United States Patent

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[54] **PRINTING PLATE LOCKING DEVICE**
8 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **101/415.1**
[51] **Int. Cl.** **B41f 27/12**
[50] **Field of Search** 101/415.1, 378, 367

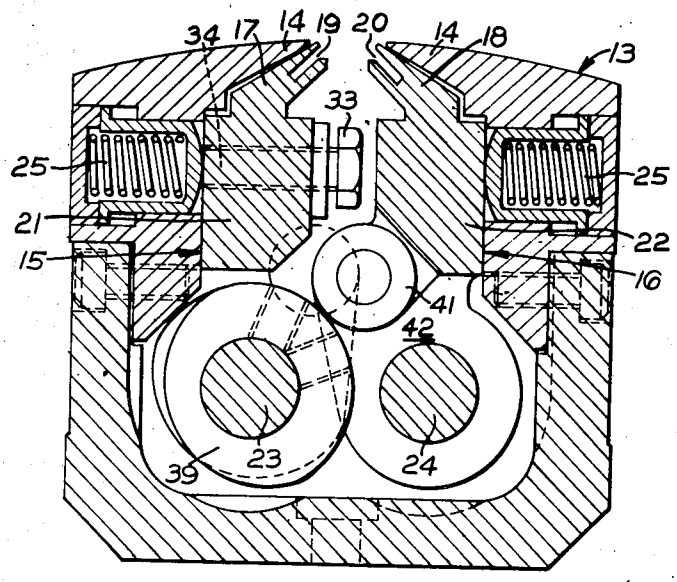
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ABSTRACT: Device for locking a printing plate onto a cylinder of a rotary press which enables the plate to be mounted and tensioned in register for operative rotation of the cylinder in either direction. A pair of grippers, each having a head for engagement with a respective opposite end portion of a plate wrapped around the cylinder, are mounted in a carrier transversely of the cylinder periphery and are each resiliently urged for independent plate-tensioning movement. Adjustment means is engageable alternatively with whichever gripper is to locate the operatively leading end portion of the plate to prevent said movement thereof so as to establish the register of the plate, while leaving the other gripper free to move for tensioning it.



