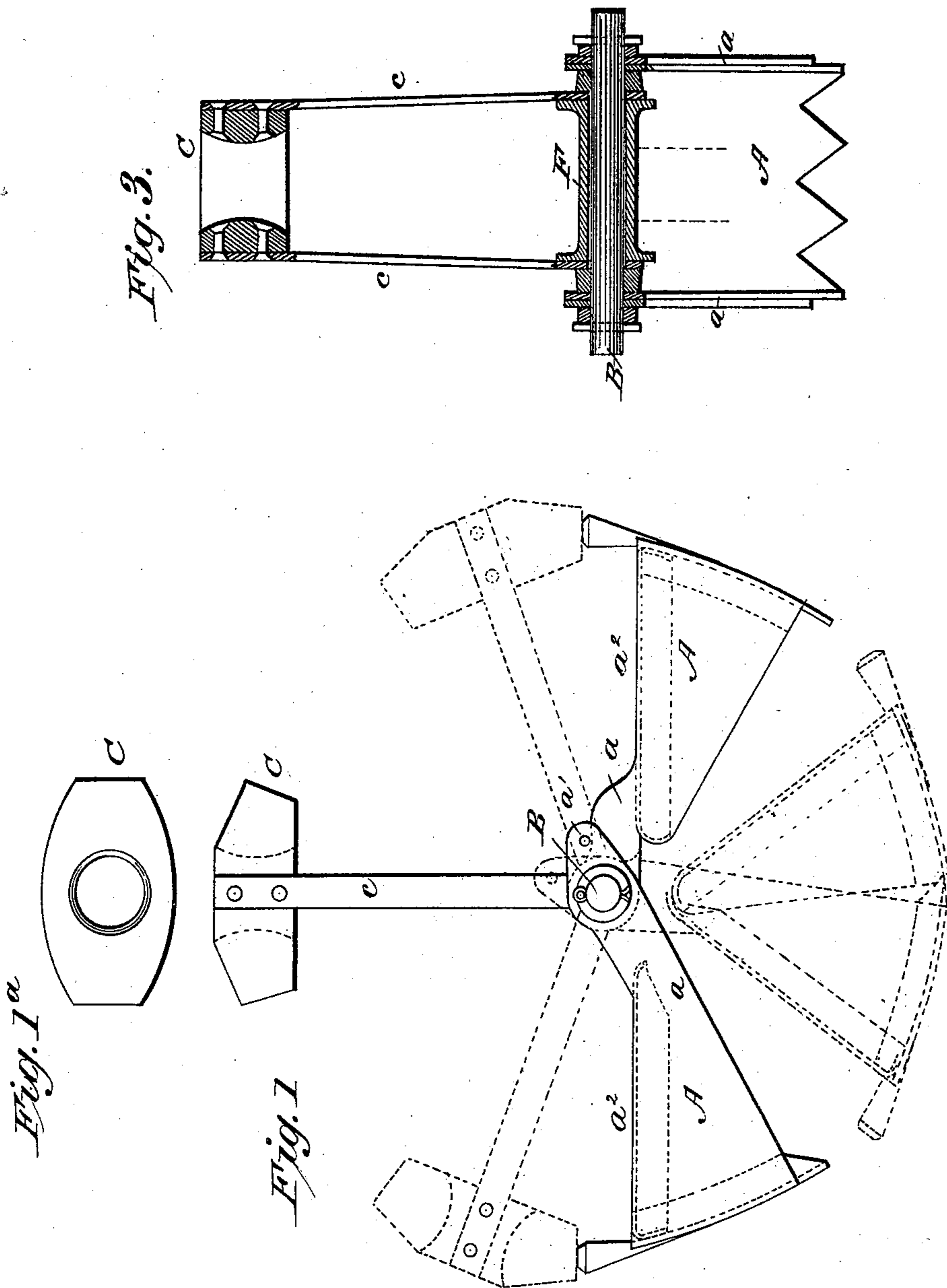
(No Model.)

3 Sheets—Sheet 1.

C. C. SULLIVAN.
DREDGING MACHINE.

No. 374,506.

Patented Dec. 6, 1887.



WITNESSES:

Fred G. Dieterich
R. B. Turpin.

INVENTOR:

C. C. Sullivan
BY *Munn & Co.*

ATTORNEYS.

