

No. 674,675.

Patented May 21, 1901.

C. F. FERNALD.  
SAFETY VALVE.

(Application filed Mar. 18, 1901.)

(No Model.)

3 Sheets—Sheet 1.

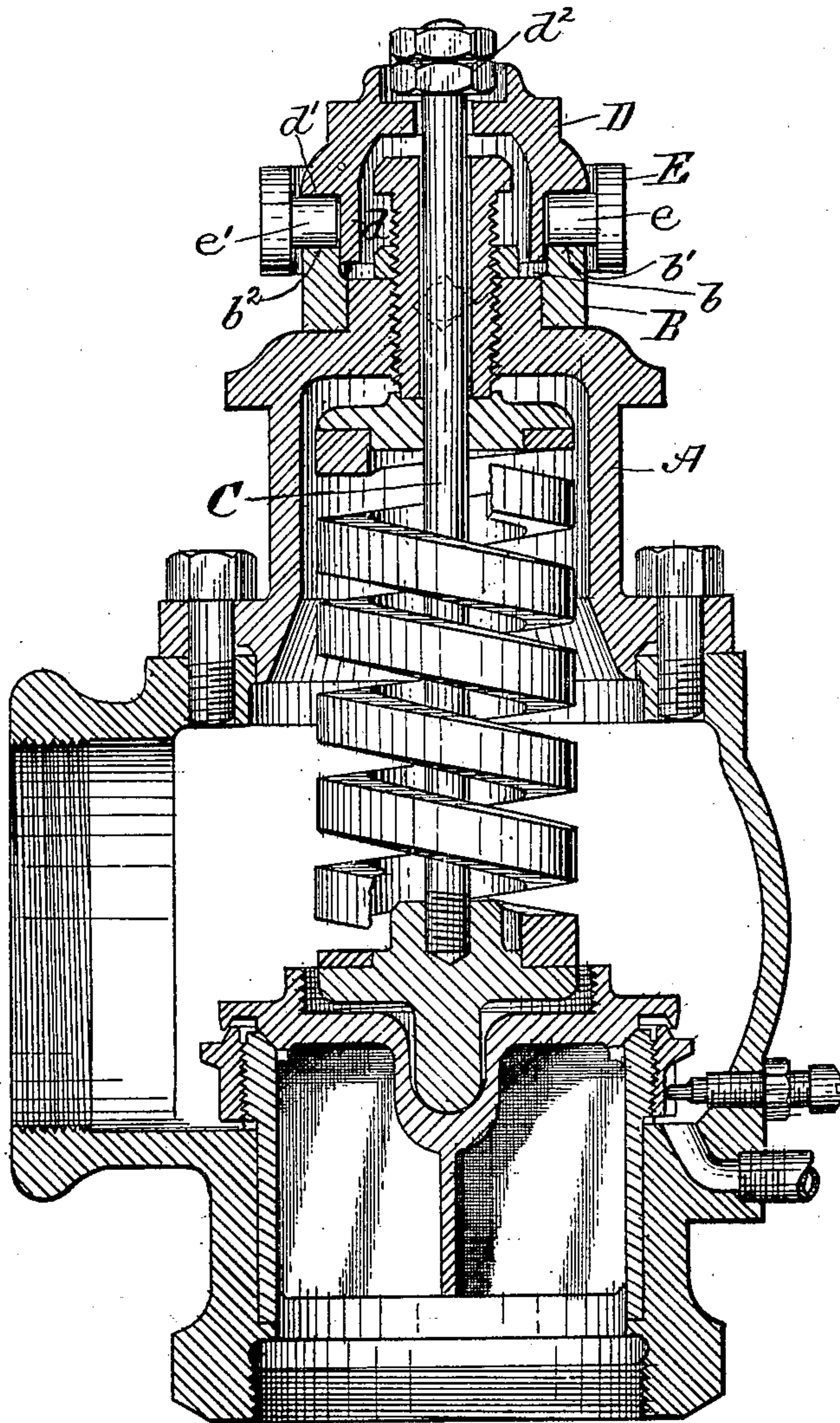


Fig. 1.

