FIG. 1

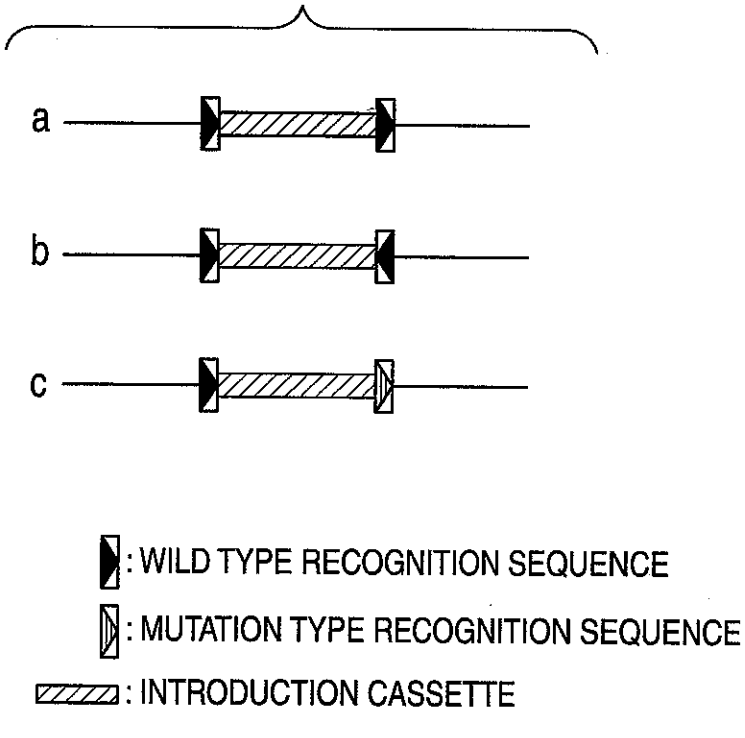

a
b
c
: WILD TYPE RECOGNITION SEQUENCE
: MUTATION TYPE RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 2

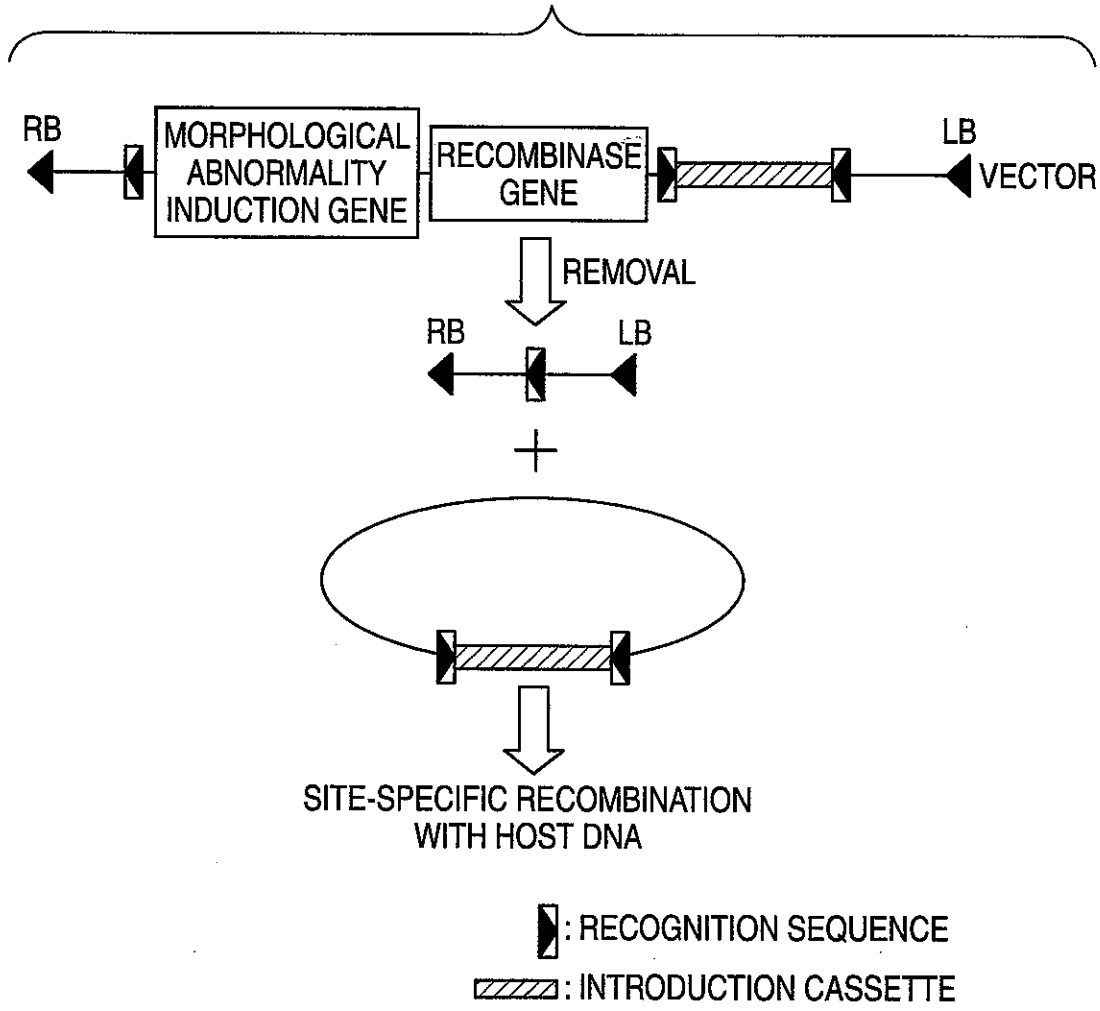

RB
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
LB
VECTOR
REMOVAL
RB
LB
SITE-SPECIFIC RECOMBINATION WITH HOST DNA
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 3

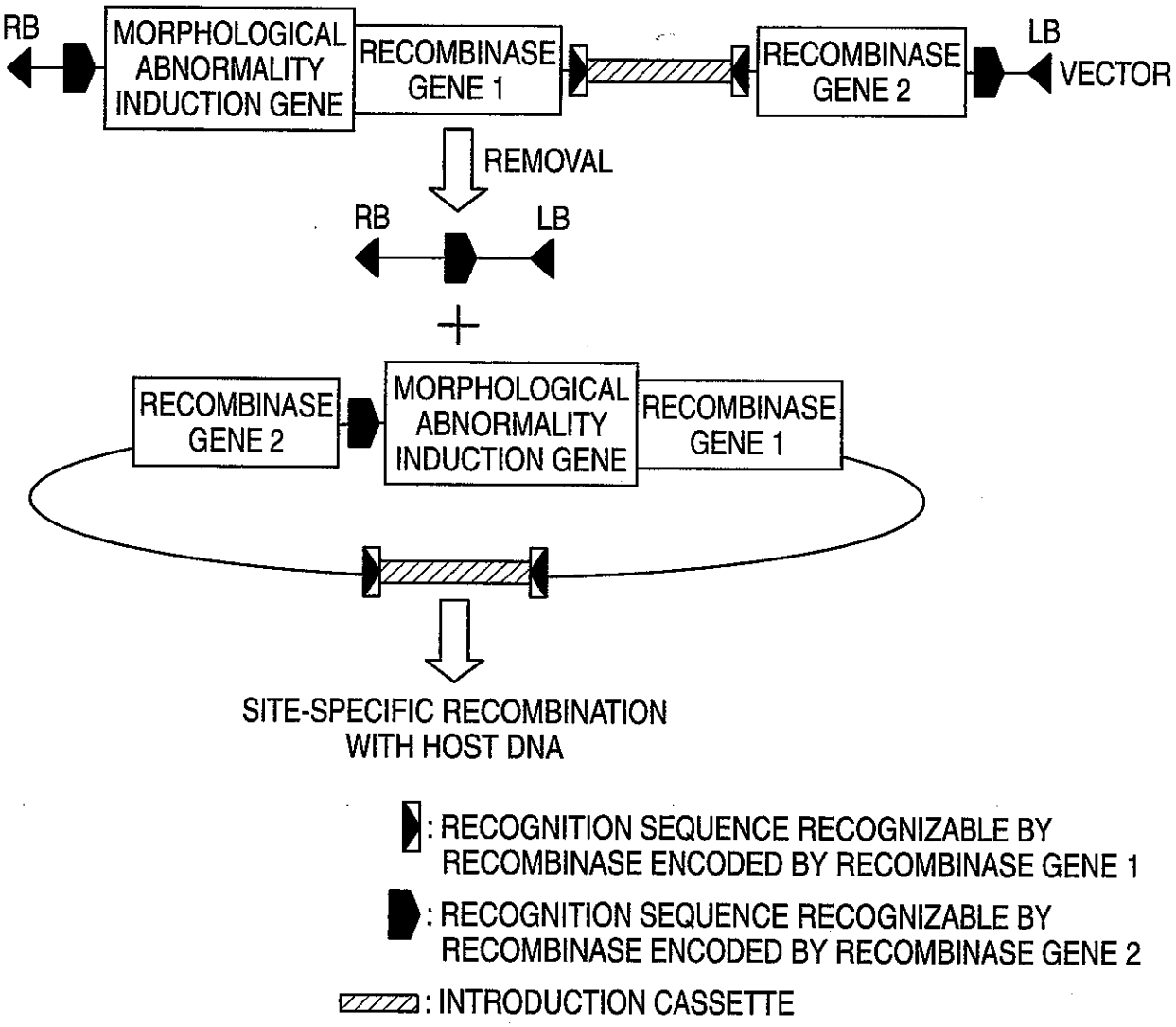

RB
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE 1
RECOMBINASE GENE 2
LB
VECTOR
REMOVAL
RB
LB
RECOMBINASE GENE 2
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE 1
SITE-SPECIFIC RECOMBINATION WITH HOST DNA
: RECOGNITION SEQUENCE RECOGNIZABLE BY RECOMBINASE ENCODED BY RECOMBINASE GENE 1
: RECOGNITION SEQUENCE RECOGNIZABLE BY RECOMBINASE ENCODED BY RECOMBINASE GENE 2
: INTRODUCTION CASSETTE

FIG. 4

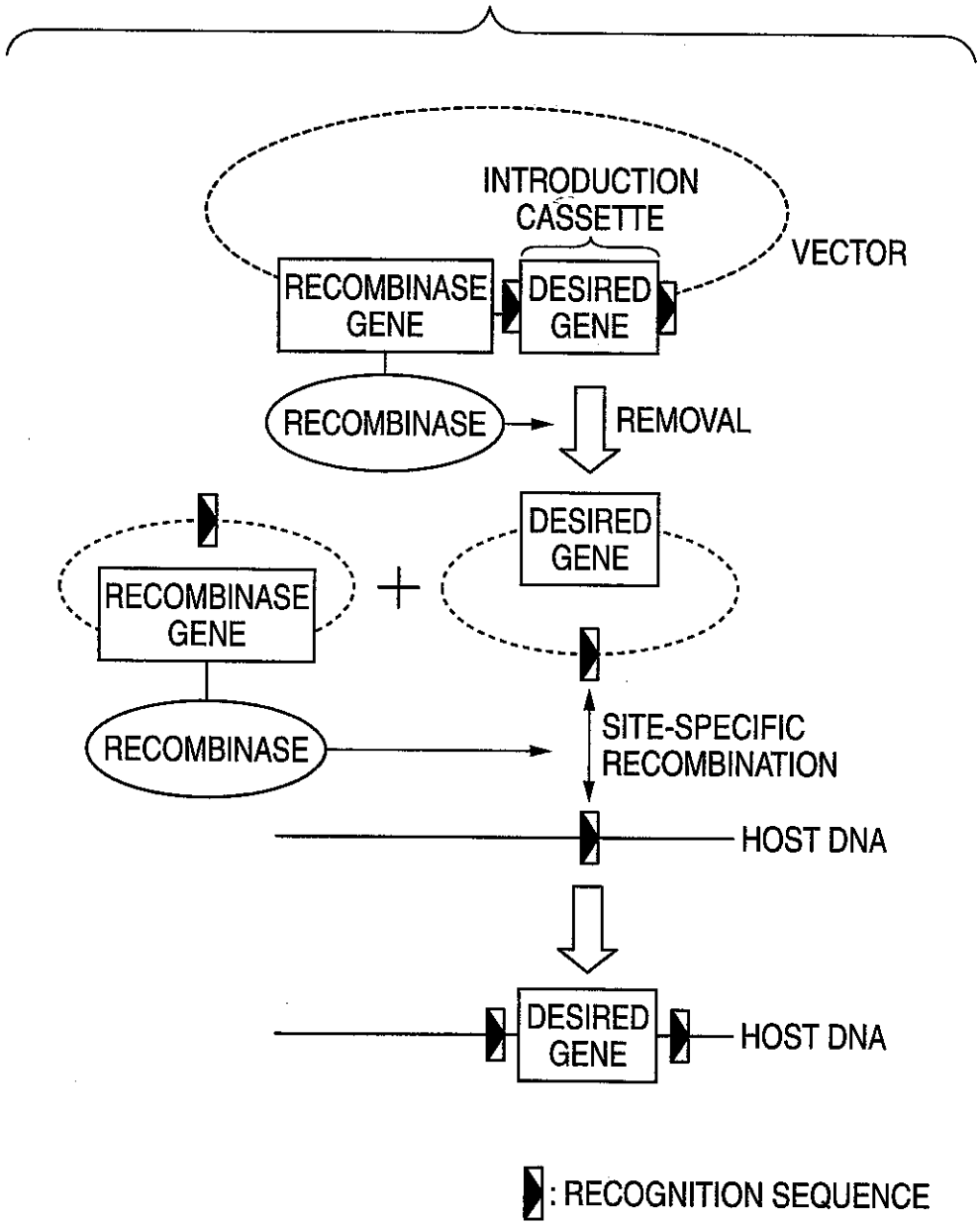

INTRODUCTION CASSETTE
VECTOR
RECOMBINASE GENE
DESIRED GENE
RECOMBINASE
REMOVAL
DESIRED GENE
RECOMBINASE GENE
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
DESIRED GENE
HOST DNA
: RECOGNITION SEQUENCE

