Sept. 13, 1938. H. J. LUEHRS 2,129,698

INTAGLIO PRINTING PRESS

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Fig. 2.

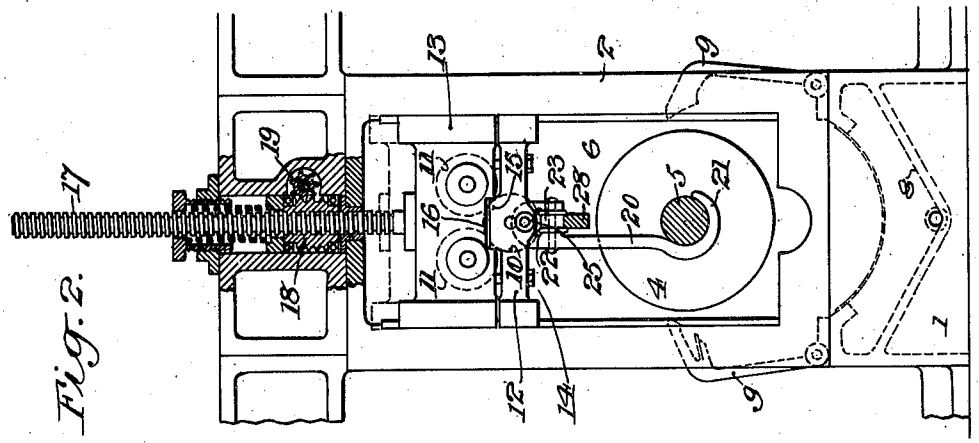
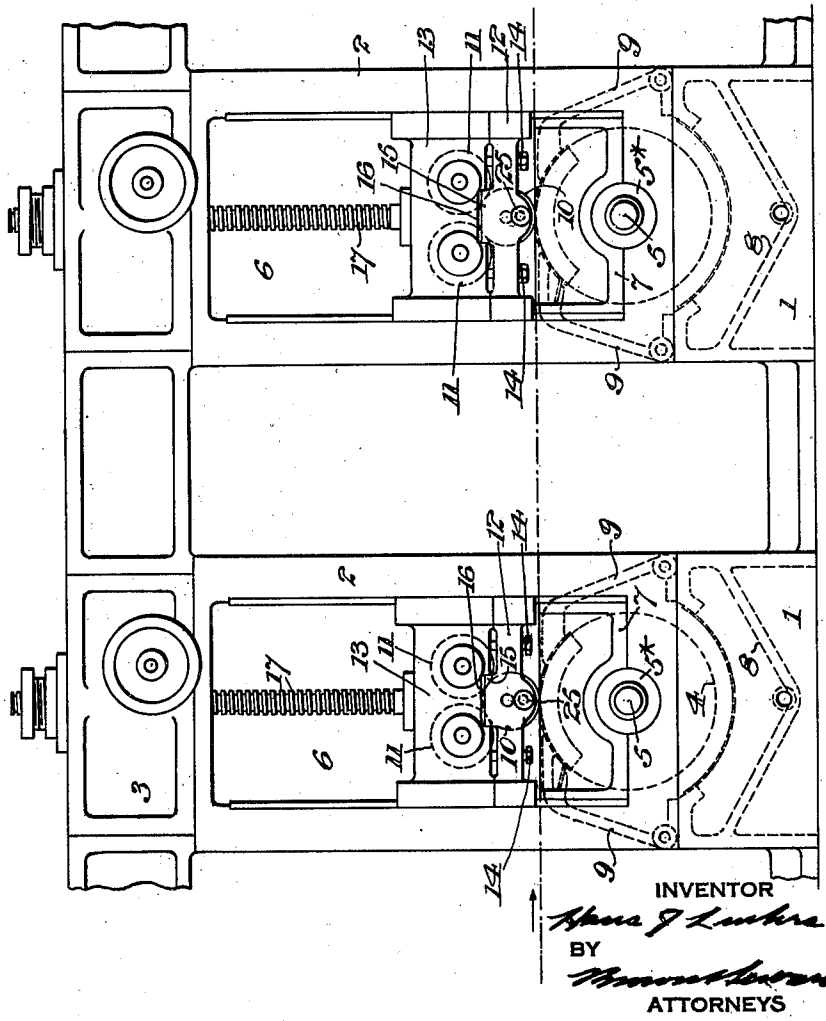


Fig. 1.