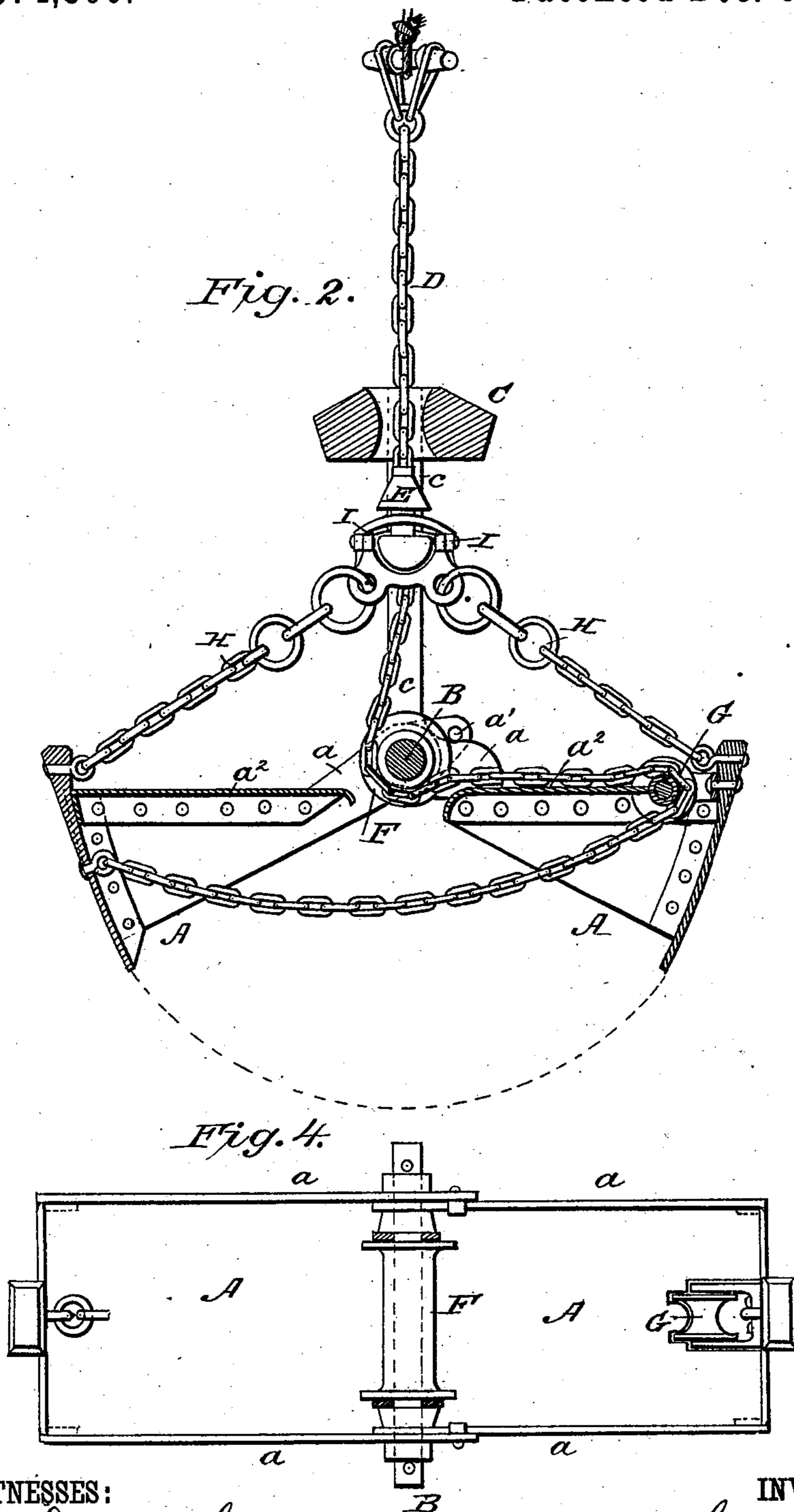
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3 Sheets—Sheet 3.

