Nov. 3, 1942. E. O. VANDERCOOK ET AL 2,300,715

MULTICOLOR PROOF PRESS

Filed May 26, 1941 3 Sheets-Sheet 1

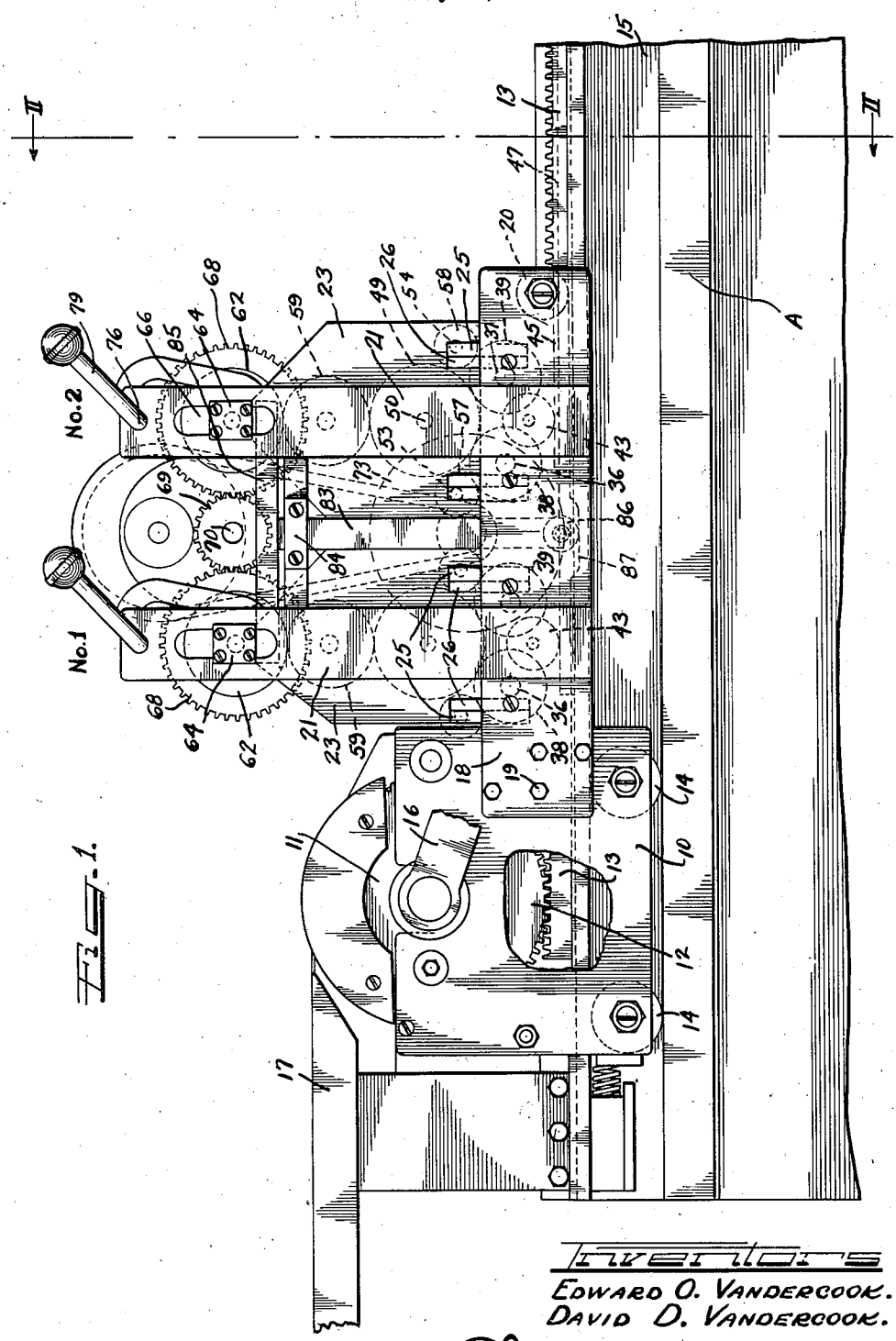

FIG. 1.

