

Dec. 8, 1959

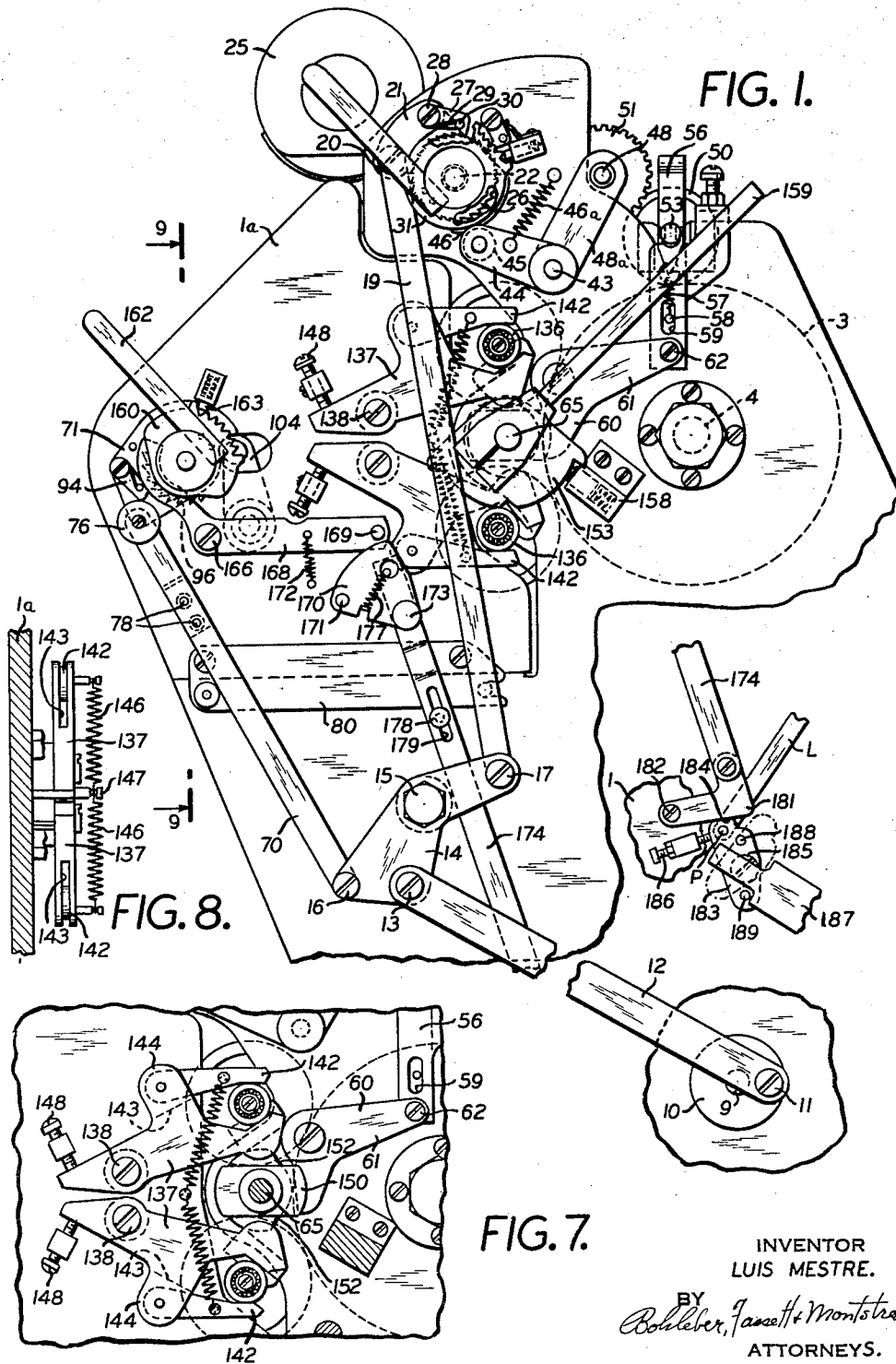
L. MESTRE

2,915,970

INKING AND DAMPENING MEANS FOR AN OFFSET PRINTING MACHINE

Original Filed Sept. 2, 1953

6 Sheets-Sheet 1



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INKING AND DAMPENING MEANS FOR AN OFFSET PRINTING MACHINE

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6 Sheets-Sheet 2

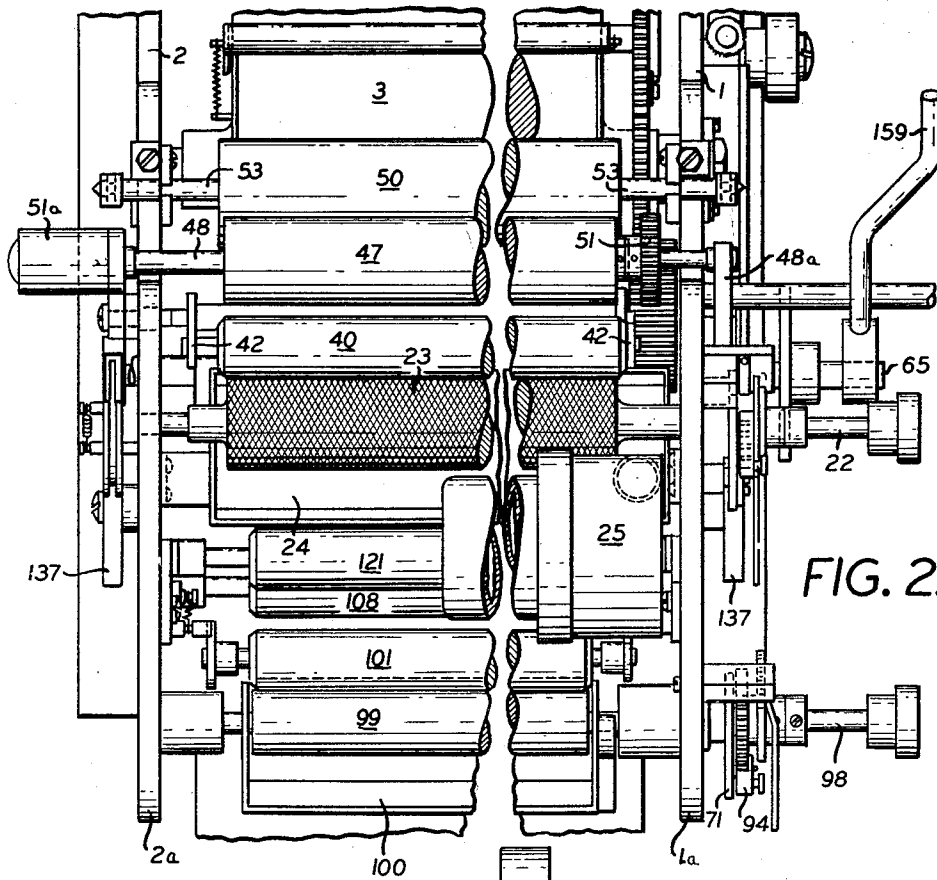


FIG. 2.