FIG. 5

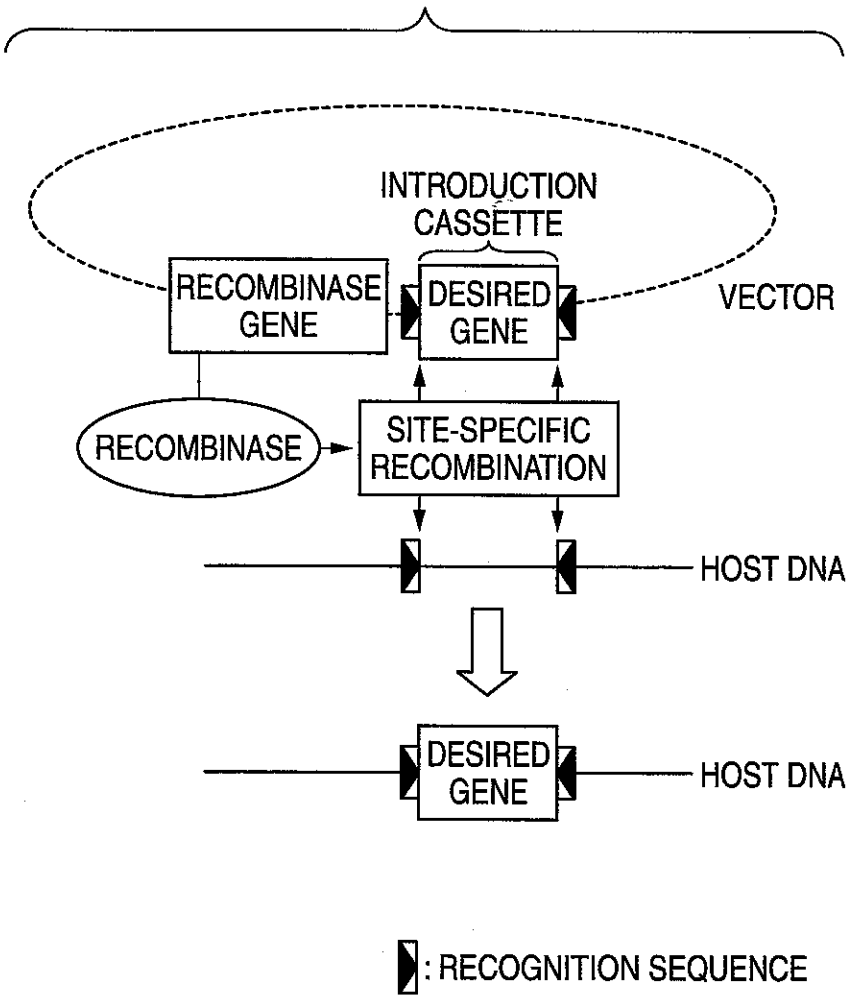

INTRODUCTION CASSETTE
RECOMBINASE GENE
DESIRED GENE
VECTOR
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
DESIRED GENE
HOST DNA
: RECOGNITION SEQUENCE

FIG. 6

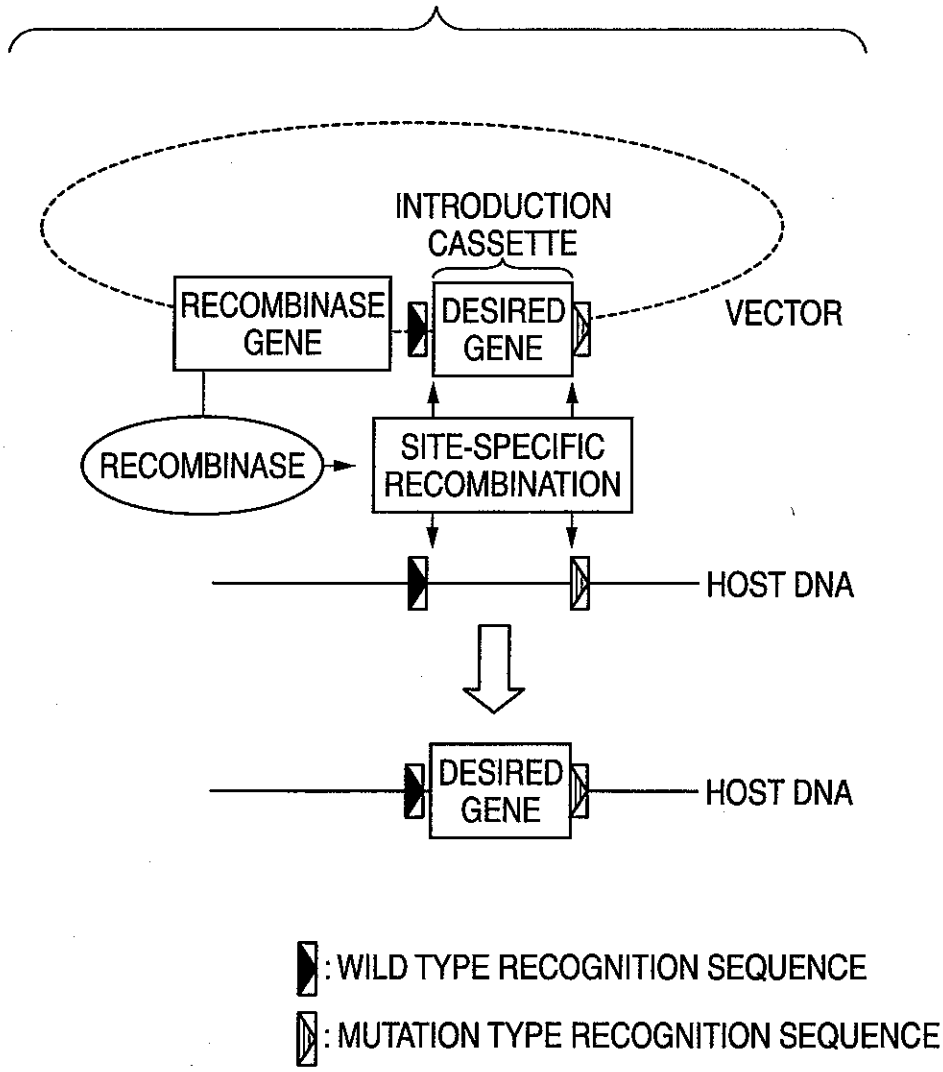

INTRODUCTION CASSETTE
RECOMBINASE GENE
DESIRED GENE
VECTOR
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
DESIRED GENE
HOST DNA
: WILD TYPE RECOGNITION SEQUENCE
: MUTATION TYPE RECOGNITION SEQUENCE

FIG. 7

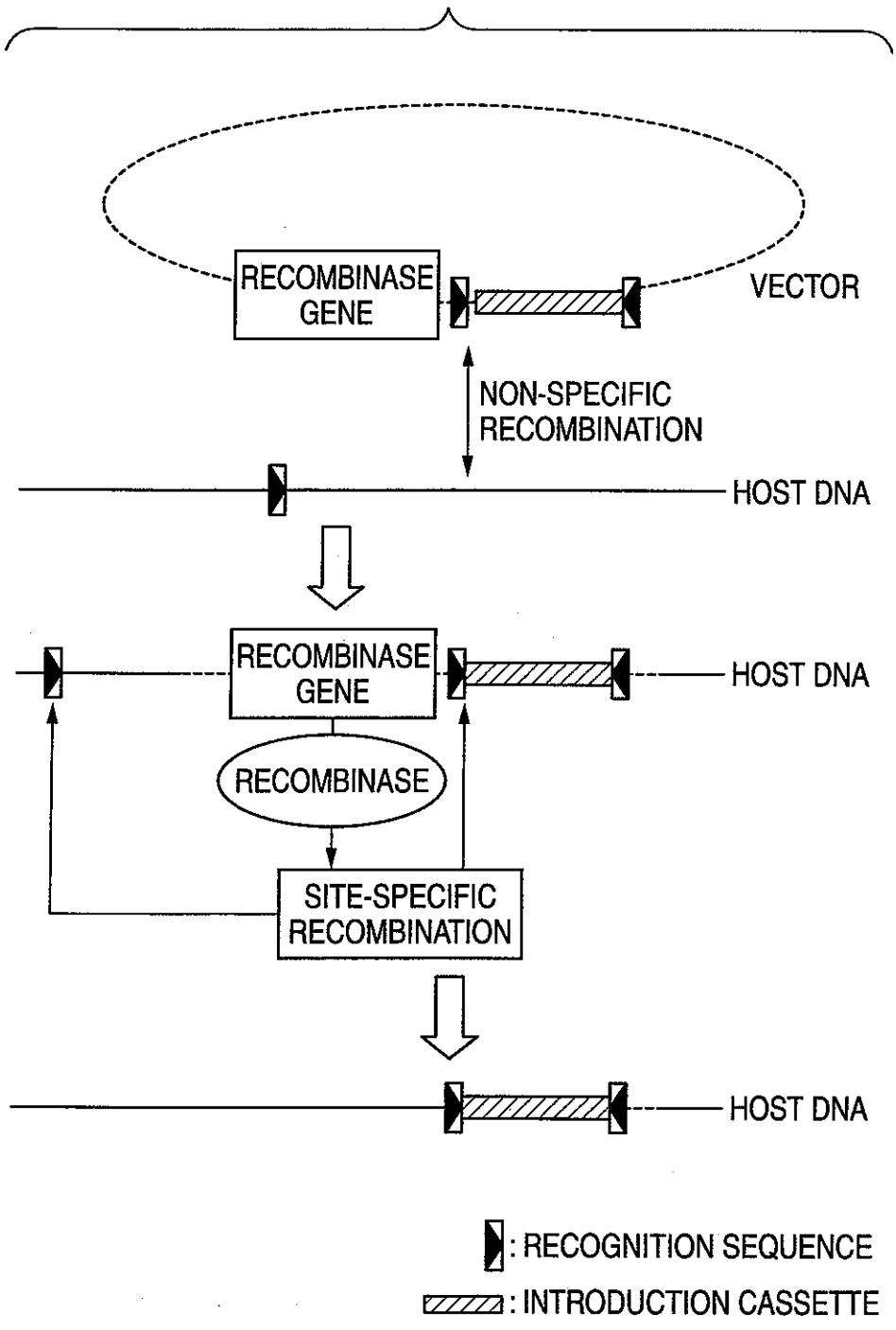

RECOMBINASE GENE
VECTOR
NON-SPECIFIC RECOMBINATION
HOST DNA
RECOMBINASE GENE
HOST DNA
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 8

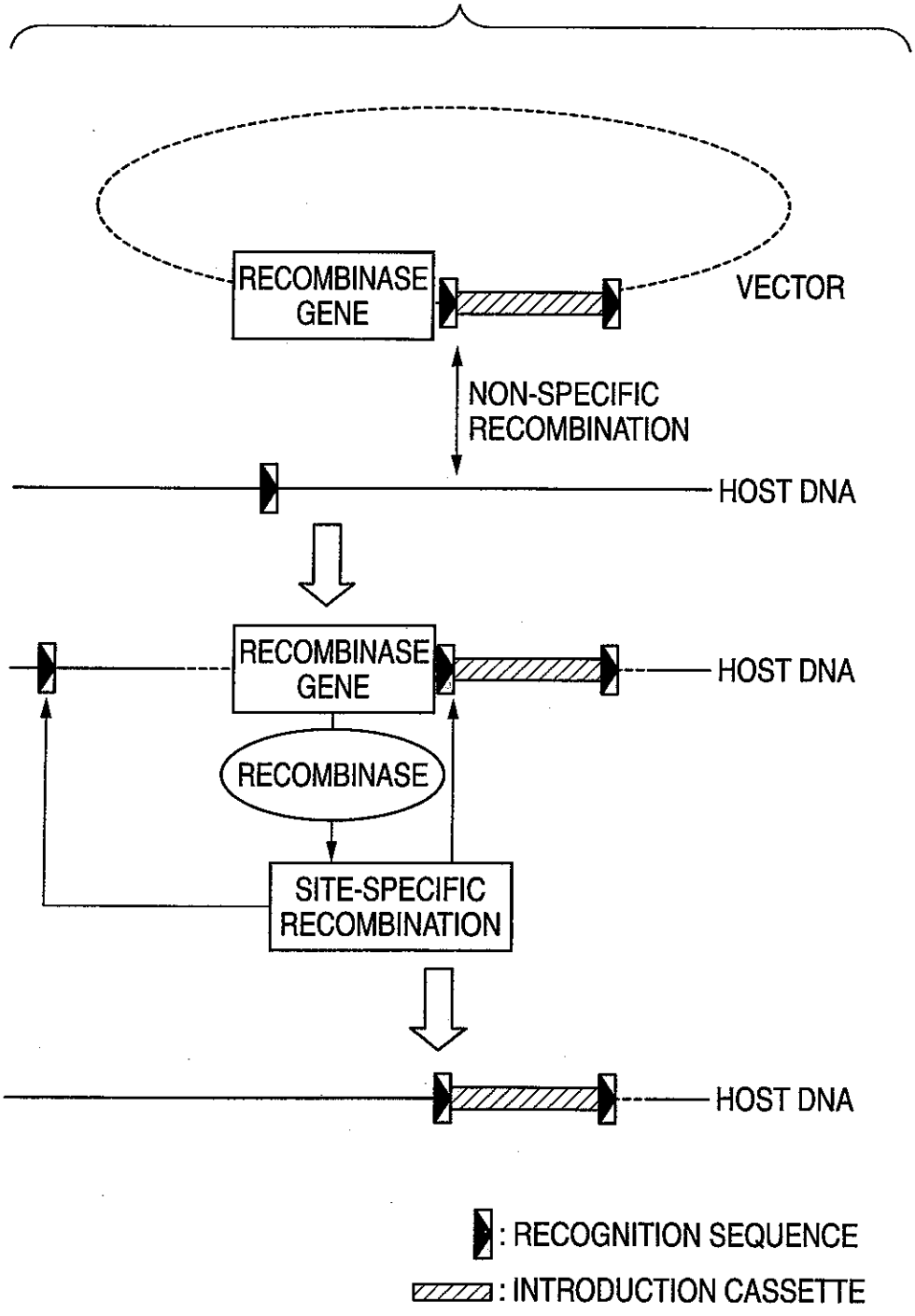

RECOMBINASE GENE
VECTOR
NON-SPECIFIC RECOMBINATION
HOST DNA
RECOMBINASE GENE
HOST DNA
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 9

