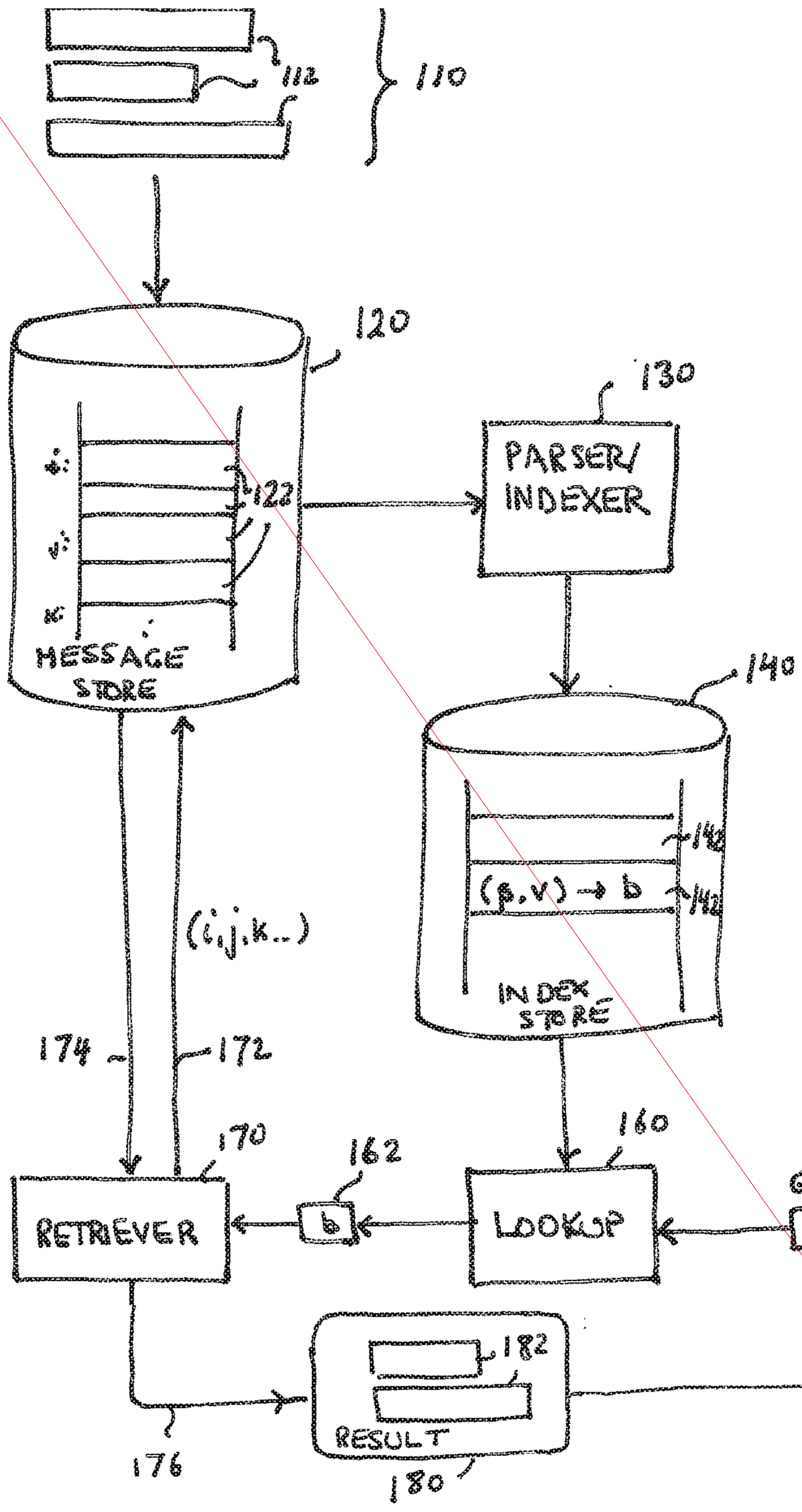

112
110
120
130
PARSER/
INDEXER
122
MESSAGE
STORE
140
142
(p.v) → b
144
INDEX
STORE
(i,j,k...)
174
172
170
162
160
152
150
RETRIEVER
b
LOOKUP
QUERY
(p.v)
182
RESULT
176
180
100

