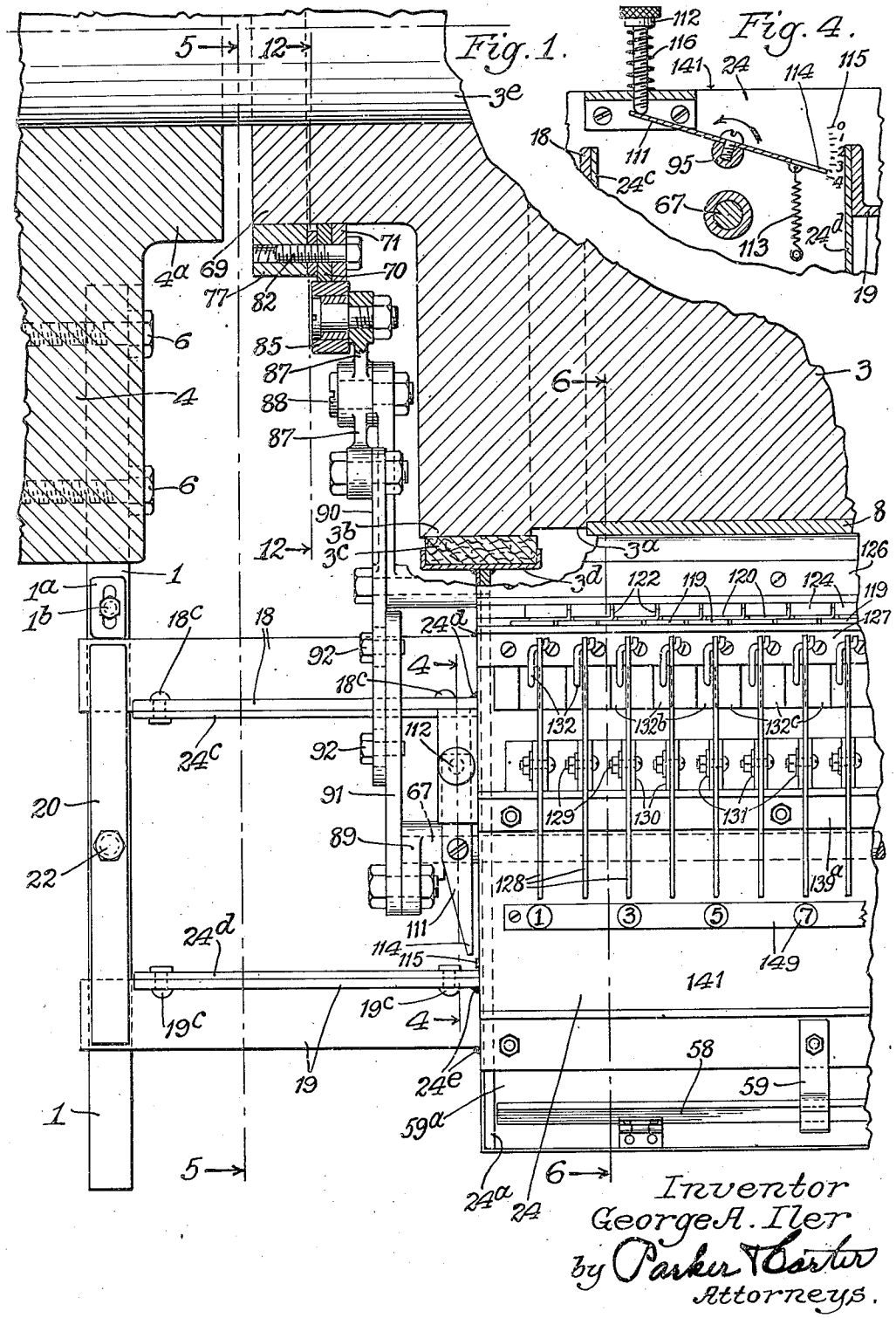
Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 1



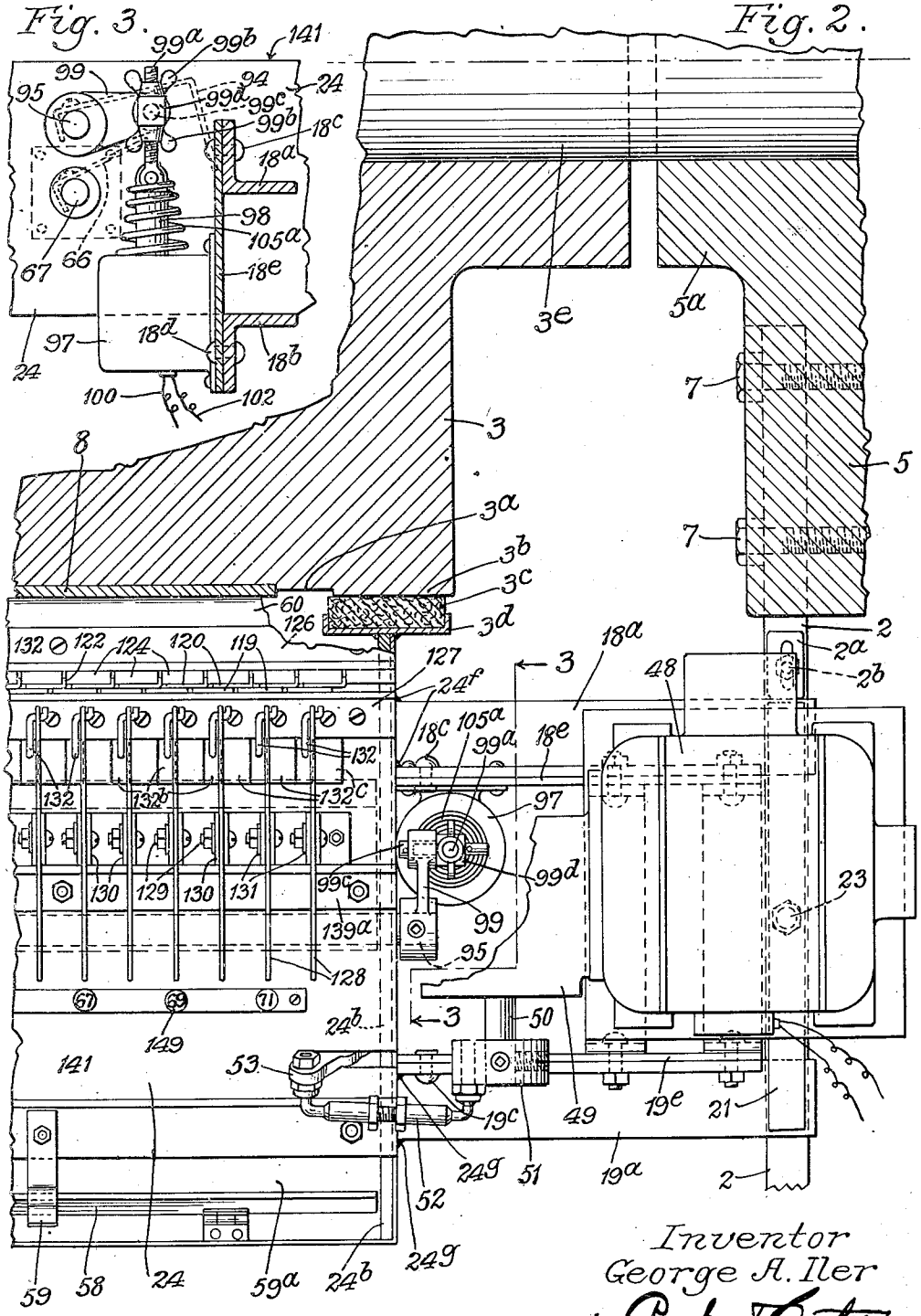
Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942. 7 Sheets-Sheet 2

Fig. 3.

Fig. 2.



