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PATENTED MAR. 27, 1906.

F. M. LEAVITT.
RETARDING DEVICE FOR AUTOMOBILE TORPEDOES.

APPLICATION FILED JULY 18, 1904.

2 SHEETS—SHEET 1.

FIG. 1.

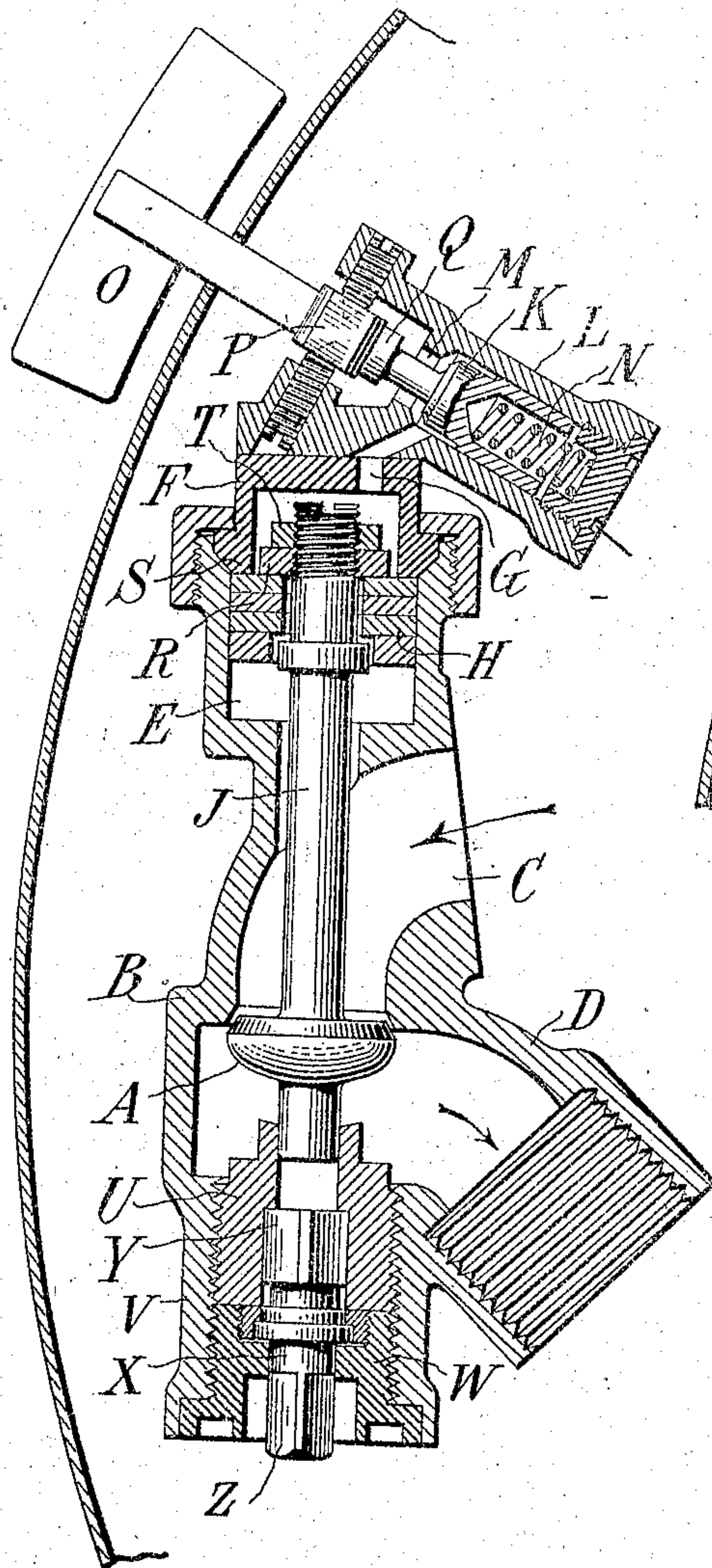


FIG. 2.

