Feb. 11, 1941. H. E. GOLBER 2,231,666

DAMPENING MECHANISM

Filed May 11, 1938 3 Sheets-Sheet 1

Fig. 1.

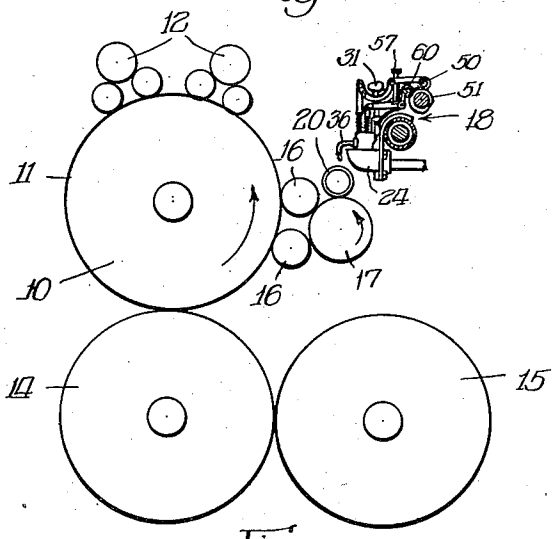
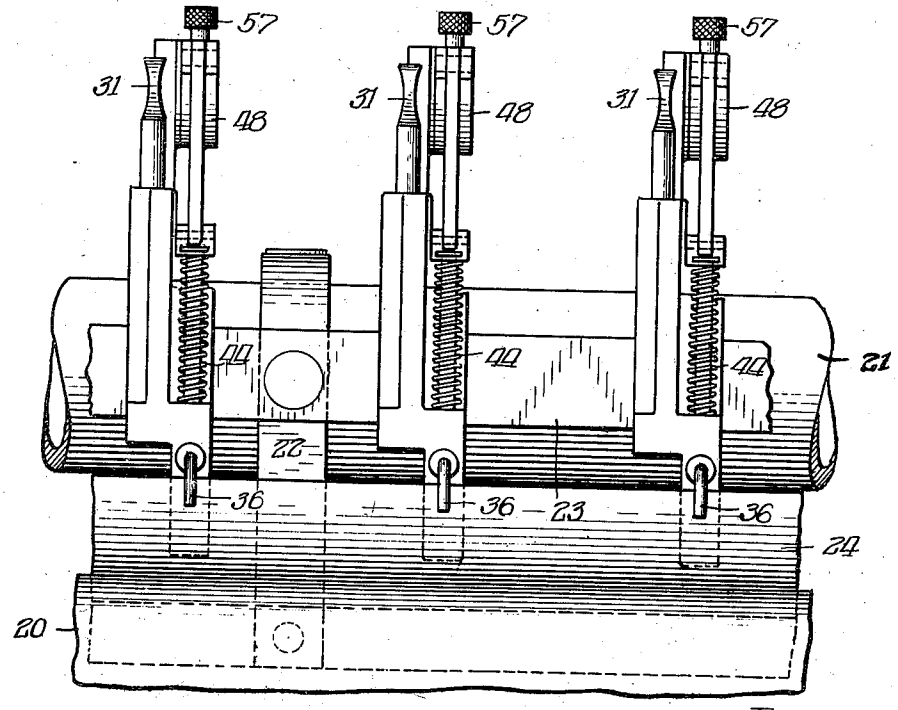


Fig. 5.



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DAMPENING MECHANISM

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Fig. 2.

