

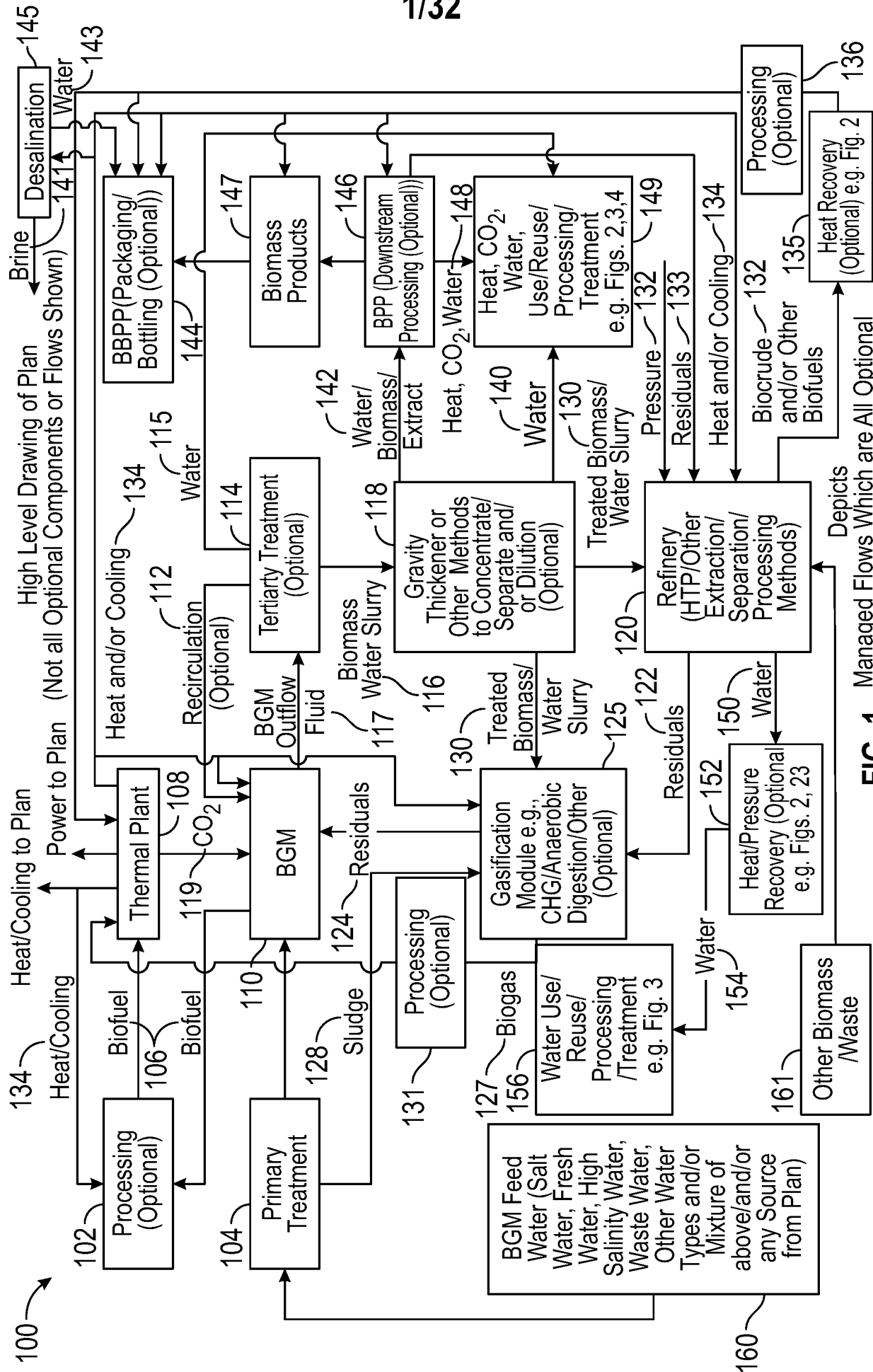
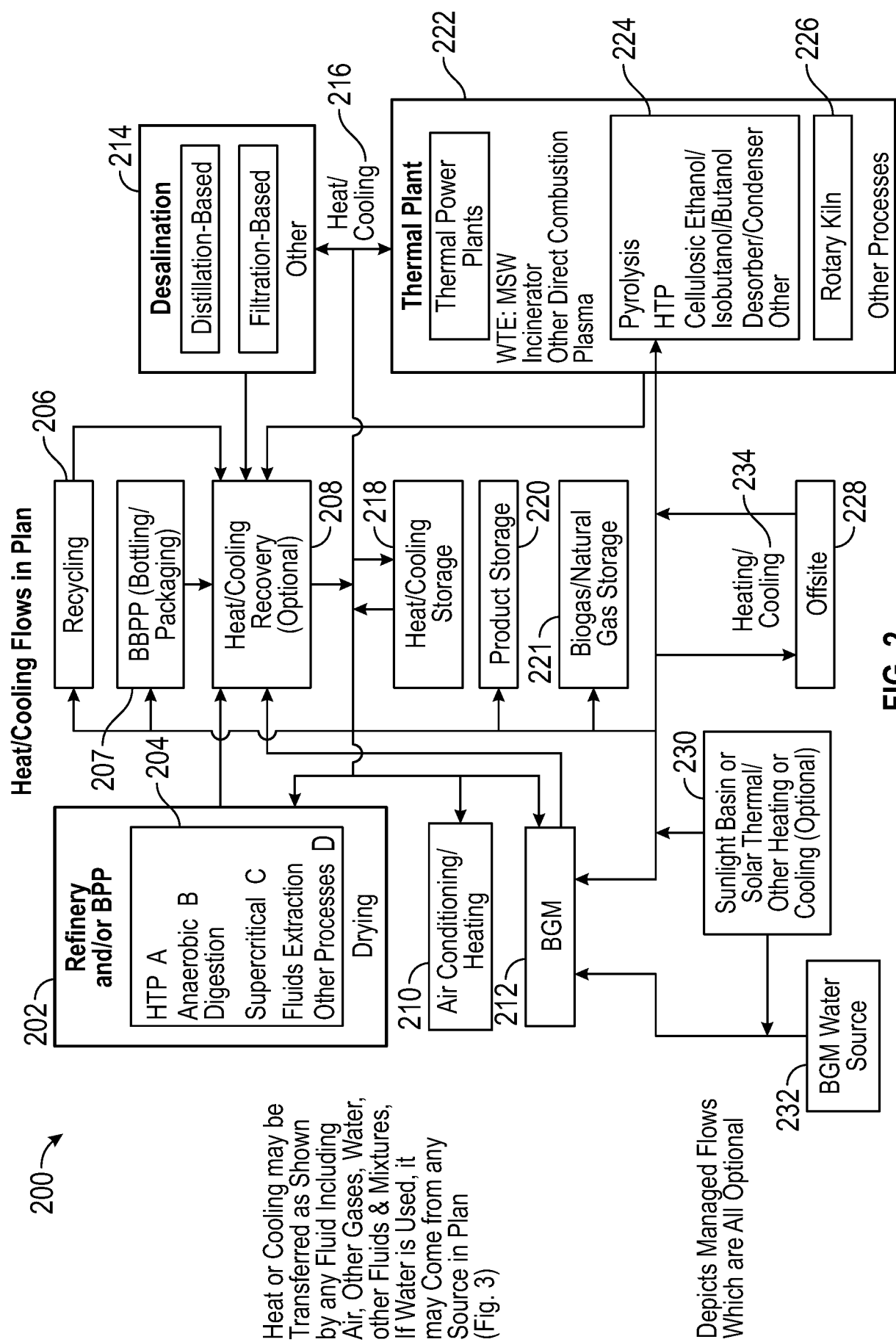


