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[54] PRINTING UNIT INTERRUPTER FOR ROTARY PRINTING PRESSES

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[58] Field of Search.....101/216, 218, 247, 352, 137, 101/139, 140, 143, 145, 182, 184, 185

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[57] ABSTRACT

A printing unit for rotary printing presses comprises three wall units, relatively movable for variable spacing and carrying a printing cylinder, a counterimpression cylinder and an inking roller respectively mounted for rotation and parallel to each other, a spindle connecting the three wall units and extending parallel to a line perpendicular to the axes of the printing cylinder and the counterimpression cylinder, nuts on two of the wall units cooperating with threaded portions of the spindle, the nuts being driven individually for spacing adjustment between the wall units and being held stationary while the spindle is rotated for simultaneous variation of the spacing.

4 Claims, 3 Drawing Figures

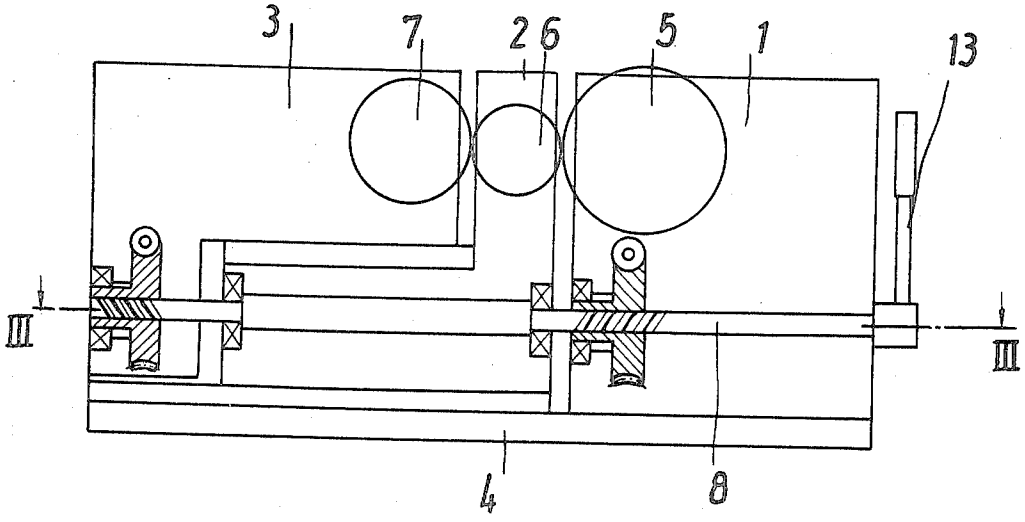
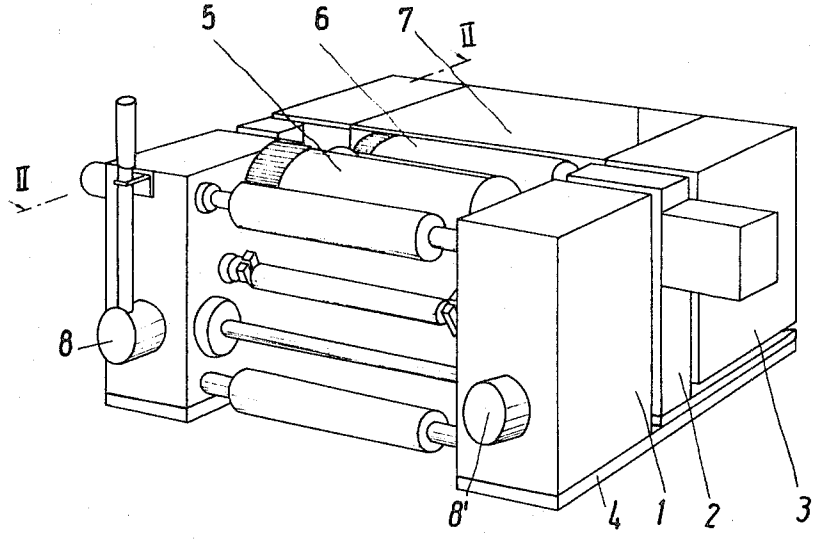


