

Feb. 1, 1949.

W. C. HUEBNER

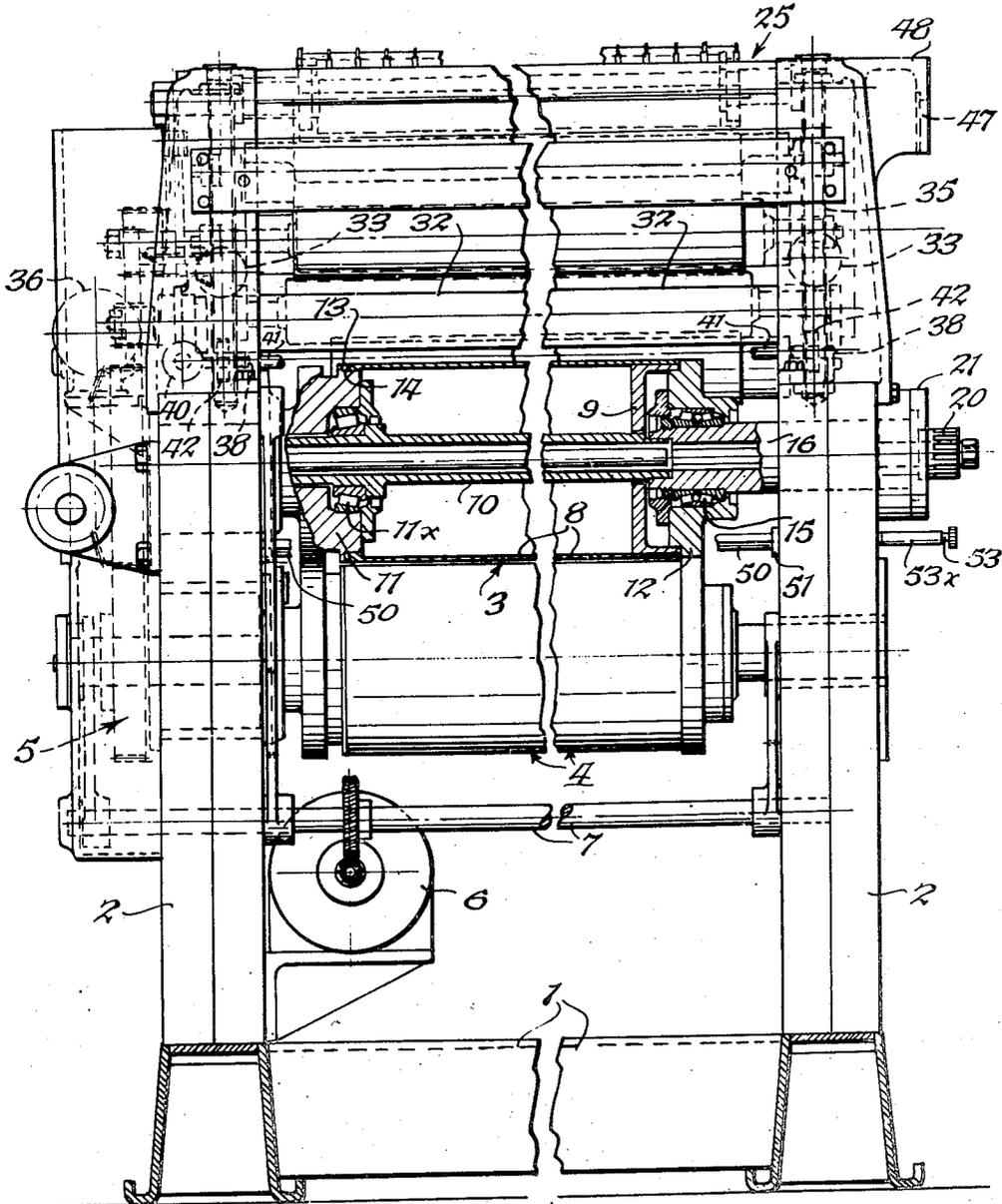
2,460,504

PRINTING APPARATUS

Filed Oct. 24, 1944

7 Sheets-Sheet 1

Fig. 1.



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7 Sheets-Sheet 2

Fig. 2.

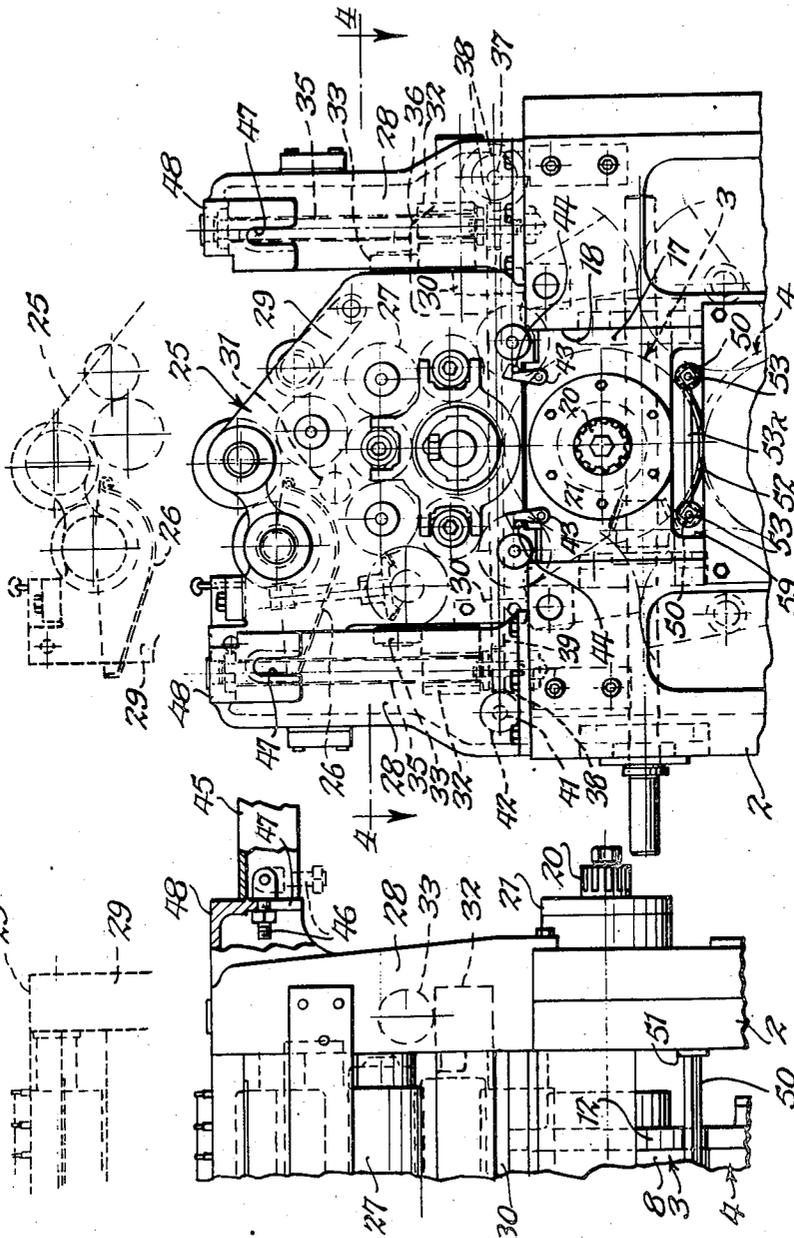


Fig. 3.

