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(71) Applicant:
Hamada Printing Press Mfg. Co., Ltd.
Nishiyodogawa-ku Osaka (JP)

(72) Inventors:
- **Masuda, Itsuro,**
  c/o Sanda Factory of Hamada
  Sanda-shi, Hyogo (JP)
- **Miyaji, Takuya,**
  c/o Sanda Factory of Hamada
  Sanda-shi, Hyogo (JP)
- **Hirano, Yoichi,**
  c/o Sanda Factory of Hamada
  Sanda-shi, Hyogo (JP)

(74) Representative:
Schieschke, Klaus, Dipl.-Ing.
Patentanwälte
Eder & Schieschke,
Elisabethstrasse 34/II
80796 München (DE)

(54) Paper feed device for printing press

(57) A paper feed device for a printing press which can laterally register a stack of paper sheets. A positioning guide is provided opposite one side of the upper portion of a stack of paper sheets placed on an elevator table. A jogger is provided opposite the other side of the upper portion of the stack of paper sheets. The jogger is reciprocated by a reciprocator to press the upper portion of the stack against the positioning guide, thereby laterally registering the stacked sheets.

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Description

BACKGROUND OF THE INVENTION

[0001] This invention relates to a paper feed device for a small sheet-fed offset printing press.

[0002] A typical conventional small sheet-fed offset printing press comprises an elevator table on which are stacked sheets of paper, and a universal feeder for feeding the paper sheets one by one from the top of the stack into between feed rollers, which feed sheets into between an impression cylinder and a blanket cylinder for printing.

[0003] None of such conventional small printing presses has had a jogger type lateral registration device for laterally registering sheets of paper stacked in the paper feed station. Thus, before printing, it is necessary for an operator to stack sheets of paper on the elevator table, move the stack of paper laterally, and determine the lateral position of the stack by intuition.

[0004] But lateral positioning work relying totally on operator's intuition requires much time and makes accurate printing difficult.

[0005] An object of this invention is to provide a paper feed device for use in a printing press that permits accurate and easy lateral positioning of the stacked sheets of paper.

SUMMARY OF THE INVENTION

[0006] According to this invention, there is provided a paper feed device for use in a printing press in which sheets of paper in a stack on a vertically movable table are fed one by one toward printing cylinders, the paper feed device comprising a positioning guide for positioning one side of the stack at its upper portion, a jogger movable toward and away from the other side of the stack, the positioning guide and the jogger being provided over the table, and a reciprocator for reciprocating the jogger relative to the other side of the stack.

[0007] The reciprocator may comprise a cam mechanism driven by a motor or a mechanism comprising a threaded shaft mounted on the outer side of the jogger, a nut threaded on the threaded shaft, and a motor for turning the nut forward and backward.

[0008] By reciprocating the jogger, the upper portion of the stacked sheets of paper is pushed against the positioning guide. This allows accurate positioning of the stacked sheets of paper in a lateral direction and thus allows printing with precise register.

[0009] Other features and objects of the present invention will become apparent from the following description made with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 is a schematic view of a printing press embodying this invention;
Fig. 2 is a plan view of a lateral registration device of the printing press of Fig. 1;
Fig. 3 is a sectional view taken along line III-III of Fig. 2;
Fig. 4 is a sectional view taken along line IV-IV of Fig. 3;
Fig. 5 is a plan view in cross-section of a reciprocator of the printing press of Fig. 1; and
Figs. 6-8 are plan views in cross-section of other embodiments of the reciprocator.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] An embodiment of this invention is now described with reference to the drawings. Fig. 1 schematically shows the feeder-to-press segment of a printing press. It has a paper feed unit 1 including an elevator table 2 on which are stacked sheets of paper. The front face of the paper stack A is positioned by abutting against a front plate 3.

[0012] Over the paper stack A, a universal feeder 4 is provided which comprises a shaft 5, an arm 6 mounted on the shaft 5, and a sucker 7 mounted at the free end of the arm 6. The arm is pivoted downward by rotating the shaft 5 counterclockwise to suck the paper sheet P at top of the stack A. Then the arm 6 is pivoted upward by rotating the shaft 5 clockwise to insert the sheet P into between a pair of feed rollers 8a and 8b.

[0013] The rollers 8a, 8b are being rotated in the directions shown by the arrows, so that the sheet P is fed forward.

