

(No Model.)

J. O'NEILL.

# EXHAUST NOZZLE FOR LOCOMOTIVES.

No. 516,899.

Patented Mar. 20, 1894.

Fig. 1.

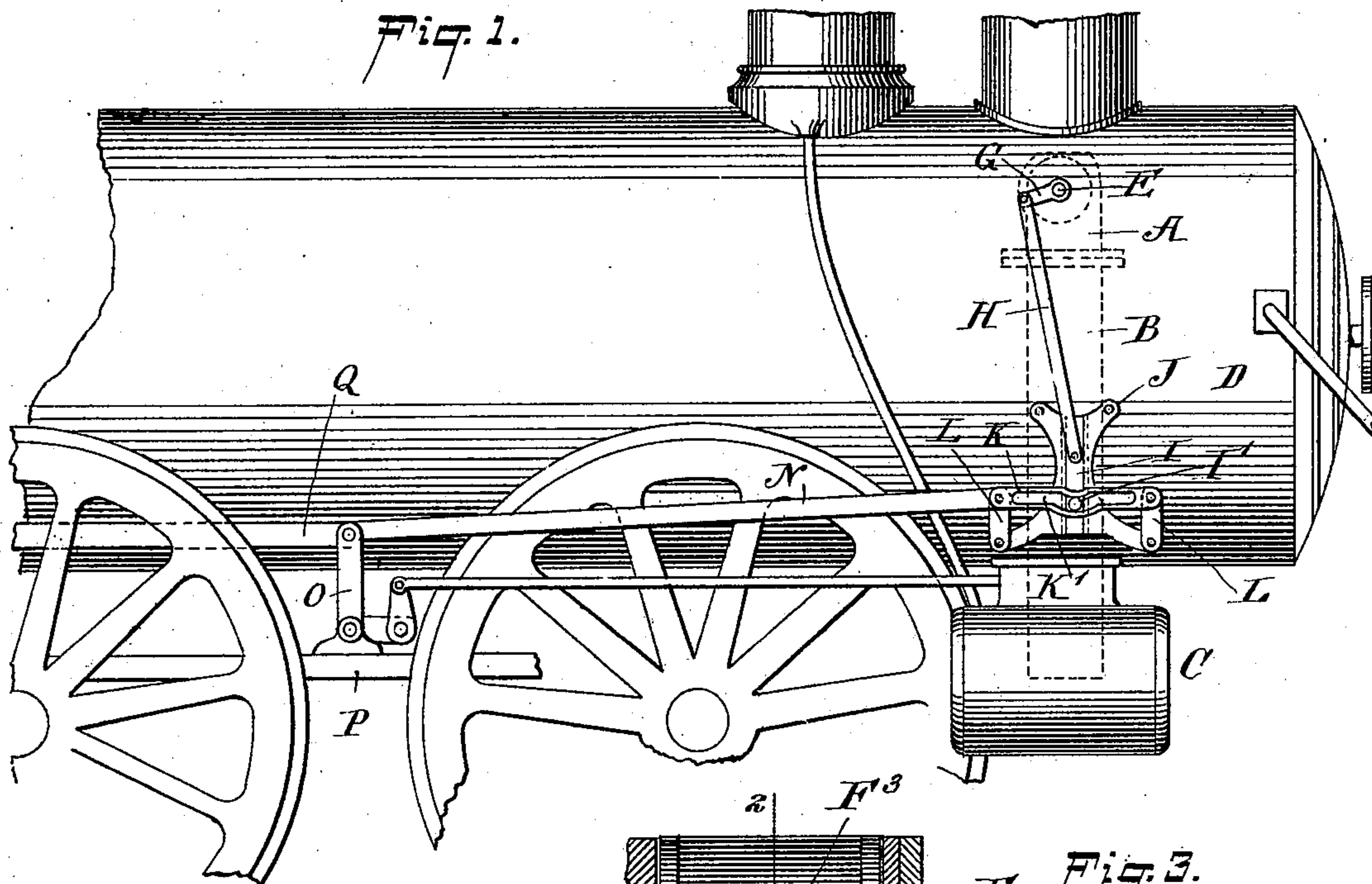
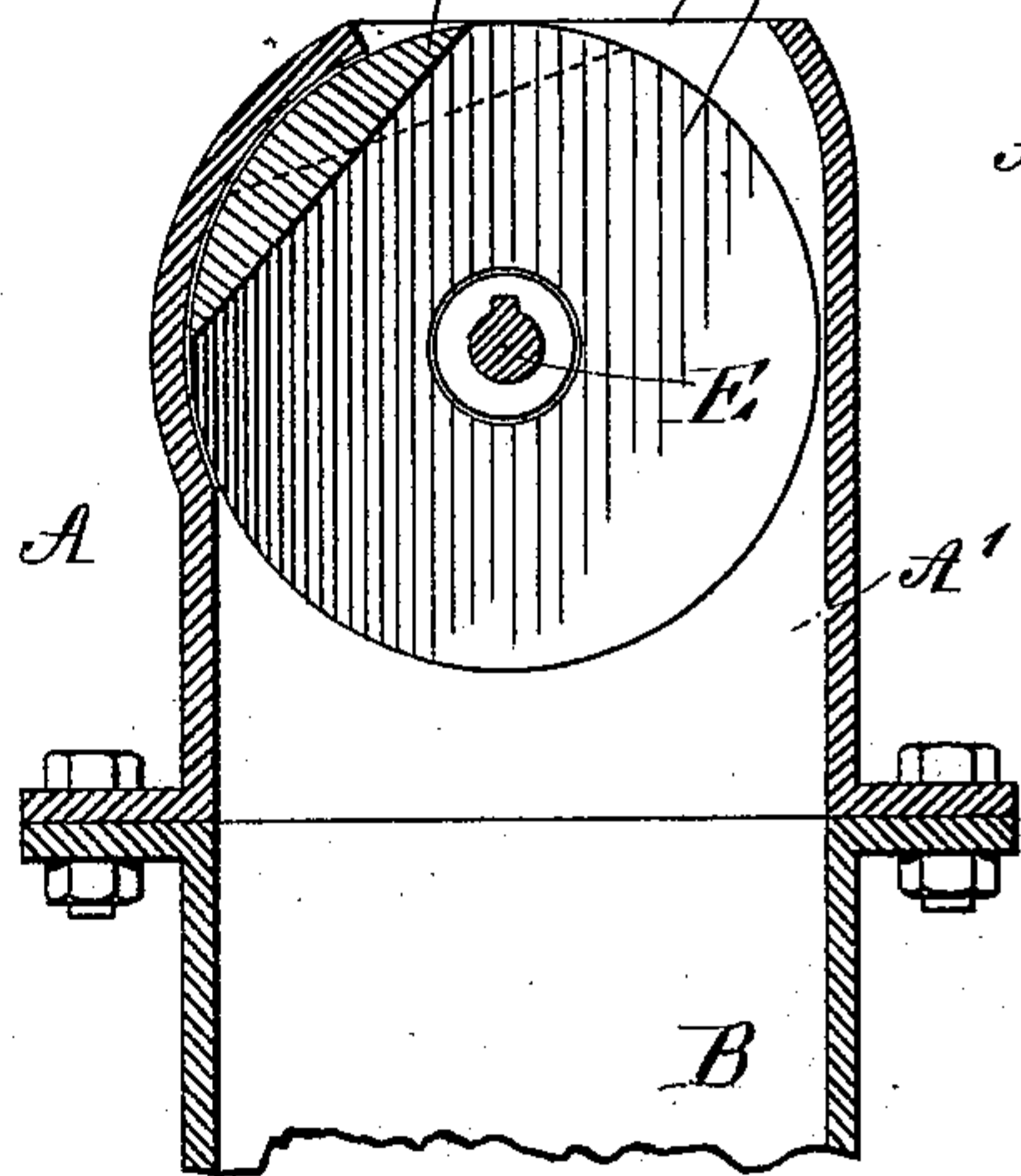


