

No. 796,080.

PATENTED AUG. 1, 1905.

C. H. LEWIS & J. SMITH.  
ADJUSTABLE EXHAUST FOR LOCOMOTIVES.

APPLICATION FILED NOV. 23, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

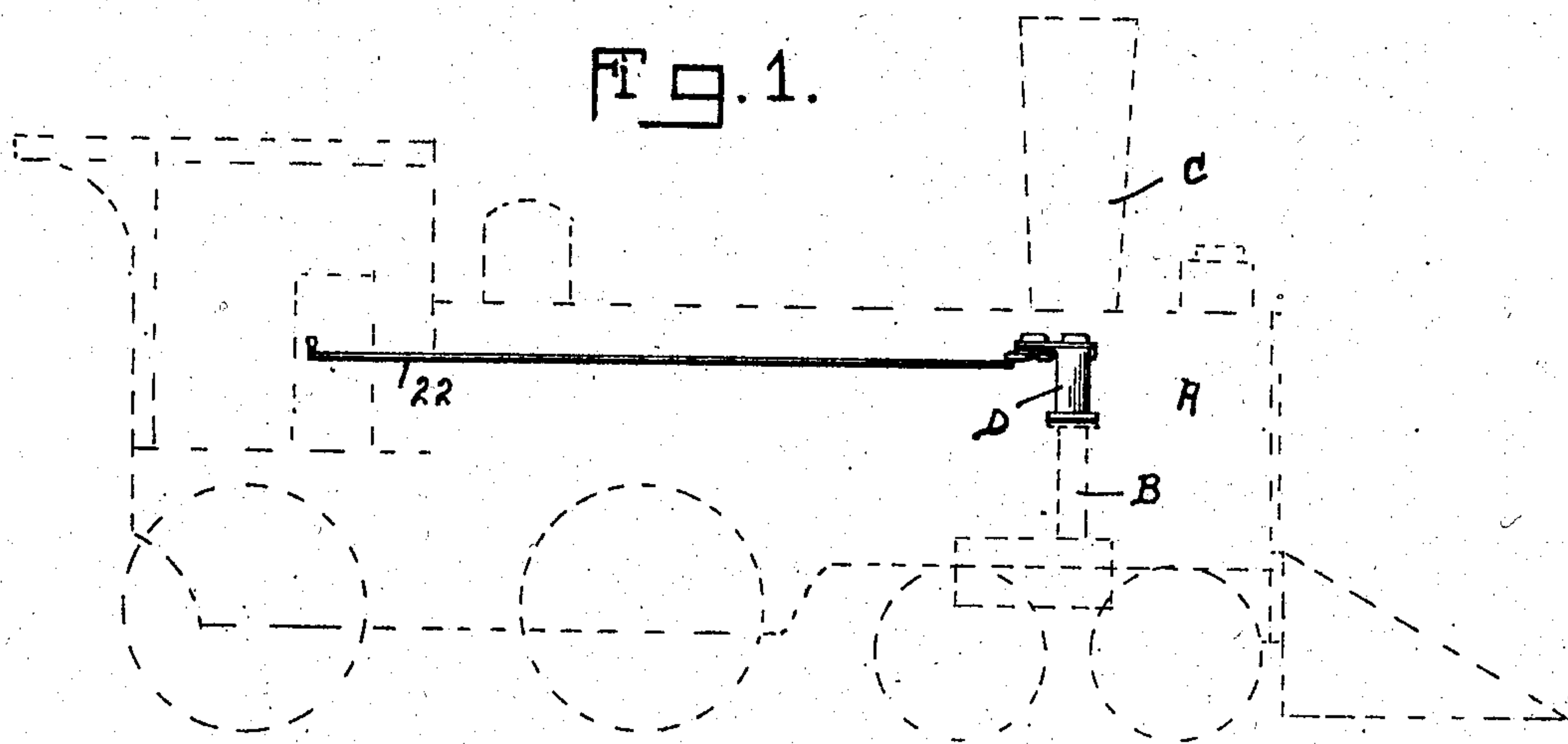
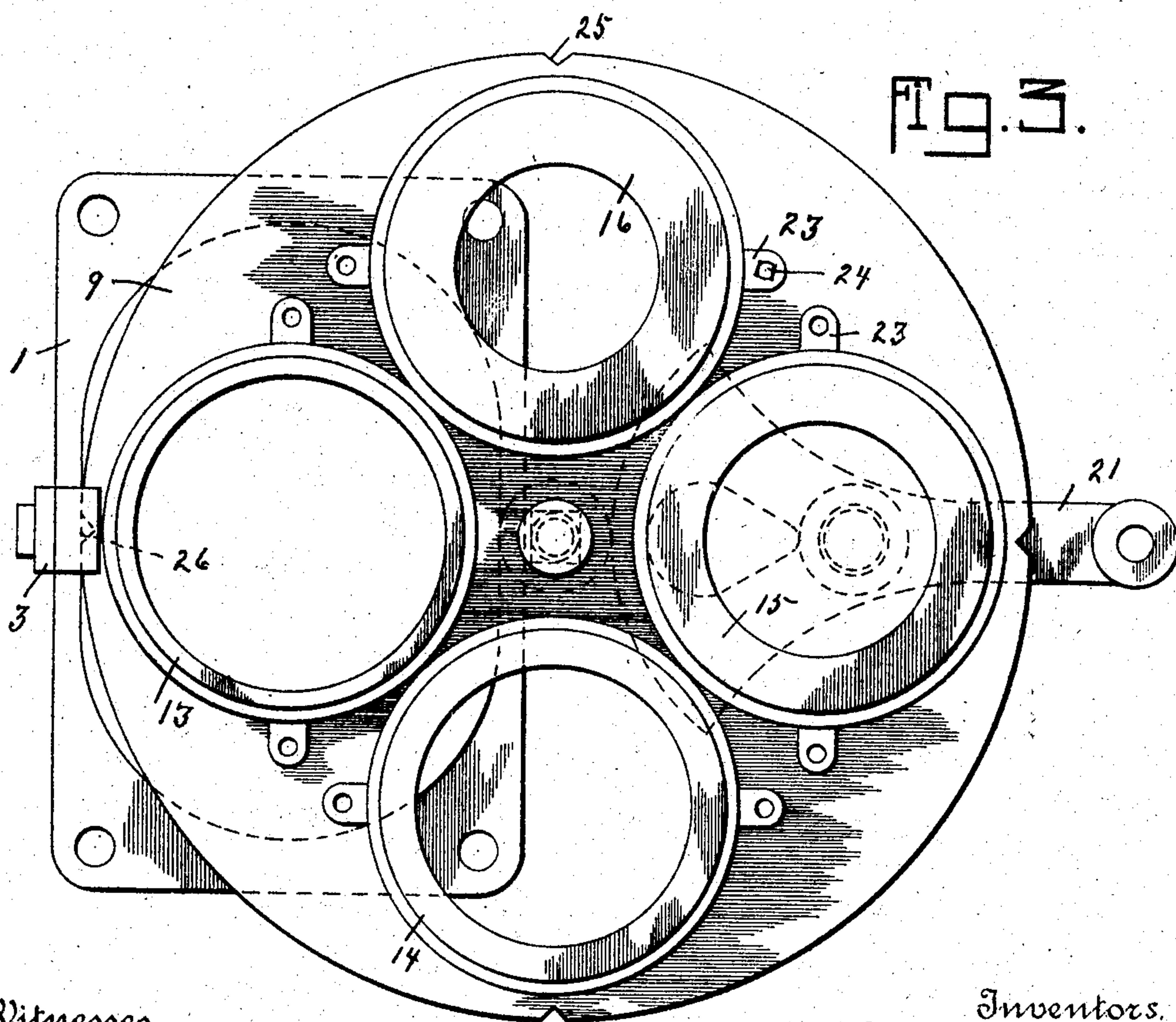


