

No. 633,069.

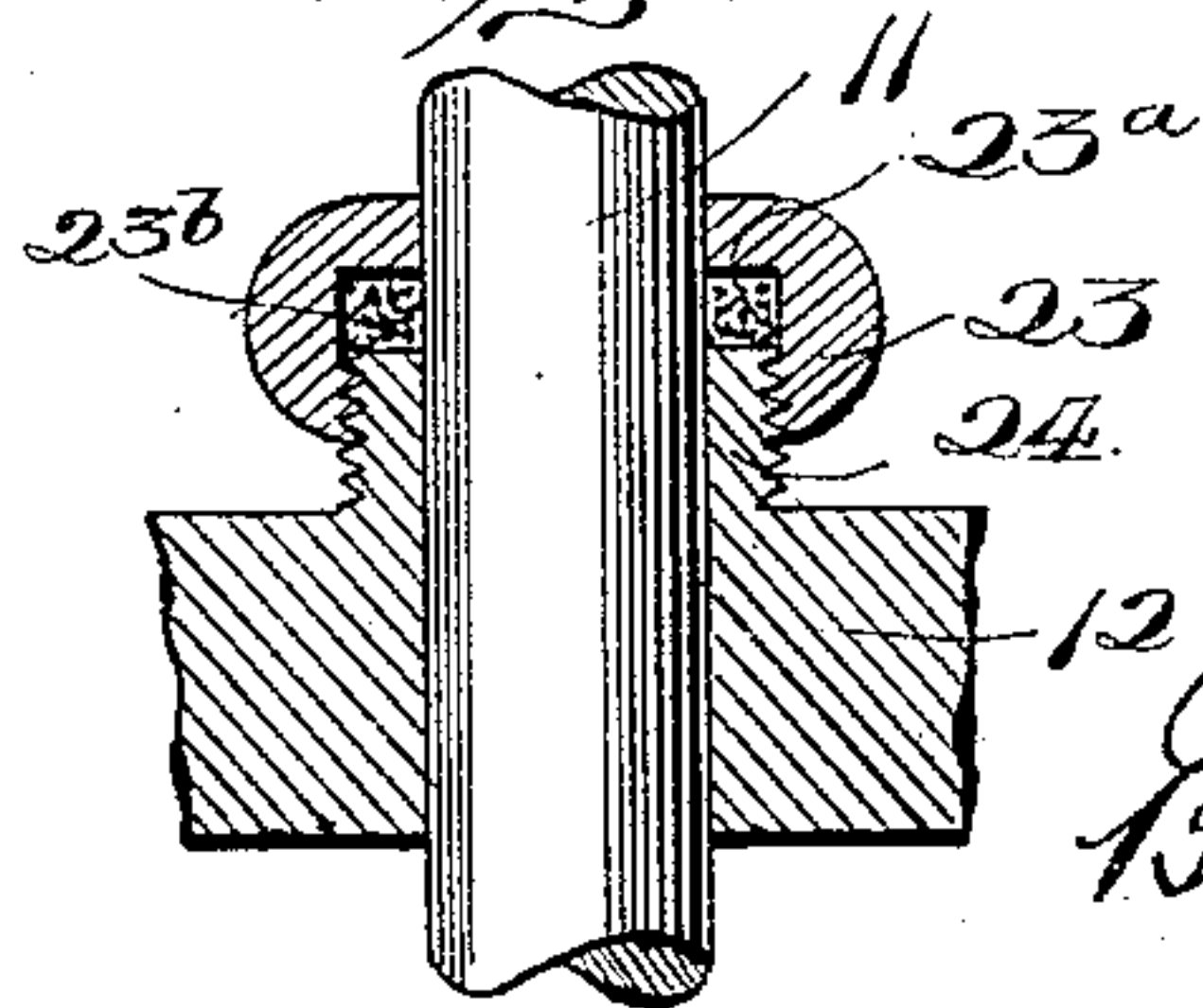
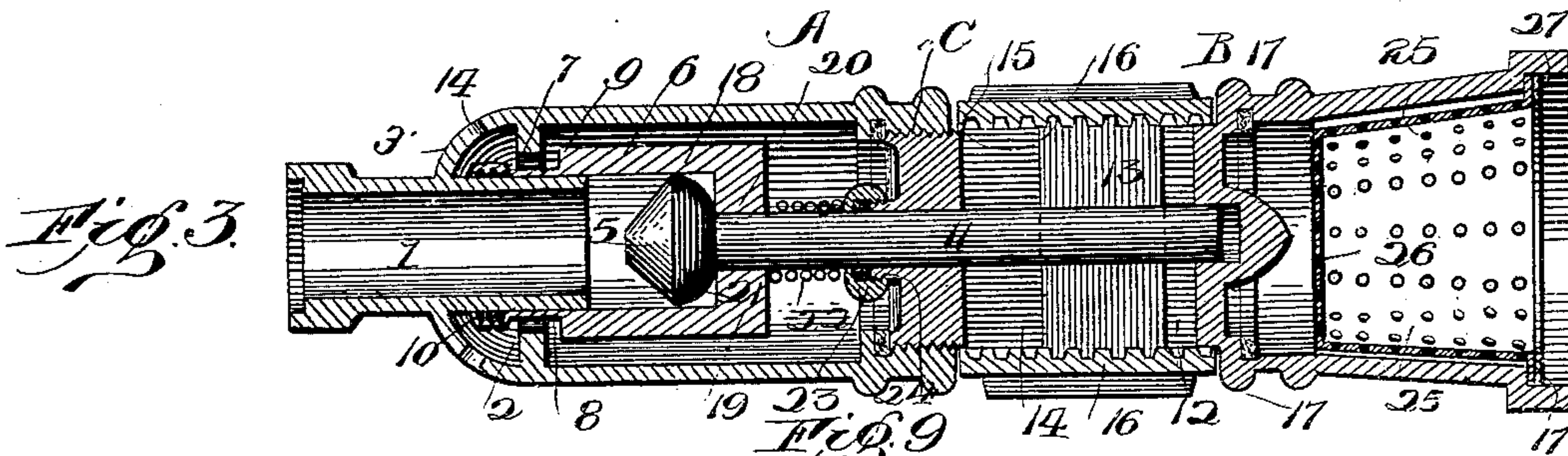
