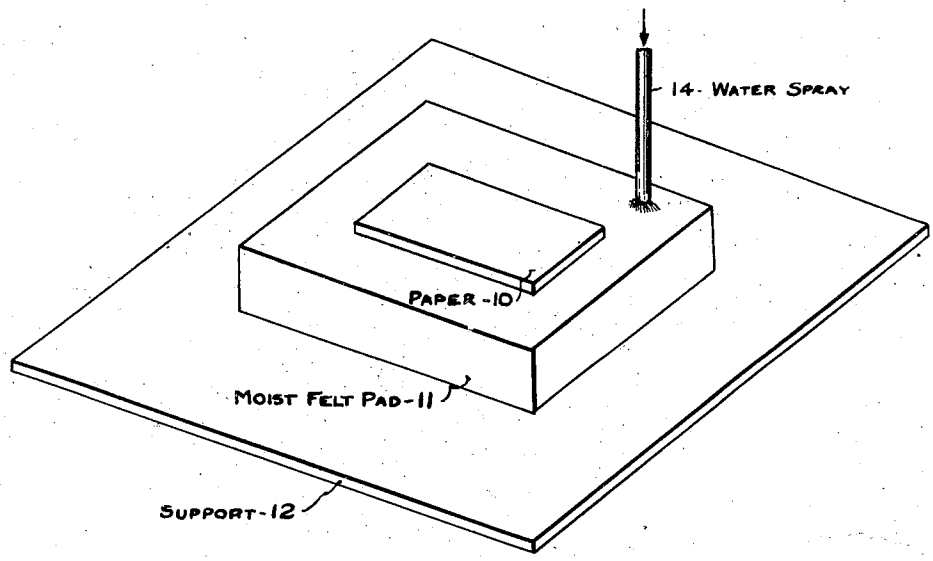
Jan. 22, 1946. E. JAHODA ET AL 2,393,378

PRINTING PROCESS

Filed Oct. 30, 1944



INVENTORS
Edward Jahoda &
Carlos Wittenmyer

BY
Daniel G Bullen

Patented Jan. 22, 1946 2,393,378

UNITED STATES PATENT OFFICE

2,393,378

PRINTING PROCESS

Edward Jahoda, Detroit, and Carlos Wittenmyer, Mount Clemens, Mich., assignors to Walter M. Fuchs, Detroit, Mich.

Application October 30, 1944, Serial No. 560,950

1 Claim. (Cl. 101—149.2)

This application relates to the art of printing, using the ferrogelatin printing process.

In that process, an original whose image lines contain a primary chemical, such as potassium dichromate, is caused to engage a moist ferrogelatin coated plate, the coating being sensitized by the inclusion herein of a secondary chemical, such as ferrous sulphate. The contact of the original image with the ferrogelatin coating causes the engaged portions of the ferrogelatin coating to be chemically affected superficially, that is, only on the surface, to form, against the unaffected parts of the ferrogelatin coating, which remain soft or unhardened, a superficial image whose lines are oxidized or dulled or hardened. The hardening which forms the image is merely superficial, but is sufficient to have a greater affinity for greasy printers' ink than the background which, when sufficiently moist, has no such affinity.

It is known that, in printing with a ferrogelatin coated plate so affected by an original image, hereafter known as a printing plate, it is desirable to keep the gelatin coating surface moist, that is, to maintain what is technically called a "water balance" for such surface.

One way of maintaining such water balance is to provide a high humidity for the room. This has obvious disadvantages, but is an accepted practice.

Another way of maintaining water balance, is to apply water to the printing surface by spraying or otherwise wetting it directly. This is not desirable, because it has been discovered that when water is applied directly to the printing surface, it has a tendency to spread unevenly, and also to emulsify with the ink.

A third way is to load the gelatin with a hygroscopic material such as glycerine. This is also undesirable since glycerine coated materials are difficult to handle and store.

In commercial practice, particularly where thick gelatin coatings are spread on a supporting table in a humid room, it is common practice to scrape off or otherwise remove the gelatin coating fairly frequently and to spread new and fresh coatings. This has obvious disadvantages but it has been accepted as part of the practice in this art.

The present invention is directed to solving the problem of maintaining water balance, now encountered in the art of printing by the ferrogelatin process. Briefly, it may be characterized as wetting the back of the printing plate, the moisture passing through the plate to the printing surface. This way of maintaining water balance is extremely effective and desirable. Using this way, it is unnecessary to control the humidity of the room in which the printing is being done, nor is it necessary to wet the printing surface from the front, and run the risk of emulsifying the ink.

The present invention may be practiced by providing, as the printing plate, a thin sheet of water absorbent wet strength paper, coated with gelatin and laid down on a wet felt pad. The paper sheet provides an economical, renewable, inexpensive to discard, stable, printing plate, which is not only superior to presently known plates because it may be wetted from the back, but in addition, can be renewed quickly, inexpensively, and very conveniently, after its gelatin coating has had its effectiveness destroyed by the chemical changes which have taken place in it during the printing operation.

A printing plate developed for practicing the invention hereof is disclosed diagrammatically in the appended drawing.