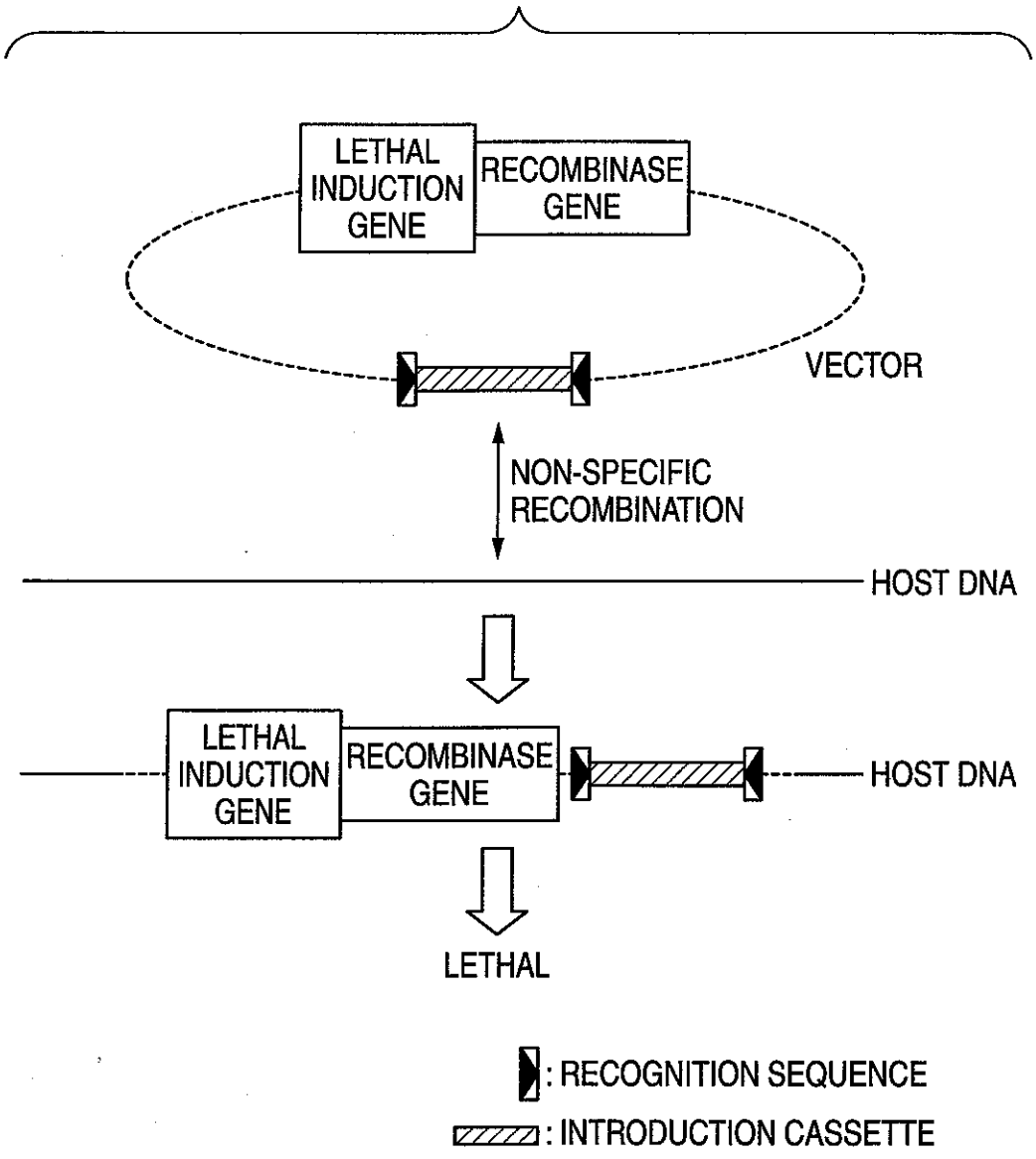

LETHAL INDUCTION GENE
RECOMBINASE GENE
VECTOR
NON-SPECIFIC RECOMBINATION
HOST DNA
LETHAL INDUCTION GENE
RECOMBINASE GENE
HOST DNA
LETHAL
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 10

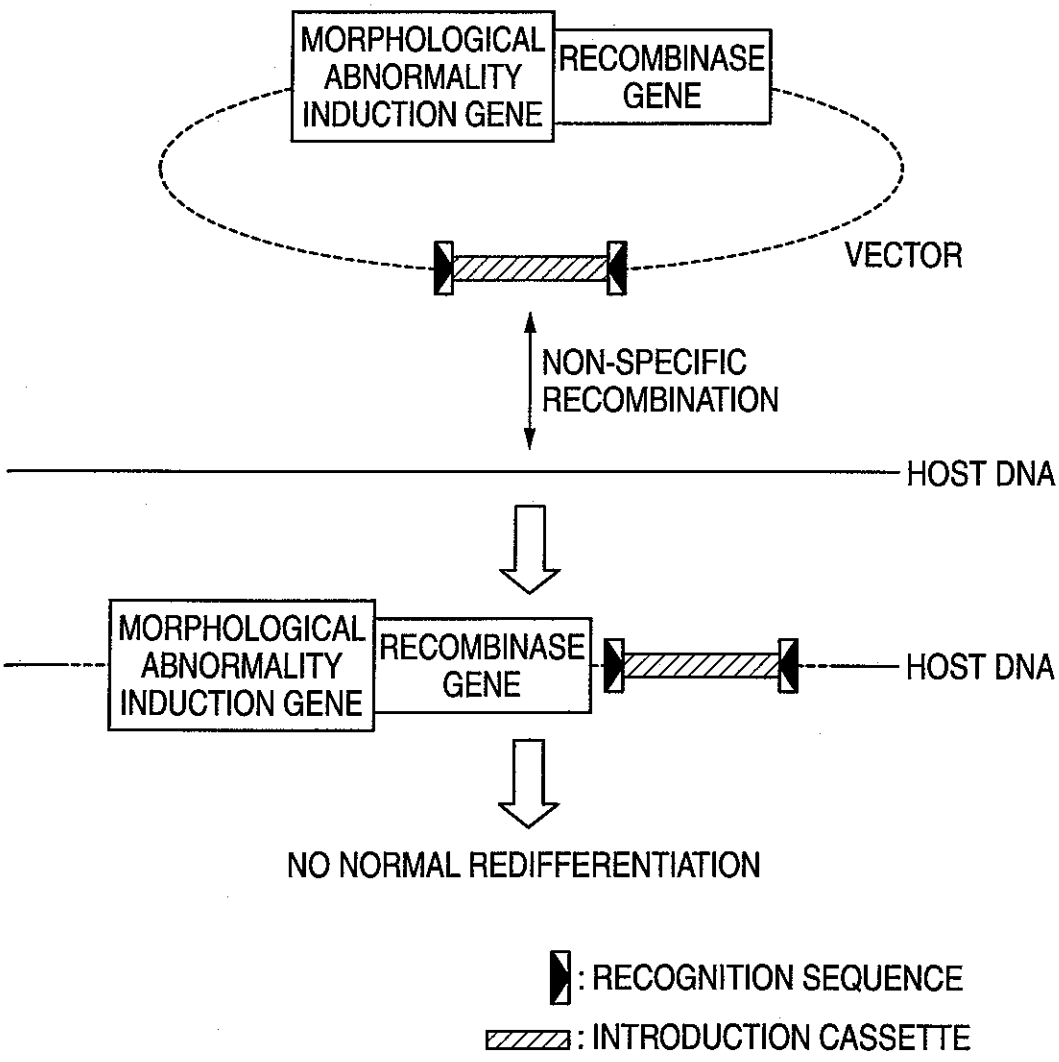

MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
VECTOR
NON-SPECIFIC RECOMBINATION
HOST DNA
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
HOST DNA
NO NORMAL REDIFFERENTIATION
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 11

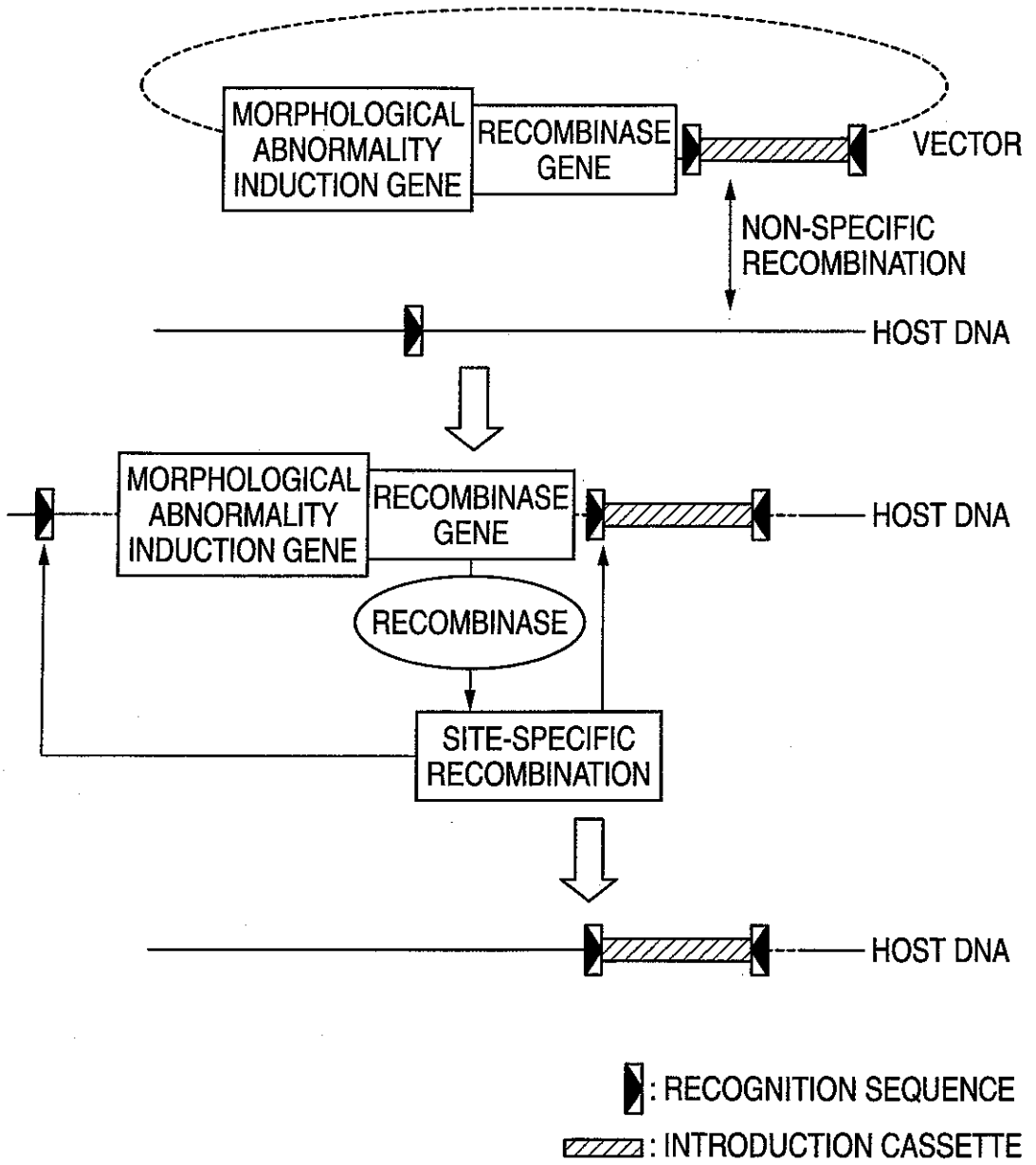

MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
VECTOR
NON-SPECIFIC RECOMBINATION
HOST DNA
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
HOST DNA
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
: RECOGNITION SEQUENCE
: INTRODUCTION CASSETTE

FIG. 12

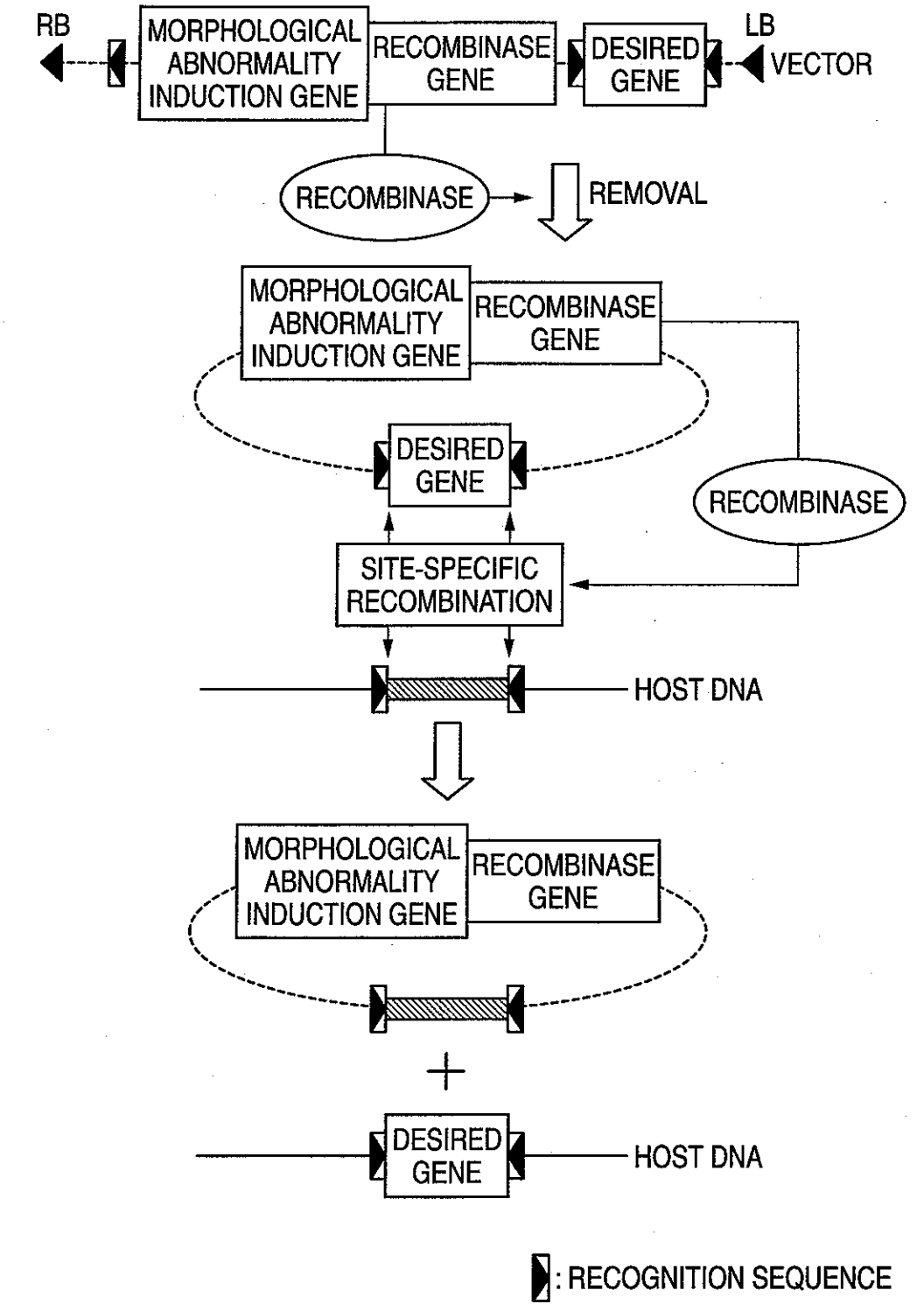

RB
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
LB
VECTOR
RECOMBINASE
REMOVAL
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
HOST DNA
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
HOST DNA
: RECOGNITION SEQUENCE

