Feb. 19, 1935. J. SCHULTZ 1,991,962

DAMPENING DEVICE FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

Filed Aug. 17, 1929 7 Sheets-Sheet 1

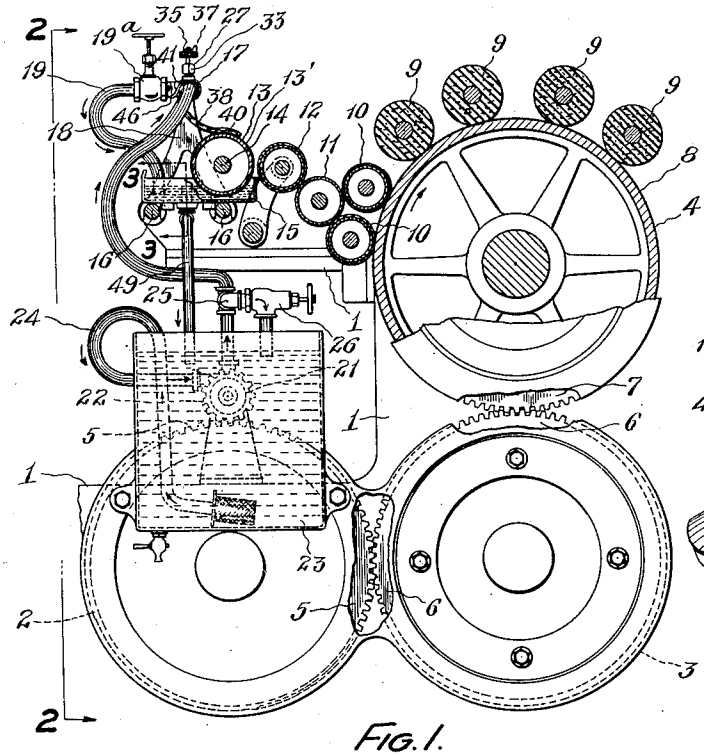


FIG. 1.

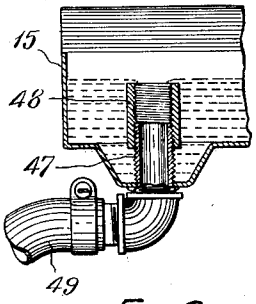


FIG. 3.

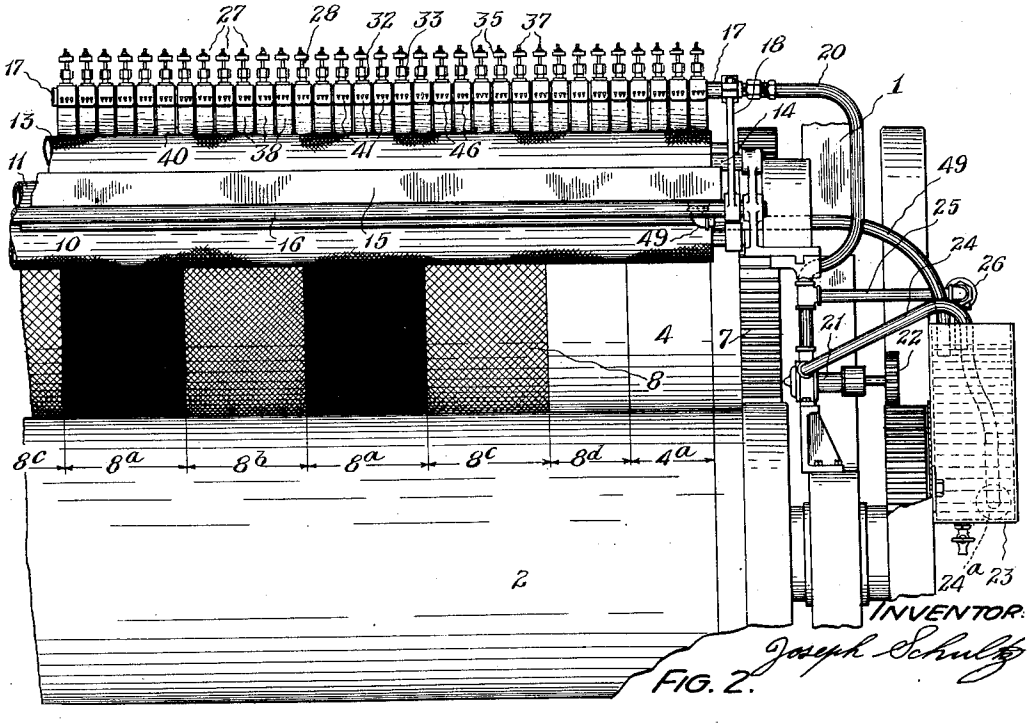


FIG. 2.

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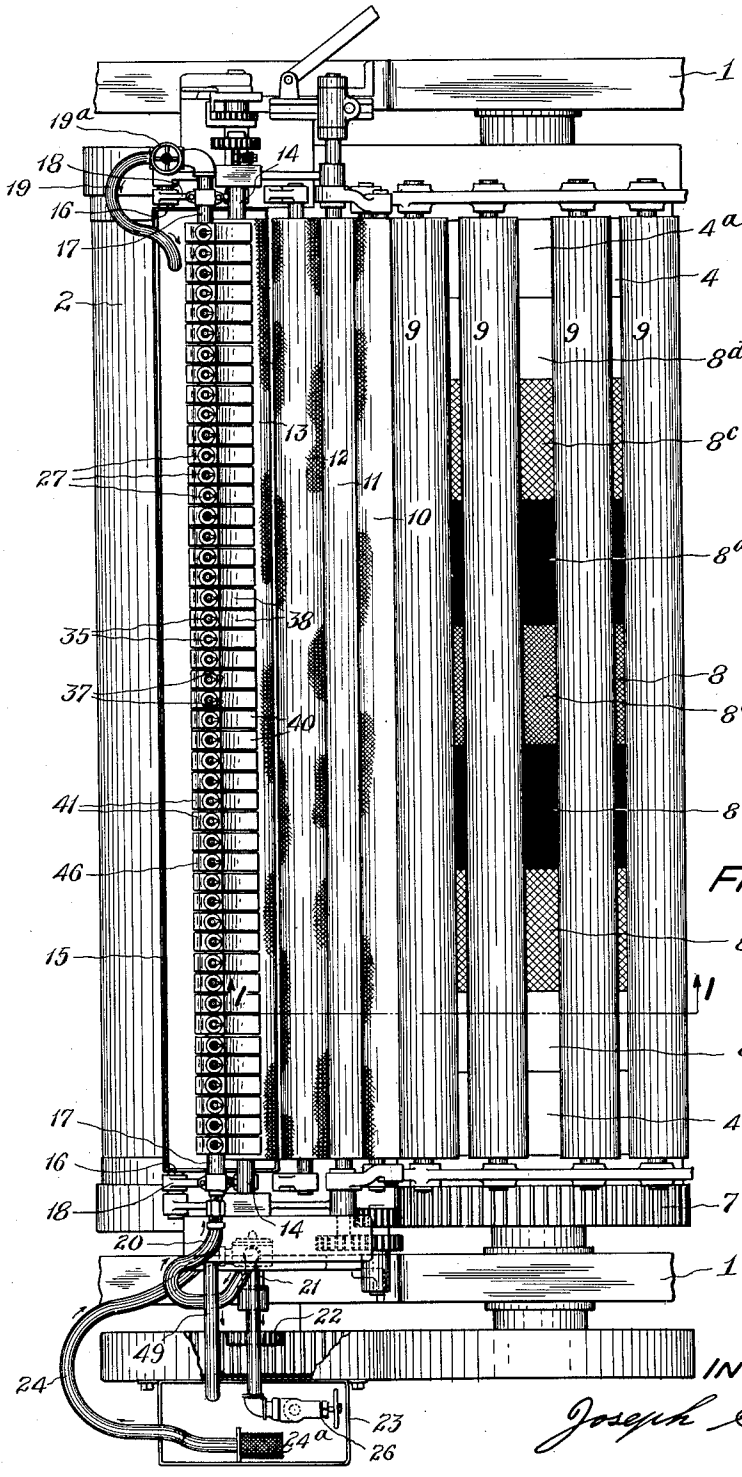


FIG. 4

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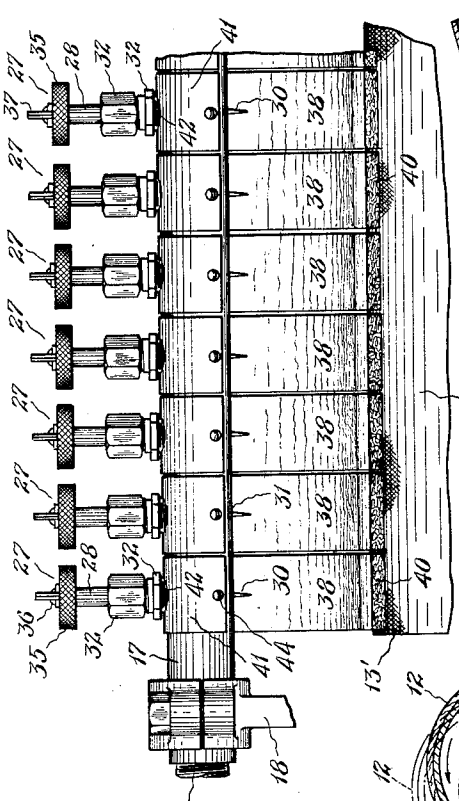


FIG. 6.

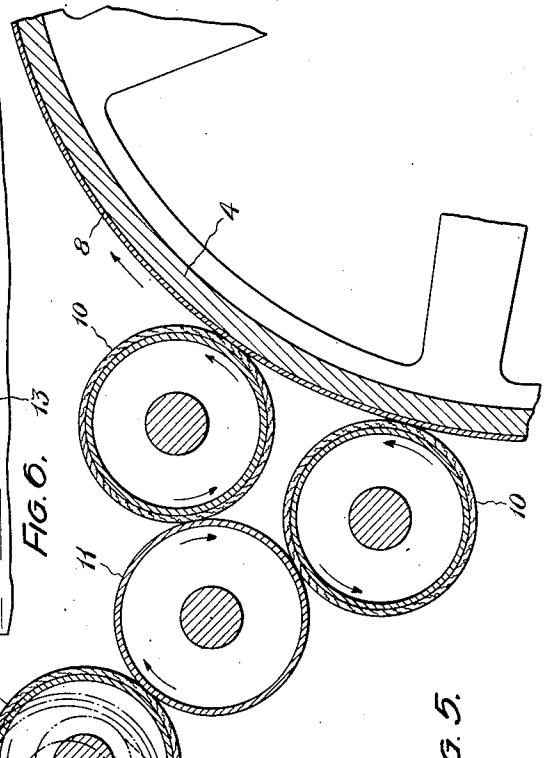


FIG. 5.

