June 20, 1961 E. A. CRAWFORD 2,988,989

INTAGLIO DRY OFFSET PRINTING PRESS

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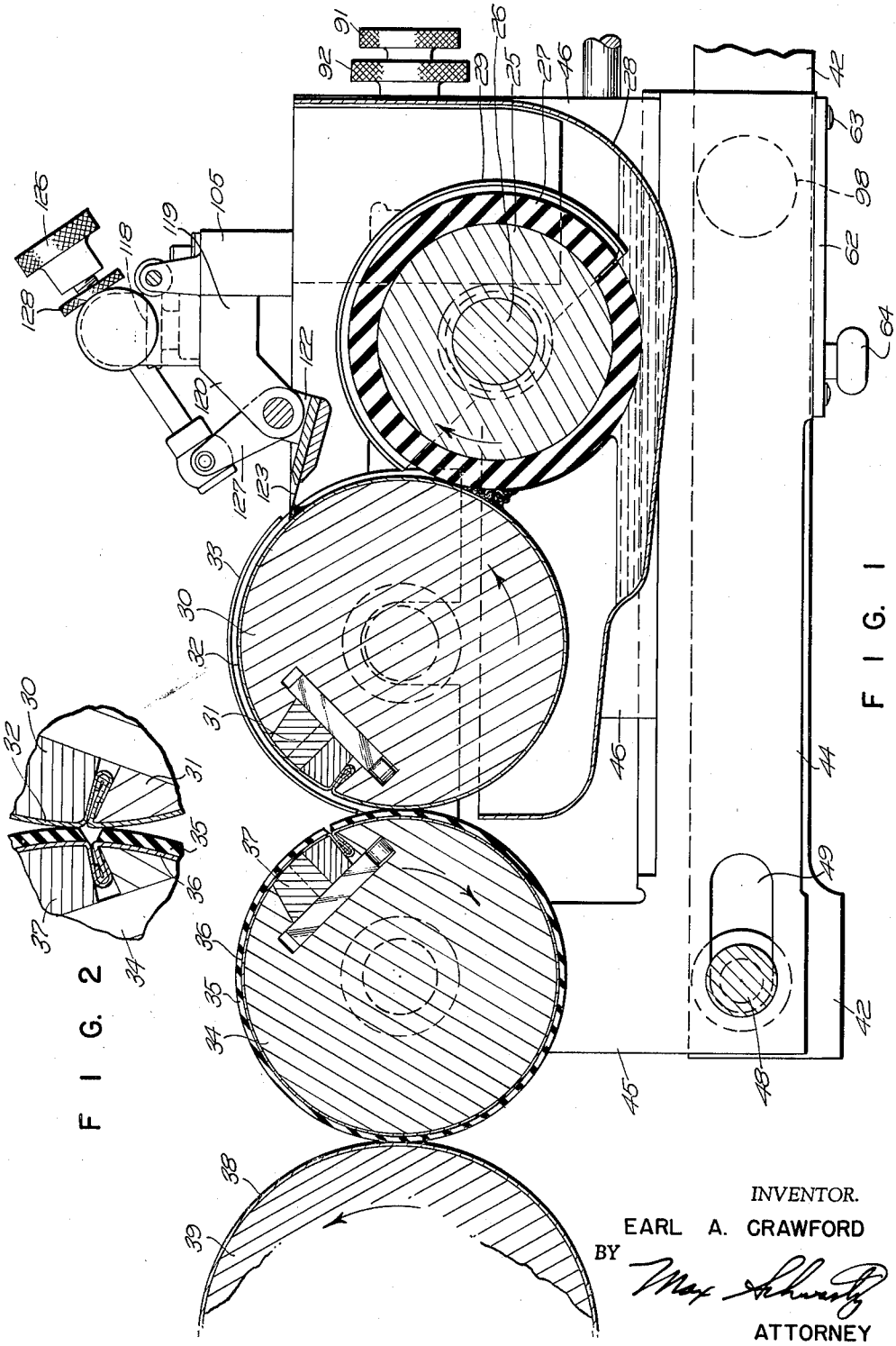


FIG. 1

FIG. 2

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INTAGLIO DRY OFFSET PRINTING PRESS

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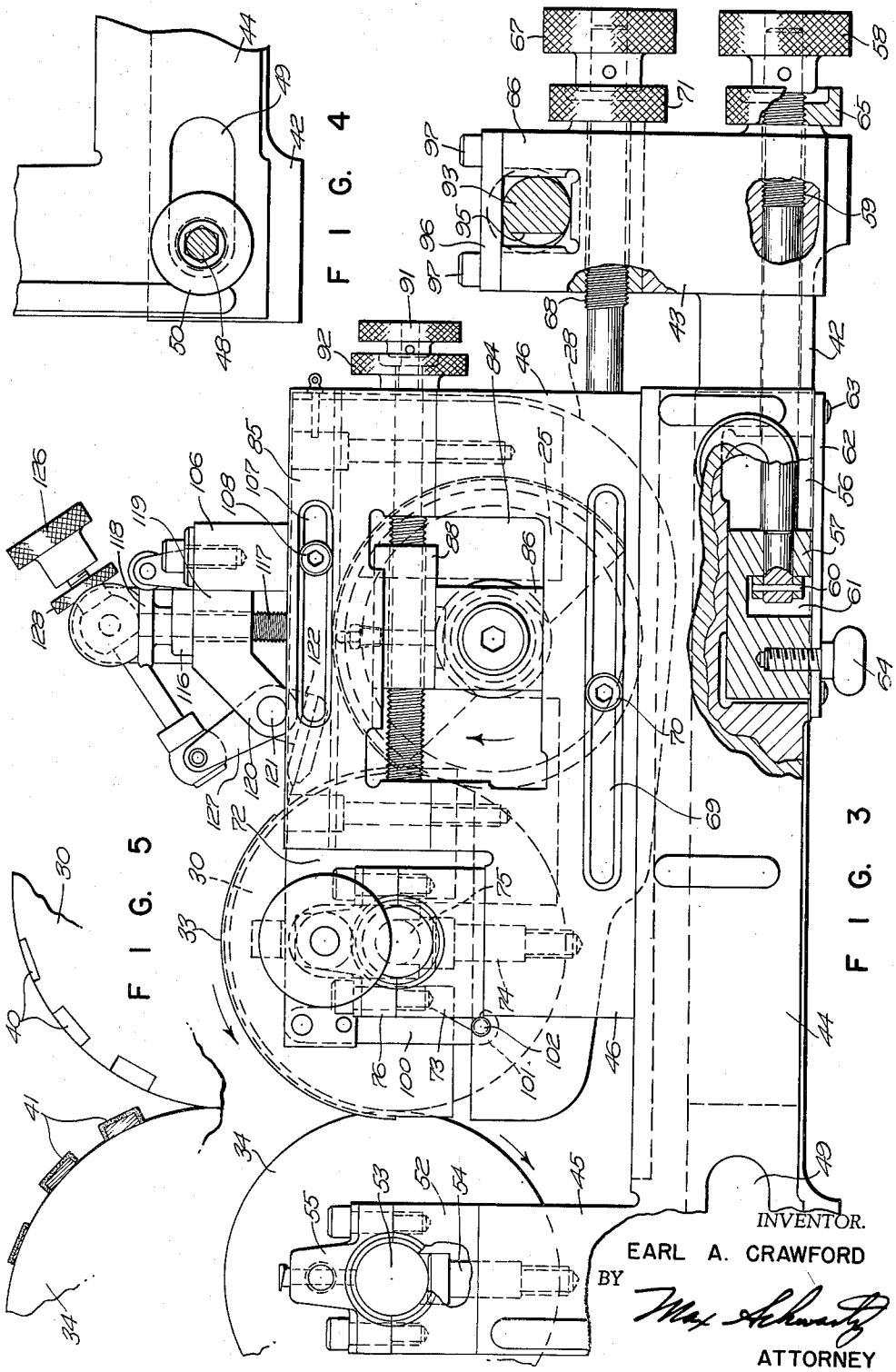


FIG. 4

FIG. 5

FIG. 3

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Filed Aug. 4, 1958 10 Sheets-Sheet 3

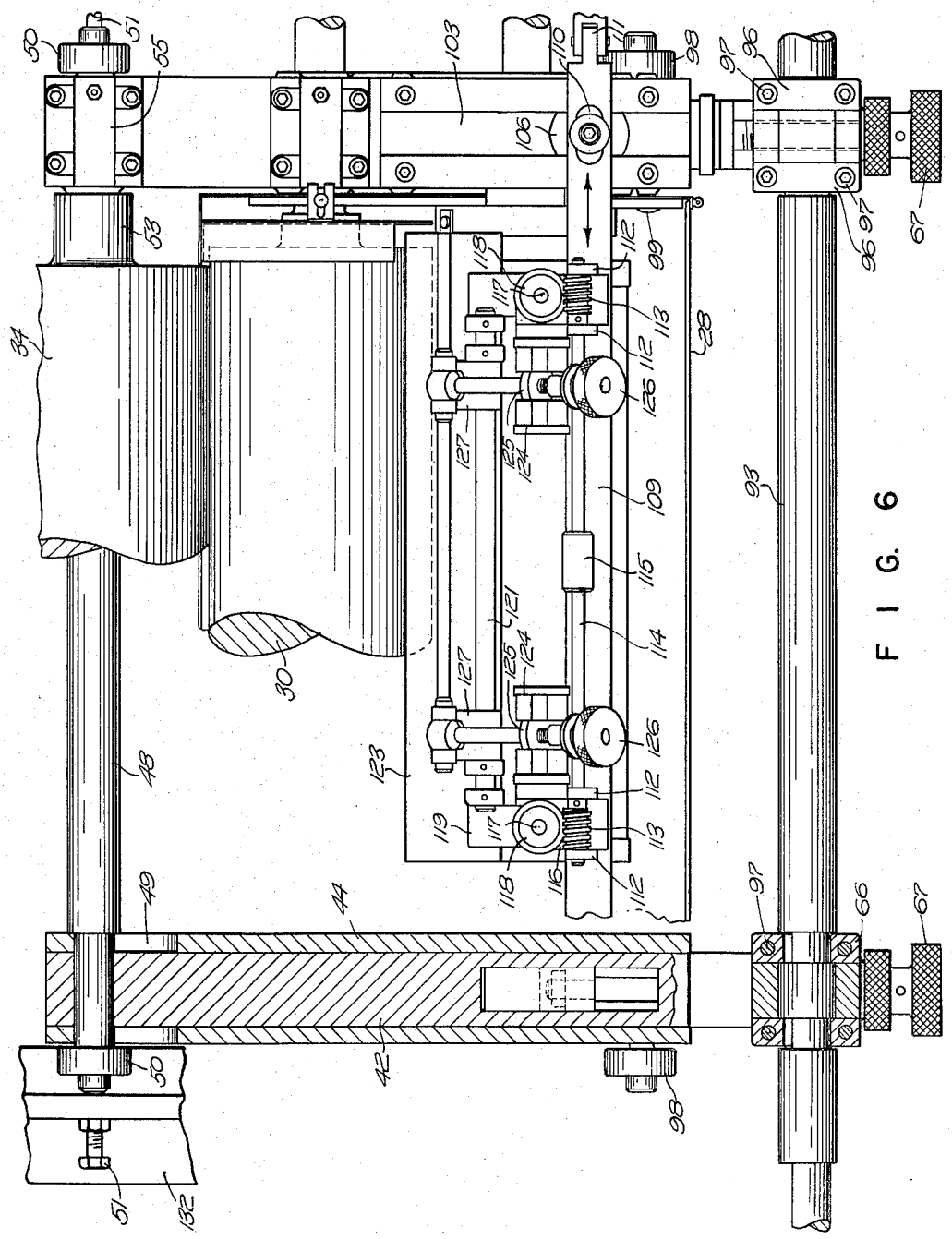


FIG. 6

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June 20, 1961 E. A. CRAWFORD 2,988,989

