

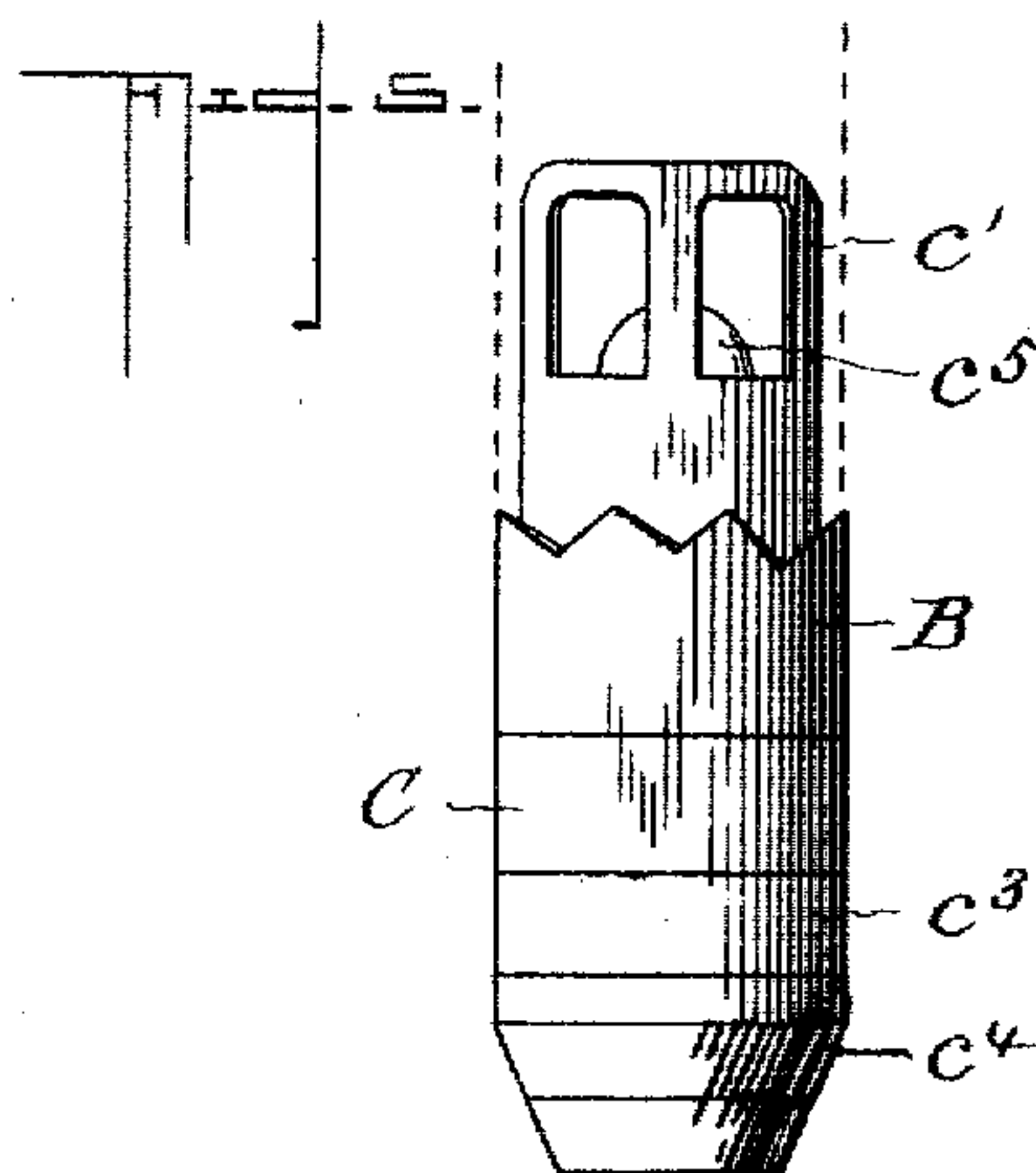
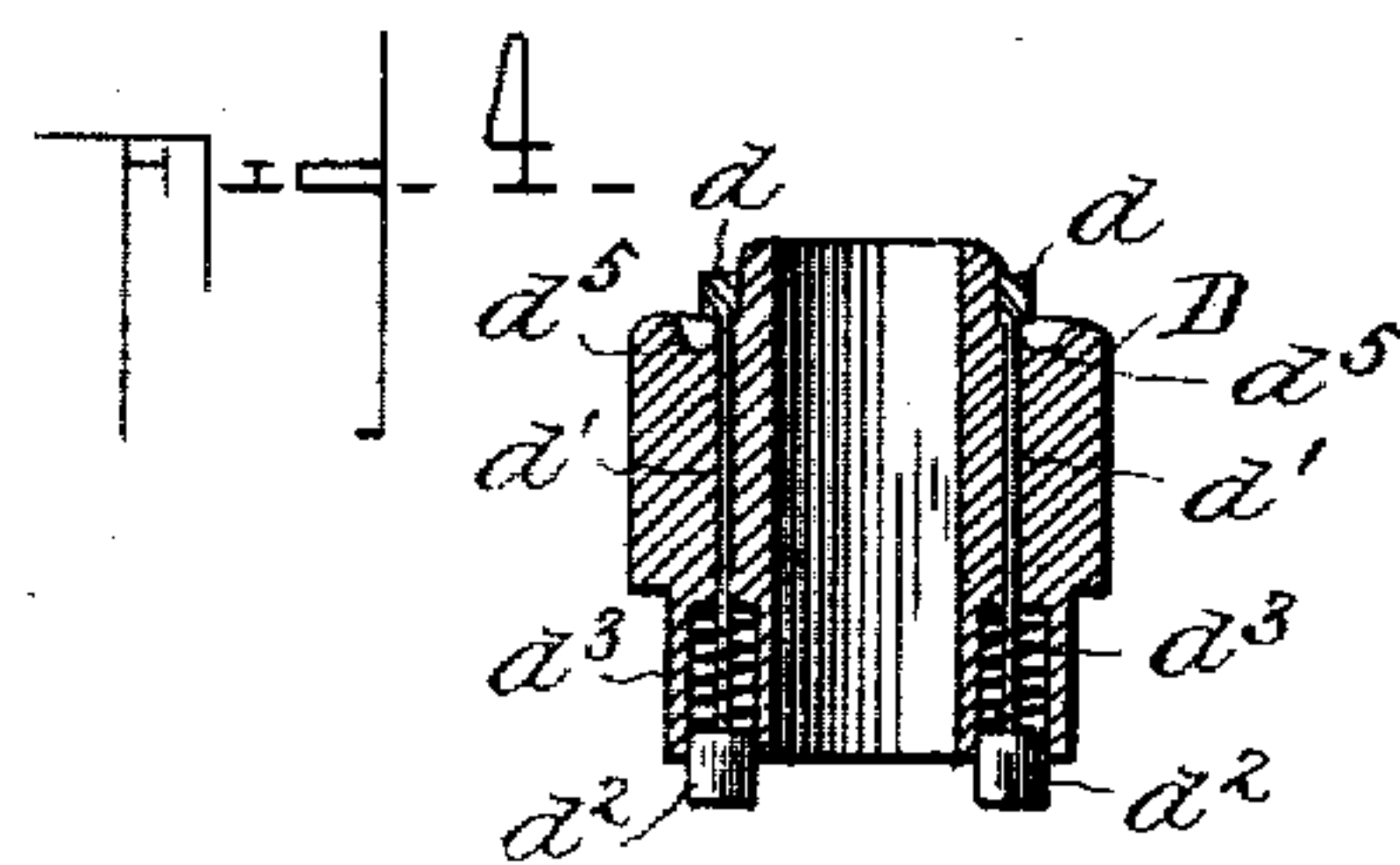
