

(No Model.)

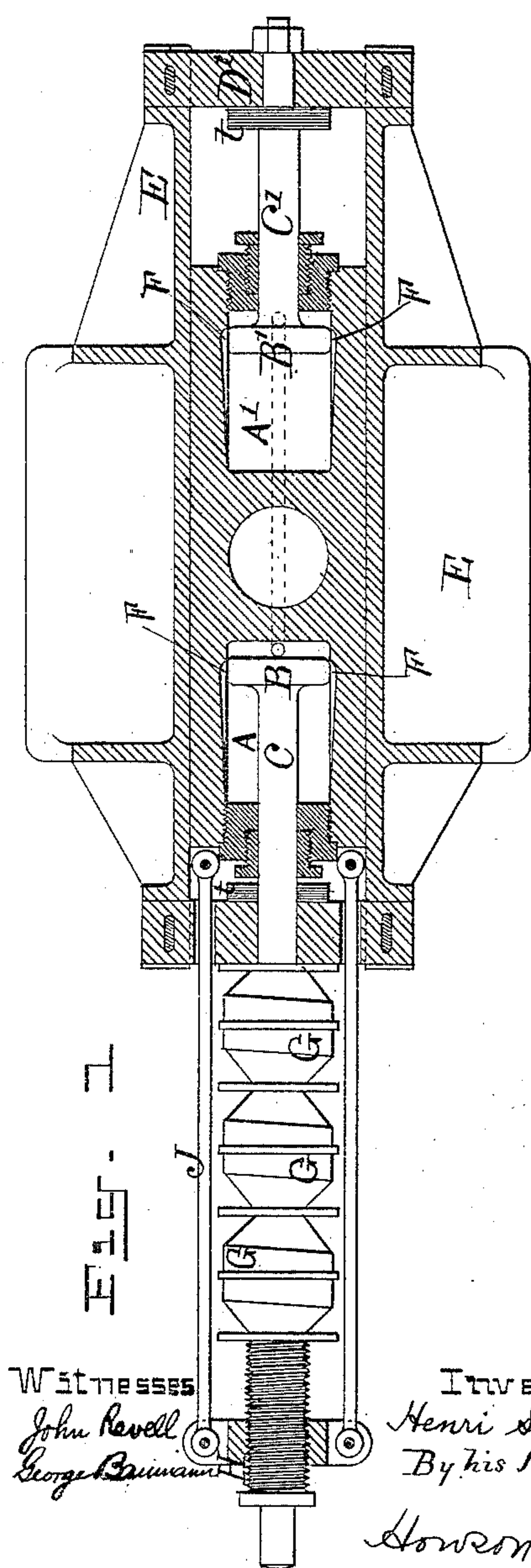
3 Sheets—Sheet 1.

H. SCHNEIDER.

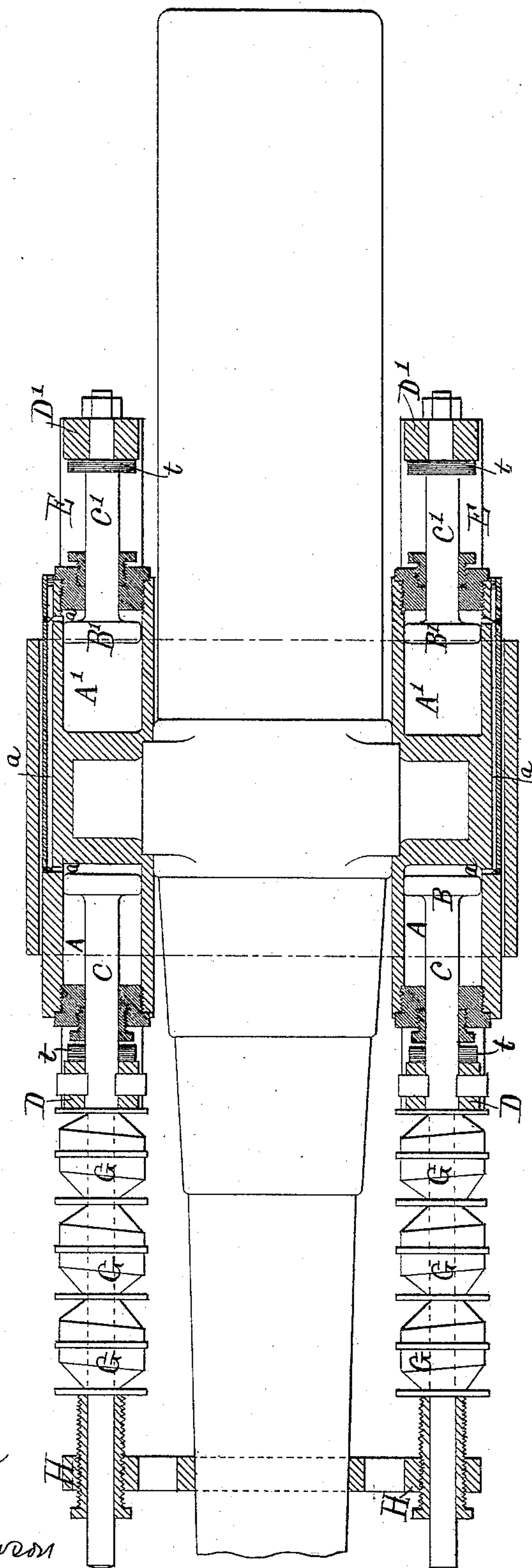
RECOIL CHECK FOR HEAVY ORDNANCE.

