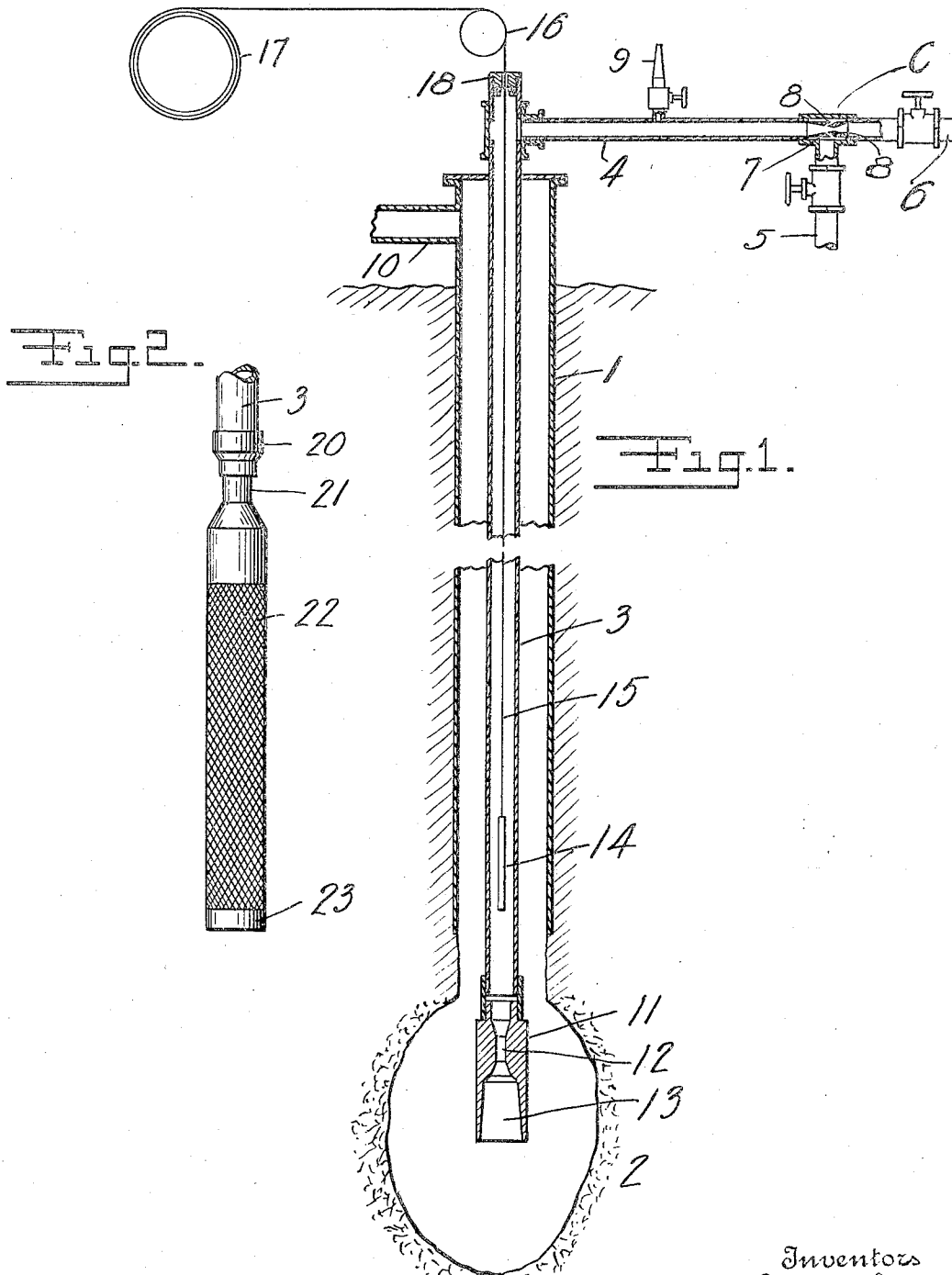


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ART OF TREATING OIL WELLS

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UNITED STATES PATENT OFFICE.