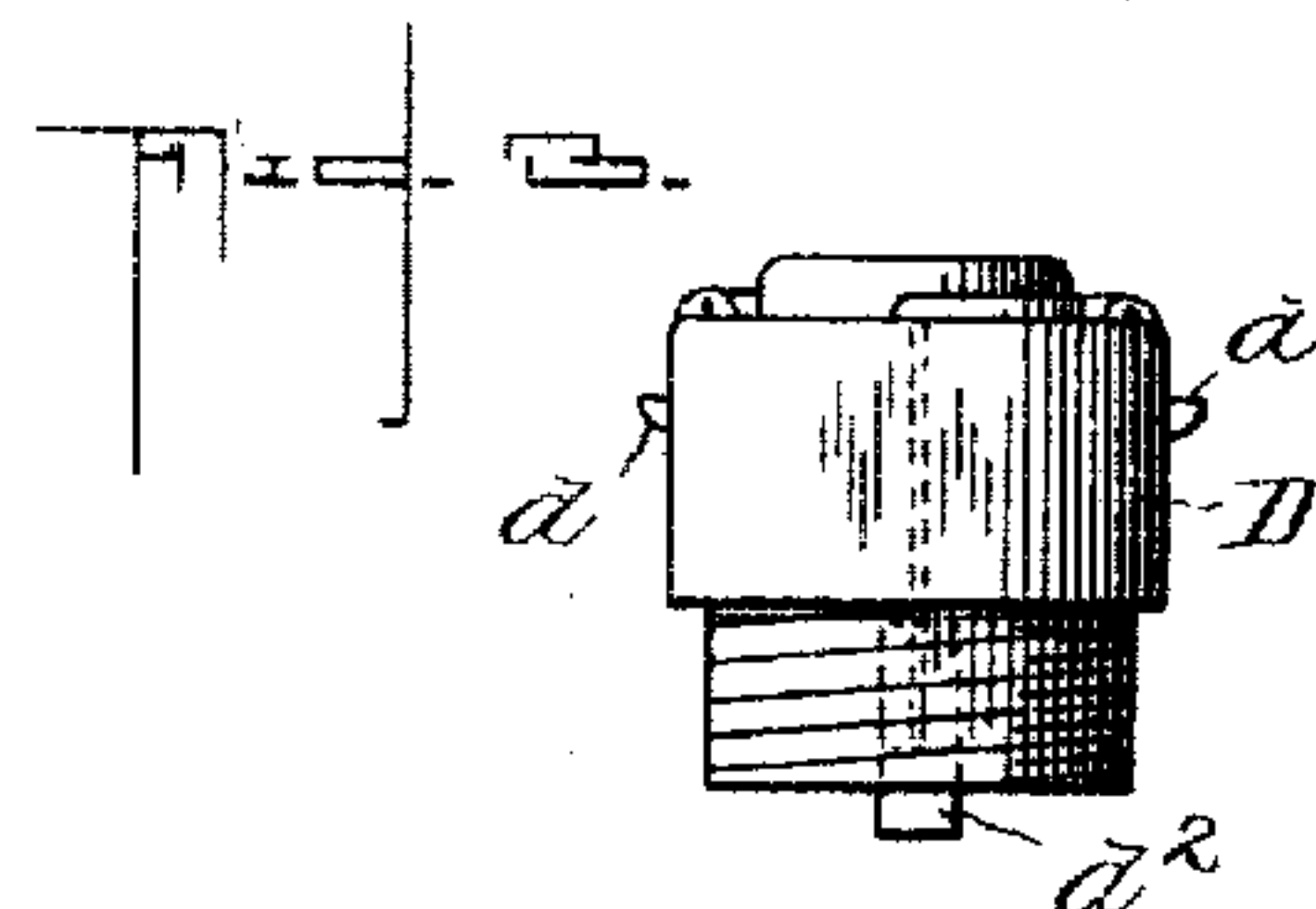