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SHEET 1 OF 2

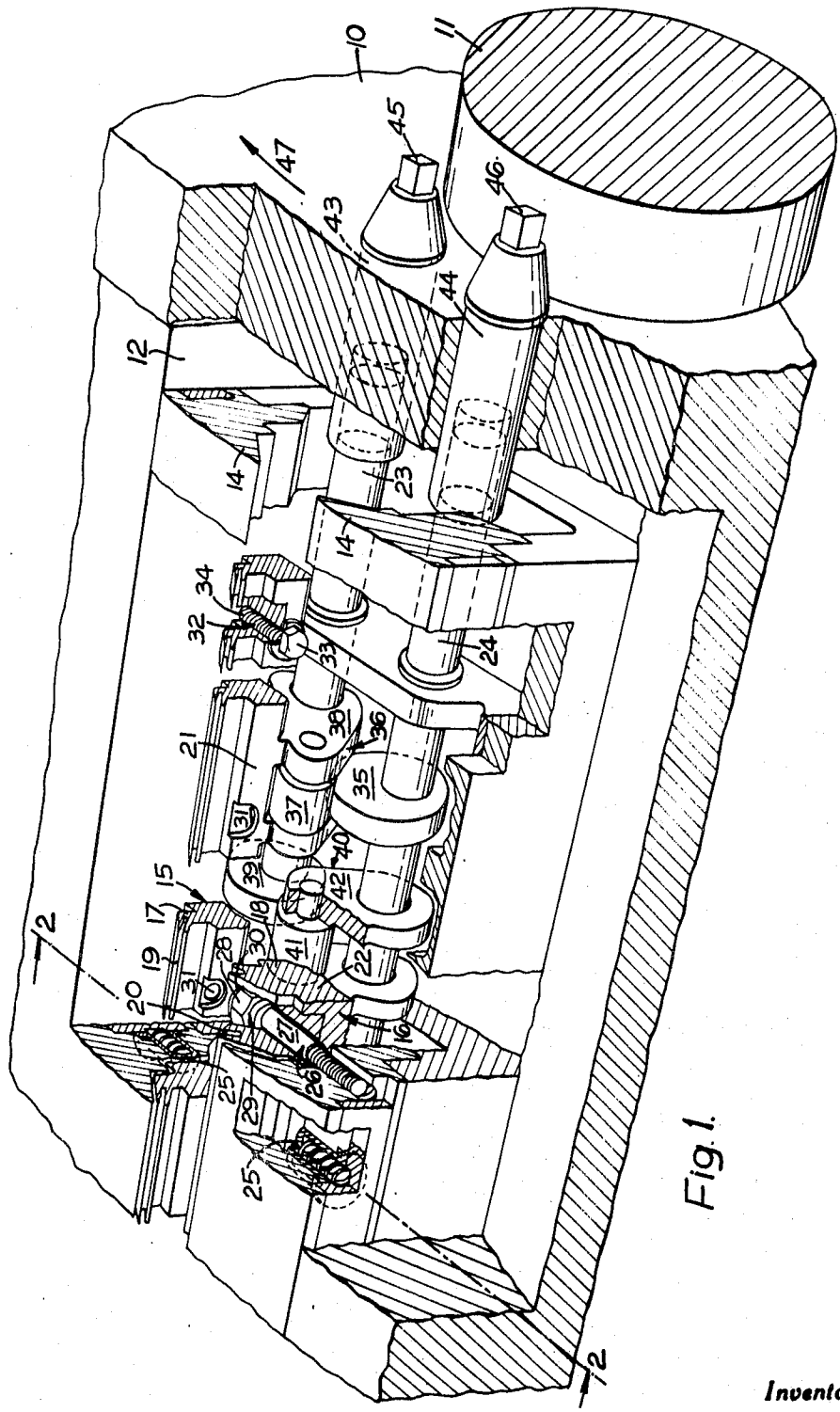


Fig. 1.

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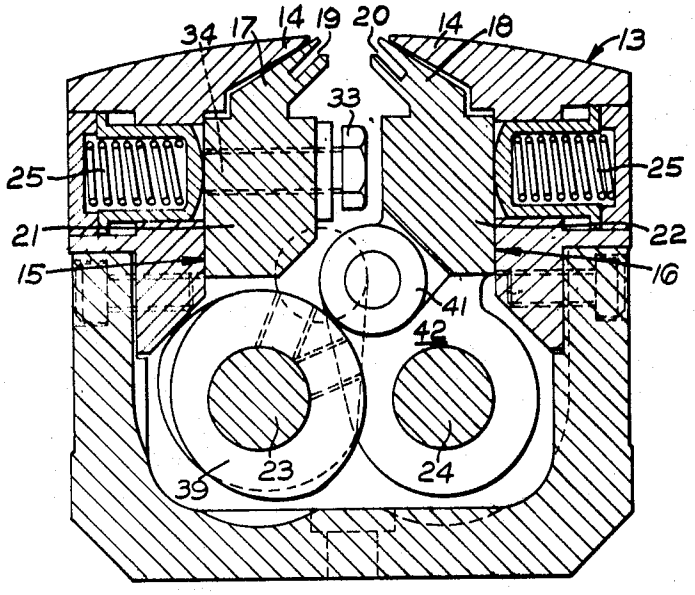


Fig. 2.

