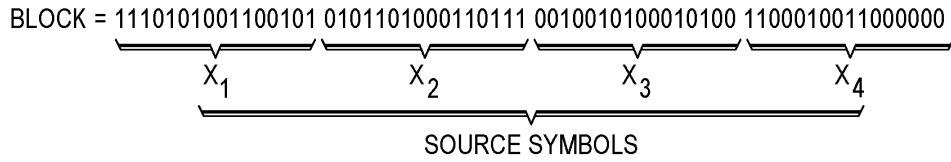
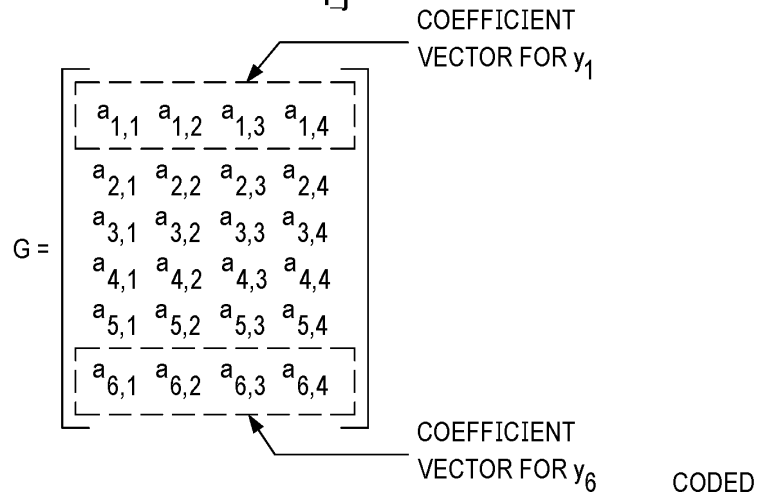


1/29

**STEP 1: PARTITION EACH BLOCK INTO SOURCE SYMBOLS****STEP 2: FORM THE VECTOR X**

$$X = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix}$$

**STEP 3: GENERATE A 6x4 MATRIX G WHERE EACH ELEMENT IS CHOSEN FROM A FIELD GF(q). LABEL EACH ELEMENT  $a_{i,j}$   $i = (1, \dots, 6)$  AND  $j = (1, \dots, 4)$ .**

**STEP 4: MULTIPLY G WITH X TO FORM EACH CODED SYMBOL.**

$$Y = GX = \begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} & a_{1,4} \\ a_{2,1} & a_{2,2} & a_{2,3} & a_{2,4} \\ a_{3,1} & a_{3,2} & a_{3,3} & a_{3,4} \\ a_{4,1} & a_{4,2} & a_{4,3} & a_{4,4} \\ a_{5,1} & a_{5,2} & a_{5,3} & a_{5,4} \\ a_{6,1} & a_{6,2} & a_{6,3} & a_{6,4} \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix} = \begin{bmatrix} a_{1,1}X_1 + a_{1,2}X_2 + a_{1,3}X_3 + a_{1,4}X_4 \\ a_{2,1}X_1 + a_{2,2}X_2 + a_{2,3}X_3 + a_{2,4}X_4 \\ a_{3,1}X_1 + a_{3,2}X_2 + a_{3,3}X_3 + a_{3,4}X_4 \\ a_{4,1}X_1 + a_{4,2}X_2 + a_{4,3}X_3 + a_{4,4}X_4 \\ a_{5,1}X_1 + a_{5,2}X_2 + a_{5,3}X_3 + a_{5,4}X_4 \\ a_{6,1}X_1 + a_{6,2}X_2 + a_{6,3}X_3 + a_{6,4}X_4 \end{bmatrix} = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{bmatrix}$$

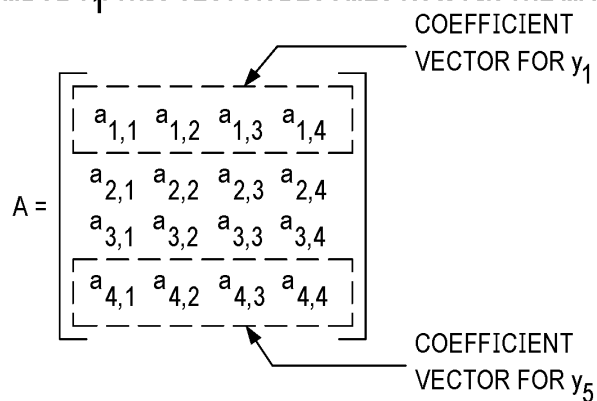
CODED  
SYMBOL  $y_1$

CODED  
SYMBOL  $y_6$

FIG. 1A

2/29

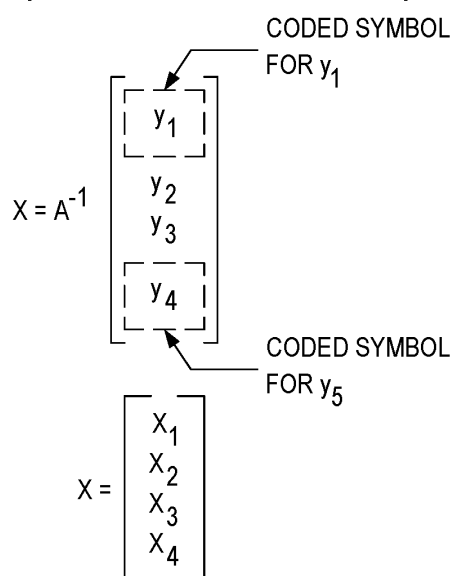
STEP 1: DETERMINE THE COEFFICIENT VECTOR ASSOCIATED WITH EACH RECEIVED CODED SYMBOL  $y_i$ . THIS VECTOR BECOMES ROW  $i$  IN THE MATRIX  $A$ .



STEP 2: TAKE THE INVERSE OF  $A$  TO FORM  $A^{-1}$

$$A^{-1} = \text{INVERSE}(A)$$

STEP 3: MULTIPLY  $A^{-1}$  WITH THE VECTOR OF CODED SYMBOLS  $y_i$  TO RECOVER THE VECTOR OF  $x_i$ 's



STEP 4: CONCATENATE EACH SYMBOL  $x_i$  TOGETHER TO REFORM THE BLOCK.

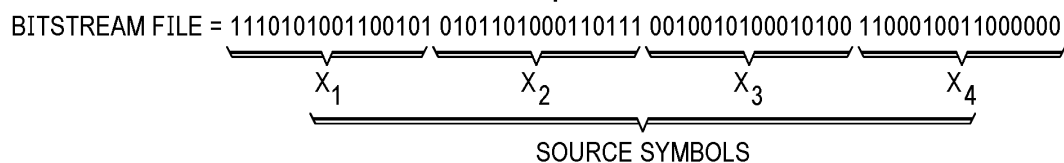
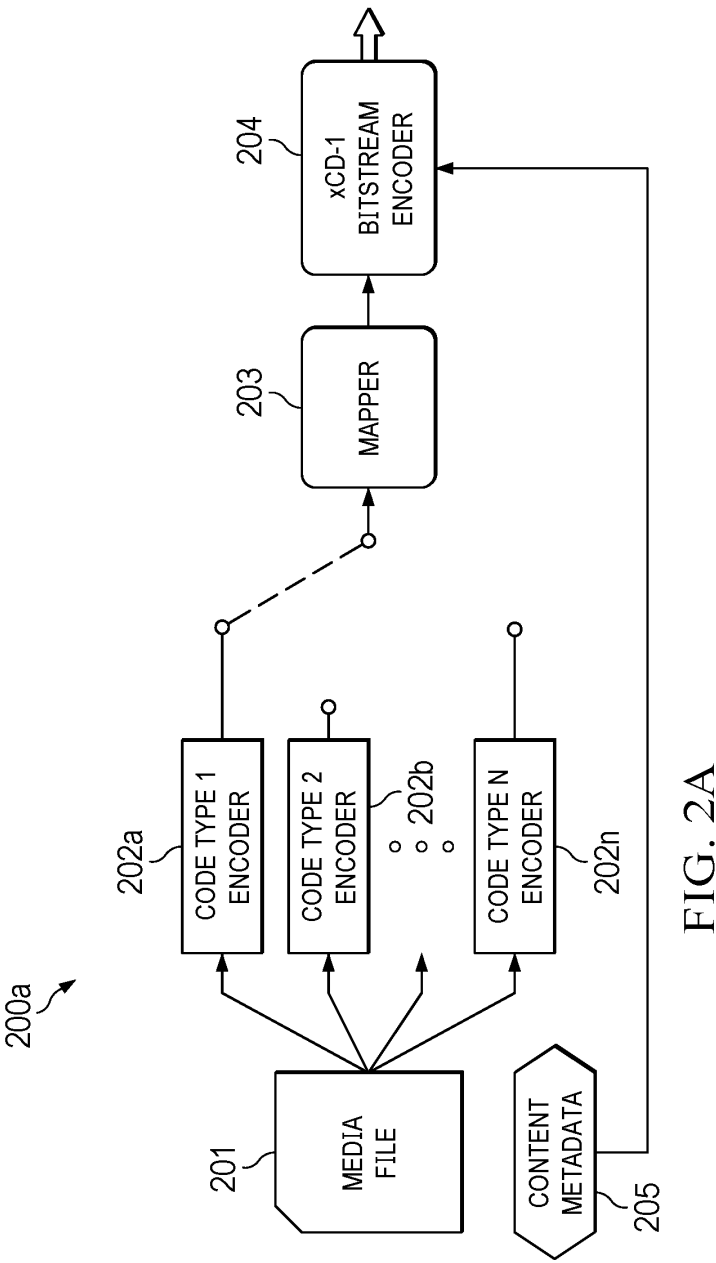


