

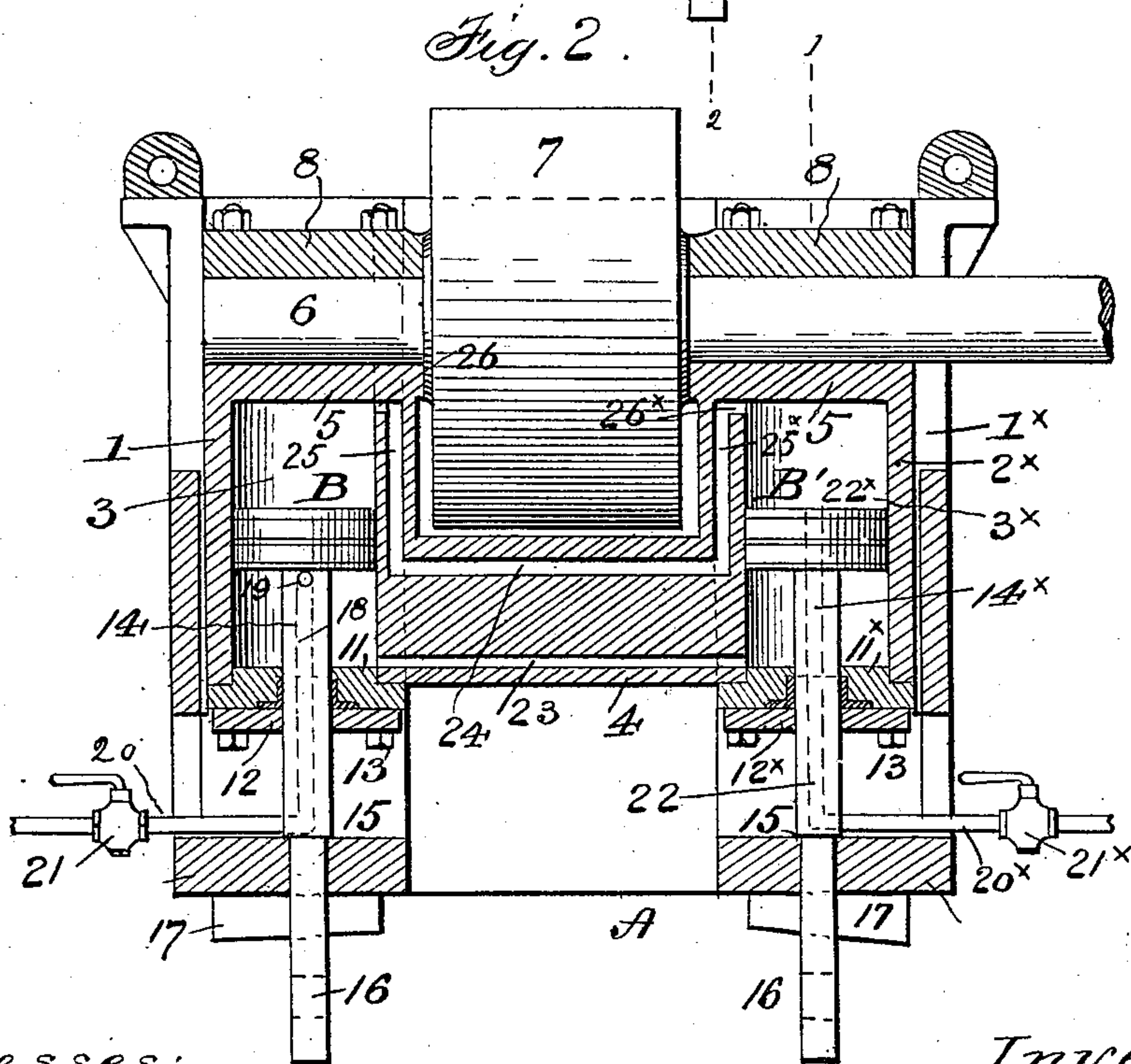