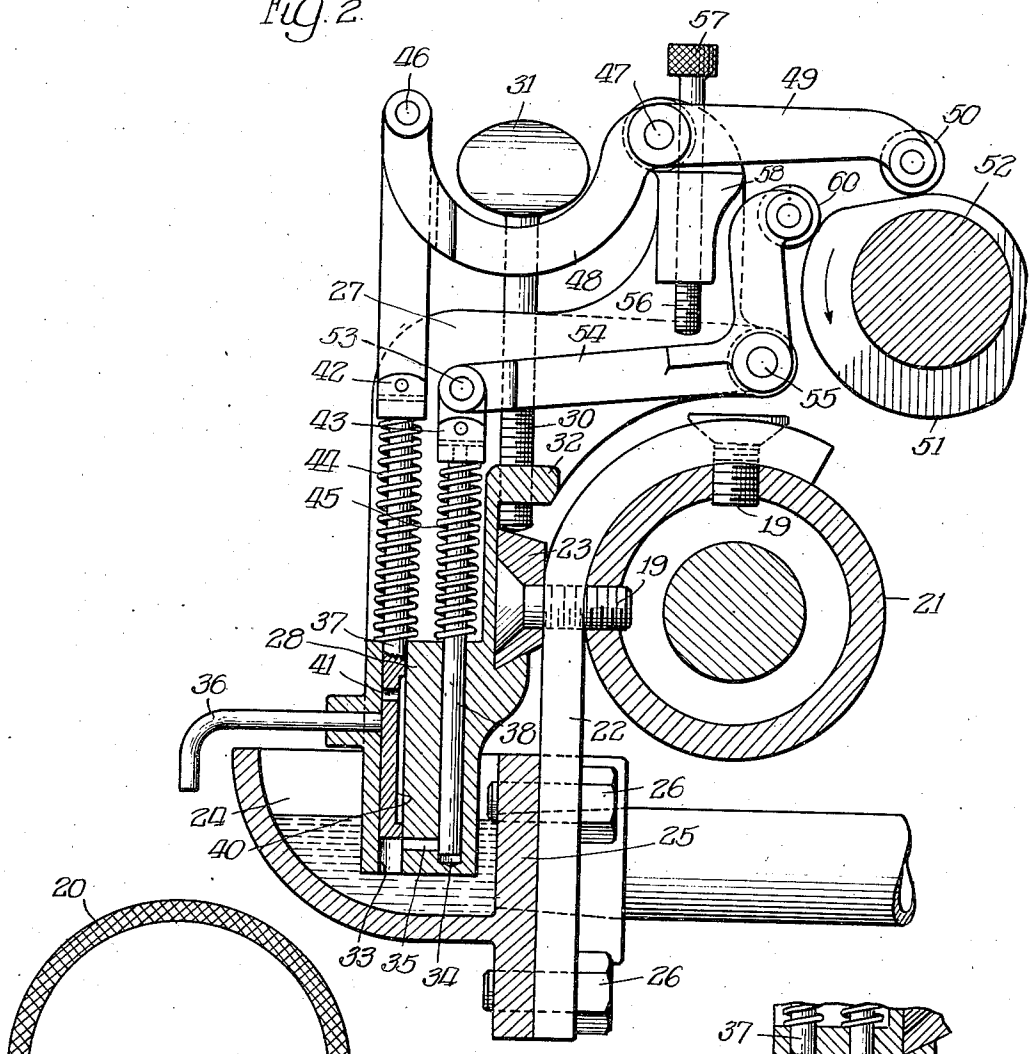
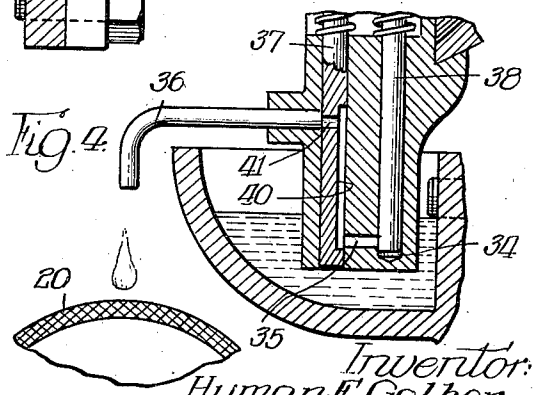


Fig. 4.



