(54) Proof press for mounting flexographic printing plates
Andruckpresse zur Befestigung von Flexodruckplatten
Presse à épreuves pour le montage de plaques d'impression flexographiques

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Description

[0001] The present invention relates to a proof press for mounting flexographic printing plates.

[0002] As known from document EP 1060884 A, an apparatus for the flexographic printing of corrugated cardboard is provided with one or more flexographic printing plates, which are fixed, by way of double adhesive tape, to corresponding mounting and supporting blankets. Generally, these printing plates are mounted on a curved surface, i.e., on a blanket cylinder of a suitable machine.

[0003] Printing plates with gradually increased dimensions were used, which gave rise to unwelcome phenomenon such as separation of the printing plate from the blanket, with infiltration of air and formation of pockets, particularly when the blanket with the corresponding printing plate is spread flat. This is due substantially to the generation of two opposite actions: a traction on the blanket and a compression on the thin polyester film provided on the lower face of the printing plate. These opposite actions can reach intensities that overcome the adhesive action of the tape, causing unacceptable bulges in one or more points.

[0004] However, it has been noted in this regard that the separation of the printing plate from the blanket is less evident if blanket cylinders are used, having a large diameter and in which therefore the ratio between the length of the printing plate and the length of the circumference of said cylinder is low.

[0005] In order to obviate the problem of the separation of the printing plate from the blanket, machines for mounting the printing plate on the blankets in a flat configuration have been devised: in this case, no significant separations are observed when the blanket and the printing plate are laid flat, but when they are wound in a curved configuration onto a cylinder to perform a proof print, one or more bulges of the blanket with respect to the printing plate are observed. A compression on the blanket and a traction on the printing plate are generated and can overcome the adhesion forces produced by the presence of the tape.

[0006] Although in this last mounting situation the phenomenon is in practice less conspicuous than observed in conventional mounting on a curved surface, it is known that machines for mounting printing plates in a flat configuration are unable to perform proof prints, which can be performed exclusively on proof presses provided with a blanket cylinder.

[0007] The aim of the present invention is to provide a proof press that is suitable for the mounting of a flexographic printing plate in a curved configuration without the drawbacks noted above, i.e., that is capable of performing proof prints without causing separations of the printing plate from the blanket.

[0008] Within this aim, an object of the present invention is to provide a structure that is simple, relatively easy to provide in practice, safe in use, effective in operation, and relatively low in cost.

[0009] This aim and this object are achieved by the present proof press for the mounting of flexographic printing plates, comprising a cylinder, which is covered by a blanket for mounting at least one of said printing plates by means of double adhesive tape and is movable at right angles to its own axis in order to be placed in contact, along a generatrix, with a respective impression roller for performing proof prints, and optical means for collimating points of said impression roller with respective points of said printing plate viewed directly, characterized in that it comprises a compression device that is adapted to produce the forced adhesion of said printing plate to said double-adhesive tape and to said blanket, so as to provide uniform fixing over the entire contact surface, avoiding the onset of separation or bulging.

[0010] Further features and advantages of the invention will become better apparent from the detailed description of a preferred but not exclusive embodiment of a proof press for mounting flexographic printing plates according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a transverse sectional view of a detail of the separation of the flexographic printing plate from the double adhesive tape for fixing to the mounting blanket, if the printing plate is fixed to the blanket on a cylindrical surface;

Figure 2 is a partially sectional side elevation view of a printing roller, showing the separation of the mounting blanket of the flexographic printing plate, which is fixed to said blanket on a flat surface;

Figure 3 is a transverse sectional view of a detail of the correct configuration for mounting the printing plate on the blanket;

Figure 4 is a partially sectional side elevation view of the proof press according to the invention;

Figure 5 is a partially sectional side elevation view of a detail of another embodiment of the device for compressing the printing plate against the blanket;

Figure 6 is a schematic partially sectional side elevation view of a detail of the machine during the mounting of the flexographic printing plate on the blanket;

Figure 7 is a partially sectional top view of a detail of the proof press according to the invention.

[0011] With reference to Figure 4, the reference numeral 1 generally designates a proof press for mounting flexographic printing plates according to the invention.

[0012] For better comprehension, reference should be made first to Figure 1, in which a printing plate 2 (made of a material such as photopolymers), lined on its lower face with a polyester film 3 for dimensional stabilization, is fixed, by way of double adhesive tape 4, to a blanket 5 for mounting on a printing cylinder 6. As described earlier, mounting the printing plate 2 onto the blanket 5 along
a curved surface and then laying said printing plate and
saying blanket onto a flat surface, the polyester film 3 of
the printing plate 2 is seen to separate and bulge with
respect to the double adhesive tape 4.

