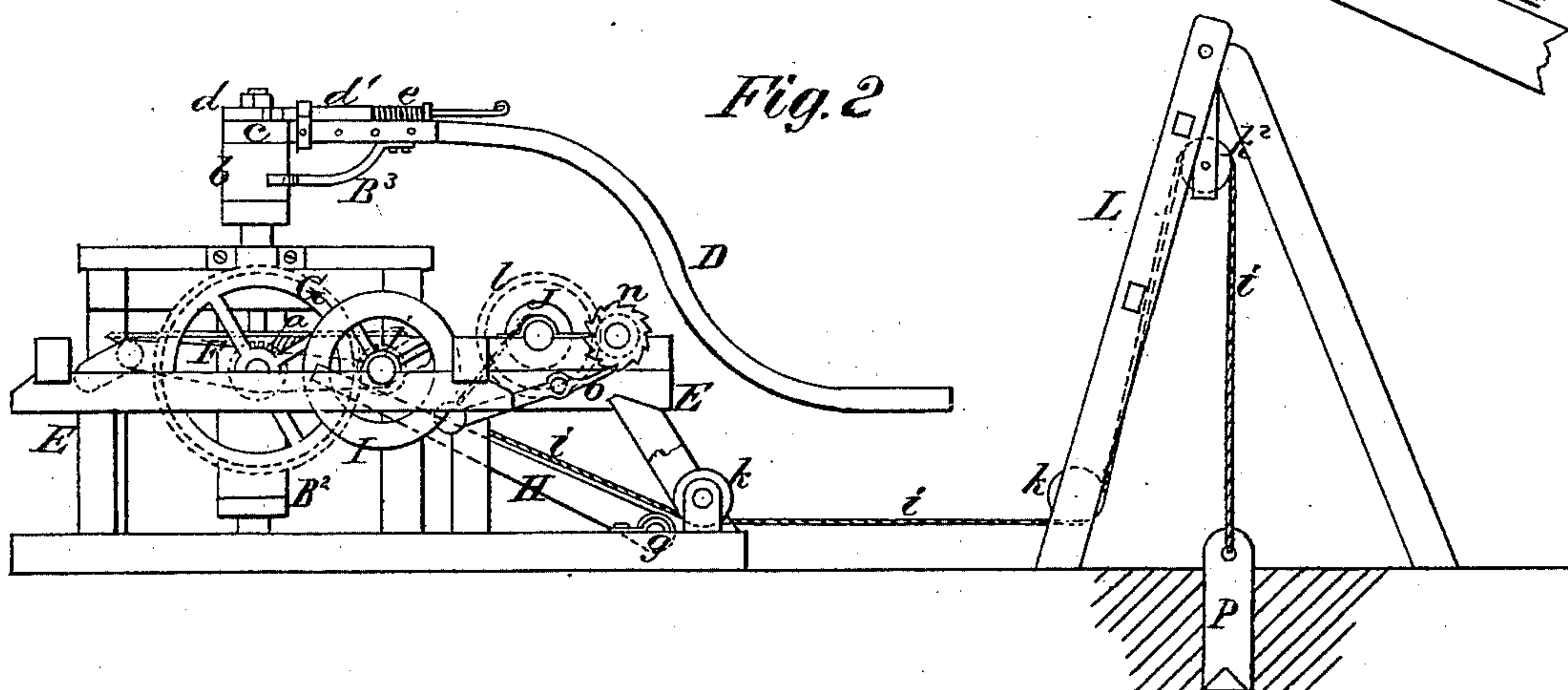
