

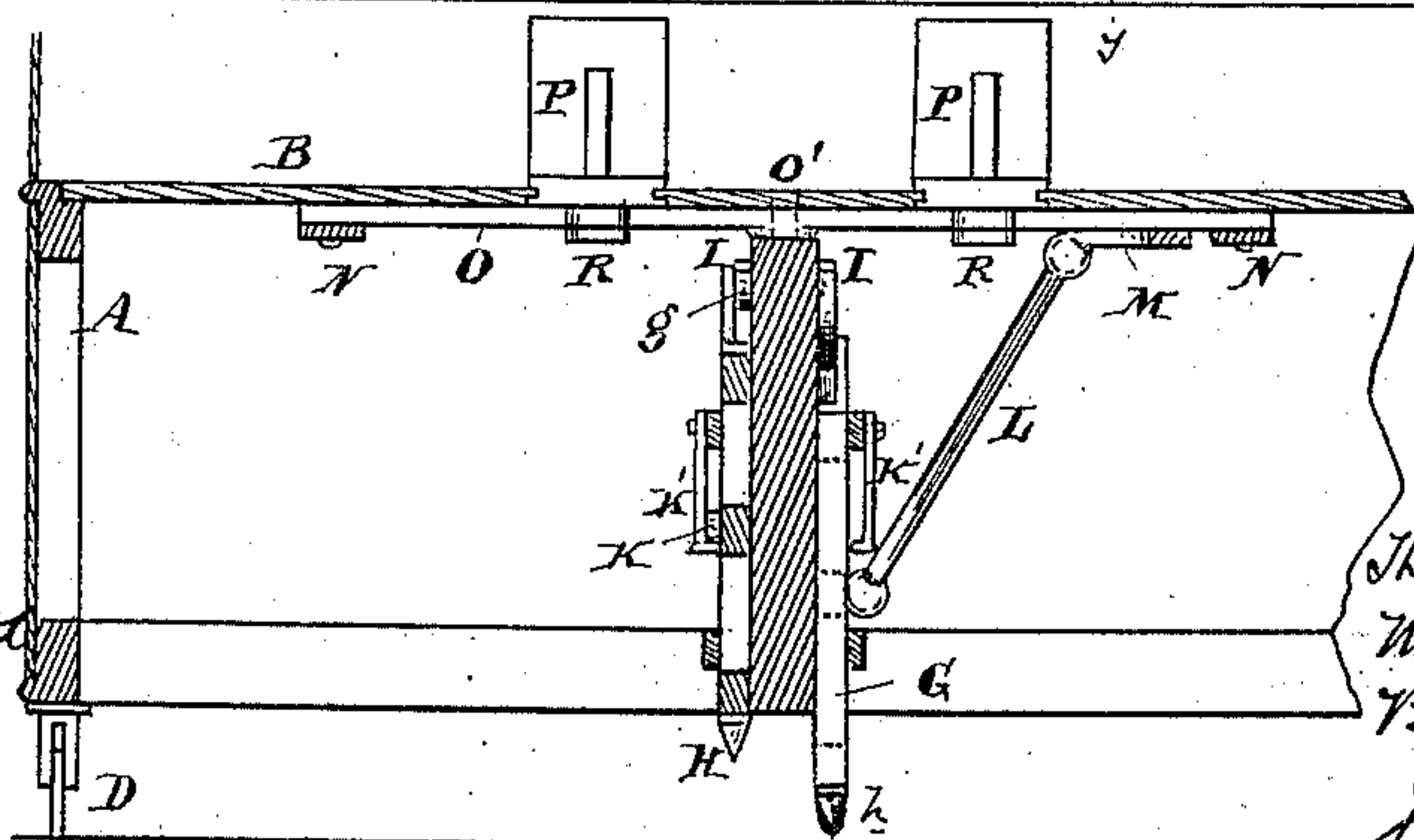
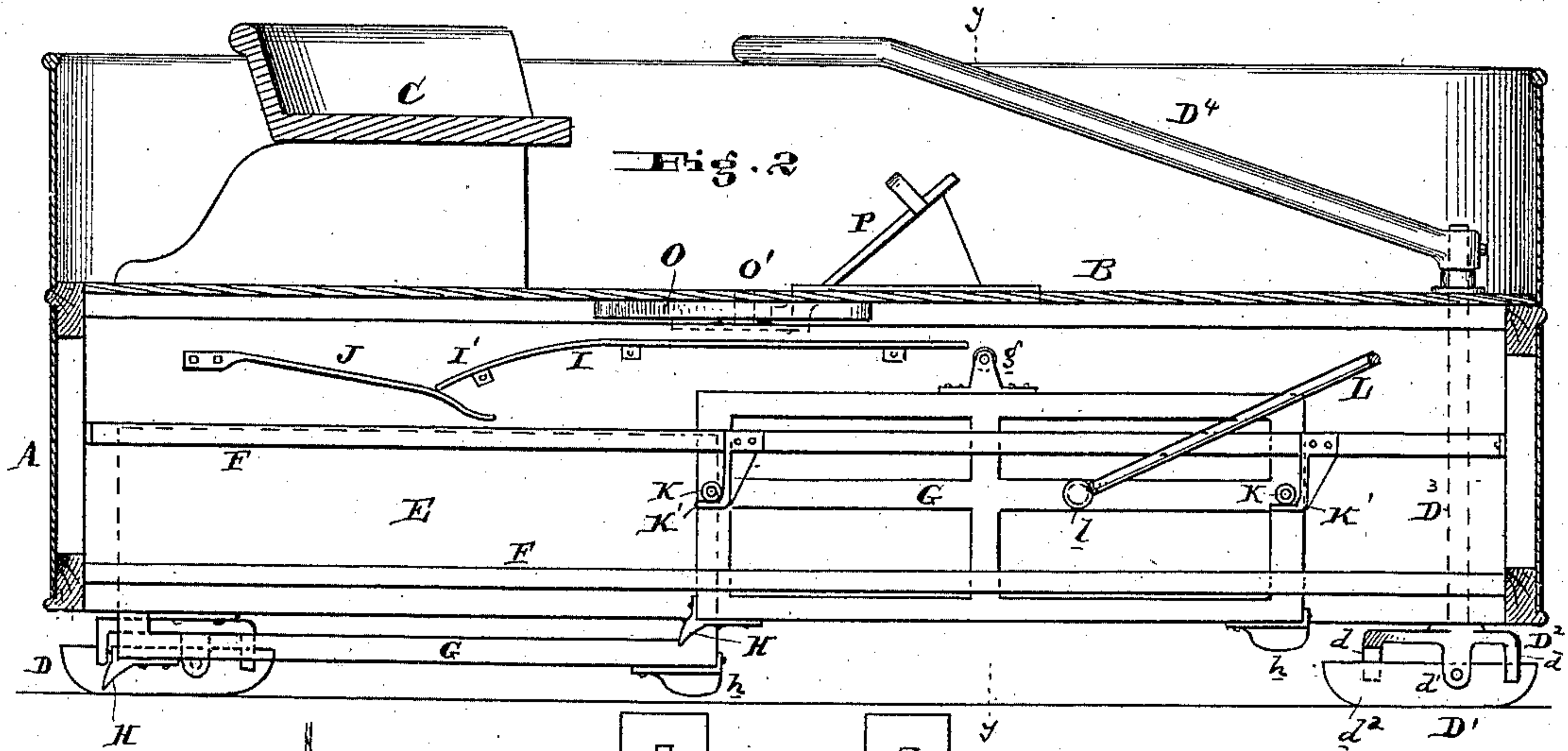
