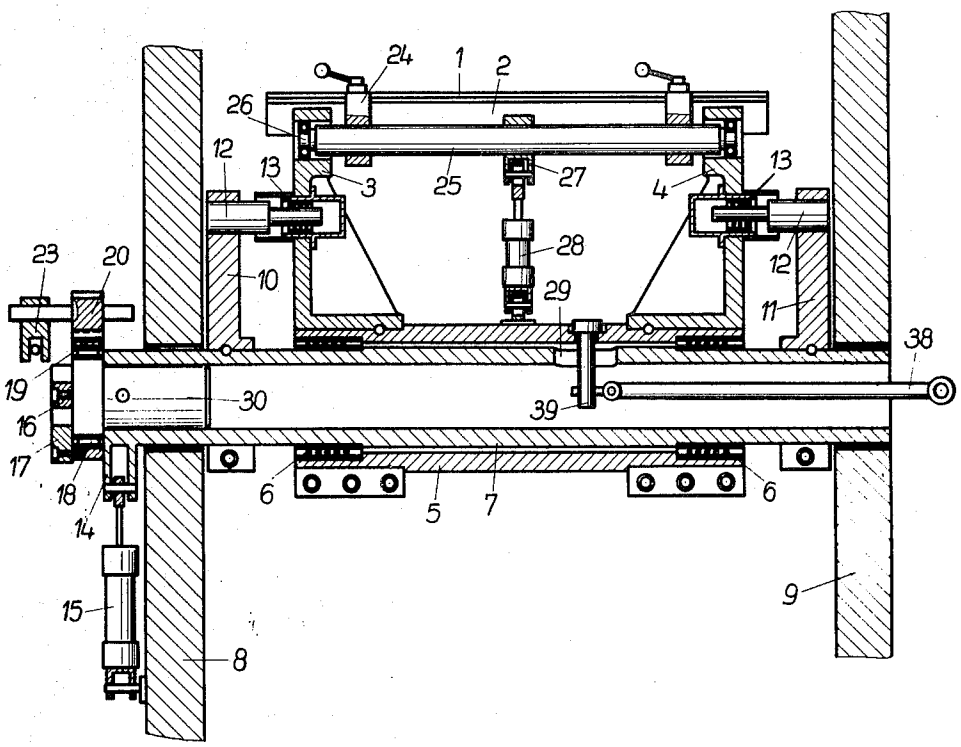
March 13, 1973 R. FREY ET AL 3,720,163

DOCTOR DEVICE FOR LOW PRESSURE ROTATING PRESSES

Filed June 24, 1971 3 Sheets-Sheet 1

Fig. 1



DOCTOR DEVICE FOR LOW PRESSURE ROTATING PRESSES

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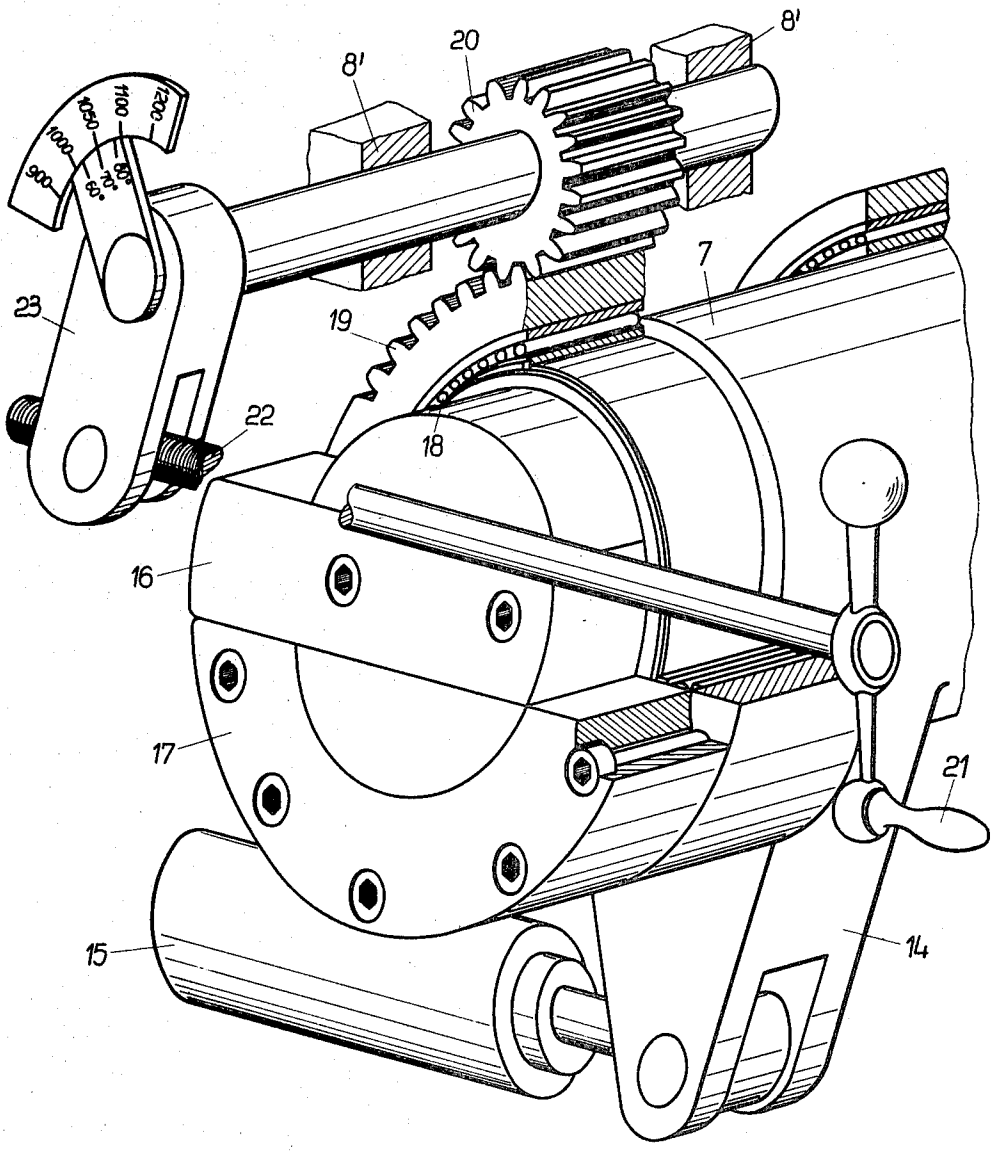