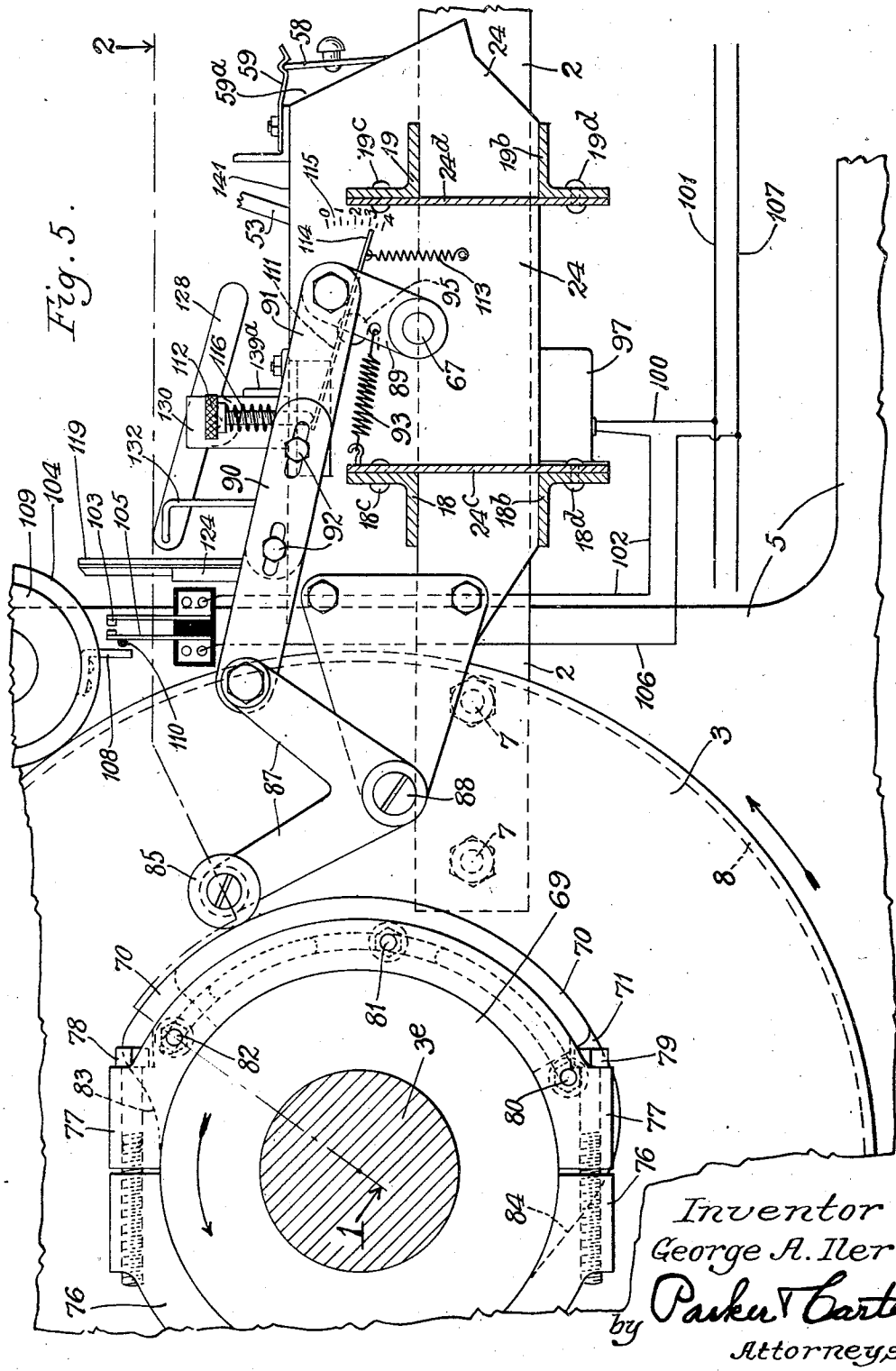
Inventor
George A. Iler
by Parker & Carter
Attorneys.

Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 3

Fig. 5.



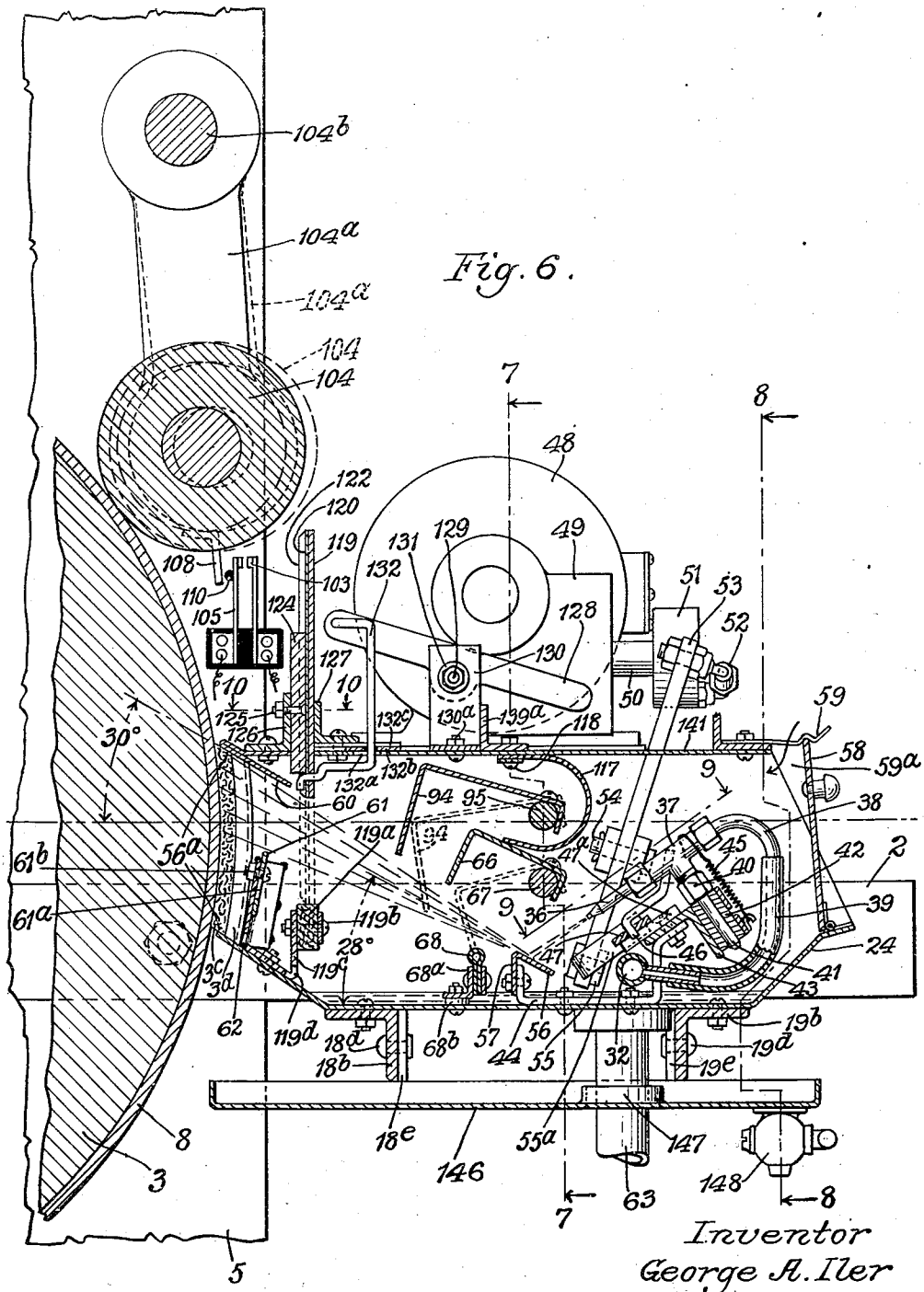
Inventor
George A. Iler
by Parker & Carter
Attorneys.

Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 4

Fig. 6.



Inventor
George A. Iler
by Parker & Carter
Attorneys.

Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 5

Fig. 7.

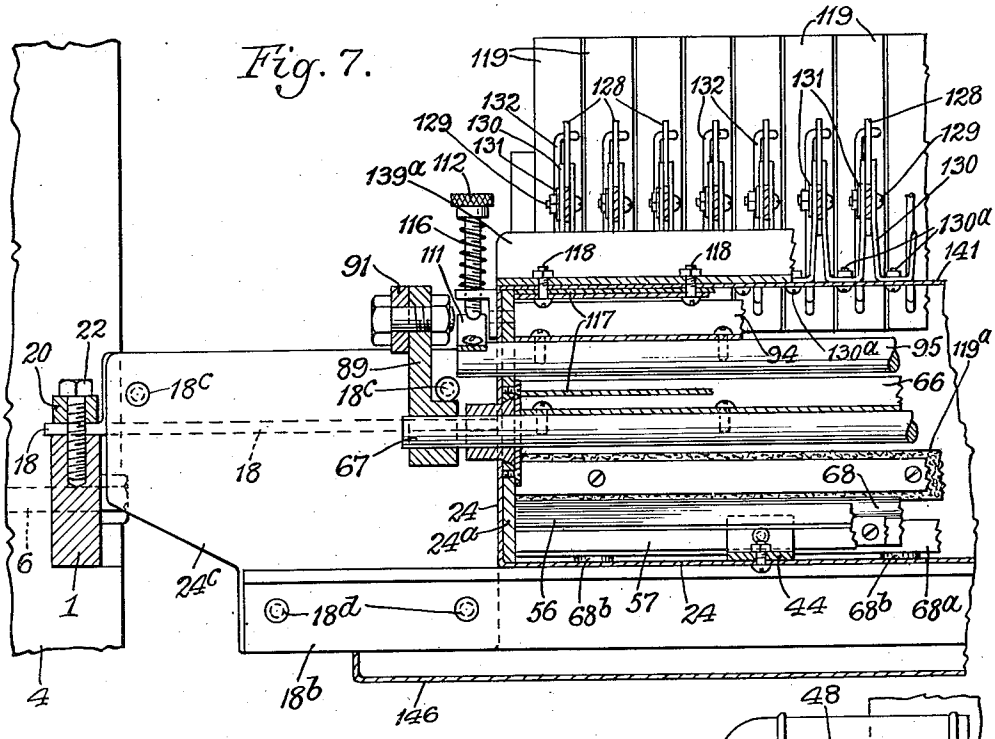
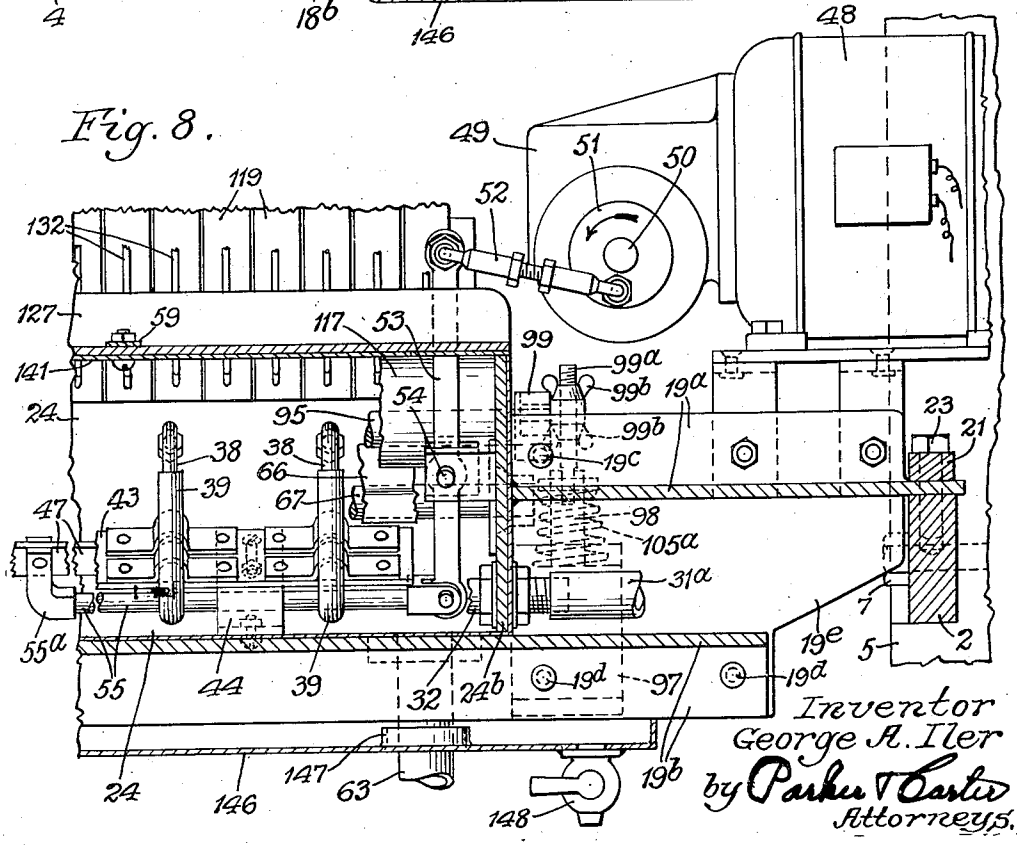


