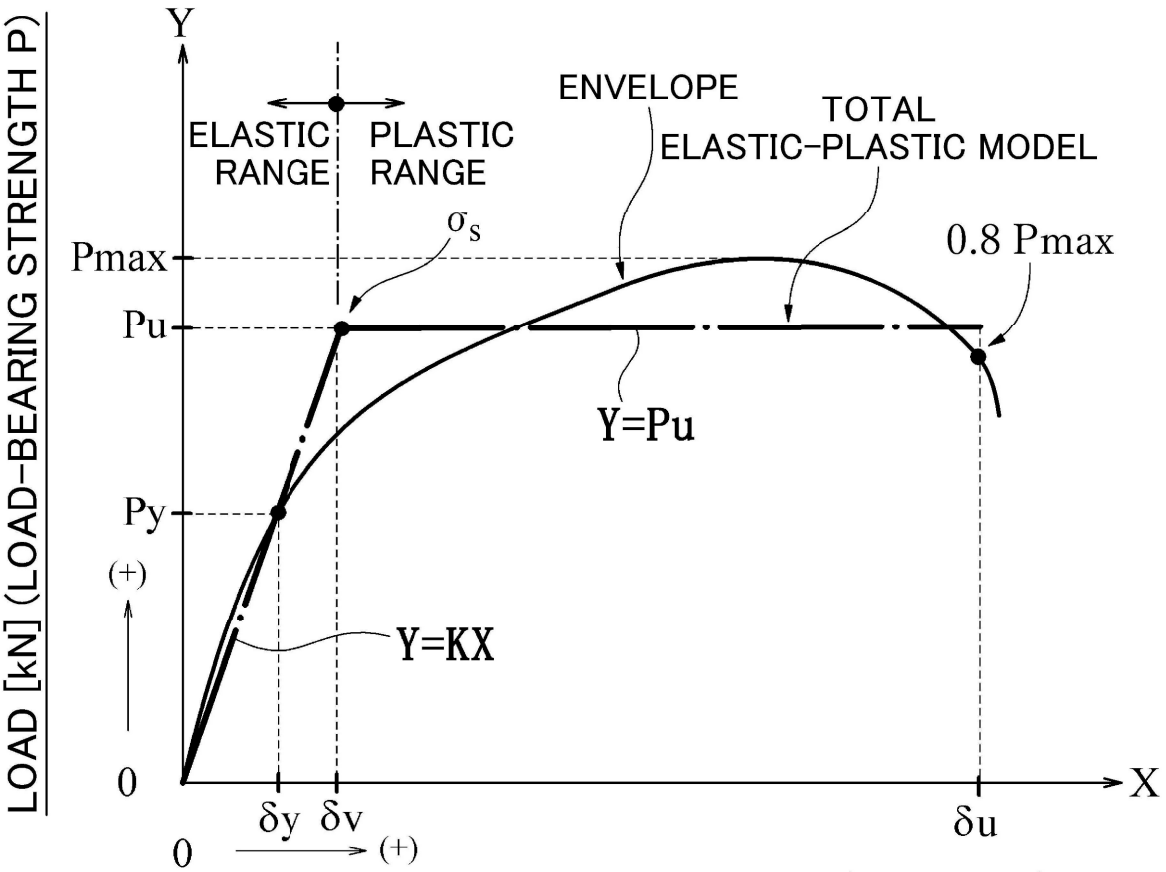
FIG.1



δu :ULTIMATE DISPLACEMENT

δv :YIELD POINT DISPLACEMENT ($\times 10^{-3}$ rad)

δy :YIELD DISPLACEMENT ($\times 10^{-3}$ rad)

