

975,136.

J. J. KIELY.
AIR COMPRESSOR.
APPLICATION FILED DEC. 8, 1909.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

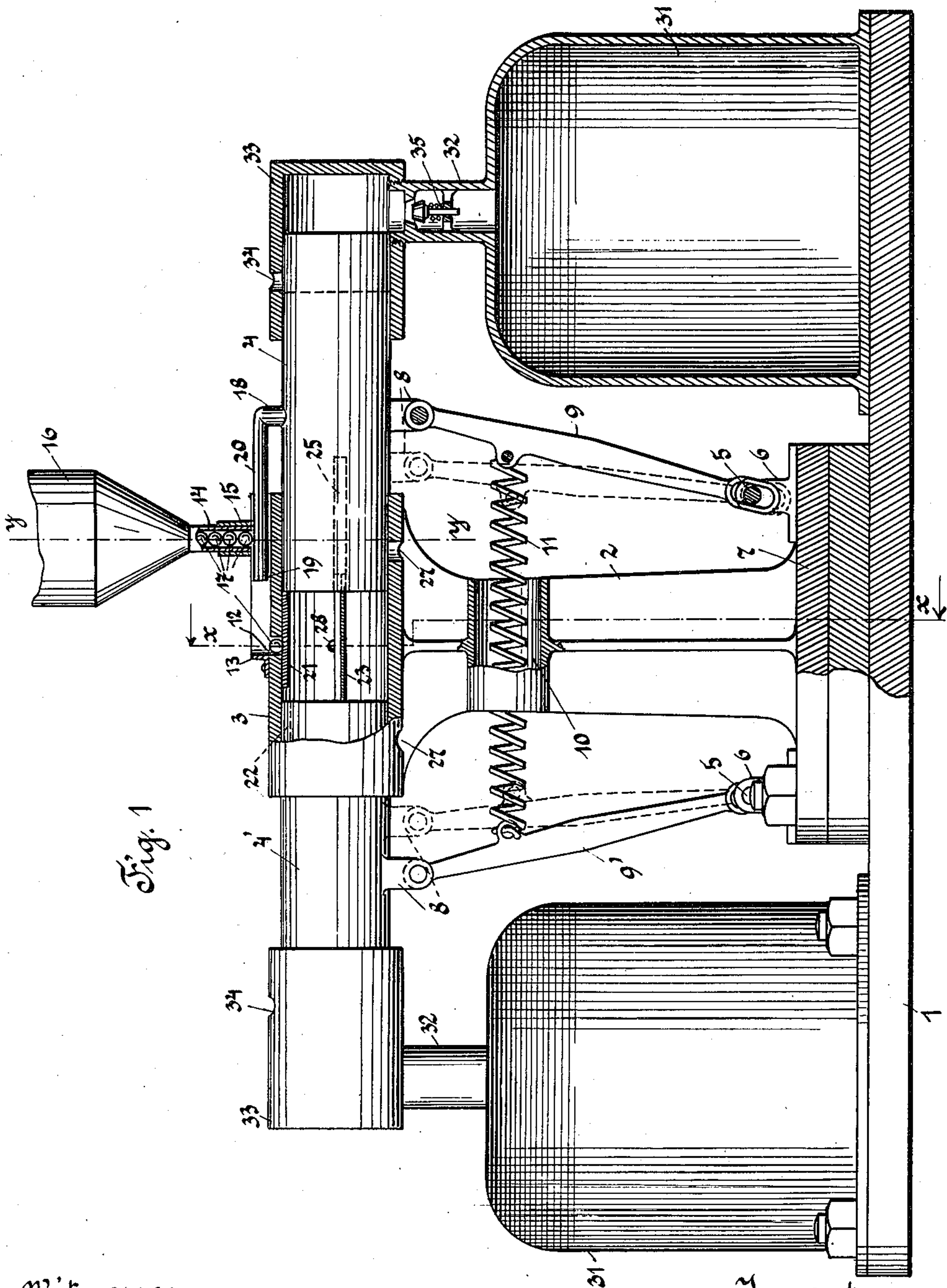


Fig. 1

Witnesses:
Carl R. Aberle
A. Q. Olson.

