

## F15B

**SYSTEMS ACTING BY MEANS OF FLUIDS IN GENERAL; FLUID-PRESSURE ACTUATORS, e.g. SERVO-MOTORS; DETAILS OF FLUID-PRESSURE SYSTEMS, NOT OTHERWISE PROVIDED FOR** (hydraulically or pneumatically operated lifting devices for soil-working machines [A01B 63/10](#); hydraulic drawing presses [B21D](#); hydraulic or pneumatic manipulators [B25J](#); hydraulic or pneumatic tipping devices for vehicles [B60P 1/00](#); hydraulic or pneumatic remote control for railway signals [B61L 7/04](#); hydraulic or pneumatic mine supports [E21D 15/44](#); motors, turbines, compressors, blowers, pumps [F01 - F04](#); {fluid signal amplifiers, relays [F15C](#) } ; fluid dynamics [F15D](#); fluid clutches or brakes [F16D](#); fluid springs [F16F](#); fluid gearing [F16H](#); pistons, cylinders packing [F16J](#); valves, taps, cocks, actuating-floats [F16K](#); safety valves with auxiliary fluid operation of the main valve [F16K 17/10](#); fluid-operating means for valves [F16K 31/12](#); pipes, pipe joints [F16L](#); lubricating [F16N](#))

### Definition statement

*This place covers:*

Systems transferring mechanical energy by means of a fluid under pressure using the principles of fluid statics or hydrostatics, i.e. hydraulic or pneumatic systems

### References

#### Limiting references

*This place does not cover:*

Desalination	<a href="#">B63J 1/00</a>
Water purification	<a href="#">C02F 1/00</a>
Engine water cooling	<a href="#">F01P 3/00</a>
Fuel injection	<a href="#">F02M</a>
Central heating systems	<a href="#">F24D 3/00</a>

#### Informative references

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

Hydraulically or pneumatically operated lifting devices for soil-working machines	<a href="#">A01B 63/10</a>
Hydraulic drawing presses	<a href="#">B21D</a>
Hydraulic or pneumatic manipulators	<a href="#">B25J</a>
Hydraulic or pneumatic tipping devices for vehicles	<a href="#">B60P 1/00</a>
Hydraulic or pneumatic remote control for railway signals	<a href="#">B61L 7/04</a>
Hydraulic or pneumatic mine supports	<a href="#">E21D 15/44</a>
Motors, turbines, compressors, blowers, pumps	<a href="#">F01 - F04</a>
Steam engines	<a href="#">F01B</a>
Perpetua mobilia using fluid	<a href="#">F03B 17/00</a>
Fluid signal amplifiers, relays	<a href="#">F15C</a>

Fluid dynamics	<a href="#">F15D</a>
Fluid clutches or brakes	<a href="#">F16D</a>
Fluid springs	<a href="#">F16F</a>
Fluid gearing	<a href="#">F16H</a>
Pistons, cylinders packing	<a href="#">F16J</a>
Valves, taps, cocks, actuating-floats	<a href="#">F16K</a>
Safety valves with auxiliary fluid operation of the main valve	<a href="#">F16K 17/10</a>
Fluid-operating means for valves	<a href="#">F16K 31/12</a>
Pipes, pipe joints	<a href="#">F16L</a>
Lubricating	<a href="#">F16N</a>

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Pneumatic	using air or an inert gas (except steam) as a pressure medium.
Hydraulic	using a liquid as the pressure medium.
Telemotor	system or device in which a substantially constant amount of fluid is trapped between an input member and an output member to act as a fluid link
Servomotor	fluid-pressure actuator, e.g. a piston and a cylinder, directly controlled by a valve or other device (e.g. pump) which is responsive to operation of an initial controlling member (e.g. joystick). The initial controlling member may be adjacent to the servomotor or at a distance and may be, e.g. a hand lever.

## F15B 1/00

### Installations or systems with accumulators; Supply reservoir or sump assemblies

## References

### Informative references

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

Hydro-pneumatic suspensions	<a href="#">B60G 17/056</a> , <a href="#">F16F 9/06</a>
Pumps having reservoirs	<a href="#">F04B 41/04</a>
Central heating systems	<a href="#">F24D 3/1008</a>

## Special rules of classification

The main group [F15B 1/00](#) is complemented by the main group [F15B 2201/00](#) and is used for classifying invention information only.

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Accumulator	vessel for storing pressurised liquid (e.g. using a liquid and a gas chamber separated by a membrane or piston or using an elastic housing)
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## F15B 1/02

**Installations or systems with accumulators (energy recuperation means [F15B 21/14](#)) ; devices damping pulsations or vibrations for fluids for use in, or connection with, pipes or pipe systems [F16L 55/04](#))**

## References

### Informative references

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

Energy recuperation means	<a href="#">F15B 21/14</a>
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## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Accumulator	vessel for storing pressurised liquid (e.g. using a liquid and a gas chamber separated by a membrane or piston or using an elastic housing)
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## F15B 1/021

**{used for damping}**

## References

### Informative references

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

Pumps having accumulators for reducing pressure pulsations	<a href="#">F04B 11/0008</a>
Hydro-pneumatic suspensions	<a href="#">F16F 9/08</a>
Buffers for preventing water hammer	<a href="#">F16L 55/05</a>

## F15B 1/022

**{used as an emergency power source, e.g. in case of pump failure}**

## References

### Informative references

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

See also	<a href="#">F15B 2211/212</a>
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**Special rules of classification**

[F15B 2211/212](#) takes precedence

**F15B 1/024**

{used as a supplementary power source, e.g. to store energy in idle periods to balance pump load}

**Definition statement**

*This place covers:*

Also for recuperation of hydraulic energy (as e.g. used in hydraulic excavators)

**References****Informative references**

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

Dredgers or soil-shifting machinery with energy recovery arrangements	<a href="#">E02F 9/2217</a>
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**F15B 1/025**

{used for thermal compensation, e.g. to collect expanded fluid and to return it to the system as the system fluid cools down}

**References****Informative references**

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

Central heating systems	<a href="#">F24D 3/1008</a>
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**F15B 1/027**

having accumulator charging devices (control of fluid pressure in general [G05D 16/00](#))

**Definition statement**

*This place covers:*

E.g. valves controlling flow of hydraulic fluid to and from the liquid chamber of an accumulator.

