

No. 733,492.

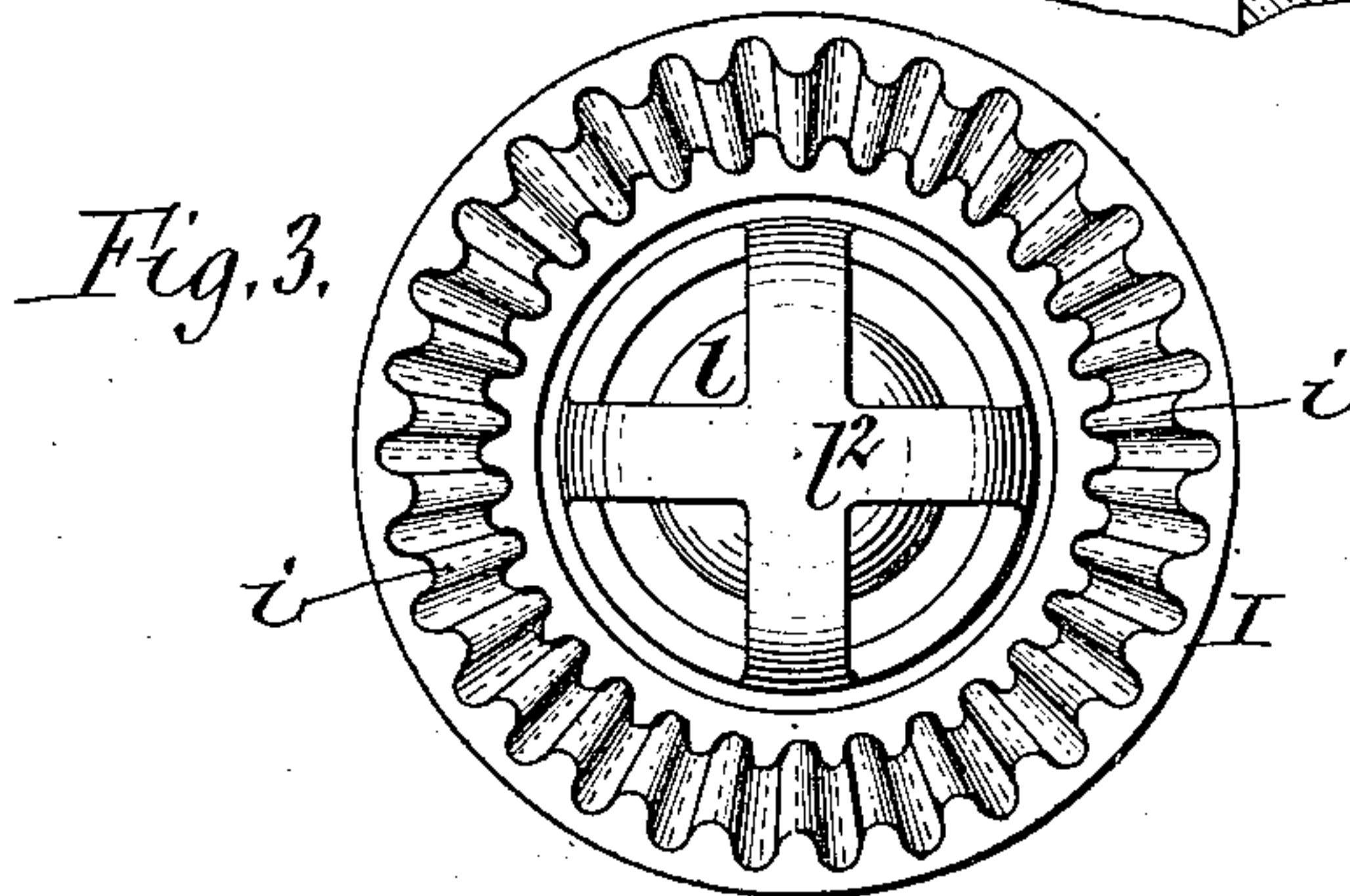
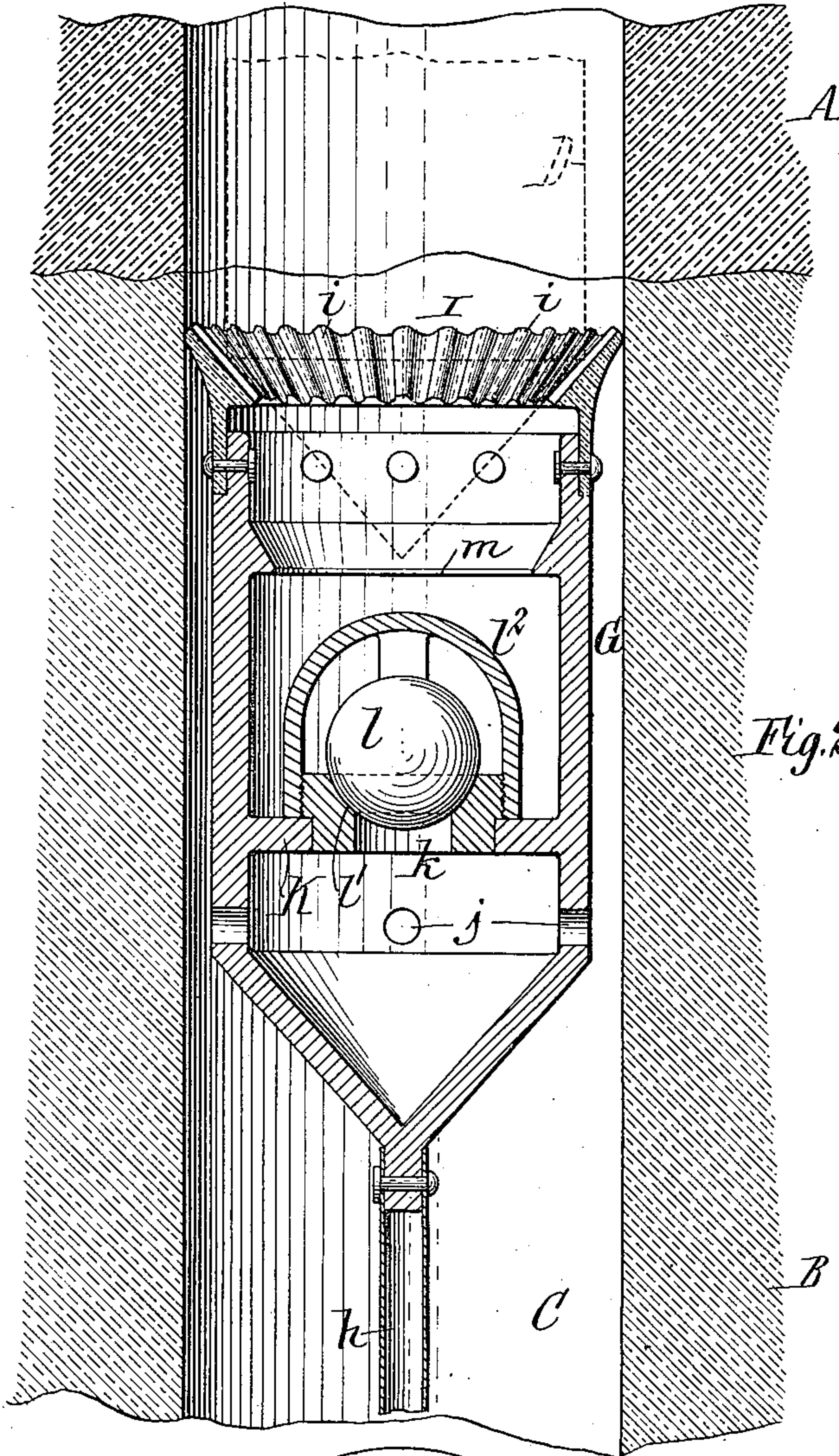
