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PATENTED JULY 19, 1904.

M. M. ZELLERS.

AUTOMATIC CUT-OFF FOR FLUIDS UNDER PRESSURE.

APPLICATION FILED SEPT. 17, 1903.

NO MODEL.

FIG. 1.

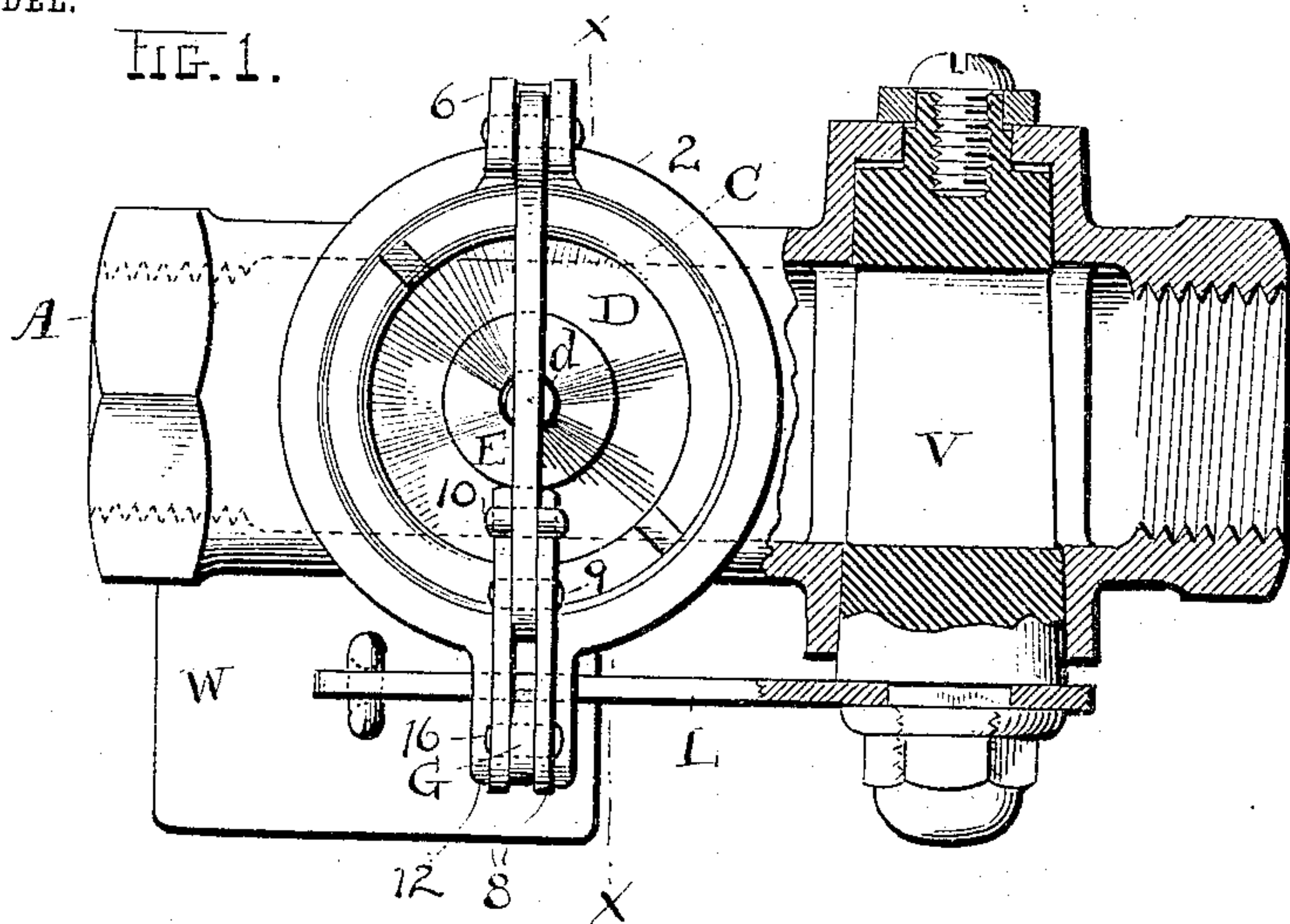


FIG. 2.

