

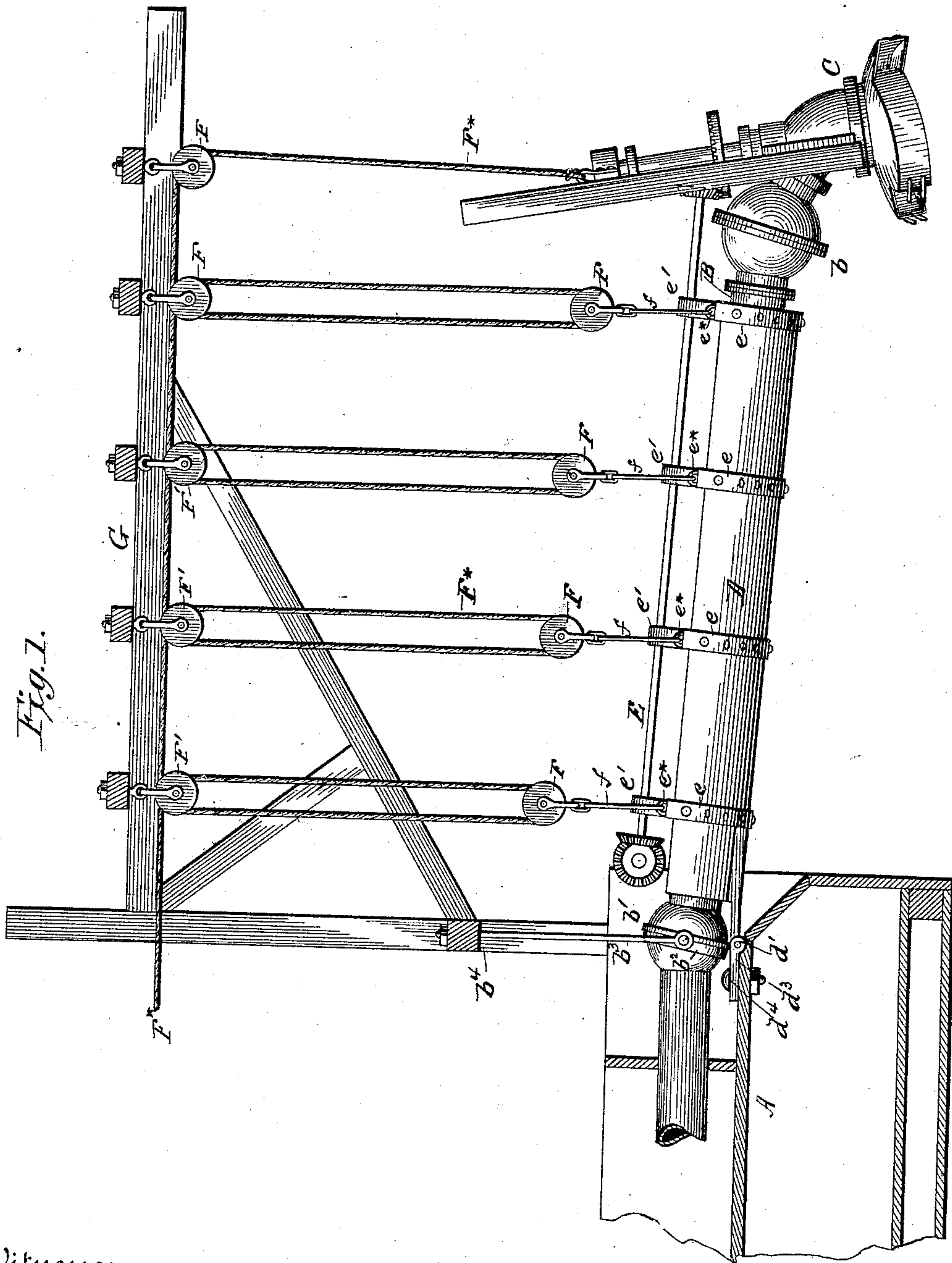
(No Model.)

2 Sheets—Sheet 1.

W. P. HUMPHREYS.
DREDGING APPARATUS.

No. 417,185.

Patented Dec. 10, 1889.



