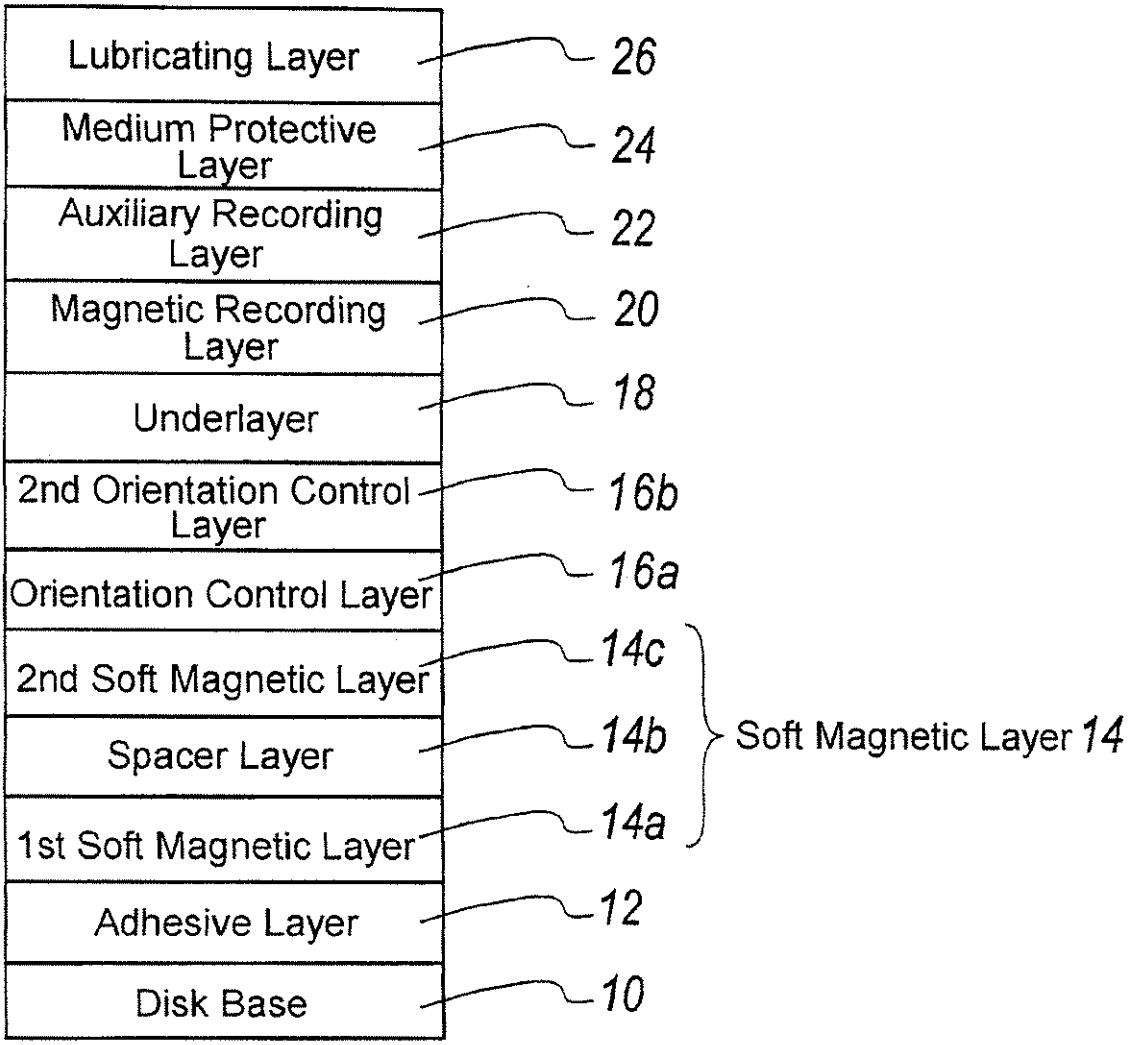
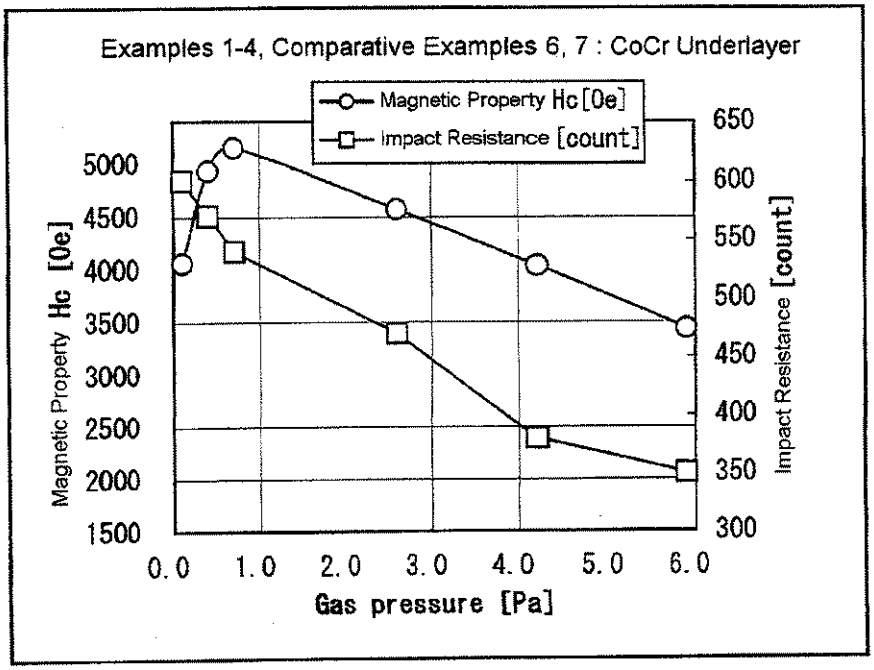