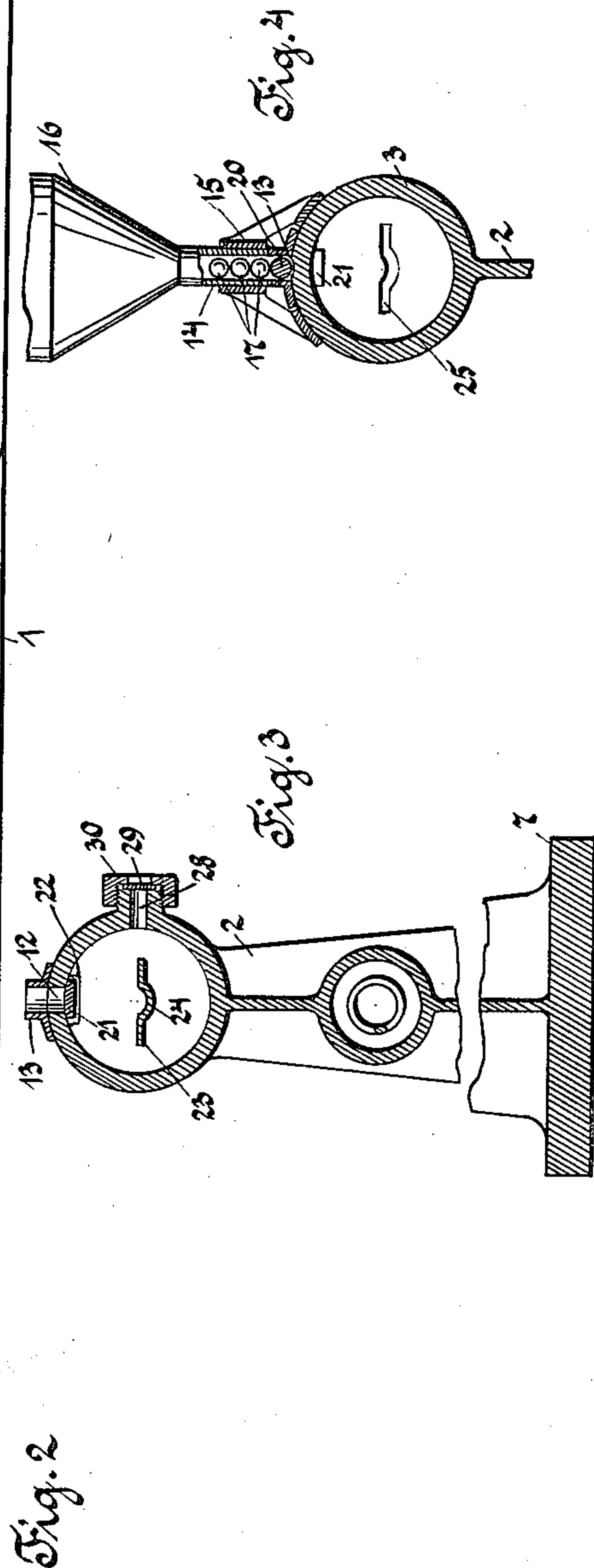
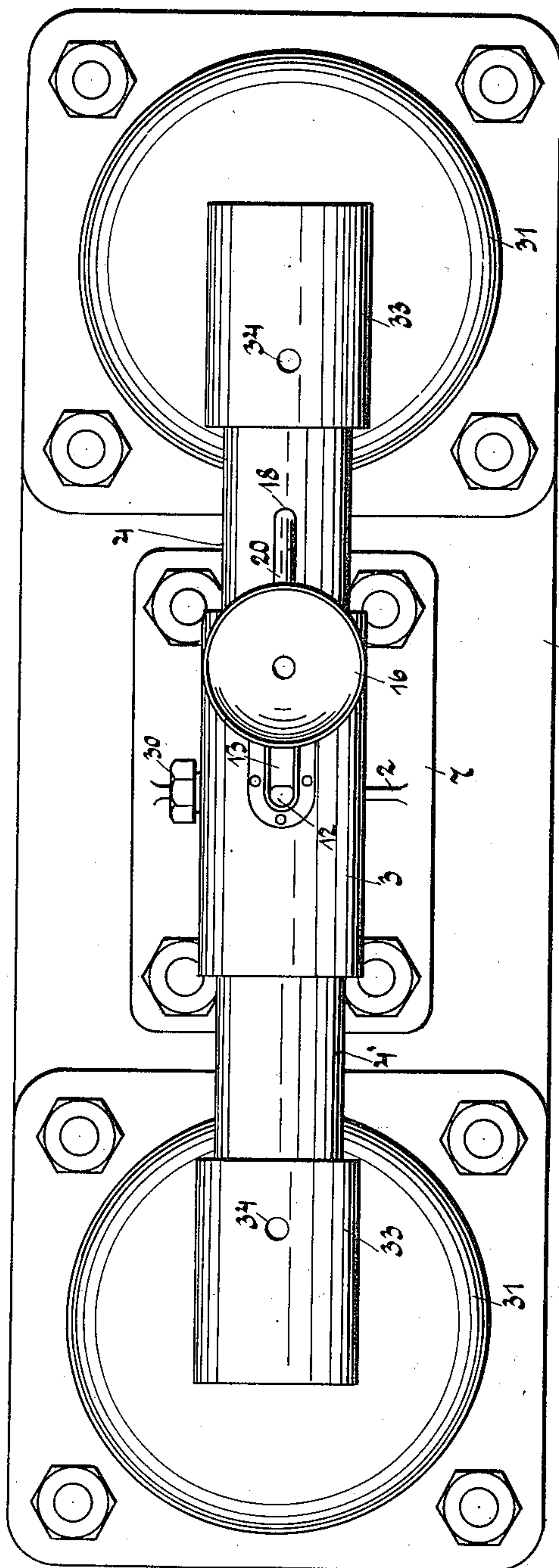
Inventor:
James J. Kiely
by Joshua S. Torrey
his Attorney.

