

Jan. 29, 1935.

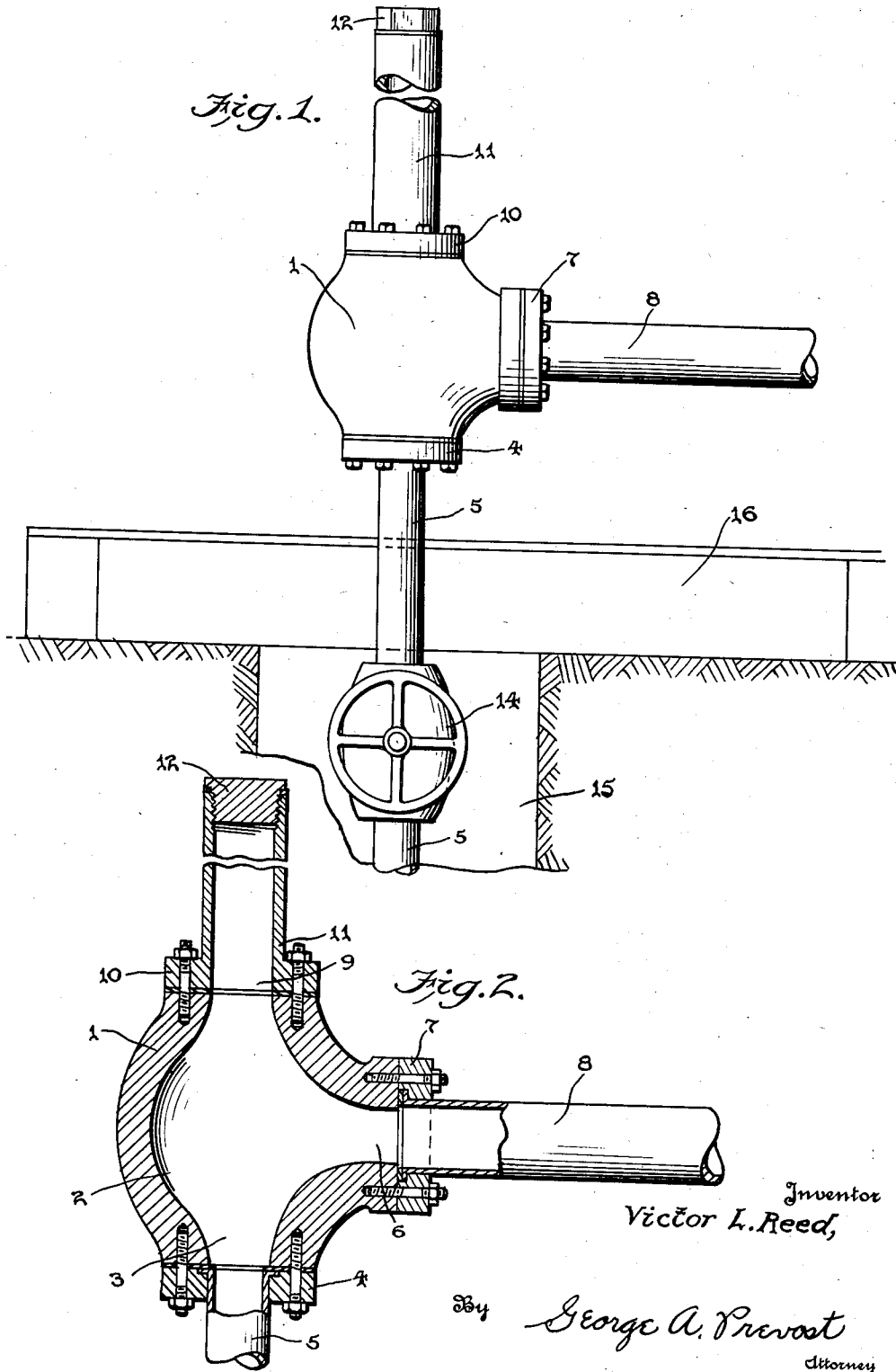
V. L. REED

1,989,608

FLOW HEAD

Filed March 22, 1932

2 Sheets-Sheet 1



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Fig. 3.

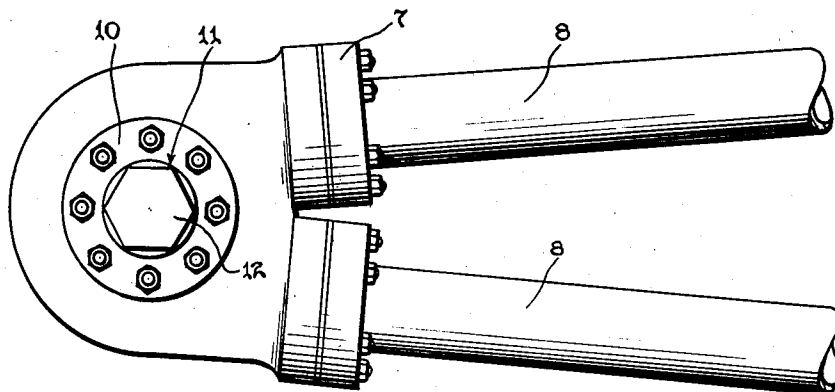


Fig. 4.