FIG. 1

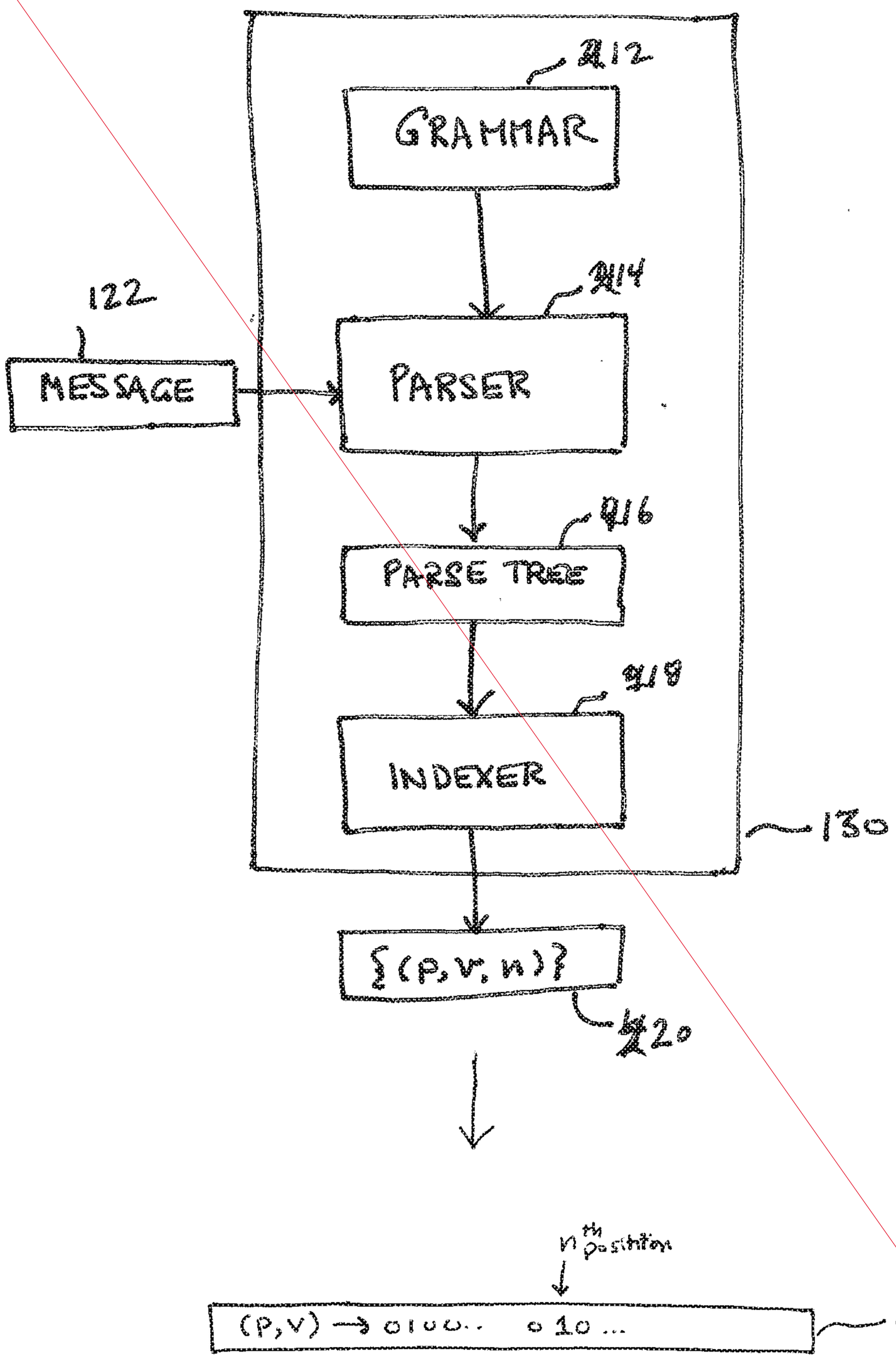

212
GRAMMAR
122
MESSAGE
214
PARSER
216
PARSE TREE
218
INDEXER
130
ζ(p,v,n)?
220
nth position
(P,V) → 0100... 010 ...
142

FIG. 2

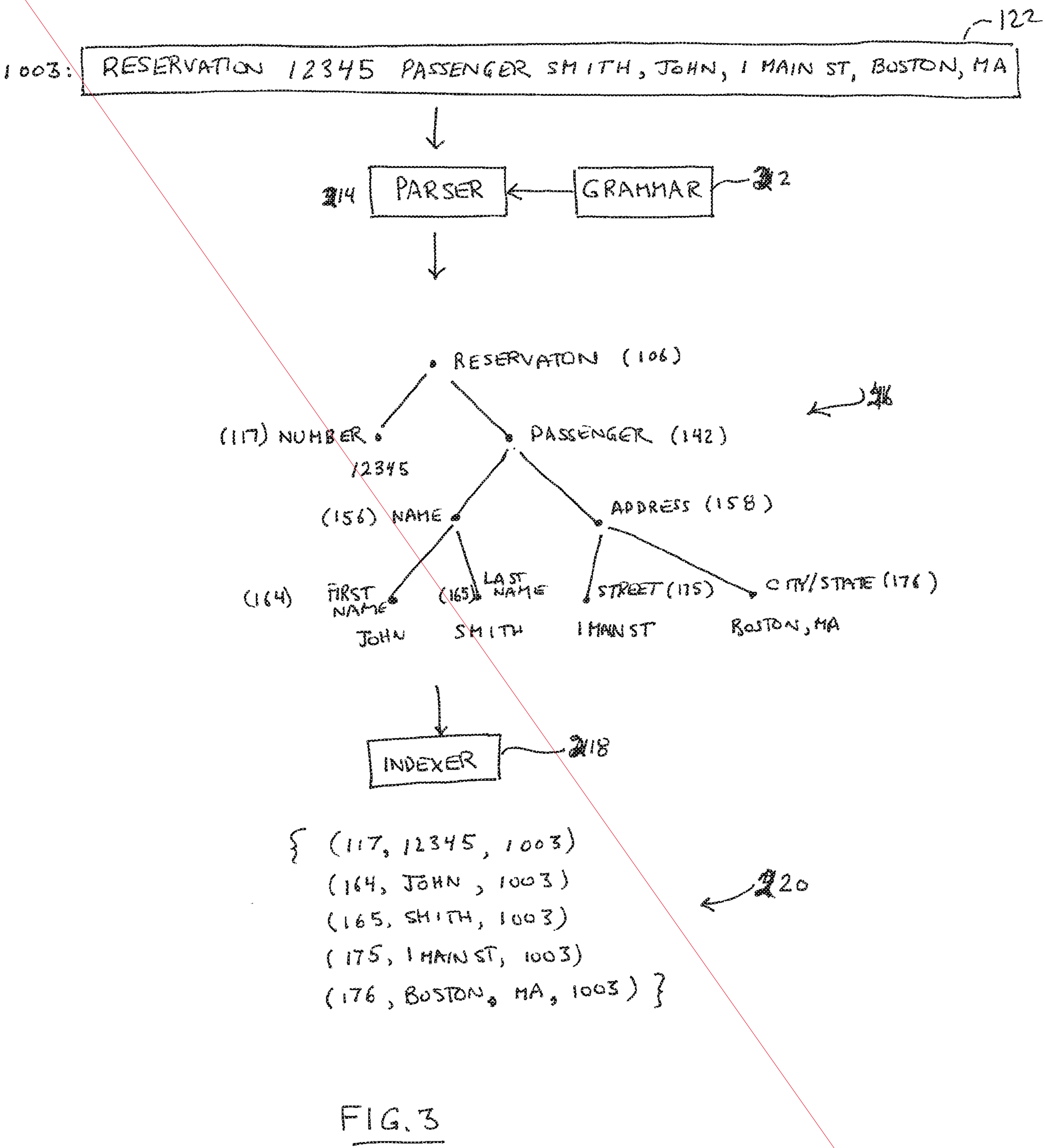

122
1003: RESERVATION 12345 PASSENGER SMITH, JOHN, 1 MAIN ST, BOSTON, MA
214
PARSER
GRAMMAR
212
RESERVATON (106)
(117) NUMBER
12345
PASSENGER (142)
216
(156) NAME
ADDRESS (158)
(164) FIRST NAME
JOHN
(165) LAST NAME
SMITH
STREET (175)
1 MAIN ST
CITY/STATE (176)
BOSTON, MA
INDEXER
218
{ (117, 12345, 1003)
(164, JOHN, 1003)
(165, SMITH, 1003)
(175, 1 MAIN ST, 1003)
(176, BOSTON, MA, 1003) }
220

