Feb. 16, 1960 P. E. FISCHER 2,925,037

APPARATUS FOR CHANGING PRINTING ASSEMBLY

Filed Dec. 7, 1956 6 Sheets-Sheet 1

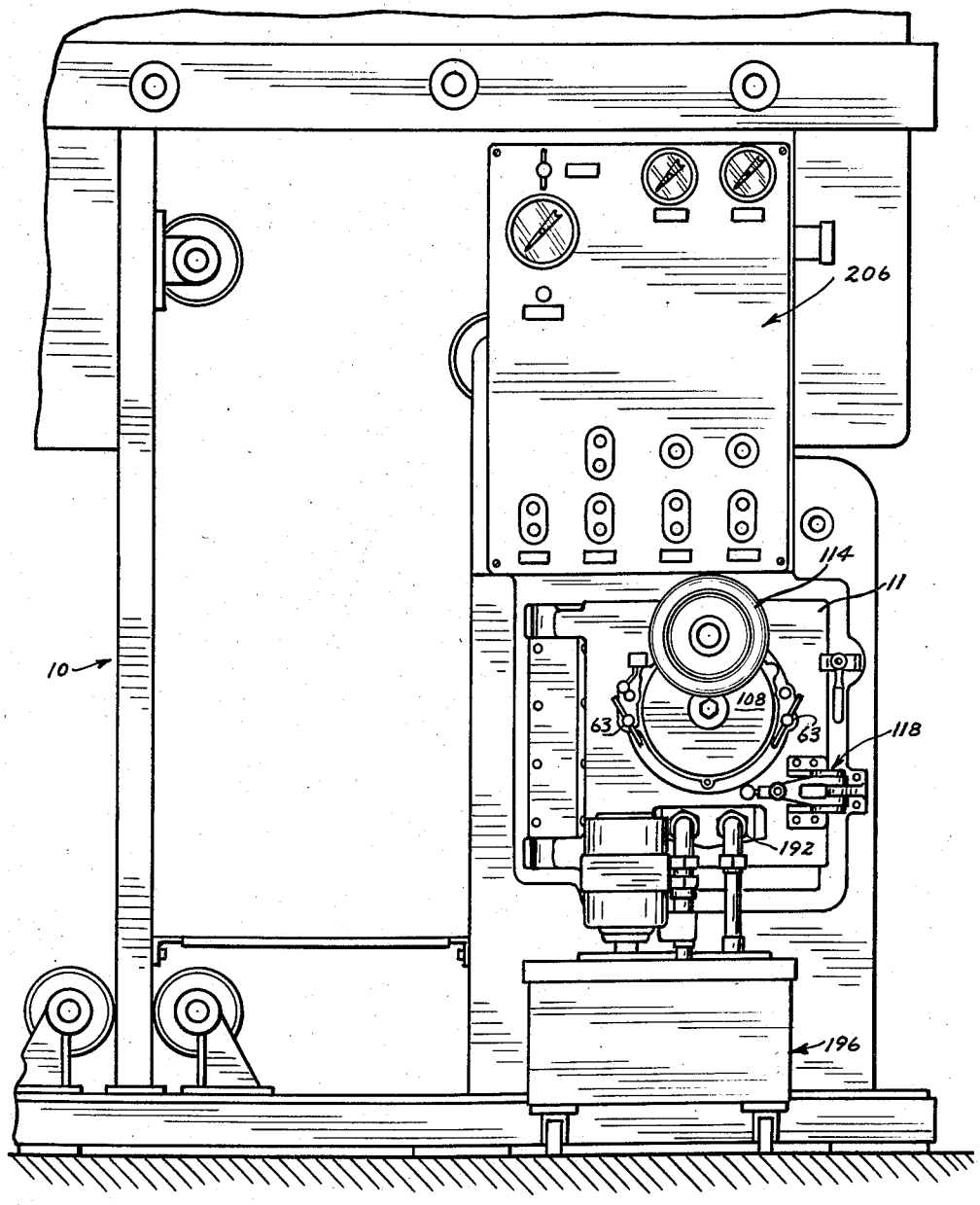


FIG. 1

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APPARATUS FOR CHANGING PRINTING ASSEMBLY

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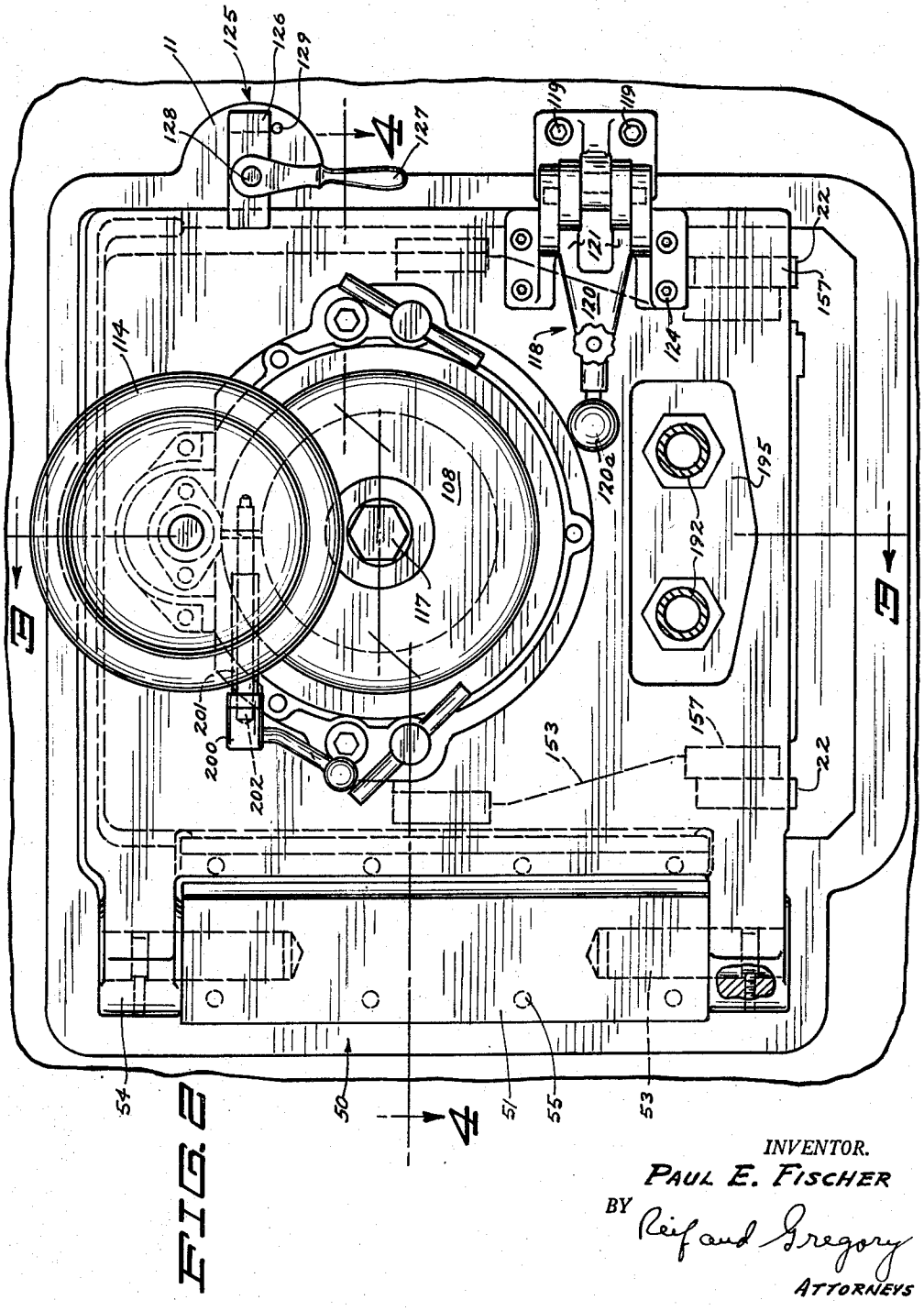