**References****Informative references**

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

Accumulator gas charging devices	<a href="#">F15B 1/08</a> , <a href="#">F15B 2201/415</a>
Control of fluid pressure in general	<a href="#">G05D 16/00</a>

## F15B 1/04

**Accumulators (connection of valves to inflatable elastic bodies [B60C 29/00](#))**

### Definition statement

*This place covers:*

Vessel for storing pressurised liquid (e.g. using a liquid and a gas chamber separated by a membrane or piston or using an elastic housing).

### References

#### Limiting references

*This place does not cover:*

Pressure vessels per se	<a href="#">F17C 1/00</a>
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#### Informative references

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

See also	<a href="#">F15B 2201/00</a>
Pumps having accumulators for reducing pressure pulsations	<a href="#">F04B 11/0008</a>
Hydro-pneumatic suspensions	<a href="#">F16F 9/08</a>
Buffers for preventing water hammer	<a href="#">F16L 55/05</a>
Central heating systems	<a href="#">F24D 3/1008</a>

### Special rules of classification

The sub-group [F15B 1/04](#) is complemented by the main group [F15B 2201/00](#) and is used for classifying invention information only. [F15B 2201/00](#) takes precedence.

### Synonyms and Keywords

*In patent documents, the following words/expressions are often used as synonyms:*

- "pressure accumulator", "Druckspeicher", "Hydrospeicher" and "Accumulateur"
- "bladder-type accumulator" and "Blasenspeicher"
- "membrane-type accumulator" and "Membranspeicher"
- "accumulator using pistons" and "Kolbenspeicher"
- "accumulators having springs" and "Federspeicher"

## F15B 1/08

**using a gas cushion; Gas charging devices; Indicators or floats therefor**

### References

#### Informative references

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

See also	<a href="#">F15B 2201/205</a>
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**Special rules of classification**

[F15B 2201/205](#) takes precedence.

**F15B 1/083**

{the accumulator having a fusible plug}

**Definition statement**

*This place covers:*

Accumulators with a safety plugs that melt at a certain temperature for relieving the pressure.

**F15B 1/086**

{the gas cushion being entirely enclosed by the separating means, e.g. foam or gas-filled balls}

**References****Limiting references**

*This place does not cover:*

Accumulators using bladders	<a href="#">F15B 1/165</a>
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**Informative references**

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

See also	<a href="#">F15B 2201/3154</a>
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**Special rules of classification**

[F15B 2201/3154](#) takes precedence.

**F15B 1/10**

with flexible separating means

**References****Informative references**

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

Accumulators with flexible separating means but without gas cushion	<a href="#">F15B 1/04</a>
See also	<a href="#">F15B 2201/315</a>

**Special rules of classification**

[F15B 2201/315](#) takes precedence.

Accumulators not using a gas cushion are classified in [F15B 1/04](#) even if they have flexible separating means (e.g. a membrane).

## F15B 1/103

{the separating means being bellows}

### Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.

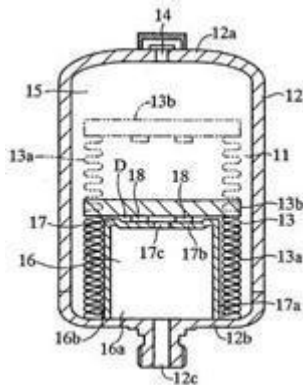


Fig. from US2004244857

### References

#### Informative references

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

See also	<a href="#">F15B 2201/3153</a>
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### Special rules of classification

[F15B 2201/3153](#) takes precedence.

### Synonyms and Keywords

*In patent documents, the following words/expressions are often used as synonyms:*

- "bellows", "Faltenbalg" and "soufflet"

## F15B 1/106

{characterised by the way housing components are assembled}

### References

#### Informative references

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

See also	<a href="#">F15B 2201/605</a>
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### Special rules of classification

[F15B 2201/605](#) takes precedence.

**F15B 1/125**

{characterised by the attachment means ([F15B 1/14](#) takes precedence)}

**Special rules of classification**

[F15B 1/14](#) takes precedence.

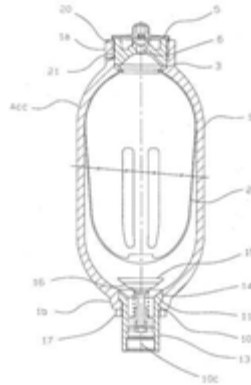
**F15B 1/165**

{in the form of a bladder}

**Definition statement**

*This place covers:*

Accumulators using bladders, i.e. essentially cylindrical flexible separating means having a first open end portion which is normally rounded and a second end portion with a fluid inlet for separating a



hydraulic fluid and a gas.

Fig. from US2006042707

**References****Informative references**

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

See also	<a href="#">F15B 2201/3152</a>
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**Special rules of classification**

[F15B 2201/3152](#) takes precedence.

**Synonyms and Keywords**

*In patent documents, the following words/expressions are often used as synonyms:*

- "bladder", "Blase" and "vessie"
- " bladder-type accumulator", "Blasenspeicher" and "accumulateur à vessie"



**F15B 1/18****Anti-extrusion means****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

See also	<a href="#">F15B 2201/43</a>
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**Special rules of classification**[F15B 2201/43](#) takes precedence.**F15B 1/20****fixed to the separating means****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

See also	<a href="#">F15B 2201/435</a>
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**Special rules of classification**[F15B 2201/435](#) takes precedence.**F15B 1/22****Liquid port constructions****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

See also	<a href="#">F15B 2201/41</a>
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**Special rules of classification**[F15B 2201/41](#) takes precedence.**F15B 1/24****with rigid separating means, e.g. pistons****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

See also	<a href="#">F15B 2201/31</a>
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**Special rules of classification**

[F15B 2201/31](#) takes precedence.

Accumulators using springs and no gas cushion are classified in [F15B 1/04](#) even if they have rigid separating means (e.g. a piston).

