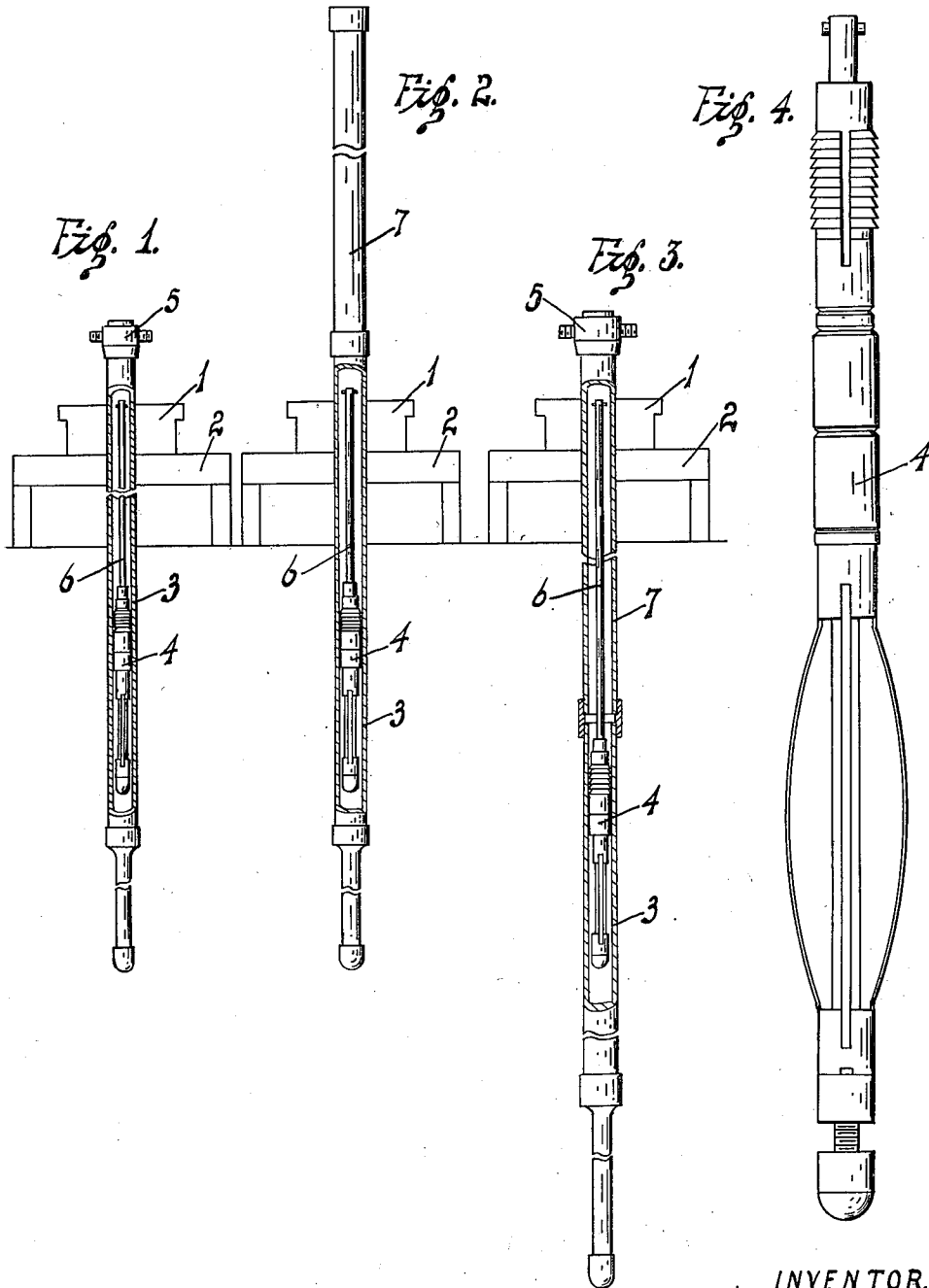


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METHOD OF TESTING PIPE
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METHOD OF TESTING PIPE

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5 Claims. (Cl. 166—21)

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This invention relates to a method of testing pipe and particularly the tubing through which an oil well or the like is produced.

