

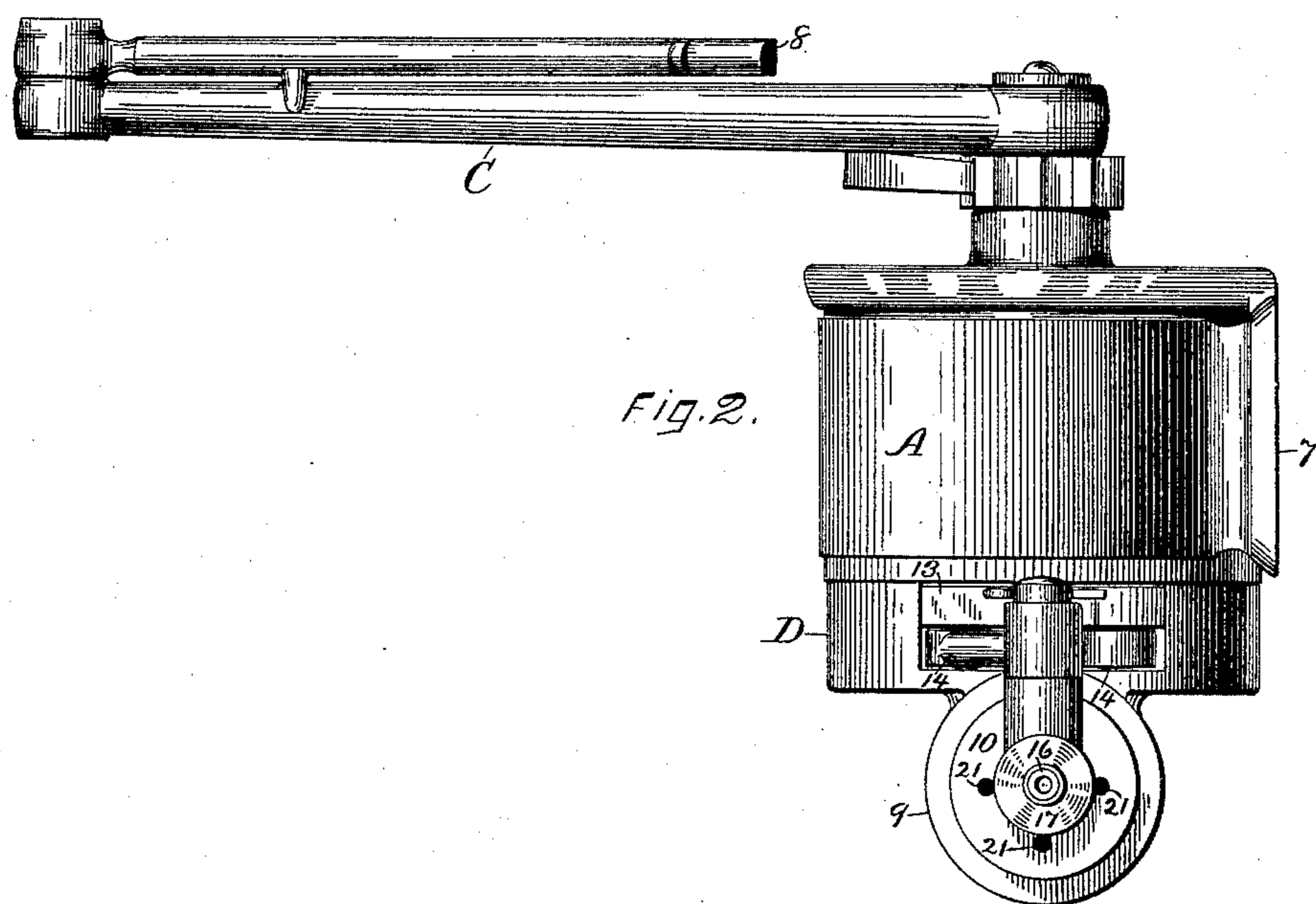