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7 Sheets-Sheet 3

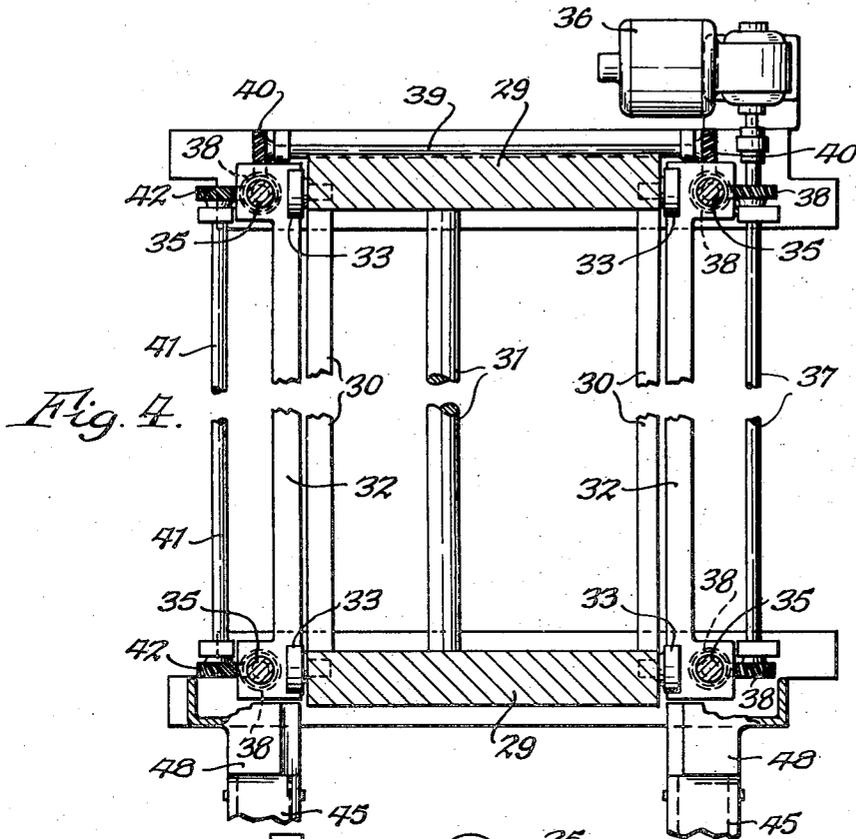


Fig. 4.

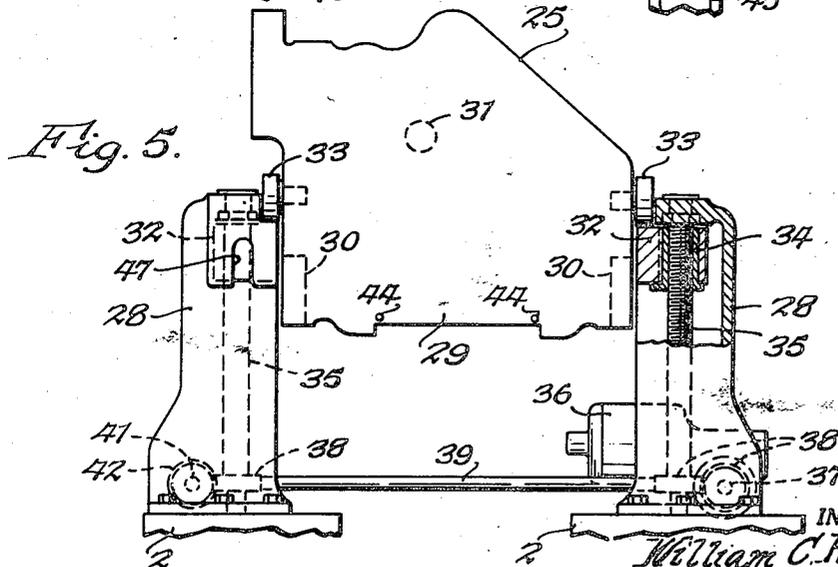


Fig. 5.

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Fig. 6.

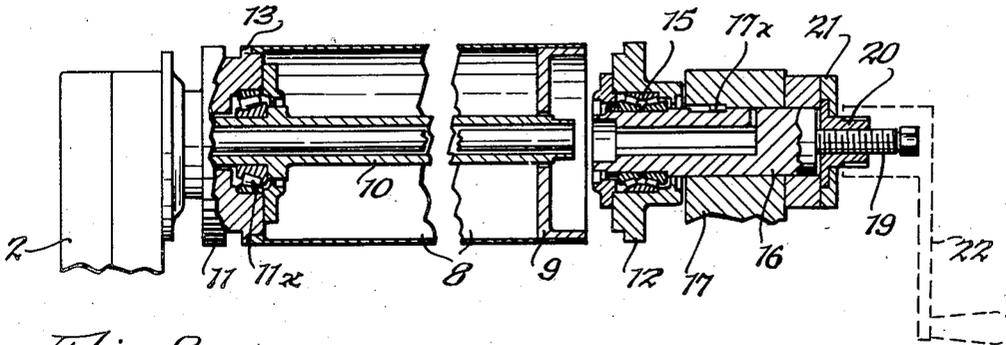


Fig. 8.

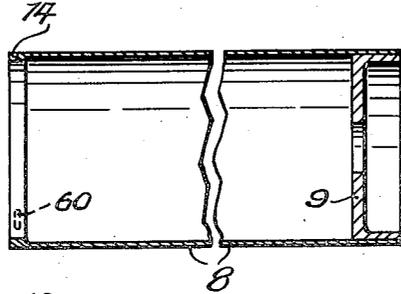
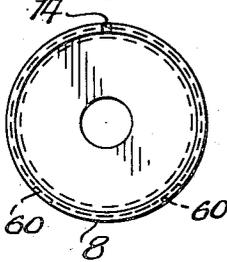


Fig. 7.

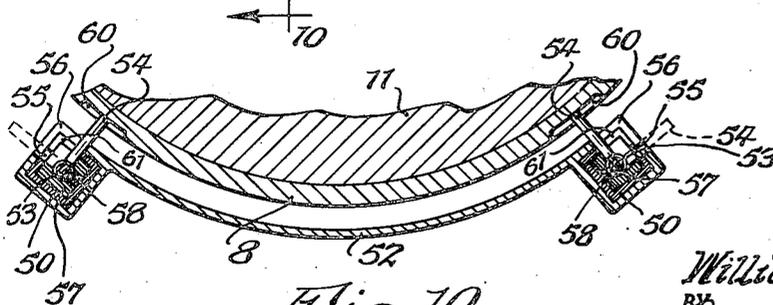
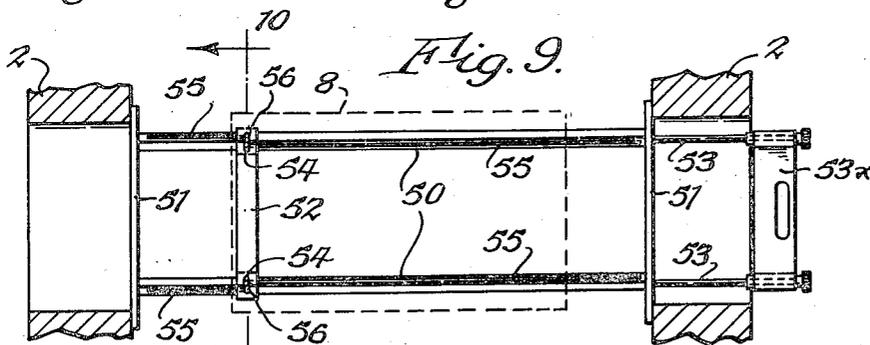


Fig. 10.

