

1/32

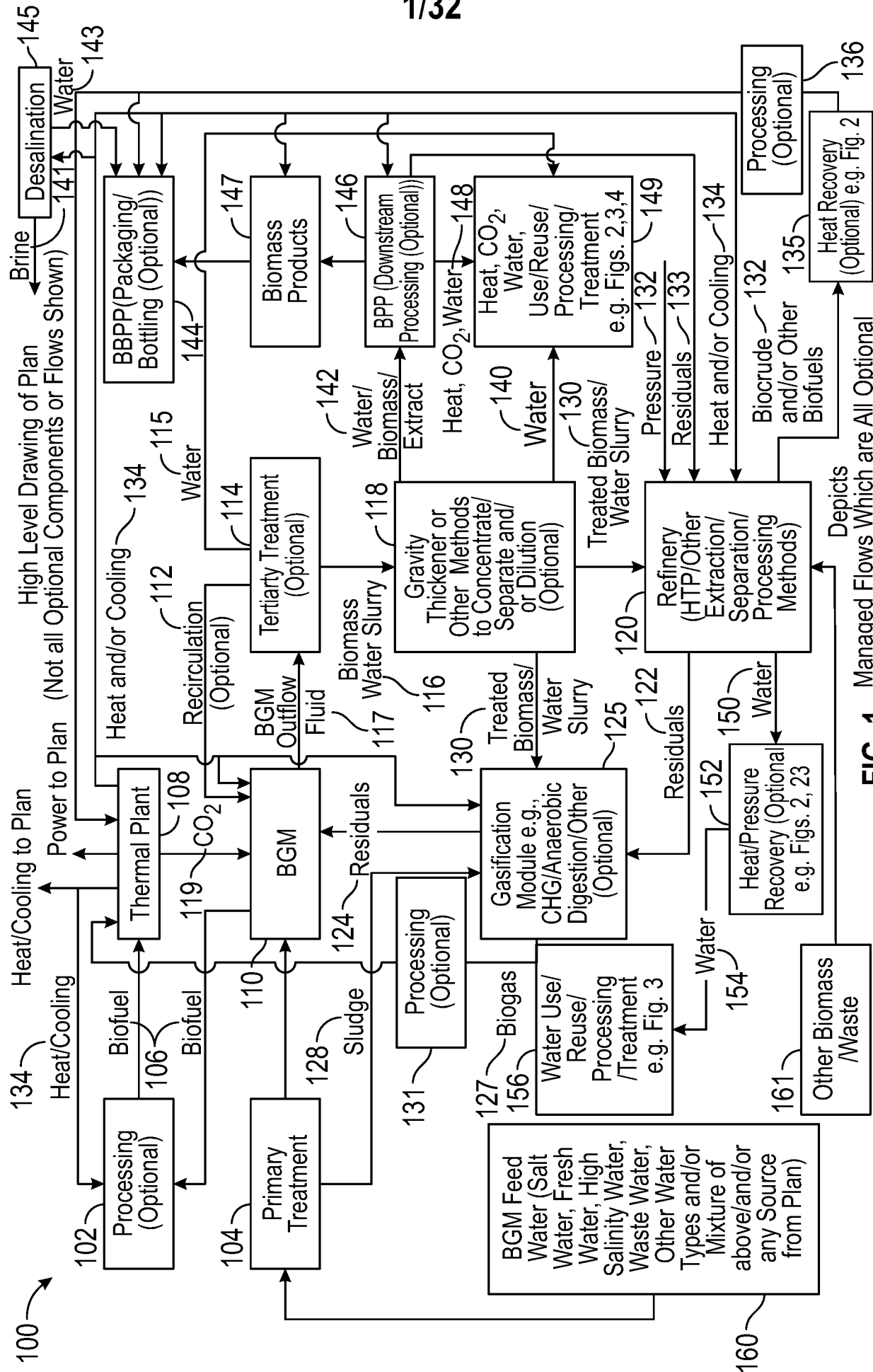


FIG. 1 Managed Flows Which are All Optional

2/32

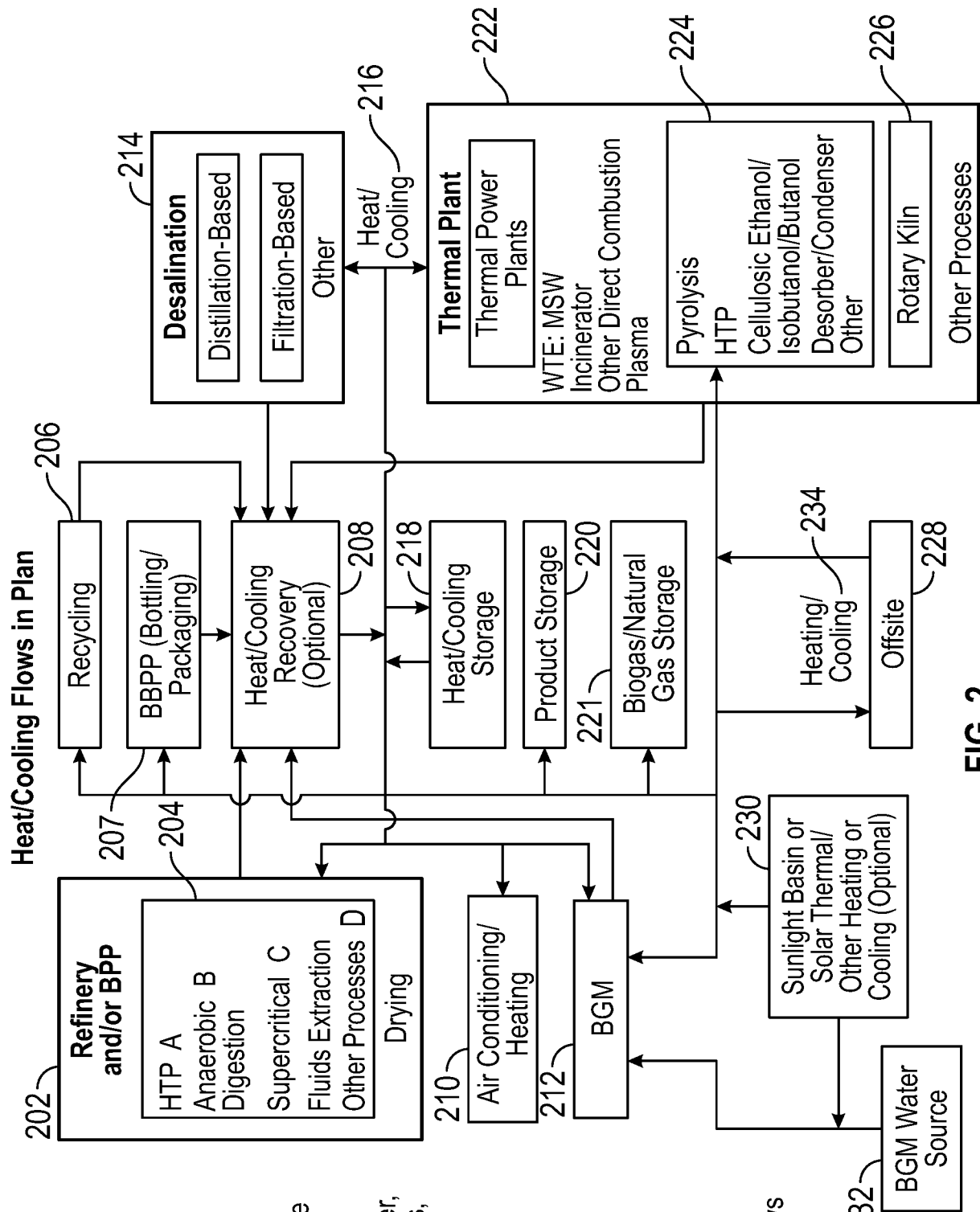


FIG. 2

Heat or Cooling may be Transferred as Shown by any Fluid Including Air, Other Gases, Water, other Fluids & Mixtures, If Water is Used, it may Come from any Source in Plan (Fig. 3)