[0014] In the feed path of sheets, guide plates 9 for guiding sheets and feed rollers 10 are provided. Sheets are fed by the feed rollers 10, which are rotated in the directions of arrows, into between an impression cylinder 11 and a blanket cylinder 12 for printing.

[0015] As shown in Figs. 2-5, the paper feed unit 1 has a lateral register device 20 for laterally registering paper sheets P at the upper part of the stack A.

[0016] The lateral register device 20 comprises a positioning guide 21 for positioning one side of the upper part of the stack A, a plate-shaped jogger 22 facing the other side of the stack A, and a reciprocator 30 for moving the jogger 22 toward and away from the other side of the stack 30.

[0017] The positioning guide 21 is a plate member movable in the lateral direction of the sheets P as well as in the vertical direction, though this feature is not shown.

[0018] The jogger 22 is movable laterally and vertically in line with the positioning guide 21. The mechanism for

moving the jogger 22 laterally and vertically comprises a pair of elongate guide members 31a, 31b extending parallel to each other in the direction perpendicular to the feed direction of sheets P, a support plate 32 supported so as to be movable along the guide members 31a, 31b, and a pair of arms 33 arranged on the outer side of the support plate 32 in the feed direction of sheets. As shown in Fig. 4, the arms 33 have their upper ends coupled to the support plate 32 by bolts 35 inserted through elongate holes 34 formed in the upper ends of the arms 33 and threaded into the support plate 32.

[0019] The arms 33 carry at their bottom ends a jogger support plate 36 (Fig. 4) having guide sleeves 37 through which guide shafts 38 secured to the outer surface of the jogger 22 slidably extend. By moving the support plate 32 along the guide members 31a, 31b, the lateral position of the jogger 22 can be adjusted. The jogger 22 can be moved vertically by loosening the bolts 35 and turning a height adjusting bolt 40, shown in Fig. 3, threadedly engaged in a vertical threaded hole 39 formed through the support plate 32 and having its bottom end coupled to the jogger support plate 36.

[0020] After the jogger 22 has been moved laterally to a desired position, locking screws 41 shown in Fig. 4, threaded into the support plate 32 from its top toward the guide members 31a, 31b are tightened to secure the support plate 32 to the guide members. After the jogger 22 has been moved vertically to a desired position, the bolts 35 are tightened to fix the arms 33 in position.

[0021] The reciprocator 30 for reciprocating the jogger 22 toward and away from the paper stack A comprises, as shown in Figs. 3 and 4, a motor 43 mounted to the bottom surface of a motor support plate 42 secured to the bottom of the jogger support plate 36, and a cam 45 fixed to the rotary shaft 44 of the motor 43.

[0022] As shown in Fig. 2, the motor support plate 42 has on its top surface a shaft 46 which pivotably supports the central portion of an arm 47 carrying at one end thereof a cam follower 48 in contact with the cam 45 and at the other end another cam follower 49 abetting the tip of one of the guide shafts 38. Springs 50 are mounted around the respective guide shafts 38 to urge the shafts 38 so as to keep the cam follower 48 always in contact with the cam 45. The jogger 22 can thus be reciprocated by turning the cam 45.

[0023] When the cam 45 is turned by the motor 43, the jogger 22 is reciprocated. While advancing, the jogger 22 pushes sheets P at the upper part of the stack A against the positioning guide 21, thus laterally positioning them simultaneously.

[0024] With the sheets at the upper part of the stack laterally positioned by the positioning guide 21 and the jogger 22, sheets are picked up one by one by the universal feeder 4 from the top of the stack and fed toward between the impression cylinder 11 and the blanket cylinder 12. Thus, it is possible to print sheets with precise register. Since lateral positioning of sheets is carried out on the table 2, sheet feeding efficiency is kept high.

[0025] If sheets are laterally positioned one at a time, sheets may be deformed in the width direction. This makes accurate lateral positioning difficult. In the present arrangement, since a plurality of sheets are positioned simultaneously, sheets are less likely to be deformed in the width direction, so that sheets can be positioned with extremely high register accuracy.

[0026] A stepping motor is preferably used as the motor 43 for driving the cam 45 to synchronize the lateral positioning of sheets with the feeding motion of the universal feeder 4.