**F15B 1/26**

**Supply reservoir or sump assemblies**

**References**

**Informative references**

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

Reservoirs for vehicle braking systems	<a href="#">B60T 17/06</a>
Fluid supply systems for power steering systems with reservoirs	<a href="#">B62D 5/07</a>
Pumps having reservoirs	<a href="#">F04B 41/04</a>

**F15B 3/00**

**Intensifiers or fluid-pressure converters, e.g. pressure exchangers; Conveying pressure from one fluid system to another, without contact between the fluids {(fluid-driven pumps [F04B 9/08](#))}**

**Definition statement**

This place covers:

Devices for converting fluid energy, i.e. from a flow of fluid having high pressure and low flow rate to a flow of fluid having low pressure and high flow rate or vice versa.

E.g. devices using pistons of different size or rotating fluid pumps and motors of different capacity.

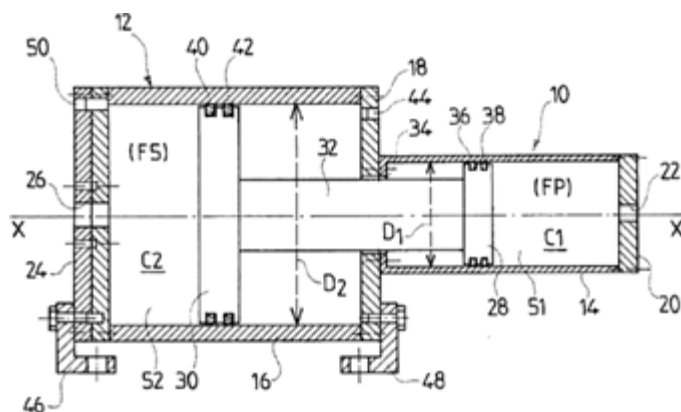


Fig. from FR2822906

**References**

**Limiting references**

This place does not cover:

Fluid-driven pumps	<a href="#">F04B 9/08</a>
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**Informative references**

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

Pressure intensifiers in processes of separation using semi-permeable membranes, e.g. dialysis, osmosis	<a href="#">B01D 61/00</a>
Fluid-driven pumps	<a href="#">F04B 9/08</a>

**F15B 5/00**

**Transducers converting variations of physical quantities, e.g. expressed by variations in positions of members, into fluid-pressure variations or vice versa; Varying fluid pressure as a function of variations of a plurality of fluid pressures or variations of other quantities ([F15B 9/00](#) takes precedence; for measuring or controlling [G01](#), [G05](#))**

**References****Limiting references**

This place does not cover:

Fluid pressure actuators	<a href="#">F15B 15/00</a>
Pressure sensors	<a href="#">G01L 9/00</a>

**Informative references**

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

Transducers for measuring or controlling	<a href="#">G01</a> , <a href="#">G05</a>
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**Special rules of classification**

[F15B 9/00](#) takes precedence.

## F15B 7/00

Systems in which the movement produced is definitely related to the output of a volumetric pump; Telemotors {(for control in motor vehicles [B60K](#); in ships [B63H 25/00](#); in aircraft [B64C 13/00](#); combinations of telemotor and servomotor systems [F15B 17/00](#))}

### Definition statement

*This place covers:*

E.g. systems wherein a master cylinder is directly connected to a slave cylinder. Illustrative example:

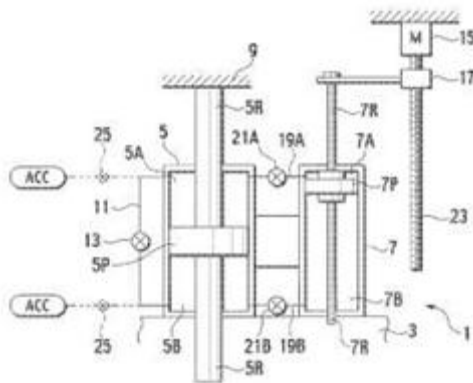


Fig. from WO2006129746

### References

#### Informative references

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

Combinations of telemotor and servomotor systems	<a href="#">F15B 17/00</a>
For control in motor vehicles	<a href="#">B60K</a>
Vehicle brakes	<a href="#">B60T 1/08</a> , <a href="#">B60T 1/093</a>
For control in ships	<a href="#">B63H 25/00</a>
For control in aircraft	<a href="#">B64C 13/00</a>
Hydraulic clutch actuation	<a href="#">F16D 25/00</a>
Hydraulic gear shifting devices	<a href="#">F16H 61/30</a>

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Telemotor	system or device in which a substantially constant amount of fluid is trapped between an input member and an output member to act as a fluid link, e.g. realised as a master cylinder which is directly connected to a slave cylinder.
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**F15B 7/001**

{with multiple inputs (input units [F15B 7/08](#), e.g. for dual control)}

**References****Informative references**

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

Input units (e.g. master cylinders)	<a href="#">F15B 7/08</a>
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**F15B 7/005**

{with rotary or crank input (input units [F15B 7/08](#))}

**References****Informative references**

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

Input units	<a href="#">F15B 7/08</a>
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**F15B 7/04**

in which the ratio between pump stroke and motor stroke varies with the resistance against the motor (in brake-actuating systems for motor vehicles [B60T](#))

**References****Informative references**

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

In brake actuating systems for motor vehicles	<a href="#">B60T</a>
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**F15B 7/06**

Details ([F15B 15/00](#) takes precedence)

**Special rules of classification**

[F15B 15/00](#) takes precedence for slave cylinders.

**F15B 7/08**

Input units; Master units

**References****Informative references**

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

Vehicle brake master cylinders	<a href="#">B60T 11/16</a>
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## F15B 7/10

Compensation of the liquid content in a system ([F15B 7/08](#) takes precedence; pressure-maintaining arrangements for brake master cylinders [B60T 11/228](#))

### References

#### Informative references

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

Pressure-maintaining arrangements for brake master cylinders	<a href="#">B60T 11/228</a>
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### Special rules of classification

[F15B 7/08](#) takes precedence.

## F15B 9/00

Servomotors with follow-up action {, e.g. obtained by feed-back control,} i.e. in which the position of the actuated member conforms with that of the controlling member {([F15B 11/10](#) takes precedence)}

### Definition statement

*This place covers:*

Fluid power drives using position feed-back

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Servomotor	fluid-pressure acutator, e.g. a piston and a cylinder, directly controlled by a valve or other device (e.g. pump) which is responsive to operation of an initial controlling member (e.g. joystick). The initial controlling member may be adjacent to the servomotor or at a distance and may be, e.g. a hand lever.
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## F15B 9/10

in which the controlling element and the servomotor each controls a separate member, these members influencing different fluid passages or the same passage

### Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.

