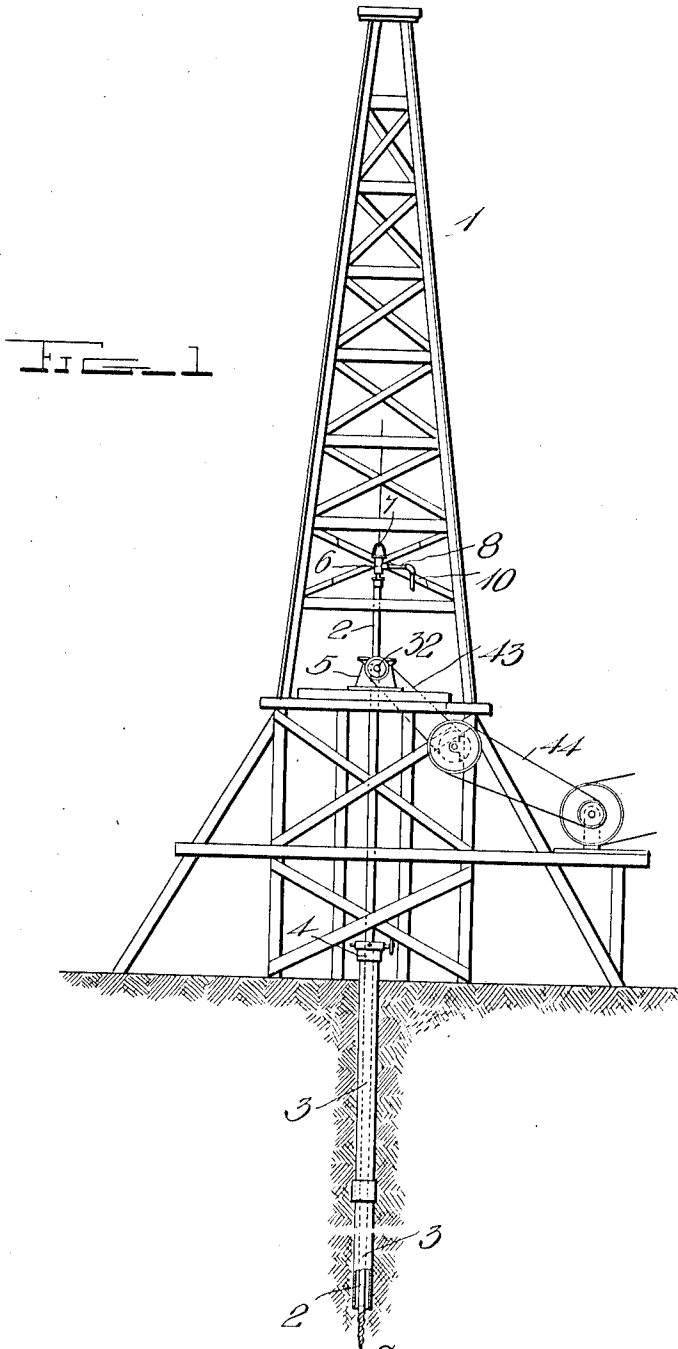


S. MORIMURA.
WELL DRILLING MACHINE.
APPLICATION FILED NOV. 9, 1909.

984,287.

Patented Feb. 14, 1911.

4 SHEETS-SHEET 1.



Witnesses
A. R. Hardy
E. E. Smith

Inventor
Senshiro Morimura
by *A. B. Wilson & Co.*
Attorneys

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4 SHEETS-SHEET 2.