C. C. SULLIVAN.

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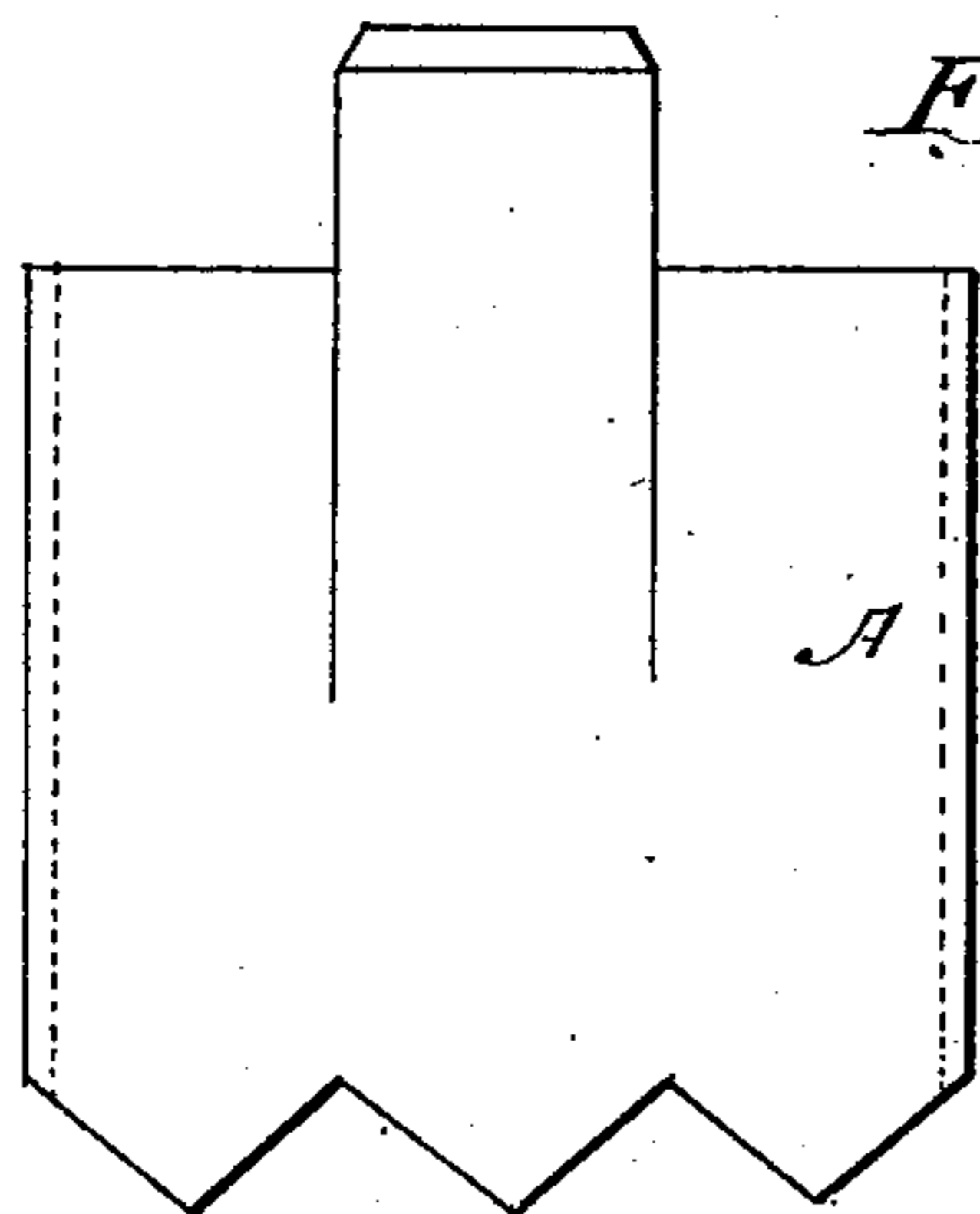


Fig. 6.