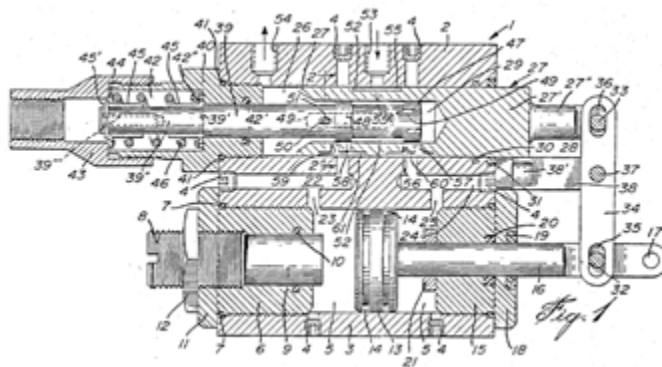


Fig. from US4733601

## F15B 9/12

in which both the controlling element and the servomotor control the same member influencing a fluid passage and are connected to that member by means of a differential gearing

### Definition statement

*This place covers:*

This class is also used for systems with a differential gear ratio of 1:1. Illustrative example:

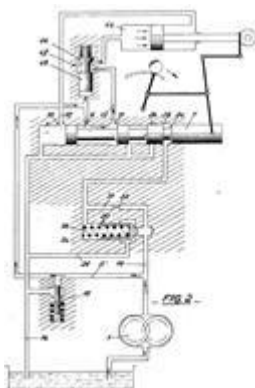


Fig. from FR74115

## F15B 9/16

Systems essentially having two or more interacting servomotors {, e.g. multi-stage ([F15B 18/00](#), [F15B 20/00](#) take precedence; servo-operated pilot valves for the following stage [F15B 13/042](#))}

### Definition statement

*This place covers:*

E.g. multi-stage systems

### References

#### Informative references

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

Servo-operated pilot valves for the following stage	<a href="#">F15B 13/042</a>
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## F15B 11/00

Servomotor systems without provision for follow-up action; {Circuits therefor} ([F15B 3/00](#) takes precedence)

### Definition statement

*This place covers:*

Servomotor systems without provision for follow-up action and circuits therefor

### Special rules of classification

The main group [F15B 11/00](#) is implemented by the main group [F15B 2211/00](#) and is used for classifying invention information only. [F15B 2211/00](#) takes precedence.

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Servomotor	fluid-pressure acuator, e.g. a piston and a cylinder, directly controlled by a valve or other device (e.g. pump) which is responsive to operation of an initial controlling member (e.g. joystick). The initial controlling member may be adjacent to the servomotor or at a distance and may be, e.g. a hand lever.
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## F15B 11/003

{Systems with load-holding valves (locking valve details [F15B 13/01](#))}

### Definition statement

*This place covers:*

This class comprises releasable check valves and proportional braking valves.



## References

### Informative references

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

Locking valve details	<a href="#">F15B 13/01</a>
See also	<a href="#">F15B 2211/30515</a>

## Special rules of classification

[F15B 2211/30515](#) takes precedence.

## Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "load holding valve" and "Lasthalteventil"
- "releasable check valve" and "Entsperrbares Rückschlagventil "

## F15B 11/022

{in which a rapid approach stroke is followed by a slower, high-force working stroke ([F15B 11/0325](#) takes precedence)}

## References

### Informative references

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

See also	<a href="#">F15B 2211/775</a>
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## F15B 11/024

by means of differential connection of the servomotor lines, e.g. regenerative circuits {(interconnecting valve details [F15B 13/021](#))}

## References

### Limiting references

This place does not cover:

Regeneration valves per se	<a href="#">F15B 13/021</a>
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### Informative references

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

Systems with directional control valves having a regenerative position	<a href="#">F15B 2211/3133</a>
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**F15B 11/028**

for controlling the actuating force ([F15B 11/024](#) takes precedence)

**References****Informative references**

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

See also	<a href="#">F15B 2211/76</a>
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**Special rules of classification**

[F15B 11/024](#), [F15B 2211/76](#) take precedence.

**F15B 11/032**

by means of fluid-pressure converters (fluid-pressure converters per se [F15B 3/00](#))

**References****Informative references**

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

Fluid pressure converters	<a href="#">F15B 3/00</a>
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**F15B 11/036**

by means of servomotors having a plurality of working chambers (servomotors per se [F15B 15/00](#))

**References****Informative references**

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

Servomotors (fluid pressure actuators)	<a href="#">F15B 15/00</a>
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**F15B 11/0406**

{during starting or stopping ([F15B 11/048](#) takes precedence)}

**References****Informative references**

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

See also	<a href="#">F15B 2211/755</a> , <a href="#">F15B 2211/851</a> , <a href="#">F15B 2211/853</a>
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**Special rules of classification**

[F15B 11/048](#), [F15B 2211/00](#) take precedence.

**F15B 11/042**

by means in the feed line {, i.e. "meter in"} ([F15B 11/046](#), [F15B 11/05](#) take precedence)

**References****Limiting references**

*This place does not cover:*

Servomotor systems for controlling the speed of an output member, the speed depending on the position of the working member	<a href="#">F15B 11/046</a>
Servomotor systems specially adapted to maintain constant speed force of an output member	<a href="#">F15B 11/05</a>

**Informative references**

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

Servomotor systems with directional control combined with flow control by regulating in feed line, i.e. meter-in control	<a href="#">F15B 2211/351</a>
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**Special rules of classification**

[F15B 11/05](#), [F15B 2211/351](#) take precedence.

**F15B 11/0423**

{by controlling pump output or bypass, other than to maintain constant speed (adjusting pump output or bypass to maintain constant speed [F15B 11/055](#))}

**References****Informative references**

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

Adjusting pump output or bypass to maintain constant speed	<a href="#">F15B 11/055</a>
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**F15B 11/0426**

{by controlling the number of pumps or parallel valves switched on}

**Definition statement**

*This place covers:*

E.g. systems controlling the speed by means of so-called digital valves or by means of systems using pulse code modulation (PCM)

## References

### Informative references

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

Circuits with digital valves	<a href="#">F15B 2211/40592</a>
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## F15B 11/044

by means in the return line {, i.e. "meter out"} ([F15B 11/046](#), [F15B 11/05](#) take precedence)

## References

### Limiting references

This place does not cover:

Servomotor systems for controlling the speed of an output member, the speed depending on the position of the working member	<a href="#">F15B 11/046</a>
Servomotor systems specially adapted to maintain constant speed force of an output member	<a href="#">F15B 11/05</a>

### Informative references

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

Servomotor systems with directional control combined with flow control by regulating means in return line, i.e. meter-out control	<a href="#">F15B 2211/353</a>
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## Special rules of classification

[F15B 11/05](#), [F15B 2211/353](#) take precedence.

