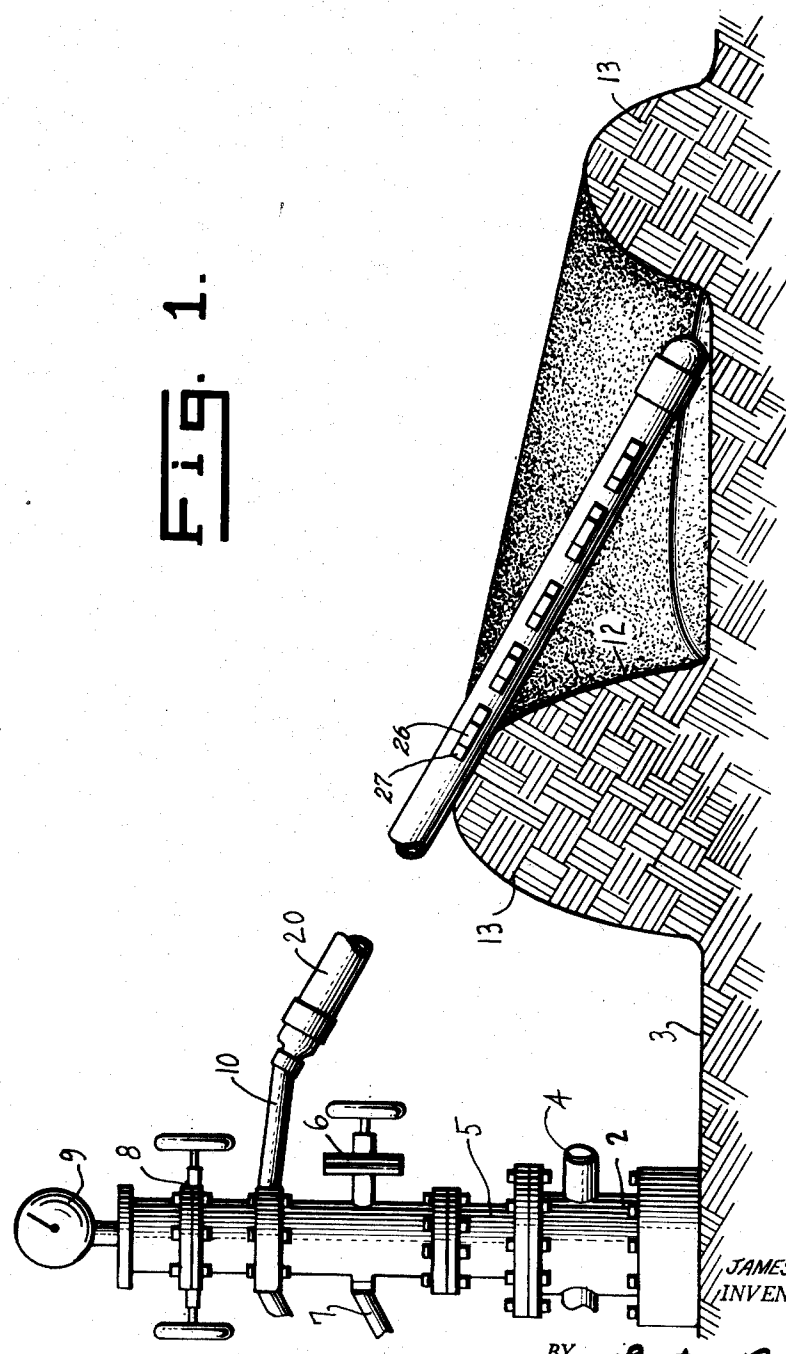
Jan. 12, 1954 J. F. HULSEY 2,665,760

PRESSURE DISSIPATING MANIFOLD FOR BRINGING IN WELLS

Filed March 31, 1950 2 Sheets-Sheet 1

Fig. 1.