FIG. 3

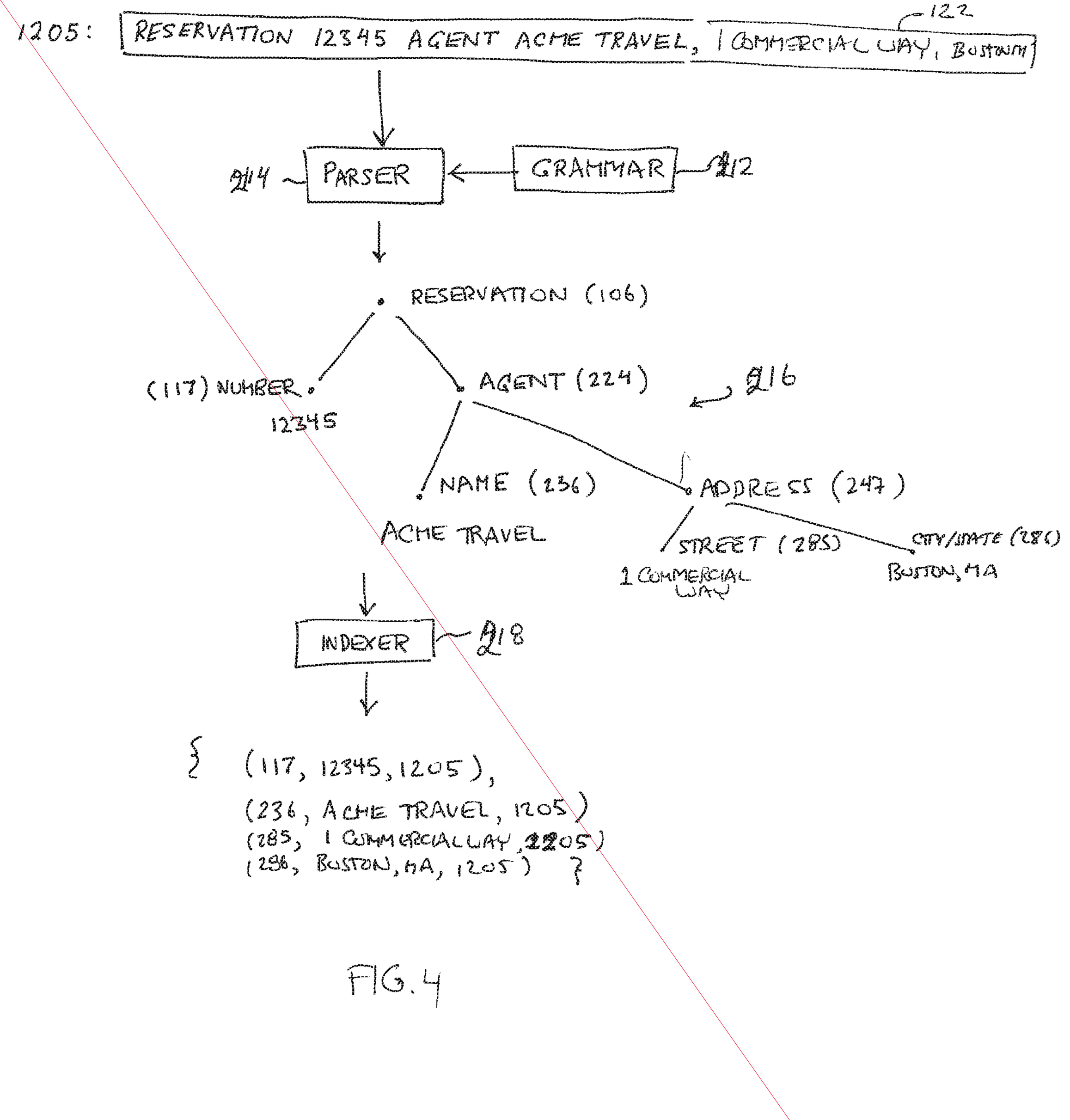

1205:
RESERVATION 12345 AGENT ACME TRAVEL, 1 COMMERCIAL WAY, BOSTON
122
PARSER
214
GRAMMAR
212
RESERVATION (106)
(117) NUMBER
12345
AGENT (224)
216
NAME (236)
ACME TRAVEL
ADDRESS (247)
STREET (285)
1 COMMERCIAL WAY
CITY/STATE (280)
BOSTON, MA
INDEXER
218
{ (117, 12345, 1205),
(236, ACME TRAVEL, 1205)
(285, 1 COMMERCIAL WAY, 1205)
(286, BOSTON, MA, 1205) }

FIG. 4

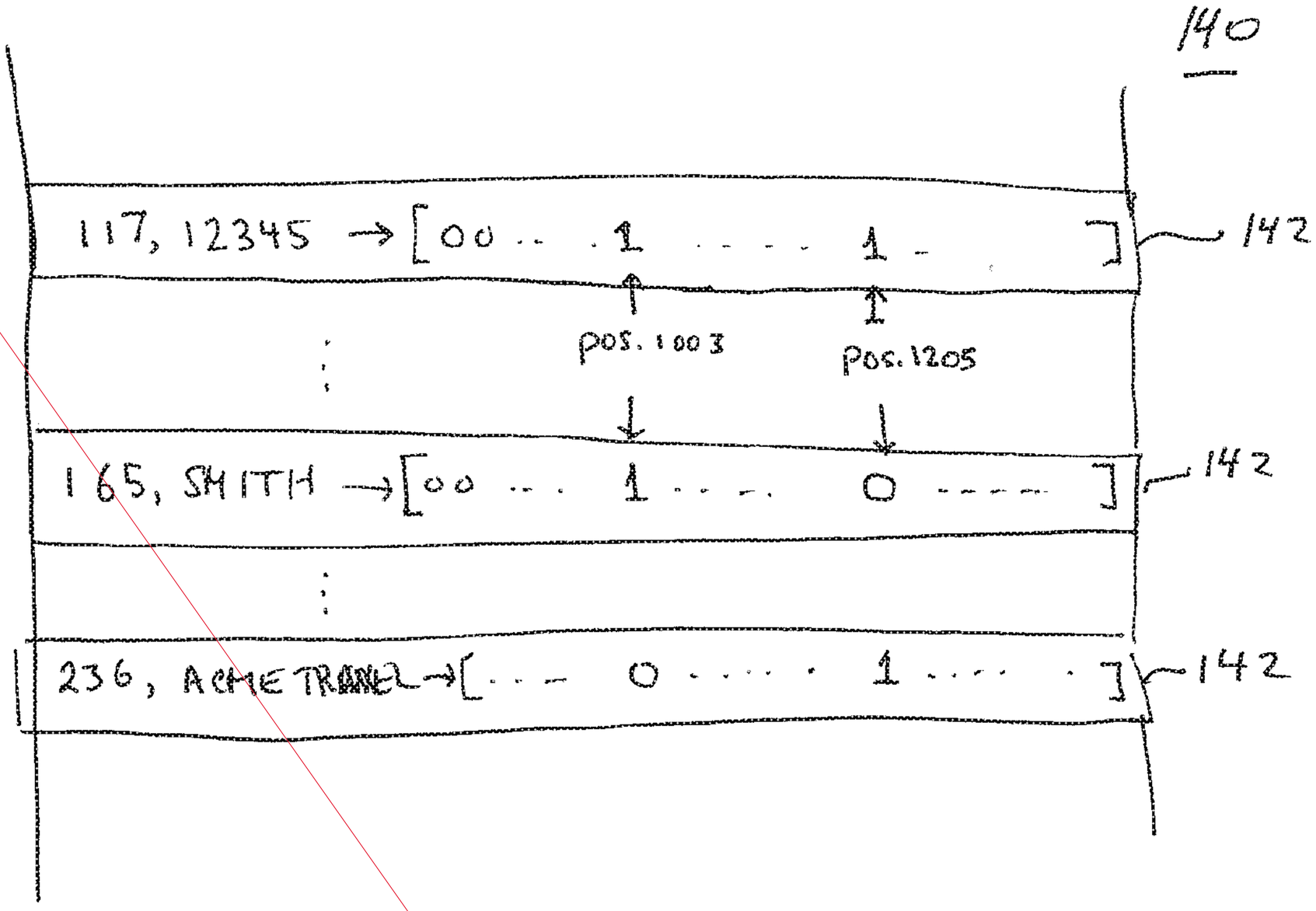

140
117, 12345 → [00 . . . 1 . . . . 1 .]
142
pos. 1003
Pos. 1205
165, SMITH → [00 . . . 1 . . . . 0 . . . . .]
142
236, ACHETRANE → [. . . 0 . . . . 1 . . . .]
142