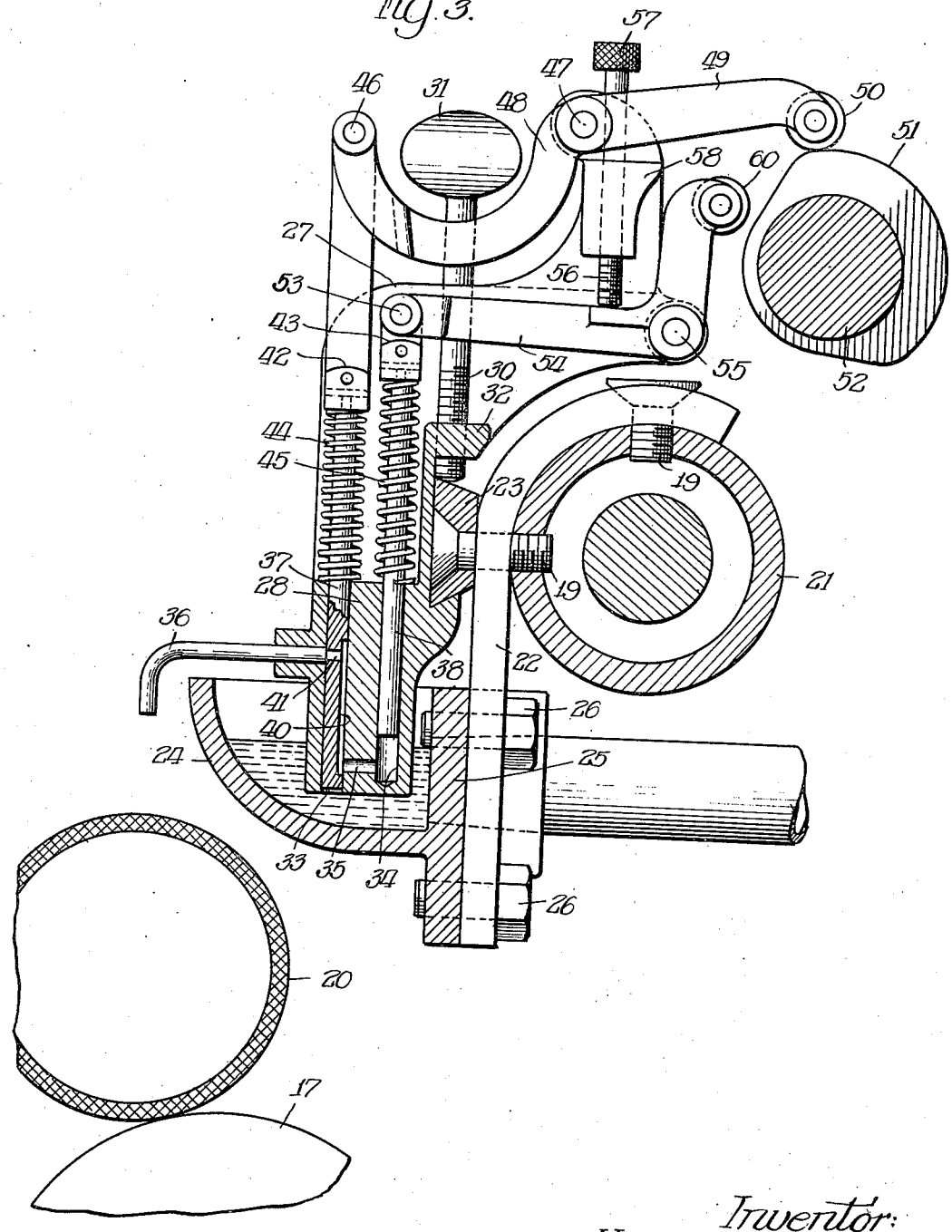
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DAMPENING MECHANISM

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Fig. 3.



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2,231,666

UNITED STATES PATENT OFFICE

2,231,666

DAMPENING MECHANISM

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Application May 11, 1938, Serial No. 207,241

9 Claims. (Cl. 101—147)

The invention relates to dampening mechanism for lithographic printing presses and other reproducing apparatus and has particular reference to dampening mechanism which will selectively control the volume of moisture to be supplied to the printing plate of a lithographic offset press.

In rotary lithographic presses, for example, it is necessary to adequately dampen the surface of the printing member in order to prevent the ink from adhering to the non-printing areas of the surface, namely, to those areas which are free of any printing image.