Fig. 3.



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2 SHEETS—SHEET 2.

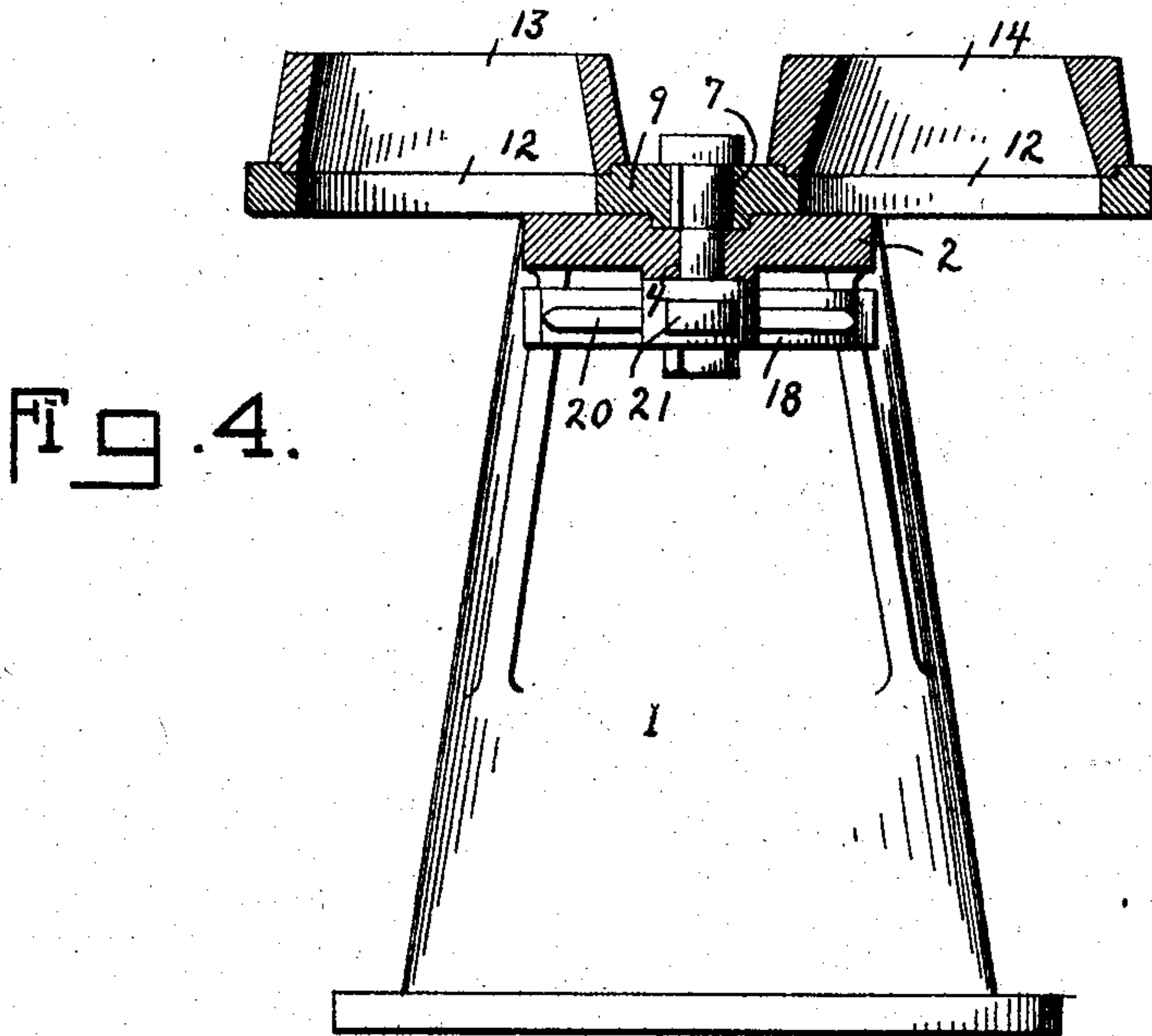


Fig. 4.