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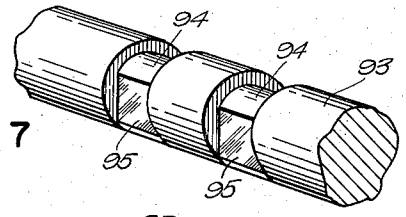


FIG. 7

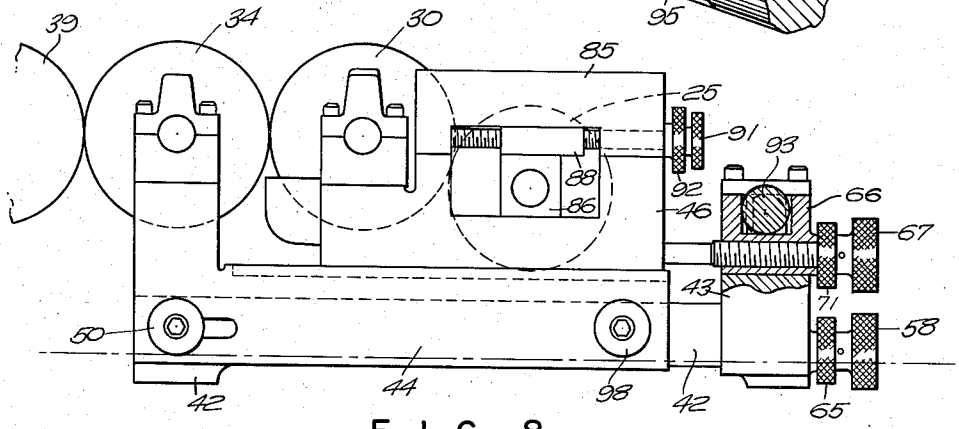


FIG. 8

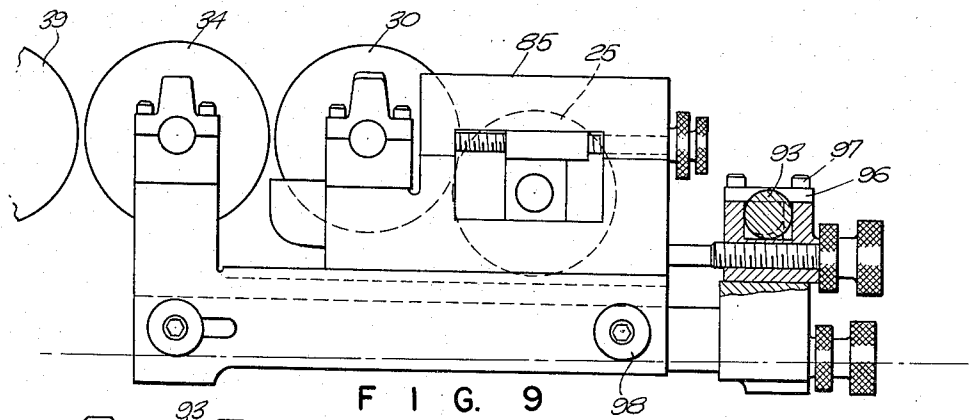


FIG. 9

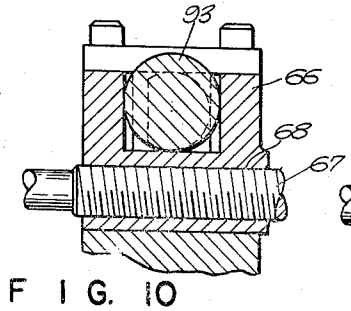


FIG. 10

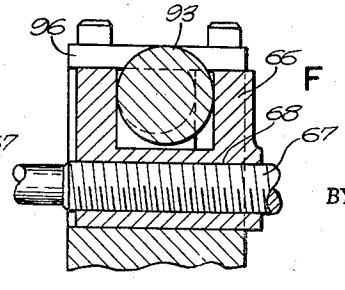


FIG. 11

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INTAGLIO DRY OFFSET PRINTING PRESS

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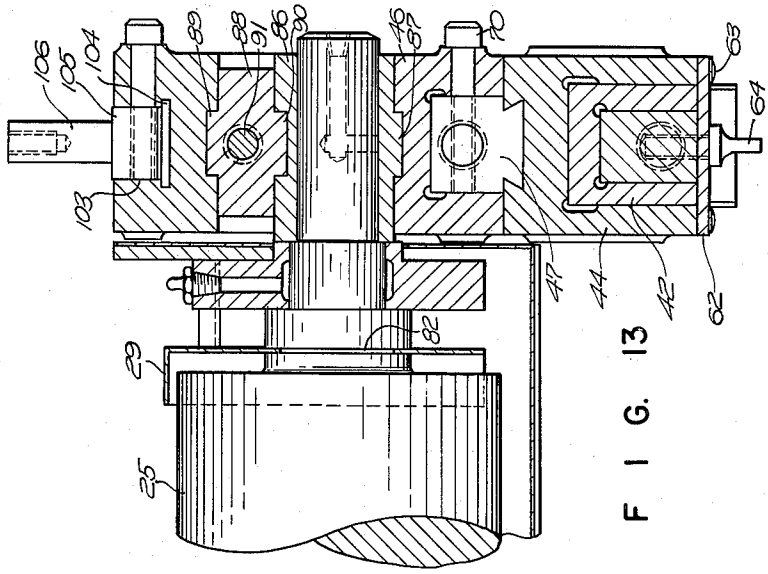


FIG. 13

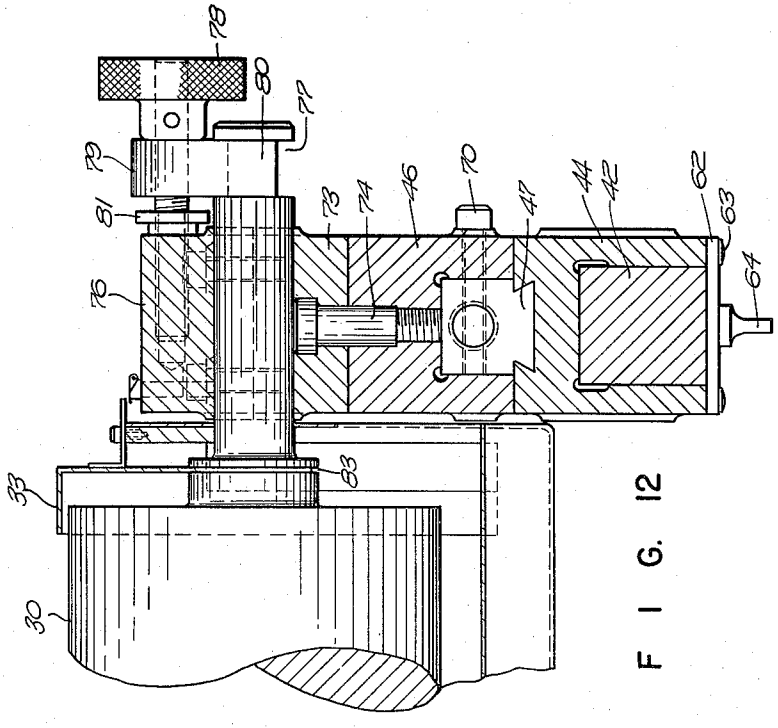


FIG. 12

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INTAGLIO DRY OFFSET PRINTING PRESS

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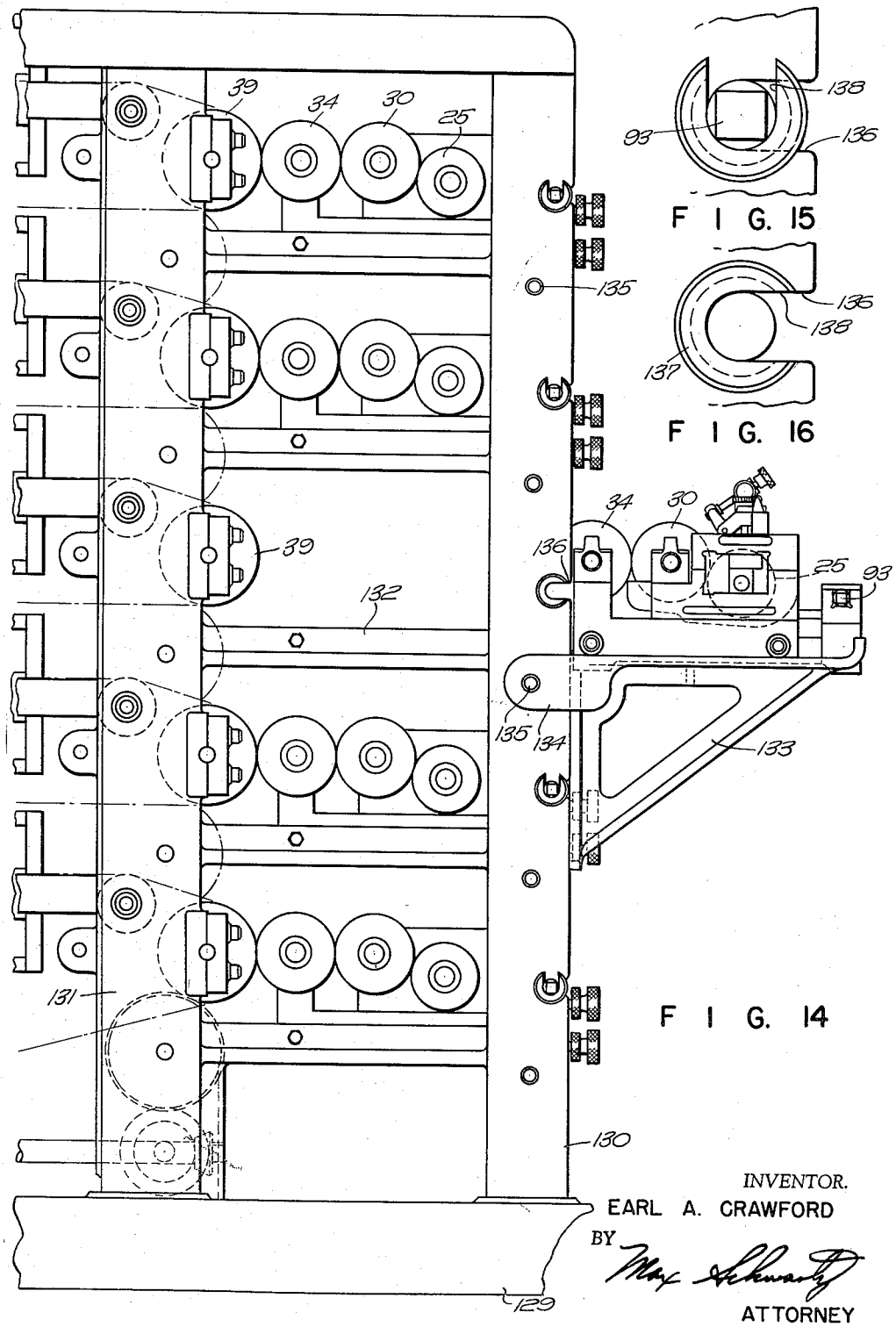


FIG. 14

FIG. 15

FIG. 16

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INTAGLIO DRY OFFSET PRINTING PRESS

