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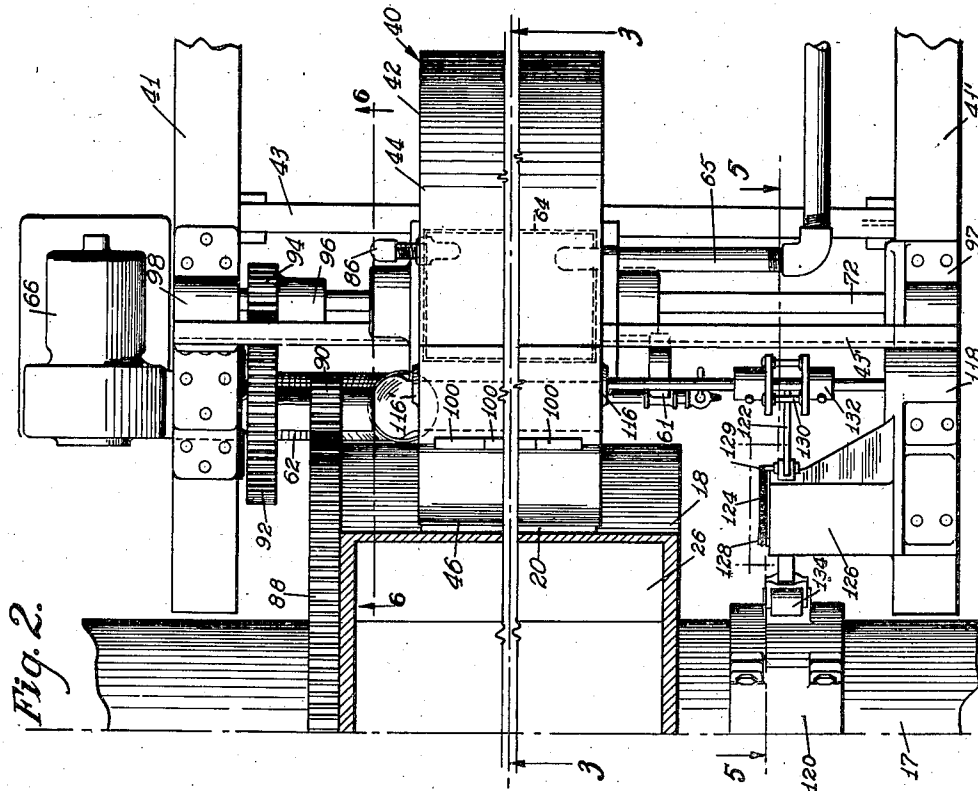
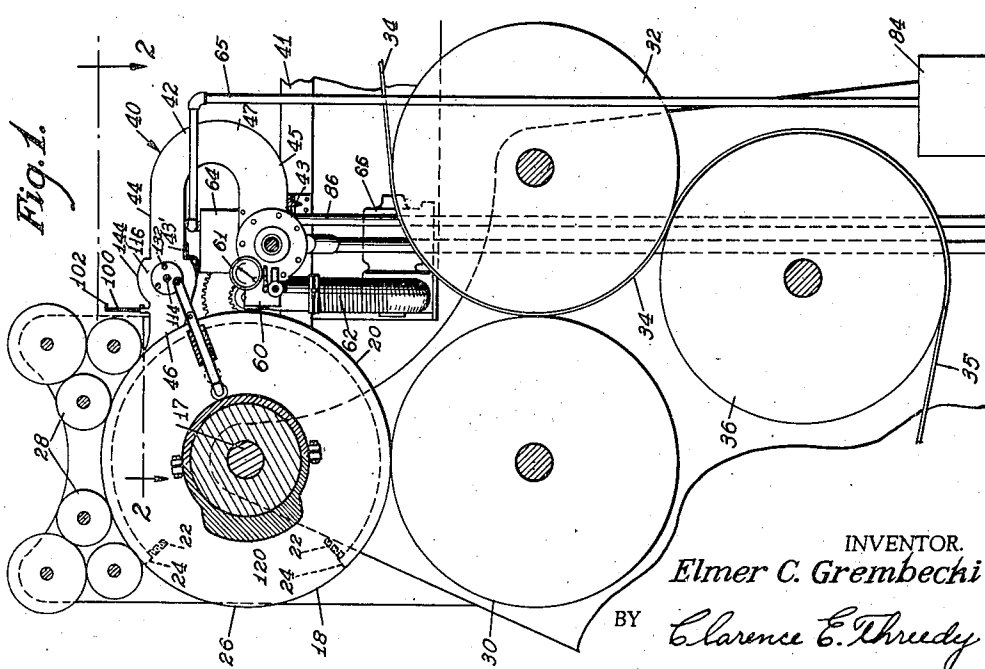
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DAMPENER FOR PRINTING PRESSES