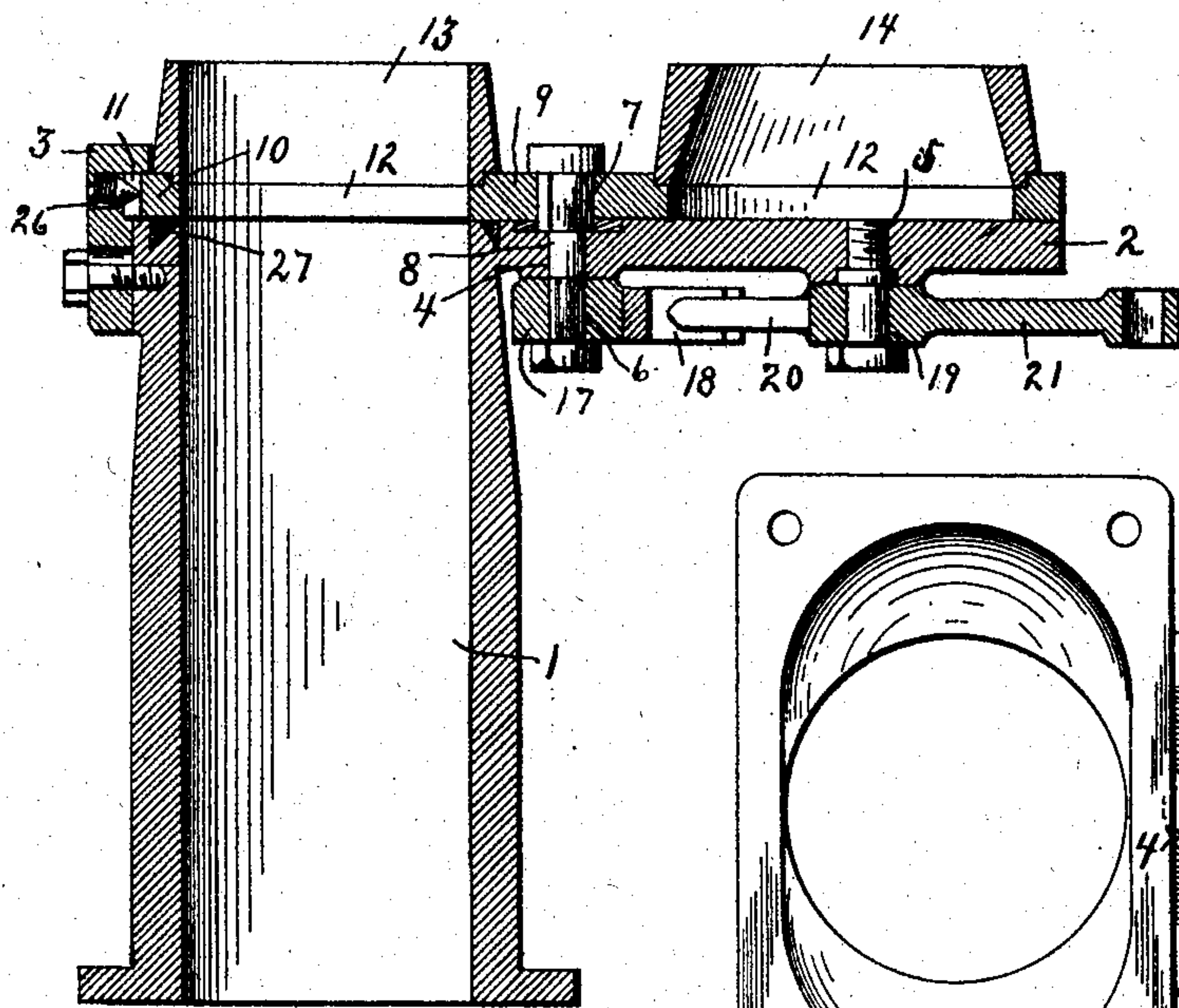
