

C. S. CORRIGAN.
DEEP WELL ENLARGING AND CISTERN MAKING MACHINE.
APPLICATION FILED SEPT. 4, 1920.

1,406,349.

Patented Feb. 14, 1922.

FIG. 1.

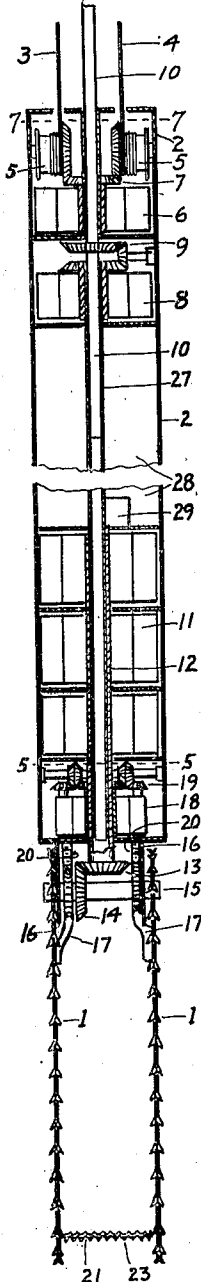


FIG. 2.

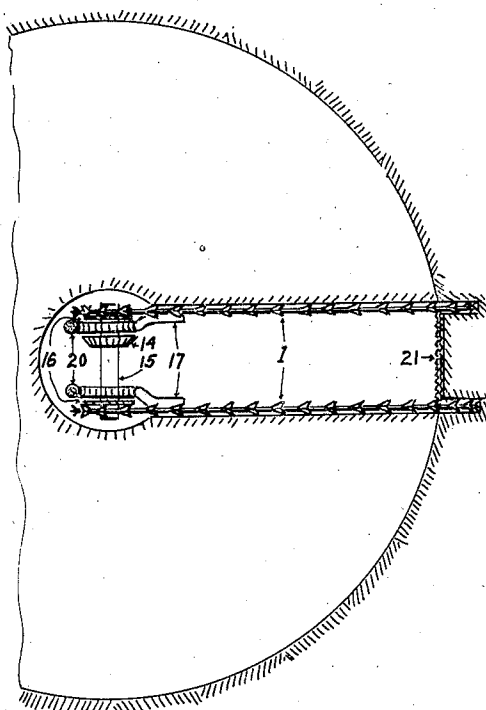


FIG. 3.

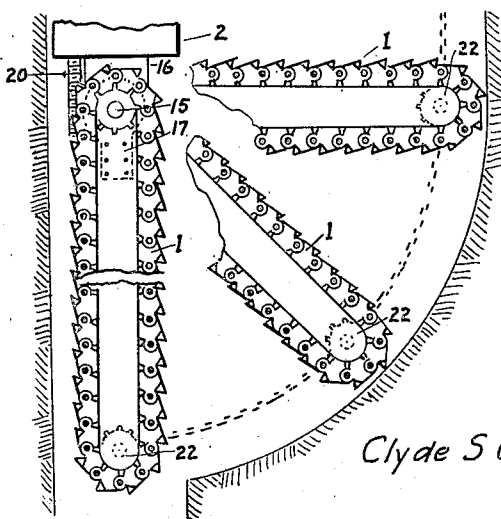


FIG. 7.

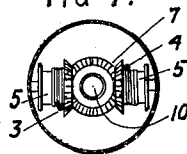


FIG. 4.

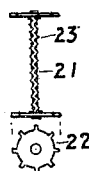


FIG. 5.

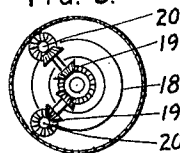
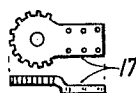


FIG. 6.



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UNITED STATES PATENT OFFICE.

CLYDE S. CORRIGAN, OF NORWOOD, OHIO.

DEEP-WELL-ENLARGING AND CISTERN-MAKING MACHINE.

1,406,349.

Specification of Letters Patent. Patented Feb. 14, 1922.

Application filed September 4, 1920. Serial No. 408,118.

To all whom it may concern:

Be it known that I, CLYDE S. CORRIGAN, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented a new and useful Deep-Well-Enlarging and Cistern-Making Machine, of which the following is a specification.

At present it is the custom to pump oil wells day and night to keep the hole free of oil so more oil can accumulate, a cistern made in a suitable formation below the oil bearing strata would allow oil to accumulate continuously for weeks or months, preserve the gasoline content and protect it from fire until pumped and shipped.

Many water wells give out in dry seasons, a reservoir tank made in impervious strata just below the water bearing strata, would collect and preserve a water supply free from evaporation or contamination.

