

(No Model.)

3 Sheets—Sheet 1.

L. W. BATES.
DREDGER.

No. 503,734.

Patented Aug. 22, 1893.

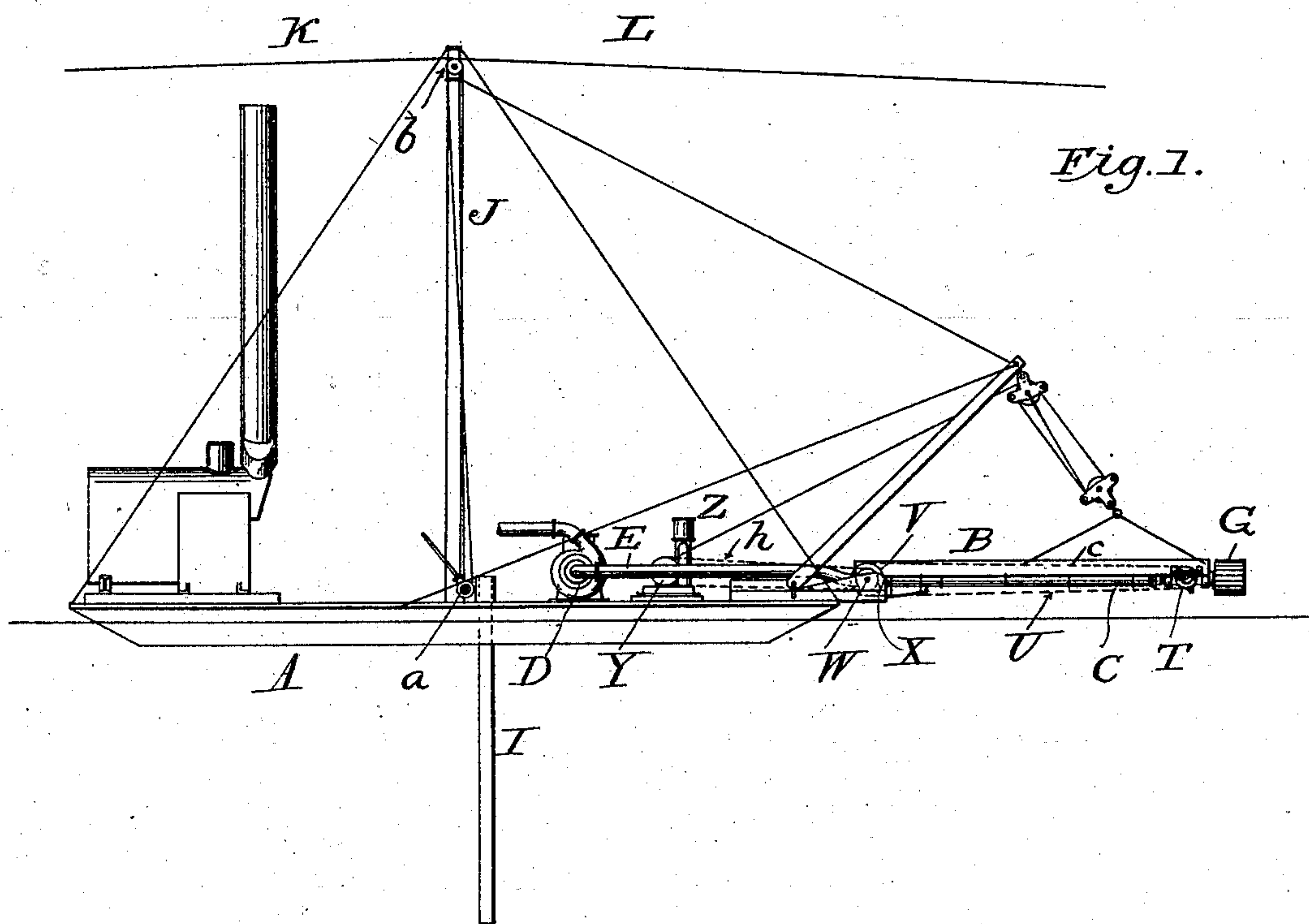


Fig. 1.

Fig. 2.