If the film of moisture applied by the dampening rollers to the printing surface of the lithographic plate is the same over the entire area of the plate, then it stands to reason that at those portions of the plate which correspond with the solids or darker tones of the subject to be printed there will be an excess of moisture. In other words, the plate will become "flooded" with moisture particularly at those areas which correspond with the dark tones and solids and consequently such excess supply of moisture will tend to repel the ink from the printing image where the ink is to adhere, resulting in a defective print.

Furthermore, when there is an overabundance of moisture on the plate the fluid will eventually become mixed with the ink so that after a number of impressions have been pulled, the solid blacks and dark tones will assume a grey appearance. In order to rectify this defect the operation of the press has to be interrupted and the inking and dampening mechanism reconditioned.

All this is due to the heretofore physical impossibility of positively and accurately controlling the supply of moisture to the different sections of the printing plate.

Apparatus heretofore most commonly used for supplying moisture to planographic printing plates consists essentially of a water fountain, a fountain roller, a ductor roller and water distributing or dampening rollers which contact the surface of the printing plate. The latter are intermittently supplied with a volume of moisture by means of the ductor roller which alternately contacts with the fountain roller and the dampening rollers. This class of apparatus however, has not proven entirely satisfactory mainly because of the difficulty experienced in obtaining the desired distribution of the aqueous fluid and also in maintaining constant the supply of such fluid to the dampening rollers. Furthermore, owing to the contact of the dampening rollers with the printing plate a certain amount of ink is picked up by these rollers and eventually transferred to the fountain roller, consequently it is impossible to maintain clean the fluid in the fountain, as well as the various rollers. In time the molleton material, with which the dampening rollers are covered, becomes saturated and clogged with ink, necessitating frequent interruptions in the printing operations in order to replace such clogged rollers.

One of the primary objects of my invention therefore, is to provide novel means whereby the required volume of moisture to be supplied to any particular section of the printing plate can be predetermined and maintained, thereby eliminating all of the defects pointed out herein.

Another object of the invention resides in the provision of dampening mechanism for supplying moisture to planographic printing plates which will overcome the major defects in apparatus heretofore used, which will be of relatively simple construction, and applicable to presses now in use.

A further object is to provide dampening mechanism which will maintain the water in the fountain clean and free of ink.

Another object resides in the provision of dampening mechanism that will supply a controllable quantity of moisture to planographic printing surfaces and which may be uniformly distributed over the entire width of the printing member or varied in amount locally to suit particular requirements of certain areas on the printing surface without adversely affecting adjacent areas.

A more specific object is to provide dampening mechanism having a plurality of water supplying nozzles and independent regulating means for each nozzle so that the amount and distribution of moisture to the printing member can be varied to suit conditions.

A still further object is to provide dampening mechanism including a plurality of nozzles supplying a controlled amount of water to a water roller during every revolution thereof and which is received by the water roller at a different point on its periphery for each revolution.

With these and various other objects in view the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings which illustrate an embodiment of the invention and wherein like reference characters are used to designate like parts—

Figure 1 is a diagrammatic illustration showing the association of the present dampening mechanism with the printing cylinders of a press;

Figure 2 is a vertical sectional view showing one of the water pumping devices comprising the present invention;

Figure 3 is a sectional view showing the water pumping device of Figure 2 with the plungers in still another position of operation;

Figure 4 is a fragmentary sectional view of the water pumping device of Figure 2 showing the plungers in the position they assume to discharge water from the nozzle; and

Figure 5 is a fragmentary elevational view showing the positioning of the devices adjacent each other to comprise the present dampening mechanism.

Referring to the drawings, particularly Figure 1, 10 indicates the plate carrying cylinder of the press having a printing plate 11 mounted thereon in the usual manner. Ink is applied to the printing plate 11 by the inking rollers 12 and the design is transferred by said plate to the blanket cylinder 14 which in turn prints the design upon a sheet of paper passed between said cylinder and the impression cylinder 15 forming the printing couple. In contact with the printing plate 11 are dampening rollers 16, preferably covered with molleton material and which in turn contact a distributing roller 17, generally mounted for axial reciprocation to more evenly distribute the moisture on the dampening rollers. The mechanism of the present invention, indicated in its entirety by numeral 18, may be described as supplying a metered quantity of water to the water roller 20 which has contact with the distributing roller and is also mounted for axial reciprocation for reasons which will be more particularly described as the description proceeds.