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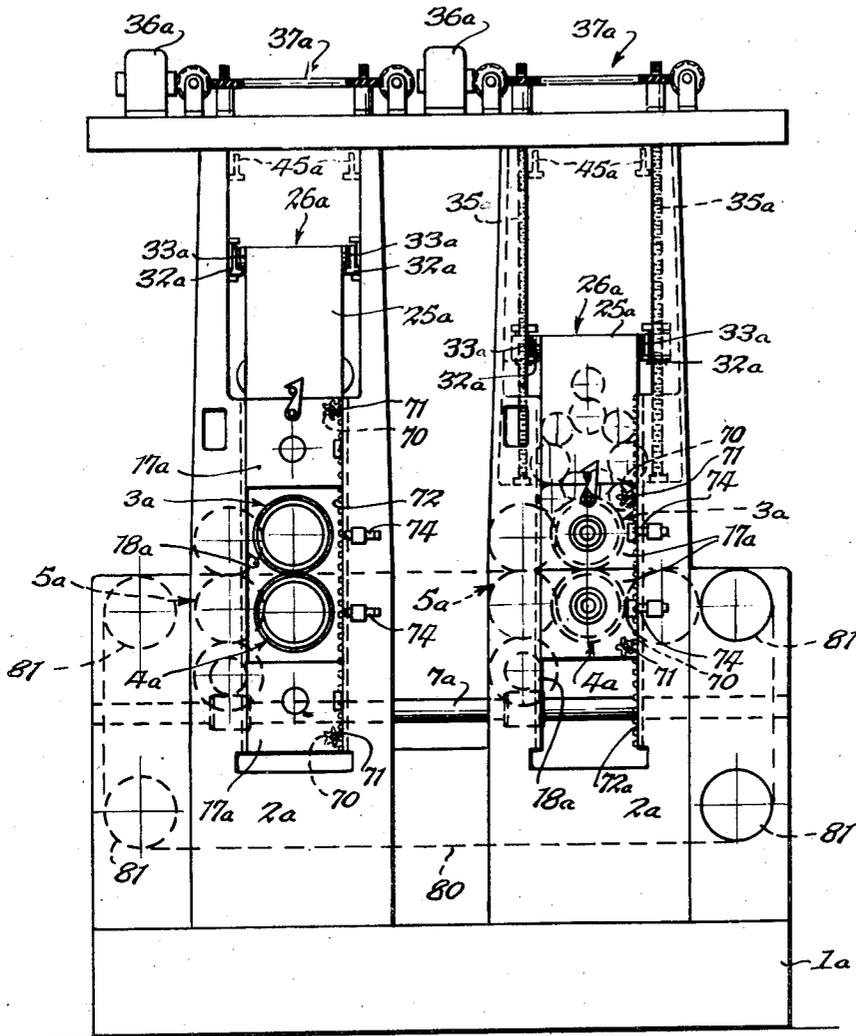


Fig. 11.

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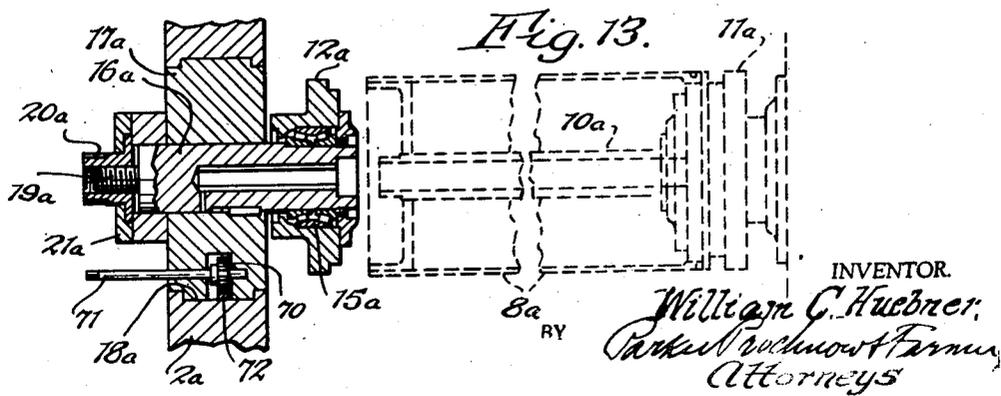
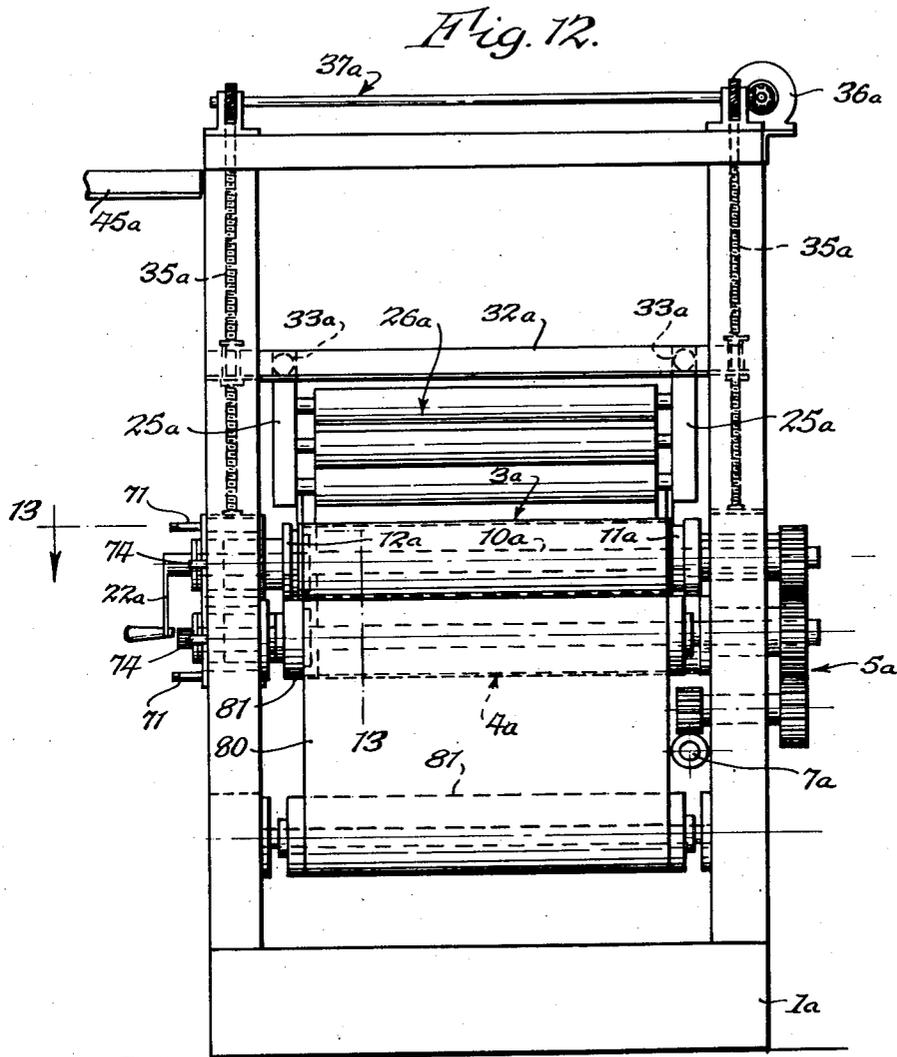
Feb. 1, 1949.