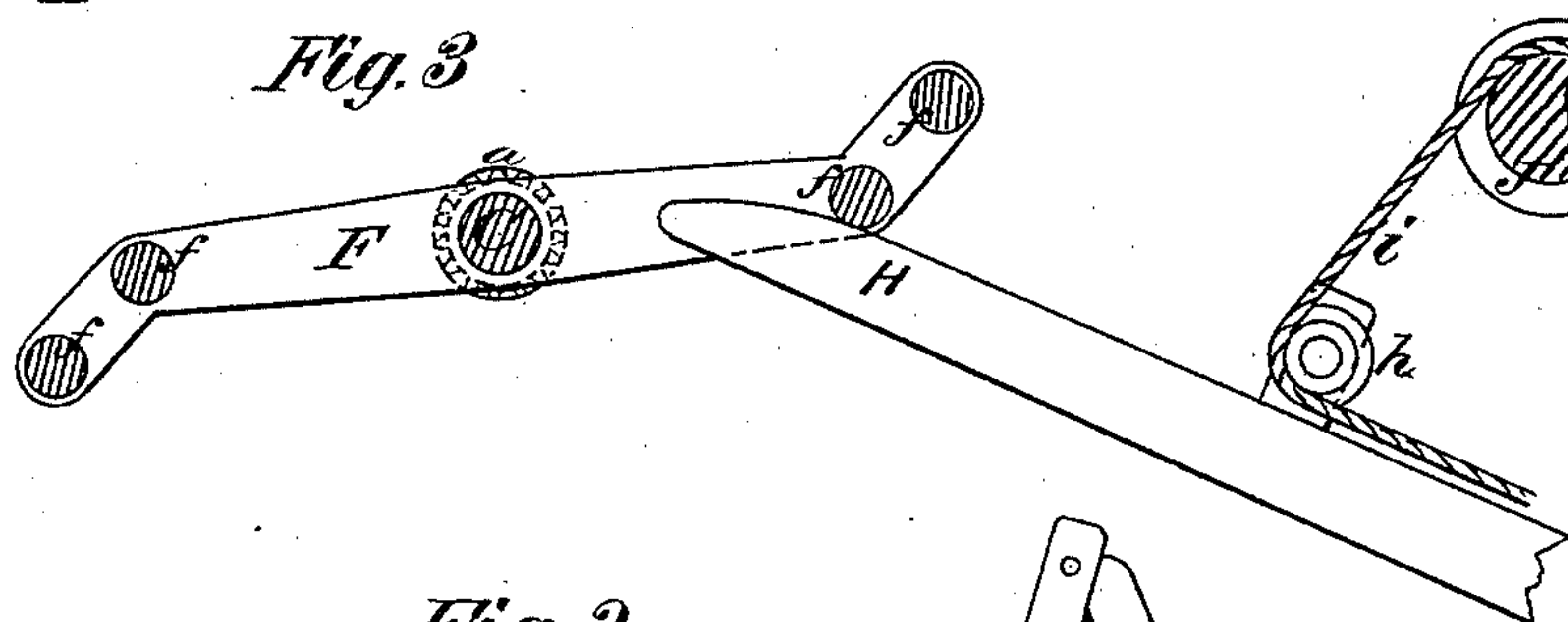