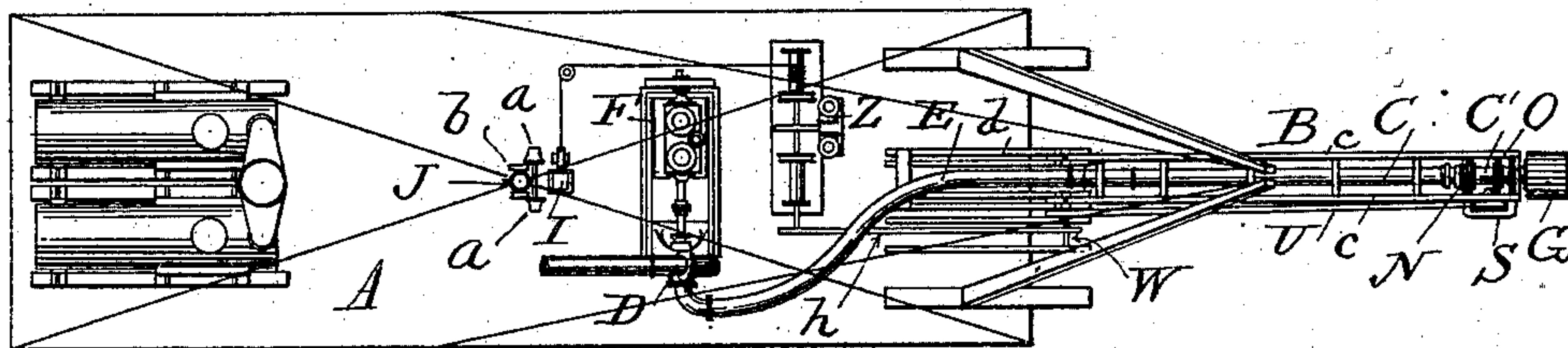
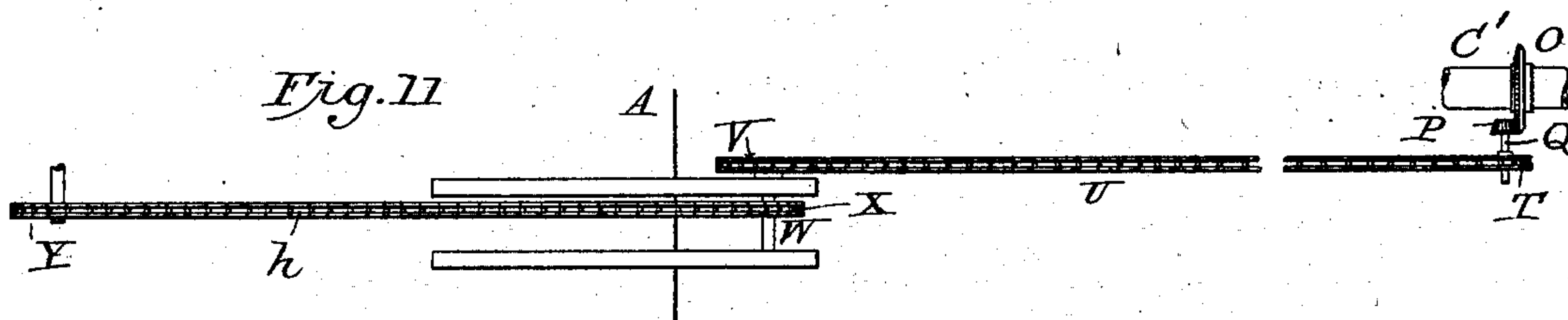


Fig. 11



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Fig. 3.

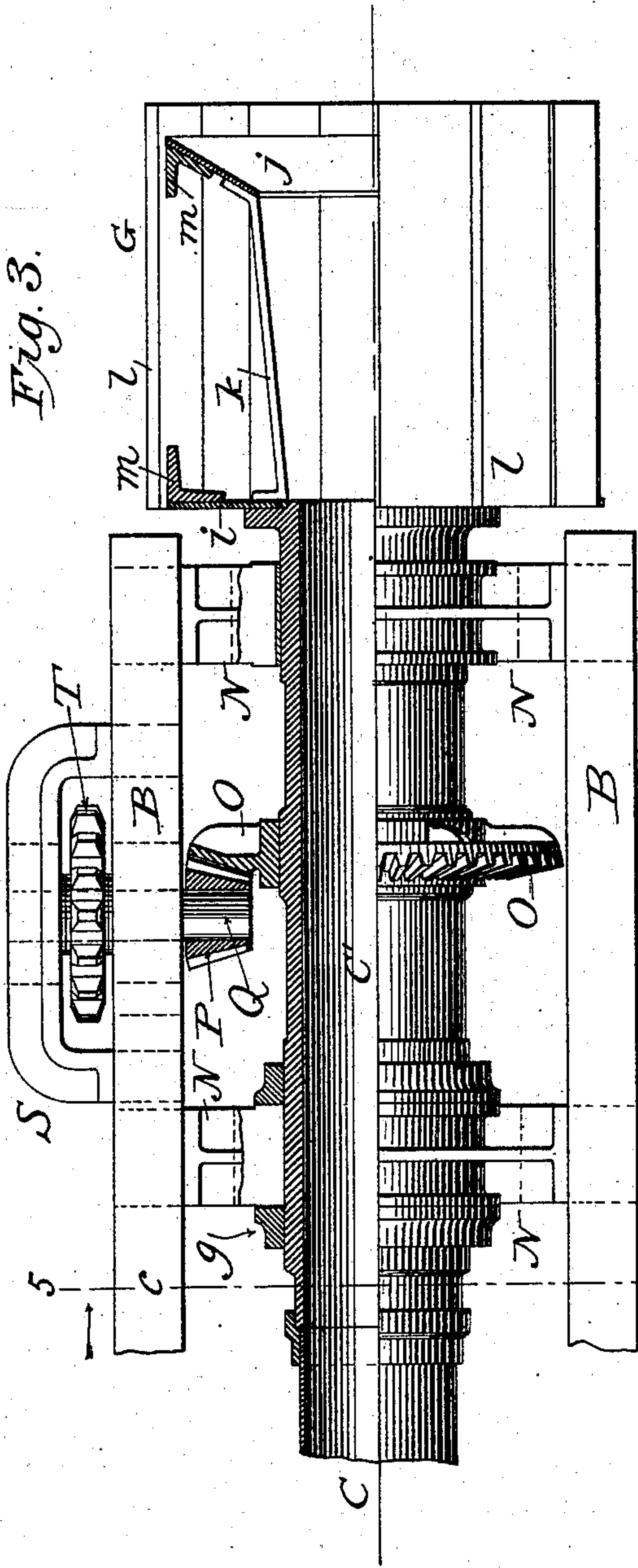


Fig. 7.