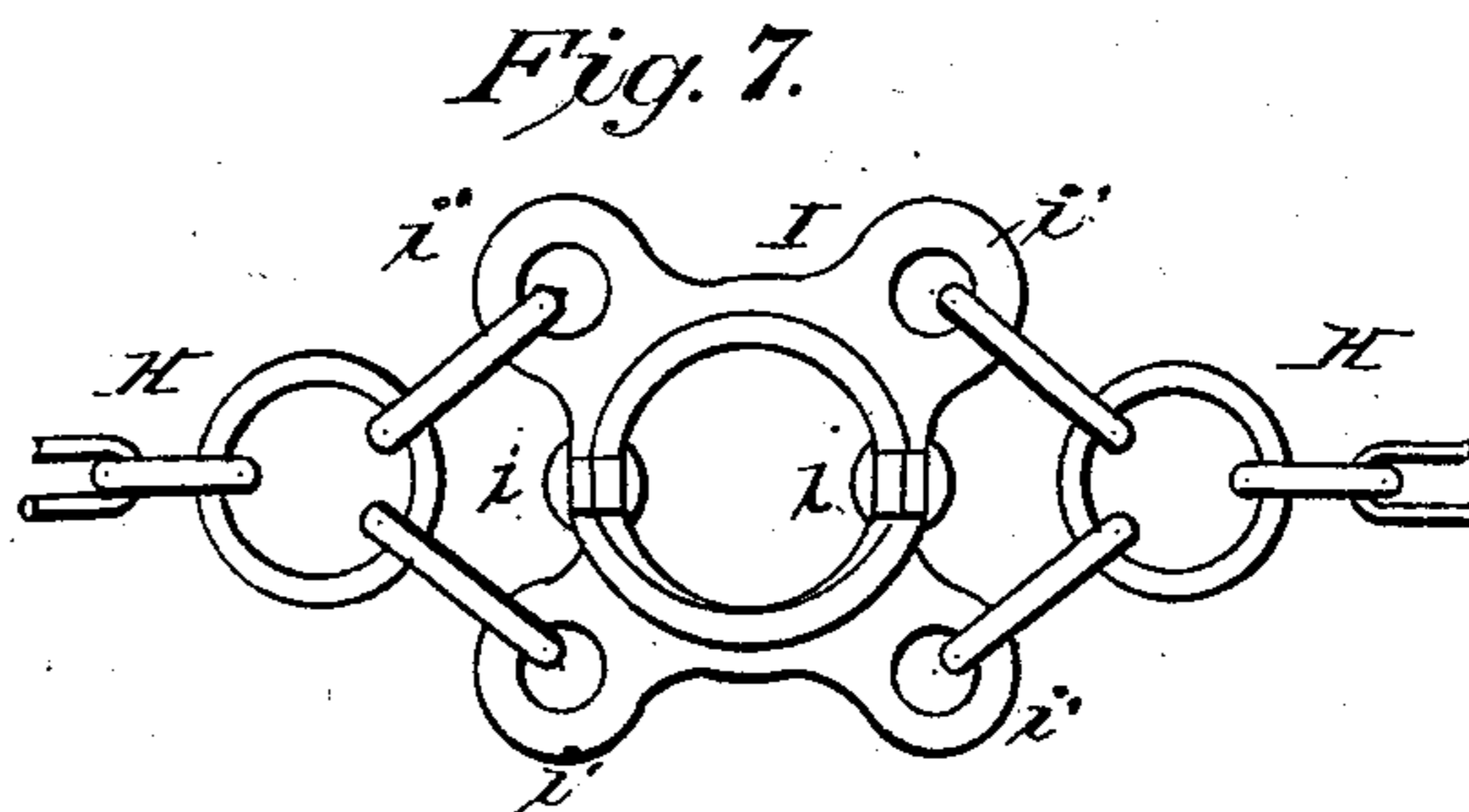


Fig. 7.