FIG. 2

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APPARATUS FOR CHANGING PRINTING ASSEMBLY

Filed Dec. 7, 1956 6 Sheets-Sheet 3

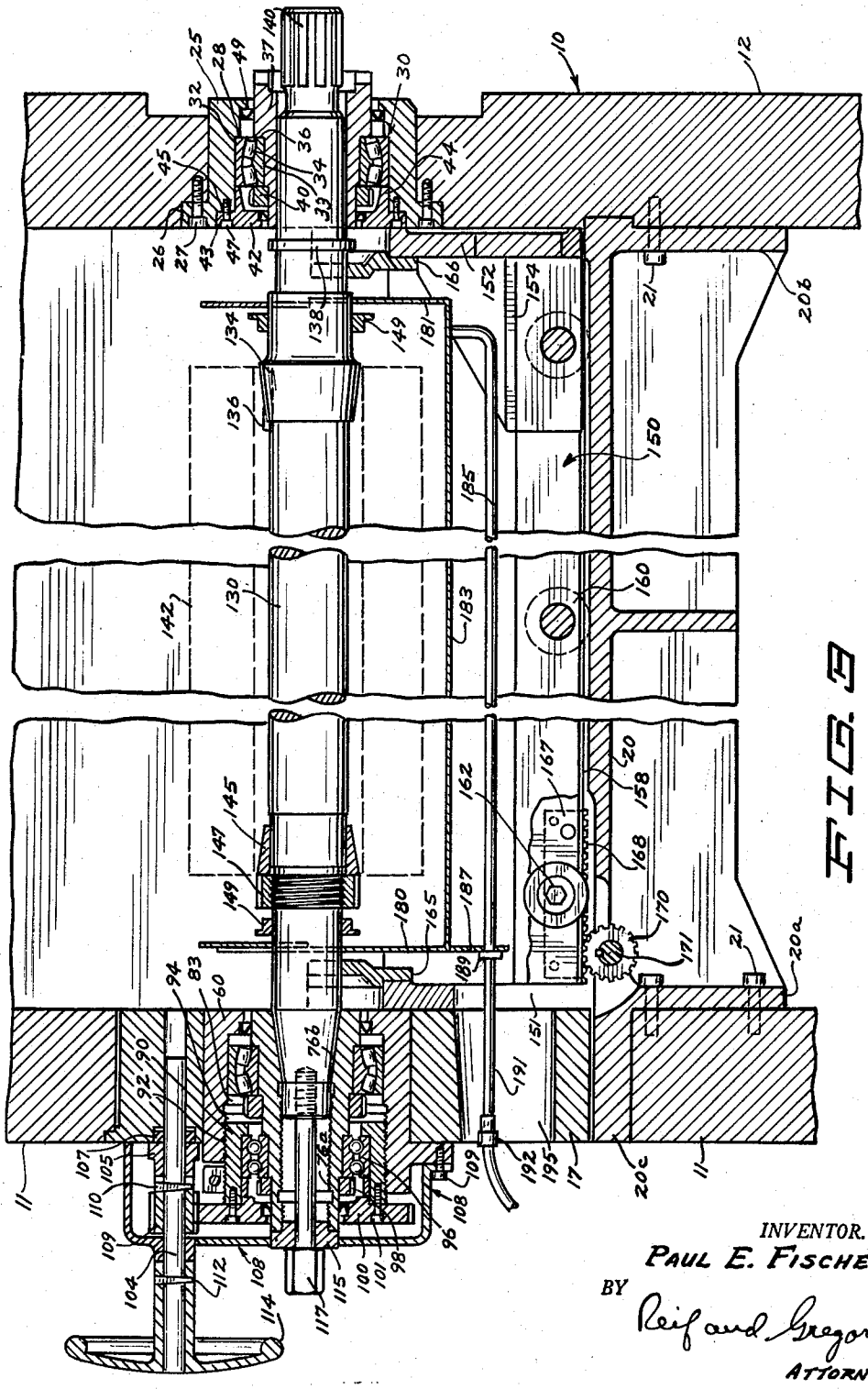


FIG. 9

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APPARATUS