Depicts Managed Flows Which are All Optional

3/32

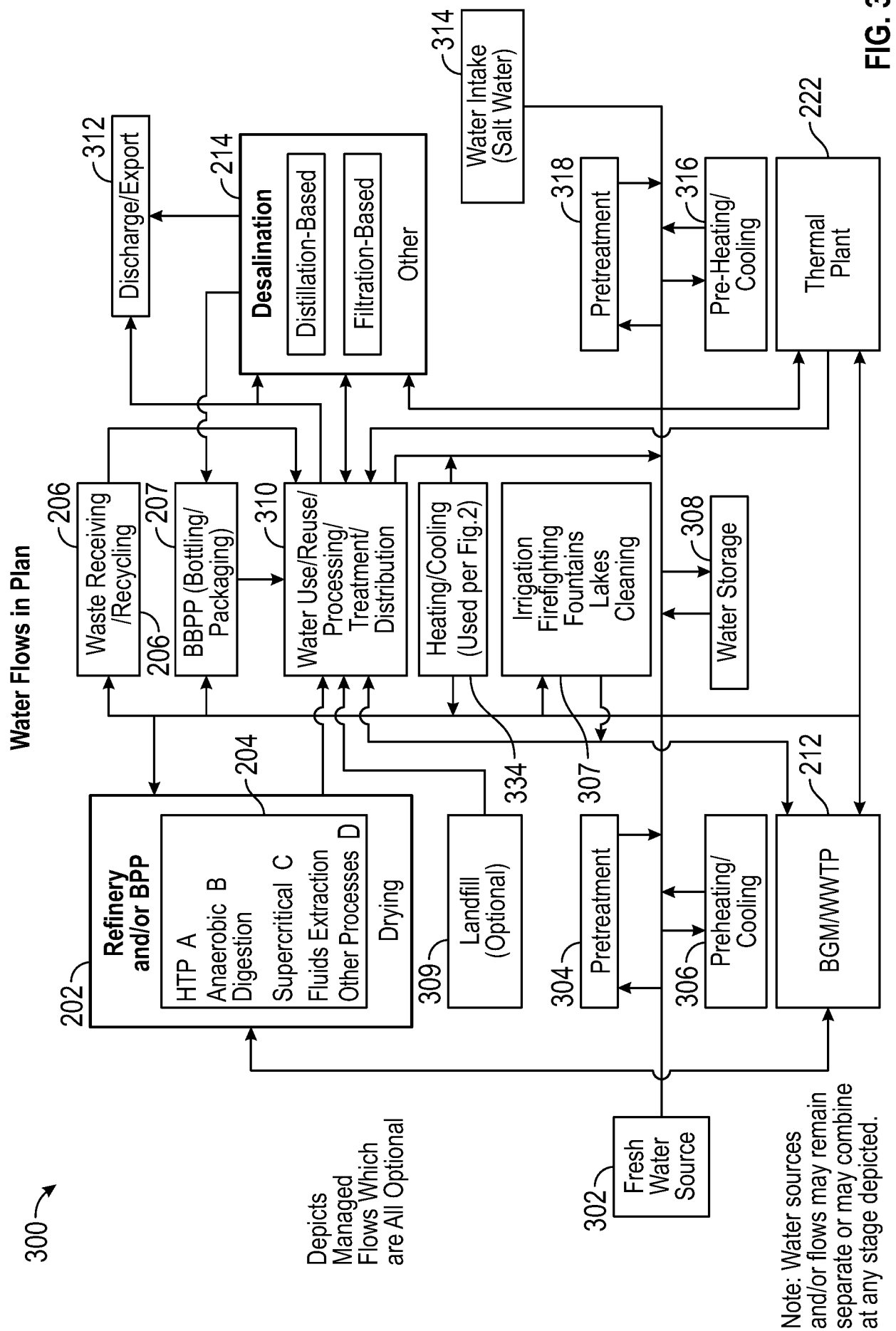


FIG. 3

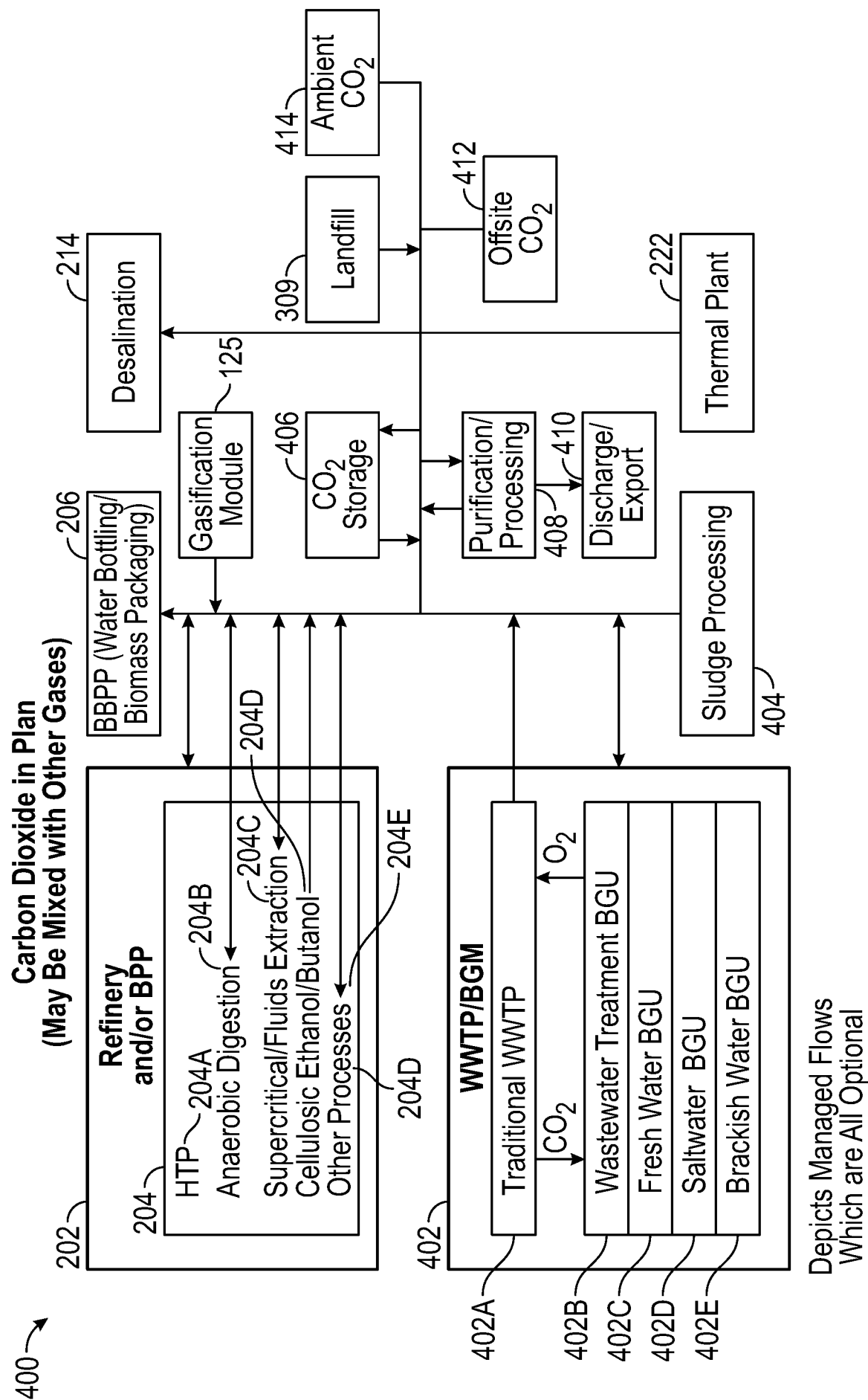


FIG. 4

5/32

500

BGM Example Configurations

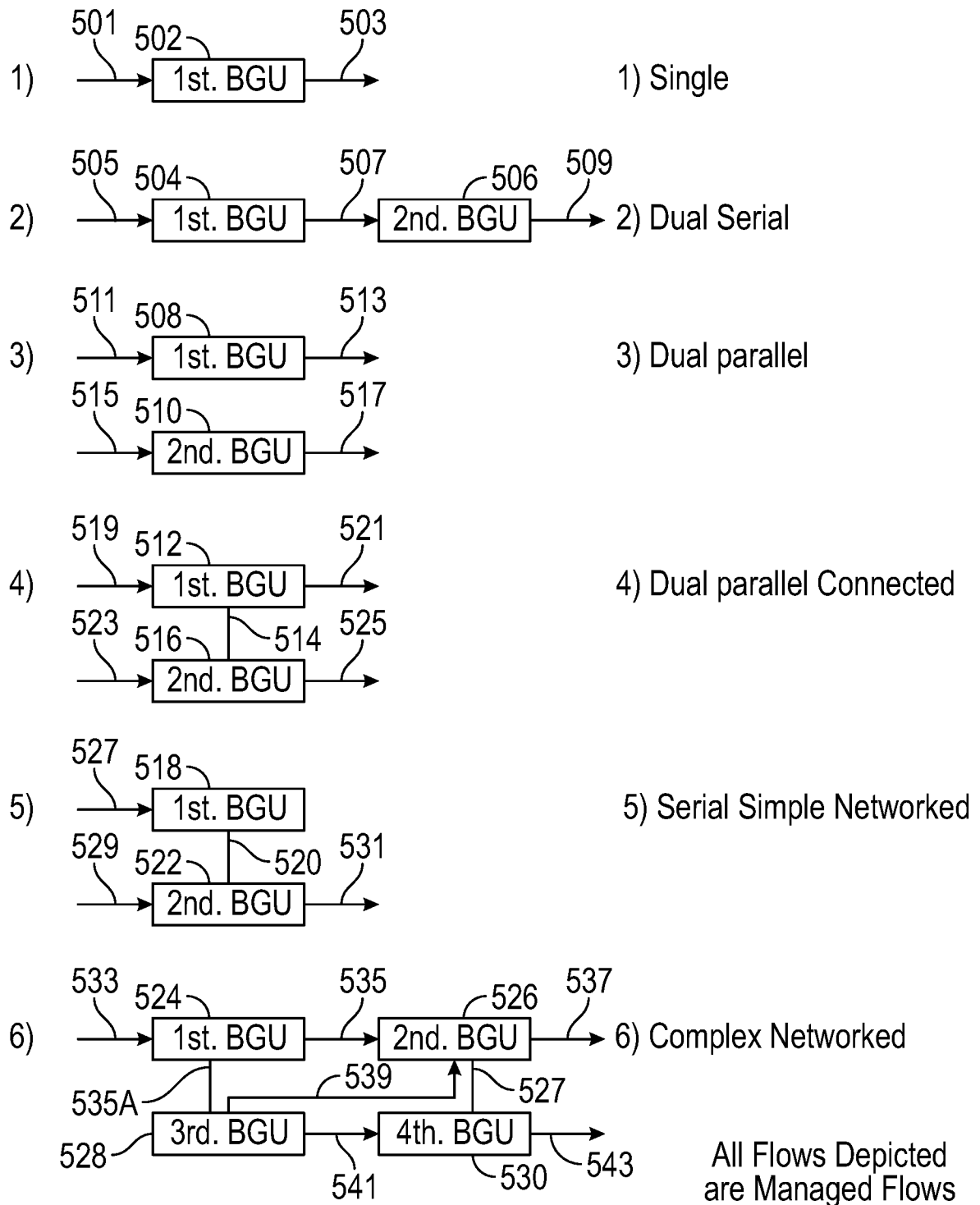


FIG. 5

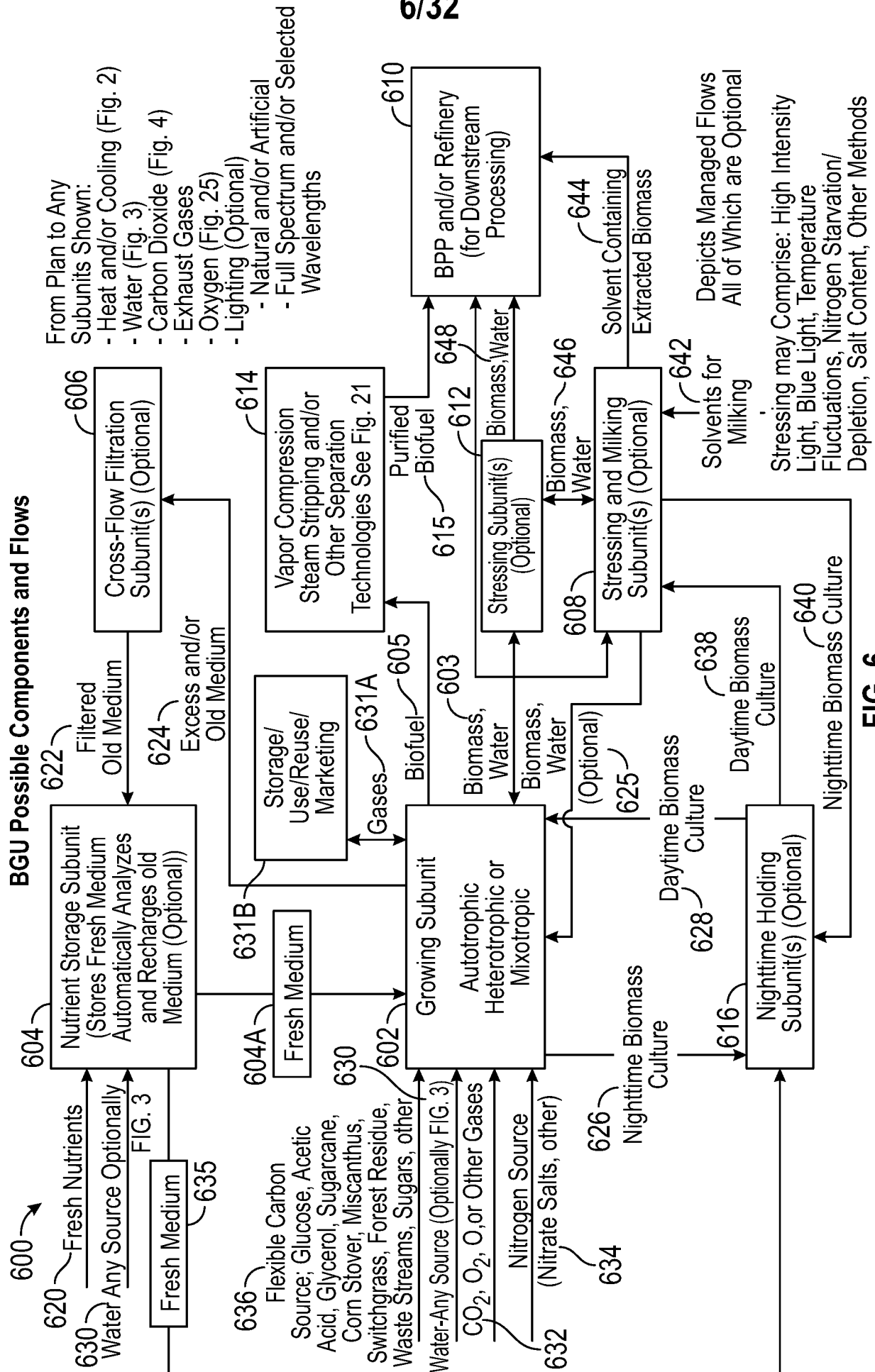


FIG. 6

7/32

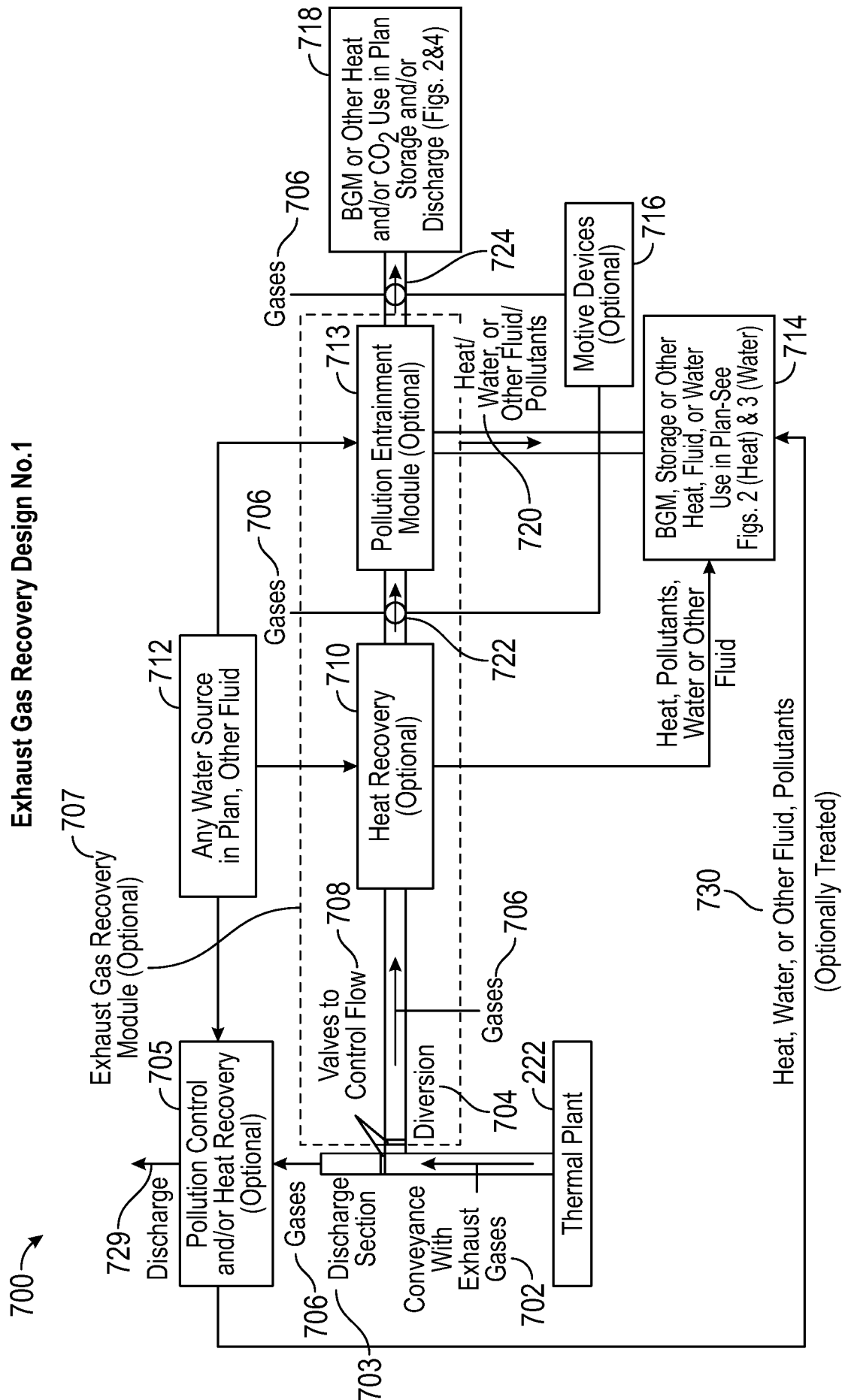
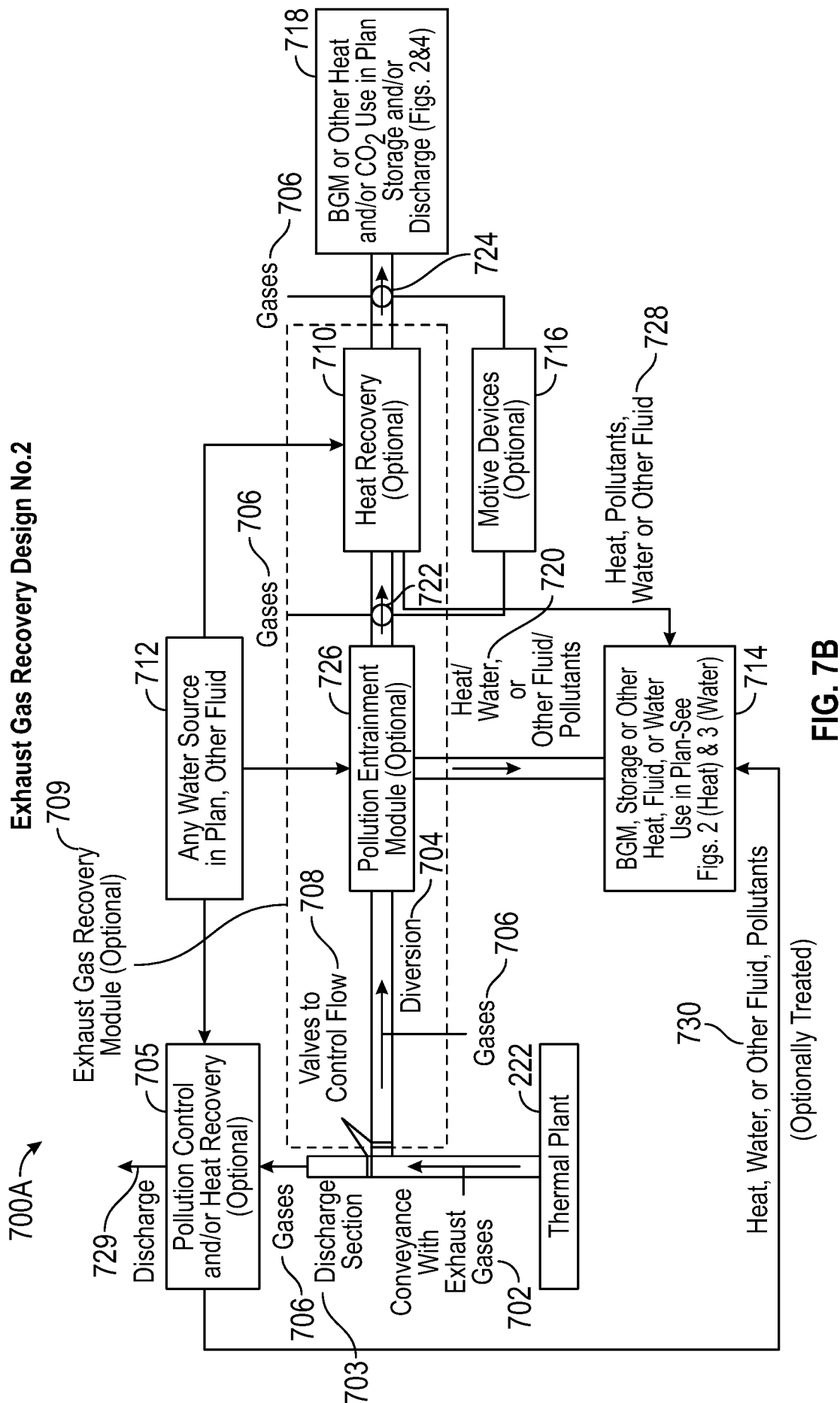