FIG. 13

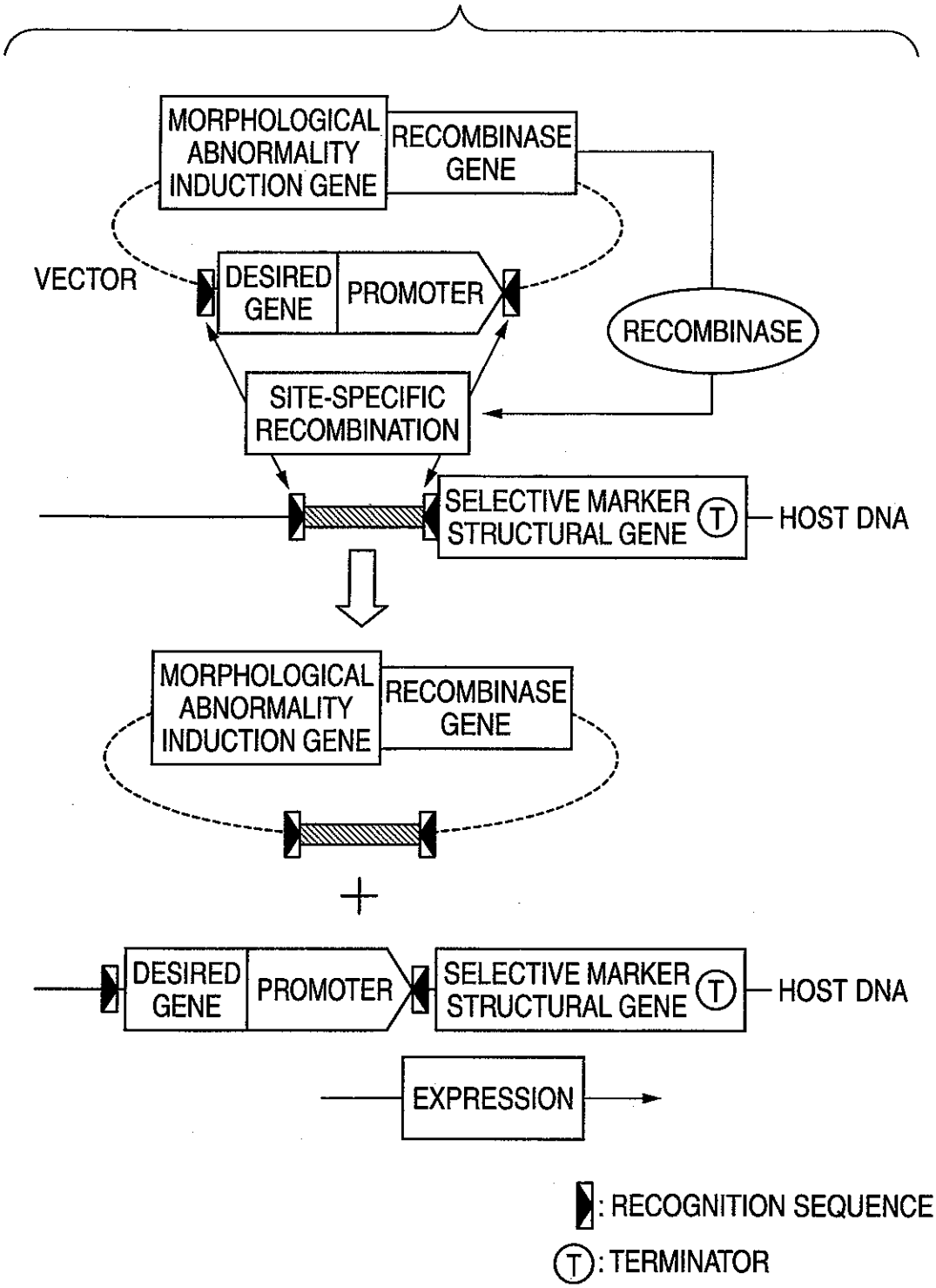

MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
VECTOR
DESIRED GENE
PROMOTER
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
SELECTIVE MARKER STRUCTURAL GENE
T
HOST DNA
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
PROMOTER
SELECTIVE MARKER STRUCTURAL GENE
T
HOST DNA
EXPRESSION
: RECOGNITION SEQUENCE
T : TERMINATOR

FIG. 14

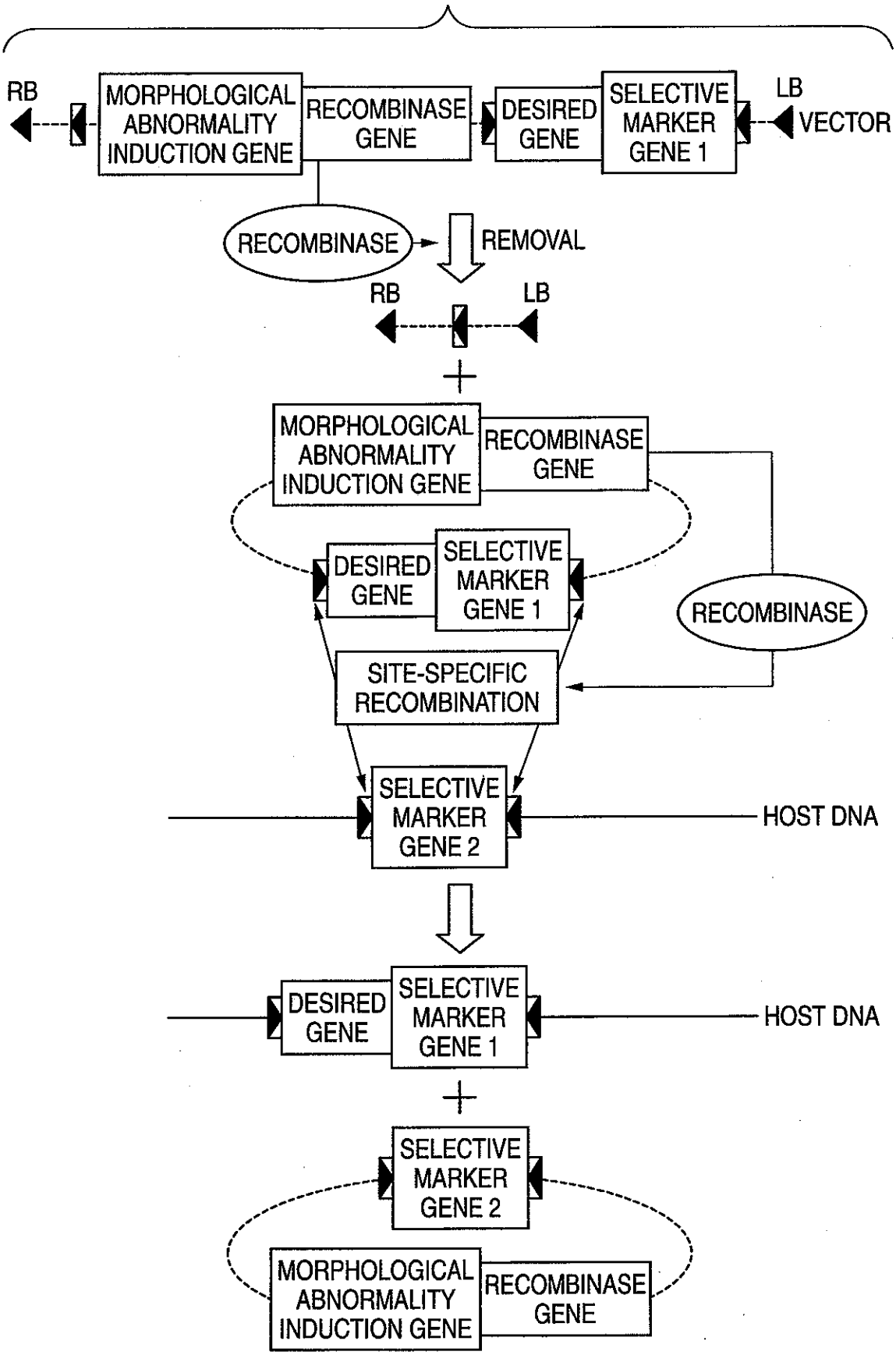

RB
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
SELECTIVE MARKER GENE 1
LB
VECTOR
RECOMBINASE
REMOVAL
RB
LB
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE
DESIRED GENE
SELECTIVE MARKER GENE 1
RECOMBINASE
SITE-SPECIFIC RECOMBINATION
SELECTIVE MARKER GENE 2
HOST DNA
DESIRED GENE
SELECTIVE MARKER GENE 1
HOST DNA
SELECTIVE MARKER GENE 2
MORPHOLOGICAL ABNORMALITY INDUCTION GENE
RECOMBINASE GENE

FIG. 15

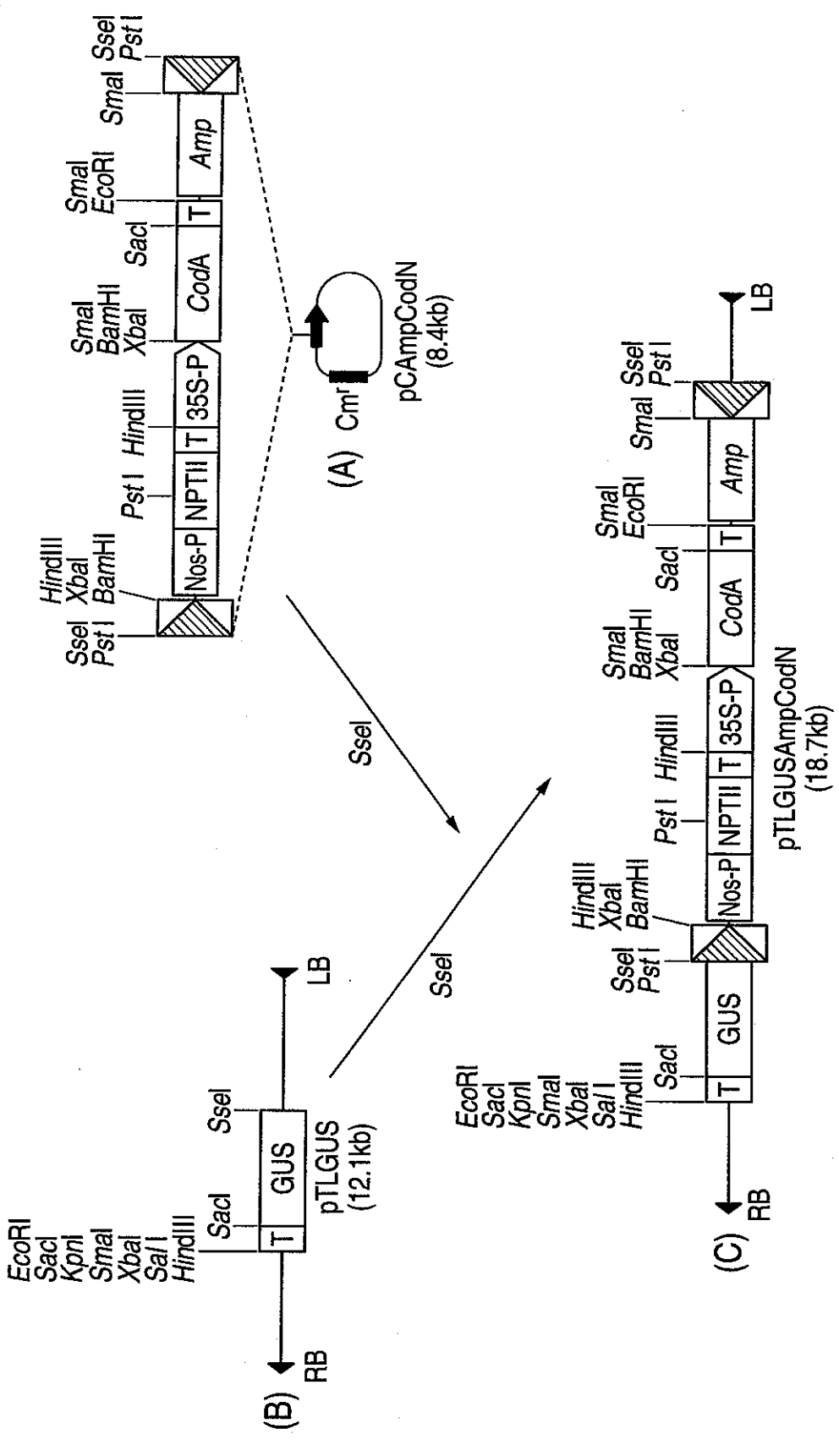

(A)
Cmr
pCAmpCodN
(8.4kb)
SmaI
EcoRI
SacI
KpnI
SmaI
XbaI
SalI
HindIII
SacI
T
GUS
SseI
LB
RB
pTLGUS
(12.1kb)
(B)
SseI
SseI
HindIII
XbaI
BamHI
PstI
Nos-P
NPTII
T
35S-P
SmaI
BamHI
XbaI
CodA
SacI
T
SmaI
EcoRI
Amp
SmaI
SseI
PstI
pTLGUSAmpCodN
(18.7kb)
(C)

FIG. 16

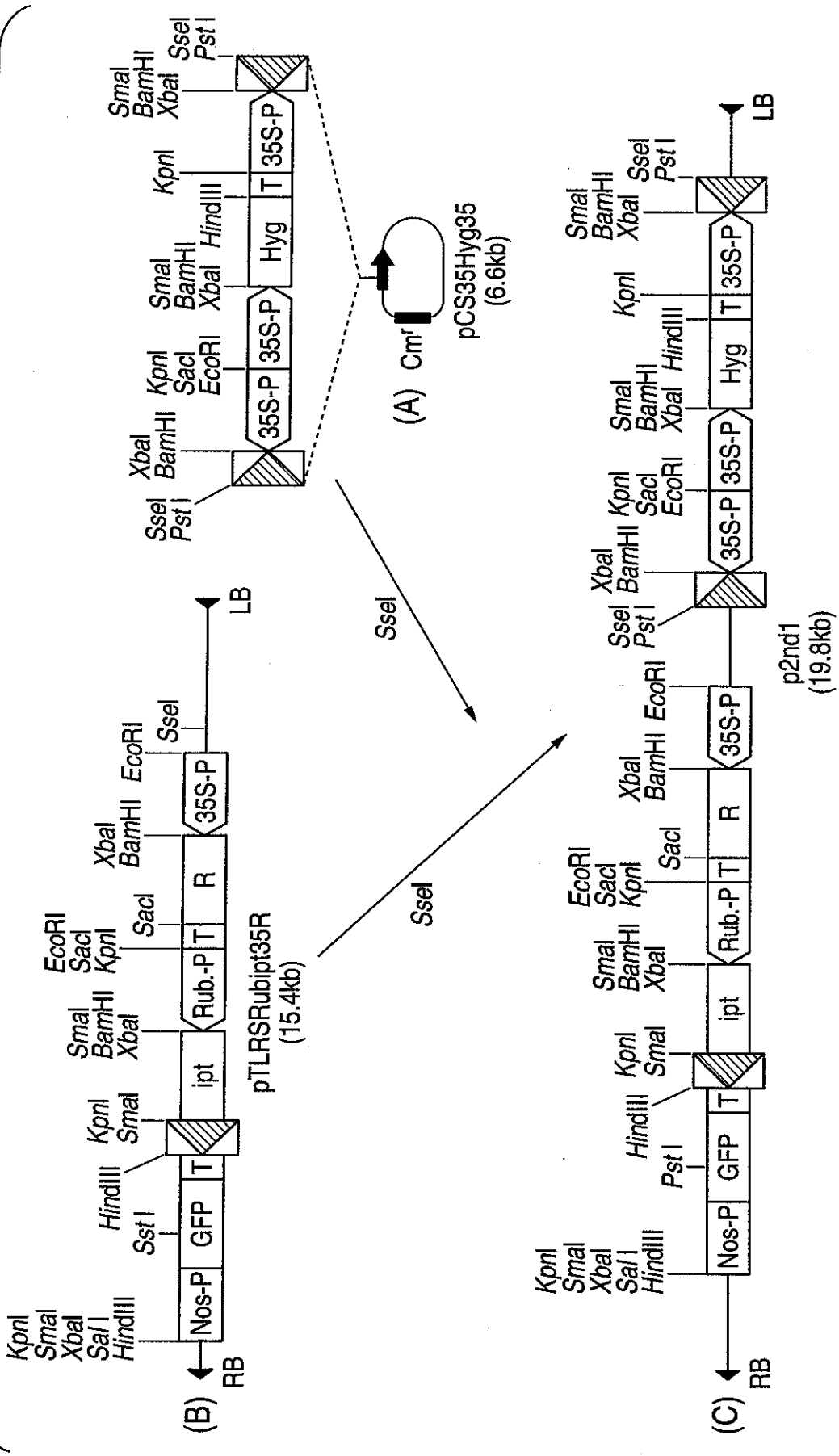

(A)
Cm^r
pCS35Hyg35
(6.6kb)
(B)
pTLRSRubipt35R
(15.4kb)
(C)
p2nd1
(19.8kb)
SseI
LB
RB
Nos-P
GFP
T
HindIII
SstI
KpnI
SmaI
ipt
XbaI
BamHI
Rub.-P
SacI
EcoRI
R
35S-P
Hyg
SalI
PstI

