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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A
COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A PATENT

I/We ERNESTO ARBILLA and ALBERTO PINEYRO

of 117 Botany Street, Randwick, New South Wales 2031, Australia, and 144 Botany Street, Kingsford, New South Wales 2032, Australia, respectively

hereby apply for the grant of a Patent for an invention entitled:

"DRILLING MACHINE"

which is described in the accompanying provisional specification.

My/Our address for service is:

GRiffith HasSEL & FraZER
71 York Street
Sydney N.S.W. 2000
Australia

DATED this 29th day of September, 1986.

ERNESTO ARBILLA and ALBERTO PINEYRO

By his/their Patent Attorneys

GRiffith HasSEL & FraZER

TO: THE COMMISSIONER OF PATENTS
COMMONWEALTH OF AUSTRALIA

7261A
INVENTOR- APPLICANT

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

In support of an Application made by ERNESTO ARBILLA and ALBERTO PINERYO

for a patent for an invention entitled: DRILLING MACHINE

\[ \text{We, ERNESTO ARBILLA and ALBERTO PINERYO} \]

of, 117 Botany Street, Randwick, New South Wales 2031, Australia, and 144 Botany Street, Kingsford, New South Wales 2032, Australia, respectively

do solemnly and sincerely declare as follows:

1. \[ \text{We are the applicant(s) for the patent.} \]
2. \[ \text{We are the actual inventor(s) of the invention.} \]

Declared at Kingsford this Eleventh day of May 1987.

Signed: \[ \underline{\text{Ernesto Arbilla}} \]

Signed: \[ \underline{\text{Alberto Pineyro}} \]

GRIFFITH HASSEL & FRAZER, SYDNEY, AUSTRALIA

6741A
1. A drilling machine comprising a mounting cradle for a portable drill, a support arm extending rearwardly from the mounting cradle in line with a drill bit extending from a portable drill when mounted in the cradle, expansion means engaged with the opposite end of the support arm from the mounting cradle, and reaction means adapted to be arranged between the expansion means and a reaction member such that actuation of the expansion means increases the distance between the reaction means and the support arm causing the mounting cradle to move forwardly away from the reaction member.
COMPLETE SPECIFICATION

FOR OFFICE USE

Short Title:

Int. Cl:

Application Number: PH8229
Lodged: 29 September 1986

Complete Specification—Lodged:
Accepted:
Lapsed:
Published:

Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: ERNESTO ARBILLA and ALBERTO PINEYRO

Address of Applicant: 117 Botany Street, Randwick, New South Wales 2031, Australia; and 144 Botany Street, Kingsford, New South Wales 2032, Australia, respectively

Actual Inventor: ERNESTO ARBILLA and ALBERTO PINEYRO

Address for Service: GRIFFITH HASSEL & FRAZER
71 YORK STREET
SYDNEY, N.S.W. 2000, AUSTRALIA

Complete Specification for the invention entitled:

DRILLING MACHINE

The following statement is a full description of this invention, including the best method of performing it known to me:—*

* Note: The description is to be typed in double spacing, pica type face, in an area not exceeding 250 mm in depth and 160 mm in width, on tough white paper of good quality and it is to be inserted inside this form.
This invention relates to a drilling machine and has been devised particularly though not solely for drilling holes in concrete.

In the building industry it is frequently necessary to drill holes in concrete floors, walls or ceilings for the running of cables, piping, or other building services. Such holes are commonly drilled using heavy duty portable drills held and supported by the operator. The drilling of such holes in many situations is difficult and arduous and the operator frequently has to support the weight of a heavy portable drill above his head or in other difficult situations. Furthermore it is necessary to apply considerable axial force for the drill as otherwise the operation is extremely time consuming and fatiguing on the operator.

The problem is particularly acute when attempting to drill holes in ceilings as it is difficult for the operator to hold the drill above his head and force the drill upwardly while at the same time balancing on a ladder. Attempts have been made to overcome this problem by hand drilling a number of small holes in the wall or ceiling around the site of the intended larger hole to be drilled and then clamping a mechanism into the smaller holes to provide a support jig for the drill. Such devices are however clumsy and time consuming to use and leave a number of smaller holes around the main hole which then must be filled.