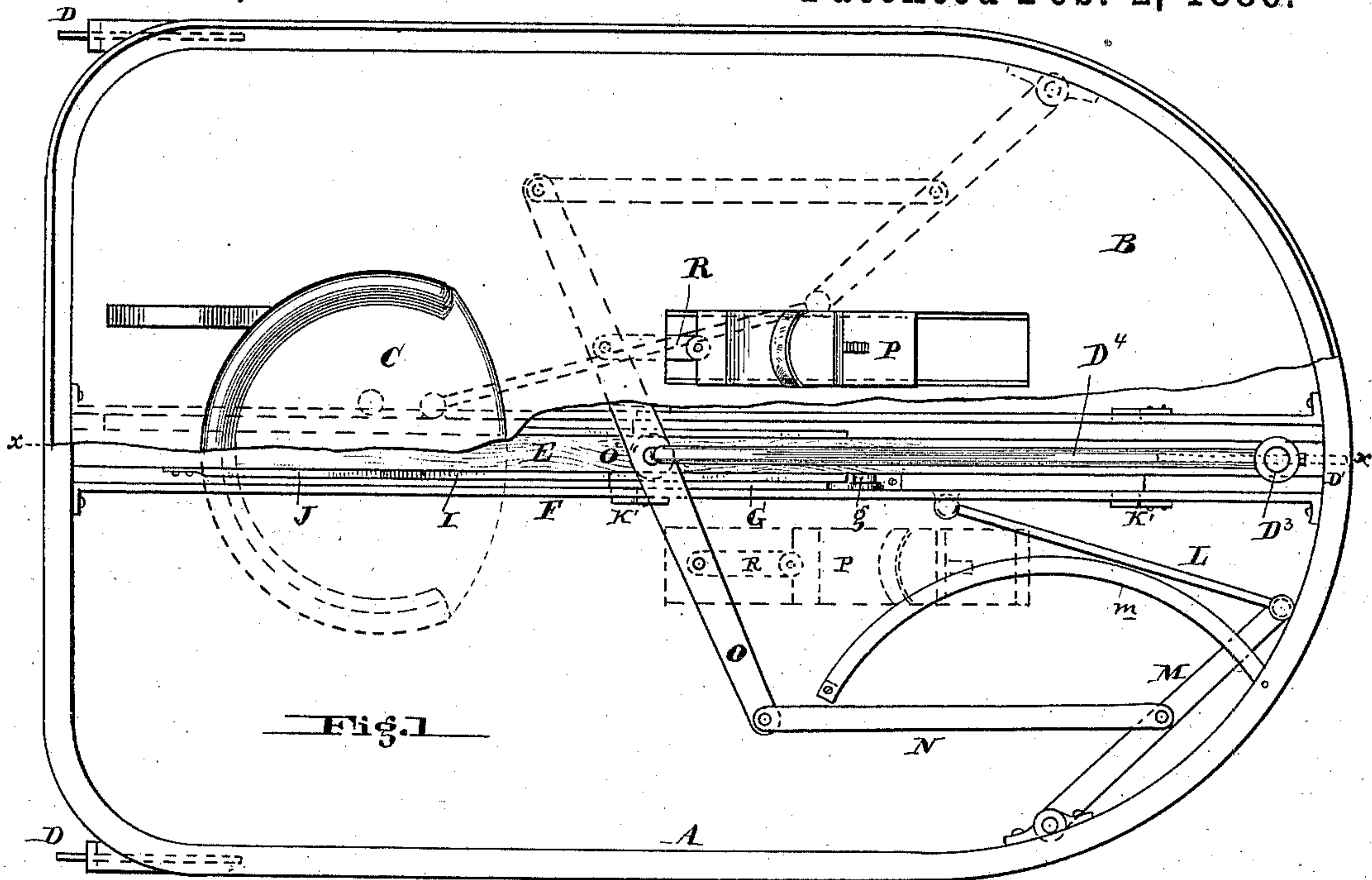
(No Model.)