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INTAGLIO PRINTING PRESS

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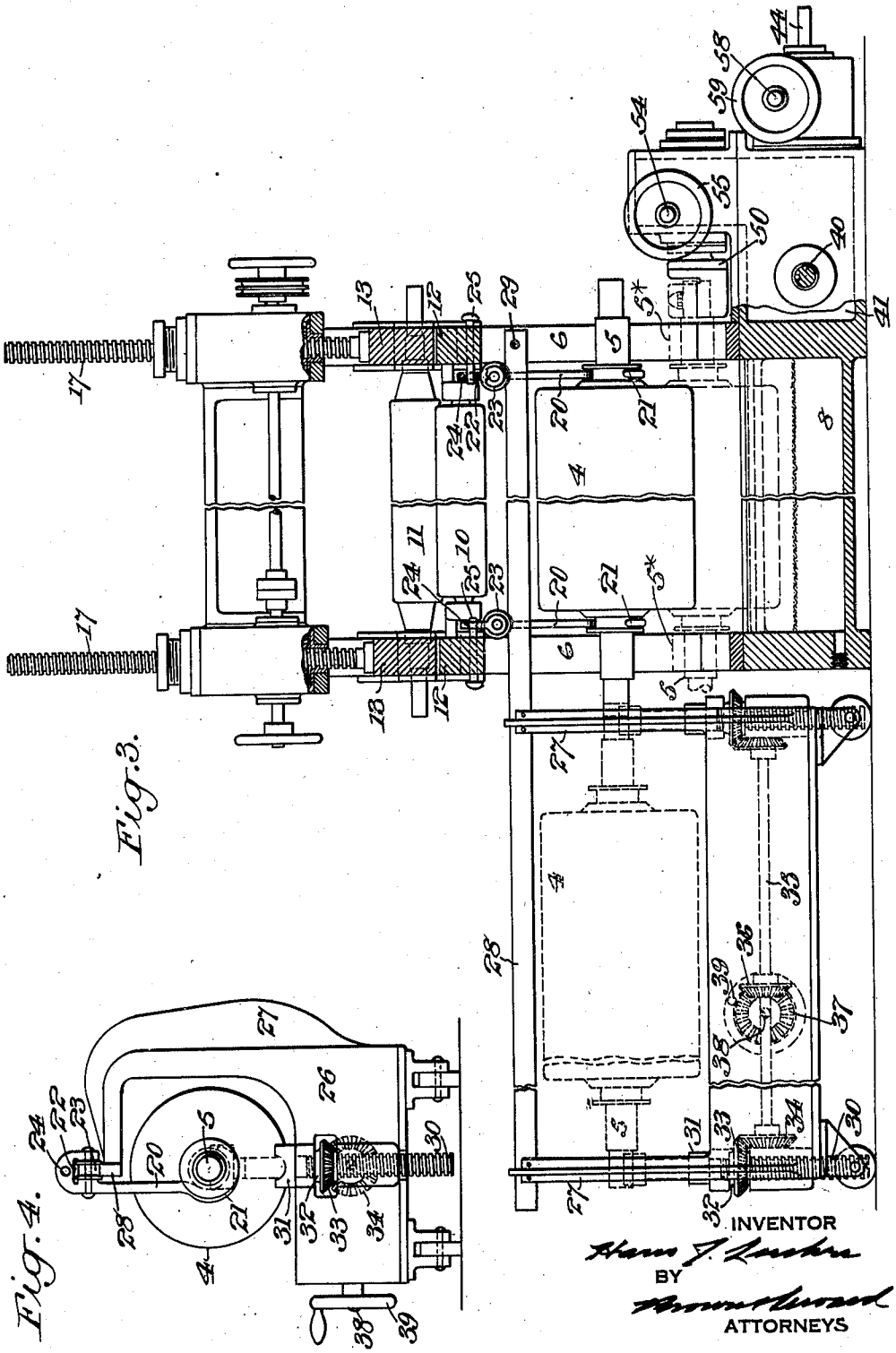

Fig. 3.

Fig. 4.

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Fig. 5.