FIG. 1



3/32

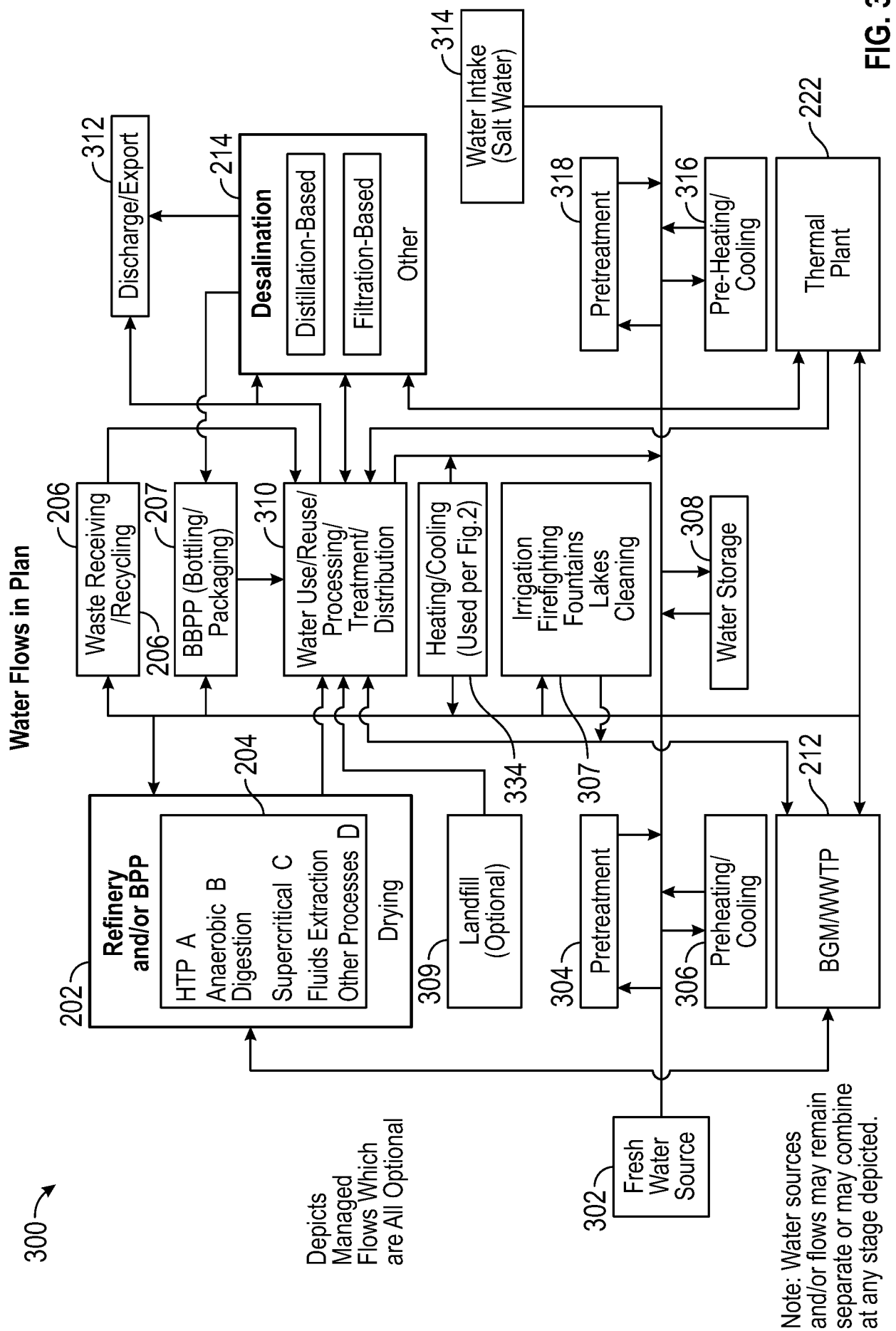


FIG. 3

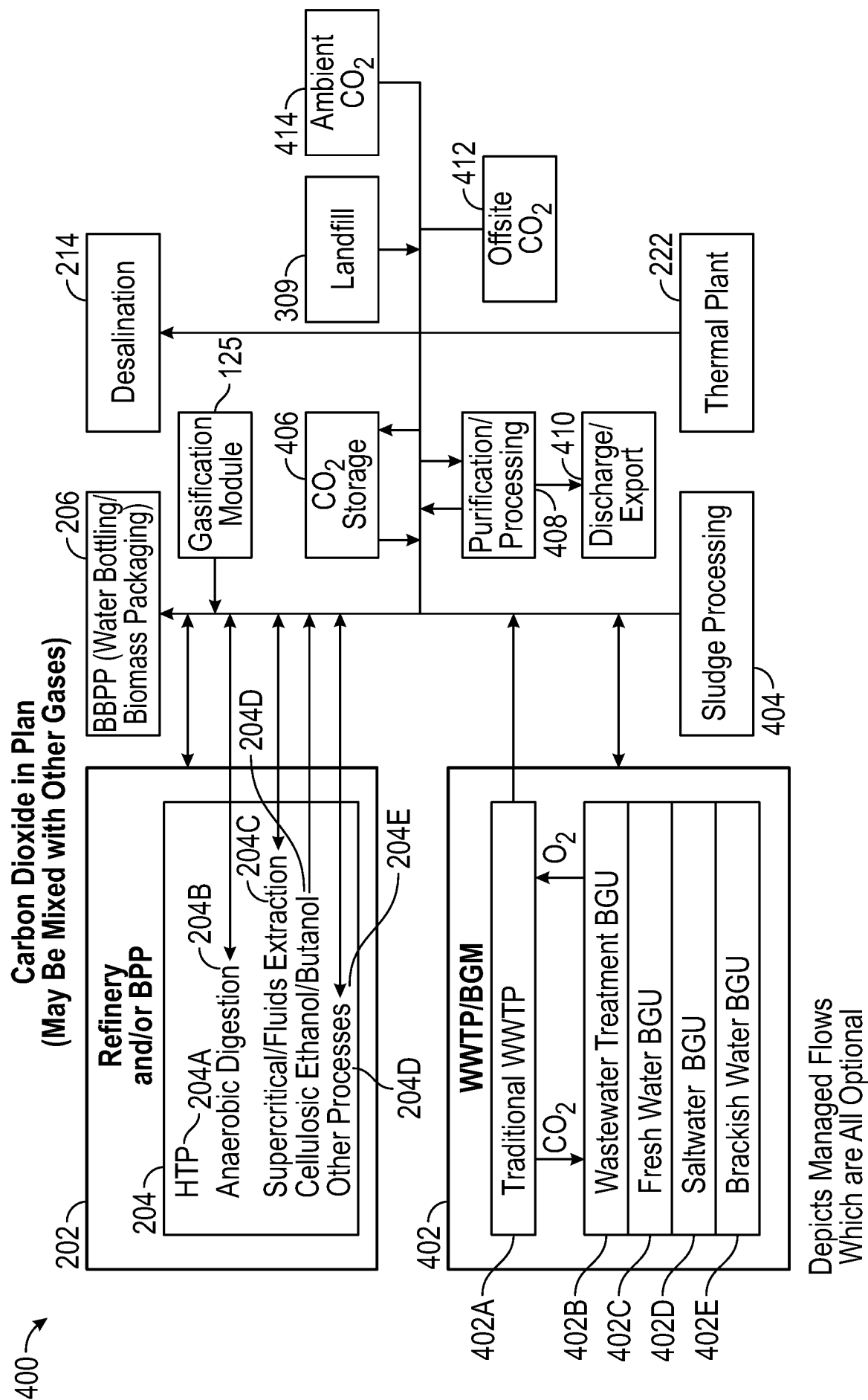


FIG. 4

5/32

500

BGM Example Configurations

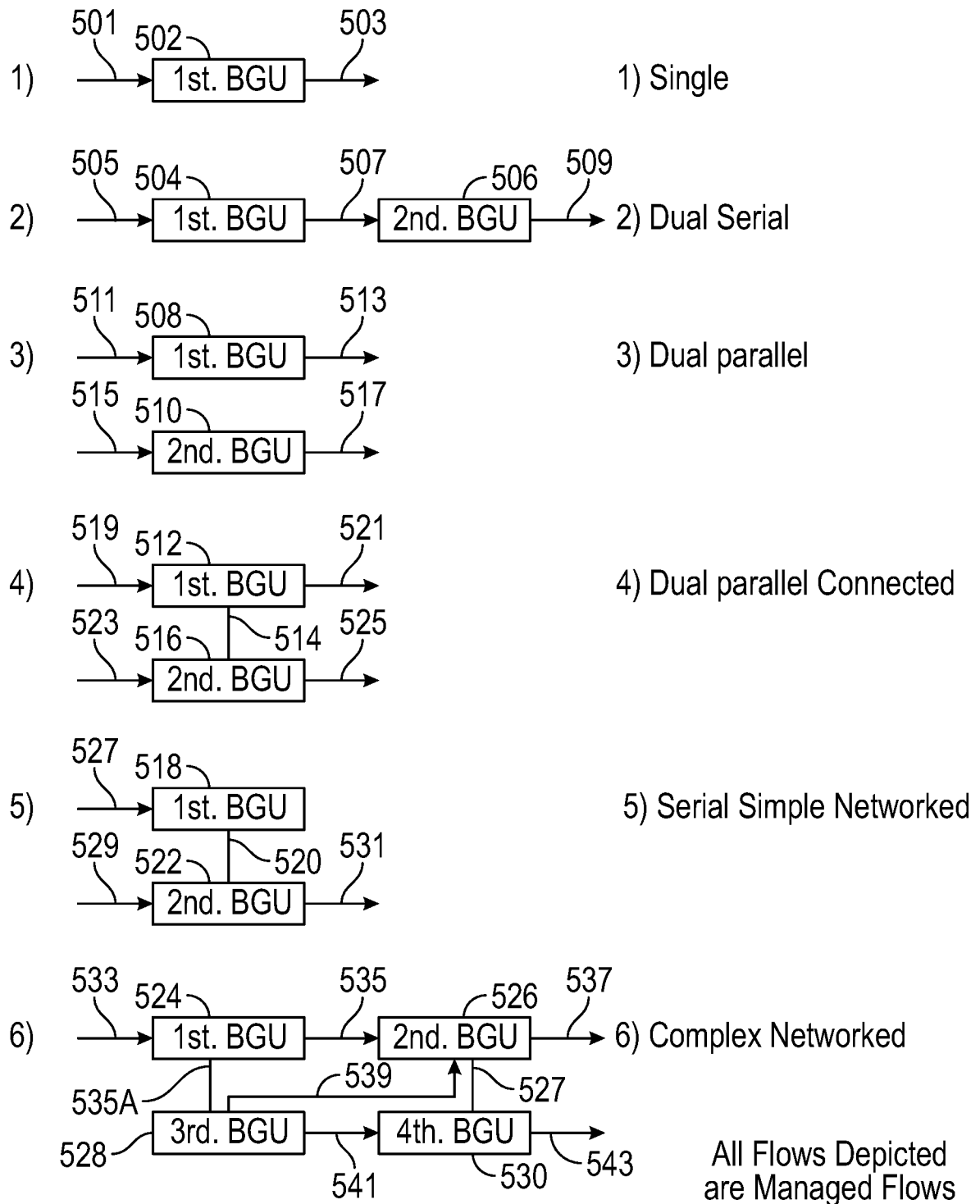
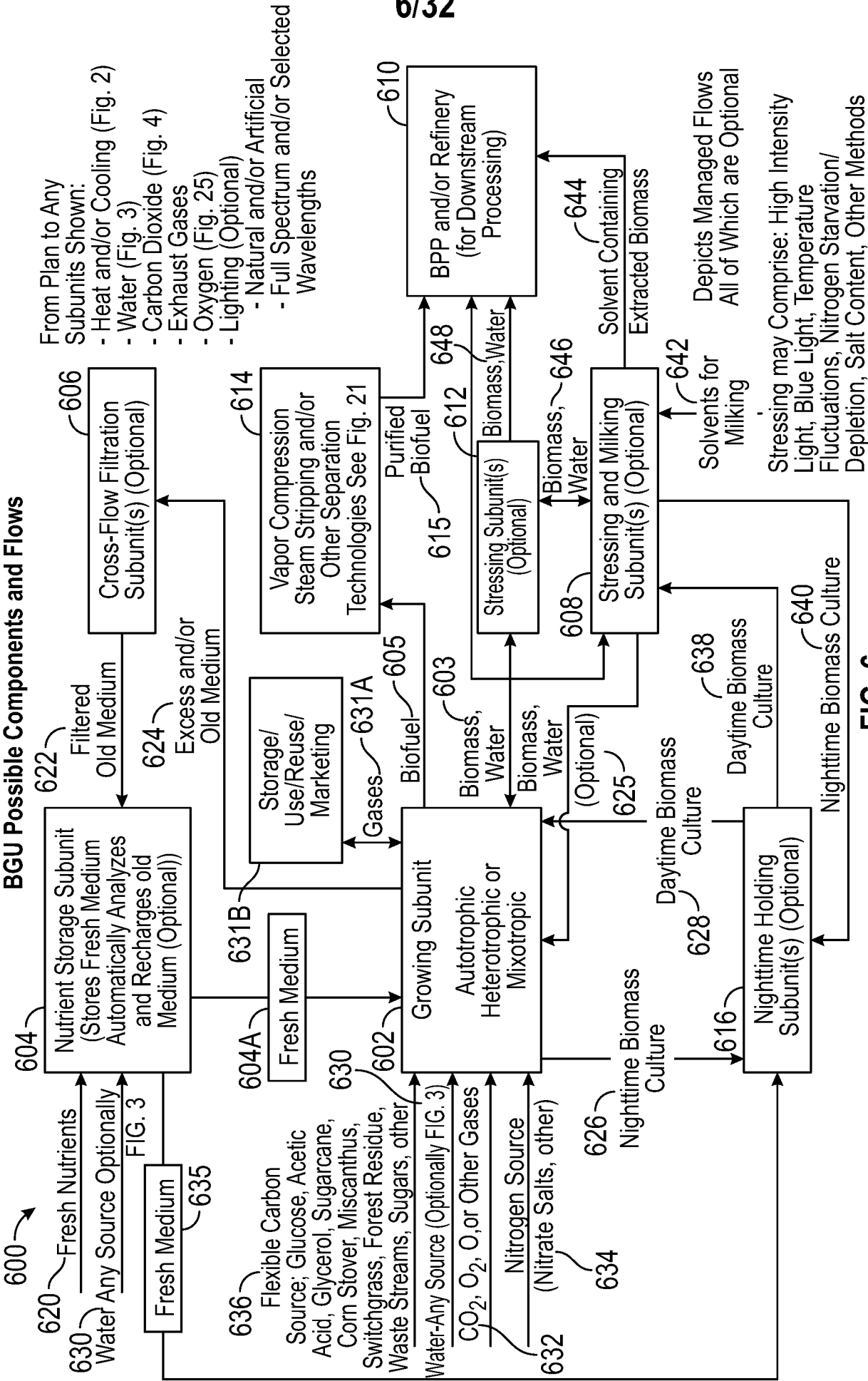


FIG. 5



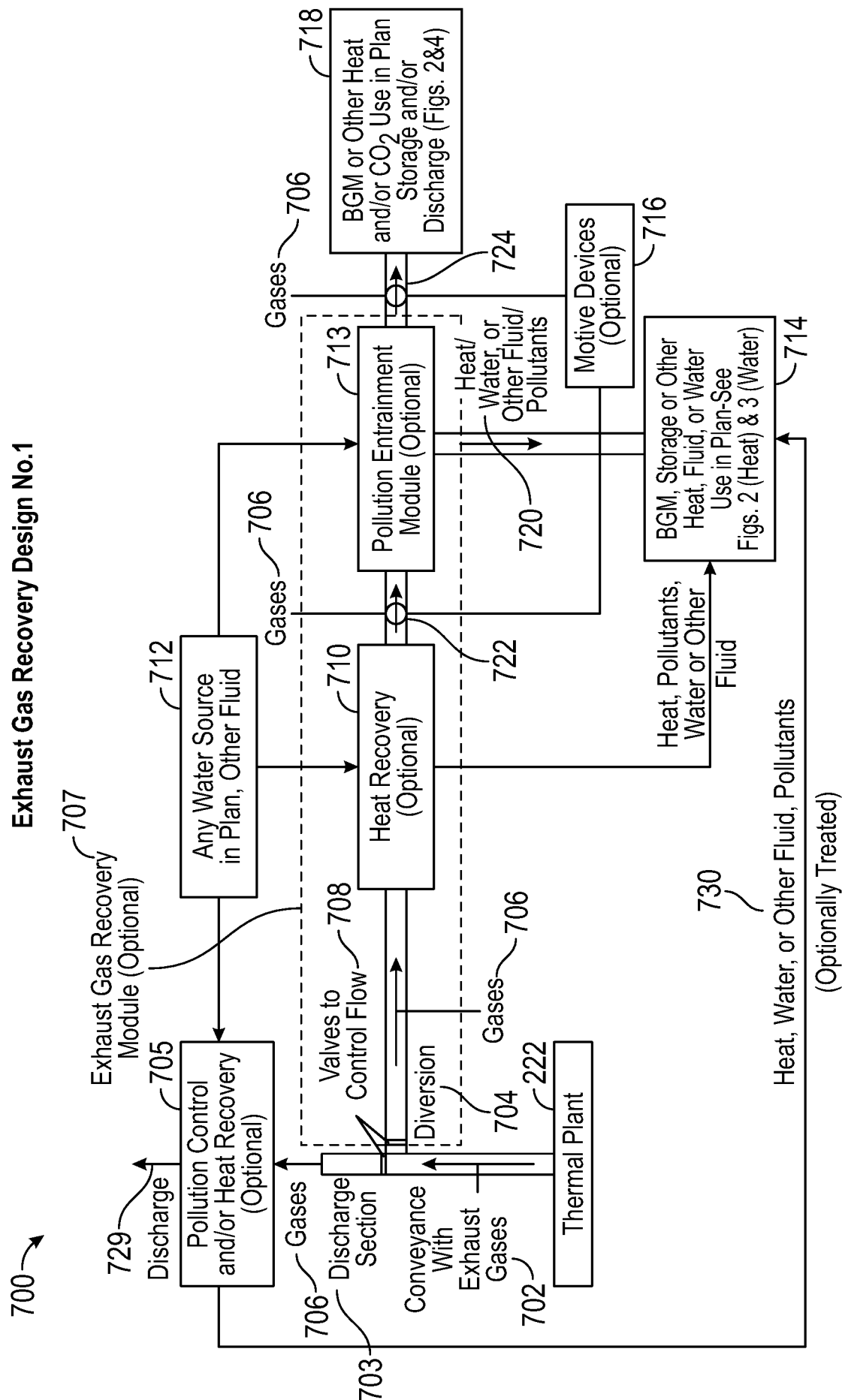
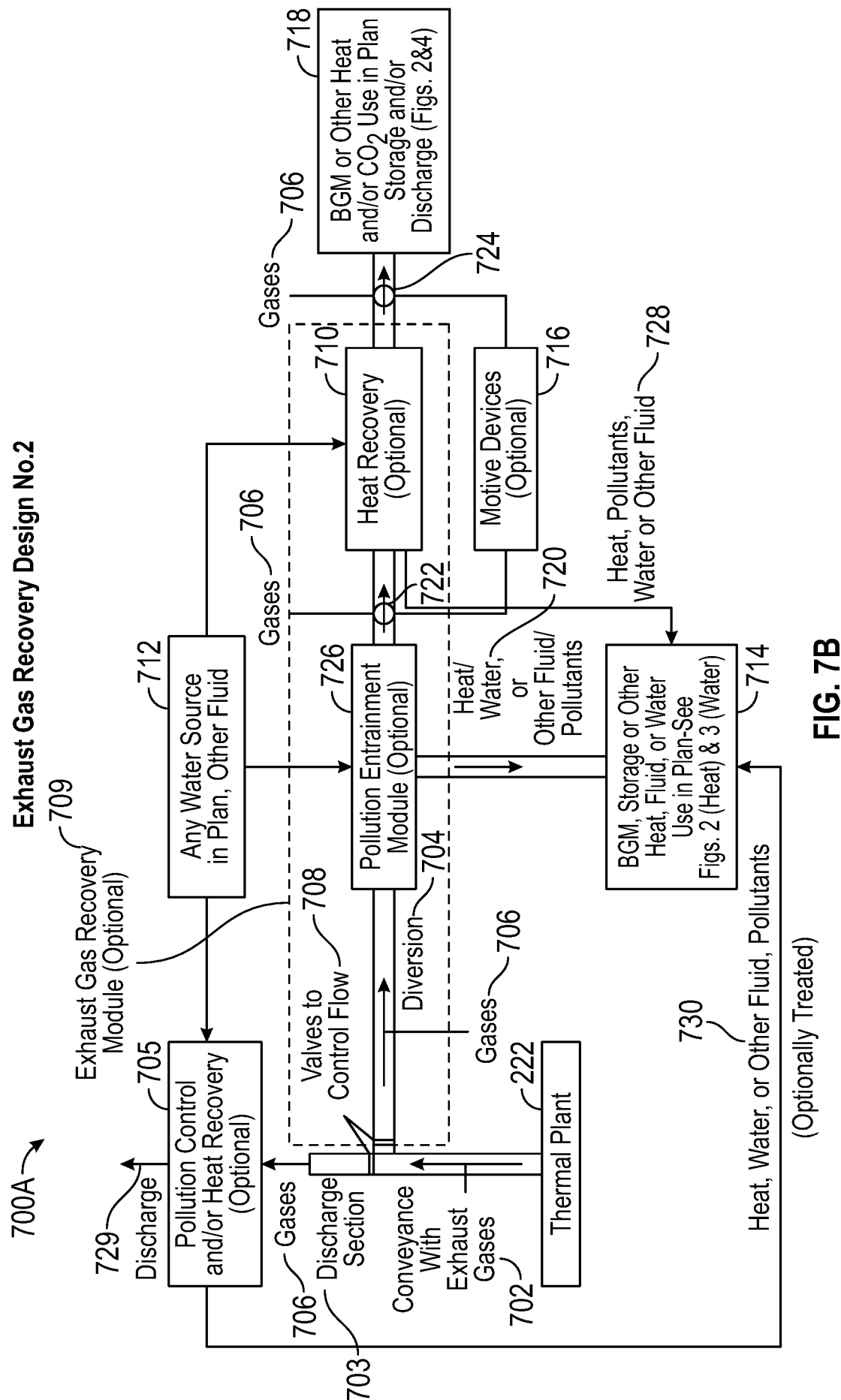


