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(54) Variable cutoff printing press with off impression gap

Druckmaschine mit variabler Abschaltung mit Druck-Aus-Lücke

Presse à imprimer à coupure variable avec arrêt espace d'impression

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Description

[0001] The present invention relates generally to printing presses and more specifically to variable cutoff printing presses.

BACKGROUND OF INVENTION

[0002] U.S. Patent Number 5,813,336 discloses a printing unit with a rotatable print cylinder and a rotatable blanket cylinder. A tubular printing blanket is removably mounted on the blanket cylinder. The printing unit may have an imaging unit mounted therein. A printing member, which is mountable on the print cylinder, is imaged by the imaging unit inside the printing unit. The printing member has a continuous surface and may be removed axially from the print cylinder. The printing unit may be configured as a cantilever printing unit, or, alternatively, may be configured with both a gear side frame and a work side frame for supporting the print and blanket cylinders. In order to provide a variable-cutoff capability, a plurality of print cylinder saddles may be provided. Each print cylinder saddle has the same inner diameter for mounting on the print cylinders. However, in order to provide a variable cut-off, the print cylinder saddles may have a variety of outer diameters.

[0003] U.S. Patent Number 6,694,877 discloses a printing assembly including an image printing cylinder, a transfer printing cylinder and an impression printing cylinder. The image printing cylinder is supported in a fixed position with respect to a U-shaped supporting construction, the transfer printing cylinder is supported on both ends between two supporting elements and the impression printing cylinder is supported on both ends between two supporting elements. The supporting elements are connected to respective bearing arms that are rotatable about a single axis. The bearing arms of the transfer printing cylinder are each rotated by respective first actuating means and the bearing arms of the impression printing cylinder are each rotated by respective second actuating means. The second actuating means are connected to the bearing arms of the transfer printing cylinder, causing the second actuating means to move along with a rotation of the bearing arm of the transfer printing cylinder if the first actuating means are actuated.

Document EP 2 415 602 A2 pertains to a printing press and method for positioning cylinders therein.

BRIEF SUMMARY OF THE INVENTION

[0004] U.S. Patent Application No. 2012/0012017 A1 discloses a variable cutoff printing unit. Two separate actuators move each of a blanket cylinder and an impression cylinder, and permit different sized blankets and plate cylinders to be accommodated. The impression cylinder actuator can move downwardly to move the impression cylinder off impression, the blanket cylinder also moving into an off impression position via a slot and cam

interaction on the blanket cylinder actuating mechanism. A stop may be positioned against an adjustable block and the stop position can be set via an adjustable stopping device and smart motor so that center distances between the plate cylinder and the blanket cylinder can be set, for example for different sized cylinders.

[0005] If a wrong stop position is set or a cylinder size is changed without proper adjustments, sometimes the actuators can fail or apply too much force, causing damage to the printing press. This is especially so if certain types of mechanisms are used to position the impression and blanket cylinder movement, for example a single pneumatic actuator.

[0006] The present invention provides a variable cutoff printing press according to claim 1.

[0007] The present invention also provides a method of operating a variable cutoff printing press according to claim 11.

Preferred embodiments are detailed in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention is described below by reference to the following drawings, in which:

Fig. 1 shows a side view of an inside portion of a gear side of a support apparatus for removably supporting different sized plate cylinders and blanket cylinders of a variable cutoff printing unit, the plate and blanket cylinders in this embodiment being for a 40.64 cm (16 inch) cut-off, off impression;

Fig. 2 shows the side view of Fig. 1 with the support apparatus adjusted to accommodate cylinders of a 60.96 cm (24 inch) cut-off;

Fig. 3 shows the side view of Fig. 1 with the support apparatus adjusted to accommodate cylinders of a 81.28 cm (32 inch) cut-off; and

Fig. 4 shows the side view of Fig. 3 on impression.

DETAILED DESCRIPTION

[0009] A variable cutoff printing press as used herein refers to a printing press that can be modified between print jobs so that the printing press can print repeating images of different lengths during different print jobs. The length of the repeating images printing during a particular print job is commonly referred to as a cutoff length or a cutoff. Plate cylinders and blanket cylinders that print the repeating images for the particular print job (and the plates and blanket mounted on the cylinders) may be said to have that cutoff length or cutoff. For example, a variable cutoff printing unit can print repeating images of a first cutoff length on a web or other substrate during a first print job and then can print repeating images of a

second cutoff length that varies from the first cutoff length on a web or other substrate during a subsequent second print job. The first print job is printed using a first printing plate and a first printing blanket each having an outer circumference of a length corresponding to the first cutoff length. After the first print job and before the second print job, the first printing plate and the first printing blanket are removed from the printing unit and replaced with a second printing plate and a second printing blanket that each has an outer circumference of a length corresponding to the second cutoff length. A change between print jobs that involves replacing printing plates and blankets having a first cutoff length with printing plates and blankets having a second cutoff length may be referred to as a cutoff change.

[0010] The printing press of the present invention preferably is a web offset lithographic printing press.