No. 442,919.

Patented Dec. 16, 1890.



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Witnesses

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George Bauman

Inventor.

Henri Schneider  
By his Attorneys

Howson and Howson

(No Model.)

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Fig. 3.

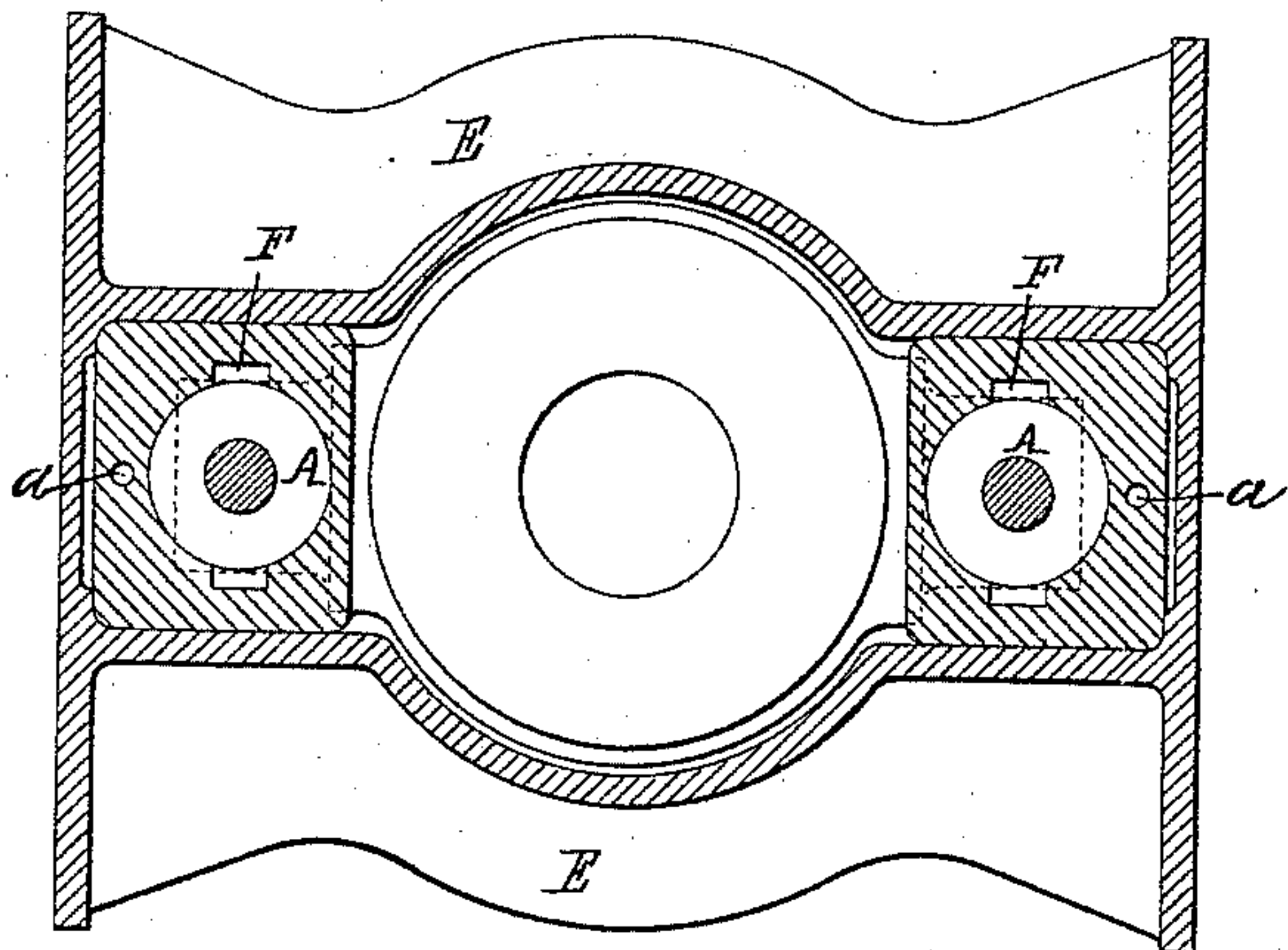


Fig. 4.