Fig.1



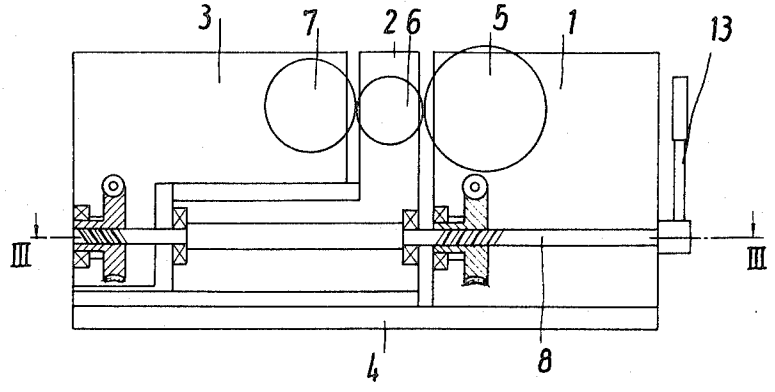


Fig. 2

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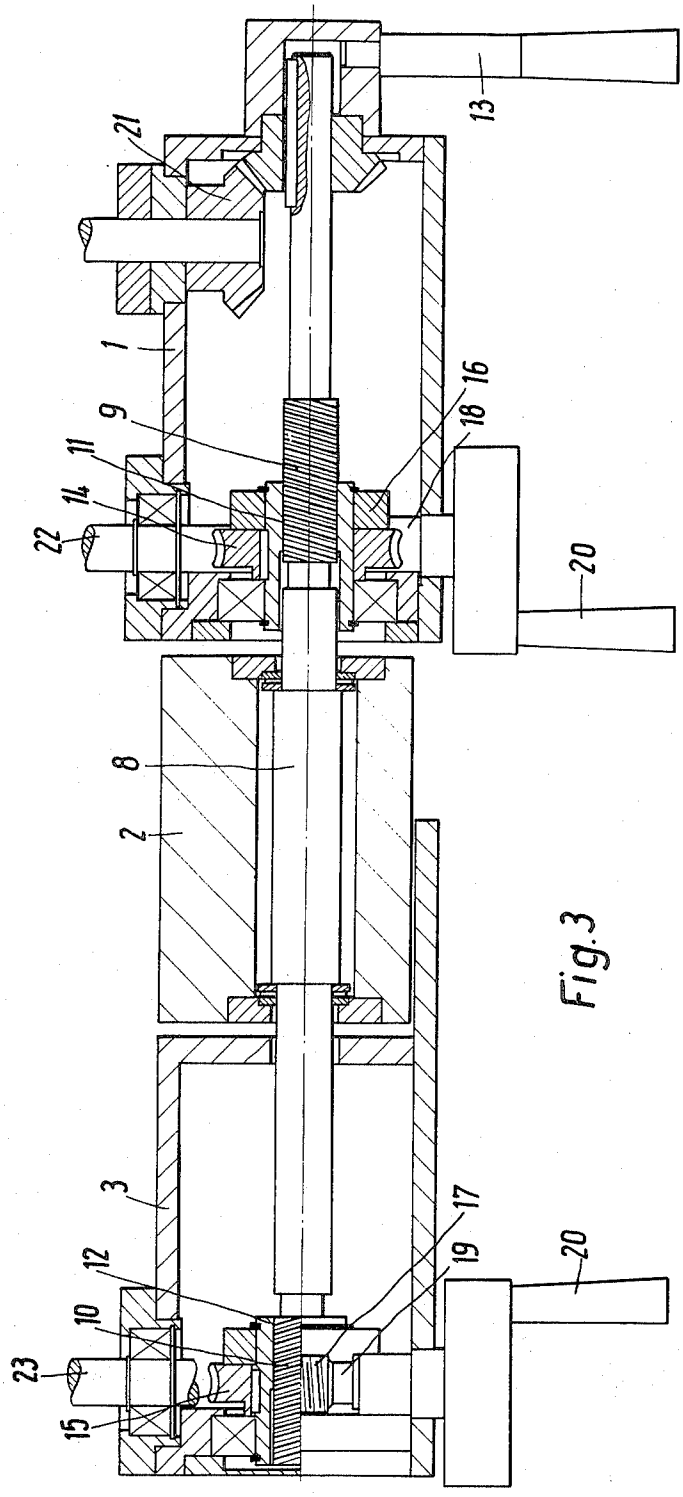


