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PRINTING CYLINDER FOR HOLDING FLEXIBLE PLATES

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FIG. 1

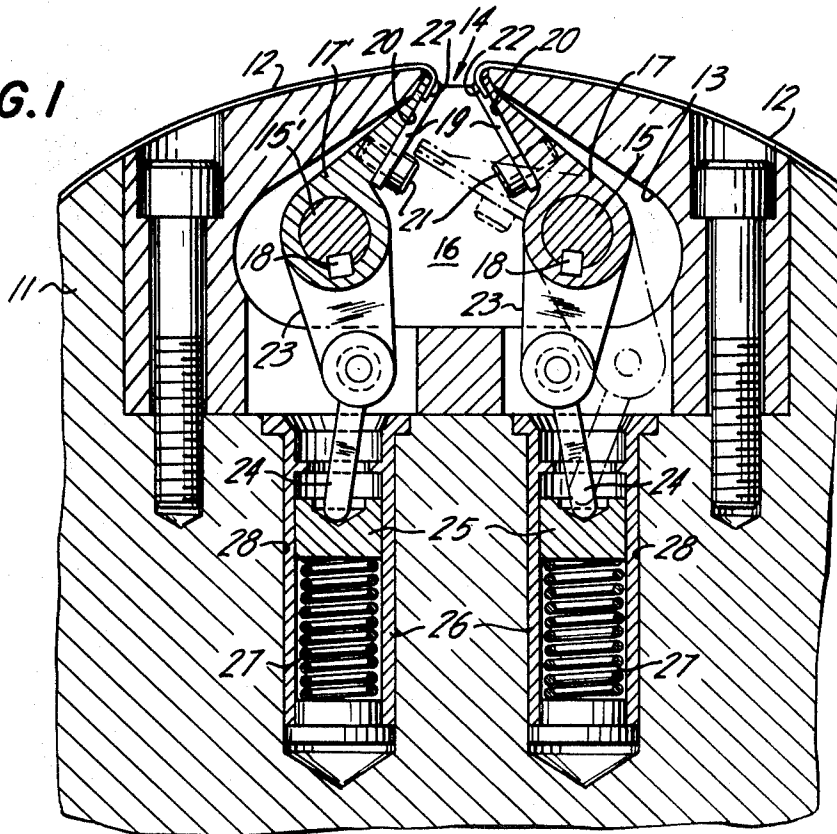


FIG. 2

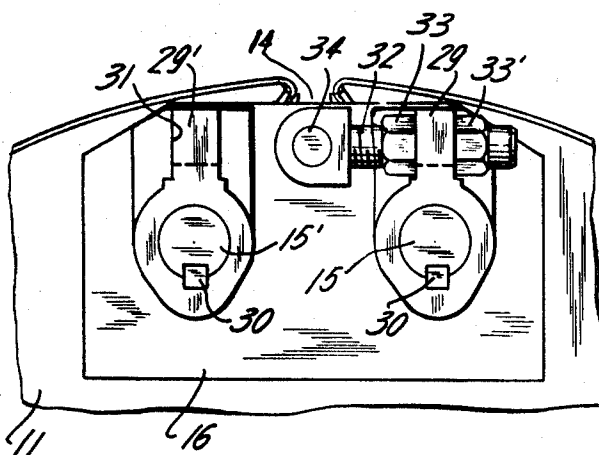
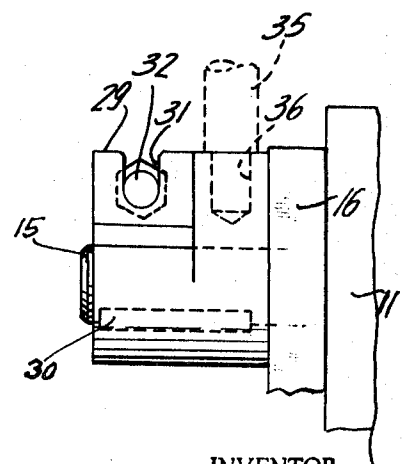


FIG. 3



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1

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PRINTING CYLINDER FOR HOLDING FLEXIBLE PLATES

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1 Claim

ABSTRACT OF THE DISCLOSURE

A clamping device for fastening a flexible printing plate on a plate cylinder of a printing machine as arranged in such a manner that the plates are as securely clamped and circumferentially registered for operation of the printing cylinder in both the clockwise and counterclockwise directions.