Fig. 8.



Inventor
George A. Iler
by Parker & Carter
Attorneys.

Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 6

Fig. 9.

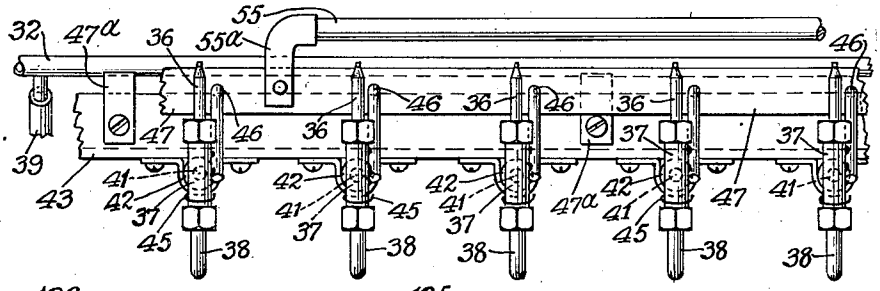


Fig. 10.

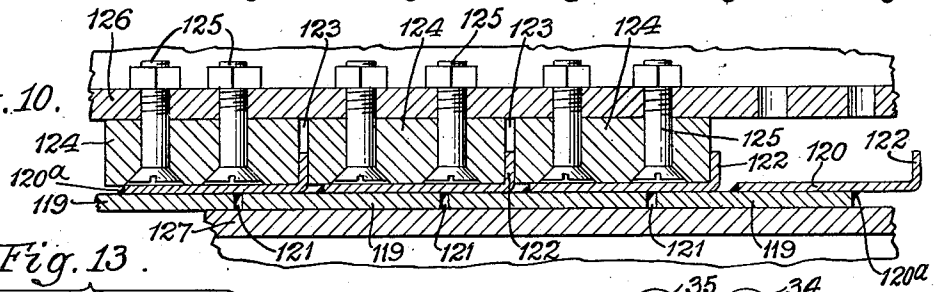


Fig. 13.

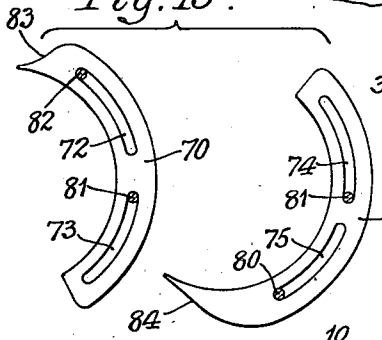


Fig. 11.

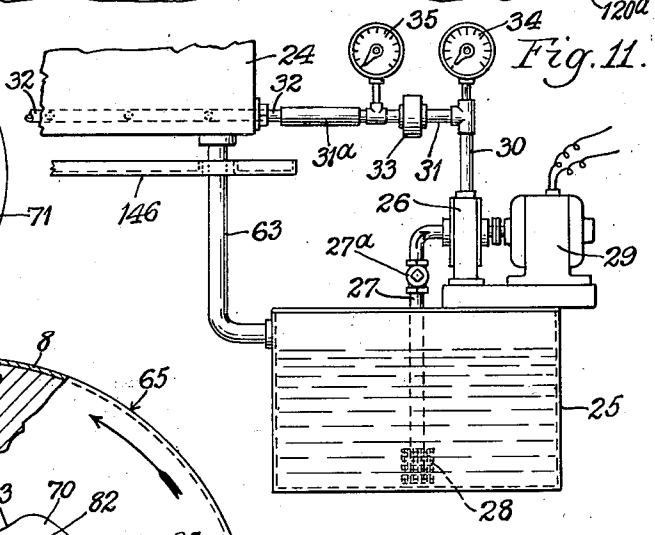


Fig. 12.

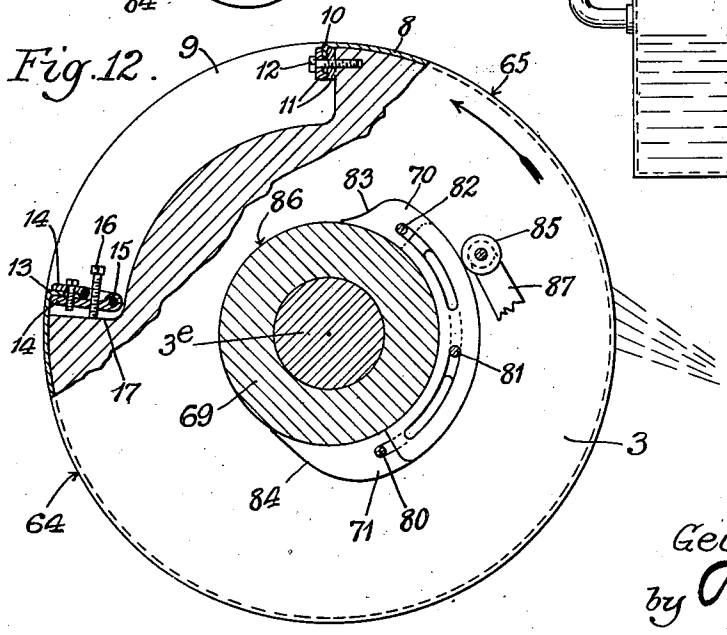
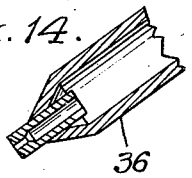


Fig. 14.



Inventor
George A. Iler
by Parker & Carter
Attorneys.

Nov. 27, 1945. G. A. ILER 2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

Filed June 3, 1942 7 Sheets-Sheet 7

Fig. 15.

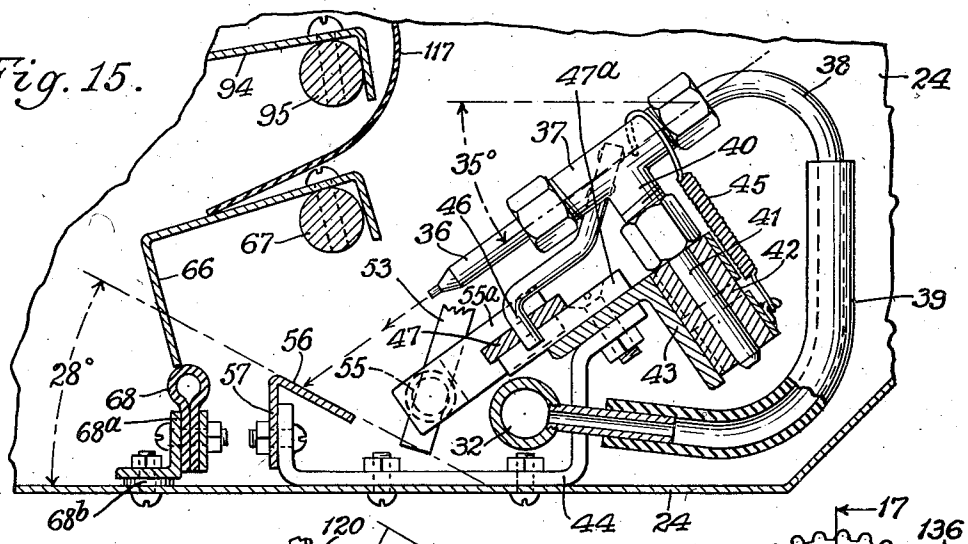


Fig. 16.