R. S. GREEN, T. S. EDEL & M. PAGEL.

ICE BOAT.

No. 335,124.

Patented Feb. 2, 1886.



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UNITED STATES PATENT OFFICE.

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ICE-BOAT.

SPECIFICATION forming part of Letters Patent No. 335,124, dated February 2, 1886.

Application filed April 11, 1885. Serial No. 161 899. (No model.)

To all whom it may concern:

Be it known that we, RAPHAEL S. GREEN, THEODORE S. EDEL, and MARX PAGEL, all of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Ice-Boats, of which the following is a specification.

Our invention has reference to ice-boats; and it consists in certain improvements fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of this invention is to provide a frame on runners adapted to move over the ice with suitable reciprocating frames adapted to catch into the ice in one direction but not in the other, the same being reciprocated by foot or other power. In operating these frames the parts are arranged so that the frames may be held clear of the ice or allowed to catch thereon to the end that in returning they shall not drag over the surface thereof; and, secondly, whereby both the frames may be supported clear of the ice, whereby the momentum given to the boat or frame may carry it forward for some distance without further manipulation of the said propelling-frames.

In the drawings, Figure 1 is a plan view of an ice-boat embodying our improvements with a portion of the floor broken away to show the mechanism by which it may be propelled and guided. Fig. 2 is a sectional elevation of same on line *x x*; and Fig. 3 is a sectional elevation on line *y y*.

A is the frame of the machine, and may be made in any suitable manner. B is the floor thereof.

C is a seat for the operator.

D D are two rigid runners arranged in the rear, and D' is the steering-runner located in the forward part of the boat, and secured to a vertical shaft, D², operated by the tiller D⁴. The blades d² of these runners are pivoted or hinged at d' to their supporting-frames, which pivot is located a little in advance of the center, and the said blades are adapted to rock upon the said pivot to compensate for unevenness in the ice, being guided vertically, and prevented from lateral motion by the yokes d, secured to or formed integral with

the plate D², which in the case of the rear rigid runners is secured to the frame of the boat, while in the case of the steering-runner it is secured to the vertical shaft.

E is a central vertical frame extending from the front to the rear, or fore and aft through the boat.

