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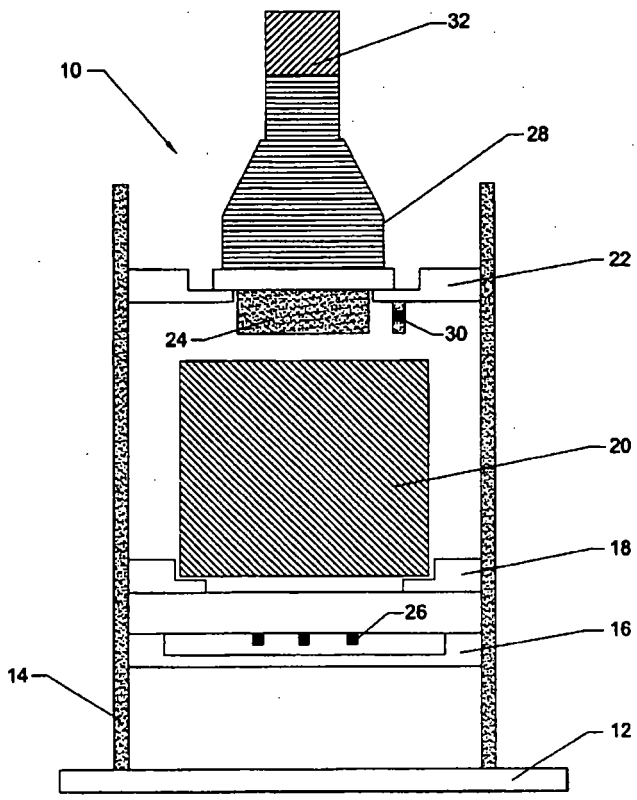
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(54) Title: APPARATUS AND METHOD FOR GAMMA-RAY DETERMINATION OF BULK DENSITY OF SAMPLES



(57) Abstract: A nuclear density gauge and test method is provided for measuring bulk density, especially of a cylindrically shaped sample such as asphalt paving material. The gauge comprises a base (12); a sample holder (18) carried by the base and having a surface configured for receiving and holding a first generally planar end of the cylindrically shaped sample (20); a plate (16) mounted in proximity to said sample holder; and at least three sources of gamma radiation located in said plate adjacent the sample holder. The sources (26) are positioned in spaced-apart relation from one another for emitting gamma radiation from at least three spaced-apart locations into said one end of the sample. Each of the sources comprises an isotope having a characteristic primary energy. A detector is mounted to the base and is positioned adjacent the opposite end of the cylindrically shaped sample for receiving gamma radiation which has penetrated the sample. Means is provided cooperating with the detector for calculating the bulk density of the sample based upon the gamma radiation counts by the detector. Preferably the detector comprises a scintillation detector (24), and the means for calculating the bulk density of the sample includes an analyzer connected to the scintillation detector for detecting gamma radiation in a predetermined energy spectrum, which preferably falls within the range of 0.1 MeV to 2 MeV.

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