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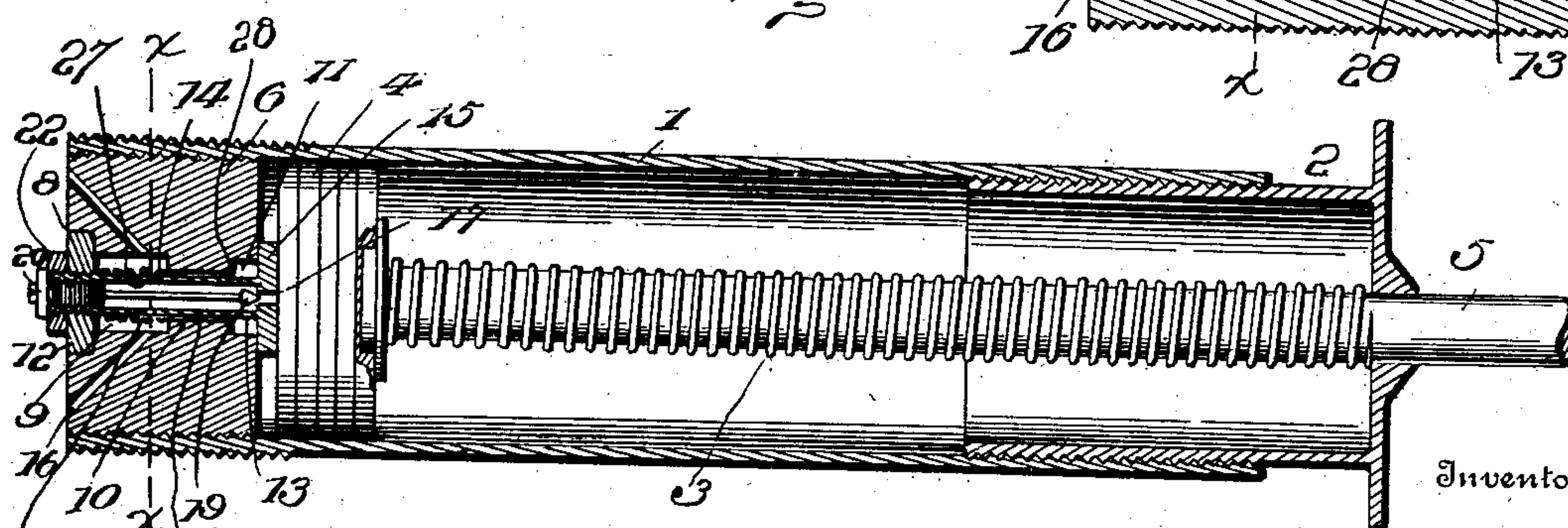
