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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Katherine Kelly Vidal

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

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If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number and timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the United States Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.

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If the application for this patent was filed on or after June 8, 1995, the term of this patent begins on the date on which this patent issues and ends twenty years from the filing date of the application or, if the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, 365(c), or 386(c), twenty years from the filing date of the earliest such application (“the twenty-year term”), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b), and any extension as provided by 35 U.S.C. 154(b) or 156 or any disclaimer under 35 U.S.C. 253.

If this application was filed prior to June 8, 1995, the term of this patent begins on the date on which this patent issues and ends on the later of seventeen years from the date of the grant of this patent or the twenty-year term set forth above for patents resulting from applications filed on or after June 8, 1995, subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b) and any extension as provided by 35 U.S.C. 156 or any disclaimer under 35 U.S.C. 253.



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(54) **METAL DETECTOR CAPABLE OF VISUALIZING THE TARGET SHAPE**

(71) Applicant: **NOKTA MUHENDISLIK A.S.**,
Sancaktepe/Istanbul (TR)

(72) Inventors: **Mehmet Onlek**, Sancaktepe/Istanbul (TR); **Basri Kutlu Yavas**, Sancaktepe/Istanbul (TR)

(73) Assignee: **NOKTA MUHENDISLIK A.S.**,
Istanbul (TR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Primary Examiner — Alesa Allgood

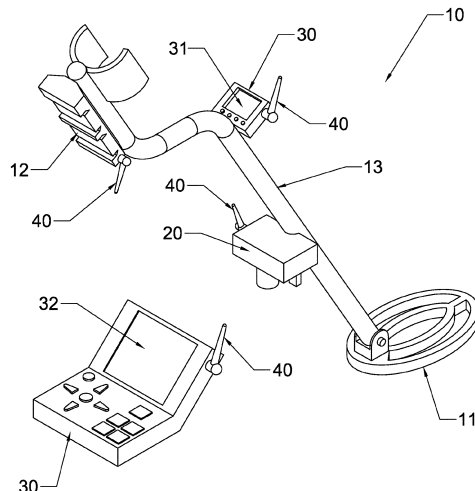
Assistant Examiner — Byung Ro Lee

(74) *Attorney, Agent, or Firm* — Bayramoglu Law Offices LLC

(57) **ABSTRACT**

Metal detectors are disclosed herein containing integrated positional tracking unit (20) containing the sensors and processors which provide the detection of the real-time positions of the search head (11) on the ground during metal target (1) searching process, by optical flow technique as (X, Y) points on an image frame at X, Y coordinate plane, following the verification and if required, correction of the parameters of height from the ground, horizontal and axial motions, angular position, focus distance, light quantity and quality; image processing/display unit (30), a shaft mount display and/or a screen, generating the image of the target (1) metal by matching the metal data received from the detector signal processing system (12), thereby from the search head (11) and the location and position data received from the integrated positional tracking unit (20), on a position/image matrix and presenting such image to the user visually.

15 Claims, 3 Drawing Sheets



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<p>(52) U.S. Cl. CPC <i>G01V 3/165</i> (2013.01); <i>G06F 18/22</i> (2023.01); <i>G06F 18/251</i> (2023.01); <i>G06V</i> <i>2201/07</i> (2022.01)</p>	<p>* cited by examiner</p>
<p>(58) Field of Classification Search CPC .. G06K 9/6215; G06K 9/6289; G06V 10/143; G06V 2201/07 USPC 324/329 See application file for complete search history.</p>	