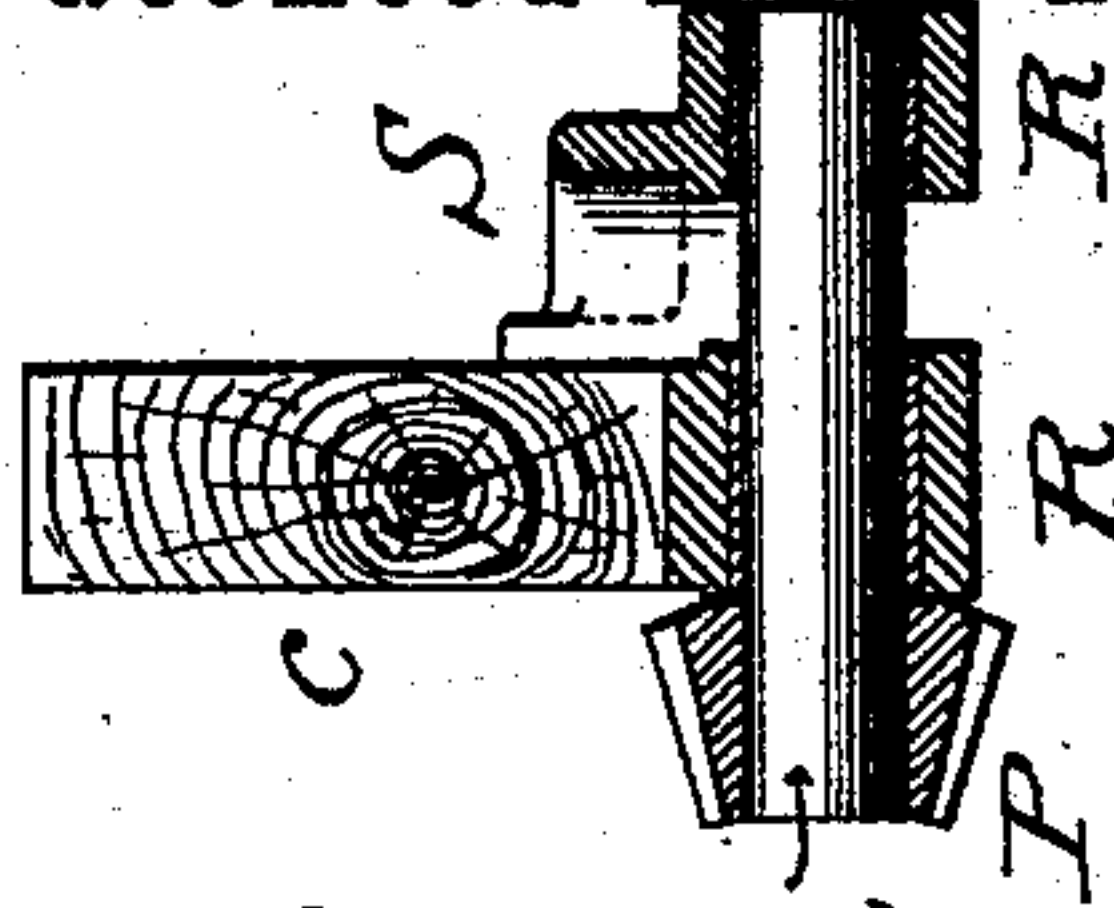


Fig. 6.

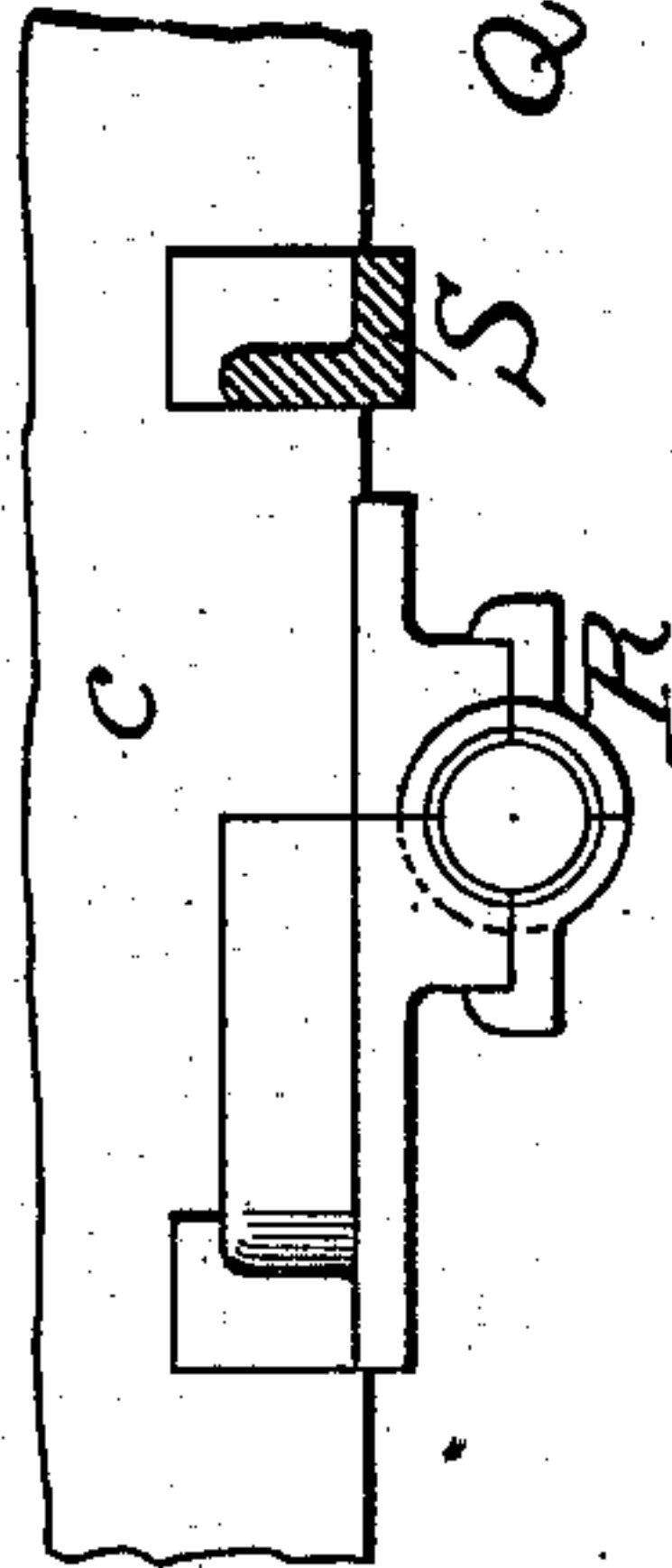


Fig. 5.