FIG. 7A



9/32

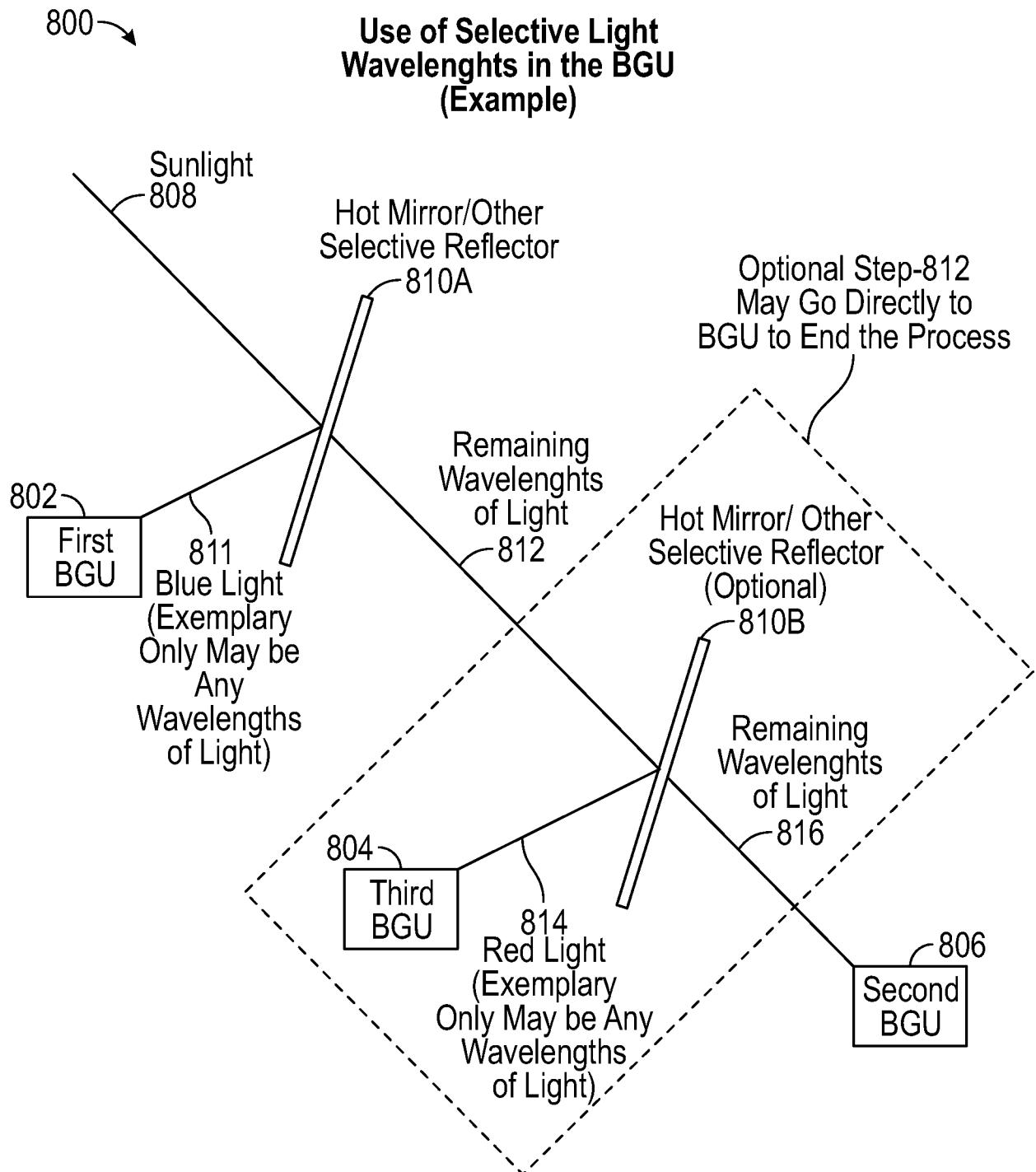


FIG. 8

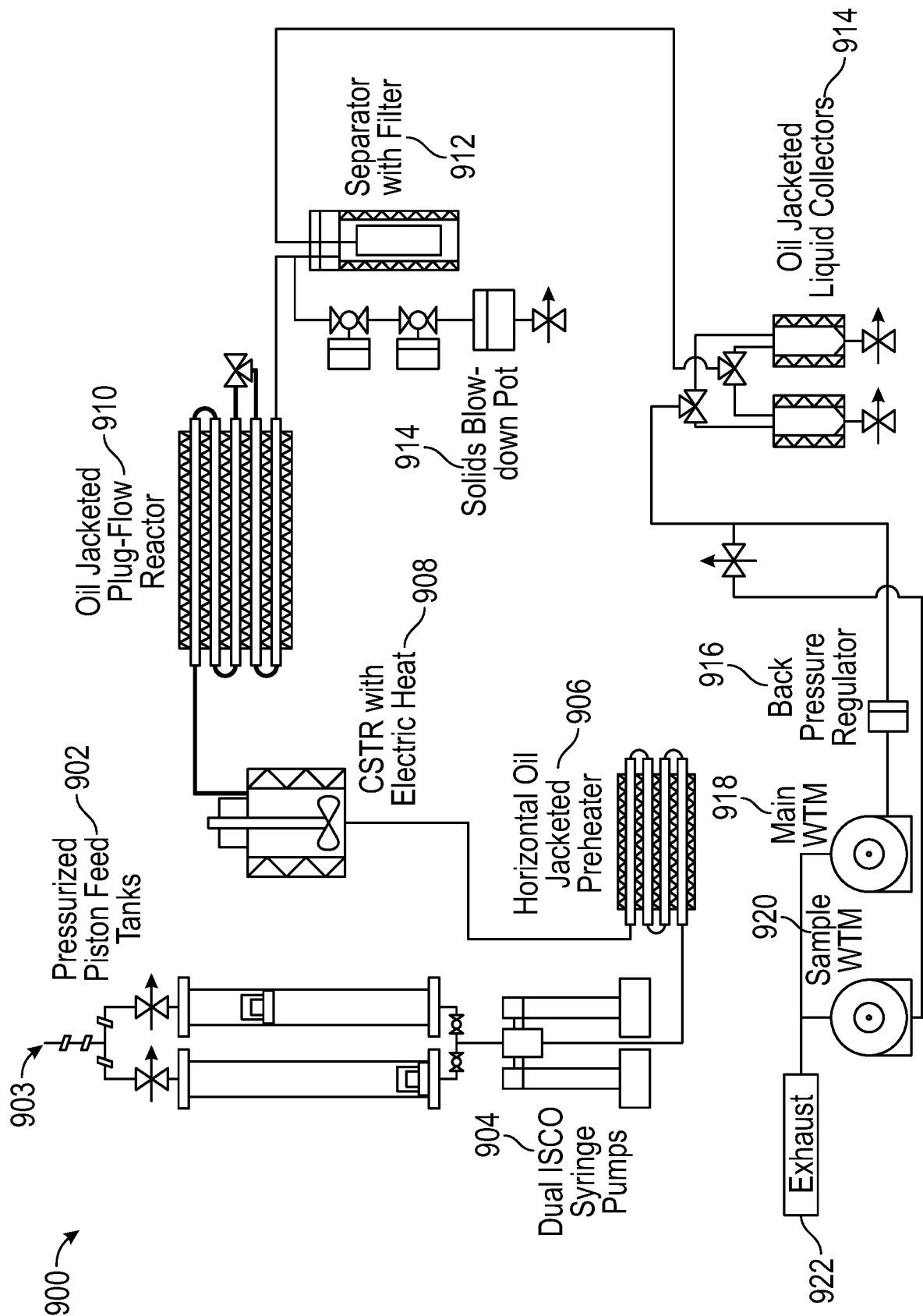
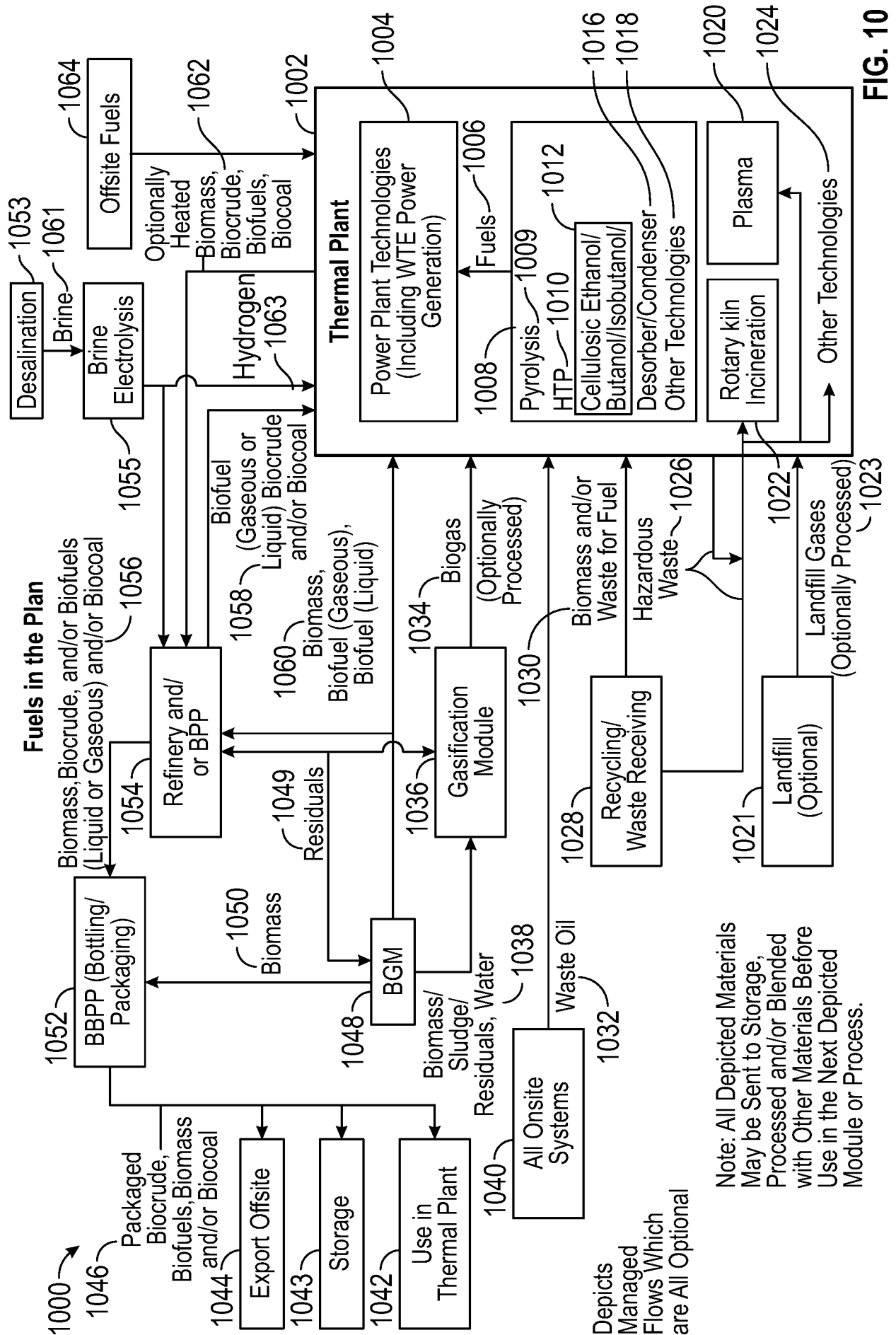