Fig.2

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DOCTOR DEVICE FOR LOW PRESSURE ROTATING PRESSES

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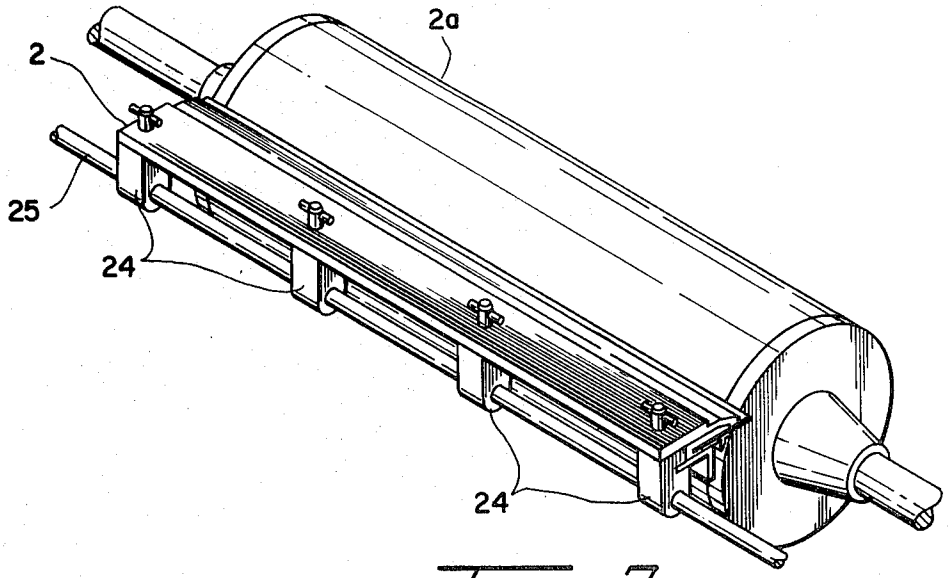

Fig. 3.

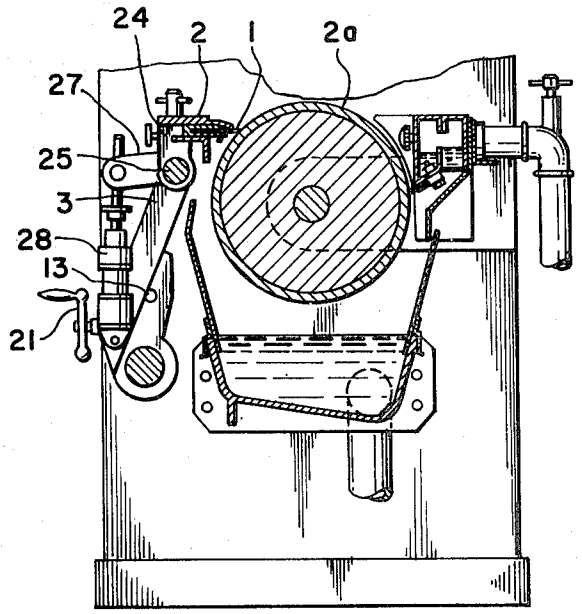

Fig. 4.