Lubricating Layer
26
Medium Protective Layer
24
Auxiliary Recording Layer
22
Magnetic Recording Layer
20
Underlayer
18
2nd Orientation Control Layer
16b
Orientation Control Layer
16a
2nd Soft Magnetic Layer
14c
Spacer Layer
14b
1st Soft Magnetic Layer
14a
Soft Magnetic Layer 14
Adhesive Layer
12
Disk Base
10

FIG. 1

	Composition			Gas Pressure (Pascal)			Magnetic Property	Impact Resistance	Evaluation
	Orientation Control Layer	2nd Orientation Control Layer	Underlayer	Orientation Control Layer	2nd Orientation Control Layer	Under-layer	Hc [Oe]	Pin On pass count	
	fcc	Amorphous	hcp	fcc	Amorphous	hcp			
Comparative Example 1	NiW10	-	Ru	0.6	-	0.5	2273	550	×
Comparative Example 2	↑	-	Ru	↑	-	1.5	2911	500	×
Comparative Example 3	↑	-	Ru	↑	-	3.0	3685	450	×
Comparative Example 4	↑	-	Ru	↑	-	4.8	4315	390	×
Comparative Example 5	↑	-	Ru	↑	-	6.0	4500	350	×
Example 1	Ti	Carbon	CoCr40	0.6	0.6	0.1	4063	600	○
Example 2	↑	↑	↑	↑	0.6	0.4	4938	570	○
Example 3	↑	↑	↑	↑	0.6	0.7	5154	540	○
Example 4	↑	↑	↑	↑	0.6	2.6	4571	470	○
Comparative Example 6	↑	↑	↑	↑	0.6	4.2	4038	380	×
Comparative Example 7	↑	↑	↑	↑	0.6	5.9	3442	350	×
Example 5	↑	-	↑	↑	-	0.4	4282	560	○
Example 6	NiW10	-	↑	0.6	-	1.0	4642	520	○
Example 7	↑	Carbon	↑	0.6	-	1.0	3800	510	○

