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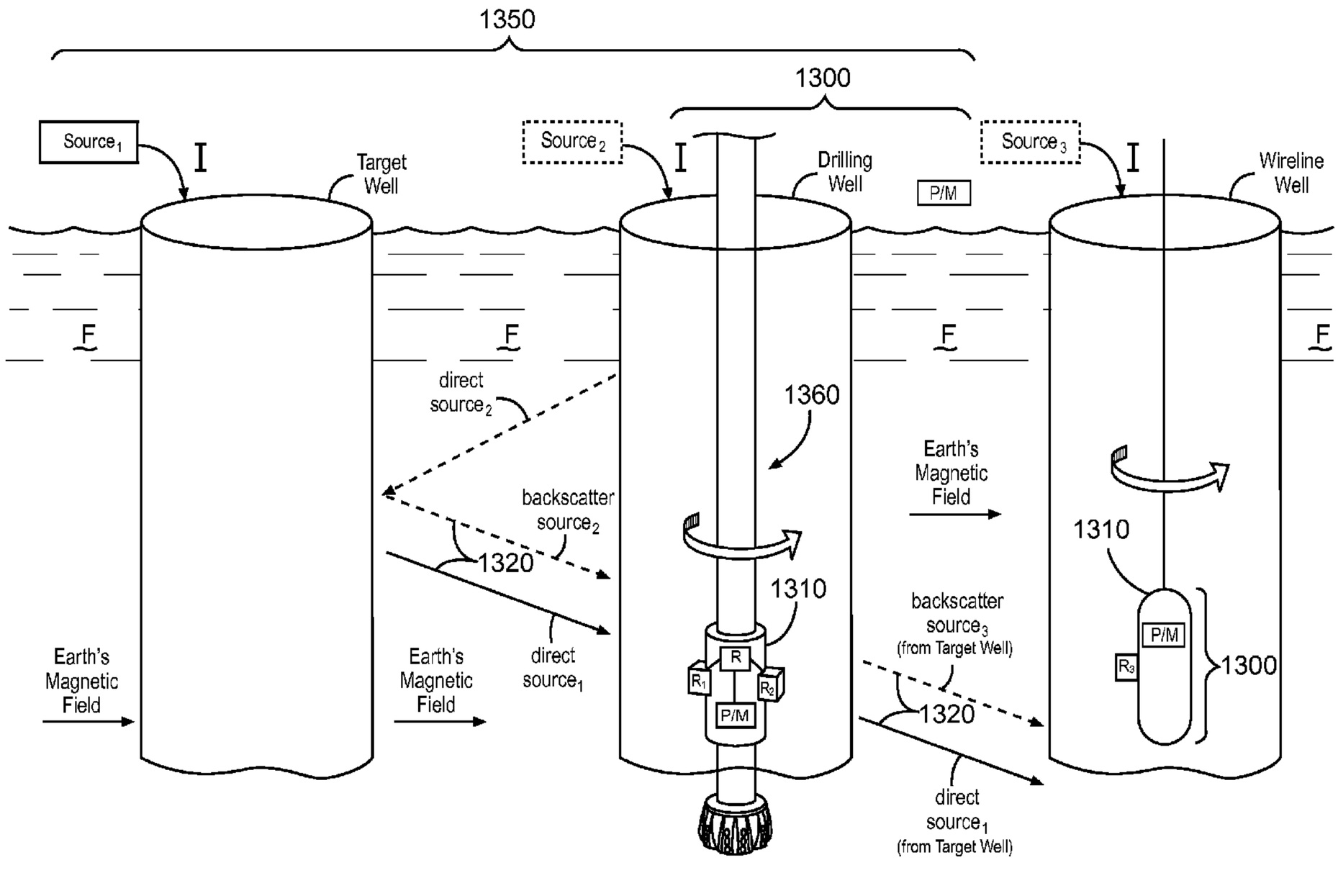

Fig. 13

(57) Abrégé/Abstract:
Disclosed embodiments include well ranging apparatus, systems, and methods which operate to detect and determine a relative distance and/or azimuthal direction of nearby target well conductors such as pipes, well casing, etc., from within a borehole of a drilling well.