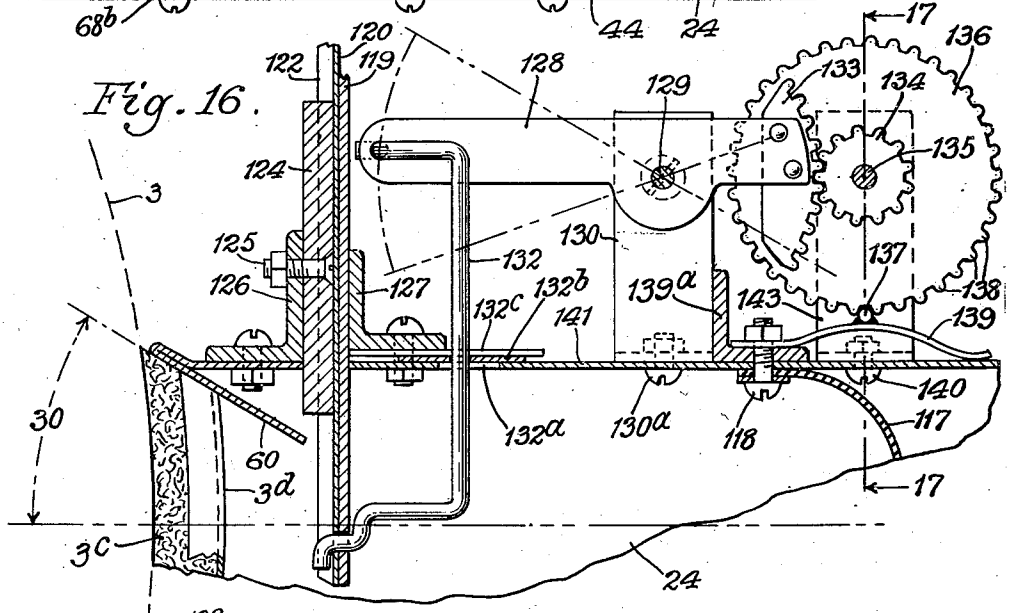
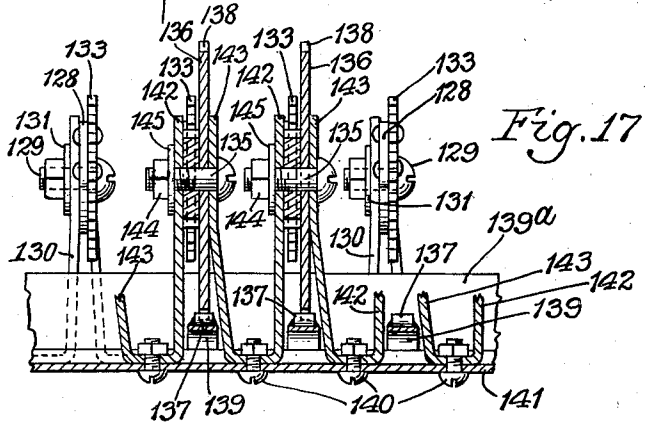


Fig. 17.



Inventor
George A Iler
by Parker & Carter
Attorneys.

Patented Nov. 27, 1945

2,389,730

UNITED STATES PATENT OFFICE

2,389,730

DAMPENING MECHANISM FOR PRINTING PRESSES

George A. Iler, Riverside, Ill., assignor to Roberts & Porter, Inc., Chicago, Ill., a corporation of Illinois

Application June 3, 1942, Serial No. 445,543

15 Claims. (Cl. 101—147)

This invention relates to a dampening mechanism for printing presses and has for its object to provide a new and improved device of this description.

The invention has as a further object to provide a dampening mechanism for printing presses wherein a spray of liquid is directed on the printing press cylinder without the use of compressed air.

The invention has as a further object to provide a dampening mechanism for printing presses wherein the spray forming apparatus is directly connected to a source of liquid under pressure from which the spray is formed.

The invention has as a further object to provide a dampening mechanism for directing a spray of liquid on the printing press cylinder and providing effective means for forming and controlling the spray.

The invention has as a further object to provide a dampening mechanism of the kind described wherein the liquid from a nozzle is directed against a spray forming target and thence onto the cylinder of the printing press.

The invention has as a further object to provide a dampening mechanism wherein the stream of liquid issuing from the nozzle is substantially free from whirl or twist.

The invention has as a further object to provide a dampening mechanism for the cylinder of a printing press with means for varying the amount of spray delivered to different portions of the press cylinder longitudinally therealong.

The invention has as a further object to provide a dampening mechanism for a printing press cylinder with means for automatically preventing the moisture from being sprayed upon a portion of the cylinder at each revolution thereof.

The invention has as a further object to provide a dampening mechanism for a printing press cylinder provided with a series of liquid discharge nozzles with means for oscillating these nozzles while the press is running.

The invention has as a further object to provide means for obstructing the passage of the spray to the press cylinder for a portion of each revolution of the cylinder.

The invention has as a further object to provide means for partially obstructing the passage of the spray to the press cylinder to regulate the amount of moisture deposited thereon.

The invention has as a further object to provide means for adjusting the amount of spray deposited upon the press cylinder.

The invention has further objects which are more particularly pointed out in the accompanying description.

Referring now to the drawings,

Fig. 1 is a sectional view on the line 1—2 of Fig. 5 showing the left-hand end of the device;

Fig. 2 is a sectional view on line 1—2 of Fig. 5 showing the right-hand end of the device;

Fig. 3 is a detailed sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a detailed sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view on line 6—6 of Fig. 1;

Fig. 7 is a sectional view on the line 7—7 of Fig. 6 showing the left-hand end of the device;

Fig. 8 is a sectional view on the line 8—8 of Fig. 6 showing the right-hand end of the device with parts omitted;

Fig. 9 is a sectional view on the line 9—9 of Fig. 6 showing a central portion of the spray device;

Fig. 10 is a sectional view taken on line 10—10 of Fig. 6 on an enlarged scale;

Fig. 11 is a diagrammatic view showing the right-hand end of the device showing the water supply system;

Fig. 12 is a sectional view on line 12—12 of Fig. 1;

Fig. 13 is a view showing the cams dismounted;

Fig. 14 is an enlarged sectional view of the nozzle;

Fig. 15 is a view of the right-hand portion of Fig. 6 showing the parts on a larger scale with the spray control gates in closed position;

Fig. 16 is a sectional view similar to Fig. 6 showing a modified construction of the device for controlling the liquid spray;

Fig. 17 is a detailed sectional view taken on line 17—17 of Fig. 16.

Like numerals refer to like parts throughout the several figures.

In the drawings I have shown one form of dampening mechanism for dampening the printing plate so that it will take the proper amount of ink from the inking roller to secure the best results. This dampening mechanism is preferably mounted upon the printing press frame in any suitable manner.

As herein shown, there are provided supports 1 and 2 on opposite sides of the press cylinder 3 mounted upon the shaft 3e. These supports are preferably connected with the press frames 4, 5 by suitable fastening devices 6, 7. The press

frames have bearings 4a, 5a to support the press cylinder. This press cylinder carries the plate 8 which is to be moistened to receive the ink. The plate 8 is attached to the cylinder in any of the usual ways.

In the construction shown (Fig. 12), the cylinder is provided with the recess 9 extending longitudinally therealong. The plate 8 has one edge 10 bent inwardly and which is clamped between the clamping members 11 by the clamping screws 12. The other edge of the plate has the inwardly bent edge 13 which is clamped between the clamping members 14, which are pivotally connected with the printing cylinder at 15. There are tightening screws 16 threaded into one of these clamping members and which engage a shoulder 17 on the cylinder so that the plate can be properly tightened around the cylinder.

As hereinafter set out, means is provided to confine the action of the dampening mechanism to the plate and for preventing moisture from being applied along the longitudinal space between the edges 10 and 13 of the plate.

Removably mounted on the supports 1 and 2 are the cross supporting members 18, 19, and 18a, 19a, which are held in position by the holding members 20, 21. Suitable removable fastening devices 22, 23 fasten the holding members in position. Slotted stop members 1a, 2a are adjustably secured to the supports 1 and 2 by the set screws 1b, 2b.

Supported in proper position is a casing 24 in which the dampening mechanism is enclosed (Fig. 6). Any suitable means may be utilized to support this casing. As herein shown, the cross supporting members 18 and 19 at the left-hand end (Fig. 1) have one end carried by the support 1. The other ends of these members about the end of the casing are fastened thereto in any desired manner as by welding at 24d and 24e. Extending crosswise under the casing 24 are the members 18b and 19b best seen in Fig. 5. The members 18 and 18b are connected together by the plate 24c and the fastening devices 18c and 18d. The members 19 and 19b are connected together by the plate 24d and the fastening devices 19c and 19d. At the opposite end (Fig. 2) the cross supporting members 18a and 19a each have one end abutting against the end of the casing and fastened thereto, as by welding, at 24f and 24g. The other ends of the members 18a and 19a rest upon the support 2. The ends of the casing, at the points where the cross supporting members are attached, are reinforced by the reinforcing members 24a and 24b (Figs. 7, 8). The member 18a is connected to the member 18b by a plate 18e similar to the plate 24c, and the member 19a is connected to the member 19b by a plate 19e similar to the plate 24d of Fig. 5. The members 18 and 19 rest and slide upon the support 1, and the members 18a and 19a rest and slide upon the support 2.

In assembling the parts of the dampening device, these members are moved about the supports 1 and 2 until the dampening mechanism and the casing are in the proper position. The stop members 1a and 2a are then moved into contact with the members 18 and 18a and the screws 1b and 2b tightened so as to hold them in position. If the device is removed for any purpose, it can be returned to its exact original position by moving the parts along the supports until the members 18 and 18a engage the stop members 1a and 2a. The parts are thus held in position by clamping the members 18 and 19, and 18a and 19a to the supports by means of the holding members 20, 21 and fastening devices 22, 23.