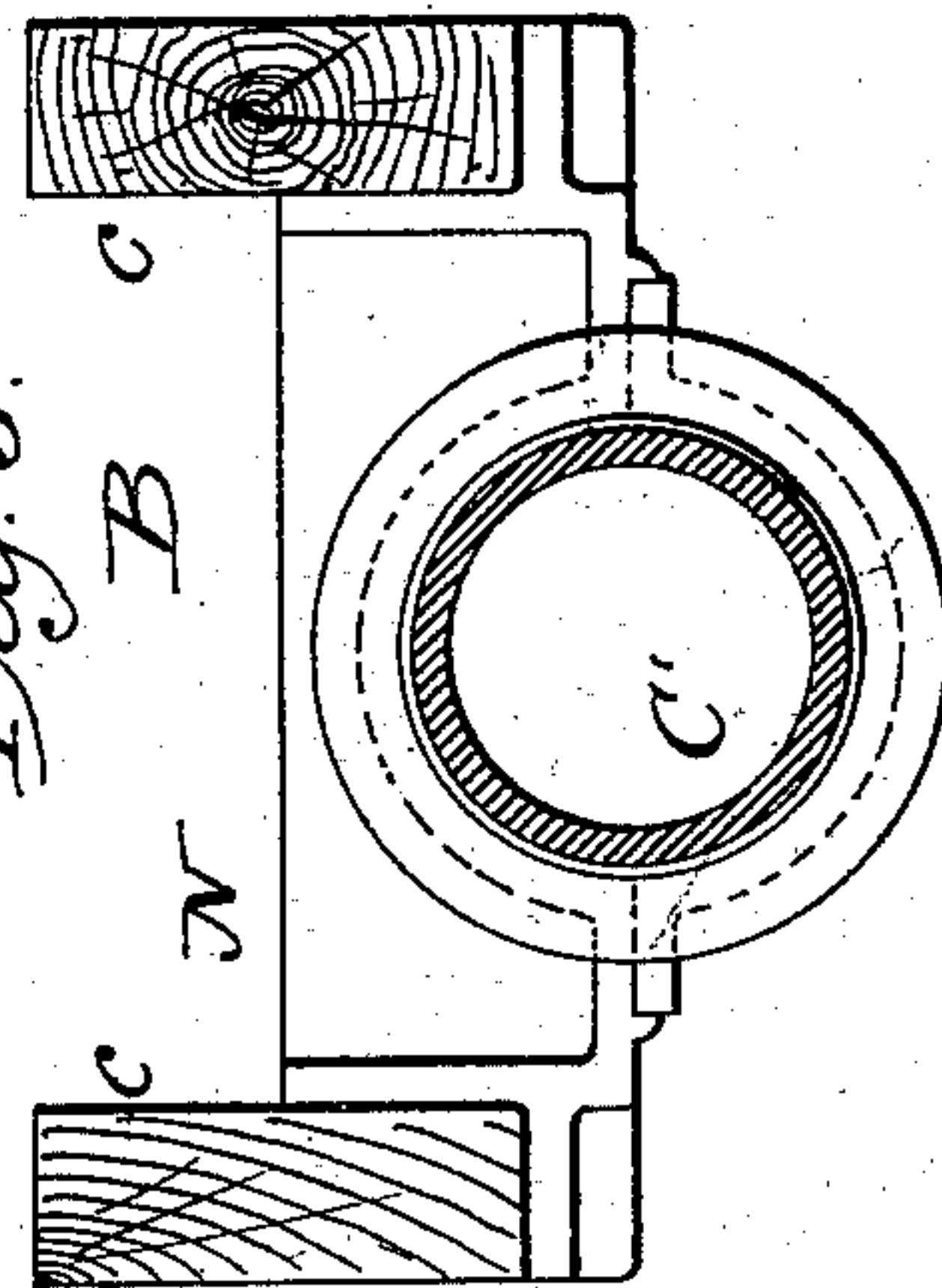
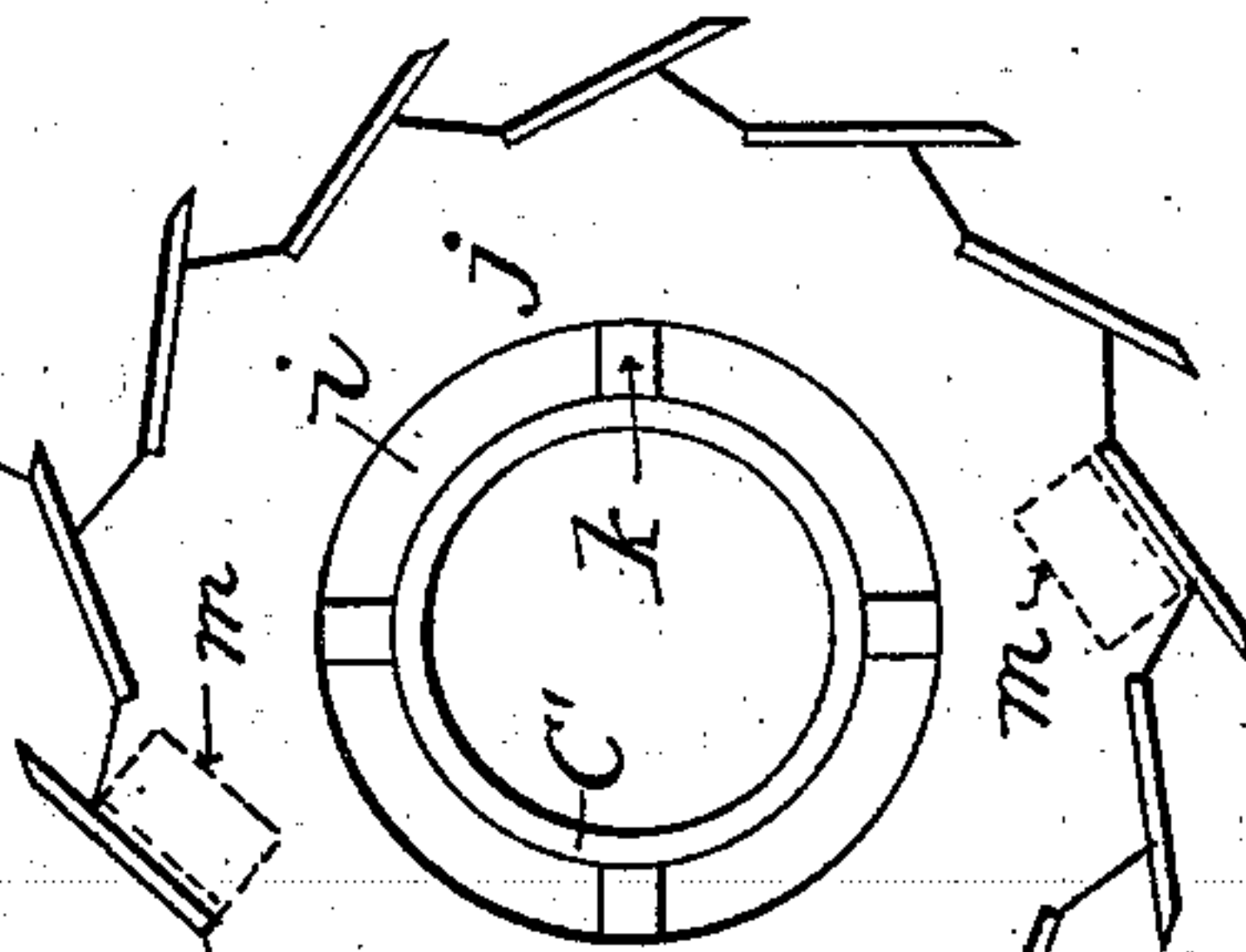