Witnesses
W. D. Blondel
F. J. F. Johnson

Inventor
William P. Humphreys
By J. N. Kalb
His Attorney

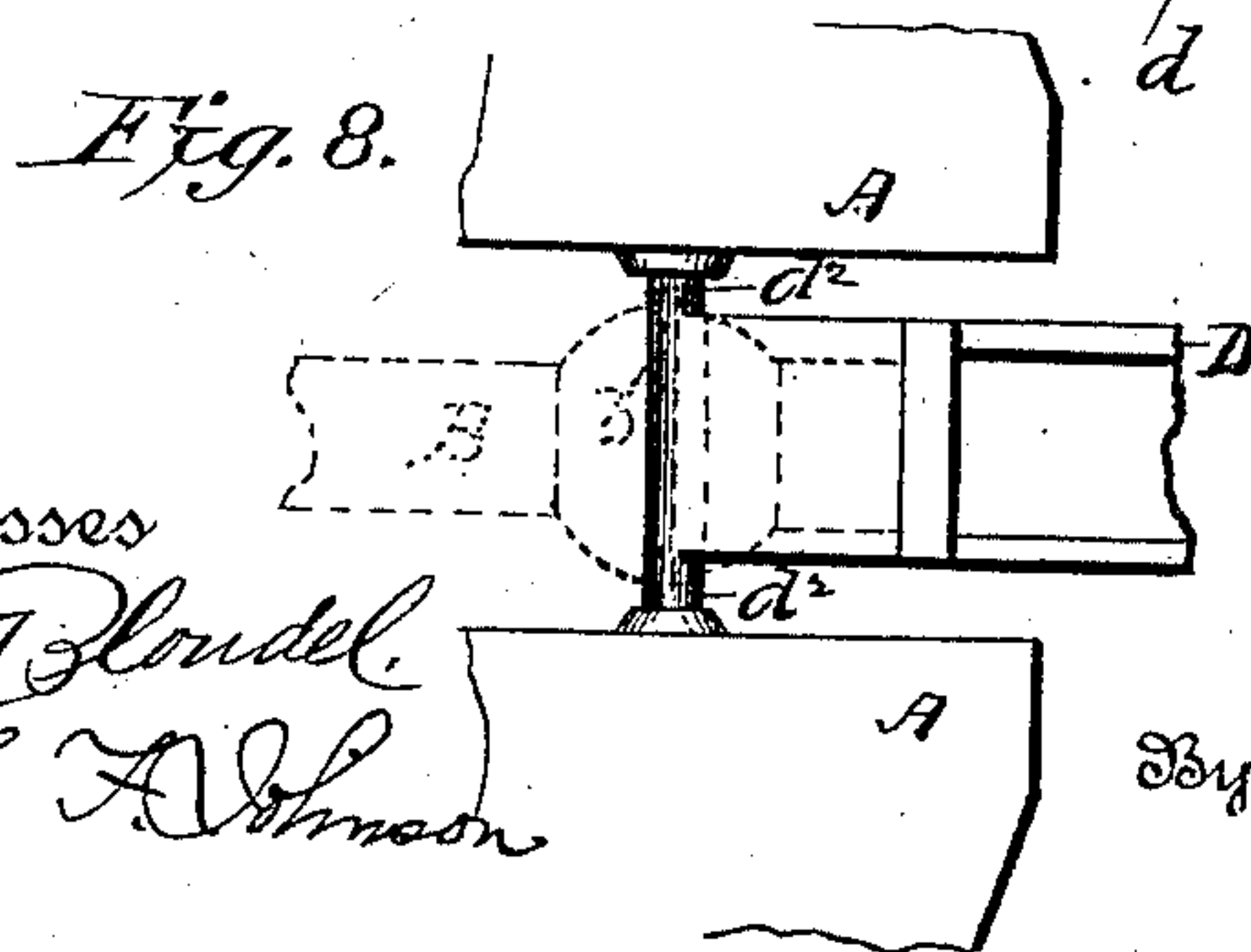
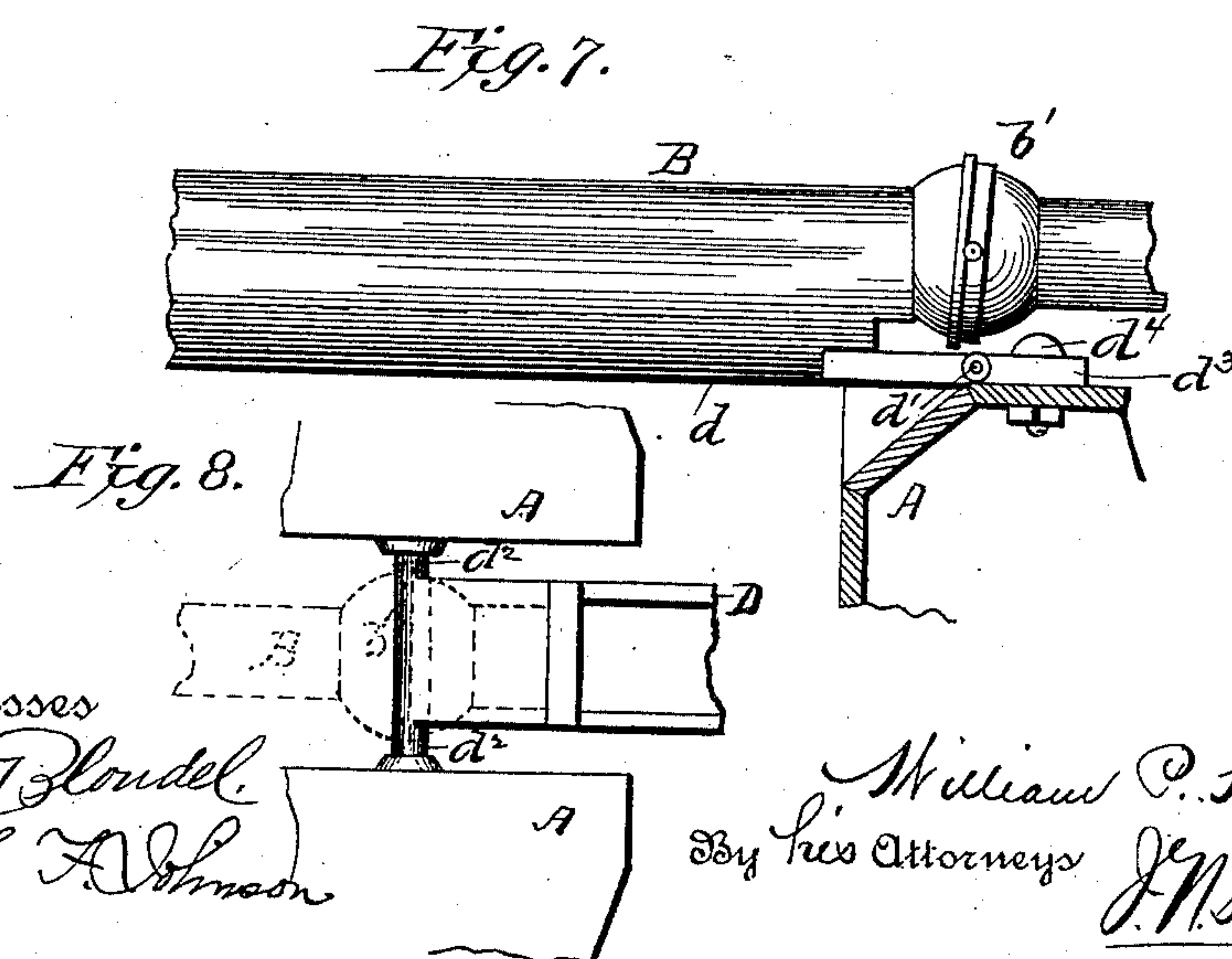