[0013] Figure 2 clearly illustrates the separation and
bulging of the blanket 5 with respect to the printing plate
2, previously assembled on a flat surface, after fixing to
a printing cylinder 6.

[0014] Figure 3 instead illustrates the correct configura-
tion for mounting the printing plate 2 on the blanket 5,
i.e., without separations or bulges.

[0015] As shown in Figure 4, the machine comprises
a footing 7 that rises vertically on opposite sides with
two parallel side walls 8. The side walls 8 are provided at
the front with guides 9 for the vertical sliding of respective
sliders 10, which are associated with translational motion
means, which are not shown in the figures because they
are conventional; each slider 10 forms an upper exten-
sion 11 for accommodating, at the top, rolling bearings
12 for rotatably supporting a printing cylinder 6, which
has a horizontal axis and on which a blanket 5 with the
corresponding printing plate 2 is mounted.

[0016] Preferably, the printing cylinder 6 has respec-
tive pivot-like ends 13, each of which rests on respective
pairs of rolling bearings 12.

[0017] The footing 7 supports rotatably, in its upper
portion, an impression roller 14, whose axis is parallel to
the axis of the printing cylinder 6; the impression roller
14 is designed to make contact, along a generatrix, with
the printing cylinder 6 in order to perform proof prints.

[0018] The machine has, at the top, optical means 15,
known per se are disclosed in EP 0 728 580 by the same
Applicant, which are adapted to produce the collimation
of specific points of the impression roller 14 with respec-
tive points of the printing plate 2 that are viewed directly.

[0019] The optical means 15 comprise a semitrans-
parent mirror 16 and a television camera 17, which are
located at the lateral surface of the impression roller 14
and are functionally connected to a monitor 18 that is
supported at the top of the footing 17 of the machine.
The impression roller 14 is designed to be covered with
a suitable sheet of paper provided by suitable tracings
of lines and/or dots, provided by means of a writing device
19; during the fine-tuning of the machine, said dots are
made to collimate with respective dots of the printing plate
2 that are viewed directly by virtue of the optical means
15.

[0020] The machine comprises, according to the in-
vention, a device 20 for compressing the printing plate 2
against the blanket 5, which is fixed onto the printing cy-
linder 6, while said printing cylinder is shifted into a suit-
able downward position. The printing cylinder 6 can
therefore perform a translational motion along the guides
9 between a lower position for compressing the printing
plate 2 against the double adhesive tape 4 and against
the blanket 5, an intermediate position for mounting the
printing plate 2, and a raised position in which it is in
contact with the impression roller 14. The compression
device 20 is suitable to produce the forced adhesion of
the printing plate 2 to the double-adhesive tape 4 and
accordingly to the blanket 5: this facilitates the elimination
of air pockets, which cause bulges and are present be-
tween the polyester film 3 and the double adhesive tape
4, accordingly achieving uniform fixing over the entire
contact surface.

[0021] The compression device 20 comprises a com-
pression roller 21, whose axis is parallel to the axis of
the printing cylinder 6; said compaction roller is associ-
ated with actuation means 22 so that it can move from an
inactive configuration to an active configuration in which
it is in contact, along a generatrix, with the printing cylin-
der 6, in order to produce the uniform adhesion, in mutual
rolling, of the printing plate 2 on the double adhesive tape
4 (Figure 6).

[0022] The compaction roller 21 is constituted by an
elongated tubular core 23, along which a sleeve 24 is
keyed; said sleeve is made of substantially flexible ma-
terial, preferably soft rubber or the like.

[0023] The actuation means 22 comprise at least one
couple of cranks 25, each of which has a first end 26 that
is pivoted, about a first articulation axis A, to a first bracket
27 that is fixed to the footing 7, and a second end 28 that
is pivoted, about a second articulation axis B, to the stem
29 of a linear actuator 30, preferably of the pneumatic
type; in turn, said actuator has, at its other end, its cylinder
pivoted to a second bracket 31 that is rigidly coupled to
the footing 7, about a third articulation axis C. The cranks
25 are affected, substantially in their central portion, by
respective seats 32 for bearings 33 for rotationally sup-
porting the tubular core 23 of the compaction cylinder 21.
Each crank 25 and the respective linear actuator 30 are
arranged so that the respective longitudinal axes form
an angle of less than 180° between them. Each one of
the cranks 25 can rotate about the first articulation axis
A by actuation of the respective actuator 30 so as to move
the compaction roller 21 from the inactive configuration
to the active configuration, in which it is in forced contact
with the printing cylinder 6.