W. C. HUEBNER
PRINTING APPARATUS

2,460,504

Filed Oct. 24, 1944

7 Sheets—Sheet 6



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W. C. HUEBNER
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Filed Oct. 24, 1944

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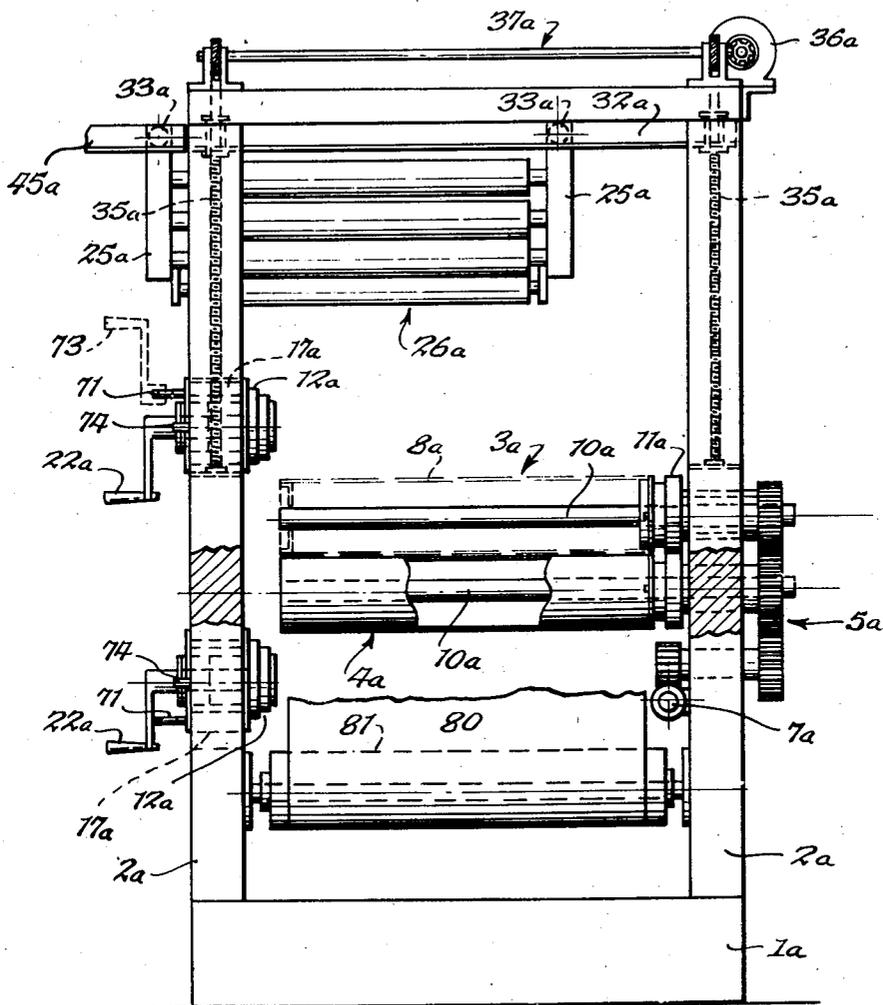


Fig. 14.

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UNITED STATES PATENT OFFICE

2,460,504

PRINTING APPARATUS

William C. Huebner, New York, N. Y.

Application October 24, 1944, Serial No. 560,136

13 Claims. (Cl. 101—1)

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This invention relates to improvements in printing presses or apparatus employing printing cylinders carrying printing surfaces or images from which ink impressions or prints are made on print-receiving elements or materials, and more particularly to improvements in printing presses or apparatus of the nature disclosed in U. S. Patents Nos. 1,820,194 and 2,224,391, granted to me respectively August 25, 1931, and December 10, 1940, in which the ink is transferred from the printing surface or image to the print-receiving element, as by electrostatic or electromagnetic force or action.

In the practical application of printing apparatus of this nature, development work has demonstrated that it is highly desirable and greatly facilitates the operation of the apparatus and makes it possible to increase its speed of production to have a printing cylinder of relatively thin or light weight tubular form carrying the printing surface or image, and which can be quickly and easily removed from the apparatus and reinserted therein in the same predetermined position, or which can be replaced by another like cylinder having another printing image in like predetermined registration with the cylinder drive mechanism or moving parts of the apparatus. The image to be printed may be made directly on the peripheral surface of the cylinder tube itself by the well known photographic process, or separate curved plates on which the printing images or surfaces are provided by photographic or other processes may be made and mounted upon the periphery of the cylinder tube. In either case the peripheral printing surfaces or images of different cylinders must register one with the other and the surface speeds of different printing cylinders must be in unison, particularly in multicolor work, to obtain the best printed results.

It is important to practical and efficient operation of such apparatus that the cylinders should be mounted in such a manner as to enable quick and easy removal and replacement of the same cylinder or its replacement by another cylinder in the same predetermined or registered position. In this way a set of similar printing cylinders carrying the necessary different images for the different color prints of a multicolor job can be prepared and made ready for work outside of the press and placed in operative position or interchanged one with another, as required, for making different colored prints.

One object of my invention therefore is to provide practical and desirable means whereby the

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printing cylinder of a press or apparatus, and especially an apparatus of the electric action type mentioned, can be quickly and easily removed from and replaced in the same predetermined position or interchanged with another printing cylinder in the apparatus.

It is to be understood that any removable cylinder inserted in the press is arranged to function in coordination with position-determining or locating means on the cylinder drive device or mechanism, whereby when the cylinder is operatively connected with a rotatable end support located at the operator's side of the press, the cylinder will be located in the intended, predetermined position in proper alinement and registration for printing. Similar functions and operative procedure apply either in single or multicolor work in a multicolor press having two or more printing units, thus making it possible to provide a set of cylinders for producing a given multicolor design to be printed, which cylinders are quickly interchangeable one for another, thereby reducing the idle or waiting time of the press to a minimum, since no make-ready is needed because all of the printing cylinders comprising a set of color printing images will register one with the other simply by inserting them in the press, so that when the press is started and a sheet or web fed through the press, the printed images will fall over each other in exact register on the print-receiving element or material.