FIG. 1B



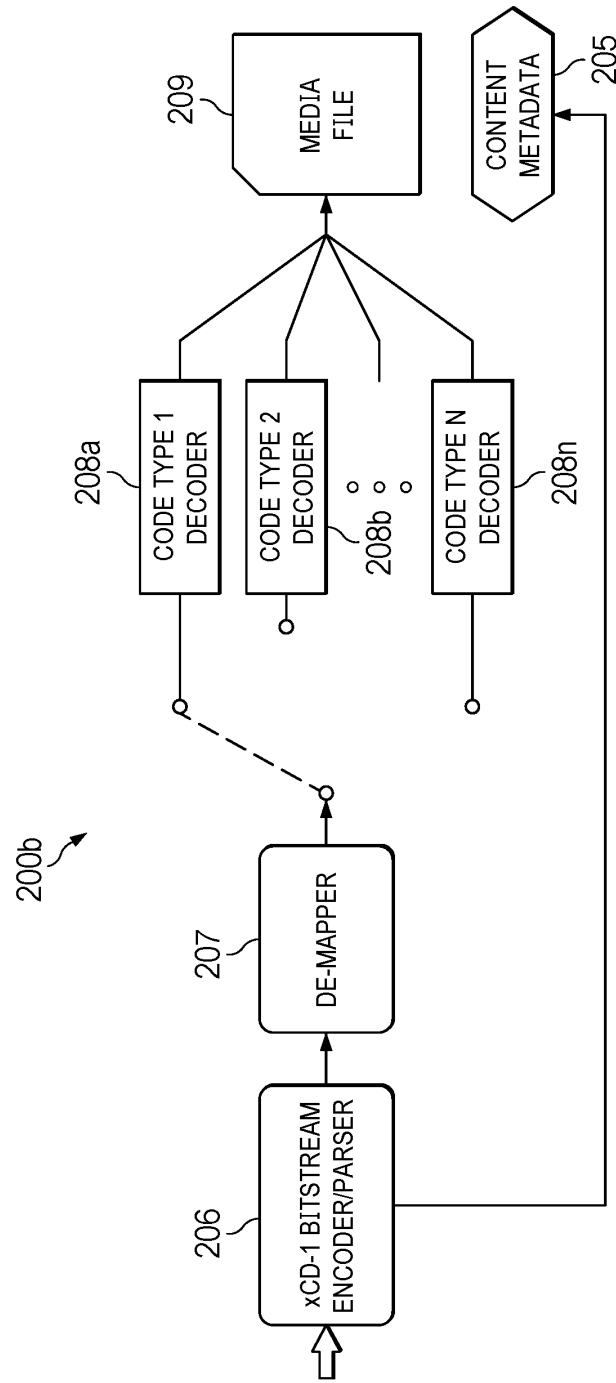
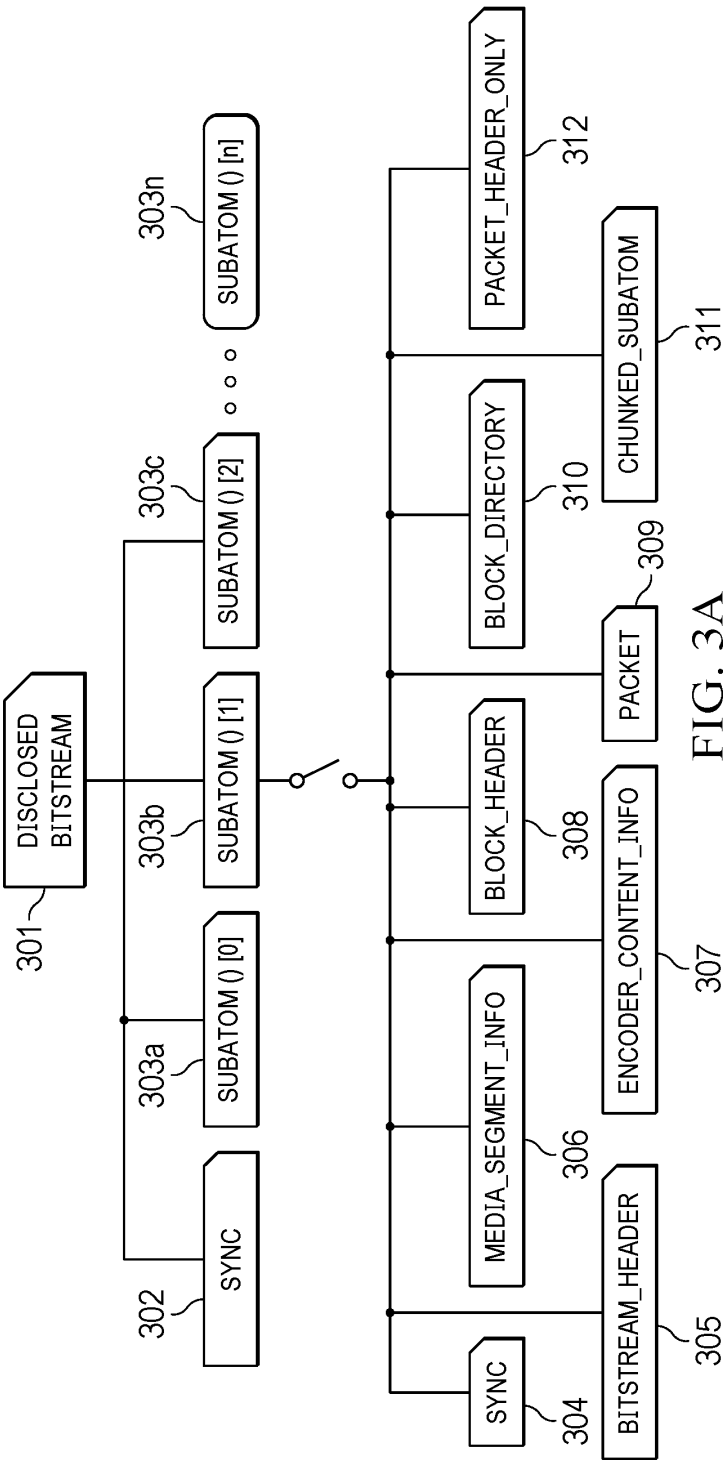
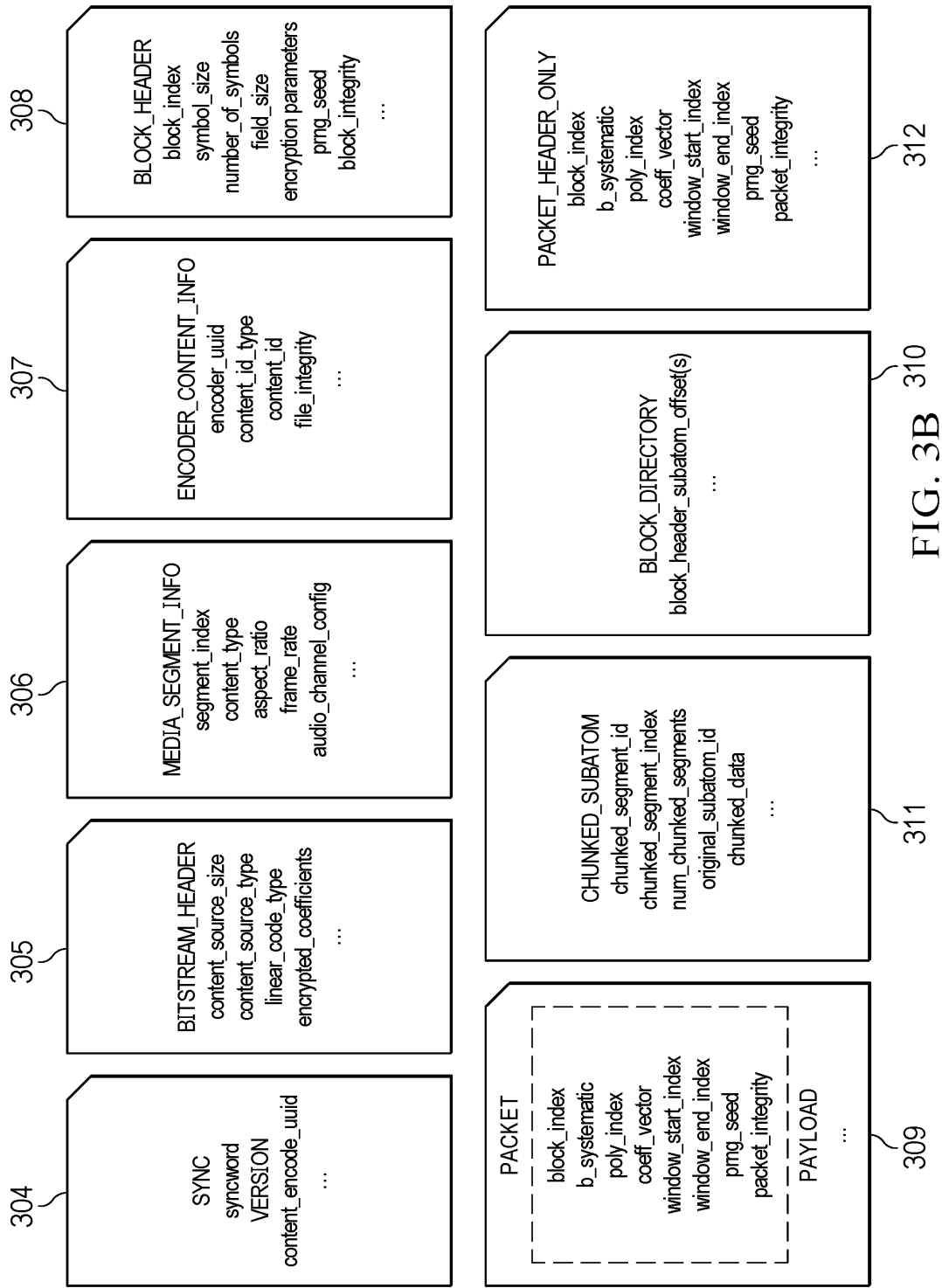