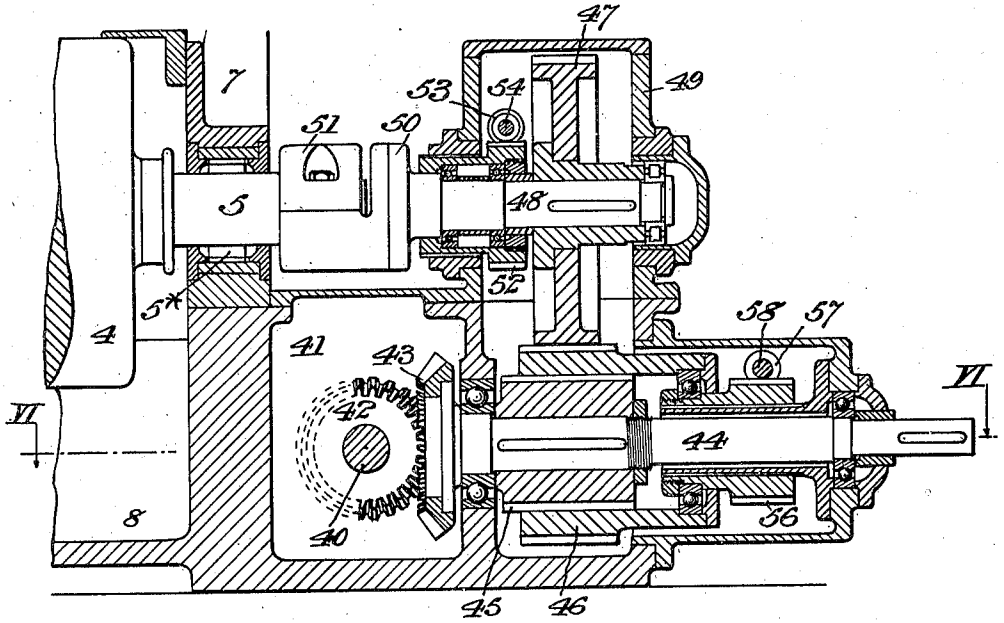
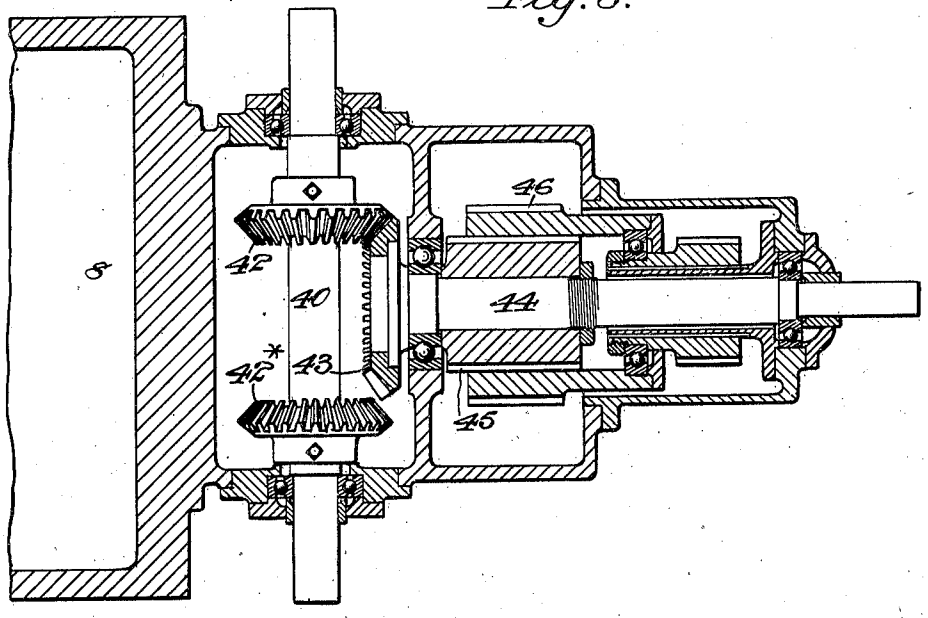


Fig. 6.



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Patented Sept. 13, 1938 2,129,698

UNITED STATES PATENT OFFICE

2,129,698

INTAGLIO PRINTING PRESS

Hans J. Luehrs, Westerly, R. I., assignor to C. B. Cottrell & Sons Company, Westerly, R. I., a corporation of Delaware

Application May 27, 1937, Serial No. 145,111

12 Claims. (Cl. 101—1)

My invention comprises an intaglio printing press unit in which the design cylinder may be removed from and inserted into the unit by an endwise movement through a window in one of the side frames of the unit.

My invention also comprises a printing press unit in which the design cylinder may be moved vertically out of and into the ink fountain and also into position to be removed and inserted by an endwise movement through the window in a side frame of the unit.

My invention also comprises a printing press unit in which the ink fountain bowl is formed in the base, which bowl is provided with end members and cover members coacting with the design cylinder to close the fountain, both of the cover members being opened to permit the insertion and removal of the design cylinder by a vertical movement thereof.