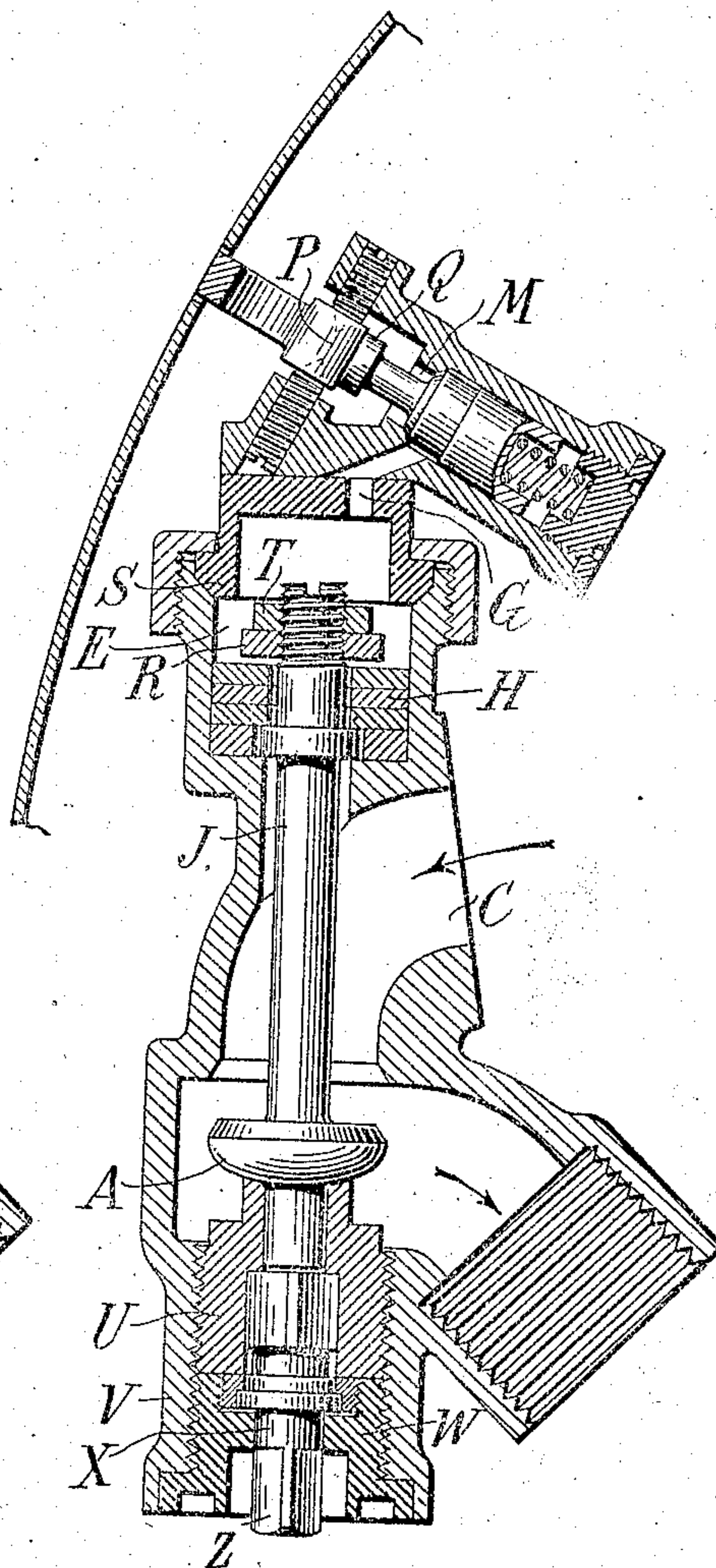


FIG. 3.

