

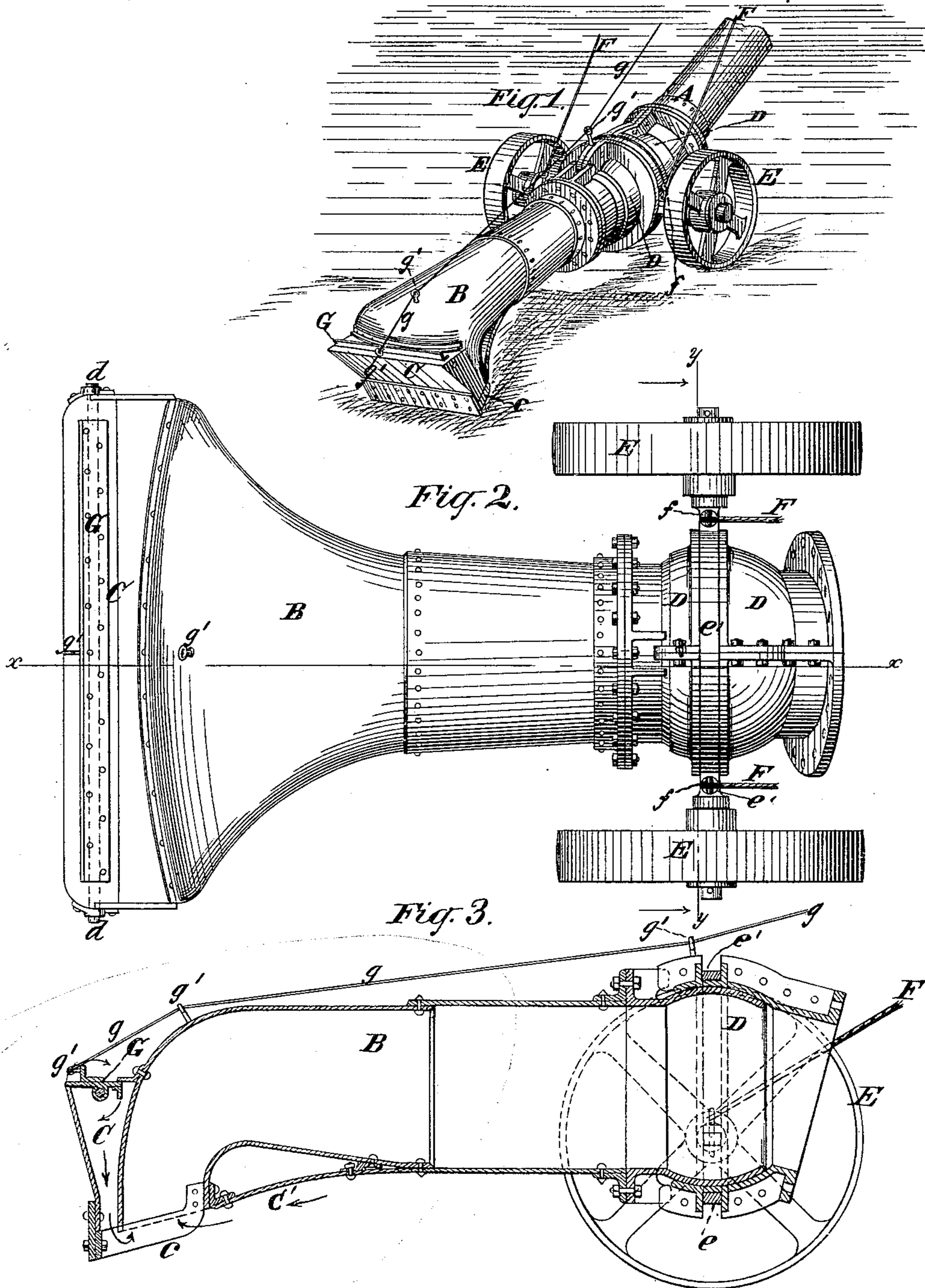
(No Model.)

2 Sheets—Sheet 1.

B. C. HOWELL.  
HYDRAULIC DREDGING MACHINE.

No. 371,686.

Patented Oct. 18, 1887.



WITNESSES  
John Becker  
M. Cunningham

INVENTOR  
Byron C. Howell

(No Model.)

