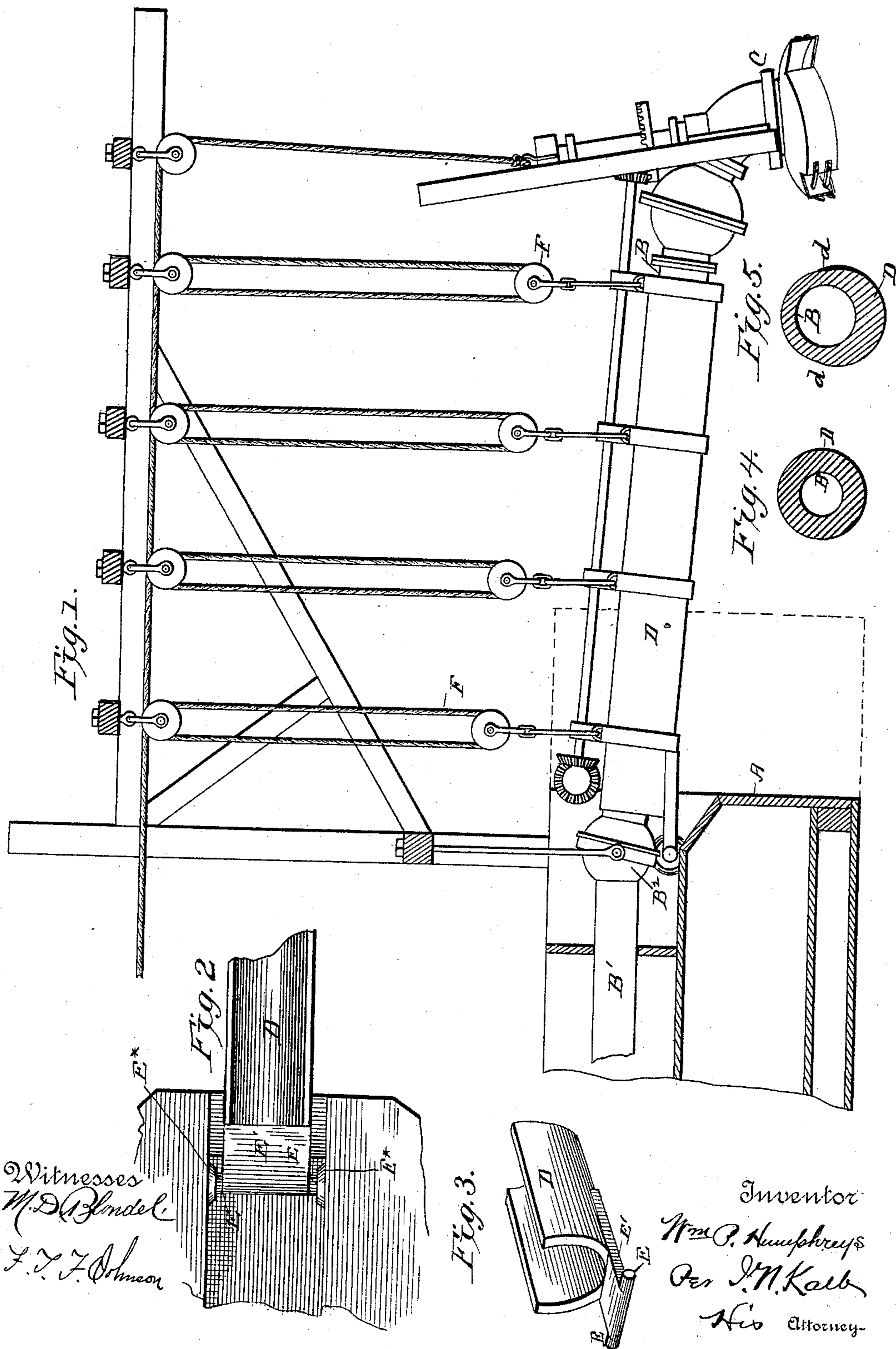


(No Model.)

W. P. HUMPHREYS.  
DREDGING APPARATUS.

No. 417,186.

Patented Dec. 10, 1889.



Witnesses  
*W. D. Bondel*  
*F. J. Johnson*

Inventor  
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Per *J. M. Kalb*  
His Attorney



# 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. 417,186, dated December 10, 1889.

Application filed September 18, 1889. Serial No. 324,310. (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 of reference marked thereon, which form a part of this specification.

