

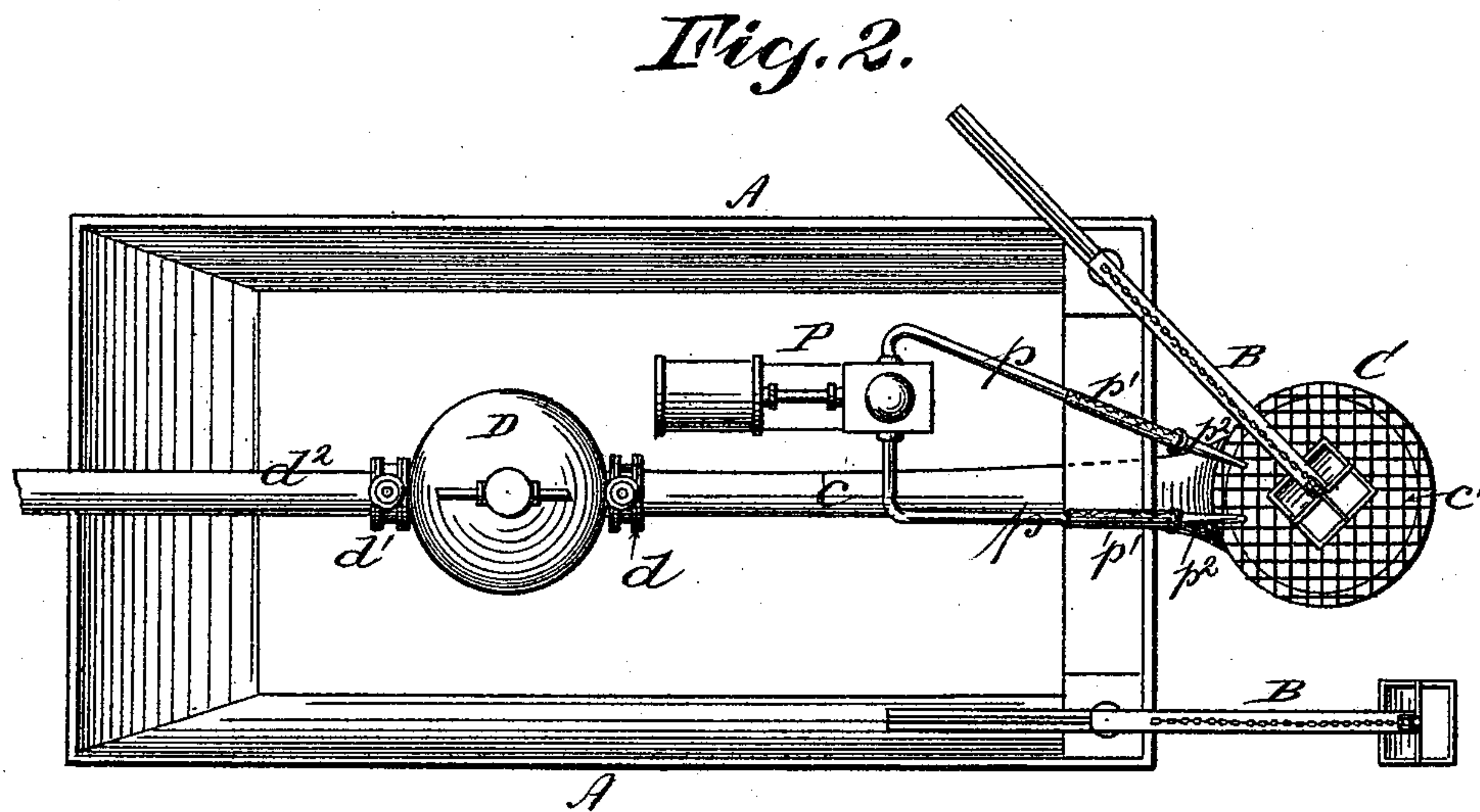