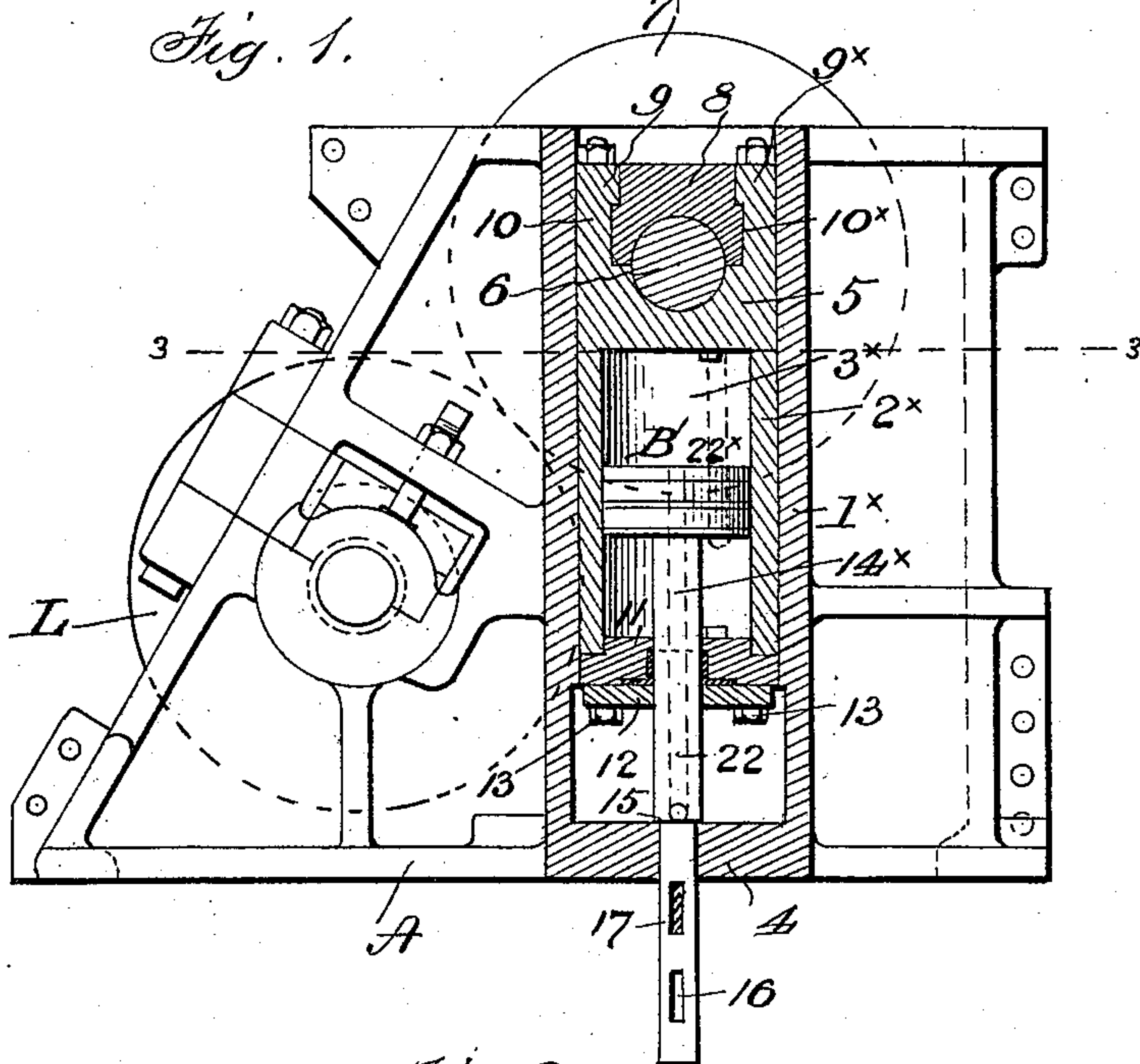
(No Model.)