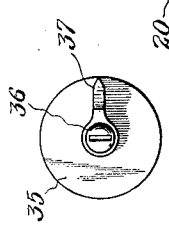


FIG 8

FIG. 7.

FIG. 9.

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DAMPENING DEVICE FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

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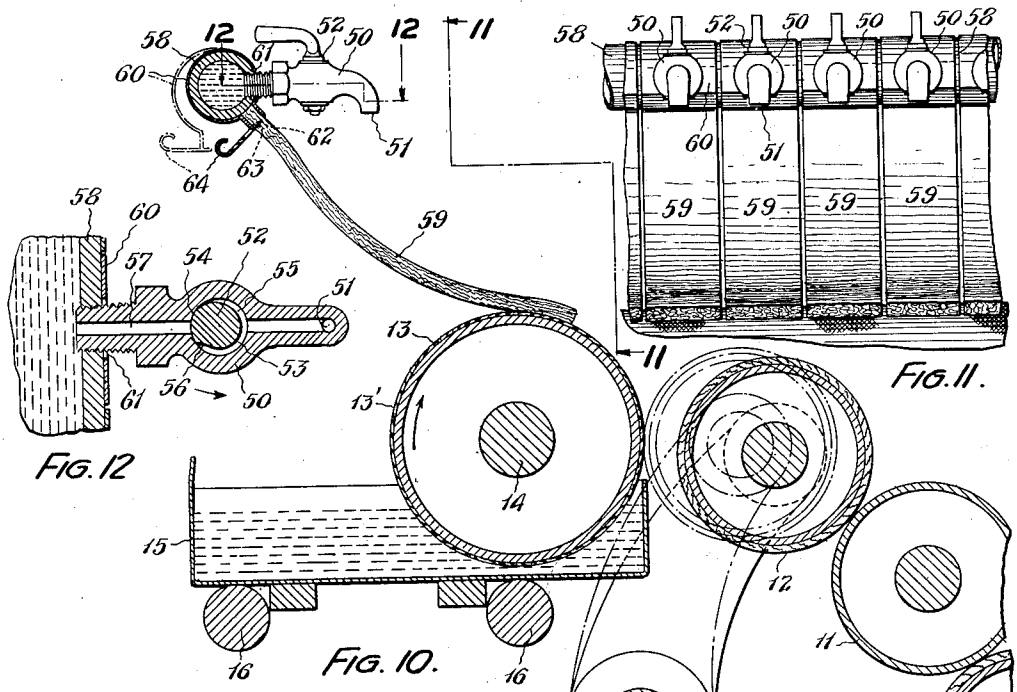


FIG. 12

FIG. 10.

FIG. 11.

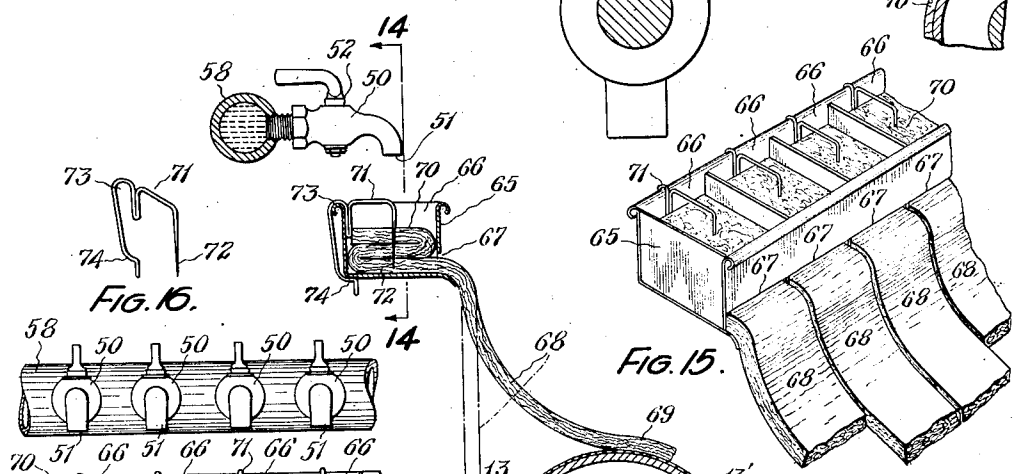


FIG. 16.

FIG. 15.

FIG. 14.

FIG. 13.

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DAMPENING DEVICE FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

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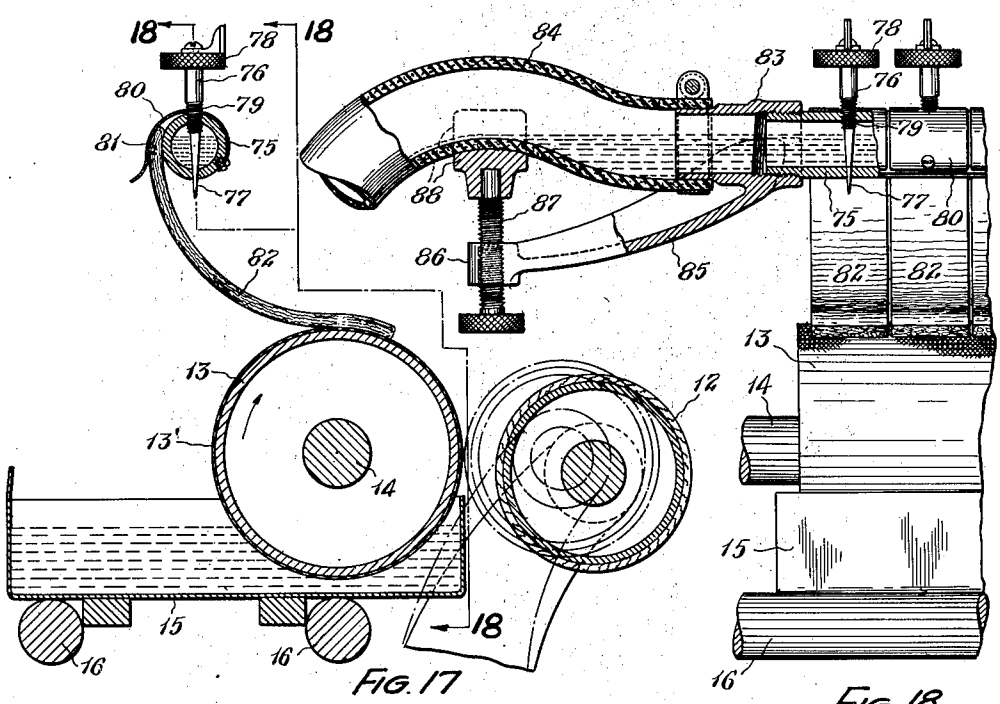


FIG. 17

FIG. 18

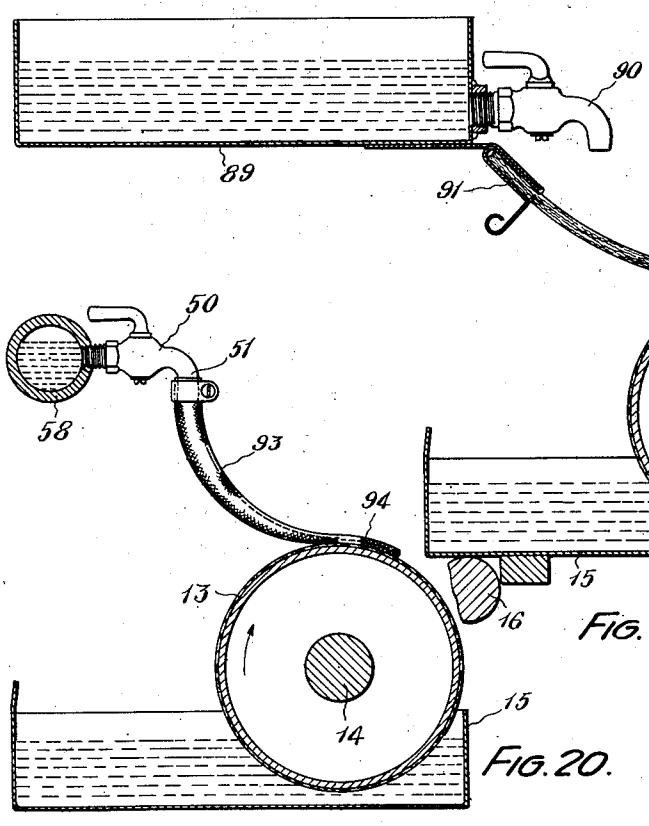


FIG. 20.

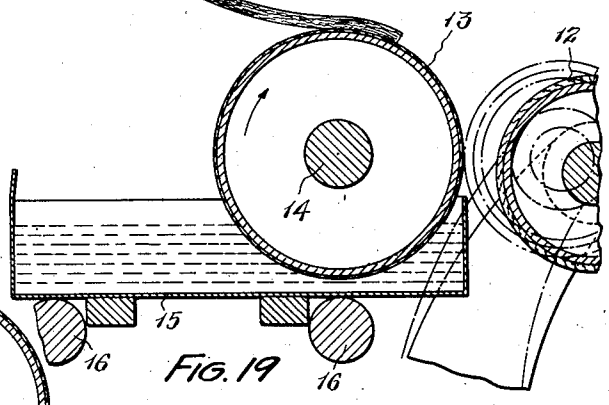


FIG. 19

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DAMPENING DEVICE FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

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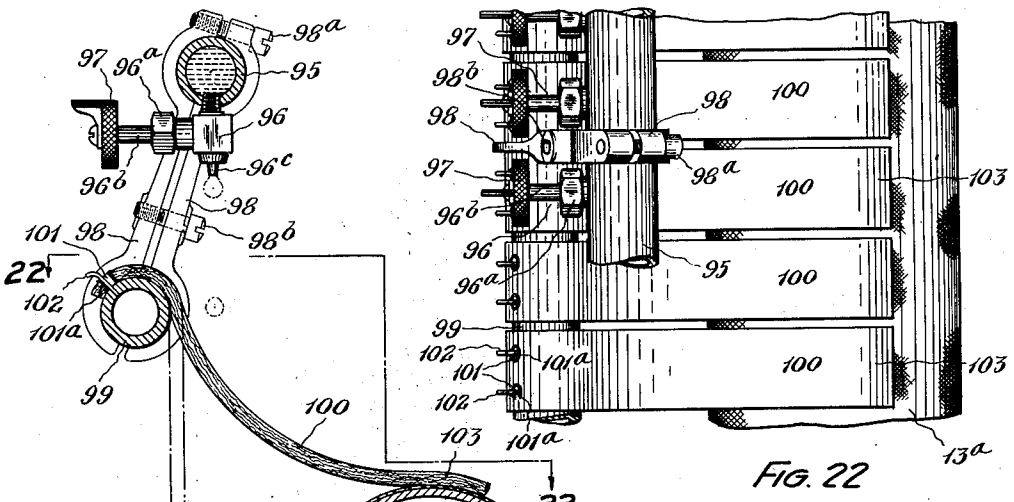


