May 7, 1935. A. J. HORTON 2,000,518

LITHOGRAPHIC PRINTING MACHINE

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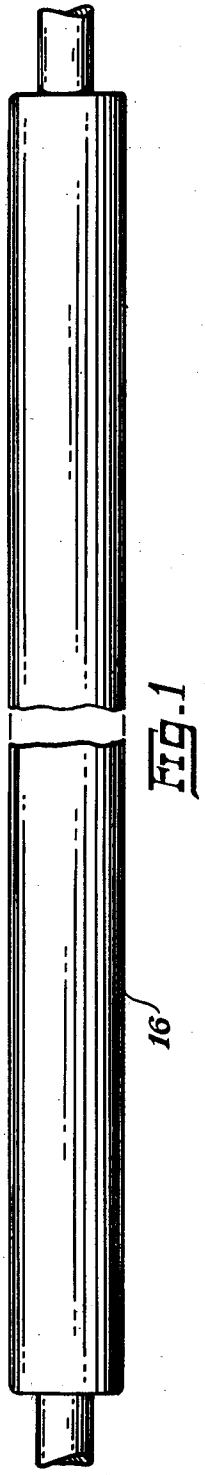

Fig. 1

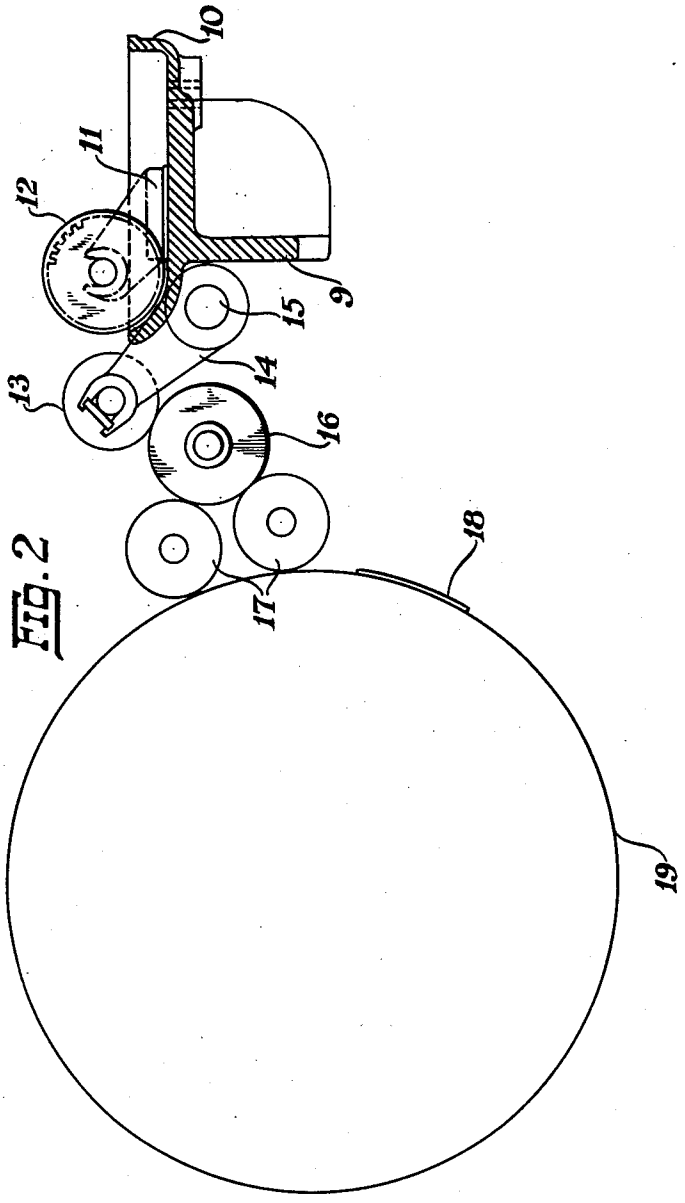

Fig. 2

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LITHOGRAPHIC PRINTING MACHINE

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4 Claims. (Cl. 101—148)

This invention relates in general to improvements in lithographic mechanism, having for an object the provision of an improved method and means for dampening printing plates.

Another object is to provide an improvement in dampening mechanism for lithographic printing machines which will convey an equally distributed amount of moisture from the water fountain to the dampening rollers, and consequently, to the printing plates.

A further object is to provide in a rotary lithographic press, distributing and fountain rollers of a special material particularly designed and constructed for longer life, greater strength and rigidity, and particularly adapted to be moistened easily and retain moisture uniformly while preventing the tendency prevalent in conventional rollers towards the formation of drops of liquid and dry patches or places on the distributing and carrying rollers resulting in a condition unfavorable to satisfactory lithographic printing.