[0024] Advantageously, the compaction roller 21 is
supported, in the specific case (as shown in Figure 9),
by a plurality of cranks 25, which are provided at the
footing 7 substantially axially equidistant and are asso-
ciated with respective pneumatic linear actuators 30,
which operate conveniently in step with each other, as
clearly shown in Figure 7. In this manner, the compres-
sion thrust on the printing cylinder 6 and the load on the
footing 7 are distributed uniformly. The sleeve 24 is di-
vided for this purpose into a plurality of portions of equal
length, which are keyed on the tubular core 23 between
each crank 25 and the directly adjacent crank.

[0025] In practical operation, after fixing the flexo-
graphic printing plate 2 to the printing cylinder 8 in the
intermediate position, said printing cylinder is moved into
the lower position, and then the pneumatic linear actu-
tors 30 are actuated simultaneously, in order to move the
compaction roller 21 from the inactive configuration to

the active configuration, in which it is in contact with the printing cylinder 8, by rotating the cranks 25 about the first articulation axis A. Then the rotation of the printing cylinder 8 is started, so that the substantially radial thrust applied by the compaction roller 21 allows complete and uniform adhesion of the printing plate 11 to the blanket 10, expelling any interstitial air pockets: in this manner, the printing plate 11 is fixed to the blanket 10 in an optimum manner, without separation or bulging.

[0026] It has thus been shown that the invention achieves the intended aim and object.

[0027] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0028] In particular, Figure 5 illustrates an important detail of another embodiment of the machine according to the invention, which provides for means 22 for actuating the compaction roller 21 which are constituted by compression springs 34 that can be adjusted appropriately and can be actuated mechanically instead of the pneumatic linear actuators 30.

[0029] All the details may be replaced with other technically equivalent ones.

[0030] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0031] In the preferred embodiments described by way of examples, individual characteristics, presented in relation to specific examples, may actually be interchanged with other different characteristics that exist in other examples of embodiment.

[0032] Moreover, it is noted that anything found to be previously known is understood not to be claimed.

[0033] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. A proof press for the mounting of flexographic printing plates, comprising a printing cylinder (6), which is covered by a blanket (5) for mounting at least one of said printing plates (2) by means of double adhesive tape (4) and is movable at right angles to its own axis in order to be placed in contact, along a generatrix, with a respective impression roller (14) for performing proof prints, and optical means (15) for collimating points of said impression roller (14) with respective points of said printing plate (2) viewed directly, characterized in that it comprises a compression device (20) that is adapted to produce the forced adhesion of said printing plate (2) to said double-adhesive tape (4) and to said blanket (5), so as to provide uniform fixing over the entire contact surface, avoiding the onset of separation or bulging.

2. The press according to claim 1, characterized in that said compression device (20) comprises a compaction roller (21), whose axis is parallel to the axis of said printing cylinder (6), said compaction roller being associated with actuation means (22) and being able to move from an inactive configuration to an active configuration in which it is in forced contact, along a generatrix, with said printing cylinder (6), causing the optimum adhesion of said printing plate (2) to said mounting blanket (5).

3. The press according to claims 1 and 2, characterized in that said actuation means (22) comprise at least two cranks (25) for rotationally supporting, in the respective central portion, said compaction roller (21), each one of said cranks (25) having a first end (26) that is pivoted to the footing (7) of said press about a first articulation axis (A) and a second end (28) that is pivoted to the stem (29) of a respective linear actuator (30) about a second articulation axis (B), said actuator (30) being pivoted, at its other end, to said footing (7) about a third articulation axis (C), so that the longitudinal axis of said cranks (25) and the longitudinal axis of said linear actuator (30) form, between them, an angle of less than 180°, said cranks (25) being able to rotate, by way of the action of said linear actuators (30), about said first articulation axis (A) in order to move said compaction roller (21) from said inactive configuration to said active configuration and vice versa.

4. The press according to one or more of the preceding claims, characterized in that said printing cylinder (6) can perform a translational motion, at right angles to its own axis, between a lower position for compressing said printing plate (2) against said blanket (5), an intermediate position for mounting said printing plate (2), and a raised position in which it is in contact, along a generatrix, with said impression roller (14) in order to perform proof prints.

5. The press according to one or more of the preceding claims, characterized in that it comprises a plurality of said cranks (25), each associated with a respective linear actuator (30), said cranks being distributed so as to be axially equidistant from one end to the other of said compaction roller (21).

6. The press according to one or more of the preceding claims, characterized in that said compaction roller (21) comprises a tubular core (23), which is covered by a sleeve (24) of elastically flexible material.