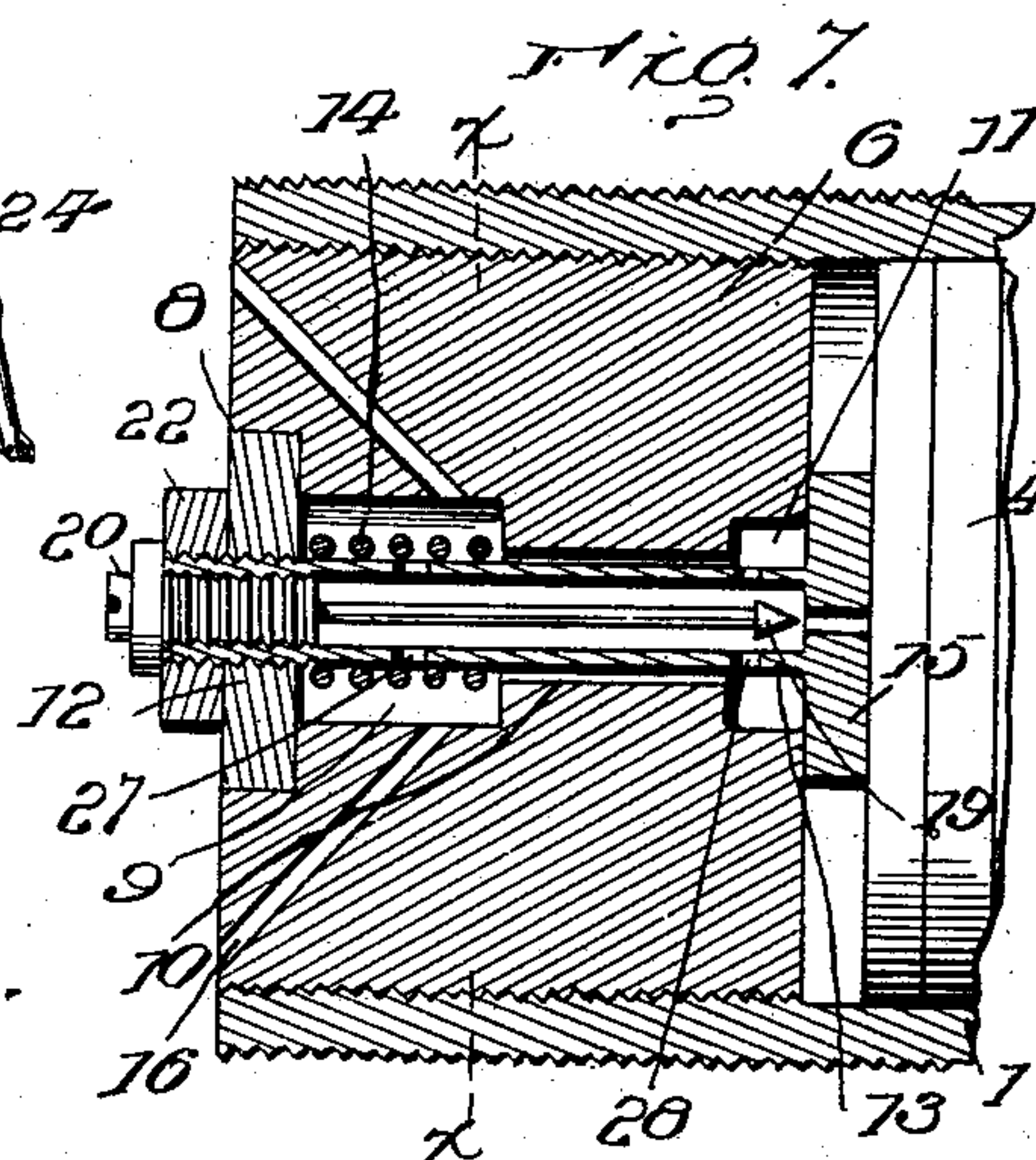
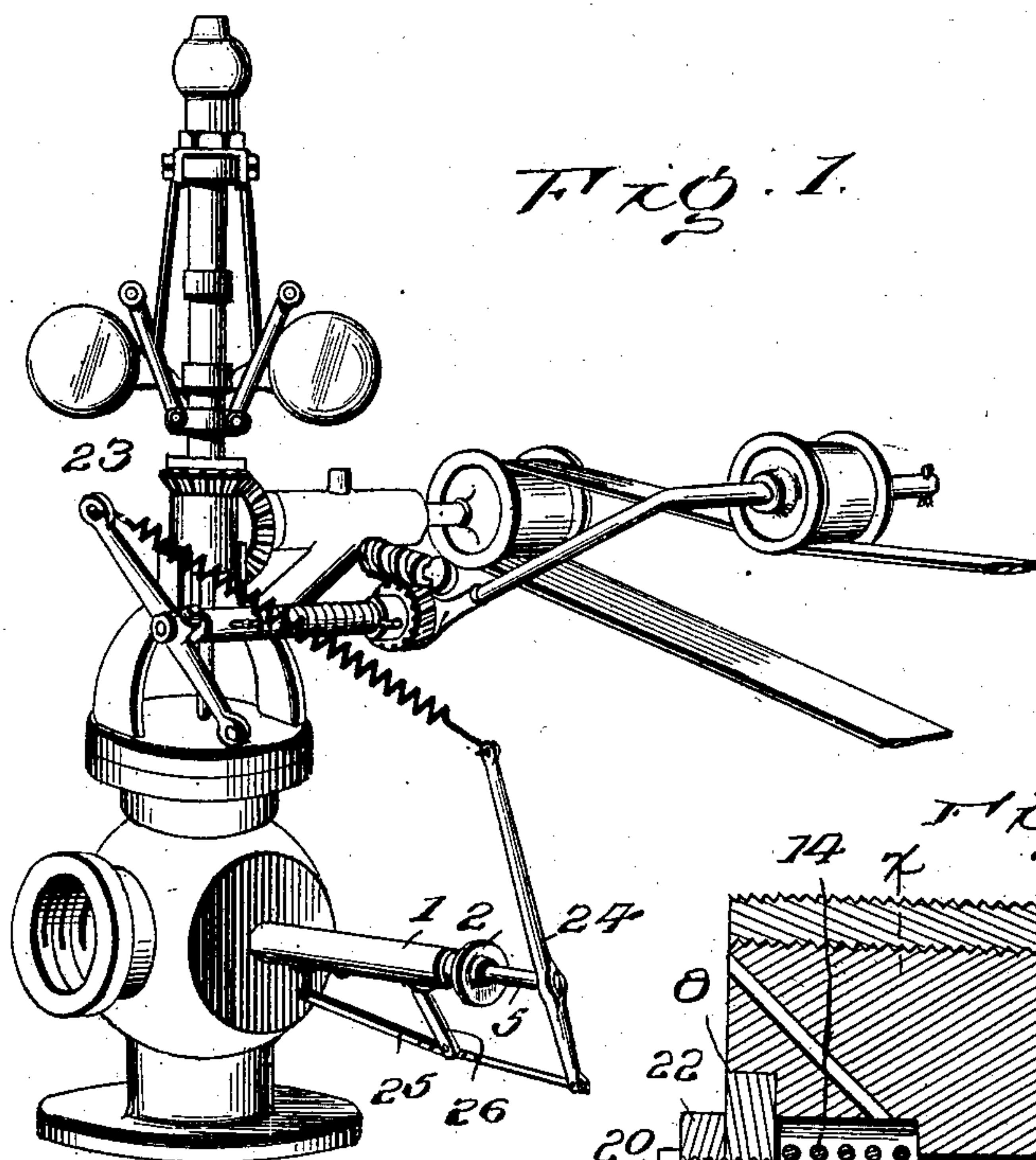
PATENTED FEB. 17, 1903.

