May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 1

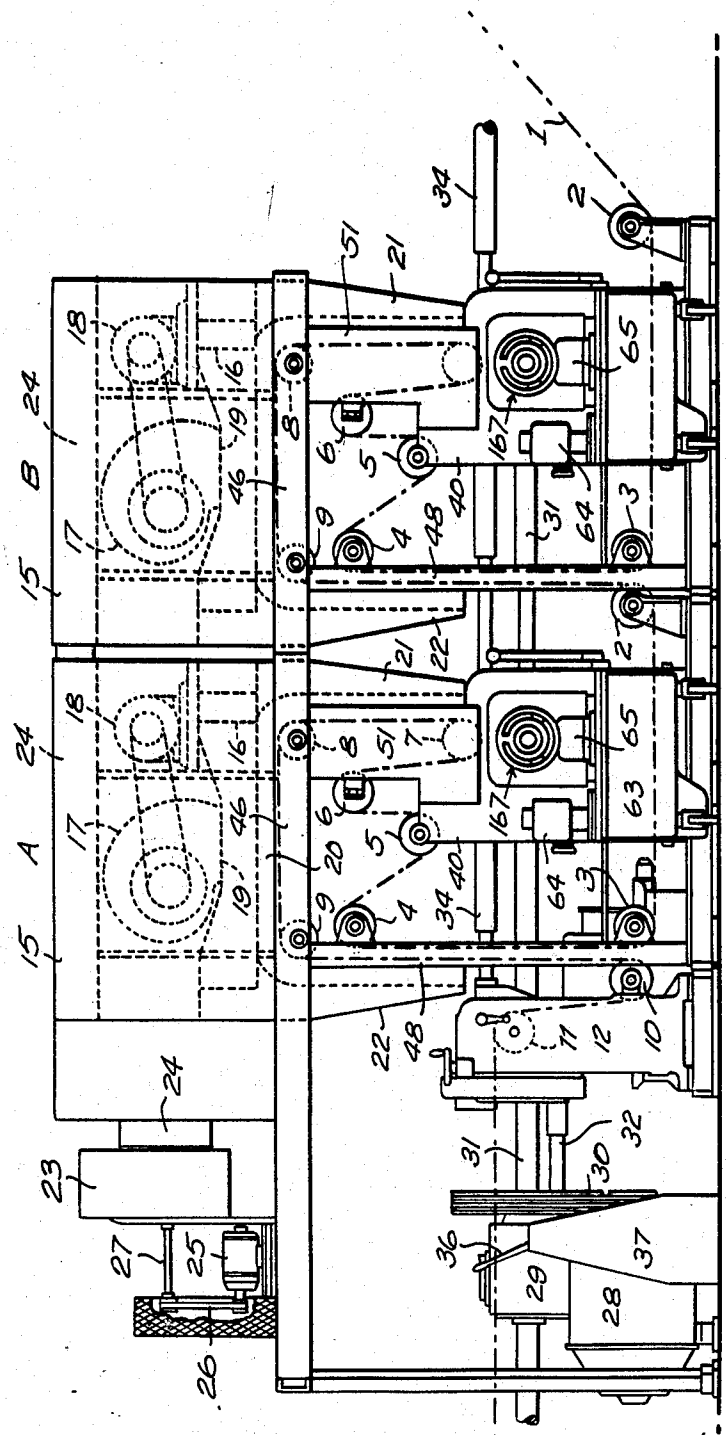


Fig. 1.

INVENTOR
Arthur P. Bamford
BY
Victor D. Borel
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 2

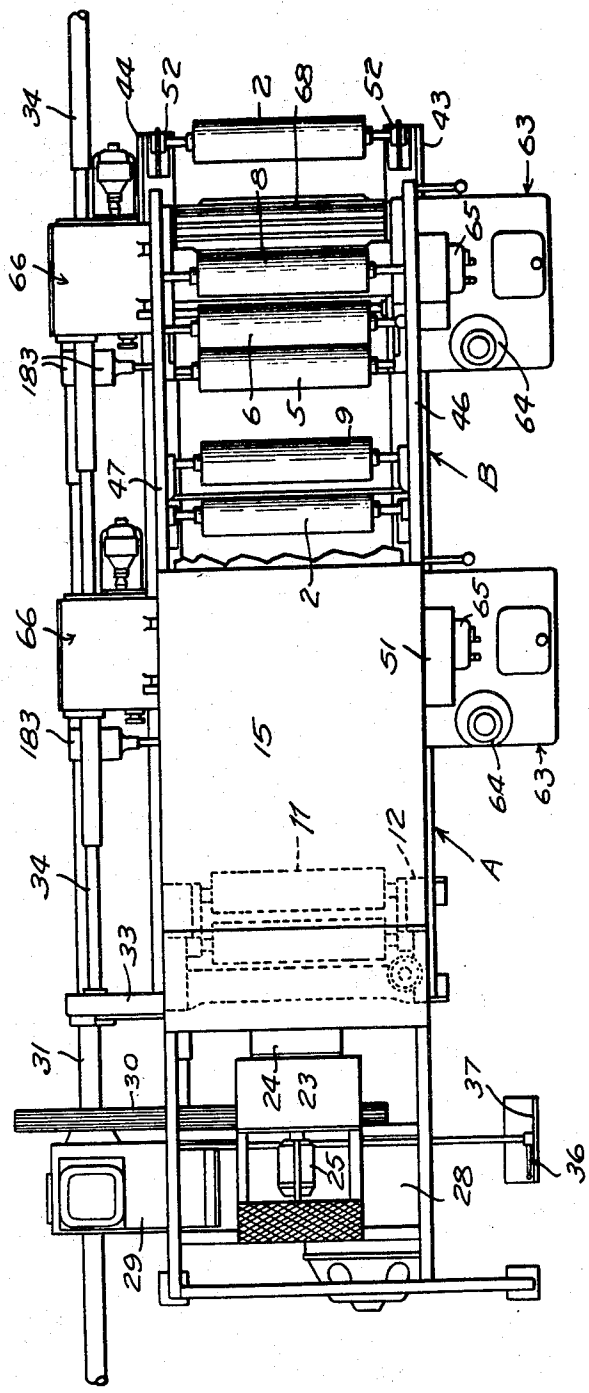



Fig. 2.

INVENTOR
Arthur P. Bamford
BY
Victor W. Bard
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 3

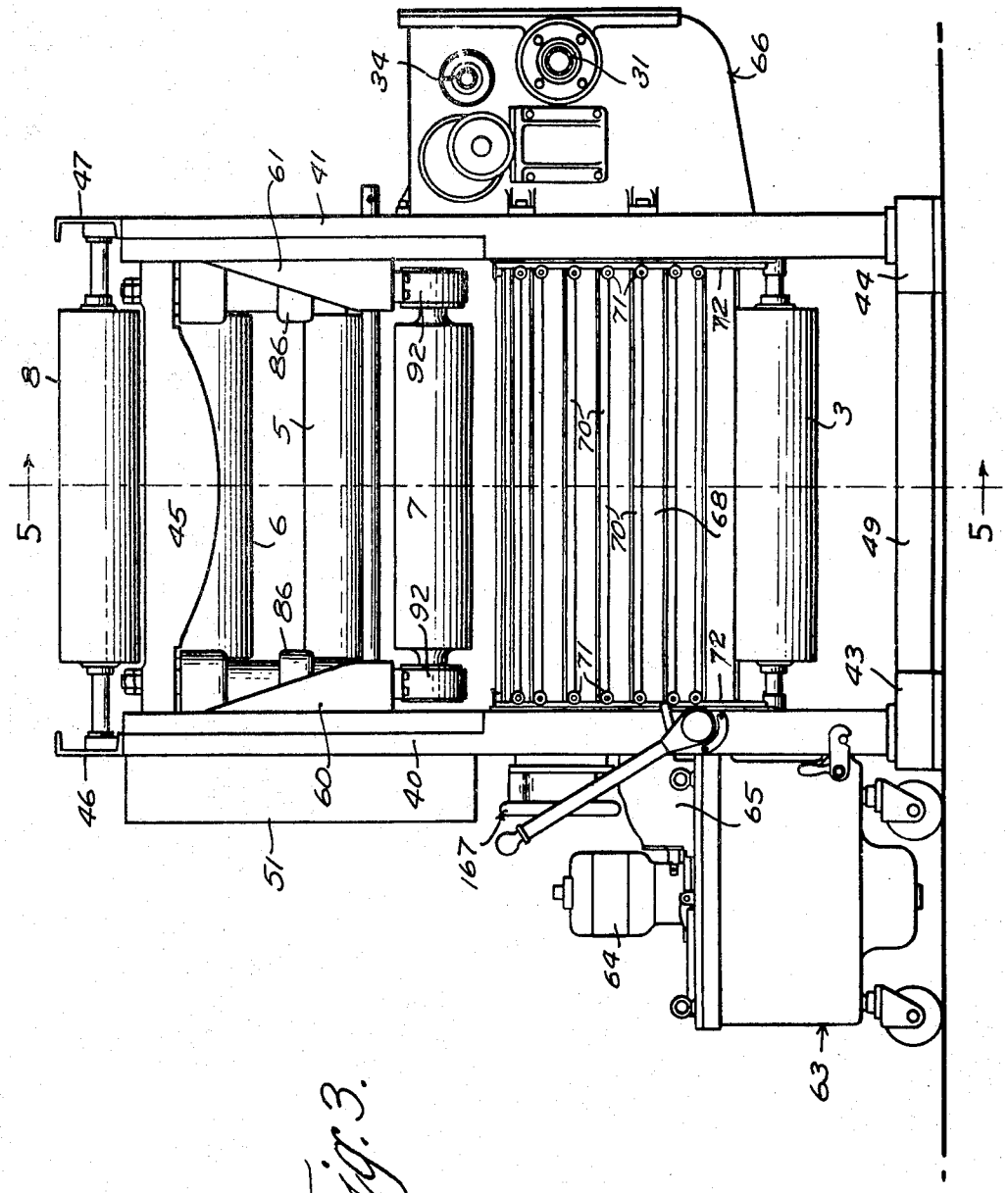



Fig. 3.