FIG. 7A



9/32

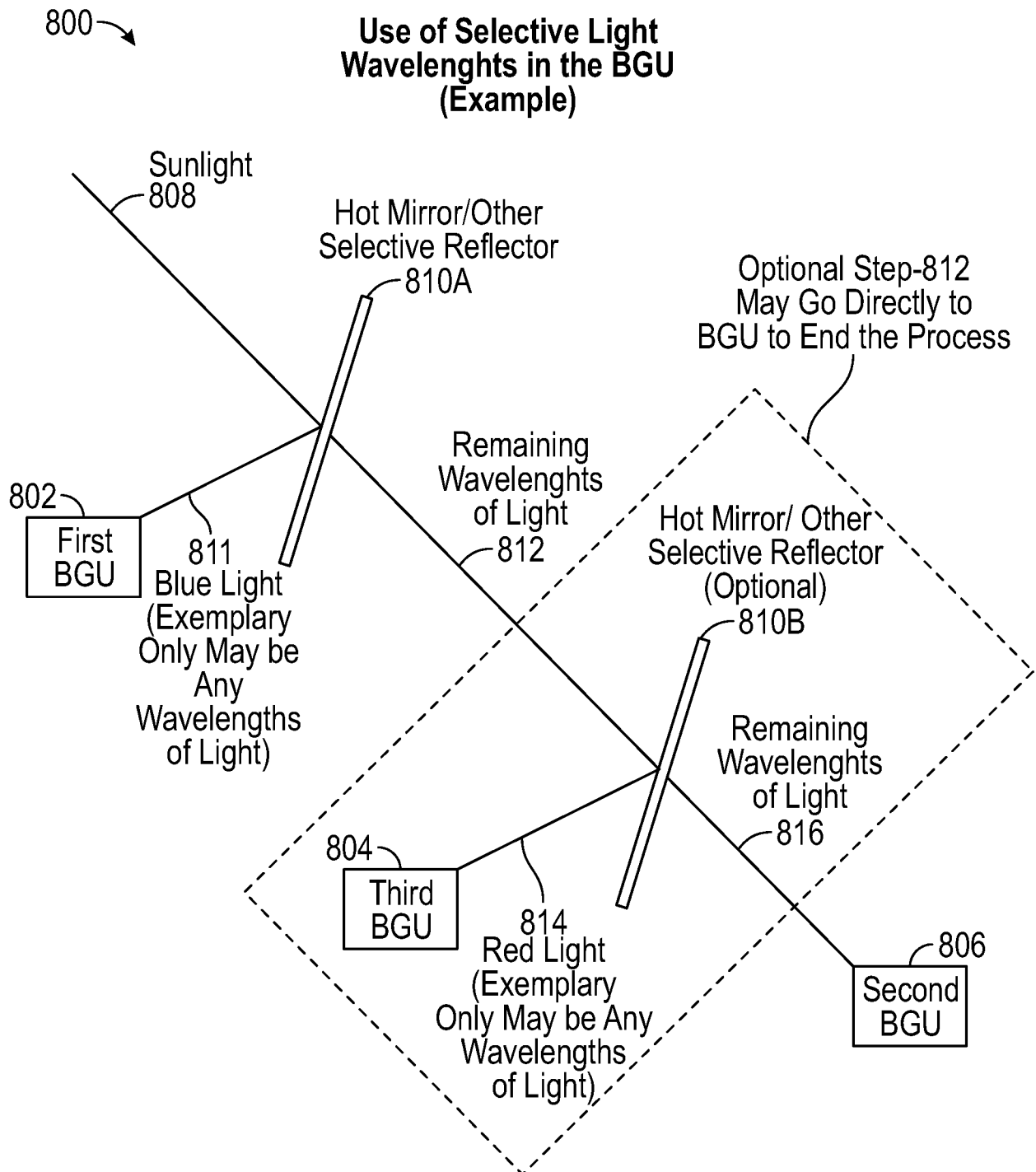


FIG. 8

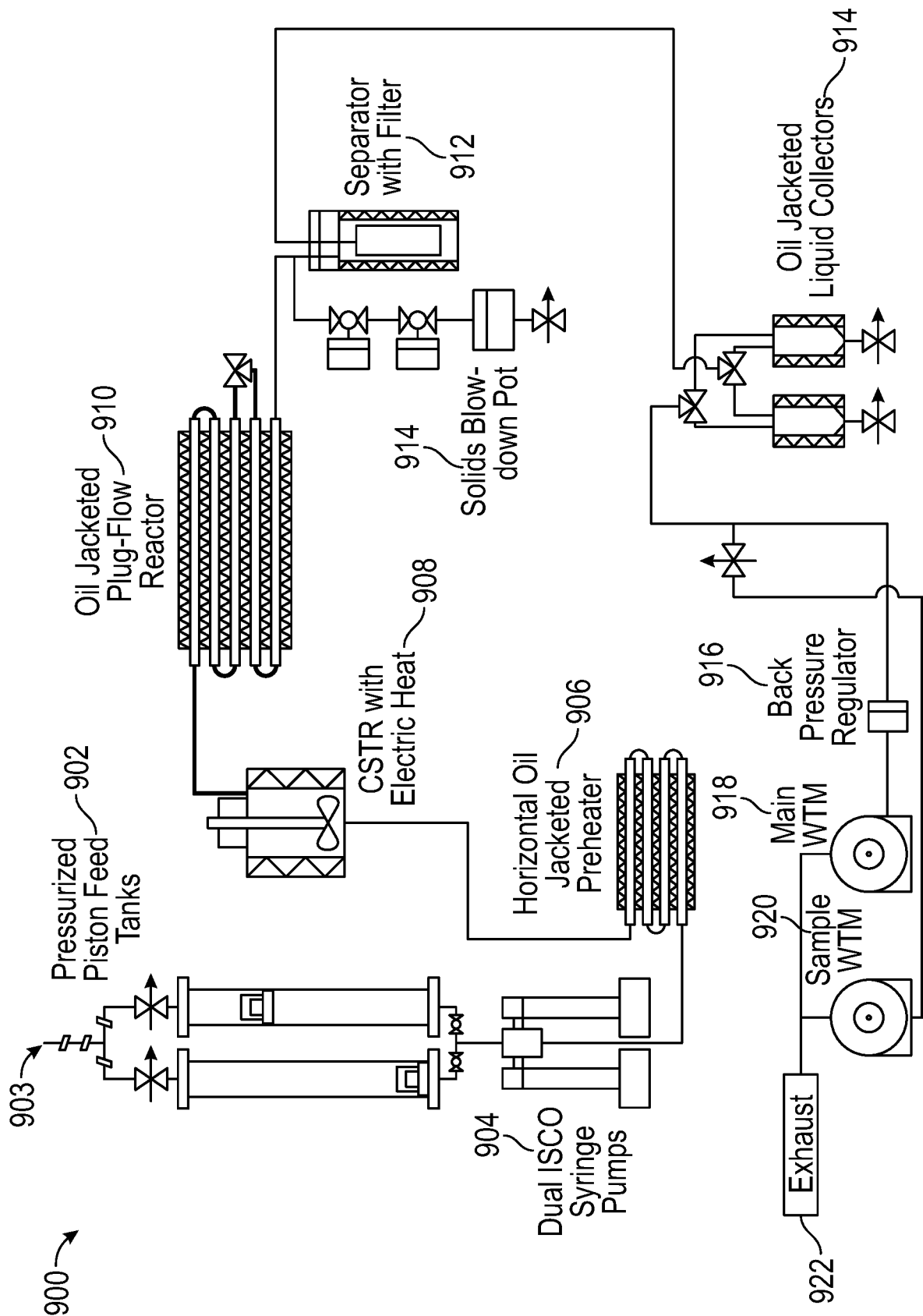


FIG. 9

11/32

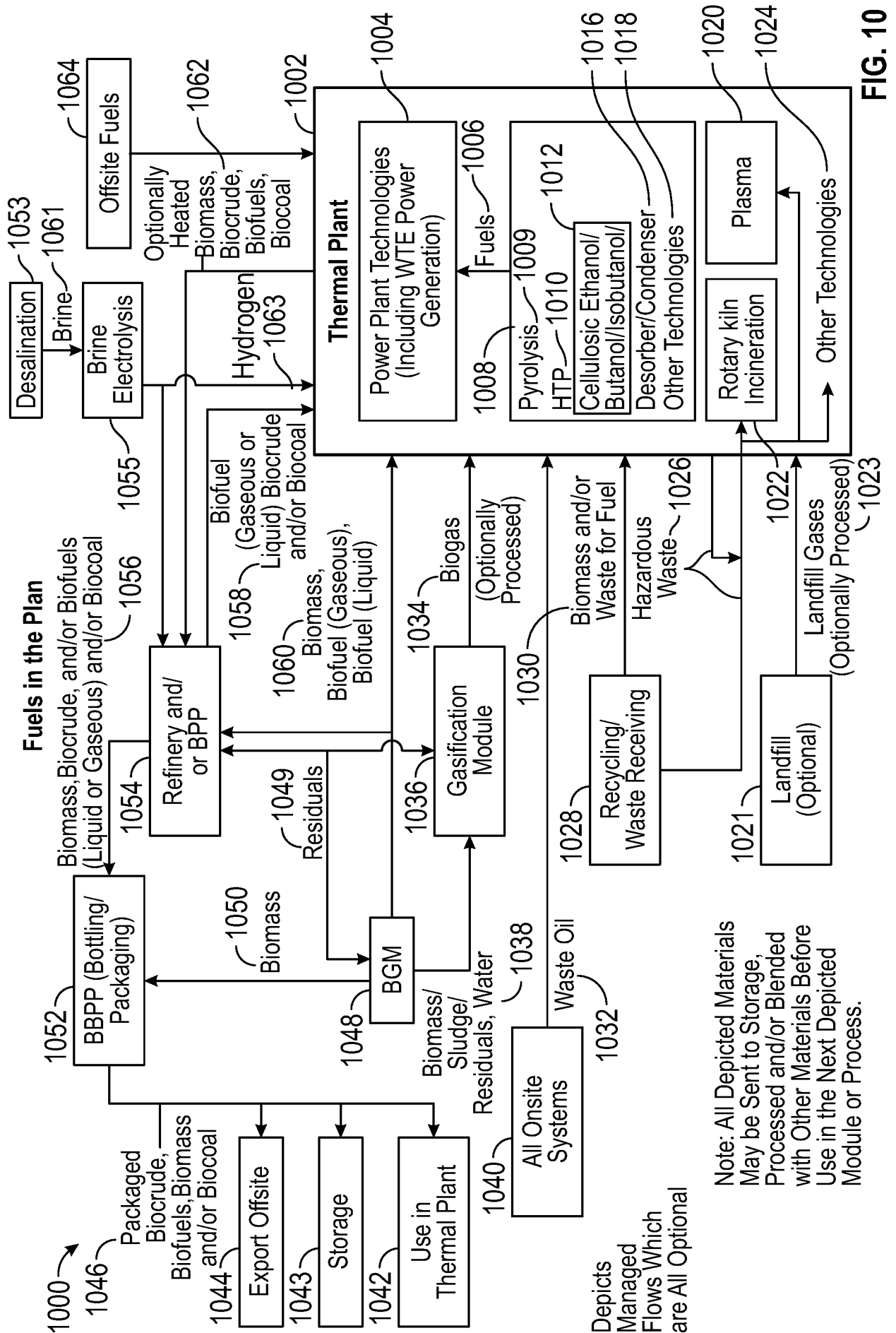
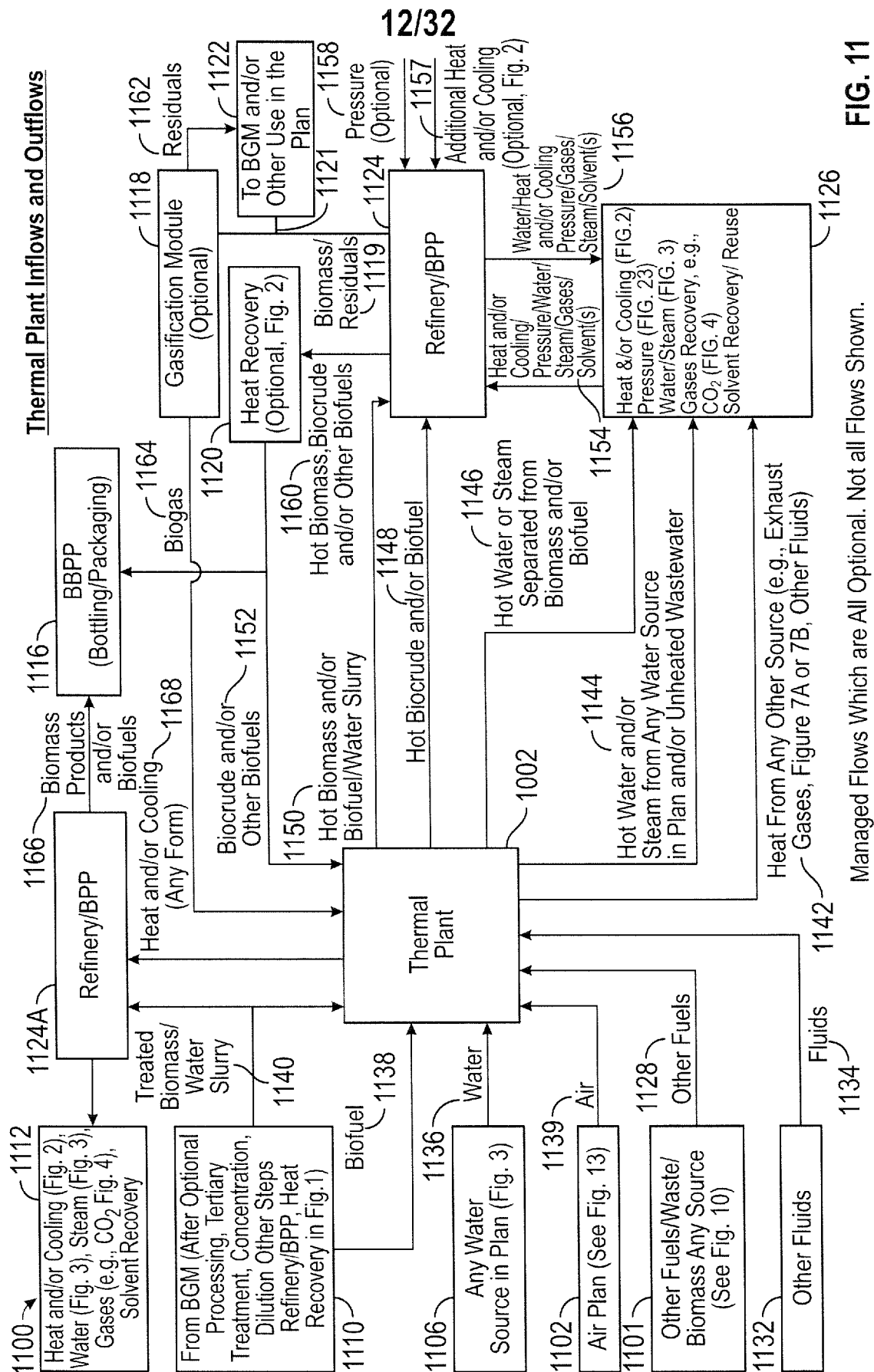