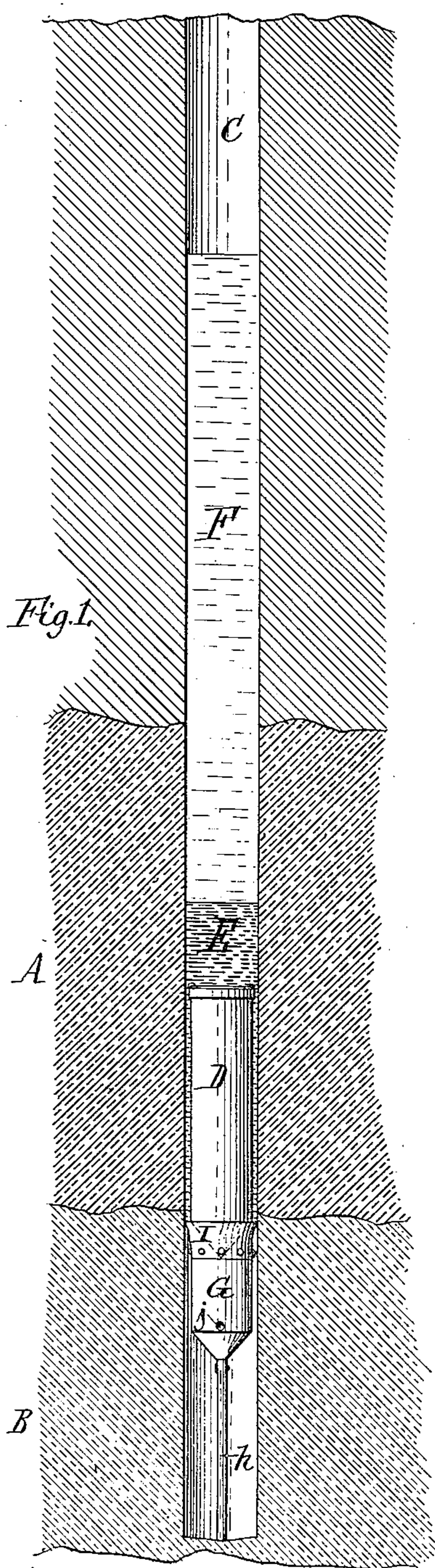
PATENTED JULY 14, 1903.

