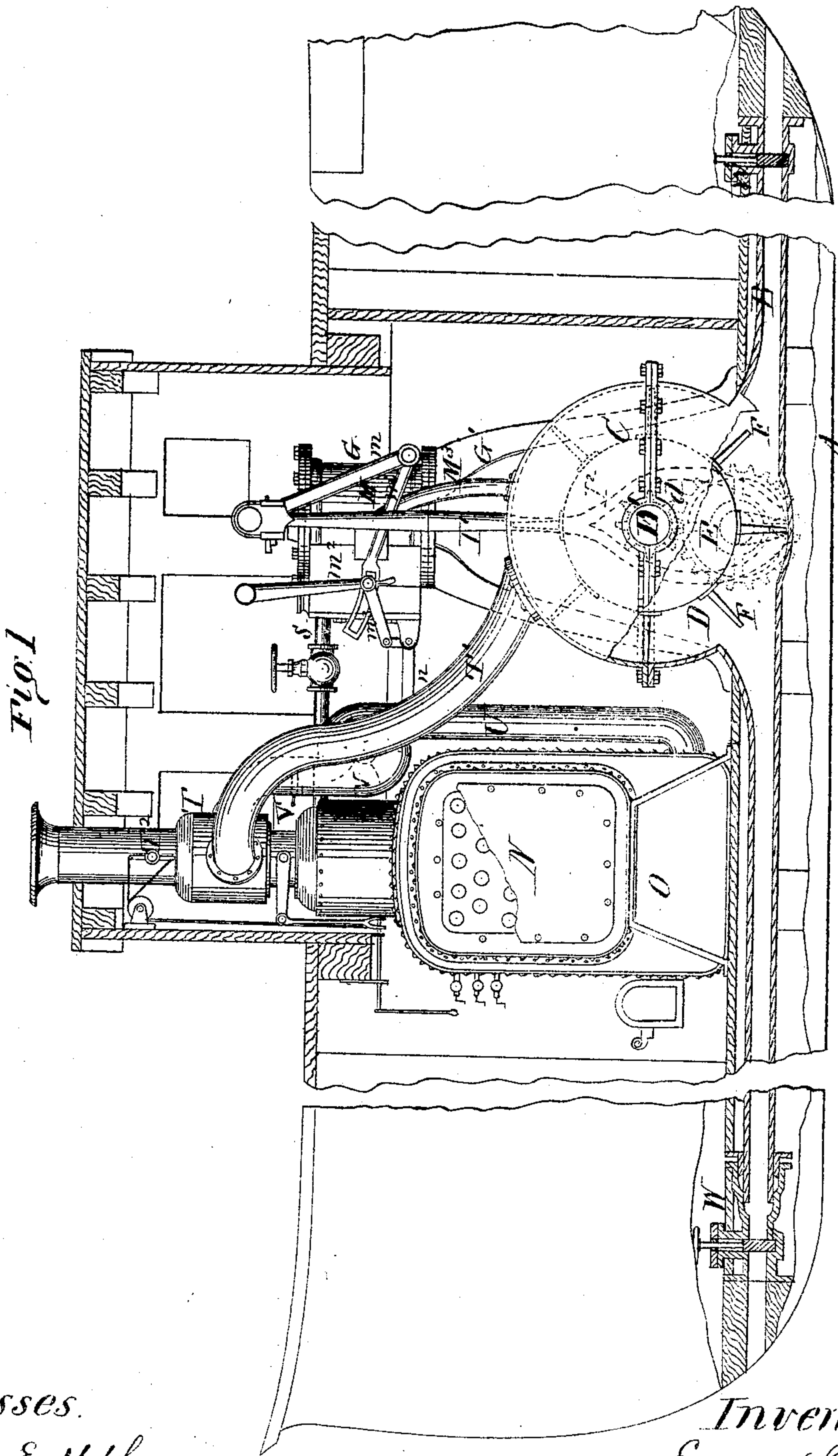


E. LYNCH.
Improvement in Steam Canal-Boats.
No. 132,300.

Patented Oct. 15, 1872.



Witnesses.

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Jos. B. Loomis.