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Filed May 26, 1941 3 Sheets-Sheet 2

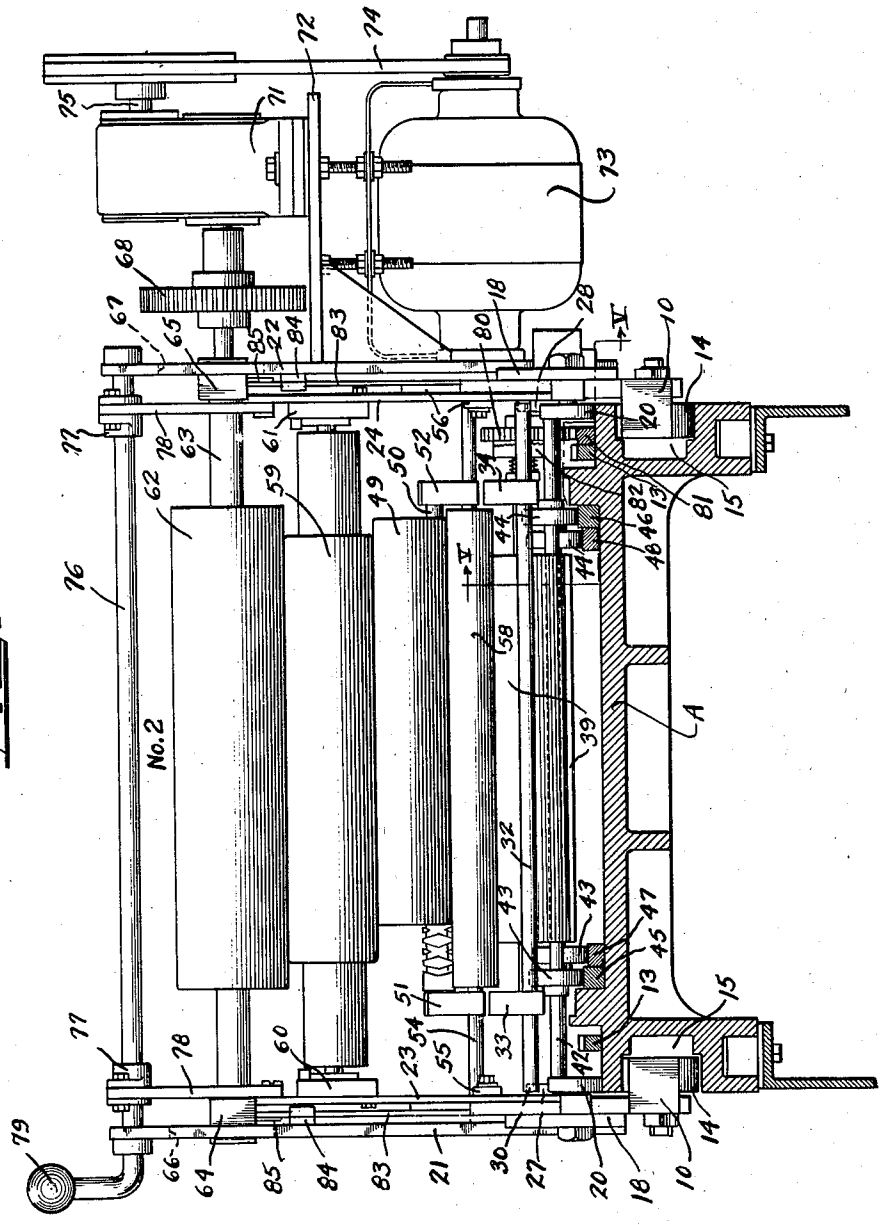

FIG. 2.

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Nov. 3, 1942. E. O. VANDERCOOK ET AL 2,300,715

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Filed May 26, 1941 3 Sheets-Sheet 3