FIG. 5

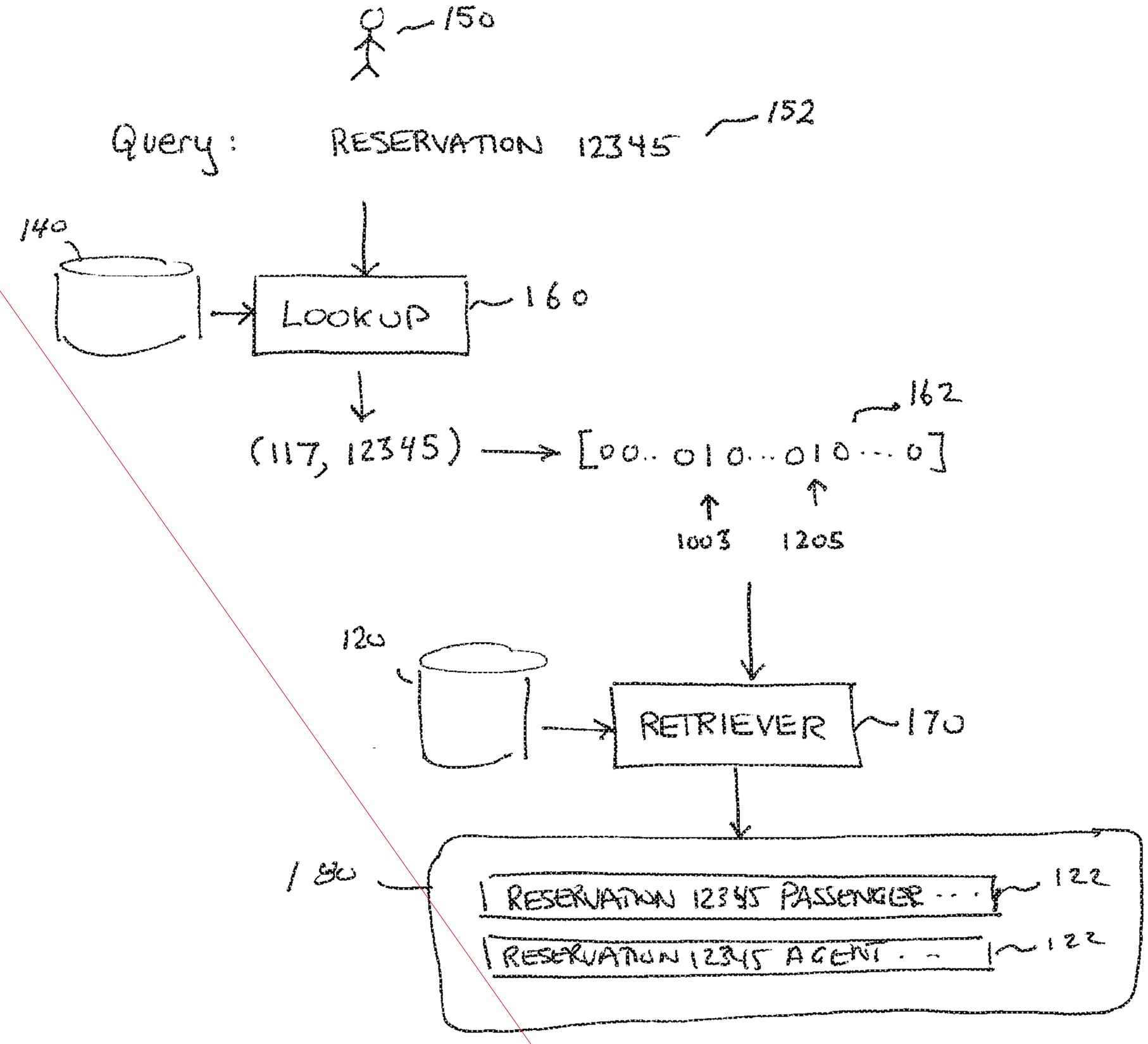

150
Query: RESERVATION 12345
152
140
LOOKUP
160
162
(117, 12345) → [00.. 0 1 0 ... 0 1 0 ... 0]
1003
1205
120
RETRIEVER
170
180
RESERVATION 12345 PASSENGER . . .
122
RESERVATION 12345 AGENT . . .
122

FIG. 6

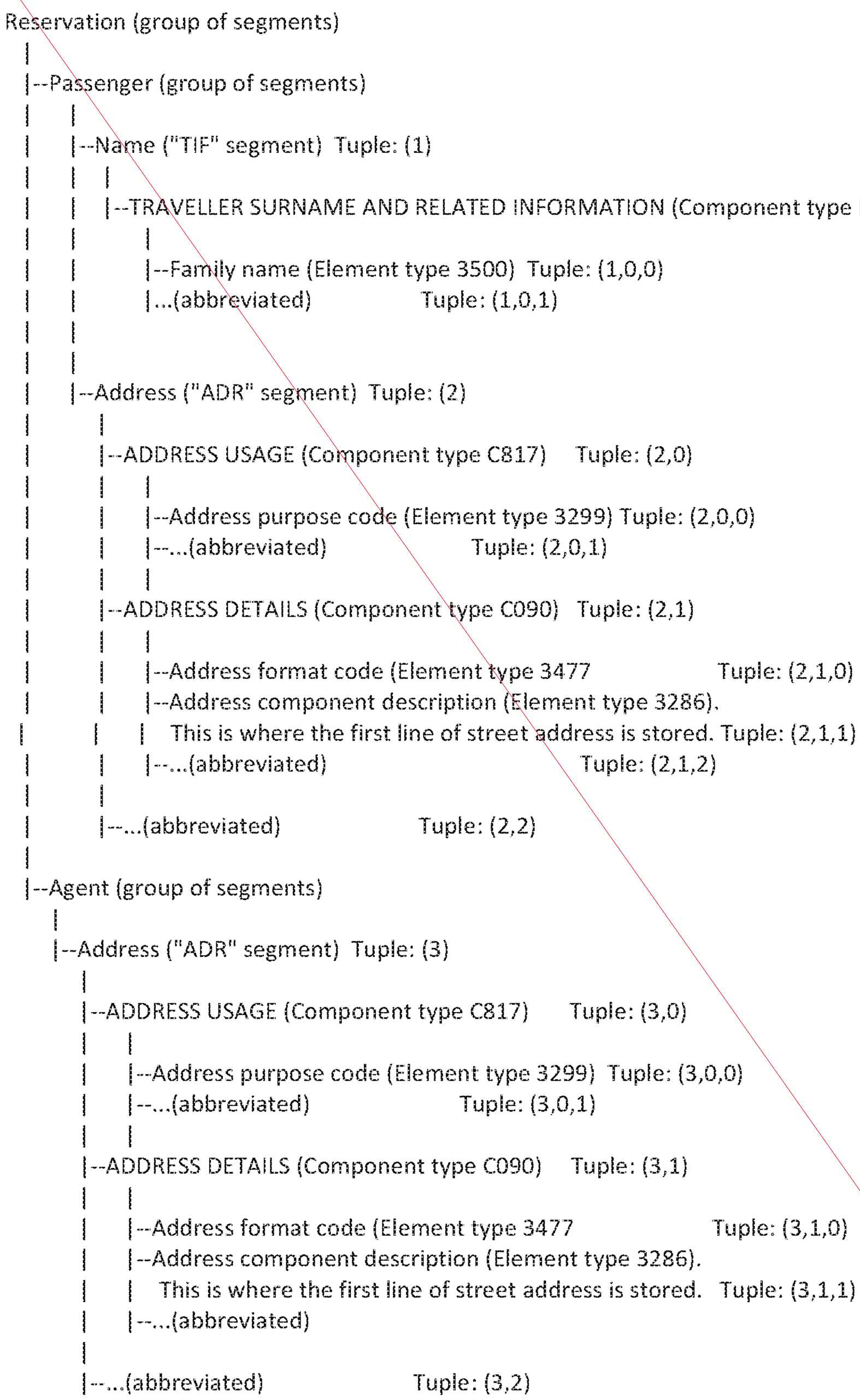

Reservation (group of segments)
|--Passenger (group of segments)
|--Name ("TIF" segment) Tuple: (1)
|--TRAVELLER SURNAME AND RELATED INFORMATION (Component type E985) Tuple: (1,0)
|--Family name (Element type 3500) Tuple: (1,0,0)
|...(abbreviated) Tuple: (1,0,1)
|--Address ("ADR" segment) Tuple: (2)
|--ADDRESS USAGE (Component type C817) Tuple: (2,0)
|--Address purpose code (Element type 3299) Tuple: (2,0,0)
|--...(abbreviated) Tuple: (2,0,1)
|--ADDRESS DETAILS (Component type C090) Tuple: (2,1)
|--Address format code (Element type 3477 Tuple: (2,1,0)
|--Address component description (Element type 3286).
This is where the first line of street address is stored. Tuple: (2,1,1)
|--...(abbreviated) Tuple: (2,1,2)
|--...(abbreviated) Tuple: (2,2)
|--Agent (group of segments)
|--Address ("ADR" segment) Tuple: (3)
|--ADDRESS USAGE (Component type C817) Tuple: (3,0)
|--Address purpose code (Element type 3299) Tuple: (3,0,0)
|--...(abbreviated) Tuple: (3,0,1)
|--ADDRESS DETAILS (Component type C090) Tuple: (3,1)
|--Address format code (Element type 3477 Tuple: (3,1,0)
|--Address component description (Element type 3286).
This is where the first line of street address is stored. Tuple: (3,1,1)
|--...(abbreviated)
|--...(abbreviated) Tuple: (3,2)