FIG. 2B





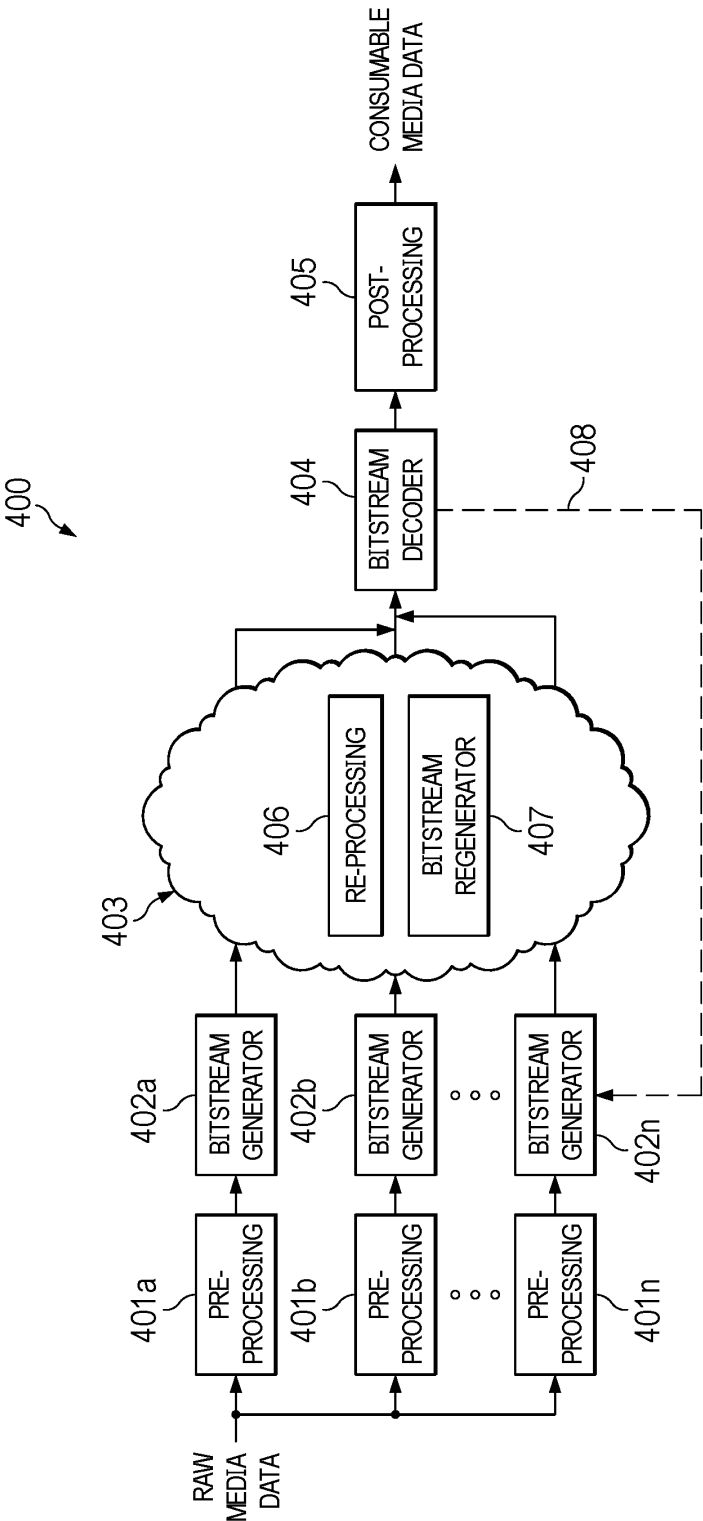


FIG. 4

8/29

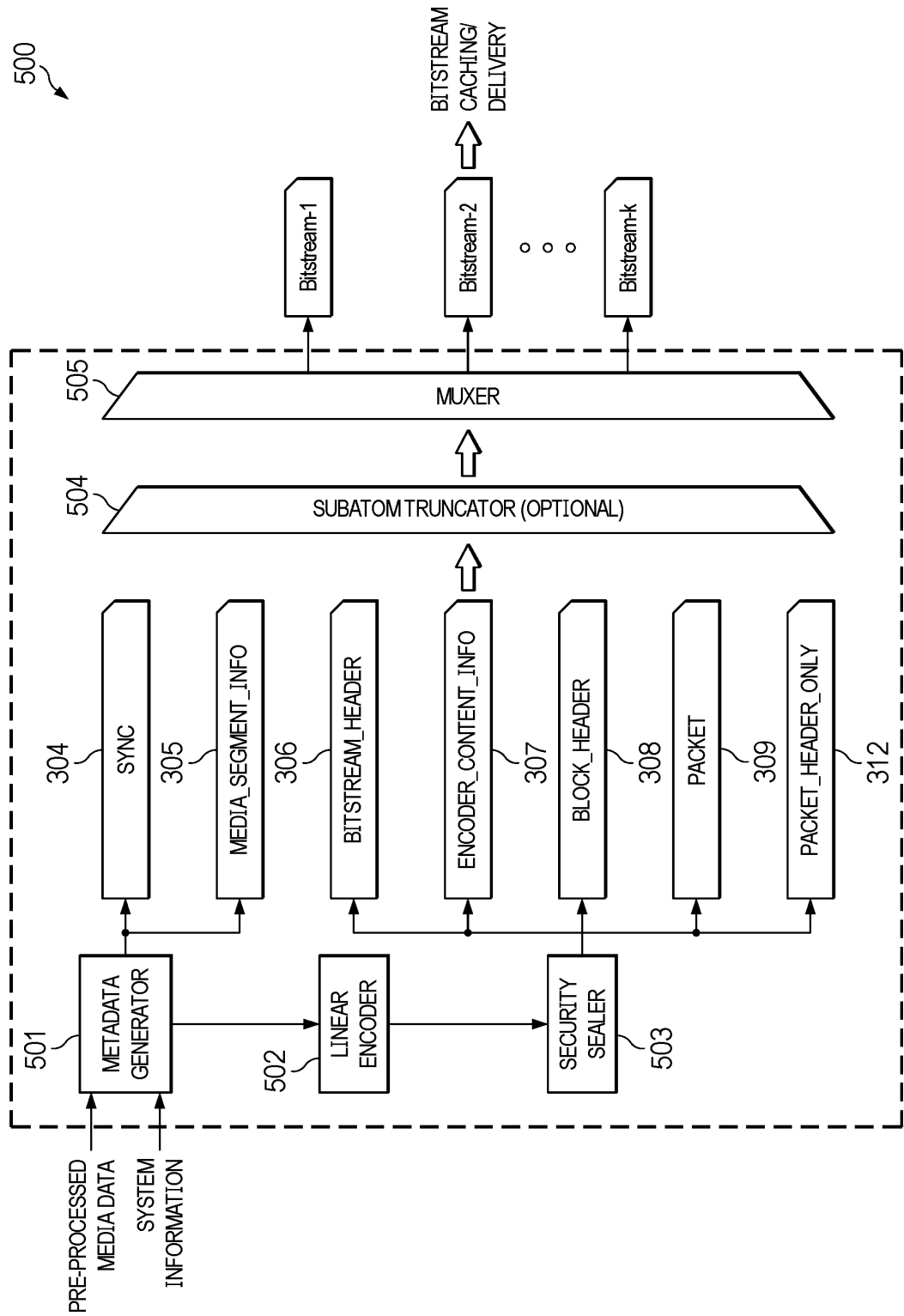


FIG. 5

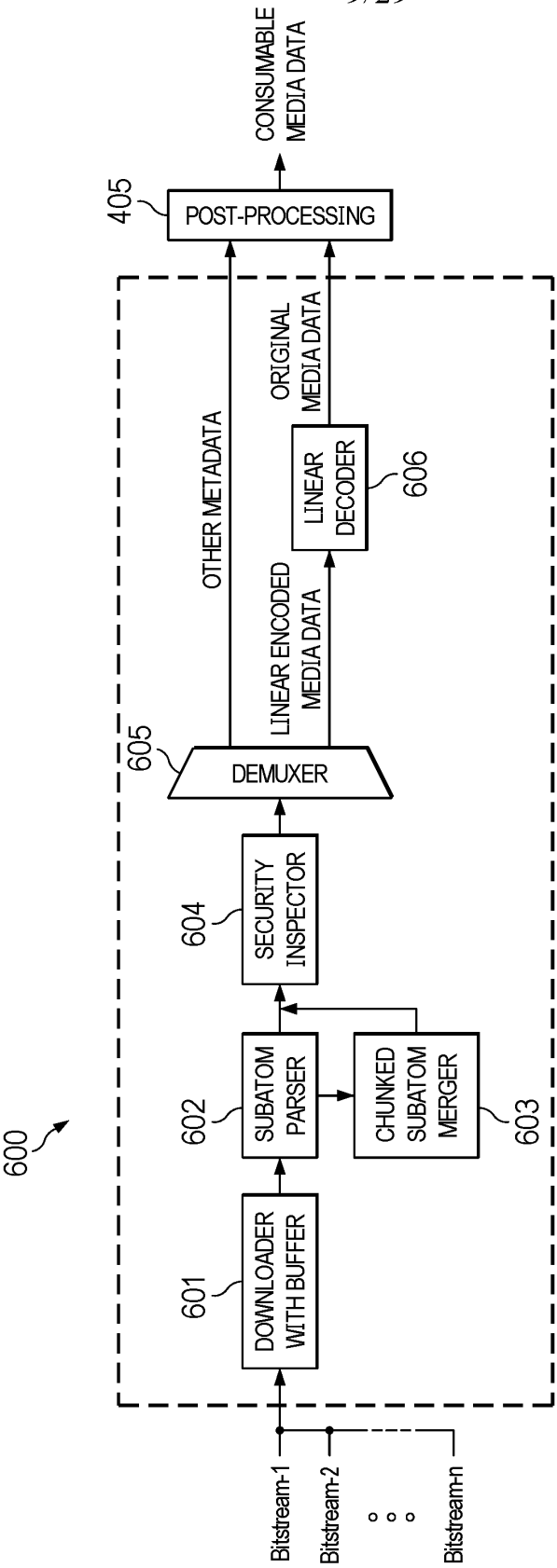


FIG. 6