[0011] Fig. 1 shows a side view of a support apparatus 10 for removably supporting plate cylinders, blanket cylinders and impression cylinders in a variable cutoff printing unit. Support apparatus 10 has a gear side and a work side and includes a frame 12. Fig. 1 shows an inside portion of gear side of support apparatus 10. Gear side of support apparatus 10 includes a plate cylinder support 14, here fixed to the frame 12.

[0012] A pivotable blanket cylinder support 16 is coupled to frame 12 at a pivot point 116, for example by supports 216, and a pivotable impression cylinder support 18 likewise can pivot with respect to frame 10 at a pivot point 118, for example using supports 218.

[0013] Cylinder supports 14, 16, 18 are adapted to support a first axial end of a plate cylinder 314, blanket cylinder 316 and impression cylinder 318, respectively. In Fig. 1 the plate cylinder 314 and blanket cylinder 316 may be for 40.64 cm (16 inch) cutoff, and are shown off impression.

[0014] Support apparatus 10 has a blanket cylinder support setting device 100 that includes an arm 28, a sliding element 32 and blanket cylinder support actuator 24 for moving blanket cylinder support 16. Arm 28 is fixedly connected to sliding element 32, for example via bolts 33 and can couple sliding element 32 to blanket cylinder support 16 so actuator 24 can lift blanket cylinder support 16. Actuator 24 adjusts the vertical position of blanket cylinder support 16 by moving sliding element 32 in slot 34. Actuator 24 moves sliding element along frame 12 to move blanket cylinder support 16 toward and away from plate cylinder support 14. Arm 28 includes a roller cam 29, which may extend into a blanket cylinder support slot 30 formed in blanket cylinder support 16. The roller cam 29 and slot 30 interaction may be similar to that described in U.S. Patent Application No. 2012/0012017. However, other details differ significantly, including that actuator 24 may be a motor that does not just set a stopping device or move the sliding element as far as possible, but actually both sets and positions the sliding element 32.

[0015] In addition, as the sliding element 32 moves

through its various positions to accommodate different sized blanket and plate cylinder sizes, during off impression a gap G is maintained between the blanket cylinder support 16 and impression cylinder support 18. A gap thus is also maintained between the blanket cylinder 316 and impression cylinder 318.

[0016] The maintenance of gap G is accomplished by a linkage 40 between blanket cylinder support 16 and impression cylinder support 18. Linkage 40 is rotatably connected at connection 42 to blanket cylinder support 16 and at a central connection 44 via a pivot link 46 rotatably connected at a connection 48 to frame 12. A roller 49 at the other end of linkage 40 from connection 42 can roll on a support surface 50 of impression cylinder support 18.

[0017] The weight of impression cylinder 318 forces impression cylinder support 18 in contact with linkage 40. A counterbalance cylinder 60 is energized to pull down on impression cylinder support 318 and minimize the force it take for first actuator 24, via linkage 40, to move impression cylinder 318 toward plate cylinder support 14, in Fig. 1 clockwise about pivot point 118. Counterbalance cylinder 60 is always energized to counteract the weight of the impression cylinder so only a minimal amount of force needs to be applied by linkage 40 to move the impression cylinder. The counterbalance cylinder 60 therefore applies a counterpressure opposite the linkage pressure, which is applied by the linkage 40, to the impression cylinder support. An on-impression actuator 70 is deenergized, and only energized when on impression is needed after the plate and blanket cylinders have been changed.

[0018] Figs. 2 and 3 thus show the movement of the support apparatus as different sized plate and blanket cylinders are used.

[0019] As shown in Fig. 2, to place 60.96 cm (24 inch) cut-off plate cylinder 414 and blanket cylinder 416 on the variable cut-off printing press, actuator 24, for example by rotating a threaded screw, moves sliding element 32 downwardly so that arm 28 and roller cam 29 rotate blanket cylinder support 16 clockwise about pivot point 116, via slot 30. As linkage 40 thus moves upwardly, air cylinder 60 forces impression cylinder support 18 to move clockwise about pivot point 118, so that gap G is maintained. A gap between the new sized blanket cylinder 416 and impression cylinder 318 thus also results in the off-impression position.

[0020] Fig. 3 shows yet further movement of actuator 24 for 81.28 cm (32 inch) cutoff plate cylinder 514 and blanket cylinder 516, with gap G being maintained. The support apparatus 10 is in a further position, as described with respect to Fig. 2, where supports 16 and 18 have rotated yet further in the clockwise direction.

[0021] During movement by the actuator 24, on impression actuator 70 is de-energized so that its actuator arm 72 is free to move.

[0022] Fig. 4 shows actuation and energizing of the on impression actuator 70, which may be a pneumatic cyl-

inder. As shown in Fig. 4, plate and blanket supports 16, 18 are positioned for supporting 81.28 cm (32 inch) cutoff plate cylinder 514 and blanket cylinder 516, which are omitted for clarity, in an on impression position. To move the printing press on impression, actuator arm 72 is moved upwardly and causes a cam surface 110 of impression cylinder support 18 to contact a cam surface 210 of blanket cylinder support 16, and for gap G to disappear. Owing to the fact that roller 29 is slightly smaller in diameter than slot 30, blanket cylinder support 16 is also moved upwardly by the impression cylinder support 18 and creates the necessary print load between the respective blanket cylinder and plate cylinder.