FIG. 17

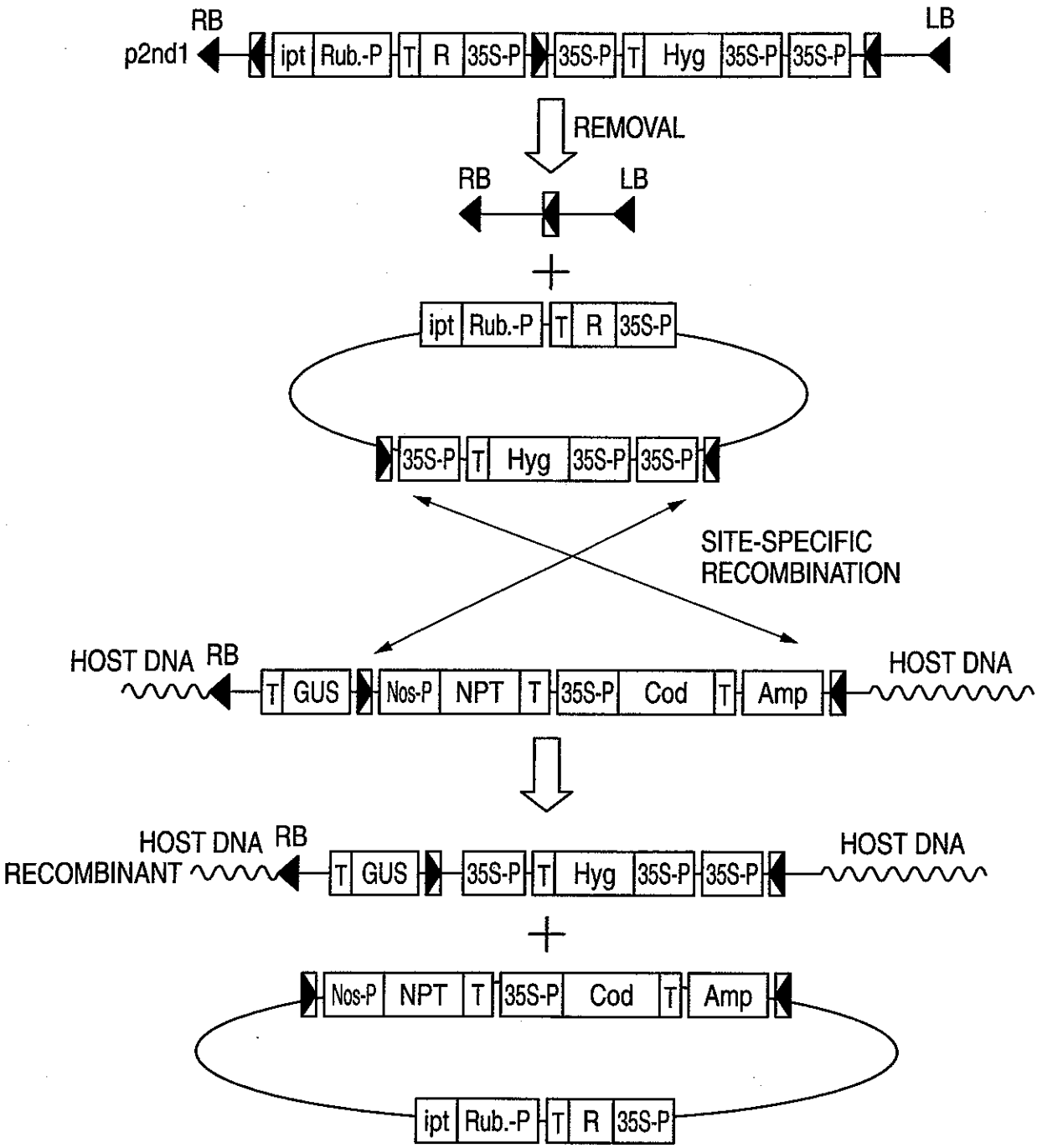

RB
p2nd1
ipt
Rub.-P
T
R
35S-P
35S-P
T
Hyg
35S-P
35S-P
LB
REMOVAL
RB
LB
ipt
Rub.-P
T
R
35S-P
35S-P
T
Hyg
35S-P
35S-P
SITE-SPECIFIC
RECOMBINATION
HOST DNA
RB
T
GUS
Nos-P
NPT
T
35S-P
Cod
T
Amp
HOST DNA
HOST DNA
RECOMBINANT
RB
T
GUS
35S-P
T
Hyg
35S-P
35S-P
HOST DNA
Nos-P
NPT
T
35S-P
Cod
T
Amp
ipt
Rub.-P
T
R
35S-P

