

(No Model.)

2 Sheets—Sheet 1.

T. MCGREGOR.
Portable Steam Engine.

No. 236,055.

Patented Dec. 28, 1880.

Fig. 1.

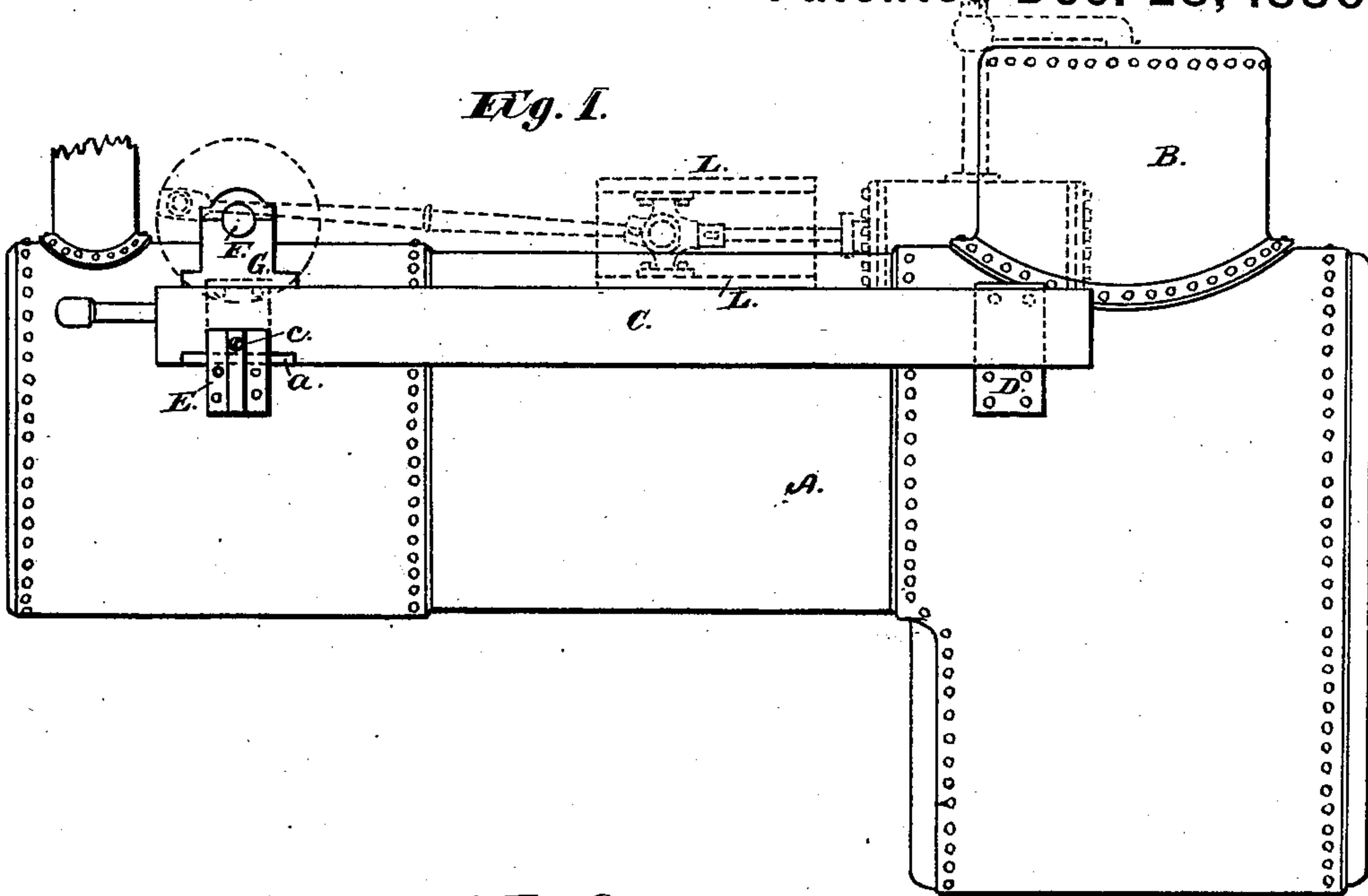


Fig. 2.