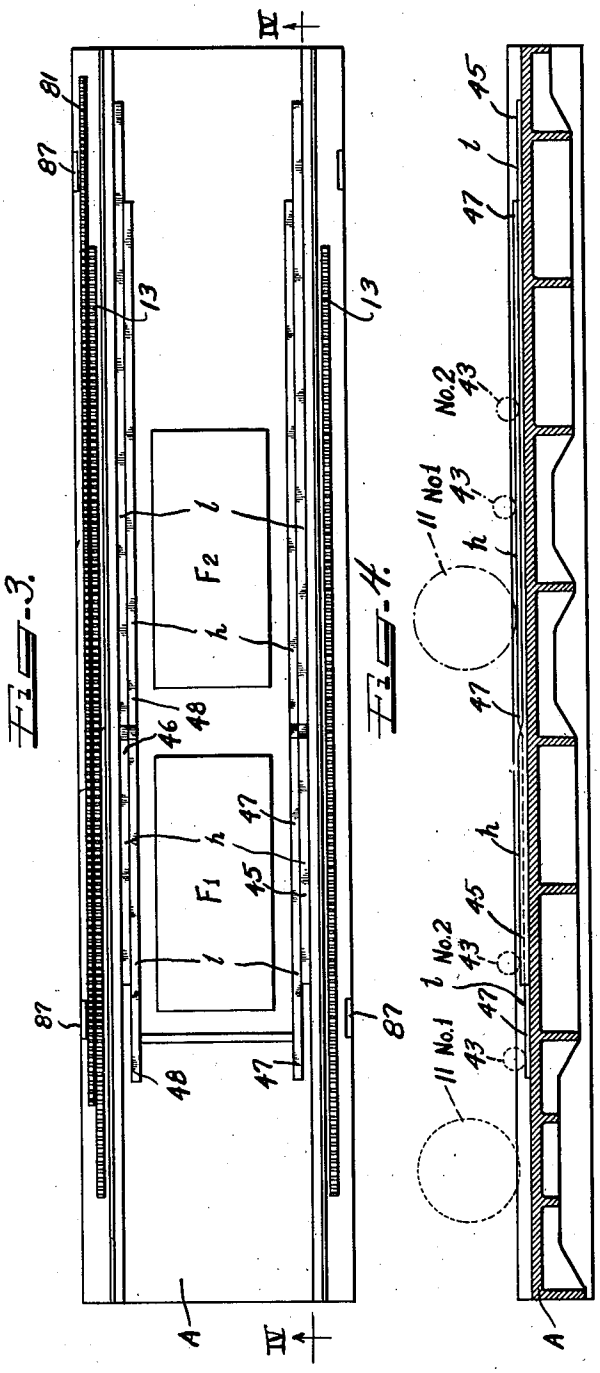

Fig. 3.

Fig. 4.

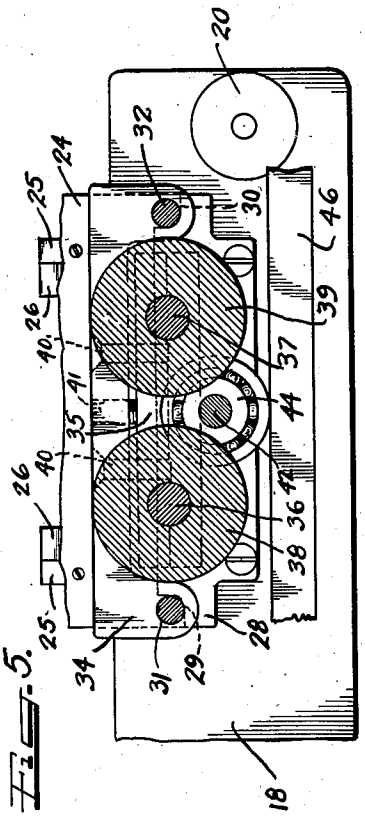

Fig. 5.

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UNITED STATES PATENT OFFICE

2,300,715

MULTICOLOR PROOF PRESS

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Chicago, Ill., a corporation of Illinois

Application May 26, 1941, Serial No. 395,124

3 Claims. (Cl. 101—186)

This invention relates to multi-color proof presses of the type in which an impression cylinder consecutively engages with a number of forms inked with different color ink for impression on a sheet carried by the cylinder. In general, the object of the invention is to provide improved and more practical and efficient arrangement and operation for inking the various forms.

In prior multi-color proof presses, the forms or plates are inked in one direction and printed in a direction at right angles to that in which they are inked, this of itself failing to produce the most desired and efficient results. In such prior presses the different color inking units are simultaneously moved crosswise of the press bed for simultaneous inking of the forms and consequently there are different lapses of time between the inking of the forms or plates and the engagement thereof by the impression cylinder and during such time lapses the ink on the forms may change its characteristics so that efficient and uniform proof printing cannot be accomplished.

The important object of the invention is therefore to eliminate the objectionable features of inking and printing at right angles to each other and the resultant delay between inking and printing. In accordance with our invention the arrangement and operation is such that different color inking units will move together with the cylinder and will be selectively applied to the corresponding plates for inking of each plate substantially immediately before the plate is engaged by the impression cylinder. In other words, the arrangement and operation is such that the plates will be consecutively engaged by the impression cylinder but each plate will not be inked until the impression cylinder is about to engage therewith so that inking of a plate will be immediately followed by printing therefrom.