FIG. 10



13/32

Examples of How a Heated Fluid may be Used to Transfer Heat to the Plan or Cooling May be Substituted for Heat in Figs. 12B, 12C and 12D

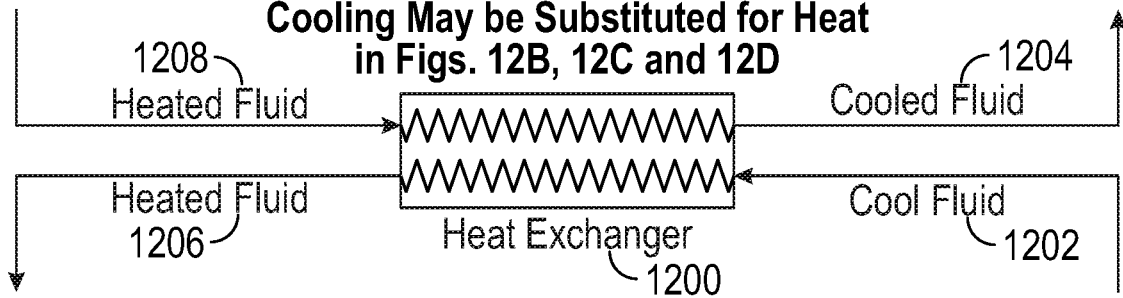


FIG. 12A

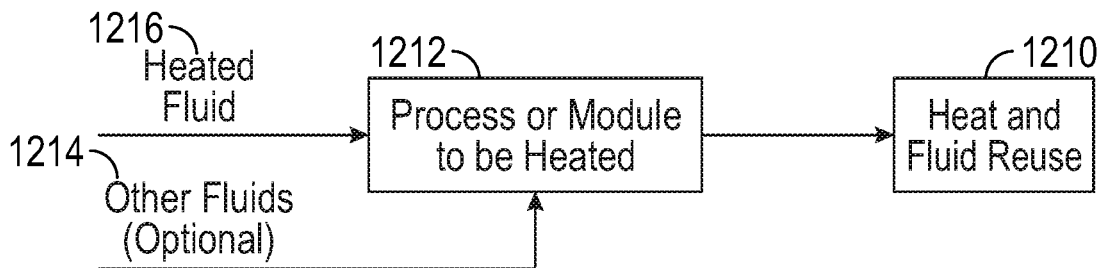


FIG. 12B

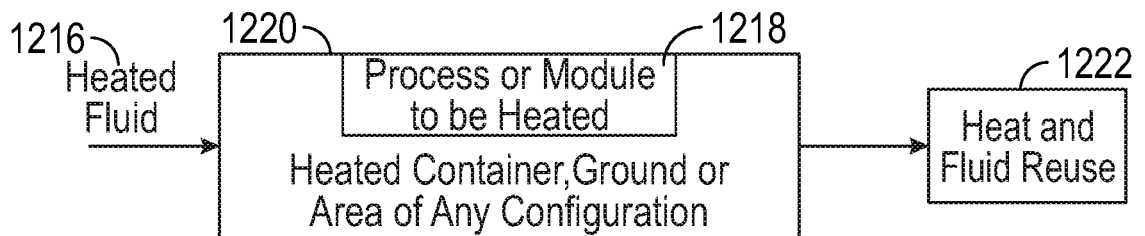


FIG. 12C

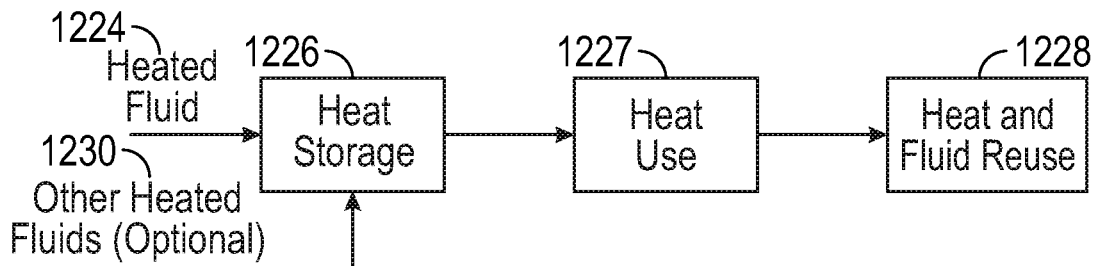


FIG. 12D

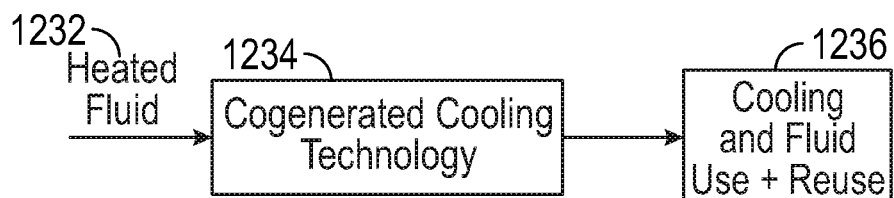


FIG. 12E

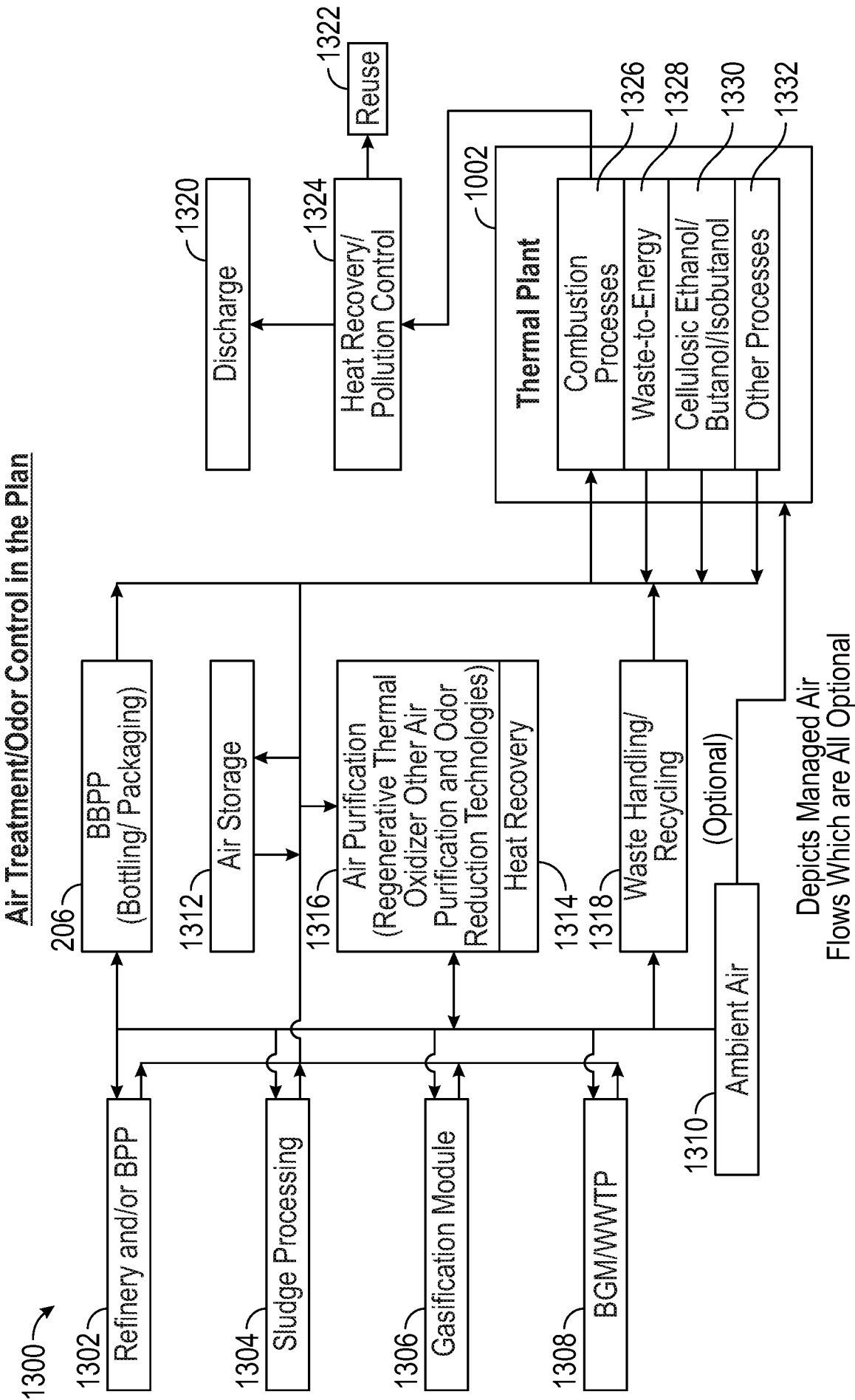


FIG. 13

15/32

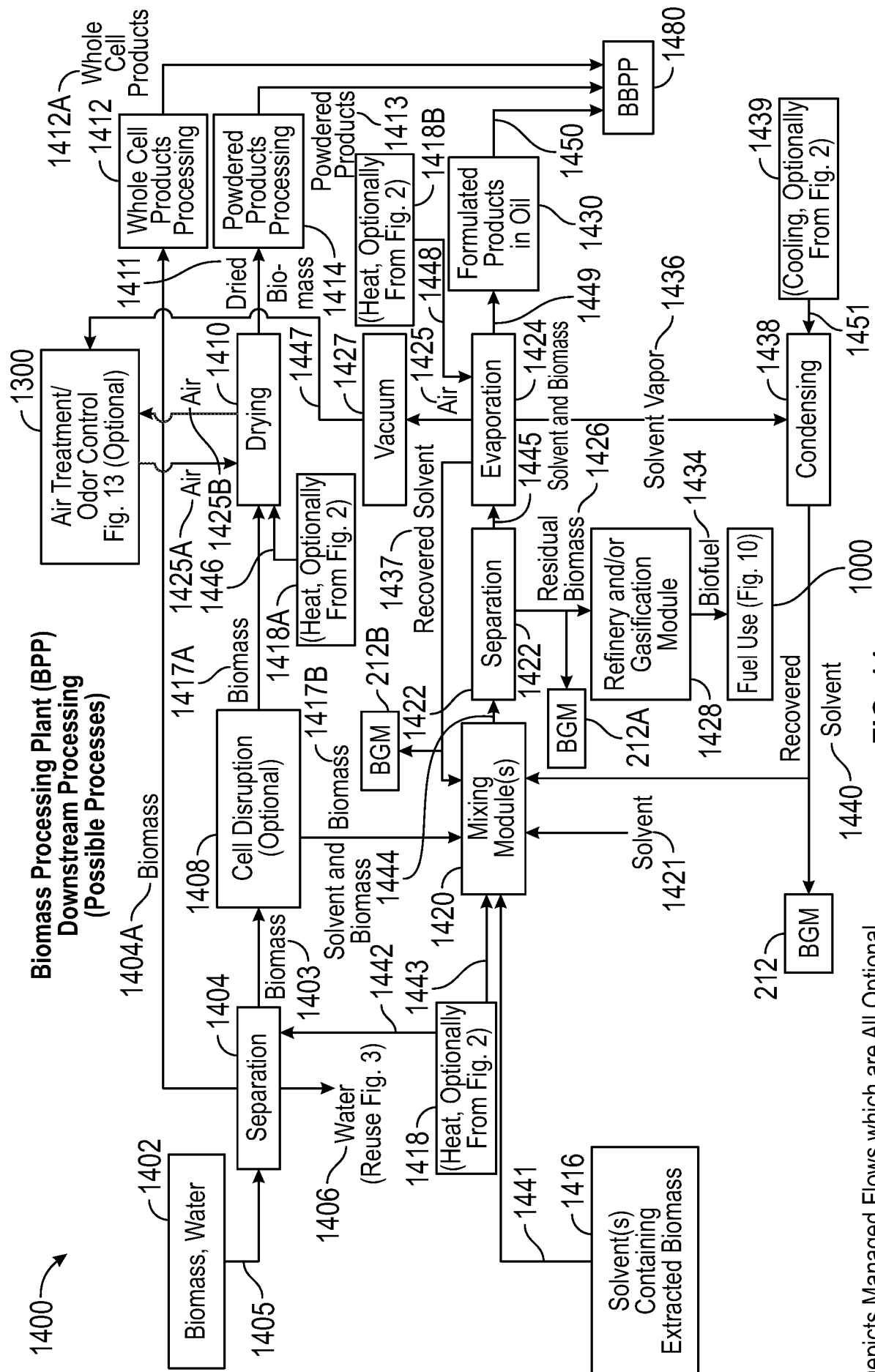


FIG. 14
Depicts Managed Flows which are All Optional.

