Dec. 26, 1939. G. R. BRAMMER 2,184,809

WELL FLOW STIMULATOR

Filed May 22, 1939

Fig. 1.

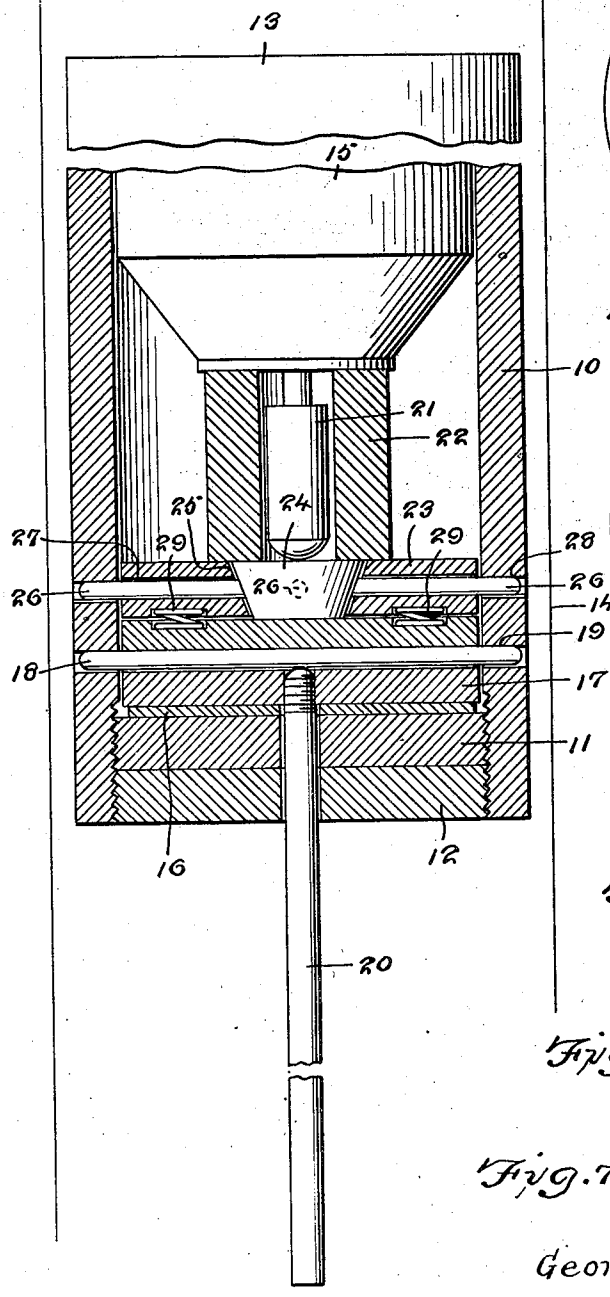


Fig. 2.

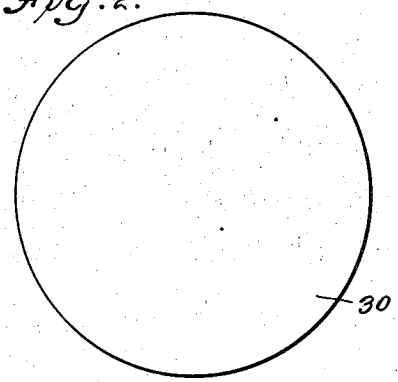


Fig. 3.

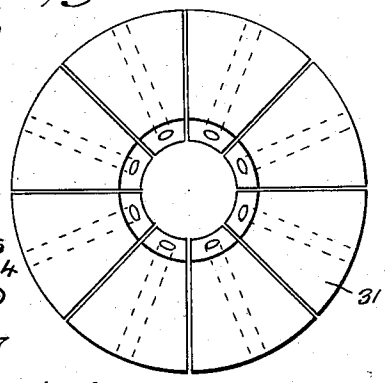


Fig. 4.

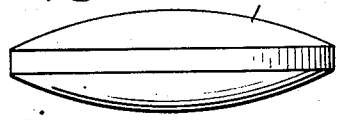


Fig. 5.

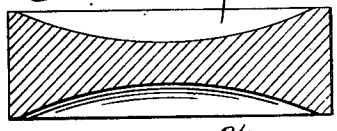


Fig. 6.

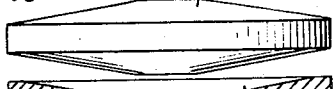
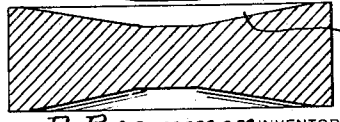


Fig. 7.



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WELL FLOW STIMULATOR

George R. Brammer, Indianapolis, Ind.

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2 Claims. (Cl. 166—1)

This invention relates to well flow stimulators and more especially to apparatus for renewing oil flow in a depleted well.

When an oil well is first drilled production is obtained by natural flow into a pocket at the bottom of the casing, and then, when natural pressure is exhausted, whatever oil drains into this pocket is pumped from the well intermittently. However, it is well known that only from 20% to 30% of the crude oil is obtained in this manner, there being 60% to 80% left in the ground. No way has been found to extract this remaining supply of oil. A great many methods have been tried to revive the flow of the crude oil under the ground, such as water pressure, steam pressure, shooting with bombs and the like. However, none of these methods have proved successful because the water mulsifies with the oil. Steam sets up flow only temporarily for after the crude oil leaves the heated area and reaches the casing it cools quickly and the paraffine clogs up the casing. The shooting with bombs is so expensive that it cannot be done with regularity nor is it practical as it only lasts for the moment of the explosion and is liable to cause a fracture in the casing.

