

(No Model.)

A. E. BARNHART.

WORKING BARREL ATTACHMENT AND COMBINATION OF VALVES.

No. 464,785.

Patented Dec. 8, 1891.

Fig. 1.

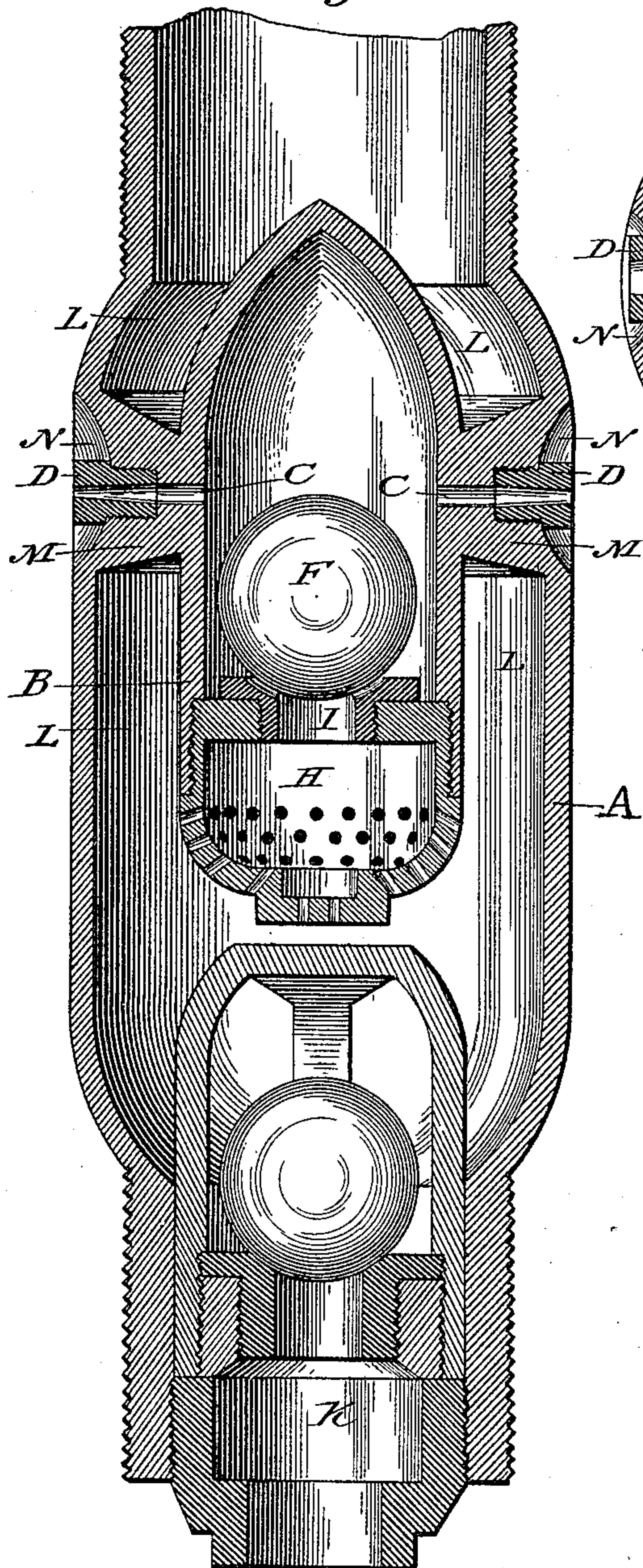


Fig. 2.

