

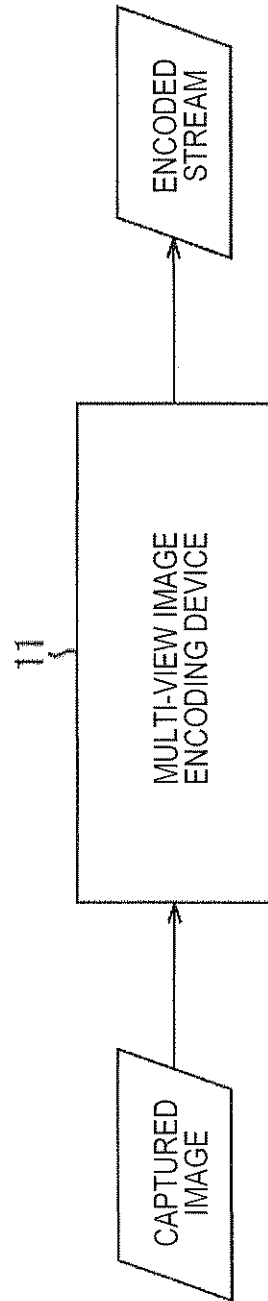
**FIG. 1**

FIG. 2

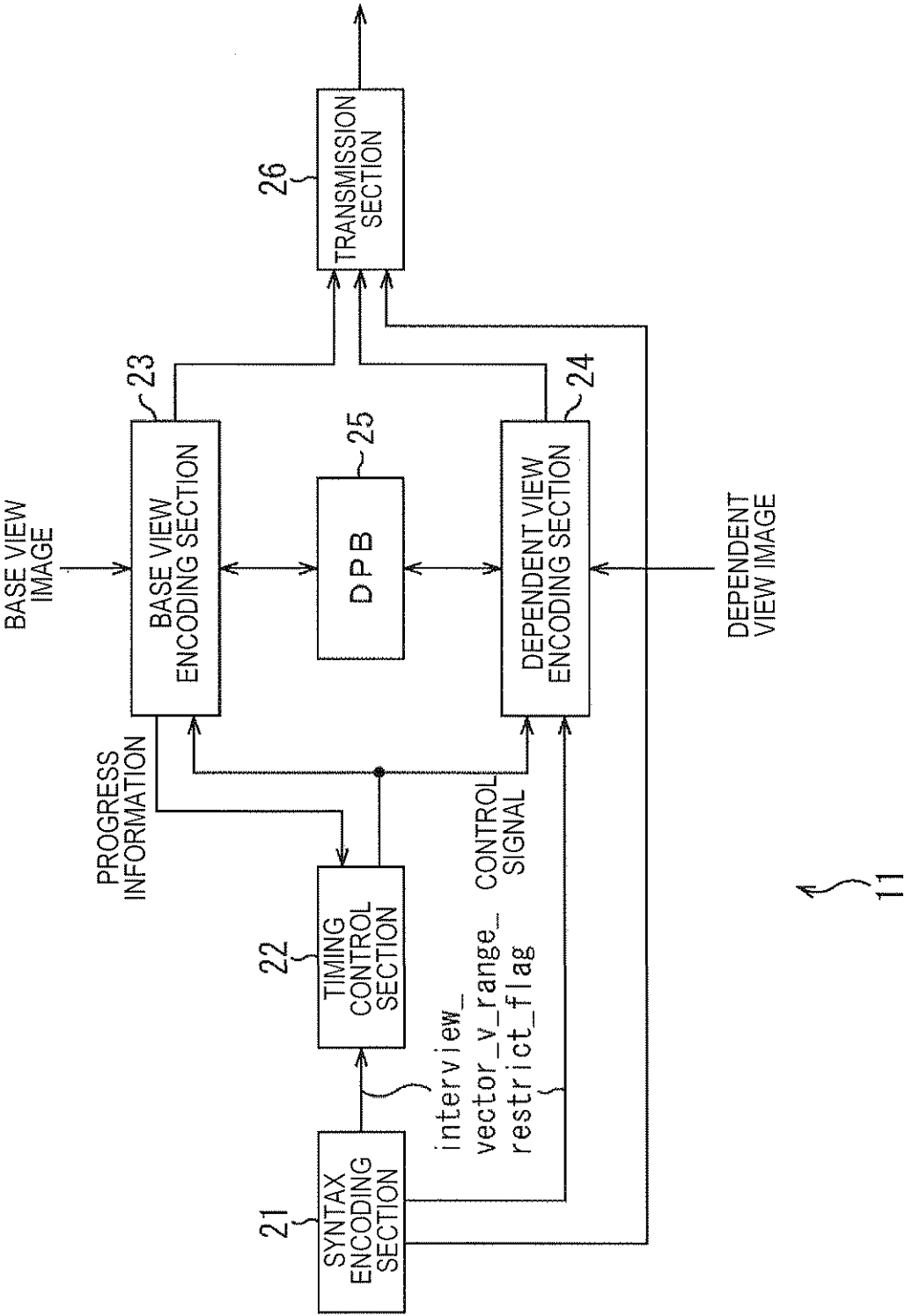


FIG. 3

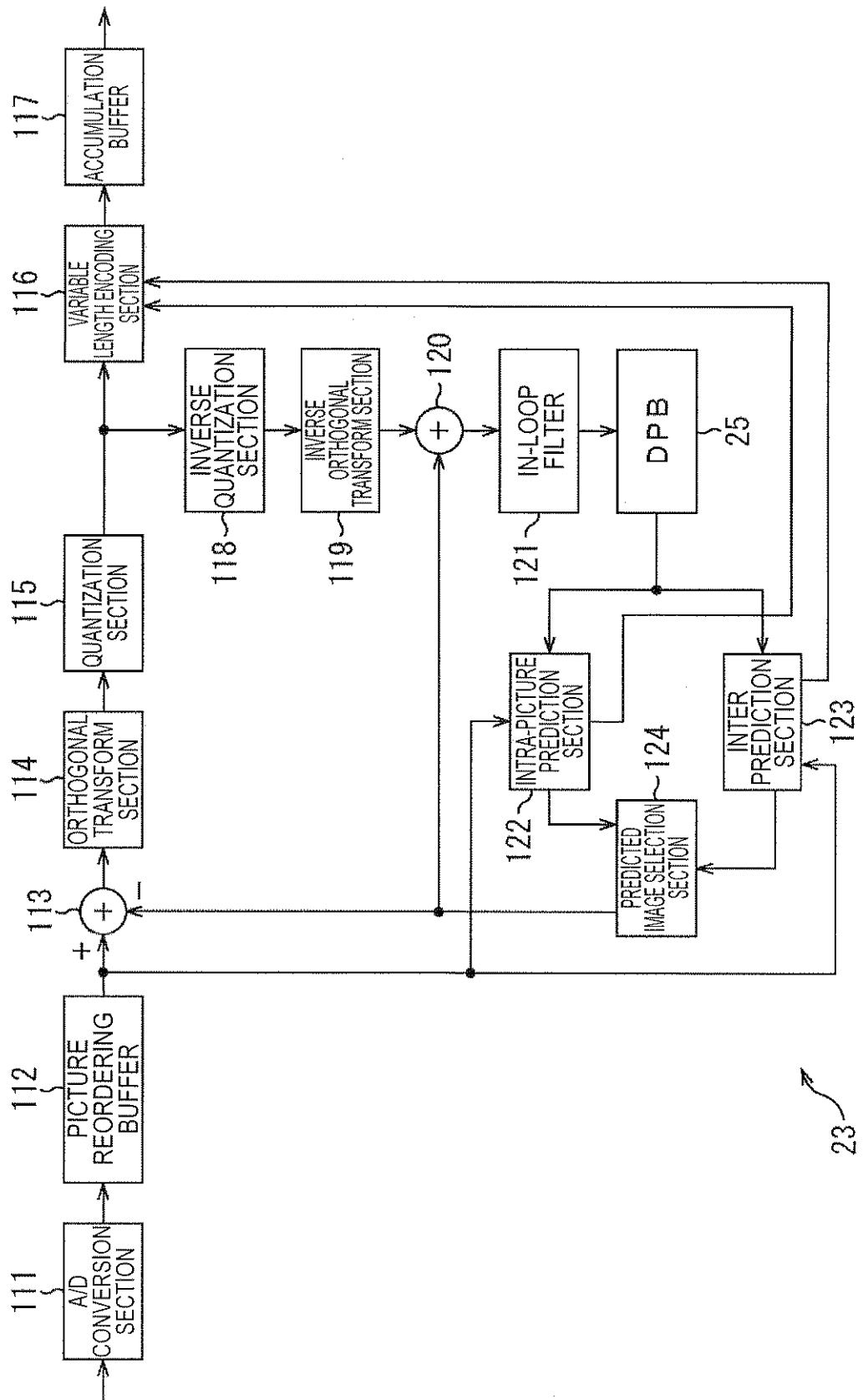


FIG. 4

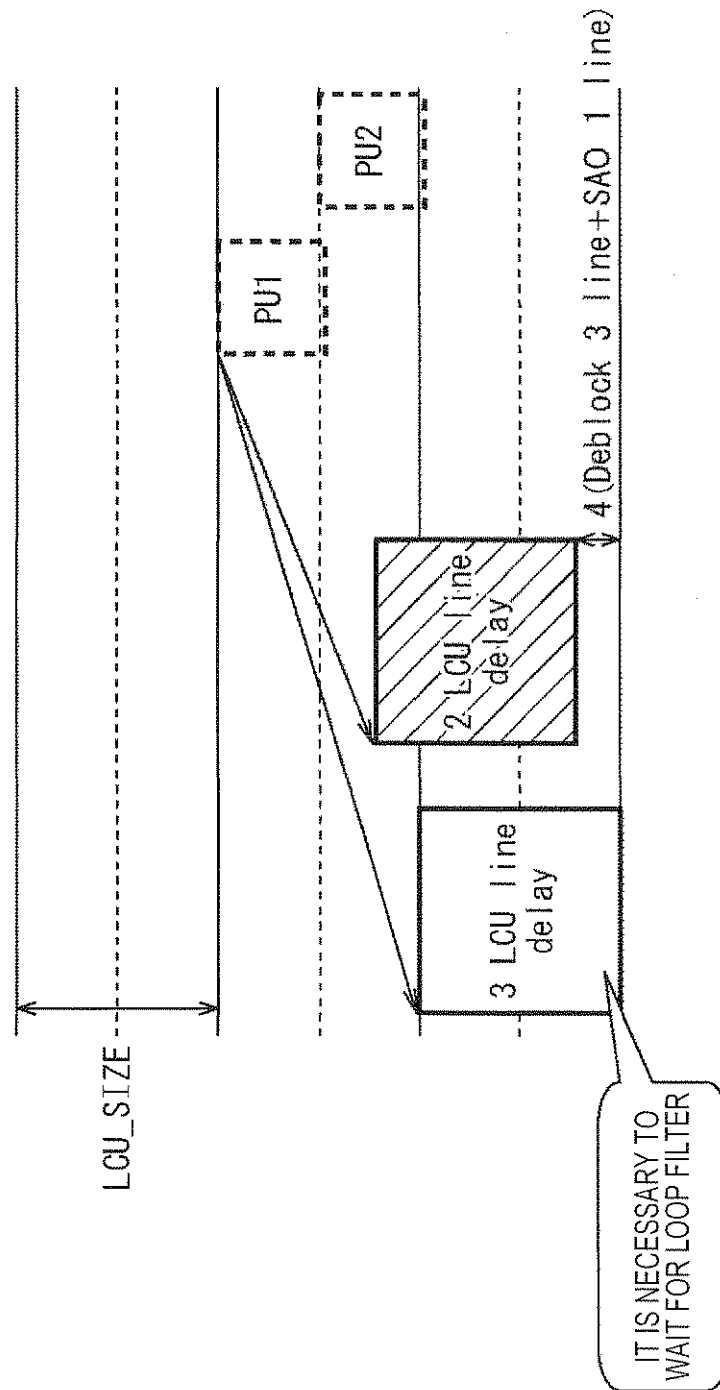
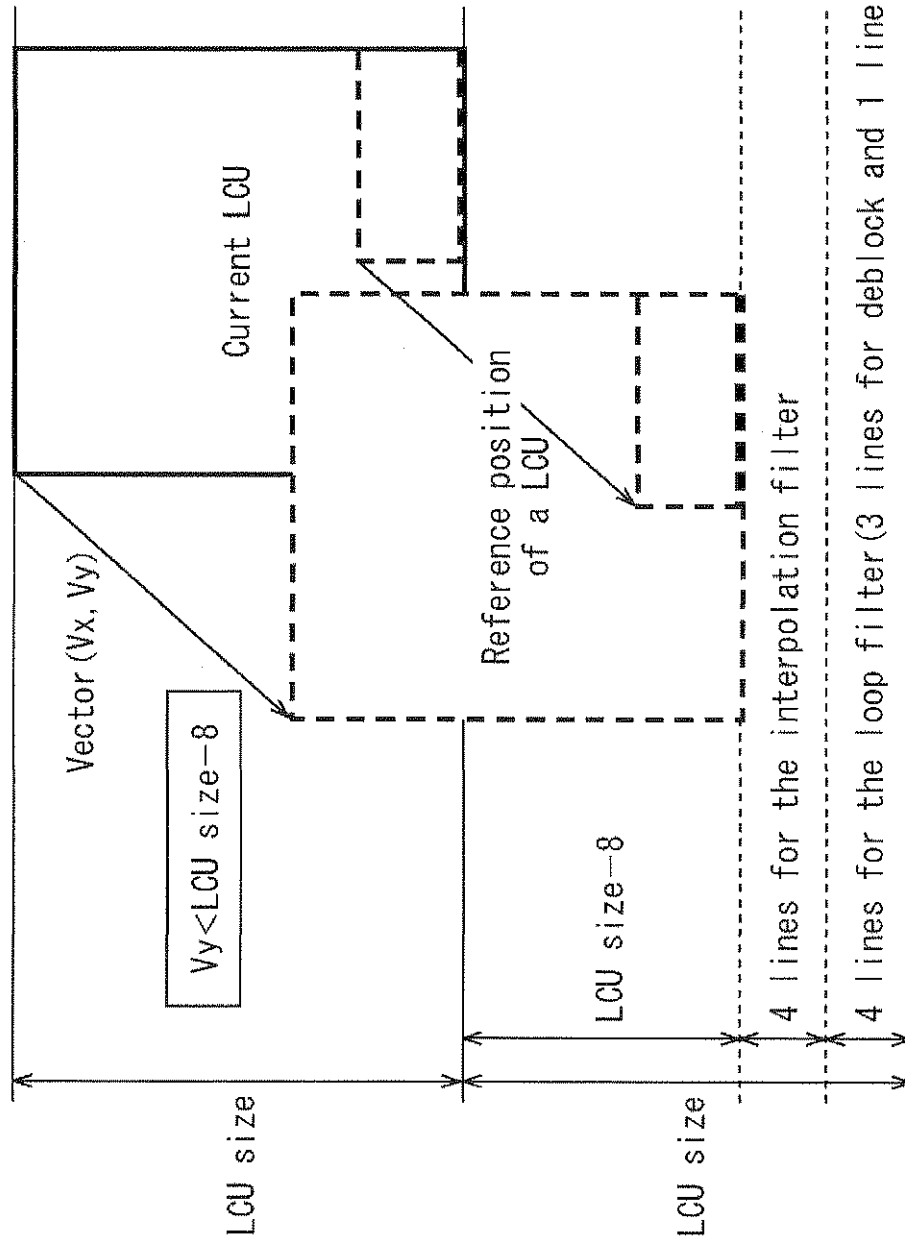


FIG. 5



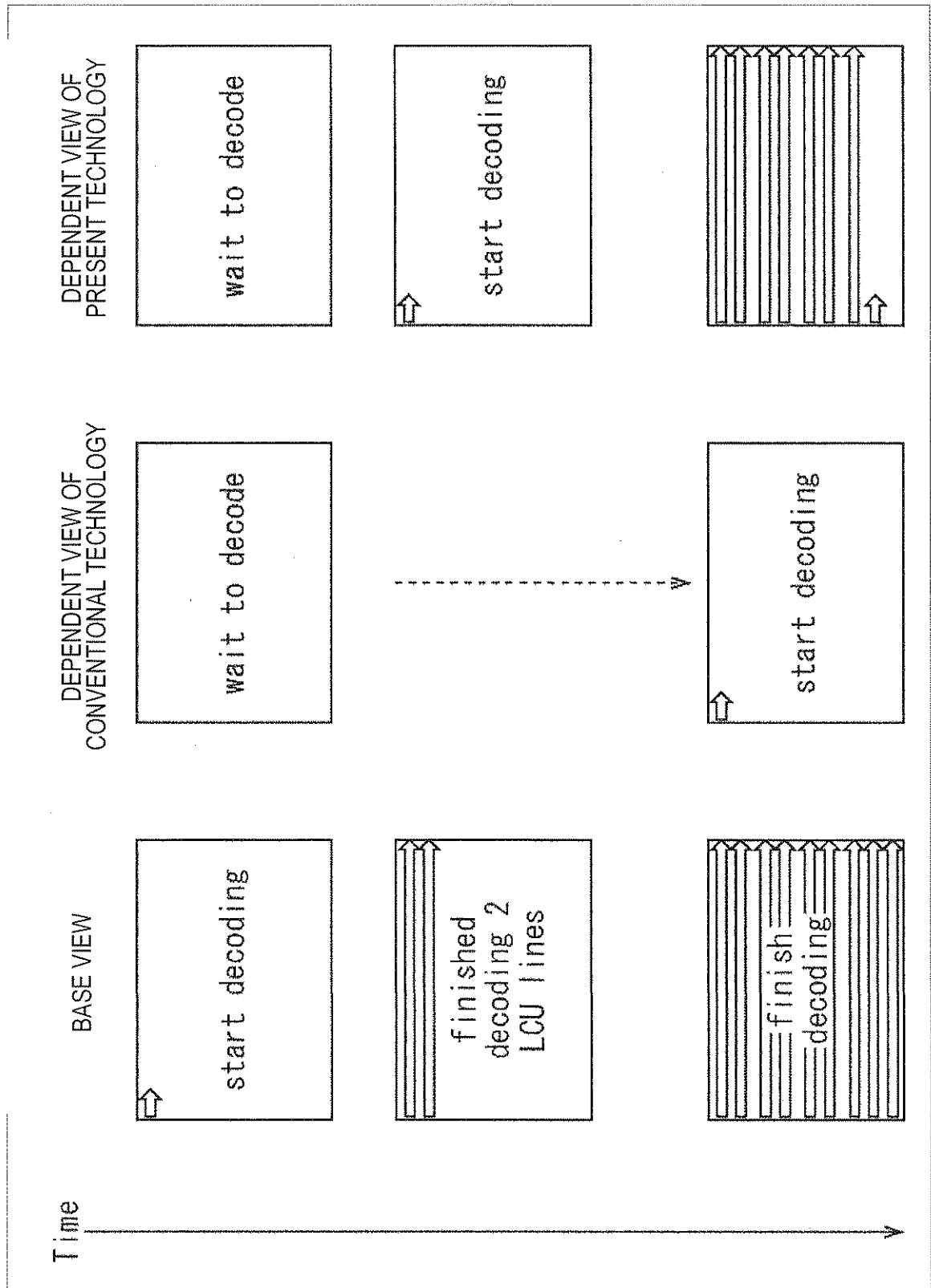
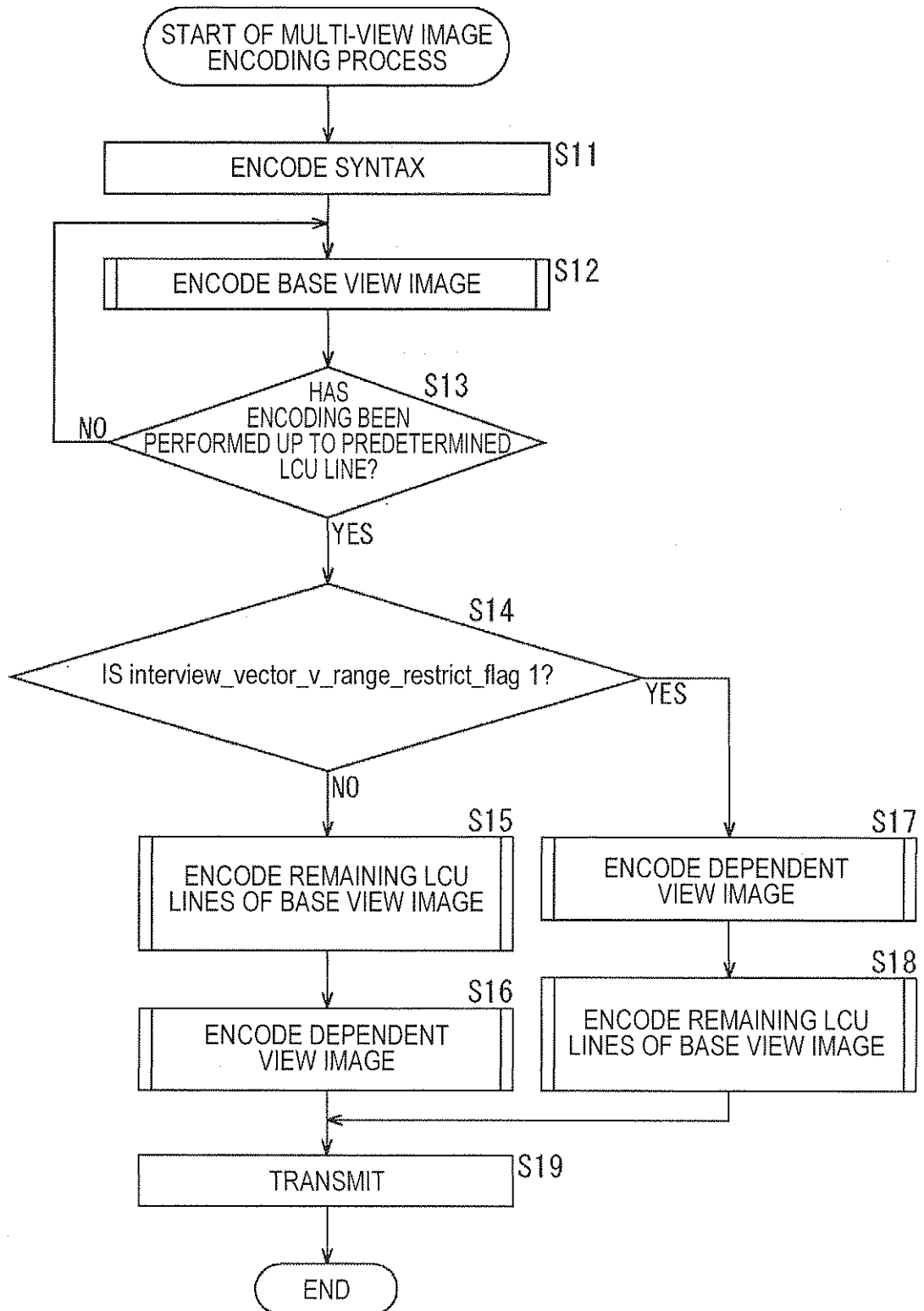
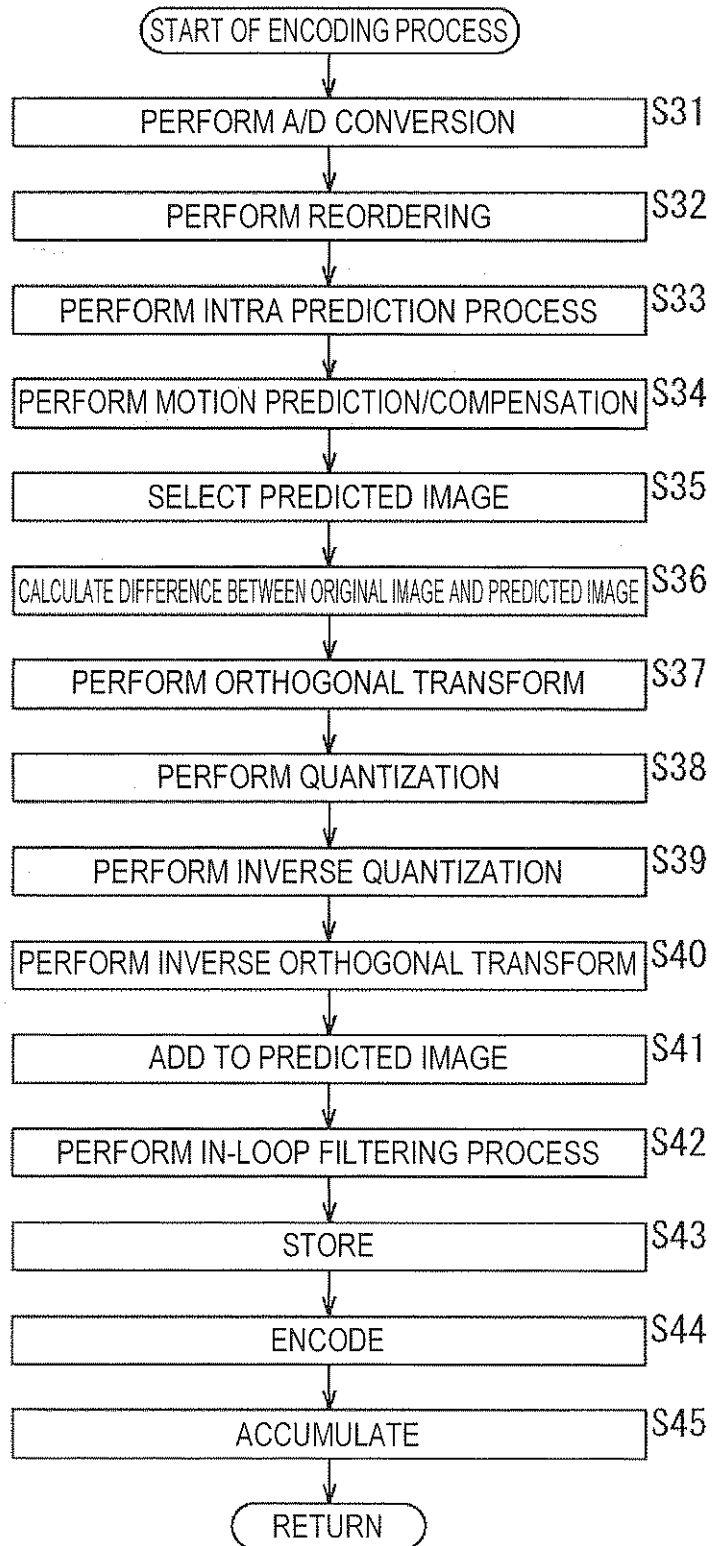
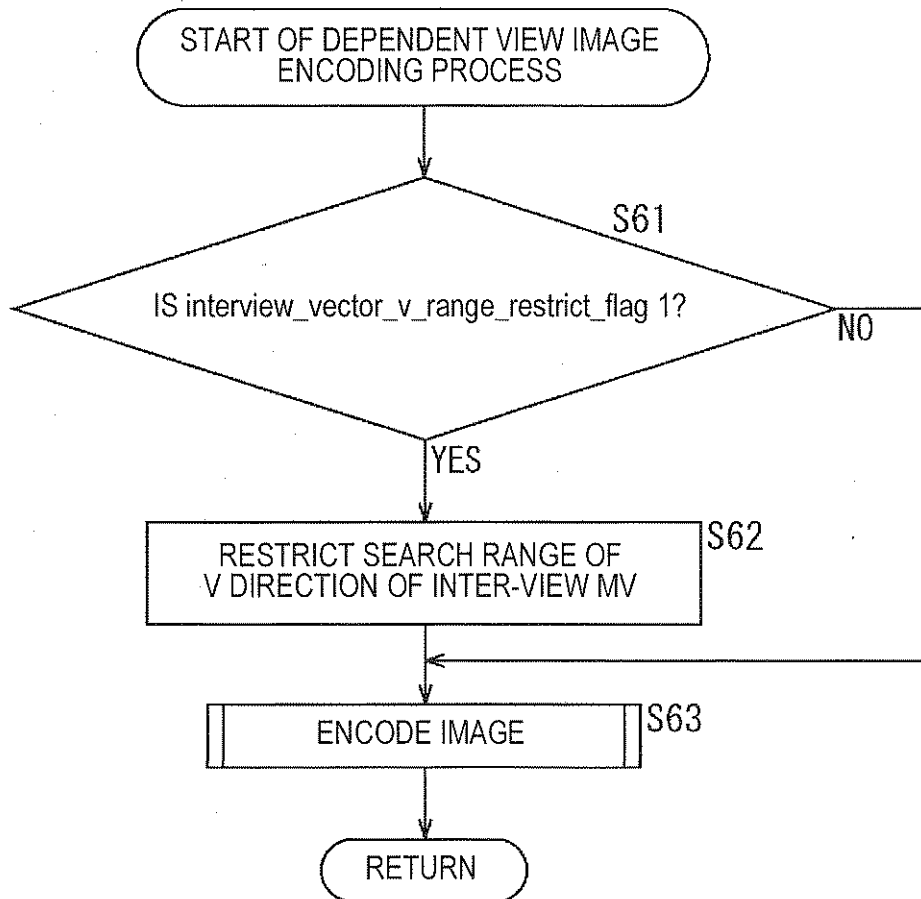