INVENTOR
Arthur P. Bamford

BY
Victor J. Borst
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 4

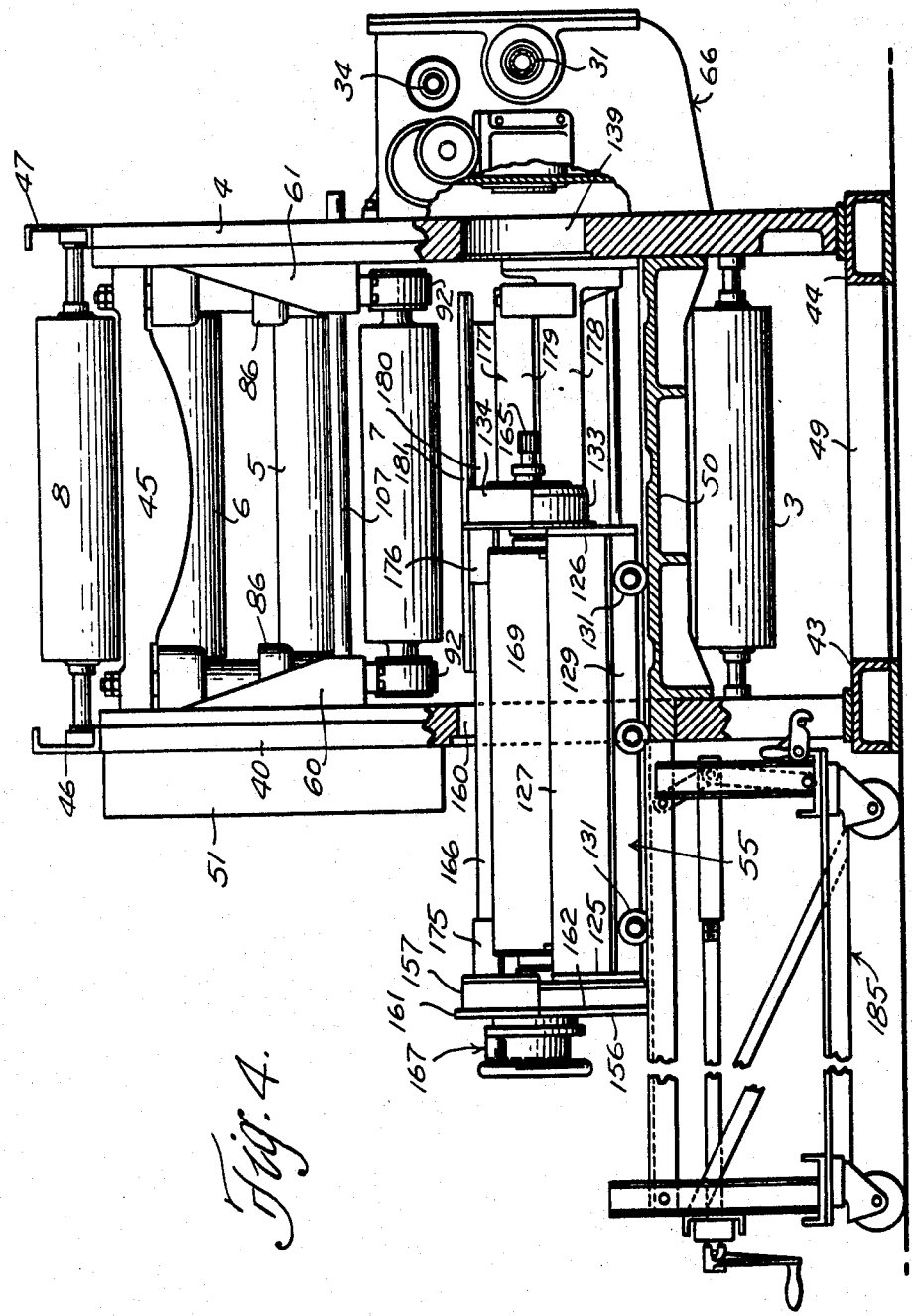



Fig. 4.

INVENTOR
Arthur P. Bamford
BY
Victor J. Bond
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 5

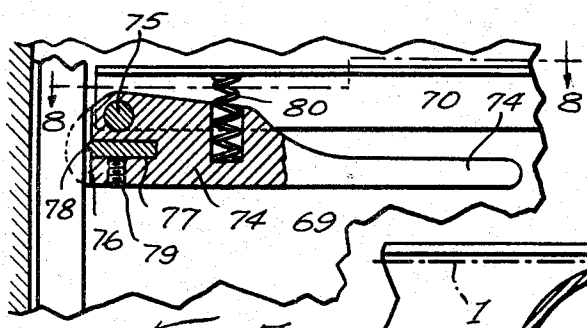



Fig. 7.

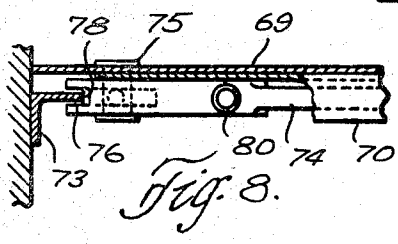



Fig. 8.




Fig. 5-A

INVENTOR
Arthur P. Bamford
BY
Victor W. Bouet
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 6

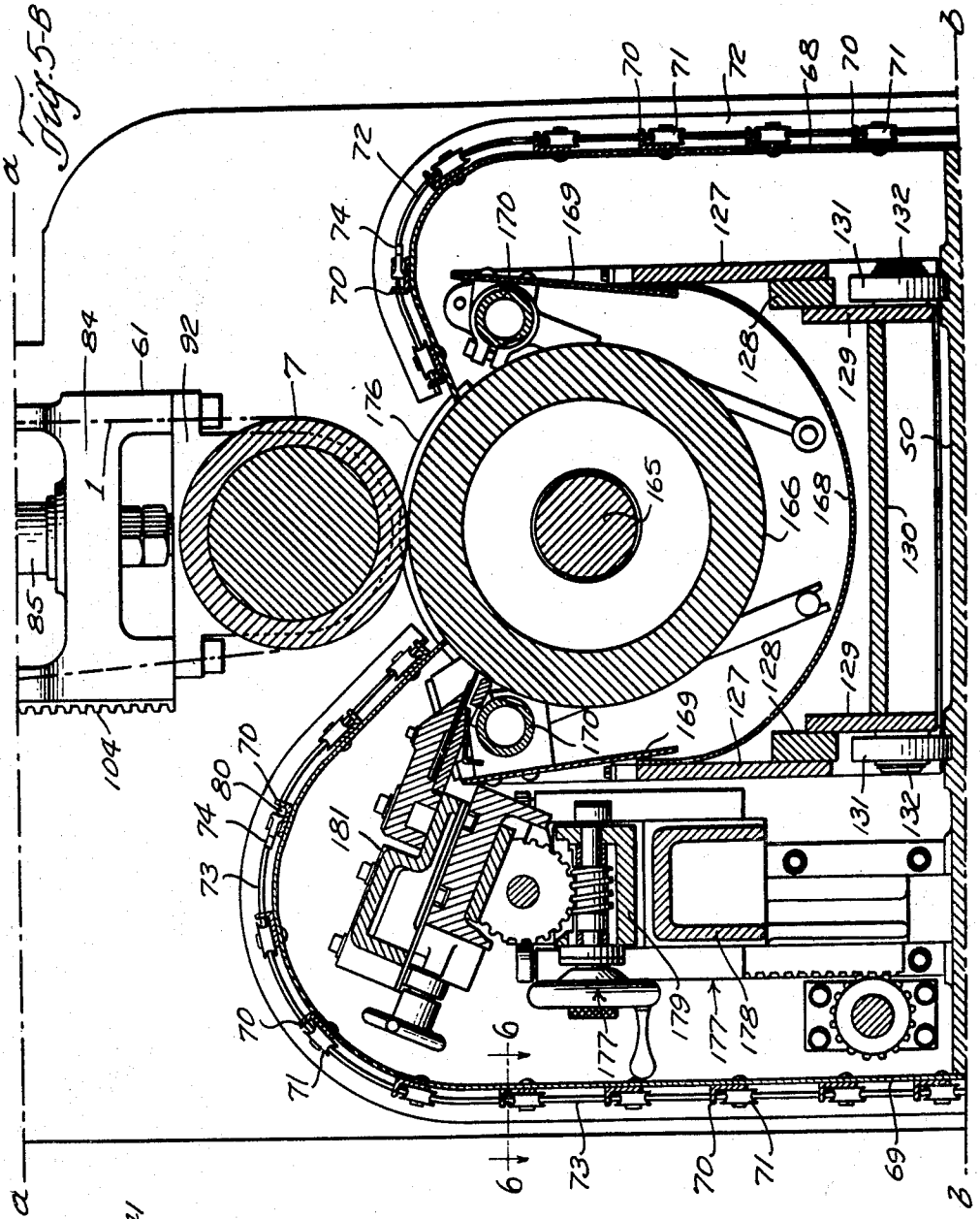



Fig. 6.