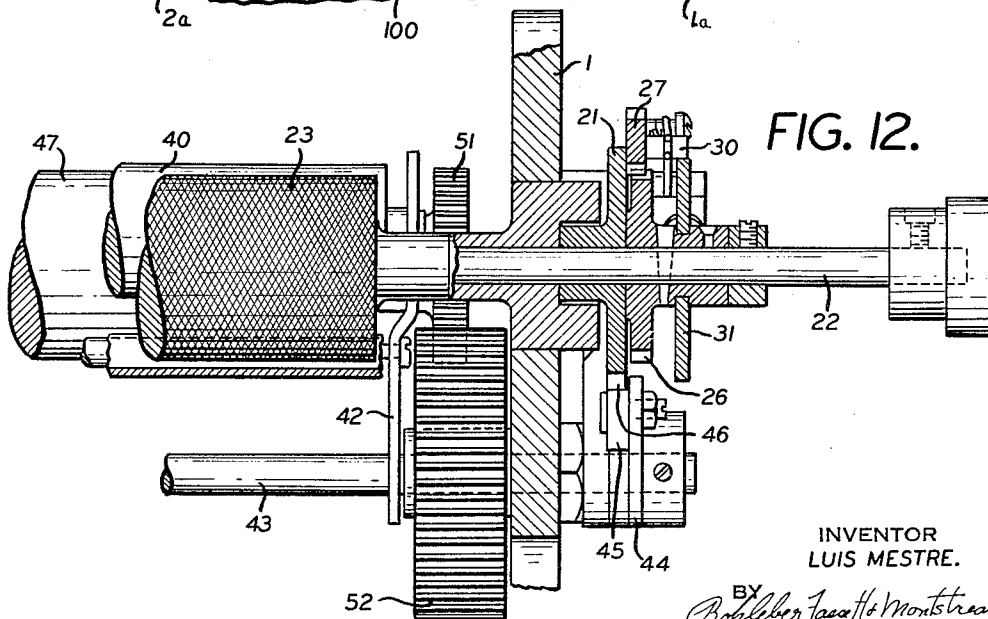


FIG. 12.

INVENTOR
LUIS MESTRE.

BY
Bohler, Jasoff & Montstream
ATTORNEYS.

Dec. 8, 1959

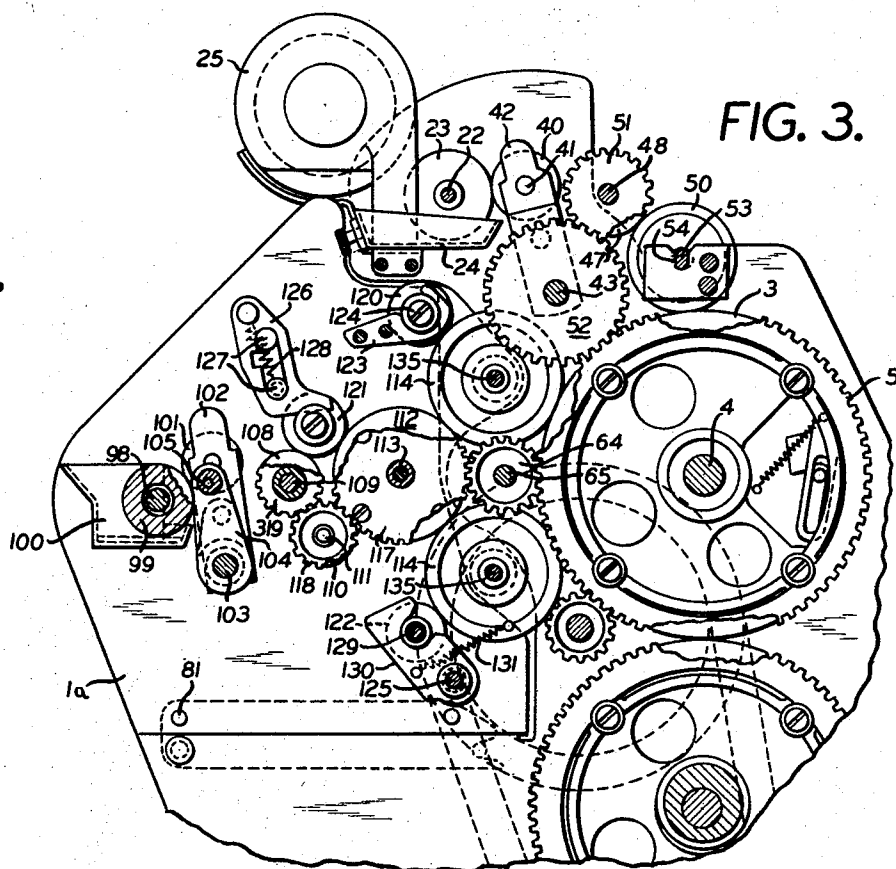
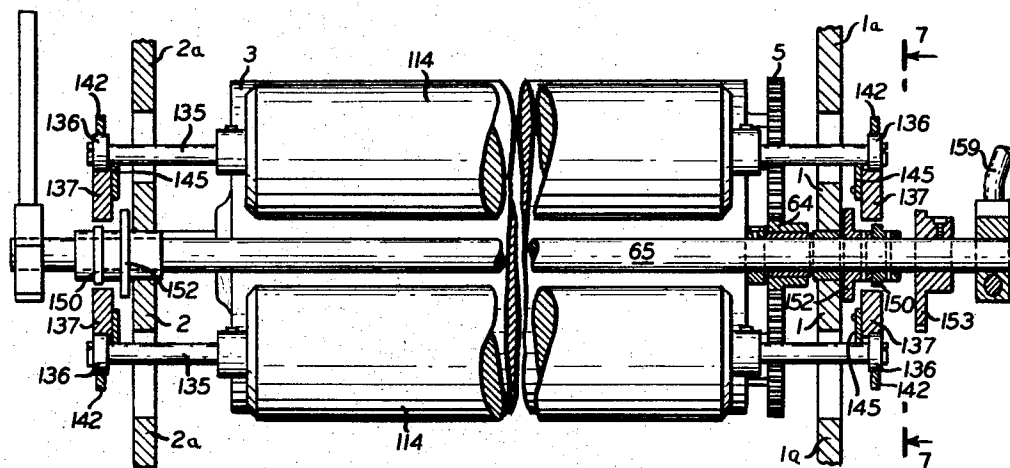
L. MESTRE

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INVENTOR
LUIS MESTRE.

BY
Bohlber, Fassett & Montstream
ATTORNEYS.

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L. MESTRE

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FIG. 4.