Fig. 2

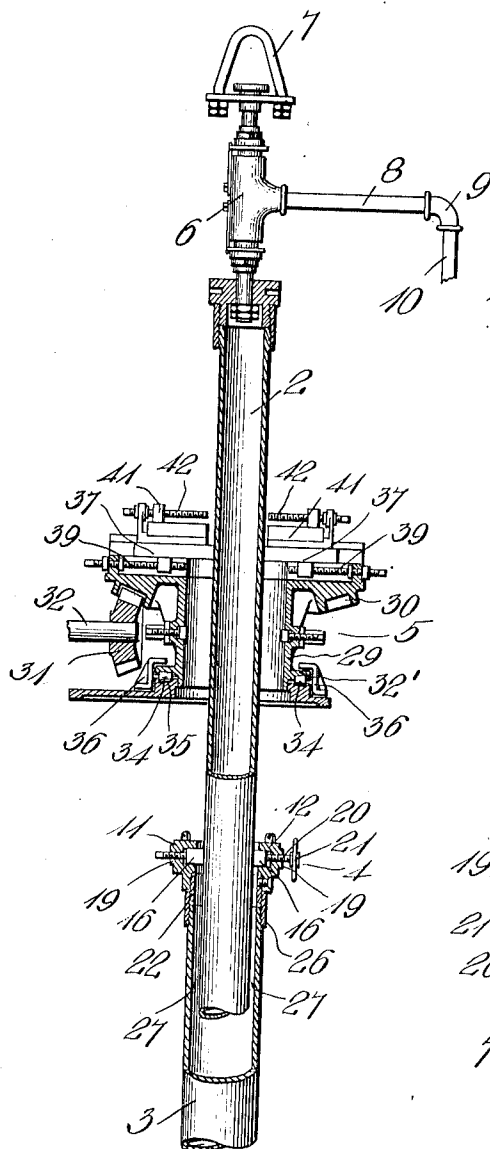


Fig. 7

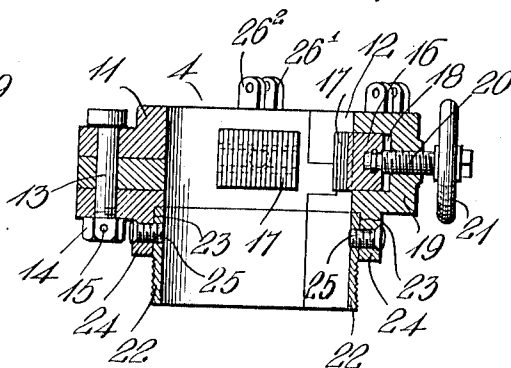
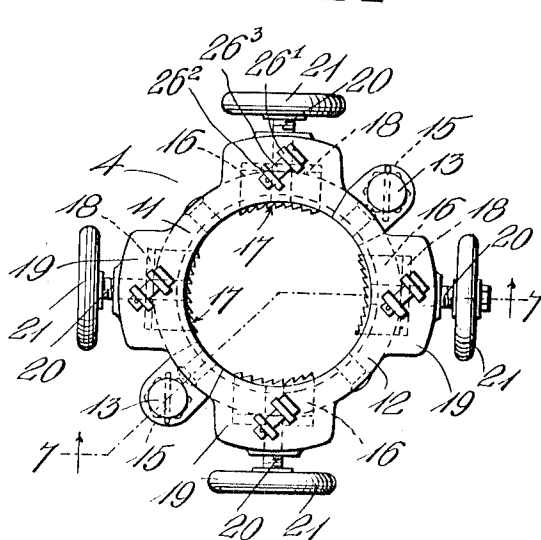


Fig. 8



Witnesses
C. A. Hardy
[Signature]

Inventor
Senshiro Morimura
by A. B. Wilson & Co.
Attorneys

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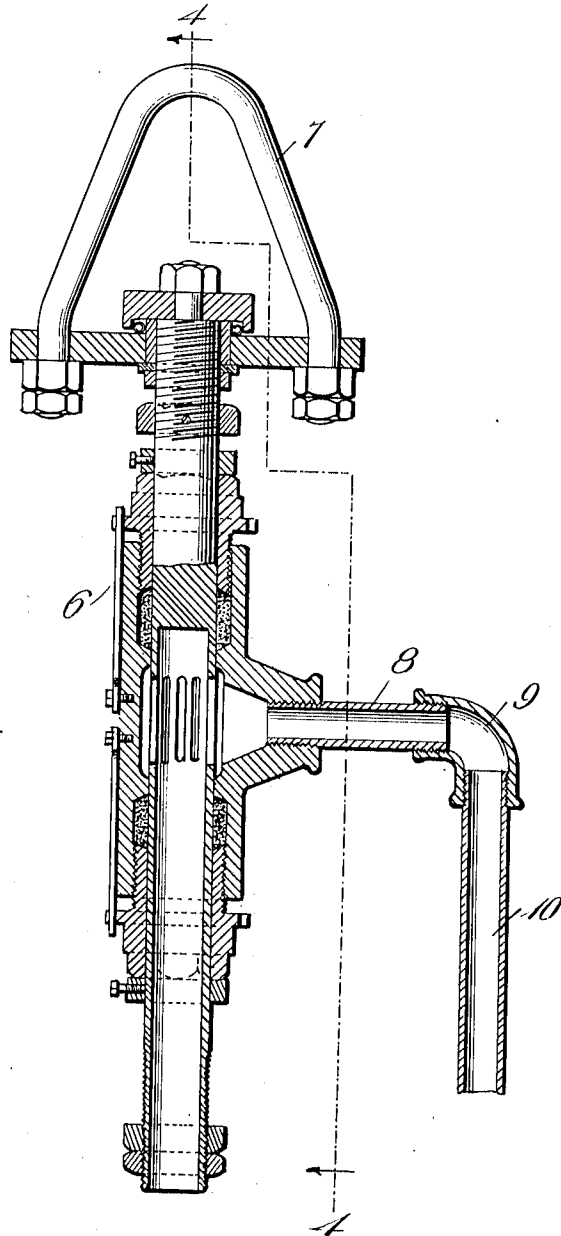
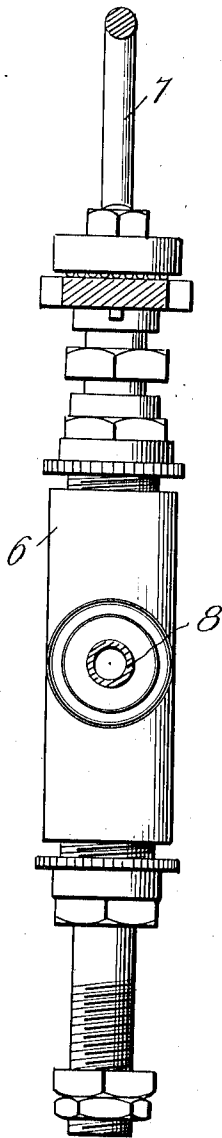
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4 SHEETS—SHEET 3.

