

(No Model.)

2 Sheets—Sheet 1.

D. A. HAINES.
MACHINE FOR CUTTING ICE.

No. 418,351.

Patented Dec. 31, 1889.

Fig. 1.

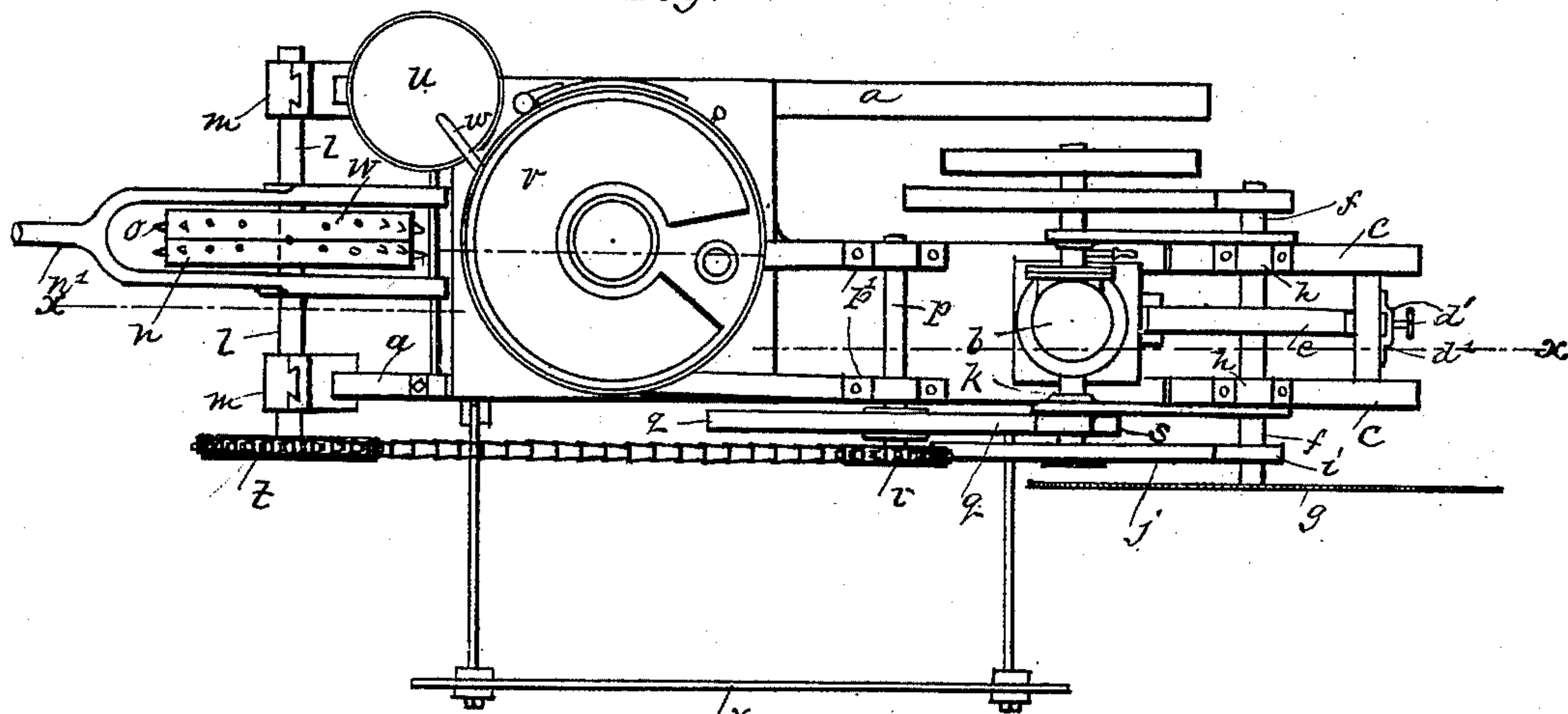
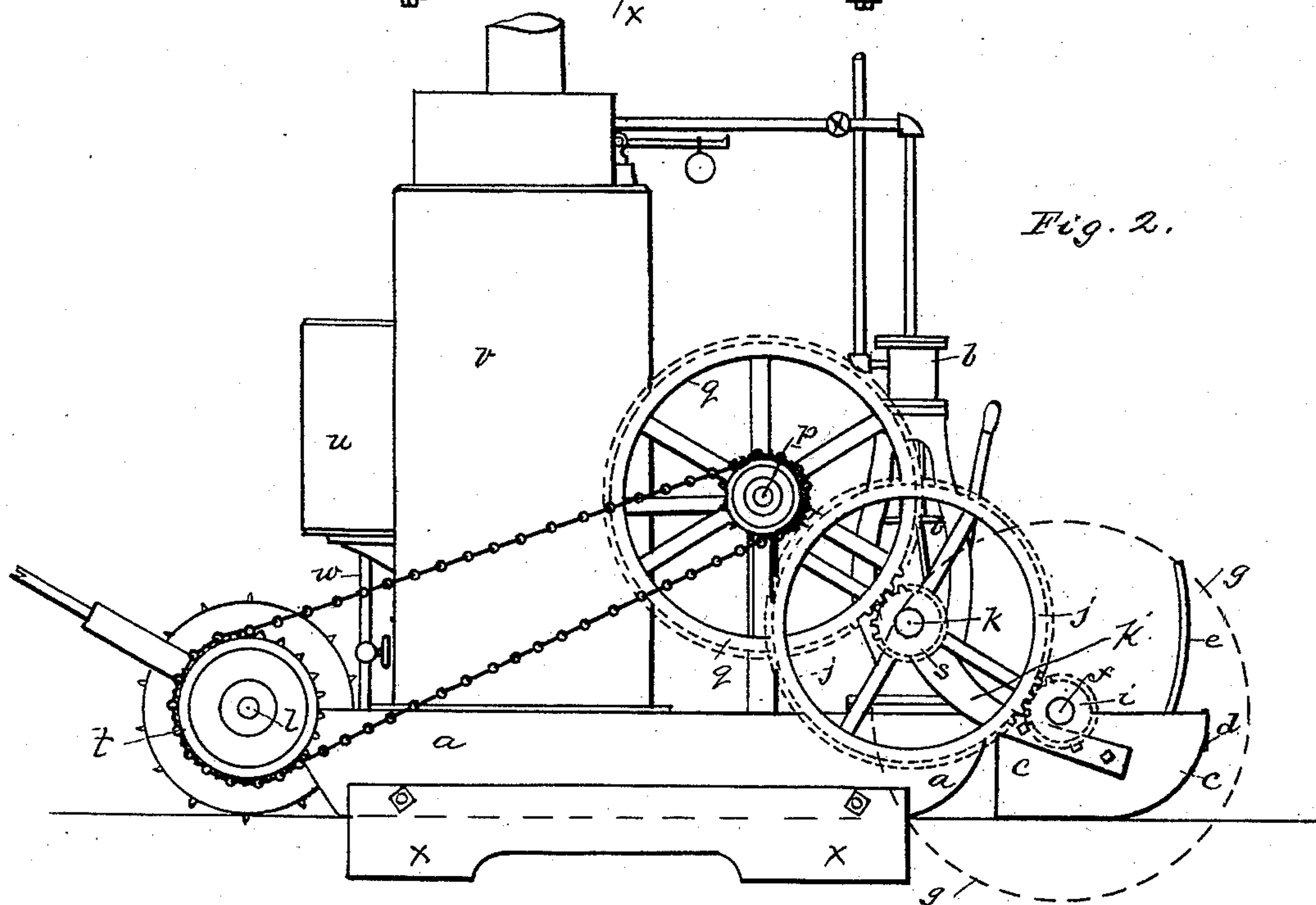