FIG. 6

**FIG. 7**

**FIG. 8**

**FIG. 9**

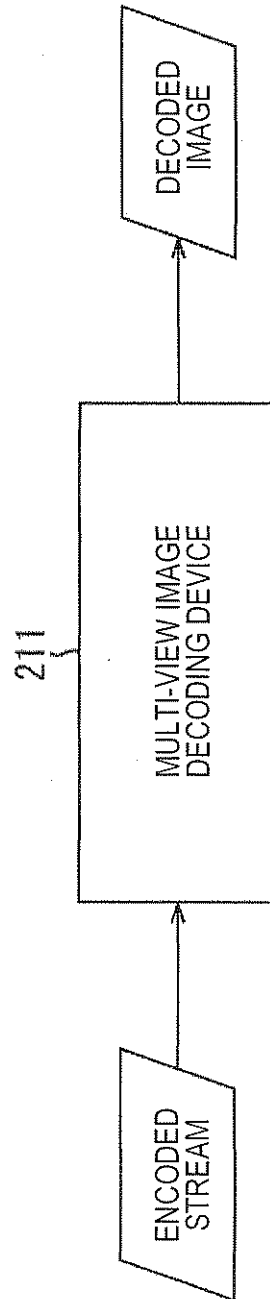
**FIG. 10**

FIG. 11

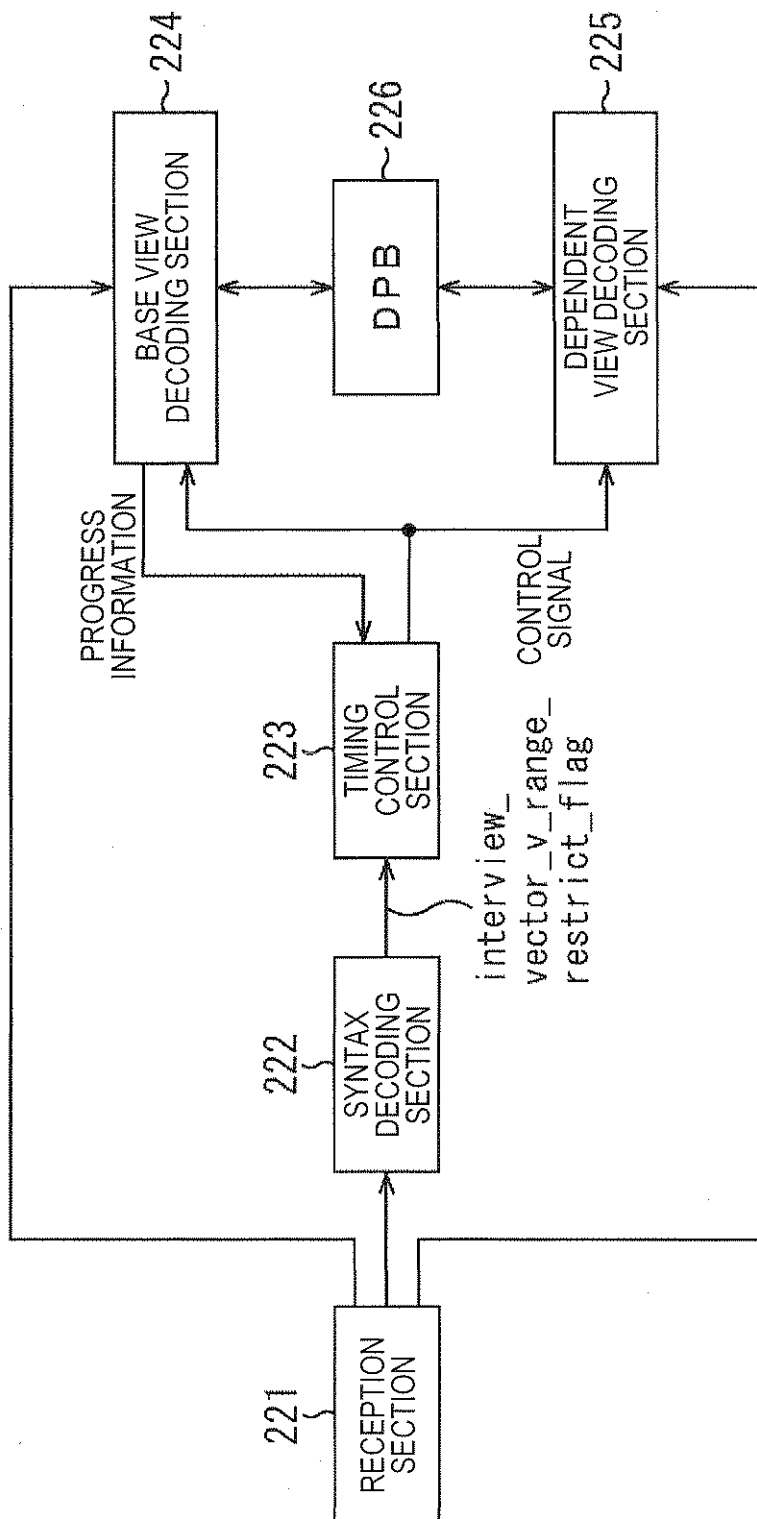
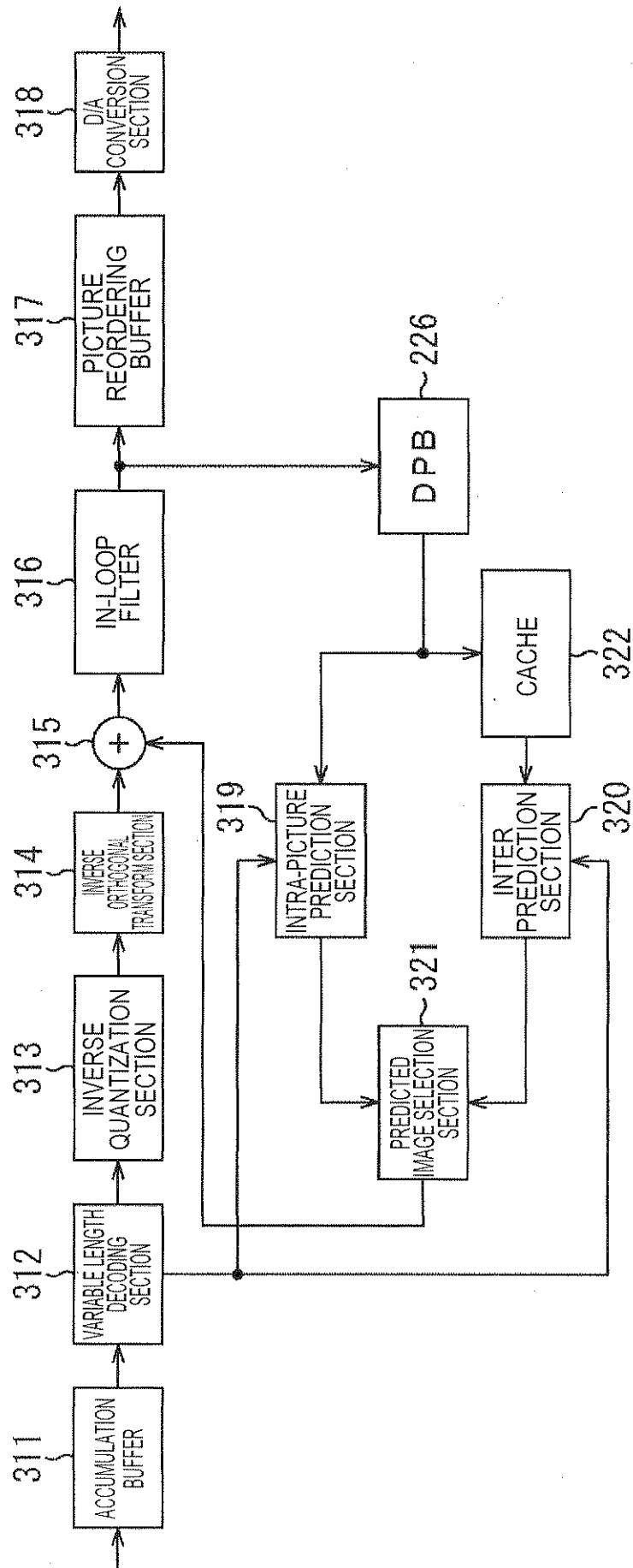
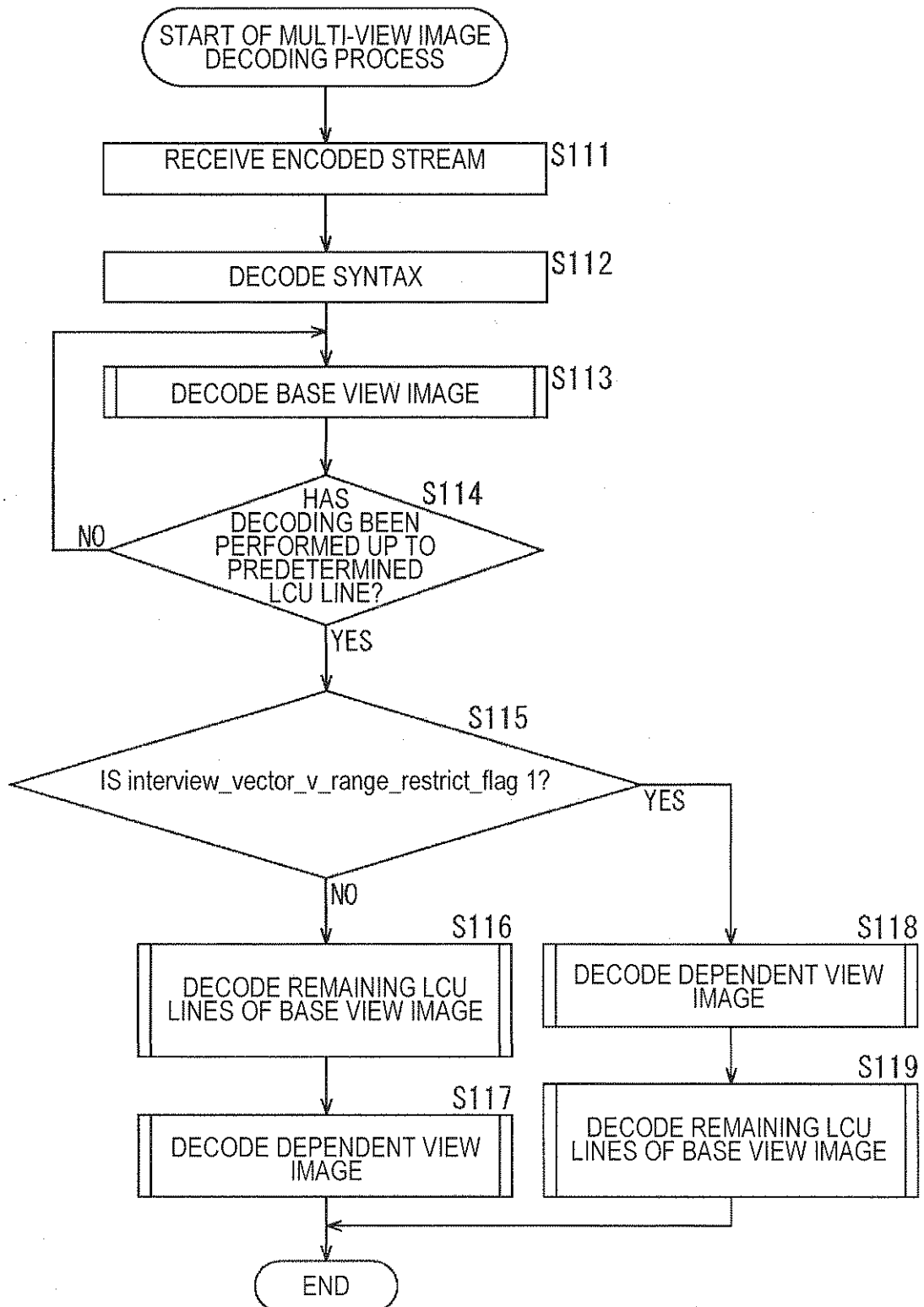
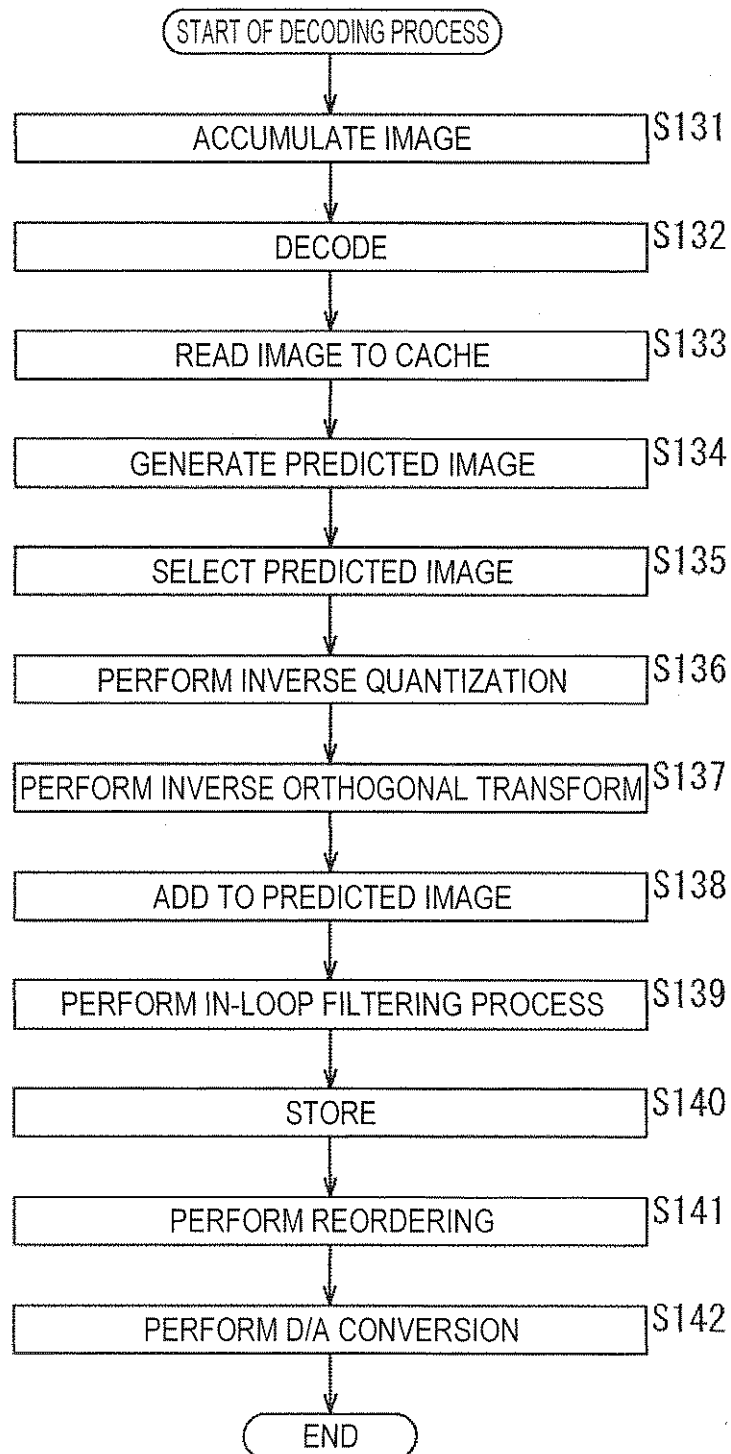


FIG. 12



224

**FIG. 13**

**FIG. 14**

**FIG. 15****Syntax**

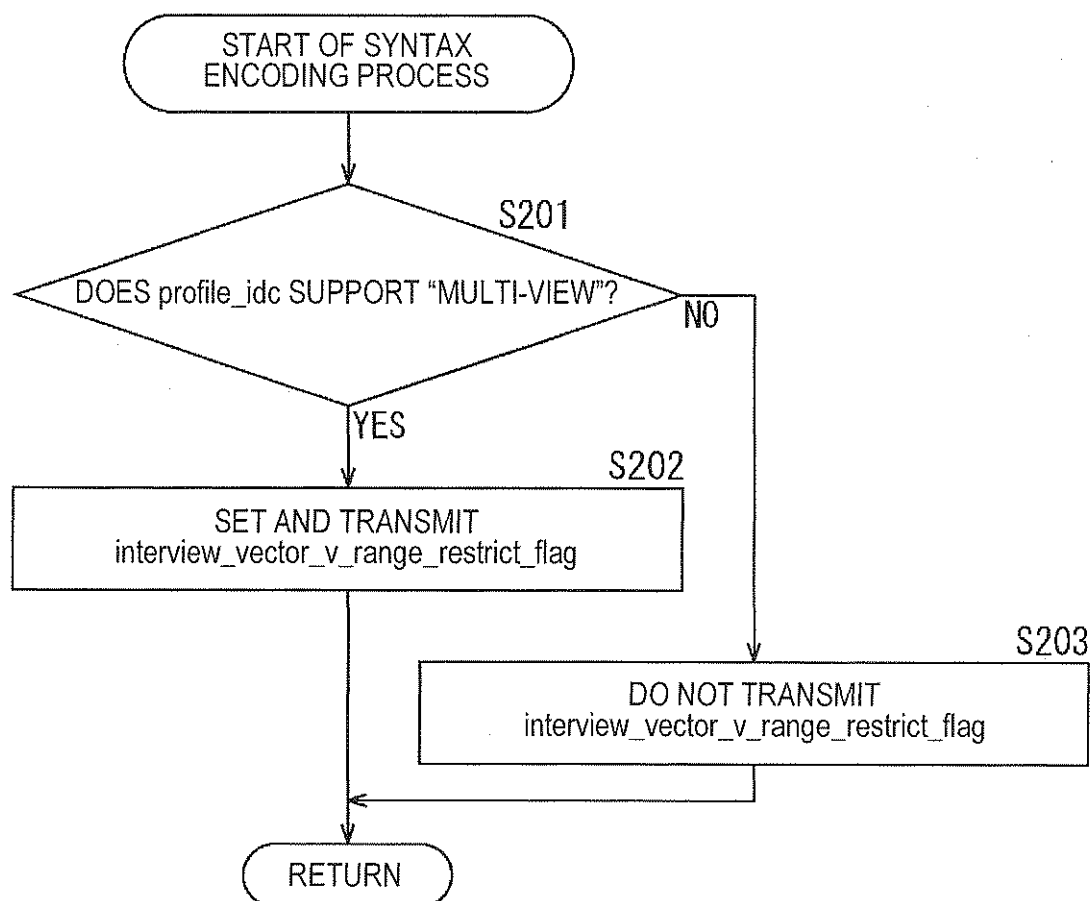
```

-- seq_parameter_set_rbsp( ) {
...
· if ( profile_idc == "Multi-view support Profile" ) {
    -- interview_vector_v_range_restrict_flag    u(1)
· }

```

**Semantics**

- interview\_vector\_v\_range\_restrict\_flag equal to 1 represents vertical component of inter-view vectors, which are used in the dependent view pictures, is equal to or less than (LCUsize-8) in units of luma samples. If not present, the value shall be inferred to be 0. If profile\_idc is equal to "Stereo profile", the value shall be set equal to 1.