A still further object is the provision of novel distributing and fountain rollers of a special non-corrodible material particularly adapted to be ground, sand-blasted, or otherwise given a desired finish or grain best suited to be uniformly moistened and for uniformly transferring moisture from their surfaces to coacting rollers, while highly resistant to taking on in use, a gloss or polished surface characteristic of softer metals.

It is also an object of the invention to provide a lithographic roller of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

In the lithographing art, it has been customary to employ moisture distributing rollers made of brass and printing plates formed of aluminum or zinc. The water or desensitizing solutions customarily employed for the purpose of moistening or dampening the said printing plates, frequently has a corrosive or oxidizing effect on the distributing and fountain rollers which are moistened with or immersed in the said solution. The corrosive action or a change in the surface due to operation, it would appear, results in the formation of a surface condition prejudicial to satisfactory lithographic printing. Under these circumstances it has been found that the surface of the distributing roller and of the fountain roller may be dry in spots, with a tendency towards the formation of drops of liquid thereon, rather than have a film of moisture uniformly distributed thereover.

Although under some conditions the action of electrolysis will hasten the corrosion of the rollers heretofore used, particularly when strong acidulous or alkaline dampening solutions are employed, there is also a tendency for the rollers in general use to acquire a surface on which the moisture is not evenly distributed, the moisture forming in patches with dry areas between them on which ink adheres. This results in an uneven distribution of moisture on the surface of the printing plate and in order to insure that sufficient moisture is provided for all parts of the printing plate it is necessary to feed a greater amount of moisture than is required. This results in feeding excess moisture to some portions of the plate, and as is well known, excess moisture acts to dilute the ink, and solid colors in the printing will show streaks of lighter color. With the roller disclosed herein, an even film of moisture is maintained on its surface and it has been found that the quantity of water delivered by the fountain roller to the ductor can be greatly decreased, thus avoiding feeding of excess moisture to some parts of the plate in order to insure that sufficient is fed to all parts.

The phenomenon of surface tension also has been found to play an important part in the tendency of liquids to diffuse themselves over a surface, it being observed that the slightest impurity or dissolved substance changes the surface tension of the liquid. Brass, as is well known, is particularly susceptible to slight corrosion under ordinary or atmospheric conditions and it has been found that a comparatively slight and sometimes almost imperceptible corrosion will play an undue part in the way of a non-uniform distribution of the dampening liquid over the said distributing and fountain rollers when this metal is used.

Aluminum rollers have also been used, but it has been found that the acids commonly used in the moistening fluid have a deleterious effect on them and in time their surface becomes roughened, resulting in imperfect moisture distribution to the plate.

From actual experience over an extended period, it has been found that the difficulties due to corrosion of the distributing or fountain rollers either by the liquids employed or by oxidation due to ordinary atmospheric conditions can be avoided without the necessity of making them of the same metal as the printing plates as has been suggested for the purpose of avoiding electrolytic action, the desired avoidance of corrosion being effected by the means employed in the

present invention, in a manner that will lend itself to practically any type of lithographic mechanism employing printing plates, which latter may be of any desired metal or alloy conventional in the art.

Briefly, the present method and means broadly contemplates the use of distributing and fountain rollers formed of a practically non-corrodible metal preferably ferrous, with which printing plates of any conventional or desired composition of metal may be used. In carrying the invention into practice rustless iron or so-called stainless steel is employed as a material admirably adapted to yield the desirable results pointed out above. So far as applicant is aware rustless iron or stainless steel has never hitherto been employed for use with printing machines or more particularly, as a material for moisture distributing and water fountain rollers.

Regardless of the material of the printing plates, the moisture distributing and water fountain rollers, if made of the rustless iron or steel indicated, will remain uncorroded in the presence of the water or dampening fluid employed, and in addition will retain their surface as originally finished over a far longer period of time than is possible with softer metals.

In accordance, therefore, with the present invention, a distributing roller of rustless iron or ferro-chorimum alloy is provided, and preferably a water fountain roller made of the same material. If desired the body portion alone may be composed of rustless iron while the shaft and journals may be composed of ordinary iron or steel. The surface of the said ferrous alloy roller, or the body portion thereof, is prepared to a "mat" finish or finished in a manner most favorable to being moistened and not to a glass finish or polish or a point of fineness where the water or dampening fluid has a tendency to form globules.

The surface of the above-mentioned rustless ferrous alloy roller, after being finished, when viewed through a microscope, presents the appearance of a surface having minute pits or indentations distributed with great uniformity and regularity of spacing. These microscopic and evenly distributed pits or indentations serve to facilitate the uniform diffusion of liquid applied thereto and to prevent the formation of drops or globules of liquid which a surface too rough or too polished is prone to occasion. Furthermore, the surface of this ferrous alloy roller, although in daily use, will be found to be in large measure free of the impurities, by reason of its non-corrodible and rust-proof character, so frequently occurring with the conventional rollers in common use.