Fig. 4

Fig. 3



Witnesses
C. P. Hardy
C. S. S. S. S.

Inventor
Senshiro Morimura
by A. B. Wilson & Co.
Attorneys

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4 SHEETS—SHEET 4.

Fig. 5

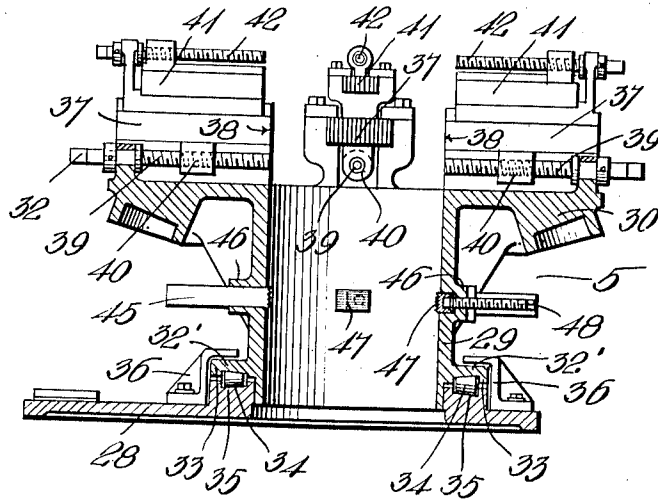
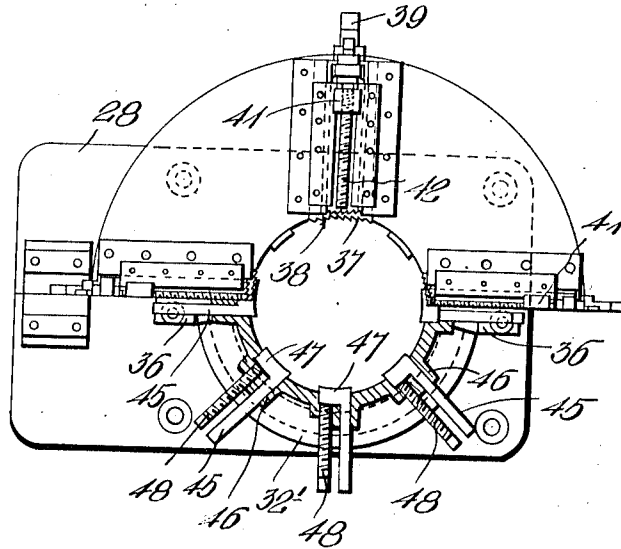


Fig. 6



Witnesses
C. R. Hardy
E. J. Hardy

Inventor
Senshiro Morimura
By *A. B. Wilson & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

SENSHIRO MORIMURA, OF TOKYO, JAPAN.

WELL-DRILLING MACHINE.

984,287.

Specification of Letters Patent.

Patented Feb. 14, 1911.