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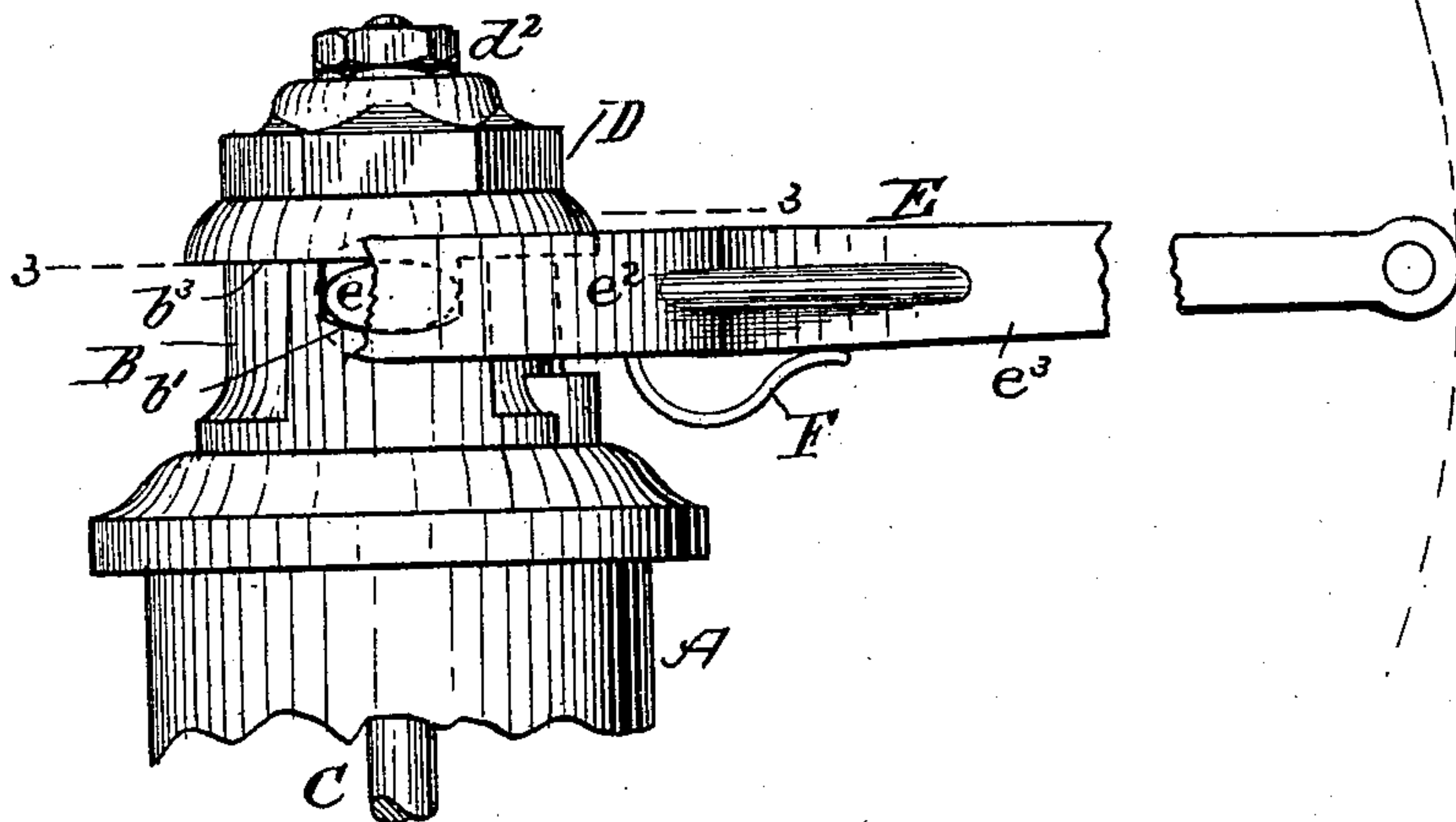


Fig. 2.