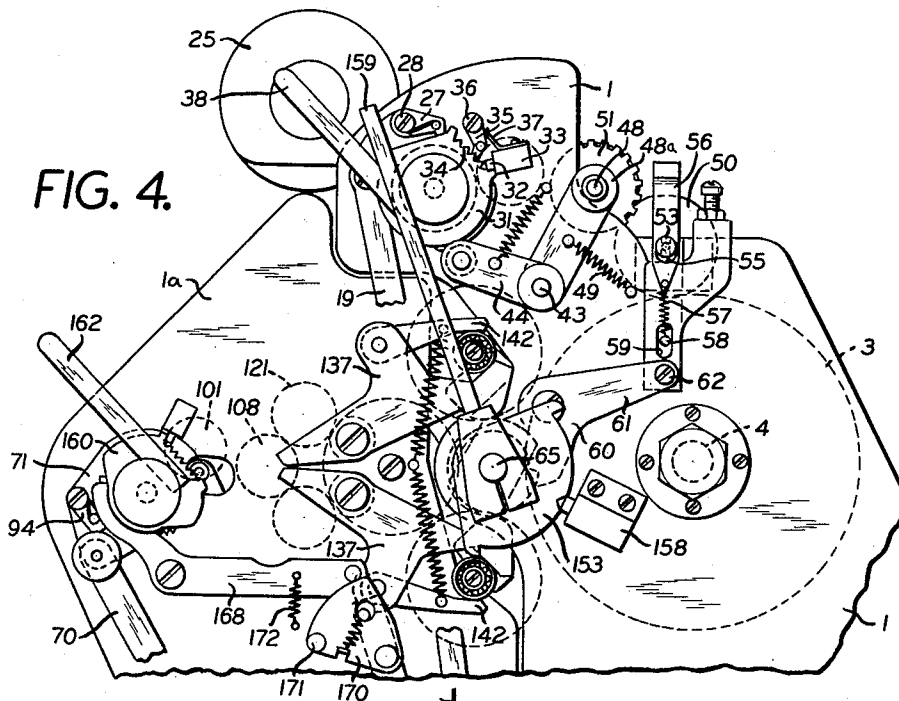
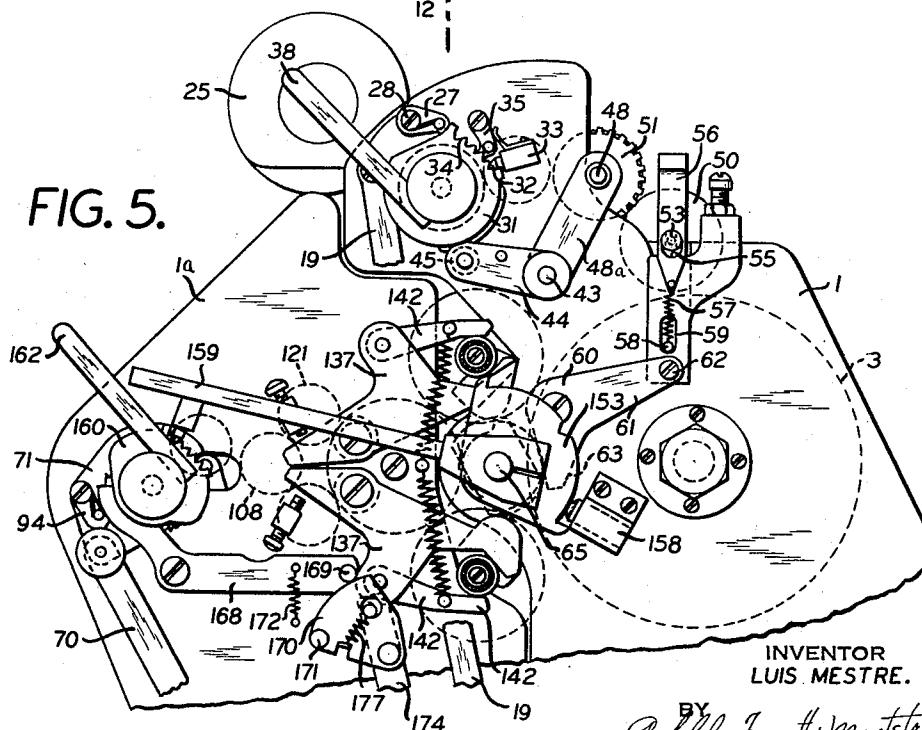


FIG. 5.



INVENTOR
LUIS MESTRE.

BY
Bohlebe, Fassett & Montstream
ATTORNEYS.

Dec. 8, 1959

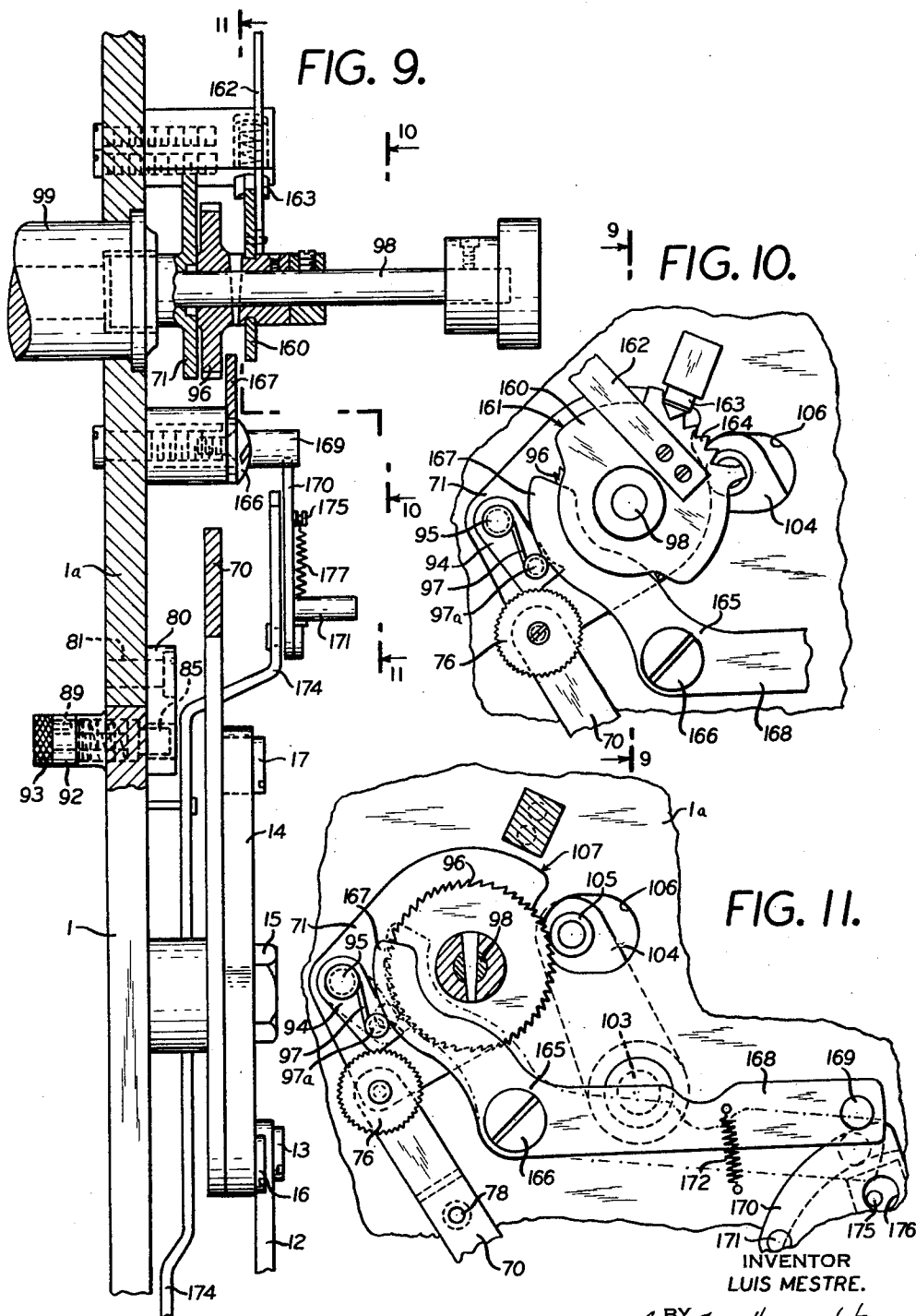
L. MESTRE

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INVENTOR
LUIS MESTRE.

BY
Bohler, Fassett & Monteban
ATTORNEYS.