[0023] Owing to the fact that the gap G between the blanket cylinder support 16 and impression cylinder support 18 is maintained throughout the course of movement of the support apparatus 10 for different sized cylinders, similar pressures can be created by the on impression actuator 70 regardless of the cylinder size. Over-torque situations or fault outs can be minimized or eliminated.

[0024] In the preceding specification, the invention has been described with reference to specific exemplary embodiments and examples thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the scope of invention as set forth in the claims that follow. The specification and drawings are accordingly to be regarded in an illustrative manner rather than a restrictive sense.

[0025] The further actuator in the claims is the on impression actuator 70.

Claims

1. A variable cutoff printing press comprising:

a plate cylinder (314);
 a plate cylinder support (14) removably supporting the plate cylinder;
 a blanket cylinder (316);
 a blanket cylinder support (16) removably supporting the blanket cylinder;
 an impression cylinder (318);
 an impression cylinder support (18);
 a blanket cylinder support actuator (24) for moving the blanket cylinder support to accommodate different blanket cylinder sizes, **characterized in that** the blanket cylinder support actuator further moves the impression cylinder support (18) so that regardless of blanket cylinder size a gap (G) exists between the blanket cylinder support and the impression cylinder support; and **in that**
 an on impression actuator (70) moves the impression cylinder support against the blanket cylinder support to set a desired print load.

2. The variable cutoff printing press as recited in claim

1 wherein the blanket cylinder support actuator (24) rotates the blanket cylinder support about a pivot point (116).

3. The variable cutoff printing press as recited in claim 2 further comprising a frame (12), the blanket cylinder support being coupled to the frame.

4. The variable cutoff printing press as recited in claim 2 or 3 further comprising a linkage (40) between the blanket cylinder support and the impression cylinder support, the linkage causing the impression cylinder support to rotate in a same direction as the blanket cylinder support.

5. The variable cutoff printing press as recited in claim 4 further comprising a counterbalance cylinder (60) forcing an end of the impression cylinder support downward.

6. The variable cutoff printing press as recited in claim 5 wherein the counterbalance cylinder (60) is an air cylinder.

7. The variable cutoff printing press as recited in any of the previous claims wherein the impression cylinder (318) is of fixed size.

8. The variable cutoff printing press as recited in any of the previous claims wherein the on impression actuator (70) is pneumatic.

9. The variable cutoff printing press as recited in any of the previous claims wherein the blanket cylinder support actuator (24) is a motor setting a position of the blanket cylinder support.

10. The variable cutoff printing press as recited in any of the previous claims wherein the press is a web offset lithographic printing press.

11. A method of operating a variable cutoff printing press including:

setting a first desired blanket cylinder position for a first blanket cylinder (316) using a first actuator (24), an impression cylinder (318) also being moved by the first actuator while a gap (G) is maintained between a blanket cylinder support and an impression cylinder support (18), wherein the first actuator is a blanket cylinder support actuator (24);
 placing the first blanket cylinder (316), impression cylinder (318) and a first plate cylinder (314) on impression using a further actuator (70) to force the impression cylinder support against the blanket cylinder support, wherein the further actuator is an on impression actuator (70);

setting a second desired blanket cylinder position for a different sized second blanket cylinder (416, 516) using the first actuator, the gap being maintained between the blanket cylinder support and the impression cylinder support; and placing the second blanket cylinder, the impression cylinder and a second plate cylinder (414, 514) on impression using the further actuator to force the impression cylinder support against the blanket cylinder support.

12. The method as recited in claim 11 wherein the first actuator (24) rotates the blanket cylinder support and the impression cylinder support in a same direction.
13. The method as recited in claim 12 wherein the impression cylinder support is rotated by the first actuator via a linkage (40).
14. The method as recited in claim 13 wherein a counterpressure opposite the linkage pressure is applied to the impression cylinder support.
15. The method as recited in any one of the preceding claims 11 to 14 wherein the further actuator (70) is pneumatically operated.
16. The method as recited in any one of the preceding claims 11 to 15 wherein the press is a web offset lithographic printing press.

Patentansprüche

1. Druckmaschine mit variabler Abschnittslänge, umfassend:
 - einen Plattenzylinder (314);
 - einen Plattenzylinderträger (14), der entfernbar den Plattenzylinder trägt;
 - einen Gummizylinder (316)
 - einen Gummizylinderträger (16), der entfernbar den Gummizylinder trägt;
 - einen Druckzylinder (318);
 - einen Druckzylinderträger (18);
 - eine Gummizylinderträger-Betätigungsverrichtung (24), um den Gummizylinderträger zu bewegen, um verschiedene Gummizylindergrößen aufzunehmen, **dadurch gekennzeichnet, dass** die Gummizylinderträger-Betätigungsverrichtung weiter den Druckzylinderträger (18) bewegt, so dass unabhängig von der Gummizylindergröße eine Lücke (G) zwischen dem Gummizylinderträger und dem Druckzylinderträger vorhanden ist; und dadurch, dass eine Druck-Betätigungsverrichtung (70) weiter den Druckzylinderträger gegen den Gummizylinderträger bewegt, um eine gewünschte

Drucklast einzustellen.

