

Jan. 6, 1953

L. W. STORM
LOCKING LIFT PLUG

2,624,609

Filed Aug. 4, 1947

2 SHEETS—SHEET 1

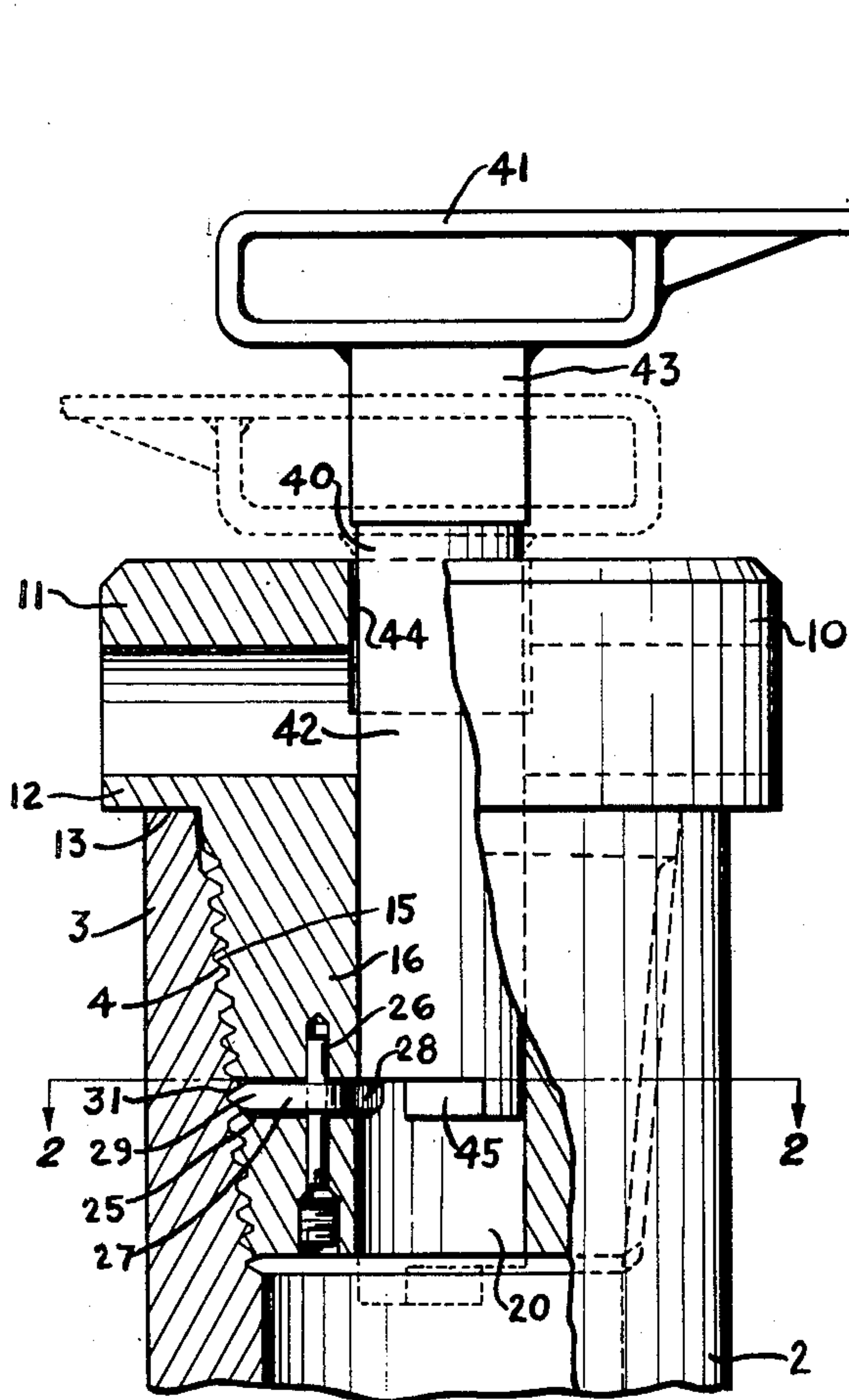


Fig. 1