My invention relates to dredgers, and has for its object the provision of protecting means for the suction-pipe, and also an improved means for connecting the protector to the barge.

In an application for Letters Patent of the United States filed by me on the 24th day of August, 1889, Serial No. 321,830, the features of the present invention are shown and certain claims are made for the protector which cover construction herein shown. Only the one form of connection between the protector and the barge is herein claimed—viz., the trunnion-joint—whereby the suction-pipe is given movement in one direction only independent of the boat—to wit, in a vertical arc.

Certain features essential to the management of the suction-pipe are shown in the application which are claimed in the application above referred to, as will be pointed out hereinafter.

The following detail description will fully disclose the nature and purpose of my said invention and the manner in which I construct and use the same.

The accompanying drawings illustrate my invention.

Figure 1 is a sectional view of one end of a scow or barge and a side elevation of the suction-pipe, protector, and rigging. Fig. 2 is a plan view of the joint between the barge and protector. Fig. 3 is a perspective view of one end of a protector, showing the trunnions for the joint. Fig. 4 is a sectional view of a protector integral with the suction-pipe, in which the enlargement is carried all around the pipe.

Fig. 5 is a sectional view of a protector integral with but extended only part way around the pipe and being in the nature of a re-enforce upon the under side of the pipe.

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

A is the end of a barge, and B B' is the suction-pipe, hinged or connected together by a universal joint B<sup>2</sup>, so that the portion B, extending beyond the joint, is free to swing.

C is the excavator, connected to the free end of the suction-pipe in the usual or any convenient manner, and F F is the block and tackle, arranged and operated to raise and lower the suction-pipe in the manner set out in my application above referred to. As this arrangement is the same as that fully described in said application, and as it is not claimed in this application, I do not deem it necessary to explain its nature and function herein.

The universal joint B<sup>2</sup> is suspended by a link similar to that shown and described but disclaimed in my aforesaid application.

D is the protector, whose purpose and function are to support, protect, and strengthen the suction-pipe at every point in its length. I have shown the protector both as a jacket or trough, such as is claimed in the other application, as well as integral with the suction-pipe to which I make claim in an application for patent filed November 18, 1889, Serial No. 330,677. In the integral form, as shown in cross-section in Figs. 4 and 5, the protector D is in the form of a re-enforce, increasing the thickness of the pipe either all around, as shown in Fig. 4, or on the under side only, extending to the points d d, as shown in Fig. 5. The protector, thus formed integral with the pipe, is capable of withstanding great strain, and can be used to good advantage either where the suction-pipe has only the vertical movement, as shown in this application, or where it has both a vertical and horizontal movement independent of the bolt. Where the boat is turned or moved to give the horizontal movement to the suction-pipe, as must be the case where the trunnion-joint herein shown is used on the protector, great strength is required in the suc-



tion-pipe, and I provide for this by my protector, which may be either the separate jacket or the integral re-enforce.

5 E E are the trunnions, which are formed with or secured upon an extension E' of the protector, which projects far enough to bring the trunnion in vertical line with the center of motion of the joint in the suction-pipe. The trunnions have bearings E\* E\* in the 10 walls of the boat and partially sustain the weight of the protector. The trunnions afford such a reliable support that the suspension-link for the universal joint may be omitted, if desired.

15 The trunnion-connection may be used with either the separately-formed or the integral protector with equal advantage, and I do not desire to be understood as limiting myself to its use with either form of protector exclusively. 20

The pipe and protector may be mounted directly at the end of the boat, as shown in full lines in the drawings, or a slot may be cut in the end of the boat in the well-known manner and the pipe and the protector mounted 25 back in the slot, as indicated by dotted lines in Fig. 1.

The operating-shaft is mounted directly over the suction-pipe in the same manner as in my previous application, or it may be 30 mounted in any other convenient manner.

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

1. The combination of a suction-pipe and 35 protector, said suction-pipe having a joint to permit its vertical movement and said protector having trunnions upon it, as and for the purpose set forth.

2. The combination, with a suction-pipe 40 having a joint at its connection with the boat, of a protector provided with an extension having trunnions upon it for engagement in bearings upon the boat.

3. A jacket-protector for suction-pipes hav- 45 ing trunnions upon its end connected to the boat, as and for the purpose set forth.

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

WM. P. HUMPHREYS.

Witnesses:

I. N. KALB,

T. D. GRIFFITH.