Fig. 4.



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Fig. 8.

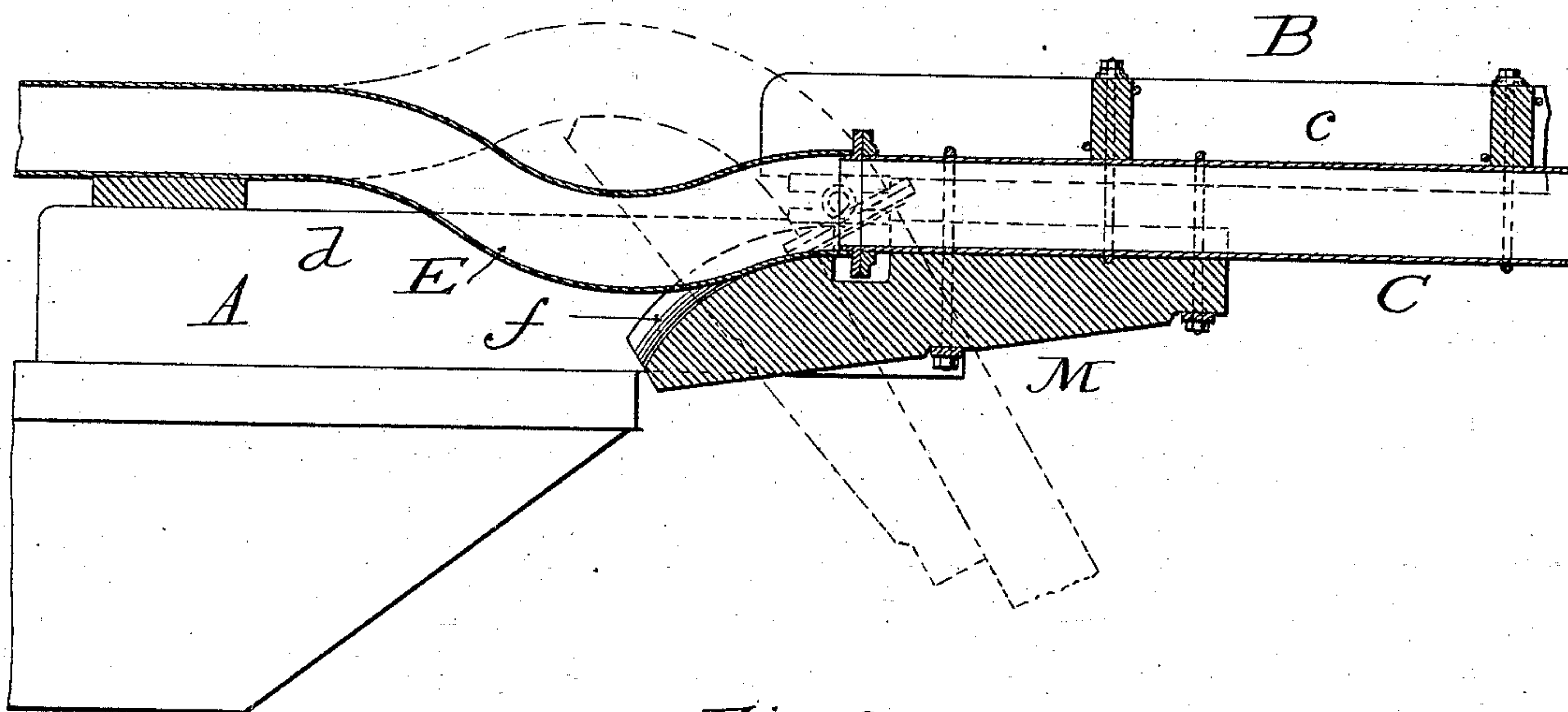


