Feb. 11, 1941. B. D. STEVENS 2,231,694

DAMPENING APPARATUS

Filed May 7, 1938 2 Sheets-Sheet 1

Fig. 1.

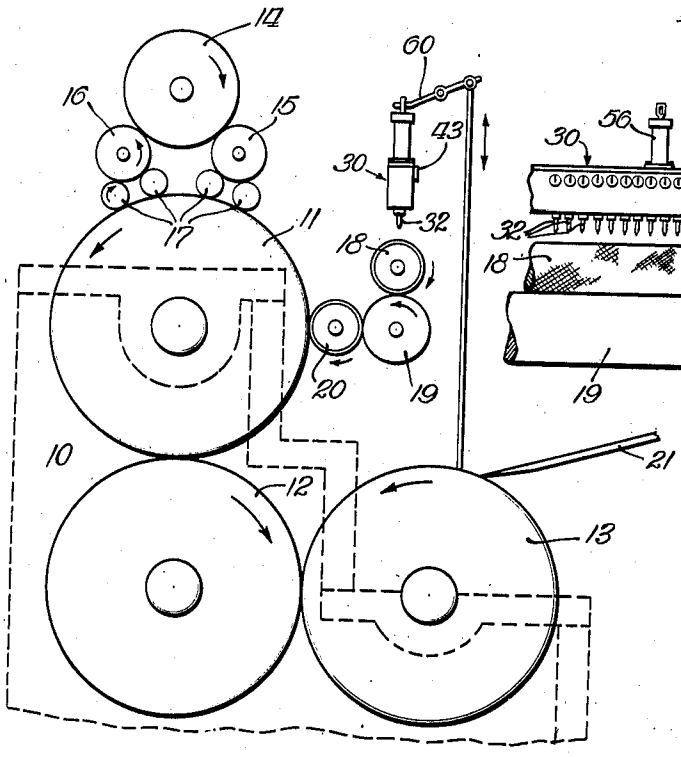

Fig. 2.

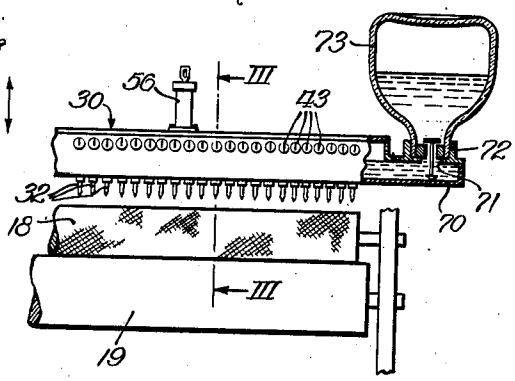

Fig. 5.

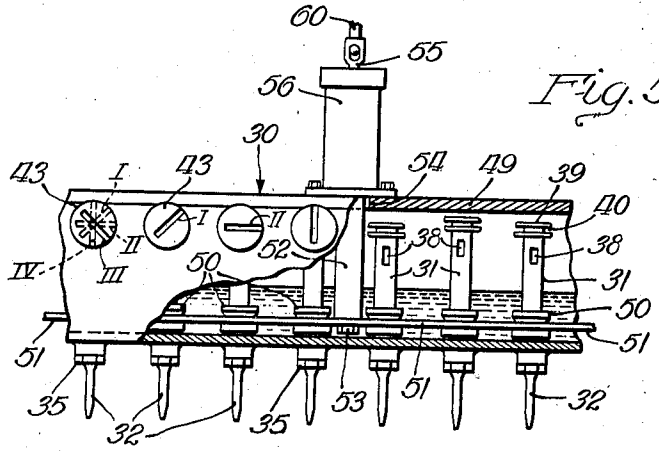

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Fig. 3.