An object of my invention is to provide a method of testing pipe below the floor of the derrick, i. e., below the surface of the ground and while the pipe or tubing is being run into the well.

An object of my invention is to provide a method of testing pipe in a series of successive steps and while the pipe is being run into the well, stand by stand.

Another object of my invention is to provide a novel method of testing pipe which consists in placing a movable packer in a stand of pipe and preferably at the lower end of this stand of pipe, then filling the pipe above the packer with water and then exerting pressure on the water to determine if the pipe is leaking. As subsequent stands of pipe are added, each stand is in turn lowered into the well and the packer is successively raised into the newly inserted stand of pipe, retaining the column of water above the packer each time that the packer is moved.

Another object of my invention is to provide a novel method of testing pipe which is safe in that there is less danger to the workmen and is quite rapidly performed, and also eliminates the spilling of large quantities of water on the floor of the derrick, as is customary in methods now in use.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a side elevation of a stand of pipe inserted in a well, with parts broken away to show interior construction.

Figure 2 is a view similar to Figure 1, but with a second stand of pipe attached to the first stand of pipe.

Figure 3 is a side elevation of stands of pipe inserted in a well with parts broken away to show interior construction.

Figure 4 is a side elevation of a packer employed in my method.

Referring more particularly to the drawing, the numeral 1 indicates the drilling table on the floor of the derrick 2. The derrick and the drilling table is shown diagrammatically because the details of this construction are usual and well known and form no part of this invention.

The pipe which is to be tested, for example, the production tubing of an oil well, is run into the well in a series of stands, each stand consisting of a number of lengths of pipe which are threaded together, or to connecting collars. The first stand of pipe shown at 3 is run into the well, and is

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then held in this position in the table 1. A packer 4 is now run into the tubing, and is set at a point adjacent the bottom of the tubing. The packer 4 may be of the type shown in the patent to Brooder No. 350,655, October 12, 1886. However, I do not wish to limit myself to this particular type of packer, since other packers of a movable type may be employed.

The type of packer disclosed in my co-pending application can be released for movement up or down the tubing as desired, and also may be set for any desired point. After the packer 4 has been set in the tubing, a head 5 is attached to the top of the tubing and water is then forced through the head and into the tubing, to entirely fill the same. Pressure is then exerted through the head 5, preferably from a suitable air pump or the like, and the level of the water is noted in the tubing. If the water level drops, it is evident there is a leak in the tubing. The required pressure to test the tubing may vary, but an adequate pressure is exerted to check this tubing at the pressures which will be exerted upon the same when the tubing is in a deep well.

A rod 6 rises from the packer 4 to adjacent the top of the stand of pipe which is being tested, and this rod can be engaged for the purpose of actuating the packer 4. After the first stand of pipe has been checked, the head 5 is removed and the second stand of pipe 7 is screwed on to the top of the stand 3. The rod 6 is now engaged by a suitable grapple, and the packer 4 is released after which the second stand of pipe 7 is run into the well so that the top of the pipe is just above the surface of the table. Note that while the second stand (and all subsequent stands) are run into the well, the packer 4 is held substantially stationary as far as vertical movement is concerned and consequently the column of water above the packer 4 will be retained with a possible loss of a small amount of water which might leak past the packer. After the second stand of pipe 7 has been lowered, the packer 4 is again re-set, this re-setting being accomplished through the rod 6, the head 5 is attached to the top of the stand 7, enough water is added to compensate for any leakage, and pressure is again applied to the second stand of pipe, as previously described.

All subsequent stands of pipe as they are run into the well are tested in the same manner heretofore described.

I have found that it is advantageous to check each stand of pipe as it is run into the well, since it is then possible to isolate any leak, and furthermore, since the testing occurs below the surface of the ground, there is little danger of injury to the workmen, and also water is not spilled on the floor of the derrick, creating a hazard.