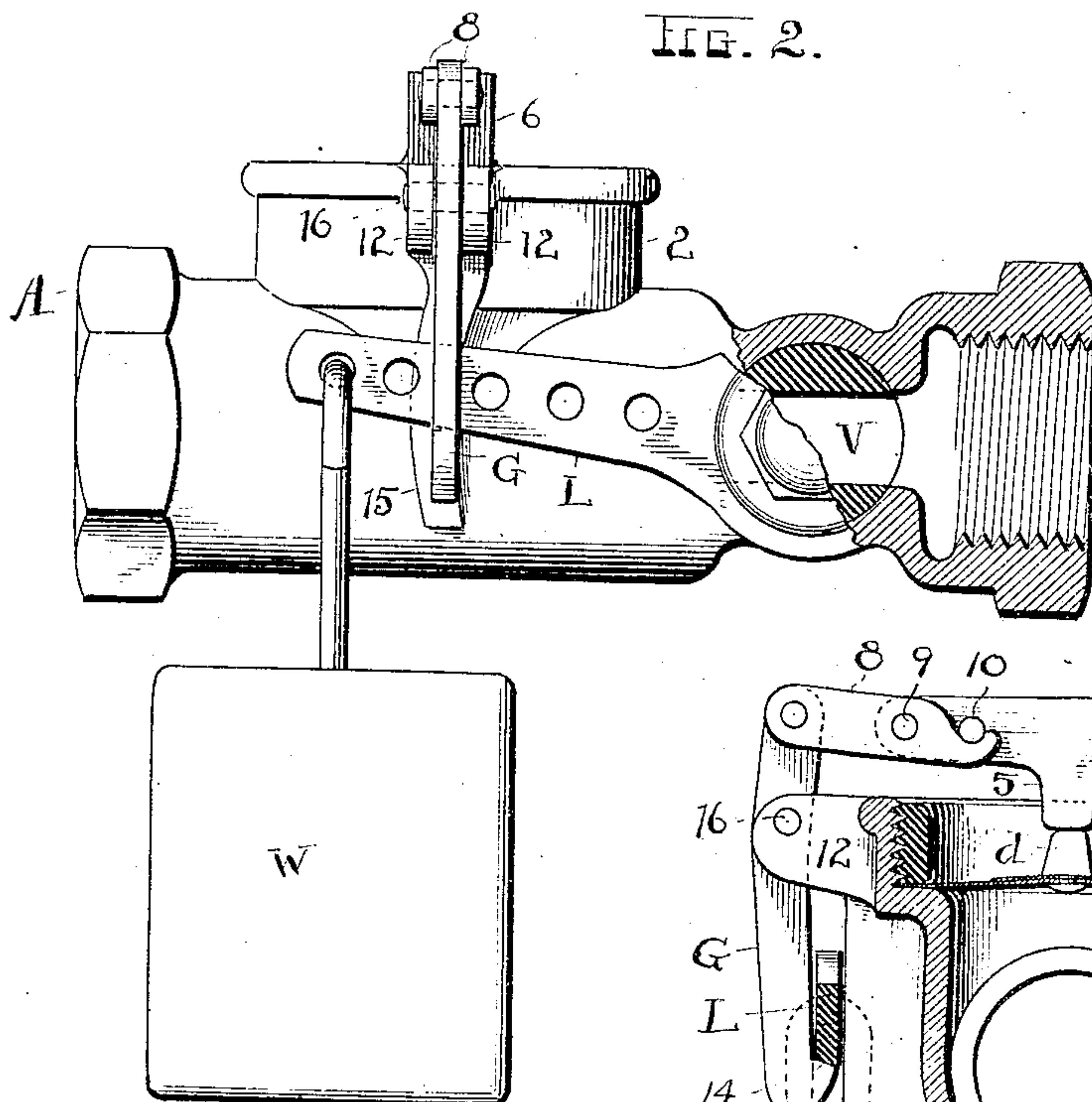
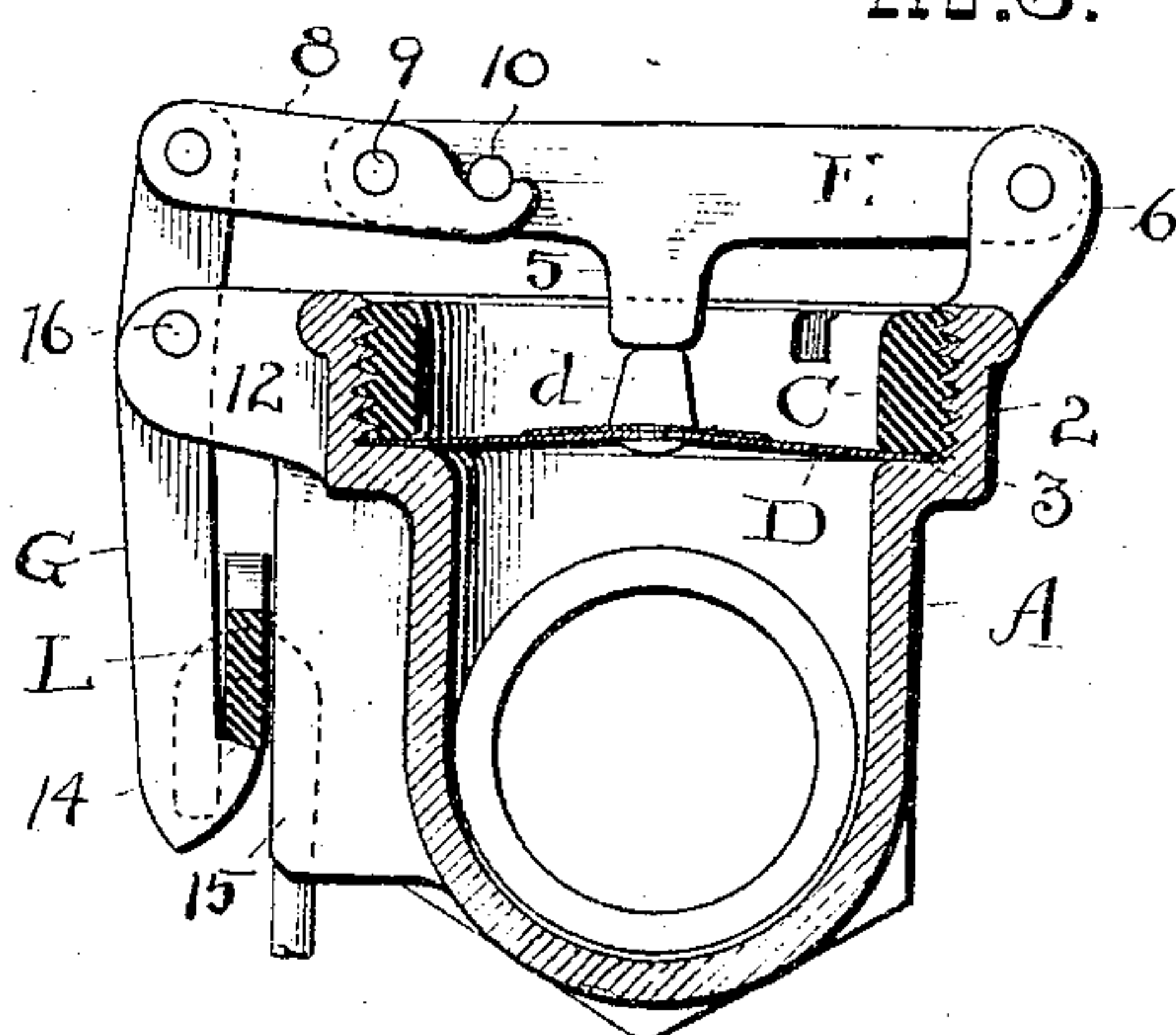