C. S. LITTLE.

PARTITION PLUG FOR OIL WELLS.

APPLICATION FILED OCT. 25, 1902.

NO MODEL.



Robert Weithnecht
Emma M. Graham.

Witnesses.

Charles S. Little,

Inventor

By Geyer & Popp

Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES S. LITTLE, OF MONTPELIER, INDIANA.

PARTITION-PLUG FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 733,492, dated July 14, 1903.

Application filed October 25, 1902. Serial No. 128,812. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. LITTLE, a citizen of the United States, residing at Montpelier, in the county of Blackford and State of Indiana, have invented new and useful Improvements in Partition-Plugs for Oil-Wells, of which the following is a specification.

According to an ordinary method of shooting oil-wells a quantity of loose nitroglycerin is introduced into the well around the torpedo or torpedoes. As the well extends below the oil-bearing sand into the barren or water-bearing sand, the nitroglycerin necessarily fills the portion of the well in the latter stratum as well as the portion in the oil-bearing stratum. The portion of the glycerin below the oil-bearing sand is thus not only ineffective to a large extent, but objectionable, in that the concussion causes the water to flow from the adjacent water-bearing sand.

The object of my invention is the provision of simple and effective means for confining the charge of nitroglycerin to the portion of the well in the oil-bearing sand, so as to overcome the above objections, and concentrate the force of the explosion upon the oil-bearing sand.

In the accompanying drawings, Figure 1 is a fragmentary vertical section of an oil-well, showing my improved appliance in position therein. Fig. 2 is a sectional elevation of the appliance placed in the well. Fig. 3 is a top plan view of the same.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates a stratum of oil-bearing sand or rock, B a water-bearing stratum below the same, and C the well extending through the oil-bearing sand into the water-bearing sand.

D indicates an oil-well torpedo of ordinary construction lowered into the portion of the well in the oil-bearing sand or rock. E is the charge of loose nitroglycerin or other suitable explosive material surrounding the same, and F the usual tamping.

In order to confine the nitroglycerin in the portion of the well extending through the oil-bearing stratum, a plug or partition G is placed in the well at or immediately below the junction of the oil and water bearing strata before introducing the nitroglycerin into the

well, this plug being closely fitted in the well to prevent the nitroglycerin from flowing past the plug into the portion of the well below the oil-bearing stratum. The plug preferably consists of a hollow cylindrical body closed at its lower end and provided with a downwardly-extending supporting-leg or anchor *h*, adapted to rest upon the bottom of the well and made of the proper length to sustain the plug at the desired height, as shown in Fig. 1. The plug is provided at its open upper end with a yielding packing *I* of rubber or other suitable material which admits of being expanded against the surrounding wall of the well. This packing preferably consists of a rubber ring or flange having the form of an inverted-cone frustum, which extends upwardly and laterally beyond the rigid body of the plug and which is adapted to form a seat for the tapering lower end of the torpedo D. The plug thus supports the torpedo, and the latter by its weight expands the packing-ring *I* tightly against the wall of the well, as shown in Fig. 2, the tapering lower portion of the torpedo being shown by dotted lines in said figure. The lower portion of the packing-ring is cylindrical and preferably seated in a rabbet at the upper end of the plug, the ring being secured to the latter by any suitable fastenings, such as rivets, as shown.