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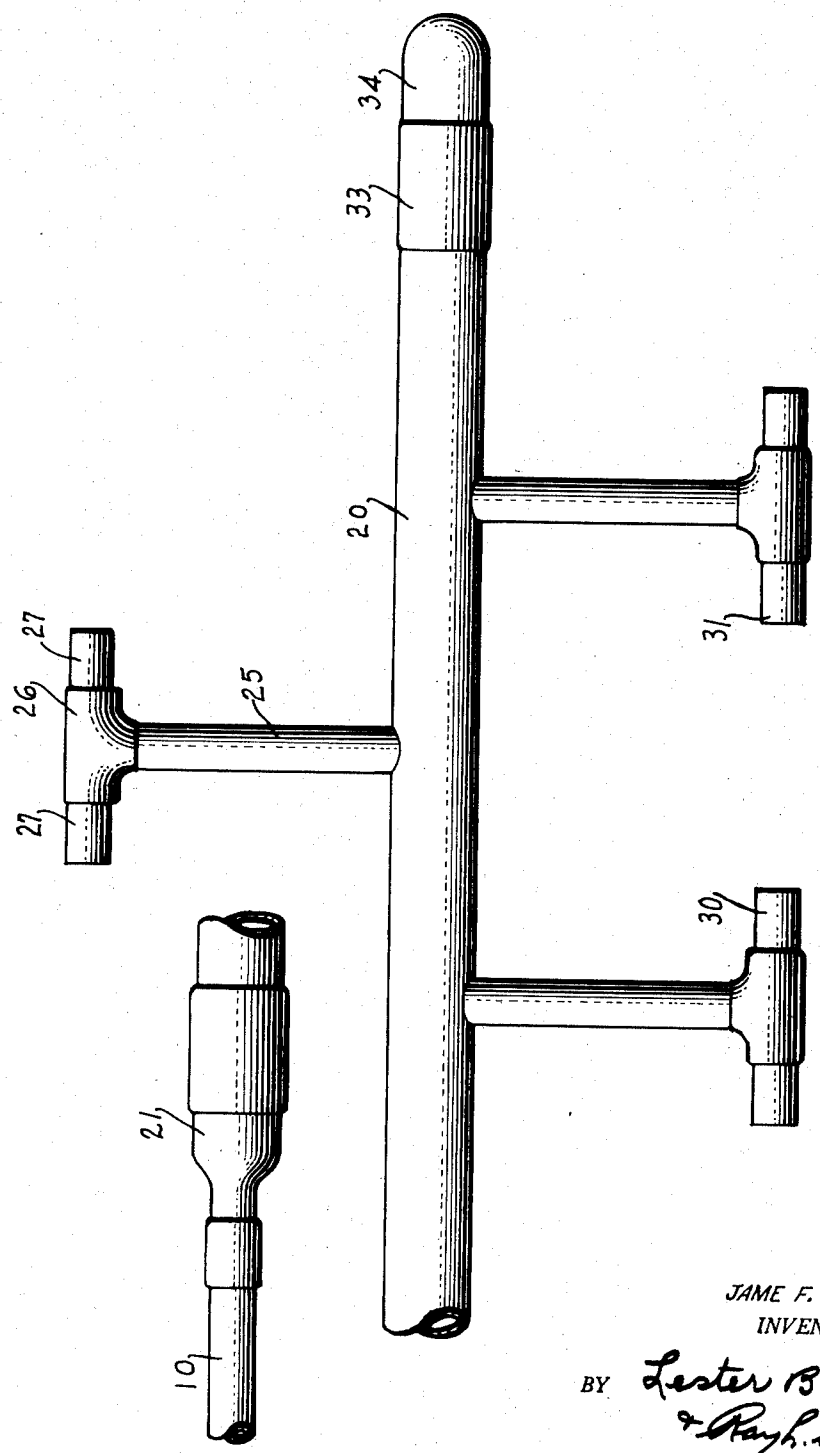

Fig. 2.

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PRESSURE DISSIPATING MANIFOLD FOR BRINGING IN WELLS

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1 Claim. (Cl. 166—2)

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This invention relates to a means and method whereby the pressure of fluids discharging from a well at the time the well is being brought into production for oil and gas, are dissipated to reduce and minimize the pressure and spraying effect of such fluids.

In the drilling of wells by the rotary method a drilling mud is circulated into and out of the well bore during the drilling operation and when the drilling is completed, it is usual practice to displace the heavy drilling mud from the well by the circulation of water or some other fluid so as to reduce the pressure on the end formation down in the well so that the flow of desirable fluids will begin to enter the well and cause the discharge of the drilling mud, or other fluids from the well head.

In many instances the pressure of discharging fluid at the well head may be considerable, so that there is substantial spraying of the mud, oil, water and gas into the atmosphere and the area around a well head to such an extent that there may be a fire hazard.

It is, therefore, one of the objects of this invention to reduce and dissipate the pressure of the discharging fluids, be they oil, gas or water, so that the flow is directed into a pit at reduced pressure to avoid a fire hazard.

Another object of the invention is to provide a means and method whereby a conduit is connected to the well head and directs the flow into a substantially enlarged manifold pipe to effect a pressure reduction and wherein a plurality of lateral outlets are therein provided to further dissipate the pressure because of the increased area of discharge.

Another object of the invention is to provide a manifold pipe of an area greater than the discharge from the casing head so that the discharge from said manifold is directed into a pit at a smaller pressure to confine the discharging fluids.

A still further object of the invention is to provide in combination with a well head and a ready pit, a structure which includes a pressure dissipating manifold pipe.

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 a well head and manifold pipe arranged in a discharge pit for the dissipating of the discharging fluids and pressure.

Fig. 2 is a broken detailed plan view looking down on the manifold to show its connection to the well head and to the lateral outlets.

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In Fig. 1 the well casing 2 extends down into the end formation 3 and has the flow lines 4 thereon. Various types of fittings 5, valves 6 and additional outlets 7 may be provided. A closure 8 and pressure gauge 9 form part of the usual and standard equipment.

In adapting the present invention to the well casing a suitable pipe 10 is connected to one of the well head fittings and is of such size as to accommodate a flow of the mud and well fluids.