FIG. 7

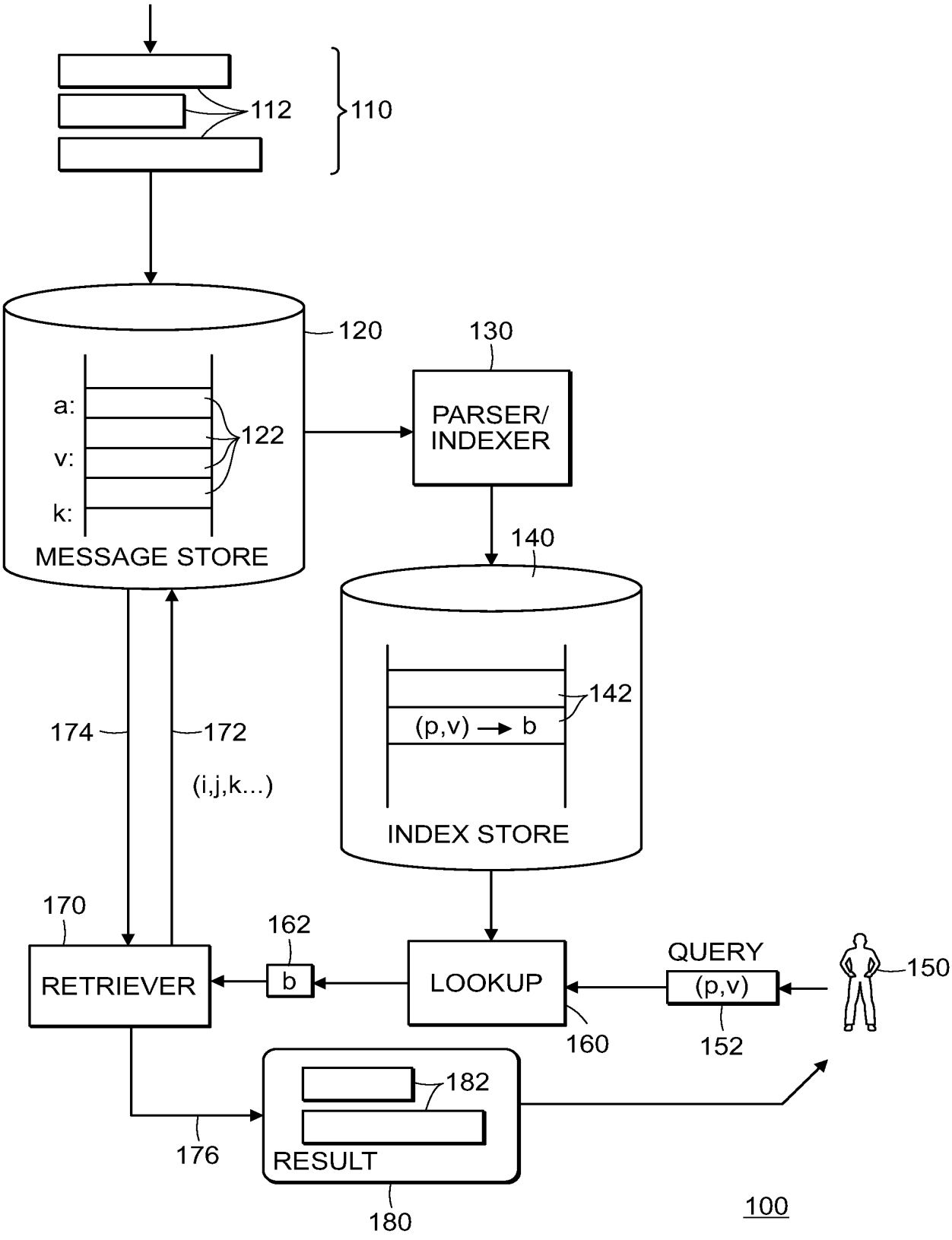

112
110
120
130
a:
v:
k:
122
PARSER/
INDEXER
MESSAGE STORE
140
142
(p,v) → b
INDEX STORE
174
172
(i,j,k...)
170
162
RETRIEVER
b
LOOKUP
QUERY
(p,v)
150
160
152
182
176
RESULT
180
100

FIG. 1

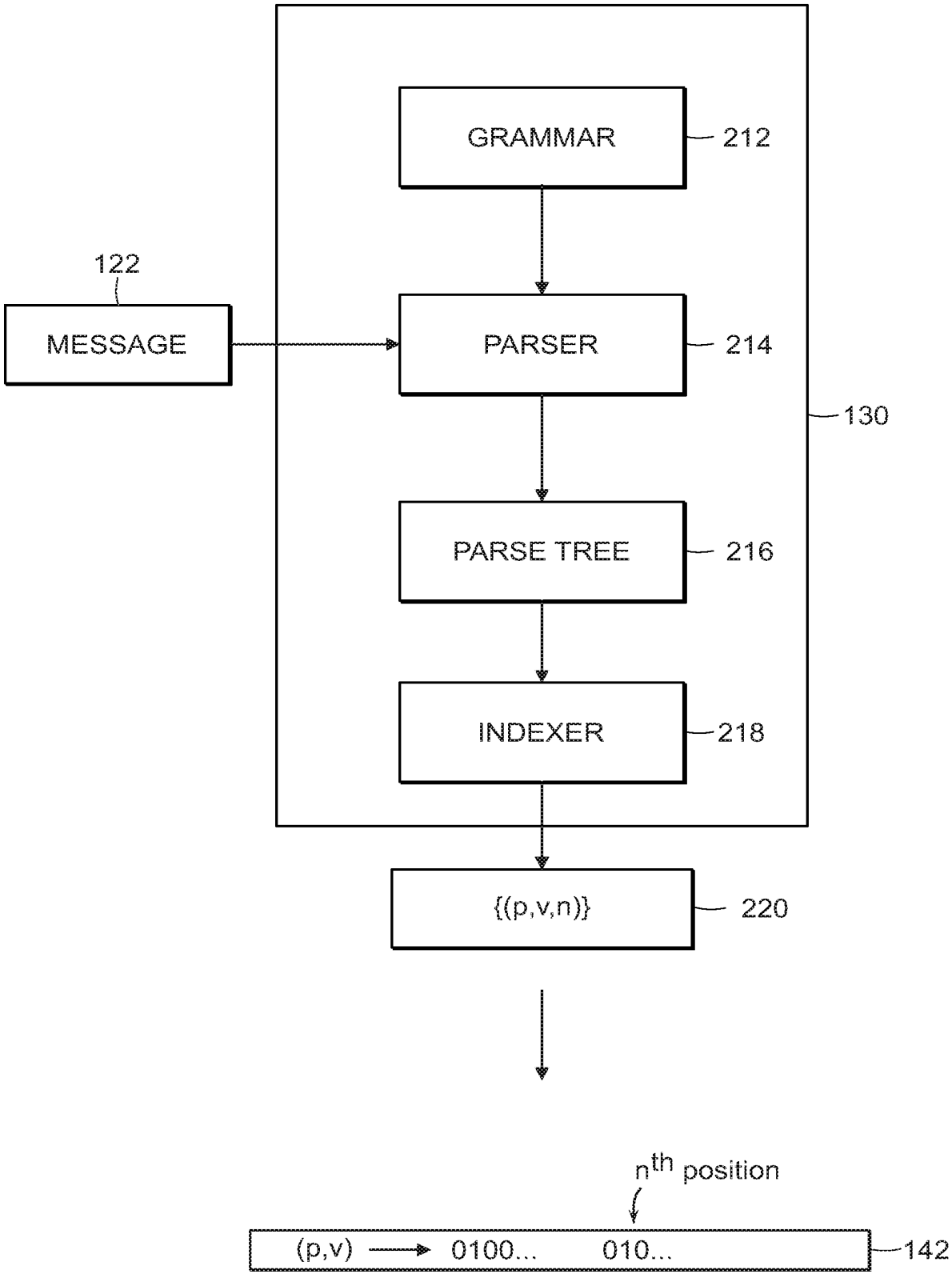

GRAMMAR
212
122
MESSAGE
PARSER
214
130
PARSE TREE
216
INDEXER
218
{(p,v,n)}
220
nth position
(p,v)
0100...
010...
142