Fig. 2.  $A^3$   
 $F^3$   $F'$  /  $F''$



*E* Fig. 3.

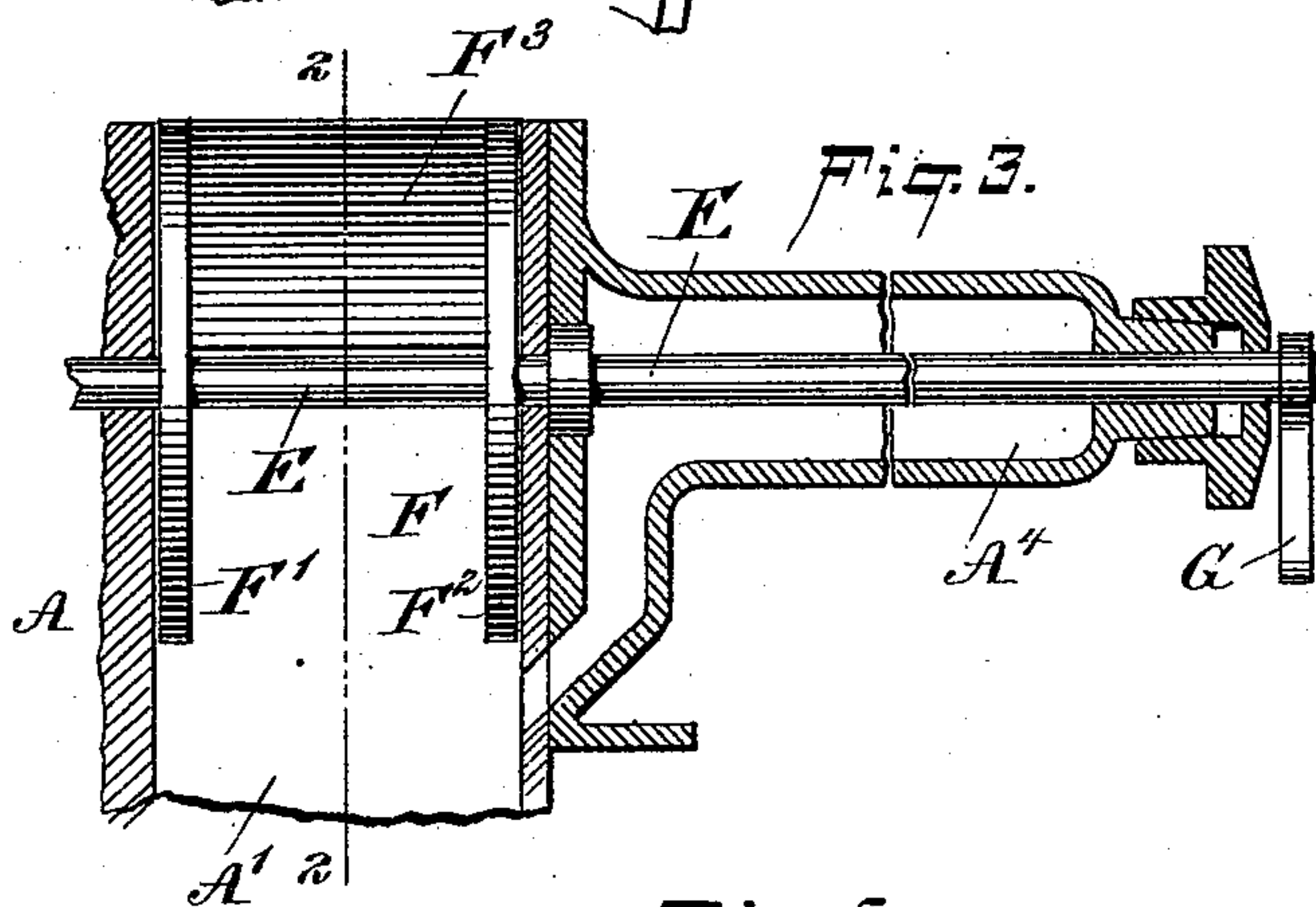


Fig. 4.