BACKGROUND OF THE INVENTION

This invention relates generally to rotary printing machines and more particularly to a printing plate cylinder of such a machine and means for receiving thereon a flexible wrap-around printing plate.

Multicolor printing on rotary web-fed printing machines requires the reversing of the direction of rotation of at least one printing cylinder couple which normally is arranged for black-and-white printing. Printing plates, particularly thin, flexible plates must not only be firmly clamped on the plate cylinders but also must have the facility of being circumferentially adjustable for color register. The leading edge of the plate (with respect to the direction of the rotation of the cylinders) must be firmly held by a mechanism which is circumferentially adjustable in both clockwise and counterclockwise directions, whereas the trailing edge of the plate must be clamped in a device by which the plate is tensioned and by which any slack in the plate is automatically taken up. Obviously the corresponding mechanism for clamping of the plates must be interchangeable for printing operations which require running of at least one printing cylinder in both directions, for example in multicolor printing. In many known cases cylinders are not properly equipped with such interchangeable devices; consequently a "run" in the opposite direction has the disadvantage in that the plate registering device is on the wrong plate edge and the tensioning device must be capable of holding the plate against the direction of running.

The problem involved in the known prior art is solved by this invention.

SUMMARY

The invention consists in such novel features, construction arrangements, combinations of parts and improvements as may be shown and described in connection with the device herein disclosed by way of example only and as illustrative of a preferred embodiment. A basic purpose of this invention is to provide a mechanism which holds a printing plate correctly respecting circumferential register and tension independent of the direction of rotation of the plate cylinder. A further purpose is also to avoid loose parts and to reduce the number of parts necessary to hold the plate when the direction of rotation of the plate cylinder is reversed.

Objects and advantages of the invention will be set forth in part hereafter and in part will be obvious herefrom or may be learned by practicing the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claim.

It is an object of this invention to provide a device

2

for clamping thin, flexible printing plates on a plate cylinder of a printing machine.

It is another object of the invention to provide a plate clamping device for equally holding a thin flexible plate during operation of the cylinder in both directions of rotation.

A further object of the invention is to provide identical clamping means for the leading and trailing edges of thin, flexible printing plates which permit changing the leading edges to the trailing clamps and vice versa in the case of changing the direction of the rotation of the plate cylinder.

Furthermore, it is an object of the invention to provide means for using interchangeably either of the plate clamping devices for circumferentially registering of thin, flexible printing plates.

Yet another object of the invention is to provide clamping and registering means which can easily and expeditiously be changed from one position to the opposite position without the removal or addition of component parts.

It is also an object of the invention to provide a new and improved device for clamping and circumferentially registering of thin, flexible printing plates on reversible plate cylinders, which is of a simple construction and which can be operated with conventional tools.

Yet another object of the invention is to provide a printing plate registering device which holds the printing plate firmly in the register position without vibration.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawing which forms part of the specification and illustrates merely by way of example one embodiment of the device of the invention.