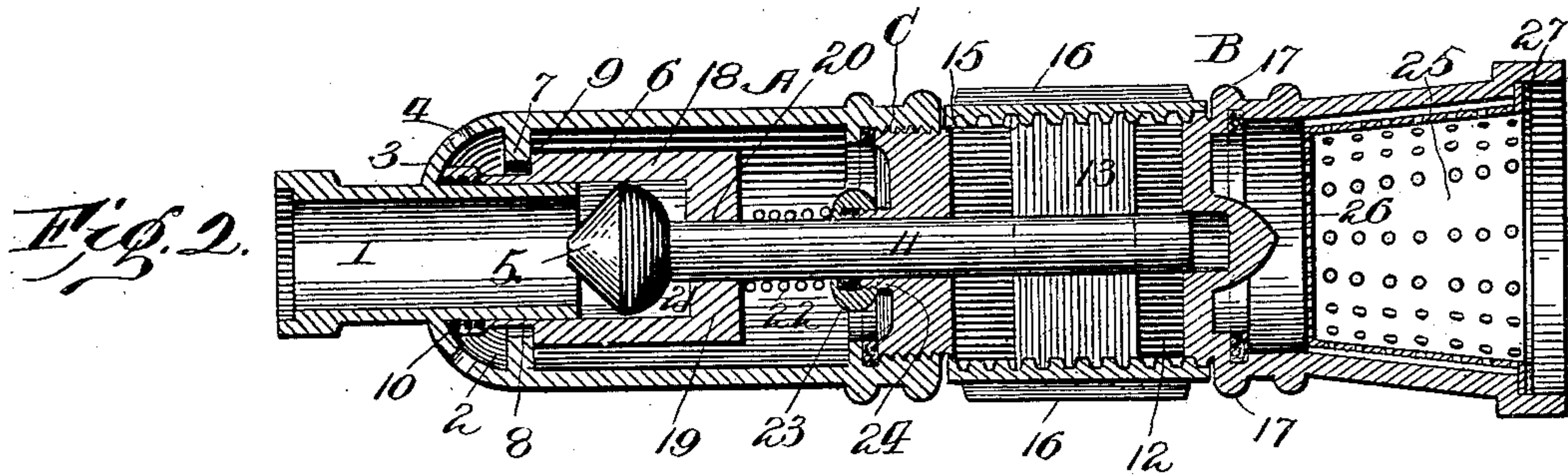
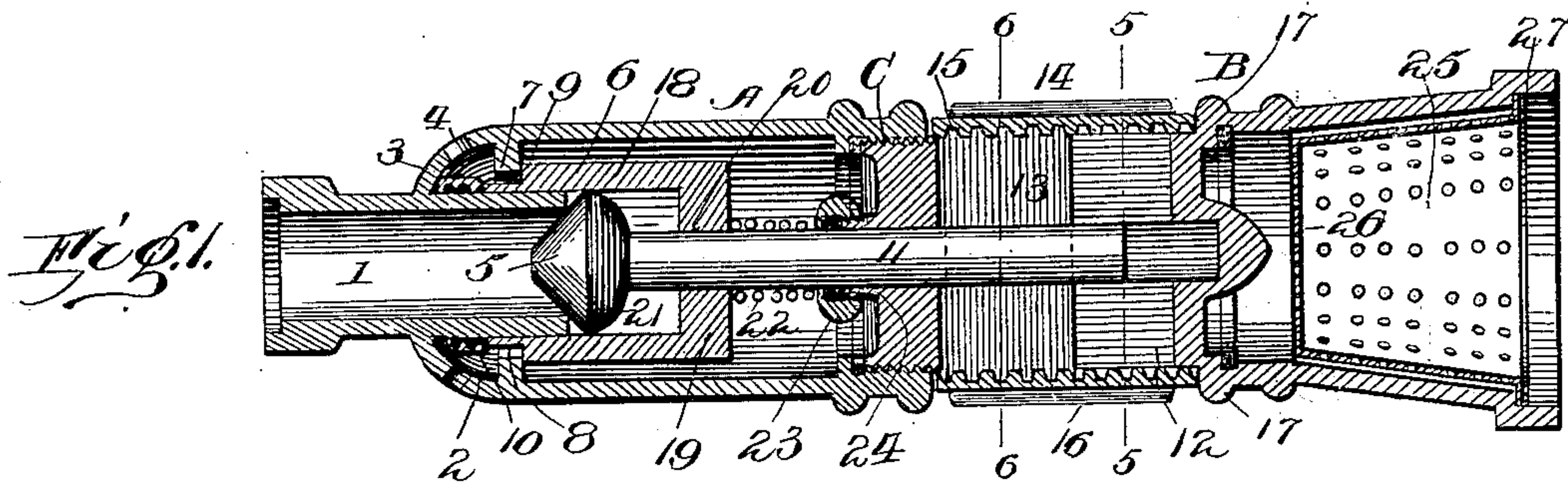
Patented Sept. 12, 1899.