[0027] As shown in Figs. 3 and 4, a guide plate 51 having a window 52 through which the jogger 22 can pass may be provided so as to be slidable along the guide members 31a, 31b and fixable at any desired position. With this arrangement, when a stack A of paper is loaded onto the table 2, the jogger 22 is retracted inside the guide plate 51, so that it never hinders the loading of a stack A of paper.

[0028] Figs. 6-8 show different embodiments of reciprocator 30 for reciprocating the jogger 22.

[0029] The reciprocator 30 shown in Fig. 6 includes a roller arm 53 mounted on the outer side of the jogger 22, a cam follower 54 mounted on the top end of the arm 53, and springs 50 mounted around the guide shafts 38 for urging the cam 45 into contact with the cam follower 54. The jogger 22 is thus directly reciprocated by the rotating cam 45.

[0030] The reciprocator 30 shown in Fig. 7 includes a threaded shaft 55 provided at the outer side of the jogger 22, a nut 56 threaded onto the threaded shaft 55 and rotatably supported by a bearing 58 mounted in a housing 57, and a motor 59 for reciprocating the jogger 22 by turning the nut 56 alternately forward and backward.

[0031] The reciprocator 30 shown in Fig. 8 includes a nut 60 fixed to the outer side of the jogger 22, a threaded shaft 61 threaded into the nut 60, and a motor 62 for reciprocating the jogger 22 by turning the threaded shaft 61 alternately forward and backward.

[0032] As described above, according to this invention, sheets stacked on the table can be laterally positioned easily and efficiently and can be printed with high register accuracy.

Claims

1. A paper feed device for use in a printing press in which sheets of paper in a stack on a vertically movable table are fed one by one toward printing cylinders, said paper feed device comprising a positioning guide for positioning one side of said stack at its upper portion, a jogger movable toward and away from the other side of said stack, said positioning guide and said jogger being provided over said table, and a reciprocator for reciprocating said jogger relative to said other side of said stack.

2. The device of claim 1 wherein said reciprocator comprises a cam mechanism.

3. The device of claim 1 wherein said reciprocator comprises a threaded shaft mounted on the outer side of said jogger, a nut threaded on said threaded shaft, and a motor for turning said nut forward and backward.