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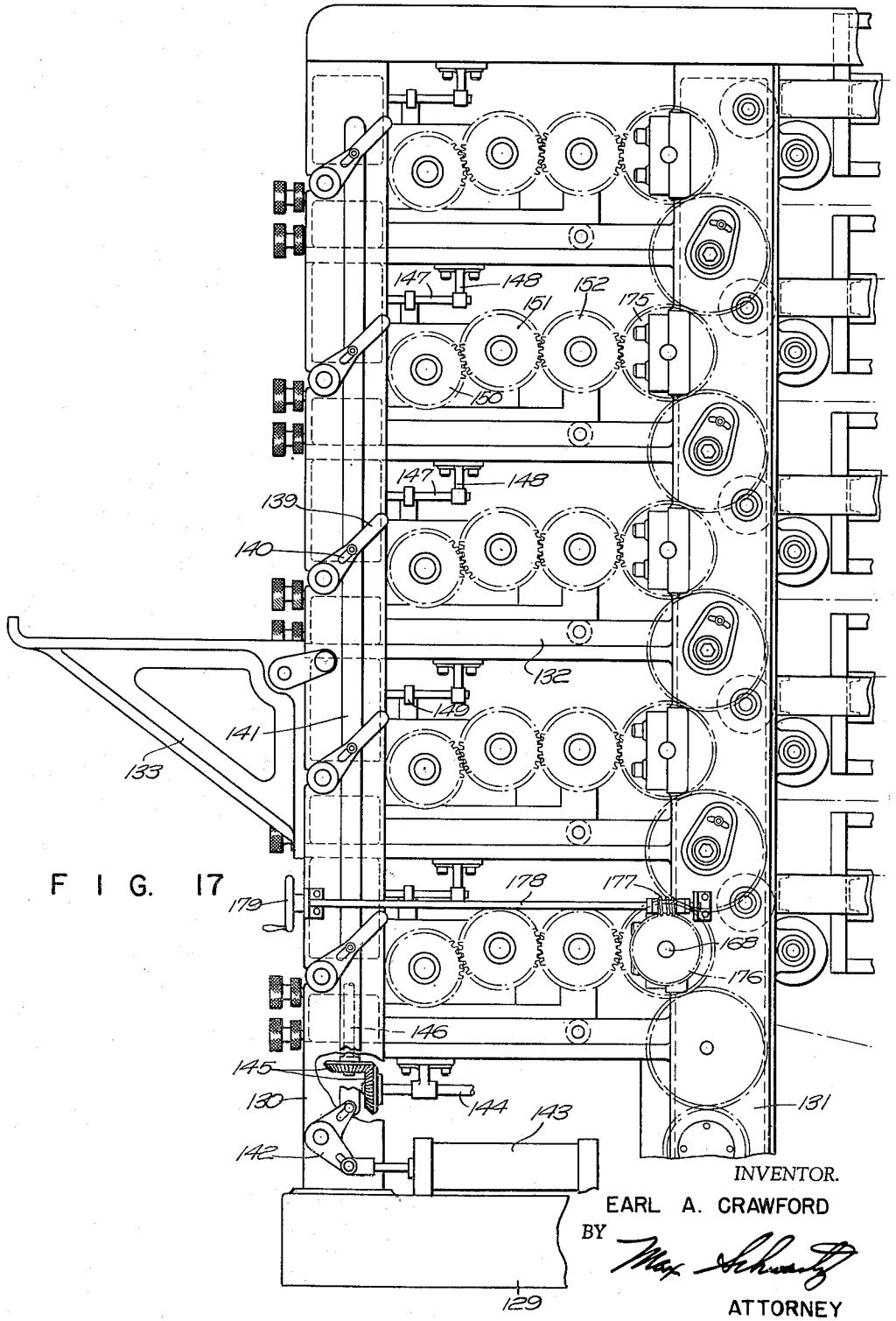


FIG. 17

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INTAGLIO DRY OFFSET PRINTING PRESS

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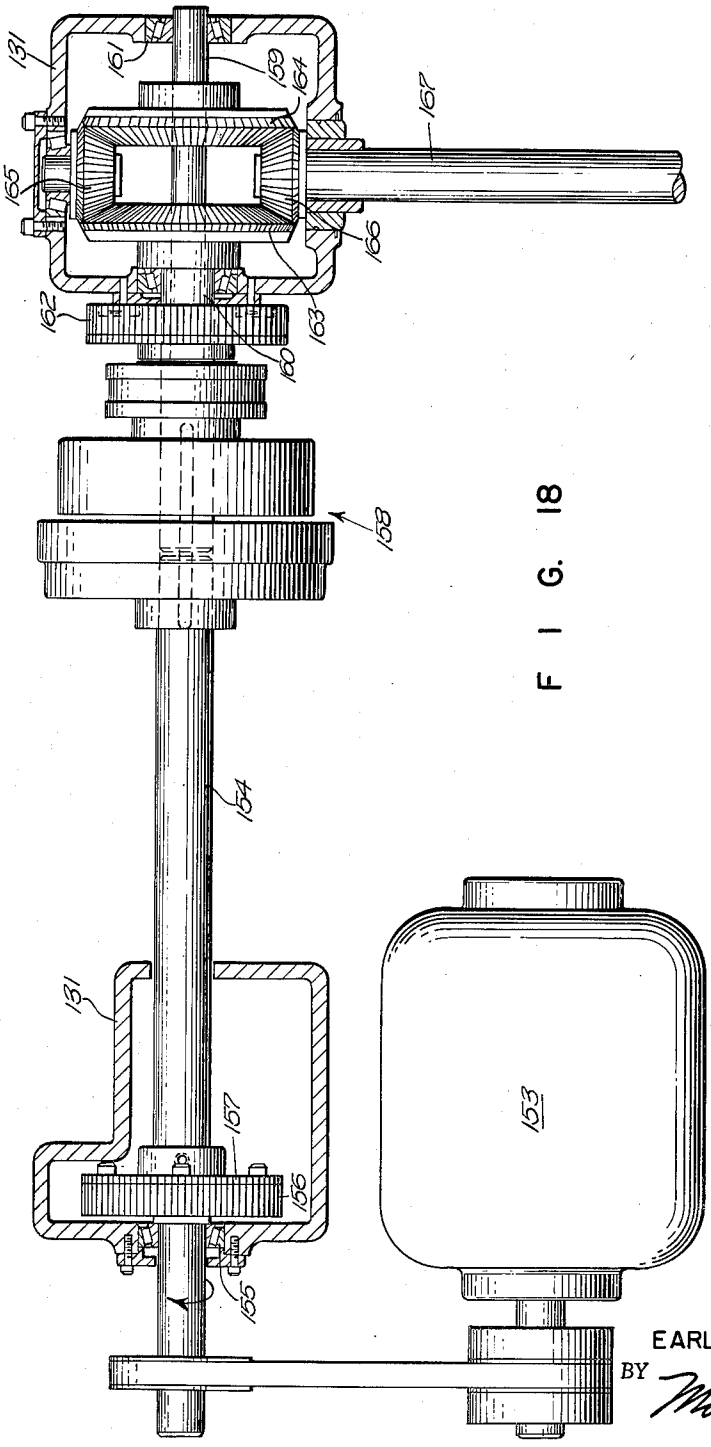


FIG. 18

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INTAGLIO DRY OFFSET PRINTING PRESS

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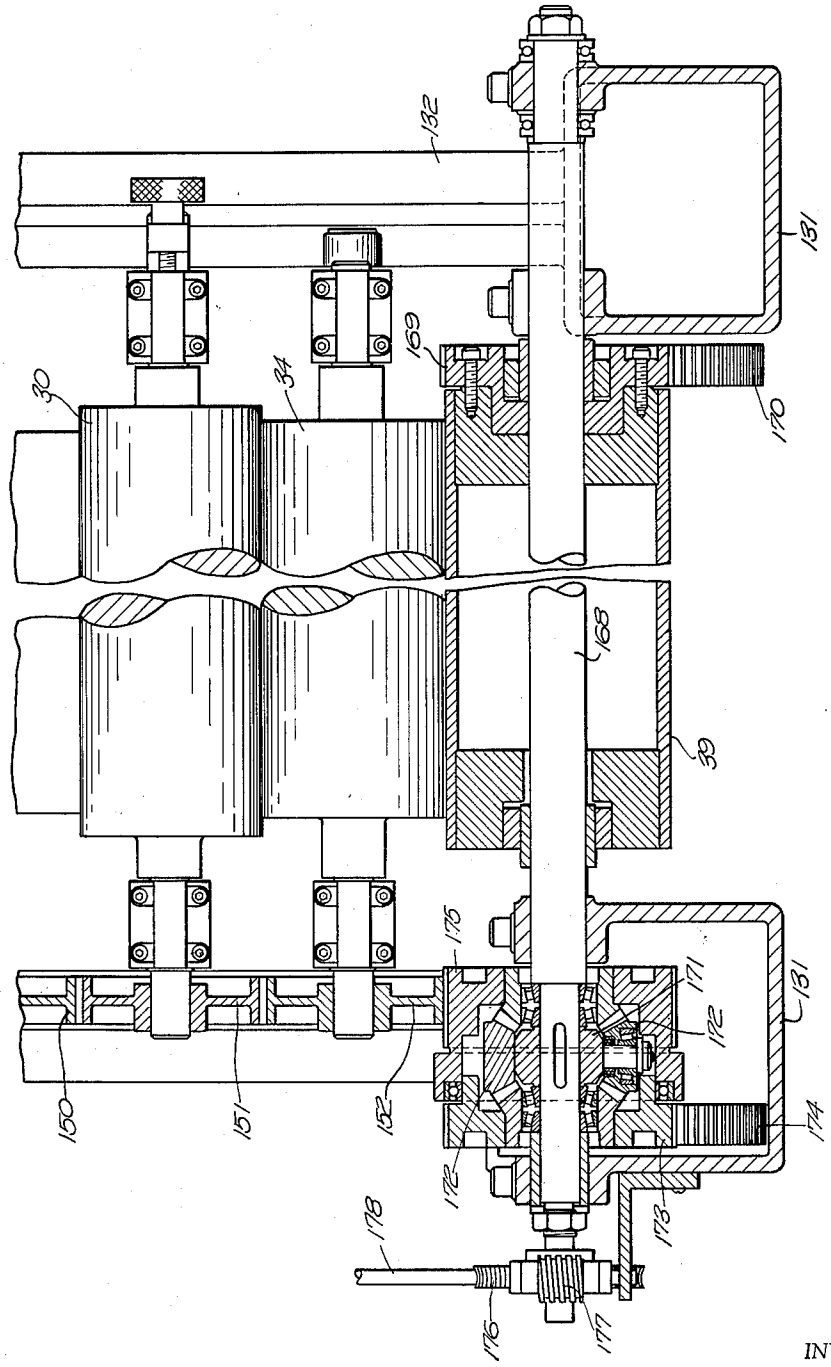


FIG. 19

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INTAGLIO DRY OFFSET PRINTING PRESS