J. BUSH.  
HOSE NOZZLE.

(Application filed Dec. 20, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
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J. BUSHA.  
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2 Sheets—Sheet 2.

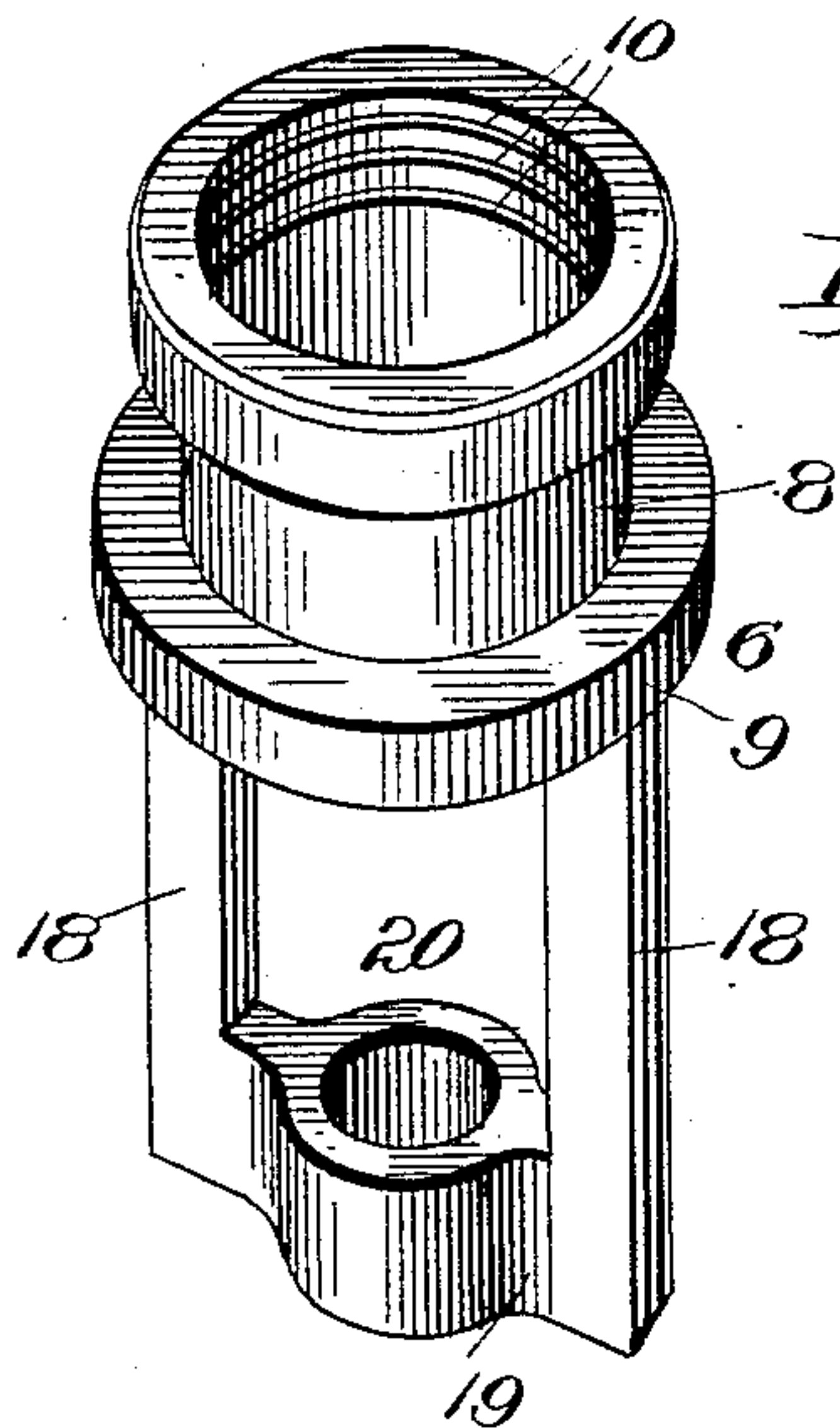


Fig. 4.