Inventor

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Chipman & Osmer & Co
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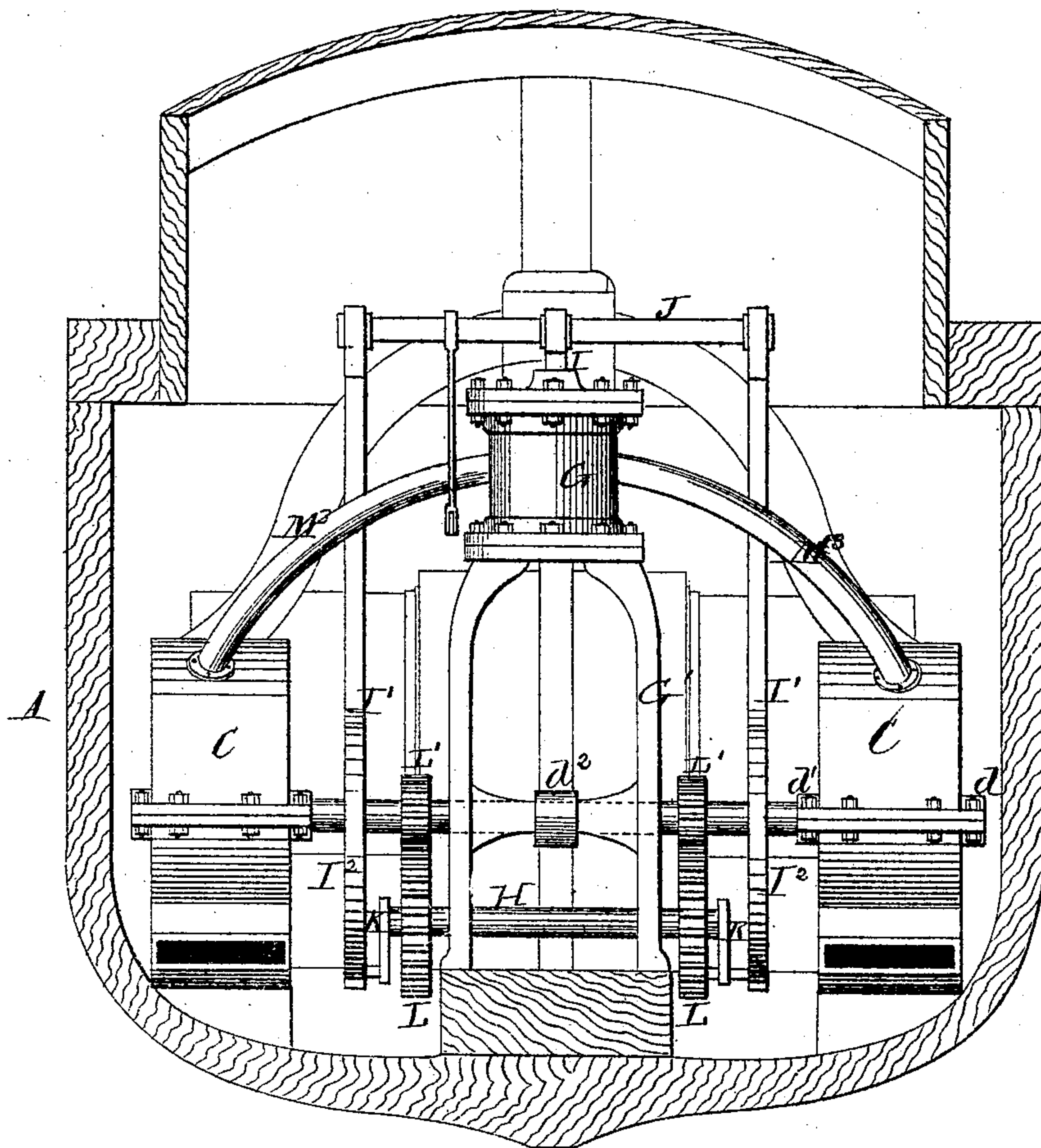
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Fig. 2