## F15B 11/0445

{with counterbalance valves, e.g. to prevent overrunning or for braking}

## References

### Informative references

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

Counterbalance valves	<a href="#">F15B 13/029</a>
Pressure control using counterbalance valves	<a href="#">F15B 2211/50581</a>

## Special rules of classification

[F15B 2211/50581](#) takes precedence

## F15B 11/05

specially adapted to maintain constant speed, e.g. pressure-compensated, load-responsive {([F15B 11/161](#) takes precedence; counterbalance valves [F15B 11/0445](#); valves for load sensing [F15B 13/0416](#))}

### References

#### Informative references

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

Valves for load sensing	<a href="#">F15B 13/0416</a>
Directional control valves in combination with pressure compensating valves	<a href="#">F15B 2211/3053</a>
Flow control using pressure compensating valves	<a href="#">F15B 2211/40553</a>

### Synonyms and Keywords

In patent documents, the following abbreviations are often used:

LS	Load sensing
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In patent documents, the following words/expressions are often used as synonyms:

- "pressure-compensated", "Lastdruckunabhängig" and "LUDV"
- "pressure compensator", "pressure compensating valve" and "Druckwaage"

## F15B 11/055

{by adjusting the pump output or bypass (pump control [F04B 49/00](#))}

### References

#### Informative references

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

Pressure margin control in load sensing systems	<a href="#">F15B 2211/253</a>
Pump control	<a href="#">F04B 49/002</a>

### Special rules of classification

[F15B 11/165](#) takes precedence.

## F15B 11/06

involving features specific to the use of a compressible medium, e.g. air, steam

### References

#### Informative references

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

Control specific to compressible fluids	<a href="#">F15B 2211/8855</a>
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## F15B 11/12

providing distinct intermediate positions; with step-by-step action {with a number of pistons in a single cylinder step-by-step action obtained by combining two or more servomotors [F15B 11/18](#); (for restricting the stroke [F15B 15/24](#))}

### References

#### Informative references

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

Step-by-step action obtained by combining two or more servomotors (actuators)	<a href="#">F15B 11/18</a>
Restricting the stroke of servomotors (actuators)	<a href="#">F15B 15/24</a>

## F15B 11/15

with special provision for automatic return {(fluid gearing with oscillating input or output [F16H 43/00](#))}

### References

#### Informative references

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

Fluid gearing with oscillating input or output	<a href="#">F16H 43/00</a>
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## F15B 11/16

with two or more servomotors {(for soil-shifting machines [E02F 9/22](#))}

### References

#### Informative references

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

For soil-shifting machines	<a href="#">E02F 9/22</a>
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### Synonyms and Keywords

In patent documents, the following abbreviations are often used:

LS	Load sensing
----	--------------

In patent documents, the following words/expressions are often used as synonyms:

- "pressure-compensated", "Lastdruckunabhängig" and "LUDV"
- "pressure compensator", "pressure compensating valve" and "Druckwaage"

## F15B 11/162

{for giving priority to particular servomotors or users (priority valve details [F15B 13/022](#); for power steering [B62D 5/07](#))}

### References

#### Informative references

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

Priority valve details	<a href="#">F15B 13/022</a>
Flow control using flow dividers	<a href="#">F15B 2211/40523</a>
One or more output members having priority	<a href="#">F15B 2211/781</a>
For power steering	<a href="#">B62D 5/07</a>

## F15B 11/163

{for sharing the pump output equally amongst users or groups of users, e.g. using anti-saturation, pressure compensation}

### References

#### Informative references

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

Valves for load sensing	<a href="#">F15B 13/0416</a>
Directional control valves in combination with pressure compensating valves	<a href="#">F15B 2211/3053</a>
Flow control using pressure compensating valves	<a href="#">F15B 2211/40553</a>

## F15B 11/165

{for adjusting the pump output or bypass in response to demand}

### References

#### Informative references

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

Maintaining constant speed by controlling pump output or bypass	<a href="#">F15B 11/055</a>
Pressure margin control in load sensing systems	<a href="#">F15B 2211/253</a>
Pump control	<a href="#">F04B 49/002</a>

**F15B 11/168**

{with an isolator valve (duplicating valve), i.e. at least one load sense [LS] pressure is derived from a work port load sense pressure but is not a work port pressure itself}

**References****Informative references**

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

Load-sensing circuits with isolator valves	<a href="#">F15B 2211/6058</a>
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**Special rules of classification**

[F15B 2211/6058](#) takes precedence.

**F15B 11/17**

using two or more pumps

**References****Informative references**

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

Servomotor systems with multiple pumps	<a href="#">F15B 2211/20576</a>
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**F15B 11/20**

controlling several interacting or sequentially-operating members (fluid distribution or supply devices for the control of two or more servomotors

[F15B 13/06](#))

**References****Informative references**

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

Fluid distribution or supply devices for the control of two or more servomotors	<a href="#">F15B 13/06</a>
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**F15B 11/205**

{the position of the actuator controlling the fluid flow to the subsequent actuator (telescopic booms [B66C 23/70](#))}

**References****Informative references**

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

Telescopic booms	<a href="#">B66C 23/70</a>
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## F15B 11/22

### Synchronisation of the movement of two or more servomotors

#### References

##### *Informative references*

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

See also	<a href="#">F15B 2211/782</a>
Synchronisation of cylinders in fluid-driven presses	<a href="#">B30B 15/24</a>

## F15B 13/00

Details of servomotor systems ({[F15B 1/04](#), [F15B 1/26](#), [F15B 3/00](#), [F15B 7/08](#), [F15B 11/02](#), [F15B 11/10](#),} [F15B 15/00](#) take precedence){; Valves for servomotor systems}

#### Definition statement

*This place covers:*

Components of hydraulic or pneumatic circuits such as valves and flow dividers.