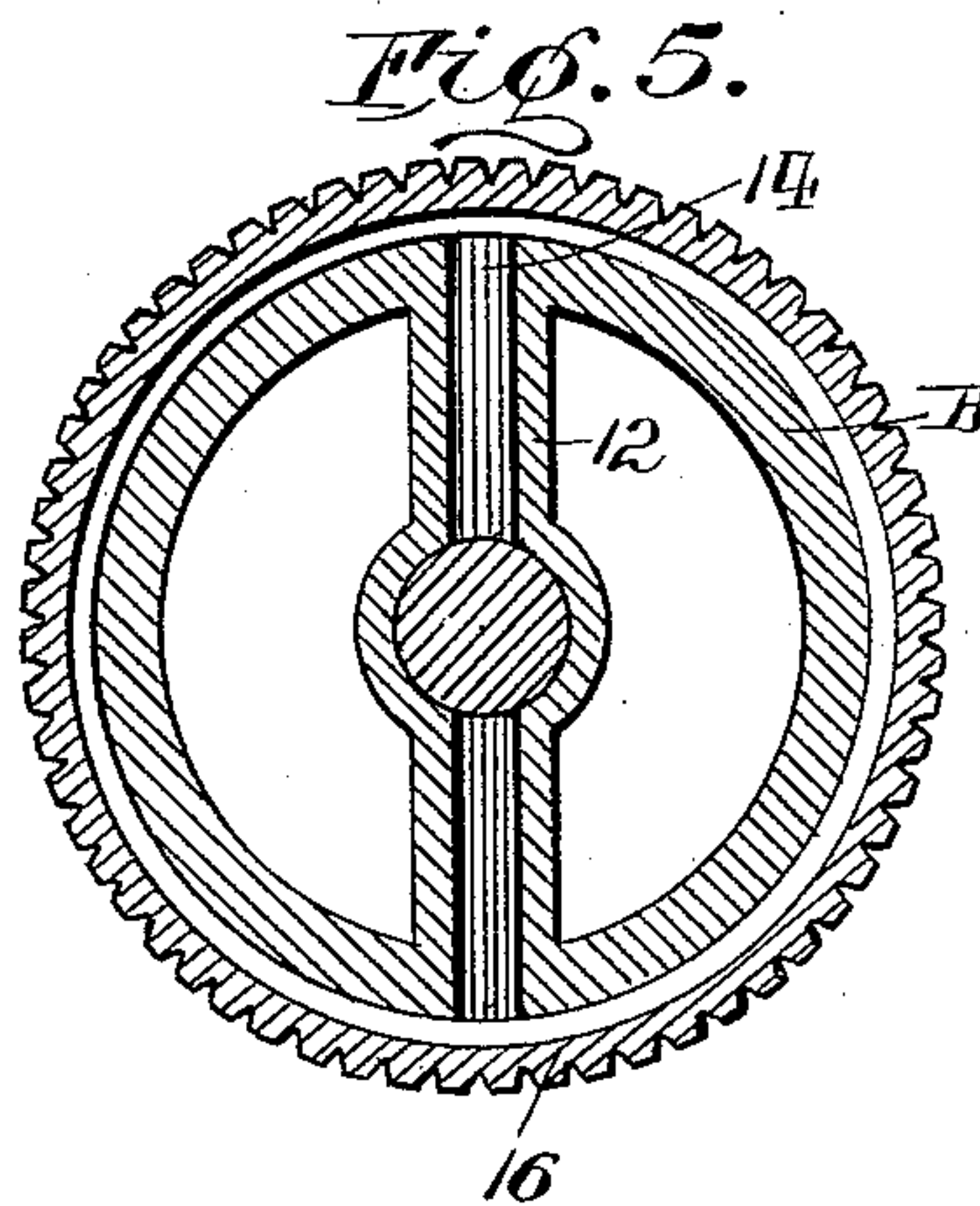


Fig. 5.

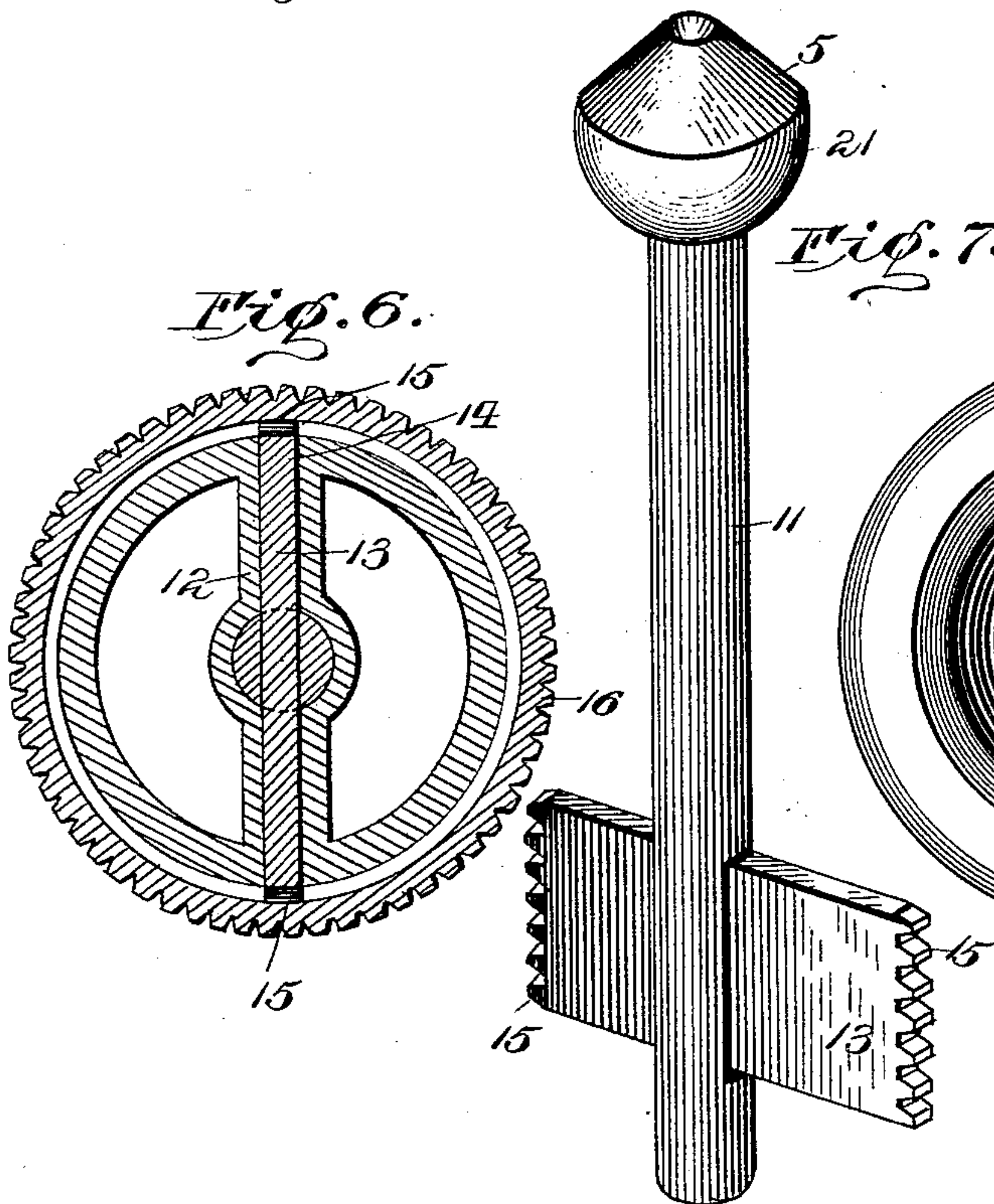


Fig. 6.