7. The press according to one or more of the preceding
claims, characterized in that said sleeve (24) is divided into a plurality of segments of the same length, each of which is keyed to said tubular core (23) between contiguous pairs of said cranks (25).

8. The press according to one or more of the preceding claims, characterized in that said sleeve (24) is made of a material such as soft rubber.

9. The press according to one or more of the preceding claims, characterized in that said linear actuator (30) is of the pneumatically actuated type.

10. The press according to one or more of claims 1 to 8, characterized in that said means (22) for actuating said compaction roller (21) are constituted by compression springs (34), which can be adjusted and actuated mechanically.

Patentansprüche

1. Andrückpresse zur Befestigung von Flexodruckplatten, die Folgendes umfasst: einen Druckzylinder (6), der bedeckt ist von einer Hülle (5) zur Befestigung mindestens einer der Druckplatten (2) mit Hilfe von doppeltem Klebeband (4) und der in rechten Winkeln zu seiner eigenen Achse beweglich ist, um entlang einer Generatrix mit einer jeweiligen Druckwalze (14) zur Durchführung von Probedrucken in Kontakt gebracht zu werden, und optische Mittel (15) zur Kollimitation von Punkten der Druckwalze (14) mit jeweiligen Punkten der Druckplatte (2), die direkt gesehen werden, dadurch gekennzeichnet, dass sie eine Kompressionsvorrichtung (20) umfasst, welche ausgebildet ist, um die erzwungene Haftung der Druckplatte (2) an dem doppelten Klebeband (4) und an der Hülle (5) zu erzeugen, um für eine gleichmäßige Befestigung über die gesamte Kontakfläche hinweg zu sorgen, um so den Beginn von Abtrennung oder Wölbung zu vermeiden.

2. Presse gemäß Anspruch 1, dadurch gekennzeichnet, dass die Kompressionsvorrichtung (20) eine Verdichtungswalze (21) umfasst, deren Achse parallel zu der Achse des Druckzyinders (6) ist, wobei die Verdichtungswalze mit Betätigungsmitteln (22) verbunden ist und in der Lage ist, sich aus einer inaktiven Anordnung in eine aktive Anordnung zu bewegen, in welcher sie entlang einer Generatrix in erzwungenum zwischen Kontakt mit dem Druckzylinder (6) steht und so für die optimale Haftung der Druckplatte (2) an der Hülle (5) sorgt.

3. Presse gemäß Anspruch 1 und 2, dadurch gekennzeichnet, dass die Betätigungsmittel (22) mindestens zwei Kurbeln (25) umfassen, um im jeweiligen mittleren Abschnitt die Verdichtungswalze (21) drehbar zu tragen, wobei jede der Kurbeln (25) ein erstes Ende (26) hat, das um eine erste Gelenkachse (A) drehgelenkig mit der Basis (7) der Presse verbunden ist, und ein zweites Ende (28), das um eine zweite Gelenkachse (B) drehgelenkig mit dem Schaft (29) eines jeweiligen linearen Antriebs (30) verbunden ist, wobei der lineare Antrieb (30) an seinem anderen Ende um eine dritte Gelenkachse (C) mit der Basis (7) drehgelenkig verbunden ist, so dass die Längsachse der Kurbel (25) und die Längsachse des linearen Antriebs (30) zwischen sich einen Winkel von weniger als 180° bilden und die Kurbeln (25) sich durch die Wirkung der linearen Antriebe (30) um die erste Gelenkachse (A) drehen können, um die Verdichtungswalze (21) aus der inaktiven Anordnung in die aktive Anordnung und umgekehrt zu bewegen.

4. Presse gemäß einem oder mehreren der obigen Ansprüche, dadurch gekennzeichnet, dass der Druckzylinder (6) eine translatorische Bewegung in rechten winkeln zu seiner eigenen Achse zwischen einer unteren Position zum Drücken der Druckplatte (2) gegen die Hülle (5), einer intermediären Position zur Befestigung der Druckplatte (2) und einer erhöhten Position durchführen kann, in welcher sie entlang einer Generatrix mit der Druckwalze (14) in Kontakt steht, um Probedrucke durchzuführen.

5. Presse gemäß einem oder mehreren der obigen Ansprüche, dadurch gekennzeichnet, dass sie eine Vielzahl der Kurbeln (25) umfasst, wobei jede mit einem jeweiligen linearen Antrieb (30) verbunden ist und die Kurbeln so verteilt sind, dass sie von einem Ende zum anderen der Verdichtungswalze (21) axial äquidistant sind.

