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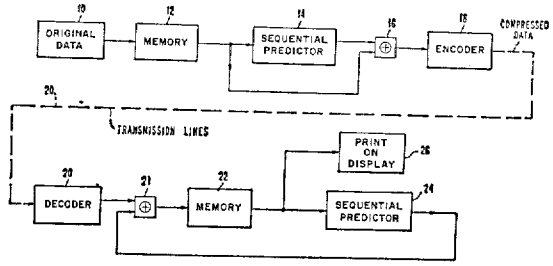
SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

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Continuation of abandoned application Ser. No. 365,335, May 30, 1973. This application July 23, 1973, Ser. No. 381,950

Int. Cl. H04n *7/12*
U.S. Cl. 235—154
10 Sheets Drawing. 26 Pages Specification

A system is disclosed for compacting digital image data by means of predictive coding. The prediction decision rule is developed by a heuristic sequential learning process from a sample image data set.



A large set of two dimensional image points represented in binary form is processed in order to generate a prediction decision tree structure. The decision tree is stored within the predictor memory, then, each image point taken from a set of data that is to be compressed, is predicted in accordance with the stored prediction tree structure. The predicted value is then added, modulo-two, to the actual binary value of the image point. The resulting output of the modulo-two addition is then compressed by conventional means into data that is transmitted to a receiving unit. The receiving unit contains both a decoder for expanding the data, and an inverse predictor for creating a data pattern representative of the image that was transmitted.

SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973

FIG. 1

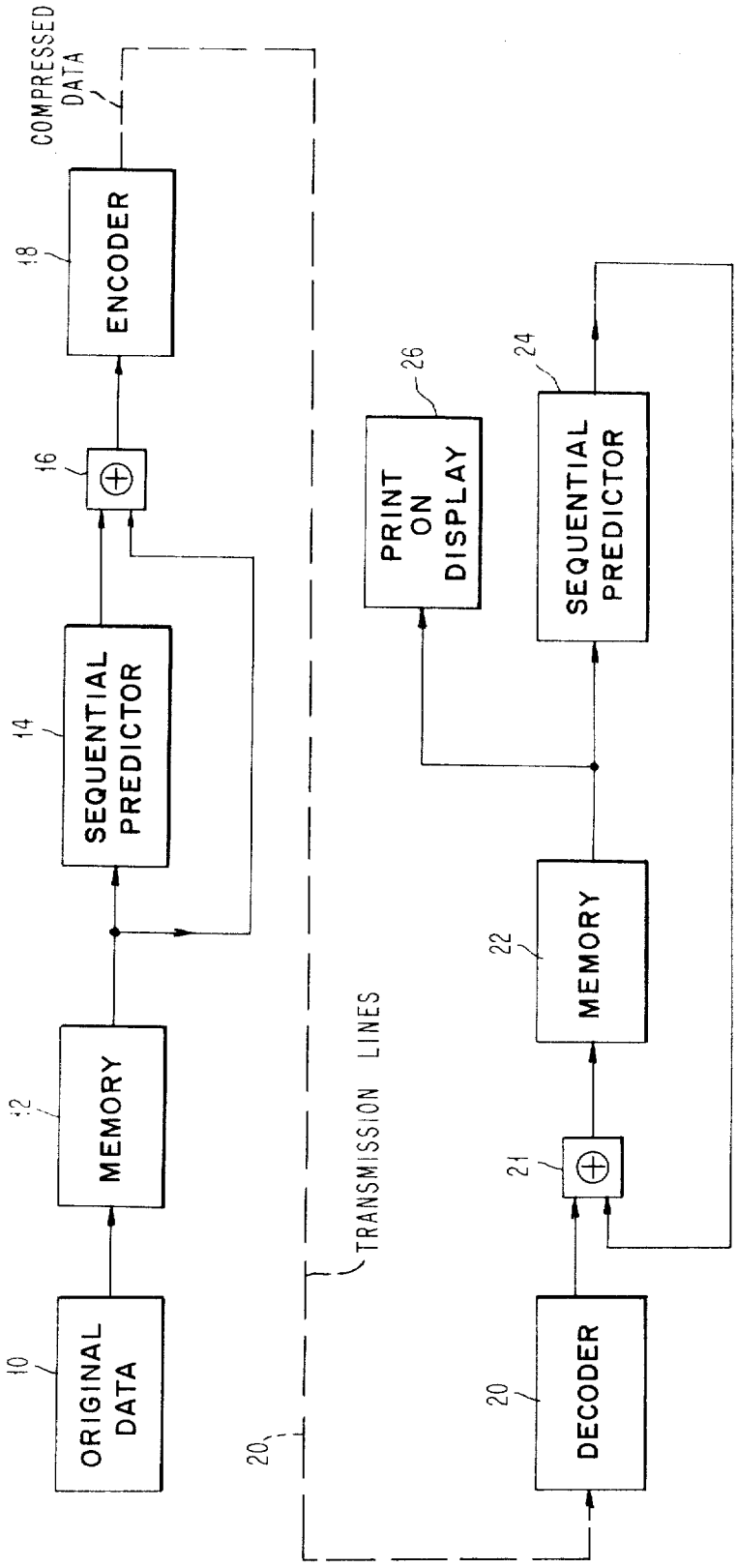


FIG. 2

3 POINT PREDICTOR (PRIOR ART)

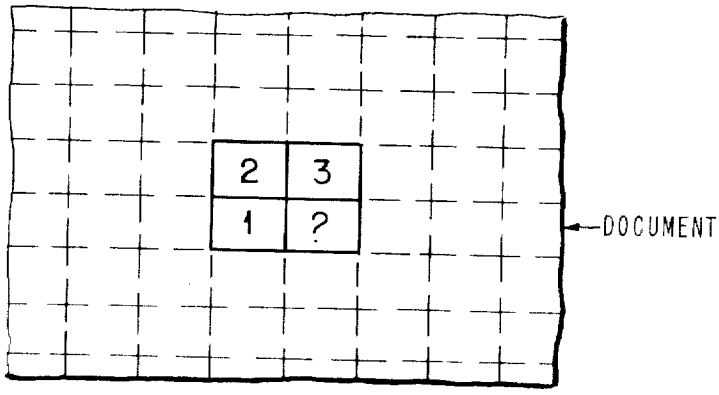
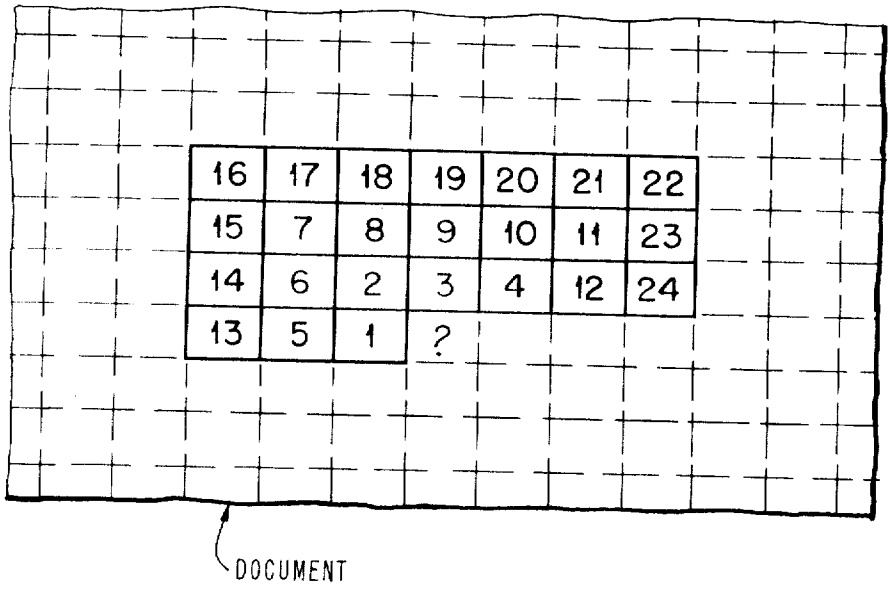


