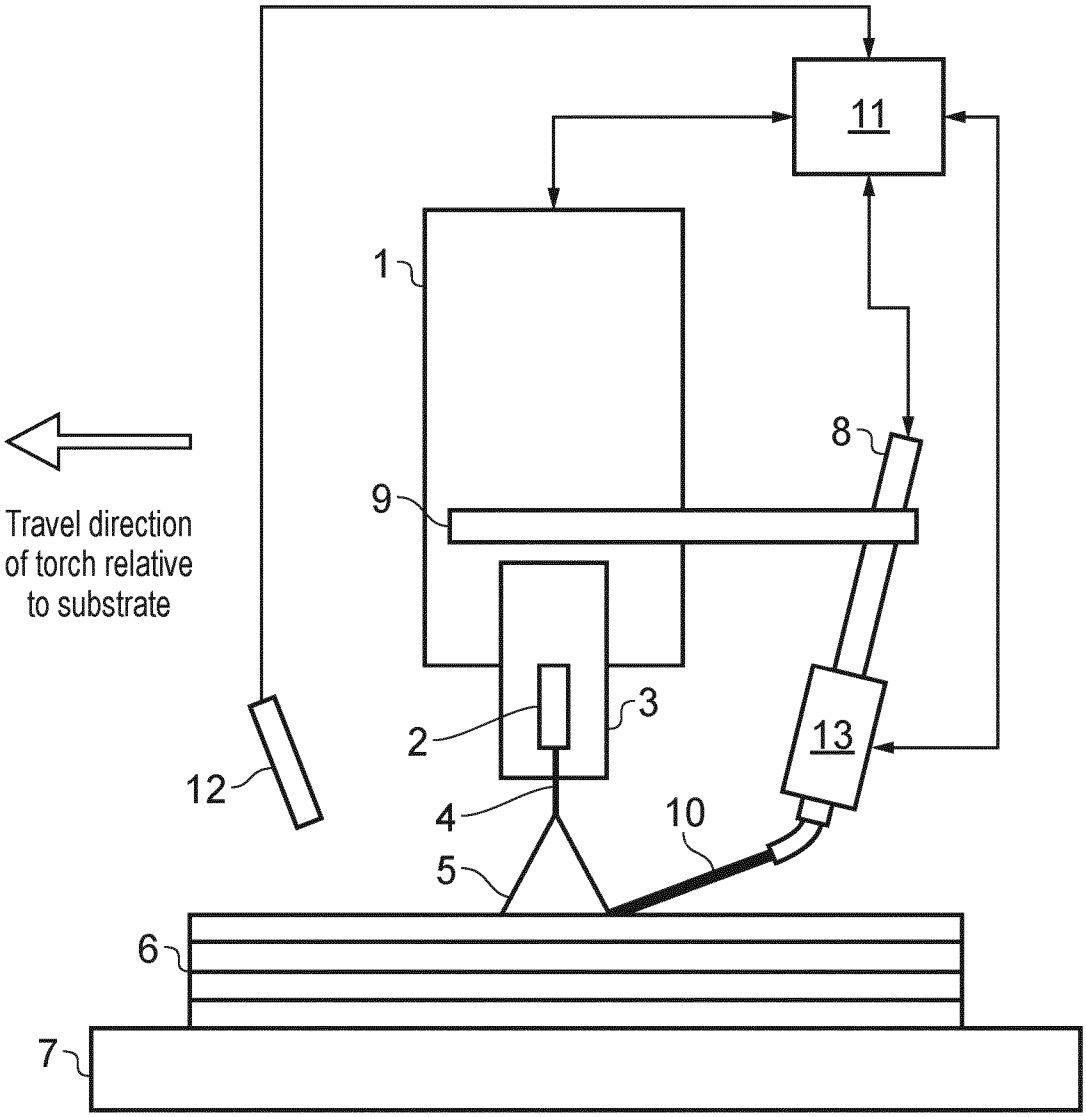

11
1
8
9
Travel direction
of torch relative
to substrate
2
3
13
12
4
10
5
6
7

FIG. 1

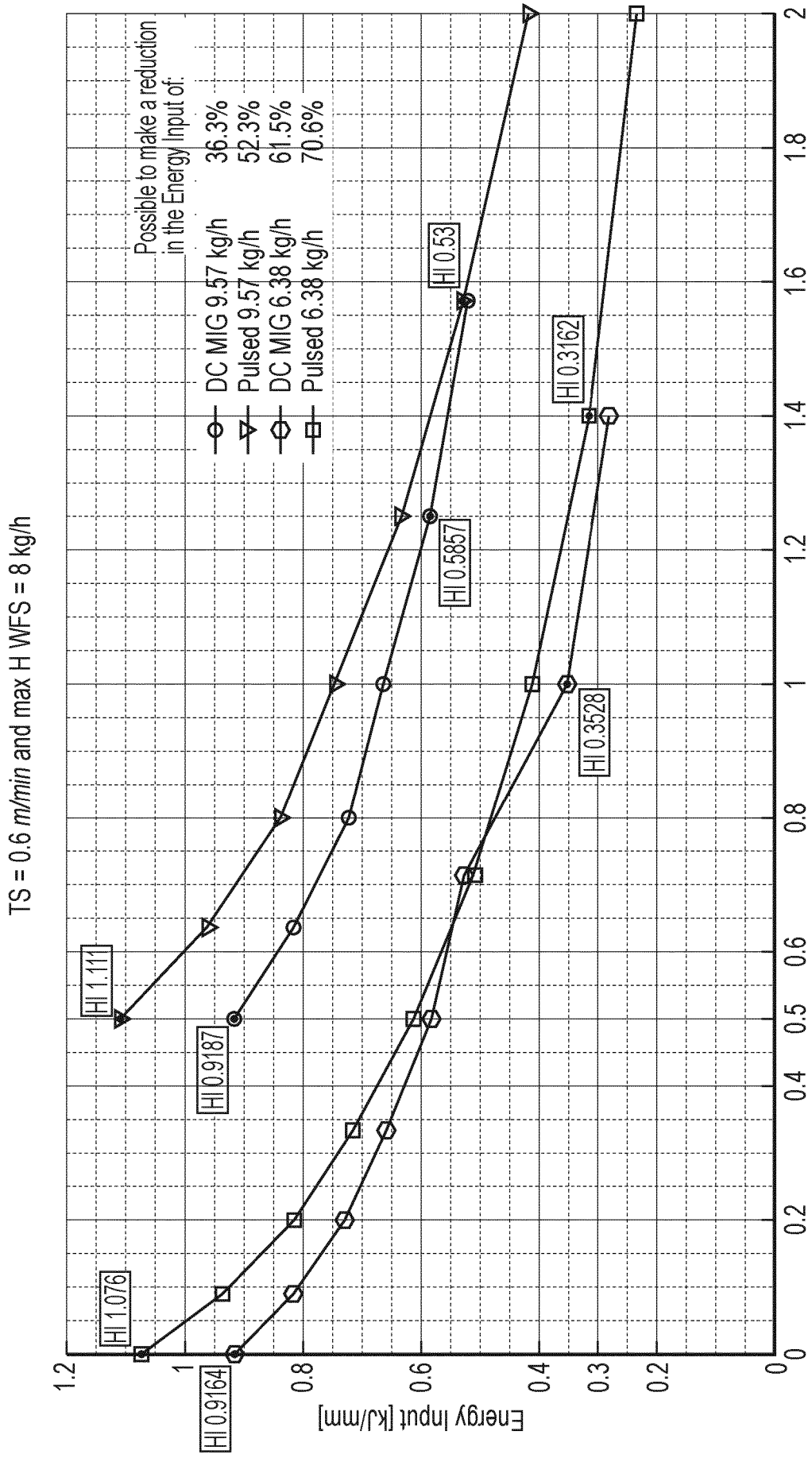

TS = 0.6 m/min and max H WFS = 8 kg/h
Possible to make a reduction in the Energy Input of:
DC MIG 9.57 kg/h 36.3%
Pulsed 9.57 kg/h 52.3%
DC MIG 6.38 kg/h 61.5%
Pulsed 6.38 kg/h 70.6%
HI 1.111
HI 1.076
HI 0.9187
HI 0.9164
HI 0.53
HI 0.5857
HI 0.3162
HI 0.3528
Energy Input [kJ/mm]
1.2
1
0.8
0.6
0.4
0.3
0.2
0
0.2
0.4
0.5
0.6
0.8
1
1.2
1.4
1.6
1.8
2
R = CWFS / HWFS

