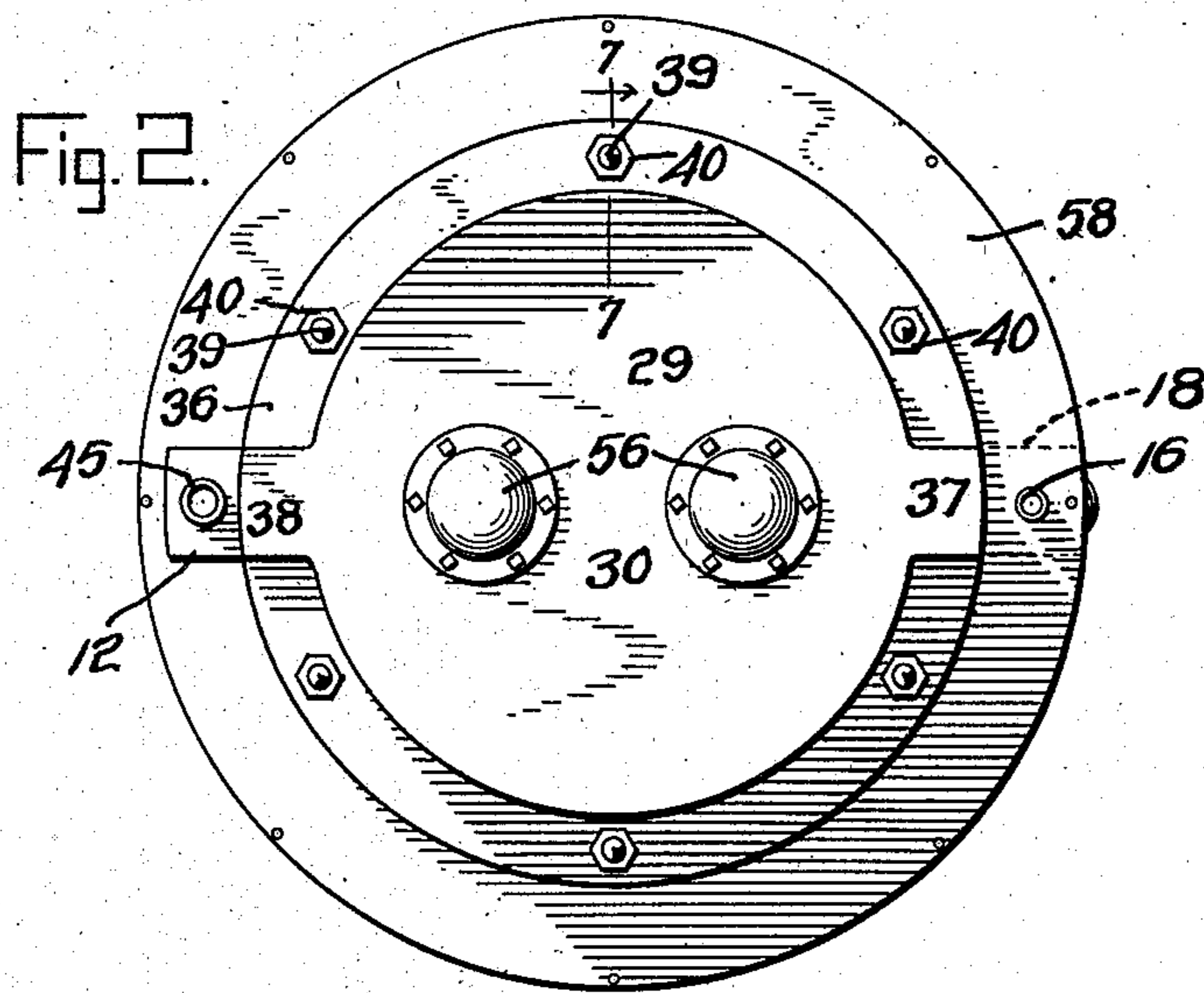