In order to permit the partition-plug to be lowered into the well, means must be provided for allowing the water in the bottom of the same to rise above the plug. For this purpose the hollow plug is provided in its lower portion with one or more relief-openings *j*, through which the water may pass into the plug and thence ascend through it into the space above it. The packing-ring *I* is provided on its inner face with longitudinal ribs or corrugations *i* to form relief-channels between the same and the torpedo D for the passage of the water, oil, or gas. Some of the nitroglycerin enters the upper portion of the plug, and to prevent the same from flowing through the water-relief openings *j* into the portion of the well below the plug the latter is provided above these openings with a diaphragm *K*, having a water-passage *k*, which is controlled by an upwardly-opening check-valve *l*, preferably of spherical form.

This valve closes normally against its seat *l'*, and while allowing the water to rise through the passage of the diaphragm checks the downward flow of the nitroglycerin through said passage, preventing the nitroglycerin from descending below the diaphragm. The check-valve is confined in a suitable cage *l''*, arranged on the upper side of the diaphragm.

In the use of my improvement the partition-plug *G* is first lowered into place in the well, the water in the bottom of the well lifting the check-valve *l* from its seat and rising through the plug and above the same. A torpedo is next introduced into the well and allowed to seat itself upon the expansible packing-ring *I* of the plug for expanding and crowding the ring against the wall of the well, after which the charge of nitroglycerin and the tamping are introduced into the well in the usual manner. If desired, additional torpedoes may be lowered into the well above the one resting upon the partition-plug. The packing-ring and the check-valve of the plug prevent the nitroglycerin from flowing into the portion of the well below the oil-bearing sand, as hereinbefore described, and the bulk of the same is thus confined within the portion of the well in said stratum. The result is that the effect of the explosion is concentrated upon the oil-bearing sand where it is desired, while the subjacent water-bearing stratum is disturbed as little as possible, thereby utilizing the nitroglycerin to the best advantage and at the same time reducing the flow of water into the well.

To permit the easy withdrawal of the partition-plug from the well, if desired, the same is preferably provided in its upper portion with a shoulder or internal rim *m*, under which the hooked lower end of a suitable implement may be engaged.

I claim as my invention—

1. A device for isolating different portions of an oil-well from each other consisting of a partition-plug adapted to bear against the wall of the well and provided with an anchor or support for sustaining the same at the proper height in the well, substantially as set forth.

2. A device for isolating different portions of an oil-well from each other, consisting of a partition-plug having an anchor or support for sustaining the same at the proper height in the well and a packing adapted to bear against the wall of the well, substantially as set forth.

3. A device for isolating different portions of an oil-well from each other, consisting of a partition-plug provided with an anchor or support and a yielding packing constructed to form a seat for a torpedo whereby the pack-

ing is expanded against the surrounding wall of the well by the weight of the superposed torpedo, substantially as set forth.

4. A device for isolating different portions of an oil-well from each other, consisting of a partition-plug having an anchor or support and provided at its upper end with a conical packing-ring adapted to receive the tapering lower end of a torpedo, substantially as set forth.

5. A device for isolating different portions of an oil-well from each other, consisting of a partition-plug constructed to bear against the wall of the well and having an open, unobstructed upper end adapted to receive the lower end of a torpedo, said plug being provided with a relief-passage for allowing the water in the well to ascend through the plug and a valve controlling said passage and operating to prevent the nitroglycerin above the plug from descending through said passage, substantially as set forth.

6. A device for isolating different portions of an oil-well from each other, consisting of a partition-plug having an open, unobstructed upper end provided with a packing-ring which is adapted to bear against the wall of the well and which forms a seat for a torpedo, said plug having a relief-passage for the ascent of the water through the plug and a valve controlling said passage and operating to check the descent of the nitroglycerin through said passage, substantially as set forth.

7. A device for isolating different portions of an oil-well from each other, consisting of a hollow partition-plug open at its upper end and provided in its lower portion with a relief-passage communicating with the interior of the plug, a packing-ring arranged at the upper end of the plug and provided with relief-channels, and a valve arranged to prevent the nitroglycerin above the plug from flowing downwardly through the latter, substantially as set forth.

8. A device for isolating different portions of an oil-well from each other, consisting of a hollow partition-plug open at its upper end and provided in its lower portion with a relief-passage communicating with the interior of the plug, a packing-ring arranged at the upper end of the plug and provided in its inner surface with ribs or corrugations forming relief-channels, and a valve arranged to check the downward flow of the nitroglycerin through the plug, substantially as set forth.

Witness my hand this 22d day of October, 1902.

CHARLES S. LITTLE.

Witnesses:

ALONZO E. SMITH,
LAVINIA W. LITTLE.