Numeral 21 indicates a tubular supporting shaft to which the depending member 22 is suitably secured by the screws 19. One of said screws securely joins to the depending member a supporting portion 23 having top and bottom sides which slope inwardly toward said member. The water fountain 24 is provided with a vertical back portion 25, which portion is located in contact with the front surface of the depending member 22 and suitably secured thereto by bolts 26. The dampening mechanism of the invention consists of a plurality of devices such as shown in Figure 2 for supplying a metered quantity of water to the water roller. Each device comprises a frame member 27 having a body portion 28 which is recessed along the rear thereof for receiving the supporting portion 23. The threaded nut 30 having the flattened head 31 is threaded into the flange 32 of the frame member and engages the sloping top side of the supporting portion to securely fasten said frame member to its support. However, the frame member can be readily released merely by turning the nut 30 in case it is desired to remove the device for cleaning or repair.

The body portion 28 is cored longitudinally to form a bore 33 extending completely through the body portion and a recess 34 terminating short of the lower end of said body portion. The longitudinal bore and recess are connected at their lower ends by the passage 35 and the bore 33 communicates with the nozzle 36 from which the water is discharged. The longitudinal bore 33 receives a plunger 37 adapted to reciprocate vertically within said bore and in a similar manner the plunger 38 is adapted to reciprocate vertically within the recess 34. The plunger 37 is formed with a longitudinal groove 40 and with a transverse passage 41. The groove has communication with recess 34 through passage 35 when the plunger is located in its lowermost position, which position of the plunger locates the passage 41 in alignment with nozzle 36, as shown in Figure 4. Fixedly secured to the upper end of each plunger are members 42 and 43, respectively, for retaining a coil spring on said plunger. The coil spring 44 on the plunger 37 is confined between the body portion and the member 42, whereas, the coil spring 45 on plunger 38 is confined between the body portion and the member 43.

Pivotally secured to the upper end of member 42 as at 46 is a bell crank lever 48 pivotally supported by the frame member 27 at 47. One arm of the bell crank has a U-shape in order to provide clearance for the flattened portion 31 of the screw 30 whereby said screw can be rotated for all positions of the bell crank. The other arm of said bell crank carries a roller 50 having contact with the cam 51 carried by shaft 52. Pivotally secured to member 43 as at 53 is a bell crank 54 pivotally secured to the frame at 55. The horizontally disposed arm of said bell crank is limited in its upward movement by the adjustable screw 56 having the knurled portion 57 and which is suitably threaded in the boss 58 formed integral with and projecting from the frame member 27. The vertical arm of said bell crank carries the roller 61 having contact with cam 51 carried by shaft 52.

In the operation of the device above described the plungers 37 and 38 are alternately reciprocated through actuation of the respective bell cranks by the cam 51. In Figure 2 the plunger 37 has just been raised as a result of the counter-clockwise rotation of the cam 51, since it will be seen that roller 50 is in contact with the lower part of the cam, thereby making possible upward movement of the plunger by the tension exerted by spring 44. With the plunger in its uppermost position the lower end of bore 33 is in communication with the fountain. As the water level in the fountain is above the lower end of the plunger, water will rise within said bore and fill the passage 35. Continued rotation of cam 51 will bring the lower part of the cam in alignment with roller 60, thereby resulting in upward movement of plunger 38 to the extent permitted by the adjusting screw 56. Upward movement of the plunger will result in drawing water within the recess 34. It will be observed that this upward movement of the plunger filling the lower end of the recess 34 with water takes place while the plunger 37 is located in its uppermost position, in which position of the plunger 37 the said recess 34 is in communication with the water in the fountain through the passage 35.