Filed Aug. 4, 1958 10 Sheets-Sheet 10

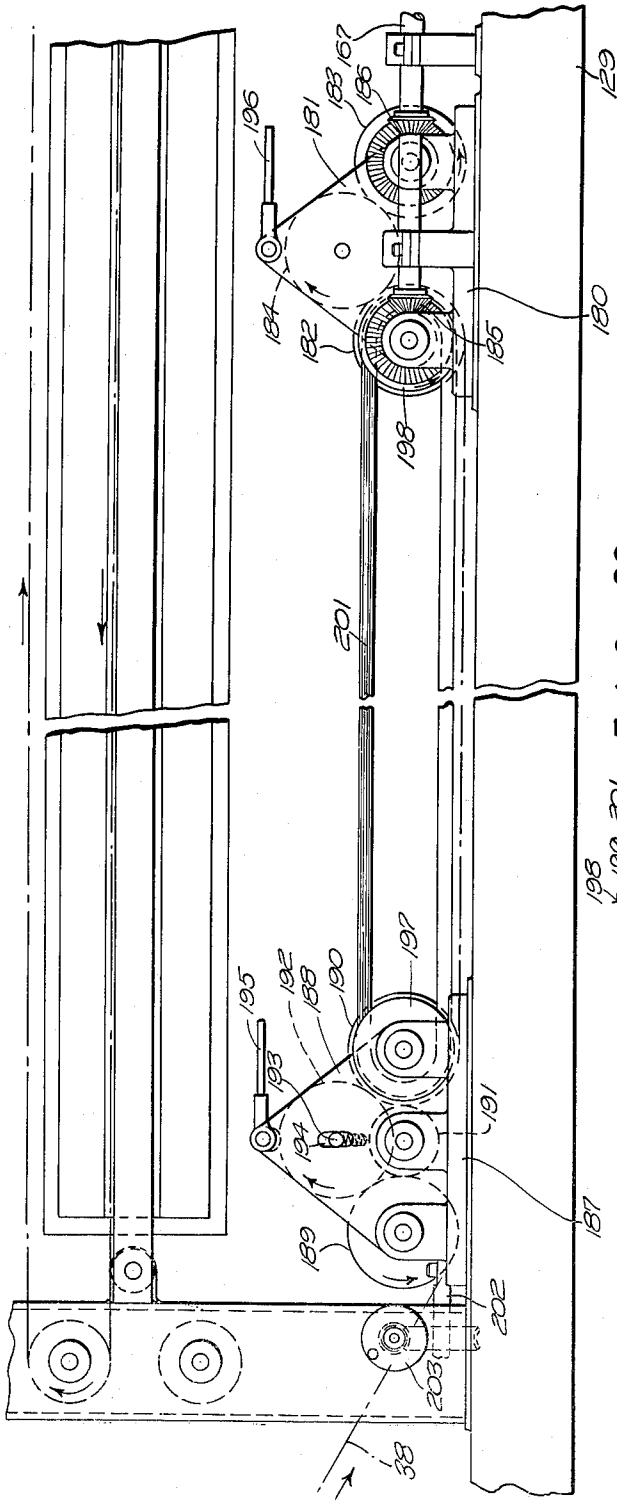


FIG. 20

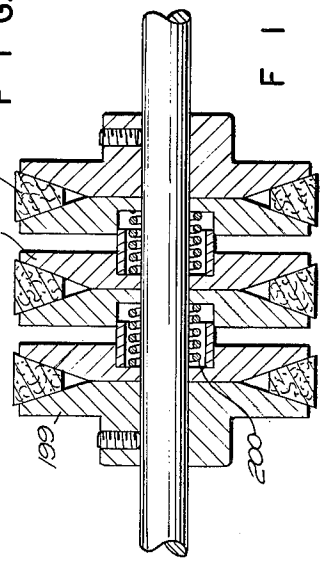


FIG. 21

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United States Patent Office 2,988,989 Patented June 20, 1961

2,988,989

INTAGLIO DRY OFFSET PRINTING PRESS

Earl A. Crawford, 123 Lansdown Road, Warwick, R.I.

Filed Aug. 4, 1958, Ser. No. 752,918
33 Claims. (Cl. 101—152)

My present invention relates to the printing art and more particularly to a novel construction of an intaglio dry offset printing press.

The principal object of the present invention is to provide an intaglio dry offset printing press having a novel removable printing unit which permits rapid changes in the work and color.

A further object of the present invention is to provide an intaglio dry offset printing press especially adaptable for multicolor printing.

Another object of the present invention is to provide an intaglio dry offset printing press having a novel cylinder and ink combination which holds the definition in process work.

A further object of the present invention is to provide an intaglio dry offset printing press having a novel press and web drive.

Another object of the present invention is to provide an intaglio dry offset printing press with a novel web feed and tensioning device.

A further object of the present invention is to provide an intaglio dry offset printing press utilizing a detachable plate and a mating transfer blanket.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawings and more particularly defined in the appended claims.

In the drawings,

FIG. 1 is a side elevation, partly in section of one of the color printing units.

FIG. 2 is a fragmentary sectional view showing the register between the transfer and plate cylinders.

FIG. 3 is a side elevation, partly broken away of one of the color printing units.

FIG. 4 is a fragmentary detailed view of the lower left corner, showing the adjustable pivot, of the unit shown in FIG. 3.

FIG. 5 is an enlarged section of a fragment of the printing plate and transfer blanket.

FIG. 6 is a plan view of one of the color printing units partly broken away.

FIG. 7 is a perspective view of a portion of the impression control shaft.

FIG. 8 is a side elevation, partly in section of the unit with the impression control shaft in "on" position.

FIG. 9 is a view similar to FIG. 8 with the impression control shaft in "off" position.

FIGS. 10 and 11 are enlarged sections of the shaft and mounting in "on" and "off" positions.

FIG. 12 is a section showing the plate cylinder mounting and adjustments.

FIG. 13 is a section showing the ink cylinder mounting and adjustments.

FIG. 14 is a side elevation of the left side of the press showing the multiple printing units.

FIG. 15 is an enlarged view of the printing unit lock in closed position.

FIG. 16 is a similar view of the lock in open position.

FIG. 17 is a side elevation of the right side of the press shown in FIG. 14.

FIG. 18 is a plan view, partly in section of the web and cylinder drive.

FIG. 19 is a section showing the web and cylinder intermediate drive mechanism.

FIG. 20 is a side elevation of the web feed and tensioning mechanism.

FIG. 21 is an enlarged section through the web feed drive wheel.

The printing press of the present invention has been designed to eliminate the many disadvantages inherent in the conventional printing methods now in use. In rotogravure printing the web is passed over a rubber cylinder, and a steel gravure cylinder, etched on the surface, rotates in an ink reservoir in contact with the web. A doctor blade removes the surplus ink leaving the cells on the etched surface filled with the ink to make the impression. This type of printing is unsuitable on rough uneven surfaces because of the difficulty of making the impression from the steel gravure cylinder. The ink used is normally a highly volatile fluid having quick evaporating solvents. The viscosity will pass it through a No. 2 Zahn cup in 17 to 34 seconds. Such inks dry very rapidly by solvent evaporation and present a fire and explosion hazard. Because they are highly volatile it is difficult to maintain the color of the ink over long periods of time.

In printing paper board or other rough surfaces the offset method is preferable. In this method the web is passed over a steel platen cylinder and the plate cylinder transfers the impression to an intermediate rubber transfer cylinder which in turn contacts the web. Here the rubber cylinder pulls the impression from the steel plate cylinder and transfers it to the web which is rotating on a steel platen cylinder which forms a hard platen. With this type of printing the ink is only slightly heavier, registering 33 to 35 seconds on the No. 2 Zahn cup scale.

The present invention is designed to provide a press which utilizes an extremely heavy fluid ink which remains press wet until it reaches the web. The ink of the present invention uses a film forming resin such as nitrocellulose or ethyl cellulose as a base and a high boiling alcohol as the solvent. This ink is extremely heavy and takes 60 to 90 seconds on the No. 2 Zahn cup scale. To handle such a heavy ink the press of the present invention provides an additional ink cylinder, rubber jacketed, which is used to stuff the ink into the plate cylinder cells. The impression is picked up from the plate cylinder by a rubber blanketed transfer cylinder which transfers it to the web rotating on a steel platen cylinder. The rotogravure process therefore uses a steel plate cylinder with the web on a rubber platen. The offset process uses a steel plate cylinder and a rubber transfer cylinder with the web on a steel platen. The press of the present invention uses a rubber inking cylinder, a steel plate cylinder and a transfer blanket cylinder with the web on a steel platen. This arrangement and the use of a heavy fluid ink has been found to maintain the color within one half of one percent over a period of twelve hours. The color register is much better and the ink will hold the definition in process work. The fire hazard due to the use of high volatile solvents is eliminated.

Referring to FIG. 1, the printing unit shown therein comprises the ink cylinder **25** rotating clockwise on a shaft **26** and provided with a rubber surface or blanket **27**. The cylinder **25** rotates in the ink reservoir **28** and is provided with a splash guard or shield **29**. The plate cylinder **30** is mounted for counterclockwise rotation adjacent the cylinder **25** and spaced therefrom approximately .005". The plate cylinder **30** may be of any conventional design but is preferably constructed with a draw lock arrangement **31** and a cylinder plate **32** of the type shown in my copending application entitled Printing Plate and Cylinder, Serial No. 651,641, filed April 9, 1957, now U.S,

No. 2,898,854. The plate cylinder **30** is also provided with a splash shield **33**.

Adjacent the plate cylinder **30** is a transfer blanket cylinder **34** rotating clockwise in contact with the plate cylinder **30**. A rubber blanket **35** is retained on the transfer cylinder **34** by mounting on a plate **36** tied to the transfer cylinder **34** by the draw lock **37**. The transfer blanket cylinder **34** contacts the web **38** on the platen cylinder **39** rotating counterclockwise. The plate cylinder **30** and transfer blanket cylinder **34** use the draw lock arrangement shown in my copending application. As shown in FIG. 2, the gap in the rubber transfer blanket **35** is slightly wider than the line in the plate **32** and registers with it. With this arrangement the cylinder plate **32** will pick up ink at the locking line but the ink will not transfer to the blanket **35** because the gap in the blanket **35** straddles the line. Therefore, a virtually continuous pattern can be printed without printing the dividing line. The cylinders **30** and **34** are mating cylinders of the same diameter so that the gap in the transfer blanket **35** will always be in register with the line in the plate **32**. It may be found desirable to further reduce this line and give the doctor blade a continuous unbroken surface on which to ride. This can be done by inserting a metal strip with a low melting point into the plate gap with a small portion protruding. A hot iron curved to the radius of the cylinder can then be applied to form the metal into a bridge over the gap.

The combination of applicant's ink with the draw lock type of cylinders has many distinct advantages. The use of a plate locked on a cylinder saves considerable time and money in preparing the job and making it ready. Both the rubber transfer blanket **35** and the cylinder plate **32** can easily be "made ready" if there are any low spots. Thus less pressure is necessary between the plate cylinder and the transfer blanket cylinder and therefore the definition is better.

The film forming heavy ink transfers in the manner shown in FIG. 5. The plate **32** is etched with rectangular intaglio cells **40**. The deep openings form the solid portions of the printed matter and the shallow cells form the high lights. The ink is picked up from the reservoir by the ink cylinder **25** and an even coating of heavy ink is laid on the surface of the plate **32** and stuffed into the cells **40**. As the plate cylinder **30** rotates the doctor blade removes the ink from the surface of the plate **32** leaving only the ink stuffed in the cells **40**, the excess ink dropping back into the reservoir. The ink in the cell **40** remains press wet. As the rubber blanket **35** presses against these cells the ink is removed by capillary action so that the blobs of ink **41** are now resting of the surface of the rubber blanket **35**. The film forming resin causes the ink to start setting. A rind is thus formed on the exposed surfaces of the blobs of ink **41**, but the portion of the ink touching the surface of the cylinder remains wet. The rind is sticky and transfers readily to the web **38**. The transfer is clean and no ink is left on the cylinder **34** to form "ghosts." It will be found that the high cells spread slightly on transfer to form solid sections while the shallow cells spread very little and hold the definition to print the highlights. Thus the combination of applicant's cylinder construction and film forming heavy fluid ink produces results heretofore not possible with other rapid drying printing methods.