Example Heat Transfer Modules
Module #1

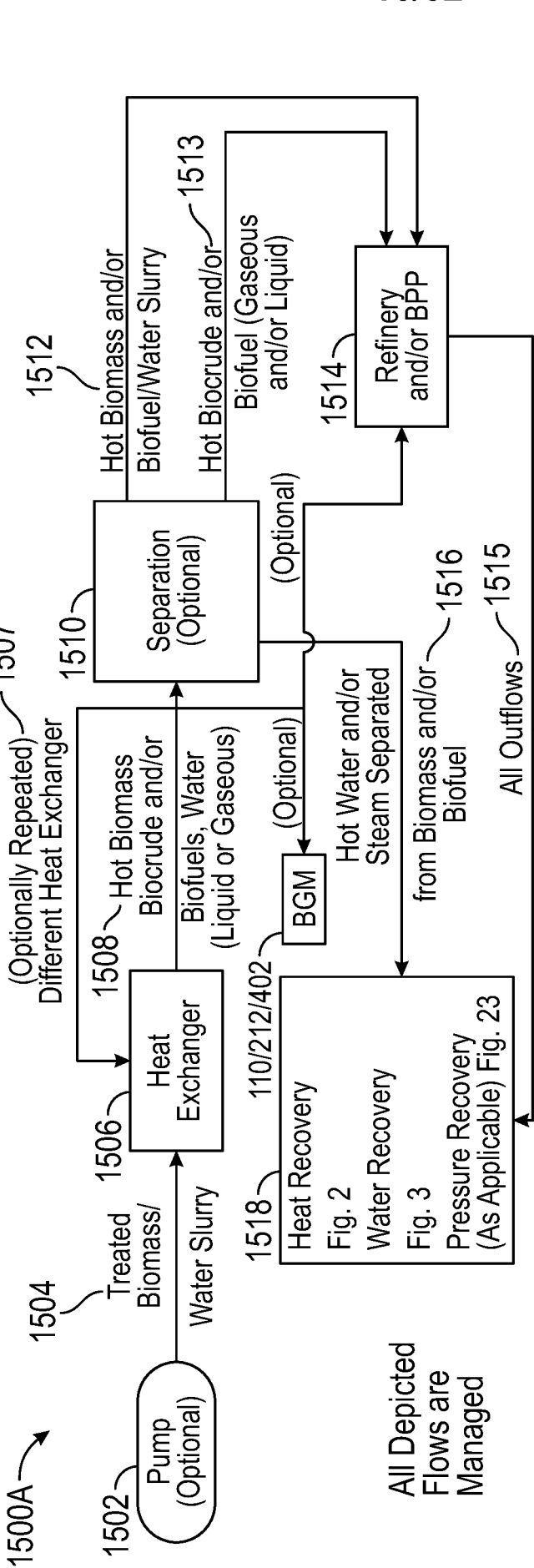


FIG. 15A

Module #2

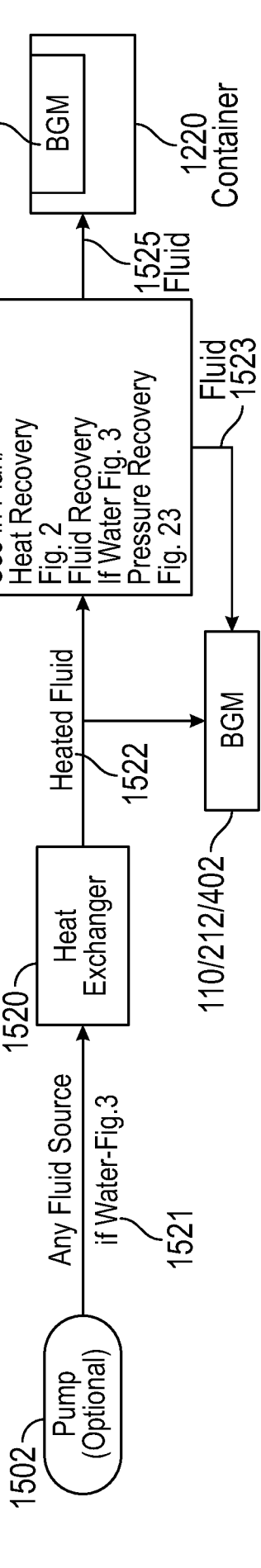


FIG. 15B

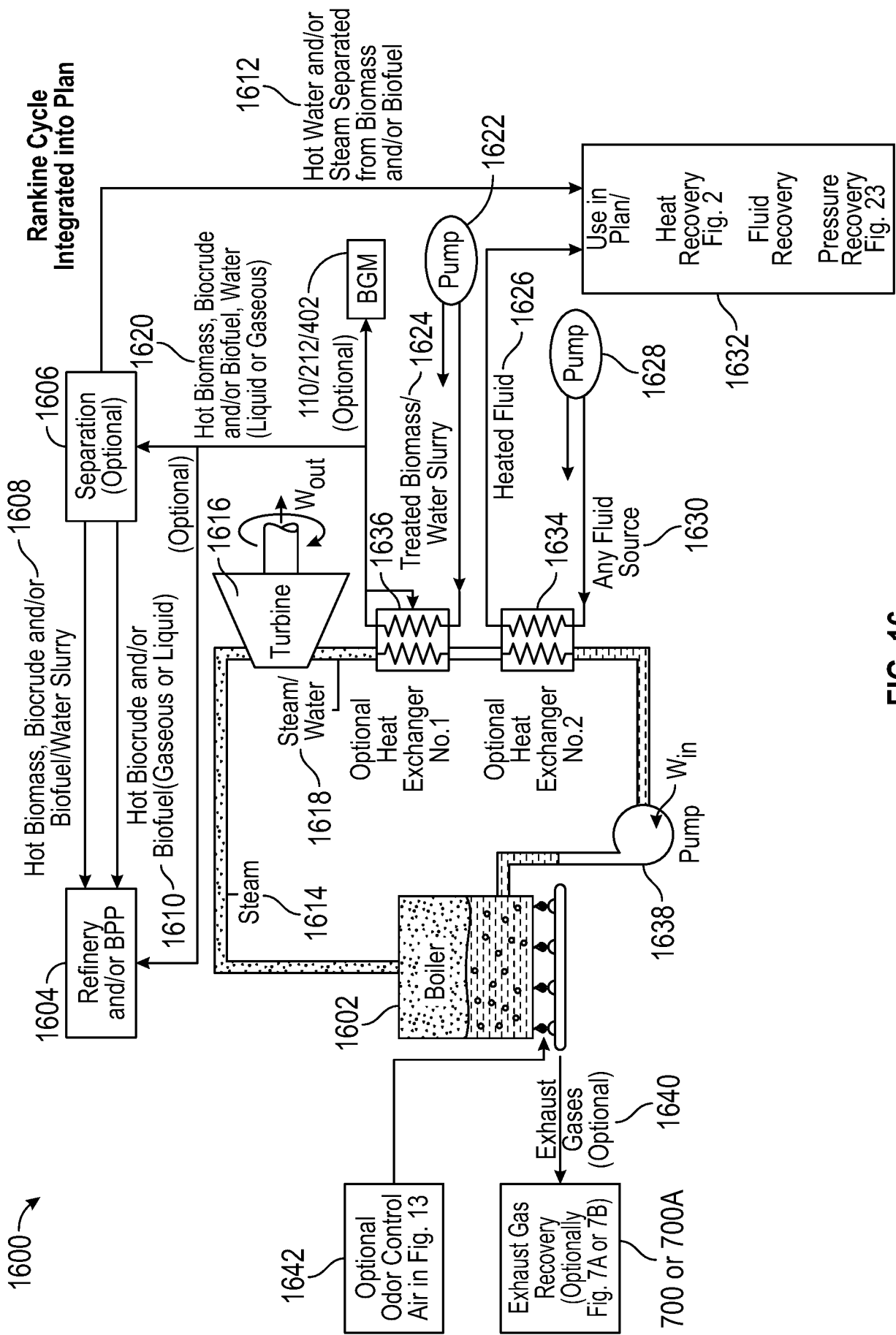


FIG. 16

18/32

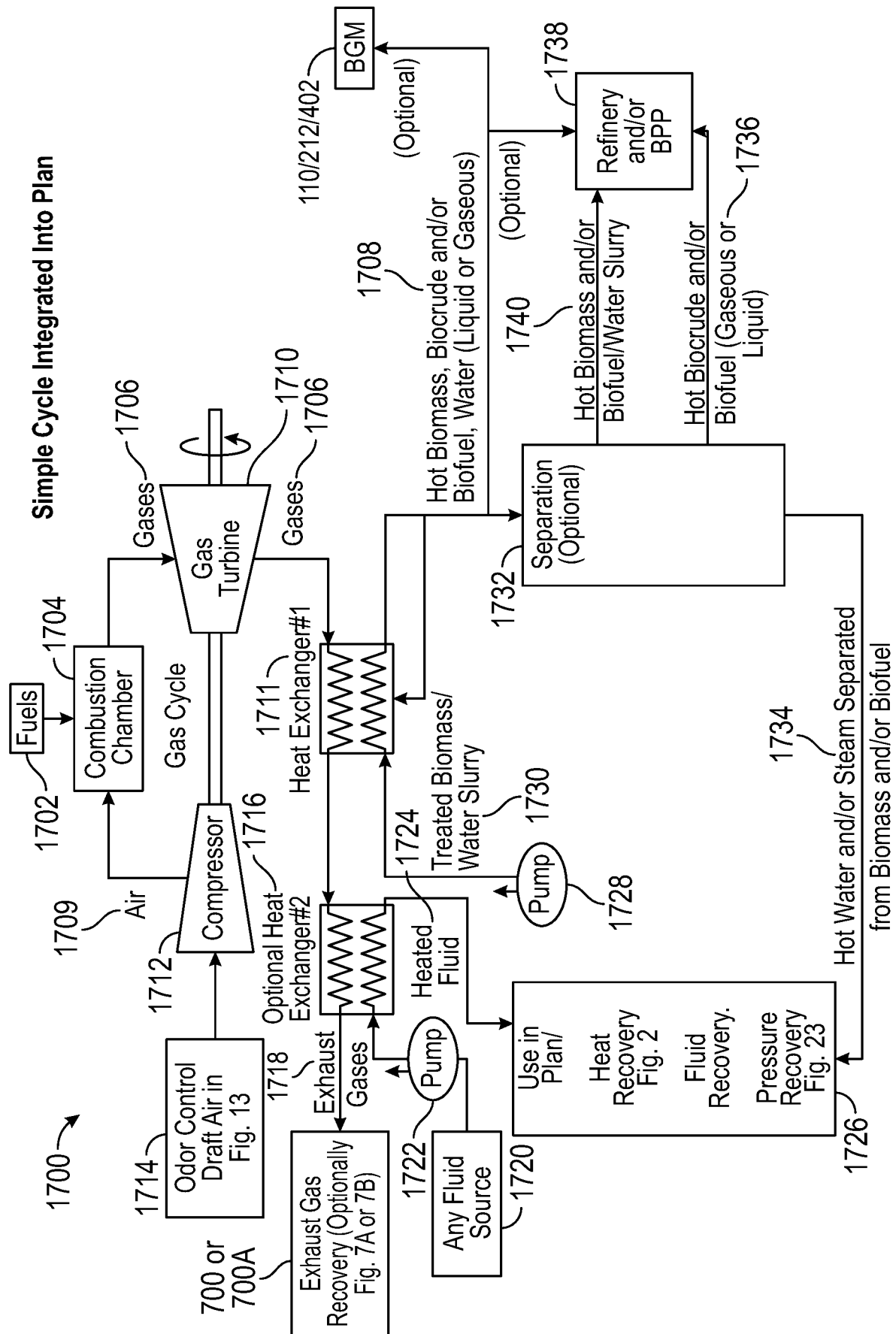
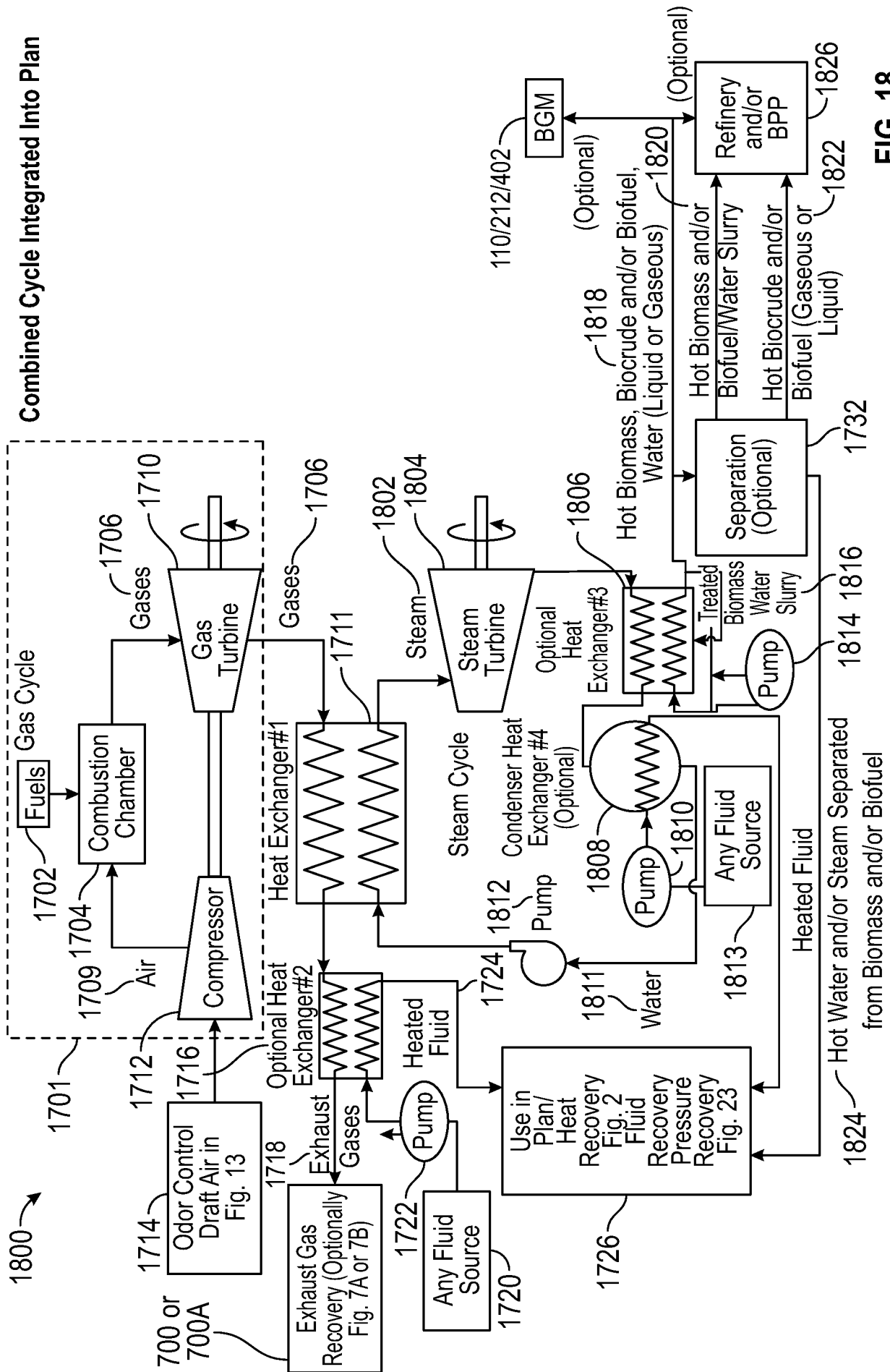