FIG. 9

11/32



Depicts
Managed
Flows Which
are All Optional

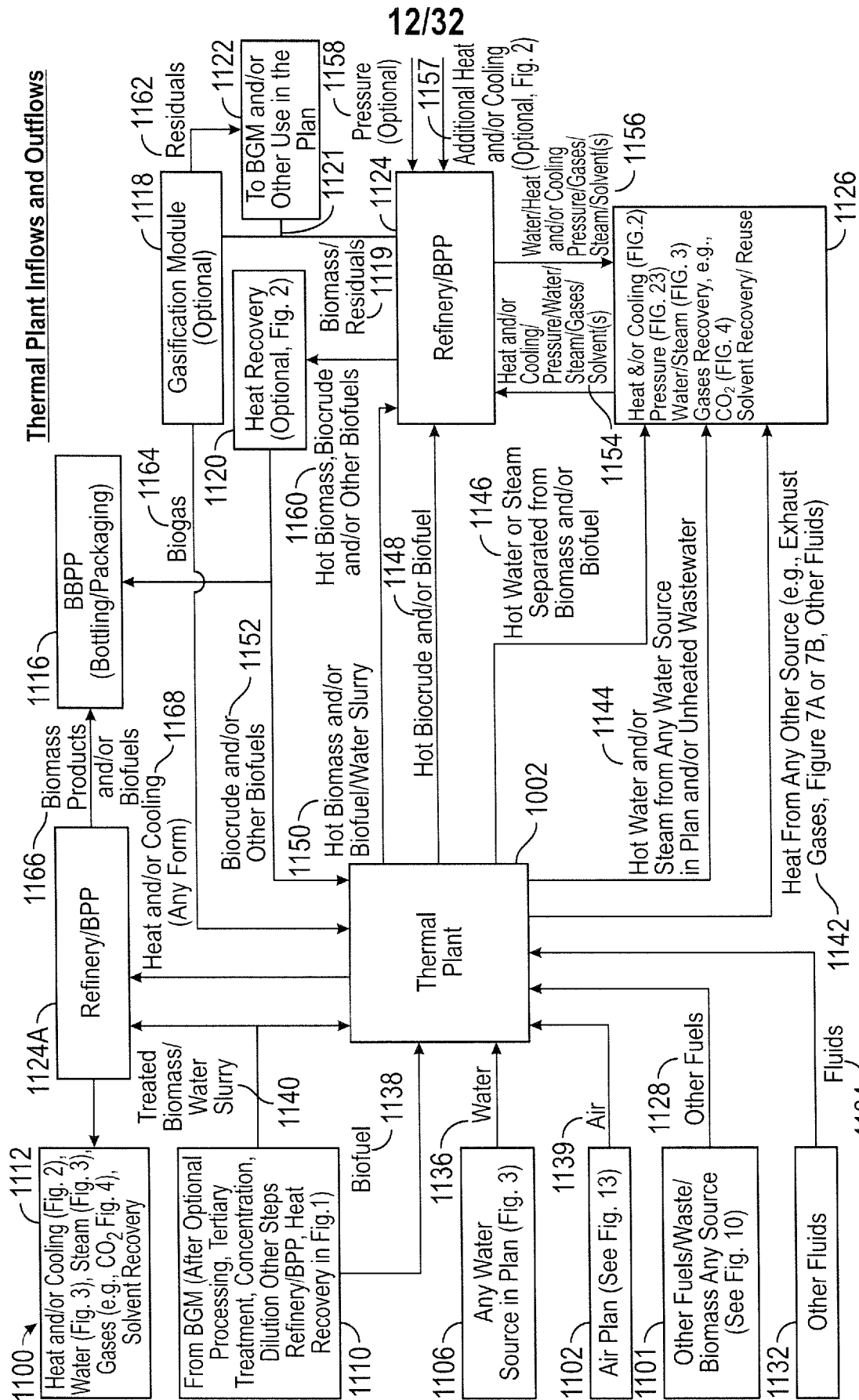


FIG. 11

Managed Flows Which are All Optional. Not all Flows Shown.

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

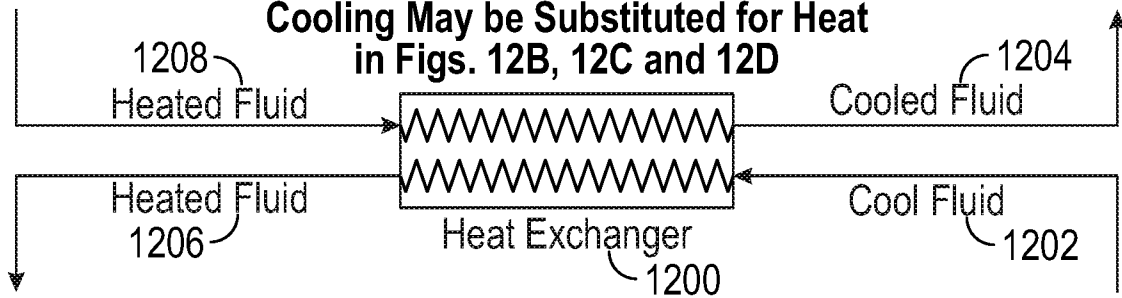


FIG. 12A

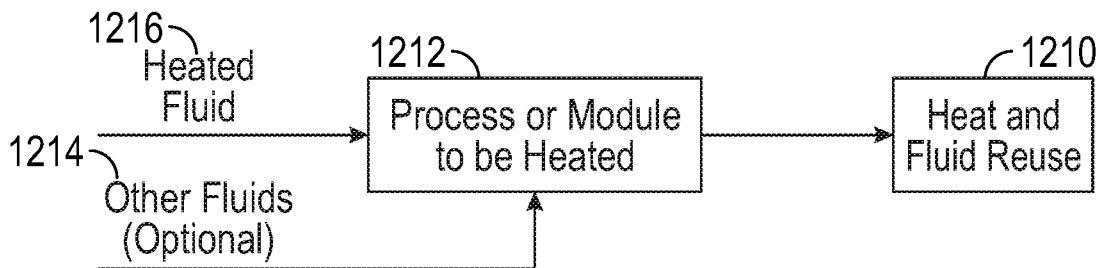


FIG. 12B

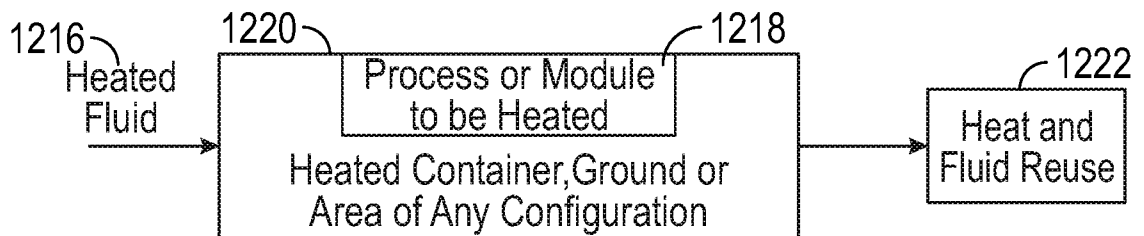


FIG. 12C

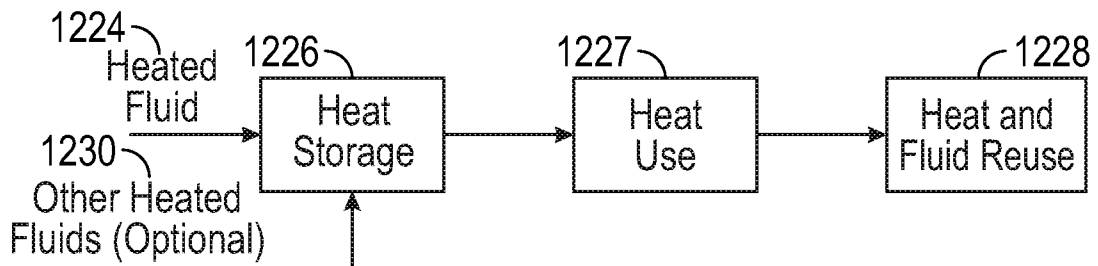


FIG. 12D

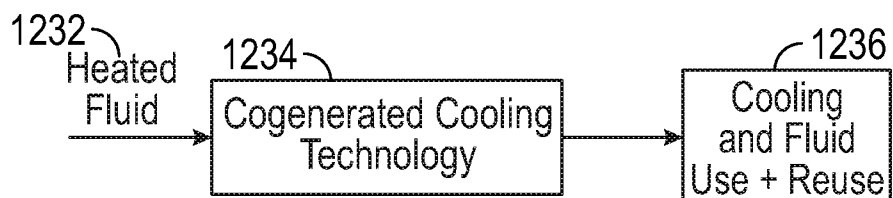


FIG. 12E

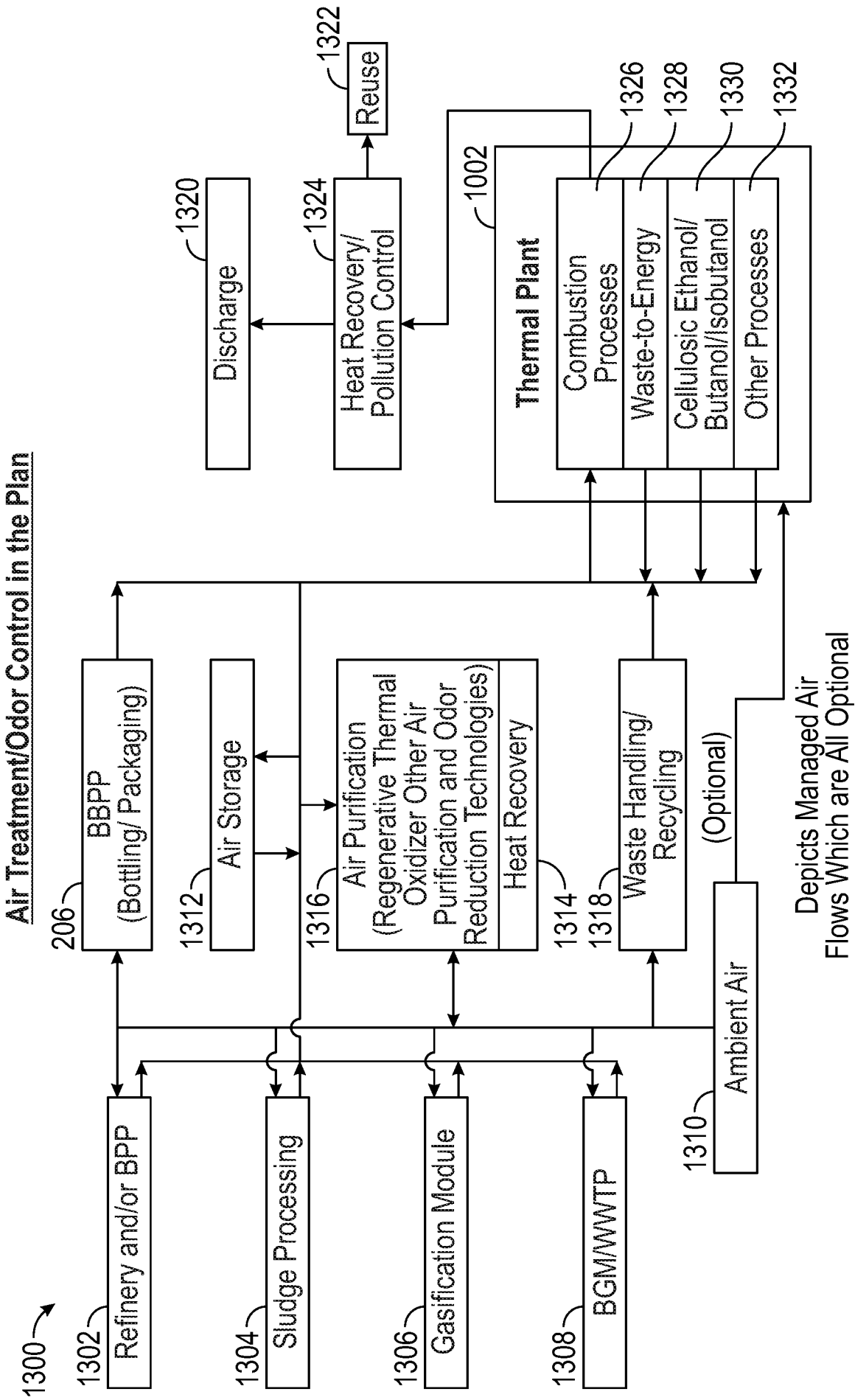
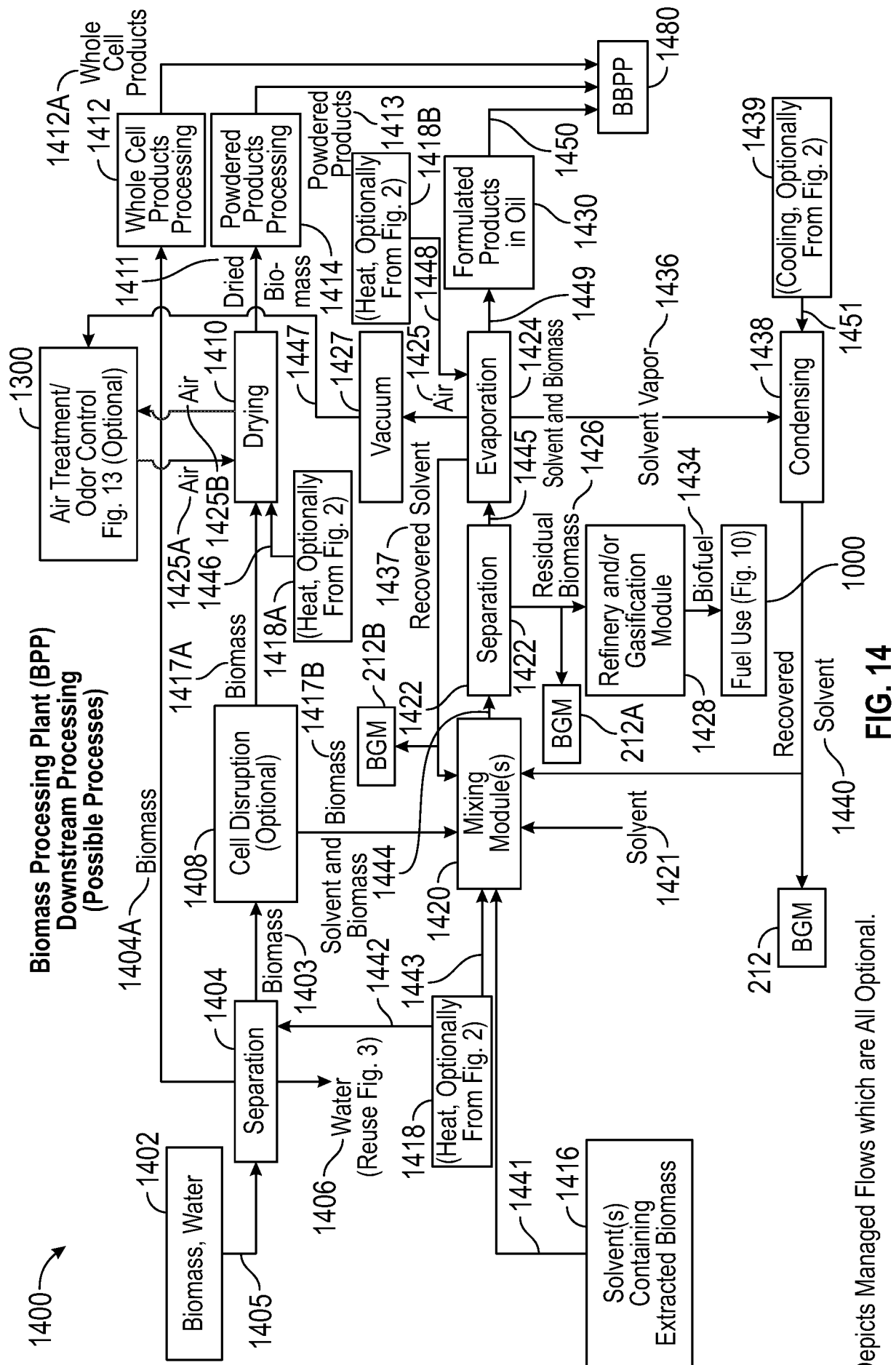


FIG. 13



Depicts Managed Flows which are All Optional.