Dec. 8, 1959

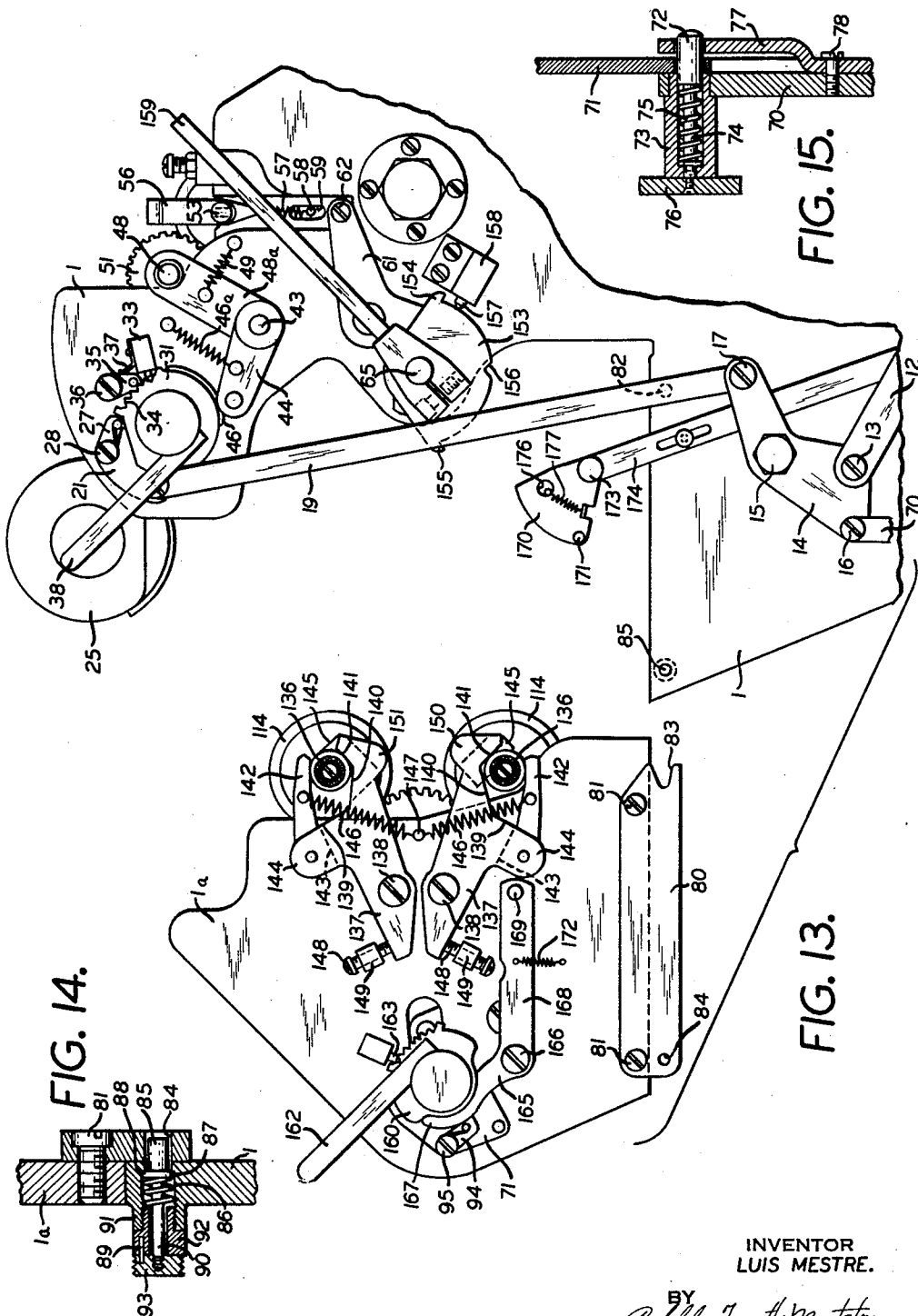
L. MESTRE

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6 Sheets-Sheet 6



INVENTOR
LUIS MESTRE.

BY
Bohler, Fassett & Montstream
ATTORNEYS.

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2,915,970

INKING AND DAMPENING MEANS FOR AN OFFSET PRINTING MACHINE

Luis Mestre, New York, N.Y., assignor to Lewfor Development Corporation, New York, N.Y., a corporation of New York

Original application September 2, 1953, Serial No. 378,035, now Patent No. 2,821,911, dated February 4, 1958. Divided and this application October 19, 1956, Serial No. 616,977

15 Claims. (Cl. 101—144)

The present invention relates to offset printing machines and the principal object of the invention is to provide a machine of the type specified embodying novel and advantageous features of construction and capable of producing novel and advantageous results.

Machines of this character heretofore in use have comprised a plate cylinder, a blanket cylinder, an impression cylinder, a delivery cylinder, dampening means for the plate cylinder and inking means for the plate cylinder.

Another object of the invention is to provide novel and advantageous apparatus of the class specified, wherein absence of a sheet at the receiving position for the impression cylinder will cause the blanket cylinder to be thrown out of position to cooperate with the impression cylinder and the plate cylinder, but not until a complete impression has been made on the last sheet passed through over the impression cylinder.

Another object of the invention is to provide novel and advantageous apparatus of the class specified whereby absence of a sheet at the receiving position for the impression cylinder will set mechanism whereby upon completion of an impression on a sheet on said impression cylinder, the blanket cylinder will be moved out of operative relation with the plate cylinder and the impression cylinder and the ink supply to the plate cylinder will be stopped.

Another object of the invention is to provide a machine of the type specified embodying novel and advantageous means for operating the ratchet wheels on the shafts of water fountain rollers and ink fountain rollers.

Another object of the invention is to provide a machine of the type specified embodying novel and advantageous means operated by a single manual control member to supply water and ink to the plate roller.

Another object of the invention is to provide a machine of the type specified embodying novel and advantageous means comprising a manually operable handle which in one position causes water only to be supplied to the plate cylinder and in a third position causes the supply of both water and ink to be cut off.

Another object of the invention is to provide a machine of the type specified embodying novel and advantageous means for stopping the supply of ink to the plate cylinder and separating the blanket cylinder from the plate cylinder and means for overcoming the stoppage of supply of ink to get a sufficient supply of ink on the plate cylinder preparatory to applying the matter inked thereon to the blanket cylinder.

Another object of the invention is to provide a machine of the type specified embodying means for shifting the impression cylinder from the blanket cylinder to permit a sufficient application to the blanket cylinder of the ink pattern on the plate cylinder.

Another object of the invention is to provide a machine of the type specified embodying novel and advantageous means comprising a detachable inking unit having only one operative connection with the main machine, which

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requires definite disconnection, other operative connections being broken merely by removal of the inking unit and reestablished by reinsertion of the inking unit.

Further objects, features, and advantages will appear upon consideration of the following detailed description and of the drawings showing a preferred embodiment in which:

Fig. 1 is a view of the upper part of the mechanism showing the operating mechanism for inking and water supply;

Fig. 2 is a top plan view of the press broken away longitudinally to narrow the figure;

Fig. 3 is a vertical section of the upper part of the press taken just inside the front plate of the frame;

Fig. 4 is a front elevation of part of the press shown in Fig. 1 with the parts in position for supply of water but no supply of ink;

Fig. 5 is a view similar to Fig. 4 but with the parts positioned for no supply of water and no supply of ink;

Fig. 6 is a sectional view illustrating the form rollers of the inking mechanism;

Fig. 7 is a view of the inking mechanism as seen from line 7—7 of Fig. 6;

Fig. 8 is a view illustrating the mechanism of Fig. 7 as viewed from the left, certain parts being broken away;

Fig. 9 is a section taken on line 9—9 of Fig. 1;

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

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

Fig. 12 is a fragmentary vertical section through the axis of the roller in the water trough;

Fig. 13 is a view in elevation illustrating the inking unit as withdrawn from the part of machine by which it is operated;

Fig. 14 is a sectional view illustrating the means for holding the inking unit in position on the machine frame while the holding screws are turned to holding position or are turned in the opposite direction to release the unit; and

Fig. 15 is a section of the upper end of a link detachably connected to the means for operating the inking unit.

