PATENT APPLICATION FORM (CONVENTION AND NON-CONVENTION)

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

APPLICATION FOR A STANDARD PATENT OR
A STANDARD PATENT OF ADDITION

(a) Insert full name(s) of applicant(s)

(b) Insert address(es) of applicant(s)

We hereby apply for the grant of a (c) Standard Patent, for an invention entitled (d)

MINE WALL CONSOLIDATION,

which is described in the accompanying (c) provisional specification.

(e) For a Convention application - details of basic application(s)

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>COUNTRY</th>
<th>DATE OF APPLICATION</th>
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(f) For Patents of Addition (Section 72):

We request that the Patent may be granted as a Patent of Addition to the Patent applied for on Application No. (g)

Patent No. (g) in the name of (h)

We request that the term of the Patent of Addition be the same as that for the main invention or so much of the term of the patent for the main invention as is applicable.

My/Our address for service is ARTHUR S. CAVE & CO., Patent and Trade Mark Attorneys, 1 Alfred Street, Sydney, New South Wales, Australia 2000.

Dated this (i) 12th February 1986

[Signature]

To:

Commissioner of Patents

ARTHUR S. CAVE & CO.
PATENT AND TRADE MARK ATTORNEYS
SYDNEY
COMMONWEALTH OF AUSTRALIA

Provisional Specification for the Invention Entitled:

"MINE WALL CONSOLIDATION"

The invention is described in the following statement;
1. A method of mine wall consolidation comprising the steps of
   (a) drilling a hole of the required depth and diameter;
   (b) inserting a hollow dowel into said hole; and
   (c) pumping an expandable foaming resin adhesive into
       said dowel such that the resin overflows the dowel
       filling the bore holes surrounding the dowel and permeates
       into the adjoining strata.
COMMONWEALTH OF AUSTRALIA
Provisional Specification for the Invention Entitled:
"MINE WALL CONSOLIDATION"

The invention is described in the following statement:
The present invention relates to an improved method and apparatus for mine wall consolidation.

It is known to use mine straps to consolidate roofs and walls of mines. With this method a hole is drilled into the strata and a resin cartridge inserted, a roof bolt inserted and the resin cartridge ruptured, the contents mixing to set the resin. A mine strap or truss is bolted onto the bolt by means of a nut and bearing plate or other means, to hold the strap against the strata to support the strata.

Instead of the roof bolt, a split dowel could be used, or an expanding bolt.

However, these type of consolidations are not particularly satisfactory with friable stratas, and the attachment between the strata and the dowel or bolt is limited by the lack of penetration of the resin (where used) a small distance into the strata. Further, the expanding bolt is both more expensive than the resin type cartridge adhesive and limited by the localised friability of the strata immediately surrounding the bolt hole.

The present invention seeks to ameliorate the above problems by providing a method of mine wall consolidation comprising the steps of:

(a) drilling a hold of the required depth and diameter;
(b) inserting a hollow dowel into said hole; and
(c) pumping an expandable foaming resin adhesive into said dowel such that the resin overflows the dowel filling the bore holes surrounding the dowel and permeates into the adjoining strata.
Preferably a truss or mining strap is then attached to a plurality of the dowel by any suitable means, such as bolting or wedging, to consolidate the strata surrounding the tunnel.

In one embodiment of the present invention, the dowel has located thereon, projections for the retaining of a bearing plate for attachment to the mining strap.

The resin can be of any suitable composition, provided that it can be pumped through said dowel to permeate the strata surrounding the dowel. Preferably the resin will be of a foaming composition and, in use, a cover can be placed surrounding the hole from which the dowel protrudes to force the foaming resin to permeate the strata.

The resin could be pumped by any suitable mechanical device or could be supplied as two separate resins which are pumped separately to meet adjacent the ingress into the dowel. Preferably the injection system comprises a hand operated injection gun which is loaded with the appropriate amount of resin located in a single or plurality of cartridges. This injection gun has an attachment which mates with the dowel opening and plugs the bore holes surrounding the dowel to ensure the forcing of the resin into the strata surrounding the bore hole. The dowels can be constructed of any material.

It should be obvious to people skilled in the art that variations and modifications can be made to the above description without departing from the spirit or scope of the present invention.
The claim defining the invention is as follows:

1. A method of mine wall consolidation comprising the steps of:
   
   (a) drilling a hole of the required depth and diameter;
   (b) inserting a hollow dowel into said hole; and
   (c) pumping an expandable foaming resin adhesive into said dowel such that the resin overflows the dowel filling the bore holes surrounding the dowel and permeates into the adjoining strata.

DATED this 8th day of April, 1987.

ARNALL'S ENGINEERING PTY LTD
By Its Patent Attorneys,
ARTHUR S. CAVE & CO.