Fig. 2.



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att'y.

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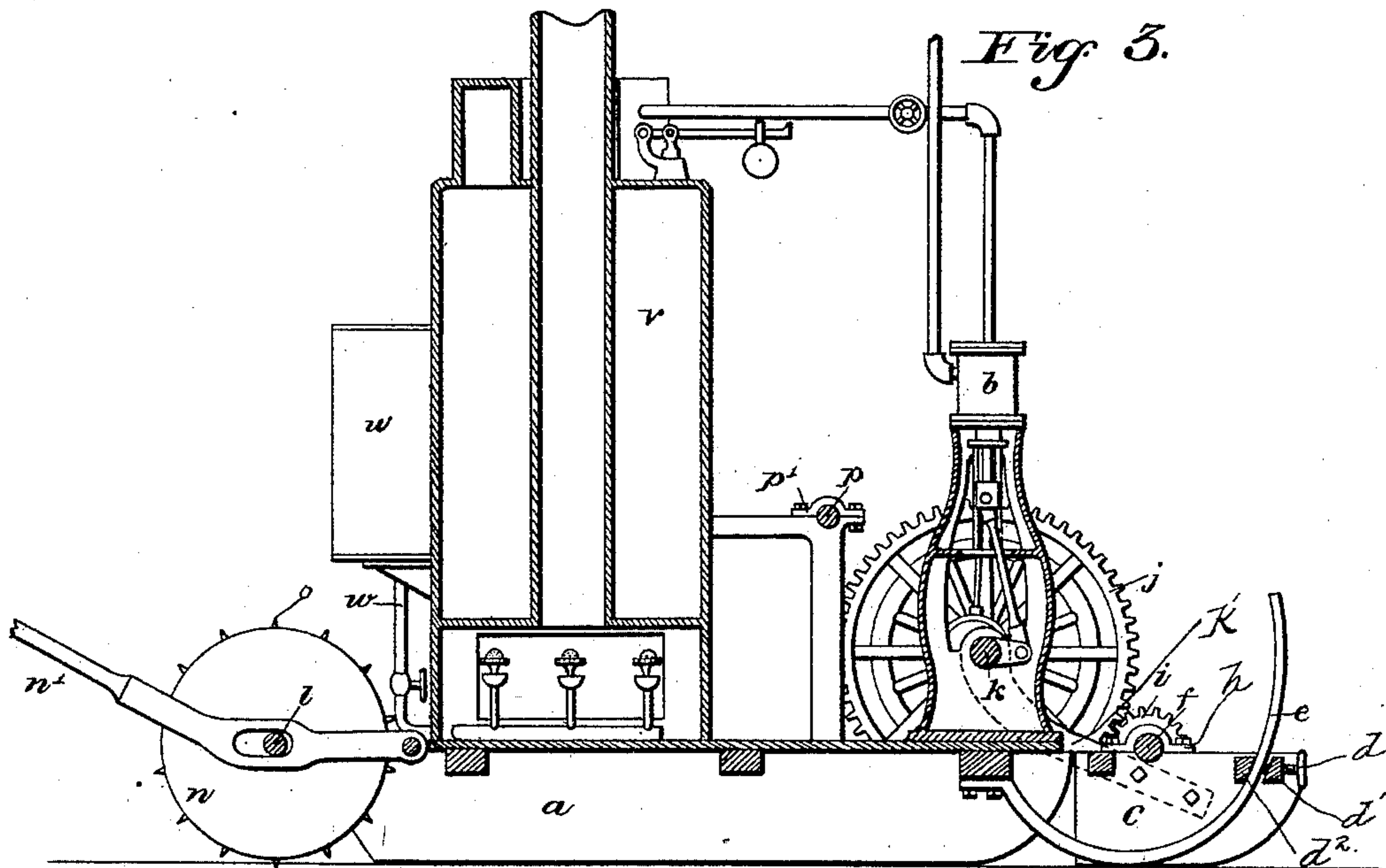


Fig. 4.

