

F22D

PREHEATING, OR ACCUMULATING PREHEATED, FEED-WATER ; FEED-WATER SUPPLY ; CONTROLLING WATER LEVEL ; AUXILIARY DEVICES FOR PROMOTING WATER CIRCULATION WITHIN BOILERS (chemical treatment of water, e.g. purification, C02F ; enclosed heat-exchange apparatus in general F28D ; controlling in general G05)

Definition statement

This subclass/group covers:

This subclass covers general aspects of, or methods for, preheating or accumulating feed water. All devices in a power plant or a steam boiler for heating water in liquid form, like economisers or water preheaters and accumulating water for preheating purposes, controlling and regulating the water level in said water accumulators, feed-water supply like automatic water feeding and controlling methods are covered. Furthermore safety feed water supply and arrangements of feed water pumps are also covered.

Relationship between large subject matter areas

Water heaters in general are classified in [F24H](#). Generation of steam or vapour is classified in [F22B](#), devices and methods for superheating steam in [F22G](#). Steam engine plants where engine aspects predominate are classified in [F01K](#), domestic central heating systems using steam are classified in [F24D](#), heat exchange or heat transfer in general is classified in F28.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooking vessels	A47J 27/00
Apparatus for making beverages	A47J 31/00
Baking, Roasting, Grilling, Frying	A47J 37/00
Machines for cleaning floors, carpets, furniture, walls, or wall coverings with arrangements for steam generation	A47L 11/4086
Water heater arrangements for cleaning windows	A47L 15/4285
Bathing devices for special therapeutic or hygienic purposes	A61H 33/00

Degasification of liquids or water	B01D 19/00 , C02F 1/20
Cleaning by methods involving the use or presence of liquid steam	B08B 3/00
Treatment of water, waste water, or sewage	C02F 1/00
Washing machines with steam generation	D06F 39/008
Hand irons	D06F 75/00
Use of steam extracted from the engine for feed-water purposes	F01K 7/34
Use of two or more feed-water heaters in series	F01K 7/40
Use of desuperheaters for feed water heating	F01K 7/42
Water heaters for domestic or space-heating systems	F28D 21/0005
Water heaters heated by electric, magnetic or electromagnetic fields	H05B 6/804

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Economiser	heat exchanger for heating feed water normally beyond the boiling point improving the boiler's efficiency
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F22D 1/00

Feed-water heaters, i.e. economisers or like preheaters

Definition statement

This subclass/group covers:

General aspects and constructional features of devices or heat exchangers for heating water normally beyond the boiling point in order to improve the boiler's efficiency arranged in a flow path up stream of an evaporator. This group covers also economisers and preheaters with water tube arranged in the boiler furnace, in fire tubes or in flue ways, with water tubes arranged outside the boiler furnace and heated for example in a separate heat exchanger. Furthermore also water and air preheating systems, combinations of exhaust-steam and smoke-gas water preheater and preheaters incorporating thermal de-aeration are covered.

Relationship between large subject matter areas

Heat exchangers and types thereof are classified in [F28C](#) and [F28D](#), details of heat-exchange and heat-transfer apparatus are classified in [F28F](#).

Informative references

Attention is drawn to the following places, which may be of interest for search:

Safety devices for boilers in general	F22B 37/42
Control of feed-water heaters	F22D 5/00
Thermal de-aeration of water per se	B01D 19/00
Liebig degassing water	C02F 1/20
Hollow fire-bars, grates, or the like used as water tubes	F23H 3/02
Valves for venting	F16K 24/04
Heat exchange apparatus in boiler for heating air supplied for combustion	F22B 31/08

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Economiser	feed water heater
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F22D 3/00

Accumulators for preheated water

Definition statement

This subclass/group covers:

Accumulators and storage vessels for water which is heated in an economiser arranged within the combustion chamber or combined with steam accumulators and thereby heated by steam or connected directly to boilers by water conduits. Water accumulators with preheated water specially adapted for locomotives and control devices are also covered by this group.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Plants characterised by the use of steam or heat accumulators	F01K 3/004
Vehicles being a steam locomotive	F01K 17/025
Steam boilers of fire-box type, locomotive boilers	F22B 13/06
Control of feed water heaters; water-level and feeding	F22D 5/00

F22D 5/00

Controlling water feed or water level; Automatic water feeding or water-level regulators (steam traps F16T; measuring or indicating instruments G01; for indicating water level G01F; level control in general G05D9/00)

Definition statement

This subclass/group covers:

Devices and methods for controlling the supply of feed water and the feed water level using intermediate compartments, pivoting buckets, receptacles outside of the boiler and devices with float actuated valves, responsive to thermal expansion and contraction, with electric switches. Also regulators with varying the speed or delivery pressure of feed pumps and automatic feed-control systems are covered by said group.

Relationship between large subject matter areas

Documents concerning measuring volume, volume flow, mass flow or liquid

level are classified in [G01F](#) and documents concerning level control in general in [G05D 9/00](#).

References relevant to classification in this group

This subclass/group does not cover:

Steam traps	F16T
Measuring or indicating instruments	G01
For indicating water level	G01F
Level control in general	G05D 9/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control devices of plants characterised by condensers	F01K 9/023
Control system for two or more steam generators including feeding	F22B 35/008
Applications and arrangements of alarm or automatic safety devices for steam boilers	F22B 37/42
Control devices for feed water heaters with water tubes arranged in the boiler furnace	F22D 1/12
Arrangements of feed water pumps	F22D 11/02

F22D 7/00

Auxiliary devices for promoting water circulation (adaptation of boilers for promoting water circulation F22B37/34)

Definition statement

This subclass/group covers:

Devices in for promoting or enhancing water circulation like saddles,

deflecting plates, Venturi arrangements, injectors for water or steam, rotary devices like for example pumps, said devices also specially adapted for locomotive boilers. Control devices of said devices are also covered by said group.

Relationship between large subject matter areas

Pumps in general are classified in [F04B](#), [F04C](#), [F04D](#) and [F04F](#)

References relevant to classification in this group

This subclass/group does not cover:

Adaptation of boilers for promoting water circulation	F22B 37/34
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Vehicles being a steam locomotive	F01K 17/025
Control devices for feed water heaters with water tubes arranged in the boiler furnace	F22D 1/12

F22D 11/00

Feed-water supply not provided for in other main groups

Definition statement

This subclass/group covers:

All other aspects of feed water supply, which are not covered by the other main groups, like for example emergency feed water supply, arrangements of feed water cleaning, when the water is cleaned between condenser and boiler and arrangements of feed water pumps

Relationship between large subject matter areas

Pumps in general are classified in [F04B](#), [F04C](#), [F04D](#) and [F04F](#)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Applications and arrangements of alarm or automatic safety devices for steam boilers	F22B 37/42
Water and air preheating systems	F22D 1/36
Feed water heater with direct heat transfer like mixing water with steam	F22D 1/28
Auxiliary devices or apparatus for promoting water circulation	F22D 7/00
Arrangements or modifications of condensate or air pumps	F01K 9/02
Treating live steam, other than thermo-dynamically, cleaning and filtering	F01K 21/06
Regenerating steam by compression done by an injection apparatus	F01K 19/08

Special rules of classification within this group

Only feed water supply devices and methods for which there is no entry in the main group [F22D 7/00](#) are to be classified in [F22D 11/00](#).