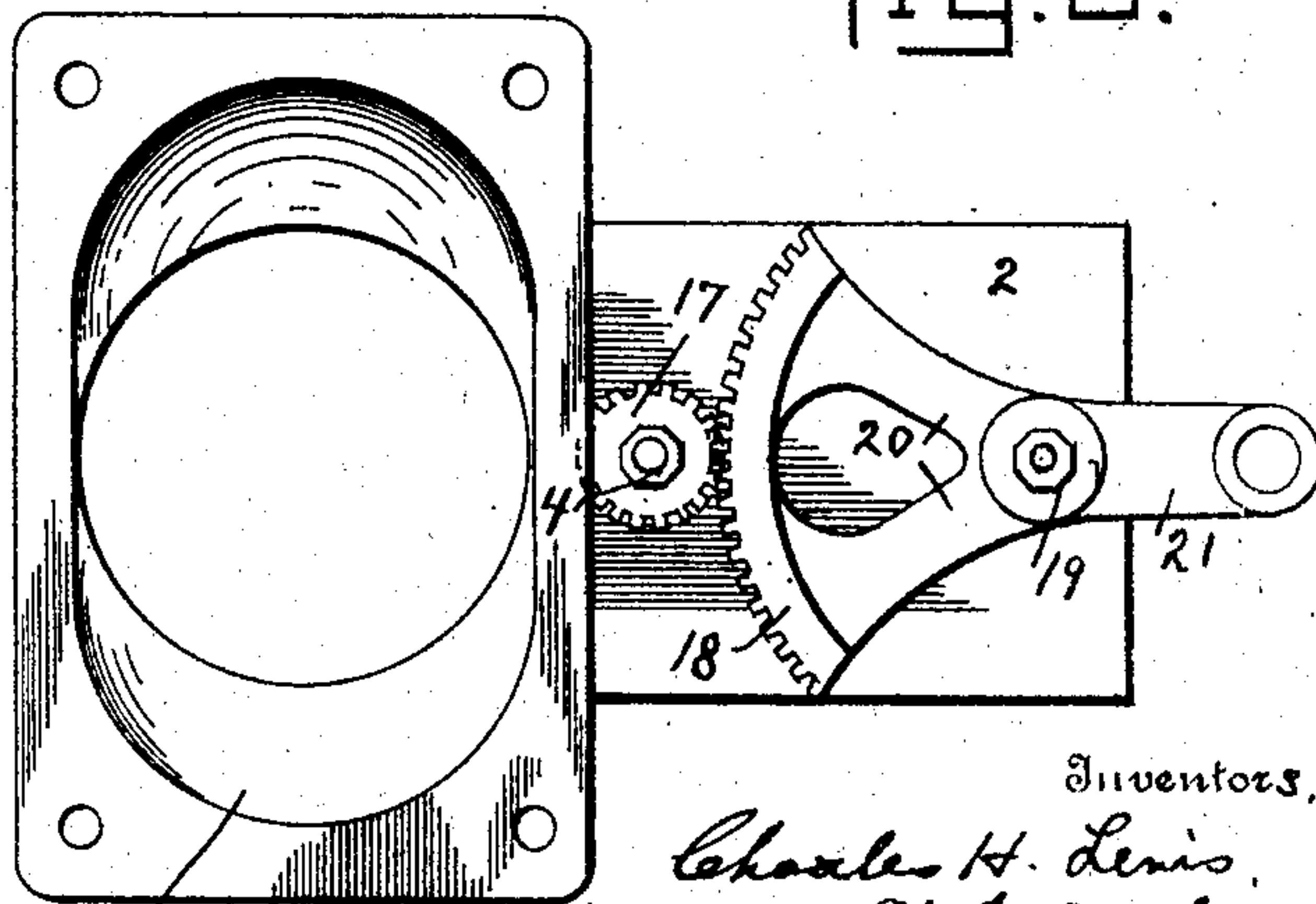


