

Spring-preloaded clamp with a releasable anti-backdrive lock

Fictional mechanical example. Demonstration only; no customer's invention or private source data is used.

Abstract

A manually operated clamp includes a fixed jaw and a guided movable jaw on a frame. An eccentric cam driven by a lever acts on a follower through a compression spring, moving the movable jaw towards the fixed jaw while accommodating variation in workpiece thickness. A toothed wheel coupled to the cam shaft is engaged by a spring-biased pawl to resist reverse shaft rotation. A release tab disengages the pawl so that the lever can retract the jaw. The spring provides a compliant load path, while the pawl and wheel provide a separate holding mechanism. This arrangement is a fictional technical example; its performance and patentability have not been assessed.

Limitations

This fictional example was created for demonstration, not from a customer's invention.

No novelty search, patentability opinion, freedom-to-operate assessment or professional legal review has been performed.

The figures are illustrative, not to scale. Materials, tolerances, spring loads, wear and safety have not been tested.

Claims, terminology, drawing requirements and filing forms require jurisdiction-specific review. This is not a filing package.

Technical disclosure

Background

A rigid cam clamp may impose different loads on workpieces of different thicknesses. Friction alone may not hold a lever in position when vibration or a reverse load is applied. This example separates compliant force transmission from the anti-backdrive mechanism.

Mechanism

The cam transmits force through a compression spring to the guided movable jaw. A wheel fixed to the cam shaft is held against opening rotation by a pawl. The user intentionally disengages the pawl with a release tab before reversing the lever. A stop limits lever travel.

Detailed description

The frame (100) carries the fixed jaw (110) and a linear guide (130). The movable jaw (120) slides along the guide towards and away from the fixed jaw. A workpiece may be placed between the jaws.

The shaft (140) supports the eccentric cam (150) and is turned by the lever (160). The cam bears on the follower (155). The compression spring (170) is interposed in the force path between the follower and movable jaw (120), so movement of the cam can compress the spring after the movable jaw contacts a workpiece.

The toothed locking wheel (190) is rotationally coupled to the shaft (140). The spring-biased pawl (180) permits rotation in the closing direction and engages a tooth to oppose reverse rotation in the opening direction. The pawl does not replace the spring's compliant force-transmission function.

Depressing the release tab (195) lifts the pawl clear of the wheel. The lever can then rotate in the opening direction, retracting the follower and allowing the jaw to move away. The stop (200) limits closing travel of the lever.

Alternative spring rates, jaw pads and guide forms are possible but require engineering evaluation. This example does not establish a safe working load or assert an advantage measured by testing.

Illustrative claims

1. Independent apparatus claim

A clamp comprising: a frame carrying a fixed jaw and a linear guide; a movable jaw guided along the linear guide towards the fixed jaw; a shaft carrying an eccentric cam and a manually operable lever; a follower acted upon by the eccentric cam; a compression spring interposed in a force-transmission path between the follower and the movable jaw; a toothed locking wheel rotationally coupled to the shaft; and a spring-biased pawl arranged to engage the toothed locking wheel to oppose rotation of the shaft in an opening direction, the pawl having a release tab operable to disengage the pawl from the toothed locking wheel.

2. Dependent on claim 1

The clamp of claim 1, wherein the pawl is arranged to pass over successive teeth of the toothed locking wheel during rotation of the shaft in a closing direction.

3. Dependent on claim 1

The clamp of claim 1, further comprising a stop on the frame arranged to limit travel of the lever in a closing direction.

Illustrative claims continued

4. Dependent on claim 1

The clamp of claim 1, wherein the movable jaw carries a replaceable workpiece-contact pad.

5. Dependent on claim 1

The clamp of claim 1, wherein the compression spring is retained between a seat on the follower and a seat on the movable jaw.