FIG. 22

FIG. 21

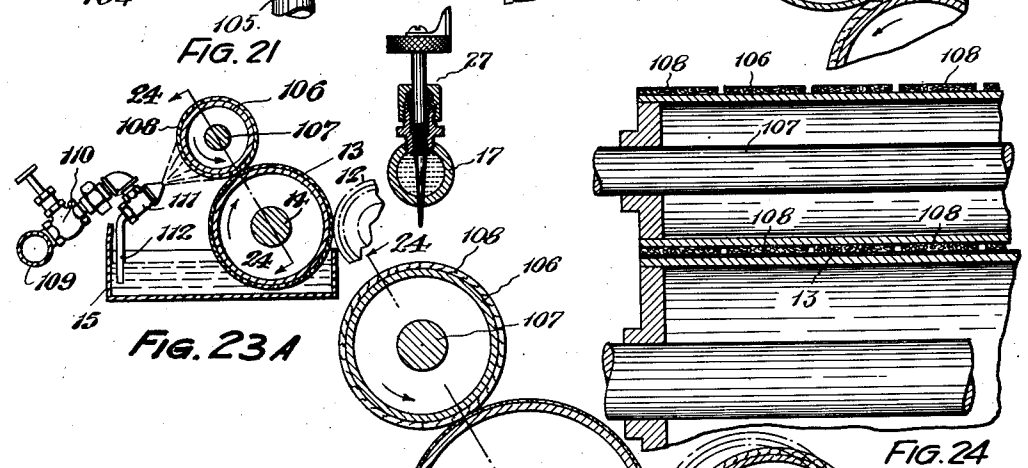


FIG. 23A

FIG. 24

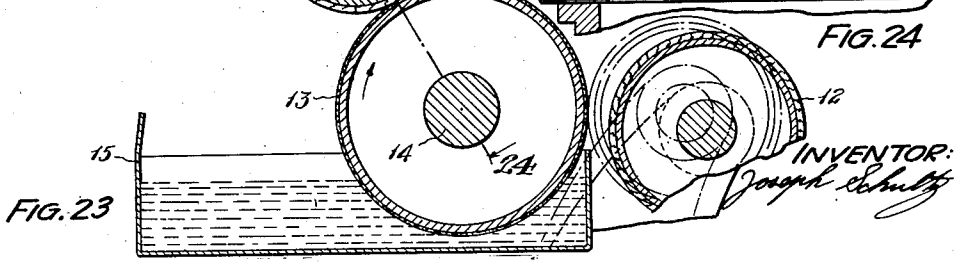


FIG. 23

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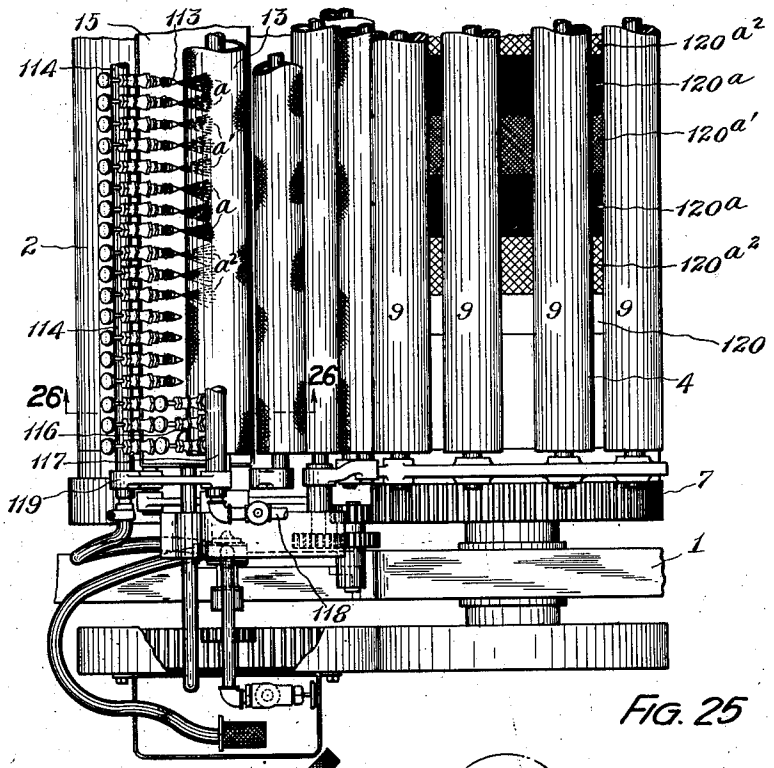


FIG. 25

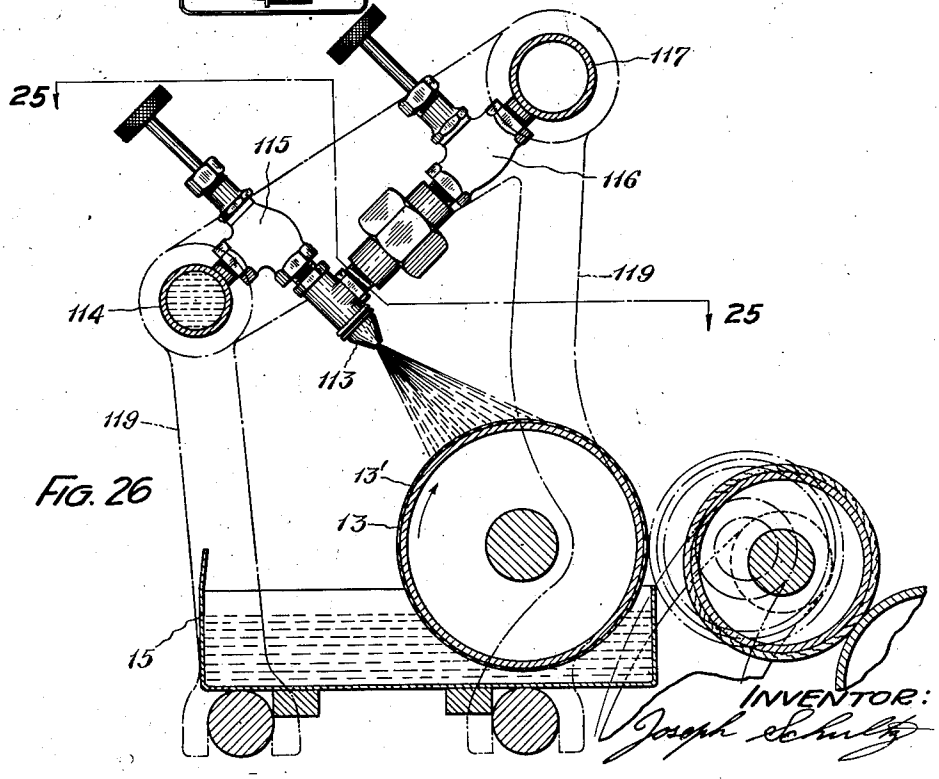


FIG. 26

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Patented Feb. 19, 1935 1,991,962

UNITED STATES PATENT OFFICE

1,991,962

DAMPENING DEVICE FOR LITHOGRAPHIC OFFSET PRESSES AND THE LIKE

Joseph Schultz, Cleveland, Ohio

Application August 17, 1929, Serial No. 386,573

38 Claims. (Cl. 101—148)

My invention relates to dampening devices, and more particularly to mechanisms of this class suitable for supplying moisture to lithographic, printing and other reproducing apparatus. The particular embodiment of this invention disclosed in the present application illustrates the use of this invention on a lithographic offset press.

The present invention is a further development of the subject matter disclosed in Patent No. 1,812,720, co-pending with this application, entitled Dampening device, and issued to me June 30, 1931, and certain features disclosed but not claimed, in the patent, are claimed in the present application. This present invention is also related to the following co-pending applications which disclose further or modified developments of Patent No. 1,812,720 and of the present invention, these applications being identified by serial numbers and dates as follows: Serial No. 504,786 filed December 26, 1930; Serial No. 507,096, filed January 7, 1931, and Serial No. 625,395, filed July 28, 1932.

As is well known, in the art of lithography, and especially offset lithography, a certain amount of moisture is required to keep the plate adequately dampened. It is also understood that a certain minimum amount of moisture must be continuously supplied to this plate to prevent it from becoming coated with ink and irreparably damaged. It is further a fact, that different portions or zones of the plate require various amounts of moisture, these different requirements arising from differences in the size and design of the printed areas, or from the entire absence of printed areas on the plate or plate cylinder. It is also essential to know that, when the borders of the areas which require additional moisture and those which do not, are clearly marked, a substantial excess or insufficiency of moisture on either side of the border of the areas will produce imperfect work. It should also be understood that any excess moisture supplied to any areas will be damaging. It should also be understood that the moisture supplied to any area must be uniformly distributed in the area in which the moisture is desired.

The dampening apparatus which has been found satisfactory by long period of use and which has been approved and almost universally adopted for lithographic offset presses comprises a reservoir of suitable liquid in which a water roller is partially immersed. Adapted for intermittent contact with this water roller is a ductor roller which transfers the liquid from a water roller to an intermediate roller. This intermediate roller transfers the liquid to a plurality of dampening rollers which in turn distribute the liquid to the plate on the plate cylinder by contact. This usual distributing device is intended to supply a uniform amount of moisture over the entire maximum width of the plate cylinder.

It will be evident that such a uniform distribution is difficult to obtain because of unequal contacting pressure and consequent unequal moisture transfer at different points along the length of the rollers. This defect may occur between the ductor roller and water roller or between any of the other rollers which perform the moisture transferring function. This unequal contacting pressure and consequent unequal liquid transfer may result from slight variations or irregularities in the diameter of any of the rollers, unequal adjustment of the two ends of adjacent rollers, spring or deflection of the center of any roller under pressure, variation in the water absorbing capacity of the roller covering, partial ink or grease coating on the covering, etc. It should be interpolated that with the present apparatus, in some cases when it is desired to reduce the amount of moisture transferred by the center of the rollers, it has been necessary to press the ends of the rollers so tightly together that the rollers become dry and collect ink from the plate, especially in the case of long rollers.

In an effort to overcome these difficulties and in an attempt to satisfy all the various requirements for different amounts of moisture at different points on the plate under different conditions, several types of devices have been proposed, most of which contemplated the entire elimination of the present generally adopted and satisfactory dampening elements, but so far as I am aware only a few of these proposed devices have actually been reduced to practice. Of the few devices which have been tried, none has been found which is a satisfactory solution for the problem.