Fig. 2.

Fig. 5.



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# UNITED STATES PATENT OFFICE.

CHARLES H. LEWIS AND JEREMIAH SMITH, OF WASHINGTON, DISTRICT OF COLUMBIA.

## ADJUSTABLE EXHAUST FOR LOCOMOTIVES.

No. 796,080.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed November 23, 1904. Serial No. 234,032.

*To all whom it may concern:*

Be it known that we, CHARLES H. LEWIS and JEREMIAH SMITH, citizens of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Adjustable Exhausts for Locomotives, of which the following is a specification.

Our present invention relates to improvements in adjustable exhausts for locomotives; and the main object of the invention is the provision of a series of various-sized nozzles which are adapted to be interposed below the smoke-stack so as to regulate at an instant the diameter of the exhaust which passes through the smoke-stack. It is a known fact that where there are no means of this character provided in locomotives that in going up grades or in starting pressure is so great that it becomes, as it were, congested in the exhaust to such an extent as to effect the pressure in the cylinders and practically cause a back pressure. It has therefore been our object to provide a means whereby this difficulty can be overcome by throwing in various-diametered nozzles, which control the diameter of the exhaust.

To carry this invention into effect, we provide a means which is mounted in the forward portion of the engine below the smoke-stack, but readily operable from the exterior and the cab of the engine, whereby a series of nozzles can be placed in alinement with the smoke-stack, said nozzles all being of different diameters.

To attain these objects, the invention consists of an adjustable exhaust for locomotives embodying novel features of construction and combination of parts substantially as disclosed herein.

In the accompanying drawings, Figure 1 is a locomotive shown in outline with our invention in operative position therein. Fig. 2 is an enlarged detail sectional view of our invention removed from the locomotive. Fig. 3 is a top plan view thereof. Fig. 4 is a front elevation thereof, partly in section; and Fig. 5 is a bottom plan view showing the mechanism for operating the disk carrying the nozzles.

Referring to the drawings, A designates the forward portion of the locomotive, which is provided, as usual, with the steam-exhaust

pipes B and the smoke-stack C, our invention D being mounted, as clearly shown therein.

Our invention consists substantially of the cylindrical support 1, which is provided with the supporting-arm 2 at its top and to one side thereof and with the guide-plate 3 at its top to the opposite side thereof. The supporting-arm 2 is provided with openings 4 and 5, the opening 4 of which is adapted to receive the shaft 6, which is threaded upon its lower end, headed upon its upper end, and provided with the intermediate shouldered portion 7 and smooth bearing portion 8, the smooth bearing portion 8 being adapted to engage the opening of the arm, while the shouldered portion fits within the rectangular opening of the disk 9. The said disk 9 rests upon the upper surface of the arm and has its periphery 10 mounted in the recess 11 of the guiding-plate 3, so that the disk may revolve and be kept in proper alinement. This disk is provided with a series of openings 12, in which are mounted the nozzles 13 14 15 16, each one of which is of different diameter, the purpose of which will presently appear.

Mounted upon the lower portion of the shaft 6 is a small pinion or gear 17, which is adapted to mesh with the toothed segment 18, carried upon the pivot 19, mounted in the opening 5 of the arm, each outer end 20 of the segment being connected to a rod 21, which projects without the engine-boiler and is connected to a controlling lever or rod 22, mounted in the cab of the engine. By this mechanism the segment is operated upon so as to revolve the pinion, and consequently the disk.

Each one of the nozzles is provided with the oppositely-extending lugs 23, through which are adapted to pass bolts 24, so as to secure the nozzles in the proper position upon the disk. In the periphery of this disk and opposite the central points of each one of the openings therethrough we provide a triangular notch 25 in order that the openings may be stopped so as to be in alinement with the smoke-stack of the engine, by means of the spring-actuated stop 26.

The support 1 is of course connected with the steam-exhaust so that when the nozzles are in alinement with the upper end of the exhaust the volume of steam passing through the smoke-stack is limited in diameter accord-



ing to the diameter of the nozzle. Thus the volume can be enlarged or reduced, as may be desired, by simply operating the lever in the cab so as to revolve the disk carrying the nozzles. To prevent escape between top of 1 and disk, we employ packing-ring 27.

From the foregoing description, taken in connection with the drawings, it is evident that we provide a device of this character embodying novel features of construction and combination of parts which render the device thoroughly efficient and practical for the intended purpose.

In starting a train you can adjust the nozzle to the largest diameter, which will allow the engine to clear herself quicker and be less severe on the fire as in a smaller nozzle. It will also cause less noise and less dirt in starting away from station. After the engine is under headway the nozzle can be adjusted to suit cut-off of the engine. For instance, if engine is using five-inch nozzle at eight-inch cut-off high-speed engine, it can be readily adjusted to suit a eleven or twelve inch cut-off, which will give power to the engine and be a saving to fuel, as a five-inch nozzle at eleven or twelve inch cut-off would be too severe on fire. In drifting at a high rate of speed the nozzle can be adjusted to the largest diameter, which will allow engine to free herself of any vacancy that forms in the cylinders, which will no doubt give better results.