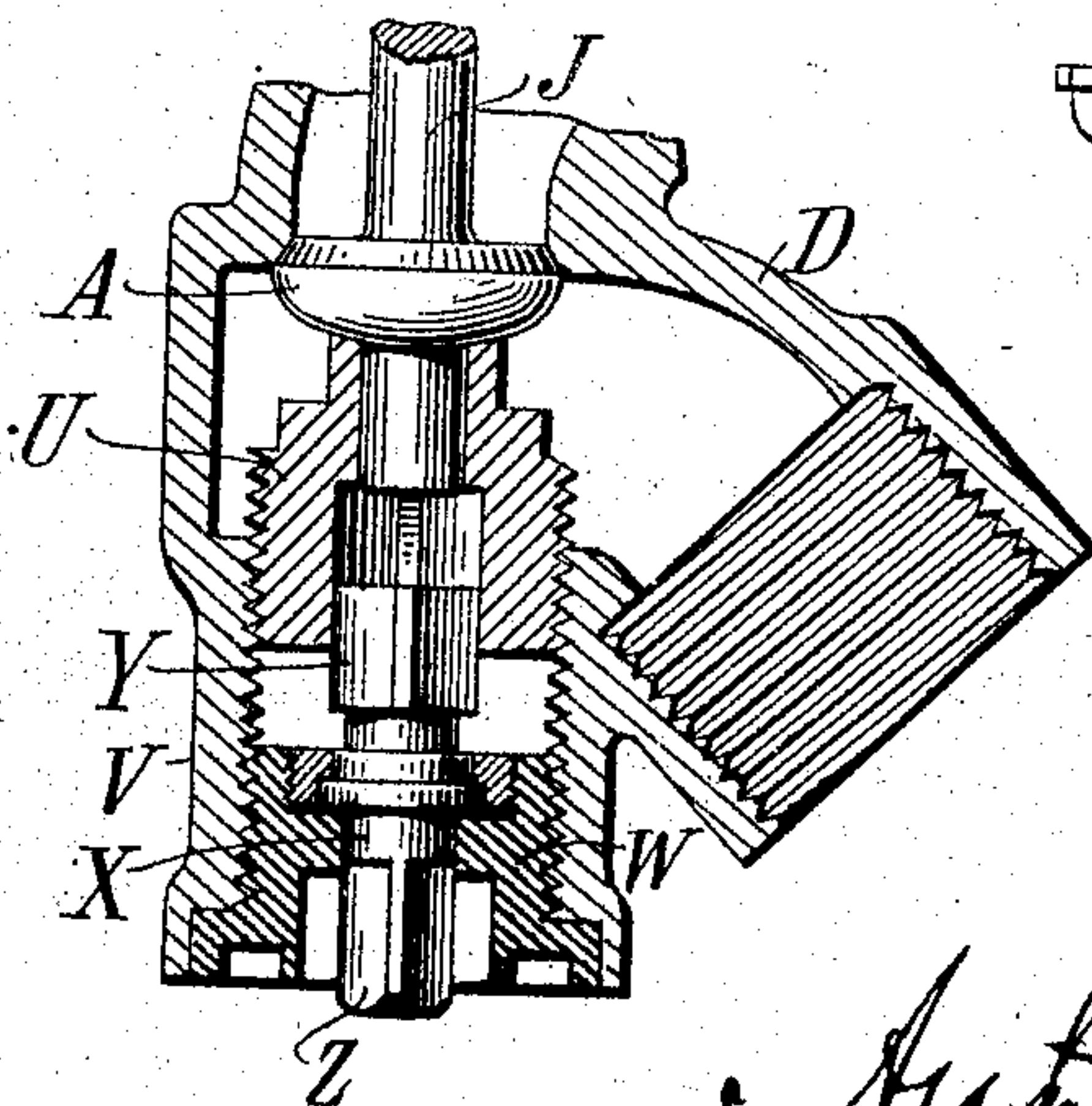