FIG. 3



SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973

FIG. 4

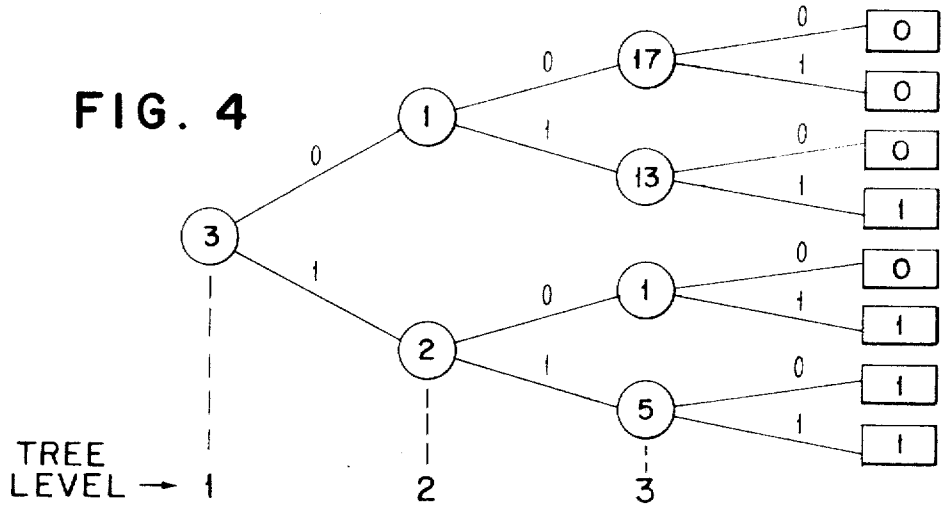


FIG. 5

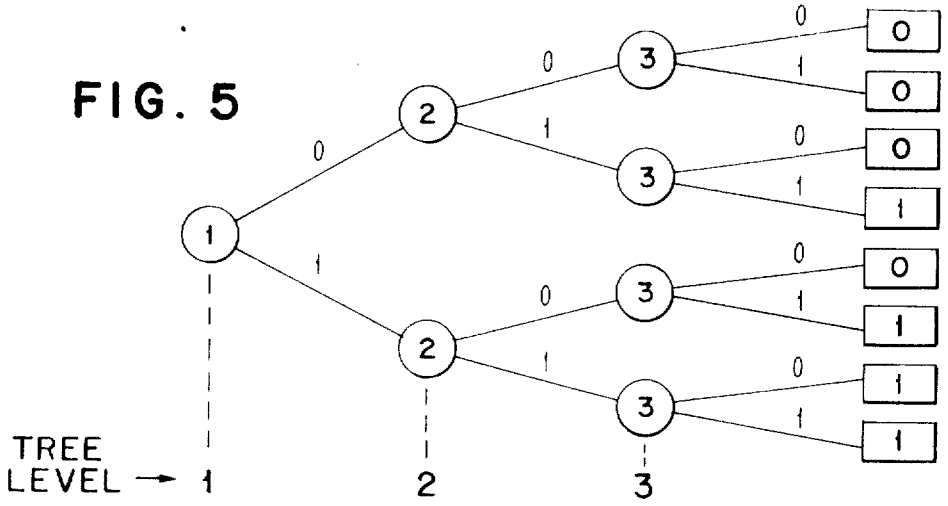
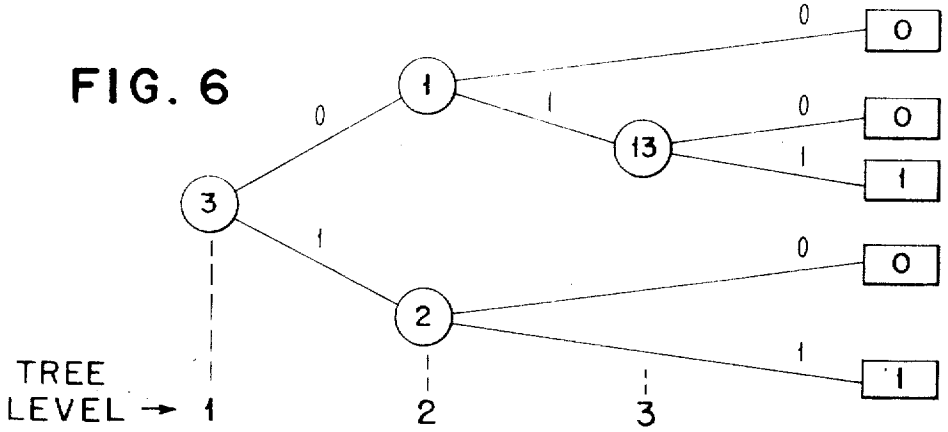