This application is a division of my application S.N. 378,035 filed on September 2, 1953, now U.S. Patent No. 2,821,911.

Referring to the drawings, the frame of the machine or press comprises front and rear frame members or plates 1 and 2 respectively, connected by suitable cross pieces (not shown). Each sheet of paper is picked from a pile or stack and advanced to the offset printing machine by any suitable feeding mechanism and printed. In the offset printing process ink and water is supplied to the plate cylinder 3 which is mounted for rotation on a shaft 4 and driven by a gear 5. The gear 5 is in turn driven by a train of gears in known manner.

The supply of water and ink to the plate cylinder (Figs. 1 and 3) during operation of the machine is effected primarily by means actuated by cam shaft 9. This shaft is connected with the gear train of the press and rotated thereby. Eccentrically mounted on a member such as a circular disk 10 at the front end of said shaft 9 is a pivot 11 in the form of a screw passing through one end of a link 12 and screwed into said member 10. Said link 12 extends upwardly and toward the delivery end of the machine and is connected by a pivot 13 to a member or lever 14 mounted on a pivot 15 substantially midway between its ends. Said pivot 13 is at the delivery side of pivot 15.

At the left end of lever 14 is a pivot 16 connected to an inking unit and at the right end of said lever is a pivot 17 connected to a water supply unit. In this connection it should be kept in mind that both water and ink must be supplied to the plate cylinder during normal

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operation of the machine. A line through the center of pivots 16 and 17 passes below pivot 15 and above pivot 13 which is to the left of pivot 15.

Said water supply or fountain unit (Figs. 1 and 12) is actuated from said lever 14 by a link 19 connected at its lower end to said pivot 17 and at its upper end to a pivot 20 on a pawl carrier 21 mounted on shaft 22 of a roll 23 (Fig. 3) dipping into a tray or fountain 24 receiving water from a container 25. A ratchet wheel 26 is fixed on shaft 22 and is operated by a pawl 27 on a pivot 28 on said pawl carrier 21 and urged into engagement with said ratchet wheel 28 by a spring 29 wound on said pivot 28 and engaging a pin 30 projecting from said pawl 27. To the front of said ratchet wheel 26 is a shield device 31 in the form of a cam disk adjustable about the axis of shaft 22 and having a cam edge arranged to engage said pin 30 and lift the pawl 27 when its stroke exceeds the desired length.

Said shield device (Fig. 4) may be held in different positions by a detent in the form of a spring pressed bolt or plunger 32 mounted in a casing 33 fixed to frame member 1 and having an end adapted to fit between teeth 34 of said shield. A holding pawl 35 may be pivoted at 36 on the adjacent frame member and may for convenience be spring pressed against said ratchet wheel 26 by suitable means such as a leaf spring 37 with an end fixed on said casing 33. The position of said shield device 31 may be varied by means of an arm 38 fixed on said shield device 31.

Said roll 23 is rotated in a clockwise direction and supplies water from tray 24 to a second or ductor roll 40 on a shaft 41 mounted in arms 42 between the frame members 1 and 2 and fixed on a shaft 43. On said shaft 43 is fixed an arm 44 (Figs. 4 and 5) having at its outer end a cam follower 45 in position to be engaged by a cam surface or edge 46 on said pawl carrier 21 and to be swung against the action of a spring 46a. The roll 40 is thus moved back and forth between roll 23 and a roll 47 on a shaft 48. Roll 47 is pivoted in arms 48a loosely mounted on shaft 43 and urged by springs 49 into contact with a molleton roll 50. Said roll 47 and shaft 48 are oscillated by a conventional device 51a (Fig. 2).

A gear 51 (Fig. 3) on shaft 48 meshes with a gear 52 rotatable on shaft 43 and meshing with gear 5 of the plate cylinder. These connections result in positive rotation of roll 47 and rotation of roll 50 by contact with roll 47. The roll 50 is thus given the same surface speed as the plate cylinder 3 to which it supplies water. Said roll 50 is rotatable on shaft 53 which has at its ends opposite flats 54 which enable it to be held without turning in slots in frame plates 1 and 2 at front and back of the machine. The ends of said shaft 53 are located in openings 55 (Figs. 4, 5) of vertical slides 56 held down by springs 57 connecting their lower ends to the outer ends of fixed pins 58 projecting through openings 59 in said slides 56.

The supply of water to the plate cylinder 3 may be interrupted by moving said slides 56 upwardly thereby separating roll 50 from said plate cylinder. The upward movement of said slides may be effected by bent levers or bell cranks 60 mounted on pivots carried by fixed frame members. Each bell crank 60 has a generally horizontal arm 61 connected by a pivot 62 to the lower end of the corresponding slide 56 and a general vertical operating arm 63 extending downwardly from the pivot.

The means for actuating arms 63 also acts to control the inking means as will be brought out hereinafter. Gear 5 (Fig. 3) of the plate cylinder also meshes with a gear 64 rotatably mounted on a shaft 65 journaled in frame members 1 and 2 and through said gear 64 operates parts of the inking mechanism.

Said pivot 16 (Fig. 1) at the left end of lever 14 is connected to the lower end of a link 70 which is connected to a pawl carrier 71 by means of a pivot or pin 72. The inking unit is removable and to that end

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the connection between link 70 and pawl carrier 71 is constructed for easy connection or separation. Said pivot 72 (Fig. 15) is slidably mounted in the outer end of a cylindrical housing 73 fixed at its inner end in an opening in link 70. A stem 74 of reduced cross section extends through a helical spring 75 to a knurled head 76 by the pivot 72 may be drawn back into the cylinder. Said spring 75 is confined between a shoulder on the stem 74 and a shoulder at the opposite end of the housing 73.

After drawing back pivot 72 into the housing 73 the portion of the pawl carrier 71 provided with a pivot receiving opening may be placed at the inside of the link 70 and the pivot 72 may be projected through the opening in said pawl carrier 71 and into an opening in a member 77. Said member 77 is parallel to the link 70 at the pivot 72 and, at a suitable distance from the pivot, is offset so as to be against the link 70 and be secured thereto by one or more fastening devices such as screws 78.

The inking unit which is detachable from the main frame as shown in Fig. 13 comprises end frames 1a and 2a of which the bottom edges are positioned on correspondingly upwardly facing edges of the main frame members 1 and 2. To facilitate introduction and removal of the inking unit the frames 1a and 2a are provided at their outer surfaces with plates 80 fastened to the outer surface of the frames 1a and 2a by screws 81. The front and rear frame members 1 and 2 are provided with outwardly projecting pins 82 to be received in slots 83 at the ends of said plates 80.

The frame members 1a and 2a are placed on the corresponding parts of the main frame members and are moved forwardly until the pins 82 are engaged by the ends of said slots 83. In this movement openings 84 are brought into alignment with spring pressed pins 85 which are drawn back to permit the plates 80 to engage the outer surfaces of the main frame members 1 and 2. When the inking unit is in place the pins 85 are advanced by springs 86 into said openings 84 and the frame of the inking unit is held in position on the main frame members being further secured by screws 81 above said pins 85.