**FIG. 16**

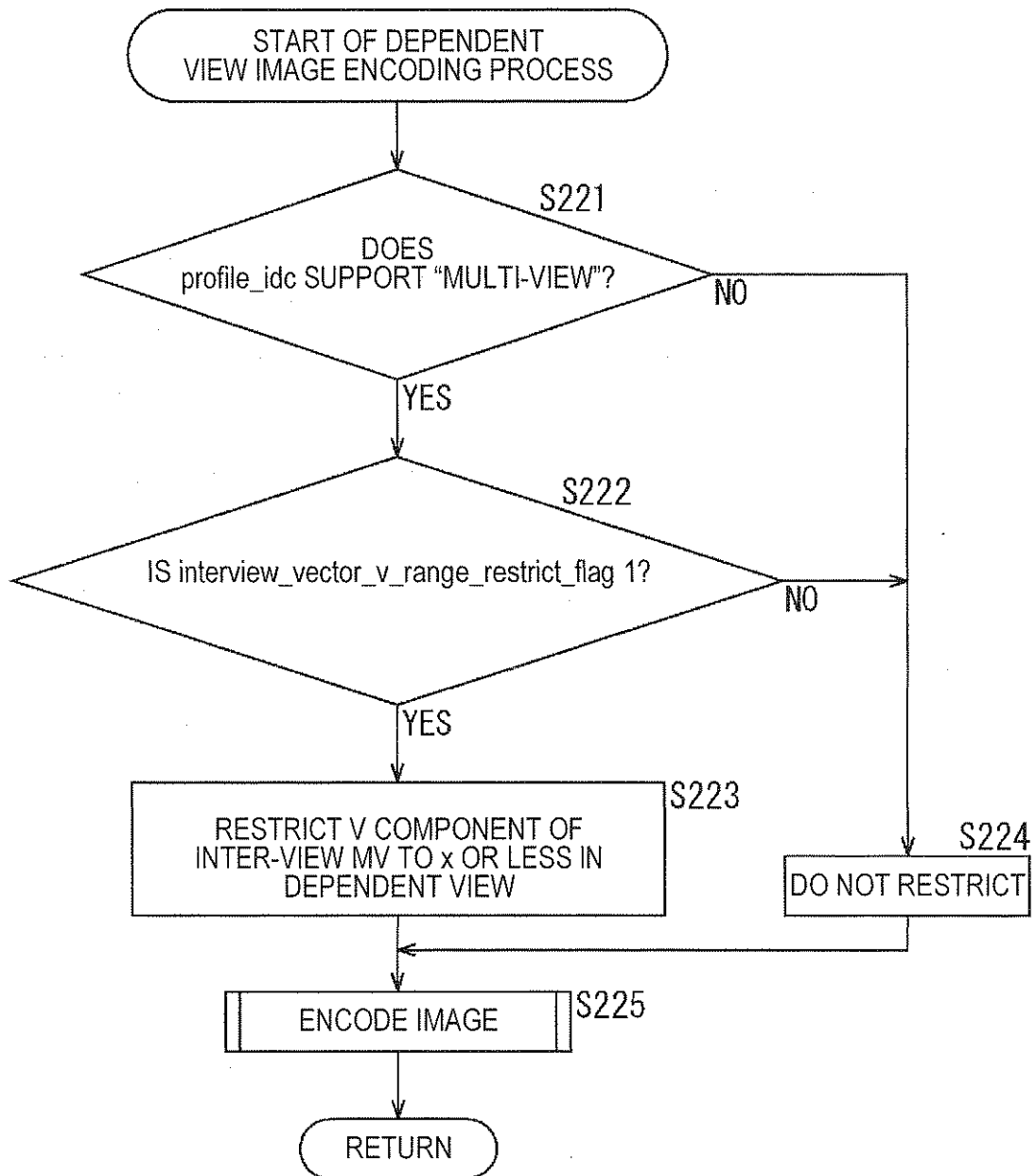
**FIG. 17**

FIG.18

## Syntax

```

- seq_parameter_set_rbsp() {
    ...
    * if ( profile_idc == "Multi-view support Profile" ) {
        interview_vector_v_range_restrict_flag    u(1)
        if (interview_vector_v_range_restrict_flag == 1 ) {
            interview_vector_v_range              u(8)
        }
    }
}

```

## Semantics

- interview\_vector\_v\_range\_restrict\_flag equal to 1 represents vertical component of inter-view vectors, which are used in the dependent view pictures, are equal to or less than the value interview\_vector\_v\_range in units of luma samples. If not present, the value shall be inferred to be 0. If profile\_idc is equal to "Stereo profile", the value shall be set equal to 1.
- interview\_vector\_v\_range represents the maximum value of vertical component of the inter-view vectors in units of luma samples. If not present, the value shall be inferred to be 0.

FIG. 19

## Syntax

```

- seq_parameter_set_rbsp() {
    ...
    . if ( profile_idc == "Multi-view support Profile" ) {
        interview_vector_v_range_restrict_flag u(1)
        if (interview_vector_v_range_restrict_flag == 1) {
            interview_vector_v_range u(8)
            interview_vector_h_range u(8)
        }
    . }

```

## Semantics

- `interview_vector_v_range_restrict_flag` equal to 1 represents vertical component of inter-view vectors, which are used in the dependent view pictures, are equal to or less than the value `interview_vector_v_range` in units of luma samples. If not present, the value shall be inferred to be 0. If `profile_idc` is equal to "Stereo profile", the value shall be set equal to 1.
- `interview_vector_v_range` represents the maximum value of vertical component of the inter-view vectors in units of luma samples. If not present, the value shall be inferred to be 0.
- `interview_vector_h_range` represents the maximum value of horizontal component of the inter-view vectors in units of luma samples. If not present, the value shall be inferred to be 0. If the value is 255, it represents that there is no restriction about the horizontal component.

**FIG. 20**

| Format nickname       | Luma width | Luma height | constraint |
|-----------------------|------------|-------------|------------|
| SQCIF                 | 128        | 96          | 56         |
| QCIF                  | 176        | 144         | 56         |
| QVGA                  | 320        | 240         | 56         |
| 525 SIF               | 352        | 240         | 56         |
| CIF                   | 352        | 288         | 56         |
| 525 HHR               | 352        | 480         | 56         |
| 625 HHR               | 352        | 576         | 56         |
| Q720p                 | 640        | 360         | 56         |
| VGA                   | 640        | 480         | 56         |
| 525 4SIF              | 704        | 480         | 56         |
| 525 SD                | 720        | 480         | 56         |
| 4CIF                  | 704        | 576         | 56         |
| 625 SD                | 720        | 576         | 56         |
| 480p (16:9)           | 864        | 480         | 56         |
| SVGA                  | 800        | 600         | 56         |
| QHD                   | 960        | 540         | 56         |
| XGA                   | 1024       | 768         | 56         |
| 720p HD               | 1280       | 720         | 56         |
| 4VGA                  | 1280       | 960         | 56         |
| SXGA                  | 1280       | 1024        | 56         |
| 525 16SIF             | 1408       | 960         | 56         |
| 16CIF                 | 1408       | 1152        | 56         |
| 4SVGA                 | 1600       | 1200        | 56         |
| 1080 HD               | 1920       | 1080        | 56         |
| 2Kx1K                 | 2048       | 1024        | 56         |
| 2Kx1080               | 2048       | 1080        | 56         |
| 4XGA                  | 2048       | 1536        | 120        |
| 16VGA                 | 2560       | 1920        | 120        |
| 3616x1536<br>(2.35:1) | 3616       | 1536        | 120        |
| 3672x1536<br>(2.39:1) | 3680       | 1536        | 120        |
| 3840x2160<br>(4*HD)   | 3840       | 2160        | 120        |
| 4Kx2K                 | 4096       | 2048        | 120        |
| 4096x2160             | 4096       | 2160        | 120        |
| 4096x2304 (16:9)      | 4096       | 2304        | 120        |
| 7680x4320             | 7680       | 4320        | 248        |
| 8192x4096             | 8192       | 4096        | 248        |
| 8192x4320             | 8192       | 4320        | 248        |

FIG. 21

Syntax

|                                  |            |
|----------------------------------|------------|
| sps_extension() {                | Descriptor |
| disparity_vector_constraint_flag | u(1)       |
| }                                |            |

Semantics

disparity\_vector\_constraint\_flag equal to 1 specifies that disparity vector is constrained in the CVS. When disparity\_vector\_constraint\_flag is equal to 1, the vertical component of the disparity vector shall be equal to or less than dv\_constraint\_value in pixel. The variable dv\_constraint\_value is specified as follows.

$$dv\_constraint\_value = ((1 + (pic\_height\_in\_luma\_samples * 0.05) >> 6) << 6) - 8$$

When disparity\_vector\_constraint\_flag is equal to 0, there is no constraint for disparity vector length. When not present, the value is inferred to be 0.

Stereo profile

Bitstreams conforming to the Stereo profile shall obey the following constraints:

Sequence parameter set extensions in the non-base view shall have disparity vector constraint flag equal to 1 only.

FIG.22

Table A—dv\_constraint\_value

| Level | Max luma height | dv_constraint_value |
|-------|-----------------|---------------------|
| 1     | 144             | 56                  |
| 2     | 288             | 56                  |
| 2.1   | 360             | 56                  |
| 3     | 540             | 56                  |
| 3.1   | 720             | 56                  |
| 4     | 1080            | 56                  |
| 4.1   | 1080            | 56                  |
| 5     | 2160            | 120                 |
| 5.1   | 2160            | 120                 |
| 5.2   | 2160            | 120                 |
| 6     | 4320            | 248                 |
| 6.1   | 4320            | 248                 |
| 6.2   | 4320            | 248                 |

Semantics  
disparity\_vector\_constraint\_flag equal to 1 specifies that disparity vector is constrained in the CVS. When disparity\_vector\_constraint\_flag is equal to 1, the vertical component of the disparity vector shall be equal to or less than dv\_constraint\_value in pixel. The variable dv\_constraint\_value is specified in Table A. When disparity\_vector\_constraint\_flag is equal to 0, there is no constraint for disparity\_vector\_length. When not present, the value is inferred to be 0.

FIG. 23

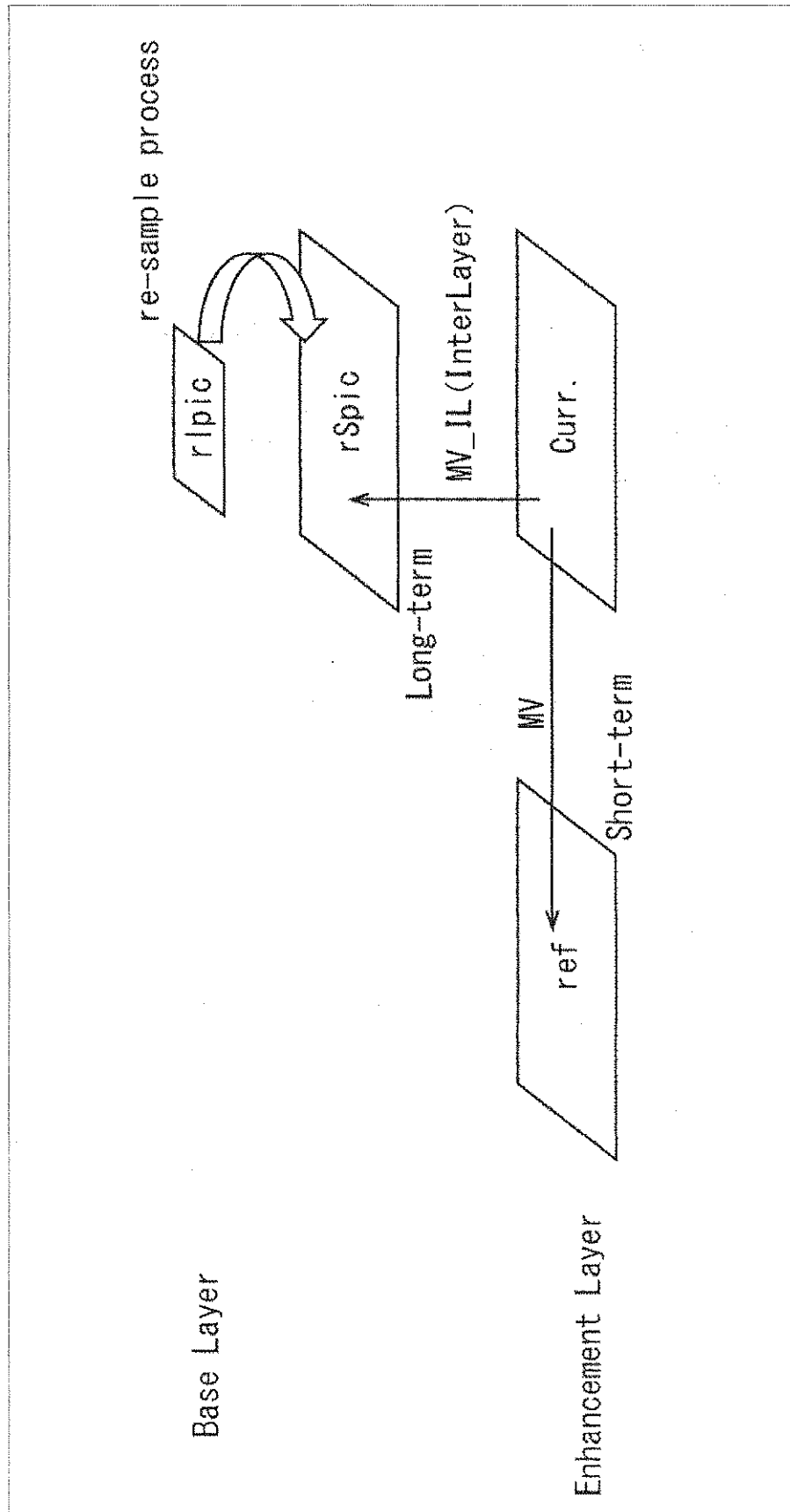
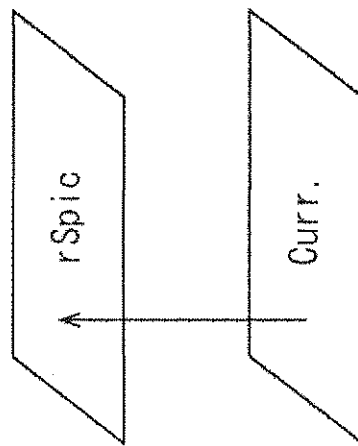


FIG. 24



Scalable video profile

Bitstreams conforming to the Stereo profile shall obey the following constraints:

- Both horizontal and vertical component of inter-layer predicted vector shall be equal to zero.

FIG. 25

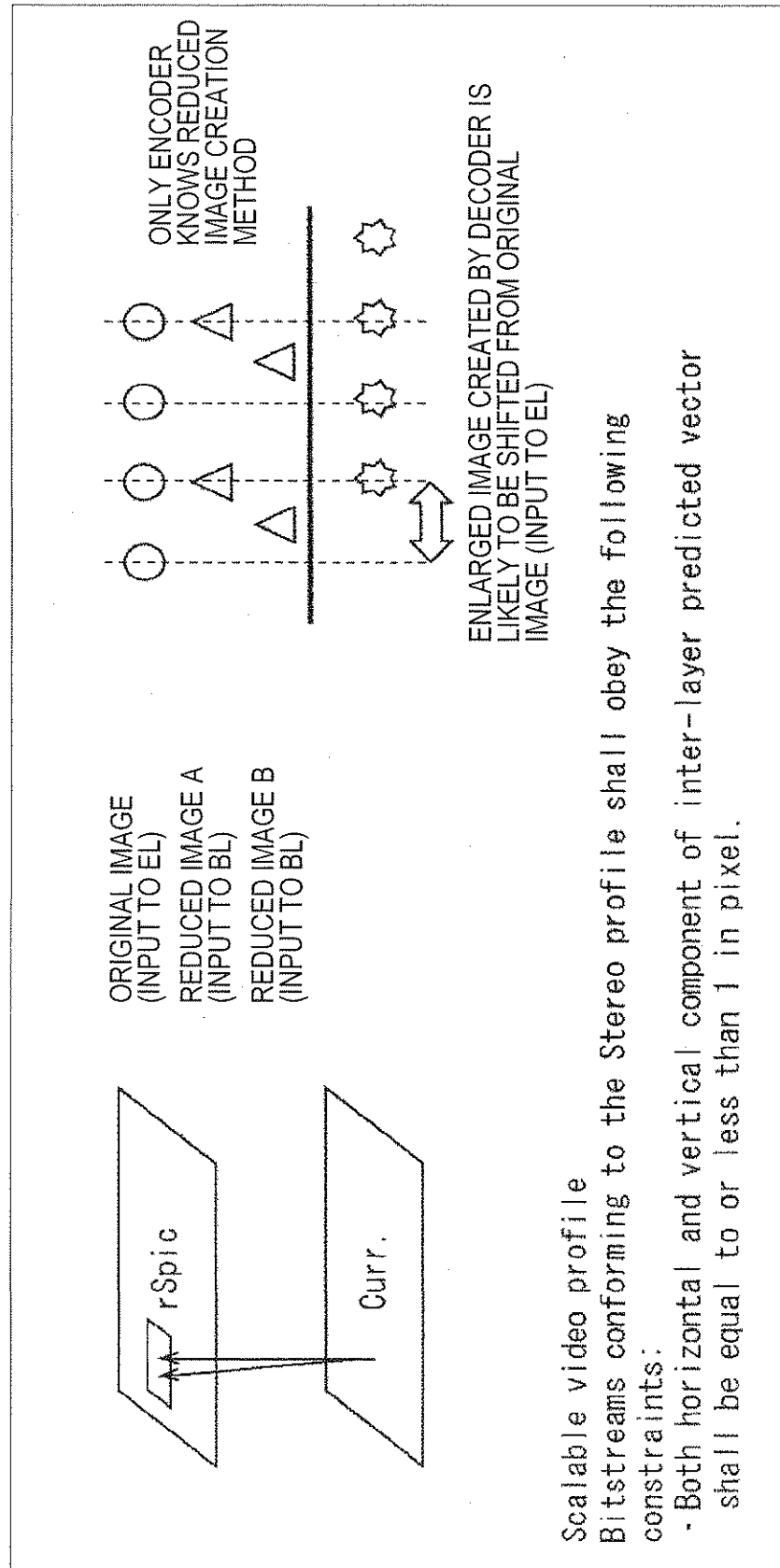
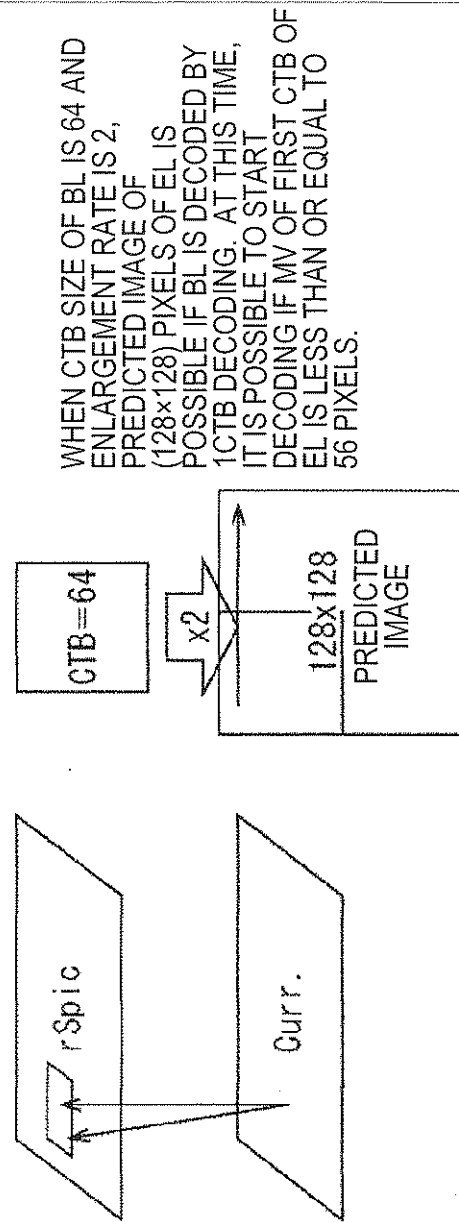


FIG. 26



WHEN CTB SIZE OF BL IS 64 AND ENLARGEMENT RATE IS 2, PREDICTED IMAGE OF  $(128 \times 128)$  PIXELS OF EL IS POSSIBLE IF BL IS DECODED BY 1CTB DECODING. AT THIS TIME, IT IS POSSIBLE TO START DECODING IF MV OF FIRST CTB OF EL IS LESS THAN OR EQUAL TO 56 PIXELS.