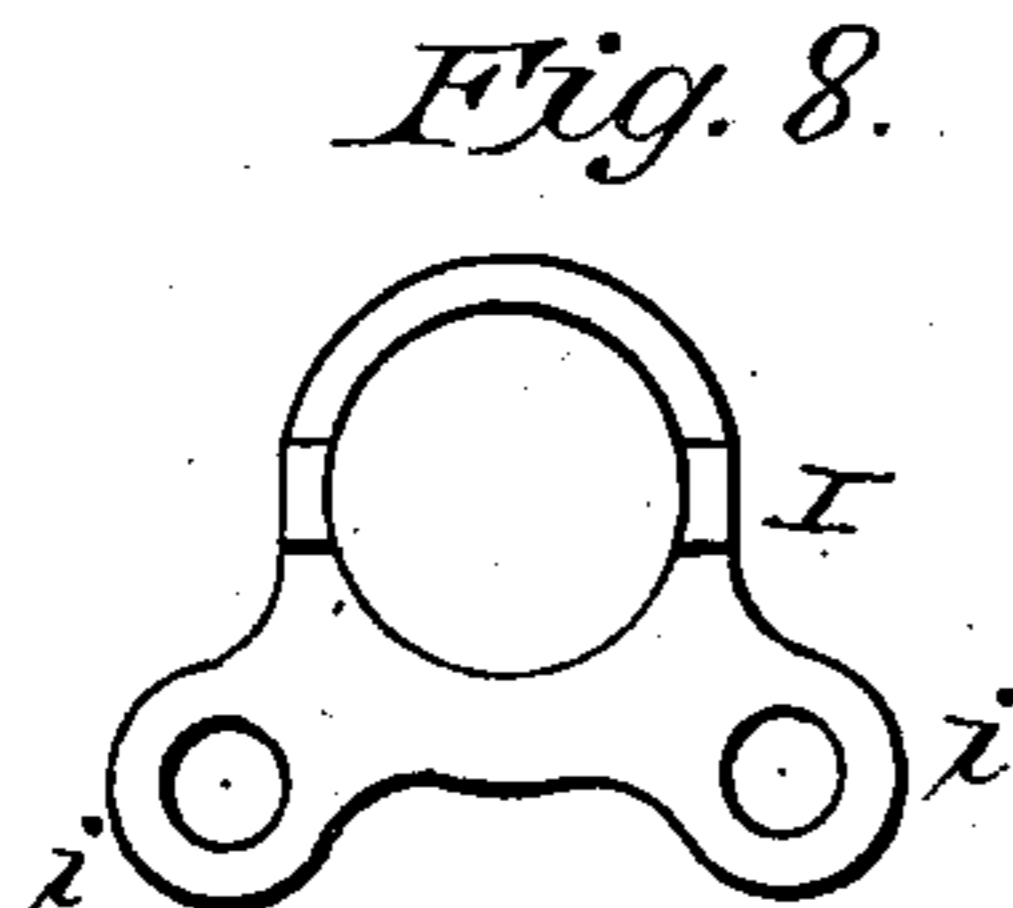


Fig. 8.

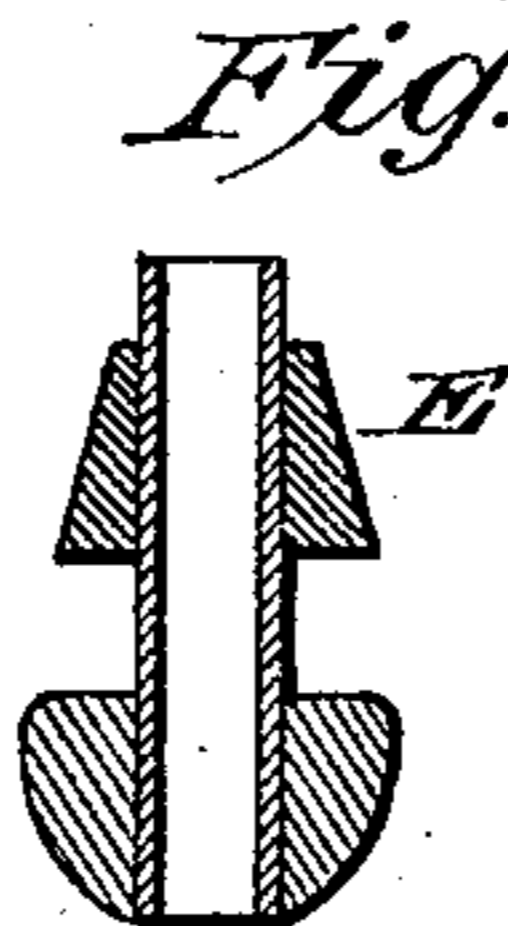


Fig. 9.

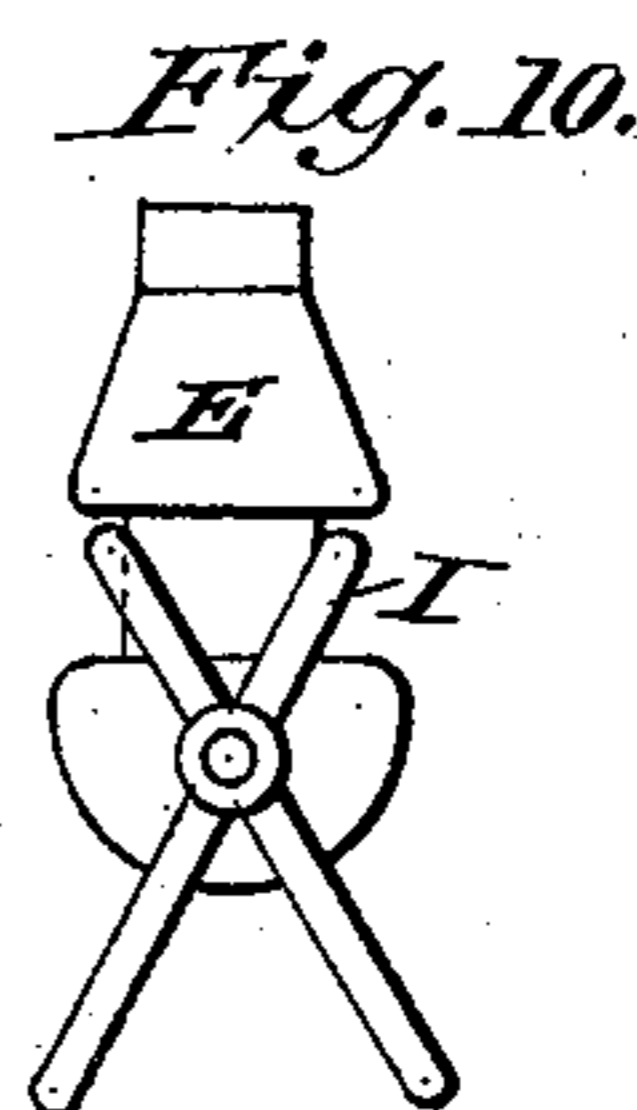


Fig. 10.