It is known that more heat than required to produce steam would be found in wells of sufficient depth but the small radiating surface in the walls of a well would not produce steam in paying quantities; but large rooms or boilers at the bottom of such wells would radiate sufficient heat to produce and superheat all the steam that could be used.

To enlarge the footings of foundation piles and piers without sinking a caisson would save time and expense.

In mine prospecting by core wells, it is often necessary to sink a number of wells to determine the width of veins, while to enlarge one well in the pay strata would give the required data as well as a large quantity of the ore so that a correct analysis of its value could be made, if the ore lay at great depths where the heat was too great for men to work, the ore could be mined out by sinking a number of wells and enlarging them in the pay vein. With these and other objects in view I have invented a machine that may be lowered into deep wells in the earth, with suitable forms of earth sawing or kerf cutting elements pivotally attached thereto. I have also provided power means in the machine by which an operator at the surface may cause said kerf cutting elements to operate while swinging from said pivot to cut kerfs into and loosen the earth from the walls of the well, so it will fall to the bottom to be brought to the surface by a

core lifter or bailer, thereby enlarging the diameter of the well to twice the length of the saws or cutting elements used with the machine.

The machine is more fully described and illustrated by the attached drawings and specifications, in which like numerals refer to similar parts throughout.

Fig. 1 sectional view of the machine with two saws and cutter bar.

Fig. 2 plan showing side slot out by two saws and cutter bar.

Fig. 3 side view of saws and cutter bar cutting side slot.

Fig. 4 detail view of cutter bar.

Fig. 5 section at 5—5 Fig. 1.

Fig. 6 detail view of saw control bracket gear Figs. 1, 2, and 3;

Fig. 7 section at 7—7 Fig. 1.

The machine primarily consists of earth cutting chain saws or cutter bars 1 operated by power means enclosed in a casing 2 adapted to be lowered into a well by a sustaining and power conveying cable, and held for controlled rotary or vertical motion with respect to the walls of the well by a fulcrum rod attached to a holding device.

Power wires 3 and control wires 4 are wound on a drum 5 positioned in the upper part of casing 2, and operated by motor 6 through bevel gears 7. To raise or lower the machine with reference to said holding device to which the wires 3 and 4 are attached before connecting with the sustaining cable.

Also positioned within casing 2 is a motor 8, operating gears against fulcrum wheel 9 which is slidably attached to fulcrum rod 10, to turn the machine to any vertical plane for making vertical slots in side of well, and also to rotate the machine and cutting elements to cut a horizontal circular kerf when making underground tanks.

Saws 1 are operated by motor 11 through hollow shaft 12 gear 13, gear 14 and shaft 15 journaled in brackets 16 attached to the bottom of casing 2.

Saws 1 hang in a vertical plane while being lowered into the well are lifted to the various positions for cutting into the walls of the well by control bracket gear 17, attached to the frames of the saws and journaled on shaft 15, said control bracket gear 17 is operated by motor 18 through bevel

gears 19 and worms 20 journaled in the bottom of casing 2. When a rotating cutter bar is used in place of saws for making either vertical or horizontal kerfs, the bracket part of control bracket gear 17 is changed to boxing in which the cutter bar is journaled.

When two saws are used for making vertical slots as shown in Figs. 1, 2, and 3, the ends are held together by cutter bar 21 operated by the chain part of saws 1 engaging toothed idler wheels 22 in place of the smooth idler wheels generally used, the cutter bar 21 is equipped with cutter teeth 23 of any suitable form so it will cut a cross and connecting kerf near the ends of the side kerfs cut by the saws 1, thereby cutting the material loose so it will fall down to the bottom of the well to be raised to the surface by a core lifter or bailer.

When it is desired to use only one saw for cutting horizontal kerfs, thereby enlarging the tank by causing the material below the saw to drop to the bottom of the well, a special control bracket gear is used.

A hollow guide member 27 for fulcrum rod 10 is centrally positioned in casing 2.

A refrigerator tank 28 with thermostat or regulator 29 is provided in machines that work at great depths in intense heat, liquid air or any suitable refrigeration element may be used to keep the motors cool.

Any part of a completed well may be enlarged to make an underground tank in strata of sufficient hardness to hold the form desired, as follows:—

First, a machine with kerf cutting elements shown in Fig. 1 hanging in a vertical plane is lowered into the well by a sustaining and power conveying cable. To hold the machine from rotary or vertical motion due to twist by motors or slack in the cable it is best to interpose, between the machines and cable, a holding device similar to the one shown in my patent application of even date Serial No. 408,119, when the machine has reached the desired depth and the holding device set, power current is switched on and operates motors 11 and 18, motor 11 operating the saws 1 and cutter bar 21 and motor 18 swinging them (with pivot shaft 15 as center) against the side of the well so that the earth is cut loose and drops to the bottom, thereby making a slot in the side of the well, when the saws 1 and cutter bar 21 have swung up so that their center line lies in a horizontal plane, power is automatically supplied to motor 6 which operates drums 5 winding up cables 3 and 4 and lifting the machine as fast as the saws 1 and cutter bar 21 cut upward, when the desired height has been cut power is automatically cut off motor 6, and reversed in motor 18; when the cutting elements have dropped to a vertical plane, power is cut off motor 11,

the holding device released and the machine raised to the surface.