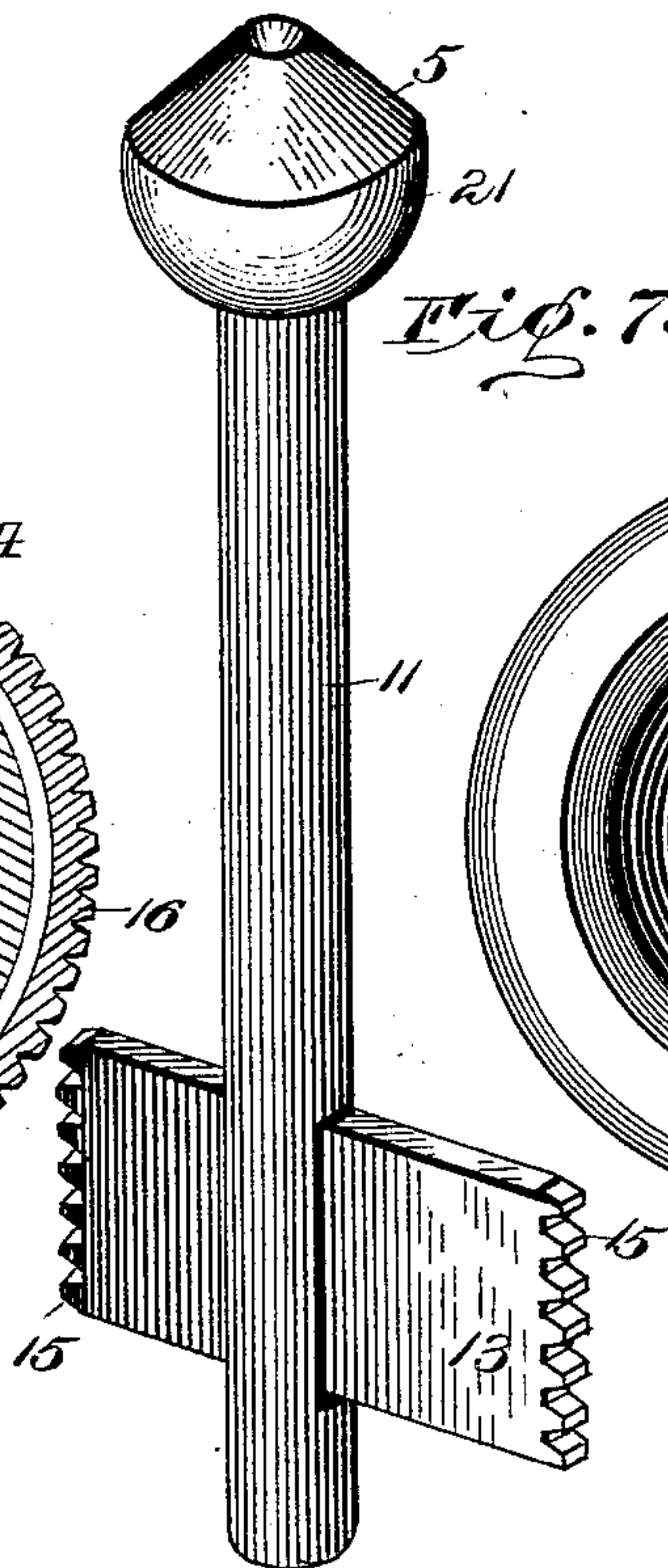


Fig. 7.