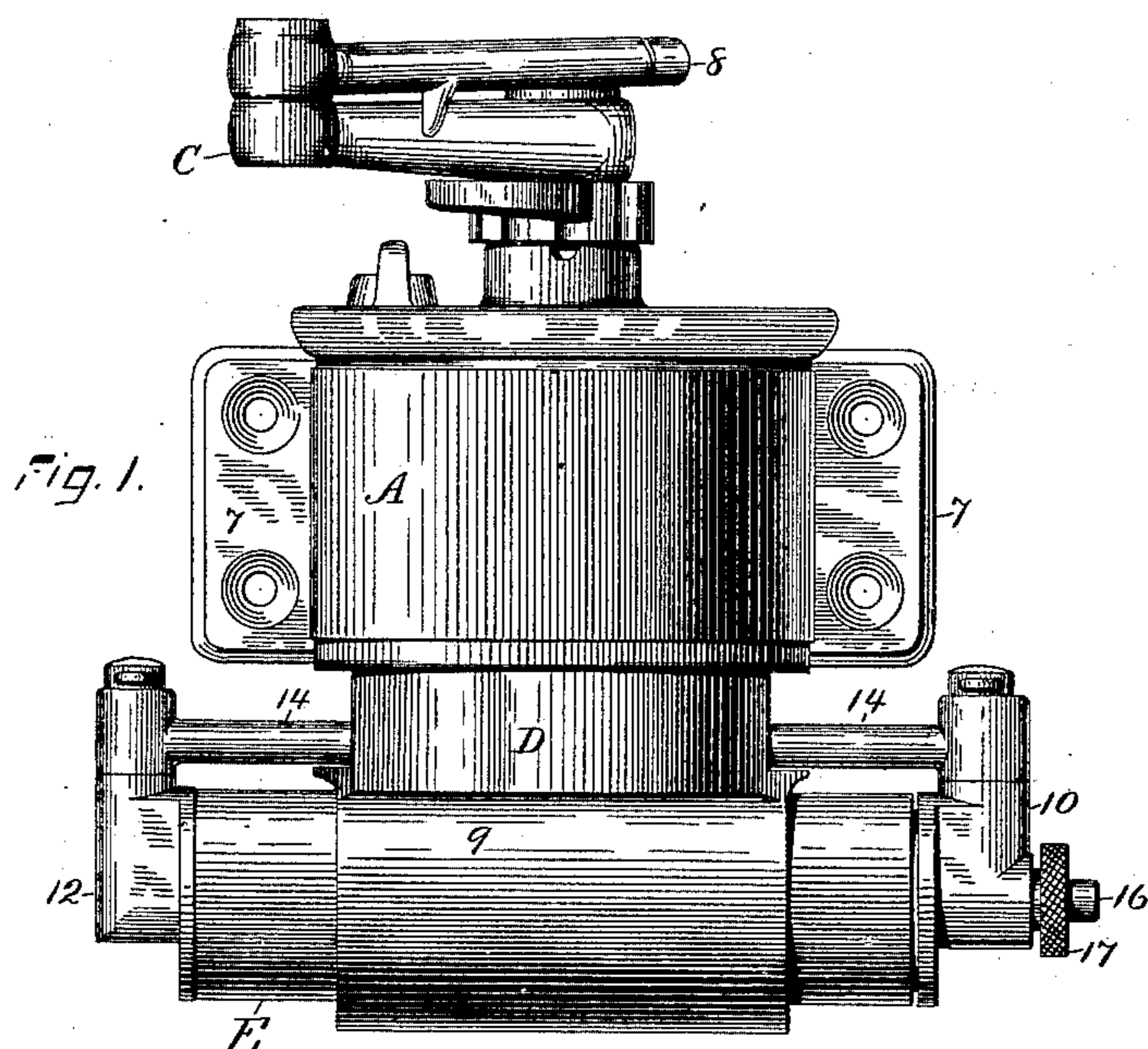
(No Model.)