Another object of my invention is to provide simple and practical means enabling the accomplishment of these results.

Other objects of the invention are to provide means constructed and arranged to enable the removable cylinder to be removed and replaced in a direction lengthwise of itself from the operator's side of the press or apparatus; to arrange and coordinate the cylinder and its supporting means so that the cylinder is detachably connected at its inner or far end with a driving support, and at its near, or operator's end of the cylinder is provided a rotatable end support which is releasable from the cylinder and, when released, is movable away from its operative position opposite the end of the cylinder so as to provide an open space or clearance through which the cylinder is removable endwise or in the direction of its length from the press.

It is also desirable to provide means which function, when inserting a cylinder into or removing it from its operative position in the press, to support and guide the inner end of the cylinder in such a way as to prevent contact of the print-

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ing surface or image with nearby parts of the press or apparatus, and thereby preclude possible damage to the printing surface or image; and so as also to facilitate the introduction and removal of the cylinder into and from the press and reduce straining or lifting effort on the part of the operator in removing and replacing the cylinder.

Another object of my invention is to provide convenient means for this purpose, preferably in the form of a sliding rest, for engaging and supporting the inner end of the cylinder while it is being inserted or removed.

Still another object of the invention is to arrange or mount the inking means or system of the press, whether comprised of orthodox rollers and vibrators or special rollers or instrumentalities of whatever assembly or relation, so that the inking means can be raised as a unit clear of the printing cylinder to an inoperative position, preferably at the top of the press, in which position said inking unit can be readily rolled or moved out of the press onto a separate portable carriage or device which has been placed beside the press, and provides a cleaning or wash-up device for the inking unit. This cleaning device, which forms the subject matter of another application for U. S. patent, may be provided with a complete roller wash-up system so that all ink can be removed from the inking rollers or instrumentalities outside of the press. It is also provided with inking roller setting or adjusting means and a master or pilot cylinder so that the setting of the rollers relatively to the printing cylinder can be done outside of the press, the arrangement being such that a separate carriage or device carrying a clean inking unit may be moved beside the press and such clean inking unit be inserted into the press while the first inking unit is being cleaned and reset. Thus, in a single or multicolor press, the operating or productive time of the press is increased definitely because the customary wash-up and make-ready time is entirely eliminated.

Further objects and advantages of the invention will appear from the following specification of the preferred embodiments of the invention shown in the accompanying drawings, and the novel features of the invention are set forth in the appended claims.

The drawings illustrate presses or apparatus of two alternative, somewhat different constructions embodying the invention.

Fig. 1 is a front elevation, partly in section, of a single unit press or apparatus embodying the invention, showing the printing cylinder and its cooperating impression or supporting cylinder for the print-receiving material or element in normal, operative position, and the inking unit in its lowered or operative relation to the printing cylinder.

Fig. 2 is a fragmentary elevation of the operator's side of the press showing by solid lines the parts in normal position, and by broken lines indicating the upper portion of the inking unit in the position the inking unit occupies when it is raised and ready for removal from the press.

Fig. 3 is a fragmentary end elevation of the parts shown in Fig. 2, showing by solid lines the normal position of the parts, and by broken lines the raised position of the inking unit.

Fig. 4 is a sectional plan view on line 4-4, Fig. 2, showing the inking unit and the elevating means for raising and lowering the same.

Fig. 5 is a side elevation of the upper portion of the press showing the printing unit in its

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raised position ready for removal from the press onto the wash-up carriage or device in which the inking unit is cleaned and its elements pre-set ready for use in the press.

Fig. 6 is a transverse, sectional elevation of the printing cylinder and its end supports, the retractable support being withdrawn to free the cylinder for removal.

Fig. 7 is a broken, sectional elevation of the printing cylinder removed from the press.

Fig. 8 is an elevation of the driving end of the cylinder.

Fig. 9 is a sectional plan view showing the sliding rest for supporting and guiding the printing cylinder when inserting it into and removing it from the press.

Fig. 10 is an enlarged transverse section thereof on line 10-10, Fig. 9.

Fig. 11 is a schematic side elevation of a modified embodiment of the invention showing how two or more color units can be employed, and alternative means for shifting the mounting cylinder supports and the inking units.

Fig. 12 is a front elevation of the apparatus as shown in Fig. 11, showing the printing and cooperating cylinder and inking unit in position ready for printing.

Fig. 13 is a sectional plan view on line 13-13, Fig. 12, showing the retracting and elevating means for the cylinder end support, and indicating by broken lines the position of the printing cylinder relative to the end support when retracted.

Fig. 14 is a view similar to Fig. 12, partially broken away, but showing the inking unit in its elevated position and partially removed from the press, and also showing the printing cylinder removed, its position being indicated by broken lines. This figure also shows cylinder end supports at the operator's side of the press, one released from and raised out of the way of the printing cylinder to permit the latter's removal, and the end support for the lower cylinder being lowered to permit the removal of the lower cylinder.

Referring first to the embodiment of the invention illustrated in Figs. 1-10, 1 indicates the base of a press frame and 2 side standards rising from the base at opposite sides of the press. 3 represents the printing cylinder and 4 a cooperating impression cylinder, or cylinder for supporting the print-receiving element or material while receiving the print from the printing cylinder, these cylinders, as shown, being arranged parallel, one above the other, with the peripheral printing surface or image of the printing cylinder slightly above or out of contact with the print-receiving element supported by the cylinder 4. The two cylinders are driven by suitable drive gearing indicated generally at 5, which may be suitably arranged in the press at the side thereof distant from the operator's side and suitably driven, as by a motor 6, from which motion may be transmitted through a transverse shaft 7 geared to the motor and connected with the drive mechanism or gearing 5.

The printing cylinder, as shown (see Figs. 6-8), preferably comprises a light-weight, thin, cylindrical shell or tube 8 provided at one end with an annular end piece 9 to which the tube 8 is fixed and which, with the cylinder tube, is adapted to be sleeved over a stationary, hollow shaft 10 which is suitably supported stationarily in the press at the driving side thereof and, in this apparatus, functions to support parts of the electric printing

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means. The cylinder tube 8 is rotatably supported, preferably at opposite ends by end supports 11 and 12, with which the cylinder tube is detachably connected, as for instance, by fitting over the peripheries of these supports, which are of annular form, against peripheral shoulders thereon. The support 11 at the driving end of the cylinder is arranged to rotate about the stationary shaft 10 on a suitable bearing 11x, and is suitably connected with the drive gearing 5 of the press so as to be rotated thereby, and the cylinder tube 8 is interengaged or interlocked with the end support 11 so as to be rotated thereby, as for instance, by a lug 13 on the periphery of the support 11, adapted to fit closely in a notch 14, Figs. 7 and 8, in the adjacent end of the cylinder tube. The opposite end support 12 is retractable from its related end of the cylinder tube, in which it fits so as to provide proper support for this end of the tube, as presently explained, thus leaving the tube 8 free to be disengaged from the driving end support 11 and removed from the press, but due to the engagement of the lug 13 of the driving support in the end notch of the tube, the cylinder tube, when placed in the press in supporting engagement with the driving support, will always occupy the same predetermined positional relation to the driving support 11, so that the printing surface or image, however formed or provided on the periphery of the cylinder tube, will always be registered in the same position relatively to the cylinder driving mechanism or moving parts of the press or apparatus when the tube is placed in position therein.