FIG. 2

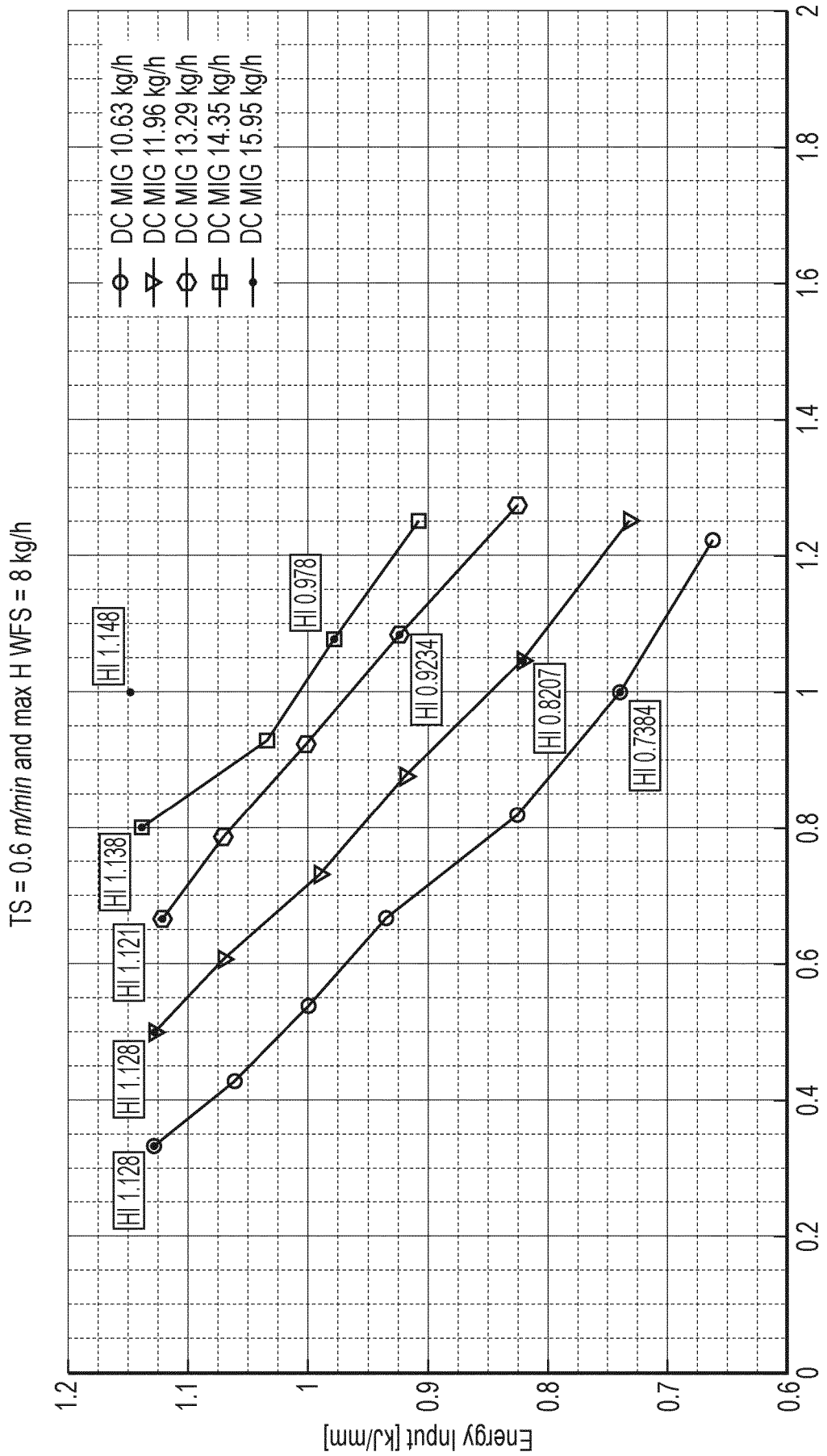

TS = 0.6 m/min and max H WFS = 8 kg/h
DC MIG 10.63 kg/h
DC MIG 11.96 kg/h
DC MIG 13.29 kg/h
DC MIG 14.35 kg/h
DC MIG 15.95 kg/h
HI 1.148
HI 1.138
HI 1.121
HI 1.128
HI 1.128
HI 0.978
HI 0.9234
HI 0.8207
HI 0.7384
Energy Input [kJ/mm]
1.2
1.1
1
0.9
0.8
0.7
0.6
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
R = CWFS / HWFS