Accordingly the general object of my invention is to provide a device for supplying moisture to a lithographic offset press or similar printing apparatus, which will satisfactorily supply moisture to the press in proportion to the requirements of the printing surface of each particular plate used in the press.

A further object of this invention is to utilize the generally approved and accepted type of dampening mechanism and supplement this with apparatus adapted to correct the deficiencies of

this mechanism in furnishing moisture to the plate as required for the most perfect results.

A further object of this invention is to provide apparatus of this type based upon an entirely new principle, which consists in supplying a substantially, uniformly distributed minimum amount of moisture to the dampening apparatus throughout its entire width, and adding varying amounts of moisture to the dampening apparatus in proportion to the requirements of the printing plate.

A further object of this invention is to provide apparatus which will insure a proper minimum supply of moisture to all portions of the printing plate combined with means for regulating this minimum supply.

A further object of this invention is to provide means whereby a controllable quantity of moisture may be supplied directly to one portion or zone of the dampening system without affecting the laterally adjacent portion or zone.

A further object of this invention is to so apply the supplemental water to the dampening system that this water will be available for transfer by this system to the printing plate at exactly the position desired.

A further object of this invention is to provide water uniformly diffused over the entire width of the zone to which the water is to be fed.

A further object of this invention is to provide apparatus of this type which will permit of ready regulation at any time of the amount of water fed to any point or zone of the dampening device.

A further object of this invention is to provide such supplemental water supplying apparatus which is mounted above the usual bath or reservoir of water so that any leaks or excess water supplied will drain into this pan.

A further object of this invention is to provide a system of this kind in which the water or liquid is continuously circulated, and is thus kept clean and of uniform consistency.

A further object of this invention is to provide distributing devices for individually and uniformly distributing the water to the dampening device and which may be made entirely inoperative instantly.

A further object of this invention is to so locate the supplemental supply system that any failure of any one of the elements of the supply system will not seriously interfere with the satisfactory operation of the balance of the dampening device.

A further object of this invention ancillary to the foregoing is to provide means for keeping the dampening rollers and apparatus clean and free from ink.

A further ancillary object of this invention is to provide means for preventing wear and tear on the dampening rollers thus reducing the maintenance cost on these parts as well as eliminating the expense and delay incidental to the repairing, replacing and renewal of these dampening rollers.

A further object of this invention is to provide a device of this character in which the amount of liquid fed by each of the individual liquid supplying devices is visible, and in which a visual inspection of an indicator on these liquid supply elements will indicate the approximate amount of liquid fed by the device.

A further object of this invention is to provide means for definitely controlling and maintaining the pressure on the liquid supply devices constant, so as to insure a continuously uniform feeding of liquid.

A further object of this invention is to provide apparatus of this type which is easy to keep clean.

A further object of this invention is to provide apparatus of this class, which will be neat in appearance, and simple and compact in construction and economical to manufacture.

A further object of this invention is to provide improved means for attaching the water absorbing and distributing elements to their support, adapted to facilitate their removal or replacement for the purpose of renewal, repair and cleaning.

A further object of this invention is to provide a mechanism of this type which will co-operate with standard dampening devices without rearrangement of parts or change in their operation.

A further object of this invention is to provide an apparatus of this type which can be applied to presses now in use as well as to new presses and which can be quickly and easily attached to such presses.

Further objects and advantages of this invention will appear from the following description and from reference to the accompanying drawings.

These annexed drawings and description set forth in detail certain means embodying this invention, such disclosed means constituting however, but a few of the forms in which the principle of this invention may be applied.

Figure 1 is a view, mainly in side elevation, showing my improved apparatus applied to a standard type of lithographic offset press, a portion only of the press being illustrated and certain parts being shown in section, to more clearly disclose my invention.

Figure 2 is a fragmentary front elevational view of the apparatus shown in Figure 1, this view being taken from the plane indicated by line 2, 2 in Figure 1.

Figure 3 is an enlarged fragmentary sectional view taken from the plane indicated by line 3, 3 in Figure 1 and showing the details of a device for regulating the water level in a certain reservoir.

Figure 4 is a plan view of the apparatus shown in Figure 1.

Figure 5 is an enlarged view of that portion of Figure 1 which illustrates certain essential details of my invention and their relation to standard equipment, some of the parts in this view being additionally shown in section.

Figure 6 is a fragmentary elevational view taken from the plane indicated by line 6, 6 in Figure 5.

Figure 7 is a still further enlarged view of several of the elements shown in Figure 5.

Figure 8 is a plan view of an adjusting wheel forming a part of my invention, this view being taken from the plane indicated by line 8, 8 in Figure 7.

Figure 9 is a detached perspective view of one of the elements used with my invention.

Figure 10 is a fragmentary view similar to a portion of Figure 5, showing a modified form of my invention.

Figure 11 is a fragmentary elevational view of the form of this invention shown in Figure 10, this view being taken from the plane indicated by line 11, 11 in Figure 10.

Figure 12 is an enlarged fragmentary plan sectional view of the valve device shown in Figure

10, this view being taken from the plane indicated by line 12, 12 in Figure 10.

Figure 13 is a view similar to Figure 10 showing a still further developed modification of the form of this invention shown in Figure 10.

Figure 14 is a fragmentary view partly in elevation and partly in section taken from the plane indicated by line 14, 14 in Figure 13.

Figure 15 is a fragmentary perspective view of the element which distinguishes the modification shown in Figure 13 from the other forms of this invention.

Figure 16 is a detached perspective view of one of the detail elements used with the form of this invention illustrated in Figure 13.

Figure 17 is another view similar to a portion of Figure 5 showing a modification of certain details shown in that figure.

Figure 18 is a longitudinal view partly in elevation and partly in section through one of the elements shown in Figure 17, showing certain regulating means desirable for use with this modification of the invention, this view being taken from the planes indicated by lines 18, 18 in Figure 17.

Figure 19 is a fragmentary view similar to Figure 10 showing a modified form of liquid supplying means adapted for use with this invention.

Figure 20 is a fragmentary view similar to Figure 19 showing a further modification of one detail of this invention.

Figure 21 is another view similar to a portion of Figure 10 showing principally a modified arrangement of certain elements of this invention and the omission of one of the elements and addition of another.

Figure 22 is a fragmentary plan view of some of the elements shown in Figure 21, partly shown in section in the plane indicated by line 22, 22 in this figure.

Figure 23 is another fragmentary view similar to a portion of Figure 10, showing a still further modification of this invention. Figure 23A illustrates another modified form of this invention similar to that shown in Figure 23, showing, however, a different device for supplying liquid to the roller.

Figure 24 is a fragmentary longitudinal sectional view taken from the plane indicated by line 24, 24 in Figure 23.

Figure 25 is a fragmentary plan view of a lithographic press, similar to Figure 4, showing a still further modified form of my invention applied thereto, part of the novel elements illustrated in this figure being shown in plan view and the other elements being shown from the plane indicated by line 25, 25 in Figure 26.

Figure 26 is an enlarged cross sectional view taken from the plane indicated by line 26, 26 in Figure 25.

The liquid used for dampening the plate of a lithographic offset press is usually either water or a relatively dilute solution of acid in water, or a dilute solution of gum arabic or other materials or combinations of materials in water, depending upon the requirements. In the following specifications the term water and liquid are used interchangeably and it is understood, that these terms are to include such liquids as are referred to above, or any liquids which may be used with this apparatus for the purposes set forth.

In the drawings only so much of a lithographic offset printing press is illustrated as bears direct relation to this invention, and to its location on the press and operation with the press. The drawings illustrate one form of this invention in several assembled views on the press and also in detail, and the drawings further illustrate several modified forms of this invention in detail, in order to show the breadth and scope of this invention.

I shall first describe the form of the invention which is illustrated in Figures 1 to 9 inclusive.

In these figures, and with particular reference to Figures 1, 2 and 4, 1 indicates the frame of the press, upon which are mounted, in well known manner, a paper or printing cylinder 2, blanket cylinder 3, and plate carrying cylinder 4. These cylinders are rotated by suitable gears 5, 6 and 7 respectively, which are driven by suitable power driven gearing, not shown. The printing plate 8 is mounted on the plate carrying cylinder 4, in the usual manner. Ink rollers 9 are suitably mounted for peripheral contact with the printing plate 8 as clearly shown in Figures 1 and 4. The balance of the inking mechanism including ink fountain, ink distributing rollers and controlling mechanism are not shown as these devices are well known to those skilled in this art and have no special bearing on this invention.

A usual type of dampening device, such as has generally been approved and adopted and as shown on the drawings, will now be described. Two dampening rollers, 10, 10, are mounted on the frame of the press for peripheral contact with the plate 8, on the plate cylinder 4. These dampening rollers 10 are usually covered with molleton, and are preferably so spaced that they contact one or more intermediate or distributing rollers 11, frequently mounted for axial reciprocation, one such roller 11 being shown in the drawings. Adjacent to this distributing roller or rollers 11, is mounted a ductor roller 12, preferably covered with molleton, which is oscillatorily mounted to intermittently and alternately contact the distributing roller 11 and a water roller 13. This water roller 13 is mounted on a shaft 14 located above a pan or reservoir 15 adapted to contain water or other suitable liquid. This pan is removably supported on a pair of rods 16 running transversely between the frames 1 of the press. The roller 13 is preferably covered with suitable water absorbing material 13' in those presses in which this roller rotates at a relatively slow speed, and is usually provided with a metallic surface in those presses in which this roller runs at a relatively higher rate of speed. The covering 13', when used, usually consists of a single layer of unbleached muslin, but any other suitable material or thickness of material may be used.

The roller 13 may rotate either continuously or intermittently. When it rotates intermittently its rotation is usually simultaneous with its contact with the ductor roller and the amount of its rotation can be regulated.

The devices so far described are quite well standardized on all lithographic offset presses and their method of mounting and method of driving, while varying in some features, are well understood and need not be further described in detail.

That portion of the dampening apparatus so far described operates in the following manner. Water or other liquid is usually manually poured into the pan 15. The periphery of the roller 13 being partially immersed in this bath of liquid, absorbs moisture, or conveys moisture by ad-

hesion which is transferred to the ductor roller 12 at intervals. This ductor roller, in turn, transfers this liquid to the roller 11 which distributes the moisture to the dampening rollers 10, whence it is applied to the plate 8. It will be apparent that the intention of this device is to transfer a uniformly distributed amount of moisture to the plate and across the entire face thereof. Means are also provided for regulating the intensity of pressure exerted by the ductor roller on its two adjacent rollers and for aligning this ductor roller therewith and for aligning and regulating the pressure exerted by the other rollers upon each other. It will be evident that this method of liquid transfer is dependent upon the perfection of the several rollers and the accuracy of their alignment, and is affected by the lack of roundness, uniform diameter, uniform absorbing power and by any spring or elasticity of the rollers between their supported ends. It will also be apparent that this system makes no provisions whatever for adding varying amounts of moisture to the plate on the cylinder.