16/32

Example Heat Transfer Modules

Module #1

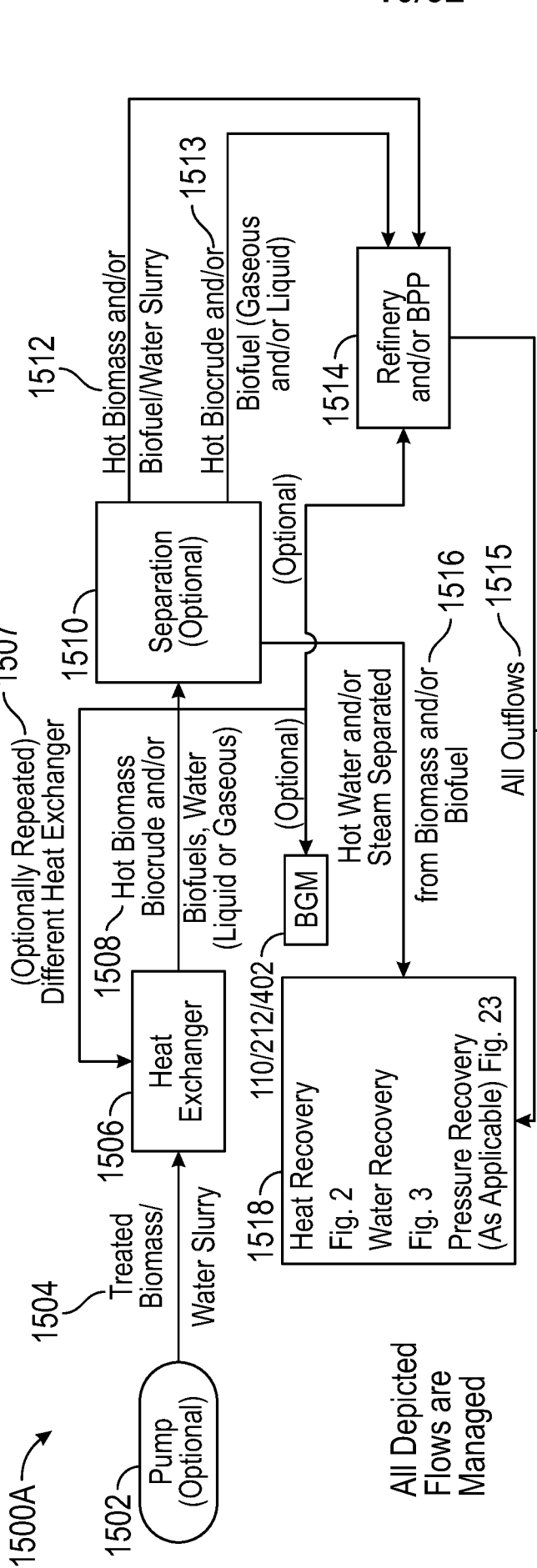


FIG. 15A

Module #2

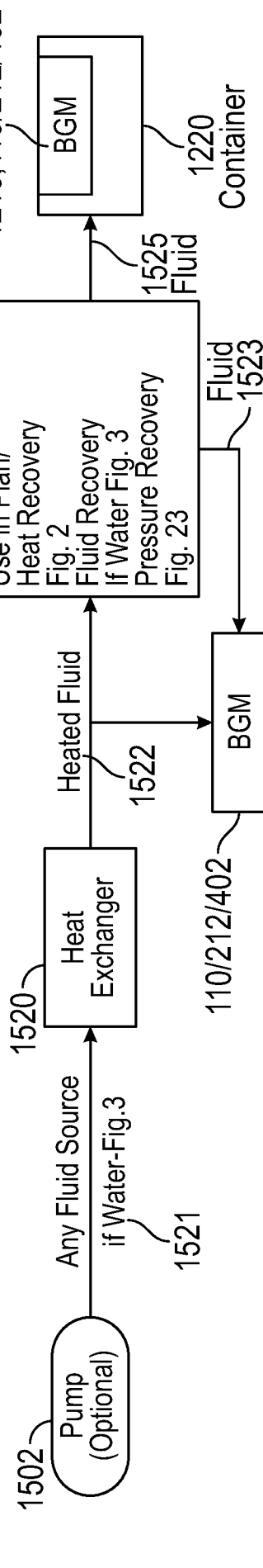
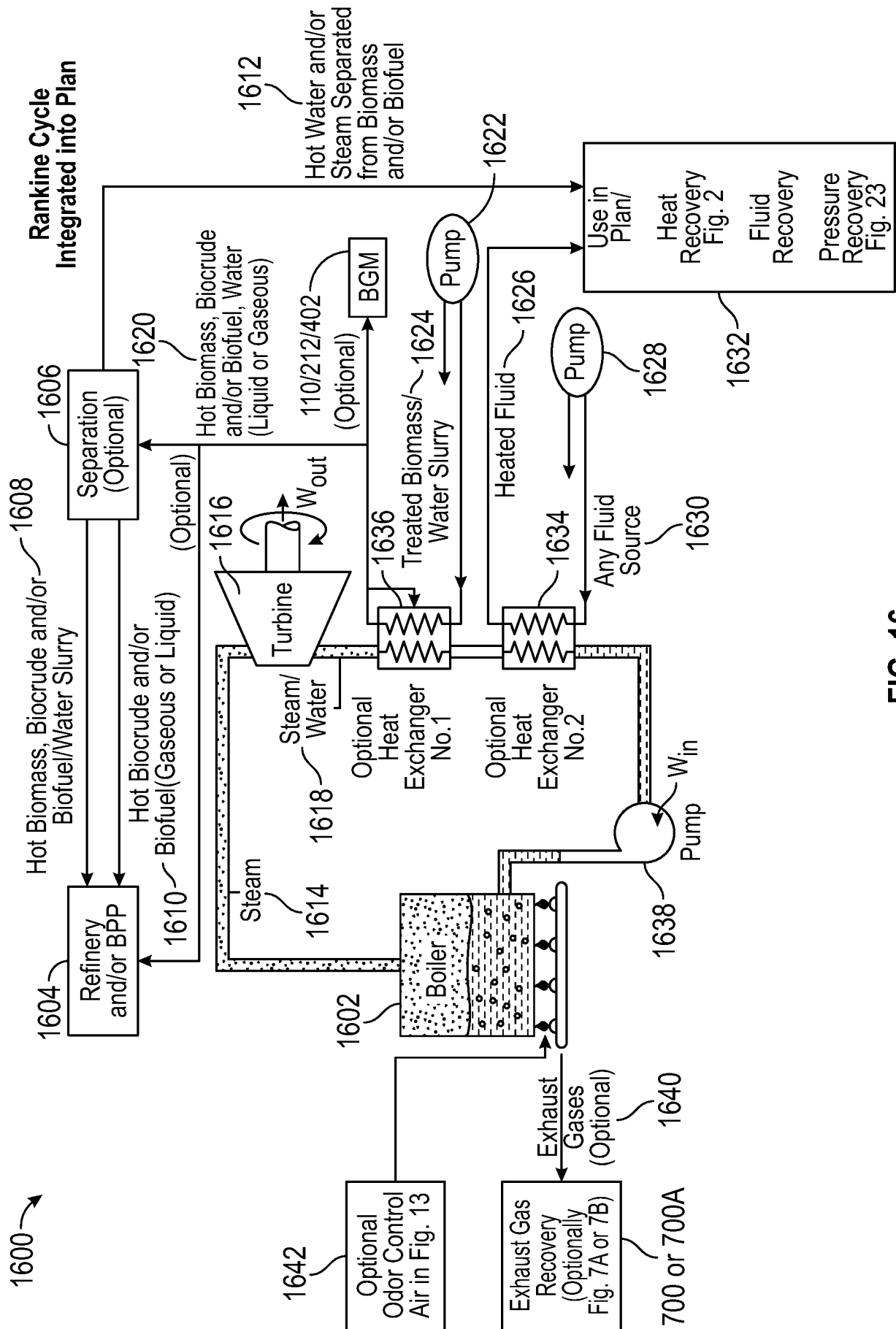