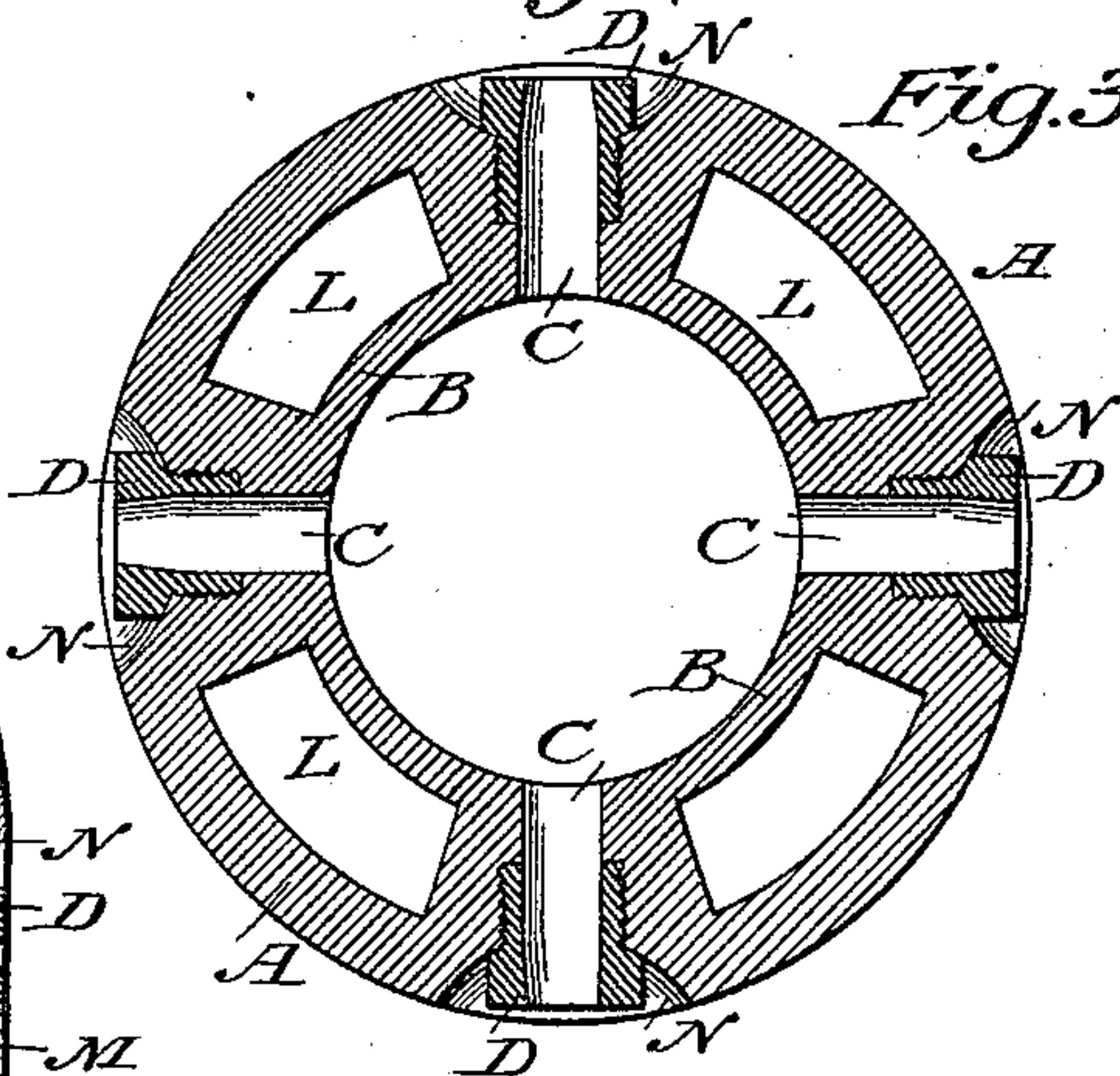


Fig. 3.