INVENTOR
Arthur P. Bamford
BY
Victor N. Bonat
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 7

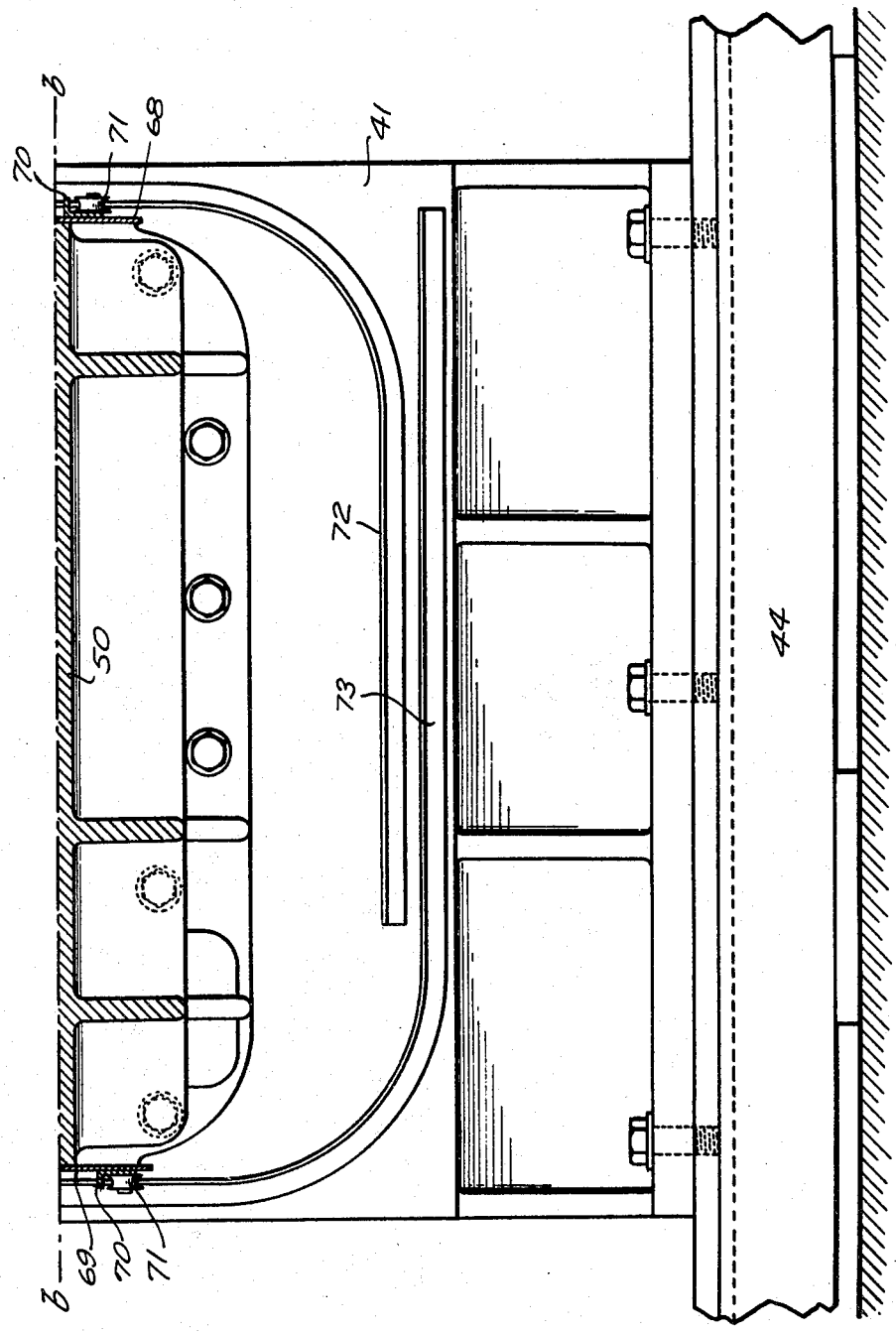



Fig. 5-C

INVENTOR
Arthur P. Bamford
BY
Victor J. Bamford
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 8

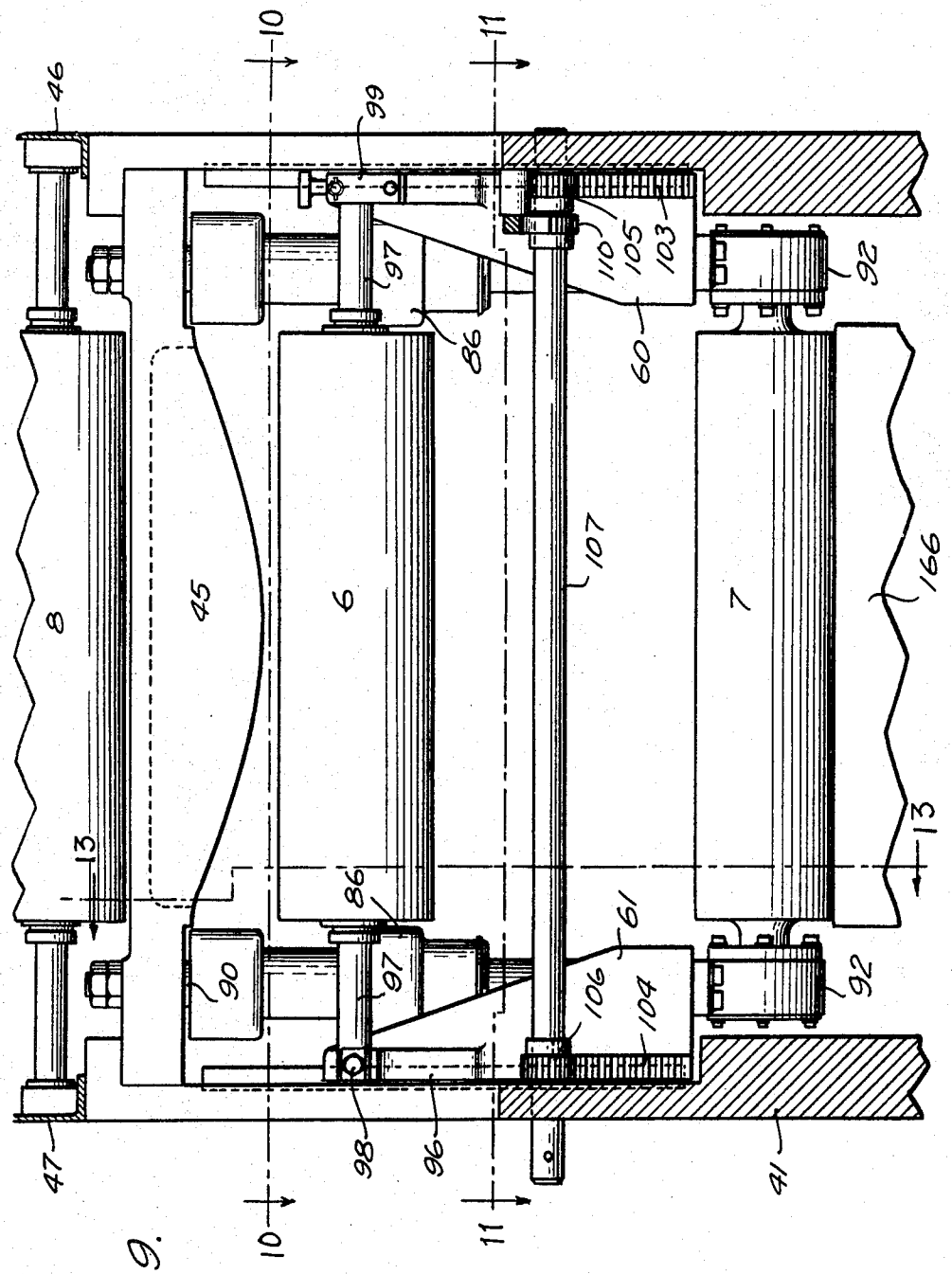



Fig. 9.

INVENTOR
Arthur P. Bamford
BY Victor D. Bowers
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 9

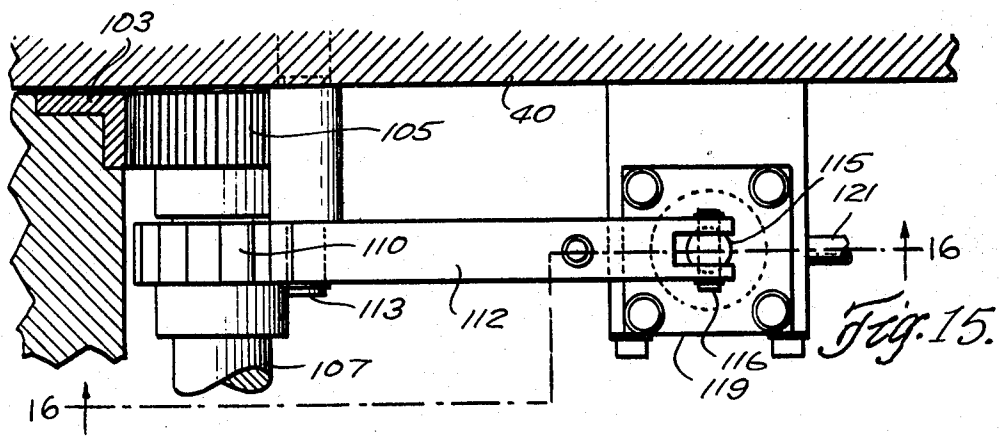



Fig. 15.