The present invention therefore provides a drilling machine comprising a mounting cradle for a portable drill, a support arm extending rearwardly from the mounting cradle in line with a drill bit extending from a portable drill when mounted in the cradle, expansion means engaged with the opposite end of the support arm from the mounting cradle, and reaction means adapted to be arranged between the expansion means and a reaction member such that actuation of the expansion means increases the distance between the reaction means and the support arm causing the
mounting cradle to move forwardly away from the reaction member.

Preferably the expansion means comprises a hydraulic piston and cylinder assembly expandable to increase the distance between the reaction means and the support arm.

Preferably the hydraulic piston and cylinder assembly comprises a conventional hand-pumped hydraulic jack mounted in a suitable support structure such that one end of the jack bears against the support arm and the other end of the jack bears against the reaction member.

Preferably the support structure for the hydraulic jack also incorporates a switched power supply for the portable drill such that the operation of the drill may be switched on and off from the support structure.

Preferably the reaction member comprises an elongate strut axially aligned with the support arm.

In one form of the invention the reaction member incorporates a collapsible tripod arranged to support the remainder of the drilling machine extending upwardly in a column-like fashion from the tripod which may in turn be supported on a floor.

Preferably the reaction member incorporates a rack and pinion length adjustment device.

Notwithstanding any other forms that may fall within its scope, one preferred form of the invention will now be described by way of example only with reference to the accompanying drawings, in which:-

Fig. 1 is an elevation of a drilling machine according to the invention arranged for drilling holes in ceilings;

Fig. 2 is an elevation of the apparatus shown in Fig. 1, adapted for drilling holes in walls;

Fig. 3 is an enlarged elevation of the expansion jack used in the apparatus according to the invention;
Fig. 4 is a side view of the drill support cradle used in the drilling machine according to the invention; and

Fig. 5 is a plan view of the cradle shown in Fig. 4.

In the preferred form of the invention a drilling machine is provided adapted to support a heavy duty portable drill (1) in a cradle (2) in which it may be secured by a peripheral collar (3) and an end plate (4) tightened by threaded rods (5). The cradle is attached to and supported by a support arm (6) which extends rearwardly from the mounting cradle axially aligned with a drill bit (7) chucked in the portable drill (1). The support arm typically comprises lengths of pipe having threaded ends which may be axially joined by threaded collars (8) to fabricate the support arm to any desired length.

The body of the drill is clamped in the cradle by tightening the peripheral collar (3) using a pinch bolt (40) (Fig. 4) to move the two arms of the collar together effectively clamping the body of the drill therebetween. The rear of the drill is supported on the end plate (4) which can be adjusted for length relative to the collar (3) by way of nuts (41) on the threaded rods (5). The threaded rods are in turn secured to the cradle (3) by way of bushes (42). The threaded rods (5) pass through slotted holes (43) in the end plate so that the rods can move toward or away from one another as the cradle is tightened and loosened using the pinch bolt (40). The cradle is further supported by way of a tube or rod (44) passing through collars (45) and being secured to the "apex" of the cradle (3) by way of a bush (46).

The end plate (4) is provided with a downwardly protruding spigot (47) for engagement with the support arm (6) referred to above.

The opposite end of the support arm from the cradle (2) is engaged with expansion means (9) in the form of a support structure (10) in which is mounted an hydraulic
jack (11) (Fig. 3). Although the expansion means may take
the form of any device which is operable to expand the
ends thereof (such as a mechanical thread) it is preferred
that the expansion means is formed from an hydraulic
piston and cylinder assembly which can conveniently take
the form of a conventional automotive hydraulic jack
(11). The upper end (12) of the jack is engaged with the
lower end of the support arm (6). The jack is operable by
a handle (13) engaged with a stud (14) which may
conveniently protrude through a slot in the wall of the
support structure (10) so that the jack may be actuated by
oscillating the handle (13).

Returning now to Fig. 1, the expansion means (9) is
in turn engaged with reaction means in the form of an
elongate strut (15) which may be formed from jointed pipe
sections in a similar manner to the support arm (6). The
strut (15) is engaged at one end with the lower end (16)
of the hydraulic jack and at the other end is arranged to
bear against a reaction member such as the floor (17). To
this end the lower end of the strut (15) may be provided
with a suitable foot (18).

