

Fig. 1

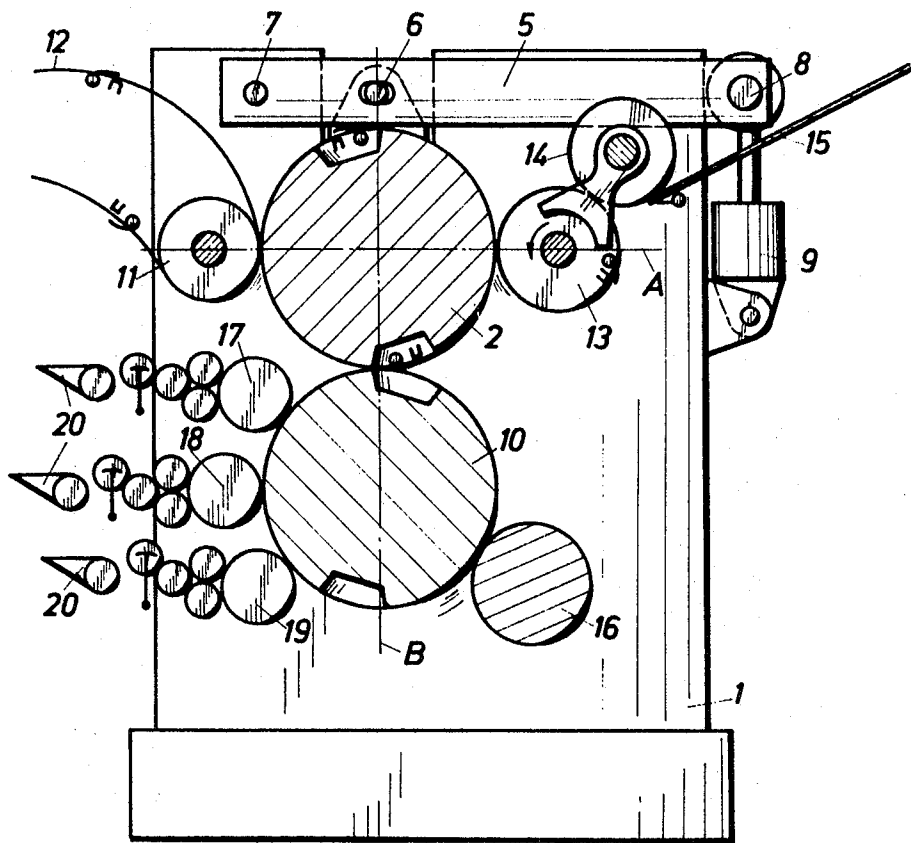


Fig. 2

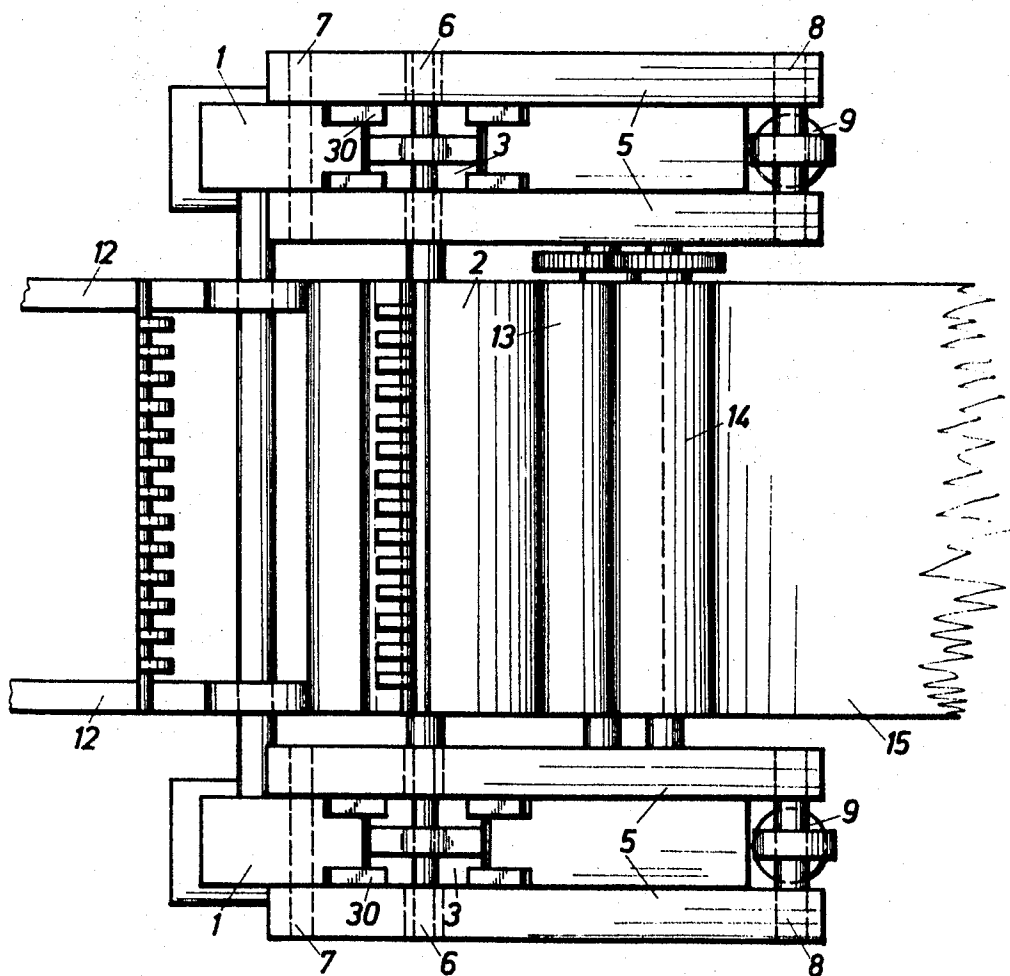


Fig. 3

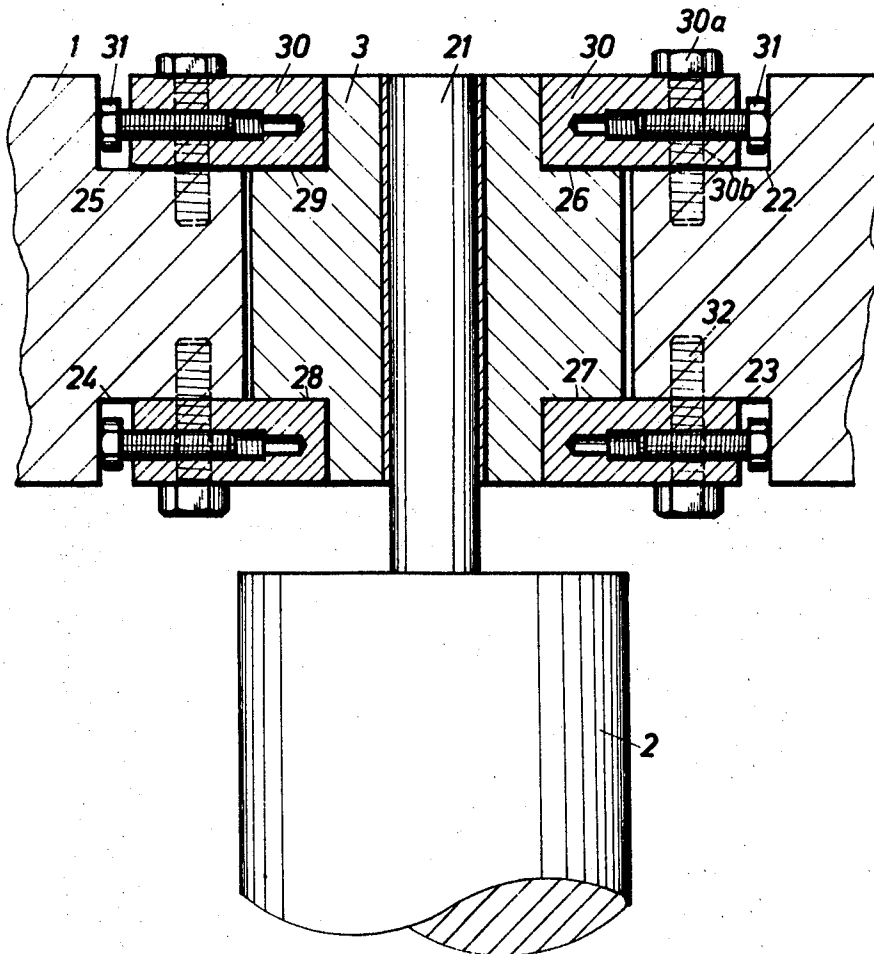


Fig. 4

MOUNTING OF THE IMPRESSION CYLINDER OF AN INTAGLIO PRESS

PRIOR ART

In known presses, the impression cylinder is mounted in eccentric bushings which can be adjusted for impression throw-on and throwoff, and for adjusting the impression force. This design, on the one hand, guarantees sturdy presses but, on the other hand, has various disadvantages. During the impression throw-on and throwoff, the central point of the impression cylinder is moving on a circular arc so that a correct sheet transfer from the grippers of the feeding drum to the impression cylinder and later on from the grippers of the impression cylinder to the delivery drum or to the chain gripper systems is only effected without tearing the sheets in the position "impression on." In the position "impression off" the gripper pads of the impression cylinder are dipping either deeply into the adjoining gripper systems or the distance is too great which entails damage to the front edges of the sheets. A further disadvantage is the stiffness of the system so that, e.g. in case of plate break, there will be high compressive forces between the impression cylinders and plate cylinders which can result in press breakdowns because the eccentric bearings do not yield.

SUMMARY OF THE INVENTION