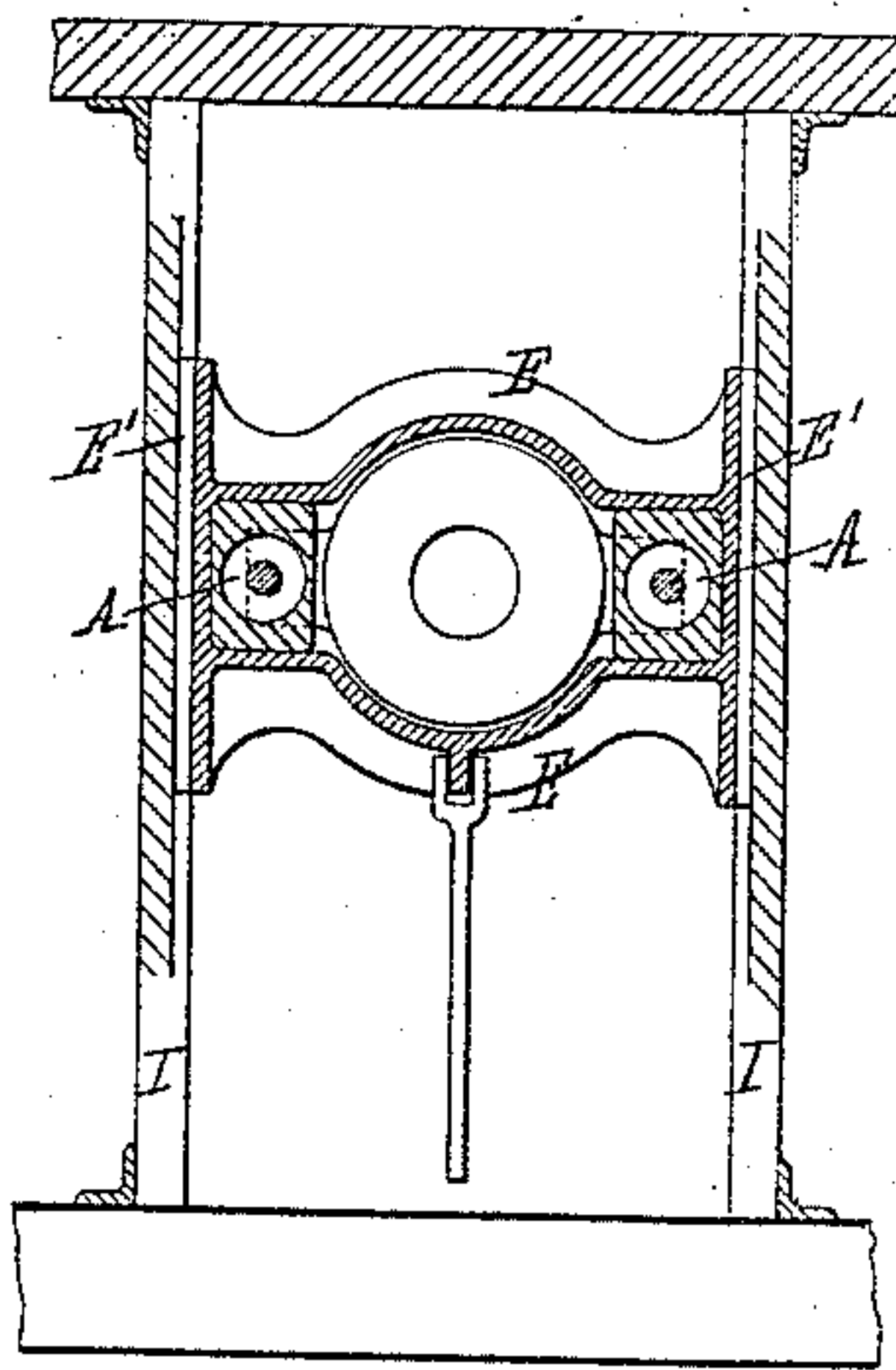


Fig. 5.