When the shaft 52 has rotated to bring roller 50 into contact with the high portion of the cam 51 the plunger 37 will be forced downwardly, whereupon the passage 35 will have communication with the nozzle 36 through the passage 41 and the longitudinal groove 40. When the roller 60 is actuated by the high portion of the cam, which will take place upon continued rotation of shaft 52, plunger 38 will be forced downwardly to force the water out of recess 34. As described the discharge nozzle 36 is in communication with said recess and the water forced from the recess by downward movement of the plunger 38 will

be delivered to said nozzle to be discharged from the nozzle onto the water roller 20, which is preferably covered with molleton material as shown in Figures 2, 3 and 4.

The metering of the water discharged from the nozzle 36 is accomplished through adjustment of screw 56. This screw limits the upward movement of plunger 38 and thereby determines the capacity of the recess 34. The recess will be entirely filled with water as a result of upward movement of said plunger but the quantity of water within the same will be in proportion to the movement of the plunger. Since plungers 37 and 38 are both actuated by the same cam, their movement occurs in timed relation with each other and the downward movement of plunger 38 will always take place while plunger 37 is located in its lowermost position, since in this position said plunger provides a passage from the recess to the discharge nozzle. The water discharged from the nozzle when the plunger 38 moves downwardly will be predetermined in amount according to the adjustment of screw 56.

The cam shaft 52 and the water roller 20 are rotated out of synchronism with each other so that the water from a nozzle 36 will be delivered to the roller at a different point on its periphery for each revolution. Also, as previously described, the water roller is vibrated, that is, said roller has axial reciprocating movement simultaneously with its rotary movement. The combined result of these operations is to properly distribute the water over those areas on the roller to which it is applied, and since each water supplying device is adjustable for varying the amount of water delivered thereby, certain portions on the water roller can be supplied with more or less water, depending on the requirements of the corresponding portions on the printing plate. In fact, it is possible to restrict the water from certain nozzles to one drop every two or three revolutions of the cam 51 or the screw can be set to entirely shut off the discharge of water from a device. On the other hand, the adjusting screw can be released to allow plunger 38 to move upwardly to its maximum extent, whereby the nozzles will deliver a relatively large quantity of water every revolution of the cam shaft.

After adjustment of the water feeding devices to suit the particular requirements of a printing job the devices will continue to operate for a definite period at the same rate of feed and therefore it is unnecessary for an operator to constantly watch the operation of the mechanism or the moisture condition of the printing plate. Each device is secured to a common support by its fastening means and accordingly the devices are removable individually to permit cleaning and repair and are also shiftable along their support so that certain devices can be grouped closer or spaced farther apart than others. This feature in combination with the metering of the water discharged by each device and the fact that the discharge is supplied to the water roller at a different point on its periphery for each revolution produces a thorough distribution of the water and in addition makes possible select application to suit the most exacting requirements.

The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawings, as various other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. A liquid feeding device for use in dampening mechanism, comprising a body portion having a discharge nozzle, a recess formed in said body portion, a plunger mounted for reciprocation in said recess, and means actuated in timed relation with the movement of said plunger for connecting the recess alternately with a source of liquid supply and with said nozzle, whereby said plunger in one direction of movement fills said recess with water and in the other direction of movement causes said water to be discharged from the nozzle.

2. A liquid feeding device for use in dampening mechanism, comprising a body portion having a discharge nozzle, a recess formed in said body portion, a plunger mounted for reciprocation in said recess, and means actuated in timed relation with the movement of said plunger for connecting the recess alternately with a source of liquid supply and with said nozzle, said plunger having movement in an upward direction when the recess is connected to the source of liquid supply to thereby fill the recess with water and said plunger moving downwardly when the recess is connected with the nozzle to cause the water to be discharged from said nozzle.

3. A liquid feeding device for use in dampening mechanism, comprising a body portion having a discharge nozzle, a recess formed in said body portion, a plunger mounted for reciprocation in said recess, means actuated in timed relation with the movement of said plunger for connecting the recess alternately with a source of liquid supply and with said nozzle, whereby the plunger in one direction of movement fills said recess with water and in the other direction of movement causes said water to be discharged from the nozzle, and adjusting means for varying the reciprocating stroke of said plunger to vary the capacity of said recess and therefore the quantity of water forced therefrom by the plunger and discharged from the nozzle.