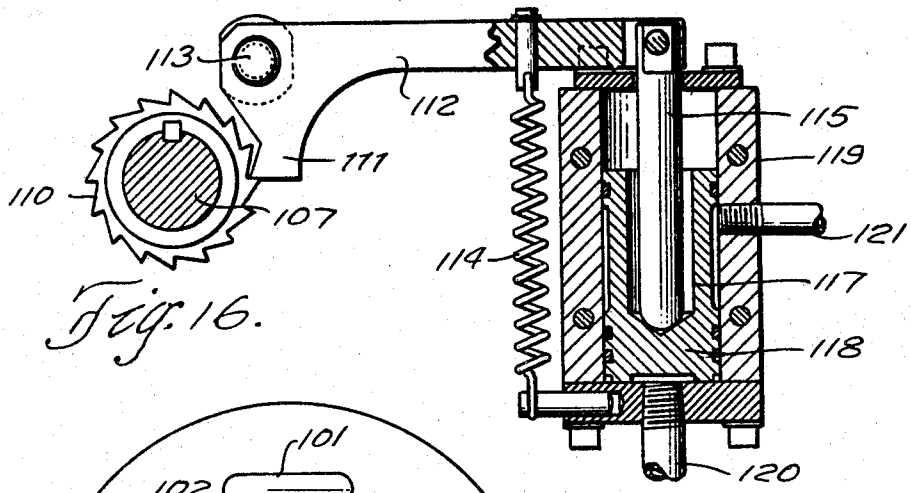



Fig. 16.

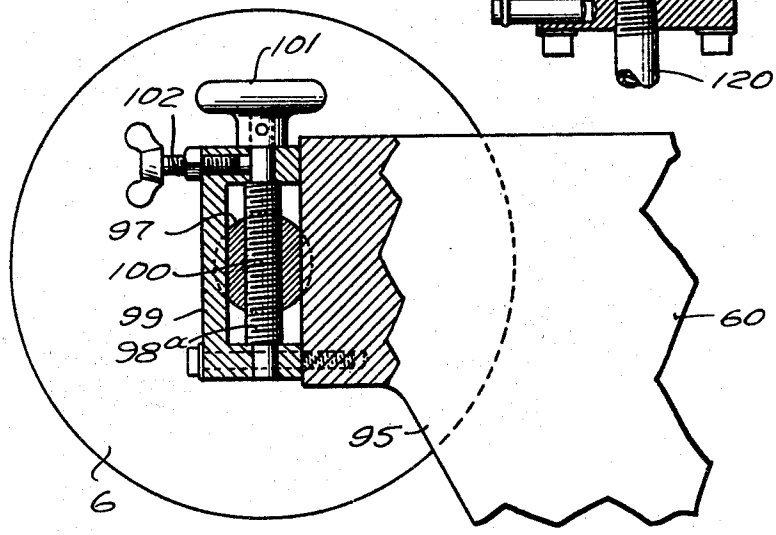



Fig. 17.

INVENTOR
Arthur P. Bamford
BY Victor N. Borst
ATTORNEY

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 10

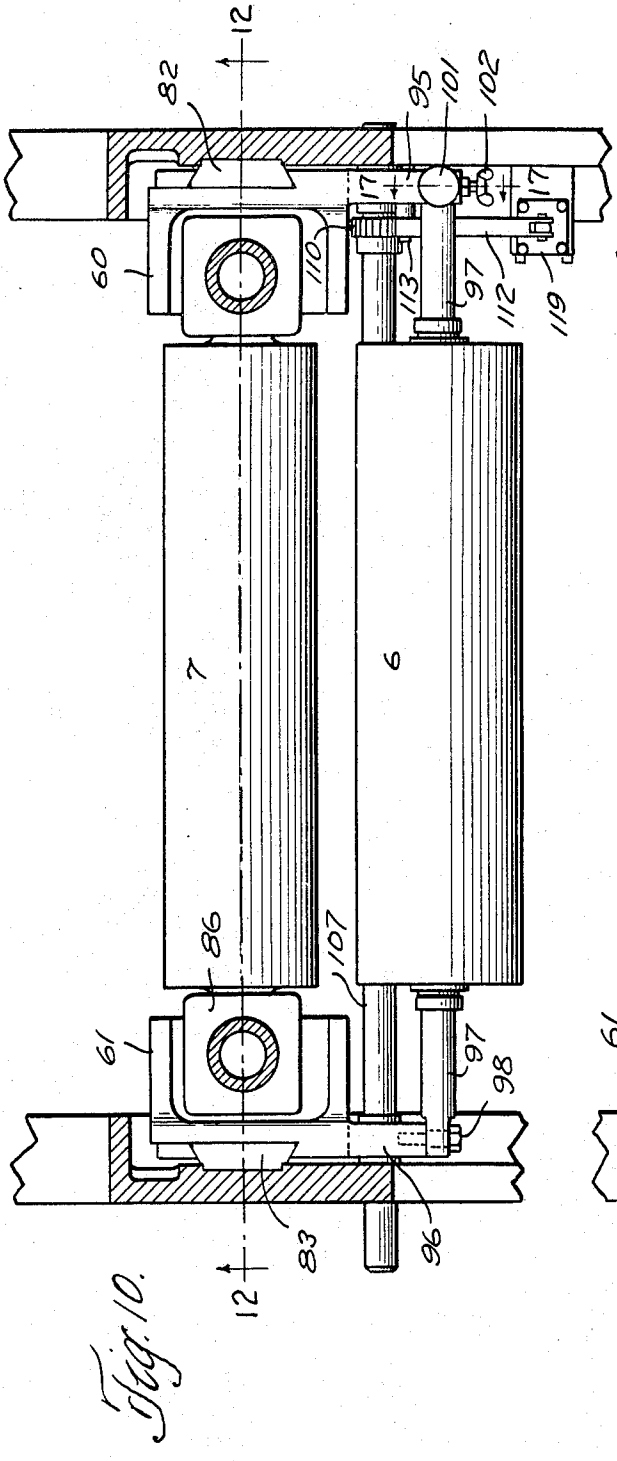



Fig. 10.

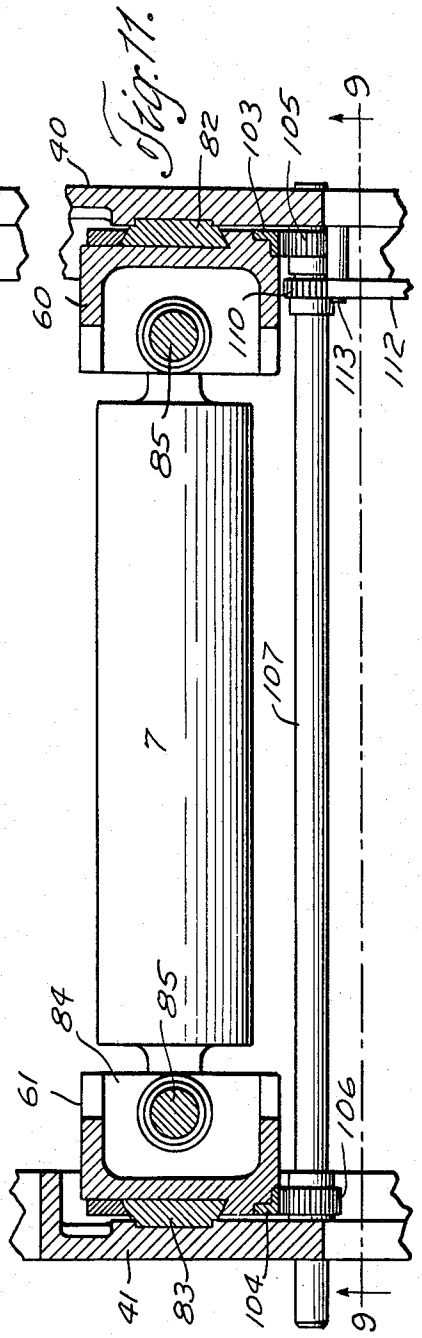



Fig. 11.

INVENTOR.
Arthur P. Bamford
BY Victor W. Borst
Atty.