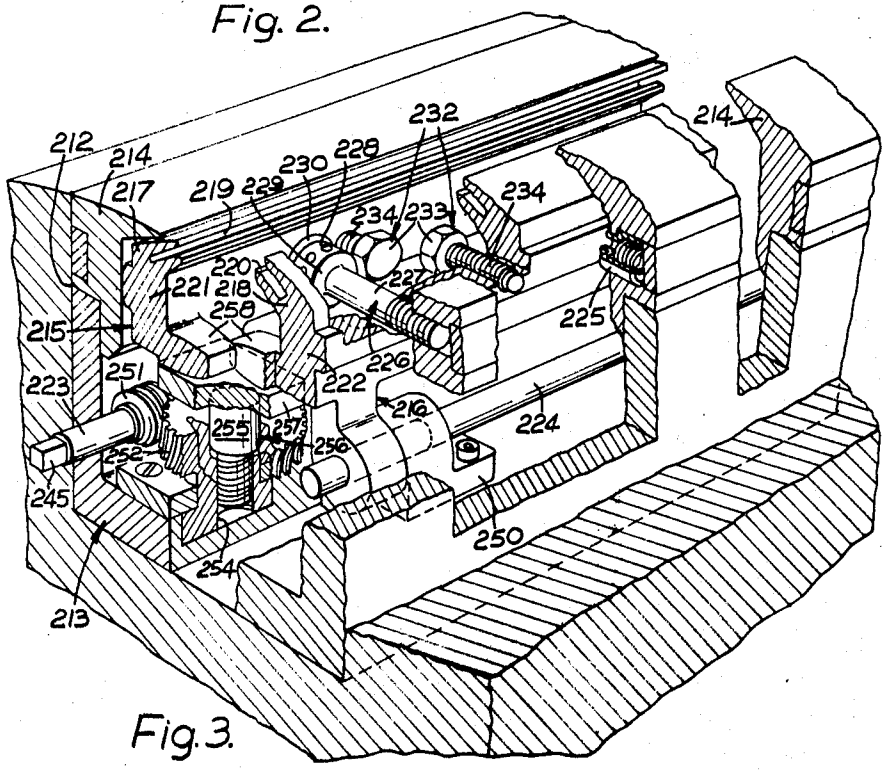


Fig. 3.

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PRINTING PLATE LOCKING DEVICE

This invention relates to printing plate locking devices for incorporation in printing cylinders of rotary printing presses, particularly but not exclusively web offset printing presses.

Web offset press printing plates are usually made of thin sheet metal secured around the periphery of the printing cylinder by a plate-locking device incorporated in a channel across said periphery and having grippers which engage preformed hooked leading and trailing edge portions of the plate. The leading edge of the plate is positively located with respect to the cylinder while the trailing edge is resiliently urged towards the leading edge gripper so as to tension the plate.

The object of the present invention is to provide a printing plate locking device for incorporation in a printing cylinder which permits operative rotation thereof in either direction as well as facilitating adjustment of the positioning of a plate on the cylinder and which is of compact construction and simple and reliable to operate.

In accordance with the present invention a printing plate locking device includes a carrier providing a channel having a mouth extending across the periphery and parallel to the axis of a printing cylinder in use, and a pair of grippers mounted in the cannel with parallel head portions adjacent the channel mouth and respectively adapted to engage opposite end portions of a printing plate wrapped around the cylinder periphery in use, characterized in that each gripper (**15**, **16**; **215**, **216**) is resiliently urged by spring means (**25**; **225**) for independent movement relative to the other gripper and the channel in a direction serving to tension the plate in use, and by adjustment means (**26**; **226**) engageable alternatively with either gripper to prevent said movement only of the gripper so engaged.

Two preferred embodiments of the invention are now described with reference to the accompanying drawings wherein:

FIG. **1** shows a perspective view of a first embodiment of the invention partially broken away for clarity;

FIG. **2** is a cross-sectional view along the line **2**—**2** of FIG. **1**; and

FIG. **3** shows a perspective view of a second embodiment of the invention.

Referring to FIGS. **1** and **2** a first embodiment of a printing plate locking device is shown mounted in a printing cylinder **10** of a conventional web offset press. Cylinder **10** rotates on stub axles **11** operatively journaled in the press and may be rotated in either direction depending on the operation being carried out by the press.

A rectangular section groove **12** extends across the periphery of the cylinder parallel to its axis, in which is received a carrier block **13** providing a channel formation longitudinally of block **13** with a mouth defined by convergent lip portions **14** of the channel walls into which mouth can extend hooked leading and trailing edge portions of a printing plate operatively wrapped around the cylinder periphery.

A pair of plate grippers **15**, **16** are located in the channel and include respective head portions **17**, **18** with respective jaws **19**, **20** directed towards each other but spaced apart in the mouth of the channel to engage said plate edge portions; and respective body portions **21**, **22** located adjacent and parallel to respective sidewalls of the channel. A pair of parallel fulcrum shafts **23**, **24** are journaled in the end walls of block **13** so that they extend along the bottom of the channel and pass through bores in extensions of the respective gripper body portions **21**, **22** to pivot them independently for angular movement, the shafts being freely rotatable in said bores.

Spring-loaded plungers **25** are located in bores at intervals along each sidewall of the carrier block **13** so that they bear on the gripper bodies **21**, **22** and resiliently urge the gripper heads **17**, **18** towards each other.