Fig. 3

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PRINTING UNIT INTERRUPTER FOR ROTARY PRINTING PRESSES

BACKGROUND OF THE INVENTION

The invention relates to a printing unit for rotary printing presses having a printing cylinder, a counterimpression cylinder and at least one inking roller which are mounted for rotation in separate lateral wall portions which are guided in a slidelike manner with their axes extending parallel, and are adjustable at different distances apart by means of drive mechanisms mounted in the walls.

If temporary interruptions in operation are necessary when working with the above-mentioned printing units, or the presses have to be stopped, then it is not sufficient to stop the drives which set the individual cylinders or rolls in rotation, but care must be taken to ensure that the printing cylinder and the counterimpression cylinder are moved apart, and at least the inking roller transferring ink directly to the printing cylinder be moved away from the printing cylinder. Such withdrawal of the rolls or cylinders running on one another during operation is necessary, for example, when working with the relatively quick-drying flexographic inks. If the withdrawal of the inking roller from the impression cylinder is not effected, then it is no longer possible to take the printing unit into service again because of ink which has dried in the meantime since the rolls in contact are firmly stuck together. In order to set the register for the proofing and for many other operations, on the other hand, it is necessary to be able to displace the band or web of paper to be printed, relative to the printing cylinder. This is only possible, however, if the printing cylinder and the counterimpression cylinder have parted.

In known printing units of the kind referred to above, the central shutting down, that is to say driving apart the cylinders and rolls running one on the other during operations, is effected by means of a complicated system of graduated threaded spindles which engage telescopically one inside the other, which can be driven jointly and, through appropriate connections to the individual wall portions guided in a slidelike manner, lead to the fact that, when one end of this spindle system is driven, all the wall portions are so displaced that said cylinders and rolls come apart. In this case, use is made of the fact that said wall portions must in any case be guided in a slidelike manner in order to provide the possibility of being able to adapt the position of the ink-transfer roll as well as the position of the counterimpression cylinder to specific dimensions of the printing cylinder which may vary from one case to another.

SUMMARY OF THE INVENTION

It is the object of the present invention to construct a printing unit of the kind referred to so that the complicated system of telescopically interengaging threaded spindles and sleeves can be dispensed with in order to permit a central shutdown.

According to the invention there is provided a printing unit for rotary printing presses comprising a first wall unit, a second wall unit movable relative to said first wall unit, a third wall unit movable relative to said first and second wall units, a counterimpression cylinder mounted for rotation in said first wall unit, a printing cylinder parallel to said counterimpression cylinder and mounted for rotation in said second wall unit, an inking roller parallel to said printing cylinder and mounted for rotation in said third wall unit, a spindle connecting all said wall units, and extending parallel to align perpendicular to the axes of said printing cylinder and said counterimpression cylinder, first and second threaded portions on said spindle having different threads therein, that is, one portion having a left-hand thread and the other portion having a right-hand thread, a rotatable nut mounted for rotation in each of two of said wall units and cooperating with said first and second threaded portions respectively, means for preventing axial movement of said nuts in their respective one of said two wall units, means for rotating said nuts individually for individual adjustment of said wall units, means for rotating said spindle and means for holding said nuts stationary for simultaneous variation of the relative position of said wall units on rotation of said spindle.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in greater detail, by way of example, with reference to the accompanying drawings, in which;

FIG. 1 shows the new printing unit illustrated in perspective;

FIG. 2 shows a sectional view through one wall side of the printing unit with a sectional plane extending along the line II—II in FIG. 1;