Scalable video profile

Bitstreams conforming to the Stereo profile shall obey the following constraints:

- Both horizontal and vertical component of inter-layer predicted vector shall be equal to or less than the  $il\_pred\_constraint$  in pixel. The variable  $il\_pred\_constraint$  is specified as follows.

$$il\_pred\_constraint = (scale\_factor * BL\_CTBsize - EL\_CTBsize) - 8$$

$$Ex. \quad il\_pred\_constraint = (2 * 64 - 64) - 8 = 56 \text{ [pixel]}$$

FIG. 27

Syntax

| vps_extension() {                          |      |
|--------------------------------------------|------|
| for (i=1: i <= vps_max_layers_minus1; i++) |      |
| inter_view_mv_vert_constraint_flag[i]      | u(1) |
| }                                          |      |

Semantics

inter\_view\_mv\_vert\_constraint\_flag[i] specifies the value of the inter\_view\_mv\_vert\_constraint\_flag syntax element in VCL NAL units of the i-th layer. For i in a range from 1 to vps\_max\_layers\_minus1, inclusive, when not present, the value of inter\_view\_mv\_vert\_constraint\_flag[i] is inferred to be equal to 0. inter\_view\_mv\_vert\_constraint\_flag equal to 1 specifies that vertical component of motion vectors used for inter-layer prediction are constrained in the CVS. When inter\_view\_mv\_vert\_constraint\_flag is equal to 1, the vertical component of the motion vectors used for inter-layer prediction shall be equal to or less than 56 in units of luma samples. When inter\_view\_mv\_vert\_constraint\_flag is equal to 0, no constraint for of the vertical component of the motion vectors used for inter-layer prediction is signalled by this flag.

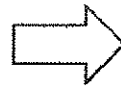
FIG. 28

## CASE OF SPS\_EXT SYNTAX

## F.1.1.1 Stereo Main profile

Bitstreams conforming to the Stereo Main profile shall obey the following constraints:

- The sub-bitstream resulting from the sub-bitstream extraction process with any value of `tlTarget` and a value of 0 in `layerIdListTarget` as inputs shall conform to the Main profile.
- The bitstream shall contain one layer with `nuh_layer_id` equal to `i` for which `ViewId[i]` is greater than 0.
- When `ViewId[i]` is greater than 0, `inter_view_mv_vert_constraint_flag` shall be equal to 1 in the `sps_extension()` syntax structure of the active layer SPS of any coded pictures with `nuh_layer_id` equal to `i`.



## CASE OF VPS\_EXT SYNTAX

## F.1.1.1 Stereo Main profile

Bitstreams conforming to the Stereo Main profile shall obey the following constraints:

- The sub-bitstream resulting from the sub-bitstream extraction process with any value of `tlTarget` and a value of 0 in `layerIdListTarget` as inputs shall conform to the Main profile.
- The bitstream shall contain one layer with `nuh_layer_id` equal to `i` for which `ViewId[i]` is greater than 0.
- When `ViewId[i]` is greater than 0, `inter_view_mv_vert_constraint_flag` of the `ViewId[i]` shall be equal to 1 in the `vps_extension()` syntax structure of any coded pictures with `nuh_layer_id` equal to `i`.

**FIG. 29**

| SAME POINT AS SPS_EXT                                                                        | DIFFERENT POINT FROM SPS_EXT                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TRANSCODING OF BITSTREAM LEVEL IS POSSIBLE<br>BECAUSE ENCODING FOR EVERY VIEW IS<br>POSSIBLE | BECAUSE VPS IS HIGHER SYNTAX THAN SPS, IN CASE OF<br>MULTI-VIEW, BITSTREAM RESTRICTION IN EACH EARLIER<br>VIEW IS KNOWN SOONER. THUS, LOAD DISPERSION OF<br>DECODER CORE IS EASY.<br>AS MODIFIED EXAMPLE, WHEN SYNTAX INDICATING THAT<br>FLAG IS SENT ONLY IN CASE OF 3D PROFILE IS SET,<br>DETERMINATION IS EASY. |

FIG. 30

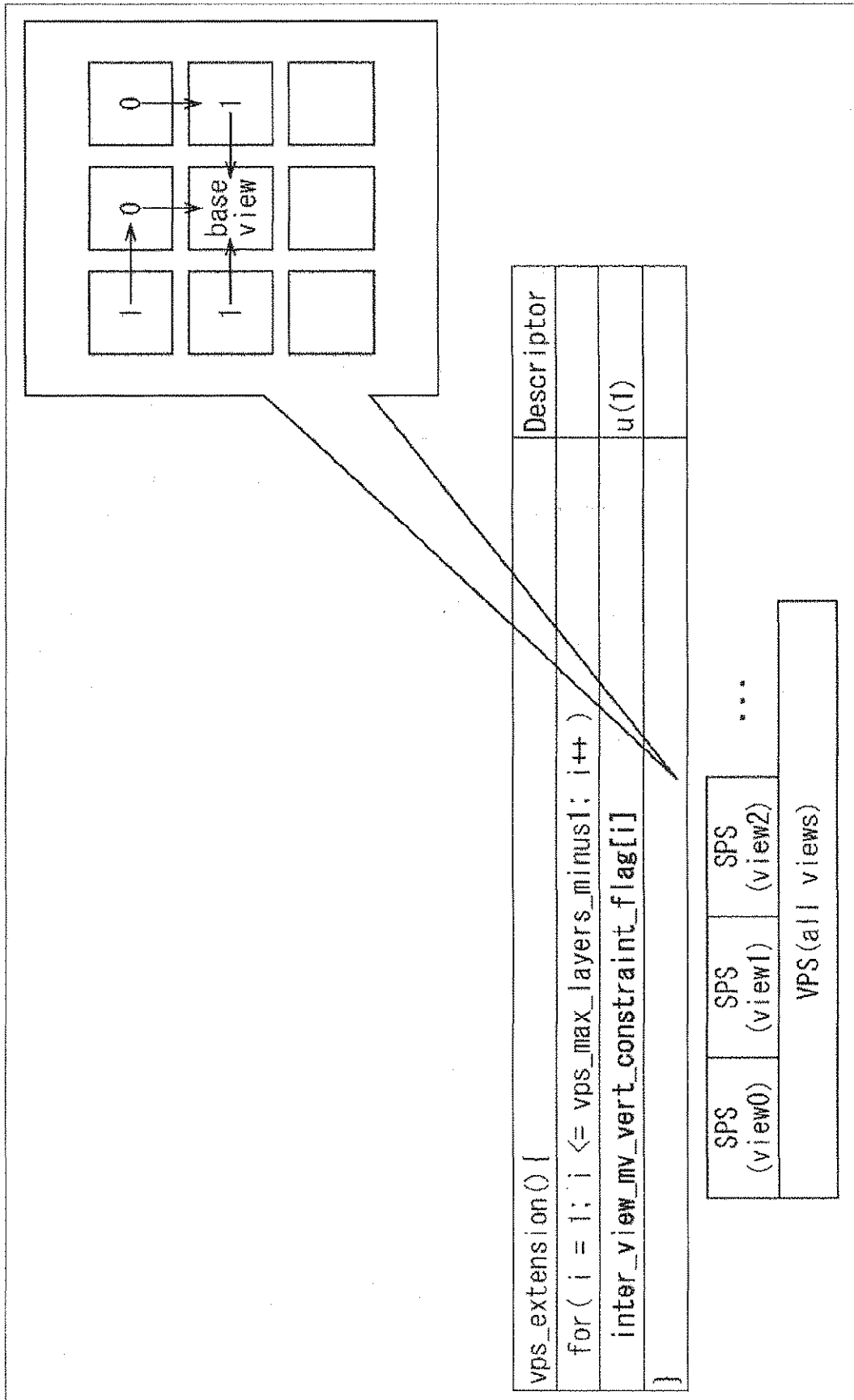


FIG. 31

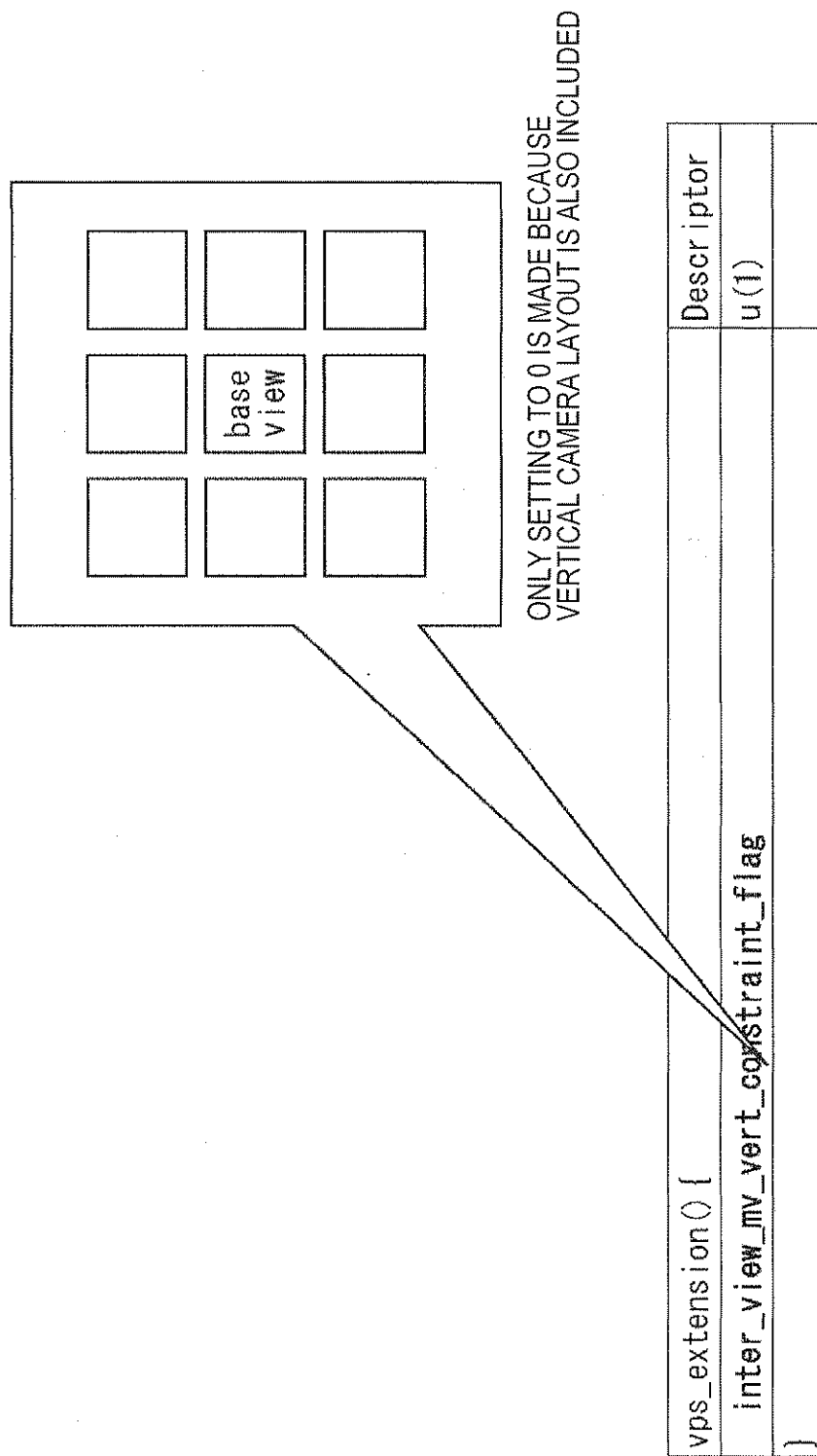


FIG. 32

|                                    |            |
|------------------------------------|------------|
| sps_extension_vui_parameters() {   | Descriptor |
| if( bitstream_restriction_flag ) { |            |
| inter_view_mv_vert_constraint_flag |            |
| }                                  | u(1)       |
| }                                  |            |

FIG. 33

Syntax

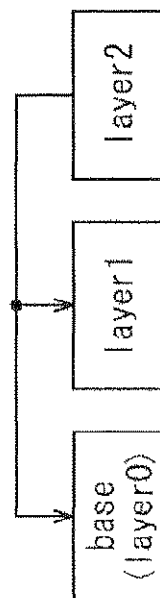
|                                                |            |
|------------------------------------------------|------------|
| sps_extension_vui_parameters() {               | Descriptor |
| ...                                            |            |
| if( bitstream_restriction_flag ) {             |            |
| num_delay_ref_layers                           | ue (v)     |
| for ( i = 0; i < num_delay_ref_layers; i++ ) { |            |
| min_spatial_segment_delay[i]                   | ue (v)     |
| if ( min_spatial_segment_delay[i] > 0 )        |            |
| ctu_based_delay_enabled_flag[i]                | u(1)       |
| if ( ctu_based_delay_enabled_flag[i] )         |            |
| min_delay_ctb_horizontal[i]                    | ue (v)     |
| }                                              |            |
| ...                                            |            |
| }                                              |            |

0 OR NUMBER OF  
REFERENCE LAYERS  
THERE IS NO RESTRICTION FROM 0

NUMBER OF CTU LINES TO  
BE DELAYED FROM  
REFERENCE LAYER

DESCRIPTION OF  
DELAY INFORMATION OF  
X DIRECTION

NUMBER OF CTUS (OF X DIRECTION)  
TO BE DELAYED FROM CTB OF SAME  
POSITION OF REFERENCE LAYER



DESCRIPTION OF EACH LAYER IS POSSIBLE  
DUE TO VUI (SPS\_EXT) AND DELAY INFORMATION  
FOR LAYER 0 AND LAYER 1 IS WRITTEN IN LAYER 2

FIG. 34

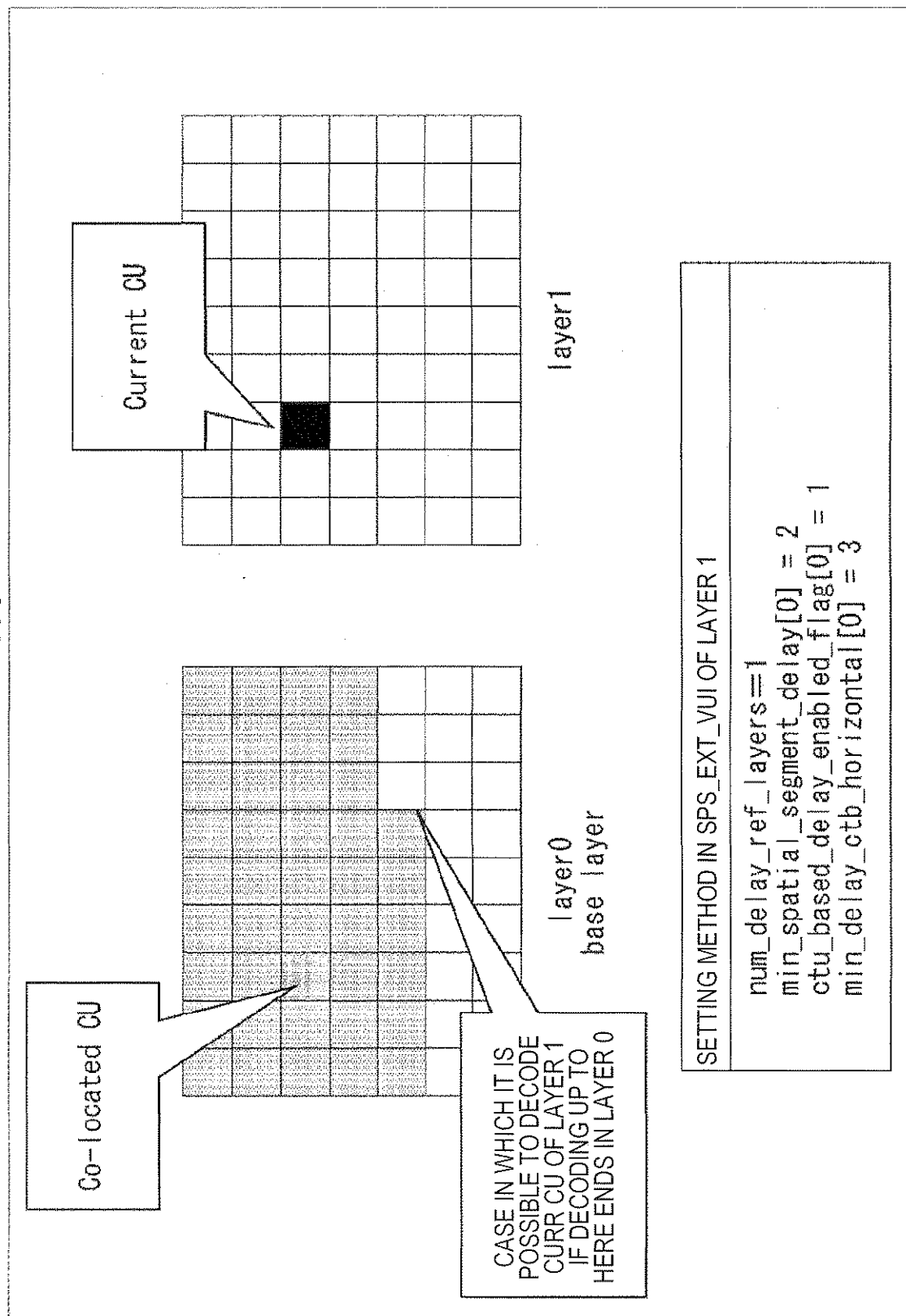


FIG. 35

## CASE OF SPS\_EXT SYNTAX

## F.1.1.1 Stereo Main profile

Bitstreams conforming to the Stereo Main profile shall obey the following constraints:

- The sub-bitstream resulting from the sub-bitstream extraction process with any value of `tidTarget` and a value of 0 in `layerIdListTarget` as inputs shall conform to the Main profile.
- The bitstream shall contain one layer with `nuh_layer_id` equal to `i` for which `ViewId[i]` is greater than 0.
- When `ViewId[i]` is greater than 0, `inter_view_mv_vert_constraint_flag` shall be equal to 1 in the `sps_extension()` syntax structure of the active layer SPS of any coded pictures with `nuh_layer_id` equal to `i`.