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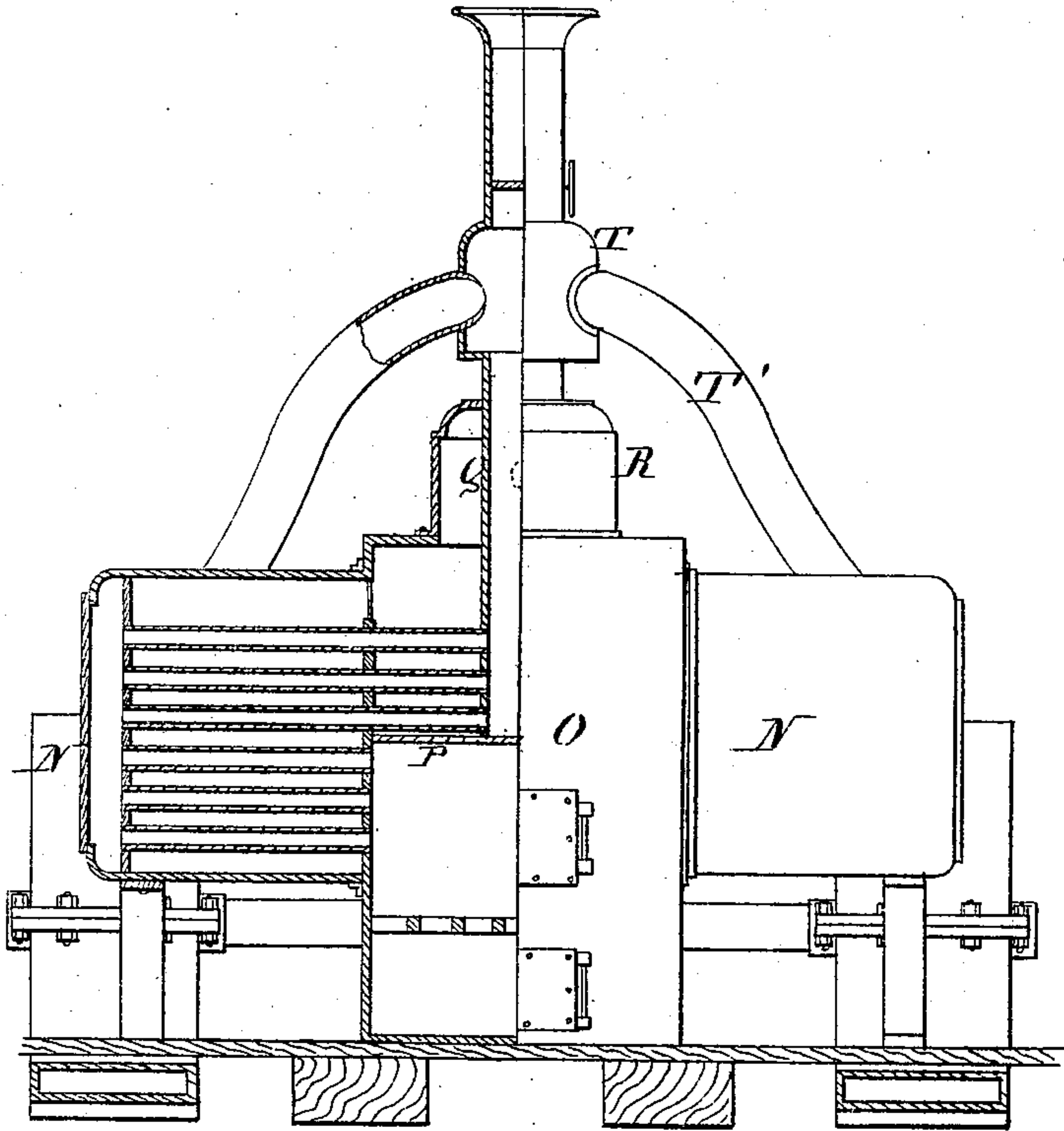
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Fig. 3



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UNITED STATES PATENT OFFICE.

EDWARD LYNCH, OF GEORGETOWN, DISTRICT OF COLUMBIA.

IMPROVEMENT IN STEAM CANAL-BOATS.

Specification forming part of Letters Patent No. 132,300, dated October 15, 1871.

To all whom it may concern:

Be it known that I, EDWARD LYNCH, of Georgetown, in the county of Washington and District of Columbia, have invented a new and valuable Improvement in Propelling Steam Canal-Boats; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a longitudinal section of my invention. Fig. 2 is a transverse section of the same. Fig. 3 is a detail view of the same.

This invention has relation to steam canal-boats the propulsion of which is effected by the action of paddle-wheels upon water passing through tubes from bow to stern; and the novelty consists in the construction and arrangement of said wheels, wheel-houses, and tubes of the engine, and connections for driving said wheels, and of the boiler and its attachments, all substantially as and for the purpose hereinafter described.

Referring to the drawing, A designates the hull of a steam canal-boat; B B, the water-tubes running from bow to stern, located in the bottom of the boat, and on each side of the keel. C designates the wheel-houses, usually made of iron, located midway between bow and stern, above and in communication, both fore and aft, with the tubes B, which lie on tangent lines with reference to said wheel-houses. D represents the paddle-wheels, hung on the ends of a horizontal transverse shaft, D', which passes through the wheel-houses, and has its end bearings in boxes d d^1 on the sides of the wheel-houses, and in the middle upon a pillar-block, d^2 , cast with or secured to the engine-frame. The wheel has a close central drum, E, from which project the paddles F, fitting the annular space around said drum closely. The water passing through the tubes comes in contact with only the lower part of the lower paddles, which force the water out behind them, thereby effecting the propulsion of the boat. As the water passing through the tubes or channels strikes the paddles far below the center of the wheel, its full force is exerted at the ends of these levers or paddles in moving the wheel, thereby economizing the