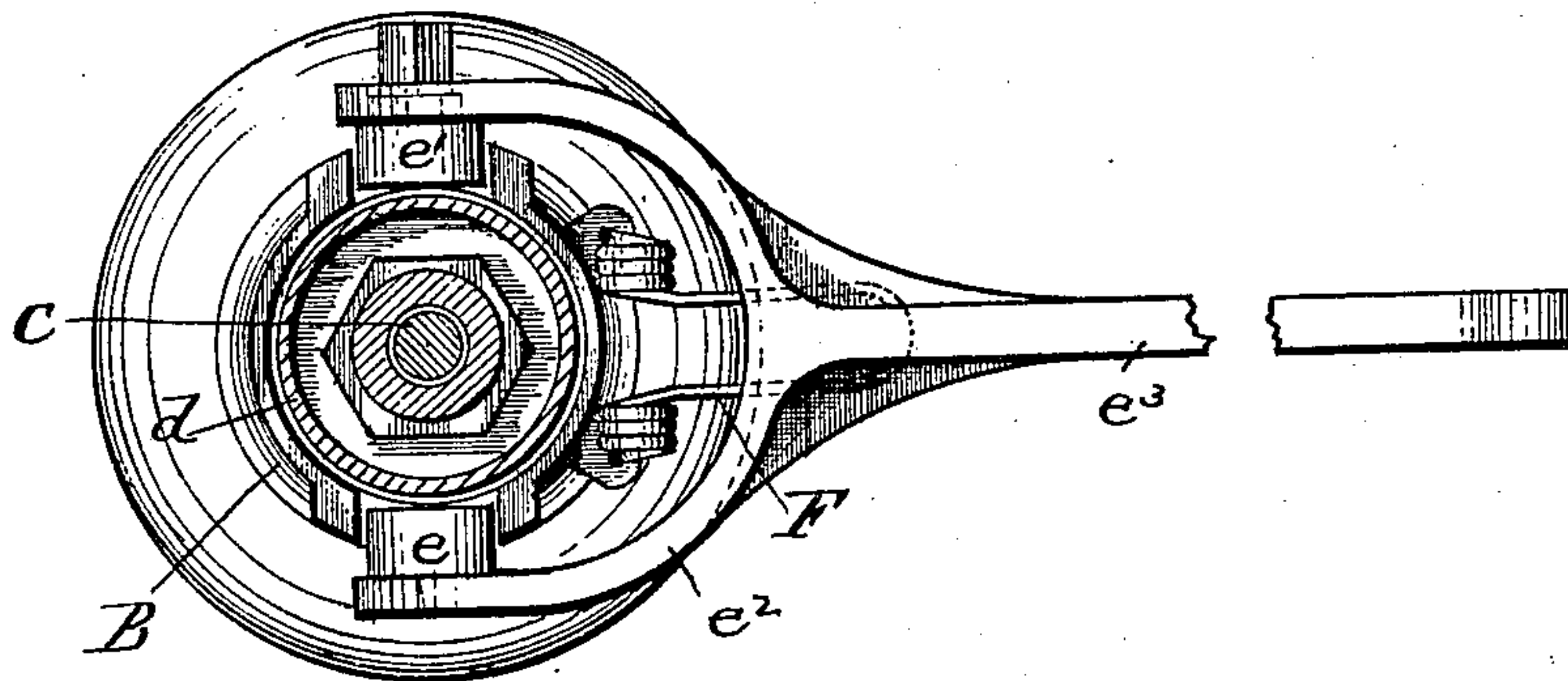


Fig. 3.