The printing press of the present application has been specifically designed to utilize the method hereinabove set forth. This press includes novel features in construction and operation including the printing unit, the printing unit and web drive, the web feed and tensioning mechanism and other novel features. Process work involves the use of colors. The applicant has devised a press in which each color is printed from a self-contained unit incorporating the elements shown in FIG.1. As illustrated in FIGS. 14 and 17, the multicolor units of the press of the present invention are stacked vertically thus saving a considerable amount of floor space. These figures illustrate a five color press with five separate color units. The press can similarly be constructed with less or more units. One of the main features of the present invention is that the individual color units are so self-contained that they can be pulled out of the press without disturbing its operation and a new unit with a different color or work can be inserted, or the same unit can be changed and put back into the press. Since all the units are identical the present application includes the construction and operation of one of the units only.

Each printing unit comprises three basic frames one superimposed on the other. The base frame or chassis **42** comprises a pair of space parallel rectangular bars having an integral vertical portion **43** at the rear end. Mounted over each chassis member **42** is an L-shaped transfer frame **44** having a short vertical portion **45** at its forward end. This horizontal portion of the L-frame **44** has an inverted U-shaped construction which straddles the chassis **42**, see FIGS. 6 and 13. Mounted on each portion of the L-frame is an auxiliary frame **46**, generally rectangular in shape. Each portion of the auxiliary frame **46** rides on a key **47** in a keyway groove in the top edge of the L-frame **44**, see FIGS. 12 and 13.

Referring to FIG. 6, the forward ends of the frames are held in spaced parallel relation by a fixed shaft **48** which passes through an opening in the chassis **42** and through a slot **49** in the L-frame **44**. The slot **49** permits longitudinal movement of the L-frame **44** in relation to the chassis **42**. A supporting roller **50** is mounted on the outside of the shaft **48** at each end and is adapted to support the forward end of the frames when the unit is rolled into and out of the press. The shaft **48** is provided with a hollow threaded portion at each end adapted to receive an elongated bolt **51** for locking the unit into the press frame in a manner hereinafter to be described.

The vertical portion of the L-frame **44** is surmounted by the bearing block **52** which supports the shaft **53** on which the transfer blanket cylinder **34** is mounted. To ease the strain on the shaft bearing, the bearing block **52** is pivotally mounted by passing a bolt **54** through the block **52** and into the vertical portion **45** of the frame **44**. A bearing cap **55** locks the shaft **53** in place. To adjust the contact between the transfer blanket cylinder **34** and the web **38** on the platen cylinder **39** a horizontal adjustment of the frame **44** on the chassis **42** is made within the limits of the slots **49**.

Referring to FIG. 3, the chassis **42** is provided with an elongated rectangular cutout portion **56** adjacent the rear end. A rectangular block **57** is horizontally slidably mounted in the cutout **56**. An adjusting screw **58** extends from the rear end of the chassis **42** into a threaded opening **59** having fine threads for making micrometer adjustments. The adjustment screw **58** then extends unthreaded into the cutout **56** with the free end entering the block **57** and being anchored therein by a lock member **60** in an opening **61** in the block **57**. A plate **62**, see FIGS. 3, 12 and 13, extends across the bottom of the L-frame **44** covering the cut out portion **56** in the chassis **42** and locking the block **57** in horizontally slidable position. The plate **62** is bolted to the bottom of the L-frame **44** by bolts **63** as illustrated. The plate **62** is provided with a slot adjacent its forward end and a wing bolt **64** extends through this slot and threadedly engages the block **57**.

Horizontal adjustment of the transfer blanket cylinder **34** can therefore be effected by turning the adjustment screw **58**. When the screw **58** is turned in one direction it will pull the block **57** to the right, see FIG. 3, within the cutout **56** of the chassis **42**. The L-frame **44** is locked to the block **57** through the plate **62** and wing bolt **64** and will therefore move with it, carrying the transfer blanket cylinder **34**. Turning movement of the adjustment screw **58** in the opposite direction will move the L-frame **44** to the left toward the web **38**. This adjustment is used to make the fine adjustment between the transfer blanket

cylinder 34 and the platen cylinder 39 in readying the job or while it is running. However, if the size of the transfer blanket cylinder 34 be changed so that a larger adjustment must be made then the wing bolt 64 is loosened and the L-frame 44 manually pushed to its approximate new position within the confines of the slot 49. The wing bolt 64 is then tightened and the final fine adjustment is made by turning the screw 58. After the final adjustments have been made the screw 58 is locked in adjusted position by the lock nut 65. The above described adjustment is made at the rear end of the frame members on each side of the unit so that the adjustment must be made in two places.

The position of the auxiliary frame 46 on the L-frame 44 is also adjustable along the key 47 by the construction shown in FIGS. 3 and 8 to 12 inclusive. Mounted on the top of the rear vertical end 43 of the chassis 42 is a block 66. The block 66 is slidable longitudinally along the top of the chassis portion 43. An adjustment screw 67 extends through the lower portion of the block 66 and threadedly engages the block with fine micrometer threads 68. The forward end of the screw 67 is unthreaded and extends into the key 47 on which the auxiliary frame 46 is slidably mounted. Referring to FIGS. 12 and 13 it should be noted that the key 47 is rectangular in shape and that the bottom edge of the auxiliary frame 46 has an inverted U-shape which straddles the key 47. Now referring to FIG. 3, the outer side of the auxiliary frame 46 is provided with an elongated slot 69. A lock bolt 70 extends through the slot 69 and into the key 47 to lock the key to the extended portion of the adjustment screw 67. To make an adjustment of the auxiliary frame 46 longitudinally, which will adjust the contact between the plate cylinder 30 and transfer blanket cylinder 34, the adjustment screw 67 if turned in one direction will move forwardly through the block 66 and push the auxiliary frame 46 and its key 47 along the keyway to the left. Turning movement in the opposite direction will move the adjustment screw 67 rearwardly and pull the auxiliary frame 46 to the right. Again this adjustment is a fine adjustment. Where the size of the cylinders has been changed and a large adjustment is required, the lock bolt 70 on each side of the unit is loosened. This loosens the connection between the auxiliary frame 46 and the adjustment screw 67. The frame can then be manually pushed along the keyways until it contacts the transfer blanket cylinder 34. The lock bolts 70 are then tightened on each side and the adjustment screws 67 on each side can then be used to make the final fine adjustment. Each adjustment screw 67 is also provided with a lock nut 71 for locking the final adjustment.

The adjustment of the contact between the plate cylinder 30 and the transfer blanket cylinder 34 is effected by the adjustment of the auxiliary frame 46 in the manner above described. However, it is desirable to provide a transverse adjustment of the plate cylinder 30 to adjust the register of the colors while the press is running. This adjustment is illustrated in FIGS. 3 and 12. The plate cylinder 30 is mounted in the upper forward corner of the auxiliary frame 46. As can be seen in FIG. 3, a rectangular portion 72 of the frame 46 is cut away. Mounted on the bottom of the cutout portion 72 is a pivoted bearing block 73 which is bolted into the frame 46 by the bolt 74. The plate cylinder 30 is mounted on a shaft 75 which is journaled in the bearing block 73. The shaft 75 is slidably mounted at each end in its bearing block 73 so that it can be moved axially. On the side of the press shown in FIGS. 3 and 12, an enlarged bearing cap 76 extends over the top of the shaft end and is bolted into the bearing block 73. It will be noted that this end of the shaft extends outwardly beyond the block 73 and is provided with a groove portion 77. An adjustment screw 78 extends into the bearing cap 76 just above the shaft 75 in spaced parallel relation to it. The adjustment screw 78 is threadedly mounted in the bearing cap 76. A plate 79 is provided with an inverted U-shaped bottom end 80. The plate 79 is mounted on the adjustment screw 78 with the U-shaped bottom end 80 entering the grooved portion 77 of the shaft 75. With the parts thus assembled, and viewing FIG. 12, it is obvious that when the adjustment screw 78 is rotated to move to the right the plate 79 will pull the shaft 75 to the right. When the adjustment screw 78 is moved to the left, the shaft 75 will be moved to the left. This adjustment is usually a very fine and very small adjustment to register the colors. A lock nut 81 rides on the adjustment screw 78 for locking the adjusted position. In certain printing operations the transfer blanket cylinder 34 may be used as the plate cylinder with raised lettering on the rubber jacket. In such case it may be desirable to also provide the transfer blanket cylinder shaft 53 with a similar transverse adjustment by replacing the bearing cap 55 with the above described assembly.

Referring to FIG. 13, the ink cylinder shaft 26 is provided with a groove 82 adjacent each end of the cylinder 25. The splash guard 29 is provided with a slot which straddles the shaft 26 and rides in the groove 82. The outer edge of the guard 29 is bent at right angles to overlap the outer edge of the cylinder 25. Similarly, see FIG. 12, the plate cylinder shaft 75 is provided with a groove 83. The guard 33 is also provided with a slot to straddle the shaft 75 and ride in the groove 83. These guards, 29 and 33 prevent the ink from flying off the ends of the cylinder, while the grooves prevent the ink from running along the shafts and fouling the shaft bearings.

The ink cylinder 25 is also mounted in the auxiliary frame 46 but must be adjustable to compensate for changes in the diameter of the plate cylinder 30 and to adjust the spacing between the ink cylinder 25 and plate cylinder 30 to compensate for different inking conditions. This adjustment is illustrated in FIGS. 3 and 13. Referring to FIG. 3, it should be noted that the auxiliary frame 46 is provided with a cutout portion 84 surmounted by an inverted U-shaped portion 85 which provides a frame having a rectangular opening. A bearing block 86 is mounted on the lower edge of the cutout 84 and having an integral central depending portion 87 which rides in a groove in the auxiliary frame 46. The ink cylinder shaft 26 is journaled in the bearing block 86. The bearing block 86 is provided with an auxiliary portion 88 which extends between the top of the block 86 and the bottom edge of the inverted U-shaped plate 85. The block 88 is provided with an upper extension 89 which enters a groove in the plate 85 and a lower extension 90 which enters a recess in the top of the block 86. As shown in FIG. 13, the block 86 can pivot on its lower extension 87 and by the extension 90 engaging the recess at the upper end. Adjustment is made by the adjustment screw 91 which extends through the lower portion of the plate 85 and is then provided with a threaded portion which extends through a threaded opening in the auxiliary block 88. Turning movement of the adjustment screw 91 will cause the block 88 to move along the screw to the right or left as shown in FIG. 3. Movement of the block 88 will carry the block 86 which slides with it in the frame. The pivotal action provided for the ink cylinder shaft 26 is desirable because when adjustments are made at each end of the shafts it may be found necessary to move one end of the cylinder closer to the plate cylinder 30 than the other end. By allowing the shaft bearings to pivot the strain is removed from the bearings and excessive wear is eliminated. After the adjustments have been made the adjustment screw 91 is locked in adjusted position by the lock nut 92.

The color printing unit above described is mounted in the press in a manner hereinafter to be described. However, in view of the heavy ink and printing method being used herein the press drive is so constructed that

when the printing unit is taken off impression the ink cylinder 25 and plate cylinder 30 are moved away from the transfer blanket cylinder 34 but continue to rotate so that the ink remains plastic and press wet and does not dry on the printing plate. When this contact is broken the web 38 continues to move until the transfer blanket cylinder 34 makes one or two more revolutions. This cleans any ink impression left on the transfer blanket. At this point the transfer blanket cylinder moves out of contact with the web 38 and the web stops. The transfer blanket cylinder 34 continues to rotate so that it remains in register with the plate cylinder 30. When it is desired to put the unit "on" impression, the transfer blanket cylinder 34 moves to contact the web 38, and then the ink and plate cylinders move until the plate cylinder contacts the transfer blanket cylinder. The control for moving the cylinders "on" and "off" impression is part of the unit and is illustrated in FIGS. 3 and 6 to 10 inclusive.