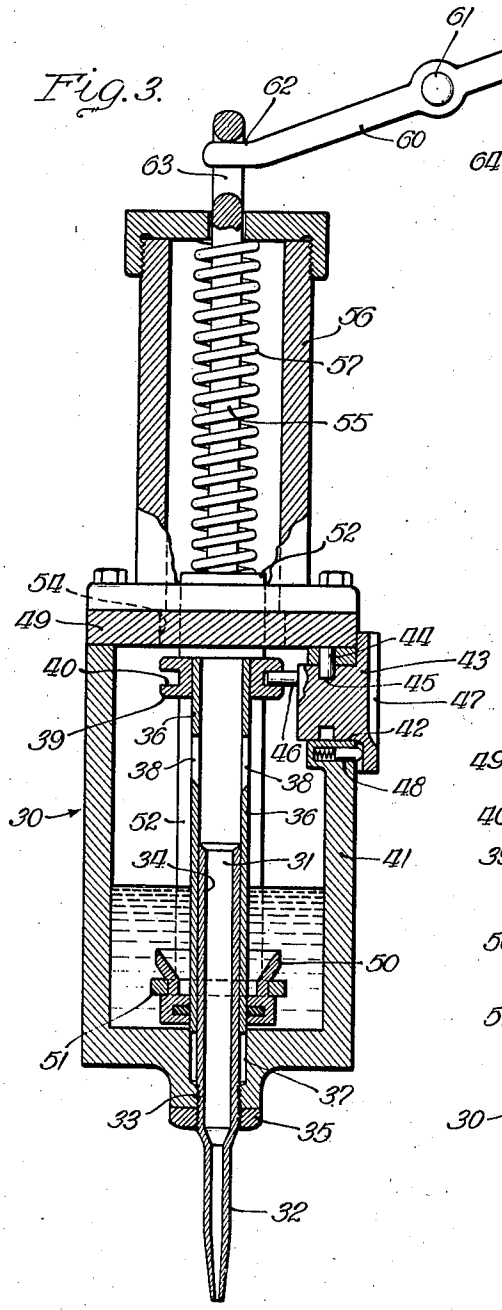
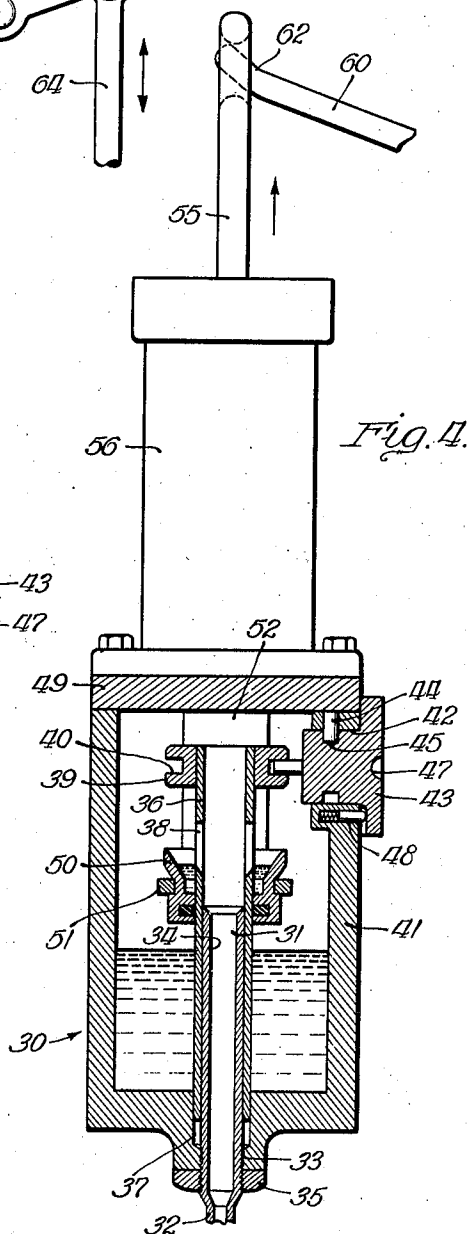


Fig. 4.



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Patented Feb. 11, 1941 2,231,694

UNITED STATES PATENT OFFICE

2,231,694

DAMPENING APPARATUS

Burt D. Stevens, Chicago, Ill., assignor to Miehle Printing Press & Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application May 7, 1938, Serial No. 206,566

1 Claim. (Cl. 101—147)

This invention relates to dampening mechanism for lithographic printing presses and other reproducing apparatus of the planographic class. It has particular reference to dampening devices which will selectively measure and maintain constant the volume of moisture to be supplied to the printing surface of a planographic plate.

In the process of planographic printing, more generally recognized by the trade as lithographic offset printing, it is essential, prior to the inking of the plate, to apply a thin, evenly distributed film of moisture to those parts of the printing plate which are not to receive any ink.

The quantity of moisture used to repel ink from such non-printing parts should be restricted to a minimum, because if the film of moisture is too heavy, then the surface of the plate will become flooded, noticeably so in those areas which represent the solids and darker tones of the subject. In such cases the dampening fluid will spread beyond the non-printing areas and consequently some of the ink that should adhere to the printing image, will be repelled and in part become emulsified with dampening fluid, thereby seriously impairing the quality of the printing to be produced.

In the use of dampening devices heretofore known, it has been found that it is extremely difficult to control and maintain constant the desired volume of dampening fluid during the printing of a job. I refer in particular to such devices which include a water fountain, a fountain roller, usually of metal and arranged to rotate within the fluid in said fountain, a ductor roller covered with material such as molleton and alternately contacting said fountain roller, a distributing or vibrating roller having a metal surface and to which moisture is transferred by said ductor roller, and one or more dampening rollers also covered with molleton and contacting with said distributing roller and the printing plate in order to apply the ink repelling fluid to the latter.