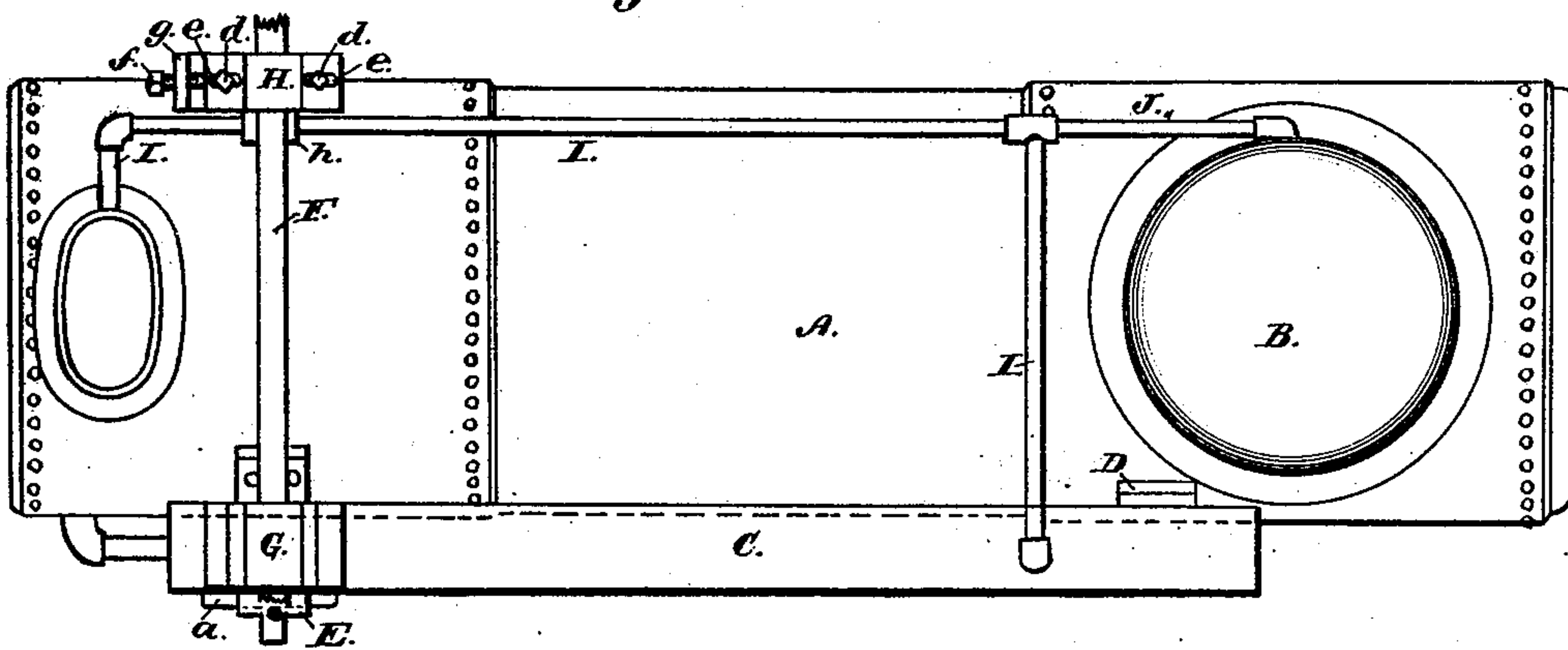
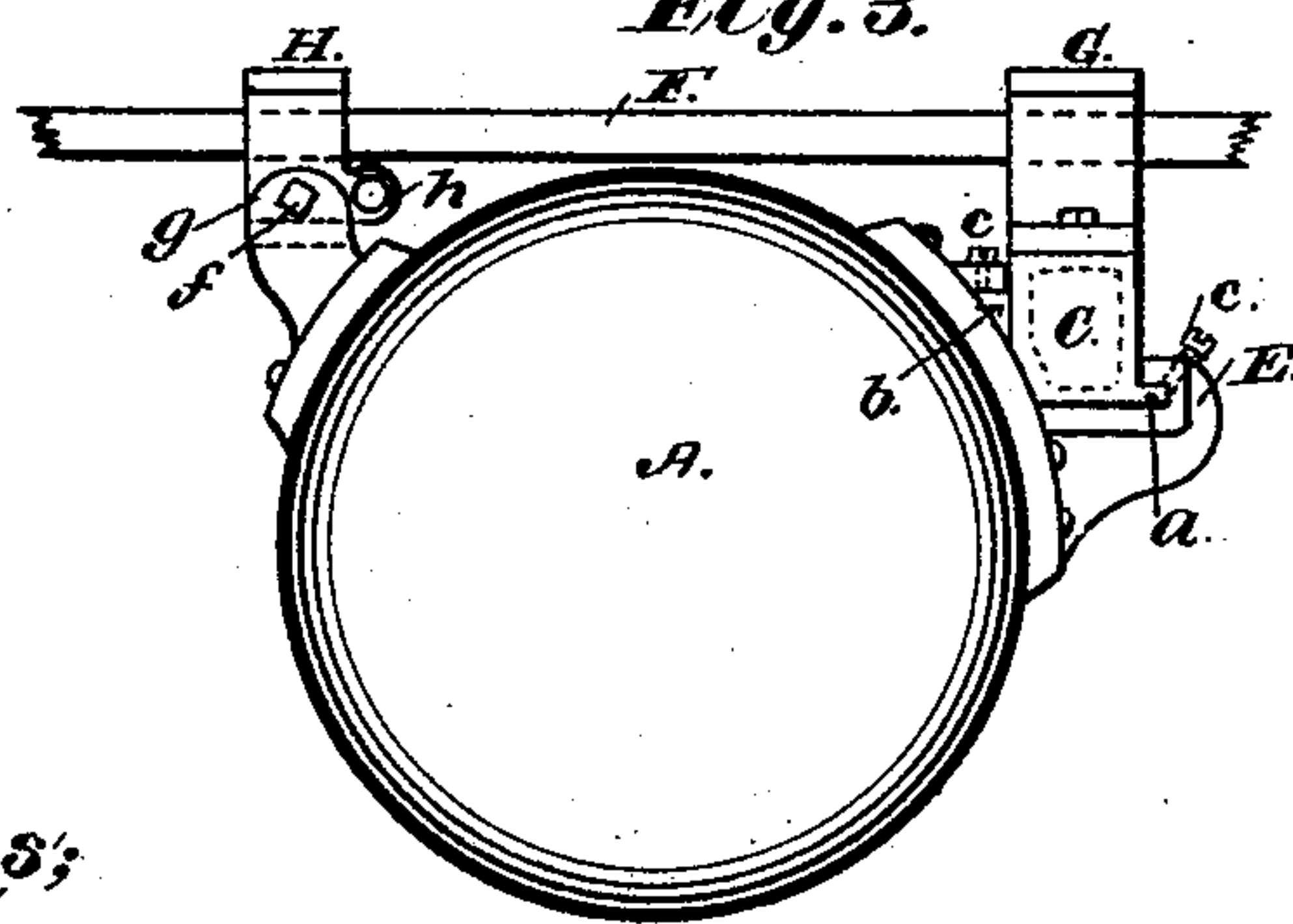