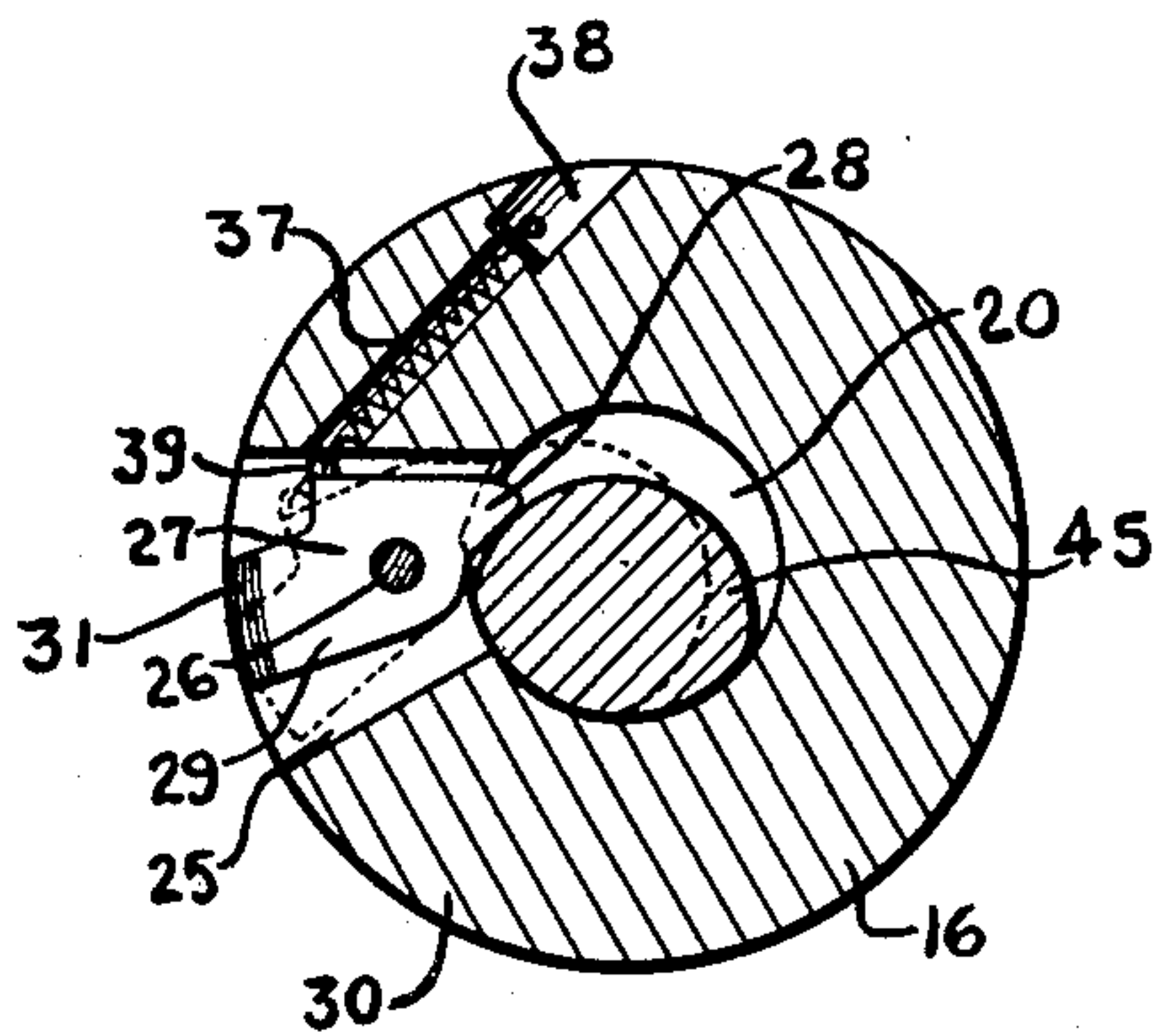


Fig. 2

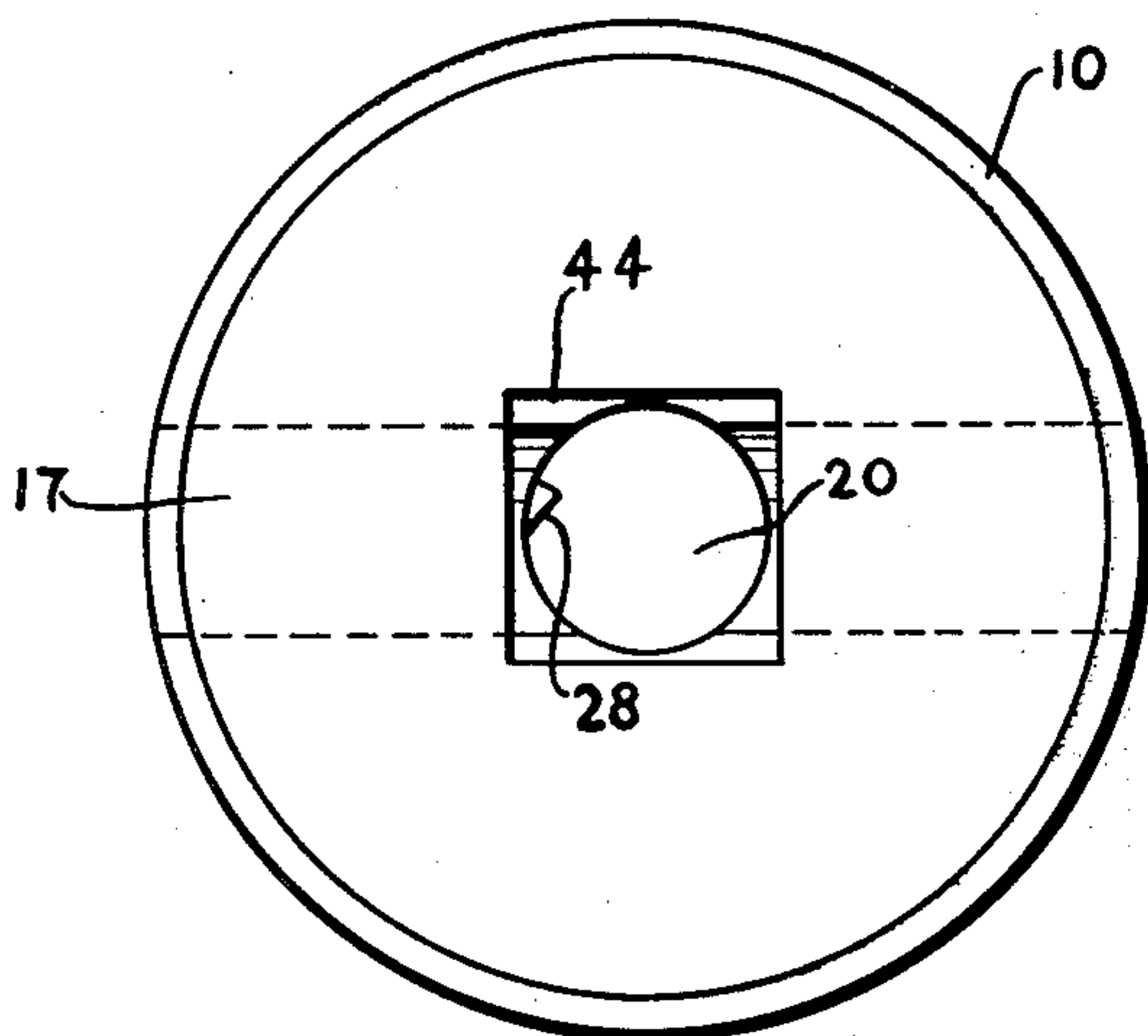


Fig. 3

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2 SHEETS—SHEET 2