Adjustment means in the form of a set of adjusting bolts **26** (one only of which is shown in the drawing) are engaged in threaded bores in one of the sidewalls of the carrier block **13** with their shanks **27** passing freely through apertures in the body **22** of the gripper **16** adjacent that sidewall. Heads **28** of the bolts provide abutment formation which are located in the center of the channel between the gripper bodies where they can be rotated by means of a spanner inserted through the mouth of the channel. By screwing the bolts **26** further into the carrier block wall a domed annular face **29** of each bolt where the head **28** adjoins the shank **27** is brought into engagement with the side of gripper body **22** remote from its respective set of spring plungers **25** so as to move the gripper **16** against the springs until it abuts the adjacent sidewall of the carrier block to locate it rigidly. Alternatively by screwing bolts **26** further out of the carrier block wall said faces **29** are moved clear of the gripper **16** but second domed faces **30** defining the outermost end of each bolthead **28** engage abutment faces **31** on the other gripper body **21** moving it against its springs until it abuts the adjacent sidewall of the carrier block.

Abutment screws **32** (of which only one is shown in the drawing) are located at intervals in threaded bores in each gripper body **21**, **22** with their heads **33** protruding into the space between the grippers for engagement by a spanner as before, and the end faces of their threaded shanks **34** projecting through the face of the gripper body adjacent the sidewall of the carrier block, adjustment of these screws permitting variations in the angular position at which each gripper abuts the block under the action of the bolts **26**.

Fulcrum shaft **24** includes one or more cams **35** each in engagement with a cam follower **36** in the form of a roller **37** pivoted in a formation **38** of the body **21** of gripper **15** which protrudes towards the other gripper **16**. A like cam or cams **39** on shaft **23** each engage similar cam followers **40** in the form of rollers **41** pivoted in formation **42** of body **22** of gripper **16**. Assuming that the respective gripper is not rigidly locked by the adjusting bolts **26** it can be angularly moved by rotating the appropriate shaft **23** or **24**. The respective cams and cam followers are staggered on each side of the channel to provide working clearance, and a pair of sleeves **43** and **44** pivotally mounted in an end wall of the cylinder **10** engage the respective shafts **23** and **24** and are rotatable by means of projecting squared ends **45** and **46** with which a key can be engaged.

Assuming that the cylinder **10** is to rotate operatively in the direction indicated by arrow **47**, the leading hooked end portion of a printing plate operatively mounted thereon will be engaged in the jaws **20** of gripper **16** while the like trailing portion will be engaged in jaws **19** of gripper **15**. For this mode of operation adjusting bolts **26** are screwed into the carrier wall until gripper body **22** is positively located in rigid abutment against said wall. The exact circumferential register of the plate relative to the cylinder is adjusted by means of the set of abutment screws **32** in that gripper body **22**. This leaves the other gripper **15** free to move angularly on its fulcrum shaft **23** so that the plate is tensioned by the set of plungers **25** acting on that gripper. If it is desired to release the plate from the cylinder shaft **24** is rotated to bring cams **35** into engagement with the followers **38** of the gripper **15** to release the tension so that the plate can be unhooked.

If it is desired that the cylinder **10** shall be operatively rotated in the direction opposite to that indicated by arrow **47** so that the leading end of the plate becomes that engaged by gripper **15** instead of gripper **16**, adjusting bolts **26** are screwed further out of the sidewall of carrier block **13** freeing gripper **16** for tensioning the trailing end of the plate and rigidly locating gripper **15** in manner corresponding to that described above. In this case the movable tensioning gripper **16** can be released to free the plate by rotating shaft **23**.

The whole plate-locking device can be removed from the cylinder **10** as a unit by disengaging carrier block **13** from the groove **12**.

FIG. **3** illustrates a second embodiment of the invention, parts having the same construction and function as in the first embodiment being given the same reference numerals prefixed by a numeral **2**. The operation of locating one of the grippers **215** or **216** positively by means of adjusting bolts **226**

to receive the leading edge of the printing plate, leaving the other gripper resiliently urged angularly about a respective fulcrum shaft **223** or **224** by its set of spring plungers **225** is exactly the same as was described for the first embodiment. Again abutment screws **232** are provided to adjust the register of the fixed gripper.