FIG. 2

(a)


Examples 1-4, Comparative Examples 6, 7 : CoCr Underlayer
Magnetic Property Hc [Oe]
Impact Resistance [count]
Magnetic Property Hc [Oe]
Impact Resistance [count]
5000
4500
4000
3500
3000
2500
2000
1500
650
600
550
500
450
400
350
300
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Gas pressure [Pa]

(b)

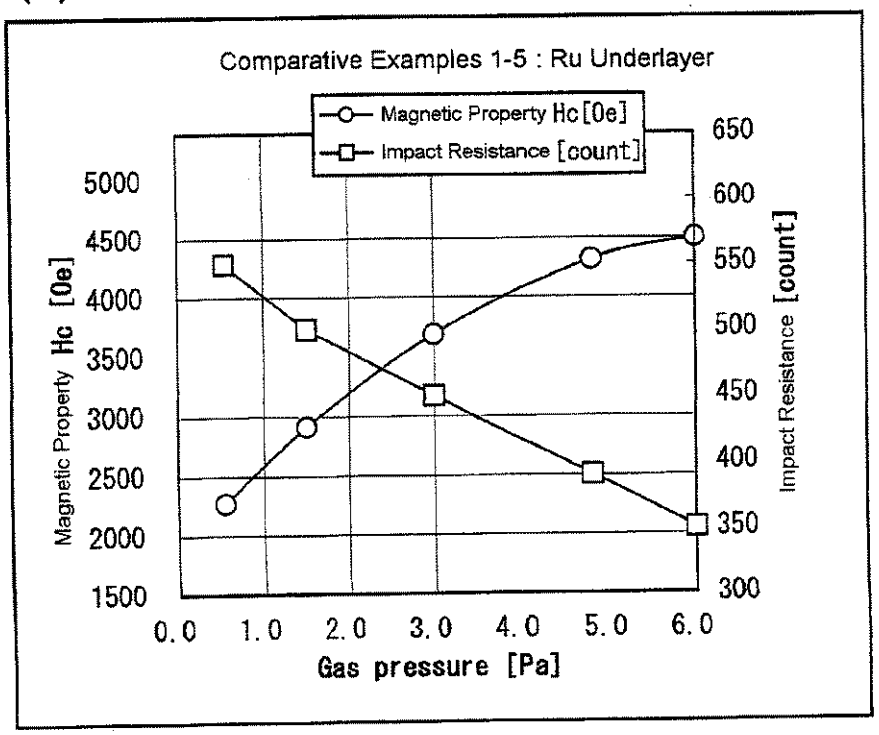

Comparative Examples 1-5 : Ru Underlayer
Magnetic Property Hc [Oe]
Impact Resistance [count]
Magnetic Property Hc [Oe]
Impact Resistance [count]
5000
4500
4000
3500
3000
2500
2000
1500
650
600
550
500
450
400
350
300
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Gas pressure [Pa]

FIG. 3

	Composition			Gas Pressure (Pascal)			Magnetic Property	Impact Resistance	Evaluation
	Orientation Control Layer	2nd Orientation Control Layer	Underlayer	Orientation Control Layer	2nd Orientation Control Layer	Under-layer	Hc [Oe]	Pin On pass count	
	fcc	Amorphous	hcp	fcc	Amorphous	hcp			
Example 10	NiW10	-	CoCr55	0.6	-	2	4677	480	○
Example 11	↑	-	CoCr40	↑	-	↑	4554	490	○
Comparative Example 8	↑	-	CoCr35	↑	-	↑	1301	470	×
Example 12	NiW10	-	CoCr40Ru10	↑	-	↑	3866	480	○
Example 13	CuW10	-	CoCr40	↑	-	↑	3899	480	○
Example 14	↑	-	CoCr40Ru10	↑	-	↑	3866	480	○

FIG. 4

(a)