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 11

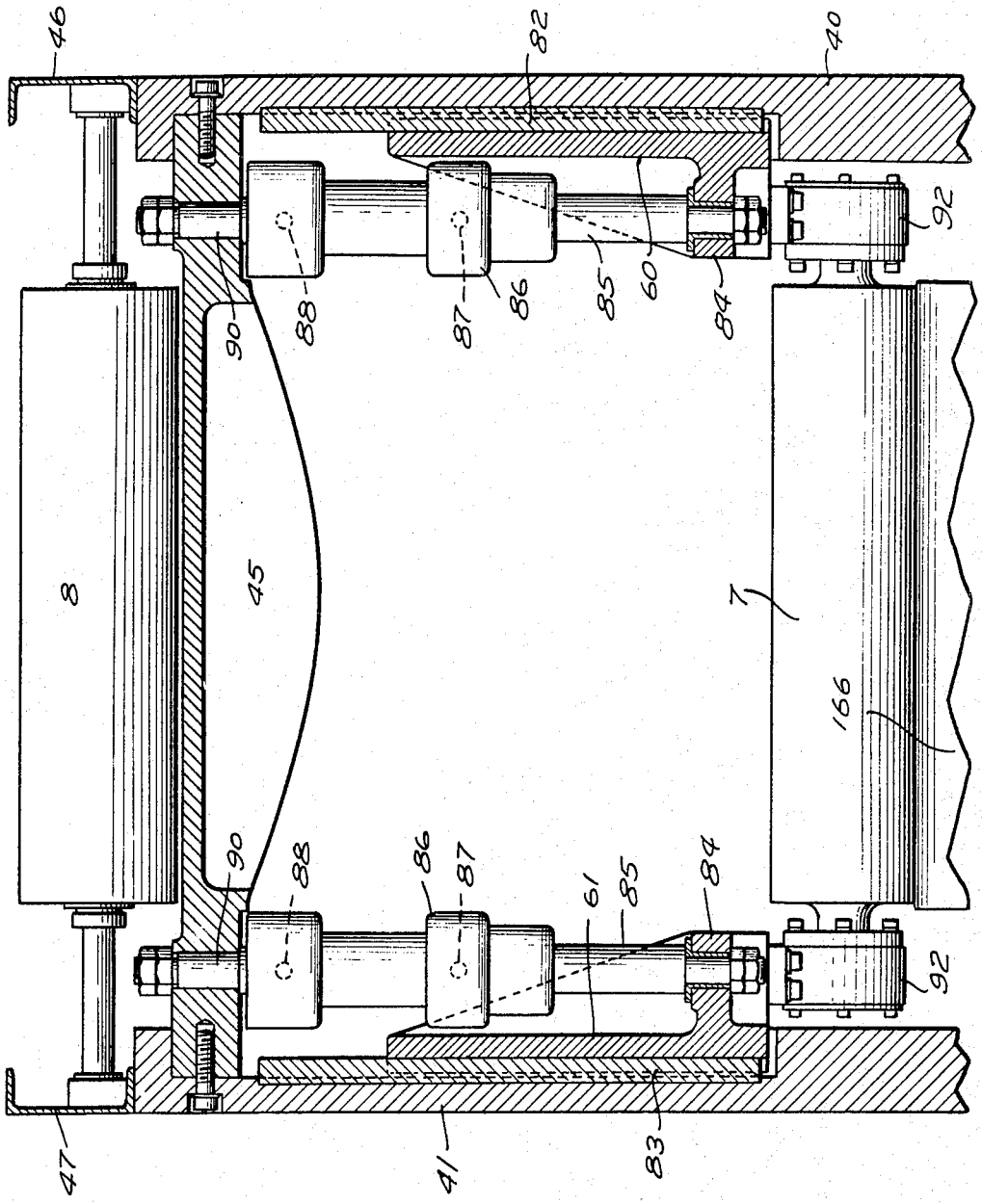



Fig. 12.

INVENTOR.
Arthur P. Bamford
BY Victor W. Borel
Atty.

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 12

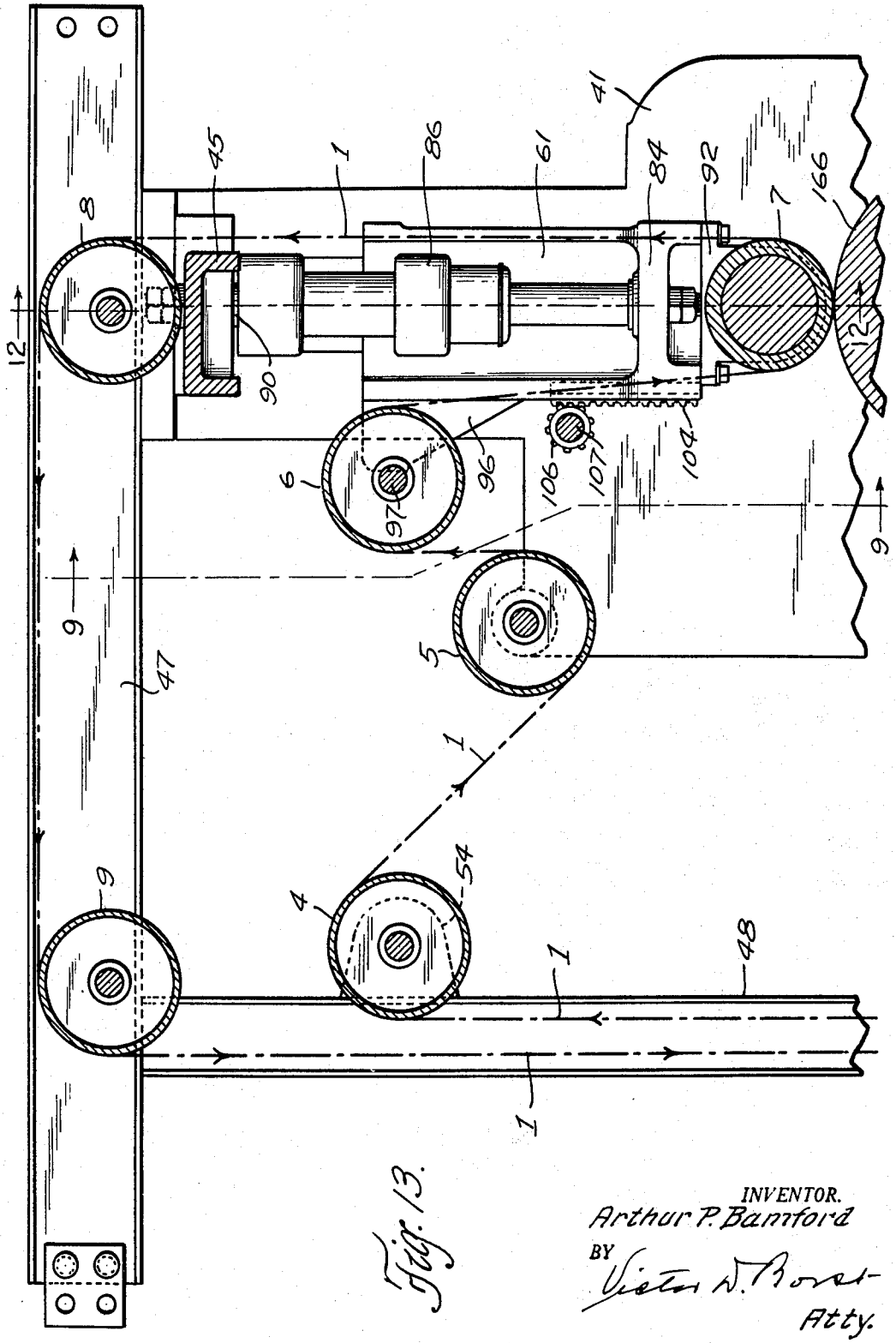



Fig. 13.

INVENTOR.
Arthur P. Bamford
BY
Victor J. Bouet
Atty.

May 22, 1956 A. P. BAMFORD 2,746,386

PRINTING CYLINDER ELEVATING MEANS

Original Filed June 23, 1949 13 Sheets-Sheet 13

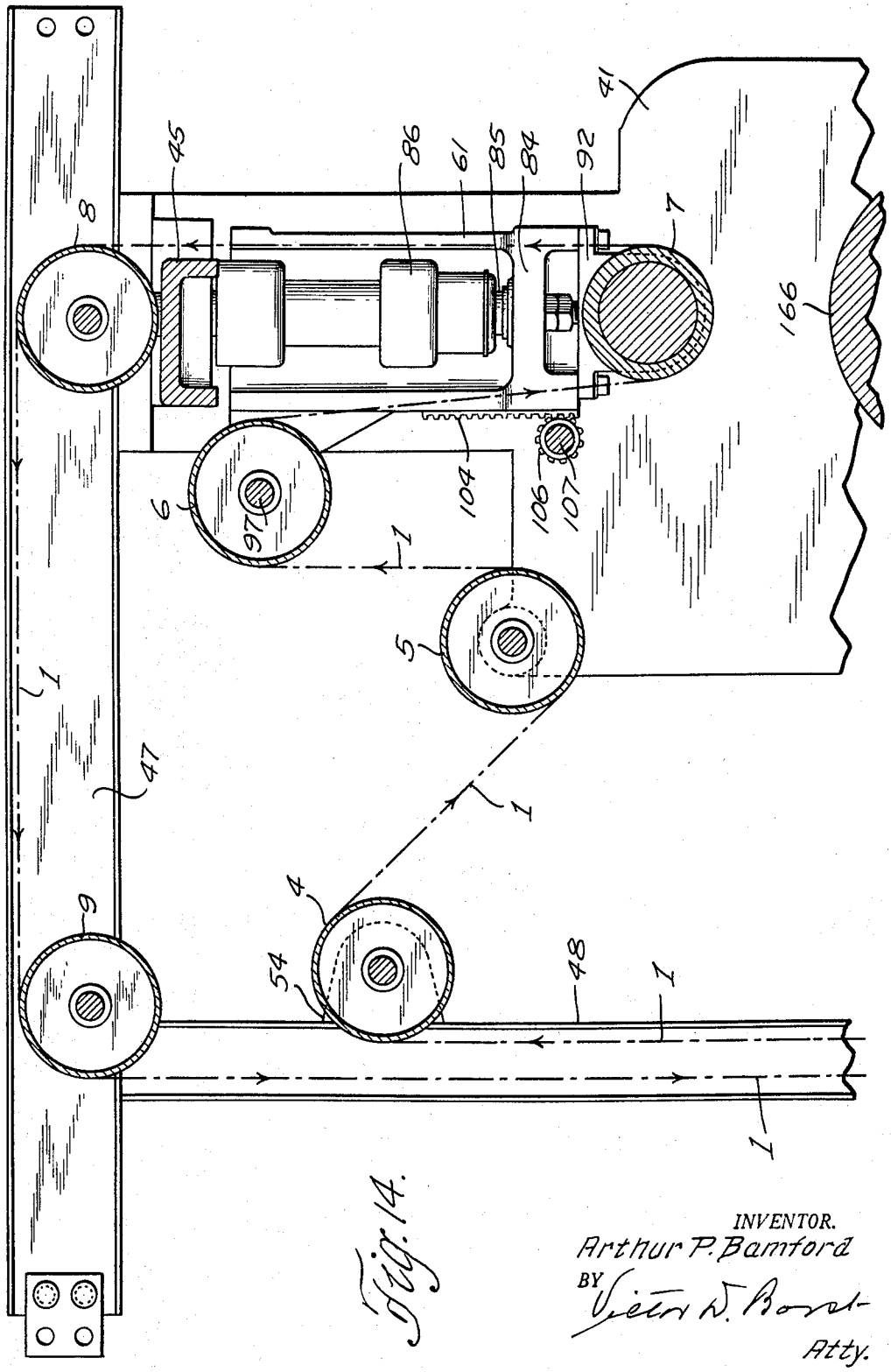



Fig. 14.