FIG. 18

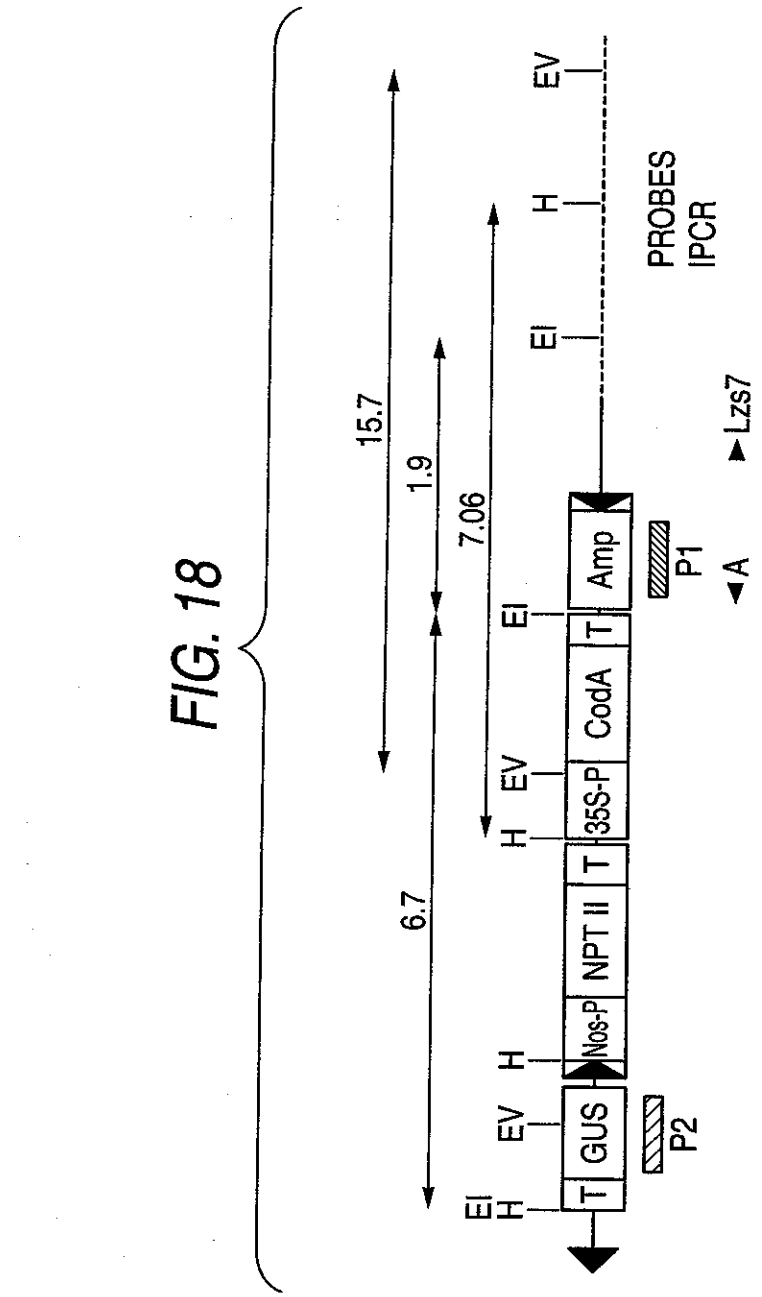

15.7
1.9
7.06
6.7
EI
H
EV
H
EV
H
EI
H
EV
T
GUS
Nos-P
NPT II
T
35S-P
CodA
T
Amp
P2
P1
A
Lzs7
PROBES
IPCR

FIG. 19

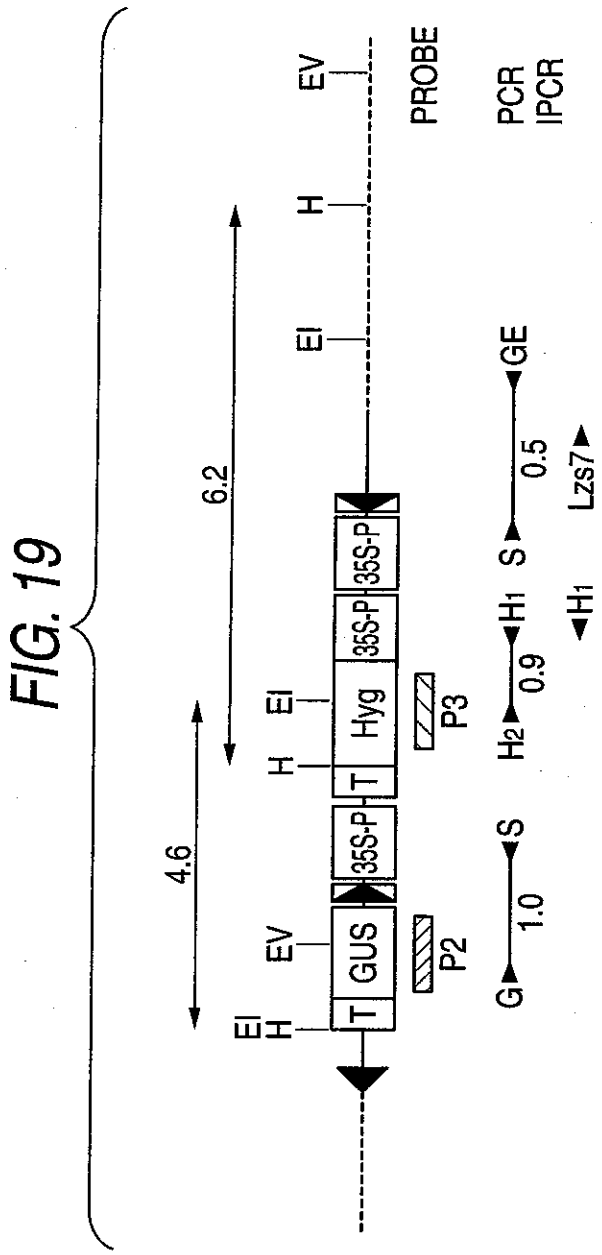

EV
H
EI
PROBE
PCR
IPCR
6.2
4.6
EI
H
T
GUS
EV
35S-P
T
Hyg
35S-P
35S-P
P2
P3
EI
H
G
S
1.0
H2
H1
0.9
S
GE
0.5
H1
Lzs7

FIG. 20

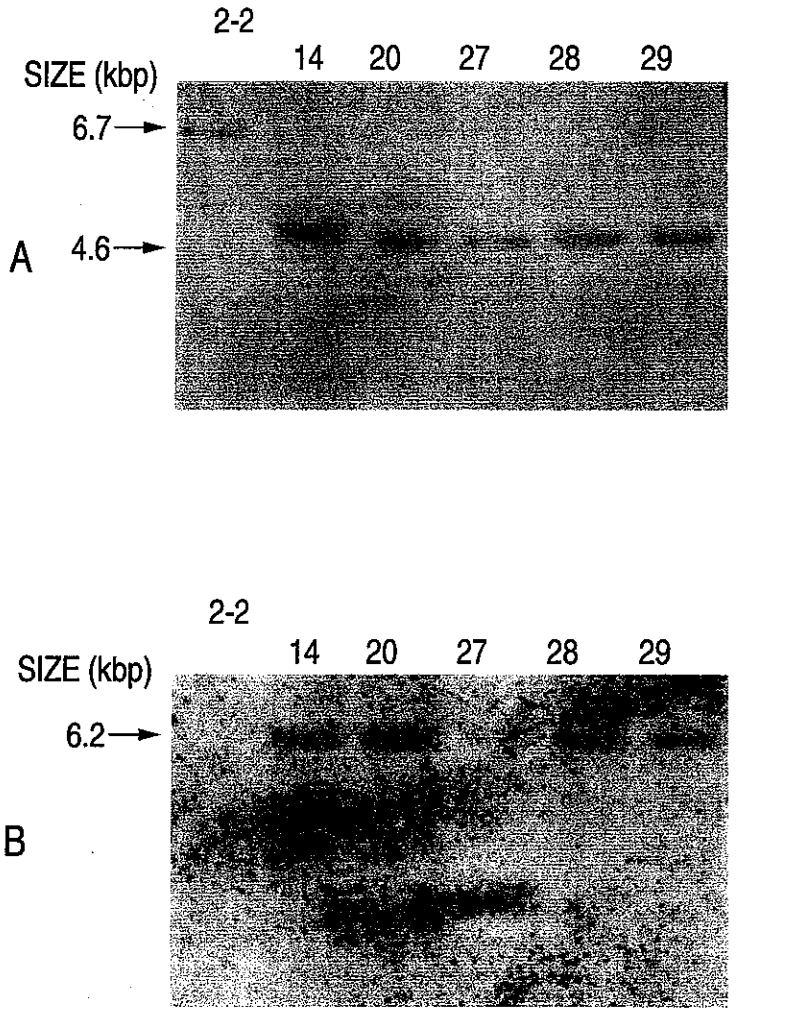


FIG. 21

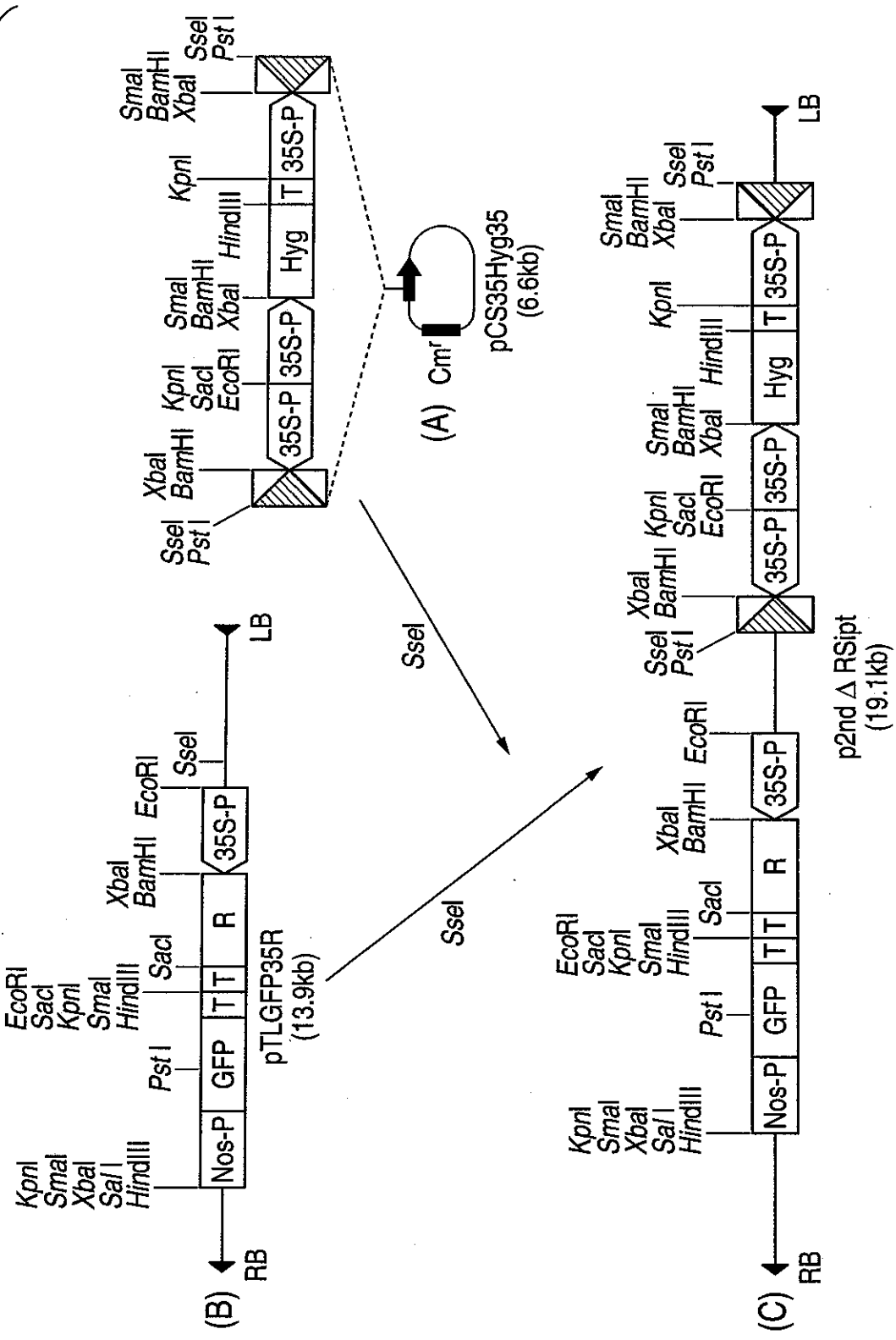

(A)
Cm^r
pCS35Hyg35
(6.6kb)
SseI
(B)
LB
RB
Nos-P
GFP
T
T
R
35S-P
pTLGFP35R
(13.9kb)
SseI
(C)
LB
RB
Nos-P
GFP
T
T
R
35S-P
Hyg
T
35S-P
p2nd Δ RSipt
(19.1kb)

FIG. 22

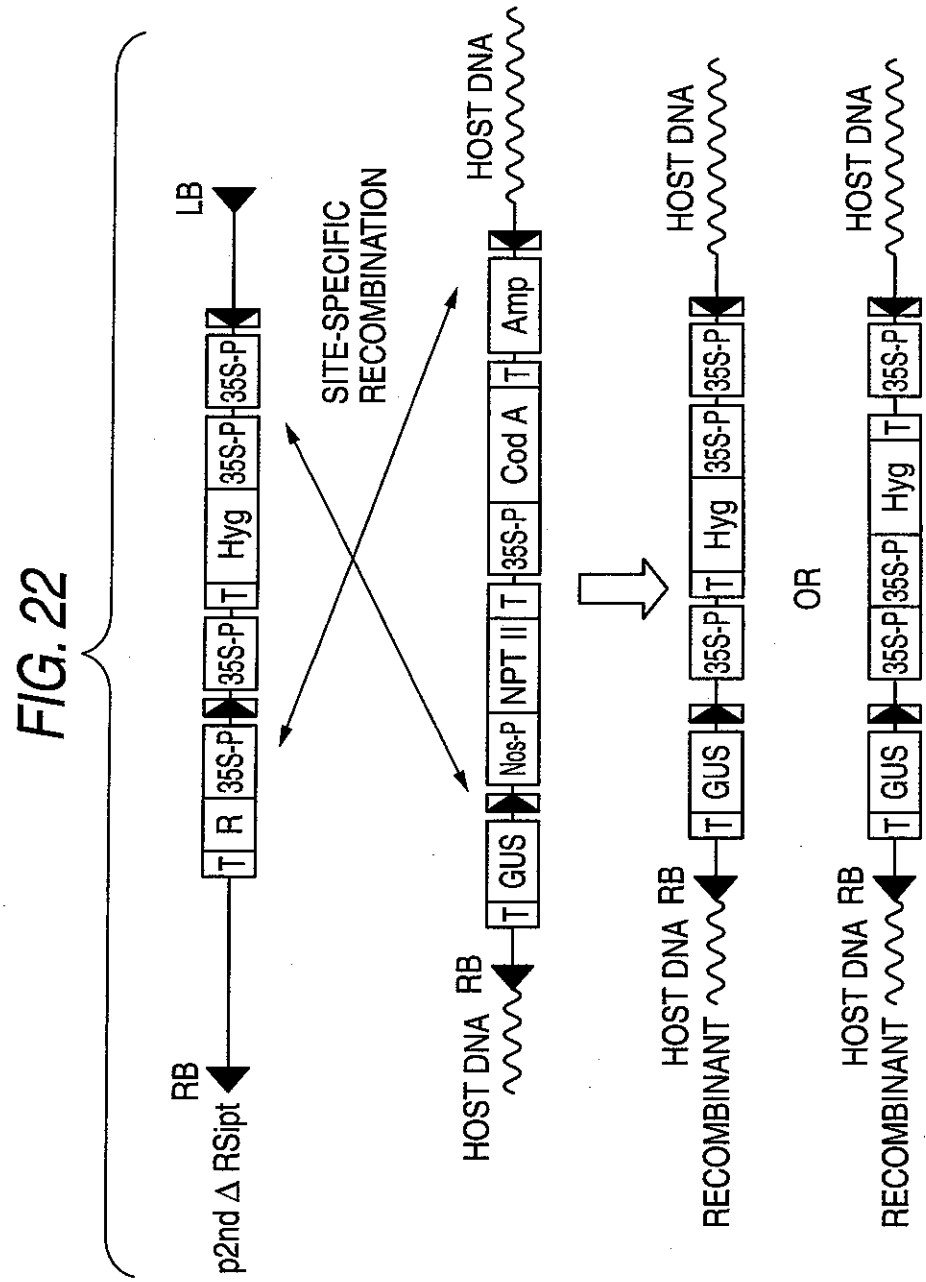

RB
p2nd Δ RSipt
T
R
35S-P
35S-P
T
Hyg
35S-P
35S-P
LB
SITE-SPECIFIC
RECOMBINATION
HOST DNA RB
T
GUS
Nos-P
NPT II
T
35S-P
Cod A
T
Amp
HOST DNA
HOST DNA
RECOMBINANT
HOST DNA RB
T
GUS
35S-P
35S-P
T
Hyg
35S-P
35S-P
HOST DNA
OR
HOST DNA
RECOMBINANT
HOST DNA RB
T
GUS
35S-P
35S-P
Hyg
T
35S-P
HOST DNA