2 Sheets—Sheet 1.

J. ROGER.  
ORE CRUSHER.

No. 574,273.

Patented Dec. 29, 1896.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

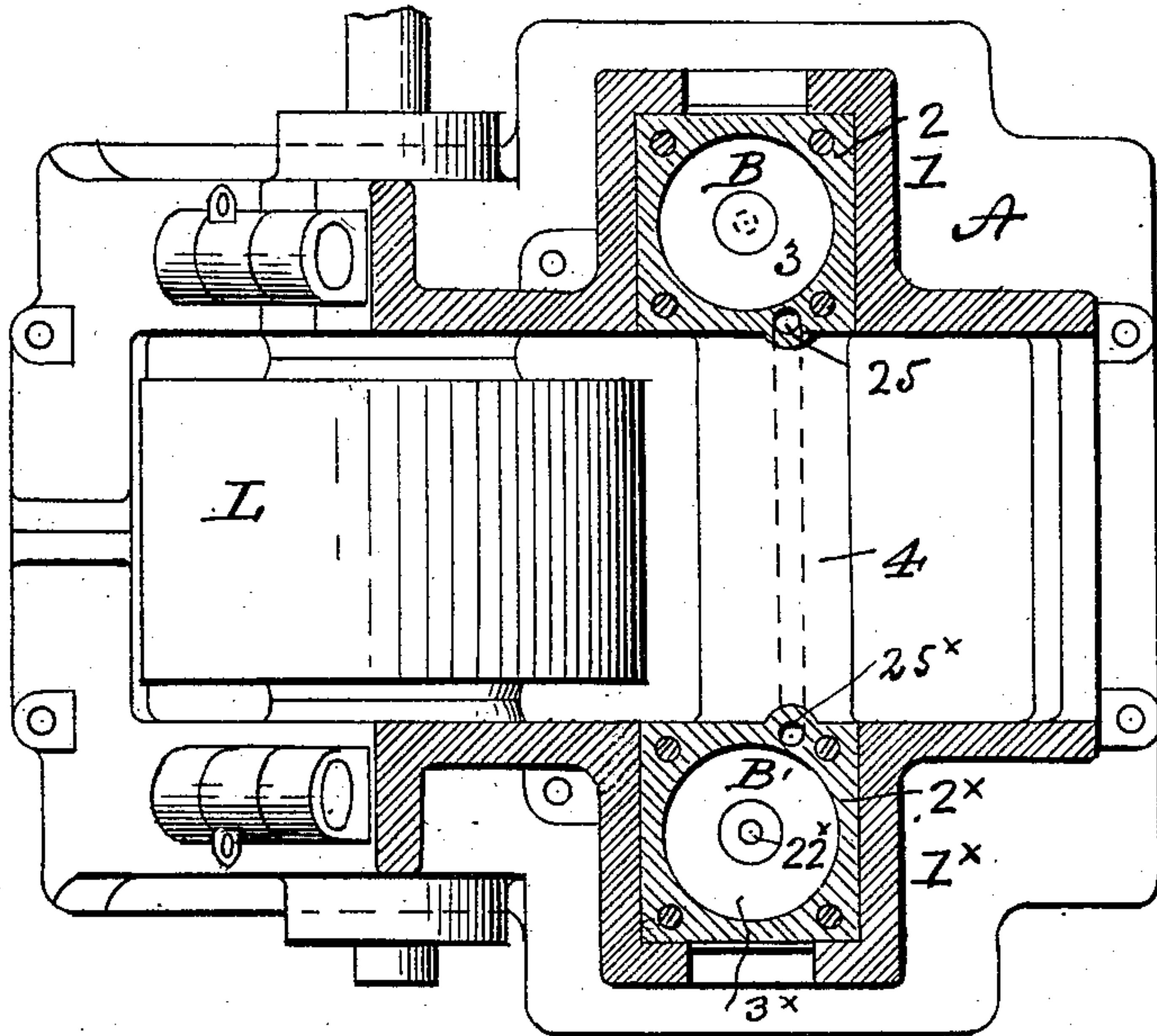
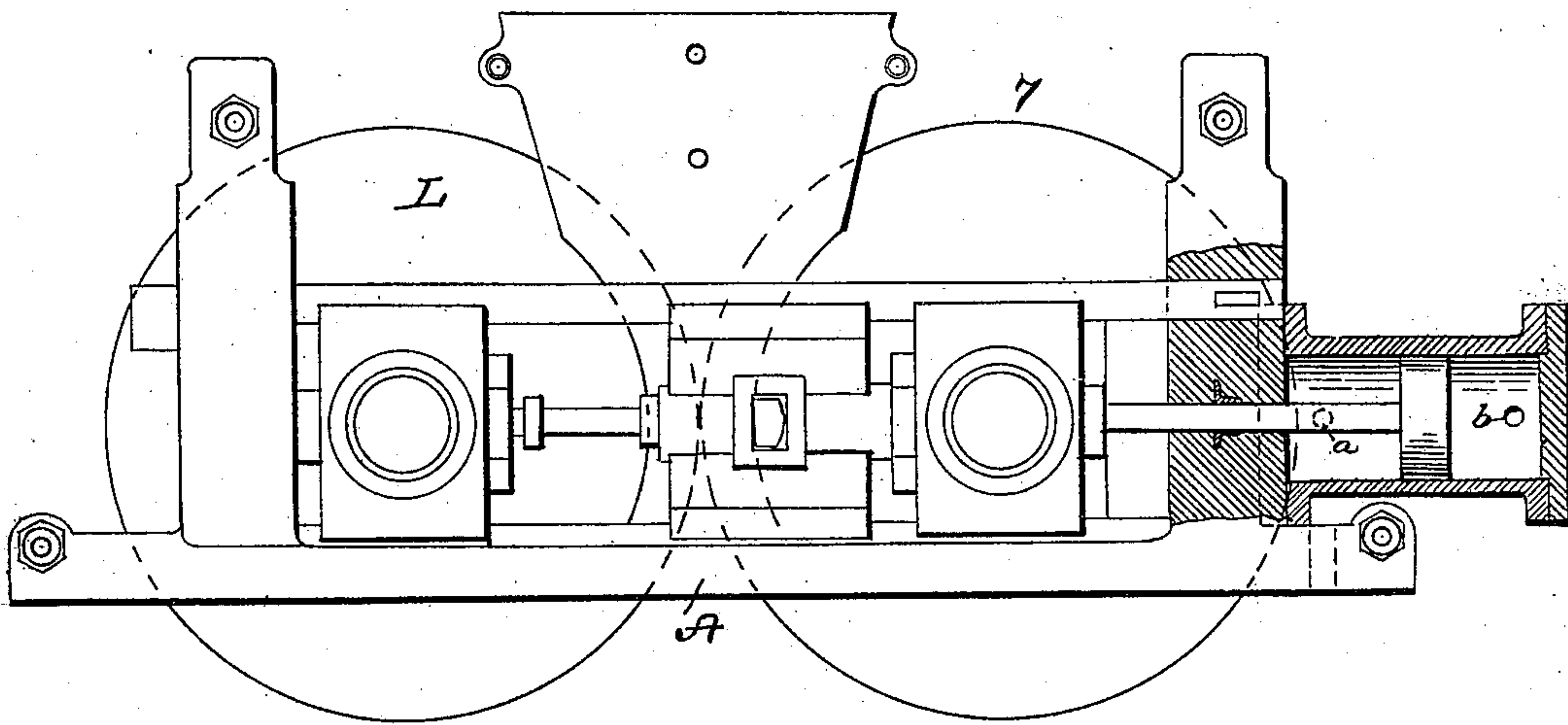