My invention also comprises a printing press unit in which the side frames are interchangeable, each side frame having a window through which the design cylinder may be moved endwise when in its raised position.

My invention also comprises a printing press unit in which the suspension means are provided for removably connecting the design cylinder to the impression cylinder heads whereby the means for imparting vertical movement to the said heads also imparts a vertical movement to the design cylinder.

My invention also comprises a loading truck having a design cylinder carrying rail arranged to be moved into and out of the press unit through the said side frame window, said truck also being provided with means for transferring the design cylinder to and from the track rail.

My invention also comprises means whereby the traveling web may be passed through a plurality of intaglio printing press units in a right line.

My invention also comprises certain improvements in the construction, form and arrangement of the several parts of the press as will be hereinafter described and claimed.

A practical embodiment of my invention is represented in the accompanying drawings, in which

Fig. 1 represents two adjacent intaglio printing press units in side elevation, with the parts in their printing position and showing also the right line path of the traveling web through the said printing press units;

Fig. 2 represents a printing press unit in side elevation, partly in section, with the cover members of the ink fountain shown swung back to their opened position and the end sealing members of the ink fountain removed, the design cylinder being shown in its raised position suspended from the loading truck rail;

Fig. 3 represents a printing press unit in cross section, the parts being in the positions shown in Fig. 2, the design cylinder being shown in dotted lines in its operative position within the unit and also in dotted lines in its position when carried by the truck;

Fig. 4 represents an end view of the truck with the cylinder shown in full lines while suspended from the truck rail;

Fig. 5 represents, on a larger scale, a detail vertical central section through the reversible drive for the design cylinder; and

Fig. 6 represents a detail horizontal section taken in the plane of the line VI—VI of Fig. 5.

The intaglio printing press may consist of any desired number of printing press units. In the present instance I have shown two printing press units of corresponding construction.

Each printing press unit comprises a base 1, two interchangeable side frames 2, 2 and a top 3. The design cylinder is denoted by 4 and its shaft by 5, which shaft is mounted in removable bearings 5*, 5* in the side frames 2, 2 at the lower ends of corresponding windows 6, 6 therethrough, said windows being sufficiently large to permit the endwise removal and insertion therethrough of the design cylinder when in its raised position, as will be hereinafter more fully explained. End sealing members 7, 7 are removably placed in the lower portions of the windows 6, 6 and form the upper half bearings for the design cylinder shaft 5.

The ink fountain bowl 8 is formed in the base 1 integral therewith, which bowl is surmounted by swinging cover members 9, 9, hinged at the top of the base. These cover members coact with the design cylinder 4 and the end members 7, 7, to effectively close the ink fountain when the design cylinder is in its lowered operative position therein. These cover members 9, 9 respectively carry the inking and wiping mechanisms, not shown herein, of any well known or approved form, and are interchangeable.

The impression and back-up rolls 10 and 11 are provided respectively, with pairs of heads 12, 12 and 13, 13, which heads are slidably mounted along their respective side walls of the windows 6, 6 in the side frames 2, 2. Each impression roll head 12 is secured, with a slight lost motion, to its back-up roll head 13 by bolts 14, 14 with the

back-up and impression rolls in their proper rolling contact when the heads are lowered. When the heads are raised the impression roll 10 drops slightly away from its contacts with the back-up rolls 11. A tongue and groove connection 15, 16 is provided between the back-up and impression roll heads to properly guide the rolls into their proper coactive position.

The mechanism mounted in the top 3 of the frame for raising and lowering the impression and back-up rolls, and, when required, the design cylinder 4, may be of any well known or approved construction, that illustrated herein being shown, described and claimed in United States Letters Patent No. 2,076,241, dated April 6, 1937. In this raising and lowering mechanism the non-rotatable screws 17, 17 which extend upwardly from the back-up roll heads 13, 13 carry wide faced helical gears 18, 18 which are rotated in either direction by worm gears 19, 19 driven from a suitable source of power, not shown herein.

The suspension means which I have shown for moving the design cylinder by means of the impression and back-up rolls vertically into and out of the ink fountain when both of the cover members are thrown back out of the way, comprises, in the present instance, a pair of hook bars 20, 20, adapted to be removably engaged with the impression roll heads and the design cylinder. The lower end of each of these bars is provided with a hook 21 for receiving and retaining the shaft 5 of the design cylinder at the opposite ends of the cylinder. The upper end of this hook bar is provided with an open recess 22 within which there is mounted a traction wheel 23. This upper end is also provided with a hole 24 for receiving the inner end of a removable locking pin 25 carried by the impression roll head 12.