## CONSTRAINT BY CTU LINE

## F.1.1.1 Stereo Main profile

Bitstreams conforming to the Stereo Main profile shall obey the following constraints:

- The sub-bitstream resulting from the sub-bitstream extraction process with any value of `tidTarget` and a value of 0 in `layerIdListTarget` as inputs shall conform to the Main profile.
- The bitstream shall contain one layer with `nuh_layer_id` equal to `i` for which `ViewId[i]` is greater than 0.
- When `ViewId[i]` is greater than 0, `num_delay_ref_layers` shall be equal to 1 and `min_spatial_segment_delay[0]` shall be equal to  $1 \ll (6 - \text{refLog2Ctbsize})$  in the `sps_extension_vui_parameters()` syntax structure of the active layer SPS of any coded pictures with `nuh_layer_id` equal to `i`.

$$MV_V \leq 56\text{pixel}$$

$$\Leftrightarrow$$

ONE-LINE DELAY WHEN CTU SIZE = 64

$$\Leftrightarrow$$
 TWO-LINE DELAY WHEN CTU SIZE = 32

$$\Leftrightarrow$$
 FOUR-LINE DELAY WHEN CTU SIZE = 16

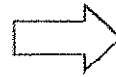
$$\Leftrightarrow 1 \ll (6 - \text{Log2CTUsize}) \text{ LINE DELAY}$$


FIG. 36

| SAME POINT AS interview_vector_v_range_restrict_flag | DIFFERENT POINTS FROM interview_vector_v_range_restrict_flag                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SAME AS DELAY INFORMATION                            | <p>RESTRICTION OF <math>MV\_V \leq 56</math> IS CHANGED ACCORDING TO ON/OFF OF LOOP FILTER IN REFERENCE PLANE OR WHETHER DISPARITY VECTOR OF Y DIRECTION HAS INTEGER PRECISION</p> <ul style="list-style-type: none"> <li>• IN CASE OF LOOP FILTER OFF, MV IS EXTENDED UP TO <math>MV\_V \leq 60</math> (= 64 - 4 OF OFFSET OF MC FILTER) PIXELS</li> <li>• BECAUSE MC FILTER IS UNNECESSARY WHEN MV LENGTH IS INTEGER, MV IS EXTENDED UP TO <math>MV\_V \leq 60</math> (= 64 - 4 OF OFFSET OF LOOP FILTER)</li> <li>• WHEN LOOP FILTER IS TURNED OFF AND MV LENGTH IS INTEGER, MV IS EXTENDED UP TO <math>MV\_V \leq 64</math></li> </ul> |

FIG. 37

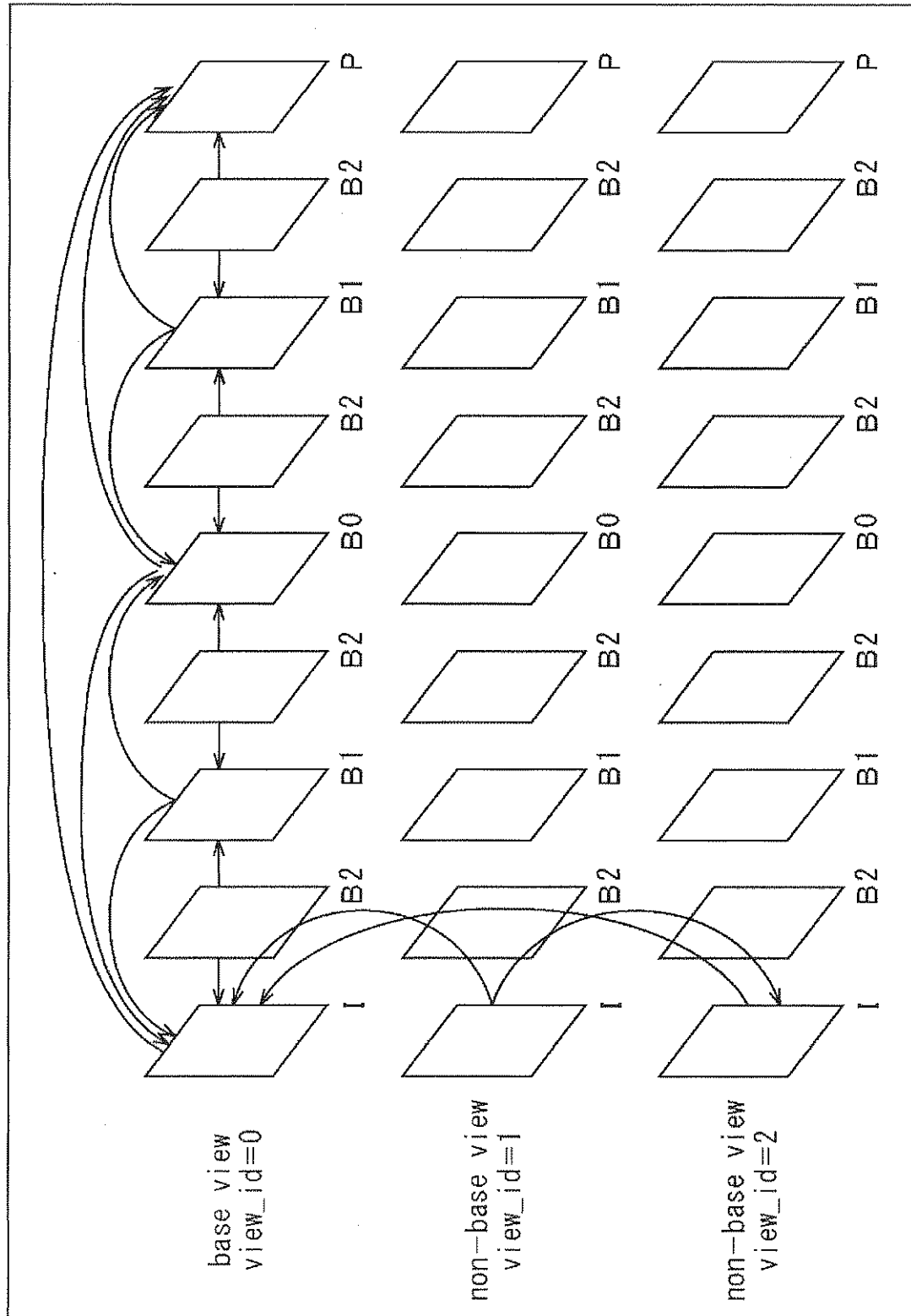


FIG. 38

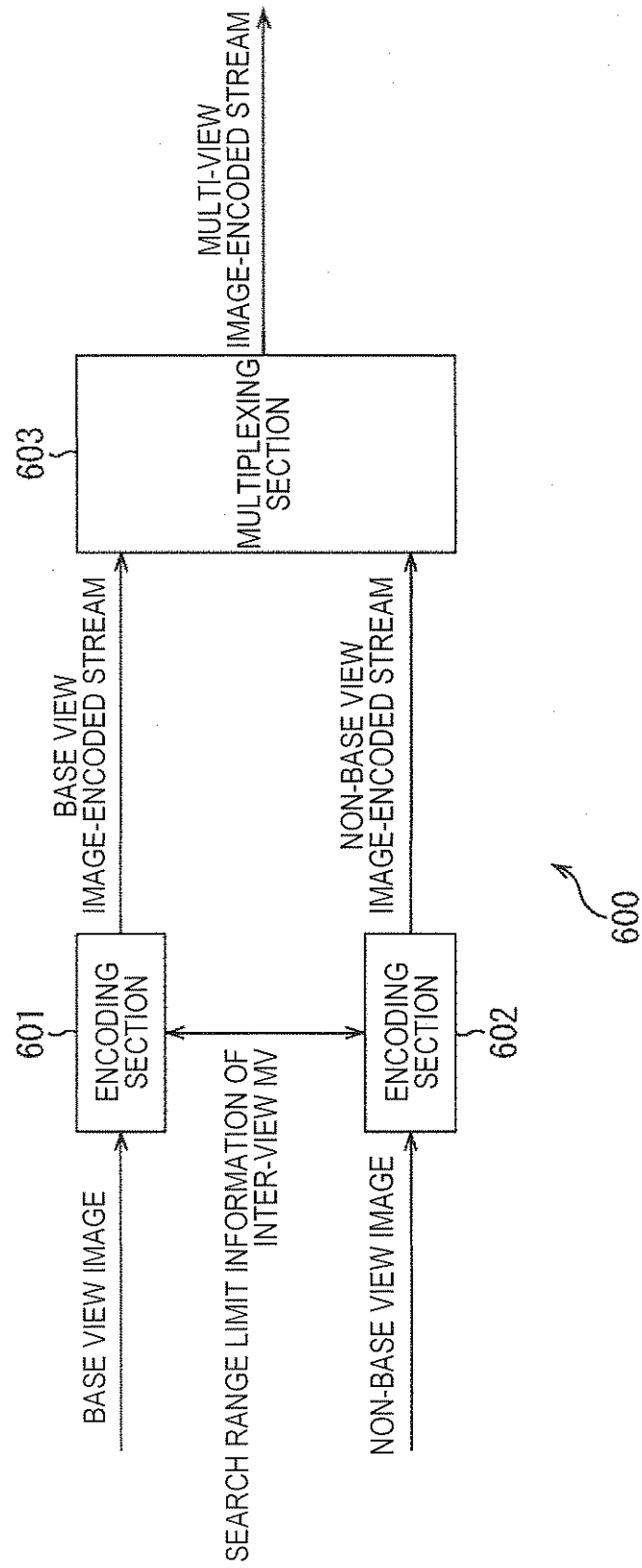


FIG. 39

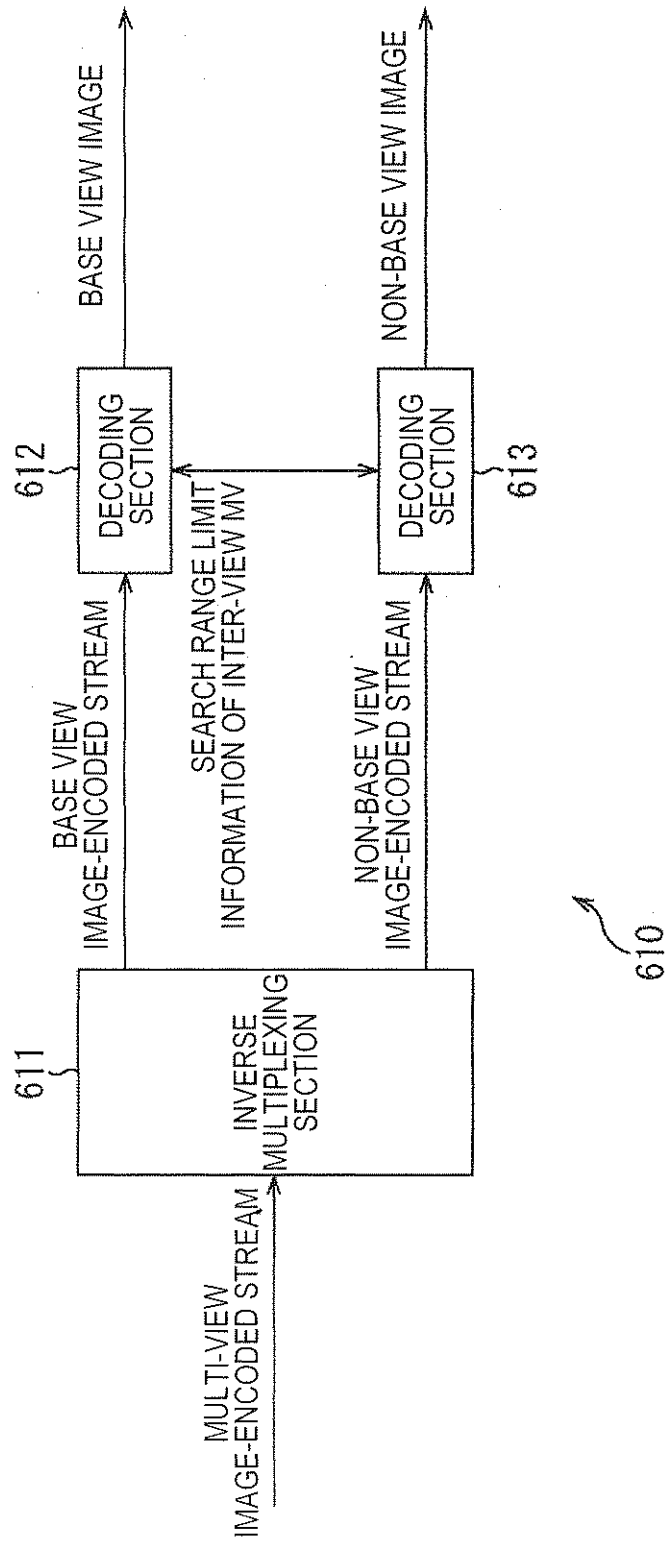


FIG. 40

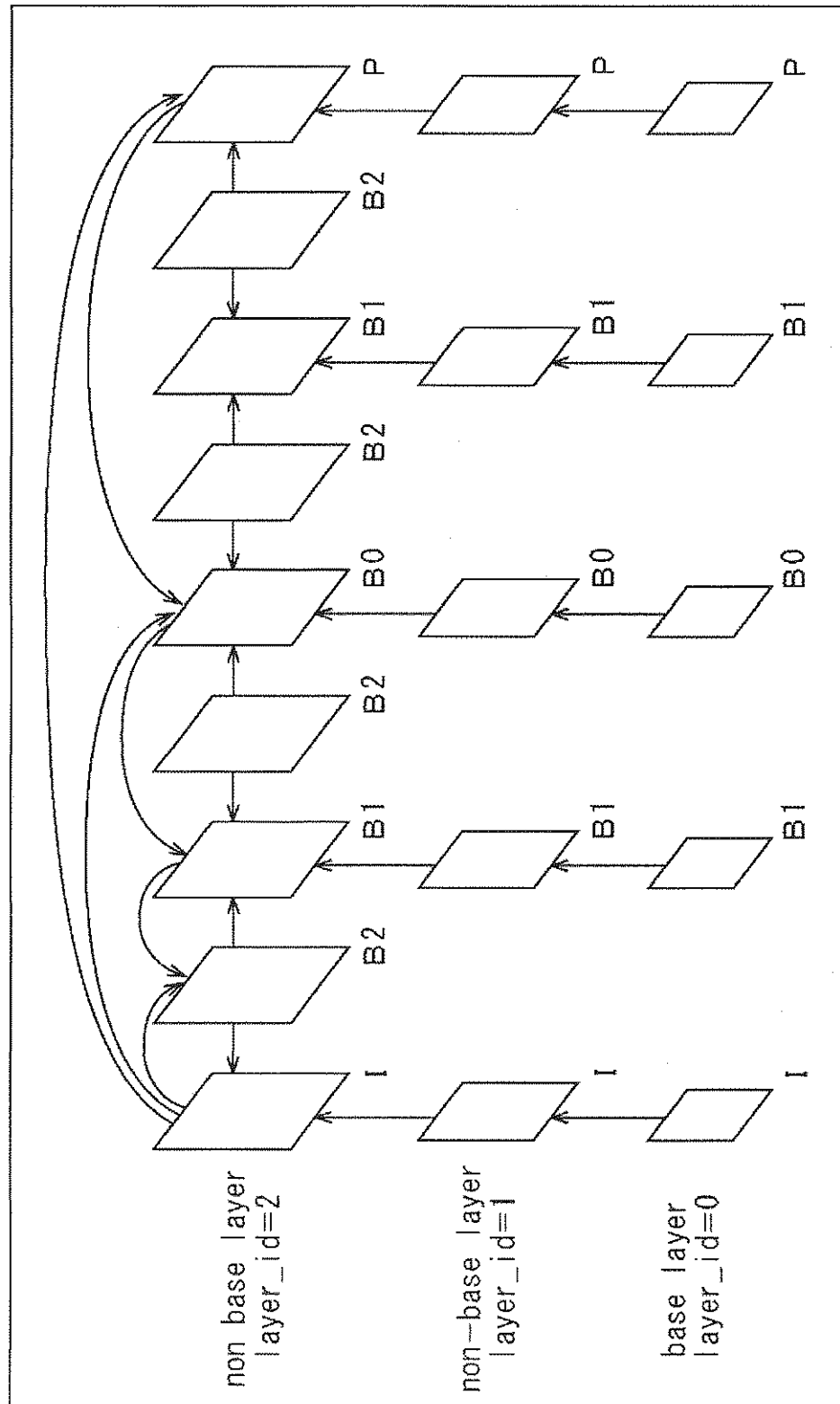


FIG. 41

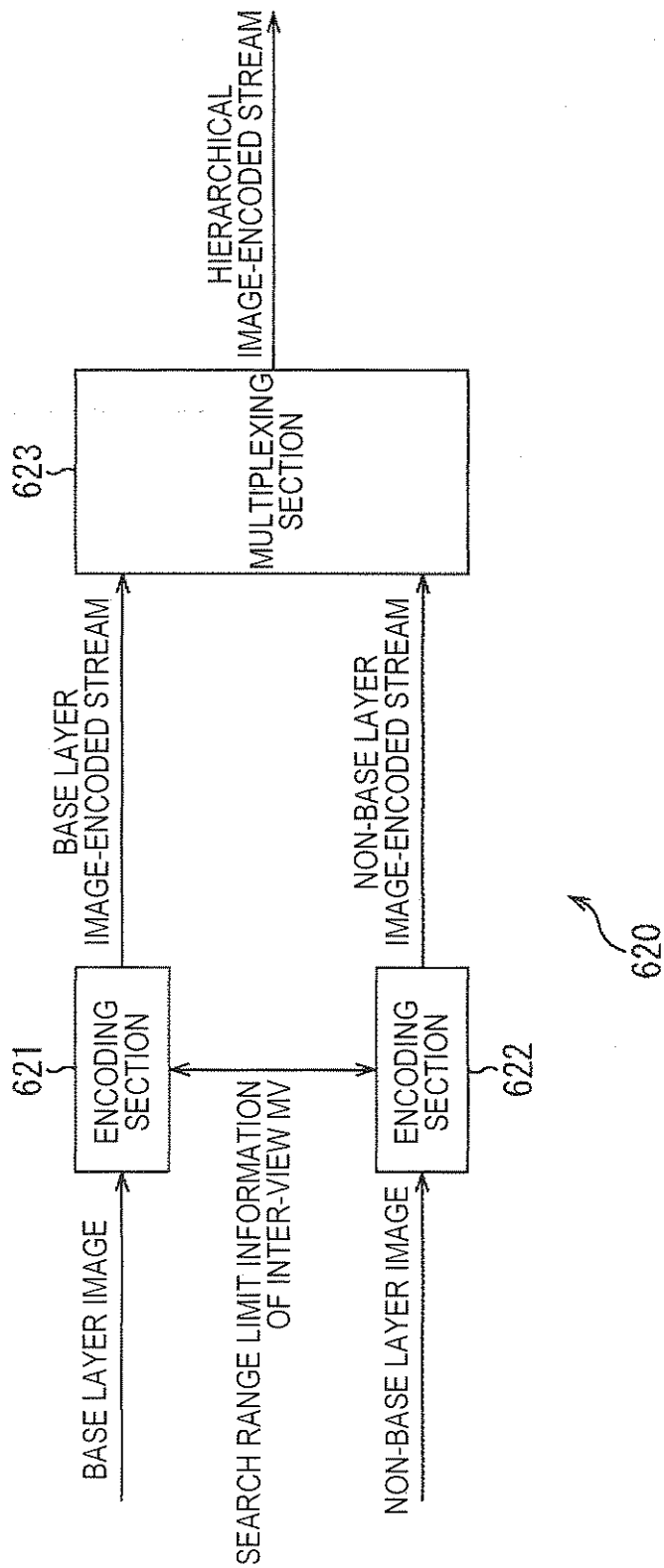
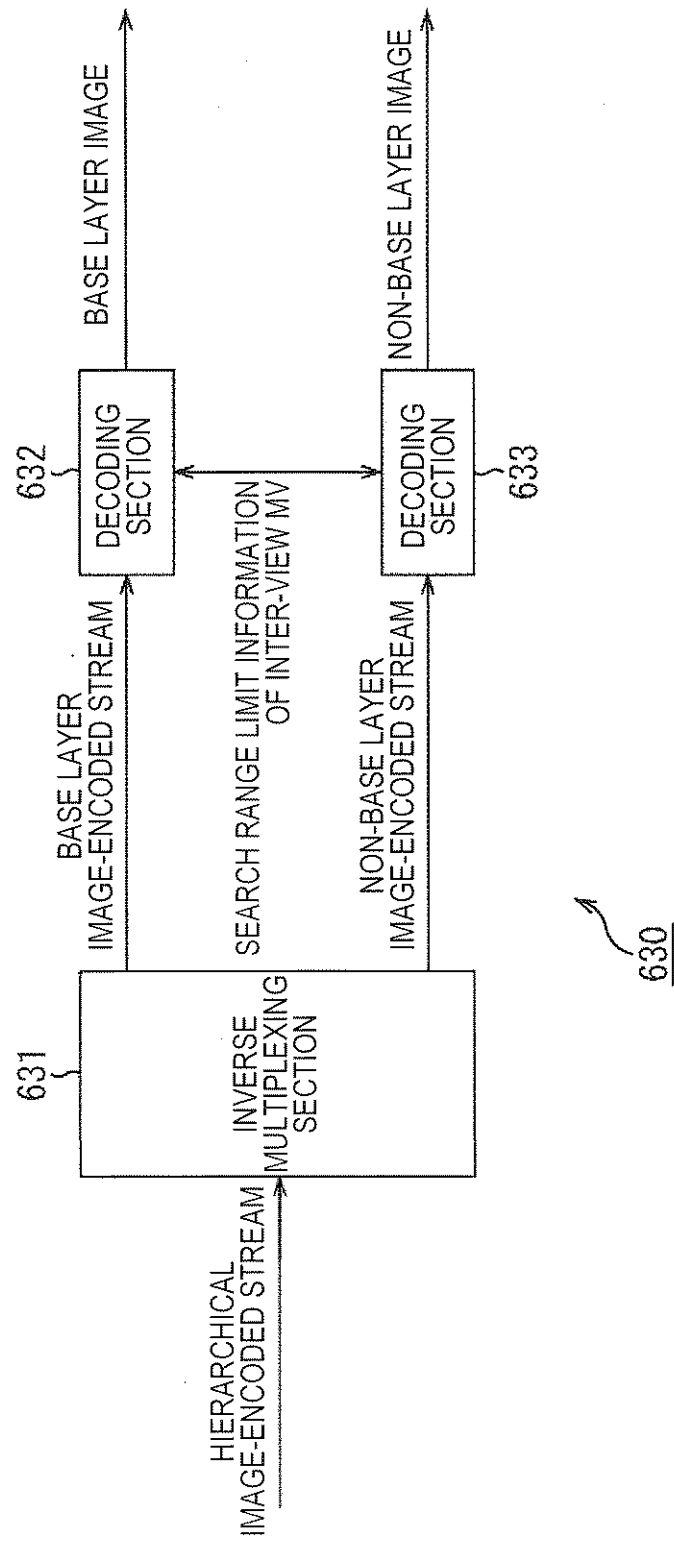