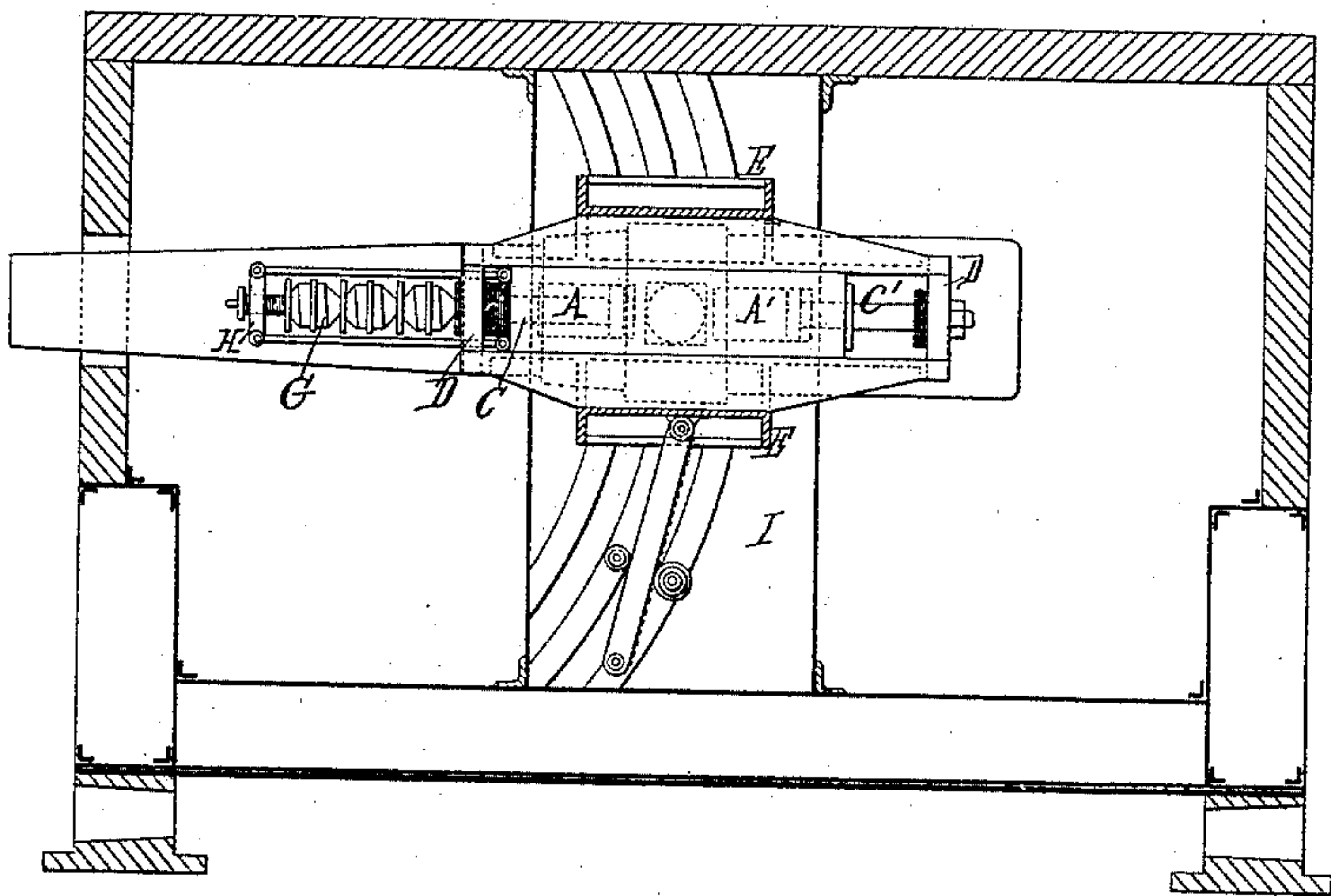
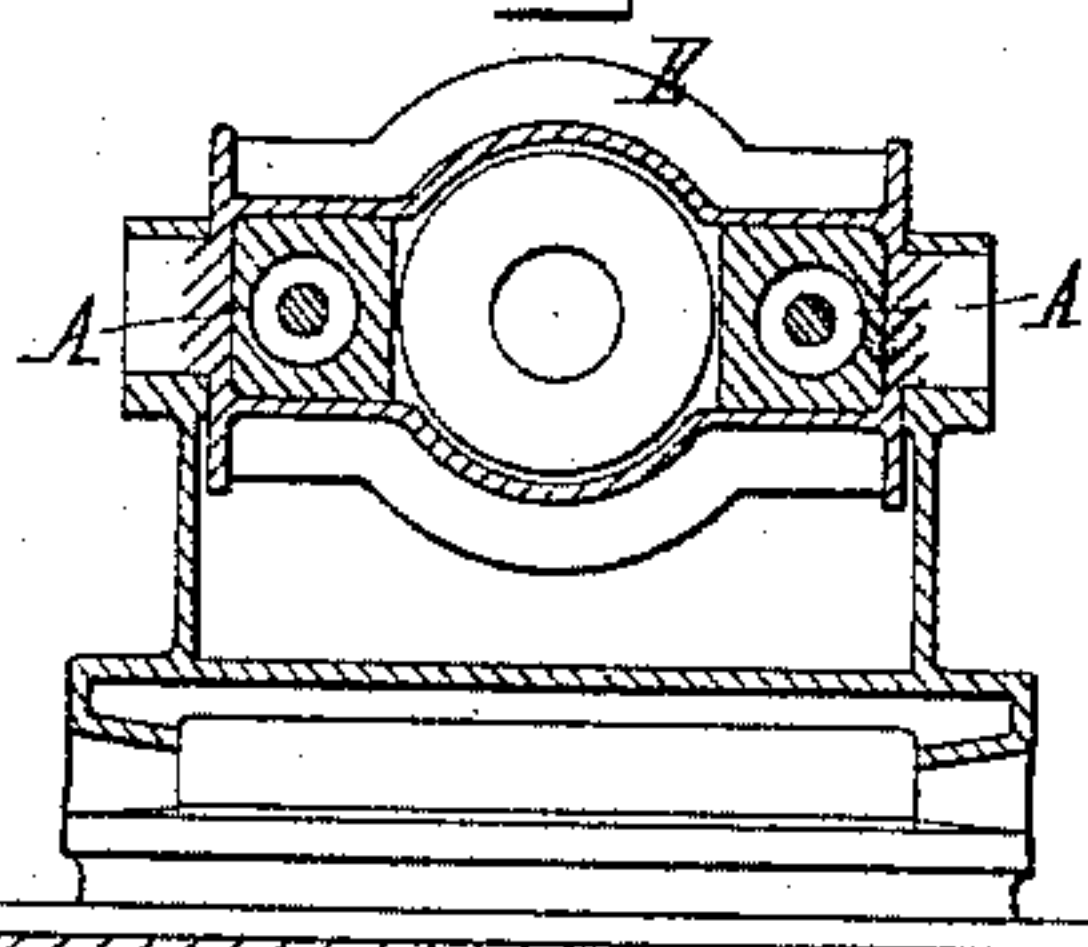