10/29

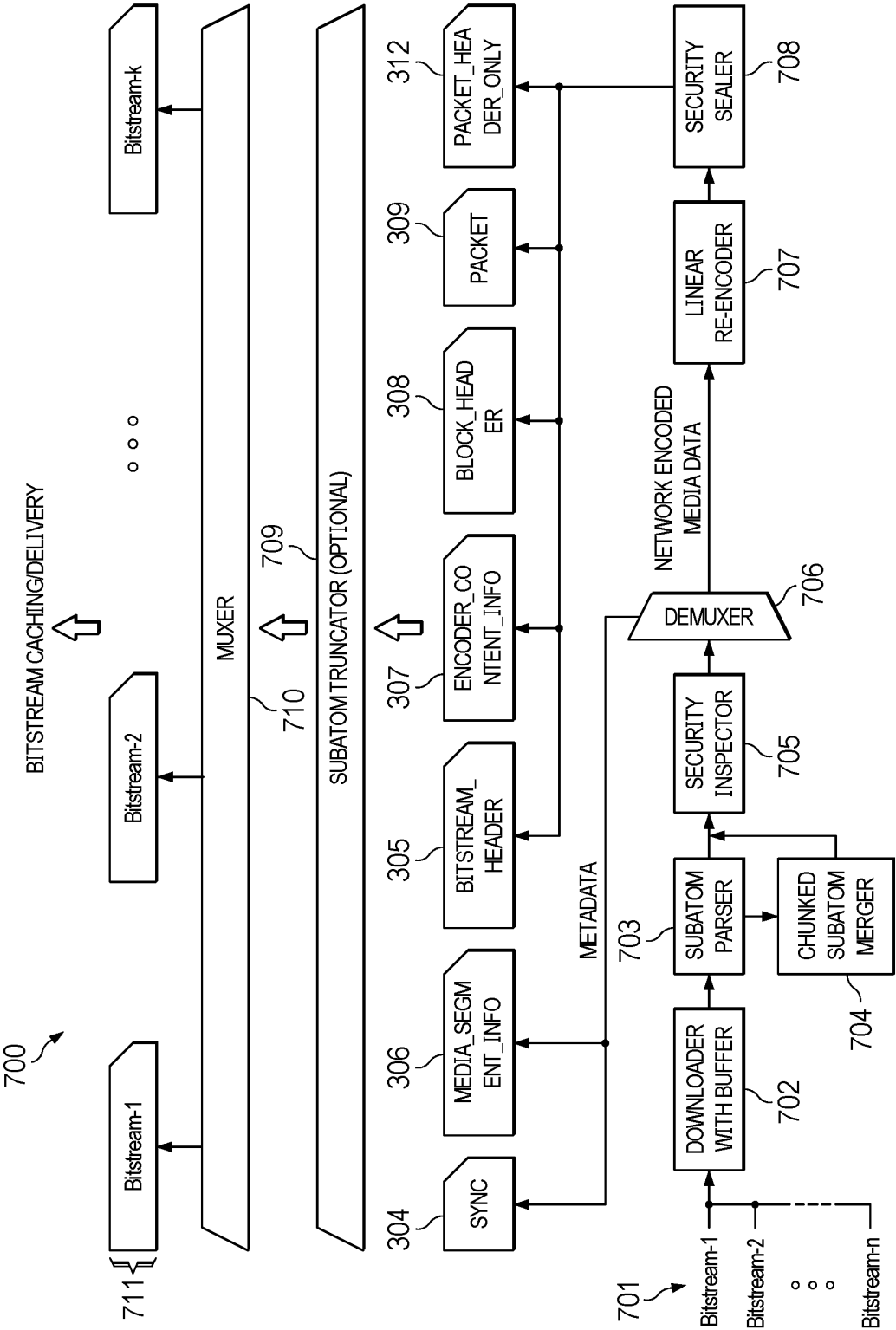


FIG. 7

11/29

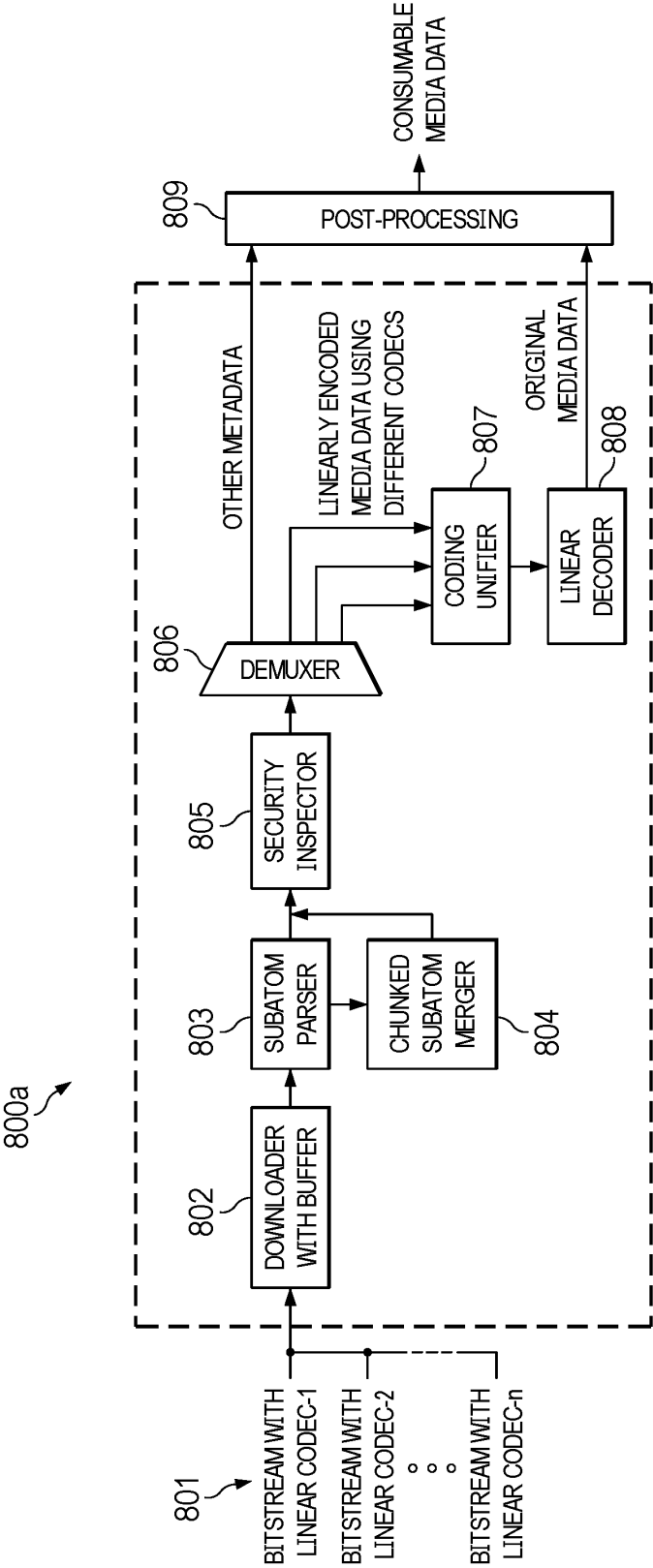


FIG. 8A

12/29

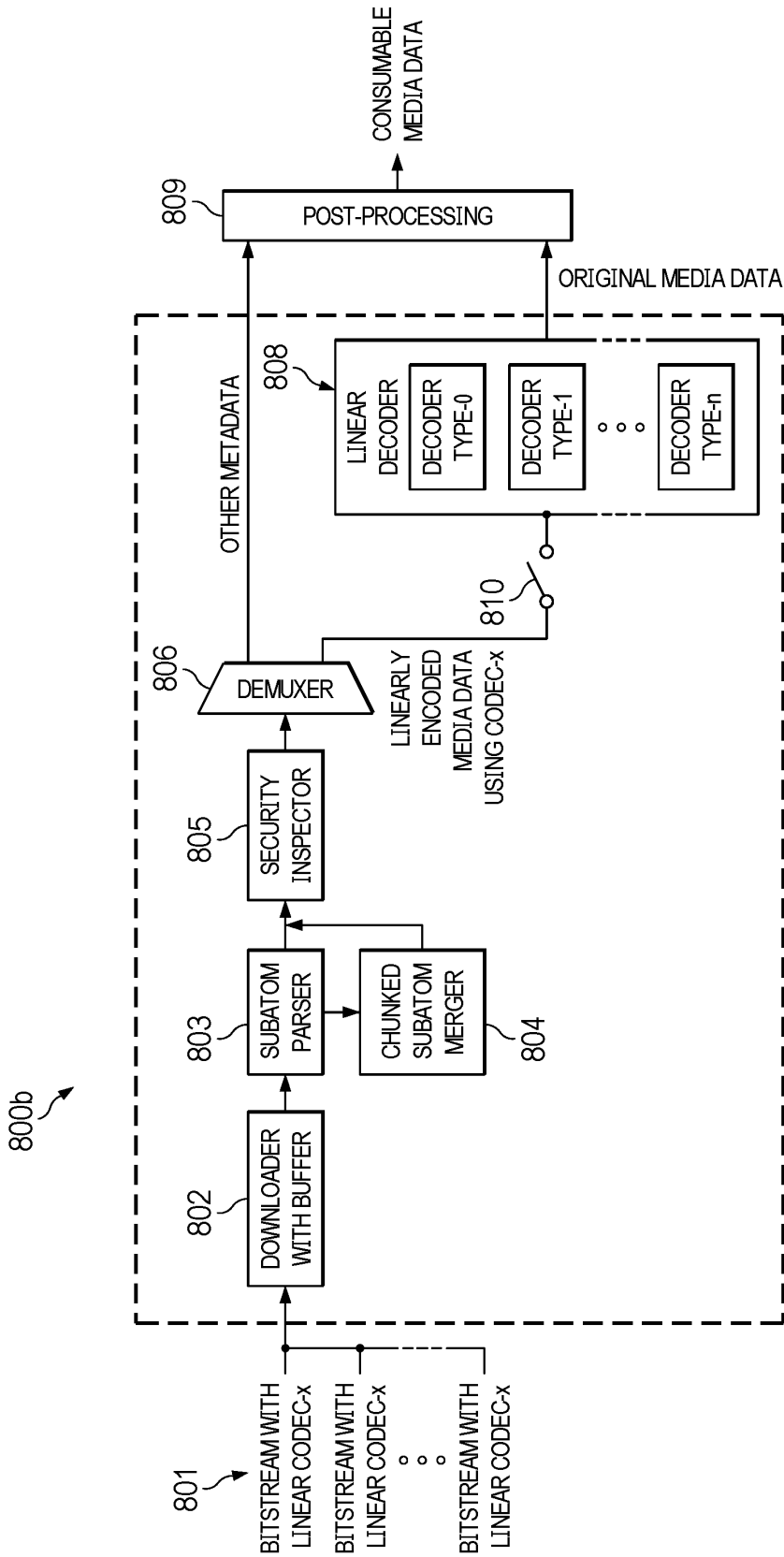


FIG. 8B