FIG. 1

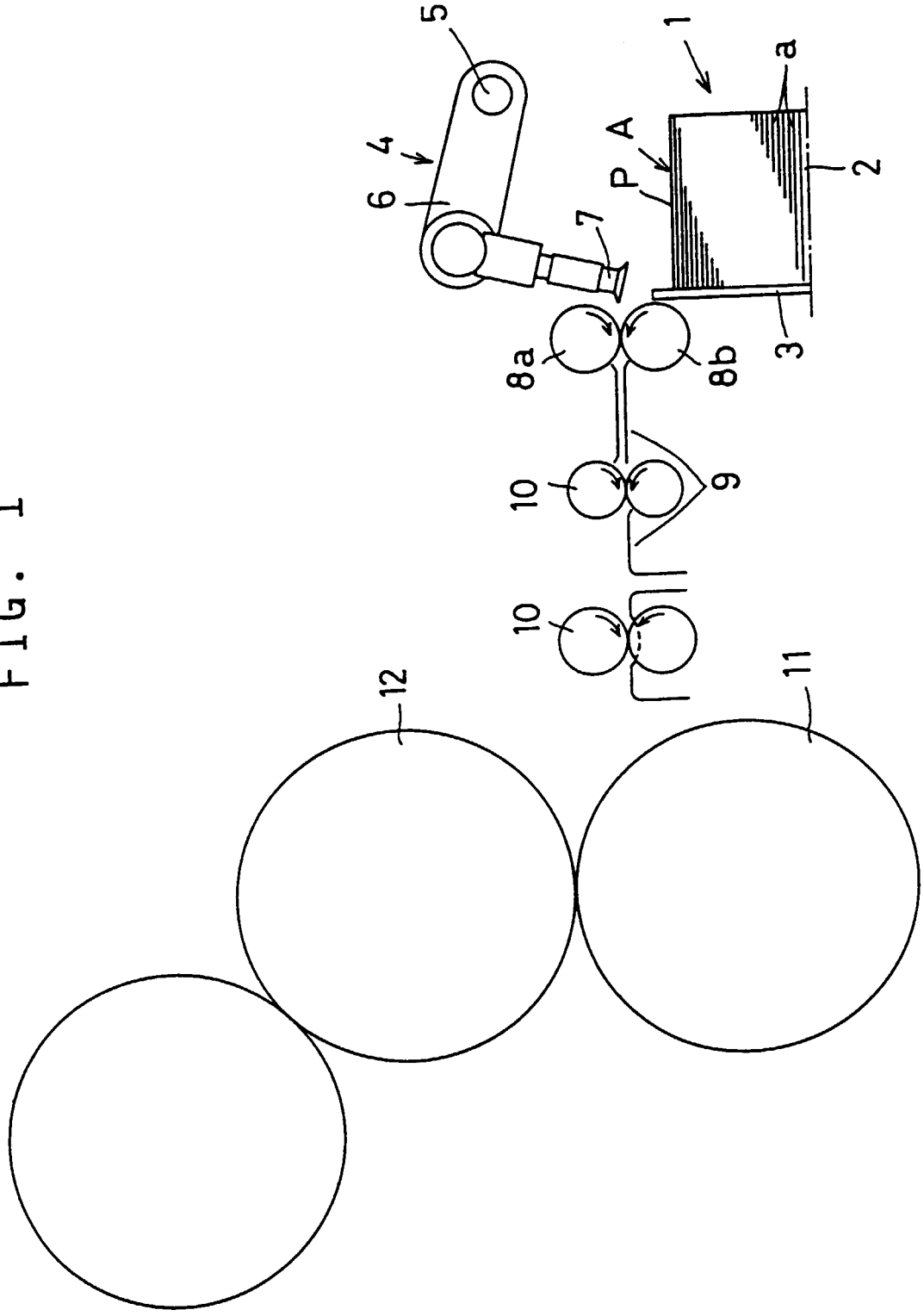