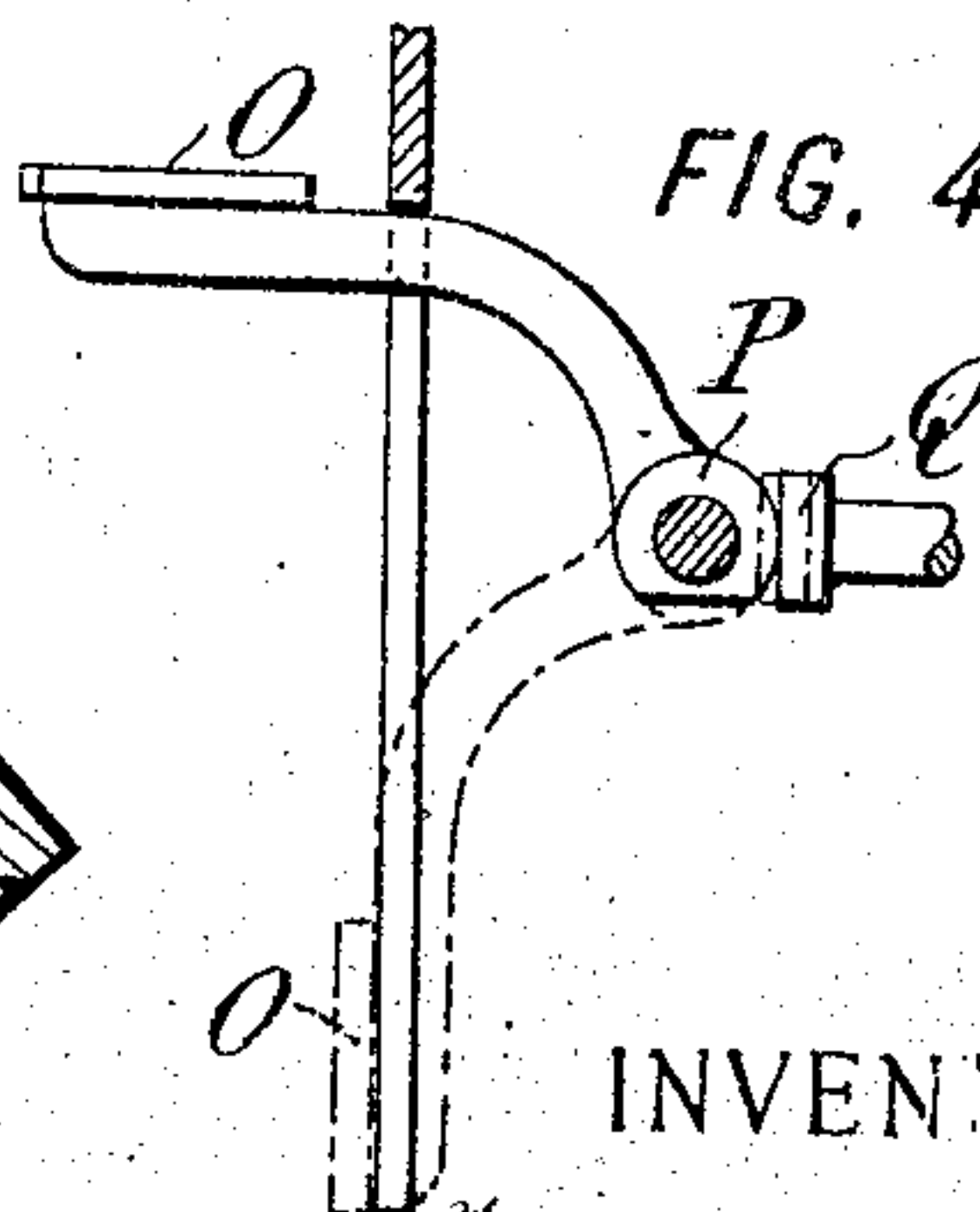