3 Sheets—Sheet 1.

C. O. CASE.  
PNEUMATIC DOOR CHECK.

No. 475,930.

Patented May 31, 1892.



Witnesses.  
John Edwards Esq.  
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Inventor.  
Cromwell O. Case  
By James Shepard  
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(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

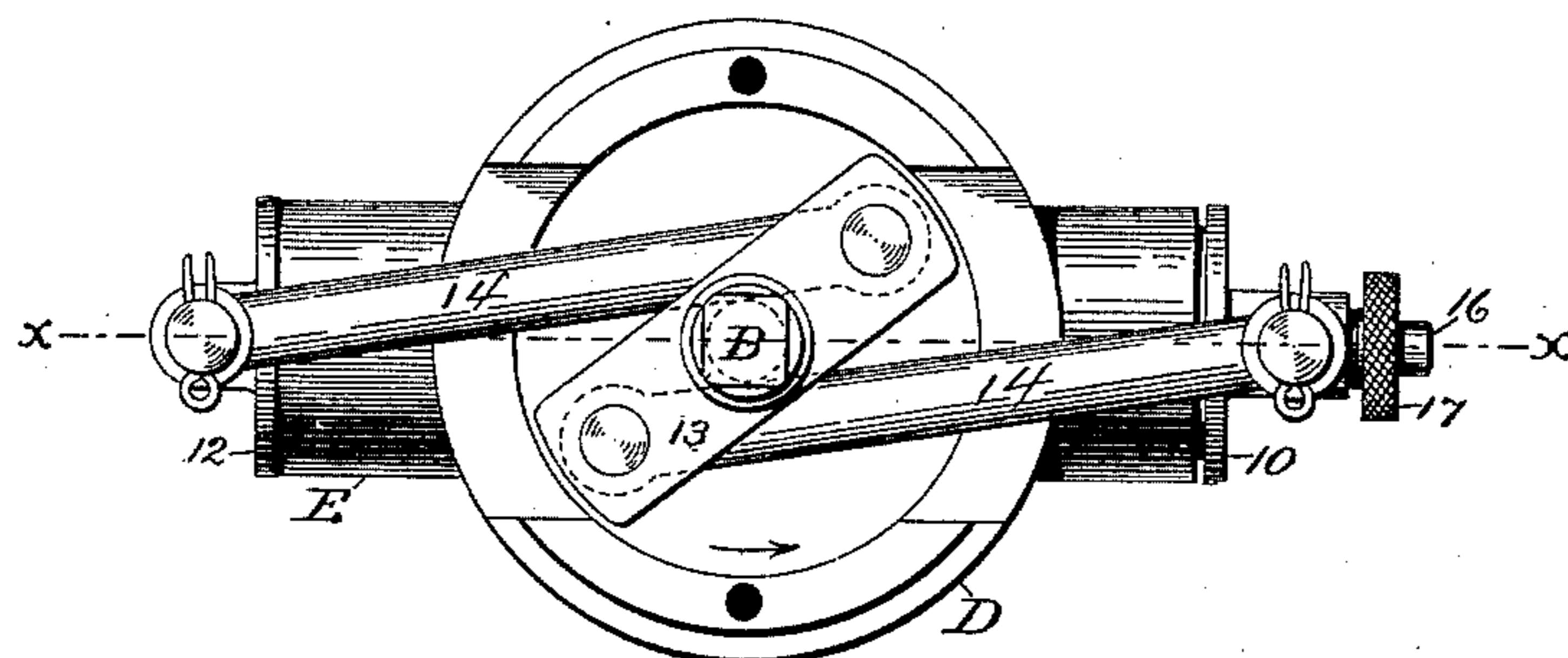
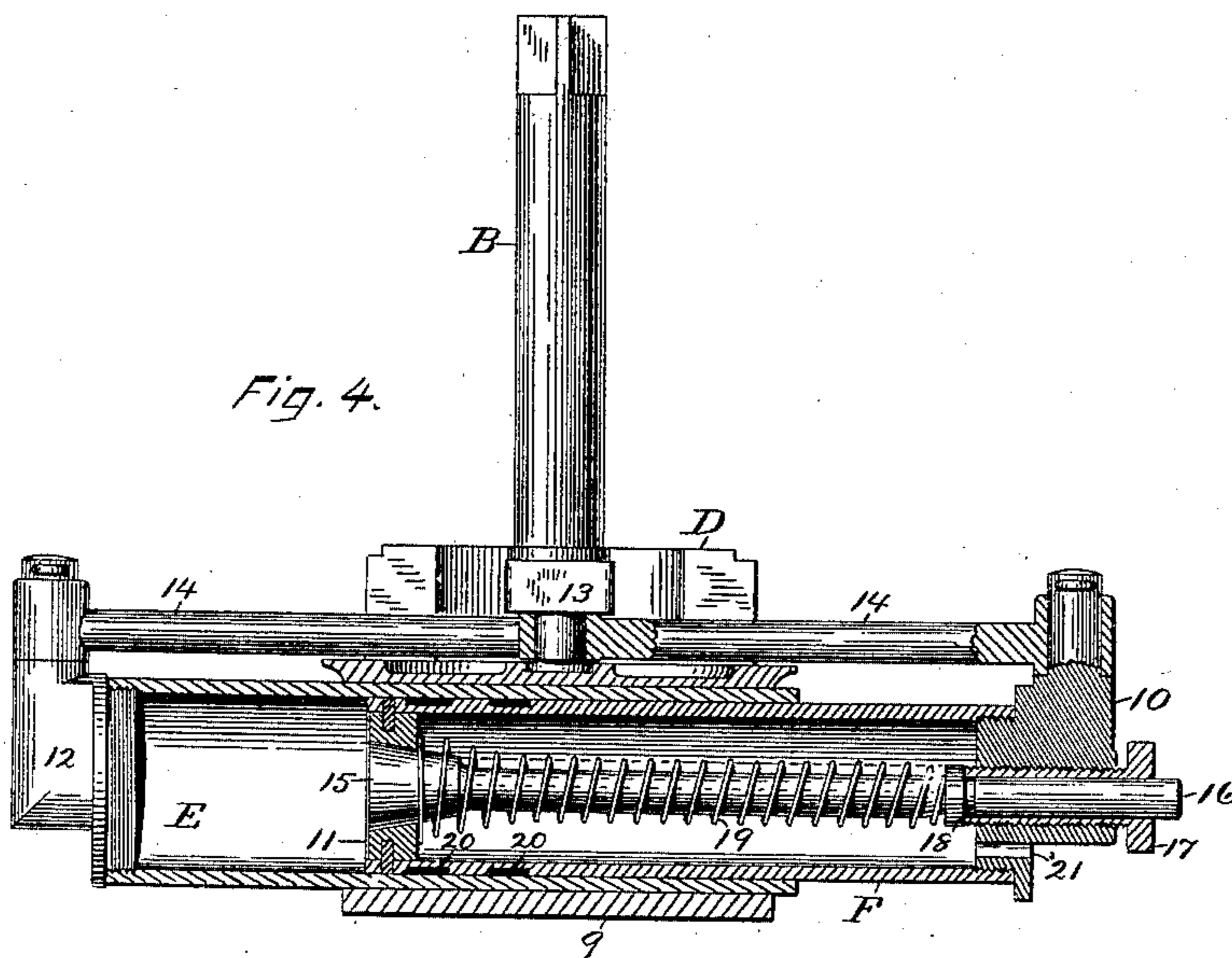