Fig. 6.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

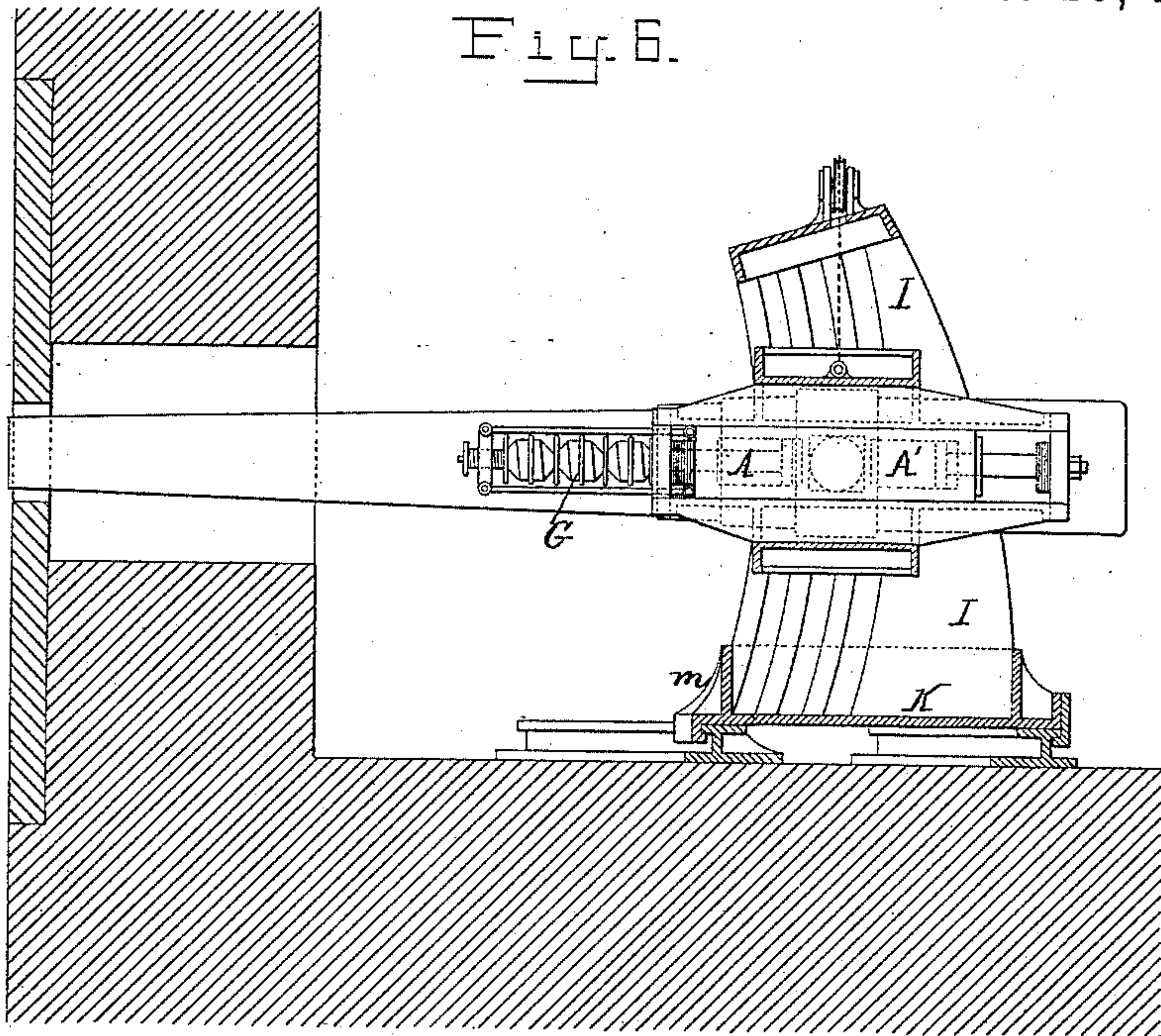


Fig. 8.