Application filed November 9, 1909. Serial No. 526,995.

To all whom it may concern:

Be it known that I, SENSHIRO MORIMURA, a subject of the Emperor of Japan, residing at Tokyo, Japan, have invented certain new and useful Improvements in Well-Drilling Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a well-drilling machine and has for its principal object to provide a drilling machine which is especially adapted for drilling where sliding or crumbling material, such as, for example quick sand is encountered.

Another object is to provide a rotary drilling machine that may be utilized for various drilling functions, as for mining or prospecting purposes as well as for sinking shafts of oil or Artesian wells, etc.

A further object is to provide a drilling machine in which the outer or protective casing will revolve and advance with the drilling rod to at all times support the wall of the shaft.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is an elevation of the complete machine. Fig. 2 is a longitudinal section on an enlarged scale of the drilling shaft or hollow boring rod, the gripping means for coupling the outer casing with the drilling shaft and the operating means for the drilling shaft. Fig. 3 is a sectional view of an enlarged scale of the revolving and jetting water swivel or rotary swivel which is arranged at the upper end of the drilling shaft. Fig. 4 is a side view of Fig. 3. Fig. 5 is a vertical transverse section of the rotary machine, that is, the drilling shaft table and gripping jaws. Fig. 6 is a plan and partly sectional view of Fig. 5. Fig. 7 is a vertical transverse section of the gripping means for the outer casing. Fig. 8 is a plan view of Fig. 7.

Referring to the drawings for a more particular description of the invention, 1 indicates the upright supporting structure or derrick which is suitably mounted on the

ground at the point where the well is to be drilled.

2 indicates the drilling shaft, 3 the outer casing which is coupled to the drilling shaft by the gripping device 4, 5 the rotary machine for turning the drilling shaft and 6 the revolving water swivel which is swiveled to the upper end of the drilling shaft and has swiveled to its upper end the bail 7. The rotary swivel 6 is provided with a laterally-extending tube 8 which is connected by means of the coupling or elbow 9 with a hose 10 which leads to the source of water. The construction of the revolving swivel has been shown on an enlarged scale in Figs. 3 and 4 of the drawings, but the details of construction will not be disclosed as the swivel is of ordinary form and forms no part of the present invention.

The gripping device 4 for connecting the outer casing with the drilling shaft 2, which is here shown in the form of a hollow rod or shell, is composed of a pair of corresponding hinged connected sections 11 and 12 which are secured together by means of the bolts 13 and nuts 14, screwing on the lower ends of the bolts, pins 15 passing through the nuts and bolts to hold the latter against working loose. The gripping coupling further comprises a plurality of gripping members 16 which are formed with arcuate inner tooth-engaging faces 17 and which are slidably mounted in sockets 18 formed in the body of the coupling and in the lateral extension or enlargements 19 projecting therefrom. The gripping members are projected or retracted by means of the operating screws 20 which screw through the extensions or enlargements 19 of the body of the grip coupling and have a swiveled engagement with the gripping members. The outer ends of the operating screws are provided with hand wheels 21, by means of which they may be turned or rotated in either direction.

An exteriorly threaded sleeve 22 is arranged with its upper portion fitting in a horizontal recess 23 formed in the inner face of the annular depending extension 24, and is held in position by the retention screws 25, which are screwed through said extension 24 in the sleeve 22. A coupling or socket sleeve 26 screws on the lower end of the sleeve 22 of the outer casing. By

this construction, it will be readily perceived that when the drill shaft is turned, the outer casing will likewise turn and is caused to advance into the ground with the drill shaft.

5 The sections of the grip coupling are provided at their upper edges with pairs of vertically-disposed spaced lifting ears 26' which are perforated as at 26², whereby they may be connected by bolts 26³ when they
10 are to be suspended from or lifted by the usual lifting bails.