Fig. 3.



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Fig. 4.

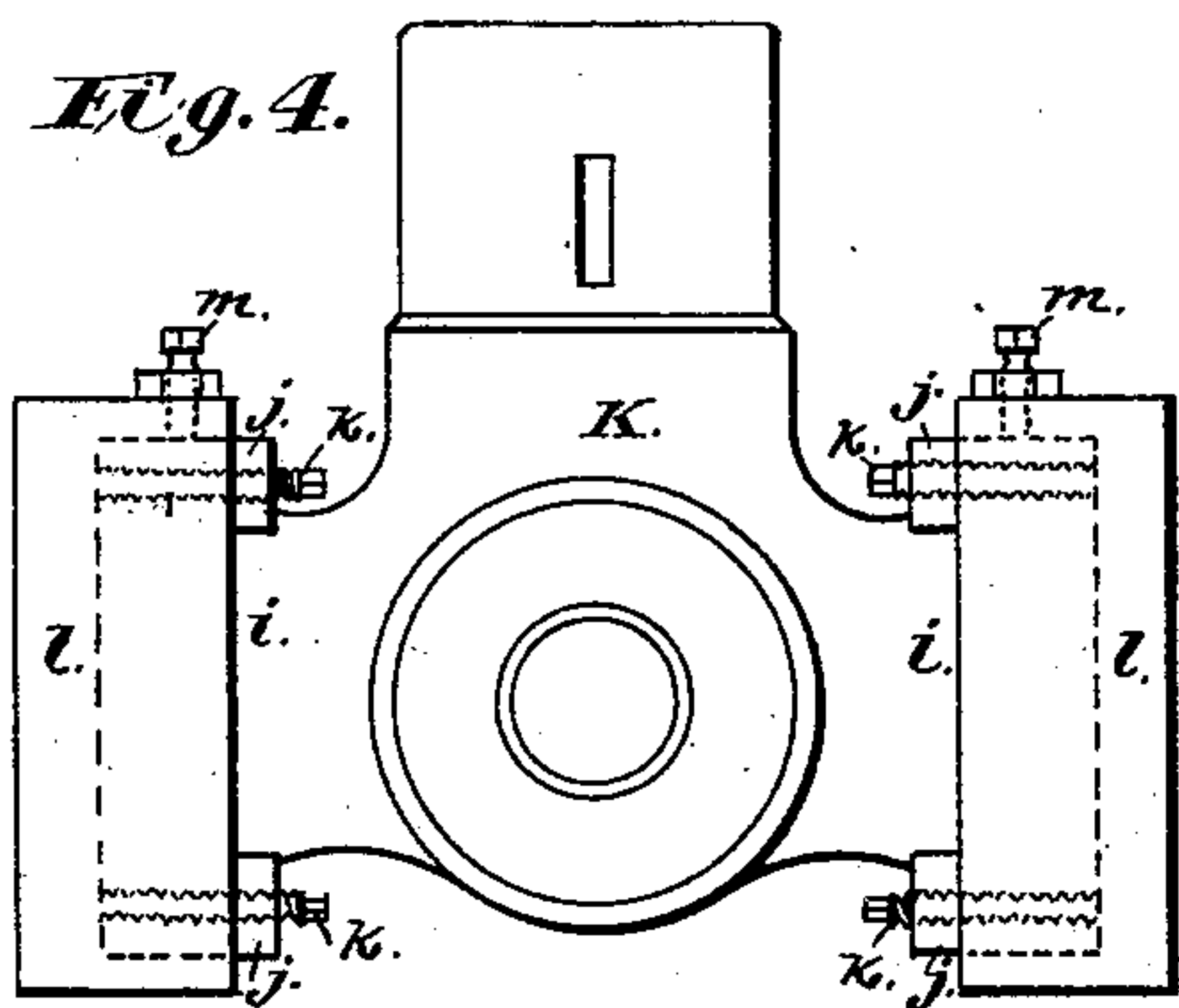


Fig. 5.