2. Druckmaschine mit variabler Abschnittslänge nach Anspruch 1, wobei die Gummizylinderträger-Betätigungsverrichtung (24) den Gummizylinderträger um einen Schwenkpunkt (116) dreht.
3. Druckmaschine mit variabler Abschnittslänge nach Anspruch 2, weiter umfassend einen Rahmen (12), wobei der Gummizylinderträger an den Rahmen gekoppelt ist.
4. Druckmaschine mit variabler Abschnittslänge nach Anspruch 2 oder 3, weiter umfassend eine Verbindung (40) zwischen dem Gummizylinderträger und dem Druckzylinderträger, wobei die Verbindung verursacht, dass sich der Druckzylinderträger in einer gleichen Richtung wie der Gummizylinderträger dreht.
5. Druckmaschine mit variabler Abschnittslänge nach Anspruch 4, weiter umfassend einen Gegengewichtszylinder (60), der ein Ende des Druckzylinderträgers nach unten drückt.
6. Druckmaschine mit variabler Abschnittslänge nach Anspruch 5, wobei der Gegengewichtszylinder (60) ein Luftzylinder ist.
7. Druckmaschine mit variabler Abschnittslänge nach einem der vorhergehenden Ansprüche, wobei der Druckzylinder (318) eine feste Größe aufweist.
8. Druckmaschine mit variabler Abschnittslänge nach einem der vorhergehenden Ansprüche, wobei die Druck-Betätigungsverrichtung (70) pneumatisch ist.
9. Druckmaschine mit variabler Abschnittslänge nach einem der vorhergehenden Ansprüche, wobei die Gummizylinderträger-Betätigungsverrichtung (24) ein Motor ist, der eine Position des Gummizylinderträgers einstellt.
10. Druckmaschine mit variabler Abschnittslänge nach einem der vorhergehenden Ansprüche, wobei die Maschine eine Rollenoffset-Lithographiedruckmaschine ist.
11. Verfahren zum Betreiben einer Druckmaschine mit variabler Abschnittslänge, darin eingeschlossen:
 - Einstellen einer ersten gewünschten Gummizylinderposition für einen ersten Gummizylinder (316) unter Verwendung einer ersten Betätigungsverrichtung (24), wobei ein Druckzylinder (318) auch von der ersten Betätigungsverrichtung bewegt wird, während eine Lücke (G) zwischen einem Gummizylinderträger und einem

- Druckzylinderträger (18) beibehalten wird, wobei die erste Betätigungsvorrichtung eine Gummizylinderträger-Betätigungsvorrichtung (24) ist;
- Platzieren des ersten Gummizylinders (316), Druckzylinders (318) und eines ersten Plattenzylinders (314) auf dem Druck unter Verwendung einer weiteren Betätigungsvorrichtung (70), um den Druckzylinderträger gegen den Gummizylinderträger zu drücken, wobei die weitere Betätigungsvorrichtung eine Druckbetätigungsvorrichtung (70) ist,
- Einstellen einer zweiten gewünschten Gummizylinderposition für einen zweiten Gummizylinder (416, 516) mit einer verschiedenen Größe unter Verwendung der ersten Betätigungsvorrichtung, wobei die Lücke zwischen dem Gummizylinderträger und dem Druckzylinderträger beibehalten wird; und
- Platzieren des zweiten Gummizylinders, des Druckzylinders und eines zweiten Plattenzylinders (414, 514) auf dem Druck unter Verwendung einer weiteren Betätigungsvorrichtung, um den Druckzylinderträger gegen den Gummizylinderträger zu drücken.
12. Verfahren nach Anspruch 11, wobei die erste Betätigungsvorrichtung (24) den Gummizylinderträger und dem Druckzylinderträger in eine gleiche Richtung dreht.
13. Verfahren nach Anspruch 12, wobei der Druckzylinderträger durch die erste Betätigungsvorrichtung über eine Verbindung (40) gedreht wird.
14. Verfahren nach Anspruch 13, wobei ein Gegendruck entgegen dem Verbindungsdruck auf den Druckzylinderträger angewendet wird.
15. Verfahren nach einem der vorhergehenden Ansprüche 11 bis 14, wobei die weitere Betätigungsvorrichtung (70) pneumatisch betrieben wird.
16. Verfahren nach einem der vorhergehenden Ansprüche 11 bis 15, wobei die Maschine eine Rollenoffset-Lithographiedruckmaschine ist.
- Revendications**
1. Presse à imprimer à coupe variable comprenant :
- un cylindre porte-plaque (314) ;
 un support de cylindre porte-plaque (14) supportant, de manière amovible, le cylindre porte-plaque ;
 un système porte-blanchet (316) ;
 un support de cylindre porte-blanchet (16) supportant, de manière amovible, le cylindre porte-blanchet ;
 un cylindre d'impression (318) ;
 un support de cylindre d'impression (18) ;
 un actionneur de support de cylindre porte-blanchet (24) pour déplacer le support de cylindre porte-blanchet afin d'accepter différentes tailles de cylindre porte-blanchet, **caractérisée en ce que** l'actionneur de support de cylindre porte-blanchet déplace en outre le support de cylindre d'impression (18) de sorte qu'indépendamment de la taille du cylindre porte-blanchet, il existe un espace (G) entre le support de cylindre porte-blanchet et le support de cylindre d'impression ;
et en ce que :
 un actionneur d'impression (70) déplace le support de cylindre d'impression contre le support de cylindre porte-blanchet afin de déterminer une charge d'impression souhaitée.
2. Presse à imprimer à coupe variable selon la revendication 1, dans laquelle l'actionneur de support de cylindre porte-blanchet (24) fait tourner le support de cylindre porte-blanchet autour d'un point de pivot (116).
3. Presse à imprimer à coupe variable selon la revendication 2, comprenant en outre un bâti (12), le support de cylindre porte-blanchet étant couplé au bâti.
4. Presse à imprimer à coupe variable selon la revendication 2 ou 3, comprenant en outre une liaison (40) entre le support de cylindre porte-blanchet et le support de cylindre d'impression, la liaison amenant le support de cylindre d'impression à tourner dans une même direction que le support de cylindre porte-blanchet.
5. Presse à imprimer à coupe variable selon la revendication 4, comprenant en outre un cylindre de contrepoids (60) forçant une extrémité du support de cylindre d'impression vers le bas.
6. Presse à imprimer à coupe variable selon la revendication 5, dans laquelle le cylindre de contrepoids (60) est un cylindre pneumatique.
7. Presse à imprimer à coupe variable selon l'une quelconque des revendications précédentes, dans laquelle le cylindre d'impression (318) a une taille fixe.
8. Presse à imprimer à coupe variable selon l'une quelconque des revendications précédentes, dans laquelle l'actionneur d'impression (70) est pneumatique.
9. Presse à imprimer à coupe variable selon l'une quelconque des revendications précédentes, dans la-