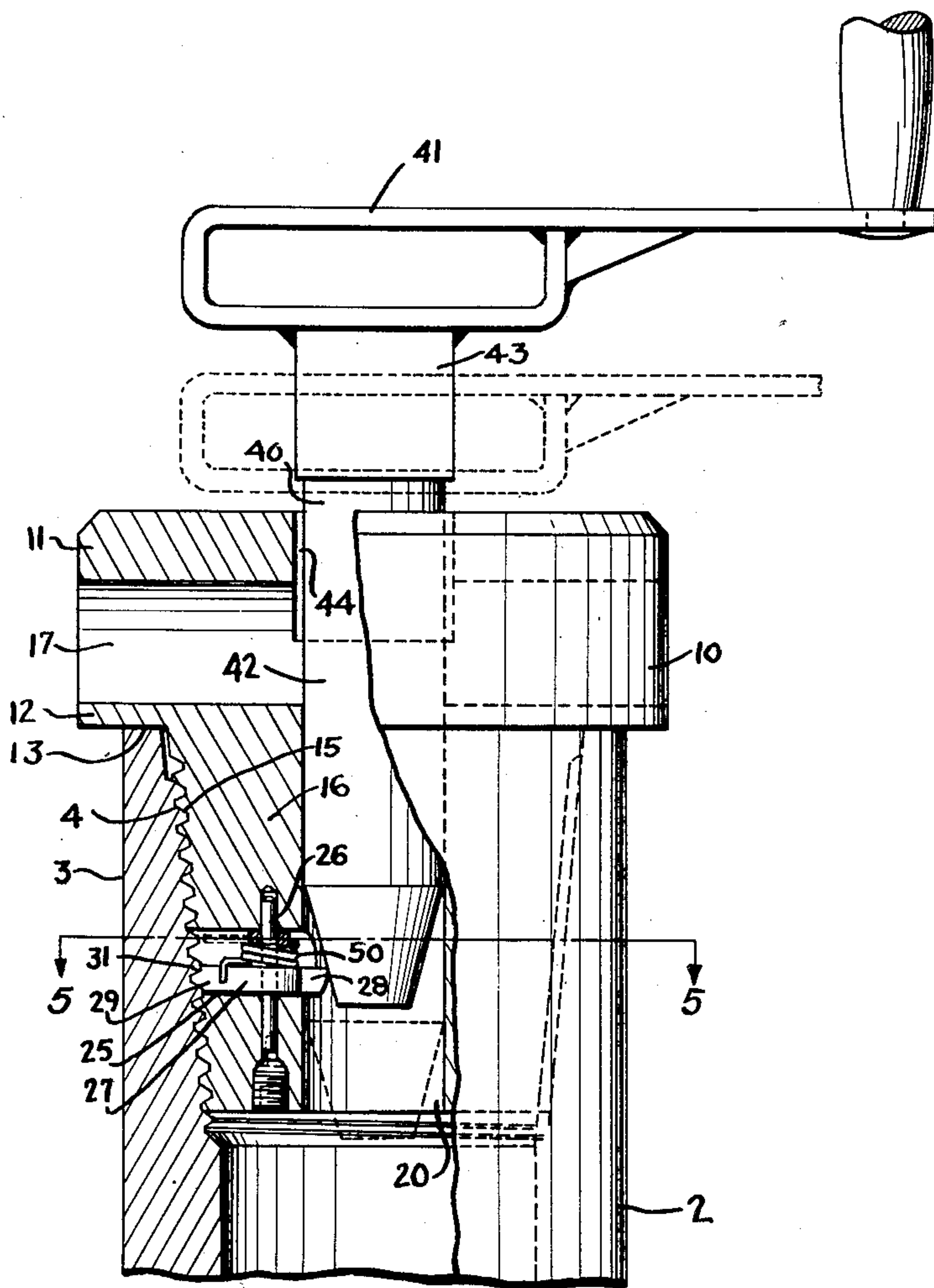


Fig. 4

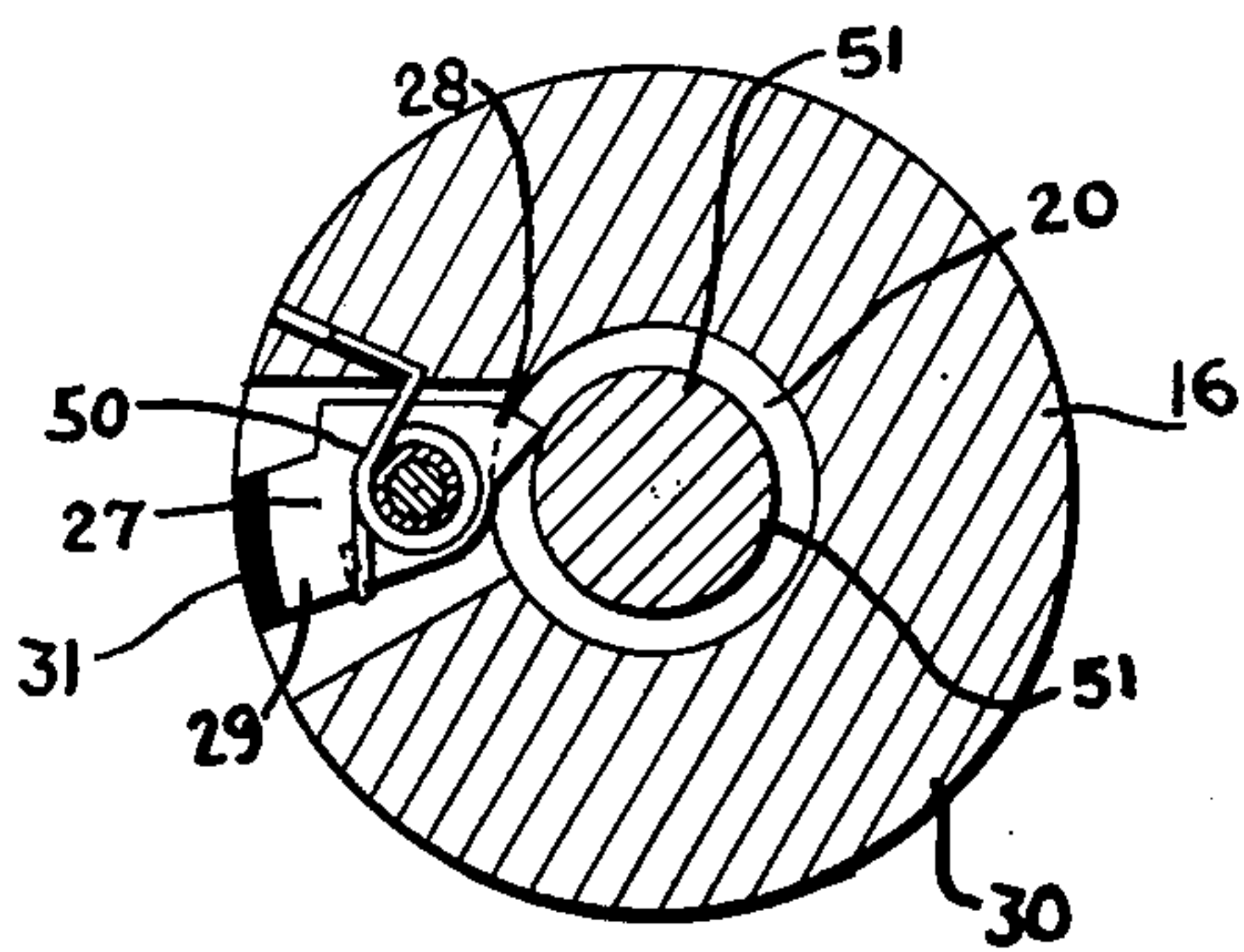


Fig. 5

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UNITED STATES PATENT OFFICE

2,624,609

LOCKING LIFT PLUG

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Application August 4, 1947, Serial No. 765,828

12 Claims. (Cl. 294—86)

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The invention relates to a locking type lift plug for use in manipulating pipe.