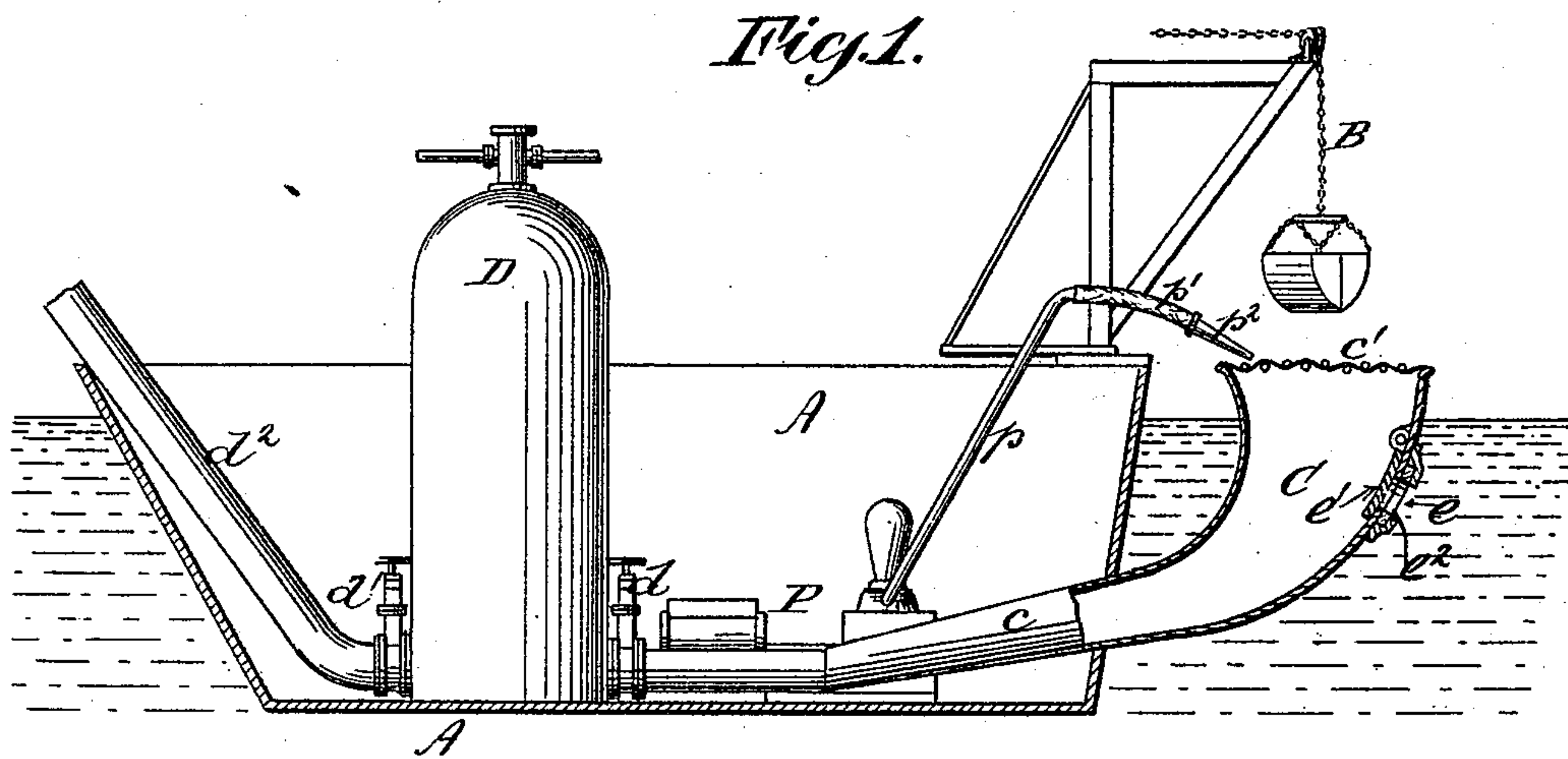
(No Model.)