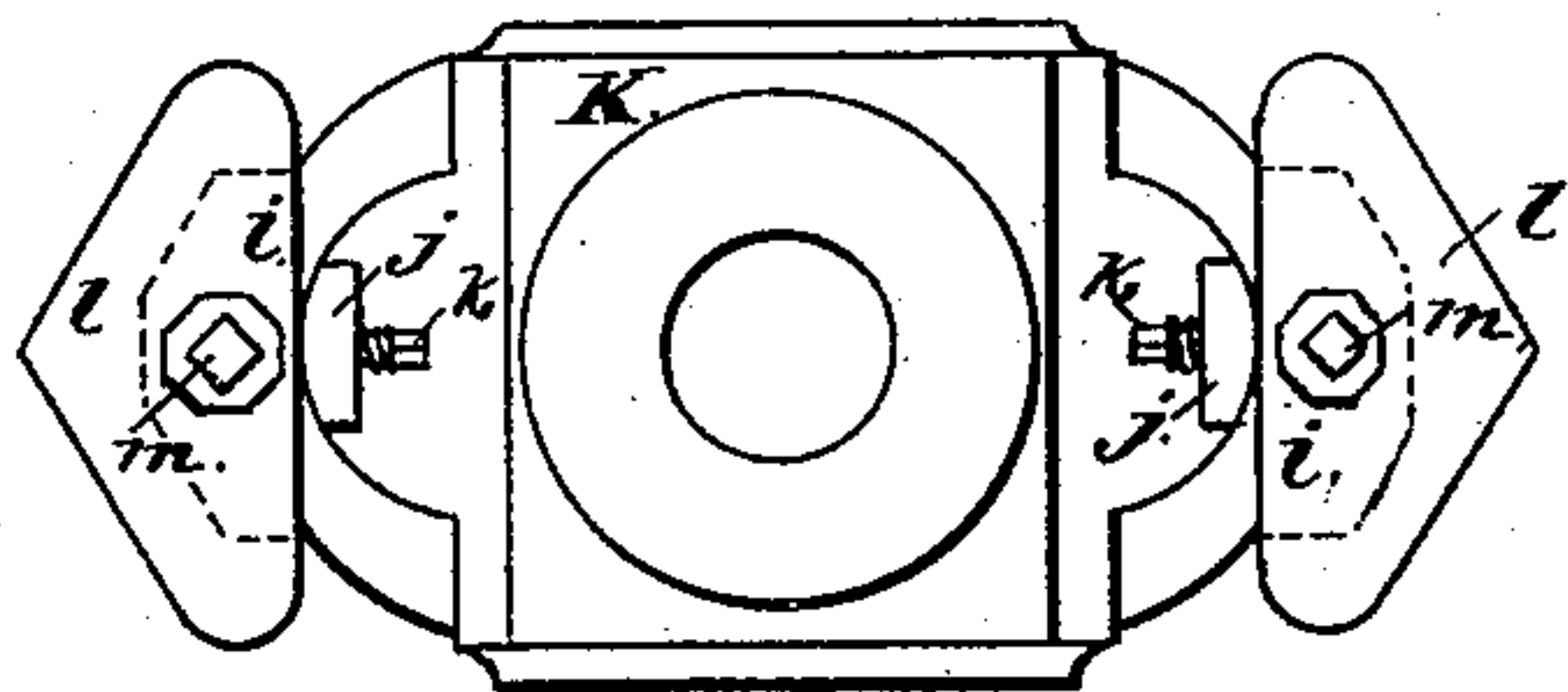


Fig. 7.