FIG. 15B



18/32

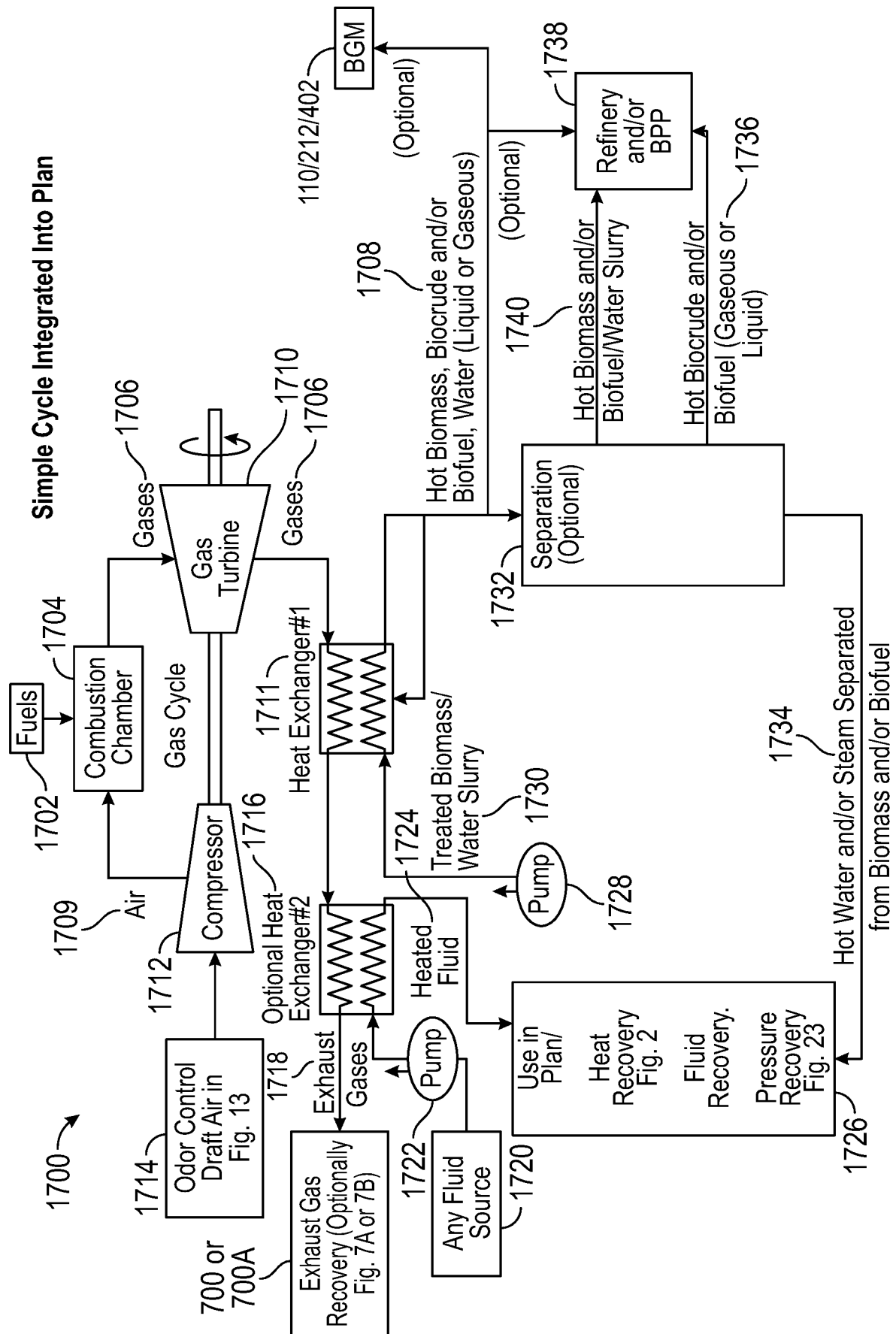


FIG. 17

Combined Cycle Integrated Into Plan

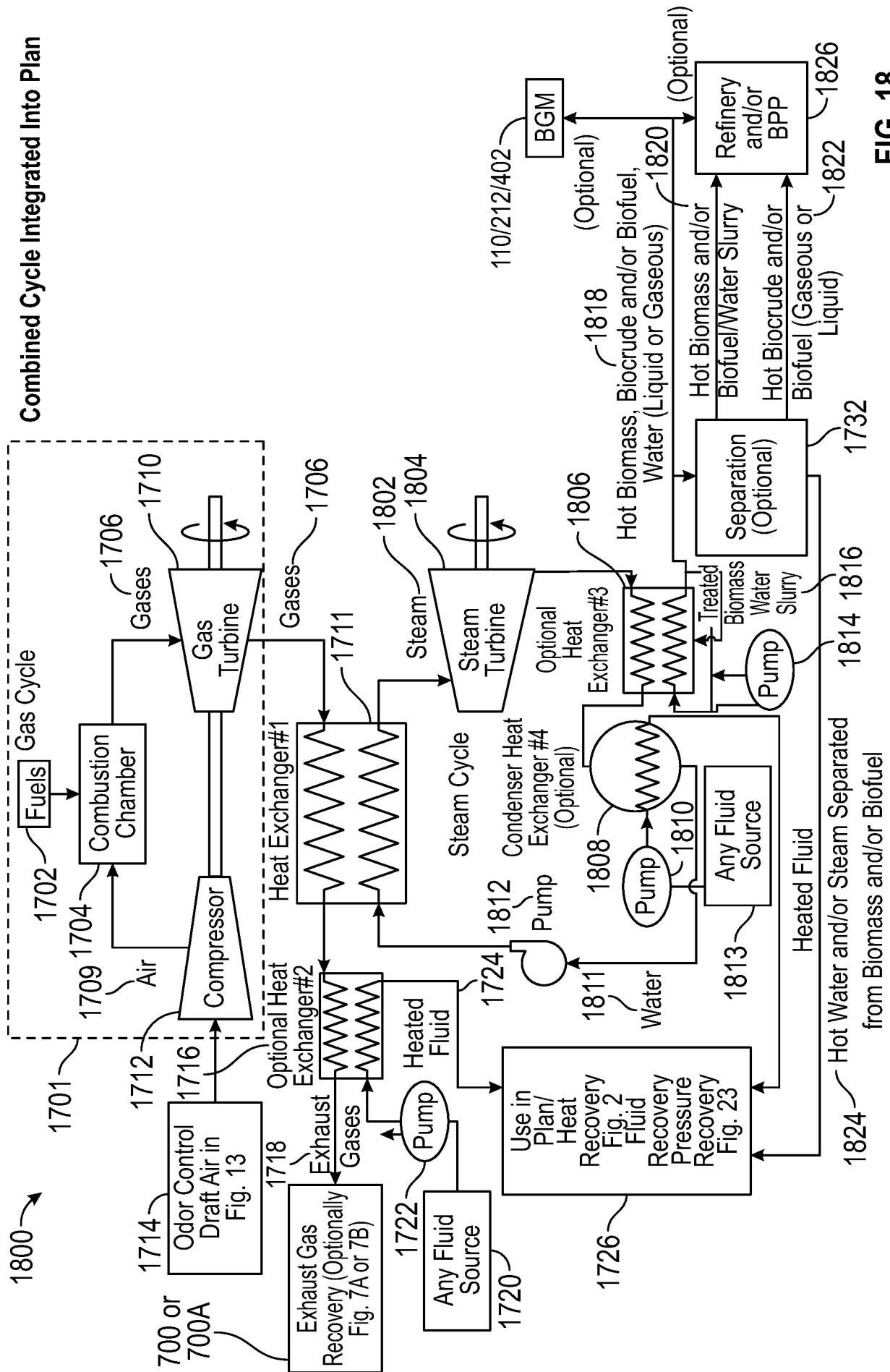
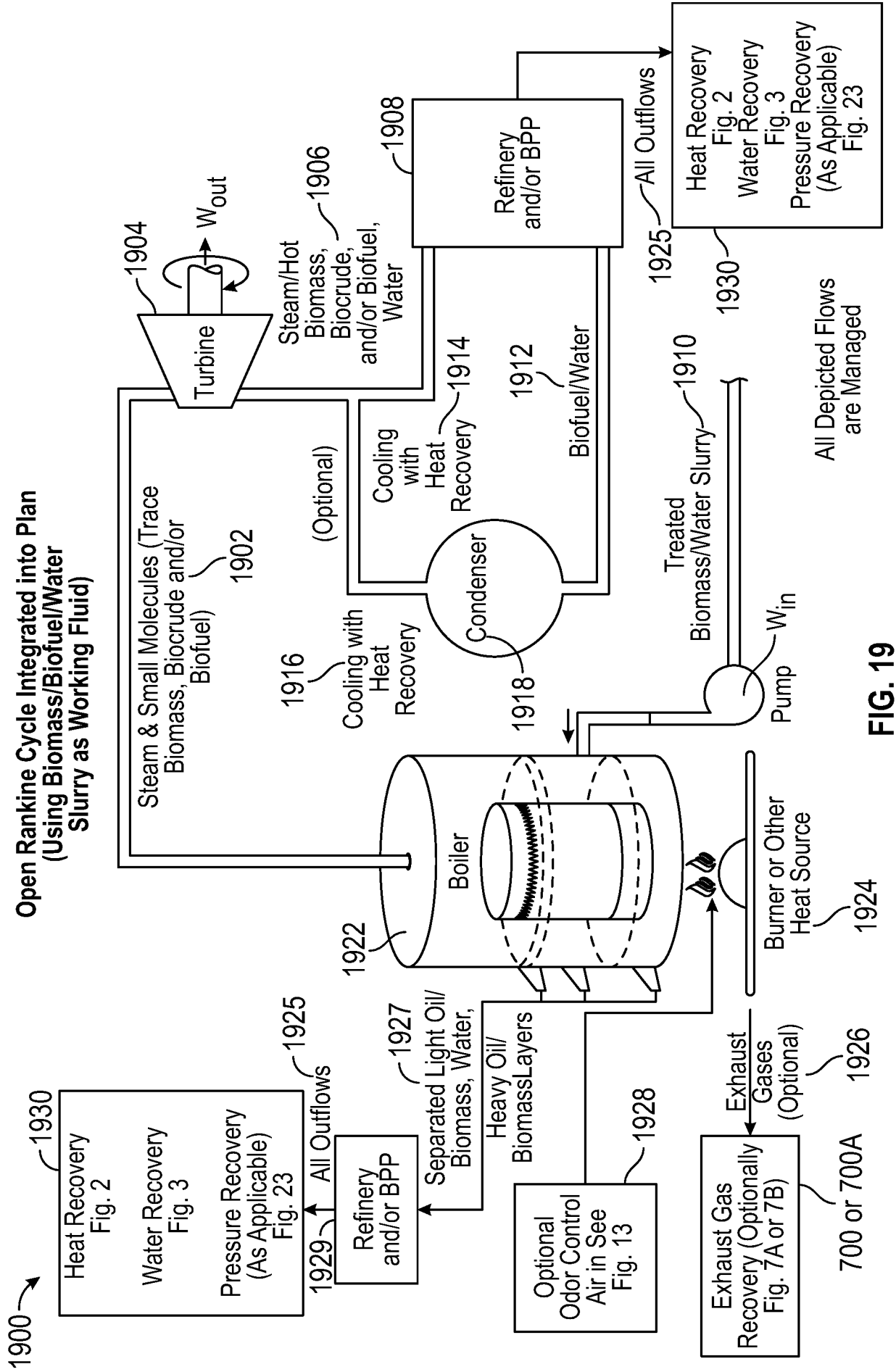


FIG. 18



21/32

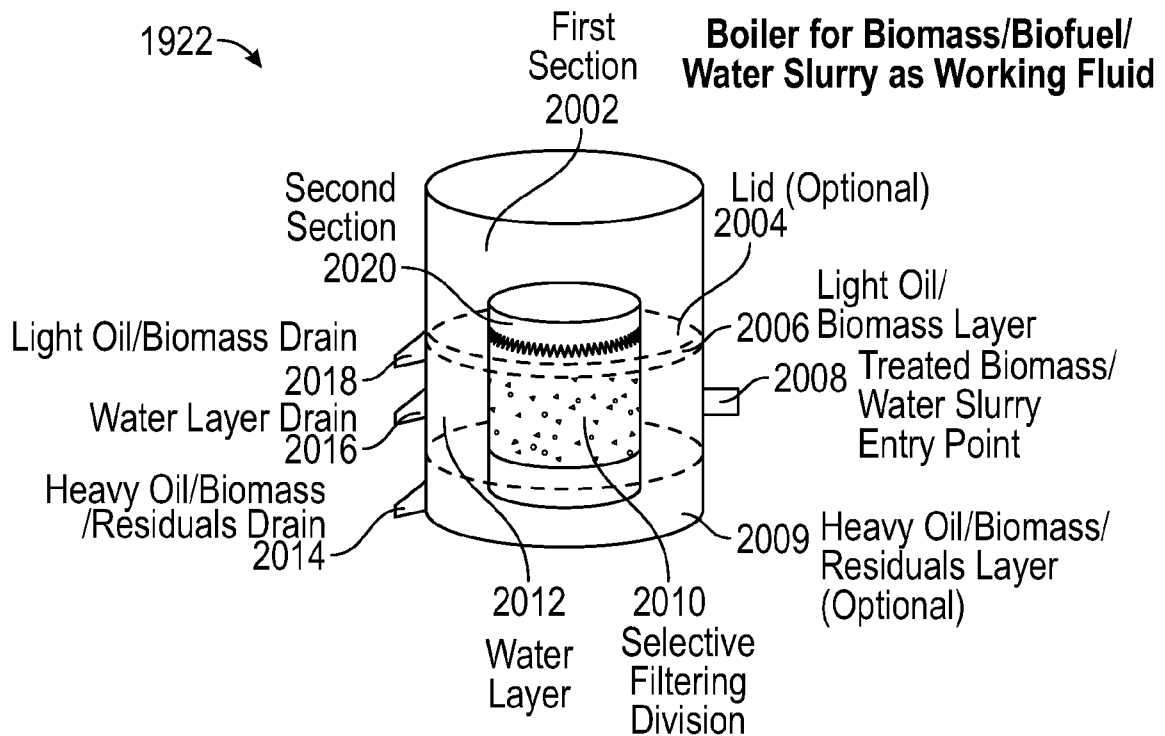


FIG. 20A

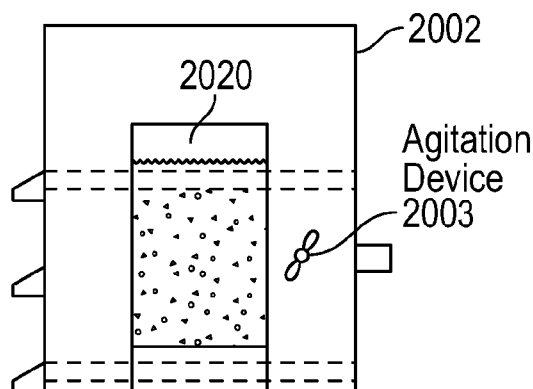
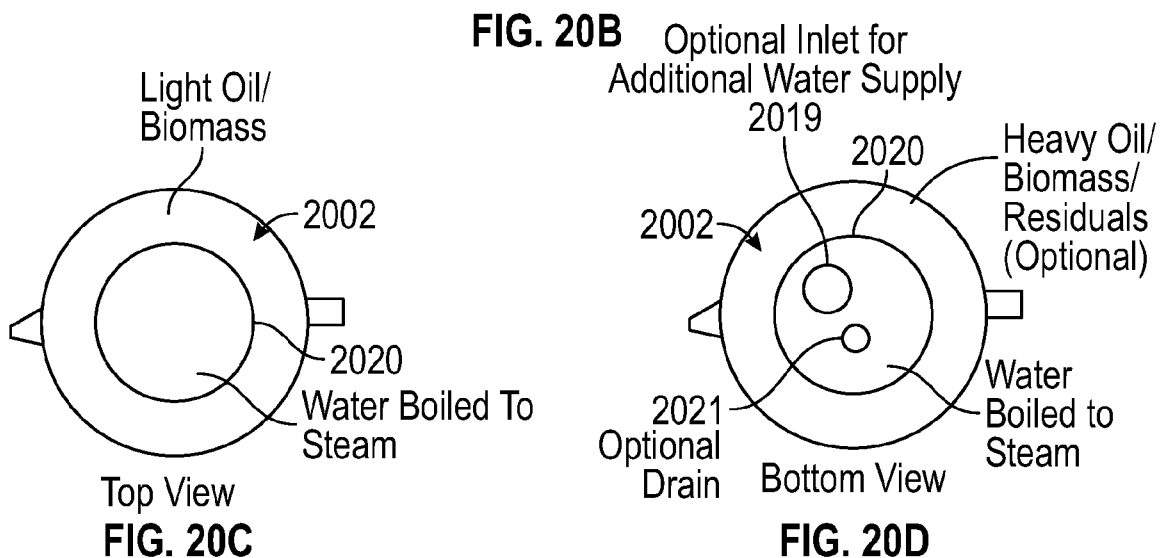
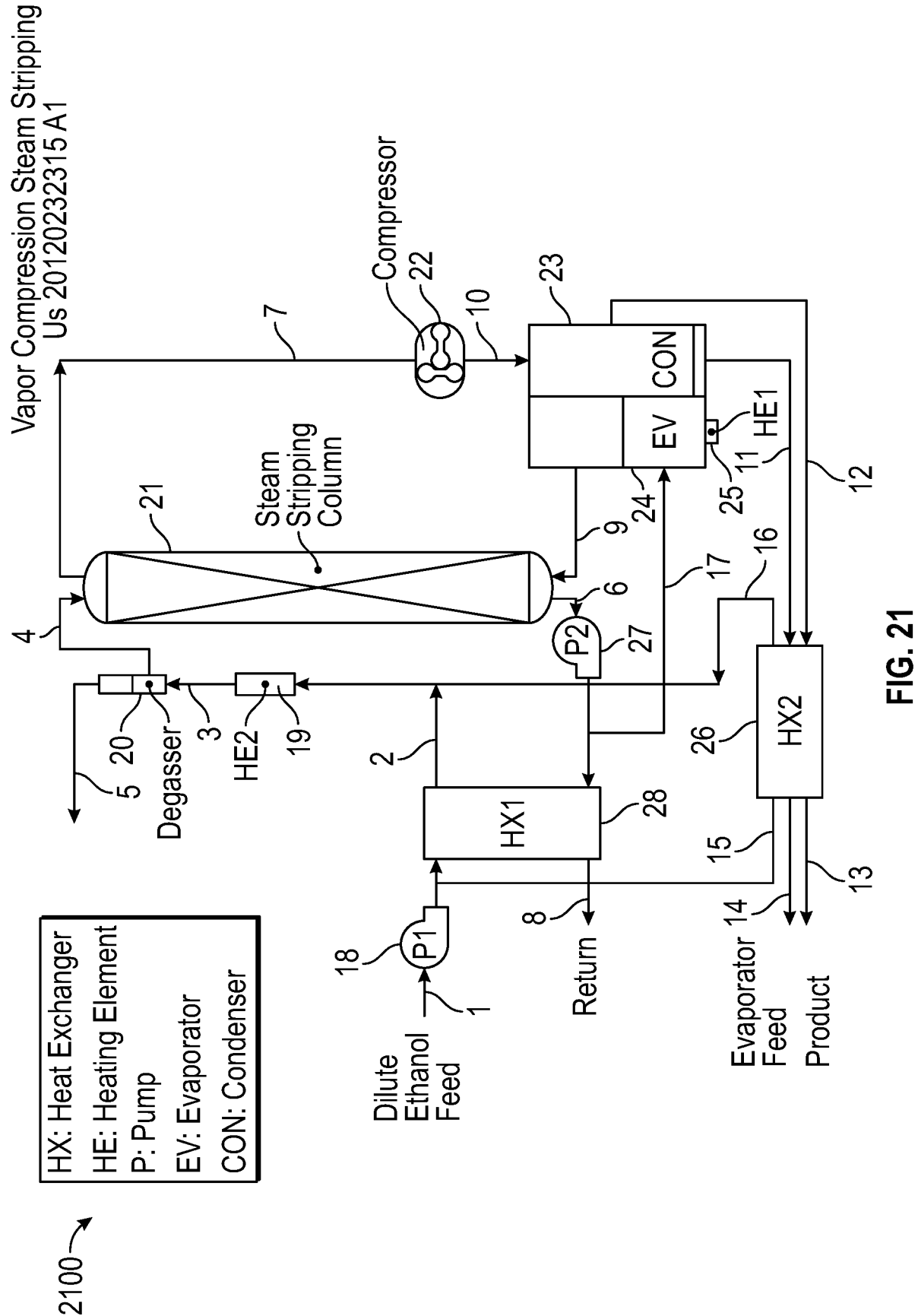