Filed Aug. 29, 1936

3 Sheets-Sheet 1



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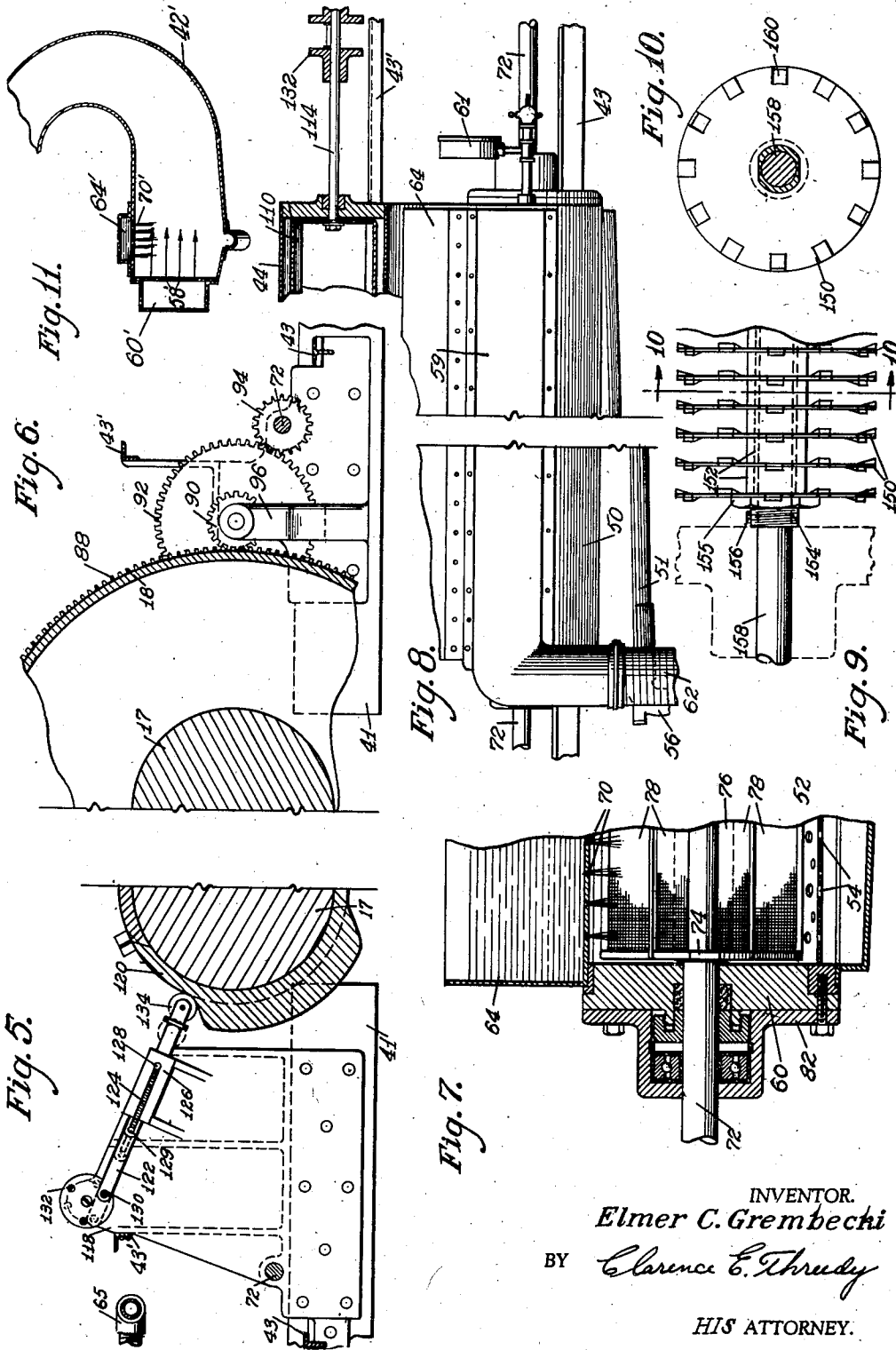
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UNITED STATES PATENT OFFICE