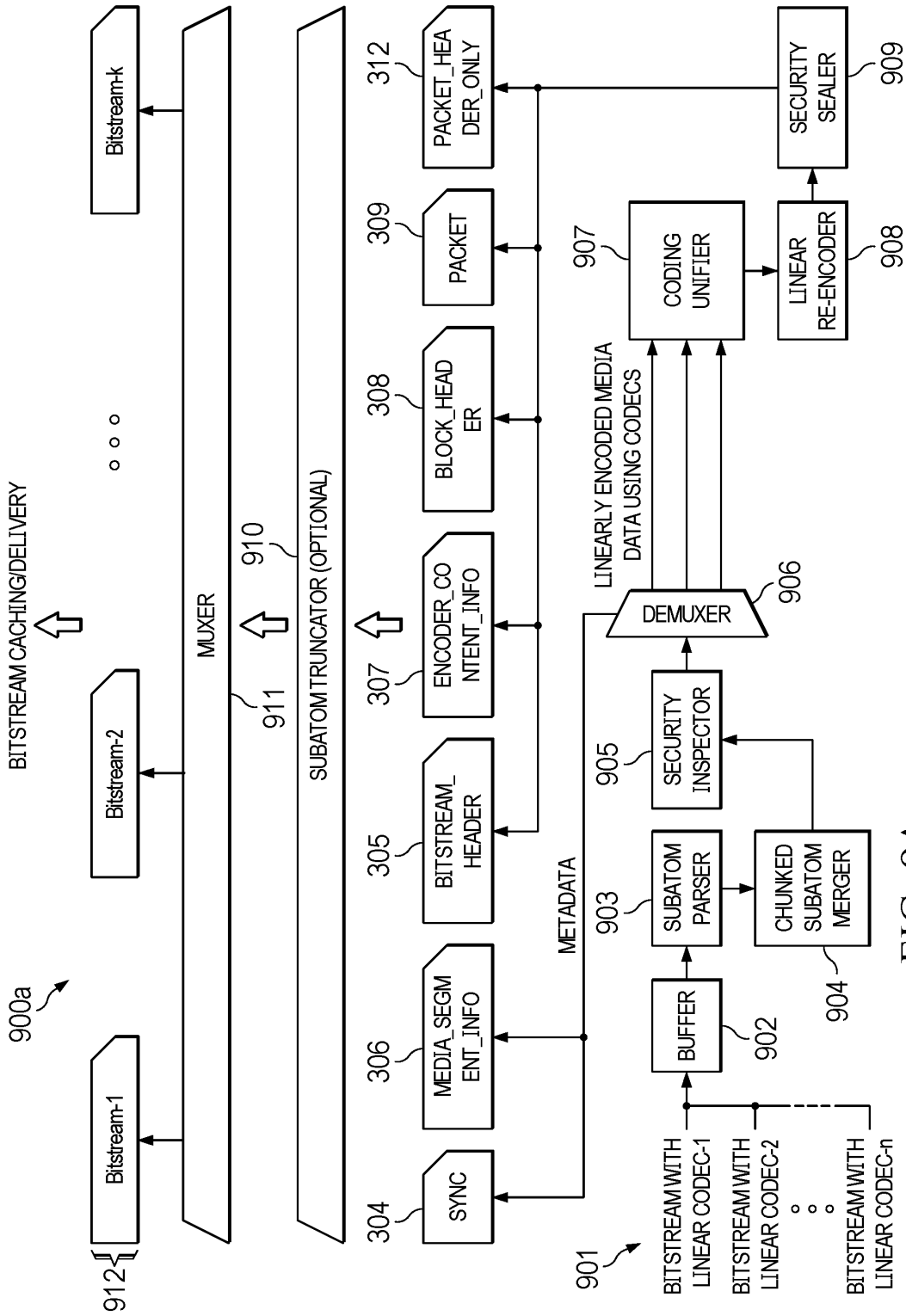


FIG. 9A

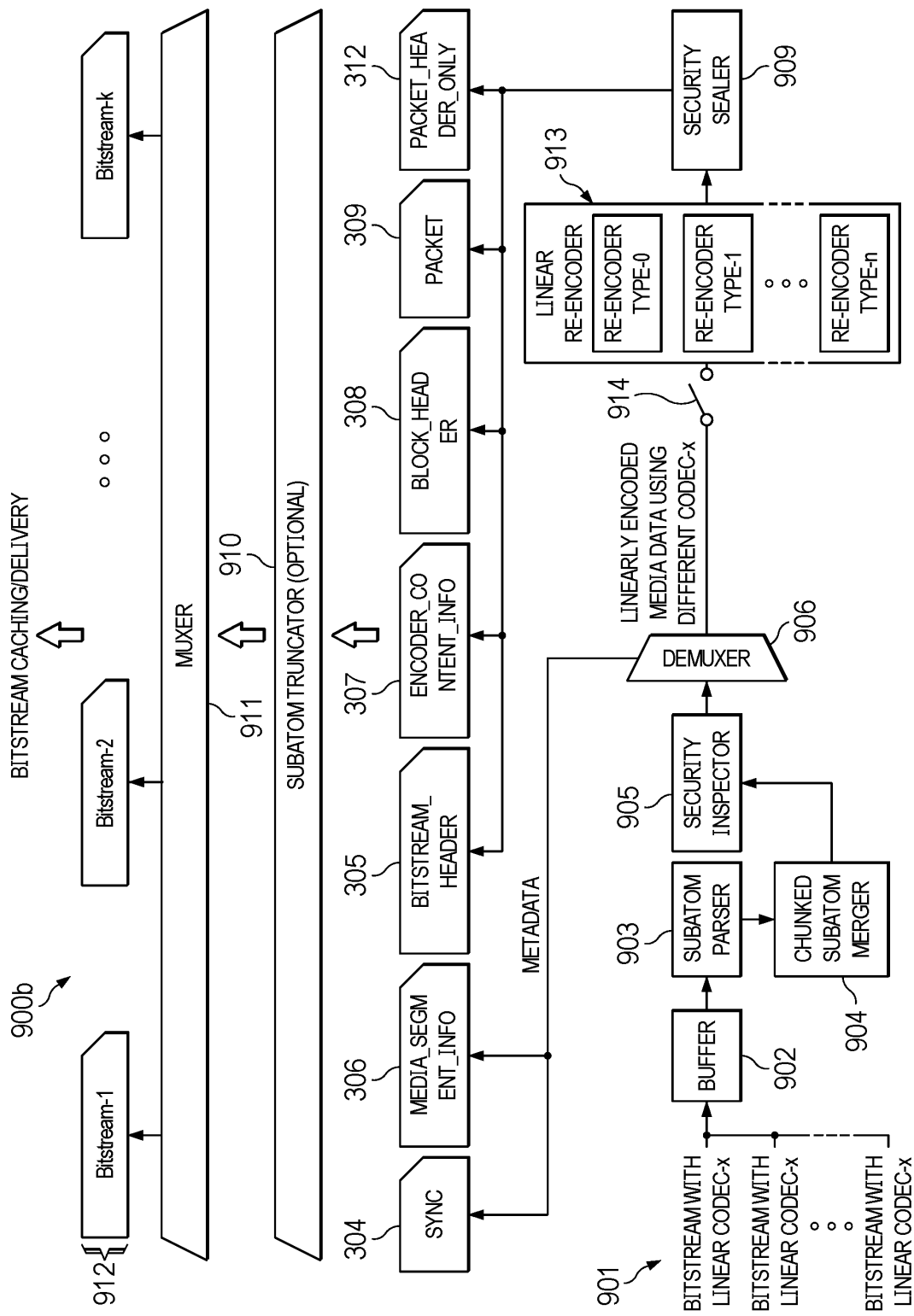


FIG. 9B

15/29

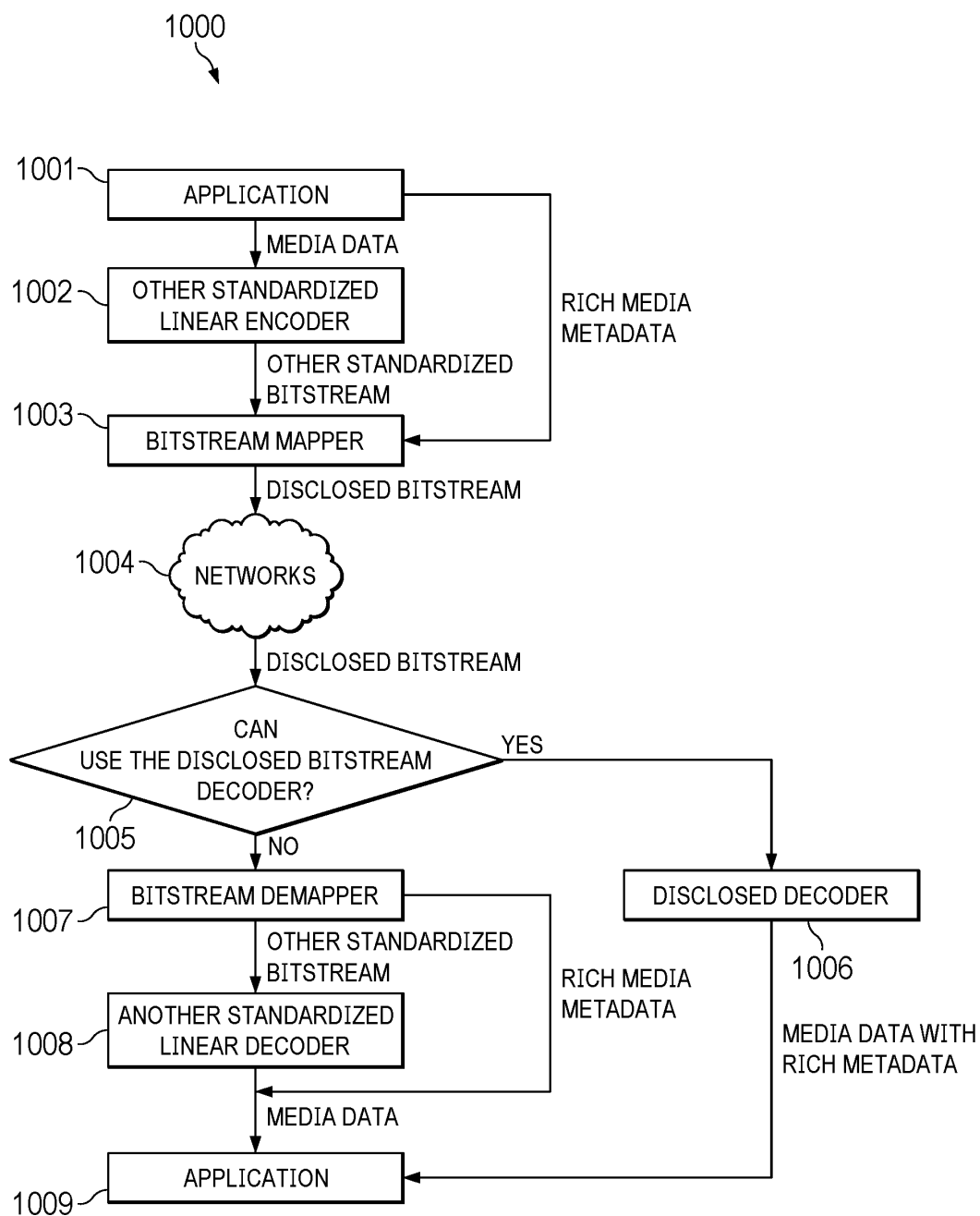


FIG. 10