σ_s :YIELD POINT

K :INITIAL STIFFNESS

μ :PLASTICITY

Pmax :MAXIMUM LOAD-BEARING STRENGTH

P_u :ULTIMATE STRENGTH

P_y :YIELD STRENGTH

$P_0 = \beta \times P_y$ ..... STRUCTURAL GYPSUM BOARD

$P_0 = \beta \times P_u'$ ..... LOW-DENSITY GYPSUM-BASED LOAD-BEARING BOARD

$$P_u' = P_u \times 0.2\sqrt{2\mu - 1}$$

$$\mu = \frac{\delta u}{\delta v}$$

$$P_a = P_0 \times \alpha$$

CO-EFFICIENT OF EFFECTIVE WALL LENGTH $= \dfrac{P_a}{L \times 1.96\,(kN/m)}$

P_a :SHORT-TERM ALLOWABLE SHEAR STRENGTH

P_0 :SHORT-TERM REFERENCE SHEAR STRENGTH

P_u' :ULTIMATE STRENGTH (CORRECTION VALUE)

α :REDUCTION COEFFICIENT

β :VARIATION COEFFICIENT

L :LENGTH OF TEST PIECE (TEST WALL) (m)

FIG.2

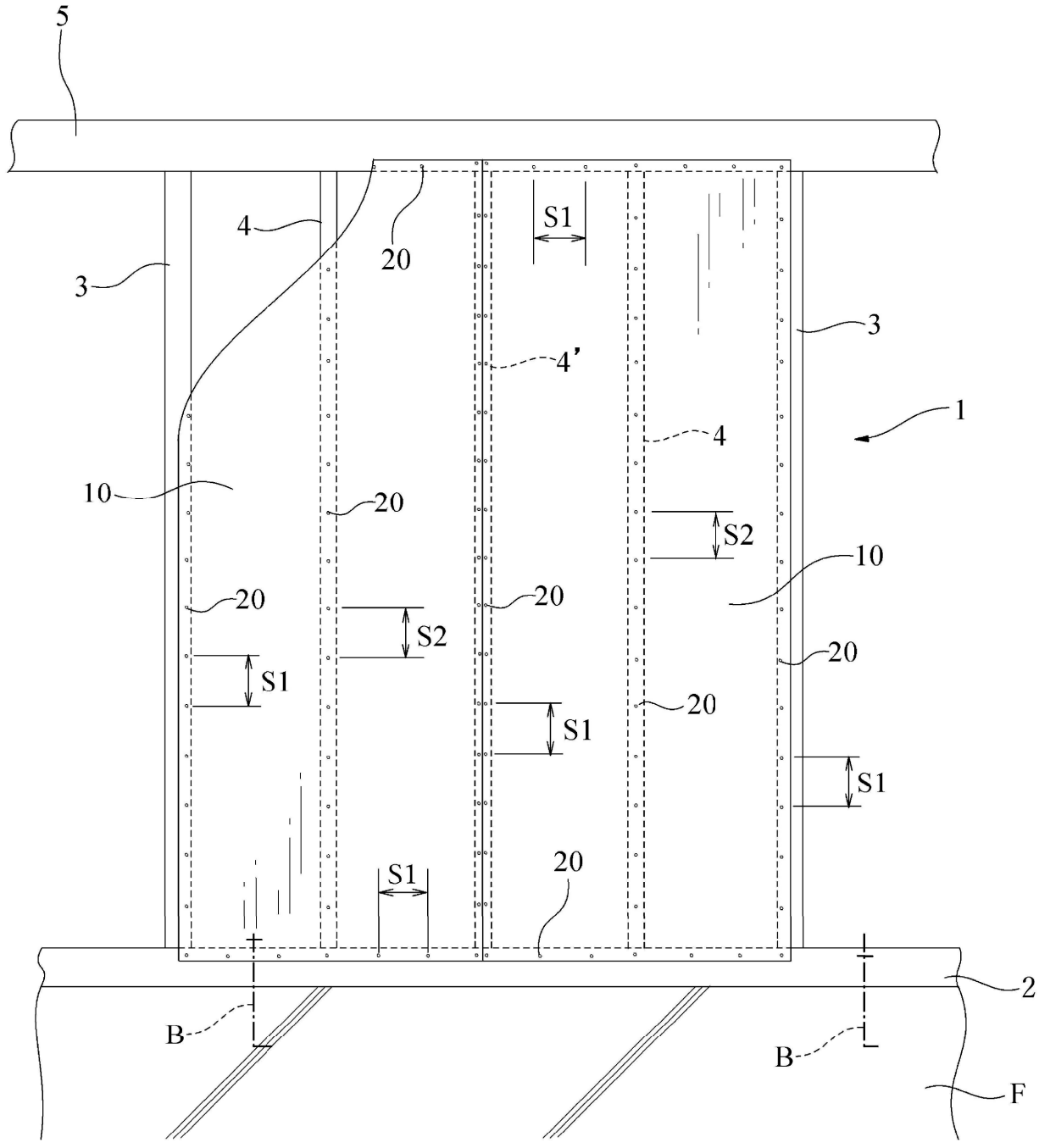


FIG.3

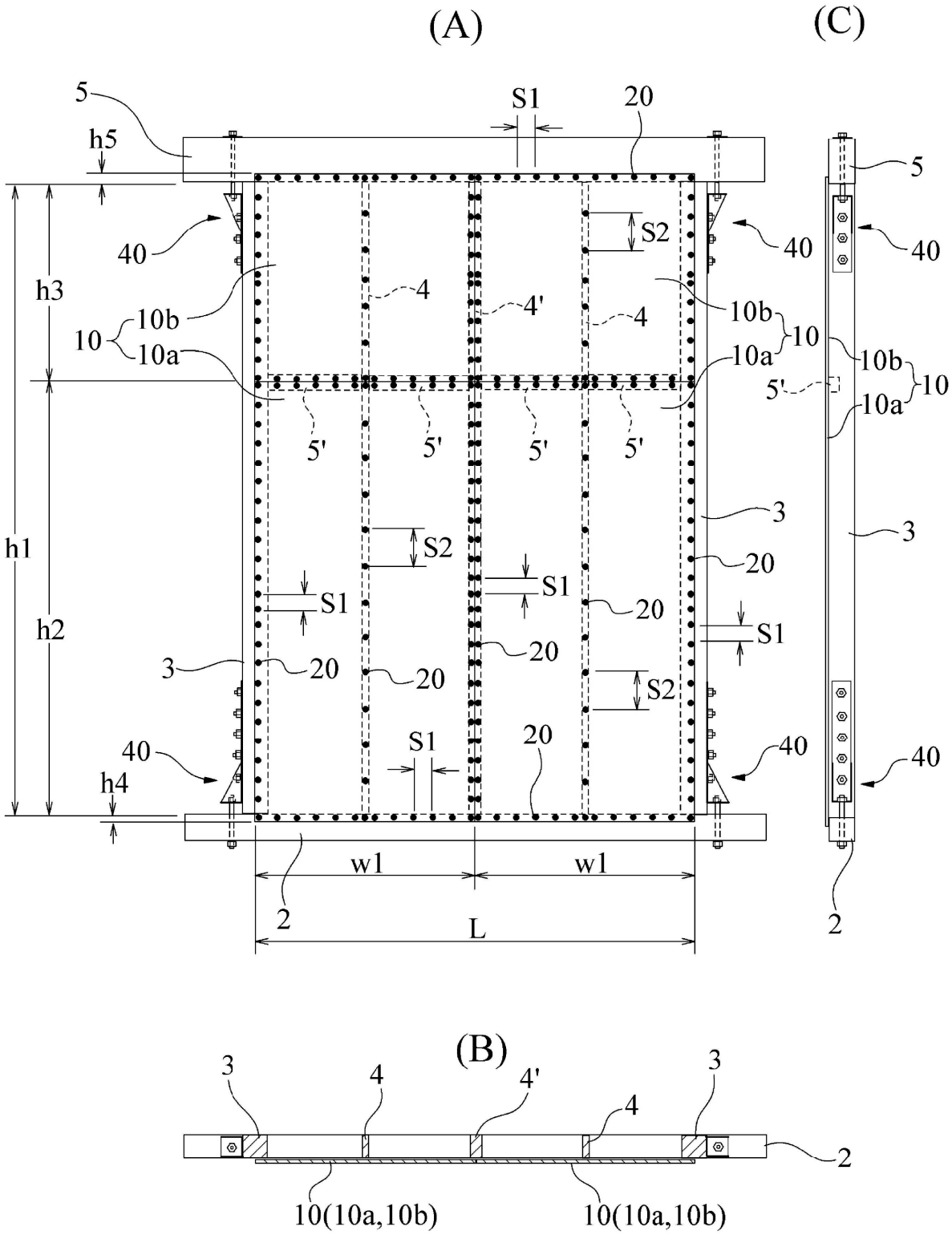


FIG.4

		EXAMPLE				COMPARATIVE EXAMPLE
		①	②	③	④	
PHYSICAL PROPERTY	SURFACE DENSITY (kg/m^2)	7.45	7.61	8.65	8.31	7.80
	SPECIFIC GRAVITY	0.77	0.78	0.89	0.81	0.80
	THICKNESS (mm)	9.68	9.76	9.72	9.75	9.75
	COMPRESSIVE STRENGTH (N/mm^2)	8.4	11.1	9.4	6.5	6.0
	LATERAL NAIL RESISTANCE (N)	516	765	664	640	600
COMPOSITION	ORGANIC-BASED STRENGTH ENHANCER (PARTS BY WEIGHT BASED ON CALCINED GYPSUM)	5.5	5.5	5.0	8.0	4.0
	INORGANIC FIBER (PARTS BY WEIGHT BASED ON CALCINED GYPSUM)	3.0	3.5	3.0	3.5	3.5
RESULT OF LOAD-BEARING TEST	INITIAL STIFFNESS K ($kN/10^{-3}rad$)	2.43	2.49	2.91	2.04	1.94
	YIELD POINT DISPLACEMENT δv ($\times 10^{-3}rad$)	6.04	6.31	6.49	6.80	7.26
	ULTIMATE DISPLACEMENT δu ($\times 10^{-3}rad$)	34.98	34.90	28.09	29.82	30.10
	PLASTICITY μ ($\delta u / \delta v$)	5.78	5.53	4.32	4.39	4.15
	ULTIMATE STRENGTH (CORRECTION VALUE) Pu' (kN)	9.60	11.90	10.40	7.80	7.62
	SHORT-TERM ALLOWABLE SHEAR STRENGTH Pa (kN)	7.20	8.92	7.80	5.85	5.72
CO-EFFICIENT OF EFFECTIVE WALL LENGTH*		2.02	2.50	2.19	1.64	1.60

* ASSUME REDUCTION COEFFICIENT α = 0.75 AND VARIATION COEFFICIENT β = 1.0.