Fig. 9.

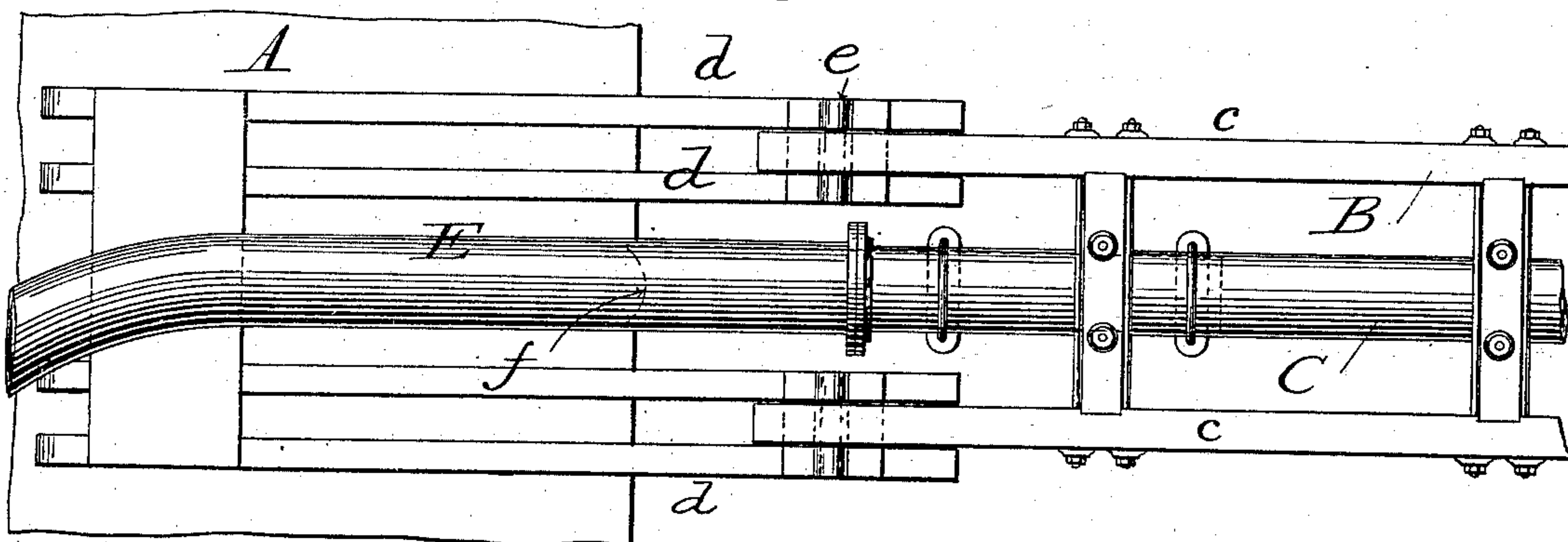
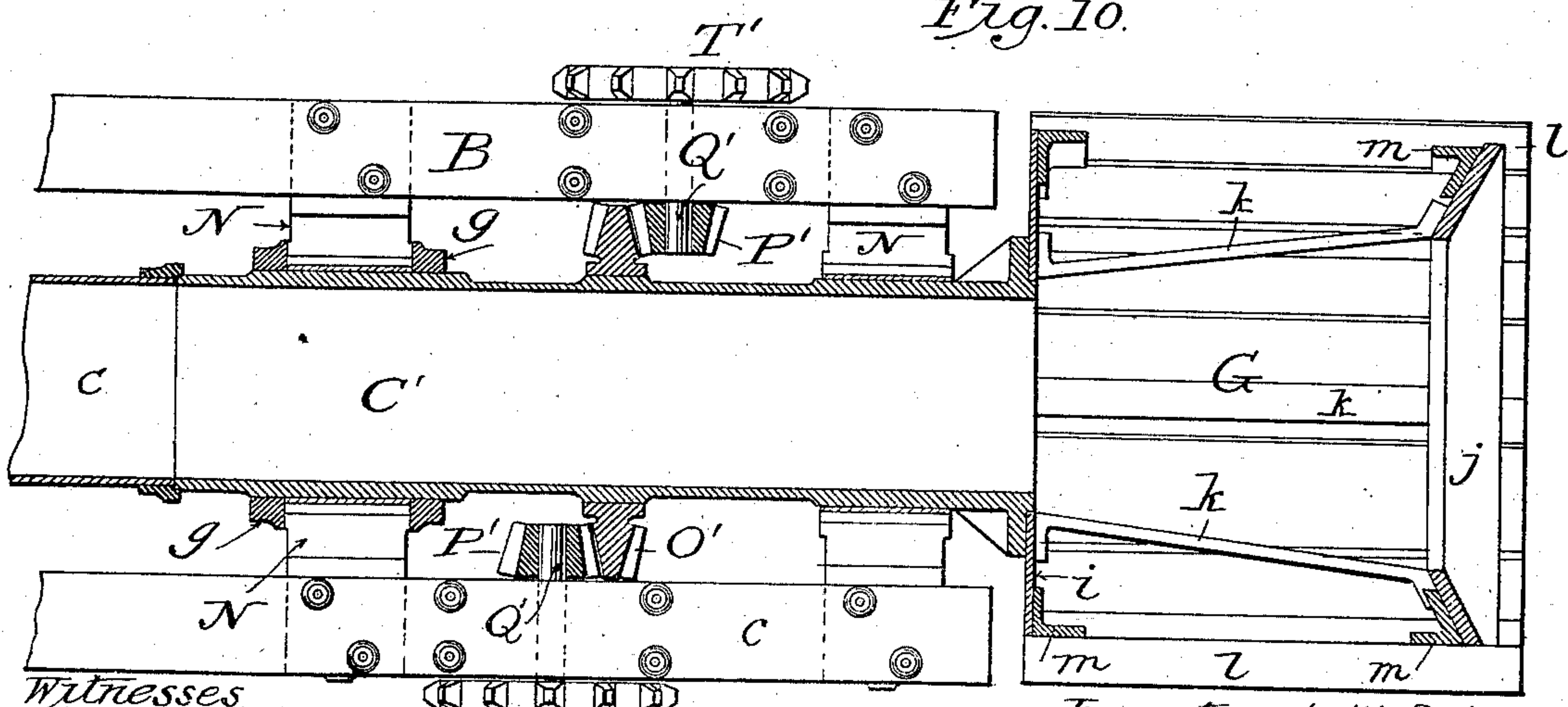


