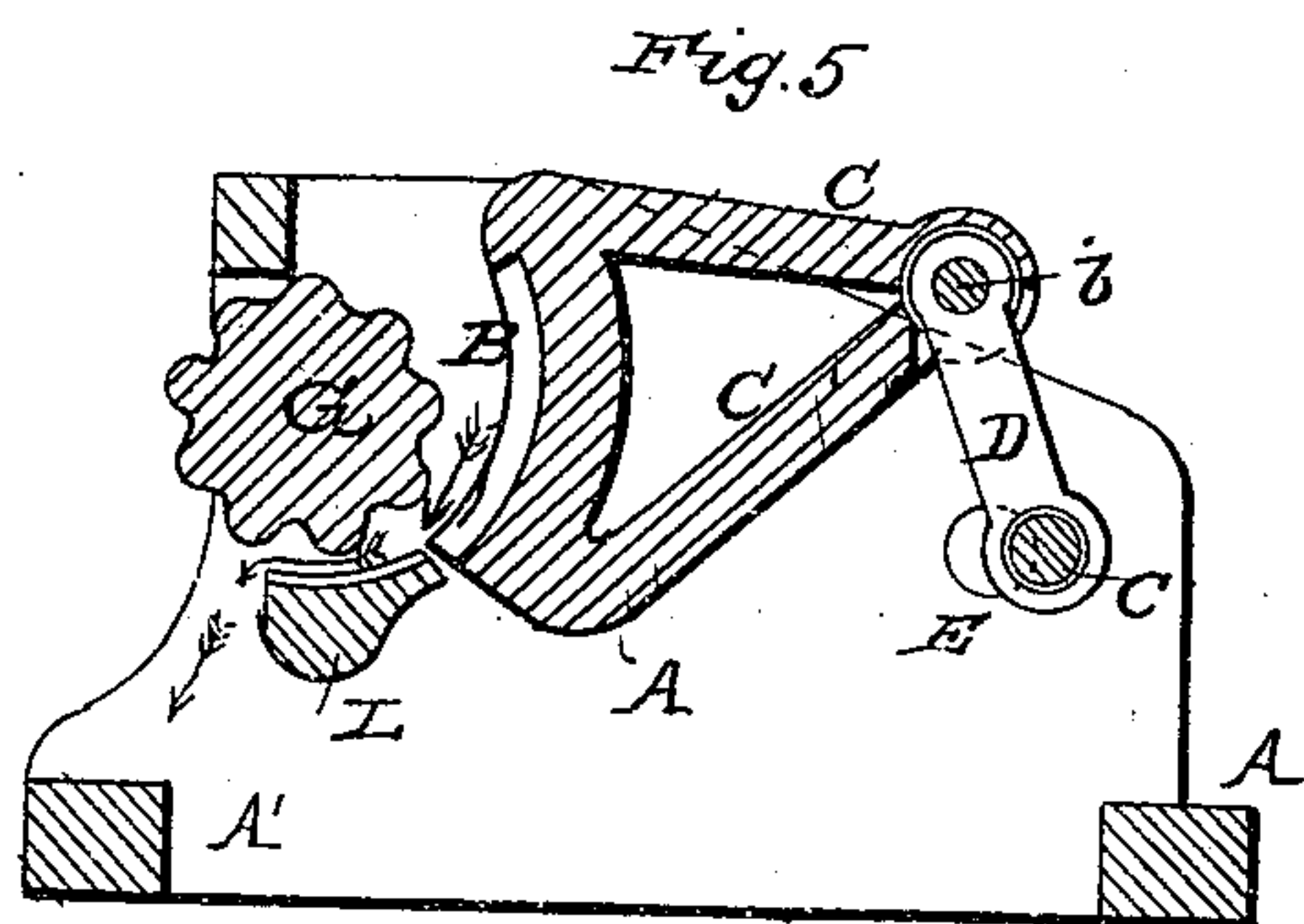