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ART OF TREATING OIL WELLS.

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This invention relates to the art of production of petroleum from wells, and will be fully understood from the following description, taken in connection with the accompanying drawing, in which—

Fig. 1 represents a sectional view of one form of apparatus contemplated, as assembled in position in a well, the section being broken for accommodation to the limits of the drawing, and

Fig. 2 is a detail, on slightly enlarged scale, of a modification.

Referring more particularly to the drawing, the reference character 1 designates the casing of a well to be treated, and 2 the producing stratum or oil-sand. Within the casing is a tubing 3 having at its upper end a lateral pipe 4, which is connected with a mixer C and this in turn with valved gas-supply and air-supply pipes 5 and 6 respectively. The precise construction of the mixer may vary, but advantageously it may be of the Venturi type, for example, having a constricted or choked flow tube 7, provided with ducts 8 opening into the tube from the surrounding passage. Between the mixer and the tubing connection is a valve-controlled test-burner 9. By means of this burner we are able to determine the character of the combustion taking place in the well and can vary the proportions of combustible and comburent, as may be necessary. A lateral pipe 10 leads from the upper end of the casing, and any suitable form of tight casing-head construction may be employed. To the lower end of the tubing 3 is coupled a burner-tip 11 having a choked passage 12, and an outlet 13 preferably flaring outwardly.

Assuming the case of a well which has declined in production and which it is desired to treat, with a view to reviving production, the well having been baled out, if necessary, and the apparatus having been assembled, a flow of combustible gas under pressure is admitted from the gas-supply pipe, and a flow of compressed air from the air-supply pipe, the proportions being so gaged as to give a ratio at the mixer C suitable for a proper combustion mixture. The test-burner 9 may be lighted to verify and

control the character of the mixture. The gas is ignited at the burner 13. This may be done by any suitable means, electric or otherwise; advantageously for example by a fuse igniter 14 initially suspended just below the outlet of the burner by a cable 15 which runs over a sheave 16, from a suitable reel 17. A stuffing-box 18 with a separable or removable gland for allowing initial entry of the igniter serves to secure an adequately tight joint about the cable. After the gas at the burner-tip has been ignited, the igniter 14 is pulled back up into the tubing 3 away from the flame. The products of combustion pass up between the tubing 3 and the casing and escape by pipe 10. The burner acts as a gigantic blow-torch, bathing the walls of the stratum in flame. Combustible matter is burned out and the surface freshened up and with continued treatment the wall may be progressively caved back, further freshening by exposing new surfaces back of the infiltrated and silt-loaded zone immediately adjacent the well-bore. After burning for from about 2 to 10 hours, the time depending upon the history of the well and the known character of stratum, the gas mixture is turned off, and the burner tubing is pulled out, and the well may be baled, and equipped for pumping.

A modified form of burner tip is shown in Fig. 2. The tubing 3 here carries a reducer coupling 20 with a swedge connection 21 to a perforated or latticed tubular member 22, closed at the bottom 23.

While we have described the invention with reference to certain specific details, changes may be made, within the spirit and scope of the invention which is limited only as defined in the following claims.

What we claim is:

1. In combination with a well casing, a tubing extending within said casing, a burner at the lower end of said tubing, a cable mounted to be raised and lowered within said tubing, and means carried by the lower end of the cable for igniting the burner.

2. In means for treating oil wells to increase production, the combination of a tubing adapted to be inserted in the well casing,

means for feeding a combustible mixture into the tubing, a burner at one end of the tubing, a closure for the other end thereof and having an orifice therein, an ignition
5 device within the tubing, and means carrying said device and passing through the orifice in the closure. crease production, the combination of a tubing, a burner carried thereby and having a 10 narrow passage merging into a flaring orifice, and ignition means adapted to be lowered through the tubing and the burner.

3. In means for treating oil wells to in-

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