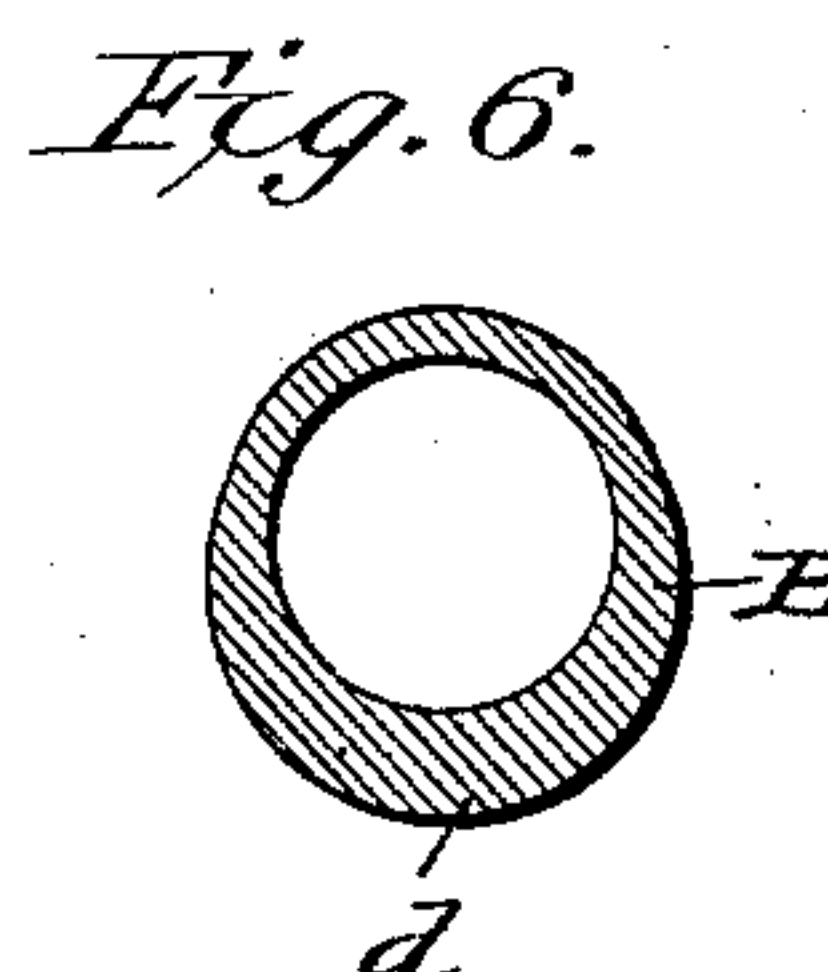
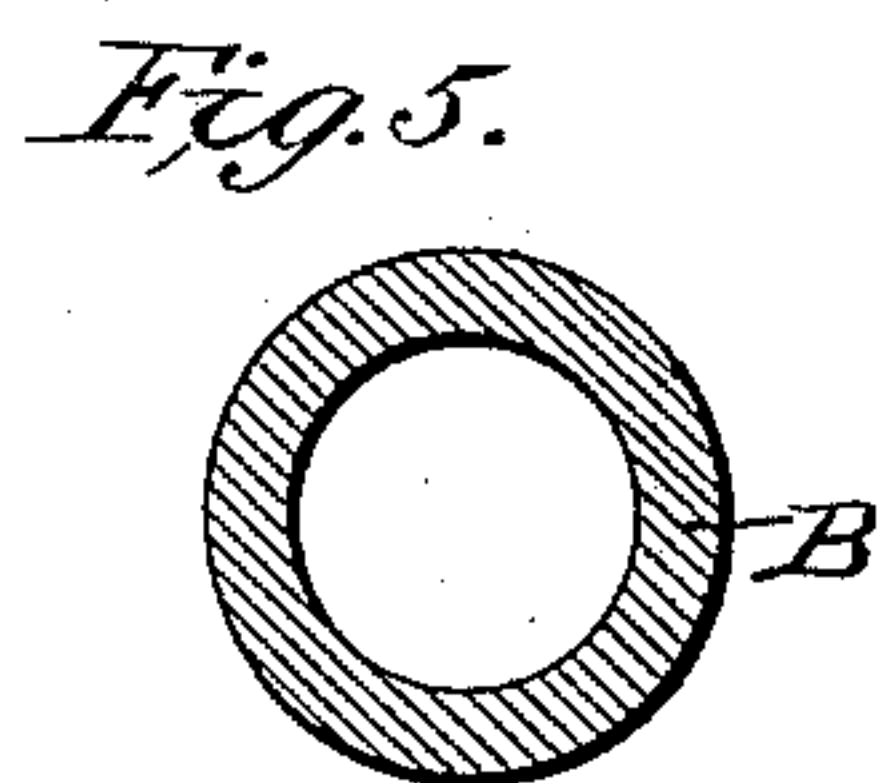