FIG. 3 shows a sectional view on a larger scale through the wall side as shown in FIG. 2 with a sectional plane extending along the line III—III.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Basically, a printing unit for rotating printing presses comprises a printing cylinder, a counterimpression cylinder and an inking roller each mounted in a wall unit, and a threaded nut, which extends in the setting direction, mounted for rotation but held against movement in the setting direction at least on the wall unit for the inking roll and for the counterimpression cylinder and which is capable of being driven by means of a worm drive, the two threaded nuts having opposite pitch and engaging in associated threaded portions of a common threaded spindle which is mounted for rotation but not for displacement in the axial direction in the wall portion for the printing cylinder and is equipped at one end with a handle for rotation.

In the new printing unit, the fact is used that the printing unit is generally mounted as a whole for displacement in a slidelike manner on a bracket of the printing press. The wall portion of the printing unit, which receives the counterimpression cylinder, is prevented from being able to be displaced relative to the printing press, by bearing against an abutment on the printing press. All displacements which the wall portion executes for the counterpressure cylinder but relative to the printing unit itself lead to the fact that it is not the wall portion for the counterimpression cylinder but the entire printing unit which is displaced relative to the printing press. Since the distance of the counterimpression cylinder from the printing cylinder increases when the threaded spindle is driven or turned, the printing cylinder is driven away from the web to be printed while the inking roll is removed from the printing cylinder by the other portion of the thread. With this embodiment of the printing unit, the threaded spindle serving for the shutting down may appropriately bear against the wall portion which receives the printing cylinder.

In comparison with known printing units with numerous threaded sleeves interengaging telescopically, this embodiment is distinguished by suprisingly simple and robust construction. Despite this construction, it is possible to adjust all three wall portions finely, relative to one another, by means of the worm drive associated therewith and the nuts mounted thereon, to move them apart to a wide extent for the central shutdown, and to restore them to the present operating position by reverse motion of the threaded spindle.

When working with more than three rolls or cylinders to be moved apart, then the above-mentioned construction of the printing unit merely has to be modified in such a manner that an additional thread portion is provided on the threaded spindle, and is equipped with a steeper or shallower pitch depending on the position of the roll in question. There is also the possibility of supporting the threaded spindle on a separate portion of the base of the printing unit or a suitable abutment so that the wall portion for the mounting of the printing cylinder can be displaced through a threaded portion on the threaded spindle and a nut mounted on or in this wall portion.

In a further development of the new printing unit, a geared connection is provided between associated worm drives as well as the threaded spindles, with nuts and threaded spindles mounted at both sides.

It is usual to construct the wall portions of printing units in a housinglike manner so that the worm drives, nuts or the like are mounted directly in the wall portions. As a result of the fact that worm drives, nuts, etc., are mounted at both sides of the printing unit, that is to say on both wall sides, guiding of the individual rolls and cylinders without tilting is assured.

As distinct from this, however, there is always the possibility of constructing printing units, primarily for the printing of very narrow webs, so that the nuts or worm drives are mounted not in the wall portions of housinglike constructions but, for example, in the middle between two associated wall portions, below the slide guide or at another suitable point, in which case only a single nut with associated thread on the spindle serves for the displacement of a roll in question.

It has already been pointed out above that the spindle with the two thread portions at one end comprises a handle for rotation. It should be mentioned that, instead of this handle or in addition to this handle, a gear clutch may be provided so as to couple the threaded spindle to a drive member of the printing press so that, when a large number of printing units are used, a central shutting down of all the printing units simultaneously can be carried out be driving corresponding spindles in all printing units at the same time.

Referring now to the drawings, FIG. 1 shows a printing unit 1 which comprises a wall portion 1, a wall portion 2 and a wall portion 3 at each side, the wall portion 1 being rigidly connected to a baseplate 4 of the printing unit, on which the wall portions 2 and 3 are guided in a slidelike manner. The printing unit 1 is connected in a suitable manner to the mechanism of a printing press not illustrated in the FIG., by the wall portion 1 or the baseplate 4.