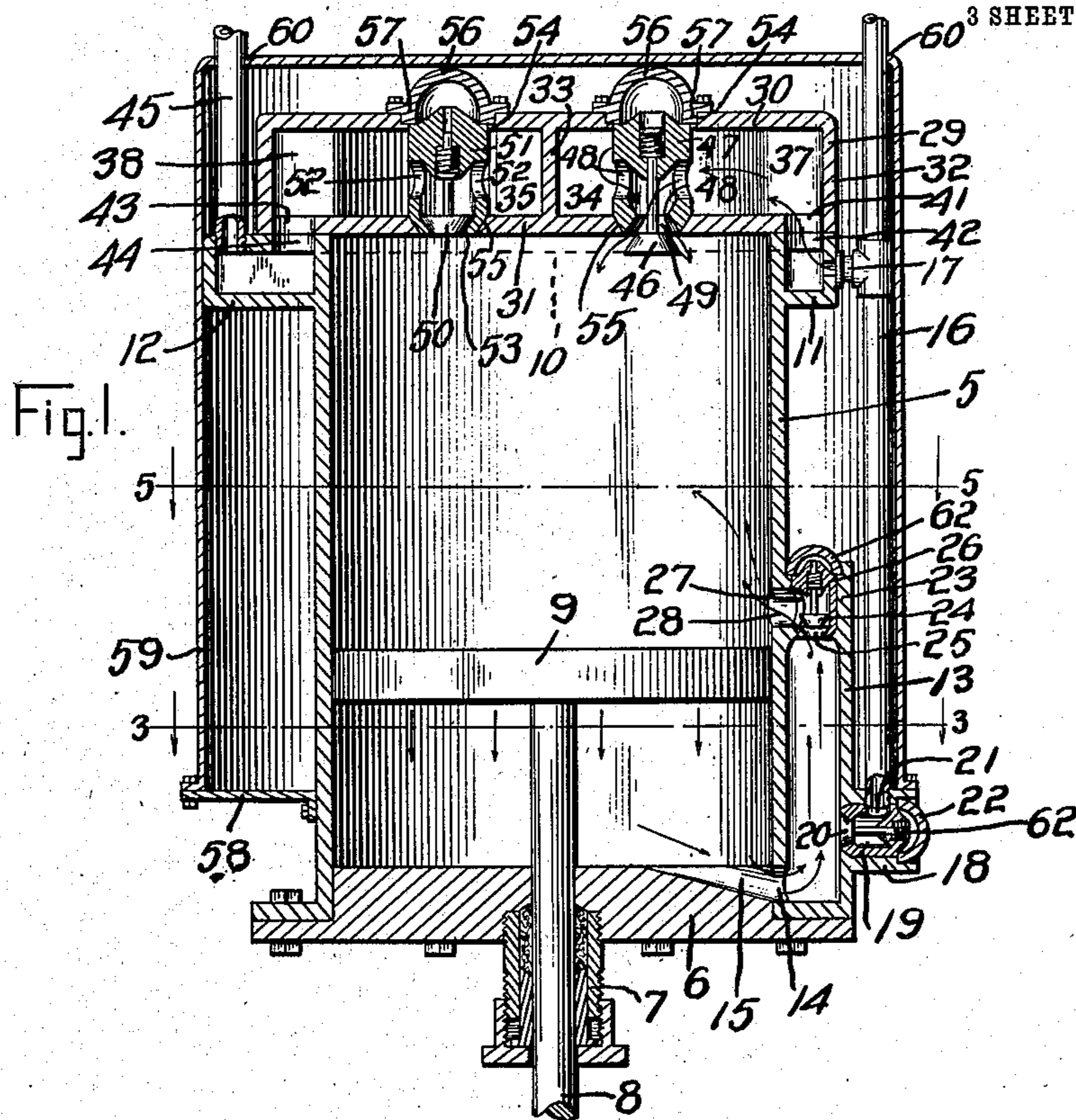