FIG. 20B





23/32

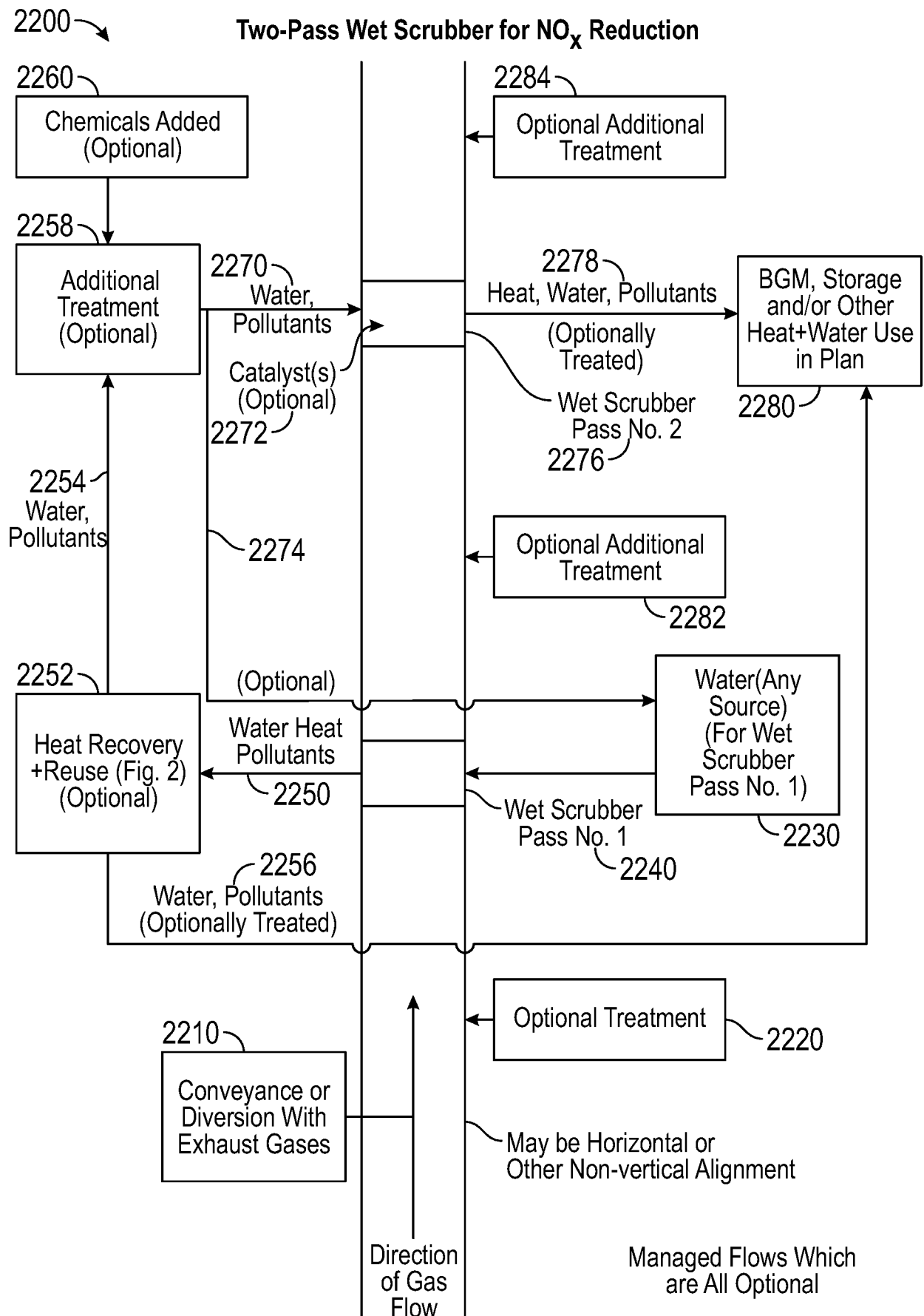


FIG. 22

24/32

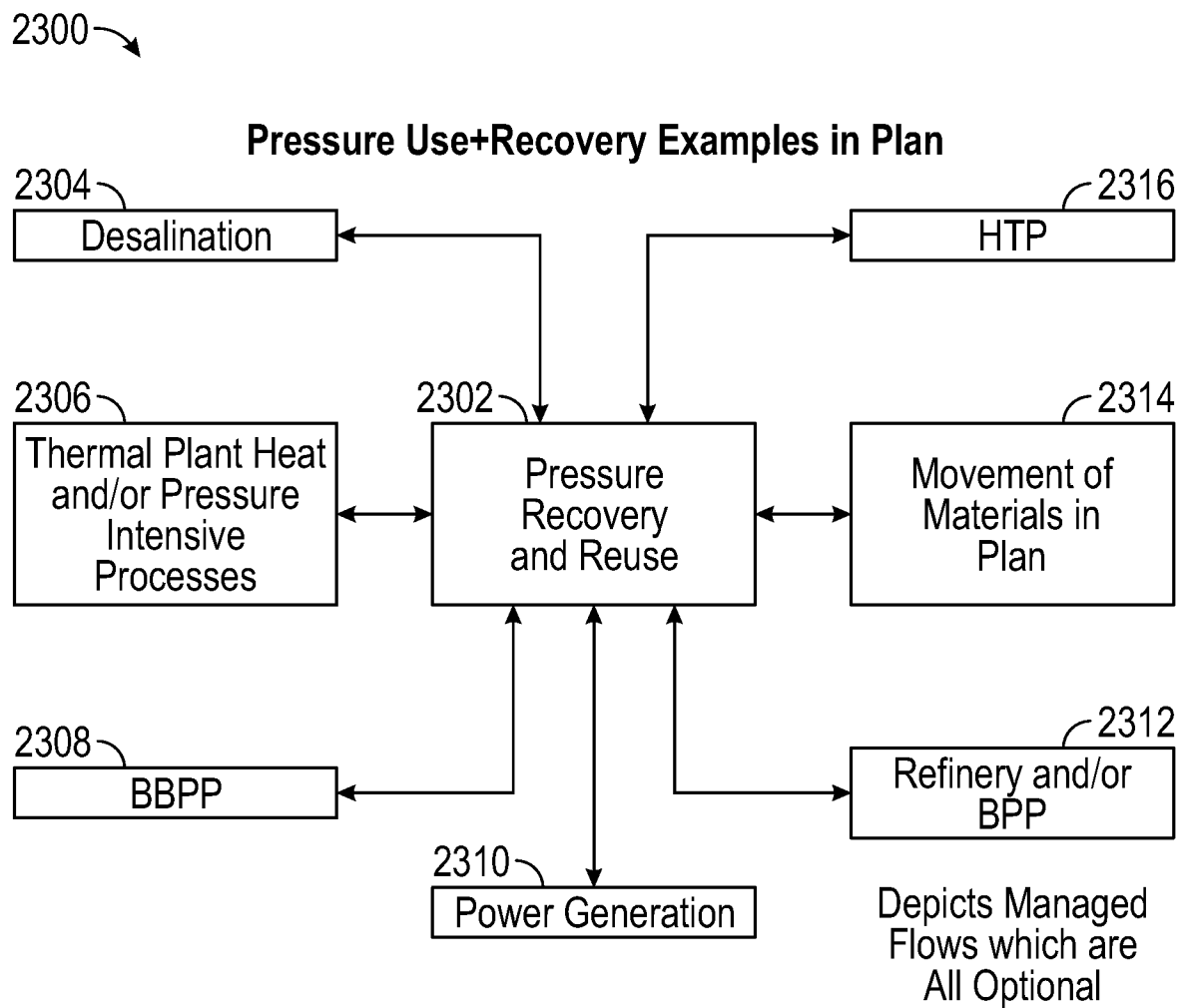
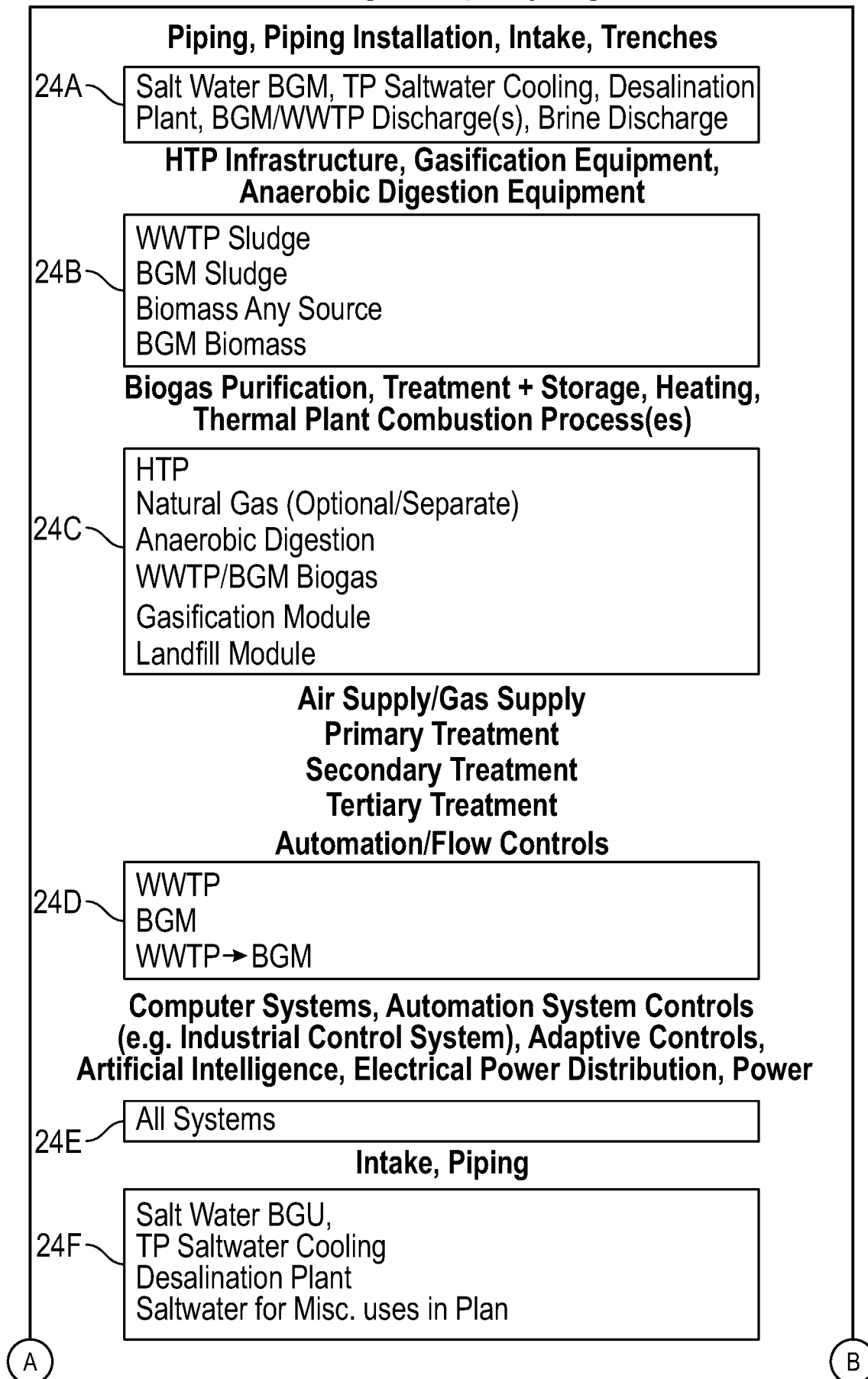


