Dec. 24, 1968 W. KOCH ET AL 3,417,696

GRIPPERS WITH ADJUSTABLE GRIPPER PADS FOR SHEET PRINTING

Filed Dec. 13, 1965

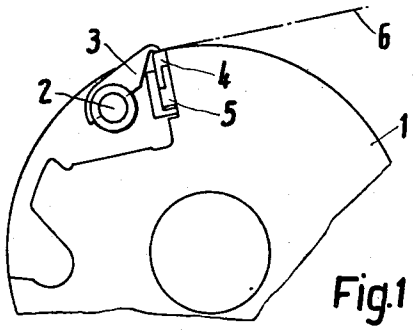


Fig.1

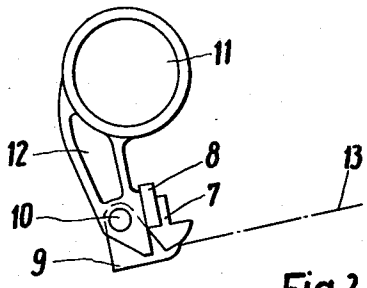


Fig.2

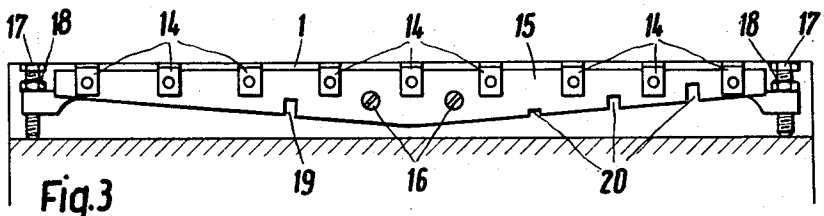


Fig.3

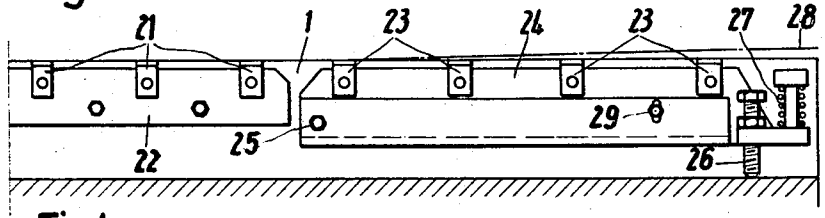


Fig.4

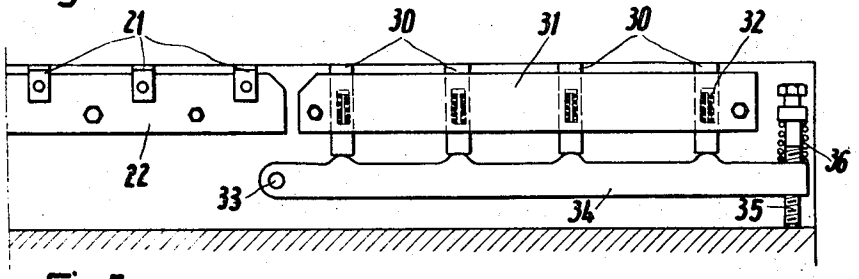


Fig.5

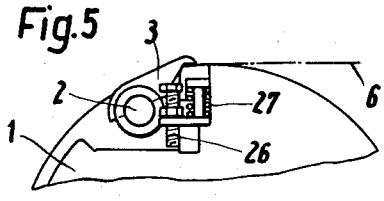


Fig.6

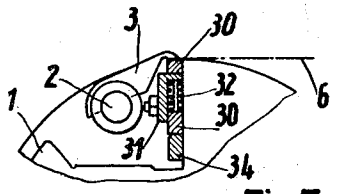


Fig.7

Inventors.
WERNER KOCH AND
FRIEDRICH PREUSS
BY Hane and Nydick
ATTORNEYS

United States Patent Office 3,417,696
Patented Dec. 24, 1968

3,417,696

GRIPPERS WITH ADJUSTABLE GRIPPER PADS

Werner Koch, Offenbach am Main, and Friedrich Preuss, Neu-Isenburg, Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG., Offenbach am Main, Germany, a company of Germany

Filed Dec. 13, 1965, Ser. No. 513,486
Claims priority, application Germany, Dec. 17, 1964, R 39,473
8 Claims. (Cl. 101—409)

ABSTRACT OF THE DISCLOSURE

A gripping device for a sheet-feeding press in which a row of grippers and a corresponding row of gripper pads coact with each other for gripping therebetween the leading edge of a sheet to be worked on in the press. The positions of the gripper pads are jointly or individually adjustable in a plane substantially normal to the plane of a gripped sheet.

In sheet-fed printing presses, the sheets are gripped at their front edges, at the pre-gripper respectively swing gripper, and also later at the impression cylinder and at the delivery chain, by a row of grippers which co-operate with gripper pads. Each row forms a set of gripper pads which is usually mounted on a common rail, which in turn is secured to the pre-gripper respectively swing grippers, to the impression cylinder, or to the delivery gripper system.