FIG. 17

Combined Cycle Integrated Into Plan



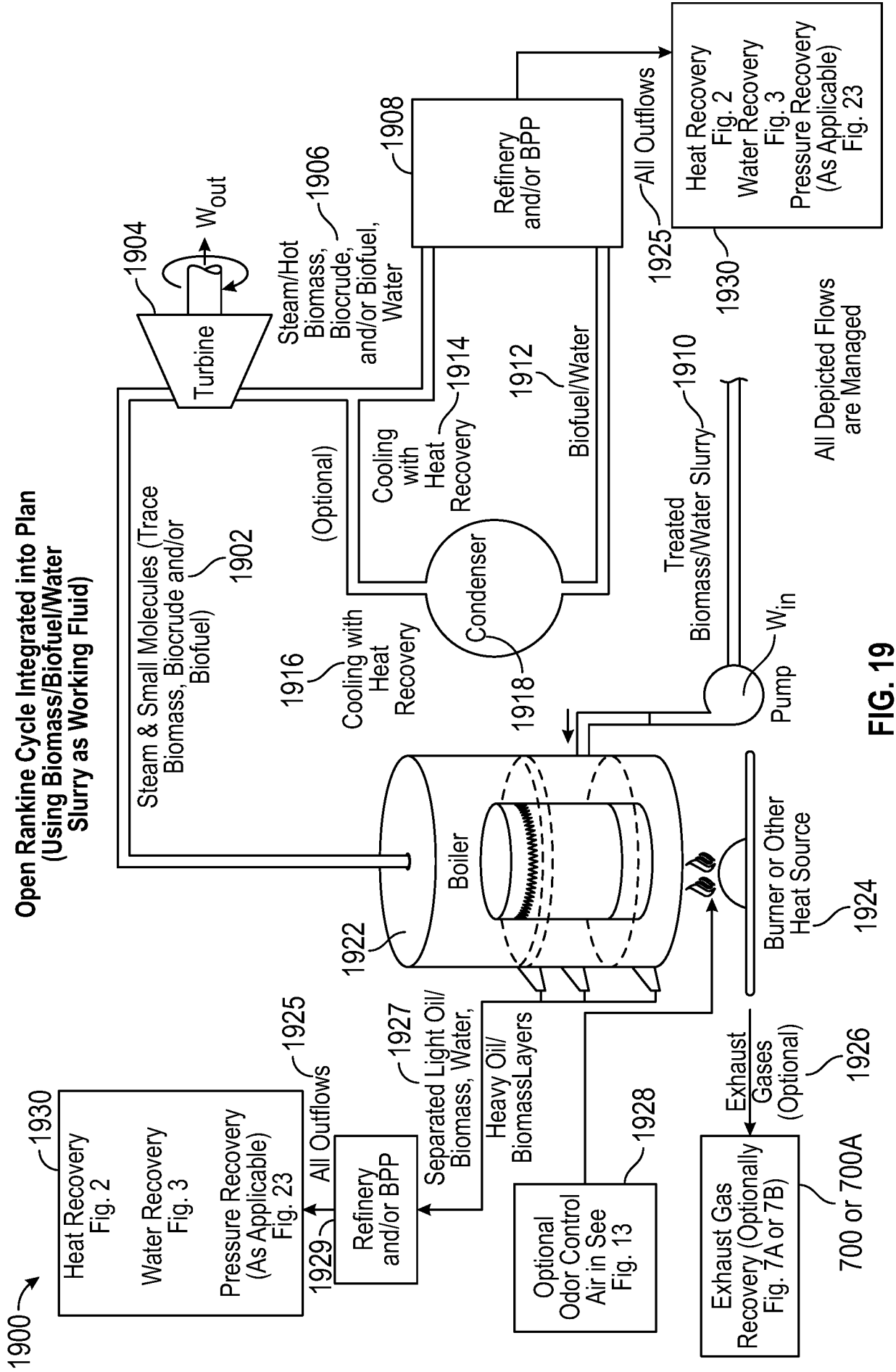


FIG. 19

21/32

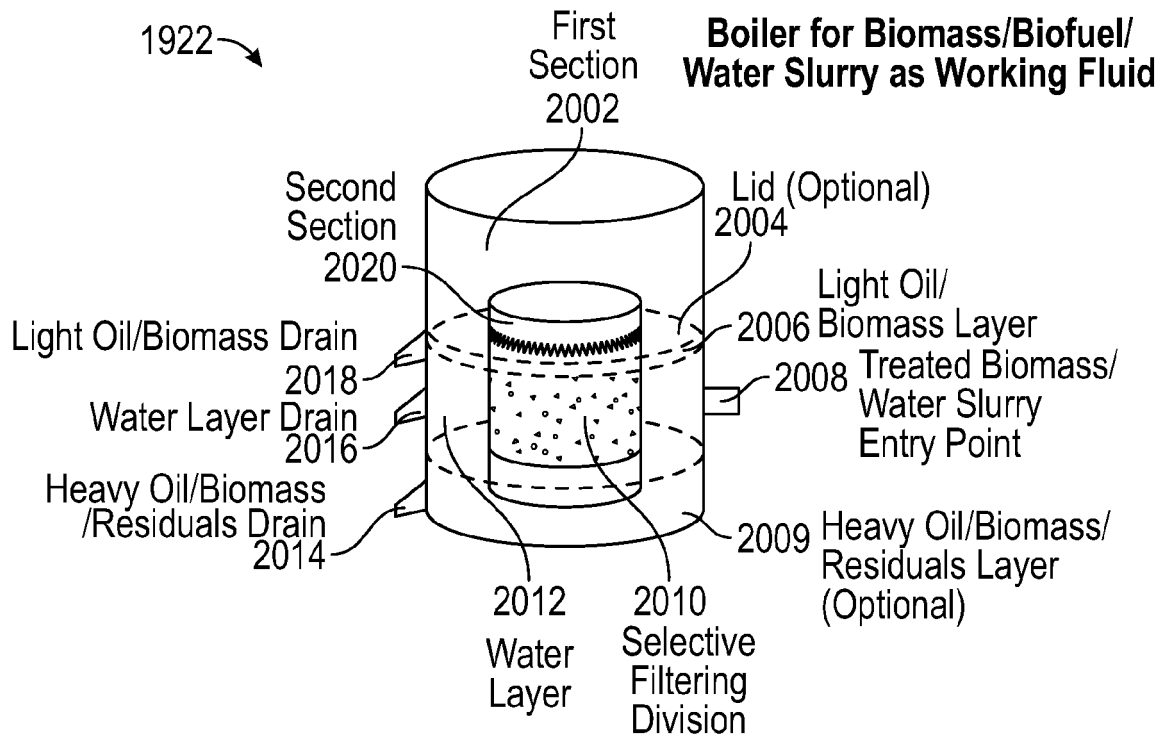


FIG. 20A

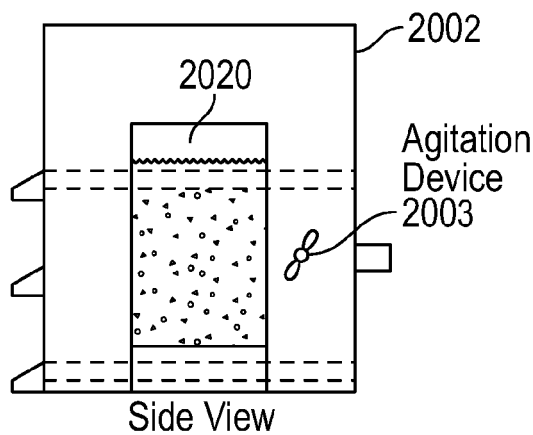


FIG. 20B

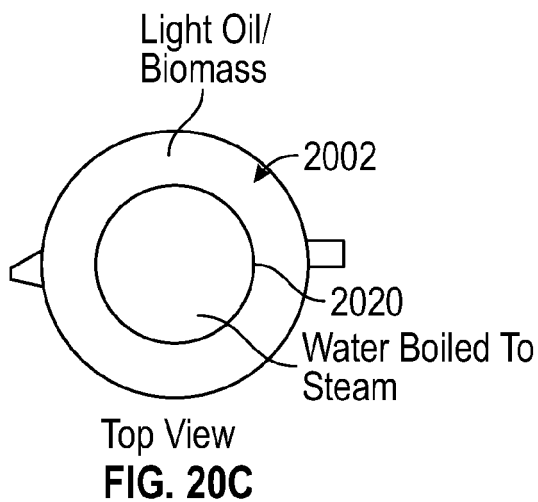


FIG. 20C

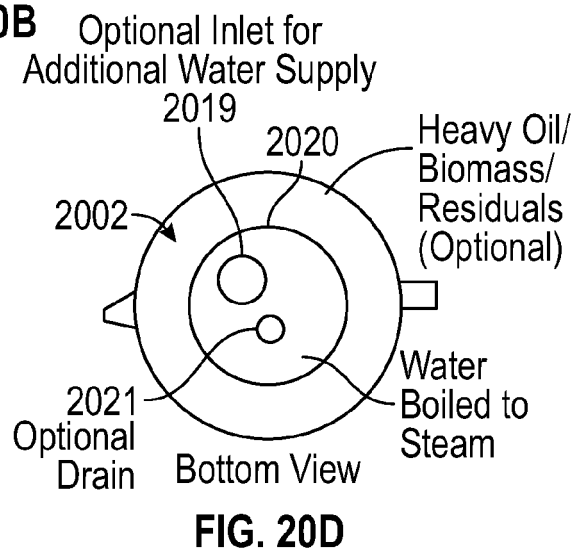