FIG. 42



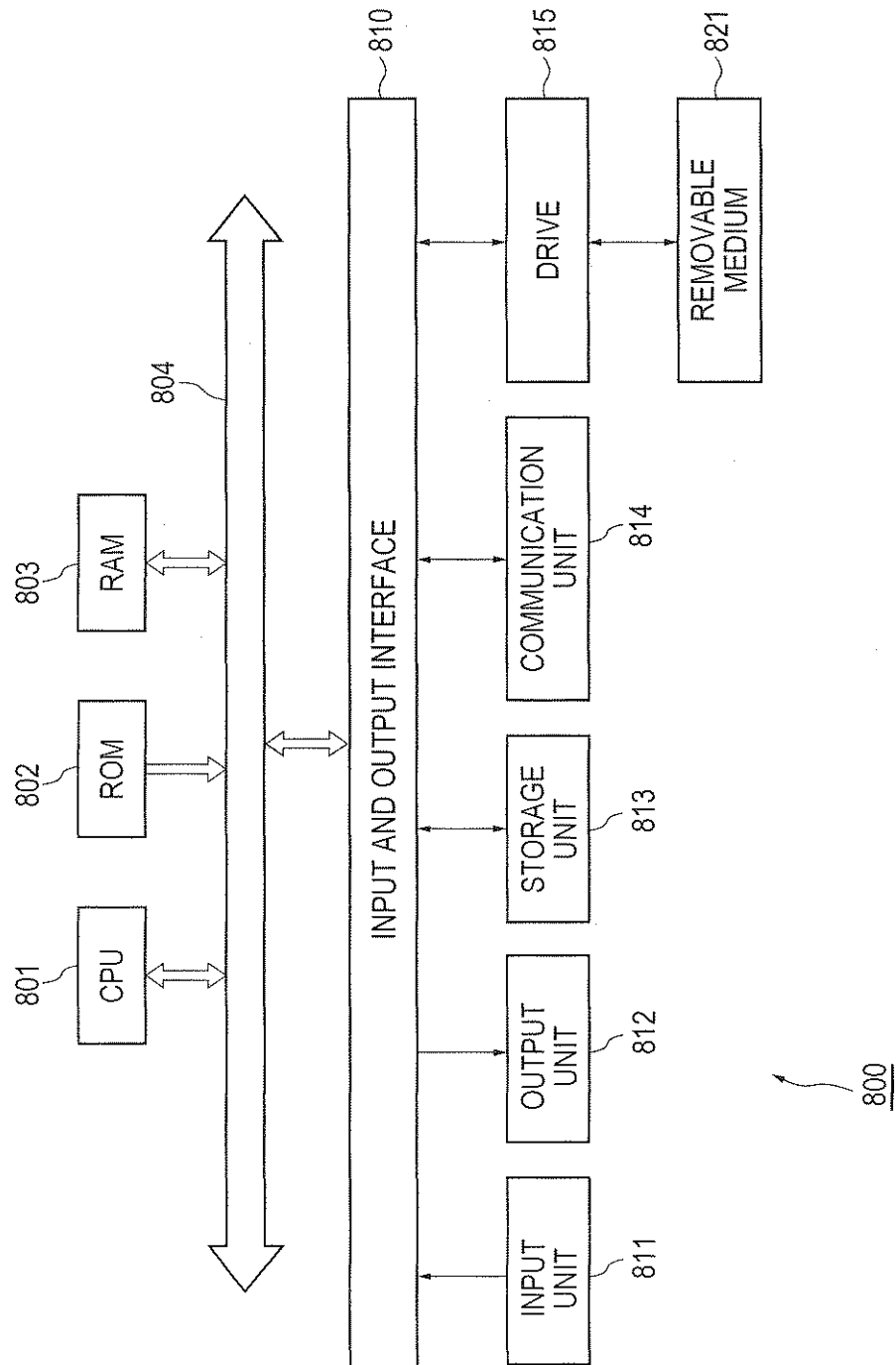
**FIG. 43**

FIG. 44

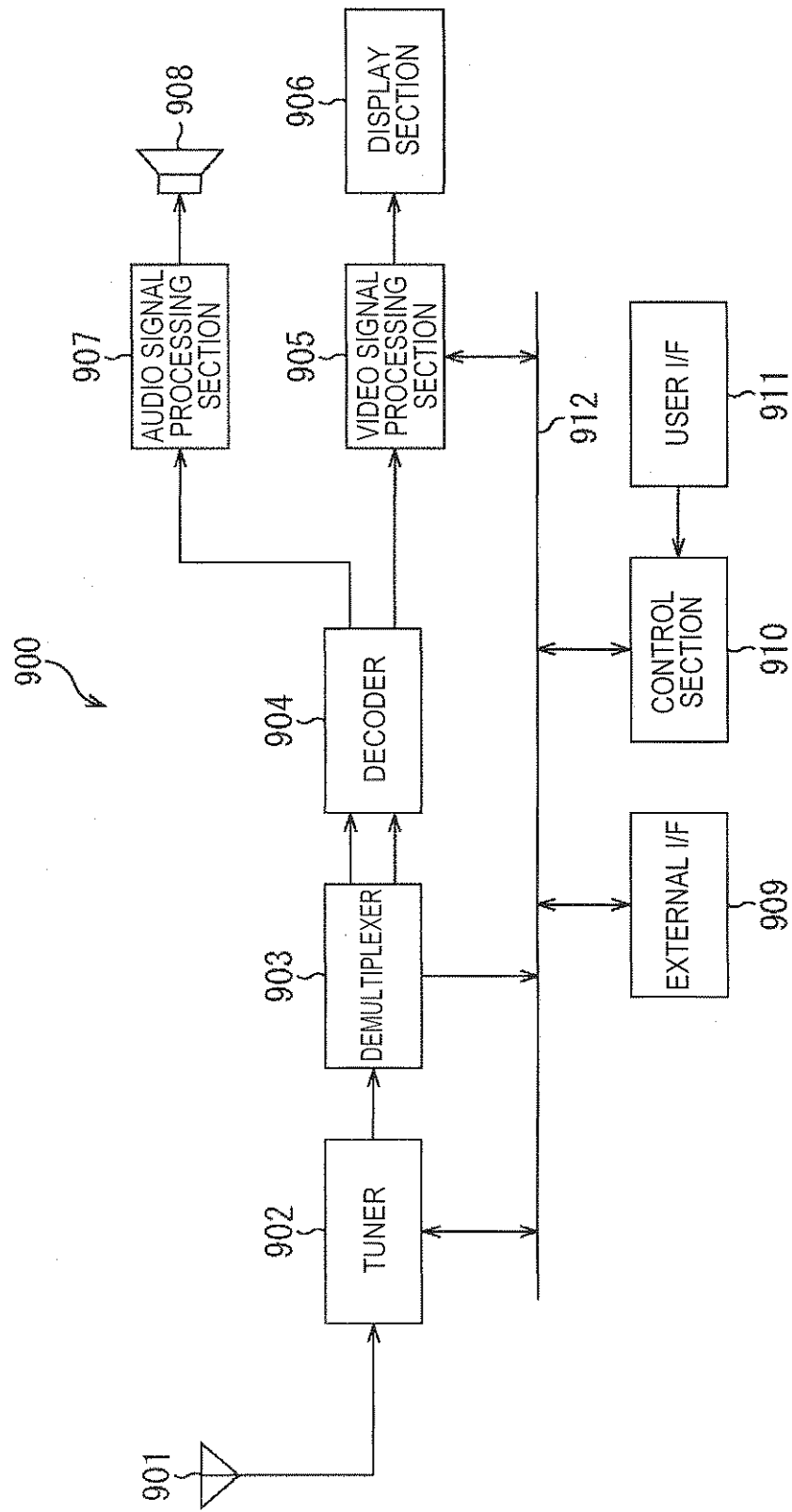
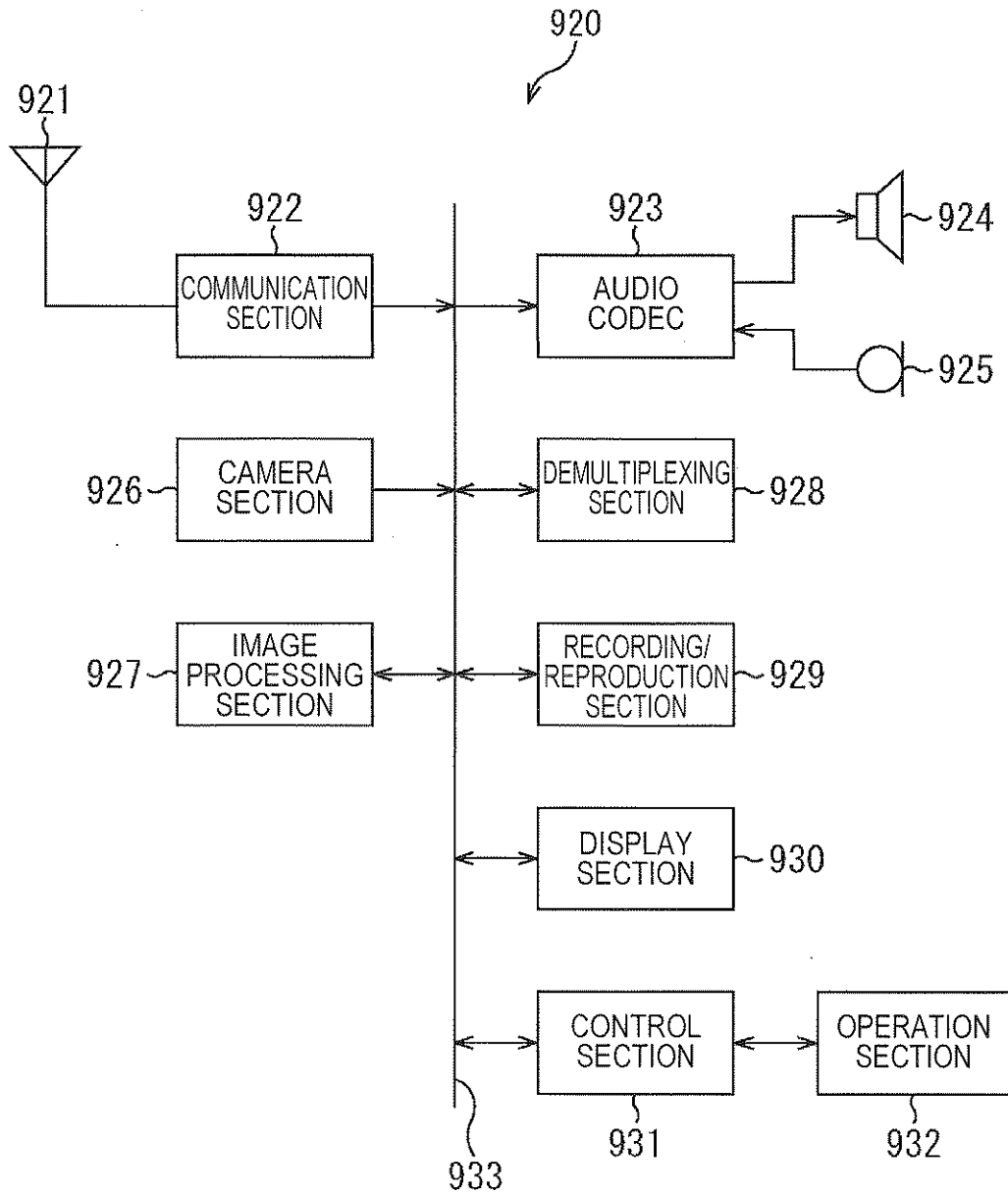