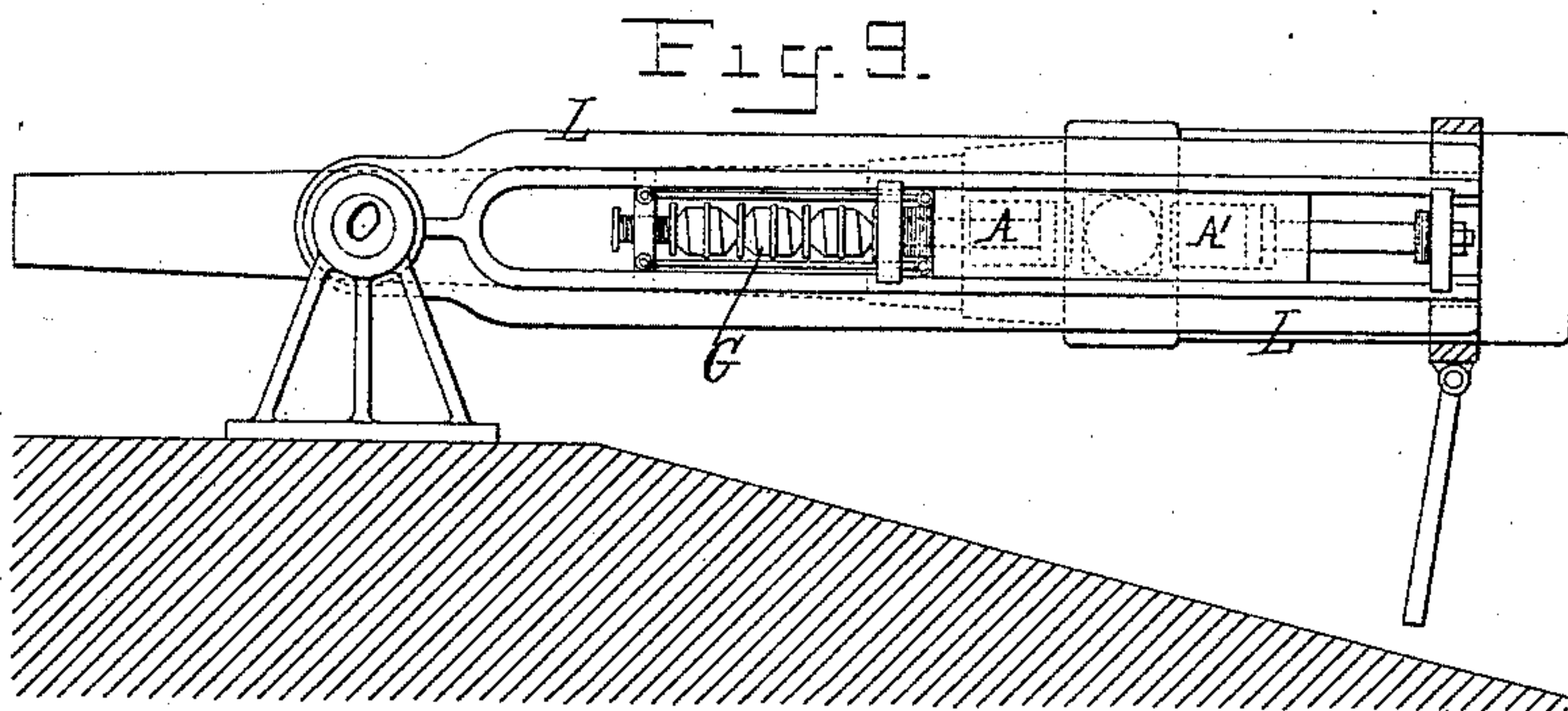
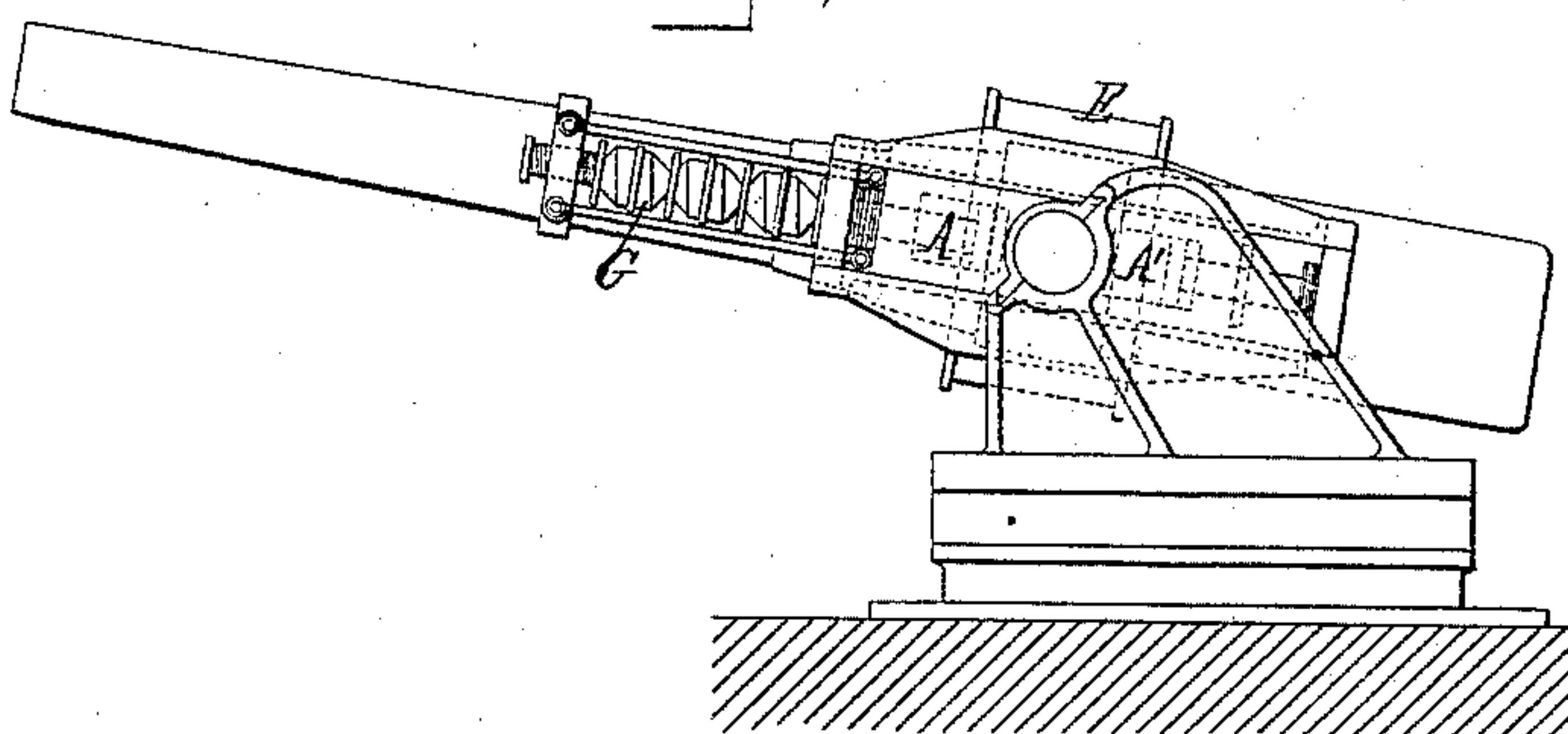