The printing press according to the invention eliminates these disadvantages by arranging the central points of the transfer drum, impression cylinder and chain delivery drum approximately on a first straight line and effecting the impression throwoff movement of the impression cylinder on a second straight line which is approximately perpendicular to the first straight line and along which also the plate cylinder is arranged. Owing to this there is practically no variation of the center-to-center distance between the impression cylinder and the adjacent sheet transfer drums if the impression is thrown on and also thrown off. Another advantage is that in this cylinder arrangement there is also no increase or decrease of the backlash so that an almost backlash-free train of gears can be used which is of utmost importance for a sheet feeding in hairline register. The sheet transfer drum, aligned with the impression cylinder and the chain delivery drum, is most expediently in constant rotation with the impression cylinder and drives on its part a rotating sheet-feeding drum (stop drum) which stops only for a short time at the feeding board to take up a registered sheet. For expediency's sake the sheet-feeding drum is driven by the constantly rotating sheet transfer drum by a generally known Genova mechanismlike transmission which has the advantage that the zero position of the sheet-feeding drum to the feeding board does not change even if the impression cylinder is raised and lowered by means of the impression throw-on device and the sheet transfer drum is therefore moving relatively forward and backward directly at the impression cylinder.

The impression cylinder is mounted on either end of the press frame in sliding blocks in order to guarantee the described direction of the throwoff movement perpendicular to the sheet-feeding elements. The sliding blocks are moved up and down on either end by means of a one-arm lever. The lever in itself is operated by one double-action hydraulic cylinder. By this means, the impression cylinder can be hydraulically lifted off the plate cylinder and on the other hand can also be pressed to it. Compared to a mounting in eccentric bushings the design described has the advantage that by regulating the hydraulic means there will be an easy impression force control which moreover can be read by means of pressure gauges. Furthermore the described type of construction incorporates an overload protection since the impression cylinder can raise from the plate cylinder at any time opposite to the pressure of the hydraulic means as soon as the impression pressure exceeds the oil pressure set. Actually it is not new to mount cylinders of printing presses in sliding blocks and also the use of hydraulic elements for achieving

high pressures is well known. However, only the combination of four features solves the jointly raised demands for a flawless web lead and minimum backlash when the impression is thrown on as well as thrown off, facilitates moreover in addition the adjustability of the force acting between the impression and plate cylinder and offers furthermore an overload protection for the entire press.