The invention comes into use generally in the handling of pipe at the mouth of a well, where it is difficult to obtain a connection to the pipe in order to raise or lower the pipe in a well bore.

It is one of the objects of the invention to provide a lift plug which may be connected to the pipe so as to provide a shoulder below which the hoisting mechanism may be connected so as to lower or raise the pipe.

Another object is to provide a lift plug which is capable of being locked in position so as to obviate the inadvertent release of the plug from the pipe.

Another object of the invention is to provide a lift plug which may be threaded or otherwise connected to the pipe to be moved in combination with a locking mechanism to prevent the inadvertent release of the plug.

Another object of the invention is to provide a lift plug which will automatically lock in position but which is capable of being readily released for removal.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevation of the upper end of a piece of flush joint pipe to which the lift nipple has been affixed.

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a top plan view looking down on the lift plug with the handle and release mechanism removed.

Fig. 4 is a side elevation similar to Fig. 1 but illustrating a modified form of latch and release.

Fig. 5 is a section taken on the line of 5—5 of Fig. 4.

The present invention is capable of use under various circumstances but will be described herein as particularly useful in connection with well drilling operations where the drill pipe is lowered into and removed from the well bore. In the use of what is known as flush joint drill pipe, where the outer surface of the threaded pipe connection is flush so as to provide less friction to the circulation of drilling mud in the well bore and so as to permit the pipe to be moved through valves and blowout preventers because of its uniform outer diameter, considerable difficulty is encountered in supporting the pipe with the hoisting equipment and the practice has been developed of inserting lift plugs in the upstanding end

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of the pipe so as to provide an outstanding shoulder to permit supporting of the pipe in the elevator or slips.

It is the usual practice to provide one such lift plug for every three joints of drill pipe in lowering the pipe into or removing it from the well bore. These lift plugs must be screwed tightly into the pipe so as to exercise the greatest care to prevent unscrewing of the plug and therefore the lift plug is usually "made up" or wedged tightly into the pipe. There have been instances, however, where such plugs have become loosened and allowed the pipe to drop into the hole.

The present invention directs itself to a lift plug which will automatically lock itself in position in the pipe so as to prevent the plug becoming loosened or being backed out of the thread in the pipe except by a special and particular releasing operation.

With the plug now in use, the general practice is to utilize a heavy sledge hammer in making up the lift plug into the threads of the pipe, and the reverse operation is performed in knocking the plug loose. As distinguished from this troublesome operation, the present invention provides a plug which may be turned into position and released by hand in a minimum of time and labor.

Fig. 1 shows a form of the invention where 2 illustrates the upper end of a section of pipe which is a flush joint type of pipe where the outer periphery 3 thereof is of uniform diameter.

The upper end of the pipe is formed with the threaded box 4 which receives a complementary threaded pin end of the next section of pipe when the string of pipe is connected together.

Fig. 1 shows a plug body 10 as having the enlarged collar portion 11 provided with a shoulder 12 to make up against the end 13 of the pipe when the threads 15 on the pin extension 16 are made up with the threads 4. The opening 17 may be used to insert a bar or lever for turning the lift plug.

The plug has the passage 20 therethrough. When the plug is threaded into the pipe as seen in Fig. 1, then the elevator or other hoisting equipment may be engaged about the periphery 3 of the pipe so that the load of the string of pipe can be supported on the elevator or shoulder 12 of the plug.