Referring to these figures, it will be noted that the upper portion of the block 66, which is mounted at the top of the portion 43 of the chassis 42, is cut out in the form of a U-shape. A control shaft 93, see FIG. 6, extends across and through the spaced blocks 66. The outer ends of the shaft 93 are used to lock the unit in the press in a manner hereinafter to be described. The portions of the shaft passing through the U-shaped portion of the blocks 66 is shown in FIG. 7. The shaft 93 is provided with spaced cut away portions 94 of smaller diameter than the shaft 93 and eccentric to it. One side of each portion 94 is provided with a flat portion 95. The top edge of each block 66 is provided with a pair of straps 96 which extend across the portions 94 and are bolted in place by bolts 97 extending well into the block. The shaft 93 is mounted for rotation on the centers of the portions 94 and the entire shaft including the portion between the portions 94 therefore becomes an eccentric cam. Now referring to FIG. 8, it will be noted that the L-frame 44 is provided with a roller 98 adjacent the rear end on each side. These rollers 98 are centered approximately ¼" above the forward rollers 50. When the unit is locked in the press, the forward end rests on the rollers 50 and the rear end is suspended from the shaft 93 by the cross straps 96.

When a switch or button is energized to take the unit "off" impression the shaft 93 begins to rotate clockwise as shown in FIGS. 3 and 8 to 11 inclusive. The initial movement of the shaft 93 causes the shaft to contact and push against the right hand walls of the blocks 66. This causes the blocks to slide to the right as shown in FIGS. 9 and 11. As the blocks 66 move to the right they carry the adjustment screws 67 with them. As hereinabove described the screws 67 are anchored in the auxiliary frame 46 and the auxiliary frame will slide along its keyway towards the right as shown in FIG. 9 until the plate cylinder 30 no longer contacts the transfer blanket cylinder 34. Further movement of the shaft 93 will bring the flat portion 95 into uppermost position and allow the chassis to drop on to the flat portions causing the rear end of the unit to drop sufficiently so that the rear rollers 98 now ride on the unit support in horizontal alignment with the front rollers 50. This in effect results in a pivotal clockwise movement of the L-frame 44 on the supporting shaft 48 which pivots the transfer blanket cylinder 34 away from the web 38 as shown in FIG. 9. The unit is now "off" impression and can be rolled or moved on the rollers 50 and 98.

When the shaft 93 is rotated counterclockwise to put the unit "on" impression, the flat portion 95 begins to return to its position shown in FIG. 8, to lift the rear of the unit, before the shaft will move the blocks 66 and auxiliary frame 46 to the left. Thus the transfer blanket cylinder 34 contacts the web 38 before the plate cylinder 30 contacts the transfer blanket cylinder 34.

Referring to FIGS. 1, 3 and 6, the film forming ink is retained in a reservoir 28 which is suspended between the sides of the auxiliary frame 46. The rear wall of the reservoir 28 is suspended in the portions 85 by bolts 99. At the front end of the auxiliary frame 46, a strap 100 depends on each side and terminates in a hooked bottom end 101 which supports a pin 102 in the reservoir. Note that the bottom of the reservoir 28 is slanted rearwardly to retain the ink at the ink cylinder 25. As the ink is laid on the plate cylinder 30 by the ink cylinder 25, a doctor blade removes the surface ink as hereinabove described. The doctor blade is mounted across the top of the auxiliary frame 46 for transverse reciprocation. To compensate for changes in cylinder diameters, the doctor blade is adjustable horizontally, vertically and radially.

The top rear portion of the frame portion 85, above the ink cylinder mounting, is provided with a slot 103 having an undercut portion 104, see FIGS. 6 and 13. A post 105 is mounted in the slot 103 and having a bottom portion in the undercut portion 104 of the slot and a narrow portion 106 extending above the frame. The side of the frame portion 85 is provided with an elongated slot 107 (FIG. 3). A bolt 108 extends through the slot 107 to lock the post 105 in adjusted position in the slot 103. This provides for longitudinal adjustment of the doctor blade assembly which is mounted on the posts 105. A rectangular bar 109 is mounted transversely across the top of the frame portions 85, FIG. 6, and is provided with slots 110 surrounding each adjustable post 105, the slots 110 permitting axial reciprocation of the bar 109. One end of the bar 109 is provided with an integral ear 111 which is connected to a reciprocating drive mechanism hereinafter to be described. When the plate cylinder 30 is adjusted out of parallel with the transfer cylinder 34, the arrangement of the posts 105 and slots 110 permit the bar 109, which carries the entire doctor blade assembly, to be similarly adjusted parallel to the plate cylinder 30 without binding.

Mounted on the bar 109 are pairs of spaced ears 112. A worm 113 is mounted between each pair of ears 112 on a split shaft 114 which is locked by the member 115 in the center. Referring to FIGS. 3 and 6, a plate 116 extends forwardly from the bar 109 in front of each worm 113. A bolt 117 extends through each plate 116 with the bottom portion threaded as shown in FIG. 3, and the top end having a worm gear 118 which meshes with the worm 113. With this arrangement turning movement of the shaft 114 will cause the bolt 117 at each end to rotate in the plate 116. A support 119 is provided with a short horizontal portion, which threadedly engages the threaded portion of the bolt 117, and an angularly downwardly extending portion 120. A shaft 121 extends between the end of the portions 120. Adjacent each end of the shaft 121 is a short depending bracket 122 which supports the doctor blade assembly 123. Turning movement of the shaft 114 is transmitted at each end through the worm 113, worm gears 118 to the support 119 which rides vertically on the threaded portion of the bolt 117. This permits vertical adjustment of the doctor blade assembly 123.

Extending from the inside of each support 119 are spaced bearings 124 in which a circular plate 125 is mounted for radial movement. An adjustment screw 126 threadedly engages the plate 125 and extends through the plate to a point over and beyond the shaft 121. A lever arm 127 extends from the end of each adjustment screw 126 and is fixed to the shaft 121. Viewing FIGS. 1 and 3, when the adjustment screw 126 is rotated counterclockwise it will pull the lever arm 127 in a clockwise direction to rotate the shaft 121 and change the angle of the doctor blade 123 in an upward direction. Movement of the adjustment screw 126 in the opposite direction will move the doctor blade downwardly. The angle with which the doctor blade contacts the plate 32 can therefore be adjusted by movement of each adjustment screw 126. The adjustment screws are provided with

lock members 128 for locking in adjusted position. The doctor blade can therefore be moved longitudinally by loosening the bolts 108 and moving the posts 105 along the slots 103. Vertical adjustment is provided by rotation of the shaft 114 as hereinabove described. Radial adjustment is provided by movement of the adjustment screws 126.

The above described unit can be repeated to provide a press adapted to print in any number of desired colors. As shown in FIGS. 14 and 17, the press illustrated herein is shown with five units capable of printing five different colors. The number of units and colors can of course be varied to suit different requirements. In the illustrated form the color units are stacked vertically. This saves a considerable amount of space and permits handling and adjustment within a small area. Another feature of the present invention is the use of a single drive for all the units and the web made possible by the intermeshing gear train and the drive mechanism shown in FIGS. 18 and 19.

Referring to FIGS. 14 and 17, the press comprises a base 129 on which the press frame is mounted. The frame is preferably cast in a single integral construction which provides strength and saves assembly operations. The press frame comprises four vertical columns, two rear columns 130 and two front columns 131. The columns 130 and 131 may be cored, angular or hollow. In the illustrated form the columns are shown as hollow as can be seen in FIGS. 18 and 19. On each side, the front and rear columns are integrally connected by a plurality of inverted T-shaped plates 132 (see FIG. 6) which form supporting tracks for the printing units hereinabove described. FIG. 17 shows the drive side of the press with the driving gears mounted on the column 131. FIG. 14 is the operating side with the web drive mechanism mounted on the column 131 opposite the driving gear column. An auxiliary triangular support 133 is provided with a strap 134 which is bolted at 135 on each side into an opening in the columns 130 as shown in FIG. 14. The auxiliary support 133 is adapted to retain one of the printing units on its rollers 50 and 98 in "off" impression position. The support 133 aligns with the track forming plates 132 and can be moved from level to level as required. In inserting one of the units, the control shaft 93 is grasped and the unit pushed forwardly so that it rides on the tracks 132 into the frame. The shaft 93 is at the rear of the unit, and as the unit enters the frame the shaft enters a horizontal slot 136 in the rear edge of each column 130. A grooved annular member 137 is rotatably mounted at the rear of each slot and is provided with a gap 138 which registers with the slot as shown in FIG. 16. This permits the shaft 93 to slide into the slot 136 and through the gap 138 of the groove member 137. The member 137 is then turned 90 degrees into the position shown in FIG. 15. This closes the slot 136 and locks the shaft in the column 130. At the forward end of the unit the lock bolt 51 is then inserted at each side through an opening in the plates 132 to lock the unit in proper position.

With the units locked into the frame the gear trains will mesh with each other. However, certain operating connections must be made. Referring to FIG. 17, the drive end of each shaft 93 is provided with a manually operable handle 139 which can be used to manually move the unit "on" and "off" impression. Each handle 139 is provided with an intermediate central slot 140 through which each handle 139 is bolted to a vertically moveable shaft 141 mounted on the column 130. The shaft 141 is vertically reciprocable by the rocker arm 142 connected to the bottom end which is operated from an air cylinder 143 mounted on the base 129. Thus movement of the air cylinder will cause vertical movement of the shaft 141 which is connected to the various handles 139 to cause rotation of the operating shafts 93 in each printing unit.

It is also necessary to connect the doctor blade drive to each unit. Referring to FIG. 17, the doctor blades are powered from a shaft 144 connected to the source of power not shown in this figure. Through the bevel gears 145 a vertical shaft 146 is rotated. At each level the shaft 146 is provided with a worm and gear connection to drive a short horizontal shaft 147 which is mounted in a bracket 148 beneath each track element 132 on the drive side of the press. A cam drive 149 on the shaft 147 is connected to the ear 111 of the doctor blade reciprocating bar 109 shown in FIG. 6. It is thus a simple matter to remove one or more color units by unlocking and releasing the various connections hereinabove described and rolling the unit out on to the support 133 from which it can be removed. A new unit pre-inked and made ready with a new color or a new printing plate can then easily be rolled into the press.

Referring to FIG. 17, which is the drive side of the press, it will be noted that the various cylinders are provided at the drive end with intermeshing gears. The ink cylinder 25 is provided with a driving gear 150 and rotates counterclockwise in FIG. 17. The plate cylinder 30 is provided with a drive gear 151 meshing with the gear 150 and rotating clockwise. The transfer cylinder 34 is provided with a drive gear 152 which meshes with the gear 151 and rotates counterclockwise. These three drive gears are in constant motion whether the press is "on" or "off" impression. The movement required to separate the plate cylinder 30 from the transfer cylinder 34 when going "off" impression is very slight and the teeth on the gears 151 and 152 are of such depth that they remain in intermeshed position after the separation of the cylinders. Thus the train of gears 150, 151 and 152 continues to drive and the cylinders remain in register whether the unit is "on" or "off" impression. This is important because of the register between the plate and transfer blanket shown in FIG. 2. The web 38 on the platen cylinder 39 is stopped when the press is "off" impression. The drive gear of the platen cylinder 39 is therefore at the opposite side of the press and is not connected to the gear train which drives the printing unit cylinders.