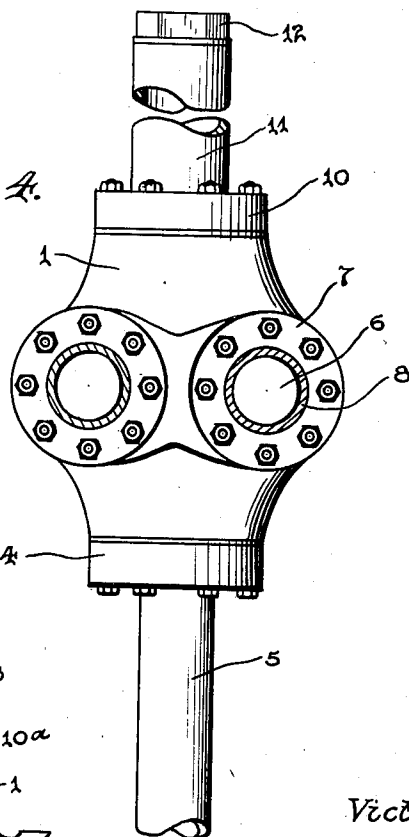
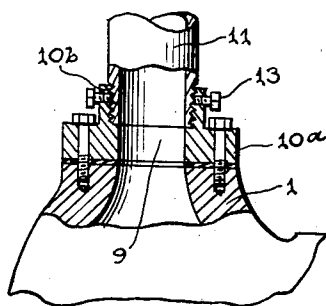


Fig. 5.



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UNITED STATES PATENT OFFICE

1,989,608

FLOW HEAD

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Application March 22, 1932, Serial No. 600,503

4 Claims. (Cl. 137-71)

My invention consists in new and useful improvements in a flow head for oil wells and has for its object to provide such a device which is particularly designed to retard the velocity and cause a reduction in pressure of the fluid passing through a well casing whereby the force of the fluid and sand carried thereby is in turn reduced to eliminate to a large extent wear on the inner walls of the flow head.

Heretofore numerous difficulties have been encountered in bringing in new wells due to the fact that in flowing the oil and gas from the well the conventional flow heads and connections soon became worn and cut out as a result of the action of sand carried in the oil and gas under extremely high pressures, thus causing leakage and consequently serious losses, both in time required for repairs and in the flowing substance itself.

To overcome the above difficulties I have designed a flow head which is substantially globular in shape, its inner surface gradually expanding into a stream lined expansion chamber of considerably greater diameter than that of the well casing to which it is attached. By this particular structure the difficulties which were caused by the action of the sand, oil and gas passing through the flow head under extremely high pressures, thus causing erosion and cutting of the head is materially reduced, if not practically eliminated, due to the retarded velocity and reduction in pressure of the fluid upon entering the flow head.

Obviously the life of a flow head constructed in accordance with my invention is greatly prolonged and the procedure in bringing in a new well is facilitated.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the novel features herein set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views,

Fig. 1 is a view in side elevation showing my improved flow head in place on a well casing.

Fig. 2 is a vertical sectional view of the flow head.

Fig. 3 is a top plan view.

Fig. 4 is a view at right angles to Fig. 1, and

Fig. 5 is a fragmentary view of a modified form of my invention showing means for se-

curing an oil saver or other appliance in place when cleaning out the well.

In the drawings, 1 represents the body portion of my improved flow head which is substantially globular in shape, its interior forming a relatively large expansion chamber 2, the walls of which are stream lined and devoid of abrupt curves and angles as clearly shown in Fig. 2. The flow head body 1 may be constructed of any suitable material but is preferably composed of cast iron with relatively thick walls.

The lower extremity of the flow head body is provided with an inlet opening 3 adjacent which is secured a flanged coupling 4 for mounting the device on the upper end of a well casing 5, said casing being in direct communication with the interior of the expansion chamber 2. In one side wall of the body portion 1 and substantially at right angles to the inlet opening 3, I provide one or more discharge openings 6 adjacent which are located suitable flanged connections 7 for coupling flow lines 8 thereto, also in communication with the expansion chamber 2, said flow lines leading to conventional oil and gas separators not shown.