Fig. 4.



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Fig. 5.

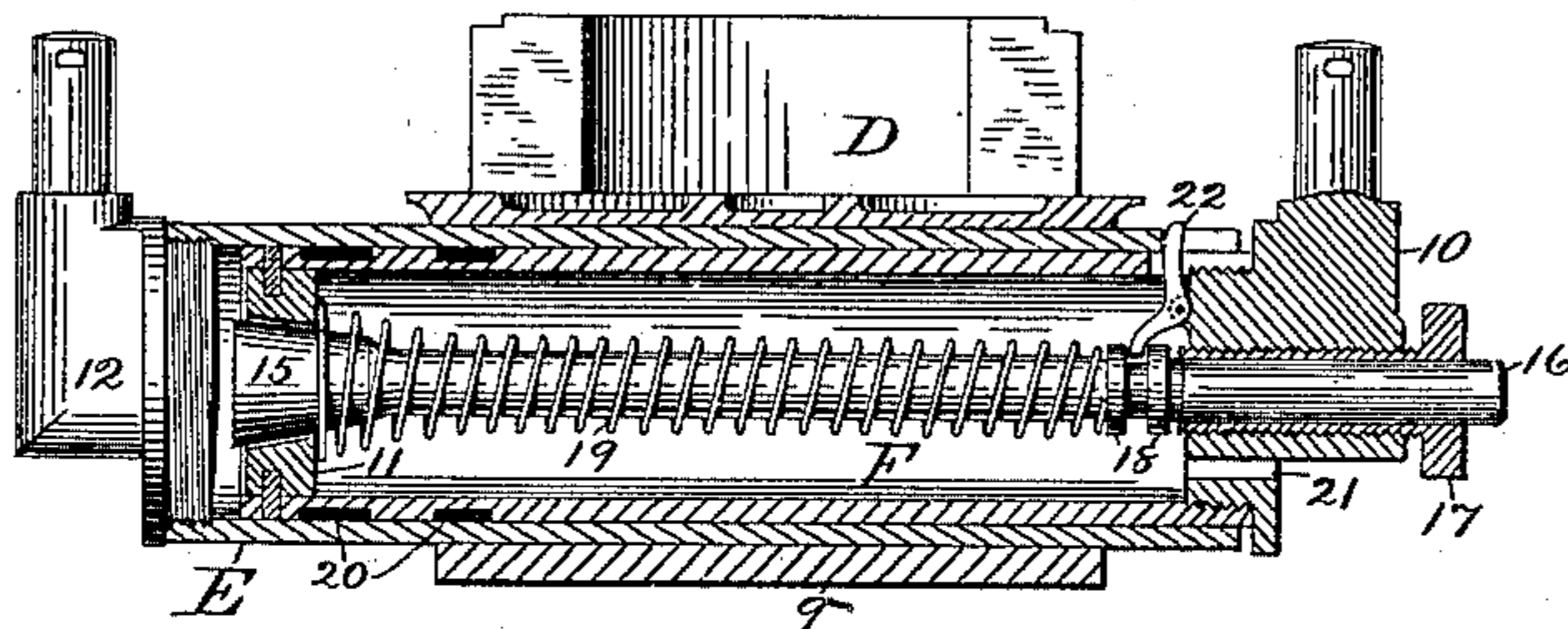
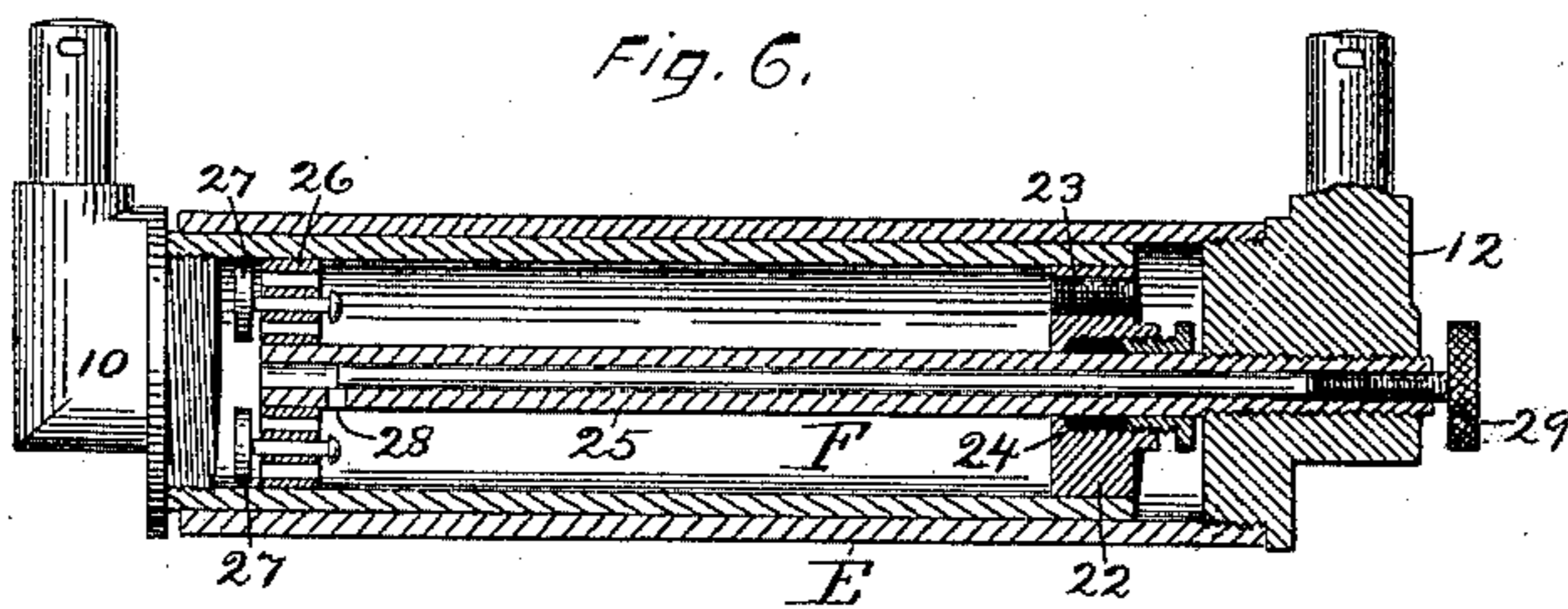


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 475,930, dated May 31, 1892.