FIG. 6



SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973 10 Sheets-Sheet 4

FIG. 7

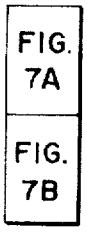


FIG. 7A

SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973 10 Sheets-Sheet

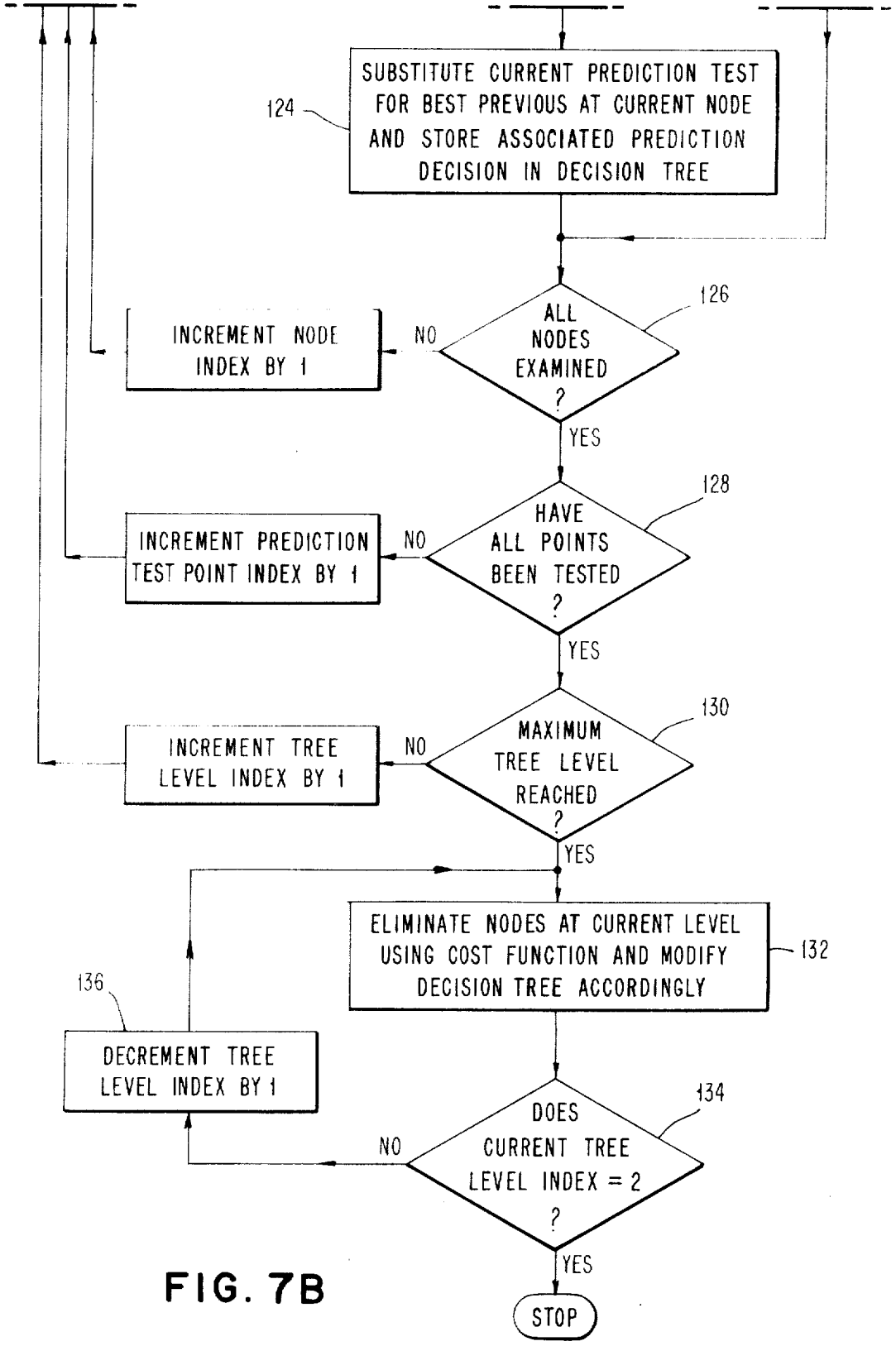


FIG. 7B

SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