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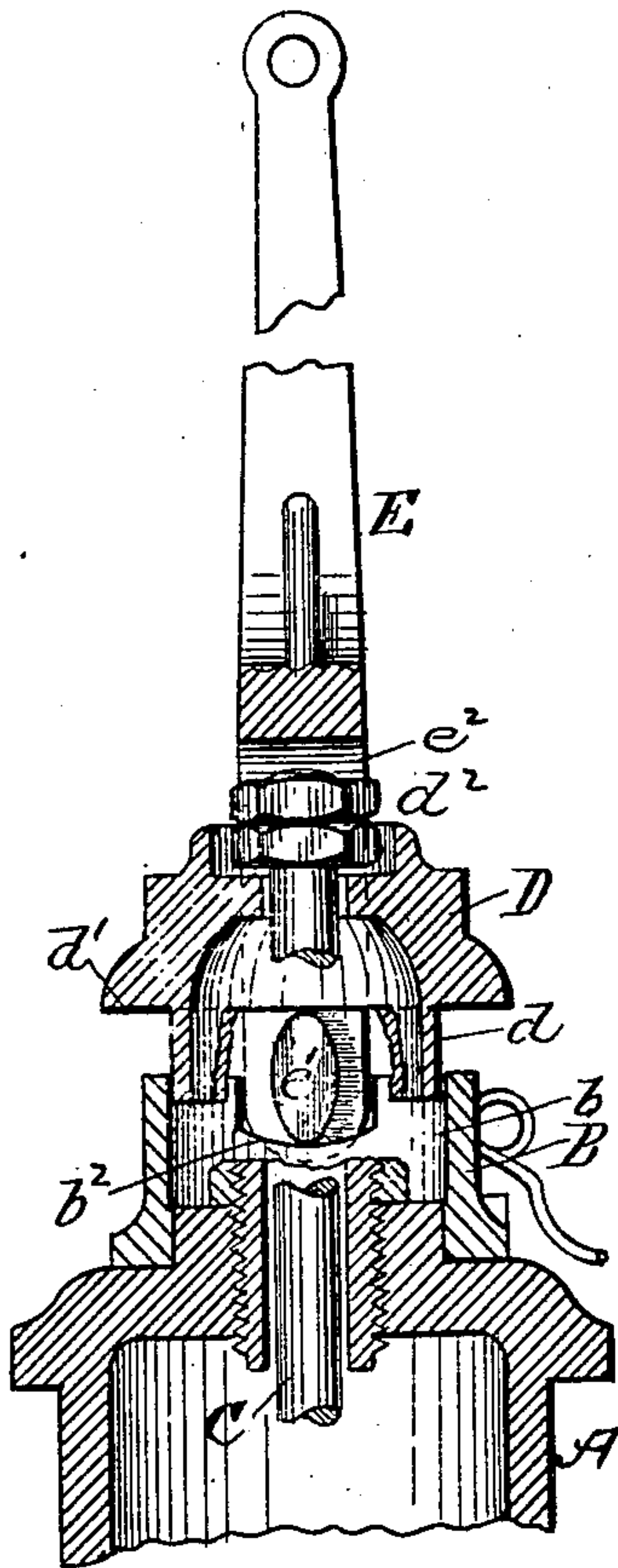


Fig. 4.