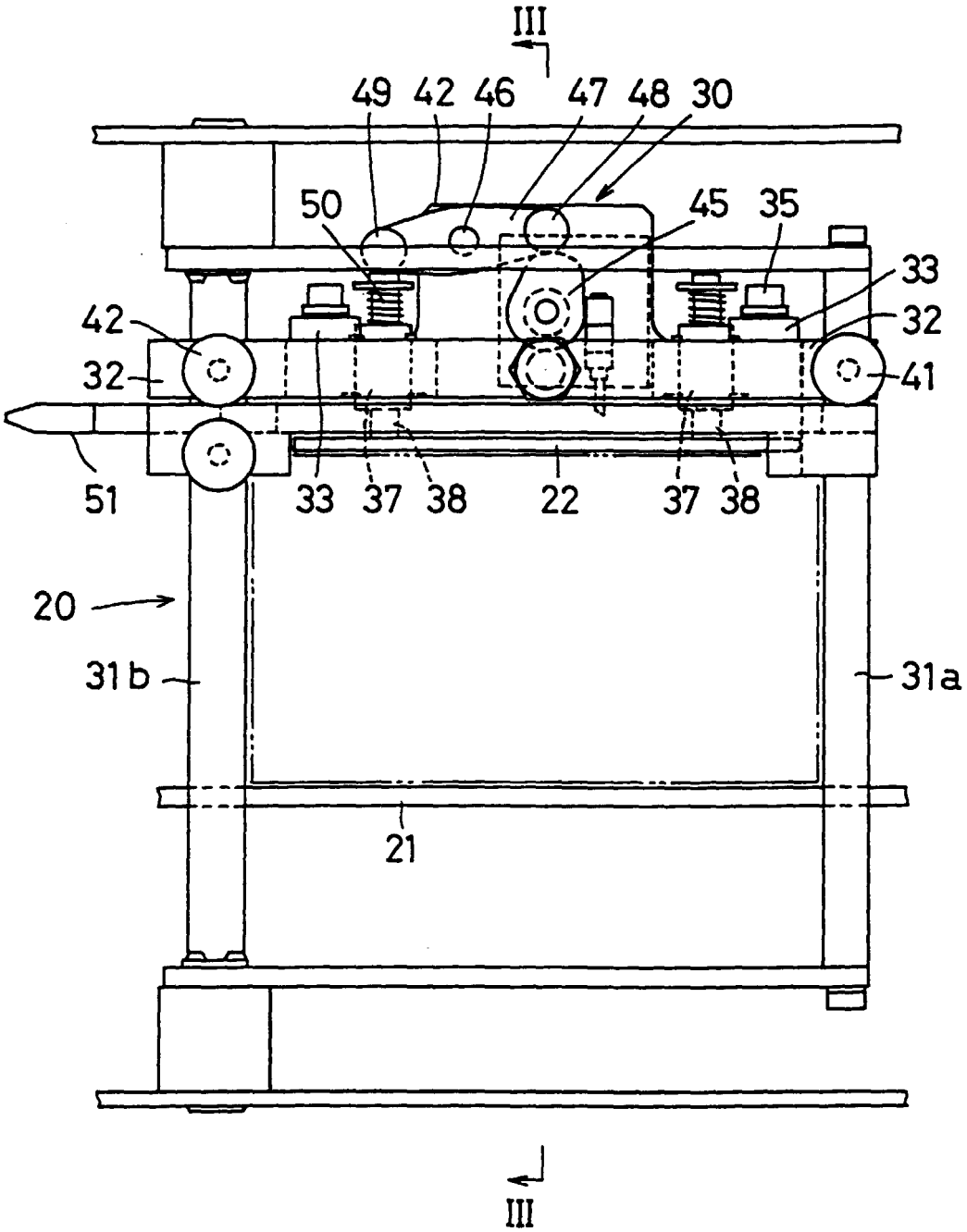