The press of the present invention utilizes a single drive mechanism to power the various printing units and the web, and the drive arrangement for imparting the proper direction of rotation and the proper drive and stop relation is illustrated in FIGS. 18 and 19. Referring to FIG. 18, the press is driven from a suitable electric motor 153 mounted on the base 129. The motor 153 drives a shaft 154 on the drive side of the press. The shaft is journaled in a bearing 155 in the column 131. A drive gear 156 is locked to the shaft adjacent this end. The drive gear 156 is provided with a lock plate 157 bolted to one side. This locks the teeth to take out play and lost motion. Slightly beyond the center, the shaft 154 is split and extends into a magnetic clutch and brake 158. Extending from the other side of the clutch 158 the split portion 159 of the shaft 154 becomes slightly narrower and passes through a larger shaft 160. The opposite end of the shaft 159 is mounted in a bearing 161 in the column 131. The shaft 160 extends through the column and at one end outside of the gear box is a large driving gear 162. The driving gear 162 is also a locking gear constructed similarly to the gear 156. The other end of the shaft 160 is provided with a large bevel gear 163. Mounted on the shaft 159 is a similar bevel gear 164 facing the gear 163. Intermediate small gears 165 and 166 are mounted in the column between the gears 163 and 164 so that turning movement of the gear 164 in one direction will be transmitted through the gears 165 and 166 to the gear 163 which will rotate in the opposite direction. It should be noted at this point that the shaft 167 which drives the web feed shown in FIG. 20, is locked to the gear 166 so that it rotates with it.

When the press has been turned on, the motor **153** will drive constantly. As a result the shaft **154** and drive gear **156** will also be rotating constantly. The printing units are all driven from gear **156** and therefore the various cylinders in these units will also remain in constant motion whether the press is "on" or "off" impression. Now viewing the right side of the drive mechanism in FIG. 18, the shaft **159** is driven by the shaft **154** through the clutch **158** causing a rotation of the shaft **160** and drive gear **162** in the opposite direction. The drive gear **162** drives the platen cylinders and the shaft **167** drives the web feed. Thus when the press is taken "off" impression the magnetic clutch disconnects the shafts **154** and **159** so that the platen cylinder drive and web feed can come to a complete stop locked in fixed position by the magnetic brake, while the shaft **154** and the drive gear **156** continue to drive the unit cylinders.

Now referring to FIGS. 17 and 19, each level of the press frame is provided with the intermediate drive mechanism shown in FIG. 19. A fixed transverse shaft **168** is mounted in the frame. The platen cylinder **39** is rotatably mounted on the shaft **168** and is provided at its right end with a gear **169**. An intermediate gear **170** is rotatably mounted to mesh with the gear **169** and also with the drive gear **162** on the shaft **160** shown in FIG. 18. Gear **170** is also a locking gear. Thus between each platen cylinder and its gear **169** there is an intermediate gear **170** which transfers the drive to the next level, see FIG. 14. The web is moved upwardly so that the platen cylinder **39** must rotate counterclockwise as shown in FIG. 14. The intermediate gears **170** therefore rotate clockwise and the drive gear **162** must rotate counterclockwise.

Adjacent the left end of the shaft **168** is a reverse gear arrangement. A spider **171** is fixed to the shaft and is provided with small bevel gears **172** on opposite sides. A large gear **173** is rotatably mounted on the shaft **168** having an inner bevelled face meshing with the gears **172** and an outer gear portion meshing with a large intermediate drive gear **174**. Opposite the gear **173** is a large gear **175** which is also provided with an inner bevelled face meshing with the gears **172** and an outer gear portion which meshes with the gear **152** on the transfer cylinder **34**. With this arrangement rotation of the gear **174** is transmitted to the gear **173**, through the spider gears **172**, to the gear **175** which drives the unit cylinder gears by contacting the transfer cylinder gear **152**.

The gear **174** meshes with drive gear **156** to the left of FIG. 18. Thereafter at each level the gear **174** meshes with the outer portion of gear **173** of the level below to provide a chain of gears as shown in FIG. 17. The gear **156** rotates counterclockwise when viewing FIG. 17. The gear **174** therefore rotates clockwise. The gear **173** rotates counterclockwise at each level. In view of the intermediate spider gears **172** the gear **175** rotates clockwise. This will cause the transfer cylinder to rotate counterclockwise to match the clockwise rotation of the platen cylinder **39**.

In setting up the job, when the press is put "on" impression it may be necessary to adjust the rotation of the cylinders in the printing unit to the web to bring the colors into register. This adjustment can be made at each unit by the arrangement shown at the left end of shaft **168** in FIG. 19. Shaft **168** is fixed in relation to the various gears and the platen cylinder rotating thereon. The left end of the shaft **168** is provided with a worm gear **176** which meshes with a worm **177** which is mounted on a shaft **178** at right angles to the shaft **168**. As can be seen in FIG. 17, the shaft **178** is mounted on the side of the frame and extends to the back end where a manually operable wheel **179** is used to turn the shaft. When the wheel **179** is rotated it will cause a turning movement of the shaft **168**. This will have no effect on the platen cylinder **39** since it is positively driven through the gears **169** and **170**. However, rotation of the shaft **168** will cause a rotating movement of the spider **171** which is locked to it, and rotating movement of the bevel gears **172** at each end of the spider. This will change the relationship of the gears **173** and **175** in one direction or the other and consequently change the position of the impression on the transfer cylinder **34**. Thus the impression can be moved up or down to bring the color into register with the other color or colors. For the purposes of illustration, one shaft **173** has been shown in FIG. 17. However, the adjustment shaft **173** is repeated at each printing unit. The worm and gear at the end of the shaft **168** acts as a lock to lock the spider in fixed position.

The arrangement above described can also be used to engage a printing unit while the press is running. The wheel **179** is rotated rapidly to spin the spider until it matches the web speed. This will bring the gear **175** to a standstill and allow the printing unit to be pushed into place so that the transfer cylinder gear **152** meshes with gear **175** without clashing or strain. The wheel **179** is now stopped and the drive picks up the new unit immediately. If desired, a separate small gear reduction motor may be inserted to operate the shaft **178** for this purpose.

When the printing units have all been locked in position as hereinabove described, the press is turned on causing immediate rotation of the driving gear **156** and all the gears on the drive side of the press as shown in FIG. 17. This constant motion prevents caking of the ink and clogging of the plates. Now when the press is switched to "on" impression the air cylinder **143** goes into operation to start rotation of the control shafts **93** and each unit goes through the cycle hereinabove described to bring the transfer cylinder **34** into contact with the web and the plate cylinder **30** into contact with the transfer cylinder **34**. However, before the web is contacted the clutch **158** acts to lock the shafts **154** and **159** and start driving the platen cylinders **39** and the web feed. If there is to be a change of color or a change in one of the plates on the cylinder **30**, the press is taken "off" impression. The air cylinder **143** immediately begins movement of the shafts **93** and then the clutch **158** disconnects the shaft **159** and stops the web drive. At this point any of the printing units can be removed by unlocking the unit and sliding it out as shown in FIG. 14. Corrections, adjustments, color changes or a complete new unit can be clipped into place. This results in a considerable saving of time and reduces the time when the press is "down" to a minimum. By using stand-by units, a job can be removed from the press and a new job inserted rapidly and if need be, even while the press is running. The number of units used will of course depend on the number of colors to be run and the press can easily be used to run a single color if desired.

It is of course essential that the ink be thoroughly dry between colors and any desired drying system may be employed. FIGS. 14 and 17 illustrate the web passing into and out of a horizontal drying system between each level. These systems use either direct heat, hot air, or infra red elements. The particular type of drying arrangement is a matter of choice and will not affect the operation of the press. The illustrated press shows five color units. Such a press is approximately seven to eight feet high. If the paper is to be printed on both sides with different colors, a similar unit is positioned at the other end of the drying chamber and the web is run alternately from one side to the other with intermediate drying without interrupting the printing. The various fine adjustments in the color units and the ink and cylinder arrangements hereinabove described permit accurate printing on many surfaces normally difficult to handle. The press of the present application has been used with excellent results on metal, thin rough paper, plastic and other materials.

While any suitable web feed may be used, I prefer the device shown in FIGS. 20 and 21. It is essential that the web feed moves the web into the press at a uniform speed under uniform tension. It is desirable that the web be stretched to remove any undesirable lasticity which may interfere with the register of the colors. It is also desir-

able that the shock caused by pulling the web from an unwinding reel be taken up short of the press. Thus the web should be fed smoothly and evenly. The device shown in FIGS. 20 and 21 is designed for this purpose.

Mounted on the base **129**, forwardly of the press, is an auxiliary base **180** having generally triangular side plates **181**. The feed comprises three cylinders arranged in pyramid form. Cylinders **182** and **183** are mounted in horizontal alignment between the plates **181**. Cylinders **182** and **183** are provided with steel surfaces. Mounted between the plates **181** above and between the cylinders **182** and **183** is an idler cylinder **184** having a rubber jacket. As shown in FIG. 18, a drive shaft **167** extends from the gear arrangement described therein. This shaft **167** extends along one end of the cylinders **182** and **183** and is provided with bevel gears **185** and **186** meshing with gears at the end of the cylinders. Thus cylinders **182** and **183** are positively driven in a counterclockwise direction as shown by the arrows in FIG. 20.

The web **38** therefore, coming from the left in FIG. 20, passes under and around the cylinder **182** over the cylinder **184**, which rotates clockwise, then under and around the cylinder **183**. This serpentine arrangement produces positive gripping action on the web **38** and ensures an even feed.

To provide stretch and to take up the shock, a second set of cylinders similarly arranged is provided in spaced relation to the first set as shown in FIG. 20. Here a base **187** is slidably mounted in the main base **129**. Triangular plates **188** are mounted on the base **187**. The horizontally aligned cylinders **189** and **190** are provided with end gears connected by an idler gear **191** so that cylinders **189** and **190** will rotate together counterclockwise. The idler cylinder **192** is mounted on a shaft **193** journaled in a vertical slot **194** in each plate **188**. The web **38** passes under the cylinder **189** over the cylinder **192** and under the cylinder **190**. Any drag on the web will pull the cylinder **192** downwardly to tighten the feed and prevent slipping of the web. A cam lever **195** is pivotally mounted in the top of each plate **188** to hold the cylinder **192** down in the slot **194**. However, the lever **195** is used to release the cylinder **192** to permit the web to be threaded through the cylinders. It should be noted that the idler cylinder **184** is also provided with a similar arrangement **196** for threading the web. The arrangement of cylinders **189**, **190** and **192** are driven from the cylinder **182** to the right by a plurality of V-belts.

Extending from the end of the shaft of the cylinder **190** is a pulley **197**. Extending from the end of the shaft of the cylinder **182** is a pulley **198**. The pulley **198** is illustrated in FIG. 21. It comprises a plurality of split pulley segments **199**, with the outer segments fastened to the cylinder shaft and the intermediate segments held together by springs **200**. The V-belts **201** extend between the pulleys **197** and **198** so that the cylinders **190** and **189** are driven through the belts **201** from the cylinder **182**. The base **187** is provided with a bar or rod **202** controlled by a wheel **203** with a worm and gear arrangement for moving the base **187** away from or towards the base **180**.

With the web threaded through the various cylinders, the wheel **203** is turned to pull the base **187** away from the base **180**. Note that the increased pressure will cause the pulley segments **199** to separate slightly so that the V-belts will slide inwardly. This will cause the cylinders **189**, **190** and **192** to rotate at a slightly slower rate than the cylinders **182**, **183** and **184**. The web will therefore be stretched between the two sets of cylinders before being fed into the press. Any change or surge in the web will be taken up by the first unit to the left before the web passes across to the press feed unit on the right. This arrangement thus provides a uniform feed under proper tension, stretched to eliminate elasticity and designed to take up any shocks before entering the press.

