

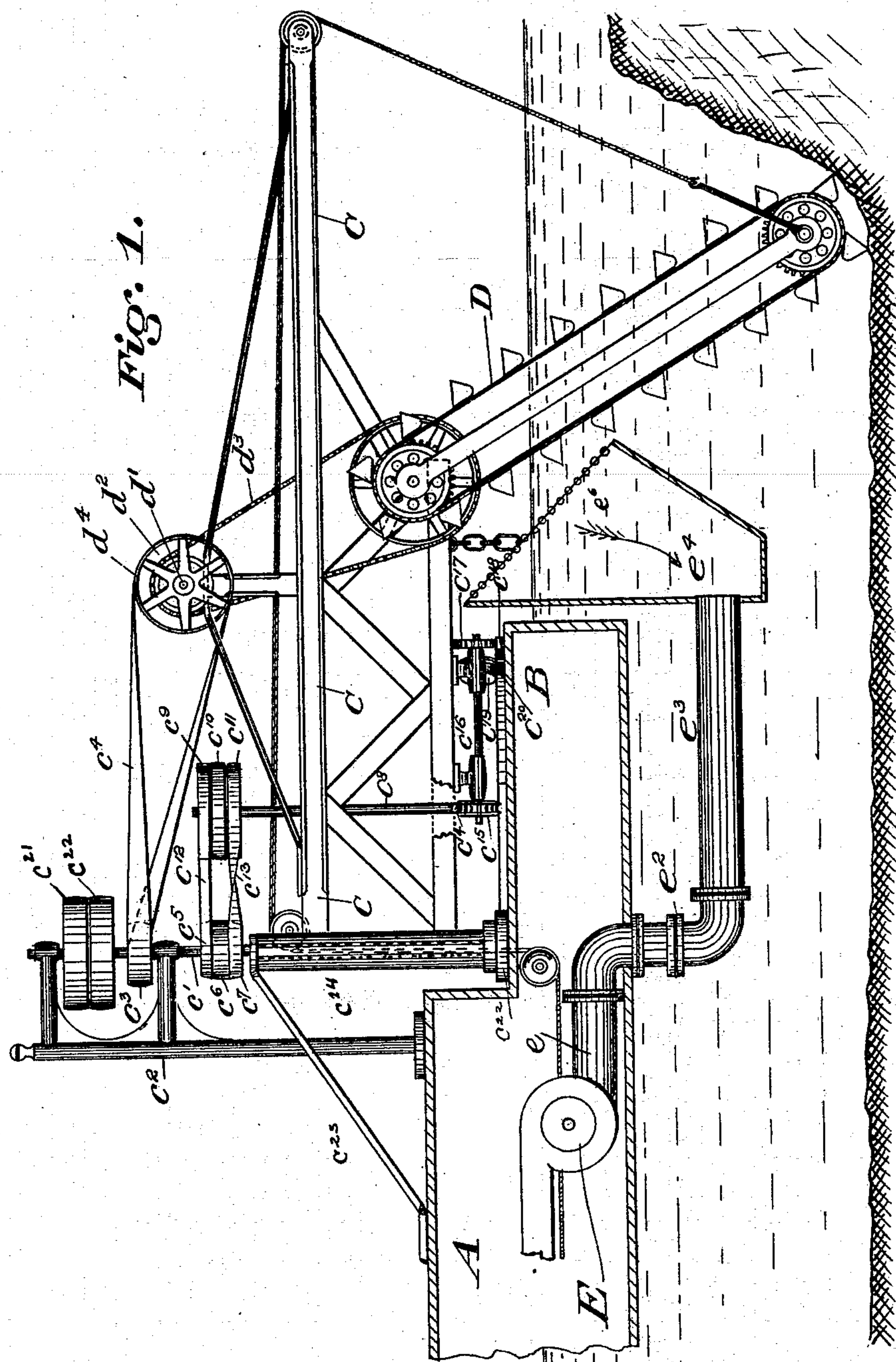
(No Model.)

2 Sheets—Sheet 1.

C. E. & F. ELLICOTT.  
HYDRAULIC DREDGER.

No. 503,655.

Patented Aug. 22, 1893.