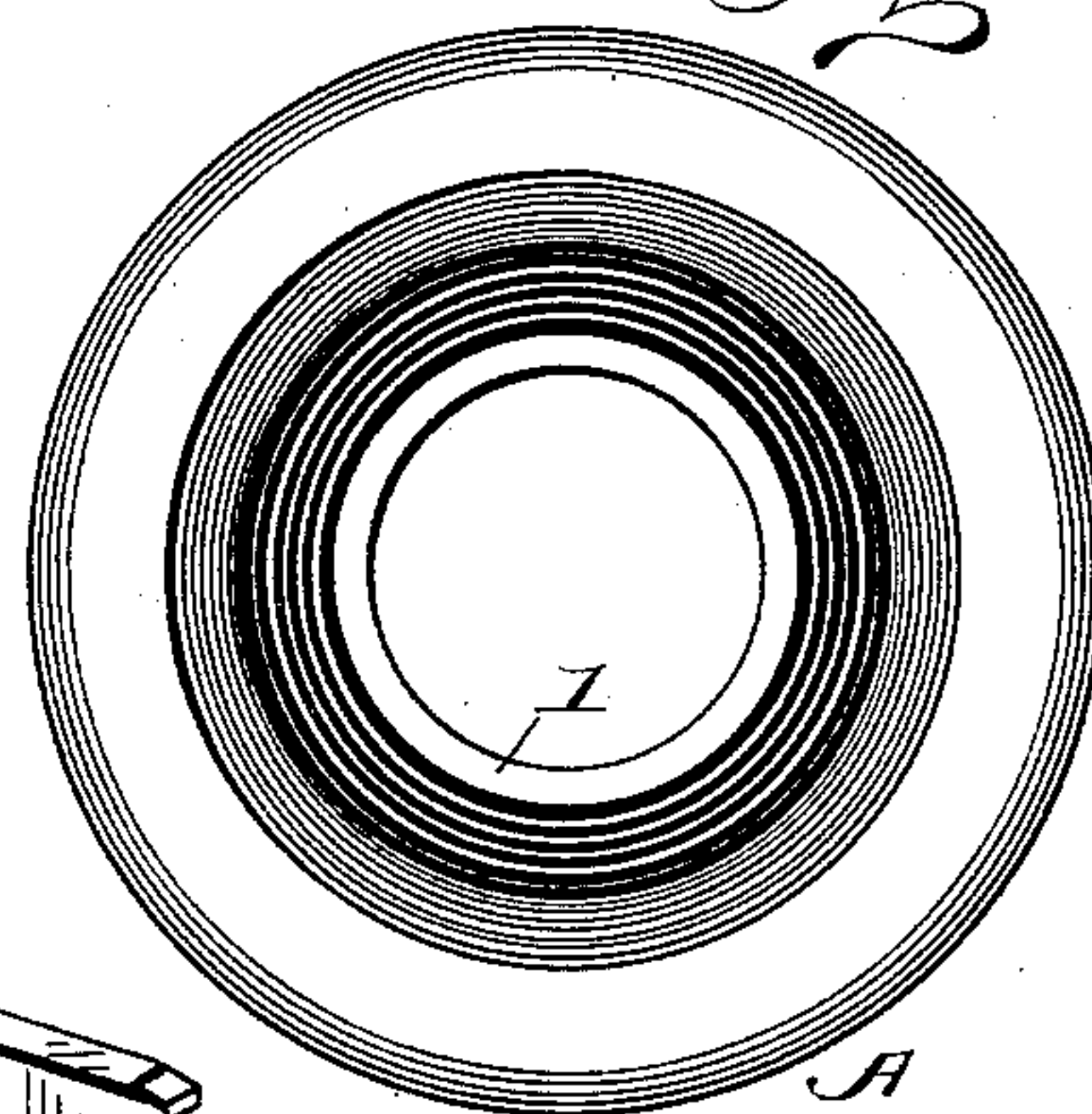


Fig. 8.

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# UNITED STATES PATENT OFFICE.

JOSEPH BUSHIA, OF PITTSBURG, PENNSYLVANIA.

## HOSE-NOZZLE.

SPECIFICATION forming part of Letters Patent No. 633,069, dated September 12, 1899.

Application filed December 20, 1898. Serial No. 699,791. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH BUSHIA, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hose-Nozzles, of which the following is a specification.

This invention has especial reference to that type of hose-nozzles for throwing both sprays and solid streams; and its object is to provide a nozzle which will be of simple, durable, and inexpensive construction and capable of being most quickly and easily converted from one throwing a solid stream only to one throwing both a spray and a solid stream at once.

The invention consists, first, in a nozzle having separate valves for controlling the passages through which the solid stream and spray, respectively, flow and a means for adjusting said valves common to both of the same and operative to open both valves at once, as contradistinguished from a single rotative valve having separate ports for the respective passages and operative to open one passage only at a time, and from a construction in which both the spray and solid-stream passages may be open at once, but are operated by mechanisms wholly distinct and independent of each other; second, in a nozzle having separate valves for controlling the passages through which the solid stream and spray, respectively, flow and a means for adjusting said valves common to both of the same, said adjusting means being operated to open one valve only (preferably the valve controlling the issue of the solid stream) or both of the valves together, at will; third, in a nozzle having separate valves for controlling the passages through which the solid stream and spray, respectively, flow and a common adjusting means for said valves, said parts being relatively constructed and arranged so that one of said valves will have an initial movement sufficient to open the passage-way controlled by it independent of the other valve, thus opening one passage-way without opening the other, and said other valve will be moved from its seat by further movement of the first valve; fourth, in the details of construction entering into and constituting the preferred embodiment of the invention,

all substantially as hereinafter described and claimed.

In the accompanying drawings I have shown a nozzle constructed in accordance with my invention and which is preferred by me, because it embodies all the features above named and carries out the several novel ideas contained in the complete invention in what I deem to be the most advantageous manner.

In said drawings, Figures 1, 2, and 3 are longitudinal sections through a nozzle containing my improvements, the first showing the valves arranged to close both passages, the second showing the passage for the solid stream open and the passage for the spray closed, and the third showing both passages open. Fig. 4 is a detail perspective view of the valve for controlling the spray. Fig. 5 is a transverse section enlarged on the line *xx* of Figs. 1, 2, or 3. Fig. 6 is a similar section on the line *yy* of Figs. 1, 2, or 3. Fig. 7 is an enlarged perspective view of the valve for controlling the passage through which the solid stream flows. Fig. 8 is a view of the forward portion of the nozzle-shell, looking into the rear end thereof. Fig. 9 is a detail view showing the stuffing-box around the valve-stem.

The same letters and numerals of reference designate the same parts in the several figures.

The shell consists of a forward portion A and a rear portion B, threaded together at C. Said portion A is reduced in diameter at its front end to form the wall 3, which is perforated, as shown at 4, or otherwise suitably constructed to cause the water to issue in a spray.

1 designates the tip or tube which provides the passage-way for the solid stream. This tip projects inward into the shell and is of such diameter relative to the latter as to leave a chamber 2 between it and the shell for the spray.