My invention which is adapted to co-operate with and supplement the above apparatus, and remedy its deficiencies and to augment its performance, will now be described. Referring particularly to Figures 1, 2, 4, 5 and 6 it will be noted that I have provided a pipe or header 17 mounted in suitable brackets 18 which may be supported on the pan supporting rods 16. This header is connected with a water supply pipe 20 at one end and connected at the other end with an outlet pipe 19 adapted to be throttled by a valve 19^a. The water supply pipe in the embodiment shown is connected to the discharge end of a rotary pump 21 suitably mounted on a portion of the frame of the press and provided with a gear 22 driven from any suitable mechanism, for instance gear 5. The pump preferably receives its liquid supply from a liquid supply mixing tank 23 through a suction pipe 24, protected at its inlet with a screen 24^a, to prevent the entrance of fine particles of lint and other foreign matter from entering and possibly clogging the circulating system. The water supply pipe 20 is further formed with a branch 25 in which is inserted an adjustable relief valve 26 of any suitable construction by means of which the pressure in the supply pipe 20 and header 17 can be maintained constant. Any liquid in excess of that required to maintain this pressure constant will escape through the relief valve into the supply tank as will be readily understood.

Reference to Figures 2, 4, 5, 6 and 7 will disclose the fact that I provide a plurality of independently controllable valve devices 27 in the header 17 from which the water may be fed from the header. I preferably space these devices relatively close together in order that I may obtain the desired fine selectivity of distribution of liquid, and I find in practice that a spacing of from 1" to 2" center to center of the valve devices gives satisfactory results. Each valve device 27 comprises preferably a valve element proper and a packing gland to prevent any uncontrolled escape of water. Inasmuch as all of the valve devices are identical it will only be necessary to describe one of them in detail. This valve device 27 comprises a valve stem 28 provided with a threaded portion 29 and a tapered needle valve portion 30. This needle valve portion 30 co-operates with a suitably tapered opening or valve seat 31 preferably located at the bottom of the header 17.

The screw threaded portion 29 of the valve stem engages suitable threads in the shouldered nipple 32 which is in turn screw threaded into the header 17 in a liquid tight manner. This nipple 32 is provided at its outer end with threads adapted for engagement with a packing gland 33 adapted to confine packing 34 whereby leakage along the stem 28 is effectively prevented. The upper end of the valve stem is provided with a square shoulder upon which is mounted a suitable regulating wheel 35. This regulating wheel is held in seated engagement with the square shoulders on the valve stem by the screw 36. Mounted on this regulating wheel 35 is an indicating finger 37 which is clamped in position by means of the screw 36 and which may be swung about the axis of the wheel 35 when the screw 36 is loosened. I prefer to turn this indicating finger so that it points toward the plate cylinder when the valve 27 is closed.

Associated with each valve device is a distributing element 38 which is suitably supported from the header 17 at its upper end 39 and gravitationally contacts the water roller 13 at its lower end as shown at 40, Figure 5. The upper ends of these distributing elements are preferably detachably supported so that they may be quickly and easily removable for purposes of renewal, cleaning or repair. The support for this distributing element as clearly shown in Figures 5, 7 and 9 comprises a resilient clamping member 41 approaching a circular form in cross section and adapted to resiliently encompass the outer surface of the header 17. This member 41 is preferably provided with an opening 42 adapted to register with the nipple 32, this opening serving to properly locate this clamping member 41 on the header 17. In order to additionally fix the position of this clamp on the header the clamp may be provided with a hole 43, adapted to be engaged by a screw 44 threaded into the header 17. The end of the clamp opposite to that which is screwed to the header is provided with a plurality of teeth 45 adapted to project into the end 39 of the distributing member 38 and securely hold the same in position. Adjacent to the teeth 45 the clamp is provided with a projection 46 which may be grasped by the fingers of the operator to facilitate the easy removal of the distributing member 38. For the distributing member I prefer to use a flat wick shaped element, preferably of slightly less width than the center to center distance of the valve devices. I prefer to make this distributing element of a material which has the property of rapidly and uniformly distributing moisture and which is light in weight so as to prevent wear on the periphery of the rotating roller 13. I have found by experiment that a fibrous material such a molleton is a very satisfactory material for this purpose and have also discovered in my experiments that woven wicking, fine wire mesh, fine woven wire ribbon, woven glass ribbon and other similar materials will perform satisfactory service.

Reference to Figures 3 and 5 will disclose one form of a device adapted to regulate the depth of liquid in the pan or reservoir 15. This regulating device comprises a nipple 47 preferably secured to a depression in the bottom of the pan 15 in a water tight manner. This nipple is exteriorly formed with a straight thread adapted for frictional engagement with an interiorly threaded sleeve 48. The nipple 47 projects through the bottom of the pan 15 and is connected by means of an elbow with an overflow pipe 49, draining to the supply tank 23.

The face of the printing plate 8 is shown in

Figures 2 and 4 and these figures also show this extending only partially across the width of the cylinder. The face of this plate 8 is shown to comprise two portions or zones 8^a, Figure 2, which require a relatively very heavy amount of ink and which, for purposes of comparison are indicated by black. Between these two zones 8^a is a portion or zone 8^b which requires relatively somewhat less ink than the portions 8^a and which for purposes of comparison is indicated by finely spaced criss-cross shading. Adjacent to and outwardly from the zones 8^a are shown portions or zones 8^c which require relatively very little ink and which for purposes of comparison are indicated by light open criss-cross shading. At 8^d are shown portions of the plate which require no ink at all and which are shown blank. The portions of the plate cylinder which are not covered by the plate are indicated at 4^a.

It will be understood, that generally speaking, the amount of moisture which it is necessary to supply to the plate will vary with the increase in the amount of ink taken by said plate and, in fact, the variation will be substantially in proportion to the relative amounts of ink used. It should also be understood that the distribution of the moisture in any zone, be it wide or narrow, must be uniform, as the presence of any lack in uniformity in moisture distribution will result in defective work. It is also essential to note that the moisture must be closely confined within the zones in which it is required for the best results and that the borders of these zones are frequently very clearly marked.

In order to provide the proper amounts of moisture for the different zones I have provided the plurality of valve devices and distributing elements associated therewith previously described, which are adapted to furnish moisture directly to the water roller when and where it is desired.

Operation

The moisture circulating and supply system operates as follows: A suitable liquid solution is prepared and poured into the tank 23. This liquid is sucked from this tank through the suction pipe 24 by the pump 21 which in turn delivers liquid to the header 17. Liquid thus supplied by the pump in excess of that required to maintain the predetermined pressure in the header will be by-passed through the relief valve 26 as previously explained and this relief valve is adapted to regulate the pressure desired to be maintained in the header. The pan 15 is also supplied with liquid from the header through the outlet pipe 19, the amount of liquid so supplied to the tank being controlled by the valve 19^a.

The periphery of the water roller 13 being partially immersed in this liquid in the pan 15 will absorb or collect moisture by adhesion to its surface. This moisture will be carried by the periphery in the direction indicated by the arrows in Figure 5. The moisture is carried upwardly as indicated by the arrow "X" and thence downwardly as indicated by the arrow "Y", whereupon it is periodically transferred to the ductor roller and is eventually transferred through the intermediate roller 11 and dampening rollers 10, 10 to the plate 8 as hereinbefore described. The moisture thus delivered by the water roller in accordance with my invention is intended to be the normal or minimum of moisture required for uniform distribution to the plate. The amount of moisture absorbed or collected by the periphery of the roller 13 will depend upon the speed of rotation and upon the depth of the immersion of the periphery of this roller in the liquid. The speed of rotation of the roller may be suitably controlled and I have provided means for regulating the depth of the immersion of the roller by the provision of the nipple 47 and interiorly threaded sleeve 48 as clearly shown in Figure 5. The range of regulation possible with this device is from a very slight immersion to an immersion amounting to nearly one third of the periphery of the roller thus providing for ample range of the minimum or normal amount of uniformly distributed moisture required on the plate.

For these plates or for those zones where this moisture distribution is sufficient and satisfactory, the distributing elements 38 may be manually disengaged from the roller 13 and allowed to hang in suspended position as shown at 38^a in Figure 5, or these distributing elements may be permitted to ride on the roller 13 and assist in spreading water uniformly over the surface without the addition of any water to the surface of the roller 13.

For those portions of the plate which require additional water, the operator will determine the corresponding position on the water roller 13 and he will then open the corresponding valve device or devices 27 by turning the regulating wheel 35 to the left until sufficient liquid is being delivered by the valve devices to satisfy the requirements of the plate. The amount of liquid fed by the valve device can be determined by observing the rate of the falling of the drops from the valve points 30. This liquid, it will be understood, will drop from each valve device to its associated distributing element 38 whence it will flow by gravity and capillary attraction to the portion 40 and thence to the roller 13. It should be noted that this distributing element will transform the intermittent drops to a continuous stream. It should also be pointed out that this water will be uniformly spread throughout the entire width of the distributing element 38 but will not spread beyond this width. The roller 13 will accordingly receive a uniformly distributed coating or zone of the liquid supplied by the juxtaposed valve device. It should also be pointed out that this liquid is supplied to the roller 13 at a point substantially at the top of its periphery and in such position that the liquid will not return by gravity down the upwardly travelling portion of the periphery of the roller, and that all of this supplemental liquid will thus be carried downwardly along the portion "Y" of the periphery of the roller, and be made available to the ductor roller for transfer to the dampening rollers and plate 8. In this manner I supply a substantially uniformly distributed normal or minimum of moisture to the printing plate and supplement this by additional moisture when and where required and in uniformly distributed condition where applied.

It will be understood that when each of the valves 27 or any group of the valves 27 are opened a sufficient amount to supply all the supplemental or additional moisture required by any particular portion of the plate, that this moisture supply will be constant after the apparatus is once set, as the pressure of the liquid supplied to the valves remains constant, and as the liquid level in the pan remains constant. Any slight variation required during the course of a long run can easily be accommodated by a slight adjustment of the controlling valve or valves. Should it be

found that for any reason an excess of moisture has been supplied to any zone on the water roller, it will be evident that the distributing member 38 may be instantly disengaged from contact with the water roller thus preventing any undesired accumulated liquid being fed from the distributing member to the water roller and thence to the plate.