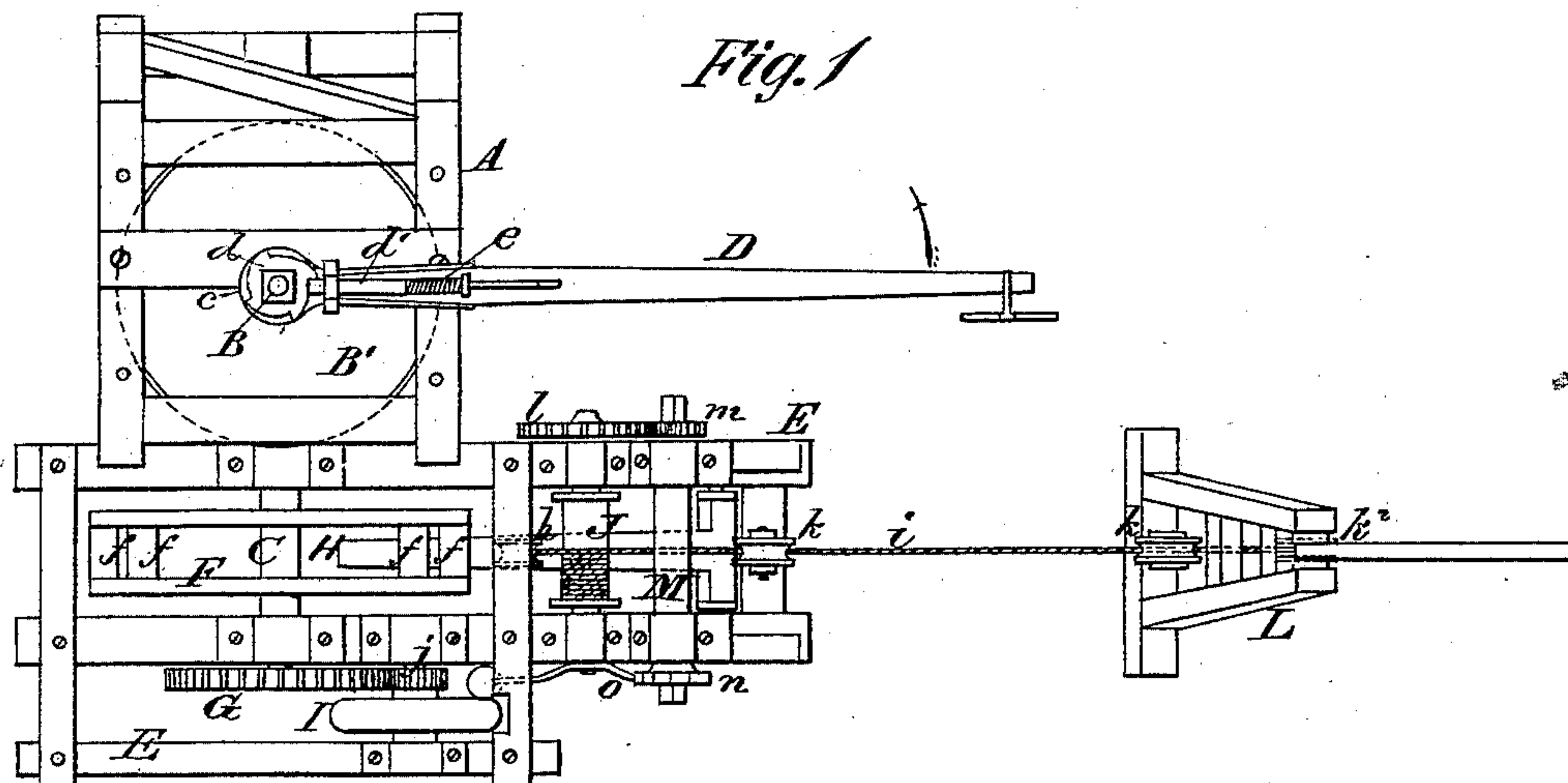