INVENTOR.
Arthur P. Bamford
BY Victor W. Bond
Atty.

United States Patent Office 2,746,386 Patented May 22, 1956



2,746,386

# PRINTING CYLINDER ELEVATING MEANS

Arthur P. Bamford, East Orange, N. J., assignor, by mesne assignments, to E. G. Staude Manufacturing Company, Inc., Concord, N. H., a corporation of New Hampshire

Original application June 23, 1949, Serial No. 100,890, now Patent No. 2,637,270, dated May 5, 1953. Divided and this application July 5, 1951, Serial No. 235,302

6 Claims. (Cl. 101—153)

This invention relates generally to intaglio printing presses and this application is a division of my copending application Serial No. 100,890, filed June 23, 1949, now Patent No. 2,637,270 issued on May 5, 1953. More specifically the invention relates to an improved mounting and adjusting mechanism for the pressure roll of an intaglio printing press.

As disclosed herein the invention is shown as applied to a multicolor intaglio printing press consisting of two identical units each of which is adapted to print a different color onto a web being fed through the press. Each unit comprises a printing cylinder, an inking mechanism by which ink is sprayed onto the printing cylinder, a doctor blade mechanism by which the ink is spread over the printing cylinder, a pressure roll by which the web is held against the printing cylinder during operation and a drying and exhaust mechanism for drying the ink on the web after printing.

The printing cylinder is mounted on a carriage which is supported by wheels riding on a track which facilitate the removal thereof from the machine. The carriage includes bearing blocks which are insertable in the frame of the machine and support the weight of the printing cylinder when the carriage is in printing position. A hand ratchet mechanism is provided which may be used to ratchet the carriage into or withdraw the carriage from its printing position. When the carriage is withdrawn sufficiently to remove the bearing blocks from the frame it rests on its rollers and may readily be moved out of the press.

The carriage also carries ink applicator tubes which are disposed on opposite sides of the printing cylinder and are independently adjustable to accommodate cylinders of different diameters. An ink reservoir is mounted on separate casters and is positionable to supply ink to the applicator tubes through the coupling members which are automatically separated when the reservoir is removed. The reservoir carries an ink feed pump and adjusting valves for controlling the supply of ink to the respective tubes.

The carriage also carries an end register control mechanism which provides for accurate adjustment of the axial position of the printing cylinder and is controlled by a manually operable hand wheel which is accessible from the front of the machine. The printing cylinder is driven from a main drive shaft which runs along the back of the machine and drives all of the units. The connection to the main drive shaft is made through suitable running register control mechanism in the form of planetary gearing which provides an accurate control of the running register of the cylinder.

The doctor blade is slidably supported on and extends between the front and rear frames of the machine and is provided with manual means for vertically adjusting the same, with automatic reciprocating means driven by the main drive shaft for reciprocating the doctor blade, with a tilting control for varying the angular position of the doctor blade on the carriage, with adjusting means for shifting the doctor blade to or from the printing cylinder so as to position the same accurately in contact with the surface of said cylinder, and with means for adjusting the position of the blade in the holder. Means is also provided for allowing the blade to be retracted from the cylinder and to be again brought into operative position without disturbing the previous adjustments.



The drying mechanism includes a drying chamber through which the printed web passes and which is mounted on the top of the press frame with downwardly extending portions at the two sides of the frame forming a hood. The drying chamber includes suitable heating elements and a blower for blowing air against the printed web. A suction fan is also provided for removing the vapor laden air from the web and discharging the same in a suitable location.

The printing cylinder except the small printing area thereof in vertical alinement with the axis of the pressure roll, the inking mechanism and the doctor blade mechanism are all enclosed during operation by a suitable housing which is so constructed and arranged that it can be quickly and easily opened up to provide access to the mechanism enclosed thereby. When closed the housing provides a substantially air tight chamber for confining the inflammable vapors created by the highly volatile inks used in high speed intaglio printing.

The pressure roll is provided to hold the web against the printing cylinder during printing. Frequently during operation it is necessary for various reasons to move the web away from the printing cylinder, as for instance, when adjusting the axial position of the cylinder. The web should be moved into and out of engagement with the printing cylinder without altering the tension thereof and without changing the feed thereof into and out of a unit.

The mounting and adjusting mechanism for the pressure roll which constitutes the subject matter of this application is so constructed and arranged that the pressure roll can be advanced or retracted to move the web into or out of engagement with the printing cylinder as desired without altering the web tension and without changing the feed thereof into or out of a unit. This mechanism comprises two spaced similar slides which are slidably mounted in the press frame. The pressure rollshaft is mounted in bearings secured to the lower ends of the slides. The slides are raised and lowered hydraulically by suitable cylinders and pistons. Interconnecting means between the slides is provided to cause the slides to move up and down in unison without binding. This means is so constructed and arranged that the slides may shift slightly with respect to each other at the lower limit of their movement in order to allow the pressure roll to adjust itself evenly to the printing cylinder throughout the length thereof. Means is also provided to lock the slides in raised position so that they cannot drift downwardly should the hydraulic pressure fail.

The principal object of the invention is to provide an intaglio press in which the web to be printed is held against the printing cylinder by a pressure roll and in which means is provided for advancing or retracting the pressure roll to or from printing position while maintaining a constant web tension.

Another object is to provide a multiunit intaglio press of the above type in which the pressure roll in each of the units may be controlled independently without altering the web feed in the remaining units.

Another object is to provide an intaglio press having novel and improved means for controlling the position of the pressure roll.

Other and more limited objects of the invention will

be apparent from the following specification and the accompanying drawings forming a part thereof wherein:

Fig. 1 is a front elevation of a multicolor intaglio press embodying the present invention, showing two of the color units and the drive mechanism;

Fig. 2 is a top plan view of the units shown in Fig. 1 with the heating and drying mechanism of one of the units broken away;

Fig. 3 is an enlarged side elevation of a unit taken from the right side of Fig. 1;

Fig. 4 is a side elevation, similar to Fig. 3, partially in section and showing the printing cylinder carriage partially removed from the press onto the dolly by which it is transported to and from the press;

Figs. 5A, 5B and 5C, when joined along the lines *a—a* and *b—b*, respectively, constitute a central vertical section through the machine taken on the line 5—5 of Fig 3 but on a larger scale;

Fig. 6 is a detail section taken on the line 6—6 of Fig. 5B;

Fig. 7 is a detail view partly in section showing the latching mechanism for the slidable side closures by which the inking mechanism is enclosed when in operation;

Fig. 8 is a horizontal section taken on the line 8—8 of Fig. 7;

Fig. 9 is a vertical section showing the web tensioning mechanism, taken along the line 9—9 of Figs. 11 and 13;

Fig. 10 is a horizontal section taken on the line 10—10 of Fig. 9;

Fig. 11 is a horizontal section taken on the line 11—11 of Fig. 9;

Fig. 12 is a central vertical section taken on the line 12—12 of Figs. 10 and 13;

Fig. 13 is a transverse section taken on the line 13—13 of Fig. 9, showing the parts in printing position with the pressure roll holding the web against the printing cylinder;

Fig. 14 is a central transverse section similar to Fig. 13 but showing the pressure roll raised from the printing roll;

Fig. 15 is a detail view of the latching mechanism for latching the pressure roll in the position shown in Fig. 14;

Fig. 16 is a vertical section taken on the line 16—16 of Figs. 15, and

Fig. 17 is a detail section view taken on the line 17—17 of Fig. 10 but on an enlarged scale.

Referring to Figs. 1 and 2, the invention is shown as applied to an intaglio printing press composed of two units A and B each of which is adapted to print one color onto a web. Each unit includes a printing cylinder together with inking and control mechanism, a doctor blade mechanism, a web-guiding mechanism, a pressure roll and a drying chamber. A single driving means is provided for all of the units which includes power means and drive shafts which extend in back of all of the units.

Referring to the figures more in detail, a web 1 is shown as fed to the unit B over guide rollers, 2, 3, 4, 5 and 6 to a pressure roll 7, thence through a drying chamber and over guide rollers 8 and 9 and around the guide roll 2 of the unit A, thence over the correspondingly numbered rolls of the unit A from which it is discharged over a guide roll 10 similar to the roll 2, thence over a roll 11 in a pulling mechanism 12, whence it is discharged to suitable cutting or stacking mechanism or to a reeling mechanism as desired.