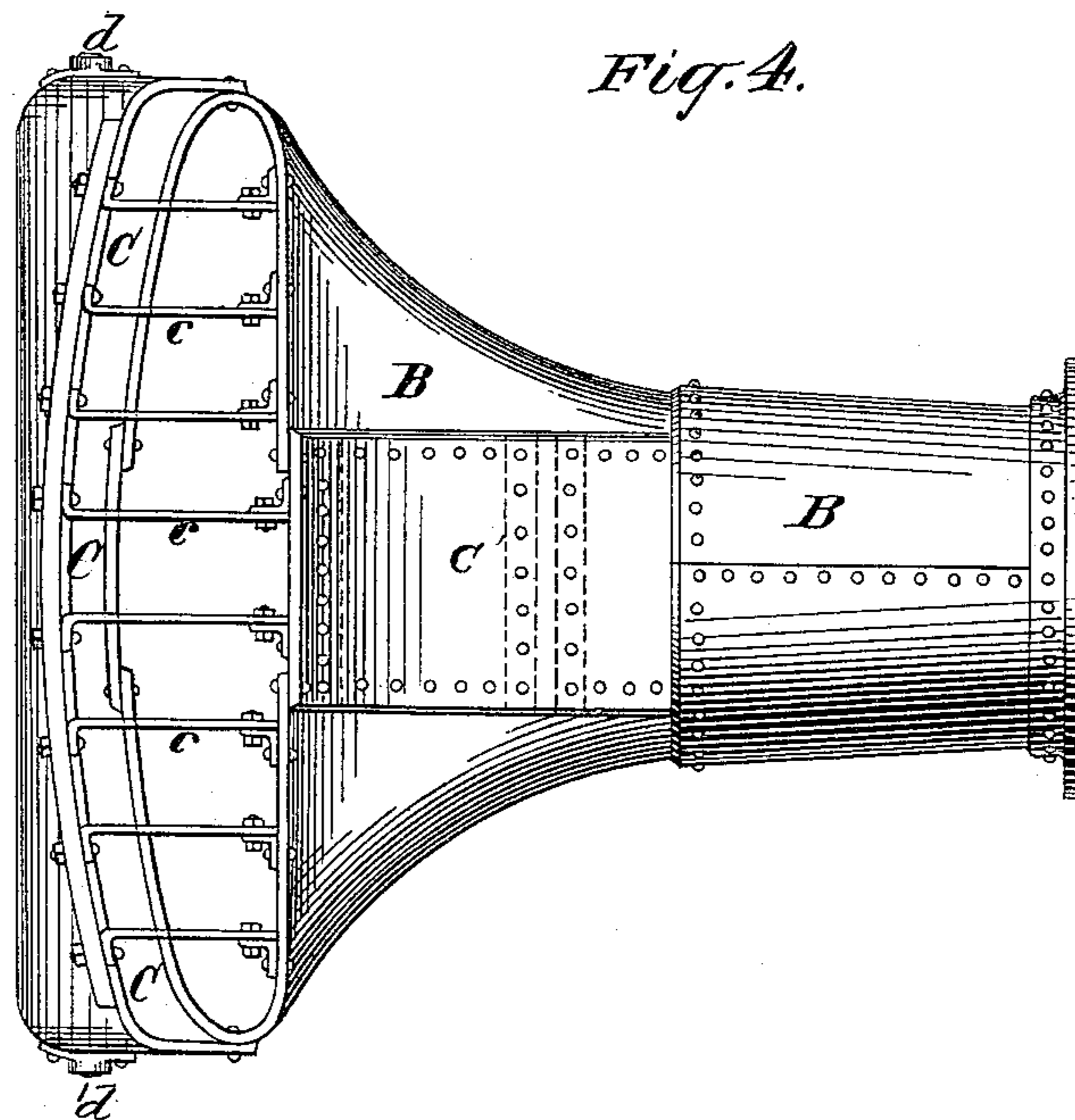
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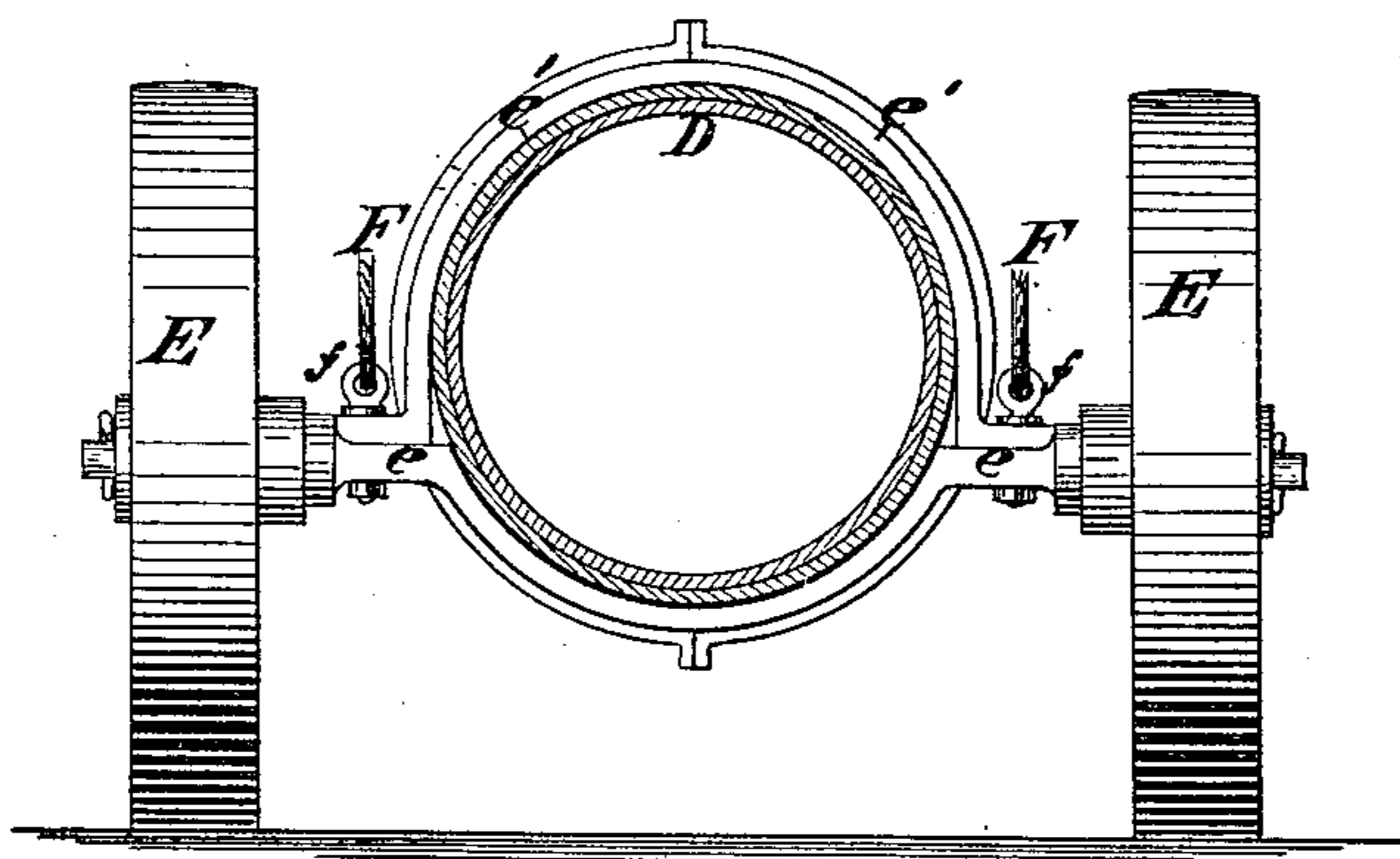
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*Fig. 5.*