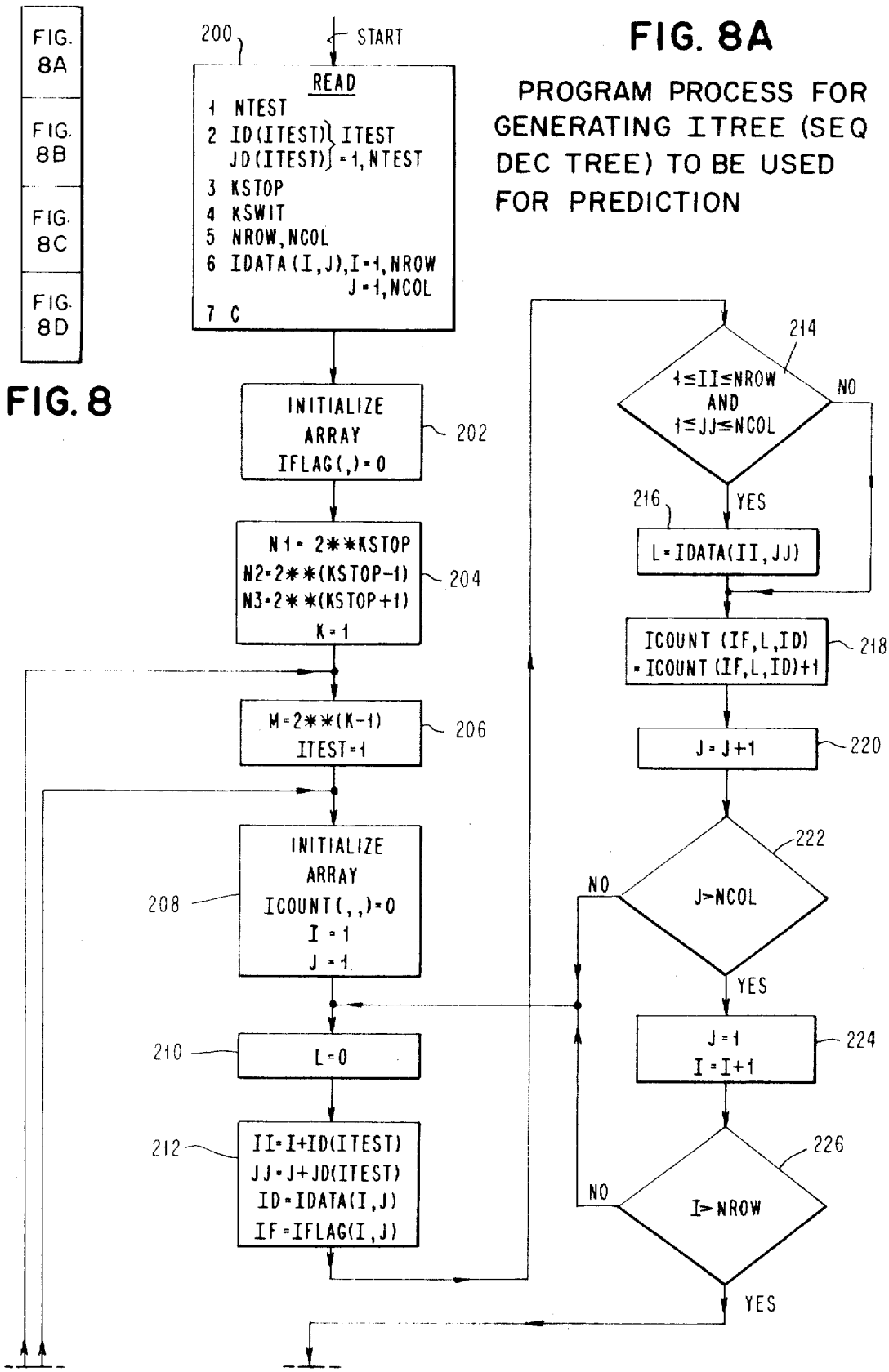
Original Filed May 30, 1973

FIG. 8A
FIG. 8B
FIG. 8C
FIG. 8D

FIG. 8

FIG. 8A