FIG. 3

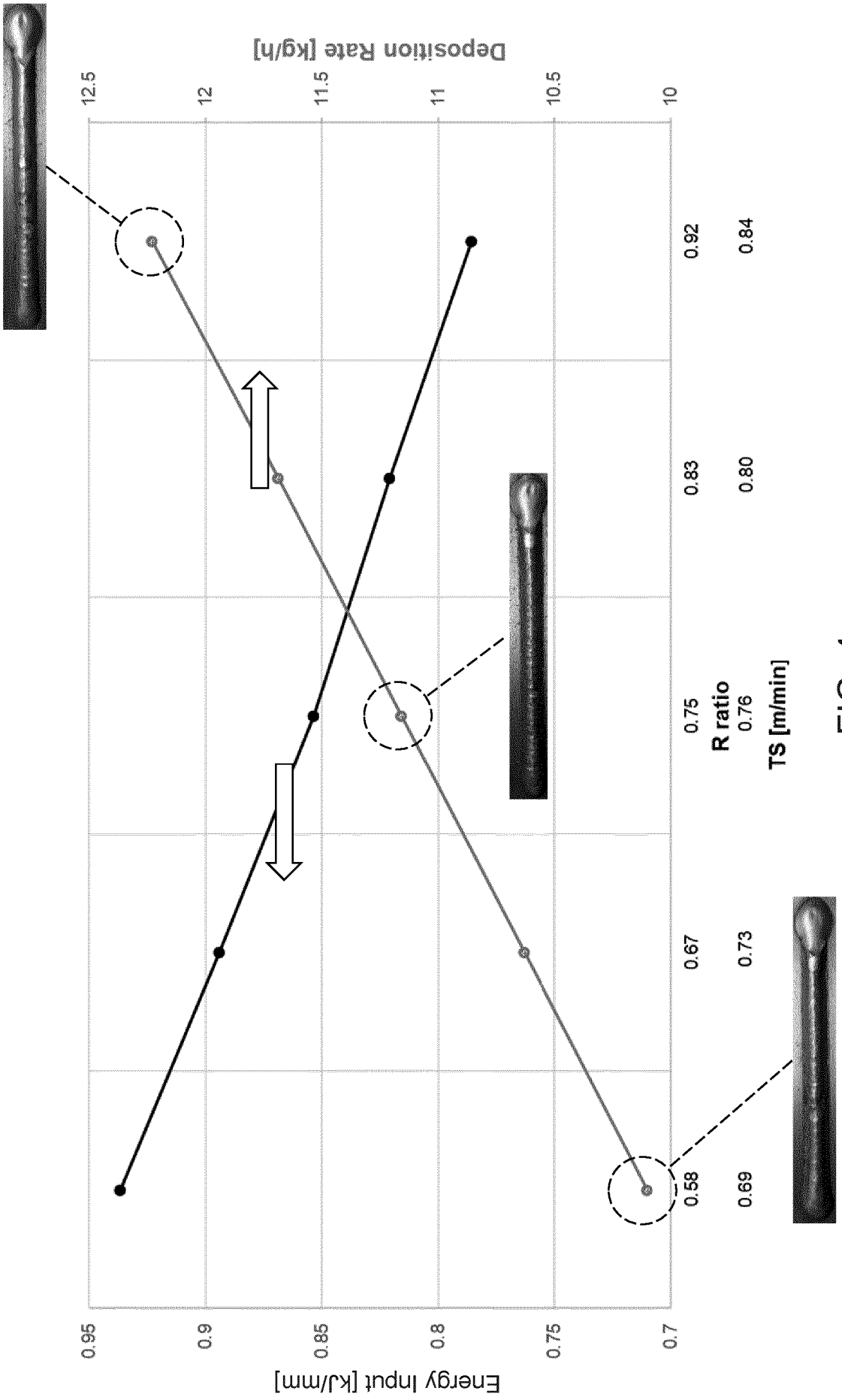

Deposition Rate [kg/h]
12.5
12
11.5
11
10.5
10
Energy Input [kJ/mm]
0.95
0.9
0.85
0.8
0.75
0.7
R ratio
0.75
0.83
0.92
TS [m/min]
0.76
0.80
0.84
0.58
0.67
0.69
0.73

FIG. 4

FIG. 5A

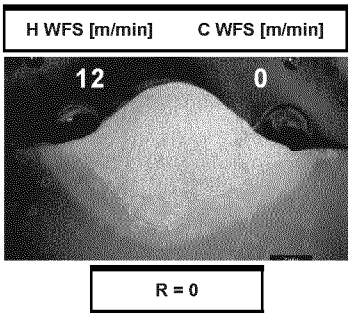


FIG. 5E

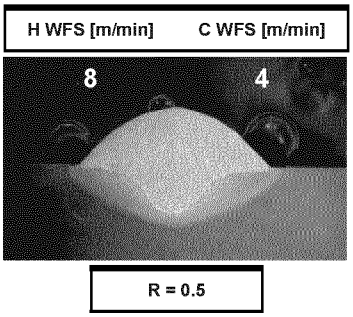


FIG. 5B

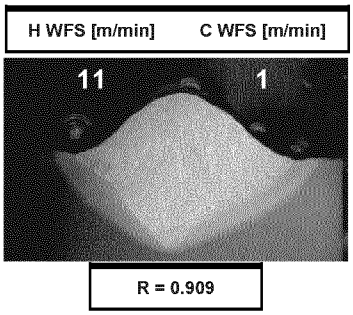


FIG. 5F

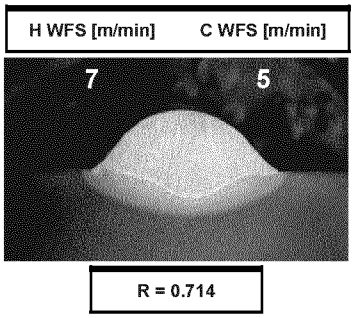


FIG. 5C

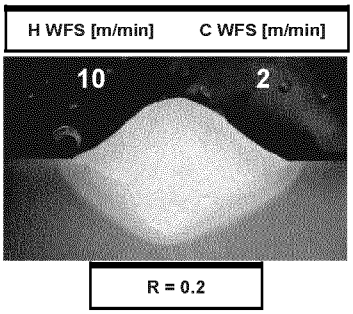


FIG. 5G

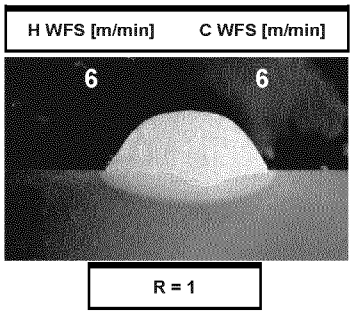


FIG. 5D

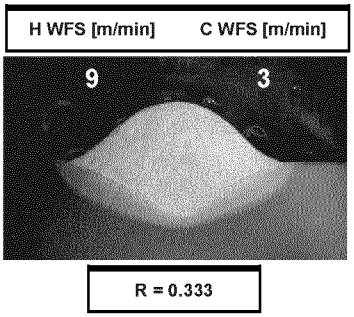
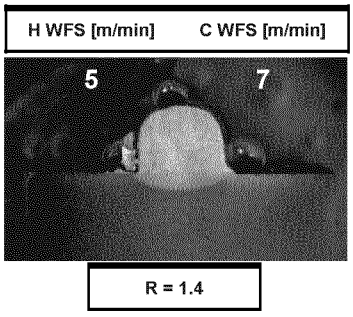