FIG. 2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III

FIG. 3

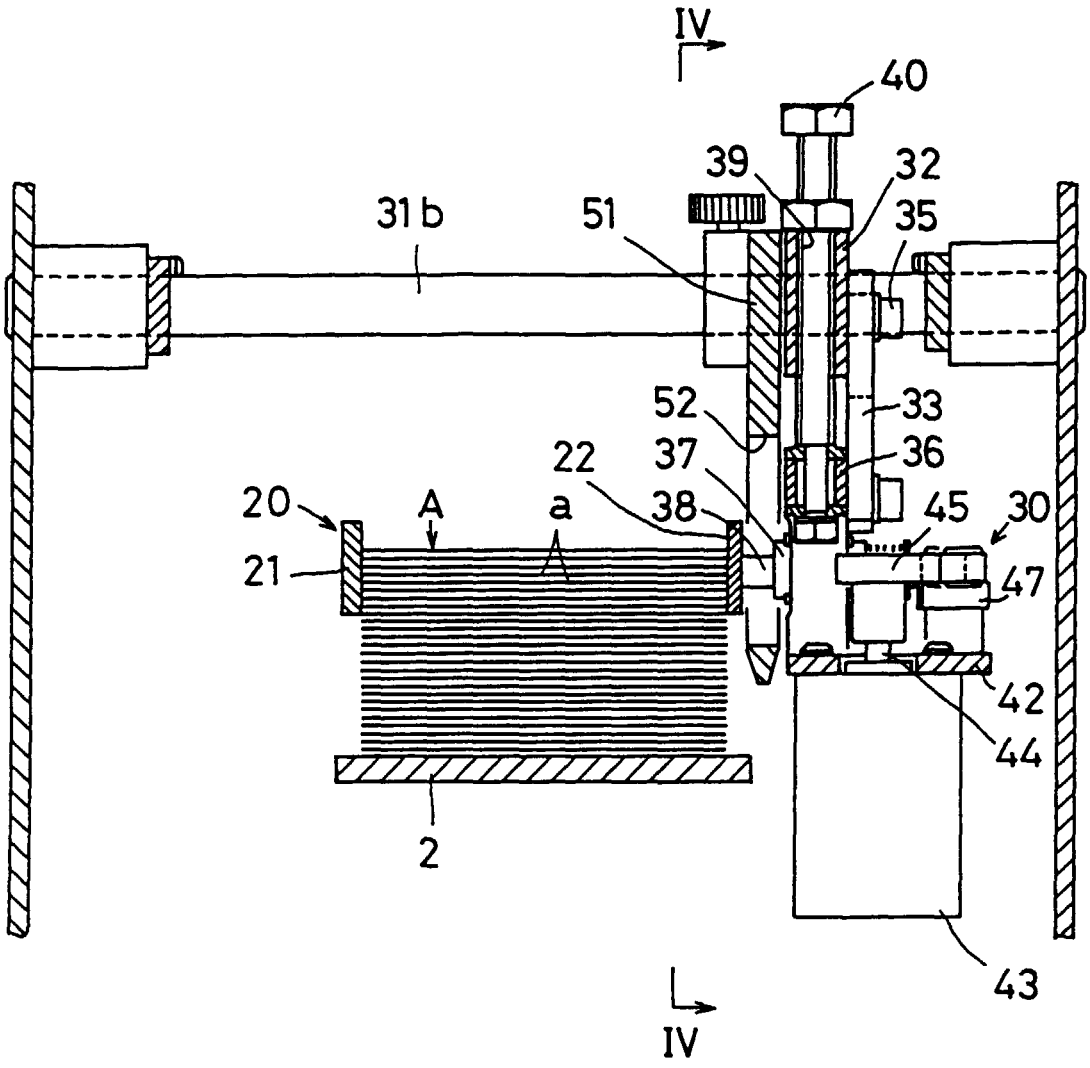

FIG. 4

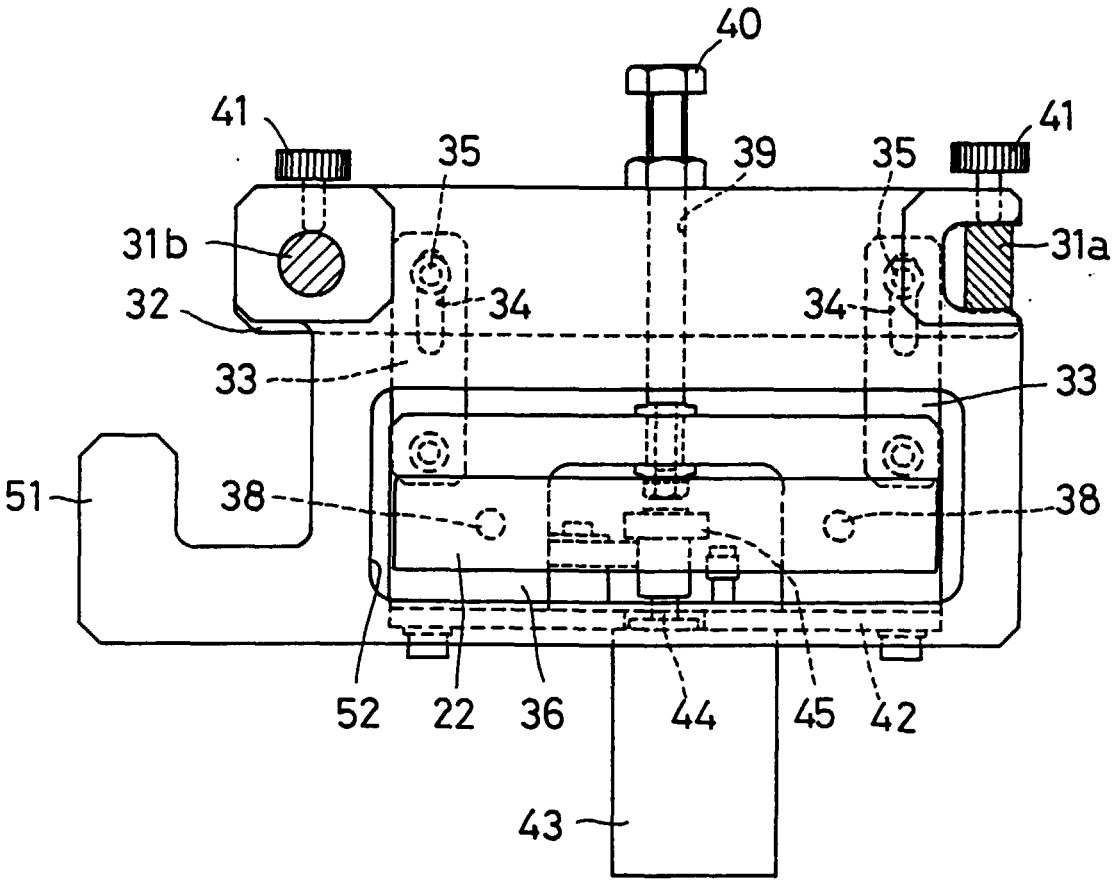

FIG. 5