The means for removing and inserting the design cylinder by an endwise movement thereof through a side frame window may be constructed, arranged and operated as follows:

A wheeled truck 26 has overhanging arms 27, 27 uprising from the ends of the truck, which arms form a support for a horizontally disposed design cylinder carrying track rail 28, one portion of which projects a considerable distance beyond the end of the truck. The free end of this track rail 28 is adapted to be inserted into and removed from the printing press unit through the window 6 in a side frame 2, by the movement of the truck toward and away from the said side frame. Means are provided for removably supporting the free end of the track rail 28 at the far side frame when the rail is inserted into the printing press unit, which means is herein shown as a removable crossbar 29 spanning the upper end of the window 6 and passing through the free end of the said track rail 28.

The truck 26 is also provided with a vertically movable supporting means for transferring the design cylinder 4 from and to the track rail 28, which supporting means is herein shown as comprising a pair of vertically movable non-rotatable screws 30, 30 having bearing supports 31, 31 at their upper ends, which bearing supports are arranged in position to engage the shaft 5 at the opposite ends of the design cylinder 4. A common manually operated means may be employed for raising and lowering these non-rotatable screws 30, 30, which means is shown herein as comprising nuts 32, 32 which carry bevel gears 33, 33 meshing with the bevel gears 34, 34 fixed on a longitudinally disposed rotary shaft 35. This rotary shaft 35 has fixed thereon a bevel gear 36 which meshes with a bevel gear 37 carried by a rotary cross shaft 38. This cross shaft 38 is provided with a hand wheel 39 exterior to the truck.

The means which I have shown for rotating the design cylinder in either direction comprises a main drive shaft 40 which is suitably mounted in a housing 41 formed integral with the base 1, which drive shaft has a bevel gear connection 42, 43 or 42*, 43 with a shaft 44 which has a wide faced gear 45 fast thereon. This wide faced gear 45 meshes with the interior tooth portion of a gear 46, the exterior threaded portion of which gear meshes with a gear 47 fast on a shaft 48 mounted in a suitable housing 49 surmounting the drive shaft housing 41. This shaft 48 is removably connected to the shaft 5 of the design cylinder through a two-part coupling 50, 51. The side register is accomplished by the endwise movement of the design cylinder when its shaft 5 is coupled to the shaft 48 by providing the shaft 48 with a spiral gear 52 which meshes with a spiral gear 53 on a cross shaft 54 provided with a hand wheel 55 exterior to the housing 49.

The circumferential register of the design cylinder 4 is accomplished by providing the shaft 44 with a spiral gear 56 which meshes with a gear 57 on a cross shaft 58 which is provided with a hand wheel 59 exterior to the housing 41.

In operation, it will be assumed that the parts are in their operative positions shown in Fig. 1 and it is desired to remove the design cylinder 4 from the printing press unit. The web is broken to permit the cover members 9, 9 of the ink fountain to be swung back out of the way of the design cylinder. The design cylinder shaft 5 may then be uncoupled from its driving shaft 48 and the end sealing members 7, 7 and the bearings 5*, 5* are removed. The pair of hook bars 20, 20 are then engaged at their lower ends with the design cylinder shaft and at their upper ends with the impression cylinder heads 12, 12. The raising and lowering mechanism is then operated through the non-rotatable screws 17, 17, the back-up cylinder heads 13, 13, the impression cylinder heads 12, 12 and the hook bars 20, 20, to raise the back-up roll, impression roll and the design cylinder. The loading truck 26 is then moved into position to project its track rail 28 into the printing press unit through the window 6 and the adjacent side frame 2. The free end of the track rail is then removably engaged and supported by the crossbar 29. The raising and lowering mechanism may then be operated to slightly lower the design cylinder and the impression and back-up rolls until the traction wheels 23, 23 of the hook bars 20, 20 rest on the track rail 28, thereby transferring the weight of the design cylinder from the raising and lowering mechanism to the track rail. The hook bar locking pins 25, 25 are then removed and the impression and back-up rolls are raised sufficiently to permit the tops of the hook bars to clear the impression roll head. The design cylinder may then be moved endwise along the track rail to the desired position on the truck. The lifting screws 30, 30 of the truck may then be raised until their bearing members 31, 31 engage and slightly lift the design cylinder shaft and thereby release the hook bar traction wheels from the track rail. The weight of the design cylinder will thus be transferred from the track rail to the truck. The hook bars may then be removed and the free end of the track rail may

also be released from its engagement with the far side frame of the printing press unit. The design cylinder may then be transported by the truck to any desired point.