I have discovered that by jarring the earth at the bottom of a well, or even at points near the bottom of the well, or by jarring the entire casing, vibrations are produced in the earth and these vibrations revive the flow. Furthermore, by using heavy blows the shock will be more pronounced, and by repeating such blows many hundred times a minute the formation or strata of the earth is maintained in a continuous disturbance or tremor causing the crude oil to move out of the layers wherein it is entrapped.

With the above in mind an object of the present invention is to provide apparatus for setting up and maintaining rapid vibrations vertically and horizontally in the layers and strata of the earth formation to produce agitation, flow, and movement of oil, mineral contents, liquid or any other content sought in any kind of well, mine or shaft.

A further object is to provide in apparatus of this character, a percussion unit delivering impulses in a vertical and downward direction, units assembled to receive and continue in a vertical and downward direction the received impulses, these units being associated with impact and transmitting units capable of delivering a portion of the transmitted vertically and downwardly directed impulses in a lateral direction.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 is a longitudinal sectional view of oil well flow stimulating apparatus constructed in accordance with the invention,

Figure 2 is a plan view of a solid flat shock transmitting plate,

Figure 3 is a bottom plan view of a sectional shock transmitting plate,

Figure 4 is a side elevation of a shock transmitting plate having convex surfaces,

Figure 5 is a cross sectional view of a shock transmitting plate having concave surfaces,

Figure 6 is a side elevation of a plate having frusto-conical surfaces, and

Figure 7 is a cross sectional view of a shock transmitting plate having frusto-conical depressions in the faces.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, 10 designates a cylindrical housing which is closed at the bottom by a threaded end retainer plate 11 and a threaded lock plate 12. The housing may be fitted at the top 13 with any suitable fitting to engage any standard connection desired. The housing is to be used in a well 14 at any desired point or depth. A standard hammer or pile driver 15 is disposed in the housing and may be driven from any suitable source of power.

Disposed upon the retainer plate 11 is a disc 16 of resilient material. Disposed upon this disc is a metal plate 17 which loosely fits in the housing and which carries horizontally disposed vibration conductors or shock emitters 18 which may be one or more rods loosely mounted in the plate and projecting loosely into openings 19 in the housing.

Vertical vibration conductors or shock emitters 20 are loosely engaged through the disc 16 and plates 11 and 12 and threaded into openings in the bottom plate 17. The members 20 may be of any desired length and may be used to support the entire device at its desired location above the bottom of the well. These vertical vibration conductors may be one or as many as is found necessary and required.

A ram 21 is a separate unit and is fastened

into the hammer 15. Rubber bushing 22 resting or disposed on a plate 23 supports the hammer 15 and holds the hammer 15 at a required distance from plates 23 and 24 to permit correct stroke or distance or permit ram to function. The hammer impinges against the ram 21 which in turn impinges against a substantially inverted frusto-conical head plate 24 which is loosely seated in a similarly shaped axial opening 25 in the plate 23.

The plate 23 is provided with horizontally disposed vibration conductors or shock emitters 26 which are loosely mounted in openings 27 in the plate and in openings 28 in the housing. There may be any number of the members 26 disposed to extend radially from the head plate 24. The plates 17 and 23 are held spaced apart by helical springs 29 seated in recesses in the opposed faces of the plates.

In Figures 2 and 7 are illustrated several types of plates to illustrate that the vibration transmitting plates may be solid and of a flat disc type as shown at 30 in Figure 2, or the plates may be formed of segmental shaped sections shown at 31 in Figure 3. Also the faces of the plates may be convex, as shown at 32 in Figure 4, or concave as shown at 33 in Figure 5, or frusto-conical as shown at 34 in Figure 6, or may have frusto-conical depressions as shown at 35 in Figure 7, or in fact any desired shape of plate may be used.

In operation shocks developed by the ram 21 hitting the head plate 24 at a rapid rate, vibrates the plates 23 and 17 and the vibrations set up in these plates travel through the vibration conductors and shock emitters 18 and 26 horizontally out through and into the layers or strata of earth formation at the point desired for the purpose of producing agitation, flow and movement of oil, into the well. Simultaneously therewith the vibration will be transmitted vertically by the vertical vibration conductor or shock emitter 20 to produce the same result.

This apparatus can be used to produce results on one or more wells, mines or shafts at a time or at any depth.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. Apparatus for stimulating well flow comprising a vertically movable hammer, a loosely secured plate, a ram vibratable by the hammer between the hammer and the plate and striking the plate to produce shocks and vibrations, means connected with the plate for transmitting the vibrations radially outward to the earth strata near the bottom of the well, and means connected to the plate for transmitting the vibrations vertically downward to the earth strata.

2. Apparatus for stimulating well flow comprising a vertically movable hammer, a loosely secured plate, a ram vibratable by the hammer between the hammer and the plate and striking the plate to produce shocks and vibrations, loosely mounted rods connected with the plate for transmitting the vibrations radially outward to the earth strata near the bottom of the well, and loosely mounted rods connected to the plate for transmitting the vibrations vertically downward to the earth strata.

GEORGE R. BRAMMER.