quelle l'actionneur de support de cylindre porte-blanchet (24) est un moteur réglant une position du support de cylindre porte-blanchet.

- 10.** Presse à imprimer à coupe variable selon l'une quelconque des revendications précédentes, dans laquelle la presse est une presse lithographique offset. 5
- 11.** Procédé pour actionner une presse à imprimer à coupe variable comprenant les étapes consistant à : 10
- régler une première position de cylindre porte-blanchet souhaitée pour un premier cylindre porte-blanchet (316) à l'aide d'un premier actionneur (24), un cylindre d'impression (318) étant également déplacé par un premier actionneur alors qu'un espace (G) est maintenu entre un support de cylindre porte-blanchet et un support de cylindre d'impression (18), dans lequel le premier actionneur est un actionneur de support de cylindre porte-blanchet (24) ; 15
- placer le premier cylindre porte-blanchet (316), le cylindre d'impression (318) et un premier cylindre porte-plaque (314) en impression à l'aide d'un autre actionneur (70) afin de forcer le support de cylindre d'impression contre le support de cylindre porte-blanchet, dans lequel l'actionneur supplémentaire est un actionneur d'impression (70) ; 20
- régler une seconde position de cylindre porte-blanchet souhaitée pour un second cylindre porte-blanchet (416, 516) de taille différente à l'aide du premier actionneur, l'espace étant maintenu entre le support de cylindre porte-blanchet et le support de cylindre d'impression ; et 25
- placer le second cylindre porte-blanchet, le cylindre d'impression et un second cylindre porte-plaque (414, 514) en impression à l'aide de l'actionneur supplémentaire afin de forcer le support de cylindre d'impression contre le support de cylindre porte-blanchet. 30
- 12.** Procédé selon la revendication 11, dans lequel le premier actionneur (24) fait tourner le support de cylindre porte-blanchet et le support de cylindre d'impression dans une même direction. 35
- 13.** Procédé selon la revendication 12, dans lequel le support de cylindre d'impression est entraîné en rotation par le premier actionneur via une liaison (40). 40
- 14.** Procédé selon la revendication 13, dans lequel une contre-pression opposée à la pression de liaison est appliquée sur le support de cylindre d'impression. 45
- 15.** Procédé selon l'une quelconque des revendications 11 à 14, dans lequel l'actionneur supplémentaire (70) est actionné par voie pneumatique. 50

- 16.** Procédé selon l'une quelconque des revendications 11 à 15, dans lequel la presse est une presse lithographique offset à bande. 55