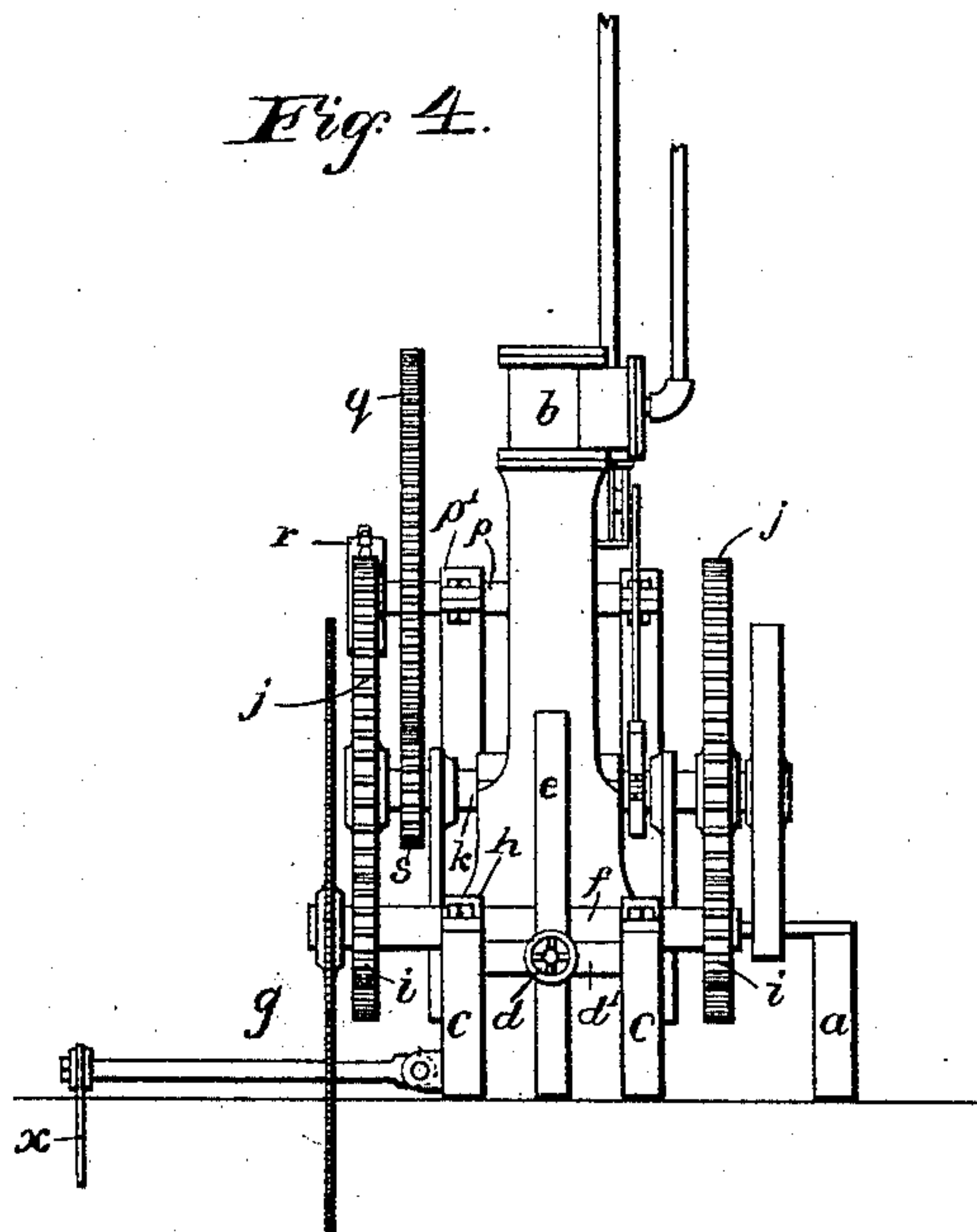