FIG. 45



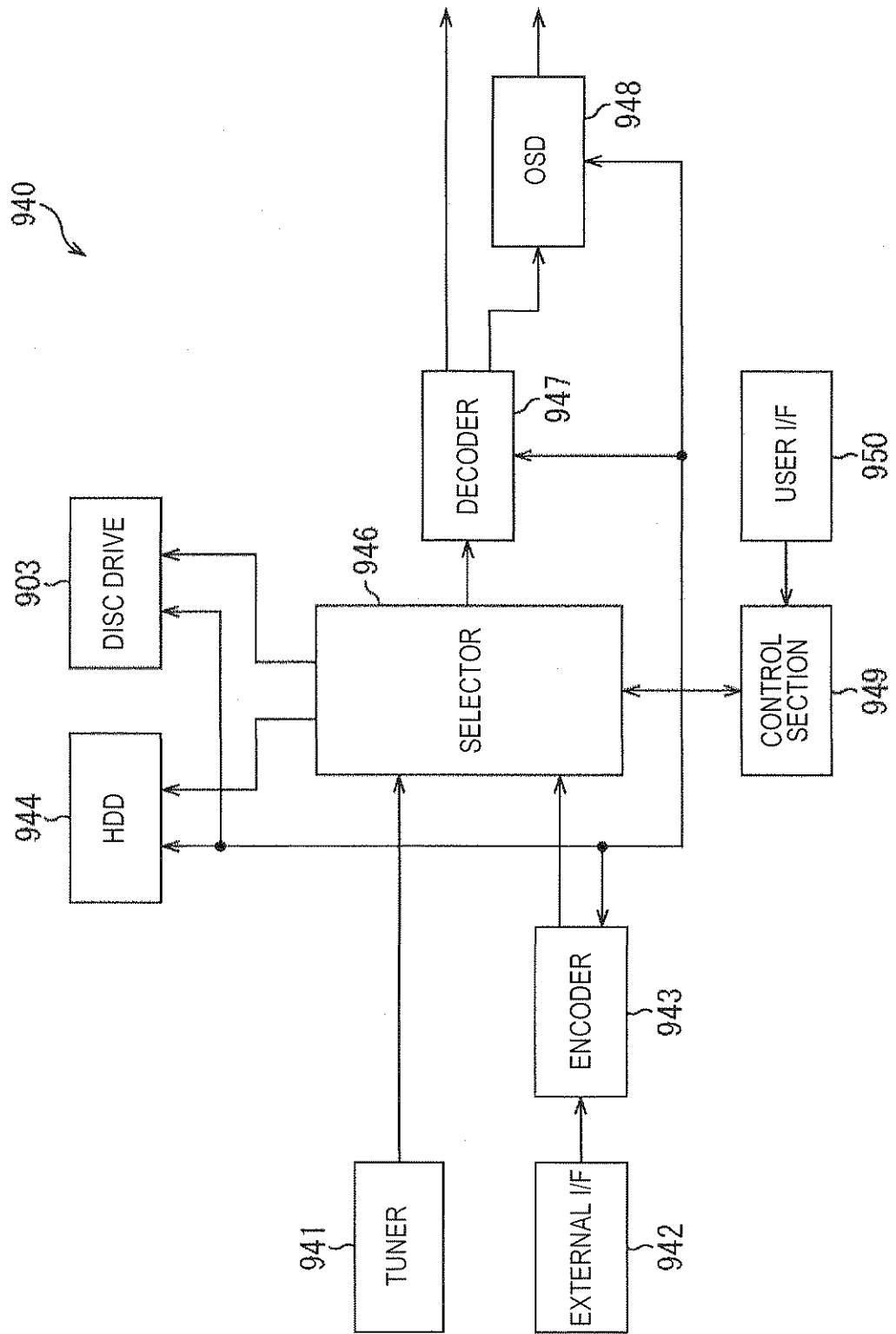
**FIG. 46**

FIG. 47

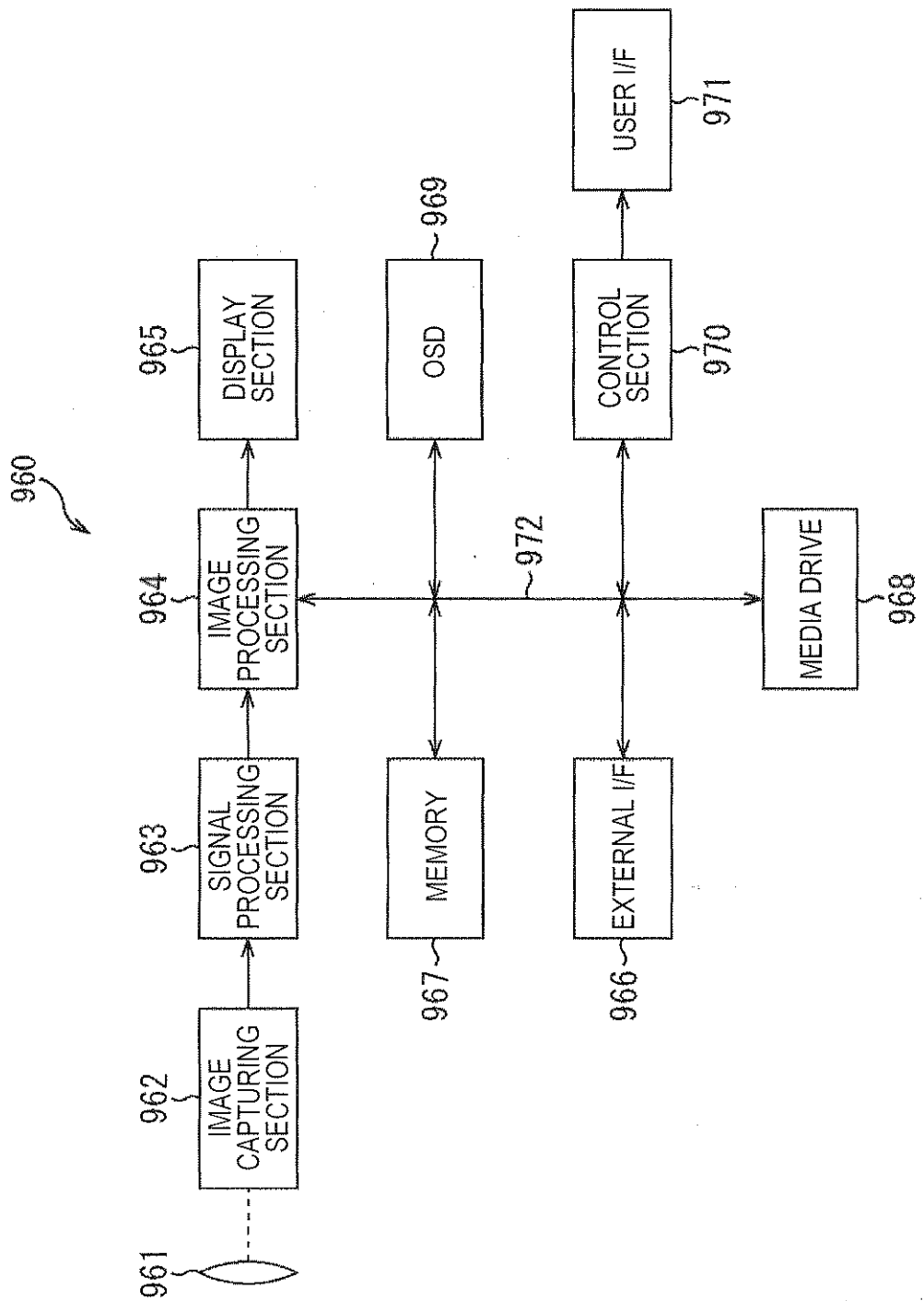


FIG. 48

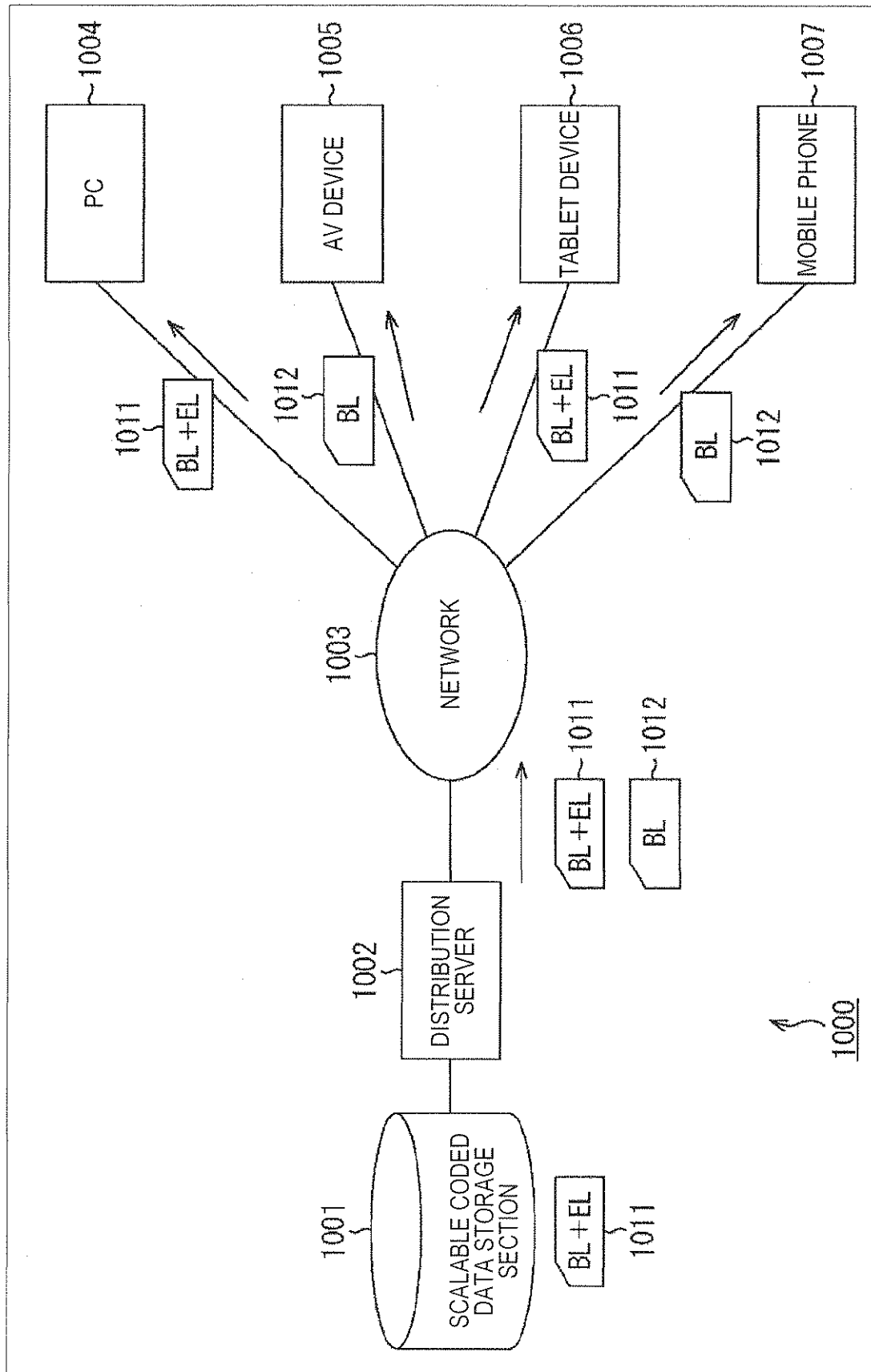


FIG. 49

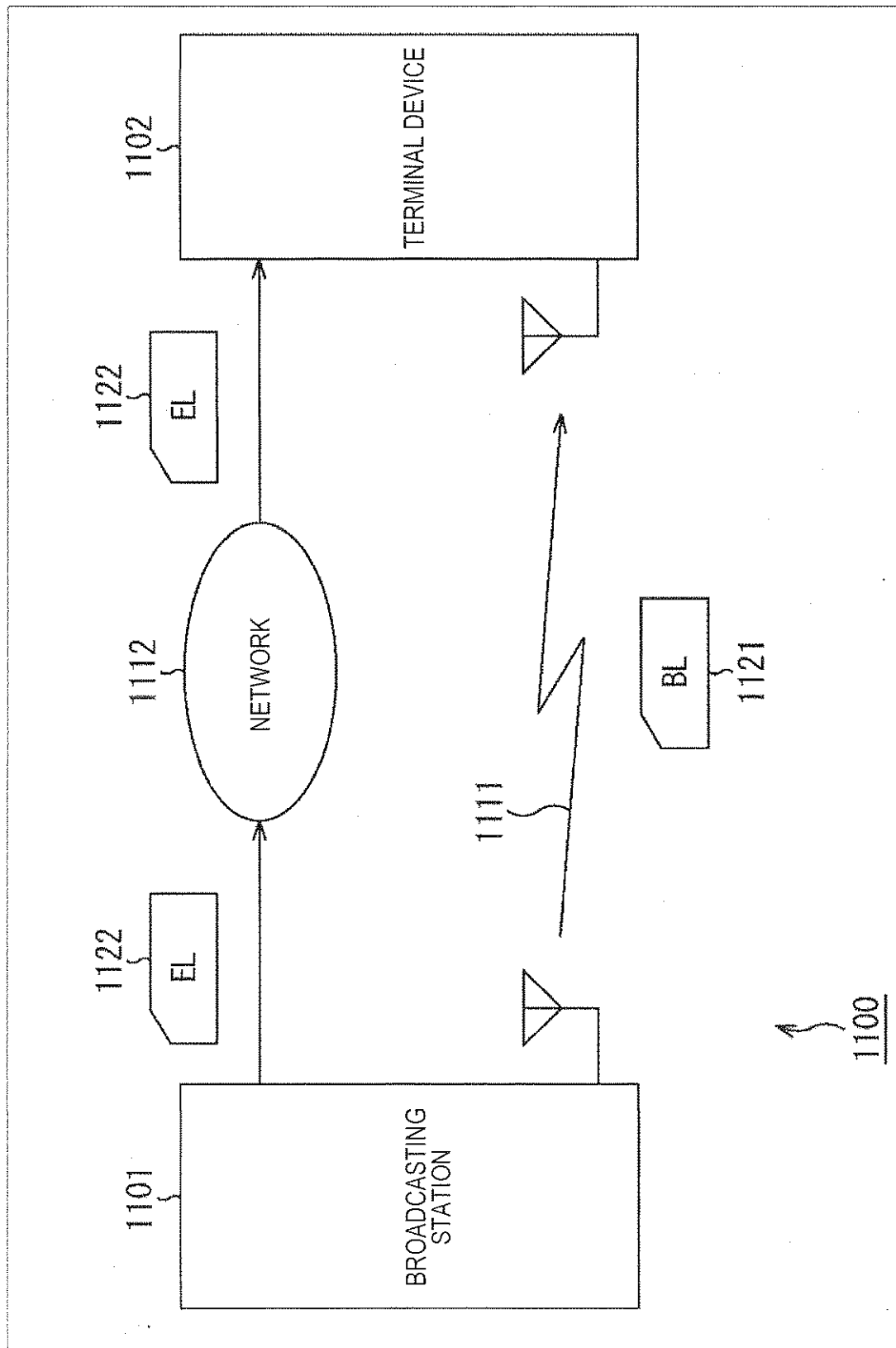


FIG. 50

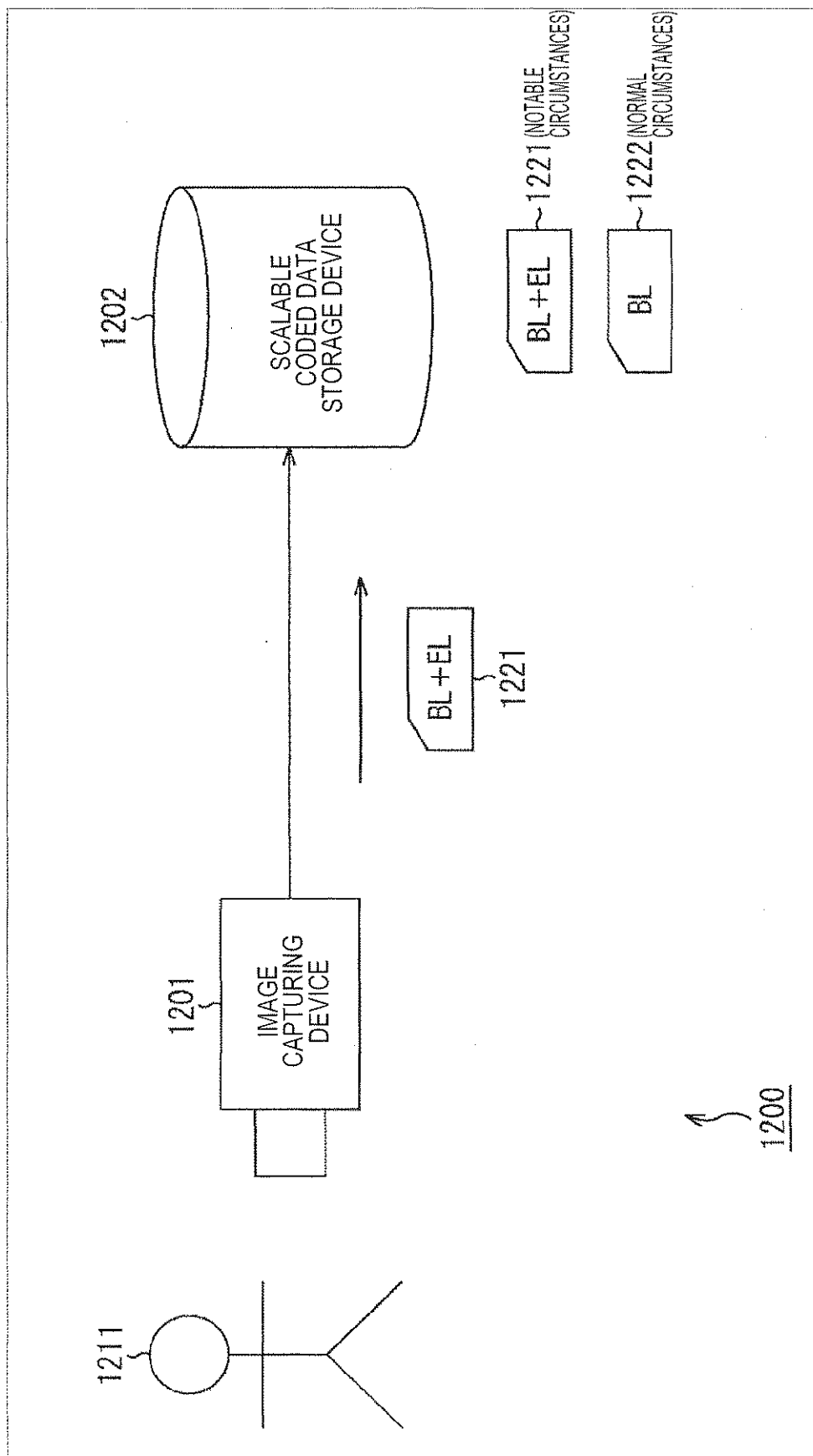


FIG. 51

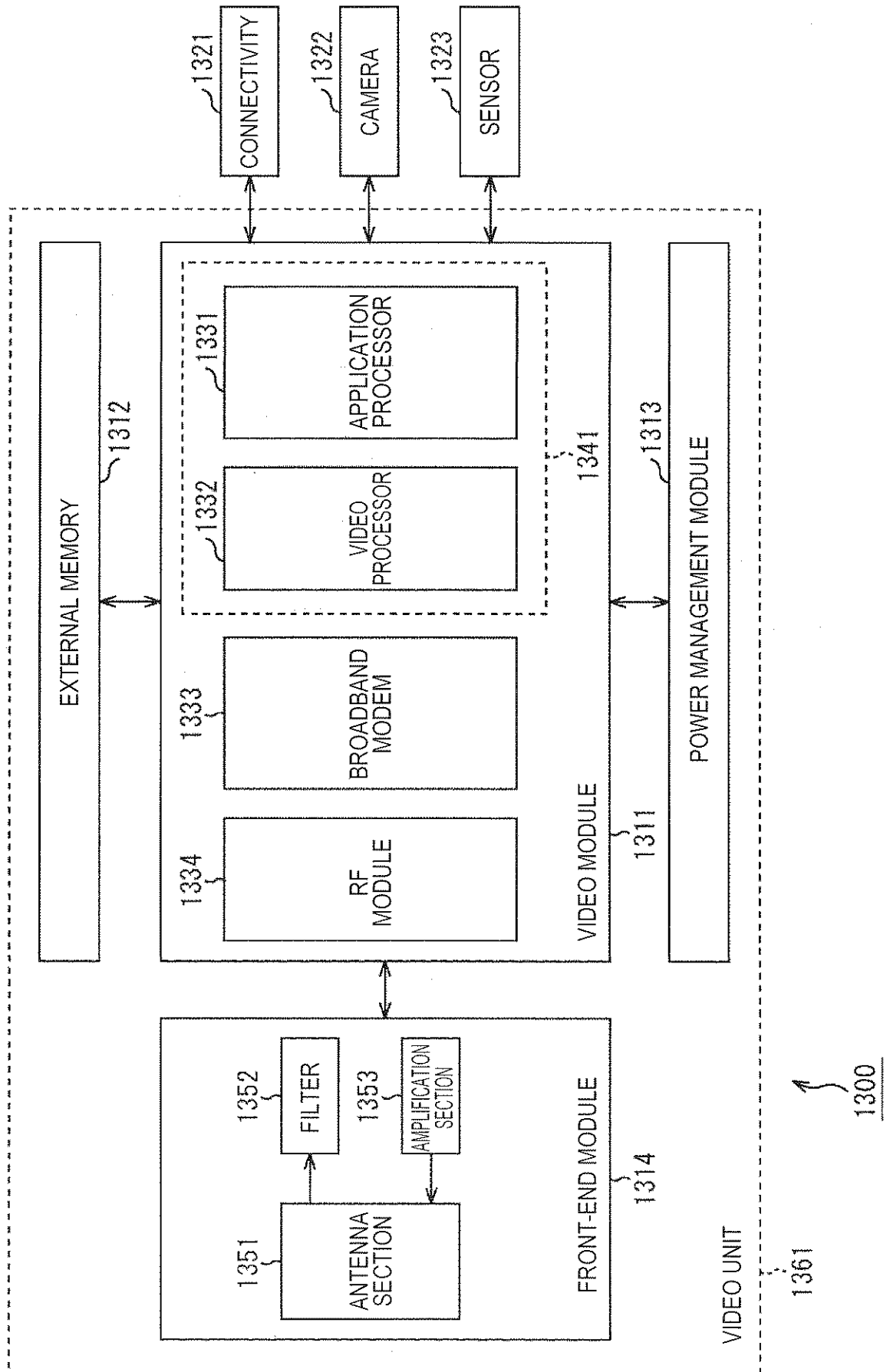


FIG. 52

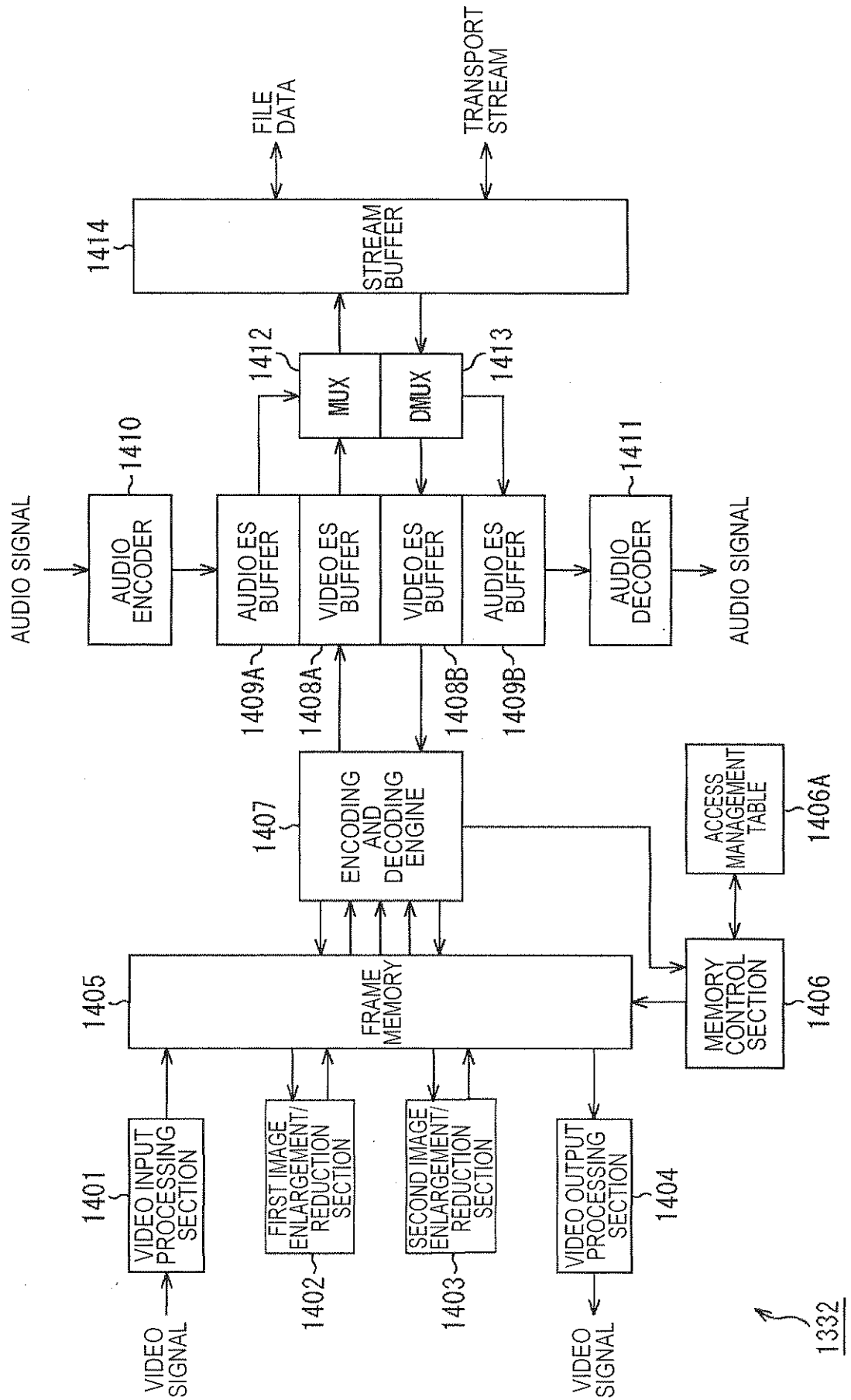


FIG. 53

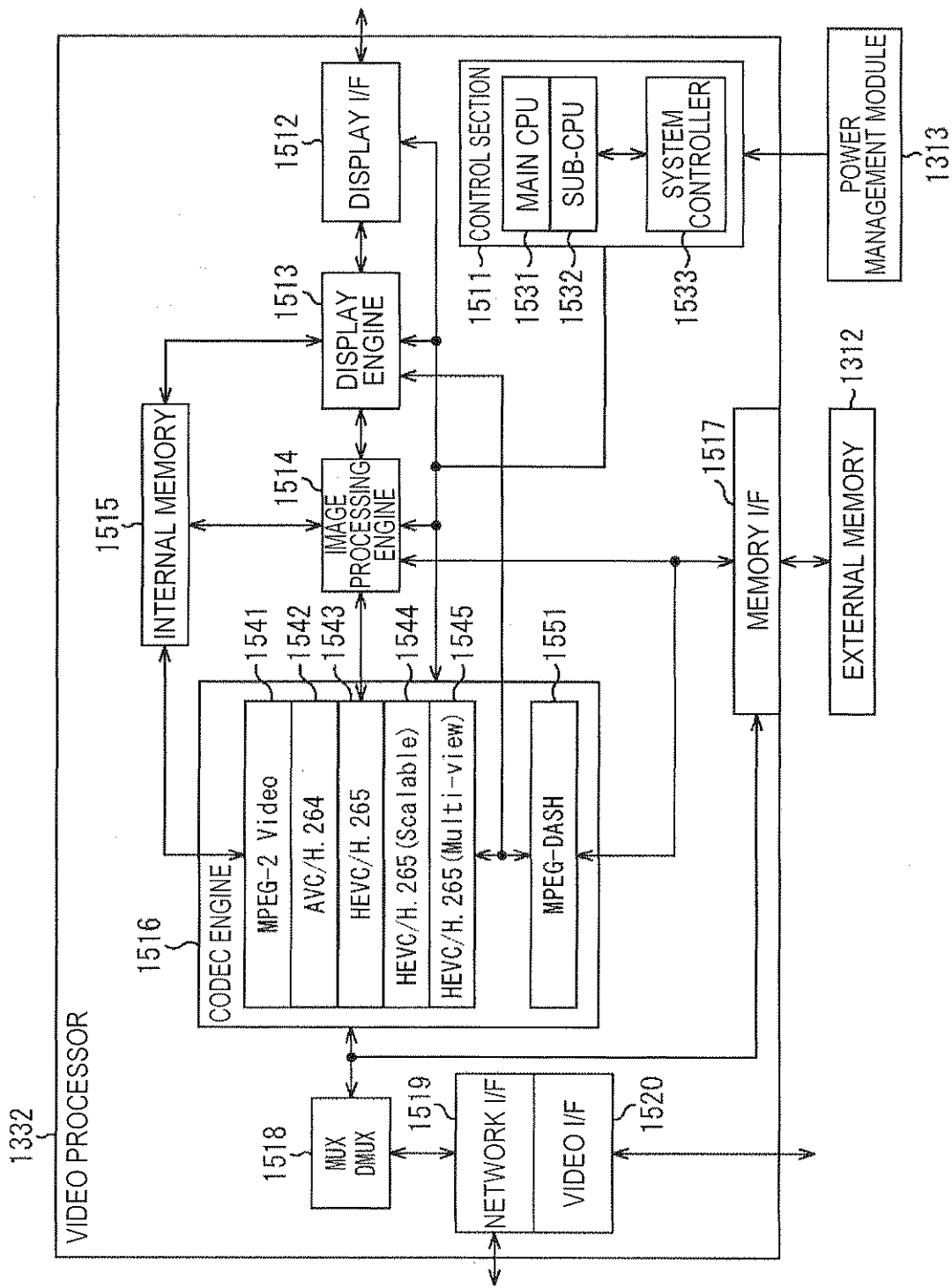
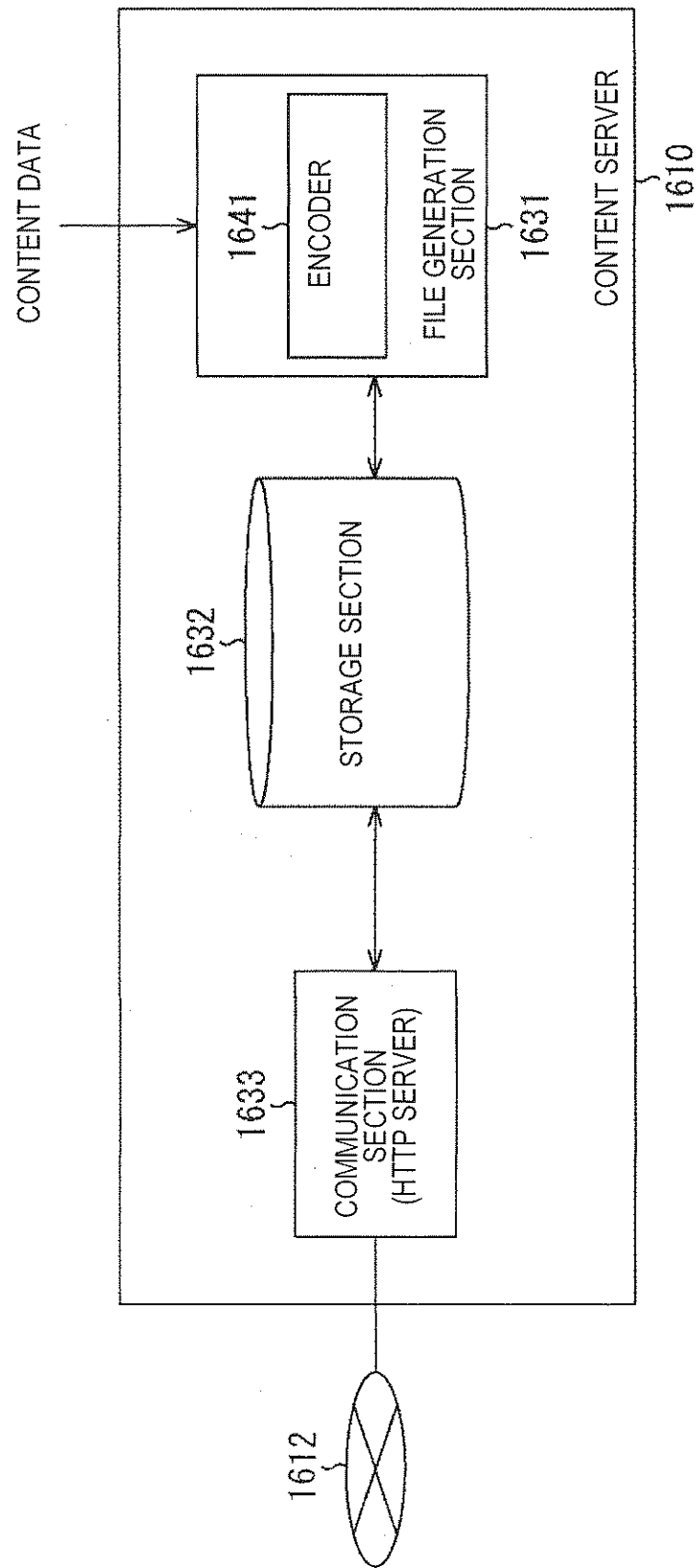