It is not uncommon to encounter various circulation pressures in a well, sometimes as high as 4,000 or 5,000 pounds per square inch. This pressure is usually overcome by the pressure of a static column of drilling mud in the well. It is usual to encounter a pressure in pounds per square inch in a well which is computed as .45 times the depth of the well in feet; thus, in a 10,000 foot well a pressure of 4,500 pounds may be expected.

As the drilling of the well is completed and the drill stem and drill bit removed, the pressure created by the column of mud in the well should exceed this expected well pressure, while the different casing production pipes and tubing are being arranged in the well and while the well head fittings are being assembled.

When such arrangements have been made, it is then usual to pump some other liquid or fluid into the well to displace the heavy mud. As an illustration, sometimes the drilling mud may have a specific gravity of approximately 1½ or 2, in order to obtain the desired pressure on the formation. If, by circulation, this drilling mud is removed and replaced by water, then the specific gravity will, of course, be reduced to 1, such reduction would permit the inflow of fluids from the well formation and a tendency to blow out the well by forcing the drilling mud, the water, or the mixture of the two, out of the top of the well; such displacement is required in order to allow the well to flow thereinto at the well pressure in the obtaining of oil or gas.

It should, therefore, be very evident that once the well head is opened to permit the outflow of the mud and water, that as the water gradually displaces the mud the pressure on the casing head will correspondingly increase so that the discharge of the fluids and liquids at the well head may be under substantial pressure. Their discharge at such pressures, of course, causes a spraying action, and the practice has come up of providing an earthen pit 12, best seen in Fig. 1. The embankment 13 of such a pit serves to confine the mixture of oil, water, mud and gas, while the pressure tends to spray this mixture over surrounding territory.

The present invention, therefore, contemplates a manifold pipe 20 which may be of substantial diameter, so that the flow from the well and the conduit 10 will be subject to a reduction in pressure because of the larger area of the manifold pipe 20. For purposes of illustration, but not limitation, suppose the conduit were a 2 inch pipe, the manifold pipe 20 could be, say, 4 inches.

This manifold pipe may be of any desired length depending upon the contemplated volume of flow, but it is shown as extending from the well and projecting into the pit 12.

If the pipe 10, or even the pipe 20, merely extended from the well and terminated in an open end in the pit, the fluid from the well would be propelled against the side of the pit with considerable force, so that a stream of oil, gas and water might blow many feet into the pit, or out into the surrounding territory. The result of such a spray of oil and gas laden vapor settling on the surrounding land or objects sets up a severe fire hazard and damages crops and other installations. This is particularly true in windy areas. In many instances the contents of the pit 12 are ignited so as to prevent the gas from settling in the adjacent areas.

The present invention, therefore, contemplates the method and means of further reducing the pressure to discharge through a plurality of lateral outlets which are best seen in Fig. 2.

The pipe 20 is there shown as connected to a swaged nipple 21 which joins the conduit 10 and the manifold 20. Spaced along the manifold 20 are a plurality of outlet nipples 25, so that the discharge is broken up into a number of relatively small discharging streams.

If desired, however, a T 26 may be connected to the nipples 25 and short additional nipples 27 laid into each end of the T, as seen in Fig. 2.

In this manner the number of discharge outlets is doubled, and if the pipes 25, the T 26 and the nipples 27 are arranged as shown in Figs. 1 and 2, the outlet from the nipple 30, for instance, would discharge in direct opposition to the outlet from the nipple 31. In this manner, the flow of one would counteract the other to prevent any spray and to cause the outcoming liquid to drop into the pit 12.

The end of the manifold pipe 20 may have a coupling 33 and a bull plug 34 as closing the end.

Any desired series of these attachments may be welded, threaded or otherwise affixed upon the manifold pipe in either a symmetrical or a staggered arrangement. It is contemplated that the total outlet volume of all of the nipples 27 will far exceed the volume of the manifold pipe 20, as well as the conduit 10 so that the pressure may be reduced to a relatively low pressure to prevent spraying.

In its simplest form the manifold pipe 20 is merely a container into which the flow of the well is directed so as to dissipate the pressure by permitting the discharge of the fluid, gases and liquids through a plurality of smaller openings.

In practice, the arrangement results in a stream of oil at the lower end of the manifold pipe, flowing therefrom at a reduced pressure and falling into the pit without any spray, while the stream of gas escapes from the outlets in the manifold with little or no force.

The operation of the means and the method should be readily apparent, and in actual practice the invention has resulted in a very satisfactory operation.

What is claimed is:

A device for dissipating the well pressure and fluids at the time of completing the well for production comprising a conduit connected to the well, a manifold pipe of larger diameter than said conduit, a plurality of outlet nipples extending laterally in spaced relation along said manifold, the size of said nipples being such that the total discharge area substantially exceeds the cross sectional area of said conduit and also of said manifold so that the pressure at each nipple is reduced to avoid spraying the fluid discharge, and a cross head on each nipple to discharge longitudinally of said manifold so that the discharge of two adjacent cross heads intersect and dampen the spray effect each of the other.

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