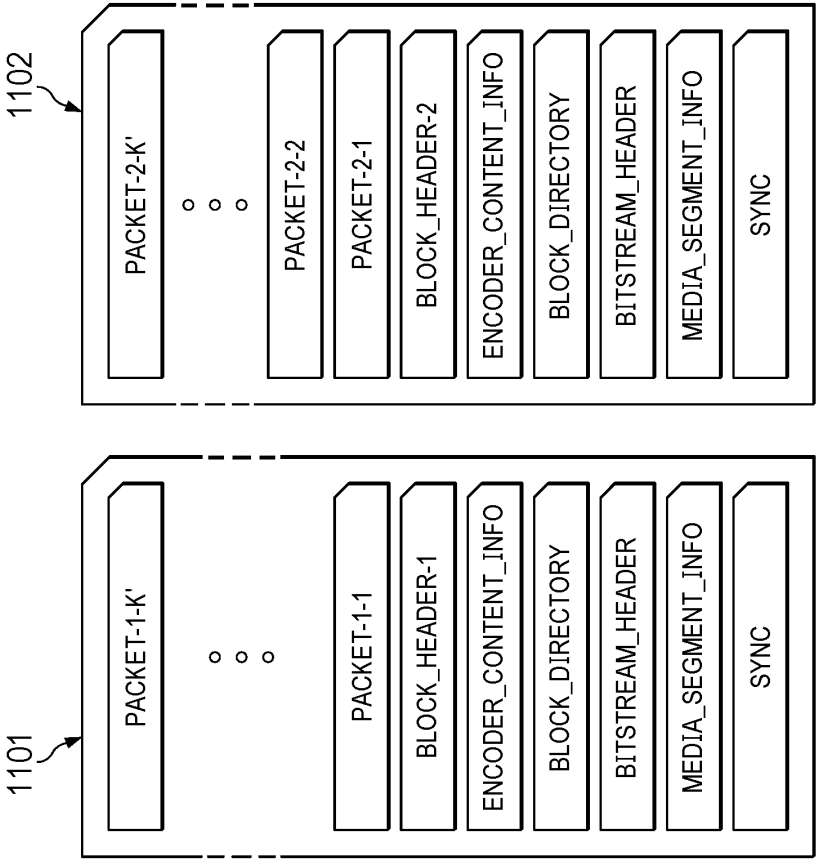


FIG. 11

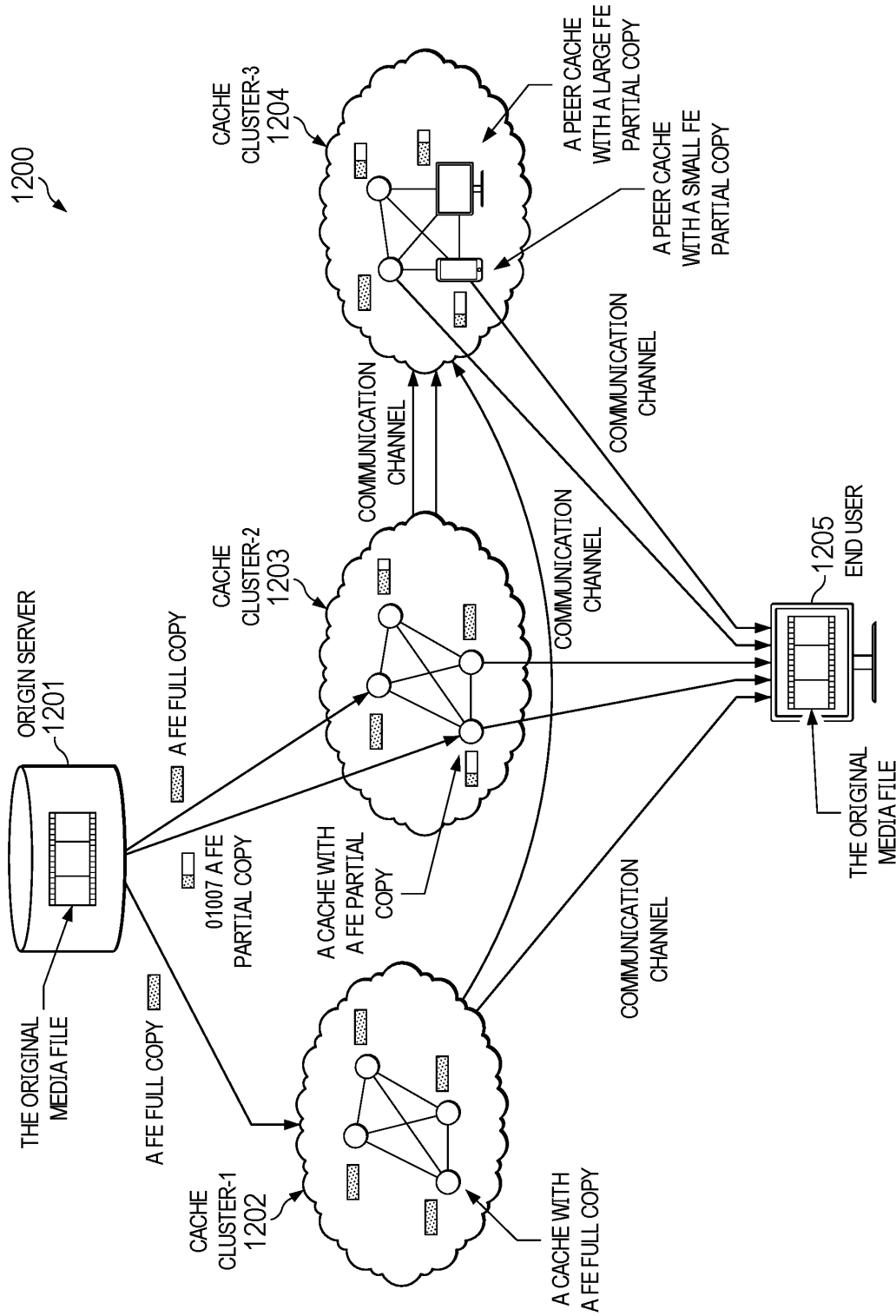


FIG. 12

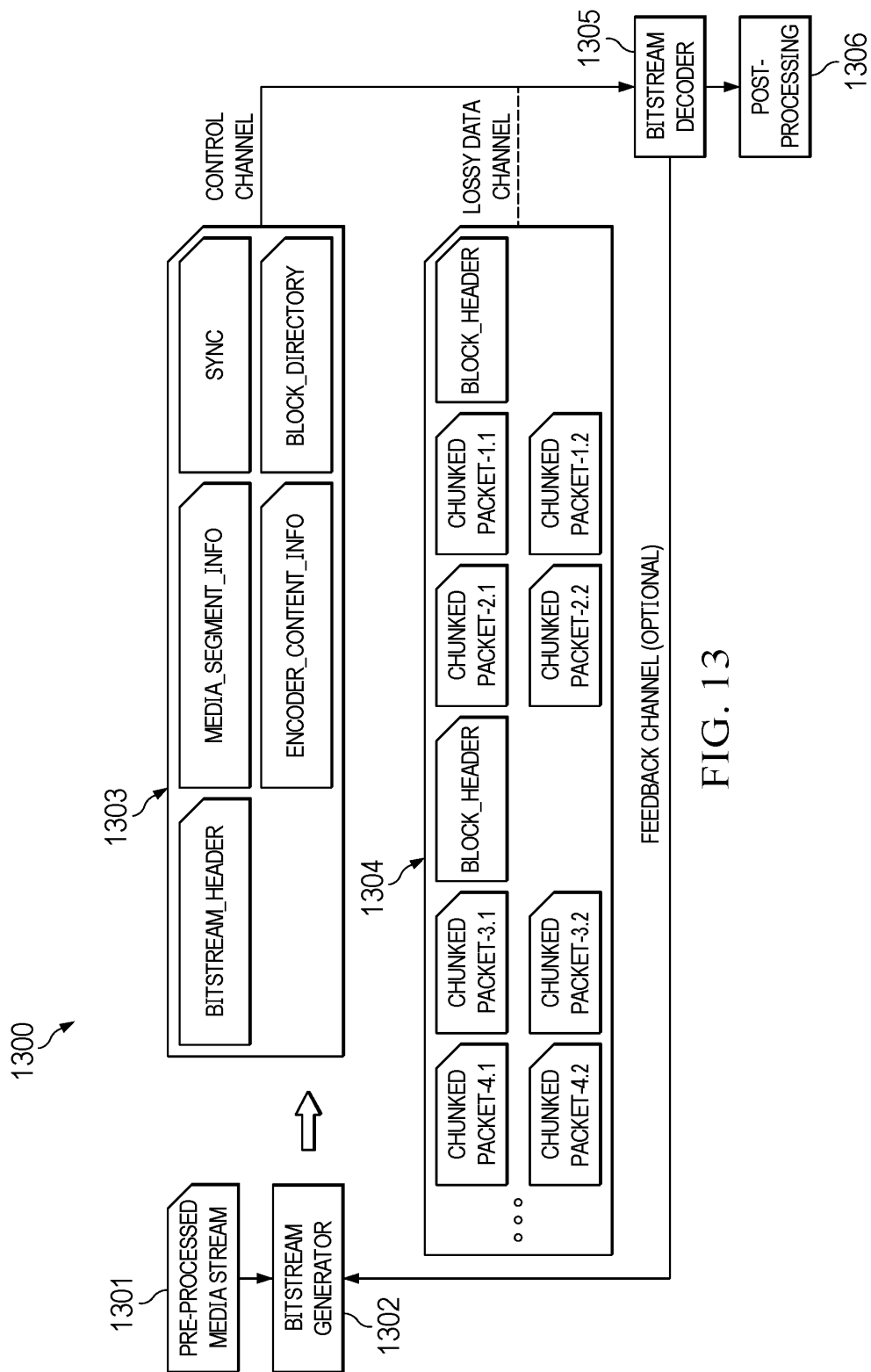
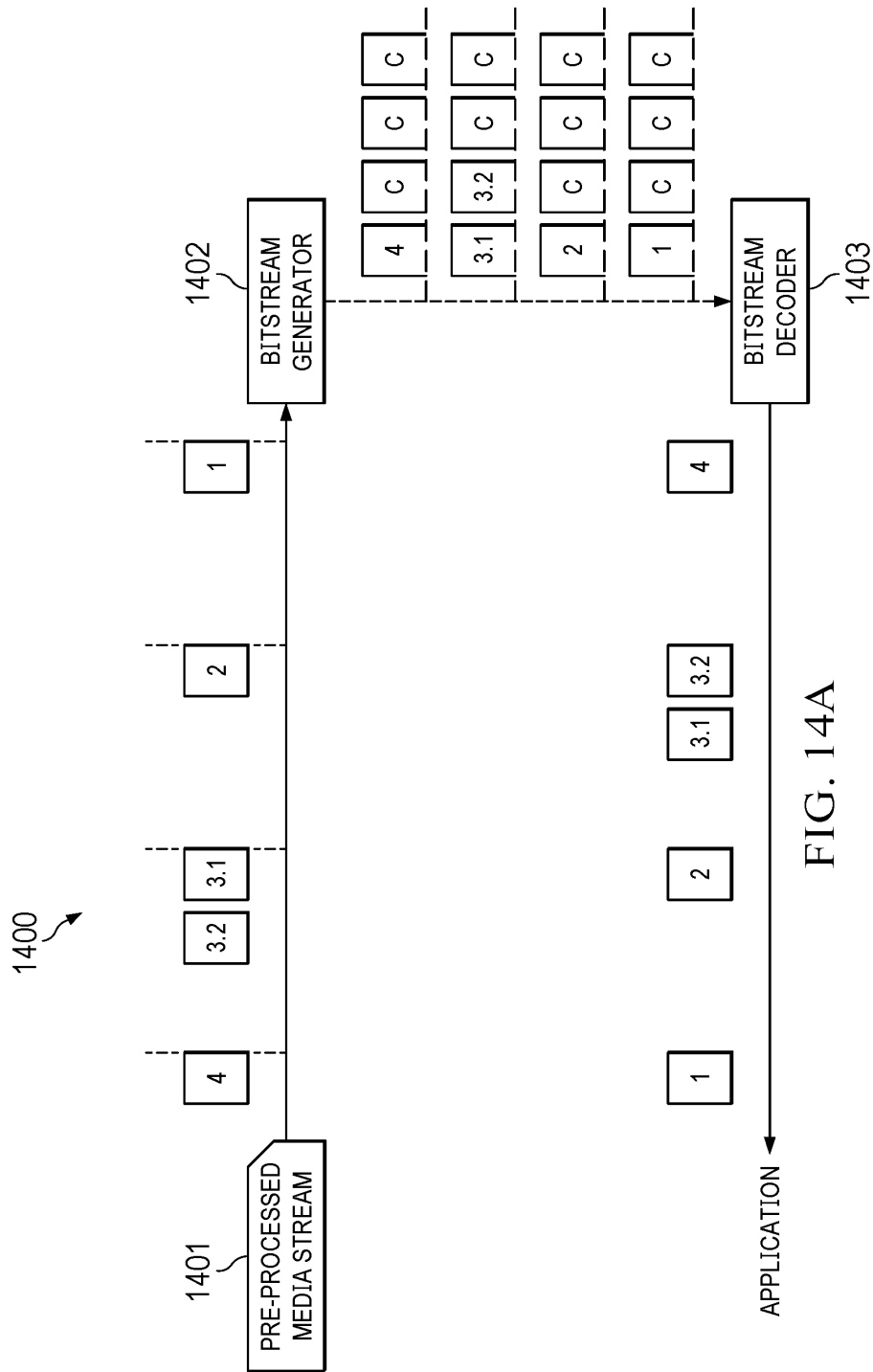