FIG. 2

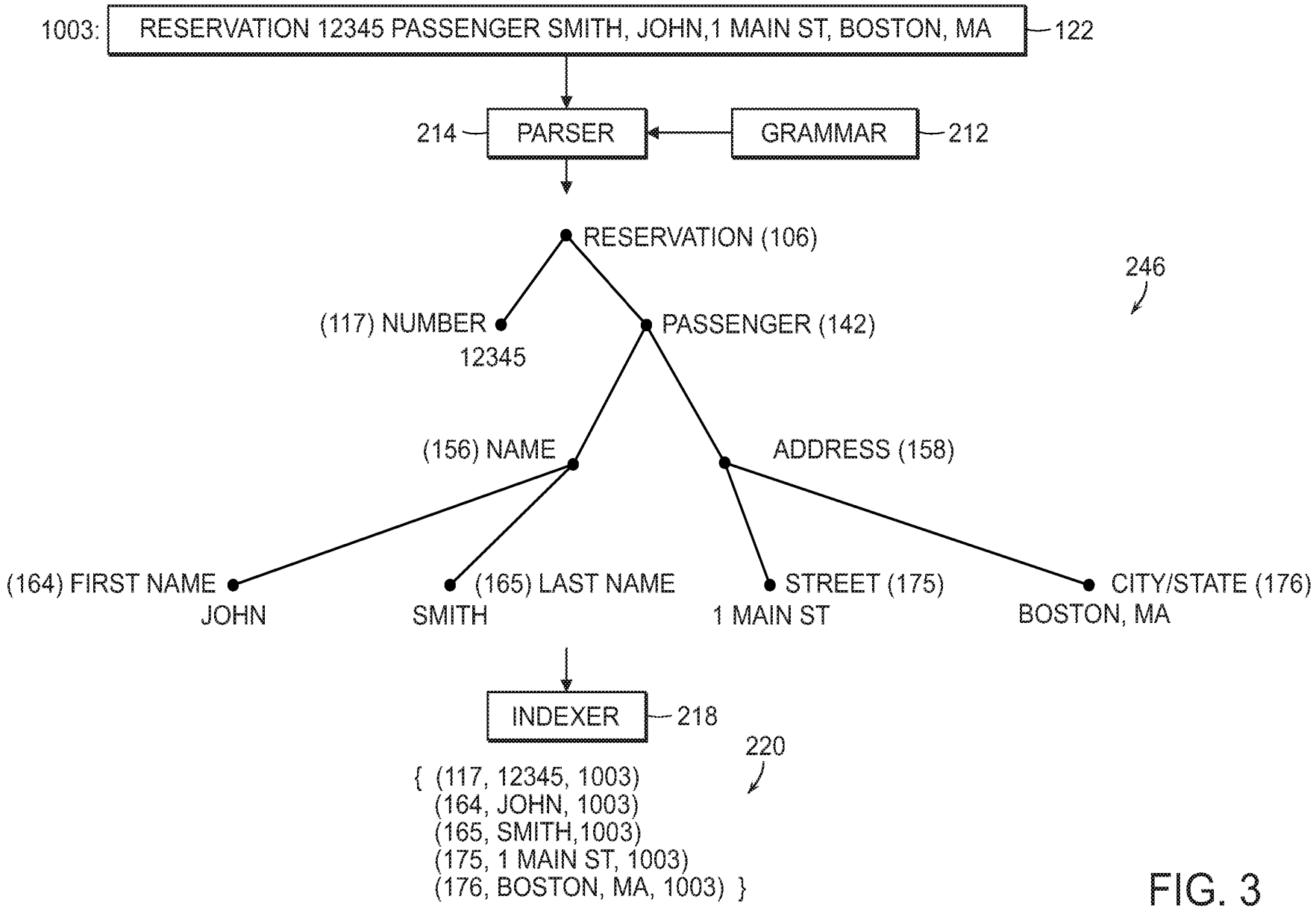

1003:
RESERVATION 12345 PASSENGER SMITH, JOHN,1 MAIN ST, BOSTON, MA
122
214
PARSER
GRAMMAR
212
RESERVATION (106)
246
(117) NUMBER
12345
PASSENGER (142)
(156) NAME
ADDRESS (158)
(164) FIRST NAME
JOHN
(165) LAST NAME
SMITH
STREET (175)
1 MAIN ST
CITY/STATE (176)
BOSTON, MA
INDEXER
218
220
{ (117, 12345, 1003)
(164, JOHN, 1003)
(165, SMITH,1003)
(175, 1 MAIN ST, 1003)
(176, BOSTON, MA, 1003) }