FIG. 5H



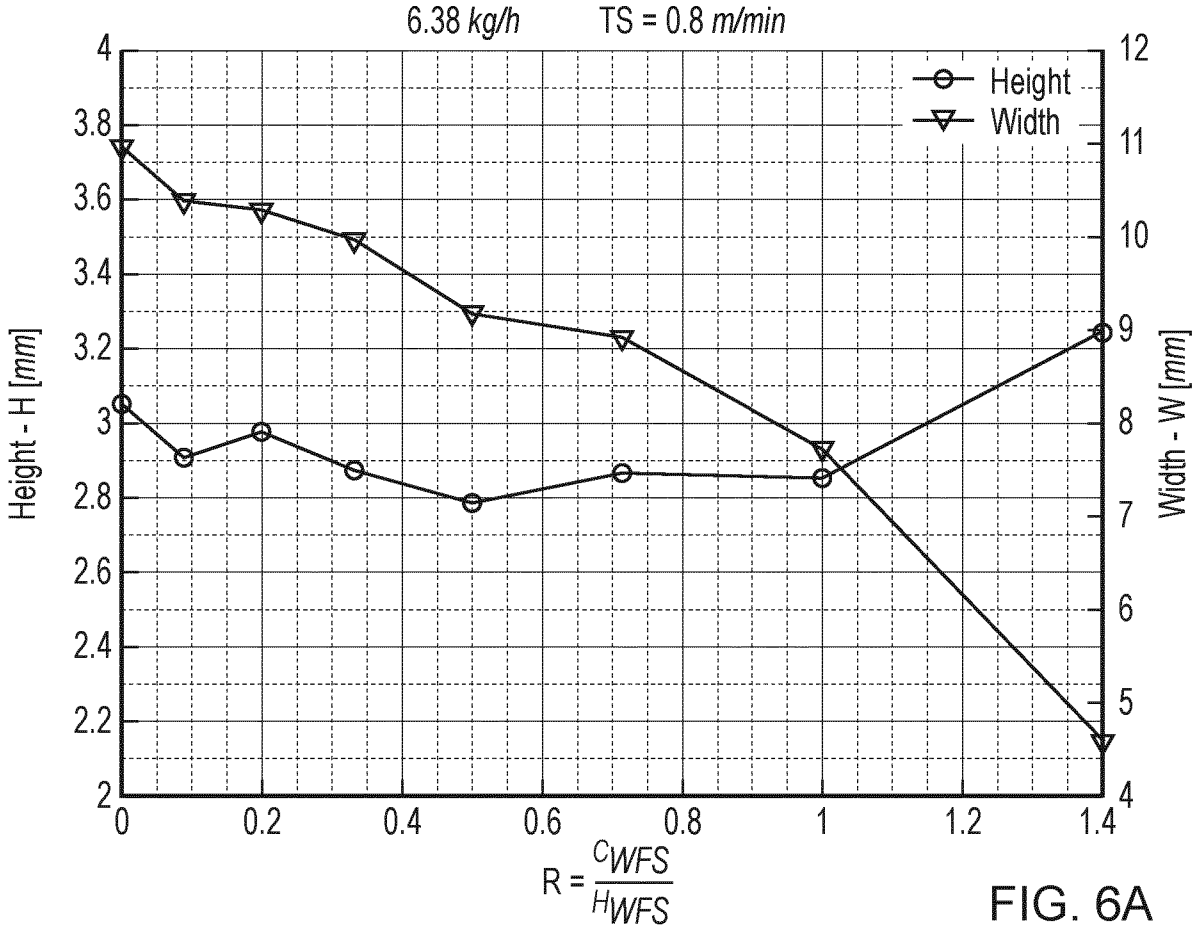

6.38 kg/h
TS = 0.8 m/min
Height
Width
Height - H [mm]
Width - W [mm]
R = $\frac{C_{WFS}}{H_{WFS}}$