I. E. OSMAN.  
REGULATOR FOR SPEED GOVERNORS.

APPLICATION FILED JUNE 28, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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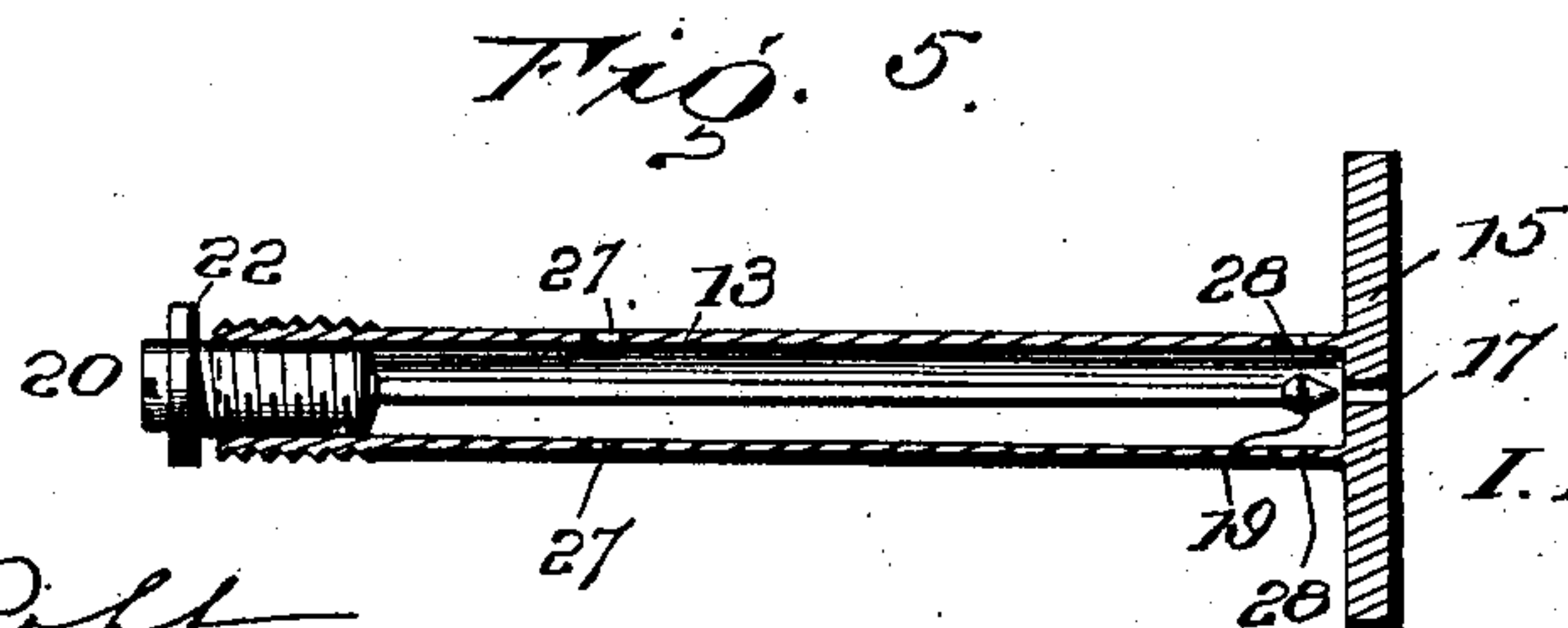
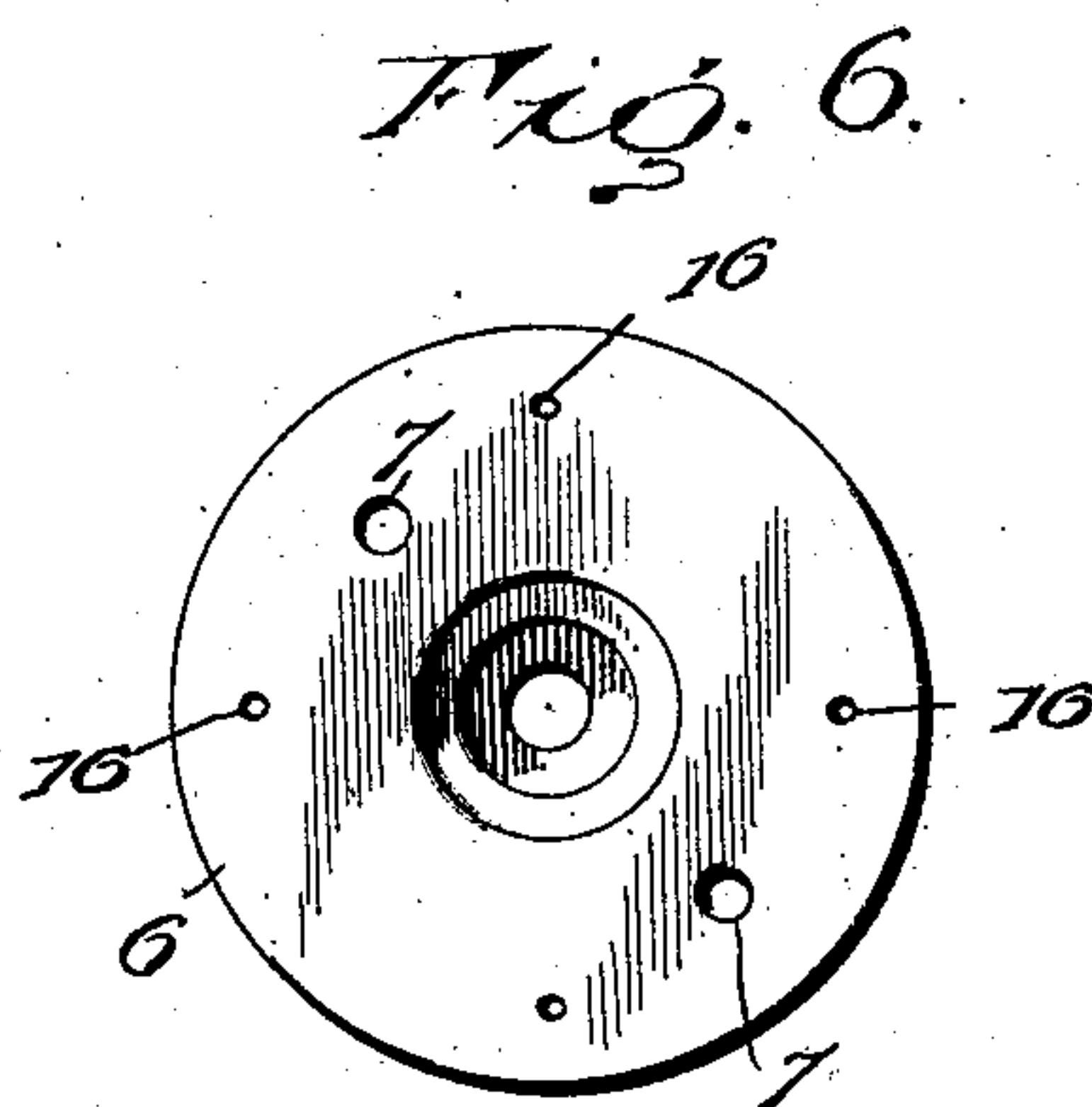
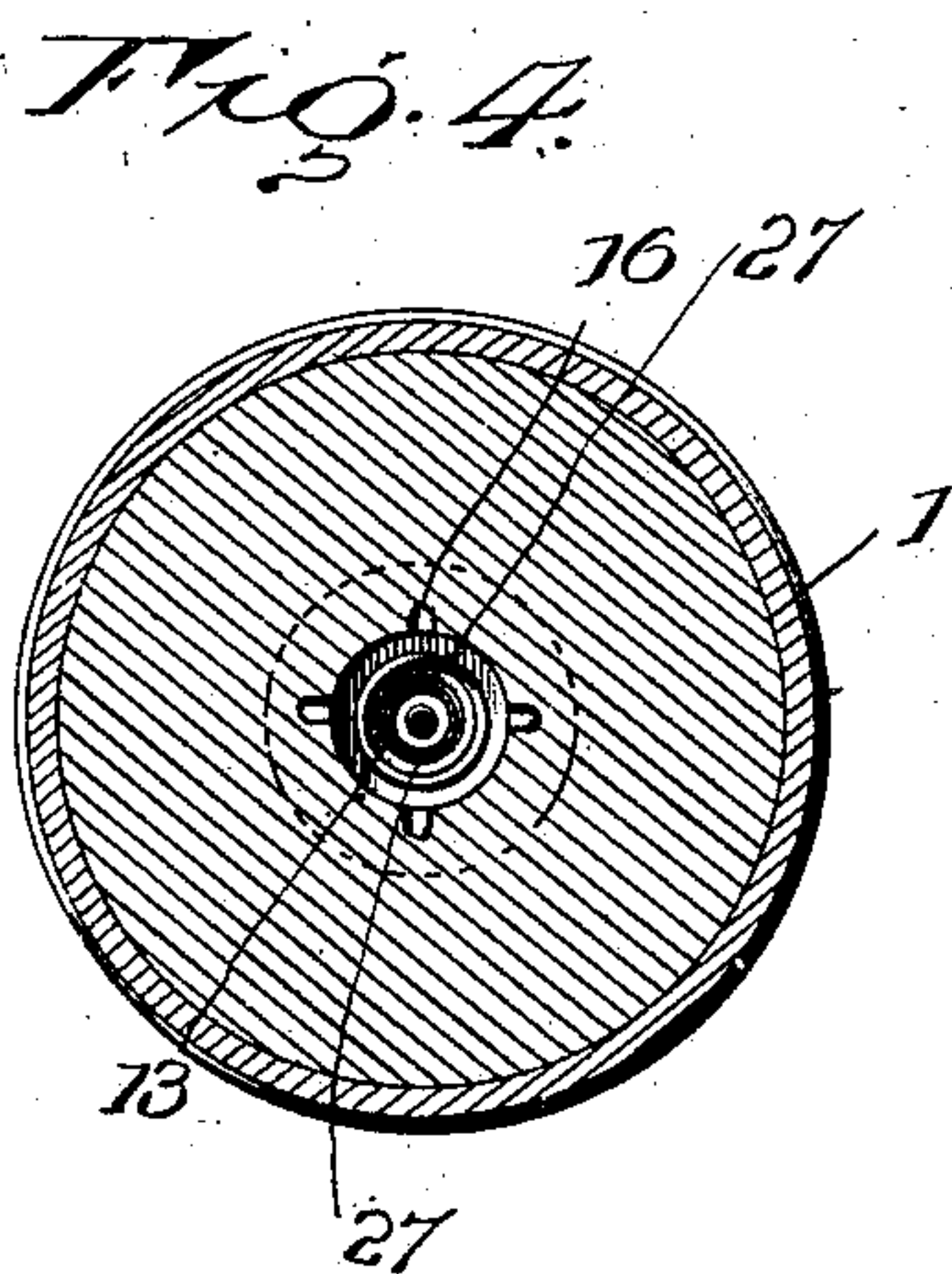