Underlayer is Single Layer

	Composition		Gas Pressure (Pascal)		Magnetic Property	Impact Resistance
	Orientation Control Layer	Underlayer	Orientation Control Layer	Underlayer	Hc [Oe]	Pin On pass count
	fcc	hcp	fcc	hcp		
Example 15	NiW10	CoCr40-SiO2(6mol%)	0.6	0.7	5350	530
Example 16	↑	CoCr40-TiO2(6mol%)	↑	↑	5210	540
Example 17	↑	CoCr40-Cr2O3(6mol%)	↑	↑	5200	530

(b)

Underlayer is Two Layers

	Composition			Gas Pressure (Pascal)			Magnetic Property	Impact Resistance
	Orientation Control Layer	1st Underlayer	2nd Underlayer	Orientation Control Layer	1st Underlayer	2nd Underlayer	Hc [Oe]	Pin On pass count
	fcc	hcp	hcp	fcc	hcp	hcp		
Example 18	NiW10	CoCr40	CoCr40-SiO2(6mol%)	0.6	0.7	0.7	5500	530
Example 19	↑	CoCr40	CoCr40-TiO2(6mol%)	↑	↑	↑	5370	540
Example 20	↑	CoCr40	CoCr40-Cr2O3(6mol%)	↑	↑	↑	5300	530

(c)

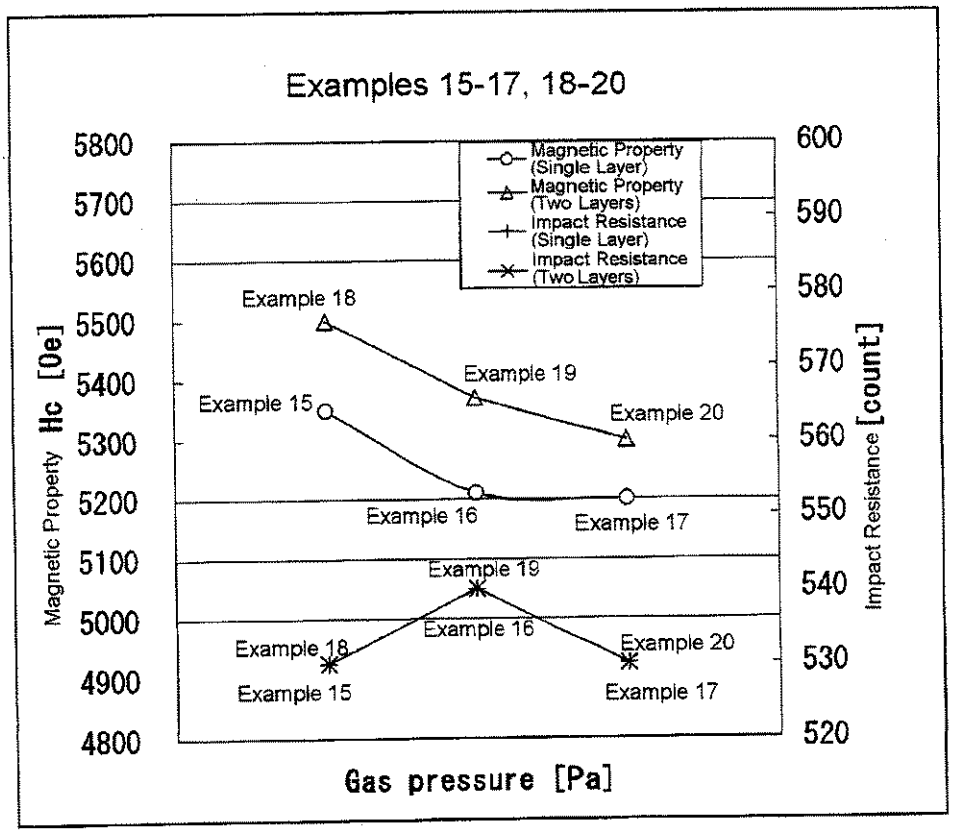


FIG. 5