It will be understood that to insert a design cylinder into the printing press unit the series of operations hereinabove described should be reversed.

From the above description it will be seen that not only is there a simple and effective means provided for the endwise removal or insertion of the design cylinder through a side frame but also that a plurality of printing press units may be located closely together.

It will also be seen that the parts are arranged and co-related to permit the passage of the web in a right line through the printing press units.

It will also be seen that the press may be readily reversed because of the interchangeability of the cover members with their inking and wiping mechanisms, and the shifting of the bevel gears **42**, **42*** to bring one or the other into mesh with the bevel gear **43**.

It will also be seen that the entire press is materially lowered by the location of the ink fountain bowl entirely within the base and that also the tendency to vibrate the parts is materially lessened by mounting the drive housing on the base.

The parts shown and described, but not claimed herein, form the subject matter of my divisional applications, filed October 8, 1937, Serial Nos. 168,016; 168,017; 168,018.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but

What I claim is:

1. In an intaglio printing press, side frames, a track rail, means for moving it endwise into and out of the press through a side frame, a design cylinder, and means whereby it may be moved along the track rail endwise through the side frame.

2. In an intaglio printing press, side frames, a track rail, means for moving it endwise into and out of the press through a side frame, a design cylinder, and means whereby it may be moved along the track rail endwise through the side frame, said means including a suspension device engaging the design cylinder and track rail.

3. In an intaglio printing press, side frames, a track rail, means for moving it endwise into and out of the press through a side frame, a design cylinder, and means whereby it may be moved along the track rail endwise through the side frame, said means including a pair of hook bars engaging the design cylinder and provided with traction wheels engaging the track rail.

4. In an intaglio printing press, side frames, a track rail, a support therefor, means for moving the support to move the track rail endwise into and out of the press through a side frame, a design cylinder, and means whereby it may be moved along the track rail endwise through the side frame.

5. In an intaglio printing press, side frames, a track rail, means for moving it endwise into and out of the press through a side frame, a design cylinder, means for moving it vertically into and out of position to be carried by the track rail, and means whereby the design cylinder may be moved along the track rail endwise through the side frame.

6. In an intaglio printing press, side frames, a track rail, a support therefor, means for moving the support to thereby move the track rail endwise into and out of the press through a side frame, a design cylinder, means for moving it vertically into and out of position to be carried by the track rail, and means whereby the design cylinder may be moved along the track rail endwise through the side frame.

7. In an intaglio printing press, side frames, a track rail, means for moving it endwise into and out of the press through a side frame, impression roll heads, a design cylinder, means for detachably connecting the design cylinder to the impression roll heads, means acting through said heads for moving the design cylinder vertically, and means whereby the design cylinder may be moved along the track rail endwise through the side frame.

8. The combination with an intaglio printing press unit which includes a frame and a design cylinder, of means including a rail, a truck, means for moving it to bring the rail into and out of the frame, and means whereby the design cylinder may be moved along the rail through the frame.

9. The combination with an intaglio printing press unit which includes side frames and a design cylinder, of a suspension device for the design cylinder, a truck provided with a projecting rail, means for moving the truck to thereby move the rail through a side frame into position to coact with said suspension device, and means whereby the suspension device, together with the design cylinder, may be moved endwise on said rail through said side frame.

10. The combination with an intaglio printing press unit which includes side frames and a design cylinder, of a suspension device for the design cylinder, a truck provided with a projecting rail, means for moving the truck to thereby move the rail through a side frame into position to coact with said suspension device, means whereby the suspension device, together with the design cylinder, may be moved endwise on said rail through said side frame, and means for removably supporting the projecting end of the rail.

11. The combination with an intaglio printing press unit which includes a frame and a design cylinder, of means including a truck provided with a projecting rail, means for moving the truck to thereby move the rail through a side frame into position to coact with said design cylinder, means whereby the design cylinder may be moved endwise on said rail through said side frame, and means on the truck movable into position to support the design cylinder.

12. The combination with an intaglio printing press unit which includes a frame and a design cylinder, of means including a truck provided with a projecting rail, means for moving the truck to thereby move the rail through a side frame into position to coact with said design cylinder, means whereby the design cylinder may be moved endwise on said rail through said side frame, and a manually operated elevating means on the truck movable into position to support the design cylinder.

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