The various features of the invention are embodied in the structure shown on the drawings, in which drawings:

Figure 1 is a side elevation of one end of a press bed structure showing the impression cylinder assembly and the inking unit assembly associated therewith;

Figure 2 is a section on plane II—II Figure 1;

Figure 3 is a plan view of the press bed showing the arrangement of the controlling rails for the inking units;

Figure 4 is a section on plane IV——IV Figure 3; and

Figure 5 is an enlarged section on plane V—V Figure 2.

On the press shown, A represents the bed plate structure. The impression cylinder assembly comprises the frame 10, in which is journaled the impression cylinder structure 11 having the gears 12 at its opposite ends for engagement with the racks 13 on the bed plate, the frame 10 at its opposite ends carrying supporting rollers 14 for engaging in the track channels 15 at the opposite sides of the bed plate structure. The cylinder structure may be power driven, or, as shown, may be manually driven by means of a crank 16 for travel over the press bed in a manner well understood in the art. From a feed table 17 mounted on the press bed sheets to be printed may be fed to the cylinder to be secured thereto by suitable clamping means (not shown).

An assembly of inking units is supported from the impression cylinder carriage 10 for travel with the carriage over the press bed in advance of the impression cylinder. Sidewalls 18 are secured at their inner ends to the opposite ends of the cylinder carriage 10, as by bolts 19, these sidewalls at their forward ends mounting rollers or wheels 20 engaging the bed plate to assist in supporting the inking assembly. In accordance with our invention, any number of inking units may be provided depending upon the number of colors to be printed. On the drawings two inking units are shown. The inking controlling rollers of each unit extend transversely of the press bed parallel with the impression cylinder and in advance thereof for inking of a plate on the bed at a predetermined time. The two inking units shown are designated No. 1 and No. 2.

The inking roller arrangement and control thereof is the same for each inking unit. Each unit is mounted between vertical walls or bars 21 and 22 extending upwardly from the opposite sidewalls 18. Inwardly of the side bars 21 and 22 of each unit are side plates 23 and 24 from which the various inking rollers are supported. These plates at their lower ends have guide bars 25 secured thereto for dovetail connection with guide bars 26 on the sidewalls 18 so that the side plates are mounted and guided for vertical shift. Secured against the inner sides of the plates 23 and 24 at the lower ends thereof are lift plates 27 and 28 respectively (Figures 1 and 5), these lift plates at their upper outer corners having recesses 29 and 30 respectively. These recesses receive the opposite ends of rods 31 and 32 which inwardly of their ends extend through and are secured to bars 33 and 34. These bars

are of inverted U shape (Figure 5), each bar receiving and spanning a bearing block 35 for the shafts 36 and 37 of a pair of form rollers 38 and 39. Figure 5 shows one manner of supporting and adjusting the bearing blocks. Screws 40 extending through the bar have threaded engagement with the bearing block for effecting vertical adjustment of the bearing block in the bar, and after adjustment, a set screw 41 in the bar engages the bearing block to hold the adjustment.

Extending between and journaled at its ends in the lift plates 27 and 28 on the sidewalls 23 and 24 is a shaft 42 on which are the track rollers 43 and 44. The track rollers 43 and 44 for the unit No. 2 (Figure 2) travel on rails 45 and 46 on the press bed and extending along the sides thereof. The track rollers 43 and 44 for the unit No. 1 travel on rails 47 and 48 on the press bed. As will be pointed out more in detail later, these rails are of different heights at different points along the press bed so that the engagement of the track rollers of a unit with the rails will effect vertical movement of the side plates 23 and 24 for raising of the corresponding form rollers and holding them a distance above the printing plane to prevent inking of a form at such time.

Above the form rollers for each unit is a vibrator or ink spreading roll 49 which is journaled on a shaft 50 extending between the bars 51 and 52 which are supported on shafts 53 and 54 journaled at their ends in bearings 55 and 56 on the side plates 23 and 24. These shafts 53 and 54 support idler rollers 57 and 58 which engage respectively with the form rollers 38 and 39.