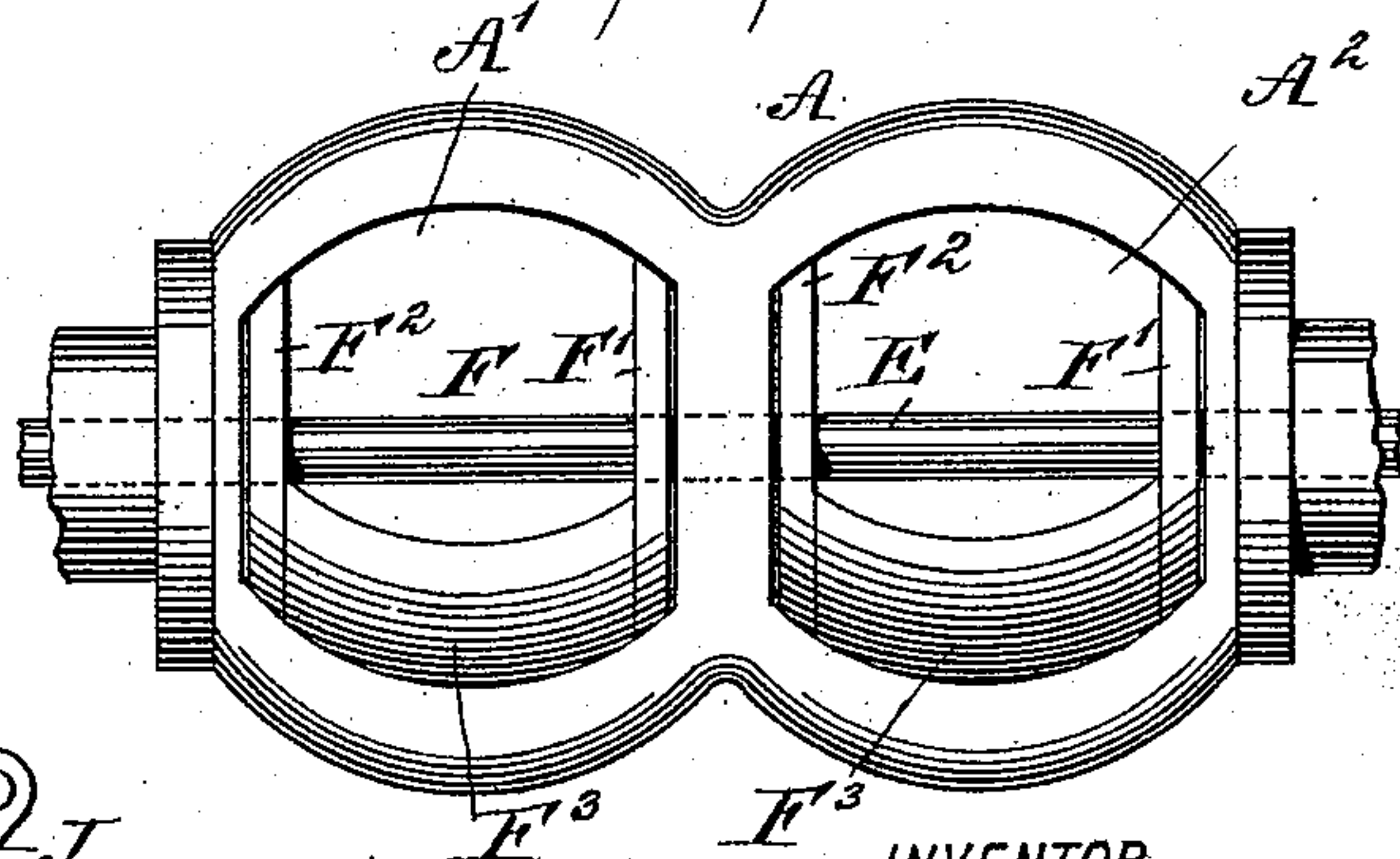
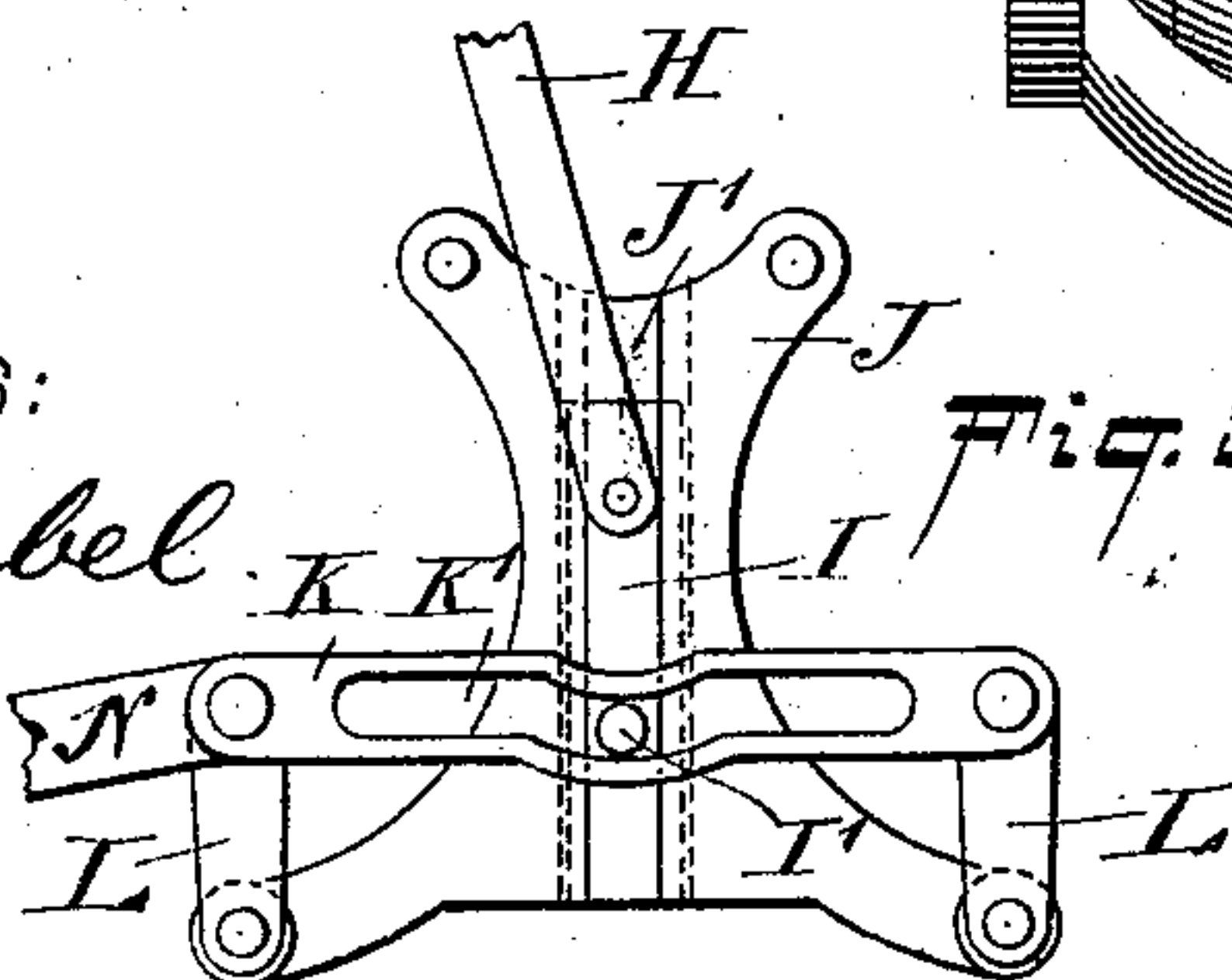