The dampening liquid may be taken from any suitable source of supply. As herein shown (Fig. 11) there is a tank 25 containing this liquid. A pump 26 has a pipe 27 extending into this tank, having at its end a screen 28 which prevents foreign particles being delivered to the dampening mechanism. The pump 26 is operated by a motor 29. The discharge pipe 30 of the pump is connected with a pipe 31 which extends into the casing 24 and connects with a delivery pipe 32. There is a filter 33 in the pipe 31. On opposite sides of this filter are the pressure gauges 34, 35. When these pressure gauges register substantially the same pressure, this indicates that the filter is working properly and is not clogged. The pipe 31 preferably has a flexible removable section 31a so that the pump can be easily disconnected. The pipe 27 has a check valve 27a.

A plurality of nozzles 36 are connected at intervals with the delivery pipe 32 (Figs. 6 and 15). As herein shown, these nozzles are connected to one end of a rocking member 37, the other end of which is connected with a pipe 38 which, in turn, is connected by a flexible pipe 39 with the delivery pipe 32. The rocking member 37 has the projecting part 40 which is provided with a pivot 41 mounted in a bearing 42 in a support 43, attached to the fixed member 44. A spring 45 is connected at one end to the support 43 and at the other end to the rocking members 37. The rocking members 37 and the nozzles 36 are rocked back and forth in any desired manner. As herein shown, there is connected to each rocking member 37 a pivot 46 which is connected to a longitudinally movable or oscillating bar 47, which is moved or oscillated by any suitable means (Figs. 2, 6 and 8). This bar slides along separated supporting members 47a (Fig. 9) which are far enough apart as not to interfere with the proper longitudinal reciprocation of this bar. As herein shown, this bar is oscillated by a motor 48 (Fig. 8) which is connected through a speed reducer 49 to a shaft 50 carrying a wheel 51. An adjusting connecting rod 52 is connected eccentrically with this wheel and is also connected to a rocking arm 53 pivoted at 54. This rocking arm is connected with a reciprocating member 55 attached to the oscillating bar 47 by the latterly projecting part 55a (Figs. 8 and 9), which in turn is connected to the nozzles 36. These nozzles are rocked back and forth during the time the device is in operation. The purpose of the oscillation of these nozzles is to insure the proper distribution of the particles of spray upon the plate of the cylinder so each individual nozzle will not leave a streak on the paper.

Any suitable number of nozzles may be used and they are preferably spaced between 3 and 4 inches apart. The nozzles are removable for cleaning purposes. This may be accomplished either by disconnecting the spring 45 and removing the rocking member 37 from the bearing 42 and then turning the end up and inserting a suitable tool or a pin in the opening of the nozzle or by unscrewing the nozzle from the rocking member and inserting a proper cleaning device therein.

A spray forming target 56 has a downwardly and rearwardly extending part which receives the stream of liquid from the nozzles and converts the liquid into spray and also directs the spray through the discharge opening 56a of the casing upon the plate of the press cylinder. The target

is fastened to a plurality of fixed members 44 spaced apart so that water can pass between them and be drained out of the casing. It is important that this target member and the nozzles have the proper inclination with relation to the horizontal. I have found, for example, that best results are secured by having the target member inclined at an angle of substantially twenty-eight degrees to the horizontal with a leeway of plus or minus ten per cent and that the nozzles have an angle of inclination with relation to the horizontal of substantially thirty-five degrees with a leeway of plus or minus ten per cent. Increasing the angle of the target member makes the mist finer and decreasing it makes the mist coarser, and the relative angles should be such as to secure the proper fineness of the mist that is directed upon the plate. If the particles of mist are too large they are crushed when the paper is pressed on the plate, thus leaving visible spots on the paper. If the mist is too fine not enough moisture will adhere to the plate to secure the proper transfer of ink thereto from the inking roller.

The moisture on the plate controls the amount of ink that adheres thereto. Too much moisture produces too little ink and, therefore, a blank spot on the paper. Too little moisture causes too much ink to adhere to the plate, thereby causing a black spot on the paper.

The press cylinder is rotating at a high speed, carrying with it a film of air. The spray particles must be heavy enough to quickly penetrate this revolving film of air and then be deposited on the plate. If the particles of spray are too light, they will be carried along by this film of air so that not enough moisture will be deposited on the plate.

The nozzles are so constructed and arranged that the stream of each nozzle will be substantially the same diameter throughout its length, that is between the ends of the nozzles and the target member.

The interior of the nozzle must be smooth without polish as the polish tends to make the stream whirl or twist, which must be avoided. The opening is best produced by drilling or reaming. I have secured good results with a nozzle where the end discharge opening is substantially one-sixteenth of an inch in length with a twenty-five per cent plus or minus leeway, with a diameter of $\frac{14}{1000}$ of an inch and a twenty-five per cent plus or minus leeway, and with a water pressure of from forty to seventy-five pounds per square inch and with a length of stream of substantially one and one-half inches. The nozzle is preferably made of commercial finished brass or other suitable non-corrosive metal. The target member should also be preferably of non-corrosive metal.

The spray of liquid from the target member to the plate on the cylinder forces a certain amount of air out of the casing 24 and it is necessary to provide means for admitting air at the rear of the casing to replace the air driven out of the casing. As herein shown, the rear of the casing is provided with a door 58 which may be held in a partially open position by the spring 59. This provides an air admission opening 59a. The door is also used to give access to the dampening apparatus in the casing. A lip 60 (Fig. 6) extends along the upper edge of the discharge opening 56a which inclines downwardly and rearwardly and which receives and stops the moisture tending to travel around with the cylinder, which moisture runs down the lower face of the lip and drops into the casing 24 to the rear of the barrier 61. The finer particles of spray tend to fall short of or be intercepted by the barrier 61, and are thus prevented from reaching the plate, due to their smaller momentum. The barrier 61 is thus effective to prevent the unduly small particles from reaching the cylinder. It may be adjusted up or down into the spray to obtain the proper control of the size of the particles allowed to reach the cylinder. The barrier 61 may be adjusted up or down by the slots 61a and bolts 61b. Water also passes down between the barrier and the plate and this water passes through holes 62 at the bottom of the barrier and runs back into the casing 24. These holes are self-sealing so that water can pass backward therethrough but spray cannot pass forward therethrough. This water and the water from the lip 60 and any other water that may be deposited in the casing 24 is conducted by the pipe 63 back into the spray tank 24 (Fig. 11).

Some means is provided for preventing the spray from being directed against the press cylinder between the edges of the plate 8, that is between the bent edges 10 and 13 of this plate (see Fig. 12). It is not practicable to end the spray right at the one edge of the plate 8 and begin it again at the other edge of the plate. In practice, therefore, the device is arranged so that the spray is shut off before the edge 13 of the plate is reached and is again directed upon the cylinder after the edge 10 has passed the spraying device. In commercial practice, for example, the directing of the spray upon the plate 8 would end at some point, as for example 64 (Fig. 12) and would again begin at some point, as for example the point 65. The spray is controlled for this purpose by a shut-off gate 66 (Figs. 6 and 15) which extends the length of the plate on the cylinder. This shut-off gate is attached to a rock shaft 67. The closing edge of the gate strikes a member 68 which extends across the casing and which is preferably of elastic material, such as rubber, which will stand the continued striking of the shut-off gate as it is opened and closed at every revolution of the press cylinder, so that the spray is only applied to the plate on the press cylinder and is not applied to the space between the edges of the plate. This member 68 is mounted upon a support 68a which extends across the casing and which is separated from the bottom of the casing at intervals by the washers 68b so as to permit water to run underneath it and return to the tank so that the tank can be kept drained.

The rock shaft 67 may be rocked by any suitable means. I have illustrated means for automatically rocking this shaft to automatically open and close the shut-off gate 66 at the proper points. This is accomplished by means of a connection between the rock shaft 67 and the press cylinder. In the particular construction shown (Figs. 1, 5, 7, 12 and 13), the hub 69 of the press cylinder is provided with a cam which is preferably removable therefrom and adjustable. This cam is formed of two sections 70 and 71 (Fig. 13). The cam 70 is provided with the slots 72, 73 and the cam 71 is provided with the slots 74, 75. The two sections, when in position, are overlapping so that they can be adjusted to increase or decrease the total circumferential length of the cam. These cam sections are held in place by means of a ring consisting of the sections of the parts 76 and 77 mounted on the hub 69 of the press cylinder and fastened together by the fastening devices 78 and 79. This ring is provided with bolts

80, 81 and 82 which extend therethrough. The cam sections 70 and 71 are located at the side of this ring and the bolts pass through the slots in the cam sections and hold the cam sections in place. By loosening the bolts, the cam sections may be moved relatively so as to decrease or increase the length thereof circumferentially. The cam section 70 has a forward inclined end 83 and the cam section 71 has a rearward inclined end 84. The inclined end 83 has a steeper incline than the inclined end 84. An engaging member 85, which is preferably a roller, passes along the periphery of this cam and that portion 86 of the periphery of the cylinder hub which is free from the cam. The roller 85 is connected by a bellcrank lever 87, pivoted at 88 and connected to the crank 89 on the rock shaft 67 by the two connecting members 90 and 91 (Fig. 5), which are adjustably connected together by means of the bolts 92 which pass through slots in the connecting members. The cam device moves the rock shaft in one direction and a spring 93 moves it in the other direction and keeps the roller 85 in contact with the cam and the portion of the hub of the cylinder free from the cam.

The adjustment of the cam sections 70 and 71 and the connecting members 90 and 91 permit the parts to be adjusted so that the shut-off gate 66 will be opened and closed at each revolution of the cylinder at the proper time to insure the dampening of the plate without dampening the space between the edges of the plate.