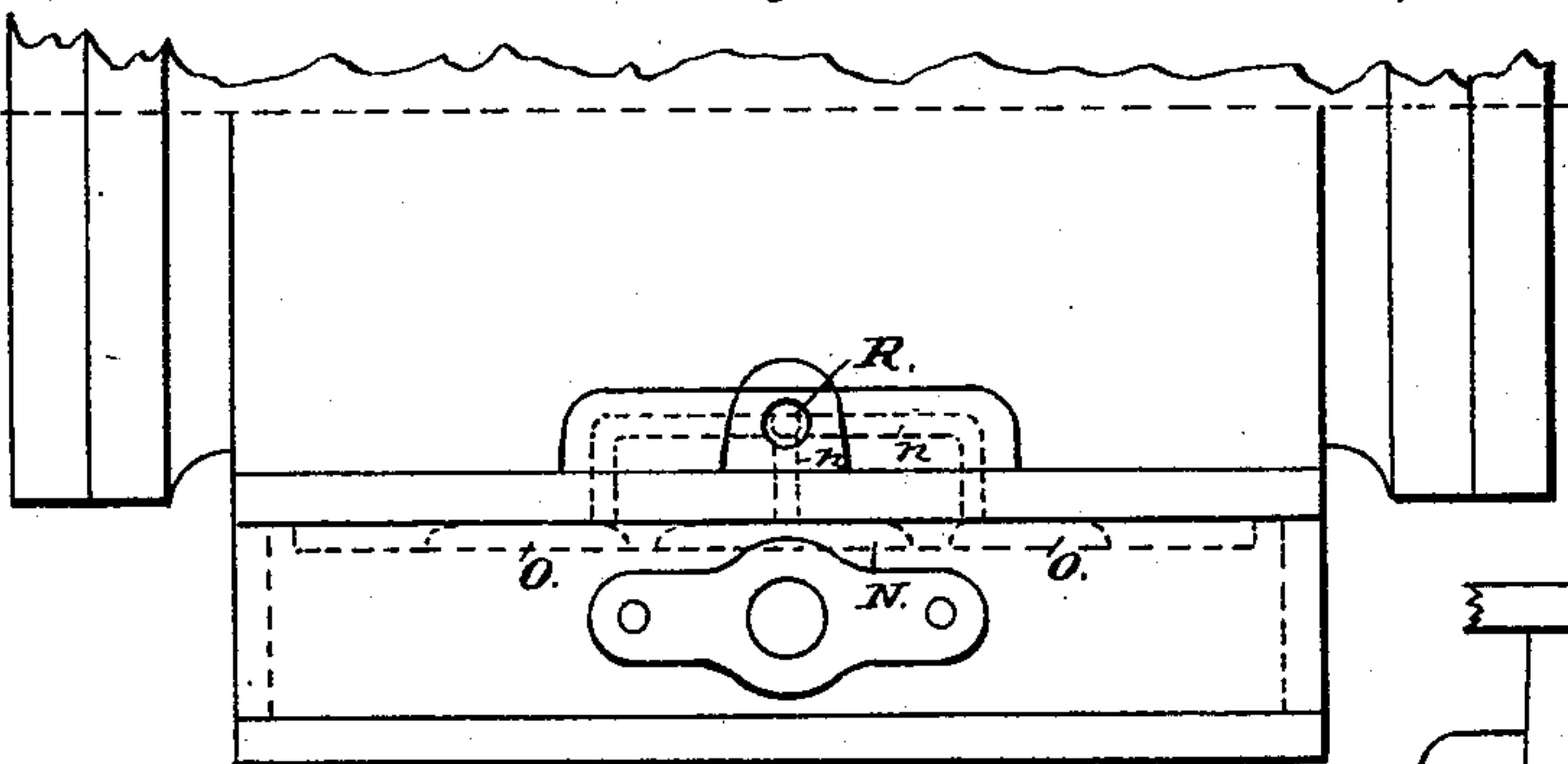


Fig. 8.