FOR CHANGING PRINTING ASSEMBLY

Filed Dec. 7, 1956 6 Sheets-Sheet 4

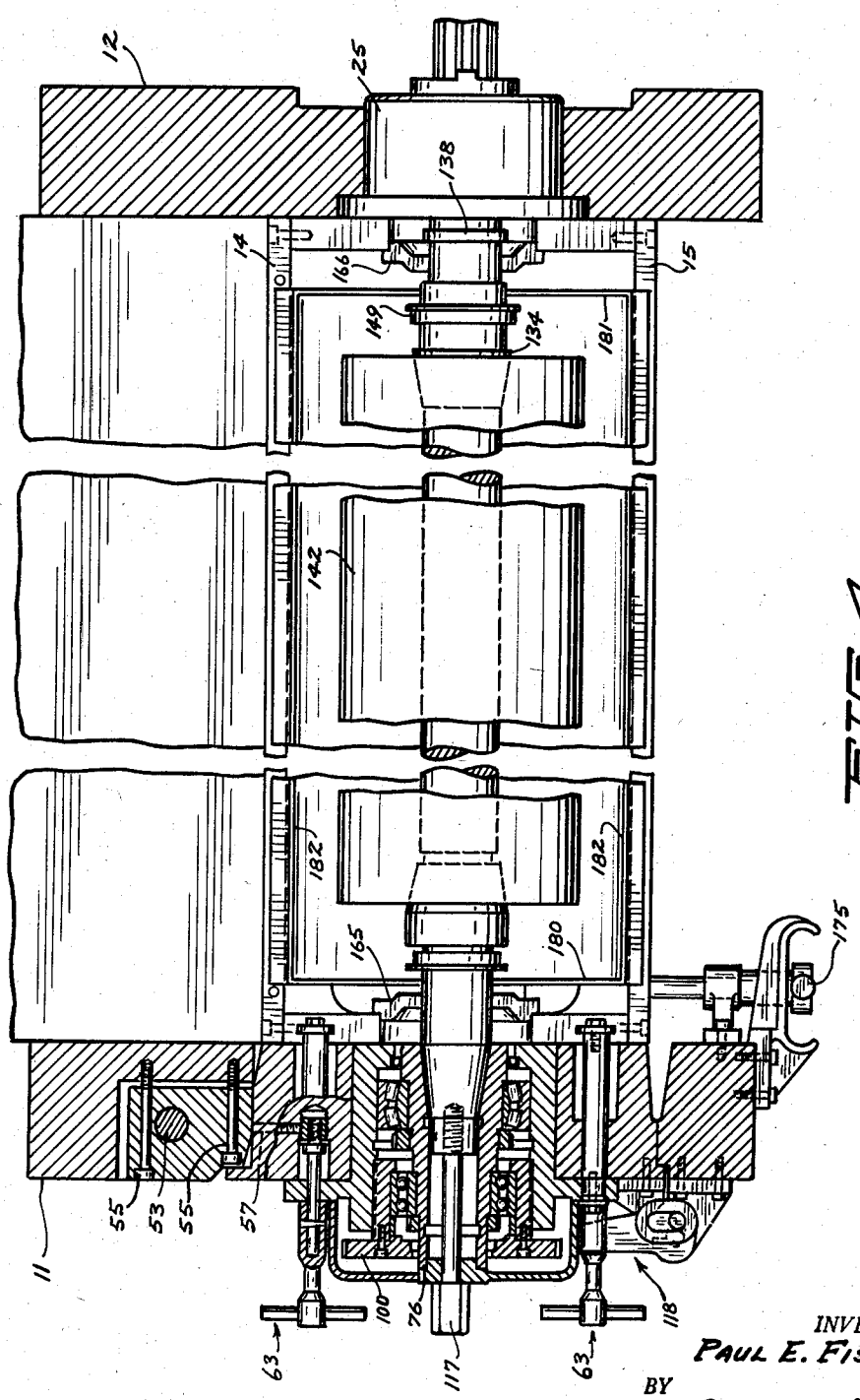


FIG. 4

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APPARATUS FOR CHANGING PRINTING ASSEMBLY