F. ELDER.
AIR AND GAS COMPRESSOR.
APPLICATION FILED DEC. 2, 1907.

899,720.

Patented Sept. 29, 1908.

3 SHEETS—SHEET 1.



Witnesses

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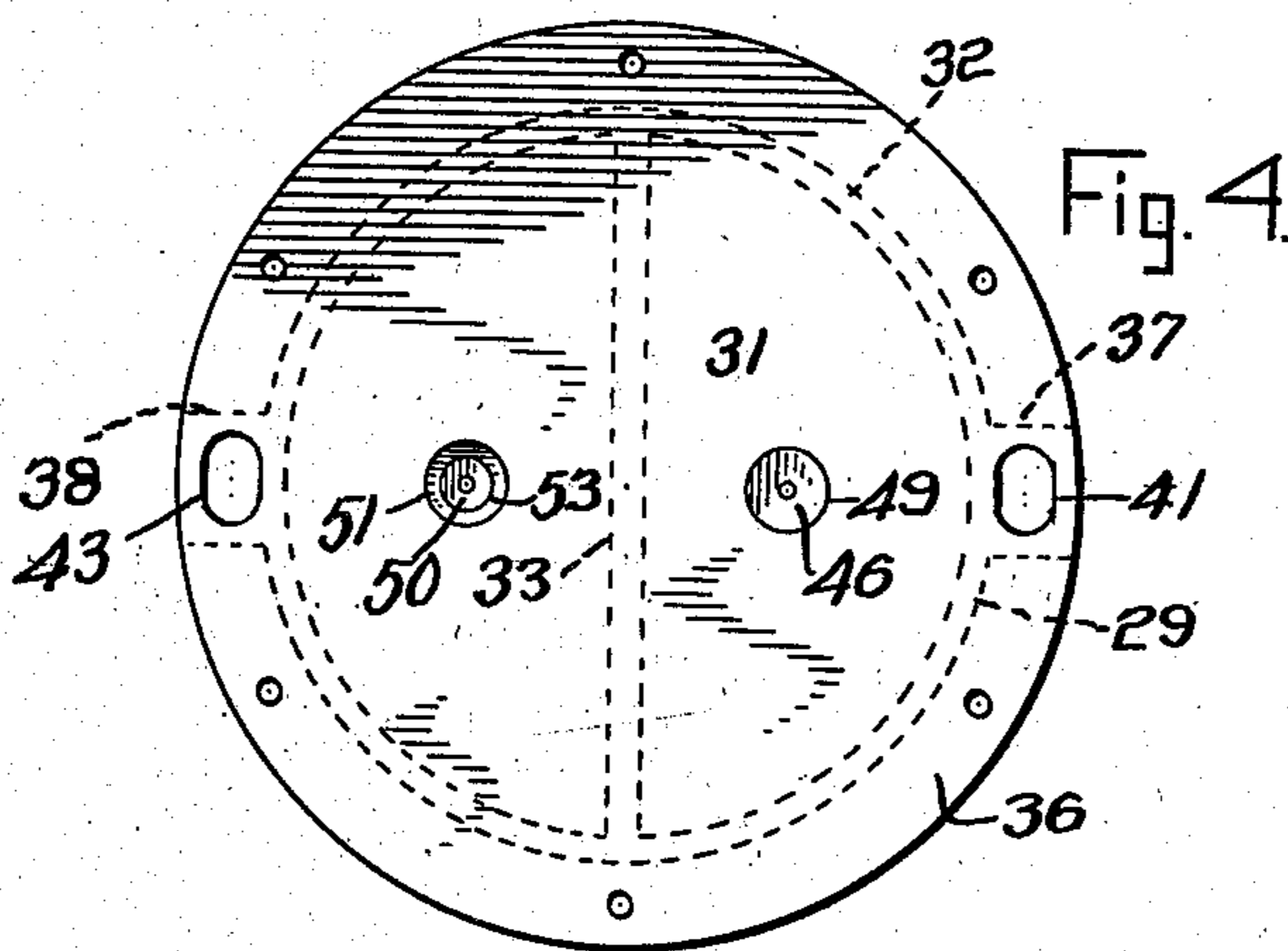
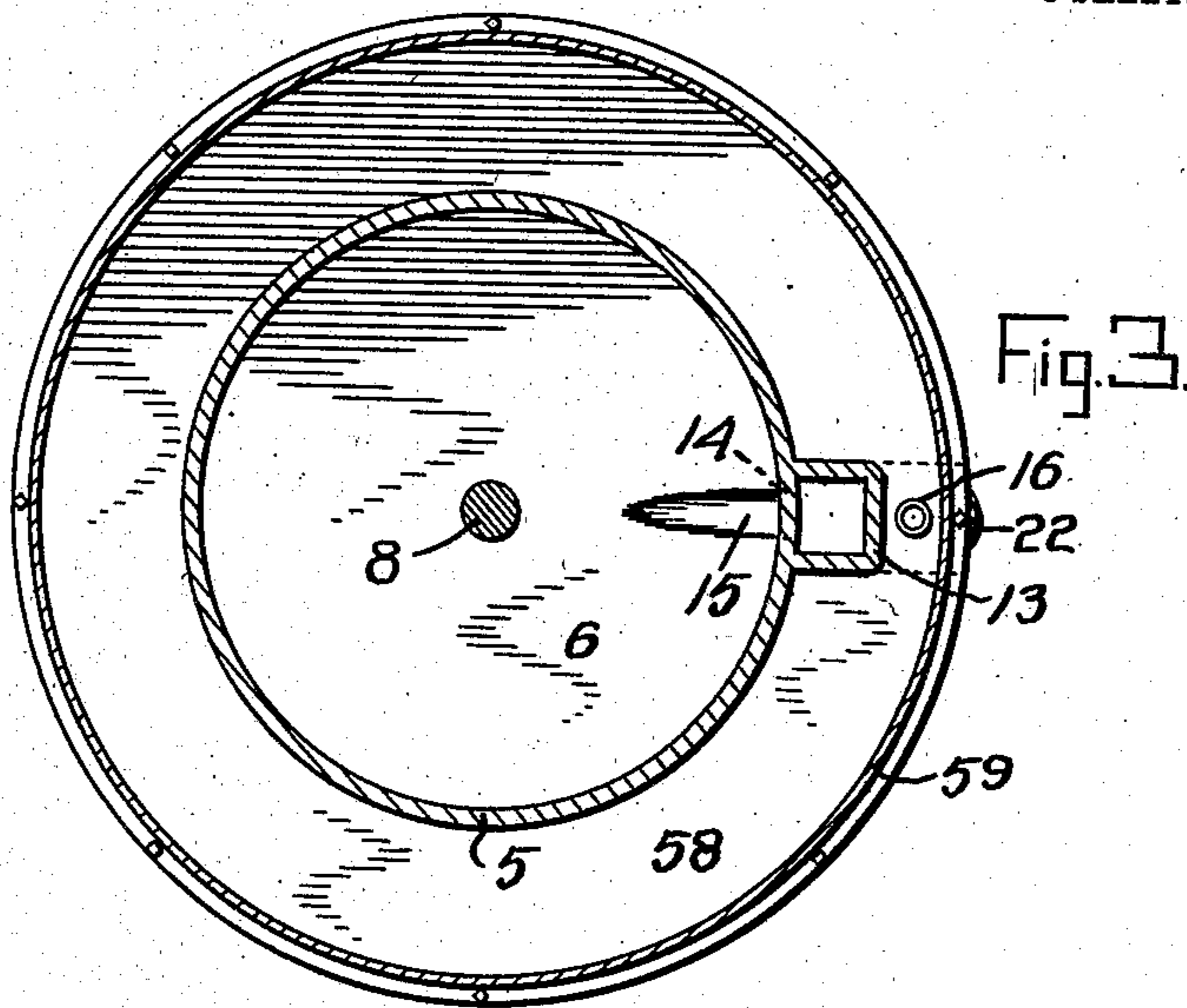
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3 SHEETS—SHEET 2.