T. N. LARSEN.
Well-Drilling Apparatus.

No. 232,191.

Patented Sept. 14, 1880.



Witnesses.

Julia Campbell
W. Read.

Inventor

Theodore N. Larsen
By Atty. R. S. Campbell

UNITED STATES PATENT OFFICE.

THEODORE N. LARSEN, OF ST. ANSGAR, IOWA, ASSIGNOR OF ONE-HALF, OF
HIS RIGHT TO ALONZO WARDALL, OF SAME PLACE.

WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 232,191, dated September 14, 1880.

Application filed September 27, 1879.

To all whom it may concern:

Be it known that I, THEODORE N. LARSEN, of St. Ansgar, in the county of Mitchell and State of Iowa, have invented certain new and useful Improvements in Well-Drilling Apparatus; 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 drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 is a plan view of the apparatus arranged for drilling through rock. Fig. 2 is an elevation of one side of the same. Fig. 3 is an enlarged sectional detail of the revolving two-throw cam-levers and the vibrating rope-actuating lever and rope-drum.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to machinery which is designed for boring into the earth and drilling through strata of rock in the formation of wells; and the nature of my invention consists in a novel combination of a horse-power, a revolving tripping-cam, a vibrating lever which moves the drill-carrying rope, and a paying-off and elevating contrivance, arranged as will be hereinafter explained.

The following is a description of the construction and operation of my improved apparatus.

In the annexed drawings, A designates the frame of a horse-power, which is strongly braced and properly secured to the ground, so that while it will be substantially fixed it can be readily removed.

B is a vertical shaft, which has fixed on it a horizontal master-wheel, B', the teeth of which engage with a pinion-wheel, a, keyed on a horizontal shaft, C. Shaft B has two drums, B² b, fast on it. The upper drum, b, has bearing against it the bifurcated end of a brake, B³, which is secured to a sweep, D, and serves as a brace for this sweep, and also as a friction-brake, to be hereinafter explained.

The pivotal eye c of the sweep D is free to revolve around the upper end of the shaft B, and immediately above the eye c is a ratchet-wheel, d, which is fast on shaft B, and with which wheel engages a pawl, d', which is held

in contact with its toothed periphery by means of a spring, e.

By retracting pawl d' the shaft B is free to turn to the right or left independent of the sweep D. When pawl d' is engaged with its ratchet-wheel the shaft B may be moved around with its sweep.

Shaft C is journaled in bearings on a frame, E, which can be detached from frame A and removed out of the way when desired.

On the shaft C is keyed a long two-throw cam-lever, F, and a large spur-wheel, G. The lever F is composed of two bent arms, which are provided at and near their angular end with anti-friction rollers f, for the purpose of acting on and giving a vibrating motion to a lever, H, which has its fulcrum at g on the sill-beams of frame E, and which bears a grooved pulley, h, under which a rope, i, passes freely. The spur-wheel G engages with a pinion, j, on a shaft which carries a balance-wheel, I, for equalizing the movements of the machine. The rope i passes from pulley h to and is wound on a drum, J, and it also passes from said pulley h underneath pulleys k k and over a pulley, k², centrally suspended from the upper end of a derrick, L, for the purpose of allowing the rope i to be attached to a drilling or boring tool.

The shaft of the drum or windlass J is journaled on frame E, and bears on one end a spur-wheel, l, which engages with a pinion, m, on the shaft M of a ratchet-wheel, n, with which latter a gravitating pawl, o, engages. By releasing ratchet-wheel n from pawl o the drum J can be rotated by crank-keys applied on the ends of shaft M, and the rope i wound upon it or paid off from it at pleasure.

It will be seen from the above description that when the sweep D is moved around in the direction of the arrow on Fig. 1, and pawl d' is engaged with ratchet-wheel d, the two-throw cam-lever F will act on lever H, which, in turn, will give a rapid vertical motion to the drill P, attached to the end of the rope i, which can be paid out as the work progresses by unwinding it from the drum J.

The derrick L, which may be constructed in any suitable manner, will, in practice, while using the drill, be located so far from the frame

E that the animals hitched to the sweep D can walk between said derrick and frame in their travel around.

Having described my invention, I claim—

- 5 1. The drums B^2 b on the shaft B of sweep D, in combination with wheels B' , a cam-lever, F, lever H, pulleys h k k' k^2 , rope i , drum J, and derrick L, all arranged for operating substantially as described.
- 10 2. The brake B^3 on sweep D, in combination

with the drums b B^2 , shaft B, ratchet-wheel d , and pawl d' , as described.

Witness my hand in the matter of my application for improvements in well-boring apparatus.

THEODORE N. LARSEN.

Witnesses:

ALONZO WARDALL,
FRANK WILLIAMS.