Filed Dec. 7, 1956 6 Sheets-Sheet 5

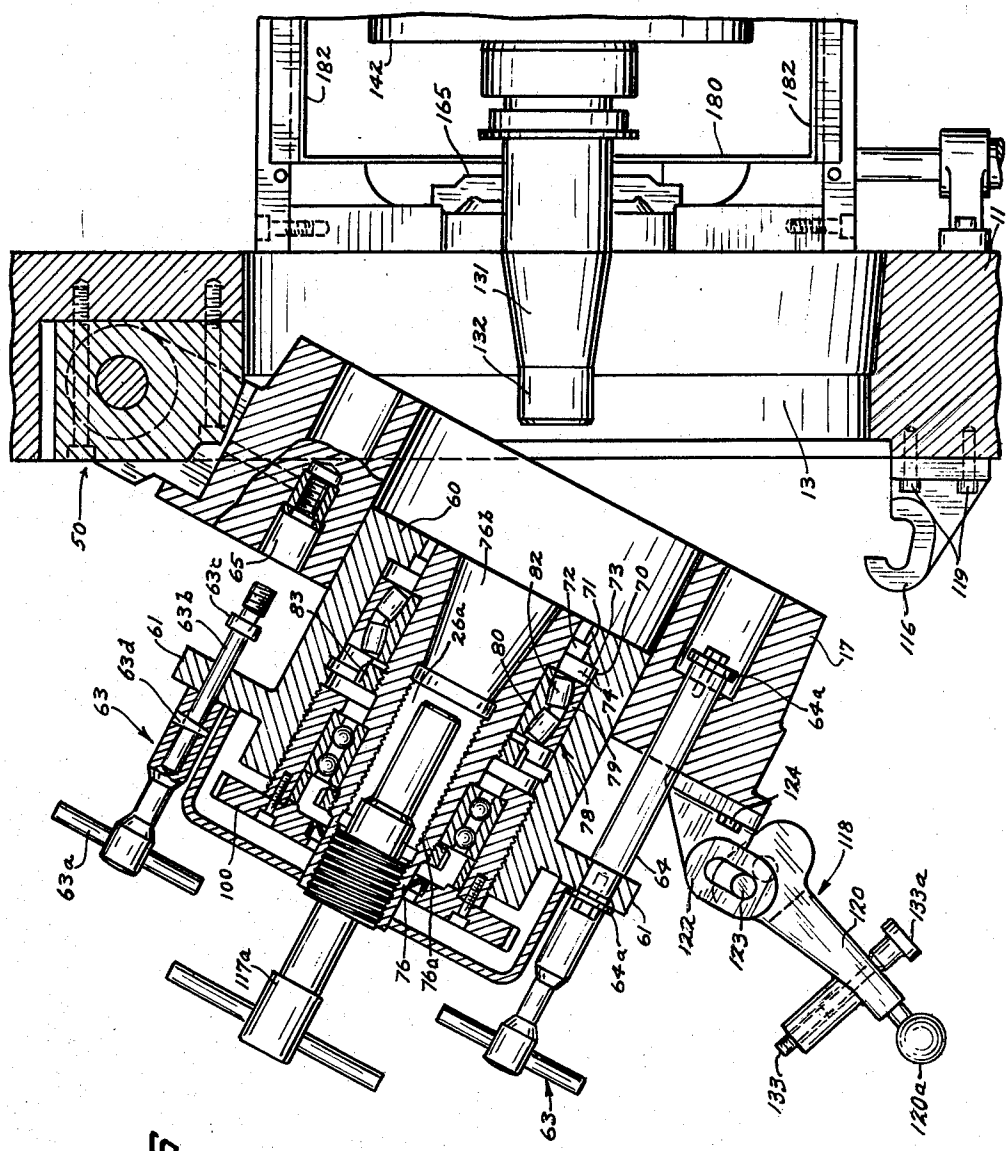


FIG. 5

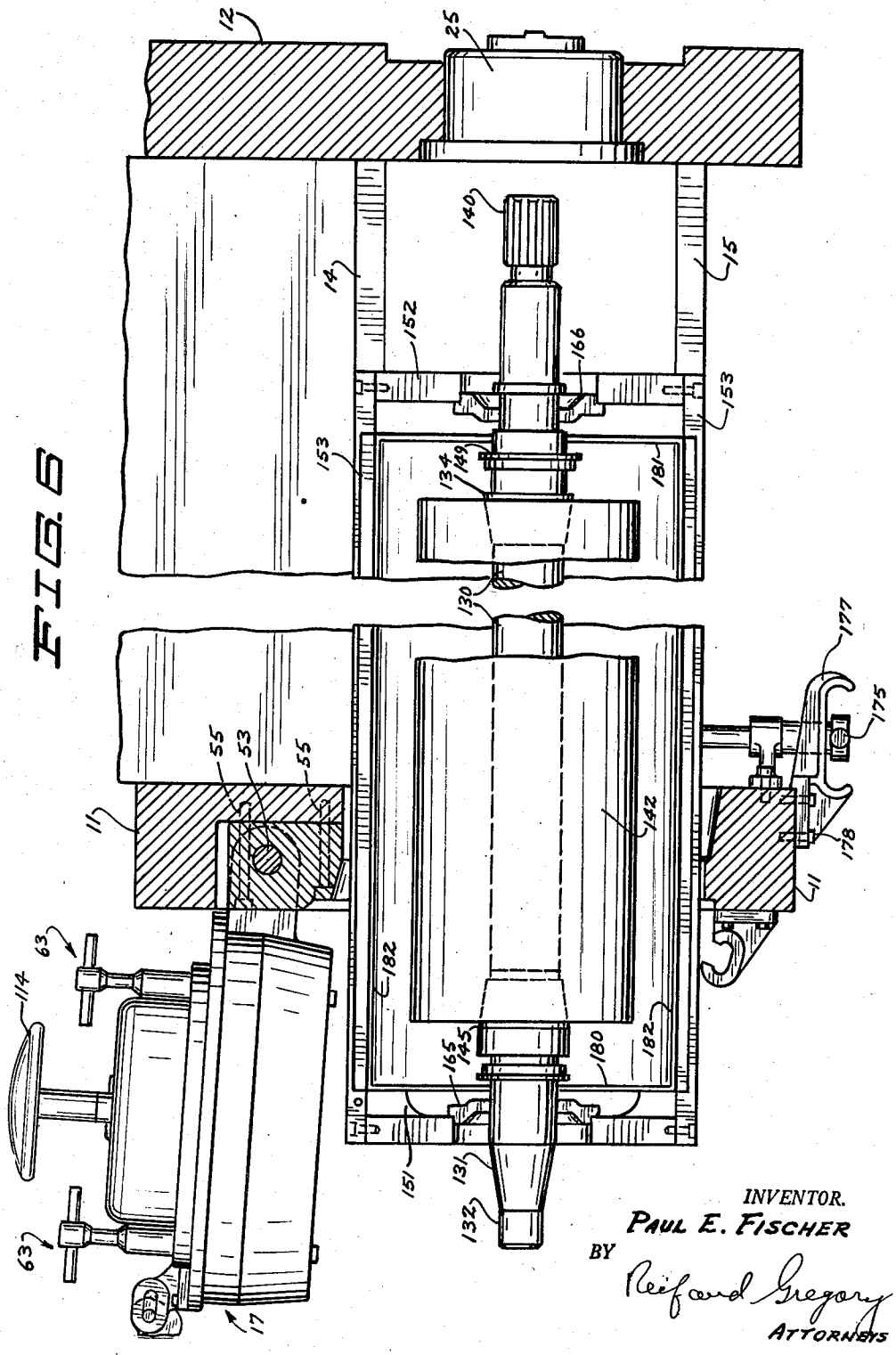
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APPARATUS FOR CHANGING PRINTING ASSEMBLY