Not only is it difficult with arrangements of this class to control and maintain constant the film of ink to be applied to the printing plate, but other drawbacks are inherent in such devices. For instance, the dampening roller or rolls which, during the printing operation remain in contact with the printing surface, will pick up ink that remains on the plate after an impression has been pulled. Consequently ink eventually becomes transferred through the intermediary of the distributing and ductor rollers to the fountain roller, thereby rendering such rollers unsuitable for the purpose for which they are intended. The resultant clogging with ink of the molleton covered rollers will necessitate interruption of the printing operation in order to replace or recondition the ink saturated rollers and perhaps also to replace the fluid in the fountain because of the ink that has become emulsified with the dampening fluid.

It is therefore one of the main objects of my invention to provide means whereby all of the defects hereinabove referred to shall be eliminated. This I accomplished by an arrangement whereby the film of moisture that is to be applied to the non-printing portions of a planographic printing plate may be reduced to a minimum and can be positively controlled and maintained constant during the productive period of a press.

Another object of my invention resides in the provision of means whereby the required volume of dampening fluid can be predetermined and metered for every printing cycle.

A further object is to provide means which will prevent ink and other impurities from becoming transferred to the fluid in the fountain of the dampening mechanism.

A more specific object is the provision of mechanism whereby the volume of fluid to be supplied to the printing plate can be readily varied while the press is in production to exactly suit each individual job.

A still further object resides in providing a dampening device which will be simple in its construction and convenient to manipulate.

These and other objects will be apparent from the accompanying description, claim and attached drawings which exemplify one preferred embodiment of my invention, and in which drawings:

Figure 1 is a diagrammatic view in side elevation showing the general arrangement of the cylinders and associated parts in a conventional type of planographic offset press to which I have applied my invention;

Figure 2 is a partial, sectional front elevation of the arrangement illustrated in Figure 1, but showing merely those parts which apply more specifically to the dampening mechanism;

Figure 3 is a cross section of one form of device whereby the volume of fluid to be supplied for dampening the printing plate, can be accurately metered, the section being taken along line III—III of Figure 2;

Figure 4 is a view similar to Figure 3 but showing certain parts in different positions; and

Figure 5 is a fragmentary, sectional front elevation of the fluid metering unit.

It shall be understood that while I am going to describe details of one convenient type of liquid supplying device, similar for instance to those disclosed in United States Letters Patents 1,855,516 and 1,874,961 issued to R. J. Gits, wherethe principle of my invention may be carried out, other conventional arrangements for metering fluid, and which are readily available to the trade and quite generally used for dispensing a lubricating fluid for the purpose of applying it to various parts of a machine, may be adopted with equal results and without departing from the basic feature of my invention.

Referring now to Figure 1 of the drawings, the planographic printing press in connection with which I have illustrated my invention merely by way of example, comprises a frame 10 in which are mounted a plate cylinder 11, blanket cylinder 12 and impression cylinder 13. The printing plate which is carried by the cylinder 11 and secured thereto in any well-known manner, is inked by means of a conventional inking mechanism which may include ink distributing rollers 14 to 16 and form rollers 17.

Prior to receiving the ink the plate is dampened for the purpose explained herein. The roller system whereby this is accomplished may comprise a molleton covered roller 18, a vibrating, i. e. distributing roller 19 and one or more dampening rollers 20 which also are covered with molleton or kindred material.

In the operation of a press of this class the ink is transferred from the inked plate to an offset blanket which is stretched over and held secure on the cylinder 12. Sheets to be printed are fed along a feed board 21 to sheet holding elements on the impression cylinder 13. Any well known means, not shown, are provided for registering the sheets prior to being engaged by the holding elements on the impression cylinder. The ink image that has been applied to the blanket cylinder 12 will be transferred i. e. offset onto a sheet as it is carried between the latter cylinder and the impression cylinder 13. The delivery of the printed sheet is then accomplished in the usual way.

The general arrangement of the dampening apparatus which embodies my invention is illustrated in Figure 2. It includes a self-contained, preferably completely closed fountain 30 within which is housed a unit of closely adjacent fluid metering and dispensing device 31, see Figure 5. These may be arranged in a single row, or they can be placed in offset relation to each other so that the fluid dispensing nozzles 32 will be as closely together as possible to thereby assure an even and complete distribution of dampening fluid over the entire surface of the roller 18 and subsequently over the roller or rollers 20.

Concerning the detail construction of the fluid metering and dispensing unit, I indicated herein that any available standard devices may be utilized. In Figure 3 I have shown the cross section of a preferred form of one device of which the unit in the fountain 30 may be made up. The relative arrangement of the series of such devices is more clearly illustrated in Figure 5.