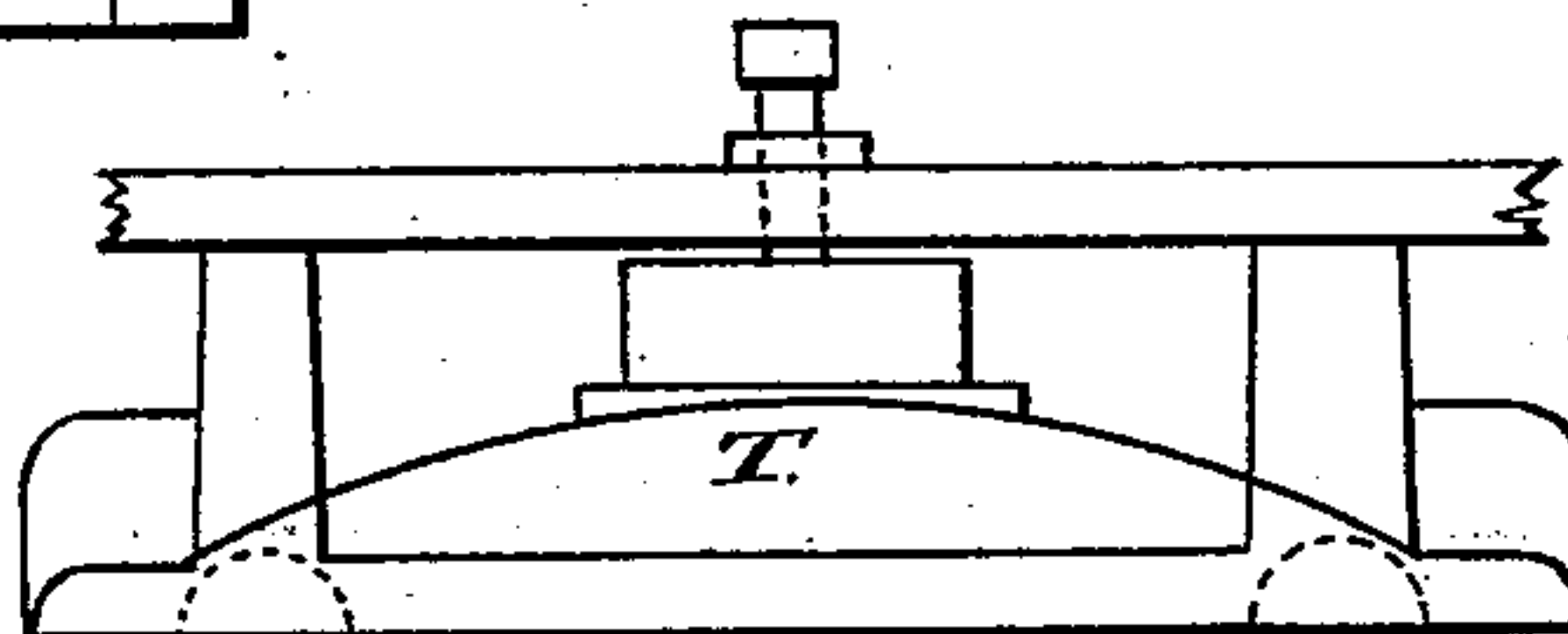


Fig. 6.

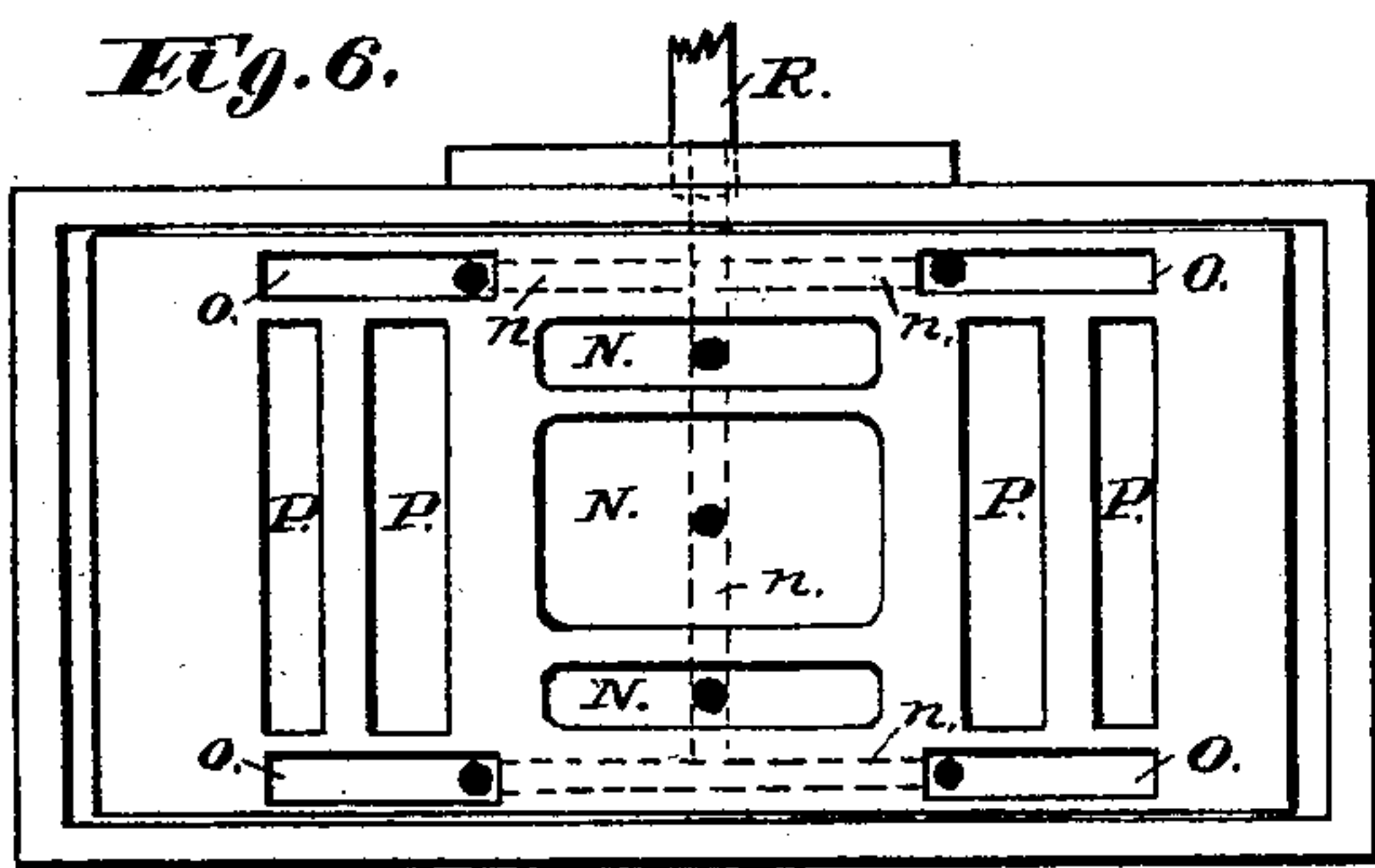
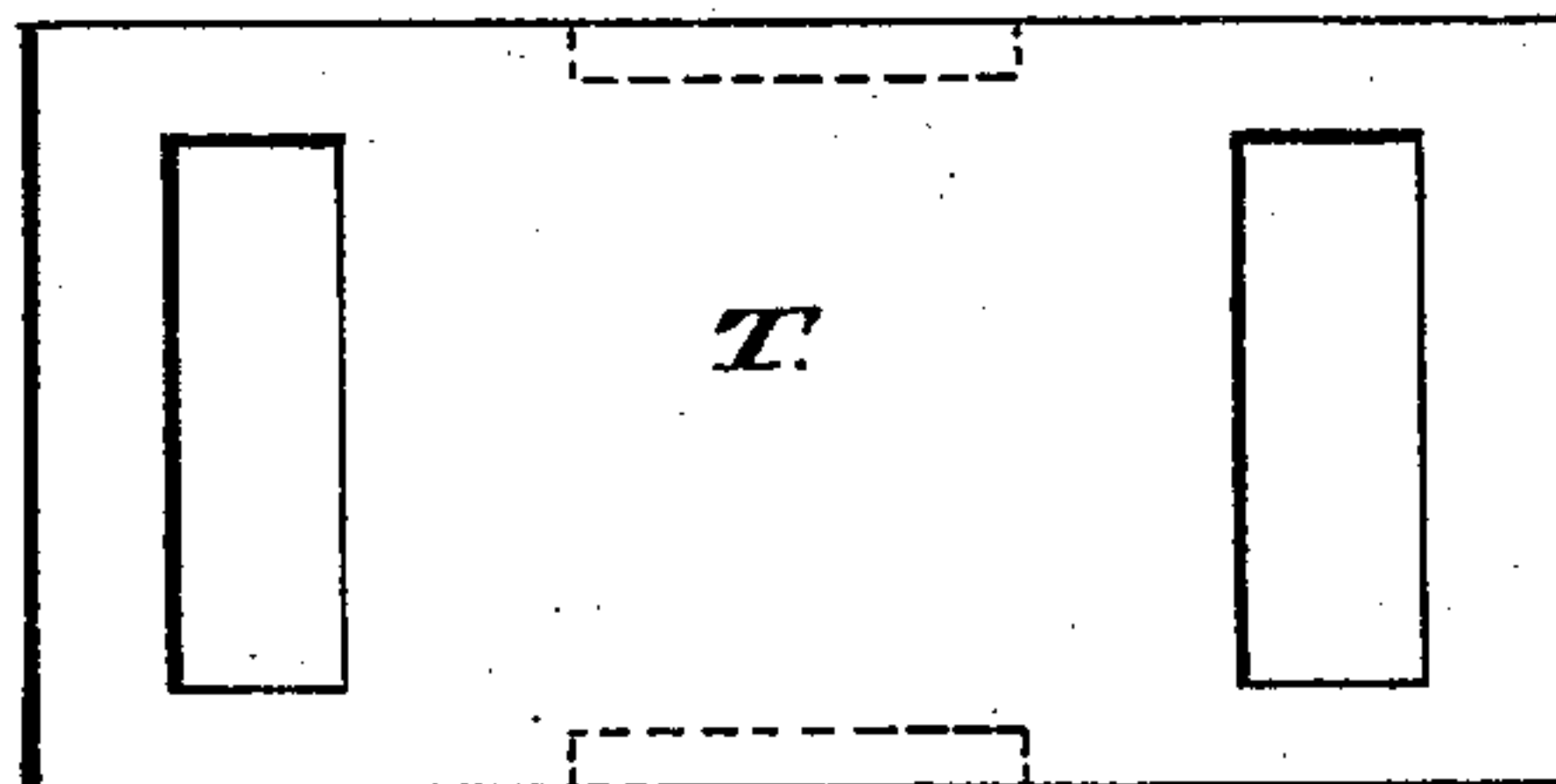