FIG. 6A

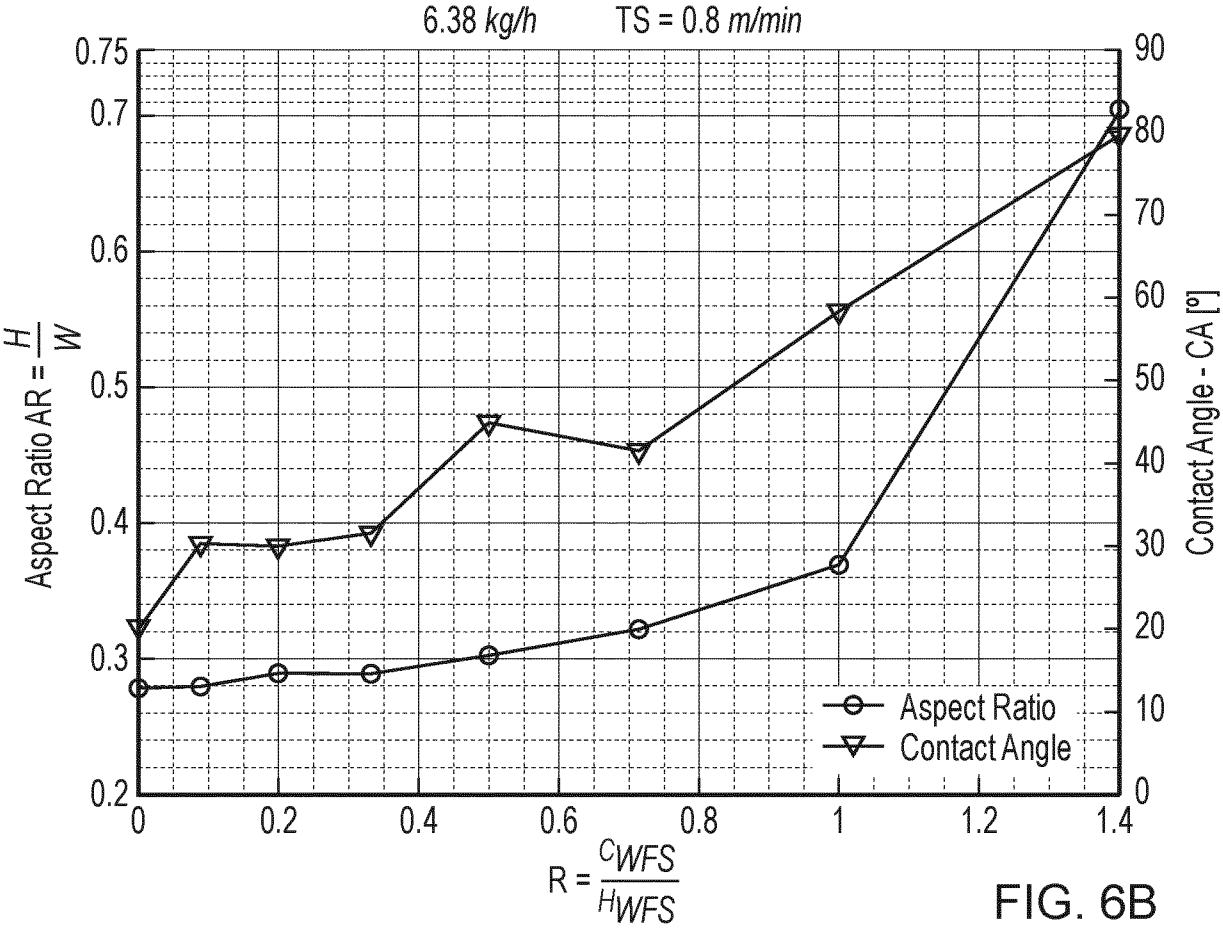

6.38 kg/h
TS = 0.8 m/min
Aspect Ratio
Contact Angle
Aspect Ratio AR = $\frac{H}{W}$
Contact Angle - CA [°]
R = $\frac{C_{WFS}}{H_{WFS}}$