Fig. 11.



Fig. 12.

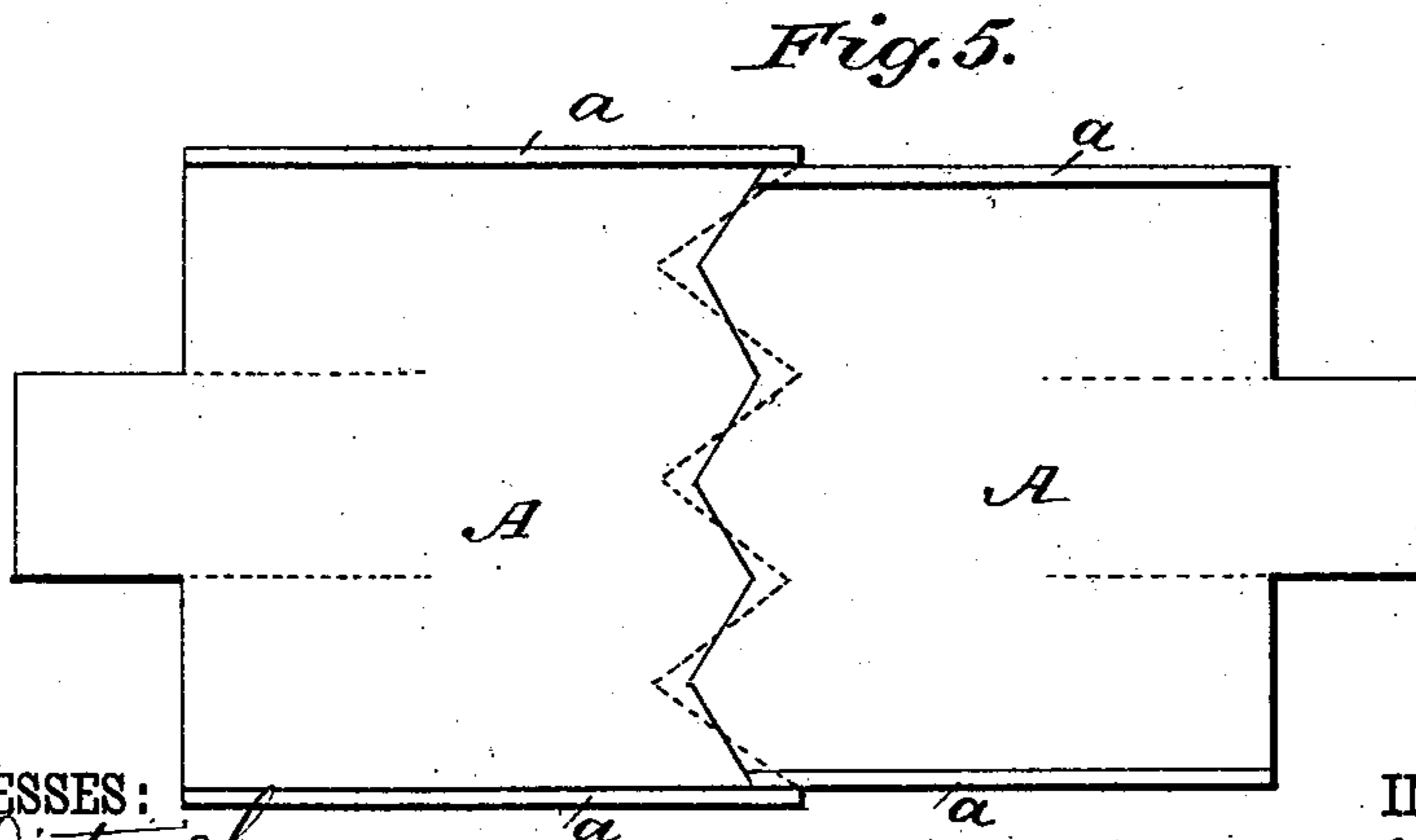


Fig. 5.

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UNITED STATES PATENT OFFICE.

CORNELIUS CURTIN SULLIVAN, OF ROORKEE, INDIA.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 374,506, dated December 6, 1887.