The wall portion 1 serves to mount a counterimpression cylinder 5, the wall portion 2 to mount plate cylinder 6, while an inking roll 7 is received in the wall portion 3. FIG. 1 clearly shows that, apart from said cylinders or rolls, further cylinders or rolls essential for the operation of a printing unit are mounted in the individual wall portions. These are not essential for the operation of the central shutdown, however.

When the printing unit is stopped, it is necessary for the impression cylinder 5 and the printing cylinder or plate cylinder 6 to be moved apart, and at the same time for the inking roll 7 to withdraw from the impression or plate cylinder 6. During operation, said rolls or cylinders are in pressed rolling contact.

In addition, it must be possible to adjust the individual rolls or cylinders 7, 6, 5 in different positions in relation to one another because the dimensions of the plate cylinder 6 may be different from one case to another. It is therefore necessary to ensure that the wall portions 3 and 2, which are guided in a slidelike manner, can be adjusted relative to the wall portion 1.

In order to carry out these adjustments and also to carry out the withdrawal motion of the rolls or cylinders from one another, a threaded spindle 8, which is rotatable in the wall portion 2 for the mounting of the printing cylinder 6 but is held against movement in the axial direction, is used. The threaded spindle 8 extends with its axis in the direction in which the cylinders and rolls have to be adjusted in relation to one another or displaced in order to effect the withdrawal movement. In the region of the wall portion 1, the threaded spindle 8 is provided with a threaded portion 9 and, in the region of the wall portion 3 for the inking roll, with a threaded portion 10 of opposite sense. Whereas the threaded spindle 8 is connected to the wall portion 2, being held against movement in the axial direction of the spindle as already mentioned, the wall portions 3 and 1 each comprise a threaded nut 11 or 12 which is held against displacement in the axial direction of the spindle but is mounted for rotation and which is screwed on to the associated threaded portion 9 or 10. At one end of the threaded spindle 8, there is a handle 13 which enables the threaded spindle 8 to be turned. When the threaded nuts 11 and 12 are held against rotation and the threaded spindle 8 is turned by actuation of the handle 13, then the wall portions 3 and 1 each execute movements in relation to the wall portion 2, according to the direction of rotation of the threaded spindle 8, during which they either approach or move away from the wall portion 2. When the wall portions 1 and 3 move away from the wall portion 2, that corresponds to the movement which has to be executed for the central shutting down of the printing unit. The approach corresponds to that movement which has to be carried out in order to bring the printing unit, temporarily stopped, back into operation.

The threaded nuts 11 and 12 are held against rotation during the execution of the central shutting down or restarting of the printing unit by the fact that they are connected to worm wheels 14 and 15 respectively. These worm wheels mesh with worms 16 and 17, to the shafts 18 and 19 of which there are secured handwheels 20. The worm drives can be actuated by actuating the handwheels and the threaded nuts 11 and 12 turned, while the threaded spindle 8 is held against rotation. This location is effected by a corresponding locking of the handle 13. The particular wall portion 3 or 1 is displaced in the axial direction of the threaded spindle 8 in relation to the wall portion 2, by the drive of the nuts 12 and 11 respectively.

In all the movements of the wall portions 1, 2, 3 outlined above, relative to one another, as a result of the supporting of the threaded spindle 8 in the wall portion 2 it was always said that the wall portion 1 or wall portion 3 was displaced relative to the wall portion 2. In practice, however, it is not the wall portion 2 which is the static pole but, as a result of the slidelike construction of the wall portions already described, namely the fixed connection of the wall portion 1 to the baseplate 4 and the slidelike guiding of the wall portions 2 and 3 on this baseplate, on actuation of the threaded spindle 8 or the handwheel 20 which would cause a movement of the wall portion 1 relatively to the wall portion 2, it is not the wall portion 1 which moves but instead the wall portion 2 and with it the wall portion 3 because this, as FIG. 2 clearly shows, is guided in a slidelike manner on the wall portion 2. Any relative movement between the wall portion 2 and wall portion 3 is additionally superimposed on this movement on the wall portion 2 with respect to the stationarily held wall portion 1.