3 Sheets—Sheet 1.

C. G. COLLINS.
DREDGING APPARATUS.

No. 496,342.

Patented Apr. 25, 1893.



Witnesses:
A. W. Gardner
L. M. Malt

Inventor:
Caleb G. Collins
By his Attorney,
George William Malt

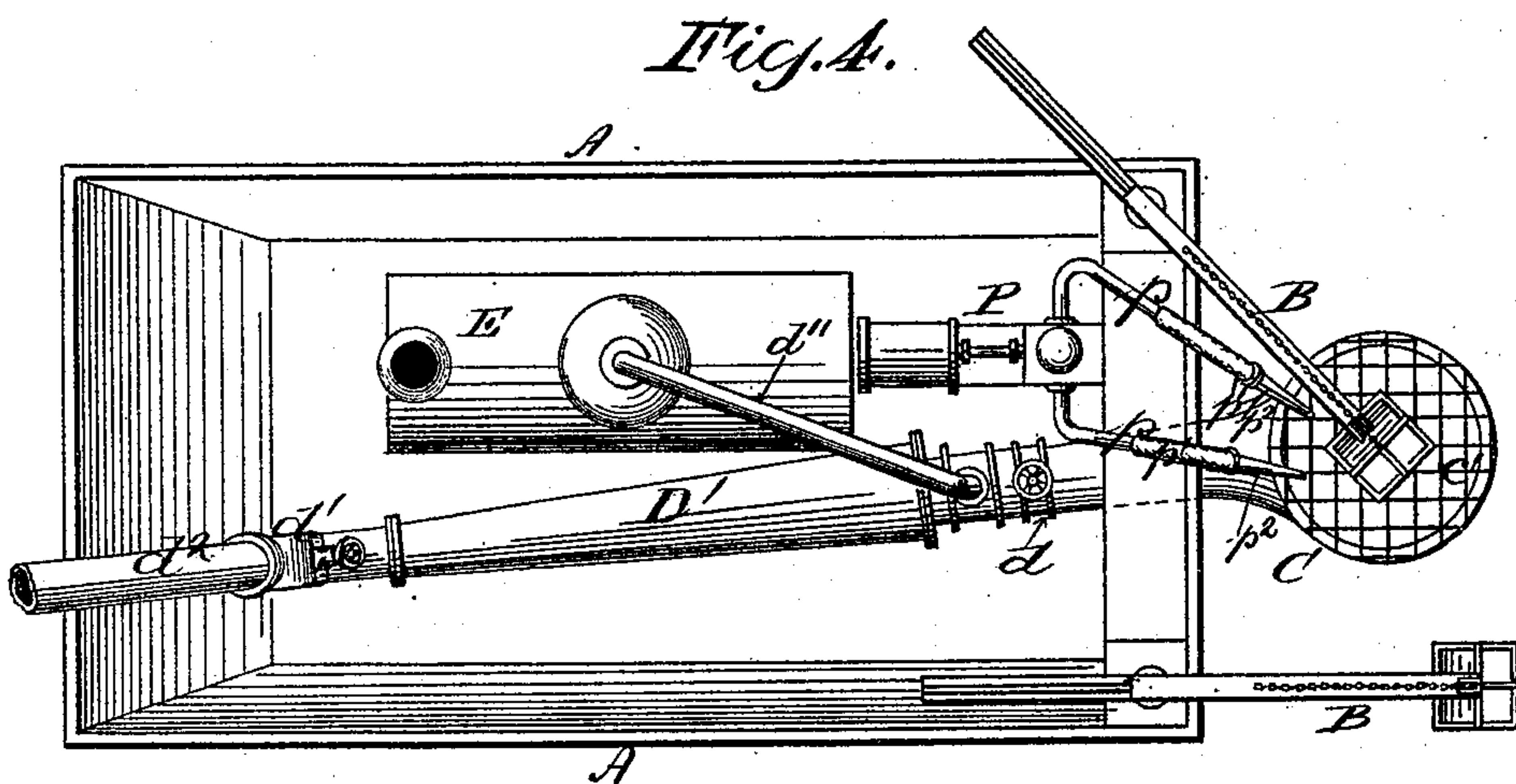
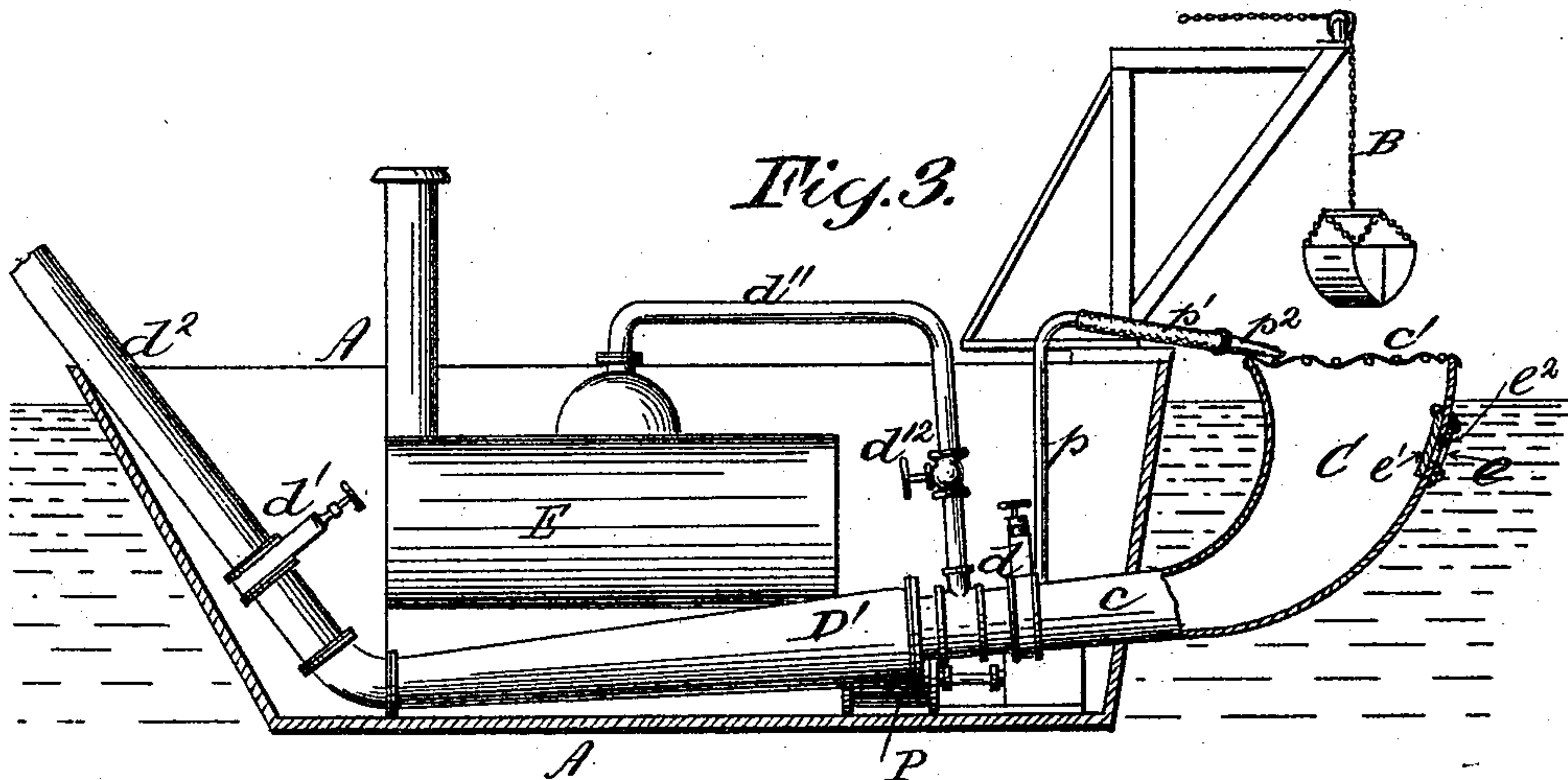
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C. G. COLLINS.
DREDGING APPARATUS.