FIG. 54



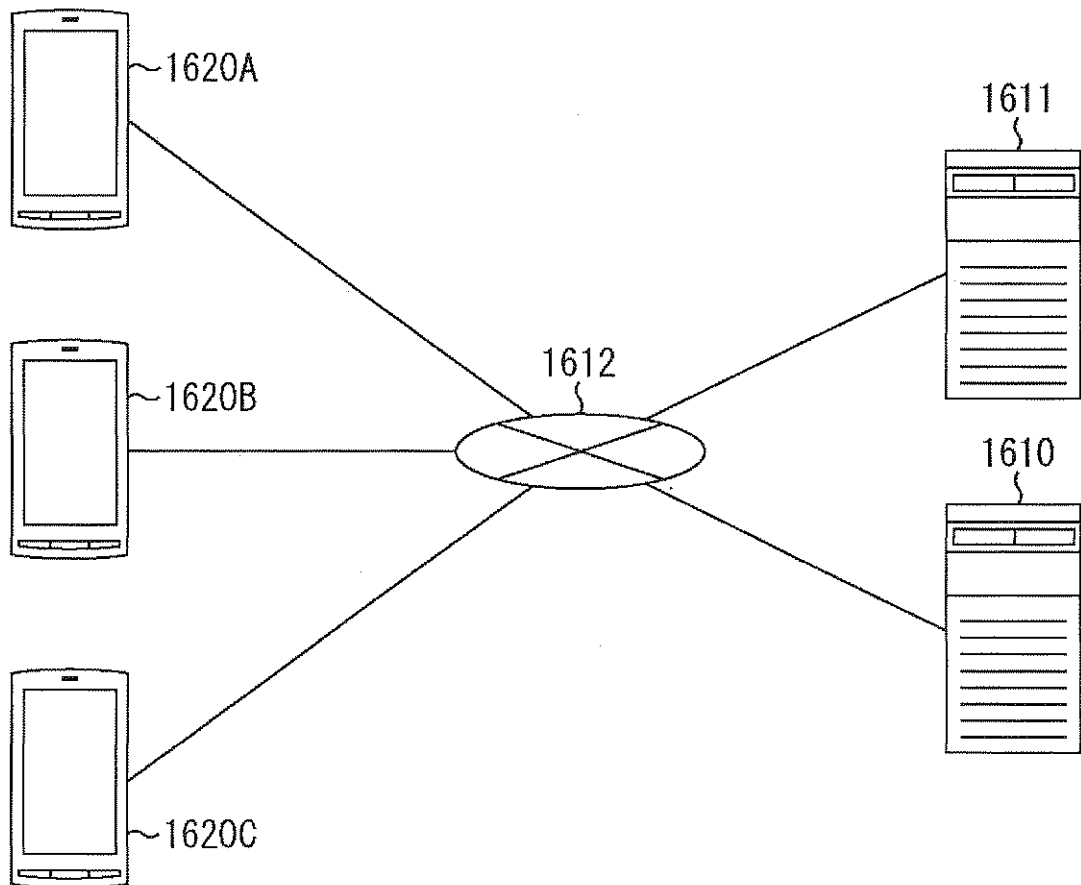
**FIG. 55**

FIG. 56

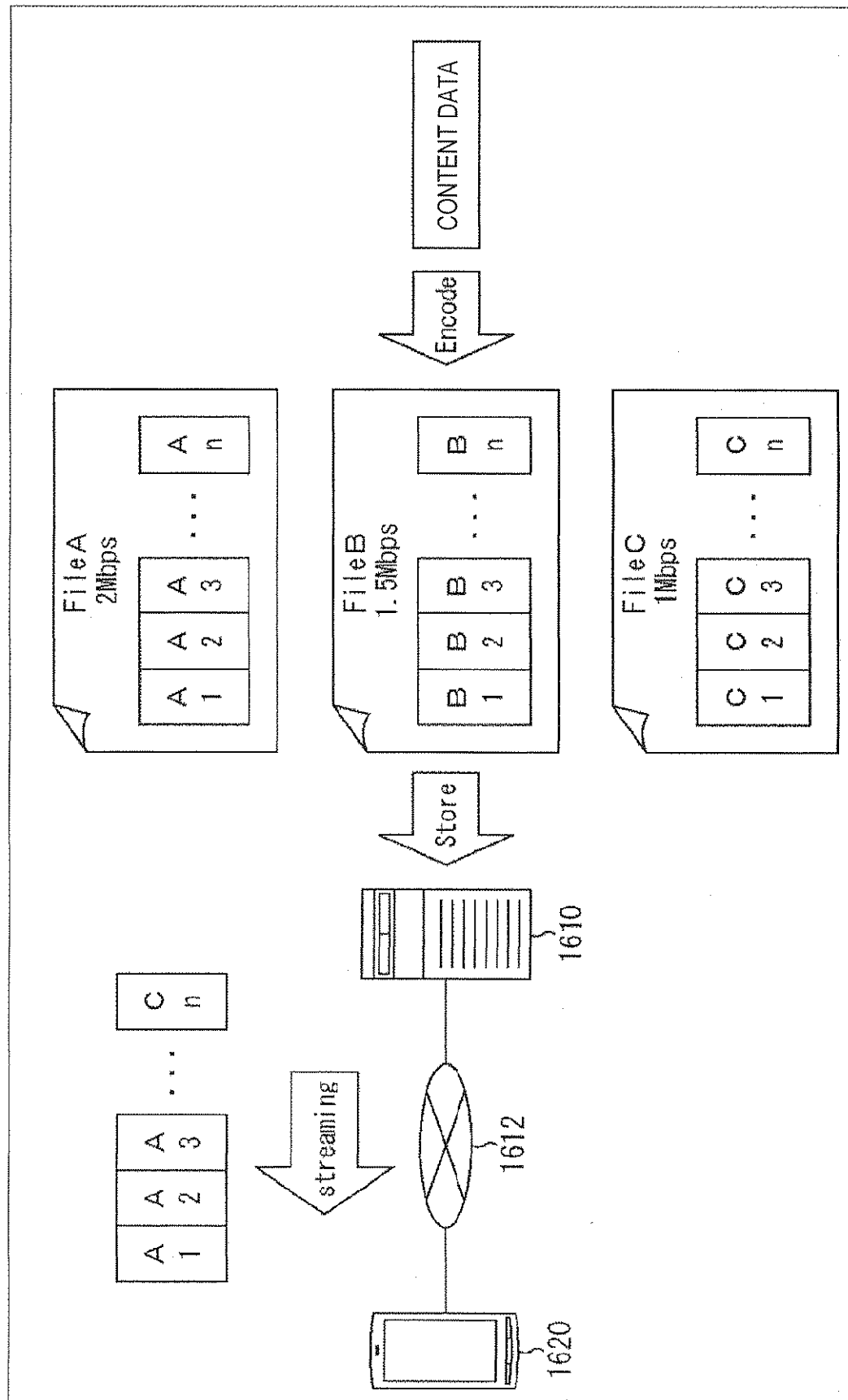


FIG.57

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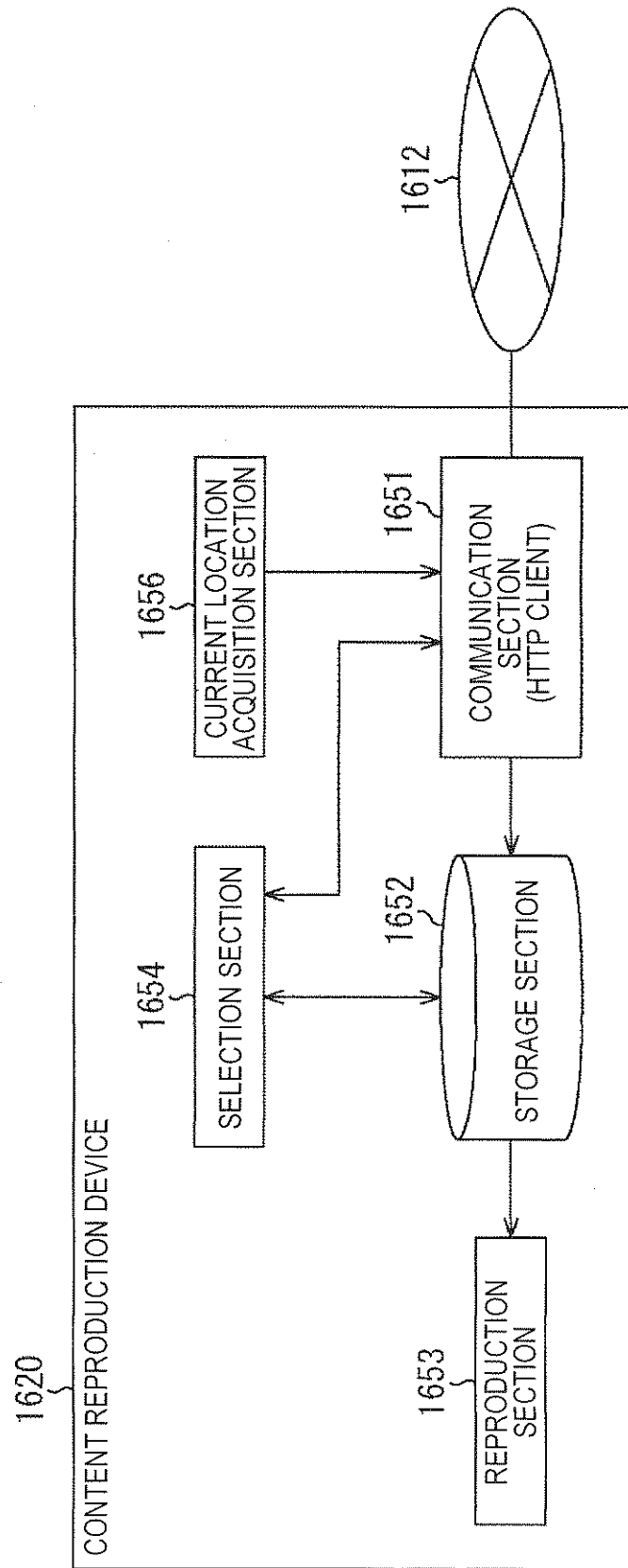
<?xml version="1.0"?>
<MPD
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="urn:mpeg:DASH:schema:MPD:2011"
  xsi:schemaLocation="urn:mpeg:DASH:schema:MPD:2011 DASH-MPD.xsd"
  type="static"
  mediaPresentationDuration="PT3256S"
  minBufferTime="PT1.2S"
  profiles="urn:mpeg:dash:profile:isoff-on-demand:2011">
  <BaseURL>http://cdn1.example.com/</BaseURL>
  <BaseURL>http://cdn2.example.com/</BaseURL>

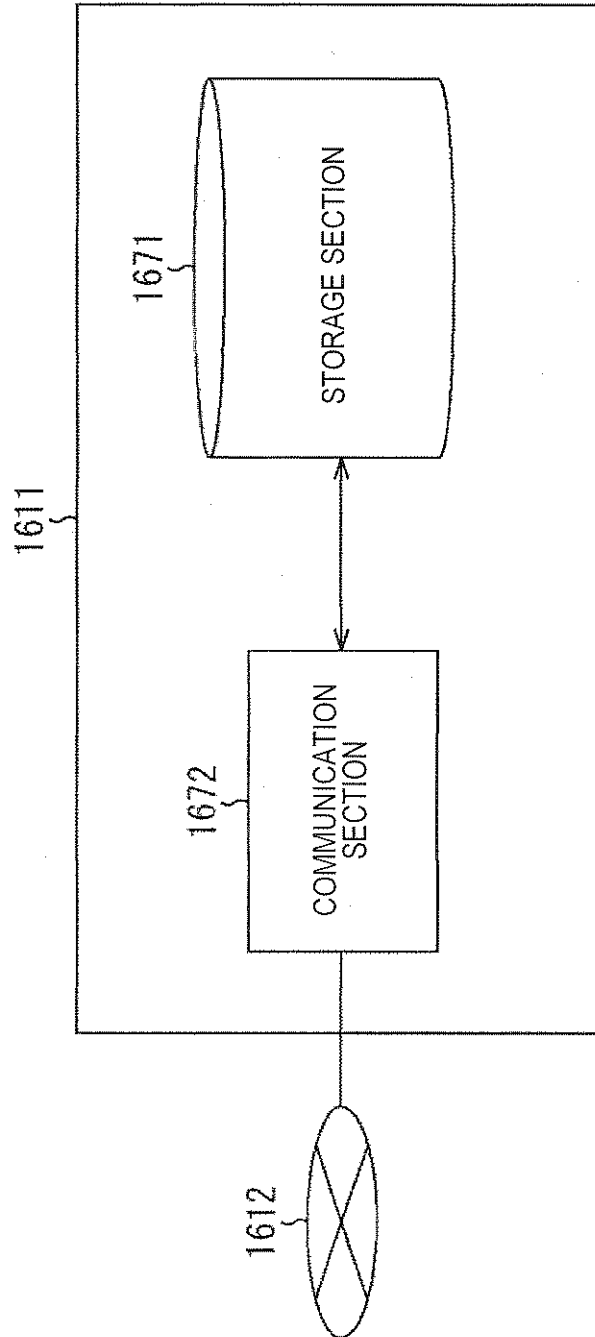
  <Period>
    <!--English Audio-->
    <AdaptationSet mimeType="audio/mp4" codecs="mp4a.0x40" lang="en" subsegmentStartsWithSAP="1">
      <ContentProtection schemeIdUri="urn:uuid:706D8953-6560-5244-4D48-656164657221"/>
      <Representation id="1" bandwidth="84000">
        <BaseURL>7657412348.mp4</BaseURL>
      </Representation>
      <Representation id="2" bandwidth="32000">
        <BaseURL>3463645346.mp4</BaseURL>
      </Representation>
    </AdaptationSet>
  </Period>

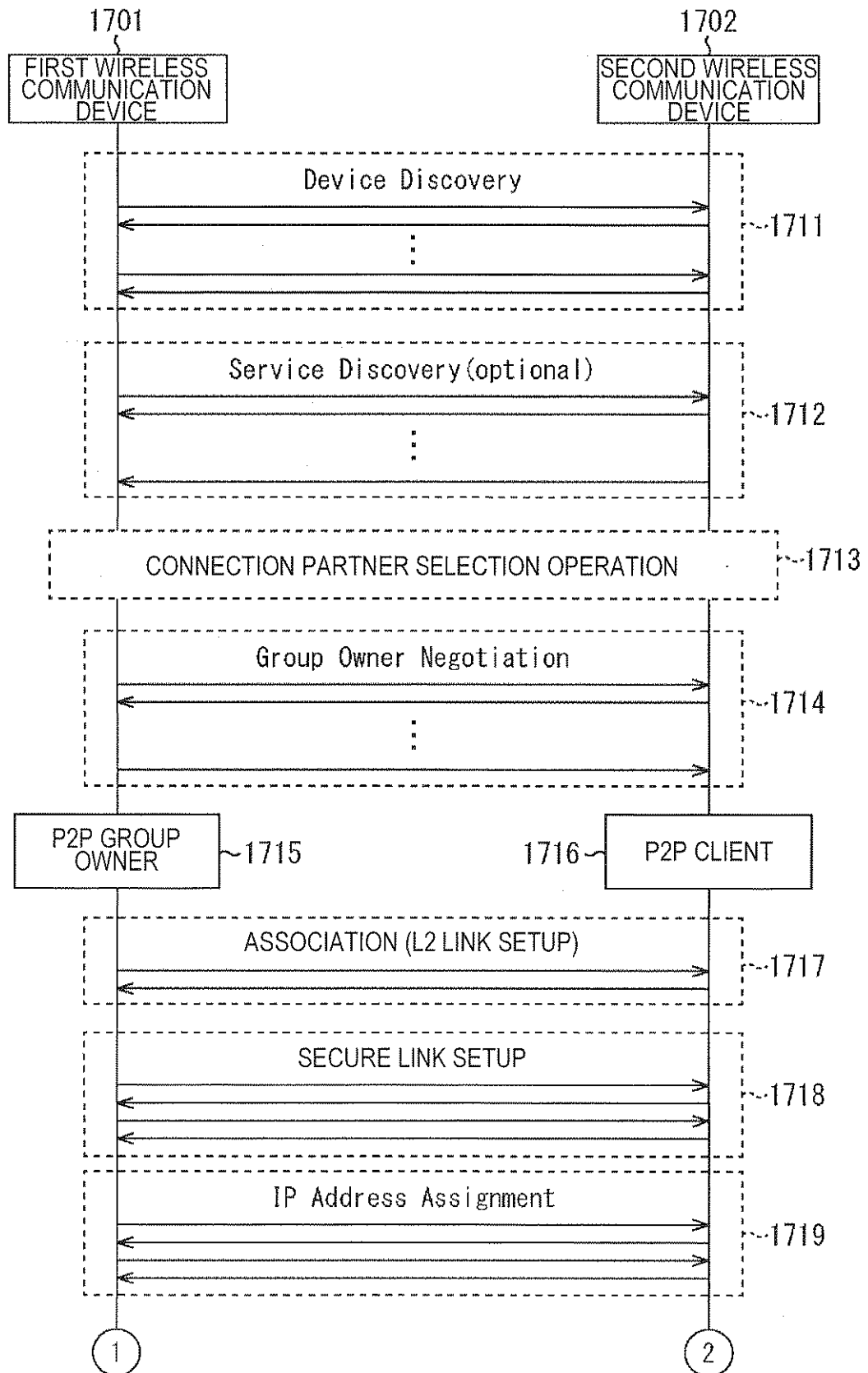
  <!--Video-->
  <AdaptationSet mimeType="video/mp4" codecs="avc1.4d0228" subsegmentStartsWithSAP="2">
    <ContentProtection schemeIdUri="urn:uuid:706D8953-6560-5244-4D48-656164657221"/>
    <Representation id="6" bandwidth="286000" width="320" height="240">
      <BaseURL>5563456473.mp4</BaseURL>
    </Representation>
    <Representation id="7" bandwidth="512000" width="320" height="240">
      <BaseURL>556363634.mp4</BaseURL>
    </Representation>
    <Representation id="8" bandwidth="1024000" width="640" height="480">
      <BaseURL>562455736.mp4</BaseURL>
    </Representation>
    <Representation id="9" bandwidth="1384000" width="840" height="480">
      <BaseURL>41325645.mp4</BaseURL>
    </Representation>
    <Representation id="A" bandwidth="1536000" width="1280" height="720">
      <BaseURL>69045625.mp4</BaseURL>
    </Representation>
    <Representation id="B" bandwidth="2048000" width="1280" height="720">
      <BaseURL>23536745734.mp4</BaseURL>
    </Representation>
  </AdaptationSet>
</Period>
</MPD>

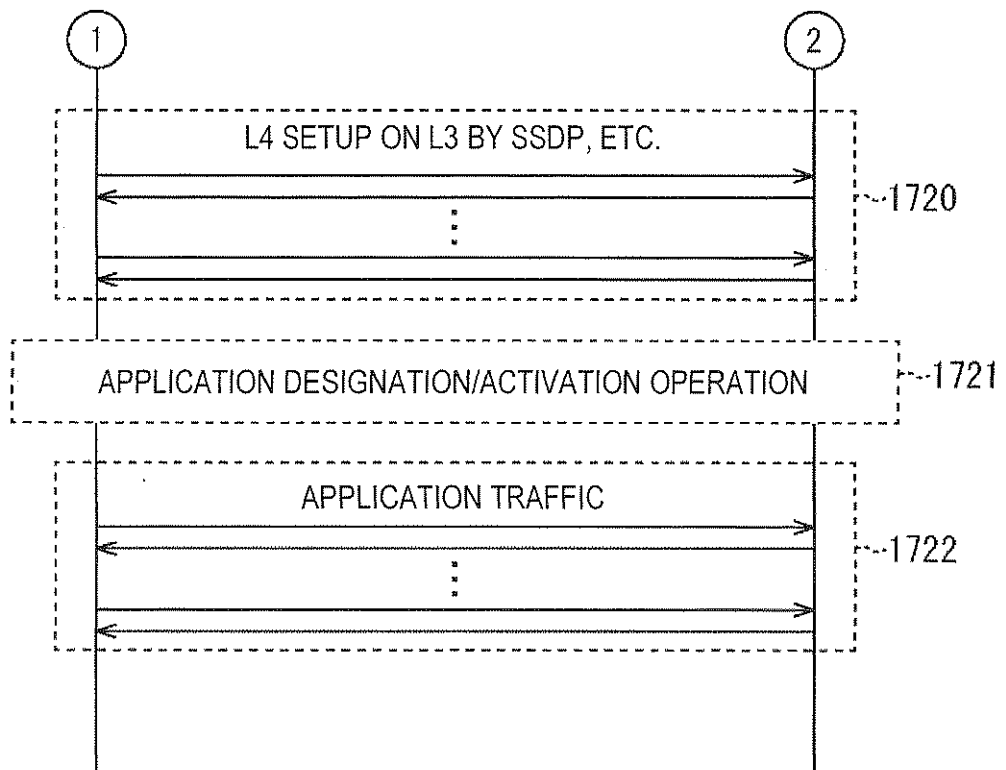
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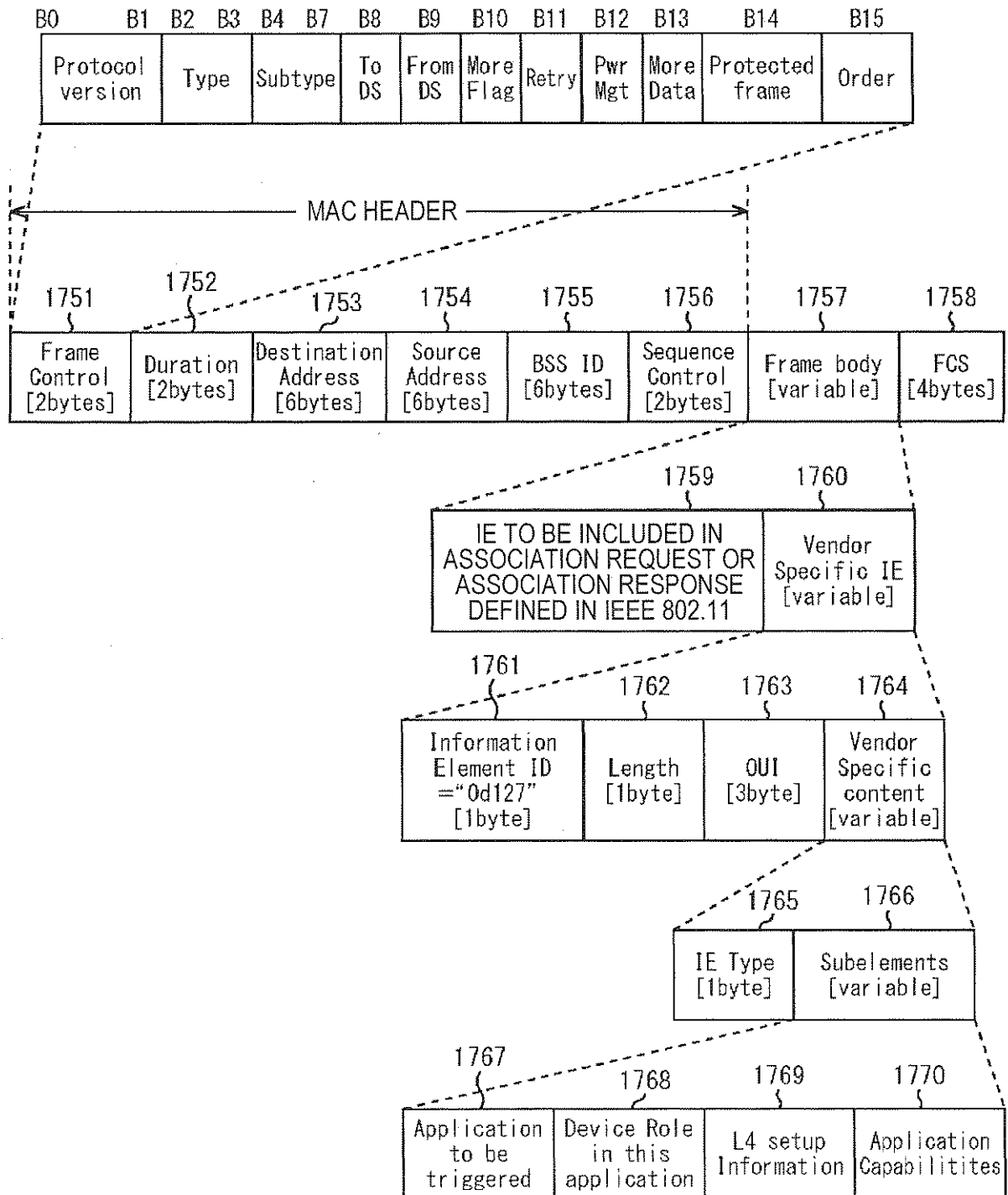
FIG. 58



**FIG. 59**

**FIG. 60**

**FIG. 61**

**FIG. 62**

**FIG. 63**