#### Special rules of classification

[F15B 1/04](#), [F15B1/06](#), [F15B 3/00](#), [F15B 5/00](#), [F15B 7/08](#), [F15B 11/02](#), [F15B 11/10](#), [F15B 15/00](#), [F15B 2201/00](#) take precedence

## F15B 13/01

Locking-valves or other detent, {i.e. load-holding}, devices (associated with the actuator [F15B 15/26](#); {systems with load-holding valves [F15B 11/003](#)})

#### References

##### *Informative references*

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

Systems with load holding valves	<a href="#">F15B 11/003</a> , <a href="#">F15B 2211/30515</a>
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#### Synonyms and Keywords

*In patent documents, the following words/expressions are often used as synonyms:*

- "over-centre valve", "Lasthalteventil", "Senkbremsventil" and "locking-valve"

## F15B 13/02

Fluid distribution or supply devices characterised by their adaptation to the control of servomotors ([F15B 11/15](#) takes precedence } ; multiple-way valves [F16K 11/00](#))

### References

#### Informative references

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

Multiple-way valves	<a href="#">F16K 11/00</a>
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### Special rules of classification

Subgroups [F15B 13/022](#) - [F15B 13/029](#) are not complete

## F15B 13/021

{Valves for interconnecting the fluid chambers of an actuator (regenerative circuits [F15B 11/024](#))}

### References

#### Informative references

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

Regenerative circuits	<a href="#">F15B 11/024</a>
Systems with directional control valves having a separate valve for interconnecting the fluid chambers of an actuator	<a href="#">F15B 2211/3058</a>
Systems with directional control valves having a regenerative position	<a href="#">F15B 2211/3133</a>

### Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "valves for interconnecting the fluid chambers of an actuator" and "Regeneration valves"

## F15B 13/022

{Flow-dividers; Priority valves (circuits for giving priority to particular servomotors [F15B 11/162](#); priority valves for power steering [B62D 5/07](#))}

### References

#### Informative references

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

Circuits for giving priority to a particular servomotor	<a href="#">F15B 11/162</a>
Flow control using flow dividers	<a href="#">F15B 2211/40523</a>
Priority valves for power steering	<a href="#">B62D 5/07</a>

**F15B 13/023****{Excess flow valves, e.g. for locking cylinders in case of hose burst}****Synonyms and Keywords***In patent documents, the following words/expressions are often used as synonyms:*

- "excess flow valves", "Rohrbruchsicherung" and "clapet parachute"

**F15B 13/027****{Check valves}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Load holding valves	<a href="#">F15B 13/01</a>
Locking valves	<a href="#">F15B 13/01</a>

**F15B 13/029****{Counterbalance valves}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Servomotor systems with counterbalance valves	<a href="#">F15B 11/0445</a>
Pressure control using counterbalance valves	<a href="#">F15B 2211/50581</a>

**F15B 13/0402****{for linearly sliding valves, e.g. spool valves}****Definition statement***This place covers:*

Illustrative example of subject matter classified in this group.

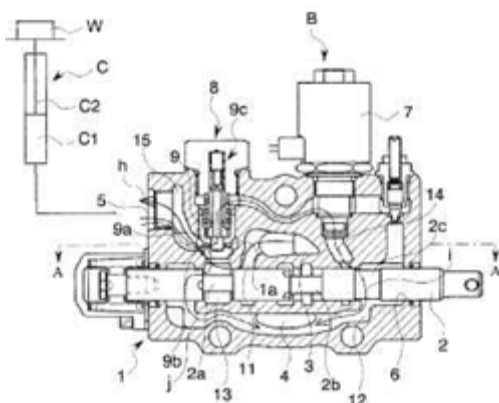


Fig. from WO2008015752

## F15B 13/0416

{with means or adapted for load sensing (fluid systems with load sensing [F15B 11/05](#), [F15B 11/161](#))}

### References

#### Informative references

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

Systems with load sensing	<a href="#">F15B 11/05</a> , <a href="#">F15B 11/161</a> , <a href="#">F15B 2211/3053</a>
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## F15B 13/0422

{with manually-operated pilot valves, e.g. joysticks (arrangements of handles or pedals for cranes [B66C 13/54](#); control levers for dredgers and soil shifting machines [E02F 9/2004](#); similar mechanical control actuators [G05G 9/047](#))}

### References

#### Informative references

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

Arrangements of handles or pedals for cranes	<a href="#">B66C 13/54</a>
Control levers for dredgers and soil shifting machines	<a href="#">E02F 9/2004</a>
Similar mechanical control actuators	<a href="#">G05G 9/047</a>

## F15B 13/043

with electrically-controlled pilot valves {(electrically-operated main valves [F15B 13/044](#))}

### References

#### Informative references

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

Electrically operated main valves	<a href="#">F15B 13/044</a>
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**F15B 13/044**

operated by electrically-controlled means, e.g. solenoids, torque-motors  
{(electrically-controlled pilot valves [F15B 13/043](#))}

**References****Informative references**

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

Electrically controlled pilot valves	<a href="#">F15B 13/043</a>
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**F15B 13/0832**

{Modular valves}

**References****Informative references**

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

Modular valves in general	<a href="#">F16K 27/003</a>
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**F15B 13/0867**

{Data bus systems}

**References****Informative references**

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

Servomotor systems using data bus, e.g. CAN bus	<a href="#">F15B 21/085</a>
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**F15B 13/16**

Special measures for feedback {, e.g. by a follow-up device (servomotors with follow-up action [F15B 9/00](#); devices with means or adapted for load sensing [F15B 13/0416](#))}

**References****Informative references**

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

Servomotors with follow-up action	<a href="#">F15B 9/00</a>
Devices with means or adapted for load sensing	<a href="#">F15B 13/0416</a>

**F15B 15/00**

**Fluid-actuated devices for displacing a member from one position to another (motors for continuous movement [F01](#) - [F03](#)); Gearing associated therewith**

**Definition statement**

*This place covers:*

Hydraulic or pneumatic actuators with linear or non-continuous rotary output.