FIG. 20D

Vapor Compression Steam Stripping
Us 20120232315 A1

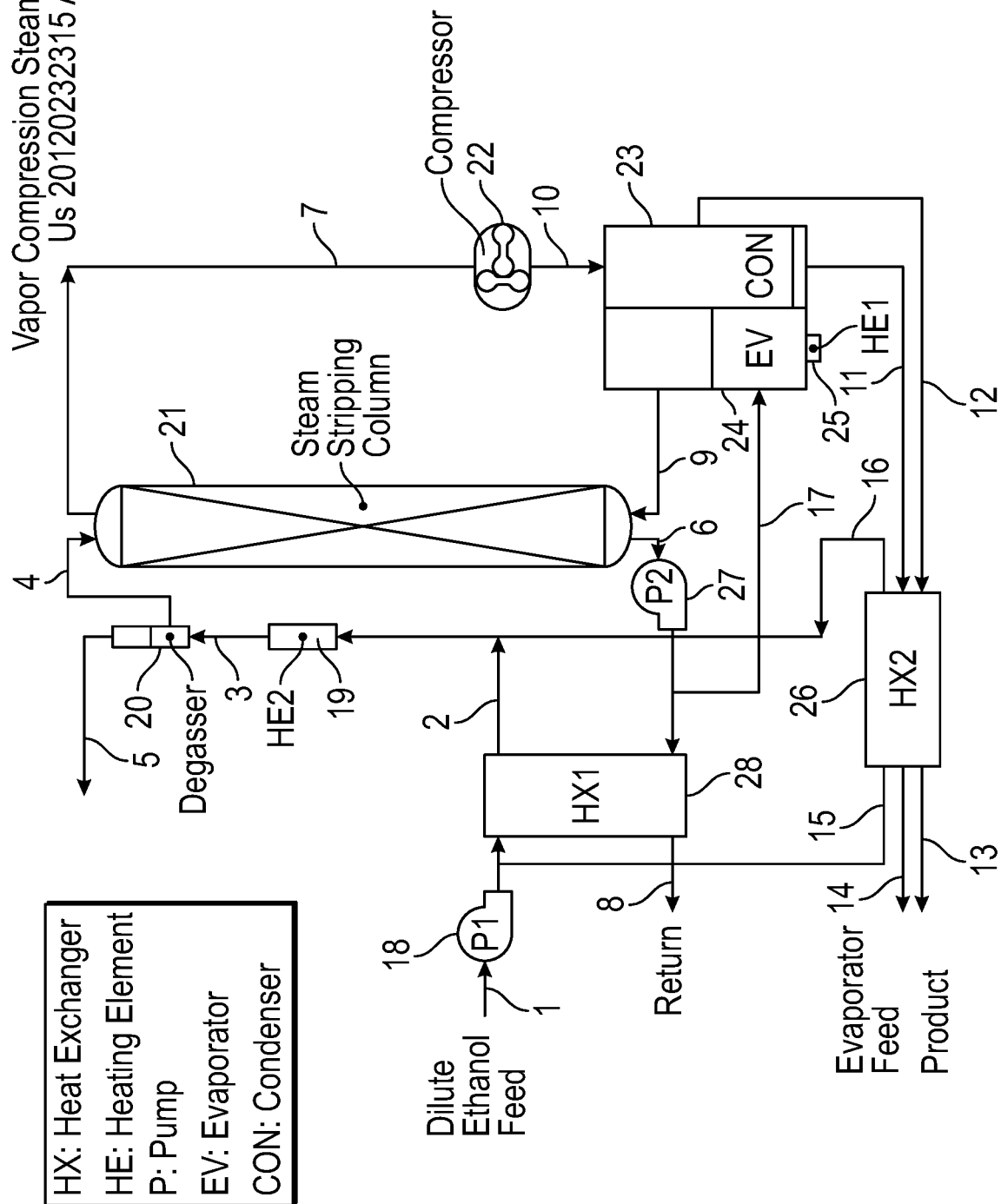


FIG. 21

2100 ↗

23/32

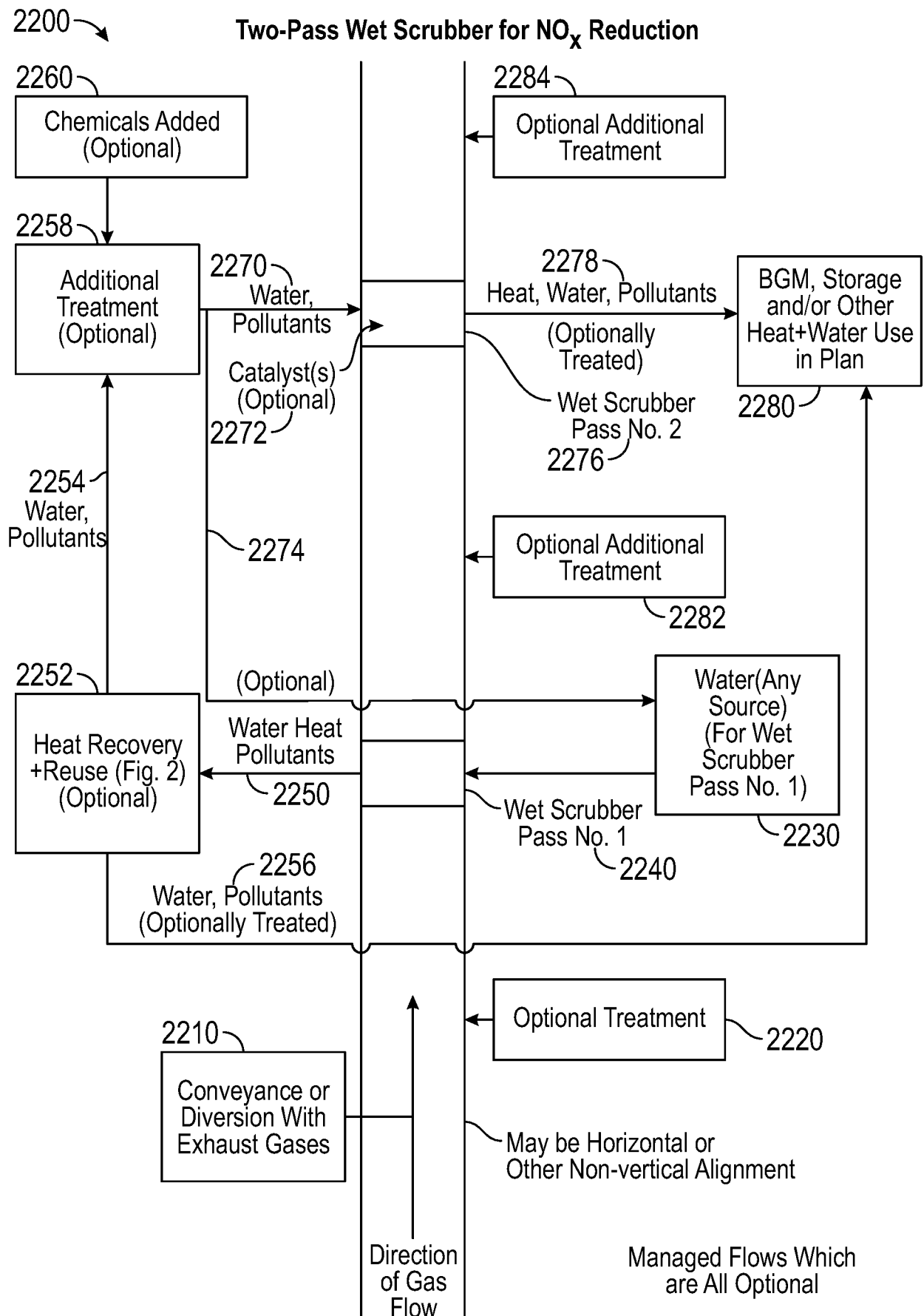


FIG. 22

24/32

2300

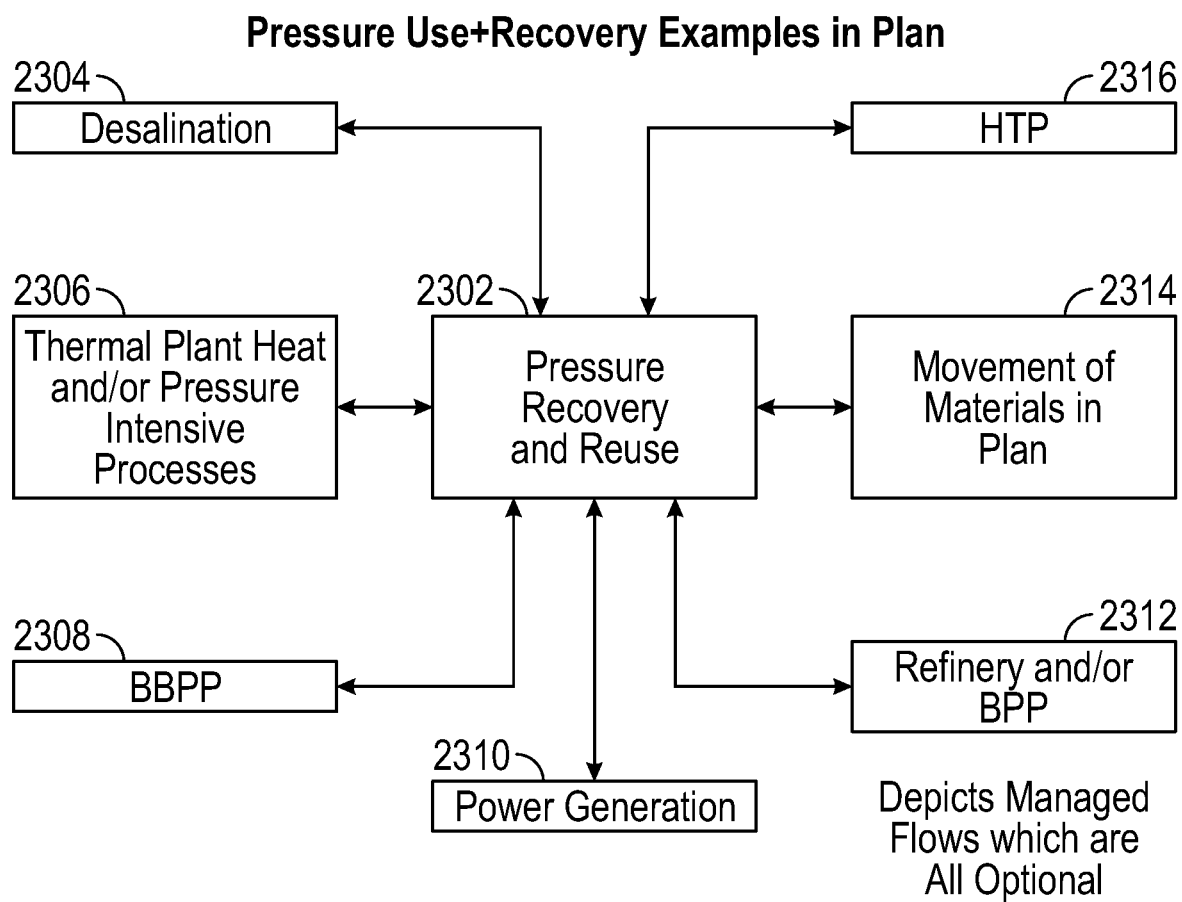
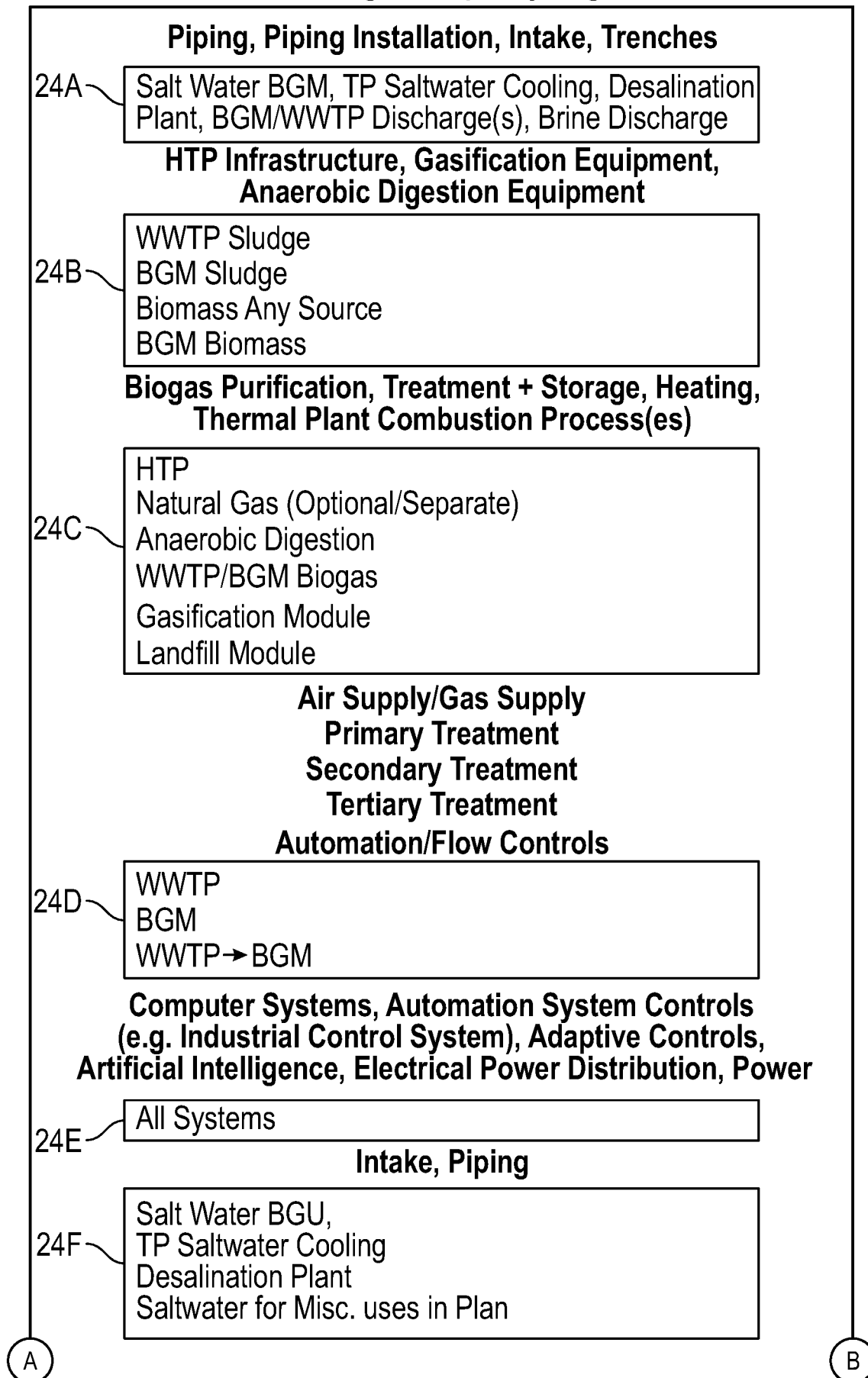