FIG. 13



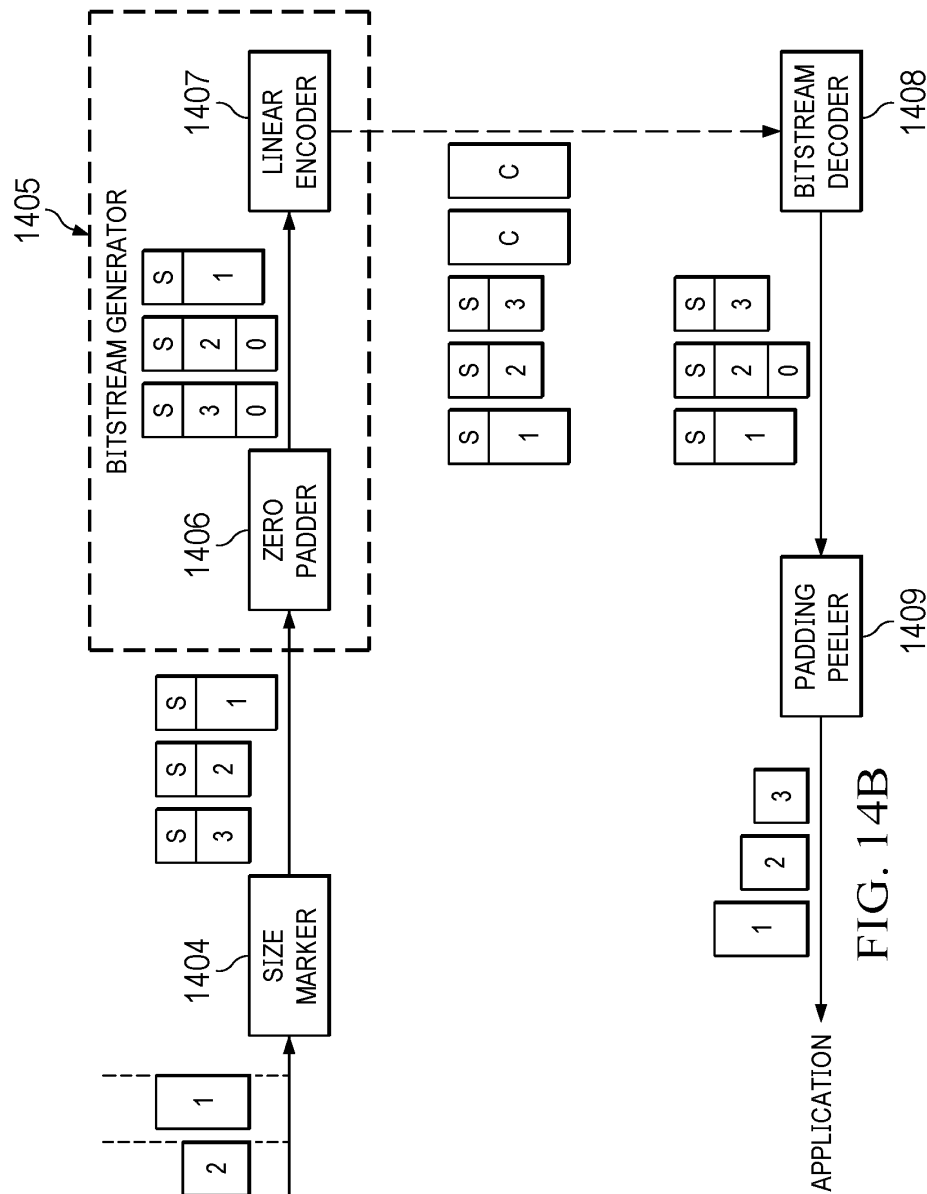


FIG. 14B

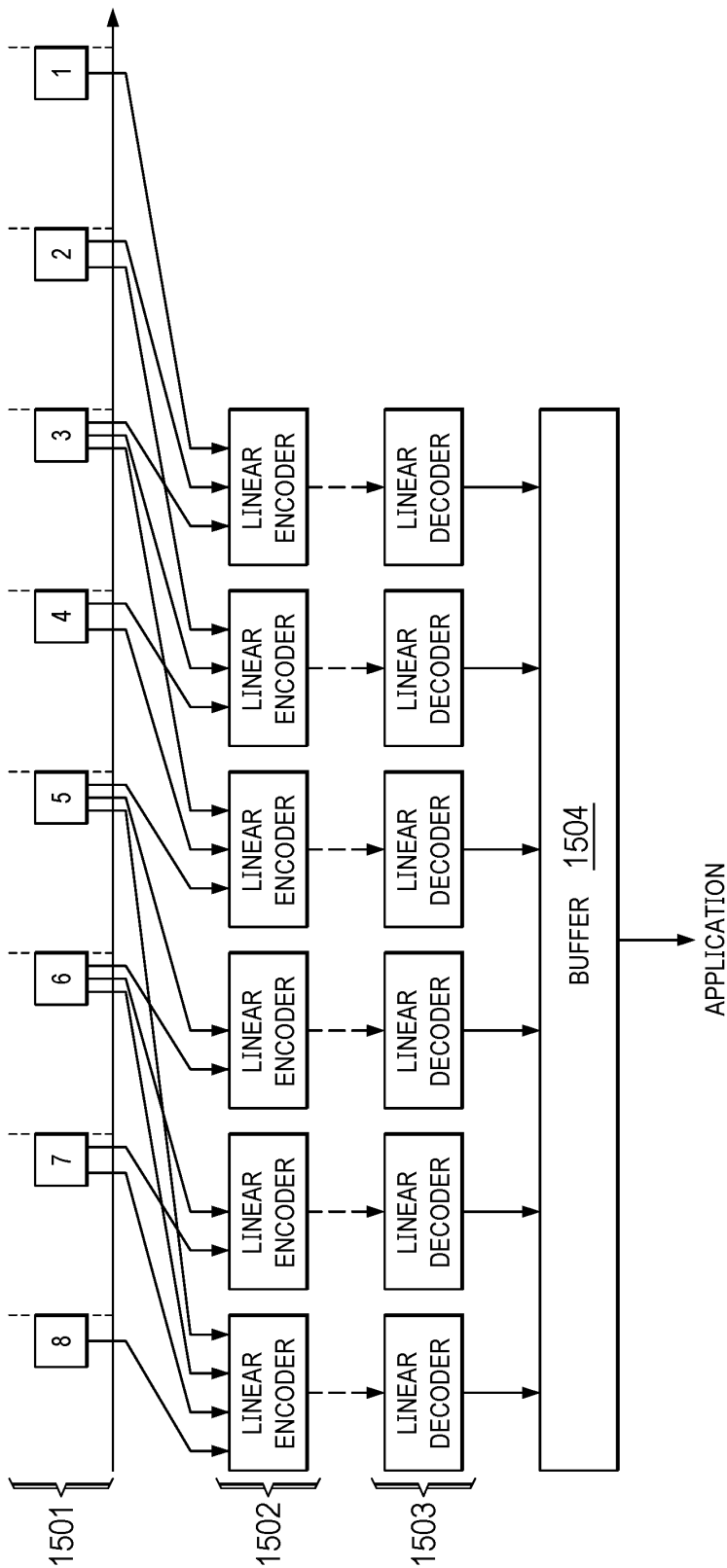


FIG. 15A

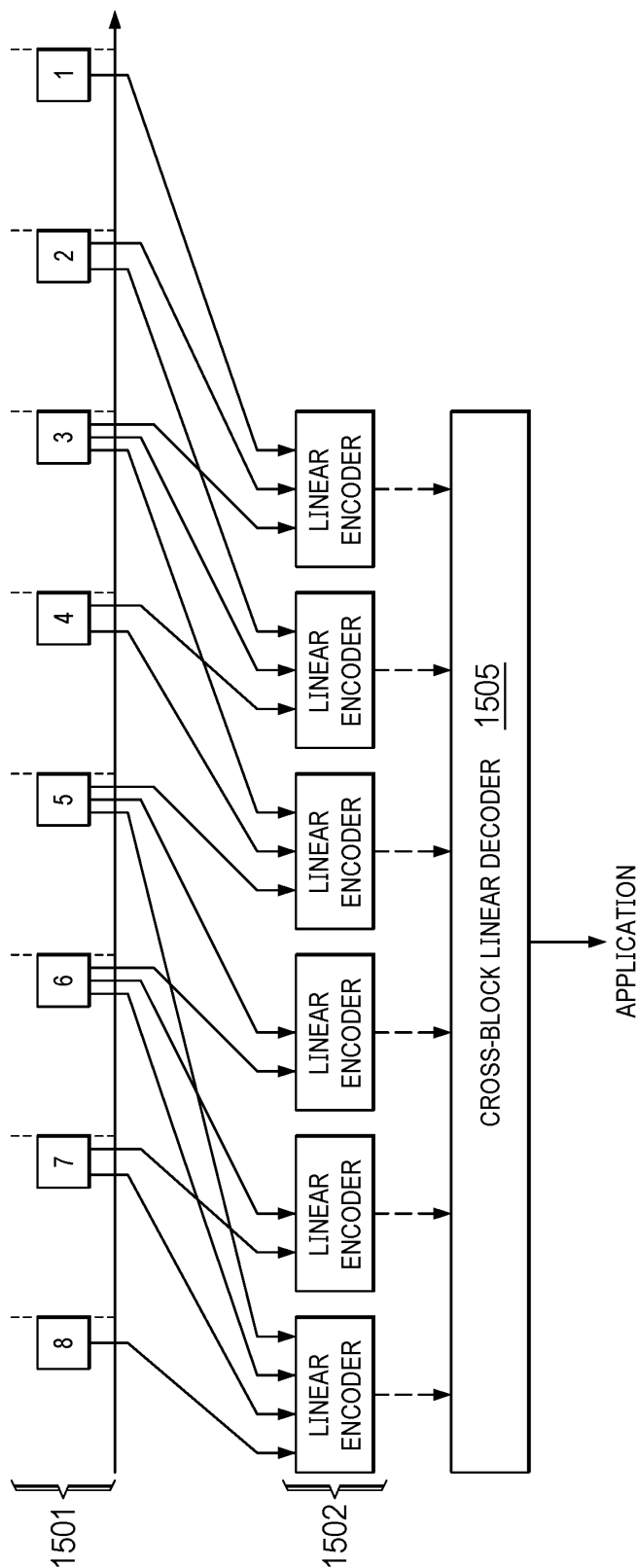


FIG. 15B

23/29

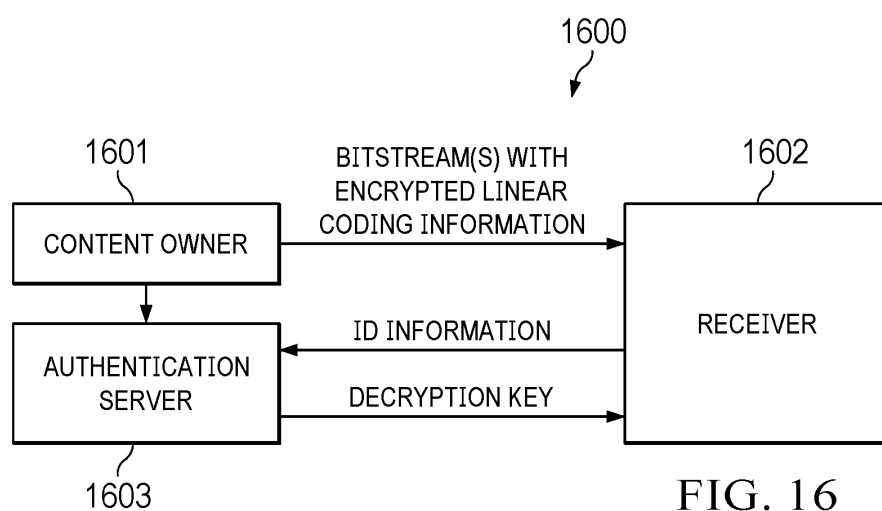


FIG. 16

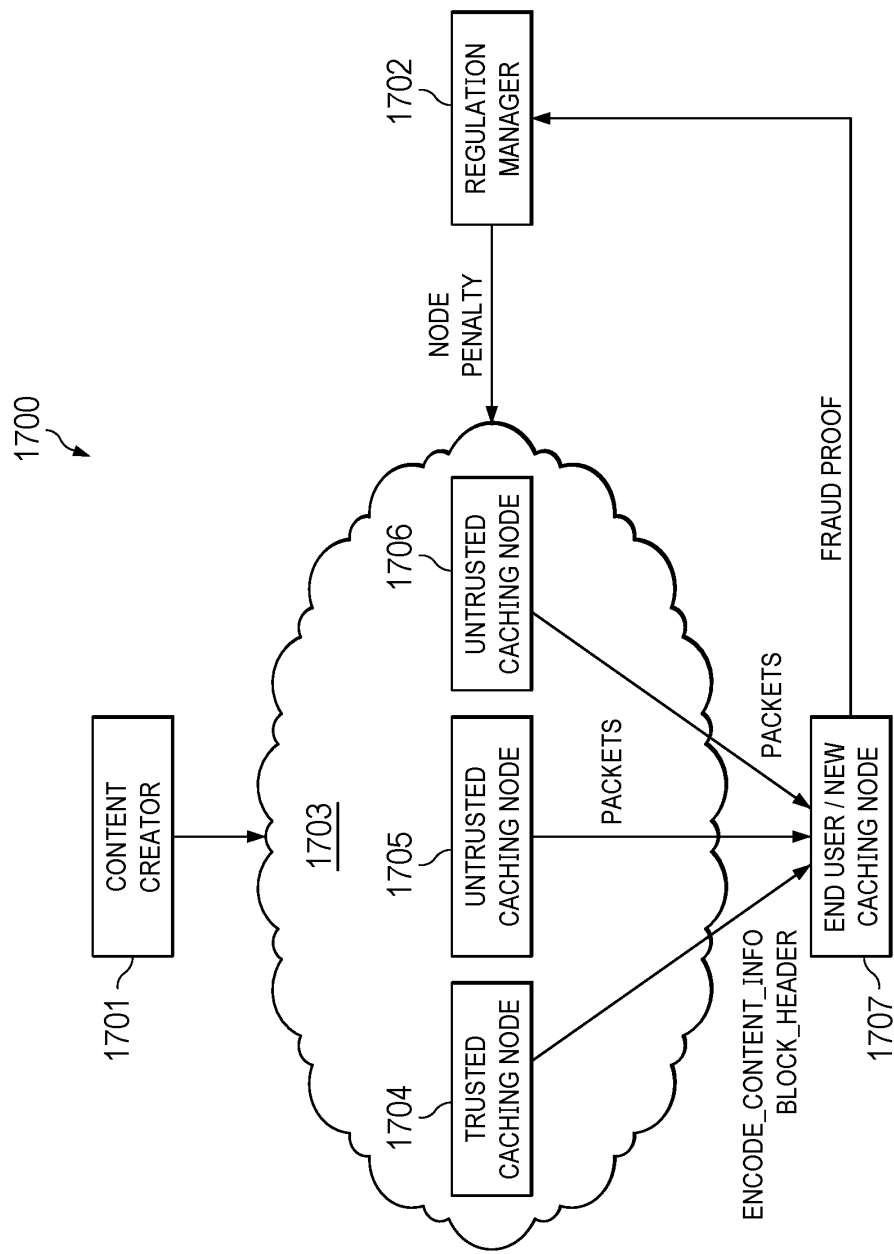


FIG. 17

25/29