In order that the plug may be automatically locked into position to prevent its inadvertent release, a lateral slot 25 has been formed in the pin 16 and a vertical pivot pin 26 pivotally supports the latch 27 in such a manner that the heel 28 projects into the passage 20 while the

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toe 29 extends to the periphery 30 of the pin 16 and this toe 29 has a beveled end 31 which conforms to the configuration of the threads 4 and 15 so that it fits into the threads as seen in Fig. 1. A tension spring 37 anchored in the plate 39 is connected at 39 to the latch 27 so as to normally urge the latch to the position shown in Figs. 1 and 2, whereby the beveled edge 31 fits into the thread 4 and the heel 28 projects into the passage 20. Due to the fact that the pivot pin 26 is off center with respect to the pin member 16 as a whole, it is apparent that if an effort is made to rotate the plug and the pin in a counter-clockwise direction, as seen in Fig. 2, that the beveled portion 31 of the heel will tend to wedge the thread 4 and prevent unscrewing or loosening of the plug. This is particularly due to the configuration and arrangement of the parts as well as to the pull of the spring 37. Thus, if the plug is once screwed into position, it will be practically impossible to unscrew the plug unless the pin 26 were sheared or some of the parts deformed.

In order to unlock the plug and permit its ready removal, a wrench 40 has been provided and is made up of a handle 41 and a spindle 42. The spindle is of sufficient length to project into the passage 20 as shown in either the full or the dotted line position of Fig. 1. The spindle has a squared portion 43 to fit into the complementary square 44 in the body 10 of the plug and the collar 11 thereof. In this manner, when the wrench is in the dotted line position of Fig. 1, the handle and the plug will be relatively non-rotatable so that either the plug can be unscrewed by rotating the handle or it may be screwed into the pipe.

In order, however, to release the latch so as to unlock the plug before it is rotated, the lower end of the wrench 40 and the spindle 42 thereof is formed with an eccentric or cam face 45 which is formed by cutting away a crescent from one side of the spindle. This cam face 45 on the spindle is arranged to engage the heel 28 of the latch 27 so that when the wrench and spindle are in the full line position of Fig. 1 and rotated from the full line position of Fig. 2 to the dotted line position of Fig. 2, the heel 28 will be forced out of the passage 20 by the surface of the spindle. This pivoting movement of the latch in a counter-clockwise direction about the pin 26 causes the beveled end 31 of the toe 29 thereof to move out of the thread 4, so that the entire plug is now released from the locking position and ready to be unscrewed by hand. The entire wrench 40 is slipped downwardly to the dotted line position of Fig. 1 so that the periphery of the spindle holds the latch 27 in retracted position. The squared portion of the wrench and body are thus engaged and the handle rotated counter-clockwise to entirely unscrew the plug.

The operation of the parts appears to be obvious from the foregoing explanation and while the invention has been described in detail as applied to a flush joint pipe having a threaded connection, it seems obvious that it may be utilized under various other conditions.

Figs. 4 and 5 show a modified form of the invention which is identical with that described in Fig. 1 except that the tension spring 37 has been replaced with a coil spring 50 which tends to rotate the latch 27 in a clockwise direction to locking position while the spindle 42 is provided with a frustoconical tapered lowered end 51 which will retract the latch when moved down-

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wardly in the passage 20 to the dotted line position shown in Fig. 4. The operation of this modified form is the same as described in connection with Fig. 1.

Broadly the invention contemplates an automatically locking lift plug where the lock is automatically and resiliently accomplished and can only be released by a special releasing tool.

What is claimed is:

1. A locking lift plug for flush joint drill pipe having a threaded internal box end comprising a body, a threaded pin thereon to engage the threaded box, a latch eccentrically disposed in said pin to grip the box thread to lock said body to the pipe, and means to release said latch when the plug is to be removed, including means to unthread said plug.

2. A locking lift plug for flush joint drill pipe having a threaded internal box end comprising a body, a threaded pin thereon to engage the threaded box, a latch eccentrically disposed in said pin to grip the box thread to lock said body to the pipe, and means to release said latch when the plug is to be removed, including a spindle insertable into said body to engage the latch, and unthread said plug.