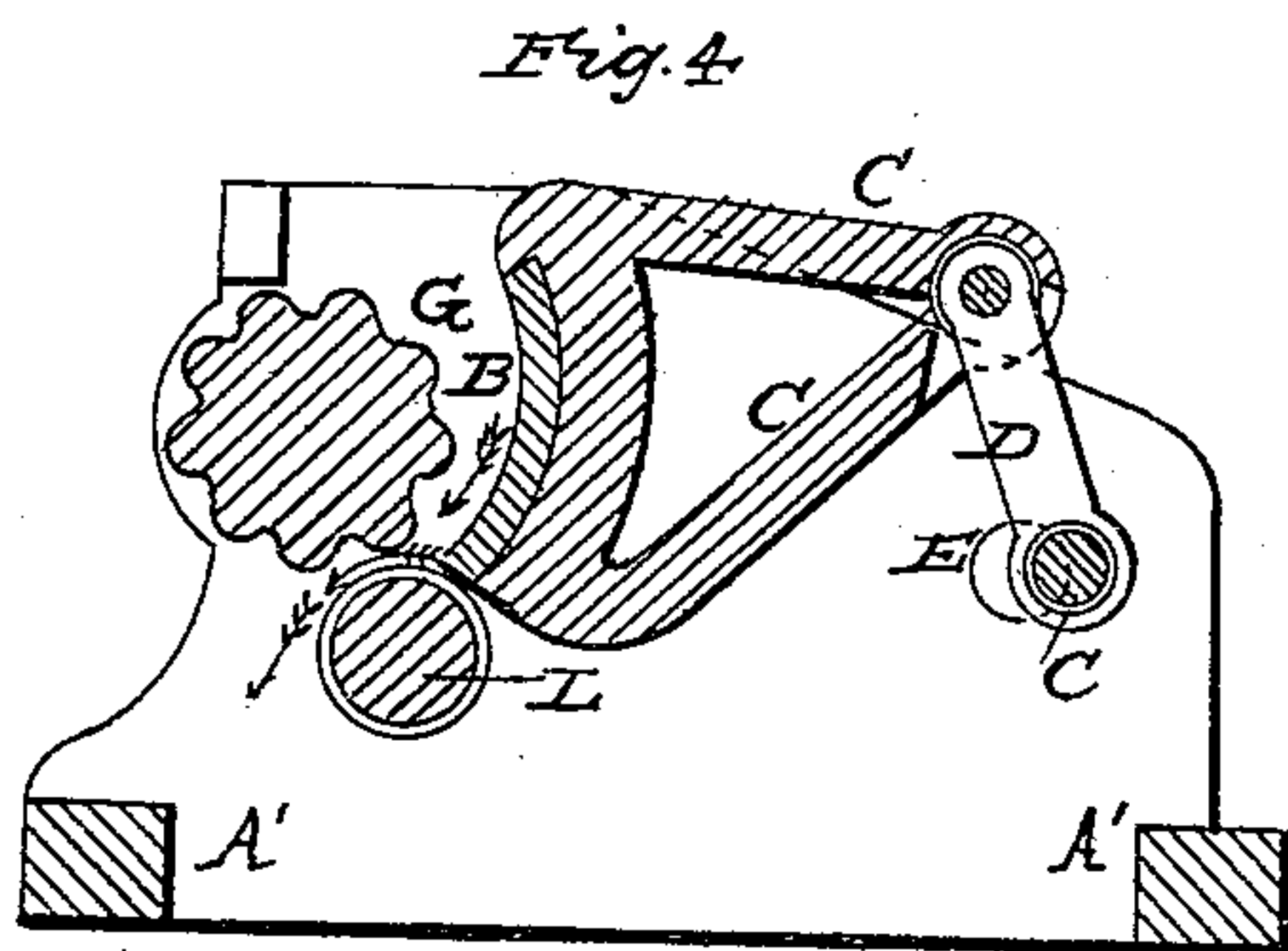
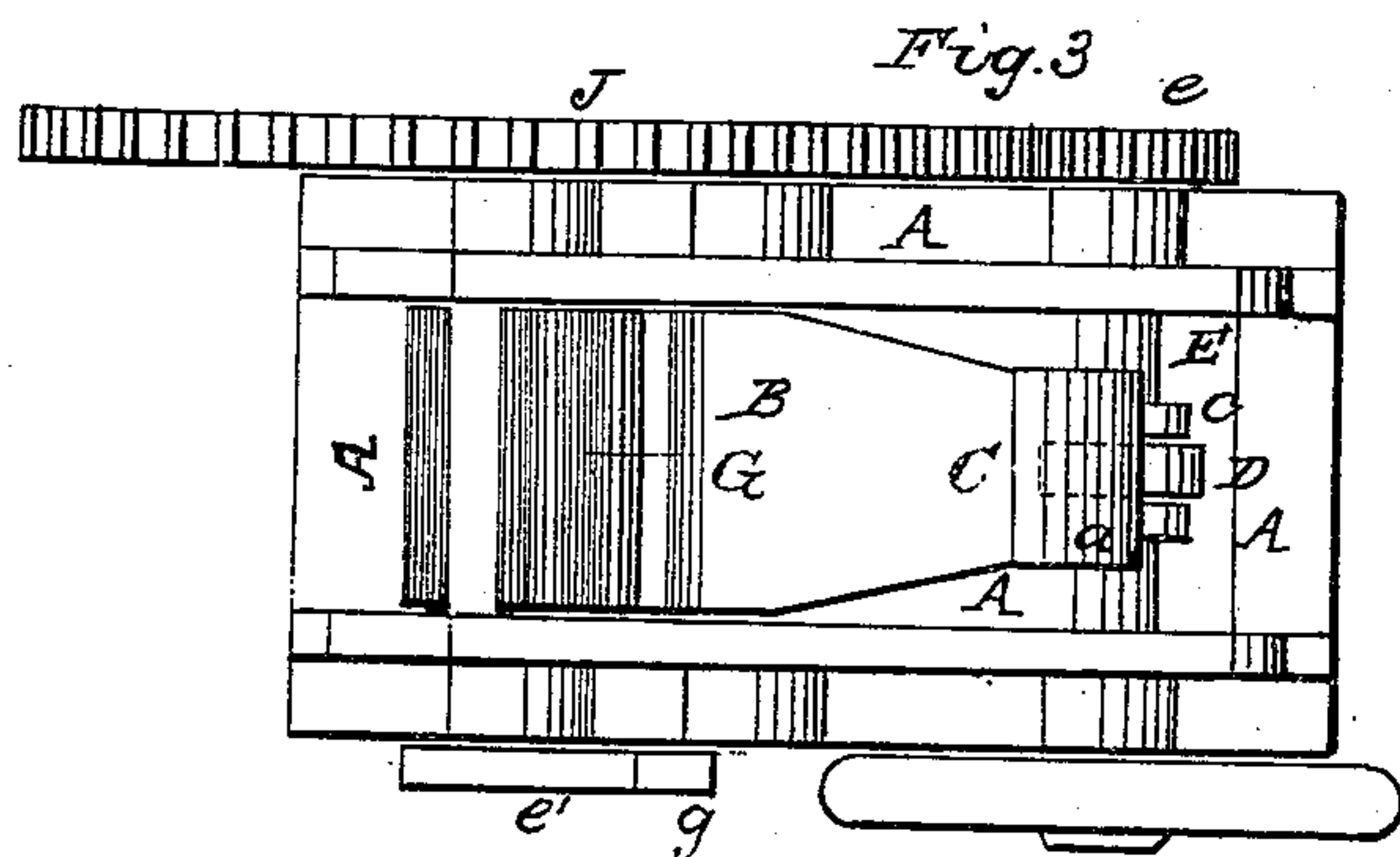