Witnesses

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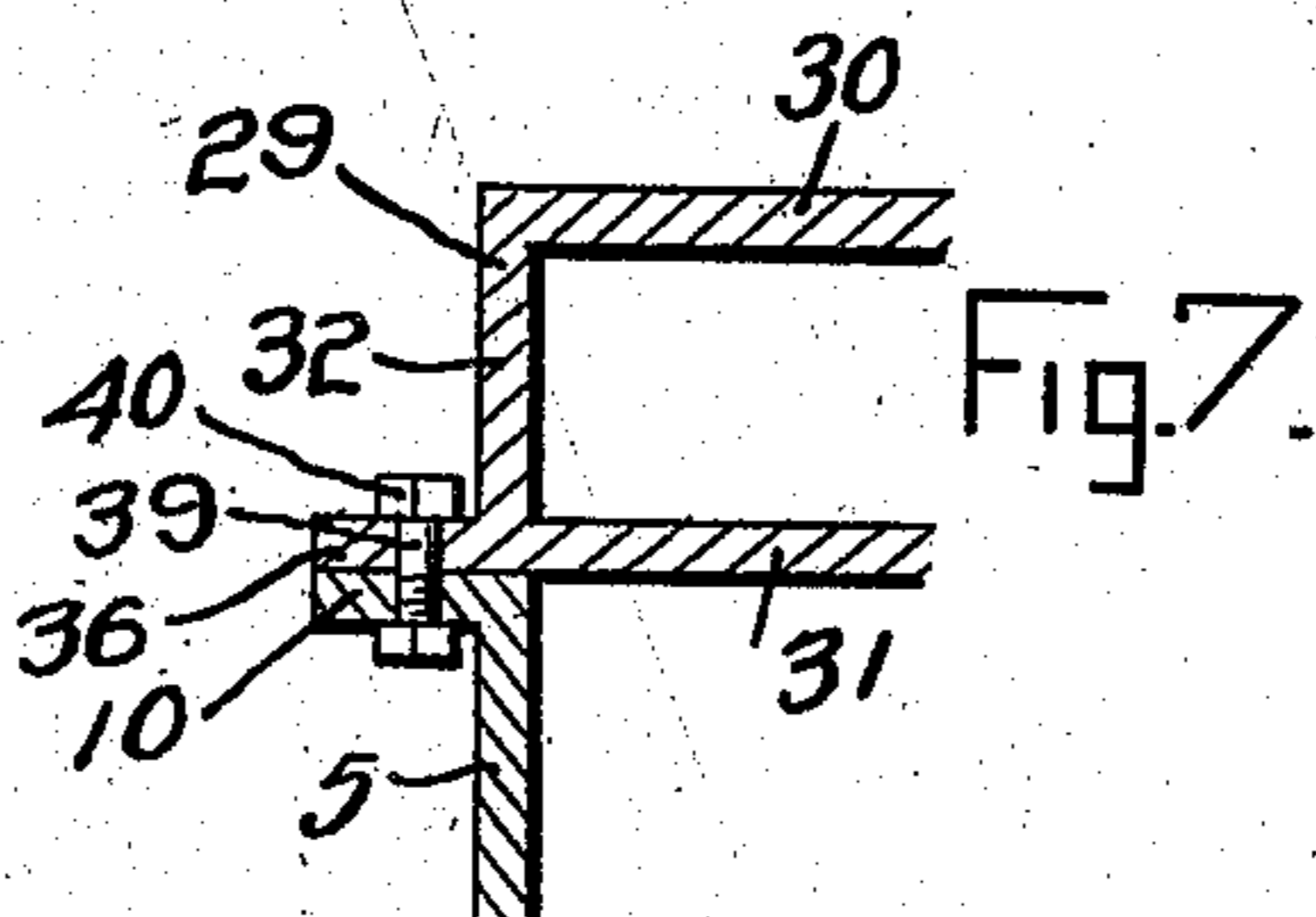
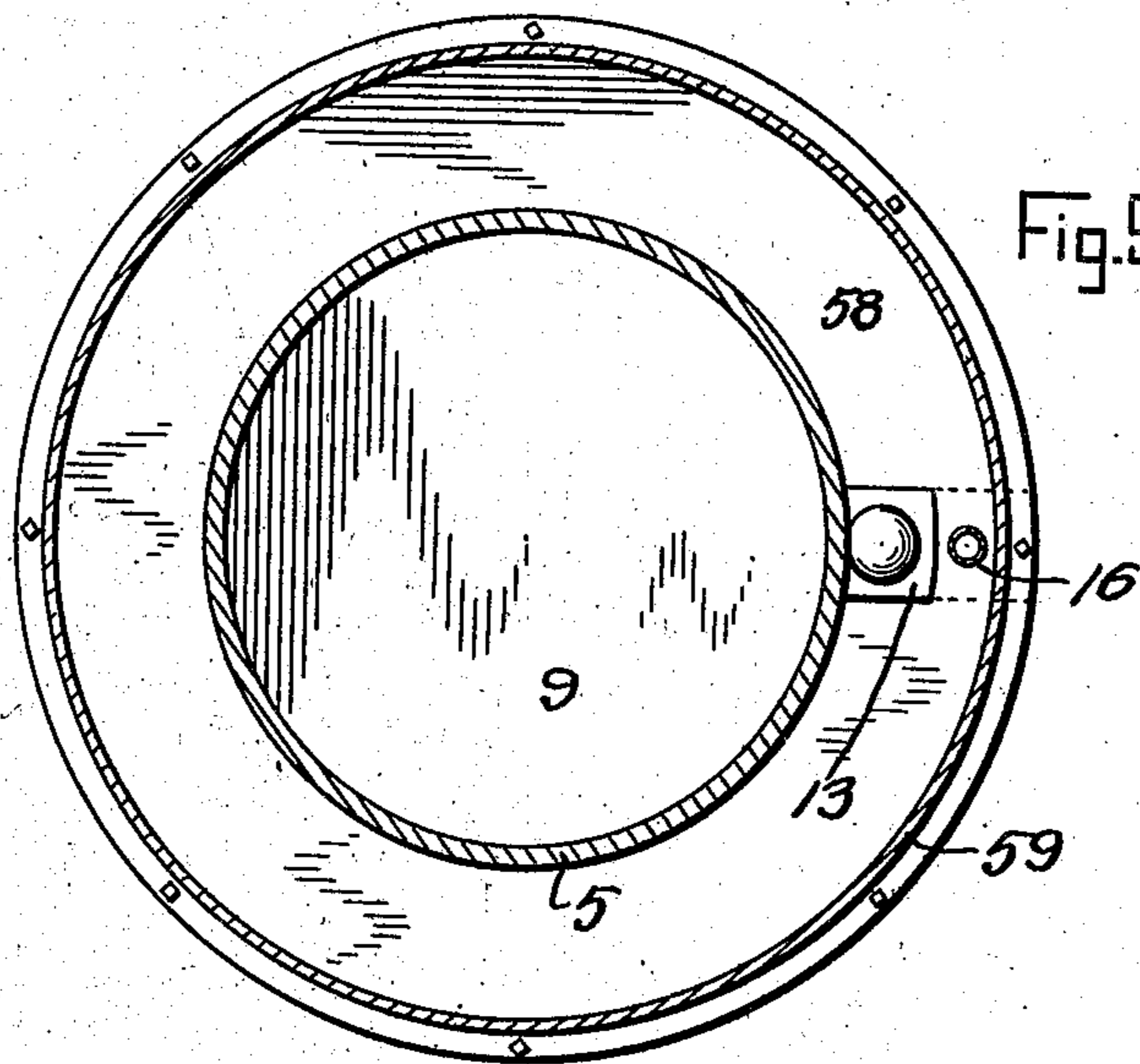
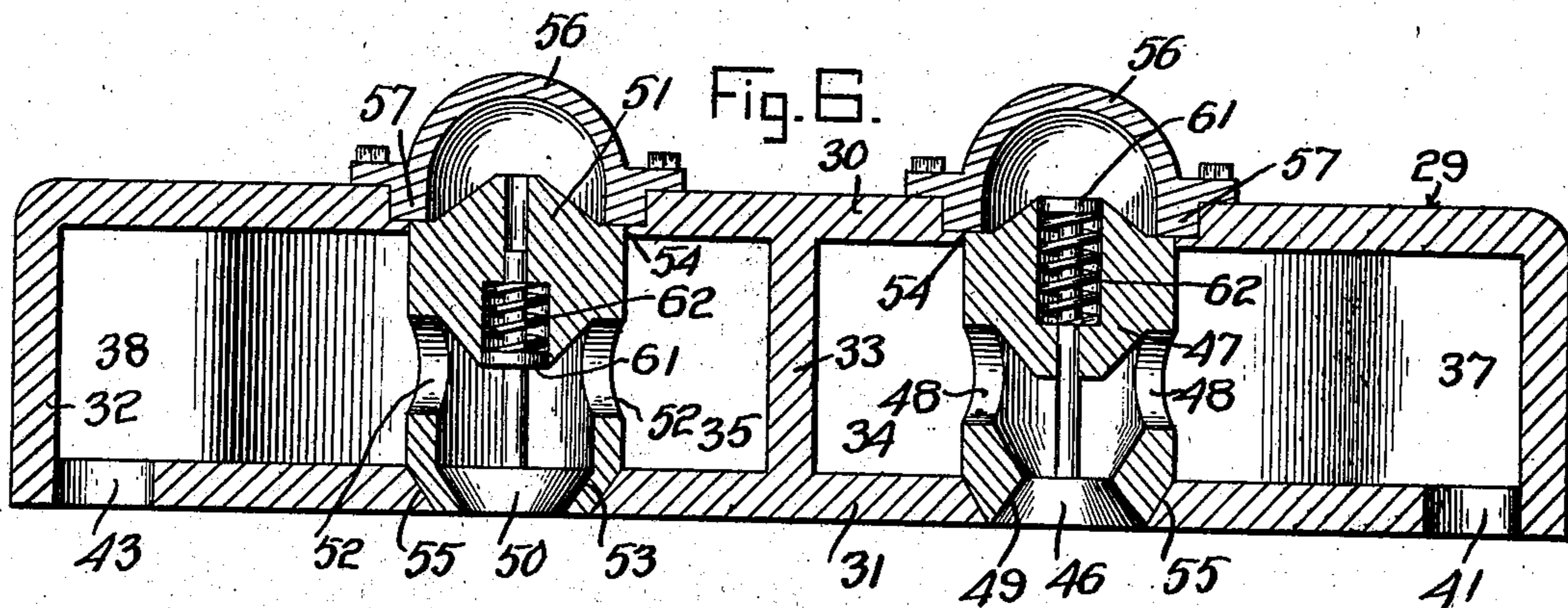
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Patented Sept. 29, 1908.
3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FRED ELDER, OF VINCENNES, INDIANA.