The plate shown comprises a sheet 10 of water absorbent, dimension retaining, wet strength paper, coated on its upper surface with gelatin, and disposed upon a thick wet felt pad 11 in turn supported on a table top 12. Moisture supply for the pad is indicated diagrammatically by the water spray 14, which is merely an arrangement for maintaining the pad 11 continuously moist.

The printing plate 10 is an effected sheet of wet strength or saturating paper, coated on its upper surface with gelatin. It can be manufactured to be sold perfectly dry, in cut sheets or rolls, and is perfectly stable under ordinary storing and handling conditions. It is economical, easy to make, and easy and satisfactory to use.

The printing plate hereof may be and preferably is free of glycerine since it is not required to be hygroscopic, for it is not intended that the water balance for the gelatin surface be maintained by absorption of moisture from the air, but rather it is intended that the water balance be maintained by the transfer of moisture from the felt pad 11, through the printing plate itself, to the printing surface. Thus the printing plate hereof is far less affected by storing and handling conditions than plates containing glycerine in which water balance is maintained by the hygroscopic action of the glycerine.

The paper functions as a moisture transfer medium, to transfer moisture from the source, namely the felt pad 11, to the gelatin surface,

and thus is required to be of a character that retains its strength during the moisture transfer. For this purpose, it might well be any well known wet strength or saturating or absorbent paper. One paper that has been found suitable is a paper obtained from the Brown Paper Company, and known as "No. 201 Aqualized Kraft." Saturating Tissue, such as is sold by the Process Manufacturing Company, of Chicago, Illinois, has been found satisfactory. Vegetable parchment papers have also been found satisfactory.

The paper need not have any capacity for storing moisture, since only its moisture transfer characteristic is relied upon to maintain the water balance.

With gelatin, the usual plasticizers, hardeners, fillers, etc., all well known to the art, may be and preferably should be incorporated within the coating.

Though the gelatin coating is to be utilized in the ferrogelatin process, it need not be originally formed with the secondary chemical of that process, ferrosulphate or its equivalent. Instead, the gelatin may be plain, but it will be sensitized or activated, just before it is engaged by the original, by dampening or moistening it with a ferrosulphate solution. This may be done from the front or the back. Thereafter, the moisture balance for printing is maintained by the transfer of moisture through the printing plate from the back, where the printing plate is in contact with the wet felt pad. While it is contemplated to apply the sensitizing solution from the front, it is, of course, obvious that if desirable, it also might be applied from the back, but except in so far as the sensitizing is a moistening step, this is not particularly important.

While felt has been used and found satisfactory for pad 11, it is apparent that from the point of view of moistening the back of the printing plate, other forms of supports or pads for the plate 10 might well be used. For example, instead of a pad of felt, the support 11 might well be porous plaster block, or a porous synthetic block of any suitable character.

It has been found that maintaining the water balance for printing in the manner here described, by transfer through the printing plate from the back to the printing surface, is better than any presently known method of maintaining water balance. With gelatin, moisture transferred to it through the paper is molecularly and evenly absorbed by the gelatin, with no excess, and without drops of water on the surface, and consequently, there is no tendency for the printing ink to spread or emulsify with water.

Further, it has been found that where it is attempted to wet the affected printing plate from the front, great skill, complicated apparatus, considerable time, frequent interruption of production, are required, and even under the best of operating conditions and performances, unevenness of distribution of the moisture occurs, with the result that the ink spreads, or emulsifies, and the unaffected or unhardened or background portions of the gelatin swell unevenly around the chemically affected or hardened or image portions of the gelatin to cause hills and valleys on that coating, and reproduction is not so satisfactory. Where there is evenness of distribution of the moisture, either no swelling of the unhardened gelatin background takes place, or else the swelling of the unaffected or unhardened gelatin is accompanied by a similar swelling of the chemically affected or hardened gelatin image. Where the moisture passes through the paper, entering from the back, as in the present case, the undesirable conditions and factors are eliminated, and, with less difficulty, better reproduction is obtained.

If desired, the paper may be supplied with wetting agents, having a tendency to increase the absorption and transfer qualities of the paper. These agents might be applied to the paper during the manufacture of the paper, or might be incorporated in the wetting solution.

The present invention is of particular value where gelatin coatings are thin, as for example, where the gelatin is in the form of a thin coating, applied to paper, and stored dry. With such plates, the wetting and maintaining of water balance is a far more delicate operation, and yet is far more important, than under conditions where thick gelatin coatings, frequently renewed, are used in humidity controlled rooms.

Now having described the art of printing herein disclosed, reference should be had to the claim which follows:

We claim:

In the art of printing with moisture repelled, greasy, printers' ink with a non-hygroscopic gelatin surfaced thin water absorbent wet strength paper printing plate having a superficial printing image of hardened gelatin on and surrounded by an unhardened ferrogelatin background, the image having been produced on the background by surface contact thereof with an original image containing a primary chemical which reacts superficially with the ferrogelatin background to harden the engaged portions thereof to form the superficial hardened image, so that there is unhardened gelatin underlying the image area as well as surrounding it, the step of feeding moisture to the plate from the back thereof, so that the moisture passes through the plate to the printing surface thereof, thus maintaining the water balance therefor, and also maintaining a constant minimum differential of level of the image and non-image areas.

EDWARD JAHODA.
CARLOS WITTENMYER.