Fig. 5.



**WITNESSES:**

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# UNITED STATES PATENT OFFICE.

JOHN O'NEILL, OF PLAINVIEW, ILLINOIS.

## EXHAUST-NOZZLE FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 516,899, dated March 20, 1894.

Application filed September 16, 1893. Serial No. 485,668. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN O'NEILL, of Plainview, in the county of Macoupin and State of Illinois, have invented a new and Improved Exhaust-Nozzle for Locomotives, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved exhaust nozzle, which is simple and durable in construction, arranged to relieve the working parts of the locomotive engines of any back pressure, adapted for ready application on all kinds of locomotives, and at all times under the full control of the engineer.

The invention consists of a cut-off arranged in the stand pipe and actuated from the reversing shaft of the locomotive engines.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied. Fig. 2 is an enlarged sectional side elevation of the revoluble cut-off, the section being taken on the line 2—2 of Fig. 3. Fig. 3 is a transverse section of the same. Fig. 4 is a plan view of the same; and Fig. 5 is an enlarged side elevation of the device for shifting the cut-off.

The improved exhaust nozzle is provided with the nozzle casing A, secured on the upper end of the stand-pipe B, into which passes the exhaust steam from the cylinders of the locomotive engines C. The exhaust casing A is arranged within the smoke box D of the locomotive boiler, directly under the stack, as indicated in dotted lines in Fig. 1. The nozzle casing A is formed with two or more compartments A', A<sup>2</sup>, according to the style of engines used on the locomotive, thus for the ordinary engines two compartments are used, and for compound engines, four such compartments are necessary.