FIG. 4.



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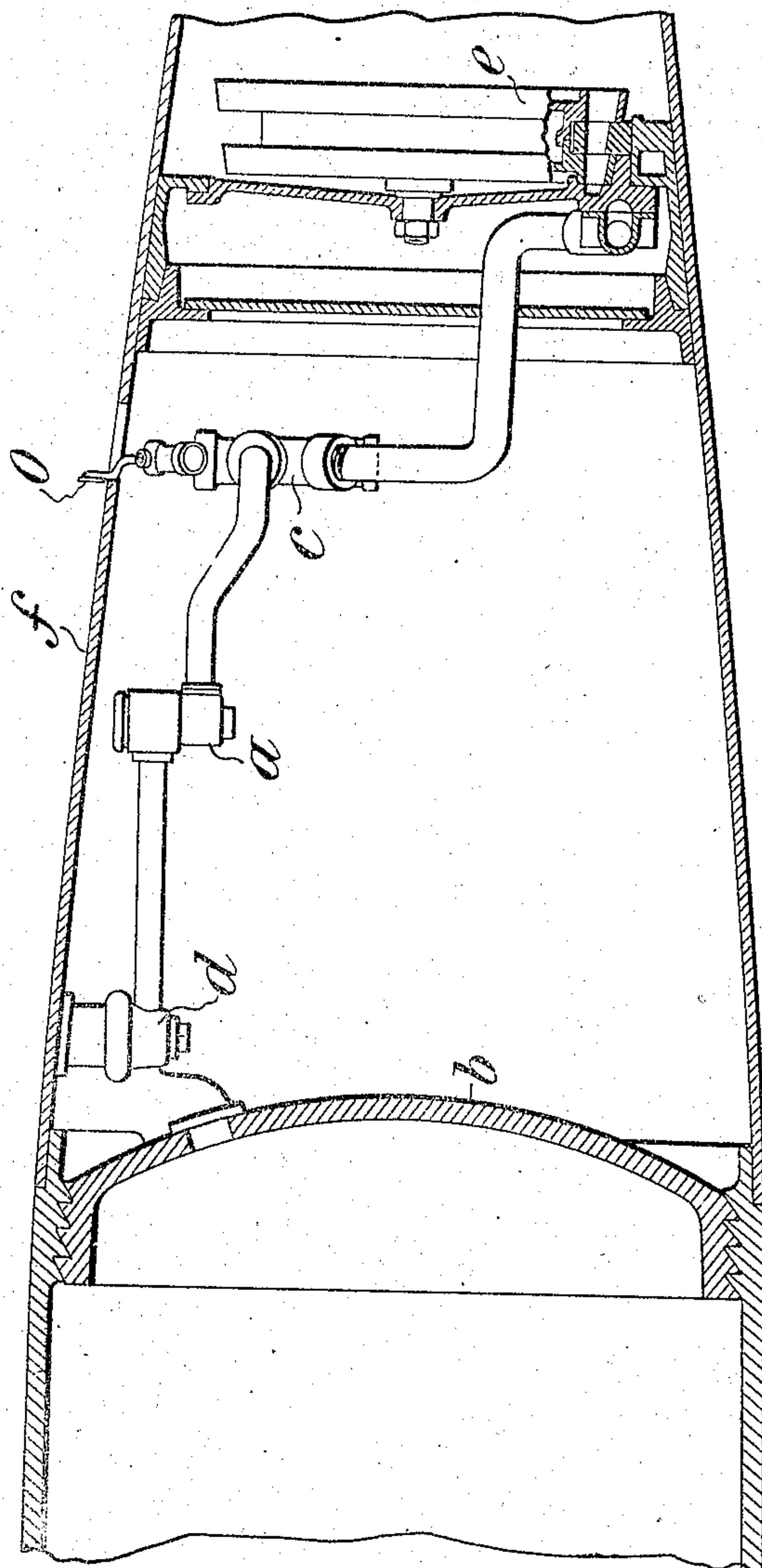
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2 SHEETS—SHEET 2.

FIG. 5.



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FRANK M. LEAVITT, OF NEW YORK, N. Y.; ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

RETARDING DEVICE FOR AUTOMOBILE TORPEDOES.

No. 816,019.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed July 18, 1904. Serial No. 217,104.

To all whom it may concern:

Be it known that I, FRANK M. LEAVITT, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Retarding Devices for Automobile Torpedoes, of which the following is a specification.

The object of this invention is to provide an improved means for preventing undue racing of the engine of a torpedo when the latter has been launched from a tube above water and before the torpedo passes into the water.

Ordinarily the main valve, which controls the supply of fluid under pressure to the engine and which is ordinarily a pressure-reducing valve, is opened by a trip which engages a suitable projection in the launching-tube and by suitable intermediate connections opens the main valve. In previous torpedoes the main or pressure-reducing valve has been so constructed as to be only partially opened by the action of the trip described and is fully opened only after the torpedo has entered the water. According to this invention an additional retarding-valve is provided between the main or pressure-reducing valve and the engine, which valve is normally held in a throttling position to permit the passage of only sufficient fluid for starting the engine, and this valve is released and opened wide when the torpedo enters the water. This retarding-valve is preferably held in its retarding position by the motive fluid and is moved to its open position by the same fluid, the two different effects being secured by an auxiliary valve under control of a water-tripper or the like.