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FIG. 6



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United States Patent Office 2,925,037 Patented Feb. 16, 1960

2,925,037

APPARATUS FOR CHANGING PRINTING ASSEMBLY

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Application December 7, 1956, Serial No. 627,015

4 Claims. (Cl. 101—216)

This invention relates to apparatus for changing a printing assembly of an intaglio printing press and relates specifically to the portion of the press in which is housed the printing cylinder assembly.

One of the important functions in operating and handling such a press is the method of removal of the printing cylinder to exchange the same in making ready for a new job. In the conventional design of such a press it is necessary to remove the bearing cartridges in which the printing cylinder is journaled along with the printing cylinder itself in removing the printing cylinder from the frame of the press. Considerable care must be exercised in handling the bearings on the printing floor and considerable time is required to remove the bearings from the shaft which carries the printing cylinder and to remount them on the same or another shaft on which a new printing cylinder has been secured for the installation of a new printing cylinder assembly in the press. Any dirt or contamination that is picked up by the bearings in their handling will seriously affect their operation as the press is normally operated with the shaft and printing cylinder being driven at very high speeds whereby the web is moved upwards of 750 to 1000 feet per minute. The bearings carried on the shaft are generally so heavy and cumbersome that an overhead hoist is necessary to handle them. Moreover the removal of the bearings from the shaft and their installation on the same shaft after the replacement of the printing cylinder or their placement on another shaft causes such a substantial delay in time that it is generally necessary to have a complete assembly of a shaft, printing cylinder and bearings as a complete alternate or exchange assembly in making ready for a new job. The additional set of bearings requires a substantial additional investment in equipment on the part of the operator.

It is therefore very desirable to have an intaglio press so constructed that the printing cylinder and shaft on which it is mounted may be removed free from the bearings in which said shaft is journaled in making a change of printing cylinders, with the bearings being left mounted in the frame of the press.

It is an object of this invention therefore to provide a printing cylinder adapted to be removed from the frame of the press free from the bearings in which it is journaled.

It is also an object of this invention to provide a frame for such a press adapted to have mounted therein bearings in which a printing cylinder may be journaled.

It is a further object of this invention to have one end of the frame of an intaglio press in which the printing cylinder is journaled adapted to have a portion thereof pivotally removable for disengagement from the printing cylinder and to provide an opening in said frame for the removal of the printing cylinder assembly.

It is a more specific object of this invention to provide a frame for an intaglio press, said frame having end walls and a support therebetween, one of said walls having a movable block therein, bearings mounted in said walls, a shaft journaled in said bearings, a printing cylinder carried on said shaft, a carriage movable on said support adapted to support said shaft and printing cylinder for removal of the same, and means for removing said carriage from said frame.

It is a still more specific object of this invention to provide a frame for an intaglio press, said frame having front and rear walls and a bottom wall therebetween, said front wall having a pivotable portion forming a door block, a housing in said door block movable outwardly thereof, aligned bearing cartridges respectively mounted in said housing and in said rear wall, a shaft removably journaled in said bearing cartridges, a printing cylinder mounted on said shaft, a carriage movable on said bottom wall adapted to have said shaft supported thereon, and means for moving said shaft out of engagement with said bearing cartridge, housing and door block whereby said shaft is moved to a supported position on said carriage and said door block is pivoted to open position leaving unobstructed said front wall, and means for moving said carriage out of said frame free of said front and rear bearing cartridges.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a view in front elevation of applicant's device;

Fig. 2 is a partial view in front elevation showing some parts in dotted line;

Fig. 3 is a view in longitudinal vertical section taken on line 3—3 of Fig. 2, as indicated by the arrows, some parts being broken away;

Fig. 4 is a view in longitudinal horizontal section taken on line 4—4 of Fig. 2 as indicated by the arrows, with some parts being broken away;

Fig. 5 is a partial view in horizontal section on an enlarged scale; and

Fig. 6 is a top plan view with some parts broken away and portions being shown in section.

Referring to the drawings, a frame **10** of an intaglio press is shown and only so much of the frame is here shown in detail and described as is pertinent to the invention herein which relates to the printing cylinder assembly and the frame adjacent thereto. Said frame **10** has a front wall **11** and a rear wall **12**. Said walls are tied together by longitudinally extending members **14** and **15**.