In indirect printing, as a result of the bulge formation at the contact zone between the blanket and impression cylinders, severe stressing of the paper occurs which leads to differences in register at the end of the sheet, particularly with sheets of large size and with papers of low strength.

It has already been proposed to compensate for these differences by deformation of the front edge of the sheet. Such deformation is carried out in the plane of the sheet whereby the register of the impression is disturbed at the front edge of the sheet. The greater accuracy of register achieved at the end of the sheet is obtained at the expense of a faulty register at the front edge of the sheet.

The invention overcomes these disadvantages by means of a device which is associated with each set of grippers to adjust the gripper pads along a bent or curved path perpendicular to the plane of the sheet. The front edge of the sheet is thereby effectively shortened by the consequent deviation from a straight line. As a result the lateral edges of the sheet exert a pull on the rear edge of the sheet and cause a deformation and hence an alteration in the length of the rear edge of the sheet. This deformation takes place precisely in the same manner as at the front edge of the sheet, in a plane substantially perpendicular to the plane of the sheet. As a result, although the required variation in the printing width is obtained transversely to the direction of travel of the sheet, nevertheless no deviation from a straight line occurs in the print.

According to the invention, in one embodiment there is provided that the gripper pads of the set are secured to a resilient rail which can be bent by means of the device. Thus a simple, robust structure is obtained. In this case, the rail may appropriately be screwed at its middle within the gap of the impression cylinder for example, while its two ends hang freely and are each bent up or down to a certain extent by a screw. The required graduation in the bending can be achieved by appropriate reduction in the cross-section of the rail from the middle toward the two ends.

In another embodiment of the invention it is provided

that a plurality of gripper pads in a set are mounted on a common holder which can be displaced, by the device, out of a position in which the gripper pad faces lie parallel with the plane of the sheet, into a position in which the faces of the gripper pads lie in a plane which forms an acute angle with the plane of the sheet. In this case, the arrangement is preferably such that the gripper pads are combined in three successive groups, of which the middle group is arranged parallel with the plane of the sheet, and the two outer groups are each secured to a common holder which is adjustable in each case by a device in such a manner that they lie at an acute angle to the plane of the sheet. The adjustment of only a few gripper pads at the ends in each case, which is sufficient in many cases, is thus obtained with very simple means.

In a further embodiment, it is provided that each gripper pad in the set is mounted for movement in a guide lying substantially perpendicular to the plane of the sheet and is adjustable by means of the device. As a result, the gripping surfaces of each gripper and its gripper pad remain parallel for relatively large setting distances, and the sheet is held uniformly tightly by the gripper over its whole width.

Several embodiments of the invention are illustrated diagrammatically in the accompanying drawings which show in:

FIGURE 1 an end view of a gripper set mounted in an impression cylinder or a conveyor drum;

FIGURE 2 an end view of a gripper set in a pre- or swing-gripper;

FIGURE 3 a set of gripper pads on a resilient rail in a cylinder (shown in section);

FIGURE 4 a set of gripper pads on a swivelling rail in a cylinder shown in lengthwise section;

FIGURE 5 gripper pads which are mounted in individual guides and which are adjusted by a swivelling rail in a cylinder shown in lengthwise section;

FIGURE 6 a detail of FIGURE 4, and in

FIGURE 7 a detail of FIGURE 5.

According to FIGURE 1, an impression cylinder **1** of a printing press is provided in a known manner with a plurality of grippers **3** mounted on a gripper shaft **2**. These grippers co-operate with gripper pads **4** which are secured to a rail **5**. The sheet grasped by the grippers **3** is designated by **6**. The same arrangement, as shown in FIGURE 2, is also usual with pre-grippers or swing-grippers **9** in which case the gripper pads **7** are secured to a rail **8**. The grippers **9** are mounted on a gripper shaft **10** which is mounted in levers **12** secured to a shaft **11**. The sheet is designated by **13**.

In the embodiment of the invention shown in FIGURE 3, the gripper pads **14** are mounted on a resilient rail **15** which is secured to the cylinder **1** by means of screws **16**. By turning screws **17**, the rail can be bent upwards at its ends in a plane substantially perpendicular to the plane of a sheet around the cylinder. The setting of the screws **17** is locked by means of the lock nuts **18**. The required graduation of the bending of the rail can be achieved by reducing the cross-section of the rail **15** from the middle towards the two ends, by providing a single notch **19**, or a plurality of notches **20** of different depths.

The embodiment of the invention, as shown in FIGURE 4 shows the right-hand half of a set of gripper pads. The six middle gripper pads **21** are not adjustable, supporting rail **22** being firmly screwed to the cylinder **1**. However, the four outer gripper pads **23** at each end of the set are mounted on a rail **24** which can be swivelled upward about a hinge pin **25** by means of a lockable screw **26** and against the downward action of a compression spring **27** as is shown also in FIGURE 6. The gripping surfaces of the gripper pads **23** may lie on the

line such as **28** for example. The position of the rail **24** can be locked by means of a screw **29**.