6. Independent method claim

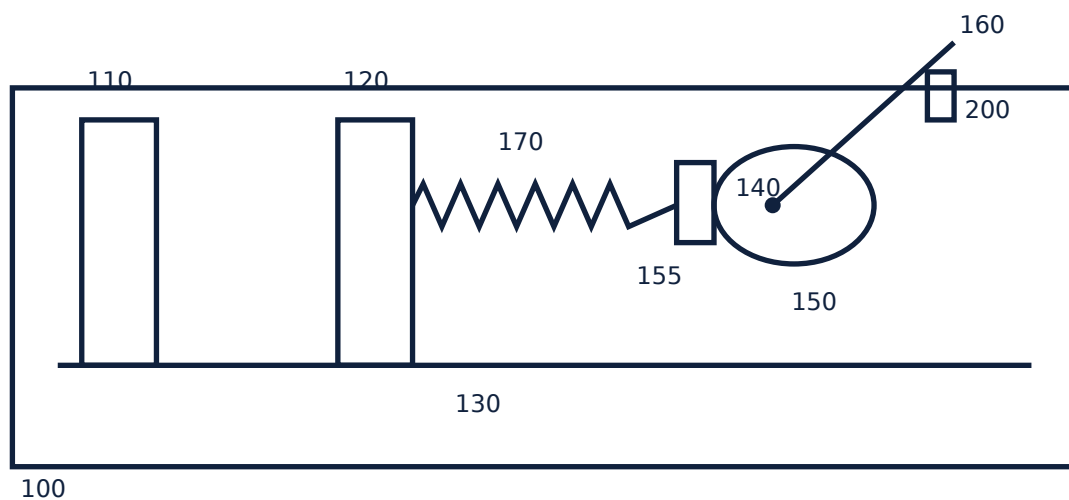
A method of holding a workpiece, comprising: placing the workpiece between a fixed jaw on a frame and a movable jaw guided along a linear guide on the frame; rotating a lever and a shaft carrying an eccentric cam in a closing direction to move a follower and advance the movable jaw through an interposed compression spring; further rotating the lever after contact with the workpiece to compress the compression spring; engaging a spring-biased pawl with a tooth of a locking wheel coupled to the shaft to oppose opening rotation; and releasing the workpiece by operating a release tab to disengage the pawl and rotating the lever in an opening direction.

7. Dependent on claim 6

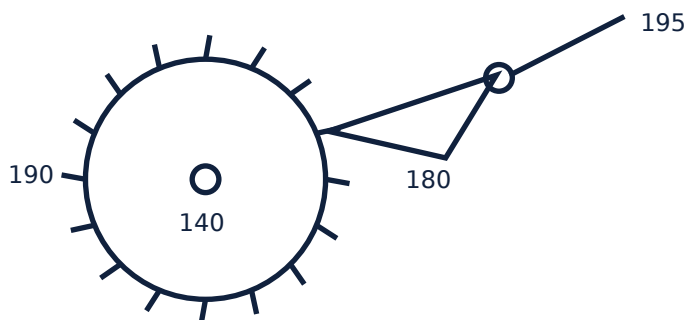
The method of claim 6, wherein closing rotation is limited by contact of the lever with a stop on the frame.

Illustrative figures

Schematic views only — not to scale. Reference numbers correspond to the disclosure and claims.



Schematic side view: jaw movement and compliant force path. The cam and follower compress spring 170 to advance movable jaw 120 along guide 130.



Schematic lock detail: pawl 180 engages wheel 190 on shaft 140; release tab 195 lifts the pawl to permit opening rotation.

Reference numerals and review limits

100 — frame

110 — fixed jaw

120 — movable jaw

130 — linear guide

140 — cam shaft

150 — eccentric cam

155 — cam follower

160 — lever

170 — compression spring

180 — spring-biased pawl

190 — toothed locking wheel

195 — release tab

200 — travel stop

No legal assessment was performed. Before filing, verify technical support for every claim, review relevant prior art and office requirements, and obtain professional advice appropriate to the invention.