Witnesses

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By their

Inventors  
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Francis Ellicott

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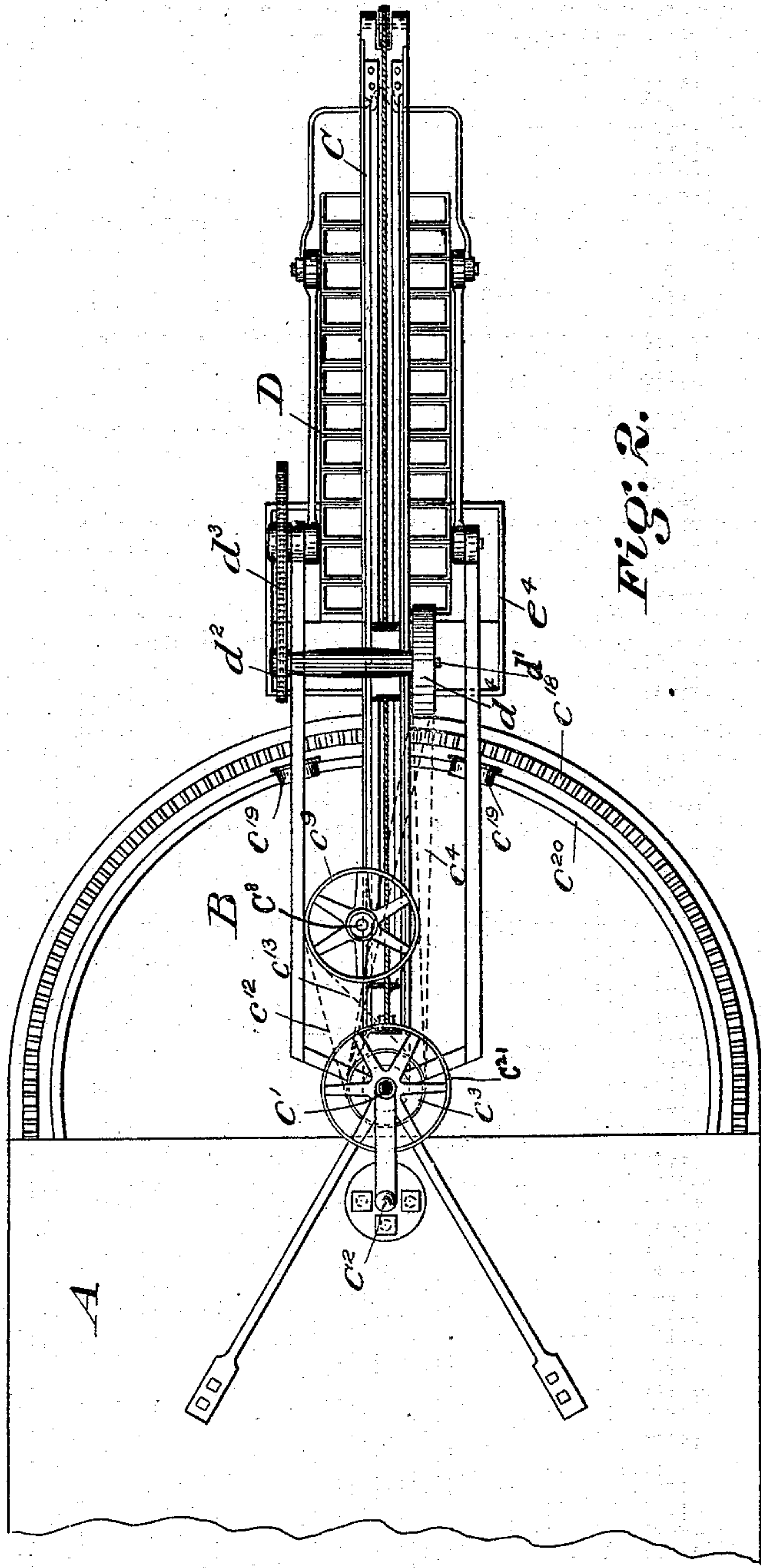
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J. K. E. Niffendrufer  
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Inventors  
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Francis Ellicott  
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# UNITED STATES PATENT OFFICE.

CHARLES E. ELLICOTT AND FRANCIS ELLICOTT, OF LAKE ROLAND,  
MARYLAND.

## HYDRAULIC DREDGER.

SPECIFICATION forming part of Letters Patent No. 503,655, dated August 22, 1893.

Application filed June 25, 1891. Serial No. 397,455. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES E. ELLICOTT and FRANCIS ELLICOTT, citizens of the United States, and residents of Lake Roland, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Hydraulic Dredges, of which the following is a specification.

Our invention relates to dredges for dredging mud, of the class generally known as hydraulic excavators, by which the mud is dug by a suitable digging apparatus or stirred up by a suitable stirrer and then forced through pipes supported upon floating pontons to any desired point of deposit.