Fig. 7.



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# UNITED STATES PATENT OFFICE.

HENRI SCHNEIDER, OF PARIS, FRANCE.

## RECOIL-CHECK FOR HEAVY ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 442,919, dated December 16, 1890.

Application filed June 17, 1890. Serial No. 355,797. (No model.)

*To all whom it may concern:*

Be it known that I, HENRI SCHNEIDER, manager of the firm Schneider & Co., manufacturers, of Le Creuzot, (Saône-et-Loire,) in the Republic of France, have invented Improvements in Apparatus for Minimizing the Recoil in Ordnance, of which the following is a specification.

This invention relates to a novel system of hydraulic brakes which may be termed "twin hydraulic brakes;" and its object is to reduce the recoil of guns, to suppress the percussive action, and to distribute the effects of the firing over a larger number of points. The recoil is considerably reduced by the use of four strong brakes arranged in a manner peculiar to this system and which transmit to four points on the body of the carriage the force of the recoil. The axes of these brakes and the axis of the gun are in the same plane and move in the same manner while the piece is being pointed. Therefore the gun always recoils in the direction of its axis, it does not produce any percussion, and the effects of the firing are directly absorbed by the brakes.

In order to better understand the system of twin hydraulic brakes and the different applications of which it is susceptible, reference should be made to the accompanying drawings, in which—

Figure 1, Sheet I, shows a longitudinal section, Fig. 2 a horizontal section, and Fig. 3 a vertical section, of the system of brakes. Figs. 4 and 5 show the invention as applied to a turret and Fig. 6 to the deck of a vessel. Figs. 7 and 8 show one form, and Fig. 9 another form, of mounting for the gun.

The apparatus consists, essentially, of two slides, in which the gun is mounted and in which are formed the cylinders A A' of the brakes. The slides work in guides forming part of the cradle or, properly speaking, frame E, which is fixed when firing. To the cradle E are secured the rods C C' of the brakes, as will be hereinafter described. The two slides are arranged symmetrically with respect to the gun and act in a precisely similar manner, and they accurately fit the trunnions of the gun and a portion of the base of the trunnions, and consequently follow all the movements of the piece.