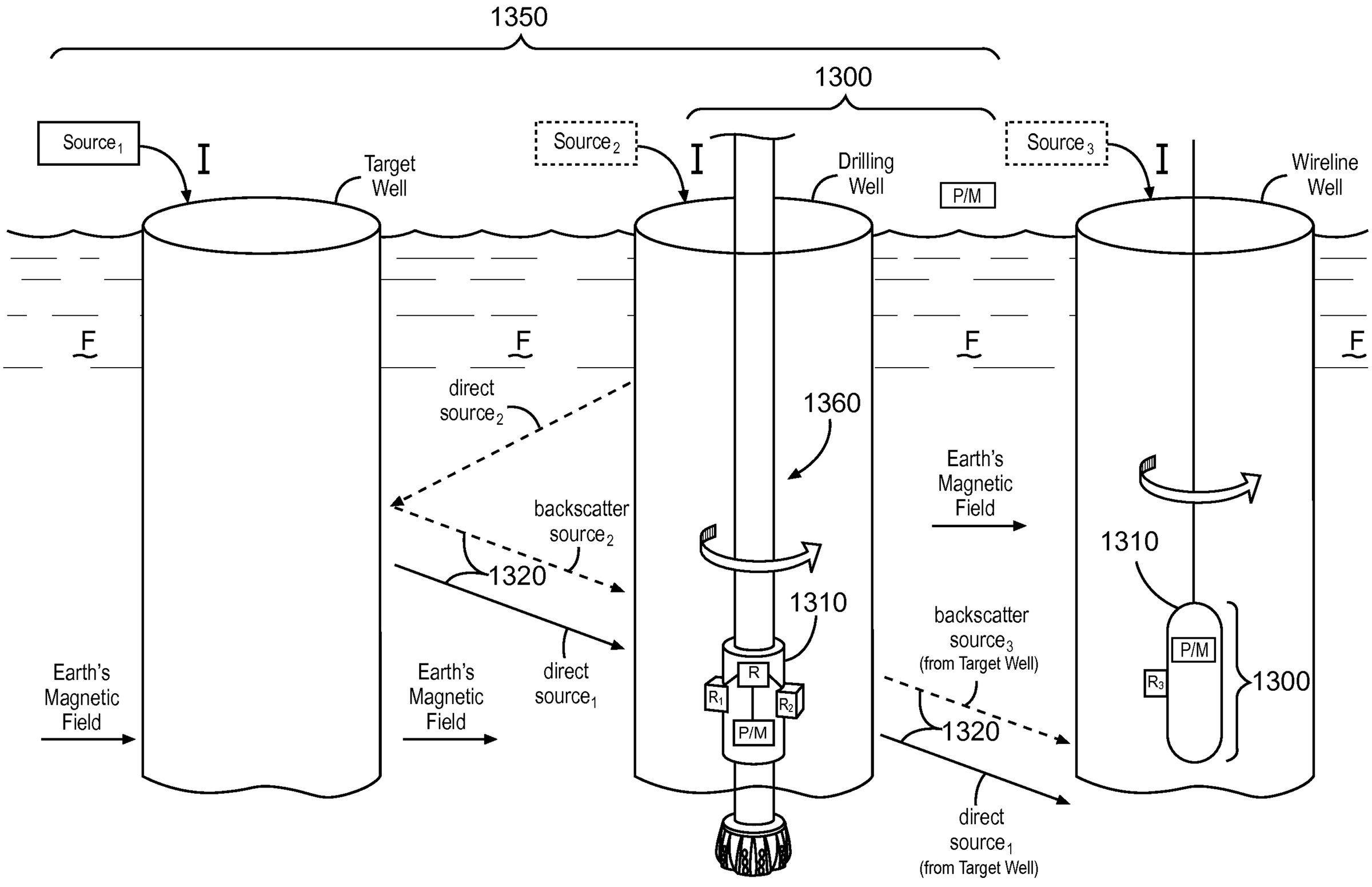
1350
1300
Source1
Source2
Source3
I
Target Well
Drilling Well
Wireline Well
P/M
F
direct source2
backscatter source2
1320
1360
Earth's Magnetic Field
1310
R
R1
R2
P/M
direct source1
backscatter source3 (from Target Well)
direct source1 (from Target Well)
R3
1300

Fig. 13