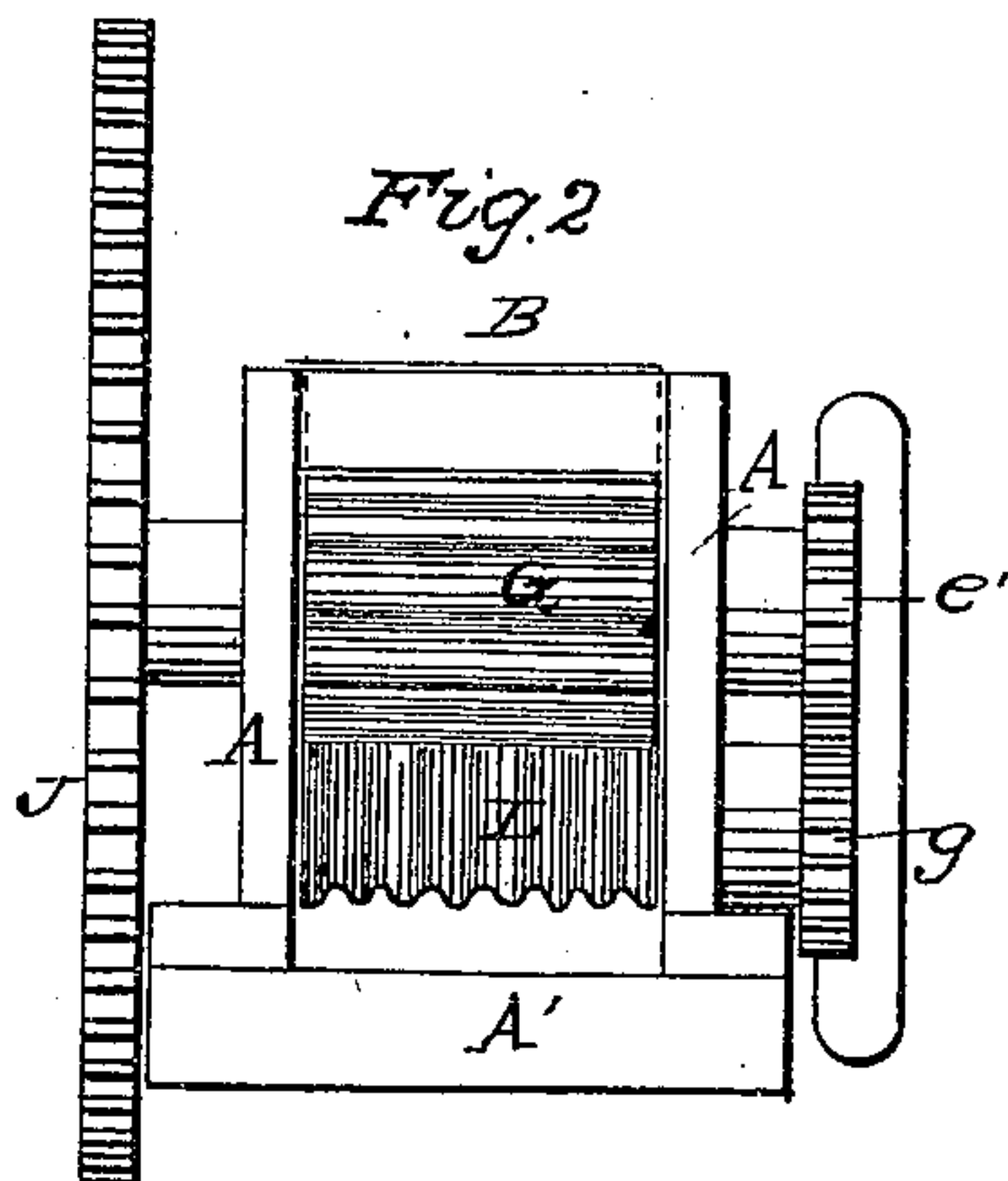