This invention provides certain other advantages referred to in detail hereinafter.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a central section showing the retarding-valve in its normal or throttling position. Fig. 2 is a similar section showing the retarding-valve open. Fig. 3 is a similar section of a portion of the mechanism, showing the retarding-valve used as a stop-valve. Fig. 4 is an elevation of the water-tripper viewed at right angles to the position of Fig. 1. Fig. 5 is a more or less diagrammatic view indicat-

ing the arrangement of the retarding-valve in the torpedo.

Referring to the embodiment of the invention illustrated, the valve A is arranged in a casing B, provided with a branch C for connection with the main or pressure-reducing valve and with a branch D for connection with the engine—as, for example, with the nozzle of a turbine-engine. The casing B is provided with an upper chamber E, having a separate end or head F, through which is a small port G. A piston H fits in the chamber E and surrounds the upper end of the valve-stem J. The piston fits loosely upon the valve-stem or within the chamber, so as to permit a leakage of the fluid from the under to the upper side of the piston, or a special small passage might be provided for the same purpose. An auxiliary valve K is provided in a casing L, attached to the head F and communicating with the passage G therethrough. The casing L has at one end a passage M, leading to the atmosphere, and which passage is adapted to be closed by the outward movement of the valve K under the pressure of the spring N. A water-tripper O is pivoted between extending arms of the casing L and has a cam-head P bearing upon the head Q of the auxiliary valve K.

When the tripper O is turned to its upper or projecting position, Figs. 1 and 4, the cam P bears against the head Q and holds the valve K open. This is the position to which the tripper is thrown before the torpedo is launched. With the parts in this position the fluid under pressure enters the main-valve chamber at C and presses upward against the piston H, which engages the stop R on the end of the valve-spindle, and thus constitutes a means for retarding admission of pressure to the engine by holding the valve A up to its throttling position, any leakage of air past the piston H being to the atmosphere through the open auxiliary valve-port M. As soon as the torpedo passes into the water the force of its movement through the water throws down the trip O to the position of Fig. 2 and of the dotted lines in Fig. 4 and cuts off the connection to the upper side of the piston H with the atmosphere, rendering said piston inoperative to further retard admission of pressure to the engine. The pressure fluid

which leaks past the piston H then soon establishes a balance of pressure on opposite sides of the piston H, and the pressure upon the top of the valve A moves the valve downward to its wide-open position.

The head F of the cylinder or chamber E is of less diameter than the cylinder, and this provides a shoulder S, which limits the upward movement of the piston H. The stop R is designed to be adjusted by screwing it up or down on the valve-stem J and holding it in place by means of the set-nut T. By this means the normal position of the valve A may be adjusted, this position being preferably such as to partly and preferably slightly open the valve A, so that when the main valve is open the fluid somewhat throttled, and therefore in restricted volume, is admitted to the engine to overcome the inertia of the same and start it before the torpedo reaches the water.

Preferably a special mechanism is provided, whereby the valve may be permanently closed. For example, a nut or plug U may be screwed up or down in the lower end V of the casing, the upper end of said plug forming a limiting-stop for the downward movement of the valve A. The lower end of the casing may be closed by a nut W and the rotation of the plug U accomplished by a short shaft X, having an inner squared (or otherwise non-circular) end Y, engaging a similar but longer socket in the plug U, and having an outer non-circular end Z for engagement by a wrench or the like. By screwing up the plug U to the position of Fig. 3 the valve A is closed entirely and the motive fluid cannot be admitted to the engine. The valve may be held in this position, for example, when it is desired to practice launching the torpedoes without using up their motive power. On the other hand, when the plug U is screwed down to the position of Fig. 2 the valve may be opened its widest. This wide-open position may be adjusted, if desired, by means of the same plug U. This plug serves at the same time as a convenient guide for the lower stem of the valve.

A suitable arrangement of the retarding-valve is indicated diagrammatically in Fig. 5. A pressure-reducing valve *a* may be introduced between the compressed-air reservoir *b* and the retarding-valve, which is indicated as a whole at *c*, or the pressure-reducing valve *a* may be omitted. The compressed air passes from the reservoir through the stop-valve *d* after the latter has been opened by hand, as is well understood, and to the retarding-valve, and thence in small quantities to the engine, (indicated diagrammatically at *e*.) The water-tripper O projects out of the hull *f* and as the torpedo plunges into the water is thrown backward to lie flat against the hull, as explained, and

to permit a gradually-increasing opening of the retarding-valve and a gradually-increasing flow of compressed air to the engine until the normal maximum is obtained.