Application filed January 25, 1892. Serial No. 419,109. (No model.)

*To all whom it may concern:*

Be it known that I, CROMWELL O. CASE, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Pneumatic Door-Checks, of which the following is a specification.

My invention relates to improvements in pneumatic or fluid door-checks; and the chief object of my improvements is general efficiency of the article.

In the accompanying drawings, Figure 1 is a front elevation of my check and so much of a door-closing device as to show its connection therewith. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of my check with the door-closing spring and its case removed. Fig. 4 is a longitudinal section mainly on the line  $x x$  of Fig. 3, but with the parts in a different position. Fig. 5 is a corresponding section with the parts in the position represented in Figs. 1 to 4, together with a valve-releasing lever; and Fig. 6 is a longitudinal section of my check as adapted more especially for liquid instead of air.

A designates a spring box or case bearing a vertical shaft B, Figs. 3 and 4, on the upper end of which shaft a lever-arm C is secured. The spring-box is provided with perforated wings 7, by means of which it is secured to a door or its jamb, while the lever-arm C is connected by a pivoted link and bracket to the jamb of the door in any ordinary manner of connecting such springs. I have shown only one part 8 of such link, inasmuch as the parts thus far specifically described are old and not of my invention, and any vertical shaft, connecting devices, and door-closing spring may be substituted for these parts.

I secure my door-check bracket D to the under side of the spring-box A, said bracket being provided with a cylindrical socket 9. Within said socket I mount the outer cylinder E, and within said outer cylinder is the inner cylinder F, having head 10 and end 11. The outer cylinder is also provided with a head 12. A cross-head 13 (or, if preferred, a disk) is connected in any proper manner with the vertical shaft B within the bracket D, so as to oscillate with said shaft as the door is

opened and closed, and I connect said cross-head with the respective cylinder-heads by means of the links or pitmen 14, the same being pivoted to said cross-head or disk on diametrically-opposite sides. The cylinder end 11 is fitted tightly to the inner cylinder and is provided with a tapering hole for a valve-seat. Within this hole is a valve 15, having valve-stem 16, that extends through the screw-sleeve 17 in the head 10 of the inner cylinder. This valve-rod is provided with a collar-like projection 18, Fig. 4, one side of which forms a shoulder for contact with the inner end of the adjusting-screw sleeve 17, while the other side forms a shoulder to furnish a seat on the valve-rod for one end of the spring 19, the opposite end of which spring rests upon the cylinder end 11. The inner cylinder is grooved at one or more points, as at 20, for the reception of any suitable packing to practically convert that end of the inner cylinder, in connection with its end 11, into a piston, while the body of the cylinder serves as the piston-rod. One or more perforations 21 are made through the head 10 of the inner cylinder for the free passage of air. When the door is closed, the parts are in the position shown in Figs. 1, 2, 3, and 5. Upon opening the door the shaft B is moved to carry the cross-head 13 in the direction indicated by the dart in Fig. 3, whereby said cross-head and connected links act to force the cylinders apart, while they are supported in position by the socket 9, carrying them from the position illustrated in Fig. 3 into that shown in Fig. 4. As the cylinders thus move, the valve 15 opens automatically to let the air pass freely into the compressing-chamber formed in the outer cylinder. When the shaft moves back again in closing the door and the cylinders return to their normal position, the valve is again closed to form an air-cushion and check the force of the door. The air is rapidly compressed to form a cushion or check by the movement of both cylinders, which in effect act like the simultaneous movement of cylinder and its piston to contract both ends of the cushioning-chamber at the same time. By turning the screw-sleeve 17 so that the collar-like projection 18 bears upon its end when the valve comes to its seat and is closed for its work

the valve may be so set that it will leak more or less, and thereby regulate the wasting away of the air-cushion to permit the final closing or last stroke of the door to be as slow  
5 or rapid as may be desired. The distance that the valve will be held from its seat when so adjusted is too small to admit of being shown in the drawings.