It will be evident that, in this invention, I have also provided a means for supplying liquid to the water roller in zones, each zone having a uniform degree of liquid distribution, and that the distributing elements are so independently arranged that the functioning or non-functioning of one element is not affected by the adjacent element. Due to the relatively rapid rotation of the water roller, these relatively varying zones remain substantially intact so that the different zones will be presented to the ductor roller substantially the same as they were formed at the distributing element.

I desire to call attention to the fact that the function of the distributing element is two fold. Its primary function is to supply the liquid to the water roller in a substantially uniform stream instead of intermittent drops as would otherwise be the case. The second function of this distributing element is to spread the liquid uniformly throughout the entire area of contact of the distributing element with the water roller.

It will also be evident that the liquid is distributed individually by each of the distributing elements by capillarity as well as by gravity.

It should also be noted that the liquid is delivered to that portion of the periphery of the water roller which is travelling either horizontally or downwardly. This is advisable so as to prevent the possibility of the liquid running downwardly on the upwardly travelling portion of the periphery, and thus tending to spread into adjacent zones on the roller.

It will also be apparent that I have provided a continuously circulating system of liquid to the dampening device, which results in a periodic carrying off of lint and other foreign matter, which is prevented from re-entering the system by the screen on the inlet end of the suction line to the pump.

It will further be evident that I have provided a quick, accurate, selective and independent control for the supplemental liquid supply.

It will further be evident that I have provided means for maintaining a uniform hydrostatic head upon the valve devices, thus assuring the maintenance of a continuously uniform flow through the valves.

It will further be evident that I have provided means, in the element 37 on the valve devices, for indicating the approximate flow from the valve at a glance and I have also made provision for the observation of the discharge from the valve devices.

One of the advantages of this invention is its capacity for keeping the dampening rollers clean and free from dirt, grease and ink. In some instances I have even found that rollers which were partly coated with ink collected from the plate due to an insufficient supply of moisture, have become cleaned of all ink and grease after my invention was applied. This result was due to the maintenance of proper moisture distribution.

While it is a fact that the covered rollers of standard dampening devices and particularly water rollers, must frequently be re-covered or replaced, I have found that these rollers can be maintained in service for a comparatively long period of time without becoming defective when my improved device is co-operatively associated therewith.

I call attention to the fact that, after a period of use the capillary capacity of the distributing elements becomes impaired due to the collection of dust from the atmosphere thereon and due to the deposits of solids left in the body of these distributing elements by evaporation of the water. It therefore occasionally becomes necessary to remove these distributing elements for cleansing or renewal. For this purpose I have provided means which will permit the quick detachment of these distributing elements from their supports and permit the quick replacement of these elements in co-operative relation with their respective valves.

I shall now briefly describe the various modified forms of this invention illustrated in the drawings.

Referring to the form of this invention illustrated in Figures 10, 11 and 12, it will be noted that, in this form, modified types of valve devices have been substituted for the valve devices 27 and additional modifications have been made in the method of mounting the distributing element, these modifications in the distributing element being considered advisable in view of the change in the valve devices. The modified types of valve devices consist of standard cocks 50, having discharge outlets 51 and plugs 52 which are slightly altered to provide a greater regulating range. As shown in Figure 12, this alteration consists of the formation of a groove 53 in the plug 52. This groove varies in cross sectional area from zero at the point 54 to a maximum at the point 55 and continues this maximum area to the point 56 as shown. The purpose of the provision of this groove in the plug of the cock is to provide a more gradual range of regulation than can be obtained with a standard type of plug having a single transverse opening. It will be understood that a slight turn of the plug in the direction indicated by the arrow in Figure 12 will permit a small amount of liquid to pass through the groove from the inlet passage 57 in the casing of the cock to the outlet 51. A greater angular turn will proportionately increase the amount of the flow, until the point 55 registers with the passage 57 in the casing of the cock, at which position of the plug the maximum capacity of the cock will be utilized. For the purpose of supplying liquid to these cocks and supporting them, I provide the header 58 into which the several cocks are threaded in a liquid tight manner. This header 58 may receive its supply of liquid and may be supported in the same manner as header 17.

Associated with each of the cocks 50 is a distributing element 59 substantially similar in proportions and characteristics to the distributing elements 38 previously described. These distributing elements are detachably suspended by means of resilient clamps 60 which are similar to the resilient clamping members 41, and are provided with an opening 61 adapted to register with the threaded portion of the cock 50 and provided with teeth 62 on a relatively stationary portion of this clamp, teeth 63 on a relatively movable portion and also with a beaded lip 64 to facilitate manual opening of the clamp. It will be apparent that this clamp practically entirely encompasses the header 58 and is therefore firmly located on the header without the aid of any ad-

ditional securing means. It will be noted that the point of attachment of the distributing element 59 to the clamp is located under the cock 50 so as to reduce the vertical distance between the discharge outlet 51 of the cock and the distributing member 59 to a minimum, whereby splashing is eliminated. It will be noted that, if it becomes essential that the addition of water to the water roller 13 be instantly stopped, it is only necessary for the operator to manually disengage the flexible distributing member from the water roller 13 whereafter it will be maintained out of engagement with the roller by gravity. It will also be apparent that the outlet 51 of the valve 50 is vertically offset from any portion of the roller 13 so that any accidental drip or leak of the valve will not fall upon the roller 13.

I shall now describe the form of invention illustrated in Figures 13 to 16 inclusive. This form of the invention is substantially similar to the form just described in respect to the water supply system and valve devices. In this form I have, however, illustrated a further advanced type and system of distributing the liquid to the roller 13. The object of this further development in the distributing system is to secure a better and more uniform distribution of the liquid than is ordinarily possible with the systems previously described, this additional refinement being desirable for certain special cases. In this system I have provided a trough 65, intermediately disposed between the valve devices and the distributing elements. This trough is divided into a plurality of compartments 66, these compartments preferably corresponding in number to the number of cocks 50 and the center of each compartment preferably being located centrally under the outlet 51 of the respective cock with which it is arranged to co-operate. Each compartment is open at the top and closed on all other sides except for a relatively narrow longitudinal opening 67 formed in one of the vertical walls of this trough. This trough is preferably located above the water roller 13 and may be supported in any desired manner. Through the opening 67, I thread a distributing element 68 substantially similar in cross section and other characteristics to the distributing element 38. The lower end of this element is adapted to gravitationally contact the roller 13 as shown at 69, and is folded over preferably a number of times as shown at 70 in Figure 13. In order to detachably hold this folded portion 70 in place so that it may act as an anchor for suspending the distributing element 68 from the trough 65, I provide a pin member 71 which is formed with a point 72 adapted to pierce the folded portion 70 and extend practically through the bottom layer of said fold. As is clearly shown in Figures 13 and 16, this pin 71 is also provided with a recess 73 adapted to engage one of the vertical walls of the trough 65 and a resilient portion 74 purposed to hold said pin in place on the trough.

It will be evident that, in this modified form which has just been described, I have provided a means, in the trough 65 for very uniformly spreading the liquid in the distributing member so as to eliminate any irregularity due to the intermittent drop feed from the valve device. The liquid fed to each of the compartments 66 will accumulate in said compartment and be uniformly distributed in the folded distributing member by gravity and by capillary attraction before it passes along the depending portion of this distributing member.

I shall now describe the form of this invention illustrated in Figures 17 and 18. This form of the invention is somewhat similar to the invention illustrated in Figures 1 to 9 inclusive, except that the liquid supplied to the valve elements is not under pressure. I find that, for some purposes, the feeding of liquid can not be sufficiently sensitively controlled with these valve elements when the liquid is fed under pressure. For this purpose I have devised the modified form which will now be described. The header 75, may be supported and may receive its liquid in a manner substantially the same as the header 17. In this header are mounted a plurality of valve elements 76 which are formed at their lower ends with tapered needle valve portions 77 and which are provided at their upper ends with regulating wheels 78. Intermediate of the ends these valve stems are formed with threaded portions 79 adapted to engage a threaded opening preferably in the top of the header 75. A resilient clamping member 80 encompasses the header 75 and is provided with teeth 81 adapted to detachably suspend the usual distributing element 82, as will be clearly evident from the drawings.

It will be noted in Figures 17 and 18 that the top of the liquid in the header is preferably maintained below the top of the header. This precaution eliminates the building up of any pressure interiorly of the header, except the slight pressure due to gravity at the bottom of the header and thus reduces the amount of liquid flowing through a given opening around the needle valve considerably, as compared with the flow through an opening of equal size under pressure. It will be evident that it is desirable to keep the liquid level constant in order to maintain a uniform height of liquid above the valve outlet so as to insure a constantly uniform flow for any setting of the valve device. It will be apparent that the maintenance of the liquid level below the top of the header eliminates the necessity of a packing gland where the stem 76 enters the header, and thus considerably simplifies the construction.

One means of maintaining and regulating the liquid level in the header 75 is shown in Figure 18. A coupling 83 is attached to the end of the header 75. To this coupling, in turn, is connected a flexible tubular member 84. Preferably integrally formed with the coupling 83 is a longitudinal extended arm 85 provided at its outer end with a boss 86 perforated by a threaded opening adapted to receive an adjusting screw 87. Rotatably resting upon the upper end of this screw is mounted a saddle 88, adapted to engage the under side of the flexible member 84. A rotation of the adjusting screw will cause the saddle to raise or lower the adjacent portion of the flexible member 84 and will thus regulate the liquid level maintained in the header 75 as will be apparent. It will be understood that any liquid supplied to the header in excess of that fed through the valves will pass through the flexible member 84 to the pan or reservoir 15.

The forms of the invention hereinbefore described have implied the use of a pump or other continuous supply of liquid to the system. It is not necessary that a pump form a part of my invention, and I have illustrated in Figure 19 a form of this invention in which the liquid may be manually supplied to the distributing devices. In this figure, a pan 89 is provided, into which liquid can be poured periodically by the operator. This pan is preferably of large area in plan compared to its height, so that the using of the

liquid in the pan will not cause any rapid change in the hydrostatic pressure on the cocks 90 which are mounted in one of the vertical walls of this pan, preferably near the bottom. A suitable resilient clamp 91 is provided for suspending the usual distributing element 92.

It is not entirely essential that the distributing elements have a wide contact with the water roller 13. As previously pointed out, one of the essential properties of the distributing element is that it shall furnish a uniform and continuous supply of liquid to the water roller. In Figure 20, I have illustrated one form of a relatively narrow distributing element which consists of a flexible tubular member 93 detachably suspended from the outlet opening 51 of the cock 50. This member 93 is preferably made of liquid absorbing material and it is evident that such a material will distribute the liquid continuously to the periphery of the roller 13 at 94. While this distribution of the liquid to the roller 94 is not as satisfactory as the distribution by the apparatus previously shown it is very satisfactory for many purposes.