These four features are:

- the impression cylinder is arranged on a straight line A on which there are also the two sheet transfer drums positioned opposite to each other,
- the impression cylinder is mounted in sliding blocks,
- the throwoff movement of the impression cylinder is perpendicular to the straight line A,
- the plate cylinder is arranged on a straight line B on which there is also the impression cylinder and which is perpendicular to the straight line A.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention is hereinafter described by way of example with reference to the accompanying drawings but it is clearly to be understood that the invention is by no means restricted to the details of this embodiment.

FIG. 1 shows an end view of the mounting of the impression cylinder,

FIG. 2 shows a vertical cross-sectional view,

FIG. 3 shows a top view of FIG. 1 and

FIG. 4 shows a cross section through the sliding block guide along the line IV-IV of FIG. 1 on an enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In press frame 1 a double-size impression cylinder 2 is mounted in sliding block 3. The two sliding blocks 3 arranged at the right and left ends of the impression cylinder 2 are supported inside frame 1 on tapered adjusting keys 4 oppositely disposed so that the center-to-center distance to the plate cylinder 10 can be regulated by moving the adjusting keys 4. The sliding block 3 is pivoted on heavy one-arm levers 5 by means of a pin 6. The levers 5 have their pivot at a pin 7 at one end mounted in the press frame 1. At pin 8 on the other end of the levers 5 is mounted a double-acting hydraulic cylinder 9 which moves the levers 5 to press the sliding block 3 onto the adjusting keys 4 by means of the system described and can bring the impression cylinder 2 into contact with the plate cylinder 10 or on the other hand move both cylinders away from each other. A pressure gauge is in the hydraulic system to indicate relative impression pressure. Perpendicularly to the connecting line B, on which are arranged the plate cylinder 10, impression cylinder 2 and the pin 6, are arranged on a straight line A a chain delivery drum 11 for a gripper chain 12, impression cylinder 2 and a sheet transfer drum 13. A slight tolerance in the parts 6 and 7 permits the lever 5 to act to move the slide 3 along line B. The relatively small stroke when throwing on and off the impression cylinder, brings about practically no center-to-center variation of the impression cylinder 2 to the chain delivery drum 11 and to the sheet transfer 13 owing to its movement in perpendicular direction to the straight line A so that there will be no variation of backlash and the conditions are equally good during the impression throw-on and throwoff. Above the sheet transfer drum 13 in an inclined position at an angle of about 60° to the line A there is a stop drum 14, a sheet-feeding drum rotating like a stop cylinder, which stops only for a short time for taking up already registered sheets from a feeding table 15 with each action cycle.

For the reason of stability the impression cylinder and plate cylinder are designed most expediently in double size for two sheets or two plates respectively in circumference. The sheet transfer drum 13 and the chain delivery drum 11 are designed for one sheet in circumference.

In FIG. 2 a wiping cylinder 16 is shown at the plate cylinder 10 for cleaning the plates as well as the inking rollers 17, 18,

19 with the pertinent ink ducts 20. The press can be equipped as a single-color press with only a single inking roller, e.g. the inking roller 17, as well as with three inking devices for three-color printing.

FIG. 4 shows the example of a sliding block guide. The journal pin 21 of the impression cylinder 2 is mounted in the sliding block 3. The press frame 1 is provided with recesses 22 to 25 whose distance from one another correspond approximately to the distance of the recesses 26 to 29 on the sliding block 3. To the recesses 22 to 25 bars 30 are screwed which fix the sliding block 3 in axial and radial direction. Capscrews 30a extend through apertures 30b in bars 30 and are received in threaded holes 32 in the side frames. The apertures 30b in the bars 30 that receive the capscrews 30a are slightly larger in diameter than the diameter of the capscrews 30a to provide adjustment. The radial play between the sliding block 3 and each bar 30 can be set by an adjusting screw 31 threadedly received therein and whose head abuts the adjacent wall of its respective recess 22 to 25. Owing to this construction the costly manufacture of the sliding block guide in the frame is dispensed with. Furthermore, the play can be readjusted at any time in case of wear.