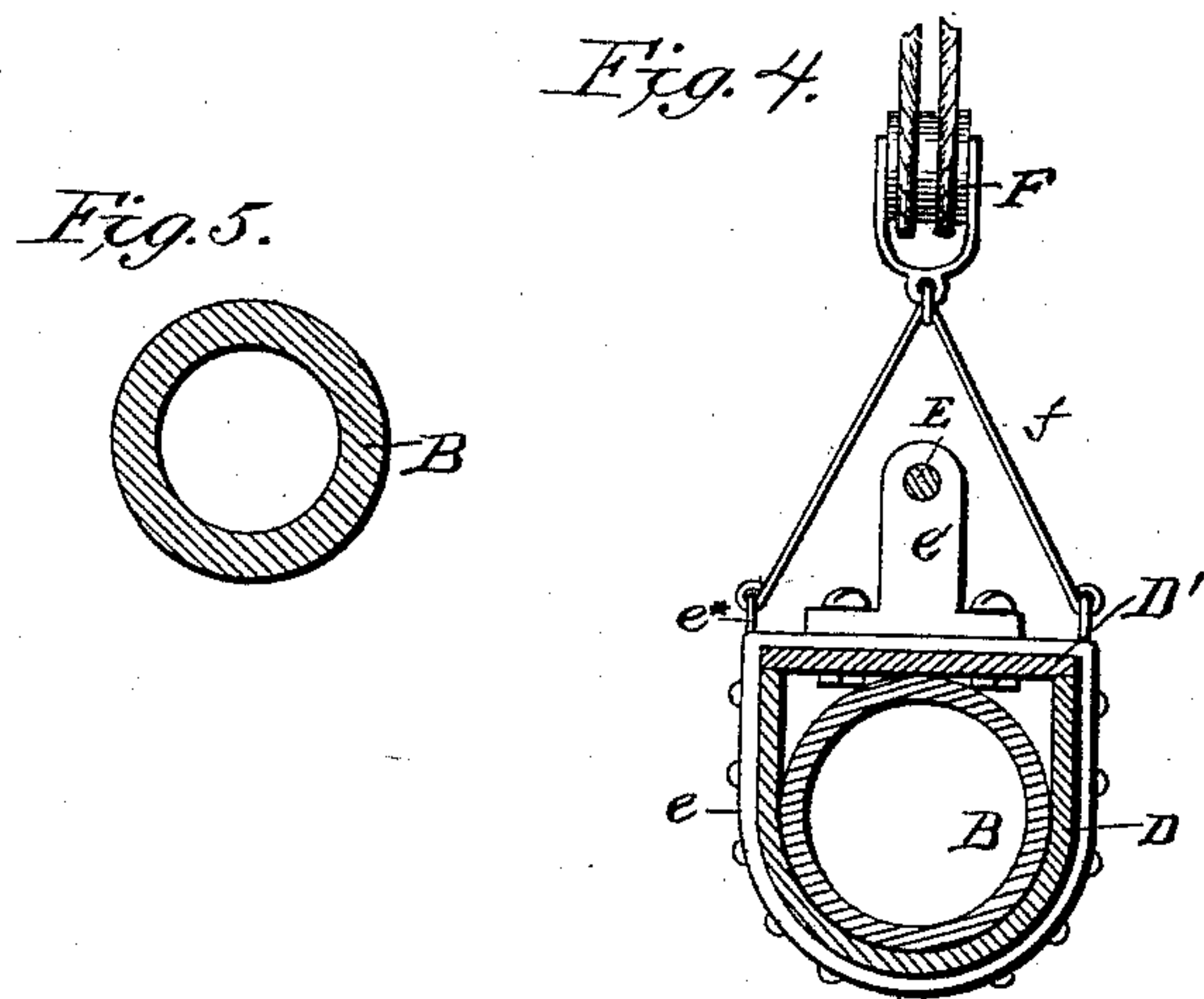
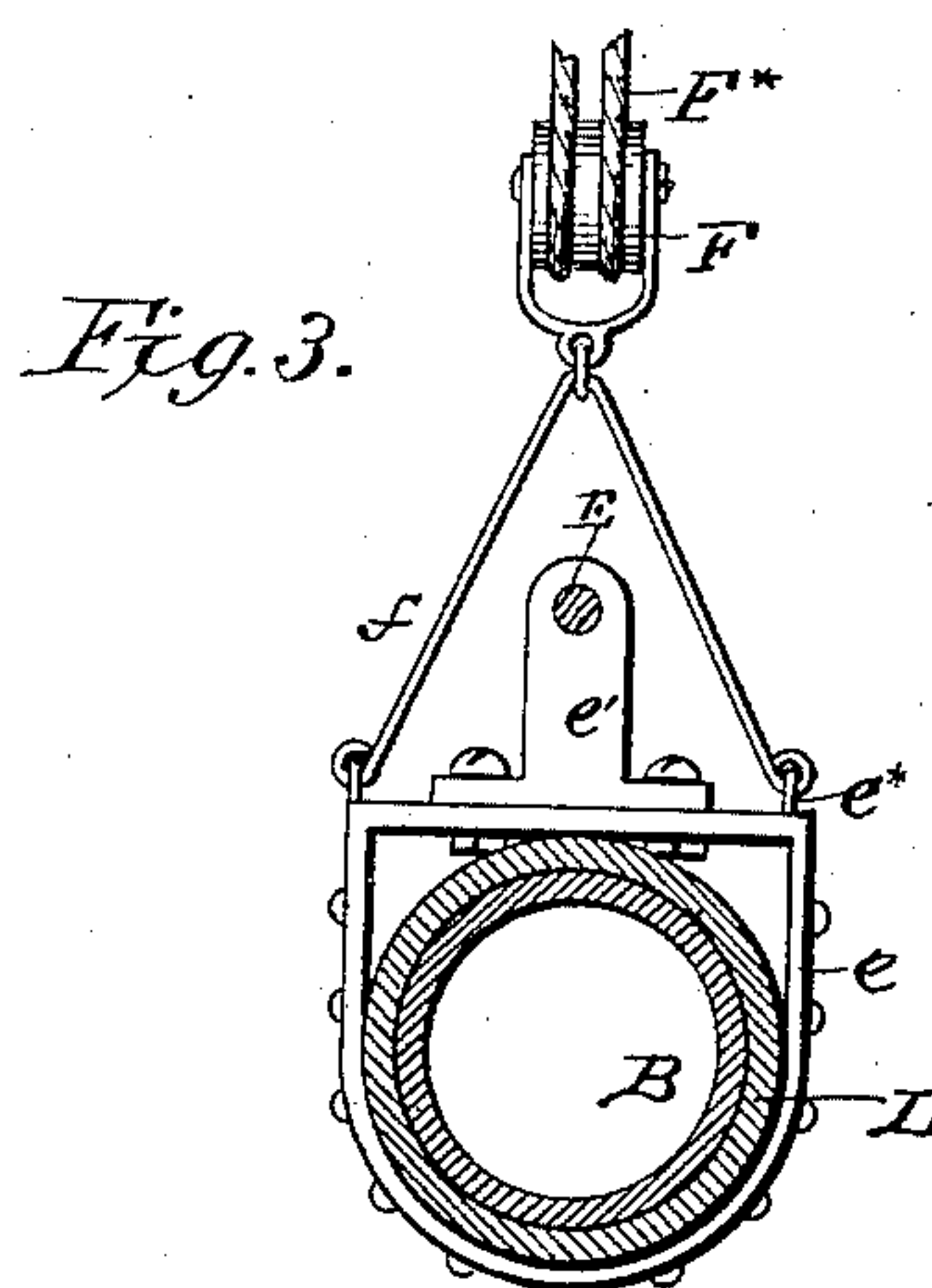
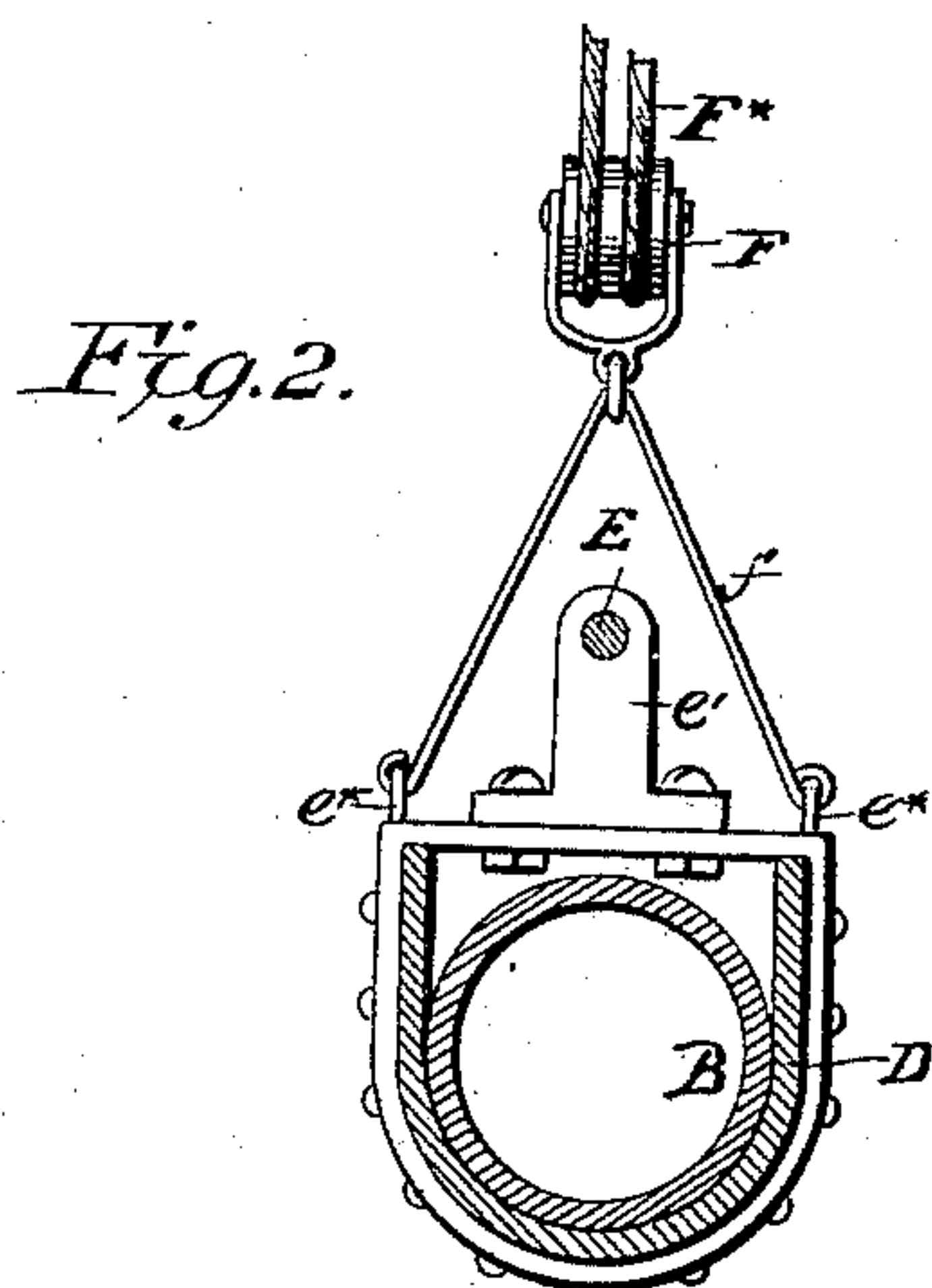
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2 Sheets—Sheet 2.