Fig. 4



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# UNITED STATES PATENT OFFICE.

JOHN ROGER, OF DENVER, COLORADO.

## ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 574,273, dated December 29, 1896.

Application filed February 13, 1896. Serial No. 579,133. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN ROGER, a subject of the Queen of England, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Crushers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to ore-crushers, and the object is to provide an improved resilient and yielding bearing for a crushing-roll, whereby the roll may be automatically moved to and from its companion roll, and also to apply to the movable roll such pressure as may be necessary or requisite to effect the reduction of the material.

I have fully and clearly illustrated my invention in the accompanying drawings, wherein—

Figure 1 is a vertical section on the line 1 1 of Fig. 2. Fig. 2 is a transverse vertical section on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section on the line 3 3 of Fig. 1. Fig. 4 is a side elevation of a crushing-mill, partly in section to show the application of the invention to an ore-crushing mill wherein the crushing-rolls are mounted side by side with their journals on the same horizontal plane.

Referring to the drawings, Figs. 1, 2, and 3, A designates a substantial cast-metal base, which may be of any suitable dimensions and contour to support the parts formed and mounted thereon and to withstand the strains to which it may be subjected by the operating mechanism carried thereby. Formed on this base-piece and rising therefrom are two oppositely-arranged vertically-disposed housings 1 1<sup>x</sup>, consisting of three-sided boxes rectangular in cross-section and having their inner open sides standing opposite to each other and in alinement, substantially as indicated in the drawings. Fitted to and slidingly arranged in the ways of the housings 1 1<sup>x</sup> are sliding boxes 2 2<sup>x</sup>, duplicates in construction and comprising rectangular boxes formed with interior cylindrical chambers 3 3<sup>x</sup>, constituting the cylinder chests or cham-

bers, opening at the lower end of the boxes, substantially as shown. The boxes 2 2<sup>x</sup> are united at their lower portions by a strong cross-piece or yoke 4, cast integral therewith, and at the upper end of each box is formed a bearing 5, in which is journaled the shaft 6 of the upper crushing-roller 7, and to keep the journals of the roller from upward displacement strong bearing-caps 8 are arranged over the journals, being held in place by lateral flanges 9 9<sup>x</sup>, formed at their lower portions and setting in ways formed in vertical extensions 10 10<sup>x</sup> of the sliding boxes. The heads 11 11<sup>x</sup> of the boxes and cylinders consist of strong metal plates supplemented by holding-plates 12 12<sup>x</sup> and held in position by means of bolts 13, let through the corners of the boxes, and clamped by nuts on the ends of the bolts, substantially as seen in the drawings.

B B' designate the pistons, fitted to the cylinders and arranged to stand normally at midway the length of the cylinders and formed with stems 14 14<sup>x</sup>, let through the cylinder-heads, and also formed with a shoulder 15 to rest on the upper surface of the bed or base of the frame, the stem or rod being projected through the bed, as shown, and formed with keyholes 16, in which are fitted cotters or keys 17, whereby the piston-rods are keyed firmly in position and so held. The piston-rod 14 is formed with an interior channel 18, starting from a point adjacent to the shoulder on which the stem rests and extending upward to a point closely adjacent to the under face of the piston where it opens radially into the cylinder, as at 19.

A conduit-pipe 20 is let into the stem 14 at the lower end of the channel 18, through which the air or other elastic medium is conducted to the cylinder below the piston. A cut-off cock 21 is interposed in the pipe 20 to let on and cut off the flow of air, &c. The piston-rod 14<sup>x</sup> is also formed with an interior channel 22, opening up through the piston, as at 22<sup>x</sup>, a conduit-pipe 20<sup>x</sup>, provided with a cock 21<sup>x</sup>, being let into the stem at the base of the channel, whereby the elastic medium is supplied to the cylinder above the piston. Communication between the cylinders be-



low the pistons is effected by means of a passage 23, formed through the yoke-piece and opening into the bases of the cylinders; and like communication is made to the cylinders  
 5 above the pistons by means of a passage 24 in the yoke-piece and extended vertically, as at 25 25<sup>x</sup>, parallel with the cylinders and opening therein at the upper ends, as at 26 26<sup>x</sup>, substantially as shown.

10 The lower roller L is journaled in strong brackets or frames formed on or firmly secured to the main frame, and is arranged and held in operative relation to the upper roller by any suitable and well-known means. In  
 15 Figs. 1, 2, and 3 of the drawings the rollers are shown as having their journals disposed on different vertical planes, throwing the top roller a distance behind the lower one; but it will be perceived that the invention can be  
 20 readily and conveniently applied and adapted to crushing-rollers having their journals on the same vertical plane, and can also be applied to rollers having their journals on the same horizontal plane, and I have therefore  
 25 shown in Fig. 4 of the drawings the invention applied to the latter arrangement of rollers, and, reference being thereto had, it will be seen that the right-hand roller is mounted in sliding bearing-boxes carried by a strong  
 30 frame, from the end of which project the cylinders in which the pistons are arranged, the stems of which are guided through a yoke or cross-piece and abut against the sliding boxes of the roller, and that the elastic medium is let through and into the respective di-  
 35 visions of the cylinders by means of conduit-pipes *a b*, substantially as shown.