As shown in Fig. 14 each pin 85 has a flange 87 which is positioned to engage a shoulder 88 at the bottom of a bore in each of the frame members 1 and 2. Spring 86 on a reduced stem 90 in a housing 91 presses the pin 85 into the opening 84, the outer end of the spring being engaged by a plug 92 screwed into said housing. The movement of the pin 85 by the spring 86 is limited by a cap 93 screwed on the end of said stem 90 and engaging the outer end of said plug. A pin 89 of small cross section projects from said cap 93 into plug 92 at one side and may serve to hold pin 85 retracted by pin 89 against engaging a solid part of the outer surface of plug 92. This feature is of substantial value in connection with removal or replacement of an inking unit.

A pawl 94 is mounted by means of a pivot 95 on said pawl carrier 71 and is urged against a ratchet wheel 96 (Fig. 11) by means of a spring 97 extending around said pivot and having an end engaging a pin 97a on said pawl 94. Actuation of the pawl carrier 71 by means of the link 70 will turn the ratchet wheel 96 in a counter-clockwise direction. Said ratchet wheel 96 is mounted on a shaft 98 and a roll 99 mounted on shaft 98 dips into an ink container or fountain 100 (Fig. 3). A ductor roll 101 is rotatably mounted in arms 102 fixed on a shaft 103. Also fixed on said shaft 103 is an arm 104 provided with a follower 105 extending through a hole 106 in the frame 1a and engaging a cam edge 107 (Fig. 11) on the pawl carrier 71 which during the back and forth movement of the pawl carrier will swing roll 101 from contact with roll 99 into contact with a roll 108 (Fig. 3) on a shaft 109.

From roll 108 ink is transferred to roll 110 on shaft

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111, and from roll 110 to roll 112 on shaft 113. From roll 112 ink is transferred by form rolls 114 to the plate cylinder 3. Motion is transmitted from gear 5 on plate cylinder 3 through said gear 64 rotatable on said shaft 65 (Figs. 3 and 28) to a gear 117 on roll 112 and from gear 117 through gears 118 and 119 to rolls 108 and 110. Shaft 65 is rotatably supported in frame members 1 and 2. These frame members also carry additional rolls 120, 121 and 122 which assist in effecting uniform distribution of the ink.

Roll 120 is supported at its front and rear ends by axial projections from the rolls, such as the ends of a shaft 124 resting in open-top recesses in brackets 123 fixed to the frame members 1a and 2a. With this arrangement said roll 120 is urged by gravity against the upper form roll 114.

Roll 121 is supported by rolls 108 and 112 in the space or trough between the upper parts of said rolls, and is urged against said rolls by means of slides 126 guided on two pins 127 and urged downwardly by springs 128 attached at their upper ends to said slides 126 and at their other ends to fixed points. Roll 122 has a shaft 129 with ends resting in open slots in brackets 130 pivoted on pivots 125 and urged inwardly by springs 131 into engagement with the lower form roll 114.

Form rolls 114 are fixed on shafts 135 which project into open parts of the frame members 1 and 2. At their outer ends said shafts 135 are provided with non-friction bearings such as ball bearings 136 having cylindrical outer casings (Figs. 4, 5 and 6). Said form rolls 114 rest against said roll 112 (Fig. 3) and are controlled for movement toward and from each other by levers 137. Such movements involve separation of the form rolls 114 from the plate cylinder 3 which stops feed of ink to the plate cylinder and movement in the opposite direction to start the feeding of ink to the plate cylinder.

Levers 137 (Fig. 13) are mounted on pivots 138 and at the ends toward the plate cylinder 3, each lever is provided with an outwardly or upwardly and downwardly facing recess 139 respectively having a flat bottom 140 and an inclined forward edge 141. The ball bearing 136 is mounted in said recess and is yieldably held in said recess by a finger 142 with one end pivoted in a slot 143 in a slug 144 projecting from the outer edge of the lever. The forward ends of said arms are provided at their inner sides with thin plates 145 to engage the sides of the ball bearing units 136. A helical spring 146 is connected with each finger 142 and with a pin 147 fixed in a stationary member midway between said fingers 142. The arms of levers 137 remote from form rolls 114 are engaged at their outer faces by set screws 148 in stationary parts or posts 149 to enable proper adjustment of the form rollers 114 with reference to the plate cylinder 3.

The shaft 65 (Fig. 7) which is mounted in frame plates 1 and 2 is provided with cams 150 between inward projections 151 of levers 137. These cams 150 have parallel sides and arcuate ends. Also shaft 165 is provided with cams 152 to actuate bellcranks 60 by engagement with downwardly extending arms 63 and separate roll 50 from said plate cylinder 3 thereby shutting off the supply of water thereto. Each cam 152 has a low portion on the right of the shaft and the high portion extends over one-half or about two-thirds of the way around the shaft. Fixed on said shaft 65 is an indexing disk 153 (Fig. 13) having an arcuate edge with three places for different settings of the shaft 65 at positions (1) where no cam is effective (Figs. 1 and 7), (2) when cams 150 engage the projections 151 of levers 137 (Fig. 4) and (3) with the cams 150 still holding said levers 137 apart and the cams 152 holding the levers 60 (Fig. 5) in position to hold said roll 50 away from the plate cylinder.

Disk 153 (Fig. 13) has projections 154 and 155 at the right and left ends of its arcuate edge and a notch 156 at the middle of said arcuate edge. A spring pressed

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detent pin 157 projects from a casing 158 fixed on the frame. As illustrated in Figs. 1 and 7 the cams 150 and 152 are ineffective when the right hand projection 154 engages detent pin 157 and a handle or arm 159 fixed on shaft 65 is positioned accordingly.

When the handle 159 is turned counter-clockwise to its middle position with detent pin 157 engaging said notch 156 (Fig. 4) cams 150 have just separated levers 137 to the full extent thereby separating rolls 114 to a substantial extent from the plate cylinder 3 and the cams 152 are in position to lift said roll 50 and separate it from the plate cylinder. Further movement of arm or handle 159 to its left hand position (Fig. 5) will not affect the position of the form rolls 114 due to the arcuate ends of said cams 150, but the high part of cam 152 will operate said levers 60 to separate roll 50 from the plate cylinder 3 thus interrupting the feed of water to the plate cylinder 113.

With the parts in the position shown in Fig. 4 no ink will be supplied to the plate cylinder 3. With the parts in the positions shown in Fig. 5, the supply of both water and ink to the plate cylinder will be broken.

The throw of the ratchet 96 may be regulated by a ratchet wheel shield in the form of a disk 160 (Figs. 10 and 11) mounted on shaft 98 at one side of ratchet wheel 96. Said disk 160 has a low edge portion which is idle at all times and a high portion 161 which acts on the pin 97a to hold pawl 94 out of engagement with the teeth of ratchet wheel 96. Disk 160 may be turned to different positions by means of a handle or arm 162. The shield or disk 160 may be held in adjusted position by means of a spring pressed detent pin 163 having a tapered end adapted to fit into the spaces between detent teeth 164.

The pawl 94 operating the ink roll 99 may also be rendered ineffective by means of a lever 165 on a pivot 166 below the ratchet wheel 96. The left end 167 of said lever (Fig. 11) has an outer or lower edge of convex arcuate outline which when the left end of the lever is swung downwardly by upward movement of the arm 168, will engage pin 97a and hold the pawl 94 out of engagement with said ratchet wheel 96. The left end of lever 165 (Fig. 10) lies between said ratchet wheel 96 and said shield 160. A spring 172 pulls lever 168 downwardly.