After the material cut loose has been lifted to the surface the operation may be repeated, cutting vertical slots in different positions until the underground tank is completed; but the excavating can be done quicker and easier if a machine with a kerf cutting saw adapted to cut horizontal kerfs is lowered into the well, the holding device set and power supplied to motors 11 and 18, when motor 18 has swung saw 1 into a horizontal plane, power is automatically supplied to motor 8 and force exerted against fulcrum rod 10 to turn the machine and saw a circular horizontal kerf causing the material beneath it to break loose at the outer circumference and drop to the bottom of the well, when the machine has turned a complete circle power is automatically cut off motor 8 and switched to motor 6 which lifts the machine a predetermined distance with saw 1 in the slot previously cut, then the power is automatically cut off motor 6 and switched back on motor 8 and another circular kerf cut and the material dropped to the bottom of the well, the operation being repeated until the full height of the tank has been reached.

My invention is not confined to the precise arrangement of motors, gears, etc. shown, it being understood that rotating cutter bars, or other suitable kerf cutters may be substituted for the chain saws I have illustrated by changing the form of control bracket gear 17.

Having described the construction and operation of my invention and not being aware of any machine now used for the purpose described, I claim the device as new and broadly patentable.

I claim:

1. In a machine for enlarging certain parts of wells and deep holes in the earth, the combination of kerf cutting elements pivotally attached to the machine and power means in the machine operatively connected to said cutting elements to swing and cut kerfs into the walls of the well, and loosen large portions thereof, so as to form underground tanks etc.

2. In a machine of the character described, the combination of a casing with earth cutting chain saws pivotally attached thereto, power means operatively connected to said saws, power means controllingly connected to the frames of said saws and means of operating said saws while causing them to swing on said pivot and cut into the walls of a well and loosen large portions thereof, to form underground cisterns etc.

3. In a machine of the character described, the combination of kerf cutting elements pivotally attached to said machine, power means in the machine operatively connected to said cutting elements, and power means

to turn the machine and cause said cutting elements to cut kerfs into the walls of the well to loosen large portions thereof to make underground excavations.

5 4. In a machine of the character described, the combination of a casing, a sustaining and power conveying cable for lowering and holding said casing in a well, two earth cutting chain saws pivotally attached to the bottom of said casing; their frames being in 10 vertical planes at right angles to a vertical plane through the pivot lengthwise, power means in the casing operatively connected to said saws, a cutter bar between the outer ends 15 of said saws and operated by the chain members thereof, power means in said casing operatively connected to the frames of said saws to cause them and the cutter bar to swing (about said pivot) against and cut a vertical slot in the wall of a well until the saws 20 reach a horizontal position, power means in said casing to lift the entire machine with saws and cutter bar while operating, thereby extending the slot upwards any desired 25 height and cutting the earth or stone loose so it will drop to the bottom of the well to be lifted to the surface by suitable means.

5 5. In a machine of the character described, the combination of a casing, earth cutting elements pivotally attached to said casing, 30 motor means in said casing for operating said cutting elements to cut loose portions of the walls of a well for making underground excavations, a refrigerator tank in

said casing, a thermo regulated means of conveying the refrigerator element from said 35 tank to the aforementioned motors to keep them cool when working in deep wells in the presence of intense heat.

6. In a machine of the character described, 40 the combination of a casing, earth cutting elements attached to the bottom thereof, a hollow guide member centrally positioned in said casing, a fulcrum rod (the upper end of which is attached to a suitable holding 45 device) slidably positioned in said guide member, a fulcrum gear wheel slidably attached to said fulcrum rod so as not to rotate with respect thereto, power means operatively connected to said fulcrum gear 50 wheel, whereby the casing and attached cutting elements may be caused to rotate with respect to the fulcrum rod to cut into the walls of the well and greatly enlarge the 55 same.

7. In a machine of the character described, the combination of a casing with earth cutting elements pivotally attached thereto, hoist drums positioned in the upper part of 60 said casing, power and control cables attached thereto and to a suitable sustaining and holding means above, power means for operating said hoist drums and winding the said power and control cables thereon, thereby lifting said casing with respect to the 65 cable sustaining and holding means.

CLYDE S. CORRIGAN.