Said front wall **11** has a central opening **13** therein in which is mounted a door block **17** to be later described. A bottom plate or platform **20** extends between said front and rear walls having depending ribs **20***a* and **20***b* respectively adjacent the inner sides of said front and rear walls and being secured thereto by bolts **21**. Said bottom plate has a portion **20***c* projecting forwardly overlying a lower portion of said front wall and being flush with the outer side thereof.

Seated in said rear wall **12** is a bearing block **25** here shown to be substantially cylindrical in form being provided with a shoulder **26** for positioning the same and is held secured in said rear wall by bolts **27**. Said bearing block has a counterbore therein forming a shoulder **28**. Seated in said bearing block is a bearing **30**.

Said bearing **30** comprises an outer ball race **32**, an inner ball race **33** and roller bearings **34** therebetween. Said outer race abuts said shoulder **28**. Said inner race abuts a shoulder **36** of a bearing sleeve **37** about which said inner race is mounted.

Holding said inner race **33** in position is a lock nut **40** threaded on said sleeve **37**.

Disposed at the inner side of said bearing block **25** is a bearing housing **42** having a shoulder **43** abutting against a shoulder **45** of said bearing block and being

secured thereto by bolts 47. Said bearing housing 42 has an inwardly extending flange 44 abutting said outer race 32. Said door block 17 is pivoted to said wall 11 by a hinge 50 comprising a central hinge plate 51 secured to said frame 11 by bolts 55. Pivoted to said plate 51 at its upper and lower ends by hinge pins 53 are hinge arms 54 secured to said door block 17 by bolts 57.

Said door block 17 as here illustrated is substantially rectangular in plan and is of considerable thickness. Disposed substantially centrally in said door block 17 and movable slidably transversely thereof is a bearing block 60 here illustrated as being substantially cylindrical in form and having a shoulder 61 extend thereabout to overlie said door block and act as a stop member when said housing 60 has been moved into said door block to be flush with its inner side. Said shoulder has a widened portion at either side of said housing through which extend bolts 63 each shown here having a handle 63*a* and a shank 63*b* secured thereto by a pin 63*d*. Said shank has a lower threaded portion having a limiting washer 63*c* thereon. Said housing has threaded recesses 65 for receiving the threaded portions of said shanks 63*b*. Said screws 63 when in screwed position hold said housing 60 in operating position in said door block 17.

Substantially in vertical alignment with said screws 63 are shafts 64 extending through passages in said shoulder 61 and through passages in said door block 17 and extend into enlarged cylindrical openings at the rear side of said door block. Said shafts have limiting washers 64*a* adjacent each end thereof for limiting the outward movement of said housing 60 in said block 17. Said washers are of a size substantially larger than said passages through which said shafts 64 extend. Said shafts are of a length to permit said housing 60 to move outwardly of said door block 17 for some distance.

Said housing 60 has a substantially cylindrical bore 70 therethrough having a shoulder 71 at its inner end and having oil seals 72 therein. Said bore has a second shoulder 73 and a spacer 74 resting against said second shoulder. Axially positioned in said housing 60 is a cartridge center sleeve or bearing sleeve 76 extending through said housing 60 for substantially the full width thereof. Said sleeve 76 has a bore 76*a* of substantial length of uniform diameter which is threaded for some distance therein and said sleeve has a flared inner end portion 76*b*. Said sleeve has an outer diameter reduced in size from its inner end towards its outer end by offset portions, giving it a generally tapered effect.

Mounted in said housing 60 and about said sleeve 76 is a bearing 78 having an outer race 79 bearing against the surface of said housing and abutting against said spacer 74. Said bearing has an inner race 80 bearing against said sleeve 60 and abutting against a shoulder formed in said sleeve. Secured between said races are rollers 82. Threaded onto said sleeve and holding said bearing 78 in position is a lock nut 83.

Disposed in said housing 60 is a housing 90 having external threads 92 thereabout meshing with internal threads 94 formed in the portion of housing 60 adjacent thereto and in engagement therewith. Said housing 90 is spaced somewhat from lock nut 83 to provide for some lateral movement. Between said sleeve 76 and said housing 90 is a thrust bearing 96 bearing against shoulders formed in said sleeve 76 and said housing 90. Said thrust bearing is held in place by a lock nut 98. A gear 100 is journaled on the outer end portion of said sleeve 76 and is secured by bolts 101 to said housing 90. A shaft 104 is journaled in said door block 17 and extends outwardly therefrom. Disposed in said shaft 104 is a bearing 105 having at its inner side a collar 107 recessed in said door block. A spur gear 109 is secured to said shaft 104 by a pin 110 and has a shoulder portion abutting said bearing 105. Said shaft extends outwardly of a cover 108 substantially cylindrical in form which encloses the outer end of said housing 60 and is secured thereto by bolts 109. Secured to the outer end of said shaft 104 by a pin 112 is a hand wheel 114 of substantial diameter. The structure described in the above paragraph forms an end register adjustment mechanism which is no part of the present invention.

Said cover 108 has a central opening therein aligned with said sleeve 76 and in which is threaded a cap 115. Said cap is bored to have a locking screw 117 extend therethrough to be threaded into the outer end of a shaft 130, to be described, to lock the same in position in said sleeve 76. For disengaging said shaft from said sleeve a jack screw 117*a* is inserted into said sleeve 76 having a portion adapted to be threaded thereinto after the removal of said screw 117 and cap 115. As said jack screw is threaded into said sleeve its elongated outer end portion moves said shaft outwardly thereof.

For holding said door block in tightly closed position a latch is provided comprising a bracket 118 forming an open slotted keeper 116 secured to frame 11 by bolts 119. An arm latch 120 having a bifurcated portion 121 is pivoted to spaced brackets 122 by pins 123. Said brackets are secured to said door block 17 by bolts 124. Said arm latch is here shown having a ball-shaped handle portion 120*a*, and adjacent its outer end is a locking screw 133 having a handle 133*a* thereon. Said screw is adapted to be threaded into said door block to hold said latch securely in locked position and free from vibration.