The object of our invention is to secure great economy in operation, to dig the mud solid, and throw it ashore at the least expense of power. For this purpose, we employ a mechanical digger, such for instance as a chain and bucket elevator; which, when placed near the bottom in contact with the mud bank, will dig the mud in solid form and deliver it to any desired point. The form of pumping mechanism employed for forcing the mud to the point of deposit may be of any kind suitable for the purpose; the particular feature of our invention however, consists of the intermediate mechanism, between the digger and pump, in which the mud is received mixed with water to a proper consistency and sucked into the pump mechanism.

In the drawings:—Figure 1, represents a section of our dredge, showing the relations of the various parts. Fig. 2, is a plan of the same.

In the drawings, A is the boat, having a semi-circular forward end B, which is provided on its outer edge with a track  $c^{20}$  and a rack  $c^{18}$ .

C is a derrick, pivoted so as to permit the structure sustained by it to swing around the front of the boat on the arc of the bow B, the front end being supported and traveling on the track  $c^{20}$  on the bow B.

D is the chain and bucket excavator, secured to a suitable frame and sustained by the derrick or carriage C, and traveling on the bow B.

E indicates a pump suitably located upon the boat.

$e$  is the suction pipe, connected to the pump at one end and provided on its outer end, immediately below the pivot of the derrick, with a joint  $e^2$  which will permit a horizontal motion of the end of the pipe; this joint may be any kind of a flexible or a swiveled joint.

$e^3$  is an external section of said suction pipe.  $e^4$  is a hopper or flared end of the suction pipe  $e^3$ , which is turned upward and in position to receive the mud as it is dropped from the excavator or digger; this hopper may be provided across its mouth with a grating  $e^6$  of a suitable character to prevent the admission of things injurious to the pump. The hopper is suspended from the under side of the derrick C by chains  $e^5$ . The mechanical structure by which the excavator is operated is also a new one and constitutes one of the features of our invention. It is fully illustrated in Fig. 1.

D is the chain and bucket elevator and excavator.

$d'$  is a shaft, journaled horizontally upon the derrick C and upon which is keyed a sprocket wheel  $d^2$  with which meshes the sprocket chain  $d^3$ , by which the excavator is driven.  $d^4$  is a pulley also keyed to said shaft.

$c'$  is a vertical shaft journaled in suitable support  $c^2$ , the axis of which is coincident with the axis of the pivot of the derrick C. The pivot of the derrick C consists of a sleeve  $c^{24}$  on the inner end of the derrick C and which is stepped at the lower end in the pedestal  $c^{22}$  and at the upper end in the guy bar  $c^{23}$ . Upon this shaft is keyed the fly-wheel  $c^3$ , from which power is communicated to the pulley  $d^4$  by the belt  $c^4$ . It will be seen that, as the derrick and excavator are swung round the end of the boat, the pulleys  $d^4$  and  $c^3$  always retain the same relative position to one another, and the belt will always act in a similar manner and drive the excavator. A similar construction is used to drive the carriage and derrick around the end of the boat.

$c^5$ ,  $c^6$ , and  $c^7$  are three pulleys upon the shaft  $c'$ .

$c^5$  and  $c^7$  are loose and  $c^6$  is fast.

$c^8$  is a vertical countershaft sustained in bearings upon the derrick C. Upon its upper end are three pulleys  $c^9$ ,  $c^{10}$  and  $c^{11}$ ;  $c^9$  and  $c^{11}$  are loose while  $c^{10}$  is fast. A straight belt



$c^{12}$  connects the pulleys  $c^9$  and  $c^5$ , while a half turned belt  $c^{13}$  connects  $c^7$  and  $c^{11}$ , so as to give  $c^{11}$  a reverse motion from  $c^7$ . It will be seen that, as these belts are alternately shifted from tight to loose pulleys, the shaft  $c^8$  will be turned one way or the other as the case may be. On the lower end of this counter shaft  $c^8$  is a screw  $c^{14}$  meshing with a worm wheel  $c^{15}$ , keyed to a counter shaft  $c^{16}$  on the opposite end of which is a gear wheel  $c^{17}$  engaging a rack  $c^{18}$  on the curved end of the boat, by which the derrick and the devices sustained by it are moved.

$c^{19}$ ,  $c^{19}$ , are wheels journaled upon the under side of the frame work of the derrick and traveling on a track  $c^{20}$  on the front end of the boat. The shaft  $c'$  is driven by the pulley  $c^{21}$ ; and  $c^{22}$  is a loose pulley on the same shaft, to which the belt may be shifted to stop the machine.