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DAMPENER FOR PRINTING PRESSES

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Application August 29, 1936, Serial No. 98,451

15 Claims. (Cl. 101—147)

This invention concerns the art of printing and particularly lithographic printing, and one of its important objects is the provision of a novel dampener for a lithographic offset press.

Generally stated, the invention provides a novel, compact, rugged and inexpensively manufactured dampening mechanism which includes a U-shaped blower tube for positioning relative to the plate cylinder of the press, means for establishing a water spray in the lower part of the tube, power driven means for atomizing the spray water, a blower device for distributing the atomized water over the cylinder, and an automatic gate or shutter mechanism for controlling the distribution of the atomized water or dampening agent with relation to the plate cylinder, together with auxiliary control and operating means to be hereinafter particularly described and such other novel elements of structure and operating features as will appear in view of the annexed drawings in which:

Fig. 1 is a side elevation of a form of offset press utilizing the novel dampener means;

Fig. 2 is a top plan view along lines 2—2 of Fig. 1 and to larger scale;

Fig. 3 is a median vertical section along lines 3—3 of Fig. 2 and to larger scale;

Fig. 4 is an enlarged vertical fragment partly in section, looking toward lines 4—4 of Fig. 3;

Fig. 5 is an operating detail of the gate cam finger taken in the direction of lines 5—5 of Fig. 2;

Fig. 6 shows the gear scheme for driving the atomizer from the plate cylinder, and is taken along lines 6—6 of Fig. 2;

Fig. 7 is a vertical section detail of the atomizer-shaft bearing structure;

Fig. 8 is an elevation detail of the blower line, taken along lines 8—8 of Fig. 3;

Fig. 9 is a modified form of atomizing mechanism;

Fig. 10 is a side view of one of the chopper discs, taken along lines 10—10 of Fig. 9; while

Fig. 11 is a vertical section of a modified type of blower mechanism.

The art of lithography to which this invention especially appertains, utilizes a printing press which is shown somewhat diagrammatically in Fig. 1, and which includes a plate cylinder 18 over which is clamped the printing plate 20 by means of suitable clamping members 22 which secure opposite extremities of the plate over longitudinally extensive edge portions 24 of an axially extended side opening 26 in the cylinder wall.

Above the plate cylinder, and bearing against

the plate 20, are a number of ink rollers 28 adapted to apply ink to the surface of the plate as it rotates against an impression roller 30 the rubberized surface of which retains the ink received from the etched plate in the particular printing outline or configuration of the latter.

A paper feeding or skeleton roller 32 urges a continuous sheet of paper stock 34 against the ink-patterned surface of the impression roller 30, and the "printed" sheet 35 is threaded out of the press over roller 36.

The "printing" or lithograph plate 20 has its active surface etched in the outline of whatever characters or delineations are to be printed, and in order to make the printing ink adhere to the unetched surfaces and to prevent it from entering the etched or cut-away portions, water or other suitable liquid is applied to the plate as it rotates from printing to inking position so that the etched crevices retain the water while the solid surfaces do not, and thus the ink (which desirably is not water soluble) is prevented from entering the etched parts of the plate, while the unetched surfaces to which the water does not cling are inked.

Heretofore, it has been the practice to apply the water by a sort of sponging process which involved the use of a special roller carrying a water retaining blanket of especially suitable fibrous material, the blanket being pressed against the plate as it rolled from impression position toward the inking rollers.