FIG. 1 shows that the printing unit shown in the example has a relatively great width so that care must be taken to ensure that tilting is avoided. For this reason, the shaft 8 is connected for example at the end at which there is the handle 13, to a correspondingly constructed shaft 8' on the other wall side, through a bevelled gear 21. Any movement of the shaft 8 by the handle 13 leads to a corresponding movement of the shaft 8' at the other wall side so that the wall portions at this other wall side, which are identical in construction to those already described, are likewise entrained. The worm shafts 19 and 18 are equipped with extensions 22, 23 so as to drive both wall portions belonging to a cylinder or a roll at the same time even during the fine infeed. These extensions 22, 23 represent gear connections to corresponding warms at the other wall side, which lead into corresponding worm wheels on corresponding nuts in the associated opposite wall portions 3, 2 or 1. This means that on actuation of one of the handwheels 20, not only is the nut 12 or 11, which is at the handwheel side, turned, but also the corresponding nut at the other wall side is also driven through the extension 23 or 22.

It will be understood that the above description of the present invention is susceptible to various modifications, changes and adaptations.

What is claimed is:

1. A printing unit for rotary printing presses comprising a first wall unit, a second wall unit movable relative to said first wall unit, a third wall unit movable relative to said first and second wall units, a counterimpression cylinder mounted for rotation in said first wall unit, a printing cylinder parallel to said counterimpression cylinder and mounted for rotation in said second wall unit, an inking roller parallel to said impression cylinder and mounted for rotation in said third wall unit, a spindle connecting all said wall units and extending parallel to a line perpendicular to the axes of said impression cylinder and said counterimpression cylinder, first and second

threaded portions on said spindle, one of said threaded portions being of a left-hand thread and the other of said threaded portions being of a right-hand thread, a rotatable nut mounted for rotation in each of two of said wall units and cooperating with said first and second threaded portions respectively, means for preventing axial movement of said nuts in their respective one of said two wall units, means for rotating said nuts individually for individual adjustment of said wall units, means for rotating said spindle and means for holding said nuts stationary for simultaneous variation of the relative position of said wall units on rotation of said spindle.

2. A printing unit for rotary printing presses comprising a first wall unit, a second wall movable relative to said first wall unit, a third wall unit movable relative to said first and second wall units, a printing cylinder, a counterimpression cylinder and an inking roller each mounted for rotation in a respective one of said wall units; a spindle connecting said first and third wall units passing through said second wall unit and extending parallel to a line perpendicular to the axes of said printing cylinder and said counterimpression cylinder, means for preventing axial movement of said spindle relative to said second wall unit, a first nut mounted for rotation in said first wall unit, means for preventing axial movement of said first nut relative to said first wall unit, a second nut mounted for rotation in said third wall unit, means for preventing axial movement of said second nut relative to said third wall unit, first and second threaded portions on said spindle, one of said threaded portions being of a left-hand thread and the other of said threaded portions being of a right-hand thread, said first and second threaded portions cooperating with said first and second nuts respectively, means for rotating said nuts individually for individual adjustment of the spacing between said first and third wall units and said wall unit, means for rotating said spindle and means for preventing rotation of said first and second nuts for simultaneous variation of the spacing of said first and third wall units and said second wall unit on rotation of said spindle.

3. A printing unit as defined in claim 2, wherein said means for rotating said nuts and said means for preventing rotation of said nuts comprises a worm wheel mounted on each nut and a worm with which it cooperates, said worm serving, when driven, to drive the nuts, but locking the nuts against rotation when it is not driven.

4. A printing unit as defined in claim 3, wherein each wall unit comprises two wall members between which the cylinders or inking roller are mounted, the spindle being provided running through the wall members at one side of each unit and a second spindle is provided passing through the other wall members of said wall units and coupled to said first spindle, said second spindle cooperating with further worm-driven nuts in said first and third wall units and means being provided for driving connecting the worms associated with each wall unit together for simultaneous drive thereof.

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