As shown (see Figs. 1 and 6), the retractable end support 12 is mounted by means of a suitable bearing, preferably a double end thrust roller bearing 15, on a supporting journal or member 16 which is movable endwise in a bearing block 17 in which it may be held from turning, as by a key 17x. The bearing block 17 is mounted for vertical movement in an opening 18, see Fig. 2, in the adjacent frame side standard 2, which opening has opposite, vertical guide edges with which the front and rear faces of the bearing block are slidably engaged so as to enable the bearing block to be slid up and down from and to its normal cylinder-supporting position. As shown in Fig. 6, the journal 16 has a screw threaded, outer end portion 19 on which turns a threaded nut 20 that is rotatably mounted, as by means of an annular retaining cap 21, suitably secured on the outer end of the bearing block. The outwardly projecting end of this nut may be toothed or otherwise fashioned for the removable engagement of a crank or device 22 (shown by broken lines in Fig. 6) for turning the nut. Thus, the nut may be turned and move the journal 16 for engaging its rotatable end support 12 in or retracting it from the adjacent end of the cylinder tube 8.

After the end support 12 has been retracted from the cylinder tube, the bearing block 17 carrying it is adapted to be raised in its guide opening 18 in the side frame until the bearing block and end support are positioned above the top of the cylinder tube, thereby permitting the cylinder tube to be disengaged from the other end support 11 and withdrawn endwise through the guide-way or opening 18 for the bearing block, this opening being large enough to permit ready withdrawal of the cylinder tube through the same from the press, and its insertion through the opening into the press. The bearing block may

be elevated for this purpose as presently explained.

In this embodiment of the invention, the inking instrumentalities for the printing cylinder are in their normal or operative position, disposed above the printing cylinder, and motor driven elevating means are provided for raising the inking unit, comprising the inking instrumentalities, from their normal position to an elevated, inoperative position, and these elevating means for the inking unit are utilized for shifting the bearing block 17 to permit removal of the printing cylinder, by releasably coupling the bearing block to the inking unit so as to move therewith.

As shown, the inking unit comprises a shiftable frame or housing 25 in which instrumentalities 26, 27 for applying the ink to the printing cylinder, are mounted. This unit frame 25 is arranged for vertical movement between pairs of upright, hollow guide posts 28 rising from the opposite side standards of the press frame. My invention is not concerned with the type, character or arrangement of the ink-applying instrumentalities of this unit, and they may be of any orthodox or suitable character, but the carrying frame 25 therefor is arranged to be guided, in its up and down movements from and toward the position of the unit for inking the printing cylinder, between the frame guide posts 28, the unit being movable from its inking position, shown in Fig. 2, to the elevated position shown in Fig. 5. The inking unit frame shown comprises opposite side members 29 rigidly tied together by cross tie bars 30 and a tie rod 31, see Figs. 4 and 5.

The motor-driven elevating mechanism shown for raising and lowering the inking unit comprises horizontal supporting rails 32 extending across the press in front and in rear of the inking unit and suitably guided for vertical movement in posts 28, and rollers 33 journaled on the unit frame 25 and bearing upon said rails 32, so as to support the inking unit from the rails and permit the unit to roll along these rails for removal from the machine when the unit is in the elevated position shown in Fig. 5. Each rail 32 rests at its opposite ends on nuts 34 having screw threaded engagement with a pair of vertical screws 35 which are suitably journaled in the guide posts 28 at the opposite ends of the rails. Nuts 34 may be held from turning in vertical holes in the rails 32, in which the nuts may have a limited vertical play, to allow a limited lift of the rails and inking unit independently of the screw-operated nuts, when necessary to lift the inking rollers out of contact with the printing cylinder during printing operation of the press. By appropriate rotation of screws 35, the cross rails 32 are raised and lowered, carrying with them the inking unit. The motor driven mechanism for rotating the elevating screws 35 may be of any suitable construction, that shown comprising a motor 36 mounted on the press frame and operatively connected by a transverse shaft 37, and suitable gears 38 to the two screws 35 for one rail. The pair of elevating screws 35 for the second rail may be rotated in unison and in like direction with the screws 35 for the first rail, as by a longitudinal shaft 39 at one side of the press, which is operatively connected, as by spiral gears 40 with the two screws 35 at the same end of the two rails, and by a second transverse shaft 41 which is geared, as by spiral gears 42, to the two screws for the second cross rail.

By causing forward or reverse operation of the motor 36 by means of a suitable control switch

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or device (not shown), the elevating mechanism is operated to raise the inking unit from its normal position shown in Fig. 2 to the elevated position shown in Fig. 5, or to return the unit to its normal position.

This elevating means is utilized for raising the bearing block 17 to enable removal of the printing cylinder from the press, as before explained, by coupling the bearing block 17 to the frame 25 of the inking unit when the latter is in its normal position. For thus coupling the bearing block to the frame of the inking unit, latches 43, see Fig. 2, are shown, pivoted on the face of the bearing block 17 and adapted to be engaged with pins or keepers 44 on the ends of the inking unit frame 25. When it is desired to elevate the bearing block for removing the printing cylinder, the latches 43 are engaged with their keepers 44, and the elevating mechanism for the inking unit operated, thereby raising the bearing block. After the return of the cylinder to the press or its replacement by another cylinder, the bearing block can be again lowered to its normal position and the rotatable end support 12 engaged with the cylinder, to support it in operative position, by operation of the crank 22.

When it is desired to remove the inking unit from the press for cleaning it or replacing it with an inking unit with ink of a different color, the latches 43 are disengaged from the inking unit and the latter is raised by its elevating mechanism, as explained, to the position shown in Fig. 5. In this position of the inking unit, the elevating rails 32 will be located at the tops of the guide posts 28 and will permit the inking unit to be rolled transversely out of the press onto rails 45 (see Figs. 3 and 4) of a portable cleaning carriage or device adapted to support the inking unit out of the press while cleaning it. This cleaning or wash-up device forms the subject matter of a separate application, and it is not necessary to disclose it herein further than to indicate the position of the rails 45 thereof which support the inking unit. This device is adapted to be rolled or moved alongside the press in a position with its rails 45 aligned with the unit supporting rails 32 of the press to adapt the inking unit to be rolled out of the press onto said rails 45 of the wash-up device.

Suitable means are provided for releasably locking the rails 45 of the wash-up device in alignment with the rails 32 of the press while removing an inking unit from or returning it to the press. The means shown for this purpose may comprise pivoted bolts or members 46 with holding nuts engageable in slots 47 in lugs 48 projecting from the two guide posts 28 at the operator's side of the press, as best shown in Figs. 3 and 4.