WITNESSES

*John Becker*  
*W. M. Cumming*

INVENTOR

*Byron C. Howell*

# UNITED STATES PATENT OFFICE.

BYRON C. HOWELL, OF NEW YORK, N. Y.

## HYDRAULIC DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 371,686, dated October 18, 1887.

Application filed January 12, 1887. Serial No. 224,147. (No model.)

*To all whom it may concern:*

Be it known that I, BYRON C. HOWELL, of the city, county, and State of New York, have invented certain new and useful Improvements in Hydraulic Dredging-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification.

The invention consists in combining with the lower end of a suction-pipe connected with any suitable dredging-pump a self-adjusting drag, B, provided with an adjustable water-valve, G, and chamber C, which delivers the water with atmospheric pressure upon or against the material to be removed in the dredging process, disturbing and diluting said material with the water-jet caused by said pressure to such an extent as will cause it to be held in such a state of solution as will enable the pump to take it up and pass it through the delivery-pipes to the point desired most easily and speedily.

The second part of my invention consists in providing the lower end of the suction-pipe A with a universal or ball joint of any approved design or make, mounted on wheels E E, to ease the draft on the suction-pipe A and its connection with the pump and dredge-boat, as well as to enable the drag B to accommodate itself to the lateral or steering movements of the dredge-boat when veered from its true course on the dredge-cut by tidal cross-currents or quartering winds, or to uneven surfaces to be operated upon, and to allow itself to sink into the space caused by the material it has removed, so that there shall be no cessation of the dredging process for want of material to be operated upon, and, finally, to allow the said drag B to remain on or near the surface to be dredged when the dredge-boat rises on the swells of a rough sea so much that the hoisting and lowering chains F F raise the wheels E E from the material to be dredged.

These inventions relate more particularly to a moving hydraulic dredging-boat operating upon sand or gravel bars at the entrance to ocean harbors or in rivers or other inland navigable waters; but they may be applied to any hydraulic dredge engaged in the process of deepening navigable water-ways.