Referring to Figs. 1, 4, 5 and 11 it will be seen that lever arm 168 is provided with a pin 169 for engagement with and operation by a member in the general form of a sector 170 having a handle 171 near the left end of the curved edge. The apex at the lowermost point of the sector is connected by means including a pivot 173 to the upper end of a link 174. The connection between said sector 170 and said link 174 also includes a pin 175 extending from the link through a circular opening 176 in the sector at the other end of its curved edge from said handle and connected by a tension spring 177 with the opposite radial edge of the sector. Said spring 177 urges sector 170 in a clockwise direction so that the left side of opening 176 engages pin 175.

Under certain conditions to be brought out hereinafter, said link 174 will be moved longitudinally in an upward direction. The sector 170 will then lift pin 169 and swing lever 165 to throw pawl 94 out of action. This corresponds to a setting of other parts. It is sometimes desirable to restore the inking unit to operative condition without changing the condition of other parts of the apparatus. To do this, all that is necessary is to grasp handle 171 and swing it to the left so that sector 170 will no longer support pin 69 which will slip down to the right of the sector (Fig. 1). The link 174 is guided from the frame member by means to be described hereinafter. It will be evident that merely placing the inking unit in place on the main frame will establish an operative relation between pin 169 and sector 170 on link 174, and removal of the inking unit will destroy such operative relations.

In putting the machine into operation when there is insufficient ink on the plate cylinder, the blanket cylinder.

may be thrown out of position and ink and water supplied to the plate cylinder 113 until there is sufficient ink thereon. In order to supply ink under these conditions it would be necessary to swing sector 170 to the left about its pivot 173 on link 174 thereby freeing pin 169 on lever 165 which will then be swung with the aid of spring 172 to free pawl 94 (Fig. 3). Ink in tray or fountain 100 will then be fed by roll 99 to ductor roll 101 and passed by the intermediate rolls 110, 121, 112 to the form rolls 114 which apply it to the plate cylinder 3. Link 174 is guided in its movement by a pin 178 carried by the frame sliding in a slot 179 in the link. It is to be noted that sector 170 merely contacts pin 169 so that it does not interfere with removal of the inking unit.

The supply of ink to the plate cylinder is automatically cut off or discontinued when there is no sheet to be fed to the press and the ink supply is automatically restored after cut off upon a sheet being received in position to be fed to the machine. This means includes a lever 181 (Fig. 1) connected with the lower end of the link 174 and pivoted to the frame on pivot 182. A lever 183 is located below lever 181 so that in one position its end 184 engages lever 183 and holds the latter in raised position. Lever 183 is pivotally mounted on the frame on a pivot 185. A stop screw 186 limits the pivotal movement of lever 183.

The lever 183 is in the position shown in full lines when there is no sheet in feeding position to be forwarded into the machine. When a sheet is in feeding position a push rod 187 engages an upper pin 188 on the lever 183 to swing the lever to the dash-dot line position so that lever 181 and link 174 move downwardly under pressure on lever 168 from spring 172. This frees the pawl 94 for the inking unit. If a sheet should not be in feeding position the push rod 187 engages a lower pin 189 to swing lever 183 to the full line position which removes pawl 94 from engagement with ratchet wheel 96 and the supply of ink is discontinued.

Lever 183 is a lever which moves the blanket cylinder to and away from contact with the impression and plate cylinders of the press through a link L connected to lever 183 by a pin P. The supply and cut off of supply of ink to the blanket roll is controlled or operated with the position of the blanket cylinder.

Another feature of the invention relates to the arrangement for cutting of the supply of water from the plate cylinder 3 by lifting the water molleton 50 which normally rests on the top of said plate cylinder. In a well known manner water is taken up by a roll 23 in the water pan or fountain 24 and transferred to a ductor roll 40 which is swung back and forth on arms 42 to transfer water from roll 23 to oscillating or reciprocating roll 47. From roll 47 water is transferred to molleton roll 50 and then to cylinder 3. As shown in detail in Figs. 3 and 12, an elongated gear 52 is driven directly from gear 5 on the plate cylinder and gear 52 on shaft 43 drives a narrower gear 51 on a shaft 48 which carries said roll 47. Shaft 48 is oscillated by device 51a (Fig. 2) and is mounted in arms 48a urged by springs 49 to press roll 47 against roll 50. The yielding pressure of roll 47 on roll 50 is necessary to permit roll 50 to be lifted from plate cylinder 3 (Figs. 3 and 12).

In order to drive the gears in the removable ink supply unit from gear 5, it is necessary to place in a projecting part of main frame members 1 and 2, a shaft 65 carrying a gear 64 meshing with a gear 117 in the removable ink supply unit. The gear 117 is on the same shaft 113 as roll 112 which supplies ink to said form rolls 114 which are mounted on shafts 135 carrying ball bearing units 136 (Figs. 7 and 13) which are held in the projecting ends of levers 137 on pivots 138 of frame members 1a and 2a.

The inner ends of levers 137 are held against spreading to keep the rolls 114 separated to pass above and below shaft 65 and engage plate cylinder 3. The fingers

142 and springs 146 keep rolls 114 in engagement with roll 112 of the inking unit. The inking unit (Fig. 13) may be placed in position with the frame members 1a and 2a resting on frame members 1 and 2 and secured thereto as hereinbefore described, the gear 117 in mesh with gear 64, the pin 169 on lever 165 over sector 170 on link 174 guided on frame member 1 (Fig. 11), and link 70 connected to pawl carrier 71 (Fig. 15). The inking units may be changed to change the ink or for cleaning purposes.

This invention is presented to fill a need for improvements in inking and dampening means for an offset printing machine. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. This disclosure illustrates the preferred means of embodying the invention in useful form.

What is claimed is:

1. In a machine of the character specified, the combination of a main frame having projecting means, a secondary frame, mounting means carried by the main frame and the secondary frame for removably mounting the same on the main frame, the secondary frame having a recess in the edge thereof to receive the projecting means, a plate cylinder mounted in the main frame; and a gear on one end of said cylinder, inking means for said plate cylinder comprising an ink reservoir, an intermittently actuated ink roller in said reservoir, a ductor roll shiftable intermittently toward and from said ink roll, a third roll receiving ink from said ductor roll, a fourth roll on which ink is applied by said receiving third roll, a larger fifth roll contacting the fourth roll, two form rolls engaging said fifth roll and said plate cylinder from above and below and on each side of the recess in the secondary frame; and gear means carried by the projecting means and meshing with the gear on the plate cylinder for actuating said inking means.

2. In a machine of the character specified, the combination according to claim 1, wherein said inking means comprises a gear on said fifth roll corresponding thereto in size and located at the recess in the secondary frame, gears on said third and fourth rolls driven from said gear on said fifth roll; and said means for actuating said inking means comprises a connecting gear carried by the projecting means of the main frame and meshing with the plate cylinder gear and with the gear on said fifth roll and with its axis in the same plane as those of the gear connected thereby.

3. In a machine of the character specified, the combination according to claim 1 wherein said inking means comprises mounting devices for opposite ends of said form rolls permitting separation thereof but maintaining said form rolls in engagement with said fifth roll; and said actuating means comprises a shaft carried by the main frame between the plate cylinder and the fifth roll, a connecting gear rotatable freely on the shaft, cams on the connecting gear shaft cooperating with said mounting devices to separate the form rolls and separate them from said plate cylinder.