SHORT-TERM REFERENCE SHEAR STRENGTH $P_0 = \beta \times P_u'$

SHORT-TERM ALLOWABLE SHEAR STRENGTH $P_a = P_0 \times \alpha$

CO-EFFICIENT OF EFFECTIVE WALL LENGTH $= \dfrac{P_a}{L \times 1.96\,(kN/m)}$

$= \dfrac{P_a}{1.82m \times 1.96\,(kN/m)} = \dfrac{P_u'}{4.75\,(kN)}$

FIG.5

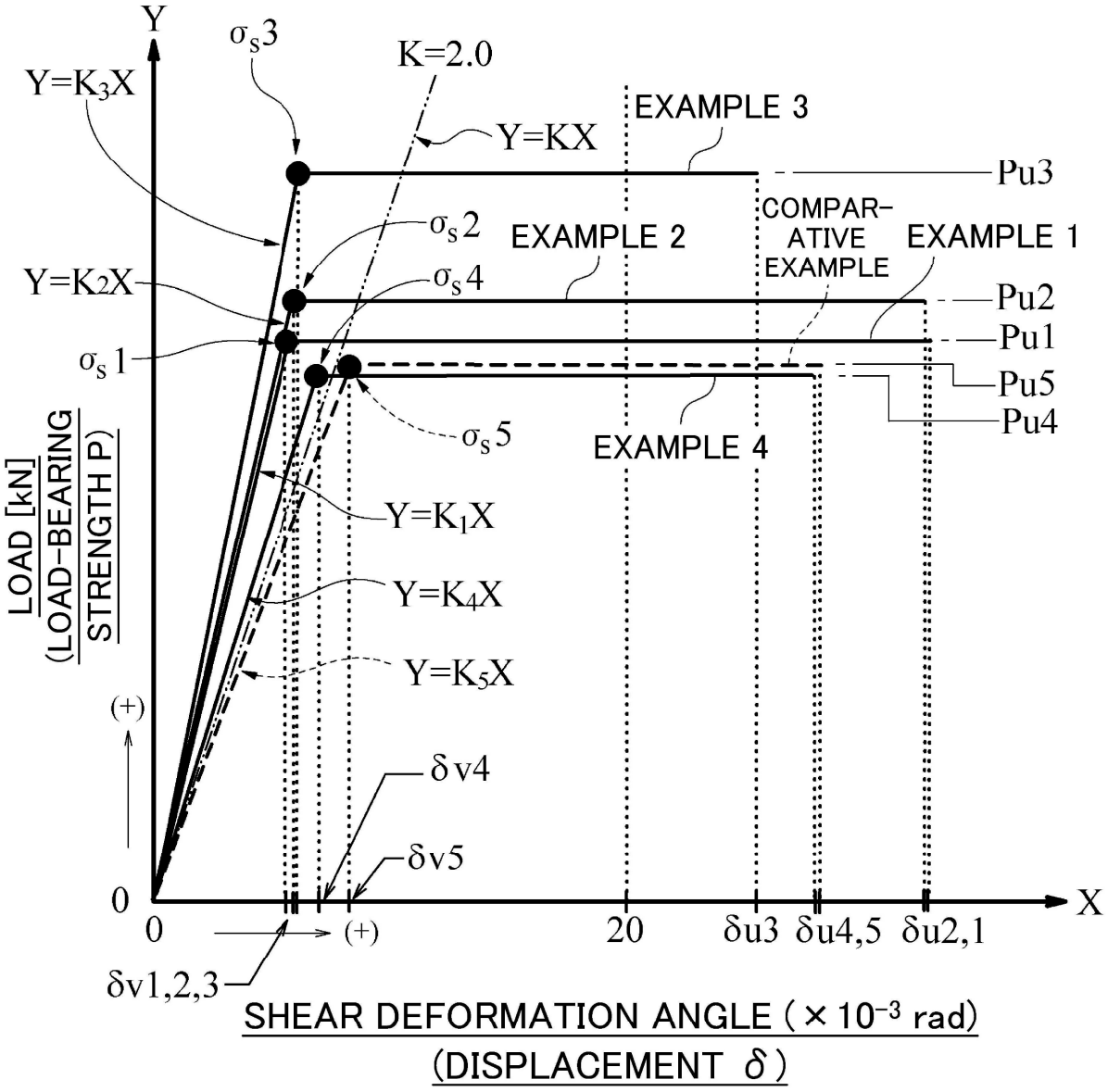

Y
X
$\sigma_s 3$
K=2.0
Y=K$_3$X
Y=KX
EXAMPLE 3
Pu3
COMPAR-
ATIVE
EXAMPLE
EXAMPLE 1
$\sigma_s 2$
EXAMPLE 2
$\sigma_s 4$
Y=K$_2$X
Pu2
Pu1
$\sigma_s 1$
Pu5
Pu4
$\sigma_s 5$
EXAMPLE 4
Y=K$_1$X
Y=K$_4$X
Y=K$_5$X
LOAD [kN]
(LOAD-BEARING
STRENGTH P)
(+)
$\delta v4$
$\delta v5$
0
0
(+)
20
$\delta u3$
$\delta u4,5$
$\delta u2,1$
$\delta v1,2,3$
SHEAR DEFORMATION ANGLE ($\times 10^{-3}$ rad)
(DISPLACEMENT δ)

FIG.6