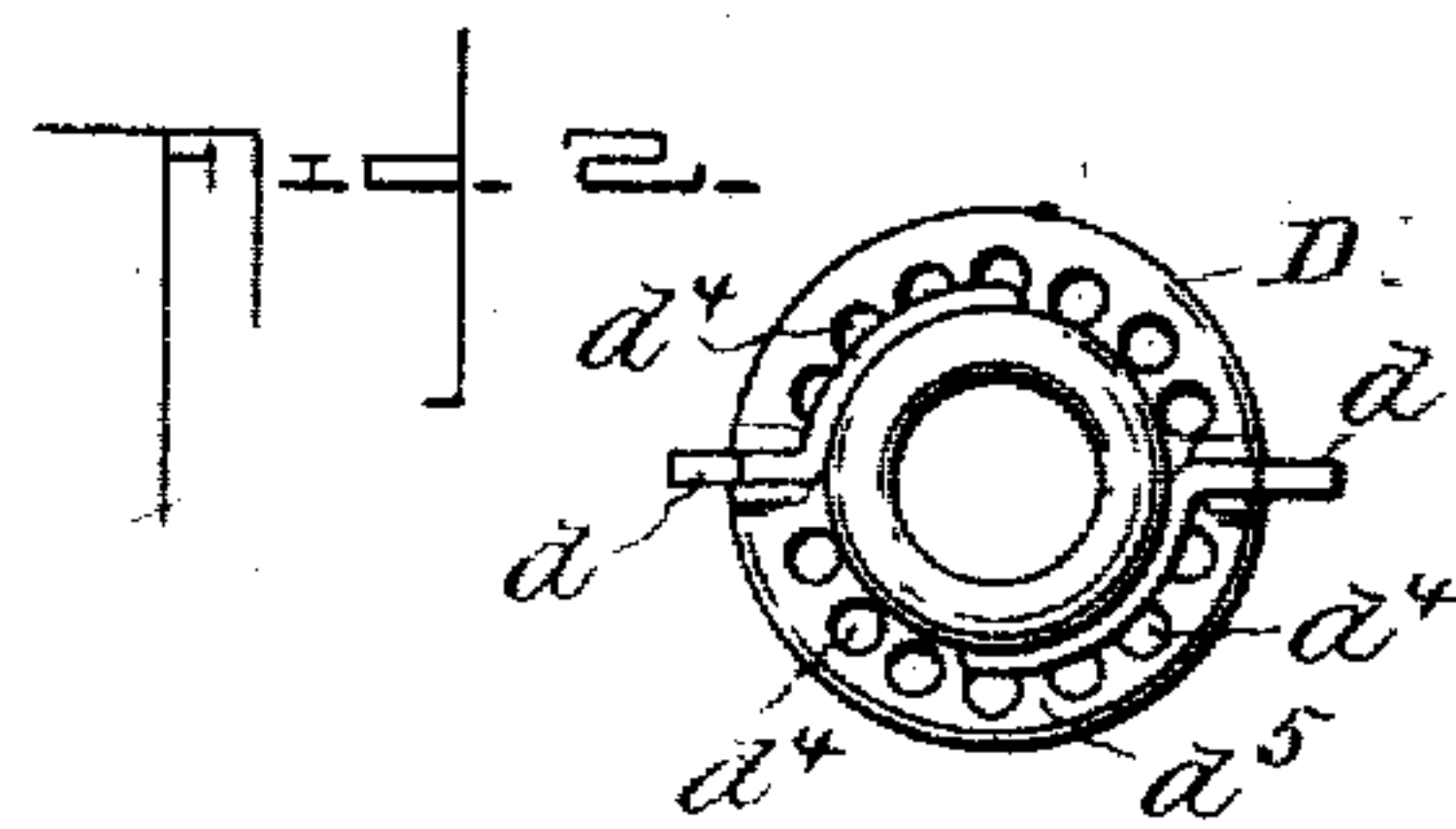
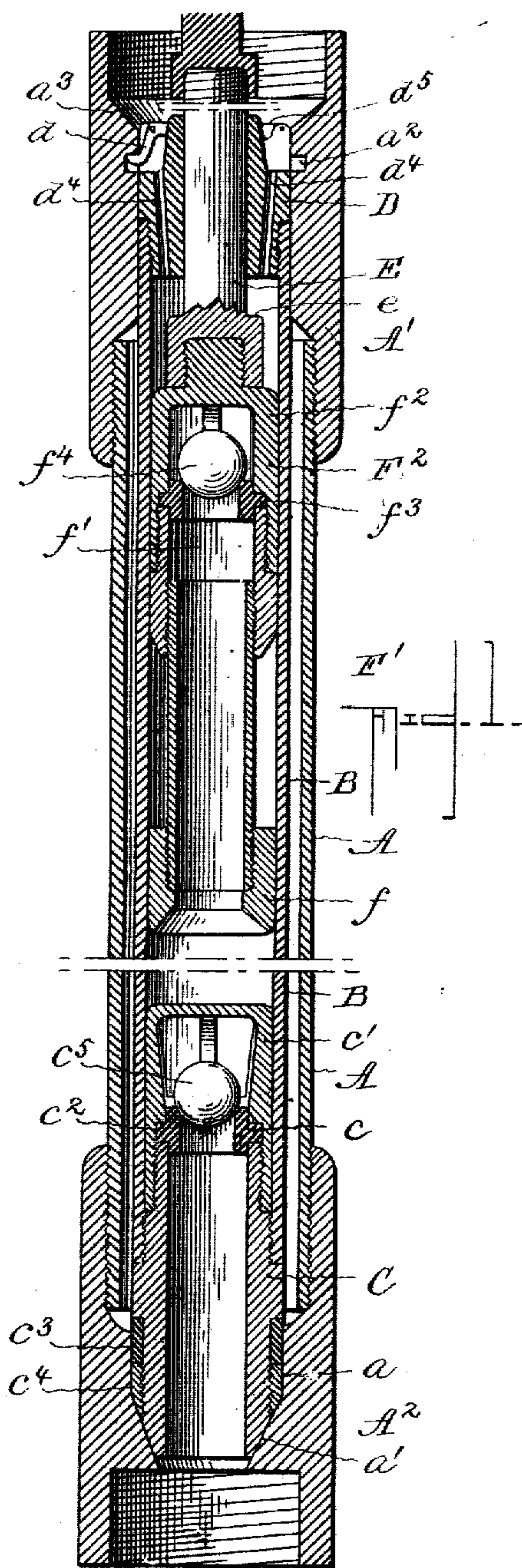
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A. T. EVANS & V. C. GAHAGAN.