FIG. 3

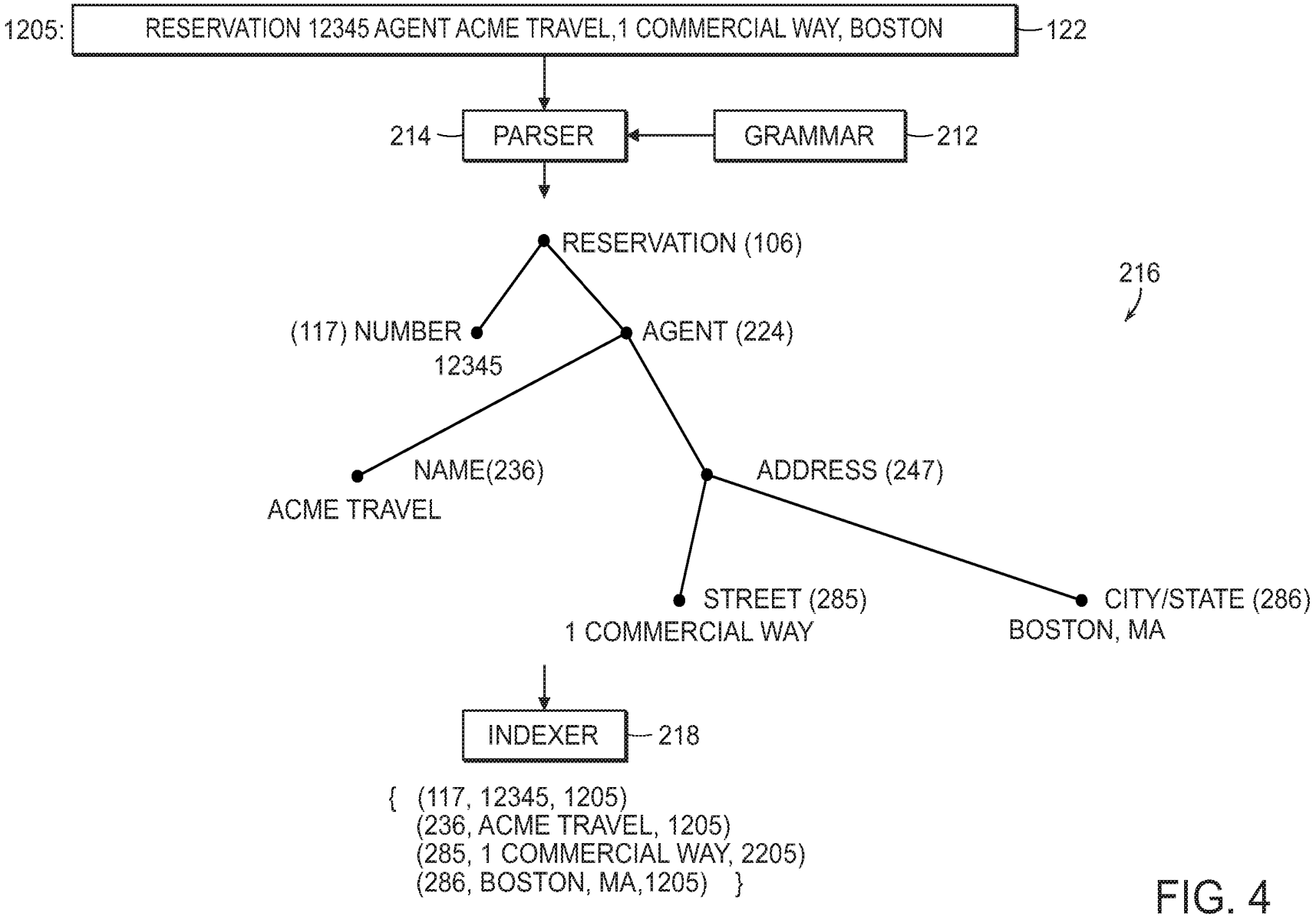

1205:
RESERVATION 12345 AGENT ACME TRAVEL,1 COMMERCIAL WAY, BOSTON
122
214
PARSER
GRAMMAR
212
RESERVATION (106)
216
(117) NUMBER
12345
AGENT (224)
NAME(236)
ACME TRAVEL
ADDRESS (247)
STREET (285)
1 COMMERCIAL WAY
CITY/STATE (286)
BOSTON, MA
INDEXER
218
{ (117, 12345, 1205)
(236, ACME TRAVEL, 1205)
(285, 1 COMMERCIAL WAY, 2205)
(286, BOSTON, MA,1205) }

FIG. 4

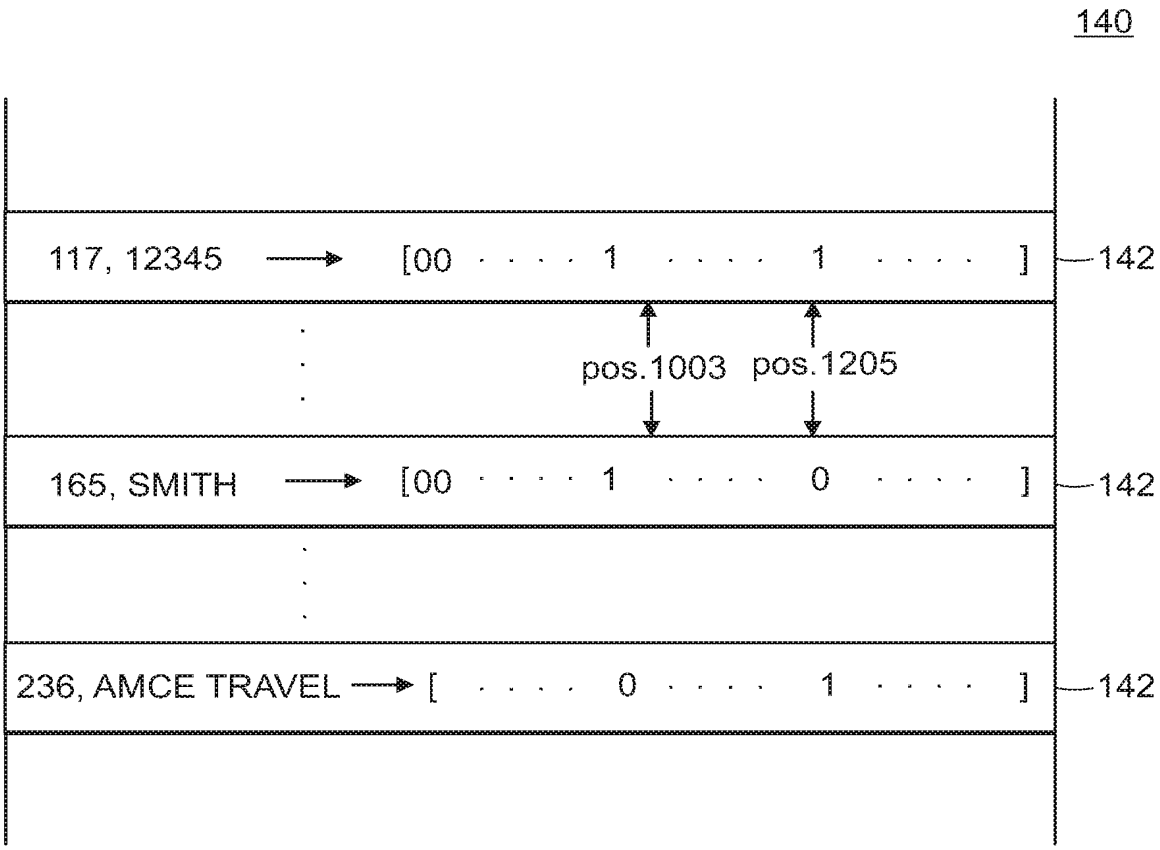

140
117, 12345
[00 . . . . 1 . . . . 1 . . . .]
142
pos.1003
pos.1205
165, SMITH
[00 . . . . 1 . . . . 0 . . . .]
142
236, AMCE TRAVEL
[. . . . 0 . . . . 1 . . . .]
142