The drilling shaft 2 is of somewhat smaller diameter than the interior diameter of the outer casing 3 leaving an annular
15 space 27 therebetween, through which the sand, dirt, or other matter passes until it passes out of the upper end of the outer casing with the water which may be supplied by the revolving water swivel. The
20 rotary machine 5 comprises the base 28, which is mounted upon the derrick 1 and the cylindrical hollow body portion 29 on its table provided with a gear wheel 30 with which the pinion 31 arranged at one end of
25 the shaft 32, intermeshes. The body 29 of the rotary machine 5 is provided with an outwardly extending annular flange 32' having a depending portion 33, said flange bearing or turning upon a plurality of conical
30 rollers 34 mounted in a raceway 5 formed by an upwardly-extending rim of the base. Guide checks 36, preferably four in number, are arranged upon the base and engage the flange 32 to hold the same
35 against jumping or working from position. A lower series of horizontal sliding gripping members 37 provided at their inner ends with engaging teeth 38, are mounted upon the table of the revolving machine and
40 are projected or retracted by operating screws 39, which screw through bolts 40 fitted to the gripping members. The outer ends of the screws are mounted in the body of the rotary machine. An upper series of
45 sliding gripping members 41 are also mounted upon the sliding gripping members 37 and are operated in the same manner as the first mentioned gripping members by the operating screws 42. Under ordinary
50 conditions, the lower gripping members only are used to turn the drilling shaft, but in drilling through hard rocks or under other conditions where an unusual strain is upon the drilling shaft, the upper series of grip-
55 ping members are used in conjunction with the lower gripping members.

In Fig. 1 of the drawings, transmission belts or chains 43 and 44 are shown for transmitting power to the shaft 32. It is
60 evident, however, that power may be transferred to said shaft in any other desired manner.

The revolving machine 5 is also provided with an annular series of sliding checks
65 comprising shanks 45 which slide through

the extensions 46 of the body of the turning machine and toothed engaging heads 47. These checks are retracted or projected by means of the operating screws 48, which have a swiveled engagement therewith.

70 From the foregoing description it will be perceived that the outer casing when coupled with the drilling shaft will revolve and advance with the same and will provide a lateral support for the wall of the well and
75 prevent the same from caving in or crumbling during the drilling operation.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the
80 invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the
85 principle or sacrificing any of the advantages of this invention as defined in the appended claims.

Having thus described and ascertained the nature of my invention, what I claim as
90 new and desire to secure by Letters-Patent is:

1. A well-drilling machine, comprising an outer casing, a drilling shaft of less diameter than the interior diameter of the casing,
95 extending therethrough, means for turning the drilling shaft and means for coupling the outer casing with said shaft, comprising a plurality of slidably mounted toothed gripping members engaging the
100 drilling shaft.

2. A well drilling machine comprising an outer tubular casing, a drilling shaft of less diameter than that of the casing, extending
105 therethrough, a rotary water swivel connected with the outer end of the drilling shaft, a grip coupling for coupling the casing with the drilling shaft having a series of adjustable toothed clamping members slidably mounted to engage the drilling
110 shaft, whereby said casing is caused to turn and advance with said shaft, a turning device comprising a series of sliding gripping members adapted to engage the drilling shaft and means secured to the outer casing
115 for projecting and retracting said gripping members.

3. A well drilling machine comprising an outer casing, a drilling shaft of less diameter than that of the casing extending there-
120 through and thereabove, a grip device for connecting the outer casing with the drilling shaft, whereby the former is caused to turn or advance with the latter and a turning device for the drilling shaft, means detachably
125 connected to the drilling shaft to revolve said shaft and casing together comprising a tubular body provided with a bevel gear, a pinion engaging said gear, operating means
130 for said pinion, an annular series of inde-

pendently adjustable sliding gripping members mounted in the tubular body, operating screws for projecting and retracting said members, and screw-projected and retracted stop devices to engage the drilling shaft.

4. In a rotary drilling machine, a drill rod, a casing spaced from said rod, means for rotating said drill rod, means for detachably connecting the casing to the drill rod to revolve therewith, said means comprising a plurality of independently adjustable slidable toothed clamping members adapted to engage the periphery of the drill rod.

5. In a rotary drilling machine, a drill rod, a casing spaced from said rod, means for rotating and advancing the drill rod, means for detachably connecting the casing and drill rod to revolve and advance together, said connecting means comprising a plurality of independently adjustable toothed gripping members adapted to engage the periphery of the rod, means secured to the casing for adjusting said grip-

ping members comprising a collar having spaced openings therein to receive the gripping members, a screw threaded extension in alinement with said openings, and adjusting screws engaging said clamping members and threaded in said extensions.

6. In a rotary drilling machine, a drill rod, a casing spaced from said rod, means for connecting the casing and drill rod to revolve and advance together, comprising a plurality of spaced annular gripping members having toothed faces adapted to engage the periphery of the drill rod, and adjustable clamping members engaging said drill rod and adapted to be rotated to thereby revolve the drill rod and casing together.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SENSHIRO MORIMURA.

Witnesses:

E. EDMONSTON, Jr.,
S. M. McCOLL.