WELL PUMP.

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# UNITED STATES PATENT OFFICE.

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## WELL-PUMP.

No. 814,365.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed June 7, 1905. Serial No. 264,099.

*To all whom it may concern:*

Be it known that we, ALFRED T. EVANS and VERNON C. GAHAGAN, citizens of the United States, residing at Guffey, in the county of McKean and State of Pennsylvania, have invented a Well-Pump, of which the following is a specification.

This invention is an improvement in pumps, and relates more especially to that class of pumps which are employed in connection with driven wells for water, oil, and other liquids.

The primary objects of the invention are to provide a construction of pump for driven wells which shall be strong and durable, effective in operation, and which can be readily and conveniently removed from the well-tubing for examination and repairs or renewal of worn parts.

Other objects and advantages of the invention will hereinafter appear, and what we claim as novel in the particular construction and arrangement will be more specifically set forth in the appended claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a pump constructed in accordance with our invention. Fig. 2 is a detail plan view of the bushing which forms the upper end or head of the pump-cylinder. Fig. 3 is a side elevation of said head or bushing. Fig. 4 is a vertical sectional view thereof. Fig. 5 is a detail side elevation of the lower end or foot portion of the pump-cylinder.

Like letters of reference indicate like parts in all the views of the drawings.

Referring to said drawings, the letter A designates the well-tubing, which at suitable points is provided with couplings A' and A<sup>2</sup>, and within the well-tubing between these couplings our unproved pump mechanism is located. The couplings A' and A<sup>2</sup> are of peculiar construction to receive and support such pump mechanism.

The coupling A<sup>2</sup> is provided with a reduced opening a, the lowered part of which is tapered, as at a', to form a seat for the lower end or foot of the pump cylinder or barrel B. The foot of the pump cylinder or barrel B comprises the standing valve C, which is threaded into said cylinder and at its lower end is beveled to correspond with the tapered opening a'. This standing valve is of the

"ball-valve" type and at the upper end thereof, within the pump-cylinder, is provided with a reversible seat or ring c and valve-cage c', the latter being threaded on the valve-casing, and holds in place the seat or ring, for which purpose the latter is provided with a circumferential rib c<sup>2</sup>. In order that the lower end of the standing valve C may fit the opening a closely, it is provided with a ring or washer c<sup>3</sup>, held in place by a collar c<sup>4</sup>. Within the cage c' and adapted to seat upon the ring or valve-seat c is the usual ball c<sup>5</sup>, which acts to close the valve against downward pressure in the pump-cylinder.

At the upper end of the pump cylinder or barrel B is a bushing or head D, which is adapted to fit snugly in a reduced opening through the coupling A', the latter being provided with an annular recess a<sup>2</sup>, and with this recess is adapted to engage spring-actuated catches d, pivoted in recesses therefor in the upper part of the bushing or head D. It will be noted that the pump cylinder or barrel B and parts C and D carried thereby are of such length with respect to the distance apart of the couplings A' and A<sup>2</sup> that when the foot or lower end of the standing valve C rests upon the seat a' of the coupling A<sup>2</sup> the head of the catches d will be on a line with the annular recess a<sup>2</sup> of the coupling A', so as to engage said recess and securely hold the pump-cylinder and parts C and D firmly within the well-tubing; also that, by simply releasing these parts can all be drawn from the well-tubing.

The heads of the catches d are rounded on their under side, as shown, so that when the connected parts B, C, and D are lowered into the well-tubing the catches will ride upon the beveled surface a<sup>3</sup> of the coupling A' and be closed within the bushing until they arrive opposite the annular recess a<sup>2</sup>. The catches each extend partly around the bushing (see Fig. 2) and at their ends are provided with rods d', Fig. 4, which pass downward through the bushing and terminate in push-buttons d<sup>2</sup>, which latter work in recesses therefor in the lower end of the bushing, and within said recesses and bearing upon the push-buttons are springs d<sup>3</sup>. The tendency of these springs is to throw the catches outward, and in this position of the catches the push-but-



tons are projected beyond the lower end of the bushing, so as to be operated upon in the manner hereinafter described to release said catches.