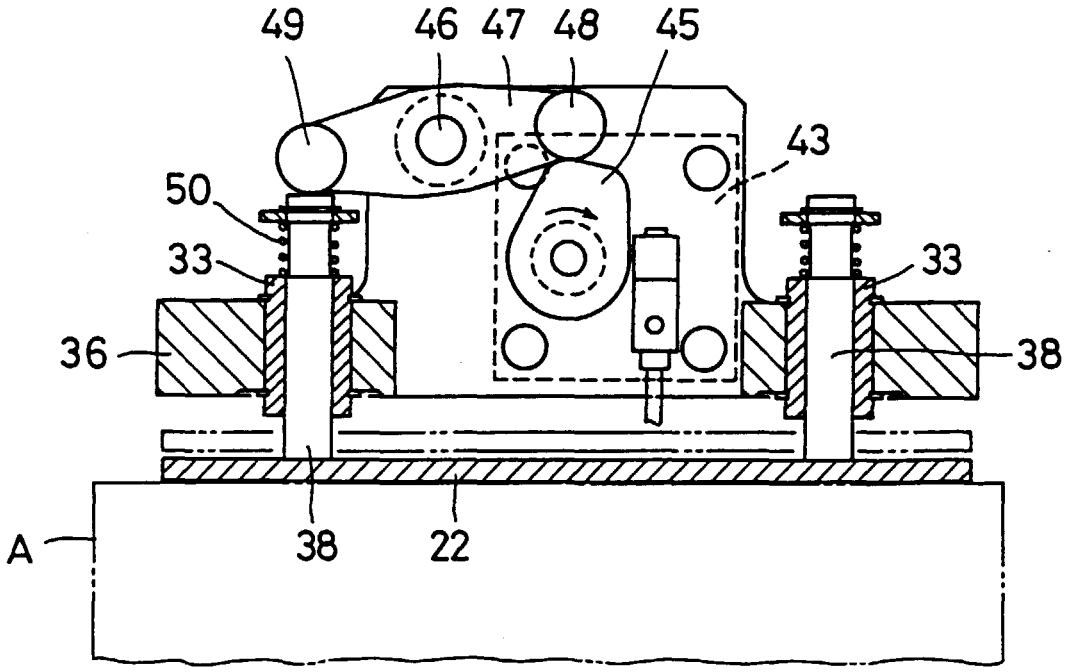
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FIG. 6

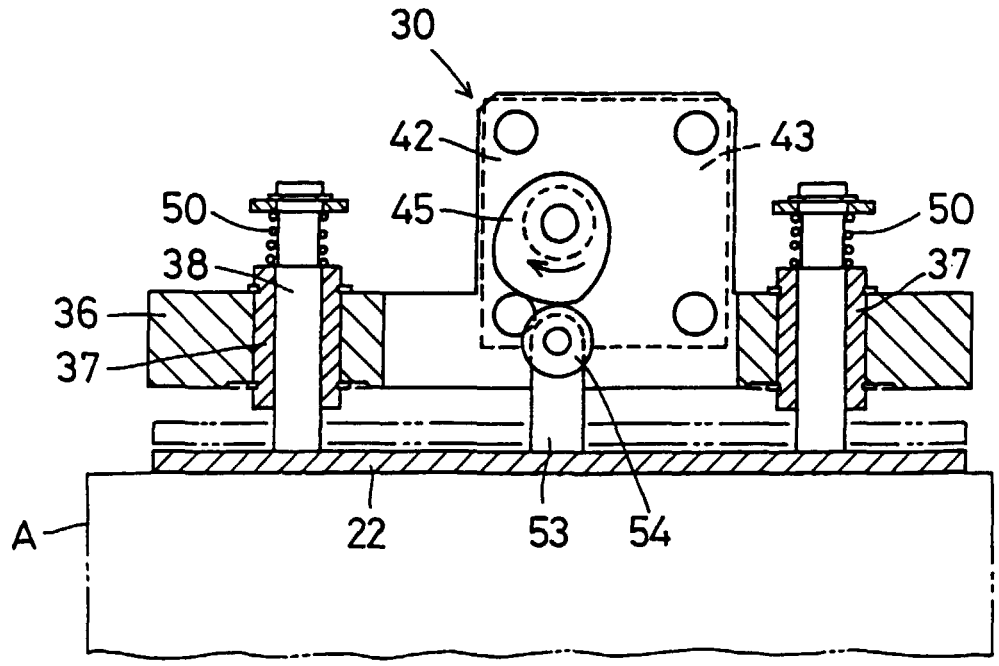
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FIG. 7