No. 496,342.

Patented Apr. 25, 1893.



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(No Model.)

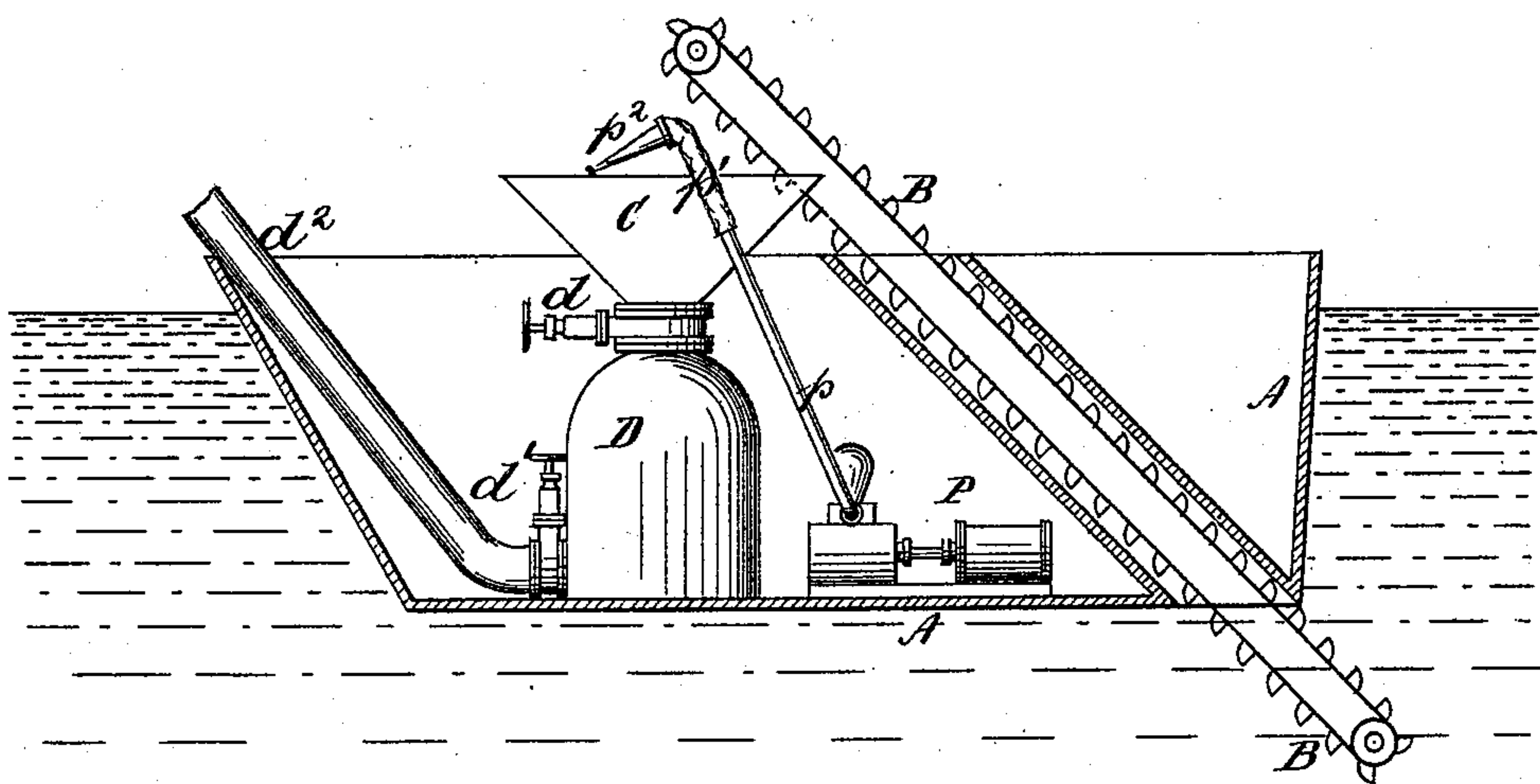
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Fig. 5.



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UNITED STATES PATENT OFFICE.

CALEB GROZIER COLLINS, OF WOODSBURG, ASSIGNOR TO C. AMORY STEVENS, OF NEW YORK, N. Y.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 496,342, dated April 25, 1893.

Application filed May 27, 1892. Serial No. 434,534. (No model.)

To all whom it may concern:

Be it known that I, CALEB GROZIER COLLINS, a citizen of the United States, residing at Woodsburg, in the county of Queens and State of New York, have invented certain new and useful Improvements in Dredging, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My improvements relate specially to the use of what are known as steam vacuum pumps employed in dredging, excavating and mining operations, &c., in which the material is drawn into a transfer chamber by the aid of a partial vacuum formed in said transfer chamber by the direct condensation of steam and then expelled from said transfer chamber by the direct pressure of live steam. The spoil has heretofore been drawn in through a submerged suction pipe which is necessarily intermittent in its action since the transfer chamber cannot thus be fed during the operation of expelling the preceding charge of spoil; and the apparatus has been subject to the danger of becoming injured or clogged with logs, bowlders, &c., which either pass in without being observed, or obstruct the suction pipe.

The main object of my invention is to provide for the continuous operation of the dredging or excavating mechanism used in conjunction with the steam vacuum transfer chamber, and thereby to facilitate operations, and at the same time to guard against the admission of anything that might injure or obstruct the apparatus.

The accompanying drawings illustrate diagrammatically means for carrying out my invention, the unessential details being omitted.

Figure 1, is a vertical sectional elevation of dredging apparatus in which an upright steam forcing or vacuum chamber is used. Fig. 2, is a plan of the same. Fig. 3, is a vertical sectional elevation of dredging apparatus in which the forcing chamber consists of a section of the discharge conduit. Fig. 4, is a plan of the same. Fig. 5, is a vertical sectional view of dredging apparatus in which the material is deposited in an upright forcing

chamber by an endless chain of excavating buckets.

In the drawings A, represents any ordinary float or vessel suitable for sustaining the apparatus; and B, the devices for excavating and elevating the material, such devices being of any well known or desired construction, and being operated and controlled in the usual way.

E, is a steam boiler.