Each drying chamber 15 which is disposed over the top of the printing unit comprises a heating source 16 which may comprise a steam heating unit and blower mechanism comprising a fan 17 driven by a motor 18 and discharging air through a port 19 into a zone 20 in which the air is applied to the top of the web passing through the chamber 15. The zone 20 also communicates with chambers 21 and 22 which are disposed on the sides of the machine to apply air from the blower 17 to the webs as they advance toward and recede from the drying chamber 15. The air from the web 1, containing the vapors which are picked up thereby, is removed from the chambers 21 and 22 and from the zone 20 by means of a suction fan 23 communicating with a duct 24 which extends through and communicates with each of the drying chambers 15. The vapor-laden air from the exhaust fan 23 may be discharged to the outside or to a ventilator as desired. The exhaust fan 23 is driven by means of a motor 25 through a driving belt 26 which in turn drives a shaft 27 on which the exhaust fan is mounted.

The various units are driven by means shown as a main drive motor 28 driving a reduction gear train in a housing 29 through a multiple V-belt 30. The reduction gear in the housing 29 drives the main drive shaft 31 and a secondary drive shaft 32. The main drive shaft 31 extends along the rear of the various units and serves to drive the various printing rolls through means to be described. The secondary drive shaft 32 drives a reduction gearing mounted in a housing 33 which in turn drives a secondary drive shaft 34 which extends along the rear of the units and drives the paper feed mechanism (not shown). The gear reduction mechanism in the housing 29 includes a clutch of any standard type while is actuated by a clutch lever 36 supported in suitable brackets on a pedestal 37. The lever 36 is adapted to control the operation of the main drive shaft 31 and the secondary drive shaft 34 and is mounted in a position readily accessible to the operator.

Each unit comprises a front frame 40 and a rear frame 41 on which the various elements, including the printing cylinder, are mounted. The frames 40 and 41 are secured on longitudinal channel members 43 and 44, respectively, and are tied together at their tops by a cross beam 45. A top frame comprising front and rear members 46 and 47 which are secured at one end to the top of the front and rear frames 40 and 41 and are supported at their other ends by uprights 48 which are also secured to the longitudinal channel members 43 and 44, is provided. The channel members 43 and 44 are tied together by spaced cross members 49 to provide a rigid unit.

A platform 50 secured between the front and rear frames 40 and 41 supports the printing cylinder carriage 55, to be described. The hydraulic control mechanism for the press is mounted in a casing 51 attached to the front frame piece 40.

The roll 2 is mounted on suitable brackets 52 carried by the channel members 43 and 44. The rolls 3 and 4 are supported by the brackets 53 and 54 on the uprights 48. The rolls 8 and 9 are rotatably supported between the longitudinal members 46 and 47. The roll 5 is supported, in suitable bearings, between the frames 40 and 41. The guide roll 6 and pressure roll 7 are mounted on suitable slides 60 and 61 which are supported on the front and back frames 40 and 41, respectively, for vertical sliding movement, so that the rolls 6 and 7 are raised or lowered in unison to bring the pressure roll 7 into printing position or to retract the same from the printing cylinder. An ink reservoir generally indicated by the numeral 63 is detachably connected to the front frame 40. The reservoir 63 carries a suitable pump mechanism which is driven by a motor 64. The reservoir also carries a valve housing and connecting means, generally indicated at 65, by which ink is supplied to and removed from the inking mechanism.

The running register 66 through which the printing cylinder is driven from the main drive shaft 31, is mounted in a suitable casing which is attached to the rear frame 41. The secondary drive shaft 34 extends through this casing but is not connected to any of the mechanism therein. Flexible cover plates 68 and 69, shown in Figs. 5B and 5C, respectively, are slidably mounted between the front and rear frames 40 and 41 and are adapted to form side closures for the printing cylinder, inking mechanism and doctor blade mechanism. These flexible plates are

mounted for sliding movement to afford access to the printing cylinder and associated mechanisms.

Referring to Figs. 5B and 5C, each of the flexible plates **68** and **69** is provided with a plurality of angle irons **70** which extend thereacross at spaced points. Rollers **71** are carried at each end of each of the angle irons **70**. The rollers **71** which are carried with the plate **68** ride on tracks **72** which are attached to the front and back frames **40** and **41**. The rollers **71** associated with the plate **69** ride on tracks **73** which are also carried by the front and back frames **40** and **41**. The lower ends of the track **73** are turned inwardly under the inturned lower ends of the track **72** to provide sufficient space to receive the cover plates when they are in fully opened position.

One of the angle irons **70** of each of the cover plates **68** and **69** carries at each end thereof a clamping means comprising an arm **74** pivoted to the angle iron **70** at **75** and having a bifurcated end **76** which spans the track **72** or **73**. Adjacent the bifurcated end **76** a hardened insert **77** is provided having a sharp edge **78** and secured by a set screw **79**. The insert **77** is located in a position to grip the track **72** or **73** and is normally held in gripping position by means of a spring **80**. The levers **74** are so positioned that they allow the cover plates **68** and **69** to be raised into closed position but automatically grip the tracks **72** and **73** to prevent the cover plates from sliding to open position. However, the cover plate is freely slidable to open position when the two levers are grasped and the free ends thereof rocked toward the supporting angle iron for retracting the sharp edges **78** of the inserts **77** from the track **72** or **73**. The plates **68** and **69** have sufficient flexibility to follow the curvature of the track as the plates are raised or lowered.

The printing cylinder is mounted in a carriage **55** which comprises a front plate **125** and a back plate **126** joined by side plates **127**. Spacer bars **128** are attached on the inside of the side plates **127** with their lower ends extending slightly below the bottoms of the side plates. The spacer bars **128** carry lower side plates **129** which extend nearly to the bottom of the end plates and are joined by a bottom plate **130**. A plurality of wheels **131** are attached to the lower side plates **129** by means of studs **132**. In the form shown three wheels **131** are spaced along each side of the carriage.

The back plate **126** is bolted to the lower half **133** of a split bearing block **134**. The outer peripheral surface of the bearing block **134** is cylindrical and seats in a cylindrical surface **139** in the rear frame **41**. The bearing block **134** is slidable axially with the carriage **55** into the rear frame **41**.

The other end plate **125** of the carriage is bolted to the lower half **156** of a rectangular bearing block **157**. The bearing block **157** is slidably mounted in a rectangular opening **160** in the front frame **40** and is provided with flanges **162** and **161**, by which it is positioned in the frame. The front plate **125** is provided with a rectangular ink return opening registering with an opening in the bearing block **157**. The sides and bottom of the bearing block **157** may be tapered slightly to facilitate its insertion in the rectangular opening **160** in the front frame **40**.

The bearing blocks **134** and **157** carry antifriction bearings in which the printing cylinder shaft **165**, on which the printing cylinder **166** is removably secured, is mounted. The shaft **165** is driven from the main drive shaft **31** through the running register mechanism **66**. An end register mechanism **167** secured to the bearing block **157** is provided to adjust accurately the position of the printing cylinder **166** between the bearing blocks **134** and **157**.

The carriage **55** also carries an ink sump which consists of a bottom pan **168** and the vertically adjustable side plates **169**. The side plates **169** carry ink applicator tubes **170** which extend parallel to and the full length of the printing cylinder **166**. Ink is pumped from the reservoir **63** through the connector **65** and into the applicator tubes **170** which spray the ink over the surface of the printing cylinder **166** as it rotates. The excess ink falls into the sump pan **168** and drains back into the reservoir **63** through the ink return openings in the plate **126** and bearing block **157** and the connector **65**.

In order to close the space between the ends of the printing cylinder and the front and back frames **40** and **41**, arcuate shields **175** and **176** are provided which are bolted, respectively, to bearing blocks **157** and **134**. The shields **175** and **176** are provided with arcuate lower surfaces which are accurately machined and overlie the ends of the printing cylinder **166** and engage the peripheral surface thereof with a running fit. Of course the shields **175** and **176** are changed when different sized cylinders are used. The shields **175** and **176** cooperate with the sliding cover plates **68** and **69** to enclose the printing cylinder inking mechanism completely except for the limited area of the printing cylinder which is required to be exposed for contact with the web passing around the pressure roll **7**. The upper edges of the cover plates **68** and **69** are shaped to engage the shields **175** and **176** which form a limiting stop and are spaced a minute distance from the peripheral surface of the printing roll.

Whenever it is desired to change a printing cylinder the in-reservoir **63** is first removed and then the carriage **55** and everything carried thereby is rolled out on to a dolly **185**, as shown in Fig. 4, on which the carriage can be transported to any desired place.

A doctor blade mechanism, generally indicated by the numeral **177**, is mounted between the side frames **40** and **41** along one side of the cylinder carriage **55** within the confines of the cover plate **69**. The mechanism generally comprises a vertically adjustable slide **178** on which is mounted a reciprocal platform **179**. The platform **179** carries a tiltable frame **180** on which is adjustably mounted a doctor blade holder **181** carrying a doctor blade **182**. The platform **179** is reciprocated by the main drive shaft **31** through suitable driving connections **183**.

The pressure roll slides **60** and **61** are mounted for vertical sliding movement on gibs **82** and **83**, respectively, which are bolted or otherwise secured to the front and rear frames **40** and **41**, respectively.