Fig. 9.



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UNITED STATES PATENT OFFICE.

THOMAS MCGREGOR, OF DAYTON, OHIO.

PORTABLE STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 236,055, dated December 28, 1880.

Application filed September 18, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MCGREGOR, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Portable Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention is an improvement in portable engines, and it relates particularly to that class in which the engine is mounted upon the boiler by means of a bed-plate or heater.

The novelty consists in the construction and combination of the parts composing my improved engine, all as will be herewith set forth, and specifically claimed.

In the accompanying drawings, Figure 1 is a side elevation of my improved engine and boiler. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the same. Fig. 4 is an enlarged front elevation of my improved cross-head and pads. Fig. 5 is a top view of the same. Fig. 6 is a face view of the valve-seat. Fig. 7 is a plan view of a portion of the cylinder and the steam-chest. Fig. 8 is a side elevation of the valve. Fig. 9 is a face view of the valve.

Corresponding letters of reference indicate like parts in all the figures.

In this class of engines the boiler becomes first heated, and expands before a corresponding expansion can take place in the heater or bed-plate, and the result is that great strain is thrown upon the various parts and connections, which tends eventually to destroy their adjustment and cause some part to give way. To remedy this serious difficulty I employ the following means, referring to Figs. 1, 2, and 3:

A represents the boiler and fire-box, and B the dome, of the usual or any suitable construction. C is the heater or bed-plate, constructed in the manner usual in this class of engines, but resting in brackets D and E, bolted upon the side of the boiler, as represented. The heater is rigidly secured to the bracket D next to the dome, but rests loosely in the bracket E at its opposite end, as seen in Fig. 3, where the shape of this bracket is more clearly shown. Flanges *a b*, upon the heater, at this point occupy recesses in the bracket E, and set-screws *c* are inserted, which can be made to bear

against them if it should be desired to clamp the heater at this end, though they should only be used, if at all, when both boiler and heater are fully expanded and self-adjusted under heat.