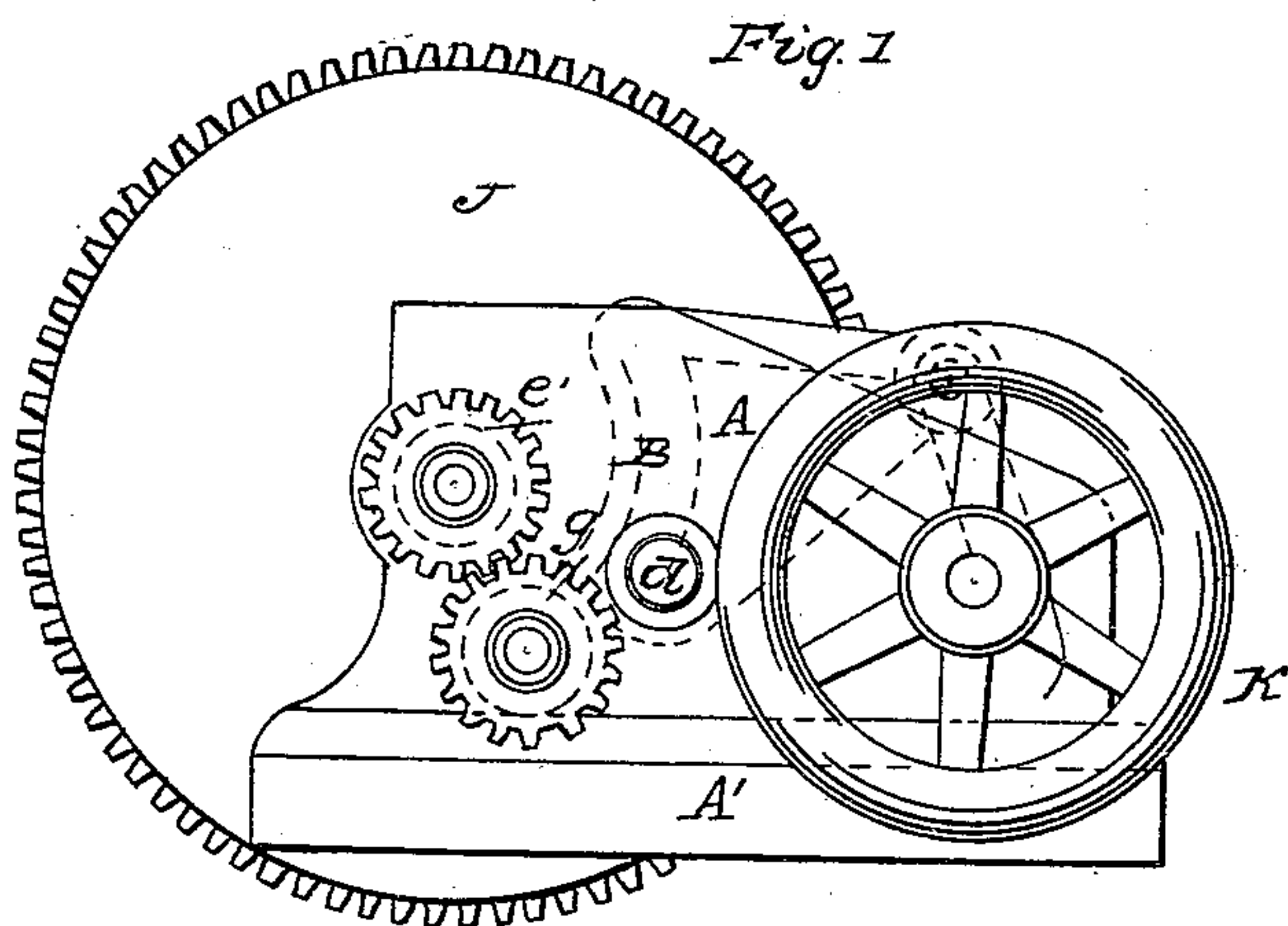