G G are two frames made in any suitable manner, and arranged to work one upon either side of said central frame, E, being free to have vertical and horizontal motion in the same plane, and being guided and retained against said frame E by the metallic guide-strips F F. These frames are provided on the forward end with shoes h, so shaped that they may be moved in any direction over the ice without catching thereon, and upon their rear ends with pointed picks H, which, when the frames rest upon the ice and are thrust backward, catch into the same and force the boat or its frame forward. These frames are provided at their upper parts with rollers g, which when the frames are pushed backward, or rather when the boat is forced forward, run upon the springs J, which cause the frames G to be raised just clear of the ice, so that at the terminal of each reciprocation both of the frames G are clear of the ice, as indicated in Figs. 2 and 3. In moving backward relatively to the boat proper, the roller g passes under the rear end of the guide-iron I, so that when it is pulled forward again the said roller runs up the inclined end I' of the guide I, and in moving forward the frame G is thus held high and clear of the ice. When drawn forward to the full extent, the roller g runs off the end of the guide I, and the frame falls slightly, and is caught by the rollers or stops K upon the arms or brackets K'. If now, the frame be thrust backward, it is allowed to fall down, the pick H being driven into the ice by the weight of the frame. These frames may be reciprocated by any suitable mechanism, that shown being well adapted to the purpose, and consisting of links L and N and levers M and O, the latter being pivoted at O' to the frame E and extended upon both sides, by which it is enabled to reciprocate the frames G G back and forth alternately—that is to say, when the frame on one side of the guide-frame E is drawn forward that on the

other side is moved backward, and vice versa. This lever O may be vibrated by the foot-pedals P, which are connected thereto by links R. By this it is seen that the operator may sit in the seat C and with his feet in the pedals P propel the boat forward and steer the same by the tiller D⁴. By the construction shown the propelling-frames G are arranged close to the center of the ice-boat, and their action upon the ice is practically in the same resultant line, thus preventing any possibility of the boat being propelled in a zigzag line against the will of the operator.

m are guides for the vibrating lever M, which may be secured to the floor B or frame A in any suitable manner.

While the mechanism shown is for propelling the frames by foot-power, it is evident that they may be operated by hand-power, or, if desired, even by steam-power, and the particular arrangement of levers and links is immaterial to our invention.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an ice-boat, two reciprocating propelling-frames provided with picks or prongs to catch into the ice, in combination with guides and suitable mechanism for reciprocating said frames, the said frames being located close to the central line of the ice-boat, by which their power is exerted in practically the same resultant line, substantially as and for the purpose specified.

2. In an ice-boat, a vertically and horizontally reciprocating propelling-frame, provided with picks or prongs to catch into the ice, in combination with stationary cam devices to raise said frame clear of the ice in its forward movement, and suitable foot-power-lever mechanism to reciprocate said frame horizontally, substantially as and for the purpose specified.

3. In an ice-boat, a vertically and horizontally reciprocating propelling-frame, provided with picks or prongs to catch into the ice, in combination with cam devices to raise said frame clear of the ice in its forward movement, supporting mechanism, substantially as set forth, to support said frame clear of the ice at the two extreme terminations of its horizontal movements, and suitable mechanism to reciprocate said frame horizontally, substantially as and for the purpose specified.

4. In an ice-boat, a vertically and horizontally reciprocating propelling frame, provided

with a prong or pick to catch into the ice, and guides by which said frame may be free to move horizontally fore and aft or vertically, in combination with levers O M and links N and L, substantially as and for the purpose specified.

5. A runner for an ice-boat, consisting of the frame or plate D², having vertically-bifurcated guides d, in combination with the flat runner d², rounded on its end and pivoted at d', between the guides d and in advance of its center, whereby the runner tends to lie parallel with the line of movement of the boat, substantially as and for the purpose specified.

6. The propelling-frame G, having the forward end provided with a smooth shoe, h, and its rear end with a pick or prong, H, substantially as and for the purpose specified.

7. In an ice-boat, the combination of the reciprocating frame G, having prong H and roller g, with guides, spring J, and guide-rail I, substantially as and for the purpose specified.

8. In an ice-boat, the combination of the reciprocating frame G, having prong H, rollers K, and rollers g, with supports K', guides, spring J, and guide-rail I, substantially as and for the purpose specified.

9. In an ice-boat, the central frame, E, in combination with the propelling-frames G, located one on each side and provided with prongs H, and suitable power mechanism, consisting of levers O M and links N and L, to reciprocate said frames alternately in opposite directions, substantially as and for the purpose specified.

10. In an ice-boat, the combination of frames G, adapted to be reciprocated in the line of movement of the boat, and having picks to catch into the ice, with horizontal levers M O, connected together and with the frames by links N and L, the two foot-pedals, links R, connecting said pedals with the lever O on each side of its pivotal point or fulcrum, and a seat, C, for the operator to sit in while operating the pedals, substantially as and for the purpose specified.

In testimony of which invention we hereunto set our hands.

RAPHAEL S. GREEN.
THEODORE S. EDEL.
MARX PAGEL.

Witnesses:

R. M. HUNTER,
ANDREW ZANE, Jr.