In the drawings, Figure 1 is a longitudinal elevation in perspective, showing the drag B connected with the ball or universal joint D,

mounted on the wheels E E, attached to the suction-pipe A as it is being drawn along on the surface of the material to be removed in the operation of dredging. Fig. 2 is a plan showing a top view of the same in perspective. Fig. 3 is a longitudinal sectional view of the same. Fig. 4 is a plan showing a bottom view of the drag B, with a portion of the plate C' removed to show the outside form or lines of the drag. Fig. 5 is a view showing a transverse section through the center of the ball or universal joint D as mounted on the wheels E E by means of the axle *e e* and secured thereto by the hoop *e' e'*.

The wheels E E and ball or universal joint D and flanges to same I construct of cast-iron of suitable dimensions and form, substantially as shown on the drawings, and the shell of the drag B, the guide-plate C', water-chamber C, and adjustable valve G, I construct of boiler-plate, of iron or steel, of suitable thickness and strength and in the form substantially as shown in the drawings; but this may be constructed of cast-iron or any other suitable material and varied in form, if desired or circumstances require it. The remaining pieces or parts I construct by forging iron or steel of suitable size and strength, and in the forms, shapes, and dimensions required and substantially as shown on the drawings.

Across the suction entrance or mouth of the drag B, Figs. 3 and 4, I place bars of iron or steel, *c c c*, of the form and fastened to the outside shell of the drag B and water-chamber C, in the manner shown on the drawings, and these serve the purpose of runners to support the drag B and as guards to prevent rocks or other insoluble material too large to pass through the suction-pipe, pump, or delivery-pipe from passing into the drag, and thereby obstructing the free passage of the dredged spoils.

The valve G is constructed so as to close itself automatically by the pivots *d d*, Figs. 2 and 4, being secured to it forward of a true center of the valve, so that when the opening line or rod *g' g'*, Figs. 1 and 3, is slack the force of the current of water passing into the chamber C will cause it to close itself.

On the under side of the drag B, I secure a guide-plate, C', Figs. 3 and 4, of a width equal to and of the shape of said drag, which serves

the double purpose of confining and giving direction to the suction-current, so that it will enter the mouth of the drag B with a force sufficient to take up dredged spoils with it, as well as to prevent the hooked portion of the drag B from becoming fouled with partially-sanded wrecks or other submerged obstructions of a character likely to damage or break the suction outfit.

10 The whole apparatus of suction-pipe and drag I provide with hoisting and lowering lines or chains, safety or guy lines, or chains of suitable size and strength, of any known system or device.

15 In operating these inventions or appliances, by a reference to the drawings, Figs. 1, 3, and 4, it may be seen that the entrance or mouth of the drag is liable to become choked by an excess of dredged spoils at such times when the dredge-boat is under such headway as to bring it against such material more rapidly than the suction force of the dredging-pump will draw it through the suction-pipe A, in which case the operator at the pump can regulate the dredging process and cause the desired induction and flow of spoils by means of the adjustable valve G and the operating-line  $g'g'$ , Figs. 1 and 3. I place the water-chamber C, with its self-closing valve G, to the rear or astern of the drag B, which renders it at all times accessible to the surrounding water and free from liability of obstruction or choking by dredging spoils, and a reliable and efficient source of relief in case the forward entrance to said drag B becomes choked by reason of an inflow of an excess of dredged spoils. On

the other hand, should the headway of the dredge-boat be retarded from any cause, so that the suction force of the dredging-pump will take up the material to be dredged more rapidly than the speed or motion of the dredge-boat would bring it against the said material at an ordinary depth of cut, the depth of cut and inflow of dredged spoils can be regulated by the operator at the pump by opening or closing of the valve G and the contributory action of the universal or ball joint D, as hereinbefore described.

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

1. The combination of the drag B and water-chamber C with an adjustable valve, G, and operating line or rod  $g'g'$ , attached to the rear of the drag B, substantially as and for the purposes set forth.

2. The combination of a self-adjusting drag, B, having the water-chamber C, adjustable valve G, and operating line or rod  $g'g'$ , with a suction-pipe, to which it is attached by a universal or ball joint, D, mounted on wheels E, substantially as shown on the drawings and set forth in the specification.

3. The combination of the scraper and suction-pipe with the universal or ball joint D at the lower end of the suction-pipe A, and the wheels E E, bow-axle, and hoop  $e'$ , for carrying and holding the same, substantially as and for the purpose set forth.

BYRON C. HOWELL.

Witnesses.

A. A. BIRNEY,  
W. WILLOUGHBY.