This dampening expedient is subject to a number of serious objections, among others, the fact that the blankets retain ink from the plate and rapidly decrease in dampening efficiency; moreover, since the ink is variously distributed, the dampening efficiency of the blanket is not uniform throughout its length. Thus the blankets must frequently be changed and discarded, and for this purpose the press must be stopped, so that, at its best, the blanket is not an ideal or reliable dampening means.

The present invention does away with the foregoing method and means by providing the dampener mechanism generally indicated at 40 (Fig. 1), which includes an elongated, U-shaped duct member or tube 42 having a constricted upper arm or branch 44 (Fig. 3) with a longitudinally extensive edgewise exhaust opening 46, having its uppermost longitudinal edge curved to form a lip 48 which closely overlies the plate 20 on cylinder 18; and having its lower edge 49 also closely positioned with respect to the plate.

The lower branch 45 of the atomizer or damp-

ening tube is enlarged or flared outwardly below the bight 47 of the U-tube, and the lowermost wall portion thereof has a longitudinally extended trough 50 into which extends a curved trough plate 52 having a plurality of openings 54. (See Figs. 3 and 8.) The trough 50 has depending from its bottom a smaller downwardly sloping drain trough or channel 51 (Figs. 3, 4 and 8) which is provided with a drain pipe connection 56 at its lower end. The entire U-tube structure is adapted to be securely mounted on the press frame by suitable brackets and cross bar structure 43 (Fig. 3).

The longitudinal edge opening of the lower branch of the dampening or U-structure is closed by an apertured baffle plate 58 over which is secured an air duct 59 communicating at its left-hand extremity (Figs. 1 to 4, and 8) with a blow-off line 62 which in turn is connected to a suitable power driven blower 64 (Fig. 1). A gauge and relief cock unit 61 is provided at the opposite (right-hand) end of the blower duct (Fig. 8) for supervision of the air pressure.

Extended across the upper surface of the lower arm of the atomizer tube is an elongated, open water feed trough 64 which may be seated on a pair of T-beams 66 riveted to upturned wall portions 68 of the tube wall. The bottom wall of this trough 64 is suitably apertured to provide a plurality of water sprays, indicated at 70, across the breadth and length of the atomizer tube above trough 50.

Rotatable with a longitudinally extended shaft 72 secured to a hub structure 74 is an atomizing or water chopping paddle 76, which includes a plurality of apertured mesh or screen blades 78 secured to the hub 74 and end plates 76 (Fig. 7). This atomizing paddle is interposed between the bottom wall of trough 64 and the tube trough 82 so that its blades intercept the spray jets 70, upon rotation of the shaft 72 in bearing plates 80 which are secured with end closure plates 82 to the tube body.

Opening into the right-hand end of the feed through trough 64 (Fig. 1) is a water supply pipe 85 from a circulating pump 84, while an overflow pipe 86 extends from the opposite end wall thereof to a drain or reservoir, as desired.

It is desirable that the atomizing paddles be revolved at a relatively high speed to effect a fine break-up of the water spray, and to this end I have provided a mechanism for driving the atomizer from a master gear 88 on the plate cylinder 18 through a gear train 90—92—94 suitably carried in shaft brackets 96 and 98 attached to frame member 41. The speed of the plate cylinder may conveniently be taken as 60 R. P. M., and the gear train is adapted to drive the chopper shaft 72 at approximately 1500 R. P. M., at which speed the water is adequately broken up into a fine mist.

The upper branch 44 of the atomizer tube is provided adjacent its exhaust end 46 with a plurality of adjustable baffle plates 100 (Figs. 1, 4) extended transversely of the duct passages along the length of the tube. These baffle plates have handle extensions 102 and are slidable vertically between upstanding confronting extensions 103 from the top wall of upper tube 44; and in order to maintain a given plate in a given vertical position, concavities 106 are provided in vertical alignment for yieldable latching engagement by a spring urged presser ball 108.

Behind the baffle plate 100 is a cylinder-shaped shutter gate 110 having a pair of opposite side

wall openings 112 and rotatably supported by spindles 114 and 114' which extend from end plates 118 in the cylinder through the end walls 116 and 116' respectively of the upper branch of the atomizer tube (Fig. 2). The shaft 114 extends beyond end wall 116 into a hanger bracket 118 on frame member 41' (bottom of Fig. 2).