BRIEF DESCRIPTION OF THE DRAWING

In the following description and in the claim, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference to characters denote like parts in the several figures of the drawing, in which

FIG. 1 is a cross section of a part of a printing plate cylinder with a printing plate clamped thereon, and of the clamping devices according to the invention;

FIG. 2 is a part of the front view of the printing plate cylinder, showing the plate registering device in one of the two positions;

FIG. 3 is a side view of the device shown in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing illustrating a preferred embodiment by which the invention may be realized, there is shown in FIG. 1 a section of a part of a printing plate cylinder 11 with a thin, flexible printing plate 12 clamped thereon. A groove 13 is arranged near the periphery of cylinder 11 extending longitudinally thereof, which has a narrow slot-like opening 14. It is understood that a second groove can be arranged diametrically opposite groove 13 in cylinder 11 when printing plates having the length of half the circumference of cylinder 11 are to be used. Two shafts 15, 15' are located in groove 13 extending longitudinally of cylinder 11. Shafts 15, 15' are journaled in blocks 16 which are fastened on the face ends of cylinder 11. A plurality of plate clamp bodies 17, 17' are fastened on shafts 15 and 15' respectively by keys 18. Clamping bars 19 are attached to the inner face 20 of clamp bodies 17 by screws 21 in such manner that a narrow slot 22 at the upper end of bodies 17, 17' is provided for inserting of the bent edges of printing plate or plates 12.

A plurality of lever arms 23 are also secured by keys (not visible in FIG. 1) on shafts 15, 15'. Short rods 24 are articulated at the ends of arms 23. The ends of rods 24 abut against the plungers 25 which are movable in the cylindrical bushings 26. Springs 27 are located in bushings 26 for exerting an upwardly directed force on plungers 25. Bushings 26 are inserted in bores 28 in cylinder 11.

At the ends of shafts 15, 15' which extend outwardly of block 16, levers 29, 29' are secured by the keys 30. Levers 29, 29', which are identical have an open slot 31, 31' which can be engaged by a bolt 32 with adjustment nuts 33, 33' thereon. Bolt 32 is pivotally mounted on a stud 34 which is centrally arranged between shafts 15, 15'. Thus it is possible to swing bolt 32 from lever 29 on shaft 15 to lever 29' on shaft 15'. When bolt 32 is engaged in slot 31 of lever 29, plate clamping body 17 on shaft 15 is used for adjusting the printing plate clamped on clamping body 17 for print registering purposes. The adjustment of lever 29 is made by unlocking and locking of adjustment nuts 33, 33', respectively.

After the registering operation has been performed, screws 33, 33' are tightened, and the respective lever 29, 29' is firmly secured in place against any movement and vibration which could affect the register position of the printing plate. When the direction of rotation of plate cylinder 11 is reversed, shaft 15' with clamping body 17 thereon is used for plate registering by swinging bolt 32 over to lever 29'. The other shaft which is not held by the registering lever, is rotated by inserting a bar 35 in a socket 36 on levers 29, 29' for locking printing plate 12 which then is kept in a tight condition by the action of the over-center moving mechanism consisting of lever arm 23 and shaft rod 24, under the pressure force of spring 27.

While the invention has been described and illustrated with respect to a certain preferred example which gives satisfactory results, it will be understood by those skilled in the art after understanding the principle of the invention, that various other changes and modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. In a printing plate cylinder of a printing machine, said cylinder having a groove extending axially near the surface of said cylinder, said groove having a slot-like opening; two shafts having ends, said shafts extending axially parallel to one another in said groove, a block secured at the face end of said cylinder, said ends of said shafts extending outwardly of said block, printing plate clamping means fixedly attached to said shafts, over-center mechanisms connected to each one of said shafts for rotating the latter from a printing plate unlocking position to a printing plate locking position, a plurality of bushings inserted in bores vertically extending downward from the bottom of said groove in said cylinder, spring means located in said bushings, said spring means operationally engaging said over-center mechanisms, levers attached to said ends of said shafts, each one of said levers having an open slot, a bolt pivotally mounted centrally between said ends of said shafts on said block, said bolt disposed for being swung from engagement with the slot of the lever on said end of one of said shafts to engagement with the slot of the lever on said end of the other one of said shafts, and said pivotally swingable bolt having thereon adjustable screw nuts positioned on either side of each one of said levers for angularly positioning of the shaft to which said lever is secured for circumferentially registering of said printing plate clamped by said clamping means on said shaft and for firmly locking of said levers against vibration in said angular position.

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