The cylinder and cross-head slides are mounted upon the heater in the usual or any manner that is suitable, and the crank of fly-wheel shaft F, running transversely across the boiler, is secured in boxes G and H, of which G is secured rigidly upon the heater, and H rests upon a bracket bolted to the opposite side of the boiler. The box H is held from lateral and vertical displacement upon the bracket by set-screws *d*, passing through slots *e* in the box, as seen in Fig. 2. One or more set-screws, *f*, passed through the shoulder *g* of the bracket, serve to hold the box H from end-wise displacement after its self-adjustment has been effected.

I represents a steam-pipe extending from the heater, near the dome, over the boiler transversely, and then parallel along it through an extension, *h*, of the box H, to which it is rigidly connected, and thence into the chimney. To aid in supporting this pipe, brackets placed upon the boiler may encompass it, or a closed extension, J, of the pipe may be attached to the dome, as seen in Fig. 2.

When the fire is first made the boiler expands, and can elongate without affecting the heater and its attachments, which remain cold; and when steam enters the heater and elongates it, it (the steam) also passes through the pipe I, and imparts a corresponding motion to the box H, so that both boxes are kept constantly in line, and the adjustment of all parts of the engine remains unimpaired. By this simple construction the boiler and engine are rendered perfectly independent of each other.

By reference to Figs. 4 and 5 the construction and arrangement of the pads upon the cross-head will be readily understood.

K represents the cross-head, having lateral shoulders *i*. (Represented by dotted lines.) These shoulders have beveled faces, as seen, and bosses *j* upon their inner side, through which set-screws *k* are passed, head first, from the outside, the heads being made small to allow this method of introduction. The V-

shaped brass pads *l* are recessed upon their inner faces to fit snugly over the shoulders *i*, and are held in place by set-screws *m*, as represented. The pads fit into the slides *L*, Fig. 1, and are adjusted thereto by the set-screws *k*. The slides are also rendered adjustable upon their bracket to suit the wear of the piston. By this simple construction the wear of the pads can be taken up at any time by simply turning the set-screws and adjusting them to suit the guides *L*, and after long use and wear the pads can be replaced with but little expense or trouble.

Referring, now, to Figs. 1, 6, 7, 8, and 9, the remaining feature of my invention will be readily understood. It is a great desideratum in all classes of engines that the slide-valve be balanced, by which is meant that the pressure of the steam upon the top of the valve be counteracted by an almost equal pressure under the valve. To accomplish this result I form chambers or recesses *N* and *O* in the valve-seat, of which the chambers *N* are centrally located and the chambers *O* are situated at each end of the induction and exhaust ports *P*. The depth of these chambers is immaterial, but their superficial areas, taken together, should about equal the exposed upper parts of the valve upon which the steam would bear, and the superficial area of the chambers *O* should about equal that of the ports *P*. All of these chambers intercommunicate by passage-ways *n*, (represented by the dotted lines,) and these latter, uniting, receive live-steam directly from the boiler through a branch pipe, *R*, extending from the feed-pipe. It is to be further observed that the outer ends of the chambers *O* are on a line with the outer edge of the induction-ports, so that the pressure under the ends of the valves is released by the escape of the steam as soon as the valve commences to open the ports at either end. The slide-valve *T* is of the usual or any suitable construction, and

by forming the chambers in its seat, as described, it is perfectly balanced.

I do not propose to limit myself to the shape, size, or number of the chambers or recesses in the seat, as in the respects mentioned they may be varied infinitely.

Having thus fully described my invention, I claim—

1. In a steam-engine, the combination, with the bed-plate or heater, of the fly-wheel shaft journaled at one end upon the heater and at the other upon a shifting pillow or box united to said heater by a steam-pipe constructed and arranged as shown, whereby the true alignment of the shaft is always maintained under the expansion or contraction of the heater, substantially as specified.

2. In a steam-engine substantially as herein shown, the cross-head *K*, provided with shoulders *i*, and adjustable pads *l*, fitted over said shoulders and rendered adjustable by set-screws *k*, all constructed and arranged substantially in the manner and for the purpose specified.

3. In a steam-engine substantially as herein shown, the slide-valve seat provided with live-steam chambers whose superficial area is about equal to the area of the exposed upper surface of the valve, all constructed and arranged as specified.

4. In a steam-engine substantially as herein shown, the slide-valve seat provided with live-steam chambers, the outer ones of which are substantially on a line with the induction-ports, all constructed and arranged as and for the purpose specified.

In testimony whereof I have hereunto set my hand.

THOMAS MCGREGOR.

Witnesses:

PATRICK H. GUNCKEL,
CHAS. M. PECK.