Some means is provided for varying the amount of spray which reaches the plate on the cylinder to properly adapt the device to varying speeds of the cylinder of the press. In the construction herein shown, there is provided a slow speed or idling gate 94 (Fig. 6). This gate is attached to a rock shaft 95 and is provided with a spray engaging section 96 which extends entirely across the device and which may be moved down into the spray sheet at varying distances. The rock shaft 95, as herein shown, is moved to any desired adjusted position and when in any of these positions is actuated by means of a solenoid 97 (Figs. 2, 3 and 5).

The gate or baffle 94 performs a double function. In the first place it is used to intercept the larger water particles traveling in the upper strata of the spray. Its second function is to serve as a slow speed or idling gate. When it is performing the second function, it is moved to its minimum opening position, for example by actuation of the solenoid 97 illustrated in Figs. 2, 3 and 5. It then cuts down the spray and permits a fine spray in limited volume. This second function is of importance for example when it is desired to slow the press down. This may become necessary for a variety of reasons such as bad paper, bad ink distribution, a malfunctioning of some other part of the press, or the necessity of the operator to leave the press for a moment or two. The speed of rotation of such presses may be controlled by any suitable switch means. When for any reason the press is slowed down, it is important that, automatically and without further effort or attention, on the part of the operator, the gate or shutter 94 be moved to the minimum opening or idling position. This result is obtained by employment of the solenoid 97.

The threaded end 99*a* of a core 98 has adjustably mounted thereon a block 99*d* provided with a projecting pin 99*c* connected to a crank 99 on the rock shaft 95 (Figs. 2 and 3). The movement of this crank and the gate 94 is regulated by adjusting the block 99*d* along the member 99*a* by the thumb nuts 99*b*. One end of the coil of the solenoid 97 is connected by a conductor 100 with the main line conductor 101. The other end of this coil is connected by a conductor 102 with a spring contact 103 located in proximity to the ink roller 104 which inks the sheet on the press cylinder, and which is connected to the arms 104*a* mounted upon the shaft 104*b*. There is a cooperating spring contact 105 in proximity to the contact 103 and which is connected by a conductor 106 with the main line conductor 107. When the ink roller 101 is moved out of contact with the sheet on the press cylinder, a control member 108 on the bearing 109 of the ink roller engages an insulating piece 110 on the spring contact 105 and moves it into contact with the spring contact 103 so as to complete the circuit through the solenoid. The solenoid is then energized and moves the crank 99 and rocks the rock shaft 95 so as to move the gate 94 down into the spray sheet. When the ink roller is moved back to its inking position in contact with the plate on the press cylinder, the spring contact 105 is released and the two spring contacts are separated so as to break the circuit through the solenoid. The spring 105*a* then moves the parts to their original position.

The downward movement of the gate 94 is controlled in the following manner. There is a control member 111 attached to the rock shaft 95 (Fig. 4). An adjustable stop 112 engages one end of this control member. The other end is provided with a spring 113 which, when the solenoid is de-energized, moves the rock shaft 95 until the control member 111 engages the stop 112. The control member 111 is provided with a pointer 114 which moves along a scale 115 which indicates the position of the gate 94 with relation to the spray sheet. The spring 116 acts like a lock nut to prevent the adjustable member 112 from being accidentally rotated. The rock shaft 95 is moved by the solenoid in the direction of the arrow (Fig. 4), so as to move the gate 94 down into the spray sheet. The distance the gate 94 is moved into the spray sheet by the solenoid is regulated by moving the end of the crank 99 along the threaded member 99*a* and locking it in position by the thumb nut 99*b*. By this adjustment the distance which the gate 94 is moved into the spray sheet by the solenoid can be regulated as desired. This adjustment may be arranged so as to prevent the gate 94 from ever being fully closed. Thus the possible limit of movement of the gate 94 toward the open position is controlled by the stop 112 as illustrated in Figure 4, and the limit of movement of the gate toward the closed position, in response to solenoid operation, is adjusted or controlled by the structure shown in Figure 3, by varying the point of attachment of the crank 99 along the threaded member 99*a* and locking it in position at the point of adjustment by the thumb nut 99*b*. Thus it is possible to predetermine or set the limit of movement of the shutter 94 in either direction. The gate 94 may be moved any desired distance into the spray sheet by hand, that is by moving the adjusting member 112 (Fig. 4) inwardly so as to rock the control member 111 and the shaft 95 in the direction of the arrow, the spring 113 maintaining the parts in their adjusted position. The pointer 114 and the scale 115 indicate the amount the gate 94 is moved into the spray sheet.

Means is provided for preventing the spray

from passing backward between the gates 66 and 94 and above the gate 94. For this purpose there is provided a sealing member 117 (Fig. 6) which extends longitudinally the entire length of the device. This sealing member is preferably of flexible and elastic material and may consist of a rubber blanket. As herein shown, it has one edge fastened to the upper part of the casing by the bolts 118 and is bent around the rock shaft 95 and engages the top of the gate 66.

In the event the plate on the press cylinder requires different quantities of ink at different points therealong, made necessary by the particular material to be impressed upon the printed sheet, I have provided an effective means for securing this result which consists of a series of separately movable spray intercepting or limiting members which preferably extend entirely along the cylinder. These spray intercepting members are each independently adjustable. Each of these intercepting members comprise an outer spray engaging member 119. There are a series of inner members 120 which overlap the spaces 121 between the members 119 and which are attached to the members 119 in any desired manner, as by the welding 120a (see Figs. 2, 6, 7 and 10). The members 120 are provided with laterally projecting edges 122 which project into the spaces 123 between the fixed members 124 of the guiding device. This provides a leak-proof construction so there can be no leak between the spray intercepting members. These fixed members are attached by the fastening devices 125 to the fixed frame member 126 which, as herein shown, is an angle iron extending longitudinally along the cylinder (Fig. 6). The members 119 engage the fixed frame member 127 which, as herein shown, consists of an angle iron extending longitudinally along the cylinder. These spray intercepting members are individually slidable in between the members 124 and 127.

The spray intercepting members may, if desired, be moved into contact with a stop member 119a (Fig. 6) preferably of rubber, felt or other similar material. This stop is fastened by fastening devices 119b to the support 119c attached to the bottom of the casing 24. This support has openings 119d at separated points therealong to let water drain back therethrough.

The spray intercepting members may be independently moved by any suitable means. As shown for example in Fig. 6, there is associated with each of these members a lever 128 which is pivoted by a bolt 129 between the fixed supports 130. Each of these bolts is provided with a friction washer 131 so that when the nut on the bolt is tightened, the lever will remain in any of its adjusted positions. Connected with each lever 128 is a connecting member 132 which passes through an opening in the top of the casing 24 and which is attached to the members 119 and 120 (see Fig. 6).

By moving downwardly the end of the lever 128 to which the connecting member 132 is attached, the spray intercepting member to which this connecting member is attached will be moved downwardly so as to intercept a part of the spray sheet so as to reduce the amount of moisture brought into contact with the sheet on the cylinder and that by moving the lever 128 so as to lift the connecting member 132, the spray intercepting member to which it is attached will be moved upwardly so that the moisture striking the sheet on the cylinder will be increased. Any one of the spray intercepting members may be moved into contact with the stop 119a so as to entirely intercept the spray at such point as desired. The members 132 which connect the levers 128 with the spray intercepting members 119 pass through openings 132a in the top of the casing, since they must have a backward and forward movement when moved by the levers 128. Means is provided for preventing spray or water from passing out through these openings. As herein shown there are sliding members 132b through which the members 132 pass with a tight fit. These sliding members slide between guiding members 132c (Fig. 2) and cover the openings 132a in all of their various positions so as to entirely close them.

In this construction of the spray intercepting members the levers 128 are directly moved by hand. In order to provide a more accurate control of the spray intercepting members, I may use a construction like that shown in Fig. 16. In this construction each lever 128, to which the connecting member 132 is attached, has connected with its other end on the other side of the pivot, a toothed segment 133. The teeth of this segment engage the teeth of a pinion 134 on a shaft 135, a gear 136 is connected with this shaft. It will be seen that by moving this gear 136, the spray intercepting members may be given a comparatively small movement at any one time. This gives a movement in the nature of a micrometer movement for the spray intercepting members. The parts of each device may be maintained in any desired position by means of a stop 137 which enters the spaces between the teeth 138 of the gear 136. This stop is attached to a spring 139, which in turn is fastened in position by the bolts 118. These bolts 118 also fasten the strengthening piece 139a. This strengthening piece is so positioned that when the supports 130 are moved against it, said supports will be in their proper position.

In operating the device, the gear 136 of the spray intercepting member to be moved is moved manually. The spring 139 then moves downwardly so that the stop 137 will pass one of the teeth and the spring will move it back into the next space between the teeth. The parts will be held in this position until the gears move again.

It will further be seen that in addition to the micrometer movement secured with this construction, there is provided means by which the operator can move any of the spray intercepting members exactly the same distance so that their lower ends will be in alignment or so that their lower ends will be in any relative position desired and the position of the ends of the spray intercepting members will be made known to the operator without their being seen, by the position of the teeth 138. The teeth of the wheels will have similar indicating means for this purpose. In this construction there are separate supporting devices for the pinions 134 and the gears 136. Each of these supporting devices consists of a U-shaped support (see Fig. 17) which is fastened at its bottom by a fastening device 140 to the top 141 of the casing 24. Each U-shaped support has its two branches 142 and 143 extending upwardly along the pinions and gears. One of the branches 142 of one U-shaped support is on one side of the pinion and gear and the branch 143 of the adjacent support is on the other side of this same pinion and gear. Each pinion and gear has a separate shaft 135 which is shown as a bolt with a nut 144 and a friction

washer 145 which helps maintain the parts in any position to which they are moved.