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United States Patent Office 3,720,163
Patented Mar. 13, 1973

3,720,163

DOCTOR DEVICE FOR LOW PRESSURE ROTATING PRESSES

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Filed June 24, 1971, Ser. No. 156,214
Claims priority, application Germany, June 26, 1970, P 20 31 680.7
Int. Cl. B41f 9/10
U.S. Cl. 101—169 5 Claims

ABSTRACT OF THE DISCLOSURE

A doctor device for photogravure printing presses. The doctor is pivotably mounted on a non-twistable frame on the printing press so as to be movable to and away from the printing cylinder of the press. A bushing, upon which the doctor device is mounted, is oscillated longitudinally along the axis of the printing cylinder to oscillate the doctor and distribute the wear of the doctor more evenly during operation.

The present invention relates to printing presses, and in particular, to a doctor device for low pressure rotating presses used for photogravure printing.

In photogravure printing in a rotary press, the picture to be printed is either engraved or etched into the surface of a form or printing cylinder in the form of a plurality of individual indentations which are filled with colored ink. A doctor device is provided to remove excess ink from the surface of the printing cylinder during operation. The doctor consists of a thin sheet of flexible steel having a ground edge disposed against the surface of the printing cylinder with a predetermined, adjustable pressure. In order to achieve proper removal of the excess ink from the surface of the form cylinder during the high operating speeds of the rotary press, the pressure of the doctor against the surface of the cylinder should remain constant. Otherwise, the colors used during the printing process will mix and the printed picture will be distorted and discolored.

The doctor device does not wear evenly during operation because of the plurality of indentations in the surface of the form cylinder. Tiny dust particles which are present in the ink used also cause damage to the thin doctor device. In order to cause the doctor device to wear more evenly during operation of the press, and because excess ink is not removed efficiently when the doctor device is in a stationary position, the doctor device is oscillated longitudinally along the longitudinal axis of the form cylinder during operation of the press.

The doctor device is also mounted so that it is pivotable away from the form cylinder. It may thus be cleaned easily. The high quality nature of photogravure printing, in which it is possible to print with half-tones, i.e., clear colors of different depths corresponding to the depths of the individual indentations in the surface of the form cylinder, require that efficient operation of the doctor device during printing be maintained.

In the present invention, the doctor device is mounted so that it will not twist during movement of the device away from the printing cylinder. This prevents the occurrence of color defects in the prints that are printed, an event which happens often in conventional printing presses, especially those which are wide. The doctor device of the present invention is also mounted so that it is prevented from twisting while it oscillates. This prevents discoloring of the prints while printing.

Accordingly, the doctor device of the present invention is mounted pivotably on lever arms secured to the press on a bushing. The bushing is movable axially, and oscillates on a pipe which is rotatably mounted in the side walls of the press.

A non-twistable frame supports the doctor device at both of its ends and ensures that the doctor device cannot twist during the operation of the press. The oscillation of the bushing is produced by a drive means which is disposed through the inside of the bushing. The bushing is rotatable, is coupled to a pivotable arm of a power piston, and is retained on the press against an adjustable abutment. This construction allows the doctor device to be pivoted away from the form cylinder during the maintenance or changing of the cylinder. The angle of incidence of the doctor may be adjusted so that the pressure exerted by the doctor device remains constant. The previously-mentioned abutment is adjustable, and is mounted on a ring segment and supported by the pipe, gear wheels and a threaded spindle. It is therefore possible to adjust the position of the doctor device during the operation of the press.

It is therefore an object of the present invention to provide a doctor device for low pressure rotating presses which will engage the printing cylinder with a constant pressure during operation of the press and thereby prevent defective color printing.

It is another object of the present invention to provide a non-twistable mounting frame which will remain rigid during longitudinal oscillation of the doctor device during operation of the press.

It is a further object of the present invention to provide a doctor device which is simple in design, easy to manufacture, and efficient and reliable in operation.

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings which disclose one embodiment of the invention. It is to be understood, however, that the drawings are designed for the purpose of illustration only and not as a definition of the limits of the invention.

In the drawings, wherein similar reference characters denote similar elements throughout the several views:

FIG. 1 is a longitudinal, cross-sectional view of a doctor device constructed in accordance with the present invention;

FIG. 2 is an enlarged, partial perspective and sectional view of an adjustment device constructed in accordance with the present invention for use with the doctor device;

FIG. 3 is a perspective view of the doctor device shown in operation with the printing cylinder of the printing press; and

FIG. 4 is a cross-sectional side view of the doctor device of the present invention, showing it in use during printing.