Instead of the cam and cam follower gripper release mechanism of the first embodiment, fulcrum shaft **224** serves purely to locate gripper **216** and is mounted in brackets **250** (one only shown) attached to the base wall of the carrier block **213**. The other fulcrum shaft **223** pivotally locates gripper **215** but is freely rotatable in bearings (not shown) formed in the carrier, one end of the shaft extending through the end wall of the cylinder and terminating in a squared end section **245** enabling it to be rotated by a key. A worm **251** on shaft **223** engages a worm wheel **252** journaled at **253** in the base wall of carrier block **213**, and having an axial threaded bore **254**. In this bore is engaged screw stem **255** of jack **256**. Head **257** of the jack is aligned with lugs **258** on each of the gripper bodies **221** and **222**, said lugs projecting towards each other across the center region of the channel between the grippers. Rotation of shaft end **245** enables the head **257** of jack **256** to be moved away from the base of the carrier block so that it moves either or both grippers **215, 216** angularly on their respective fulcrum shafts **223, 224** against the pressure of the spring plungers **225** to enable a plate to be released from engagement therewith as described in connection with the first embodiment.

Various modifications in the constructions above described are envisaged. For example the adjustment bolts **26** may be replaced by a camshaft within the channel, abutment formations in the form of cams having alternative engagement with the two grippers to lock one or other of them against angular movement. The cam and follower or worm and jack gripper release mechanism may be omitted in other embodiments, leaving the plate to be released by forcing the grippers apart by a handtool or other means.

The number of adjustment bolts **26** or **226**, abutment screws **32** or **232** and cams **35** with cam followers **26, 40**; or jacks **256** required will depend on the overall length of the particular plate-locking assembly. Two or more assemblies may be located end to end across a single cylinder for reversible processing of multiple width webs, and in the case of the second embodiment single shafts **223** and **224** may extend through or be coupled end to end in, for example, two assemblies; the grippers of respective ones of the assemblies being released by rotation of a respective shaft.

It is also anticipated that the invention may be applied to plate-locking devices of the kind described in our copending U.S. Pat. application No. 739,380, in which the plate grippers are in sections and can be moved longitudinally relative to the carrier to accommodate a range of plate widths.

Instead of the operative parts of the locking device being located in a channel in a carrier block as described above they may be located in a channel formed in the cylinder itself so that the channel walls are integral therewith.

I claim:

1. A printing plate locking device for a printing cylinder including a carrier adapted to be mounted on said printing cylinder providing a channel having a mouth extending across the periphery and parallel to the axis of said printing cylinder, and a pair of grippers mounted in the channel with head portions parallel to one another and adjacent the channel mouth and respectively adapted to engage opposite end portions of a printing plate wrapped around the cylinder periphery, each gripper being resiliently urged by spring means for independent movement relative to the other gripper to tension the plate, characterized by adjustment means providing a movable abutment member disposed within the channel and mounted for movement transversely of the channel into alternate engagement with one or the other of the grippers to prevent said movement only of the gripper so engaged, said abutment member comprising a rotatable axially displaceable bolt having screw thread mounting in said carrier and a head located between said pair of grippers whereby rotation of the bolt in one direction may engage a first side face at said head with one of said grippers to force one gripper into fixed relation with one side of the channel for there receiving the leading edge of a printing plate during rotation of the printing cylinder in a first direction and rotation of the bolt in the opposite direction may engage a second side face at said head with said other gripper to force the other gripper into fixed relation with the other side of the channel for there receiving the leading edge of a printing plate during rotation of the printing cylinder in a second direction.

2. A locking device according to claim **1** characterized in that the spring means comprises a plurality of compression spring-loaded plungers located in bores in sidewalls of the carrier.

3. A locking device according to claim **1** characterized in that each gripper is pivotally mounted in the channel on a respective rotatably mounted fulcrum shaft for the independent movement.

4. A locking device according to claim **3** characterized in that each fulcrum shaft includes a cam engaged with a respective follower portion of the gripper mounted on the other shaft so that said gripper is angularly movable against the spring means to release the tension on the plate.

5. A locking device according to claim **1** wherein said carrier channel has opposed sidewalls and each said gripper is disposed adjacent an opposite sidewall and characterized by means for adjusting the position of each gripper relative to the adjacent sidewall when engaged by the adjustment means.

6. A locking device according to claim **5** characterized in that the gripper position adjusting means is a bolt having a threaded shank in engagement with a threaded bore in the respective gripper (**15, 16; 215, 216**) and projecting to abut a carrier sidewall and a head between the pair of grippers whereby the bolt can be rotated to vary the position of said gripper relative to an adjacent sidewall of the carrier when engaged by the adjustment means.

7. A locking device according to claim **1** characterized in that the carrier is a block located in a mounting groove in the cylinder periphery.

8. A printing plate locking device as defined in claim **1** wherein said bolt passes freely through one of said grippers to dispose said opposed head faces transversely between said grippers.

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