The press or apparatus is preferably equipped with means for supporting and guiding the far end of the printing cylinder when removing it from and replacing it in the press in order to prevent damaging the printing surface or image by contact with nearby parts of the press, and also to relieve the strain on, and ease the effort of, the operator in removing and replacing the cylinder. This means, as illustrated, comprises a pair of parallel, tubular slotted supporting bars 50, see Figs. 1, 9 and 10, which extend transversely in the press below the printing cylinder 8 and are attached at their ends to cross supporting bars 51 which may be suitably fixed to the side standards of the press frame. Slidable lengthwise on these bars is a saddle or carrier

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52 which normally is located at the driving side of the press beyond the inner end of the printing cylinder. Telescoping in the supporting bars 50 are operating rods 53 having at their inner ends laterally projecting fingers 54 which extend through longitudinal slots 55 in tubular bars 50 and through transverse slots 56 in the saddle 52 so that the saddle can be slid outwardly and inwardly along bars 50 by means of the operating rods 53, which preferably are connected by a cross head or handle 53x at their outer ends, and at their inner portion bear rotatably in central holes in bearing blocks 57 slidable in the tubular bars 50. The rods may be attached to said bearing blocks by set screws 58 which project into peripheral grooves in the operating rods that permit the rods 52 to turn a quarter revolution in their bearings. The inner or driving end of the printing cylinder tube is provided in its periphery at its under side with transverse slots 60 (Figs. 7 and 10) into which the carrier fingers 54 are adapted to be engaged for holding the cylinder end in place on the saddle, by pulling the saddle outwardly toward the inner end of the cylinder by the rods 53 and turning the rods a quarter turn in the tubular bars 50 to throw the fingers 54 from their positions shown by dotted lines in Fig. 10, into their full line position, Fig. 10, in which the fingers will engage in the cylinder slots 60 and hold the cylinder to the saddle. The longitudinal slots 55 of the tubular bars 50 have offset outer and inner portions, see Fig. 9, connected by transverse portions 61 opposite the inner end of the printing cylinder which allow the turning of the fingers 54 for engaging them with and disengaging them from the cylinder. By pulling the saddle toward and engaging it with the adjacent or inner end of the printing cylinder tube, this end will be supported on the saddle 52, and when the cylinder end support 12 is retracted to release the opposite or outer end of the cylinder, the operator can support the outer end of the cylinder by hand, while pulling the cylinder out of the press, and at the same time by pulling the saddle outwardly with the cylinder by means of its operating rods 53, the inner end of the cylinder will be supported and guided during the removal of the cylinder. In replacing the cylinder, its inner end is engaged with the saddle and the latter is moved inwardly in pushing the cylinder into the press, thereby supporting and guiding its inner end during the insertion of the cylinder.

Referring now to the alternative construction illustrated in Figs. 11-14, these figures show schematically a two-unit multicolor printing press or apparatus in which the cooperating cylinders of each unit and the inking means thereof are removable from the press for the stated purposes. Except as hereinafter described, this construction may be substantially as already described in connection with the Figs. 1 to 10 embodiment.

In each color unit, 3a and 4a represent the printing and cooperating or impression cylinders, each of which has a removable cylinder tube 8a removably mounted in the press to rotate about stationary central electrical insulating shafts 10a by a driving end support 11a and a retractable and vertically shiftable end support 12a at the operator's side of the press. The insulator shafts 10a carry electrical devices, the functions of which are disclosed in copending applications and need not be further described herein. 5a indicates the drive gearing for the cylinders

which may be suitably driven from a motor driven shaft 7a. The retractable end support 12a for each cylinder is rotatable about a journal 16a, which may be mounted, as before explained, for axial movement out of supporting engagement with its cylinder tube, in a bearing block 17a. 20a indicates the rotatable nut for shifting the journal 16a axially in the bearing block, and 22a the crank for turning the nut. The two bearing blocks 17a for the upper and lower cylinders 3a and 4a of each color unit are arranged for vertical movement respectively upwardly and downwardly from their normal positions opposite the ends of the cylinder, to enable removal of the cylinders, in an open vertical guideway 18a in a side standard 2a of the main frame, there being two such standards, one for each color unit, at the operator's side of the press. A pinion 70 is shown rotatably mounted in each bearing block 17a, by a shaft 71 journalled in the block, and meshing with a vertical toothed rack 72 in the guideway 18a for raising and lowering the bearing block in its guideway. The pinion may be turned for this purpose by a removable crank applied to the outer end of the pinion shaft, as indicated by broken lines at 73 in Fig. 14. In Fig. 11, the bearing blocks 17a for the cylinders of the right hand color unit are shown in their normal supporting position opposite the ends of the cylinders, in which position the blocks may be releasably secured, as by a locking bolt 74, while the bearing block 17a for the upper cylinder 3a of the other color unit is shown raised above the cylinder, and the bearing block for the lower cylinder 4a is shown as shifted below its cylinder, thereby leaving the cylinders unobstructed for endwise removal through the guideway 18a for the bearing blocks. Fig. 14 also shows the raised and lowered positions for these bearing blocks and this figure indicates by broken lines that the upper cylinder tube 8a has been removed from the press.

25a represents the vertically movable carrying frame or housing of the inking unit 26a for each color unit. Each inking unit, as in the first embodiment described, is supported by rollers 33a on horizontal cross rails 32a of an elevating mechanism comprising vertical screws 35a, turning in nuts supporting the cross rails, and adapted to be rotated in unison by suitable shaft and gear mechanism 37a, such as before described, driven by a motor 36a. The inking unit of the right-hand color unit, shown in Fig. 11, is in normal operative position, and the inking unit of the other color unit is shown raised in this figure to enable lifting of the bearing block 17a for the removal of the cylinders of this unit. When the inking unit is raised by this elevating mechanism to the position shown in Fig. 14, it can be rolled out of the press through the guideway opening of its related standard 2a onto the aligned rails 45a of a portable wash-up device. Fig. 14 shows the inking unit for the left-hand color unit of the press partially so removed.

In this multicolor press is shown a conveyor belt 80 passing around supporting and guide rolls or drums 81 for carrying the sheets or elements to be printed in succession between the printing and impression cylinders of the different color units.

I claim as my invention:

1. In a printing press having a rotary cylinder, a main frame, and cylinder supports on said frame at opposite ends of the cylinder one of which drives the cylinder, the improved con-

struction comprising means detachably connecting said cylinder at one end with said driving support, a bearing block shiftable in a guideway in said frame from a supporting position axially opposite the other end of said cylinder, a journal by which said second support is rotatably mounted and which is adjustable in said bearing block axially of said cylinder for releasing said second support from the cylinder, said bearing block being shiftable in said guideway with said second support away from its supporting position opposite the end of the cylinder when the support is released from the cylinder, said guideway being of greater dimensions than the diameter of the cylinder, and said cylinder being freed for disconnection from said driving support and removable endwise of itself from the press through said guideway when the bearing block is shifted out of its cylinder supporting position.