The present invention thus provides a multiple color dry offset printing press having a great deal of flexibility. "Down" time is saved and colors and jobs can be rapidly changed especially if stand-by units are used. The press is easily adjustable and the single drive arrangement simplifies controls and reduces trouble spots. The single drive also permits the addition of automatic control devices. For example, the press can be controlled to go "on" impression at the exact point where it was taken "off" impression, thus eliminating waste of the web.

Other advantages of the present invention will be readily apparent to a person skilled in the art.

I claim:

1. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a removable auxiliary frame mounted in said main frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, and means for rotating said plate and transfer cylinders, said web driving means including a base, a pair of cylinders mounted in horizontal alignment on said base, a third cylinder mounted above and between said horizontal cylinders, means for rotating said horizontal cylinders, a second base adjustably positioned in spaced relation to said first base, a pair of cylinders mounted horizontally on said second base, a third cylinder mounted between and above said second pair of cylinders, a pulley wheel for driving said second pair of cylinders, a pulley wheel on one of said first pair of cylinders, a V-belt connecting said pulley wheels, the pulley wheel on the first pair of cylinders being split, and a spring for yieldingly holding said split portions together.

2. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a removable auxiliary frame mounted in said main frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, and means for rotating said plate and transfer cylinders, said plate and transfer cylinders continuing to rotate in register and said platen cylinder and web stopping when the press is "off" impression, said web driving means including a base, a pair of cylinders mounted in horizontal alignment on said base, a third cylinder mounted above and between said horizontal cylinders, means for rotating said horizontal cylinders, a second base adjustably positioned in spaced relation to said first base, a pair of cylinders mounted horizontally on said second base, a third cylinder mounted between and above said second pair of cylinders, a pulley wheel for driving said second pair of cylinders, a pulley wheel on one of said first pair of cylinders, a V-belt connecting said pulley wheels, the pulley wheel on the first pair of cylinders being split, and a spring for yieldingly holding said split portions together.

3. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a removable auxiliary frame mounted in said main frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, and means for rotating said plate and transfer cylinders, and means for successively moving said plate cylinder out of contact with said transfer cylinder and said transfer cylinder out of contact with said web when the press is "off" impression, said web driving means including a base, a pair of cylinders mounted in horizontal alignment on said base, a third cylinder mounted above and between said horizontal cylinders, means for rotating said horizontal cylinders, a second base adjustably positioned in spaced relation to said first base, a

pair of cylinders mounted horizontally on said second base, a third cylinder mounted between and above said second pair of cylinders, a pulley wheel for driving said second pair of cylinders, a pulley wheel on one of said first pair of cylinders, a V-belt connecting said pulley wheels, the pulley wheel on the first pair of cylinders being split, and a spring for yieldingly holding said split portions together.

4. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a removable auxiliary frame mounted in said main frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, said plate and transfer cylinders comprising mating cylinders of the same size having intermeshing gear drives, means for adjusting the contact between said transfer cylinder and said web, means for adjusting the contact between said plate cylinder and said transfer cylinder, means in said auxiliary frame for inking said plate cylinder, and means for rotating said plate and transfer cylinders, said web driving means including a base, a pair of cylinders mounted in horizontal alignment on said base, a third cylinder mounted above and between said horizontal cylinders, means for rotating said horizontal cylinders, a second base adjustably positioned in spaced relation to said first base, a pair of cylinders mounted horizontally on said second base, a third cylinder mounted between and above said second pair of cylinders, a pulley wheel for driving said second pair of cylinders, a pulley wheel on one of said first pair of cylinders, a V-belt connecting said pulley wheels, the pulley wheel on the first pair of cylinders being split, and a spring for yieldingly holding said split portions together.

5. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a removable auxiliary frame mounted in said main frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, and means for rotating said plate and transfer cylinders, said inking means comprising an ink reservoir in said auxiliary frame, an inking cylinder rotatable in said reservoir adjacent said plate cylinder, and a doctor blade contacting said plate cylinder, and means for adjusting said doctor blade horizontally, vertically and radially, said web driving means including a base, a pair of cylinders mounted in horizontal alignment on said base, a third cylinder mounted above and between said horizontal cylinders, means for rotating said horizontal cylinders, a second base adjustably positioned in spaced relation to said first base, a pair of cylinders mounted horizontally on said second base, a third cylinder mounted between and above said second pair of cylinders, a pulley wheel for driving said second pair of cylinders, a pulley wheel on one of said first pair of cylinders, a V-belt connecting said pulley wheels, the pulley wheel on the first pair of cylinders being split, and a spring for yieldingly holding said split portions together.

6. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

7. A dry offset printing press comprising a main frame, a plurality of spaced platen cylinders vertically mounted on said main frame, means for rotating said platen cylinders, means for driving a web around said platen cylinders, a plurality of self-contained mobile printing units each comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent each of said platen cylinders for supporting said mobile units in said main frame for relative motion therewith, each of said auxiliary frames including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile units are mounted in said main frame.

8. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

9. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said

plate cylinder out of contact with said transfer cylinder and then after a predetermined time lapse said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

10. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression and successively moving said transfer cylinder into contact with said web and then said plate cylinder into contact with said transfer cylinder when the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

11. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then after a predetermined time lapse said transfer cylinder out of contact with said web when the press is "off" impression and successively moving said transfer cylinder into contact with said web and then said plate cylinder into contact with said transfer cylinder when the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

12. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

13. A dry offset printing press comprising a main frame, a platen cylinder mounted in said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means comprising an ink reservoir in said auxiliary frame, an inking cylinder mounted in said auxiliary frame and depending into said reservoir, and a doctor blade contacting said plate cylinder, said inking cylinder being rotatably mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

14. A dry offset printing press comprising a main frame, a plurality of spaced platen cylinders vertically mounted on said main frame, means for rotating said platen cylinders, means for driving a web around said platen cylinders, a plurality of self-contained mobile printing units each comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent each of said platen cylinders for supporting said mobile units in said main frame for relative motion therewith, each of said auxiliary frames including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile units are mounted in said main frame.

15. A dry offset printing press compring a main frame, a plurality of spaced platen cylinders vertically mounted on said main frame, means for rotating said platen cylinders, means for driving a web around said platen cylinders, a plurality of self-contained mobile printing units each comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted

in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent each of said platen cylinders for supporting said mobile units in said main frame for relative motion therewith, each of said auxiliary frames including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile units are mounted in said main frame.

16. A dry offset printing press comprising a main frame, a plurality of spaced platen cylinders vertically mounted on said main frame, means for rotating said platen cylinders, means for driving a web around said platen cylinders, a plurality of self-contained mobile printing units each comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent each of said platen cylinders for supporting said mobile units in said main frame for relative motion therewith, each of said auxiliary frames including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile units are mounted in said main frame.

17. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

18. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined postion on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

19. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

20. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent

said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

21. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, said part supporting the rear end of said auxiliary frame when said part and means are in locking engagement and said press is "on" impression.

22. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

23. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said control shaft being rotatably mounted on said vertical portions, said control shaft supporting the rear end of said auxiliary frame when said control shaft is in locking engagement with the main frame and the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

24. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said control shaft being rotatably mounted on said vertical portions, said control shaft supporting the rear end of said auxiliary frame when said control shaft is in locking engagement with the main frame and the press is "on" impression, said transfer and plate cylinders being slidably mounted on said auxiliary frame members, said control shaft having eccentric cam portions for successively sliding said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

25. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means

for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said control shaft being rotatably mounted on said vertical portions, said control shaft supporting the rear end of said auxiliary frame when said control shaft is in locking engagement with the main frame and the press is "on" impression, said transfer and plate cylinders being slidably mounted on said auxiliary frame members, said control shaft having eccentric cam portions for successively sliding said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and successively moving said transfer cylinder into contact with said web and then said plate cylinder into contact with said transfer cylinder when the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

26. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

27. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and successively moving said transfer cylinder into contact with said web and then said plate cylinder into contact with said transfer cylinder when the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

28. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means including an inking cylinder mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

29. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means comprising an ink reservoir in said auxiliary frame, an inking cylinder mounted in said auxiliary frame and depending into said reservoir, and a doctor blade contacting said plate cylinder, said inking cylinder being rotatably mounted in spaced relation to said plate cylinder

for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

30. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, said plate cylinder having intaglio cells in its surface, said inking means comprising an ink reservoir in said auxiliary frame, an inking cylinder mounted in said auxiliary frame and dependng into said reservoir, and a doctor blade contacting said plate cylinder, said inking cylinder being rotatably mounted in spaced relation to said plate cylinder for stuffing ink into said intaglio cells, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said last named means successively moving said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame.

31. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a movable part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part when moved having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said part being mounted on said vertical portions, said part supporting the rear end of said auxiliary frame when said part and means are in locking engagement and said press is "on" impression, the rear end of said auxiliary frame having supporting wheels positioned in a higher horizontal plane than said front shaft supporting wheels, said front and rear wheels supporting said auxiliary frame when said press is "off" impression and for movement of said mobile unit into and out of said main frame.

32. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said control shaft being rotatably mounted on said vertical portions, said control shaft supporting the rear end of said auxiliary frame when said control shaft is in locking engagement with the main frame and the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame, the rear of said auxiliary frame having supporting wheels positioned in a higher horizontal plane than said fornt shaft supporting wheels, said front and rear wheels supporting said auxiliary frame when said press is "off" impression and for movement of said mobile unit into and out of said main frame.

33. A dry offset printing press comprising a main frame, a platen cylinder mounted on said frame, means for rotating said platen cylinder, means for driving a web around said platen cylinder, a self-contained mobile printing unit comprising an auxiliary frame, a transfer cylinder mounted in said auxiliary frame, a plate cylinder mounted in said auxiliary frame, means in said auxiliary frame for inking said plate cylinder, said plate cylinder and inking means being supported for relative adjustment, means on said main frame adjacent said platen cylinder for supporting said mobile unit in said main frame for relative motion therewith, said auxiliary frame including a part which cooperates in locking engagement with means on said main frame for locating said auxiliary frame in a predetermined position on the main frame when said part and means are in locking engagement, said part comprising an eccentric control shaft mounted on said auxiliary frame, said locking means comprising spaced slots in the rear edges of said main frame for receiving the ends of said control shaft, and means in said slots for releasably locking said shaft in said slot, said part having means cooperating with other means

on said auxiliary frame for producing relative motion between the web, transfer cylinder, and plate cylinder, said auxiliary frame comprising a pair of spaced parallel members connected at their front ends by a transverse shaft, a supporting wheel at each end of said shaft, the rear end of said members having integral vertical portions, said control shaft being rotatably mounted on said vertical portions, said control shaft supporting the rear end of said auxiliary frame when said control shaft is in locking engagement with the main frame and the press is "on" impression, said transfer and plate cylinders being slidably mounted on said auxiliary frame members, said control shaft having eccentric cam portions for successively sliding said plate cylinder out of contact with said transfer cylinder and then said transfer cylinder out of contact with said web when the press is "off" impression, and successively moving said transfer cylinder into contact with said web and then said plate cylinder into contact with said transfer cylinder when the press is "on" impression, and means in said main frame for rotating said plate and transfer cylinders when said mobile unit is mounted in said main frame, the rear end of said auxiliary frame having supporting wheels positioned in a higher horizontal plane than said front shaft supporting wheels, said front and rear wheels supporting said auxiliary frame when said press is "off" impression and for movement of said mobile unit into and out of said main frame.

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