The support 130 for the pivot 129 is made up of similar U-shaped members, as is shown at the left hand end of Fig. 17. These members are held in place by the bolts 130a.

The discharge opening in the casing through which the spray is directed upon the plate on the cylinder has its ends sealed so as to prevent the escape of spray and water. The press cylinder 3 is reduced in diameter between its ends, as shown at 3a, leaving a projecting ring 3b at each end. There is a sealing member 3c at each end of the casing which fits into holding members 3d attached to the casing. These sealing members engage the projecting ring 3b at the ends of the cylinder (see Figs. 1 and 2).

The angle with relation to the horizontal of the nozzles, the spray target and the lip which returns the water to the casing, has been heretofore referred to and will depend upon the pressure of the water and other conditions. The angle of the lip 60 which directs the water back into the casing is thirty degrees with ten per cent plus or minus leeway.

Located beneath the casing 24 is a drip pan 146 for receiving any drip water. The pipe 63 passes through this drip pan and there is an upwardly projecting ring 147 which prevents any of this drip water from leaking out at this point. A discharge valve 148 is provided for letting the water out of the drip pan.

There is preferably an indicating device 149 associated with the spray intercepting members 119 which may consist of numbers as indicated (Fig. 1) so that these spray intercepting members may be more accurately controlled. It may happen, for example, that when a proof of the printed sheet is made, it will show at certain points that the spray should have been more or less intercepted. By comparing this proof with the indicating device, the proper spray intercepting member or members can be located and thus moved to secure the desired result. The indicating device is shown as having every other one numbered as 1, 3, 5, etc., to simplify it.

The barrier 61 is adjustable by means of the slot 61a and the bolt 61b so that it may be moved up to partially intercept the spray stream. It will be seen, therefore, that this spray stream may be partially intercepted from below by the barrier 61 and partially intercepted from above by the gate 94.

The use and operation of my invention are as follows.

In assembling the device, the cross supporting members 18 and 19 are placed upon the support 1 and the cross supporting members 18a and 19a are placed upon the support 2. The parts are then moved along these supports until the casing is in proper position and the sealing members are in contact with the cylinder. The slotted stop members 1a and 2a are then brought into contact with the supporting members 18 and 18a and the bolts 1b and 2b are tightened to hold the stop members in position.

In subsequently removing and replacing the casing, it is only necessary to move the parts until the supporting members 18 and 18a strike the stop members 1a and 2a. The motor 29 is then started. Liquid is drawn from the tank 25 and forced under pressure, by the pump 26, into the pipe 32 (Figs. 11, 6). The liquid under pressure then passes to the nozzles 36 which directs streams of liquid upon the target or targets 56, whereupon the liquid is converted into a spray and directed through the discharge opening 56a of the casing onto the plate 8 on the cylinder.

The nozzles are oscillated by means of the motor 48, the connections 53, 55 and the bar 47 (Fig. 8) thereby continually varying the points on the target or spray converting device struck by the streams of liquid from the nozzles. The spray converting member or target converts the streams of liquid into spray and directs it through the discharge opening 56a of the casing 24 onto the plate 8.

The rock shaft 67 and shut off gate 66 (Fig. 6) are moved by means of the cam members 70, 71, connected with the rotating cylinder of the press, bellcrank lever 87, links 90, 91 and crank 89 (Fig. 5) so as to move the shut off member 66 to completely obstruct the spray stream before it reached the edge 10 of the plate 8 (Fig. 12). This prevents the spray from striking the portion of the cylinder 9 free from the plate 8. As the cylinder rotates the shut off member is moved out of its obstructing position after the portion 9 of the cylinder has passed the discharge opening 56a in the casing.

It will be seen that by this means the shut off gate 66 is moved to intercept the spray at each revolution of the press cylinder when the portion of the press cylinder free from the printing plate is opposite the spray receiving point and that it is moved out of its intercepting position as soon as this portion of the cylinder has passed the spray receiving point.

When it is desired to partially obstruct the entire spray stream the idling gate 94 (Fig. 6) is moved into the spray stream the desired amount. There is herein shown means for moving this idling gate responsive to the movement of the ink roller away from the plate. When this ink roller 104 is moved out of contact with the plate, the projection 108 on its bearing moves the contact 105 into contact with the contact 103 and completes the circuit through the solenoid 97 (Figs. 3 and 5). The crank 99 of the rock shaft 95, to which the idling gate is attached, is connected to the plunger of the solenoid and, when the solenoid is energized, the plunger rocks the shaft so as to move the idling gate to its obstructing position. When the ink roller is moved back into contact with the plate, the electric circuit is broken and the spring 105a moves the parts so that the idling gate is moved out of its intercepting position. The amount of movement of the gate 94 is controlled by the member 111 which is attached to the rock shaft 95 (Fig. 4) and the adjusting member 112. By adjusting this adjusting member, the rock shaft may be rocked more or less so as to move the idling gate more or less into the spray stream. There is a scale 115 by means of which the position of the idling gate 94 may be ascertained.

When the printed sheet, for example, requires more ink at one place than at another, extending longitudinally of the plate, the spray intercepting members 119 are used (Figs. 1, 2, 6 and 10). Each of these spray intercepting members has a control lever 128 (Fig. 6) which is pivoted at 129 and which is connected by the connecting member 132 with its associated spray intercepting member 119 so that any one or any series can be moved independently so as to insure the proper moistening of the plate under varying conditions. In Fig. 16 there is illustrated another way of adjusting these spray intercepting members.

In this construction each lever 128 is provided with a gear 136 which is connected to the lever by means of the pinion 134 and tooth section 133. This gives a very accurate control as it practically gives a micrometer arrangement for moving these members.

In my use of the above described structure, and referring for example to Figure 6, it will be understood that the structure is adapted to carry out the following method. The nozzles 36 deliver a solid stream or spray, using the term "solid" to differentiate from a spray or stream in which air or a gas is employed as a conveying vehicle or medium. The solid stream impinges on the target 56 and is "exploded" and deflected in the direction of the broken lines of Figure 6. The consequent spray is a solid spray, in the sense that it is formed of water particles without the use of air or gas as a conveying means. However, in addition to the mechanical separation or widening of the spray from the impact point toward the cylinder 3, there is a certain classification of particles by size in the spray. While the classification may not be as accurate as a complete stratification, the larger particles tend to concentrate in the upper part of the spray. The particles of smaller size tend to drop from the spray. Such small particles as carry through toward the cylinder may be intercepted by the adjustable lower baffle 61, which may be set by the operator at the desired position, upon observation of the results on the machine. The upper gates, shutters or keys 119 may be individually adjusted with micrometric accuracy, and may be individually adjusted at different positions, as earlier pointed out, to prevent any water delivery at all, along some parts of the length of the cylinder or plate, or to graduate or vary the water delivery to different parts of the plate. Some sheets of offset printing may have heavy colored sections through one end of the sheet and nothing but sky at the other end, and it is therefore necessary to differentiate between one end of the plate and the other as to the amount of ink delivered and thus the amount of water delivered to the plate. Thus the inking may be controlled by the setting of shutters or keys 119.

I find it desirable, as earlier pointed out, to block out the larger particles which would cause blotting and white spots on the plate. While it may be possible to some extent to do this by the setting of the shutters or keys 119, I prefer to maintain sizing control of the upper part of the spray by use of the movable shutter 94, which may extend through the entire length of the cylinder or plate and constitutes the major adjusting or control means. As earlier pointed out, I limit its range of movement both into and out of the spray, by the adjustments shown in Figures 3 and 4. This control may be carried out by hand, but I find it desirable to employ the solenoid 97 for automatically moving the shutter 94 toward minimum spray position, when the press or cylinder slows down.

Considering together the effect of the shutters or baffles 61 and 94, 61 is effective to prevent particles of minimum size from reaching the plate. The shutter 94 is effective to prevent particles of maximum size from reaching the plate. I therefore permit to reach the plate only particles of an intermediate range of size and I accurately control this range at both limits.

One advantage of this procedure or method is to prevent the delivery of an unduly fine mist or fog to the plate. The particles which are admitted to the plate are sufficiently large to reach the plate without being carried off or interrupted by the current of air which is entrained by the surface of the plate and travels with the plate as it revolves. If the finer particles did get through they would not help or perform any function in moistening the plate but would increase the moisture delivered to the room and to the space around the plate and would eventually cover the machine with a coating of mist and cause rust and dust collection, as well as creating an undue and disadvantageous humidity in the space within the printing room, where large volumes of raw paper are usually stored.

I claim:

1. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, an ink roller for applying ink to said plate a plurality of nozzles which discharge liquid in the form of streams, spray converting means which convert the streams of liquid from the nozzles into spray and direct the spray against the printing plate on the press cylinder, a shut-off gate for entirely shutting off the delivery of spray against the printing plate, and means controlled by the movement of the press for moving said shut-off gate so as to intercept the spray stream during each revolution of the cylinder, a second shut-off gate and means for automatically moving the second shut-off gate so as to partially intercept the spray stream.

2. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, an ink roller for applying ink to said plate a casing having a discharge opening having a surrounding edge in proximity to the cylinder, means in said casing for converting liquid into a spray and directing it through said discharge opening upon said plate, a lip overlapping end extending along the upper edge of said discharge opening and projecting rearwardly into said casing for receiving moisture which tends to travel along with the cylinder and which returns the moisture to the casing, a barrier on the interior of the casing spaced from the edge of said discharge opening extending along the bottom of the discharge opening, the lip along the upper edge of the opening projecting rearwardly beyond the barrier so that the moisture running along the lip drops into the casing at the rear of said barrier.