The material raised by the dredge or excavators B, is discharged into a hopper C, the mouth of which is arranged above the level which the material is to occupy in the steam vacuum chamber D, so that the material may descend or flow into the latter by gravity when of a semi-fluid nature, or by gravity aided by suction created by the formation of a partial vacuum in the said chamber D.

It will be seen that any particular form or arrangement of the steam vacuum transfer chamber is not essential, and it may consist of the section D', of the conduit c, between the inlet valve d, and the outlet valve d', as in Figs. 3 and 4, in which the steam is admitted through pipe d¹¹, and valve d¹², directly behind the inlet valve d, when the latter is closed and the other valve d', opened and will then eject the material through the discharge pipe d², in substantially the same manner that it is ejected from the upright cylinder. Where an endless chain of excavating buckets is employed to raise the material, the receiving hopper C, may be situated above and upon the steam vacuum transfer chamber D, as illustrated in Fig. 5, the inlet valve d, being placed between the hopper and the top of the discharge chamber.

In order to facilitate the flow or descent of the material from the hopper to the steam vacuum transfer chamber D, and its ejection therefrom when of a comparatively dry or solid character, provision is made for admitting water to the hopper, or to the conduit, by means of suitable valves or adjustable openings e, as indicated in Figs. 1 and 3, in which a flap valve e', is shown as closing over a damper valve e². These valves are designed for use where it is simply necessary to soften up or dilute the mass of material. Where

the latter requires to be forcibly broken up and disintegrated in the hopper C, I employ jets of water under suitable degrees of pressure, as provided for by the pipes p, p , which
 5 are connected with suitable force pump F, or other source of supply. By this means jets of water may be made to impinge upon and disintegrate the material, at the same time
 10 affording a liquid vehicle to aid in carrying it through the steam vacuum transfer chamber D, and ejector d^2 . The mouth of the receiver or hopper C, is formed with a coarse grating or lattice work c' , the interstices in which are sufficiently large to admit all spoil
 15 excepting logs or bowlders of objectionable size that might otherwise clog and obstruct the apparatus. The grating c' , also performs another important function in aiding in the loosening and breaking up of the spoil, especially in conjunction with the hydraulic
 20 jets delivered from the nozzles p^2 , of the pipes p , since the grating holds and sustains the material against the action of the water jets until the material is sufficiently reduced thereby to fall through the grating into the hopper C. The sections p' , of the pipes p , are flexible to admit of the direction of the nozzles p^2 .

An advantage arising from my invention is
 30 the ability to arrange and operate two or more dredging or excavating appliances for use in connection with a single hopper C, and steam vacuum transfer chamber D, as illustrated in Fig. 2, thus increasing the speed and effectiveness of the apparatus as a whole.
 35

The feature of a fixed, permanent, elevated hopper to receive the material as dredged, raised, and collected, and to convey such material directly to the steam vacuum transfer
 40 chamber I believe to be original with myself.

The dilution of the material during its passage from the hopper to the steam vacuum transfer chamber is an important feature of the invention, enabling me not only to adapt

the material to the requirements of the vacuum chamber but also to regulate its distribution more perfectly over a given space. 45

My improvements may be readily adapted to and used upon the present forms of dredging apparatus, whether of the clam-scoop, endless bucket chain, or dipper class,—affording
 50 a fixed, permanent receiver for the spoil elevated above, and adapted to flow it into, the steam vacuum chamber, to be ejected thereby to a suitable distance. 55

The receiver or hopper is of sufficient capacity to hold all the material which is dredged or excavated while the charge is being ejected from the discharge chamber or pump D, so that the operation of the apparatus as a whole is rendered practically continuous. 60

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

1. The combination, with a dredge boat, of spoil excavating and elevating mechanism, a
 65 steam vacuum pump, and a permanently elevated receiver formed with a screen upon which the spoil is dumped, substantially in the manner and for the purpose described.

2. The combination, with a dredge boat, of
 70 spoil excavating and elevating mechanism, a steam vacuum pump, a permanently elevated receiver formed with a screen upon which the spoil is dumped, and means for forcibly projecting jets of water against the spoil upon
 75 said screen, substantially in the manner and for the purpose described.

3. The combination with a dredge boat of a steam vacuum pump, formed with a permanently elevated receiver placed intermediately between two excavating and elevating
 80 devices, and the latter arranged and operating substantially in the manner and for the purpose described.

CALEB GROZIER COLLINS.

Witnesses:

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 N. F. RAND.