FIG. 3.



ATTEST.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CUT-OFF FOR FLUIDS UNDER PRESSURE.

SPECIFICATION forming part of Letters Patent No. 765,870, dated July 26, 1904.

Application filed September 17, 1903. Serial No. 173,560. (No model.)

To all whom it may concern:

Be it known that I, MAHLON M. ZELLERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Automatic Cut-Offs for Fluids under Pressure; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an automatic cut-off for fluids under pressure, and while the invention is adapted to be used in connection with different fluids, whether they be liquid or gaseous, it is more especially designed in this instance for use with natural gas.

It is well known to those who have had experience with natural gas, especially in cases where it is piped a greater or less distance from the source of supply, that there always is danger that the supply will be suddenly interrupted or entirely cut off. This may occur by a break in the main or from any one of many possible causes, and in such cases lights and fires go out and valves remain open if there be no special means for closing them. Then as the supply is reestablished the gas will flow through the open outlets and if not discovered may lead to most serious consequences. This danger is increased by the well-known reason that natural gas is practically odorless, and hence is not easily discovered by its smell, so that thereby precautions may be taken.

The object of my invention is to meet this serious objection in the use of natural gas by a mechanism which is so constructed that when the pressure of gas falls below a certain predetermined or safe working minimum in the main or service pipe a safety-valve will be operated and effectually cut off the flow of gas or close the channel of flow to a dwelling or other building having the disturbed connection.

In the accompanying drawings, Figure 1 is a plan view, partly in section, horizontally of my invention; and Fig. 2 is an elevation thereof, also partly sectioned in its valve portion. Fig. 3 is a cross-section on line *xx*, Fig. 1.