FIG. 23

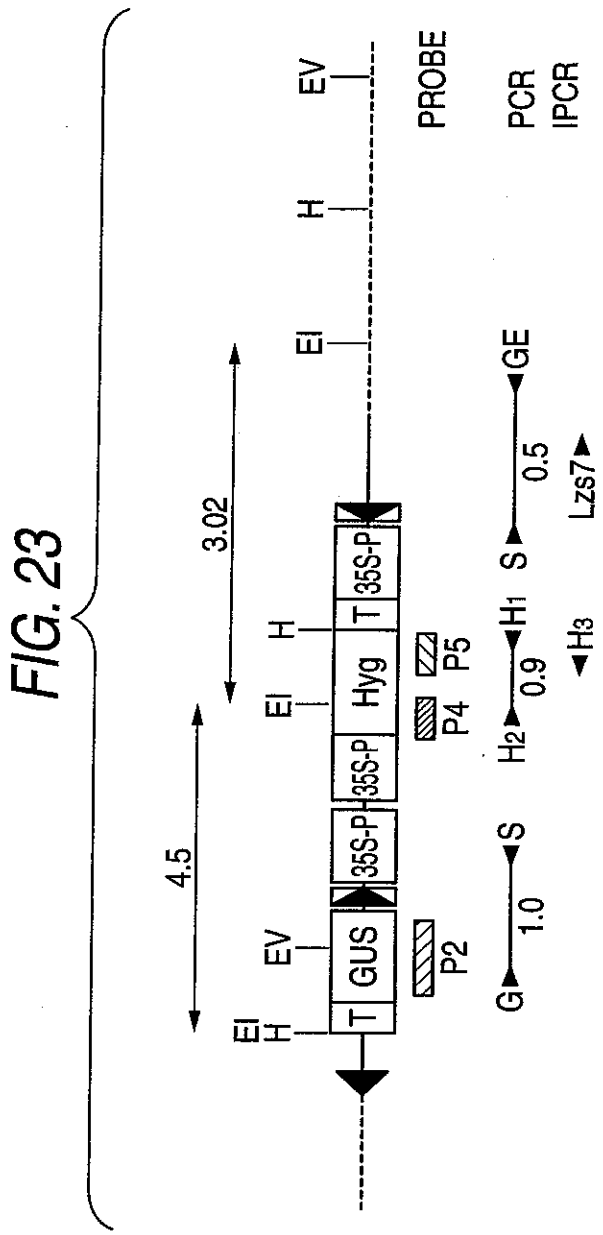

EI
H
T
GUS
EV
35S-P
35S-P
Hyg
H
EI
T
35S-P
EV
H
EI
4.5
3.02
P2
P4
P5
PROBE
PCR
IPCR
G
S
1.0
H2
0.9
H1
S
0.5
GE
H3
Lzs7

FIG. 24

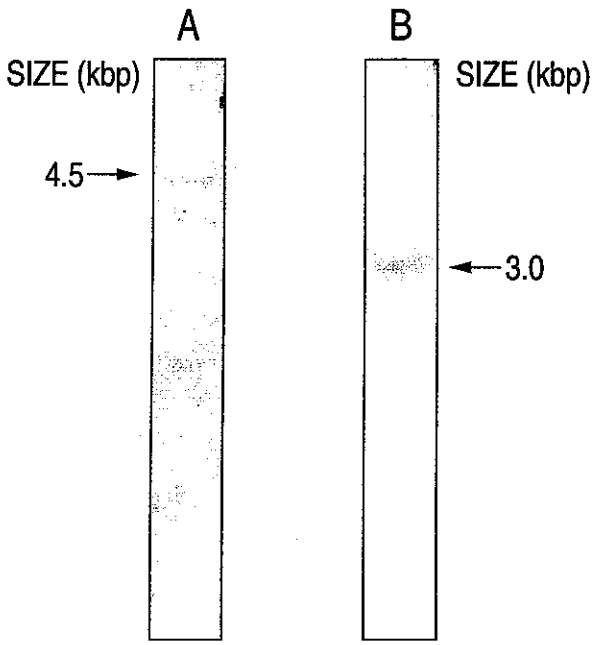


FIG. 25

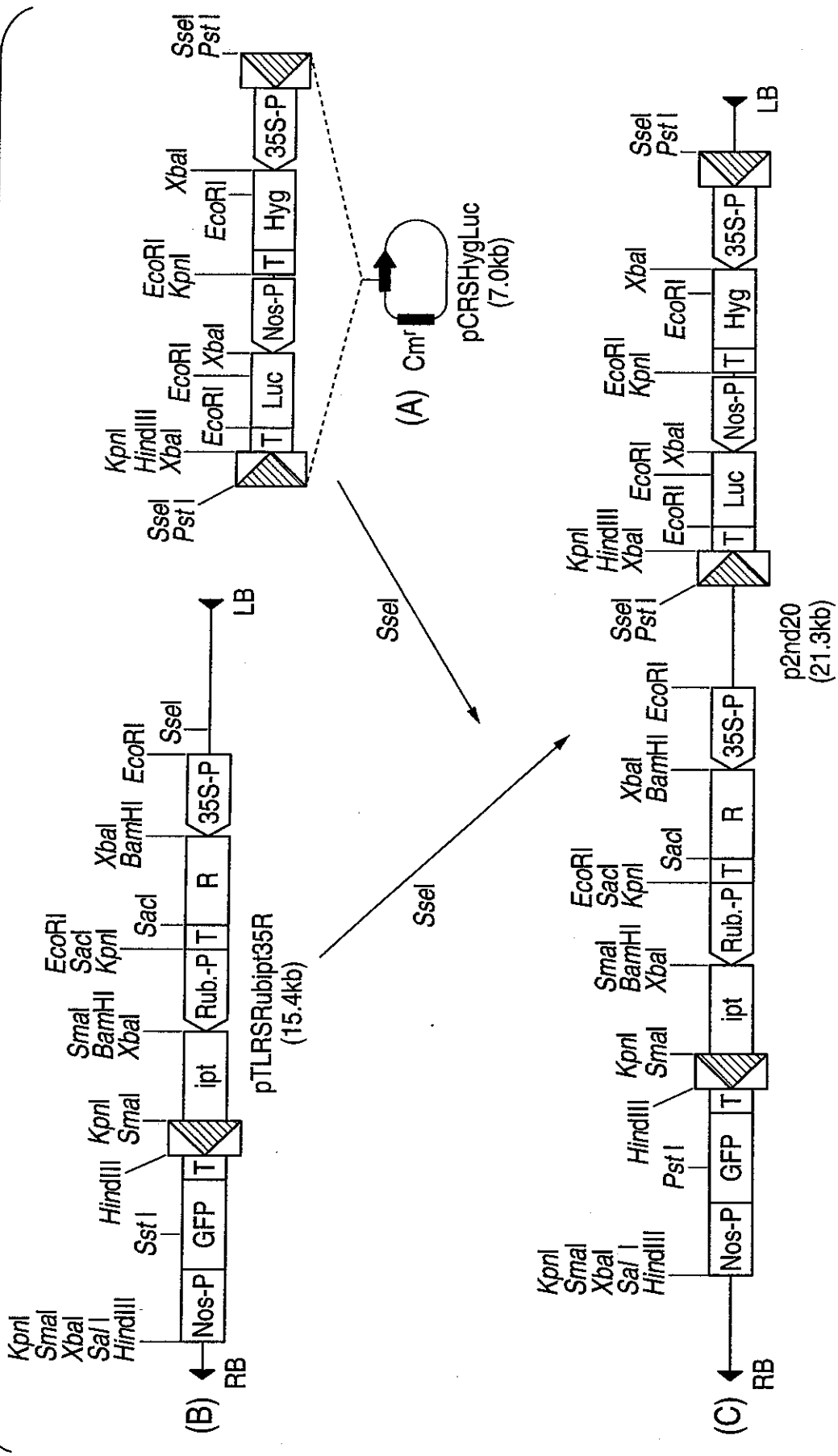

KpnI
SmaI
XbaI
SalI
HindIII
Nos-P
SstI
GFP
T
HindIII
KpnI
SmaI
ipt
SmaI
BamHI
XbaI
EcoRI
SacI
KpnI
Rub.-P
T
SacI
R
XbaI
BamHI
EcoRI
SseI
35S-P
LB
RB
(B)
pTLRSRubipt35R
(15.4kb)
SseI
SseI
PstI
KpnI
HindIII
XbaI
EcoRI
T
Luc
EcoRI
XbaI
Nos-P
EcoRI
KpnI
T
Hyg
EcoRI
XbaI
35S-P
SseI
PstI
(A) Cmr
pCRSHygLuc
(7.0kb)
SseI
PstI
KpnI
HindIII
XbaI
EcoRI
T
Luc
EcoRI
XbaI
Nos-P
EcoRI
KpnI
T
Hyg
EcoRI
XbaI
35S-P
SseI
PstI
LB
KpnI
SmaI
XbaI
SalI
HindIII
Nos-P
PstI
GFP
T
HindIII
KpnI
SmaI
ipt
SmaI
BamHI
XbaI
EcoRI
SacI
KpnI
Rub.-P
T
SacI
R
XbaI
BamHI
EcoRI
35S-P
p2nd20
(21.3kb)
(C)
RB

FIG. 26

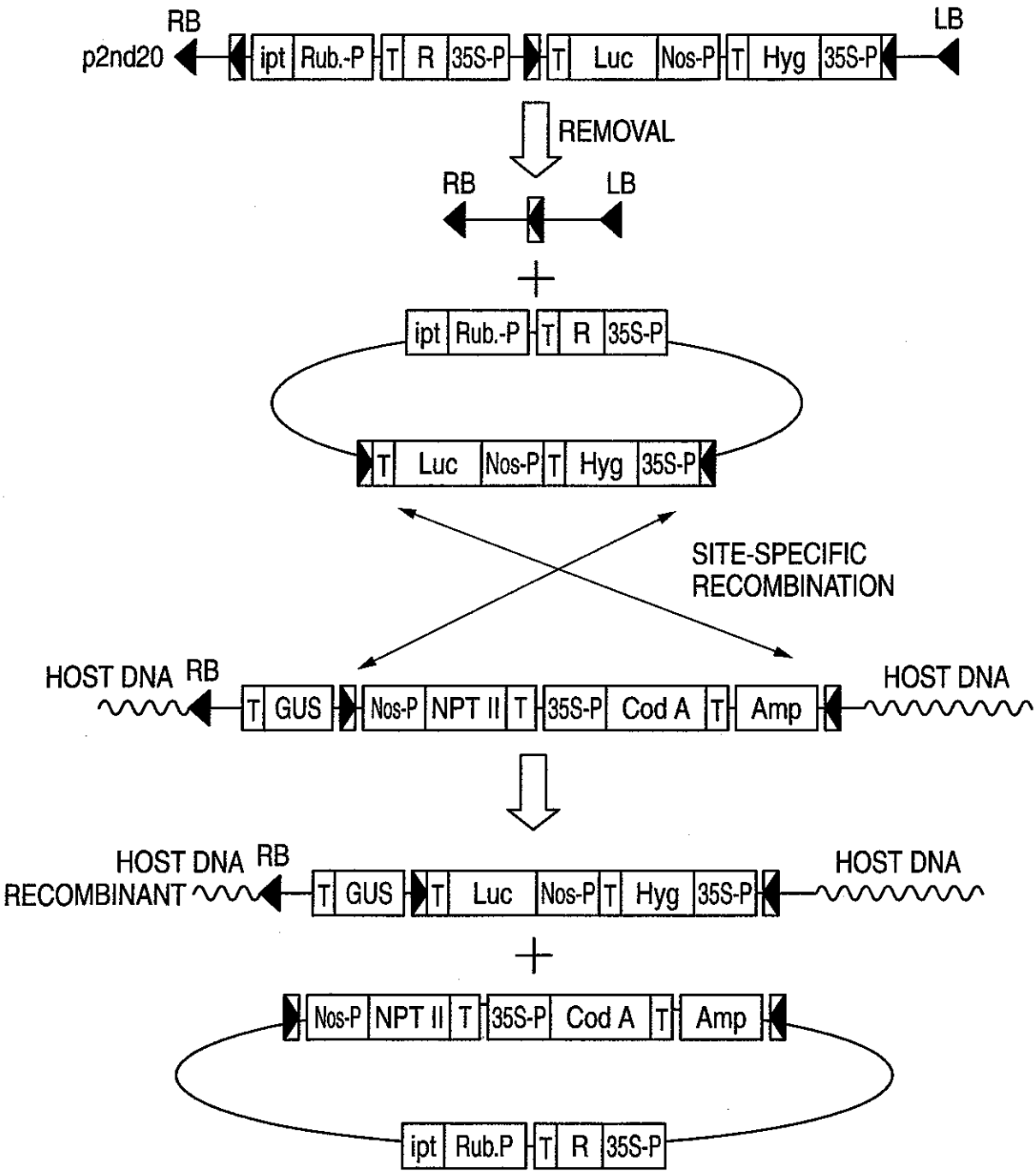
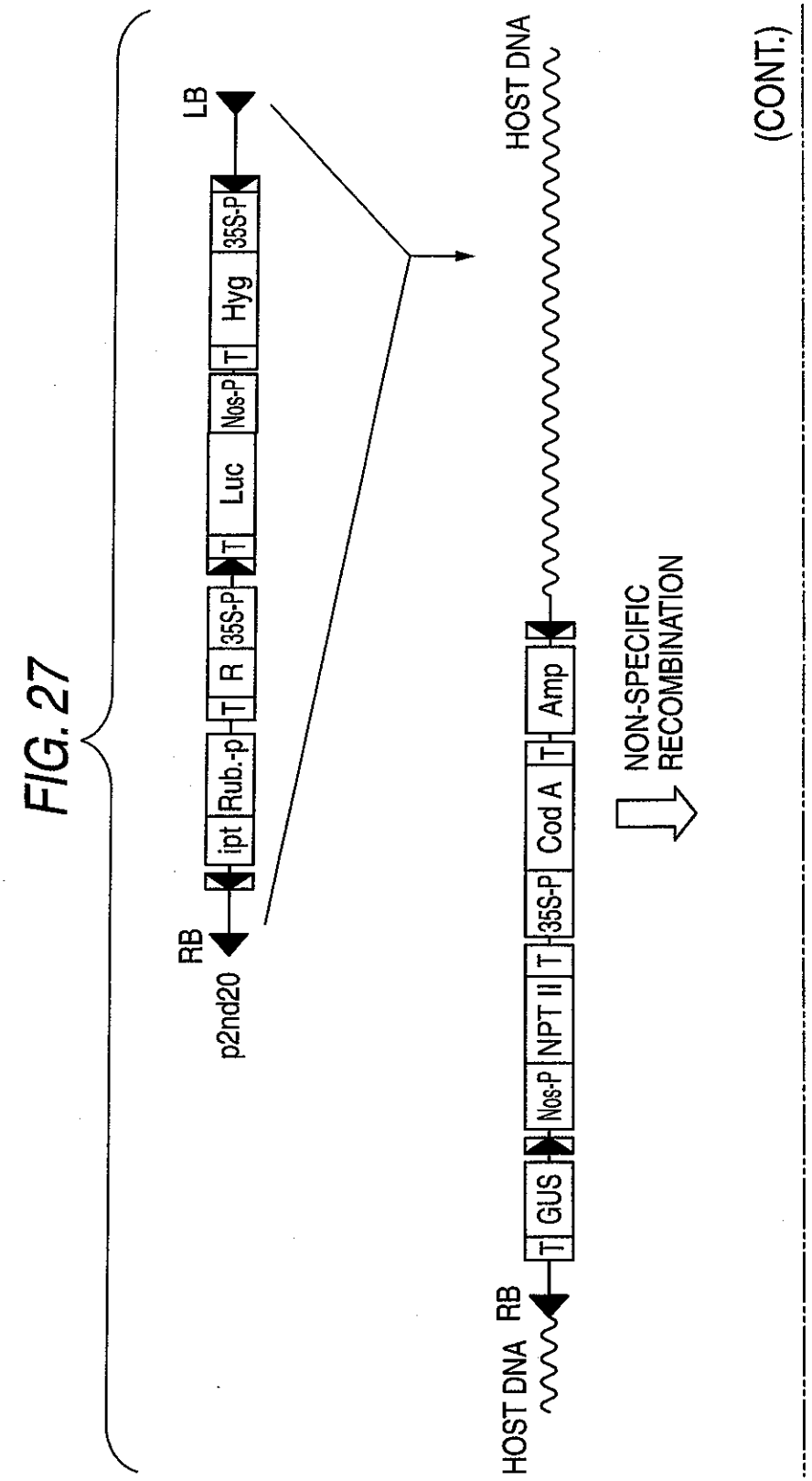

RB
p2nd20
ipt
Rub.-P
T
R
35S-P
T
Luc
Nos-P
T
Hyg
35S-P
LB
REMOVAL
RB
LB
ipt
Rub.-P
T
R
35S-P
T
Luc
Nos-P
T
Hyg
35S-P
SITE-SPECIFIC
RECOMBINATION
HOST DNA
RB
T
GUS
Nos-P
NPT II
T
35S-P
Cod A
T
Amp
HOST DNA
HOST DNA
RB
RECOMBINANT
T
GUS
T
Luc
Nos-P
T
Hyg
35S-P
HOST DNA
Nos-P
NPT II
T
35S-P
Cod A
T
Amp
ipt
Rub.P
T
R
35S-P

FIG. 27


RB
p2nd20
ipt
Rub.-p
T
R
35S-P
T
Luc
Nos-P
T
Hyg
35S-P
LB
HOST DNA
NON-SPECIFIC
RECOMBINATION
HOST DNA
RB
T
GUS
Nos-P
NPT II
T
35S-P
Cod A
T
Amp
(CONT.)

(FIG. 27 CONTINUED)