Fig. 5 shows the parts with the shaft, cross-  
10 head, and links removed. On the inside of the head 10 of the inner cylinder I pivot a lever 22, with one end extending through slots in the cylinders and its other end entering a groove in the collar-like projection 18. Just  
15 before the parts reach the position shown in said figure as the door is being closed the end wall of the slot in the outer cylinder strikes the lever 22, so as to move the valve-stem a little and open the valve against the force of  
20 the spring, and thereby wholly release all the air in the compression-chamber and permit the spring to act on the door with all its force.

In Fig. 6 I have shown my cylinder as arranged for a liquid—as, for instance, glycer-  
25 ine or oil. These cylinders will be supported in a cylindrical socket and operated by a shaft, cross-head, and links, as before described. The inner cylinder is provided with an end 22, having a filling-plug 23 and stuff-  
30 ing-box 24, through which the hollow piston-rod 25 extends. Said piston-rod is screwed into the head 12 of the outer cylinder, so as to be rigid therewith, while a piston 26 is secured to its opposite end. This piston, in-  
35 stead of having a central valve for the rapid passage of the liquid, has one or more valves 27 at a point or points outside of the center, the valves being of an ordinary construction. At a point near the junction of the hollow pis-  
40 ton there is a leakage-hole 28, and inside of said hollow rod is the screw-adjustable leakage valve-rod 29, with its end reaching said hole, whereby by screwing said valve-rod out or in, more or less of said hole 28 may be cov-  
45 ered or uncovered to make the leakage greater or less, as may be desired. In this construction the outer cylinder, its head 12, the piston-rod, and piston all move together as one piece, while the inner cylinder moves in the  
50 opposite direction. When the cylinders are moving outwardly, as in opening the door, the liquid flows freely through the valves 27 from the chamber in the back of the piston to the chamber at its front. On the reverse move-  
55 ment of the cylinders in closing the door the valves 27 are closed and the liquid can only pass through the leakage-hole 28, thereby checking the closing of the door to a greater or less extent, according to the adjustment of  
60 the valve-rod 29.

In the arrangement of the cylinder as first described, and also in Fig. 6, both ends of the fluid-compressing chamber have a synchroni-  
65 cal movement from and toward each other, thereby more rapidly contracting said chamber than in prior constructions, in which one

end only moves, while the other end is stationary. In both arrangements I employ an outer and inner cylinder and mechanism for moving them simultaneously in opposite di- 70 rections.

In the construction first described I combine the passage-valve with an adjustable stop device—viz., the screw-sleeve—whereby I adjust said valve with reference to its seat 75 to provide the desired leakage when the valve is closed for effective work.

I claim as my invention—

1. In a door-check, the combination of a cylinder and a piston, both movably mounted 80 and forming a compression-chamber, with operating devices for moving said cylinder and its piston simultaneously in opposite directions, and carrying both ends of said compression-chamber toward each other, sub- 85 stantially as described, and for the purpose specified.

2. In a door-check, the combination of an outer and inner cylinder, both movably mount- 90 ed and fitted one within the other, and operating devices for simultaneously moving both of said cylinders in opposite directions, substantially as described, and for the purpose specified.

3. In a door-check, the combination of an 95 oscillating or vibratory shaft, a cross-head moving therewith, a cylinder and piston, and a pair of links connecting said cylinder and piston with said cross-head for moving simultaneously in opposite directions, substantially 100 as described, and for the purpose specified.

4. In a door-check, the combination of a cylinder and piston, the latter having a valve-seat, the valve 15, valve-stem 16, having a 105 shoulder, and the adjustable screw-sleeve 17, mounted in a fixed position with reference to said valve-seat, whereby the leakage of the valve when closed for work may be regulated, substantially as described.

5. In a door-check, the combination of a 110 holding-bracket having a cylindrical socket 9, a cylinder E, fitted to move within and supported by said socket, a piston fitted within and supported by said cylinder, and mechanism for moving said cylinder and piston 115 within said socket, substantially as described, and for the purpose specified.

6. In a door-check, the combination of an outer and inner cylinder, the latter forming a piston and having a valve-seat, the valve 120 15, valve-stem 16, the head 10 of said inner cylinder, operating mechanism for moving said cylinders, and the release-lever 22, having one end arranged for engagement with said outer cylinder and its opposite end en- 125 gaged with said valve-stem, substantially as described, and for the purpose specified.

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