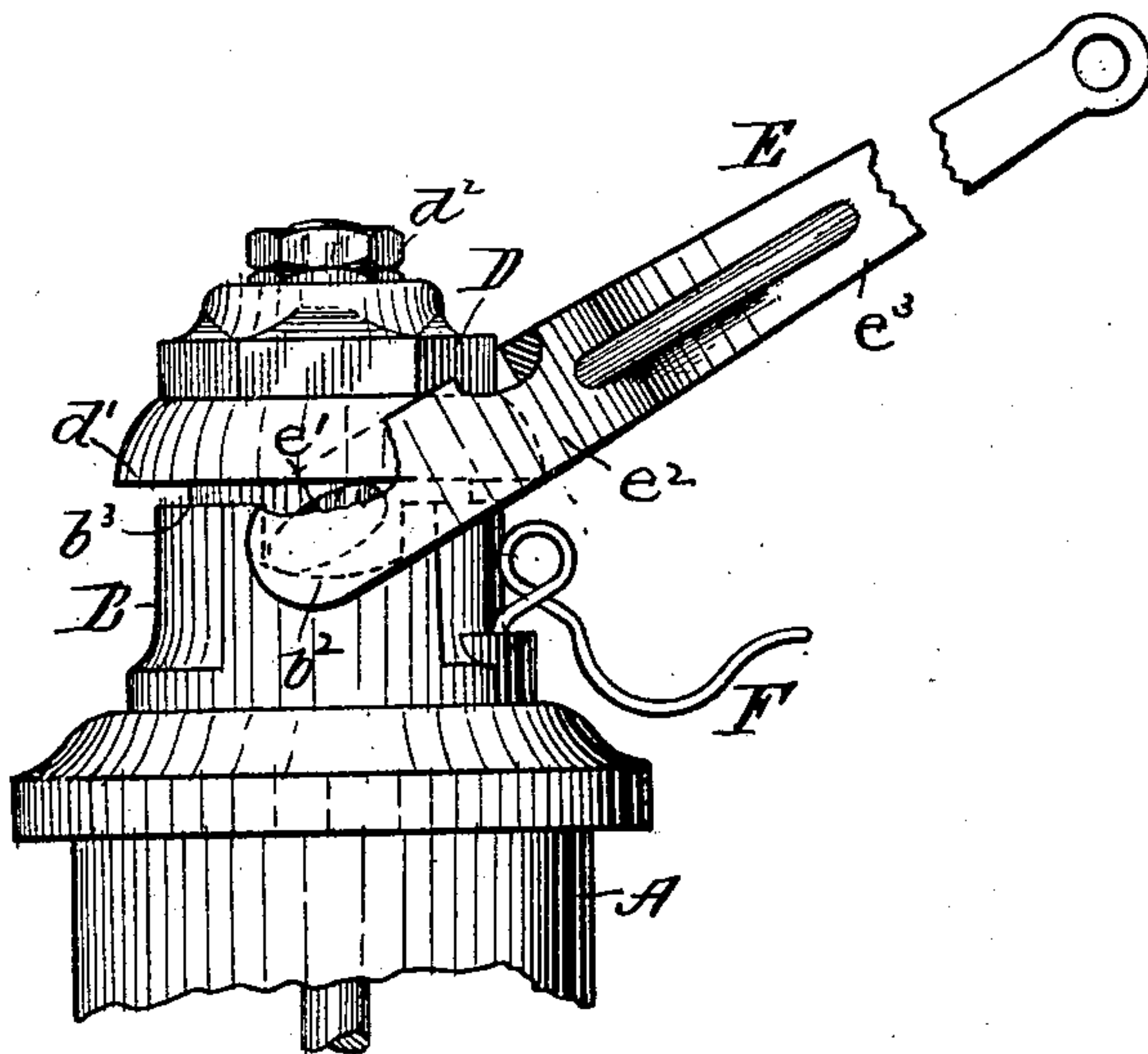


Fig. 5.

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# UNITED STATES PATENT OFFICE.

CHARLES F. FERNALD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO STAR BRASS MANUFACTURING COMPANY, OF SAME PLACE.

## SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 674,675, dated May 21, 1901.

Application filed March 18, 1901. Serial No. 51,616. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. FERNALD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Safety-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a lever to lift the valve from its seat against the pressure of the spring for the purpose of ascertaining whether it is free or not and also for the purpose of removing it from the seat in case it should be stuck thereto, and its adjuncts will be described in connection with the drawings, wherein—

Figure 1 is a view in vertical central section of a safety-valve equipped with my improvement. Fig. 2 is view of the upper part thereof in elevation and turned one-quarter from the position represented in Fig. 1. Fig. 3 is a view in horizontal section upon the dotted line 3 3 of Fig. 2 and in plan of parts below said line. Fig. 4 represents the valve-lever lifted to a vertical position. Fig. 5 is a view showing a modification.

Referring to the drawings, A is the casing of the valve.