3. The method of controlling the fineness of the spray employed in dampening printing plates on printing rolls, which includes directing toward the plate a solid spray consisting of particles of mixed size, with the larger and smaller particles concentrated in different parts of the spray; blocking from the spray particles of one size range, by interposing a barrier in the spray; further blocking the particles of a different range of size by interposing an additional barrier in a different part of the spray; leaving an opening for the spray between the edges of the said barriers, through which opening the spray travels directly against the printing plate; and varying the field of approach of particles through said opening, and thereby varying the fineness of that part of the spray which reaches the printing plate, by adjusting the width of said opening between said barriers, until the fineness of the water particles of that part of the spray which directly strikes the plate is maintained within a desired range of size.

4. The method of controlling the fineness of the spray employed in dampening printing plates

on printing rolls, which includes directing generally horizontally toward the plate a solid spray consisting of particles of mixed size, with the larger and smaller particles concentrated in different parts of the spray; blocking from the spray particles of one size range, by interposing a barrier in the spray from below; further blocking the particles of a different range of size by interposing an additional barrier in the spray from above; leaving an opening for the spray between the edges of said barriers, through which opening the spray travels directly against the printing plate; and varying the field of approach of particles through said opening, and thereby varying the fineness of that part of the spray which reaches the printing plate, by adjusting the width of said opening between said barriers, until the fineness of the water particles of that part of the spray which directly strikes the plate is maintained within a desired range.

5. The method of controlling the fineness of the spray employed in dampening printing plates on printing rolls, which includes directing a solid jet of water against a target in such fashion as to cause a spray to move directly from said target generally horizontally against the printing plate with the larger and smaller particles concentrated in different parts of the spray; blocking from the spray particles of one size range, by interposing a barrier in the spray from below; further blocking the particles of a different range of size by interposing an additional barrier in the spray from above; leaving an opening for the spray between the edges of said barriers, through which opening the spray travels directly against the printing plate; and varying the field of approach of particles through said opening, and thereby varying the fineness of that part of the spray which reaches the printing plate, by adjusting the width of said opening between said barriers, until the fineness of the water particles of that part of the spray which directly strikes the plate is maintained within a desired range.

6. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening in a generally rectilinear, uninterrupted path, upon said plate, a barrier extending along the lower edge of said discharge opening, projecting upwardly into the spray, and adapted to stop the particles of spray in the lower portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier on the interior of the casing, extending along the upper edge of said discharge opening and projecting downwardly into the spray and adapted to stop the particles of spray of the upper portion of the spray stream, and to prevent them from being brought into contact with the plate, and means for independently adjusting both barriers into and out of the spray stream.

7. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening in a generally rectilinear, uninterrupted path, upon said plate, a barrier extending along the lower edge of said discharge opening, projecting upwardly into the spray, and adapted to stop the particles of spray in the lower portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier on the interior of the casing, extending along the upper edge of said discharge opening and projecting downwardly into the spray and adapted to stop the particles of spray of the upper portion of the spray stream, and to prevent them from being brought into contact with the plate, and means for independently adjusting both barriers into and out of the spray stream, a shut off gate, for entirely shutting off the delivery of spray against the printing plate, and means controlled by the movement of the press for moving said shut off gate so as to intercept the spray stream during each revolution of the cylinder.

8. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening in a generally rectilinear, uninterrupted path, upon said plate, a barrier extending along the lower edge of said discharge opening, projecting upwardly into the spray, and adapted to stop the particles of spray in the lower portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier on the interior of the casing, extending along the upper edge of said discharge opening and projecting downwardly into the spray and adapted to stop the particles of spray of the upper portion of the spray stream, and to prevent them from being brought into contact with the plate, and means for independently adjusting both barriers into and out of the spray stream, a shut off gate and means for automatically moving it to partially intercept the spray stream.

9. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening in a generally rectilinear, uninterrupted path, upon said plate, a barrier extending along the lower edge of said discharge opening, projecting upwardly into the spray, and adapted to stop the particles of spray in the lower portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier on the interior of the casing, extending along the upper edge of said discharge opening and projecting downwardly into the spray and adapted to stop the particles of spray of the upper portion of the spray stream, and to prevent them from being brought into contact with the plate, means for independently adjusting both barriers into and out of the spray stream, a shut off gate and means for automatically moving it to partially intercept the spray stream, and means for adjustably limiting the penetration of said shut off gate into the spray stream.

10. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a dis-

charge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening, in a generally rectilinear uninterrupted path, upon said plate, with the particles of water of said spray differentially concentrated by size in different parts of the spray, a barrier projecting upwardly into the spray; and adapted to stop the particles in the spray in the lowest portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier projecting downwardly into the path of the spray and adapted to stop the particles of spray of the uppermost portion of the spray stream, and to prevent them from being brought into contact with the plate, and means for adjusting said last mentioned barrier into and out of the spray stream.

11. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening, in a generally rectilinear uninterrupted path, upon said plate, with the particles of water of said spray differentially concentrated by size in different parts of the spray, a barrier projecting upwardly into the spray; and adapted to stop the particles in the spray in the lowest portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier projecting downwardly into the path of the spray and adapted to stop the particles of spray of the uppermost portion of the spray stream, and to prevent them from being brought into contact with the plate, and means for adjusting said last mentioned barrier into and out of the spray stream, said first mentioned barrier extending from end to end of said discharge opening, said additional barrier including a plurality of separate sections arranged edge to edge, and separately adjustable into and out of the path of the spray, and individual means for accurately adjusting each said section and for holding it in adjusted position.

12. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, and an inking roller for applying ink to said plate, which includes a casing having a discharge opening in proximity to the cylinder, means in said casing for converting liquid into a solid spray and for directing it generally horizontally through said discharge opening, in a generally rectilinear uninterrupted path, upon said plate, with the particles of water of said spray differentially concentrated by size in different parts of the spray, a barrier projecting upwardly into the spray; and adapted to stop the particles in the spray in the lowest portion of the spray stream and to prevent them from being brought into contact with the plate, an additional barrier projecting downwardly into the path of the spray and adapted to stop the particles of spray of the uppermost portion of the spray stream, and to prevent them from being brought into contact with the plate, means for adjusting said last mentioned barrier into and out of the spray stream, said first mentioned barrier extending from end to end of said discharge opening, said additional barrier including a plurality of separate sections arranged edge to edge, and separately adjustable into and out of the path of the spray, individual means for accurately adjusting each said section and for holding it in adjusted position, and a cutoff gate positioned between said additional barrier and said converting means and directly aligned with said converting means, for entirely shutting off the delivery of spray against the printing plate, and means controlled by the movement of the press for moving said shut off gate so as to intercept the spray stream during each revolution of the cylinder.

13. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, an ink roller for applying ink to said plate including a plurality of nozzles which discharge liquid in the form of streams, spray converting target means, in the line of delivery of said streams, which convert the streams of liquid from the nozzles into a spray and direct the spray against the printing plate on the press cylinder, said nozzles being somewhat downwardly inclined from the horizontal, said spray converting target means being adapted and arranged to direct the spray generally horizontally but somewhat upwardly and directly against the printing plate, the distance separating said target means from said printing plate being sufficient to cause a differential arrangement of the water particles, by size, in the upper and lower parts of the spray, a baffle extending upwardly into the path of the spray, adapted to prevent the particles in the lower part of the spray from reaching the printing plate, a second baffle, extending downwardly into the spray, adapted to prevent the uppermost particles of the spray from reaching said plate, and means for adjusting the distance separating the upper edge of the first baffle and the lower edge of the second baffle and for thereby limiting the range of size of water particles which reach the plate.

14. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, an ink roller for applying ink to said plate including a plurality of nozzles which discharge liquid in the form of streams, spray converting target means, in the line of delivery of said streams, which convert the streams of liquid from the nozzles into a spray and direct the spray against the printing plate on the press cylinder, said nozzles being somewhat downwardly inclined from the horizontal, said spray converting target means being adapted and arranged to direct the spray generally horizontally but somewhat upwardly and directly against the printing plate, the distance separating said target means from said printing plate being sufficient to cause a differential arrangement of the water particles, by size, in the upper and lower parts of the spray, a baffle extending upwardly into the path of the spray, adapted to prevent the particles in the lower part of the spray from reaching the printing plate, a second baffle, extending downwardly into the spray, adapted to prevent the uppermost particles of the spray from reaching said plate, and means for adjusting the distance separating the upper edge of the first baffle and the lower edge of the second baffle and for thereby limiting the range of size of water particles which reach the plate, including means for independently adjusting both said baffles.

15. A dampening mechanism for printing presses comprising a printing cylinder, a printing plate, an ink roller for applying ink to said plate, a plurality of nozzles which discharge liquid in

the form of streams, spray converting means which convert the streams of liquid from the nozzles into a spray and direct the spray against the printing plate on the press cylinder, a shut off gate, for entirely shutting off the delivery of spray against the printing plate, and means controlled by the movement of the press for moving said shut off gate so as to intercept the spray stream during each revolution of the cylinder, including a cam on said printing roller, a cam engaging roller and means for normally urging it against said cam, a gate actuating lever and means for actuating it in response to movement of said cam engaging roller by said cam, said cam including a portion of maximum diameter, generally concentric with said printing cylinder, and inclined end portions, said end portions being of different sharpness of inclination, the inclined end portion which initially engages the roller being substantially sharper in inclination than the inclined end portion over which the roller passes inwardly toward the axis of the cylinder at the end of the travel of the roller across the concentric portion of the cam, and means for separately adjusting said inclined end portions about the axis of said roller.

GEORGE A. ILER.