FIG. 6B

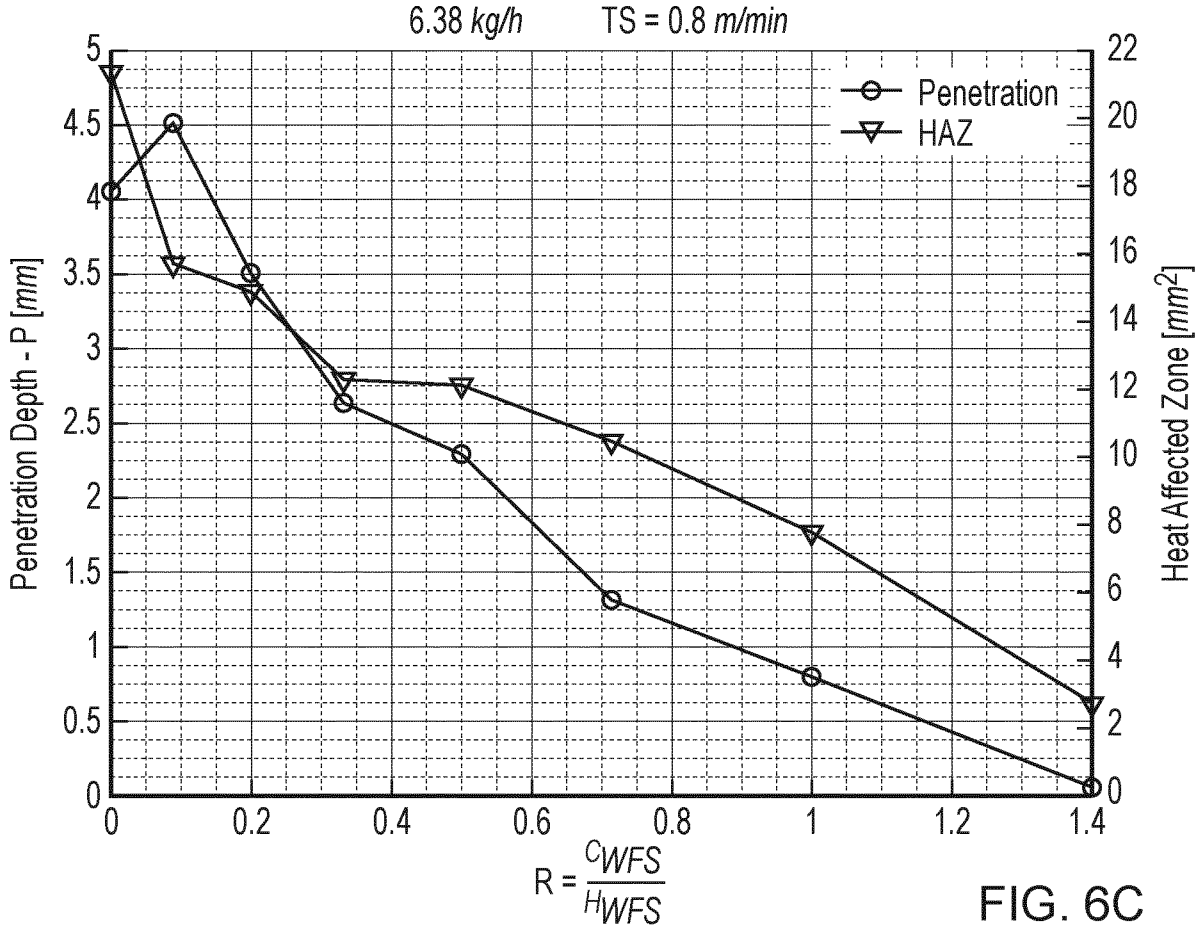

6.38 kg/h
TS = 0.8 m/min
Penetration
HAZ
Penetration Depth - P [mm]
Heat Affected Zone [mm²]
R = CWFS / HWFS

FIG. 6C

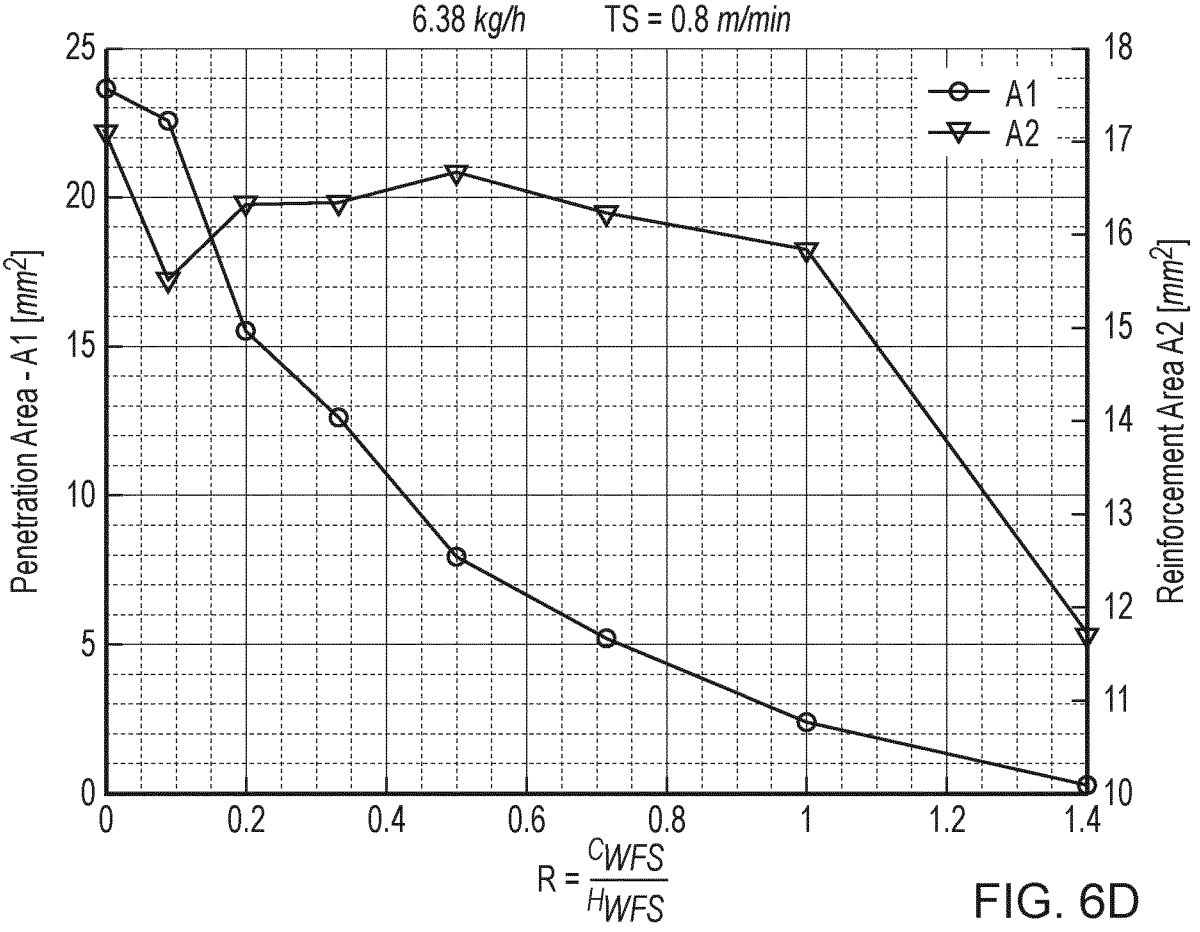

6.38 kg/h
TS = 0.8 m/min
A1
A2
Penetration Area - A1 [mm²]
Reinforcement Area A2 [mm²]
R = CWFS / HWFS