Though I have described with great particularity of detail a certain specific embodiment of the invention, yet it is not to be understood therefrom that the invention is limited to the specific embodiment described. Various modifications thereof in detail and in the arrangement and combination of the parts may be made by those skilled in the art without departure from the invention.

What I claim is--

1. In a torpedo operated by fluid under pressure, a retarding-valve, and means operated by said fluid for temporarily holding said valve closed to a desired extent and subsequently permitting said valve to open.

2. In a torpedo operated by fluid under pressure, means operated by said fluid for retarding its admission to the engine, said means being rendered inoperative to further retard such admission by the passage of the torpedo into the water.

3. A retarding means for torpedoes comprising in combination a piston, means admitting fluid under pressure to one side thereof, and means for exposing the opposite side of the piston to the atmosphere or cutting it off therefrom, the parts being constructed and arranged to permit a leakage of the pressure fluid from one side to the other of the piston so as to balance the pressure thereon when it is cut off from the atmosphere.

4. A retarding means for torpedoes comprising in combination a piston, means admitting fluid under pressure to one side thereof, the opposite side thereof being normally exposed to the atmosphere, and means controlled by the passage of the torpedo into the water for cutting said opposite side off from the atmosphere, the parts being constructed and arranged to permit a leakage of the pressure fluid from one side to the other of the piston so as to balance the pressure thereon when it is cut off from the atmosphere.

5. A retarding means for torpedoes comprising in combination a piston moving in a chamber, means admitting fluid under pressure to one side of said piston, and a valve for opening said chamber at the opposite side of the piston to the atmosphere or cutting it off therefrom, the parts being constructed and arranged to permit a leakage of the pressure fluid from one side of said piston to the other so as to balance the pressure thereon when such valve is closed.

6. A retarding means for torpedoes comprising in combination a piston H working in a chamber E into which pressure is admitted at one side of said piston, a valve K for opening said chamber at the opposite side of the piston to the atmosphere or cutting it off

therefrom, means tending normally to close said valve, and a water-tripper arranged to hold said valve open while in its elevated position and to release said valve when in its lowered position.

7. In a torpedo, a source of motive fluid, an engine, and a valve in the passage leading from said source to the engine and normally partly open to permit starting of the engine slowly before admitting full pressure thereto, and means for automatically opening said valve farther to admit full pressure.

8. In a torpedo, a retarding-valve, a piston arranged to receive the pressure of the motive fluid and engage the valve-stem to hold said valve in its normal position, and means for adjusting the amount of opening of said valve in its normal position.

9. In a torpedo, a compressed-air reservoir and an engine, a valve controlling the passage from said reservoir to said engine and held closed to a desired extent by the pressure of air from said reservoir, and adapted to be opened farther to admit air to the engine, and a movable plug arranged to permit the opening of said valve or to close the same permanently.

10. In a torpedo, a retarding-valve, means for opening the same when the torpedo passes into the water, and a movable plug arranged to permit the opening of said valve or to close the same permanently.

11. In a torpedo, a retarding-valve nor-

mally partly open to permit starting the engine slowly, means for opening the same wide when the torpedo passes into the water, and means for holding said valve permanently closed.

12. In a torpedo, in combination with a main valve for controlling a supply of fluid under pressure to the engine, an additional retarding-valve controlled by said fluid for temporarily retarding admission of the motive fluid to the engine.

13. In a torpedo, in combination with a main valve for controlling a supply of fluid under pressure to the engine, an additional retarding-valve, and means for holding said retarding-valve in a throttling position, said means being rendered inoperative to hold the valve and thus permitting it to be released and opened wide when the torpedo enters the water.

14. In a torpedo in combination a valve A, a stop R on the upper end of the stem thereof, and a piston H on the upper end of the stem and loosely engaging the same, and a cylinder E in which said piston moves.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK M. LEAVITT.

Witnesses:

DOMINGO A. USINA,
FRED WHITE.