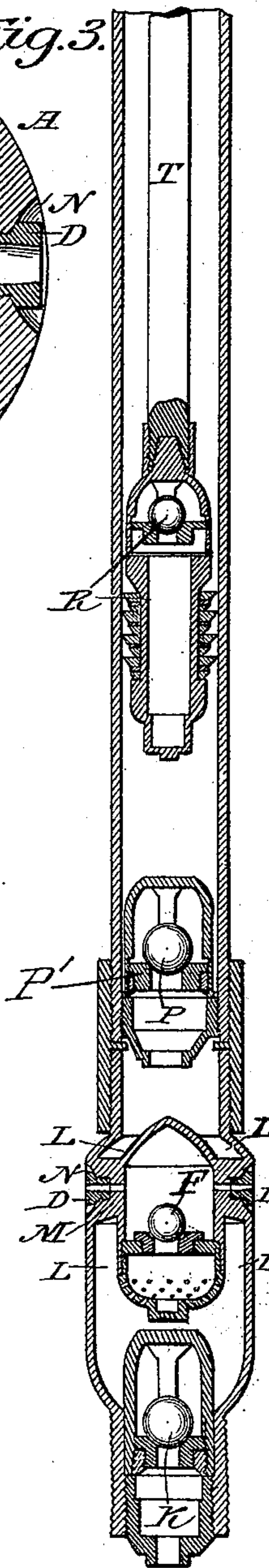
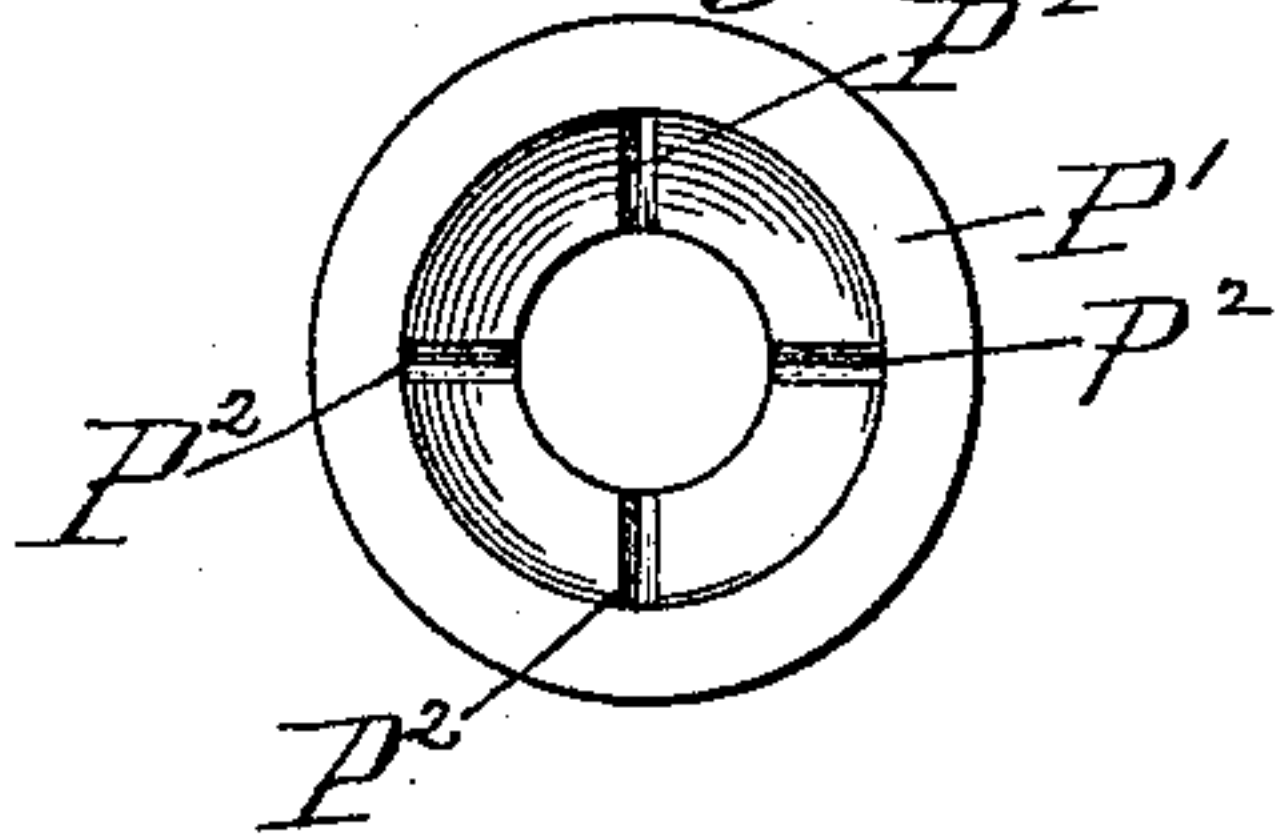


Fig. 4.



Witnesses.  
J. C. Haisford  
W. H. Westerman

Inventor.

Aaron E. Barnhart.



# UNITED STATES PATENT OFFICE.

AARON E. BARNHART, OF MILLERSTOWN, PENNSYLVANIA.

WORKING-BARREL ATTACHMENT AND COMBINATION OF VALVES.

SPECIFICATION forming part of Letters Patent No. 464,785, dated December 8, 1891.

Application filed March 6, 1891. Serial No. 384,055. (No model.)

*To all whom it may concern:*

Be it known that I, AARON E. BARNHART, a citizen of the United States, residing at Millerstown, in the county of Butler and State of Pennsylvania, have invented a new and useful Working-Barrel Attachment and Combination of Valves, of which the following is a specification.

This invention relates to a working-barrel attachment constructed, adapted, and operating by hydraulic pressure to eject in forcible penetrating jets the liquid pumped from wells into the liquid, oil, gaseous, or other product bearing strata in order to increase the production of said strata.

Additional objects and purposes of the invention include not only the increase of production, but the ejection of air and gas from the working barrel and attachment, thus preventing their interference with the proper working of the valves employed in both and permitting the utilization of the gas thus ejected for fuel by allowing it to pass up and outside of the tubing through a pipe from the casing-head to the furnace. This elimination of the interference of the gas with the valves secures a steady motion of the pumping and other machinery employed.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a vertical section of the attachment. Fig. 2 is a horizontal section taken through the jet-apertures C C, Fig. 1. Fig. 3 is a vertical section of the working barrel with the attachment connected therewith. Fig. 4 is a plan of the seat of valves P.

Like letters refer to like parts in all the figures.

A represents a shell or cylinder properly threaded at its upper end for a liquid-tight connection with the lower end of a working barrel. At its lower end the cylinder A is interiorly threaded for the reception and connection of a ball-valve K, its cage, and seat, and an anchor of usual construction, when employed. Within the shell or cylinder A is a smaller cylinder B, which is maintained centrally within the shell by means of lugs or radial arms M, between which are passages

L, and through which are radial openings or jets C, which may be in number four, or more or less, as desired. Insets N are formed in the outer shell, and nipples B are secured therein so as to communicate with the jet-opening C and so as not to project beyond the insets, whereby the nipples are prevented from injury by coming into contact with the casing or walls of a well. The apertures through the nipples contract the cross-area of the jet-openings to concentrate and give effective force to the fluid, which is ejected from the inner cylinder of the attachment.