Fig. 10.



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by his attorneys,
Wodgett & Lane

UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF CHICAGO, ILLINOIS.

DREDGER.

SPECIFICATION forming part of Letters Patent No. 503,734, dated August 22, 1893.

Application filed March 21, 1893. Serial No. 466,984. (No model.)

To all whom it may concern:

Be it known that I, LINDON W. BATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dredgers, of which the following is a specification.

My invention relates to dredgers, and has reference more particularly to that class of machines in which the material to be excavated or removed is carried off or raised by hydraulic means.

In the drawings,—Figure 1 is a side view of my improved dredge boat. Fig. 2 is a top plan view; Fig. 3, a top plan view, partly in section, showing the cutter and mechanism for operating the same; Fig. 4, an end view of the cutter; Fig. 5, a transverse sectional view on the line 5—5 of Fig. 3; Figs. 6 and 7, detail views of a portion of the cutter rotating mechanism; Fig. 8, a longitudinal sectional view through a portion of the suction pipe; Fig. 9, a top plan view of the same; and Fig. 10, a view illustrating the mechanism for driving a cutter for a special class of work. Fig. 11 is a view on a larger scale showing the connections for transmitting motion to the cutter.

Referring now to Figs. 1 and 2, A indicates the boat proper; B the ladder, hinged or pivoted thereto; C the main suction pipe carried by the ladder; D the pump; E the hose or pipe connecting the main suction pipe with the pump; F the engine for actuating the pump and other parts of the apparatus; G the cutter carried at the outer end of the main suction pipe; I the spud, adapted to be projected down through the boat; and J the mast.

At or near the lower end of the mast J is a winch *a* carrying two spools or drums or two independent winches, about which suitable cables, K and L respectively wind in opposite directions. The stern cable K is anchored at some distance in rear of the boat or vessel, while the other cable L is anchored at a considerable distance in advance of the boat or vessel, both of said cables extending from their anchorage to the top of the mast where they pass over sheaves or pulleys *b*, as clearly shown in Figs. 1 and 2. From this construction it will be seen that by turning the winch

in one direction, one of the cables will wind thereupon, and the other will unwind therefrom, and thus cause the vessel to move in one direction; and it will also be seen that if the direction of rotation of the winch or winches be reversed, the direction of travel of the boat will also be reversed.

The longitudinal timbers *c* of the ladder B are connected at various points throughout their length by cross bars and by suitable tie rods or bolts, and to these cross bars the suction pipe C is secured or clamped by yokes or stirrups, or in any other suitable manner. The inner ends of the bars *c* project between the forwardly-extending arms or bars *b* of the boat or vessel A, and are pivotally connected thereto by means of bolts *e* in such manner as to permit the ladder, with its suction pipe, to rise and fall upon such bolts as a pivot or center, as is indicated by the dotted lines in Fig. 8.

Directly under the inner end of the main suction pipe C, and secured thereto, is a block or timber M, whose inner and upper face or end is curved lengthwise on the arc of a circle as at *f*. This bearing face *f* is also curved transversely to conform to the curvature in cross section of the hose or pipe E, as indicated by the dotted lines in Fig. 9. A part or the whole of this hose or pipe E connecting the suction pipe with the pump is made flexible, so that when the ladder swings downward, as indicated by the dotted lines in Fig. 8, the bearing face *f* of the block M will afford a seat for the hose or pipe, preventing the same from being bent off at an acute angle, and also preventing the breakage of the hose or pipe or its collapsing.