The form of this invention disclosed in Figures 21 and 22 differs from the previously described forms by the provision of a support for the distributing elements which is separate from the liquid supplying header and valve devices, and which is preferably vertically spaced therefrom. This arrangement has the evident advantage that the drip or feed from the valve devices may be clearly seen from any position on either side or end of the apparatus. This arrangement is considered advisable for some cases, as a continuous visible check on the amount of liquid fed by any of the valve devices. This form of the invention also illustrates a simplified and improved connection of the distributing element to its support, which makes possible a quick removal and replacement of this element by one hand of the operator, for cleansing or renewal, and insures its correct location with relation to the valve with which it it intended to co-operate. This form of the invention also shows a mounting for the support for the distributing elements which provides for adjustment with relation to the header and water roller. Figure 21 also illustrates the omission of the usual pan or reservoir 15, in which the water roller has been shown to be immersed in the forms previously described. In this form the only liquid fed to the water roller is that delivered by the valve devices. This feature is illustrated to lay stress upon the fact that the reservoir is not indispensably essential to the use of my invention.

The liquid supply for this form of the invention comprises a header 95 which may receive its liquid in a manner similar to that previously described, and the liquid in this header may be under pressure or the header may be only partially full of liquid as shown in Figure 17. The valve devices in this form consist of drip or sight feed valves 96 controlled by hand wheels 97 and provided with the usual stuffing boxes 96^a for the needle valve stem 96^b which controls the discharge from the nipple 96^c.

Clamped upon the header 95 are a plurality of brackets 98 only one pair being shown in the drawings. These brackets are formed at their upper end with recesses adapted to encompass the header 95 and be held in frictional engagement therewith by means of a screw 98^a. These brackets are similarly formed at their lower ends with recesses adapted to encompass a tube 99 and be held in frictional engagement therewith by means of a screw 98^b as will be apparent from an inspection of Figure 21.

The tube 99 is adapted to support a plurality of distributing elements 100 similar in size and characteristics to the distributing elements previously described. These elements are each provided with a plurality of holes 101 of suitable size, which may be lined with an eyelet 101^a and preferably spaced to pass over the pins 102 which are mounted in the supporting tube 99. These distributing elements 100 gravitationally contact the water roller 13^a as shown at 103.

Disposed below the water roller 13^a and preferably also below the valve devices 96 and distributing elements 100 is a pan 104 provided with a drain 105.

It will be apparent from an inspection of Figure 22 that the brackets 98 are relatively narrow at the bottom so that they may engage the tube 99 without disturbing the proper spacing of the distributing elements. These brackets 98 may be, and preferably should be, as wide at the top as is permitted by the spacing of the valve devices 96 so as to insure a rigid mounting of these brackets on the header. It will be evident from an inspection of Figure 21 that these brackets 98 may be rotatably adjusted about the header 95 upon the loosening of the screw 98^a whereby the support 99 may be moved laterally with relation to the axis of the roller 13^a and with relation to the header 95, as viewed in Figure 21. It will also be evident that the supporting tube 99 may be rotated in the recesses at the bottom of the bracket 98 upon the releasing of the screw 98^b. This mounting for the tube 99 permits the adjustment of the distributing elements 100 with relation to the header 95 and water roller 13^a as will be readily understood.

The operation of this form of the invention is substantially identical with the operation of the forms previously described, the amount of liquid desired at any point being regulated by turning the hand wheel 97 the required amount to secure the desired feed from the discharge nipple 96^c in the valve. This discharge will, except under the most extraordinary conditions, be in drops which can readily be seen from all directions and particularly from the left of Figure 1 which is the side from which the operator adjusts the valves.

This visibility of the dropping discharge of the valves is desirable not only at the time of regulation but also as a visual check upon the continued feed of the valve at any time subsequent to the regulation. This is especially advantageous for thick liquids or liquids which contain undissolved or foreign matter which might tend to clog the valves and thus gradually reduce or stop the flow. These drops of liquid fall upon the inclined surface of the distributing element 100 whence they are immediately diffused by capillary attraction and gravity and made available to the water roller 13^a in a uniformly distributed condition. If the operator should desire to instantly discontinue the feeding of any water to the water roller 13^a from any distributing elements it will only be necessary for him to manually disengage the distributing elements in question from the water roller 13^a whereupon these distributing elements will assume the position shown at 100' in Figure 21. Any drip either from the water roller 13^a or distributing elements 100 or valves 96 will be caught by the pan and returned through the drain 105

to the liquid supply tank as will be readily understood.

The modification of the invention shown in Figure 23 and 24 primarily illustrates the modified form of the distributing elements in which these elements are endless and are mounted on a roller specially and additionally provided for this purpose.

The liquid supply header and liquid regulating devices may be of any desired form, and for the purpose of illustration I have shown the header 17 and valve devices 27 which have been previously described.

The supplemental roller 106 is mounted on a shaft 107. Mounted on the periphery of this roller are a plurality of endless liquid distributing elements 108 which have the same general characteristics as the liquid distributing elements previously described and which are spaced at the same intervals as the superposed valve device 27 with which these distributing elements are intended to co-operate. The shaft 107 is mounted in any desired manner for a light contact of the periphery of the distributing elements 108 with the periphery of the water roller 13. It is essential that this contact be light so that neither the distributing elements 108 nor the fabric covering of the roller 13 may be compressed.

In operation the regulated amount of liquid will drop from the bottom of the valve stems of the valve devices 27 upon the distributing elements 108. The water dropped upon any one of the distributing elements 108 will immediately be diffused throughout the entire width of this distributing element and will be carried downwardly in a counter clockwise direction as indicated in Figure 23, and will be passed to the periphery of the water roller 13 which in turn will carry the moisture to the ductor roller and subsequently to the distributing and dampening rollers in the manner previously described for other forms of this invention. It will be understood that the roller 106 may be placed in any desired position with relation to the roller 13 so long as the degree of pressure between the distributing elements 108 and the roller 13 is not sufficient to interfere with the proper transfer of the liquid from the distributing elements 108 to the roller 13 and provided that the speed and location of the roller 108 are so co-related that the liquid will not pass downward along the upwardly travelling periphery of the roller 13.

A modified form of feeding the liquid to the distributing elements is shown in Figure 23A, in which a source of air under pressure is assumed to be supplied through the header 109. This air passes through a plurality of regulating valves 110 to spray nozzles or atomizers 111. The passage of the air through these spray nozzles develops a suction in the liquid supply tubes 112 which are immersed in the liquid contained in the pan or reservoir 15. One individual spray is directed toward each of the distributing elements 108. The intensity of the spray or amount of liquid fed to each of the distributing elements can be controlled by the regulating valve 110 as will be understood. The liquid carried by the spray will be still further uniformly diffused by the distributing element and will be delivered by contact to the roller 13 in individual zones as will be understood. This device illustrates a method of feeding the auxiliary moisture in an upward direction from a source of liquid supply below the water roller and in the form illustrated the source of liquid supply is identical with that in which the water roller is immersed. This arrangement is especially desirable for those cases where the liquid supply and valve devices above the water roller are objectionable.

In Figures 25 and 26, I have illustrated a somewhat different method of distributing the liquid to the water roller. This method, as illustrated, consists of applying the liquid to the roller by means of a series of sprays or atomizers. The spread of the sprays at the point where these sprays strike the water roller being substantially the same as the center to center distance of the spray devices. In this manner the entire length of the roller can be coated by these sprays. I have also provided individual regulating means for each of the sprays whereby liquid can be sprayed to each section of the roller in amounts in proportion to the requirements of the section.

Referring to the drawings, 113 indicates one of the spray nozzles which receives its liquid from a header 114 the flow of this liquid from the header to the spray nozzle 113 being controlled by a valve 115 of any suitable type. In order to insure the uniform distribution of the liquid sprayed upon the water roller 13, under varying amounts of feed I provide, associated with each of the nozzles 113, a valve 116 adapted to supply air under pressure to the nozzle 113 in order that the liquid may be atomized. This air is supplied to the various valve elements 116 from the header 117 which receives its air supply from any suitable source through an inlet pipe 118. It will be understood that the liquid may be supplied to the header 114 in the same manner as that described and illustrated in Figures 1 to 9 inclusive. The headers 114 and 117 may be supported by any suitable bracket such as that shown at 119 in broken lines. In Figure 25 I have shown various intensities of sprays at a, a' and a^2 as a suggestion of the variations which may be made in the spray to conform to the variations in the requirements of the design on the plate 120 as shown at 120^a, $120^{a'}$ and 120^{a2} respectively. In this figure those sprays supplying liquid to the portion of the water roller corresponding to that section of the plate which has the relatively heavier water requirements being shown with darker lines, and those sprays delivering less water being shown with relatively lighter lines, and those portions requiring no water, being shown turned off, and supplying no liquid whatever.

While I have shown and described a spray nozzle which effects the distribution of the liquid by use of air, the use of a self atomizing water spray nozzle is also contemplated.

In the preferred forms of this invention I have shown a water absorbing element for transferring liquid from the liquid supplying devices to the water roller. It is not necessary that these elements be of water absorbing nature, as screens, corrugated plates and other distributing material may be used. It is also not necessary that these distributing elements be of the shape or proportion shown. These distributing elements may conceivably be rotating rollers or other movable elements which will properly transfer and distribute the liquid from the supply devices to the water roller such for instance as shown in Figures 23 and 24.

While I have shown the adjustable pressure regulating relief valve 26 located close to the pump and discharging into the supply tank it will be understood that this valve may be placed anywhere in this supplementary liquid supply system

and, in fact, may take the place of the valve 19a and may discharge into the pan 15.

Although I have illustrated the addition of the supplemental liquid directly to the water roller in all of the forms of this invention, it is within the contemplation and scope of this invention to add this supplemental liquid to any of the other rollers of a dampening device such as the ductor roller, distributing roller or even to one of the dampening rollers.

The feeding of liquid by valves or other independently controllable supplying devices directly upon a roller in a dampening system without the interposition of a transfer or distributing element, is also within the scope of my invention. This direct method of adding supplementary liquid directly is satisfactory for some types of work; I have found by experiment, however, that this method of feeding liquid directly to the rollers without the interposition of a distributing element, is not generally entirely satisfactory for finer work, because the liquid is not applied to the roller as a continuous feed and is not properly distributed for the best results.

Many other modifications of this invention and its application will naturally occur to those skilled in the art, and these present disclosures should therefore be considered as typical, and I desire not to be limited to the exact constructions shown and described.

While this invention has been described particularly in its application to a lithographic offset press, it should be pointed out that this invention is equally well adapted for use with tin decorating presses and other presses of that type, and in its broader aspects, the invention is adapted for use on all types of lithographic presses as well as printing presses and other duplicating machines.