GATES & FRASER.

Stone Breaker.

No. 50,813.

Patented Nov. 7, 1865.



Witnesses
R. T. Campbell
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UNITED STATES PATENT OFFICE.

P. W. GATES AND D. R. FRASER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN STONE-BREAKERS.

Specification forming part of Letters Patent No. 50,813, dated November 7, 1865.

To all whom it may concern:

Be it known that we, P. W. GATES and D. R. FRASER, of Chicago, Cook county, and State of Illinois, have invented a new and Improved Stone-Breaker; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of our improved machine. Fig. 2 is an elevation of one end thereof. Fig. 3 is a top view. Fig. 4 is a vertical longitudinal section through the center of the machine. Fig. 5 is a longitudinal section taken in a vertical plane through a stone-breaker having a concave jaw instead of the cylinder shown in Fig. 4.

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

This invention relates to a novel machine for breaking rock, for stamping machinery, or for macadamizing roads and other purposes where small stones are desired.

The nature of our invention consists in combining a movable cylinder with a vibrating jaw or lever in such manner that the rock which is introduced between them will be broken and discharged very rapidly from the machine, as will be hereinafter described.

It also consists in arranging a rotating cylinder beneath the discharge-opening of a stone-breaker for the purpose of more uniformly breaking the stone, and also assisting in its discharge from the machine when broken, as will be hereinafter described.

To enable others skilled in the art to understand our invention, we will describe its construction and operation.

In the accompanying drawings, A A represent the two vertical sides of the frame, and A' is the sill or foundation thereof, all of which parts should be made very strong.