FIG. 6D

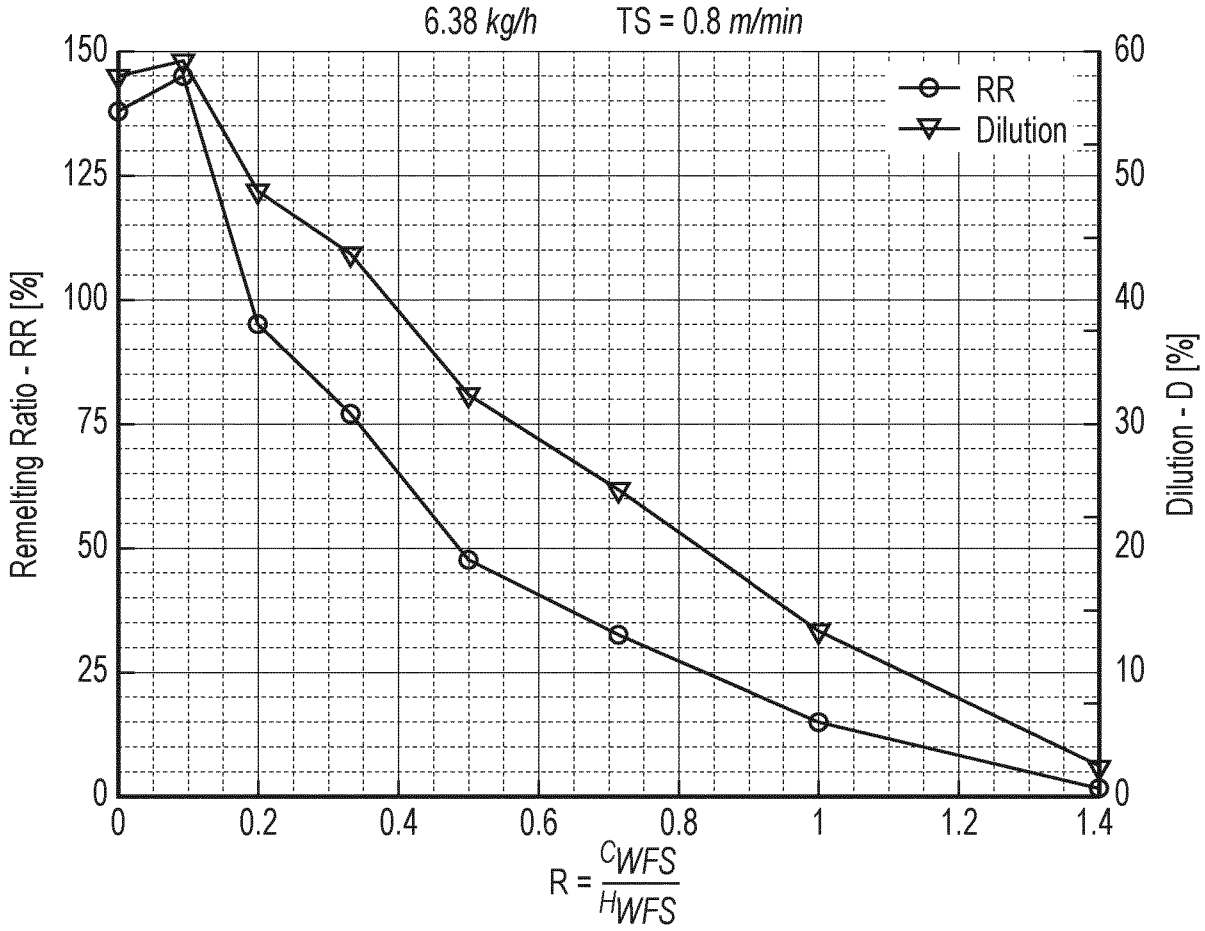

6.38 kg/h
TS = 0.8 m/min
RR
Dilution
Remelting Ratio - RR [%]
Dilution - D [%]
150
125
100
75
50
25
0
60
50
40
30
20
10
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
R = CWFS / HWFS

FIG. 6E

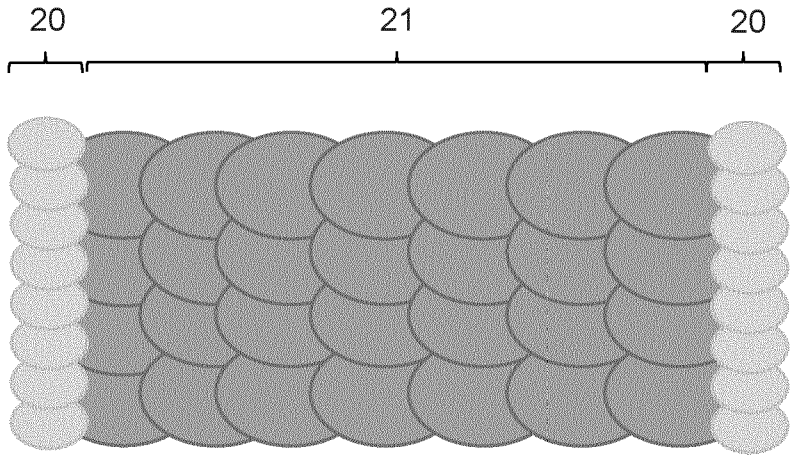

20
21
20

FIG. 7