The preferred embodiment of the invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a plan view of a distributing or carrying roller embodying my invention;

Figure 2 is a diagrammatic view, partly in section, of such parts of a lithographic printing machine, as will suffice to an understanding of the invention.

With more particular reference to the drawing wherein similar characters of reference indicate corresponding parts in the views, the numeral 9 designates a frame member forming a part of a lithographic printing machine on which is secured or formed integrally therewith, a tray or fountain 10 adapted to contain water or the usual dampening solution composed of acidulated water. Rotatably mounted in the tray 10 on bearing brackets 11 secured to the frame member 9, is a fountain or carrying roller 12 which, in accordance with the present invention, is formed of rustless iron or stainless steel, preferably ground, sand-blasted, or otherwise finished with a grained or mat surface, best adapted to uniformly take-up and convey liquid from the tray 10, the said fountain roller 12 being coactingly and intermittently engaged by a ductor roller 13 revolvably mounted on arms 14 secured to a rocking shaft 15. A material or alloy employed for the body portion of the fountain roller 12, which has been found to yield the desirable results indicated above has the following percentage composition:

	Percent
Carbon	less than .10
Manganese	less than .40
Silicon	less than .50
Sulphur	less than .03
Phosphorous	less than .03
Chromium	16.00 to 18.00
Iron	80.00 to 83.00

The ductor roller 13, which is moistened by the fountain roller 12, is also adapted to intermittently or periodically engage a revolvably mounted distributing roller 16 the body portion of which is formed, as an important feature of the invention, of the ferrous alloy indicated above, the said distributing roller being in engagement with a pair of dampening rollers 17, which bear constantly against a printing surface of, or a plate 18 secured on, the plate cylinder 19.

It will be understood that when the machine is in operation, the ductor roller 13, which is generally covered by a fabric, will oscillate back and forth between the fountain roller 12 and the distributing roller 16, thus carrying or transferring water or desensitizing liquid from the tray 10 to the distributing roller 16, the grained surface of the latter being dampened thereby, but almost immediately dried by contact with the absorbent covering of the dampening rollers 17 with which it is in constant engagement, the latter rollers 17 being also engaged with the printing cylinder 19 or a printing plate 18 thereon.

The physical characteristics of the rollers 12 and 16, by reason of their uniformly finished surfaces and their proof against corrosion, are such as to insure a comparative freedom from surface imperfections arising from oxidation and other corrosion, and also to assure a very uniform distribution of liquid applied to their surface.

Hitherto the use of iron or steel as a material for lithographic rollers was impractical owing to the proneness of such material to corrosion by the water or desensitizing solutions employed. As now, indicated, however, rustless iron or stainless steel not only permits the use of a roller having all the natural advantages inherent in ordinary iron and steel, so far as maximum strength, rigidity and long life are concerned, but by reason of its chromium content and other constituents it is particularly adapted to be ground to and retain the desired or mat finish, and above all, has the superlative non-corrodible characteristic mentioned above which renders it superior to any other material yet employed for distributing and fountain rollers.

The composition of the alloy described above may be varied somewhat without materially altering its properties so far as resistance to corro-

sion by the solutions and reagents ordinarily employed are concerned.

For example, the chromium content may be reduced to 12 or 14 percent or increased to 25 or 30 percent, with the rest of the ingredients in the same proportion and the iron content increased or decreased in an amount corresponding to the decrease or increase in chromium. Nickel may be employed in the alloy also in amounts varying from a trace to 10% without substantially altering the corrosion-resisting properties of the alloy to ordinary reagents or solutions employed in lithographic printing.

None of the solutions employed for the purpose of moistening the dampening rollers of a lithographic machine or encountered in daily life have the slightest corrosive effect on the ferrous alloy rollers employed in mechanism constructed in accordance with the present invention.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In a dampening mechanism for a lithographic printing machine, a distributing roller and a fountain roller, both of said rollers being formed of rustless ferrous alloy and having their exterior surfaces grained to a mat finsh.

2. In a dampening mechanism for a lithographic printing machine, a distributing roller formed of a non-corrodible ferrous alloy having approximately the following composition:

	Percent
Carbon	less than .10
Manganese	less than .40
Silicon	less than .50
Sulphur	less than .03
Phosphorous	less than .03
Chromium	16.00 to 18.00
Iron	80.00 to 83.00

3. A dampening roller for a lithographic printing machine formed of a ferrous alloy commonly known as rustless iron or stainless steel having a molecular structure which adapts it to receive a durable grained finish, and having an affinity for the moistening solutions commonly employed in lithographic printing; whereby when its surface is so moistened it is repellent to ink.

4. A dampening roller for a lithographic printing machine formed of a ferrous alloy commonly known as rustless iron or stainless steel having a characteristic twin or parallel grain molecular structure which adapts it to receive a durable mat finish, and having an affinity for the moistening solutions commonly employed in lithographic printing; whereby when its surface is so moistened it is repellent to ink.

ALBERT J. HORTON.