Application filed September 21, 1887. Serial No. 250,282. (No model.) Patented in India July 14, 1885, No. 86, and in England September 23, 1885, No. 11,309.

To all whom it may concern:

Be it known that I, CORNELIUS CURTIN SULLIVAN, a subject of the Queen of Great Britain, residing at Roorkee, Northwest Presidency, India, have invented a new and useful Dredging-Machine, (for which I have obtained patents in Great Britain, No. 11,309, bearing date September 23, 1885, and in India, No. 86, dated July 14, 1885,) of which the following is a specification.

This invention relates to improvements in machines for dredging and for excavating wells and subsoil foundations; and it consists, essentially, in the combination of a pair of jaws or cutters forming, when closed together, a scoop or bucket, and of an oscillating hammer for driving the jaws or cutters into the soil by percussion, the jaws and hammer being pivoted on a common axis, and of a hoisting-chain and subsidiary parts for working the hammer, opening and closing, and hoisting and lowering the bucket.

It consists further in certain novel constructions and combinations of parts, all as hereinafter more fully described, with reference to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a side elevation of the excavator, showing various positions of the parts in dotted lines. Fig. 1^a is a top view of hammer-head. Figs. 2 and 3 are respectively longitudinal and transverse vertical sections of the excavator. Fig. 4 is a top plan of the excavator open. Fig. 5 is an underneath view of the same closed. Fig. 6 is a face view of one of the cutters. Figs. 7 is a plan, and Figs. 8, 9, 10, 11, and 12 details, of the clip and collar.

Similar letters of reference indicate similar parts in all the figures.

The two half scoops or jaws A are carried by arms *a*, forming the side cheeks of the half scoops or jaws, and are pivoted upon a common transverse shaft, B, the arms of the one jaw being prolonged at the upper ends beyond said axis and provided with stop-pins *a'*, engaging with the arms of the other jaw to limit the extent of opening motion of the excavator, so that when fully open the upper ends of the jaws will be in about the same plane with said shaft B. The cutting-edges of the jaws overlap each other and may either be serrated or

pronged or plain. Their backs are strengthened or formed with anvils at the upper ends, adapted to receive the blows of the hammer, and when of large size would be strengthened by a stiffening-rib extending centrally from edge to back on the inner side.

C is the hammer, carried upon a pair of arms, *c*, pivoted loosely upon the shaft B, and at a radial distance corresponding to that of the backs or upper edges of the jaws of the scoop, so that as the hammer is swung from side to side upon the axis B, it will be caused to strike the said jaws alternately and drive them into the soil. The hammer-head is formed with a round hole through it, splayed at both ends to give passage to the chain D and collar E, hereinafter referred to, which work freely through it, the chain passing thence below a friction-roller, F, on the axis B, thence around a guide-pulley, G, mounted in a bracket attached to the inner side of one of the jaws at the upper part, and thence across to the other jaw, to which the chain is made fast at a point about the middle of its height, so that tension on the chain will tend to close the jaws. The chain is continued upward a sufficient distance above the hammer-head, and may terminate at the upper end in one or more rings, to which the hoisting chain or rope is attached.

The opening or separation of the jaws is effected by a bridle consisting of a pair of sling-chains, H, respectively attached to the upper ends of the two jaws, and a clip, I, at the middle, to which the chains are connected at opposite sides, this bridle being just long enough to admit of the clip being opened or closed when the excavator is shut, the clip remaining always beneath the hammer-head.

The clip I consists of a pair of "sister" rings or links, each of the form shown in Fig. 8, riveted loosely together at *i*, and working thereon as an axis, the one ring within the other, as shown in Figs. 1, 7, 10, and 12, wherein the clip is shown in the open and closed positions. Each ring is formed with ears *i'*, and each chain H is connected with one ear of each clip by three links, as represented in Fig. 7, so that tension on said chains will tend to close the clip. The chain D works freely up and down through this clip when the same is open; but it is engaged thereby when it is

required to open or separate the jaws of the excavator. This is effected by the rings I, embracing and gripping the grooved neck of the collar or stop E, as shown in Figs. 2 and 10.

5 The collar E is fixed or riveted upon the chain, and is so shaped that it can be moved up and down through the hole in the hammer-head without catching, and can be gripped firmly by the clip when this is closed over the
10 bowl or lower rounded head of the collar and the weight of the excavator brought to bear upon it. It readily becomes disengaged from the clip when the latter is open; but the bowl of the collar is too large to admit of its passing
15 downward through the clip. The friction-roller F on the axis B extends between the arms of the hammer and has end flanges of a sufficient depth to prevent the chain running
20 off. This friction roller or sleeve, being cylindrical, offers no obstruction to the under parts of the clip I, opening or spreading outward when they come down upon it. Suitable washers or tubular distance-pieces at either side of the arms *a*, with cross-pins at the ends of the
25 shaft, retain the parts in position thereon.