The lower end of the main suction pipe C is provided with a cast or wrought end piece or extension C', which is journaled in suitable brackets N extending from one bar *c* to the opposite bar of the ladder. This section C' is provided with suitable thrust collars *g* shown in Fig. 3, which embrace opposite faces of one of the brackets or supports N. At a point between the brackets this pipe or section C' is provided with a bevel gear O, with which a small bevel gear P is designed to mesh. The gear P is carried at the inner end of a short shaft Q, which in turn is supported in bear-

ings R R, secured respectively to one of the side bars *c*, and in a bracket S secured to one of said side bars.

Between the bracket S and the side bars *c* to which said bracket is secured, the shaft Q is provided with a sprocket wheel T, which is designed to receive a chain U shown in dotted lines in Fig. 1 and in full lines in Fig. 2. This chain U passes not only about the wheel T, but also about a larger sprocket V, which is carried upon a shaft W in line with the bolts *e* which form the axis or pivot of the ladder. There is also mounted upon this shaft W a second sprocket X about which and a sprocket wheel Y (secured to a shaft controlled by the engine Z) passes a chain *h*, which is also shown by dotted lines in Fig. 1 and by full lines in Fig. 2. From this construction it will be seen that no matter what the position of the ladder may be, a rotary motion can be transmitted to the extension C' of the suction pipe and the cutter carried thereby. This cutter comprises two disks or plates *i* and *j*, open at the center as shown in Figs. 3 and 4, said disks or plates being connected by longitudinal braces or bars *k*, as also shown in said figures. The periphery of the disks or plates *i* and *j* is notched to form a series of substantially tangential seats to receive the blades or knives *l*, as clearly shown in Fig. 4, said knives or blades being secured to the respective disks or plates by angle irons *m*, which are shown in section in Fig. 3 and by dotted lines in Fig. 4.

It will be noticed upon reference to Fig. 3 that the knives or blades project forwardly in advance of the front disk or plate *j*, and also that the said disk or plate *j* is arranged in a slightly inclined position, or in other words, is made slightly conical so as not to interfere with or retard the entrance of material through the open end of the cutter. This cutter is rigidly secured to the outer end of the suction pipe and turns or rotates therewith.

In some instances where light work is being done, the longitudinal bars or braces *k* of the cutter may be omitted; and on the other hand, where heavy work is in progress, the number of braces may be increased.

The machine represented in Figs. 1, 2 and 3 is designed for light work, but where a harder material is being operated upon, it will be found necessary to duplicate the cutter rotating mechanism as illustrated in Fig. 10. In this figure the rotatable section of the suction pipe is provided with a double faced gear ring O', which is engaged by two bevel pinions P', P', carried each upon a short shaft Q', Q', journaled in suitable bearings on the side bars of the ladder; each of said shafts carrying also a sprocket wheel T', which will receive motion from an engine mounted upon the boat or upon the ladder.

Having thus described my invention, what I claim is—

1. In a dredging machine, the combination with a boat or vessel, of a mast J projecting

upwardly therefrom and provided at its upper end with sheaves or pulleys *b* and at its lower end with a winch or winches; cables K and L provided respectively with anchorages and winding upon the winch in opposite directions, all substantially as shown and described.

2. In a dredging machine, the combination with a boat or vessel, of a ladder hinged or pivoted thereto and carrying a suction tube, a flexible extension secured to said suction tube at the inner end of the latter, and a block M secured to the ladder and having a bearing face *f* curved longitudinally, all substantially as shown and described.

3. In a dredging machine, the combination with a boat or vessel, of a ladder hinged or pivoted thereto and carrying a suction tube; a flexible hose or pipe secured to the inner end of the said suction tube; and a block carried by the ladder and having a seat *f* to receive the flexible hose or tube,—said seat being curved longitudinally and transversely, all substantially as shown and described.

4. In a dredging machine, the combination with a boat or vessel, of a ladder hinged or pivoted thereto and provided with a suction tube; a flexible hose or tube connected to the said suction tube; and a block carried by the ladder and adapted to support the flexible hose or tube, all substantially as shown and described.

5. In a dredging machine, the combination with a boat, of a ladder hinged or pivoted thereto, a suction pipe C carried by the ladder, and provided with a rotatable section or extension C'; a centrally open cutter carried by the extension C', and means for rotating said extension and cutter.

6. In a dredging machine, the combination with a boat or vessel, of a ladder hinged or pivoted thereto; a suction pipe mounted upon the ladder and provided with a rotatable section or extension C', a cutter carried by said extension and having its axis in line therewith; and means for rotating the extension C' and the cutter carried thereby.

7. In a dredging machine, the combination with a boat or vessel, of a ladder hinged or pivoted thereto, a suction pipe carried by the ladder and provided with a rotatable section or extension C'; a cutter carried by said extension and adapted to turn or rotate therewith; a shaft Q carried by the ladder and provided with a pinion to gear with the pinion upon the extension C'; means for rotating the shaft Q from the boat or vessel; and a countershaft forming an element of said means and located in line with the axis or pivot of the ladder substantially as and for the purpose set forth.

8. In a dredging machine, a cutter comprising two disks or plates *i* and *j*, open at the center, and the tangential blades or knives *l* secured to said disks.

9. In a dredging machine, a cutter comprising the disks or plates *i* and *j*, open at the center, with the outer plate *j* made conical or in-

clined as shown,—and the blades or knives *l* secured to the periphery of the plates or disks.

10. In a dredging machine, a cutter comprising the disks or plates *i* and *j*, open at the center, the longitudinal knives or blades *l*, and the angle irons *m* secured respectively to the plates or disks and to the cutters.

In witness whereof I hereunto set my hand in the presence of two witnesses.

LINDON W. BATES.

Witnesses:

CHAS. H. WHITING,
P. C. NORTON.