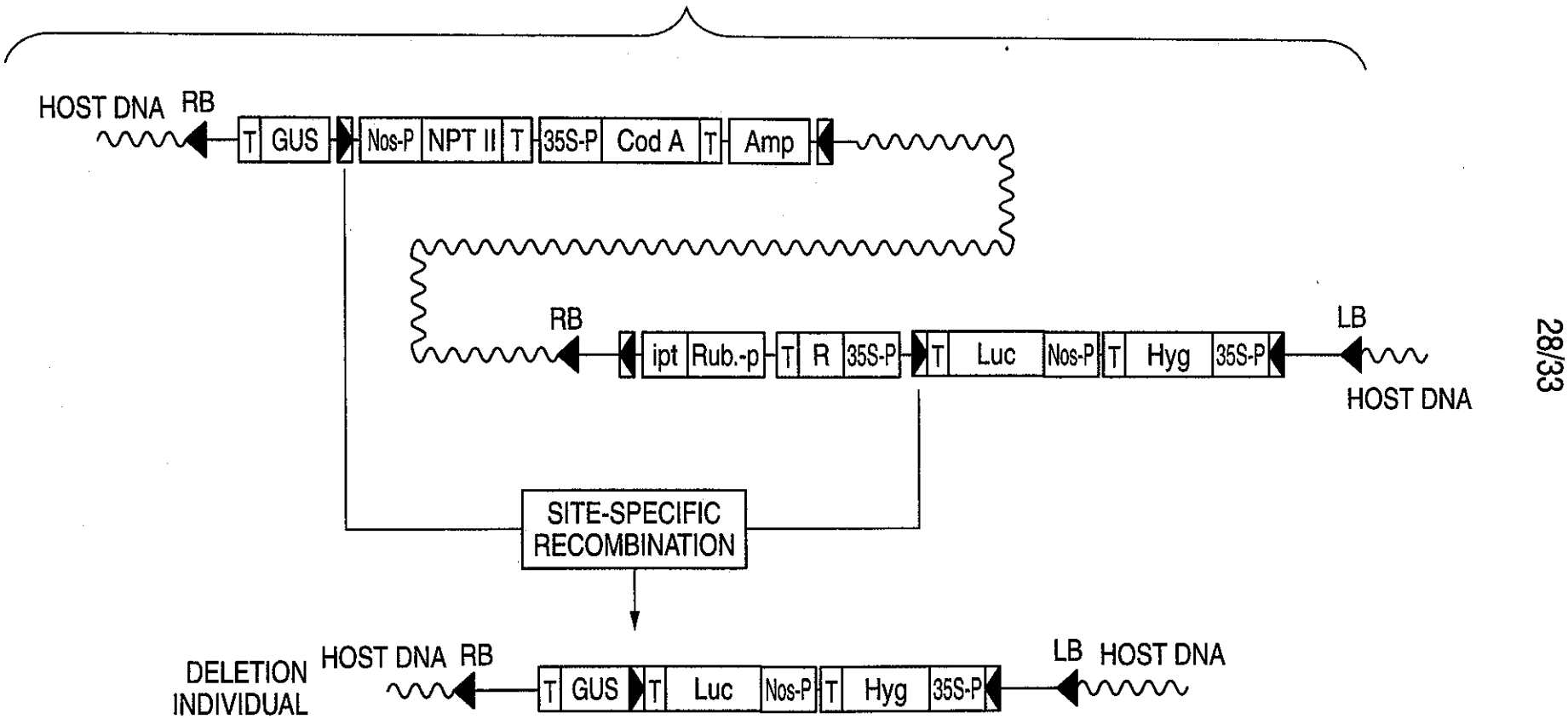


FIG. 28

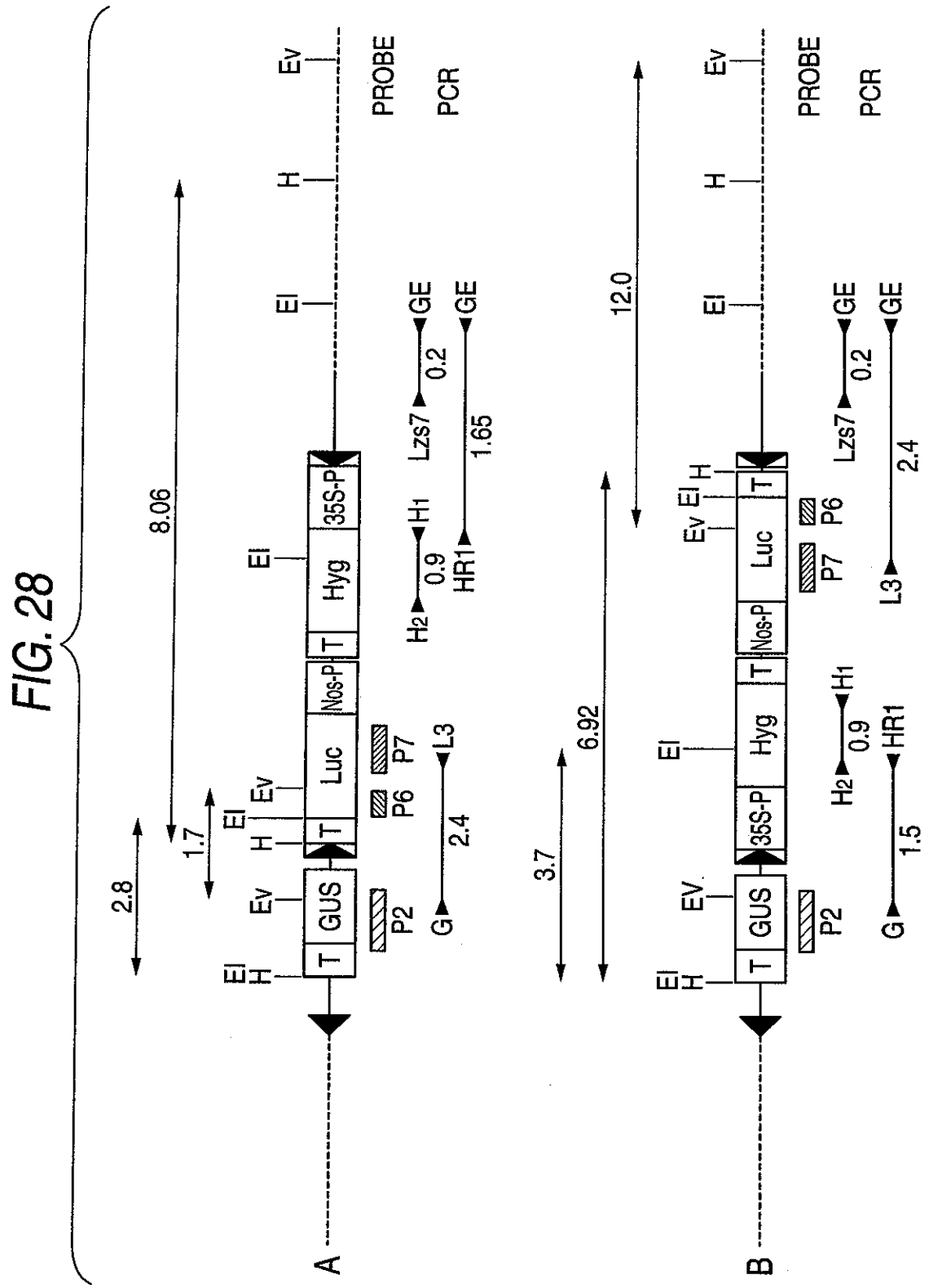

A
B
PROBE
PCR
Ev
H
EI
T
GUS
35S-P
Hyg
Nos-P
Luc
P2
P6
P7
G
L3
H1
H2
HR1
Lzs7
GE
0.2
0.9
1.65
2.4
1.5
8.06
1.7
2.8
12.0
6.92
3.7

FIG. 29

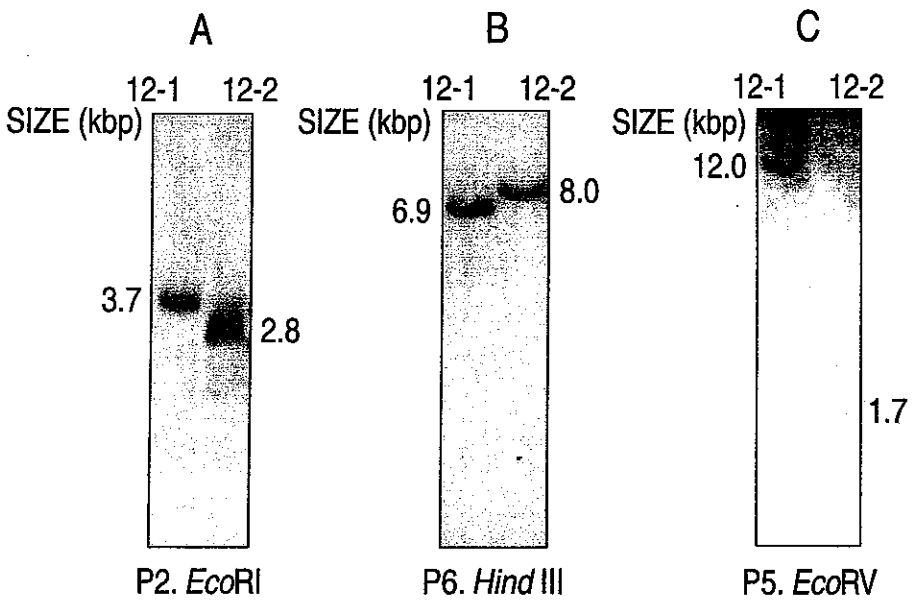

A
12-1
12-2
SIZE (kbp)
3.7
2.8
P2. EcoRI
B
12-1
12-2
SIZE (kbp)
6.9
8.0
P6. Hind III
C
12-1
12-2
SIZE (kbp)
12.0
1.7
P5. EcoRV

FIG. 30

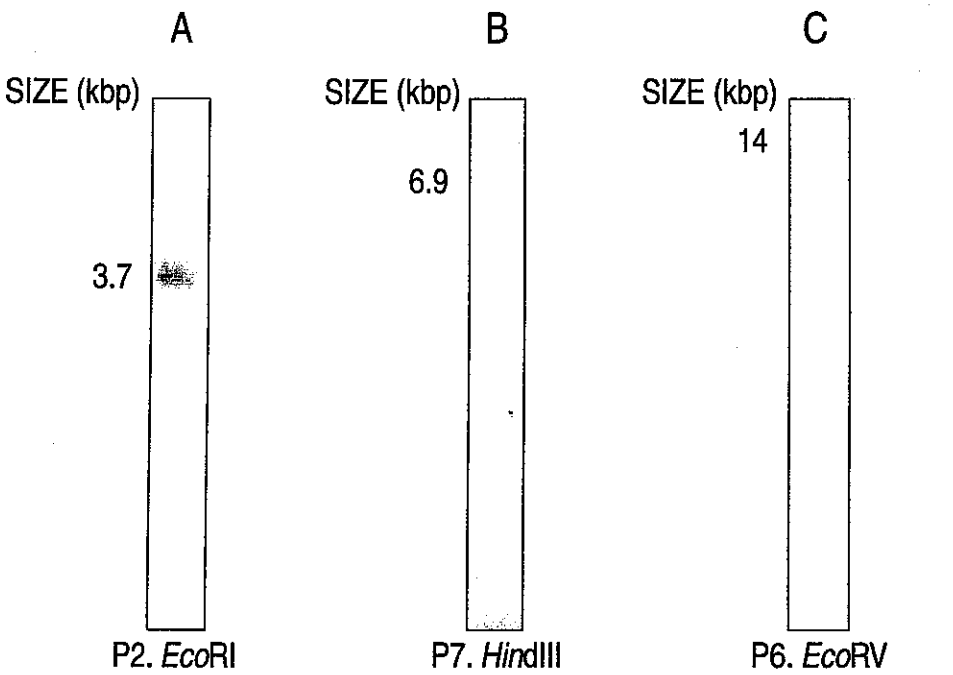

A
SIZE (kbp)
3.7
P2. EcoRI
B
SIZE (kbp)
6.9
P7. HindIII
C
SIZE (kbp)
14
P6. EcoRV

FIG. 31

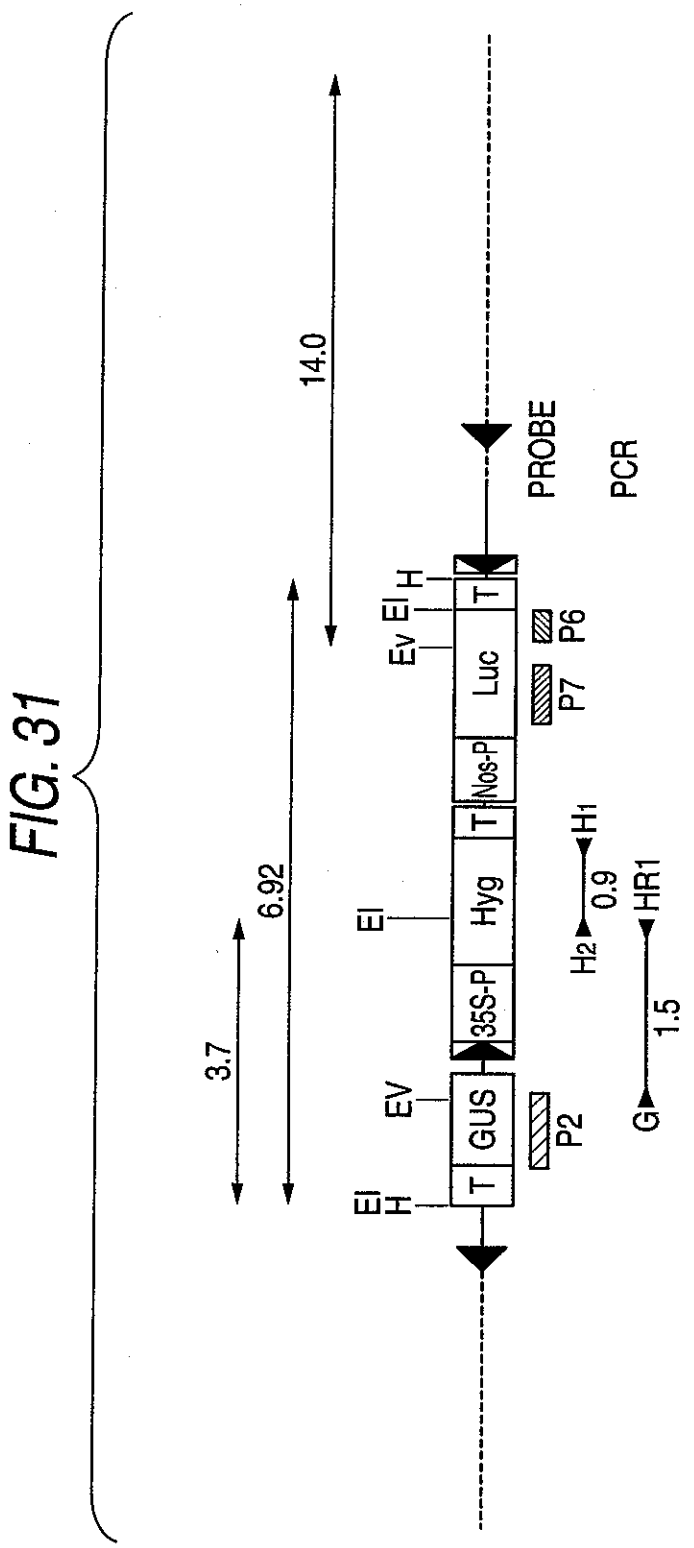
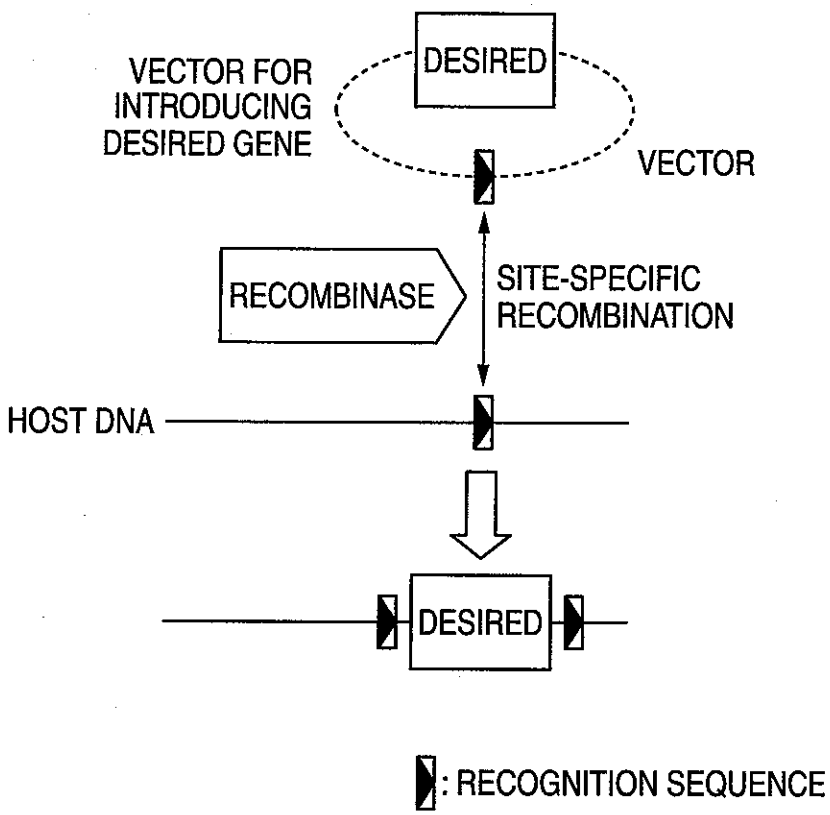

14.0
6.92
3.7
PROBE
PCR
H
EI
Ev
T
Luc
Nos-P
T
Hyg
35S-P
EI
EV
GUS
T
EI
H
P6
P7
P2
H1
0.9
H2
HR1
1.5
G

FIG. 32


VECTOR FOR
INTRODUCING
DESIRED GENE
DESIRED
VECTOR
RECOMBINASE
SITE-SPECIFIC
RECOMBINATION
HOST DNA
DESIRED
: RECOGNITION SEQUENCE