**References****Limiting references**

*This place does not cover:*

Motors with continuous rotary movement	<a href="#">F01</a> , <a href="#">F03</a>
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**F15B 15/06**

**for mechanically converting rectilinear movement into non- rectilinear movement**

**References****Informative references**

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

Fluid-driven safety belt tensioners	<a href="#">B60R 22/4628</a>
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**F15B 15/063**

**{Actuator having both linear and rotary output, i.e. dual action actuator}**

**References****Informative references**

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

Corresponding FI class	F15B15/06&E
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**F15B 15/08**

**characterised by the construction of the motor unit (pistons, cylinders, packing [F16J](#))**

**References****Informative references**

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

Pistons, cylinders, packings	<a href="#">F16J</a>
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**F15B 15/082**

{the motor being of the slotted cylinder type (locking mechanisms therefor [F15B 15/265](#))}

**References****Informative references**

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

Locking mechanisms therefor	<a href="#">F15B 15/265</a>
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**F15B 15/084**

{the motor being of the rodless piston type, e.g. with cable, belt or chain (locking mechanisms therefor [F15B 15/265](#))}

**References****Informative references**

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

Locking mechanisms therefor	<a href="#">F15B 15/265</a>
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**F15B 15/10**

the motor being of diaphragm type (connection of valves to inflatable elastic bodies [B60C 29/00](#); diaphragms, bellows [F16J 3/00](#) {; clutches with a fluid-actuated elastic clutching member [F16D 25/04](#)})

**References****Limiting references**

This place does not cover:

Inflatable flexible elements for lifting goods	<a href="#">B66F 3/35</a>
Bellows pistons	<a href="#">F16J 3/06</a>

**Informative references**

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

Hoisting using inflatable flexible elements	<a href="#">B66F 3/35</a>
Pneumatic actuators for EGR valves	<a href="#">F02M 26/58</a>
Clutches with fluid-actuated elastic clutching member	<a href="#">F16D 25/04</a>
Bellows	<a href="#">F16J 3/06</a>
Corresponding FTerms	3H081/AA14-3H081/AA18

## F15B 15/103

{using inflatable bodies that contract when fluid pressure is applied, e.g. pneumatic artificial muscles or McKibben-type actuators}

### Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.

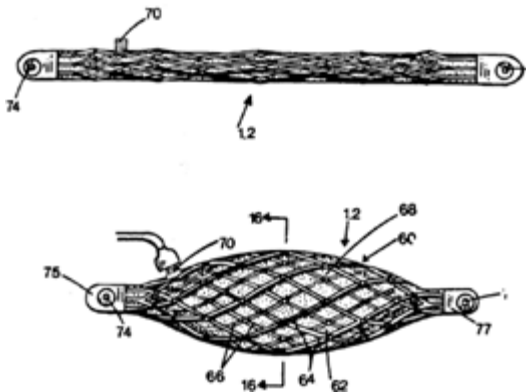


Fig. from US4819547

### References

#### Informative references

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

Corresponding FI class	F15B15/10&H
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### Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "fluidic muscle-type actuator", "McKibben-type actuator" and "Fluidischer Muskel"

## F15B 15/12

of the oscillating-vane or curved-cylinder type

### References

#### Limiting references

*This place does not cover:*

Rotary motors with continuous output movement	<a href="#">F01C 9/002</a> , <a href="#">F03C 4/00</a> , <a href="#">F04C 9/002</a>
Sealings for vane motors	<a href="#">F16J 15/545</a>



**F15B 15/125****{of the curved-cylinder type}****Definition statement***This place covers:*

Illustrative example of subject matter classified in this group.

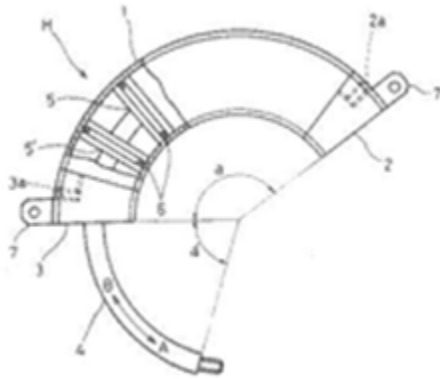


Fig. from JP58163805

**F15B 15/1404****{in clusters, e.g. multiple cylinders in one block (servomotors having a plurality of working chambers [F15B 11/036](#); motors with two or more independently movable working pistons [F15B 15/1409](#))}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Systems with servomotors having a plurality of working chambers	<a href="#">F15B 11/036</a>
Motors with two or more independently movable working pistons	<a href="#">F15B 15/1409</a>

**F15B 15/1409****{with two or more independently movable working pistons (systems [F15B 11/12](#), [F15B 11/18](#))}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Servomotor systems with step-by-step action	<a href="#">F15B 11/12</a>
Servomotor systems with stepwise operation	<a href="#">F15B 11/18</a>

**F15B 15/1447****{Pistons; Piston to piston rod assemblies}****References*****Limiting references****This place does not cover:*

Pistons per se	<a href="#">F16J 1/00</a>
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**F15B 15/18****Combined units comprising both motor and pump {(telemotors [F15B 7/00](#))}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Telemotors	<a href="#">F15B 7/00</a>
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**F15B 15/26****Locking mechanisms {(locking valves not combined with the actuator [F15B 13/01](#))}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Locking valves not combined with the actuator	<a href="#">F15B 13/01</a>
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**F15B 15/261****{using positive interengagement, e.g. balls and grooves, for locking in the end positions}****Definition statement***This place covers:*

Locking mechanisms using positive interengagement for locking in any distinct position (not restricted to locking in the end positions).

**F15B 15/264****{Screw mechanisms attached to the piston}****Definition statement***This place covers:*

This subgroup contains documents relating to locking mechanisms using screw mechanisms attached to the piston but not using friction.

**F15B 15/2869**

{using electromagnetic radiation, e.g. radar or microwaves}

**Special rules of classification**

[F15B 15/2846](#) takes precedence.

**F15B 17/00**

**Combinations of telemotor and servomotor systems**

**References****Informative references**

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

Telemotors	<a href="#">F15B 7/00</a>
Servomotors with follow-up	<a href="#">F15B 9/00</a>
Servomotors without follow-up	<a href="#">F15B 11/00</a>

**F15B 18/00**

**Parallel arrangements of independent servomotor systems**

**Definition statement**

*This place covers:*

E.g. redundant systems.