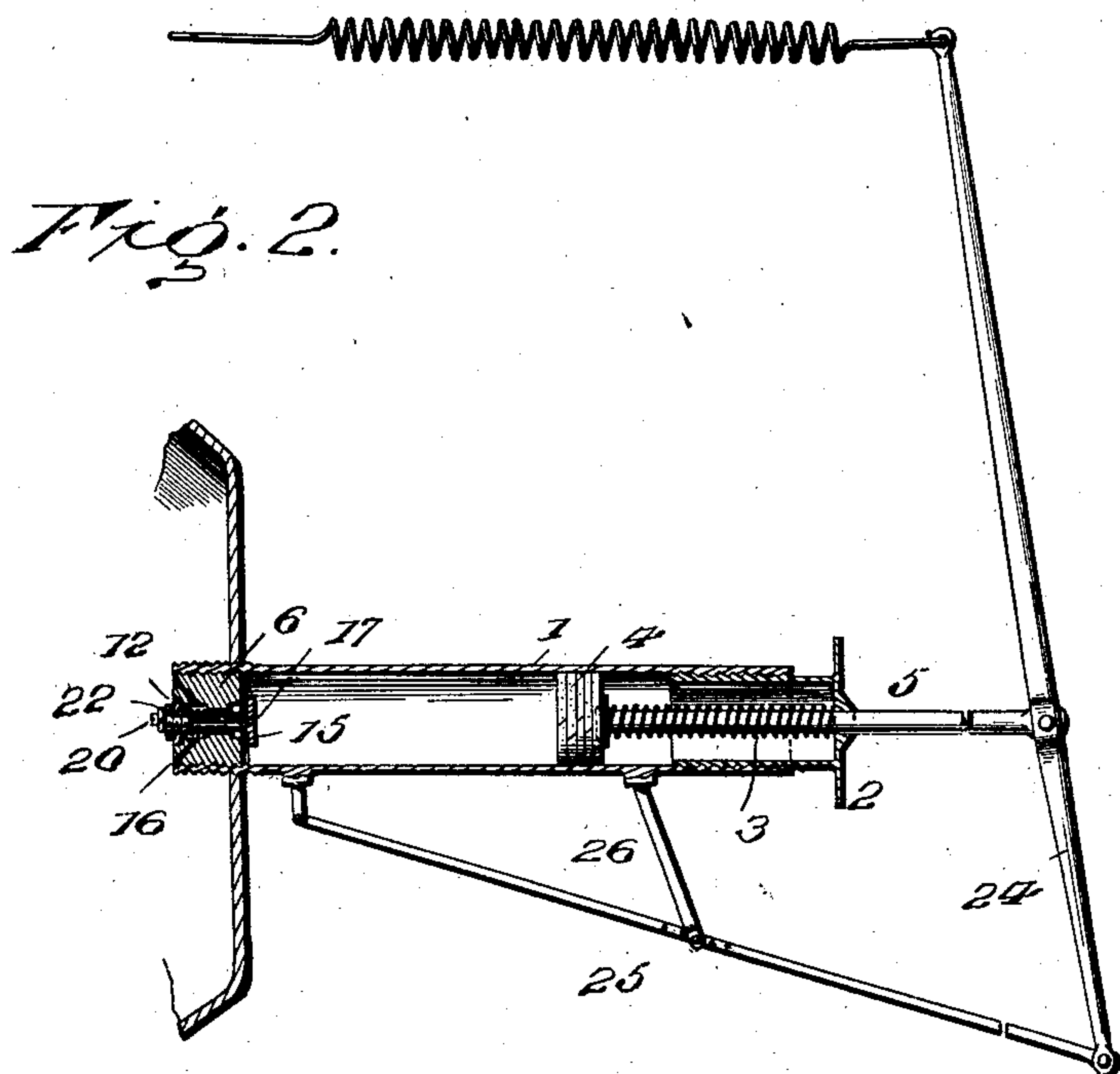
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