Above each vibrator roll is a rider roll 59 journaled in bearings 60 and 61 in the side plates 23 and 24, and above the rider roll is an ink drum 62 for applying ink to the rider roll. The shaft 63 of the ink drum is journaled in bearing boxes 64 and 65 confined for vertical movement in slots 66 and 67 in the side bars 21 and 22 respectively of each unit. At the outer end of the shaft 63 for each unit is a driving gear 68. These driving gears 68 for the ink drums are engaged by a driving pinion 69 on the shaft 70 extending from one end of a train of reduction gearing within a housing 71 mounted on a bracket 72 secured to the side bar 22. From this bracket is suspended a driving motor 73 connected by a driving belt 74 with the other shaft 75 of the reduction gearing.

Extending between the upper ends of the side bars 21 and 22 is a shaft 76 having arms 77 connected with links 78 through which the ends of the ink drum shaft 63 extend, the links at their lower ends being secured to the upper ends of the side plates 23 and 24 respectively. The shaft 76 is provided with a crank 79 and upon turning of the shaft the side plates 23 and 24 with the various roll mechanisms mounted thereon will be raised, the upper ends of the side plates 23 and 24 abutting the journal boxes 64 and 65 for the shaft 63 so that this shaft will also be raised, this manual raising of the ink roller assembly being usually for the purpose of inspection or cleaning or repairs.

On Figures 3 and 4, the arrangement of the tracks 45, 46 and 47, 48 is clearly shown. On Figure 3 are shown forms F1 and F2 which are to be inked by the respective units No. 1 and No. 2, and on Figure 4 are shown in dotted lines the various positions of the impression cylinder 11 and the track wheels 43 and 44 and their cooperation with the rails. The inking unit No. 1 will ink form F1 and inking unit No. 2 will ink the form F2. Figure 1 shows the impression cylinder and inking assembly at the left end of the machine ready for a printing operation. The low portions l of the rails 47 and 48 engaged by the track rollers 43 and 44 of unit No. 1 are of a height so that the form rollers 38 and 39 of unit No. 1 will have inking engagement with the form F1 when the printing cylinder travels toward the right, the cylinder then carrying the sheet to be printed across the form F1 in the wake of the form rolls for an impression on the sheet from the form F1 with the color for which inking unit No. 1 has been inked. During such impression from the form F1, the track rollers 43 and 44 for inking unit No. 2 will ride along the high portions *h* of the rails 45 and 46 so that the printing rolls of unit No. 2 will be prevented from inking engagement with the form F1. After inking of form F1 by unit No. 1 its rollers will engage the high portions *h* of rails 47 and 48, so that the unit No. 1 will be raised to prevent inking engagement thereof with the form F2. When the track rollers 43 and 44 of unit No. 2 have traveled beyond the form F1 on the high portion of the rails 45 and 46, the rollers will drop down to the lower portions of the rails for engagement of the form rollers of inking unit No. 2 with the form F2 for inking thereof by the colored ink on unit No. 2 and the impression cylinder follows and makes the impression from the form F2.

In the operation of the proof press the ink drums 62 are effective only at the ends of the printing strokes of the press for applying ink to the rider rolls 59, and during the printing operation between inkings by the ink drums, the form rollers are positively driven. As shown on Figure 2, each form roller has a gear 80 at one end engageable with the rack 81 on the press bed. Suitable clutch means 82 is provided for connecting the gears with the form roller shafts and suitable means, not shown, are usually provided for unclutching the gears 80 from the form roller shafts during the periods when the ink drums are effective to apply ink to the form rollers through the intervening roll members.

The means for rendering the ink drums 62 ineffective comprises raise bars 83 at the opposite sides of the inking assembly, these bars being guided at their lower ends by the sidewalls 18 and at their upper ends by cross guides 84 extending between the side bars 21 and 22. The bars 83 at their upper ends terminate in cross bars 85 below the journal boxes 64 and 65 for the ink drums 62 of the inking units. The bars 83 at their lower ends have rollers 86 engageable with the press bed, and at the ends of the travels of the impression cylinder carriage, these rollers 86 engage in depressions 87 in the press bed for lowering of the bars to permit downward movement of the ink drum journal boxes for inking engagement of the ink drums with the rider rolls 59 for inking of the form rollers, the driving gears for the form rollers being at such times unclutched from the form rollers. As soon as the printing drum and inking assembly starts its movement from one end of the bed to the other, the rollers 86 will travel out of the depressions 87 and the raise bars 83 will be raised to lift the inking drums into non-inking position and the clutches 82 will be rendered effective for clutching of the gears 80 to the form rollers which will then be positively driven, and the train of inking rolls above the form rolls will be frictionally driven for spreading and applying ink to the form rolls. When the

printing and inking assembly reaches the end of the bed the form roll gears **80** will again be unclutched and the ink drums will be lowered for application of ink to the ink roll train for inking of the form rolls.

