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J. STREDA

METHOD OF AND MEANS FOR FREEING JAMMED EARTH BORING COLUMNS

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Fig. 1

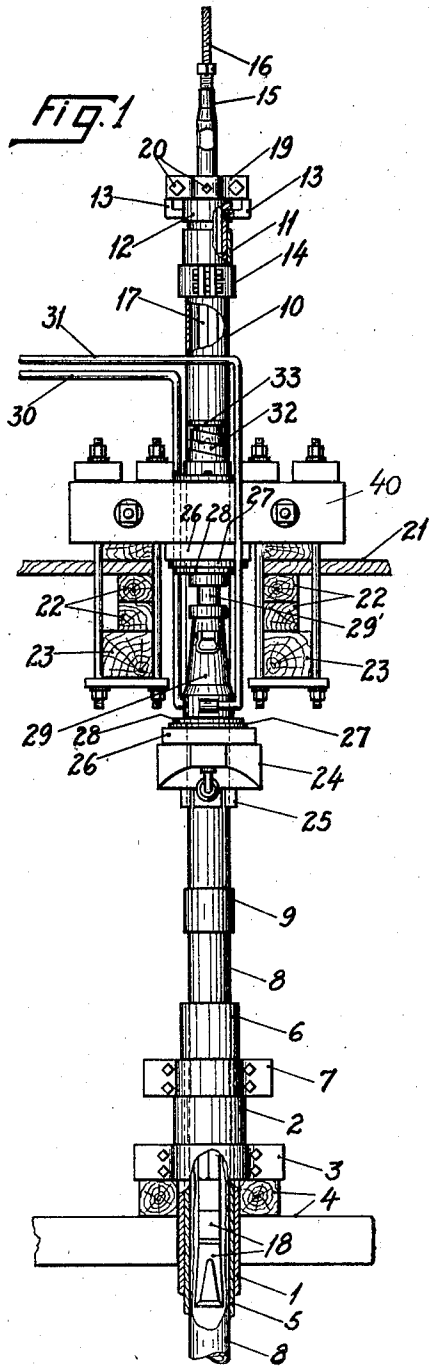
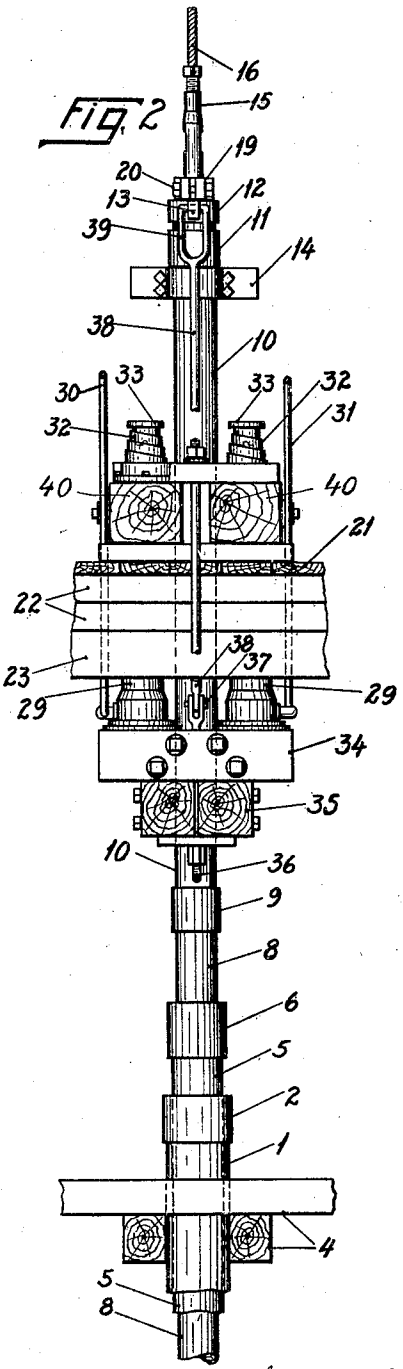


Fig. 2



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UNITED STATES PATENT OFFICE.

JOSEPH STREDA, OF LONDON, ENGLAND.

METHOD OF AND MEANS FOR FREEING JAMMED EARTH-BORING COLUMNS.

Application filed December 4, 1922. Serial No. 604,947.

To all whom it may concern:

Be it known that I, JOSEPH STREDA, a citizen of the Czechoslovakian Republic, residing at London, England, have invented a certain Method of and Means for Freeing Jammed Earth-Boring Columns, of which the following is a specification.

In the boring of petroleum and like wells, it sometimes happens that the boring column gets jammed in the surrounding sand or like strata and defies removal. The object of the present invention is to provide means for the freeing of such columns, and the invention consists in subjecting the column to the simultaneous effect of pressure and percussion, while in some cases a jammed column may also be filled with liquid by way of facilitating the loosening of the earth.

Fig. 1 of the drawings represents a side view of the device whereby the method may be carried into effect, and

Fig. 2 is a view at right angles to Fig. 1, and showing a slightly modified arrangement.