5 The bushing D is provided with vertical perforations or openings  $d^4$ , through which the liquid passes from the pump-cylinder into the well-tubing, and it will be noted that the upper end of the bushing is depressed, as  
10 at  $d^3$ , so as to catch and hold broken rivets and other small pieces and prevent them from interfering with the working of the pump. The bushing D is provided centrally with an opening through which the piston-  
15 rod E passes.

F designates the piston of the pump, which is connected to the lower end of the piston-rod E and comprises a tube  $F'$ , a working valve  $F^2$  on the upper end of said tube, and a  
20 collar or bushing  $f$  on the lower end thereof, the said piston working in the pump cylinder or barrel B. The working valve, like the standing valve, is of the ball-valve type and consists of the casing  $f'$ , ball-cage  $f^2$ , the  
25 valve seat or ring  $f^3$ , and the ball  $f^4$ .

The lower end of the piston-rod E, below the bushing D, is provided with a shoulder  $e$ , as shown, which is adapted to contact with the push-buttons  $d^2$  and operate the catches  
30  $d$  to release them from the annular recess in the coupling  $A'$ . This operation takes place, however, only when it is desired to remove the pump mechanism from the well-tubing, inasmuch as in the ordinary operation of the  
35 pump it is not intended that the shoulder strike the buttons on the upward stroke of the piston, the connections of the pump being such as to limit such upward stroke of the piston.

40 In the operation of pumping the parts all operate in the usual manner—that is to say, the liquid is drawn upward through the standing valve into the pump-cylinder on the upstroke of the piston, and upon the down-  
45 stroke of said piston the standing valve is closed and the liquid in the lower part of the pump-cylinder passes upward through the working valve, so that it will be lifted in the well-tube upon the upstroke of the piston  
50 when the working valve is closed, such liquid passing from the pump-cylinder upward through the perforations or openings  $d^4$  in the bushing D. In withdrawing the pump mechanism from the well-tube it is only nec-  
55 essary to draw upon the piston-rod, which will release the catches  $d$  by the engagement of the shoulder  $e$  with the push-buttons  $d^2$ , and the pump-cylinder and piston may be drawn through the coupling  $A'$  and out through  
60 the well-tube. The entire pump mechanism is thereby removed in practically one simple operation and may be examined for repairs or renewal of parts. In replacing

the pump mechanism it is only necessary to lower the same into the well-tube, when the  
65 tapered lower end of the pump-cylinder or standing valve thereof will be centered in the coupling  $A'$  by means of the inclined surface  $a^2$  thereof, and passing therethrough and through the intermediate section of well-tube  
70 will rest upon the seat  $a'$  of the coupling  $A^2$ , the catches  $d$  at the upper end of the pump cylinder or bushing D then engaging the annular recess  $a^2$  in the coupling  $A'$  to securely and firmly hold the pump-cylinder and its  
75 mechanism in the well-tube or that section thereof between said couplings.

It will be noted that most of the parts of the pump mechanism are reversible—that is, the valve-seats, the pump-cylinder, and the  
80 piston-tube.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a well-pump, of an  
85 upper and lower coupling forming a part of the well-tube, the lower coupling having a seat and the upper coupling an inner annular recess, a removable pump-cylinder located in the well-tube between the couplings and rest-  
90 ing upon the seat, catches carried by the pump-cylinder and adapted to engage the aforesaid annular recess in the upper coupling, a piston working in the pump-cylinder, and means for releasing the catches by the  
95 piston-rod.

2. In a well-pump, the combination of an upper and lower coupling forming a part of the well-tube, the lower coupling having a  
100 seat and the upper coupling an annular recess, a removable pump-cylinder located in the well-tube between the couplings and resting upon the seat, a bushing in the upper part of the pump-cylinder, and a standing valve in the lower part thereof, catches in the bush-  
105 ing engaging the aforesaid annular recess, rods connecting said catches with push-buttons projecting below the bushing, springs for projecting the catches into said recess, a valved piston working in the pump-cylinder  
110 and connected to a piston-rod having a shoulder adapted to engage the push-buttons and release the catches from the annular recess of the upper coupling and thereby permit the pump-cylinder and parts to be removed from  
115 the well-tube, substantially as shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ALFRED T. EVANS.  
VERNON C. GAHAGAN.

Witnesses:

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T. M. BUCHANAN.