What we claim as new, and desire to secure by Letters Patent, is—

1. In combination with a locomotive having a smoke-stack and an exhaust-pipe below and in line with the smoke-stack, of a rotary disk provided with a series of different-diametered nozzles adapted to aline one at a time with the mouth of the exhaust-pipe for limiting the volume of exhaust therethrough and means controllable from the cab for operating said disk.

2. In combination with a locomotive having a smoke-stack and an exhaust-pipe below and in alinement with said smoke-stack, of a rotary disk carrying a series of different-diametered nozzles mounted at the mouth of the exhaust-pipe, and mechanism for revolving the disk so as to cause one at a time to be in alinement with the exhaust-pipe.

3. In combination with a locomotive having a smoke-stack and an exhaust-pipe in alinement therewith, of an adjustable exhaust therefor consisting of a support, a disk provided with a series of openings mounted rotatably upon the said support, a series of different-diametered nozzles removably secured to said disk and in alinement with said opening and mechanism for revolving the disk so that one nozzle at a time is in alinement with the smoke-stack and the exhaust-pipe.

4. In combination with a locomotive having a smoke-stack and an exhaust-pipe in

alinement therewith, of an adjustable exhaust therefor consisting of a support, a disk provided with a series of openings mounted rotatably upon the said support, a series of different-diametered nozzles removably secured to said disk and in alinement with said opening, and means for revolving the disk, so that one nozzle at a time is in alinement with the smoke-stack and the exhaust-pipe, said means being controllable from the cab of the engine.

5. In combination with a locomotive having a smoke-stack and an exhaust-pipe in alinement therewith of an adjustable exhaust therefor, consisting of a support, a disk provided with a series of openings mounted rotatably upon the said support, a series of different-diametered nozzles removably secured to said disk and in alinement with said opening, a pinion carried by the disk, a toothed segment meshing with said pinion and mechanism for operating the segment to revolve the disk.

6. In combination with a locomotive having the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting of a circular disk rotatably supported at the upper end of said pipe, said disk being provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, and mechanism controllable from the cab for rotating said disk to cause one opening at a time to aline with said pipe.

7. In combination with a locomotive having the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting of a support formed integral with the rear upper end of said pipe, a disk rotatably supported by said support and provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, and mechanism controllable from the cab for operating said disk.

8. In combination with a locomotive having the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting of a support formed integral with the rear upper end of said pipe, a shaft passing through said support of the pipe, a disk carried by the upper end of said shaft provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, a pinion carried by the lower end of said shaft, a toothed segment journaled below said support in engagement with said pinion whereby the disk is rotated, and mechanism controllable from the cab for operating the segment.

9. In combination with a locomotive having the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting



of a circular disk rotatably supported at the upper end of said pipe, said disk being provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, removable nozzles secured in the openings of said disk, and mechanism controllable from the cab for rotating said disk to cause one opening at a time to aline with said pipe.

10. In combination with a locomotive having the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting of a support formed integral with the rear upper end of said pipe, a disk rotatably supported by said support and provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, removable nozzles secured in the openings of said disk, and mechanism controllable from the cab for operating said disk.

11. In combination with a locomotive hav-

ing the exhaust from the cylinders terminating in a single stack or pipe, of means for adjusting the flow of exhaust from said pipe, consisting of a support formed integral with the rear upper end of said pipe, a shaft passing through said support of the pipe, a disk carried by the upper end of said shaft provided with a series of different-diametered openings adapted to aline one at a time with the upper end of said pipe, removable nozzles secured in the openings of said disk, a pinion carried by the lower end of said shaft, a toothed segment journaled below said support in engagement with said pinion whereby the disk is rotated, and mechanism controllable from the cab for operating the segment.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES H. LEWIS.  
JEREMIAH SMITH.

Witnesses:

EMORY H. BOGLEY,  
B. C. RUST.