ISAAC E. OSMAN, OF GREENSBURG, INDIANA.

## REGULATOR FOR SPEED-GOVERNORS.

SPECIFICATION forming part of Letters Patent No. 721,083, dated February 17, 1903.

Application filed June 28, 1902. Serial No. 113,663. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC E. OSMAN, a citizen of the United States, residing at Greensburg, in the county of Decatur and State of Indiana, have invented certain new and useful Improvements in Regulators for Speed-Governors, of which the following is a specification.

This invention has relation to apparatus for regulating the speed of steam-engine governors, whereby the engine is caused to run at a low speed—say about seventy-five revolutions per minute—when not performing work and at a high speed of about three hundred revolutions per minute when loaded, the regulator being entirely automatic in its action.

The regulator is not restricted in its use and is designed for application wherever steam is to be controlled, the speed of an engine regulated, or dampers or other parts are to be adjusted.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing the invention applied to a steam-engine governor. Fig. 2 is a longitudinal section. Fig. 3 is a central longitudinal section of the barrel and attached parts on a larger scale. Fig. 4 is a transverse section on the line X X of Fig. 3. Fig. 5 is a central longitudinal section of the check-valve on a larger scale. Fig. 6 is a view of the inner end of the barrel. Fig. 7 is a longitudinal section of the plug and adjunctive parts on a larger scale.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In its organization the regulator comprises a barrel 1 of any size, depending upon the specific use of the contrivance. A cap 2 is fitted to one end of the barrel, preferably by means of a screw-thread joint, to admit of ad-

justment of the cap to vary the length of the barrel and provide means for varying the tension of the spring 3. A plunger 4 snugly fits within the barrel, and its stem 5 works through an opening central of the cap 2. The spring 3 surrounds the inner end portion of the stem 5 and is confined between the plunger 4 and cap 2 and is of the open or expansible type, so as to force the plunger 4 within the barrel to expel the steam when the engine is relieved of all load, so as to effect a reduction of the speed of the engine.

A plug 6 is fitted to the inner end of the barrel 1, preferably by means of a screw-thread joint, and is provided in its outer end with openings 7 to receive a spanner or like tool to admit of screwing or unscrewing the plug, according as the same is applied to or removed from the barrel. An opening is formed through the center of the plug 6 and comprises the parts 8, 9, 10, and 11. The terminal portions 8 and 11 of the openings are larger than the intermediate portions, the part 8 being provided to receive the nut 12 and the part 11 constituting a chamber into which the steam is received preliminary to its discharge into the barrel. The portion 10 of the opening receives the valve-stem 13, which fits snugly therein, and the portion 9 constitutes a chamber for reception of the steam prior to its admission into the valve-stem and also receives the spring 14, which normally holds the check-valve 15 seated. A series of openings or passages 16 are formed in the plug 6 and extend obliquely therein from its outer end, the inner or converged ends of the passages 16 being in communication with the chamber 9 and their outer ends extending through the outer face or end of the plug 6. The plug 6 is preferably of metal and may be fitted to the barrel 1 in any selected way and is provided with a check-valve-controlled opening, by means of which the steam is controlled in its admission to the barrel.

The check-valve 15 is adapted to obtain a seat against the inner end or face of the plug 6 and to close the open side of the chamber 11 and is provided with a minute opening 17 for the escape of the steam from the barrel when the check-valve is seated and the supply of steam is cut off. The valve-stem 13 is



tubular and snugly fits the contracted portion 10 of the opening through the plug 6. The nut 12 is threaded upon the outer end portion of the valve-stem 13 and is secured by a jam-nut 18. The spring 14 is mounted upon the valve-stem 13 and is confined between the nut 12 and the inner end of the chamber 9 and normally exerts an outward pressure upon the nut 12, so as to hold the valve 15 seated. The opening 17 in the check-valve is controlled by a valve 19 at the inner end of a stem 20, passing centrally through the tubular valve-stem 13 and having its outer end enlarged, as shown at 21, and threaded into the outer end portion of the valve-stem 13, whereby provision is had for adjusting the valve 19 to vary the effective size of the opening 17. The valve-stem 20 is adapted to be turned by a suitable tool, and, as shown, its outer end is slotted to receive a screw-driver. The valve 19 is held in an adjusted position by means of a jam-nut 22, fitted upon the extended portion of the enlarged part 21.

The regulator is adapted to be fitted to the valve-casing of the steam-engine governor 23 or other part by having the inner end of the barrel 1 fitted into an opening formed in said casing or in any convenient or determinate way. A lever 24 is pivoted to an arm 25, connected to the frame of the regulator in any convenient way, and the stem 5 of the plunger 4 is adapted to exert pressure against the lever 24 and move it, so as to automatically increase the speed of the engine when the load is thrown thereon. The arm 25 is pivoted at one end to the barrel 1 and has adjustable connection intermediate of its ends with an arm 26, projected outward from said barrel 1, thereby making provision for varying the point of contact of the stem 5 with the lever 24, as will be readily comprehended. The steam-engine governor 23 is of ordinary construction and is illustrated to show the application of the invention.

When the engine is running without performing work, the valve 15 is seated and the plunger 4 is moved to the limit of its inward movement within the barrel 1; but when the engine is loaded or work is thrown thereon the steam enters the chamber 9 through the passages 16 and passes into the tubular stem 13 through openings 27 in the sides thereof, thence through the stem 13 into the chamber 11, through other openings 28, formed in the sides of the stem 13, and exerting a pressure against the valve 15, unseats the same and passes into the barrel 1 and forces the plunger 4 outward and through the connections herein specified increases the speed of the engine. When the steam is cut off, the valve 15 automatically seats itself by the action of the spring 14 and the plunger 4 is moved inward by the action of the spring 3 and the steam confined within the barrel slowly escapes through the opening 17 into the stem 13, thence into the chamber 10 through the openings 27, and out through the passages 16

or through the chamber 9 into the casing of the cover or other part to which the regulator may be applied. The slow exhaust of the steam from the barrel through the minute openings 17 allows for pulsations of the engine-piston, as will be readily comprehended.