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Having described my invention, I claim:

1. A method of subjecting each of a plurality of elongated tubular members that may be connected in longitudinal sequence to substantially the same predetermined hydraulic testing pressure which comprises, disposing the first of said members in a vertical position with the lower interior end portion thereof in slidable fluid sealing contact with fluid sealing means that closes the lower end thereof, filling said first member with fluid to provide a fluid column therein, applying fluid pressure to said column to subject the interior of said first member to a predetermined hydraulic pressure for testing purposes, connecting a second member to the upper end of said first member, moving said first and second members in a longitudinal direction relative to said sealing means to transfer said fluid column from said first member into said second member and position said sealing means in the lower end of said second member in a member closing and fluid column supporting position, and repeating said hydraulic testing operation by use of said column in said second member and said column in subsequent members in sequence as said members are connected to the uppermost of the tested members and moved relative to said sealing means into a testing position.

2. A method of subjecting each of a plurality of tubular members that may be connected in longitudinal sequence to substantially the same predetermined interior hydraulic testing pressure which comprises, disposing the first of said members in an upright position with the lower interior end portion thereof in a slidable fluid sealing contact with a packer to close the lower end thereof, filling said first member with fluid to a predetermined level to provide a fluid column, applying a predetermined fluid pressure to said column to subject the interior of said first member to a known hydraulic pressure, determining after a predetermined length of time any decrease in the pressure on said fluid column in said first member, connecting a second member to the upper end of said first member, moving said first and second members in a longitudinal direction relative to said packer holding said packer stationary to move said fluid column in said first member into said second member and position said packer in the end of said second member adjacent said first member in a member closing and fluid column supporting position, adding sufficient fluid as necessary to bring said column in said second member to a predetermined level, and applying said predetermined fluid pressure to said column in said second member and to subsequent members in sequence in which said column is positioned after said members are moved into a testing position relative to said packer for testing purposes.

3. A method of subjecting each of a plurality of tubular members that may be connected in longitudinal sequence to substantially the same predetermined interior hydraulic testing pressure which comprises, disposing the first of said members in a substantially vertical position with the lower interior end portion thereof in slidable fluid sealing contact with a sealing means to close the end of said first member, filling said first member with fluid, applying a predetermined fluid pressure to said fluid and subjecting the interior of said first member to a known hydraulic head, connecting a second member to said first member in an end-to-end manner, moving said sealing means and said fluid above said sealing means upwardly

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through said first member to a position where said sealing means closes the lower end of said second member and said fluid is situated within the confines of said second member, and applying said predetermined fluid pressure to said fluid in said second member and to subsequent members in sequence after said sealing means has been moved to a position where each of said members is in a testing position, relative to the sealing means.

4. A method of subjecting each of a plurality of tubular members that may be connected in longitudinal sequence to substantially the same predetermined interior hydraulic testing pressure by using a single fluid column substantially the length of one of said members which comprises, disposing the first of said members in a substantially vertical position with the lower interior end portion thereof in slidable fluid sealing contact with stationary fluid sealing means to close the end of said member, filling said first member to provide a fluid column within the confines thereof, subjecting said fluid column to a predetermined fluid pressure to test the interior of said first member at a known pressure, connecting a second member to said first member at the end thereof opposite that engaged by said sealing means, moving said first and second members downwardly relative to said sealing means to position said fluid column in said second member and said sealing means in the lower end of said member to close same and support said column, and subjecting said second member and subsequent members in sequence to said predetermined fluid pressure after they have been moved into a testing position relative to said packing means to position said fluid column within the confines thereof.

5. A method of subjecting each of a plurality of tubular members that may be connected in longitudinal sequence to substantially the same predetermined interior hydraulic testing pressure by use of a single fluid column substantially the length of one of said members which comprises, disposing the first of said members in a substantially vertical position, with the lower interior end portion thereof in slidable fluid sealing contact with a stationary fluid packer to close the end of said member, filling said first member to provide a fluid column within the confines thereof, subjecting said fluid column to a predetermined fluid pressure to test the interior of said first member at a known pressure, connecting a second member to said first member at the end thereof opposite that engaged by said packer, moving said first and second members relative to said packer to position said fluid column in said second member and said packer in the lower end of said second member, and subjecting said second member and subsequent members in sequence to said predetermined fluid pressure after they have been moved into a testing position relative to said packing means.

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