The jaws or half-scoops A are covered in at top by plates *a*², extending from side to side and approaching one another, so as to overlap when the dredger is closed, as shown in dotted
30 lines, Fig. 1, thus excluding the water, it having been found that by this arrangement any kind of soil can be raised and landed without loss in transit through the water, even when obstructions between the jaws prevent them
35 from completely closing.

Excavators may be thus constructed of any desired size or capacity, and are adapted for use in agricultural wells and for excavating any kind of subsoil foundations, or for removing
40 sand, clay, or gravel, however compact or at any depth below water.

It is preferred to construct the excavator of steel and iron. The backs and sides of the jaws may be in one continuous piece, and the
45 plan thereof may be of semicircular or other shape, or the side and top may be in one, having the backs or cutters riveted or otherwise secured to them.

The apparatus is raised, lowered, and worked
50 by means of a single rope or chain, and the necessary swinging motion is given to the hammer by pulling up the rope or chain a sufficient distance and then "letting go" suddenly, this operation being repeated as often
55 as may be required to drive the cutting-edges into the ground. In small machines the chain may be lifted by hand; and in larger machines suitable gear would be provided for performing this operation. The apparatus is let down
60 "by the run" when possible, and when it touches the ground the clip becomes disconnected from the chain D. The excavator is now hauled up, and the chain, being free from the bridle, closes the jaws, the weight of the
65 apparatus and load tending to increase the grip. When the soil is too stiff to admit of the cutters penetrating it sufficiently by the drop

alone, the hammer is brought into use. The excavator being landed on the platform, it is opened by lowering the collar E to the clip I, 70 closing the latter upon it, and raising the excavator from the platform, whereupon it discharges its contents and is ready for use again.

Having now particularly described and ascertained the nature of the said invention and 75 in what manner the same is to be performed, I declare that what I claim is--

1. In a dredging and excavating bucket consisting of a pair of cutting-jaws pivoted together, the combination therewith of an oscillating hammer pivoted upon a common axis 80 with the jaws, and acting thereon by percussion in the manner and for the purpose specified.

2. In a dredging and excavating bucket, the 85 combination, with the pair of pivoted cutting-jaws, of an oscillating hammer pivoted on a common axis therewith, and a chain for closing and hoisting and lowering the bucket, the chain passing through the hammer-head 90 and being used for the purpose of swinging the hammer in the manner described.

3. A dredging and excavating bucket of the kind herein described, having its jaws covered in at top, and having the plates covering 95 such tops arranged to overlap when the bucket is closed, whereby to protect the contents from the action of the water in dredging, substantially as set forth.

4. In a dredging and excavating bucket 100 constructed of a pair of cutting-jaws pivoted together and closed by the hoisting and lowering chain, the combination, with the jaws and with a collar or stop on the chain, of a clip constructed of a pair of sister rings pivoted together and adapted to be engaged with 105 the collar or stop on the chain, substantially in the manner herein described, and being attached by chains to the jaws, so as to be closed by tension thereon, as and for the purpose 110 specified.

5. The clip composed of a pair of sister rings pivoted together and adapted for operation substantially as shown and described.

6. In a dredging and excavating apparatus, 115 a bucket comprising a pair of pivoted cutting-jaws or sections, combined with an oscillating hammer adapted for use substantially as set forth.

7. In a dredging and excavating apparatus, 120 a bucket having a cutting jaw or jaws combined with a hammer arranged to act thereon by percussion, substantially in the manner and for the purposes specified.

8. A dredger and excavator comprising a 125 pair of pivoted cutting-jaws and a pivoted oscillating hammer provided with an opening for the passage of the hoisting chain or rope, substantially as and for the purposes specified.

9. The combination of the pivoted jaws, the 130 hoisting chain or rope connected therewith and adapted to close the said jaws by tension on the hoisting-chain, a chain or rope extended between the outer ends of the jaws, whereby

tension on said chain will open the jaws, and a detachable connection between the said connecting-chain and the hoisting-chain, substantially as set forth.

- 5 10. A dredger and excavator having its bucket formed with a cutting jaw or jaws and provided with a hammer for acting by percussion on said jaw or jaws, an anvil-like portion

or portions being provided to receive the impact of said hammer, substantially as set forth.

CORNELIUS CURTIN SULLIVAN.

Witnesses:

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