power of the engine. These wheel-houses are designed to be air-tight, and the tendency of the action of the paddles will be to produce therein partial vacuums, forming condensing-chambers. The engine is located in the center of the boat, between the two wheels, and has an upright cylinder, G, supported upon an upright frame, G', which forms the middle bearing of the wheel-shaft and the sole bearing of the crank-shaft H. The piston-rod I has a cross-head, J, connected to a crank, K, on each end of the crank-shaft H by means of pitmen I¹ having oval yokes I² formed at their lower ends to straddle the wheel-shaft. The shaft H, being thus driven, is provided with a pair of cog-wheels, L, engaging with pinions L' on the wheel-shaft, in order to transmit motion to the latter. The cross-head J is connected to the valve-rod by means of the link-coupling M, consisting of the jointed rods m m^1 (the latter having a curved slot in the ends) and the adjustable arm m^2 . By adjusting the latter along the slot the steam may be cut off at any desirable point. An L-shaped or bell-crank lever, n , pivoted to the valve-chest and connected to the arm m^2 by a link, m^3 , is used for adjusting said arm. The exhaust is carried to the forward part of and into the wheel-houses by means of tubes M³, and, while directly assisting the motion of the wheels, is therein condensed and carried downward by the paddles. N designates the boiler, of a double, tubular, or rocket form, with the furnace O in the center, and is therefore arranged in a most convenient and compact manner "athwartships," instead of lengthwise or "fore and aft." The boiler, when thus constructed and arranged, may be of sufficient capacity for all the steam-power required, and yet occupy very little space in the hold. The coal-bins may be at its ends. As shown in Fig. 3 the heat passes through the boiler-tubes to the ends and returns above the water-bottom P to the center. The smoke-stack Q rises from the top of the furnace, instead of from the end of the boiler and passes directly through the steam-dome R. The steam is taken from the latter to the engine by the pipe S. The steam is therefore always dry, being superheated by the heat passing through the flue. The smoke-stack has a drum at T, from the sides of which pass the pipes T¹, communicating with the wheel-

houses. The wheels create an artificial draft through the pipes T^1 , which may be regulated by means of a damper at T^2 . Communicating with the drum T is a pipe, U , containing a fan-wheel, V , driven by belt and pulley from the wheel-shaft. This pipe enters the furnace near the bottom, and is designed for the purpose of carrying the smoke back to the fire. A damper, V' , above the fan, is used to open and close said tube. The smoke-stack, pipes T^1 , and pipe U may be used interchangeably. The water-tubes B have stuffing-boxes, valves w , and expansible couplings near their ends, as shown at $W W$, to compensate for strain in the boat.

Sometimes I design to arrange the paddles to work in horizontal planes, the wheel-houses being connected to the sides of the water-tubes.

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

1. In a steam-vessel, the combination, with horizontal water-tubes B , provided with valves w and expansion-tubes W , of circular wheel-houses C , connected therewith tangentially, and paddle-wheels D , located at the bottom of the boat and on both sides of the keel, substantially as specified.

2. The air-tight wheel houses or boxes C , located, as described, on both sides of the keel, in combination with the horizontal tubes B running from bow to stern, and the paddle-wheels D , constructed and arranged substantially as specified.

3. The engine located, in relation to the wheels D , substantially as shown, and sup-

ported by the frame G' , said frame constituting bearings for the wheel-shaft D and crank-shaft H , as specified.

4. The valve-connection, consisting of the jointed arms $m m^1$, the latter being slotted, the adjustable rod m^2 , bell-crank n , and link m^3 , combined and arranged substantially as specified.

5. The exhaust-tubes M^3 , communicating with the condensing wheel-boxes C , substantially as and for the purposes specified.

6. The arrangement of the double tubular boiler N athwart the boat, and having the furnace O in the center, in combination with the paddle-wheels D , houses C , and longitudinal tubes B , substantially as specified.

7. The flue-tubes T^1 , in combination with the furnace O and wheel D , substantially as and for the purpose specified.

8. The combination and arrangement of the tubes B , wheel-houses C , paddle-wheels D , shafts $D' H$, cranks K , yoke-pitmen I^1 , cylinder G , frame G' , double rocket boiler N , and central furnace O , substantially as and for the purpose described.

9. The tubes B having the expansible couplings W , substantially as and for the purpose specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

EDWARD LYNCH.

Witnesses:

D. D. KANE,
GEO. E. UPHAM.