FIG. 23

25/32

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

26/32

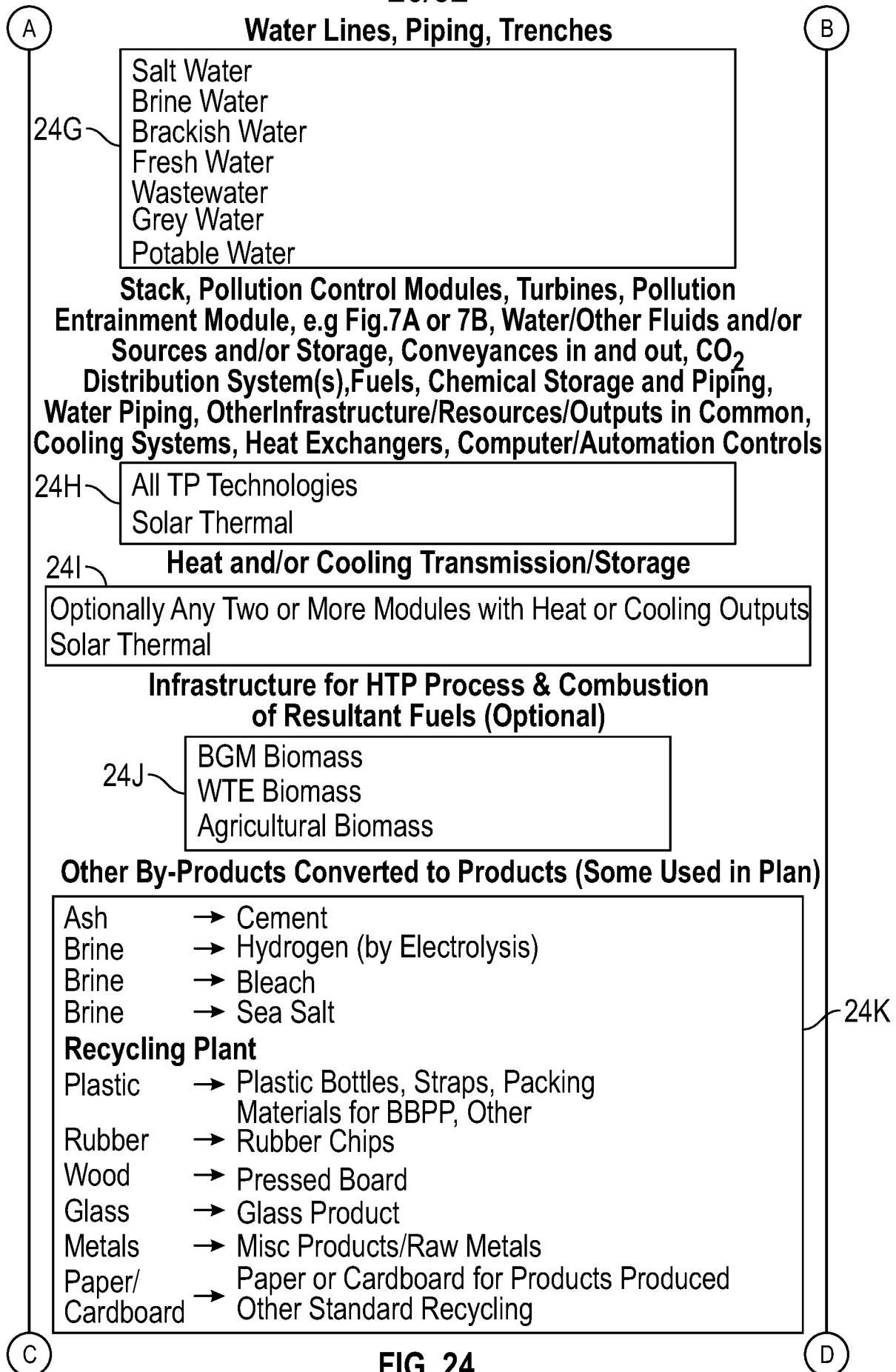


FIG. 24

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)

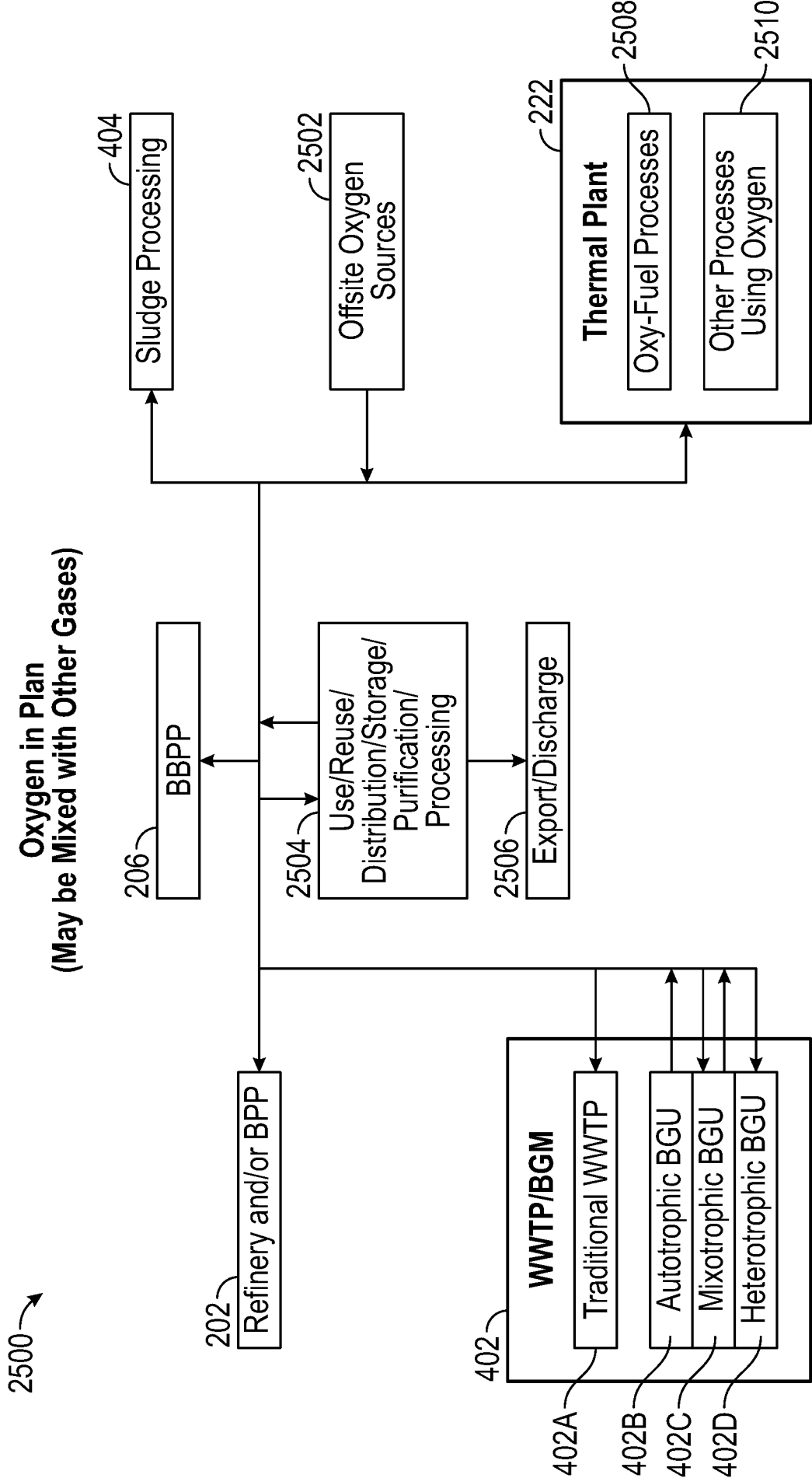
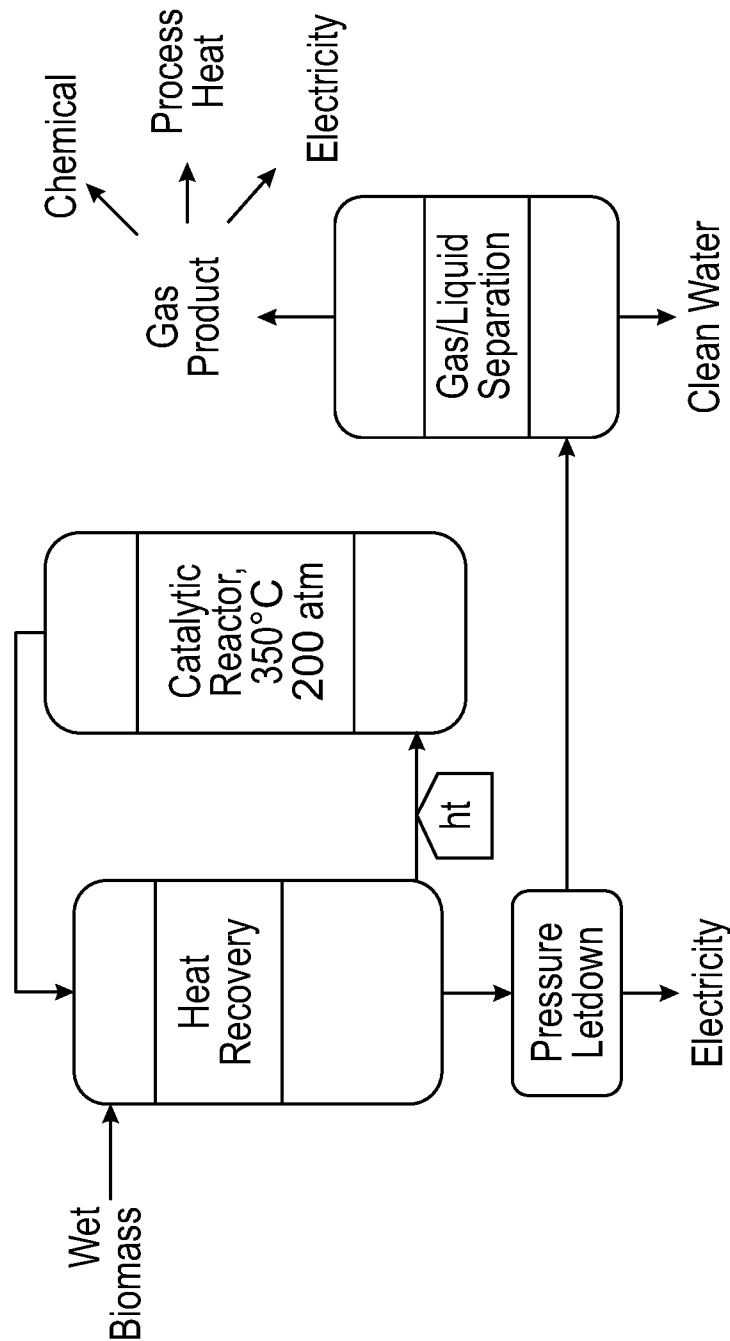


FIG. 25



Catalytic Hydrothermal Gasification at Subcritical Conditions

FIG. 26

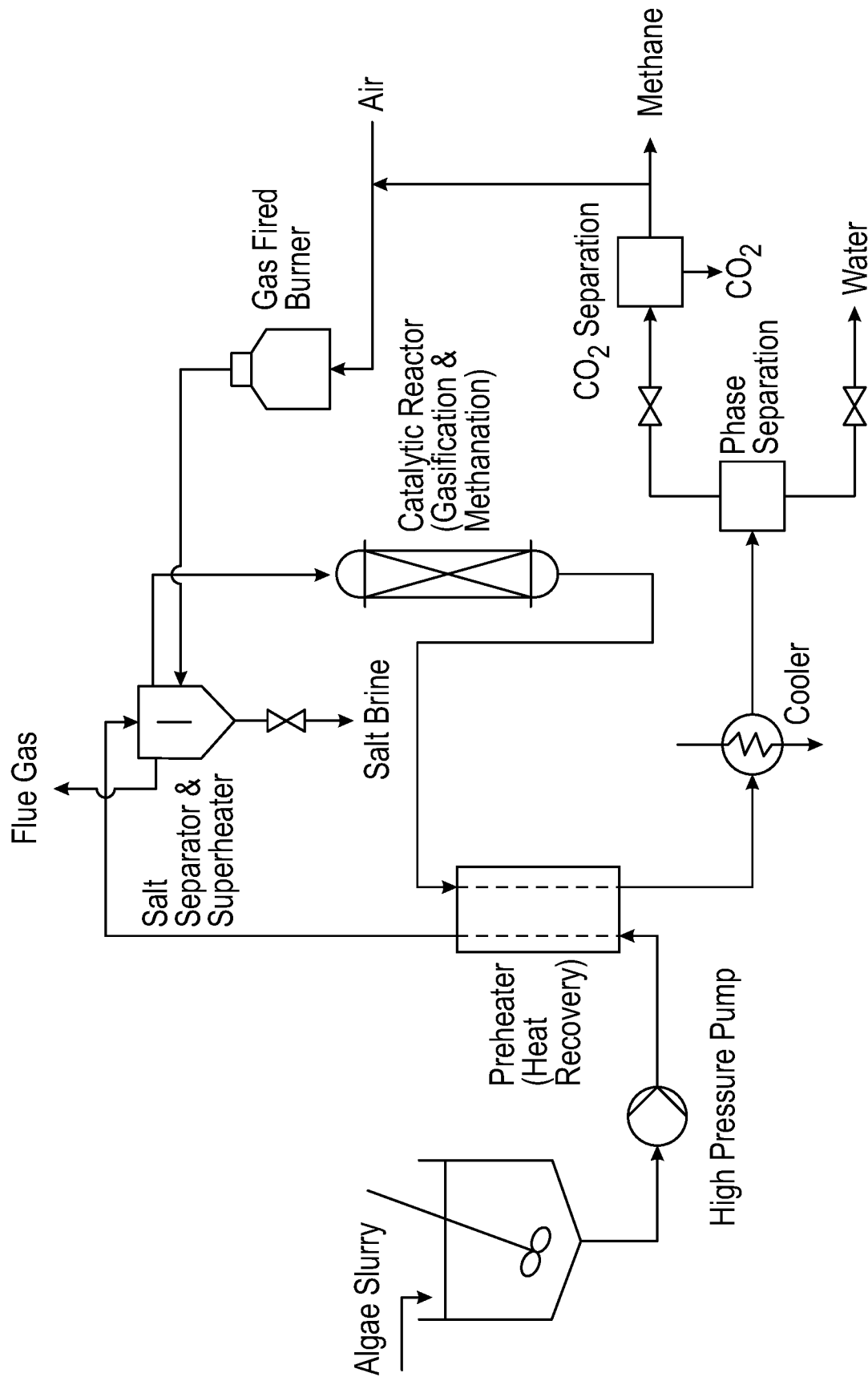


FIG. 27