Referring to the drawings, doctor device **1** having holder **2** is mounted adjacent printing cylinder **22** on arms **3** and **4**. The arms are mounted on a common bushing **5** which is secured by ball-bearing bushings **6** on pipe **7** which is rotatably mounted in walls **8** and **9** of the press. Bushing **5** is oscillated by cylindrical rod **38** which extends through pipe **7** and is coupled to a bolt **39** disposed through opening **29**. Arms **10** and **11** are also mounted on pipe **7** adjacent arms **3** and **4**. Arms **3** and **4**, and **10** and **11** are coupled together by bolts **12** and casings **13**. Thus, when pipe **7** is rotated, arms **3** and **4** and the doctor device may be pivoted towards and away from the working area without subjecting the oscillating bushing to lateral forces. The doctor device is pivoted by turning pipe **7** by means of pivot arm **14** affixed to the pipe. Power piston **15** is coupled to arm **14** and is supported on one wall **8** of the press. Insert **30** having abutment **16** is disposed in one end of pipe **7**. The abutment is mounted on ring segment **17** which is pivotably mounted on insert **30** of pipe **7** by pin bearing

18. Ring segment 17 is rigidly affixed to a gear wheel 19 by bolts, and is movable by gear wheel 20 which engages wheel 19. Gear wheel 20 is mounted on shoulders 8' provided on press wall 8. Thread spindle 22 is also mounted on shoulder 8' of press wall 8. Hand wheel 21 is connected to spindle 22 to actuate lever 23. Due to a relatively large gear reduction, fine adjustment of the angle of incidence of the doctor device is made possible. This adjustment may be made during operation of the press without affecting the pressure force of the doctor device, since holder 2 of the doctor device is pivotably mounted by means of arm 24 on thread spindle 25 which is actuated by lever 27 and power piston 28. The power piston provides the pressure force for the doctor device and maintains the proper angle of incidence. The power piston also guarantees secure engagement of abutment 16 and ring segment 17 even while correcting the angle of incidence. The ball bushings permit easy lateral movement of the doctor device during oscillation.

While only a specific embodiment of the present invention has been shown and described, it will be obvious to one skilled in the art that many changes and modifications may be made thereunto without departing from the spirit and scope of the invention.

What is claimed is:

1. In a photogravure printing press including a pivotable doctor device which is reciprocated longitudinally during printing, a twist resistant frame for mounting the doctor device on the printing press, comprising:

a cylindrical pipe, rotatably mounted on the printing press;

a cylindrical bushing, disposed on said pipe, and movable rotatably about and longitudinally along said pipe;

a first pair of mounting arms, rigidly mounted on said pipe adjacent the ends of said bushing;

a second pair of mounting arms, rigidly mounted on each end of said bushing, for mounting the doctor device on the printing press, said second pair of mounting arms including a pair of apertures extending therethrough parallel to the longitudinal axis of said bushing; and

at least one pair of cylindrical coupling members, affixed at one end to the ends of said first pair of mounting arms, and disposed parallel to the longitudinal axis of said bushing in said apertures provided in said second pair of mounting arms, for rotatably coupling said first pair of mounting arms with said second pair of mounting arms, said coupling members being slidably disposed in said apertures so that said second pair of mounting arms are movable longitudinally along said pipe.

2. The frame as recited in claim 1, wherein said second pair of mounting arms further comprise cylindrical casings disposed in said apertures, having an opening at one end, and a plurality of ball bearings disposed on the inside surface thereof, for receiving said cylindrical coupling members so that said second pair of mounting arms are movable longitudinally with respect to said pipe and said coupling members.

3. The frame as recited in claim 1, wherein said pipe further comprises a radially outwardly extending pivotable arm, affixed to one end thereof, and a power piston, having the arm thereof coupled to said radially outwardly extending arm, for rotating said pipe with respect to the printing press and thereby adjusting the position of the doctor device.

4. The frame as recited in claim 1, further comprising ball bearings, disposed on said pipe, for rotatably and slidably mounting said cylindrical bushing on said pipe.

5. The frame as recited in claim 1, further comprising a cylindrical insert disposed in one end of said pipe, an abutment member affixed to the end of said cylindrical insert and extending past the end of said pipe, a first gear wheel rotatably mounted on one end of said pipe adjacent said insert, a semi-circular ring member, mounted on said gear wheel and disposed adjacent said abutment member, a threaded spindle mounted on the printing press, a rotatable handle coupled to said threaded spindle for adjusting the position thereof, and a second gear wheel coupled to said spindle and engaging said first gear wheel, for adjusting the position of the doctor device on the printing press.

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U.S. Cl. X.R.

101—157