4. A liquid feeding device for use in dampening mechanism, comprising a body portion having a discharge nozzle, a recess formed in said body portion, a plunger mounted for reciprocation in said recess, means actuated in timed relation with the movement of said plunger for connecting the recess alternately with a source of liquid supply and with said nozzle, said plunger having movement upwardly when the recess is connected with the source of liquid supply to thereby fill the recess with water and said plunger moving downwardly when the recess is connected with the nozzle to cause said water to be discharged from the nozzle, and adjusting means for varying the reciprocating stroke of said plunger to vary the capacity of the recess and thus the quantity of water forced from the recess and discharged by said nozzle.

5. In dampening mechanism, the combination with a reservoir containing a liquid, of a plurality of liquid feeding devices having operation to discharge a quantity of liquid for each actuation thereof, means on each device for releasably securing the same to a support positioned above and extending the length of said reservoir, the lower end of each said device having an opening therein below the level of the liquid in the reservoir, and each device including a reciprocating plunger pump mounted for movement within a recess and having operation to alternately fill

said recess with liquid and force the liquid therefrom, the said filling operation drawing the liquid from the reservoir through the opening in the lower end of the device and the forcing of the liquid from the recess causing discharge of the same from the device, and means for actuating said reciprocating pump of each device.

6. In dampening mechanism, the combination with a reservoir containing a liquid, of a plurality of liquid feeding devices having operation to discharge a quantity of liquid for each actuation thereof, means on each device for releasably securing the same to a support positioned above and extending the length of said reservoir, the lower end of each said device having an opening therein below the level of the liquid in the reservoir, and each device including a reciprocating plunger pump mounted for movement within a recess and having operation to alternately fill said recess with liquid and force the liquid therefrom, the said filling operation drawing the liquid from the reservoir through the opening in the lower end of the device and the forcing of the liquid from the recess causing discharge of the same from the device, and cam means extending the length of said reservoir for actuating the reciprocating pump of each device.

7. In dampening mechanism, the combination with a reservoir containing a liquid, of a plurality of liquid feeding devices having operation to discharge a quantity of liquid for each actuation thereof, means on each device for releasably securing the same to a support with the lower end of the device immersed in the liquid in the reservoir, each device including a discharge nozzle and a movably mounted plunger forming a pump for the liquid whereby the liquid is withdrawn from the reservoir and discharged through said discharge nozzle, means actuating the said plunger, and other means having actuation in timed relation with said plunger for controlling the withdrawal of the liquid from the reservoir and the delivery of the same to the discharge nozzle.

8. A liquid feeding device for use in dampening mechanism comprising a body portion having an opening in the lower end below the level of the liquid to be fed thereby, a recess in said body portion having communication with said opening, a discharge nozzle extending from the body portion, a plunger mounted for reciprocation in said recess, said plunger forming a pump for the liquid whereby movement in one direction will draw liquid through said opening to fill the recess and movement in the opposite direction will force the liquid therefrom, and a second plunger having reciprocating movement in timed relation with said first mentioned plunger, said second plunger having operation to connect the recess with the discharge nozzle when movement of said first mentioned plunger is in a direction to force liquid therefrom.

9. A liquid feeding device for use in dampening mechanism comprising a body portion having its lower end positioned below the level of the liquid to be fed thereby, a plunger mounted for vertical movement within a recess formed in said body portion to provide a pump for the liquid, a second plunger mounted for vertical movement within a passage extending through the body portion, a discharge nozzle leading from the upper end of said passage and projecting from the body portion, said passage providing an opening below the liquid level and which communicates with the lower end of the recess, whereby liquid may flow from the reservoir into said recess, said second plunger having a groove extending longitudinally thereof, and means reciprocating said second plunger in timed relation with said first mentioned plunger whereby the said plunger in one position of movement will connect the recess with said opening and in its other position of movement will connect the recess with the discharge nozzle.

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