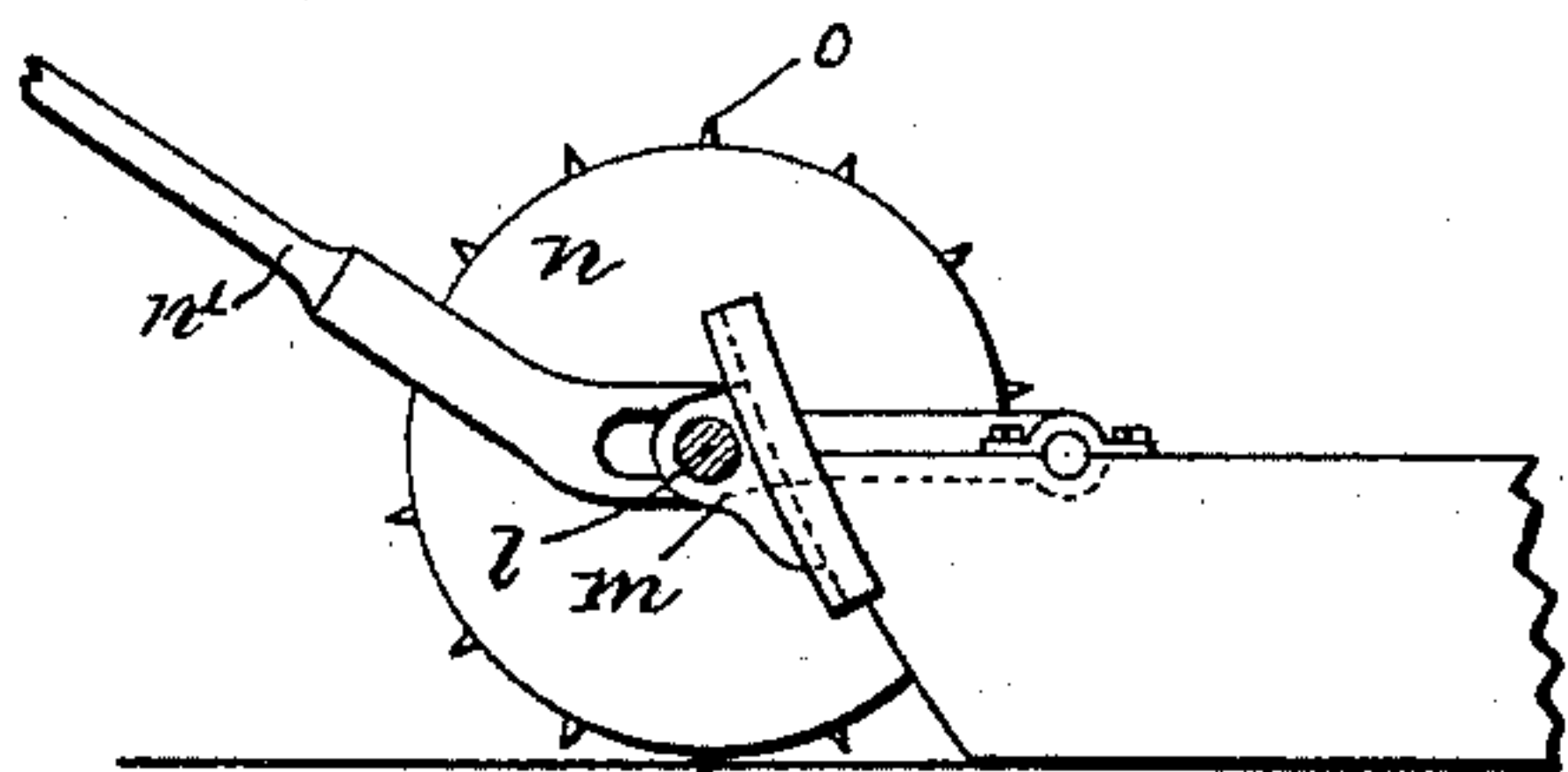