PROGRAM PROCESS FOR GENERATING ITREE (SEQ DEC TREE) TO BE USED FOR PREDICTION



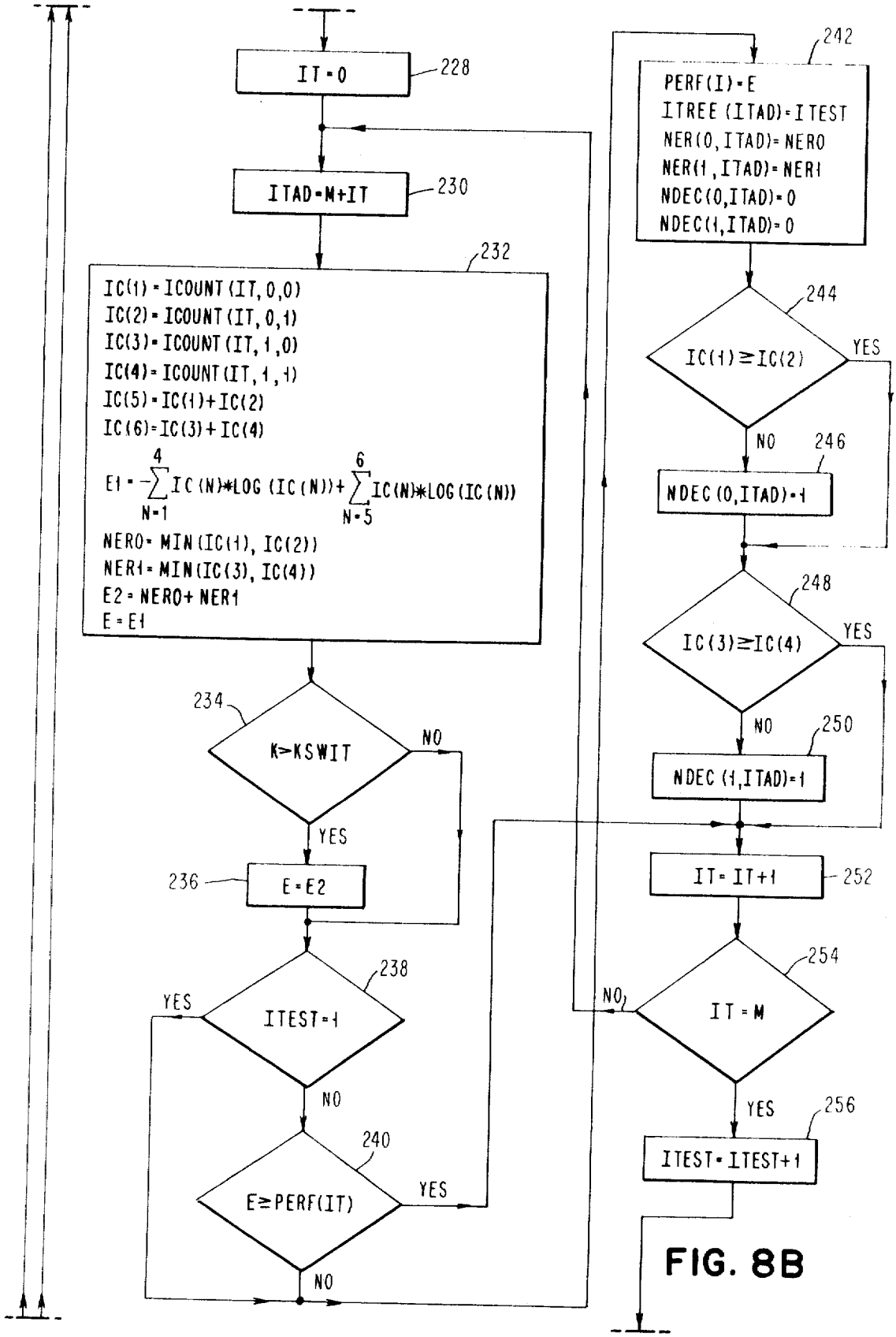
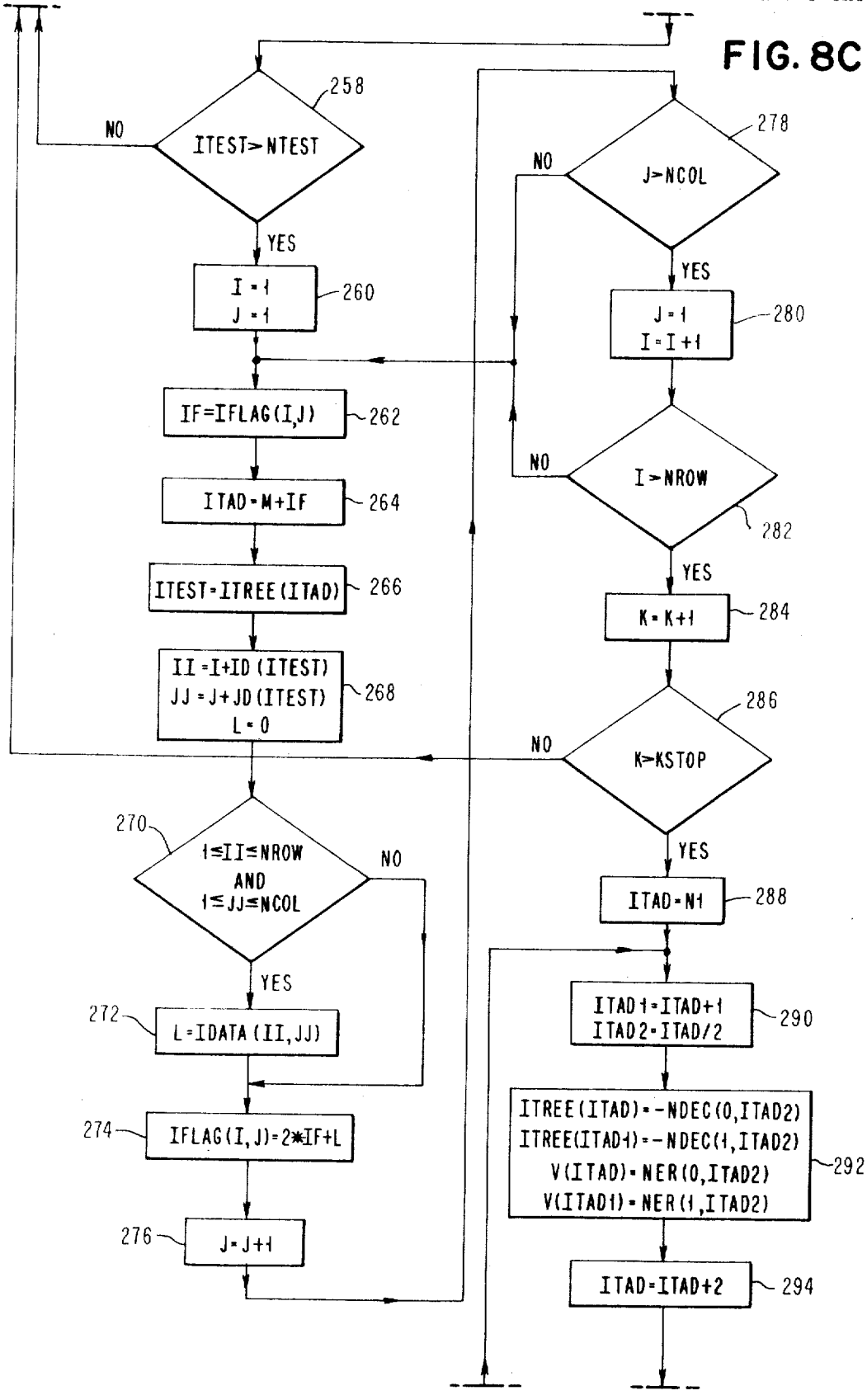