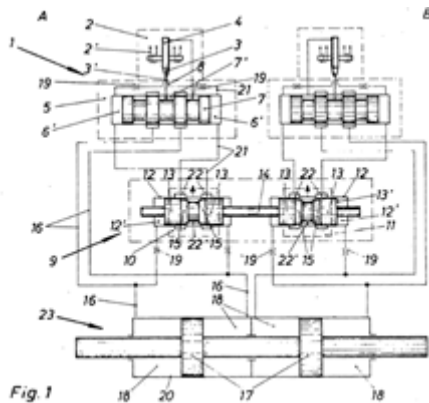


Fig. from DE1940946A1

**F15B 19/00**

**Testing; {Calibrating; Fault detection or monitoring; Simulation or modelling of} fluid-pressure systems or apparatus not otherwise provided for**

**References****Informative references**

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

Testing of fluid pressure systems	<a href="#">F15B 2211/855</a>
Monitoring of fluid pressure systems	<a href="#">F15B 2211/857</a>

**F15B 20/00**

**Safety arrangements; Applications of safety devices (safety devices in general [F16P](#), [{F16P 3/22}](#)); Emergency measures**

**References****Informative references**

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

Control during or prevention of an electric or electronic failure	<a href="#">F15B 2211/862</a>
Control during or prevention of an hydraulic or pneumatic failure	<a href="#">F15B 2211/863</a>
Control during or prevention of a human failure	<a href="#">F15B 2211/8643</a>
Prevention of failures	<a href="#">F15B 2211/865</a>
Detection of failures	<a href="#">F15B 2211/87</a>
Control measures for coping with failures	<a href="#">F15B 2211/875</a>
Safety devices in general	<a href="#">F16P</a>
Safety devices for pneumatic or hydraulic control systems	<a href="#">F16P 3/22</a>

**F15B 20/002**

**{Electrical failure}**

**References****Informative references**

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

Control during or prevention of electric or electronic failures	<a href="#">F15B 2211/862</a>
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**F15B 20/004****{Fluid pressure supply failure}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Fluid supply failure	<a href="#">F15B 2211/8633</a>
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**F15B 20/005****{Leakage; Spillage; Hose burst}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Valve or hose failure	<a href="#">F15B 2211/8636</a>
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**F15B 20/008****{Valve failure ([F15B 18/00](#) takes precedence)}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Valve or hose failure:	<a href="#">F15B 2211/8636</a>
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**F15B 21/006****{Compensation or avoidance of ambient pressure variation (systems with a pressurised main reservoir [F15B 1/265](#))}****References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Systems with a pressurised main reservoir	<a href="#">F15B 1/265</a>
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**F15B 21/008****{Reduction of noise or vibration}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

For pumps	<a href="#">F04B 39/0027</a>
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**F15B 21/02****Servomotor systems with programme control derived from a store or timing device; Control devices therefor ({programme control in washing-machines [D06F 33/04](#)}; programme control in general [G05B 19/00](#))****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Servomotor systems with electrically operated control means	<a href="#">F15B 21/08</a>
Programme control in general	<a href="#">G05B 19/00</a>

**F15B 21/044****{Deaeration, venting, bleeding; Removal or measurement of undissolved gas (preventing cavitation [F15B 21/047](#))}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Preventing cavitation	<a href="#">F15B 21/047</a>
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**Synonyms and Keywords***In patent documents, the following words/expressions are often used as synonyms:*

- "deaeration" and "Entlüftung"

**F15B 21/045****{Viscosity or temperature compensation (warming up fluid systems [F15B 21/042](#))}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Warming up fluid systems	<a href="#">F15B 21/042</a>
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**F15B 21/047**

{Preventing foaming, churning or cavitation (supply reservoir or sump assemblies [F15B 1/26](#))}

**References****Informative references**

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

Supply reservoir or sump assemblies	<a href="#">F15B 1/26</a>
Control during or prevention of cavitation	<a href="#">F15B 2211/8609</a>

**F15B 21/048**

{Compressed air preparation units, e.g. comprising air driers or condensers, filters, oilers or lubricators, pressure regulators (for steam traps [F16T](#); for mist lubrication [F16N 7/32](#); for air conditioning [F24F](#))}

**References****Informative references**

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

For mist lubrication	<a href="#">F16N 7/32</a>
For steam traps	<a href="#">F16T</a>
For airconditioning	<a href="#">F24F</a>

**F15B 21/06**

Use of special fluids, e.g. liquid metal; Special adaptations of fluid-pressure systems, or control of elements therefor, to the use of such fluids

**References****Limiting references**

This place does not cover:

Actuators having special fluid pressurization means	<a href="#">F15B 2015/208</a>
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**F15B 21/065**

{Use of electro- or magnetosensitive fluids, e.g. electrorheological fluid}

**References****Informative references**

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

Control specific to the type of fluid, e.g. specific to magnetorheological fluid	<a href="#">F15B 2211/885</a>
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## F15B 21/085

{using a data bus, e.g. "CANBUS"}

### References

#### Informative references

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

Modular units using data bus	<a href="#">F15B 13/0867</a>
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### Special rules of classification

[F15B 13/0867](#) takes precedence.

## F15B 21/10

Delay devices or arrangements ({hydraulic braking [F15B 11/076](#)} ; associated with fluid motors or actuators [F15B 15/22](#))

### References

#### Informative references

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

Hydraulic braking	<a href="#">F15B 11/076</a>
Delay devices associated with fluid motors or actuators	<a href="#">F15B 15/22</a>

## F15B 21/12

Fluid oscillators or pulse generators (fluid oscillators predominantly used for computing or control purposes [F15C 1/22](#), [F15C 3/16](#))

### References

#### Informative references

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

Fluid oscillators used for computing or control purposes	<a href="#">F15C 1/22</a> , <a href="#">F15C 3/16</a>
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## F15B 21/14

Energy recuperation means (for vehicles [B60T 1/10](#)); {Means for reducing energy consumption (regenerative circuits [F15B 11/024](#))}

### References

#### Informative references

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

Regenerative circuits	<a href="#">F15B 11/024</a>
Control measure for saving energy	<a href="#">F15B 2211/88</a>
For vehicles	<a href="#">B60T 1/10</a>



Systems for storing electric energy in the form of pneumatic energy	<a href="#">H02J 15/006</a>
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