W. P. HUMPHREYS.
DREDGING APPARATUS.

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Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM P. HUMPHREYS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
CHARLES DODGE, OF WASHINGTON, DISTRICT OF COLUMBIA.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 417,185, dated December 10, 1889.

Application filed August 24, 1889. Serial No. 321,830. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. HUMPHREYS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Dredging Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to dredging-machines, and has particular reference to means for mounting, operating, and protecting the suction-pipe of hydraulic excavators.

The leading objects of my invention may be stated to be as follows, viz: first, an improved means for strengthening or protecting the suction-pipe whereby the entire length of the pipe is braced and strengthened; second, an improved joint or means for connecting the pipe-protector to the boat, so that the pipe and its protector may swing in unison whether in vertical arcs only or in both vertical and horizontal arcs; third, an improved manner of mounting the shaft for operating the excavator; fourth, an improved means for raising and lowering the pipe and its attachments, whereby easy and even force is brought to bear upon all points of suspension.

In addition to these general purposes and objects the invention comprises various novel features of construction.

The nature of my invention and the manner in which I construct and operate the same will be understood from the following detailed description.

The accompanying drawings illustrate a means for carrying my invention into practice.

Figure 1 is a side elevation of a suction-pipe having the features of my improvement illustrated with it, and showing the excavator and a section of a portion of a dredge-boat. Figs. 2, 3, 4, 5, and 6 are transverse sections of suction pipe and protector, showing differ-

ent ways of providing the protector. Fig. 7 is a side elevation of the pipe having a re-enforce or protector integral therewith and the manner of providing the hinge therefor. Fig. 8 is a plan view of a portion, showing trunnions upon the protector instead of a hinge and swivel.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A represents the end of a dredge-boat.

B is the suction-pipe, and C the excavator. The suction-pipe and excavator may be united in any suitable manner, as by universal joint, as shown at *b*, and the suction-pipe is provided with a universal joint *b'* at the boat. The joint *b'* is suspended by means of a band *b²* and link *b³*, swiveled at a point above, as shown at *b⁴*; but I do not lay claim to this manner of swinging the suction-pipe, as it is not my invention.

The excavator C may be of any desired form and mounted and controlled in any convenient manner, as will be readily understood by those skilled in dredging machinery.

D is the protector for the suction-pipe, which may consist of a jacket, as shown in Figs. 1, 2, 3, and 4, or of a re-enforce or enlargement integral with the pipe, as shown in Figs. 5, 6, and 7. In either case it forms an effectual strengthening means for the whole length of pipe, protecting it against undue lateral strain and guarding against bursting.

As shown in Fig. 2, the protector consists of a trough whose sides extend to or above the top of the suction-pipe. As shown in Fig. 3, it consists of a complete cylinder or tube encircling the entire circumference of the pipe.

As shown in Fig. 4, the jacket or protector is of the same form as that shown in Fig. 2, but is provided with a flat or other suitably-shaped and separate cap-piece *D'*.

Where the protector is formed integral with the pipe, it may extend all round, as shown by the thick walls in Fig. 5, or it may extend only a part of the way round, as shown by re-enforce *d* in Fig. 6, which re-enforced side is preferably placed under the bottom of the pipes.

I do not in this patent claim the re-enforce form of protector, having made it the subject-matter of an application for patent filed November 18, 1889, Serial No. 330,677.

5 The protector has a connection to the barge or boat independent of the suction-pipe connection, which may consist of a hinge d' , as shown in Fig. 1, or trunnions d^2 d^3 , as shown in Fig. 8, which latter work in sockets in or
10 upon the boat. When the trunnions are employed, the protector can only swing vertically, and consequently the suction-pipe can have but the one motion—viz., vertical—independent of the boat.