A represents a pipe coupling, joint, or member fashioned to receive the operating parts of the invention and adapted to be set into proper connection in a service-pipe at any convenient point back of the distributing-pipes. The said joint or member is provided with a well open at its top into the interior thereof and having its wall about its top formed with an internally-threaded rim 2. At the bottom of the said rim there is provided an annular shoulder or ledge 3, on which I secure a diaphragm D by means of a threaded collar C. At the center of said diaphragm I fix a nipple *d*, which is engaged by a lug 5 on pivoted arm E. The said arm lies centrally across the diaphragm D, so as to bring lug 5 upon and into engagement with nipple *d*, and is pivoted at one end on ears or projections 6 on rim 2 and at its other end carries a pair of toggle-links 8, one on each side in the present construction; but one might do. These links are pivoted between their ends at 9 on said arm, and their free inner extremities are adapted each to engage a short pin or projection 10 on arm E, which forms a stop to their movement on pivot 9 when they are practically straight with said arm, thus forming a bracing structure for swing-catch G, as will be seen. Otherwise, and when pressure from the diaphragm D is off, the links 8 swing away from said pins and the catch G accommodates itself to this position. The said catch G is shown as pivoted at its upper portion between ears 12 on the coupling A and pivotally engaged at its upper extremity between links 8, while at its lower extremity it has a preferably inclined or equivalently-formed seat 14, upon which the valve-controlling lever L rests and is supported as long as the gas-pressure within is maintained at a working pressure, and a plain one-way valve V is shown as located across the outlet from or through coupling A and subject to control through lever L. As here shown, said valve is open, and always when open the lever L is held in a raised position, but subject to the heavy counterweight W, suspended from its outer end. The said weight might be substituted by a spring, or the end of the lever itself might be made heavy enough to reverse the valve when disengagement from

supporting-catch 9 occurs; but a spring in such a case is equivalent of a weight, and anything that will depress lever L and close the valve may be used.

5 Now in operation, and when the pressure is on, all the parts appear as seen in the drawings; but the instant that the pressure of gas against the diaphragm declines sufficiently the weight W on lever L will assert itself and
10 pull lever L off its seat 14. It will be seen that said seat is off the pivot-center of the catch and the weight of the spring and drop of arm E tend to swing the catch back at its lower end and disengage lever L. The sensi-
15 tive point in this mechanism therefore is manifested at seat 14, and as long as the gas-pressure continues in the coupling A at a working point it will hold catch 5 to its work and lever L cannot escape or become disengaged.
20 Said lever rests against a straight-edged fin 15 on the coupling opposite catch G, and hence is confined at that side and cannot drop, except as the catch swings away. This it will do the moment the upward pressure on dia-
25 phragm D becomes sufficiently reduced to allow the catch G to swing and effect the release of lever L.

Obviously I might give more or less inclination to seat 14, so as to make it more or less
30 sensitive, and I might use a lighter or heavier weight, and I might engage it at one point or another on lever L; but these changes would be merely of degree and would not affect the principle of operation.

35 The upward movement of the diaphragm D is limited by the free ends of links 8 striking against pins 10, because the other ends of said links are fixed in their relation to catch G from its pivot 16, and when said links strike pins
40 10 they form a rigid brace across from said catch. This rigidity likewise operates to hold catch G in supporting position for weighted lever L. The arm E and diaphragm D might be connected and work as well together.

45 What I claim is—

1. In a safety mechanism for fluids under pressure, a casing and a diaphragm therein, a safety-valve and a controlling-lever therefor, a catch to hold said lever and valve open, and

an arm bearing upon said diaphragm and hav- 50
ing a link connection with said catch, substan-
tially as described.

2. In a safety mechanism for fluids under pressure, a valve to close the fluid-channel and a lever to control the valve, a pivoted catch 55
having a seat for the lever off the center of pivot of said catch, and a diaphragm-controlled mechanism to hold said catch in engaging po-
sition for said lever, substantially as described.

3. A safety mechanism for natural gas and 60
the like, comprising a diaphragm exposed to fluid-pressure on one side and an arm bearing upon its opposite side, a pivotally-supported catch and a double pivot connection between
said catch and arm, substantially as described. 65

4. A coupling and the diaphragm therein and an arm bearing upon said diaphragm, in combination with a pivoted catch and a link connecting the adjacent ends of said catch and arm and provided with a stop on said arm, sub- 70
stantially as described.

5. A coupling and the diaphragm therein and an arm bearing upon said diaphragm, in combination with a pivoted catch and a link connecting said catch with one end of said arm 75
and provided with a stop on said arm limiting its movement, substantially as described.

6. A coupling and a valve therein and a lever controlling said valve, in combination with a support for said lever comprising a 80
pivoted catch having an inclined seat for said lever to rest upon, a diaphragm and an arm bearing thereon, and a link connecting the upper end of said catch above its pivot with
said arm, substantially as described. 85

7. A coupling and the arm and the catch pivoted at substantially right angles to each other, a link connecting the adjacent ends of said parts and a stop on said arm to limit the pivotal movement of said link, substantially 90
as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MAHLON M. ZELLERS.

Witnesses:

R. B. MOSER,
R. ZBORNIK.