Secured to front plate 11 adjacent the upper right-hand portion of door block 17, as seen in Fig. 2, is a latch 125 comprising a clamping plate 126 having a handle 127 secured thereto with said plate and handle pivoted on a pin 128. Said plate is adapted to engage an edge portion of said door block. A stop pin 129 limits the pivotal movement of said clamping plate.

Journaled in said bearing blocks 25 and 60 is a shaft 130 having a tapered portion 131 adjacent one end with the end portion 132 outwardly thereof being of uniform reduced diameter and being threaded to receive said lock screw 117. Said shaft has a frusto conical portion 134 adjacent its other end and having disposed therein a key 136. A collar 138 for limiting the axial movement of said shaft 130 is secured thereabout and in its normal position is spaced inwardly somewhat of said sleeve 37. Extending outwardly of said sleeve 37 said shaft has a splined end portion 140. The end of the portion of shaft 130 in sleeve 37 has a tapered shoulder.

Removably carried on said shaft 130 is a printing cylinder 142 having its bore flared at each end with one end portion adapted to fit over said frusto conical portion 134 of said shaft and having a slot therein to receive a portion of said key 136 to prevent relative movement between said shaft and said cylinder. The other end of said cylinder is adapted to have pressed therein a tapered nut 145 held in position by a lock nut 147 threaded onto said shaft 130. Carried on said shaft adjacent either end of said cylinder are deflector rings 149 to prevent ink from spreading along said shaft.

Movably carried on said support 20 is a carriage 150 comprising a frame having a front plate 151 and a back plate 152 joined by side plates 153 and a lower plate 154. Said lower plate is spaced upwardly somewhat from the bottom of said side plates. Said side plates are inclined upwardly and outwardly and said front and back plates have substantially yoke-shaped upper portions. Secured to the lower portions of said side plates are spacer bars 157 which extend nearly to the bottom of the front and rear plates. Joining the bottoms of said front, rear and side plates is a bottom plate 158.

A plurality of wheels or casters 160 are attached to the lower side plates at either side of said carriage and are shown here to be three in number spaced at each of said sides. Said casters are secured to said side plates by studs 162. Said casters will run in spaced tracks 22 formed in said bottom plate 20.

Secured to said side plates 153 and extending transversely thereof adjacent either end thereof are brackets

165 and 166 adapted to have supported therein said shaft 130 when said shaft is disengaged from operating position. When in operating position said shaft clears said brackets. Said brackets have semi-cylindrical recesses for receiving and supporting said shaft. Bolted to a side plate 153 adjacent the front thereof is a plate 167 carrying at the bottom thereof a rack 168.

A shaft 171 is journaled in said bottom member 20 adjacent said rack. Secured to said shaft and adapted to engage said rack is a gear 170. A handle 175 equipped with pawl and ratchet mechanism is used to engage said shaft 171. A bracket 177 is secured by bolts 178 to frame member 11 for limiting the reciprocating movement of said handle 175.

An inking mechanism mounted to be removable with said carriage 150 is shown comprising a front plate 180, a rear plate 181, connecting side plates 182 and a bottom plate 183. Conduits 185 provide passage for a supply of ink to said inking mechanism and extend along said bottom plate 183. Said conduits are coupled to the inner end of said bottom plate. Said conduits are generally two in number. A hanger 187 depending from plate 180 supports the outer ends of said conduits 185 and couplings 189 are secured to said conduits outwardly of said hanger 187. Conduits 191 of short length having couplings 192 respectively at their outer ends are coupled to couplings 189 and extend through an opening 195 in said door block 17. As shown in Fig. 1, adapted to be removably secured to said couplings 192 in an ink reservoir mechanism 196 which is not further described and forms no part of the present invention.

Mounted on the front of said door block 17 and extending inwardly of said cover 108 transversely thereof is an adjustment member comprising a handle 200 having connected thereto a spacer 201 and a screw 202 extending through said spacer.

Mounted on the upper part of said frame 10, as shown in Fig. 1, is a control panel 206 which forms no part of the present invention and is not further described.

In operation, said ink reservoir mechanism 196 is first uncoupled from said couplings 192 and is moved away. Conduits 191 are next uncoupled from coupling 189 and removed. Lock screw 117 and cap 115 are next removed from cover 108. Said jack screw 117*a* is inserted in place of said screw 117 and is threaded into said sleeve 76 with the inner end of said jack screw engaging the adjacent end of said shaft 130. Said jack screw will move said shaft 130 inwardly out of said sleeve 76 to the point that collar 138 butts up against the inner side of said sleeve 37.

Said screws 63 are loosened to be disengaged from said door block 17. Said jack screw 117*a* is further threaded into said sleeve 76 and with said collar 138 butting up against said sleeve 37, the pressure thus created moves housing 60 outwardly of said door block 17 to the point where said housing 60 is disengaged and moved from end 132 of shaft 130 so that said door block 17 can be swung open.

Door locking mechanism 118 is then unlatched as also is said latching means 125. Said door block is then swung open ninety degrees, as shown in Figs. 5 and 6, to leave entirely unobstructed said opening 13.