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Inventor:
James J. Kiely
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UNITED STATES PATENT OFFICE.

JAMES J. KIELY, OF CHICAGO, ILLINOIS.

AIR-COMPRESSOR.

975,136.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed December 8, 1909. Serial No. 531,973.

To all whom it may concern:

Be it known that I, JAMES J. KIELY, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification.

My invention relates to air compressors.

The object of my invention is the provision of a compressor of the character mentioned in which will be embodied an explosion engine wherein the source of motive power is embodied in percussion-powder balls which are automatically fed or dropped into the explosion chamber of the engine cylinder and there exploded by the percussion of the piston reciprocally mounted in the latter.

A further object is the provision of an air compressor which will be thoroughly efficient in construction and operation.

Other objects will appear hereinafter.

With these objects in view my invention consists in an air compressor characterized as above mentioned and in certain details of construction and arrangement of parts all as will be hereinafter fully described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a partially sectional side elevation of my device in its preferred form, Fig. 2 is a top plan view thereof, and Figs. 3 and 4 are transverse sections taken on substantially the lines $x-x$ and $y-y$ of Fig. 1.

Referring now to the drawings 1 indicates a suitable base centrally mounted upon and rigidly secured to which is a vertically disposed bracket 2 terminating at its upper extremity in an integral horizontal cylinder 3 open at both ends. Having their inner ends reciprocally mounted in the respective ends of said cylinder are similar oppositely acting pistons 4 and 4'. Having their lower slotted extremities fulcrumed to pins 5 extending between pairs of upwardly projecting ears 6 provided upon opposite sides of the base 7 of the bracket 2, the same projecting upwardly therefrom and being connected to depending ears 8 provided upon the under sides of the pistons 4 and 4' are levers 9 and 9' respectively. Connecting said levers, the same extending

through an opening 10 formed in the bracket 2 for the reception thereof, is a helical tension spring 11, adapted, through the medium of said levers, to normally hold the pistons 4 at their inner extremities of movement, that is with their adjacent end surfaces in forced contact, as shown in dotted lines in Fig. 1.

Formed in the upper side of the cylinder 3 midway the extremities thereof is an opening 12. Leading from said opening to one extremity of said cylinder is a guide channel 13. Having its lower contracted tubular exhaust end portion 14 mounted in a tubular bracket 15 rigidly mounted upon the upper side of the cylinder 3, the lower extremity of said end portion being positioned directly above and in close proximity with the upper edges of the channel 13, is a magazine 16 which is adapted to contain the percussion-powder balls 17 employed in the engine. Said magazine is preferably of a funnel form, as shown, whereby the balls contained therein will, by gravity, be automatically fed to a position for exhaustion.

Having its extremity 18 secured to the upper side of the piston 4 midway the extremities thereof, the free end portion 19 thereof extending parallel with the axis of said piston and toward the inner end thereof is an angular rod 20. Said rod is of such transverse dimensions and is so disposed that the free end thereof snugly fits the channel 13, and is of such a length that, when the piston 4 is at the inner extremity of its movement, said free extremity thereof will register with the adjacent side of the opening 12, and that, when said piston is at its outer extremity of movement said rod extremity will be withdrawn from beneath the lower exhaust extremity of the magazine 16. With this arrangement, it will be observed that, with each reciprocation of the piston 4 a powder ball will be forced along the channel 13 by the rod 20 and deposited in the opening 12. By forming said rod, as before stated, of transverse dimensions such that the same snugly fits the channel 13, and by employing powder balls of a diameter substantially equal to the thickness of said rod, it will be seen that but one ball will each time be fed forwardly in said channel, said rod itself, upon removing the lowermost ball from a position beneath the exhaust opening of the magazine, serving as a closure to prevent the

passage of another until the piston 4 is again forced by the explosion of a powder ball to a position at its outer extremity of movement.

5 Provided at the inner extremity of the piston 4 at the upper side thereof, the same resting upon the inner upper surface of the cylinder, is a projecting transversely curved plate 21. Said plate is adapted to serve as
10 a closure for the opening 12 and is of such a length that the same will remain in a traversing position over said opening until the piston 4 is approximately at the extremity of its outward movement. The piston 4'
15 is provided with a correspondingly positioned opening 22 in its inner end for the reception of said plate. Provided at the inner extremity of the piston 4' at substantially the center thereof is also a projecting plate 23 provided with a central longitudinal groove 24 in its upper side. A correspondingly positioned opening 25 of a transverse shape like that of said plate is provided in the inner extremity of the piston 4 for the reception of said plate. The
25 latter is of a length slightly greater than the length of the piston stroke, hence when the engine is in operation, the same will intercept the powder ball as it is released by the plate 21 and retain the same in a central position in the cylinder. By the provision of a central groove 24 in the plate 23, said balls, which evidently enter the same, will positively be held in a central position upon
35 the latter and upon the return stroke of the engine will be rolled down said groove by the piston 4 and be exploded centrally between the contiguous surfaces of said pistons upon the percussion of the latter.