3. A locking lift plug for flush joint drill pipe having a threaded internal box end comprising a body, a threaded pin thereon to engage the threaded box, a latch carried by said pin to grip the box thread to lock said body to the pipe, and means to release said latch when the plug is to be removed, including a spindle insertable into said body to engage the latch, a squared portion in said body, and a complementary squared portion in said spindle movable to engage said squared portion in said body so that turning of the spindle will insert or remove the plug.

4. A lift plug for pipe comprising a hollow body, a threaded pin thereon, a cam member extensible laterally from said pin, means normally urging said cam member outwardly to engage the internally threaded box of the pipe to be lifted so as to lock the plug against release from the pipe, and means insertable into said plug to remove said plug including a cam member to engage said first cam member and release the latter.

5. A lift plug for pipe comprising a hollow body, a threaded pin thereon, a pivoted latch extensible laterally from said pin, means normally urging said latch outwardly to engage the internally threaded box of the pipe to be lifted so as to lock the plug against release from the pipe, said latch having a beveled end to bind in the pipe thread and a heel portion extending into said hollow portion engageable by means to unthread the plug to disengage the latch.

6. A lift plug comprising a body and a threaded pin having communicating axial bores, said threaded pin being adapted to be screwed into pipe to be lifted, means on said body engageable to lift such pipe, a latch in said pin, a pivot for said latch so that unscrewing of the body binds the latch and locks the body to the pipe, a heel portion on such latch extending into said axial bore adapted to be engaged and the latch thereby released by means insertable into said axial bore to unthread the plug.

7. A lift plug comprising a body and a threaded pin having communicating axial bores, said threaded pin being adapted to be screwed into pipe to be lifted, means on said body engageable to lift such pipe, a latch in said pin, a pivot for said latch so that unscrewing of the body binds

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the latch and locks the body to the pipe, a heel portion on such latch extending into said axial bore, and means insertable into said axial bore to unthread the plug and engage such heel portion and thereby release the latch.

8. A lifting plug for handling flush joint drill pipe comprising a hollow body, a threaded pin thereon to screw into the pipe, a latch in the threaded pin normally urged to engage the pipe to lock the threaded pin to the pipe, and a handle to engage and release the latch and to unscrew said pin from the pipe.

9. A lift plug comprising a body, a threaded pin on the body to be screwed into the pipe to be lifted, a latch in the threaded pin, a pivot for said latch arranged so that unscrewing of the body binds the latch and locks the body to the pipe, and means insertable in the body to release said latch, including a handle and complementary portions on said handle and in said body so that turning of the handle unscrews the plug from the pipe thread.

10. A lift plug comprising a body, a threaded pin on the body to be screwed into the pipe to be lifted, a latch in the threaded pin, a pivot for said latch arranged so that unscrewing of the body binds the latch and locks the body to the pipe, and means insertable in the body to release said latch, including a handle having a squared portion thereon to engage a complementary portion in said body so that the turning of

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the handle unscrews the plug from the pipe thread.

11. A lift plug comprising a body, a threaded pin on the body to be screwed into the pipe to be lifted, a latch in the threaded pin, a pivot for said latch arranged so that unscrewing of the body binds the latch and locks the body to the pipe, and means insertable in the body to release said latch, including an eccentric engageable with the latch.

12. A lift plug comprising a body, a threaded pin on the body to be screwed into the pipe to be lifted, a latch in the threaded pin, a pivot for said latch arranged so that unscrewing of the body binds the latch and locks the body to the pipe, and means insertable in the body to release said latch, including a tapered end engageable with the latch.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,288,215	Savickis	Dec. 17, 1918
1,532,150	Olson	Apr. 7, 1925
1,597,667	Blair	Aug. 31, 1926
1,669,186	Bunker	May 8, 1928
1,801,773	Ladd	Apr. 21, 1931