Although the reaction means has been described and
illustrated in the form of an elongate strut (15) formed
from jointed pipe sections, in one form of the invention
the strut may take the form of a rack and pinion mechanism
readily adjustable for length so as to provide greater
operating convenience for the drilling machine. The rack
and pinion mechanism (not shown) allows the operator to
conveniently adjust the length of the reaction means over
a limited range without having to insert further lengths
of jointed pipe section.

The foot of the reaction means (18) may also be
substituted by a tripod which can be folded in use, and
which will allow the drilling machine to be supported in a
free standing manner protruding upwardly in a column-like
configuration from the tripod. This is particularly handy
when drilling holes in ceilings as the apparatus can be
placed on the floor and adjusted so that the drill bit lines up with the desired position of the hole and is then supported by the tripod during the drilling operation.

The support structure (10) may also be provided with a switched power supply socket (19) supplied with power from an extension cord (20). The power chord (21) from the drill (1) may be plugged into the switched socket (19) so that the drill may be turned on and off by operating the switch on the socket.

In use when it is desired to drill a hole in a concrete ceiling (22) the drilling machine is assembled by fabricating the support arm (6) and the strut (15) to the desired length to position the cradle (2) at a small distance below the ceiling (22) when the foot (18) is placed on the floor (17). The support structure (10) is located at a convenient operating height by selecting the appropriate lengths of the support arm (6) and the strut (15).

The drilling machine is then positioned as shown in Fig. 1 whereupon the portable drill may be turned on by the operator switching the socket (19). The operator may then pump the handle (13) of the hydraulic jack (11) causing the expansion means (9) to expand and move the support arm, mounting cradle and drill upwardly forcing the drill bit (7) into the ceiling (22). In this manner an operator may easily drill a hole in a ceiling without being placed in a physically tiring position and without having to exert any excessive force.

In a further form of the invention as shown in Fig. 2, the apparatus may be adapted for drilling holes in a wall (23) by positioning the drilling machine in a horizontal orientation supported by bipod legs (24). The foot (18) is placed against an opposite wall or pillar (25) which provides the reaction means in place of the floor (17). Otherwise the operation of the embodiment shown in Fig. 2 is the same as that described with reference to Fig. 1.
It is a particular feature of the invention that most of the components are assembled from similar lengths of piping joined by threaded collars, T-pieces or elbows so that the required support framework and other members may be fabricated as required from a basic kit of parts.

In this manner a drilling machine is provided which while inexpensive and simple to construct and easy to operate, will enable an operator to drill difficult holes in concrete or other hard materials without exerting unnecessary physical force.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A drilling machine comprising a mounting cradle for a portable drill, a support arm extending rearwardly from the mounting cradle in line with a drill bit extending from a portable drill when mounted in the cradle, expansion means engaged with the opposite end of the support arm from the mounting cradle, and reaction means adapted to be arranged between the expansion means and a reaction member such that actuation of the expansion means increases the distance between the reaction means and the support arm causing the mounting cradle to move forwardly away from the reaction member.

2. A drilling machine as claimed in claim 1 wherein the expansion means comprises a hydraulic piston and cylinder assembly expandable to increase the distance between the reaction means and the support arm.

3. A drilling machine as claimed in claim 2 wherein the hydraulic piston and cylinder assembly comprises a conventional hand-pumped hydraulic jack mounted in a suitable support structure such that one end of the jack bears against the support arm and the other end of the jack bears against the reaction member.

4. A drilling machine as claimed in claim 3 wherein the support structure for the hydraulic jack also incorporates a switched power supply for the portable drill such that the operation of the drill may be switched on and off from the support structure.

5. A drilling machine as claimed in any one of the preceding claims wherein the reaction member comprises an elongate strut axially aligned with the support arm.

6. A drilling machine as claimed in any one of the preceding claims wherein the reaction member incorporates a rack and pinion mechanism arranged to allow adjustment of the length of the reaction member.

7. A drilling machine as claimed in any one of the preceding claims wherein the reaction member is provided with a tripod arranged to allow the drilling machine to be
supported thereby and extend upwardly therefrom in a column-like manner.

8. A drilling machine substantially as described herein with reference to the accompanying drawings.

DATED this TWENTY-EIGHTH day of SEPTEMBER 1987

ERNESTO ARBILLA and ALBERTO PINEYRO

By their Patent Attorneys

GRIFFITH HASSEL & FRAZER
DRAWINGS
FIG. 4

FIG. 5