The slides **60** and **61** are provided with transverse webs **84** which are secured to piston rods **85** projecting from cylinders **86**, the details of which may be of standard construction and are preferably arranged for the raising or lowering of the piston rods by the application of fluid pressure above or below the piston inlet and outlet ports **87** and **88**, respectively. The cylinders **86** are attached by bolts **90** to the cross piece **45** of the frame.

At its lower end each of the slides **60** and **61** carries a bearing **92** which rotatably support the pressure roll **7**. The slides **60** and **61** also carry brackets **95** and **96**, respectively, for supporting a shaft **97** on which the roll **6** is rotatably mounted. One end of the shaft **97** is pivotally supported on the bracket **96** by means of a pin **98**. The other end of the shaft **97** is adjustably supported by the bracket **95** by means of a threaded shaft **98***a* journalled in a bracket **99** attached to the bracket **95** and extending through a threaded hole **100** near one end of the shaft **97**. A handle **101** is provided for rotating the shaft **98***a* and a set screw **102** is provided for securing the threaded shaft **98***a* in adjusted position. The arrangement is such that actuation of the handle **101** varies the angularity of the shaft **97** and of the roll **6** for controlling the feed of the web.

In order to cause the slides **60** and **61** to operate in unison and thereby prevent any binding, the slides **60** and **61** are provided with racks **103** and **104**, respectively, at their lower ends meshing with gears **105** and **106** which are carried on opposite ends of a shaft **107** journalled in the front and rear frames **40** and **41**, respectively. The shaft **107** and the meshing gear teeth cause

the slides 60 and 61 to operate in unison. However, in order to provide a certain clearance to permit the pressure roll 7 to adjust itself to the position of the printing cylinder when the pressure roll is in its lower position, the teeth at the upper portions of the respective racks 103 and 104 are made with more than normal clearance.

In order to provide a mechanical latch to prevent the slides 60 and 61 from drifting downwardly due to loss of hydraulic pressure when in raised position, a ratchet 110 is secured to the shaft 107 adjacent the gear 105 and is engaged by a pawl 111 carried by an arm 112 pivoted to the frame 40 of the machine at 113 and normally held in engagement with the ratchet by a spring 114. The arm 112 may be raised by a pin 115 which is pivoted to the end of the arm 112 at 116 and rests in a cup 117 formed in a piston 118 which is slidably mounted in a cylinder 119. Hydraulic pressure is supplied to the lower end of the piston 118 by means of a duct 120 which is also connected to the line leading to the port 88 so that pressure is applied beneath the piston 118 whenever pressure is applied above the pistons in the cylinders 86 for lowering the slides 60 and 61. In the absence of pressure in the lines leading to the ports 88 and in the line 120, the spring 114 causes the pawl 111 to engage the ratchet 110 and thereby prevent rotation of the shaft 107 in the direction to lower the slides 60 and 61. Whenever pressure is applied to the cylinders 86 for lowering the slides, however, pressure is also applied to the cylinder 119 for releasing the pawl for 111. A vent 121 may be provided in the wall of the cylinder 119 to drain any fluid which may leak past the piston 118 from the pressure chamber therebelow.

As the pressure roll 7 is raised and lowered between the positions shown in Figs. 13 and 14 the length of the web 1 between the feed rolls 5 and 8 always remains the same. Consequently the web tension always remains constant for any and all positions of the pressure roll between the upper and lower limits of its movement. Also the feeding of the web into and out of a unit is not affected by the movement of the pressure roll toward and away from the printing cylinder. All of this is due to the particular arrangement of the guide and feed rolls 5, 6 and 8 and the pressure roll 7 with the respect to each other. By reference to Figs. 13 and 14 it will be seen that the plane of the web 1 between the pressure roll 7 and the feed roll 8 is parallel to the plane of the web between the feed roll 5 and the guide roll 6, and that both of these planes are parallel to the axial plane of movement of the pressure roll 7 toward and away from the printing cylinder. Thus as the pressure roll 7 is raised from the position shown in Fig. 13 to the position shown in Fig. 14, the length of the web between the pressure roll 7 and the feed roll 8 is shortened to the length of the web between the feed roll 5 and guide roll 6 a like amount; and the web behind the feed roll 5 and beyond the feed roll 8 is not affected. And when the pressure roll 7 is lowered from the position shown in Fig. 14 to the position shown in Fig. 13, the web between the pressure roll 7 and the feed roll 8 is lengthened and is shortened a like amount between the rolls 5 and 6 without affecting the web behind and beyond the feed rolls 5 and 8, respectively.

From the foregoing it will be apparent to those skilled in this art that I have provided a very simple mechanism for accomplishing the objects of the invention.

It is to be understood that I am not limited to the specific construction shown and described herein as various modifications may be made therein within the scope of the appended claims.

I claim:

1. In a printing press comprising a printing cylinder, a pressure roll holding a web in printing contact therewith and a pair of frames disposed in spaced apart parallel relation at opposite ends of said rolls the improvement which consists in providing a mechanism for adjustably mounting the pressure roll comprising brackets slidable vertically in said frames, means in said brackets for journalling the shaft carrying said pressure roll extending between said brackets, fluid pressure means mounted on each frame and connected to raise or lower the respective brackets in response to fluid pressure, a rack on each bracket, pinions mounted on said frames to engage each rack, and a shaft carrying both pinions for operation in unison so as to equalize the movement of said brackets, a ratchet keyed to the shaft carrying the pinions, an arm pivoted to one of said frames carrying a pawl adapted to engage said ratchet to latch said brackets in elevated position, a cylinder, a piston slidably mounted in said cylinder, pin means connecting said piston and the end of said pivoted arm, and connections to supply fluid pressure to said cylinder in unison with the supply of fluid pressure in a direction to lower said brackets.

2. In a printing press comprising a printing cylinder, a pressure roll holding a web in printing contact therewith and a pair of frames disposed in spaced apart parallel relation at opposite ends of said rolls the improvement which consists in providing a mechanism for adjustably mounting the pressure roll comprising brackets slidable vertically in said frames, means in said brackets for journalling the shaft carrying said pressure roll extending between said brackets, fluid pressure means mounted on each frame and connected to raise or lower the respective brackets in response to fluid pressure, a latch positioned to latch said brackets in elevated position, fluid pressure means to release said latch, connections to supply fluid pressure to said last means in unison with the supply of fluid pressure in a direction to lower said brackets, a rack on each bracket, pinions mounted on said frames to engage each rack, a shaft carrying both pinions for operation in unison so as to equalize the movement of said brackets, said racks, in the positions corresponding to printing position of said pressure roll, having teeth with increased clearance with said pinions for permitting limited independent movement of the ends of said roll for seating on said cylinder.

3. A mechanism for adjustably mounting the pressure roll of a printing press holding a web in printing contact with a printing cylinder of said press, said mechanism comprising a pair of brackets slidable vertically respectively in a pair of frames disposed in parallel relation at opposite ends of said rolls, means in said brackets for journalling the shaft carrying said pressure roll extending between said brackets, fluid pressure means mounted on each frame and connected to raise or lower the respective brackets in response to fluid pressure, a rack on each bracket, pinions mounted on said frames to engage each rack, and a shaft carrying both pinions for operation in unison so as to equalize the movement of said brackets, a ratchet keyed to the shaft carrying the pinions, an arm pivoted to one of said frames carrying a pawl adapted to engage said ratchet to latch said brackets in elevated position, a cylinder, a piston slidably mounted in said cylinder, pin means connecting said piston and the end of said pivoted arm, and connections to supply fluid pressure to said cylinder in unison with the supply of fluid pressure in a direction to lower said brackets.

4. A mechanism for adjustably mounting the pressure roll of a printing press holding a web in printing contact with a printing cylinder of said press, said mechanism comprising a pair of brackets slidable vertically respectively in a pair of frames disposed in parallel relation at opposite ends of said rolls, means in said brackets for journalling the shaft carrying said pressure roll extending between said brackets, fluid pressure means mounted on each frame and connected to raise or lower the respective brackets in response to fluid pressure, a latch positioned to latch said brackets in elevated position, fluid pressure means to release said latch, connections to supply fluid pressure to said last means in unison with the

supply of fluid pressure in a direction to lower said brackets, a rack on each bracket, pinions mounted on said frames to engage each rack, a shaft carrying both pinions for operation in unison so as to equalize the movement of said brackets, said racks, in the positions corresponding to printing position of said pressure roll, having teeth with increased clearance with said pinions for permitting limited independent movement of the ends of said roll for seating on said cylinder.

5. A printing press according to claim 1 further characterized in that the racks, in the positions corresponding to the printing position of said pressure roll, have teeth with increased clearance with said pinions for permitting limited independent movement of the ends of said roll for seating on the printing cylinder.

6. A mechanism according to claim 3 further characterized in that the racks, in the positions corresponding



to the printing position of said pressure roll, have teeth with increased clearance with said pinions for permitting limited independent movement of the ends of said roll for seating on the printing cylinder.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,344,037 | Haymann | June 22, 1920 |
| 1,743,257 | Wilhelm | Jan. 14, 1930 |
| 2,076,241 | Luehrs | Aug. 6, 1937 |
| 2,097,067 | Huck | Oct. 26, 1937 |
| 2,188,148 | Harless | Jan. 23, 1940 |
| 2,213,130 | Presby | Aug. 27, 1940 |
| 2,424,741 | Chambers | July 29, 1947 |
| 2,502,895 | Shaffer | Apr. 4, 1950 |
| 2,569,034 | Auer | Sept. 25, 1951 |