What we claim is:

1. In combination in an intaglio printing press, having a frame, means mounting the shafts of a sheet transfer drum, impression cylinder and delivery drum in a straight line in said frame, means mounting the shaft of a plate cylinder in the frame on a second straight line passing through the center of the shaft of the impression cylinder and perpendicular to the first-mentioned straight line, said means mounting the shaft of the impression cylinder including means for moving the impression cylinder for throw-on and throwoff movement in said second straight line approximately perpendicular to said first straight line,

said means mounting the shaft of the impression cylinder in the frame being a sliding block in the frame at each end of the impression cylinder and power means connected to the sliding blocks for moving the impression cylinder to throw-on and throwoff positions,

said frame having spaced-apart portions in side frames thereof providing slots for means adjustably mounting said sliding blocks therewithin whereby the blocks are indirectly mounted in the press side frames,

said sliding blocks having oppositely disposed recesses extending parallel to the direction of movement of said sliding blocks, said frames of the press frame having recesses therein adjacent the recesses in the sliding blocks and parallel thereto, and bars adjustably mounted in said recesses in the frame and protruding into said adjacent recesses in the sliding blocks whereby the sliding blocks are fixed in axial and radial direction.

2. An intaglio press having, in combination, a frame, an impression cylinder having gripper means thereon and sheet feed and delivery drums having gripper means thereon,

means mounting said impression cylinder in the frame and means mounting said drums in said frame at opposite sides of the impression cylinder with the axes of said impression cylinder and drums extending parallel to each other and lying on a straight line for sheet feeding, printing and delivery,

said impression cylinder having a center shaft coinciding with the cylinder axis,

said frame having slots at each end extending perpendicular

to said straight line joining the axes of the impression cylinder and drums,

said means mounting said impression cylinder and its center shaft in said frame being slidably received in said slots for movement perpendicular to said straight line,

an intaglio cylinder having associated inking means and a center shaft mounted in said frame below said impression cylinder with the axis of its center shaft extending parallel to the center shaft of said impression cylinder and lying in a plane extending perpendicular to said straight line at the center shaft of said impression cylinder,

an operating lever arm for said mounting means of the impression cylinder received in said slots in the frame and pivotally mounted at one end on said frame and having means intermediate its ends connecting it with said mounting means in the slots for moving the same and the impression cylinder perpendicular to said straight line away from and toward said intaglio cylinder, and yieldable operating means connected adjacent the other end of the lever for moving the same.

3. An intaglio press according to claim 2 wherein said yieldable operating means are hydraulic means.

4. An intaglio press according to claim 2 wherein said slots in the frame are formed by parallel spaced-apart walls in the frame,

said means mounting the impression cylinder and its center shaft in the frame being a sliding block received in said slots.

5. An intaglio press according to claim 4 including adjusting means in the slots in the frame cooperating with each sliding block for limiting the travel of said sliding block and said impression cylinder toward said intaglio cylinder and the respective desired distance between said impression and intaglio cylinder.

6. An intaglio press according to claim 4 wherein said sliding blocks have oppositely disposed recesses extending parallel to the direction of movement of said sliding blocks,

said walls in the frame forming the slots having recesses therein extending into said frame adjacent the recesses in the sliding blocks, and bars having means adjustably mounting them in said recesses in the frame and protruding into said adjacent recesses in the sliding blocks whereby the sliding blocks are fixed in axial and radial direction.

7. An intaglio press according to claim 2 wherein said impression cylinder is of double size having two printing surfaces and said grippers comprise two sets.

8. An intaglio press according to claim 7 wherein said intaglio cylinder is of double size having two in circumference ink transfer areas.

9. An intaglio press according to claim 2 wherein, said slots in the frame are formed by parallel spaced-apart walls in the frame,

said means mounting the impression cylinder and its center shaft in the frame being a sliding block received in said slots, and

including adjusting means in the slots in the frame cooperating with each sliding block for limiting the travel of said sliding block and said impression cylinder toward said intaglio cylinder and the respective desired distance between said impression and intaglio cylinders.