15 I do not in this application claim the trunnion form of hinge, the same having been made the subject-matter of a separate application for patent filed September 18, 1889, Serial No. 324,310; but with the hinge I have de-
20 vised a means for permitting movement of the suction-pipe and protector in both vertical and horizontal arcs. This consists of swiveling the leaf or butt d^3 of the hinge to the boat, as shown at d^4 , by which means, in connection
25 with the universal joint on the pipe, the pipe and protector can be swung in both vertical and horizontal arcs, and the horizontal movement can be effected when the suction-pipe and protector are in any degree of elevation
30 or inclination. At suitable points the protector is equipped with cleats or straps e e , which are made to surround the entire suction-pipe and serve to provide seats for the bearings e' e' of the shaft E, which operates
35 the excavator or cutter, thereby permitting the shaft to be mounted directly on top of the suction-pipe, whereby it is stiffened and supported at numerous points in its length. The construction of the parts and the weight
40 of the mechanism to which the suction-pipe is connected are thereby simplified and reduced to a minimum, while all necessary strength and effectiveness are insured.

Ears e^* e^* are provided upon the straps to
45 which the hangers or links f f are attached, which at their opposite ends connect with the lower pulley-blocks F of a block and tackle rigged from a projecting beam or crane G above the suction-pipes. The rope F* at its
50 outer end preferably connects with the excavator C, and is rove through the blocks comprising the series until it reaches the boat, where it is belayed in any suitable manner. The upper blocks are marked F', and there
55 will preferably be as many upper and lower blocks as there are cleats or straps around the protector and pipe; but I would not insist on this uniformity in number, as it may be found desirable to provide a greater num-
60 ber of cleats or straps than pairs of pulley-blocks. This block-and-tackle arrangement serves to give an evenly-distributed pull upon the various points at which the tackle is connected to the suction-pipe, and thereby de-
65 fends against strains upon the suction-pipe, which, if sudden, may result in the immediate fracture of the pipe in case the strain or pull

is applied at one point, as is usually the case in dredges now known and used.

The frame or crane G may be of any de- 70 sired form, and may be made to swing laterally with the suction-pipe when the latter has the lateral movement. If desired, it may be a fixed frame and extend upon both sides of the cut or opening of the boat made for the 75 suction-pipe in cases where the latter has one motion only—viz., the vertical.

It is apparent that in many of the details of construction modifications within wide limits may be made without departing from 80 the purview and spirit of my invention or sacrificing its advantages.

It is apparent that the block-and-tackle arrangement herein shown and claimed can be used with any form of suction-pipe. 85

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

1. A suction-pipe for dredgers, having a jacket-protector, substantially as and for the 90 purpose set forth.

2. A suction-pipe for dredgers, having a jacket-protector, substantially as described, and provided with a connection to the dredger-boat independent of the connection of the 95 suction-pipe, as set forth.

3. The combination, with a suction-pipe having a universal joint at its connection with the boat, of a jacket-protector for said suction-pipe, having a hinge and a swivel to per- 100 mit it to move in both directions with the suction-pipe.

4. The combination, with a suction-pipe having a universal joint at its connection with the boat, of a protector for the suction-pipe, 105 having a hinge to permit its vertical movement, and swivel in the butt or leaf connected to the boat to permit its horizontal movement.

5. A protector for suction-pipes, consisting 110 of a jacket fitting upon the suction-pipe, as set forth.

6. A protector for suction-pipes, consisting of a trough in which the suction-pipe is held, 115 as set forth.

7. A protector for suction-pipes, composed of a trough and a separate cap or top piece, and cleats or straps for uniting the parts.

8. The combination, with a suction-pipe and jacket-protector therefor, of cleats or bands 120 surrounding the jacket and forming supports for bearings, and an operating-shaft mounted in said bearings directly over the suction-pipe.

9. The combination, with a suction-pipe and 125 protector therefor having cleats or straps surrounding it, of bearings secured upon said cleats or straps directly over the suction-pipe and a shaft mounted in said bearings, as set forth.

10. The combination, with a suction-pipe and a jacket therefor having cleats or bands 130 around it, of a series of block-and-tackle sheaves attached to said bands or cleats and

a corresponding series attached to a beam overhead, and a rope rove through both series, as set forth.

11. The combination, with a suction-pipe
5 having a series of cleats or straps, of a series of sheave-blocks linked thereto, a corresponding series of sheave-blocks suspended from a crane or frame above, and a rope connected

at one end to the pipe or cutter and rove through the entire series, as set forth. 10

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

WILLIAM P. HUMPHREYS.

Witnesses:

I. N. KALB,
C. S. DOMER.