It will be recalled that the plate cylinder 18 has a relatively wide axially extensive opening 26 to facilitate mounting and clamping the impression plate, and in order to prevent water being driven into this opening, when it revolves into position before the exhaust end 46 of upper tube 42, a reciprocating drive connection is effected to a cam 120 (Figs. 1 and 5) on plate cylinder shaft 17, by means of a presser rod 122 slidable in a bracket 126, which is part of the hanger bracket 118, and against the tension of a spring 124 attached to the bracket 126 and to the rod 122 on pin 128 and connecting pin 129, respectively.

One extremity of the presser rod 122 is pivotally connected as at 130 to an eccentric coupling 132 on shaft 114, and has at its other extremity a roller 134 which bears against the face of the cam 120 so as to rock shutter 110 through the shaft 114 from open to closed position at determined intervals.

The shutter member 110 extends beyond both the upper and lower wall portions of the upper branch of the atomizer tube as will appear from Fig. 3, and attached to the bottom wall underlying the bottom of the shutter cylinder is a downwardly inclined drip apron 140 which terminates over the trough 64 and serves to drain the condensation water from both the baffles 100 and shutter 110. A second and smaller drip apron 142 extends oppositely to the first apron from a depending plate 141 on the tube body and has its drip edge overlying the edge of plate 140.

On the upper wall of the upper tube arm 44 opposite to the drip aprons 140—142 is an extruded hood 144 from the inner surface of which depends a suitable wiper 146.

In Figs. 9 and 10 I show a modified chopper or atomizer in the form of a plurality of discs 150 spaced apart by collars 152 on a tubular shaft 154 having a threaded end portion engaged by a mounting nut 156, which in turn cooperates with a similarly disposed nut at the opposite end of the shaft to secure the spaced chopper plates together. The tubular mounting shaft 154 may be keyed to a drive shaft 158 by a set screw 156, the drive shaft corresponding to shaft 72 of Fig. 3, for example.

Each of the discs 150 is provided with a plurality of ears or fins 160 which may be extruded from, or formed upon, the plane faces of the several plates in varying patterns, other than that shown in Fig. 10.

If desired, the rotary atomizing mechanism may be omitted, as shown in the modification of Fig. 11, in which case the general tube structure will otherwise be the same, except that the air pressure in duct 88' will necessarily be materially increased and the apertures in baffle plate 58' will be reduced in dimension in corresponding ratio to provide a plurality of fine energetic air jets to break up the water-sprays 70' from the overhead feed trough 64' in atomizer tube 42'.

Another arrangement for the atomizing mechanism and one which gives excellent results may be easily achieved by closing off the drain 56, 75

and for this purpose any common form of valve may be applied to the drain, or the plug may be screwed in place of the screw plug now shown (Fig. 4). Under these conditions, water will remain in the trough 50 and it is desirable to provide a float valve to regulate the flow from the source (either the tank 64; or the water feed 86, or a direct water feed to the trough 50). When this arrangement is utilized, the best results are achieved by using the chopper of Fig. 10 in place of the device of Fig. 7.

Operation

Referring particularly to Figs. 1 and 3, the plate cylinder 18 will be rotated by the usual power means, and the etched plate 20 carried therewith will move in an anti-clockwise direction toward the dampening mechanism 40 and be rotated past the horizontally extensive exhaust opening 46 of the upper branch 44 of the atomizing tube structure.

Meanwhile the atomizer blower mechanism 64 (Figs. 1 and 2) has been set in motion and an air pressure of approximately 4 pounds set up in the duct 60, forcing air through the apertured baffle plate 100 over and through the atomizing or chopping paddles 78.

The water pump 84, which may be provided with necessary automatic controls, will deliver water, which is preferably acidulated, through pipe 65 into the open trough 64 to maintain a suitable head therein in cooperation with the overflow line 86.