FIG. 5

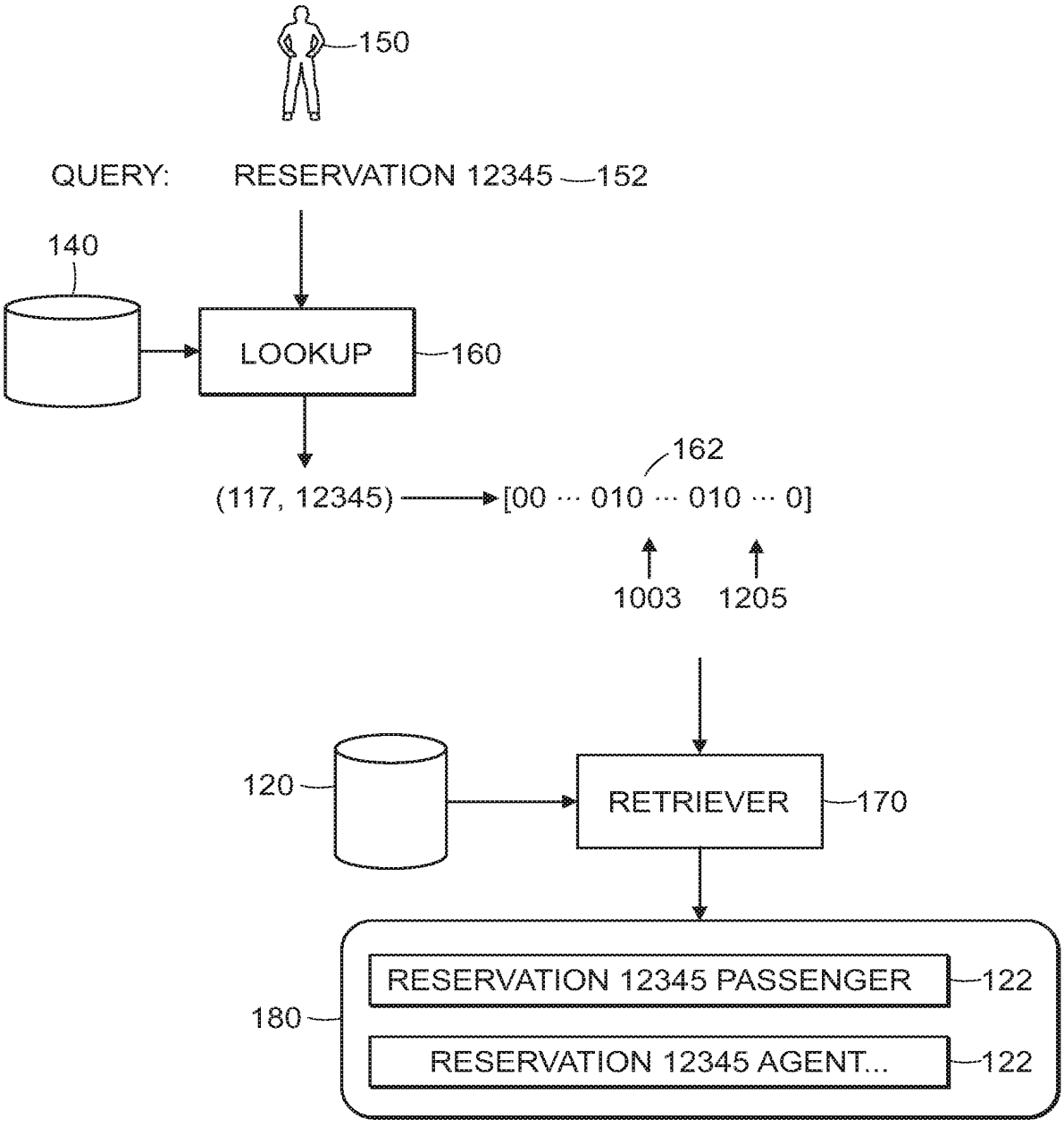

150
QUERY:
RESERVATION 12345
152
140
LOOKUP
160
162
(117, 12345)
[00 ··· 010 ··· 010 ··· 0]
1003
1205
120
RETRIEVER
170
180
RESERVATION 12345 PASSENGER
122
RESERVATION 12345 AGENT...
122

FIG. 6

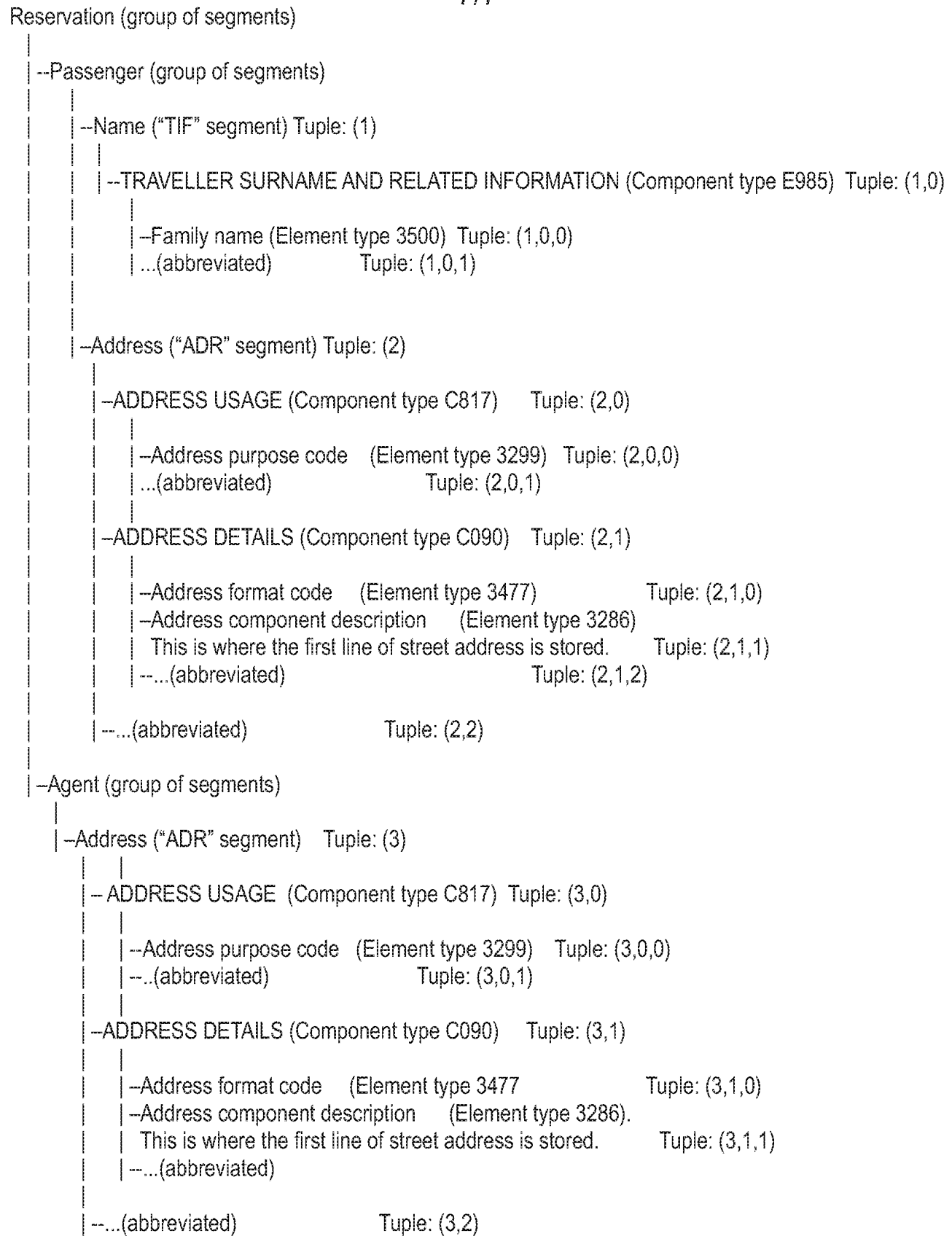

Reservation (group of segments)
--Passenger (group of segments)
--Name ("TIF" segment) Tuple: (1)
--TRAVELLER SURNAME AND RELATED INFORMATION (Component type E985) Tuple: (1,0)
--Family name (Element type 3500) Tuple: (1,0,0)
...(abbreviated) Tuple: (1,0,1)
--Address ("ADR" segment) Tuple: (2)
--ADDRESS USAGE (Component type C817) Tuple: (2,0)
--Address purpose code (Element type 3299) Tuple: (2,0,0)
...(abbreviated) Tuple: (2,0,1)
--ADDRESS DETAILS (Component type C090) Tuple: (2,1)
--Address format code (Element type 3477) Tuple: (2,1,0)
--Address component description (Element type 3286)
This is where the first line of street address is stored. Tuple: (2,1,1)
--...(abbreviated) Tuple: (2,1,2)
--...(abbreviated) Tuple: (2,2)
--Agent (group of segments)
--Address ("ADR" segment) Tuple: (3)
-- ADDRESS USAGE (Component type C817) Tuple: (3,0)
--Address purpose code (Element type 3299) Tuple: (3,0,0)
--...(abbreviated) Tuple: (3,0,1)
--ADDRESS DETAILS (Component type C090) Tuple: (3,1)
--Address format code (Element type 3477 Tuple: (3,1,0)
--Address component description (Element type 3286).
This is where the first line of street address is stored. Tuple: (3,1,1)
--...(abbreviated)
--...(abbreviated) Tuple: (3,2)

FIG. 7