As shown in Figure 3, the bottom plate of the fountain 30 is provided with tapped bores 33 into which are threaded the stationary, inner tubes 34 of the metering and dispensing devices. These tubes may be locked in position by means of a lock nut 35. A second tube 36 is arranged to freely slide over the inner tube 34 so that it may be raised and lowered into different positions, a recess 37 being provided in the bore 33 to accommodate the lower end of the tube 36 when the latter is moved into its extreme lower limit. Near its upper end, the wall of this tube is cut away to form an outlet slot 38 which establishes communication with the open, upper end of the inner tube 34 i. e. dispensing nozzle 32.

The means whereby the tube 36 may be raised and lowered includes a collar 39 with an annular recess 40. In the front wall 41 of the fountain there are provided a series of bores 42, one for every metering device. Each one of these bores retains an adjusting knob 43 which is free to rotate within the bore and held in position by means of a pin or key 44 engaging an annular groove 45 in said knob. Parallel to its axis and projecting from near the periphery of the inner face of the knob 43 is a pin 46 which engages the annular groove 40 in the collar 39. The front face of the adjusting knob is formed with an axial slot 47 which, however, does not extend across the entire width of the front face, see Figures 3, 4 and 5, for reasons that will become apparent later.

The adjusting knob 43 may be held in its various positions by means of a spring actuated friction pin 48 engaging corresponding notches formed in said knob.

For metering the fluid that is to be fed to the roller 18, I propose to use a series of cups 50 which are normally submerged in the fluid within the fountain 30. One of such cups is associated with each one of the metering devices and they are all mounted on a bar 51 which extends lengthwise within the fountain. In order to raise and lower said bar, and therewith the cups 50, I provide a plunger 52 which is bolted at 53 to the bar 51, see Figure 5, and extends upwardly through a bore 54 in the cover plate 49 of the fountain 30. At its upper end the plunger 52 is provided with a stem 55 which extends through a housing 56 bolted to the cover plate 49 or otherwise secured to the fountain. The plunger 52 is urged downwardly by means of a compression spring 57 which embraces the stem 55. Said plunger may of course be actuated in any suitable manner either by separate driving mechanism or by a moving part of the press. I have illustrated in Figures 1 and 3 one preferred, simple way of transmitting motion to the plunger 52, namely by means of a bell crank lever 60 which is pivoted at 61. The end 62 of said lever engages within a slot 63 provided at the upper end of the stem 55, while the free end of the other arm of the lever 60 is pivoted to a connecting rod 64 which extends downwardly and is attached to any moving part of the press whereby reciprocating motion will be imparted to said rod in proper timed relation.

It is preferable of course to provide some means whereby the level of the fluid in the fountain 30 is kept substantially constant. For that purpose the fountain is formed at one end with an extension 70, see Figure 2, which is reduced in height so that its cover plate is substantially in line with the contemplated level of the fluid. Said extension 70 is formed with an opening 71 and an annular recess 72 to receive a container 73 such as are widely used for the purpose of maintaining the level of a liquid in a tank or the like constant.

It will be evident from the aforesaid that with the fluid metering and dispensing means de-

scribed, the volume of substance that is to be applied to the roller 18, can be accurately predetermined and maintained constant throughout the printing of a job. Each individual metering device can be independently adjusted so that the volume shall be varied gradually from nil to the maximum volume of fluid that the cups 50 can retain. This is readily accomplished by inserting a flat piece of metal into the slot 47 in the face of the knob 43 and then turn the latter to the desired position. When the open part of the slot 47 points upwardly as shown in Figure 3, then the supply of fluid will be nil. By turning the knob into different positions I, II, III or IV the volume of fluid to be dispensed by the nozzles 32 will vary correspondingly, it being the maximum when the open end of the slot points down, namely in position IV. As more clearly shown in Figure 5, the location of the outlet slot 38 in the tube 36 will vary according to the extent the knob 43 is turned, and therefore the volume of fluid to be emptied from the cups 50 into the slots 38, when the plunger 52 is brought into its uppermost position, will vary correspondingly, see Figures 4 and 5.

I have indicated herein that any suitable metering devices, other than the type described above, may be used for the purpose of carrying out my invention without departing from its basic principle; therefore, I wish it to be understood that it is my intention to cover any modifications in the general arrangement of my scheme that will come within the scope of the appended claim.

I claim:

In dampening apparatus for planographic printing presses or the like, the combination of a set of fluid distributing rollers, a fluid feeding unit comprising fluid expelling devices arranged to supply dampening fluid to one of said rollers, metering elements associated with said devices for selectively determining the volume of fluid to be supplied to different portions of said rollers, means to adjust said metering elements, means to actuate said expelling devices at predetermined intervals to supply measured volumes of fluid, and means for maintaining the fluid in said unit at a constant level.

BURT D. STEVENS.