What I claim is:

1. A dampening device for a lithographic press, comprising a roller mounted on a horizontal axis, a plurality of liquid supply devices, a plurality of liquid distributing elements each adapted to directly independently and uniformly distribute the liquid over a section of the periphery of said roller above the axis of said roller, and means for controlling the amount of liquid distributed by each of said elements.

2. In a dampening device for a lithographic press or the like, in combination, a dampening roller having a periphery formed of liquid absorbing material, a source of liquid and a plurality of liquid transferring devices, each device adapted to directly and independently transfer liquid from said source to said roller by gravity, and means adapted to regulate the amount of liquid transferred by each of said devices.

3. In a dampening device, for a lithographic press, a roller, a plurality of liquid dispensing elements mounted exteriorly of said roller, each element adapted to deliver liquid directly to said roller independently of every other dispensing element, and means adapted to independently control the amount of liquid delivered by each of said elements, whereby a variable coating of liquid is formed on the roller, for the purposes as set forth.

4. In a dampening device a roller whose periphery is partially immersed in a reservoir of liquid, a plurality of devices each adapted to independently deposit liquid directly upon the periphery of said roller at points longitudinally spaced from each other, and means adapted independently to regulate the liquid added by each of said devices.

5. In a dampening device, in combination, a roller, means adapted to supply a uniformly distributed coating of liquid to said roller and a plurality of devices each adapted to independently add liquid directly upon the coating of said roller at points spaced from each other, each device being independently adjustable.

6. In a dampening device for a lithographic plate, a roller, means adapted to feed water to a plurality of zones of said roller, means adapted to distribute said water uniformly throughout the length of each of said zones, and means adapted to regulate the amount of water fed to each of said zones, and means adapted to transfer said water in said zoned relation from said roller to said plate.

7. A dampening device for a lithographic plate, comprising a roller mounted on a horizontal axis and a plurality of liquid distributing elements each adapted to independently and uniformly distribute liquid over a zone of the periphery of said roller, said liquid being delivered to said roller above its axis, means adapted to maintain the liquid uniformly distributed in any one zone and means adapted to transfer the liquid from said roller to said plate.

8. In a dampening device, in combination a liquid reservoir, a roller partially immersed in said liquid reservoir, a plurality of liquid dispensing elements mounted above said reservoir and adapted to deliver liquid to said roller, and means adapted to independently control the amount of liquid delivered to each of said dispensing elements.

9. In a dampening device for a lithographic press, a roller, a source of liquid, a plurality of devices contacting said roller, and adapted to conduct liquid from said source of liquid to said roller, each of said devices comprising means adapted to regulate the amount of liquid flowing from said source of liquid to said roller, whereby a variable intensity of liquid coating is formed on the roller for the purpose set forth.

10. In a dampening device, in combination a rotatable roller, means adapted to uniformly coat said roller with liquid and a plurality of devices adapted to independently add liquid to said roller subsequently to said coating operation directly upon the periphery of the coated roller at points longitudinally spaced from each other, the amount of liquid fed by each of said devices being independently controllable.

11. A dampening device, comprising a rotatable roller, means adapted to coat the periphery of said roller with a liquid, means adapted to regulate the amount of said coating, and supplemental means adapted to add liquid to predetermined sections of the periphery of said roller.

12. In a dampening device, a source of liquid, a roller, a plurality of devices adapted to feed said liquid by drops, each of said devices being cooperatively associated with individual means for diffusing said drops of liquid and each means adapted to deliver said diffused liquid directly to said roller, independently of every other means.

13. In a dampening device, for a lithographic press, comprising a printing plate, a dampening roller, a source of dampening liquid, a plurality of valve devices each adapted to feed said liquid, a plurality of means, one arranged beneath each of said valve devices, adapted to receive said liquid, and adapted to transfer said liquid to said roller independently of every other means, said roller being adapted to transfer said liquid to said plate.

14. In a dampening device for a lithographic press, in combination, a printing plate, a rotating periphery of a cylinder, a plurality of liquid supply devices adapted independently to feed liquid to said periphery, the point of delivery of the liquid to the periphery being substantially to the uppermost portion of the periphery of said cylinder whereby the liquid is prevented from running downwardly along the upwardly travelling periphery of the cylinder, and means interposed between said cylinder and said plate adapted to transfer said liquid from said cylinder to said plate.

15. In a dampening device, a source of liquid, a liquid receiving member and liquid transferring elements interposed between the source of liquid and the liquid receiving member and engaging said receiving member, said liquid transferring elements being adapted to be disengaged from said receiving member, and a pan located beneath said liquid transferring elements when they are disengaged from said receiving member.

16. In a dampening device, a source of liquid, a liquid receiving roller and distributing elements interposed between the source of liquid and the liquid receiving roller, said distributing elements being adapted to be disengaged from said receiving roller and adapted to be gravitationally maintained in a position laterally of the receiving roller.

17. In a dampening device, a plurality of valve devices adapted to supply liquid, a roller, and manually shiftable means adapted to transfer said liquid from said valve devices to said roller, transfer of liquid from said valve device to said roller being prevented by the shifting of said manually shiftable means.

18. In a dampening device, a plurality of liquid supply devices, a plurality of liquid distributing elements co-operatively associated with said liquid supply devices, a support for said liquid distributing elements, said distributing elements being detachably mounted on pins.

19. In a dampening device, a liquid distributing element, a support for said liquid distributing element and a detachable mounting for said distributing element on said support, said mounting comprising a spring element and detent teeth adapted to hold said distributing element.

20. In a dampening device, a liquid reservoir, a rotatable roller mounted in said reservoir, means for independently feeding liquid to the periphery of said roller at different points along the length of the roller, and means for controlling the relative amount of liquid fed to the roller at the different points.

21. In a dampening device for a lithographic press, a source of liquid, a plurality of valve devices adapted to dispense said liquid, adjustable means adapted to maintain a constant hydrostatic pressure on said valve devices and means adapted to transfer said liquid to said press.

22. In a dampening device, in combination, a roller partially immersed in liquid and a plurality of liquid absorbing elements in contact with said roller.

23. A dampening device for a lithographic press comprising a liquid receiving member, means adapted to deliver a uniformly distributed supply of liquid to said member, and supplementary means, comprising valve elements, adapted to deliver additional liquid to said member.

24. In a dampening device, in combination, a rotatable roller, means adapted to coat said roller with liquid, a plurality of spray devices adapted to independently add liquid to said roller, subsequent to said coating operation.

25. In a dampening device, a source of liquid, a liquid receiving member, and liquid absorbing elements interposed between the source of liquid and the liquid receiving member, said liquid absorbing elements being adapted to be disengaged from said roller and adapted to be gravitationally maintained in a position laterally of said receiving member, and a liquid collecting pan located beneath said element.

26. In a dampening device, a source of liquid, a liquid receiving roller, and distributing elements interposed between the source of liquid and the liquid receiving roller, said elements being detachably fixed at their upper ends and laterally of said roller, and being gravitationally supported at their lower ends upon said roller.

27. A dampening device for a lithographic press comprising a roller whose periphery is formed of liquid absorbing material in non-contiguous zones and means adapted to deliver moisture to said zones.

28. In a dampening device for a lithographic plate, in combination, a roller, a plurality of liquid atomizers, each atomizer adapted to deliver liquid to said roller independently of every other atomizer, means adapted to regulate the amount of liquid delivered by each of said atomizers, and a plurality of rollers adapted to uniformly diffuse the liquid delivered by each of said atomizers and to transfer said liquid to the lithographic plate.

29. In a dampening device, in combination, a rotatable roller, means adapted to coat said roller with liquid, adjustable means adapted to regulate the intensity of liquid coating on said roller, and a plurality of devices adapted to independently add liquid to said roller subsequent to said coating operation.

30. In a dampening device, a reservoir of liquid, a rotatable roller whose periphery is partially immersed in said liquid, adjustable means for varying the depth of immersion, in combination with a plurality of devices each adapted to independently add liquid to said roller.

31. In a dampening device for a lithographic press, in combination, a reservoir of liquid, a roller partially immersed in said reservoir, a plurality of individually controllable devices adapted to elevate the liquid from said reservoir and deposit said liquid upon the periphery of the roller at a point above the level of the liquid in the reservoir, and means for actuating said devices.

32. In a dampening device for a lithographic press, in combination, a reservoir of liquid, a roller partially immersed in said reservoir, automatic means adapted to supply liquid to said reservoir, means adapted to maintain the level of the liquid in said reservoir at a predetermined point, and controllable means adapted to superimpose liquid from said reservoir upon a portion of the periphery of said roller above said liquid level.

33. In a dampening device, in combination, a reservoir of liquid, a rotating roller immersed in said reservoir, a plurality of individual spray devices adapted to add liquid to the moistened roller from the reservoir, and means adapted to maintain the level of the liquid in said reservoir at a predetermined point, whereby the depth of the immersion of the roller and the level of the liquid with relation to the spray devices is maintained constant.

34. In a dampening device for a lithographic press, a source of liquid, a plurality of devices contacting said roller and adapted to feed the

liquid from said source of liquid to said roller, each of said devices comprising means adapted to regulate the amount of liquid flowing from said source of liquid to said roller, and adjustable means adapted to vary the area of contact of said devices with said roller.

35. In a dampening device for a lithographic press, a roller, a source of liquid, a plurality of liquid absorbent elements having a portion contacting the periphery of said roller and adapted to conduct liquid from said source of liquid to said roller, and adjustable means adapted to vary the length of the arc of contact of said elements with the periphery of said roller.

36. In a dampening device, in combination, a roller, means adapted to supply a uniformly distributed coating of liquid to said roller, and a second roller adapted to superimpose an additional coating of liquid upon said uniformly distributed coating, said additional coating being of variable intensity in a direction parallel with the axis of said second roller, and means adapted to supply said variable coating to said second roller.

37. In a dampening device for a lithographic press, in combination, a roller, means adapted to supply a uniformly distributed coating of liquid to said roller, a second roller substantially parallel to and adapted to contact said first mentioned roller, and liquid supplying elements adapted to supply a coating of liquid variable in intensity in a direction parallel with the axis, to said second roller.

38. In a dampening device for a lithographic plate, in combination, a roller, means adapted to supply a substantially uniformly distributed coating of liquid to said roller, a plurality of liquid atomizers, each atomizer adapted to deliver liquid to said roller independently of every other atomizer, means adapted to regulate the amount of liquid delivered by each of said atomizers, and a plurality of rollers adapted to uniformly diffuse the liquid delivered by each of said atomizers and to transfer said liquid to the lithographic plate.

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