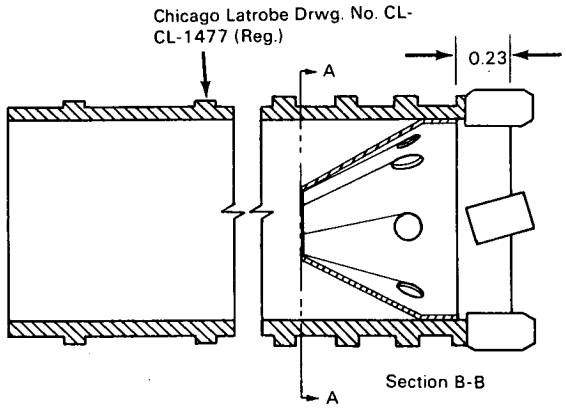
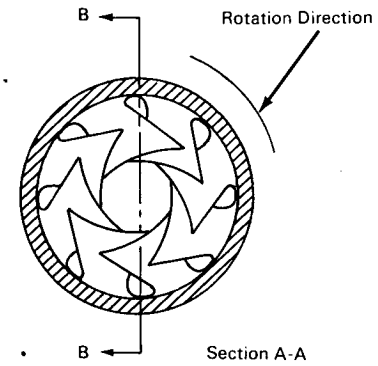
September 1969 Brief 69-10496

NASA TECH BRIEF

Iris-Leaf Core Retainer for a Surface Drill





The problem:

To devise an iris-leaf core retainer for a surface drill. This retainer could be particularly useful in mining explorations. A modification of it could also trap and maintain liquids and gases.

The solution:

An iris-leaf retainer to insure the retention of a complete sample within the drill string. Because of a unique overlapping feature, the individual leaves will not rupture or tear out when they come in contact with the oncoming core. In addition, this feature will prevent the individual leaves from mixing or tumbling the loose core sample within the drill string. This device can be attached to the inside of the hollow cutting bit and is relatively inexpensive to fabricate.

How it's done:

The innovation illustrated in the figure can provide a means for maintaining a complete core sample within a drill string. This assembly, which resembles an iris-light-restraint mechanism found in most cameras, is stamped from 0.010-in. spring steel with the individual leaves permanently set at an angle of 28° with the vertical. Extensions of the leaves are spot-welded to the main body within the core drill string in order to maintain leaf overlap. This overlap feature eliminates the possibility of the oncoming core seizing one or more of the leaves, which inevitably would cause failure of the core-retention capability.

When the assembly is not operating, it has a conical configuration. As the drill string is inserted into the ground surface, however, the oncoming core forces the individual leaves to bend upward and form around the inside periphery of the drill string. The total thickness of the leaves (0.020 in.) is less than the existing space between the inside wall and the surface of the core (0.025 in.). This difference (0.005 in.) makes it possible to eliminate the chance that the core retainer will grasp the core, create additional frictional loads, and consume unnecessary energy.

When the drill has reached the proper depth in a sampling operation, the operator proceeds to extract the drill string from the subsurface of the earth. At this instant, the leaves, which are pressed against

(continued overleaf)

the inner wall of the drill string, start to insert themselves into the core and continue to close as the downward pressure of the core increases, bringing about a complete closure.

Notes:

1. This innovation could be of interest to the mining industry, particularly that segment involved in exploration activities. It would also be of interest to geologists engaged in research and development.
2. No further documentation is available. Inquiries may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Houston, Texas 77058
   Reference: B69-10496

Patent status:

No patent action is contemplated by NASA.

Source: Humbert Olivari of
Martin-Marietta Corporation
under contract to
Manned Spacecraft Center
(MSC-11402)