The elastic medium employed may be any elastic fluid, such as air, steam, &c., adapted  
 40 to the purpose.

In mechanisms embodying crushing-rollers it is necessary to provide means whereby the rollers may be easily and quickly adjusted in operative relation to crush with certainty  
 45 and economy substances of different degrees of hardness, and to accomplish this the rollers must be held or forced toward each other with a greater or less pressure, according to the nature of the material. It is also essen-  
 50 tial that the pressure of the rollers be a yielding one, so that in the event of an irreducible substance getting between them they will open freely and pass the substance through without damage to any of the parts involved.  
 55 These requisites I attain by the means hereinafter described and shown, the operation of which will now be explained.

To depress or move the cylinders or boxes and the upper roller journaled therein, the  
 60 cock or valve 21<sup>x</sup> is closed and the valve 21 opened. The elastic fluid from a compression-chamber (not shown) is then free to enter the cylinders through the pipe 20 and the channel through the piston-stem to the under side of  
 65 the piston. The pressure created by this op-

eration will exert an upward force on the pistons, the reaction producing a downward pressure on the cylinders, and bring the upper roller tightly down on the lower roller, the force of pressure thus created and exerted by  
 70 the top roll being dependent on the pressure of the elastic fluid admitted to the cylinders. When it is desired to relieve the roller from this pressure, the valve 21 is closed, thus removing the pressure and affording an escape  
 75 for the fluid through any means provided for the purpose. The pressure will then be that due to the weight of the adjustable and yielding roller and the yoke and boxes as they are carried by the shaft of the roller. 80

When it is desired to move the rollers apart, so that an opening may be formed between them, the valve 21<sup>x</sup> is opened, admitting the flow of the fluid into the cylinders above the pistons, as heretofore specified. The fluid so  
 85 admitted then exerts its force in the cylinders above the pistons, thereby forcing the top roller upward. In this manner the rollers can be readily opened and as readily brought together and put under pressure by the means  
 90 of the elastic medium in the cylinders.

It is readily perceived from the foregoing description that the invention can with slight mechanical modifications be applied to any movable and adjustable bearings carrying  
 95 crushing-rollers whether the crushing-roller be mounted in vertically or horizontally movable bearings or in swinging bearings, and I do not desire to limit the invention to a specific construction in its application. 100

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an ore-crushing mill, the combination of a crushing-roller journaled in stationary  
 105 bearings, movable cylinders formed with bearings, and having upper and lower conduits communicating between the cylinders, a crushing-roller journaled in the bearings of the cylinders, and stationary pistons in the  
 110 cylinders having hollow stems opening, respectively, above and below the piston-heads, whereby the elastic medium is delivered into the cylinders above or below the piston-heads.

2. In a crushing-roller mill, the combination of vertically-arranged housings, sliding bearings in the housings, formed with cylinders and connected by a cross-piece having a passage opening into the base of each cylinder, pistons in the cylinders, one of which is  
 120 formed with a stem having an interior passage opening into the cylinder below the piston, and a pipe leading into the hollow piston-stem to conduct an elastic fluid into the cylinder, substantially as and for the purpose specified. 125

3. In a crushing-roller mill, the combination of oppositely-arranged vertical housings, sliding bearings in the housings formed with cylinders and connected by a cross-piece having upper and lower passages opening respec- 130

tively at the top and bottom of the cylinders,  
pistons in the cylinders provided with hollow  
stems, opening respectively above and below  
the pistons into the cylinders, and pipes lead-  
5 ing into the passages of the piston-stems to  
conduct an elastic fluid above or below the  
pistons, substantially as described.

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

JOHN ROGER.

Witnesses:

D. BLACK,

JAMES HENDERSON.