AIR AND GAS COMPRESSOR.

No. 899,720.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed December 2, 1907. Serial No. 404,787.

To all whom it may concern:

Be it known that I, FRED ELDER, a citizen of the United States, residing at Vincennes, in the county of Knox, State of Indiana, have invented certain new and useful Improvements in Air and Gas Compressors; and I do hereby 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.

This invention relates to new and useful improvements in air and gas compressors and in its broad conception, it comprises a pump for feeding air to a storage tank, the said pump having inlet valves arranged adjacent each end of the cylinder and including a main outlet valve at the upper end of the cylinder and an auxiliary outlet valve opening into the cylinder.

In connection with an air compression pump having the above characteristics, the invention aims as a primary object to provide a novel construction, combination and arrangement of parts, whereby the pump piston head effects in the two movements a primary and secondary compressing action.

The details of construction will appear in the course of the following description, in which reference is had to the accompanying drawings, forming a part of this specification, like characters of reference designating similar parts throughout the several views, wherein:—

Figure 1 is a central longitudinal sectional view of an air and gas compression pump constructed in accordance with the present invention. Fig. 2 is a top plan view of the pump, the water jacket being removed. Fig. 3 is a section on the line 3—3 of Fig. 1, looking in the direction of the arrow. Fig. 4 is a bottom plan view of the upper cylinder head. Fig. 5 is a section on the line 5—5 of Fig. 1, looking in the direction of the arrow. Fig. 6 is an enlarged detailed sectional view of the valves which open into the upper end of the cylinder. Fig. 7 is a section on the line 7—7 of Fig. 2.

In the accompanying drawings, the numeral 5 designates the pumping cylinder closed at its lower end by a head 6 having a stuffing box 7 through which works a piston rod 8 carrying at its end a piston head 9. The cylinder 5 is provided at its upper end with an annular circumscribing flange 10 which forms the top wall of oppositely lo-

cated inlet and outlet extensions, designated 11 and 12 respectively. Below the extension 11 and on the same side of the cylinder an elongated vertical extension 13 is provided which at its lower end is formed with an opening 14, registering with an inclined passageway 15 formed in the lower head 6.

An air supply pipe 16 extends in parallelism to the cylinder 5 and communicates with the extension 11 by a branch pipe 17. The pipe 16 at its lower end communicates with an annular valve casing 18 projecting outwardly from the extension 13. A valve bushing 19 is disposed in the casing 18 and surrounds the stem of a spring held check valve 20 which opens into the extension 13, the bushing 19 having an opening 21 in registry with the pipe 16. The casing 18 is closed at its outer end by a dome shaped cap 22. The upper part of the extension 13 is constructed as a casing 23 for a spring pressed valve 24 which valve normally closes an opening 25 formed in the lower wall of the casing 23, and is movable in a bushing 26. The bushing 26 is formed with an opening 27 which registers with an opening 28 provided in the side of the cylinder 5.

The upper end of the cylinder 5 is closed by a head 29 comprising spaced upper and lower plates 30 and 31 connected by an annular wall portion 32 and a transverse partitioning web 33 affording inlet and outlet chambers 34 and 35. The head 29 is constructed with an annular flange 36 circumscribing its lower end and forming the lower walls of extensions 37 and 38 which register with the respective chambers 34 and 35. The head 29 is secured upon the upper end of the cylinder 5 by bolts 39 engaged through the flanges 10 and 36 and held by nuts 40. The extension 37 has an opening 41 formed in its base which registers with an opening 42 formed in the top wall of the extension 11. Similarly, the extension 38 has an opening 43 formed in its base which registers with an opening 44 formed in the upper wall of the extension 12. Leading from the extension 12 is an air outlet pipe 45 which leads to a tank or service main (not shown).