H represents a perforated bottom or closure for the cylinder B, by which foreign material is prevented from entering the cylinder of a size or character which would be liable to clog or close the openings C.

F represents a ball-valve, and I its seat, both arranged within the cylinder.

In Fig. 3 the valves R and P of the working barrel, as well as the valves F and K of the attachment, are at rest—that is, with all the balls closing the valve-seats. The valve P, however, has in its seat P' creases, grooves, or nicks P<sup>2</sup>, which cause it to leak to a certain extent for the purpose of regulating the amount of fluid that may pass through the valve down through the openings L and upwardly through the perforated bottom H of the cylinder B, and thence through the nipples. The same construction permits of the exit of any gas or air that may accumulate between the valves R, P, and K.

The operation is as follows: The working valve R in ascending the barrel S creates a vacuum or suction, which raises the balls of the valves P and K, thus admitting liquid into the attachment through the openings L, as well as into the working barrel up to its valve R. Meantime while the valve R is ascending it and the valve F are closed; but while the valve R is descending it and the valve F are open, permitting the greater portion of the liquid to pass up through valve R, and thence into the tubing, while as much liquid as the leakage of valve-seat P will allow to pass downward through it will pass upward through valve F in cylinder B, and thence out through the nipples D with a force of discharge against and into the producing sand or rock, according to the depth of the well, from six



hundred to one thousand pounds to the square inch, the reciprocations of the walking-beam being from thirty-five to fifty per minute. It will be noted that while the valves R and F are  
 5 firmly closed the valves P and K are open, and vice versa. In other words, valves R and F work in conjunction with each other and P and K act in conjunction with each other, simulta-  
 10 neously opening and closing, but in a reverse and opposite direction from the aforesaid working valve R and standing valve P. The purpose of the standing-valve in the working barrel being to regulate the amount of liquid pumped, it will be seen that my attachment  
 15 is perfectly operative whether the standing valve of the barrel be employed or not, and I therefore do not limit my invention to a use in connection with a working barrel having a standing valve. In fact, the attachment is so  
 20 constructed and applied that a standing valve may be placed within or removed from the working barrel after removing its working valve without disconnecting or removing my attachment.  
 25 One of the most important results attained by my attachment is the accomplishment of a sort of hydraulic mining at very low points below the surface of the earth and wherever the oil or other product bearing strata is lo-  
 30 cated in the well. The liquid is ejected with such force and to such a distance that it has far more than a mere washing or spraying effect, as it penetrates the sand or rock so as to open new passages for the flow of the pro-  
 35 duct to the well, and hence increases the quantity of the same.

What I claim is—

1. The shell A, provided with the interior central cylinder B, having a valve and jet-  
 40 openings extending through its body and that of the shell, and having the standing valve K and adapted for connection with a working barrel, substantially as specified.

2. The shell A, having the central cylinder  
 45 B and connecting-lugs M, with insets N and nipples B, substantially as specified.

3. The shell A, having the central cylinder B, provided with the perforated bottom or closure H and valve F, and with the jet-open-  
 50 ing C extending continuously through the body of the shell and of the cylinder, and a standing valve, as K, seated in the lower end of the cylinder, substantially as specified.

4. The combination, with a working barrel and its valves, of an attachment provided  
 55 with a centralejector-cylinder having a valve therein, and a standing valve located in line with the ejector-cylinder valve and at the lower end of the attachment, said cylinder having jet-openings extending continuously  
 60 through the body of the shell and of the cylinder, substantially as specified.

5. The combination, with a working barrel having a standing valve at its lower end, of  
 65 an attachment having a standing valve at its lower end and having an inner cylinder provided with a valve and ejector-openings leading out through the walls of the outer shell, the attachment and the valve being all substan-  
 70 tially as specified.

6. The combination, with a working barrel having a standing valve at its lower end, of  
 75 an attachment having a standing valve at its lower end, and a centrally-arranged cylinder provided with a valve, the alternating valves of the series working in conjunction with each other, substantially as and for the pur-  
 80 pose specified.

7. The shell A, provided with the central cyl-  
 80 inder B, having a detachable perforated bottom or closure, and a valve F and jet-openings extending through its body and that of the shell, and having a standing valve K ar-  
 85 ranged in the axial line with the valve F and adapted for connection with the working bar-  
 90 rel, substantially as specified.

AARON E. BARNHART.

Witnesses:

J. C. GAISFORD,

W. H. WESTERMAN.