Having thus described the invention, what is claimed as new is—

1. In a speed-regulator, a barrel, a closure at one end of the barrel provided with a check-valve-controlled opening, and a plunger movable within the barrel and adapted to be controlled by opposing forces, one of which is overcome by the superior pressure of the steam admitted into the barrel when the regulator is in active operation, substantially as set forth.

2. In a speed-regulator, a barrel, a closure at one end of the barrel, an automatically-closing check-valve controlling an opening in said closure, a plunger movable within the barrel, and a spring normally exerting a pressure to hold said plunger at the limit of its inward movement within the barrel, substantially as specified.

3. In a speed-regulator, a barrel provided with a closure having a check-valve-controlled opening, a cap adjustably connected with the opposite end of the barrel, a plunger adapted to operate within the barrel and having its stem passing through an opening in the said cap, and a spring confined between the plunger and cap and adapted to have its tension controlled by the adjustable connection of the cap with the barrel, substantially as described.

4. In a speed-regulator, a barrel, a plunger operable within said barrel, a plug closing the barrel and provided with an opening, a check-valve for controlling the opening of said plug and having a minute opening, and a valve co-operating with the check-valve to regulate the effective size of the minute opening thereof, substantially as specified.

5. In a speed-regulator, and in combination with the barrel, a plunger operable therein, and a plug closing said barrel and having an opening therein, a check-valve controlling the opening of said plug and having a minute opening and having a tubular stem, and a valve located within the said tubular stem and adapted to regulate the effective size of the minute opening of the check-valve and having adjustable connection with the check-valve stem, substantially as set forth.

6. In a speed-regulator, a barrel, a plunger operable therein, and a plug closing an end portion of the barrel and provided with an opening having its end portions enlarged and its intermediate portions of different size, in combination with a check-valve seated against the inner end of the plug and closing the open side of the inner enlarged end portion of the opening thereof, a tubular stem extended from the check-valve and snugly fitting within the contracted portion of the opening through the plug, a nut applied to



the outer end of the tubular valve-stem and fitting within the outer enlarged portion of the opening through the plug, and a spring located in an intermediate portion of the opening of the plug and confined between the nut of the valve-stem and the inner end of the enlarged portion of the opening, substantially as set forth.

7. In a speed-regulator, a barrel, a plunger operable therein, and a plug closing an end portion of the barrel and provided with an opening having its end portions enlarged and its intermediate portions of different size, in combination with a check-valve seated against the inner end of the plug and provided with a minute opening, a tubular valve-stem having communication with the opening of the plug at opposite sides of the contracted portion of said opening, a valve for controlling the minute opening of the check-valve, and means for supplying steam to the outer portion of the opening of the aforesaid plug, substantially as described.

8. In a speed-regulator, a barrel, a plunger operable therein, and a plug closing an end portion of the barrel and provided with an opening having its end portions enlarged and its intermediate portions of different size, in combination with a check-valve seated against the inner end of the plug and having a minute opening, a tubular stem extended from the check-valve and snugly fitting the contracted portion of the opening through the said plug and having openings in its sides in communication with the enlarged portion of the opening through said plug, a valve located within the tubular stem and having

adjustable connection therewith and adapted to control the minute opening of the check-valve, and means for supplying steam to the outer end of the opening through the plug, substantially as set forth.

9. A speed-regulator comprising the following elements, namely, a barrel, a cap adjustably connected with one end of the barrel, a plunger operable within the barrel and having its stem working through said cap, a spring mounted upon the stem of the plunger and confined between the plunger and cap and having its tension adapted to be controlled by the adjustable connection of the cap with the barrel, a plug fitted to the opposite end of the barrel and provided with a longitudinal opening and a series of passages in communication therewith, said opening having portions of different size, a check-valve seated against the inner end of the plug and provided with a minute opening and having a tubular stem snugly fitting an intermediate portion of the opening through said plug, a spring located within the enlarged portion of the opening of the plug and serving normally to seat the check-valve, and a valve located within the tubular stem and adapted to control the minute opening of the check-valve and having adjustable connection with said stem, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC E. OSMAN. [L. S.]

Witnesses:

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WALTER DAVIS.