The free end of the flow head is provided with an opening 9 adapted to register with and receive the flanged connection 10 of an upwardly extending fluid cushion pipe 11, the upper extremity of the latter being internally threaded to receive a suitable bull plug or the like 12.

In Fig. 5 of the drawings I have shown a slightly different construction wherein the flanged coupling 10a is separate from the fluid cushion pipe 11 and is provided with an upwardly projecting annular collar 10b, internally threaded to receive complementary threads on the lower end of the fluid cushion pipe. With this structure, the opening 9 being in communication with the expansion chamber 2 and in direct line with the inlet opening 3 and casing 5, by removing the pipe 11 a bailer, swabbing device or other tools may be inserted through the flow head when bringing in a well or when cleaning the well out. The collar 10b is preferably drilled and threaded transversely at predetermined points around its circumference to receive a plurality of set screws 13 for securing an oil saver or other appliance in place when cleaning out the well, it being understood that during such operation the fluid cushion pipe 11 is disconnected. These set screws perform no function while the well is flowing and the fluid cushion pipe 11 and bull plug 12 are in place. It will be noted that instead of the fluid cushion pipe

11 it may be desired to connect an additional flow line into the opening 9.

14 represents a master gate valve which is connected into the well casing 5 and usually located near the upper extremity of the collar 15, and 16 designates a conventional derrick floor constructed at the top of the well.

The operation of my improved flow head is obvious. The up-flowing oil and gas, carrying varying quantities of sand and other foreign matter passes through the casing 5, usually, under extremely high pressure and is discharged through the inlet 3 into the expansion chamber 2 of the flow head, where due to the increased area, the velocity of flow is materially retarded and the pressure of the fluid reduced. This expansion of the fluid and consequent reduction in pressure and velocity, together with the stream-lined design of the inner walls of the chamber 2, naturally eliminates the cutting effect of the sand carried by the fluid, upon the inner walls of the flow head and the direction of flow of the fluid is transferred substantially at right angles and into the flow lines 8, which conduct the mixture of oil gas and sand to suitable separators as before stated.

When the well is flowing the pipe extension 11 fills with oil, gas etc., and acts as a cushion, which insures greater safety and service to the flow head in the event some large bulk such as rocks should be thrown up by the oil stream into the flow head.

When it is desired to use a bailer or other tools, the pipe 11 is removed, affording access to the flow head and casing from the top thereof, and when cleaning out a well a conventional oil saver may be inserted through the opening 9 and secured in place by means of the set screws 13 in the collar 10b.

From the foregoing it is believed that the objects and advantages of my improved flow head over structures heretofore known will be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details of construction without departing from the spirit of the invention as set forth in the following claims.

What I claim and desire to secure by Letters Patent is:—

1. In combination with an oil well casing, an expansion flow head comprising a substantially globular body portion, an unobstructed expansion chamber in said body portion, of relatively large diameter with respect to said

well casing and in communication therewith, and a discharge opening leading from said expansion chamber at an angle to said well casing, the inner walls of said expansion chamber being stream-lined and devoid of abrupt curves and angles, its surfaces gradually merging into the inlet and outlet openings of said chamber.

2. In combination with an oil well casing, an expansion flow head comprising a substantially globular body portion, an unobstructed expansion chamber in said body portion, of relatively large diameter with respect to said well casing and in communication therewith, a discharge opening leading from said expansion chamber at an angle to said well casing, the inner walls of said expansion chamber being stream-lined and devoid of abrupt curves and angles, its surfaces gradually merging into the inlet and outlet openings of said chamber, and a fluid cushioning column in communication with said chamber and arranged in direct line with the flow from said casing.

3. In combination with an oil well casing, an expansion flow head comprising a substantially globular body portion, an unobstructed expansion chamber in said body portion, of relatively large diameter with respect to said well casing and in communication therewith, a plurality of discharge openings radiating from said expansion chamber at an angle to said well casing, the inner walls of said expansion chamber being stream-lined and devoid of abrupt curves and angles, its surfaces gradually merging into the inlet and outlet openings of said chamber, and a fluid cushioning column in communication with said chamber and arranged in direct line with the flow from said casing.

4. In combination with an oil well casing, an expansion flow head comprising a relatively large body portion having an unobstructed expansion chamber therein of relatively large diameter with respect to said well casing and in communication therewith, and a plurality of discharge openings leading from said expansion chamber at an angle to said well casing, the inner walls of said expansion chamber being stream lined and devoid of abrupt curves and angles, its surfaces gradually merging into the inlet and outlet openings of said chamber, whereby oil flowing into said chamber from said casing is expanded anterior to its diversion through the outlet opening to permit a full flow of oil with no reduction of volume as a result of back pressure.

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