40 27 indicate exhaust ports, the same being so positioned as to be uncovered by the pistons 4 and 4' upon the latter reaching the extremity of their outer movements. Formed, preferably centrally in the cylinder 3
45 is a nipped opening 28. Arranged over said opening is a plate 29 held in position thereon by a perforated threaded cap 30. Said plate is of a certain predetermined strength, it being adapted to serve in
50 the capacity of a blow-out or safety valve, and whereby, should the pressure in the cylinder exceed a certain limit said plate will be blown out or broken through thereby preventing possible injury to the other parts
55 of the engine. Said valve plate is held in such a manner that upon the breaking thereof another may evidently be readily arranged in its place.

60 Arranged upon the base 1 at either side of the engine in alinement with the longitudinal axis of the cylinder thereof, is a tank 31. Threaded upon an inlet nipple 32 provided at the upper extremity of each of said tanks is a cylindrical fitting or cylinder 33. Said
65 fittings are open each at only one end, the

same embracing the outer ends of the respective pistons 4 and 4'. 34 indicate inlet ports formed in the walls of said fittings, said openings being so positioned as to be uncovered by the pistons 4 and 4' only upon
70 the latter being in positions at the extremity of their inward movements. Provided in each of the needles 32 is an ordinary check valve 35. With this provision it will be seen that with each outward reciprocation or stroke of the pistons 4 and 4' air
75 admitted through the ports 34 into the cylinders 33 upon the inward movements of said pistons, will be forced and compressed into the tanks 31. 80

While I have shown what I deem to be the preferable form of my device I do not wish to be limited thereto as there might be various changes made in the details of construction and the arrangement of parts
85 without departing from the spirit of the invention comprehended within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters
90 Patent is:

1. The combination in an air compressor of an explosion engine, air tanks mounted adjacent said engine, said engine comprising a horizontal stationary cylinder open at both
95 ends, oppositely acting pistons mounted in the respective ends of said cylinder, levers fulcrumed at one end and having their opposite ends connected respectively to said pistons, resilient means interposed between
100 said levers for normally holding said pistons at their inner extremities of movement, and means for automatically feeding a percussion-powder ball into said cylinder with each reciprocation of said pistons, and means
105 co-acting with said pistons whereby, upon each reciprocation of said pistons, air is forced into said tanks, substantially as described.

2. The combination in an air compressor
110 of an explosion engine, air tanks mounted adjacent said engine, said engine comprising a horizontal stationary cylinder open at both ends, oppositely acting pistons mounted in the respective ends of said cylinder, levers
115 fulcrumed at their lower ends and having their upper ends connected respectively to said pistons, resilient means interposed between said levers for normally holding said pistons with their inner extremities contacting, said cylinder being provided substantially centrally in its upper side with
120 an opening, a percussion-powder ball magazine, and means whereby, upon each reciprocation of said pistons a ball is fed to said opening, and means co-acting with said pistons whereby, upon each reciprocation thereof, air is forced into said tanks, substantially as described. 125

3. The combination in an air compressor 130

of an explosion engine, air tanks mounted adjacent to said engine, said engine comprising a horizontal stationary cylinder open at both ends, oppositely acting pistons mounted 5 in the respective ends of said cylinder, substantially vertically disposed levers having their lower ends fulcrumed and having their upper ends connected respectively to said pistons, a helical tension spring having its 10 respective extremities connected to said levers for normally holding said pistons with their inner ends contacting, said cylinder being provided substantially centrally in its upper side with an opening, a percussion- 15 powder ball magazine mounted above said cylinder, a channel leading from the lower exhaust end of said magazine to said opening, means carried by one of said pistons

adapted, upon each reciprocation thereof, to 20 remove a powder ball from said magazine and to force the same in said groove into said opening, means in said cylinder adapted to centrally position the ball dropped therein, a safety valve provided in the walls of 25 said cylinder, means co-acting with said pistons whereby, upon each reciprocation of said pistons, air is forced into said tanks, and check valves provided in said tanks.

In testimony whereof I have signed my 30 name to this specification in the presence of two subscribing witnesses.

JAMES J. KIELY.

Witnesses:

HELEN F. LILLIS,
JOSHUA R. H. PORTS.