This water will descend through the apertured bottom of the trough in a plurality of sprays 70 which will be rapidly intercepted or chopped by the rotating screen, or equivalent, paddles 78 carried about by the shaft 72 which is driven at relatively high speed by the gear train 88-90-92-94 powered through the rotating plate cylinder.

If the modified form of chopper discs of Figs. 9 and 10 are used, the laterally extending ears or fins 160 will beat into the water sprays and break up the water in similar manner.

Meanwhile a plurality of air jets or streams will be issuing from the apertures in baffle plate 50 and passing through the openings in the screening or mesh of the paddles 78, thus further breaking up the water and driving the atomized particles around the bight 47 of tube 42 into the upper arm 44.

The operation of the modified structure of Fig. 11, which omits the mechanical chopper, relies upon the interacting air jets and water sprays to effect an adequate break-up of the water, the air being supplied under higher pressure than otherwise necessary (c. g. 25 lbs.).

The water particles will be driven upwardly against the outer bight part 47 of the wall of the U-tube, and the heavier particles will tend to collect and drop back into the trough 50 through pan 54 to pass out through the inclined drain trough 51 and drain 56. Such condensation of the finer mist which occurs will be disposed of similarly.

Such of the finer water particles as enter the upper branch 44 of the tube will pass through the aligned openings 112 in shutter 110 (still referring to Fig. 3) and impinge against any portion of the adjustable baffle plates 100 which may have been positioned to lie in the path thereof. Particles deflected by the baffle plates will pass downwardly over the apron 140 and into trough 64, while the unimpeded atomized particles will be

carried and directed by the outwardly moving air current against the rotating plate 20 on cylinder 18, in a uniform quantity highly suitable for moistening the etched plate in the manner and for the purpose hereinbefore set forth.

When a plate 20 of reduced width is clamped on the cylinder 18, the baffles 100 may be lowered along a line parallel to the axis of the cylinder and thus limit the dampening field.

As the plate cylinder rotates through its cycle the axial opening 26 therein will approach (counter-clockwise) the mouth or exhaust end 46 of the dampening tube, and at this juncture the cam 120 or cylinder shaft 17 (Fig. 5) will approach the presser finger 122 and thereafter urge the latter outwardly against its spring 124 to rock the shaft 114 through the eccentric coupling 132, whereupon the shutter 110 will be pivoted by shaft 114 to close the upper delivery branch 44 of the tube 42 so that none of the moisture will be driven into the cylinder opening. As the cylinder proceeds the shutter 110 will again be opened by further movement of cam 120 against finger 122, in timed relation to the next positioning of the plate 20. In this manner the exhaust side of the atomizer is alternately opened and closed.

Where the mechanical chopping mechanism is omitted and the air pressure increased in accordance with the showing of Fig. 11, the operation so far as it applies to the elements not omitted, is substantially the same.

In general it is observed that the combined co-operative effect of the air moving means with the spray and propelling or chopping devices, together with the particular form of the atomizer tube, are all important in providing suitably divided water particles in adequate quantity and depositing the same uniformly and under control on the lithograph plate.

While I have described the means of my invention in detail, I do not intend to be confined to any particular recitations or limitations except as may be hereinafter provided in the annexed claims.

1. Dampening mechanism for printing presses and the like comprising a housing having an opening for confrontation with a press plate cylinder, means providing a water spray in said housing, a power driven propeller supported within the housing and having a plurality of apertured arms rotatable to intercept said sprays and break up the water into fine particles, together with means for moving air past said propeller means in said housing to carry said particles through said opening on to said cylinder.

2. A dampening mechanism in accordance with claim 1 and further characterized by a pivotable shutter member in said housing behind the said opening for blocking the movement of said water particles.

3. Dampening mechanism for use with printing devices comprising a housing having an opening adapted to confront the plate cylinder of the press, means for maintaining a spray of water in said housing, a power driven propeller rotatably supported within the housing and having apertured arms movable through the said spray to break the water up into fine particles, means for directing air under pressure against the said propeller means including an apertured plate for dividing the said air into a plurality of streams, the said water particles being moved toward the said opening in the housing by said air, a shutter in the housing movable to intercept the movement

of water particles toward the opening, and a baffle plate adjustably movable into the path of said water particles behind the said opening.