The chamber 34 is provided with a spring pressed valve 46 which works in a bushing 47, the latter being in communication with the chamber 34 by means of openings 48 formed in the side thereof and in communication with the cylinder 5 by means of an opening 49 formed in the lower end thereof, which

opening 49 is controlled by the valve 46, the latter opening into the cylinder 5. The chamber 35 is provided with a spring pressed valve 50 which works in a bushing 51, the latter being in communication with the chamber 35 by means of openings 52 formed in the sides thereof, and in communication with the cylinder 5 by means of an opening 53 formed in the lower end thereof, which opening 53 is controlled by the valve 50, the latter opening into the bushing 51.

The bushings 47 and 51 constitute, in effect, casings for the respective valves 46, and 50 and are seated in openings 54 and 55, formed in the respective plates 30 and 31. The openings 54 are closed by dome-shaped caps 56 secured to the plate 30 and having shoulders 57 which bear against and confine the bushings 47 and 51.

To the lower part of the cylinder 5, there is secured a ring-shaped member 58 which forms the lower wall of a cylindrical water jacket 59 having any conventional inlet and draining means (not shown), the jacket 59 being bolted to the member 58 and inclosing said cylinder and the pipes 16 and 45, the said pipes passing through openings 60 formed in the top wall of the water jacket 59.

The operation will be readily apparent from the foregoing description. On the up stroke of the piston head 9, air or gas is drawn into the cylinder 5 by suction through the pipe 16, the valve casing 18, the opening 14 and the passage 15, the degree of suction being sufficient to move the valve 20 from its seat against the tension of its controlling spring. On the down stroke of the piston head 9, air or gas is drawn into the upper part of the cylinder 5 by suction through the pipe 16, the branch 17, the extensions 11 and 37, the chamber 34, the bushing 47 and the opening 49, and the charge previously admitted into the lower end of the cylinder is forced into the upper end of the cylinder with the charge entering thereinto, through the extension 13, the casing 23, and the openings 27 and 28. Then as the head 9 moves up again, the entire charge that has been drawn in on the previous up and down strokes, is forced out of the cylinder 5 through the opening 53, bushing 51, chamber 35, extensions 38 and 12, and pipe 45. It will be understood that the valves 20 and 50 are operated on the up stroke of the piston head and are held closed by the combined action of their springs and the air pressure on the down stroke of the piston head and that the valves 24 and 46 are similarly operated on the downstroke of the piston head and are similarly held closed on the up stroke thereof. As shown in Fig. 1, the piston head 9 is on its downstroke and the valves 24 and 46 are op-

erating. It will thus be seen that on the down stroke of the piston head 9, a double charge of air or gas is admitted into the upper part of the cylinder 5, and that on the up stroke of the piston head 9, such double charge is compressed and forced out for distribution to the service main or storage tank.

The stems of the several valves 20, 24, 46 and 50 are threaded and provided with adjusting nuts 61, whereby the tension of the controlling springs 62 may be regulated as desired, to correspondingly regulate the degree of movement of said valves away from their seats. Thus, the amount of air or gas admitted to the cylinder 5, at each complete stroke of the piston head 9, may be regulated as desired.

The invention is simple in its structural details, inexpensive to manufacture and practical and efficient in use.

What is claimed is:

An air or gas compressing pump comprising a cylinder having a head formed with independent inlet and exhaust chambers communicating with said cylinder and with an extension for each chamber, said cylinder being formed at opposite sides thereof with inlet and exhaust extensions, the inlet extension being in communication with the extension of said inlet chamber and the exhaust extension being in communication with the extension of said exhaust chamber, said cylinder being formed with an elongated inlet extension communicating with the lower end of said cylinder and with said cylinder at a point distant from its lower end, a piston head working in said cylinder, an inlet pipe connected to said inlet extensions, an outlet pipe connected to said exhaust extension, a valve arranged in said elongated inlet extension to control the communication of said inlet pipe therewith, a valve arranged in said elongated inlet extension to control the communication thereof with said cylinder at the point distant from its lower end, a valve arranged in said inlet chamber to control the communication thereof with said cylinder and a valve arranged in said exhaust chamber to control the communication of said cylinder therewith, said first and fourth named valves being operable to open position, when the piston head is moving in one direction, said second and third named valves being operable to open position when the piston head is movable in a reverse direction.

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

FRED ELDER.

Witnesses:

JOHN J. ROBBINS,
FRED LONG.