In each casing A is journaled a transversely extending shaft E, passing through the several compartments and provided in each compartment with a cut-off F, operating in the

contracted end A<sup>3</sup> of the respective compartments in the casing A. A cut-off F comprises two disks F' and F<sup>2</sup>, secured on the shaft E and fitted against opposite sides of the compartment in the casing A, and the said disks are connected with each other by a cross-piece F<sup>3</sup> adapted to pass into the contracted end A<sup>3</sup> of the respective compartment so as to decrease the opening and cut off the steam, according to the working of the engines, as hereinafter more fully explained. The several cut-offs F have their cross bars or pieces F<sup>3</sup> arranged in alignment with one another, so that the openings in the contracted ends A<sup>3</sup> are simultaneously decreased whenever the cut-off is actuated, as hereinafter more fully described. The shaft E extends through a hollow offset A<sup>4</sup> projecting from the casing A, the extreme outer end of the said shaft passing through the shell of the boiler to the outside thereof, as plainly shown in Fig. 1. On this outer end of the shaft E is secured a crank arm G, pivotally connected by a link H with a slide I, mounted to slide vertically in guide-ways J' formed on a bracket J bolted or otherwise secured to the locomotive boiler, see Fig. 1. On the slide I is arranged a pin I' extending into a slot K' formed in a bar K arranged horizontally and pivotally connected with two links L fulcrumed on the bracket J. The ends of the slots K' are straight, while the middle portion is curved, as plainly shown in Fig. 5, so that during part of the longitudinal movement of the said bar K the pin I' remains at a standstill, but when the said pin is engaged by the straight ends of the slot, it is moved downward so that a like movement is given to the slide I and link H. The movement of the latter causes a swinging of the crank arm G, so that the shaft E is turned and the several cut-offs increase the openings in the contracted ends A<sup>3</sup> of the compartments. The bar K is pivotally connected by a link N with an arm O secured on the reversing shaft P on the locomotive engines C, the said shaft being connected with the valves, in the usual manner, and by a link Q with the cab of the locomotive, so that the said shaft is under the control of the operator. Thus when the engineer moves the reversing lever, a rocking motion is given to the reversing shaft P so that the valves are shifted in



the engines C and, at the same time, the crank arm O, by the link N, imparts a longitudinal movement to the bar K so that the latter acts on the pin I', as above described, 5 to shift the cut-off F in each compartment to decrease the opening in the contracted end of the respective compartments A' and A<sup>2</sup>. Thus it will be seen that the engineer on manipulating the valves in the cylinders at the 10 same time controls and manipulates the cut-offs in the nozzle casing. By this arrangement, no back pressure whatever will be experienced in the engine cylinders, and at the same time the necessary draft will be 15 given in the boiler flues, so that considerable fuel will be saved.

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

- 20 1. An exhaust nozzle for locomotives comprising a nozzle casing held on a stand pipe and provided with a contracted outlet a revoluble cut off secured to a shaft and arranged at the said contracted outlet, a hollow off set 25 projecting from the casing and through which the said shaft extends, and means substantially as described for manipulating the said cut off from the reversing shaft of the engine as set forth.
- 30 2. An exhaust nozzle for locomotives comprising a nozzle casing having its open end contracted and curved upon the arc of a circle and a cutoff valve working in the contracted end of the casing and comprising the 35 side disks secured on a shaft and fitted against opposite sides of the casing and a transverse

cutoff bar connecting the disks, the outer side of the said cutoff bar being curved to correspond with the curvature in the contracted end of the casing and means for actuating 40 said cutoff valve, substantially as shown and described.

3. An exhaust nozzle for locomotives, comprising a nozzle casing held on the stand pipe and provided with compartments having contracted outlets, revoluble cut-offs arranged in 45 the said compartments at the said contracted outlets, a shaft carrying the said cut-offs, a crank arm held on the said shaft, a link connected with the said crank arm, a slide pivotally connected with the said link and provided with a pin, and a slotted bar mounted to swing and engaged by the said pin, substantially as shown and described. 50

4. An exhaust nozzle for locomotives, comprising a nozzle casing held on the stand pipe and provided with compartments having contracted outlets, revoluble cut-offs arranged in 55 the said compartments at the said contracted outlets, a shaft carrying the said cut-offs, a crank arm held on the said shaft, a link connected with the said crank arm, a slide pivotally connected with the said link and provided with a pin, a slotted bar mounted to swing and engaged by the said pin, and a link 60 connected with the said bar and with the reversing shaft of the engine, substantially as shown and described.

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Witnesses:

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