The figures show the surface part of the boring column which is in this case composed of three concentric pipes 1, 5 and 8. The outer pipe is a riveted one and it is supported on joists 4 by means of a clamping collar 3, the latter being applied to the pipe immediately beneath the connecting sleeve 2. On this sleeve rests another clamping collar 7 which is applied to the next pipe 5 beneath a sleeve 6. The pipe 5 is seamless and is screwed into the sleeve 6. The inner pipe 8 is the one which is jammed and which is therefore to be subjected to the freeing process. For this purpose another pipe 10 of the same size is connected thereto by means of a sleeve 9. The pipe 10 passes between joists 22 and 23 through the floor 21 of the boring tower. Planks 40, arranged above the floor at opposite sides of the pipe and at right angles to the joists, are clamped to the latter by means of screw bolts. The planks 40 serve as abutments for hydraulic pistons 29′ the cylinders 29 of which are used for applying pressure to the pipe 10. According to Fig. 1 the cylinders are supported on the pipe 10 by means of a dog 24 which is secured to the pipe by means of wedges 25 inserted from below. A piece of wood 26, a metal plate 27 and a sheet 28 of some flexible material are interposed one after the other between the dog and each cylinder. Similar paddings are interposed between the pistons and the planks 40.

According to Fig. 2, the dog is replaced by two superposed sets of planks 34 and 35 arranged at right angles to one another and clamped to the pipe 10 by means of screw bolts.

A sleeve 11, screwed on the upper end of the pipe 10, carries an anvil head 12. This head is fitted with hooks 13 which, in the arrangement shown in Fig. 2, are connected by rods 38 to the planks 34 and 35 so as to communicate the pressure on the latter partly to the top end of the pipe. Each rod 38 has at one end a shackle 39 whereby it is connected to the hook 13, the other end being eyed and connected by means of a bolt 37 to a forked screw-bolt 36 holding the planks. A central aperture is provided in the head 12 through which a rod 17 is admitted into the boring column. This rod carries at the lower end a chisel 18 and at the upper end a union 15 by means of which it is connected to a cable 16, the latter being used in known manner for raising and dropping the rod. A collar 19 which is clamped by means of screws 20 to the rod 17 strikes against the head 12 when the rod drops and transfers the impact to the pipe 10. To support the pipe 10 after it has been freed and to reduce the shock if the pipe should drop, two buffer-heads 33 with springs 32 are arranged on the planks 40, the pipe being furnished with a collar 14 for abutment against the buffers. A pipe 30 supplies water under pressure to the hydraulic cylinders, and a pipe 31 leads off the discharge.

For the freeing of a jammed column there should be a free space underneath it, and if not already in existance it should be formed by boring. Then the jammed column is filled with liquid, such as clayey water, which does not form any deposits. In the absence of clayey water petroleum may be used. A considerable pressure is set up by the liquid at the bottom of the bore-hole, and the liquid penetrates the strata and forces an upward passage between the earth and the column. Meanwhile the hydraulic press is erected and pressure, which must not overtax the resistance of the pipe, is applied to the latter. After a certain pressure has been obtained, the percussion rod 17 is set in motion. The vertically directed blows set up vibrations which ex-

tend throughout the length of the pipe and which loosen the sand particles whereby the pipe is held. The liquid which is forced by its own pressure up along the pipe penetrates the loosened earth and completes the disintegration of the obstructive earth layers which finally yield to the pressure on the pipe and allow the latter to sink onto the buffers 33. The free pipe is then connected to the machinery in the tower and moved a few strokes up and down to complete the operation. The other pipes, if also jammed, may be freed in the same manner, the deepest pipe being treated first.

In some cases the freeing of the pipes may be effected without the use of liquid.

In cases where water has to be excluded from the bore hole, the device may conveniently be used for boring purposes. In this case a rather deep and truly cylindrical hole is bored in advance in the usual manner and the pipe left some distance down the hole. Hydraulic pressure is then applied to the column until it sinks into the hole. After some sinking the hole is cleared out whereupon pressure is again applied to the column. When pressure is no more sufficient for sinking the column, pressure and percussion may be used alternately. In this manner great depths may be attained with a complete exclusion of water from the bore hole.

Old pipes which have been abandoned owing to jamming can easily be freed by the method according to the invention.

I claim—

1. A method of freeing jammed earth boring columns, consisting in forming a space underneath the lowest end of the column and subjecting the latter to simultaneous downward pressure and percussion.

2. A method of freeing jammed earth boring columns, consisting in forming a space below the lowest end of the column, filling the jammed column with a liquid and then subjecting such column to simultaneous downward pressure and percussion.

3. A device for freeing jammed earth boring columns, comprising a pair of hydraulic presses, a rigid support for the pistions of such presses, means for supporting the cylinders of said presses on the jammed pipe for exerting downward pressure thereon, and means for driving the pipe by percussion while the pressure is applied.

4. A device for freeing jammed earth boring columns, comprising a pair of hydraulic presses, a rigid support for the pistons of such presses, a cylinder support secured to the jammed column for transmitting pressure to the same, a head secured to the upper end of the jammed column, rods connecting said head with the cylinder support so as to transfer part of the pressure to said head, a percussion rod guided in said head, and a collar connected to the percussion rod so as to strike against the head for vibrating the column.

5. A device for freeing jammed earth boring columns, comprising a pair of hydraulic presses, a rigid support for the pistons of such presses, a cylinder support secured to the jammed column for transmitting pressure to the same, a head secured to the upper end of the jammed column, rods connecting said head with the cylinder support so as to transfer part of the pressure to said head, a percussion rod guided in said head, a collar connected to the percussion rod so as to strike against the head for vibrating the column, a collar connected to the upper part of the jammed column, and buffers mounted on the piston support so as to take up the support of the sinking column by abutment against said latter column.

JOSEPH STREDA.