We are aware that it is old to dredge with a chain and bucket excavator, or a clam shell digger or simple scoop and dump the spoil into a hopper on the dredge boat, from whence it is pumped to any desired point; but the use heretofore made of this principle lacks several very important elements of our invention. The elevation of the mud to a point high enough to deliver it on the boat requires a large machine and a great expenditure of power; while, to supply the hopper with sufficient water to dilute the mud to a proper consistency, would require an additional pump of considerable capacity. We submerge our suction pipe with its hopper; and suck water and mud into it together. The hopper may be entirely submerged, or the top of it may be slightly out of water; and its sides may be perforated or not as may be found necessary. We support the digger and suction pipe by a derrick; and swing them united and sustained together and in constant relative position, around the end of the boat, so as thereby to dig a wide swath of mud with one adjustment of the apparatus; in relation to the mud bank operated upon or the digger and suction pipe may be fixed in the center of the bow, and the boat be provided with a single spud at the stern, and anchors and guy ropes at the bow, by which the whole boat may be swung in an arc having the single spud as a center. The mouth of the suction pipe being submerged or nearly so, is always supplied with an abundance of water. The elevator has only to lift the mud to the surface of the water or slightly above it; thus consuming the least possible quantity of power by lifting the mud principally under water.

What we claim, and desire to secure by Letters Patent, is—

1. In a dredge the combination of a mechanical excavator, a hydraulic discharging apparatus and a suction pipe its mouth being submerged below the surface of the surrounding water; the end of the pipe being provided with a hopper placed in position to receive the mud lifted above the surface of the water

and dropped by the digger, which mud in entering the suction pipe must pass back into the water, substantially as described.

2. In a dredge, the combination of a suction pipe the mouth of which is submerged, secured to the front of the boat by a flexible joint and provided on its end with a hopper and opening upward and a chain and bucket digger and elevator and means whereby the elevating excavator and suction pipe are swung back and forth across the end of the boat while remaining in proper relative position to dig a swath of mud with one adjustment of the machine.

3. In a dredge, the combination of a suction pipe the mouth of which is submerged, secured to the front of a boat by a flexible joint and provided on its end with a hopper opening upward; a crane mounted upon the boat, a chain and bucket excavator swung from the crane and arranged to swing round the end of the boat, the suction pipe and elevator being connected so as to move together and retain their relative positions; substantially as described.

4. In a dredge, the combination of a suction pipe the mouth of which is submerged secured to the front of a boat by a flexible joint and provided on the end with a hopper opening upward, with a chain and bucket excavator mounted upon a carriage arranged to travel on a track provided for the purpose, and means for propelling the carriage and suction pipe, substantially as described.

5. In a dredge, the combination of a suction pipe the mouth of which is submerged, secured to the front of a boat by a flexible joint and provided on its end with a hopper opening upward, a derrick pivoted upon a boat, a chain and bucket excavator swung from the derrick and arranged to swing around the end of the boat, a vertical shaft journaled so that its axis is coincident with the axis of the pivot of the derrick, a pulley keyed to said shaft, a belt running upon said pulley and engaging another pulley journaled upon the derrick boom and moving with it, from which pulley the excavator is driven, and power transmitting mechanism connecting the counter shaft on the boom with the excavator, whereby power is communicated to the excavator from the vertical shaft with equal facility no matter what position the boom and excavator may occupy.

6. In a dredge, the combination of a suction pipe the mouth of which is submerged secured to the boat by a flexible joint and provided on its end with a hopper opening upward, with a chain and bucket excavator mounted on a carriage arranged to travel upon a track provided for the purpose, on the end of the boat, and a device for propelling said carriage, which consists of a vertical shaft journaled in the axial line of the center of rotation of the carriage, a pulley secured to said shaft, a vertical counter shaft journaled upon the carriage and provided upon one end in line with the pulley of the



first shaft with a similar pulley, which is connected with the first one by a belt, a worm upon said counter-shaft, and a worm wheel meshing therewith and driving a horizontal counter-shaft also mounted upon the carriage, to which is keyed a gear wheel which meshes with a curved rack, laid upon the front end of the boat whereby the carriage and the device supported by it, that is to say, the excavator and submerged suction pipe, are propelled back and forth across the end of the boat, substantially as described.

7. In a dredging machine the combination

with a boat having an excavating device, of a hopper projecting from the boat and provided with an opening to allow the water in which it is partially immersed, to have access to the interior thereof, and means for withdrawing the material deposited from the hopper.

Signed at Baltimore city and State of Maryland this 24th day of June, A. D. 1891.

CHARLES E. ELLICOTT.

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Witnesses:

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