The rear ends of cylinders A A' communi-

cate with each other by passages *a a a*, made in the thickness of the metal, and the cylinders receive pistons B B', the rods C C' of which are firmly secured to the cross-heads D D', which form part of the frame E. The cylinders are provided with the requisite amount of liquid.

When the gun is fired, it will in its backward movement or recoil carry with it the slides, or rather the cylinders, of the brakes. The pistons B B' will remain stationary, being secured to the frame E, and the liquid which is in front of each of the pistons is violently driven out and passes to the back of the said pistons by conveniently-arranged passages F. These passages F, as shown on the drawings, take the form of grooves in the walls of the cylinders. It is really sufficient for the action of the brake that the total section of the passages F should be such that all the force due to the recoil should be absorbed by the forced expulsion of the liquid. During the recoil the void formed in the forward cylinder A by reason of the exit of the rod C is constantly filled by an equal quantity of liquid driven out by the rod C', which, on the contrary, enters its cylinder A', the escape of the liquid being effected by the above-mentioned passages *a a a*. In this manner the brake-cylinders are at all times quite full, the loss from one being compensated for by the overflow of the other. The brakes are thus under constant pressure, which is absolutely necessary for insuring a regular and unvarying recoil and without shock.

H is a cross-head secured on the gun and connected by rods J with the slides A A'. Carried by threaded sockets which work in the cross-head H are rods, on which springs G are mounted. These springs bear against the cross-heads D and are compressed during the recoil. The pressure of these springs at the end of the recoil movement serves to return the brakes and the gun to their normal position. During this return movement the rods of the forward pistons B slide in their respective cylinders A, driving out an equal volume of liquid, which passes by the passages *a a a* and exactly fills the void caused by the outward movement of the rods of the rearward pistons B'. Elastic buffers *t* limit the travel of the



slides in both directions. The return-action springs are shown in front of the slides; but they may be placed at the rear above or below the slides, or they may be attached directly to the gun, or even be replaced by a counter-weight, which will return the gun to its normal position. This system of twin hydraulic brakes, comprising four cylinders, divides the effect of the recoil and distributes it on four points of the carriage by means of the four piston-rods, two of which work in compression and two in tension. This division of the effects of firing permits of the length of the recoil being much reduced by using brakes of small dimensions, which are at the same time very powerful. This being established, it is now desirable, by way of example, to illustrate the various applications of the system.

Figs. 4 and 5, Sheet II, show the invention as applied to a turret. In this example the slides or brake-cylinders A A' are arranged as in Sheet I. They slide inside the frame E, to which are attached the brake piston-rods C C'. The frame transmits the impetus it receives from the rods C C' to two standards I, firmly secured to the turret. To this end the frame is furnished with projecting sides E', which slide in suitable grooves formed in the standards I.

Fig. 6, Sheet II, shows the invention as applied to the main-deck of a vessel or in a gallery or casemate. The brakes and the frame are arranged as in the turret-carriage; but the standards I are tied together at their upper part and are secured at bottom to a bed K. This bed, furnished with rollers, is fitted to circular ways secured on the deck or floor. In these carriages the percussive effects are suppressed, and the recoil being absorbed by the brakes has a tendency to overthrow the carriage. This is, however, averted by the resistance of the hook m, which takes under a flange in the circular way. To facilitate the movement of the gun to obtain the proper elevation, the gun with the brake mechanism may be balanced by means of a counter-weight.

Figs. 7 and 8, Sheet II, show a carriage in which the brakes are arranged in the same

manner, but the frame E is provided with trunnions, and the carriage is mounted on a central pivot.

Fig. 9, Sheet II, shows another type of carriage. The twin brakes are still arranged in the same manner; but the frame is replaced by two side pieces L L, forming guides and oscillating on pivots O, situated forward of the arrangement.

All these severally-detailed arrangements may be modified both in detail and action, the only object for thus illustrating them being to show the variety of applications of which the twin hydraulic brakes are susceptible.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I would remark that I reserve to myself the right of applying this system to any carriage whatsoever, and also of varying at will the material proportions and dimensions, as well as accessory arrangements; and

I declare that what I claim is—

1. Hydraulic brakes consisting of two slides in which the gun is mounted, each composed of two brake-cylinders communicating with each other at their rear ends, a frame serving as a guide to the said slides, pistons in the cylinders, and piston-rods firmly secured to the said frame for the purpose of reducing by a simultaneous action the recoil of guns and transmitting the firing strain to four points of the carriage while neutralizing the percussive action, substantially as described.

2. Hydraulic brakes consisting of two slides in which the gun is mounted, two brake-cylinders in each slide, a frame serving as a guide to the said slides, pistons in the cylinders, piston-rods firmly secured to the said frame, return-action springs G, and elastic buffers t, which limit the travel of the slides in each direction, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRI SCHNEIDER.

Witnesses:

R. J. PRESTON,  
CHARLES BRÉNON.