2. In a printing press having a rotary cylinder, a main frame, and cylinder supports on said frame at opposite ends of the cylinder one of which drives the cylinder, the improved construction comprising means detachably connecting said cylinder at one end with said driving support, a bearing block shiftable in a guideway in said frame from a supporting position axially opposite the other end of said cylinder and rotatably mounting said second cylinder support, said second support being movable on said bearing block out of supporting engagement with said cylinder, and means for moving said bearing block with said second support in said guideway away from its supporting position opposite the end of the cylinder when said second support is disconnected from the cylinder, said guideway when said bearing block is thus moved away from its supporting position providing an unobstructed opening opposite the end of the cylinder through which the cylinder is removable endwise thereof from the press.

3. In a printing press having a rotary printing cylinder with a peripheral printing surface, a main frame, cylinder supports on said frame at opposite ends of the cylinder one of which drives the cylinder, and an inking unit for said cylinder, the improved construction comprising means detachably connecting said cylinder at one end with said driving support in a predetermined position relative thereto, a bearing block vertically shiftable in a guideway in said frame from a supporting position opposite the other end of said cylinder and rotatably mounting said second cylinder support, said second cylinder support being movable on said bearing block out of supporting engagement with said cylinder, means for elevating said inking unit from its operative position relative to the cylinder, means for attaching said bearing block to said inking unit for elevation therewith, said guideway when said bearing block is thus shifted away from its supporting position providing an opening opposite the end of the cylinder through which the cylinder is removable endwise thereof from the press.

4. In a printing press having a main frame, a printing cylinder therein and supports rotatably mounting the cylinder at opposite ends, the improved construction in which said cylinder is disconnectable from said supports and is removable lengthwise of itself from the press, and which construction comprises tubular rails supported in said frame lengthwise parallel with and beneath the cylinder, a saddle movable lengthwise on said rails and on which the inner end of the cylinder

rests when removing it from and replacing it in the press, operating rods movable lengthwise and rotatable in said tubular rails and having at their inner ends fingers extending through slots in said tubular rails and connected with said saddle 5 for moving the saddle along said rails, said fingers being releasably engageable with the inner end of the cylinder when resting on said saddle for retaining the inner end of the cylinder in place 10 on the saddle during the removal of the cylinder from and its replacement in the press.

5. In a printing press, the improved construction according to claim 4, in which said fingers are engaged with and disengaged from peripheral slots in the cylinder by turning said operating rods, for retaining the cylinder in connection with and releasing it from said saddle.

6. In a printing press having a frame, and a rotary cylinder, bearing supports for the cylinder on said frame and operatively and detachably associated with said cylinder for rotation therewith adjacent the opposite ends thereof, and means mounting one of said supports for movement axially of said cylinder for detachment therefrom, said means being movable on said frame with the detached support transversely to the axis of said cylinder away from its cylinder supporting position opposite the end of the cylinder thereby leaving a space opposite the end of the cylinder through which said cylinder may be axially inserted into or removed from position in said frame. 20

7. In a printing press having a frame, and a rotary cylinder, bearing supports operatively and detachably associated with said cylinder for rotation therewith adjacent the opposite ends thereof, said frame being provided with a guide opening extending transversely to the axis of said cylinder, and means rotatably mounting one of said supports and movable in said guide opening away from its cylinder supporting position, whereby said one support is movable to leave said guide opening unobstructed opposite the end of the cylinder and enable the cylinder to be inserted into or removed from operative position in said frame through said opening. 30

8. In a printing press having a rotary printing cylinder with a peripheral printing surface, a main frame, cylinder supports on said frame at the opposite ends of the cylinder and one of which supports drives the cylinder, and an inking unit for said cylinder, the improved construction comprising means detachably connecting said cylinder at one end with said driving support, a bearing block shiftable in a guideway in said frame from a supporting position opposite the other end of said cylinder and rotatably mounting said second cylinder support, said second cylinder support being shiftable on said bearing block out of supporting engagement with said cylinder, means for moving said inking unit from its operative position relative to the cylinder, means for operatively connecting said bearing block with said inking unit for movement therewith, said guideway when said bearing block is thus shifted away from its supporting position providing an opening opposite the end of the cylinder through which the cylinder is removable endwise thereof from the press. 40

9. In a printing press having a frame, and a rotary printing cylinder, the improved construction comprising a printing cylinder having a cylindrical body and rotary supporting ends therefor releasably connected to the opposite ends of said body, means rotatably mounting said ends 45

on said frame, and driving means associated with one of said ends for driving the cylinder, said mounting means for said other end movably supporting the end for movement to release it from said body and said mounting means being movable on said frame with said released end transversely to the axis of said cylinder away from its body-supporting position, thereby freeing said body for release from said driving end and leaving the cylinder through which said body is removable lengthwise of itself from and insertable into operative position in the press. 50

10. In a printing press having a frame, and a rotary cylinder, the improved construction comprising a cylinder having a tubular body, and rotary supporting heads therefor releasably connected to opposite ends of said body, and means rotatably mounting said heads on said frame, said mounting means for one head movably supporting the head for movement to release it from said body and said mounting means being movable on said frame with said released head transversely to the axis of the cylinder away from its body-supporting position, thereby freeing said body for release from said other head and leaving an unobstructed space axially opposite the cylinder through which said body is removable lengthwise of itself from and insertable into operative position in the press. 55

11. In a printing press having a frame, and a rotary cylinder, the improved construction comprising a cylinder having a tubular body, and rotary supporting heads therefor releasably connected to opposite ends of said body, means rotatably mounting said heads on said frame, driving means associated with one of said heads for driving said cylinder, said mounting means for said other head movably supporting the head for movement to release it from said body and said mounting means being movable on said frame with said released head transversely to the axis of the cylinder away from its body-supporting position, thereby freeing said body for release from said driving head and leaving an unobstructed space axially opposite the cylinder through which said body is removable lengthwise of itself from and insertable into operative position in the press. 60

12. In a printing press having a frame, and a rotary printing cylinder, the improved construction comprising a printing cylinder having a tubular body carrying a peripheral printing surface, and rotary supporting heads therefor releasably connected to opposite ends of said body, means rotatably mounting said heads on said frame, driving means associated with one of said heads for driving said cylinder, said mounting means for said other head movably supporting the head for movement to release it from said body and said mounting means being movable on said frame with said released head transversely to the axis of said cylinder away from its body-supporting position, thereby freeing said body for release from said driving head and leaving an unobstructed space axially opposite the cylinder through which said body is removable lengthwise of itself from and insertable into operative position in the press, and parts on said body and driving head cooperating to locate the body always in the same predetermined axial and circumferential relation to said driving head. 65

13. In a printing press having a main frame, a tubular cylinder, rotatable supports axially aligned with and rotatably mounting the cylinder 70

at opposite ends, said cylinder being disconnect-
 able from said supports and one of said supports
 when disconnected from the cylinder being shift-
 able away from its normal supporting position in
 axial alinement with the cylinder and thereby
 leaving an unobstructed opening in the main
 frame axially opposite the cylinder through
 which the cylinder is removable lengthwise of
 itself from the press, and a device mounted in
 said frame to move in the direction of the length
 of said cylinder and comprising means shiftable
 into supporting engagement with the inner end
 of said tubular cylinder and being movable end-
 wise with the cylinder for supporting and guiding
 it when removing the cylinder from and replacing
 it in the press.

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