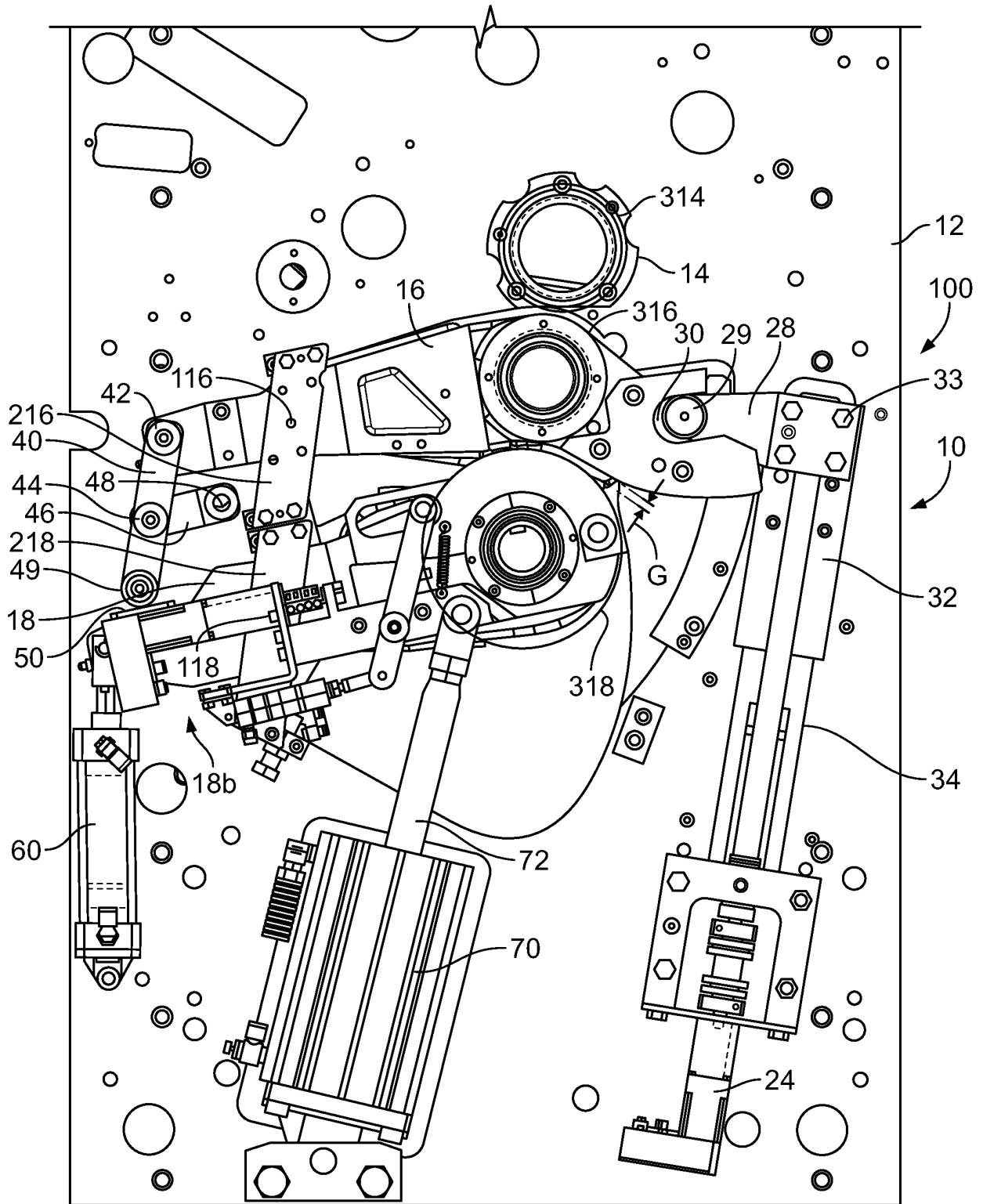


FIG. 1

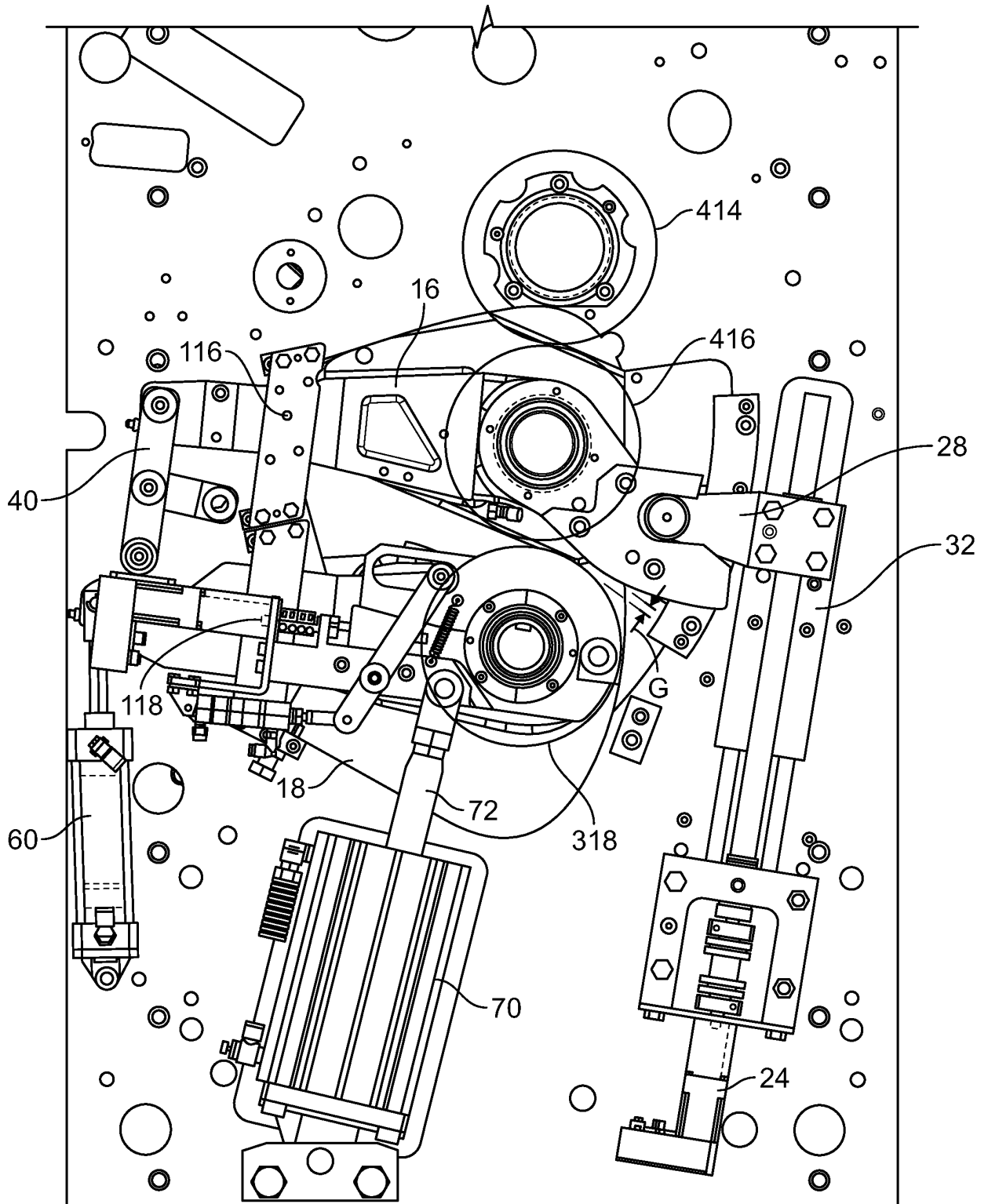


FIG. 2