4. A dampening mechanism for lithographic presses of the type including a rotating plate cylinder, said mechanism comprising a housing having a lower chamber and an upper chamber with an open end confronting a said plate cylinder, the said chambers being joined by a bight portion, means for spraying water into the lower chamber, a power driven propeller in said lower chamber and having a plurality of screen mesh plates rotatable through the water spray to comminute the water, means for directing air into the said lower chamber past the said propeller whereby the comminuted water will be carried around said bight portion into said upper chamber and out the opening thereof against a said plate cylinder, and a movable shutter device in the said upper chamber and having a reciprocable driving connection with said plate cylinder whereby the shutter alternately opens and closes the said upper chamber to the movement of water particles toward said opening as said cylinder rotates.

5. A dampening mechanism for lithographic presses of the type including a rotating plate cylinder comprising a housing having a lower chamber and an upper chamber with an open end confronting a said plate cylinder, the said chambers being joined by a bight portion, means for spraying water into the lower chamber, a power driven propeller in the lower chamber and having a plurality of screen mesh plates rotatable through the water spray to comminute the water, means for directing air into the said lower chamber past the said propeller means whereby the comminuted water will be carried around said bight portion into said upper chamber and out the opening thereof against a said plate cylinder, a reciprocally mounted shutter device in the said upper chamber and having a reciprocating driving connection with said plate cylinder whereby the shutter alternately opens and closes the said upper chamber to the movement of water particles toward said opening as said cylinder rotates, and baffle means including plates slidably mounted in side by side relation on said upper chamber for movement adjustably into the latter and across the path of water particles moving toward said opening.

6. In lithographic presses and the like having a rotatable plate cylinder, dampening mechanism comprising a housing having a lower chamber and also an upper chamber with an open end adapted to confront a said plate cylinder, the said upper and lower chambers being joined by a constricted bight or bend portion, means for maintaining a water spray in the said lower chamber, means for atomizing the sprayed water including the rotatable propeller mounted in said lower chamber and having radially extended members movable through said spray to break up the water, means for directing air into said lower chamber against said propeller toward and around said bight or bend portion whereby particles and the atomized water will be carried into said upper chamber toward the said opening thereof, and means in said upper chamber for controlling the movement of water particles toward said opening.

7. Dampening mechanism for lithographic presses of the type including a rotating plate cylinder, said mechanism comprising a housing having a lower chamber and an upper chamber

and the latter having an exhaust opening confronting the plate surface of a said plate cylinder, the said chambers being joined by a reduced bight portion, means including a tank having an apertured bottom wall and positioned on said lower chamber for spraying water into the latter, means for breaking up the water of said spray into fine particles, and means for directing a current of air through said lower chamber to carry water particles against and around said bight portion toward the said exhaust opening of said upper chamber.

8. Dampening mechanism for lithographic presses of the type including a rotating plate cylinder, said mechanism comprising a housing having a lower chamber and an upper chamber and the latter having an exhaust opening confronting the plate surface of a said plate cylinder, the said chambers being joined by a reduced bight portion, means including a tank having an apertured bottom wall and positioned on said lower chamber for spraying water into the latter, driven means in said lower chamber for breaking up the water of said spray into fine particles, means for directing a current of air through said lower chamber to carry water particles around said bight portion toward the said exhaust opening of said upper chamber, and manually operable baffle means in said upper chamber for adjustably deflecting the movement of water particles relative to said exhaust opening.

9. Dampening mechanism for lithographic presses of the type including a rotating plate cylinder, said mechanism comprising a housing having a lower chamber and an upper chamber, the latter having an exhaust opening confronting the plate surface of a said plate cylinder, the said chambers being joined by a narrowing bight portion, means including a tank having an apertured bottom wall and positioned on said lower chamber for spraying water into the latter, driven means in said housing for breaking up the water of said spray into fine particles, means for directing a current of air through said lower chamber to carry water particles around said bight portion toward the said exhaust opening of said upper chamber, manually operable baffle means in said upper chamber for adjustably obstructing the movement of water particles toward said exhaust opening, and means including a shutter reciprocally mounted in said upper chamber and having a reciprocating drive connection with said rotating plate cylinder for alternately opening and closing the said chamber to the passage of water particles toward said exhaust opening.