A dolly not here illustrated is placed in position in front of said opening 13. As said shaft 130 was moved out of said sleeve 76 its front end portion was lowered slightly to a resting position on bracket 165. Handle 175 is then placed in engagement with shaft 171 and is reciprocated to move forward said rack 168 by rotation of said gear 170. Thus said carriage 150 is moved endwise outwardly through said opening 13 and onto said dolly. As said shaft 130 is moved outwardly of said sleeve 37 its position becomes lowered as its tapered shoulder is moved outwardly of said sleeve so that it comes to rest on said bracket 166 and thus said shaft is supported on said brackets 165 and 166. Thus the entire printing assembly consisting of said carriage 150, said shaft 130 and said printing cylinder 142 are removed as a complete unit free from the bearing cartridges in which said shaft 130 is journaled when in operation.

It is relatively simple and requires but a short time to remove the printing cylinder 142 from the shaft 130 and to replace it with a new unit to make ready for a new job. All of the bearings in which said shaft is journaled remain in operating position untouched in the frame of the press free from the danger of becoming contaminated, which danger is always present in their being handled on the printing floor and their accurate positioning for maximum operating efficiency is undisturbed.

To install the printing assembly in operating position, the above steps for its removal are reversed. The shaft 130 is drawn into position in bearing sleeve 76 by tightening lock screw 117.

Thus it is seen that I have provided a novel, efficient and relatively simple structure by means of which a printing assembly can be readily removed from an intaglio press without disturbance of the bearings and their housing structure. This invention provides a substantial improvement in the saving of time and effort in making ready for a new job and reduces considerably the investment necessary in alternate equipment in getting a press ready for a new job, as it makes unnecessary the need for having an alternate set of bearings which involves a heavy investment.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the apparatus and in the steps and sequence of steps of the method without departing from the scope of applicant's invention, which, generally stated, consists in a method and apparatus capable of carrying out the objects above set forth, such as disclosed and the defined in the appended claims.

What is claimed is:

1. An intaglio printing press having in combination, a frame having an open front wall, a rear wall spaced from said front wall, a support between said walls, a door hinged in said front wall forming a door block, a central portion of said door block movable outwardly thereof, bearings permanently mounted respectively in axial alignment in said central portion of said door block and in said rear wall, a shaft journaled in said bearings adapted to be movable longitudinally for some distance, a printing cylinder carried on said shaft, a carriage movable on said support and having spaced arms upstanding at either end thereof for supporting said shaft, a collar on said shaft adjacent the rear of said arms to limit longitudinal movement of said shaft, a screw jack in said central portion of said door for engaging the adjacent end of said shaft to draw the same forwardly out of engagement with the rear of said bearings to a position of support on said carriage, means for releasing said central portion of said door from said door block and said screw jack moving said central portion of said door block out of said door block and away from the front end of said shaft against the weight of said shaft to draw the central portion of said door and bearings therein away from the forward portion of said shaft whereby said shaft completely rests on said carriage to permit said door to be free of said shaft to be swung open, and means for moving said carriage with said shaft and said printing cylinder supported thereon out of said frame.

2. An intaglio printing press having in combination, a frame having an open front wall, a rear wall spaced from said front wall, a horizontal support between said walls having a track thereon, a door hinged in said front wall forming a door block, a central portion of said door block being slidably mounted therein for movement outwardly thereof, means for releasingly securing said central

portion in said door block, bearings mounted respectively in axial alignment in said central portion of said door block and said rear wall, a shaft journaled in said bearings, a printing cylinder carried on said shaft, a wheeled carriage on said support movable on said track thereon and having spaced upstanding arms at either end thereof adapted to support said shaft, a collar about said shaft adjacent the rear end portion thereof adapted to engage the rear of said arms as a stop member, the forward end of said shaft being internally threaded for a short distance axially thereof, a screw means disposed through said central portion adapted to threadingly engage the threaded end of said shaft and to draw said shaft forwardly out of engagement with the rear of said bearings and to a position of rest on said carriage, releasing said central portion from said door block by said first mentioned means and moving said central portion forwardly of said door block away from the adjacent end of said shaft by pressure of said screw means against said adjacent end of said shaft whereby said central portion and the forward bearings therein are drawn away from the forward end of said shaft and said bearings are disengaged therefrom whereby the forward end of said shaft is supported on the forwardly upstanding arm of said carriage, means for unlatching said door block and pivoting the same to open position, a rack secured to said carriage, a gear in said frame engaging said rack, and means for rotating said gear to move said carriage and the shaft supported thereon forwardly outwardly of said frame through said open front wall.

3. An intaglio printing press having in combination, a frame having an open front wall, a rear wall spaced from said front wall, a horizontal support between said walls having a track thereon, a door hinged in said front wall forming a door block for said opening, a central portion of said door being slidably mounted therein for movement outwardly thereof longitudinally thereof, spaced bolts for releasingly securing said central portion to said door block, a shaft having its ends respectively journaled in said rear wall and in said central portion of said door block, means for supporting said shaft on said track, and means in said central portion of said door block for engaging the adjacent end of said shaft to move the same free of said door and onto said supporting means to permit said door block to be swung open freely and said shaft is removed from said frame on said supporting means.

4. An intaglio printing press having in combination, a frame having an open front wall, a rear wall spaced from said front wall, a horizontal support between said walls having a track thereon, a door hinged in said front wall forming a door block for said opening, a central portion of said door block being slidably mounted therein for movement outwardly thereof longitudinally thereof, means for releasingly securing said central portion to said door block, a shaft having its ends respectively journaled in said rear wall and in said central portion of said door block, said shaft being adapted to have longitudinal movement inwardly of said frame away from said door block, means for supporting said shaft on said track, said means adapted to limit said longitudinal movement of said shaft to a certain amount, means in said central portion of said door block for engaging the adjacent end of said shaft to cause the same to have said certain amount of longitudinal movement and to cause said central portion to move outwardly of said door block in a direction away from the adjacent end of said shaft to permit said door block to be swung open freely whereby said shaft is removed from said frame on said supporting means.

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