FIG. 23

25/32

Infrastructure Sharing, Example Synergies within Plan**FIG. 24**

26/32

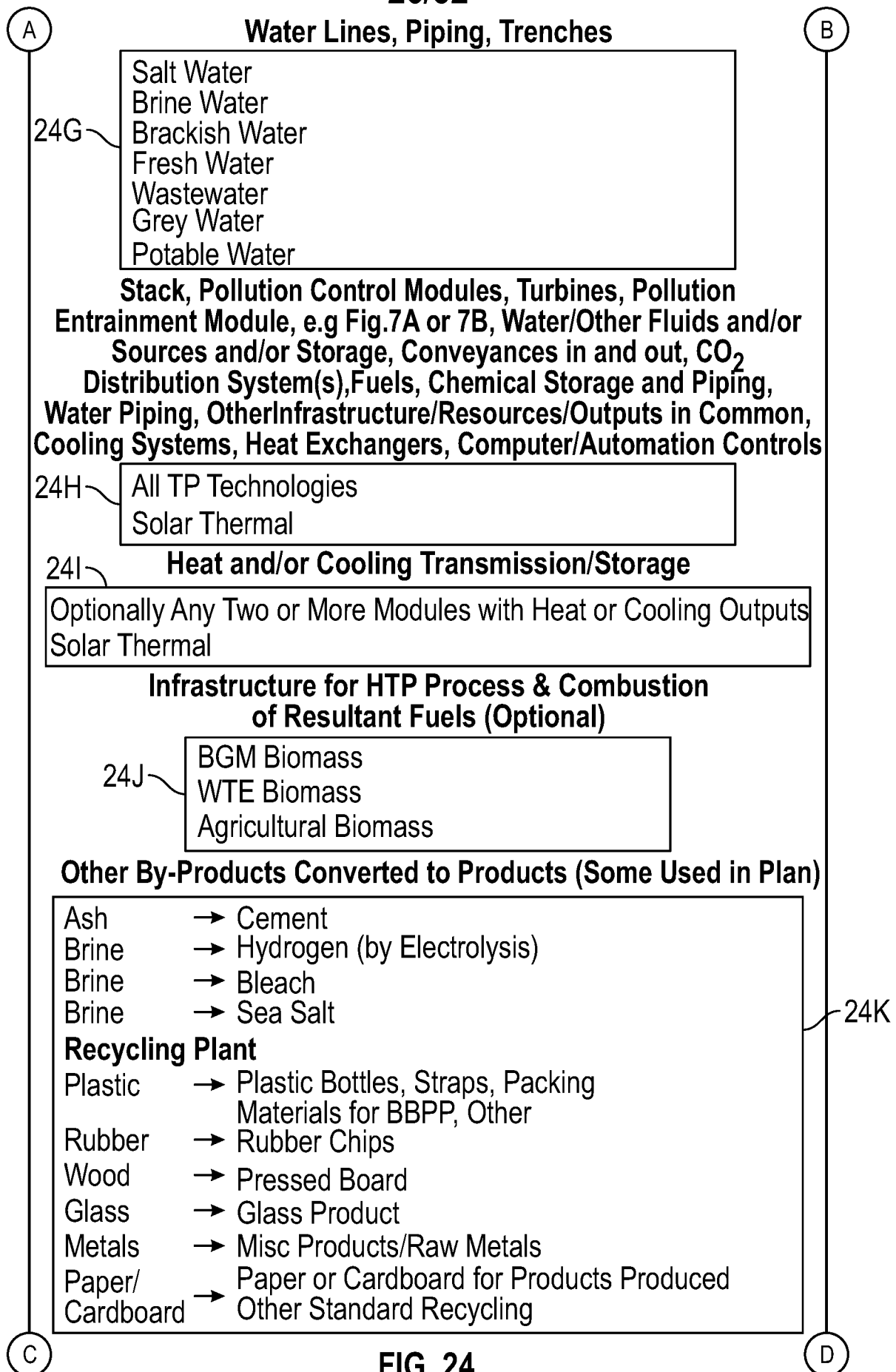


FIG. 24

27/32

C

D

Example of Refinery and/or BPP Synergies within the Plan

24L

- Prompt Processing of Biomass Into Fuels and/or Nonfuel Products for Use Onsite, Storage, Export
- All Fuels may be Used in Plan
- Nonfuel Products Synthesized which may be Used in Plan
 - Lubricants,
 - Bioplastics
 - Paper
 - Soil Amendments/Fertilizer
 - Paints
 - Chemicals
 - Other Useful Products
- When Refinery and BPP Both Present, may Share:
 - Infrastructure in Common
 - Resources&Inputs
 - Outflows
 - May Process Outflows and/or by Products from Each Other
- Use of Power, Waste Heat, Cogenerated Cooling, CO₂ and/or Other Resources from Thermal Plant

Examples of BBPP Synergies within the Plan

24M

- Prompt Processing and Bottling of Desalinated Water for Freshness
- Carbonation of Water Optionally Using Purified CO₂ from Plan (Fig.4)
- Ability to Store and Transport Water from Source
 - Creates Versatile Water Supply
 - May Generate Water Reserve Supply to meet Varying Needs or for Emergencies
- Prompt Packaging of Biomass Products for Freshness
- Carbonation of Biomass Liquids Optionally Using Purified CO₂ from Plan (Fig.4)
- May Use Heat Including Waste Heat from Thermal Plant for Processing
- May Use Cogenereted Cooling from Thermal Plant for Preservation of Water and/or Biomass Products

FIG. 24
(Continued)

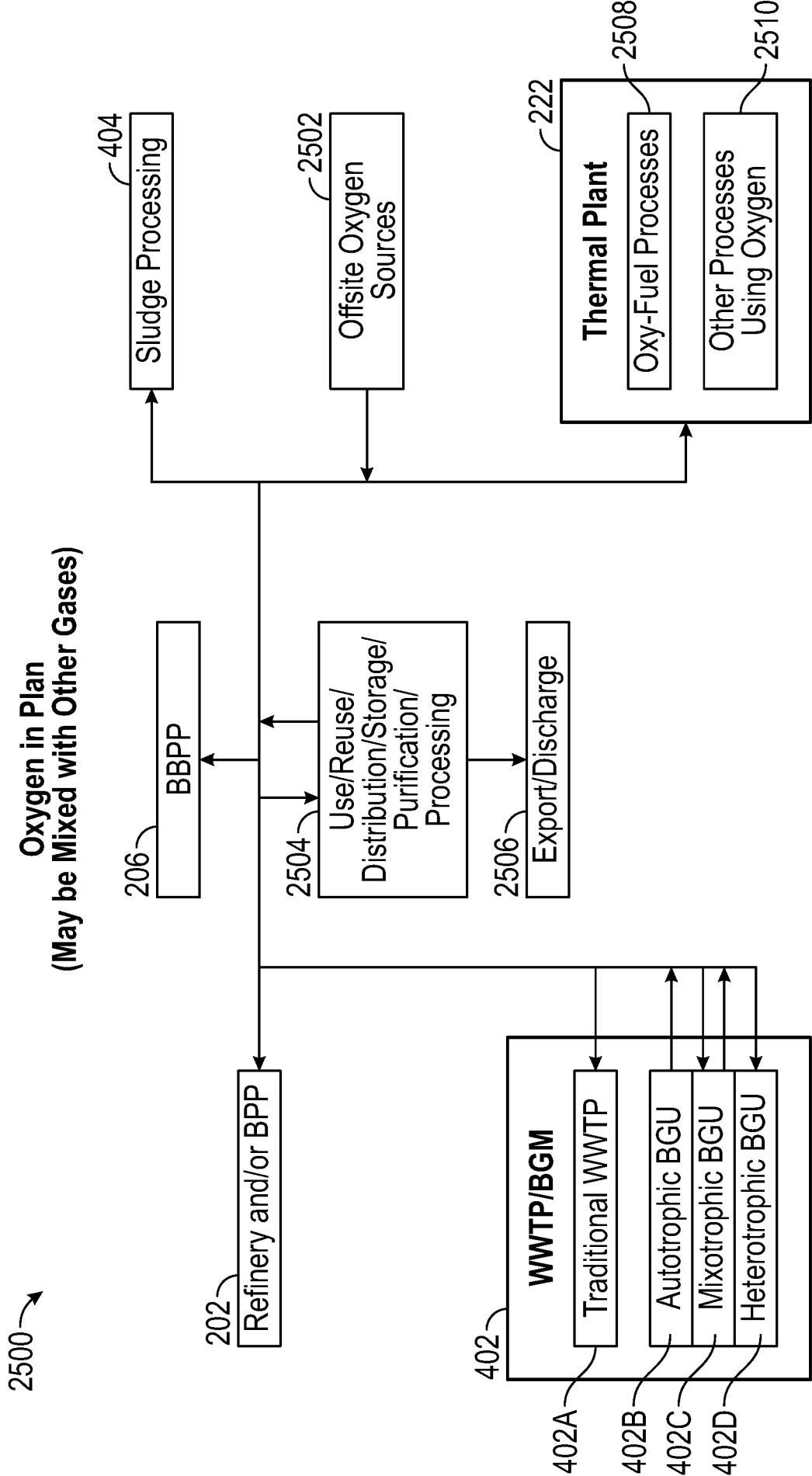
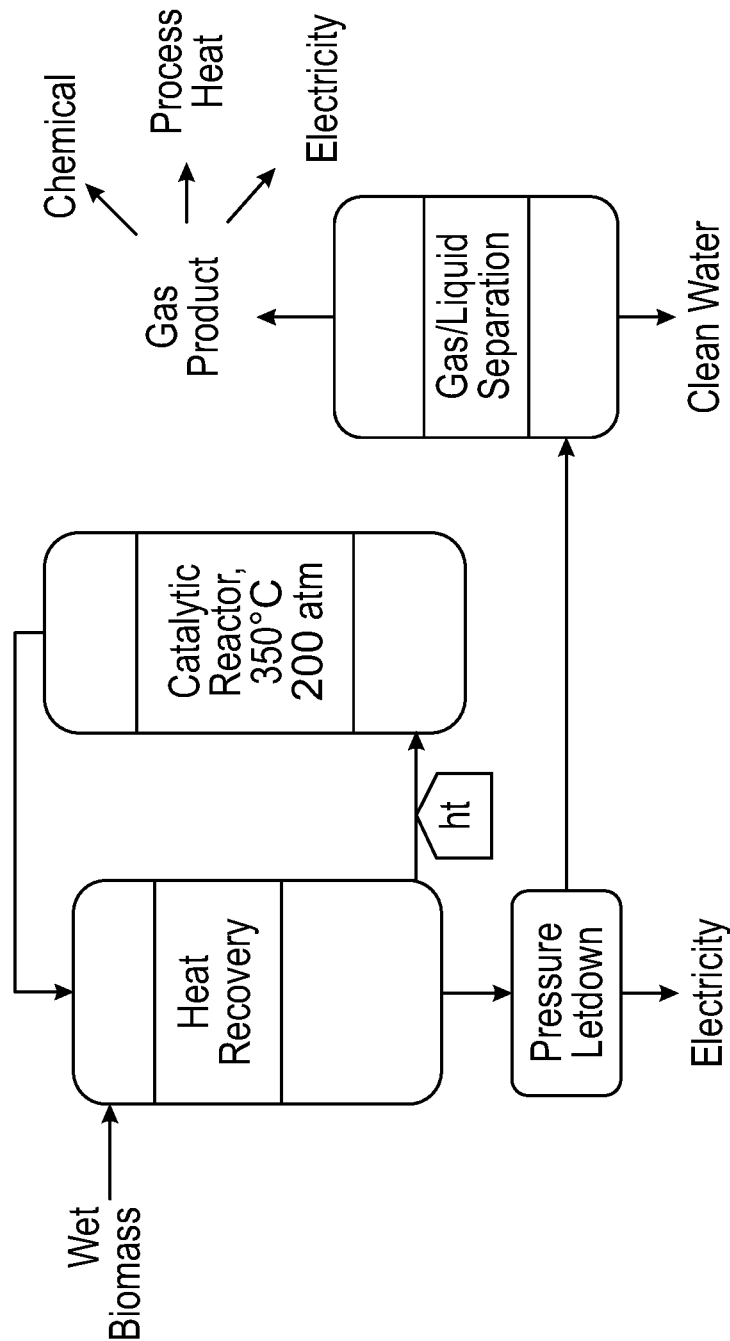


FIG. 25



Catalytic Hydrothermal Gasification at Subcritical Conditions

FIG. 26

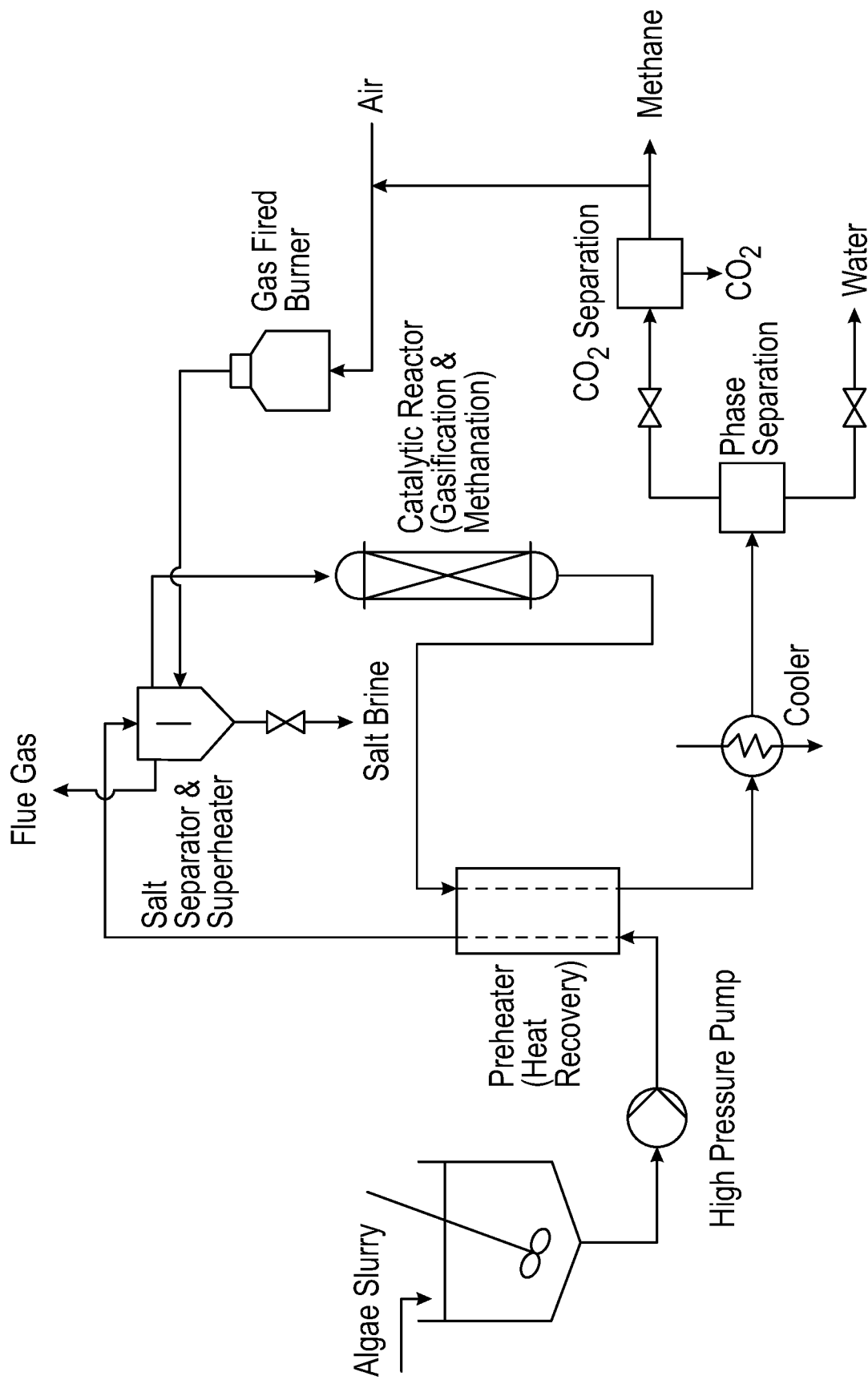


FIG. 27