B is a sleeve secured to the casing by a set-screw or in any other desired way and surrounding the spindle C of the valve. This sleeve has a cylindrical cavity or guide *b*, which receives and contains the cylindrical member *d* of a head D. The sleeve B also has the two seats *b'* *b*<sup>2</sup>, opposite each other, for the cam-shaped fulcrums *e e'* of the lever E. These seats *b'* *b*<sup>2</sup> are disposed so that the cam-shaped fulcrums when in one position shall be below the top *b*<sup>3</sup> of the wall of the sleeve. The head D has a hole into and through which the valve-spindle C extends. It also has a flange *d'*, which extends over the top of the sleeve B and seats *b'* *b*<sup>2</sup> and a cavity at its top for the nuts *d*<sup>2</sup> on the valve-stem. The head D is not attached to the valve-stem; but its motion is communicated to the valve-stem and to the valve by the nuts, so that when it is lifted in relation to the sleeve B it causes the valve to be raised from its seat. The cam-

shaped fulcrums *e e'* are oval in shape when in their horizontal position, and upon being turned they come into contact with the shoulder of the head at opposite points and serve to lift it with respect to the sleeve. They are arranged upon the inner side of the yoke *e*<sup>2</sup> of the lever to face each other, and from the yoke the arm *e*<sup>3</sup> of the lever extends. The cam-shaped fulcrums act as the means for attaching the lever to the valve-casing, as the centers upon which the lever is moved, and as the means for lifting the valve-seat from the valve. The head D because of its extension into the sleeve is steadied and guided by it and relieves the valve-spindle from a canting strain which might be produced if the head were not prevented from tipping as it is lifted by the lever. The yoke of the lever may be of such size as to permit the lever to be swung entirely over the head from one side of the valve to the other. This construction will also permit the lever to hold the valve lifted from its seat when desired, and it will also permit the lever to be located upon either side of the valve and to be operated from said side, if desired. In some instances it is not desirable to provide the lever with this range of movement, whereby it may serve to hold the valve from its seat, and I then provide a stop for limiting the extent of upward movement of the lever, and in Fig. 5 I have represented this stop as a portion of the head D, the yoke part of the lever being reduced in size, so as to come into contact with the head and not swing over it, as with the construction represented in Figs. 1 to 4, inclusive, the yoke coming into contact with the head and thus preventing further upward movement of the lever.

I have represented as a means for holding the lever in a horizontal position when inoperative the spring-rest F, fastened to the sleeve B.

It will be seen that the cam-shaped fulcrums of the lever are not only placed opposite each other, but are also opposite the center of the head D and valve-spindle C and so that the power of the lifting-cams is applied as near the center of the resistance as possible and also so as to avoid torsional or tipping strain upon the valve-spindle.



Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination in a safety-valve of a  
5 valve-case, having a cylindrical section, the  
inner surface of which forms a guide, and in  
the upper edge of which are two cam fulcrum-  
seats, opposite each other and separated from  
each other by a valve-spindle, with a valve-  
10 head having a portion to fit the sleeve-bear-  
ing and to be guided thereby, a portion over  
the cam fulcrum-seats and connected with  
the valve-spindle to lift the same, and a le-  
ver having cam-fulcrums to rest upon the  
15 fulcrum-seats and bear against the portions  
of the head over them, as and for the pur-  
poses described.

2. The combination in a safety-valve of a  
valve-spindle, a head connected with the

valve-spindle and a lever comprising an arm 20  
having at its lower end a yoke to embrace the  
head and from which yoke extend two cam-  
fulcrums, which are adapted to be moved by  
the lever from an inoperative position, when  
the lever is closed, to a position which causes 25  
the lever to be lifted from its seat.

3. The combination in a safety-valve, of the  
valve-casing, a head, the valve-spindle with  
which the head is connected, a lever, cam-  
fulcrums carried by the lever upon each side 30  
of the valve-spindle, arranged between the  
head and the valve-casing, a rest for holding  
the valve-lever in one position and a stop for  
limiting the extent of its opening movement.

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Witnesses:

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