When the rollers **43**, **44** of an inking unit travel from the low portion of their supporting rails to the higher portion thereof, the corresponding side plates **23** and **24** with all of the inking roll mechanism mounted thereon will be raised. Figure 1 shows inking unit No. 2 held raised by engagement of its rollers **43**, **44** with high track, while the rollers of unit No. 1 are on low track.

We have thus produced a more compact, more practical and efficient arrangement and operation for inking forms on multi-color proof presses. The inking units are compactly assembled in front of the impression cylinder carriage in tandem, with the inking rolls extending transversely of the press bed, the inking units progressively engaging with the respective forms to be inked thereby with the least lapse of time between inking of a form by the respective inking unit and the impression engagement of the impression cylinder with that form. In other words, inking is in the same direction as printing and with a minimum lapse of time between inking and printing of a form.

We have shown a practical and efficient embodiment of the features of our invention but we do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications may be made without departing from the scope of the invention.

We claim as our invention:

1. In a multi-color proof press of the reciprocating type, an impression cylinder and a carriage therefor reciprocable over the press bed for successively impressing a sheet supported on the cylinder against forms on the press bed, supporting walls extending forwardly from the opposite sides of said carriage, an individual inking unit for each form, each unit comprising opposed upwardly extending supporting bars on said supporting walls, opposed supporting plates mounted on said supporting walls for vertical movement thereon, form rollers journaled by said plates at the lower end thereof, inking rolls above said form rollers journaled by said plates, an ink drum for said inking rolls journaled in said supporting bars, track rollers at the lower ends of said plates, tracks on said press bed for the rollers of each unit and having high portions for holding said units above the inking plane and depressed portions for holding said units in the inking plane for inking by the units of the respective forms as said carriage reciprocates over the press bed, a common raising means for the ink drums of the units and means whereby said raising means is effective during reciprocation of the carriage over the forms to hold the ink drums disengaged from the inking rolls of the respective units and to effect engagement of the drums with the inking rolls only at the ends of carriage reciprocation.

2. In a multi-color proof press of the reciprocating type, an impression cylinder and a carriage therefor reciprocable over the press bed for successively impressing a sheet supported on the cylinder against forms on the press bed, supporting walls extending forwardly from the opposite sides of said carriage, an individual inking unit for each form, each unit comprising opposed upwardly extending supporting bars on said supporting walls, opposed supporting plates mounted on said supporting walls for vertical movement thereon, form rollers journaled by said plates at the lower end thereof, inking rolls above said form rollers journaled by said plates, an ink drum for said inking rolls journaled in said supporting bars, track rollers at the lower ends of said plates, tracks on said press bed for the rollers of each unit and having high portions for holding said units above the inking plane and depressed portions for holding said units in the inking plane for inking by the units of the respective forms as said carriage reciprocates over the press bed, a common raising structure for the ink drums of said units having rollers for engagement with the press bed during reciprocation of the carriage to hold said drums disengaged from the inking rolls of the respective units, said press bed having depressions at its ends for receiving said rollers to permit said ink drums to engage with the inking rolls for inking thereof.

3. In a multi-color proof press of the reciprocating type, an impression cylinder and a carriage therefor reciprocable over the press bed for successively impressing a sheet supported on the cylinder against forms on the press bed, supporting walls extending forwardly from the opposite sides of said carriage, an individual inking unit for each form, each unit comprising opposed upwardly extending supporting bars on said supporting walls, opposed supporting plates mounted on said supporting walls for vertical movement thereon, form rollers journaled by said plates at the lower end thereof, inking rollers above said form rollers journaled by said plates, an ink drum for said inking rolls journaled in said supporting bars, track rollers at the lower ends of said plates, tracks on said press bed for the rollers of each unit and having high portions for holding said units above the inking plane and depressed portions for holding said units in the inking plane for inking by the units of the respective forms as said carriage reciprocates over the press bed, a common driving means for the ink drums of the units, means rendering said ink drums effective only at the ends of carriage reciprocation for driving engagement with the inking rolls and inking of the form rollers, means for simultaneously holding said ink drums elevated out of engagement with the inking rolls during reciprocation of the carriage for engagement of the form rollers with the forms, and means for directly driving said form rollers during such reciprocation of the carriage.

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