IT=0
228
ITAD=M+IT
230
232
IC(1)=ICOUNT(IT,0,0)
IC(2)=ICOUNT(IT,0,1)
IC(3)=ICOUNT(IT,1,0)
IC(4)=ICOUNT(IT,1,1)
IC(5)=IC(1)+IC(2)
IC(6)=IC(3)+IC(4)
E1=-∑ IC(N)*LOG(IC(N))+∑ IC(N)*LOG(IC(N))
N=1 N=5
NERO=MIN(IC(1), IC(2))
NER1=MIN(IC(3), IC(4))
E2=NERO+NER1
E=E1
234
K>KSWIT
NO
YES
236
E=E2
238
ITEST=1
YES
NO
240
E≥PERF(IT)
YES
NO
242
PERF(I)=E
ITREE(ITAD)=ITEST
NER(0,ITAD)=NERO
NER(1,ITAD)=NER1
NDEC(0,ITAD)=0
NDEC(1,ITAD)=0
244
IC(1)≥IC(2)
YES
NO
246
NDEC(0,ITAD)=1
248
IC(3)≥IC(4)
YES
NO
250
NDEC(1,ITAD)=1
IT=IT+1
252
254
IT=M
NO
YES
256
ITEST=ITEST+1

FIG. 8B

SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973 10 Sheets-Sheet 8

FIG. 8C



SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973 10 Sheets-Sheet

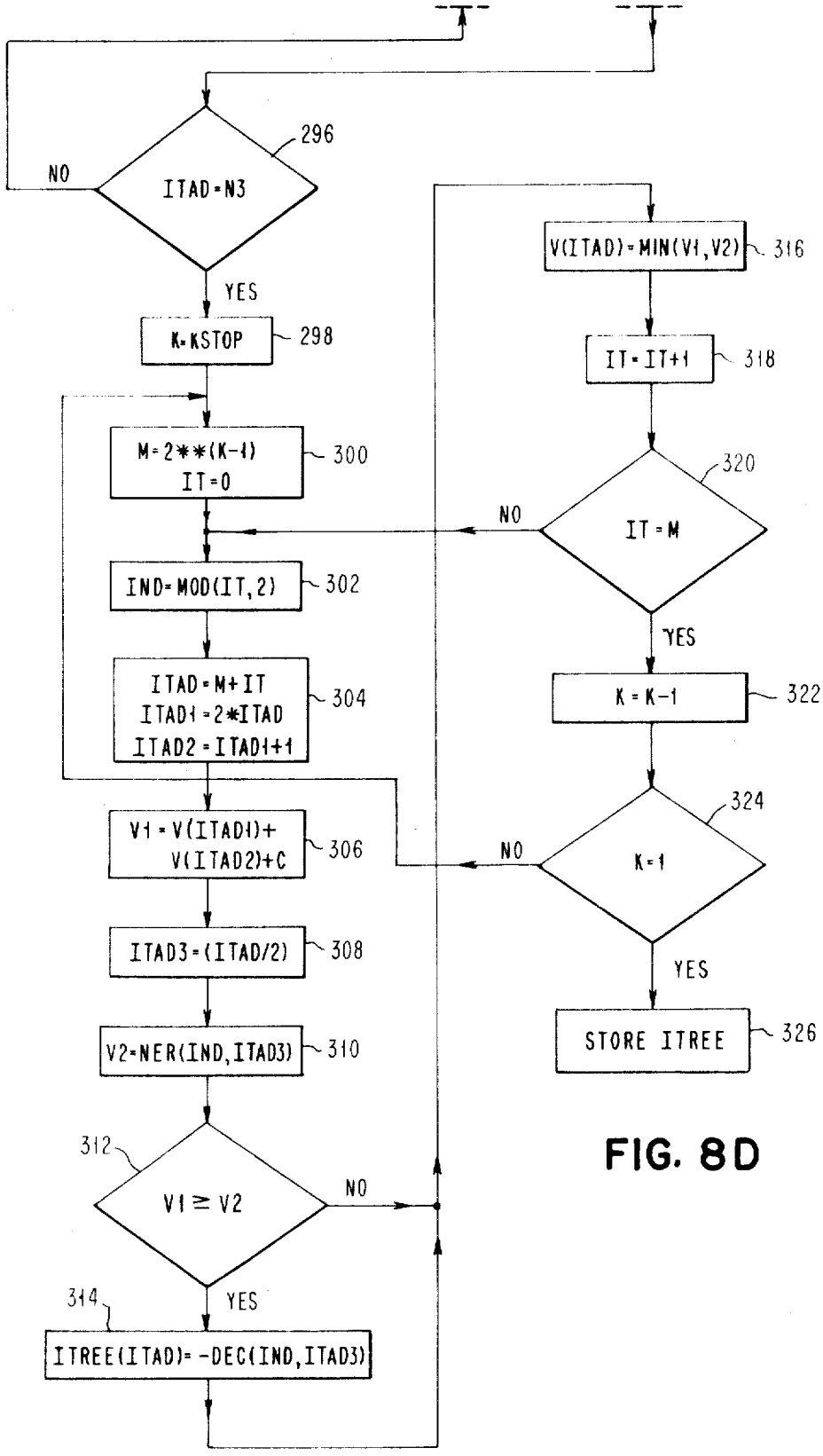


FIG. 8D

SEQUENTIAL LEARNING PREDICTOR FOR AN IMAGE COMPRESSION SYSTEM

Original Filed May 30, 1973

FIG. 9

PROGRAM FOR PREDICTION