10. A dampening mechanism for lithographic presses having a rotatable plate cylinder comprising a U-shaped housing having an upper and lower chamber joined by a constricted bight portion, means including a trough having an apertured bottom supported on a wall of said lower chamber for spraying water into the latter, a power driven atomizing device in said lower chamber including a rotatably mounted propeller wheel having a plurality of apertured radially extensive arms movable through said spray, a blower duct communicating through an apertured baffle plate with said lower chamber to direct air against said propeller wheel and carry water particles around said bight portion into said upper chamber, blower means for supplying air under pressure to said blower duct, the said lower chamber having a trough portion and drain means communicating therewith, a reciprocable shutter in said upper chamber including a member hav-

ing a pair of oppositely disposed solid wall portions and a pair of oppositely disposed open wall portions respectively adjacent said solid portions and pivotable about a shaft member supported in the walls of said upper chamber whereby the said solid wall portions and apertured wall portions may be respectively rotated into or out of position across the said chamber to block the movement of water particles therethrough toward said opening, driving connections between said shutter member and said rotating plate cylinder for pivoting the said shutter alternately into open and closed position, the said driving connection including a presser finger having a pivoted connection with the shaft of said shutter and reciprocable by a cam driven by said plate cylinder, adjustable means for blocking the movement of water particles toward said opening in said upper chamber and including a plurality of plates slidably mounted in side by side relation in a wall of said upper chamber for movement into the latter across the path of water particles moving toward the opening, and means for holding the said plates in adjusted position.

11. Dampening mechanism for a device including a rotating cylinder, said mechanism comprising a housing adapted for mounting adjacent a said cylinder and having an upper and a lower chamber joined by an arcuate wall portion, the said upper chamber having an exhaust opening confronting the surface of said cylinder, means in said housing providing a spray of water or like moistening substance, means for atomizing said water including a pressure chamber having communication through an apertured member into said lower chamber of said housing whereby air under pressure from an auxiliary source, may be directed through said spray to atomize the latter and drive atomized particles from said lower chamber past said arcuate wall portion and through the upper chamber out the exhaust opening thereof for impingement against said cylinder.

12. Dampening mechanism for printing presses and the like having a power-driven plate cylinder, said mechanism comprising a shallow housing of greater length than depth and of a width adapted to extend axially across said cylinder and having an opening disposed in confrontation with said cylinder, means providing a fall of water in

said housing at a point remote from said opening, power driven means in said housing breaking up said water into fine particles, and means directing air into said housing to drive said particles of water toward and through said opening onto the plate cylinder.

13. Dampening mechanism for printing presses and the like having a power-driven rotatable plate cylinder, said mechanism comprising a shallow housing of greater length than depth and of a width adapted to extend axially across said cylinder and having an opening disposed in confrontation with said cylinder, means providing a fall of water in said housing at a point remote from said opening, power driven means in said housing breaking up said water into fine particles, means directing air into said housing to drive said particles of water toward and through said opening onto the plate cylinder, together with means for blocking the movement of water particles onto said cylinder once during each revolution of the latter, said last-mentioned means including a shutter member in said housing behind said opening and movable into and out of particle blocking position therein periodically by drive mechanism operably connecting said shutter member with said power driven plate cylinder.

14. Dampening mechanism for printing presses and the like having a power-driven plate cylinder, said mechanism comprising a housing having an opening confronting said cylinder, a source of water in said housing, a power-driven chopper in contact with said water and operable to atomize the same, together with air pressure means for carrying the atomized water toward and through said opening for deposit onto said cylinder.

15. Dampening mechanism for printing presses and the like having a plate cylinder, said mechanism comprising a substantially U-shaped housing arranged before said cylinder and having the end portion of one of its arms provided with a discharge opening in confrontation with said cylinder, a source of water in the opposite arm portion of said housing, together with means for atomizing said water and carrying the atomized particles toward said discharge opening for deposit on said cylinder.

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