Fig. 5.



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UNITED STATES PATENT OFFICE.

DANIEL A. HAINES, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR CUTTING ICE.

SPECIFICATION forming part of Letters Patent No. 418,351, dated December 31, 1889.

Application filed August 17, 1888. Serial No. 282,967. (No model.)

To all whom it may concern:

Be it known that I, DANIEL A. HAINES, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Cutting Ice; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in ice-cutting machines; and it consists of the combination of devices and construction and arrangement of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a plan view of my improved ice-cutting machine constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical sectional view through the apparatus or machine on the plane indicated by the irregular line $x x$ of Fig. 1. Fig. 4 is an end elevation of the machine, looking at the front end thereof. Fig. 5 is a detail view illustrating the means for supporting and adjusting the steering-wheel.

To construct an ice-cutting machine in accordance with my invention, I provide a set of runners or pair of skids a , and mount thereon a small reversible engine b and steam-boiler v , together with all necessary equipments to put the engine in working or running order. At the forward ends of these skids a is a hinged frame c , which is pivotally connected at its rear end to a shaft k by means of arms k' , which are secured to the frame and fitted loosely on the shaft, so that said frame is capable of being revolved about its pivotal point. This frame c rests and travels, when the machine is in use, on the surface of the ice, as the lower side of the frame is extended below the pivot c' thereof, (see Fig. 3,) and the frame may be held at any desired elevation by means of a set-screw d , operating in a clamp or box d' , which is rigidly secured to a cross-bar d^2 of the vertically-adjustable frame c , and this clamp or box is made open to receive a segmental

guide-bar e , which is fixed at one end to one of the skids and projects forward beyond said skid, the guide-bar being curved so that the clamp or box d' will readily slide over the same when the frame is raised. Mounted on this frame c , in proper bearings h , is a shaft f , having secured to one end of the same a large circular cutter g , which is given a rapid motion by a small pinion i meshing with a large toothed wheel j , secured to the driving-shaft k of the engine b . At the rear of the skids a is a shaft l , mounted on bearings m , capable of being moved vertically a short distance, as clearly indicated in Fig. 5 of the drawings. This shaft l carries two wheels n , each provided with a series of projecting barbs or spikes o , which, when the wheels n are revolved, engage with the ice on which the machine rests and propel the apparatus forward. A lever n' , spanning the two wheels n and secured to the shaft l , serves as a convenient means for readily lifting the wheels n and thus disengaging the barbs o from the ice. Back of the engine b is a short shaft p , suitably mounted in bearings p' , having attached to one end a large toothed wheel q , which meshes with a pinion s , secured to the driving-shaft of the engine b , which arrangement gives the said shaft p a slow powerful rotary movement. Attached to one of the extremities of this shaft p is a small chain-belt wheel r , which is engaged with a similar wheel t , attached to the vertically-moving shaft l , which arrangement will give the necessary rotary movement to the spiked wheels n for propelling the machine forward. Mounted in a suitable position on the skids a is a tank u , properly connected with the fire-box of the boiler v by small pipes or tubes w , provided with suitable valves for regulating and controlling the flow of a gaseous vapor generated in the tank u from gasoline, oil, or other substance. The object of this tank u is to provide the boiler v with a suitable fuel for generating steam. Hinged to one of the skids a is a guide-plate x , for properly steering the apparatus, which consists of a plate x , secured in a vertical position some distance away from the side of the skid a , to which it is attached.

In operation the cutter g is given a rapid

rotary motion and the frame *c* allowed to rest on the ice. By the rotary movement of the wheels the machine is propelled forward, the cutter *g* making an incision in the ice. After the first cut has been made the guide-plate *x* is placed in the incision, which steers the apparatus and cuts the ice in parallel lines.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an ice-cutting machine, the combination of the skids, a motor mounted thereon and having the shaft *k*, a vertically-adjustable frame *c*, carried by the arms *k'* and adapted, when lowered, to lie in the plane of the skids and to travel on the surface of the ice, a saw-arbor journaled in the vertically-adjustable frame and geared directly to the shaft *k*, on which said frame is pivoted, an upright arched arm secured to the skids and extending between the sides of the adjustable frame, and a clamp carried by the adjustable frame at or near its outer end and fitted on the arched arm to hold the frame in a fixed position thereon, all arranged and combined substantially as described, and for the purpose set forth.

2. In a machine for cutting ice, the combi-

nation of the skids, a motor mounted thereon, a crank-shaft *k*, driven by the motor, an adjustable frame having a saw-mandrel which is geared directly to the shaft *k*, a propelling-wheel mounted on the skids at one end, and an intermediate counter-shaft *p*, geared to the shaft *k* and to the shaft of the propelling-wheel, whereby the saw-mandrel and the propelling-wheel are rotated from a common motor, substantially as described.

3. In a machine for cutting ice, the combination, with the skids, of a horizontal lever *n'*, fulcrumed at one end of the same, the vertically-sliding bearings fitted in fixed segmental guides whose arc is concentric with the fulcrum of the lever, a shaft *l*, journaled in said bearings and passing through a slot in the lever, a propelling-wheel carried by the shaft, and a motor geared to the shaft for rotating the same, substantially as described.

In testimony that I claim the foregoing I hereunto affix my signature this 20th day of March, A. D. 1888.

DANIEL A. HAINES. [L. S.]

In presence of—

C. C. LEE,

M. E. HARRISON.