B represents a concave-faced breaker, which is applied to a lever, C, consisting of two converging arms, that are united at their rear ends in the form of an eye, *a*, to which the upper end of a short pitman, D, is pivoted by a transverse pin, *b*. The lower end of this pitman is connected to an eccentric, *e*, on the main shaft E, and when this shaft is rotated the lever C receives a vibrating motion. This lever C is piv-

oted at *d*, which is at or near the lower end of the breaking-jaw B, so that when the rear end of the lever is depressed there will be a considerable space left between the upper end of the concave jaw B and a cylinder, G, which is arranged in front of it. This opening forms a kind of hopper for the admission of rock, that will be broken as the rear end of the lever C receives its upward stroke.

The cylinder G extends transversely across the frame of the machine, and has its end bearings in the two sides A A. This cylinder may have corrugations extending longitudinally across its surface, or it may have spurs or knobs formed on or applied to its surface, or the surface may be smooth. It is so arranged with reference to the concave jaw B that the space between its surface and that of said jaw at the point of discharge for the broken stone will allow broken pieces of stone of a certain determined size to escape. One end of the shaft of this cylinder projects through the side of the frame and receives upon it a large spur-wheel, J, the teeth of which engage with a large spur-wheel, *e*, which is keyed on the shaft E. On the opposite end of the shaft of cylinder G a pinion spur-wheel, *e'*, is keyed, which engages with a corresponding pinion, *g*, on the shaft of a horizontal cylinder, L, that is arranged beneath the discharge-opening of the cylinder G, so as to leave an opening between it and this latter cylinder for the discharge of the broken stone, as indicated by the brack arrows in Fig. 4.

The cylinder L has a series of annular elevations and depressions formed on its surface; but, if desirable, projections of any other form than I have shown may be made.

The balance-wheel K, which is represented on the main driving-shaft, is for the purpose of equalizing the movements of the machinery.

One of the chief difficulties attending machinery hitherto used for breaking stone is the sluggishness of the stone in leaving the breakers after it has been properly broken, and for this reason the operation of breaking was necessarily very slow and the stone was broken until it was too much reduced.

It is important to keep the breakers clear of broken stone by effecting its discharge as rapidly as possible, and for this purpose we em-

ploy the rotating cylinder G, which is rotated in the direction indicated by the arrow in Fig. 4, which not only feeds the stone downward before it is broken, but also compels the discharge of the broken stone. The operation of said cylinder carries the rock down to the lowest point of the jaw B as this jaw recedes, and as this jaw approaches the cylinder G and crushes the rock the pieces are immediately discharged; hence there can be no wedging or clogging of the large pieces of rock between the upper parts of the breakers, so as to require several strokes of the jaw to break up one large piece, nor can the pieces of rock clog up the hopper-space above the cylinder G, for by its rotary motion all are rapidly carried down and discharged, while the constant succession of elevations and depressions on this cylinder will greatly assist the jaw B in breaking the rock into pieces of nearly a uniform size.

The lower cylinder, L, operates, in conjunction with the cylinder G, to rebreak the stones which have passed the jaw B, and to discharge them near the forward end of the machine, where they can be conveniently removed.

Instead of using a cylinder, L, a small jaw may be applied in its stead, as shown in Fig. 5, which may be movable or stationary. In either case it will be seen that the cylinder G will operate upon it as a rebreaker.

If desirable, the cylinder G and its roller or concave L may have adjustable bearings in the sides of the frame, which will admit of the ma-

chine being adapted to break coarse or fine, as may be required.

The surfaces of the jaw B and the rollers G and L may be faced with steel for durability.

If desirable, the lever C, with its jaw B, may be so constructed and arranged as to receive a reciprocating rectilinear movement, and also a vibrating movement, so that it will move bodily up to and from the cylinder G and rebreaking-cylinder L.

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

1. Constructing a stone-breaker with the primary cylinder-jaw G and a movable breaking-jaw, B, and arranging these parts substantially as described.

2. So arranging a single rebreaking device with respect to two primary breaking devices, B G, one of said devices being a cylinder, that the stone will be subjected to a second breaking operation after it leaves the primary breakers by means of a coaction of the primary and secondary breakers G L, substantially as described.

Witness our hands in the matter of our improved stone-breaker this 26th day of August, 1865.

P. W. GATES.
D. R. FRASER.

Witnesses:

L. D. TURNER,
J. L. FARGO.