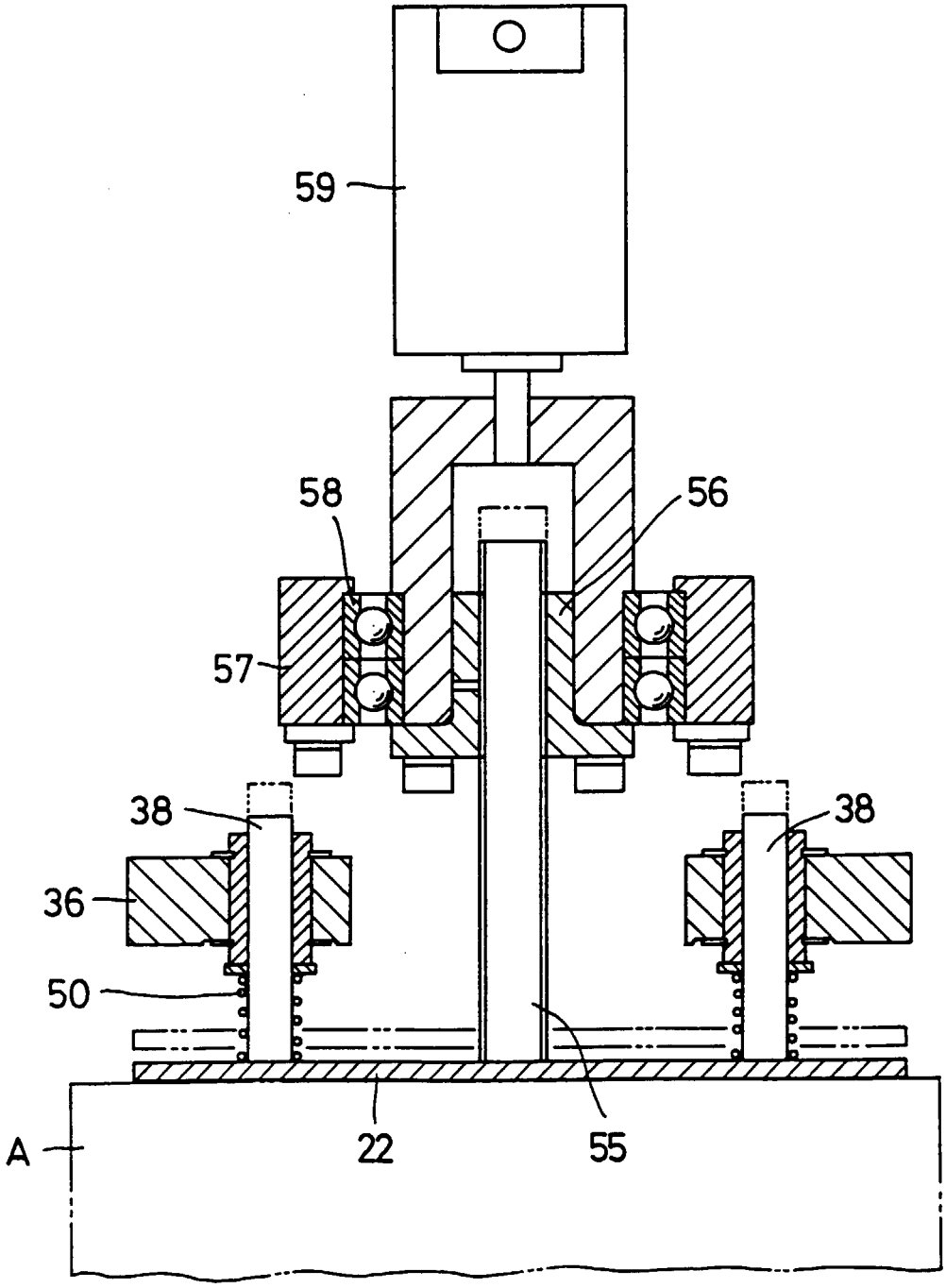

FIG. 8