5 designates the valve which controls the flow of water into the tube 1 and which preferably has a conical forward end, as is usual in this type of nozzles. This valve 5 is designed to be seated within the inlet end of the tube 1, while a separate valve 6 is provided for closing the inlet end of the spray-chamber 2 and engages an annular shoulder



7, forming the seat therefor. The valve 6 is of tubular form and encircles the rear end of said tube 1 and projects forward into said chamber 2. It has a reduced portion 8 of such diameter relative to the seat 7 as to permit water to flow through said seat and out through the spray-openings 4 when the valve is in its rearward position with its wider portion 9 out of engagement with said seat. The inner wall of the valve 6 has a series of deep grooves 10, whereby in operation a water-cushion is provided which prevents leakage. The valve 5 is mounted on the forward end of a stem 11, which projects into and is guided by an opening formed in a vertical wall 12, located in the rear part A of the shell. Said stem has a cross-bar 13, which projects laterally therefrom in both directions through coinciding openings 14, formed in the cross-wall 12 and in the wall of said part B. The openings 14 are of such length as to permit the bar 13 to move forward and rearward therein during the adjustment of the valve 5 to and from its seat. The outer ends of said cross-bar are threaded, as shown at 15, and are engaged by the threaded inner wall of an adjusting-sleeve 16, which loosely encircles said rear part B, so that it may be turned thereon; but when the parts are assembled it is held against longitudinal movement by the shell member A at one end and the flange 17 at the other end. It will be seen that the valve 5 will be adjusted to or from its seat according to the direction in which said sleeve is turned. This sleeve and cross-bar constitute the preferred means for adjusting said valve, but other suitable means may be employed without departing from the spirit of the invention.

Projecting rearward from the rear end of the valve 6 are two arms or valve-stems 18, the rear ends of which are connected by a cross-arm 19, having an opening 20, through which the stem 11 extends loosely. The valves 5 and 6 are relatively positioned, so that the former may be moved rearward from its seat a certain predetermined distance (sufficient to permit the flow of water through the passage controlled thereby) without affecting the position of the other valve 6. A projection 21, herein provided by the rear portion of the valve 5, is arranged to engage said cross-arm 19 (which constitutes a projection movable with the valve 6) when said valve 5 has been moved from its seat a distance farther than the predetermined one referred to for forcing said valve 6 from its seat and opening the spray-passage. During the initial movement of the valve 5 the pressure of inflowing water will usually be sufficient to hold the valve 6 to its seat; but in order to supplement the power of said water, and more especially to hold the valve 6 to its seat while the nozzle is not in use and prevent "chattering" when the nozzle is being drawn rapidly from place to place, I prefer to provide a coiled spring 22, which encircles the valve-stem 11 and

bears upon the cross-arm 19 at one end and the nut 23 at its other end. Said nut 23 is threaded upon a forwardly-projecting portion 24 of the wall 12 and preferably has a flange 23<sup>a</sup> at its forward end and is formed and arranged to provide a space for a packing-ring 23<sup>b</sup> between its flange and said part 24. The stuffing-box thus formed obviously prevents leakage of water around the valve-stem.

From the above the operation of my invention will readily be understood to be as follows: When the parts are in the position shown in Fig. 1, the valve 6 will be held to its seat by the spring 22 and the valve 5 will be held to its seat by the coaction of the cross-bar 13 (which is at the forward end of the opening 14) with the sleeve 6. If now the sleeve be turned in the proper direction, said valve 5 will be drawn from its seat and its portion 21 brought into engagement with the cross-arm 19. At this time the inlet to the tube or passage-way 1 is open and a solid stream will issue from the nozzle. If it is not desired to use the spray, the parts are left in the position they now occupy, and when the spray is needed in addition to the solid stream said sleeve is given an additional turn or two, thus forcing the valve-stem 11 and the valve 5 farther rearward, causing the power of the water-pressure and the spring 22 to be overcome and forcing valve 6 from its seat. When it is desired to shut off the spray, the sleeve is turned in the reverse direction, so as to force the valve 5 forward and permit the water-pressure and spring to return valve 6 to its seat. If it is desired to shut off the nozzle entirely, said reverse movement of the sleeve is continued until the valve 5 has also been seated.

The valve 5 herein shown is of that well-known type of pointed-cone valves which are placed concentrically in the nozzle ajutage and adapted to be so operated in connection therewith as to cause the nozzle to throw a solid stream of any required volume—from nearly the full diameter of the discharge-opening to a small jet—without cutting off or diminishing the projectory force and pressure of water at its point of discharge from the nozzle. This type of valve is preferred by me, but is not entirely essential to the operativeness or practicability of the invention.

A serious objection has been experienced with spray-valves, especially when the nozzles have been connected directly with fire-hydrants, as is sometimes done in certain cities having high water-pressure when the fire to be extinguished is a small one and may be reached by such city pressure, owing to the quickness with which the spray becomes clogged with dirt, &c., and thus unfit for further use until cleaned. In order largely to overcome this disadvantage, and thus render it practical to connect the nozzle directly with fire-hydrants when desirable, I provide the rear end of the nozzle with a strainer 25, which is in the form of a tube having a front wall



26 and perforated side and front walls. The side walls of the tube are out of contact with the adjacent wall of the shell-section B, within the rear end of which latter the strainer is preferably located, and the rear end of said strainer has an outwardly-projecting annular flange 27, by which it is held rigidly in place when the nozzle is attached to the hose and whereby it may be quickly removed and replaced when desired. The strainer may also be found to be very useful when the nozzle is connected directly with a fire-engine as a supplemental means to the strainer in the latter.

Having thus described the invention, what I believe to be new, and desire to secure by Letters Patent, and what I therefore claim, is—

1. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, valve-seats at the inlet ends of said chambers, two longitudinally-movable valves cooperating with said seats to control the passage of water through said chambers, and means for adjusting said valves common to both of the same and operative to open both valves at once, substantially as described.

2. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, separate valves controlling said chambers or passages respectively, both of said valves being movable relatively to their respective chambers or passages, and a common adjusting means for said valves, operative to open one valve alone or both valves at once.

3. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, separate valves controlling said chambers or passages respectively, one of said valves being movable independently of the other during a portion of its whole extent of travel, and means for transmitting the movement of said independently-movable valve to said other valve during the remaining portion of the movement of the former.

4. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, a spring-pressed valve for closing one of said chambers or passages, a second valve for closing the other chamber or passage, said second valve being movable relatively to the spring-pressed valve, and means for connecting said two valves together so that they will move in unison after said second valve has completed an initial movement throughout a portion of its whole extent of travel.

5. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, a longitudinally-movable valve for closing the latter chamber or passage, a stem for said valve, means connected with said stem for adjusting said valve to and from its seat, a second valve, movable relatively to the spray-

chamber for controlling the spray, and means for moving said second valve with the first one.

6. In a hose-nozzle, the combination of the shell, constructed to provide separate chambers or passages for the spray and solid stream, a valve for controlling admission of water to the latter chamber, a projection movable with said valve, a second valve, for controlling admission of water to the spray-chamber, and a device movable with said second valve to be engaged by said projection after the first valve has moved a predetermined distance, so as to open said second valve.

7. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, a valve for controlling admission of water to the latter chamber, a projection movable with said valve, a second valve, for controlling admission of water to the spray-chamber, and a projection movable with said second valve and arranged in the path of the first-mentioned projection and rearward of the same.

8. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, a valve for controlling admission of water to the latter chamber, a stem for said valve, a projection movable with said valve and stem, a second valve, for controlling admission of water to the spray-chamber, a stem for said second valve having a projection arranged in the path of the first-mentioned projection and rearward of the same, and means engaging the first-mentioned valve-stem for adjusting the same.

9. In a hose-nozzle, the combination with the shell constructed to provide separate chambers or passages for the spray and solid stream, of a valve for controlling admission of water to the latter chamber, a stem for said valve, a projection movable with said valve and stem, a second valve, for controlling admission of water to the spray-chamber, a stem for said second valve having a projection arranged in the path of the first-mentioned projection, rearward of the same and at a distance therefrom, substantially as described, whereby the first-mentioned valve has a movement in opening independent of the second valve and the second valve is opened by continued opening movement of said first valve, as and for the purposes specified.

10. In a hose-nozzle, the combination of the shell constructed to provide separate chambers or passages for the spray and solid stream, a valve for closing the latter chamber or passage, a stem for said valve, means connected with said stem for adjusting said valve to and from its seat, a second valve, movable relatively to the spray-chamber, for controlling the spray, a spring for holding said second valve yieldingly to its seat, arms projecting from said second valve, a cross-arm connecting said arms together and engaged by said



spring, said cross-arm having an opening through which said valve-stem extends, and a projection movable with said stem and brought into engagement with said cross-arm  
5 after said stem has moved a portion of its whole extent of travel, substantially as set forth.

11. In a hose-nozzle, the combination with the shell constructed to provide concentric  
10 chambers or passages for the spray and solid stream, and having a seat at the inlet end of the outer chamber, and a valve moved to open or close said inner chamber, of a tubular valve encircling the inner chamber and mov-  
15 able relatively to the same and to the shell, and means for moving both of said valves to and from their respective seats.

12. In a hose-nozzle, the combination with the shell constructed to provide concentric  
20 chambers or passages for the spray and solid stream, and having a seat at the inlet end of the outer chamber, and a valve moved to open or close said inner chamber, of a tubular valve encircling said inner chamber and mov-  
25 able relatively to the same and to the shell, and a common adjusting means for both of said valves.

13. In a hose-nozzle, the combination with the shell constructed to provide concentric  
30 chambers or passages for the spray and solid stream, and having a valve-seat at the inlet end of the outer chamber, and a valve moved to open or close said inner chamber, of a tubular valve encircling said inner chamber and  
35 movable relatively to the same and to the shell, means for moving the first-mentioned valve from its seat, and means for transmitting the movement of said first-mentioned valve to the tubular valve after the former  
40 has moved a predetermined distance.

14. In a hose-nozzle the combination with the shell constructed to provide concentric chambers or passages for the spray and solid

stream, and the valve for closing the inner passage, of a valve-seat at the inlet end of the  
45 outer passage, a tubular valve encircling said inner passage and having a grooved inner wall, said valve projecting into the outer pas-  
sage and having a widened rear end to engage said seat.

15. In a hose-nozzle, the combination with the shell constructed to provide concentric  
chambers or passages for the spray and solid stream, a valve for closing the inner cham-  
ber, and a projection movable with said valve,  
55 of a tubular valve for closing the outer chamber, arms projecting rearward from said tubular valve, and a projection from the rear ends of said arms arranged rearward of the first-mentioned projection and in position to  
60 be engaged thereby.

16. In a hose-nozzle, the combination with the shell constructed to provide concentric  
chambers or passages for the spray and solid stream, a valve for closing the inner cham-  
65 ber, a stem for said valve, and a projection movable with said valve and its stem, of a tubular valve for closing the outer chamber, arms projecting rearward from said tubular valve, a cross-arm connecting together the  
70 rear ends of the rearwardly-projecting arms, said cross-arm being arranged in the path of said projection and at a slight distance therefrom, and means engaging said valve-stem for adjusting the same, said means being opera-  
75 tive to hold the first-mentioned valve at an intermediate place in its adjustment, whereby either the first valve alone or both valves, may be opened, as set forth.

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

JOSEPH BUSHA.

Witnesses:

DANIEL HARRISON,  
DAVID HOLMES.