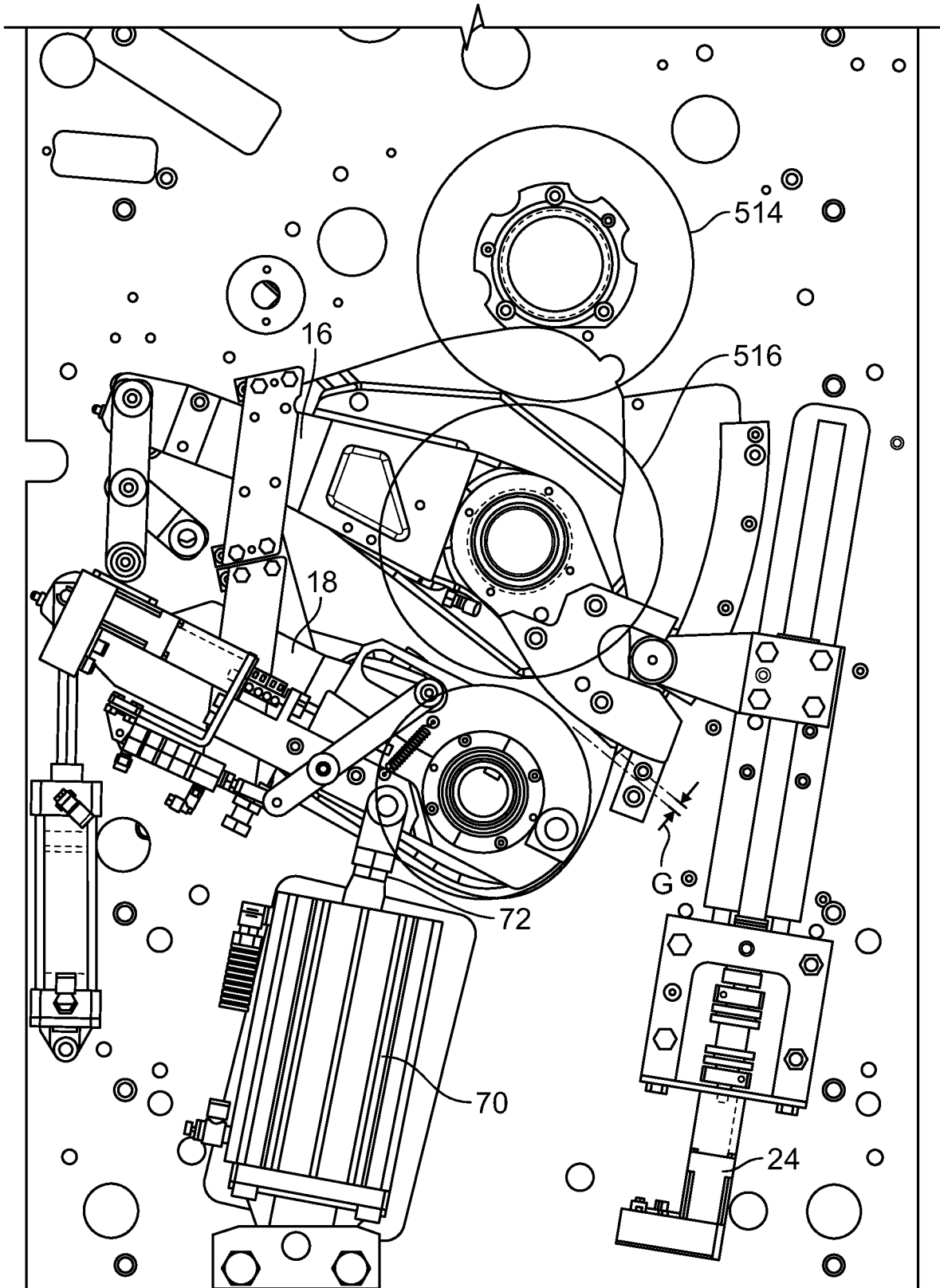


FIG. 3

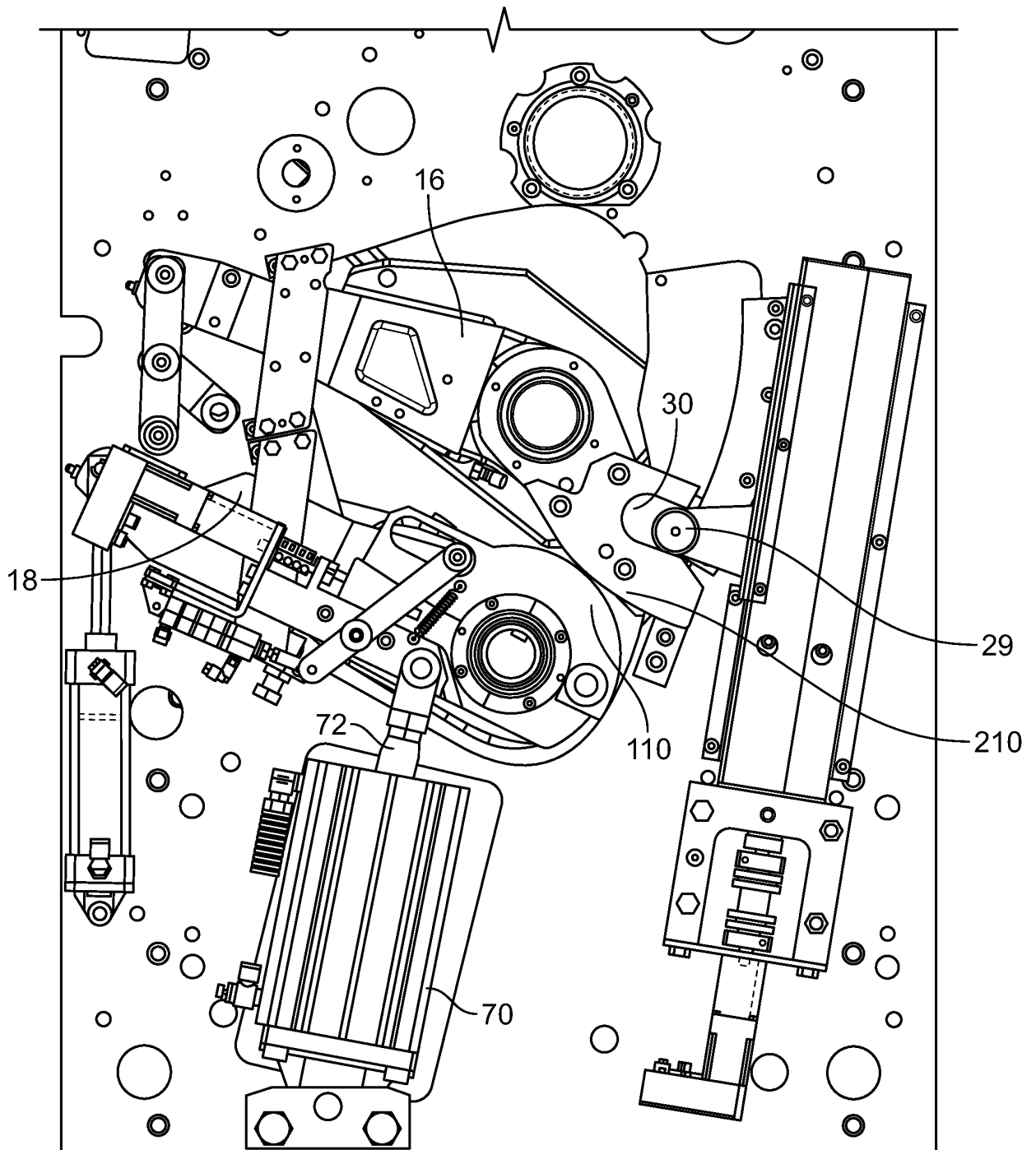


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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