6. Presse gemäß einem oder mehreren der obigen Ansprüche, dadurch gekennzeichnet, dass die Verdichtungswalze (21) einen rohrförmigen Kern (23) umfasst, der von einer Hülse (24) bedeckt ist, welche aus elastisch flexiblen Material besteht.


10. Presse gemäß einem oder mehreren der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass die Mittel (22) zur Betätigung der Verdichtungswalze (21) aus Kompressionsfedern (34) bestehen, die mechanisch eingestellt und betätigt werden können.

Revendications

1. Presse à épreuves pour le montage de clichés flexographiques, comprenant un cylindre d’impression (6), qui est couvert par un blanchet (5) pour le montage d’au moins un desdits clichés (2) au moyen d’une bande bi-adhésive (4) et est mobile à angle droit par rapport à son axe afin d’être placé en contact, le long d’une génératrice, avec un rouleau d’impression (14) respectif pour réaliser des épreuves, et des moyens optiques (15) pour la collimation des points dudit rouleau d’impression (14) avec des points respectifs dudit cliché (2) vus directement, caractérisée en ce qu’elle comprend un dispositif de compression (20) qui est adapté pour produire l’adhésion forcée dudit cliché (2) à ladite bande bi-adhésive (4) et audit blanchet (5), de sorte à fournir une fixation uniforme sur toute la surface de contact, empêchant l’apparition de décollement ou de relogement.

2. Presse selon la revendication 1, caractérisée en ce que ledit dispositif de compression (20) comprend un rouleau de compactage (21) parallèle à l’axe dudit rouleau d’impression (6), ledit rouleau de compactage étant associé à des moyens d’actionnement (22) et étant capable de se déplacer d’une configuration inactive à une configuration active dans laquelle il est en contact, le long d’une génératrice, avec ledit rouleau d’impression (6), provoquant l’adhésion optimale dudit cliché (2) audit blanchet (5) de montage.

3. Presse selon les revendications 1 et 2, caractérisée en ce que ledits moyens d’actionnement (22) comprennent au moins deux manivelles (25) pour le support rotationnel, dans une partie centrale respective, dudit rouleau de compactage (21), chacune desdites manivelles (25) présenant une première extrémité (26) qui est articulée à la base (7) de la presse autour d’un premier axe d’articulation (A) et une deuxième extrémité (28) qui est articulée à la tige (29) d’un actionneur linéaire respectif (30) autour d’un deuxième axe d’articulation (B), ledit actionneur (30) étant articulé, au niveau de son autre extrémité, à ladite base (7) autour d’un troisième axe d’articulation (C), de sorte que l’axe longitudinal de ladite manivelle (25) et l’axe longitudinal dudit actionneur linéaire (30) forment, entre eux, un angle d’au moins 180°, lesdites manivelles (25) étant capable de pivoter, sous l’action desdits actionneurs linéaires (30), autour du premier axe d’articulation (A) afin de déplacer ledit rouleau de compactage (21) de ladite configuration inactive à ladite configuration active et vice-versa.

4. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce que ledit cylindre d’impression (6) peut réaliser un déplacement translationnel, à angle droit par rapport à son axe, entre une position inférieure pour compresser ledit cliché (2) contre ledit blanchet (5), une position intermédiaire pour monter ledit cliché (2), et une position relevée dans laquelle il est en contact, le long d’une génératrice, avec ledit rouleau d’impression (14) afin de réaliser des épreuves.

5. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce qu’elle comprend une pluralité desdites manivelles (25), chacune associée à un actionneur linéaire respectif (30), ledites manivelles étant distribuées de sorte à être axialement équidistantes depuis une extrémité à l’autre dudit rouleau de compactage (21).

6. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce que ledit rouleau de compactage (21) comprend un noyau tubulaire (23) qui est recouvert par un manchon (24) fait d’un matériau élastiquement flexible.

7. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce que ledit manchon (24) est divisé en une pluralité de segments de même longueur, chacun desquels est claveté audit noyau tubulaire (23) entre des paires contiguës desdites manivelles (25).

8. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce que ledit manchon (24) est fait d’un matériau tel que du caoutchouc souple.

9. Presse selon l’une ou plusieurs des revendications précédentes, caractérisée en ce que ledit actionneur linéaire (30) est du type actionné de façon pneumatique.

10. Presse selon l’une ou plusieurs des revendications 1 à 8, caractérisée en ce que lesdits moyens (22) pour actionner ledit rouleau de compactage (21) sont constitués par des ressorts de compression (34) qui peuvent être réglés et actionnés mécaniquement.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description