4. In a machine of the character specified having a removable inking unit with form rolls, the combination of a main frame, mounting means carried by the main frame to receive a removable secondary frame, a plate cylinder and a gear on one end of said plate cylinder, a projection on the main frame adjacent to the plate cylinder and positioned with respect to the mounting means for the secondary frame to locate the same for co-operative action with the mechanism carried by the secondary frame; and dampening apparatus comprising a water reservoir, a water roll in said reservoir, a ductor roll movable to and from said water roll, an oscillating roll to which water is supplied by said ductor roll, pivoted arms carrying said oscillating roll, springs acting on said

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arms to swing said oscillating roll away from said ductor roll, a molleton roll normally resting on said plate cylinder from above and receiving on its upper part the oscillating roll, a shaft about which said molleton roll rotates, means for guiding said molleton shaft vertically, means mounted on the main frame projections for lifting said molleton shaft to separate said molleton roll from said plate cylinder, and means mounted on the main frame projections for separating the form rolls of an inking unit.

5. In a machine of the character specified, the combination according to claim 4 wherein said means for lifting said molleton roll comprises vertically slidable members, springs urging said slidable members downwardly, lifting levers for each of said slidable members, and a shaft with cams thereon for actuating said levers.

6. In a machine of the character specified, the combination of a main frame, a removable secondary frame, frame mounting means carried by the frame to removably mount the secondary frame on the main frame, a plate cylinder and a plate cylinder gear mounted on said main frame; inking means mounted on the secondary frame comprising a central roll mounted in the frame members and having a gear connected with the roll, form rolls, form roll shafts, mounting means for the ends of said form roll shafts permitting movement of said form rolls outwardly along the surface of the central roll to separate said form rolls from said plate cylinder, a connecting gear meshing with said central roll gear and said plate cylinder gear, a shaft mounted on the main frame between said central roll and said plate cylinder about which said connecting gear rotates; dampening means comprising rolls actuated by said plate cylinder gear and a vertically movable molleton roll, lifting slides at each end of said molleton roll, bell cranks to lift said slides, cams on said connecting gear shaft to separate said form rolls from said plate cylinder, cams on said connecting gear shaft to operate said bell cranks, an arm on said connecting gear shaft to operate the same, said cams being so arranged that in one position of said arm both ink and water are supplied to the plate cylinder, in a second position water only is supplied to the plate cylinder and in a third position neither ink nor water is supplied to the plate cylinder.

7. In a machine of the character specified, a main frame comprising front and rear main frame members cut out at the rear to provide generally horizontal edges; an inking unit removably mounted on the main frame having side frames to rest on said horizontal edges, an ink reservoir, an ink roller in said reservoir, a ratchet fixed to said ink roller, a pawl having a projecting pin, a pawl carrier having means for detachable connection with a link operable by parts on the main frame, a lever pivoted on the front frame member of the inking unit and having an end with its outer edge curved to engage the pin on the pawl and a second arm having a projecting pin normally resting on the top of a spring supported member on the upper end of a link carried by one of the main frame members, form rolls, shafts for said form rolls, bearings on said shafts, levers pivoted on the front and rear frames of said inking unit, set screws engaging the rear ends of said lever at their outer sides to keep the front ends apart, the outer ends of said levers having recesses to receive said bearings, a pivoted finger across each of said recesses, and spring means to press said bearings into said recesses, a central roll at the inner side of said form rolls and on which they rest under pressure from said spring pressed pivoted fingers, and a gear on said central roll adapted to engage a gear on a shaft carried by the main frame and in mesh with the plate cylinder gear.

8. In a machine of the character specified, a main frame comprising front and rear main frame members cut out at the rear; an inking unit having side frame members, means carried by the main frame members and the

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side frame members to removably secure them together, an ink reservoir, an ink roller in said reservoir, a ratchet wheel fixed to said ink roller, a pawl having a projecting pin, a pawl carrier having means for detachable connection with a link operable by parts on the main frame, a lever pivoted on the front side frame member of the inking unit and having an end with its outer edge curved to engage the pin on the pawl, and a second arm resting on the upper end of a link carried by one of the main frame members, form rolls, shafts for said form rolls, bearings on said shafts, levers pivoted on the front and rear side frame members of said inking unit, means on the outer ends of said levers to receive said bearings, a central roll at the inner side of said form rolls and on which they rest, and a gear on said central roll adapted to engage a gear on a shaft carried by the main frame and in mesh with the plate cylinder gear.

9. In a machine of the character specified the combination of a main frame, drive mechanism to operate the machine, a plate cylinder mounted in the main frame, a plate gear on one end of the cylinder, a connecting gear mounted on the main frame meshing with the plate gear; a removable inking unit including a secondary frame on which inking means is mounted, means removably mounting the secondary frame on the main frame, said inking means including a transfer roll, a gear on the transfer roll meshing with the connecting gear when the secondary frame is mounted on the main frame, at least one form roll, means mounting the form roll on the secondary frame in position to engage the transfer roll and to engage the plate cylinder when the secondary frame is mounted on the main frame and for movement towards and away from the plate cylinder; dampening means carried on the main frame including a molleton roll, and means carried by the main frame mounting the molleton roll for movement towards and away from the plate cylinder; cam means mounted on the main frame and releasably connected with said form roll upon removal of the secondary frame and to move the form roll towards and away from the plate cylinder, means operatively connecting the cam means with the molleton roll to move the latter towards and away from the plate cylinder, the cam means being arranged so that in one position said form roll is moved away from the plate cylinder and in a second position the molleton roll is moved away from the plate cylinder and in a third position said form roll and the molleton roll are both moved away from the plate cylinder.

10. In a machine of the character specified as in claim 9 including an inking roll, ratchet means connected with the inking roll to rotate the same, and a lever removably connected with the ratchet means and operated by the drive mechanism.

11. In a machine of the character specified as in claim 9 in which the ratchet means includes a pawl and a ratchet wheel, a throwout lever mounted on the secondary frame and movable to engage the pawl to hold the latter away from the ratchet wheel, and an operating lever carried by the main frame and connected with the drive mechanism and having contact engagement with the throwout lever whereby disengagement takes place upon removing the secondary frame from the main frame.

12. In a machine of the character specified as in claim 9 in which the cam means includes a cam for said form roll, a cam for the molleton roll, and a shaft mounted on the main frame and carrying the cams.

13. In a machine of the character specified as in claim 9 in which the secondary frame includes secondary frame members having a recess in the edges thereof, projections carried by the main frame received in the recesses, a shaft mounted in the projections, the driven gear being rotatable on the shaft, and the cam means being carried by the shaft.

14. In a machine of the character specified having a main frame on which is mounted a plate cylinder; a re-

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movable inking unit comprising a secondary frame, mounting means carried by the secondary frame to mount the same on the main frame, ink transfer rolls mounted on the secondary frame including form rolls located to press against a plate cylinder in the main frame, an ink reservoir, an ink roller in the reservoir, pawl means for the ink roller including a pawl carrier having a hole to receive a spring pressed pin from one of two parts of a forked end of an operating link to pass through a hole in the other part of said fork, a pawl-blocking lever pivotally mounted on the secondary frame and normally held out of operation away from the pawl but resting on the top of a link when the inking unit is mounted on the main frame, and a gear projecting from said inking unit connected with the ink transfer rolls and located to engage a gear on said main frame when the unit is mounted on the latter.

15. A removable inking unit as in claim 14 including

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a ductor roll, means mounting the ductor roll on the secondary frame for movement into contact with and away from the ink roller, and means carried by the pawl carrier to pivot the ductor roll.

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