In the embodiment shown in FIGURE 5, which likewise shows the right-hand half of a set of gripper pads, and in FIGURE 7, the gripper pads **30** are mounted for movement in their axial direction by being guided in slots in a holding rail **31** and are urged downwards by means of springs **32**. As a result, they engage an adjusting device in the form of a rail **34** which can be swivelled about a hinge pin **33**. Pivoting of rail **34** is effected by turning a set screw **35** while a compression spring **36** ensures contact between the screw **35** and a wall of the cylinder gap.

What we claim is:

1. A gripping device of a sheet-feeding press, said gripping device comprising in combination:

a row of grippers;

a corresponding row of gripper pads coacting with said grippers for gripping therebetween the leading edge of a sheet to be worked on in the press;

support means for the gripper pads, said support means including a flexible rail mounting said row of gripper pads; and

adjustment means for adjusting the positions of the gripper pads in a plane substantially normal to the plane of a sheet gripped between the grippers and the gripper pads, said adjustment means including flexing means for flexing said rail into a selected bent configuration in said plane substantially normal to the sheet plane thereby correspondingly varying the positions of the gripper pads in reference to said sheet plane.

2. A gripping device according to claim **1** wherein said flexing means comprise fastening means securing said rail intermediate its ends to a stationary point of support, and adjustable abutment means at each end of said rail, the position of said abutment means being selectively adjustable in said plane normal to the sheet plane in reference to said stationary point of support for flexing said rail in accordance with the positioning of the abutment means.

3. A gripping device according to claim **2**, wherein said adjustable abutment means comprise set screws threaded into said rail ends and resting at one end upon a stationary support.

4. A gripping device according to claim **1** wherein the cross-sectional outline of said rail varies along the length thereof to impart to the rail predetermined bending characteristics in response to an actuation of said flexing means.

5. A gripping device according to claim **1**, wherein said rail includes at least one notch in one of its lengthwise sides to impart to the rail predetermined bending characteristics in response to an actuation of said flexing means.

6. A gripping device of a sheet-feeding press, said gripping device comprising in combination:

a row of grippers;

a corresponding row of gripper pads coacting with said grippers for gripping therebetween the leading edge of a sheet to be worked on in the press;

support means for said row of gripper pads, said support means including a bar having said gripper pads fixedly secured thereto and mounted pivotal in a plane substantially normal to the plane of a sheet gripped between the grippers and the gripper pads, between a position in which surfaces of the gripper pads coacting with the grippers are substantially parallel to said plane of the sheet and a position in which said surfaces define an acute angle with said sheet plane; and

retaining means coacting with said bar for retaining the same in the selected pivotal position.

7. A gripping device of a sheet-feeding press, said gripping device comprising in combination:

a row of grippers;

a corresponding row of gripper pads coacting with said grippers for gripping therebetween the leading edge of a sheet to be worked on in the press, said gripper pads being divided into three groups;

support means supporting the intermediate one of said groups in spatially fixed positions with reference to said sheet plane;

a holder for each of the outer groups; and

mounting means for each of said holders, each of said mounting means supporting the respective holder pivotal between a position in which surfaces of the gripper pads coacting with the grippers are substantially parallel to the plane of a sheet gripped between the grippers and the gripper pads and a position in which said gripper pad surfaces define an acute angle with said sheet plane.

8. A gripping device of a sheet-feeding press, said gripping device comprising in combination:

a row of grippers;

a corresponding row of gripper pads coacting with said grippers for gripping therebetween the leading edge of a sheet to be worked on in the press;

support means including an elongate guide member supporting at least some of said gripper pads, said guide member being disposed in a plane parallel to the plane of a sheet gripped between the grippers and the gripper pads, the gripper pads supported by the guide member being each dislaceable in the same in a direction substantially normal to said sheet plane for selectively varying the distance between said gripper pads and said sheet plane;

a common control bar disposed in engagement with the end of each of the supported gripper pads opposite to the end facing the guide member;

pivot means pivotally supporting said control bar at one end thereof; and

adjustment means coacting with said control bar for placing the same in a selected angular position in reference to the sheet plane, said adjustment means including spring means engaging said control bar to bias the same toward the selected angular position, and adjustable setting means engaging said bar for retaining the same in a selected position against the action of said spring means thereby correspondingly varying the positions of the gripper pads in the guide member.

References Cited

UNITED STATES PATENTS

1,208,731	12/1916	Blaine	101—412
1,271,329	7/1918	Kyle	101—412
1,296,008	3/1919	Rich	101—412
1,914,456	6/1933	Parker et al.	101—412
2,577,099	12/1951	Albrecht	101—183
3,125,022	3/1964	Reinartz et al.	101—410 X
3,332,345	7/1967	Smyth	101—409

ROBERT E. PULFREY, *Primary Examiner.*

J. R. FISHER, *Assistant Examiner.*