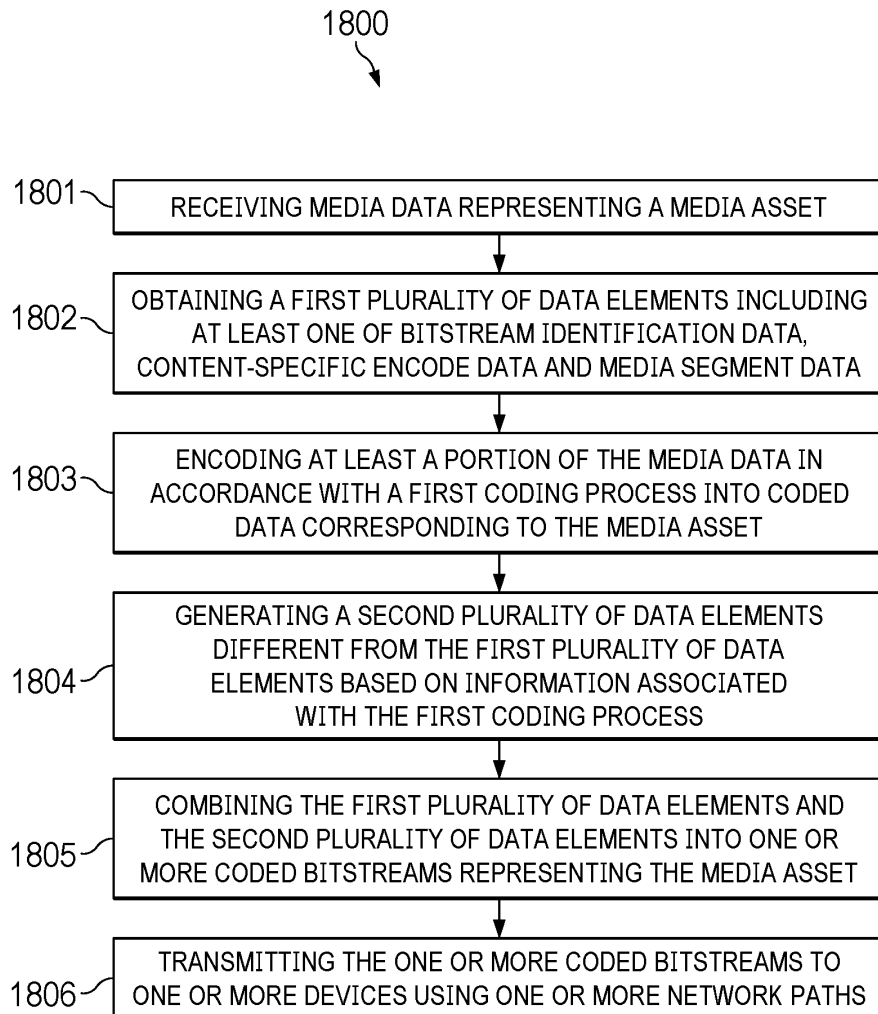


FIG. 18

26/29

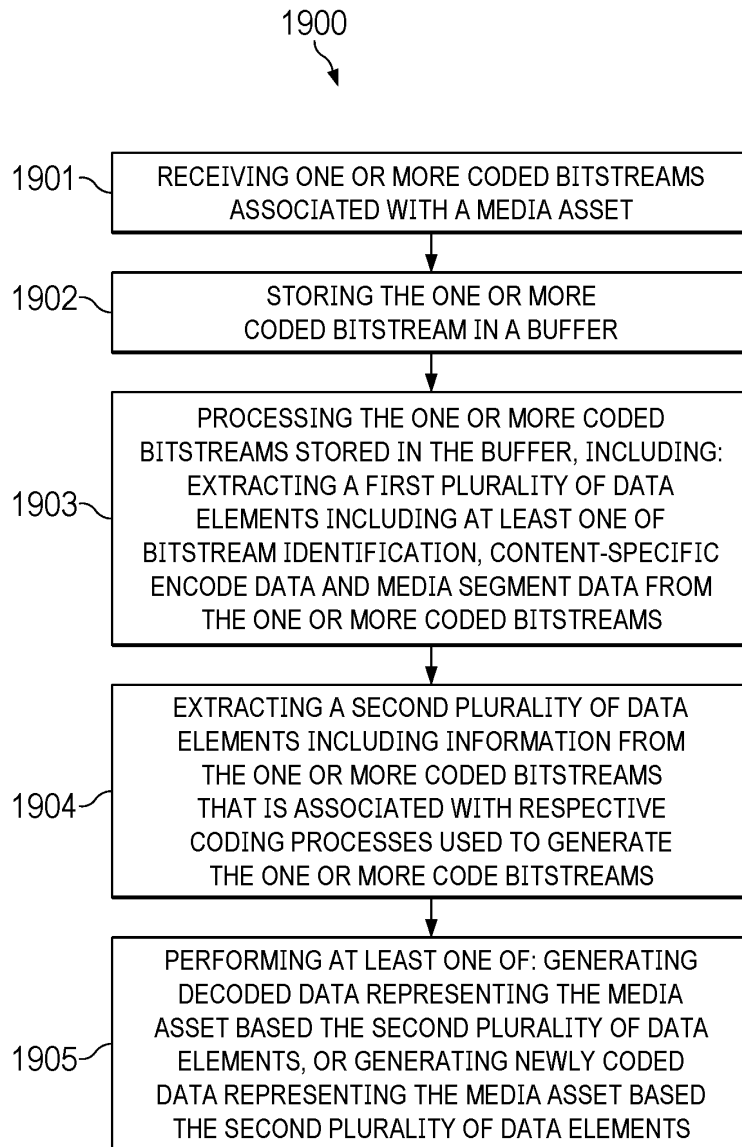


FIG. 19

27/29

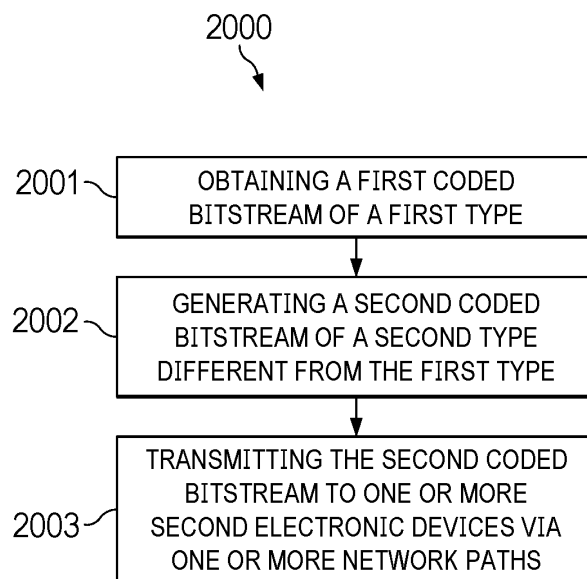


FIG. 20

28/29

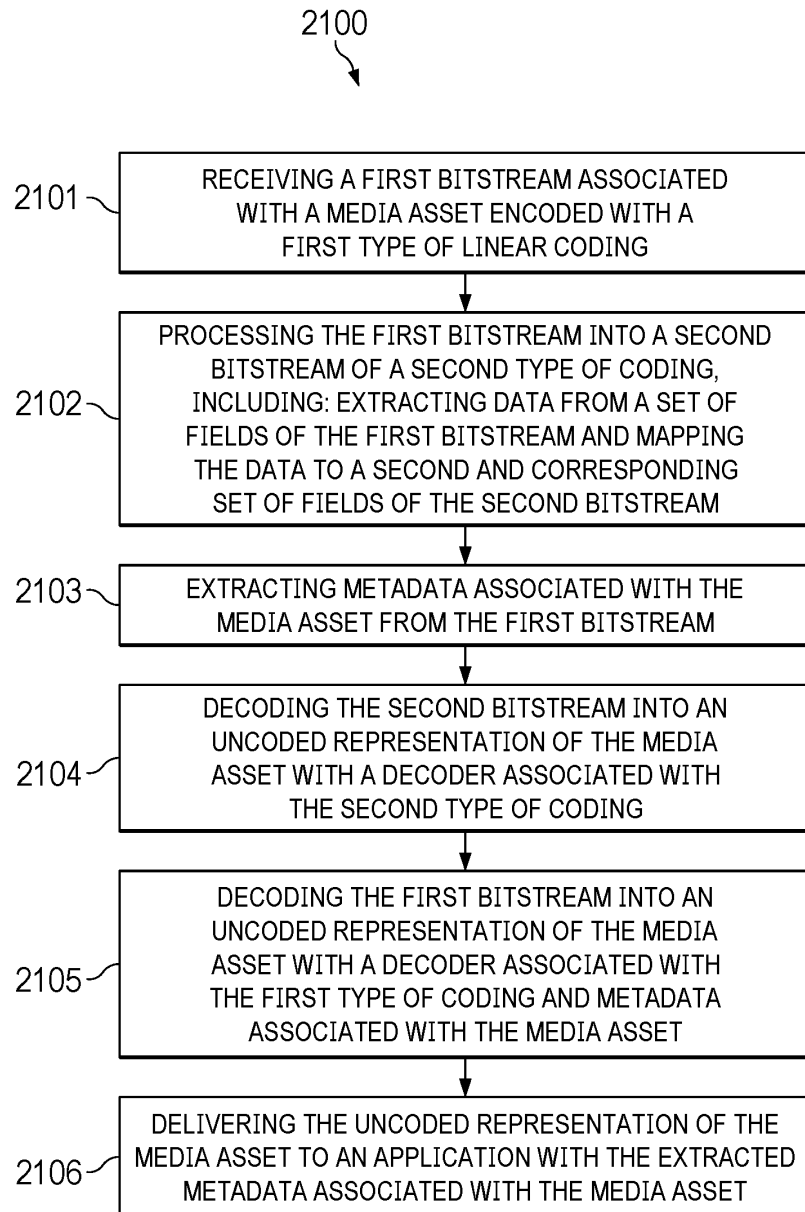


FIG. 21

29/29

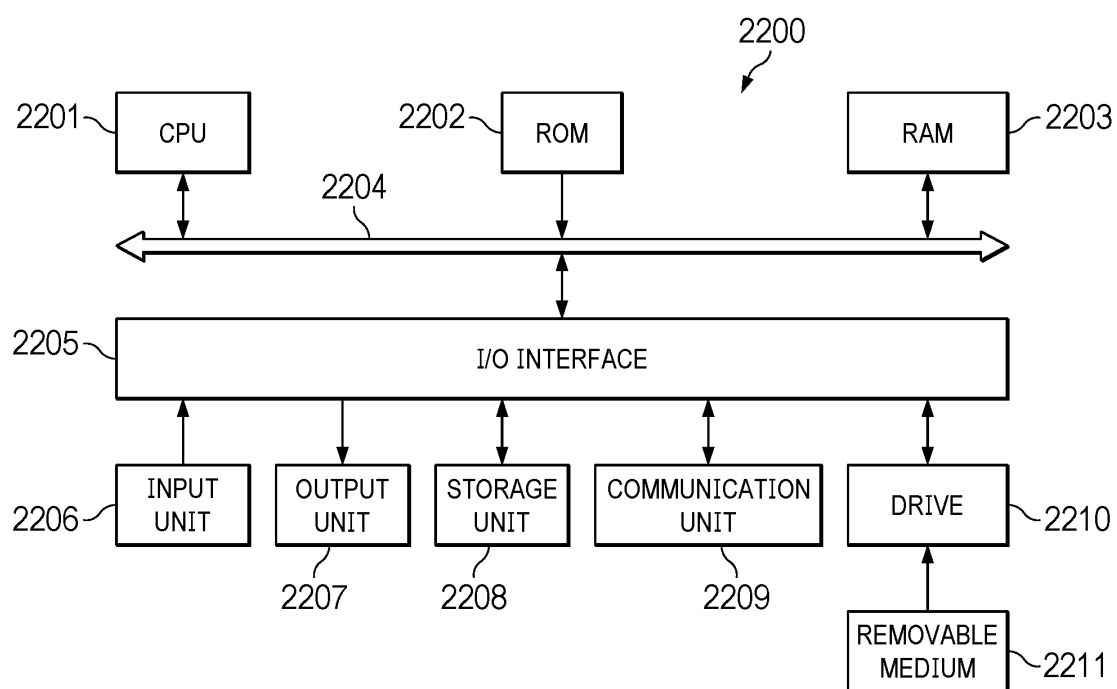


FIG. 22